# Appendix O & M

# Operation & Maintenance Plan

# CEMEX, LLC

## SOUTH BROOKSVILLE CEMENT PLANT

## OPERATION & MAINTENANCE PLAN
## STARTUP, SHUTDOWN & MALFUNCTION PLAN

**INITIAL PLAN PREPARATION DATE:**
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This plan provides Standard Operating Procedures (SOP), maintenance schedules, maintenance checklists, monitoring procedures, monitoring schedules, and corrective actions in attachments to the plan.


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## Introduction

The National Emission Standards for Hazardous Air Pollutants From the Portland Cement Manufacturing Industry (40 CFR 63, Subpart LLL) require the owner or operator of each Portland cement plant to prepare for each affected source a written operations and maintenance plan. The plan must include the following information:

(1) Procedures for proper operation and maintenance of the affected source and air pollution control devices in order to meet the emission limits and operating limits of 40 CFR 63.1343 through 63.1348;

(2) Corrective actions to be taken when required by paragraph 40 CFR 63.1350(e);

(3) Procedures to be used during an inspection of the components of the combustion system of each in-line kiln and raw mill located at the facility at least once per year; and

(4) Procedures to be used to periodically monitor affected sources subject to opacity standards under 40 CFR 63.1346 and 63.1348.

The affected sources covered by this plan are designated by 40 CFR 63.1340:

(1) Each in-line kiln/raw mill
(2) Each clinker cooler
(3) Each raw mill
(4) Each finish mill
(5) Each raw material dryer
(6) Each raw material, clinker, or finished product storage bin
(7) Each conveying system transfer point
(8) Each bagging system; and
(9) Each bulk loading or unloading system.

The affected sources and air pollution control devices are specifically described by the Florida Department of Environmental Protection Title V Air Permit No. 0530021-002-AV.

| Brooksville Cement Line 1 | |
|---|---|
| **E.U. ID No./Facility ID No.** | Brief Description |
| -001/D-75 | Filter Dust Bin with Baghouse |
| -002/D-67 | Fly Ash/Equilibrium Catalyst Bin with Baghouse |
| -004/F-14 | Raw Meal Transfer with Baghouse |
| -006/G-12A & B | Two Blend Silos with Baghouse |
| -007/H-15 | Kiln Feed Surge Bin with Baghouse |
| -008/S-04 | Clinker Receiving/Handling System |
| -009/L-03 | Clinker Cooler Discharge with Baghouse |
| -010/L-06 & L-07 | Clinker Storage Silo and Finish Mill Storage Silo with Baghouse |
| -011/L-08 | Gypsum and Limestone Bins with Baghouse |
| -012/M-08 | Silo Discharge with Baghouse |
| -013/N-13 | Finish Mill with Baghouse |
| -014/Q-17 | Cement Storage Silos #1 & #2 Discharge System with Baghouse |
| -015/Q-15 | Cement Storage Silos #1 & #2 with Baghouse |
| -017/D-63 | Iron Ore Bin with Baghouse |
| -019/M-05 | Finish Mill Feed Belt with Baghouse |
| -020/ | In-Line Kiln I/Raw Mill and Clinker Cooler I with Baghouse |
| -021/Z-17 | Cement Storage Silo #3 Discharge System with Baghouse |
| -022/Z-15 | Cement Storage Silo #3 with Baghouse |
| -023/ | Cement Storage Silo #4 and Truck Loadout System with Baghouse |
| -024/Z-18 | Cement Storage Silo and Railcar Loadout System with Baghouses |

This plan provides Standard Operating Procedures (SOP), maintenance schedules, maintenance checklists, monitoring procedures, monitoring schedules, and corrective actions. This plan also provides a Startup, Shutdown and Malfunction plan, as required by 40 CFR 63.6.

## Procedures for Proper Operation and Maintenance of the Affected Source and Air Pollution Control Devices

This section provides procedures for proper operation and maintenance of the affected sources and air pollution control devices in order to meet the emission limits and operating limits of 40 CFR 63.1343 through 63.1348.

At all times, including periods of startup, shutdown, and malfunction, owners or operators shall operate and maintain any affected source, including associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions at least to the levels required by all relevant standards.

Appropriate parameters of processing or materials handling systems provide a measure of the rate of operations. The operation and maintenance plan includes performance parameters which indicate the rate of operation, process weight throughput, the fuel or other energy source, the materials being processed or other physical or chemical characteristics, as applicable.

The plan includes schedules for the maintenance and inspection of each control device and collection system and a schedule for recording performance parameters of the control devices, collection systems and auxiliary equipment. The performance parameters include such physical, chemical or electrical characteristics as are applicable to the particular emissions unit and which are indicators of the condition, operating rates and efficiencies. The plan contains inspection and maintenance schedules including periodic assessments of the condition of manholes, ducting, breaching, hoods, conveyor and elevator housings, loading sheds and other equipment. Records of inspections, maintenance and performance data of control devices and auxiliary equipment shall be retained by the emissions unit for a minimum of five years and shall be made available to the Department upon request.

Safety is a critical component of plant operation and maintenance, and is not specifically addressed in this plan. Existing site-specific safety procedures supersede any general guidance within this plan.

## EU 001/D-75 Filter Dust Bin with Baghouse

### *Emission Limits and Operating Limits*

The owner or operator shall not cause to be discharged any gases from this affected source which exhibit opacity in excess of ten percent.
[40 CFR 63.1348]

### *Operation of Affected Source*

This emissions unit is a storage bin for fines (dust). Dust from the kiln is collected and either:

1. recycled into the kiln to produce clinker,
2. used as an additive in the production of special cement products, or
3. sold to third parties as a waste stabilizer.

OPERATIONAL PARAMETERS FOR EMISSIONS UNIT

| | |
|---|---|
| Weight per unit time of raw materials input | 45 TPH |
| Process temperature or pressure | 475 deg. F (max) |
| Chemical or physical data on product or raw materials | Filter dust |

The material is transferred to the elevated storage bin pneumatically. From the elevated bin, the material is fed by gravity or screw conveyor. The loading, unloading, handling, transfer and storage of materials is in a totally enclosed system. All dust-laden air generated by the process operations is extracted and vented to the fabric filtering system to meet the emission limits stipulated above.

The level of the material in the bin is measured daily to prevent overfilling. When the bin level approaches full, filling is stopped by the control room operator.

### *Maintenance of Affected Source*

Bins are prone to internal buildup of material, particularly if material is wet or if aeration is inadequate. Periodic inspection (every 1-2 years) and maintenance are necessary.

In order to use a bin for material storage, it must be structurally sound, with no evidence of major deterioration or over stressing. Bins with supports and/or walls that show any signs of having been over-stressed during previous use, or that have been badly deteriorated by corrosion, should be repaired before further use. Deteriorated doors and door frames shall be repaired to prevent possible air leakage during aeration. Regular maintenance will help extend the bin's life. At least annually, a thorough inspection of the entire structure is performed, and repairs are made where necessary.

### *Operation of Air Pollution Control Device*

The filter equipment will be operated and maintained according to the manufacturer's recommendations. An adequate inventory of spare parts shall be kept. The particulate matter (PM) emissions from the materials being transferred are controlled by a low

temperature baghouse fabric filter system. The baghouse is put in operation prior to the start of source operation, and remains in operation while the source is in operation.

Operators are familiar with startup and shutdown procedures of dust control systems. All dust control systems should be in operation before any processing equipment is started. Certain units are equipped with an alarm to sound when a dust collector stops operating.

OPERATIONAL PARAMETERS FOR BAGHOUSE

| | |
|---|---|
| Identification of control device | D-75 |
| Type of control device | Baghouse |
| Stack height | 125 feet |
| Exit diameter | 2.0 feet |
| Bag pressure drop | 2-6” $H_2O$ |
| Actual volumetric flow rate | 6800 acfm |
| Maximum dry standard flow rate | 6686 dscfm |
| Gas temperature | 77° F |
| Percent water vapor | Ambient |
| Bag cleaning method | Pulsed air |
| Bag cleaning cycle: | Periodic |

***Maintenance of Air Pollution Control Device***

See Attachment 1 – Baghouse Maintenance.

## EU 002/D-67 Fly Ash/Equilibrium Catalyst Bin with Baghouse

### *Emission Limits and Operating Limits*

The owner or operator shall not cause to be discharged any gases from this affected source which exhibit opacity in excess of ten percent.
[40 CFR 63.1348]

### *Operation of Affected Source*

This emissions unit is a storage bin for fly ash/equilibrium catalyst.

OPERATIONAL PARAMETERS FOR EMISSIONS UNIT

| | |
|---|---|
| Weight per unit time of raw materials input | 25 TPH |
| Process temperature or pressure | Ambient |
| Chemical or physical data on product or raw materials | Fly ash/Equilibrium catalyst |

The material is transferred to the elevated storage bin pneumatically. From the elevated bin, the material is fed by gravity or screw conveyor. The loading, unloading, handling, transfer and storage of materials is in a totally enclosed system. All dust-laden air generated by the process operations is extracted and vented to the fabric filtering system to meet the emission limits stipulated above.

The level of the material in the bin is measured at least daily to prevent overfilling. When the level of the material in the bin approaches full, filling is stopped by the control room operator.

### *Maintenance of Affected Source*

Bins are prone to internal buildup of material, particularly if material is wet or if aeration is inadequate. Periodic inspection (every 1-2 years) and maintenance are necessary.

In order to use a bin for material storage, it must be structurally sound, with no evidence of major deterioration or over stressing. Bins with supports and/or walls that show any signs of having been over-stressed during previous use, or that have been badly deteriorated by corrosion, should be repaired before further use. Deteriorated doors and door frames shall be repaired to prevent possible air leakage during aeration. Regular maintenance will help extend the bin's life. At least annually, a thorough inspection of the entire structure is performed, and repairs are made where necessary.

### *Operation of Air Pollution Control Device*

The filter equipment will be operated and maintained according to the manufacturer's recommendations. An adequate inventory of spare parts shall be kept. The particulate matter (PM) emissions from the materials being transferred are controlled by a low temperature baghouse fabric filter system. The baghouse is put in operation prior to the start of source operation, and remains in operation while the source is in operation.

Operators are familiar with startup and shutdown procedures of dust control systems. All dust control systems should be in operation before any processing equipment is started. Certain units are equipped with an alarm to sound when a dust collector stops operating.

OPERATIONAL PARAMETERS FOR BAGHOUSE

| | |
|---|---|
| Identification of control device | D-67 |
| Type of control device | Baghouse |
| Stack height | 125 feet |
| Exit diameter | 2.0 feet |
| Bag pressure drop | 2-6” $H_2O$ |
| Actual volumetric flow rate | 4200 acfm |
| Maximum dry standard flow rate | 4130 dscfm |
| Gas temperature | 77° F |
| Percent water vapor | Ambient |
| Bag cleaning method | Pulsed air |
| Bag cleaning cycle: | Periodic |

***Maintenance of Air Pollution Control Device***

See Attachment 1 – Baghouse Maintenance.

## EU 004/F-14 Raw Meal Transfer with Baghouse

### *Emission Limits and Operating Limits*

The owner or operator shall not cause to be discharged any gases from this affected source which exhibit opacity in excess of ten percent.
[40 CFR 63.1348]

### *Operation of Affected Source*

This emissions unit is an activity of raw meal being transferred from the raw mill collection cyclones, to an air lift system.

OPERATIONAL PARAMETERS FOR EMISSIONS UNIT

| | |
|---|---|
| Weight per unit time of raw materials input | 138 TPH |
| Process temperature or pressure | >Ambient |
| Chemical or physical data on product or raw materials | Raw materials |

From the raw mill cyclones, the material is fed by air gravity conveyor to an air lift system, which in turn lifts the material to the top of and into the blend silos. This baghouse provides ventilation and dust collection for the air gravity conveyors. The loading, unloading, handling, transfer and storage of materials is in a totally enclosed system. All dust-laden air generated by the process operations is extracted and vented to the fabric filtering system to meet the emission limits stipulated above.

All conveyor transfer points are totally enclosed. All dust-laden air generated by the material transfer process shall be totally vented to fabric filtering system to meet the emission limits stipulated above.

### *Maintenance of Affected Source*

☐ Inspect and repair air gravity conveyor housings to prevent leakage.
☐ Inspect and repair vent ducts to dust collector to prevent leakage.

### *Operation of Air Pollution Control Device*

The filter equipment will be operated and maintained according to the manufacturer's recommendations. An adequate inventory of spare parts shall be kept. The particulate matter (PM) emissions from the materials being transferred are controlled by a low temperature baghouse fabric filter system. The baghouse is put in operation prior to the start of source operation, and remains in operation while the source is in operation.

Operators are familiar with startup and shutdown procedures of dust control systems. All dust control systems should be in operation before any processing equipment is started. Certain units are equipped with an alarm to sound when a dust collector stops operating.

OPERATIONAL PARAMETERS FOR BAGHOUSE

| | |
|---|---|
| Identification of control device | F-14 |
| Type of control device | Baghouse |
| Stack height | 70 feet |
| Exit diameter | 1.0 feet |
| Bag pressure drop | 2-6” $H_2O$ |
| Actual volumetric flow rate | 1200 acfm |
| Maximum dry standard flow rate | 970 dscfm |
| Gas temperature | 180° F |
| Percent water vapor | Ambient |
| Bag cleaning method | Pulsed air |
| Bag cleaning cycle: | Periodic |

***Maintenance of Air Pollution Control Device***

See Attachment 1 – Baghouse Maintenance.

## EU 006/G-12A & B Two Blend Silos with Baghouse

### *Emission Limits and Operating Limits*

The owner or operator shall not cause to be discharged any gases from this affected source which exhibit opacity in excess of ten percent.
[40 CFR 63.1348]

### *Operation of Affected Source*

This emissions unit is two blending silos for the raw meal being transferred from the raw mill.

OPERATIONAL PARAMETERS FOR EMISSIONS UNIT

| | |
|---|---|
| Weight per unit time of raw materials input | 138 TPH |
| Process temperature or pressure | >Ambient |
| Chemical or physical data on product or raw materials | Raw meal |

The material is transferred to the silos pneumatically. From the silos, the material is fed by air gravity conveyors. The loading, unloading, handling, transfer and storage of materials is in a totally enclosed system. All dust-laden air generated by the process operations is extracted and vented to the fabric filtering system to meet the emission limits stipulated above.

The silos are equipped with high level probes and associated alarms to warn of overfilling. The high-level indicators are interlocked with the material filling system such that in the event of a silo approaching an overfilling condition, the material filling system will be automatically shut down.

### *Maintenance of Affected Source*

Silos are prone to internal buildup of material, particularly if material is wet or if aeration is inadequate. Periodic inspection (every 1-2 years) and maintenance are necessary.

In order to use a silo for material storage, it must be structurally sound, with no evidence of major deterioration or over stressing. Deteriorated doors and door frames should be repaired to prevent possible air leakage during aeration. Regular maintenance will help extend the silo's life. Silos need periodic inspection and maintenance, such as cleaning. At least annually, a thorough inspection of the entire structure is performed, and repairs are made where necessary.

Storage silos allow cement plants to stockpile inventory until needed. Buildup on the vessel walls, however, can rob plants of the storage capacity in which they have invested. Buildups slow material flow and decrease the "live" capacity of the vessel. Overcoming these flow problems and recovering storage capacity may require silo cleaning.

Several types of equipment can be used for silo cleaning. One of these operates like an industrial-strength "weed whip," rotating a set of "flails" against the material in the

vessel. The cleaning head is typically inserted through the access port down into the vessel on a pivoting arm.

Any clean-out activity must be carefully controlled to avoid damage to the inner wall, which can reduce flow and cause continuing problems. Steel chain is commonly used for Portland cement or any compacted material where there is no risk of explosion. Nonsparking brass chain is effective for compacted materials where the risk of fire or explosion is present.

Before the cleaning process is initiated, a path for loosened material to leave the vessel must be secured, and the discharge opening must be clear. A transport mechanism at the bottom — a conveyor, a truck, or a loader — is required to avoid buildup below the discharge and blockage of the opening as large quantities of material are removed. In cleaning a plugged silo, the operator starts at the bottom and progresses upward. Wall accumulations are undercut until they fall by their own weight.

### *Operation of Air Pollution Control Device*

The filter equipment will be operated and maintained according to the manufacturer's recommendations. An adequate inventory of spare parts shall be kept. The particulate matter (PM) emissions from the materials being transferred are controlled by a low temperature baghouse fabric filter system. The baghouse is put in operation prior to the start of source operation, and remains in operation while the source is in operation.

Operators are familiar with startup and shutdown procedures of dust control systems. All dust control systems should be in operation before any processing equipment is started. Certain units are equipped with an alarm to sound when a dust collector stops operating.

OPERATIONAL PARAMETERS FOR BAGHOUSE

| | |
|---|---|
| Identification of control device | G-12 |
| Type of control device | Baghouse |
| Stack height | 240 feet |
| Exit diameter | 3.5 feet |
| Bag pressure drop | 2-6" $H_2O$ |
| Actual volumetric flow rate | 17,000 acfm |
| Maximum dry standard flow rate | 13,745 dscfm |
| Gas temperature | 180° F |
| Percent water vapor | Ambient |
| Bag cleaning method | Pulsed air |
| Bag cleaning cycle: | Periodic |

***Maintenance of Air Pollution Control Device***

See Attachment 1 – Baghouse Maintenance.

## EU 007/H-15 Kiln Feed Surge Bin with Baghouse

### *Emission Limits and Operating Limits*

The owner or operator shall not cause to be discharged any gases from this affected source which exhibit opacity in excess of ten percent.
[40 CFR 63.1348]

### *Operation of Affected Source*

This emissions unit is an activity of raw meal being transferred from the kiln feed storage silos to the kiln feed surge bin, and then on to the kiln preheater.

OPERATIONAL PARAMETERS FOR EMISSIONS UNIT

| | |
|---|---|
| Weight per unit time of raw materials input | 138 TPH |
| Process temperature or pressure | Ambient |
| Chemical or physical data on product or raw materials | Kiln feed |

The material is transferred to the elevated kiln feed surge bin by air gravity conveyor and bucket elevator. From the elevated bin, the material is fed by air gravity conveyor, to an air lift system, which lifts the material pneumatically to the kiln preheater. The loading, unloading, handling, transfer and storage of materials is in a totally enclosed system. All dust-laden air generated by the process operations is extracted and vented to the fabric filtering system to meet the emission limits stipulated above.

The bin is equipped with load cells that continually weigh the bin and its contents. If the bin reaches a high level, an alarm flashes and the filling control valves close automatically. This prevents overfilling.

### *Maintenance of Affected Source*

Bins are prone to internal buildup of material, particularly if material is wet or if aeration is inadequate. Periodic inspection (every 1-2 years) and maintenance are necessary.

In order to use a bin for material storage, it must be structurally sound, with no evidence of major deterioration or over stressing. Bins with supports and/or walls that show any signs of having been over-stressed during previous use, or that have been badly deteriorated by corrosion, shall be repaired before further use. Deteriorated doors and door frames shall be repaired to prevent possible air leakage during aeration. Regular maintenance will help extend the bin's life. At least annually, a thorough inspection of the entire structure is to be performed, and repairs are to be made where necessary.

### *Operation of Air Pollution Control Device*

The filter equipment will be operated and maintained according to the manufacturer's recommendations. An adequate inventory of spare parts shall be kept. The particulate matter (PM) emissions from the materials being transferred are controlled by a medium temperature baghouse fabric filter system. The baghouse is put in operation prior to the start of source operation, and remains in operation while the source is in operation.

Operators are familiar with startup and shutdown procedures of dust control systems. All dust control systems should be in operation before any processing equipment is started. Certain units are equipped with an alarm to sound when a dust collector stops operating.

OPERATIONAL PARAMETERS FOR BAGHOUSE

| | |
|---|---|
| Identification of control device | H-15 |
| Type of control device | Baghouse |
| Stack height | 50 feet |
| Exit diameter | 2.0 feet |
| Bag pressure drop | 2-6” $H_2O$ |
| Actual volumetric flow rate | 6000 acfm |
| Maximum dry standard flow rate | 4704 dscfm |
| Gas temperature | 200° F |
| Percent water vapor | Ambient |
| Bag cleaning method | Pulsed air |
| Bag cleaning cycle: | Periodic |

***Maintenance of Air Pollution Control Device***

See Attachment 1 – Baghouse Maintenance.

## EU 008/S-04 Clinker Receiving/Handling System

### *Emission Limits and Operating Limits*

The owner or operator shall not cause to be discharged any gases from this affected source which exhibit opacity in excess of ten percent.
[40 CFR 63.1348]

### *Operation of Affected Source*

This emissions unit is an integrated system for handling clinker that includes a below-grade truck unloading hopper, a belt conveyor, and a deep-bucket conveyor. The fugitive particulate matter emissions generated from the transfer of clinker from the receiving hopper to the belt conveyor are controlled using a Johnson-Marsh Dust Suppressant system, which uses a non-ionic wetting agent or water, as necessary, to enhance the wettability of the clinker.

OPERATIONAL PARAMETERS FOR EMISSIONS UNIT

| | |
|---|---|
| Weight per unit time of raw materials input | 100 TPH |
| Process temperature or pressure | Ambient |
| Chemical or physical data on product or raw materials | Clinker |

The loading, unloading, handling, transfer or storage of clinker, which may generate airborne dust emissions, will be carried out in such a manner to prevent or minimize dust emissions. The materials mentioned above shall be adequately wetted prior to and during the loading, unloading and handling operations. Manual or automatic water spraying system shall be provided at all unloading areas, stock piles and material discharge points.

Openings for the passage of conveyors are fitted with adequate flexible seals. Scrapers shall be provided at the turning points of all conveyors to remove dust adhered to the belt surface. Conveyors are arranged to minimize free fall as far as practicable. All receiving hoppers for unloading materials shall be enclosed on three sides above the unloading point. The belt conveyors for handling materials shall be enclosed on top and 2 sides with to eliminate any dust emission due to wind erosion.

### *Maintenance of Affected Source*

- ☐ Inspect and adjust all belt conveyors and their skirting rubber and dust seals
- ☐ Inspect belt covers and repair or replace as required
- ☐ Replace torn or defective conveyor belts to prevent leakage
- ☐ Inspect belt scrapers on belt conveyors and adjust, replace worn-out components

### *Operation of Air Pollution Control Device*

An adequate inventory of spare parts shall be kept. The particulate matter (PM) emissions from the materials being transferred are controlled by a wet suppression system. The system is put in operation prior to the start of source operation, and remains in operation while the source is in operation.

Operators are familiar with startup and shutdown procedures of dust control systems. All dust control systems should be in operation before any processing equipment is started.

The spray discharge should be proportional with dust emission. The Dust Suppression System is meant to suppress the dust generated during transfer at feed/discharge points of conveyors. Wetting Agents are chemicals that are added to water to improve the rate at which spray droplets wet dust particles.

This system consists of three main parts.
1. Proportioner units.
2. Spray headers with pipe lines & pumping system.
3. Control units with electrical systems.

Proportioner units include a feed water pump, metering pump, feed water tank, and solutions tanks. The water required for the system is supplied by a feed water pump. The wetting agent, which is in liquid form, is dosed by metering pump as per requirement. Spray headers with pipe lines are provided. The pumping system includes solution pumps, isolating valves, spray nozzles, and pipe lines. The solution pumps are used to supply pressurized water to spray headers. The required quantities of nozzles are used to spray water. Control units with electrical systems consist of sensing units and control panels. The control panels consist of various relays and transformers.

Auto control or manual control governs the system. The water is pumped and at the same time the metering pump doses the proper quantity of chemical. Its inherent design features also make it extremely reliable from a maintenance standpoint. The nozzles have no moving parts.

OPERATIONAL PARAMETERS FOR WET SUPPRESSION

| | |
|---|---|
| Identification of control device | S-04 |
| Type of control device | Wet suppression |
| Manufacturer | Johnson-Marsh |
| Type of chemical used | Water or dust suppressant |
| Frequency of application | Continuous when operating |
| Schedule for maintenance and inspection | Semiannually |

### *Maintenance of Air Pollution Control Device*

- ☐ Check proportioner units.
- ☐ Check spray headers with pipe lines & pumping system.
- ☐ Check control units with electrical systems.
- ☐ Check solutions tanks.
- ☐ Check feed water supply.
- ☐ Check spray nozzles
- ☐ Check nozzles and system components for wear and corrosion.

## EU 010/L-06 & L-07 Clinker Storage Silo and Finish Mill Storage Silo with Baghouse

### *Emission Limits and Operating Limits*

The owner or operator shall not cause to be discharged any gases from this affected source which exhibit opacity in excess of ten percent.
[40 CFR 63.1348]

### *Operation of Affected Source*

This emissions unit is an activity of clinker being transferred into the clinker storage silos.

OPERATIONAL PARAMETERS FOR EMISSIONS UNIT

| | |
|---|---|
| Weight per unit time of raw materials input | 83 TPH |
| Process temperature or pressure | >Ambient |
| Chemical or physical data on product or raw materials | Clinker |

The material is transferred to the silos by a deep bucket conveyor. From the silos, the material is fed by gravity to belt conveyors. The loading, unloading, handling, transfer and storage of materials is in a totally enclosed system. All dust-laden air generated by the process operations is extracted and vented to a fabric filtering system to meet the emission limits stipulated above.

The silos are measured at least daily to prevent overfilling. If the manual measurements indicate overfilling is imminent, measures are taken by the operations group to prevent overfilling.

### *Maintenance of Affected Source*

Silos are prone to internal buildup of material, particularly if material is wet or if aeration is inadequate. Periodic inspection (every 1-2 years) and maintenance are necessary.

In order to use a silo for material storage, it must be structurally sound, with no evidence of major deterioration or over stressing. Deteriorated doors and door frames shall be repaired to prevent possible air leakage. Regular maintenance will help extend the silo's life. Silos need periodic inspection and maintenance, such as cleaning. At least annually, a thorough inspection of the entire structure is performed, and repairs are made where necessary.

Storage silos allow cement plants to stockpile inventory until needed. Buildup on the vessel walls, however, can rob plants of the storage capacity in which they have invested. Buildups slow material flow and decrease the "live" capacity of the vessel. Overcoming these flow problems and recovering storage capacity may require silo cleaning.

Several types of equipment can be used for silo cleaning. One of these operates like an industrial-strength "weed whip," rotating a set of "flails" against the material in the

vessel. The cleaning head is typically inserted through the access port down into the vessel on a pivoting arm.

Any clean-out activity must be carefully controlled to avoid damage to the inner wall, which can reduce flow and cause continuing problems. Steel chain is commonly used for cement or any compacted material where there is no risk of explosion. Nonsparking brass chain is effective for compacted materials where the risk of fire or explosion is present.

Before the cleaning process is initiated, a path for loosened material to leave the vessel must be secured, and the discharge opening must be clear. A transport mechanism at the bottom — a conveyor, a truck, or a loader — is required to avoid buildup below the discharge and blockage of the opening as large quantities of material are removed. In cleaning, the operator starts at the bottom and progresses upward. Wall accumulations are undercut until they fall by their own weight.

### *Operation of Air Pollution Control Device*

The filter equipment will be operated and maintained according to the manufacturer's recommendations. An adequate inventory of spare parts shall be kept. The particulate matter (PM) emissions from the materials being transferred are controlled by a medium temperature baghouse fabric filter system. The baghouse is put in operation prior to the start of source operation, and remains in operation while the source is in operation.

Operators are familiar with startup and shutdown procedures of dust control systems. All dust control systems should be in operation before any processing equipment is started. Certain units are equipped with an alarm to sound when a dust collector stops operating.

OPERATIONAL PARAMETERS FOR BAGHOUSE

| | |
|---|---|
| Identification of control device | L-06/L-07 |
| Type of control device | Baghouse |
| Stack height | 200 feet |
| Exit diameter | 1.5 feet |
| Bag pressure drop | 2-6" $H_2O$ |
| Actual volumetric flow rate | 2600 acfm |
| Maximum dry standard flow rate | 2038 dscfm |
| Gas temperature | 200° F |
| Percent water vapor | Ambient |
| Bag cleaning method | Pulsed air |
| Bag cleaning cycle: | Periodic |

### *Maintenance of Air Pollution Control Device*

See Attachment 1 – Baghouse Maintenance.

## EU 011/L-08 Gypsum and Limestone Bins with Baghouse

### *Emission Limits and Operating Limits*

The owner or operator shall not cause to be discharged any gases from this affected source which exhibit opacity in excess of ten percent.
[40 CFR 63.1348]

### *Operation of Affected Source*

This emissions unit is an activity of gypsum and limestone being stored and transferred.

OPERATIONAL PARAMETERS FOR EMISSIONS UNIT

| | |
|---|---|
| Weight per unit time of raw materials input | 75 TPH |
| Process temperature or pressure | Ambient |
| Chemical or physical data on product or raw materials | Gypsum & limestone |

The material is transferred to the elevated storage bins mechanically by bucket elevator and belt conveyor. From the elevated bin, the material is fed by gravity onto belt feeders. The loading, unloading, handling, transfer and storage of materials is in a totally enclosed system. All dust-laden air generated by the process operations is extracted and vented to the fabric filtering system to meet the emission limits stipulated above.

The bins are measured at least daily and the inventory levels controlled by the control room operator to prevent overfilling.

### *Maintenance of Affected Source*

Bins are prone to internal buildup of material, particularly if material is wet or if aeration is inadequate. Periodic inspection (every 1-2 years) and maintenance are necessary.

In order to use a bin for material storage, it must be structurally sound, with no evidence of major deterioration or over stressing. Bins with supports and/or walls that show any signs of having been over-stressed during previous use, or that have been badly deteriorated by corrosion, should be repaired before further use. Deteriorated doors and door frames shall be repaired to prevent possible air leakage during aeration. Regular maintenance will help extend the bin's life. At least annually, a thorough inspection of the entire structure is performed, and repairs are made where necessary.

### *Operation of Air Pollution Control Device*

The filter equipment will be operated and maintained according to the manufacturer's recommendations. An adequate inventory of spare parts shall be kept. The particulate matter (PM) emissions from the materials being transferred are controlled by a medium temperature baghouse fabric filter system. The baghouse is put in operation prior to the start of source operation, and remains in operation while the source is in operation.

Operators are familiar with startup and shutdown procedures of dust control systems. All dust control systems should be in operation before any processing equipment is started. Certain units are equipped with an alarm to sound when a dust collector stops operating.

OPERATIONAL PARAMETERS FOR BAGHOUSE

| | |
|---|---|
| Identification of control device | L-08 |
| Type of control device | Baghouse |
| Stack height | 135 feet |
| Exit diameter | 1.5 feet |
| Bag pressure drop | 2-6” $H_2O$ |
| Actual volumetric flow rate | 5000 acfm |
| Maximum dry standard flow rate | 3920 dscfm |
| Gas temperature | 200° F |
| Percent water vapor | Ambient |
| Bag cleaning method | Pulsed air |
| Bag cleaning cycle: | Periodic |

***Maintenance of Air Pollution Control Device***

See Attachment 1 – Baghouse Maintenance.

## EU 012/M-08 Silo Discharge with Baghouse

### *Emission Limits and Operating Limits*

The owner or operator shall not cause to be discharged any gases from this affected source which exhibit opacity in excess of ten percent.
[40 CFR 63.1348]

### *Operation of Affected Source*

This emissions unit is an activity of clinker, gypsum or limestone being transferred from their silos, to the finish mill feed belt.

OPERATIONAL PARAMETERS FOR EMISSIONS UNIT

| | |
|---|---|
| Weight per unit time of raw materials input | 122 TPH |
| Process temperature or pressure | Ambient |
| Chemical or physical data on product or raw materials | Clinker, gypsum, & limestone |

From the silos, the material is fed by gravity onto belt feeders. The loading, unloading, handling, transfer and storage of materials is in a totally enclosed system. All dust-laden air generated by the process operations is extracted and vented to the fabric filtering system to meet the emission limits stipulated above.

All conveyor transfer points are totally enclosed. Openings for the passage of conveyors are fitted with adequate flexible seals. Scrapers shall be provided at the turning points of all conveyors to remove dust adhered to the belt surface. Conveyors are arranged to minimize free fall as far as practicable. The opening between the silos and weigh belt of the materials is fully enclosed. All dust-laden air generated by the material transfer process shall be totally vented to fabric filtering system to meet the emission limits stipulated above.

### *Maintenance of Affected Source*

- ☐ Inspect and adjust all belt conveyors and their skirting rubber and dust seals
- ☐ Replace torn or defective conveyor belts to prevent leakage
- ☐ Inspect and repair belt covers and enclosures as required to prevent leakage
- ☐ Inspect belt scrapers on belt conveyors and adjust, replace worn-out components

### *Operation of Air Pollution Control Device*

The filter equipment will be operated and maintained according to the manufacturer's recommendations. An adequate inventory of spare parts shall be kept. The particulate matter (PM) emissions from the materials being transferred are controlled by a low temperature baghouse fabric filter system. The baghouse is put in operation prior to the start of source operation, and remains in operation while the source is in operation.

Operators are familiar with startup and shutdown procedures of dust control systems. All dust control systems should be in operation before any processing equipment is started. Certain units are equipped with an alarm to sound when a dust collector stops operating.

OPERATIONAL PARAMETERS FOR BAGHOUSE

| | |
|---|---|
| Identification of control device | M-08 |
| Type of control device | Baghouse |
| Stack height | 135 feet |
| Exit diameter | 2.5 feet |
| Bag pressure drop | 2-6” $H_2O$ |
| Actual volumetric flow rate | 9000 acfm |
| Maximum dry standard flow rate | 8316 dscfm |
| Gas temperature | 100° F |
| Percent water vapor | Ambient |
| Bag cleaning method | Pulsed air |
| Bag cleaning cycle: | Periodic |

***Maintenance of Air Pollution Control Device***

See Attachment 1 – Baghouse Maintenance.

## EU TBA/L-03 Clinker Cooler Discharge with Baghouse

### *Emission Limits and Operating Limits*

The owner or operator shall not cause to be discharged any gases from this affected source which exhibit opacity in excess of ten percent.
[40 CFR 63.1348]

### *Operation of Affected Source*

This emissions unit is an activity of clinker being transferred from the clinker cooler.

From the clinker cooler, the clinker is transported by gravity or drag chain conveyor to a deep bucket conveyor. The loading, unloading, handling, transfer and storage of materials is in a totally enclosed system. All dust-laden air generated by the process operations is extracted and vented to the fabric filtering system to meet the emission limits stipulated above.

All conveyor transfer points are totally enclosed. Openings for the passage of conveyors are fitted with adequate flexible seals. Conveyors are arranged to minimize free fall as far as practicable. All dust-laden air generated by the material transfer process shall be totally vented to fabric filtering system to meet the emission limits stipulated above.

OPERATIONAL PARAMETERS FOR EMISSIONS UNIT

| | |
|---|---|
| Weight per unit time of raw materials input | 83 TPH |
| Process temperature or pressure | >Ambient |
| Chemical or physical data on product or raw materials | Clinker |

### *Maintenance of Affected Source*

- ☐ Inspect drag chain housing and deep bucket conveyor covers and repair as required to prevent leakage
- ☐ Inspect material transfer chutes and repair as required to prevent leakage
- ☐ Inspect dust collector vent ducts and repair as required
- ☐ Inspect deep bucket conveyor buckets for holes and repair as required

### *Operation of Air Pollution Control Device*

The filter equipment will be operated and maintained according to the manufacturer's recommendations. An adequate inventory of spare parts shall be kept. The particulate matter (PM) emissions from the materials being transferred are controlled by a high temperature baghouse fabric filter system. The baghouse is put in operation prior to the start of source operation, and remains in operation while the source is in operation.

Operators are familiar with startup and shutdown procedures of dust control systems. All dust control systems should be in operation before any processing equipment is started. Certain units are equipped with an alarm to sound when a dust collector stops operating.

OPERATIONAL PARAMETERS FOR BAGHOUSE

| | |
|---|---|
| Identification of control device | L-03 |
| Type of control device | Baghouse |
| Stack height | 10 feet |
| Exit diameter | 1.0 feet |
| Bag pressure drop | 2-6” $H_2O$ |
| Actual volumetric flow rate | 5100 acfm |
| Maximum dry standard flow rate | 3717 dscfm |
| Gas temperature | 250° F |
| Percent water vapor | Ambient |
| Bag cleaning method | Pulsed air |
| Bag cleaning cycle: | Periodic |

***Maintenance of Air Pollution Control Device***

See Attachment 1 – Baghouse Maintenance.

## EU 013/N-13 Finish Mill with Baghouse

### *Emission Limits and Operating Limits*

The owner or operator of each new or existing raw mill or finish mill shall not cause to be discharged from the mill sweep or air separator air pollution control devices of these affected sources any gases which exhibit opacity in excess of ten percent.
[40 CFR 63.1347]

### *Operation of Affected Source*

The final process stage includes grinding the clinker and gypsum to produce cement. Grinding mills are equipped with alloy steel grinding balls. The ball mill grinds the clinker into the final product, for distribution and packaging. The mill works in a closed circuit with a dynamic separator which separates cement of the required fineness from that which needs further grinding. The coarse fraction is returned to the mill.

The accuracy and reliability of metering and proportioning of the mill feed components by weight is critical for maintaining product quality and the high energy efficiency of a grinding system. The metering and proportioning equipment for the material feed to the mill is belt weigh feeders.

The plant uses a pulse-jet fabric filter with a high-efficiency separator. The cement dust collected by the fabric filter is restored to the system.

OPERATIONAL PARAMETERS FOR EMISSIONS UNIT

| | |
|---|---|
| Weight per unit time of raw materials input | 125 TPH |
| Process temperature or pressure | >Ambient |
| Chemical or physical data on product or raw materials | Clinker, gypsum & limestone |

### *Maintenance of Affected Source*

Preventive maintenance provides for more productivity through increased uptime. The mill maintenance program reflects the fact that long lead times are required to procure and deliver materials to the site. A target is to maintain a three-month inventory of wear parts and common failure components on-site, to carry a large inventory of spare parts, and to stock two years of certain mechanical, electrical and instrumentation spares.

The inspection and maintenance program includes periodic assessments of the condition of ducting, hoods, conveyors, elevator housings, and other equipment.

### *Operation of Air Pollution Control Device*

The filter equipment will be operated and maintained according to the manufacturer's recommendations. An adequate inventory of spare parts shall be kept. The particulate matter (PM) emissions from the materials being transferred are controlled by a high temperature baghouse fabric filter system. The baghouse is put in operation prior to the start of source operation, and remains in operation while the source is in operation.

Operators are familiar with startup and shutdown procedures of dust control systems. All dust control systems should be in operation before any processing equipment is started. Certain units are equipped with an alarm to sound when a dust collector stops operating.

OPERATIONAL PARAMETERS FOR BAGHOUSE

| | |
|---|---|
| Identification of control device | N-13 |
| Type of control device | Baghouse |
| Stack height | 70 feet |
| Exit diameter | 5.0 feet |
| Bag pressure drop | 2-6” $H_2O$ |
| Actual volumetric flow rate | 40000 acfm |
| Maximum dry standard flow rate | 30892 dscfm |
| Gas temperature | 210° F |
| Percent water vapor | Ambient |
| Bag cleaning method | Pulsed air |
| Bag cleaning cycle: | Periodic |

***Maintenance of Air Pollution Control Device***

See Attachment 1 – Baghouse Maintenance.

## EU 014/Q-17 Cement Storage Silos #1 & #2 Discharge System with Baghouses

### *Emission Limits and Operating Limits*

The owner or operator shall not cause to be discharged any gases from this affected source which exhibit opacity in excess of ten percent.
[40 CFR 63.1348]

### *Operation of Affected Source*

This emissions unit is an activity of cement being transferred from silos. This emissions unit includes systems for in-plant distribution to loading areas and to packaging systems.

OPERATIONAL PARAMETERS FOR EMISSIONS UNIT

| | |
|---|---|
| Weight per unit time of raw materials input | 300 TPH |
| Process temperature or pressure | Ambient |
| Chemical or physical data on product or raw materials | Cement |

From the silos, the material is fed by gravity and air gravity conveyors. The loading, unloading, handling, transfer and storage of materials is in a totally enclosed system. All dust-laden air generated by the process operations is extracted and vented to the fabric filtering system to meet the emission limits stipulated above.

All conveyor transfer points are totally enclosed. All dust-laden air generated by the material transfer process shall be totally vented to fabric filtering system to meet the emission limits stipulated above.

### *Maintenance of Affected Source*

- ☐ Inspect air gravity conveyor housings and repair as required to prevent leakage
- ☐ Inspect loading spouts for holes and repair as required
- ☐ Inspect material transfer chutes for holes and repair as required to prevent leakage
- ☐ Inspect dust collector ducting for holes and repair as required
- ☐ Inspect control valves for holes and seal deterioration and repair as required to prevent leakage
- ☐ Inspect all pneumatic lines for cracks

### *Operation of Air Pollution Control Device*

The filter equipment will be operated and maintained according to the manufacturer's recommendations. An adequate inventory of spare parts shall be kept. The particulate matter (PM) emissions from the materials being transferred are controlled by a low temperature baghouse fabric filter system. The baghouse is put in operation prior to the start of source operation, and remains in operation while the source is in operation.

Operators are familiar with startup and shutdown procedures of dust control systems. All dust control systems should be in operation before any processing equipment is started. Certain units are equipped with an alarm to sound when a dust collector stops operating.

OPERATIONAL PARAMETERS FOR BAGHOUSE

| | |
|---|---|
| Identification of control device | Q-17 |
| Type of control device | Baghouse |
| Stack height | 50 feet |
| Exit diameter | 1.5 feet |
| Bag pressure drop | 2-6” $H_2O$ |
| Actual volumetric flow rate | 3200 acfm |
| Maximum dry standard flow rate | 2671 dscfm |
| Gas temperature | 160° F |
| Percent water vapor | Ambient |
| Bag cleaning method | Pulsed air |
| Bag cleaning cycle: | Periodic |

***Maintenance of Air Pollution Control Device***

See Attachment 1 – Baghouse Maintenance.

## EU 015/Q-15 Cement Storage Silos #1 & #2 with Baghouse

### *Emission Limits and Operating Limits*

The owner or operator shall not cause to be discharged any gases from this affected source which exhibit opacity in excess of ten percent.
[40 CFR 63.1348]

### *Operation of Affected Source*

This emissions unit is an activity of cement being pneumatically transferred to two storage silos from the finish mill.

OPERATIONAL PARAMETERS FOR EMISSIONS UNIT

| | |
|---|---|
| Weight per unit time of raw materials input | 125 TPH each |
| Process temperature or pressure | >Ambient |
| Chemical or physical data on product or raw materials | Cement |

The material is transferred to the silos pneumatically. From the silos, the material is fed by gravity to trucks, or pneumatically to railcar loading or to bagging. The loading, unloading, handling, transfer and storage of materials is in a totally enclosed system. All dust-laden air generated by the process operations is extracted and vented to the fabric filtering system to meet the emission limits stipulated above.

The silos are measured at least daily. The control room operator controls the inventory levels to prevent overfilling.

### *Maintenance of Affected Source*

Silos are prone to internal buildup of material, particularly if material is wet or if aeration is inadequate. Periodic inspection (every 1-2 years) and maintenance are necessary.

In order to use a silo for material storage, it must be structurally sound, with no evidence of major deterioration or over stressing. Deteriorated doors and door frames shall be repaired to prevent possible air leakage during aeration. Regular maintenance will help extend the silo's life. Silos need periodic inspection and maintenance, such as cleaning. At least annually, a thorough inspection of the entire structure is performed, and repairs are made where necessary.

Storage silos allow cement plants to stockpile inventory until needed. Buildup on the vessel walls, however, can rob plants of the storage capacity in which they have invested. Buildups slow material flow and decrease the "live" capacity of the vessel. Overcoming these flow problems and recovering storage capacity may require silo cleaning.

Several types of equipment can be used for silo cleaning. One of these operates like an industrial-strength "weed whip," rotating a set of "flails" against the material in the vessel. The cleaning head is typically inserted through the access port down into the vessel on a pivoting arm.

Any clean-out activity must be carefully controlled to avoid damage to the inner wall, which can reduce flow and cause continuing problems. Steel chain is commonly used for cement or any compacted material where there is no risk of explosion. Nonsparking brass chain is effective for compacted materials where the risk of fire or explosion is present.

Before the cleaning process is initiated, a path for loosened material to leave the vessel must be secured, and the discharge opening must be clear. A transport mechanism at the bottom — a conveyor, a truck, or a loader — is required to avoid buildup below the discharge and blockage of the opening as large quantities of material are removed. In cleaning, the operator starts at the bottom and progresses upward. Wall accumulations are undercut until they fall by their own weight.

### *Operation of Air Pollution Control Device*

The filter equipment will be operated and maintained according to the manufacturer's recommendations. An adequate inventory of spare parts shall be kept. The particulate matter (PM) emissions from the materials being transferred are controlled by a medium temperature baghouse fabric filter system. The baghouse is put in operation prior to the start of source operation, and remains in operation while the source is in operation.

Operators are familiar with startup and shutdown procedures of dust control systems. All dust control systems should be in operation before any processing equipment is started. Certain units are equipped with an alarm to sound when a dust collector stops operating.

OPERATIONAL PARAMETERS FOR BAGHOUSE

| | |
|---|---|
| Identification of control device | Q-15 |
| Type of control device | Baghouse |
| Stack height | 200 feet |
| Exit diameter | 2.0 feet |
| Bag pressure drop | 2-6" $H_2O$ |
| Actual volumetric flow rate | 7400 acfm |
| Maximum dry standard flow rate | 5983 dscfm |
| Gas temperature | 180° F |
| Percent water vapor | Ambient |
| Bag cleaning method | Pulsed air |
| Bag cleaning cycle: | Periodic |

### *Maintenance of Air Pollution Control Device*

See Attachment 1 – Baghouse Maintenance.

## EU 017/D-63 Iron Ore Bin with Baghouse

### *Emission Limits and Operating Limits*

The owner or operator shall not cause to be discharged any gases from this affected source which exhibit opacity in excess of ten percent.
[40 CFR 63.1348]

### *Operation of Affected Source*

This emissions unit is an activity of iron ore being stored in a bin.

OPERATIONAL PARAMETERS FOR EMISSIONS UNIT

| | |
|---|---|
| Weight per unit time of raw materials input | 100 TPH |
| Process temperature or pressure | Ambient |
| Chemical or physical data on product or raw materials | Iron ore |

The material is transferred to the elevated storage bin by bucket elevator. From the elevated bin, the material is fed by a belt feeder. The loading, unloading, handling, transfer and storage of materials is in a totally enclosed system. All dust-laden air generated by the process operations is extracted and vented to the fabric filtering system to meet the emission limits stipulated above.

The bin is equipped with a high level probe and a flashing alarm to warn of overfilling. The high-level alarm indicators are interlocked with the material filling line such that in the event of the bin approaching an overfilling condition, an alarm will operate, and the material filling feeder will be stopped.

### *Maintenance of Affected Source*

Bins are prone to internal buildup of material, particularly if material is wet or if aeration is inadequate. Periodic inspection (every 1-2 years) and maintenance are necessary.

In order to use a bin for material storage, it must be structurally sound, with no evidence of major deterioration or over stressing. Bins with supports and/or walls that show any signs of having been over-stressed during previous use, or that have been badly deteriorated by corrosion, shall be repaired before further use. Deteriorated doors and door frames shall be repaired to prevent possible air leakage during aeration. Regular maintenance will help extend the bin's life. At least annually, a thorough inspection of the entire structure is performed, and repairs are made where necessary.

### *Operation of Air Pollution Control Device*

The filter equipment will be operated and maintained according to the manufacturer's recommendations. An adequate inventory of spare parts shall be kept. The particulate matter (PM) emissions from the materials being transferred are controlled by a low temperature baghouse fabric filter system. The baghouse is put in operation prior to the start of source operation, and remains in operation while the source is in operation.

Operators are familiar with startup and shutdown procedures of dust control systems. All dust control systems should be in operation before any processing equipment is started. Certain units are equipped with an alarm to sound when a dust collector stops operating.

OPERATIONAL PARAMETERS FOR BAGHOUSE

| | |
|---|---|
| Identification of control device | D-63 |
| Type of control device | Baghouse |
| Stack height | 51 feet |
| Exit diameter | 1.5 feet |
| Bag pressure drop | 2-6” $H_2O$ |
| Actual volumetric flow rate | 3600 acfm |
| Maximum dry standard flow rate | 2911 dscfm |
| Gas temperature | 180° F |
| Percent water vapor | Ambient |
| Bag cleaning method | Pulsed air |
| Bag cleaning cycle: | Periodic |

***Maintenance of Air Pollution Control Device***

See Attachment 1 – Baghouse Maintenance.

## EU 019/M-05 Finish Mill Feed Belt with Baghouse

### *Emission Limits and Operating Limits*

The owner or operator shall not cause to be discharged any gases from this affected source which exhibit opacity in excess of ten percent.
[40 CFR 63.1348]

### *Operation of Affected Source*

This emissions unit is an activity of transferring clinker, gypsum and limestone to the finish mill.

The loading, unloading, handling, transfer and storage of materials is in a totally enclosed system. All dust-laden air generated by the process operations is extracted and vented to the fabric filtering system to meet the emission limits stipulated above.

All conveyor transfer points are totally enclosed. Openings for the passage of conveyors are fitted with adequate flexible seals. Scrapers shall be provided at the turning points of all conveyors to remove dust adhered to the belt surface. Conveyors are arranged to minimize free fall as far as practicable. All dust-laden air generated by the material transfer process shall be totally vented to fabric filtering system to meet the emission limits stipulated above.

OPERATIONAL PARAMETERS FOR EMISSIONS UNIT

| | |
|---|---|
| Weight per unit time of raw materials input | 120 TPH |
| Process temperature or pressure | >Ambient |
| Chemical or physical data on product or raw materials | Clinker |

### *Maintenance of Affected Source*

- ☐ Inspect and adjust all belt conveyors and their skirting rubber and dust seals
- ☐ Inspect belt conveyor covers and repair as required
- ☐ Replace torn or defective conveyor belts to prevent spillage
- ☐ Inspect material transfer chutes for holes and repair as required to prevent leakage
- ☐ Inspect dust collector vent ducts for holes
- ☐ Inspect belt scrapers on belt conveyors and adjust, replace worn-out components

### *Operation of Air Pollution Control Device*

The filter equipment will be operated and maintained according to the manufacturer's recommendations. An adequate inventory of spare parts shall be kept. The particulate matter (PM) emissions from the materials being transferred are controlled by a low temperature baghouse fabric filter system. The baghouse is put in operation prior to the start of source operation, and remains in operation while the source is in operation.

Operators are familiar with startup and shutdown procedures of dust control systems. All dust control systems should be in operation before any processing equipment is started. Certain units are equipped with an alarm to sound when a dust collector stops operating.

OPERATIONAL PARAMETERS FOR BAGHOUSE

| | |
|---|---|
| Identification of control device | M-05 |
| Type of control device | Baghouse |
| Stack height | 29 feet |
| Exit diameter | 2.0 feet |
| Bag pressure drop | 2-6” $H_2O$ |
| Actual volumetric flow rate | 9000 acfm |
| Maximum dry standard flow rate | 8820 dscfm |
| Gas temperature | $85^o$ F |
| Percent water vapor | Ambient |
| Bag cleaning method | Pulsed air |
| Bag cleaning cycle: | Periodic |

***Maintenance of Air Pollution Control Device***

See Attachment 1 – Baghouse Maintenance.

## EU 020/ In-Line Kiln I/Raw Mill and Clinker Cooler I with Baghouse
### *Emission Limits and Operating Limits*

**40 CFR 63.1343 Standards for kilns and in-line kiln/raw mills.**
(a) *General*. The provisions in this section apply to each kiln, each in-line kiln/raw mill, and any alkali bypass associated with that kiln or in-line kiln/raw mill.
(b) *Existing, reconstructed, or new brownfield/major sources*. No owner or operator of an existing, reconstructed or new brownfield kiln or an existing, reconstructed or new brownfield in-line kiln/raw mill at a facility that is a major source subject to the provisions of this subpart shall cause to be discharged into the atmosphere from these affected sources, any gases which:
(1) Contain particulate matter (PM) in excess of 0.15 kg per Mg (0.30 lb per ton) of feed (dry basis) to the kiln. When there is an alkali bypass associated with a kiln or in-line kiln/raw mill, the combined particulate matter emissions from the kiln or in-line kiln/raw mill and the alkali bypass are subject to this emission limit.
(2) Exhibit opacity greater than 20 percent.
(3) Contain D/F in excess of:
(i) 0.20 ng per dscm ($8.7 \times 10^{-11}$ gr per dscf) (TEQ) corrected to seven percent oxygen; or
(ii) 0.40 ng per dscm ($1.7 \times 10^{-10}$ 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 deg.C (400 deg.F) or less.
(c) *Greenfield/major sources*. Not applicable at time of initial O&M Plan preparation.
(d) *Existing, reconstructed, or new brownfield/area sources*. Not applicable at time of initial O&M Plan preparation.
(e) *Greenfield/area sources*. Not applicable at time of initial O&M Plan preparation.

**40 CFR 63.1344 Operating limits for kilns and in-line kiln/raw mills.**
(a) The owner or operator of a kiln subject to a D/F emission limitation under 40 CFR 63.1343 must operate the kiln such that the temperature of the gas at the inlet to the kiln particulate matter control device (PMCD) and alkali bypass PMCD, if applicable, does not exceed the applicable temperature limit specified in paragraph (b) of this section. The owner or operator of an in-line kiln/raw mill subject to a D/F emission limitation under 40 CFR 63.1343 must operate the in-line kiln/raw mill, such that:
(1) When the raw mill of the in-line kiln/raw mill is operating, the applicable temperature limit for the main in-line kiln/raw mill exhaust, specified in paragraph (b) of this section and established during the performance test when the raw mill was operating is not exceeded.
(2) When the raw mill of the in-line kiln/raw mill is not operating, the applicable temperature limit for the main in-line kiln/raw mill exhaust, specified in paragraph (b) of this section and established during the performance test when the raw mill was not operating, is not exceeded.
(3) If the in-line kiln/raw mill is equipped with an alkali bypass, the applicable temperature limit for the alkali bypass, specified in paragraph (b) of this section and established during the performance test when the raw mill was operating, is not exceeded.

(b) The temperature limit for affected sources meeting the limits of paragraph (a) of this section or paragraphs (a)(1) through (a)(3) of this section is determined in accordance with 40 CFR 63.1349(b)(3)(iv).
(c) Carbon injection – Not applicable at time of initial O&M Plan preparation.
(d) Carbon injection – Not applicable at time of initial O&M Plan preparation.
(e) Carbon injection – Not applicable at time of initial O&M Plan preparation.

**40 CFR 63.1345 Standards for clinker coolers.**
(a) No owner or operator of a new or existing clinker cooler at a facility which is a major source subject to the provisions of this subpart shall cause to be discharged into the atmosphere from the clinker cooler any gases which:
(1) Contain particulate matter in excess of 0.050 kg per Mg (0.10 lb per ton) of feed (dry basis) to the kiln.
(2) Exhibit opacity greater than ten percent.
(b) [Reserved].

**40 CFR 63.1347 Standards for raw and finish mills.**
The owner or operator of each new or existing raw mill or finish mill at a facility which is a major source subject to the provisions of this subpart shall not cause to be discharged from the mill sweep or air separator air pollution control devices of these affected sources any gases which exhibit opacity in excess of ten percent.

### *Operation of Affected Source*
The cement plant is designed for 1800 tons/day of cement clinker product. The cement kiln I, in-line kiln/raw mill and clinker cooler I share a common baghouse fabric filter system (for particulate matter emissions control) and stack with the power plant. Waste heat from the kiln is used to provide heat to the raw mill and the kiln preheater, which is used to drive off moisture from the materials used for making clinker. The movement of raw materials, recycled materials, and product will be through enclosed transfer systems. All gas streams from the various transfer systems will vent through a single baghouse system into the ambient air. The existing site is zoned for mining, so limestone and clay used in the production of cement will be supplied on site. The kiln is allowed to fire bituminous coal, distillate and residual fuel oil, on-specification used oil, and shredded and whole tires. Continuous monitors are operated for opacity, NOx, $SO_2$, and $O_2$.

In addition to meeting environmental standards, kiln burning stability increases such things as the kiln brick life, refractory life, requires less frequent warm-up times and lowers fuel consumption.

The kiln product (clinker) discharges from the kiln into the clinker cooler. Cooled clinker is then discharged into a conveyor system and carried to storage.

OPERATIONAL PARAMETERS FOR EMISSIONS UNIT

| | |
|---|---|
| Weight per unit time of raw materials input | 138 TPH: Raw mill<br>127 TPH: Kiln preheater<br>83 TPH: Clinker cooler |
| Process temperature or pressure | >Ambient |
| Fuel or fuel mixture | bituminous coal, distillate and residual fuel oil, on-specification used oil, and shredded and whole tires |
| Chemical or physical data on product | Clinker |

### *Maintenance of Affected Source*

The kiln is the main machine in the cement manufacturing process. Kiln repair and maintenance are critical components in assuring the efficiency of the cement manufacturing plant. If not maintained properly, kiln run-time will be reduced, causing substantial economic losses. Maintenance procedures performed according to prescribed instructions will significantly improve the performance of the kiln and increase plant efficiency.

Proper kiln maintenance techniques ensure desirable operating efficiency. Alignment and ovality measurements can help prevent breakdowns. Inspection and maintenance of the clinker cooler are also important.

Plant availability is critical in a continuous process such as cement production, and an important part is implementing maintenance based on predictive maintenance information. High kiln availability can impact the stability of auxiliary equipment – shutdowns can have a “domino effect” on auxiliary equipment.

Vibration analysis and monitoring is a part of the preventive maintenance program. Unplanned maintenance on a continuous process line can result in higher costs per ton of clinker. The use of predictive maintenance techniques allows one planned shutdown per year, with four or five minor stops and starts. Vibration analysis identifies potential problems and corrective actions can be initiated to eliminate the influence on the component from other sources, such as imbalance or misalignment.

Mechanical personnel are aware of the importance of setting up a machine within certain criteria to enable a long, trouble-free mechanical life. When setting up a machine after repairs or installation, ensure that imbalance or pulley wobbles are eliminated. Evaluate clinker cooler fans, simple, inexpensive adjustments can lower the overall vibration levels.

Predictive maintenance can reduce the systematic replacement of components, regardless of their condition. Individual job requests are initiated when there is evidence that a component is deteriorating. This information is used to determine a plan of action to carry out repairs at the most convenient time, allowing lead time for planning and ordering of parts, labor resources.

An effective predictive maintenance program looks at the rate of change over a period of time with a set of machinery components, using specific criteria to asses the various individual components that make up a particular machine. Another benefit of predictive maintenance is inventory stock control of mechanical components.

- ☐ Inspect preheater system
- ☐ Inspect kiln shell
- ☐ Inspect kiln supports
- ☐ Inspect kiln drive
- ☐ Evaluate alignment and mechanical balance of kiln
- ☐ Inspect clinker cooler
- ☐ Inspect kiln lining at regular intervals
- ☐ Check the kiln shell temperature. Special attention must be focused on the covered areas in the burning zone where high surface temperatures may occur
- ☐ The clearance between the kiln shell and kiln riding-rings must be checked at regular intervals

### *Operation of Air Pollution Control Device*

The filter equipment will be operated and maintained according to the manufacturer's recommendations. An adequate inventory of spare parts shall be kept. The particulate matter (PM) emissions are controlled by a high temperature baghouse fabric filter system. The baghouse is put in operation prior to the start of source operation, and remains in operation while the source is in operation.

Operators are familiar with startup and shutdown procedures of dust control systems. All dust control systems should be in operation before any processing equipment is started. Certain units are equipped with an alarm to sound when a dust collector stops operating.

OPERATIONAL PARAMETERS FOR BAGHOUSE

| | |
|---|---|
| Type of control device | Baghouse |
| Stack height | 300 feet |
| Exit diameter | 16.0 feet |
| Bag pressure drop | 2-6" $H_2O$ |
| Actual volumetric flow rate | 577,700 acfm |
| Maximum dry standard flow rate | 376,796 dscfm |
| Gas temperature | $220^o$ F |
| Percent water vapor | Ambient |
| Bag cleaning method | Reverse air |
| Bag cleaning cycle: | Periodic |

### *Maintenance of Air Pollution Control Device*

See Attachment 1 – Baghouse Maintenance.

## EU 021/Z-17 Cement Storage Silo #3 Discharge System with Baghouse

### *Emission Limits and Operating Limits*

The owner or operator shall not cause to be discharged any gases from this affected source which exhibit opacity in excess of ten percent.
[40 CFR 63.1348]

### *Operation of Affected Source*

This emissions unit is an activity of cement being transferred from silos. This emissions unit includes systems for in-plant distribution to loading areas and to packaging systems.

OPERATIONAL PARAMETERS FOR EMISSIONS UNIT

| | |
|---|---|
| Weight per unit time of raw materials input | 300 TPH |
| Process temperature or pressure | Ambient |
| Chemical or physical data on product or raw materials | Cement |

From the silos, the material is fed by gravity. The loading, unloading, handling, transfer and storage of materials is in a totally enclosed system. All dust-laden air generated by the process operations is extracted and vented to the fabric filtering system to meet the emission limits stipulated above.

All conveyor transfer points are totally enclosed. Openings for the passage of conveyors are fitted with adequate flexible seals. Scrapers shall be provided at the turning points of all conveyors to remove dust adhered to the belt surface. Conveyors are arranged to minimize free fall as far as practicable. The opening between the silos and weigh belt of the materials is fully enclosed. Loading to trucks and railcars is through a flexible rubber boot. All dust-laden air generated by the material transfer process shall be totally vented to fabric filtering system to meet the emission limits stipulated above.

### *Maintenance of Affected Source*

- ☐ Inspect and adjust all belt conveyors and their skirting rubber and dust seals
- ☐ Check the speed of belt conveyors and slow then down, if possible, to reduce dust circulation and spillage
- ☐ Replace torn or defective conveyor belts
- ☐ Inspect belt conveyor idlers and nonmoving idlers
- ☐ Remove and replace missing or broken idlers
- ☐ Inspect all belt conveyor training idlers, adjust as necessary so the conveyor belt does not travel laterally
- ☐ Inspect belt scrapers on belt conveyors and adjust, replace worn-out components
- ☐ Inspect all pneumatic lines and pumps for cracks
- ☐ Inspect rubber boots for cracks and tears

### *Operation of Air Pollution Control Device*

The filter equipment will be operated and maintained according to the manufacturer's recommendations. An adequate inventory of spare parts shall be kept. The particulate matter (PM) emissions from the materials being transferred are controlled by a low

temperature baghouse fabric filter system. The baghouse is put in operation prior to the start of source operation, and remains in operation while the source is in operation.

Operators are familiar with startup and shutdown procedures of dust control systems. All dust control systems should be in operation before any processing equipment is started. Certain units are equipped with an alarm to sound when a dust collector stops operating.

OPERATIONAL PARAMETERS FOR BAGHOUSE

| | |
|---|---|
| Identification of control device | Z-17 |
| Type of control device | Baghouse |
| Stack height | 50 feet |
| Exit diameter | 1.5 feet |
| Bag pressure drop | 2-6” $H_2O$ |
| Actual volumetric flow rate | 10000 acfm |
| Maximum dry standard flow rate | 8346 dscfm |
| Gas temperature | 160° F |
| Percent water vapor | Ambient |
| Bag cleaning method | Pulsed air |
| Bag cleaning cycle: | Periodic |

***Maintenance of Air Pollution Control Device***

See Attachment 1 – Baghouse Maintenance.

## EU 022/Z-15 Cement Storage Silo #3 with Baghouse

### *Emission Limits and Operating Limits*

The owner or operator shall not cause to be discharged any gases from this affected source which exhibit opacity in excess of ten percent.
[40 CFR 63.1348]

### *Operation of Affected Source*

This emissions unit is an activity of cement being pneumatically transferred to the storage silo from the finish mill.

OPERATIONAL PARAMETERS FOR EMISSIONS UNIT

| | |
|---|---|
| Weight per unit time of raw materials input | 125 TPH |
| Process temperature or pressure | >Ambient |
| Chemical or physical data on product or raw materials | Cement |

The material is transferred to the silos pneumatically. From the silo, the material is fed by gravity to trucks or railcars, or pneumatically to bagging. The loading, unloading, handling, transfer and storage of materials is in a totally enclosed system. All dust-laden air generated by the process operations is extracted and vented to the fabric filtering system to meet the emission limits stipulated above.

The silo is equipped with audible high level alarms to warn of overfilling. The high-level alarm indicators are interlocked with the material filling line such that in the event of a silo approaching an overfilling condition, an audible alarm will operate, and the material filling line will be closed.

### *Maintenance of Affected Source*

Silos are prone to internal buildup of material, particularly if material is wet or if aeration is inadequate. Periodic inspection (every 1-2 years) and maintenance are necessary.

In order to use a silo for material storage, it must be structurally sound, with no evidence of major deterioration or over stressing. Deteriorated doors and door frames should be repaired to prevent possible air leakage during aeration. Regular maintenance will help extend the silo's life. Silos need periodic inspection and maintenance, such as cleaning. Each year, preferably when the silo is empty, a thorough inspection of the entire structure is to be performed, and repairs are to be made where necessary.

Storage silos allow cement plants to stockpile inventory until needed. Buildup on the vessel walls, however, can rob plants of the storage systems in which they have invested. Buildups slow material flow and decrease the "live" capacity of the vessel. Overcoming these flow problems and recovering storage capacity may require silo cleaning.

Several types of equipment can be used for silo cleaning. One of these operates like an industrial-strength "weed whip," rotating a set of "flails" against the material in the

vessel. The cleaning head is typically inserted through the access port down into the vessel on a pivoting arm.

Any clean-out activity must be carefully controlled to avoid damage to the inner wall, which can reduce flow and cause continuing problems. Steel chain is commonly used for cement or any compacted material where there is no risk of explosion. Nonsparking brass chain is effective for compacted materials where the risk of fire or explosion is present.

Before the cleaning process is initiated, a path for loosened material to leave the vessel must be secured, and the discharge opening must be clear. A transport mechanism at the bottom — a conveyor, a truck, or a loader — is required to avoid buildup below the discharge and blockage of the opening as large quantities of material are removed. In cleaning, the operator starts at the bottom and progresses upward. Wall accumulations are undercut until they fall by their own weight. Cleaning from the top would cause the removed material to fall on top of the lower accumulation with no place to go until the entire mass is cut away; when the entire section falls, then, the risk of damage to the bottom of the vessel or discharge is considerable.

If a vessel is choked, that is, still running but nearly closed down, it will most likely get worse. As material falls through the vessel, it will build up on the accumulations, gradually restricting the flow path until blockage is total. Consequently, as soon as a partial blockage is noticed, scheduling a cleaning from a service is recommended. Time is then available to work the cleaning into the schedule of the plant and the cleaning contractor. Hung up, clogged, or slow running silos will interfere with the efficiency and profitability of a plant. Remove buildup from silo walls regularly, effectively, and safely.

### *Operation of Air Pollution Control Device*

The filter equipment will be operated and maintained according to the manufacturer's recommendations. An adequate inventory of spare parts shall be kept. The particulate matter (PM) emissions from the materials being transferred are controlled by a medium temperature baghouse fabric filter system. The baghouse is put in operation prior to the start of source operation, and remains in operation while the source is in operation.

Operators are familiar with startup and shutdown procedures of dust control systems. All dust control systems should be in operation before any processing equipment is started. Certain units are equipped with an alarm to sound when a dust collector stops operating.

OPERATIONAL PARAMETERS FOR BAGHOUSE

| | |
|---|---|
| Identification of control device | Z-15 |
| Type of control device | Baghouse |
| Stack height | 200 feet |
| Exit diameter | 2.0 feet |
| Bag pressure drop | 2-6" $H_2O$ |
| Actual volumetric flow rate | 5300 acfm |
| Maximum dry standard flow rate | 4285 dscfm |
| Gas temperature | 180° F |
| Percent water vapor | Ambient |
| Bag cleaning method | Pulsed air |
| Bag cleaning cycle: | Periodic |

### *Maintenance of Air Pollution Control Device*

See Attachment 1 – Baghouse Maintenance.

## EU 023 Cement Storage Silo #4 and Truck Loadout System with Baghouse

### *Emission Limits and Operating Limits*

The owner or operator shall not cause to be discharged any gases from this affected source which exhibit opacity in excess of ten percent.
[40 CFR 63.1348]

### *Operation of Affected Source*

This emissions unit is an activity of cement being pneumatically transferred to the storage silo from the finish mill and an activity of cement being transferred from the silo. This emissions unit includes systems for in-plant distribution to loading areas and to packaging systems.

OPERATIONAL PARAMETERS FOR EMISSIONS UNIT

| | |
|---|---|
| Weight per unit time of raw materials input | 47 TPH: silo, 390 TPH: trucks |
| Process temperature or pressure | >Ambient |
| Chemical or physical data on product or raw materials | Cement |

The material is transferred to the silos pneumatically. From the silo, the material is fed by gravity to trucks or railcars, or pneumatically to bagging. The loading, unloading, handling, transfer and storage of materials is in a totally enclosed system. All dust-laden air generated by the process operations is extracted and vented to the fabric filtering system to meet the emission limits stipulated above.

The silo is equipped with audible high level alarms to warn of overfilling. The high-level alarm indicators are interlocked with the material filling line such that in the event of a silo approaching an overfilling condition, an audible alarm will operate, and the material filling line will be closed.

All conveyor transfer points are totally enclosed. Openings for the passage of conveyors are fitted with adequate flexible seals. Scrapers shall be provided at the turning points of all conveyors to remove dust adhered to the belt surface. Conveyors are arranged to minimize free fall as far as practicable. The opening between the silos and weigh belt of the materials is fully enclosed. Loading to trucks and railcars is through a flexible rubber boot. All dust-laden air generated by the material transfer process shall be totally vented to fabric filtering system to meet the emission limits stipulated above.

### *Maintenance of Affected Source*

Silos are prone to internal buildup of material, particularly if material is wet or if aeration is inadequate. Periodic inspection (every 1-2 years) and maintenance are necessary.

In order to use a silo for material storage, it must be structurally sound, with no evidence of major deterioration or over stressing. Deteriorated doors and door frames should be repaired to prevent possible air leakage during aeration. Regular maintenance will help extend the silo's life. Silos need periodic inspection and maintenance, such as cleaning.

Each year, preferably when the silo is empty, a thorough inspection of the entire structure is to be performed, and repairs are to be made where necessary.

Storage silos allow cement plants to stockpile inventory until needed. Buildup on the vessel walls, however, can rob plants of the storage systems in which they have invested. Buildups slow material flow and decrease the "live" capacity of the vessel. Overcoming these flow problems and recovering storage capacity may require silo cleaning. Do not try to clean a vessel from below. To protect both plant personnel and the structure, the safest method is to clean down from the access opening(s) at the top of the vessel. That opening, however, is not to be used for putting people down into the silo, which likely would constitute a violation of the confined space entry rules.

Several types of equipment can be used for silo cleaning. One of these operates like an industrial-strength "weed whip," rotating a set of "flails" against the material in the vessel. The cleaning head is typically inserted through the access port down into the vessel on a pivoting arm.

Any clean-out activity must be carefully controlled to avoid damage to the inner wall, which can reduce flow and cause continuing problems. Steel chain is commonly used for cement or any compacted material where there is no risk of explosion. Nonsparking brass chain is effective for compacted materials where the risk of fire or explosion is present.

Before the cleaning process is initiated, a path for loosened material to leave the vessel must be secured, and the discharge opening must be clear. A transport mechanism at the bottom — a conveyor, a truck, or a loader — is required to avoid buildup below the discharge and blockage of the opening as large quantities of material are removed. In cleaning, the operator starts at the bottom and progresses upward. Wall accumulations are undercut until they fall by their own weight. Cleaning from the top would cause the removed material to fall on top of the lower accumulation with no place to go until the entire mass is cut away; when the entire section falls, then, the risk of damage to the bottom of the vessel or discharge is considerable.

If a vessel is choked, that is, still running but nearly closed down, it will most likely get worse. As material falls through the vessel, it will build up on the accumulations, gradually restricting the flow path until blockage is total. Consequently, as soon as a partial blockage is noticed, scheduling a cleaning from a service is recommended. Time is then available to work the cleaning into the schedule of the plant and the cleaning contractor. Hung up, clogged, or slow running silos will interfere with the efficiency and profitability of a plant. Remove buildup from silo walls regularly, effectively, and safely.

- ☐ Inspect and adjust all belt conveyors and their skirting rubber and dust seals
- ☐ Check the speed of belt conveyors and slow then down, if possible, to reduce dust circulation and spillage
- ☐ Replace torn or defective conveyor belts
- ☐ Inspect belt conveyor idlers and nonmoving idlers
- ☐ Remove and replace missing or broken idlers

- ☐ Inspect all belt conveyor training idlers, adjust as necessary so the conveyor belt does not travel laterally
- ☐ Inspect belt scrapers on belt conveyors and adjust, replace worn-out components
- ☐ Inspect all pneumatic lines and pumps for cracks
- ☐ Inspect rubber boots for cracks and tears

### *Operation of Air Pollution Control Device*

The filter equipment will be operated and maintained according to the manufacturer's recommendations. An adequate inventory of spare parts shall be kept. The particulate matter (PM) emissions from the materials being transferred are controlled by a low temperature baghouse fabric filter system. The baghouse is put in operation prior to the start of source operation, and remains in operation while the source is in operation.

Operators are familiar with startup and shutdown procedures of dust control systems. All dust control systems should be in operation before any processing equipment is started. Certain units are equipped with an alarm to sound when a dust collector stops operating.

OPERATIONAL PARAMETERS FOR BAGHOUSE

| | |
|---|---|
| Type of control device | Baghouse |
| Stack height | 75 feet |
| Exit diameter | 0.8 feet |
| Bag pressure drop | 2-6" $H_2O$ |
| Actual volumetric flow rate | 860 acfm |
| Maximum dry standard flow rate | 829 dscfm |
| Air to cloth ratio | |
| Bag weave | |
| Bag material | |
| Gas temperature | Ambient |
| Percent water vapor | Ambient |
| Bag cleaning method | Pulsed air |
| Bag cleaning cycle: | Periodic |

### *Maintenance of Air Pollution Control Device*

See Attachment 1 – Baghouse Maintenance.

## EU 024/Z-18 Cement Storage Silo and Railcar Loadout System with Baghouses

### *Emission Limits and Operating Limits*

The owner or operator shall not cause to be discharged any gases from this affected source which exhibit opacity in excess of ten percent.
[40 CFR 63.1348]

### *Operation of Affected Source*

This emissions unit is an activity of cement being pneumatically transferred to the storage silo from the finish mill and an activity of cement being transferred from the silo. This emissions unit includes systems for in-plant distribution to loading areas.

OPERATIONAL PARAMETERS FOR EMISSIONS UNIT

| | |
|---|---|
| Weight per unit time of raw materials input | 30 TPH: silo, 100 TPH: trucks |
| Process temperature or pressure | >Ambient |
| Chemical or physical data on product or raw materials | Cement |

The material is transferred to the silos pneumatically. From the silo, the material is fed by gravity to trucks or railcars. The loading, unloading, handling, transfer and storage of materials is in a totally enclosed system. All dust-laden air generated by the process operations is extracted and vented to the fabric filtering system to meet the emission limits stipulated above.

The silo is equipped with audible high level alarms to warn of overfilling. The high-level alarm indicators are interlocked with the material filling line such that in the event of a silo approaching an overfilling condition, an audible alarm will operate, and the material filling line will be closed.

All conveyor transfer points are totally enclosed. Openings for the passage of conveyors are fitted with adequate flexible seals. Scrapers shall be provided at the turning points of all conveyors to remove dust adhered to the belt surface. Conveyors are arranged to minimize free fall as far as practicable. The opening between the silos and weigh belt of the materials is fully enclosed. Loading to trucks and railcars is through a flexible rubber boot. All dust-laden air generated by the material transfer process shall be totally vented to fabric filtering system to meet the emission limits stipulated above.

### *Maintenance of Affected Source*

Silos are prone to internal buildup of material, particularly if material is wet or if aeration is inadequate. Periodic inspection (every 1-2 years) and maintenance are necessary.

In order to use a silo for material storage, it must be structurally sound, with no evidence of major deterioration or over stressing. Deteriorated doors and door frames should be repaired to prevent possible air leakage during aeration. Regular maintenance will help extend the silo’s life. Silos need periodic inspection and maintenance, such as cleaning.

Each year, preferably when the silo is empty, a thorough inspection of the entire structure is to be performed, and repairs are to be made where necessary.

Storage silos allow cement plants to stockpile inventory until needed. Buildup on the vessel walls, however, can rob plants of the storage systems in which they have invested. Buildups slow material flow and decrease the "live" capacity of the vessel. Overcoming these flow problems and recovering storage capacity may require silo cleaning.

Several types of equipment can be used for silo cleaning. One of these operates like an industrial-strength "weed whip," rotating a set of "flails" against the material in the vessel. The cleaning head is typically inserted through the access port down into the vessel on a pivoting arm.

Any clean-out activity must be carefully controlled to avoid damage to the inner wall, which can reduce flow and cause continuing problems. Steel chain is commonly used for cement or any compacted material where there is no risk of explosion. Nonsparking brass chain is effective for compacted materials where the risk of fire or explosion is present.

Before the cleaning process is initiated, a path for loosened material to leave the vessel must be secured, and the discharge opening must be clear. A transport mechanism at the bottom — a conveyor, a truck, or a loader — is required to avoid buildup below the discharge and blockage of the opening as large quantities of material are removed. In cleaning, the operator starts at the bottom and progresses upward. Wall accumulations are undercut until they fall by their own weight. Cleaning from the top would cause the removed material to fall on top of the lower accumulation with no place to go until the entire mass is cut away; when the entire section falls, then, the risk of damage to the bottom of the vessel or discharge is considerable.

If a vessel is choked, that is, still running but nearly closed down, it will most likely get worse. As material falls through the vessel, it will build up on the accumulations, gradually restricting the flow path until blockage is total. Consequently, as soon as a partial blockage is noticed, scheduling a cleaning from a service is recommended. Time is then available to work the cleaning into the schedule of the plant and the cleaning contractor. Hung up, clogged, or slow running silos will interfere with the efficiency and profitability of a plant. Remove buildup from silo walls regularly, effectively, and safely.

- ☐ Inspect and adjust all belt conveyors and their skirting rubber and dust seals
- ☐ Check the speed of belt conveyors and slow then down, if possible, to reduce dust circulation and spillage
- ☐ Replace torn or defective conveyor belts
- ☐ Inspect belt conveyor idlers and nonmoving idlers
- ☐ Remove and replace missing or broken idlers
- ☐ Inspect all belt conveyor training idlers, adjust as necessary so the conveyor belt does not travel laterally
- ☐ Inspect belt scrapers on belt conveyors and adjust, replace worn-out components
- ☐ Inspect all pneumatic lines and pumps for cracks

☐ Inspect rubber boots for cracks and tears

### *Operation of Air Pollution Control Device*

The filter equipment will be operated and maintained according to the manufacturer's recommendations. An adequate inventory of spare parts shall be kept. The particulate matter (PM) emissions from the materials being transferred are controlled by a low temperature baghouse fabric filter system. The baghouse is put in operation prior to the start of source operation, and remains in operation while the source is in operation.

Operators are familiar with startup and shutdown procedures of dust control systems. All dust control systems should be in operation before any processing equipment is started. Certain units are equipped with an alarm to sound when a dust collector stops operating.

OPERATIONAL PARAMETERS FOR BAGHOUSE

| | |
|---|---|
| Identification of control device | Z-18 |
| Type of control device | Baghouse |
| Stack height | 80 feet |
| Exit diameter | 1.5 feet |
| Bag pressure drop | 2-6" $H_2O$ |
| Actual volumetric flow rate | 500 acfm |
| Maximum dry standard flow rate | 490 dscfm |
| Gas temperature | Ambient |
| Percent water vapor | Ambient |
| Bag cleaning method | Pulsed air |
| Bag cleaning cycle: | Periodic |

### *Maintenance of Air Pollution Control Device*

See Attachment 1 – Baghouse Maintenance.

## Corrective Actions

The owner or operator of a raw mill or finish mill shall monitor opacity by conducting daily visual emissions observations of the mill sweep and air separator PMCDs of these affected sources, in accordance with the procedures of Method 22 of appendix A of 40 CFR 60. The Method 22 test shall be conducted while the affected source is operating at the highest load or capacity level reasonably expected to occur within the day. The duration of the Method 22 test shall be six minutes.

If visible emissions are observed during any Method 22 visible emissions test, the owner or operator must:

(1) Initiate, within one-hour, the corrective actions specified in this site specific operating and maintenance plan; and

(2) Within 24 hours of the end of the Method 22 test in which visible emissions were observed, conduct a visual opacity test of each stack from which visible emissions were observed in accordance with Method 9 of appendix A of 40 CFR 60. The duration of the Method 9 test shall be thirty minutes.

### Applicability of Corrective Actions

The requirement for site-specific corrective actions applies to:

☐ EU 013/N-13 Finish Mill with Baghouse

### Description of Corrective Actions

- Notify control room that finish mill will be going off-line
- Determine availability of clinker storage volume
- Take kiln off-line only as necessary
- Gradually reduce milling rate and cease milling operation
- Perform complete baghouse and ductwork inspection
- Perform necessary repairs
- Put baghouse in operation
- Resume milling
- If any new bags have been installed, allow bags to form a filter cake before conducting the Method 9 test specified above

## Annual Combustion System Inspection

An inspection of the components of the combustion system of the in-line kiln raw mill shall be conducted at least once per year. Optimum combustion conditions in cement kiln systems occur when kiln exit gas oxygen and carbon monoxide emissions are as low as possible. Stated another way, optimum combustion conditions occur when excess air is as low as possible and complete combustion still occurs. A kiln operating with low excess air may cause partial combustion of fuel. A kiln system operating with high excess air

increases the heat loss in the kiln system exit gases. In either case, the net effects are higher specific fuel consumption and lower clinker production.

At a minimum, an inspection shall include the following:

1) Inspect all burners, pilot assemblies, and pilot sensing devices for proper operation; clean pilot flame sensor, as necessary;
2) Ensure proper adjustment of primary and secondary combustion air, and adjust as necessary;
3) Inspect hinges and door latches, and lubricate as necessary;
4) Inspect dampers, fans, and blowers for proper operation;
5) Inspect door and door gaskets for proper sealing;
6) Inspect motors for proper operation;
7) Inspect refractory lining; clean and repair/replace lining as necessary;
8) Inspect kiln shell for corrosion and/or hot spots;
9) Inspect kiln, preheater and stack, clean as necessary;
10) Inspect fuel supply systems, for proper operation;
11) For the burning that follows the inspection, document that the combustion system is operating properly and make any necessary adjustments;
12) Inspect air pollution control device(s) for proper operation;
13) Inspect gas conditioning systems to ensure proper operation;
14) Ensure proper calibration of thermocouples, sorbent feed systems and any other monitoring equipment; and
15) Generally observe that the equipment is maintained in good operating condition.

Within 10 operating days following an equipment inspection all necessary repairs shall be completed unless the owner or operator obtains written approval from the State agency establishing a date whereby all necessary repairs of the designated facility shall be completed.

## Periodic Monitoring

This section provides procedures to be used to periodically monitor affected sources subject to opacity standards under 40 CFR 63.1346 and 63.1348.

### Applicability of Periodic Monitoring

| | | |
|---|---|---|
| ☐ | EU 001/D-75 | Filter Dust Bin |
| ☐ | EU 002/D-67 | Fly Ash/Equilibrium Catalyst Bin |
| ☐ | EU 004/F-14 | Raw Meal Transfer |
| ☐ | EU 006/G-12A & B | Two Blend Silos |
| ☐ | EU 007/H-15 | Kiln Feed Surge Bin |
| ☐ | EU 008/S-04 | Clinker Receiving/Handling System |
| ☐ | EU 010/L-06 & L-07 | Clinker Storage Silo & Finish Mill Storage Silo |
| ☐ | EU 011/L-08 | Gypsum and Limestone Bins |
| ☐ | EU 012/M-08 | Silo Discharge |
| ☐ | EU 014/Q-17 | Cement Storage Silos #1 & #2 Discharge System |
| ☐ | EU 015/Q-15 | Cement Storage Silos #1 & #2 |

| | | |
|---|---|---|
| ☐ | EU 017/D-63 | Iron Ore Bin |
| ☐ | EU 019/M-05 | Finish Mill Feed Belt |
| ☐ | EU 021/Z-17 | Cement Storage Silo #3 Discharge System |
| ☐ | EU 022/Z-15 | Cement Storage Silo #3 |
| ☐ | EU 023 | Cement Storage Silo #4 and Truck Loadout System |
| ☐ | EU 024/Z-18 | Cement Storage Silo and Railcar Loadout System |

### Procedures for Periodic Monitoring

The owner or operator must conduct a monthly 1-minute visible emissions test of each affected source in accordance with Method 22 of Appendix A to 40 CFR 60. The test must be conducted while the affected source is in operation.

If no visible emissions are observed in six consecutive monthly tests for any affected source, the owner or operator may decrease the frequency of testing from monthly to semi-annually for that affected source. If visible emissions are observed during any semi-annual test, the owner or operator must resume testing of that affected source on a monthly basis and maintain that schedule until no visible emissions are observed in six consecutive monthly tests.

If no visible emissions are observed during the semi-annual test for any affected source, the owner or operator may decrease the frequency of testing from semi-annually to annually for that affected source. If visible emissions are observed during any annual test, the owner or operator must resume testing of that affected source on a monthly basis and maintain that schedule until no visible emissions are observed in six consecutive monthly tests.

If visible emissions are observed during any Method 22 test, the owner or operator must conduct a 6-minute test of opacity in accordance with Method 9 of appendix A to 40 CFR 60. The Method 9 test must begin within one hour of any observation of visible emissions.

## Reporting Requirements

The O&M Plan includes procedures for an annual inspection of the combustion system. Results of this inspection are to be included with annual reporting.

Maintenance and inspection records will be kept for five years and provided upon request.

## Startup, Shutdown, and Malfunction Plan

The purpose of the startup, shutdown, and malfunction plan is to—

(A) Ensure that, at all times, owners or operators operate and maintain affected sources, including associated air pollution control equipment, 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 owners or operators are prepared 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).

### Procedures for Malfunctions

Malfunctions shall be corrected as soon as practicable after their occurrence in accordance with the startup, shutdown, and malfunction plan of this section.

The equipment subject to the MACT standards includes equipment such as process equipment (e.g., kiln, raw and finish mills), storage silos, control devices (e.g., baghouses), and continuous monitoring systems (CMS; i.e., monitoring systems used to demonstrate compliance with the MACT standards during normal operation).

Potential malfunctions of the applicable equipment were evaluated to determine whether a particular malfunction could result in excess HAP emissions. Potential malfunctions that may result in excess HAP emissions include:

- broken bags in baghouses
- excess or inadequate combustion air
- high level in a storage vessel
- excessive temperature at inlet of control device

Corrective actions are identified for all malfunctions that have the potential for excess HAP emissions. The standards do not necessarily require facilities to control HAP emissions resulting from malfunctions to the level established in the standard, but to do their best to minimize emissions. The corrective actions are documented in the SSM plan. Operations personnel have reviewed the proposed corrective actions to validate that each will effectively mitigate the malfunction and the resulting excess HAP emissions, while also providing sufficient operational flexibility.

The malfunction scenarios have been identified in the SSM plan and corrective actions have been specified.

| | |
|---|---|
| broken bags in baghouses | Repair bags as necessary |
| excess or inadequate combustion air | Adjust combustion O2 |
| high level in a storage vessel | Cease filling, reduce level |
| excessive temperature at inlet of control device | Repair gas conditioning equipment |

The corrective actions allow operators to react to the malfunction to minimize excess HAP emissions, achieve compliance with the standard, and maintain operational flexibility.

Where two (or more) corrective actions are available, both are included in the SSM plan. This prevents the facility from deviating from the plan (and having to report the deviation to the regulatory agency) if one of the alternatives is not available or is not feasible when a malfunction occurs.

Part of an effective SSM plan implementation is to record the time and duration of each malfunction event identified. Compliance management tools, such as monitoring and recordkeeping systems, are essential in order to demonstrate continued compliance with the SSM requirements. Included in the SSM plan are the monitoring instruments (e.g., oxygen sensors, vessel high level alarms) that will be used to record SSM events for each piece of equipment subject to the standard. Where no instrumentation is available, visual inspections of certain equipment will be performed and documented at regular intervals to demonstrate that SSM events are not occurring.

This SSM plan includes startup and shutdown procedures for the equipment subject to the MACT standards. These procedures were discussed with operations personnel to determine whether a particular routine startup or shutdown activity potentially results in excess HAP emissions. Any that do are documented in the SSM plan.

Specific maintenance procedures for the air pollution control devices and the continuous monitoring systems were developed and documented in the O&M plan or the SSM plan, including the frequency of implementation. The plan identifies all routine or otherwise predictable continuous monitoring systems malfunctions. Routine calibration of the continuous monitoring systems is required. An onsite inventory of critical spare parts is maintained. Routine maintenance of all monitoring equipment is documented.

## Procedures for Startup and Shutdown

Specific procedures for startup and shutdown are included with this plan as attachments.

## Reporting

When actions taken by the owner or operator during a startup, shutdown, or malfunction (including actions taken to correct a malfunction) are consistent with the procedures specified in the affected source's startup, shutdown, and malfunction plan, the owner or

operator shall keep records for that event that demonstrate that the procedures specified in the plan were followed. These records may take the form of a ‘‘checklist,’’ or other effective form of recordkeeping, that confirms conformance with the startup, shutdown, and malfunction plan for that event.

In addition, the owner or operator shall keep records of these events as specified in 40 CFR 63.10(b) (and elsewhere in this part), including records of the occurrence and duration of each startup, shutdown, or malfunction of operation and each malfunction of the air pollution control equipment. Furthermore, the owner or operator shall confirm that actions taken during the relevant reporting period during periods of startup, shutdown, and malfunction were consistent with the affected source’s startup, shutdown and malfunction plan in the semiannual (or more frequent) startup, shutdown, and malfunction report required in 40 CFR 63.10(d)(5).

If an action taken by the owner or operator during a startup, shutdown, or malfunction (including an action taken to correct a malfunction) is not consistent with the procedures specified in the affected source’s startup, shutdown, and malfunction plan, the owner or operator shall record the actions taken for that event and shall report such actions within 2 working days after commencing actions inconsistent with the plan, followed by a letter within 7 working days after the end of the event, in accordance with 40 CFR 63.10(d)(5) (unless the owner or operator makes alternative reporting arrangements, in advance, with the Administrator.

Two kinds of reports are required: the immediate SSM deviation report, and the semi-annual SSM report. A deviation report is sent to the regulatory agency each time an SSM event occurs and the facility deviates from its SSM plan. This notification must be made within two days by phone or facsimile, followed by a written letter within seven days.

The semi-annual report summarizes all of the deviations in the six-month reporting period. Customized reports can be designed and incorporated into the SSM CMT to provide both immediate and periodic reports.

The owner or operator shall keep the written startup, shutdown, and malfunction plan on record after it is developed to be made available for inspection, upon request, by the Administrator for the life of the affected source or until the affected source is no longer subject to the provisions of this part. In addition, if the startup, shutdown, and malfunction plan is revised, the owner or operator shall keep previous (i.e., superseded) versions of the startup, shutdown, and malfunction plan on record, to be made available for inspection, upon request, by the Administrator, for a period of 5 years after each revision to the plan.

## Definitions

*Alkali bypass* means a duct between the feed end of the kiln and the preheater tower through which a portion of the kiln exit gas stream is withdrawn and quickly cooled by air or water to avoid excessive buildup of alkali, chloride and/or sulfur on the raw feed. This may also be referred to as the ``kiln exhaust gas bypass".

*Bagging system* means the equipment which fills bags with Portland cement.

*Clinker cooler* means equipment into which clinker product leaving the kiln is placed to be cooled by air supplied by a forced draft or natural draft supply system.

*Continuous monitor* means a device which continuously samples the regulated parameter specified in 40 CFR 63.1350 of this subpart without interruption, evaluates the detector response at least once every 15 seconds, and computes and records the average value at least every 60 seconds, except during allowable periods of calibration and except as defined otherwise by the continuous emission monitoring system performance specifications in appendix B to part 60 of this chapter.

*Conveying system* means a device for transporting materials from one piece of equipment or location to another location within a facility. Conveying systems include but are not limited to the following: feeders, belt conveyors, bucket elevators and pneumatic systems.

*Conveying system transfer point* means a point where any material including but not limited to feed material, fuel, clinker or product, is transferred to or from a conveying system, or between separate parts of a conveying system.

*Dioxins and furans (D/F)* means tetra-, penta-, hexa-, hepta-, and octa-chlorinated dibenzo dioxins and furans.

*Excess HAP Emissions* — emissions in excess of those that would have occurred if there were no startup, shutdown or malfunction and the owner or operator complied with the relevant provisions of the regulation.

*Facility* means all contiguous or adjoining property that is under common ownership or control, including properties that are separated only by a road or other public right-of-way.

*Feed* means the prepared and mixed materials, which include but are not limited to materials such as limestone, clay, shale, sand, iron ore, mill scale, cement kiln dust and flyash, that are fed to the kiln. Feed does not include the fuels used in the kiln to produce heat to form the clinker product.

*Finish mill* means a roll crusher, ball and tube mill or other size reduction equipment used to grind clinker to a fine powder. Gypsum and other materials may be added to and

blended with clinker in a finish mill. The finish mill also includes the air separator associated with the finish mill.

*Greenfield kiln, in-line kiln/raw mill, or raw material dryer* means a kiln, in-line kiln/raw mill, or raw material dryer for which construction is commenced at a plant site (where no kilns and no in-line kiln/raw mills were in operation at any time prior to March 24, 1998) after March 24, 1998.

*Hazardous waste* is defined in 40 CFR 261.3 of this chapter.

*In-line kiln/raw mill* means a system in a Portland cement production process where a dry kiln system is integrated with the raw mill so that all or a portion of the kiln exhaust gases are used to perform the drying operation of the raw mill, with no auxiliary heat source used. In this system the kiln is capable of operating without the raw mill operating, but the raw mill cannot operate without the kiln gases, and consequently, the raw mill does not generate a separate exhaust gas stream.

*Kiln* means a device, including any associated preheater or precalciner devices, that produces clinker by heating limestone and other materials for subsequent production of Portland cement.

*Kiln exhaust gas bypass* means alkali bypass.

*Malfunction* — 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.

*Monovent* means an exhaust configuration of a building or emission control device (e. g. positive pressure fabric filter) that extends the length of the structure and has a width very small in relation to its length (i. e., length to width ratio is typically greater than 5:1). The exhaust may be an open vent with or without a roof, louvered vents, or a combination of such features.

*New brownfield kiln, in-line kiln raw mill, or raw material dryer* means a kiln, in-line kiln/raw mill or raw material dryer for which construction is commenced at a plant site (where kilns and/or in-line kiln/raw mills were in operation prior to March 24, 1998) after March 24, 1998.

*One-minute average* means the average of thermocouple or other sensor responses calculated at least every 60 seconds from responses obtained at least once during each consecutive 15 second period.

*Portland cement plant* means any facility manufacturing Portland cement.

*Raw material dryer* means an impact dryer, drum dryer, paddle-equipped rapid dryer, air separator, or other equipment used to reduce the moisture content of feed materials.

*Raw mill* means a ball and tube mill, vertical roller mill or other size reduction equipment, that is not part of an in-line kiln/raw mill, used to grind feed to the appropriate size. Moisture may be added or removed from the feed during the grinding operation. If the raw mill is used to remove moisture from feed materials, it is also, by definition, a raw material dryer. The raw mill also includes the air separator associated with the raw mill.

*Rolling average* means the average of all one-minute averages over the averaging period.

*Run average* means the average of the one-minute parameter values for a run.

*Shutdown* — the cessation/stopping of operation of an affected source.

*Startup* — the setting into operation of an affected source.

*TEQ* means the international method of expressing toxicity equivalents for dioxins and furans as defined in U.S. EPA, Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of Chlorinated Dibenzo-p-dioxins and -dibenzofurans (CDDs and CDFs) and 1989 Update, March 1989.

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## Attachment 1: Baghouse Maintenance for Affected Sources other than In-line Kiln/Raw Mill/Clinker Cooler

Daily

- Maintain a written record of the observation and any action resulting from the inspection.

Weekly

- Check and document the baghouse pressure drop. If the pressure drop falls out of the normal operating range, specified by the manufacturer, corrective action will be taken to return the pressure drop to normal.
- Check drive components on fan.
- Maintain a written record of the observation and any action resulting from the inspection.

Monthly

- Visible emissions shall be observed on a monthly basis to ensure no visible emissions during the material handling operation of the unit. If weather conditions prevent the observer from conducting an opacity observation, the observer shall note such conditions on the data observation sheet. If unsuccessful that day due to weather, an observation shall be made the following day.
- Check the cleaning sequence of the baghouse.
- Pulse jet baghouse - check the air delivery system.
- Check compressed air lines including oilers and filters.
- Check the hopper functions and performance.
- Check all moving parts on the discharge system and screw-conveyor bearings.
- If leaks or abnormal conditions are detected the appropriate measures for repair will be implemented within eight (8) hours.
- Maintain a written record of the inspection and any action resulting from the inspection.

Quarterly

- Thoroughly inspect bags for leaks and wear. (Look for obvious holes or tears in the bags.) If leaks or abnormal conditions are detected the appropriate measures for repair will be implemented within eight (8) hours. Bag replacement should be documented by identifying the date, time and location of the bag in relationship to the other bags. The location should be identified on an overhead drawing of the bag layout in the baghouse.
- Check fan for corrosion and blade wear.
- Inspect baghouse housing for corrosion.
- Maintain a written record of the inspection and any action resulting from the inspection.

Semiannual

- Inspect every 6 months all components that are not subject to wear or plugging, including structural components, housing, ducts and hoods.

- Check duct for dust buildup.
- Check gaskets on all doors.
- Inspect paint on baghouse.
- Maintain a written record of the inspection and any action resulting from the inspection.

Annual

- Check all welds and bolts.
- Check hopper for wear.
- Replace high-wear parts on cleaning system.
- Maintain a written record of the observation and any action resulting from the inspection.

Inspection of rotary valves

Inspect the condition of the following:

- ☐ check for wear on bearings and shaft
- ☐ check hopper and chute for holes and leaks
- ☐ check sprocket and chain for wear
- ☐ check chain for tightness
- ☐ spray a thin film of oil on chain
- ☐ check the alignment of the sprockets
- ☐ check oil in gear box
- ☐ check bolts for tightness
- ☐ check gear box for oil leaks
- ☐ are all guards in place and bolted down?

Service of separator duct

- ☐ clean the draft duct from the separator to the dust collector
- ☐ open bottom of dust collector
- ☐ clean all hard build-up inside hopper
- ☐ clean and remove all lumps from grates
- ☐ check that all draft pipes are clear, and clean if necessary
- ☐ lightly tap on all duct work to ensure that pipes are open
- ☐ check partition and walls for cracks
- ☐ seal cracks found in partitions
- ☐ check operation of purge valves
- ☐ check dust pipes and air pipes for leaks
- ☐ check door gaskets for leaks
- ☐ replace broken bags
- ☐ tighten all loose bags
- ☐ remove any dust build up from bags
- ☐ check bag clamps, and replace them if defective
- ☐ clean and remove any dust build up from all compartments

Record number of new bags used: _____

Record in the space below any condition that will require major repairs:_____

_____

Service of pressurizing unit

Cleaning of bottom hopper:

- ☐ place dumpster under hopper
- ☐ inspect bottom of hopper slide gate
- ☐ open bottom of dust collector slide gate
- ☐ lightly tap on hopper to insure that all dust is out of hopper.
- ☐ open bottom hopper inspection.
- ☐ clean all hard build-up inside hopper.
- ☐ clean and remove all lumps from grates.
- ☐ inspect operation of hopper door and seal
- ☐ close hopper inspection door

Record in the space below any condition that will require major repairs:_____

_____

Safety note!!! Respirators must be worn when working inside dust collector.

## Attachment 2: Baghouse Maintenance for In-line Kiln/Raw Mill/Clinker Cooler

Daily

- Maintain a written record of the observation and any action resulting from the inspection.

Weekly

- Check and document the baghouse pressure drop. If the pressure drop falls out of the normal operating range, specified by the manufacturer, corrective action will be taken to return the pressure drop to normal.
- Check drive components on fan.
- Maintain a written record of the observation and any action resulting from the inspection.

Monthly

- Visible emissions shall be observed on a monthly basis to ensure no visible emissions during the material handling operation of the unit. If weather conditions prevent the observer from conducting an opacity observation, the observer shall note such conditions on the data observation sheet. If unsuccessful that day due to weather, an observation shall be made the following day.
- Check the cleaning sequence of the baghouse.
- Pulse jet baghouse - check the air delivery system.
- Check compressed air lines including oilers and filters.
- Check the hopper functions and performance.
- Check all moving parts on the discharge system and screw-conveyor bearings.
- If leaks or abnormal conditions are detected the appropriate measures for repair will be implemented within eight (8) hours.
- Maintain a written record of the inspection and any action resulting from the inspection.

Quarterly

- Thoroughly inspect bags for leaks and wear. (Look for obvious holes or tears in the bags.) If leaks or abnormal conditions are detected the appropriate measures for repair will be implemented within eight (8) hours. Bag replacement should be documented by identifying the date, time and location of the bag in relationship to the other bags. The location should be identified on an overhead drawing of the bag layout in the baghouse.
- Check fan for corrosion and blade wear.
- Inspect baghouse housing for corrosion.
- Maintain a written record of the inspection and any action resulting from the inspection.

Semiannual

- Inspect every 6 months all components that are not subject to wear or plugging, including structural components, housing, ducts and hoods.
- Check duct for dust buildup.
- Check gaskets on all doors.
- Inspect paint on baghouse.
- Maintain a written record of the inspection and any action resulting from the inspection.

Annual

- Check all welds and bolts.
- Check hopper for wear.
- Replace high-wear parts on cleaning system.
- Maintain a written record of the observation and any action resulting from the inspection.

## Attachment 3: Baghouse Startup Procedures

Proper start-up procedures will help extend the life of new filter media in a dust collector. What is generally accepted as start-up procedures is the process designed to intentionally develop a dust cake on the bags. This is referred to as seasoning, or conditioning, the filter media. In a fabric filter dust collector, the filter media is used to support a dust cake. A dust cake is the porous layer of collected particulate that develops during the conditioning period of new collector bags and following each cleaning cycle. The process can be accelerated in many installations by introducing a precoat material, such as agricultural lime, into the system. Commercial precoats also are available. Following installation of the filter bags and inspection of the related auxiliary equipment, the exhaust fan can be started. However, it is extremely important that the new filter bags are not exposed to the full volume (ACFM) of the fan.

First, close the fan damper (or inlet dampers) to one-half open until the monitoring gauge reads about 50% to 65% of the manufacturer's recommended maximum flange-to-flange differential drop. At roughly 75% of the manufacturer's recommended differential pressure, the cleaning system can be initiated. Normal operation and periodic cleaning will bring the pressure drop to a calculable and historically stable level.

Depending on the application, development of this differential pressure may take a number of hours or even days. This is necessary to ensure that the new filter media is exposed to low filtering velocities of dust-laden air. Reducing the volume decreases the airstream's velocity (air-to-cloth ratio), thus protecting the virgin bags from a high velocity impingement of dust. Should the bags be exposed to the fan's full volume, fine particles may embed themselves into the inner fibers of the bags and create a blinding condition. This also can damage the fibers of the media, reducing the life of the bags.

# Attachment 4: In-line Kiln/Raw Mill/Clinker Cooler Startup Procedures

## Kiln Startup Procedures

It is important that ignition be achieved as soon as fuel is injected and, if the flame fails during warm-up, the kiln should be purged with 5 times the volume of kiln, preheater, ducting, and dust collector before re-ignition is attempted. Volatile hydrocarbons accumulate rapidly in the kiln and, if then re-ignited, will potentially explode.

Warm-up follows agreement by production and maintenance management that all work is completed, that all tools and materials have been removed and that all doors are closed. Work may, with discretion, continue in the cooler during warm-up but no workers should remain in the cooler at the time of ignition.

Commonly, warm-up from cold takes 24 hours from ignition to feed-on, but may be increased if extensive refractory work requires curing. The introduction of feed (usually 50% of full rate), and the increase of fuel, speed and feed to normal operation can take another 8 hours from feed-on. The ID fan should be operated at approximately 10% $0_2$ at the back of the kiln to feed-on whereupon the normal $0_2$ target is adopted.

For coal fired kilns, warm-up uses gas or oil with switch-over to coal at the time of feed-on. If the coal mill uses hot gas from the cooler, there may be a delay before heat is available from clinker.

Prior to beginning to bring the kiln on-line, the kiln/raw mill I.D. fan and baghouse are powered to normal operating conditions. The kiln is then preheated with unused No. 2 fuel oil for a period of up to 24-36 hours; depending upon how long the kiln has been shut down.

Once the kiln is sufficiently hot and while still firing unused No. 2 fuel oil, raw meal feed is fed to the preheater at about 30-40 percent of normal feed rate. This material will coat the kiln and will produce clinker that is discharged to the clinker cooler. When there is heat in the clinker cooler, the coal mill is brought on-line and coal firing to the kiln main burner is initiated. At this point, raw meal feed to the preheater is incrementally increased. As the kiln stabilizes, the raw meal feed is incrementally increased until the system is operating at full capacity. Typically, the time from feed-on to full capacity is 3-4 hours.

During the startup of the kiln/raw mill, there could be periods when emissions are higher than normal (pounds per ton of clinker) due to imbalances of feed and fuel. These periods will be minimized through good operating practices. The emissions of particulate matter (PM and PM10), are not expected to exceed permit limits (pounds per ton of clinker) during startup.

This start-up procedure assumes the kiln system has been preheated for desired refractory dry-out but the system is cold. In connection with the normal startup procedure where

the linings have been dried out, the heat procedure can be reduced from the stated 72 hours to 24 hours. All fans, conveyors, air purging system, and associated equipment should be run for a minimum of eight hours and all necessary adjustments made prior to start-up.

### *Kiln Heat-Up*

1. Start the main dust collector fan with damper closed.
2. Open the main dust collector fan damper gradually so that a negative pressure is generated at the dust collector inlet.
3. Open the damper of the preheater I.D. fan 10%.
4. Start the primary air fan and open the associated damper 10%.
5. Start the kiln burner.
6. Check that the fuel is ignited and if necessary, adjust primary air, fuel rate and draft through kiln so that a stable flame is obtained.
7. Increase the fuel volume gradually and slowly.
8. Adjust the draft level in kiln by means of the preheater I.D. fan damper, and main baghouse fan.
9. CAUTION: The flame must not cause sooting. Quite often, this will require that the 02 content indicated by the kiln back end analyzer is 6-8%.
10. It will normally be necessary to start clinker cooler fans to provide adequate combustion air.
11. Start the preheater I.D. fan, if necessary to maintain proper combustion.
12. Start rotating the kiln in accordance with the manufacturer's rotation schedule.
13. Check the supporting roller lubrication – the journals must not become dry.
14. Continuous rotation on the auxiliary drive is required if the kiln is exposed to cooling, e.g. heavy rain showers.
15. After 16 hours of preheating the temperature of the kiln lining should be sufficiently high to ensure ignition of the coal from the operation nozzle, which is put into operation as follows:

    A. Turn off the oil flow to the oil burner.
    B. Retract the oil burner completely.
    C. Replace the oil burner by a burner with an operating nozzle that is ready for operation.

16. After 18 - 20 hours when the kiln gets very hot, raw feed should be introduced to the preheater. A raw feed weight equal to 0.1% of the daily clinker output is a good estimate. When this material gets into the kiln it will help protect the refractory by coating the bricks and filling voids.
17. At the end of the kiln heat-up the remaining clinker cooler fans should be started to protect the grate plates.
18. Start the cooler vent fan to maintain the firing hood pressure by automatic control.
19. Regulate the draft (by adjusting the preheater I.D. fan damper) and the fuel flow to attain an oxygen content of 4 – 6% in the kiln inlet.

### *Kiln Startup*

1. Recirculate kiln feed at the desired starting feed rate. It should be a minimum of 50% of feed rate at full production.
2. Start kiln shell cooling fans.
3. Start cooler drives on minimum speed. Increase the air flows on the front fans to normal operating values and put into automatic control. This will provide sufficient combustion air at startup.
4. Start main kiln drive on minimum speed.
5. Perform the following operations in rapid, but correct, sequence:

    A. Start the I.D. fan if not yet started.
    B. Start the feed to the preheater.
    C. Increase the draft when the feed enters the preheater.
    D. Increase the kiln speed to 1 rpm.
    E. Open the primary air fan damper to 40% (approximately).
    F. Gradually increase the fuel to the kiln and simultaneously adjust the draft to obtain proper oxygen level at the inlet to the kiln.
    G. Open the tertiary air damper.
    H. Adjust the draft and tertiary air to balance the oxygen levels at preheater exit and kiln inlet.

6. Personnel must be stationed in the preheater tower in order to monitor the passage of raw meal. If there is any indication of blocking, the control room must be informed immediately and the kiln operation stopped until the blockage is cleared.
7. Increase the feed and speed of kiln as soon as possible. The preheater is more efficient at high feed rates.
8. Increase the cooler undergrate air flow rates.
9. When the material arrives at the burning zone it may be necessary to reduce the kiln speed to prevent the material from passing the burning zone too quickly. It is very important that the initial material charge is well burned so that the visibility in kiln is not lost due to dust formations. The clinker must be well burnt all the time. If not, increase the raw meal temperature by increasing the draft and fuel quantity.
10. Increase the kiln speed and feed gradually so that the exit gas temperature after the preheater does not exceed safe levels.
11. The maximum production rate can generallly be achieved within a few hours after the startup.

### Raw Mill Startup

Typically, the raw mill is brought on-line during the preheat of the kiln once there is sufficient heat for the raw mill to operate.

The kiln and raw mill usually operate together in what is referred to as the compound mode of operation. This operating mode occurs approximately 90 percent of the time. The remaining 10 percent of the time, the kiln operates alone in what is referred to as the direct operating mode. The raw mill is a source of particulate matter and a source of

combustion products when the raw mill heater operates. The raw mill exhaust gases are discharged through the kiln baghouse.

With the kiln in the direct operating mode, the raw mill is brought on-line by opening the dampers isolating the raw mill; and as quickly and simultaneously as possible starting the raw mill fan, the raw mill and the raw mill feed.

During the startup of the raw mill while the kiln is operating, there can be a brief imbalance in the airflow through the kiln system resulting in short-term spikes in emissions from the kiln. These short-term emission spikes will be minimized by best operating practices. The raw mill startup is not expected to affect particulate matter (PM or PM10) emissions.

### Clinker Cooler Startup

The clinker cooler I.D. fan and baghouse are powered prior to clinker being discharged From the kiln into the clinker cooler. The air flow and clinker flow through The cooler during startup will be controlled to optimize heat recovery. The time to bring the cooler on-line and to full capacity is dependent upon the time required To bring the kiln/raw mill to full capacity. Typically, this time period will be 3-4 hours. Emissions from the cooler are limited to PM and PM10. During the startup period, no excess emissions are expected from the clinker cooler.

It may, from time to time, be necessary to start the grate cooler and the clinker conveying system in order to transport away the materials. In order not to fill up the cooler, the grates should be moved for about 10 minutes every hour at minimum speed. To ensure effective cooling at the cooler inlet, it may at the same time be necessary to start the first fans of the cooler to ensure that there is sufficient air for combustion.

The clinker cooler startup should occur around the same time as the kiln feed startup.

1. Start clinker pan conveyors.
2. Start clinker crusher.
3. Start timer and operation of tipping valves.
4. Start cooler vent fan and adjust draft to maintain a negative pressure in the kiln firing hood.
5. Progressively, start cooler undergrate fans to provide enough combustion air to the kiln, and keep grate plate temperatures down.
6. As clinker begins to discharge into the cooler, the grates should be started to prevent any buildups.
7. Progressively, as the clinker production increases, the fan volumes should be increased, and the grates operated more frequently.

## Attachment 5: In-line Kiln/Raw Mill/Clinker Cooler Shutdown Procedures

The kiln/raw mill, clinker cooler and coal mill have normal and emergency shutdown procedures. The emergency procedures will shutdown entire systems immediately and close dampers isolating the systems.

Shut-down may be either:

- Emergency, in which case all equipment upstream of the failure must be stopped immediately, or

- Controlled, in which case the feed bin and coal system should be emptied, the kiln load run out as far as possible, and the cooler emptied. The burner pipe is withdrawn, or cooling air is continued through the burner, and the kiln is rotated on a standard schedule for about 12 hours with the ID fan running at reduced speed.

Suggested inching is as follows:

| Duration of Shutdown | Kiln Turning |
|---|---|
| 0 - 2 hours | continuous |
| 2 - 4 hours | 1/4 turn every 15 minutes |
| 4 - 12 hours | 1/4 turn every hour |

If the shut-down is for less than 24 hours and does not involve entering the kiln or preheater, then heat should be retained either by stopping the ID fan immediately and shutting the preheater dampers after 2 hours, or shutting down the fan after 2 hours.

The following procedures are followed for normal (controlled) shutdowns.

### Normal Kiln/Raw Mill Shutdown

Shutdown of the kiln and raw mill, while operating in the compound operating mode, is accomplished by first shutting down the raw mill and then shutting down the kiln. The raw mill is shutdown by stopping raw meal feed, stopping the raw mill and stopping the raw mill fan quickly and as simultaneously as possible. The dampers isolating the raw mill are then quickly closed.

The kiln is shutdown by shutting off the kiln feed and cutting back on the fuel to the main kiln burner. The kiln exhaust fan is also cut back. The kiln continues turning as the fuel in the main burner is continually cut back and finally cut off. The kiln continues turning at a prescribed rate until cool. At this time, the kiln can stop being turned. The kiln baghouse remains powered as long as air is drafted through the kiln.

There are no excess emissions expected during kiln shutdown.

### *Shutdown Sequence*

1. Stop the preheater I.D. fan. The following should happen automatically:

A. The kiln feed will stop
B. The kiln and calciner firing will stop
C. The preheater fan damper will close
D. The last two cooler fans will stop and the air flows to all other cooler fans will reduce to preset minimum

2. Stop the kiln drive.
3. Reduce the cooler grate speeds to minimum.
4. Reduce the primary air fan damper.
5. Stop the shell cooling fans.
6. Close the tertiary air damper.
7. Start kiln rotation operation as outlined above.
8. Stop the cooler grates and operate for 5 minutes every 30 minutes.

### *Extended Shutdowns*

Where shutdown of kiln extends over a prolonged period of time, all machinery not required for rotation of kiln and cooling of burner pipe must be stopped

1. Stop the dust conveyance system when the system is empty.
2. Stop the compressors.
3. Prepare plans for subsequent clean-up operation in kiln, preheater, cooler, and baghouse.
4. After the kiln has cooled off, stop the primary air fan.
5. Stop the clinker conveying system.
6. Plan for maintenance and repair work prior to startup.

### Normal Raw Mill Shutdown

The shutdown of the raw mill while the kiln continues to operate is accomplished by stopping the raw meal feed, the raw mill fan and the raw mill quickly and as simultaneously as possible. The dampers isolating the raw mill are then quickly closed. The shutdown of the raw mill can create a slight imbalance in the kiln system causing short-term spikes in emissions. The excess emissions will be minimized by good operating practices.

### Normal Clinker Cooler Shutdown

The clinker cooler is shutdown following the shutdown of the kiln by cutting back on the airflow through the clinker cooler until any residual clinker in the cooler is sufficiently cool. At that time, the clinker cooler fan can be shut off. The clinker cooler baghouse operates at normal conditions during the entire time the clinker cooler fan operates.

There are no excess emissions associated with the shutdown of the clinker cooler.

# Attachment 6: Startup Procedures for other Affected Facilities

## Coal Mill Startup

The coal mill is required to operate when the kiln is operating. The coal mill is a source of PM and PM10 emissions and discharges through a baghouse. The coal mill is started as soon as sufficient heat is available from the clinker cooler to dry the coal. The coal is mill is started by opening the dampers isolating the coal mill; and quickly and as simultaneously as possible starting the coal mill fan, the coal mill and the coal mill feed.

No excess emissions are expected as a result of the coal mill startup.

## Material Handling Systems Startup

There are fabric filter dust collectors (baghouses) used to control particulate matter (PM and PM10) emissions from emission points associated with the raw mill, clinker handling, the finish mill, cement handling and coal handling. Startup of these systems involves powering the system I.D. exhaust fans and the baghouse cleaning systems prior to commencing process operations. No excess emissions are anticipated during the startup of any of these systems.

# Attachment 7: Shutdown Procedures for other Affected Facilities

## Normal Coal Mill Shutdown

The shutdown of the coal mill is associated with the shutdown of the kiln. The coal mill is shutdown by shutting off the coal mill feed, the coal mill and the coal mill fan quickly and as simultaneously as possible. The dampers isolating the coal mill are then quickly shut.

There are no excess emissions associated with the shutdown of the coal mill.

## Material Handling Systems Shutdown

The dust collectors associated with the material handling emission points are operated until the associated processes are shutdown. Once no material is being processed, the dust collectors are shutdown by turning off power to the I.D. fans and the baghouse cleaning systems.

No excess PM or PM10 emissions are associated with the shutdown of these dust collectors.