LEHIGH SOUTHWEST CEMENT COMPANY

Startup, Shutdown, and Malfunction Plan

Redding Facility

Portland Cement NESHAP

June 2002
Version 1.0

Black & Veatch Project 065188 File 32.0100 Document 065188-DRH-002

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Prepared by:
BLACK & VEATCH CORPORATION
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SECTION	TITLE	REVISION NUMBER	REVISION DATE
1	Introduction	0	04/08/2011
2	Regulatory Overview	0	04/08/2011
3	Responsibilities	0	04/08/2011
4	Recordkeeping Requirements	0	04/08/2011
A	Raw Mill and Kiln Department	0	04/08/2011
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1. INTRODUCTION

This Startup, Shutdown, and Malfunction Plan ("SSMP" or "Plan") has been developed to satisfy the requirements of 40 CFR 63.6(e)(3). The intent of the SSMP is to minimize emissions during periods of startup, shutdown, and malfunction. More specifically, as outlined in 40 CFR 63.6(e)(3) the purpose of the SSMP is to -

A. Ensure that, at all times, affected sources (including associated air pollution control equipment) are operated and maintained in a manner consistent with good air pollution control practices for minimizing emissions at least to the levels required by all relevant standards;

B. Ensure that preparations are made to correct malfunctions as soon as practicable after their occurrence in order to minimize excess emissions of hazardous air pollutants; and

C. Reduce the reporting burden associated with periods of startup, shutdown, and malfunction (including corrective action taken to restore malfunctioning process and air pollution control equipment to its normal or usual manner of operation).

With this purpose in mind, the focus of the SSMP is on the startup, shutdown, and corrective action procedures of those source components, pollution control equipment, or monitoring devices that have a direct impact on the ability of affected sources to meet emission standards and requirements.

The structure of the SSMP is based on the major systems at the plant that involve affected sources. This includes the Raw Mill and Kiln Department, Finish Grinding Department, and the Storage and Shipping Department. Each major system includes a variety of affected sources including conveying system transfer points and storage bins as well as others. The purpose of structuring the SSMP according to the major systems at the plant is to streamline efforts for recording startup and shutdown of systems. A separate section is included to address malfunctions and corrective action procedures for dust collectors. Since each Department contains similar dust control equipment, this section provides a consolidated list of typical malfunctions and associated corrective action procedures.

2. REGULATORY OVERVIEW

As the result of a June 14, 1999 U.S. Environmental Protection Agency ("USEPA") rulemaking, Lehigh Southwest Cement Company Redding Plant (hereinafter referred to as "Lehigh") will be subject to additional emissions standards for hazardous air pollutants. The National Emissions Standards for Hazardous Air Pollutants for Source Categories; Portland Cement Manufacturing Industry (hereinafter referred to as the "PC NESHAP") or 40 CFR subpart LLL establishes limits for emissions of particulate matter (as a surrogate for HAP metals), opacity, and dioxins/furans (D/F) for existing portland cement plants. The compliance date for existing facilities is June 14, 2002.

The Redding plant is a major source as defined in 40 CFR 63.2. As a major source, Lehigh is subject to emissions standards for the in-line kiln/raw mill, finish mills, raw material storage bins, clinker storage bins, finished product storage bins, conveying system transfer points, bagging and bulk loading and unloading systems.

A. Basic Requirements for the SSMP

As provided in §63.6(e)(3), the written startup, shutdown, and malfunction plan shall include -

1. Detailed procedures for operating and maintaining affected sources during periods of startup, shutdown, and malfunction;

2. A program of corrective actions for malfunctioning process and air pollution control equipment used to comply with the relevant standard; and

3. Identification of all routine or otherwise predictable continuous monitoring system (CMS) malfunctions

B. Summary of Emissions Standards

A summary of the affected sources and applicable standards are summarized in Table 1 below. The compliance date for affected source is June 14, 2002.

Table 1. Summary of Affected Sources and Standards.

Affected Source	Pollutant	Emission Limit
In-Line Kiln / Raw Mill	PM	0.15 kg/Mg feed (dry basis)
	Opacity	20%
	D/F	• 0.20 ng/dscm TEQ **OR** • 0.40 ng/dscm TEQ (PM control device operating at ≤ 400°F)
	Temp - Mill On	230.9 °F (3-hr rolling avg) [1]
	Temp - Mill Off	436.7 °F (3-hr rolling avg) [1]
Finish Mills (including Air Separators)	Opacity	10%
Raw Material, Clinker, Finished Product Storage	Opacity	10%
Conveying System Transfer Points	Opacity	10%
Bagging and Bulk Loading and Unloading Systems	Opacity	10%

[1] Operating parameter limits determined during the April 2001 D/F performance test. Performance testing for D/F must be repeated every 30 months. Therefore, the most recent D/F performance test results should be consulted to determine current operating parameter limits.

1. In-Line Kiln / Raw Mill

Standards affecting the in-line kiln/raw mill system include limits on particulate matter (PM), opacity, and dioxins and furans (D/F).

a. Particulate Matter (PM)

PM emissions from the in-line kiln/raw mill system are limited as a surrogate for HAP metals including arsenic, cadmium, chromium and lead. PM emissions from the in-line kiln/raw mill are limited to 0.15 kg PM per Mg (0.30 lb per ton) of kiln feed (dry basis).

b. Dioxins and Furans (D/F)

D/F emissions from the in-line kiln/raw mill system are limited to:

1. 0.20 ng per dscm ($8.7x10^{-11}$ gr per dscf) (TEQ) corrected to seven percent oxygen; or

2. 0.40 ng per dscm ($1.7x10^{-10}$ gr per dscf) (TEQ) corrected to seven percent oxygen, when the average of the performance test run average temperatures at the inlet to the particulate matter control device is 204 °C (400 °F) or less.

c. Opacity

Opacity from the in-line kiln/raw mill system is limited to 20 percent based on a six-minute average.

d. Temperature

The temperature of the kiln exhaust gases at the inlet to the particulate matter control device is limited according to the average of the run average temperatures measured during the most recent performance test conducted in accordance with 40 CFR 63.1349(b)(3). This performance testing must be repeated every 30 months.

During performance testing, temperature limits are established for two modes of operation, (1) raw mill on and (2) raw mill off (See Definitions-Raw Mill and Kiln Department). Compliance with the temperature limits are based on a three-hour rolling average period that begins anew each time the operating mode is changed from on to off, or from off to on.

2. Other Affected Sources

Other affected sources include the finish mills (mill sweep and air separators); raw material, clinker, and finished product storage bins; conveying system transfer points; and bagging and bulk loading and unloading systems. Standards affecting these sources include limits on the opacity of discharges from affected sources and associated air pollution control devices.

a. Opacity

Opacity from affected sources or associated dust collectors is limited to 10 percent based on a six-minute average.

C. Compliance Demonstration Methods

A summary of the compliance demonstration requirements for each affected source group is summarized in Table 2 below. The compliance date for affected sources is June 14, 2002.

Table 2. Summary of Compliance Demonstration Requirements for Affected Sources.

Affected Source	Pollutant	Monitoring Requirement
In-Line Kiln / Raw Mill	PM	None [1]
	Opacity	Continuous Opacity Monitor
	D/F	Annual Combustion System Inspection
	Temperature	Continuous Temperature Monitor[2]
Finish Mills	Opacity	Bag Leak Detection Systems **or** Daily 6-minute Method 22
Raw Material, Clinker, Finished Product Storage	Opacity	Monthly **or** Semi-Annual (as applicable) 1-minute Method 22
Conveying System Transfer Points	Opacity	Monthly **or** Semi-Annual (as applicable) 1-minute Method 22
Bagging and Bulk Loading and Unloading Systems	Opacity	Monthly **or** Semi-Annual (as applicable) 1-minute Method 22

[1] EPA has deferred the requirement to install a PM CEM until a future rulemaking, at which time EPA will consider what performance specification requirements should be established. Performance testing on PM emissions from the in-line kiln/raw mill must be conducted every 5 years [40 CFR 63.1349(c)].
[2] The continuous temperature monitor must be calibrated quarterly.

3. RESPONSIBILITIES

Key responsibilities are assigned to assist with the implementation of this plan. Although specific procedures may be performed by various plant personnel, overall responsibilities are outlined below to assist plant personnel with implementation of the SSMP and to establish a framework through which NESHAP compliance will be maintained during periods of startup, shutdown, and malfunction.

A. Plant Manager

The Plant Manager has overall responsibility for NESHAP regulatory compliance. The Plant Manager is responsible for oversight of the air quality control program at the plant and for ensuring that the procedures in this plan are implemented and adhered to by plant personnel.

B. Production Manager

The Production Manager is responsible for day-to-day implementation of the SSMP at the facility. The Production Manager will report to the Plant Manager or Environmental Manager, as appropriate, on all matters of NESHAP compliance. Specific duties of the Production Manager to implement the SSMP might include:

1. Notify Maintenance Manager and Plant Manager of potential and/or actual non-compliance with emissions or monitoring standards;

2. Support recordkeeping efforts related to the startup, shutdown, and malfunction of affected sources as outlined in Section 4;

3. Oversight of training for production employees on the procedures outlined in the SSMP; and

4. Periodically review the SSMP and suggest updates to any procedures or appendices.

C. Maintenance Manager

The Maintenance Manager will consult with plant personnel on corrective action needs of affected sources and associated pollution control equipment when malfunctions occur. The Maintenance Manager also provides guidance on the content and implementation of this plan. Specific duties of the Maintenance Manager might include:

1. Schedule and review the corrective action procedures included in this plan;

2. Receive and review specific inspection procedures conducted by plant personnel for affected sources or associated pollution control equipment that malfunction;

3. Evaluate diagnostic results from malfunctioning equipment, identify appropriate corrective action procedures, and ensure all appropriate corrective action procedures are implemented;

4. Maintain files of actions implemented to correct malfunctions with affected sources or associated pollution control equipment, including inspection forms, diagnostic results, and/or maintenance work orders, in electronic filing system;

5. Ensure spare parts are maintained at the plant to allow for timely implementation of corrective action procedures; and

6. Assist with recordkeeping efforts associated with the malfunction of affected sources and pollution control equipment.

D. Electrical Superintendent

The Electrical Superintendent is responsible for the proper operation, calibration, and maintenance of operating parameter monitoring equipment and continuous opacity monitoring equipment. Specific duties of the Electrical Superintendent might include:

1. Conduct or oversee the performance of quality control program as required by 40 CFR 63.8(d) and PS-1 of appendix B to part 60 for the COMS and continuous temperature monitor at the inlet to the main baghouse;

2. Perform necessary corrective action for the COMS and continuous temperature monitor at the inlet to the main baghouse;

3. Maintain files of quality control program data, including periodic checks, audits, and corrective action data; and

4. Ensure spare parts for the COMS and continuous temperature monitor at the inlet to the main baghouse are maintained at the plant.

E. Control Room Operator

The Control Room Operator has the overall responsibility of ensuring that the appropriate startup and shutdown procedures for the Raw Mill and Kiln Department are followed. Specific duties of the Control Room Operator might include:

1. Monitor COMS fault warning systems and alarms;

2. Periodically perform a visual check of the data acquisition and management system computer to verify that the computer is operational;

3. Provides any appropriate operating data necessary to support the annual inspection of the components of the combustion system;

4. Reports any deviations from the startup/shutdown procedures for the Raw Mill and Kiln Department to the Environmental Manager and Production Managers, as appropriate; and

5. Reports any alarms, computer fault messages, malfunctions, process upsets, missing or erroneous data, or process problems that impair the ability of the in-line kiln / raw mill system to meet or demonstrate compliance with applicable opacity or operating parameter limits to the Environmental Manager.

F. Environmental Manager

The environmental manager has the overall responsibility of ensuring compliance with all federal, state, and local environmental regulations including the notification, reporting, record keeping requirements of 40 CFR part 63 subparts A and LLL. Specific tasks of the environmental manager might include:

1. Ensure that appropriate plant personnel are familiar with applicable emissions standards and compliance demonstration requirements;

2. Inform plant personnel of the content of the startup, shutdown, and malfunction plan and ensure that the plan is effectively implemented; and

3. Fulfill all appropriate regulatory recordkeeping and reporting requirements associated with the startup, shutdown, and malfunction plan. These requirements are outlined in Section 4.0.

4. RECORDKEEPING AND REPORTING REQUIREMENTS

The following rules are applicable to the implementation of the SSMP and are included here as reference only to aid plant personnel in complying with 40 CFR part 63 subpart A. Per 40 CFR 63.10(b)(1), all records shall be retained for at least 5 years following the date of each occurrence, measurement, maintenance, corrective action, report, or record. Additionally, the most recent 2 years of records must be maintained on-site. Several forms included in the appendices have been developed to assist plant personnel with the recordkeeping and reporting requirements associated with the SSMP. These forms or documents containing similar information may be used to satisfy the recordkeeping and reporting requirements outlined in this section.

A. SSMP Checklists

When the actions taken in response to a startup, shutdown, or malfunction event are consistent with the procedures contained within this Plan, records must be maintained to demonstrate this fact. To aid plant personnel in complying with this requirement, a series of checklists have been developed that correspond to the procedures in this Plan. These checklists are included in the Appendices.

[40 CFR 63.6(e)(3)(iii) and 40 CFR 63.10(b)(2)(v)]

B. Deviations from the SSMP

When actions taken during periods of startup, shutdown, and malfunction (including corrective actions to restore malfunctioning process and air pollution control equipment to its normal or usual manner of operation) are different from the procedures specified in this Plan, the following procedures should be followed-

1. Record the actions taken for the event;

2. Report the actions taken to the Administrator (currently Shasta County Air Pollution Control Office or SCAPCO) within 2 working days after commencing actions inconsistent with the Plan;

3. Submit a letter to the Administrator (SCAPCO) within 7 working days that describes the actions taken; and

4. If the Plan fails to address or inadequately addresses an event that meets the characteristics of a malfunction but was not included in the current version of the Plan, revise the Plan within 45 days after the event to include detailed procedures for operating and maintaining the source during similar malfunction events and a program of corrective action for similar malfunctions of process or air pollution control equipment.

   [40 CFR 63.6(e)(3)(iv) and 40 CFR 63.10(b)(2)(iv)]

5. For malfunctions affecting the CMS (i.e. COMS or thermocouple) that are not addressed in this plan or if actions taken to correct a malfunctioning CMS are inconsistent with the procedures included in this plan, the following procedures should be followed -

   a. Report all actions taken that are not consistent with the procedures in this plan within 24 hours after commencing actions inconsistent with this plan;

b. Send a follow-up report within 2 weeks after commencing actions inconsistent with this plan that either certifies that corrections have been made or includes a corrective action plan and schedule; and
c. If applicable, maintain records that demonstrate that repair parts have been ordered or any other records that would indicate that the delay in making repairs is beyond the facility's control.

[40 CFR 63.8(c)(ii) and 40 CFR 63.10(d)(5)(ii)]

C. Additional Records

In addition to maintaining the records outlined above, the following records related to the SSMP must also be maintained -

1. The occurrence and duration of each startup, shutdown, or malfunction of operation (i.e. process equipment);

2. The occurrence and duration of each malfunction of the air pollution control equipment;

3. All maintenance performed on the air pollution control equipment; and

4. Each period during which a CMS (i.e. COMS or thermocouple) is malfunctioning or inoperative (including out-of-control periods);

5. The date and time identifying each period during which the CMS was out of control or inoperative (except for low-level and high-level checks);

6. The nature and cause of any malfunctions of the CMS (if known);

7. The corrective action taken or preventive measures adopted for the malfunctioning CMS; and

8. The nature of repairs or adjustments to the CMS that was inoperative or out of control.

[40 CFR 63.6(e)(3)(iii), 40 CFR 63.10(b)(2), and 40 CFR 63.10(c)]

D. Additional Reporting Requirements

A startup, shutdown, and malfunction report must be submitted at least semiannually. This report must be filed by the 30th day following the end of each calendar half if a startup, shutdown, or malfunction occurred during the reporting period. This report must include:

1. A statement that actions taken were consistent with this plan (if applicable);

2. A description of whether any excess emissions and/or parameter monitoring exceedances were believed to have occurred (if actions taken were not consistent with this plan);

3. An explanation of the circumstances of the event (if actions taken were not consistent with this plan);

4. A description of all continuous monitoring system (CMS) repairs; and

5. A certification of the report's accuracy by a responsible official.

[40 CFR 63.10(d)(5)(i)]

Issue Date: 04/08/2011

Approved: ____________________

Revision: 0

SYSTEM: Raw Mill and Kiln Department

EQUIPMENT: Rotary Kiln and Roller Mill
Affected Conveying System Transfer Points
Affected Storage Bins

PURPOSE: The purpose of this procedure is to provide air quality protection measures, achieve emissions limits, and satisfy NESHAP Subpart LLL requirements for development of operations and maintenance procedures. This procedure also explains the regulatory standards, monitoring requirements, and operation, inspection and maintenance procedures necessary to ensure on-going compliance with applicable standards.

1. INTRODUCTION

A. Affected sources in the Raw Mill and Kiln Department include an in-line kiln/raw mill, storage bins, a clinker cooler (closed system), and conveying system transfer points. Refer to Appendix 3 for a complete list of affected sources in the Raw Mill and Kiln Department.

B. The cement kiln system is a single dry process rotary kiln equipped with a 4 stage preheater. The kiln system uses a variety of fuels to provide the thermal input necessary to convert raw materials into clinker. These fuels include fossil fuels (i.e. coal, petroleum coke, etc.) as well as non-hazardous fuels such as tire-derived fuels. The raw materials fed to the kiln process include materials obtained from both on-site and off-site sources. Raw materials may include limestone, shale/clay, alumina, silica, iron ore, and/or other raw material additives.

C. Hot exhaust gases from the rotary kiln pass counter-currently through the downward-moving raw materials in the preheat tower. The hot exhaust gases exiting the preheat tower are cooled in a spray tower before being routed to the main baghouse or to the roller mill. Exhaust gases entering the roller mill are used as a source of heat for drying raw materials and carrying the ground materials into raw mill cyclones. During "Mill Off" operation, the kiln exhaust gases bypass the mill and are routed directly to the main baghouse.

D. The kiln exhaust gases exiting the roller mill cyclones are then routed to the particulate matter control device (PMCD), referred to as the main baghouse. Fines from the cyclone discharge are routed to the Raw Feed Blending and Storage System.

E. The clinker exiting the kiln is passed through a planetary cooler system consisting of a series of tubes attached to the outside of the kiln shell. The tubes are grouped uniformly around the circumference of the shell. Clinker cooling is achieved by passing combustion air over the hot clinker. Exhaust gases from the clinker cooler are routed to the kiln resulting in a totally enclosed system for the clinker cooler.

F. Ancillary equipment used in support of kiln operations include raw material and clinker storage bins and conveying system transfer points for transporting materials to and from the kiln.

2. DEFINITIONS

The following definitions apply to affected sources that comprise the Raw Mill and Kiln Department only. These definitions are intended to be consistent with the definitions provided in 40 CFR 63.2. The importance of these definitions relates to the applicability of the Part 63 standards. 40 CFR 63.6(h)(1) states, "the opacity and visible emission standards set forth in this part shall apply at all times except during periods of startup, shutdown, and malfunction, and as otherwise specified in an applicable subpart."

A. Startup Period

Startup procedures for the Raw Mill and Kiln Department are not expected to impact the ability of the in-line kiln/raw mill to meet the PM and D/F emission limits or the temperature limit at the inlet to the PMCD. Therefore, the startup period is defined in terms of factors that affect the ability of affected sources to meet opacity standards including fuel and feed addition.

As per 40 CFR 63.2, the startup period for the kiln begins with the setting in operation for any purpose. This begins with the Preheat Stage where the kiln temperature is increased through the addition of fuel and followed by the gradual increase in raw material feed rate. The startup period for the kiln ends when a uniform rate of feed is achieved and opacity readings by the COM system on the Main Baghouse stabilize at levels below applicable standards.

The raw mill operates intermittently. As such, the startup period for the in-line raw mill system begins each time that the operating mode of the raw mill is changed from off to on. Operation mode "on" for the raw mill is defined as the opening of the roller mill fan damper (S-250-1), which allows kiln exhaust gasses to enter the mill. When the damper is opened and raw materials enter the mill, the temperature at the inlet to the PMCD will gradually drop. The startup period is considered complete when the temperature at the inlet to the PMCD stabilizes to the set operating temperature.

The ancillary equipment in the Raw Mill and Kiln Department also operate intermittently. Therefore, the startup period for affected sources used to support operation of the kiln (i.e. storage bins and conveyor transfer points) corresponds to the startup period for the kiln.

B. Shutdown Period

Shutdown procedures for the Raw Mill and Kiln Department are not expected to impact the ability of the in-line kiln/raw mill to meet the PM and D/F emission limits or the temperature limit at the inlet to the PMCD. As such, the shutdown period is also defined in terms of factors that affect the ability of affected sources to meet opacity standards including fuel and feed cessation.

In 40 CFR 63.2, shutdown is defined as "the cessation of operation of an affected source for any purpose." In accordance with this definition, the shutdown period for the kiln begins with the decrease in fuel and kiln feed rates with the intent of ceasing kiln operation. The shutdown period for the kiln ends with the cessation of all fuel and kiln feed. Further, kiln shutdown (including shutdown of ancillary equipment) is assumed complete when the Main Baghouse equipment is shutdown (i.e. fan, screws).

The raw mill operates intermittently. As such, the shutdown period for the in-line raw mill system begins each time that the operating mode of the raw mill is changed from on to off. Operation mode "off" for the raw mill is defined as the closing of the roller mill fan damper (S-250-1), which allows kiln exhaust gasses to bypass the mill. When the raw material ceases to enter the mill and the damper is closed, the temperature at the inlet to the PMCD will gradually rise. The shutdown period for the roller mill is considered complete with cessation of movement of raw materials and exhaust gases through the mill.

C. Ancillary Equipment with Intermittent Operation

For ancillary equipment such as affected conveyor transfer points and storage bins that operate intermittently, the startup and shutdown periods are defined with reference to the major systems supported by those ancillary systems. For ancillary equipment in the Raw Mill and Kiln Department, the major system associated with defining startup and shutdown is the kiln.

D. Malfunction

In 40 CFR 63.2, malfunction is defined as "any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. Failures that are caused in part by poor maintenance or careless operation are not malfunctions." For the purposes of this plan, malfunction is further defined to include only those failures of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner that results in an exceedance of the emission limits established under 40 CFR part 63 subpart LLL.

3. STARTUP PROCEDURES

The startup procedures detailed in this section are intended to minimize emissions from affected sources in the Raw Mill and Kiln Department during the startup period to levels below relevant standards. As previously noted, opacity is the only standard likely to be affected during the startup period. Therefore, the following procedures are related to controlling opacity emissions.

A. Kiln Startup

Startup of the kiln system is performed in stages. These stages include 1) preheat; 2) APCD startup; and 3) kiln feed and fuel feed ramp up. Note that stages 1 and 2 can occur concurrently (e.g., APCD startup may occur prior to preheat).

1. Preheat

   During the preheat stage of kiln startup, natural gas (or other fuels) is fired to gradually raise burning zone temperature of the kiln. During the preheat stage of kiln startup, draft is maintained at a level that will ensure complete combustion of preheat fuel(s).

   Record date and time of kiln startup at the onset of the preheat stage (see Appendices for sample recordkeeping form).

2. APCD Startup

   Draft is induced through the main baghouse (S-260) prior to or during the preheat stage. The procedures for dust collector startup are detailed in Section 3.B. below.

3. Kiln Feed and Fuel Ramp Up

   Raw material and alternate fuel feed to the kiln may begin after sufficient temperature and airflow have been reached in the calciner. Kiln feed is ramped up slowly and the fuel feed rate is adjusted as appropriate to maintain proper combustion and temperature profiles. Once the kiln reaches a sufficient temperature, solid fuels such as coal and pet coke may be introduced to the kiln system.

B. Dust Collector Startup

The following procedures should be used during startup of the dust collectors used to control emissions from affected sources in the Raw Mill and Kiln Department (including the Main Baghouse).

1. Establish Normal Draft

   Dust collector startup begins with initiating operation of the induced draft fan and/or baghouse fan. Once the fan has established a normal draft, affected source operation may begin, and, if applicable, the occurrence and duration of startup may be recorded (see Appendices for sample recordkeeping forms).

2. Dust Cake Buildup

   Dust cake buildup is necessary only when a new dust collector is initially put into service, when filter bags are replaced, or when an insufficient dust cake results from cleaning during shutdown. Dust cake buildup may be accomplished by (1) operating the dust collector at a reduced gas volume; (2) precoating the bags; or (3) reducing the cleaning cycle.

3. Check for Proper Operation

   After initiating draft through the dust collector, check for proper operation of the dust removal system, monitoring devices (pressure drop), and cleaning sequence. Alternately, proper operation may be verified by checking for excess visual emissions using the Method 22 procedures.

For the Main Baghouse, proper operation may be monitored in the control room.

C. Roller Mill Startup

Roller mill startup may occur independently of kiln startup. Additionally, the temperature limit at the inlet to the APCD changes with roller mill startup. Therefore, the procedures for roller mill startup are addressed separately in this plan.

1. Startup roller mill main drive (if necessary).

2. Open dampers to begin airflow through mill.

3. Add raw materials.

4. APCD Inlet Temperature Control/Spray Tower

   Prior to roller mill startup, the temperature of kiln exhaust gases measured at the inlet to the APCD may be reduced, if necessary, to below the appropriate limit using the spray tower.

   The following procedures for spray tower startup should be followed:

   a. Set operating temperature to appropriate "Roller Mill On" parameter; and

   b. Check that temperature control alarms are set appropriately and enabled (this indicates sufficient water flow).

5. Verify APCD Inlet temperature is being updated.

   When startup of the roller mill is initiated, calculation of the three-hour rolling average temperature at the inlet to the APCD begins anew. At this time, the date and time of roller mill startup are recorded (see Appendices for sample recordkeeping form).

   NOTE - The three-hour rolling average temperature at the inlet to the APCD must be calculated during the startup period of the roller mill even though the temperature limit does not apply during periods of startup, shutdown, and malfunction.

4. PLANNED SHUTDOWN PROCEDURES

The shutdown procedures detailed in this section are intended to minimize emissions from affected sources in the Raw Mill and Kiln Department during planned shutdown periods to levels below relevant standards. The procedures to be followed in the event of an unplanned shutdown are provided in Section 5, Malfunctions.

As previously noted, opacity is the only standard likely to be affected during the shutdown period. Therefore, the following procedures are related to controlling opacity emissions.

A. Kiln Shutdown

Shutdown of the kiln system occurs in three stages: 1) downgrade kiln feed and fuel input; 2) shutdown spray tower (if applicable); and 3) shutdown APCD.

1. Downgrade Kiln Feed and Fuel Input

Kiln shutdown begins with a decrease of fuel and kiln feed input rates. Stage 1 is complete when the kiln feed and fuel inputs are stopped.

After stage 1 is complete, the kiln may continue to rotate on the creeper drive.

2. Spray Tower Shutdown

Once draft has ceased through the kiln system, the spray tower system may be shutdown.

3. APCD Shutdown

After kiln feed and fuel inputs are stopped, the rotary kiln continues to rotate until the temperature of any materials in the kiln has decreased to the point that the kiln shell will not sustain heat damage if the kiln is stopped and materials are allowed to remain in the kiln. After this point, the Main Baghouse fans are shutdown and the occurrence and duration of kiln shutdown are recorded (see Appendices for sample recordkeeping form).

In the event that the kiln is to be emptied of all feed material, the kiln may continue to rotate until most or all material is discharged. In this case, shutdown is not considered complete until all movement of materials through affected sources in the Raw Mill and Kiln Department are discontinued. This includes ancillary equipment such as conveyor transfer points and storage bins. After shutdown is complete, all dust collectors used to control emissions from affected sources to below relevant emission limits are shutdown.

B. Dust Collector Shutdown

The following procedures should be used during shutdown of the Main Baghouse. Except during emergency situations, dust collector shutdown should not be initiated until after shutdown of the kiln.

1. Shutdown reverse air fan.

2. Shutdown discharge system.

The final step in dust collector shutdown is shutdown of the discharge system. At this point, the occurrence and duration of shutdown are recorded (see Appendices for sample recordkeeping form).

C. Roller Mill Shutdown

Roller mill shutdown may occur independently of kiln shutdown. Additionally, the temperature limit at the inlet to the APCD changes with roller mill shutdown. Therefore, the procedures for roller mill shutdown are addressed separately in this plan.

1. Take feed off of roller mill;

2. Redirect kiln exhaust gases to bypass the roller mill to the APCD;

3. Spray Tower Monitoring (Optional)

   After the roller mill is shutdown, the temperature limit for kiln exhaust gases measured at the inlet to the APCD increases to the level measured during the most recent D/F performance test. At this time, the spray tower may be set to the appropriate mill down operating conditions.

   The following procedures for spray tower shutdown should be followed:

   a. Set operating temperature to appropriate "Roller Mill Off" parameter;

   b. Check temperature control alarms and verify that they are enabled (this indicates sufficient water flow).

4. Turn off all appropriate equipment;

5. Verify APCD Inlet temperature is being updated.

   When shutdown of the roller mill is complete, calculation of the three-hour rolling average temperature at the inlet to the APCD begins anew. At this point, the occurrence and duration of roller mill shutdown are recorded (see Appendices for sample recordkeeping form).

   NOTE - The three-hour rolling average temperature at the inlet to the APCD must be calculated during the startup period of the roller mill even though the temperature limit does not apply during periods of startup, shutdown, and malfunction.

5. MALFUNCTIONS

Malfunctions in the Raw Mill and Kiln Department may occur resulting in excess emissions, gaps in monitoring data, or data quality errors. Each plausible and foreseeable malfunction for affected sources in the Raw Mill and Kiln Department has been provided below along with corresponding response procedures to correct the malfunction in a timely manner.

A. Spray Tower Malfunction

A malfunction with the spray tower kiln gas cooling system is indicated by a temperature spike measured at the inlet to the APCD (Main Baghouse). A temperature spike that results in an exceedance of the operating limit is considered a malfunction. The following procedures are followed in the event of spray tower malfunction.

1. Plugging

   a. Identify location of plugging (if possible);

   b. Dislodge blockage (if possible);

2. Water Supply System Failure

   a. Check for leaks, valve failure, and water availability to ensure that water supply system is functioning properly. Correct as necessary.

   b. Check for power supply to pumps. Correct as necessary.

   c. Check for proper operation of water supply pumps. Repair or replace, as necessary.

3. Nozzle Failure

   a. Identify location of faulty nozzle;

   b. Shut off the water and/or air supply to the faulty nozzle;

   c. Remove faulty nozzle from spray tower;

   d. Repair or replace faulty nozzle;

   e. Re-open water and/or air supply valve to nozzle.

B. Feed Starvations

A lack of feed (raw material) to affected sources may result in excess emissions. This may be caused by chemistry, mechanical, electrical, or natural (acts of God) and are discussed further in Section D. The two most common examples of lack of feed would be a raw material conveying system shutdown to the Roller Mill due to a detection of metal and lower feed rates to mill due to unforeseen changes in raw feed chemistry. This could cause a temperature spike at the inlet to the ACPD. A temperature spike that results in an exceedance of the operating limit is considered a malfunction.

The following procedures are followed in the event of a feed starvation that results in excess emissions or an operating parameter limit exceedance.

1. Metal Detection

   a. Initiate inspection of conveyance system;

   b. Remove metal material; and

   c. Resume standard material conveyance.

2. Chemistry

   a. Maximize tonnage of corrective material;

   b. Monitor Spray Tower efficiency; and

   c. Resume standard feed conveyance.

C. Loss of Containment

A failure in the containment equipment or other equipment responsible for maintaining negative pressure associated with affected sources (including sources, ductwork and dust collectors) may result in excess emissions due to loss of containment.

1. Loss of Negative Pressure

   Excess emissions may occur if a loss of negative pressure associated with affected source equipment, ductwork, air pollution control equipment, etc. is not maintained. The following procedures are implemented if a loss of negative pressure associated with affected sources in the Raw Mill and Kiln Department is discovered.

   a. To the extent possible, perform a diagnostic to determine the extent of the malfunction and appropriate corrective actions;

   b. Repair as appropriate or replace equipment (as appropriate); and

   c. Resume normal operation. If necessary, check for remaining malfunctions causing excess emissions.

2. Structural Integrity

   The other likely cause of excess emissions resulting from a malfunction in containment and mechanical equipment is due to structural faults. Structural faults can occur as a result of wear, external stressors, or manufacturing defects. The following procedures are implemented if a structural fault in containment equipment associated with affected sources in the Raw Mill and Kiln Department are discovered.

   a. Discontinue flow to fault area (if necessary).

   b. Repair as appropriate (as appropriate) or replace equipment.

   c. Resume normal operation and check for remaining structural faults causing excess emissions.

D. Continuous Opacity Monitor System (COMS)

Downtime of the COM system is defined by 40 CFR 63.10(c)(5) and (6) as inoperative, except for zero (low-level) and high-level checks, or out-of-control. A CMS is out-of-control per 40 CFR 63.8(c)(7)(i) if -

- The zero (low-level), mid-level (if applicable), or high-level calibration drift (CD) exceeds two times the applicable CD specification in the applicable performance specification or in the relevant standard;
- The CMS fails a performance test audit (e.g., cylinder gas audit), RATA, or linearity test audit; or
- The COMS CD exceeds two times the limit in the applicable performance specification in the relevant standard.

The following procedures may be necessary if a malfunction (as defined above) of the COM system occurs.

1. Based on the results of the quality control inspection required by 63.8(c)(6), correct malfunctioning components.
2. Recalibrate COM system.
3. Record date and time of COM failure period (beginning and ending), explanation of downtime, and corrective actions taken or preventative maintenance performed. This information should be included in the Continuous Monitoring System Downtime Report submitted for each reporting period. A sample reporting form is included in Appendix 4.

Refer to the checklist included in the appendices for specific quality control inspection procedures and calibration procedures.

E. Temperature Monitor

As required by 40 CFR 63.1350(f), a continuous monitor is used to record the temperature of kiln exhaust gases at the inlet to the particulate matter control device. The following guidelines are followed when determining compliance with the temperature limit (3-hour rolling average) on the kiln exhaust gases at the inlet to the particulate matter control device -

1. The three-hour rolling average is calculated as the average of 180 successive one-minute average temperatures.
2. Periods of time when one-minute averages are not available are excluded when calculating three-hour rolling averages. When one-minute averages become available, the first one-minute average is added to the previous 179 values to calculate the three-hour rolling average.
3. When the operating status of the raw mill is changed from off to on, or from on to off, the calculation of the three-hour rolling average temperature begins anew, without considering previous recordings.

Calibration of the thermocouple used to monitor compliance with the NESHAP operating limits must be verified at least once every three months.

F. Malfunctions due to unscheduled shutdowns, mechanical failure, electrical failure, control equipment failure, main power interruption, and acts of God.

The following procedures are implemented if unscheduled shutdowns, mechanical failure, electrical failure, control equipment failure, main power interruption, or acts of God result in a malfunction of equipment associated with affected sources in the Raw Mill and Kiln Department are discovered.

a. To the extent possible, perform a diagnostic to determine the extent of the malfunction and appropriate corrective actions;

b. Repair as appropriate or replace equipment (as appropriate); and

c. Resume normal operation and check for remaining malfunctions causing excess emissions.

G. Dust Collectors

Refer to Section D for a detailed list of common dust collector malfunctions and associated corrective action procedures.

Issue Date: 04/08/2011

Approved: ____________________

Revision: 0

SYSTEM: Finish Grinding Department

EQUIPMENT: Finish Mills A, B, and C
Affected Conveying System Transfer Points
Affected Storage Bins

PURPOSE: The purpose of this procedure is to identify affected sources in the Finish Grinding Department, define startup and shutdown periods, and to outline startup and shutdown procedures for this system. These procedures are intended to minimize emissions during periods of system startup and shutdown.

1. INTRODUCTION

A. Affected sources in the Finish Grinding Department include finish mills A, B, and C along with various storage bins and conveying system transfer points.

B. The Finish Grinding Department processes clinker, limestone, gypsum and other materials into a finely ground cement. Various conveying systems, including weigh feeders, bucket elevators, drag conveyors, and pneumatic conveying systems, are used to transfer materials to and from the finish mills. The Finish Grinding Department also includes storage bins for storing clinker, gypsum, cement, and other raw materials.

C. Particulate matter may be emitted from mill vents, air separator vents, material handling system vents, and storage bin vents. Dust collectors are used to control particulate emissions from affected sources comprising the Finish Grinding Department (excluding fugitive sources). The dust collected by fabric filters is returned to the process.

D. Particulate detectors to monitor filter bag bleedthrough may be operated to identify leaks and bag failures on dust collectors that control the finish mills.

2. DEFINITIONS

The following definitions apply to the affected sources that comprise the Finish Grinding Department only. These definitions are intended to be consistent with the definitions provided in 40 CFR 63.2. The importance of these definitions relates to the applicability of the Part 63 standards. As provided by 40 CFR 63.6(h)(1), the opacity and visible emission standards set forth in 40 CFR Part 63 subpart LLL apply at all times except during periods of startup, shutdown, and malfunction.

A. Startup Period

The startup period for the Finish Grinding Department begins with material feed conveyance to the surge bins and feeders to any of the finish mills. The startup period for the Finish Grinding Department ends when the target capacity factor (based on material feed) is achieved. Startup for the finish mills typically occurs after planned outages, malfunctions, or when switching cement types.

B. Shutdown Period

The shutdown period begins with the discontinuation of feed to the finish mill from the surge bins. The shutdown period ends with the cessation of clinker, grinding out the mill, or other material movement through the system and subsequent shutdown of all associated pollution control equipment. Shutdown of the finish mills typically occurs for planned outages, malfunctions, or when switching cement types.

C. Intermittent Operation

For ancillary equipment such as affected conveyor transfer points and storage bin loading that operate intermittently, the startup and shutdown periods are defined with reference to the major systems supported by those ancillary systems (e.g., the finish mills). Startup and shutdown for intermittent equipment is typically associated with major system outages or malfunctions of the equipment.

D. Malfunction

In 40 CFR 63.2, malfunction is defined as "any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. Failures that are caused in part by poor maintenance or careless operation are not malfunctions." For the purposes of this plan, malfunction is further defined to include only those failures of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner that results in an exceedance of the emission limits established under 40 CFR part 63 subpart LLL.

3. STARTUP PROCEDURES

The startup procedures detailed in this section are intended to minimize emissions from affected sources in the Finish Grinding Department during the startup period to levels below relevant standards. Affected sources in the Finish Grinding Department are subject to a 10 percent opacity standard. The following procedures are related to controlling opacity emissions.

A. Finish Mill System Startup

Operation of the finish mill systems is initiated once the surge bins contain sufficient material. Specific procedures for finish mill startup include -

1. Initiate APCD Operation.

Startup all appropriate dust collectors according to the procedures outlined in section 3.B.

2. Start separator operation.

3. Begin mill feed.

   After the finish miller has reached its required rotational speed, the surge bin feeders begin to transport material into the feed throat of the mill.

4. Finish mill feed ramp up.

   Material feed to the finish mill is increased until the desired production rate is achieved.

B. Dust Collector Startup

The following procedures should be used during startup of the dust collectors used to control emissions from affected sources in the Finish Grinding Department.

1. Establish Normal Draft

   Dust collector startup begins with initiating operation of the induced draft fan. Once the induced draft fan has established a normal draft, affected source operation may begin and the occurrence and duration of startup should be recorded (see Appendices for sample recordkeeping forms).

2. Dust Cake Buildup

   Dust cake buildup is necessary only when a new dust collector is initially put into service, when filter bags are replaced, or when an insufficient dust cake results from cleaning during shutdown. Dust cake buildup may be accomplished by (1) operating the dust collector at a reduced cleaning cycle or (2) precoating the bags.

3. Check for Proper Operation of Equipment

   For some dust collectors, proper operation may be verified in the control room.

   Alternately, proper operation may be verified by checking for excess visual emissions using the Method 22 procedures, the COM system, or an alternate visible emission monitoring method.

4. PLANNED SHUTDOWN PROCEDURES

The shutdown procedures detailed in this section are intended to minimize emissions from affected sources in the Finish Grinding Department during planned shutdown periods to levels below relevant standards. The procedures to be followed in the event of an unplanned shutdown are provided in Section 5, Malfunctions.

As previously noted, affected sources in the Finish Grinding Department are subject to an opacity standard of 10 percent. Therefore, the following procedures are related to controlling opacity emissions during shutdown.

A. Finish Mill System Shutdown

Shutdown procedures for the finish mill system include four steps: discontinuation of feed, shutdown of the mill, shutdown of the air separator, and shutdown of the dust collector.

1. Discontinue Feed to Mills

   Finish mill system shutdown begins with the discontinuation of feed to the mills with the intent of ceasing all finish grinding operations.

2. Shutdown Mill

   After all material feeds to the mill have been discontinued, the mill can either be shut down with material remaining inside or operated until all materials are ground out and only the ball charge remains.

3. Shutdown Air Separator

   Once the finish mill is stopped, the air separator may continue to operate until all material has been discharged from the separator process. Once all material has been discharged from the separator process, the air separator is shutdown.

4. APCD Shutdown

   Shutdown is complete when the dust collector induced draft fan is shutdown. The occurrence and duration of shutdown should be recorded at this time(see Appendices for sample recordkeeping form).

B. Shutdown of Intermittent Equipment

Ancillary equipment in the Finish Grinding Department that operate on an intermittent basis, such as material handling systems, may continue to operate after the finish mill system has been shutdown. Shutdown of ancillary affected sources in the Finish Grinding Department is not considered complete until operation of all affected sources and associated dust collectors has been discontinued with the intent for prolonged shutdown (i.e. during the annual downtime or for maintenance purposes). Shutdown procedures for ancillary affected sources in the Finish Grinding Department include the following.

1. Shutdown of Affected Emissions Source

   Affected emission sources that require the control of a dust collector to meet the opacity standard must be shutdown prior to shutdown of the associated dust collector.

2. APCD Shutdown (if applicable)

   After all affected emission sources associated with the dust collector are shutdown, the induced draft fan may be shutdown. At this point, shutdown of the affected source is complete and the occurrence and duration of shutdown are recorded (see Appendices for sample recordkeeping form).

5. MALFUNCTIONS

Malfunctions in the Finish Grinding Department may occur resulting in excess emissions or in monitoring equipment failure (i.e. broken bag detectors). Possible malfunctions for affected sources and continuous monitoring equipment in the Finish Grinding Department has been provided below along with corresponding response procedures to correct the malfunction in a timely manner.

A. Loss of Containment

A failure in the containment equipment or other equipment responsible for maintaining negative pressure associated with affected sources (including sources, ductwork and dust collectors) may result in excess emissions due to loss of containment.

1. Loss of Negative Pressure

Excess emissions may occur if a loss of negative pressure associated with affected source equipment, ductwork, air pollution control equipment, etc. is not maintained. The following procedures are implemented if a loss of negative pressure associated with affected sources in the Finish Grinding Department is discovered.

a. To the extent possible, perform a diagnostic to determine the extent of the malfunction and appropriate corrective actions;

b. Repair as appriopriate or replace equipment (as appropriate); and

c. Resume normal operation. If necessary, check for remaining malfunctions causing excess emissions.

2. Structural Integrity

The other likely cause of excess emissions resulting from a malfunction in containment and mechanical equipment is due to structural faults. Structural faults can occur as a result of wear, external stressors, or manufacturing defects. The following procedures are implemented if a structural fault in containment equipment associated with affected sources in the Finish Grinding Department are discovered.

a. Discontinue flow to fault area (if necessary).

b. Repair as appropriate or replace equipment (as appropriate).

c. Resume normal operation and check for remaining structural faults causing excess emissions.

B. Broken Bag Detectors (BBDS)

In the case of a malfunction with the broken bag detectors, compliance monitoring for the finish mills will be conducted according to the provisions of 40 CFR 63.1350(e) until the BBDs are functional.

C. Malfunctions due to unscheduled shutdowns, mechanical failure, electrical failure, control equipment failure, main power interruption, and acts of God.

The following procedures are implemented if unscheduled shutdowns, mechanical failure, electrical failure, control equipment failure, main power interruption, or acts of God result in a malfunction of equipment associated with affected sources in the Finish Grinding Department are discovered.

a. To the extent possible, perform a diagnostic to determine the extent of the malfunction and appropriate corrective actions;

b. Repair as appropriate (as appropriate) or replace equipment (as appropriate); and

c. Resume normal operation and check for remaining malfunctions causing excess emissions.

D. Dust Collectors

Refer to Section D for a detailed list of common dust collector malfunctions and associated corrective action procedures.

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Approved: ____________

Revision: 0

SYSTEM: Storage and Shipping Department

EQUIPMENT: Finished Product Storage Bins
Affected Conveying System Transfer Points
Bagging and Bulk Loading and Unloading Systems

PURPOSE: The purpose of this procedure is to identify affected sources in the Storage and Shipping Department, define startup and shutdown periods, and to outline startup and shutdown procedures for this system. All foreseeable malfunctions that could result in excess emissions are also identified along with corrective action procedures. These procedures are intended to minimize emissions during periods of system startup, shutdown, and malfunction.

1. INTRODUCTION

A. Affected sources in the Storage and Shipping Department include cement storage silos, packaging operations, truck loading, railcar loading, and conveying system transfer points.

B. The Storage and Shipping Department receives finished product from the finish mills. The finished product is then stored or distributed to railcars, trucks, or packages for off-site shipment. Conveying systems in the Storage and Shipping Department are primarily pneumatic with some bucket elevators.

C. Particulate matter emissions from affected sources in the Storage and Shipping Department are controlled with dust collectors or total enclosures. The dust collected by fabric filters is restored to the process.

D. The finished product is transported in bulk by railway, truck, or in multi-walled paper bags. Dust generated during bagging and bulk loading and unloading is collected and vented to dust collectors. Fugitive emissions from bagging and bulk loading and unloading operations are contained via loading spouts to the extent possible.

2. DEFINITIONS

The following definitions apply to the affected sources that comprise the Storage and Shipping Department only. These definitions are intended to be consistent with the definitions provided in 40 CFR 63.2. The importance of these definitions relates to the applicability of the Part 63 standards. As provided by 40 CFR 63.6(h)(1), the opacity and visible emission standards set forth in 40 CFR Part 63 subpart LLL apply at all times except during periods of startup, shutdown, and malfunction.

A. Startup Period

The startup period for affected sources in the Storage and Shipping Department begins with the initiation of material feed conveyance from the finished product storage silos to any of the bulk loading or packaging operations after an outage. The startup period ends when a systems check indicates that all equipment (including dust collectors) are operating properly and within set parameters.

B. Shutdown Period

The shutdown period for affected sources in the Storage and Shipping Department begins with the discontinuation of material feed conveyance with the intention of taking equipment off-line. The shutdown period ends with the cessation of material movement through the system and subsequent shutdown of all associated pollution control equipment.

C. Intermittent Operation

Most of the affected sources comprising the Storage and Shipping Department operate intermittently (e.g., conveying system transfer points, bagging operations, and bulk loading). To avoid the undue burden associated with recording each startup and shutdown of intermittently operated equipment, the startup and shutdown periods are defined based on the intent to take the affected source off-line for an extended period (e.g., during outage or maintenance periods).

Typically, dust collectors controlling intermittent operations (such as conveyor transfer points) remain in operation despite the frequent changes in the operating status of an intermittently operated affected source. By defining the startup and shutdown periods based on the intent to take the equipment off-line for an extended period, unnecessary shutdown and subsequent startup of dust collectors (as required by the startup and shutdown procedures) are avoided.

D. Malfunction

In 40 CFR 63.2, malfunction is defined as "any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. Failures that are caused in part by poor maintenance or careless operation are not malfunctions." For the purposes of this plan, malfunction is further defined to include only those failures of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner that results in an exceedance of the emission limits established under 40 CFR part 63 subpart LLL.

3. STARTUP PROCEDURES

The startup procedures detailed in this section are intended to minimize emissions from affected sources in the Storage and Shipping Department during the startup period to levels below relevant standards. Affected source in the Storage and Shipping Department are subject to a 10 percent opacity standard. Therefore, the following procedures are related to controlling opacity emissions.

A. Storage and Shipping System Startup

Startup of affected sources comprising the Storage and Shipping Department includes two distinct processes: 1) material conveyance from finished product storage silos; and 2) initiation of bagging and bulk loading operations.

1. Material Conveyance

The following procedures are used during startup of the finished product material conveyance systems.

a. Initiate APCD operation.

Operation of finished product conveying processes begins with initiating the operation of all appropriate dust collectors. Startup procedures for affected source dust collectors in the Shipping and Storage Department are provided in section 3.B.

b. Initiate material conveyance system.

Once the induced draft fans on all relevant dust collectors has established a normal draft, operation of the material feed conveyance system is initiated. At this point, operation of the material feed conveyance systems becomes intermittent depending on material levels in the various surge bins and silos.

2. Bagging and Bulk Loading Operations

Operation of the bagging and bulk loading systems may be initiated once the surge bins contain sufficient material. Specific procedures for startup of loading operations include -

a. Initiate APCD operation.

Startup all appropriate dust collectors according to the procedures outlined in section 3.B.

b. Initiate loading operations.

Once the induced draft fans on all relevant dust collectors has established a normal draft, loading operations may begin. At this point, operation of the bagging and bulk loading systems becomes intermittent based on inventory levels and purchasing demands.

B. Dust Collector Startup

The following procedures should be used during startup of the dust collectors used to control emissions from affected sources in the Storage and Shipping Department.

1. Establish Normal Draft

Dust collector startup begins with initiating operation of the induced draft fan. Once the induced draft fan has established a normal draft, affected source operation may begin and the occurrence and duration of startup should be recorded (see Appendices for sample recordkeeping forms).

2. Dust Cake Buildup

Dust cake buildup is necessary only when a new dust collector is initially put into service, when filter bags are replaced, or when an insufficient dust cake results from cleaning during shutdown. Dust cake buildup may be accomplished by (1) operating the dust collector at a reduced cleaning cycle or (2) precoating the bags.

3. Check for Proper Operation of Equipment

For some dust collectors, proper operation may be verified in the control room.

Alternately, proper operation may be verified by checking for excess visual emissions using the Method 22 procedures, or an alternate visible emission monitoring method.

4. PLANNED SHUTDOWN PROCEDURES

The shutdown procedures detailed in this section are intended to minimize emissions from affected sources in the Storage and Shipping Department during planned shutdown periods to levels below relevant standards. The procedures to be followed in the event of an unplanned shutdown are provided in Section 5, Malfunctions.

As previously noted, affected sources in the Storage and Shipping Department are subject to an opacity standard of 10 percent. Therefore, the following procedures are related to controlling opacity emissions during shutdown.

A. Storage and Shipping System Shutdown

Those affected sources in the Storage and Shipping Department that operate on a continuous basis (e.g., finished product storage silos) may continue to operate regardless of the operating status of other Departments. Shutdown procedures for finished product storage silos in the Storage and Shipping Department include two steps: discontinuation of material movement through the affected source and shutdown of appropriate dust collectors.

1. Discontinue Material Movement

Prior to shutdown of pollution control equipment in the Storage and Shipping Department, all material movement through the storage silo slated for shutdown is discontinued. Storage silos may be shut down with material remaining in the system or operated until all materials are discharged from the silo.

2. APCD Shutdown

Once all movement of finished product through the affected source or system (e.g., storage silo(s) associated with a particular pollution control device) has been discontinued, the dust collector induced draft fan is shutdown. At this point, shutdown is complete and the occurrence and duration of shutdown should be recorded (see Appendices for sample recordkeeping form).

B. Shutdown of Intermittent Equipment

Most affected sources in the Storage and Shipping Department operate on an intermittent basis (e.g., material conveying systems, bagging operations, and bulk loading). Shutdown of intermittently operated affected sources in the Storage and Shipping Department is not considered complete until operation of affected sources and associated dust collectors has been discontinued with the intent for prolonged shutdown (e.g., during outages, malfunctions, equipment replacement/removal, for maintenance purposes, etc.). Shutdown procedures for ancillary affected sources in the Storage and Shipping Department include the following.

1. Shutdown of Affected Emissions Source

Affected emission sources that require the control of a dust collector to meet the opacity standard must be shutdown prior to shutdown of the associated dust collector.

2. APCD Shutdown (if applicable)

After all affected emission sources associated with the dust collector are shutdown, the induced draft fan may be shutdown. At this point, shutdown of the affected source is complete and occurrence and duration of shutdown are recorded (see Appendices for sample recordkeeping form).

5. MALFUNCTIONS

Malfunctions in the Storage and Shipping Department may occur resulting in excess emissions. Possible malfunctions for affected sources and continuous monitoring equipment in the Storage and Shipping Department have been provided below along with corresponding response procedures to correct the malfunction in a timely manner.

A. Loss of Containment

A failure in the containment equipment or other equipment responsible for maintaining negative pressure associated with affected sources (including sources, ductwork and dust collectors) may result in excess emissions due to loss of containment.

1. Loss of Negative Pressure

Excess emissions may occur if a loss of negative pressure associated with affected source equipment, ductwork, air pollution control equipment, etc. is not maintained. The following procedures are implemented if a loss of negative pressure associated with affected sources in the Storage and Shipping Department is discovered.

a. To the extent possible, perform a diagnostic to determine the extent of the malfunction and appropriate corrective actions;

b. Repair as appropriate or replace equipment (as appropriate). and

c. Resume normal operation. If necessary, check for remaining malfunctions causing excess emissions.

2. Structural Integrity

The other likely cause of excess emissions resulting from a malfunction in containment equipment is due to structural faults. Structural faults can occur as a result of wear, external stressors, or manufacturing defects. The following procedures are implemented if a structural fault in containment equipment associated with affected sources in Storage and Shipping Department are discovered.

a. Discontinue exhaust flow to fault area (if necessary).

b. Repair as appropriate or replace equipment (as appropriate).

c. Resume normal operation and check for remaining structural faults causing excess emissions.

B. Malfunctions due to unscheduled shutdowns, mechanical failure, electrical failure, control equipment failure, main power interruption, and acts of God.

The following procedures are implemented if unscheduled shutdowns, mechanical failure, electrical failure, control equipment failure, main power interruption, or acts of God result in a malfunction of equipment associated with affected sources in the Storage and Shipping Department are discovered.

a. To the extent possible, perform a diagnostic to determine the extent of the malfunction and appropriate corrective actions;

b. Repair as appropriate or replace equipment (as appropriate); and

c. Resume normal operation and check for remaining malfunctions causing excess emissions.

C. Dust Collectors

Refer to Section D for a detailed list of common dust collector malfunctions and associated corrective action procedures.

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Revision: 0

SYSTEM: Various

EQUIPMENT: Fabric Filter Dust Collectors

PURPOSE: The purpose of this procedure is to provide a comprehensive list of possible malfunctions of dust collector components and ancillary equipment that impact the ability of the source to achieve emission limits. Each malfunction is followed by the appropriate corrective action procedures.

1. BROKEN BAGS

Filter bag failure may result due to manufacturer's defects, thermal failure, chemical corrosion, mechanical failure (e.g., abrasion), excessive cleaning, high differential pressure, or gradual wear over time. The following corrective action procedures are used when a diagnostic has revealed that the cause of a malfunction resulting in excess emissions is due to broken filter bags.

A. Repair or replace filter bags, as necessary.

B. Establish filter cake according to manufacturer's instructions. Dust cake buildup may be accomplished by (1) operating the dust collector at a reduced gas volume; (2) operating the dust collector at a reduced cleaning cycle; or (3) pre-coating the bags.

2. FILTER BAG BLEED THROUGH

Filter bag bleed through typically occurs as a results of improper dust cake buildup. The following corrective action procedures are used when a diagnostic has revealed that the cause of a malfunction resulting in excess emissions is due to filter bag bleed through.

A. Establish proper dust cake buildup by (1) operating the dust collector at a reduced gas volume; (2) operating the dust collector at a reduced cleaning cycle; or (3) pre-coating the bags; or

B. Replace or upgrade filter bags, if necessary (e.g., if changes to process equipment result in a change in the particle size distribution, filter bag changes may be necessary).

3. FAN FAILURE

A failure of the dust collector system to maintain negative pressure typically results due to a malfunction of the fan. The corrective action procedures to be used when a diagnostic reveals that the cause of a malfunction resulting in excess emissions is due to fan failure include repair, replacement, or adjustment of the fan or the motor (if necessary). The following are some common malfunctions of fans and associated corrective action procedures.

A. Mechanical Malfunction

A mechanical malfunction may result from drive belts that are loose or out of alignment. Similarly, improper alignment of the inlet cone or wheel could cause a malfunction. Corrective action procedures for these types of malfunctions include making adjustments to the alignment or tension of fan components until the desired airflow is achieved.

B. Dirty Equipment

Reduced airflow can result from dirt buildup on airflow surfaces. The corrective action procedure for this type of malfunction involves cleaning of all airflow surfaces coated with excessive particulate.

C. Fan Settings

Malfunction in fan settings may include improper fan rotation, or malfunction of dampers or controls. All of these malfunctions could impede airflow. Corrective action procedures for improper fan settings may involve adjusting fan settings (particularly after initial fan startup or after maintenance to the wiring of the motor), correcting damper settings, or modifying control settings.

D. Fan Speed

Insufficient fan speed may result in reduced airflow. Fan speed may corrected by adjusting the horsepower or static pressure of the fan.

E. Fan Connections

Additional corrective actions for insufficient airflow include adjustments to fan inlet connections. Turning vanes installed in inlet boxes or elbows may allow for increased airflow and performance by evenly directing the airflow into the fan and reducing turbulence or spiral flow into the fan inlet.

4. CLEANING MECHANISM FAILURE

A failure of the cleaning mechanism of the dust collector system may cause a malfunction that results in excess emissions and may even cause further damage to the system.

A. Check cleaning mechanism for proper operation

A malfunction of the cleaning mechanism may be identified by listening for unusual grinding or other noises. The corrective action procedures to be used when a diagnostic reveals that the cause of a malfunction is due to a failure of the cleaning mechanism include repair or replacement of the components of the cleaning system (e.g., reverse air fans, pulse jet nozzles, etc.).

B. Check cleaning mechanism for proper settings (e.g., in the case of an excessive pressure drop across the dust collector).

A malfunction that results from improper settings that control the cleaning mechanism may be identified by measuring the pressure drop across the dust collector. The corrective action procedures to be used in the case of improper settings include adjusting the cleaning sequence accordingly.

1. If filter cake buildup is insufficient (e.g., low pressure drop), reduce cleaning frequency.

2. If filter cake buildup is excessive (e.g., high pressure drop), increase cleaning frequency.

C. Corrective Action Procedures for Reverse Air Dust Collectors

1. Bag Tensioning

Inadequate tension on bags in reverse air dust collectors can allow over-flexing of the fabric, reduced strength and cause pinhole leaks along flex lines. Lack of tension allows the bag to flex and abrade against other surfaces (e.g., sidewalls, structural components, surrounding bags, etc.). Stress caused by over-tensioned bags can cause seams to pull apart as well as limit cleaning action. The corrective action procedures for improper bag tension involves adjusting bag tension according to manufacturer's instructions.

2. Cleaning Sequence

An improper cleaning sequence may result in re-entrainment of dust in the air stream. Corrective action procedures for this type of malfunction include re-adjustments to the cleaning sequence. The cleaning sequence should be adjusted to allow for sufficient time for fine particles to fall the length of the bag and be collected in the hopper during the cleaning cycle.

3. Valve and Damper Malfunctions

Valve failure or seals in poor condition could reduce dust removal efficiency from filter bags. Another common problem is material buildup in the plenum around the valve that could prevent the valve or damper from sealing properly. Corrosion on the valve seat can also prevent a good seal. If any of these problems are identified, the malfunction may be corrected by repairing or replacing damaged parts.

4. Bent or Damaged Cages

Bent or damaged cages that cannot properly support the filter bag may result in improper cleaning of the dust collector. Corrective action procedures for bent or damaged cages involve repair or replacement of the damaged cage.

D. Corrective Action Procedures for Pulse Jet Dust Collectors

1. Pulse Sequence

   An improper pulse sequence may result in re-entrainment of dust in air stream. Adjustments to the pulse sequence may include staggering the cleaning cycle (e.g., staggering the order of rows to be pulsed) or re-adjusting according to manufacturer's specifications.

2. Pulse Cycle

   Insufficient pressure to the compressed air system that serves the pulsing mechanism may result in a malfunction of the pulse cycle. Corrective action procedures for this type of malfunction may include adjustments to the pulse frequency settings or repair/replacement of the compressed air supply or delivery system.

3. Valve Malfunctions

   Valve malfunctions may be caused by diaphragm failure, dirt, oil, and/or moisture penetrating the valve body, leaks in tubing or fittings between valves, or improper connections. If any of these problems are identified, the malfunctioning valves should be removed and serviced or repairs to the fittings or connections may be necessary.

4. Bent or Damaged Cages

   Bent or damaged cages that cannot properly support the filter bag may result in improper cleaning of the dust collector. Corrective action procedures for bent or damaged cages involve repair or replacement of the damaged cage.

5. IMPROPER SEQUENCING (COMPARTMENTAL BAGHOUSE SYSTEMS ONLY)

Improper sequencing of the cleaning system on a compartmental baghouse (e.g., Main Baghouse) can result in overloading of the discharge screw conveyor and poor dust removal. This can cause overfilling of hoppers, and in turn, bag wear, higher pressure drop, and reduced gas flow. Corrective action procedures for this type of malfunction include adjustments to the compartmental cleaning sequence according to manufacturer's specifications.

6. SYSTEM POWER FAILURE

A power failure of any of the components of the dust collector system could result in excess emissions. The corrective action procedures to be used when a diagnostic reveals that the cause of a malfunction that results in excess emissions is due to a system power failure include repair or replacement of power system components. Emergency generators exist at the facility in case of a plant-wide power failure.

7. INTEGRITY OF CONTAINMENT EQUIPMENT

A failure in the integrity of the air emissions containment equipment (e.g., ductwork, hood skirting, vent box, fans, motors, etc.) could result in excess emissions from affected sources or from the dust collectors associated with affected sources. The corrective action procedures to be used when a diagnostic reveals that the cause of a malfunction is due to a failure of containment equipment include repair or replacement of defective or broken components. This may include repair or replacement of leaks in the containment structure of the dust collector or immediate ductwork.

8. AIR INLEAKAGE

Air in-leakage throughout the ventilation system could cause excess emissions from affected sources. Common trouble spots are expansion joints, access doors, screw conveyor covers, rotary airlocks, poorly connected seams, existing corrosion spots, cracked welds or poorly designed pickup points, etc. Leakage in a positive pressure system located after the fan outlet may cause dust emissions while leakage on the negative pressure side of the fan may cause air volume problems and reduced suction at the pickup points. Corrective action procedures for air in-leakage include repair or replacement of damaged or defective equipment.

9. EXCESSIVE INLET GRAIN LOADING

Excessive inlet grain loading to the dust collector typically results from malfunctioning or improperly designed process equipment. The corrective action procedures for addressing excessive inlet grain loading will vary depend upon observations made during the initial diagnostic inspection. These corrective action procedures may include repair or replacement of malfunctioning process equipment, modifications to the design of process equipment (e.g., reduce drop distance at belt conveyor transfer point), replacement or addition of new dust control equipment, or adjustments to equipment operating parameters.