

**From:** [Woolley, Lillian](#)  
**To:** [EGLE-ROP](#)  
**Cc:** [Conklin, Michael \(EGLE\)](#); [Thomas J. Skewis](#)  
**Subject:** P0668 - ROP Renewal Application  
**Date:** Wednesday, December 20, 2023 3:06:05 PM  
**Attachments:** [P0668 ROP Renewal Application.pdf](#)  
[3 P0668 Final mark up.docx](#)

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**CAUTION: This is an External email. Please send suspicious emails to [abuse@michigan.gov](mailto:abuse@michigan.gov)**

Attached you will find an electronic copy of the Marquette Energy Center ROP Renewal Application (P0668). Files included in the pdf file include: a) the ROP Renewal Application Forms and b) an ROP Mark-up c) a CAM Plan (as this is the first renewal) and d) the approved PM/MAP. Since a word copy of the ROP mark-up is required, a word copy is also attached. It does not includes changes to the existing emission units but adds a section for the gasoline storage tank subject to the area source GACT. We have mailed a signed hard copy of the application – we understand that the ROP Renewal cannot be considered administratively complete without a hard copy including an original signature. Once you have received the hard copy – please let me know if you have any questions.

Happy Holidays!

**Lillian L. Woolley, PE | Senior Chemical Engineer**  
Fishbeck | w: 248.324.4785 | c: 586.489.6876 | [Fishbeck.com](http://Fishbeck.com)



# BOARD OF LIGHT AND POWER

CITY OF MARQUETTE  
2200 WRIGHT STREET  
MARQUETTE, MI 49855-1398

PHONE 906-228-0313  
FAX 906-228-0329  
PLANT FAX 906-228-0359

THOMAS R. CARPENTER  
EXECUTIVE DIRECTOR

December 21, 2023

Mr. Michael Conklin  
Upper Peninsula District  
Air Quality Division  
Michigan Department of Environment, Great Lakes and Energy (EGLE)  
1504 West Washington Street  
Marquette, MI 49855

Re: Renewable Operating Permit (ROP) Renewal Application  
Marquette Board of Light & Power – Marquette Energy Center (P0668)

Dear Mr. Conklin:

Fishbeck has prepared an ROP renewal application for MI-ROP-P0668-2019 for the Marquette Board of Light & Power (MBLP), Marquette Energy Center (MEC) located in Marquette Michigan. The renewal application is due no later than April 1, 2024.

This application includes:

- EGLE ROP Application Form EQP 6000
- EGLE ROP Application Additional Information Form AI-001
- A marked-up copy of MI-ROP-P0668-2019 (no changes were made)
- A CAM Plan and copy of the approved PM/MAP

An electronic copy of the application and supporting documents will be provided to EGLE, which reduces the EGLE application administrative completeness review to 15 days.

If you have any questions or require additional information, please feel free to contact me at (906) 225-8670 or [Tskewis@mblp.org](mailto:Tskewis@mblp.org).

Sincerely,

Thomas J. Skewis  
Utility Compliance  
Marquette Board of Light & Power

**dmg**  
By email and UPS

cc: Lillian L. Woolley, PE - Fishbeck



## RENEWABLE OPERATING PERMIT RENEWAL APPLICATION FORM

*This information is required by Article II, Chapter 1, Part 55 (Air Pollution Control) of P.A. 451 of 1994, as amended, and the Federal Clean Air Act of 1990. Failure to obtain a permit required by Part 55 may result in penalties and/or imprisonment. Refer to instructions for additional information to complete the Renewable Operating Permit Renewal Application Form.*

### GENERAL INSTRUCTIONS

This application form should be submitted as part of an administratively complete application package for renewal of a Renewable Operating Permit (ROP). This application form consists of nine parts. Parts A – H must be completed for all applications and must also be completed for each section of a sectioned ROP. Answer all questions in all parts of the form unless directed otherwise. Detailed instructions for this application form can be found at <http://michigan.gov/air> (select the Permits Tab, “Renewable Operating Permits (ROP)/Title V”, then “ROP Forms & Templates”).

### PART A: GENERAL INFORMATION

Enter information about the source, owner, contact person and the responsible official.

#### SOURCE INFORMATION

SRN P0668	SIC Code 4911	NAICS Code 221112	Existing ROP Number MI-ROP-P0668-2019	Section Number (if applicable)
Source Name MBLP, Marquette Energy Center				
Street Address 2200 Wright Street				
City Marquette	State MI	ZIP Code 49855	County Marquette	
Section/Town/Range (if address not available)				
Source Description The Marquette Energy Center (MEC) generates electricity for the City of Marquette and surrounding areas using three Wartsila 18V50DF dual fuel-fired reciprocating internal combustion engines.				
<input type="checkbox"/> Check here if any of the above information is different than what appears in the existing ROP. Identify any changes on the marked-up copy of your existing ROP.				

#### OWNER INFORMATION

Owner Name	Section Number (if applicable)			
Mailing address ( <input type="checkbox"/> check if same as source address)				
City	State	ZIP Code	County	Country

Check here if any information in this ROP renewal application is confidential. Confidential information should be identified on an Additional Information (AI-001) Form.

SRN: P0668	Section Number (if applicable):
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**PART A: GENERAL INFORMATION (continued)**

At least one contact and responsible official must be identified. Additional contacts and responsible officials may be included if necessary.

**CONTACT INFORMATION**

Contact 1 Name Thomas Skewis		Title Utility Compliance		
Company Name & Mailing address ( <input checked="" type="checkbox"/> check if same as source address)				
City	State	ZIP Code	County	Country
Phone number		E-mail address tskewis@mblp.org		

Contact 2 Name (optional) Lillian Woolley, PE		Title Senior Chemical Engineer		
Company Name & Mailing address ( <input type="checkbox"/> check if same as source address) 39500 Mackenzie Drive, Suite 100				
City Novi	State MI	ZIP Code 48377	County Oakland	Country United States
Phone number 586.489.6876		E-mail address llwoolley@fishbeck.com		

**RESPONSIBLE OFFICIAL INFORMATION**

Responsible Official 1 Name Thomas Carpenter		Title Executive Director		
Company Name & Mailing address ( <input checked="" type="checkbox"/> check if same as source address)				
City	State	ZIP Code	County	Country
Phone number		E-mail address Tcarpenter@mblp.org		

Responsible Official 2 Name (optional)		Title		
Company Name & Mailing address ( <input type="checkbox"/> check if same as source address)				
City	State	ZIP Code	County	Country
Phone number		E-mail address		

<input type="checkbox"/> Check here if an AI-001 Form is attached to provide more information for Part A. Enter AI-001 Form ID:
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**PART B: APPLICATION SUBMITTAL and CERTIFICATION by Responsible Official**

Identify the items that are included as part of your administratively complete application in the checklist below. For your application to be complete, it must include information necessary to evaluate the source and to determine all applicable requirements. Answer the compliance statements as they pertain to all the applicable requirements to which the source is subject. The source's Responsible Official must sign and date this form.

**Listing of ROP Application Contents. Check the box for the items included with your application.**

<input checked="" type="checkbox"/> Completed ROP Renewal Application Form (and any AI-001 Forms) (required)	<input type="checkbox"/> Compliance Plan/Schedule of Compliance
<input checked="" type="checkbox"/> Mark-up copy of existing ROP using official version from the AQD website (required)	<input type="checkbox"/> Stack information
<input checked="" type="checkbox"/> Copies of all Permit(s) to Install (PTIs) that have not been incorporated into existing ROP (required)	<input type="checkbox"/> Acid Rain Permit Initial/Renewal Application
<input checked="" type="checkbox"/> Criteria Pollutant/Hazardous Air Pollutant (HAP) Potential to Emit Calculations <b>AI-PTE</b>	<input type="checkbox"/> Cross-State Air Pollution Rule (CSAPR) Information
<input type="checkbox"/> MAERS Forms (to report emissions not previously submitted)	<input type="checkbox"/> Confidential Information
<input type="checkbox"/> Copies of all Consent Order/Consent Judgments that have not been incorporated into existing ROP	<input checked="" type="checkbox"/> Paper copy of all documentation provided (required)
<input checked="" type="checkbox"/> Compliance Assurance Monitoring (CAM) Plan	<input checked="" type="checkbox"/> Electronic documents provided (optional)
<input checked="" type="checkbox"/> Other Plans (e.g., Malfunction Abatement, Fugitive Dust, Operation and Maintenance, etc.) <b>AI-PM/MAP</b>	<input type="checkbox"/> Other, explain: <b>AI-CAM</b>

**Compliance Statement**

This source is in compliance with all of its applicable requirements, including those contained in the existing ROP, Permits to Install that have not yet been incorporated into that ROP, and other applicable requirements not currently contained in the existing ROP.

Yes  No

This source will continue to be in compliance with all of its applicable requirements, including those contained in the existing ROP, Permits to Install that have not yet been incorporated into that ROP, and other applicable requirements not currently contained in the existing ROP.

Yes  No

This source will meet in a timely manner applicable requirements that become effective during the permit term.

Yes  No

The method(s) used to determine compliance for each applicable requirement is/are the method(s) specified in the existing ROP, Permits to Install that have not yet been incorporated into that ROP, and all other applicable requirements not currently contained in the existing ROP.

If any of the above are checked No, identify the emission unit(s) or flexible group(s) affected and the specific condition number(s) or applicable requirement for which the source is or will be out of compliance at the time of issuance of the ROP renewal on an AI-001 Form. Provide a compliance plan and schedule of compliance on an AI-001 Form.

**Name and Title of the Responsible Official (Print or Type)**

Thomas Carpenter, Executive Director

***As a Responsible Official, I certify that, based on information and belief formed after reasonable inquiry, the statements and information in this application are true, accurate, and complete.***

  
Signature of Responsible Official

12-18-23  
Date

**PART C: SOURCE REQUIREMENT INFORMATION**

Answer the questions below for specific requirements or programs to which the source may be subject.

C1.	Actual emissions and associated data from <b>all</b> emission units with applicable requirements (including those identified in the existing ROP, Permits to Install and other equipment that have not yet been incorporated into the ROP) are required to be reported in MAERS. Are there any emissions and associated data that have <b>not</b> been reported in MAERS for the most recent emissions reporting year? If <u>Yes</u> , identify the emission unit(s) that was/were not reported in MAERS on an AI-001 Form. Applicable MAERS form(s) for unreported emission units must be included with this application.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
C2.	Is this source subject to the federal regulations on ozone-depleting substances? (40 CFR Part 82)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
C3.	Is this source subject to the federal Chemical Accident Prevention Provisions? (Section 112(r) of the Clean Air Act Amendments, 40 CFR Part 68) If <u>Yes</u> , a Risk Management Plan (RMP) and periodic updates must be submitted to the USEPA. Has an updated RMP been submitted to the USEPA?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
C4.	Has this stationary source <b>added or modified</b> equipment since the last ROP renewal that changes the potential to emit (PTE) for criteria pollutant (CO, NOx, PM10, PM2.5, SO2, VOC, lead) emissions? <b>BUT AI-PTE included anyway</b> If <u>Yes</u> , include potential emission calculations (or the PTI and/or ROP revision application numbers, or other references for the PTE demonstration) for the added or modified equipment on an AI-001 Form. If <u>No</u> , criteria pollutant potential emission calculations do not need to be included.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
C5.	Has this stationary source <b>added or modified</b> equipment since the last ROP renewal that changes the PTE for hazardous air pollutants (HAPs) regulated by Section 112 of the federal Clean Air Act? If <u>Yes</u> , include potential emission calculations (or the PTI and/or ROP revision application numbers or other references for the PTE demonstration) for the added or modified equipment on an AI-001 Form. Fugitive emissions <u>must</u> be included in HAP emission calculations. If <u>No</u> , HAP potential emission calculations do not need to be included.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
C6.	Are any emission units subject to the Cross-State Air Pollution Rule (CSAPR)? If <u>Yes</u> , identify the specific emission unit(s) subject to CSAPR on an AI-001 Form.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
C7.	Are any emission units subject to the federal Acid Rain Program? If <u>Yes</u> , identify the specific emission unit(s) subject to the federal Acid Rain Program on an AI-001 Form. Is an Acid Rain Permit Renewal Application included with this application?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
C8.	Are any emission units identified in the existing ROP subject to compliance assurance monitoring (CAM)? If <u>Yes</u> , identify the specific emission unit(s) subject to CAM on an AI-001 Form. If a CAM plan has not been previously submitted to EGLE, one must be included with the ROP renewal application on an AI-001 Form. If the CAM Plan has been updated, include an updated copy. Is a CAM plan included with this application? If a CAM Plan is included, check the type of proposed monitoring included in the Plan: 1. Monitoring proposed by the source based on performance of the control device, or 2. Presumptively Acceptable Monitoring, if eligible	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> <input type="checkbox"/>
C9.	Does the source have any plans such as a malfunction abatement plan, fugitive dust plan, operation/maintenance plan, or any other monitoring plan that is referenced in an existing ROP, Permit to Install requirement, or any other applicable requirement? If <u>Yes</u> , then a copy must be submitted as part of the ROP renewal application.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
C10.	Are there any specific requirements that the source proposes to be identified in the ROP as non-applicable? If <u>Yes</u> , then a description of the requirement and justification must be submitted as part of the ROP renewal application on an AI-001 Form.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<input checked="" type="checkbox"/>	Check here if an AI-001 Form is attached to provide more information for Part C. Enter AI-001 Form ID: <b>AI-CAM, AI-MAP</b>	



**PART E: EXISTING ROP INFORMATION**

Review all emission units and applicable requirements (including any source wide requirements) in the existing ROP and answer the questions below as they pertain to **all** emission units and **all** applicable requirements in the existing ROP.

<p>E1. Does the source propose to make any additions, changes or deletions to terms, conditions and underlying applicable requirements as they appear in the existing ROP? If <u>Yes</u>, identify changes and additions on Part F, Part G and/or Part H.</p>	<p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>
<p>E2. For each emission unit(s) identified in the existing ROP, <u>all</u> stacks with applicable requirements are to be reported in MAERS. Are there any stacks with applicable requirements for emission unit(s) identified in the existing ROP that were <u>not</u> reported in the most recent MAERS reporting year? If <u>Yes</u>, identify the stack(s) that was/were not reported on applicable MAERS form(s).</p>	<p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>
<p>E3. Have any emission units identified in the existing ROP been modified or reconstructed that required a PTI? If <u>Yes</u>, complete Part F with the appropriate information.</p>	<p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>
<p>E4. Have any emission units identified in the existing ROP been dismantled? If <u>Yes</u>, identify the emission unit(s) and the dismantle date in the comment area below or on an AI-001 Form.</p>	<p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p>
<p>Comments: The facility has a gasoline storage tank, EUTANK1, which is subject to the requirements of 40 CFR Part 63, Subpart CCCCC. The ROP mark-up includes additional conditions associated with this applicable requirement.</p>	
<p><input type="checkbox"/> Check here if an AI-001 Form is attached to provide more information for Part E. Enter AI-001 Form ID: <b>AI-</b></p>	

**PART F: PERMIT TO INSTALL (PTI) INFORMATION**

Review all emission units and applicable requirements at the source and answer the following questions as they pertain to **all** emission units with PTIs. Any PTI(s) identified below must be attached to the application.

F1. Has the source obtained any PTIs where the applicable requirements from the PTI have not been incorporated into the existing ROP? If Yes, complete the following table.  Yes  No  
 If No, go to Part G.

Permit to Install Number	Emission Units/Flexible Group ID(s)	Description (Include Process Equipment, Control Devices and Monitoring Devices)	Date Emission Unit was Installed/ Modified/ Reconstructed

F2. Do any of the PTIs listed above change, add, or delete terms/conditions to **established emission units** in the existing ROP? If Yes, identify the emission unit(s) or flexible group(s) affected in the comments area below or on an AI-001 Form and identify all changes, additions, and deletions in a mark-up of the existing ROP.  Yes  No

F3. Do any of the PTIs listed above identify **new emission units** that need to be incorporated into the ROP? If Yes, submit the PTIs as part of the ROP renewal application on an AI-001 Form, and include the new emission unit(s) or flexible group(s) in the mark-up of the existing ROP.  Yes  No

F4. Are there any stacks with applicable requirements for emission unit(s) identified in the PTIs listed above that were not reported in MAERS for the most recent emissions reporting year? If Yes, identify the stack(s) that were not reported on the applicable MAERS form(s).  Yes  No

F5. Are there any proposed administrative changes to any of the emission unit names, descriptions or control devices in the PTIs listed above for any emission units not already incorporated into the ROP? If Yes, describe the changes on an AI-001 Form.  Yes  No

Comments:

Check here if an AI-001 Form is attached to provide more information for Part F. Enter AI-001 Form ID: **AI-**



**PART H: REQUIREMENTS FOR ADDITION OR CHANGE**

Complete this part of the application form for all proposed additions, changes or deletions to the existing ROP. This includes state or federal regulations that the source is subject to and that must be incorporated into the ROP or other proposed changes to the existing ROP. **Do not include additions or changes that have already been identified in Parts F or G of this application form.** If additional space is needed copy and complete an additional Part H.

Complete a separate Part H for each emission unit with proposed additions and/or changes.

H1. Are there changes that need to be incorporated into the ROP that have not been identified in Parts F and G? If <u>Yes</u> , answer the questions below.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
H2. Are there any proposed administrative changes to any of the existing emission unit names, descriptions or control devices in the ROP? If <u>Yes</u> , describe the changes in questions H8 – H16 below and in the affected Emission Unit Table(s) in the mark-up of the ROP.	<input type="checkbox"/> Yes <input type="checkbox"/> No
H3. Does the source propose to add a new emission unit or flexible group to the ROP not previously identified in Parts F or G? If <u>Yes</u> , identify and describe the emission unit name, process description, control device(s), monitoring device(s) and applicable requirements in questions H8 – H16 below and in a new Emission Unit Table in the mark-up of the ROP. See instructions on how to incorporate a new emission unit/flexible group into the ROP.	<input type="checkbox"/> Yes <input type="checkbox"/> No
H4. Does the source propose to add new state or federal regulations to the existing ROP? If <u>Yes</u> , on an AI-001 Form, identify each emission unit/flexible group that the new regulation applies to and identify <u>each</u> state or federal regulation that should be added. Also, describe the new requirements in questions H8 – H16 below and add the specific requirements to existing emission units/flexible groups in the mark-up of the ROP, create a new Emission Unit/Flexible Group Table, or add an AQD template table for the specific state or federal requirement.	<input type="checkbox"/> Yes <input type="checkbox"/> No
H5. Has a Consent Order/Consent Judgment (CO/CJ) been issued where the requirements were not incorporated into the existing ROP? If <u>Yes</u> , list the CO/CJ number(s) below and add or change the conditions and underlying applicable requirements in the appropriate Emission Unit/Flexible Group Tables in the mark-up of the ROP.	<input type="checkbox"/> Yes <input type="checkbox"/> No
H6. Does the source propose to add, change and/or delete <b>source-wide</b> requirements? If <u>Yes</u> , identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below.	<input type="checkbox"/> Yes <input type="checkbox"/> No
H7. Are you proposing to <b>streamline</b> any requirements? If <u>Yes</u> , identify the streamlined and subsumed requirements and the EU ID, and provide a justification for streamlining the applicable requirement below.	<input type="checkbox"/> Yes <input type="checkbox"/> No

**PART H: REQUIREMENTS FOR ADDITION OR CHANGE – (continued)**

<p>H8. Does the source propose to add, change and/or delete <b>emission limit</b> requirements? If <u>Yes</u>, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>H9. Does the source propose to add, change and/or delete <b>material limit</b> requirements? If <u>Yes</u>, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>H10. Does the source propose to add, change and/or delete <b>process/operational restriction</b> requirements? If <u>Yes</u>, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>H11. Does the source propose to add, change and/or delete <b>design/equipment parameter</b> requirements? If <u>Yes</u>, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>H12. Does the source propose to add, change and/or delete <b>testing/sampling</b> requirements? If <u>Yes</u>, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>H13. Does the source propose to add, change and/or delete <b>monitoring/recordkeeping</b> requirements? If <u>Yes</u>, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No
<p>H14. Does the source propose to add, change and/or delete <b>reporting</b> requirements? If <u>Yes</u>, identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below.</p>	<input type="checkbox"/> Yes <input type="checkbox"/> No

**PART H: REQUIREMENTS FOR ADDITION OR CHANGE – (continued)**

H15. Does the source propose to add, change and/or delete <b>stack/vent restrictions</b> ? If <u>Yes</u> , identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below.	<input type="checkbox"/> Yes <input type="checkbox"/> No
H16. Does the source propose to add, change and/or delete any <b>other</b> requirements? If <u>Yes</u> , identify the addition/change/deletion in a mark-up of the corresponding section of the ROP and provide a justification below.	<input type="checkbox"/> Yes <input type="checkbox"/> No
H17. Does the source propose to add terms and conditions for an alternative operating scenario or intra-facility trading of emissions? If <u>Yes</u> , identify the proposed conditions in a mark-up of the corresponding section of the ROP and provide a justification below.	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Check here if an AI-001 Form is attached to provide more information for Part H. Enter AI-001 Form ID: <b>AI-</b>	



## RENEWABLE OPERATING PERMIT APPLICATION AI-001: ADDITIONAL INFORMATION

This information is required by Article II, Chapter 1, part 55 (Air Pollution Control) of P.A. 451 of 1994, as amended, and the Federal Clean Air Act of 1990. Failure to obtain a permit required by Part 55 may result in penalties and/or imprisonment. Please type or print clearly. Refer to instructions for additional information to complete this form.

SRN: P0668

Section Number (if applicable):

1. Additional Information ID

**AI-MARK-UP**

### Additional Information

2. Is This Information Confidential?

Yes  No

**A word copy of the ROP is attached. MEC is proposing no changes to the ROP at this time. The mark-up indicates an additional emission unit, EUTANK1 which includes applicable requirements included in FG-GDFMACT.**

**MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY  
AIR QUALITY DIVISION**

EFFECTIVE DATE: October 1, 2019

ISSUED TO

**Marquette Board of Light and Power  
Marquette Energy Center (MEC)**

State Registration Number (SRN): P0668

LOCATED AT

2200 Wright Street, Marquette, Marquette County, Michigan 49855

**RENEWABLE OPERATING PERMIT**

Permit Number: MI-ROP-P0668-2019

Expiration Date: October 1, 2024

Administratively Complete ROP Renewal Application Due Between  
April 1, 2023 and April 1, 2024

This Renewable Operating Permit (ROP) is issued in accordance with and subject to Section 5506(3) of Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451). Pursuant to Rule 210(1) of the administrative rules promulgated under Act 451, this ROP constitutes the permittee's authority to operate the stationary source identified above in accordance with the general conditions, special conditions and attachments contained herein. Operation of the stationary source and all emission units listed in the permit are subject to all applicable future or amended rules and regulations pursuant to Act 451 and the federal Clean Air Act.

**SOURCE-WIDE PERMIT TO INSTALL**

Permit Number: MI-PTI-P0668-2019

This Permit to Install (PTI) is issued in accordance with and subject to Section 5505(1) of Act 451. Pursuant to Rule 214a of the administrative rules promulgated under Act 451, the terms and conditions herein, identified by the underlying applicable requirement citation of Rule 201(1)(a), constitute a federally enforceable PTI. The PTI terms and conditions do not expire and remain in effect unless the criteria of Rule 201(6) are met. Operation of all emission units identified in the PTI is subject to all applicable future or amended rules and regulations pursuant to Act 451 and the federal Clean Air Act.

Michigan Department of Environment, Great Lakes, and Energy

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Ed Lancaster, Marquette District Supervisor

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## AUTHORITY AND ENFORCEABILITY

For the purpose of this permit, the **permittee** is defined as any person who owns or operates an emission unit at a stationary source for which this permit has been issued. The **department** is defined in Rule 104(d) as the Director of the Michigan Department of Environment, Great Lakes, and Energy (EGLE) or his or her designee.

The permittee shall comply with all specific details in the permit terms and conditions and the cited underlying applicable requirements. All terms and conditions in this ROP are both federally enforceable and state enforceable unless otherwise footnoted. Certain terms and conditions are applicable to most stationary sources for which an ROP has been issued. These general conditions are included in Part A of this ROP. Other terms and conditions may apply to a specific emission unit, several emission units which are represented as a flexible group, or the entire stationary source which is represented as a Source-Wide group. Special conditions are identified in Parts B, C, D and/or the appendices.

In accordance with Rule 213(2)(a), all underlying applicable requirements are identified for each ROP term or condition. All terms and conditions that are included in a PTI are streamlined, subsumed and/or is state-only enforceable will be noted as such.

In accordance with Section 5507 of Act 451, the permittee has included in the ROP application a compliance certification, a schedule of compliance, and a compliance plan. For applicable requirements with which the source is in compliance, the source will continue to comply with these requirements. For applicable requirements with which the source is not in compliance, the source will comply with the detailed schedule of compliance requirements that are incorporated as an appendix in this ROP. Furthermore, for any applicable requirements effective after the date of issuance of this ROP, the stationary source will meet the requirements on a timely basis, unless the underlying applicable requirement requires a more detailed schedule of compliance.

Issuance of this permit does not obviate the necessity of obtaining such permits or approvals from other units of government as required by law.

## A. GENERAL CONDITIONS

### Permit Enforceability

- All conditions in this permit are both federally enforceable and state enforceable unless otherwise noted. **(R 336.1213(5))**
- Those conditions that are hereby incorporated in a state-only enforceable Source-Wide PTI pursuant to Rule 201(2)(d) are designated by footnote one. **(R 336.1213(5)(a), R 336.1214a(5))**
- Those conditions that are hereby incorporated in a federally enforceable Source-Wide PTI pursuant to Rule 201(2)(c) are designated by footnote two. **(R 336.1213(5)(b), R 336.1214a(3))**

### General Provisions

1. The permittee shall comply with all conditions of this ROP. Any ROP noncompliance constitutes a violation of Act 451, and is grounds for enforcement action, for ROP revocation or revision, or for denial of the renewal of the ROP. All terms and conditions of this ROP that are designated as federally enforceable are enforceable by the Administrator of the United States Environmental Protection Agency (USEPA) and by citizens under the provisions of the federal Clean Air Act (CAA). Any terms and conditions based on applicable requirements which are designated as "state-only" are not enforceable by the USEPA or citizens pursuant to the CAA. **(R 336.1213(1)(a))**
2. It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this ROP. **(R 336.1213(1)(b))**
3. This ROP may be modified, revised, or revoked for cause. The filing of a request by the permittee for a permit modification, revision, or termination, or a notification of planned changes or anticipated noncompliance does not stay any ROP term or condition. This does not supersede or affect the ability of the permittee to make changes, at the permittee's own risk, pursuant to Rule 215 and Rule 216. **(R 336.1213(1)(c))**
4. The permittee shall allow the department, or an authorized representative of the department, upon presentation of credentials and other documents as may be required by law and upon stating the authority for and purpose of the investigation, to perform any of the following activities: **(R 336.1213(1)(d))**
  - a. Enter, at reasonable times, a stationary source or other premises where emissions-related activity is conducted or where records must be kept under the conditions of the ROP.
  - b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of the ROP.
  - c. Inspect, at reasonable times, any of the following:
    - i. Any stationary source.
    - ii. Any emission unit.
    - iii. Any equipment, including monitoring and air pollution control equipment.
    - iv. Any work practices or operations regulated or required under the ROP.
  - d. As authorized by Section 5526 of Act 451, sample or monitor at reasonable times substances or parameters for the purpose of assuring compliance with the ROP or applicable requirements.
5. The permittee shall furnish to the department, within a reasonable time, any information the department may request, in writing, to determine whether cause exists for modifying, revising, or revoking the ROP or to determine compliance with this ROP. Upon request, the permittee shall also furnish to the department copies of any records that are required to be kept as a term or condition of this ROP. For information which is claimed by the permittee to be confidential, consistent with the requirements of the 1976 PA 442, MCL §15.231 et seq., and known as the Freedom of Information Act, the person may also be required to furnish the records directly to the USEPA together with a claim of confidentiality. **(R 336.1213(1)(e))**

6. A challenge by any person, the Administrator of the USEPA, or the department to a particular condition or a part of this ROP shall not set aside, delay, stay, or in any way affect the applicability or enforceability of any other condition or part of this ROP. **(R 336.1213(1)(f))**
7. The permittee shall pay fees consistent with the fee schedule and requirements pursuant to Section 5522 of Act 451. **(R 336.1213(1)(g))**
8. This ROP does not convey any property rights or any exclusive privilege. **(R 336.1213(1)(h))**

### **Equipment & Design**

9. Any collected air contaminants shall be removed as necessary to maintain the equipment at the required operating efficiency. The collection and disposal of air contaminants shall be performed in a manner so as to minimize the introduction of contaminants to the outer air. Transport of collected air contaminants in Priority I and II areas requires the use of material handling methods specified in Rule 370(2).<sup>2</sup> **(R 336.1370)**
10. Any air cleaning device shall be installed, maintained, and operated in a satisfactory manner and in accordance with the Michigan Air Pollution Control rules and existing law. **(R 336.1910)**

### **Emission Limits**

11. Unless otherwise specified in this ROP, the permittee shall comply with Rule 301, which states, in part, "Except as provided in Subrules 2, 3, and 4 of this rule, a person shall not cause or permit to be discharged into the outer air from a process or process equipment a visible emission of a density greater than the most stringent of the following:"<sup>2</sup> **(R 336.1301(1))**
  - a. A 6-minute average of 20% opacity, except for one 6-minute average per hour of not more than 27% opacity.
  - b. A limit specified by an applicable federal new source performance standard.

The grading of visible emissions shall be determined in accordance with Rule 303.

12. The permittee shall not cause or permit the emission of an air contaminant or water vapor in quantities that cause, alone or in reaction with other air contaminants, either of the following:
  - a. Injurious effects to human health or safety, animal life, plant life of significant economic value, or property.<sup>1</sup> **(R 336.1901(a))**
  - b. Unreasonable interference with the comfortable enjoyment of life and property.<sup>1</sup> **(R 336.1901(b))**

### **Testing/Sampling**

13. The department may require the owner or operator of any source of an air contaminant to conduct acceptable performance tests, at the owner's or operator's expense, in accordance with Rule 1001 and Rule 1003, under any of the conditions listed in Rule 1001(1).<sup>2</sup> **(R 336.2001)**
14. Any required performance testing shall be conducted in accordance with Rule 1001(2), Rule 1001(3) and Rule 1003. **(R 336.2001(2), R 336.2001(3), R 336.2003(1))**
15. Any required test results shall be submitted to the Air Quality Division (AQD) in the format prescribed by the applicable reference test method within 60 days following the last date of the test. **(R 336.2001(5))**

## Monitoring/Recordkeeping

16. Records of any periodic emission or parametric monitoring required in this ROP shall include the following information specified in Rule 213(3)(b)(i), where appropriate. **(R 336.1213(3)(b))**
  - a. The date, location, time, and method of sampling or measurements.
  - b. The dates the analyses of the samples were performed.
  - c. The company or entity that performed the analyses of the samples.
  - d. The analytical techniques or methods used.
  - e. The results of the analyses.
  - f. The related process operating conditions or parameters that existed at the time of sampling or measurement.
17. All required monitoring data, support information and all reports, including reports of all instances of deviation from permit requirements, shall be kept and furnished to the department upon request for a period of not less than 5 years from the date of the monitoring sample, measurement, report or application. Support information includes all calibration and maintenance records and all original strip-chart recordings, or other original data records, for continuous monitoring instrumentation and copies of all reports required by the ROP. **(R 336.1213(1)(e), R 336.1213(3)(b)(ii))**

## Certification & Reporting

18. Except for the alternate certification schedule provided in Rule 213(3)(c)(iii)(B), any document required to be submitted to the department as a term or condition of this ROP shall contain an original certification by a Responsible Official which state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete. **(R 336.1213(3)(c))**
19. A Responsible Official shall certify to the appropriate AQD District Office and to the USEPA that the stationary source is and has been in compliance with all terms and conditions contained in the ROP except for deviations that have been or are being reported to the appropriate AQD District Office pursuant to Rule 213(3)(c). This certification shall include all the information specified in Rule 213(4)(c)(i) through (v) and shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the certification are true, accurate, and complete. The USEPA address is: USEPA, Air Compliance Data - Michigan, Air and Radiation Division, 77 West Jackson Boulevard, Chicago, Illinois 60604-3507. **(R 336.1213(4)(c))**
20. The certification of compliance shall be submitted annually for the term of this ROP as detailed in the special conditions, or more frequently if specified in an applicable requirement or in this ROP. **(R 336.1213(4)(c))**
21. The permittee shall promptly report any deviations from ROP requirements and certify the reports. The prompt reporting of deviations from ROP requirements is defined in Rule 213(3)(c)(ii) as follows, unless otherwise described in this ROP. **(R 336.1213(3)(c))**
  - a. For deviations that exceed the emissions allowed under the ROP, prompt reporting means reporting consistent with the requirements of Rule 912 as detailed in Condition 25. All reports submitted pursuant to this paragraph shall be promptly certified as specified in Rule 213(3)(c)(iii).
  - b. For deviations which exceed the emissions allowed under the ROP and which are not reported pursuant to Rule 912 due to the duration of the deviation, prompt reporting means the reporting of all deviations in the semiannual reports required by Rule 213(3)(c)(i). The report shall describe reasons for each deviation and the actions taken to minimize or correct each deviation.
  - c. For deviations that do not exceed the emissions allowed under the ROP, prompt reporting means the reporting of all deviations in the semiannual reports required by Rule 213(3)(c)(i). The report shall describe the reasons for each deviation and the actions taken to minimize or correct each deviation.

22. For reports required pursuant to Rule 213(3)(c)(ii), prompt certification of the reports is described in Rule 213(3)(c)(iii) as either of the following: **(R 336.1213(3)(c))**
  - a. Submitting a certification by a Responsible Official with each report which states that, based on information and belief formed after reasonable inquiry, the statements and information in the report are true, accurate, and complete.
  - b. Submitting, within 30 days following the end of a calendar month during which one or more prompt reports of deviations from the emissions allowed under the ROP were submitted to the department pursuant to Rule 213(3)(c)(ii), a certification by a Responsible Official which states that; “based on information and belief formed after reasonable inquiry, the statements and information contained in each of the reports submitted during the previous month were true, accurate, and complete.” The certification shall include a listing of the reports that are being certified. Any report submitted pursuant to Rule 213(3)(c)(ii) that will be certified on a monthly basis pursuant to this paragraph shall include a statement that certification of the report will be provided within 30 days following the end of the calendar month.
23. Semiannually for the term of the ROP as detailed in the special conditions, or more frequently if specified, the permittee shall submit certified reports of any required monitoring to the appropriate AQD District Office. All instances of deviations from ROP requirements during the reporting period shall be clearly identified in the reports. **(R 336.1213(3)(c)(i))**
24. On an annual basis, the permittee shall report the actual emissions, or the information necessary to determine the actual emissions, of each regulated air pollutant as defined in Rule 212(6) for each emission unit utilizing the emissions inventory forms provided by the department. **(R 336.1212(6))**
25. The permittee shall provide notice of an abnormal condition, start-up, shutdown, or malfunction that results in emissions of a hazardous or toxic air pollutant which continue for more than one hour in excess of any applicable standard or limitation, or emissions of any air contaminant continuing for more than two hours in excess of an applicable standard or limitation, as required in Rule 912, to the appropriate AQD District Office. The notice shall be provided not later than two business days after the start-up, shutdown, or discovery of the abnormal conditions or malfunction. Notice shall be by any reasonable means, including electronic, telephonic, or oral communication. Written reports, if required under Rule 912, must be submitted to the appropriate AQD District Supervisor within 10 days after the start-up or shutdown occurred, within 10 days after the abnormal conditions or malfunction has been corrected, or within 30 days of discovery of the abnormal conditions or malfunction, whichever is first. The written reports shall include all of the information required in Rule 912(5) and shall be certified by a Responsible Official in a manner consistent with the CAA.<sup>2</sup> **(R 336.1912)**

## Permit Shield

26. Compliance with the conditions of the ROP shall be considered compliance with any applicable requirements as of the date of ROP issuance if either of the following provisions is satisfied. **(R 336.1213(6)(a)(i), R 336.1213(6)(a)(ii))**
  - a. The applicable requirements are included and are specifically identified in the ROP.
  - b. The permit includes a determination or concise summary of the determination by the department that other specifically identified requirements are not applicable to the stationary source.

Any requirements identified in Part E of this ROP have been identified as non-applicable to this ROP and are included in the permit shield.

27. Nothing in this ROP shall alter or affect any of the following:
  - a. The provisions of Section 303 of the CAA, emergency orders, including the authority of the USEPA under Section 303 of the CAA. **(R 336.1213(6)(b)(i))**
  - b. The liability of the owner or operator of this source for any violation of applicable requirements prior to or at the time of this ROP issuance. **(R 336.1213(6)(b)(ii))**
  - c. The applicable requirements of the acid rain program, consistent with Section 408(a) of the CAA. **(R 336.1213(6)(b)(iii))**

- d. The ability of the USEPA to obtain information from a source pursuant to Section 114 of the CAA. **(R 336.1213(6)(b)(iv))**
28. The permit shield shall not apply to provisions incorporated into this ROP through procedures for any of the following:
- a. Operational flexibility changes made pursuant to Rule 215. **(R 336.1215(5))**
  - b. Administrative Amendments made pursuant to Rule 216(1)(a)(i)-(iv). **(R 336.1216(1)(b)(iii))**
  - c. Administrative Amendments made pursuant to Rule 216(1)(a)(v) until the amendment has been approved by the department. **(R 336.1216(1)(c)(iii))**
  - d. Minor Permit Modifications made pursuant to Rule 216(2). **(R 336.1216(2)(f))**
  - e. State-Only Modifications made pursuant to Rule 216(4) until the changes have been approved by the department. **(R 336.1216(4)(e))**
29. Expiration of this ROP results in the loss of the permit shield. If a timely and administratively complete application for renewal is submitted not more than 18 months, but not less than 6 months, before the expiration date of the ROP, but the department fails to take final action before the end of the ROP term, the existing ROP does not expire until the renewal is issued or denied, and the permit shield shall extend beyond the original ROP term until the department takes final action. **(R 336.1217(1)(c), R 336.1217(1)(a))**

## Revisions

30. For changes to any process or process equipment covered by this ROP that do not require a revision of the ROP pursuant to Rule 216, the permittee must comply with Rule 215. **(R 336.1215, R 336.1216)**
31. A change in ownership or operational control of a stationary source covered by this ROP shall be made pursuant to Rule 216(1). **(R 336.1219(2))**
32. For revisions to this ROP, an administratively complete application shall be considered timely if it is received by the department in accordance with the time frames specified in Rule 216. **(R 336.1210(10))**
33. Pursuant to Rule 216(1)(b)(iii), Rule 216(2)(d) and Rule 216(4)(d), after a change has been made, and until the department takes final action, the permittee shall comply with both the applicable requirements governing the change and the ROP terms and conditions proposed in the application for the modification. During this time period, the permittee may choose to not comply with the existing ROP terms and conditions that the application seeks to change. However, if the permittee fails to comply with the ROP terms and conditions proposed in the application during this time period, the terms and conditions in the ROP are enforceable. **(R 336.1216(1)(c)(iii), R 336.1216(2)(d), R 336.1216(4)(d))**

## Reopenings

34. A ROP shall be reopened by the department prior to the expiration date and revised by the department under any of the following circumstances:
- a. If additional requirements become applicable to this stationary source with three or more years remaining in the term of the ROP, but not if the effective date of the new applicable requirement is later than the ROP expiration date. **(R 336.1217(2)(a)(i))**
  - b. If additional requirements pursuant to Title IV of the CAA become applicable to this stationary source. **(R 336.1217(2)(a)(ii))**
  - c. If the department determines that the ROP contains a material mistake, information required by any applicable requirement was omitted, or inaccurate statements were made in establishing emission limits or the terms or conditions of the ROP. **(R 336.1217(2)(a)(iii))**
  - d. If the department determines that the ROP must be revised to ensure compliance with the applicable requirements. **(R 336.1217(2)(a)(iv))**

## Renewals

35. For renewal of this ROP, an administratively complete application shall be considered timely if it is received by the department not more than 18 months, but not less than 6 months, before the expiration date of the ROP. **(R 336.1210(9))**

## Stratospheric Ozone Protection

36. If the permittee is subject to Title 40 of the Code of Federal Regulations (CFR), Part 82 and services, maintains, or repairs appliances except for motor vehicle air conditioners (MVAC), or disposes of appliances containing refrigerant, including MVAC and small appliances, or if the permittee is a refrigerant reclaimer, appliance owner or a manufacturer of appliances or recycling and recovery equipment, the permittee shall comply with all applicable standards for recycling and emissions reduction pursuant to 40 CFR Part 82, Subpart F.
37. If the permittee is subject to 40 CFR Part 82 and performs a service on motor (fleet) vehicles when this service involves refrigerant in the MVAC, the permittee is subject to all the applicable requirements as specified in 40 CFR Part 82, Subpart B, Servicing of Motor Vehicle Air Conditioners. The term "motor vehicle" as used in Subpart B does not include a vehicle in which final assembly of the vehicle has not been completed by the original equipment manufacturer. The term MVAC as used in Subpart B does not include the air-tight sealed refrigeration system used for refrigerated cargo or an air conditioning system on passenger buses using Hydrochlorofluorocarbon-22 refrigerant.

## Risk Management Plan

38. If subject to Section 112(r) of the CAA and 40 CFR Part 68, the permittee shall register and submit to the USEPA the required data related to the risk management plan for reducing the probability of accidental releases of any regulated substances listed pursuant to Section 112(r)(3) of the CAA as amended in 40 CFR 68.130. The list of substances, threshold quantities, and accident prevention regulations promulgated under 40 CFR Part 68, do not limit in any way the general duty provisions under Section 112(r)(1).
39. If subject to Section 112(r) of the CAA and 40 CFR Part 68, the permittee shall comply with the requirements of 40 CFR Part 68, no later than the latest of the following dates as provided in 40 CFR 68.10(a):
- June 21, 1999,
  - Three years after the date on which a regulated substance is first listed under 40 CFR 68.130, or
  - The date on which a regulated substance is first present above a threshold quantity in a process.
40. If subject to Section 112(r) of the CAA and 40 CFR Part 68, the permittee shall submit any additional relevant information requested by any regulatory agency necessary to ensure compliance with the requirements of 40 CFR Part 68.
41. If subject to Section 112(r) of the CAA and 40 CFR Part 68, the permittee shall annually certify compliance with all applicable requirements of Section 112(r) as detailed in Rule 213(4)(c). **(40 CFR Part 68)**

## Emission Trading

42. Emission averaging and emission reduction credit trading are allowed pursuant to any applicable interstate or regional emission trading program that has been approved by the Administrator of the USEPA as a part of Michigan's State Implementation Plan. Such activities must comply with Rule 215 and Rule 216. **(R 336.1213(12))**

### Permit to Install (PTI)

43. The process or process equipment included in this permit shall not be reconstructed, relocated, or modified unless a PTI authorizing such action is issued by the department, except to the extent such action is exempt from the PTI requirements by any applicable rule.<sup>2</sup> **(R 336.1201(1))**
44. The department may, after notice and opportunity for a hearing, revoke PTI terms or conditions if evidence indicates the process or process equipment is not performing in accordance with the terms and conditions of the PTI or is violating the department's rules or the CAA.<sup>2</sup> **(R 336.1201(8), Section 5510 of Act 451)**
45. The terms and conditions of a PTI shall apply to any person or legal entity that now or hereafter owns or operates the process or process equipment at the location authorized by the PTI. If a new owner or operator submits a written request to the department pursuant to Rule 219 and the department approves the request, this PTI will be amended to reflect the change of ownership or operational control. The request must include all of the information required by Subrules (1)(a), (b) and (c) of Rule 219. The written request shall be sent to the appropriate AQD District Supervisor, EGLE.<sup>2</sup> **(R 336.1219)**
46. If the installation, reconstruction, relocation, or modification of the equipment for which PTI terms and conditions have been approved has not commenced within 18 months of the original PTI issuance date, or has been interrupted for 18 months, the applicable terms and conditions from that PTI, as incorporated into the ROP, shall become void unless otherwise authorized by the department. Furthermore, the person to whom that PTI was issued, or the designated authorized agent, shall notify the department via the Supervisor, Permit Section, EGLE, AQD, P. O. Box 30260, Lansing, Michigan 48909, if it is decided not to pursue the installation, reconstruction, relocation, or modification of the equipment allowed by the terms and conditions from that PTI.<sup>2</sup> **(R 336.1201(4))**

#### **Footnotes:**

<sup>1</sup>This condition is state-only enforceable and was established pursuant to Rule 201(1)(b).

<sup>2</sup>This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

## **B. SOURCE-WIDE CONDITIONS**

Part B outlines the Source-Wide Terms and Conditions that apply to this stationary source. The permittee is subject to these special conditions for the stationary source in addition to the general conditions in Part A and any other terms and conditions contained in this ROP.

The permittee shall comply with all specific details in the special conditions and the underlying applicable requirements cited. If a specific condition type does not apply to this source, NA (not applicable) has been used in the table. If there are no Source-Wide Conditions, this section will be left blank.

## SOURCE-WIDE CONDITIONS

### DESCRIPTION

The following conditions apply source-wide to all process equipment including equipment covered by other permits, grand-fathered equipment and exempt equipment.

### POLLUTION CONTROL EQUIPMENT

NA

#### I. EMISSION LIMIT(S)

Pollutant	Limit	Time Period/Operating Scenario	Equipment	Monitoring/ Testing Method	Underlying Applicable Requirements
1. NOx	222 tpy <sup>2</sup>	12-month rolling time period as determined at the end of each calendar month	SOURCE-WIDE	SC VI. 6	<b>R 336.1205(1)(a) &amp; (3)</b>
2. VOC	218 tpy <sup>2</sup>	12-month rolling time period as determined at the end of each calendar month	SOURCE-WIDE	SC VI. 6	<b>R 336.1205(1)(a) &amp; (3)</b>
3. Individual HAP	8.9 tpy <sup>2</sup>	12-month rolling time period as determined at the end of each calendar month	SOURCE-WIDE	SC VI. 6	<b>R 336.1205(1)(a) &amp; (3)</b>
4. Aggregate HAP	22.4 tpy <sup>2</sup>	12-month rolling time period as determined at the end of each calendar month	SOURCE-WIDE	SC VI. 6	<b>R 336.1205(1)(a) &amp; (3)</b>

#### II. MATERIAL LIMIT(S)

NA

#### III. PROCESS/OPERATIONAL RESTRICTION(S)

- The permittee shall not operate EUENGINE01, EUENGINE02, and EUENGINE03 while firing fuel oil for more than 6,000 total hours combined per year on a 12-month rolling time period basis as determined at the end of each calendar month. This restriction does not include fuel oil used as a pilot fuel for natural gas combustion, where FGNGOP is the applicable flexible group.<sup>2</sup> **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**
- Total startups for all units in FGNGOP and FGDIESELOP combined is limited to 4,380 startup events per year on a 12-month rolling time period basis as determined at the end of each calendar month. Of the 4,380 events, the startups for EUENGINE01, EUENGINE02, and EUENGINE03 combined is further restricted in SC III.3.<sup>2</sup> **(R 336.1205(1)(a) & (3), R 336.1225)**
- Startup for EUENGINE01, EUENGINE02, and EUENGINE03 combined is limited to 825 startup events while firing fuel oil per year on a 12-month rolling time period basis as determined at the end of each calendar month. Of the 825 events, the cold startups while firing fuel oil for EUENGINE01, EUENGINE02, and EUENGINE03 combined shall not exceed 375 cold startup events while firing fuel oil per year on a 12-month rolling time period basis as determined at the end of each calendar month, where a cold startup is defined as a startup following a minimum of 24 hours of non-operation of the engine.<sup>2</sup> **(R 336.1205(1)(a) & (3), R 336.1225)**

#### IV. DESIGN/EQUIPMENT PARAMETER(S)

NA

## **V. TESTING/SAMPLING**

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

NA

## **VI. MONITORING/RECORDKEEPING**

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. The permittee shall complete all required calculations in a format acceptable to the AQD District Supervisor and make them available by the last day of the calendar month, for the previous calendar month, unless otherwise specified in any monitoring/recordkeeping special condition.<sup>2</sup> **(R 336.1205(1)(a))**
2. The permittee shall monitor and record, in a satisfactory manner, the total hours of operation when firing fuel oil in EUENGINE01, EUENGINE02, and EUENGINE03 on a monthly basis. The permittee shall calculate and keep, in a satisfactory manner, the total hours of operation when firing fuel oil for EUENGINE01, EUENGINE02, and EUENGINE03 combined on a monthly and 12-month rolling time period basis. The permittee shall keep all records on file at the facility in a manner acceptable to the AQD District Supervisor and make them available to the Department upon request.<sup>2</sup> **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**
3. The permittee shall monitor and record, in a satisfactory manner, the number of total startup events for each unit in FGNGOP and each unit in FGDIESELOP on a monthly basis. The permittee shall calculate and keep, in a satisfactory manner, the total number of startup events for FGNGOP and FGDIESELOP combined on a monthly and 12-month rolling time period basis. The permittee shall keep all records on file at the facility and make them available to the Department upon request.<sup>2</sup> **(R 336.1205(1)(a) & (3), R 336.1225)**
4. The permittee shall monitor and record, in a satisfactory manner, the number of total startup events when firing fuel oil and the number of total cold startup events when firing fuel oil in EUENGINE01, EUENGINE02, and EUENGINE03 on a monthly basis. The permittee shall calculate and keep, in a satisfactory manner, the total number of startup events for EUENGINE01, EUENGINE02, and EUENGINE03 combined and the total number of cold startup events for EUENGINE01, EUENGINE02, and EUENGINE03 combined on a monthly and 12-month rolling time period basis. The permittee shall keep all records on file at the facility in a manner acceptable to the AQD District Supervisor and make them available to the Department upon request.<sup>2</sup> **(R 336.1205(1)(a) & (3))**
5. The permittee shall keep, in a satisfactory manner, all records required to perform facility-wide NO<sub>x</sub>, VOC, and individual HAP calculations. This may include, but is not limited to:
  - a. Hours of operation.
  - b. Fuel use.
  - c. Documentation of guaranteed emission rates.
  - d. Documentation of stack test results used in calculating emissions.
  - e. Contemporaneous records of whether each engine is operated as a natural gas-fired engine or diesel-fired engine.

The permittee shall keep all records on file at the facility and make them available to the Department upon request.<sup>2</sup> **(R 336.1205(1)(a) & (3), R 336.1213(3)(b)&(8)(a))**

6. The permittee shall calculate and keep, in a satisfactory manner, monthly and 12-month rolling time period NO<sub>x</sub>, VOC, individual HAP, and aggregate HAPs emission calculation records for Source-Wide. The permittee shall calculate monthly NO<sub>x</sub>, VOC, individual HAP, and aggregate HAPs emissions for Source-Wide by using the calculation methodology of multiplying the fuel usage by default emission factors or the most recent tested values. The permittee shall keep all records on file at the facility and make them available to the Department upon request.<sup>2</sup> **(R 336.1205(1)(a) & (3))**

## **VII. REPORTING**

1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**

2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**
3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD's District Office by March 15 for the previous calendar year. **(R 336.1213(4)(c))**

**See Appendix 8**

**VIII. STACK/VENT RESTRICTION(S)**

NA

**IX. OTHER REQUIREMENT(S)**

NA

**Footnotes:**

<sup>1</sup>This condition is state-only enforceable and was established pursuant to Rule 201(1)(b).

<sup>2</sup>This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

### C. EMISSION UNIT SPECIAL CONDITIONS

Part C outlines terms and conditions that are specific to individual emission units listed in the Emission Unit Summary Table. The permittee is subject to the special conditions for each emission unit in addition to the General Conditions in Part A and any other terms and conditions contained in this ROP.

The permittee shall comply with all specific details in the special conditions and the underlying applicable requirements cited. If a specific condition type does not apply, NA (not applicable) has been used in the table. If there are no conditions specific to individual emission units, this section will be left blank.

#### EMISSION UNIT SUMMARY TABLE

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

Emission Unit ID	Emission Unit Description (Including Process Equipment & Control Device(s))	Installation Date/ Modification Date	Flexible Group ID
EUENGINE01	Dual fuel-fired (natural gas and fuel oil) Wärtsilä 18V50DF, 4 Stroke, Lean Burn, nominal 17 MW (173 MMBTU/HR when firing natural gas as primary fuel, 154 MMBTU/HR when firing fuel oil as primary fuel), Reciprocating Internal Combustion Engine used for electricity generation. The engine is equipped with Selective Catalytic Reduction (SCR) and oxidation catalyst for control.	08/25/2017	FGNGOP FGDIESELOP
EUENGINE02	Dual fuel-fired (natural gas and fuel oil) Wärtsilä 18V50DF, 4 Stroke, Lean Burn, nominal 17 MW (173 MMBTU/HR when firing natural gas as primary fuel, 154 MMBTU/HR when firing fuel oil as primary fuel), Reciprocating Internal Combustion Engine used for electricity generation. The engine is equipped with SCR and oxidation catalyst for control.	08/25/2017	FGNGOP FGDIESELOP
EUENGINE03	Dual fuel-fired (natural gas and fuel oil) Wärtsilä 18V50DF, 4 Stroke, Lean Burn, nominal 17 MW (173 MMBTU/HR when firing natural gas as primary fuel, 154 MMBTU/HR when firing fuel oil as primary fuel), Reciprocating Internal Combustion Engine used for electricity generation. The engine is equipped with SCR and oxidation catalyst for control.	08/25/2017	FGNGOP FGDIESELOP
EUEDG	A 400-kilowatt (kW) emergency diesel-fired generator. The engine is used to supply power to the Wärtsilä engine auxiliary equipment during an interruption of the electrical power supply.	08/25/2017	NA
<u>EUTANK1</u>	<u>4,000 gallon gasoline storage tank.</u> <u>Has submerged fill.</u>	<u>2023</u>	<u>FGGDF</u>

<b>Emission Unit ID</b>	<b>Emission Unit Description (Including Process Equipment &amp; Control Device(s))</b>	<b>Installation Date/ Modification Date</b>	<b>Flexible Group ID</b>
EUNGINE	An existing emergency generator firing natural gas or propane, which is subject to the New Source Performance Standards for Stationary Spark Ignition Internal Combustion Engines, 40 CFR Part 60, Subpart JJJJ.	11/01/2006	NA

**EUEDG  
 EMISSION UNIT CONDITIONS**

**DESCRIPTION**

A 400 kW emergency diesel-fired generator. The engine is used to supply power to the Wärtsilä engine auxiliary equipment during an interruption of the electrical power supply.

**Flexible Group ID:** NA

**POLLUTION CONTROL EQUIPMENT**

NA

**I. EMISSION LIMIT(S)**

Pollutant	Limit	Time Period/Operating Scenario	Equipment	Monitoring/ Testing Method	Underlying Applicable Requirements
1. NMHC + NOx	4.0 g/kW-hr <sup>2</sup>	Hourly	EUEDG	SC III.4 SC V.1	<b>40 CFR 60.4205(b)</b>
2. CO	3.5 g/kW-hr <sup>2</sup>	Hourly	EUEDG	SC III.4 SC V.1	<b>40 CFR 60.4205(b)</b>
3. PM	0.2 g/kW-hr <sup>2</sup>	Hourly	EUEDG	SC III.4 SC V.1	<b>40 CFR 60.4205(b)</b>

**II. MATERIAL LIMIT(S)**

1. The permittee shall burn only ultra-low diesel fuel, in EUEDG with a maximum sulfur content of 15 ppm (0.0015 %) by weight and either a minimum cetane index of 40 or a maximum aromatic content of 35% by volume.<sup>2</sup> **(40 CFR 60.4207(b))**

**III. PROCESS/OPERATIONAL RESTRICTION(S)**

1. The permittee shall not operate EUEDG for more than 500 hours per year on a 12-month rolling time period basis as determined at the end of each calendar month.<sup>2</sup> **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**
2. In order to be considered an emergency generator, the permittee must operate EUEDG according to the requirements below. Any operation other than this is prohibited. If not operated according to these requirements, then the engine must meet all requirements in 40 CFR Part 60, Subpart IIII for non-emergency engines:
  - a. The permittee may operate EUEDG for any combination of the purposes specified in SC III.2.a.i through a.iii below for a maximum of 100 hours per calendar year. Any operation for non-emergency situations as allowed by SC III.2.b counts as part of this 100 hours per calendar year.
    - i. EUEDG may be operated for maintenance checks and readiness testing, provided that the tests are recommended by Federal, State or local government, the manufacturer, the vendor, the regional transmission organization or equivalent balancing authority and transmission operator, or the insurance company associated with the engine. The owner or operator may petition the Administrator for approval of additional hours to be used for maintenance checks and readiness testing, but a petition is not required if the owner or operator maintains records indicating that federal, state, or local standards require maintenance and testing of emergency RICE beyond 100 hours per calendar year.<sup>2</sup> **(40 CFR 60.4211(f))**
3. The permittee shall do all the following, except as permitted in SC III.5, SC V.1, and SC VI.3:
  - a. Operate and maintain EUEDG and control device (if any) according to the manufacturer's emission-related written instructions;
  - b. Change only those emissions-related settings that are permitted by the manufacturer; and

- c. Meet the requirements of 40 CFR parts 89 and/or 1068 as it applies to EUEDG.<sup>2</sup> **(40 CFR 60.4211(a))**
4. Except as allowed in SC III.5, SC V.1, and SC VI.3, the permittee shall not operate EUEDG unless the engine is certified by the manufacturer to meet the applicable emission standards specified in §60.4205(b), which references §60.4202(a)(2), for all pollutants, for the same model year and maximum engine power for their 2007 model year and later emergency stationary CI ICE. The engine must be installed and configured according to the manufacturer's specifications.<sup>2</sup> **(40 CFR 60.4211(c))**
5. If the permittee purchases a non-certified engine, does not install, configure, operate and maintain EUEDG and control device(s), if any, according to the manufacturer's emission-related written instructions, or changes emission-related settings in a way that is not permitted by the manufacturer, compliance must be demonstrated by keeping a maintenance plan and shall, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions.<sup>2</sup> **(40 CFR 60.4211(g)(3))**

#### **IV. DESIGN/EQUIPMENT PARAMETER(S)**

1. The permittee shall equip and maintain EUEDG with a non-resettable hours meter to track the operating hours.<sup>2</sup> **(R 336.1205(1)(a), R 336.1225, 40 CFR 60.4209)**

#### **V. TESTING/SAMPLING**

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. If the permittee purchases a non-certified engine, does not install, configure, operate and maintain EUEDG and control device(s), if any, according to the manufacturer's emission-related written instructions, or the emission-related settings are changed in a way that is not permitted by the manufacturer, compliance shall be demonstrated by conducting an initial performance test to demonstrate compliance with the applicable emission standards within 1 year of startup, or within 1 year after an engine and control device is no longer installed, configured, operated and maintained in accordance with the manufacturer's emission-related written instructions, or within 1 year after the change in emission-related settings in a way that is not permitted by the manufacturer. The Permittee must conduct subsequent performance testing every 8,760 hours of engine operation or 3 years, whichever comes first, thereafter, to demonstrate compliance with the applicable emission standards. The performance tests shall be conducted according to 40 CFR 60.4212.<sup>2</sup> **(40 CFR 60.4211(g)(3), 40 CFR 60.4212)**
2. The permittee shall notify the AQD Technical Programs Unit Supervisor and the District Supervisor not less than 30 days of the time and place before performance tests are conducted. **(R 336.1213(3))**

#### **VI. MONITORING/RECORDKEEPING**

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. The permittee shall keep, in a satisfactory manner, fuel supplier certification records or fuel sample test data, for each delivery of diesel fuel oil used in EUEDG, demonstrating that the fuel sulfur content meets the requirement of 40 CFR 80.510(b). The certification or test data shall include the name of the oil supplier or laboratory, and the sulfur content of the fuel oil.<sup>2</sup> **(40 CFR 60.4207(b))**
2. The permittee shall monitor and record, in a satisfactory manner, the total hours of operation for EUEDG, on a monthly and 12-month rolling time period basis, and the hours of operation during non-emergency operation for EUEDG, on a calendar year time period basis, in a manner acceptable to the AQD District Supervisor. The permittee shall document how many hours are spent for emergency operation of EUEDG, including what classified the operation as emergency and how many hours are spent for non-emergency operation.<sup>2</sup> **(R 336.1205(1)(a) & (3), 40 CFR 60.4211, 40 CFR 60.4214)**
3. If the permittee does not install, configure, operate and maintain EUEDG and control device(s), if any, according to the manufacturer's emission-related written instructions, or the emission-related settings are changed in a way that is not permitted by the manufacturer, a maintenance plan and records of conducted maintenance shall be kept in accordance with 40 CFR 63.4211(g)(3).<sup>2</sup> **(40 CFR 60.4211(g)(3))**

#### **VII. REPORTING**

1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**
2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**
3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year. **(R 336.1213(4)(c))**
4. If testing is required, no less than 30 days prior to testing, the permittee must submit a complete stack-testing plan to the AQD Technical Programs Unit and District Office. The AQD must approve the final plan prior to testing. Verification of emission rates includes the submittal of a complete report of the test results to the AQD Technical Programs Unit and District Office within 60 days following the last date of the test.<sup>2</sup> **(R 336.2001, 40 CFR 60.8)**

See Appendix 8

**VIII. STACK/VENT RESTRICTION(S)**

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:

Stack & Vent ID	Maximum Exhaust Diameter / Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements
1. SV-EUEDG	8 <sup>2</sup>	20 <sup>2</sup>	<b>R 336.1225</b>

**IX. OTHER REQUIREMENT(S)**

1. The permittee shall comply with all provisions of the federal standards of Performance for new Stationary Sources as specified in 40 CFR Part 60, Subparts A & IIII, as they apply to EUEDG.<sup>2</sup> **(40 CFR Part 60, Subparts A and IIII)**
2. The permittee shall comply with all provisions of the National Emission Standards for Hazardous Air Pollutants as specified in 40 CFR Part 63, Subparts A and ZZZZ, as they apply to EUEDG.<sup>2</sup> **(40 CFR Part 63, Subparts A and ZZZZ)**

**Footnotes:**

<sup>1</sup> This condition is state only enforceable and was established pursuant to Rule 201(1)(b).  
<sup>2</sup> This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

## **EUNGENINE EMISSION UNIT CONDITIONS**

### **DESCRIPTION**

An existing emergency generator firing natural gas and propane, which is subject to the New Source Performance Standards for Stationary Spark Ignition Internal Combustion Engines, 40 CFR Part 60, Subpart JJJJ.

**Flexible Group ID:** NA

### **POLLUTION CONTROL EQUIPMENT**

NA

### **I. EMISSION LIMIT(S)**

NA

### **II. MATERIAL LIMIT(S)**

NA

### **III. PROCESS/OPERATIONAL RESTRICTION(S)**

1. The permittee shall operate the emergency generator EUNGENINE for emergency use only, except for 100 hours per calendar year for maintenance checks and readiness testing. **(40 CFR 60.4243(d))**

### **IV. DESIGN/EQUIPMENT PARAMETER(S)**

1. The permittee shall equip and maintain each engine in EUNGENINE with a non-resettable hour meter to track the operating hours. **(R 336.1213(3)(b)(ii))**

### **V. TESTING/SAMPLING**

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

NA

### **VI. MONITORING/RECORDKEEPING**

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. The permittee shall monitor and record the hours of operation of EUNGENINE, on a monthly and 12-month rolling time period basis, including how many hours are spent for emergency operation, what classified the operation as emergency, and how many hours are spent for non-emergency operation. Records shall be kept in a manner that is acceptable to the AQD District Supervisor. **(R 336.1213(3)(b)(ii))**

### **VII. REPORTING**

1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**
2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**

3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year. **(R 336.1213(4)(c))**

See Appendix 8

**VIII. STACK/VENT RESTRICTION(S)**

NA

**IX. OTHER REQUIREMENT(S)**

1. The permittee shall comply with all applicable provisions of the New Source Performance Standards for Stationary Spark Ignition Internal Combustion Engines, 40 CFR Part 60, Subpart JJJJ and National Emission Standards for Hazardous Air Pollutants, as specified in 40 CFR Part 63, Subpart A and Subpart ZZZZ, for Stationary Reciprocating Internal Combustion Engines.<sup>2</sup> **(40 CFR 63.6595, 40 CFR Part 63, Subparts A and ZZZZ)**

**Footnotes:**

<sup>1</sup> This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

<sup>2</sup> This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

**D. FLEXIBLE GROUP SPECIAL CONDITIONS**

Part D outlines the terms and conditions that apply to more than one emission unit. The permittee is subject to the special conditions for each flexible group in addition to the General Conditions in Part A and any other terms and conditions contained in this ROP.

The permittee shall comply with all specific details in the special conditions and the underlying applicable requirements cited. If a specific condition type does not apply, NA (not applicable) has been used in the table. If there are no special conditions that apply to more than one emission unit, this section will be left blank.

**FLEXIBLE GROUP SUMMARY TABLE**

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

Flexible Group ID	Flexible Group Description	Associated Emission Unit IDs
FGNGOP	This flexible group consists of the Wärtsilä 18V50DF Engines while firing natural gas as the primary fuel. The terms and conditions of FGNGOP are triggered only when less than 2% of the fuel fired in each engine in FGNGOP on an annual average is fuel oil, such that the engines meet the definition of a spark ignition engine.	EUENGINE01 EUENGINE02 EUENGINE03
FGDIESELOP	This flexible group consists of the Wärtsilä 18V50DF Engines while firing fuel oil as the primary fuel. The terms and conditions of FGDIESELOP are triggered only when equal to or greater than 2 % of the fuel fired in each engine in FGDIESELOP on an annual average is fuel oil, such that the engines meet the definition of a compression ignition engine.	EUENGINE01 EUENGINE02 EUENGINE03
<u>FGDGACT</u>	<u>One 4,000 gallon gasoline storage tank.</u>	<u>EUTANK1</u>

**FGNGOP  
 FLEXIBLE GROUP CONDITIONS**

**DESCRIPTION**

This flexible group consists of the Wärtsilä 18V50DF Engines while firing natural gas as the primary fuel. The terms and conditions of FGNGOP are triggered only when less than 2 % of the fuel fired in each engine in FGNGOP on an annual average is fuel oil, such that the engines meet the definition of a spark ignition engine.

**Emission Units:** EUENGINE01, EUENGINE02, EUENGINE03

**POLLUTION CONTROL EQUIPMENT**

SCR for NO<sub>x</sub> control and oxidation catalyst for VOC and CO control.

**I. EMISSION LIMIT(S)**

Pollutant	Limit	Time Period/Operating Scenario	Equipment	Monitoring/Testing Method	Underlying Applicable Requirements
1. NO <sub>x</sub>	3.3 pph excluding startup and shutdown <sup>2</sup>	Hourly	Each engine in FGNGOP	SC V.1	R 336.1205(1)(a) & (3) 40 CFR 52.21(c) & (d)
2. NO <sub>x</sub>	1.0 g/hp-hr or 82 ppmvd @15%O <sub>2</sub> <sup>2</sup>	Hourly	Each engine in FGNGOP	SC III.3 SC V.2	40 CFR 60.4233(e) Table 1 of 40 CFR Part 60, Subpart JJJJ
3. CO	5.0 pph excluding startup and shutdown <sup>2</sup>	Hourly	Each engine in FGNGOP	SC V.1	R 336.1205(1)(a) & (3)
4. CO	2.0 g/hp-hr or 270 ppmvd @15%O <sub>2</sub> <sup>2</sup>	Hourly	Each engine in FGNGOP	SC III.3 SC V.2	40 CFR 60.4233(e) Table 1 of 40 CFR Part 60, Subpart JJJJ
5. VOC <sup>A</sup>	0.7 g/hp-hr or 60 ppmvd @15%O <sub>2</sub> <sup>2</sup>	Hourly	Each engine in FGNGOP	SC III.3 SC V.2	40 CFR 60.4233(e) Table 1 of 40 CFR Part 60, Subpart JJJJ
6. VOC <sup>B</sup>	16.5 pph excluding startup and shutdown <sup>2</sup>	Hourly	Each engine in FGNGOP	SC V.3	R 336.1205(1)(a) & (3) R 336.1702(a)
7. Formaldehyde	0.648 pph excluding startup and shutdown <sup>2</sup>	Hourly	Each engine in FGNGOP	SC V.3	R 336.1205(1)(a) & (3) R 336.1224 R 336.1225

ppmvd = parts per million by volume at 15 % oxygen and on a dry gas basis  
<sup>A</sup> Per footnote "d" of Table 1 of 40 CFR Part 60, Subpart JJJJ, when calculating emissions of VOCs, emissions of formaldehyde should not be included.  
<sup>B</sup> This emission limit is for all VOCs and the compliance demonstration must include formaldehyde.

**II. MATERIAL LIMIT(S)**

NA

**III. PROCESS/OPERATIONAL RESTRICTION(S)**

- The permittee shall operate and maintain each unit in FGNGOP such that it meets the emission limits in SC I.2, SC I.4, and SC I.5 over the entire life of the engine.<sup>2</sup> (40 CFR 60.4234)

2. The permittee shall submit, implement, and maintain an updated malfunction abatement plan (MAP) as described in Rule 911(2) for each unit in FGNGOP. The MAP shall, at a minimum, specify the following:
  - a. A complete preventative maintenance program including identification of the supervisory personnel responsible for overseeing the inspection, maintenance, and repair of air-cleaning devices, a description of the items or conditions that shall be inspected, the frequency of the inspections or repairs, and an identification of the major replacement parts that shall be maintained in inventory for quick replacement.
  - b. An identification of the source and air-cleaning device operating variables that shall be monitored to detect a malfunction or failure, the normal operating range of these variables, and a description of the method of monitoring or surveillance procedures.
  - c. A description of the corrective procedures or operational changes that shall be taken in the event of a malfunction or failure to achieve compliance with the applicable emission limits.

If at any time the MAP fails to address or inadequately addresses an event that meets the characteristics of a malfunction, the permittee shall amend the MAP within 90 days after such an event occurs. The permittee shall also amend the MAP within 90 days, if new equipment is installed or upon request from the District Supervisor. The permittee shall submit the MAP and any amendments to the MAP to the AQD District Supervisor for review and approval. If the AQD does not notify the permittee within 90 days of submittal, the MAP or amended MAP shall be considered approved. Until an amended plan is approved, the permittee shall implement corrective procedures or operational changes to achieve compliance with all applicable emission limits.<sup>2</sup> **(R 336.1911)**

3. If the permittee is demonstrating compliance with the emission standards in 40 CFR 60.4233(e) by purchasing a certified engine, compliance shall be demonstrated according to the following:
  - a. The engine shall be certified for the for the same model year; and
  - b. The certified engine and control device shall be operated and maintained according to the manufacturer's emission-related written instructions. The applicable requirements in 40 CFR Part 1068, Subparts A-D shall be met. If the engine settings are adjusted according to and consistent with the manufacturer's instructions, the engine will not be considered out of compliance.<sup>2</sup> **(40 CFR 60.4243(b)(1))**
4. If the permittee has purchased a non-certified engine or purchased a certified engine which was not operated and maintained as specified, for units in FGNGOP, the permittee shall keep a maintenance plan and to the extent practicable, maintain and operate the unit(s) in a manner consistent with good air pollution control practice for minimizing emissions.<sup>2</sup> **(40 CFR 60.4243(b)(2))**

**IV. DESIGN/EQUIPMENT PARAMETER(S)**

1. The permittee shall not operate FGNGOP unless SCR and an oxidation catalyst are installed, maintained, and operated in a satisfactory manner, for each unit in FGNGOP. Satisfactory manner includes operating and maintaining each control device in accordance with an approved MAP for each unit in FGNGOP as required in SC III.3.<sup>2</sup> **(R 336.1205(1)(a) & (3), R 336.1910, 40 CFR 52.21(c) & (d))**

**V. TESTING/SAMPLING**

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. Within five years of the previous acceptable verification of emission rates, the permittee shall verify NO<sub>x</sub> and CO pph emission rates from each unit in FGNGOP by testing at owner's expense, in accordance with Department requirements. Upon approval of the AQD District Supervisor, subsequent testing may be conducted upon a representative engine in FGNGOP. However, the permittee shall not test the same representative unit in subsequent tests unless approved or requested by the AQD District Supervisor. Testing shall be performed using an approved EPA Method listed below.

<b>Pollutant</b>	<b>Test Method Reference</b>
NO <sub>x</sub>	40 CFR Part 60, Appendix A
CO	40 CFR Part 60, Appendix A

An alternate method, or a modification to the approved EPA Method, may be specified in an AQD-approved Test Protocol. No less than 30 days prior to testing, the permittee shall submit a complete test plan to the AQD Technical Programs Unit and District Office. The AQD must approve the final plan prior to testing, including any modifications to the method in the test protocol that are proposed after initial submittal. The permittee must submit a complete report of the test results to the AQD Technical Programs Unit and District Office within 60 days following the last date of the test.<sup>2</sup> **(R 336.1205(1)(a) & (3), R 336.1902, R 336.2001, R 336.2003, R 336.2004, 40 CFR 52.21(c) & (d))**

2. If the permittee purchases a non-certified engine or a certified engine that is not operated and maintained according to the manufacturer's written emissions-related instructions, the permittee shall:
  - a. Conduct an initial performance test within one year after startup of the engine.
  - b. Conduct subsequent performance testing every 8,760 hours or 3 years, whichever comes first, thereafter to demonstrate compliance, unless an alternative schedule is approved.
  - c. The performance tests shall be conducted according to 40 CFR 60.4244 and Table 2 of 40 CFR Part 60, Subpart JJJJ.
  - d. If testing to quantify VOC emissions is performed using test methods based on VOC speciation, then a list of required VOCs must be approved by the AQD and must include, at a minimum, the following air contaminants: propane, butane, pentane, hexane, ethene, propene, butene, acetaldehyde, acrolein, propanol, acetylene, methanol, benzene, 1-butene, ethylene, and propylene.

No less than 30 days prior to testing, the permittee shall submit a complete test plan to the AQD Technical Programs Unit and District Office. The permittee must submit a complete report of the test results to the AQD Technical Programs Unit and District Office within 60 days following the last date of the test.<sup>2</sup> **(R 336.2001, 40 CFR 60.4243(b)(2)(ii), 40 CFR 60.4244, 40 CFR 60.4245(d), Table 2 of 40 CFR Part 60, Subpart JJJJ)**

3. The permittee shall verify VOC and formaldehyde pph emission rates from each unit in FGNGOP by testing at owner's expense, in accordance with Department requirements at least once every five years. Upon approval of the AQD District Supervisor, subsequent testing may be conducted upon a representative engine in FGNGOP. However, the permittee shall not test the same representative unit in subsequent tests unless approved or requested by the AQD District Supervisor. Testing shall be performed using an approved EPA Method listed below.

<b>Pollutant</b>	<b>Test Method Reference</b>
VOCs	40 CFR Part 60, Appendix A, 40 CFR Part 63, Appendix A
HAPs	40 CFR Part 63, Appendix A

An alternate method, or a modification to the approved EPA Method, may be specified in an AQD-approved Test Protocol. Any test method(s) used must properly account for VOC emissions, which at a minimum, must include the following air contaminants: propane, butane, pentane, hexane, ethene, propene, butene, formaldehyde, acetaldehyde, acrolein, propanol, acetylene, methanol, benzene, 1-butene, ethylene, and propylene. No less than 30 days prior to testing, the permittee shall submit a complete test plan to the AQD Technical Programs Unit and District Office. The AQD must approve the final plan prior to testing, including any modifications to the method in the test protocol that are proposed after initial submittal. The permittee must submit a complete report of the test results to the AQD Technical Programs Unit and District Office within 60 days following the last date of the test.<sup>2</sup> **(R 336.1205(1)(a) & (3), R 336.1224, R 336.1225, R 336.1702(a), R 336.1902, R 336.2001, R 336.2003, R 336.2004)**

4. The permittee shall notify the AQD Technical Programs Unit Supervisor and the District Supervisor not less than 30 days of the time and place before performance tests are conducted. **(R 336.1213(3))**

**VI. MONITORING/RECORDKEEPING**

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. The permittee shall keep, in a satisfactory manner, records of testing required in SC V.2 or manufacturer's certification and maintenance records documenting that each unit in FGNGOP meets the applicable emission limitations contained in the federal Standards of Performance for New Stationary Sources 40 CFR Part 60,

Subpart JJJJ. The permittee shall keep all records on file and make them available to the Department upon request.<sup>2</sup> **(40 CFR 60.4245)**

2. The permittee shall keep records of the following information for each unit in FGNGOP:
  - a. All notifications submitted to comply with 40 CFR Part 60, Subpart JJJJ and all documentation supporting any notification.
  - b. Maintenance conducted on each unit in FGNGOP. The records shall adequately demonstrate compliance with either condition SC III.3 or SC III.4 above.
  - c. If each unit in FGNGOP is a certified engine, documentation from the manufacturer that each unit in FGNGOP is certified to meet the emission standards and information as required in 40 CFR Parts 90, 1048, 1054, and 1060, as applicable.
  - d. If a unit(s) in FGNGOP is not a certified engine or is a certified engine operating in a non-certified manner and subject to 40 CFR 60.4243(a)(2), documentation that each unit in FGNGOP meets the emission standards.<sup>2</sup> **(40 CFR 60.4243(b)(1), 40 CFR 60.4245(a))**
3. The permittee shall calculate and keep, in a satisfactory manner, records of the parts diesel fuel to parts total fuel on an energy equivalent basis each calendar year for EUENGINE01, EUENGINE02, and EUENGINE03.<sup>2</sup> **(40 CFR Part 60, Subparts IIII & JJJJ)**

## VII. REPORTING

1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**
2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**
3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year. **(R 336.1213(4)(c))**

See Appendix 8

## VIII. STACK/VENT RESTRICTION(S)

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:

Stack & Vent ID	Maximum Exhaust Diameter / Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements
1. SV-EUENGINE01	64 <sup>2</sup>	70 <sup>2</sup>	<b>R 336.1225</b>
2. SV-EUENGINE02	64 <sup>2</sup>	70 <sup>2</sup>	<b>R 336.1225</b>
3. SV-EUENGINE03	64 <sup>2</sup>	70 <sup>2</sup>	<b>R 336.1225</b>

## IX. OTHER REQUIREMENT(S)

1. The terms and conditions of FGNGOP are triggered only when less than 2 parts diesel fuel to 100 parts total fuel on an energy equivalent basis is fired in EUENGINE01, EUENGINE02, or EUENGINE03 on an annual average basis as determined each calendar year, such that the engines meet the definition of a spark ignition engine.<sup>2</sup> **(40 CFR 60.4248)**
2. The permittee shall comply with the provisions of the federal Standards of Performance for New Stationary Sources as specified in 40 CFR Part 60, Subpart A and Subpart JJJJ, as they apply to each unit in FGNGOP.<sup>2</sup> **(40 CFR Part 60, Subparts A and JJJJ)**

3. The permittee shall comply with all provisions of the National Emission Standards for Hazardous Air Pollutants as specified in 40 CFR Part 63, Subparts A and ZZZZ, as they apply to each unit in FGNGOP.<sup>2</sup> **(40 CFR Part 63, Subparts A and ZZZZ)**
4. The permittee shall comply with the requirements of 40 CFR 72.7(a) for all periods for which the unit is exempt from the Acid Rain Program under 40 CFR 72.7. **(40 CFR 72.7(f)(1)(i))**
5. If a unit becomes no longer exempt from the Acid Rain Program under 40 CFR 72.7, the designated representative shall submit a complete Acid Rain permit application no later than 60 days after the first date on which the unit is no longer exempt. **(40 CFR 72.7(f)(4)(ii))**

**Footnotes:**

<sup>1</sup> This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

<sup>2</sup> This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

**FGDIESELOP  
 FLEXIBLE GROUP CONDITIONS**

**DESCRIPTION**

This flexible group consists of the Wärtsilä 18V50DF Engines while firing fuel oil as the primary fuel. The terms and conditions of FGDIESELOP are triggered only when equal to or greater than 2 % of the fuel fired in each engine in FGDIESELOP on an annual average is fuel oil, such that the engines meet the definition of a compression ignition engine.

**Emission Units:** EUENGINE01, EUENGINE02, EUENGINE03

**POLLUTION CONTROL EQUIPMENT**

SCR for NO<sub>x</sub> control and oxidation catalyst for VOC and CO control.

**I. EMISSION LIMIT(S)**

Pollutant	Limit	Time Period/ Operating Scenario	Equipment	Monitoring/ Testing Method	Underlying Applicable Requirements
1. NO <sub>x</sub>	21 pph excluding startup and shutdown <sup>2</sup>	Hourly	Each engine in FGDIESELOP	SC V.1	<b>R 336.1205(1)(a) &amp; (3) 40 CFR 52.21(c) &amp; (d)</b>
2. NO <sub>x</sub>	2.58 g/kW-hr <sup>C.2</sup>	Hourly	Each engine in FGDIESELOP	SC V.2 SC V.3	<b>40 CFR 60.4204(c)(3)(ii)</b>
3. PM	0.15 g/kW-hr <sup>2</sup>	Hourly	Each engine in FGDIESELOP	SC V.2 SC V.3	<b>40 CFR 60.4204(c)(4)</b>
4. SO <sub>2</sub>	7.8 pph excluding startup and shutdown <sup>2</sup>	Hourly	Each engine in FGDIESELOP	SC II.1 SC VI.2	<b>R 336.1205(1)(a) &amp; (3) 40 CFR 52.21(c) &amp; (d)</b>

<sup>C</sup> This is from the equation  $9 \times n^{-0.20}$  required in 40 CFR 60.4204(c)(3)(ii), where n is the maximum engine speed. 514 rpm was used as the maximum engine speed based upon manufacturer specifications.

**II. MATERIAL LIMIT(S)**

1. The permittee shall burn only fuel oil, in FGDIESELOP with a maximum sulfur content of 500 ppm (0.05 %) by weight.<sup>2</sup> **(R 336.1205(1)(a) & (3), 40 CFR 52.21(c) & (d), 40 CFR 60.4207(d))**

**III. PROCESS/OPERATIONAL RESTRICTION(S)**

1. The permittee shall operate and maintain each unit in FGDIESELOP such that it meets the emission limits in SC I.2 and I.3 over the entire life of the engine.<sup>2</sup> **(40 CFR 60.4206)**
2. The permittee shall submit, implement, and maintain an updated MAP as described in Rule 911(2). The MAP shall, at a minimum, specify the following:
  - a. A complete preventative maintenance program including identification of the supervisory personnel responsible for overseeing the inspection, maintenance, and repair of air-cleaning devices, a description of the items or conditions that shall be inspected, the frequency of the inspections or repairs, and an identification of the major replacement parts that shall be maintained in inventory for quick replacement.
  - b. An identification of the source and air-cleaning device operating variables that shall be monitored to detect a malfunction or failure, the normal operating range of these variables, and a description of the method of monitoring or surveillance procedures.

- c. A description of the corrective procedures or operational changes that shall be taken in the event of a malfunction or failure to achieve compliance with the applicable emission limits.

If at any time the MAP fails to address or inadequately addresses an event that meets the characteristics of a malfunction, the permittee shall amend the MAP within 90 days after such an event occurs. The permittee shall also amend the MAP within 90 days, if new equipment is installed or upon request from the District Supervisor. The permittee shall submit the MAP and any amendments to the MAP to the AQD District Supervisor for review and approval. If the AQD does not notify the permittee within 90 days of submittal, the MAP or amended MAP shall be considered approved. Until an amended plan is approved, the permittee shall implement corrective procedures or operational changes to achieve compliance with all applicable emission limits.<sup>2</sup> **(R 336.1911)**

- 3. The permittee shall do all the following, except as permitted in SC III.6, SC V.2, and SC VI.4:
  - a. Operate and maintain each engine and control device (if any) in FGDIESELOP according to the manufacturer’s emission-related written instructions;
  - b. Change only those emissions-related settings that are permitted by the manufacture;
  - c. Meet the requirements of 40 CFR Parts 89, 94, and/or 1068, as they apply.<sup>2</sup> **(40 CFR 60.4211(a))**
- 4. If the permittee does not install, configure, operate and maintain each unit of FGDIESELOP and control device(s), if any, according to the manufacturer’s emission-related written instructions, or you change emission-related settings in a way that is not permitted by the manufacturer, compliance must be demonstrated by keeping a maintenance plan and shall, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions.<sup>2</sup> **(40 CFR 60.4211(g)(3))**

**IV. DESIGN/EQUIPMENT PARAMETER(S)**

- 1. The permittee shall equip and maintain each unit in FGDIESELOP with non-resettable hours meters to track the operating hours.<sup>2</sup> **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a))**
- 2. The permittee shall not operate FGDIESELOP unless SCR and an oxidation catalyst are installed, maintained, and operated in a satisfactory manner, for each unit in FGDIESELOP. Satisfactory manner includes operating and maintaining each control device in accordance with an approved MAP for each unit in FGDIESELOP as required in SC III.2.<sup>2</sup> **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1910, 40 CFR 52.21(c) & (d))**

**V. TESTING/SAMPLING**

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

- 1. Within five years of the previous acceptable verification of emission rates, the permittee shall verify NO<sub>x</sub> pph emission rates from each unit in FGDIESELOP by testing at owner's expense, in accordance with Department requirements. Upon approval of the AQD District Supervisor, subsequent testing may be conducted upon a representative engine in FGDIESELOP. However, the permittee shall not test the same representative unit in subsequent tests unless approved or requested by the AQD District Supervisor. Testing shall be performed using an approved EPA Method listed below.

<b>Pollutant</b>	<b>Test Method Reference</b>
NO <sub>x</sub>	40 CFR Part 60, Appendix A

An alternate method, or a modification to the approved EPA Method, may be specified in an AQD-approved Test Protocol. No less than 30 days prior to testing, the permittee shall submit a complete test plan to the AQD Technical Programs Unit and District Office. The AQD must approve the final plan prior to testing, including any modifications to the method in the test protocol that are proposed after initial submittal. The permittee must submit a complete report of the test results to the AQD Technical Programs Unit and District Office within 60 days following the last date of the test.<sup>2</sup> **(R 336.1205(1)(a) & (3), R 336.1902, R 336.2001, R 336.2003, R 336.2004, 40 CFR 52.21(c) & (d))**

- 2. The permittee shall demonstrate compliance with the emission standards specified in §60.4204(c) for each unit of FGDIESELOP by doing all of the following:

- a. Conducting an initial performance test to demonstrate initial compliance with the emission standards according to test methods in 40 CFR 60.4213.
  - b. Establishing operating parameters to be monitored continuously to ensure the stationary internal combustion engine continues to meet the emission standards. The owner or operator must petition the Administrator for approval of operating parameters to be monitored continuously. The petition must include the information described in SC V.1.b.i through b.v below:
    - i. Identification of the specific parameters you propose to monitor continuously;
    - ii. A discussion of the relationship between these parameters and NO<sub>x</sub> and PM emissions, identifying how the emissions of these pollutants change with changes in these parameters, and how limitations on these parameters will serve to limit NO<sub>x</sub> and PM emissions;
    - iii. A discussion of how you will establish the upper and/or lower values for these parameters which will establish the limits on these parameters in the operating limitations;
    - iv. A discussion identifying the methods and the instruments you will use to monitor these parameters, as well as the relative accuracy and precision of these methods and instruments; and
    - v. A discussion identifying the frequency and methods for recalibrating the instruments you will use for monitoring these parameters.
  - c. Conducting annual performance tests to demonstrate continuous compliance with the emission standards according to test methods in 40 CFR 60.4213, unless an alternative schedule is approved.<sup>2</sup>  
**(40 CFR 60.4204(c), 40 CFR 60.4211(d))**
3. If the permittee does not install, configure, operate and maintain each unit of FGDIESELOP and control device(s), if any, according to the manufacturer's emission-related written instructions, or the emission-related settings are changed in a way that is not permitted by the manufacturer, compliance shall be demonstrated by conducting an initial performance test to demonstrate compliance with the applicable emission standards within 1 year of startup, or within 1 year after an engine and control device is no longer installed, configured, operated and maintained in accordance with the manufacturer's emission-related written instructions, or within 1 year after you change emission-related settings in a way that is not permitted by the manufacturer. The permittee must conduct subsequent performance testing every 8,760 hours of engine operation or 3 years, whichever comes first, thereafter, to demonstrate compliance with the applicable emission standards. The performance tests shall be conducted according to 40 CFR 60.4213.<sup>2</sup> **(40 CFR 60.4211(g)(3))**
4. The permittee shall notify the AQD Technical Programs Unit Supervisor and the District Supervisor not less than 30 days of the time and place before performance tests are conducted. **(R 336.1213(3))**

## **VI. MONITORING/RECORDKEEPING**

Records shall be maintained on file for a period of five years. **(R 336.1213(3)(b)(ii))**

1. The permittee shall complete all required calculations in a format acceptable to the AQD District Supervisor and make them available by the last day of the calendar month, for the previous calendar month, unless otherwise specified in any monitoring/recordkeeping special condition.<sup>2</sup> **(R 336.1205(1)(a))**
2. The permittee shall keep, in a satisfactory manner, fuel supplier certification records or fuel sample test data, for each delivery of diesel fuel oil used in FGDIESELOP, demonstrating that the fuel sulfur content meets the requirement of SC II.1 and 40 CFR 60.4207(d). The certification or test data shall include the name of the oil supplier or laboratory, and the sulfur content of the fuel oil.<sup>2</sup> **(R 336.1205(1)(a) & (3), 40 CFR 52.21(c) & (d), 40 CFR 60.4207(d))**
3. If the permittee does not install, configure, operate and maintain each unit of FGDIESELOP and control device(s), if any, according to the manufacturer's emission-related written instructions, or the emission-related settings are changed in a way that is not permitted by the manufacturer, a maintenance plan and records of conducted maintenance shall be kept in accordance with 40 CFR 63.4211(g)(3).<sup>2</sup> **(40 CFR 60.4211(g)(3))**
4. The permittee shall keep records of the following information for each unit in FGDIESELOP:
  - a. All notifications submitted to comply with 40 CFR Part 60, Subpart IIII and all documentation supporting any notification.
  - b. Maintenance conducted on each unit in FGDIESELOP. The records shall adequately demonstrate compliance with either condition SC III.5 or SC III.6 above.

- c. If each unit in FGDIESELOP is a certified engine, documentation from the manufacturer that each unit in FGDIESELOP is certified to meet the emission standards.
- d. If a unit(s) in FGDIESELOP is not a certified engine or is a certified engine operating in a non-certified manner, documentation that each unit in FGDIESELOP meets the emission standards.<sup>2</sup>  
**(40 CFR 60.4214(a)(2))**

5. The permittee shall calculate and keep, in a satisfactory manner, records of the parts diesel fuel to parts total fuel on an energy equivalent basis each calendar year for EUENGINE01, EUENGINE02, and EUENGINE03.<sup>2</sup>  
**(40 CFR Part 60, Subparts IIII & JJJJ)**

**VII. REPORTING**

- 1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. **(R 336.1213(3)(c)(ii))**
- 2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. **(R 336.1213(3)(c)(i))**
- 3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year.  
**(R 336.1213(4)(c))**

See Appendix 8

**VIII. STACK/VENT RESTRICTION(S)**

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:

Stack & Vent ID	Maximum Exhaust Diameter / Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements
1. SV-EUENGINE01	64 <sup>2</sup>	70 <sup>2</sup>	<b>R 336.1225</b>
2. SV-EUENGINE02	64 <sup>2</sup>	70 <sup>2</sup>	<b>R 336.1225</b>
3. SV-EUENGINE03	64 <sup>2</sup>	70 <sup>2</sup>	<b>R 336.1225</b>

**IX. OTHER REQUIREMENT(S)**

- 1. The terms and conditions of FGDIESELOP are triggered only when equal to or greater than 2 parts diesel fuel to 100 parts total fuel on an energy equivalent basis is fired in EUENGINE01, EUENGINE02, or EUENGINE03 on an annual average basis as determined each calendar year, such that the engines meet the definition of a compression ignition engine.<sup>2</sup> **(40 CFR 60.4219)**
- 2. The permittee shall comply with all provisions of the federal standards of Performance for new Stationary Sources as specified in 40 CFR Part 60, Subparts A & IIII, as they apply to FGDIESELOP.<sup>2</sup> **(40 CFR Part 60, Subparts A & IIII)**
- 3. The permittee shall comply with all provisions of the National Emission Standards for Hazardous Air Pollutants as specified in 40 CFR Part 63, Subparts A and ZZZZ, as they apply to FGDIESELOP.<sup>2</sup> **(40 CFR Part 63, Subparts A & ZZZZ)**
- 4. The permittee shall comply with the requirements of 40 CFR 72.7(a) for all periods for which the unit is exempt from the Acid Rain Program under 40 CFR 72.7. **(40 CFR 72.7(f)(1)(i))**

5. If a unit becomes no longer exempt from the Acid Rain Program under 40 CFR 72.7, the designated representative shall submit a complete Acid Rain permit application no later than 60 days after the first date on which the unit is no longer exempt. **(40 CFR 72.7(f)(4)(ii))**

**Footnotes:**

- <sup>1</sup> This condition is state only enforceable and was established pursuant to Rule 201(1)(b).
- <sup>2</sup> This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

## FG-GDFMACT FLEXIBLE GROUP CONDITIONS

### DESCRIPTION

This flexible group includes existing and new/reconstructed stationary gasoline dispensing facilities (GDF) that have a maximum monthly gasoline throughput of at least 10,000 gallons and no more than 100,000 gallons and located at an area source of hazardous air pollutants (HAPs). The gasoline distribution area source MACT (maximum achievable control technology) imposes Stage I controls to control emissions during the loading of gasoline storage tanks at each GDF and management (work) practices. The federal regulation addressed by this flexible group includes:

➤ The National Emission Standard for Hazardous Air Pollutants (NESHAP) for Source Categories: Gasoline Dispensing Facilities. Title 40 of the Code of Federal Regulations (CFR), Parts 9 and 63 (40 CFR 63.11110-11132), Subpart CCCCC (hereinafter GDF MACT) initially promulgated effective September 23, 2008. Amendments were proposed on December 15, 2009 and the Final Rule was promulgated January 24, 2011.

A GDF is an "existing" GDF if it was constructed or reconstructed on or before November 9, 2006. A GDF is "new" if it was constructed or reconstructed after November 9, 2006. (40 CFR 63.11112(b) and (c))

The compliance date for existing GDF that only load gasoline into fuel tanks other than those in motor vehicles, as defined in 40 CFR 63.11132, is January 24, 2014. 40 CFR 63.11124(a)(1) states that GDF that are now subject to the rule because they only load gasoline into fuel tanks other than those in motor vehicles, as defined in 40 CFR 63.11132, must submit Initial Notifications within 120 days of publication of these final amendments. 40 CFR 63.11124(a)(2) and (b)(2) include a requirement that facilities must state in their Notification of Compliance Status (NOCS) report whether the facilities' gasoline throughput is determined based on the volume of gasoline loaded into all gasoline storage tanks, or on the volume of gasoline dispensed from all gasoline storage tanks. EPA also specifically included the 60-day time frame for the submittal of the NOCS in 63.11124(a)(2).

Emission Units: EU-TANK1

### POLLUTION CONTROL EQUIPMENT

NA

#### I. EMISSION LIMIT(S)

NA

#### II. MATERIAL LIMIT(S)

NA

#### III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The permittee must, at all times, operate and maintain any affected source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Administrator which may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the source. (40 CFR 63.11115(a))
2. The permittee shall not allow gasoline to be handled in a manner that would result in vapor releases to the atmosphere for extended periods of time. Measures to be taken include, but are not limited to the following: (40 CFR 63.11116(a), 40 CFR 63.11117(a))

- a. Minimize gasoline spills. (40 CFR 63.11116(a)(1))
  - b. Clean up spills as expeditiously as practicable. (40 CFR 63.11116(a)(2))
  - c. Cover all open gasoline containers and all gasoline storage tank fill-pipes with a gasketed seal when not in use. (40 CFR 63.11116(a)(3))
  - d. Minimize gasoline sent to open waste collection systems that collect and transport gasoline to reclamation and recycling devices, such as oil/water separators. (40 CFR 63.11116(a)(4))
3. The permittee must only load gasoline into storage tanks utilizing submerged filling, as defined in 40 CFR 63.11132, and as specified in 40 CFR 63.11117(b)(1), (2), and (3). The applicable distances in 40 CFR 63.11117(b)(1) and (2) shall be measured from the point in the opening of the submerged fill pipe that is the greatest distance from the bottom of the storage tank. (40 CFR 63.11117(b))
- a. Submerged fill pipes installed on or before November 9, 2006, must be no more than 12 inches from the bottom of the tank. (40 CFR 63.11117(b)(1))
  - b. Submerged fill pipes installed after November 9, 2006, must be no more than 6 inches from the bottom of the tank. (40 CFR 63.11117(b)(2))
  - c. Submerged fill pipes not meeting the specifications listed on 40 CFR 63.11117(b)(1) and (2) are allowed if the owner or operator can demonstrate that the liquid level in the tank is always above the entire opening of the fill pipe. Documentation for such demonstration must be made available for inspection by the Administrator's delegated representative during the course of a site visit. (40 CFR 63.11117(b)(3))
  - d. Gasoline storage tanks with capacities of less than 250 gallons are not required to comply with the submerged fill requirements cited in 40 CFR 63.11117(b), but must comply only with all of the requirements in 40 CFR 63.11116. (40 CFR 63.11117(c))
4. If the GDF has a monthly throughput of 100,000 gallons of gasoline or more, the permittee must comply with the requirements in 40 CFR 63.11118. (40 CFR 63.11111(d))
5. If the affected source's throughput ever exceeds an applicable throughput threshold, the affected source will remain subject to the requirements for sources above the threshold, even if the affected source throughput later falls below the applicable throughput threshold. (40 CFR 63.11111(i))

#### **IV. DESIGN/EQUIPMENT PARAMETER(S)**

NA

#### **V. TESTING/SAMPLING**

Records shall be maintained on file for a period of five years. (R 336.1213(3)(b)(ii))

NA

#### **VI. MONITORING/RECORDKEEPING**

Records shall be maintained on file for a period of five years. (R 336.1213(3)(b)(ii))

1. The permittee must have records available within 24 hours of a request by the Administrator to document your gasoline throughput. (40 CFR 63.11117(d))
2. The permittee must keep applicable records as specified in 40 CFR 63.11125(d).
  - a. Records of the occurrence and duration of each malfunction of operation (i.e., process equipment) or the air pollution control and monitoring equipment. (40 CFR 63.11125(d)(1))
  - b. Records of actions taken during periods of malfunction to minimize emissions in accordance with 40 CFR 63.11115(a), including corrective actions to restore malfunctioning process and air pollution control and monitoring equipment to its normal or usual manner of operation. (40 CFR 63.11125(d)(2))

#### **VII. REPORTING**

1. Prompt reporting of deviations pursuant to General Conditions 21 and 22 of Part A. (R 336.1213(3)(c)(ii))
2. Semiannual reporting of monitoring and deviations pursuant to General Condition 23 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for reporting period July 1 to December 31 and September 15 for reporting period January 1 to June 30. (R 336.1213(3)(c)(i))
3. Annual certification of compliance pursuant to General Conditions 19 and 20 of Part A. The report shall be postmarked or received by the appropriate AQD District Office by March 15 for the previous calendar year. (R 336.1213(4)(c))
4. Submit an Initial Notification if subject to this subpart by May 9, 2008, or at the time the GDF becomes subject to the control requirements (submerged fill), unless the facility meets the requirements in SC VII.6 below. The notification must be submitted to the applicable USEPA Regional Office and the AQD and contain: (40 CFR 63.11124(a)(1))
  - a. The name and address of the owner and the operator.
  - b. The address (i.e., physical location) of the GDF.
  - c. A statement that the notification is being submitted in response to the Gasoline Distribution Facility Area MACT (40 CFR Part 63, Subpart CCCCCC) and identifying the requirements in paragraphs a. through c. of 40 CFR 63.11117 that apply.
5. Submit a Notification of Compliance Status to the applicable USEPA Regional Office and the AQD, by January 10, 2011 (or upon startup of a new/reconstructed GDF) unless in compliance with Michigan Rule 703 (R 336.1703) or a permit requiring submerged fill (see SC VII.6 below). The Notification of Compliance Status must be signed by a responsible official who must certify its accuracy and must indicate whether the source has complied with the requirements of this subpart. If the facility is in compliance with the requirements of 40 CFR 63.11117 at the time the Initial Notification is due, the Notification of Compliance Status may be submitted in lieu of the Initial Notification provided it contains the information required under SC VII.4. above. (40 CFR 63.11124(a)(2))
6. If, prior to January 10, 2008, the facility is operating in compliance with an enforceable State, local, or tribal rule or permit that requires submerged fill as specified in 40 CFR 63.11117(b), neither the Initial Notification or a Notification of Compliance Status is required. (40 CFR 63.11124(a)(3))
7. The permittee must submit reports as specified in 40 CFR 63.11126(b). Each owner or operator of an affected source shall report, by March 15 of each year, the number, duration, and a brief description of each type of malfunction which occurred during the previous calendar year and which caused or may have caused any applicable emission limitation to be exceeded. The report must also include a description of actions taken by an owner or operator during a malfunction of an affected source to minimize emissions in accordance with 40 CFR 63.11115(a), including actions taken to correct a malfunction. No report is necessary for a calendar year in which no malfunctions occurred. (40 CFR 63.11126(b))

**See Appendix 8**

**VIII. STACK/VENT RESTRICTION(S)**

NA

**IX. OTHER REQUIREMENT(S)**

1. Existing GDFs must comply with the "GDF MACT" by January 24, 2014. New and reconstructed GDFs must comply by dates specified in 40 CFR 63.11113(f)(2)(i) and (ii). (40 CFR 63.11113(f))
2. The permittee shall comply with all applicable provisions of the National Emission Standards for Hazardous Air Pollutants, as specified in 40 CFR Part 63, Subparts A and CCCCCC, for Gasoline Dispensing Facilities. (40 CFR Part 63, Subparts A and CCCCCC)

**Footnotes:**

<sup>1</sup> This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

<sup>2</sup> This condition is federally enforceable and was established pursuant to Rule 201(1)(a).

## **E. NON-APPLICABLE REQUIREMENTS**

At the time of the ROP issuance, the AQD has determined that no non-applicable requirements have been identified for incorporation into the permit shield provision set forth in the General Conditions in Part A pursuant to Rule 213(6)(a)(ii).

## APPENDICES

### Appendix 1. Acronyms and Abbreviations

Common Acronyms		Pollutant / Measurement Abbreviations	
AQD	Air Quality Division	acfm	Actual cubic feet per minute
BACT	Best Available Control Technology	BTU	British Thermal Unit
CAA	Clean Air Act	°C	Degrees Celsius
CAM	Compliance Assurance Monitoring	CO	Carbon Monoxide
CEM	Continuous Emission Monitoring	CO <sub>2</sub> e	Carbon Dioxide Equivalent
CEMS	Continuous Emission Monitoring System	dscf	Dry standard cubic foot
CFR	Code of Federal Regulations	dscm	Dry standard cubic meter
COM	Continuous Opacity Monitoring	°F	Degrees Fahrenheit
Department/ department	Michigan Department of Environment, Great Lakes, and Energy	gr	Grains
EGLE	Michigan Department of Environment, Great Lakes, and Energy	HAP	Hazardous Air Pollutant
EU	Emission Unit	Hg	Mercury
FG	Flexible Group	hr	Hour
GACS	Gallons of Applied Coating Solids	HP	Horsepower
GC	General Condition	H <sub>2</sub> S	Hydrogen Sulfide
GHGs	Greenhouse Gases	kW	Kilowatt
HVLP	High Volume Low Pressure*	lb	Pound
ID	Identification	m	Meter
IRSL	Initial Risk Screening Level	mg	Milligram
ITSL	Initial Threshold Screening Level	mm	Millimeter
LAER	Lowest Achievable Emission Rate	MM	Million
MACT	Maximum Achievable Control Technology	MW	Megawatts
MAERS	Michigan Air Emissions Reporting System	NMO	Non-methane Organic Compounds
MAP	Malfunction Abatement Plan	C	
MSDS	Material Safety Data Sheet	NO <sub>x</sub>	Oxides of Nitrogen
NA	Not Applicable	ng	Nanogram
NAAQS	National Ambient Air Quality Standards	PM	Particulate Matter
NESHAP	National Emission Standard for Hazardous Air Pollutants	PM10	Particulate Matter equal to or less than 10 microns in diameter
NSPS	New Source Performance Standards	PM2.5	Particulate Matter equal to or less than 2.5 microns in diameter
NSR	New Source Review	pph	Pounds per hour
PS	Performance Specification	ppm	Parts per million
PSD	Prevention of Significant Deterioration	ppmv	Parts per million by volume
PTE	Permanent Total Enclosure	ppmw	Parts per million by weight
PTI	Permit to Install	%	Percent
RACT	Reasonable Available Control Technology	psia	Pounds per square inch absolute
ROP	Renewable Operating Permit	psig	Pounds per square inch gauge
SC	Special Condition	scf	Standard cubic feet
SCR	Selective Catalytic Reduction	sec	Seconds
SNCR	Selective Non-Catalytic Reduction	SO <sub>2</sub>	Sulfur Dioxide
SRN	State Registration Number	TAC	Toxic Air Contaminant
TEQ	Toxicity Equivalence Quotient	Temp	Temperature
USEPA/EPA	United States Environmental Protection Agency	THC	Total Hydrocarbons
VE	Visible Emissions	tpy	Tons per year
		µg	Microgram
		µm	Micrometer or Micron
		VOC	Volatile Organic Compounds
		yr	Year

\*For HVLP applicators, the pressure measured at the gun air cap shall not exceed 10 psig.

**Appendix 2. Schedule of Compliance**

The permittee certified in the ROP application that this stationary source is in compliance with all applicable requirements and the permittee shall continue to comply with all terms and conditions of this ROP. A Schedule of Compliance is not required. (R 336.1213(4)(a), R 336.1119(a)(ii))

**Appendix 3. Monitoring Requirements**

Specific monitoring requirement procedures, methods or specifications are detailed in Part A or the appropriate Source-Wide, Emission Unit and/or Flexible Group Special Conditions. Therefore, this appendix is not applicable.

**Appendix 4. Recordkeeping**

Specific recordkeeping requirement formats and procedures are detailed in Part A or the appropriate Source-Wide, Emission Unit and/or Flexible Group Special Conditions. Therefore, this appendix is not applicable.

**Appendix 5. Testing Procedures**

Specific testing requirement plans, procedures, and averaging times are detailed in the appropriate Source-Wide, Emission Unit and/or Flexible Group Special Conditions. Therefore, this appendix is not applicable.

**Appendix 6. Permits to Install**

The following table lists any Permit to Install and/or Operate, that relates to the identified emission units or flexible groups as of the effective date of this ROP. This includes all Permits to Install and/or Operate that are hereby incorporated into Source-Wide PTI No. MI-PTI-P0668-2019. PTIs issued after the effective date of this ROP, including amendments or modifications, will be identified in Appendix 6 upon renewal.

Permit to Install Number	Description of Equipment	Corresponding Emission Unit(s) or Flexible Group(s)
204-15A	Three Dual fuel-fired (natural gas and fuel oil) Wärtsilä Reciprocating Internal Combustion Engines used for electricity generation and a 400 kW emergency diesel-fired generator.	EUEDG FGNGOP FGDIESELOP

**Appendix 7. Emission Calculations**

Specific emission calculations to be used with monitoring, testing or recordkeeping data are detailed in the appropriate Source-Wide, Emission Unit and/or Flexible Group Special Conditions. Therefore, this appendix is not applicable.

## **Appendix 8. Reporting**

### **A. Annual, Semiannual, and Deviation Certification Reporting**

The permittee shall use EGLE, AQD, Report Certification form (EQP 5736) and EGLE, AQD, Deviation Report form (EQP 5737) for the annual, semiannual and deviation certification reporting referenced in the Reporting Section of the Source-Wide, Emission Unit and/or Flexible Group Special Conditions. Alternative formats must meet the provisions of Rule 213(4)(c) and Rule 213(3)(c)(i), respectively, and be approved by the AQD District Supervisor.

### **B. Other Reporting**

Specific reporting requirement formats and procedures are detailed in Part A or the appropriate Source-Wide, Emission Unit and/or Flexible Group Special Conditions. Therefore, Part B of this appendix is not applicable.



## RENEWABLE OPERATING PERMIT APPLICATION

### AI-001: ADDITIONAL INFORMATION

*This information is required by Article II, Chapter 1, Part 55 (Air Pollution Control) of P.A. 451 of 1994, as amended, and the Federal Clean Air Act of 1990. Failure to obtain a permit required by Part 55 may result in penalties and/or imprisonment. Please type or print clearly. Refer to instructions for additional information to complete this form.*

SRN: P0668	Section Number (if applicable):
------------	---------------------------------

1. Additional Information ID <b>AI-PTE</b>
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<b>Additional Information</b>
-------------------------------

2. Is This Information Confidential? <span style="float: right;"><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</span>
---

No changes have made at the MEC that would require a Permit to Install or which should change facility's Potential to Emit (PTE). While the application does not require facility-wide criteria pollutant and HAP emissions, MEC has elected to include this information in its application..

Table 1 presents criteria pollutant emissions information from the entire facility including two operating scenarios. One operating scenario where the engines run on natural gas exclusively and a scenario where the engines run on light fuel oil. Support for these estimates is included in Tables 2 (natural gas) and 3.(light fuel oil or diesel). Information on the criteria pollutant emissions from the black start engine and emergency engine are included in Tables 4 and 5. Table 6 includes criteria pollutant emissions from the miscellaneous heaters. Table 7 includes facility-wide HAP emissions while Table 8 includes HAP emissions from the engines firing natural gas, Table 9 includes HAP emissions while firing light fuel oil or diesel and Table 9 includes emissions from firing both. Table 10 includes HAP emissions from the black start generator, Table 11 includes emissions from the emergency generator and Table 12 includes HAP emissions from the miscellaneous heaters. .

While MEC estimated the PTE for this facility, it does not expect that additional limits will be included in its ROP based on the use of this emission estimate.

**Table 1 – Criteria Pollutant Emissions Summary**

Marquette Board of Light &amp; Power

Marquette Energy Center

**Table 1A – Operating Scenario 1 Criteria Pollutant Emissions Summary**

Pollutant	Wartsilla Engine Operating Scenario 1 (tpy)	400 kW Black Start EU-EDG (tpy)	EU-LPGENGINE (tpy)	Misc Heaters (tpy)	Annual Emissions (tpy)	Limits
CO	7.39	0.77	0.06	1.08	9.30	
NO <sub>x</sub>	81.95	0.77	0.42	1.29	84.44	<b>225</b>
PM	58.44	0.04	-	0.02	58.51	
PM <sub>10</sub>	58.44	0.04	0.00	0.10	58.58	
PM <sub>2.5</sub>	58.44	0.04	0.00	0.10	58.58	
SO <sub>2</sub>	8.03	0.00	-	0.01	8.04	
VOC	79.36	0.11	0.02	0.07	79.56	
Lead	-	-	-	0.000	0.00	

**Table 1B – Operating Scenario 2 Criteria Pollutant Emissions Summary**

Pollutant	Wartsilla Engine Operating Scenario 2 (tpy)	400 kW Black Start EU-EDG (tpy)	EU-LPGENGINE (tpy)	Misc Heaters (tpy)	Annual Emissions (tpy)	Limits
CO	43.94	0.77	0.06	1.08	45.86	
NO <sub>x</sub>	223.26	0.77	0.42	1.29	225.74	<b>225</b>
PM	72.58	0.04	-	0.10	72.72	
PM <sub>10</sub>	72.58	0.04	0.00	0.10	72.73	
PM <sub>2.5</sub>	72.58	0.04	-	0.01	72.63	
SO <sub>2</sub>	45.05	0.00	-	0.07	45.12	
VOC	50.11	0.11	0.02	0.04	50.28	
Lead	-	0.11	-	-	0.11	



## RENEWABLE OPERATING PERMIT APPLICATION

### AI-001: ADDITIONAL INFORMATION

*This information is required by Article II, Chapter 1, Part 55 (Air Pollution Control) of P.A. 451 of 1994, as amended, and the Federal Clean Air Act of 1990. Failure to obtain a permit required by Part 55 may result in penalties and/or imprisonment. Please type or print clearly. Refer to instructions for additional information to complete this form.*

SRN: P0668	Section Number (if applicable):
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1. Additional Information ID <b>AI-CAM</b>
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<b>Additional Information</b>
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2. Is This Information Confidential? <span style="float: right;"><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</span>
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Form ASC-001

The Compliance Assurance Monitoring (CAM) Plan requirements apply to the Wartsila Engines located at the Marquette Energy Center as they meet the criteria outlined in 40 CFR Part 64.1. Each engine uses an add-on control device to achieve compliance with a federally enforceable limit - the engines are subject to emission limits through the PTI as well as the NSPS. Pre-control emissions of NOx exceed the major source threshold of 100 tons/yr.

As Table 1 demonstrates, no engine has post-control emissions over the CAM threshold. As a result, none of the engines are defined as "large pollutant-specific emissions units" (PSEU). The engines are "other pollutant-specific emission units". While EU-ENGINE01, EU-ENGINE02 and EU-ENGINE03 are subject to CAM, because the facility contains no large PSEU, a CAM Plan is not required with an initial application. As described in 40 CFR Part 64.5(b) and in the MDEQ CAM Fact Sheet, "other pollutant-specific emission units" must supply their CAM Plan with their renewal application.

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**Table 1 – Criteria Pollutant Emissions Summary**

Marquette Board of Light &amp; Power

Marquette Energy Center

**Table 1A – Operating Scenario 1 Criteria Pollutant Emissions Summary**

Pollutant	Wartsilla Engine Operating Scenario 1 (tpy)	400 kW Black Start EU-EDG (tpy)	EU-LPGENGINE (tpy)	Misc Heaters (tpy)	Annual Emissions (tpy)	Limits
CO	7.39	0.77	0.06	1.08	9.30	
NO <sub>x</sub>	81.95	0.77	0.42	1.29	84.44	<b>225</b>
PM	58.44	0.04	-	0.02	58.51	
PM <sub>10</sub>	58.44	0.04	0.00	0.10	58.58	
PM <sub>2.5</sub>	58.44	0.04	0.00	0.10	58.58	
SO <sub>2</sub>	8.03	0.00	-	0.01	8.04	
VOC	79.36	0.11	0.02	0.07	79.56	
Lead	-	-	-	0.000	0.00	

**Table 1B – Operating Scenario 2 Criteria Pollutant Emissions Summary**

Pollutant	Wartsilla Engine Operating Scenario 2 (tpy)	400 kW Black Start EU-EDG (tpy)	EU-LPGENGINE (tpy)	Misc Heaters (tpy)	Annual Emissions (tpy)	Limits
CO	43.94	0.77	0.06	1.08	45.86	
NO <sub>x</sub>	223.26	0.77	0.42	1.29	225.74	<b>225</b>
PM	72.58	0.04	-	0.10	72.72	
PM <sub>10</sub>	72.58	0.04	0.00	0.10	72.73	
PM <sub>2.5</sub>	72.58	0.04	-	0.01	72.63	
SO <sub>2</sub>	45.05	0.00	-	0.07	45.12	
VOC	50.11	0.11	0.02	0.04	50.28	
Lead	-	0.11	-	-	0.11	

**Table 2 - Wärtsilä Engines - Criteria Pollutant Emissions (Natural Gas-Fired - Operating Scenario 1)**

Marquette Board of Light & Power

Marquette Energy Center

FG-NGOP

Maximum Horse Power	23,758 HP	Annual Estimated Number of Starts (per engine)	
Maximum Power	17,700 KW	Total (per engine)	1460
Annual Operating Hours (per engine, 100% load)	8760 hr/yr	Cold Starts (per engine)	487
Estimated Startup Hours (per engine)	730 hr/yr	Warm Starts (per engine)	487
Hourly Heat Input Limit or Capacity	173.200 MMBtu/hr	Hot Starts (per engine)	487
Annual Heat Input Limit (3 Engines)	4,551,696 MMBtu/yr		
	4,642,729,920.00	does not include start-up	
		4,485.445 MMscf/yr permit limit - based on 1014.8 Btu/scf	

NSR Regulated Pollutant	100% Load Operation Emission Factor (See Notes)	Notes	Cold Start Emission Factor (lb/start)	Warm Start Emission Factor (lb/start)	Hot Start Emission Factor (lb/start)	Individual Engine Hourly Emissions (lb/hr)	Total Start Annual Emissions (tpy)	Total Annual Emissions (tpy)	Total Annual Emissions (tpy)
CO	0.033 lb/MMBtu	1	6.6	2.5	2.5	5.7	7.4	0.0	7.39
NO <sub>x</sub>	0.023 lb/MMBtu	1	26.5	19	12	4.0	34.0	48.0	81.95
PM	0.025 lb/MMBtu	2	3.3	3.3	3.3	4.3	6.3	52.2	58.44
PM <sub>10</sub>	0.025 lb/MMBtu	2	3.3	3.3	3.3	4.3	6.3	52.2	58.44
PM <sub>2.5</sub>	0.025 lb/MMBtu	2	3.3	3.3	3.3	4.3	6.3	52.2	58.44
SO <sub>2</sub>	0.0028 lb/MMBtu	3	0	0	0	0.5	2.2	5.8	8.03
VOC	0.033 lb/MMBtu	2	6.6	5.8	5.8	5.7	10.5	68.8	79.36

<sup>1</sup> Manufacturer's estimates/ permit limits

<sup>2</sup> Manufacturer's emissions estimates

<sup>3</sup> Based on 1 gr/100 cf natural gas

**Emission Calculation Methods**

$$E(\text{lb/hr}) = EF (\text{lb/MMBtu}) \times HI(\text{MMBtu/hr})$$

where:

*E* = Maximum Emissions (lb/hr);

*HI* = Annual Heat Input (MMBtu/hr)

*EF* = Emission Factor (lb/MMBtu)

Hourly emissions are multiplied by number of operating hours and converted to tons to obtain annual emissions in tons/yr.

**Table 3 - Wärtsilä Engines - Criteria Pollutant Emissions (Oil-fired - Operating Scenario 2)**

Marquette Board of Light & Power

Marquette Energy Center

FG-DIESELOP

Maximum Horse Power	23,758 HP		
Maximum Power	17,700 KW		
Annual Operating Hours (per engine, 100% load)	4000 hr/yr	Annual Estimated Number of Starts (per engine)	
Estimated Startup Hours (per engine)	150 hr/yr	Total (per engine)	300
Hourly Heat Input Limit or Capacity (per engine)	153.6 MMBtu/hr	Cold Starts (per engine)	100
Total Annual Heat Input Capacity (3 Engines)	1,774,080 MMBtu/yr	Warm Starts (per engine)	100
Fuel Heat Value	138,000 Btu/gallon	Hot Starts (per engine)	100
S content	0.0015%		13,458,000 gal/yr permit limit

Of the 4000 hrs/year, each engine is in start-up for no more than 150 hours.

NSR Regulated Pollutant	100% Load Operation Emission Factor (See Notes)	Cold Start Emission Factor (lb/start)	Warm Start Emission Factor (lb/start)	Hot Start Emission Factor (lb/start)	Individual Engine Baseload Hourly Emissions (lb/hr)	Total Start Annual Emissions all Engines (tons/yr)	Total Annual Emissions from Operating (tons/yr)	Total Annual Emissions (tpy)
CO	0.048 lb/MMBtu	4.5	3.7	3.7	7.3	1.8	42.2	43.94
NO <sub>x</sub>	0.137 lb/MMBtu	250.0	220.5	209.4	21.0	102.0	121.3	223.26
PM	0.080 lb/MMBtu	6.2	6.2	6.2	12.3	1.6	71.0	72.58
PM <sub>10</sub>	0.080 lb/MMBtu	6.2	6.2	6.2	12.3	1.6	71.0	72.58
PM <sub>2.5</sub>	0.080 lb/MMBtu	6.2	6.2	6.2	12.3	1.6	71.0	72.58
SO <sub>2</sub>	0.0508 lb/MMBtu	0.0	0.0	0.0	7.8	0.0	45.0	45.05
VOC	0.055 lb/MMBtu	6.4	6.4	6.4	8.4	1.6	48.5	50.11

Emission estimates based on manufacturer's estimates/ permit limits

***Emission Calculation Methods***

$$E(\text{lb/hr}) = EF (\text{lb/MMBtu}) \times HI(\text{MMBtu/hr})$$

where:

*E* = Maximum Emissions (lb/hr);

*HI* = Annual Heat Input (MMBtu/hr)

*EF* = Emission Factor (lb/MMBtu)

Hourly emissions are multiplied by number of operating hours and converted to tons to obtain annual emissions in tons/yr.

**Table 4 - Black Start Emergency Generator - Criteria Pollutant Emissions**

Marquette Board of Light & Power

Marquette Energy Center

EU-EDG

Maximum Horse Power	536.91 HP
Maximum Power	400 KW
Maximum Fuel Usage Rate	27.23 Gal/hr
Heat Input Capacity	3.76 MMBtu/Hr
Annual Operating Hours	500 hr/yr
Annual Heat Input Limit or Capacity	1879.19 MMBtu/yr
Fuel Heat Value	138,000 Btu/gal
Diesel Sulfur Content	0.0015%
<i>SCC Code 20-200-102</i>	

NSR Regulated Pollutant	Emission Factor (See Notes)	Notes	Annual Emissions (lb/yr)	Annual Emissions (tpy)
CO	3.5 g/KW-hr	1	1543.2	0.77
NO <sub>x</sub>	3.5 g/KW-hr	1	1543.2	0.77
PM	0.2 g/KW-hr	1	88.2	0.04
PM <sub>10</sub>	0.2 g/KW-hr	1	88.2	0.04
PM <sub>2.5</sub>	0.2 g/KW-hr	1	88.2	0.04
SO <sub>2</sub>	0.0021 Lb/1000 Gal	2	0.029	0.00
VOC	0.5 g/KW-hr	1	220.5	0.11

<sup>1</sup> Emission factors are from Permit

<sup>2</sup> Emission factor from Table 1.3-1, with S emission factor 142S where S is 0.0015% S

**Emission Calculation Methods**

where:

$$EA_{(lb/yr)} = C_{kw} \times hr/yr \times EF_{(g/kW-hr)} \times (lb/453.6 g)$$

$E_A$  = Annual Maximum Emissions (lb/yr);

$C_{kW-yr}$  = Max kW-hr/yr

$EF_{g/kW-hr}$  = emission factor (g/kW-hr)

**Using lb/1000 Gal Emission Factors**

$$EA_{(lb/yr)} = C_{GAL} / 1000 Gal \times EF_{KGal}$$

$C_{Gal}$  = Max Fuel Usage (Gallon/hr); and

$EF_{KGal}$  = emission factor (lb/1000 Gal)

**Table 5 - Gas-fired Emergency Engine - Criteria Pollutant Emissions**

Marquette Board of Light &amp; Power

Marquette Energy Center

EU-UNGGENGINE

Maximum Horse Power	81 HP
Maximum Power	60 KW
Maximum Fuel Usage Rate	6.69 gal/hr
Heat Input Capacity	0.56 MMBtu/Hr
Annual Operating Hours	500 hr/yr
Annual Heat Input Limit or Capacity	281.88 MMBtu/yr
Fuel Heat Value	84,300 Btu/gallon

NSR Regulated Pollutant	Emission Factor (See Notes)	Notes	Annual Emissions (lb/yr)	Annual Emissions (tpy)
CO	35.70 lb/ 1000 gal	1	119.4	0.06
NO <sub>x</sub>	254 lb/ 1000 gal	1	849.3	0.42
PM <sub>10</sub>	0.90 lb/ 1000 gal	1	3.0	0.00
VOC	10.40 lb/ 1000 gal	1	34.8	0.02

<sup>1</sup> MAERS emission factor for SCC 2-02-010-01.

SCC Code 2-02-010-01

**Emission Calculation Methods**

where:

**Using lb/MMBtu Emission Factors**

$$EA = C_{HI} \times EF_{HI}$$

 $E_A =$  Annual Maximum Emissions (lb/yr);

 $C_{HI} =$  Heat Input Capacity (MMBtu/hr); and

 $EF_{HI} =$  emission factor (lb/MMBtu)

**Table 6 Miscellaneous Heaters - Criteria Pollutant Emissions**

Marquette Board of Light & Power

Marquette Energy Center

Heat Input Capacity	3 MMBtu/hr
Heat Input Capacity	0.003 MMcf/hr
Annual Operating Hours	8760 hr/yr
Annual Fuel Consumption	25.765 MMcf/yr
Fuel Heat Value	1020 Btu/scf
Annual Heat Input	26280 MMBtu/yr
<i>SCC Code 1-02-006-03</i>	

NSR Regulated Pollutant	Emission Factor (See Notes)	Notes	Annual Emissions (lb/yr)	Annual Emissions (tpy)
CO	84 lb/MMCF	1	2164.24	1.1
NO <sub>x</sub>	100 lb/MMCF	1	2576.47	1.3
PM <sub>10</sub>	7.6 lb/MMCF	1	195.81	0.1
PM <sub>2.5</sub>	7.6 lb/MMCF	1	195.81	0.1
SO <sub>2</sub>	0.6 lb/MMCF	1	15.46	0.0
VOC	5.5 lb/MMCF	1	141.71	0.1
Ammonia	3.2 lb/MMCF	1	82.45	0.0

<sup>1</sup> Emission factors are from Web-fire for SCC 1-02-006-03 for a Boiler with a heat input capacity of less than 10 MMBtu/hr.

**Emission Calculation Methods**

**Using lb/MMCF Emission Factors**

$$E_A = C_{MMCF} \times EF_{MMCF} \times (ton/2000 lb)$$

where:

$E_A$  = Annual Maximum Emissions (tpy);

$C_{MMCF}$  = Max Fuel Usage (MMCF/hr); and

$EF_{MMCF}$  = emission factor (lb/MMCF)

$C_{HI}$  = Heat Input Capacity (MMBtu/hr); and

**Table 7 – Facility HAP Emissions Summary (REVISED)**

Marquette Board of Light &amp; Power

Marquette Energy Center

Pollutant	FG-NGOP (tpy)	FG-DIESELOP (tpy)	FGDUALFUEL (tpy)	400 kW Black Start EU-EDG (tpy)	EU-LPGENGINE (tpy)	Misc Heaters (tpy)	Annual Emissions (tpy)
Formaldehyde	8.56E+00	5.45E-02	4.71E+00	1.11E-03	7.44E-03	9.66E-04	8.57E+00
Benzo (a) pyrene	-	1.78E-04	1.78E-04	1.77E-07	-	1.55E-08	1.78E-04
Dibenzo(a,h) anthracene	-	2.39E-04	2.39E-04	5.48E-07	-	1.55E-08	2.40E-04
Carbon tetrachloride	6.74E-02	-	3.66E-02	-	-	-	6.74E-02
3-Methylcholanthrene	-	-	-	-	-	2.32E-08	2.32E-08
Benzo (a) anthracene	-	4.30E-04	4.30E-04	1.58E-06	-	2.32E-08	4.32E-04
Dimethylbenz(a)anthracene	-	-	-	-	-	2.06E-07	2.06E-07
Methyl alcohol	4.59E+00	-	2.50E+00	-	3.52E-04	-	4.59E+00
Chloroform	5.24E-02	-	2.85E-02	-	-	-	5.24E-02
Benzene	8.08E-01	5.36E-01	9.76E-01	8.77E-04	6.20E-05	2.71E-05	9.77E-01
Ethyl chloride	3.44E-03	-	1.87E-03	-	2.64E-07	-	3.44E-03
Vinyl chloride	2.74E-02	-	1.49E-02	-	2.10E-06	-	2.74E-02
Acetaldehyde	9.63E-01	1.74E-02	5.41E-01	7.21E-04	1.18E-03	-	9.65E-01
Dichloromethane	3.67E-02	-	2.00E-02	-	2.82E-06	-	3.68E-02
1,1-Dichloroethane	4.34E-02	-	2.36E-02	-	-	-	4.34E-02
Propylene dichloride	4.94E-02	-	2.69E-02	-	-	-	4.94E-02
1,1,2-Trichloroethane	5.84E-02	-	3.17E-02	-	-	-	5.84E-02
1,1,2,2-Tetrachloroethane	7.35E-02	-	3.99E-02	-	-	-	7.35E-02
Acenaphthene	2.30E-03	3.23E-03	4.48E-03	1.33E-06	1.76E-07	2.32E-08	4.48E-03
Phenanthrene	1.91E-02	2.82E-02	3.86E-02	2.76E-05	1.47E-06	2.19E-07	3.86E-02
Fluorene	1.04E-02	8.85E-03	1.45E-02	2.74E-05	7.99E-07	3.61E-08	1.45E-02
Naphthalene	1.37E-01	8.99E-02	1.64E-01	7.97E-05	1.05E-05	7.86E-06	1.64E-01
2-Methyl Naphthalene	6.10E-02	-	3.31E-02	-	-	3.09E-07	6.10E-02
Biphenyl	3.90E-01	-	2.12E-01	-	2.99E-05	-	3.90E-01
Ethylbenzene	7.29E-02	-	3.96E-02	-	5.59E-06	-	7.29E-02
Styrene	4.34E-02	-	2.36E-02	-	3.33E-06	-	4.34E-02
Ethylene dibromide	8.14E-02	-	4.42E-02	-	-	-	8.14E-02
1,3-Butadiene	4.91E-01	-	2.67E-01	3.67E-05	3.76E-05	-	4.91E-01
Acrolein	1.07E-01	5.45E-03	6.38E-02	8.69E-05	7.24E-04	-	1.08E-01
Ethylene dichloride	4.34E-02	-	2.36E-02	-	-	-	4.34E-02
Toluene	7.50E-01	1.94E-01	6.02E-01	3.84E-04	5.75E-05	4.38E-05	7.50E-01
Propylene	-	1.93E+00	1.93E+00	2.42E-03	-	-	1.93E+00
Chlorobenzene	5.59E-02	-	3.04E-02	-	4.28E-06	-	5.59E-02
Phenol	4.41E-02	-	2.40E-02	-	3.38E-06	-	4.41E-02
N-Hexane	2.04E+00	-	1.11E+00	-	1.56E-04	2.32E-02	2.06E+00

**Table 7 – Facility HAP Emissions Summary (REVISED)**

Marquette Board of Light & Power

Marquette Energy Center

Pollutant	FG-NGOP (tpy)	FG-DIESELOP (tpy)	FGDUALFUEL (tpy)	400 kW Black Start EU-EDG (tpy)	EU-LPGENGINE (tpy)	Misc Heaters (tpy)	Annual Emissions (tpy)
Anthracene	-	8.50E-04	8.50E-04	1.76E-06	-	3.09E-08	8.52E-04

**Table 7 – Facility HAP Emissions Summary (REVISED)**

Marquette Board of Light &amp; Power

Marquette Energy Center

Pollutant	FG-NGOP (tpy)	FG-DIESELOP (tpy)	FGDUALFUEL (tpy)	400 kW Black Start EU-EDG (tpy)	EU-LPGENGINE (tpy)	Misc Heaters (tpy)	Annual Emissions (tpy)
Perchloroethylene	4.56E-03	-	2.48E-03	-	-	-	4.56E-03
Pyrene	2.50E-03	2.56E-03	3.92E-03	4.49E-06	1.92E-07	6.44E-08	3.93E-03
Benzo (g,h,i) perylene	7.61E-04	3.84E-04	7.98E-04	4.59E-07	5.84E-08	1.55E-08	7.98E-04
Benzo (e) pyrene	7.63E-04	-	4.14E-04	-	5.85E-08	-	7.63E-04
Indeno(1,2,3-cd)pyrene	-	2.86E-04	2.86E-04	3.52E-07	-	2.32E-08	2.87E-04
Benzo (b) fluoranthene	3.05E-04	7.67E-04	9.33E-04	9.31E-08	2.34E-08	2.32E-08	9.33E-04
Fluoranthene	2.04E-03	2.79E-03	3.89E-03	7.15E-06	1.56E-07	3.86E-08	3.90E-03
Benzo (k) fluoranthene	-	1.51E-04	1.51E-04	1.46E-07	-	2.32E-08	1.51E-04
Acenaphthylene	1.02E-02	6.38E-03	1.19E-02	4.75E-06	7.79E-07	2.32E-08	1.19E-02
Chrysene	1.27E-03	1.06E-03	1.75E-03	3.32E-07	-	2.32E-08	1.75E-03
2,2,4-Trimethylpentane	4.59E-01	-	2.50E-01	-	-	-	4.59E-01
1,3-Dichloropropene	4.85E-02	-	2.64E-02	-	-	-	4.85E-02
Isomers of xylene	3.38E-01	1.33E-01	3.17E-01	2.68E-04	7.62E-05	-	3.38E-01
Manganese	-	-	-	-	-	4.90E-06	4.90E-06
Mercury	-	-	-	-	-	3.35E-06	3.35E-06
Nickel	-	-	-	-	-	2.71E-05	2.71E-05
Arsenic	-	-	-	-	-	2.58E-06	2.58E-06
Beryllium	-	-	-	-	-	1.55E-07	1.55E-07
Cadmium	-	-	-	-	-	1.42E-05	1.42E-05
Chromium	-	-	-	-	-	1.80E-05	1.80E-05
Cobalt	-	-	-	-	-	1.08E-06	1.08E-06
Selenium	-	-	-	-	-	3.09E-07	3.09E-07
<b>Total HAP Emissions (tpy) =</b>							<b>22.75</b>

**Table 8 - Wärtsilä Engines HAP Emissions Summary (Natural Gas-fired)**

Marquette Board of Light & Power

Marquette Energy Center

FG-NGOP

Maximum Horse Power	23,758 HP
Maximum Power	17,700 KW
Maximum Fuel Usage Rate	0.171 MMCF/Hr
Heat Input Capacity	173.2 MMBtu/Hr
Annual Operating Hours (per engine, 100% load)	8760 hr/yr
Estimated Startup Hours (per engine)	730 hr/yr
Annual Heat Input Limit or Capacity	4,551,696 MMBtu/yr
Fuel Heat Value	1014.8 Btu/CF
Number of Identical Units	3

Pollutant <sup>1</sup>	CAS No.	Emission Factor - Original (See Notes)	Emission Factor - 7% Increase (See Notes)	Control Efficiency (%)	Notes	Maximum Short-Term Emissions per Unit (lb/hr)	Annual Emissions (tpy)
Formaldehyde	50-00-0	4.66E-03 Lb/MMBtu	5.02E-03 Lb/MMBtu	25%	2	0.652	8.562
Carbon tetrachloride	56-23-5	3.67E-05 Lb/MMBtu	3.95E-05 Lb/MMBtu	25%	1	0.005	0.067
Methyl alcohol	67-56-1	2.50E-03 Lb/MMBtu	2.69E-03 Lb/MMBtu	25%	1	0.350	4.593
Chloroform	67-66-3	2.85E-05 Lb/MMBtu	3.07E-05 Lb/MMBtu	25%	1	0.004	0.052
Benzene	71-43-2	4.40E-04 Lb/MMBtu	4.74E-04 Lb/MMBtu	25%	1	0.062	0.808
Ethyl chloride	75-00-3	1.87E-06 Lb/MMBtu	2.01E-06 Lb/MMBtu	25%	1	0.000	0.003
Vinyl chloride	75-01-4	1.49E-05 Lb/MMBtu	1.60E-05 Lb/MMBtu	25%	1	0.002	0.027
Acetaldehyde	75-07-0	5.24E-04 Lb/MMBtu	5.64E-04 Lb/MMBtu	25%	2	0.073	0.963
Dichloromethane	75-09-2	2.00E-05 Lb/MMBtu	2.15E-05 Lb/MMBtu	25%	1	0.003	0.037
1,1-Dichloroethane	75-34-3	2.36E-05 Lb/MMBtu	2.54E-05 Lb/MMBtu	25%	1	0.003	0.043
Propylene dichloride	78-87-5	2.69E-05 Lb/MMBtu	2.90E-05 Lb/MMBtu	25%	1	0.004	0.049
1,1,2-Trichloroethane	79-00-5	3.18E-05 Lb/MMBtu	3.42E-05 Lb/MMBtu	25%	1	0.004	0.058
1,1,2,2-Tetrachloroethane	79-34-5	4.00E-05 Lb/MMBtu	4.31E-05 Lb/MMBtu	25%	1	0.006	0.073
Acenaphthene	83-32-9	1.25E-06 Lb/MMBtu	1.35E-06 Lb/MMBtu	25%	1	0.000	0.002
Phenanthrene	85-01-8	1.04E-05 Lb/MMBtu	1.12E-05 Lb/MMBtu	25%	1	0.001	0.019
Fluorene	86-73-7	5.67E-06 Lb/MMBtu	6.10E-06 Lb/MMBtu	25%	1	0.001	0.010
Naphthalene	91-20-3	7.44E-05 Lb/MMBtu	8.01E-05 Lb/MMBtu	25%	1	0.010	0.137
2-Methyl Naphthalene	91-57-6	3.32E-05 Lb/MMBtu	3.57E-05 Lb/MMBtu	25%	1	0.005	0.061
Biphenyl	92-52-4	2.12E-04 Lb/MMBtu	2.28E-04 Lb/MMBtu	25%	1	0.030	0.390
Ethylbenzene	100-41-4	3.97E-05 Lb/MMBtu	4.27E-05 Lb/MMBtu	25%	1	0.006	0.073
Styrene	100-42-5	2.36E-05 Lb/MMBtu	2.54E-05 Lb/MMBtu	25%	1	0.003	0.043
Ethylene dibromide	106-93-4	4.43E-05 Lb/MMBtu	4.77E-05 Lb/MMBtu	25%	1	0.006	0.081
1,3-Butadiene	106-99-0	2.67E-04 Lb/MMBtu	2.87E-04 Lb/MMBtu	25%	1	0.037	0.491
Acrolein	107-02-8	5.84E-05 Lb/MMBtu	6.29E-05 Lb/MMBtu	25%	2	0.008	0.107

**Table 8 - Wärtsilä Engines HAP Emissions Summary (Natural Gas-fired)**

Marquette Board of Light & Power

Marquette Energy Center

FG-NGOP

Maximum Horse Power	23,758 HP
Maximum Power	17,700 KW
Maximum Fuel Usage Rate	0.171 MMCF/Hr
Heat Input Capacity	173.2 MMBtu/Hr
Annual Operating Hours (per engine, 100% load)	8760 hr/yr
Estimated Startup Hours (per engine)	730 hr/yr
Annual Heat Input Limit or Capacity	4,551,696 MMBtu/yr
Fuel Heat Value	1014.8 Btu/CF
Number of Identical Units	3

Pollutant <sup>1</sup>	CAS No.	Emission Factor - Original (See Notes)	Emission Factor - 7% Increase (See Notes)	Control Efficiency (%)	Notes	Maximum Short-Term Emissions per Unit (lb/hr)	Annual Emissions (tpy)
Ethylene dichloride	107-06-2	2.36E-05 Lb/MMBtu	2.54E-05 Lb/MMBtu	25%	1	0.003	0.043
Toluene	108-88-3	4.08E-04 Lb/MMBtu	4.39E-04 Lb/MMBtu	25%	1	0.057	0.750
Chlorobenzene	108-90-7	3.04E-05 Lb/MMBtu	3.27E-05 Lb/MMBtu	25%	1	0.00425	0.056
Phenol	108-95-2	2.40E-05 Lb/MMBtu	2.58E-05 Lb/MMBtu	25%	1	0.00336	0.044
N-Hexane	110-54-3	1.11E-03 Lb/MMBtu	1.19E-03 Lb/MMBtu	25%	1	0.15521	2.039
Perchloroethylene	127-18-4	2.48E-06 Lb/MMBtu	2.67E-06 Lb/MMBtu	25%	1	0.00035	0.00456
Pyrene	129-00-0	1.36E-06 Lb/MMBtu	1.46E-06 Lb/MMBtu	25%	1	0.00019	0.00250
Benzo (g,h,i) perylene	191-24-2	4.14E-07 Lb/MMBtu	4.46E-07 Lb/MMBtu	25%	1	0.000058	0.00076
Benzo (e) pyrene	192-97-2	4.15E-07 Lb/MMBtu	4.47E-07 Lb/MMBtu	25%	1	0.00006	0.00076
Benzo (b) fluoranthene	205-99-2	1.66E-07 Lb/MMBtu	1.79E-07 Lb/MMBtu	25%	1	0.00002	0.00031
Fluoranthene	206-44-0	1.11E-06 Lb/MMBtu	1.19E-06 Lb/MMBtu	25%	1	0.00016	0.00204
Acenaphthylene	208-96-8	5.53E-06 Lb/MMBtu	5.95E-06 Lb/MMBtu	25%	1	0.00077	0.01016
Chrysene	218-01-9	6.93E-07 Lb/MMBtu	7.46E-07 Lb/MMBtu	25%	1	0.00010	0.001
2,2,4-Trimethylpentane	540-84-1	2.50E-04 Lb/MMBtu	2.69E-04 Lb/MMBtu	25%	1	0.03496	0.459
1,3-Dichloropropene	542-75-6	2.64E-05 Lb/MMBtu	2.84E-05 Lb/MMBtu	25%	1	0.00369	0.049
Isomers of xylene	1330-20-7	1.84E-04 Lb/MMBtu	1.98E-04 Lb/MMBtu	25%	1	0.02573	0.338
<b>Total</b>							<b>20.554</b>

<sup>1</sup> Emission factors are from Web-fire for SCC 2-02-002-54 for Uncontrolled Natural Gas 4-Stroke Lean Burn Internal Combustion Engines

<sup>2</sup> Emission factors are from CATEF Source

***Emission Calculation Methods***

***Using lb/MMBtu Emission Factors***

$E_{ST} = C_{HI} \times EF_{HI}$

$E_A = E_{ST} \times \text{Annual Operating Hours} / 2,000 \text{ lb/ton}$

where:

$E_{ST}$  = Short Term Emissions (lb/hr);

$E_A$  = Annual Maximum Emissions (tpy);

$C_{HI}$  = Heat Input Capacity (MMBtu/hr); and

$EF_{HI}$  = emission factor (lb/MMBtu)

**Table 9 - Wärtsilä Engines HAP Emissions Summary (Oil-fired)**

Marquette Board of Light &amp; Power

Marquette Energy Center

## FG-DIESELOP

Maximum Horse Power	23,758 HP
Maximum Power	17,700 KW
Annual Operating Hours (per engine, 100% load)	4000 hr/yr
Estimated Startup Hours (per engine)	150 hr/yr
Hourly Heat Input Limit or Capacity (per engine)	153.6 MMBTU/hr
Total Annual Heat Input Capacity	1,843,200 MMBTU/yr
Fuel Heat Value	133,565 btu/gallon
S content	0.0015%

## Annual Estimated Number of Starts (per engine)

Total (per engine)	300
Cold Starts (per engine)	100
Warm Starts (per engine)	100
Hot Starts (per engine)	100

**13,458,000 gal/yr permit limit**

Pollutant <sup>1</sup>	Emission Factor	Emission Factor (See Notes)	Control Efficiency (%)	Notes	Maximum Short Term Emissions per Unit (lb/hr)	Annual Emissions (tpy)
Formaldehyde	7.89E-05	lb/MMBtu	25%	2	0.027	5.4536E-02
Benzo (a) pyrene	2.57E-07	lb/MMBtu	25%	1	0.000	1.7764E-04
Dibenzo(a,h) anthracene	3.46E-07	lb/MMBtu	25%	1	0.000	2.3916E-04
Benzo (a) anthracene	6.22E-07	lb/MMBtu	25%	1	0.000	4.2993E-04
Benzene	7.76E-04	lb/MMBtu	25%	2	0.268	5.3637E-01
Acetaldehyde	2.52E-05	lb/MMBtu	25%	2	0.009	1.7418E-02
Acenaphthene	4.68E-06	lb/MMBtu	25%	1	0.002	3.2348E-03
Phenanthrene	4.08E-05	lb/MMBtu	25%	1	0.014	2.8201E-02
Fluorene	1.28E-05	lb/MMBtu	25%	1	0.004	8.8474E-03
Naphthalene	1.30E-04	lb/MMBtu	25%	1	0.045	8.9856E-02
Acrolein	7.88E-06	lb/MMBtu	25%	2	0.003	5.4467E-03
Toluene	2.81E-04	lb/MMBtu	25%	1	0.097	1.9423E-01
Propylene	2.79E-03	lb/MMBtu	25%	2	0.964	1.9284E+00
Anthracene	1.23E-06	lb/MMBtu	25%	1	0.00043	8.5018E-04
Pyrene	3.71E-06	lb/MMBtu	25%	1	0.001	2.5644E-03
Benzo (g,h,i) perylene	5.56E-07	lb/MMBtu	25%	1	0.000	3.8431E-04
Indeno(1,2,3-cd)pyrene	4.14E-07	lb/MMBtu	25%	1	0.000	2.8616E-04
Benzo (b) fluoranthene	1.11E-06	lb/MMBtu	25%	1	0.000	7.6723E-04
Fluoranthene	4.03E-06	lb/MMBtu	25%	1	0.001	2.7855E-03
Benzo (k) fluoranthene	2.18E-07	lb/MMBtu	25%	1	0.000	1.5068E-04
Acenaphthylene	9.23E-06	lb/MMBtu	25%	1	0.003	6.3798E-03
Chrysene	1.53E-06	lb/MMBtu	25%	1	0.001	1.0575E-03
Isomers of xylene	1.93E-04	lb/MMBtu	25%	2	0.067	1.3340E-01
					<b>Total</b>	<b>3.02</b>

<sup>1</sup> Emission factors are from AP-42, Table 3.4-4 for Large Uncontrolled Stationary Diesel Engines.<sup>2</sup> Emission factors are from AP-42, Table 3.4-3 for Large Uncontrolled Stationary Diesel Engines.**Emission Calculation Methods**

$$EA_{(lb/yr)} = EF_{(lb/mmbtu)} \times HI_{(mmbtu/yr)}$$

**Using lb/1000 Gal Emission Factors**

$$EA_{(lb/yr)} = C_{GAL} / 1000 \text{ Gal} \times EF_{KGal}$$

where:

 $E_A$  = Annual Maximum Emissions (lb/yr); $HI$  = Annual Heat Input (mmbtu/yr) $EF_{lb/mmbtu}$  = emission factor (lb/mmbtu) $C_{Gal}$  = Max Fuel Usage (Gallon/yr; and $EF_{KGal}$  = emission factor (lb/1000 Gal)

**Table 10 - Wärtsilä Engines HAP Emissions Summary (Dual Fuel-fired)**

Marquette Board of Light &amp; Power

Marquette Energy Center

FG-DUALFUEL

Maximum Horse Power	23,758 HP
Maximum Power	17,700 KW
Annual Oil-fired Operating Hours (per engine, Oil)	4000 hr/yr
Hourly Heat Input Limit or Capacity (per engine, Oil)	153.6 MMBtu/hr
Hourly Heat Input Limit or Capacity (per engine, Gas)	173.2 MMBtu/Hr
Annual Operating Hours (per engine, 100% load)	4760 hr/yr
Number of Identical Units	3

Pollutant <sup>1</sup>	CAS No.	NG Emission Factor (See Notes)		Notes	Diesel Oil Emission Factor (See Notes)		Notes	Control Efficiency (%)	Annual Emissions (tpy)
Formaldehyde	50-00-0	5.02E-03	Lb/MMBtu	2	7.89E-05	lb/MMBtu	4	25%	4.707
Benzo (a) pyrene	50-32-8	-	-	-	2.57E-07	lb/MMBtu	3	25%	0.000
Dibenzo(a,h) anthracene	53-70-3	-	-	-	3.46E-07	lb/MMBtu	3	25%	0.000
Carbon tetrachloride	56-23-5	3.95E-05	Lb/MMBtu	1	-	-	-	25%	0.037
Benzo (a) anthracene	56-55-3	-	-	-	6.22E-07	lb/MMBtu	3	25%	0.000
Methyl alcohol	67-56-1	2.69E-03	Lb/MMBtu	1	-	-	-	25%	2.496
Chloroform	67-66-3	3.07E-05	Lb/MMBtu	1	-	-	-	25%	0.028
Benzene	71-43-2	4.74E-04	Lb/MMBtu	1	7.76E-04	lb/MMBtu	4	25%	0.976
Ethyl chloride	75-00-3	2.01E-06	Lb/MMBtu	1	-	-	-	25%	0.002
Vinyl chloride	75-01-4	1.60E-05	Lb/MMBtu	1	-	-	-	25%	0.015
Acetaldehyde	75-07-0	5.64E-04	Lb/MMBtu	2	2.52E-05	lb/MMBtu	4	25%	0.541
Dichloromethane	75-09-2	2.15E-05	Lb/MMBtu	1	-	-	-	25%	0.020
1,1-Dichloroethane	75-34-3	2.54E-05	Lb/MMBtu	1	-	-	-	25%	0.024
Propylene dichloride	78-87-5	2.90E-05	Lb/MMBtu	1	-	-	-	25%	0.027
1,1,2-Trichloroethane	79-00-5	3.42E-05	Lb/MMBtu	1	-	-	-	25%	0.032
1,1,2,2-Tetrachloroethane	79-34-5	4.31E-05	Lb/MMBtu	1	-	-	-	25%	0.040
Acenaphthene	83-32-9	1.35E-06	Lb/MMBtu	1	4.68E-06	lb/MMBtu	3	25%	0.004
Phenanthrene	85-01-8	1.12E-05	Lb/MMBtu	1	4.08E-05	lb/MMBtu	3	25%	0.039
Fluorene	86-73-7	6.10E-06	Lb/MMBtu	1	1.28E-05	lb/MMBtu	3	25%	0.015
Naphthalene	91-20-3	8.01E-05	Lb/MMBtu	1	1.30E-04	lb/MMBtu	3	25%	0.164
2-Methyl Naphthalene	91-57-6	3.57E-05	Lb/MMBtu	1	-	-	-	25%	0.033
Biphenyl	92-52-4	2.28E-04	Lb/MMBtu	1	-	-	-	25%	0.212
Ethylbenzene	100-41-4	4.27E-05	Lb/MMBtu	1	-	-	-	25%	0.040
Styrene	100-42-5	2.54E-05	Lb/MMBtu	1	-	-	-	25%	0.024
Ethylene dibromide	106-93-4	4.77E-05	Lb/MMBtu	1	-	-	-	25%	0.044
1,3-Butadiene	106-99-0	2.87E-04	Lb/MMBtu	1	-	-	-	25%	0.267
Acrolein	107-02-8	6.29E-05	Lb/MMBtu	2	7.88E-06	lb/MMBtu	4	25%	0.064
Ethylene dichloride	107-06-2	2.54E-05	Lb/MMBtu	1	-	-	-	25%	0.024
Toluene	108-88-3	4.39E-04	Lb/MMBtu	1	2.81E-04	lb/MMBtu	3	25%	0.602
Chlorobenzene	108-90-7	3.27E-05	Lb/MMBtu	1	-	-	-	25%	0.030
Phenol	108-95-2	2.58E-05	Lb/MMBtu	1	-	-	-	25%	0.024
N-Hexane	110-54-3	1.19E-03	Lb/MMBtu	1	-	-	-	25%	1.108
Propylene	115-07-1	-	-	-	2.79E-03	lb/MMBtu	4	25%	1.928
Anthracene	120-12-7	-	-	-	1.23E-06	lb/MMBtu	3	25%	0.001
Perchloroethylene	127-18-4	2.67E-06	Lb/MMBtu	1	-	-	-	25%	0.002
Pyrene	129-00-0	1.46E-06	Lb/MMBtu	1	3.71E-06	lb/MMBtu	3	25%	0.004
Benzo (g,h,i) perylene	191-24-2	4.46E-07	Lb/MMBtu	1	5.56E-07	lb/MMBtu	3	25%	0.001
Benzo (e) pyrene	192-97-2	4.47E-07	Lb/MMBtu	1	-	-	-	25%	0.000
Indeno(1,2,3-cd)pyrene	193-39-5	-	-	-	4.14E-07	lb/MMBtu	3	25%	0.000
Benzo (b) fluoranthene	205-99-2	1.79E-07	Lb/MMBtu	1	1.11E-06	lb/MMBtu	3	25%	0.001
Fluoranthene	206-44-0	1.19E-06	Lb/MMBtu	1	4.03E-06	lb/MMBtu	3	25%	0.004
Benzo (k) fluoranthene	207-08-9	-	-	-	2.18E-07	lb/MMBtu	3	25%	0.000
Acenaphthylene	208-96-8	5.95E-06	Lb/MMBtu	1	9.23E-06	lb/MMBtu	3	25%	0.012
Chrysene	218-01-9	7.46E-07	Lb/MMBtu	1	1.53E-06	lb/MMBtu	3	25%	0.002
2,2,4-Trimethylpentane	540-84-1	2.69E-04	Lb/MMBtu	1	-	-	-	25%	0.250
1,3-Dichloropropene	542-75-6	2.84E-05	Lb/MMBtu	1	-	-	-	25%	0.026
Isomers of xylene	1330-20-7	1.98E-04	Lb/MMBtu	1	1.93E-04	lb/MMBtu	4	25%	0.317
								<b>Total</b>	<b>14.185</b>

**Table 10 - Wärtsilä Engines HAP Emissions Summary (Dual Fuel-fired)**

Marquette Board of Light &amp; Power

Marquette Energy Center

FG-DUALFUEL	
Maximum Horse Power	23,758 HP
Maximum Power	17,700 KW
Annual Oil-fired Operating Hours (per	4000 hr/yr
Hourly Heat Input Limit or Capacity (per engine, Oil)	153.6 MMBtu/hr
Hourly Heat Input Limit or Capacity (per engine, Gas)	173.2 MMBtu/Hr
Annual Operating Hours (per engine, 100% load)	4760 hr/yr
Number of Identical Units	3

<sup>1</sup> Emission factors are from Web-fire for SCC 2-02-002-54 for Uncontrolled Natural Gas 4-Stroke Lean Burn Internal Combustion Engines<sup>2</sup> Emission factors are from CATEF Source<sup>3</sup> Emission factors are from AP-42, Table 3.4-4 for Large Uncontrolled Stationary Diesel Engines.<sup>4</sup> Emission factors are from AP-42, Table 3.4-3 for Large Uncontrolled Stationary Diesel Engines.**NG Emission Calculation Methods****Using lb/MMBtu Emission Factors**

$$E_{ST} = C_{HI} \times EF_{HI}$$

$$E_A = E_{ST} \times \text{Annual Operating Hours} / 2,000 \text{ lb/ton}$$

where:

 $E_{ST}$  = Short Term Emissions (lb/hr); $E_A$  = Annual Maximum Emissions (tpy); $C_{HI}$  = Heat Input Capacity (MMBtu/hr); and $EF_{HI}$  = emission factor (lb/MMBtu)**Diesel Emission Calculation Methods**

$$EA_{(lb/yr)} = EF_{(lb/mmbtu)} \times HI_{(mmbtu/yr)}$$

where:

 $E_A$  = Annual Maximum Emissions (lb/yr); $HI$  = Annual Heat Input (mmbtu/yr) $EF_{lb/mmbtu}$  = emission factor (lb/mmbtu) $C_{Gal}$  = Max Fuel Usage (Gallon/yr; and $EF_{KGal}$  = emission factor (lb/1000 Gal)**Using lb/1000 Gal Emission Factors**

$$EA_{(lb/yr)} = C_{GAL} / 1000 \text{ Gal} \times EF_{KGal}$$

**Table 11 - Black Start Generator HAP Emissions Summary**

Marquette Board of Light &amp; Power

Marquette Energy Center

EU-EDG

Maximum Horse Power	536.91 HP
Maximum Power	400 KW
Maximum Fuel Usage Rate	27.23 Gal/hr
Heat Input Capacity	3.76 MMBtu/Hr
Annual Operating Hours	500 hr/yr
Annual Heat Input Limit or Capacity	1879.19 MMBtu/yr
Fuel Heat Value	138,000 Btu/gal

Pollutant <sup>1</sup>	CAS No.	Emission Factor (See Notes)	Notes	Maximum Short Term Emissions per Unit (lb/hr)	Annual Emissions (tpy)
Formaldehyde	50-00-0	1.18E-03 Lb/MMBtu	1	0.0044	0.0011
Benzo (a) pyrene	50-32-8	1.88E-07 Lb/MMBtu	1	0.0000	0.0000
Dibenzo(a,h) anthracene	53-70-3	5.83E-07 Lb/MMBtu	1	0.0000	0.0000
Benzo (a) anthracene	56-55-3	1.68E-06 Lb/MMBtu	1	0.0000	0.0000
Benzene	71-43-2	9.33E-04 Lb/MMBtu	1	0.0035	0.0009
Acetaldehyde	75-07-0	7.67E-04 Lb/MMBtu	1	0.0029	0.0007
Acenaphthene	83-32-9	1.42E-06 Lb/MMBtu	1	0.0000	0.0000
Phenanthrene	85-01-8	2.94E-05 Lb/MMBtu	1	0.0001	0.0000
Fluorene	86-73-7	2.92E-05 Lb/MMBtu	1	0.0001	0.0000
Naphthalene	91-20-3	8.48E-05 Lb/MMBtu	1	0.0003	0.0001
1,3-Butadiene	106-99-0	3.91E-05 Lb/MMBtu	1	0.0001	0.0000
Acrolein	107-02-8	9.25E-05 Lb/MMBtu	1	0.0003	0.0001
Toluene	108-88-3	4.09E-04 Lb/MMBtu	1	0.0015	0.0004
Propylene	115-07-1	2.58E-03 Lb/MMBtu	1	0.0097	0.0024
Anthracene	120-12-7	1.87E-06 Lb/MMBtu	1	0.0000	0.0000
Pyrene	129-00-0	4.78E-06 Lb/MMBtu	1	0.0000	0.0000
Benzo (g,h,i) perylene	191-24-2	4.89E-07 Lb/MMBtu	1	0.0000	0.0000
Indeno(1,2,3-cd)pyrene	193-39-5	3.75E-07 Lb/MMBtu	1	0.0000	0.0000
Benzo (b) fluoranthene	205-99-2	9.91E-08 Lb/MMBtu	1	0.0000	0.0000
Fluoranthene	206-44-0	7.61E-06 Lb/MMBtu	1	0.0000	0.0000
Benzo (k) fluoranthene	207-08-9	1.55E-07 Lb/MMBtu	1	0.0000	0.0000
Acenaphthylene	208-96-8	5.06E-06 Lb/MMBtu	1	0.0000	0.0000
Chrysene	218-01-9	3.53E-07 Lb/MMBtu	1	0.0000	0.0000
Isomers of xylene	1330-20-7	2.85E-04 Lb/MMBtu	1	0.0011	0.0003

<sup>1</sup> Emission factors are from AP 42, Table 3.3-2 for Uncontrolled Diesel Engines.

#### Emission Calculation Methods

##### Using lb/MMBtu Emission Factors

$$E_{ST} = C_{HI} \times EF_{HI}$$

$$E_A = E_{ST} \times \text{Annual Operating Hours} / 2,000 \text{ lb/ton}$$

where:

$E_{ST}$  = Short Term Emissions (lb/hr);

$E_A$  = Annual Maximum Emissions (tpy);

$C_{HI}$  = Heat Input Capacity (MMBtu/hr); and

$EF_{HI}$  = emission factor (lb/MMBtu)

**Table 12 - Emergency Engine HAP Emissions Summary**

Marquette Board of Light &amp; Power

Marquette Energy Center

## EU-LPGENGINE

Maximum Horse Power	81	HP	
Maximum Power	60	KW	
Maximum Fuel Usage Rate	6.687525377	gal/hr	Emission factors used for natural gas-fired engine.
Heat Input Capacity	0.56	MMBtu/Hr	SCC 2-02-002-54
Annual Operating Hours	500	hr/yr	
Annual Heat Input Limit or Capacity	281.8791946	MMBtu/yr	
Equivalent Natural Gas Usage	0.276	MMscf	assuming 1020 btu/scf

Pollutant <sup>1</sup>	Emission Factor (See Notes)		Notes	Annual Emissions (lb/yr)	Annual Emissions (tpy)
Acenaphthene	0.001275	lb/MMscf	1	0.0004	0.0000
Acenaphthylene	0.005641	lb/MMscf	1	0.0016	0.0000
Acetaldehyde	8.527	lb/MMscf	1	2.3565	0.0012
Acrolein	5.243	lb/MMscf	1	1.4489	0.0007
Benz(GHI)perylene	0.0004223	lb/MMscf	1	0.0001	0.0000
Benzene	0.4488	lb/MMscf	1	0.1240	0.0001
Benzo(b)fluoranthene	0.0001693	lb/MMscf	1	0.0000	0.0000
Benzo(e)pyrene	0.0004233	lb/MMscf	1	0.0001	0.0000
Biphenyl	0.2162	lb/MMscf	1	0.0597	0.0000
1,3 Butadiene	0.2723	lb/MMscf	1	0.0753	0.0000
Chlorobenzene	0.03101	lb/MMscf	1	0.0086	0.0000
Chloroethane	0.001907	lb/MMscf	1	0.0005	0.0000
Ethylbenzene	0.04049	lb/MMscf	1	0.0112	0.0000
Fluoranthene	0.001132	lb/MMscf	1	0.0003	0.0000
Fluorene	0.005783	lb/MMscf	1	0.0016	0.0000
Formaldehyde	53.86	lb/MMscf	1	14.8843	0.0074
Hexane	1.132	lb/MMscf	1	0.3128	0.0002
Methanol	2.55	lb/MMscf	1	0.7047	0.0004
Methylene chloride	0.0204	lb/MMscf	1	0.0056	0.0000
Napthalene	0.07589	lb/MMscf	1	0.0210	0.0000
Polycyclic aromatic hydrocarbons	0.02744	lb/MMscf	1	0.0076	0.0000
Phenanthrene	0.01061	lb/MMscf	1	0.0029	0.0000
Phenol	0.02448	lb/MMscf	1	0.0068	0.0000
Pyrene	0.001387	lb/MMscf	1	0.0004	0.0000
Styrene	0.02407	lb/MMscf	1	0.0067	0.0000
Toluene	0.4162	lb/MMscf	1	0.1150	0.0001
Vinyl chloride	0.0152	lb/MMscf	1	0.0042	0.0000
Xylenes (ISO)	0.5518	lb/MMscf	1	0.1525	0.0001

<sup>1</sup> Emission factors are from Web-fire for SCC 2-02-002-54 for Uncontrolled Natural Gas 4-Stroke Lean Burn Internal Combustion Engines  
Annual Emissions (tpy) = Emission Factor (lb/MMscf) x Fuel Consumption (MMscf/yr) x (ton/2000 lb)

**Table 13 - Miscellaneous Heaters HAP Emissions Summary**

Marquette Board of Light &amp; Power

Marquette Energy Center

Heat Input Capacity	3 MMBtu/hr
Heat Input Capacity	0.003 MMcf/hr
Annual Operating Hours	8760 hr/yr
Annual Heat Input Limit or Capacity	26280 MMBtu/yr
Fuel Heat Value	1020 MMBtu/MMcf

Pollutant <sup>1</sup>	CAS No.	Emission Factor (See Notes)	Notes	Maximum Short Term Emissions (lb/hr)	Annual Emissions (tpy)	HAP?
Formaldehyde	50-00-0	7.50E-02 lb/MMCF	1	2.21E-04	9.66E-04	Yes
Benzo (a) pyrene	50-32-8	1.20E-06 lb/MMCF	1	3.53E-09	1.55E-08	Yes
Dibenzo(a,h) anthracene	53-70-3	1.20E-06 lb/MMCF	1	3.53E-09	1.55E-08	Yes
3-Methylcholanthrene	56-49-5	1.80E-06 lb/MMCF	1	5.29E-09	2.32E-08	Yes
Benzo (a) anthracene	56-55-3	1.80E-06 lb/MMCF	1	5.29E-09	2.32E-08	Yes
Dimethylbenz(a)anthracene	57-97-6	1.60E-05 lb/MMCF	1	4.71E-08	2.06E-07	Yes
Benzene	71-43-2	2.10E-03 lb/MMCF	1	6.18E-06	2.71E-05	Yes
Acenaphthene	83-32-9	1.80E-06 lb/MMCF	1	5.29E-09	2.32E-08	Yes
Phenanthrene	85-01-8	1.70E-05 lb/MMCF	1	5.00E-08	2.19E-07	Yes
Fluorene	86-73-7	2.80E-06 lb/MMCF	1	8.24E-09	3.61E-08	Yes
Naphthalene	91-20-3	6.10E-04 lb/MMCF	1	1.79E-06	7.86E-06	Yes
2-Methyl Naphthalene	91-57-6	2.40E-05 lb/MMCF	1	7.06E-08	3.09E-07	Yes
Toluene	108-88-3	3.40E-03 lb/MMCF	1	1.00E-05	4.38E-05	Yes
N-Hexane	110-54-3	1.80E+00 lb/MMCF	1	5.29E-03	2.32E-02	Yes
Anthracene	120-12-7	2.40E-06 lb/MMCF	1	7.06E-09	3.09E-08	Yes
Pyrene	129-00-0	5.00E-06 lb/MMCF	1	1.47E-08	6.44E-08	Yes
Benzo (g,h,i) perylene	191-24-2	1.20E-06 lb/MMCF	1	3.53E-09	1.55E-08	Yes
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06 lb/MMCF	1	5.29E-09	2.32E-08	Yes
Benzo (b) fluoranthene	205-99-2	1.80E-06 lb/MMCF	1	5.29E-09	2.32E-08	Yes
Fluoranthene	206-44-0	3.00E-06 lb/MMCF	1	8.82E-09	3.86E-08	Yes
Benzo (k) fluoranthene	207-08-9	1.80E-06 lb/MMCF	1	5.29E-09	2.32E-08	Yes
Acenaphthylene	208-96-8	1.80E-06 lb/MMCF	1	5.29E-09	2.32E-08	Yes
Chrysene	218-01-9	1.80E-06 lb/MMCF	1	5.29E-09	2.32E-08	Yes
Manganese	7439-96-5	3.80E-04 lb/MMCF	1	1.12E-06	4.90E-06	Yes
Mercury	7439-97-6	2.60E-04 lb/MMCF	1	7.65E-07	3.35E-06	Yes
Nickel	7440-02-0	2.10E-03 lb/MMCF	1	6.18E-06	2.71E-05	Yes
Arsenic	7440-38-2	2.00E-04 lb/MMCF	1	5.88E-07	2.58E-06	Yes
Beryllium	7440-41-7	1.20E-05 lb/MMCF	1	3.53E-08	1.55E-07	Yes
Cadmium	7440-43-9	1.10E-03 lb/MMCF	1	3.24E-06	1.42E-05	Yes
Chromium	7440-47-3	1.40E-03 lb/MMCF	1	4.12E-06	1.80E-05	Yes
Cobalt	7440-48-4	8.40E-05 lb/MMCF	1	2.47E-07	1.08E-06	Yes
Selenium	7782-49-2	2.40E-05 lb/MMCF	1	7.06E-08	3.09E-07	Yes
<b>Total</b>					<b>6.60E-02</b>	

<sup>1</sup> Emission factors are from Web-fire for SCC 1-02-006-02 because no TAC factors are available for SCC 1-02-006-03.

**Emission Calculation Methods****Using lb/MMCF Emission Factors**

$$E_{ST} = C_{MMCF} \times EF_{MMCF}$$

$$E_A = E_{ST} \times \text{Annual Operating Hours} / 2,000 \text{ lb/ton}$$

where:

 $E_{ST}$  = Short Term Emissions (lb/hr); $E_A$  = Annual Maximum Emissions (tpy); $C_{MMCF}$  = Max Fuel Usage (MMCF/hr); and $EF_{MMCF}$  = emission factor (lb/MMCF)



# Compliance Assurance Monitoring Plan Selective Catalytic Reduction (SCR)

## Marquette Energy Center Engines 1, 2, and 3

Project No. 230889  
November 9, 2023

**REVIEW DRAFT**

# **Compliance Assurance Monitoring Plan Selective Catalytic Reduction (SCR)**

**Prepared For:  
Marquette Energy Center  
Engines 1, 2, and 3**

**November 9, 2023  
Project No. 230889**

***Review Draft***

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**List of Abbreviations/Acronyms**

Btu	British thermal unit(s)
Btu/gal	Btus per gallon
Btu/scf	Btus per standard cubic feet
CAM	Compliance Assurance Monitoring
CEMS	Continuous Emission Monitoring System
CFR	Code of Federal Regulations
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
°F	degrees Fahrenheit
gal/mo	gallons per month
gal/yr	gallons per year
g/hp-hr	grams per horsepower hour
g/kW-hr	grams per kilowatt hour
H <sub>2</sub> O	water
HAP	hazardous air pollutant(s)
hr/yr	hours per year
I&M	Inspection and Maintenance
kW	kilowatt(s)
lb	pound(s)
lb/MMBtu	pound(s) per million Btus
LFI	light fuel oil
MBLP	Marquette Board of Light & Power
MEC	Marquette Energy Center
MMBtu/hr	million Btus per hour
MMscf	million standard cubic feet
MMscf/mo	million standard cubic feet per month
MW	megawatt(s)
NH <sub>3</sub>	ammonia
NO	nitric oxide
NO <sub>2</sub>	nitrogen dioxide

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NO <sub>x</sub>	nitrogen oxides
O <sub>2</sub>	oxygen
pph	parts per hour
ppm	parts per million
QIP	Quality Improvement Plan
ROP	Renewable Operating Permit
scf/yr	standard cubic feet per year
SCR	selective catalytic reduction
Tpy	tons per year

## Part 1 – SCR Monitoring Plan

The Marquette Energy Center (MEC) is a major source of nitrogen oxides (NO<sub>x</sub>) emissions with three emission units that require a Compliance Assurance Monitoring (CAM) Plan. These emission units would be considered “other pollutant-specific emission units” for NO<sub>x</sub>. NO<sub>x</sub> emissions are controlled using a selective catalytic reduction (SCR) system.

### 1.1 Background

#### 1.1.1 Emissions Unit

Description:	Wartsila 18V50df, dual-fired engines (3)
Identification:	Engines 1, 2, and 3 (EUENGINE01, EUENGINE02 and EUENGINE03)
Facility:	Marquette Energy Center

#### 1.1.2 Applicable Regulation, Emission Limit, and Monitoring Requirements

Permit No.	MI-ROP No. MI-ROP-P0668-2019
------------	------------------------------

##### Emission Limits:

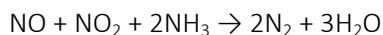
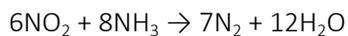
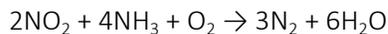
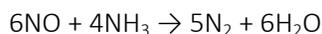
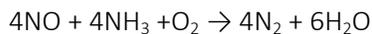
NO <sub>x</sub>	<ul style="list-style-type: none"> <li>222 tons per year (tpy), 12-month rolling time period as determined at the end of each calendar month</li> <li>3.3 parts per hour (pph) excluding startup and shutdown, hourly time period</li> <li>1.0 grams per horsepower hour (g/hp-hr) or 82 ppmvd @ 15% oxygen (O<sub>2</sub>), hourly time period</li> </ul>
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#### 1.1.3 Control Technology

Each engine is equipped with SCR to reduce NO<sub>x</sub> emissions. An SCR system reduces the level of nitrogen oxide in the exhaust gas from the engine by means of catalyst elements and reducing agent. An aqueous solution of urea (which is converted to ammonia) is used as the reducing agent in the SCR reaction.

Nitrogen oxides (NO and NO<sub>2</sub>) are generated in secondary reactions in the engine during fuel combustion.

SCR converts nitrogen oxides to nitrogen and water by the following reactions:



The reactions take place on the surface of a catalyst. SCR represents the state-of-the-art for back-end engine NO<sub>x</sub> removal. NO<sub>x</sub> conversion is sensitive to exhaust gas temperature. Performance can be limited by contaminants in the exhaust gas which may mask or poison the catalyst. The efficiency of the catalytic reduction depends on many factors, including the dosing of reducing agent, the catalyst volume and the exhaust gas temperature. The exhaust temperature must be within a certain range when the reducing agent feed is active. This temperature range is case-specific, depending mainly on the fuel used; it is set during commissioning of the SCR system.

Due to the toxicity and volatility of pure ammonia gas, aqueous solutions of urea or ammonia are used as reducing agents. The water in the reducing agent solution is evaporated as the solution is injected into the hot

exhaust gas. The high temperature also induces thermal decomposition of the urea  $[(\text{NH}_2)_2\text{CO}]$  into ammonia ( $\text{NH}_3$ ) and carbon dioxide ( $\text{CO}_2$ ):



The SCR system includes a reactor with catalyst elements, units for transfer, dosing, injection, and mixing of reducing agent, as well as equipment for monitoring and control. A pump unit transfers the reducing agent from the storage tank to the dosing unit which controls the flow of the reducing agent to the injection system. The injection system contains the air distribution unit and the reducing agent injectors. Compressed air is supplied to the dosing unit from the plant main instrument air supply and is used to purge the system during engine start-up. From the dosing unit, air is supplied to the air distribution unit. The air distribution unit ensures that the correct injector is supplied with the required compressed air flow and that the injectors are flushed with compressed air after engine shutdown or when switching the operational mode from gas to liquid fuel or vice versa. The injector sprays the reducing agent into the mixing duct located upstream of the reactor. The system contains one dedicated injector for engine gas mode operation and one dedicated injector for engine liquid fuel operation. Dedicated reducing agent control and injection components, based on engine operation mode, are required due to the large difference in the engine  $\text{NO}_x$  emission levels in the gas and the liquid fuel modes.

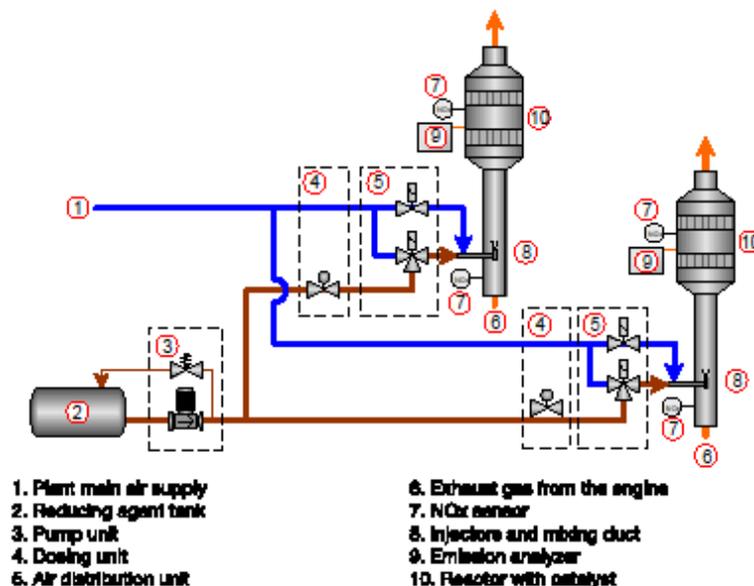


Figure 1. Diagram of Engine Control System

Monitoring the inlet and outlet temperature to/from the reactor and the pressure drop over the reactor is essential for the proper operation of the system. The exhaust temperature is measured in the inlet and outlet of the reactor and the pressure drop is measured over all catalyst elements.

## 1.2 Monitoring Approach

The key elements of the monitoring approach are presented below:

### 1.2.1 Indicator for Meeting Emission Limit

#### Indicator Range

<b>Indicator</b>	MEC monitors pressure drop over the reactors, reactor inlet/outlet temperature, and urea injection rate to ensure compliance with the NO <sub>x</sub> emission limits.	
<b>Indicator Ranges</b>	Pressure drop	Pressure drop is measured with a differential pressure gauge. It is continuously monitored and recorded at least once per day the engines are operating. It varies between 0 and 53 lb/ft <sup>2</sup> .
	Reactor inlet temperature	Reactor inlet temperature is measured with a thermocouple. It is continuously monitored and recorded at least once per day the engines are operating. It varies between 570 and 850°F.
	Reactor outlet temperature	Reactor outlet temperature is measured with a thermocouple. It is continuously monitored and recorded at least once per day the engines are operating. It varies between 570 and 850°F.
	Urea injection rate	Separate pumps/dosing units service the engines while firing natural gas versus firing light fuel oil. While firing natural gas, the urea injection rate varies between 0 and 14 gallons per hour (gph). While firing light fuel oil, it varies between 0 and 121 gph.
<b>QIP Threshold</b>	Excursions occur when the daily measurement is outside the acceptable range. The daily measurement is representative of the day's operation and does not include startup or shutdown readings. A Quality Improvement Plan (QIP) will be developed upon request of the EGLE-AQD if an excessive number of excursions have been reported.	

### 1.2.2 Performance Criteria

<b>Monitoring Data Representativeness:</b>	<p>The reducing agent dose and pressure, engine load, air pressure, reactor pressure drop, and exhaust gas exit temperature indicate optimal performance of the SCR system.</p> <ul style="list-style-type: none"> <li>• Low pressure drop may indicate a leakage, clog, worn pump, or air in the system.</li> <li>• High pressure drop may indicate that a valve or pipe is clogged.</li> <li>• If temperature is too high, the catalyst elements may be damaged.</li> <li>• If temperature is too low, catalyst efficiency is reduced mainly due to formation of deposits and consequential clogging.</li> <li>• A continuous supply of reducing agent is required to reduce the nitrogen oxide emissions. The reducing agent injection is automatically shut off if the operating conditions do not meet the requirements for reliable and efficient operation.</li> <li>• A continuous and reliable supply of compressed air is required for the injection of reducing agent. The air pressure must always be kept at the correct level, and the manual shut-off valves in the air lines must be fully open.</li> </ul>
<b>Verification of Monitoring Operational Status:</b>	<p>The SCR system starts automatically when all the start conditions are fulfilled. Start conditions are: reactor outlet temperature over 300 C (570F), no shutdowns, and the SCR must be set in auto mode. Data is not recorded during non-operation of monitoring equipment. All required system monitoring equipment will be maintained and calibrated per the manufacturer's recommendations. Calibration records will be maintained for future reference.</p>
<b>QA/QC Practices and Criteria:</b>	<p>The measuring devices will be installed, calibrated, maintained, and operated in accordance with manufacturer's recommendations.</p> <p>At least once per 12-months, the internal condition of the SCR system will be evaluated, and required repairs made to the injection nozzles, the pumping system, catalyst, and pumping system valves.</p> <p>After corrective action has been taken, proper operation of the measuring devices will be verified.</p>
<b>Monitoring Frequency and Collection Procedure:</b>	<p>Monitoring data will be recorded continuously. Out of range values will be documented. All monitoring data can be rolled up into representative daily values.</p>

## 1.3 Justification

### 1.3.1 Indicator for Meeting Emission Limit

Emissions testing has been performed and verifies the proper operation of the equipment. The engines have an internal system that verifies the correct urea injection rate. A feedback signal is provided by the analyzer that measures the NO<sub>x</sub> emissions in the middle of the reactor (after the SCR elements and before the oxidation catalyst elements). If any of the measurements used for the reagent or NO<sub>x</sub> control fails, the system will fall back to a limp mode. If the analyzer alarms for failure, the feedback control will be turned off and will use a pre-set correction factor instead. If the analyzer gives alarms for failure, it means that it is not capable of measuring NO<sub>x</sub> reliably or not at all. In this instance, the urea injection rate will default to a preset value. In addition, alarms for out of range pressure drop and inlet/outlet temperatures are also in place.

### **1.3.2 Rationale for Selection of Performance Indicator**

Engine pressure drop is a recognized indicator of performance; pressure differentials outside of their normal range indicates a developing problem with the catalyst that should be investigated. Parameters outside the specified range should be investigated and could indicate a malfunctioning control device. Pressure drop monitoring is included in other engine rules (NSPS, NESHAP) where catalysts control emissions.

Monitoring the temperature into and out of the catalyst is also a recognized indicator of performance. Temperature monitoring is included in other engine rules to ensure the catalyst is operating properly.

Urea is needed for the chemical reaction to take place. Monitoring the urea injection rate and comparing it to expected levels will ensure that the control equipment is working correctly.

### **1.3.3 Rationale for Selection of Indicator Level**

The specified indicator ranges were selected because they are within the ranges demonstrated through stack testing which indicates compliance with the NO<sub>x</sub> limit. When operation outside the selected indicator ranges occur, corrective action will be initiated, beginning with an evaluation of the occurrence to determine the action required to correct the situation. All excursions will be documented.



## RENEWABLE OPERATING PERMIT APPLICATION AI-001: ADDITIONAL INFORMATION

*This information is required by Article II, Chapter 1, Part 55 (Air Pollution Control) of P.A. 451 of 1994, as amended, and the Federal Clean Air Act of 1990. Failure to obtain a permit required by Part 55 may result in penalties and/or imprisonment. Please type or print clearly. Refer to instructions for additional information to complete this form.*

SRN: P0668

Section Number (if applicable):

1. Additional Information ID

AI-MAP

### Additional Information

2. Is This Information Confidential?

Yes  No

The PTI 205-14 includes a requirement to develop a Malfunction Abatement Plan (MAP). This MAP was submitted for approval on February 25, 2018. A copy is attached.

Page of

Received  
EGLE/AQD

JUN 26 2019

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# Preventive Maintenance and Malfunction Abatement Plan

## Marquette Energy Center Engine Units 1, 2, and 3

Project No. 190482  
Revised June 25, 2019



Fishbeck, Thompson, Carr & Huber, Inc.  
engineers | scientists | architects | constructors

ftc&h

# **Preventive Maintenance and Malfunction Abatement Plan**

## **Marquette Energy Center Engine Units 1, 2, and 3**

**Prepared For:  
Marquette Board of Light & Power  
Marquette Energy Center  
Marquette, Michigan**

**Revised June 25, 2019  
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# 1.0 Introduction

Marquette Board of Power & Light (MBLP) is a municipal electric utility serving approximately 17,000 customers in Marquette County, Michigan. This Preventive Maintenance and Malfunction Abatement Plan (PM/MAP) has been prepared for MBLP to comply with PTI 204-15A for the Marquette Energy Center (MEC). The PTI requires that MBLP adopt a PM/MAP within 90 days of permit issuance, or before June 27, 2019. Section 2.0 of this PM/MAP provides a source description; Section 3.0 presents a description of the air pollution control equipment; Section 4.0 includes the emission limits and describes malfunctions, and Section 5.0 outlines Rule 911 and provides a list of supervisor personnel associated with implementing this PM/MAP. Section 6.0 describes the PM Program and includes expected operating parameters and corrective procedures. Section 7.0 includes a list of spare parts; Section 8.0 includes information on estimating emissions, and Section 9.0 describes the requirements for reporting under Rule 912.

It should be noted that this PM/MAP meets the requirements of 40 CFR 60.4211(d) as well.

# 2.0 Source Description

MEC operates three Wärtsilä 18V50DF dual fuel-fired reciprocating internal combustion engines. Each is rated at approximately 17 MW and 173 MMBtu/hr when firing natural gas, or 154 MMBtu/hr when firing light fuel oil (LFO) or diesel fuel. MBLP intends to operate each engine base-loaded to provide electricity to MBLP customers. Each is equipped with SCR to reduce NO<sub>x</sub> emissions and catalytic oxidation to reduce CO and VOC emissions. Collectively, MEC refers to this system as the *SCR+Oxi System*. The engines use primarily natural gas as fuel, though they are capable of firing LFO for 6,000 hr/yr total for the three engines.

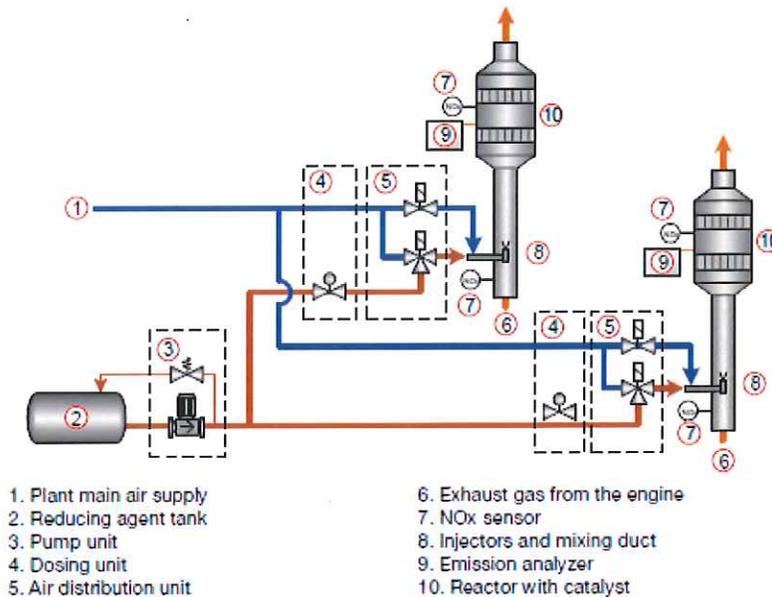
The Wärtsilä dual-fuel engines are unique because they have two different injection systems. A *micro-pilot injection system* is used when the engine is burning natural gas; the micro-pilot system allows a very small amount of fuel oil to be injected into the combustion chamber to ignite the natural gas. This amount makes it possible to meet very stringent emission regulations, which would not be possible if a normal injection system were used. A conventional injection system is used when the engine is running on LFO. Fuel flexibility and high efficiency are the main advantages of the dual-fuel technology. The Wärtsilä 18V50DF engine model has demonstrated an efficiency of more than 48%.

Three separate reciprocating engine-generator trains will operate in parallel within the engine hall/power block. The reciprocating engine subsystems include the engine, inlet air filtration, reciprocating engine, generator, and instrumentation. The reciprocating engine is comprised of cylinder block, valves, pistons, connecting rods, and a crankshaft. It is very similar to a conventional automobile engine, only larger. Each reciprocating engine contains 18 cylinders, pistons, and connecting rods, arrayed in V-formation. Reciprocating engine control and instrumentation will cover the engine governing system, and the protective system.

Thermal energy is produced in the reciprocating engines through the combustion of natural gas, which is converted into mechanical energy required to drive the crank shaft and electric generators. The generator sets will be equipped with the following required systems to provide safe and reliable operation:

- Natural gas and LFO fuel systems
- Lubricating oil system
- Compressed air systems
- Cooling system
- Intake air and exhaust gas systems
- Emission control system
- Fire detection and protection system
- Gas leakage detection system
- Oily water collection system
- Engine generator control and protection system

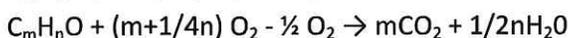
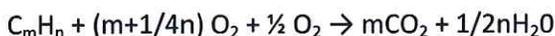
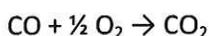
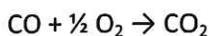
Figure 1 – SCR+Oxi System



Monitoring the inlet and outlet temperature to/from the reactor and the pressure drop over the reactor is essential for the proper operation of the system. The exhaust temperature is measured in the inlet and outlet of the reactor and the pressure drop is measured over all catalyst elements as well as over the oxidation catalyst elements. The reactor and the auxiliary units are available in different sizes, to serve different engine types, cylinder configurations, and emission abatement requirements. In multi-engine installations, the reducing agent pump and the control unit are shared by several engines, while the dosing units are engine-specific. The reagent dosing amount is fine-tuned with a closed loop NO<sub>x</sub> controller. The NO<sub>x</sub> controller uses another NO<sub>x</sub> measurement as feedback. This feedback signal is provided by the analyzer that measures the NO<sub>x</sub> emissions in the middle of the reactor (after the SCR elements and before the oxidation catalyst elements). This measurement value may differ from the final NO<sub>x</sub> emission level at the outlet of the reactor. Neither NO<sub>x</sub> measurement is performed using NO<sub>x</sub> measurement of CEMS quality. If any of the measurement analyzers for the reagent or NO<sub>x</sub> control fail, the system will fall back to a *limp mode*. As a result, the system will not be able to compare measurements before and after the reactor. The analyzer can indicate a fault mode if the sample cooler is not working properly, if both NO<sub>x</sub> cells are disconnected, or have too high a zero point. If the analyzer alarms for any of these potential failure modes, the feedback control will be turned off and a preset correction factor will be used to meter urea until the measurement analyzers are serviced. If the analyzer alarms for failure, it means that it is incapable of measuring NO<sub>x</sub> reliably or at all.

Oxidation catalyst layers for the abatement of carbon monoxide and unburned hydrocarbons are located after the SCR catalyst layers. The oxidation catalyst consists of a substrate to which one or several noble metals are added as catalytically active material. The oxidation reactions take place on the surface of the catalytically active material and utilize the excess of oxygen already present in the flue gas.

Catalytic oxidation converts carbon monoxide and VOCs to carbon dioxide and water by the following reaction:



The oxidation catalyst requires no consumable reagent and produces no waste effluents. The catalyst elements are installed in the same reactor.

Following is a list of malfunction events covered by this Plan:

- Failure of the emission control systems that results in emissions exceeding the allowed rate contained in the MEC PTI and ROP. This will be detected through monitoring of operating parameters associated with the air pollution control equipment to ensure its proper operation.
- Failure of emission control system components (e.g., pump failure) monitoring equipment (such as equipment used for measuring the pressure drop across the catalyst), and data acquisition equipment to demonstrate compliance with emission limits. It should be noted that MEC maintains full back-up components (e.g., pumps) for critical systems (i.e., the urea injection system).
- An unexpected sudden and unavoidable failure of engine control equipment or monitoring equipment

During engine operation, the operators have been instructed to pay attention to indications of problems in the system including:

- Leakage
- Smoke
- Excessive vibration
- Abnormal sounds or odors

## 4.2 NSPS Requirements for Operating Engines Properly

MEC is required to operate the engine control equipment properly to ensure compliance with emission limits. In addition, 40 CFR Part 60.4211, requires MEC to define equipment operating parameters and their correct ranges for monitoring to ensure compliance. MEC monitors:

- Pressure drop over the reactors
- Reactor inlet/outlet temperature
- Urea injection
- NO<sub>x</sub> feedback control
- Engine load

Using emissions testing and manufacturer’s recommendations, MEC has identified acceptable ranges for these operating parameters which depend on engine load. While MEC operates add-on control equipment to lower NO<sub>x</sub> emissions (as described in Section 3.0), MEC does not operate add-on control equipment for PM.

PM in engine exhaust results primarily from partially oxidized fuel (most often LFO), lubricating oil in the exhaust or sulfates formed when sulfur in fuel is oxidized.

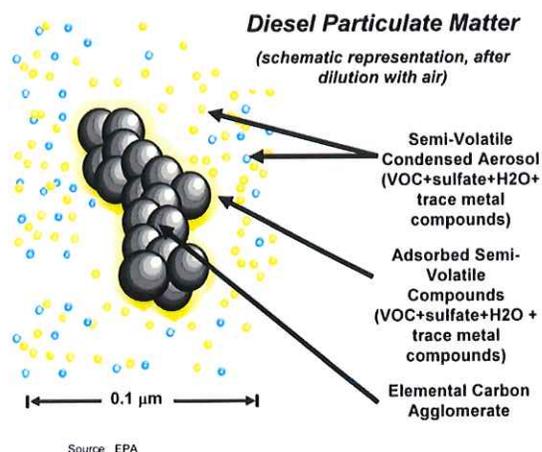


Figure 2 – Formation of PM in Engine Exhaust

Table 3 contains the titles and responsibilities of the responsible personnel, for purposes of this PM/MAP

**Table 3 – Responsible Personnel**

Position	Responsibility
Director of Operations and Maintenance	Overall responsibility for engine operation, corrective actions, and malfunction response
Maintenance/Engineering Services Manager	Preventative maintenance inspections and repairs
MEC Operators	Pollution control equipment monitoring and oversight
Environmental Compliance	Monitoring monthly emissions estimates, ensuring emission testing and reporting is completed
Outside Contractors (as necessary)	Calibration, repairs, and maintenance of equipment instrumentation

## 6.0 Preventive Maintenance Program, Operational Variables and Corrective Procedures

Preventive maintenance will include equipment inspections, scheduled replacement of parts, and maintaining an inventory of critical spare parts. The facility's Inspection and Maintenance (I&M) database system tracks and maintains records of each preventive maintenance action and/or repair completed and will track maintenance and repairs performed. This system was established by the engine manufacturer and then loaded into the MEC PM System.

Equipment inspections generally fall under two categories:

- Inspections that take place while the engines are operating
- Less frequent inspections that take place during an engine outage

I&M that occurs during engine operation is typically on a more frequent basis than I&M that occurs when the engine is not operating (shutdown or outage). The frequency and scope of these inspections will depend on the manufacturer recommendations; however, will be adjusted based on operator experience.

MEC will utilize internal resources, as well as outside vendors, to conduct maintenance, repairs, and calibration, as necessary.

## 6.2 Weekly Maintenance Schedule (or Upon System Startup)

1. The complete Engine Start-up/Weekly Checklist included in Appendix 1. Conducted during weeks when the engine is operating.
2. Maintain a record of the observation(s) and service(s) performed.

## 6.3 Monthly Maintenance Schedule

1. Inspect and maintain the dosing and reagent system pumps.
2. Inspect and maintain the dosing unit air filters.
3. Perform NO<sub>x</sub>Box System maintenance.
4. Calibrate the measurement cells in the NO<sub>x</sub> analyzer.
5. Inspect and maintain the temperature and differential pressure transmitters associated with the SCR+Oxi System.
6. Maintain a record of the observation(s) and service(s) performed.

## 6.4 Annual Routine Maintenance

1. Inspect and maintain the compressed air system associated with the SCR+Oxi System.
2. Inspect and maintain the atomizing lance associated with the SCR+Oxi System.
3. Inspect and maintain the reducing agent filters.
4. Inspect and maintain the compressed air filter associated with the dosing unit.
5. Change reducing agent gear box oil.
6. Replace NO<sub>x</sub> sensors.
7. Inspect and maintain the air distribution unit.
8. Inspect and maintain NO<sub>x</sub>Box System analyzers.
9. Calibrate the fuel meters, the pressure and temperature transmitters, and the transducers associated with the SCR+Oxi System.
10. Inspect and maintain the catalyst.
11. Maintain a record of the observation(s) and service(s) performed.

## 6.5 Corrective Action

If a malfunction occurs which causes, or may cause, excess emissions during engine operations, the equipment causing the potential excess emission rate will be evaluated – as soon as practicable in accordance with safe operating procedures – to determine the proper procedure to correct the issue or determine that the malfunction will not cause excess emissions. In some cases, a faulty signal to the control panel may represent a false alarm. In that case, the electronic tracking system will be repaired and the operator will manually record readings at least once per day until repairs have been completed. Determine if the engine can continue to operate within compliance of the limitations specified in the MEC's PTI and/or ROP. If not, action shall be taken to correct the issue in accordance with safe operating procedures.

- Notify the appropriate staff of any issues that occur and/or if there are any questions regarding compliance or action(s) which should be taken to correct the issue.
- If the issue is one that calls for immediate corrective action, contact any one of the individuals listed in Section 5.0, Table 2.

## 7.0 Major Parts Kept Onsite for Quick Replacement

Following is a list of general spare parts kept onsite facilitating quick repairs and maintenance on the SCR+Oxi System. A detailed list, including a description and part number for each, is kept at MEC for ordering purposes.

**Table 6 – Parts Kept Onsite**

Equipment	Replacement Parts
Reducing Agent Pump	Spare pump, stator, flexible joint seals, rotor, joint parts, shaft seals, axle shift seal, filter cartridge, sealing ring
Dosing Unit	Air filter element, sealing O-rings
Reducing Agent Injection System	Atomizing lance with 1 nozzle tip, additional nozzle tip
NO <sub>x</sub> Box	NO <sub>x</sub> sensors (4), NO <sub>x</sub> calibration gas, air inlet filter (2), peristaltic pump, measurement cell (4)
Catalysts	Gaskets, sealing cord for service hatches, sealing strip

## 8.0 Emissions Tracking and Monitoring

MBLP must comply with a site-wide NO<sub>x</sub> limit of 222 tons per 12-month rolling total by tracking NO<sub>x</sub> emissions from the engines. Emission factors are obtained by engineering testing, performance testing, or compliance testing. Emission factors, developed from the most recent testing, are provided in Appendices 2 and 3.

Emissions are calculated using emission factors multiplied by the fuel throughput in conjunction with its heating value.

NO<sub>x</sub> emissions (tons/12 months) = (fuel consumption - gal/mo or MMscf/mo) x (heat input - Btu/gal or Btu/scf) x (emission factor - lb/MMBtu) x (ton/2,000 lb)

The ROP also requires tracking of VOC and individual HAP (formaldehyde) emissions. Calculations for VOCs and individual HAPs are performed in similar matter with a spread sheet maintained at the site.

## 9.0 Reporting Malfunctions and Abnormal Conditions

Michigan Rules 912(2)-(5) require facilities to report of certain abnormal conditions, start-up, shutdown, or malfunctions associated with process and/or emission control systems subject to air quality requirements.

Michigan Rule 912(2) addresses reporting requirements for sources releasing emissions of HAPs and/or TACs in excess of applicable limitations for one hour or more. The requirement reads:

*The owner or operator of a source, process, or process equipment shall provide notice of an abnormal condition, start-up, shutdown, or a malfunction that results in emissions of a hazardous air pollutant which continue for more than 1 hour in excess of any applicable standard or limitation established by the clean air act or the emissions of a toxic air contaminant which continue for more than 1 hour in excess of an emission standard established by a rule promulgated under the air pollution act or an emission limitation specified in a permit issued or order entered under the air pollution act.*

# Appendix 1



**Appendix 1 - Start-up Checklist (Performed at Least Once per Week)**

Marquette Board of Light & Power  
 Marquette Energy Center, Marquette, Michigan

Checklist Completed by: \_\_\_\_\_  
 Date: \_\_\_\_\_

Check	Unit #1 - PAAE266676 Wartsila 18V50DF	Value	Units	Expected Range	Comments
Engine Load			kW	4,000 - 17,700	
Pressure Drop Over the Reactor			lb/ft <sup>2</sup>	0 - 53	
Reactor Inlet Temperature			°F	570 to 850	
Reactor Outlet Temperature			°F	570 to 850	
Urea Injection Rate			gal/hr	0-14 (gas) 0-121 (LFO)	
Check	Unit #2 - PAAE266677 Wartsila 18V50DF	Value	Units	Expected Range	Comments
Engine Load			kW	4,000 - 17,700	
Pressure Drop Over the Reactor			lb/ft <sup>2</sup>	0 - 53	
Reactor Inlet Temperature			°F	570 to 850	
Reactor Outlet Temperature			°F	570 to 850	
Urea Injection Rate			gal/hr	0-14 (gas) 0-121 (LFO)	
Check	Unit #3 - PAAE266678 Wartsila 18V50DF	Value	Units	Expected Range	Comments
Engine Load			kW	4,000 - 17,700	
Pressure Drop Over the Reactor			lb/ft <sup>2</sup>	0 - 53	
Reactor Inlet Temperature			°F	570 to 850	
Reactor Outlet Temperature			°F	570 to 850	
Urea Injection Rate			gal/hr	0-14 (gas) 0-121 (LFO)	
<b>Notes:</b>					

\* Operation outside of the expected range may not be problematic - it does merit investigation. In some cases, MEC may adjust the ranges



**Appendix 1 - Start-up Checklist (Performed at Least Once per Week)**  
 Marquette Board of Light & Power  
 Marquette Energy Center, Marquette, Michigan

Checklist Completed by: \_\_\_\_\_  
 Date: \_\_\_\_\_

Check	Emissions Control System Manual 3C 12	Value/Checked	Expected Range	Comments
<b>Inspect Reducing Agent Related Pipes and Instrumentation</b>				
a. Inspect the pipe for leaks, insulation damage, broken or loose flanges, etc.	wca3698			
b. Operate valves and grease exposed moving parts as necessary				
c. Check all electrical connections for insulation damage or loose contacts				
d. Verify that all automatic equipment and instrumentation is operating correctly.				
<b>Check the Reducing Agent Supply</b>				
a. Check the level in the reducing agent tank		%	25 - 100	
b. Check the reducing agent temperature		*F	41 - 95	
<b>Inspect the Reducing Agent Pump Unit</b>				
a. Check the pump for abnormal vibration or noise.	wca3445			
b. Check the pump inlet and outlet pressure.		psi	(Inlet) -7.25 - 61 (Outlet) 43.5 - 145	
c. Fill the barrier fluid cup with water if necessary	wca3717			
d. Check the output frequency or the pump control signal of the frequency converter.		Hz	0 - 60 Hz	
e. Check the electrical cabinet cooling and the dosing unit air filters, clean dust/deposits if necessary.	wca3717 wca3719 3C 12 2-19			
f. Check the heat tracing cabinet for proper operation (seasonal) and setpoints.	wca3717			
<b>Check the Operation of the Emission Analyzers (Engine 1.2.3)</b>				
a. Check that the flow through the flow meters is stable.	wca3443 3C 12 2-35			
b. Check the operation of the main sample pump by checking that gas flows out of the exhaust drain when the analyzer is measuring.	wca3700 3C 12 2-35			
c. Check that the measurements from the analyzer are realistic and that the measurement cells are showing similar values. (NO Cell 1 & 2 Raw / CO Cell Raw)	wca3700			
d. Check for moisture in the filters.	wca3700			
e. Check that the sample selection valve is tight.	wca3700 3C 12 2-35			
f. Check the operation of the peristaltic pump and tube inside. (Remove cover)	wca3700 3C 12 2-41			

# Appendix 2

## Appendix 2 - Engine Test Summary and Emission Factor Development (Natural Gas)

Marquette Board of Light & Power  
Marquette Energy Center, Marquette, Michigan

	Emission Limit	Engine One			
		Run One	Run Two	Run Three	Average
Active Power (kW)		17,006	17,007	17,011	17,008
Average hp		22,743	22,793	22,761	22,766
NOx Concentration (@15% O <sub>2</sub> )	82	1.8	1.1	1	1.3
NOx (lb/hr)	3.3	1.0	0.6	0.6	0.7
NOx (g/hp-hr)	1.0	0.020	0.012	0.011	0.014
NOx Emission Factor (lb/MMBtu)		0.0071	0.0043	0.0043	0.0052
CO Concentration (@15% O <sub>2</sub> )	270	0.9	0.6	0.6	0.7
CO (lb/hr)	5.0	0.3	0.2	0.2	0.2
CO (g/hp-hr)	2.0	0.006	0.004	0.004	0.005
CO Emission Factor (lb/MMBtu)		0.0021	0.0014		0.0018
VOC Concentration (@15% O <sub>2</sub> )	60	3.9	4.7	1.2	3.3
VOCs (lb/hr)	16.5	2	2.4	0.7	1.7
VOCs (g/hp-hr)	0.7	0.040	0.049	0.013	0.03
VOCs Emission Factor (lb/MMBtu)		0.0142	0.0172		0.0157
Formaldehyde Concentration		0.9	1.0	1.0	1.0
Formaldehyde (lb/hr)		0.19	0.22	0.22	0.21
Formaldehyde (g/hp-hr)		0.004	0.004	0.004	0.004
Formaldehyde (lb/MMBtu)		0.0013	0.0016	0.002	0.00
Fuel Use (lb/hr)		6226	6173	6216	6205.14
Fuel Use (scf/hr)		138,355	137,186	138,135	137,892
Heat Input (MMBtu/hr)		141.122	139.929	140.898	140.650
Reagent Flowrate (gal/hr)		9	9	9	9.30
Reactor Inlet Temperature (°F)		763	764	764	763.59
Reactor Outlet Temperature (°F)		770	772	773	771.59
Temperature Differential (°F)		7	8	9	8.00
Pressure Differential (lb/ft <sup>2</sup> )		20	21	21	20.56
Heat Rate (Btu/kW-hr)		8299	8228	8283	8269.78
Brake-specific fuel consumption (Btu/hp-hr)		6205	6139	6190	6178.18

Density of natural gas is 0.045 lb/scf

Heating value of natural gas is 1,020 Btu/scf

Fuel Oil for Ignition

Heat Input from Ignition (MMBtu/hr)

19,300 Btu/lb

139,000 Btu/gallon

29.14194817	121.1921231	41.64942739
4.050730796	16.84570511	5.789270408

# Appendix 3

### Appendix 3 - Engine Test Summary and Emission Factor Development (LFO)

Marquette Board of Light & Power

Marquette Energy Center, Marquette, Michigan

	Emission Limit	Engine One
Active Power (kW)		17,011
Average hp		22,762
NOx Concentration (@15% O <sub>2</sub> )		10.3
NOx (lb/hr)	21	5.8
NOx (g/hp-hr)	2.58 g/kW-hr	0.116
NOx Emission Factor (lb/MMBtu)		0.0425
CO Concentration (@15% O <sub>2</sub> )		0.6
CO (lb/hr)		0.2
CO (g/hp-hr)		0.004
CO Emission Factor (lb/MMBtu)		0.0015
PM Concentration (gr/dscf)		0.0016
PM (lb/hr)		0.7880
PM (g/kW-hr)	0.15 g/kW-hr	0.0210
PM Emission Factor (lb/MMBtu)		0.0058
VOC Concentration (@15% O <sub>2</sub> )		0.1
VOC (lb/hr)		0.0000
VOC (g/hp-hr)		0.001
VOC (lb/MMtu)		0.0000
Fuel Use (lb/hr)		7065
Fuel Use (gal/hr)		981
Heat Input (MMBtu/hr)		136
Reagent Flowrate (gal/hr)		102
Reactor Inlet Temperature (°F)		663
Reactor Outlet Temperature (°F)		702
Temperature Differential (°F)		39
Pressure Differential (lbf/ft <sup>2</sup> )		21
Heat Rate (btu/kW-hr)		8015
Brake-specific fuel consumption (btu/hp-hr)		5,990

Density of natural gas is 0.045 lb/scf

Heating value of natural gas is 1,020 Btu/scf

19,300 Btu/lb

139,000 Btu/gallon

# Appendix 4

# ENVIRONMENTAL RELEASE REPORTING FORM

*For internal use only.*

To be completed by the Environmental Engineer

Date _____	Time of Report _____	Reported By _____
Location of Incident _____		
Type of Incident	<input type="checkbox"/> Spill/Release	<input type="checkbox"/> Fire <input type="checkbox"/> Explosion <input type="checkbox"/> Other
Time Incident was Detected _____	a.m./p.m.	Duration of Event _____
Name of Material(s) Released _____		
Regulatory Status of Released Material:	<input type="checkbox"/> Michigan Critical Material	<input type="checkbox"/> Act 451, Part 31 Polluting Material
	<input type="checkbox"/> Oil	<input type="checkbox"/> RCRA <input type="checkbox"/> CERCLA <input type="checkbox"/> EPCRA/SARA
Amount Released _____ (lbs)	RQ?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Container Type	<input type="checkbox"/> Drum <input type="checkbox"/> UST <input type="checkbox"/> AST	<input type="checkbox"/> Other _____
Release Characteristics	Color _____	Odor _____ Other _____
Release Entering	<input type="checkbox"/> Drains <input type="checkbox"/> Soil	<input type="checkbox"/> Surface Water <input type="checkbox"/> Air <input type="checkbox"/> Other _____
Weather Conditions	Precipitation _____	Wind Direction/Speed _____
Company Response Personnel at Scene _____		
Outside Response Personnel at Scene	<input type="checkbox"/> Spill Contractor(s)	<input type="checkbox"/> Fire Department
	<input type="checkbox"/> Regulatory _____	Governmental _____
	<input type="checkbox"/> Other _____	
Injuries?	<input type="checkbox"/> No <input type="checkbox"/> Yes (type of injuries) _____	
Site or Building Evacuation?	<input type="checkbox"/> No <input type="checkbox"/> Yes	

## Agencies Notified

<input type="checkbox"/> MDEQ*	Date _____	Time _____	Initials _____
<input type="checkbox"/> Local Governmental Depts.	Date _____	Time _____	Initials _____
<input type="checkbox"/> PEAS Hotline	Date _____	Time _____	Initials _____
<input type="checkbox"/> EPA Response Center	Date _____	Time _____	Initials _____
<input type="checkbox"/> UST Release Hotline	Date _____	Time _____	Initials _____

*\*Written report must be filed with the MDEQ within ten (10) days.*