

PC MACT Startup, Shutdown, and Malfunction Plan Kiln Groups 5 and 6 and Clinker Cooler Systems

Sources: FG: KG5, KG6, KG5&6, CLINK COOL, CLINKER SYS, CKD HAND SYS

1.0 Source Description

Kiln Groups 5 and 6 and the Clinker Cooler System are used to manufacture cement clinker. The Kiln Groups each have five main system components, and the Clinker Coolers Each have three main system components; these are:

Kiln Groups 5 and 6

- A feed system that conveys solid feed materials to the kiln.
- A feed reclaim system that returns raw materials from other collection points in the plant to the kiln.
- A main stack exhaust system that controls emissions from the kilns prior to release to the stack.
- A dust return system that removes dust from various conveyance sources and collects it for use.
- A rotary kiln system [Kilns 19, 20 and 21 for Kiln Group 5 and Kilns 22 and 23 for Kiln Group 6] that is used to manufacture clinker.

Clinker Coolers

- A clinker cooler system that receives hot clinker from the kilns and cools it with air.
- A clinker handling and storage system that moves clinker from the clinker cooler to the clinker silo and the hot clinker bin in preparation for further processing or handling.
- A clinker cooler dust collection system that removes dust from air leaving the clinker cooler before it reaches the atmosphere, including a clinker breaker, cooling fans, the clinker cooler baghouse, and the clinker cooler stack.

2.0 System Emission Points and Air Pollution Control Equipment

2.1 *Kiln Groups 5 and 6*

During Kiln Groups 5 and 6 System operations, particulate matter is emitted at several emission points. The system includes fabric filters to control particulate matter emissions. The following table summarizes system emission points and applicable air pollution control devices (APCDs):

Emission Point #	Description	Air Pollution Control Device	Equipment #
25-280	Dust collector, bucket elevators	Fabric Filter #40	25-280
25-247	Dust collector, surge bin, Kiln 19	Fabric Filter #14	25-247
25-278	Dust collector, surge bin, Kiln 20	Fabric Filter #38	25-278
25-279	Dust collector, surge bin, Kiln 21	Fabric Filter #39	25-279
31-182	Dust collector, Kiln 19 air slide pickups	Fabric Filter #2	31-182
31-184	Dust collector, Kiln 20 screw conveyor pickup	Fabric Filter #4	31-184
31-185	Dust collector, Kiln 21 screw conveyor	Fabric Filter #5	31-185
31-181	Dust collector, screw conveyor	Fabric Filter #1	31-181
31-187	Dust collector, dust tank control 31-006	Fabric Filter (bm)	31-187
25-253	Dust collector, Kiln 19 exhaust	Fabric Filter #13	25-253
25-252	Dust collector CC60 boiler	Collector #12	25-252
25-265	Dust collector, Kiln 20 exhaust	Fabric Filter #25	25-265
25-263	Dust collector, CC60 boiler	Collector #23	25-263
25-266	Dust collector, Kiln 21 exhaust	Fabric Filter #26	25-266
25-264	Dust collector, CC60 boiler	Collector #24	25-264
26-254	Dust collector, screw conveyor, house 22	Fabric Filter #54	26-254
26-260	Dust collector, screw conveyor, pups #23	Fabric Filter #60	26-260
32-171	Dust collector, reclaim elevator	Fabric Filter #101	32-171
32-172	Dust collector, Kiln 23 screw conveyor pups	Fabric Filter #102	32-172
32-173	Dust collector, Kiln 22 screw conveyor pups	Fabric Filter #103	32-173
26-256	Dust collector, Kiln 22 feed end	Fabric Filter #56	26-256
26-262	Dust collector, Kiln 23 feed end	Fabric Filter #62	26-262
26-261	Dust collector, CC59 boiler	Fabric Filter #61	26-261
26-255	Dust collector, CC59 boiler	Fabric Filter #55	26-255

2.2 **Clinker Cooler Systems**

During Clinker Cooler System operations, particulate matter is emitted at various emission points. The system includes a number of fabric filters to control particulate matter emissions at the clinker cooler, conveyor, and the dust collection system. The following table summarizes system emission points and applicable air pollution control devices (APCDs):

Emission Point #	Description	Air Pollution Control Device	Equipment #
25-267	Dust collector, clinker cooler 20 conveyor, Kiln 20	Fabric Filter #27	25-267
25-268	Dust collector, clinker cooler 21 conveyor, Kiln 21	Fabric Filter #28	25-268
25-506	Dust collector, drag conveyor pickups	Fabric Filter #46	25-506
25-507	Dust collector, KG5 Clinker cooler process	Fabric Filter #47	25-507
25-825	Dust collector, conveyor pickups, KG5 clinker	Fabric Filter	25-825
26-252	Dust collector, K22 cooler	Fabric Filter #52	26-252
26-258	Dust collector, K23 cooler	Fabric Filter #58	26-258
26-251	Dust collector, clinker clr conveyor 26-205, Kiln 22	Fabric Filter #51	26-251
26-257	Dust collector, drag conveyor, pups 26-206	Fabric Filter #57	26-257
26-825	Dust collector, KG6 Drag conveyor pickups	Fabric Filter	26-825
DC7	Dust collector, 25-213 belt load	Fabric Filter	DC7
DC8	Dust collector, 25-213 belt discharge	Fabric Filter	DC8
DC9	Dust collector, 25-215 belt load	Fabric Filter	DC9
DC10	Dust collector, 25-215 belt discharge	Fabric Filter	DC10

40-100	Dust collector, reclaim tunnel	Dust Collectr (ff?)	40-100
40-110	Dust collector, top tower	Dust Collectr (ff?)	40-110
40-120	Dust collector, no description	Dust Collectr (ff?)	40-120
41-352	Dust collector, clinker crush (41-420) vent	Fabric Filter	41-352
41-356	Dust collector, gypsum unloading	Fabric Filter	41-352
41-427	Dust collector, 2KK Silo vents top	Fabric Filter	41-427
41-485	Dust collector, transfer tower	Fabric Filter	41-485
41-439	Dust collector, belt conv. 41-205 pups	Fabric Filter	41-439
41-447	Dust collector, crew conv. Pups, gypsum stone	Fabric Filter	41-447
41-450	Dust collector, silo vent bottom, gypsum silo scale	Fabric Filter	41-450

3.0 **Applicable Emission Limit**

The emission limits applicable to the Kiln System are the following:

- For the kilns:
 1. Particulate emissions must not exceed 0.004 gr/dscf (based on a 7 day rolling average).
 2. Visible emissions must not exceed 20 percent opacity.
 3. Dioxin/furan emissions must be less than 0.20 ng/dscm (TEQ), corrected to 7% oxygen, with a baghouse inlet temperature less than 204°C.

- For the coolers:
 1. Particulate emissions must not exceed 0.004 gr/dscf (based on a 7 day rolling average).
 2. Visible emissions must not exceed 10 percent opacity.

- For other equipment in the kiln and cooler systems: Visible emissions must not exceed 10 percent opacity.

4.0 **Procedures to be followed during Kiln System Operation**

4.1 **Startup**

Kiln Groups 5 and 6, and Clinker Cooler Systems startup occurrences and durations are defined as follows: Startup begins when the first item in the sequential start procedure is initiated. Startup ends when the sequential start procedure is complete and, where applicable, when the system maintains production.

Kiln Groups 5 and 6, and Clinker Cooler System startup procedures are provided in the Lafarge Standard Operating Procedure (SOP) documents for Feed System, Feed Reclaim, Main Stack Exhaust, Dust Return, and Kiln Groups 5 and 6. Applicable SOPs include the following:

- Kiln 19
- Kiln 20
- Kiln 21

- Kiln 22
- Kiln 23
- KG5 evac to offspec
- KG5 evac to storage barn
- KG6 evac to clinker silos
- KG6 evac to offspec
- KG6 evac to storage barn
- KG5 evac to clinker silos
- Reclaim clinker to clinker silos

These procedures are kept in the Environmental Department, where they are maintained. The SOPs discuss how the plant shall be operated, and are used for job-specific training.

4.2 *Shutdown*

Kiln Groups 5 and 6 and Coolers System shutdown occurrences and durations begin when the first item in the sequential stop procedure is initiated, and end when the sequential stop procedure is complete.

Kiln Groups 5 and 6 and Coolers System shutdown procedures are provided in the Lafarge SOPs for Feed System, Feed Reclaim, Main Stack Exhaust, Dust Return, and Kiln Groups 5 and 6, Clinker Cooler, Clinker Handling and Storage, and Clinker Cooler Dust Collection. Applicable SOPs include the following:

- Kiln 19
- Kiln 20
- Kiln 21
- Kiln 22
- Kiln 23
- KG5 evac to offspec
- KG5 evac to storage barn
- KG6 evac to clinker silos
- KG6 evac to offspec
- KG6 evac to storage barn
- KG5 evac to clinker silos
- Reclaim clinker to clinker silos

As with the startup procedures, the shutdown procedures are maintained in the Environmental Department. The SOPs include these procedures and are used for job-specific training.

4.3 *Malfunction*

Operator procedures for responding to malfunctions are detailed in the Lafarge SOP titled Malfunctions Affecting Environmental Systems (AIR). These procedures include the prompt elimination of any excess emissions and proper maintenance of all records.

Potential malfunction event scenarios that could result in excess emissions include the following types of malfunctions:

1. Bag failure (e.g., due to rips/tears, bag blinding due to moisture in gas, temperature failure [i.e., burned/disintegrated bags], timer failure, magnahelic failure, manometer failure)
2. Power failure
3. Plugging of air slide screw

5.0 Recordkeeping

5.1 Startups and Shutdowns

The occurrence and duration of startups and shutdowns of the Kiln Groups 5 and 6 and Clinker Cooler Systems are recorded manually in the logbook in the Shift Coordinator's office and electronically in the Plant Production Database. In the event that startups or shutdowns are not conducted in accordance with this plan, the Environmental Manager (or a designated representative) will be notified within 24 hours to ensure required reporting deadlines are met.

5.2 Malfunctions

For purposes of this plan, malfunctions are defined as sudden, infrequent, and not reasonably preventable failures of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner and that results in excess emissions. The occurrence and duration of each malfunction of the Kiln Groups 5 and 6 and Coolers Systems and their air pollution control devices are recorded manually and electronically.

To certify that any malfunction events occurring during the shift were responded to in accordance with this plan, the logbook located in the Shift Coordinator's office is reviewed regularly. In the event that malfunctions are not responded to in accordance with this plan, the Shift Coordinator will record all actions inconsistent with the malfunction response procedures specified here, and the Environmental Manager (or a designated representative) will be notified within 24 hours to ensure required reporting deadlines are met.

6.0 Notifications and Reports to Regulators

The Environmental Manager (or a designated representative) will provide verbal notification to the Michigan Department of Environmental Quality (MDEQ) Regional Office within two working days following the occurrence of actions inconsistent with this Kiln Groups 5 and 6 and Coolers System SSM Plan, followed by written letter within seven working days.

The Environmental Manager (or a designated representative) will document the occurrences of operator actions consistent with this Kiln Groups 5 and 6 and Clinker Cooler Systems SSM Plan in the Semiannual Compliance Reports submitted to MDEQ.

7.0 Periodic Review and Update of this Startup, Shutdown, and Malfunction Plan

The Environmental Manager (or a designated representative) will review this Kiln Groups 5 and 6 and Cooler System SSM Plan once per year for adequacy and currency. Documentation of the annual review or update will be retained in Environmental Department files for five years. In addition, the Environmental Manager (or a designated representative) will update this plan upon the occurrence of a malfunction event scenario that is not included in this plan. Superseded versions of this plan will also be retained on file in the Environmental Department for a period of five years.

8.0 Startup, Shutdown, and Malfunction Plan Revision History

<u>Revision</u>	<u>Date</u>	<u>Purpose</u>
1.0	February 2004	Initial plan generation
2.0	June 2008	Production Increase
3.0	October 2011	ROP Renewal