



RECEIVED

NOV 12 2019

## RENEWABLE OPERATING PERMIT APPLICATION C-001: CERTIFICATION

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 provide this information may result in civil and/or criminal penalties. Please type or print clearly.

MAERS FILE MAERS


**This form is completed and included as part of Renewable Operating Permit (ROP) initial and renewal applications, notifications of change, amendments, modifications, and additional information.**

Form Type <b>C-001</b>	SRN N5831
------------------------	-----------

Stationary Source Name Riverside Energy Michigan-Hayes 29 CPF	
City Gaylord	County Otsego

<b>SUBMITTAL CERTIFICATION INFORMATION</b>	
1. Type of Submittal <i>Check only one box.</i>	
<input type="checkbox"/> Initial Application (Rule 210)	<input type="checkbox"/> Notification / Administrative Amendment / Modification (Rules 215/216)
<input type="checkbox"/> Renewal (Rule 210)	<input checked="" type="checkbox"/> Other, describe on AI-001
2. If this ROP has more than one Section, list the Section(s) that this Certification applies to <u>2</u>	
3. Submittal Media <input type="checkbox"/> E-mail <input type="checkbox"/> FTP <input type="checkbox"/> Disk <input checked="" type="checkbox"/> Paper	
4. Operator's Additional Information ID - Create an Additional Information (AI) ID that is used to provide supplemental information on AI-001 regarding a submittal.	
AI <b>PMMAP</b>	

<b>CONTACT INFORMATION</b>	
Contact Name Carolann Knapp	Title Compliance Coordinator
Phone number 231-995-4130	E-mail address cknapp@riversideem.com

<b>This form must be signed and dated by a Responsible Official.</b>				
Responsible Official Name James Schramski			Title VP Operations	
Mailing address 10691 E. Carter Rd., Ste 201				
City Traverse City	State MI	ZIP Code 49684	County Grand Traverse	Country USA
<b>As a Responsible Official, I certify that, based on information and belief formed after reasonable inquiry, the statements and information in this submittal are true, accurate and complete.</b>				
 Signature of Responsible Official			<u>11/8/19</u> Date	



# 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.*

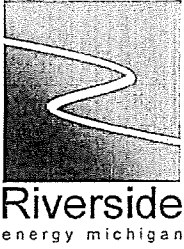
SRN: N5831	Section Number (if applicable): 2
------------	-----------------------------------

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

### Additional Information

2. Is This Information Confidential?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
--------------------------------------	---

Submitting a revised Preventative Maintenance & Malfunction Abatement Plan for Riverside Energy Michigan



10691 East Carter Road  
Suite 201  
Traverse City, MI 49684

T: +1 231 995 4000  
F: +1 231 943 2129  
www.RiversideEM.com

RECEIVED  
AQD

NOV 12 2019

November 7, 2019

Department of Environmental Quality  
Air Quality Division  
120 W. Chapin St.  
Cadillac, MI 49601-2158

MACES \_\_\_\_\_ MAERS \_\_\_\_\_  
FILE \_\_\_\_\_

Attn: Jodi Lindgren

Re: Preventative Maintenance/Malfunction Abatement Plan for the Hayes 29 CPF  
Permit #MI-ROP-N5831 Section 2

Dear Jodi,

Attached please find the Preventative Maintenance & Malfunction Abatement Plan for Riverside's Section 2 of the Hayes 29 CPF, referenced above. And per your direction, you will also find enclosed a signed and completed C-001 Certification Form as well as an A-001 form that are required documents for the application renewal process.

If you have any questions regarding this PM/MAP, please call (231) 995-4130 or reach me at [cknapp@riversideem.com](mailto:cknapp@riversideem.com).

Sincerely,

A handwritten signature in cursive script that reads "Carolann Knapp".

Carolann Knapp  
Compliance Coordinator

Enclosures



10691 East Carter Road  
Suite 201  
Traverse City, MI 49684

T: +1 231 995 4000  
F: +1 231 943 2129  
www.RiversideEM.com

RECEIVED  
AQD

> NOV 12 2019

MACES  MAERS \_\_\_\_\_  
FILE MAP

November 7, 2019

Department of Environmental Quality  
Air Quality Division  
120 W. Chapin St.  
Cadillac, MI 49601-2158

Attn: Jodi Lindgren

Re: Preventative Maintenance/Malfunction Abatement Plan for the Hayes 29 CPF  
Permit #MI-ROP-N5831 Section 2

Dear Jodi,

Attached please find the Preventative Maintenance & Malfunction Abatement Plan for Riverside's Section 2 of the Hayes 29 CPF, referenced above. And per your direction, you will also find enclosed a signed and completed C-001 Certification Form as well as an A-001 form that are required documents for the application renewal process.

If you have any questions regarding this PM/MAP, please call (231) 995-4130 or reach me at [cknapp@riversideem.com](mailto:cknapp@riversideem.com).

Sincerely,

A handwritten signature in blue ink that reads "Carolann Knapp".

Carolann Knapp  
Compliance Coordinator

Enclosures



**PREVENTATIVE MAINTENANCE &  
MALFUNCTION ABATEMENT PLAN**

**RIVERSIDE ENERGY MICHIGAN, LLC**

**HAYES 29 CPF  
MI-ROP-N5831**

**10875 GERONIMO TRAIL  
GAYLORD, MI 49735  
OTSEGO COUNTY**

**November 7, 2019**

## TABLE OF CONTENTS

	<b>Page No.</b>
1.0 INTRODUCTION	3
2.0 ENGINES AND CATALYTIC CONTROL UNITS	3
3.0 RECORDKEEPING	4
4.0 UPDATES	5

### **APPENDIXES:**

Appendix A – List of Facility Specific Equipment Covered by this PM/MAP

Appendix B – Monthly Operating Report

Appendix C – Catalyst Monthly Operating Report

## **1.0 INTRODUCTION**

Central Production Facility (CPF) receives gas from natural gas wells in the area. Gas is dehydrated and compressed prior to flowing to sales points. Riverside Energy Michigan, LLC (Riverside) uses both rich burn and lean burn engines at its facilities. Generally, there are no add-on control devices for lean burn engines. However, a few of Riverside's lean burn engines are equipped with oxidation catalytic control systems. The text of this PM/MAP is uniform for all of Riverside's facilities.

The text of this PM/MAP is uniform for all of Riverside's facilities. The cover page and the specific engine and catalyst information (if applicable) shown in Appendix A will be unique to each facility.

### **1.1 CONTACT PERSON**

Any questions regarding this PM/MAP should be directed to Mr. Chris Matts, Operations Supervisor – Special Projects, at 989-732-4146, ext. 4112, or Ms. Natalie Schrader, Compliance Coordinator, at 231-995-4076.

## **2.0 ENGINES AND CATALYTIC CONTROL UNITS**

### **2.1 Description**

Hayes 29 CPF has (1) natural gas fired combustion engine which is identified in Appendix A. It is equipped with a Oxidation Catalyst. Oxidation Catalysts used on lean-burn engines reduce CO, VOC and trace organic toxic air contaminants (TACs), which include hazardous air pollutants (HAPS). Information on all on-site engines is stored and updated in a compressor database and/or spreadsheet.

### **2.2 Operation of Catalytic Converters**

For both 3-way catalysts and oxidation catalysts, the hot exhaust gases from the engine pass through a catalytic reduction bed where the reduction and oxidation occur. An oxidation catalyst requires higher oxygen levels to allow the converter bed to oxidize the CO, VOC and trace organic TACs/HAPs. The exhaust gases then pass out a stack.

### **2.3 Critical Criteria**

Preventive maintenance of the engines is done to keep the engines operating properly and to extend their life span. Any major malfunction of the engine will cause it to automatically shut down and activate the alarm, leading to its being taken out of service for repair. Each engine has a control panel that will indicate critical malfunctions and will initiate an engine shutdown if necessary. In the event of a shutdown, the contract mechanic is called out to repair the engine and a record of the event is made. Records are kept in Riverside's database.

The critical criteria for the operation of the catalytic converter are the oxygen content of the incoming gases, the pressure drop across the catalyst bed and the inlet and outlet temperatures. If the oxygen content is too high for a 3-way catalytic converter, the NO<sub>x</sub> reduction reaction will not yield the desired 90% decrease in concentration. Similarly, for oxidation catalysts, if the oxygen level drops to low, the proper oxidation of CO, VOC and trace TACs/HAPs will decrease. For lean burn engines, the oxygen level should be enough to ensure that the oxygen content of the exhaust gases will remain adequate to allow proper oxidation.

A high-pressure drop may be an indication of plugging of the catalyst, and a very low one may indicate the catalyst bed has leakage around or through it. A high outlet temperature may also be an indication of the need to shut down the unit to prevent burnout of the catalyst. Typical operating temperature ranges for a 3-way catalyst is 750° F to 1350° F. But is not uncommon for an oxidation catalyst to perform as inverted temperatures, with the proper reduction still performing.

## **2.4 Catalyst Inspections and Maintenance**

To reduce the chance of fouling problems with a 3-way catalyst and oxidation catalysts, if an engine is new or major maintenance is performed, the engine could run for up to 100 hours without the catalyst installed. The engine may run without the catalytic converter for a maximum of 200 hours per year (per permit conditions). Records will be maintained of the engine hours of operation without the catalyst. All catalysts will be equipped with pre-and post-catalyst temperature sensors. If the post-catalyst temperature on a 3-way catalyst is less than the pre-catalyst temperature, a service person will be called out to investigate. Temperature rise will not be used as a measure of oxidation catalyst performance.

Preventative maintenance schedule for Riverside engines and catalysts is included in Table 1. A log of all inspections and maintenance work will be maintained in a database or spreadsheet. A schedule is maintained for each engine and its add-on control devices (see Table 2 “Operating Variables and Remedial Actions”).

Third party compressor maintenance personnel are responsible for overseeing inspection, maintenance and repair of all add-on control devices.

## **2.5 Spare / Replacement Parts**

All engine replacement parts, catalyst insert kits and extra temperature probes will be maintained by the contracted maintenance service company. No spare or major replacement parts will be kept on site.

## **2.6 Key Operating Variables and Corrective Procedures in the Event of a Malfunction**

See Table 2 for a summary of the key operating variables and corrective actions for each malfunction.



### **3.0 RECORDKEEPING**

Records of engine operating hours and maintenance are kept and updated on Riverside's date server in a database or in a spreadsheet form. Appendix B is an example of data recorded each month by a contract service company; hard copy records of these reports are sent to the Riverside office at the end of each month. Appendix C is an example catalyst maintenance log. This data is recorded in a database or spreadsheet. All required records will be retained for a period of 5 years per permit conditions.

Riverside will keep all records necessary for demonstrating compliance with this PM/MAP. Records will be made available within two weeks from the date of request by the EGLE.

### **4.0 UPDATES**

If Riverside engines experience a malfunction that is not properly addressed in this Preventative Maintenance and Malfunction Abatement Plan, it will be updated and submitted to the EGLE District Supervisor for review and approval.

**Table 1  
Engine & Catalytic Converter Preventative Maintenance Schedule**

<b>Item</b>	<b>Activity</b>	<b>Equipment Status</b>	<b>Frequency</b>
Engine	Service * Check and adjust valves * Check engine compression * Check timing * Check fuel pressure * Check air filter * Change pre-air filter * Check all kill devices	Off line	Every 60-90 days
Engine	Major Service * Perform service as listed above * Change motor oil and filter	Off line	Approximately every 3,000 hours of engine operation.
Engine	Swing/Overhaul * Replace existing engine with rebuilt engine * When new/rebuilt engine is installed, or major maintenance is performed, the unit will be run without the catalyst, if applicable, for up to 100 hours per event. This prevents the catalyst from becoming damaged.	Off line	Approximately every 85,000 hours of engine operation, or as needed.
Catalyst	* Check Differential pressure across catalyst * Establish baseline $\Delta P$ each time a new CC or cleaned CC insert is installed at normal operating conditions (rpm's). Check monthly. If greater than baseline $\Delta P$ by 4" WC @ 80-100% max rpm, then inspect catalyst and take actions based on findings. * Check inlet and outlet temperatures across the catalyst * If the pre-catalyst temp. is less than 750°F, or another min. temp established through testing, a service person will be called out to investigate. * If the post-catalytic temp. exceeds 1350°F, the engine will be shut down. * If the $\Delta T$ across CC is negative, a service person will evaluate cause and determine a resolution, based on history and degree of change and	Online	Monthly

	establish engine specific $\Delta T$ through testing.		
--	---	--	--

**Table 1 Continued**  
**Engine and Catalytic Converter Preventative Maintenance Schedule**

<b>Item</b>	<b>Activity</b>	<b>Equipment Status</b>	<b>Frequency</b>
Catalyst	<ul style="list-style-type: none"> <li>* The catalytic converter shall be removed, inspected and cleaned at least once per 12-18 months. Cleaning will consist of vacuuming the catalyst face and washing the fouling and built up ash.</li> <li>* If the catalyst does not respond to the annual vacuum blowing treatment or washing, the catalyst will be shipped to the manufacturer and washed. A replacement catalyst insert shall be used.</li> <li>* Replace the gaskets (typically done when the catalyst is removed for any servicing).</li> <li>* Establish baseline.</li> </ul>	Offline	Every 12-18 months of catalyst operating time, or in the event of an engine malfunction where foreign fluids cause engine shutdown
Catalyst	<ul style="list-style-type: none"> <li>* Remove catalyst insert and wash in chemical solution to remove surface contamination</li> <li>* Replace with clean or fresh insert</li> <li>* Establish baseline.</li> </ul>	Offline	Every 18-24 months of operation
Portable Emission Analyzer	* Maintenance and calibration	On or offline	Testing will be done by Riverside or contract company on a 5-year schedule

**Appendix A  
Equipment Information**

<b>Facility</b>	<b>AQD</b>	<b>Unit #</b>	<b>Type</b>	<b>AFRC (Yes/No)</b>	<b>Model</b>	<b>Lean Burn or Standard</b>
HAYES 29	EUENGINEH 29	3956	OXIDATION	Yes	CATERPILLAR 3516, 1085 HP	Lean Burn

**Table 2 – Operating Variables and Remedial Actions**

<b>Device Description</b>	<b>Operating Variable</b>	<b>Monitoring Method</b>	<b>Frequency</b>	<b>Normal Operating Range</b>	<b>Corrective Procedure or operational Change in the Event of a Malfunction</b>	<b>Responsible Supervisor</b>
Catalyst	0-4" WC Change in $\Delta P$ @ normal operating conditions	Gauge or manometer	Monthly	Varies by engine. Recorded in database.	Remove and inspect catalyst insert within 3 days. Clean or replace if necessary, within 5 days.	Operations Manager, Contract Service Vendor
Catalyst	Inlet and Outlet temperatures	Thermocouple	Monthly or as Needed	Must be below 1350 degrees F. For 3-way catalysts only: Outlet temp. must be equal or greater than the catalytic inlet temp.	Engine will be shut down at 1200° F or greater. For 3-way catalysts: if outlet temperature is less than the inlet temperature, a mechanic will investigate within 3 days and make appropriate repairs within 5 days.	Operations Manager, Contract Service Vendor
Engine			As needed		Engine will be shut down	Operations Manager, Contract Service Vendor



