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

July 22, 2024

# PERMIT TO INSTALL
87-24

**ISSUED TO**
Lakeshore Liquids Recovery, LLC

**LOCATED AT**
Section 36
Dover Township, Michigan 49735

**IN THE COUNTY OF**
Otsego

**STATE REGISTRATION NUMBER**
P0446

The Air Quality Division has approved this Permit to Install, pursuant to the delegation of authority from the Michigan Department of Environment, Great Lakes, and Energy. This permit is hereby issued in accordance with and subject to Section 5505(1) of Article II, Chapter I, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Pursuant to Air Pollution Control Rule 336.1201(1), this permit constitutes the permittee's authority to install the identified emission unit(s) in accordance with all administrative rules of the Department and the attached conditions. Operation of the emission unit(s) identified in this Permit to Install is allowed pursuant to Rule 336.1201(6).

| | |
|---|---|
| DATE OF RECEIPT OF ALL INFORMATION REQUIRED BY RULE 203:<br>**July 1, 2024** | |
| DATE PERMIT TO INSTALL APPROVED:<br>**July 22, 2024** | SIGNATURE: |
| DATE PERMIT VOIDED: | SIGNATURE: |
| DATE PERMIT REVOKED: | SIGNATURE: |

# PERMIT TO INSTALL

## Table of Contents

## COMMON ACRONYMS

| | |
|---|---|
| AQD | Air Quality Division |
| BACT | Best Available Control Technology |
| CAA | Clean Air Act |
| CAM | Compliance Assurance Monitoring |
| CEMS | Continuous Emission Monitoring System |
| CFR | Code of Federal Regulations |
| COMS | Continuous Opacity Monitoring System |
| Department/department/EGLE | Michigan Department of Environment, Great Lakes, and Energy |
| EU | Emission Unit |
| FG | Flexible Group |
| GACS | Gallons of Applied Coating Solids |
| GC | General Condition |
| GHGs | Greenhouse Gases |
| HVLP | High Volume Low Pressure* |
| ID | Identification |
| IRSL | Initial Risk Screening Level |
| ITSL | Initial Threshold Screening Level |
| LAER | Lowest Achievable Emission Rate |
| MACT | Maximum Achievable Control Technology |
| MAERS | Michigan Air Emissions Reporting System |
| MAP | Malfunction Abatement Plan |
| MSDS | Material Safety Data Sheet |
| NA | Not Applicable |
| NAAQS | National Ambient Air Quality Standards |
| NESHAP | National Emission Standard for Hazardous Air Pollutants |
| NSPS | New Source Performance Standards |
| NSR | New Source Review |
| PS | Performance Specification |
| PSD | Prevention of Significant Deterioration |
| PTE | Permanent Total Enclosure |
| PTI | Permit to Install |
| RACT | Reasonable Available Control Technology |
| ROP | Renewable Operating Permit |
| SC | Special Condition |
| SCR | Selective Catalytic Reduction |
| SNCR | Selective Non-Catalytic Reduction |
| SRN | State Registration Number |
| TBD | To Be Determined |
| TEQ | Toxicity Equivalence Quotient |
| USEPA/EPA | United States Environmental Protection Agency |
| VE | Visible Emissions |

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

## POLLUTANT / MEASUREMENT ABBREVIATIONS

| | |
|---|---|
| acfm | Actual cubic feet per minute |
| BTU | British Thermal Unit |
| °C | Degrees Celsius |
| CO | Carbon Monoxide |
| $CO_2e$ | Carbon Dioxide Equivalent |
| dscf | Dry standard cubic foot |
| dscm | Dry standard cubic meter |
| °F | Degrees Fahrenheit |
| gr | Grains |
| HAP | Hazardous Air Pollutant |
| Hg | Mercury |
| hr | Hour |
| HP | Horsepower |
| $H_2S$ | Hydrogen Sulfide |
| kW | Kilowatt |
| lb | Pound |
| m | Meter |
| mg | Milligram |
| mm | Millimeter |
| MM | Million |
| MW | Megawatts |
| NMOC | Non-Methane Organic Compounds |
| $NO_x$ | Oxides of Nitrogen |
| ng | Nanogram |
| PM | Particulate Matter |
| PM10 | Particulate Matter equal to or less than 10 microns in diameter |
| PM2.5 | Particulate Matter equal to or less than 2.5 microns in diameter |
| pph | Pounds per hour |
| ppm | Parts per million |
| ppmv | Parts per million by volume |
| ppmw | Parts per million by weight |
| psia | Pounds per square inch absolute |
| psig | Pounds per square inch gauge |
| scf | Standard cubic feet |
| sec | Seconds |
| $SO_2$ | Sulfur Dioxide |
| TAC | Toxic Air Contaminant |
| Temp | Temperature |
| THC | Total Hydrocarbons |
| tpy | Tons per year |
| µg | Microgram |
| µm | Micrometer or Micron |
| VOC | Volatile Organic Compounds |
| yr | Year |

## GENERAL CONDITIONS

1. The process or process equipment covered by this permit shall not be reconstructed, relocated, or modified, unless a Permit to Install authorizing such action is issued by the Department, except to the extent such action is exempt from the Permit to Install requirements by any applicable rule. **(R 336.1201(1))**

2. If the installation, construction, reconstruction, relocation, or modification of the equipment for which this permit has been approved has not commenced within 18 months, or has been interrupted for 18 months, this permit shall become void unless otherwise authorized by the Department. Furthermore, the permittee or the designated authorized agent shall notify the Department via the Supervisor, Permit Section, Air Quality Division, Michigan Department of Environment, Great Lakes, and Energy, P.O. Box 30260, Lansing, Michigan 48909-7760, if it is decided not to pursue the installation, construction, reconstruction, relocation, or modification of the equipment allowed by this Permit to Install. **(R 336.1201(4))**

3. If this Permit to Install is issued for a process or process equipment located at a stationary source that is not subject to the Renewable Operating Permit program requirements pursuant to Rule 210 (R 336.1210), operation of the process or process equipment is allowed by this permit if the equipment performs in accordance with the terms and conditions of this Permit to Install. **(R 336.1201(6)(b))**

4. The Department may, after notice and opportunity for a hearing, revoke this Permit to Install if evidence indicates the process or process equipment is not performing in accordance with the terms and conditions of this permit or is violating the Department's rules or the Clean Air Act. **(R 336.1201(8), Section 5510 of Act 451, PA 1994)**

5. The terms and conditions of this Permit to Install 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 this Permit to Install. If the new owner or operator submits a written request to the Department pursuant to Rule 219 and the Department approves the request, this permit 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 and shall be sent to the District Supervisor, Air Quality Division, Michigan Department of Environment, Great Lakes, and Energy. **(R 336.1219)**

6. Operation of this equipment shall not result in the emission of an air contaminant which causes injurious effects to human health or safety, animal life, plant life of significant economic value, or property, or which causes unreasonable interference with the comfortable enjoyment of life and property. **(R 336.1901)**

7. 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 Department. The notice shall be provided not later than two business days after start-up, shutdown, or discovery of the abnormal condition or malfunction. Written reports, if required, must be filed with the Department 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 condition or malfunction, whichever is first. The written reports shall include all of the information required in Rule 912(5). **(R 336.1912)**

8. Approval of this permit does not exempt the permittee from complying with any future applicable requirements which may be promulgated under Part 55 of 1994 PA 451, as amended or the Federal Clean Air Act.

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

10. Operation of this equipment may be subject to other requirements of Part 55 of 1994 PA 451, as amended and the rules promulgated thereunder.

11. Except as provided in subrules (2) and (3) or unless the special conditions of the Permit to Install include an alternate opacity limit established pursuant to subrule (4) of Rule 301, the permittee shall not cause or permit to be discharged into the outer air from a process or process equipment a visible emission of density greater than the most stringent of the following. The grading of visible emissions shall be determined in accordance with Rule 303 (R 336.1303). **(R 336.1301)**
    a) A six-minute average of 20 percent opacity, except for one six-minute average per hour of not more than 27 percent opacity.
    b) A visible emission limit specified by an applicable federal new source performance standard.
    c) A visible emission limit specified as a condition of this Permit to Install.

12. 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). **(R 336.1370)**

13. The Department may require the permittee to conduct acceptable performance tests, at the permittee's expense, in accordance with Rule 1001 and Rule 1003, under any of the conditions listed in Rule 1001. **(R 336.2001)**

# EMISSION UNIT SPECIAL CONDITIONS

## 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)) | Flexible Group ID |
|---|---|---|
| EUENGINE6 | A 1900 bhp compressor engine with a model year of 2011 or later. The engine is equipped with an emissions control catalyst. | NA |

Changes to the equipment described in this table are subject to the requirements of R 336.1201, except as allowed by R 336.1278 to R 336.1291.

# EUENGINE6
# EMISSION UNIT CONDITIONS

## DESCRIPTION

A 1900 bhp compressor engine with a model year of 2011 or later. The engine is equipped with an emissions control catalyst.

**Flexible Group ID:** NA

## POLLUTION CONTROL EQUIPMENT

EUENGINE6 is equipped with an emissions control catalyst.

## I. EMISSION LIMIT(S)

| Pollutant | Limit | Time Period / Operating Scenario | Equipment | Monitoring / Testing Method | Underlying Applicable Requirements |
|---|---|---|---|---|---|
| 1. $NO_x$ | 9.2 tpy | 12-month rolling time period as determined at the end of each calendar month | EUENGINE6 | SC VI.5 and Appendix B | R 336.1205, 40 CFR 52.21(c) & (d) |
| 2. $NO_x$ | 1.0 g/hp-hr -OR- 82 ppmvd at 15% oxygen | Hourly | EUENGINE6 | SC III.3 SC III.4 SC V.2 | 40 CFR 60.4233(e), Table 1 of 40 CFR Part 60 Subpart JJJJ, 40 CFR 52.21 (c) & (d) |
| 3. CO | 2.8 tpy | 12-month rolling time period as determined at the end of each calendar month | EUENGINE6 | SC VI.6 and Appendix B | 40 CFR 52.21(c) & (d) |
| 4. CO | 2.0 g/hp-hr -OR- 270 ppmvd at 15% oxygen | Hourly | EUENGINE6 | SC III.3 SC III.4 SC V.2 | 40 CFR 60.4233(e), Table 1 of 40 CFR Part 60 Subpart JJJJ, 40 CFR 52.21 (c) & (d) |
| 5. VOC | 7.5 tpy | 12-month rolling time period as determined at the end of each calendar month | EUENGINE6 | SC VI.7 and Appendix B | 40 CFR 52.21(c) & (d) |
| 6. VOC | 0.7 g/hp-hr[a] -OR- 60 ppmvd at 15% oxygen[a] | Hourly | EUENGINE6 | SC III.3 SC III.4 SC V.2 | 40 CFR 60 4233(e), Table 1 of 40 CFR Part 60 Subpart JJJJ, 40 CFR 52.21 (c) & (d) |

[a] For purposes of this emission limit, when calculating emissions of VOC, emissions of formaldehyde should not be included. (See Table 1 to 40 CFR 60 Subpart JJJJ.)

## II. MATERIAL LIMIT(S)

1. The permittee shall burn only process fuel (natural gas) in EUENGINE6. Process fuel is defined as unrefined field gas of which the principal constituent is methane, without any additives or processing to become pipeline quality natural gas. **(R 336.1205(1)(a) & (3), R 336.1225, R 336.1702(a), 40 CFR 52.21 (c) & (d), 40 CFR 60.4248)**

## III. PROCESS/OPERATIONAL RESTRICTION(S)

1. No later than 60 days after the initial startup of EUENGINE6, the permittee shall submit to the AQD District Supervisor, for review and approval, a preventative maintenance/malfunction abatement plan (PM/MAP) for EUENGINE. After approval of the PM/MAP by the AQD District Supervisor, the permittee shall not operate EUENGINE unless the PM/MAP, or an alternate plan approved by the AQD District Supervisor, is implemented, and maintained. The plan shall incorporate procedures recommended by the equipment manufacturer as well as incorporating standard industry practices. Guidance to what to include in a PM/MAP can be found in Appendix A. At a minimum the plan shall include:

   a) Identification of the equipment and, if applicable, air-cleaning device and the supervisory personnel responsible for overseeing the inspection, maintenance, and repair.
   b) Description of the items or conditions to be inspected and frequency of the inspections or repairs.
   c) Identification of the equipment and, if applicable, air-cleaning device, operating parameters that shall be monitored to detect a malfunction or failure, the normal operating range of these parameters and a description of the method of monitoring or surveillance procedures.
   d) Identification of the major replacement parts that shall be maintained in inventory for quick replacement.
   e) 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 the plan fails to address or inadequately addresses an event that meets the characteristics of a malfunction at the time the plan is initially developed, the owner or operator shall revise the plan within 45 days after such an event occurs and submit the revised plan for approval to the AQD District Supervisor. Should the AQD determine the PM / MAP to be inadequate, the AQD District Supervisor may request modification of the plan to address those inadequacies. **(R 336.1205, R 336.702(a), R 336.1910, R 336.1911, R 336.1912, 40 CFR 52.21(c) & (d))**

2. The permittee shall not operate any engine equipped with an add-on control device for more than 200 hours per engine per year without that control device consistent with the PM / MAP (pursuant to SC III.1). The 200 hours shall include times after an engine change-out occurs and general maintenance performed as allowed by the PM / MAP. The hours per year limit is based on a 12-month rolling time period as determined at the end of each calendar month. **(R 336.1205, R 336.1702(a), 40 CFR 52.21 (d))**

3. The permittee shall operate and maintain EUENGINE6 such that it meets the emission limits over the entire life of the engine. **(40 CFR 60.4234)**

4. If the permittee purchased a certified engine, according to procedures specified in 40 CFR Part 60 Subpart JJJJ, for the same model year, the permittee shall meet the following requirements for EUENGINE6:

   a) Operate and maintain the certified engine and control device according to the manufacturer's emission-related written instructions,
   b) May only adjust engine settings according to and consistent with the manufacturer's emission-related written instructions,
   c) Meet the requirements as specified in 40 CFR 1068, subparts A through D, as they apply to the engine.

   If the permittee does not operate and maintain the certified engine and control device according to the manufacturer's emission-related written instructions, the engine will be considered an uncertified engine. **(40 CFR 60.4243(b)(1))**

5. If the permittee purchased a non-certified engine or a certified engine operating in a non-certified manner, the permittee shall keep a maintenance plan and records of conducted maintenance for EUENGINE6 and shall, to the extent practicable, maintain and operate each engine in a manner consistent with good air pollution control practice for minimizing emissions. **(40 CFR 60.4243(b)(2))**

## IV. DESIGN/EQUIPMENT PARAMETER(S)

1. The permittee shall not operate any engine that contains an add-on control device unless that device is installed, maintained, and operated in a satisfactory manner, except as specified in SC III.2. Satisfactory operation includes performing the manufacturer's recommended maintenance on the control device and operating in conjunction with the PM / MAP specified in SC III.1. **(R 336.1205, R 336.1702(a), R 336.1910, 40 CFR 52.21(c) and (d))**

2. The permittee shall install, calibrate, maintain, and operate in a satisfactory manner, a device to monitor the fuel usage for EUENGINE6 on a continuous basis. **(R 336.1205, 40 CFR 52.21(c) & (d))**

## V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. Upon request of the AQD District Supervisor, the permittee shall verify $NO_x$ and CO emission factors used to calculate emissions from EUENGINE6, by testing at the owner's expense, in accordance with Department requirements. If a test has been conducted, any resulting increase in an emission factor shall be implemented to calculate $NO_x$ and CO. Testing shall be performed using an approved EPA Method listed below.

| Pollutant | Test Method Reference |
|---|---|
| $NO_x$ | 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 and must meet the requirements of the federal Clean Air Act, all applicable state and federal rules and regulations, and be within the authority of the AQD to make the change. No less than 60 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. **(R 336.1205, R 336.2001, R 336.2003, R 336.2004, 40 CFR 52.21 (c) & (d))**

2. If EUENGINE6 is a non-certified engine and control device or a certified engine operating in a non-certified manner, per 40 CFR Part 60 Subpart JJJJ, the permittee must demonstrate compliance as follows:

   a) Conduct an initial performance test to demonstrate compliance with the applicable emission standards within 1 year of startup or from when the engine is no longer considered certified.

   b) If a performance test is required, the performance tests shall be conducted according to 40 CFR 60.4244.

   c) Conduct subsequent performance testing every 8,760 hours of engine operation or every 3 years thereafter, whichever comes first, to demonstrate compliance with the applicable emission standards.

   If a performance test is required, no less than 30 days prior to testing, a complete test plan shall be submitted 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. **(R 336.2001, 40 CFR 60.8, 40 CFR 60.4243, 40 CFR 60.4244, 40 CFR 60.4245, 40 CFR Part 60 Subpart JJJJ)**

## VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The permittee shall complete all required calculations in a format acceptable to the AQD District Supervisor by the last day of the calendar month, for the previous calendar month, unless otherwise specified in any monitoring/recordkeeping special condition. **(R 336.1205, R 336.702(a), R 336.1901)**

2. The permittee shall monitor, in a satisfactory manner, the fuel usage for on a continuous basis. **(R 336.1205, 40 CFR 52.21(c) & (d))**

3. The permittee shall maintain a record of all maintenance activities conducted according to the PM / MAP (pursuant to SC III.1). The permittee shall keep this record on file at a location approved by the AQD District Supervisor and make it available to the Department upon request. **(R 336.1205, R 336.1702(a), R 336.1911, 40 CFR 52.21(c) & (d))**

4. The permittee shall keep, in a satisfactory manner, for any engine equipped with an add-on control device, monthly and 12-month rolling time period records of the hours that the engine is operated without the control device. The permittee shall keep all records on file at a location approved by the AQD District Supervisor and make them available to the Department upon request. **(R 336.1205, R 336.1702(a), 40 CFR 52.21(c) & (d))**

5. The permittee shall keep, in a satisfactory manner, monthly and previous 12-month $NO_x$ emission calculation records for EUENGINE6, as required by SC I.1 and Appendix B. The permittee shall keep all records on file at a location approved by the AQD District Supervisor and make them available to the Department upon request. **(R 336.1205, 40 CFR 52.21 (c) & (d))**

6. The permittee shall keep, in a satisfactory manner, monthly and previous 12-month CO emission calculation records for EUENGINE6, as required by SC I.3 and Appendix B. The permittee shall keep all records on file at a location approved by the AQD District Supervisor and make them available to the Department upon request. **(R 336.1205, 40 CFR 52.21 (c) & (d))**

7. The permittee shall keep, in a satisfactory manner, monthly and previous 12-month VOC emission calculation records for EUENGINE6, as required by SC I.5 and Appendix B. The permittee shall keep all records on file at a location approved by the AQD District Supervisor and make them available to the Department upon request. **(R 336.1205, 40 CFR 52.21 (c) & (d))**

8. The permittee shall keep, in a satisfactory manner, the following records for EUENGINE6:

   a) All notifications submitted to comply with this subpart and all documentation supporting any notification.
   b) Maintenance conducted on the engine.
   c) If the stationary SI internal combustion engine is a certified engine, documentation from the manufacturer that the engine is certified to meet the emission standards and information as required in 40 CFR parts 1048, 1054, and 1060, as applicable.
   d) If the stationary SI internal combustion engine is not a certified engine or is a certified engine operating in a non-certified manner, documentation that the engine meets the emission standards.
      i. Testing for each engine, as required in SC V.2.
      ii. Maintenance activities for each engine, as required by SC III.1.

   The permittee shall keep all records on file and make them available to the Department upon request. **(R 336.1205(1)(a) & (3), 40 CFR 52.21(c) & (d), 40 CFR 60.4243, 40 CFR 60.4245(a))**

9. The permittee shall keep records of all notifications submitted to comply with 40 CFR Part 60 Subpart JJJJ, as required in SC VII.3, and all documentation supporting any notification. **(40 CFR 60.4245(a))**

## VII. REPORTING

1. Except as provided in R 336.1285, if the engine is replaced with an equivalent-emitting or lower-emitting engine, the permittee shall notify the AQD District Supervisor of such change-out and submit acceptable emissions data to show that the alternate engine is equivalent-emitting or lower-emitting. The data shall be submitted within 30-days of the engine change out. **(R 336.1205, R 336.1702(a), R 336.1911, 40 CFR 52.21 (c) & (d))**

2. The permittee shall submit a notification specifying whether EUENGINE6 or any replacement of EUENGINE6 as allowed by SC VII.1 will be operated in a certified or an uncertified manner to the AQD District Supervisor, in writing, within 30 days following permit issuance and within 30 days of switching the manner of operation. **(R 336.1201(3), 40 CFR Part 60 Subpart JJJJ)**

3. If EUENGINE6 or any replacement of EUENGINE6 as allowed by SC VII.1 has not been certified by an engine manufacturer to meet the emission standards in 40 CFR 60.4231, the permittee shall submit an initial notification as required in 40 CFR 60.7(a). The notification must include the following information:

   a) The date construction of the engine commenced.
   b) Name and address of the owner or operator.
   c) The address of the affected source.
   d) The engine information including make, model, engine family, serial number, model year, maximum engine power, and engine displacement.
   e) The emission control equipment.
   f) Fuel used in the engine.

   The notification must be postmarked no later than 30 days after construction commenced for each engine. **(40 CFR 60.7(a)(1), 40 CFR 60.4245(c))**

## 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. SVENGINE6 | 20 | 40 | R 336.1225, 40 CFR 52.21 (c) & (d) |

## IX. OTHER REQUIREMENT(S)

1. The permittee shall comply with the provisions of the Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, as specified in 40 CFR, Part 60, Subpart A and Subpart JJJJ, as they apply to EUENGINE6. **(40 CFR Part 60 Subparts A and JJJJ)**

2. The permittee shall comply with the provisions of the National Emission Standards for Hazardous Air Pollutants, as specified in 40 CFR, Part 63, Subpart A and Subpart ZZZZ, as they apply to EUENGINE6. **(40 CFR Part 63 Subparts A and ZZZZ, 40 CFR 63.6595)**

## APPENDIX A
## Preventative Maintenance / Malfunction Abatement Plan (PM / MAP)
## Content Checklist for Engines Required to Submit a PM / MAP

| | PM / MAP Content | Location | |
|---|---|---|---|
| | | Page | Section / Table |
| 1 | Contact Person | | |
| | **Engines** | | |
| 2 | Engine Identification: Include the engine make / model and type of engine (i.e. rich or lean burn). Identify engines with add on control and AFRC. If add on control is present, identify type of control. | | |
| 3 | Engine Operating Variables To Be Monitored. Include a copy of the normal engine maintenance log. | | |
| 4 | Corrective procedures or operational changes that will be taken in the event of a malfunction. | | |
| 5 | Major parts replacement inventory for engines. | | |
| | **Add-On Controls** | | |
| 6 | Catalytic Converter operating variables to be monitored. Include the method and frequency of monitoring these variables; provide the normal operating range of these variables. | | |
| 7 | Corrective actions to be taken in event of malfunction of the catalytic converter. | | |
| 8 | AFRC $O_2$ Sensor replacement schedule or operating variables to be monitored | | |
| 9 | Corrective actions to be taken in event of malfunction of the AFRC | | |
| 10 | Emission testing utilizing portable analyzer | | |
| 11 | Scheduled maintenance of control equipment | | |
| 12 | Major parts replacement inventory for add on control. | | |
| 13 | Identify supervisory personnel responsible for overseeing inspection, maintenance and repair of add on controls. | | |
| 14 | Recordkeeping and retention of records. | | |
| 15 | Updates of PM / MAP as necessary. | | |

Guidance Document

## For Preventative Maintenance / Malfunction Abatement Plan (PM / MAP) Checklist

1. Contact Person: Include the name, title, telephone number (extension if applicable) and e-mail address for the person that may be contacted with questions regarding this Preventative Maintenance / Malfunction Abatement Plan (PM / MAP) with the transmittal letter accompanying the PM / MAP rather than within the body of the PM / MAP.

**Engines**

2. Engine Identification: For each engine at the facility, list the engine manufacturer, model and type of engine (rich burn or lean burn) and the type of add-on control equipment used (oxidation catalyst, three-way catalyst), if any. Also, identify each engine with an air to fuel ratio controller (AFRC).

3. Engine operating variables to be monitored: Provide the normal engine maintenance log.

4. Corrective procedures in the event of an engine malfunction: Provide a brief summary of the procedures that will take place in the event of an engine malfunction. A malfunction is defined in Rule 113(d) of the State of Michigan Air Pollution Control Rules which states, in part, 'any sudden, infrequent and not reasonable preventable failure of the equipment to operate in a normal or usual manner. Failures caused in part by poor maintenance or careless operations are not malfunctions.'

5. Major parts replacement inventory: Provide a list of major replacement parts that shall be maintained in inventory for quick replacement. If no replacement parts are kept on site provide a statement that no parts shall be kept.

**Add-On Controls**

6. Catalytic converter operating variables to be monitored: Provide the following:
   a) A list of variables that will be monitored to measure catalytic converter performance including the catalytic converter inlet and outlet temperature, pressure differential across the catalytic converter, and any other relevant catalytic converter variables that are monitored.
   b) The normal operating range that has been developed for each variable; acceptable ranges shall include documentation as to how the range was determined (i.e. manufacturer's recommendations or determined in the field with documentation or testing).
   c) The method of monitoring the variables, and
   d) The frequency of monitoring the variables.

7. Corrective procedures in the event of a malfunction of the catalytic converter: Malfunction is defined in number four above. Provide information on what steps shall be taken when a variable is out of range. This could include monitoring of emissions or cleaning and/or replacement of the catalytic converter.

8. AFRC $O_2$ sensor replacement schedule or operating variables to be monitored: Chose either (a) or (b).
   a) $O_2$ sensor replacement interval or sensor life detector
   b) If monitoring, provide:
      i. A list of variables monitored to measure AFRC performance (i.e. millivolt output, $O_2$, and/or any other relevant AFRC variables that are monitored).
      ii. The normal operating range that has been developed for each variable; acceptable ranges shall include documentation as to how the range was determined (i.e. manufacturer's recommendations or determined in the field with documentation or testing).
      iii. The method of monitoring the variables.
      iv. The frequency of monitoring the variables.

9. Corrective procedures in the event of a malfunction of the AFRC: Malfunction is defined in number 4 above. If choosing monitoring in paragraph 8.b above, provide information on what steps shall be taken when a variable is out of range.

10. Emission checks: Describe when a portable analyzer would be used and how it will be used.
    a) Calibration of the analyzer will be conducted as required by manufacturer's specifications. Records shall be kept on file and made available to the Air Quality Division upon request.
    b) Checks for both CO and $NO_x$.
    c) Checks to be used to:
        i. Check performance if monitored parameter is out of normal range, e.g. low inlet temperature (an engine specific minimum inlet temperature could then be established).
        ii. When vendor cleaned catalyst is installed. This check will normally occur in the 12-18 month window as specified for routine cleaning.
    d) Companies may choose to perform any of following the three valid methods:
        i. Inlet and outlet checks and estimate destruction efficiency.
        ii. Outlet testing and check for g/hp-hr compared to levels used for permitting.
        iii. Outlet testing and use the uncontrolled vendor data to establish destruction efficiency.

11. Scheduled maintenance: Describe the scheduled cleaning and/or replacement of the catalytic converter.
    a) Frequency of catalytic converter inspection and field catalyst media cleaning (vacuum catalyst face): Follow vendor recommendations, typically 12-18 months unless parameters (pressure drop, temperature deviations, etc) indicate otherwise.
    b) Catalyst media removal and wash in chemical solution by manufacturer (if catalyst media does not respond to field cleaning). A replacement catalyst media will be used during the cleaning process.
    c) Catalytic converter gasket replacement: Follow vendor recommendations, typically 12-18 months when catalyst is serviced.
    d) Replace catalyst media if not functioning properly after vendor cleaning, or in lieu of vendor cleaning.

12. Major parts replacement inventory: Provide a list of major replacement parts that shall be maintained in inventory for quick replacement. If no replacement parts are kept on site provide a statement that no parts shall be kept.

13. Supervisory personnel responsible for maintenance of the control equipment: Include the contact information. This person or position can be a company employee or contractor and may or may not be the same person / position listed in number one above.

14. Retention of records: Records shall be kept on file and retained as described in the permit.

15. Updates of PM / MAP: Any updates to the plan shall be submitted to the AQD District Supervisor for written approval as required in the permit (the Department recommends the PM / MAP be reviewed annually).

## APPENDIX B
## Procedures for Calculating $NO_x$ and CO Emissions

The permittee shall demonstrate compliance with the $NO_x$, CO, and VOC emission limits by keeping track of all fuel usage for EUENGINE6 and multiplying that fuel usage by an equipment-specific emission factor. The emission factors are typically expressed as the mass of pollutant per unit of fuel.

EUENGINE6:
The permittee shall use emission factors from vendor data or from source specific testing (stack testing), as available for EUENGINE6. This also applies to engine(s) from engine change-out(s). If emission factors from other sources are used, the permittee shall obtain the approval of the AQD District Supervisor before using the emission factors to calculate emissions.

The permittee shall document the source of each emission factor used in the calculations.