POLLUTION CONTROL BOARD
May 28, 1987

IN THE MATTER OF:	)	
	)	
AMENDMENTS TO 35 ILL. ADM. CODE 211 AND 215, ORGANIC MATERIAL EMISSION STANDARDS AND LIMITATIONS, FOR POLYSTYRENE PLANTS	)	R86-12

PROPOSED RULE FIRST NOTICE

OPINION AND ORDER OF THE BOARD (by B. Forcade):

This matter comes before the Board on a March 11, 1986, regulatory proposal by the Illinois Environmental Protection Agency (Agency) for the control of organic material emissions from polystyrene plants. Hearings were held on October 15, 1986, in Chicago and on October 16, 1986, in Joliet. Comments were received through January 23, 1987. On January 16, 1987, the Department of Energy and Natural Resources (DENR) filed a letter of negative declaration of economic impact, obviating the need for further economic study of the proposed rules. The Economic and Technical Advisory Committee of the DENR filed a concurrence on January 22, 1987. The Agency filed an amended proposal on April 6, 1987, which entailed non-substantive codification changes.

This is one of a series of Board actions directed at promulgating rules implementing Reasonably Available Control Technology (RACT) for the control of ozone precursors from existing major stationary sources (emissions greater than 100 tons/year). The implementation of RACT in non-attainment areas for ozone is required as a part of a federally approvable State Implementation Plan (SIP) under the federal Clean Air Act (CAA) (42 U.S.C. 7401 et seq.). Section 172 of the CAA requires that RACT be implemented at existing major stationary sources in the non-attainment areas of those states needing an extension from the 1982 deadline until 1987 to achieve the air quality standards for ozone. Illinois is such a state, having requested the extension in its 1979 and 1982 SIP.

The definition of RACT is contained in 40 CFR 51, along with the requirements for a federally acceptable SIP. However, the specific parameter of what constitutes reasonablly available controls and, therefore, the parameters which the states must adopt to ensure that RACT is implemented, are not. Instead, the United States Environmental Protection Agency (USEPA) publishes a series of documents entitled "Control Technique Guideline" (CTGs). Each of the CTGs, which are summaries of industries

specific case studies, contains the means and the degree of control which the USEPA requires the states to adopt categorically as part of its SIP in order to have an acceptable SIP. Failure to adopt rules identical to those presented in the CTGs, or other ones demonstrated by the individual state as comparable, can mean that the state will have an inadequate SIP, which in turn, can trigger the sanction provision in CAA found at Section 110, 113 and 176 (42 USC 7410, 7413, 7506). While the mandate for sanctions is contained in the CAA, the mandate to adopt the CTGs or otherwise demonstrate a state rule to be comparable is not. It is not even contain in the federal regulations, but instead, is articulated in the "general preamble for proposed rulemaking and approvable State Implementation Plan revisions for non-attainment areas" (44 FR 20372).

This federal policy statement includes yet another requirement which is relevant to this rulemaking. The USEPA allows the states until the January after one year from the finalization of a CTG to adopt either the "rule" contained therein or comparable rule, if sources covered by that particular CTG are within a state's non-attainment areas. A final CTG for the manufacture of high-density polyethylene, polypropylene and polystyrene resins was published in November of 1983 (Ex. 3).

The CTG defines RACT for the manufacture of high-density polyethylene, polypropylene and polystyrene resin. However, a search was made of the Agency's emission inventory system (Total Air System - TAS) which found no manufacturers of polypropylene or high-density polyethylene. All of the Illinois plants manufacture polystyrene. Consequently, the Agency's proposed amendments only cover this process, rather than the full scope of the CTG.

The CTG used a bulk polymerization plant as a basis for its flow diagram for polystyrene manufacture, but its model plant was an all-liquid-phase continuous process. On page 4-1 of the CTG, the subparagraph number 3, contains the RACT limitation which applies to the continuous processes. This limitation is given as 0.12 kg of volatile organic material per 1000 kg of polystyrene resin produced. The CTGs process description is for a "fully continuous co-polymerization process for the manufacture of pelletized polystyrene resin from styrene monomer and polybutadiene" rubber. The process is described as follows:

> Styrene, rubber, a catalyst (in some cases), recycle styrene, and other ingredients are dissolved in feed dissolver tank and pumped to a reactor, where a polymerization takes place. Polymer melt still contains some unreacted styrene and by-products, so it is pumped to a devolatilizer where these are separated and sent to a styrene recovery

unit. Polymer melt is then pumped through an extrusion dye where it is solidified in the form of strands, which are pelletized and stored. In the styrene recovery unit, the unreacted styrene monomer is separated by distillation and recycled to the feed dissolver tank. Noncondensibles are vented through a vacuum system. The heavy components from the distillation (the fractions from the bottom of the distillation column) are often used as a fuel supplement in boilers.

The CTG lists four VOM sources of importance in its model plant process. They are:

1. The Feed Dissolver (FD), where the styrene monomer and the polybutadiene rubber are dissolved and mixed. The VOM emissions come chiefly during filling and washing and normally are vented to the atmosphere;

2. The Styrene Condenser Vent (SCV), where unreacted styrene monomer is separated from the polystyrene in the vacuum devolatilizer. The styrene is vented to the atmosphere. If a vacuum system is used (rather than, for example, steam jet ejectors), and a suitable condenser follows the vent, emissions are lower. The CTG states that this point is the largest VOM source.

3. The Styrene Recovery Unit Condenser Vent (SRUCV), where noncondensible components are vented from the styrene recovery unit.

4. The Extruder Quench Vent (EQV) is not a large source. Traces of styrene vapor are emitted as the polystyrene is being extruded into strands. These are usually removed by a demister or an electrostatic precipitator.

Recently, USEPA has published additional RACT guidance to clarify the sources to be covered in this category (Ex. 4). To make certain that the proper sources are covered, the Agency has added definitions to Section 211.122 which describe and define the continuous process, material recovery section, styrene devolatilizer unit and styrene recovery unit.

The geographical applicability of the proposed rules includes eight counties designated non-attainment for ozone, as well as two counties contiguous to the Chicago non-attainment area. These two counties, Will and McHenry, are considered part of the Chicago urbanized air quality planning region by the Agency and the USEPA. Organic emission sources within this urbanized area are believed to contribute to the Northern Illinois-Southwest Wisconsin ozone non-attainment problem.

The Agency conducted a review of its permit files and field operation inspections in order to identify potentially affected facilities. It was determined that two presumably affected facilities were producing polystyrene by a batch-suspension process and thus would not be affected by the Agency's proposal. Four potentially regulated facilities were identified; three facilities are located in Will County and one facility is in Cook County.

Cosden Oil and Chemical (Calumet City, Cook County) uses a conventional process as described in the CTG. Cosden's polystyrene lines have dissolving vessels without controls, styrene vent condensers (SCV) which are attached to the vacuum system and extruder quench vents (EQV) with hoods. The styrene from the styrene vent condenser is recycled through the dissolving vessel so that there is no styrene recovery unit vent. The finished polystyrene is made into pellets which are flash-dried rather than vacuum-devolatilized. Cosden is planning to close its facility and cease operations in 1988 (R. 58).

Permits from the Amoco facility (Joliet, Will County) indicate that there is a styrene condenser vent at the devolatilizer which is controlled by a condenser and vacuum system and a flow dissolver. There is also a Styrene Recovery Unit Condenser Vent in the form of a condensate recovery tower with a condenser and vacuum system. The permits do not specify if an Extruder Quench Vent exists.

Dow Chemical (Joliet, Will County) has flow dissolvers in the form of dissolver tanks, styrene vent condensers in the form of a monomer separators, extruder quench vents in the form of exhaust hoods on the nozzles and dies which are fed a demister and a styrene recovery unit condenser vent that sends heavy material to the heaters as fuel.

Mobil Chemical (Joliet, Will County) has flow dissolvers (FD), styrene condenser vents (SCV) with condensers and vacuum systems, a styrene recovery unit condenser vent (SRUCV) in the form of an oligomer stripper and extruder quench vent with electrostatic precipitators.

All four plants are within the limitation of 0.12 kg emissions per 1000 kg of production from the styrene condenser

vent and the styrene recovery unit condenser vent as proposed in Section 215.877 as specified by the CTG. These emission data are all based upon engineering calculations which were supplied by letters to the Agency. While the Agency does not anticipate the need for testing to determine compliance, to have an enforceable regulation a testing method must be specified. Section 215.886 specified Method 25 which is the standard volatile organic material control equipment efficiency testing method used in other sections of the Board's regulations and was used as the test method in emission data cited in the CTG (Ex. 3, pp. 10-14) and is cited as one of the appropriate testing method in the USEPA memorandum, dated September 14, 1984 (Ex. 8).

Because all four sources appear to be currently in compliance with the proposed Section 215.877, it is expected that there will be no emission reductions or cost of control to comply with the limitations. The CTG, on page 5-25, states that "...current industry control is in a transitional period in which vacuum pumps are replacing steam eductors to produce the required vacuum ...". The plants in major urbanized areas of Illinois have already made this transition and are thus in compliance with the RACT standard. This finding of no economic impact is supported by the Department of Energy and Natural Resources' letter of negative declaration.

The Board will propose rules regulating organic material emissions from polystyrene manufacturing plants for first notice, as a final CTG for this category has been issued, sources in urbanized non-attainment planning areas have been identified and the rules constitute RACT. The Agency's proposed Section 211.122 definitions are moved to Section 215.104. This action will help fulfill the state's legal obligation to demonstrate that existing major stationary emission sources in non-attainment areas are subject to regulations representing RACT, as well as in regions that impact non-attainment areas.

ORDER

The following amendments to 35 Ill. Adm. Code 215 are directed to first notice for publication in the Illinois Register.

TITLE 35: ENVIRONMENTAL PROTECTION
SUBTITLE B: AIR POLLUTION
CHAPTER I: POLLUTION CONTROL BOARD
SUBCHAPTER c: EMISSION STANDARDS AND LIMITATIONS FOR STATIONARY SOURCES

PART 215
ORGANIC MATERIAL EMISSION STANDARDS AND LIMITATIONS

SUBPART A: GENERAL PROVISIONS

SUBPART B: ORGANIC EMISSIONS FROM STORAGE AND LOADING OPERATIONS

SUBPART C: ORGANIC EMISSIONS FROM MISCELLANEOUS EQUIPMENT

SUBPART E: SOLVENT CLEANING

SUBPART F: COATING OPERATIONS

SUBPART K: USE OF ORGANIC MATERIAL

SUBPART N: VEGETABLE OIL PROCESSING

SUBPART P: PRINTING AND PUBLISHING

SUBPART Q: SYNTHETIC ORGANIC CHEMICAL AND POLYMER MANUFACTURING

SUBPART R: PETROLEUM REFINING AND RELATED INDUSTRIES; ASPHALT MATERIALS

SUBPART S: RUBBER AND MISCELLANEOUS PLASTIC PRODUCTS

SUBPART U: COKE MANUFACTURE AND BY-PRODUCT RECOVERY

SUBPART W: AGRICULTURE

SUBPART X: CONSTRUCTION

SUBPART Y: GASOLINE DISTRIBUTION

SUBPART Z: DRY CLEANERS

SUBPART BB: POLYSTYRENE PLANTS

AUTHORITY: Implementing Section 10 and authorized by Section 27 of the Environmental Protection Act (Ill. Rev. Stat. 1985, ch. 111½ pars. 1010 and 1027).

SOURCE: Adopted as Chapter 2: Air Pollution, Rule 205: Organic Material Emission Standards and Limitations, R71-23, 4 PCB 191, filed and effective April 14, 1972; amended in R77-3, 33 PCB 357, at 3 Ill. Reg. 18, p. 41, effective May 3, 1979; amended in R78-3 and R78-4, 35 PCB 75, at 3 Ill. Reg. 30, p. 124, effective July 28, 1979; amended in R80-5 at 7 Ill. Reg. 1244, effective January 21, 1983; codified at 7 Ill. Reg. 13601; Notice of Corrections at 7 Ill. Reg. 14575; amended in R82-14 at 8 Ill. Reg. 13254, effective July 12, 1984; amended in R83-36 at 9 Ill. Reg. 9114, effective

May 30, 1985; amended in R82-14 at 9 Ill. Reg. 13960, effective August 28, 1985; amended in R85-28 at 11 Ill. Reg. 3127, effective February 3, 1987; amended in R82-14 at 11 Ill. Reg. 7296, effective April 3, 1987; amended in R86-12 at _____ Ill. Reg. _____, effective _____.

SUBPART A: GENERAL PROVISIONS

Section 215.104 Definitions

The definitions of 35 Ill. Adm. Code 201 and 211 apply to this Part, as well as the definition contained in this Section. Where the definition contained in this Section is more specific than that found in Parts 201 or 211, it shall take precedence in application of this Part.

"Binders": Organic materials and resins which do not include volatile organic materials.

"Clear Topcoat": The final coating which contains binders, but not opaque pigments, and is specifically formulated to form a transparent or translucent solid protective film.

"Continuous Process": A method of manufacture of polystyrene resin in which the styrene raw material is delivered on a continuous basis to the reactor in which the styrene is polymerized to polystyrene.

"Conventional Soybean Crushing Source": Any hexane extraction soybean crushing equipment that uses direct contact steam for desolventizing and producing toasted soy meals.

"Component": Any piece of equipment which has the potential to leak volatile organic material including, but not limited to, pump seals, compressor seals, seal oil degassing vents, pipeline valves, pressure relief devices, process drains and open ended pipes. This definition excludes valves which are not externally regulated, flanges, and equipment in heavy liquid service. For purposes of Subpart Q, this definition also excludes ball and plug valves.

"Furniture Coating Application Line": The combination of coating application equipment, flash-off area, spray booths, ovens, conveyors, and other equipment operated in a predetermined sequence for purpose of apply coating materials to wood furniture.

"Heatset": A class of web offset lithography which requires a heated dryer to solidify the printing inks.

"Heavy Liquid": Liquid with a true vapor pressure of less than 0.3 kPa (0.04 psi) at 294.3 K (70°F) established in a standard reference text or as determined by ASTM method D-2879; or which has 0.1 Reid Vapor Pressure as determined by ASTM method D-323; or which when distilled requires a temperature of 421.95K (300°F) or greater to recover 10% of the liquid as determined by ASTM method D-86.

"Light Liquid": Volatile organic material in the liquid state which is not defined as heavy liquid.

"Light Oil": A liquid condensed or absorbed from coke oven gas composed of benzene, toluene, and xylene.

"Material Recovery Section": Any equipment designed to transport and recover styrene monomer and other impurities from other products and by-products in a polystyrene plant, including but not limited to the styrene devolatilizer unit and styrene recovery unit.

"Offset": Use of a blanket cylinder to transfer ink from the plate cylinder to the surface to be printed.

"Opaque Stains": All stains containing pigments not classified as semi-transparent stains including stains, glazes and other opaque material to give character to wood.

"Pigments Coatings": Opaque coatings containing binders and colored pigments which are formulated to conceal the wood surface either as an undercoat or topcoat.

"Polystyrene Plant": Any plant using styrene to manufacture polystyrene resin.

"Polystyrene Resin": A substance consisting of styrene polymer and additives which is manufactured at a polystyrene plant.

"Repair Coatings": Coatings to correct imperfections or damage to furniture surface.

"Sealer": Coating containing binders which seals the wood prior to application to subsequent coatings.

"Semi-transparent Stains": Stains containing dyes or semi-transparent pigments which are formulated to enhance wood grain and change the color of the surface

but not to conceal the surface, including, but not limited to, sap stain, toner, non-grain raising stains, pad stain, spatter stain.

"Specialty Soybean Crushing Source": Any hexane extraction soybean crushing equipment using indirect steam heat in flash or vapor desolventizers as the primary method of desolventizing and producing specialty solvent extracted soy flakes, grits or flour.

"Styrene Devolatilizer Unit": Equipment performing the function of separating unreacted styrene monomer and other volatile components from polystyrene in a vacuum devolatilizer.

"Styrene Recovery Unit": Equipment performing the function of separating styrene monomer from other less volatile components of the styrene devolatilizer unit's output. The separated styrene monomer may be reused as raw material in the polystyrene plant.

"Volatile Organic Material": Any organic material which has a vapor pressure of 17.24 kPa (2.5 psia) or greater at 294.3 K (70°F). For purposes of this definition, the following are not volatile organic materials:

Methane
Ethane
1,1,1-trichloroethane
Methylene chloride
Trichlorofluoromethane
Dichlorodifluoromethane
Chlorodifluoromethane
Trifluoromethane
Trichlorotrifluoroethane
Chloropentafluoroethane

For purposes of the following Sections, volatile organic materials are any organic materials having the corresponding vapor pressures at 294.3 K (70°F):

Sections	Vapor Pressure	
215.181 - 215.184	0.013 kPa	(.0019 psia)
215.104 - 215.209	0.013 kPa	(.0019 psia)
215.340 - 215.345	0.013 kPa	(.0019 psia)
215.401 - 215.408	0.013 kPa	(.0019 psia)
215.420 - 215.428	0.013 kPa	(.0019 psia)
215.441 - 215.444	10.34 kPa	(1.5 psia)
215.445 - 215.451	0.013 kPa	(.0019 psia)
215.461 - 215.464	0.013 kPa	(.0019 psia)
215.875 - 215.886	0.013 kPa	(.0019 psia)

215.510 - 215.513	0.013 kPa	(.0019 psia)
215.601 - 215.613	0.013 kPa	(.0019 psia)

"Wash Coat": Coating containing binders which seals wood surfaces, prevents undesired staining and controls penetration.

"Web": A substrate which is printed in continuous roll-fed presses.

"Wood Furniture": Room furnishings including cabinets (kitchen, bath and vanity), tables, chairs, beds, sofas, shutters, art objects, wood paneling, wood flooring, and any other coated furnishings made of wood, wood composition or fabricated wood materials.

(Source: Amended at ____ Ill. Reg. _____, effective _____

Section 215.105 Incorporations by Reference

The following materials are incorporated by reference:

a) American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103:

1) ASTM D 1633-59 Method A

2) ASTM D 1475-60

3) ASTM D 2369-73

4) ASTM D 2879 - 83 (Approved 1983)

5) ASTM D 323 - 82 (Approved 1982)

6) ASTM D 86 - 82 (Approved 1982)

7) ASTM E 260 - 73 (Approved 1973), E 168 - 67 (Reapproved 1977), E 169 - 63 (Reapproved 1981), E 20 (Approved 1985)

b) Federal Standard 141a, Method 4082.1

c) National Fire Codes, National Fire Protection Association, Battery March Park, Quincy, Massachusetts 02269 (1979)

d) United States Environmental Protection Agency, Washington, D.C., EPA-450/2-77-026, Appendix A

e) United States Environmental Protection Agency, Washington, D.C. EPA-450/2-78-041.

f) Standard Industrial Classification Manual, published by Executive Office of the President, Office of Management and Budget, Washington, D.C., 1972

(Board Note: The incorporations by reference listed above contain no later amendments or editions.

(Source: Amended at ____ Ill. Reg. _____, effective _____

SUBPART BB: POLYSTYRENE PLANTS

Section 215.875 Applicability of Subpart BB

The provisions of this Subpart shall apply to polystyrene plants:

a) Which are located in any of the following counties: Will, McHenry, Cook, DuPage, Lake, Kane, Madison, St. Claire, Monroe and Macoupin;

b) Which use continuous processes to manufacture polystyrene - polybutadiene co-polymer; and

c) Which fall within Standard Industrial Classification Group No. 282, Industry No. 2821, except that the manufacture of polystyrene resins need not be the primary manufacturing process at the plant.

(Source: Added at ____ Ill. Reg. _____, effective _____)

Section 215.877 Emissions Limitation at Polystyrene Plants

No person shall cause or allow the emissions of volatile organic material from the material recovery section to exceed 0.12 kg of Volatile Organic Material per 1000 kg of polystyrene resin produced.

(Source: Added at ____ Ill. Reg. _____, effective _____)

Section 215.879 Compliance Date

Every owner and operator of an emission source subject to this Subpart shall comply with its standards and limitations by December 31, 1987.

(Source: Added at ____ Ill. Reg. _____, effective _____)

Section 215.881 Compliance Plan

a) The owner or operator of an emission source subject to the requirements of this Subpart shall submit to the Agency a compliance plan in accordance with 35 Ill. Adm. Code 201, Subpart H, including a project completion schedule where applicable, on or before December 1, 1986.

b) Unless the submitted compliance plan or schedule is disapproved by the Agency, the owner or operator of a facility or emission source subject to this Subpart may operate the emission source according tot he plan and schedule as submitted.

c) The plan and schedule shall meet the requirements of 35 Ill. Adm. Code 201, Subpart H.

(Source: Added at ____ Ill. Reg. _____, effective _____)

Section 215.883 Special Requirements for Compliance Plan

For sources subject to this Subpart, an approvable compliance plan shall include:

a) A complete description of each process which is subject to an emissions limitation;

b) Quantification of the emissions from each process;

c) A description of the procedures and methods used to determine the emissions of volatile organic material;

d) A description of the methods which will be used to demonstrate compliance with the allowable plantwide emission limitation, including a method of inventory, recordkeeping and emission calculation or measurement.

(Source: Added at ____ Ill. Reg. _____, effective _____)

Section 215.886 Testing and Monitoring

a) Upon a reasonable request of the Agency, the owner or operator of a polystyrene plant subject to this Subpart shall at his own expense demonstrate compliance by use of the following method: 40 CFR 60, Appendix A, Method 25 (1984).

b) A person planning to conduct a volatile organic material emissions test to demonstrate compliance with this Subpart shall notify the Agency of that intent not less than 30 days before the planned initiation of the tests so the Agency may observe the test.

(Source: Added at ____ Ill. Reg. _____, effective _____)

IT IS SO ORDERED

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above Proposed Rule, First Notice Opinion and Order was adopted on the 28th day of May, 1987, by a vote of 6-0.

Dorothy M. Gunn

Dorothy M. Gunn, Clerk
Illinois Pollution Control Board