PAUL R. LEPAGE
GOVERNOR

PATRICIA W. AHO
COMMISSIONER

PIONEER PLASTICS CORPORATION	)	**DEPARTMENTAL**
ANDROSCOGGIN COUNTY	)	**FINDING OF FACT AND ORDER**
AUBURN, MAINE	)	**NEW SOURCE REVIEW**
A-448-77-8-A	)	**NSR # 8**

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.), §344 and §590, the Maine Department of Environmental Protection (Department) finds the following facts:

I. REGISTRATION

A. Introduction

Pioneer Plastics Corporation (Pioneer) operates a manufacturing plant in Auburn, Maine. The principal products are Pionite, a decorative laminate used for counter tops and furniture, and low pressure decorative laminates. Pioneer has requested an amendment to their air emissions license, A-448-70-A-A/I issued April 20, 2004. This amendment requests the installation and operation of a regenerative thermal oxidizer (RTO #1) that will control VOC and HAP emissions from their reactors (emission units K1 – K8) and will also incinerate the liquid distillate by-product stream generated by polyester resin production. The unit will meet the applicable regulations of 40 CFR Part 60 and Part 63 as described in Section II.

FACILITY	PIONEER PLASTICS CORPORATION (PIONEER)
LICENSE NUMBER	A-448-77-8-A
LICENSE TYPE	06-096 CMR 115, New Source Review Minor Modification
NAICS CODES	325211, 322222, 326130
NATURE OF BUSINESS	Manufacturer of decorative laminate, melamine coated paper, and specialty resins
FACILITY LOCATION	Auburn, Maine

B. Emission Equipment

The following equipment is addressed in this air emission license:

Thermal Oxidizer

Equipment	Maximum Capacity (MMBtu/hr)	Maximum Firing Rate (scf/hr)	Fuel Type	Install. Date	Stack Height (ft)
RTO #1	1.5 MMBtu/hr	1500 scf/hr	Natural gas	2014	50

C. Application Classification

A new emission unit at a major source is considered a major modification based on whether or not expected emission increases exceed the "Significant Emission Increase Levels" as defined in the Department's regulations. The emissions increases for a new source are determined by the maximum future license allowed emissions, as follows:

Pollutant	Potential-to-Emit from the RTO (TPY)	Sig. Level
PM	1.4	25
PM_{10}	1.4	15
$PM_{2.5}$	1.4	15
SO_2	0.3	40
NO_x	4.3	40
CO	1.0	100
VOC	17.5	40
CO_2e	<75,000	75,000

Therefore, the modification is minor for all pollutants. Since all emissions associated with this modification will increase, all criteria pollutants are subject to Best Available Control Technology (BACT) requirements. 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 startup of the new RTO #1.

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 CMR 100 (as amended). 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 *Definitions Regulation*, 06-096 CMR 100 (as amended). BACT is a top-down approach to selecting air emission controls considering economic, environmental and energy impacts.

B. Amendment Description

Pioneer operates a manufacturing plant in Auburn, Maine. Pioneer currently utilizes a 39.5 MMBtu/hr Boiler #5/Thermal Oxidizer to treat volatile organic compound (VOC) and hazardous air pollutant (HAP) laden emission streams from its manufacturing process. This unit also treats a non-hazardous distillate by-product that is controlled primarily for odor. In an effort to reduce fuel usage and emissions from the facility, Pioneer has proposed to install a 3,500 standard cubic feet per minute (SCFM) Regenerative Thermal Oxidizer (RTO #1) that fires natural gas and has a maximum heat input capacity of 1.5 MMBtu/hr to treat emissions from the K1-K8 reactors and treat the non-hazardous distillate stream. The RTO was manufactured by GEOENERGY out of Seattle, Washington in 2000. The unit will be installed behind the Specialty Resins department (not in the Boiler House), and will control all emissions from the eight reactors (K1 – K8). This unit will also combust the non-hazardous distillate by-product stream generated by the polyester reactors (K4 – K8) that is currently burned in the Boiler #5/Thermal Oxidizer.

The existing large Boiler #5/Thermal Oxidizer will continue to operate as a control device for the solvent treaters and coaters, P4, C4, P5 and as a potential back-up control device for the emission units K1-K8. Pioneer anticipates that this change will result in a net decrease in actual emissions, due to the improved efficiency of the new unit and a reduction in the load to the current existing thermal oxidizer.

Therefore, this amendment will allow Pioneer to install and operate an RTO that will control VOC and HAP emissions from the facility's reactors (emission units K1 –

K8) and will also incinerate the liquid distillate by-product stream generated by polyester resin production.

C. Federal Regulation Review

1. **New Source Performance Standards Applicability**

The RTO is expected to be subject to 40 CFR Part 60, Subpart DDDD *Emissions Guidelines and Compliance Times for Commercial and Industrial Solid Waste Incineration Units* (CISWI). This designation as a "solid waste incinerator" is due to burning/treating of the non-hazardous distillate by-product generated from the polyester resin production. The unit, manufactured in 2000, is considered an existing unit based on EPA's previous determinations that "neither relocation of an existing source nor change in ownership, by itself, triggers new source under the NSPS. Therefore, in general, relocation of an existing source does not trigger new source".

To meet the requirements of CISWI, Pioneer is subject, but not limited, to the following found in §63.7505:

(a) The facility must be in compliance with the emission limits (including operating limits) and the work practice standards in this subpart at all times, except during periods of startup, shutdown, and malfunction.

(b) The facility must always operate and maintain the affected source, including air pollution control and monitoring equipment, according to the provisions in § 63.6(e)(1)(i).

(c) The facility can demonstrate compliance with any applicable emission limit using fuel analysis if the emission rate calculated according to § 63.7530(d) is less than the applicable emission limit. Otherwise, the facility must demonstrate compliance using performance testing.

(d) If the facility demonstrate compliance with any applicable emission limit through performance testing, the facility must develop a site-specific monitoring plan according to the requirements in paragraphs (d)(1) through (4) of this section. This requirement also applies to the facility if it petitions the EPA Administrator for alternative monitoring parameters under § 63.8(f).

2. **National Emissions Standards for Hazardous Air Pollutants Applicability**

As is required for the existing Boiler #5/Thermal Oxidizer, the RTO will be subject to the requirements of National Emission Standards for Hazardous Air Pollutants (NESHAP) 40 CFR Part 63, Subpart FFFF, *National Emission Standard for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing* (MON); Subpart EEEE, *National Emission Standards for Hazardous Air*

Pollutants: Organic Liquids Distribution (OLD); and Subpart OOO, *National Emission Standards for Hazardous Air Pollutant Emissions: Manufacture of Amino/Phenolic Resins.*

In summary, the rules that will apply to this new RTO unit include:

- 40 CFR Part 63, Subpart FFFF (MON)
- 40 CFR Part 63, Subpart EEEE (OLD)
- Amino-Phenolic 40 CFR Part 63, Subpart OOO
- 40 CFR Part 60, Subpart DDDD * (CISWI)

* Note: (Determined by EPA Region 1 based on construction date of the RTO to be subject to DDDD as an existing source. The RTO was manufactured in 2000)

Pioneer will continue to meet the requirements of the applicable MACTs as described in their current Air Emissions License, A-448-71-A-N. Pioneer will be subject to a comprehensive emissions testing program to prove effectiveness of the new unit, which will include MACT compliance, VOC destruction efficiency, as well as CISWI compliance when required.

D. BACT Review and Identification of Control Technologies

RTOs are used to reduce emissions from a variety of stationary sources. RTOs use a high-density media such as a ceramic packed bed still hot from a previous cycle to preheat an incoming VOC-laden emission stream. The preheated, partially-oxidized gases then enter a combustion chamber where they are heated by auxiliary fuel (natural gas) combustion to a final oxidation temperature typically between 1400 - 1500 °F and maintained at this temperature to achieve maximum VOC destruction. The treated hot gases exit this chamber and are directed to one or more different ceramic-packed beds cooled by an earlier cycle. Heat from the treated gases is absorbed by these beds before the gases are exhausted to the atmosphere. The reheated packed bed then begins a new cycle by heating a new incoming waste gas stream. Regulated pollutants emitted by this treatment process include products of combustion: particulate matter (PM), nitrogen oxides (NOx), carbon monoxide (CO), sulfur dioxide (SO_2), and volatile organic compounds (VOC).

The technologies listed in the following table are determined to be potentially available and technically feasible control technologies for emissions from combustion sources. The technologies are listed by order of effectiveness and described in greater detail in following subsections.

Potentially Available Control Technologies for Emissions from Combustion Sources

Pollutant	Control Technology	Effectiveness
PM/PM_{10}/$PM_{2.5}$	Electrostatic Precipitator (ESP)	99% - 99.9%
	Fabric Filtration	99% - 99.9%
	Mechanical Collectors	80-99%
	Scrubbers	50-99%
	Good Combustion Practices	--
	Clean Fuels	--
	Selective Catalytic Reduction (SCR)	70-90%
NOx	Selective Non-catalytic Reduction (SNCR)	30-50%
	Flue Gas Recirculation	60-90% (when used in combination)
	Low NOx Burners	
	Staged Combustion	--
	Good Combustion Practices	--
	Flue Gas Desulfurization (FDG)	> 95%
SO_2	Clean Fuels	--
	Thermal Oxidizer	98-99.9%
	Regenerative Thermal Oxidizer	95-99%
CO and VOC	Scrubbers	50-99%
	Catalytic Incinerator	95%
	Good Combustion Practices	--

Control of Particulate Matter (PM)

Particulate matter (PM) from fuel combustion is formed from non-combustible material (ash) in the fuel and from incomplete combustion. Add-on pollution control equipment for the control of PM includes electrostatic precipitators, fabric filtration, mechanical collectors, and scrubbers. Due to the small size of this RTO and the relatively small amount of PM emissions, the installation of add-on pollution control equipment is not economical. Good combustion practices reduce the products of incomplete combustion including PM during operation. The combustion of clean fuels means burning fuels with low amounts of contaminants that could become airborne as PM following combustion. Good combustion practices and the use of natural gas, a clean fuel, to fire the RTO are technically feasible to control PM emissions.

Pioneer proposes good combustion practices and burning clean fuels as BACT for PM emissions from the RTO.

Control of Nitrogen Oxides (NOx)

NOx is generated in one of three mechanisms; fuel NOx, thermal NOx, and prompt NOx. Fuel NOx is produced by oxidation of nitrogen in the fuel source. Combustion of fuels with high nitrogen content produces greater amounts of NOx than those with low nitrogen content such as distillate oil and natural gas. Thermal NOx is formed by the fixation of nitrogen (N_2) and oxygen (O_2) in the high temperature flame zone near the burners. Prompt NOx forms from the oxidation of hydrocarbon radicals near the combustion flame and produces an insignificant amount of NOx.

Potential control technologies for NOx emissions include: (1) add-on controls (Selective Catalytic Reduction and Selective Non-Catalytic Reduction); (2) flue gas recirculation; (3) low NOx burners; (4) staged combustion; (5) good combustion practices; and (6) combustion of clean fuels.

Add-on Controls - Add-on controls to treat NOx emissions would not be appropriate or economically feasible for an RTO.

Combustion of Clean Fuels -The combustion of clean fuels to minimize NOx emissions is accomplished by burning fuels with less fuel bound nitrogen. The RTO will burn natural gas which has a low nitrogen content and the VOC gas stream that is oxidized also has a low nitrogen content.

Good Combustion Practices – The RTO will be operated and maintained so as to limit the formation of thermal NOx to the greatest extent practicable. Pioneer proposes following good combustion practices and combusting a clean burning fuel as BACT for the RTO.

Control of Sulfur Dioxide (SO_2)

Sulfur dioxide (SO_2) is formed from sulfur in the fuel during combustion. Pollution control options to reduce the emissions of sulfur dioxide (SO_2) can be achieved through either flue gas desulfurization by means of wet scrubbing whereby a caustic solution is used to remove sulfur from the flue gas, or restricting the sulfur content of the fuel. The costs of a wet scrubbing system for the RTO including the associated annual operating cost for caustic, energy, operation and maintenance does not make this option economically feasible. The other control option is to limit the sulfur content of the fuel burned in the RTO. The RTO will burn natural gas which has a low sulfur content and the VOC gas stream that is oxidized will also have a sufficiently low sulfur content. Pioneer proposes combusting a clean burning fuel as BACT for the RTO.

Control of Carbon Monoxide (CO) and Volatile Organic Compounds (VOCs)

Carbon monoxide (CO) and volatile organic compound (VOC) emissions result from incomplete combustion of fuels. CO and VOC emissions result when there is insufficient residence time or oxygen available near the hydrocarbon molecule during combustion to complete the final step in hydrocarbon oxidation. Add-on control technology is not needed to control VOC and CO emissions from small combustion units and it should be noted that the RTO is already providing pollution control for the VOC process emission stream.

Properly maintaining the RTO will keep VOC and CO emissions at a minimum. Proper maintenance includes keeping the air/fuel ratio at the manufacturer's specified setting, and having the proper air and fuel pressures at the burner. Pioneer proposes applying good combustion efficiency and maintenance practices as BACT for the RTO.

E. BACT Summary

Pioneer shall combust natural gas, a relatively clean burning fuel with an inherently low sulfur content, as BACT for PM, SO_2 and NOx emissions. Pioneer shall operate the RTO according to manufacturer's recommendations and will employ good combustion practices to minimize PM, CO, and VOC emissions.

The RTO shall comply with emission limits that meet the requirements of 40 CFR Part 60, Subpart DDDD (CISWI) as part of BACT.

The following table shows the emissions associated with the new RTO and the regulatory reference from where the performance standards and mass emission limits were derived.

Pollutant	Performance Standard (Identify lb/MMBtu, ppm, gr/dscf, etc.)	Averaging Period	Regulatory Reference	Mass Emission Rate (lb/hr)	Annual (TPY)
PM/PM_{10}/ $PM_{2.5}$ **	70 mg/DSCM	3-hr average	CISWI Subpart DDDD	0.32	1.4
SO_{2}**	20 ppmdv@ 7% O2	3-hr average	CISWI Subpart DDDD	0.1	0.3
NO_{x} **	388 ppmdv@ 7% O2	3-hr average	CISWI Subpart DDDD	1.0	4.3
CO **	157 ppmdv@ 7% O2	3-hr average	CISWI Subpart DDDD	0.22	1.0
VOC*	--	--	--	4.0	17.5

Cd	0.004 mg/DSCM	3-hr average	CISWI Subpart DDDD	1.82e-05	--
Pb	0.04 mg/DSCM	3-hr average	CISWI Subpart DDDD	1.82e-04	--
Hg	0.47 mg/DSCM	3-hr average	CISWI Subpart DDDD	2.13e-03	--
Dioxin / Furan (TEQ)	0.41 ng/DSCM	3-hr average	CISWI Subpart DDDD	--	--
Hydrogen chloride	62 ppmdv@ 7% O_2	3-hr average	CISWI Subpart DDDD	0.12	0.54
Opacity	10%	6-minute block average	CISWI Subpart DDDD	--	--
CO_2***	--	--	--	720	3,150

* VOC based on estimated input to incinerator from resin kettle exhausts of 200 #/hour and a rate destruction efficiency of 98%.

** Mass and annual emissions based on estimated gas flow of 3500 SCFM, exhaust O_2 of 19.5% and moisture of 8% using the CISWI limits as max emission rate.

*** CO_2 based on EPA emission factor for natural gas combustion 120,000 lbs/10^6SCF and burner rate of 1.5 MMBTU/hr. Also includes the CO_2 generated from the 98% VOC (as CH_4) combusted and converted to CO_2.

F. Facilty-wide Emissions

Pioneer shall be restricted to the following annual emissions, based on a 12 month rolling total.

Total Licensed Annual Emissions for the Facility
(used to calculate emission fee)

Equipment	**PM**	**PM_{10}**	**SO_2**	**NOx**	**CO**	**VOC**
Boiler #4	33.0	33.0	368.0	99.0	66.0	2.0
Boiler#5/Thermal Oxidizer	52.1	52.1	385.9	103.8	329.0	131.4
Boiler #6	27.7	27.7	135.3	86.6	98.3	6.9
Boiler #7 and #8	0.7	0.7	0.4	6.8	13.7	0.4
Fire Pump	0.3	0.3	0.7	9.9	2.2	0.8
RTO	1.4	1.4	0.3	4.3	1.0	17.5
Totals	**115.2**	**115.2**	**890.6**	**310.4**	**510.2**	**159**

III. AMBIENT AIR QUALITY ANALYSIS

Pioneer 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. An additional ambient air quality analysis is not required for this New Source Review minor modification.

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, and
- will not violate applicable ambient air quality standards, or increment standards either alone or in conjunction with emissions from other sources.

The Department hereby grants this minor modification, A-448-77-8-A, subject to the conditions found in Air Emission License A-448-70-A-A/I and subsequent amendments, in addition to the following conditions:

Pioneer is subject to the following New Source Review conditions.

(1) The RTO shall fire natural gas and shall not exceed the following emission limitations when operating as a Pollution Control Device for the Control of VOCs and HAPs:

A. Emissions shall not exceed the following [40 CFR Part 63, Subpart DDDD, 06-096 CMR 115, BACT]:

Pollutant	Performance Standard (Identify lb/MMBtu, PPM, gr/dscf, etc.)	Averaging Period	Regulatory Reference	Mass Emission Rate (lb/hr)
PM/PM_{10}/ $PM_{2.5}$	70 mg/DSCM	3-hr average	CISWI Subpart DDDD	0.32
SO_2	20 ppmdv@ 7% O2	3-hr average	CISWI Subpart DDDD	0.1
NO_x	388 ppmdv@ 7% O2	3-hr average	CISWI Subpart DDDD	1.0

CO	157 ppmdv@ 7% O2	3-hr average	CISWI Subpart DDDD	0.22
VOC	--	--	--	4.0
Cd	0.004 mg/DSCM	3-hr average	CISWI Subpart DDDD	1.82e-05
Pb	0.04 mg/DSCM	3-hr average	CISWI Subpart DDDD	1.82e-04
Hg	0.47 mg/DSCM	3-hr average	CISWI Subpart DDDD	2.13e-03
Dioxin / Furan (TEQ)	0.41 ng/DSCM	3-hr average	CISWI Subpart DDDD	--
Hydrogen chloride	62 ppmdv@ 7% O_2	3-hr average	CISWI Subpart DDDD	0.12

B. Visible Emissions

Visible emissions from the RTO firing natural gas shall not exceed 10% opacity on a 6 minute block average basis. [06-096 CMR 115, BACT]

(2) The RTO shall meet the New Source Performance Standard (NSPS) requirements of 40 CFR Part 60, Subpart DDDD, *Emissions Guidelines and Compliance Times for Commercial and Industrial Solid Waste Incineration Units*, including but not limited to the following requirements:

- The facility must be in compliance with the emission limits (including operating limits) and the work practice standards in this subpart at all times, except during periods of startup, shutdown, and malfunction.
- The facility must always operate and maintain the affected source, including air pollution control and monitoring equipment, according to the provisions in § 63.6(e)(1)(i).
- The facility can demonstrate compliance with any applicable emission limit using fuel analysis if the emission rate calculated according to § 63.7530(d) is less than the applicable emission limit. Otherwise, the facility must demonstrate compliance using performance testing.
- If the facility demonstrates compliance with any applicable emission limit through performance testing, the facility must develop a site-specific monitoring plan according to the requirements in paragraphs (d)(1) through (4) of this section. This requirement also applies to the facility if it petitions the EPA Administrator for alternative monitoring parameters under § 63.8(f).
- For existing affected sources, the facility must demonstrate initial compliance no later than 180 days after the compliance date that is specified for the source in § 63.7495 and according to the applicable provisions in

§ 63.7(a)(2) as cited in Table 10 to this subpart and according to the performance tests and procedures in § 63.7520.

[40 CFR Part 63, Subpart DDDD]

(3) The RTO shall meet the applicable requirements of the following regulations:
- National Emission Standards for Hazardous Air Pollutants (NESHAP) 40 CFR Part 63, Subpart FFFF, *National Emission Standard for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing*;
- Subpart EEEE, *National Emission Standards for Hazardous Air Pollutants: Organic Liquids Distribution (Non-Gasoline)*; and
- Subpart OOO, *National Emission Standards for Hazardous Air Pollutant Emissions: Manufacture of Amino/Phenolic Resins.*

(4) Pioneer shall submit an application to incorporate this amendment into the Part 70 air emission license no later than 12 months from commencement of the requested operation. [06-096 CMR 140, Section 2(J)(2)(c)]

DONE AND DATED IN AUGUSTA, MAINE THIS 1 DAY OF May 2014.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: Mark Allen Robert Cone for
PATRICIA W. AHO, COMMISSIONER

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: February 18, 2014
Date of application acceptance: February 24, 2014

Date filed with Board of Environmental Protection:

Filed
MAY 02 2014
State of Maine
Board of Environmental Protection

This order prepared by Edwin Cousins, Bureau of Air Quality