

Malfunction Abatement Plan

[per AQD Rule 911]

Michigan Sugar Company - Sebewaing

General Background:

The Factory Manager is responsible for all aspects of the sugar production process and maintenance of all factory equipment, including all air pollution control equipment. During the campaign the majority of the maintenance supervision is delegated to the Maintenance Manager. Depending on the nature of the mechanical problem all supervisory staff on-site may become involved.

Since it is very important to the factory to avoid breakdown of any kind, all of the inter-campaign season (approximately 6-month period during the growing season) is dedicated to repairing, maintaining and improving the physical condition of all of the factory equipment. The goal of the summer activities is to avoid the need for this plan during the campaign (production period).

The goal of this plan is to ensure the operation of air pollution control devices, especially for the major emission devices at the Sebewaing factory. The devices of most concern include the coal fired boilers and the pulp driers. The lime kiln has no controls of significance which are expected to ever have any issues. The remaining devices are small units (<30,000 cfm).

A general troubleshooting process description and flow chart are in Appendix A for use as a guide for situations outside of previous experience and this plan.

Boiler House:

Two people staff the boiler house during campaign. Their jobs are boiler operator and boiler house fireman. There is at least one person in the boiler house at all times during the campaign. During the inter-campaign these employees are responsible for ensuring all inspections and repairs are completed. They are to notify their supervisor when assistance is needed (for example, an Instrument Technician to inspect, repair and calibrate instruments). The supervisor arranges for additional staff.

During campaign three boilers are used. Boiler #2 and boiler #3 are coal fired. The third (#4) can run on either fuel oil or natural gas. Recently, Boiler #4 has been operated on natural gas, but retains the ability to fire on fuel oil, should that be desired.

The two coal fired boilers, #2 & #3, are base loaded (steady state steam generation) and generally run between 45,000 and 75,000 pounds per hour. Boiler #4 is used to pick up the swings in steam demand as dictated by process variation which may be from idle to approximately 80,000 pounds of steam per hour.

The summer boiler (boiler #1) is used for heating. This boiler runs on natural gas.

This section applies to air-cleaning devices on coal fired boilers No. 2 and No. 3.

1. Inter-campaign Activities (generally April to September)

- a. Boilers are cleaned and inspected every summer. The inspection includes the condition of each grate, the side wall and water tubes.
- b. Each of the multiclone units are inspected. This includes checking for leaks, wall thickness of the clones and the condition of the inter-tubes.
- c. Multiclone units: All components are inspected.
 - i. Each clone is inspected for excessive wear and holes.
 - ii. Each exhaust tube (a.k.a. inter-tube or inter-clone) is inspected for wear and holes.
 - iii. Any component the above inspections reveal are unsatisfactory is replaced.
 - iv. Once every ten years all of the clones in a unit are replaced. Past experience has proven the components will last ten years or more.
- d. The wet scrubber is thoroughly inspected each summer.
 - i. The venturi is inspected for wear.
 - ii. Each spray nozzle is checked for wear or dirt build-up.
 - iii. The over flow is cleaned if needed.
 - iv. All other components are checked for wear and signs of abnormalities. Examples of abnormalities include asymmetrical patterns which would indicate uneven air flow.
 - v. The monitoring equipment for flow and pressure drop are maintained and calibrated prior to campaign.
- e. The WESP is thoroughly inspected each summer.
 - i. Each spray nozzle is checked for wear or dirt build-up.
 - ii. The over flow is cleaned if needed.
 - iii. All other components are checked for wear and signs of abnormalities. Examples of abnormalities include burns on the membranes and asymmetrical pattern which indicate uneven air flow.
 - iv. The monitoring equipment for flow and pressure drop are maintained and calibrated prior to the campaign.
- f. Other boiler instrumentation is checked and calibrated on boilers prior to campaign.

2. Campaign Activities

- a. Particulate emissions are controlled by good combustion practices
 - i. Boiler #2 and boiler #3 are generally run at 0.0" - 0.10" W.C. draft. Combustion of coal is controlled by under fire and over fire air, and the coal feed rate.
 - ii. #2 & #3 boilers are base loaded to reduce swings. Consistent steam demand and fuel feed helps maintain proper combustion which translates to steady-state emissions rates and control.

- iii. Boiler operator generally controls the ash bed at 3" to 4", however sometimes it may be reduced to 1" or increased to 6". The operators periodically examine the firebox (wearing dark shaded eye protection) using their experience to determine the condition of the inside components of the boiler.
 - 1. If abnormal conditions are determined to exist the operators will need to use their experience to determine if immediate action is needed. Action may include operational changes or shutting the boiler down to conduct repairs.
- b. Each coal-fired boiler has two multi-clone fly ash collectors with Plattco dust valves. Dust collectors are visibly checked, for example, hourly to see that they are working correctly. In the event of a malfunction, actions are taken by the boiler attendant/operator to correct and the incident is logged on boiler sheet.
 - i. The ROP required stack visual emissions survey and multiclones monitoring are logged as required. This log sheet is maintained/retained for a period of five (5) years.
 - ii. As operations dictate, the boiler(s) are shutdown as necessary in response to malfunctions and needed repairs.
- c. The pressure drop and flow parameters on the scrubber will be monitored as required by rule and by permit.
 - i. In the event a parameter is below the minimum indicating acceptable performance the operations of the scrubber will be inspected and the root cause diagnosed.
 - ii. In the event of a scrubber malfunction which causes excess emissions (or may cause excess emissions) the boiler will be shut down as appropriate and as quickly as may reasonably and safely performed for scrubber repairs unless the repair can be made on the working unit, in which case all measures will be taken to minimize particulate and other emissions.
 - iii. Records will be kept of scrubber malfunction events.

Boiler No. 4, CE boiler gas/oil fired

This boiler is the swing boiler used during campaign. It is not equipped with an end of pipe, air-cleaning device. As changes are experienced in steam demand, this boiler will increase or decreased steam production accordingly and on demand. Normally run on automatic, steam demand is reflected in header pressure, the boilers adapt and modulates fuel supply (firing) to meet steam (pressure) demand.

- 1. The instrument technicians calibrate and check the boiler every summer.
- 2. ROP required records of steam flow are recorded and kept for a minimum of five (5) years.
- 3. Samples are taken from fuel oil shipments, analyzed and kept for one year or the vendor data is used to demonstrate environmental compliance.
- 4. A log sheet is kept on this boiler and visual emissions are logged at least once per shift. This sheet is kept on file.

Lime Kiln

There are four emission points from this unit, with no add on air-cleaning device.

Baghouses - General

Baghouses are highly effective air-cleaning/air pollution control devices. They are used at a number of locations throughout the factory. They need a minimal amount of monitoring to ensure proper operation.

For monitoring purposes each unit is equipped with a differential pressure monitor (a pressure gauge or manometer). Except for start-up the measured pressure drop across a baghouse should be greater than one inch of water column (1" WC). A slow start-up may occur if the material flow through the emission unit is lower than normal. Normally, this is not a problem because even though the filter cake is missing (typical cause of low pressure drop) the load to the baghouse is low because of the small amount of material in the emission unit. Pressure drop will be monitored periodically. If the pressure drop is less than one inch of water, the baghouse will be inspected to determine if there has been a malfunction, and repaired as appropriate. If necessary, process equipment will be shut down until and while repairs are being made.

Replacement Parts Inventory

Certain key components are maintained within the company inventory or otherwise readily available from outside sources or vendors. These include:

- (1). Multiclone components
- (2). Primary motor for boiler wet scrubber
- (3). Actuators
- (4). Fans and motors for critical units

(i) GENERIC TROUBLESHOOTING PROCESS TO FIND ROOT CAUSE(S)

1. Problem (Deviation) Identified by Operator of Equipment



2. Operator of Equipment Troubleshoots to Find Root Cause(s)



3. Appropriate Hourly Leader and the Operator of the Equipment work together in Troubleshooting to Find Root Cause(s)



4. Shift Superintendent, appropriate Hourly Leader and the Operator of the Equipment work together in Troubleshooting to Find Root Cause(s)



5. As needed the Assistant Maintenance Manager joins the Shift Superintendent, appropriate Hourly Leader and the Operator of the Equipment in Troubleshoots to Find Root Cause(s)



6. As needed the Maintenance Manager joins the Assistant Maintenance Manager, Shift Superintendent, appropriate Hourly Leader and the Operator of the Equipment in Troubleshooting to Find Root Cause(s)



7. None of the Above Steps should ever be skipped unless it is an Emergency

NOTE: WHEN FACED WITH A REQUEST FOR ANY ASSISTANCE BECAUSE OF A DEVIATION, THE SHIFT SUPERINTENDENT WILL ENSURE THAT THE STEPS ABOVE WERE PROPERLY COMPLETED PRIOR TO FULLFILLING THE REQUEST (SAVE EMERGENCIES)

MALFUNCTION ABATEMENT FLOW CHART

