Startup, Shutdown, and Malfunction Plan
Quarry Operations System
Sources: FG: QUARRY

1.0 Source Description

The Quarry Operations System involves the blasting and mining of limestone and transporting or conveying the stone for primary and secondary crushing prior to stockpiling the material for feeding to the Raw Grind System. Its three main system components are:

- Drilling, blasting and hauling the limestone for initial crushing at the primary crusher. The system includes the portable drill rig, haul trucks, front end loaders and the quarry roadways used to mine and deliver limestone to the primary crusher.
- Primary Crusher is utilize to crush the raw limestone down to a 12 inch minue size prior to feeding the material to the secondary crusher. The system includes the primary crusher, conveyors and the primary stockpile.
- Secondary Crusher receives 12 inch minus stone from the Primary Crusher stockpile and thoough additional crushing brings the stone size down to 4 inch minus and stockpiles the material in Upper and Lower Bench stockpiles. The system includes a secondary crusher and building, dust collector, conveyors, stone towers and a upper and lower bech stockpiles.

2.0 System Emission Points and Air Pollution Control Equipment

During Quarry operations, particulate matter is emitted at several emission points. The system includes the drilling rig, mobile equipment, haul roads, primary crusher, secondary crusher and building, conveyors, and fabric filers 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 #
Haul Roads	Roads utilized to haul mined limestone and Dust wasting to the CKD landfill	Water Truck	91-27
Conveyors (10-032)/Primary Stockpile	Conveyors transporting limestone from crusher to primary stockpile and the stockpile	Dust Suppressant System	10-049
Conveyors/Secondary Crusher (11-002)	Conveyors transporting limestone from Primary Stockpile to secondary crusher, Secondary Crusher and Building	Building	10-921

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Emission Point #	Description	Air Pollution Control Device	Equipment #
Conveyors/Secondary Crusher(11-002)	Conveyors transporting limestone from Primary Stockpile to secondary crusher, Secondary Crusher and Building	Dust Suppressant System	11-047
Secondary Crusher (11-002)	Dust collector on secondary crusher	Fabric filter	11-055

3.0 Applicable Emission Limit

The emission limits applicable to the Quarry Operations System is the following:

- EU QUARRY FUG - Visible emissions must not exceed 20 percent opacity.
- Primary Stone Stockpile - Visible emissions must not exceed 15 percent opacity at the footprint of the stockpile.
- Primary Crusher Conveyor Transfer Points - Visible emissions must not exceed 10 percent opacity
- Secondary Crusher - Visible emissions must not exceed 7 percent opacity
- Secondary Crusher Conveyor Transfer Points - Visible emissions must not exceed 5 percent opacity
- Secondary Crusher Stockpiles Stone Towers - Visible emissions must not exceed 5 percent opacity
- Secondary Crusher Building - Visible emissions must not exceed 0 percent opacity

4.0 Procedures to be followed during Quarry Operations

4.1 Startup

Quarry Operations System startup occurs 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 limestone transfer.

Quarry Operations System startup procedures are provided in the Lafarge Standard Operating Procedure (SOP) documents for the Rock Drill, Primary Crusher, Secondary Crusher and Stone Towers.

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

Quarry Operations System shutdown occurs when the first item in the sequential stop procedure is initiated, and ends when the sequential stop procedure is complete.

Quarry Operations System shutdown procedures are provided in the Lafarge Standard Operating Procedure (SOP) documents for the Rock Drill, Primary Crusher, Secondary Crusher and Stone Towers.

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, timer failure, magnahelic failure, manometer failure)
2. Power failure
3. Plugging of conveyors

5.0 Recordkeeping

5.1 Startups and Shutdowns

The occurrence and duration of startups and shutdowns of the Quarry Operations System are recorded manually in the logbook in the Quarry/Mobile Shop and 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 result in excess emissions. The occurrence and duration of each malfunction of the Quarry Operations System and its 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 Quarry Operations 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 Quarry Operations System 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 Quarry Operations 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

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