

**Dragon Products Company, Inc.  
Knox County  
Thomaston, Maine  
A-326-70-B-A**

**Departmental  
Findings of Fact and Order  
Part 70 Air Emission License  
Amendment #1**

After review of the Part 70 Significant License Modification application, staff investigation reports and other documents in the applicant's file in the Bureau of Air Quality, pursuant to 38 M.R.S.A, Section 344 and Section 590, the Department finds the following facts:

**I. Registration**

A. Introduction

FACILITY	Dragon Products Company, Inc. (Dragon)
LICENSE NUMBER	A-326-70-B-A
LICENSE TYPE	Part 70 Significant License Modification
NAIC CODES	32731
NATURE OF BUSINESS	Cement Manufacturing
FACILITY LOCATION	Thomaston, Maine
Date of Initial License Issuance	December 31, 2003
Date of Significant Modification	July 24, 2007
License Expiration Date	December 31, 2008

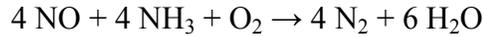
B. Description of Part 70 Significant Modification

Dragon converted the existing wet process cement kiln to a dry process (preheater/precalciner type) in 2004. NO<sub>x</sub> continuous emissions monitoring system data shows NO<sub>x</sub> emissions approaching, but not exceeding, the licensed NO<sub>x</sub> limit. So as to ensure the cement plant continues to meet the licensed NO<sub>x</sub> emission limit, Dragon has requested an amendment to add a Selective Non-Catalytic Reduction (SNCR) system to the calciner. This SNCR system will utilize aqueous ammonia injected into the calciner to reduce NO<sub>x</sub> generated in the calciner, thus reducing NO<sub>x</sub> emissions from the kiln stack.

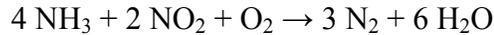
NO<sub>x</sub> in flue gas is a mixture of nitrogen oxide (NO) and nitrogen dioxide (NO<sub>2</sub>) with 90-95% of the NO<sub>x</sub> occurring in the form of NO. In a SNCR system, aqueous ammonia (or urea) is injected into the system at a point where the flue gas is at the correct temperature.

The chemical equation for the SNCR reaction is as follow:

Nitrogen Oxide reduction:



Nitrogen Dioxide reduction:



Aqueous ammonia has a higher efficiency in a gas stream having a temperature between 1,600°F and 2,000°F whereas urea has a higher efficiency in a gas stream having a temperature between 1,650°F and 2,100°F. Below the effective temperature range ammonia present in the gas stream does not react with the NO<sub>x</sub> and passes out the stack. This is known as ammonia slip. Other causes of ammonia slip are excess amounts of ammonia injected into the system, insufficient residence time as well as insufficient mixing of ammonia in the system. Ammonia slip results in an increase in ammonia emissions and can also result in producing a detached plume at the stack, causing opacity compliance issues.

Dragon will be allowed to inject aqueous ammonia, or urea, into the calciner. The option of aqueous ammonia or urea allows Dragon the flexibility to tailor the chemical injected to the calciner temperature.

On November 1 and 2, 2006, an ammonia slip determination test was performed on the kiln stack. Three runs were performed with the raw mill on and three runs were performed with the raw mill off. The average results of the test are as follows:

	Raw Mill On	Raw Mill Off
ppm <sub>dv</sub> NH <sub>3</sub> @7% O <sub>2</sub>	10.3	22.5
Lb/hr NH <sub>3</sub>	3.2	6.9

Based upon stack test data and performance of other SNCR systems licensed in the State, the Department has determined the following additional emission limits on the cement kiln are appropriate:

	Raw Mill On	Raw Mill Off	Averaging Time
ppm <sub>dv</sub> NH <sub>3</sub> @7% O <sub>2</sub>	20	40	1-hour block
Lb/hr NH <sub>3</sub>	6.3	12.3	1-hour block

Based upon the raw mill operating 80% of the time and continuous operation (i.e., 8,760 hours per year) of the kiln, Dragon will have annual NH<sub>3</sub> emissions of 32.9 tons per year; 22.1 tons per year while the raw mill is on and 10.8 tons per year while the raw mill is off.

Additionally, aqueous ammonia shall not be injected into the kiln/calcliner system until the gas temperature in the calcliner is a minimum of 1,600°F as demonstrated by the mid-calcliner thermocouple.

C. Application Classification

The application for Dragon includes a case-by-case determination of an emission limit for a pollutant not previously licensed. Therefore the license is considered to be a Part 70 Significant License Modification and is being processed as such.

D. Revised Annual Emission

Dragon has the following annual emissions (12 month rolling total), based on 8,760 hours of kiln and cooler operation (20% of that time with the raw mill off).

**Annual Emissions**  
(used to calculate the annual license fee)

	PM	PM <sub>10</sub>	SO <sub>2</sub>	NO <sub>x</sub> *	CO	VOC	NH <sub>3</sub>
Kiln	41.17	41.17	306.60	1533.00	843.20	57.70	32.9
Cooler	40.08	40.08	--	--	--	--	--
<b>Total TPY</b>	<b>81.3</b>	<b>81.3</b>	<b>306.6</b>	<b>1533.00</b>	<b>843.2</b>	<b>57.7</b>	<b>32.9</b>

\*NO<sub>x</sub> as measured as NO<sub>2</sub>

**ORDER**

The Department hereby grants Part 70 Significant License Modification A-326-70-B-A, subject to the conditions found in Part 70 License A-326-70-A-I, and in addition to the following conditions:

**The following replaces Special Condition (14)E of Air Emission License A-326-70-A-I:**

(14) Portland Cement Kiln System

E. Beginning 180 days after the new cement kiln systems are maintained for an hour above 30 TPH (tons per hour) of dry feed to the kiln, emissions from the cement kiln system shall not exceed the limits set forth below. Emissions from the kiln system include emissions from the in-line raw mill and alkali (preheater) bypass that are emitted from the common main kiln stack.

Pollutant	Limit	Units	Averaging Time	Method of Compliance Demonstration	Origin & Authority
PM	9.4	lb/hr	N/A	Stack Test, Method 5 (front-half only), once every other year for PM	MEDEP Chapter 115, BACT 40 CFR 63, Subpart LLL
	0.3	lb/ton dry kiln feed	N/A		
PM <sub>10</sub>	9.4	lb/hr	N/A	When requested by the Department	MEDEP Chapter 115 BACT
	0.3	lb/ton dry kiln feed	N/A		
SO <sub>2</sub>	1,000 <sup>3</sup>	lb/hr	1-hour block average	CEM	MEDEP Chapter 115, BACT
	70.0	lb/hr	90-day rolling average <sup>1</sup>		
	306.6	ton/yr	12-month rolling <sup>1</sup> total, calculated at the end of each calendar month.		
NO <sub>x</sub> <sup>4</sup>	1,200.0 <sup>3</sup>	lb/hr	1-hour block average	CEM	MEDEP Chapter 115, BACT
	350.0	lb/hr	90-day rolling average <sup>1</sup>		
	1,533.0	ton/yr	12-month rolling <sup>1</sup> total, calculated at the end of each calendar month.		
CO	500.0 <sup>3</sup>	lb/hr	1-hour block average	CEM	MEDEP Chapter 115, BACT
	192.5	lb/hr	90-day rolling average <sup>1</sup>		
	843.2	ton/yr	12-month rolling <sup>1</sup> total, calculated at the end of each calendar month.		
VOC	13.13	lb/hr	1-hour block average	Stack test and emission factor	MEDEP Chapter 115, BACT
	57.5	ton/yr	12-month rolling <sup>1</sup> total, calculated at the end of each calendar month.		

Dioxin/Furans	0.40 <sup>2</sup>	ng TEQ/dscm	@7% O <sub>2</sub> and PMCD inlet temperature ≤ 400°F <sup>2</sup>	Stack Test	40 CFR Part 63 Subpart LLL
NH <sub>3</sub> (raw mill on)	20 <sup>3</sup>	ppm <sub>dv</sub> corrected to 7%O <sub>2</sub>	1-hour block average	Stack test once every other year.	MEDEP Chapter 115, BACT
	6.3 <sup>3</sup>	lb/hr			
NH <sub>3</sub> (raw mill off)	40 <sup>3</sup>	ppm <sub>dv</sub> corrected to 7%O <sub>2</sub>	1-hour block average	Stack test once every other year.	MEDEP Chapter 115, BACT
	12.3 <sup>3</sup>	lb/hr			

1. Rolling averages are calculated as consecutive days or months and include operating and non-operating days
2. Unless Dragon can demonstrate compliance with the allowable 40 CFR 63 Subpart LLL dioxin/furan limitation for particulate matter control device (PMCD) inlet temperatures greater than 400°F.
3. **Enforceable by State Only**
4. NO<sub>x</sub> reported as NO<sub>2</sub>

**The following replaces Special Condition (23)A of Air Emission License A-326-70-A-I:**

- (23) A. The following **periodic** records shall be kept:
1. Summary page of the results of stack testing for PM, PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>x</sub>, CO, VOC and NH<sub>3</sub> for the main kiln stack when performed.
  2. Summary page of the results of bi-ennial stack testing for particulate matter emissions from the clinker cooler.
  3. Summary page of the results of stack testing for dioxin/furans required by Subpart LLL every 2.5 years.
  4. Summary of the daily visual observations of the finish mill.
  5. Summary of the periodic Method 9 performance tests on the finish mill.
  6. Summary of the annual inspection of the components of the combustion system and raw mill.
  7. Summary of the daily records of fuel use in the kiln including:
    - a. Gallons of #2 fuel oil,
    - b. Gallons of #4 fuel oil,
    - c. Gallons of specification waste oil and non-specification waste oil,
    - d. Tons of coal,
    - e. Tons of petroleum coke,
    - f. Tons of tires or tire chips.
  8. Summary of the quantity of off-site waste water, including landfill leachate and petroleum contaminated waters, used each day.

**The following are new conditions to Part 70 License A-326-70-A-I:**

(36) Aqueous ammonia shall not be injected into the kiln/calcliner system until the gas temperature in the calciner is a minimum of 1,600°F as demonstrated by the mid-calciner thermocouple. [MEDEP Chapter 140 BPT]

(37) **Air Toxics Emissions Statement**

If Dragon exceeds the thresholds for HAPs listed in Appendix A of MEDEP Chapter 137 in an inventory year, in accordance with MEDEP Chapter 137, the licensee shall report, no later than July 1 every three years (2005, 2008, 2011, etc.) or as otherwise stated in Chapter 137, the information necessary to accurately update the State's toxic air pollutants emission inventory by means of a computer program supplied by the Department or a written emission statement containing the information required in MEDEP Chapter 137.

Reports and questions on the Air Toxics emissions inventory portion should be directed to:

Attn: Toxics Inventory Coordinator  
Maine DEP  
Bureau of Air Quality  
17 State House Station  
Augusta, ME 04333-0017  
Phone: (207) 287-2437

DONE AND DATED IN AUGUSTA, MAINE THIS                      DAY OF                      2007.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

By: \_\_\_\_\_  
                    DAVID P. LITTELL, COMMISSIONER

**The term of this amendment shall be concurrent with the term of Air Emission License A-326-70-A-I.**

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of Part 70 application January 31, 2007

Date of Part 70 application acceptance February 20, 2007

Date filed with Board of Environmental Protection \_\_\_\_\_

This Order prepared by Mark E. Roberts, Bureau of Air Quality