

# Compliance Assurance Monitoring (CAM) Plan Cadillac Renewable Energy (CRE)

Revised June 26, 2018

## I. BACKGROUND

CAM applies to particulate matter emissions on the CRE boiler because pre-control potential emissions exceed 100 tons per year and a control device is used to reduce emissions. CAM does not apply to NOx because the facility has a continuous emissions monitor (CEM) to measure these emissions.

### Emission Unit

Description: One wood fired boiler with an estimated heat input rating of 530 MMBtu/hr that fires waste wood with natural gas as a startup fuel. Equipped with multiclone/ESP controls for particulate matter.

Identification: EG-BOILER-NEW

Facility: Cadillac Renewable Energy  
1525 Miltner St.  
Cadillac MI 49601

### Applicable Regulation, Emission Limit, Monitoring Requirements

Renewable Operating Permit No: MI-ROP-N1395-2014a

Emission Limits subject to CAM requirements:

Particulate Matter: 15.7 lb/hr and 0.03 lb/MMBtu

Opacity 10% opacity based on 6-minute average, except for one 6-minute average per hour of not more than 20% opacity, Rule 301 and 40 CFR 52.21(j)

Monitoring requirements: Continuous opacity monitoring using a Continuous Opacity Monitoring System (COMS)

### Control Technology

Particulate emissions from the boiler are controlled by a multiclone and an electrostatic precipitator (ESP). Pre-control potential emissions are estimated from AP-42 emission factor of 7.2 lb/ton as follows:

PM – 1987 tons/year

The removal efficiency rate of the multiclone/ESP is well over 98%.

## II. MONITORING APPROACH

The key elements of the monitoring approach for PM are presented in Table 1. Opacity will be used as the primary performance indicator for demonstrating compliance with the PM mass emission limit.

**Table 1 Monitoring Approach – PM**

A. Opacity Indicator	Visible emissions (Opacity) will be monitored continuously by a certified COMS installed in the boiler stack.
B. Opacity Indicator Range	An excursion is defined as any continuous reading exceeding 7% but below 10%. Excursions trigger an investigation and corrective action if deemed necessary by control indications from the ESP. An Opacity reading of above 7% and below 10% would indicate a possible problem with the ESP. During such event the Operators will investigate the ESP operational parameters and determine if corrective action is necessary.

## III. PERFORMANCE CRITERIA

**Table 2. Performance Criteria**

	<b>Visible Emissions (Opacity)</b>
A. Data Representativeness	Measurements are made in the stack. The 40CFR60, Appendix B, PS-1 certified opacity monitor is correlated to the stack exit diameter to provide 6-minute average opacity indications.
B. Verification of Operational Status	Daily zero and calibration.
C. QA/QC Practices and Criteria	Routine preventative maintenance and an annual monitor audit.
D. Monitoring Frequency	Continuous (Six-minute averages based on 24 or more equally spaced instantaneous opacity measurements per 6-minute period).
E. Data Collection Procedure	Continuously recorded by data acquisition system and maintained for five years.
F. Averaging Period	Six minute averages.

## IV. JUSTIFICATION

### Rationale for Selection of Performance Indicator

Opacity was selected as a performance indicator because it is indicative of good operation and maintenance of the precipitators. When a precipitator is operating properly, there will be minimal opacity from the boiler stack. Particulate emission test results historically indicate that the emission rate is below the particulate limit when the stack opacity is at or below 10%.

Stack opacity is controlled with Malfunction Abatement Plan.

The Malfunction Abatement Plan assures that the ESP is operating normally by monitoring important operating parameters on daily basis. These checks are documented and abnormal conditions are reported to the team leader who ensures corrective actions are taken. Specified routine preventative maintenance activities are performed on a quarterly basis and major preventative maintenance activities are performed annually during the major scheduled maintenance outage.

The Malfunction Abatement Plan also specifies operator actions to minimize emissions during various operating scenarios such as startup/shutdown and malfunction modes, normal operation and specific operating scenarios that often have an effect on opacity, such as increasing boiler load. Operator actions to minimize emission during normal operation include basic actions such as responding to opacity alarms and taking corrective action to minimize emissions. During startup and shutdown and malfunctions, the operator is required to follow a predetermined sequential list of actions aimed at emission minimization.

To assure proper operation of the ESP, the Malfunction Abatement Plan is followed. This plan ensures that the continuous opacity monitoring system is calibrated, maintained and operated properly.

#### Rationale for Selection of Indicator Range based on Performance Tests

The selected indicator range is more than 7% and below 10% opacity. Stack testing in 1998 indicated a PM10 emission rate of 7.3 lb/hr while running at 3-4% opacity, and a PM10 emission rate of 13.6 lb/hr when running at 6-7% opacity.