Background Report Reference

AP-42 Section Number: 11.6

Background Chapter: 4

Reference Number: 38

Title: Emission Testing of Dust Collectors on Kiln No. 1 at lafarge Corporation, Paulding, Ohio

Clayton Environmental Consultants, Inc.

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July 1989

AP-42 Section 11.6
Reference NOT USED
Report Sect. 4
Reference 38

* Do not use as fuel
Coal + WDF

Emission Testing of Dust Collectors
on Kiln 1
at
Lafarge Corporation
Paulding, Ohio

Clayton Project No. 23857.00

Clayton Environmental Consultants, Inc.

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1.0 INTRODUCTION

Mr. Alfonso Rodriguez of Lafarge Corporation in Paulding, Ohio, authorized Clayton Environmental Consultants, Inc. to conduct a comprehensive stack emission evaluation from the precipitator dust collector of cement Kiln 1.

The purpose of the study was to quantify the controlled emissions from the production of portland cement during normal kiln firing of coal and supplemental fuel. The emission data will be evaluated for determining compliance with Ohio Environmental Protection Agency (OEPA) air permit requirements.

The testing program included collection and analysis of the Kiln 1 precipitator dust collector exhaust for the following substances:

- Particulate matter
- Barium
- Chromium
- Lead
- Zinc
- Principal organic hazardous constituent (POHC)
- Volatile organic compounds -total gaseous nonmethane organics (TGNMO)
- Sulfur dioxide
- Hydrochloric acid

2.1 PARTICULATE

The particulate emission from the Kiln 1 precipitator collector averaged 46.4 pounds particulates per hour and 0.093 grains particulate per dry standard cubic foot (grains particulate/dscf). Table 1 shows the individual test values. OEPA permit to operate number 03630000002P016 has placed an allowable mass emission limitation of 43.0 pounds of particulate matter per hour on Kiln 1.

2.2 TRACE METAL

The barium emission from the Kiln 1 precipitator collector averaged 0.020 pounds barium per hour and 0.0000040 grains barium per dry standard cubic foot. Table 2 shows the individual test values.

The chromium emission from the Kiln 1 precipitator collector averaged less than 0.032 pounds chromium per hour and less than 0.000063 grains chromium per dry standard cubic foot. Table 3 shows the individual test values.

The lead emission from the Kiln 1 precipitator collector averaged 0.073 pounds lead per hour and 0.00015 grains lead per dry standard cubic foot. Table 4 shows the individual test values.

The zinc emission from the Kiln 1 precipitator collector averaged 0.017 pounds zinc per hour and 0.000035 grains zinc per dry standard cubic foot. Table 5 shows the individual test values.

2.3 MONOCHLOROBENZENE

The monochlorobenzene (MCB) emission from the Kiln 1 precipitator collector averaged 0.0033 pounds MCB per hour and 0.000068 grains MCB per dry standard cubic foot. Table 6 shows the individual test MCB values. The MCB DRE of Kiln 1 averaged 99.9990% based on an average MCB input rate of 375.83 pounds per hour. Table 6 shows the individual DRE test values.

2.4 SULFUR DIOXIDE

The sulfur dioxide emission from the Kiln 1 precipitator collector averaged 94.2 pounds sulfur dioxide per hour and 0.000030 pounds sulfur dioxide per dry standard cubic foot. Table 7 shows the individual test values. OEPA permit to operate number 0363000002P016 has placed a allowable mass emission limitation of 43 pounds sulfur dioxide per ton cement produced on Kiln 1. On the basis of a average cement clinker production rate of 29.6 tons cement per hour, the emission limit is 1272.8 pounds sulfur dioxide per hour.

2.5 HYDROCHLORIC ACID

The hydrochloric acid emission from the Kiln 1 precipitator collector averaged 1.93 pounds hydrochloric acid per hour and 0.00000056 pounds hydrochloric acid per dry standard cubic foot. Table 8 shows the individual test values.

2.6 TOTAL GASEOUS NONMETHANE ORGANICS

The TGNMO emissions from the Kiln 1 precipitator collector averaged 20.6 pounds TGNMO as carbon per hour and 0.0000060 pounds TGNMO as carbon per dry standard cubic foot. Table 9 shows the individual test values.

3.0 PROCESS DESCRIPTION

There are two rotary kilns which produce portland cement clinker by the wet process. The kilns are long, horizontal steel cylinders with refractory brick lining. The kilns are slightly inclined and rotate about the longitudinal axis. During grinding of the raw materials, water is added to produce a slurry.The liquid slurry raw materials are fed into the kilns' upper end and travel slowly to the lower end. The kilns are fired with a mixture of pulverized coal and supplemental liquid waste solvent fuel at the lower end so that the hot gases pass upward and through the raw material. Drying, decarbonating, and calcining are accomplished as the material travels through the heated kiln, finally burning to insipient fusion and forming the clinker. The clinker is air-cooled, mixed with gypsum, and ground to final product fineness.

Each kiln's exhaust gases are ducted to a separate precipitator dust collector, and then the cleaned gases are discharged to the atmosphere from a common stack (Figures 1 and 2).

TABLE 7

Sulfur Dioxide Emission Results
Kiln 1 Precipitator Outlet
Lafarge Corporation
Paulding, Ohio

Clayton Project No. 23857.00

July 7 to 10, 1989

Test Number	Stack Gas Air Volume (dscfm)	Stack Gas Temperature (°F)	Sulfur Dioxide Emission milligrams per cubic meter	Sulfur Dioxide Emission pounds per dry standard cubic foot	Sulfur Dioxide Emission pounds per hour
SO2-1-7/7	58,940	394	467	0.000 029	103.1
SO2-2-7/10	52,484	390	317	0.000 020	62.3
SO2-3-7/10	49,486	387	633	0.000 040	117.4
Average	53,470	390	472	0.000 030	94.2

dscfm = dry standard cubic feet per minute (68 °F, 29.92 inches mercury)
dscf = dry standard cubic feet