

ILLINOIS POLLUTION CONTROL BOARD  
October 7, 1993

IN THE MATTER OF: )  
 )  
JOINT PETITION OF QUANTUM CHEMICAL )  
CORPORATION, USI DIVISION (and the ) AS 92-14  
ILLINOIS ENVIRONMENTAL PROTECTION AGENCY)) (Adjusted Standard)  
FOR AN ADJUSTED STANDARD FROM PARTS OF )  
35 ILL. ADM.CODE 218.966 AND 213.986 )

DAVID A. COPELAND APPEARED ON BEHALF OF PETITIONER, QUANTUM  
CHEMICAL CORPORATION;

ANN M. ZWICK APPEARED ON BEHALF OF PETITIONER, ILLINOIS  
ENVIRONMENTAL PROTECTION AGENCY.

OPINION AND ORDER OF THE BOARD (by T.C. Flemal):

This matter comes before the Board on a petition for adjusted standard filed jointly by Quantum Chemical Corporation, USI Division (Quantum), and the Illinois Environmental Protection Agency (Agency) on August 16, 1993. The co-petitioners request an adjusted standard from the air emission controls requirements of parts of 35 Ill. Adm. Code 218.966 and 218.986 as these would otherwise apply to the polymer manufacturing and cooling tower facilities at Quantum's plant located near Morris, Illinois.

The Board's responsibility in this matter arises from the Environmental Protection Act (Act) (415 ILCS 5/1 et seq.). The Board is charged therein to "determine, define and implement the environmental control standards applicable in the State of Illinois"<sup>1</sup> and to "grant \*\*\* an adjusted standard for persons who can justify such an adjustment"<sup>2</sup>. More generally, the Board's responsibility in this matter is based on the system of checks and balances integral to Illinois environmental governance: the Board is charged with the rulemaking and principal adjudicatory functions, and the Illinois Environmental Protection Agency (Agency) is responsible for carrying out the principal administrative duties.

Based upon the record before it and upon review of the factors involved in the consideration of adjusted standards, the Board finds that the co-petitioners have demonstrated that grant of an adjusted standard in the instant matter is warranted. The adjusted standard accordingly will be granted.

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<sup>1</sup> Act at Section 5(b).

<sup>2</sup> Act at Section 28.1(a).

### ADJUSTED STANDARD PROCEDURE

The Act at Section 28.1 provides that a petitioner may request, and the Board may impose, an environmental standard that is: (a) applicable solely to the petitioner, and (b) different from the standard that would otherwise apply to the petitioner as the consequence of the operation of a rule of general applicability. Such a standard is called an adjusted standard. The general procedures that govern an adjusted standard proceeding are found at Section 28.1 of the Act and within the Board's procedural rules at 35 Ill. Adm. Code Part 106.

Where, as here, the regulation of general applicability does not specify a level of justification required for a petitioner to qualify for an adjusted standard, the Act at Section 28.1(c) specifies four demonstrations that must be made by a successful petitioner:

- 1) Factors relating to that petitioner are substantially and significantly different from the factors relied upon by the Board in adopting the general regulation applicable to that petitioner;
- 2) The existence of those factor justifies an adjusted standard;
- 3) The requested standard will not result in environmental or health effects substantially and significantly more adverse than the effects considered by the Board in adopting the rule of general applicability; and
- 4) The adjusted standard is consistent with any applicable federal law.

### PROCEDURAL HISTORY

This matter has antecedents in State and Federal programs designed to reduce ozone in the lower atmosphere through the control of volatile organic material (VOM) emissions. Among these programs has been the required application of reasonably available control technology (RACT) to certain VOM emission sources. RACT regulations developed for the Chicago ozone non-attainment area occur at 35 Ill. Adm. Code 218. More general and less stringent regulations applicable within the ozone attainment areas of the State occur at 35 Ill. Adm. Code 215.

The Chicago ozone non-attainment area as originally defined did not include any of Grundy County, Illinois. However, in response to federal requirements under the Clean Air Act Amendments of 1990, the Board in Docket R91-28 redefined the

Chicago ozone non-attainment area to include Aux Sable Township in Grundy County. Quantum's Morris Plant is located in Aux Sable Township. The effective date of the redefined non-attainment area was November 15, 1992. This is the first date on which the Part 218 regulations became applicable to the Morris Plant.

On December 7, 1992<sup>3</sup> Quantum filed its initial petition for adjusted standard. The Agency was not a co-petitioner. On December 21, 1992 Quantum filed an amended petition, where upon the Agency requested additional information from Quantum and moved this Board for an extension of time to file the Agency recommendation in response to the amended petition. By order of February 4, 1992 the Board granted the Agency's request for additional time.

On May 17, 1993 Quantum filed a second amended petition, again as the sole petitioner. The Agency again requested an extension of time for carrying on discussions with Quantum prior to filing of its recommendation. The Agency's request was granted by Board order on June 17, 1993.

A third amended petition (Pet.) was filed on August 16, 1993, and is the matter before the Board today. A principal feature of the third amended petition is the joining of the Agency as co-petitioner.

On August 26, 1993 the Board issued an order noting that the two sections of the Board's rules from which adjusted standard was being requested were in the processes of being amended in Board proceeding R93-9<sup>4</sup>, and asking the co-petitioners to advise the Board as to how the amendments would affect the instant petition. Co-petitioners filed a response (Response) on September 13, 1993 indicating that the amendments do not alter the instant pleadings except that the requested condition related to work practices at the cooling towers (Pet. at p. 45-46) would be mooted upon the adoption of 35 Ill. Adm. Code 218.986(d); 218.986(d) has been adopted by the Board.

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<sup>3</sup> Pursuant to Section 28.1(f) of the Act, a petitioner who files for an adjusted standard within 20 days of the effective date of the applicable regulations is exempt from the regulations until the Board makes a final determination on the petition. In the instant matter that final determination is made with today's order.

<sup>4</sup> In the Matter of: Omnibus Cleanup of the Volatile Organic Material RACT Rules Applicable to Ozone Nonattainment Areas: Amendments to 35 Ill. Adm. Code Parts 203, 211, 218, and 219. Final order of the Board issued September 9, 1993.

A hearing premised on the second amended petition was originally set and noticed for June 30, 1993. Continuance of this hearing was granted until September 9, 1993 in the Board's order of June 17, 1993. The September 9 hearing was held in Morris, Illinois. No members of the public attended.

#### FACILITY DESCRIPTION

Quantum's Morris Plant is located approximately six miles east of the City of Morris. The area is rural and is zoned for heavy industry. (Pet. at p. 9.)

The Morris Plant is an integrated petroleum manufacturing complex that includes manufacturing operations classified as organic chemical manufacturing (SIC 2869) and polymer manufacturing (SIC 2821). Approximately 700 people are employed at the plant. (Pet. at p. 9.)

Quantum acquired the Morris Plant on November 5, 1986 when it acquired the issued and outstanding capital stock of Enron Chemical Company, owner of the plant. Enron Chemical Company was then renamed to USI Chemical Co., Inc., which was eventually merged into Quantum's USI Division. (Pet. at p. 9.)

The instant petition is confined to VOM emission sources related to two activities at the Morris Plant: polymer manufacture and cooling.

In the polymer manufacturing process, plastic resins are synthesized in closed reactor units from feed stocks of ethane, propane, and butane (Tr. at 16). The resins are formed into pellets following manufacture, and the pellets are stored and transferred to rail cars and trucks for distribution. (Pet. at p.10.)

Co-petitioners observe that:

During the synthesis process, some of the hydrocarbon gases are entrained within the polymer resin. These entrained gases are evolved during the storage and transfer of the polymer pellets. The entrained gases (primarily ethylene and propylene) are emitted to the atmosphere with the conveying air at numerous diverse exhaust points (i.e., storage bins, storage silos, rail car loading systems, and truck loading systems)\*\*\* (Pet. at p. 11.)

Among facilities at the Morris Plant are three at which polymer manufacturing occurs and for which an adjusted standard is sought: the Low Density Polyethylene (LDPE) Plant, the Linear

Low Density Polyethylene (LLDPE) Plant, and the Polypropylene Plant. Each plant has multiple VOM emission sources.

The Morris Plant also includes six cooling towers. Five of these are non-contact cooling towers<sup>5</sup> that under normal operating conditions have no VOM emissions. Process water is used in the sixth tower, the ethylene oxide/ethylene glycol (EO/EG) cooling tower. In the EO/EG Plant ethylene is reacted with oxygen to form ethylene oxide, which in turn may be hydrated to form ethylene glycol. (Tr. at 16-17.) The EO/EG cooling tower has VOM emissions under normal operating conditions.

#### RULE OF GENERAL APPLICABILITY

Co-petitioners seek alternate application of regulations found within two sections of the Board's RACT rules. These are Sections 218.966 and 218.986, which occur respectively within subparts addressing Miscellaneous Organic Chemical Manufacturing Processes (35 Ill. Adm. Code: Subpart RR) and Other Emission Sources (35 Ill. Adm. Code: Subpart TT).

The request for adjusted standard from Section 218.966 deals solely with the requirements found at subsections (a) and (b)<sup>6</sup>, which require a reduction in uncontrolled VOM emissions of at least 81 percent or an alternative control plan. The specific text of the two pertinent subsections is as follows:

#### Section 218.966 Control Requirements

Every owner or operator of a miscellaneous organic chemical manufacturing process emission unit subject to this Subpart shall comply with the requirements of subsection (a) or (b) below.

- a) Emission capture and control techniques which achieve an overall reduction in uncontrolled VOM emissions of at least 81 percent from each emission unit, or

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<sup>5</sup> The non-contact cooling water towers at issue are the Ethylene Plant Cooling Tower, the LDPE Plant Cooling Tower, the Polypropylene Plant Cooling Tower, the Utilities Cooling Tower, and the Air Separation Plant Cooling Tower.

<sup>6</sup> In Omnibus Cleanup of VOM RACT Rules (see preceding footnote) the Board adopted a new subsection 218.966(c) pertaining to leaks. Quantum asserts that it does not need and does not request relief from subsection (c). (Response at ¶13.)

(Board Note: For the purpose of this provision, an emission unit is any part or activity at a source of a type that by itself is subject to control requirements in other Subparts of this Part or 40 CFR 60, incorporated by reference in Section 218.112, e.g., a coating line, a printing line, a process unit, a wastewater system, or other equipment, or is otherwise any part or activity at a source.)

- b) An alternative control plan which has been approved by the Agency and the USEPA in a federally enforceable permit or as a SIP revision.

The request for adjusted standard from Section 218.986 deals solely with the requirements found at subsections (a), (b), and (c)<sup>7</sup>, which require an 81 percent reduction in uncontrolled VOM emissions, an independent requirement for coating lines, or an alternative control plan. The specific text of the three pertinent subsections is as follows:

Section 218.986 Control Requirements

Every owner or operator of an emission unit subject to this Subpart shall comply with the requirements of subsection (a), (b), (c), (d), or (e) below.

- a) Emission capture and control equipment which achieve an overall reduction in uncontrolled VOM emissions of at least 81 percent from each emission unit, or

(Board Note: For the purpose of this provision, an emission unit is any part or activity at a source of a type that by itself is subject to control requirements in other Subparts of this Part or 40 CFR 60, incorporated by reference in Section 218.112, e.g., a coating line, a printing line, a process unit, a wastewater system, or other

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<sup>7</sup> In Omnibus Cleanup of VOM RACT Rules (see preceding footnote) the Board adopted new subsections 218.986(d) and (e) pertaining to work practices and to leaks, respectively, at cooling towers. Quantum asserts that it will be subject to 218.986(d) and does not request relief from that subsection, and that it does not need and does not request relief from subsection (e). (Response at ¶4.)

equipment, or is otherwise any part or activity at a source.)

- b) For coating lines, the daily-weighted average VOM content shall not exceed 0.42 kg VOM/l (3.5 lbs VOM/gal) of coating (minus water and any compounds which are specifically exempted from the definition of VOM) as applied during any day. Owners and operators complying with this Section are not required to comply with Section 218.301 of this Part, or
- c) An alternative control plan which has been approved by the Agency and the USEPA in a federally enforceable permit or as a SIP revision.

#### EMISSION SOURCES/COMPLIANCE EFFORTS

Quantum has undertaken various initiatives to modify its Part 215 VOM emissions program to comply with the general Part 218 regulations. Principal focus has been on those potential emission sources where VOM concentrations are sufficiently high that control technologies are effective in reducing or eliminating the emissions. Among examples are controls on the wax blow-down system at the LDPE Plant that are intended to reduce VOM emissions by over 450 tons per year (Tr. at 18), and installation of closed loop sampling in the EO/EG Plant that is expected to reduce VOM emission by approximately 50 tons per year (Tr. at 20). Quantum intends to continue these initiatives, and they are not subject to the adjusted standard considered today.

However, there are a number of potential emissions sources within the Quantum operation where VOM exists in large air streams. These low-concentration sources are difficult to control. (Tr. at 21.) Quantum contends, and the Agency agrees, that there are no technically or economically feasible control methods for these sources beyond those currently employed. (Id.) Co-petitioners contend, therefore, that current practices constitute RACT.

The low-concentration emission sources at issue occur within the finishing and storage units of the polymer plants and within the cooling tower operations. The former include elements of the pneumatic conveying system, the storage silos, and the rail car and truck loading units. (Tr. at 21.) The full set of low-concentration emission sources for which adjusted standard is requested is listed in Exhibits A and A1. The list is today repeated in conditions (A) and (B) of the order accompanying today's action.

The largest single source among these, accounting for 80% of all the VOM emissions at issue, are the blender units at the LDPE Plant. (Tr. at 36, 45.) These typically emit concentrations of ethylene at less than two hundred parts per million (0.02%) by weight. (Tr. at 36.) However, the air volumes are large at approximately 70 thousand cubic feet per minute. (Id.)

Collectively, these sources are estimated to produce emissions at the rate of 263 tons per year (Pet. at 13) or 0.72 tons per day. (Tr. at 25.) Individual sources have emissions based on actual field tests and measures in tons per year as follows (Pet. at p. 13):

LDPE Plant

|             |        |
|-------------|--------|
| Spin Driers | 37.24  |
| Blenders    | 210.50 |
| Car Loading | 0.08   |

LLDPE Plant

|                           |      |
|---------------------------|------|
| Pellet Driers             | 3.00 |
| Blenders                  | 5.26 |
| Multi Pass Separator      | 0.76 |
| Scalperator & Hopper Cars | 1.38 |

Polypropylene Plant

|                         |      |
|-------------------------|------|
| Pellet Driers           | 0.62 |
| Blenders                | 4.00 |
| Storage and Car Loading | 0.55 |

Quantum observes that the particular type of polymer manufacturing employed at its Morris Plant was not considered during the promulgation of Part 218 or in the regulations which preceded Part 218 (Tr. at 26), and was not reviewed by the United States Environmental Protection Agency (USEPA) in preparation of the Control Technology Guideline (CTG)<sup>8</sup> upon which RACT for the polymer manufacturing industry was based (Exh. D at 5-1). However, Quantum observes that the USEPA did review the specific manufacturing processes employed at the Morris Plant in developing the New Source Performance Standards (NSPS). The NSPS exempt emission sources from controls where VOM concentrations are less than 0.001 (0.1%) by weight. (Exh. D. at 5-2; Tr. at 22; see also 40 CFR 60.560(g).) The emissions sources for which Quantum requests adjusted standard all have VOM concentrations below 0.001 by weight. (Tr. at 37.) While Quantum allows that

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<sup>8</sup> "Control of Volatile Organic Emissions From the Manufacture of High-Density Polyethylene, Polypropylene, and Polystyrene Resins", EPA-450/3-83-008.



"the New Source Performance Standards are not necessarily the same as [RACT]", it observes that the NSPS do "give a good indication of what kind of practical control technology is available for these sorts of sources". (Tr. at 22-23.) Moreover, no emission control would be required for the emission sources at issue under NSPS if the sources were constructed today. (Exh. D at 5-3.)

Quantum has commissioned a study to review possible control strategies and costs for the low-concentration emission sources. The full report of this study, which considered nine possible control technologies, is present in the record as Exhibit D<sup>9</sup>.

Three of the possible control technologies, carbon adsorption, absorption, and condensation, were found to be technically infeasible due to low adsorption capacity, ineffective absorbants, and condensation difficulties. (Exh. D at 6-26; Tr. at 38-39.)

The remaining six control technologies all were found to be "economically infeasible". The technologies include thermal incineration, catalytic incineration, regenerative thermal incineration, flaring, and use of a low pressure product separator or degassing extruder. For control of just the emissions from the blenders of the LDPE Plant, annualized costs range between \$549,080 for the low pressure product separator to \$37,775,500 for flaring. (Pet. at p. 30; Exh. D. at 6-2; Tr. at 39-44.) Costs for a ton of VOM removed per year range from \$7,270 for regenerative incineration to \$183,110 for flaring. (Id.) Destruction efficiency ranges from a low of 22% for the low pressure product separator to 98% for incineration. (Id.)

Each of the incineration technologies emits significant amounts of NOx. (Pet. at p. 31.) Since NOx also contributes to ozone formation, these technologies negate part of the desired benefit. (Exh. D at 7-2.) The incineration technologies also produce carbon monoxide. (Pet. at p. 31.)

Co-petitioners contend that under normal operations there should be no VOM emissions from any of the non-contact cooling towers. In the case of the EO/EG cooling tower, the VOM emissions are contended to be negligible due to the high solubility and low vapor pressure (less than 1 mm Hg at ambient temperatures) of ethylene glycol. (Pet. at 15.) Co-petitioners further observe that under normal operating conditions daily water samples have shown ethylene oxide concentration of about 1

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<sup>9</sup> "Economic Analysis and Technology Review for Control of VOM Emissions from Polyolefin Finishing and Storage Units", prepared by Pilko and Associates, Inc.

ppm, which corresponds to 3.4 tons per year of emissions. (Pet. at 16.)

HEALTH AND ENVIRONMENTAL EFFECTS

Co-petitioners contend that grant of the requested adjusted standard would not produce significant adverse health or environmental effects. Quantum observes that the major component of its VOM emissions is ethylene<sup>10</sup>. (Tr. at 24.) Although ethylene is flammable, it is non-toxic and is approved by the Federal Food and Drug Administration as an indirect food additive and for use in treating fruits and vegetables to promote ripening. (Pet. at 39; Tr. at 24.) The concentrations at which ethylene is emitted are far below the flammability limit. (Pet. at 39.) Co-petitioners therefore expect no direct adverse health or environmental effects from the emitted ethylene.

Ethylene does contribute to ozone formation in the lower atmosphere and thereby does have indirect adverse health effects. Quantum contends, however, that its emissions are small compared to the total VOM emissions in the Chicago ozone non-attainment area, and hence that the emissions have no measurable impact on the ozone levels in the Chicago area (Tr. at 25) and constitute "a negligible contribution to the VOM burden" in the Chicago area (Pet. at p. 38.)

PROPOSED AMENDMENT TO SECTION 218.103(b)

The Board notes that the co-petitioners also request that 35 Ill. Adm. Code 218.103(b) be amended to specifically identify Quantum (see Pet. at p.36 and Exh. E). The following amendment is proposed:

\* \* \*

- b) The provisions of the Part shall not apply to Viskase Corporation; Allsteel, Incorporated; Stepan Company; ~~or Ford Motor Company;~~ or Quantum Chemical Corporation to the extent such source has obtained an adjusted standard from the Board or an exclusion from the General Assembly for any Subpart of this Part or of 35 Ill. Adm. Code 215.

However, the Board cannot make this amendment in the instant adjusted standard proceeding. Since the amendment would change the text of an existing regulation, the amendment would constitute a rulemaking, and rulemaking must be conducted in

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<sup>10</sup> Other VOM emissions are propylene and "very small amounts of vinyl acetate, butenes, and hexenes". (Pet. at 12; Exh. I.)

accordance with the regulatory procedures of Title VII of the Act.

The Board notes that today's grant of adjusted standard is not dependent upon the existence of the requested amendment to Section 218.103(b), nor is the requested amendment necessary for the Board to grant the adjusted standard.

#### CONCLUSION

Based upon its consideration of the record presented in this action, the Board finds that the co-petitioners have provided the justification required pursuant to Section 28.1 of the Act for an adjusted standard to be granted with conditions.

This opinion constitutes the Board's findings of fact and conclusions of law in this matter.

#### ORDER

Quantum Chemical Corporation, USI Division (Quantum), is hereby granted an adjusted standard, pursuant to 415 ILCS 5/28.1, applicable to Quantum's facility located in Aux Sable Township, Grundy County, Illinois, subject to the provisions and conditions listed below.

A) The adjusted standard pertains to VOM emission sources from Quantum's polymer plant finishing and storage units, as follows:

1) Low Density Polyethylene (LDPE) Plant:

Spin Driers - Total of 4 spin driers, one for each line.

Blenders - Total of 18 blenders, BL-1 through BL-18 and associated bagfilters.

Storage and Car Loading - Total of 17 Silos, car loading facilities and associated bagfilters.

2) Linear Low Density Polyethylene (LLDPE) Plant:

Pellet Driers - Total of 2 spin dryers, one for each line.

Blenders - Total of 12 blenders, 4 for line #5 (BL-13 through BL-16) and 8 for line #6 (BL-30 through BL-37) and associated bagfilters.

Multipass Separators - 4 multipass separators, 2 at the booster blower, 2 at car loading and associated bagfilters.

Scalperators and Hopper Cars - 4 scalperators and 2 bagfilters at car loading.

3) Polypropylene Plant:

Pellet Driers - Total of 4 spin dryers, one for each line.

Blenders - Total of 7 blenders and associated bagfilters.

Storage and Car Loading - Total of 24 silos, car loading facilities and associated bagfilters.

B) The adjusted standard pertains additionally to the following VOM emission sources:

- 1) Non-contact cooling water towers at the Ethylene Plant, LDPE Plant, Polypropylene Plant, Utilities Area, and Process Research Area, and
- 2) Process cooling water tower at the Ethylene Oxide/Ethylene Glycol Plant.

C) The current operation of the VOM emission sources listed in (A) and (B) above represent RACT control and no additional controls are required to meet the requirements of 35 Ill. Adm. Code 218.966(a) or (b) and 35 Ill. Adm. Code 218.986 (a), (b), or (c).

D) Quantum shall comply with the following requirements at its LDPE Plant:

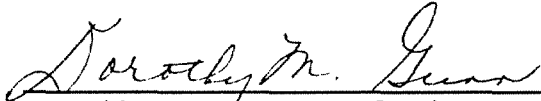
- 1) VOM concentrations from the LDPE finishing operations, measured at the discharge of the fabric filters (during normal operation in which two production lines are running through one bagfilter), may not exceed 250 parts per million by weight.
- 2) VOM concentrations from LDPE spin dryers may not exceed 500 parts per million by weight.
- 3) Quantum shall conduct testing in accordance with 35 Ill. Adm. Code 218.105 to determine VOM concentrations from the LDPE finishing operation and spin dryers upon written request by the Illinois Environmental Protection Agency or upon a significant change in LDPE product or operation that may increase VOM emissions.

- 4) Quantum shall maintain operating records, as specified in an operating permit, that identify any significant change in LDPE product or operation that may increase VOM emissions.

IT IS SO ORDERED.

Section 41 of the Environmental Protection Act, 415 ILCS 5/41 (1992), provides for appeal of final orders of the Board within 35 days. The Rules of the Supreme Court of Illinois establish filing requirements. (See also 35 Ill. Adm. Code 101.246, Motions for Reconsideration.)

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above opinion and order was adopted on the 7<sup>th</sup> day of October, 1993, by a vote of 7-0.

  
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Dorothy M. Gunn, Clerk  
Illinois Pollution Control Board