Fugitive Dust Control Program

Cement

Alpena Plant
1435 Ford Avenue
Alpena, Michigan 49707

February 10, 2010

Submitted To

Air Quality Division (AQD)
Michigan Department of Natural Resources and Environment

Revised – 02/10/10

1.0 Introduction

1.1 Purpose

Michigan Rule 371 (R336.1371) requires designated facilities to prepare and implement Fugitive Dust Control Programs in order to minimize generation of fugitive dust in and around their processes. Fugitive dust control programs must contain provisions that address loading and unloading of open storage piles, transporting of bulk materials, outdoor conveying, roads and lots, inactive storage piles, and building ventilation. This document describes the procedures, equipment, and products employed to control fugitive dust from these sources (if present) at Lafarge North America's Alpena, Michigan cement plant.

1.2 Flexibility

Lafarge North America is committed to the process of continuously evaluating potential improvements to the procedures, equipment, and products it uses for controlling fugitive dust at the Alpena Plant. In order to adequately evaluate new equipment and products, Lafarge may periodically substitute products and equipment that are different from those described in this document, on a trial basis. If such new equipment or products provide significant performance improvements, Lafarge will provide AQD a minimum of thirty (30) days notice prior to making any substantial change.

Lafarge does not consider minor changes (such as switching supplier or specific product formulation of a dust suppressant) as significant changes that would require approval from AQD prior to implementation. Products such as dust suppressant emulsions and foams will be applied at the manufacturers recommended concentration, application rate, and frequency.

1.3 Plant Description

Lafarge North America's Alpena, Michigan cement plant operates five dry process rotary kilns with an estimated total annual production of 2.5 million tons of Portland cement. Although currently owned by Lafarge, this facility has been operated by a variety of different owners on the site since 1908. The kilns are currently fired by a coal/coke blend and supplemented with clean wood and non-halogenated polyethylene/polypropylene (PE/PP). The production and shipping facilities of the plant occupy 135 acres. The plant also owns and operates an active limestone quarry located adjacent to the plant. Lafarge owns another 2,540 acres adjacent to the quarry. Currently the plant's raw materials include the quarried limestone, fly ash, iron, sand, and gypsum. Additional alternative raw materials are either stored and periodically used or brought on site as necessary.

1.4 Functional Areas

1.4.1 Quarry

The limestone quarry is approximately 640 acres and produces approximately 4 million tons of limestone per year. The active face is drilled and blasted to loosen stone from the quarry face. The stone is loaded into haul trucks and transported along the quarry floor to the primary crusher. The crusher fractures the limestone to a size of ~ 12 inch minus. The stone then passes on covered conveyor belts to the secondary crusher (also on the quarry floor), which crushes the stone to ~ 4 inch minus. From here, the stone moves on covered conveyor belts to the stone storage area (located above the quarry) where there are stock piles from the upper and lower benches where it can be stored or conveyed directly to Raw Grind.

1.4.1a Drilling Rig

The drill rig is equipped with adjustable rubber skirting around the base which reaches to the ground. It also has a cartridge style dust collector for emissions control.

1.4.2 Raw Grind

This step crushes and blends the raw materials to appropriate proportions in preparation for pyro-processing. Raw materials are carried on conveyor belts to feed bins in the Raw Grind building. After passing through a series of roll presses, ball mills, and separators, the fine powder product is dried, metered and pneumatically conveyed to kiln feed silos. The Raw Grind building contains a ventilation system controlled by fabric filter dust collectors.

1.4.3 Kilns

This step transforms the raw materials into clinker. The Alpena Plant has five refractory-lined kilns. Raw material is introduced at the top of the inclined, slowly rotating kilns and spends about two hours in the kiln before exiting as clinker. The temperature in the burning zone of the kilns is ~ 2700 degrees Farenhite. The exiting clinker (about 3/8 inch size) passes immediately into clinker coolers where it is air-cooled. Hot exit gases from the kiln are used to heat boilers at the backend of the kiln.

1.4.4 Clinker Storage

Clinker leaves the clinker coolers on a series of covered conveyors and is either deposited into an enclosed clinker storage hall, or moved directly to the clinker proportioning silos. An underground conveyor system reclaims clinker from the storage hall and transports it to the clinker proportioning silos.

1.4.5 Finish Grind

A series of covered conveyor belts carry clinker and gypsum from the storage silos to feed bins in the Finish Grind building. A metered mixture of clinker and gypsum passes through a series of roll presses, ball mills, and separators that grind the materials into finished Portland cement. From here, the cement is moved into storage silos to await shipment to market. The cement is loaded for shipment via enclosed, baghouse vented air slides and chutes.

1.5 Dust Collector and Ventilation System

The Alpena Plant completed a Fugitive Dust Action Plan in 2001. The plan detailed a list of specific actions maximizing the effectiveness of the dust collectors and ventilations systems. Improved collection systems have also been installed on the bulk loading air slides and telescopes. In addition to physical improvements, the plant has submitted notification of compliance under the Portland Cement MACT, 40 CFR, Subpart LLL, which requires the implementation of a monitoring program (Method 22) and certification of compliance by Method 9 on a majority of the process collectors throughout the plant.

2.0 Fugitive Dust Control -- Loading and Unloading of Open Storage Stockpiles

2.1 Rock Storage Pile at Primary Crusher

Description. The primary crusher is located on the floor of the quarry. It discharges fractured limestone rock (12 inch minus) onto a covered conveyor belt that moves the rock and discharges it onto the primary storage pile. Material is removed from the bottom of the primary storage pile by underground feeders that discharge onto a covered conveyor belt for transport to the secondary crusher. When necessary, water spray is applied to the rock at the transfer from the belt to the storage pile. If the water spray alone is inadequate to control generation of fugitive dust, foam dust suppressant is applied to the rock on the crusher feeder and at the transfer from the belt to the storage pile.

Primary Pile.

The Primary Pile has an alternative opacity reading method that is 15% at footprint of the pile.

Control Methods. Application of water or foam dust suppressant to rock prior to discharge onto the stockpile; and material is removed from the pile by underground feeder or front-end loader.

Recordkeeping. Monthly records of water & foam dust suppressant usage are kept. Records are retained for five years.

2.2 Stone Secondary Storage Piles North of Ford Avenue

Description. The secondary crusher (located on the quarry floor) discharges crushed limestone (4 inch minus) directly onto a covered conveyor belt. This belt moves the limestone from the secondary crusher to the secondary storage area. In this area, the stone is either discharged from the conveyor system onto one of two storage piles (Upper and Lower benches), or conveyed directly to Raw Grind. When necessary, water or foam dust suppressant is sprayed onto the crushed stone as it drops into the secondary crusher. In addition to water or foam suppressant, the material is transferred to stone towers that distribute the material onto the stockpile. Material is removed from the bottom of the stone storage piles by underground feeders discharging onto a series of belts that move the limestone to Raw Grind storage bins.

Control Methods. Application of water & foam dust suppressant to limestone prior to discharge onto the stockpile; material transferred through the stone towers; and material removal from the pile by underground feeder.

Recordkeeping. Monthly records of water & foam dust suppressant usage are kept. Records are retained for five years.

2.3 Coal, Coke, Blended Coal & Coke and Wood Storage Piles

Description. Coal and coke are delivered to the plant in self-unloading ships that discharge these materials using conveyor belts onto separate stockpiles. From these piles, material is loaded by front-end loaders and fed through hoppers to covered conveyor belts to a stacking conveyor, which creates a third stockpile of a proportioned blend of coal and coke. Material is removed from the blended coal & coke pile by a scraper, which transports the fuel to the coal/coke feed hopper at the firing ends of the kilns. The scraper also compacts the blended coal & coke storage pile in order to minimize fugitive dust. When necessary water is applied by fixed water cannons positioned around the coal and the coke piles. If additional water is required a tanker truck with water cannon is used to apply water. The blended coal/coke pile is periodically watered down by the water truck and its water cannon.

Control Methods. High moisture content and moderate-to-low fines content in the delivered coal and low fines content in delivered coke plus water spray and water truck. The scraper also compacts the blended coal & coke storage pile in order to minimize fugitive dust. When necessary water is applied by fixed water cannons positioned around the coal, and the coke piles. If additional water is required a tanker truck with water cannon is used to apply water. The blended coal/coke pile is periodically watered down by the water truck and its water cannon. The wood storage pile has a high moisture content and low fines and does not require routine watering. If necessary the wood storage pile can be watered down.

Recordkeeping. Records are retained for five years.

2.4 Clinker Storage Hall

Description. At times, clinker from the clinker coolers is conveyed by a series of covered conveyor belts to an elevated tripper that discharges into the clinker storage hall. Clinker is removed from this stockpile by underground feeders discharging onto a clinker reclaim tunnel belt that feeds a series of covered clinker handling belts that discharge into the clinker proportioning silos.

Control Methods. Enclosed clinker storage hall and associated dust collection systems.

Recordkeeping. See PM Schedule in Maximo for Dust Collection Systems Maintenance of the transfer point dust collector is recorded in plant's computerized maintenance management system (Maximo)

3.0 Fugitive Dust Control -- Roads and Lots

3.1 Quarry Haul Roads

Description. Haul roads on the quarry floor are used to transport limestone from the active quarry face(s) to the primary crusher. The roads are also used by loaders and other mobile equipment. The surface of these haul roads is composed of crushed stone and gravel. When necessary, the roads are maintained using a motor grader equipped with a bit blade. Following renovation, fresh stone/gravel is added to select spots where needed.

Active quarry haul roads are watered down at least once per shift using one of the plant' s water tankers (one 10,000 gallon, one 8,000 gallon) when the quarry is operating. As weather conditions accelerate road surface drying, the roads are watered more frequently. (Note: Water is not applied when application of water would create hazardous conditions due to freezing on any route of transportation.) or the occurrence of precipitation and subsequent lack of substantial evaporation makes it unnecessary. Once per day, the water truck driver logs the total time the water truck has operated. At times, a dust suppressant emulsion is applied to active haul roads.

Control Methods. Restoration of high-use road surfaces by a motor grader and addition of crushed stone on selected spots; watering of active haul roads; application of dust suppressant emulsion or calcium chloride solution to active haul roads.

Recordkeeping. Daily records of water truck hours of operation. Records of dates and amount of dust suppressant emulsion application. Records are retained for five years.

3.2 CKD Haul Road

Description. Hydrated cement kiln dust (CKD) is transported in a scraper from the Pug Mill Building (located in the quarry) to the CKD landfill (located in the quarry). The scraper uses the CKD haul road to travel between these locations. Like the quarry haul roads, the surface of the CKD haul road is crushed stone and gravel that is renovated by motor grader with bit blade and addition of fresh stone on selected spots as needed. Water and dust suppression emulsions are applied to the CKD haul road at the same frequency as the active quarry haul roads.

Control Methods. Restoration of road surface by a motor grader and addition of crushed stone on selected spots; application of water, dust suppressant emulsion or calcium chloride solution.

Recordkeeping. Same as for quarry haul roads.

3.3 Coal and Coke Haul Roads

Description. A scraper is used to transport a blended mixture of coal & coke from the coal &coke stockpile area to a covered coal/coke feed hopper outside of the Kiln Group 5 firing floor building. Most of this haul road is concrete pavement, but the portion in the coal/coke storage pile area is compacted coal over bedrock. When necessary, the unpaved portion is watered and periodically renovated by a motor grader. When necessary, the paved portion of this haul road is cleaned with the vacuum/ brush sweeper truck. When vacuum sweeping is not sufficient, the paved portion of this haul road is sprayed with water.

Control Methods. 15 mph speed limit; cleaning with vacuum/brush sweeper truck; watering.

Recordkeeping. None.

3.4 Cement Truck Route

Description. Cement transport trucks enter the plant through Ford Avenue plant entrance, and proceed on the main plant road to the truck loading area. This route is re-traced when the trucks leave the plant. The road surface is concrete paved and, as with all paved main roads in the plant, this route is cleaned with the vacuum/brush sweeper truck, or sprayed with water.

Control Methods. 15 mph speed limit; cleaning with vacuum/ brush sweeper truck; watering .

Recordkeeping. None.

3.5 General Plant Traffic

Description. Other than the routes between the main plant entrances and the employee parking lots, most general plant traffic consists of light duty pickups. The vast majority of this general plant traffic is confined to the main plant roadways that have concrete paved surfaces. When necessary, the roads are cleaned by the vacuum/brush sweeper truck or sprayed with water (unless watering will create hazardous conditions due to freezing).At times, Maintenance Department pickups and mobile equipment must travel off the plant's main paved roads. Most high-usage paths off the main paved roads are covered with crushed stone and gravel, treated with a dust suppressant emulsion, and watered as needed.

Control Methods. Cleaning with vacuum/brush sweeper truck; watering; 15 mph speed limit, application of crushed stone to non-paved routes; application of dust suppressant emulsion.

Recordkeeping. Date of application of dust suppressant emulsion.

Projected Improvements. The plant, as needed, reviews traffic patterns and recommends standard routes for most traffic. This results in fewer off-the-main-road excursions, and also reduces fugitive dust generated by these activities.

3.6 Main Plant Parking Lots

Description. The main employee parking lots are located adjacent to the Operations Center, Maintenance Building, and at the old plant entrance. The paved parking lots are periodically cleaned with the vacuum/brush sweeper truck.

Control Methods. Cleaning of paved parking lot with vacuum/brush sweeper truck and 15 mph speed limit

3.7 Quarry Parking Area

Description. When not in operation, the plant's heavy vehicles (haul trucks, loaders, scrapers, water tankers, etc.) are parked near the Mobile Repair Shop. Quarry personnel also park other light-duty plant vehicles in this area, as well as personal vehicles. This area is surfaced with crushed stone. Water and dust suppressant emulsions are applied to this area as needed to control generation of fugitive dust.

Control Methods. 15 mph speed limit; application of water and dust suppressant emulsion.

Recordkeeping. Date of application of dust suppressant emulsion or calcium chloride solution.

4.0 Fugitive Dust Control -- Outdoor Bulk Material

4.1 Stone Conveyors

Description. There are a series of covered belt conveyors that move crushed stone from the primary crusher in the quarry to the secondary crusher, the stone storage piles and to the Raw Grind. As noted previously in the material storage pile section, the material moved by this series of belts is fairly large (4 inch minus). Large sections of these belts are in underground tunnels, and all the above ground sections of the belts are covered. All the belts have at least one belt scraper. All above ground transfer points from one belt to another are enclosed.

Plant operations personnel inspect this equipment at least once per shift. Observed problems are referred to plant maintenance for corrective action. Cleanup crewsare assigned to clean up spills and fines from beneath the belt systems. Cleanup material is returned to the process.

Control Methods. High moisture and low fines content of stone; small materials drop distance at transfer points; enclosed transfer points.

Recordkeeping. None.

4.2 Iron Conveyors

Description. The iron raw material source is a granular material delivered to the plant in self-unloading ships that discharge the material into an enclosed hopper adjacent to the ship basin. The receiving hopper discharges onto a short belt conveyor (completely enclosed in a 9 foot diameter pipe) that moves the material to the fully enclosed Iron Ore Tailings Storage Building. When needed for production, the material is loaded onto a reclaim belt inside the storage building. This belt discharges onto an overland belt conveyor (also completely enclosed in a pipe) that moves the material to a feed bin in the Raw Grind building. The transfer point between the reclaim belt and the overland belt is enclosed and ventilated by a dust collector that vents inside the building. Best Management Practices are followed when the iron source is being handled including slow vehicle speeds and minimizing drop distance to the bin on the reclaim belt. In addition the Storage Hall door can be closed if necessary.

When in operation, plant operations personnel inspect this equipment at least once per shift. Observed problems are referred for corrective action.

Control Methods. Completely enclosed belt conveyors; enclosed and ventilated transfer points.

Recordkeeping. Maintenance of the transfer point dust collector is recorded in plant's computerized maintenance management system (Maximo)

4.3 Fly Ash Conveyors

Description. Fly ash is delivered to the plant in railcars. The rail cars are unloaded individually inside an enclosed building and pneumatically conveyed to a receiving building. From the receiving building, fly ash is pneumatically conveyed to either the fly ash storage dome or storage bins at the Raw Grind building. Reclaim and transportation from the fly ash dome to Raw Grind is also done with pneumatic conveying. The pneumatic conveyance system, the fly ash unloading building and hopper, and the fly ash storage dome are all equipped with dust collection systems.

When in operation, plant operations personnel inspect this equipment at least once per shift. Observed problems are referred to plant maintenance for corrective action.

Control Methods. Pneumatic conveyance systems; fully enclosed unloading and storage structures equipped with ventilation and dust collection systems.

Recordkeeping. Maintenance of ventilation and dust collector systems is recorded in plant's computerized maintenance management system (Maximo).

4.4 Outdoor Clinker and Gypsum Conveyors

Description. Clinker discharged from coolers is moved along a series of fully enclosed drag conveyors, to a series of covered belt conveyors that transport it to the clinker-handling building. There, clinker is either directed to a series of conveyor belts that discharge into the clinker storage hall, or to the clinker proportioning silos.

Gypsum and limestone is delivered to the plant in railcars or trucks, and discharged into an underground receiving hopper that feed a series of two covered conveyor belts that transfer material into storage silos.

The clinker proportioning and gypsum storage silos feed onto a series of belts that transfer material into feed bins in the Finish Grind building.

All of the clinker drag conveyors are fully enclosed, with transfer points ventilated by dust collectors. All clinker belt conveyors are covered, and transfer points are enclosed and ventilated by dust collectors.

The gypsum belt conveyors are covered. Because gypsum has moderate moisture content, dust collection is not used at the one enclosed belt transfer point between the underground receiving hopper and the gypsum storage silos.

The covered belt conveyors that move clinker and gypsum, including the Finish Grind feed bin transfer points are enclosed and ventilated by a dust collector.

When in operation, plant operations personnel inspect this equipment at least once per shift. Observed problems are referred to plant maintenance for corrective action.

Control Methods. Drag conveyors are fully enclosed; belt conveyors are covered; transfer points are enclosed and ventilated by dust collectors (except one gypsum transfer point)

Recordkeeping. Maintenance of ventilation and dust collector systems is recorded in plant's computerized maintenance management system (Maximo).

4.5 Plastics and Wood Conveyor

Description. Wood Chips and Plastics are delivered to the plant by truck. The plastic trucks are unloaded individually inside an enclosed building and the plastic material is transferred to the conveyor by front end loader. The wood chips are unloaded in a stock pile area and transferred to the feed building by front end loader and then loaded onto the conveyor by another front end loader.

When in operation, plant operations personnel inspect this equipment at least once per shift. Observed problems are referred to plant maintenance for corrective action.

Control Methods. High moisture and large particle size of the plastics and wood. Drop distance at transfer points and enclosed inside of a building.

5.0 Fugitive Dust Control -- Transportation of Bulk Materials

5.1 Transportation of Quarried Rock

Description. Fractured rock is separated from active quarry faces by drilling and blasting. The rock is then loaded into haul trucks for transportation to the primary crusher. Because these haul trucks do not leave the quarry, and the rock contains a small percentage of fines, this activity is not a source of fugitive dust.

Control Measures. Low fines in transported material.

Recordkeeping. None.

5.2 Transportation of Conditioned Cement Kiln Dust

Description. Hydrated cement kiln dust (CKD) is transported in a scraper from the Pug Mill Building to the CKD landfill. Once at the landfill, the scraper using dust-minimizing techniques detailed in Lafarge best management practice (BMP) deposits the conditioned CKD at the landfill.

Control Methods. Hydrated CKD; scraper transportation and deposition of conditioned CKD.

Recordkeeping. None.

5.3 Transportation of Blended Coal/Coke

Description. A blended mixture of coal & coke is transported in a scraper from the coal & coke stockpile area to the coal/coke feed hopper.

Control Measures. Material is treated with water; speed limit 15 mph.

Recordkeeping. None.

5.4 Miscellanious/Non-routine Material Handling

Description. Similar control measures as the methods outlined above will be followed during instances of non-routine material handling.

Control Measures. Dependent on conditions.

Recordkeeping. None

6.0 Fugitive Dust Control -- Building Ventilation

6.1 Raw Grind Building

Description. The Raw Grind building houses feed bins for crushed limestone, fly ash, iron, and other raw materials; feeders and belt conveyors for metering and transporting these raw materials; roll presses; dryers; raw mills; separators; and pneumatic conveyance equipment for transporting the ground raw materials. The feed bins, conveyor transfer points, presses, dryers, mills, separators, air slides, and hoppers inside the Raw Grind building are connected to ventilation systems controlled by fabric filter dust collectors. The Raw Grind building has wall vents with fans, as well as several doors and other exterior openings.

Draglines are situated under feed belts and apron feeders in order to continuously remove spills and fines. A cleanup crew is assigned to clean up other spills. Cleanup material from the ground floor is transferred to a roll off box and disposed of, while cleanup from higher levels of the building is returned to the process.

Control Measures. Process equipment inside the building is connected to dust collection systems. Draglines under belts and feeders, cleanup crew.

Recordkeeping. Maintenance of ventilation and dust collector systems is recorded in plant's computerized maintenance management system (Maximo).

6.2 Finish Grind Building

Description. The Finish Grind building houses feed bins for clinker and gypsum; feeders and conveyors for metering and transporting these materials; roll presses; finish mills; separators; and pneumatic conveyance equipment for transporting finished cement to storage silos. The feed bins, conveyor belt transfer points, presses, mills, separators, air slides, and hoppers inside the Finish Grind building are connected to ventilation systems controlled by fabric filter dust collectors. The Finish Grind building has monitor roof vents, roof ventilators, wall vents, as well as several doors and other exterior openings. A powered sweeper (supplemented by hand sweeping) is used to clean the ground floor of the finish Mill Building. Material spills and clean-up are returned to the process through a closed circuit system consisting of a floor hopper, elevator, tank, and screw conveyor.

Control Measures. Process equipment inside the building is connected to dust collection systems; sweeping; closed circuit clean up materials handling system.

Recordkeeping. Maintenance of ventilation and dust collector systems is recorded in plant's computerized maintenance management system (Maximo).

6.3 Fly Ash Unloading Building

Description. The fly ash unloading building houses a receiving hopper and a pneumatic conveyance system for fly ash. The building has doors at both ends to allow railcars to enter and leave the building. The building and the pneumatic conveyance system are both equipped with fabric filter dust collectors.

Control Measures. Dust collection system on pneumatic conveyance system and on unloading building.

Recordkeeping. Maintenance of ventilation and dust collector systems is recorded in plant's computerized maintenance management system (Maximo).

6.4 Fly Ash Storage Dome

Description. The fly ash storage dome is a completely enclosed structure. The dome has a single vent located at its apex. This vent is equipped with a fabric filter dust collector.

Control Measures. Entire building is enclosed and exhausted to a dust collector.

Recordkeeping. Maintenance of ventilation and dust collector systems is recorded in plant's computerized maintenance management system (Maximo).

7.0 Lafarge Procedures for Equipment Malfunctions Causing Fugitive Dust Emissions

This section addresses the procedures on reporting of visible emissions and tracking of the corrective action. This procedure applies to all plant personnel. Any employees who witness any visible emissions shall notify the control room supervisor. The Shift Coordinator or designated representative will assess the situation and enter an emergency work order in Maximo. If possible the problem will be corrected immediately. If correction of the problem requires equipment repair or replacement, the Shift Coordinator or designated representative will forward the work order to the appropriate Maintenance Supervisor. The work order must be closed within 48 hours. If there are delays in abatement, the Shift Coordinator or a certified Method 9 Observer will monitor the emissions assuring they remain in compliance. The Environmental Department will be notified of the emissions event within 24 hours. The Environmental Department will review the incident to determine if fugitive emissions exceeded permit limits for more than 2 hours. If so, a malfunction will be reported to the AQD (Rule 912).