

Preventative Maintenance Plan (PMP) for Baghouses

Intertape Polymer Group

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Section 1

Introduction

Intertape Polymer Group (IPG) developed this Preventative Maintenance Plan (PMP) to simplify and provide a clear understanding of maintenance and management responsibility concerning air pollution control (APC) equipment. The plan identifies the personnel responsible for overseeing and the actions for performing the inspection, maintenance, and repair of APC equipment. This PMP also identifies APC device monitoring ranges (*e.g.*, pressure differential across the baghouse) that demonstrate proper operation of the APC devices as required by the Title V Renewable Operating Permit (ROP) No. MI-ROP-A6220-2015a for the IPG facility.

Proper operation and maintenance of APC equipment minimizes emissions of air pollutants, reduces the potential for equipment upsets, and ensures continued compliance with Michigan Department of Environmental Quality – Air Quality Division (MDEQ-AQD) air pollution control regulations. Regardless of how well an APC system is designed, poor operation and maintenance can lead to the deterioration of the various components and to a decline in the pollutant removal efficiency. When process operations must be curtailed or shut down to minimize emissions during outages of APC equipment, the plant's productivity suffers, which in turn affects delivery to IPG's customers. Therefore, IPG strives to maintain the APC equipment in good working condition and regularly performs preventative maintenance.

Regular monitoring of the collection systems through daily, weekly, and monthly monitoring supports the continued implementation of the PMP. Nevertheless, APC system malfunctions may occur. In the event of a potential APC system malfunction, the monitoring of performance parameters in this PMP may require Reactive Maintenance by IPG. It is IPG's intent to investigate every abnormal situation identified by the PMP monitoring of system parameters and performance within one hour from the time it is first identified and to promptly initiate corrective or appropriate response actions. However, this response or corrective action may be limited by IPG's standard operating procedures (SOPs) and requirements for shut down of equipment in a safe manner. In addition, because the frequency of the ROP performance monitoring varies and is not continuous in all cases, identification of an abnormal situation may depend on the frequency of monitoring observations.

The other sections of the PMP include:

- Section 2 (Air Pollution Control Device Summary) summarizes the regulated APC equipment employed at the Marysville, Michigan facility and describes the emission units that are controlled by each control device. This section also presents the acceptable operating ranges for the monitoring of APC devices.

- Section 3 (Management and Staff) describes the organization and responsibilities of the APC staff.
- Sections 4 (Maintenance and Operating Manuals) describes the management and upkeep of maintenance and operating procedures for the individual APC devices.
- Section 5 (Spare Parts) provides information regarding spare parts lists.
- Section 6 (Work Order Systems) details the procedures required for proper communication and follow-through on routine or abnormal maintenance procedures.
- Section 7 (Reactive Maintenance) includes a summary table of common APC device problems with recommended immediate correction responses.
- Section 8 (Preventative Maintenance) includes a summary table of preventative measures to be taken for each APC device to minimize APC device problems.
- Section 9 (Recordkeeping) describes the methods used to keep records of Preventative and/or Reactive Maintenance work performed.

Section 2

Air Pollution Control Device Summary

The table below presents the APC devices that control emissions from the emission units at IPG and the acceptable operating ranges for monitoring of the APC devices. These values are based on past operating and performance evaluation experience, and operation of the APC devices within these ranges (excluding normal startup and shutdown conditions) verifies the APC device is operating properly. The equipment will be operated within the ranges shown in the table below. The monitoring ranges for the APC devices do not apply during normal startup and shutdown conditions because the ranges proposed in the PMP apply to steady-state operations.

Air Pollution Control Device Identification	Emission Units Controlled	Acceptable APC Device Operating Range	Measure & Record Per ROP ⁽¹⁾
Baghouse 1 (Asset No. 01)	EGCOMPOUNDING: BAN-RAM-DUST1	Pressure Drop: .1 < 3.0" W.G.	Once Weekly
Baghouse 2 (Asset No. 02)	EGCOMPOUNDING: BAN-RAM-DUST2	Pressure Drop: .1 < 3.0" W.G.	Once Weekly
TubeJet Dust Collector	EUWETMIXEXTRUDER	Pressure Drop: .1 < 5.0" W.G.	Continuous when in use

" W.G." = inches of water gauge

(1) IPG measures and records only when the process is operating, as specified in the ROP No. MI-ROP-A6220-2015.

If IPG's monitoring shows the APC operating parameter identified in this section falls outside of these operating ranges, IPG will initiate reactive maintenance responses (see Section 7). In the future, IPG may determine the APC device is operating properly at values outside of the previously established acceptable operating range. In that case and with AQD approval, IPG may modify this PMP to reflect an updated "acceptable" operating range that supports proper APC device performance and compliance with the appropriate emission limits.

Section 3

Management and Staff

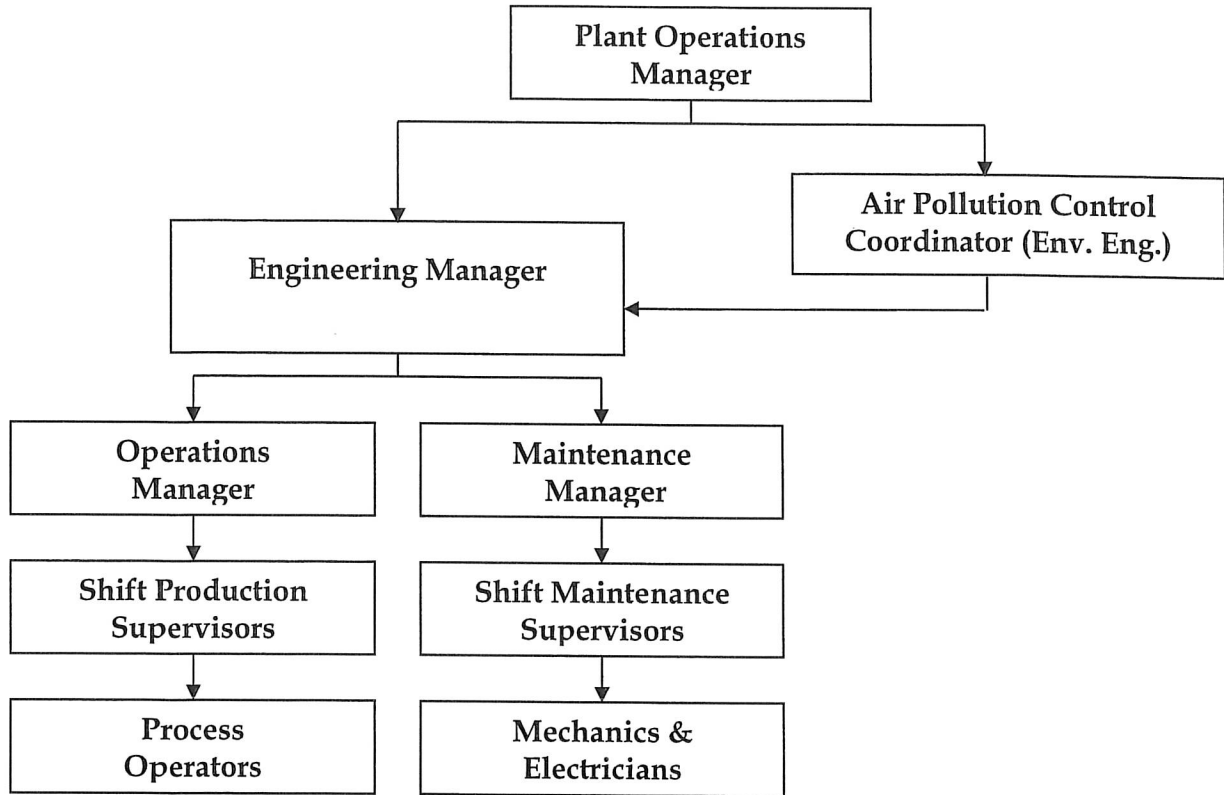
Coordination of the operation and maintenance of all APC equipment is the responsibility of the APC Coordinator (Environmental Manager). All routine and special maintenance procedures along with the ongoing monitoring program are the direct responsibility of the Maintenance Manager and his Shift Maintenance Supervisors.

All requests for repair and/or investigation of abnormal operation should go through the Maintenance Manager or Shift Maintenance Supervisor. Upon completion of repairs, documentation of the repair should also be sent to the Maintenance Manager or Shift Maintenance Supervisor. The APC Coordinator will coordinate the administration of this PMP and ensure that appropriate action is taken for equipment malfunctions and air pollution releases.

Figure 1 is an organizational chart illustrating the hierarchy for administration of the PMP by operational and maintenance employees.

By maintaining effective lines of communication between employees and the APC Coordinator concerning operating parameters and maintenance, operating problems can be minimized and APC failures can be corrected and/or prevented, as specified in Table 1, "Summary of Reactive Maintenance" and Table 2, "Summary of Preventative Maintenance."

Figure 1. Organizational Chart for Administration of the PMP



Section 4

Maintenance and Operating Manuals

Maintenance manuals (combined with operations manuals) for the APC equipment are maintained in the Engineering and/or Maintenance department(s). The maintenance and operations managers are responsible for keeping these manuals current and will evaluate the technical information for the APC equipment and update the information as necessary.

Maintenance manuals for the APC equipment will contain descriptions of the APC equipment, operation, safety equipment, and manufacturer maintenance information.

Operating manuals for the APC equipment will contain descriptions of the APC equipment and operation, operational factors, and manufacturer recommended startup/shutdown procedures.

Section 5

Spare Parts

Spare parts lists are included in the maintenance manuals and/or the computerized inventory per the manufacturers' recommendations or IPG operating experience. The Maintenance Manager is responsible for updating any spare parts inventory as operational and equipment changes occur. The critical spare parts include fan motors, bag shaker motors, dust collector bags, Magnehelics, and spare control components as appropriate for each APC system.

Section 6

Work Order Systems

IPG utilizes a preventative maintenance program software, called Maintmizer, to administer and schedule preventative and reactive maintenance for APC equipment. The Maintmizer work order system provides:

- Systematic screening and authorization of requested work
- Necessary information for planning and coordinating future work
- Cost information for future planning
- Instructions for management and craftsmen in the performance of repairs
- Identification of the equipment that needs to be repaired (or replaced/redesigned).
- Records of maintenance work performed.

Work order requests concerning repairs to APC equipment or process equipment that can affect APC equipment can be generated by anyone familiar with the operation of the APC equipment. Irregularities in operations, as evident from routine monitoring as presented in Tables 1 and 2, will result in a work order request being generated. The Maintenance Manager or Shift Maintenance Supervisor assigns a level of priority to the work order request. The Maintenance Manager or Shift Maintenance 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 ROP.

Section 7

Reactive Maintenance

Table 1 summarizes the reactive maintenance responses for APC device monitoring values that fall outside of the acceptable range. Based on past operating experience and knowledge of proper APC device operation, IPG has established monitoring ranges for implementing the reactive maintenance. IPG may change the Reactive Maintenance response procedure if new operating experience and historical performance of the APC device operation warrants.

Operation of the APC devices within the acceptable range is indicative of proper and compliant APC device operation. While operation of the APC device 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 the APC device was operating properly and compliant with the applicable emission limit even if the monitoring values were outside of the “acceptable” range. For example, Magnehelic devices occasionally get plugged with dust, malfunction, and produce a false reading. In this situation, the gauge is cleaned, put back into service and the correct reading is taken showing the baghouse was operating properly. In that case, it may also be appropriate to perform a non-certified visual emission observation. IPG will track and document when the APC device monitoring falls outside of the acceptable operating range as described in Section 9, Recordkeeping. IPG will maintain a record of the corrective “response actions” taken when reactive maintenance response is required (see Table 1).

It is IPG’s intent to investigate every abnormal situation identified by the PMP monitoring of system parameters and performance within one hour from the time it is first identified and to promptly initiate corrective or appropriate response actions. However, this response or corrective action may be limited by IPG’s SOPs and requirements for shut down of equipment in a safe manner. In addition, because the frequency of the ROP performance monitoring varies and is not continuous in all cases (*e.g.*, the ROP requires weekly pressure drop observations), identification of an abnormal situation may depend on the frequency of monitoring observations.

Table 1
Summary of Reactive Maintenance
Intertape Polymer Group, Inc. - Marysville, MI

PROBLEM	EMISSION UNITS	MAXIMUM ACCEPTABLE MAGNEHELIC READING	RESPONSE
HIGH DIFFERENTIAL PRESSURE	EGCOMPOUNDING: BAN-RAM-DUST1 (Asset No. 01)	3.0" W.G.	If above the maximum acceptable Magnehelic reading, call the Maintenance Department. Maintenance checks, as necessary, for improper operation of Magnehelics, bag condition, excessive dust in the dust collector hopper, improper operation of dampers, improper operation of shaker cleaning system, restricted ductwork, high humidity in exhaust air. Determine what the problem is and repair it.
	EGCOMPOUNDING: BAN-RAM-DUST2 (Asset No. 02)	3.0" W.G.	Same response procedures as BAN-RAM-DUST1.
	EGCOMPOUNDING: TubeJet Dust Collector	3.0" W.G.	If above the maximum acceptable Magnehelic reading, call the Maintenance Department. Maintenance checks, as necessary, for improper operation of Magnehelics, bag condition, excessive dust in the dust collector hopper, improper operation of dampers, improper operation of shaker cleaning system, restricted ductwork, high humidity in exhaust air. Determine what the problem is and repair it. Maintenance to refer to the trouble shooting section of the Operating Instructions for the TubeJet Dust Collector.
LOW DIFFERENTIAL PRESSURE	EGCOMPOUNDING: BAN-RAM-DUST1 (Asset No. 01)	.1" W.G.	If above the maximum acceptable Magnehelic reading, call the Maintenance Department. Maintenance checks, as necessary, for improper operation of Magnehelics, bag condition, improper operation of dampers, improper operation of shaker cleaning system. Determine what the problem is and repair it.

EGCOMPOUNDING: BAN-RAM-DUST2 (Asset No. 02)

.1" W.G.

Same response procedures as BAN-RAM-DUST1.

Section 8

Preventative Maintenance

As mentioned previously, IPG uses the Maintmizer software system to organize and manage the frequency and schedule the work orders for the APC equipment based on past operating experience and performance history. IPG updates the information in the Maintmizer system based on new operating experience and equipment history. For example, the frequency and scope of specific maintenance tasks may be modified, if IPG determines that these changes will maintain proper equipment operation in the future.

Table 2 presents the inspection, preventative maintenance, and repair scheduled for the APC devices. This preventative maintenance is subject to change, if IPG determines that less frequent maintenance or repair is warranted.

Table 2
Summary of Preventative Maintenance
Intertape Polymer Group, Inc. - Marysville, MI

I. INSPECTION AND ROUTINE MAINTENANCE - BAGHOUSES

This section presents the inspection and routine maintenance performed by IPG for their baghouses. Because the designs of the baghouses are identical, the inspection and maintenance performed by IPG for each unit is the same. With AQD approval, IPG may update and modify the scheduled maintenance based on operating experience.

Emission Unit/Flexible Group ID	Process Description	Control Device Description	Asset No.
EGCOMPOUNDING	Dry Stock Compounding Process - elastomers (natural or synthetic rubber) are mixed in a Banbury mixer with dry powder fillers to produce various dry stocks	Baghouse1- Fabric Filter collector - 2800 cfm	01
EGCOMPOUNDING	Dry Stock Compounding Process - elastomers (natural or synthetic rubber) are mixed in a Banbury mixer with dry powder fillers to produce various dry stocks	Baghouse2- Fabric Filter collector - 2800 cfm	02

Control Device	Frequency	Work Requested
Baghouse	Daily	Inspect baghouse for general cleanliness of the operation and for proper operation.
	Weekly	Record Magnehelic differential pressure data as required by the permit.
	2 Weeks	Inspect the baghouse visually, and check the condition of readily accessible externally visible parts for buildup of foreign matter, cracks, excessive wear, and structural integrity. Make repairs as necessary.
	4 Months	Clean and inspect dust collector for wear. Visually inspect filter bags and replace as needed.
	Annually	Physically inspect the baghouse pump/blower/fan motor(s) for vibration and noise. Report any notable vibration to the Shift Maintenance Supervisor for further investigation and repair. Replace filter bags.
	Annually	Clean and inspect impeller/blade for nicks, cracks, erosion, and any signs of wear and repair or replace as necessary.
	Annually	Check condition of bearings and lubricate as necessary.
	Annually	Check coupling(s) for slop, any sign of wear, and general condition. Replace or repair coupling(s) as needed.
	Annually	Check gearbox for wear, repair as necessary. Fill or change lubricant in gearbox as needed.
	Annually	Inspect drive gears, idler gears and drive belts for wear, checking for frayed edges, loose or missing teeth, and proper tensions.
Annually	Clean out any buildup and residue and check the condition of duct/pipe, and repair or replace as necessary.	

Section 9

Recordkeeping

IPG utilizes the Maintmizer preventative maintenance software program, as described in Section 6, "Work Order Systems," to keep records of maintenance work performed on APC equipment. The computerized records include the date the work was performed, the name of the mechanic or electrician who performed the work, a description of the work requested, and the corrective action taken.

Magnehelic readings and other recordkeeping data required by the ROP, such as filter replacement dates, are currently gathered either manually or electronically. As the electronic database systems are further developed, they will replace the manual recordkeeping. IPG may change the required content of the recordkeeping system.