



STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

SUS S. KING, JR.
GOVERNOR

EDWARD O. SULLIVAN
COMMISSIONER

PIONEER PLASTICS CORPORATION)
ANDROSCOGGIN COUNTY) DEPARTMENTAL
AUBURN, MAINE) FINDINGS OF FACT AND ORDER
A-448-71-P-A) AIR EMISSION LICENSE
) AMENDMENT #3

After review of the air emission license amendment 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

1. Pioneer Plastics Corporation (Pioneer) operates a manufacturing plant in Auburn, Maine. The principle product is Pionite, a decorative laminate used for counter tops and furniture. Pioneer also manufactures specialty resins both for resale and for use in the production of Pionite. Pioneer was issued Air Emission License A-448-72-K-A/R on August 23, 1995. The license was subsequently amended on May 29, 1996 (A-448-71-M-M) and on March 10, 1997 (A-448-71-O-M).
2. Pioneer has requested an amendment to their Air Emission License to address Reasonably Available Control Technology (RACT) for Volatile Organic Compounds (VOC) as required by Chapter 134 of the Maine Air Regulations.

B. Application Classification

The application for Pioneer is considered to be an amendment to incorporate the VOC RACT requirements as required by Chapter 134 of the Maine Air Regulations.

II. BEST PRACTICAL TREATMENT

A. Introduction

Pioneer is located in an attainment area for all U.S. EPA designated criteria pollutants, except for ozone which is determined to be moderate non attainment for Androscoggin County. In addition, Maine is part of the Ozone Transport Region (OTR), and thus, the entire State of Maine is subject to the non attainment requirements for ozone. Chapter 134 of the Maine Air Regulations requires that every stationary source who has the potential to emit quantities of VOC equal to or greater than 40 tons per year apply RACT to their applicable VOC emissions.

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B. RACT for VOC Emissions

Pioneer has identified the following VOC sources which are not exempt pursuant to Section 1(C) of Chapter 134.

#	Category	Emission Units	Actual 1996 VOC (pounds)
1	Tank Truck Activities	n/a	561
2	Storage Tanks	31 storage tanks	6,271
3	Weigh Tanks and Blend Tanks Located in Specialty Resins Dept	2 weigh tanks, 2 blend tanks	1,438
4	Polyester Reactors	K4, K5, K6, K7, K8	2,780*
5	Reactor "K3"	K3	720
6	Melamine and Urea Reactors	K1 and K2	11,729
7	Letdown and Cooling of Polyester Resin	n/a	92
8	Wastewater Streams	n/a	3,963
9	Pressroom	six presses	9,886
10	Treated Paper and Waste Materials Located in Treating and Resopreg Departments	n/a	1,086
11	Resin Blend Tanks, Holding Tanks, and Transfer Pots Located in the "Treating" and "Resopreg" Departments	n/a	2,580
12	Equipment Leaks	n/a	4,542
13	Cleanup Activities in Treating and Resopreg Departments	n/a	6,897
14	Handling of Various Raw Materials in Specialty Resins Department	n/a	100
15	Laboratory Activities	n/a	36
16	Emissions from Fabrication of Laminate	n/a	negligible
17	Handling of Hazardous Waste	n/a	negligible
18	Miscellaneous Activities Not Related to Manufacturing	n/a	negligible
		TOTAL	52,681 (26.3 TPY)

- * Total uncontrolled VOC emissions from Category #4 for 1996 were estimated at 115,046 pounds. Of these, an estimated 112,266 pounds were vented to the existing incinerator or the wet scrubber for control under the terms of Pioneer's Air Emission License, Condition (18). The remaining 2,780 pounds corresponds to charging solid materials to the polyester reactors and sampling reactor contents.

	VOC Emissions Exempt from Chapter 134	Citation	Reason
1.	Paper Coating Lines M1, M3, M4, M5, M6, M7, P1, P4, P5, C3, and C4	1(C)(3)	subject to Chapter 123
2.	Press Room Coating Station	1(C)(3)	subject to Chapter 129
3.	Solvent Degreasers	1(C)(3)	subject to Chapter 130
4.	Boilers #4, #6, #7, #8, Incinerator, Fire Pump, Space Heater, etc.	1(C)(4)	fuel burning equipment

Pioneer elected to perform an alternative RACT analysis for the above sources as specified by Section 3(A)(3) of Chapter 134. The following is a brief discussion of each emission category and Pioneer's proposed RACT determination.

Category #2 Storage Tanks

Pioneer stores various raw materials and finished products in above-ground storage tanks. There are thirty-one above-ground tanks used for the storage and handling of organic liquids, including both raw materials, finished resins, and distillates. VOC emissions from storage tanks are primarily associated with working and breathing losses. The estimated total VOC emission from the storage tanks during 1996 were 3.1 tons.

Pioneer evaluated control options for the formalin and methanol tanks. These fixed roof design tanks have a relatively large storage capacity compared to other tanks at the facility (20,000 gallons each), thus they are more likely to warrant control than other tanks. The formalin and methanol tanks currently employ pressure vacuum valves (conservation vents) which allow the tanks to operate at a slight internal pressure or vacuum, thus minimizing VOC emissions. Pioneer estimates that the VOC emissions from the formalin and methanol tank during 1996 were approximately 0.35 tons and 0.17 tons, respectively.

Pioneer examined various references on the control of working and breathing losses of storage tank control regulations in EPA control technology guidelines (CTG) and alternative control techniques (ACT) documents. Pioneer identified the following controls for fixed roof storage tanks: inert gas blanket application, vapor recovery/control system, and internal floating roof.

Pioneer currently employs an inert gas blanket application for safety purposes on the formalin tank. As a result, the inert gas blanket application does minimize VOC emissions associated with breathing losses. It is proposed by Pioneer that the inert gas blanket application is not considered effective for working losses. Pioneer determined that although the inert gas blanket may be minimizing breathing losses, it would not be cost effective to install the system on other storage tanks solely for the purpose of reducing emissions, and therefore was rejected as RACT.

Pioneer found that considering the quantity of emissions released from the tanks, the cost associated with a vapor recovery and control system was not justified as RACT. Pioneer also found the installation of internal floating roofs were \$12,765 per ton of VOC removed, and thus rejected this option as RACT.

In summary, Pioneer concluded that the continued use of conservation vents for those tanks that have conservation vents represents RACT. For all remaining tanks Pioneer concluded that the current operating practices represent RACT.

Category #3 Weigh Tanks and Blend Tanks Located in Specialty Resins Dept
Pioneer employs weigh tanks to charge known quantities of liquid materials to the reactors for resin production and resin blending operations. The blend tanks are employed for mixing liquid materials into manufactured resins. VOC emissions are released as the result of displacement during filling of the weigh and blend tanks. Pioneer estimates that the VOC emissions from the weigh and blend tanks during 1996 were approximately 0.7 tons.

EPA's ACT for batch processes (referred to as the "Batch ACT") examines the feasibility of controlling VOC emissions from an entire batch process. Given the low level of emissions associated with the weigh and blend tanks, Pioneer determined that use of add-on controls was not cost effective and thus rejected as RACT. The Batch ACT also addresses the use of vapor containment as a method for controlling emissions from equipment such as weigh tanks back to vessels from which the liquid was originally taken. However, as already discussed by Category #2 the control of storage tank working losses was rejected by Pioneer as RACT.

Based on the review of various emission control alternatives, Pioneer concluded that the current operating practices of the weigh and blend tanks represent RACT.

Category #4 Polyester Reactors

Pioneer produces polyester resin and blends solid polyester resin with acetone in the reactors K4 through K8. Activities that have the potential to release VOCs include but are not limited to: reactor charging, cooking, and activities that involve opening the charging hatch covers. The polyester resin production and blending activities are batch processes. Pioneer estimates that if released uncontrolled the emissions from the reactors during 1996 would have been approximately 57.5 tons. However, most of these emissions are vented to the existing incinerator, which results in estimated 1996 actual VOC emissions of 1.4 TPY from the charging of solid materials to the polyester reactors and sampling reactor contents. Pioneer has proposed that the existing emission control requirements as specified by Condition (18) of its Air Emission License represents RACT.

Category #5 Reactor "K3"

Operations in this reactor (K3) include production of urea-formaldehyde resin, blending of phenolic resin, and blending of LE-4060 with acetone. Activities which have the potential to emit VOCs include but are not limited to charging of raw materials to the reactor for both blending and resin production purposes, as well as the blending and resin production cycles themselves. The operation that occurs in this reactor are classified as batch processes.

VOC emissions from the tank are controlled by a vapor condenser. The temperature of the condenser coolant (water) is maintained below 100 degrees Fahrenheit as it enters the condenser. Pioneer estimates that the controlled emissions from the tank during 1996 was approximately 0.36 tons. Pioneer has proposed that the control of the VOC emissions by the existing condenser to be RACT.

Category #6 Melamine and Urea Reactors

Pioneer currently produces melamine resins in two reactors (K1 and K2) by a batch process. Pioneer also has the capability of producing urea resins in them. These reactors are part of the melamine resin batch process which uses formalin as the primary liquid raw material. VOC emissions are released from the reactors during various stages of the resin production cycle, including reactor charging, cooking, and sampling. Pioneer estimates that total VOC emissions from both reactors during 1996 was approximately 5.9 tons. Pioneer evaluated EPA's Batch Act and determined the following control options warrant further review: condensers and thermal incineration.

Condensers

The Batch ACT states that condensers are commonly employed on batch reactor vents. For example Pioneer currently employs a reflux condenser on the reactor K3, primarily for the purpose of condensing and recycling the large quantity of acetone vapors that are released during cutting of LE-4060. Pioneer also operates the K3 condenser when producing urea resin and blending of phenolic resin, but the quantity of vapors released during these operations is expected to be relatively small when compared to the cutting of LE-4060. Consequently, operating the condenser solely when producing urea resin and phenolic resin blending is not likely to be cost effective.

Similarly, the vapors released from the reactors K1 and K2 during the production of melamine or urea resins is small. Pioneer measured and found the VOC emissions to vary from 20 to 2,000 ppmv depending on the operating condition of the reactor. As identified by the Batch ACT, condensers employed on VOC concentrations below 10,000 ppmv may not be cost effective.

A related consideration is the possible formation of ice in the condenser as a result of having a very large heat removal requirement. Given the extremely high volatility of the formaldehyde and its relatively low concentration in the exhaust, any condenser system would likely need to operate below the freezing point of water in order to condense a significant portion of the VOC. Pioneer reviewed the cost-effectiveness curves contained in the ACT to assess the cost-effectiveness of using a condenser to treat VOCs. The curves assume annual emission levels of 30,000 lb/yr and above. Using the curve associated with high volatility curve, 90% control efficiency, combined flow of 3,000 scfm, and a VOC concentration of 10,000 ppmv, Pioneer determined that the cost-effectiveness for the operation of condensers to be greater than \$27,000/ton. The control of the reactors K1 and K2 by condensers was therefore rejected by Pioneer as RACT.

Thermal Incineration

The second option evaluated by Pioneer for the control of VOC emissions from the reactors K1 and K2 was thermal incineration, both by the existing incinerator or by a new dedicated incinerator.

Pioneer performed a streamlined analysis of the cost-effectiveness of manifolding K1 and K2 to the existing incinerator. Pioneer focused on the cost for the ductwork that would be required to connect the reactor exhausts to the incinerator. Pioneer found that due to the temperature of the exhaust from K1 and K2, the streams would need to be delivered directly to the forced draft fan serving the incinerator, where the cooler exhaust temperature could be added to the combined

flow with minimal to no effect. Based on the 5.8 tons per year of VOC that would be reduced as a result of the tie-in, the overall cost effectiveness was determined by Pioneer to be approximately \$4,200 per ton. This cost does not account for other cost considerations such as fan requirements to deliver to fumes to the incinerator, potential heating requirements for the duct, closer consideration of controls that may be necessary to monitor and regulate potentially explosive conditions within the duct. The control of the reactors K1 and K2 by the existing incinerator was therefore rejected by Pioneer as RACT.

Pioneer also evaluated the cost-effectiveness associated with the installation of a regenerative thermal oxidation (RTO) system sized to treat the combined exhaust stream from K1 and K2. Using a price for the system which includes a completely packaged system (RTO, induced draft fan, exhaust stack, installation, startup services, etc.) Pioneer estimated the cost-effectiveness to be approximately \$30,108/ton. The control of the reactors K1 and K2 by a new RTO system was therefore rejected by Pioneer as RACT.

Based on the review of various emission control alternatives, Pioneer concluded that the current operating practices of K1 and K2 represent RACT.

Category #9 Pressroom

Papers that have been treated with resin on the coating lines are layered and then pressed together to form a laminate. The papers are pressed on one of six individual presses, each which is vented separately to atmosphere. The pressure and heat supplied to each press promotes cross-linking within the layers to form the laminate and may also release small amounts of free organic material (VOC) that was not driven from the paper in the dryer section of the coating line. Pioneer estimates that the total VOC emissions from the presses during 1996 was approximately 4.9 tons, with Methanol being the primary VOC.

Pioneer evaluated VOC emission control methods which can be grouped into three general types: pollution prevention, VOC recovery devices, and VOC destruction devices.

Pollution prevention methods may involve material substitution or operational changes. Given the types of laminates currently manufactured, Pioneer proposed that material substitution is not an option. Operational changes were also determined by Pioneer to be not practical based on the fact that the operating conditions in the coating lines are determined by product specifications.

Based on the high volume, low concentration exhaust streams from the press vents Pioneer determined that VOC recovery devices such as scrubbing and condensation technologies were not suitable. Pioneer found that the exhaust stream temperatures during the press cook cycles were above the upper limit for adsorption technology. In addition, Pioneer determined that adsorption technology systems are generally not appropriate where the removal of methanol is desired.

VOC destruction devices such as thermal incinerators are capable of effectively treating VOCs contained in high volume, low concentration exhaust streams. Assuming all of the six presses were run simultaneously, Pioneer determined that the combined flow rate of exhaust could be as high as 60,000 scfm. The existing incinerator currently handles approximately 30,000 to 40,000 scfm of VOC laden air from the paper coating lines. Pioneer determined that the current incinerator would have to be completely redesigned in order to accommodate the vent streams from even two of the six presses, and thus this option was rejected as RACT. Pioneer then examined the feasibility of using a dedicated incinerator to treat the press exhausts. Based on the cost-effectiveness value of \$59,861/ton of VOCs reduced, this option was rejected by Pioneer as RACT.

Based on the review of the various emission control alternatives, Pioneer concludes that the current operating practices represent RACT for VOC emissions from the pressroom.

Categories #1, 7, 8, and 10 through 18

Category #1 Tank Truck Activities

Pioneer receives various raw materials in tank trucks, and loads various products into tank trucks for shipment to customers. Fugitive VOC emissions can occur from the manway hatch located on the tank truck as samples are taken prior to unloading or as the result of vapor displacement during product loading.

Category #7 Letdown and Cooling of Polyester Resin

Polyester resin that has been produced in the reactors is poured or "let down" into metal pans and allowed to cool into a solid. There is the potential for VOCs to be released from the hot resin as it flows out the bottom of the reactor and exposed to room air.

Category #8 Wastewater Streams

Wastewater containing VOCs is generated at various locations around the plant. Wastewater is generated by reactor rinsing activities in the Specialty Resins department, by wet scrubbing of polyester reactor fumes, by washdown of spills into floor drains and sumps, and so on. The only treatment for organic compounds in the wastewater is for phenol. Chemicals are added by Pioneer to the 20,000 gallon wastewater storage tank to oxidize the phenols. The tank contents are continuously aerated to promote mixing. VOCs are released from the wastewater during its handling, storage and treatment. Pioneer discharges its treated wastewater to the Lewiston-Auburn Water Pollution Control Authority.

Category #10 Treated Paper and Waste Materials Located in Treating and Resopreg Departments

Sheets of paper that have been treated with resin in the coating lines are temporarily stored next to the coating lines. VOC that are not released from the paper on the coating line can be released from the treated sheets. In addition, waste materials are stored in drums, resulting in fugitive VOC emissions.

Category #11 Resin Blend Tanks, Holding Tanks, and Transfer Pots Located in the "Treating" and "Resopreg" Departments

Resins produced in the Specialty Resins department are delivered to the Treating and Resopreg departments for use in coating paper and other webs on the coating lines. Resins are typically combined with other materials in the blend tanks, then stored temporarily in a series of holding tanks until the resin is ready to be applied to the coating line. Transfer pots are sometimes used to deliver resin to the coating lines. VOC emissions as the result of these activities are released as point as well as fugitive emissions.

Category #12 Equipment Leaks

VOCs can be released as a fugitive emission from pumps, valves, and other piping and liquid transfer equipment.

Category #13 Cleanup Activities in Treating and Resopreg Departments

This category includes but is not limited to the clean-up of melamine treaters using isopropyl alcohol. Since the melamine treaters are not vented to the incinerator, it is assumed that 100% of the isopropyl alcohol (a VOC) used for clean-up on these treaters is emitted to atmosphere.

Category #14 Handling of Various Raw Materials in Specialty Resins Department

This category includes but is not limited to the handling of glycols in transfer pots and the replacement and drying of ethylene glycol filters prior to disposal which may release small quantities of fugitive VOC emissions.

Category #15 Laboratory Activities

Laboratory activities that result in the release of VOC include but are not limited to the production of polyester resin batches, the use of pyridine to dissolve resin samples for testing purposes, and miscellaneous chemical use.

Category #16 Emissions from Fabrication of Laminate

Pioneer fabricates laminates using routing, cutting and sanding equipment. Negligible amounts of VOC emissions are potentially released from the laminate due to exposure to heat generated by the cutting and sanding action.

Category #17 Handling of Hazardous Waste

Hazardous waste containing VOCs is transferred and stored at hazardous waste accumulation sites and in a central storage area. Negligible amounts of VOC emissions are potentially emitted as waste is being transferred to and from the storage containers and drums.

Category #18 Miscellaneous Activities Not Related to Manufacturing

There are miscellaneous activities at the plant that are not related to manufacturing but do have the potential to emit negligible amounts of VOC emissions. These activities include use of paints, lubricating agents, and various chemicals as part of general maintenance, emissions from boiler blowdown vents, and emissions from fuel oil storage tanks.

Based on the relatively small emissions associated with each of the Categories #1, 7, 8, and 10 through 18 (3.4 TPY or less) Pioneer has proposed that any additional control measures would not be cost effective, therefore the current operating practices represent RACT.

Conclusion

The Bureau of Air Quality finds that the above mentioned satisfies RACT for VOC emissions for this facility which incorporates the requirements of Chapter 134 VOC RACT.

ORDER

The Department hereby grants Air Emission License Amendment A-448-71-P-A, subject to the conditions found in Air Emission License A-448-72-K-A/R, in amendments A-448-71-M-M and A-448-71-O-M, and in addition to the following conditions:

The following shall replace Condition (18) of Air Emission License A-448-72-K-A/R:

(18) Reactors

a. The following conditions are to meet VOC RACT:

1. (a) At all times that K4, K5, K6, K7, and K8 are producing polyester resins, Pioneer shall vent the emissions from the main outlet vent on each reactor to the Incinerator for destruction, except such emissions may be vented to the Wet Scrubber system for control for up to 300 hours a calendar year.

(b) At all times that K4, K5, K6, and K8 are blending polyester resins, Pioneer shall vent the emissions from the main outlet vent on each reactor through the separating column and vapor condenser which shall be operated to maximize the condensation of any emissions. The temperature of the coolant on the inlet side of the vapor condensers to K4, K5, K6, and K8 shall be maintained below 100 degrees Fahrenheit while the reactors are blending polyester resins. Pioneer shall record the date and length of time in minutes when each reactor is blending polyester resins.

At all times that K4, K5, K6, and K8 are blending polyester resins, Pioneer shall monitor and record in a log the temperature of the coolant on the inlet side of the vapor condensers to K4, K5, K6, and K8, at the beginning of the cycle and every 6 hours thereafter. Pioneer shall maintain such records for a minimum of 6 years and they shall be submitted to the Bureau of Air Quality upon request.

2. At all times that K3 is producing urea resins, blending phenolic resins, or blending LE-4060 with Acetone, Pioneer shall vent the emissions from the main outlet vent on K3 through the vapor condenser. The temperature of the coolant on the inlet side of the K3 condenser shall be maintained below 100 degrees Fahrenheit while the reactor is in operation.

At all times that K3 is producing urea resins, blending phenolic resins, or blending LE-4060 with Acetone, Pioneer shall continuously monitor and record the temperature of the coolant on the inlet side of the K3 condenser, at the beginning of the cycle and every 6 hours thereafter. Pioneer shall maintain such records for a minimum of 6 years and they shall be submitted to the Bureau of Air Quality upon request.

3. Pioneer shall maintain a log detailing the period of time in hours and minutes, that such emissions receive control by the use of the wet scrubber system. Pioneer shall maintain such records for a minimum of 6 years and they shall be submitted to the Bureau of Air Quality upon request.
- b. Visible emissions from K1, K2, K3, K4, K5, K6, K7 and K8 shall be limited to 20% opacity except for 5 minutes in any 1 hour period.
- c. Particulate emissions from K1, K2, K3, K4, K5, K6, K7 and K8 shall be limited to the applicable limitation from Table 105A or the formula in Section 4 of Chapter 105.

The following are new Conditions:

- (27) For VOC RACT, Pioneer shall maintain conservation vents on: the formalin storage tank (Tank 30); the methanol storage tank (Tank 29); the LE-4060 solution storage tank (Tank 60); the NPG storage tank (Tank 66); the blended "raw" phenolic resin storage tanks (Tanks 45, 46, 47, 48); and the urea-formaldehyde resin storage tank (Tank 49). In order to document maintenance of the conservation vents, Pioneer shall keep a maintenance log recording the date of conservation vent inspections as well as all routine maintenance when performed. Conservation vent inspections shall be performed, at a minimum, once every 6 months.
- (28) For VOC RACT and when engaging in cleanup activities on the melamine treaters, Pioneer shall limit the VOC content of its cleaning solutions to 50 % by volume, except for the use of 500 pounds of cleaning solutions per year which may contain greater than 50% by volume VOC.

Pioneer shall keep records of the VOC emissions per year from cleanup activities on the melamine treaters, and also records of the pounds per year of cleaning solutions which were used on the melamine treaters with a VOC content greater than 50% by volume.

PIONEER PLASTICS CORPORATION)
ANDROSCOGGIN COUNTY)
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A-448-71-P-A)

DEPARTMENTAL)
FINDINGS OF FACT AND ORDER)
AIR EMISSION LICENSE)
13 AMENDMENT #3

(29) This amendment shall expire concurrently with Air Emission License A-448-72-K-A/R.

DONE AND DATED IN AUGUSTA, MAINE THIS 16th DAY OF June 1997.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: James P. Brooks for
EDWARD O. SULLIVAN, COMMISSIONER

PLEASE NOTE THE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application April 10, 1997

Date of application acceptance April 10, 1997

Date filed with the Board of Environmental Protection _____

This Order prepared by Kim Hibbard, Bureau of Air Quality

