

# **Malfunction Abatement Plan and a Maintenance Procedures and Schedules Plan for Boiler 7**

Prepared for  
Wyandotte Department of Municipal Services



Updated August 2021



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# 1.0 Introduction

This Malfunction Abatement Plan/Maintenance Procedures and Schedules Plan (MAP) has been prepared to meet the requirements of Renewable Operating Permit (Title V) MI-ROP-B2132-2017b, subsequent ROP renewal permits (Title V) issued by the Michigan Department of Environment Great Lakes and Energy, Air Quality Division (EGLE-AQD) to Wyandotte Department of Municipal Services Power Plant (WMS).

## 1.1 Process/Operational Restrictions

This submittal is designed to address permit conditions requiring implementation of a MAP for EUUNIT7BLR 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 Boiler 7 MAP requirements. Section 2.0 of this document provides a process description. Section 3.0 summarizes the preventive maintenance program for the boiler and Section 4.0 summarizes the operating variables. Finally, Section 5.0 summarizes the corrective actions associated with boiler operation outside of accepted operating parameters.

## 2.0 Process Description

Boiler 7 (EUUNIT7BLR) is a 32.5 MW steam and electric generator. The boiler is capable of firing only natural gas. Table 1 summarizes the control equipment associated with Boiler 7.

**Table 1: EUUNIT7BLR Control Equipment**

Emission Source	Control Equipment	Emissions Controlled
Natural Gas Boiler	Low NO <sub>x</sub> burners, separated over-fire air	NO <sub>x</sub>

## 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 MAP:

**Table 2: 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 on a daily, weekly, monthly or quarterly basis. The frequency and scope of these inspections will depend on manufacturer recommendations and operator experience. As is the case with all power plants, WMS has '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 make daily rounds during periods of operation and monitor equipment performance using the control system (e.g. Rockwell) in the control room. 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). The following items are inspected or monitored to ensure proper operation of boiler and control equipment:

## **During Operation – Boiler**

- Address alarms or warnings on the control panels
- View flame to assess proper combustion characteristics
- Check for out of service burners
- CEMS is properly calibrated and emissions appear acceptable in the data acquisition and handling system (DAHS)

## **Periodic (Annual) Outage – Boiler**

- Inspect and calibrate instrumentation as applicable
- Inspect burners for wear and damage to burner components
- Check burner dampers and air registers

WMS uses a software system to organize and manage the frequency and schedule the work orders for the boiler and air pollution control equipment, based on past operating experience and performance history.

## **3.3 Replacement Parts**

WMS stocks spare parts necessary for routine maintenance and other common replacement parts. The boiler 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 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))

Boiler 7 has very specific operating parameters for start-up, shutdown and normal operation.

The definitions provided below are for reference when defining the modes of operation for Boiler 7. The following tables list conditions for Unit 7 operating mode.

**Table 3: Unit 7 (EUUNIT7BLR) Operating Parameters**

	STARTUP	SHUTDOWN	NORMAL
Burner Valve (maxon)	Open	Closed	Open
Igniter Valve (maxon)	Open	Closed	Closed
Gas Flow	>0	0	>0
Steam Pressure	>0 and <800 PSIG (non-return valve open in cold start) >0 and <500 PSIG (steam customers)	<500 PSIG	>500 PSIG
Steam Flow	>0 and <20 KPPH	<10 KPPH	>20 KPPH

The following lists Boiler 7 emission limits, as listed in the Title V permit or as otherwise applicable.

**Table 4: Title V and other Operating Limits**

Pollutant	Limit	Averaging Time	Alarm Condition
NO <sub>x</sub> (burning natural gas only)	0.20 lb/MMBtu	3-hour average	Elevated NO <sub>x</sub>
Opacity (Rule 301)	20%	6 minute average, except one period of ≤27% per hour	Elevated Opacity (Visible Emissions)

Boiler 7 is equipped with continuous emission monitors for NO<sub>x</sub>. The emission monitors serve as the primary indicators of proper operation of the equipment and low NO<sub>x</sub> Burners. Generally these systems are monitored in a centralized control system and, as a result, the data is available at all times to the operators.

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

Operation of the boiler and air pollution control equipment within the acceptable operating parameters and emission limits is indicative of proper and compliant operation. While operation outside of the “acceptable” monitoring range may indicate a potential equipment problem, diagnosis and determination of the consequences of these values depends on the information gathered upon response. Therefore, depending on the circumstances of each particular event, it may be possible to conclude that the boiler or air pollution control equipment was operating properly and compliant with the applicable emission limit, even if the monitoring values were outside of the “normal or acceptable” range. For example, dampers occasionally don’t meet their limits and produce a false reading on the indicating panel. In this situation, the limit may be reset or the damper cycled and then put back into service and the correct indication shows that the Low NO<sub>x</sub> Burner is operating properly. WMS will track and document when the various equipment or device monitoring falls outside of the acceptable operating range. In the event that simple adjustments cannot clear the problem, WMS will maintain a record of the corrective “response actions” taken when a major maintenance response is required.

Work order requests concerning repairs to the CEMS or process equipment that can affect the boiler or air pollution control equipment can be generated by anyone familiar with the operation of the equipment. The appropriate supervisor(s) or the operator(s) assign a level of priority to the work order request. The supervisor then decides on a course of action and assigns resources to resolve the work order in a manner consistent with the requirements of the systems operation, safety, reliability, power demands, environmental permit requirements and other factors. CEMS equipment maintenance is documented by a logging system, using a logbook that is kept in the CEMS room. Additional information on the CEMS is maintained in the DAHS associated with the CEMS equipment. Electronic work order records will be maintained for at least five years.

Much of the operating or emissions information required by the Title V permit is maintained in the DAHS. Quarterly reports, including emissions and operating information, are prepared and submitted to the US EPA or EGLE-AQD as required.

In the event of an excess emission event as defined in R 336.1912 (Rule 912), notification and reporting will be performed. Deviations from the MAP requirements and emission limits will be reported in semi-annual and annual deviation reports, as applicable.