Puget Sound Clean Air Agency
Notice of Construction Worksheet

NOC Number: **9237**	Reg. No. **14046**	Source Name: **Lafarge Corporation**
Received Fee: **5/16/05**	Due Date: **6/16/05**	Source Location **5400 West Marginal Way SW Seattle, WA 98106**
Engineer **F. Austin**	Inspector **M. McAfee**	Compliance Issues: **Yes** **No**

A. Project Description

Order of Approval for the Construction, operation and testing of Mid-Kiln Whole Tire Firing with a Whole Tire Unloading, Conveying and Mid-Kiln Injection System.

LONG DESCRIPTION

Lafarge North America, Inc. operates a wet process cement kiln to produce Portland cement in Seattle. Lafarge proposes to install and operate a mid-kiln firing system that will utilize whole tires as tire derived fuel (TDF). While new equipment will be used to handle the TDF, Lafarge is currently permitted to burn TDF in the fuel end of the kiln provided that the total amount of TDF does not exceed 20% of total Btu supplied from the coal and coke used in kiln.

The installation of a whole tire TDF system for the kiln will involve the following equipment to transfer tires from delivery trucks to the kiln:
1) A truck unloading system to remove tires from enclosed trailers and transfer them to a conveying system;
2) A tire classifier to sort and feed tires onto the conveying system to the kiln;
3) Various conveyors to move the tires to the tire feed system; and
4) The tire feed system that injects the tires into the kiln.

B. Fee

Paid $750 5/16/05

Puget Sound Clean Air Agency - NOC Review Fee Worksheet			
Source Name:	Lafarge N. America		
Registration No.	14046		
NOC No.	9237		
	Filing Fee	$ 750	
	Date Paid	5/16/05	
Description	Units	Unit Cost	Cost
Equipment Based Charges			
Description: Installation of Whole Tire Handling System	1	$ 500	$500
Description: Installation of Mid-Kiln Injection System	1	$ 500	$500
Additional Charges			
SEPA Threshold Determination (DNS, Reg. I, 2.04)	1	$ 500	$500
Public Notice[a]	1	$ 500	$500
Subpart(s): NESHAPS Subpart LLL source.	1	$ 1,000	$1,000
Total Fee Estimate (for Invoicing)			$3,000
NOTES:			
[a]Does not include publication costs.			
[b]Does not include Ecology fees.			

Paid $3,000 10/21/05

C. SEPA Review

If Puget Sound Clean Air Agency is the Lead Agency, who was contacted at the City/County?

Comments:
Andy McKim [Andy.McKim@Seattle.Gov]
E-Mail sent 9/8/05

Hello Andy

I want to make sure I contact the City. Lafarge has submitted an application for approval to install and operate a system to receive, handle, convey, and inject whole tires into the kiln (~65 ft rotary).

Lafarge currently has a permit to inject and burn ground tires in the feed end of the kiln, @ ~20% Btu total fuel firing.

In my current search there is many cement plants that have installed and ran injection of tires and other fuels.

I believe their application is complete or nearly so. I am developing a draft Worksheet with my analysis and recommendations.

In the end I am reasonably sure the following steps will take place for the Agency.

A 30-day comment period, a public hearing, a temporary (~1 yr) approval with testing to verify kiln stability and air emission controls, and a re-application with the gathered test data for a permanent approval

Can you see whether the City would have any significant interest in this project, and would the City need any information from us?

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206.343.7522 fax
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D. Basic Equipment (BE)/Control Equipment (CE) Codes

No new emission generating equipment (BE entries). Kiln and ESP are currently listed for the site. Whole tire feeding system does not represent new emission generating equipment that needs to be added to the existing equipment list. Mixing air fans may also be installed to direct additional air within the kiln upstream (towards the burner) of the whole tire injection chute as a part of this project to support maximum whole tire firing trials.

E. Emission Estimate

1. ACTUAL emissions

Based on tests performed at other cement plants (see section M, Other Comments below), the Agency anticipates a reduction in the emission of nitrogen oxides (and sulfur dioxide) with mid-kiln injection of whole tires. Mid-kiln injection of whole tires should lower NOx emissions in the same manner as staged combustion in a boiler. Data indicate some pollutants such as carbon monoxide might increase. The magnitude of the increases or decreases can be ascertained only by testing and monitoring the kiln as specified in the conditions of this temporary permit.

Because this is a temporary approval and tests will be conducted on emissions associated with varying percentages of tires, there will be ample data available for further review in support of the application by Lafarge for a permanent approval to burn whole tires. That application would include

consideration of the emission data collected in relation to the tire injection rates which Lafarge found to be successfully demonstrated during the approval period proposed in this order.

2. POTENTIAL to emit

Lafarge has previously demonstrated that burning up to 20% chipped tires substituted for coal significantly decreases most emissions. This decrease is a consequence of lower amounts of metals and chemicals in tires. For this approval Lafarge needs to determine what effect injection of whole tires at mid-kiln (up to 4 tires per revolution) will have on emissions as compared with emissions from injection of shredded tires at the fuel end of the kiln and with emissions from the coal/coke fired operation (i.e. no alternative fuels fired).

During this temporary permit, the existing 20% limitation on the use of tires will remain in effect except during short periods of time (as allowed by the NESHAPS Subpart LLL) when Lafarge is actually testing the emissions as required under the conditions of this order of approval. The changes in emissions will largely depend on the tendency for mid-kiln injection to act as a staged combustion process.

A.) PRODUCTION RESTRICTIONS

No change anticipated.

3. Facility wide Emissions

A.) REPORTING SOURCE YES

B.) SYNTHETIC MINOR NO

C.) OPERATING PERMIT YES

F. Applicable Regulations (see Air Operating Permit)

1. PUGET SOUND CLEAN AIR AGENCY

2. State

WAC 173-434 (Solid Waste Incinerator Facilities)

This regulation applies to solid waste incinerator facilities and includes emission limitations, operational performance requirements, monitoring, and recordkeeping requirements. The previous version of WAC 173-434 (effective 10/18/90) was an applicable requirement for Lafarge until September 6, 2005. September 6, 2005 is the effective date of EPA's approval of a revision to the Washington State Implementation Plan (SIP) which replaced the 1990 version of this regulation with the present version of WAC 173-434.

Ecology revised WAC 173-434 in 2003 (effective 1/22/04). In this updated regulation, the definition of solid waste excludes tires and waste oils burned in Portland cement kilns. Since these specific materials are no longer included in its definition of solid waste, the kiln is no longer considered a solid waste incinerator facility under this rule.

Currently, Lafarge is approved to burn certain waste oils (limited to 25% of the Btu input to the kiln under Order of Approval No. 6202) and chipped tires (limited to 20% Btu input to the kiln under Order of Approval No. 3374).

3. Federal

40 CFR 63 Subparts LLL (Portland Cement NESHAP)

Lafarge has been subject to the Cement NESHAP regulation since it was promulgated. The facility was determined to be an "area source" of hazardous air pollutants (HAPs) as defined for that regulatory program (less than 10 tons/yr of a single HAP emitted, less than 25 tons/yr of combined HAP emissions). This area source classification determines the specific portions of the regulation which are applicable to the facility (see Lafarge's Air Operating Permit & Statement of Basis for more details).

This regulation requires performance tests requirement for dioxin/furan emissions every 30 months after the compliance effective date of June 14, 2002. The initial performance test was completed by Lafarge on February 13, 2002. Lafarge started the subsequent performance test required by this regulation on December 21, 2004, but it was not completed at that time due to kiln operational problems. Performance test reports for February 13, 2002, December 21, 2004, May 12, 2005, and June 10, 2005 are on file at this Agency.

A proposal of this nature by itself would trigger an additional performance test, as defined in 40 CFR 63.1249(e)(1). However, the testing requirements alone included in the proposed approval conditions represent dioxin/furan emission performance tests. Those tests may change operational temperatures limits under the NESHAP regulation for Lafarge if the tire fuel practice continues after the performance test event. The proposed approval conditions for this Order allow no continuing increase in tire fuel substitution beyond the presently allowed 20% of fuel supply to the kiln. The proposed approval would allow increased tire feeding for testing purposes only. These test conditions beyond the existing tire feed allowance must comply with the NESHAP operational limitation of 360 hours of changed operation for the purpose of completing a test, as defined in 40 CFR 63.1349(e)(3).

G. Technology Review BACT, RACT, ~~LAER~~

Based on tests performed at other cement plants, the Agency anticipates a reduction in the emission of nitrogen oxides with mid-kiln injection of whole tires. Mid-kiln injection of whole tires should lower NOx emissions in the same manner as staged combustion in a boiler. EPA has recognized mid-kiln injection as an emission control technology. If testing performed under this temporary order of approval confirms this, any subsequent application for a permanent order of approval will require review under WAC 173-400-114 (RCW 70.94.153). Alternatively, review may be performed under WAC 173-400-113 and Chapter 173-460 WAC (RCW 70.94.152) for those pollutants that are found to increase as a result of the modification.

Because the emission changes associated with the proposed project are not clearly quantifiable for this kiln at this time, the Agency is proposing a temporary Order of Approval. The proposed order imposes specific approval conditions to obtain the site-specific test data necessary to quantify those emission changes. This proposed temporary approval will provide site specific data to address the emission changes attributable to the proposed modification.

If the testing shows that whole tire system results in an increase in emissions of a regulated pollutant, then Lafarge will need to submit another NOC application to permanently approve the mid-kiln system at the desired maximum tire feed rate. If the testing shows that there are no emission increases with

the whole tire system operation yet Lafarge sought greater tire feed rates than the 20% limit, another NOC application will need to be submitted to increase the amount of tire use.

Currently, Lafarge is approved to burn certain waste oils (limited to 25% of the Btu input to the kiln under Order of Approval No. 6202) and chipped tires (limited to 20% Btu input to the kiln under Order of Approval No. 3374). Lafarge has withdrawn their initial request to burn '*other acceptable non-hazardous fuels'*.

~~*1. GENERIC BACT*~~

~~*2. Similar to:*~~

~~*3. Case-By-Case BACT*~~

H. Ambient Impact Analysis

At the time this temporary Order of Approval expires, Lafarge may submit an application for continuing the use of mid-kiln injection of tires on a permanent basis. At that time an impact analysis may be required (based on testing results collected under this temporary order of approval).

~~*1. GENERIC*~~

~~*2. Screen Results*~~

I. Public Notice Requirement

A public notice and hearing will occur as allowed by WAC 173-400-171(2)(c) because the Agency has determined that there is substantial public interest in this project.

J. Operating Permit or PSD

Lafarge is an operating permit source. The operating permit was initially issued on May 15, 2004 and was last modified on July 28, 2004.

The proposed Order of Approval does not require an operating permit revision, as defined in *"WAC 173-401-722 Changes Not Requiring a Permit Revision"*. It is important to note that the proposed order of approval is a temporary action intended only for collection of additional information to document the emission changes which may be attributable to the project. It is assumed that Lafarge will pursue permanent approval to burn whole tires at rates beyond the 20% limitation. It is also assumed that Lafarge may use all of its current fuel firing scenarios allowed (while meeting the 20% tire limit) except for the required testing periods in this Order. The NOC review process to accomplish that will trigger an operating permit modification.

The conditions necessary to classify this NOC action in this category are as follows:

1. *Proposed changes are not Title I modifications*

Title I modifications can include NSPS, NESHAP, PSD, or nonattainment NSR elements. This project does not trigger applicability of the NSPS rule for Portland cement plants (40 CFR 60, Subpart F). Equipment proposed for this project does not fit the definition of an "affected facility" under that rule. Additionally, the technical information available at this time does not suggest the proposal would increase the hourly rate of PM emissions, which would be necessary to classify this as a modification under NSPS definitions. Lafarge is already subject to the Portland Cement NESHAP (40 CFR 63, Subpart LLL) requirements for area sources of

HAP, which are included in its operating permit. Information related to this proposed project does not suggest that Lafarge would become a major source of HAP. There is insufficient information to determine if PSD would be triggered with mid-kiln injection of whole tires were to be used on a continuing basis, although data suggests that CO emissions may increase. The test data collected during the temporary approval period should answer this question. Nonattainment NSR is not an issue since the Puget Sound region presently meets all ambient air quality standards.

2. *Proposed changes do not result in emissions which exceed those allowable under the permit, whether expressed as a rate of emissions, or in total emissions*

While information indicates there may be may be an increase in CO emissions associated with the mid-kiln firing, there currently is no CO emission limitation for the kiln. The testing that Lafarge will conduct under this proposed order will establish the actual CO emission increase which may be attributable to the proposed project. Other existing emission limitations included in the operating permit (including those limits established by the Portland Cement NESHAPS) will remain in effect throughout the proposed approval period.

If during the testing for this Order of Approval, Lafarge discovers that the enhanced use of tires potentially causes or affects operation of the plant as relates to compliance with the dioxin emission standard in the NESHAPS, Lafarge must follow Subpart LLL in the re-establishment of a new temperature limit.

3. *Proposed changes do not alter permit terms that are necessary to enforce limitations on emissions from units covered by the permit*

As identified above, no existing operating permit terms would be altered by this temporary order of approval. This proposed approval continues to limit the use of tires to 20% of the fuel usage in the kiln on an ongoing basis as is currently allowed. It also allows Lafarge the ability to inject the same total amount of tires at the fuel end or at mid-kiln.

This proposed approval also allows short term periods for testing emissions from whole tire injection starting with no injection and ending with as much as 40% of the fuel usage from the burning of whole tires in the kiln for relatively short testing periods. These short term testing periods have requirements that Lafarge follow the monitoring and compliance provisions of 40 CFR 63.1349. Specifically, Section 63.1349((e)((3) allows up to 360 hours (15 days) for preparations and testing in order for a source to substantiate whether a change in operations may potentially create an adverse affect on compliance with the applicable dioxin limit of Subpart LLL. The 15 day window is reasonable because a cement kiln requires a fairly long run-up period to assure stable and smooth operations are maintained during operations. A cement kiln also has a great deal of thermal inertia because all the tons of raw material and the tons of equipment can not be changed quickly.

Prior to issuance of any permanent order of approval, the test results will be evaluated to determine appropriate emission standards and the need for any reopening of the operating permit. A reopening will be required if the limit of 20% TDF is to be increased.

4. *Facility provides the administrator and the permitting authority written notice at least prior to making the proposed changes*

This application and the subsequent public comment period will serve as notice for this action as it relates to the current operating permit.

K. Recommended Approval Conditions

GENERIC CONDITIONS

1. Approval is hereby granted as provided in Article 6 of Regulation I of the Puget Sound Air Pollution Control Agency to the applicant to install or establish the equipment, device or process described herein at the INSTALLATION ADDRESS in accordance with the plans and specifications on file in the engineering Division of Puget Sound Clean Air Agency.

2. This approval does not relieve the applicant or owner of any requirement of any other governmental agency.

WHOLE TIRE LIMITATION

3. Lafarge North America (Lafarge) is approved to inject only whole tires (tire derived fuel - TDF) at mid-kiln.

4. Lafarge shall limit and record the total use of whole tires and chipped tires injected into the kiln to no more than 20% of the total fuel energy (Btu) supplied to the kiln on a hourly average, except as allowed by Conditions No. 8 and 9 of this Order. Whole tire injection may not proceed at any rate until the performance test report for that whole tire feed rate has been submitted with a demonstration of compliance with the limits of 40 CFR 63.1343(d). Lafarge shall submit these records on a monthly basis with the required CEMS reports.

NOx & CO MONITORING

5. While the kiln is operating, Lafarge shall continuously operate the NOx and CO emission monitors, Lafarge shall record the NOx and CO emission data and report the data for the duration of this Order. As part of the testing process in Conditions 8 and 9, Lafarge shall investigate short term relationships between NOx and CO emissions and the types, quantities and rates of raw materials, fuels and kiln operations during periods before and after injection of chipped or whole tires. These investigations shall be submitted along with the test reports for Conditions 8 and 9. Lafarge shall record the fuels used and their usage rate for the duration of this Order and submit this data on a monthly basis with the required CEMS reports.

SOURCE TEST SCHEDULE

6. Lafarge shall submit source test notifications and test reports as required by Regulation I, Section 3.07 for each required test identified in Condition No. 8 of this Order.

7. Within 30 days of kiln startup after the 2005-06 winter maintenance period and the 2006-07 winter maintenance period, Lafarge shall evaluate the installation, calibration and drift of the existing NOx, CO and O_2 monitors following the procedures in 40 CFR 60, Appendix B (Specifications 2, 3 and 4) and Appendix F. Lafarge shall apply bias correction factors as needed for the existing NOx, CO and O2 monitors for use during this temporary approval. Lafarge shall conduct daily calibration drift checks on the NOx, CO and O2 monitors. Lafarge shall submit the results from these QA/QC procedures to the Agency within 30 days of test completion and continue to report on a monthly basis in accordance with Article 12 of Regulation I. For the purposes of this testing, these NOx, CO and O_2 monitors do not need comply with the CEMS installation and measurement Specifications in Section

8.1 and the Relative Accuracy Performance Specification in Section 13.2 of Performance Specification 2 and the Relative Accuracy requirement in Section 13.2 of Performance Specification 4.

8. Lafarge shall perform quarterly source tests beginning during the second quarter of 2006 and ending after the second quarter of 2007. During these source tests, Lafarge may request Agency approval for different tire injection rates other than listed below if necessary to assure kiln stability. Lafarge shall make any such request at least 7 days prior to a scheduled source test. Lafarge shall perform source tests in accordance with Conditions No. 9 and 10 of this Order while operating the kiln near capacity and consistently adding tires as nearly as practical at the levels specified. Lafarge shall conduct the following tests no later than the date specified:

a) Second Quarter 2006 - no waste oil, no chipped tires, and no whole tires;
b) Third Quarter 2006 - no waste oil, no chipped tires, and whole tires at 20% of the total heat input supplied to the kiln on a hourly average;
c) Fourth Quarter 2006 - no waste oil, chipped tires at 10% and whole tires at 10% of the total heat input supplied to the kiln on a hourly average;
d) First Quarter 2007 - no waste oil, chipped tires at 20% and whole tires at 20% of the total heat input supplied to the kiln on a hourly average;
e) Second Quarter 2007 - no waste oil, no chipped tires and whole tires at 40% of the total heat input supplied to the kiln on a hourly average.

OPERATIONS AND TESTING

9. Lafarge shall test the emissions in accordance with the following methods:
a) Opacity (CEMS);
b) SO2 (CEMS);
c) NOx (EPA Method 7E);
d) CO (EPA Method 10);
e) O2 (EPA Method 3A);
f) Dioxin/Furan (EPA Method 23);
g) Metals (EPA Method 29) - testing required under Conditions No. 8(a), 8(b), and 8(e) only;
h) Formaldehyde (Method 0011/SW-8315) - testing required under Conditions No. 8(a), 8(b), and 8(e) only;
i) Volatile Organic Compounds (EPA Method TO-14A);
j) Polycyclic Aromatic Hydrocarbons (EPA Method 0010).

10. Lafarge shall monitor and record the following data:

a). ESP inlet temperature following 40 CFR 63.1349(b)(3);
b) Type and quantity of clinker manufactured for cement;
c) Type and quantity of raw materials added to kiln;
d) Type, quantity and fuel Btu added to the kiln;
e) Burnability Index;
f) Amount of CKD produced and re-injected;
g) Variability of raw mix; and
h) Amount of tires (chipped or whole) added to kiln.

11. Lafarge shall submit a report to the Agency no later than August 30, 2007 which contains the following:

a) Analysis of testing results quantifying emission changes between burning no tires, burning chipped tires and burning whole tires; and
b) Estimated or projected changes in emissions between burning no tires, burning chipped tires and burning whole tires in pounds per hour and estimated on a tons per year basis for measured pollutants from the source tests and monitored data collected to that date.

12. Lafarge shall submit a Notice of Construction application to obtain final approval for future tire fuel operations no later than September 30, 2007.

13. Lafarge shall submit an Air Operating Permit renewal application no later than September 30, 2007.

14. If the applications identified in Conditions Nos. 12 and 13 are both complete by December 30, 2007, this Temporary Order of Approval will remain in effect until final action is taken on the applications identified in Conditions Nos. 12 and 13. If the applications identified in Conditions Nos. 12 and 13 are not complete by December 30, 2007, this Temporary Order of Approval will expire on that day.

L. Recommendation for Legal Review

None.

M. Discussion/Questions - Recommended Approval Conditions

Why doesn't the allowance to burn at 40% tires trigger the AOP?

Lafarge is subject to the requirements of 40 CFR 63, Subpart LLL that regulates cement plants. Section 63.1349 allows periods of time for testing when the plant plans to make a change in operations and defines the conditions for testing.

Why allow testing whole tires in mid-kiln?

Lafarge is approved to burn certain waste oils (Order of Approval # 6202, 11/15/95) and chipped tires (Order of Approval # 3374, 7/10/91) injected at the fuel end of the kiln. There have been source tests and dispersion modeling studies conducted for these approvals. There also are tests conducted at other cement plants that burn whole tires.

This plant currently meets all emission standards while burning 100% coal (the dirtiest fuel). The use of these alternate fuels may lower emissions because coal is displaced with a tires which are a cleaner fuel.

During the temporary permit, the use of tire derived fuel (TDF) is limited to the same percentage as is currently allowed. After establishing the emissions from the use of 20% whole tires, testing is allowed to be conducted for short periods while burning up to 40% tires pursuant to 40 CFR Part 63, Subpart LLL, Section 63.1349.

Whole tires tested in other cement kilns have shown substantial decreases in some pollutant emission levels (e.g. NOx) at other plants in the United States. In the Seattle plant there may be some differences between burning whole tires mid-kiln versus burning shredded tires in the fuel end of the kiln. The testing to be carried out under this permit will allow Lafarge to find out how the differences may affect kiln operations.

Why Allow the Extended Period for this Order of Approval?

Cement kilns operate at very high temperature generally exceeding 2700 - 2800 °F. Lafarge's kiln can process some 54 tons/hour (1300 tons/day) of clinker. Because all kilns need a significant amount of time to start-up and settle down to a consistent operational level, changes in the feed rate, raw material chemistry or fuel mixture can cause a kiln's ideal operational level to change. This in turn may cause the kiln operators to modify the burning conditions to re-establish a new set of operational parameters. The new operational parameters may take days to re-establish stable kiln conditions after significant changes in fuel.

Although Lafarge operates continuous monitors that measure opacity, SO2, NOx and CO, other individual pollutants will be tested with stack gas sampling probes which gives only a snap-shot picture during a single day of operations. Also, the laboratory analysis can take up to two months to finalize.

A stack sampling source test collects emissions during a single day of operations. Laboratory analysis can take up to two months to finalize for dioxin results. Because of the long turn around time for reporting testing data and the slow response time to correctly modify kiln operations the Agency is proposing to allow this temporary approval to last for at least 24 months. This should allow the gathering of sufficient data for Lafarge to make a complete application if they decide to apply for a permanent Order of Approval.

Why allow continued operation after testing period?

Lafarge is only allowed to increase the level of tire fuel above the currently allow 20% during short periods when testing is planned. After a test at a higher level (i.e., 40% tires) is complete Lafarge is required to return their operations to the level that is currently approved.

If Lafarge requests permanent approval, what might the final Approval look like?

Orders of Approval are issued by the Agency on a case-by-case basis using the available information relevant to the source. While the Agency can not pre-judge the details of what an approval would contain, there are certain elements it must contain to satisfy the regulations. Regulation I, Section 6 specifies the elements of a complete application. This project may require the use of Reasonable Available Control Technology (RACT) or Best Available Control Technology (BACT). So, part of the requirement for Lafarge is to quantify whether there are any significant changes in air emissions.

Another part of the results from these tests may be the establishment of appropriate levels for NOx and CO emissions by setting emission standards. It is expected that if any additional application for permanently approval of mid-kiln firing of tires or approve to fire tires at higher feed rates, there would be another public comment period to review the updated information developed through the testing and the recommended approval conditions.

If adding tires mid-kiln increases regulated pollutants and Lafarge seeks approval to continue burning tires mid-kiln, what may cause the application to be denied?

The three criteria that must be satisfied for approval include:

- Source/project must meet existing applicable regulatory requirements and emission limits
- Source/project must represent or implement BACT or RACT, as appropriate
- Source/project must demonstrate impacts below regulatory defined thresholds

If these criteria are not satisfied, the Agency will embark on a process to issue an Order to Prevent Construction.

Discuss difference between continuous monitoring and source testing.

A source test is a one time event usually lasting for a day or two. The source test results are a one time picture of the tested emissions and may need some linkage to plant operations as a baseline. However, a continuous emission monitor operates 24-hours a day and gives continuous data over a long period that can be used to verify trends associated with how the plant operates. Both source tests and CEMS are very expensive. A source test can range from $5000 - $25,000 depending on the pollutant being measured. A continuous emission monitor system can cost a significant amount of money to install and may require highly trained personnel for their operation and maintenance.

Some source tests measure the same emissions as a CEMS (NOx, CO), but many compounds cannot be measured by a CEMS and must be sampled with a source test (dioxin, metals).

What is the difference between existing permit(s) and this approval. (temp & whole tires versus waste oil and chipped tires)

Order of Approval # 6202 approved 11/15/95 allows Lafarge to burn waste oils (only non-hazardous and non-dangerous materials as defined by WAC 173-303-515 and 173-303-090).

Order of Approval # 3374 approved 7/10/91 allows Lafarge to burn chipped tires injected at the fuel end of the kiln. There have been multiple source tests and dispersion modeling studies conducted for these approvals.

The main difference between this Temporary Order of Approval No. 9237 and existing approvals is the approval to burn up to 40% whole tires in the mid-kiln area during source tests trial of test burns. During other periods the amount of tire derived fuel (TDF) is limited to 20% as it is currently approved.

N. Application Materials

1. Initial Application, May 16, 2005

The following information was extracted from the original application from Lafarge

SOURCE ESTIMATED AIR QUALITY IMPACTS

Air Quality Impact Analysis

"The emission rate for each TAP was determined based on the highest emission rate measured for that pollutant since 1996. Those measurements include at test using 24% TDF and two tests using waste oil. Normally, an applicant is only required to model the impacts of the emission increases. However in this case, not only was the worst case increase evaluated, but existing Lafarge emissions were also included as an extra margin of safety."

"The emission rates were then modeled and compared to the Acceptable Source Impact Level (ASIL). The results are shown in Table 3 below for metals with the results expressed as a percentage of the ASIL for each pollutant."

"TAP's emissions were modeled using the proposed ISC3-PRIME (Version 01228) model. Surface meteorological data collected from the Seattle Boeing Field meteorological station was used for this analysis. Five years of data from the years 1994 to 1998 collected from the Seattle Boeing Field station were processed with the mixing height data from Quillayute, Washington, upper air station. This data was purchased from the National Climatic Data Center (NCDC) and processed by CH2M HILL. The annual max impact is about 1 km northwest of the site and the 24-hour max impact is about 500 m southwest of the site."

"Table 4 lists the predicted ambient concentration of organic TAPs, that have been detected in any test since 1996, and the percent of the ASIL. Of the organic TAP's, only benzene and dioxins (expressed as TCDD equivalent) exceeded one fifth of the ASIL."

"As shown the expected ambient impacts of all TACs modeled are below the ASIL and no further modeling is necessary. A more detailed discussion of the modeling, including input and output data, is shown in Appendix A (of the application)."

Tables 3 & 4 from the applicant:

Table 3 -Metals TAP Ambient Concentration (% of ASIL)

Metals

Pollutant	*ASIL ($\mu g/m^3$)*	*Class A/B TAP*	*HAP*	*Averaging time*	*Ambient Conc. ($\mu g/m^3$)*	*Percent of ASIL*
Aluminum	*6.7*	*B*	*N*	*24*	*0.0269*	*0.40%*
Antimony	*1.7*	*B*	*N*	*24*	*0.0000*	*0.00%*
Arsenic	*0.00023*	*A*	*Y*	*Annual*	*0.0000*	*2.79%*
Barium	*1.7*	*B*	*N*	*24*	*0.0014*	*0.08%*
Beryllium	*0.00042*	*A*	*Y*	*Annual*	*0.0000*	*0.33%*
Boron	*33*	*B*	*N*	*24*	*0.0052*	*0.02%*
Cadmium	*0.00056*	*A*	*Y*	*Annual*	*0.0001*	*13.49%*
Chromium	*0.000083*	*A*	*Y*	*Annual*	*0.0000*	*9.54%*
Cobalt	*0.17*	*B*	*N*	*24*	*0.0008*	*0.45%*
Copper	*3.3*	*B*	*N*	*24*	*0.0114*	*0.35%*
Lead	*0.5*	*A*	*N*	*Annual*	*0.0011*	*0.22%*
Lithium	*0.08*	*B*	*N*	*24*	*0.0011*	*1.41%*
Magnesium	*33*	*B*	*N*	*24*	*0.0076*	*0.02%*
Manganese	*0.4*	*B*	*N*	*24*	*0.0007*	*0.17%*
Mercury	*0.17*	*B*	*Y*	*24*	*0.0236*	*13.86%*
Nickel	*0.0024*	*A*	*N*	*Annual*	*0.0000*	*1.80%*
Phosphorous	*0.33*	*B*	*N*	*24*	*0.0014*	*0.41%*
Potassium	*6.7*	*B*	*N*	*24*	*0.6679*	*9.97%*
Selenium	*0.67*	*B*	*N*	*24*	*0.0046*	*0.69%*
Silver	*0.033*	*B*	*N*	*24*	*0.0001*	*0.34%*
Thallium	*17*	*B*	*N*	*24*	*0.0010*	*0.01%*
Tin	*6.7*	*B*	*N*	*24*	*0.0073*	*0.11%*
Vanadium *****	*0.17*	*B*	*N*	*24*	*0.0015*	*0.88%*
Yttrium	*3.3*	*B*	*N*	*24*	*0.0000*	*000%*
Zinc	*3.3*	*B*	*N*	*24*	*0.0059*	*0.18%*

***** The name of this metal was missing in the original table, but appears to be 'Vanadium'.

Table 3 Sorted by Percent ASIL:

Pollutant	*ASIL ($\mu g/m^3$)*	*Class A/B TAP*	*HAP*	*Averaging time*	*Ambient Conc. ($\mu g/m^3$)*	*Percent of ASIL*
Mercury	*0.17*	*B*	*Y*	*24*	*0.0236*	*13.86%*
Cadmium	*0.00056*	*A*	*Y*	*Annual*	*0.0001*	*13.49%*
Potassium	*6.7*	*B*	*N*	*24*	*0.6679*	*9.97%*
Chromium	*0.000083*	*A*	*Y*	*Annual*	*0*	*9.54%*
Arsenic	*0.00023*	*A*	*Y*	*Annual*	*0*	*2.79%*
Nickel	*0.0024*	*A*	*N*	*Annual*	*0*	*1.80%*
Lithium	*0.08*	*B*	*N*	*24*	*0.0011*	*1.41%*
*Vanadium **	*0.17*	*B*	*N*	*24*	*0.0015*	*0.88%*
Selenium	*0.67*	*B*	*N*	*24*	*0.0046*	*0.69%*
Cobalt	*0.17*	*B*	*N*	*24*	*0.0008*	*0.45%*
Phosphorous	*0.33*	*B*	*N*	*24*	*0.0014*	*0.41%*
Aluminum	*6.7*	*B*	*N*	*24*	*0.0269*	*0.40%*
Copper	*3.3*	*B*	*N*	*24*	*0.0114*	*0.35%*
Silver	*0.033*	*B*	*N*	*24*	*0.0001*	*0.34%*
Beryllium	*0.00042*	*A*	*Y*	*Annual*	*0*	*0.33%*
Lead	*0.5*	*A*	*N*	*Annual*	*0.0011*	*0.22%*
Zinc	*3.3*	*B*	*N*	*24*	*0.0059*	*0.18%*
Manganese	*0.4*	*B*	*N*	*24*	*0.0007*	*0.17%*
Tin	*6.7*	*B*	*N*	*24*	*0.0073*	*0.11%*
Barium	*1.7*	*B*	*N*	*24*	*0.0014*	*0.08%*
Boron	*33*	*B*	*N*	*24*	*0.0052*	*0.02%*
Magnesium	*33*	*B*	*N*	*24*	*0.0076*	*0.02%*
Thallium	*17*	*B*	*N*	*24*	*0.001*	*0.01%*
Antimony	*1.7*	*B*	*N*	*24*	*0*	*0.00%*
Yttrium	*3.3*	*B*	*N*	*24*	*0*	*0%*

Table 4 -Organic TAP Ambient Concentration (% of ASIL) **from the applicant**

VOC TAP & Dioxin

Pollutant	*ASIL ($\mu g/m^3$)*	*Class A/B TAP*	*HAP*	*Averaging Time*	*Ambient Conc. ($\mu g/m^3$)*	*Percent of ASIL*
1,2,4-Trimethylbenzene	*420*	*B*	*Y*	*24*	*0.0123*	*0.0%*
Benzene	*0.12*	*A*	*Y*	*Annual*	*0.0583*	*0.00%*
Chlorobenzene	*150*	*B*	*Y*	*24*	*0.0064*	*48.58%*
Chloroethane	*10000*	*B*	*Y*	*24*	*0.0057*	*0.00%*
Chloromethane	*340*	*B*	*Y*	*24*	*0.2348*	*0.00%*
Ethylbenzene	*1000*	*B*	*Y*	*24*	*0.0295*	*0.07%*
m,p-Xylenes	*1500*	*B*	*Y*	*24*	*0.0288*	*0.00%*
Methyl bromide	*5*	*B*	*Y*	*24*	*0.1924*	*0.00%*
Methylene chloride	*0.56*	*A*	*Y*	*Annual*	*0.0050*	*0.00%*
o-Xylene	*1500*	*B*	*Y*	*24*	*0.0300*	*3.85%*
Tetrachloroethylene	*1.1*	*A*	*Y*	*Annual*	*0.0000*	*0.89%*
Toluene	*400*	*B*	*Y*	*24*	*0.2941*	*0.00%*
Trichloroethene	*0.59*	*A*	*Y*	*Annual*	*0.0744*	*0.00%*
Vinyl chloride	*0.012*	*A*	*Y*	*Annual*	*0.0004*	*0.07%*
Dioxins and Furans (Based on TCDD)	*3E-08*	*A*	*Y*	*Annual*	*0.0000*	*35.14%*

Table 4 Sorted by Percent ASIL:

Pollutant	ASIL ($\mu g/m^3$)	Class A/B TAP	HAP	Averaging Time	Ambient Conc. ($\mu g/m^3$)	Percent of ASIL
Chlorobenzene	150	B	Y	24	0.0064	48.58%
Dioxins and Furans (Based on TCDD)	3.00E-08	A	Y	Annual	0	35.14%
o-Xylene	1500	B	Y	24	0.03	3.85%
Tetrachloroethylene	1.1	A	Y	Annual	0	0.89%
Ethylbenzene	1000	B	Y	24	0.0295	0.07%
Vinyl chloride	0.012	A	Y	Annual	0.0004	0.07%
1,2,4-Trimethylbenzene	420	B	Y	24	0.0123	0.00%
Benzene	0.12	A	Y	Annual	0.0583	0.00%
Chloroethane	10000	B	Y	24	0.0057	0.00%
Chloromethane	340	B	Y	24	0.2348	0.00%
m,p-Xylenes	1500	B	Y	24	0.0288	0.00%
Methyl bromide	5	B	Y	24	0.1924	0.00%
Methylene chloride	0.56	A	Y	Annual	0.005	0.00%
Toluene	400	B	Y	24	0.2941	0.00%
Trichloroethene	0.59	A	Y	Annual	0.0744	0.00%

2. Supplemental Submittal, August 31, 2005 (via E-Mail)

From: Russ.Simonson@lafarge-na.com [mailto:Russ.Simonson@lafarge-na.com]
Sent: Wednesday, August 31, 2005 7:01 AM
To: Fred Austin
Cc: tom.crowninshield@lafarge-na.com
Subject: response to request of additional information regarding whole tire permit application

Mr. Fred Austin
Puget Sound Clean Air Agency
110 Union Street, Suite 500
Seattle, WA 981010-2038

RE: Lafarge Seattle Whole Tire Permit Response of Incompleteness

Thank for meeting with us about Lafarge's proposed tire burning project Notice of Construction No. 9237. We are in the process of getting SO2 data tabulated in the requested form. We expect SO_2 calculations to be provided in mid August.
However, the remaining issues you are requesting additional information on are addressed below.

It would also be helpful to get clarification on two issues; one dealing with the definition of modification and the other the applicability of an existing approval condition. We would like confirmation that modification a result of an increase in the hourly emission rate of a pollutant. We understand that RCW 70.94.030

(14) "Modification" means any physical change in, or change in the method of operation of, a stationary source that increases the amount of any air contaminant emitted by such source or that results in the emission of any air contaminant not previously emitted. The term modification shall be construed consistent with the definition of modification in ***Section 7411, Title 42, United States Code, and with rules implementing that section.***

The rules implementing Section 7411 of the Federal Clean Air Act are contained in 40 CFR Part 60. In 40 CFR 60.14, a modification is defined to be an increase in the hourly emission rate. At our meeting another definition of modification was suggested, would you please clarify.

We also are requesting clarification of the applicability to NOC Order of Approval No. 6202. Please clarify if the approval would include the use of whole tires and mid kiln injection TDF.

The following responses to your request for more information about our project will hopefully be sufficient in helping the Clean Air Agency make a determination for approval on the Whole Tire Injection project:

1. Requirement for replacement or substantial alteration of emission control technology

Clean Air has suggested that a RACT determination for NOx is required because the proposal constitutes a substantial alteration of control technology for NOx. We feel there are both legal and practical reasons that this may not be necessary.

First, the authority to require RACT when there is a substantial alteration of emission control technology comes from the WA Clean Air Act in RCW 70.94.153. There is a strong argument that this provision does not apply where, as here, the project is otherwise reviewable under the minor NSR rules. The provision gives the permitting authority the discretion to require RACT (the provision says that the permitting authority "may" require RACT) only for "projects that are not otherwise reviewable under RCW 70.94.152," which is the statutory provision authorizing permitting authorities to promulgate NOC rules. Because the Agency is reviewing the project under its NOC rules, the substantial alteration of control technology provision that allows the Agency to require RACT does not apply.

Second, even if the statute (and the WAC provision that implements the statute) did not have the "for projects not otherwise reviewable" language, Lafarge would have strong arguments against the position of RACT analysis. Just because an EPA study identified mid-kiln whole tire injection as a NOx control method, does not necessary mean that the project constitutes a "substantial alteration of control technology" under the state law. The state provision necessarily requires an existing control technology that is proposed to be replaced or altered. In this case, the Agency would have to take the position that Lafarge's current practice of burning tires is an existing control technology, and that changing the system to accommodate whole tires is a substantial alteration of it. But the Agency has never in the past referred to or considered tire burning at the Seattle plant to constitute a control technology, and they have not regulated it as such. In fact, the authorizing permit limits the amount of tire burning that Lafarge can do -- a good indication that during permitting it was not view it as means of emissions control. Further, due to the variable nature of tire supplies, and possibly operational considerations, there is no reasonable way that Lafarge could commit to injecting whole tires at any pre-set level. This makes the proposal for the Lafarge plant decidedly un-control-technology-like. Rather, it is an operational choice that the plant is seeking, that just may have the effect of lowering NOx emissions.

2. Control technologies for increases

By increasing the amount of tires burned in the kiln, Lafarge will not increase the capacity of the kiln to emit on a short-term, pounds per hour basis. The project should not, therefore, constitute a modification for minor NSR purposes.

The WA Clean Air Act's definition of "modification" states that "[t]he term modification shall be construed consistent with definition of modification in Section 7411, Title 42, United States Code, and with rules implementing that section." RCW 70.94.030(14). The reference is to the NSPS provisions in the federal Clean Air Act. The definition of "modification" in the NSPS rules differs from the PSD definition of modification. To constitute a modification under the NSPS regulations, a change must "result in an increase in the emission rate to the atmosphere." 40 CFR § 60.14(a). EPA directs this analysis to be based on a unit's capacity to emit on a short-term (pounds per hour) basis, by measuring the emission rate at maximum capacity just before and just after a proposed change.

Pursuant to longstanding EPA interpretations, the emissions rate before and after a physical or operational change is evaluated at each unit by comparing the hourly potential emissions under current maximum capacity to emissions at maximum capacity after the change. … The thrust of the NSPS modification provisions is to compare actual maximum capacity before and after the change in question.

EPA Memorandum, Applicability of Prevention of Significant Deterioration (PSD) and New Source Performance Standards (NSPS) Requirements to the Wisconsin Electric Power Company (WEPCO) Port Washington Life Extension Project, from D. Clay, Acting Asst. Administrator for Air and Radiation, to D. Kee, EPA Region V, Sept. 9, 1988. As long as the proposed project will not affect the kiln's current maximum capacity, hourly potential emissions under current maximum capacity and emissions at maximum capacity after the change will be the same, so there will be no increase in the emission rate from the kiln, and therefore no modification.

3. SO2 baseline

We suggest that with pending adoption of WAC 173-434 into the SIP, the issue of re-addressing the baseline is resolved and is unnecessary.

4. Submit emission data and calculations

SO2 data pending. These data will be submitted separately once calculations have been completed.

5. Other fuels

We acknowledge your suggestion of using the process of applying for a specific and separate NOC application to address other fuels as the best way to expedite the whole tires project permitting. Lafarge requests that "and other acceptable non-hazardous fuels" be stricken from Section 3.1 of our application.

We also did not mean that we were looking to exceed the ASILs.

Please call with any questions,

Russ Simonson, Environmental Manager
Lafarge North America Inc., Seattle Plant
206/937-8025 ext. 319

3. Supplemental Submittal, September 19, 2005 (via E-mail)

-----Original Message-----
From: Russ.Simonson@lafarge-na.com [mailto:Russ.Simonson@lafarge-na.com]
Sent: Monday, September 19, 2005 3:41 PM
To: Fred Austin
Subject: Re: Lafarge Meeting 9/14/05

Hi Fred,

Here are the details and chronology of the past three dioxin/furan tests.

Let me know if you would like anything further,

Best regards,

Russ Simonson, Environmental Manager
Lafarge North America Inc., Seattle Plant
206/937-8025 ext. 319

(See attached file: DF test results.doc)

September 16, 2005

Mr. Fred Austin
Puget Sound Clean Air Agency
110 Union Street, Suite 500
Seattle, WA 981010-2038

RE: Dioxin/Furan PC MACT Performance Testing

Dear Fred:

The following is an account of the three PC MACT dioxin/furan performance tests we have completed since last December.

December 21, 2004 Performance Test

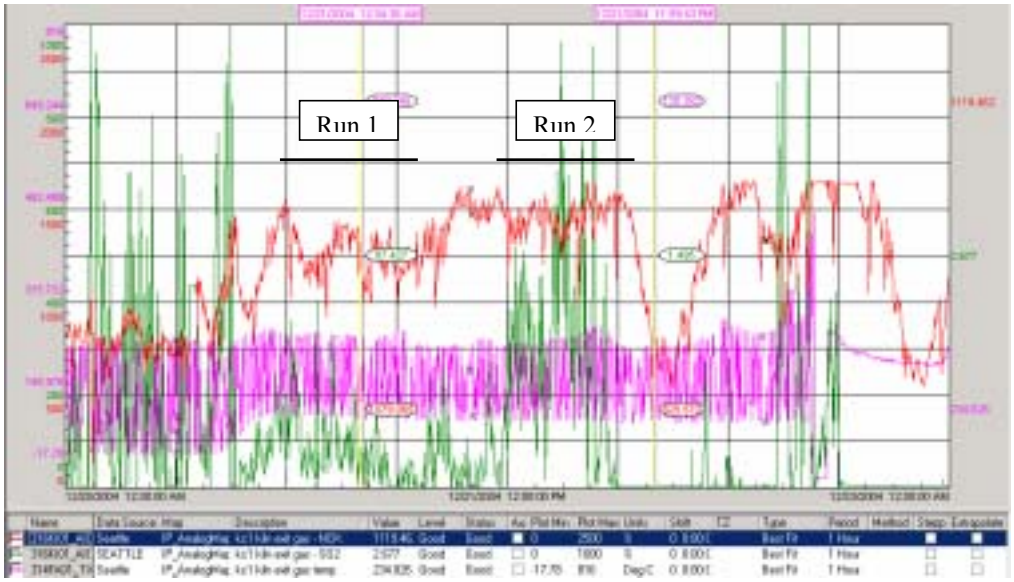
During this test, one of the goals for the plant was to establish a higher temperature compliance limit for the inlet to the APCD. At the time, our limit was 197 degrees Celsius. The day prior to the test, we began to ramp up the kiln's back-end temperature and during the time of the tests, we were averaging 248 degrees Celsius.

During the second run of the test, a refractory failure at the front-end of the kiln, caused the plant operators to begin shut-down and control measures. We were unable to finish the test due to the kiln performance. The plant decided that the kiln refractory was too poor for continued operations, and the decision to begin our winter kiln maintenance outage ahead of schedule was made.

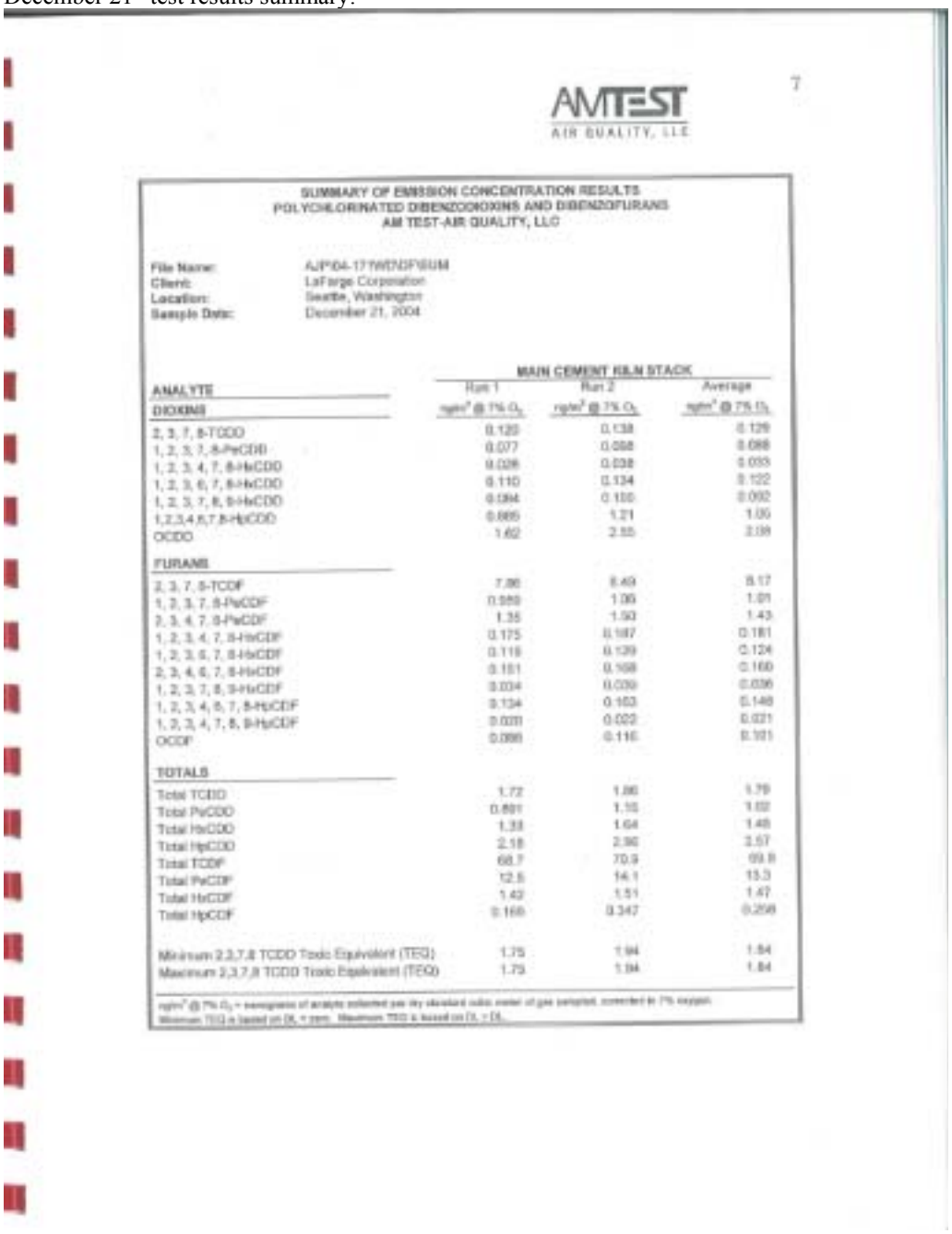
The process information gathered during the first run indicated that overall kiln operations were within normal tolerances except for the elevated back-end temperatures and an overall temperature instability at the front-end that caused the eventual kiln outage. During the second run, SO2 was a little more variable, but still within expectations, and again the elevated back-end temperatures continued.

We do not feel this test period represented the normal way in which our kiln is operated. The back-end temperatures we were striving for, even though outside of our operating limits, were meant to help us with compliance even in upset conditions.

Process data snapshot:



December 21st test results summary:



AMTEST
AIR QUALITY, LLC

7

SUMMARY OF EMISSION CONCENTRATION RESULTS
POLYCHLORINATED DIBENZODIOXINS AND DIBENZOFURANS
AM TEST-AIR QUALITY, LLC

File Name: AJP\04-17\WDF\SUM
Client: LaFarge Corporation
Location: Seattle, Washington
Sample Date: December 21, 2004

ANALYTE	MAIN CEMENT KILN STACK Run 1	Run 2	Average
	ng/dscm @ 7% O_2	ng/dscm @ 7% O_2	ng/dscm @ 7% O_2
DIOXINS			
2, 3, 7, 8-TCDD	0.120	0.138	0.129
1, 2, 3, 7, 8-PeCDD	0.077	0.098	0.088
1, 2, 3, 4, 7, 8-HxCDD	0.026	0.038	0.035
1, 2, 3, 6, 7, 8-HxCDD	0.110	0.134	0.122
1, 2, 3, 7, 8, 9-HxCDD	0.084	0.100	0.092
1,2,3,4,6,7,8-HpCDD	0.885	1.21	1.05
OCDD	1.62	2.55	2.09
FURANS			
2, 3, 7, 8-TCDF	7.86	8.49	8.17
1, 2, 3, 7, 8-PeCDF	0.950	1.06	1.01
2, 3, 4, 7, 8-PeCDF	1.35	1.50	1.43
1, 2, 3, 4, 7, 8-HxCDF	0.175	0.187	0.181
1, 2, 3, 6, 7, 8-HxCDF	0.116	0.139	0.124
2, 3, 4, 6, 7, 8-HxCDF	0.151	0.168	0.160
1, 2, 3, 7, 8, 9-HxCDF	0.034	0.039	0.036
1, 2, 3, 4, 6, 7, 8-HpCDF	0.134	0.163	0.148
1, 2, 3, 4, 7, 8, 9-HpCDF	0.020	0.022	0.021
OCDF	0.086	0.116	0.101
TOTALS			
Total TCDD	1.72	1.86	1.79
Total PeCDD	0.891	1.15	1.02
Total HxCDD	1.33	1.64	1.48
Total HpCDD	2.18	2.96	2.57
Total TCDF	68.7	70.9	69.8
Total PeCDF	12.5	14.1	13.3
Total HxCDF	1.42	1.51	1.47
Total HpCDF	0.160	0.347	0.258
Minimum 2,3,7,8 TCDD Toxic Equivalent (TEQ)	1.75	1.94	1.84
Maximum 2,3,7,8 TCDD Toxic Equivalent (TEQ)	1.75	1.94	1.84

ng/dscm @ 7% O_2 = nanograms of analyte collected per dry standard cubic meter of gas sampled, corrected to 7% oxygen.
Minimum TEQ is based on DL = zero. Maximum TEQ is based on DL = DL.

May 12-13, 2005 Performance Test

During this test, we continued to believe that we would be able to perform at a higher temperature and still meet the PC MACT requirement for dioxin and furan emissions. We chose to try and establish a higher temperature compliance limit for the inlet to the APCD. The day prior to the test, we began to ramp up the kiln's back-end temperature and during the time of the tests, we were averaging 235 degrees Celsius. This was a lower point that what we experienced in the failed December test, but higher than our compliance temperature of 197 degrees Celsius.

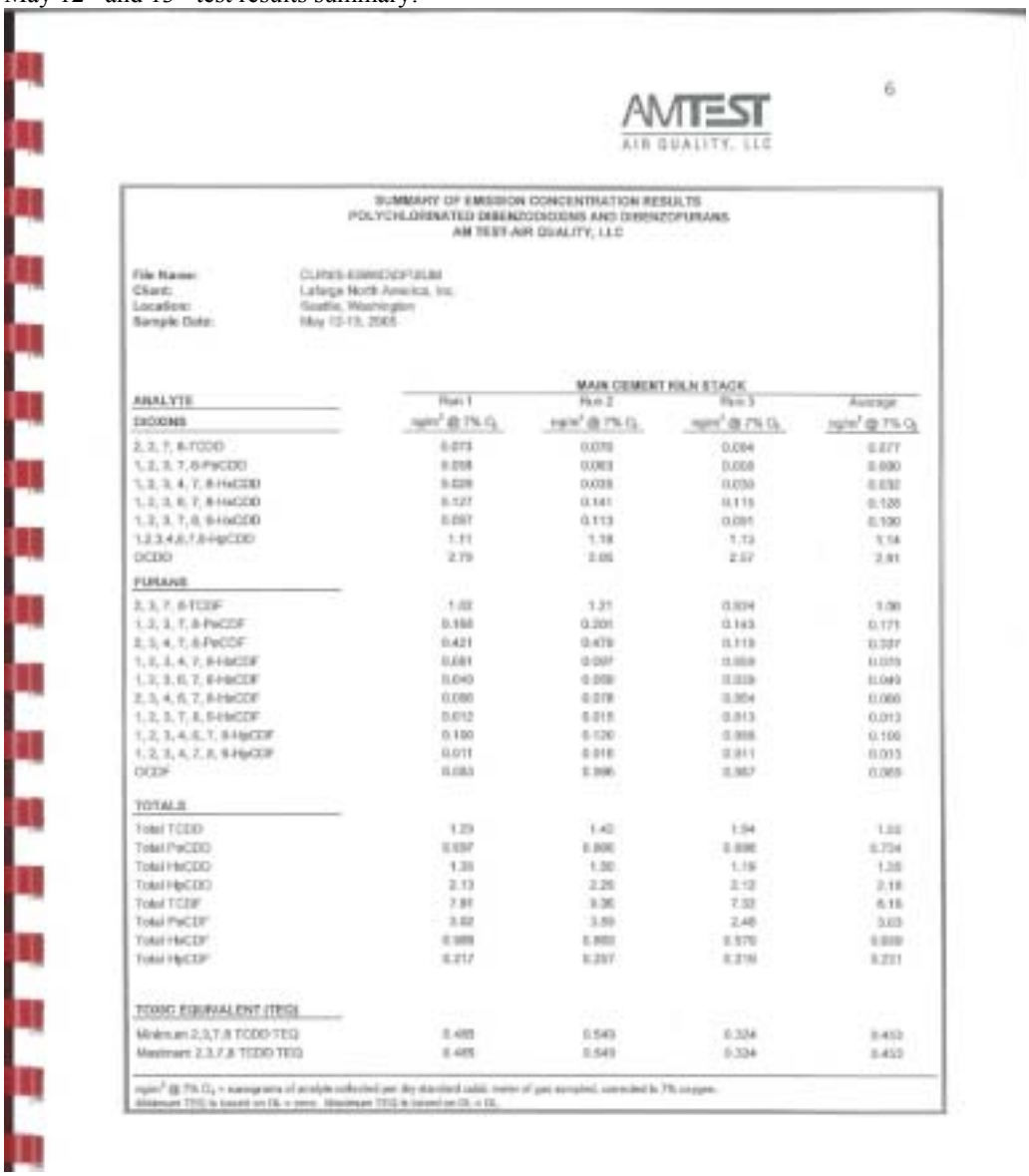
The kiln was stable through-out the test. We did experience a couple small plugging events with our coal mill, but as shown in the process data snapshot on the next page, they had little affect on kiln stability. In the chart below, the thick red line is the back-end temperature and the shaded area encompasses all of the run time's data.

There was a slight decrease in the back-end temperature for the third run which, circumstantially, can possibly be correlated to the slightly reduced dioxin/furan emission data.

We would like to note that the time between the December and May PC MACT tests is related to the kiln utilization this year. Due to a new automation system, we have experienced unusual kiln outages. A high number of them were to work on de-bugging the new computer system. Year to date, we have had 26 kiln outages, where in comparable time period in the past 30 plus years, we would not expect to see any more than 3 outages. The testing schedule was purely a matter of timing. We had to schedule testing for dioxins and furans when the kiln was operating in normal production ranges for output and at a time not too close to a start-up. When the May testing occurred, we paid for expedited analyses and were then able to reschedule a repeat test upon failure – again with expedited procedures.

Process data snapshot:

May 12th and 13th test results summary:



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SUMMARY OF EMISSION CONCENTRATION RESULTS
POLYCHLORINATED DIBENZODIOXINS AND DIBENZOFURANS
AM TEST AIR QUALITY, LLC

File Name: [illegible]
Client: Lafarge North America, Inc.
Location: Seattle, Washington
Sample Date: May 12-13, 2005

	MAIN CEMENT KILN STACK			
ANALYTE	Run 1	Run 2	Run 3	Average
DIOXINS	ng/m³ @ 7% O_2	ng/m³ @ 7% O_2	ng/m³ @ 7% O_2	ng/m³ @ 7% O_2
2, 3, 7, 8-TCDD	0.073	0.070	0.084	0.077
1, 2, 3, 7, 8-PeCDD	0.058	0.063	0.058	0.060
1, 2, 3, 4, 7, 8-HxCDD	0.029	0.033	0.030	0.032
1, 2, 3, 6, 7, 8-HxCDD	0.127	0.141	0.115	0.128
1, 2, 3, 7, 8, 9-HxCDD	0.097	0.113	0.091	0.100
1,2,3,4,6,7,8-HpCDD	1.11	1.18	1.13	1.14
OCDD	2.79	3.05	2.57	2.81
FURANS				
2, 3, 7, 8-TCDF	1.02	1.21	0.934	1.06
1, 2, 3, 7, 8-PeCDF	0.155	0.201	0.143	0.171
2, 3, 4, 7, 8-PeCDF	0.421	0.479	0.113	0.337
1, 2, 3, 4, 7, 8-HxCDF	0.081	0.097	0.059	0.079
1, 2, 3, 6, 7, 8-HxCDF	0.049	0.059	0.039	0.049
2, 3, 4, 6, 7, 8-HxCDF	0.080	0.078	0.054	0.066
1, 2, 3, 7, 8, 9-HxCDF	0.012	0.015	0.013	0.013
1, 2, 3, 4, 6, 7, 8-HpCDF	0.100	0.120	0.095	0.100
1, 2, 3, 4, 7, 8, 9-HpCDF	0.011	0.018	0.011	0.013
OCDF	0.083	0.096	0.057	0.065
TOTALS				
Total TCDD	1.23	1.42	1.34	1.33
Total PeCDD	0.697	0.806	0.698	0.734
Total HxCDD	1.33	1.50	1.19	1.35
Total HpCDD	2.13	2.25	2.12	2.18
Total TCDF	7.91	9.36	7.32	8.19
Total PeCDF	3.62	3.59	2.48	3.03
Total HxCDF	0.989	0.850	0.570	0.809
Total HpCDF	0.217	0.237	0.219	0.231
TOXIC EQUIVALENT (TEQ)				
Minimum 2,3,7,8 TCDD TEQ	0.485	0.549	0.324	0.453
Maximum 2,3,7,8 TCDD TEQ	0.485	0.549	0.324	0.453

ng/m³ @ 7% O_2 = nanograms of analyte collected per dry standard cubic meter of gas sampled, corrected to 7% oxygen.
Minimum TEQ is based on DL = zero. Maximum TEQ is based on DL = DL.

June 10-11, 2005 Performance Test

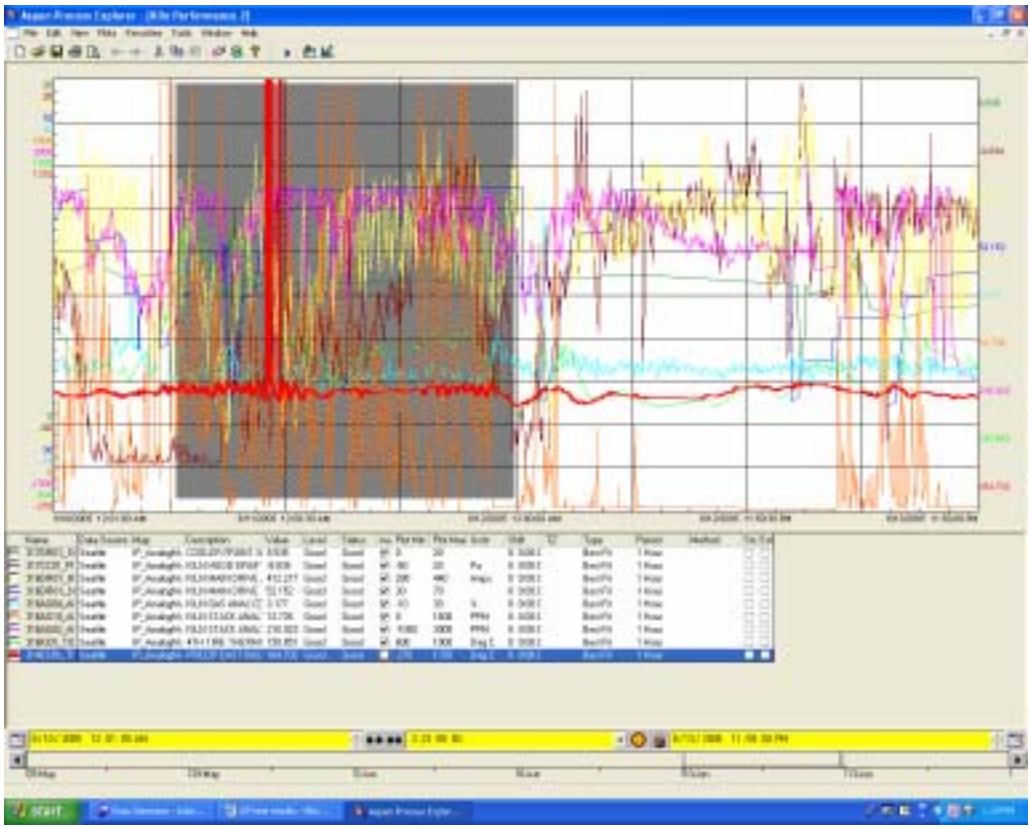
On June 10th and 11th we tested for dioxins and furans. Again, we requested expedited analyses and found that the maximum 2,3,7,8 TCDD TEQ for the four runs was 0.207 ng/m3 @ 7% O2. Well below the emission limit. The average APCD inlet temperature during the test was 188 degrees Celsius. This is below the previous 197 degrees Celsius established in the original compliance test.

The kiln was stable through-out the test, albeit a little more variable than during the May test. In the chart below, the thick red line is the back-end temperature and the shaded area encompasses all of the run time's data. The temperature spike shown in the chart corresponds to calibration of temperature data recorder and a check on the thermocouple.

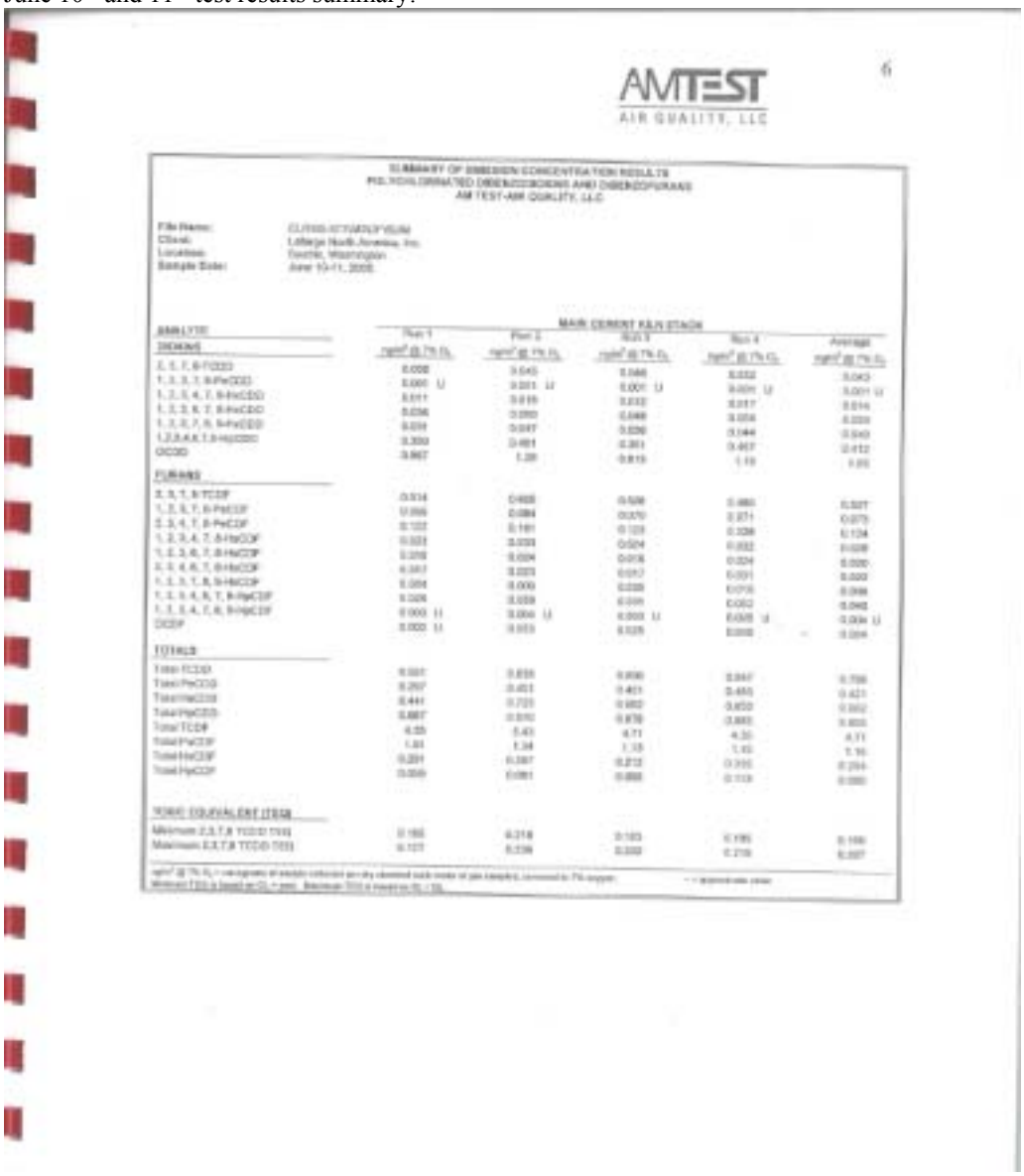
We are attributing the differences between the results from the previous two tests and the June test to be a function of APCD inlet temperature.

Future compliance testing for dioxins and furans will be scheduled to be performed 2 months prior to the 30 month deadline. This will help to alleviate a reoccurrence of the situations we found ourselves in trying to navigate kiln outages.

June process data snapshot:



June 10th and 11th test results summary:



AMTEST
AIR QUALITY, LLC

6

SUMMARY OF EMISSION CONCENTRATION RESULTS
POLYCHLORINATED DIBENZODIOXINS AND DIBENZOFURANS
AM TEST-AIR QUALITY, LLC

File Name:
Client:
Location:
Sample Date:

MAIN CEMENT KILN STACK

ANALYTE	Run 1	Run 2	Run 3	Run 4	Average
DIOXINS					
2, 3, 7, 8-TCDD	0.008	0.043	0.046	0.032	0.043
1, 2, 3, 7, 8-PeCDD	0.000 U	0.001 U	0.001 U	0.001 U	0.001 U
1, 2, 3, 4, 7, 8-HxCDD	0.011	0.015	0.032	0.017	0.014
1, 2, 3, 6, 7, 8-HxCDD	0.036	0.050	0.048	0.034	0.033
1, 2, 3, 7, 8, 9-HxCDD	0.031	0.047	0.039	0.044	0.040
1,2,3,4,6,7,8-HpCDD	0.300	0.481	0.261	0.457	0.412
OCDD	0.967	1.20	0.815	1.19	1.05
FURANS					
2, 3, 7, 8-TCDF	0.014	0.028	0.026	0.060	0.027
1, 2, 3, 7, 8-PeCDF	0.056	0.084	0.070	0.071	0.075
2, 3, 4, 7, 8-PeCDF	0.122	0.181	0.123	0.128	0.124
1, 2, 3, 4, 7, 8-HxCDF	0.023	0.033	0.024	0.032	0.028
1, 2, 3, 6, 7, 8-HxCDF	0.018	0.024	0.018	0.024	0.020
2, 3, 4, 6, 7, 8-HxCDF	0.017	0.023	0.017	0.021	0.020
1, 2, 3, 7, 8, 9-HxCDF	0.004	0.000	0.035	0.010	0.009
1, 2, 3, 4, 6, 7, 8-HpCDF	0.026	0.039	0.026	0.052	0.040
1, 2, 3, 4, 7, 8, 9-HpCDF	0.000 U	0.004 U	0.000 U	0.005 U	0.004 U
OCDF	0.000 U	0.003	0.025	0.008	0.004
TOTALS					
Total TCDD	0.091	0.035	0.056	0.047	0.058
Total PeCDD	0.297	0.451	0.461	0.483	0.421
Total HxCDD	0.441	0.723	0.662	0.630	0.552
Total HpCDD	0.887	0.910	0.878	0.883	0.889
Total TCDF	4.55	5.43	4.71	4.30	4.71
Total PeCDF	1.83	1.34	1.13	1.43	1.16
Total HxCDF	0.291	0.397	0.212	0.310	0.294
Total HpCDF	0.069	0.081	0.068	0.113	0.080
TOXIC EQUIVALENT (TEQ)					
Minimum (I.D.T.E TCDD TEQ)	0.165	0.218	0.183	0.195	0.189
Maximum (I.D.T.E TCDD TEQ)	0.177	0.236	0.202	0.219	0.207

ng/m³ @ 7% O₂ = nanograms of dioxin collected per dry standard cubic meter of gas sampled, corrected to 7% oxygen
Minimum TEQ is based on ½ + zero. Maximum TEQ is based on ½ + DL
U = analyte was not detected above the detection limit

Please call with any questions,

Russ Simonson, Environmental Manager

O. References

1. EPA -450/3-91-024 Burning Tires for Fuel and Tire Pyrolysis: Air Implications.

This study concludes that burning tires in a cement kiln is a good method of reducing costs and is a sound way of reclaiming their fuel value while reducing emissions of almost all air contaminants.

This study finds that while there are a very few compounds that show a percentage increases in emissions, these particular compounds are emitted at such very low concentrations that there are no significant change in the environmental impacts associated with replacing coal as fuel with the burning of tires. Copies of the highlighted test information collected for chipped tire fuel substitution at this kiln (then owned by Holnam) from the report are shown below.

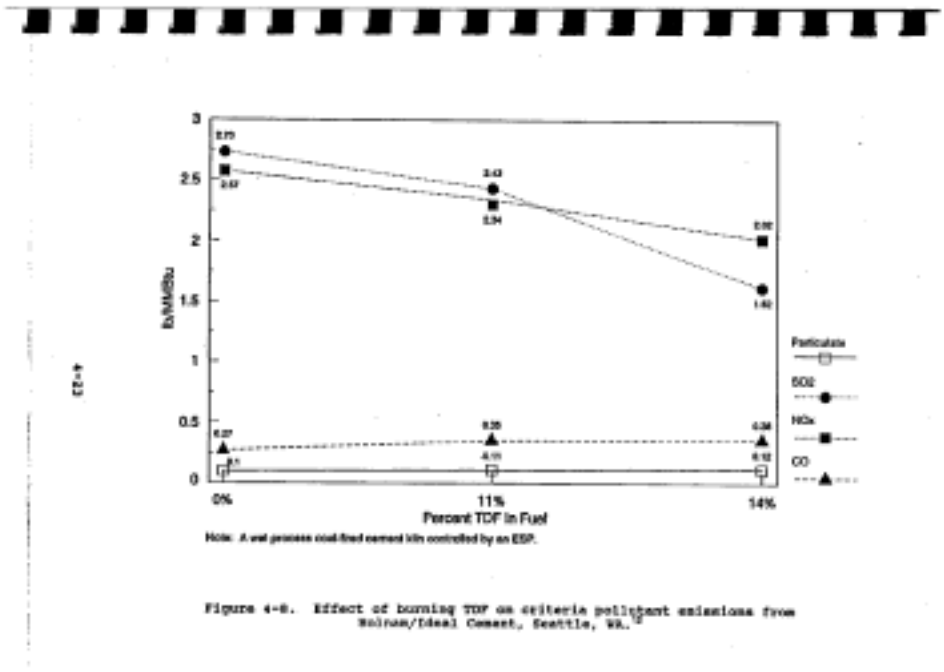


Figure 4-8. Effect of burning TDF on criteria pollutant emissions from Holnam/Ideal Cement, Seattle, WA.

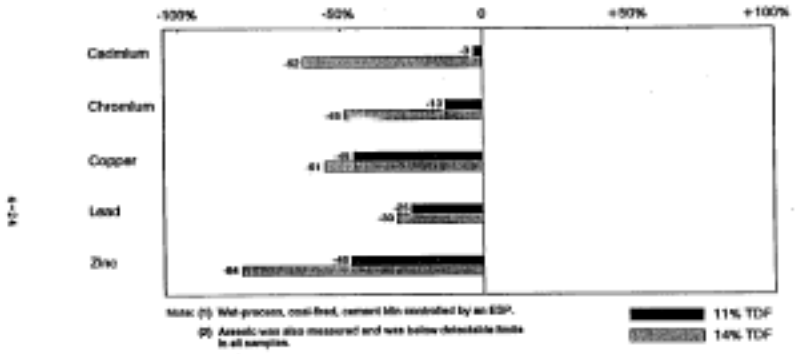


Figure 4-9. Percent change in emissions of metals when burning TDF at Holnam/Ideal Cement, Seattle, WA.[9]

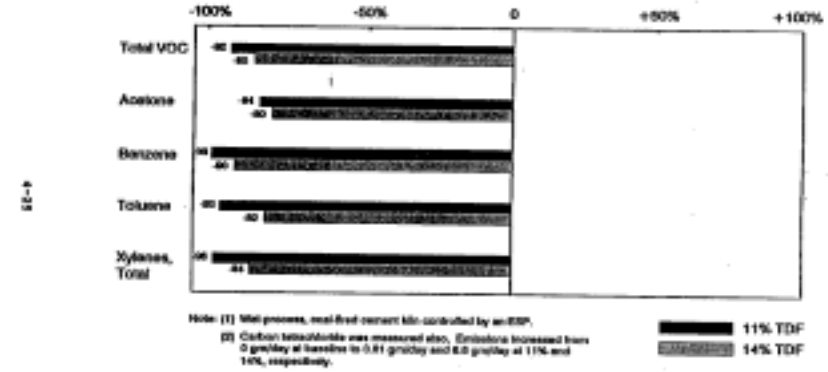


Figure 4-10. Percent change in VOC emissions when burning TDF at Holnam/Ideal Cement, Seattle, WA.[9]

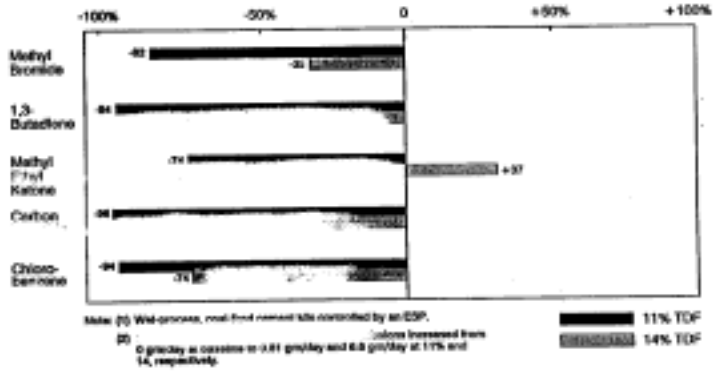


Figure 4-10. Percent change in VOC emissions when burning TDF at Holnam/Ideal Cement, Seattle, WA.[4] (Continued)

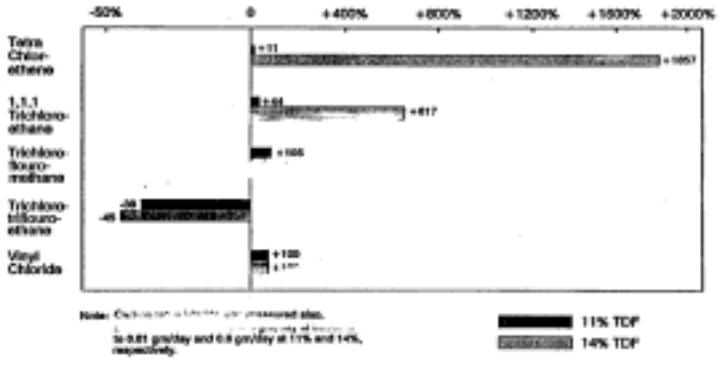


Figure 4-10. Percent change in VOC emissions when burning TDF at Holnam/Ideal Cement, Seattle, WA.[4] (Concluded)

Table 4-3. Effect of Burning TDF on HAP Emissions from Holnam/Ideal Cement, Seattle, WA[12,a]

Pollutant	Baseline 100% Coal, (lb TDF / lb10^6 Btu) emitted	11% TDF		14% TDF	
		(lb x 10^6) / MMBtu	% Change	(lb x 10^6) / MMBtu	% Change
Acenaphthene	2.76	2.01	-27	2.04	-26
Acenaphthylene	0.22	0.00	-100	0.00	-100
Anthracene	2.46	0.00	-100	0.00	-100
Benzo(b)Anthracene	9.88	0.00	-100	0.00	-100
Benzoic Acid	10.46	0.00	-100	0.00	-100
Benzo(a)Pyrene	2.04	0.00	-100	0.00	-100
Benzo(g,h,i)Perylene	0.00	3.11	NA	10.23	NA
Bis(2 chloroethoxy) Methane	222.42	173.45	-22	275.75	+24
Butyl benzyl Phthalate	1.96	0.00	-100	0.00	-100
3-Benzo(a) anthracene	104.69	47.67	-55	67.17	-37
Di-n-Butylphthalate	2.23	0.00	-100	0.00	-100
1,2-Dichlorobenzene	3.21	0.00	-100	0.00	-100
2,4-Dinitrotoluene	13.37	9.97	-25	9.90	-26
Fluorene	7.65	7.01	-8	7.12	-7
Hexachlorobenzene	73.49	40.42	-45	53.46	-27
Naphthalene	348.00	178.94	-47	159.20	-55
2-Nitroaniline	4.67	0.00	-100	5.02	+7
N-nitrosodiphenyl-amine	90.81	47.60	-48	49.99	-45
Pyrene	4.97	2.58	-52	2.73	-45
1,2,4-Trichloro-benzene	17.45	2.57	-85	0.00	-100
4,6-Dinitro-2-Methyl-phenol	5.55	0.00	-100	0.00	-100
4-Methyl Phenol	10.55	9.13	-13	11.58	+22
2-Nitrophenol	194.99	169.58	-13	171.12	-12
4-Nitrophenol	0.00	49.62	NA	29.77	NA
Pentachlorophenol	0.00	0.00	NA	0.00	NA
Phenol	320.95	161.04	-50	306.71	-4
2,4,5-Trichloro-phenol	0.00	0.00	NA	0.00	NA

[a] Wet process, coal-fired, cement kiln controlled by an ESP.

2. NOx Control Technologies for the Cement Industry, September 19, 2000 (EPA Contract No. 68-D98-026)

This document clearly shows that NOx decreases with tire injection by some 30% - 40%.

Page 66 indicates that mid-kiln injection of tires can decrease thermal NOx by burning part of the fuel at lower temperatures which may destroy some of the NOx formed upstream of the kiln burning zone. There may be a need to control CO emissions by increasing combustion air which can decrease production capacity.

3. Alternative Control Techniques Document - NOx Emissions from Cement Manufacturing, EPA, March 1994

Page 7-8 Emission Tradeoffs, addresses the potential for some increases in emissions (CO, SO2, hydrocarbons) but concludes that with proper and careful combustion control it should be possible to operate a kiln without increasing other pollutants.

4. Air Emissions from Scrap Tire Combustion, October 1997 (EPA-600/R-97-115)

This EPA document was cited in during the comment period. It is on file at the Agency and may also be found on the EPA's website. This study characterizes air emissions from burning scrap tires from uncontrolled and controlled sources. The recommendations from this study include the following statements.

"The results of a laboratory test program on controlled burning of tire-derived fuel (TDF) in a Rotary Kiln Incinerator Simulator (RSKIS) are presented. Based on the results of the RSKIS test program, it was concluded that, with the exception of zinc emissions, potential emissions from TDF are not expected to be very much different that from other conventional fossil fuels, as long as combustion occurs in a well-designed, well-operated, and well-maintained combustion device."

"Source test data from 22 industrial facilities that have used TDF are presented: 3 kilns (2 cement and 1 lime) and 19 boilers (utility, pulp and paper, and general industrial applications). In general, the results indicate that properly designed existing solid fuel combustors can supplement their normal fuels (coal, wood, and various combination of coal, wood, oil, coke, and sludge) with 10 to 20% TDF and still satisfy environmental compliance emissions limits. Furthermore, results from a dedicated tires-to-energy (100% TDF) facility indicate that it is possible to have emissions much lower than produce by existing solid-fuel-fired boilers (on a heat input basis), when properly designed and the facility is controlled."

P. Other Information

1. Portland Cement NESHAP Background (Performance Tests/Temperature)

Dioxin testing is required pursuant to 40 CFR 63.1349(e)(1) which states: "*If a source plans to undertake a change in operations that may adversely affect compliance with an applicable D/F standard under this subpart, the source must conduct a performance test and establish new temperature limit(s) as specified in paragraph (b)(3) of this section.*"

Dioxin Temperature Limit

40 CFR 63.1350(a) requires an O&M Plan to contain specific elements and that the Agency reviews and approves this plan.

The element of the Plan that relates to the temperature monitoring is 40 CFR 63.1350(a)(1):

> *(1) Procedures for proper operation and maintenance of the affected source and air pollution control devices in order to meet the emission limits and operating limits of §63.1343 through §63.1348;*

40 CFR 63.1344(b) specifically states that the air pollution control device temperature is a limit and that it is determined following 40 CFR 63.1349(b)(3)(iv), 40 CFR 63.1344(b) says:

> (b) The temperature limit for affected sources meeting the limits of paragraph (a) of this section or paragraphs (a)(1) through (a)(3) of this section is determined in accordance with §63.1349(b)(3)(iv).

Also, 40 CFR 63.1344(b) specifically states:

(b) Failure to comply with any provision of the operations and maintenance plan developed in accordance with paragraph (a) of this section shall be a violation of the standard.

Therefore, whenever Lafarge violates the temperature limit the language of the NESHAPS specifically states that Lafarge is in violation of the standard.

40 CFR 63.1343(d)(1) & (2) state the following:

(d) *Existing, reconstructed, or new brownfield/area sources.* No owner or operator of an existing, reconstructed, or new brownfield kiln or an existing, reconstructed or new brownfield in-line kiln/raw mill at a facility that is an area source subject to the provisions of this subpart shall cause to be discharged into the atmosphere from these affected sources any gases which contain D/F in excess of:

(1) 0.20 ng per dscm (8.7×10^{-11} gr per dscf) (TEQ) corrected to seven percent oxygen; or

(2) 0.40 ng per dscm (1.7×10^{-10} gr per dscf) (TEQ) corrected to seven percent oxygen, when the average of the performance test run average temperatures at the inlet to the particulate matter control device is 204 °C (400 °F) or less.

The setting of the temperature standard follows 40 CFR 63.1349(b)(3)((i - iv):

(3) The owner or operator of an affected source subject to limitations on D/F emissions under this subpart shall demonstrate initial compliance with the D/F emission limit by conducting a performance test using Method 23 of appendix A to part 60 of this chapter.

(i) Each performance test shall consist of three separate runs; each run shall be conducted under the conditions that exist when the affected source is operating at the representative performance conditions in accordance with §63.7(e). The duration of each run shall be at least 3 hours, and the sample volume for each run shall be at least 2.5 dscm (90 dscf). The concentration shall be determined for each run, and the arithmetic average of the concentrations measured for the three runs shall be calculated and used to determine compliance.

(ii) The temperature at the inlet to the kiln PMCD (particulate matter control device), and where applicable, must be continuously recorded during the period of the Method 23 test, and the continuous temperature record(s) must be included in the performance test report.

(iii) One-minute average temperatures must be calculated for each minute of each run of the test.

(iv) The run average temperature must be calculated for each run, and the average of the run average temperatures must be determined and included in the performance test report and will determine the applicable temperature limit in accordance with §63.1344(b).

Exceeding the maximum temperature of the PMCD is required to be reported per 40 CFR 63.1354(b)(9)(i):

(9) The owner or operator shall submit a summary report semiannually which contains the information specified in §63.10(e)(3)(vi). In addition, the summary report shall include:

(i) All exceedences of maximum control device inlet gas temperature limits specified in §63.1344(a) and (b);

(ii) All failures to calibrate thermocouples and other temperature sensors as required under §63.1350(f)(7) of this subpart; and

(iii) All failures to maintain the activated carbon injection rate, and the activated carbon injection carrier gas flow rate or pressure drop, as applicable, as required under §63.1344(c).

(iv) The results of any combustion system component inspections conducted within the reporting period as required under §63.1350(i).

(v) All failures to comply with any provision of the operation and maintenance plan developed in accordance with §63.1350(a).

40 CFR 63.1351 defines the initiation of the Subpart LLL compliance date:

(a) The compliance date for an owner or operator of an existing affected source subject to the provisions of this subpart is June 14, 2002.

(b) The compliance date for an owner or operator of an affected source subject to the provisions of this subpart that commences new construction or reconstruction after March 24, 1998 is June 14, 1999 or upon startup of operations, whichever is later.

40 CFR 63.1349(d) required Lafarge to repeat the dioxin performance test every 30 months:

(d) Performance tests required under paragraph (b)(3) of this section shall be repeated every 30 months.

This means Lafarge was to repeat the dioxin performance test by December 2004. The December 21, 2004 test did not pass the dioxin emission standard because the kiln had an upset. Lafarge conducted another test May 12 -13, 2005 which failed due to high ESP inlet temperatures. Lafarge

conducted yet another test on June 10 - 11,2005 which demonstrated compliance with the NESHAPS requirements for dioxin.

Also, Lafarge is required by 40 CFR 63.1349(d) & (e) to re-establish its ESP inlet temperature limit whenever it plans to make a change that carries the potential to adversely affects compliance. During a retesting period Lafarge is allowed by the NESHAPS to have 360 hours (equivalent to 15 days) to make operational changes or adjustments during the period of testing for the compliance performance source tests to demonstrate compliance.

(d) Performance tests required under paragraph (b)(3) of this section shall be repeated every 30 months.

(e)(1) If a source plans to undertake a change in operations that may adversely affect compliance with an applicable D/F standard under this subpart, the source must conduct a performance test and establish new temperature limit(s) as specified in paragraph (b)(3) of this section.

(2) If a source plans to undertake a change in operations that may adversely affect compliance with an applicable PM standard under §63.1343, the source must conduct a performance test as specified in paragraph (b)(1) of this section.

(3) In preparation for and while conducting a performance test required in paragraph (e)(1) of this section, a source may operate under the planned operational change conditions for a period not to exceed 360 hours, provided that the conditions in paragraphs (e)(3)(i) through (iv) of this section are met. The source shall submit temperature and other monitoring data that are recorded during the pretest operations.

(i) The source must provide the Administrator written notice at least 60 days prior to undertaking an operational change that may adversely affect compliance with an applicable standard under this subpart, or as soon as practicable where 60 days advance notice is not feasible. Notice provided under this paragraph shall include a description of the planned change, the emissions standards that may be affected by the change, and a schedule for completion of the performance test required under paragraph (e)(1) of this section, including when the planned operational change period would begin.

(ii) The performance test results must be documented in a test report according to paragraph (a) of this section.

(iii) A test plan must be made available to the Administrator prior to testing, if requested.

(iv) The performance test must be conducted, and it must be completed within 360 hours after the planned operational change period begins.

2. Estimated Tire Btu

Coal is between 10,000 and 11,000 Btu/lb.

Each tires weighs about 20 lb and contains about 12,500 Btu/lb

3. Order of Approval No. 3374 TDF

NOTE Order of Approval 3374 allows chipped tires to be added to the kiln as fuel

The Air Operating Permit Table 2 Emission Unit #(EU-1) Requirement No. EU 1-10 copied here:

Puget Sound Clean Air Agency Orders of Approval - Tire Fuel Limits						
Reqmt. No.	**Enforceable Requirement**	**Adoption or Effective Date**	**Requirement Paraphrase** (Information Only	**Monitoring, Maintenance & Recordkeeping Method** (See Section II)	**Emission Standard Period**	**Reference Test Method**
EU 1-10	Puget Sound Clean Air Agency Order of Approval No. 3374 Condition 5	7/10/91	Shall limit tire derived fuel (lb/hr) used in the kiln to less than 20% by weight of coal & coke (lb/hr) used	II.A.2(c) Tire Derived Fuel Monitoring II.B. Operation and Maintenance (O&M) Plan Requirements	Measuring Frequency Hourly by BTU of all fuels	Compliance Method for fuel Btu

Comment: 1.Check with the source how this 20% is verified?

Order of Approval No. 3374 (7/10/91) describes the design feed rate of the tire derived fuel (TDF) Metering Unit as being 4493 lb/hr and as being a limit of 25% tire as lb/hr for tire derived fuel (TDF).

This Order of Approval required a series of source test to verify and establish the maximum TDF limit.

After a series of source tests was conducted the TDF limit was established to be "....less than 20% by weight of coal & coke (lb/hr) used."

The actual statement of the description in the Order of Approval states that the lb/hour of TDF is set at the limit of 20% of the total weight of coal and coke added to the kiln (not the total weight of all fuels added).

The original application specified that the tire metering system was rated at 3,593 lb/hr of chipped tires that could be added to the kiln as additional fuel.

Table 2 of the NOC # 3374 application listed the example fuels as:

Coal	12,274 lb/hr
Coke	7,043 lb/hr
Total	19,317 lb/hr
TDF	3,593 lb/hr

That is the TDF is 18.6 % of the coal and coke fuel weight added to the kiln.

The monitoring as required by the Air Operating Permit states that the Btu fuel content of all fuels added to the kiln is to be monitored hourly. The AOP also specifies that the compliance method is the measurement of fuel Btu.

Coal	10,000 Btu/lb*12,274 lb/hr	= 122,740,000 Btu/hr
Coke	14,200 Btu/lb* 7,043 lb/hr	= 100,010,600 Btu/hr
TDF	15,500 Btu/lb* 3,593 lb/hr	55,691,500 Btu/hr
Total Fuel Btu		= 278,442,100 Btu/hr

In this case the TDF is 20% of the total Btu/hr of coal, coke and TDF being added to the kiln.

Therefore this shows that by

4. Portland Cement NESHAP Background (Dioxin Limits & Temperature)

The following Federal Register documents the reasoning and testing used as reference information for the emission limit for dioxin and the setting of the inlet temperatures as a surrogate for dioxin emissions that is used for hazardous waste combustors. The dioxin limit and the temperature monitoring in the PC MACT NESHAPS Subpart LLL are basically the same values.


Federal Register
Friday
April 19, 1996
Part II
Environmental Protection Agency
40 CFR Part 60, et al.
Hazardous Waste Combustors; Revised Standards; Proposed Rule
17357

TABLE IV.4.A.1.—PROPOSED EMISSION STANDARDS FOR EXISTING CEMENT KILNS

HAP or HAP surrogate	Proposed standard[a]
Dioxin/furans (TEQ)	0.20 ng/dscm (TEQ).
Particulate Matter	69 mg/dscm (0.030 gr/dscf).
Mercury	50 μg/dscm.
SVM (Cd, Pb)	57 μg/dscm.
LVM (As, Be, Cr, Sb)	130 μg/dscm.
HCl+Cl_2 (total chlorides)	630 ppmv.
Hydro-carbons:	
Main Stack[b]	20 ppmv.
By-pass Stack[c]	6.7 ppmv.
Carbon Monoxide:	
Main Stack	N/A.
By-pass Stack[c]	100 ppmv.

[a] All emission levels are corrected to 7 percent O_2.

[b] Applicable only to long wet and dry process cement kilns (i.e., not applicable to preheater and/or precalciner kilns).

[c] Emissions standard applicable only for cement kilns configured with a by-pass duct (typically preheater and/or precalciner kilns). Source must comply with either the HC or CO standard in the by-pass duct. A long wet or long dry process cement kiln that has a by-pass duct has the option of meeting either the HC level in the main stack or the HC or CO limit in the by-pass duct.

1. Dioxin/Furans

a. MACT Floor. The Agency's analysis of dioxin/furan (D/F) emissions from HWCs and other combustion devices (e.g., municipal waste combustors and medical waste incinerators) indicates that temperature of flue gas at the inlet of the PM control device can have a major effect on D/F emissions.[79] D/F emissions generally decrease as the gas temperature of the PM control device decreases, and emissions are lowest when the gas temperature of the PM control device are below the optimum temperature window for D/F formation—450 °F to 650 °F.[80] Given that CKs operate their ESPs and FFs under a range of temperatures (i.e., from 350 °F to nearly 750 °F), the Agency is identifying MACT floor for D/F based on temperature control at the inlet to the ESP or FF.[81]

The emissions data for CKs includes results from 58 test conditions collected from 19 cement plants, with a total of 28 kilns being tested. The Agency's database shows that the average test condition D/F emissions ranged from 0.004 to nearly 30 ng/dscm (TEQ).

Kilns emitting D/F at or below levels emitted by the median of the best performing 12 percent of kilns had flue gas temperatures at or below 418 °F at the inlet to the ESP or FF, while inlet temperatures for other kilns ranged to nearly 750 °F. The Agency then evaluated D/F emissions from all kilns that operated the ESP or FF at 418 °F or less and determined that 75 percent had D/F emissions less than 0.2 ng/dscm (TEQ). The other 25 percent of kilns generally had TEQs less than 0.8 ng/dscm (TEQ), although one kiln emitted 4.7 ng/dscm (TEQ).

The Agency is, therefore, identifying temperature control at the inlet to the ESP or FF at 418 °F as the MACT floor control. Given that 75 percent of sources achieve D/F emissions of 0.20 ng/dscm (TEQ) at that temperature, the Agency believes that it is appropriate to express the floor as "0.20 ng/dscm (TEQ), or temperature at the inlet to the ESP or FF not to exceed) 418 °F". This would allow sources that operate at temperatures above 418 °F but that achieve the same D/F emissions as the majority of sources that operate below 418 °F (i.e., 0.20 ng/dscm (TEQ)) to meet the standard without incurring the expense of lowering the temperature at the ESP or FF.

EPA estimates that over 50 percent of CKs currently are meeting the floor level. The national annualized compliance cost[82] for CKs to reduce D/F emissions to 0.20 ng/dscm (TEQ) or control ESP or FF inlet temperature to below 418 °F would be $7.3 million for the entire hazardous waste-burning cement industry, and would reduce D/F TEQ emissions nationally by 830 grams/year (TEQ) or 96 percent from current baseline emissions.

b. Beyond-the-Floor (BTF) Considerations. The Agency has identified activated carbon injection (CI) at less than 400 °F as a BTF control for D/F for cement kilns because CI is currently used in similar applications such as hazardous waste incinerators, municipal waste combustors, and medical waste incinerators. The Agency is not aware of any CK flue gas conditions that would preclude the applicability of CI or inhibit the performance of CI that has been demonstrated for other waste combustion applications.

Carbon injection has been demonstrated to be routinely effective at removing greater than 95 percent of D/F for MWCs and MWIs and some tests have demonstrated a removal efficiency exceeding 99 percent at gas temperatures of 400 °F or less.[83] To determine a BTF emission level, the Agency considered the emission levels that would be expected to result from gas temperature control to less than 400 °F combined with CI.

To estimate emissions with temperature control only, the Agency considered the MACT floor database that indicates, as noted above, 25 percent of CKs operating the ESP or FF at temperatures above 418 °F could be expected to emit D/F at levels above 0.2 ng/dscm (TEQ). Although the majority could be expected to emit levels of 0.8 ng/dscm (TEQ) or below, some could be expected to emit levels as high as 4.7 ng TEQ.

When CI is used in conjunction with temperature control, an additional 95 percent reduction in emissions could be expected. Accordingly, emissions with these BTF controls could be expected to be less than a range of 0.04 to 0.24 ng/dscm (TEQ) (i.e., 95 percent reduction from 0.8 ng and 4.7 ng, respectively). Given that CI reductions greater than 95 percent are readily feasible, the Agency believes that it is appropriate to identify 0.20 ng/dscm (TEQ) as a reasonable BTF level that could be routinely achieved.

The Agency notes that, because we have assumed a fairly conservative carbon injection removal efficiency of 95 percent to identify the 0.20 ng/dscm (TEQ) level, we believe that this approach adequately accounts for emissions variability at an individual kiln because CI removal efficiency is likely to be up to or greater than 99 percent. EPA thus believes that it is not necessary to add a statistically-derived variability factor to the 0.20 ng/dscm (TEQ) level to account for emissions variability at an individual kiln. Thus,

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[79] USEPA, "Draft Technical Support Document For HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies", February 1996.

[80] For example, consider kiln #1 at the Ash Grove Cement Company in Chanute, Kansas. During IRF certification of compliance testing in 1992, Ash Grove showed its Wasco emissions exceeded 1.7 ng/dscm (TEQ) at a control device temperature of 450 °F. Testing in 1994 at a temperature of approximately 325 °F resulted in emissions less than 0.01 ng/dscm (TEQ).

[81] The Agency notes, however, that other factors can affect D/F emissions including presence of precursors in the feed or as a result of incomplete combustion and presence of compounds thought to inhibit surface-catalyzed formation of D/F such as sulfur. Thus, D/F emissions may be low (e.g., 0.2 ng TEQ per dscm) even though the temperature of stack gas at the inlet to the ESP or FF may exceed 400–450 °F, and D/F emissions may be relatively high (e.g., 0.3–0.5 ng TEQ per dscm) even though the temperature may be below that range.

[82] Total annual compliance costs are before annualization and do not incorporate market exit resulting from the proposed rule. Also, CKM costs assume that no facilities currently have a HC analyzer in place. Thus, these compliance costs may result in overstated annual compliance costs. See the "Social Addendum to the Regulatory Impact Assessment for Proposed Hazardous Waste Combustion MACT Standards", February 1996, for details.

[83] USEPA, "Draft Technical Support Document for HWC MACT Standards, Volume III: Selection of Proposed MACT Standards and Technologies", February 1996.

the 0.20 ng/dscm (TEQ) BTF level represents the proposed emission standard.

EPA solicits comment on this approach, and notes that if a statistically-derived variability factor were deemed appropriate with the assumed conservative CI removal efficiency, the BTF level of 0.20 ng/dscm (TEQ) would be expressed as a standard of 0.31 ng/dscm (TEQ). We note, however, that under this approach, it may be more appropriate to use a less conservative, higher CI removal efficiency of 99 percent (i.e., because emissions variability would be accounted for using statistics rather than in the engineering decision to use a conservative CI removal efficiency). Doing so would lower the 0.20 ng/dscm (TEQ) level to approximately 0.04 ng/dscm (TEQ) (i.e., 99 percent reduction from 0.8 ng and 4.7 ng results in levels of 0.008 ng to 0.047 ng/dscm (TEQ), respectively, and 0.04 ng is a reasonable value within this range). If so, the D/F standard would be about 0.15 ng/dscm (TEQ) (i.e., 0.04 ng/dscm TEQ plus the variability factor of 0.11 ng/dscm TEQ).

We note that although CI is normally a relatively inexpensive control technology to add to sources (with flue gas above the dew point) that already have PM controls at the 69 ng/dscm level, CKs present a special situation. This is because: (1) CI will remove Hg as well as D/F (see discussion below regarding BTF control for Hg); (2) CKs recycle as much collected PM as possible because it is useful raw material and doing so reduces cement kiln dust (CKD) management cost; (3) some CKs recycle the CKD by injecting it at the raw material feed end of the kiln where the D/F may not be destroyed; and (4) to remove Hg from the recycling system to ensure compliance with the Hg standard, a portion of the CKD would have to be wasted.[84]

Accordingly, EPA has assumed that CKs that have to use CI to meet the BTF standard (i.e., those that cannot achieve the standard with temperature control alone) would install the CI system after the existing ESP or FF and add a FF to remove the injected carbon with the adsorbed D/F (and Hg). Although adding a new FF in series is an expensive approach, it would enable CKs to meet both the proposed D/F and Hg standards (as well as the PM, SVM, and LVM standards). Thus, the cost of the CI and FF systems have been apportioned among these proposed standards.

EPA estimates that 40 percent of CKs are currently meeting this BTF level. The national incremental annualized compliance cost for the remaining CKs to meet this BTF level[85] rather than comply with the floor controls would be $6.6 million for the entire hazardous waste-burning cement industry, and would provide an incremental reduction in D/F (TEQ) emissions nationally beyond the MACT floor controls of 20 grams/year (TEQ).

EPA has considered costs in relation to emissions reductions and the special bioaccumulation potential that D/F pose and determined that proposing a BTF limit is warranted.[86] D/F are some of the most toxic compounds known due to their bioaccumulation potential and wide range of health effects at exceedingly low doses, including carcinogenesis. Further, as discussed elsewhere in today's preamble, EPA's risk analysis developed for purposes of RCRA shows that emissions of these compounds from hazardous waste-burning cement kilns could pose significant risks by indirect exposure pathways, and that these risks would be reduced by BTF controls. Finally, EPA is authorized to consider this non-air environmental benefit in determining whether to adopt a BTF level. As noted earlier, exposure via these types of indirect pathways was in fact a chief reason Congress singled out D/F for priority MACT control in section 112(c)(6).

Finally, EPA's initial view is that it may need to adopt further controls under RCRA to control D/F if it did not adopt the BTF MACT standard. This would defeat one of the purposes of this proposal, to avoid regulation of emissions under both statutes for these sources wherever possible. These risks would, however, be reduced to acceptable levels if emissions levels are reduced to 0.20 ng/dscm (TEQ).

For these reasons, the Agency is proposing a BTF level of 0.20 ng/dscm (TEQ) for D/F emitted from hazardous waste-burning cement kilns.

2. Particulate Matter

a. MACT Floor. Cement kilns have high particulate inlet loadings to the control device due to the nature of the cement manufacturing process; that is, a significant portion of the finely pulverized raw material fed to the kiln is entrained in the flue gas entering the control device. CKs use ESPs or FFs to control PM to a 0.08 gr/dscf standard under the BIF rule, unless the kiln is subject to the more stringent New Source Performance Standard (NSPS) (see 40 CFR 60.60 (Subpart F)) of 0.3 lb/ton of raw material feed (dry basis) to the kiln,[87] which is generally equivalent to 69 mg/dscm or 0.03 gr/dscf.

The PM emissions data for CKs includes results from 54 test conditions collected from 26 facilities, with a total of 34 units being tested. The Agency analyzed all available PM emissions data and determined that sources with emission levels at or below the level emitted by the median of the best performing 12 percent of sources used fabric filters with air-to-cloth (A/C) ratios of 2.3 acfm/ft² or less. Analysis of emissions data from all CKs using FFs with the 2.3 acfm/ft² A/C ratio or less resulted in a level of 0.005 gr/dscf.

Because the NSPS is a federally enforceable limit that many cement kilns are currently subject to, the Agency has chosen the existing NSPS standard, not the statistically-derived limit discussed above, as MACT for existing hazardous waste-burning CKs. Thus, the Agency is identifying a MACT floor for PM and is identifying the floor level as the NSPS limit of 69 mg/dscm (0.03 gr/dscf). Given that the NSPS standard was promulgated in 1971, the Agency believes that it is reasonable to consider it as the MACT floor level. We note further that 30 percent of cement kiln test conditions currently meet the 69 mg/dscm floor level.

As mentioned above, the NSPS standard for PM is expressed as 0.3 lb/ton of raw material (dry basis) feed to the kiln. Although we are proposing to establish the floor level as the MACT standard (see BTF discussion below) expressed as 69 mg/dscm (0.03 gr/dscf), we specifically invite comment on whether the standard should be expressed in terms of raw material feed. We are proposing a "mg/dscm" basis for the standard because a PM concentration in stack gas is commonly used for waste combustors (hazardous waste incinerators, municipal waste

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[84] We note that most CKs currently dispose of a portion of CKD to control clinker quality (i.e., to control alkali salts). Nonetheless, the economics of CKD management are uncertain at this time given impending Agency action to ensure proper management. Thus, we believe that CKs will increase efforts in the future to minimize the amount of CKD that is disposed.

[85] We note that not every source with D/F emissions currently exceeding 0.20 ng TEQ per dscm would need to install CI to meet the standard. As noted previously in the text, 75 percent of sources could be expected to meet the standard with temperature control only. In estimating the cost of compliance with the standard, EPA considered the magnitude of current emissions and current operating temperatures to project whether the source could comply with the standard with temperature control only.

[86] We note that the D/F BTF control technology, CI, would also be used to control mercury emissions beyond the floor.

[87] See §60.62 Standard for particulate matter for further details.

Q. Public Comments

The draft order proposed for approval was published on December 19, 2005 for public comment. The public comment period was open through February 10, 2006. A public hearing was held on the proposal and draft order on January 24, 2006. Comments were received in writing throughout this period and comments were also received at the hearing.

An executive summary of the comments received and a response to those summarized comments has been prepared (and is shown below). As a result of the comments received, the Agency has made some revisions to the originally proposed special approval conditions and is issuing this order of approval with those revisions. A copy of the final approval conditions (with edits shown) is also provided below to highlight the nature of the changes made. A transmittal letter, final order of approval, and executive summary of comments and responses will be sent to the source, to all commenters, and to all attendees at the public hearing. The final records of this review, response, and decision will be available on the Agency's website following the publication of the permit through contacting the Agency's Records Administrator.

Executive Summary of Comments & Responses

[Insert final executive summary]

Special Approval Conditions w/ Revisions (Additions Underlined)

GENERIC CONDITIONS

1. Approval is hereby granted as provided in Article 6 of Regulation I of the Puget Sound Air Pollution Control Agency to the applicant to install or establish the equipment, device or process described herein at the INSTALLATION ADDRESS in accordance with the plans and specifications on file in the engineering Division of Puget Sound Clean Air Agency.

2. This approval does not relieve the applicant or owner of any requirement of any other governmental agency.

WHOLE TIRE LIMITATION

3. Lafarge North America (Lafarge) is approved to inject only whole tires (tire derived fuel - TDF) at mid-kiln.

4. Lafarge shall limit and record the total use of whole tires and chipped tires injected into the kiln to no more than 20% of the total fuel energy (Btu) supplied to the kiln on a hourly average, except as allowed by Conditions No. 8 and 9 of this Order. Whole tire injection may not proceed at any rate until the performance test report for that whole tire feed rate has been submitted with a demonstration of compliance with the limits of 40 CFR 63.1343(d). Lafarge shall submit these records on a monthly basis with the required CEMS reports.

NOx & CO MONITORING

5. While the kiln is operating, Lafarge shall continuously operate the NOx and CO emission monitors, Lafarge shall record the NOx and CO emission data and report the data for the duration of this Order. As part of the testing process in Conditions 8 and 9, Lafarge shall investigate short term relationships

between NOx and CO emissions and the types, quantities and rates of raw materials, fuels and kiln operations during periods before and after injection of chipped or whole tires. These investigations shall be submitted along with the test reports for Conditions 8 and 9. Lafarge shall record the fuels used and their usage rate for the duration of this Order and submit this data on a monthly basis with the required CEMS reports.

SOURCE TEST SCHEDULE

6. Lafarge shall submit source test notifications and test reports as required by Regulation I, Section 3.07 for each required test identified in Condition No. 8 of this Order.

7. Within 30 days of kiln startup after the 2005-06 winter maintenance period and the 2006-07 winter maintenance period, Lafarge shall evaluate the installation, calibration and drift of the existing NOx, CO and O_2 monitors following the procedures in 40 CFR 60, Appendix B (Specifications 2, 3 and 4) and Appendix F. Lafarge shall apply bias correction factors as needed for the existing NOx, CO and O2 monitors for use during this temporary approval. Lafarge shall conduct daily calibration drift checks on the NOx, CO and O2 monitors. Lafarge shall submit the results from these QA/QC procedures to the Agency within 30 days of test completion and continue to report on a monthly basis in accordance with Article 12 of Regulation I. For the purposes of this testing, these NOx, CO and O_2 monitors do not need comply with the CEMS installation and measurement Specifications in Section 8.1 and the Relative Accuracy Performance Specification in Section 13.2 of Performance Specification 2 and the Relative Accuracy requirement in Section 13.2 of Performance Specification 4.

8. Lafarge shall perform quarterly source tests beginning during the second quarter of 2006 and ending after the second quarter of 2007. During these source tests, Lafarge may request Agency approval for different tire injection rates other than listed below if necessary to assure kiln stability. Lafarge shall make any such request at least 7 days prior to a scheduled source test. Lafarge shall perform source tests in accordance with Conditions No. 9 and 10 of this Order while operating the kiln near capacity and consistently adding tires as nearly as practical at the levels specified. Lafarge shall conduct the following tests no later than the date specified:

a) Second Quarter 2006 - no waste oil, no chipped tires, and no whole tires;
b) Third Quarter 2006 - no waste oil, no chipped tires, and whole tires at 20% of the total heat input supplied to the kiln on a hourly average;
c) Fourth Quarter 2006 - no waste oil, chipped tires at 10% and whole tires at 10% of the total heat input supplied to the kiln on a hourly average;
d) First Quarter 2007 - no waste oil, chipped tires at 20% and whole tires at 20% of the total heat input supplied to the kiln on a hourly average;
e) Second Quarter 2007 - no waste oil, no chipped tires and whole tires at 40% of the total heat input supplied to the kiln on a hourly average.

OPERATIONS AND TESTING

9. Lafarge shall test the emissions in accordance with the following methods:
a) Opacity (CEMS);
b) SO2 (CEMS);
c) NOx (EPA Method 7E);
d) CO (EPA Method 10);
e) O2 (EPA Method 3A);
f) Dioxin/Furan (EPA Method 23);

g) Metals (EPA Method 29) - testing required under Conditions No. 8(a), 8(b), and 8(e) only;
h) Formaldehyde (Method 0011/SW-8315) - testing required under Conditions No. 8(a), 8(b), and 8(e) only;
i) Volatile Organic Compounds (EPA Method TO-14A);
j) Polycyclic Aromatic Hydrocarbons (EPA Method 0010).

10. Lafarge shall monitor and record the following data:

a). ESP inlet temperature following 40 CFR 63.1349(b)(3);
b) Type and quantity of clinker manufactured for cement;
c) Type and quantity of raw materials added to kiln;
d) Type, quantity and fuel Btu added to the kiln;
e) Burnability Index;
f) Amount of CKD produced and re-injected;
g) Variability of raw mix; and
h) Amount of tires (chipped or whole) added to kiln.

11. Lafarge shall submit a report to the Agency no later than August 30, 2007 which contains the following:

a) Analysis of testing results quantifying emission changes between burning no tires, burning chipped tires and burning whole tires; and
b) Estimated or projected changes in emissions between burning no tires, burning chipped tires and burning whole tires in pounds per hour and estimated on a tons per year basis for measured pollutants from the source tests and monitored data collected to that date.

12. Lafarge shall submit a Notice of Construction application to obtain final approval for future tire fuel operations no later than September 30, 2007.

13. Lafarge shall submit an Air Operating Permit renewal application no later than September 30, 2007.

14. If the applications identified in Conditions Nos. 12 and 13 are both complete by December 30, 2007, this Temporary Order of Approval will remain in effect until final action is taken on the applications identified in Conditions Nos. 12 and 13. If the applications identified in Conditions Nos. 12 and 13 are not complete by December 30, 2007, this Temporary Order of Approval will expire on that day.

Has the source seen this:		Date:	
Done By:		Date:	
Inspector Review:		Date:	
Reviewed by: Supervising Engineer		Date:	