



DEPARTMENT ORDER

**Dragon Products Company, LLC
Knox County
Thomaston, Maine
A-326-77-10-A**

**Departmental
Findings of Fact and Order
New Source Review
NSR #10**

FINDINGS OF FACT

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

I. REGISTRATION

A. Introduction

FACILITY	Dragon Products Company, LLC
LICENSE TYPE	06-096 C.M.R. ch. 115, Minor Modification
NAICS CODES	32731
NATURE OF BUSINESS	Cement Manufacturing
FACILITY LOCATION	U.S. Route 1, Thomaston, Maine

B. NSR License Description

Dragon Products Company, LLC (Dragon) has requested a New Source Review (NSR) license to replace an existing 140 HP auxiliary kiln drive reciprocating internal combustion engine with a new 139 HP auxiliary kiln drive reciprocating internal combustion engine.

C. Emission Equipment

The following equipment is addressed in this NSR license:

Engine

Equipment	Max. Heat Input Capacity (MMBtu/hr)	Max. Firing Rate (gal/hr)	Output	Fuel Type, % sulfur	Mfr. Date	Install. Date
Auxiliary Kiln Drive Engine	1.0	8.0	139 HP	Distillate Fuel, 0.0015%	2011	2017

D. Definitions

Distillate Fuel. For the purposes of this license, *distillate fuel* means the following:

- Fuel oil that complies with the specifications for fuel oil numbers 1 or 2, as defined by the American Society for Testing and Materials (ASTM) in ASTM D396;
- Diesel fuel oil numbers 1 or 2, as defined in ASTM D975;
- Kerosene, as defined in ASTM D3699;
- Biodiesel, as defined in ASTM D6751; or
- Biodiesel blends, as defined in ASTM D7467.

E. Application Classification

All rules, regulations, or statutes referenced in this air emission license refer to the amended version in effect as of the issued date of this license.

The application for the replacement Auxiliary Kiln Drive Engine does not violate any applicable federal or state requirements and does not reduce monitoring, reporting, testing, or recordkeeping requirements.

The modification of a major source is considered a major or minor modification based on whether or not expected emissions increases exceed the “Significant Emission Increase” levels as given in *Definitions Regulation*, 06-096 Code of Maine Rules (C.M.R.) ch. 100.

Pollutant	New Auxiliary Kiln Drive Engine Potential Emissions* (ton/year)	Significant Emissions Increase Levels (ton/year)
PM	0.53	25
PM ₁₀	0.53	15
PM _{2.5} **	0.58	10
SO ₂	0.01	40
NO _x	19.32	40
CO	4.16	100
VOC	1.53	40
CO _{2e}	<75,000	75,000

* Projected emissions were calculated based on continuous use. Actual emissions are expected to be lower.

** Upon review of available emission factors for condensable PM_{2.5}, EPA’s AP-42 Table 1.3-2 (5/2010) identifies a condensable PM_{2.5} emission factor of 1.3 lb/1000 gallons for distillate fuel fired in external combustion sources. AP-42 identifies no emission factor for condensable PM_{2.5} for internal combustion sources such as this engine. Estimating both filterable and condensable PM_{2.5} emissions from the new, distillate fuel-fired Auxiliary Kiln Drive Engine assuming all

filterable PM is PM_{2.5} and using this emission factor to quantify condensable PM_{2.5}, the total is 0.58 ton/year, well below the significant emissions increase level for PM_{2.5}.

Secondary formation of PM_{2.5} due to the precursor emissions of NO_x and SO₂ are considered in Table III-1 of “*Guidance for PM_{2.5} Permit Modeling*” (USEPA, 2014), which presents Significant Emission Rate (SER) values for primary PM_{2.5} as well as for precursor pollutants. Since the proposed increases for this modification are well below the identified SERs for direct PM_{2.5}, NO_x, and SO₂, the Department considers secondary formation of PM_{2.5} does not contribute appreciably to the total. The Department concludes that this modification is not major for PM_{2.5}, and this pollutant will not be addressed further in this license.

Note: The above values are for the new Auxiliary Kiln Drive Engine only. None of the other equipment at the facility is affected by this NSR license.

Therefore, this NSR license is determined to be a minor modification under *Minor and Major Source Air Emission License Regulations*, 06-096 C.M.R. ch. 115 since the changes being made are not addressed or prohibited in the Part 70 air emission license. An application to incorporate the requirements of this NSR license into the Part 70 air emission license shall be submitted no later than 12 months from commencement of the requested operation.

II. BEST PRACTICAL TREATMENT (BPT)

A. Introduction

In order to receive a license, the applicant must control emissions from each unit to a level considered by the Department to represent Best Practical Treatment (BPT), as defined in *Definitions Regulation*, 06-096 C.M.R. ch. 100. Separate control requirement categories exist for new and existing equipment as well as for those sources located in designated non-attainment areas.

BPT for new sources and modifications requires a demonstration that emissions are receiving Best Available Control Technology (BACT), as defined in 06-096 C.M.R. ch. 100. BACT is a top-down approach to selecting air emission controls considering economic, environmental and energy impacts.

B. Auxiliary Kiln Drive Engine

1. Project Description

Dragon is proposing to replace an existing 140 HP Auxiliary Kiln Drive Engine with a new 139 HP Auxiliary Kiln Drive Engine. The kiln drive engine is used to keep the kiln rotating in emergency situations such as a power outage or failure of the primary drive system. It is also used in non-emergency situations, such as during kiln startup and shutdown. The engine is used to rotate the kiln at slow speeds when there is no kiln

feed and the kiln is not producing clinker. The rotation is required for periods of startup, shutdown, and malfunction to avoid thermal damage to the outer shell or internal refractory.

Dragon has proposed to replace the existing kiln drive engine with a US EPA certified Tier 3, Caterpillar C4.4 ACERT engine, rated at 139 HP (approximately 1.0 MMBtu/hr), and manufactured in 2011.

2. BACT

a. Particulate Matter (PM/PM₁₀)

Particulate matter emissions from distillate fuel-fired engines are generally controlled through proper operation and maintenance. Additionally, this engine will be subject to 40 C.F.R. Part 60, Subpart IIII, which means it is required to meet EPA emission standards for stationary engines as discussed below. BACT for PM/PM₁₀ emissions from the Auxiliary Kiln Drive Engine shall be proper operation and maintenance of the unit and installation of an EPA certified stationary engine as required in 40 C.F.R. § 60.4204(b).

b. Sulfur Dioxide (SO₂)

For engines of this size that fire distillate fuel, the use of wet-scrubbers or other SO₂ add-on control methods would not be economically feasible. The most practical method for limiting SO₂ emissions is the use of low sulfur fuel, such as distillate fuel with a sulfur content no greater than 0.0015% by weight. BACT for SO₂ emissions from the Auxiliary Kiln Drive Engine shall be the use of distillate fuel with a sulfur content no greater than 0.0015% by weight and installation of an EPA certified stationary engine as required in 40 C.F.R. § 60.4204(b).

c. Nitrogen Oxides (NO_x)

Potentially available control options for reducing emissions of NO_x from distillate fuel-fired engines include combustion controls, selective catalytic reduction (SCR), and non-selective catalytic reduction (NSCR). Combustion controls are typically implemented through design features such as electronic engine controls, injection systems, combustion chamber geometry, and turbocharging systems. Most new engines are designed with these features as standard equipment.

SCR is a post-combustion NO_x reduction technology that uses ammonia to react with NO_x in the gas stream in the presence of a catalyst to form nitrogen and water. SCR would not be economically feasible for an engine of this size.

NSCR is another post-combustion NO_x reduction technology that uses a catalyst to convert CO, NO_x, and hydrocarbons into carbon dioxide, nitrogen, and water without the use of an additional reagent. Engines operating with NSCR require strict air-to-fuel control to maintain high reduction effectiveness without increasing hydrocarbon emissions. To achieve effective NO_x reduction performance with NSCR, the engine may need to run with a richer fuel adjustment than normal, which means that the engine would have to run using less air per unit of fuel being combusted than they otherwise would. NSCR would not be economically feasible for an engine of this size, and would not be technically feasible because engines firing distillate fuel inherently operate lean and therefore have exhaust oxygen levels in excess of those required to effectively use NSCR.

BACT for NO_x emissions from the Auxiliary Kiln Drive Engine shall be the use of good combustion controls, proper operation and maintenance, and installation of an EPA certified stationary engine as required by 40 C.F.R. § 60.4204(b).

d. Carbon Monoxide (CO) and Volatile Organic Compounds (VOC)

CO and VOC emissions are a result of incomplete combustion, caused by conditions such as insufficient residence time or limited oxygen availability. CO and VOC emissions from distillate fuel-fired engines are generally controlled through proper operation and maintenance. Oxidation catalysts have been used on large generators to reduce CO and VOC emission levels in the exhaust, but use of an oxidation catalyst on an engine of this size would not provide a significant environmental benefit and thus would not be economically feasible.

BACT for CO and VOC for the Auxiliary Kiln Drive Engine shall be proper operation and maintenance and installation of an EPA certified stationary engine as required in 40 C.F.R. § 60.4204(b).

The BACT emission limits for the Auxiliary Kiln Drive Engine are based on the following:

PM/PM ₁₀	- 0.12 lb/MMBtu from 06-096 C.M.R. ch. 103
SO ₂	- combustion of distillate fuel with a maximum sulfur content not to exceed 15 ppm (0.0015% sulfur by weight)
NO _x	- 4.41 lb/MMBtu from AP-42 table 3.3-1 dated 10/96
CO	- 0.95 lb/MMBtu from AP-42 table 3.3-1 dated 10/96
VOC	- 0.35 lb/MMBtu from AP-42 table 3.3-1 dated 10/96
Opacity	- 06-096 C.M.R. ch. 115, BACT

The BACT emission limits for the Auxiliary Kiln Drive Engine are the following:

Unit	PM (lb/hr)	PM₁₀ (lb/hr)	SO₂ (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Auxiliary Kiln Drive Engine (1.0 MMBtu/hr) Distillate fuel	0.12	0.12	0.01	4.41	0.95	0.35

Visible emissions from the Auxiliary Kiln Drive Engine shall not exceed 20% opacity on a six-minute block average basis.

3. 40 C.F.R. Part 60, Subpart III

Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, 40 C.F.R. Part 60, Subpart III is applicable to the Auxiliary Kiln Drive Engine since the unit was ordered after July 11, 2005, and manufactured after April 1, 2006. [40 C.F.R. § 60.4200] By meeting the requirements of 40 C.F.R. Part 60, Subpart III, the unit also meets the requirements found in the *National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*, 40 C.F.R. Part 63, Subpart ZZZZ. [40 C.F.R. § 63.6590(c)]

A summary of the currently applicable federal 40 C.F.R. Part 60, Subpart III requirements is listed below.

a. Manufacturer Certification Requirement

The engine shall be certified by the manufacturer as meeting the emission standards for new nonroad compression ignition engines found in 40 C.F.R. § 60.4201. [40 C.F.R. § 60.4204(b)]

b. Ultra-Low Sulfur Fuel Requirement

The fuel fired in the engine shall not exceed 15 ppm sulfur (0.0015% sulfur), except that any existing fuel purchased (or otherwise obtained) prior to October 1, 2010, may be used until depleted. [40 C.F.R. § 60.4207(b)]

c. Operation and Maintenance Requirements

The engine shall be operated and maintained according to the manufacturer's emission-related written instructions or procedures developed by Dragon that are approved by the engine manufacturer. Dragon may only change those emission-related settings that are permitted by the manufacturer. [40 C.F.R. § 60.4211(a)]

C. Incorporation Into the Part 70 Air Emission License

The requirements in this 06-096 C.M.R. ch. 115 New Source Review license shall apply to the facility upon issuance. Per *Part 70 Air Emission License Regulations*, 06-096 C.M.R. ch. 140 § 1(C)(8), for a modification at the facility that has undergone NSR requirements or been processed through 06-096 C.M.R. ch. 115, the source must apply for an amendment to their Part 70 license within one year of commencing the proposed operations, as provided in 40 C.F.R. Part 70.5.

D. Annual Emissions

Dragon shall be restricted to the following annual emissions, based on a 12-month rolling total. The tons per year limits were calculated based on 8,760 hours/year operation for the PM emissions from the Kiln System and Clinker Cooler; previous tpy limits for SO₂, NO_x, CO, and VOC from the Kiln System and Clinker Cooler (established in the licensing of the wet-to-dry process modification); 100 hours/year operation for each emergency generator; 8,760 hours/year operation for the Auxiliary Kiln Drive Engine; and a maximum annual production limit of 75,000 tons of slag through the Slag Dryer:

Total Licensed Annual Emissions for the Facility
Tons/year
 (used to calculate the annual license fee)

	<u>PM</u>	<u>PM₁₀</u>	<u>SO₂</u>	<u>NO_x</u>	<u>CO</u>	<u>VOC</u>	<u>NH₃</u>
Kiln System	41.2	41.2	306.6	1,533.0	843.2	57.5	32.9
Clinker Cooler	40.1	40.1	--	--	--	--	--
Emergency Generator	0.02	0.02	0.0003	0.8	0.2	0.1	--
Quarry #1 Pump	0.01	0.01	0.0001	0.4	0.1	0.03	--
Auxiliary Kiln Drive Engine	0.53	0.53	0.01	19.32	4.16	1.53	--
Slag Dryer	--	--	0.02	2.8	2.4	0.2	--
Total TPY	81.9	81.9	306.6	1,556.3	850.1	59.4	32.9

III. AMBIENT AIR QUALITY ANALYSIS

Dragon previously submitted an ambient air quality analysis demonstrating that emissions from the facility, in conjunction with all other sources, do not violate ambient air quality standards (See license A-326-71-U-A/R). An additional ambient air quality analysis is not required for this NSR license.

ORDER

Based on the above Findings and subject to conditions listed below, the Department 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 Department hereby grants New Source Review License A-326-77-10-A pursuant to the preconstruction licensing requirements of 06-096 C.M.R. ch. 115 and subject to the specific conditions below.

Severability. The invalidity or unenforceability of any provision of this License or part thereof 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) Auxiliary Kiln Drive Engine

A. Emissions shall not exceed the following [06-096 C.M.R. ch. 115, BACT]:

Unit	PM (lb/hr)	PM₁₀ (lb/hr)	SO₂ (lb/hr)	NO_x (lb/hr)	CO (lb/hr)	VOC (lb/hr)
Auxiliary Kiln Drive Engine (1.0 MMBtu/hr) Distillate fuel	0.12	0.12	0.01	4.41	0.95	0.35

B. Visible emissions from the Auxiliary Kiln Drive Engine shall not exceed 20% opacity on a six-minute block average basis. [06-096 C.M.R. ch. 115, BACT]

C. The Auxiliary Kiln Drive Engine shall meet the applicable requirements of 40 C.F.R. Part 60, Subpart III, including the following: [incorporated under 06-096 C.M.R. ch. 115, BACT]

1. **Manufacturer Certification**

The engine shall be certified by the manufacturer as meeting the emission standards for new nonroad compression ignition engines found in §60.4201. [40 C.F.R. § 60.4204(b)]

2. Ultra-Low Sulfur Fuel

The fuel fired in the engine shall not exceed 15 ppm sulfur (0.0015% sulfur), except that any existing fuel purchased (or otherwise obtained) prior to October 1, 2010, may be used until depleted. Compliance with the fuel sulfur content limit shall be based on fuel records from the supplier documenting the type of fuel delivered and the sulfur content of the fuel. [40 C.F.R. § 60.4207(b) and 06-096 C.M.R. ch. 115]

3. Operation and Maintenance

The engine shall be operated and maintained according to the manufacturer's emission-related written instructions or procedures developed by Dragon that are approved by the engine manufacturer. Dragon may only change those emission-related settings that are permitted by the manufacturer. [40 C.F.R. § 60.4211(a)]

(2) Dragon shall submit an application to incorporate this NSR license into the facility's Part 70 air emission license no later than 12 months from commencement of the requested operation. [06-096 C.M.R. ch. 140 § 1(C)(8)]

DONE AND DATED IN AUGUSTA, MAINE THIS 29 DAY OF November, 2017.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: Paul Mercer
PAUL MERCER, COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: September 18, 2017

Date of application acceptance: September 19, 2017

Date filed with the Board of Environmental Protection:

This Order prepared by Benjamin Goundie, Bureau of Air Quality.

