

Preventative Maintenance Plan

Diesel-Fired Caterpillar Engines

Prepared for
Wyandotte Municipal Services – Power Plant



Updated August 2021



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1.0 Purpose and Applicable Requirements

1.1 Purpose

Wyandotte Municipal Services – Power Plant (WMS) operates three diesel-fired engines located at the WMS Power Plant Diesel Generation site at 100 James DeSana Drive in Wayne County, Michigan and operates under Michigan Renewable Operating Permit MI-ROP-B2132-2017b and subsequent renewal ROPs (Title V). The purpose of this document is to outline the Preventive Maintenance Plan (PMP) required by the Title V permit for the three diesel-fired engines. Following the PMP will verify that emissions from the engines continue to comply with applicable regulations and emission limits.

1.2 Applicable Regulatory Requirements

This PMP has been prepared to meet the requirements of the WMS Title V permit. The Title V require operation of the engines following a PMP approved by the Michigan Department of Environment, Great Lakes, Energy, Air Quality Division (EGLE).

This submittal is designed to address permit conditions requiring implementation of a PMP for the three diesel-fired engines and has been prepared in accordance with Michigan Air Pollution Rule R 336.1911 (Rule 911). It includes sections on the following:

- Rule 911(2)(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.
- Rule 911(2)(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.
- Rule 911(2)(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.

The purpose of this document is to summarize PMP requirements. Section 2.0 of this document provides a process description. Section 3.0 summarizes the preventive maintenance program for the engines and Section 4.0 summarizes the operating variables. Finally, Section 5.0 summarizes the corrective actions associated with engine operation outside of accepted operating parameters.

2.0 Process Description

The engines, identified as EU-WMSENGINE1, EU-WMSENGINE2, and EU-WMSENGINE3 in the Title V permit are Caterpillar Model 3516 SR4B HV rated at approximately 1825 kW prime rating with a manufacture date of May 3, 2006. The three engines are compression ignition diesel fuel-fired engine generators equipped with catalytic oxidation emission control systems that are designed to control carbon monoxide (CO) and volatile organic compounds (VOCs), including organic hazardous air pollutants (HAPs).

The following provides the serial numbers for each engine.

- WMSENGINE1 ZAP00228
- WMSENGINE2 ZAP00229
- WMSENGINE3 ZAP00230

3.0 Preventive Maintenance Program (Rule 911(2)(a))

Plant management is responsible for ensuring that WMS operates in compliance with all environmental and safety requirements and regulations. Plant management delegates day-to-day responsibilities for operation of the plant to the Plant Shift Supervisor or Lead Operator. The Plant Shift Supervisor is responsible for all operations at the plant, while the Lead Operator is management's representative during off-hours (i.e. nights and weekends) when plant management is not on site.

3.1 Identification of Supervisory Personnel

The following supervisory personnel are assigned specific responsibilities related to this PMP:

Table 1: Supervisor Personnel

Position	Responsibility
Plant Superintendent	Overall operations and maintenance
Operations Manager or Equivalent	Training, maintaining documentation, reporting to EGLE
Boiler Operators or Equivalent	Corrective actions, malfunction response, routine inspections
Maintenance	Preventative maintenance/inspections, repairs, and spare part inventory
Environmental Manager or Equivalent	Pollution control equipment monitoring and oversight, reporting to EGLE

3.2 Equipment Inspection Program

The financial success of WMS depends on proper operation of the equipment to verify reliability, availability, efficiency and long-term production. Preventative maintenance is a key component to accomplishing reliability, availability, efficiency and production of the facility.

Preventative maintenance includes equipment inspections, scheduled replacement of parts, and maintaining an inventory of critical spare parts. Equipment inspections generally fall under two categories: inspections that take place while the facility is operating and less frequent inspections that take place while the facility is not operating. The inspections that take place during facility operation typically occur prior to startup based upon the infrequent operation of the engines and during periodic rounds. The frequency and scope of these inspections will depend on manufacturer recommendations and operator experience. As is the case with all power plants, WMS have 'major maintenance' outages that involve more-in depth inspections of the internals of equipment. These major maintenance outages are dependent on actual facility operation and good management practices.

Operators can monitor equipment performance on control room monitors. When performance deteriorates, corrective maintenance will be scheduled through the WMS work order system. Exception reporting is performed for inspections, in which only situations meriting follow-up action are recorded. In addition, WMS has a preventive maintenance program that involves equipment inspections (with repairs or replacement, as necessary).

WMS schedules the work orders and maintenance requests for the diesel engine and air pollution control equipment, based on past operating experience and performance history. Preventative maintenance may be performed by the equipment manufacturer or manufacturer's representative on at least an annual basis due to the limited operation of the equipment

3.3 Replacement Parts

WMS stocks spare parts necessary for routine maintenance and other common replacement parts. The engines and air pollution control equipment spare parts lists are based on the equipment maintenance manuals or WMS operating experience. The supervisor(s) are responsible for updating any critical spare parts inventory as operational and equipment changes occur.

Replacement parts may also be ordered directly from the manufacturer. Most parts can be shipped within 24 hours of ordering. A complete list of parts and catalog numbers is included in the operating manuals.

4.0 Operating Variables (Rule 911(2)(b))

The applicable federal standards require WMS to establish operating parameters for the catalytic oxidizer during a performance test. The pressure drop across the catalyst and catalyst temperature are the required operating parameter under federal standards. The pressure drop ranges are updated from each performance test into the engine operation log datasheets so any deviations from the operating parameters may be identified. Catalyst operating temperatures must be maintained between 450 and 1350 °F.

5.0 Corrective Actions (Rule 911(2)(c))

If an operating variable is out of the specified range, the corrective actions as described below will be followed.

Catalysts will be inspected for defects or fouling. If the catalyst inlet temperature exceeds the upper range of 1350°F for more than 2 hours, the generator will be shut down as soon as possible and the catalyst will be inspected. If the minimum catalyst inlet temperature of 450°F is not achieved during operation, the generator will be shut down as soon as possible for inspection.

If the pressure drop across the catalyst is outside of the range established during the most recent performance test, the catalyst and/or pressure drop monitors will be inspected following shutdown.

If the catalyst is found to be fouled or damaged and is deemed to be non-functional, a new catalyst will be installed and emissions testing will be performed. Alternatively, the catalyst may be cleaned and placed back into service.