STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PAUL R. LEPAGE
GOVERNOR

PATRICIA W. AHO
COMMISSIONER

Dragon Products Company, LLC
Knox County
Thomaston, Maine
A-326-77-3-A

Board
Findings of Fact and Order
New Source Review
NSR #3

FINDINGS OF FACT

After review of the air emissions license amendment application, staff investigation reports and other documents in the applicant's file in the Bureau of Air Quality, pursuant to 38 Maine Revised Statutes Annotated (M.R.S.A.), Section 344 and Section 590, the Board of Environmental Protection (Board) finds the following facts:

I. REGISTRATION

A. Introduction

FACILITY	Dragon Products Company, LLC
LICENSE TYPE	06-096 CMR 115, Minor Modification
NAICS CODES	32731
NATURE OF BUSINESS	Cement Manufacturing
FACILITY LOCATION	US Route 1, Thomaston, Maine

Dragon Products Company, LLC (Dragon) manufactures cement using a dry cement manufacturing process. The facility is considered an existing Part 70 Major Source as defined in *Definitions Regulations*, 06-096 CMR 100 (as amended) and currently operates under Part 70 license A-326-70-A-I (issued December 31, 2003) and associated amendments.

Dragon submitted a minor modification application for an alternative mercury emission limit, as allowed under 38 M.R.S.A §585-B (5)(B).

B. Amendment Description

Mercury air emission limits are established in 38 M.R.S.A §585-B(5), including a requirement after January 1, 2010 for a source to meet either a mercury emission limit of 25 lb/year or a mercury reduction of 90% by weight. In addition, Section (B) under 38 M.R.S.A §585-B(5) allows for the Board of Environmental

Protection (Board) to grant a "license modification for an alternative mercury emission limit if the Board finds that the proposed mercury emission limit meets the most stringent emission limitation that is achievable and compatible with that class of source, considering economic feasibility." Dragon applied for an alternative mercury emission limit to be aligned with the federal standards in 40 CFR Part 63, Subpart LLL, *National Emission Standards for Hazardous Air Pollutants from the Portland Cement Manufacturing Industry* promulgated by the U.S. Environmental Protection Agency (EPA) in September 2010. This regulation is also referred to as the portland cement MACT (Maximum Achievable Control Technology). Based on the finalized mercury emission standard in 40 CFR Part 63, Subpart LLL of 55 lb/MMtons clinker, Dragon has requested a mercury emission limit of 42 lb/year.

C. Emission Equipment

This amendment addresses the equipment used to produce clinker, including the 440 MMBtu/hr nominal capacity portland cement rotary kiln and various process equipment.

D. Application Classification

The application for Dragon does not violate any applicable federal or state requirements and does not reduce monitoring, reporting, testing or record keeping. The application proposes to establish an alternative mercury emission limit as allowed under 38 M.R.S.A §585-B(5)(B). There will be no emissions increases of the regulated pollutants listed in the "Significant Emission Increase" Levels as given in *Definitions Regulation*, 06-096 Code of Maine Rules (CMR) 100 (as amended).

Therefore, this amendment is determined to be a New Source Review (NSR) minor modification under *Minor and Major Source Air Emission License Regulations* 06-096 CMR 115 (as amended) since the establishment of a mercury emission limit is not addressed or prohibited in the Part 70 air emission license. An application to incorporate the requirements of this amendment into the Part 70 air emission license shall be submitted no later than 12 months from commencement of the requested operation.

II. ALTERNATIVE MERCURY EMISSION LIMIT

A. Background

Maine statute 38 M.R.S.A §585-B, *Hazardous Air Pollutant Standards* includes mercury emission limits and requirements in sections 5, 6, and 7. Section 5 of the statute lists specific mercury emission limits including: an air emission source may not emit mercury in excess of 25 lbs per year after January 1, 2010 or, alternatively, a source may reduce mercury emissions by 90% by weight after January 1, 2010. Section 5(B) allows for a license modification to establish an alternative mercury emission limit, with an interim mercury limit of 35 lb/year prior to the issuance of the license modification. Section 6 of the statute requires mercury reduction plans from sources emitting mercury above 10 lb/year after January 1, 2007 and a summary mercury report from the Department to the joint standing Natural Resources Committee of the Legislature. Section 7 of the statute requires four mercury stack tests over two subsequent years for those sources emitting mercury in excess of 10 lb/year in 2010, a second source mercury reduction plan, and an updated summary mercury report from the Department to the Legislature.

Mercury emissions from Dragon were identified and reviewed through the submitted mercury reduction plans, required stack tests, and submittal of the alternative mercury emission limit application and addendum. The following summarizes the timeline of Dragon's mercury submittals and requirements, along with the Department's mercury reports to the Legislature:

- On August 29, 2008 Dragon submitted a mercury reduction plan to the Department, pursuant to 38 M.R.S.A §585-B(6).

- On December 31, 2008 Dragon submitted an alternative mercury emission limit application under 38 M.R.S.A §585-B(5)(B) prior to the January 1, 2009 deadline. The application included a copy of the public notice of intent to file as published in the newspaper as required. The Department did not receive any comments during the public comment period on the application. The application included a review of Dragon's mercury emissions calculated using various methods (stack testing, data from a trial CEM system, and mass balance), the sources of mercury within the process, available mercury control technologies and their feasibility, and an alternative mercury limit analysis. Dragon proposed a mercury emission limit of 50 lb/year and discussed the requirements of the portland cement federal rule, 40 CFR Part 63, Subpart LLL in effect at the time.

- In March 2009, the Department submitted the first mercury reduction report to the Legislature and recommended revisions to the statute to allow

the option of a 90% mercury emission reduction, requiring additional stack testing for sources over the 10 lb/year level with a reduction plan due at the end of the two year period, and requiring the Department to submit an updated mercury reduction report to the Legislature. The recommendations were added to the statute. The 25 lb/year mercury limit and option to submit an alternative mercury limit was retained.

- In 2011 and 2012 mercury stack testing was performed by Dragon for a total of four stack tests, two each year.

- On December 28, 2012 Dragon submitted a second mercury reduction plan to the Department.

- In March 2013, the Department submitted an updated mercury Legislative report which included a recommendation of amending 38 MRSA §585-B to allow portland cement facilities to meet the applicable requirements of 40 CFR Part 63, Subpart LLL (as revised in 2010) as an alternative to meeting the 25 lb/year mercury emission limit.

- On November 20, 2013 Dragon submitted an addendum to the alternative mercury emission limit application to reflect the changes in the federal regulation made by EPA in 2010 and to revise the proposed mercury emission limit to 42 lb/year.

This license amendment establishes an annual mercury emission limit for Dragon based on the information submitted and the applicable emission standards contained in 40 CFR Part 63, Subpart LLL.

B. Mercury Kiln Emissions, Control Technologies, and Rules

The Dragon facility consists of a single pre-heater, pre-calciner cement kiln with an in-line raw mill. Associated processes include quarrying, raw material processing, and finished material processing. Limestone quarried on-site, iron ore, sand, recycled waste clinker sand, utility fly ash, and other miscellaneous permitted raw materials are combined in the raw mill, ground, and stored in the raw feed blend silo. Recycled cement kiln dust (CKD) is mixed with the raw meal in the blend silo and is fed to the pre-calciner. Dragon periodically uses utility fly ash generated from coal fired power plants. The fly ash is mixed into the kiln feed prior to being fed to the rotary kiln and typically makes up approximately 1.0% of the total raw feed. Allowable kiln fuels include coal, #2 and #4 fuel oil, specification and non-specification waste oil, whole tires and tire chips, recycled carpet fiber, and petroleum coke. The rotary kiln operating temperatures are typically in excess of 2800°F. The kiln produces a material known as 'clinker', which is discharged from the kiln into the clinker cooler. The

material is transferred to clinker storage and ultimately transported to the finishing mills. The clinker is combined with gypsum and other additives to make portland cement.

1. Dragon Mercury Emissions

Mercury emissions from Dragon can be estimated using various methods, including stack test emission results, mass balance, and through the use of a mercury continuous emissions monitoring system (CEMS) on the kiln stack.

Dragon performed mercury stack tests in April 2005, twice in 2011, and twice in 2012. The stack tests occurred under two raw mill operating scenarios: raw mill on and raw mill off. When the in-line raw mill is on, the kiln flue gases enter the raw mill at approximately 350°F-400°F and are used to dry the raw feed stock material and transport it through the raw mill. The flue gases then exhaust to the kiln's main baghouse at a temperature of 200°F-280°F since cooling occurs as it progresses through the mill. With the in-line raw mill off, the flue gases by-pass the raw mill and exhaust directly to the kiln baghouse at a temperature of 350°F-400°F. Studies of mercury emissions from portland cement plants have demonstrated that mercury is typically bound to the particulate matter entrained in the effluent flue gasses which is captured by the kiln's main baghouse. The lower kiln exhaust temperatures observed during the raw mill operation allow less mercury vaporization and lower mercury emissions. Then the raw mill operation ceases, higher kiln exhaust temperatures tend to result in higher emissions. Stack test results typically do not capture spikes in mercury emissions. The tests are required to be performed under each operating scenario and under normal, stable conditions. Dragon operates the raw mill approximately 80% of kiln operation. Dragon must shut down the raw mill periodically for maintenance and inspection. Lubrication and inspection of mill components are important for raw mill reliability and the reduction of operating costs. Dragon's process utilizes a blend silo to provide for the storage of raw meal. Dragon must operate the raw mill to ensure the blend silo has sufficient feed for periods when raw materials may not be available. In addition, the raw mill is designed to produce more kiln feed than the kiln typically uses. Stack tests are also representations of emissions at the time of the test and do not necessarily take into account operational variability. The following are the results of the recent mercury stack tests performed at Dragon, including 2007 calculations for comparison purposes to the mass balance and CEM calculation methods discussed in later sections:

Mercury Emissions Testing Results at Dragon

Calendar Year	Test Condition	Test Date	Test Hourly Emissions (lb/hr)	Average Emissions (lb/hr)	Annual Operating Hours (hrs)	Calc. Annual Emissions (lbs)	Total Calc. Annual Emissions (lbs)
2005	Raw Mill On	4/5/05	1.93E-03	1.38E-03	7008 (max.)	9.7	24.1 (max.)
		4/5/05	6.61E-04				
		4/5/05	1.66E-03				
	Raw Mill Off	4/6/05	9.09E-03	8.23E-03	1752 (max.)	14.4	
		4/6/05	7.44E-03				
		4/6/05	8.15E-03				
2007 (using 2005 test results)	Raw Mill On	see above	see above	1.38E-03	5151.4 (actual)	7.11	12.88
	Raw Mill Off	see above	see above	8.23E-03	676.6 (actual)	5.77	
2011	Raw Mill On	6/7/11	2.48E-03	2.00E-03	3200.2 (actual)	6.41	7.87
		6/7/11	2.47E-03				
		12/1/11	1.69E-03				
		12/1/11	1.37E-03				
	Raw Mill Off	6/7/11	2.92E-03	2.42E-03	604.6 (actual)	1.46	
		11/15/11	2.15E-03				
		11/15/11	2.19E-03				
2012	Raw Mill On	7/17/12	9.16E-04	7.74E-04	3107.3 (actual)	2.40	3.86
		7/17/12	9.81E-04				
		11/20/12	6.32E-04				
		11/20/12	5.66E-04				
	Raw Mill Off	7/17/12	2.41E-03	2.44E-03	597.7 (actual)	1.46	
		11/20/12	2.47E-03				

Dragon has also calculated annual mercury emissions using a mass balance approach with feed material analysis data of 2007. Emissions estimates using this calculation method can vary depending on the assumptions used to handle non-detect levels. Results submitted in the 2008 Mercury Reduction Report with non-detect as both zero and also as 0.01 ppm are shown in the following table:

Dragon 2007 Estimated Hg Emissions Using Mass Balance

Process Stream	No. of Samples	Range of Hg Conc. (ppm)	Average Hg Conc. With ND*=0 (ppm)	Average Hg Conc. With ND*=0.01 (ppm)	2007 Usage (tons)	Average Hg Quantity with ND*=0 (lb/yr)	Average Hg Quantity with ND*=0.01 (lb/yr)
Low Rock	4	ND*-0.02	0.005	0.013	236,561	2.37	5.91
High Rock	4	ND*-0.04	0.020	0.023	203,614	8.14	9.16
Mg Rock	4	ND*	0.000	0.010	415,834	0.0	8.32
Iron Ore	4	0.04-0.07	0.053	0.053	8,999	0.94	0.94
Sand	4	ND*	0.000	0.010	105,563	0.0	2.11
Foundry Sand	3	ND*	0.000	0.010	692	0.0	0.01
OCS	1	ND*	0.000	0.010	1,256	0.00	0.03
Perlite	2	ND*	0.000	0.010	0	0.00	0.00
CKD Pile	4	ND*-0.07	0.058	0.058	0	0.00	0.00
CLK Pile	4	ND*-0.02	0.010	0.015	41,708	0.83	1.25
Fly Ash S (from NH Schiller Station)	3	0.41-0.51	0.457	0.457	9,800	8.95	8.95
Fly Ash C (from Bucksport facility)	4	ND*-0.29	0.170	0.173	5,314	1.81	1.83
Slag	3	ND*	0.000	0.010	12,624	0.0	0.25
Coke	4	ND*-0.02	0.005	0.013	58,548	0.59	1.46
						Total Input: 23.63	Total Input: 40.24
Clinker (product)	4	ND*-0.02	0.005	0.013	674,939	6.75	16.87
						Emissions (Total Input less Clinker): **16.88**	Emissions (Total Input less Clinker): **23.37**

* Shows non-detect (ND) equaling 0.0 ppm or 0.01 ppm (half the detection level of 0.02 ppm).

A third calculation method Dragon utilized was a continuous emission monitoring system (CEMS) for mercury. Dragon contracted AirTox, Inc. to

install and operate a continuous mercury monitor during a period from September 17 to October 24, 2008, during which time approximately 21 days of CEMS mercury data was obtained from the kiln stack. Using the CEMS results and extrapolating with the various years' operating hours yields the following:

Calculated Mercury Emissions Extrapolated from CEMS Data

Calendar Year	Mercury Emission Rate from 2008 CEMS data (lb/hr)*	Operating Hours (hrs/yr)	Annual Mercury Emissions (lb/yr)
2007	0.00524	5828	30.5
2011	0.00524	3805	19.94
2012	0.00524	3705	19.41

* CEMS mercury data collected from September 17 - October 24, 2008: 7.0 ug/dscm average stack concentration, 199,760 acfm average stack exhaust gas flow rate resulting in a calculated 0.00524 lb/hr average mercury emission rate.

The three calculation methods are all valid estimates, but vary due to the limitations of each. The results of each method show that Dragon has been below the 35 lb/year mercury limit required to be met from the time of the alternative mercury emission limit application submittal. However, Dragon's actual production numbers (tons/clinker) have been well below capacity over the last few years.

2. Mercury Control Technologies

Through the two submitted mercury reduction plans and the alternative mercury emission limit application, Dragon presented information on the mercury control technologies available to the facility.

a. Feed Rate Controls – Raw Materials

One method of mercury reduction is to reduce the input of raw material and fuels that contain mercury. Dragon's 2008 Mercury Reduction Plan included mercury testing results performed by the facility on numerous feed streams, as presented in the mass balance calculation table above. The materials analyzed included three types of limestone, iron ore, sand, foundry sand, oil contaminated soil, perlite, cement kiln dust pile, waste, fly ash, slag, coke, and clinker. The sand, oil contaminated soils, perlite, and slag were non-detect for mercury. The other raw feeds had varying amounts of mercury and are discussed below.

i. Limestone

Limestone is the primary feed material in portland cement production and has been shown to be the largest contributor of mercury. All of the limestone used at Dragon is quarried on-site (low rock, high rock, and magnesium rock). Dragon stated that it would be infeasible to switch their limestone source based on mercury content, since the limestone would have to be transported from elsewhere and would make further operation in Thomaston impractical. EPA made a similar assertion that switching limestone sources would not be an achievable MACT option in the preamble of the proposed December 2, 2005 rule (70 FR 72333): "Though costs may not be considered in determining a MACT floor, portland cement plants are typically located at or near a limestone quarry because the economics of the portland cement industry require minimal transportation costs. If we were to now require sources to ship raw low mercury limestone over potentially long distances to reduce mercury emissions, it would change the economics of the plant so significantly that the plant would not be the same class or type of source compared to facilities that happened to have low-mercury limestone located nearby (or, at least, had happened on a vein of low mercury limestone at the time of its performance test). Because limestone's composition varies with location, limestone must be processed locally to be profitable, portland cement plants must formulate the mixture of limestone with other materials to attain the desired composition and performance characteristics of their product, and access to limestone is exclusive to each portland cement plant." Based on the inherent requirement for large amounts of limestone to be used to manufacture portland cement, switching from the use of limestone or to an off-site source of potentially lower mercury vein of limestone is not a feasible option.

ii. Iron Ore

Iron ore supplements the iron content in the cement manufacturing processes. Dragon uses off-site iron ore, so switching iron ore may be feasible if there is lower mercury containing ore available. However, the mercury content from iron ore has been calculated to be only 2.3 to 4% of the mercury fed into the kiln, based on data submitted in Dragon's 2008 Mercury Reduction Plan. Switching ore suppliers would result in only a negligible reduction in kiln mercury feed, and thus changing ore sources was not considered further as a mercury reduction option.

iii. Reclaimed Clinker

Reclaimed waste clinker from the on-site waste clinker pile is used as an additional raw material source. The mercury content represents 3.1

to 3.5% of the detectable mercury feed. Eliminating the use of waste clinker would result in a proportional increase in the use of limestone used at the site. Limestone also contains similar amounts of mercury, therefore the elimination of using reclaimed waste clinker would not necessarily result in decreased mercury emissions from the kiln. In addition, Dragon is required by the Department's solid waste Orders to actively reclaim the waste clinker until the area is returned to wetland, which is estimated to take another 7 to 10 years. Removing reclaimed waste clinker as a feed material was not considered a mercury reduction option.

iv. Fly Ash

Dragon uses fly ash as an alternative raw material to shale or clay since utility boiler fly ash provides the alumina necessary to the portland cement process. The fly ash used by Dragon is currently obtained from external sources. Fly ash initially represented a notable portion of the estimated mercury fed into Dragon's process using the mass balance information with non-detect assumptions, but further laboratory sampling undertaken with lower detection levels showed that the mercury contribution by feed material was the following using the extrapolated mercury emission rate based on CEM data for 2007 operations:

Kiln Input	Contribution by Percentage of Mercury	Contribution to Total Mercury Emission Rate (lb/hr)	Contribution of the 2007 30.5 lb/yr emission rate (lb/yr)
Kiln Feed Mix (excluding fly ash)	84.29%	4.42E-03	25.74
Fly Ash	15.62%	8.18E-4	4.77
Petroleum Coke	0.09%	4.77E-6	0.03

Although the kiln feed mix, mainly limestone, contributes the largest portion to the facility's overall mercury emissions, removal of the use of fly ash was further investigated as a potential mercury reduction option.

Several economic and environmental costs and/or disadvantages are associated with the removal of fly ash from the feed stream at Dragon. There would be an immediate revenue cost if fly ash was discontinued and had to be replaced. Increased power costs would occur related to

additional grinding since unlike most raw materials, the fly ash does not need to be ground prior to being fed to the kiln. Fuel costs would also increase due to the increased heat required to calcine the additional limestone feed.

Environmentally, if shale and/or clay replace the fly ash, higher total hydrocarbon emissions may result. Shale and clay have a higher organic content than fly ash and would necessitate additional fuel consumption in the kiln to remove the organic carbon. By eliminating the use of fly ash, the resulting fuel usage increase needed for the replacement with shale and/or clay would result in increased emissions of pollutants such as sulfur dioxide (SO_2), oxides of nitrogen (NOx), carbon monoxide, and the greenhouse gas carbon dioxide (CO_2). In addition, power consumption would increase due to the grinding and crushing requirements to process the shale or clay. The alumina found in the fly ash assists in increasing the burn ability of the raw feed material and is necessary for the formation of tricalciumaluminate, a chemical transformation that occurs during the clinkering process. Absent an alumina source, the raw feed material composition will need to be adjusted which will necessitate an increase in limestone usage since limestone contains a small percentage of alumina. But limestone also contains mercury. Lastly, there is an environmental benefit to using the fly ash rather than disposing of it in a landfill.

At this time, the replacement of fly ash is not currently a viable option considering the economic costs, the potential negative operational impacts, the product quality impacts, the environmental impacts, and amount of actual mercury emissions that would result. Fly ash usage at Dragon has been reduced over the last few years due to limited availability on the market. Dragon will continue to monitor and evaluate fly ash usage at the facility as it relates to mercury emissions.

b. Feed Rate Controls – Fuels

Although Dragon does have the potential to fire coal, petroleum coke is currently the main fuel fired at Dragon. Petroleum coke has a mercury content lower than that of coal. To further reduce mercury emissions from kiln fuel, another fuel option is the use of natural gas. However, there is no natural gas pipeline to Dragon at this time, the manufacturing process would need an uninterruptible contract if a supply line is installed, and the mercury emission reductions gained by going from petroleum coke to natural gas would not be significant. Additionally, the use of natural gas may significantly increase NO_X emissions.

c. Activated Carbon Injection

Activated carbon injection is an add-on control in which mercury is absorbed onto injected carbon. The carbon is then removed from the process. For the Dragon facility, the activated carbon injection system could be installed prior to the existing particulate air pollution control device and the carbon would be captured with the clinker kiln dust. But clinker kiln dust is returned to the kiln process and the mercury associated with the captured material would then be released, resulting in little or no emissions reduction. In an alternative, more effective set-up, the activated carbon injection system would be installed after the existing particulate control device, however a secondary air pollution control device would need to be designed to capture the mercury-laden carbon. This system is expected to be approximately 90% effective.

In the development of the portland cement MACT, EPA estimated an activated carbon injection system and an additional air pollution control device to have a capital cost range of approximately $761,000 to $5.5 million per kiln with an annual cost of $477,000 to $3.7 million (70 FR 72335, December 2, 2005). These values were refined by EPA in 2010, with an estimation that the activated carbon injection system including an additional baghouse necessary to collect the carbon would have an average capital cost of approximately $2.56/ton of clinker with an average annual cost of $0.91/ton of clinker. ("Summary of Environmental and Cost Impacts for Final Portland Cement NESHAP and NSPS" USEPA, August 6, 2010, page 14). Using these updated figures with Dragon's licensed production rate of 766,500 tons of clinker, the estimated capital and annual cost for Dragon would be approximately $2.0 million and $700,000 per year, respectively. In addition to the capital and annual costs, further costs would be incurred for solid waste disposal and increased energy use.

Environmentally, the use of activated carbon injection controls will generate additional solid waste. Increased energy use will result in overall increased emissions where the power is produced.

Based on the high cost of installing and operating the control equipment, and the potential negative environmental impact created by the controls, it was determined that installing an activated carbon injection control system was not a viable mercury reduction strategy for Dragon.

d. Wet Scrubber

Wet Scrubbers are not widely used to control mercury from portland cement plants. Five cement kilns in the United States utilize wet

scrubbers for SO_2 emission control, but there is insufficient data on the control efficiency for mercury. EPA has stated that there is a reasonable basis that wet scrubbers remove oxidized mercury from cement kiln exhausts and further estimated a best-case mercury control efficiency of 80% in its 'Summary of Environmental and Cost Impacts for Final Portland Cement NESHAP and NSPS', dated August 6, 2010 (page 3). The annualized cost of a wet scrubber system was estimated to be $1.5 million per year for a source slightly smaller in production than Dragon (71 FR 76525, December 20, 2006).

In addition to the high cost and uncertain mercury control efficiency, the wet scrubber system also has potential environmental impacts due to the make-up water requirements, the transfer of mercury from air to water, waste sludge disposal, and added energy requirements.

Based on the high cost of installing and operating the control equipment, the uncertainty of the mercury removal effectiveness, and the potential negative environmental impact created by the controls, it was determined that installing a wet scrubber was not a viable mercury reduction strategy for Dragon.

e. Cement Kiln Dust (CKD) Removal

Cement kiln dust consists mostly of clinker dust and small amounts of raw material which are recycled back into the kiln process. Studies have shown that some mercury adsorbs on the cement kiln dust captured in the air pollution control devices. The annual cost for the replacement of cement kiln dust used as a raw material and the disposal of the additional solid waste generated if it is not recycled back into the process is estimated by EPA to be $3.7 million per year for a source slightly smaller in production than Dragon (71 FR 76524, December 20, 2006). Dragon asserts that EPA's cost probably underestimates the actual costs of removing cement kiln dust from the process and disposing of it in a landfill.

Environmentally, the cement kiln dust will significantly increase the required landfill space if it is removed from the process.

Based on the high cost of removing cement kiln dust from the process and the resulting landfill impacts, it was determined that removing cement kiln dust as a recycled feed material was not a viable mercury reduction strategy for Dragon.

3. 40 CFR Part 63, Subpart LLL, *National Emission Standards for Hazardous Air Pollutants from the Portland Cement Manufacturing Industry*

EPA initially promulgated 40 CFR Part 63, Subpart LLL on June 14, 1999 and subsequently amended the rule, with the most recent amendment occurring on February 12, 2013. The current mercury standard in Subpart LLL was established by amendments adopted in September 2010. Title 40 CFR Part 63, Subpart LLL includes mercury standards and requirements for new and existing sources, as well as addressing total hydrocarbons (THC), particulate matter (PM), hydrochloric acid (HCl), and organic hazardous air pollutants (HAP) which can be used as an alternative to total hydrocarbons. Compliance with the mercury standard is required to be demonstrated using either a mercury continuous emission monitor or sorbent trap monitoring system.

EPA based the mercury emissions standards and requirements on an extensive data collection from portland cement facilities throughout the United States. The research included mercury emissions from various facilities, methods of monitoring and the feasibility of those monitors, and the costs associated with control technologies. 40 CFR Part 63, Subpart LLL is a MACT rule for which requirements are based on the Maximum Achievable Control Technology for a specific source category. The MACT standards are established based on the average performance of the top 12% best controlled facilities in an industrial category.

Under 40 CFR Part 63, Subpart LLL, Dragon is required to comply with a mercury emission limit from the kiln of 55 lb/million tons clinker on a 30 day rolling average basis by the compliance date of September 9, 2015. Using this production-based emission limit will result in maximum mercury emissions from Dragon of 42 lb/year, calculated with Dragon's Title V license clinker production limit of 766,500 tons/year. Dragon shall install and operate a mercury CEMS by the rule's compliance date

Reviewing past production numbers and using the 55 lb/MM tons clinker limit, equivalent actual mercury emissions would have been 19.96 lb/year in 2011 and 19.31 lb/year in 2012. These numbers are similar to the emissions calculated using the trial CEMS data. Since the 55 lb/MM tons clinker limit is production based, a normal operating year will result in actual annual mercury emissions below 42 lb/year (established using the highest production rate of the facility).

4. Mercury Emission Limit

Dragon is required to comply with 40 CFR Part 63, Subpart LLL and the Board has determined that Dragon shall also meet a 42 lb/year mercury emission limit. The 42 lb/year limit shall be based on a calendar year to be consistent with the State's mercury statute. Dragon shall install and operate a mercury CEMS to demonstrate compliance with the mercury limit.

A mercury CEMS at Dragon will result in a more complete understanding of the operational aspects impacting mercury emissions, such as fuel type, raw material input, and variations in operational configurations. Timely informational feedback on the effect of a change in operation is superior to a stack test which involves data collection for a particular short period of time during normal operations. The mercury CEMS will result in a more complete dataset of actual emissions during normal operations, variations in operations, and under upset conditions. The mercury CEMS is subject to specific quality assurance and quality control requirements to ensure the validity of the data collected.

The mercury CEMS data allows Dragon to meet the 40 CFR Part 63, Subpart LLL limit of 55 lb/MM ton of clinker and the associated state limit of 42 lb/year. The CEMS data will be used to monitor and evaluate the fly ash and/or fuel inputs as they relate to mercury emissions, as well as other options to maintain compliance with the mercury emission limits in a cost effective manner.

The application Dragon submitted in December 2008 included a proposed alternative mercury emission limit of 50 lb/year, however, the application addendum submitted on November 20, 2013 revised the proposed limit to 42 lb/year, in alignment with the requirements of 40 CFR Part 63, Subpart LLL. Through the review of nationwide data and the comments received during the rulemaking process, 40 CFR Part 63, Subpart LLL establishes a consistent and stringent mercury emission limit achievable and compatible for existing portland cement plants.

Per 38 M.R.S.A §585-B(5)(B), the Board concludes that a 42 lb/calendar year mercury emission limit from the kiln at Dragon is reasonable and appropriate, basing the emission limit on that which is achievable and compatible within the portland cement source classification under 40 CFR Part 63, Subpart LLL and economic feasibility. Dragon shall install an operating mercury CEMS on the kiln stack by March 9, 2015 and shall have the CEMS certified by September 9, 2015.

C. Incorporation into the Part 70 Air Emission License

The requirements in this 06-096 CMR 115 New Source Review amendment shall apply to the facility upon amendment issuance. The requirements of this license based on 38 M.R.S.A. §585-B shall be considered enforceable by the State only since the statute is not a federally enforceable statute. Per *Part 70 Air Emission License Regulations*, 06-096 CMR 140 (as amended), Section 1(C)(8), for a modification that has undergone NSR requirements or been processed through 06-096 CMR 115, the source must then apply for an amendment to the Part 70 license within one year of commencing the proposed operations as provided in 40 CFR Part 70.5.

D. Annual Emissions

Annual emissions of the criteria pollutants used for calculating the annual license fee are not being revised.

Mercury emissions from Dragon shall not exceed 42 pounds on a calendar year basis.

ORDER

Based on the above Findings and subject to conditions listed below, the Board concludes that the emissions from this source:

- will receive Best Practical Treatment,
- will not violate applicable emission standards,
- will not violate applicable ambient air quality standards in conjunction with emissions from other sources.

The Board hereby grants Air Emission License A-326-77-3-A pursuant to the preconstruction licensing requirements of 06-096 CMR 115 and subject to the conditions below.

Severability. The invalidity or unenforceability of any provision, or part thereof, of this License shall not affect the remainder of the provision or any other provisions. This License shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

SPECIFIC CONDITIONS

(1) **Mercury Emissions**

A. State Mercury Emission Limit
Dragon shall not exceed a 42 lb/calendar year mercury emission limit from the kiln stack as an alternative limit to otherwise applicable limits in 38 M.R.S.A §585-B (5)(B). [38 M.R.S.A §585-B (5)(B)] **enforceable by state only**

B. Mercury Monitoring (CEMS)
Dragon shall install an operating mercury continuous emissions monitoring system on the kiln stack by March 9, 2015. The CEMS shall be certified by September 9, 2015. [06-096 CMR 115 and 40 CFR Part 63, Subpart LLL]

C. Compliance
1. For the calendar year 2014, compliance with the mercury limit shall be based on the average emission factor calculated from the previous CEMS trial data (0.00524 lb/hr) and the actual annual production hours for the year.
2. For the calendar year 2015, compliance with the mercury limit shall be based the average mercury emission factor calculated from the previous CEMS trial data (0.00524 lb/hr) and the actual annual production hours from January until the date the permanent CEMS is certified (no later than September 9, 2015). This calculation shall be added to the actual CEMS data collected from the date of CEMS certification through December 2015 to get the total mercury emissions for 2015.
3. For the calendar years 2016 and thereafter, compliance with the mercury limit shall be demonstrated by the use of a mercury CEMS, operated in accordance with federal and state regulations.

[38 M.R.S.A §585-B (5)(B) and 06-096 CMR 115]

D. Federal Requirements

Dragon shall meet all applicable mercury standards and requirements in 40 CFR Part 63, Subpart LLL.

(2) Dragon shall submit an application to incorporate this amendment into the Part 70 air emission license no later than 12 months from issuance of this license amendment. [06-096 CMR 140, Section 1(C)(8)]

DONE AND DATED IN AUGUSTA, MAINE THIS DAY OF , 2014.

BOARD OF ENVIRONMENTAL PROTECTION

BY:_____
ROBERT A. FOLEY, CHAIR

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: December 31, 2008
Date of application acceptance: December 31, 2008

Date filed with the Board of Environmental Protection: