CEMEX CONSTRUCTION MATERIALS FLORIDA, LLC
BROOKSVILLE SOUTH CEMENT PLANT

KILN NO. 1 SYSTEM
And
KILN NO. 2 SYSTEM
AIRS ID: 0530021

OPERATION & MAINTENANCE PLAN

PLAN REVISION DATE: April 15th, 2016

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SECTION 1 - INTRODUCTION

1.1 SCOPE OF PLAN

This document acts as an Operation and Maintenance (O&M) Plan that has been prepared to fulfill requirements of NESHAP Subpart LLL, see 40 CFR 63.1347(a) for the CEMEX Construction Materials Florida, LLC., Brooksville South Cement Plant (Facility ID 0530021) located in Brooksville, Florida. Facilities that are subject to Subpart LLL rule are required to prepare a written O&M plan for affected sources and submit to the Administrator for review and approval as part of the Title V permit. The language of the rule states:

40 CFR 63.1347 Operation and maintenance plan requirements.

> *(a) You must prepare, for each affected source subject to the provisions of this subpart, a written operations and maintenance plan. The plan must be submitted to the Administrator for review and approval as part of the application for a part 70 permit and 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 emissions limits and operating limits, including fugitive dust control measures for open clinker piles, of §§63.1343 through 63.1348. Your operations and maintenance plan must address periods of startup and shutdown;*
> >
> > *(2) Corrective actions to be taken when required by paragraph §63.1350(f)(3);*
> >
> > *(3) Procedures to be used during an inspection of the components of the combustion system of each kiln and each in-line kiln raw mill located at the facility at least once per year.*
>
> *(b) Failure to comply with any provision of the operations and maintenance plan developed in accordance with this section is a violation of the standard.*
>
> *[75 FR 55054, Sept. 9, 2010, as amended at 78 FR 10040, Feb. 12, 2013; 80 FR 44781, July 27, 2015]*

Per 40 CFR 63.1347(a), the potential affected sources covered by this plan are designated by 40 CFR 63.1340. The list of potential NESHAP sources and the applicable emissions unit is listed below:

NESHAP LLL: Description of Affected Sources

(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.

NOTE: NESHAP emission limits are the same for source types (6) through (9), 10% opacity.

Per 40 CFR 63.1347(a)(1), this O&M Plan provides procedures for proper operation and maintenance of each affected source listed above and related air pollution control devices (if present) in order to meet the current and upcoming NESHAP emissions limits and operating limits, including fugitive dust control measures for open clinker piles.

NESHAP emission limits and operating limits are listed in 40 CFR 63.1343 through 63.1348. CEMEX will follow the recommendation of manufacturers but reserves the right to modify the recommended schedule based on experience, technological advancements, or related improved O&M procedures. NESHAP now incorporates Startup, Shutdown, and Malfunction within this O&M Plan and not a separate document. This O&M Plan addresses periods of startup and shutdown of these NESHAP affected sources; see Section 2. Clinker piles are discussed in Section 6.

Per 40 CFR 63.1347(a)(2), this O&M Plan addresses corrective actions to be taken in case Method 22 VEs, as required by 40 CFR 63.1350(f)(1) and (f)(2), show visible emissions are observed. The corrective actions are required under 40 CFR 63.1350(f)(3). See Section 5.

NESHAP Opacity Limit (10%) versus TV permit Opacity Limit (5%)
There can be confusion as to what is the opacity limit while performing periodic monitoring required by NESHAP LLL. The Title V permit lists each emissions unit that is subject to NESHAP periodic monitoring (see Tables 1-1 and 1-2 for units with NESHAP opacity limits). Only for State of Florida rules, and not NESHAP LLL monitoring, the TV permit states these same emission units have a 5% opacity limit. However, this 5% opacity ***only*** applies during annual 30-minute Method 9 testing. That annual Method 9 testing is only required for State of Florida rules and is not required by NESHAP LLL.

When you are performing NESHAP monthly or daily Method 22s and then must immediately perform Method 9 testing because of a failed Method 22, the opacity limit is 10%.

Per 40 CFR 63.1347(a)(3), this O&M Plan provides procedures to be used during an inspection of the components of the combustion system of each kiln and each in-line kiln raw mill located at the facility at least once per year. See Section 2.

This plan also addresses coal processing emission units, 060 and 061, that are not subject to NESHAP LLL but the TV permit does require an O&M Plan to address inspection, PM, and record keeping that originated as part of a PSD permit (PSD-FL-351E).

> *The O&M plan shall address the schedule for inspection of this equipment and required preventive maintenance (PM) and shall require records of the condition of the equipment upon each inspection and any maintenance activities performed. [Rule 62-4.070(3), F.A.C.; and, PSD-FL-351E]*. See TV permit, 0530021-047-AV Condition F.3.
>
> These units are inspected on a monthly basis and records are maintained in the Environmental office files.

1.2 DESCRIPTION OF PLANT

This Plant is owned and operated by CEMEX Construction Materials Florida, LLC. Portland cement manufacturing involves the crushing, grinding, and blending of limestone and other raw materials into a chemically proportioned mixture, which is then heated in the preheater and rotary kiln at extremely high temperatures to produce clinker. The clinker is cooled and ground with gypsum and other additives to produce the finished product, Portland cement. The facility is permitted to burn coal, petroleum coke, natural gas, tires, wood, and other alternative materials as allowed in the Title V Permit as fuels. Brooksville cement plant has two kilns which include in-line raw mills and respective finish mills. The finished product is conveyed to cement silos before being loaded for offsite shipments.

This O&M Plan addresses both Line No. 1 and Line No. 2. Tables 1-1 and 1-2 summarize the subjected emission units for Line No. 1 and Line No. 2 respectively. Figures 1-1 and 1-2 show an overview image of the Line No. 1 and Line No. 2 emission units respectively. See Appendix 10 for a larger map.

Table 1-1: Summary of Line No. 1 Emission Units

E.U. ID No./Facility ID No.	EU Description	Regulated NESHAP Pollutant(s)
-001/D-75	Filter Dust Bin with Baghouse	Opacity
-002/D-67	Fly Ash/Equilibrium Catalyst Bin with Baghouse	
-004/F-14	Raw Meal Transfer with Baghouse	
-006/G-12 (A & B)	Two Blend Silos with Baghouse	
-007/H-15	Kiln Feed Surge Bin with Baghouse	
-008/S-04	Clinker Receiving/Handling System	
-009/K-07 & L-03	Clinker Cooler Discharge with Baghouse	
-010/L-06 to L-05 & L-07	Clinker Storage Silo and Finish Mill Storage Silo with Baghouse	
-011/L-08	Gypsum and Limestone Bins with Baghouse	
-012/M-08, 04	Silo Discharge with Baghouse (M-08) and Clinker Feeder Baghouse (M04)	
-013/N-13	Finish Mill with Baghouse	
-014/Q-17	A-Side Cement Storage Silos #1 & #2 Discharge System with Baghouse	
-015/Q-15	Cement Storage Silos #1 & #2 with Baghouse	
-019/M-05	Finish Mill Feed Belt with Baghouse	
-020/	In-Line Kiln I/Raw Mill and Clinker Cooler I with Baghouse	PM, Hg, HCl, THC, D/F
-021/Q-18	B-Side Cement Storage Silos #1, #2, #3 Discharge System with Baghouse	Opacity
-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	
-064/M-03	Kiln No. 1 Clinker Belt Dust Control	

Table 1-2: Summary of Line No. 2 Emission Units

EU ID No.	EU Description	Regulated NESHAP Pollutant(s)
044	Kiln No. 2, Preheater, Precalciner, Clinker Cooler, Raw-Mill – 331.BF300	PM, Hg, HCl, THC, D/F
045	Filter Dust Bin – 331.BF640 Filter Dust Bin Loadout Spout – 311.LS609	Opacity
046	Blend Silo – 341.BF400	
047	Kiln Feed Transport – 351.BF420 Blind Silo Discharge – 341.BF410 Kiln Feed Bin – 351.BF410	
048	Clinker Transport – 471.BF110	
050	Clinker Storage Silo – 471.BF120 Clinker Silo Discharge 1 – 481.BF155 Clinker Silo Discharge 2 – 481.BF165	
051	Finish Mill Additives Bin – 511.BF650	
052	Finish Mill and Air Heater – 531.BF500	
054	Finish Mill Bucket Elevator – 531.BF020	
057	Finish Mill Cement Transport – 531.BF400 Finish Rejects Transport –531.BF400	
058	Cement Silo 5 – 612.BF005 Cement Silo 5 Loadout Bin – 612.BF620 Cement Silo 5 Loadout Spout N – 622.LS140 Cement Silo 5 Loadout Spout S – 622.LS160	
059	Multi Cell Cement Silo – 611.BF005 Multi Cell Cement Silo – 611.BF045 Multi Cell Loadout Transport – 611.BF610 Multi Cell Loadout Spout – 611.LS.760	
062	Packing Plant – 641.BF150	
065	Cement Storage Silo and Railcar Loadout System with Baghouses (Cement Line 2)	
060	Coal Mill – 461.BF400	Not subject to NESHAP LLL opacity limits but an O&M plan for each EU is required in TV permit
061	Fine Coal Bin – 461.BF560	
063	Emergency Diesel Generator	No O&M plan required
042	Coal Receiving, Handling, and Transfer System (fugitives)	

Figure 1-1: Overview of Line No. 1 Emission Units

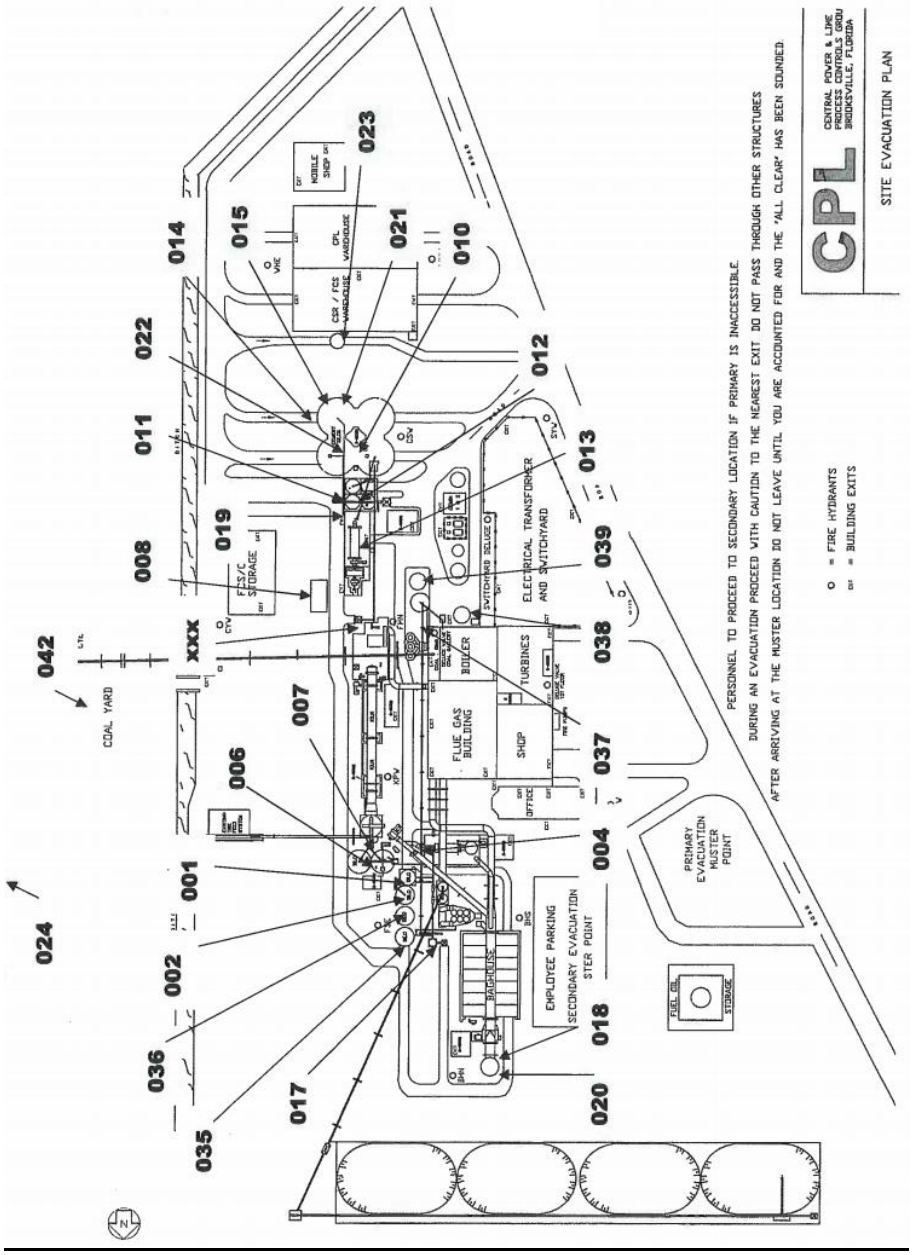
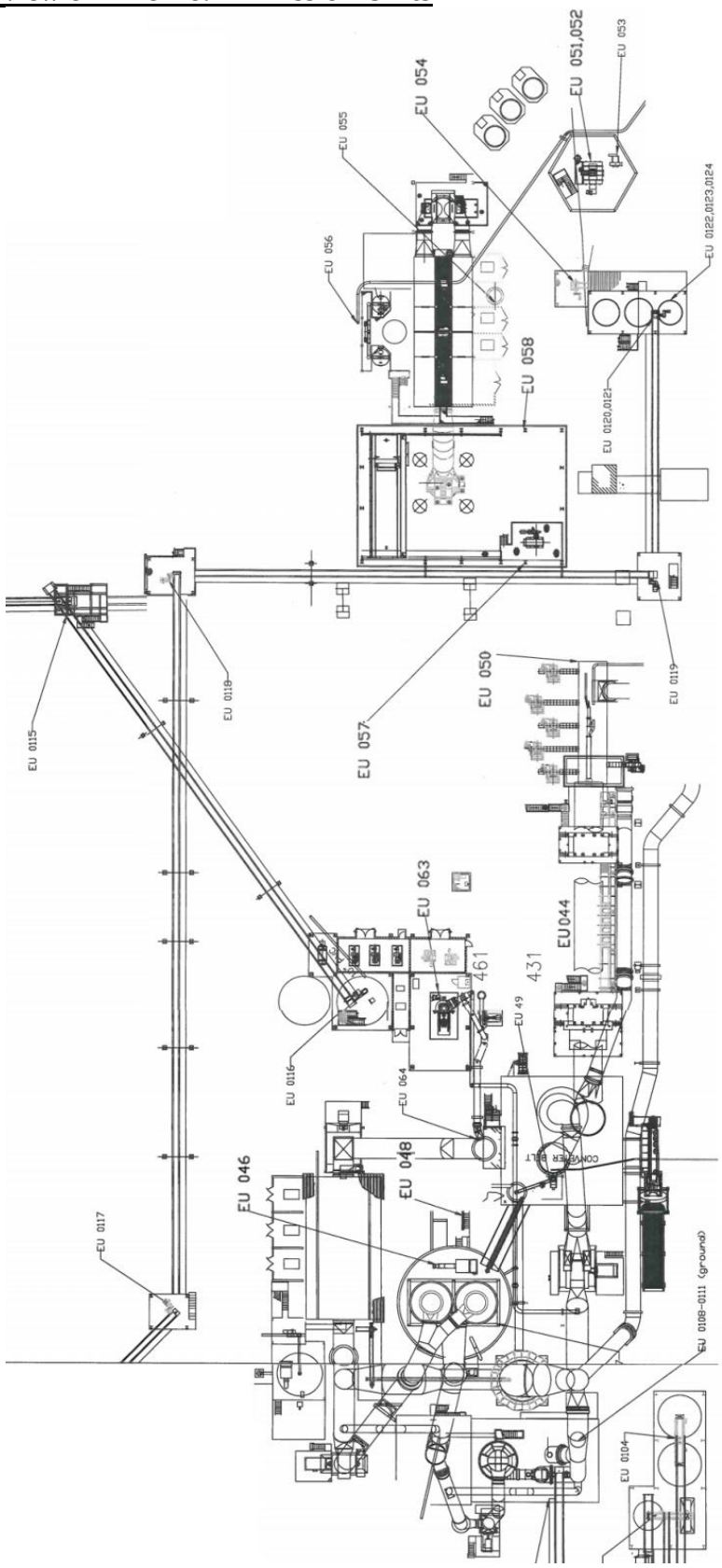


Figure 1-2: Overview of Line No. 2 Emission Units



SECTION 2 - OPERATION AND MAINTENANCE PROCEDURES

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

2.1 OPERATION PROCEDURE

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.

Air pollution control equipment will be operated and maintained according to manufacturer's recommendations. CEMEX will target to ensure all air pollution control devices will be put into operation prior to the start of source operation and remain in operation while the source is in operation. Operators are familiar with startup and shutdown procedures of dust control systems. Certain units are equipped with an alarm to sound when the air pollution control device stops operating.

Air pollution control device/stack parameters and NESHAP monitoring requirements can be seen in Tables 2-1 through 2-3.

2.2 MAINTENANCE PROCEDURE

The Maintenance Procedure is the established equipment inspection implemented as a result of the Title V Operating Permit requirements. Routine preventive maintenance inspections on a quarterly basis will be conducted as scheduled via the maintenance work order planning system.

If any piece of equipment is found with abnormalities and needs to be corrected, then a work order will be made out for the APCD specifying a description of the problem with any recommendations for improvement (one work order per piece of abnormal equipment). All records of inspections and repairs will be held for 5 years.

An *Annual Combustion System Inspection Procedure* (**Appendix 2**) has been developed that assesses the combustion operation at the main burner, while in the operating mode. The results of the inspection will indicate any repairs needed to maintain efficient burner operation.

An *Inspection and Preventive Maintenance Schedule* has been prepared for all affected sources. This schedule is included in **Appendix 3**.

The plant maintains a supply of replacement and spare parts as current inventory. In the event that parts are unavailable, there is a high possibility that nearby CEMEX cement plants in Florida, Alabama, and Georgia would have the necessary replacement parts.

2.2.1 Storage Bins

Bins are prone to internal buildup of material, particularly if material is wet or if aeration is inadequate. Periodic inspection and maintenance are necessary.

2.2.2 Conveyors / Conveyor Transfer Points

CEMEX targets to conduct these inspections semi-annually. Records can be extracted through the SAP work order system.

1. Inspect and repair air gravity conveyor housings to prevent leakage.

2. Inspect and repair vent ducts to dust collector to prevent leakage.

3. Inspect and repair belt covers and enclosures as required to prevent leakage.

4. Replace torn or defective conveyor belts and parts to prevent leakage.

5. Inspect belt scrapers on belt conveyors and adjust, replace worn-out components.

6. Inspect chain housing and deep bucket conveyor covers and repair as required to prevent leakage.

7. Inspect material transfer chutes for holes and repair as required to prevent leakage.

8. Inspect deep bucket conveyor buckets for holes and repair as required.

9. Inspect control valves for holes and seal deterioration and repair as required to prevent leakage.

10. Inspect all pneumatic lines and pumps for cracks.

11. Inspect dust collector vent ducts for holes.

12. Inspect and adjust all conveyors and their skirting rubber and dust seals.

13. Check the speed of conveyors and slow them down, if possible, to reduce dust circulation and spillage.

14. Inspect conveyor idlers and nonmoving idlers.

15. Remove and replace missing or broken idlers.

16. Inspect all conveyor training idlers; adjust as necessary so the conveyor does not travel laterally.

17. Inspect rubber boots for cracks and tears.

2.2.4 Finish Mill

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 minimal inventory of critical spare parts and common failure components on-site.

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

2.2.5 In-Line Kiln, Preheater, Precalciner, Clinker Cooler, and Raw Mill

The kiln is the main operation in the cement manufacturing process. Kiln repair and maintenance are critical components in assuring the efficiency of the cement manufacturing plant.

Vibration analysis and monitoring is a part of the preventive maintenance program. 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. When setting up a machine after repairs or installation, ensure that imbalance or pulley wobbles are eliminated. By evaluating clinker cooler fans, simple, inexpensive adjustments can lower the overall vibration levels.

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, and for 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 assess the various individual components that make up a particular machine. Another benefit of predictive maintenance is inventory stock control of mechanical components. See Appendix 2 for predictive maintenance plan.

Table 2-1: Operational Parameters for Line No. 1 Baghouses[1]

ID	Description	Stack Height (ft)	Exit Dia. (ft)	Design Volumetric Flow Rate (acfm)	Max. Dry Standard Flow Rate (dscfm)	Gas Temp. (^{o}F)
EU 001 / D-75	Baghouse for Filter Dust Bin	125	2.0	6,800	6,686	77
EU 002 / D-67	Baghouse for Fly Ash / Equilibrium Catalyst Bin	125	2.0	4200	4,130	77
EU 004 / F-14	Baghouse for Raw Meal Transfer	70	1.0	1200	970	180
EU 006 / G-12 (A&B)	Baghouse for Two Blend Silos	240	3.5	17,000	13,745	180
EU 007 / H-15	Baghouse for Kiln Feed Surge Bin	50	2.0	6,000	4,704	200
EU 009 / K-7 & L-03	Baghouse for Clinker Cooler Discharge	10	1.0	5,100	3,717	250
EU 010 / L-06 to L-05 & L-07	Baghouse for Clinker Storage Silo and Finish Mill Storage Silo	200	1.5	2,600	2,038	200
EU 011 / L-08	Baghouse for Gypsum and Limestone Bins	135	1.5	5,000	3,920	200
EU 012 / M-08	Baghouse for Silo Discharge	135	2.5	9,000	8,316	100
EU 013 / N-13	Baghouse for Finish Mill	70	5.0	40,000	30,892	210
EU 014 / Q-17	Baghouse for A-Side Cement Storage Silos #1 & #2 Discharge System	50	1.5	3,200	2,671	160

Table 2-1 (continued)						
ID	**Description**	**Stack Height (ft)**	**Exit Dia. (ft)**	**Design Volumetric Flow Rate (acfm)**	**Max. Dry Standard Flow Rate (dscfm)**	**Gas Temp. (^{o}F)**
EU 015 / Q-15	Baghouse for Cement Storage Silos #1 & #2	200	2.0	7,400	5,983	180
EU 019 / M-05	Baghouse for Finish Mill Feed	29	2.0	9,000	8,820	85
EU 020[2]	Baghouse for In-Line Kiln I / Raw Mill and Clinker Cooler	300	16.0	577,700	376,796	220
EU 021 / Q-18	Baghouse for B-Side Cement Storage Silos #1, #2, #3 Discharge System	50	1.5	10,000	8,346	160
EU 022 / Z-15	Baghouse for Cement Storage Silo #3	200	2.0	5,300	4,285	180
EU 023	Baghouse for Cement Storage Silo #4 and Truck Loadout System	75	0.8	860	829	Ambient
EU 024 / Z-18	Baghouse for Cement Storage Silo and Railcar Loadout	80	1.5	500	490	Ambient
EU 064 / M03	Clinker Silo 1 Discharge - Finish Mill 1 Clinker Belt Dust Control	27	1.0	2125	1732	Ambient

[1] With the exception of the In-Line Kiln I / Raw Mill and Clinker Cooler Baghouse, all baghouses should be cleaned by the pulsed air method periodically. The percent water vapor should be ambient. The bag pressure drop should be 2 – 8 in. H_2O.

[2] The In-Line Kiln I / Raw Mill and Clinker Cooler Baghouse should be cleaned by the reverse air method periodically. The percent water vapor should be ambient. The bag pressure drop should be 2 – 8 in. H_2O.

See Table 1-1 for more information on these EUs.

Table 2-2: Operational Parameters for Line No. 1 Dust Suppression System (EU-008)

Dust Suppression System: The spray discharge should be proportional with dust emissions. 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.	
Identification of Control Device:	EU 008 / S-04 – Clinker Receiving Handling System
Manufacturer:	Johnston – Marsh or Equivalent
Type of Chemical Used:	Water or Dust Suppressant
Frequency of Application:	Continuous when Operating
Schedule for Maintenance and Inspection:	Semi-Annually

Table 2-3: Operational Parameters for Line No. 2 Baghouses

ID	Description	Stack Height (ft)	Exit Diameter (ft)	Design Volumetric Flow Rate (acfm)	Max. Dry Standard Flow Rate (dscfm)	Gas Temp. (^{o}F)
044/ 331.BF300	Baghouse for Kiln No. 2, Preheater, Precalciner, Clinker Cooler, Air Heater	320	13.6	329,698	--	500
045/ 331.BF640	Baghouse for Filter Dust Bin	90	1	3,400	2,065	392
045/ 311.LS609	Baghouse for Filter Dust Bin Loadout Spout	25	0.38	8,000	4,958	375
046/ 341.BF400	Baghouse for Blend Silo	220	1.53	8,100	6,468	188
047/ 341.BF410	Baghouse for Blend Silo Discharge	28	0.69	11,700	9,343	188
047/ 351.BF410	Baghouse for Kiln Feed Bin	91	1.37	7,100	5,669	188
047/ 351.BF420	Baghouse for Kiln Feed Transport	280	1.7	11,700	9,343	188
048/ 471.BF110	Baghouse for Clinker Transport	15	1.29	4,200	2,551	392
050/ 481.BF155	Baghouse for Clinker Silo Discharge 1	16	1.08	2,871	1,779	375
050/ 481.BF165	Baghouse for Clinker Silo Discharge 2	16	1.08	2,871	1,779	375
050/ 471.BF120	Baghouse for Cement Storage Silo	105	1.7	13,200	8,017	392
051/ 511.BF650	Baghouse for Finish Mill Additives	33	1.37	7,300	6,697	104

Table 2-3 (continued)						
052/ 531.BF500	Baghouse for Finish Mill	207	6.58	263,778	179,120	302
054/ 531.BF020	Baghouse for Finish Mill Bucket Elevator	88	1.75	11,500	6,984	392
057/ 531.BF400	Baghouse for Finish Mill Cement Transport	64	1	2,800	1,996	266
057/ 531.BF290	Baghouse for Finish Mill Rejects Transport	74	1.2	5,150	3,128	392
058/ 612.BF005	Baghouse for Cement Silo 5	210	1.53	8,300	5,916	266
058/ 612.BF620	Baghouse for Cement Silo 5 Loading Bin	28	1.29	4,300	3,065	266
058/ 622.LS140	Baghouse for Cement Silo Loadout Spout N	28	0.38	1,500	1,069	266
058/ 622.LS160	Baghouse for Cement Silo Loadout Spout S	28	0.38	1,500	1,069	266
059/ 611.BF005	Baghouse for Multi-cell Cement Silo	208	1.33	2,200	1,568	266
059/ 611.BF045	Baghouse for Multi-cell Cement Silo Alleviator	210	1.37	7,500	5,345	266
059/ 611.BF610	Baghouse for Multi-cell Loadout Transport	38	1.42	1,600	1,140	266
059/ 611.LS760	Baghouse for Multi-cell Loadout Spout	29	0.38	1,500	1,069	266
060/ 461.BF400	Baghouse for Coal Mill	320	1.29	27,777	22,814	170
061/ 461.BF560	Baghouse for Fine Coal Bin	59	0.5	544	369	302
062/ 641.BF150	Baghouse for Packing Plant	39	2.11	19,200	13,684	266

Table 2-3 (continued)						
065/	Baghouse for Silo	80	1	3,000		
065/	Baghouse for Railcars			2,400		

See Table 1-2 for more information on these EUs.

SECTION 3 - EMISSION UNIT MONITORING PROCEDURES

3.1 MONTHLY OPACITY MONITORING PROCEDURES

Once per calendar month, *ten-minute* Method 22 visible emissions (VE) tests will be conducted on the emission points indicated on the Summary of Emission Units Sheets **(Tables 1-1 & 1-2 and Figures 1-1 & 1-2)**.

The *Procedure for Monthly VE Monitoring* is to be followed. A flow chart of the Procedure can be seen in Figure 3-1. The results of each month's test are recorded on a *Monthly Visible Emissions Inspection Report* (**MVEIR-M22**) *Form*, **Appendix 4**.

At least one person at the facility will be certified to perform a Method 9 test.

3.1.1 Procedure for Monthly VE Monitoring

Determine that all the sources to be monitored are operating. Conduct a *ten-minute* Method 22 test. Record the time and operating capacity at which each Method 22 was made. If no VE are observed, the observer may record a negative observation. At the end of the test, the observer will verify that all sources being tested continuously operated throughout the test period. If any of the sources stopped operation during the test period, another *ten-minute*, Method 22 test will be performed for those sources during the calendar month.

If VE are observed, the observer will record the time of the observation and the identity of the equipment from which emissions were observed. The observer should then contact the person qualified to conduct a Method 9 test as soon as practical and initiate a *Corrective Action Report Monthly* (**CARM)** *Form*, **Appendix 5**.

A *thirty- minute* Method 9 must be started no later than one hour from the time visible emissions were observed and all the required information recorded. When testing is complete, the observer will again verify that the equipment was running during the test. If the equipment stopped operation during the test, the test must be repeated when the equipment is restarted.

Per 40 CFR 63.1350 (F)

(1)

(i) You must conduct a monthly 10-minute visible emissions test of each affected source in accordance with Method 22 of appendix A-7 to part 60 of this chapter. The performance test must be conducted while the affected source is in operation.

(iv) If visible emissions are observed during any Method 22 performance test, of appendix A-7 to part 60 of this chapter, you must conduct 30 minutes of opacity observations, recorded at 15-second intervals, in accordance with Method 9 of appendix A-4 to part 60 of this chapter. The Method 9 performance test, of appendix A-4 to part 60 of this chapter, must begin within 1 hour of any observation of visible emissions.

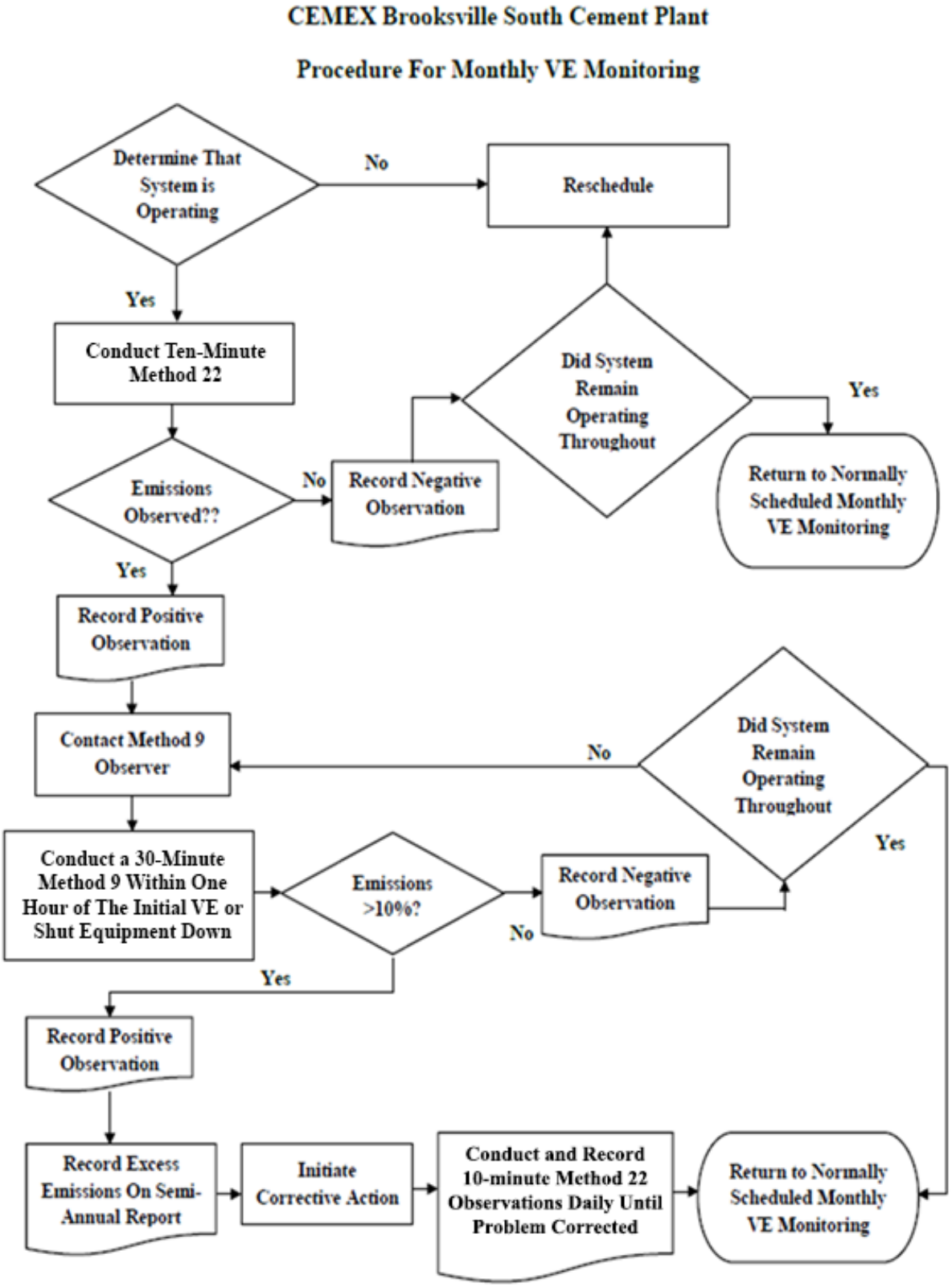
(3) If visible emissions are observed during any Method 22 visible emissions test conducted under paragraphs (f)(1) or (2) of this section, you must initiate, within one-hour, the corrective actions specified in your operation and maintenance plan as required in §63.1347.

If the Method 9 test indicates that the source is in compliance with the opacity limit, a negative observation will be recorded and the observer will return to the normally scheduled VE monitoring schedule (monthly Method 22).

If the Method 9 indicates that the source is exceeding the opacity limit, a positive observation shall be recorded on the semi-annual report. Corrective action will be initiated. Daily *ten-minute* Method 22 tests will be conducted until the problem is corrected. A sample of the *Visible Emission Observation Form* to be used when performing a Method 9 test is included in **Appendix 7**.

When the daily Method 22 test verifies compliance, return to the normal VE monitoring schedule.

Figure 3-1: Method 22 Visible Emissions Observation Flow Chart – Other Sources



3.2 DAILY OPACITY MONITORING PROCEDURES (FINISH MILLS)

Applicable Sources:

EU-013	Line No. 1 Finish Mill with Baghouse
EU-052	Line No. 2 Finish Mill with Baghouse

Once per operating day, a *six-minute* Method 22 VE test will be conducted covering the Finish Mill PM control devices that filter air from the mill sweeps and air separators.

The *Procedure for Daily VE Monitoring* is to be followed. A flow chart of the Procedure can be seen in Figure 3-2. The results of each test are recorded on the **DVEIR-M22 Form**, **Appendix 6**.

At least one person at the facility will be certified to perform a Method 9 test.

3.2.1 Procedure for Daily VE Monitoring

Determine that all the sources to be monitored are operating. If not operating, mention such on DVEIR-M22 form. Conduct a *six-minute* Method 22 test. Record the time and operating capacity for which the Method 22 determination was made. If no VE are observed, the observer may record a negative observation. At the end of the test, the observer will verify that all sources being tested operated continuously throughout the test period. If any of the sources stopped operation during the test period, the Method 22 test will be rescheduled.

Per 40 CFR 63.1350 (F)(2)

> **(i)** For a raw mill or finish mill, you must monitor opacity by conducting daily visible emissions observations of the mill sweep and air separator PM control devices (PMCD) of these affected sources in accordance with the procedures of Method 22 of appendix A-7 to part 60 of this chapter. The duration of the Method 22 performance test must be 6 minutes.
> **(ii)** Within 24 hours of the end of the Method 22 performance test in which visible emissions were observed, the owner or operator must conduct a follow up Method 22 performance test of each stack from which visible emissions were observed during the previous Method 22 performance test.
> **(iii)** If visible emissions are observed during the follow-up Method 22 performance test required by paragraph (f)(2)(ii) of this section from any stack from which visible emissions were observed during the previous Method 22 performance test required by paragraph (f)(2)(i) of the section, you must then conduct an opacity test of each stack from which emissions were observed during the follow up Method 22 performance test in accordance with Method 9 of appendix A-4 to part 60 of this chapter. The duration of the Method 9 test must be 30 minutes.

If VE are observed, the observer must complete a *Corrective Action Report Daily* (**CARD)** *Form* (Appendix 8) and take corrective action within one hour. Within 24 hours, the observer will subsequently conduct a second *six-minute* Method 22 test.

If VE are observed during the second Method 22 test, the observer must notify a Method 9 observer within one hour of that test. A qualified observer will conduct a *thirty-minute* Method 9 test within 24 hours.

If the Method 9 test indicates that the opacity is greater than 10%, then a *six-minute* Method 22 will be conducted daily until the problem is corrected.

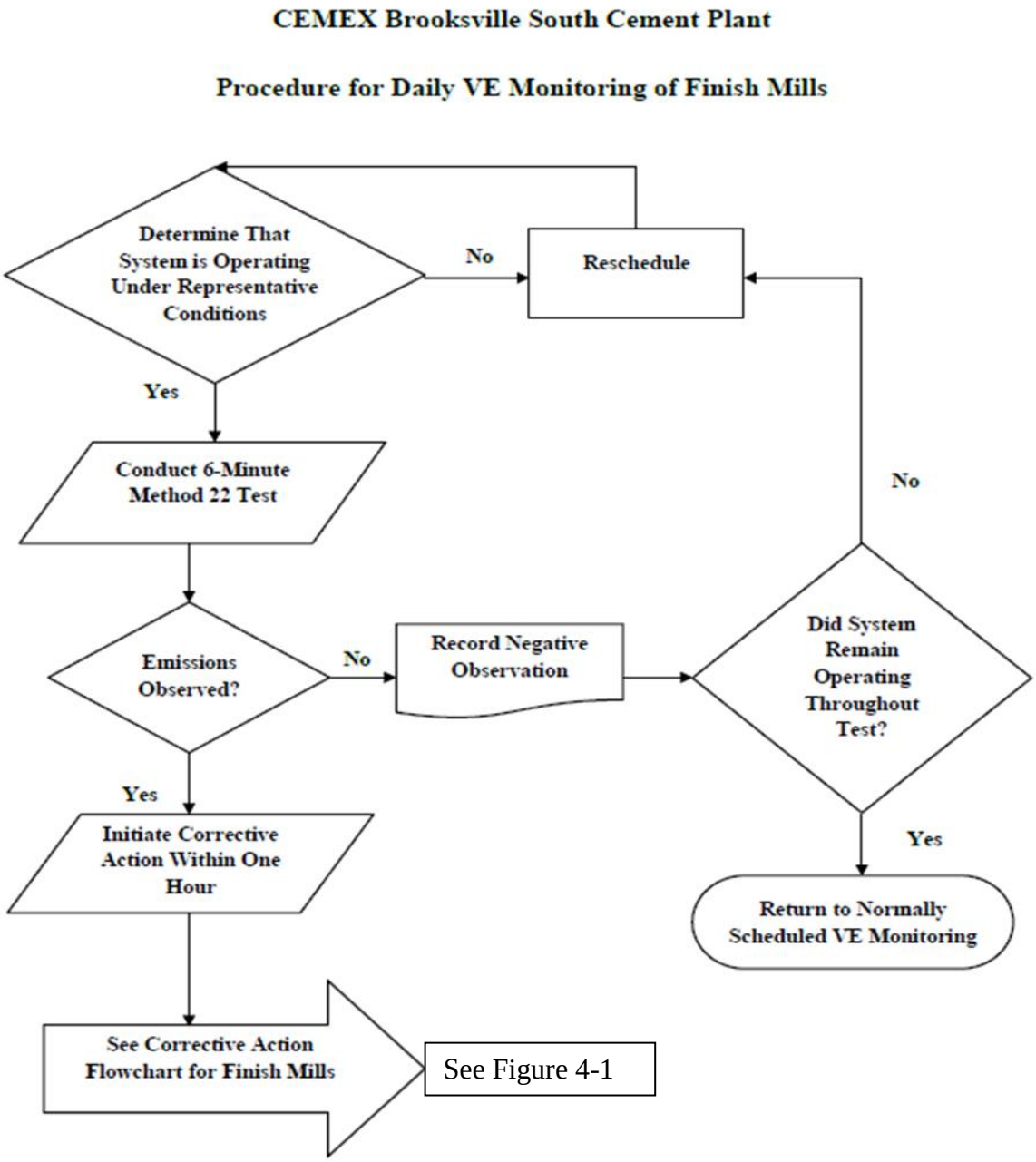
If any of the Method 9 tests indicate that opacity exceeds than 10% limit, further corrective action will begin as soon as possible. Corrective action when the opacity exceeds 10% is to initiate maintenance repairs to correct the problem or shut the mill down if entry into the baghouse is needed to make the repairs.

If any problems occur, all information will be recorded on the **CARD Form**. A positive observation shall be recorded on the semi-annual report that will be filed with the Florida Department of Environmental Protection. Once the problem is corrected, normal Method 22 observations will resume.

Figure 3-2: Method 22 Visible Emissions Observation Flow Chart – Finish Mills

Applies to:

EU-013	Finish Mill with Baghouse
EU-052	Finish Mill with Baghouse



3.3 KILN MONITORING PROCEDURES

Applicable Sources:

EU-020	Kiln No. 1, Preheater, Precalciner, Clinker Cooler, Raw Mill
EU-044	Kiln No. 2, Preheater, Precalciner, Clinker Cooler, Raw Mill – 331.BF640

In addition to the VE testing described above, additional monitoring requirements for the kiln are described in Table 3-3.

Table 3-3: Summary of NESHAP LLL emission limits for an existing kiln:

Testing/Monitoring	Control Device	Emission Limits:	Units of Emissions Limit:
Method 5: annual / PM-CPMS	Baghouse	PM[1] (see eqn. 1)	lb/ton clinker
Method 23: 30 month / Continuous temperature monitoring	Gas Conditioning Tower	D/F[2] 0.2 BH inlet temp. determined during M23 testing	ng/dscm (TEQ), 7% O2 deg F
Hg – CEMS/Sorbent trap	Dust shuttling	Hg 55	lb/MM tons clinker
CEMS		THC[3,4] 24	ppmvd, 7% O2
CEMS	sorbent injection	HCl 3 / SO2	ppmvd, 7% O2

[1]*The initial and subsequent PM performance tests are performed using Method 5 or 51 and consist of three 1-hour tests. Clinker cooler vents to kiln and therefore a clinker cooler CPMS is not required.*
[2]*If the average temperature at the inlet to the first PM control device (fabric filter or ESP) during the D/F performance tests is 400°F or less, this limit is changed to 0.40 ng/dscm (TEQ).*
[3]*Measured as propane.*
[4]*Any source subject to the 24 ppmvd THC limit may elect to meet an alternative limit of 12 ppmvd for total organic HAP.*

SECTION 4 - CORRECTIVE ACTION PROCEDURES

4.1 CORRECTIVE ACTION PROCEDURES – METHOD 22

If visible emissions are observed during a regularly scheduled inspection, the 'YES' column of each **DVEIR-M22** and **MVEIR-M22 Form** shows the Corrective Action Method to follow. In addition, each *Daily* and *Monthly Inspection Form Logbook* gives a detailed explanation of each Corrective Action Method. **CARD** or **CARM Forms (See Appendix 5)** are located in each of the inspection logbooks and should be completed in the event of any visible emissions.

4.2 CORRECTIVE ACTION PROCEDURES – METHOD 22, FINISH MILLS

A flow chart of the Corrective Actions can be seen in Figure 4-1. The results of each corrective action implemented are recorded on the **CARD Form (See Appendix 5).**

4.2.1 Corrective Action for Finish Mills

The person making the daily VE observation is responsible for initiating corrective action. The observer will record the time that corrective action began. Corrective action must be initiated within one hour of the time of the observation of VE. The following procedure will be followed:

1. The person responsible for corrective action will attempt to identify the source and/or cause of the visible emissions. If possible, attempt to correct the problem as quickly as practical without shutting down the mill.

2. After the problem is corrected, a *six-minute* Method 22 VE test will be conducted. If no VE is observed, return to the normally scheduled VE testing.

3. If VE are observed on two consecutive days, and the problem cannot be corrected without shutting the mill down, within 24 hours of the second *six-minute* Method 22, a *thirty-minute* Method 9 test must be conducted. If the Method 9 test indicates that the source is in compliance with the 10% opacity limit, return to normal daily monitoring procedure.

4. If the Method 9 test indicates that the opacity exceeds the 10% limit, further corrective actions will be implemented and the observer will return to the normal VE monitoring schedule. The excursion will be recorded as excess emissions for the day and included on the semi-annual report.

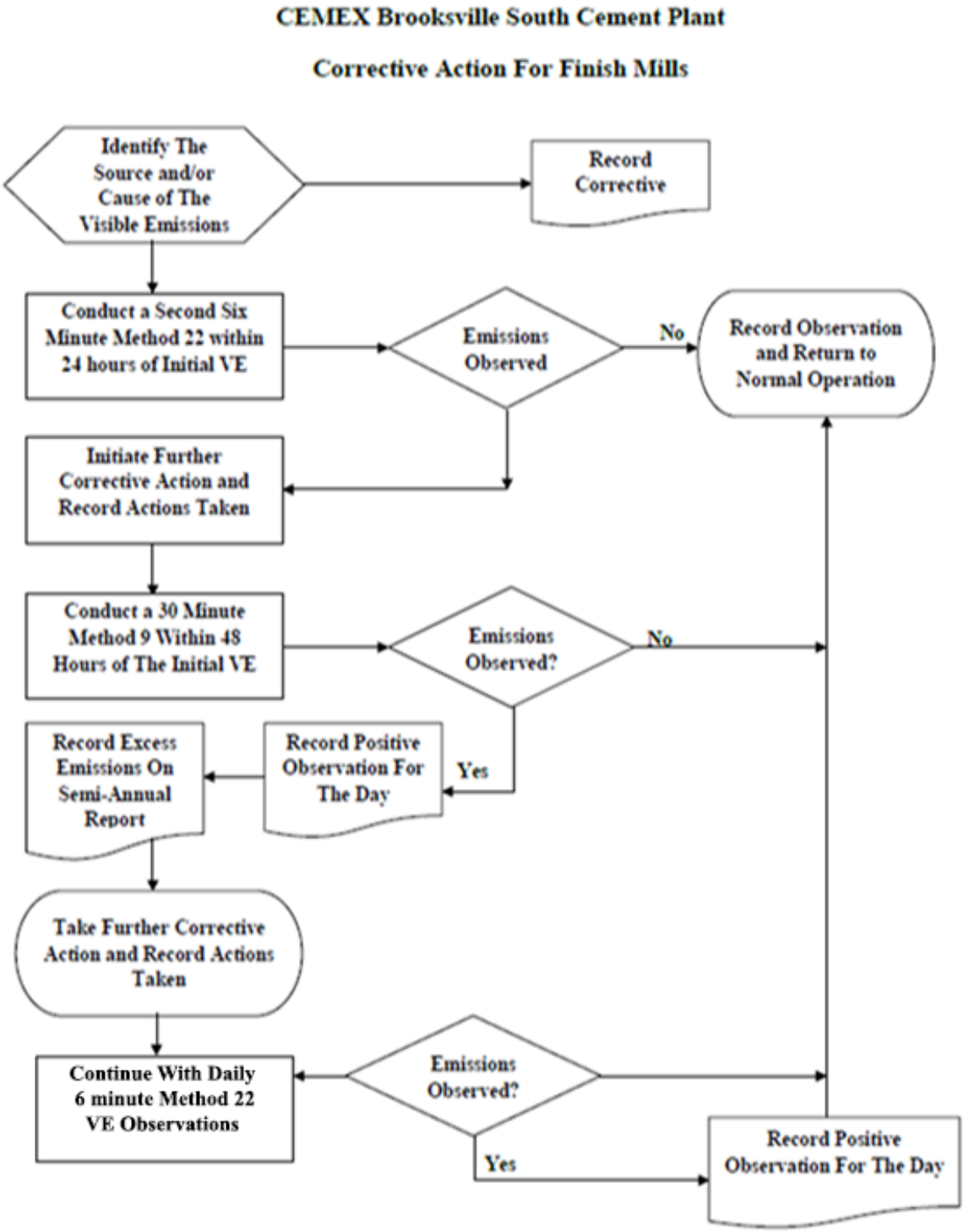
If the mill ***must*** go offline:

1. Notify control room that Finish Mill will be going off-line.
2. Determine availability of clinker storage volume.
3. Temporarily store clinker if necessary.
4. Gradually reduce milling rate and cease milling operation.
5. Perform complete baghouse and ductwork inspection.
6. Perform necessary repairs.
7. Put baghouse in operation.
8. Resume milling.

If any new bags have been installed, allow bags to form a filter cake before conducting the Method 9 test specified above.

A sample of the *Visible Emission Observation Form* to be used upon performing a Method 9 test is included in **Appendix 7.**

Figure 4-1: Corrective Action for Finish Mills



SECTION 5 - TRAINING FOR VISIBLE EMISSIONS TESTING

5.1 METHOD 9

This method involves the determination of plume opacity by qualified observers. The method includes procedures for the training and certification of observers, and procedures to be used in the field for determination of plume opacity.

At least one person in the plant will have a current Method 9 Certification.

5.2 METHOD 22

This method does ***not*** require that the opacity of emissions be determined. Since this procedure requires only the determination of whether visible emissions occur and does not require the determination of opacity levels, observer certification according to the procedures of Method 9 is not required. However, it is necessary that the observer is knowledgeable with respect to the general procedures for determining the presence of visible emissions.

Plant personnel may be trained to perform Method 22 testing. The person conducting the Method 22 training will have received Method 9 training and will include the following information in the training:

1. Appropriate location from which observations are to be made
2. Duration and frequency of testing required
3. Procedures outlined in Sections 3 and 4 of this manual
4. Recording of data
5. Ambient lighting
6. Observer's position relative to lighting
7. Effects of background contrast
8. Wind
9. Presence of condensed water
10. Procedures to follow if a positive reading occurs.

The information presented in training may be taken from:

- This manual
- 40 CFR 60, Appendix A, Method 22
- 40 CFR 60, Appendix A, Method 9
- The lecture portion of the Method 9 certification course.

SECTION 6 - OPEN CLINKER STORAGE PILES

6.1 OPEN CLINKER STORAGE PILE PROCEDURES

Clinker is conveyed from the cooler to the storage silo via a conveyor, see site map of facility in Appendix 10. For the purposes of this O&M Plan a clinker "pile" will be defined as a pile 10 cubic yards or greater. Open clinker storage pile means a clinker storage pile on the ground for more than three days that is not completely enclosed in a building or structure. If clinker spills from clinker conveyors it will be cleaned up on a routine basis, as soon as practical. The No. 2 finish mill reject clinker is discharged into a three sided structures and it is routinely removed and reprocessed. The No. 2 finish mill eject clinker is not typically considered a "pile"; or under the deep pan conveyor from clinker cooler to the silo, operations will routinely clean up the clinker for reuse in the process.

Per 40 CFR 63.1343:

> *(c) Open clinker storage pile. The owner or operator of an open clinker storage pile must prepare, and operate in accordance with, the fugitive dust emissions control measures, described in their operation and maintenance plan (see §63.1347 of this subpart), that is appropriate for the site conditions as specified in paragraphs (c)(1) through (3) of this section. The operation and maintenance plan must also describe the measures that will be used to minimize fugitive dust emissions from piles of clinker, such as accidental spillage, that are not part of open clinker storage piles.*
>
> > *(1) The operation and maintenance plan must identify and describe the location of each current or future open clinker storage pile and the fugitive dust emissions control measures the owner or operator will use to minimize fugitive dust emissions from each open clinker storage pile.*
> >
> > *(3) Temporary piles of clinker that result from accidental spillage or clinker storage cleaning operations must be cleaned up within 3 days.*

6.2 CONTROL MEASURES

Per 40 CFR 63.1343:

> *(2) For open clinker storage piles, the operations and maintenance plan must specify that one or more of the following control measures will be used to minimize to the greatest extent practicable fugitive dust from open clinker storage piles:*
>
> - *Locating the source inside a partial enclosure,*
> - *installing and operating a water spray or fogging system,*
> - *applying appropriate chemical dust suppression agents,*
> - *use of a wind barrier,*
> - *compaction,*
> - *use of tarpaulin or other equally effective cover or* **– CEMEX preferred option**
> - *use of a vegetative cover.*
>
> *You must select, for inclusion in the operations and maintenance plan, the fugitive dust control measure or measures listed in this paragraph that are most appropriate for site conditions. The plan must also explain how the measure or measures selected are applicable and appropriate for site conditions. In addition, the plan must be revised as needed to reflect any changing conditions at the source.*

Clinker is cleaned up routinely; however if a "pile" as defined above, cannot be cleaned up, it will be covered with a tarp. When clinker is placed on the ground for short term storage, it will be covered with a tarp. This will minimize the potential for fugitive dust and prevent the clinker from getting wet. Excess clinker piles will be stored in the batch plant. See Figure A10-2 in Appendix 10 for location on site map.

SECTION 7 - RECORD KEEPING REQUIREMENTS

7.1 RECORDS

This section contains recordkeeping requirements that pertain to covered equipment. Recordkeeping associated with notifications, applicability, or performance testing, unless associated with emission standards or operating limits, is not covered.

Files will be retained for at least 5 years following the date of each occurrence, measurement, maintenance, corrective action, report, or record. At a minimum, the most recent 2 years of data shall be retained on site. The remaining 3 years of data may be retained off site.

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

7.2 SITE SPECIFIC RECORDS

7.2.1 Kiln

1. General Kiln Records
    a. Record of each startup or shutdown period in accordance with recordkeeping requirements (Control Room)
    b. Record of the type of fuel used until the kiln reaches a temperature of 1200°F (Control Room)
    c. Record of the primary kiln fuel used once the kiln temperature reached 1200°F (Control Room)
    d. Continuous kiln temperature monitoring record (Control Room)
    e. Calibration and repair records for kiln temperature monitor (TC reports-George, repairs SAP work order system)
    f. Burner Inspection and preventive maintenance record (SAP system)
    g. Record of the amount of CKD removed from the kiln system (Control Room/Environmental Manager)
    h. Record of each malfunction that causes the kiln to fail to meet an applicable standard in accordance with recordkeeping requirements (SAP system/Control Room)
    i. Record of actions taken during periods of malfunction in accordance with recordkeeping requirements (Environmental Manager)
    j. Record of each exceedance from an emissions standard or established operating parameter limit in accordance with recordkeeping requirements (Environmental Manager)

7.2.2 Clinker Cooler

1. General Clinker Cooler Records
    a. Record of each startup or shutdown period in accordance with recordkeeping requirements
    b. Record of each malfunction that causes the clinker cooler to fail to meet an applicable standard in accordance with recordkeeping requirements
    c. Record of actions taken during periods of malfunction in accordance with recordkeeping requirements

7.2.4 Raw Mill

1. General Raw Mill Records
    a. Record of each startup or shutdown period in accordance with recordkeeping requirements
    b. Record of each malfunction that causes the raw mill to fail to meet an applicable standard in accordance with recordkeeping requirements
    c. Record of actions taken during periods of malfunction in accordance with recordkeeping requirements

7.2.5 Finish Mill

1. General Finish Mill Records
    a. Record of each malfunction that causes the finish mill to fail to meet an applicable standard in accordance with recordkeeping requirements

b. Record of actions taken during periods of malfunction in accordance with recordkeeping requirements
c. Record of each exceedance from an emissions standard or established operating parameter limit in accordance with recordkeeping requirements

7.2.6 Open Clinker Piles

1. General Open Clinker Storage Pile Records
    a. Record of each malfunction that causes the open clinker storage piles to fail to meet an applicable standard in accordance with recordkeeping requirements
    b. Record of actions taken during periods of malfunction in accordance with recordkeeping requirements
    c. Record of each exceedance from an emissions standard or established operating parameter limit in accordance with recordkeeping requirements
2. Fugitive dust control system preventive maintenance and repair record

7.2.7 All other affected sources

1. General Affected Source Records
    a. Record of each malfunction that causes the affected source to fail to meet an applicable standard in accordance with recordkeeping requirements
    b. Record of actions taken during periods of malfunction in accordance with recordkeeping requirements
    c. Record of each exceedance from an emissions standard or established operating parameter limit in accordance with recordkeeping requirements

SECTION 8 - STARTUP, SHUTDOWN, AND MALFUNCTION

Applicable Sources:

Brooksville South Cement Plant - Kiln No. 2 Line	
EU ID No.	**EU Description**
044	Kiln No. 2, Preheater, Precalciner, Clinker Cooler, Raw Mill
045	Filter Dust
046	Raw Meal Transport
047	Kiln Feed Transport
048	Clinker Transport
050	Clinker Storage
051	Finish Mill Collecting Bin
052	Finish Mill
054	Bucket Elevator
057	Cement Transport
058	Cement Loadout Bin (Silo 5)
059	Cement Loadout Bin (Multi-Cell)
062	Packing Plant
065	Cement Storage Silo and Railcar Loadout System with Baghouses (Cement Line 2)

8.1 PURPOSE

The purpose of the startup, shutdown, and malfunction (SSM) 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).

8.2 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 maximum achievable control technology (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 hazardous air pollutant (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 O_2
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 and minimize excess emissions, achieve compliance with the standard, and maintain operational stability.

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 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.

8.3 STARTUP AND SHUTDOWN PROCEDURES

During startup the facility will use one or a combination of the following clean fuels: natural gas, synthetic natural gas, propane, distillate oil, synthesis gas (syngas), and ultra-low sulfur diesel (ULSD) until the kiln reaches a temperature of 1200 degrees Fahrenheit. The facility uses ultra-low sulfur diesel fuel to start up the kiln.
Combustion of the primary kiln fuel may commence once the kiln temperature reaches 1200 degrees Fahrenheit.
All air pollution control devices must be turned on and be operating prior to combusting any fuel.
Records are kept as specified in §63.1355 during periods of startup and shutdown.
Specific procedures for S*tartup* and S*hutdown* are included in **APPENDIX 8** and **APPENDIX 9**.

8.4 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 SSM 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 SSM 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 SSM 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 SSM were consistent with the affected source's SSM plan in the semiannual (or more frequent) SSM 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 SSM 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.

The owner or operator shall keep the written SSM 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 SSM is revised, the owner or operator shall keep previous (i.e., superseded) versions of the SSM 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.

SECTION 9 – IMPLEMENTATION AND REVISION OF PLAN

The Plan was most recently revised and implemented on **April 15th, 2016.**

9.1 PROCEDURES

The plan will be submitted to the Administrator for approval when the Title V permit is modified/renewed or upon request. Prior to submitting the plan to the Administrator, the plan may be revised without the Administrator's review.

If any parts of this plan are found to be ineffective, inadequate or unnecessary, after the Administrator has approved the plan, CEMEX may submit a revised plan to the Administrator for approval. If the Administrator approves the revised plan or takes no action within 90 days, CEMEX may implement the revised plan without reopening the Title V permit.

Table 9-1: CEMEX Brooksville South - Operations and Maintenance Plan Revision Log

Revision Date	Section(s) Revised	Revised by Name / Title	Comments
Rev. 0 – Nov. 18, 2008	--	--	--
Rev. 1 – Oct. 30, 2013	Table of Contents	Shelley Huskey /Environmental Specialist	This was revised to reflect changes in Plan.
	1.2 Plant Description	Shelley Huskey /Environmental Specialist	Section 1.2 was revised to remove power plant criteria.
	6.1: O & M Plan Revisions	Shelley Huskey /Environmental Specialist	Revised Table 6.1 with changes and updates.
	6.2: Open Clinker Pile Procedure	Shelley Huskey /Environmental Specialist	Due to a change in the requirements for open clinker piles, this section was added.
	6.3: Control Measures	Shelley Huskey /Environmental Specialist	Due to a change in the requirements for open clinker piles, the section was added.
	8.3: Start Up and Shut Down Requirements	Shelley Huskey /Environmental Specialist	Due to a change in the clean fuel requirements for Startup and Shut down, this section was updated.
	9.0: Implementation and Revision of Plan	Shelley Huskey /Environmental Specialist	Due to the previous updates, the O & M Plan has to be sent to the Administrator for approval, so this section was added. Section 9.1 was also added to provide procedures for implementing revisions.
	Appendix 1: 40 CFR 63, Subpart LLL, NESHAP for Portland Cement Industry	Shelley Huskey /Environmental Specialist	Due to updates in the rule, the previous rule was replaced with a current one.
	Appendix 2: Annual Combustion Report	Shelley Huskey /Environmental Specialist	This form was updated with current information.
	Appendix 4: Monthly Visual Inspection Report	Shelley Huskey /Environmental Specialist	This form was updated with current information.
	Appendix 5: Corrective Action Report	Shelley Huskey /Environmental Specialist	This form was updated with current information.
	Appendix 7: Visible Emission Observation Form	Shelley Huskey /Environmental Specialist	This form was updated with current information.
	Appendix 8: Corrective Action Plan Daily Report	Shelley Huskey /Environmental Specialist	Since the monthly and daily corrective action forms were the same, this attachment was deleted.
	Appendix 9: Shutdown Procedures	Shelley Huskey /Environmental Specialist	Due to changes listed above, Appendix 10 was renamed Appendix 9.
	Appendix 10: Facility Site Map	Shelley Huskey /Environmental Specialist	Facility Site Map was added to indicate the Open Clinker Piles.
Rev. – Oct. 2, 2015	Numerous	Koogler and Associates, Inc.	Updated O & M Plan for 2015 LLL requirements. Incorporated K1 into K2 O & M Plan. Separated SSM Plan.
Rev. – April 16, 2015	Numerous	Koogler and Associates, Inc.	Updated O&M Plan to account for miscellaneous errors and the new emissions unit, EU-065. Reincorporated startup and shutdown procedures according to 63.1347(a)(1).

SECTION 10 - REFERENCES

1. The Cement Plant Operations Handbook, 3rd Edition. International Cement Review. November 2001.

2. A Guidance Note on the Best Practicable Means for Cement Works (Concrete Batching Plant). Environmental Protection Department. Air Management Group. November 1993.

3. AP-42 Section 11.6: Portland Cement Manufacturing. United States Environmental Protection Agency. January 1995.

4. AP-42 Section 11.12: Concrete Batching. United States Environmental Protection Agency. October 2001.

5. Rule 62-296.700, F.A.C. Reasonably Available Control Technology (RACT) Particulate Matter. Florida Department of Environmental Protection. March 1999.

6. Maintenance Checklist for a Better Baghouse. Cement Americas. May 1999.

7. Operating and Preventive Maintenance Procedures, OSHA Silica Advisor. http://www.osha-slc.gov/SLTC/silica_advisor/protect_against/protect_against.html

8. Removing Material Buildup from Cement Storage Silos. Jim Stuckey. Cement Americas. July 2002.

9. Emissions Activity Category Form Cement Manufacturing and Blending Plants: Fugitive Dust Emissions. Ohio EPA. 199. http://www.epa.state.oh.us/dapc/fops/eac/Cement.pdf.

10. Failure of Dust Suppression Systems at Coal Handling Plants of Thermal Power Stations. Makarand Joshi. http://www.plant-maintenance.com/articles/dust_suppression.pdf

11. European Commission Directorate-General Joint Research Centre. Integrated Pollution Prevention and Control (IPPC). Reference Document on Best Available Techniques in the Cement and Lime Manufacturing Industries. March 2000.

12. Martin Sprocket & Gear, Inc. Comprehensive brochure. Kiln Maintenance. FL Smidth Institute. http://www.flsmidth.com/services/Seminars/kiln_maintenance.pdf

13. Entek International Corporation. Adelaide Brighton Cement Ltd. -- Business Success Profile. http://www.entekird.com/news/profiles/Adelaide%20Brighton%20Cement%20Ltd.pdf

14. 40 CFR Part 60. 40 CFR 60.36e Inspection guidelines.

15. Develop an Effective Startup, Shutdown and Malfunction Plan. Chad Scott, P.E., and Shishir Mohan, Trinity Consultants. CEP August 2002. www.cepmagazine.org.

16. http://www.martinsprocket.com/innovation.htm

17. http://www.state.ia.us/epd/air/prof/oper/tech/baghouse.pdf

18. http://www.state.ia.us/epd/air/prof/oper/tech/esp.pdf

19. http://www.cdphe.state.co.us/ap/down/FSstart.PDF

20. http://cementtour.cementamericas.com/ar/cement_maintenance_checklist_better/

21. http://www.goodyearindustrialproducts.com/conveyorbelts/troubleshoot.html

APPENDIX 1

40 CFR 63, SUBPART LLL

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FROM THE PORTLAND CEMENT MANUFACTURING INDUSTRY

(Click to go to eCFR website)

APPENDIX 2

ANNUAL COMBUSTION SYSTEM INSPECTION REPORT FORM

Figure A2-1: Sample Annual Combustion System Inspection Form

CEMEX Construction Materials Florida, LLC. / Brooksville South Cement Plant

ANNUAL COMBUSTION SYSTEM INSPECTION REPORT

Reporting Year: _____ Facility ID: 0530021

Section A.

Kiln Status: ☐ Operating ☐ Down

Date(s) of Inspection:_____

An inspection of the components of the combustion systems of In-line Kiln/Raw Mill No. 2 (EU 044) was conducted to include the following:

Condition Checked or Verified		
Yes	**No**	
☐	☐	Burner system (main), pilot assemblies and pilot sensing devices for proper operation; clean pilot flame sensor as necessary.
☐	☐	Ensure proper adjustment of primary and secondary combustion air, and adjust as necessary
☐	☐	Kiln door hinges and latches
☐	☐	Kiln door gaskets for proper sealing
☐	☐	Combustion air dampers, fans and blowers for proper sealing
☐	☐	Combustion air fan and blower motors for proper operation
☐	☐	Refractory lining main burner (if applicable), replace/repair as necessary
☐	☐	Kiln shell for corrosion and/or hot spots
☐	☐	Kiln, Preheater and stack, clean as necessary
☐	☐	Fuel supply system for leaks and proper operation
☐	☐	Check burner operation following the inspection, document that the combustion system is operating properly and make any necessary adjustments, Date:_____
☐	☐	Air pollution control devices for proper operation
☐	☐	Gas-condition system to ensure proper operation
☐	☐	Generally observe that the combustion system is maintained in good working order

Inspection items checked "No" due to kiln being down, unable to verify

Section B.

1. Any repair items resulting from inspection? ☐ Yes ☐ No
2. If yes to #1, were repair items completed within 10 days? ☐ Yes ☐ No ☐ N/A
3. If no to #2, was FDEP notified and approval requested for established date for completion of repair(s)? ☐ Yes ☐ No ☐ N/A
4. If applicable, attach date of completion and explanation of repair(s).

Section C.

I certify that the information contained in this report is true, accurate, and complete.

Name:_____

Signature:_____ Date:_____

Title:_____

APPENDIX 3

INSPECTION AND PREVENTATIVE MAINTENANCE

The following is the inspection procedure for pulse-jet dust collectors. There are slight variations in the construction and operation of all dust collectors and baghouses but all will follow this form.

QUARTERLY PREVENTATIVE MAINTENANCE FOR PULSE-JET DUST COLLECTORS

Preliminary work:

1. Coordinate production operator in charge prior to preventative maintenance implementation.
2. Prepare tools, parts and all necessary things in order to complete the preventative maintenance activities.
3. Wear appropriate outfit and safety paraphernalia.
4. Follow proper lock-out procedure.

Scope of work:

DISCHARGE DEVICE OF DUST COLLECTOR:

1. Visually inspect the rotary feeder or tipping valve for material buildup or damage, if applicable.
2. Check packing for proper lubrication.
3. Check for loose connections and tight flange seal.
4. Check wear of sealing strips of rotor vane.

BEARINGS AND SCREW SHAFT:

1. Check bearings for wear and lubricant.
2. Check screw shaft and flights for deformation and wear.
3. Lubricate packing rings.
4. Check hanger bearings for wear and damage, replace if necessary.

SCREW TROUGH:

1. Remove cement accumulation in all surfaces.
2. Check joints regarding cracks, damage, and defects for repair.

DRIVE MOTOR OF SCREW CONVEYOR AND FAN:

1. Check for material buildup, remove if necessary.
2. Check all mounting bolts for secure fastening.
3. Check drive components for wear and looseness.

GEARBOX OF SCREW CONVEYOR:

1. Check oil level in the gearbox. Correct if necessary.
2. Check oil sample regarding color and consistency. Change if sample is polluted.
3. Check the tightness of all mounting bolts.
4. Test run the unit and observe for abnormal noise and vibration during operation.
5. Check for oil leaks. Repair immediately if present.

RADIAL FAN:

1. Open inspection manhole and inspect the impeller blade.
2. Remove hardened cement accumulation in the impeller blade and foreign matters inside.
3. Check bearing status. If necessary change the lubricant.
4. Check v-belts for tension, wear and damage.
5. Check for the tightness of the set screws and alignment of the pulleys.
6. Check for tightness of all mounting bolts.
7. Check the stands from cracks and deformation.
8. At running condition, check for leaks in the housing and rubber connection. If present, repair immediately. Also observe for abnormal noise in the bearings and vibration in the machine noise in the bearings and vibration in the machine.

FILTER HOUSING:

1. Remove all hardened cement accumulation around the chamber.
2. Check for holes and wear of filter bags through the use of visualite.
3. Check doors for tightness and easy open/close. Clean doors and rubber seal to avoid sticking.
4. Check all snap rings for correctness.
5. Check hopper for wear or damage.
6. Check baffles for wear.
7. Clean the clean gas chamber.
8. Check for material buildup in dust pipe.

CLEANING MECHANISM:

1. Check cleaning mechanism for correct functioning. Make sure that all diaphragm valves are in good operating condition.
2. Check for solenoid function. Time interval of solenoid to trigger should be equal in each cycle.
3. Check all valves and pipes for leaks.
4. Remove, dismantle and clean the float valve of water separator in the compressed air line.

If any piece of equipment is found with abnormalities and needs to be corrected, then a work order will be made up for each dust collector specifying a description of the problem with any recommendations for improvement (one work order per piece of abnormal equipment). All records of inspections and repairs will be held for 5 years.

APPENDIX 4

MONTHLY VISIBLE EMISSIONS INSPECTION REPORT (MVEIR) – METHOD 22

Figure A4-1 Sample MVEIR-M22 Form

Brooksville South Monthly Visible Emission Test Form

Kiln No. 2 MVEIR

Observe Each Source For 10 Minutes

ID No. 045 Filter Dust Bin - 331.BF300						Method 22 - Ten (10) Minute Duration					
	Operating @ Normal Conditions		Observer		Date mm/dd/yy	Military Time		Wind		Emissions Observed	
Month	YES	NO	Print Name	Signature		Start	Stop	Speed MPH	Direct.	YES	NO
JANUARY											
FEBRUARY											
MARCH											
APRIL											
MAY											
JUNE											
JULY											
AUGUST											
SEPTEMBER											
OCTOBER											
NOVEMBER											
DECEMBER											

ID No. 046 Blind Silo - 341.BF400						Method 22 - Ten (10) Minute Duration					
	Operating @ Normal Conditions		Observer		Date mm/dd/yy	Military Time		Wind		Emissions Observed	
Month	YES	NO	Print Name	Signature		Start	Stop	Speed MPH	Direct.	YES	NO
JANUARY											
FEBRUARY											
MARCH											
APRIL											
MAY											
JUNE											
JULY											
AUGUST											
SEPTEMBER											
OCTOBER											
NOVEMBER											
DECEMBER											

NOTE: If visible emissions are observed, initiate corrective action and conduct 30 minute Method 9 within 1 - hour of observing visible emissions and complete corrective form

APPENDIX 5

CORRECTIVE ACTION REPORT FOR VE (CARM) FORM

Figure A5-1: Sample Corrective Action Report

CORRECTIVE ACTION REPORT

Monthly Observations

	Description and Date of problem	Equip. #	Date	Time (Military time)	Step 1 Check for emissions Conduct 30-minute Method 9 Visible Emissions within 1 hr of Initial VE		Step 3 30-minute Method 9 Emissions > 10	
					Positive Reading?			
					Yes - Go to Step 2	No-Return to normal sched.	YES	NO
							Continue to take further corrective action and conduct and record daily 30 minute Method 9* observations until the problem is corrected. **Record positive observation and include on semi-annual report**	**Resume normal inspection schedule**
	Corrective Action Initiated:							
	Corrective Action Completed:							
1.	Completed By:							
	Corrective Action Initiated:							
	Corrective Action Completed:							
2.	Completed By:							
	Corrective Action Initiated:							
	Corrective Action Completed:							
3.	Completed By:							

* Non certified plant personnel can conduct Method 22 observations. A smoke school certified reader conducts Method 9 Test. Attach Visible Emissions Observation (VEO) form. Return report/forms to Environmental Manager. **All Entries Should be in ink.**

APPENDIX 6

DAILY VISIBLE EMISSIONS INSPECTION REPORT (DVEIR) – METHOD 22

Figure A6-1: Sample DVEIR-M22 Form

Brooksville South Daily Visible Emission Report
Form DVEIR
Observe Each Source For 6 - Minutes

Finish Mill No. 1 - DC N-013					Method 22 - Six (6) Minute Duration					
		Observer			Military Time		Wind		Emissions Observed	
Day	Operating Rate TPH	Print Name	Signature	Date mm/dd/yy	Start	Stop	Speed MPH	Direct.	YES	NO
Monday										
Tuesday										
Wednesday										
Thursday										
Friday										
Saturday										
Sunday										

Finish Mill No. 2 - DC 531.BF500					Method 22 - Six (6) Minute Duration					
		Observer			Military Time		Wind		Emissions Observed	
Day	Operating Rate TPH	Print Name	Signature	Date mm/dd/yy	Start	Stop	Speed MPH	Direct.	YES	NO
Monday										
Tuesday										
Wednesday										
Thursday										
Friday										
Saturday										
Sunday										

NOTE: If visible emissions are observed, initiate corrective action within 1 hour and conduct additional 6 minute Method 22 within 24 hours of observing visible emissions. If visible emission still observed, conduct a 30 minute Method 9 within 48 hours of initial visible emission observation

Complete Corrective Action Form if visible emissions observed

APPENDIX 7

VISIBLE EMISSIONS OBSERVATION FORM – METHOD 9

Figure A7-1: Sample Method 9 Form

VISIBLE EMISSION OBSERVATION FORM

No. 1 of 1

COMPANY NAME	
STREET ADDRESS	
CITY	STATE / ZIP
PHONE (KEY CONTACT)	SOURCE ID NUMBER
PROCESS EQUIPMENT	OPERATING MODE
CONTROL EQUIPMENT	OPERATING MODE
DESCRIBE EMISSION POINT	
HEIGHT ABOVE GROUND LEVEL	HEIGHT RELATIVE TO OBSERVER: Start / End
DISTANCE FROM OBSERVER: Start / End	DIRECTION FROM OBSERVER: Start / End
DESCRIBE EMISSIONS: Start / End	
EMISSION COLOR: Start / End	IF WATER DROPLET PLUME: Attached / Detached
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED: Start / End	
DESCRIBE PLUME BACKGROUND: Start / End	
BACKGROUND COLOR: Start / End	SKY CONDITIONS: Start / End
WIND SPEED: Start / End	WIND DIRECTION: Start / End
AMBIENT TEMP: Start / End	WET BULB TEMP / Rh. Percent

OBSERVATION DATE	START TIME	END TIME

MIN \ SEC	0	15	30	45	COMMENTS	
1						
2						
3						
4						
5						
6						6 Min. Avg.
7						
8						
9						
10						
11						
12						6 Min. Avg.
13						
14						
15						
16						
17						
18						6 Min. Avg.
19						
20						
21						
22						
23						
24						6 Min. Avg.
25						
26						
27						
28						
29						
30						6 Min. Avg.

Stack with Plume
Sun
Wind

SOURCE LAYOUT SKETCH — Draw North Arrow

X Emission Point

Observer's Position

140

Sun Location Line

OBSERVER'S NAME (PRINT)

OBSERVER'S SIGNATURE — DATE

ORGANIZATION

CERTIFIED BY — DATE

ADDITIONAL INFORMATION:

CONTINUED ON VE FORM NUMBER

APPENDIX 8

FACILITY SITE MAP

Figure A10-1: Facility Site Map

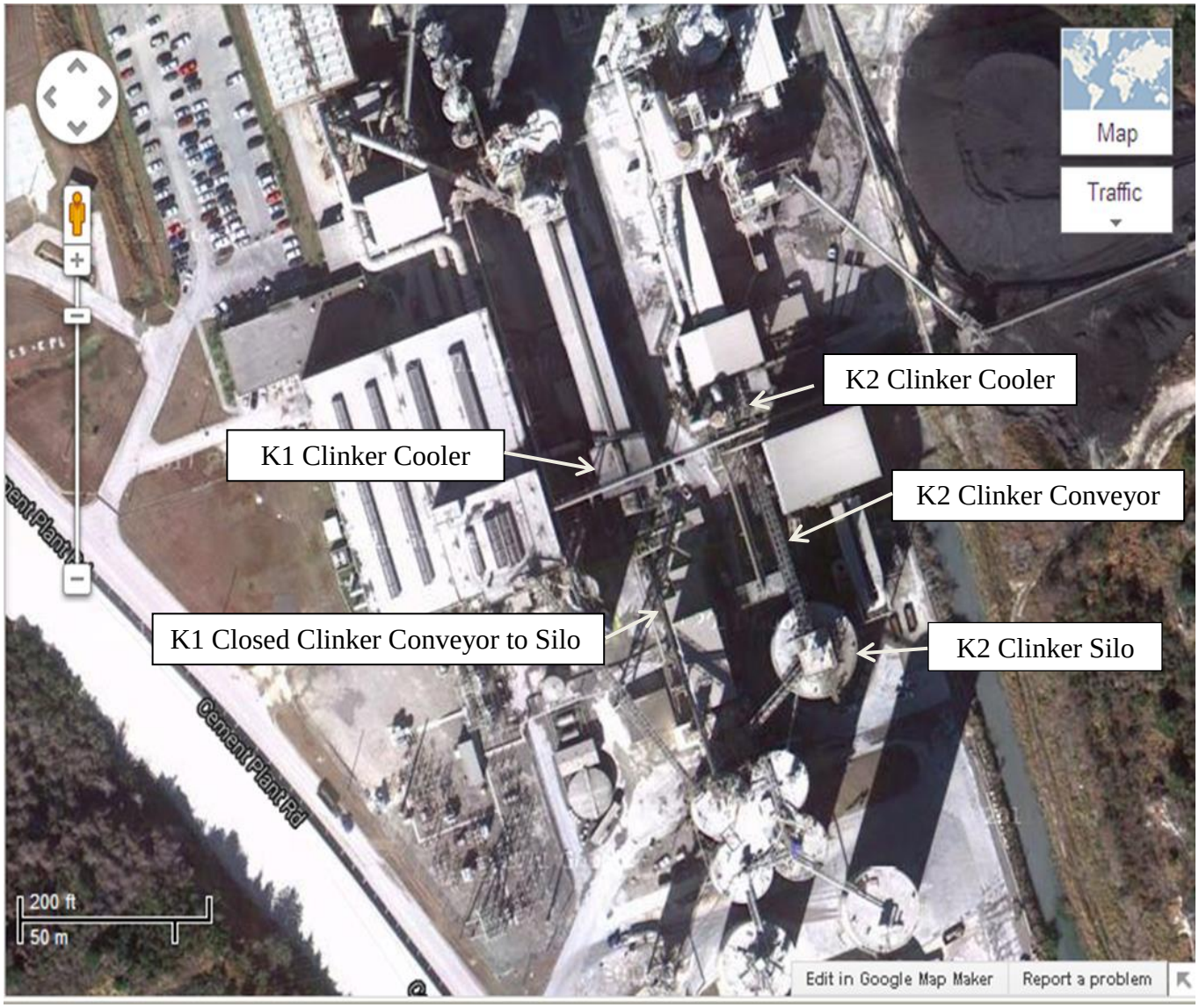
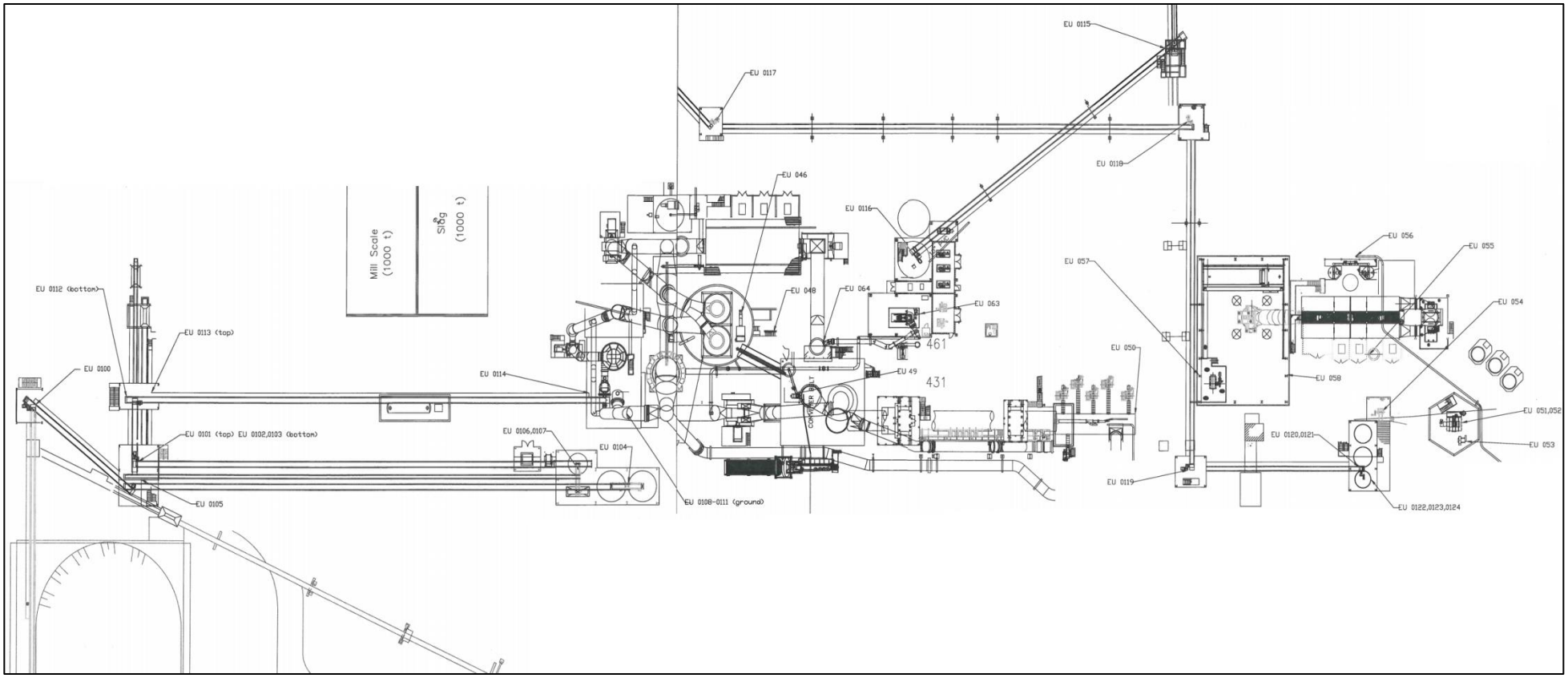


Figure A10-2: Location of Excess Clinker Piles:

Figure A10-3: Large Overview of Line No. 2 Emissions Units



Note: See Table 1-2 for list of Line No. 2 emission units and description.

APPENDIX 9: PROCEDURES FOR STARTUP AND SHUTDOWN

STARTUP PROCEDURES

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 pre-coat material, such as agricultural lime, into the system. Commercial pre-coats 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.

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 bringing 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 PM/PM_{10} 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 O_2 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 generally be achieved within a few hours after the startup.

Raw Mill Startup

Typically, the raw mill is brought on-line during the pre-heat 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 PM/PM_{10} 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 PM_{10}. 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.

Coal Mill Startup

The coal mill is required to operate when the kiln is operating. The coal mill is a source of PM and PM_{10} 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 PM/PM_{10} 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.

SHUTDOWN PROCEDURES

In-line Kiln/Raw Mill/Clinker Cooler No. 2 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.

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 PM_{10} emissions are associated with the shutdown of these dust collectors.