

ILLINOIS POLLUTION CONTROL BOARD  
October 1, 1987

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

ADOPTED RULE                      FINAL ORDER

OPINION 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.

On May 28, 1987, the Board proposed regulatory language for first notice comment which was published at 11 Ill. Reg. 10985, June 19, 1987. The statutory 45-day comment period ended on August 3, 1987. The Agency filed first notice comments, which were mailed on August 3, 1987 (P.C. 2). The Administrative Code Unit of the Secretary of State's office also filed comments regarding non-substantive format changes. The Board proposed the rules for second notice review by the Joint Committee on Administrative Rules (JCAR) on August 6, 1987. The Administrative Code Unit's comments were incorporated in the second notice Order. Additionally, the Board deleted one of the incorporations by reference as unnecessary to this regulation. JCAR issued a Certification of No Objection on September 23, 1987. On September 24, 1987, the Board issued an Order directing the Clerk of the Board to file the rules with the Secretary of State's office for final notice publication in the Illinois

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The Board acknowledges the contributions of David G. Mueller, hearing officer, in this proceeding.

Register. This Opinion supports the Board's Order of September 24, 1987.

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 reasonably 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 contained 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 CTG 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 die 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 noncondensable 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 Agency, in its first notice comments, noted that there are currently pending proposed amendments to the definition of "volatile organic material" (VOM) in a separate docket, R86-37. These proposed amendments would delete the vapor-pressure based

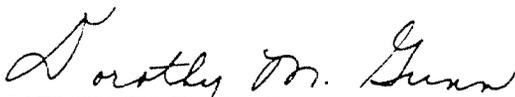
definition of VOM and would modify the definition proposed in the instant docket. The Agency recommended deleting the definition contained in the Board's proposed rule in the R86-12 docket and replace it with the proposed definition in R86-37. At second notice, the Board found that the best course of action was to retain the existing definition of VOM proposed at Section 215.104 in this proceeding and address the proposed redefinition of VOM in the R86-37 docket. First, there is no record established in the instant proceeding supporting such a change. Second, the Board had not yet substantively ruled on the merits regarding the proposed redefinition of VOM pending in R86-37, as the record still remains open. (See R86-37, Proposed Redefinition of VOM, Opinion and Order, July 16, 1987.)

During the second notice JCAR review, the Board agreed to make the following modifications: (1) In Section 215.881(a), the phrase "if applicable" was deleted from the last line; (2) In Section 215.881(c), the phrase "and Section 215.883" was added to the end of the sentence; (3) In Section 215.883(a), the word "complete" was deleted from the first line; (4) In Section 215.883(d), the citation "(Section 215.877)" was added to the third line; and (5) In Section 215.886, the full title of Method 25 was added and the sentence "The incorporation by reference contains no later amendments and editions" was added.

The Board adopts rules regulating organic material emissions from polystyrene manufacturing plants, 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. 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.

IT IS SO ORDERED

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above Opinion was adopted on the 1st day of October, 1987, by a vote of 6-0.

  
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Dorothy M. Gunn, Clerk  
Illinois Pollution Control Board