Malfunction Abatement Plan

Pulp Dryer and Misc. Baghouses

[per AQD Rule 911]

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 break-down of any kind during the active sugar beet production period (active campaign), all of the inter-campaign season (approximately six 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 preventive maintenance activities is to improved uptime operation of the processing and support equipment and avoid the need for repairs and equipment replacement (which is the subject of this plan) during the campaign production period.

The goal of this malfunction abatement plan is to minimize emissions to the extent possible by determining those elements that can impact the effective operation of air pollution control devices. The process equipment of greatest concern to the MAP Rule requirements at the Caro factory is the pulp dryer. The lime kiln has no end of pipe air pollution control devices and therefore is not subject to these regulatory requirements. The remaining applicable devices are small baghouse units (<30,000 cfm).

A general troubleshooting process description and flow chart are included in Appendix A for use as a guide for situations which go beyond the foreseeable events and procedures outlined in this written plan.

Pulp Drier Flue Gas Recirculation System

Emissions from the pulp dryer are reduced using flue gas recirculation and a multiclone. The specific air cleaning device components consists of the flue gas recirculation fan, the multi-cyclones and the rotary air lock. Heavy particles drop from multiclone through a rotary airlock and back into the dried pulp feed system to capture and combine the recovered materials with the desired dried pulp. The collected particulate is directed to the pellet mill and is used to make pellets. Airborne particulate is pulled from the multi-clone by the recirculation fan and introduced back into furnace and is burned in suspension of the combustion gases. The following standard operating procedures apply to the operation of the pulp dryer flue gas control system:

1. An operator monitors temperature and furnace draft at all times.
2. Instrumentation is used to continuously measure the pressure drop across the multi-cyclone. Acceptable operating parameters are between 3” and 12” W.C. The normal operating range is 4.5” to 12” W.C. Lower pressure drops (below 4.5”) do occur during low load periods and are considered acceptable. Generally, the lower the load the lower the pressure drop, therefore very low pressure drops (<3”) are sometime unavoidable due to factory operations or during periods of start-up and shut-down. Trying to force a normal level pressure drop when the pulp load is below normal can lead to high opacity and can significantly increase the risk of fire in the pulp dryer. Therefore, before making adjustments during periods of low pressure readings, the operator must first determine if the readings are the result of low pulp loadings in the rotary dryer. The most common causes of low load are pulp dryer start-up and significant factory slow-downs (including stoppages).

3. Instruments record the return air volume flow rate for the flue gas recirculation (FGR) system; these records are kept for five (5) years. The acceptable range for the FGR is typically in the range of 5,000 to 20,000 SCFM, and the normal operating range is generally 7,000 to 16,000 SCFM. As a back-up to the direct measurement of the FGR flow rate, a differential pressure gage can be installed to measure the differential pressure of the FGR fan. Should the FGR flow meter fail the fan pressure will be used as a supplemental indicator of satisfactory operation. The back-up (FGR fan pressure increase) is also affected by low loads to the pulp dryers. Abnormal readings may occur during these low load/production operating periods.
4. The Pulp drier is not run unless the flue gas recirculation system is also operational.
5. A written log of pulp drier operation is maintained on file for a period of five (5) years
6. Pulp drier flue gas recirculation system is run within the acceptable parametersas described above to comply with the air quality division MAP requirements. If these normal ranges and operating conditions cannot be met, the pulp drier will be shut down.

Lime Kilns

The lime kiln is exhausted through a single emissions point that is not controlled using end of pipe air pollution control equipment. As a result, this plan does not include malfunction or abatement provisions for the lime kiln.

Baghouses – General Procedures

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

For monitoring purposed each unit is equipped with a differential pressure monitor (a pressure gage or manometer). Except during periods of start-up and shutdown, the measured pressure drop across a baghouse should be one inch of water column (1" WC) or more. After bags are replaced and during initial start of the equipment, a gradual initial load on the fabric of the bags can result in lower than normal differential readings. Normally, this low pressure situation does not result in significant emissions to the atmosphere and the condition will correct itself as a filter cake gradually forms on the filter media. In the event that the differential pressure readings do not return to the normal range, the unit should be shut down and the filter bags should be inspected. The filter cake buildup period during start-up can take 36 to 48 hours long after any prolonged (more than 48 hours) shut-down or stoppages. Pressure drops of <1.0 inches of w.c. during these periods are considered acceptable, so long as the pressure drop increase to normal ranges following the filter cake period build up period.

The pressure drop will be monitored periodically to determine the ongoing system performance. If the pressure drop is less than one inch of water, the baghouse will be shut down and inspected to determine if there has been a malfunction of the unit or damage to the filter bags, and repaired as appropriate. If necessary process equipment will be shut down until necessary repairs are made.

Replacement Parts Inventory

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

- Multiclone components
- Actuators
- Fans and motors for critical units

GENERIC TROUBLESHOOTING PROCESS TO FIND ROOT CAUSE(S)

1. Problem or 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)

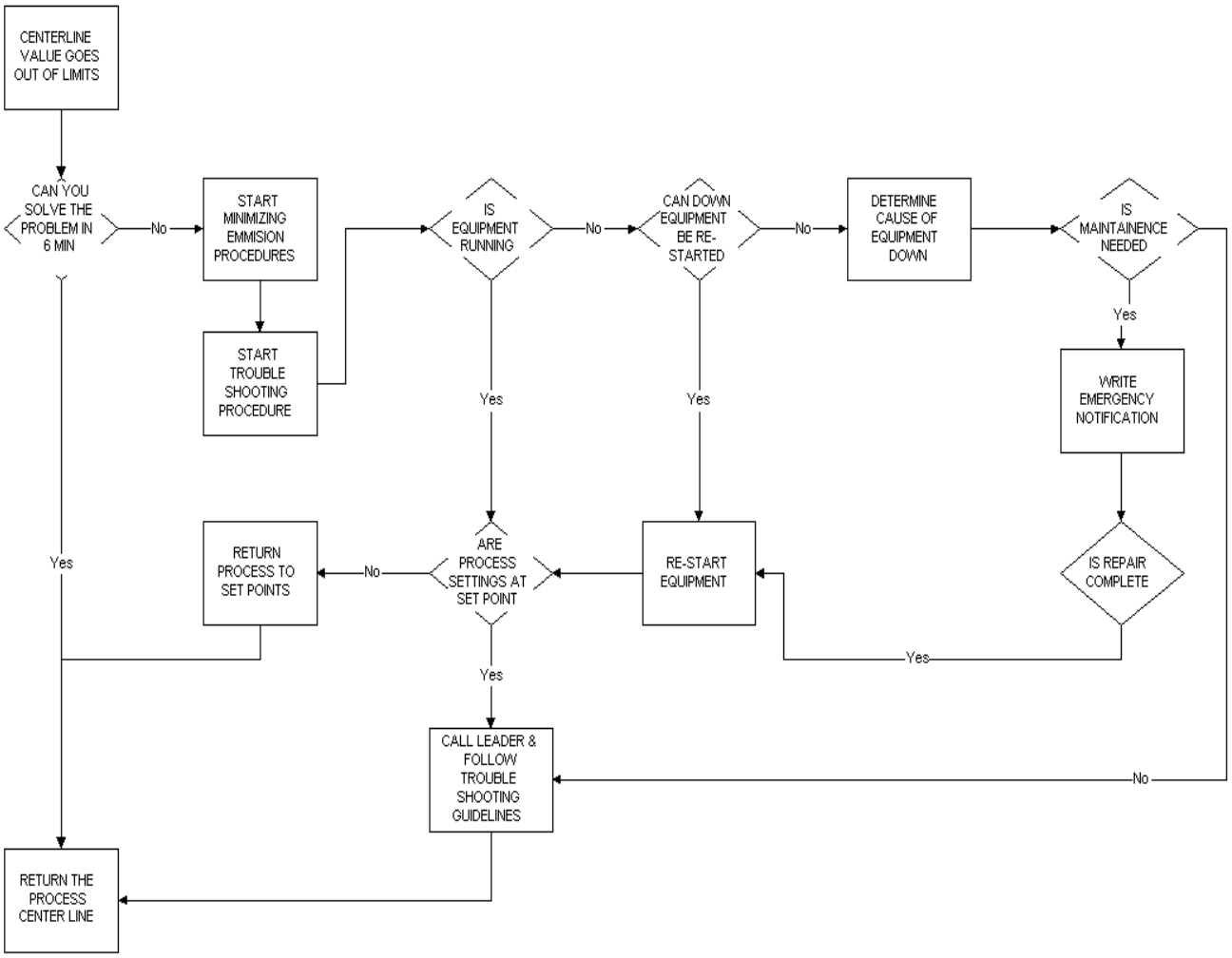
5. As needed the Assistant Maintenance Manager joins the Shift Superintendent, appropriate Hourly Leader and the Operator of the Equipment in Troubleshoots to Find Root Cause(s)

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



(i)

History

Original Draft September 2014 by S. Smock

Modified January 2015 by S. Smock; changes made to address DEQ's comments

Modified February 2018 to merge the original MAP with the Boiler #4 MAP