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**4111 WEST FOUR MILE ROAD**

**GRAYLING, MICHIGAN 49738**

**STARTUP, SHUTDOWN, AND MALFUNCTION ABATEMENT PLAN (SSMAP)**

**REVISION 19**

**MARCH 6, 2019**

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**APPENDIX A – CRITICAL SPARE PARTS LIST**

# 1.0 GENERAL

1.1 DOCUMENT OBJECTIVES

This plan covers the general operations, documentation and reporting procedures for startup, shutdown, and malfunction (S/S/M) events of air emission sources, control devices, and monitoring systems at the Weyerhaeuser facility in Grayling, Michigan. The objectives of this plan are to:

a) Meet the S/S/M plan requirements found in the National Emission Standard for Hazardous Air Pollutants for the Plywood and Composite Wood Products (PCPW) found in 40 CFR 63 Subpart DDDD. This is also known as the PCPW MACT standard.

b) Meet the malfunction abatement plan and emission minimization for startup and shutdown plans per Rules 911 and 912 of the Michigan Air Pollution rules.

c) Ensure that process equipment, air pollution control equipment, and monitoring equipment is operated in a manner consistent safety and with good air pollution control practices to minimize emissions during startup, shutdown, and malfunction events.

d) Ensure that effective preventive maintenance procedures for source and control devices are in place to minimize any malfunctions.

e) Ensure that the necessary critical spares are available for timely repair of control devices and monitoring systems.

f) Assure proper documentation and follow-up on equipment inspections, compliance reporting, malfunction notification, and semiannual S/S/M reporting requirements consistent with the PCPW MACT standard.

1.2 AFFECTED PROCESSES

The Weyerhaeuser Grayling facility converts raw logs into an OSB (Oriented Strand Board) structural wood panel. The following processes at the facility have emission limitations in the PCWP MACT standard and/or the Renewable Operating Permit (ROP) or “permit”:

|  |  |  |  |
| --- | --- | --- | --- |
| **Emission Unit ID** | **Source** | **Emission Limit in PCPW MACT?** | **Emission Limit in ROP?** |
| FGDRYERS pg. 6 | Rotary dryers with WESP, RTO and CEMS | Yes | Yes |
| FGDRYERS pg. 8 | Coen dust/gas burner | Yes\* | Yes |
| EUIBW pg. 9 | IBW gas burner | No | Yes |
| EUPRESSLINE pg. 17 | Press with biofilter and CEMS | Yes | Yes |
| EUPAINTBOOTH pg. 24 | Paint Booth | No\*\* | Yes |
| FGWOODHANDLING pg. 24 | Six (6) wood handling systems with baghouses | No | Yes |
| FGDIESELENGINES NA | 3 emergency diesel engines | No | No |

\* Coen burner on the thermal oil heater normally exhausts to dryers, so emissions are limited along with dryers unless bypassed through TOH stack when burning natural gas.

\*\*Paint booth is required to use only non-HAP coatings as defined in 40 CFR 63.2292

This plan is required to identify and address situations where emissions may be in excess of the regulated limits during startup, shutdown, and malfunction events. Therefore, all of the above processes are addressed in this plan, whether subject to the S/S/M requirements of the PCWP MACT standard or only subject to emission limits under the ROP.

1.3 COMPANY ORGANIZATION

The Weyerhaeuser Grayling facility operates (24) hours per day (7) days per week. The facility is operated by (4) Teams working on a rotating shift basis. Each team is staffed with trained operators and maintenance members to assure proper equipment operation, including startups and shutdowns, and quick response to any malfunctions. The Maintenance Manager has overall responsibility for overseeing the inspection, maintenance, and repair of equipment.

1.4 COMPLIANCE COMPUTER

All data collection required under the permit and PCWP MACT is performed by a personal computer control system located in dryer control. This system utilizes a dedicated PLC, which interfaces directly with field sensors and monitors. This system displays compliance variables, calculates exceedances and stores data. The system also provides operator interface to document exceedances, monitor process variables and compliance alarms and project compliance process and compliance data.

The compliance computer has a 2-hour battery backup in case of power failure.

1.5 RECORDKEEPING

All documents required by this SSM Plan, and any other documents required by the Operating Permit will be kept for (5) years and made available to The U.S. Environmental Protection Agency (EPA) and/or the Michigan Department of Environmental Quality – Air Quality Division (MDEQ-AQD) upon request.

All records of inspections shall include date and time and status of equipment. Start-ups, Shutdowns and Malfunctions shall be documented with duration and corrective actions needed.

* 1. REPORTING REQUIREMENTS

Reference: 40 CFR 63.10(d)(5) and Michigan Rule 912

Reporting requirements associated with the SSM plan to the environmental agencies EGLE (Michigan Department of Environmental, Great Lakes, and Energy) – Air Quality Division and U.S. EPA) are as follows:

1. Annual reports are due to the U.S. EPA for PCWP MACT-related S/S/M events. Annual deviations are also due for ROP-related items. Semiannual and annual reports are due to the Michigan EGLE. These reports will document if an S/S/M event occurred and the procedures in the S/S/M plan were not followed, but an exceedance of an emission limitation in the MACT standard (or the ROP) did not occur.
2. If the procedures outlined in this S/S/M plan are not followed and there is an exceedance of the PCWP MACT emission standard, then a record of actions taken will be documented and a report made within (2) business days after commencement of actions inconsistent with the plan. A written follow-up report will be submitted within 7 working days after the end of the event. This report will include probable cause, duration, corrective action taken, and steps taken to prevent a reoccurrence.
3. If the procedures outlined in this S/S/M plan are followed and there is an exceedance of an ROP emission limit for more than 2 hours, then immediate reporting is required within two (2) working days with a written follow-up report within 7 working days. This report will include probable cause, duration, corrective action taken, and steps taken to prevent a reoccurrence.

# 2.0 DRYERS AND ENERGY (FG Dryers)

2.1 GENERAL DESCRIPTION

The facility uses four (4) triple pass rotary strand dryers to dry the wood strands. These dryers are equipped by a cyclone for each dryer to remove the strands and collect particulate matter. All 4 dryers exhaust through a 5-field wet electrostatic precipitator (“WESP”) and a 2-unit regenerative thermal oxidizer (“RTO”) and exit one common RTO stack.

The primary heat sources for the dryers (4) MEC wood dust/natural gas suspension burners (1 for each dryer). Additionally, the waste heat from the Coen wood dust/gas burner for a thermal oil heater (“TOH1”) also exhausts to the dryers. TOH1 may exhaust to a separate stack provided that it is being fired on gas and not wood. The dryer and energy area also includes a separate gas fired thermal oil heater manufactured by International Boiler Works (IBW). This source is gas fired only and exhausts through a dedicated stack (TOH2). (The IBW is not part of the PCWP MACT category.)

The drying process and associated energy systems are highly automated and numerous process variables are monitored continuously by the control room operators.

The RTO stack is equipped with a continuous emission monitoring system (CEMS) for Volatile Organic Compounds (“VOC’s”), opacity, and carbon monoxide (“CO”).

In general, emissions of NOx, CO and PM originate from the heat sources that serve the dryers. The drying process itself is the primary source of VOC’s, but particulate matter and CO emissions also originate from the drying process.

2.2 REGULATORY REQUIREMENTS

There are numerous emission limits in the permit for the dryers. Additionally, the PCWP MACT standard contains emission limits and operating requirements.

The IBW is subject to Boiler MACT and the Coen burner is subject to Boiler MACT when fueled by natural gas and venting to atmosphere. Requirements include recording the type of fuel burned (63.7540), prescribed burner tune-up scheduling and reporting (63.7540(a)(10), and work practices as defined in part 63 Subpart DDDDD, table 3. These MACT standards have been incorporated into the current ROP.

2.2.1 Non-MACT Emission Limits

The non-MACT regulatory limits in the permit for the dryer systems exhausting through the RTO stack that are continuously monitored are as follows:

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Limit** | **Averaging Time** |
| Opacity | 20% | 6-minutes  |
| VOC | 18.6 lb/hr | 30 day rolling  |
| VOC | 81.5 tons per year | 12 month rolling  |
| CO | 343.7 lb/hr | 1-hour |
| CO | 147.3 lb/hr | 24-hour |

The PCWP MACT standard also includes an operating requirement for continuous compliance with the minimum RTO combustion chamber temperature (as determined from testing).

Additionally, the ROP imposes particulate matter limits and specific organic emission limits for the dryers in which compliance is demonstrated by periodic stack testing. Past experience has indicated that compliance with the continuously monitored emissions above indicates compliance with the other parameters.

There are also oxides of nitrogen (NOx) and CO emission limits for the two TOH stacks and a general prohibition for TOH1 to utilize wood while exhausting through the TOH1 stack. Compliance is verified through stack testing.

Emissions of opacity (and particulate matter) are dictated primarily by the proper operation of the WESP. Likewise, emissions of VOC and CO are dictated primarily through the proper operation of the RTO. Actual process parameters for the heat sources and the dryers themselves have only a minor effect on these emissions when the control equipment is properly operated. The general requirement to have the control equipment operating prior to the startup of the processes ensures emissions are minimized during startup and shutdown.

2.2.2 MACT Requirements

Removal of 90 percent Total Hydrocarbons (THC) is the selected compliance option for this unit to meet the PCWP MACT standard. The PCWP MACT also includes an operating requirement to demonstrate continuous compliance of keeping the minimum RTO combustion chamber temperature above the temperature during performance testing.

The dryer emissions are allowed to bypass the control equipment up to 3% of annual operating time during routine maintenance. During these times, attention to process equipment operating parameters is critical to minimizing emissions. Dryer emission bypass during routine maintenance is not an SSM event.

2.3 CRITICAL MONITORED VARIABLES

The dryer and energy systems are highly controlled and automated, with many variables monitored on a continuous basis for production, quality and environmental compliance purposes. The key monitored variables of the dryer and energy systems, with the associated control equipment, for environmental compliance purposes are as follows:

|  |  |  |
| --- | --- | --- |
| Equipment | Variable Monitored | Normal Range/Reading |
| TOH Burners (both Coen and IBW) | Thermal oil temperature, stack used | TOH1 on wood and ducting through dryers. TOH1 on gas only if using TOH1 stack. Oil temperature ranges between 100° and 500°F with 470°F set point. |
| WESP | Field Voltage for all 5 fields | All 5 fields energized, typical voltage range 50-60 kilovolts |
| WESP | Duct sprays | 1200 - 1600 gallons per minute.  |
| RTO | Combustion chamber temperature (Required by PCWP MACT) | 1424° minimum temperature determined during performance testing. Sensors meet requirements of 40 CFR 63.2269(b) may change w/ test results. |
| RTO  | Inlet static pressure | Negative |
| Entire system exhausting through RTO stack | CO, VOC, opacity, flow and RTO Combustion Temperature | See section 2.2 |

2.4 COEN WOOD/GAS BURNER

2.4.1 STARTUPS AND SHUTDOWNS

Start-up and shut-down sequences of the Coen burner are automatic. The Coen starts only on gas and undergoes an automatic purge cycle and warm up prior to wood being introduced. Shutdown of the unit is done simply by disabling wood feed to the burner. A gas pilot continues and the burner must be manually disabled if shutting the burner completely down.

The Coen burner exhausts normally pass through the dryer systems, but may vent to atmosphere via the TOH stack when the dryers are in startup or shutdown mode. To minimize emissions, the Coen burner will not fire wood unless the TOH stack is shut, the exhausts pass through the dryer, and the WESP is operational. The Coen will automatically shut down if venting through the TOH stack while firing wood.

* + 1. **MALFUNCTIONS**

Emissions from the Coen burners are minimized during dryer malfunctions when heat to the dryer is not needed by changing to gas fuel and venting to the atmosphere. The flue gases from the Coen burner must vent through the dryers, including the WESP, when burning wood. When the natural gas burners are the sole source of heat the exhaust gases may be vented to either the WESP or the TOH1 Stack. The control system is set so that TOH1 will not exhaust to the TOH1 stack when firing wood.

Malfunctions of the Coen and corrective actions are as follows:

|  |  |  |
| --- | --- | --- |
| **Malfunction** | **Corrective Action** | **Additional Notes** |
| Flame Character – poor color, flickering | Adjust fuel bias. If not corrected, shut down burner and check fuel scroll for plugging |  |
| WESP not operational while firing wood | Exhaust through TOH stack and cease wood firing  | TOH stack will open automatically and an automatic timer will shut down wood firing if the TOH stack is open for 15 minutes |

2.4.3 PREVENTATIVE MAINTENANCE

|  |  |  |
| --- | --- | --- |
| **Item To Be Inspected** | **Frequency of Inspection** | **Recordkeeping Method** |
| Flame Condition | Once per shift | DSE Shift Summary |
| Verify standard operating condition | Once per shift | DSE Shift Summary |
| General inspection and lubrication | Monthly | SAP electronic tracking system |

The Coen Burner is not considered to be an essential piece of equipment, therefore, there are no critical spare parts currently managed for it. The unit will remain out of service in the event of a breakdown until any needed parts are obtained and repairs completed.

2.5 IBW THERMAL OIL HEAT EXCHANGER (EUIBW):

2.5.1 STARTUP AND SHUDOWNS

The startup and shutdown of the IBW is straightforward, controlled by a toggle switch in the process controls.

**2.5.2 MALFUNCTIONS**

|  |  |  |
| --- | --- | --- |
| **Malfunction** | **Corrective Action** | **Additional Notes** |
| Flame Character – poor color, flickering | Adjust fuel bias; if this does not correct, then recalibrate excess air/fuel ratio. Shut down burner and cease strand feed to dryer if problem persists. | Consult with instrument team if recalibration required by the next working day.  |

2.5.3 PREVENTIVE MAINTENANCE:

|  |  |  |
| --- | --- | --- |
| **Item To Be Inspected** | **Frequency of Inspection** | **Recordkeeping Method** |
| Flame Condition | Once per shift | DSE Shift Summary |
| General inspection and lubrication | Weekly | SAP electronic tracking system |

The critical spares are those that control or calibrate the gas burner excess air setting. (See Appendix A)

2.6 WOOD STRAND DRYERS WITH SUSPENSION BURNERS (FGDRYERS):

2.6.1 STARTUPS AND SHUTDOWNS

Start-up of the entire Wood Strand Dryer system begins when; 1) the RTO combustion chamber reaches the minimum operating temperature (established during performance testing), 2) the North and South RTO abort gates are closed, and 3) heat is applied to one of the four dryers. Start-up of the Wood Strand Dryer system ends when strands are fed to the dryer. Shut down of the system begins when heat to the dryer is removed and ends 30 minutes after wood feed to the dryer is stopped. Under normal conditions, dryer start up is only initiated after the WESP and RTO control equipment have been started. Likewise, the WESP and RTO remain on line until the system shutdown is complete. Therefore, emissions in excess of the PCWP MACT standards are not anticipated.

Individual dryers may startup or shutdown while the other dryers are operational with the WESP and RTO on-line. Individual dryer startups and shutdowns generally do not affect the ability of the dryer system to maintain compliance with the emission limits with the control equipment operating.

The detailed startup sequence for all (4) dryers are detailed in ESOP-DS-010 Dryer Startup. The most critical steps for emission minimization during startup are as follows:

1) All fans are operating, WESP is energized, and RTO is operating at proper temperature prior to introducing strands to the dryer and burning wood fuel in suspension burners (or in TOH1 if ducting through dryers).

2) Continuous emission monitoring system is operating and recording upon initiation of fuel feed into the suspension burners and/or TOH1 if ducting through dryers.

3) Wood strands added to dryer once the dryer outlet temperature reaches a minimum of 200 degrees F.

The cyclone system is an essential part of the dryer exhaust gas path and is always functioning (i.e., it cannot be turned on or off or bypassed).

During a planned shutdown of all dryers, emissions are minimized by stopping wood fuel feed to the suspension burners and wood strand feed to the dryers prior to the shutdown of the WESP and RTO. For an unplanned shutdown of an individual dryer (e.g. malfunction or fire), the WESP and RTO remain operational thereby minimizing emissions.

OTHER SOPS CITED and held on site at the facility:

ESOP-DS-008 Dryer Shut Down

ESOP-DS-009 Dryer Start-up after a power outage

 ESOP-DS-010 Dryer Start Up

 ESOP-WRO-038 RTO Normal Start Up Mode Cold State

 ESOP-WRO-042 WESP Down Day Shut Down Mode

 ESOP-WRO-044 WESP Start Up

 ESOP-WRO-063 RTO Bypass-Bake Out

2.6.2 MALFUNCTIONS

Malfunctions of the suspension burners/rotary dryers and the corrective actions are described below:

|  |  |  |
| --- | --- | --- |
| **Malfunction** | **Corrective Action** | **Additional Notes** |
| Flame character in burners – poor color, flickering | Inspect wood fuel system for obstructions. Shut down burner and cease strand feed to dryer if problem persists. | Call maintenance to assist with troubleshooting as needed. |
| Fire in Dryer | Continue to operate WESP and RTO, shut down all dryers if CEMS indicate non-compliance |  |
| Loss of system power or control system | Immediate shutdown of fuel feed and wood strand feed to dryers |  |

2.6.3 PREVENTIVE MAINTENANCE

Regular preventative maintenance activities for the suspension burners and dryers are as follows:

|  |  |  |
| --- | --- | --- |
| **Item To Be Inspected** | **Frequency of Inspection** | **Recordkeeping Method** |
| MEC Gas Train | Once per shift | DSE Shift Summary |
| General inspection while equipment is operating | Once per shift | DSE Shift Summary |
| General inspection during shutdown and lubrication | Weekly | SAP electronic tracking system |

Critical spares are documented in the site’s Critical Spare Parts Report (See Appendix A).

2.7 CYCLONE COLLECTION SYSTEM

2.7.1 MALFUNCTIONS

Potential malfunctions of the cyclone collection system are as follows:

|  |  |  |
| --- | --- | --- |
| **Malfunction** | **Corrective Action** | **Additional Notes** |
| Discharge airlock disengage  | Automatic shutdown of the dryers | WESP and RTO remain operational  |
| Fire in cyclone system | Automatic shutdown of dryers, wood feed to TOH1 stops. Replace blown explosion vents as needed prior to startup. | WESP and RTO bypassed to prevent equipment damage.  |
| Leaks in ductwork or explosion vents | Temporary patch immediately and permanent repair on scheduled down day not to exceed 3 weeks |  |

2.7.2 PREVENTIVE MAINTENANCE

Regular preventative maintenance activities for the cyclone system are as follows:

|  |  |  |
| --- | --- | --- |
| **Item To Be Inspected** | **Frequency of Inspection** | **Recordkeeping Method** |
| General inspection while equipment is operating, no visible emissions indicating leaks | Once per shift | DSE Shift Summary |
| General inspection while process is down, and lubrication | Weekly | SAP electronic tracking system |

There are no critical spares to this equipment as repairs can be made with common mill items.

2.8 WET ELECTROSTATIC PRECIPITATOR (WESP)

2.8.1 MALFUNCTIONS

The following malfunctions can affect the ability of the system to maintain compliance:

|  |  |  |
| --- | --- | --- |
| **Malfunction** | **Corrective Action** | **Additional Notes** |
| Loss of power on three of the five fields | Automatic shutdown of the wood fired burners serving the dryers and bypass of RTO to prevent equipment damage | Set on automatic 15 minute timer |
| Loss of water flow to both the duct sprays and pre-quench tower | Automatic shutdown of WESP, dryer system, and RTO. | Set on 15 minute timer |
| Leaks in ductwork  | Temporary patch and permanent repair on scheduled down day not to exceed 3 weeks | Patch when leak is detected.  |
| Loss of control system or power | The dryer production rates and raw material mix (pine usage) are adjusted to ensure compliance with the VOC and CO emission limits in the ROP. | To be followed after each occurrence. |

2.8.2 PREVENTIVE MAINTENANCE

The following regular preventative maintenance is carried out on the WESP:

|  |  |  |
| --- | --- | --- |
| **Item To Be Inspected** | **Frequency of Inspection** | **Recordkeeping Method** |
| General inspection while equipment is operating, no visible emissions indicating leaks | Once per shift | DSE Shift Summary |
| General inspection while process is down | Every 2 weeks | SAP electronic tracking system |
| General lubrication | Monthly | SAP electronic tracking system |

Critical spares for the WESP are documented in the site’s Critical Spare Parts Report (See Appendix A).

2.9 REGENERATIVE OXIDZER (RTO)

2.9.1 MALFUNCTIONS

The potential malfunctions for the RTO system that would affect the ability of the dryers and heat sources to meet the regulatory emission limits are as follows:

|  |  |  |
| --- | --- | --- |
| **Malfunction** | **Corrective Action** | **Additional Notes** |
| All fields of WESP not energized | Automatic shutdown of RTO to prevent equipment damage | Dryer exhaust bypasses RTO and dryers/heat sources are shut down |
| Failure of inlet/outlet valves used for heat regeneration | Automatic shutdown of WESP, dryer system, and RTO. | Set on 15 minute timer |
| Loss of exhaust fan  | Shutdown RTO, bypass dryer exhaust and commence shutdown of dryers | As soon as malfunction is detected |
| Low combustion temperature | Check burner operation and temperature probe/ thermocouples. Replace thermocouple if burner is operating properly. | As soon as malfunction is detected |
| Loss of temperature reading | Replace sensor if hardware failure, troubleshoot if software failure | Shutdown RTO and dryers if temperature sensor replacement does not correct |
| High inlet static pressure  | Confirm proper operation of fans and inlet/outlet valves; conduct online bake out. | Schedule off line bake out and washing for next down day. |
| Gate(s) frozen after downtime (seasonal) | Run exhaust gases through RTO to thaw the gate(s). Malfunction if RTO minimum temperature has not been met. | As soon as malfunction is detected |

2.9.2 PREVENTIVE MAINTENANCE

The following preventative maintenance is done to the RTO:

|  |  |  |
| --- | --- | --- |
| **Item To Be Inspected** | **Frequency of Inspection** | **Recordkeeping Method** |
| General inspection while equipment is operating, no visible emissions indicating leaks | Once per shift | DSE Shift Summary |
| General inspection while process is down | Every two weeks | SAP electronic tracking system |
| Temperature Sensor | Semiannual | SAP electronic tracking system |
| Temperature Sensor Calibration  | Semiannual  | SAP electronic tracking system |
| Bake out/Washout  | As needed | SAP electronic tracking system |
| Check lube and hydraulic reservoir | Annual | SAP electronic tracking system |
| Replacement of ceramic media | +/- 3 years |  |

Critical spares for the WESP are documented in the site’s Critical Spare Parts Report (See Appendix A).

2.10 CONTINUOUS MONITORING SYSTEM – Dryers and Energy

2.10.1 DESCRIPTION

The RTO stack servicing the Dryers and Energy emissions unit is equipped with several continuous emission monitors which operate while the dryer and associated energy systems are operating. Additionally, the RTO combustion chamber temperature is continuously monitored for compliance demonstration with the PCWP MACT operating requirements for Thermal Oxidizers.

Summary descriptions of the monitors are as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| **Monitor Type** | **Manufacturer Make/Model** | **Normal Range** | **Notes** |
| Opacity | Teledyne LightHawk 560 SN: 5602516 | 0 – 100%, alarms at 20% | Cannot operate when WESP is operational and RTO in full bypass  |
| Carbon Monoxide | CAI601SN: B06014-M or B06015-M | 0 to 1,000 ppm |  |
| Airflow | Teledyne Ultraflo 150SN: 1501354 | 0 – 233300 CFM | Used to calculate mass emissions of VOC and CO |
| VOC | CAI600 HFIDSN: B05010 | 0 to 100 ppm and 0 to 1000 ppm (as propane) dual range |  |
| Temperature Sensor | Rosemount High Temp. Thermocouple | 0 – 1100 Degrees C | Used to monitor temperature of RTO Combustion Chamber  |

The CEMS system has been designed and installed under the following EPA specifications:

Opacity – PS1 of 40 CFR 60 Appendix B

CO – PS4 of 40 CFR 60 Appendix B

VOC – Performance Specifications for Continuous Emission Monitoring of Hydrocarbons, US EPA Publication EPA/530-SW-91-010 and PS8 of 40 CFR 60 Appendix B

Quality Assurance calibrations are conducted in accordance to 40 CFR 60 Appendix F, including daily calibrations, cylinder gas audits (CGA’s), and relative accuracy test audits (RATA’s). Additional details are provided in the Quality Assurance Plan (QAPs).

The temperature monitoring systems on the RTO Combustion Chamber have been designed and installed, and are maintained in accordance with 40 CFR 63.2269(b). The temperature sensors are located in a position that provides a representative temperature of the actual combustion chamber temperature. The thermocouples used have a minimum accuracy of 4 Degrees F or 0.75% of the temperature value. Quality assurance calibrations include a semi-annual electronic calibration, performed according to the manufacturer’s operations and maintenance manual, followed by a validation check with a second, redundant sensor placed nearby the process sensor. Sensors are replaced whenever the manufacturer’s specified operating temperature range is exceeded. All components of the temperature monitoring system are inspected quarterly and electrical connections are inspected for continuity, oxidation and galvanic corrosion.

* + 1. MALFUNCTIONS

Potential malfunctions of the various continuous monitors are listed below:

|  |  |  |  |
| --- | --- | --- | --- |
| **Malfunction** | **Monitor** | **Corrective Action** | **Notes** |
| Loss of Power | Opacity, CO, VOC, and airflow  | Check breakers, reenergize when power available, reset and recalibrate upon restart | As soon as malfunction is detected |
| Monitor Hardware Fault | Opacity, CO, VOC, and airflow | Control instrument specialist to troubleshoot | As soon as malfunction is detected |
| Monitor Software Fault | Opacity, CO, VOC and airflow | Control instrument specialist to troubleshoot | As soon as malfunction is detected |
| Loss of sample line or probe heat/purge air | Opacity, CO, VOC, and airflow | Check circuit breaker to heater. Check sample lines and probes for dirt, condensation. | Temperatures are alarmed in system. Repair as soon as malfunction is detected. |
| Plugged or damaged sample lines or filters | CO, VOC, and airflow  | Maintenance to troubleshoot and repair as soon as malfunction is detected. | Cal drift will alarm |
| Failed daily calibration | Opacity, CO, and VOC  | Rerun a calibration immediately. If still failing, inspect cal gas system, analyzers, and sample line. Control system specialist to troubleshoot until recalibration passes. | If on-site troubleshooting does not correct the problem, contact vendor for assistance. Monitor downtime to be reported. |
| Failed daily calibration | Opacity | Rerun the calibration. If still failing, check windows for dirt, replace if necessary | As soon as malfunction is detected |
| Sample conditioner failure (moisture intrusion) | CO and VOC monitor | Maintenance to troubleshoot system as soon as malfunction is detected. | Will alarm as general system fault |
| Hardware failure | Temperature sensor | Maintenance to replace failed sensor as soon as malfunction is detected. | RTO shutdown if no combustion chamber temperature sensors operational |
| System control failure | Temperature sensor | Control instrument specialist to troubleshoot as soon as malfunction is detected | RTO shutdown if no combustion chamber temperature sensors operational |

Weyerhaeuser has trained control system specialists on all shifts to troubleshoot the CEMS system should there be a malfunction

If the opacity monitor fails when operating the dryers with only the WESP or with a partially or fully bypassed RTO, the dryers may not be operated until the monitor is repaired and/or the RTO is no longer bypassed, unless a certified visual emissions evaluator performs a Method 9 reading and determines that the opacity is 20% or less.

* + 1. PREVENTATIVE MAINTENANCE

Beyond the required QC activities for the monitors and Temperature Monitoring System (calibration and validation checks, quarterly CGA’s, and annual RATA’s), the following preventative maintenance program is in place for the continuous emission monitors:

|  |  |  |
| --- | --- | --- |
| **Item To Be Inspected** | **Frequency of Inspection** | **Recordkeeping Method** |
| General inspection while equipment is operating  | Once per shift | Dryer CERMS checklist |
| Calibration gas tank levels | Daily | Dryer CERMS checklist |
| Replace filter elements for airflow monitors | Semiannual | SAP electronic system |
| Rebuild VOC and CO pumps | Annual | SAP electronic system |
| Replace filter elements for VOC and CO sampling probe | Every 28 days | SAP electronic system |
| Temperature Monitoring System | Quarterly | SAP electronic system |

Critical spares for the Continuous Monitoring Systems are documented in the site’s Critical Spare Parts Report (See Appendix A).

# 3.0 PRESS (EUPRESS)

3.1 GENERAL DESCRIPTION

After the wood strands are dried in the dryers, they are mixed with resin and formed into mats on the form line. The form line feeds into a single press. The mats are transported to the press on steel caul screens and set in a loader, which feeds the press. The press uses pressure and heat to form the panels. The heat is provided by thermal oil (the thermal oil heaters are discussed in the dryer and energy section). The exhaust from the press and unloader are captured in a hood and treated by a biological air filtration (BAF or biofilter) unit that control emissions from the pressing process. The BAF is actually constructed of two-packed tower humidifiers and filter beds, operating simultaneously to treat the press exhaust. The exhaust is combined after the biofilter beds and ducted to the press stack.

3.2 REGULATORY REQUIREMENTS

There are numerous emission limits in the permit for the press. Additionally, the PCWP MACT standard contains emission limits and operating requirements.

The permit for the press exhausting through the press stack that is continuously monitored is as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Limit** | **Averaging Time** | **Compliance Demonstration** |
| VOC emission rate | 19.5 lb./hr. | 30 day rolling  | Continuous emissions rate monitor |
| VOC emission rate | 85.4 tons per year | 12 month rolling  | Continuous emissions rate monitor |

The PCWP MACT rules include operational requirements for biofilter bed temperature monitoring and for the design and operation of the press enclosure (Wood Products Enclosure).

3.3 CRITICAL MONITORED VARIABLES

Similar to the dryers, the press is highly automated with many variables monitored for production and quality purposes. The critically monitored variables on the press and biofilter for environmental compliance purposes are as follows:

|  |  |  |
| --- | --- | --- |
| Equipment | Variable Monitored | Normal range/reading |
| Press Enclosure | Access doors/position streamers | Doors closed and streamers pointing into press |
| Biofilter | Humidifier pressure drop | 0.5 to 10” wg |
| Biofilter  | Humidifier exit air temperatures | <120° F |
| Biofilter  | Bed Temperatures | 77.7F – 99.9F based on compliance test results |
| Biofilter | Water application rate | Variable based on bed condition |
| Press exhaust | VOC, airflow | <19.5 lb./hr. VOC |

3.4 PRESS AND PRESS ENCLOSURE

3.4.1 STARTUPS AND SHUTDOWNS

Press startup begins when heat is first applied to the press to warm it up to be ready for production. Press start up ends when the biofilter media temperature established during performance testing has been reached. HAP emissions are minimized during startup by (1) relying on the absorptive capacity of the biofilter for water soluble HAPs until the biofilter is brought to its operating temperature, and (2) increasing the operating temperature as rapidly as possible using heat and humidity generated from pressing boards and supplemental steam addition. The HAP emissions from the press are made up of water soluble HAPs. The biofilter media is moist, allowing it to absorb a considerable amount of HAPs. Colder temperatures increase the absorptive capacity of the biofilter. Heating the biofilter will cause the biota to rapidly consume the accumulated HAPs. Although the biofilter temperature is below the operating limit during startup, the HAP emissions removal is expected to be greater than the 90% destruction required. Shut down begins when the final 16 boards exit the press enclosure and the press heat is shut off. Shut down ends when the Press Exhaust Fans and Biofilter Exhaust fans are turned off. There may be interruptions for various reasons in wood mat feed but the press will stay hot in idle mode, ready to resume operations at any time.

The press is always exhausted to the biofilter, except when the biofilter media is changed out as discussed in Section 3.5.1 below. For this reason, it is anticipated that there will be no emissions in excess of the PCWP MACT limitations during routine start-ups or shutdowns when the biofilter is operating in its normal bed temperature range.

The PCWP MACT standard requires that the press enclosure achieve a certain capture efficiency or meet the definition of a “wood products enclosure” under 40 CFR 63.2292. The press enclosure at the facility meets this definition with the access doors positioned consistent with ESOP-BFP-018 Press Enclosure Compliance. The press will not be started up unless the access doors positioned consistent with the ESOP.

During startup, the continuous emission monitors are operational before mats are fed to the press.

3.4.2 MALFUNCTIONS

There are relatively few malfunctions of the press itself that will cause excess emissions due to the fact that the press is always exhausted through the biofilter. Airflow continues to the biofilter regardless of whether or not the press is operating.

|  |  |  |
| --- | --- | --- |
| **Malfunction** | **Corrective Action** | **Additional Notes** |
| Loss of power | Restore power, re-start exhaust fans | As soon as power is restored |
| Process fire | Extinguish fire, re-start system  | As soon as safe to restart system |
| Lack of press enclosure inflow | Check exhaust fans, make-up air units and access door positions  | ESOP-BFP-018 Press Enclosure Compliance |

3.4.3 PREVENTATIVE MAINTENANCE

The following regular preventative maintenance is performed on the press and press enclosure system:

|  |  |  |
| --- | --- | --- |
| **Item To Be Inspected** | **Frequency of Inspection** | **Recordkeeping Method** |
| General inspection while equipment is operating  | Once per shift | Press Reporting System (MIS) Operator Log  |
| Clean inlet ducting and fan impellors | Every 6 months | SAP electronic system |
| Fan bearing vibration analysis | Every 6 months | SAP |
| Fans – sheaves, belts | Every year | SAP electronic system |
| Media replacement | About every 3 years | SAP electronic system |

3.5 PRESS BIOFILTER

3.5.1 MALFUNCTIONS

The following malfunctions of the biofilter may affect the ability of the system to meet the emission limitations in the permit and/or MACT standard

|  |  |  |
| --- | --- | --- |
| **Malfunction** | **Corrective Action** | **Additional Notes** |
| Loss of water spray in humidifier indicated by high air exit temperature | Check humidifier components, including pumps and sump pumps and repair as necessary as soon as the malfunction is detected | Increase over-bed irrigation on biofilter bed to maintain bed temperatures |
| Loss of over-bed water spray indicated by high bed temperature | Check over-bed spray components, including pumps, filters and valves and repair as necessary | Resume over-bed irrigation on biofilter bed to return bed temperatures to normal operating range |
| Mechanical failure of biofilter exhaust fans | Troubleshoot and repair mechanical failure, restart fans as soon as malfunction is detected. |  |
| Loss of control system or power | Troubleshoot control system power problem and restart affected components as soon as malfunction is detected. |  |
| Structural failure of bed resulting in reduced exhaust gas retention time | Start additional humidifier pumps and ensure optimal blowdown water flow to the WESP.Restore bed to design exhaust gas retention time through media aeration and/or screening or through replacement of media | Notify MDEQ and plan repair in time-frame agreed upon with the district inspector. |

The press exhaust gases may bypass the biofilter for routine maintenance purposes such as biofilter media change out. The PCWP MACT standard allows for up to 0.5% bypass based on actual operations over a 12-month period. During such bypass, emissions are minimized by adjusting production and/or softwood use as to not exceed the emissions limitations set forth in the facility's air permit.

3.5.2 PREVENTATIVE MAINTENANCE

The following regular preventative maintenance procedures are performed on the biofilter:

|  |  |  |
| --- | --- | --- |
| **Item To Be Inspected** | **Frequency of Inspection** | **Recordkeeping Method** |
| General inspection while equipment is operating  | Once per shift | MIS Operator Log |
| Replace water nozzles on overhead sprays | Every 56 days | SAP electronic system |
| Underbed Sump Operation | Every 182 days | SAP electronic system |
| Clean out humidifier sump  | Every 182 days | SAP electronic system |
| Fans – sheaves, belts | Every year | SAP electronic system |
| Media replacement | About every 3 years | SAP electronic system |
| Fan Inspection | Weekly | SAP electronic system |

The critical spares are identified in Appendix A.

3.6 CONTINUOUS MONITORING SYSTEM – Press and Biofilter

3.6.1 DESCRIPTION

The stack servicing the press and biofilter emissions unit is equipped with continuous emission monitors which operate while the Press and biofilter are operating. Additionally, the biofilter bed temperature is continuously monitored for compliance demonstration with the PCWP MACT operating requirements for biofilters.

A summary description of the monitors is as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| **Monitor Type** | **Manufacturer Make/Model** | **Normal Range** | **Notes** |
| Airflow | Teledyne Ultraflow Model 150SN: 1501355 | 0-200,000 CFM | Used to calculate mass emissions of VOC  |
| VOC | CAI600 HFID SN: B05011 | 0 to 100 ppm (as propane) dual range |  |
| Temperature Sensor | Rosemount Type T Thermocouple | -180 – 400 Degrees C | Used to monitor temperature of Biofilter Bed  |

This THC monitoring system has been installed and is calibrated, maintained and operated in accordance with the procedures found in "Performance Specifications for Continuous Emission Monitoring of Hydrocarbons, US EPA Publication EPA/530-SW-91-010, and Performance Specification 8 (PS8) of 40 CFR 60, Appendix B. The system is used to measure and report the mass emission rate of VOC’s from the press.

The monitors are operated at all times while the press is operating.

Calibration and quality control procedures comply with 40 CFR 60 Appendix F. Additional details on the monitors, including calibration and quality control procedures, are contained in the quality assurance plan (QAP).

The temperature monitoring system on the Biofilter Bed have been designed and installed, and are maintained in accordance with 40 CFR 63.2269(b). The temperature sensors are located in a position that provides a representative temperature of the bed temperature.

The temperature monitoring system is operated at all times while the press is operating, except during periods when the bed media is being changed out.

As per 40 CFR 63.2269 (b), the thermocouples used have a minimum accuracy of 4 Degrees F or 0.75% of the temperature value. Quality assurance calibrations include a semi-annual electronic calibration, performed according to the manufacturer’s operations and maintenance manual, followed by a validation check with a second, redundant sensor placed nearby the process sensor. Sensors are replaced whenever the manufacturer’s specified operating temperature range is exceeded. All components of the temperature monitoring system are inspected quarterly, and electrical connections are inspected for continuity, oxidation and galvanic corrosion.

3.6.2 PRESS SYSTEM CEMS MALFUNCTIONS

There potential malfunctions that can affect the ability of the monitors to corrected measure and record the emissions from the press are as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| **Malfunction** | **Monitor** | **Corrective Action** | **Notes** |
| Loss of Power | VOC , airflow, and thermocouples | Check breakers, reenergize when power available, reset and recalibrate upon restart |  |
| Monitor Hardware Fault | VOC, and airflow | Control instrument specialist to troubleshoot |  |
| Monitor Software Fault | VOC and airflow | Control instrument specialist to troubleshoot |  |
| Loss of sample line or probe heat/purge air | VOC and airflow | Check circuit breaker to heater. Check sample lines and probe for dirt, condensation. | Temperatures are alarmed in system.  |
| Plugged or damaged sample lines or filters | VOC and airflow  | Maintenance to troubleshoot and repair | Cal drift will alarm |
| Failed daily calibration | VOC  | Rerun a calibration. If still failing, inspect cal gas system, analyzers, and sample line. Control system specialist to troubleshoot until recalibration passes. | If on-site troubleshooting does not correct the problem, contact vendor for assistance. Monitor downtime to be reported. |
| Sample conditioner failure (moisture intrusion) | VOC monitor | Maintenance to troubleshoot system | Will alarm as general system fault |
| Hardware failure | Temperature sensor | Maintenance to replace failed sensor | System will utilize remaining redundant sensors to calculate average bed temperature |
| System control failure | Temperature sensor | Control instrument specialist to troubleshoot |  |

3.6.3 PREVENTIVE MAINTENANCE

In addition to the daily calibration requirements, quarterly calibration gas audits, and annual relative accuracy test audits, the following preventative maintenance is performed on the monitors:

|  |  |  |
| --- | --- | --- |
| **Item To Be Inspected** | **Frequency of Inspection** | **Recordkeeping Method** |
| General inspection while equipment is operating  | Once per shift | Press CERMS Checklist |
| Calibration gas tank levels | Daily | Press CERMS Checklist |
| Replace filter elements for airflow monitors | 4 times per year | SAP electronic system |
| Rebuild VOC pump | Annual | SAP electronic system |
| Temperature Monitoring System | Semiannual | SAP electronic system |

Critical spares are documented in the site’s Critical Spare Parts Report (See Appendix A).

4.0 MISCELLANEOUS SOURCES

4.1 PAINT BOOTH (EUPAINTBOOTH)

4.1.1 DESCRIPTION

The Paint Booth services the Edge and End painting operation in the finishing area of the mill. The material applied to the unitized panels is a latex-based sealant. The Paint Booth provides a negative draft around the spraying operating to contain any over spray. The air is filtered and vented through a stack located on the roof of the warehouse. The condition of the filter bank controls the collection efficiency of the unit.

4.1.2 REGULATORY REQUIREMENTS

The permit limits the particulate matter emission rate to 0.94 lb./hr. and 4.1 tons per year. Compliance with this limit is demonstrated by an emissions calculation provided in Appendix 7 of the air permit. In support of this calculation records of the amount of paint used in the paint booth are maintained. The permit also limits the visible emissions (opacity) from the paint booth to 5%. Compliance is demonstrated by monitoring and recording the pressure drop across the paint booth once per day.

The MACT standard also requires that only non-HAP coatings are to be used in the paint booth. Documentation showing that the coatings used are non-HAP coatings is kept on file.

4.1.3 CRITICAL MONITORED VARIABLES

The pressure drops across the filters are measured at least once per shift. The pressure drop typically ranges from 0.03” to 3.0” wg. Paint usage is tracked through purchasing records.

4.1.4 STARTUP, SHUTDOWN, AND MALFUNCTIONS

The paint booth will not be operated unless the filters are installed and functioning properly. There is no particular startup or shutdown sequence to this process that affects emissions.

If the paint filters indicate a pressure drop outside of normal, then the following corrective actions are taken:

1) Paint booth fan speeds are checked for normal speed.

2) If fans are operating properly, paint filters are changed/replaced.

4.1.5 PREVENTIVE MAINTENANCE

The following regular preventative maintenance is performed on the paint booth:

|  |  |  |
| --- | --- | --- |
| **Item To Be Inspected** | **Frequency of Inspection** | **Recordkeeping Method** |
| General inspection while equipment is operating; verification of pressure drop across filters  | Once per shift | Warehouse Shift Report |
| General inspection and lubrications | Every 4 months | SAP electronic system |

The facility maintains a stock of replacement filters. There are no other critical spares for this equipment.

4.2 WOOD HANDLING SYSTEMS WITH CYCLONE/BAGHOUSES (FGWOODHANDLING)

4.2.1 DESCRIPTION

There are seven (7) wood or wood dust collection systems on the mill site. Each system has essentially the same components of a cyclone, fan/blower and baghouse. The systems are located on the finishing area (Finishing I), mat trim system, dry bin clean-up, Form line air quality, MDI dust collection, screens building clean-up, and fuel prep and storage area.

4.2.2 REGULATORY REQUIREMENTS

The wood dust collection systems are limited by permit to 0.002 pounds per thousand pounds of exhaust gasses, 1.86 lb./hr., and 8.1 tons per year of particulate emissions for all combined. All baghouses have a visible emissions limit of 5%.

Compliance with these limits is demonstrated by monitoring the differential pressure across the baghouses.

4.2.3 CRITICAL MONITORED VARIABLES

The proper performance of the baghouses is determined by maintaining the pressure drop in the following ranges:

|  |  |  |
| --- | --- | --- |
| **Emission Unit ID** | **Baghouse name** | **Acceptable Pressure drop**  |
| EUSAQ | Stranding Air Quality | 0.10” to 3” wg. |
| EUDRYFUEL | Fuel Prep. and Storage | 0.10” to 3” wg. |
| EUCLEANUP | Screens Bldg. Cleanup | 0.10” to 8” wg. |
| Dry Bin Cleanup | 0.10” to 4” wg. |
| EUBLENDVENT | MDI Dust Collection | 0.10” to 3” wg. |
| EUFLAQ | Form Line  | 0.10” to 3” wg. |
| EUMATTRIM | Mat Trim | 0.10” to 3” wg. |
| EUFINISHING | Finishing I  | 0.10” to 3” wg. |

There is also a spark detection system which is monitored automatically.

The status for all motors in each system is also monitored and displayed continuously in the process control system.

4.2.4 STARTUP, SHUTDOWNS, AND MALFUNCTIONS

The baghouses are all operational prior to the startup of the wood handling systems. There is no particular startup or shutdown exceedance to minimize emissions beyond this requirement.

Malfunctions that can affect the ability of the systems to maintain compliance with the permit limits are as follows:

|  |  |  |
| --- | --- | --- |
| **Malfunction** | **Corrective Action** | **Additional Notes** |
| Fire in system | Abort gate opens to allow venting to atmosphere, system is shutdown automatically | Baghouses is inspected for damage and bags replaced as necessary |
| Ductwork leaks | Shutdown system to repair leak or replace explosion vents prior to restart. Temporary repairs of leaks for up to (3) weeks. | Indicated by missing explosion vent or visual observation |
| Pressure drop across baghouse out of range | Replace any damaged bags immediately. Blinded bags to be replaced at earliest down day not to exceed (3) weeks | Associated pneumatic systems are shut down until bags are replaced |
| Failure of bag cleaning mechanism | Repair bag cleaning mechanism immediately | Associated pneumatic systems are shut down until repairs are complete. |

Note: loss of power is not considered a malfunction because this would result in a shutdown of the system and the bags remain operational.

4.2.5 PREVENTIVE MAINTENANCE

The following regular preventative maintenance activities are carried out on the baghouse collectors:

|  |  |  |
| --- | --- | --- |
| **Item To Be Inspected** | **Frequency of Inspection** | **Recordkeeping Method** |
| General inspection while equipment is operating; verification of pressure drop across filters  | Once per shift | Shift Summary Report and/or Press CERMS and Dust Collection System Daily Checklist |
| General inspection while equipment is not operating | Every 180 days | SAP electronic system |
| Calibration of magnahelic or photohelic | Once per year | SAP electronic systems |

The bag filters and cages that hold the bags in place are considered critical and are completely spared. The bag cleaning mechanism is also spared on site.

5.0 RECORD OF REVISIONS

In accordance to the Michigan Air Pollution Rules 911 and 912 and the PCWP MACT regulations, this plan will be reviewed and revised as necessary on an annual basis.

Revision dates to this plan are listed as follows:

|  |  |  |  |
| --- | --- | --- | --- |
| **Revision Date** | **Description** | **Sections Affected** | **Revised By:** |
| 7/26/11 | Committee review of plan | All | Environmental Committee |
| 8/13/11 | Updated PM and frequency | 3.5 and 3.6 | K. Moss |
| 3/9/12 | Updated minimum RTO temp | 2.3 | K. Moss |
| 8/26/12 | Updated Woodhandling | 4.2 | K. Moss |
| 3/23/13 | Updated minimum RTO temp | 2.3 | K. Moss |
| 11/13/13 | Replaced “Maximo” with “SAP” | All | F. Dandois |
| 1/24/2014 | Updated opacity monitor info | Pg 16 | Faith Dandois |
| 8/21/14 | Removed reference to deleted ESOP-DSE-040 RTO Power Outage. Updated airflow monitor information. | Pgs. 11, 16, 23 | Faith Dandois |
| 2/1/15 | Updated minimum RTO temp and CEM Info for Press and Dryers | 2.3, 2.10.1 and 3.6.1 | Kathi Moss |
| 2/23/15 | Review | All | Leadership Team |
| 6/3/15 | Corrected Paint Booth dp typo for high range | 4.1.3 | Kathi Moss |
| 2/1/2016 | Review | All | Leadership Team |
| 6/8/16 – 7/19/16 | Chg’d RTO Min Temp. Updated per discussion with MDEQ. Archived revisions records prior to 2011 | All | Kathi Moss |
|  12/20/16 | Changed RTO Min Temp  | 2.3  | Kathi Moss  |
| 8/28/17 | Review after press PTI and removed CO from press monitoring table | 3.6.3 | Kathi Moss |
| 3/6/19 | Review and Dryer PTI & ROP update and SAP work order frequencies | 1.6(3), 2.6.1, 2.6.2, 4.2.3 | Kathi Moss |