BEFORE THE
ILLINOIS POLLUTION CONTROL BOARD

RECEIVED
JAN 31 1995
STATE OF ILLINOIS
POLLUTION CONTROL BOARD

IN THE MATTER OF:)
)
15% ROP PLAN CONTROL MEASURES FOR VOM) R 94-33
EMISSIONS - PART VII: BATCH OPERATIONS;) (Rulemaking)
AMENDMENTS TO 35 IL. ADM. CODE PARTS)
211, 218 AND 219.

P.C. #6

NOTICE

TO: Dorothy Gunn, Clerk
Illinois Pollution Control Board
State of Illinois Center
100 W. Randolph
Suite 11-500
Chicago, Illinois 60601

Audrey Lozuk-Lawless
Illinois Pollution Control Board
State of Illinois Center
100 W. Randolph
Suite 11-500
Chicago, Illinois 60601

PLEASE TAKE NOTICE that I have today filed with the Clerk of the Illinois Pollution Control Board an original and nine copies of the Comments of Stepan Company, copies of which are herewith served upon you.

MAYER, BROWN & PLATT

By: [signature]
Patricia F. Sharkey

Dated: January 30, 1995

Patricia F. Sharkey
MAYER, BROWN & PLATT
190 South LaSalle Street
Chicago, IL 60603
312/782-0600

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15% ROP PLAN CONTROL MEASURES FOR VOM EMISSIONS - PART VII: BATCH OPERATIONS; AMENDMENTS TO 35 IL. ADM. CODE PARTS 211, 218 AND 219.	)	R 94-33 (Rulemaking)

COMMENTS OF STEPAN COMPANY

Stepan Company ("Stepan") owns and operates a manufacturing facility located in Elwood, Illinois which includes among its processes a number of "batch process operations" as defined in the proposed rule in this matter. As an owner and operator of a number of complex batch process operations, Stepan has had extensive experience in both running batch processes and in addressing the unique regulatory compliance issues associated with batch processes. Stepan's efforts to address batch processes under the "generic rule approach" go back to the Board's initial "generic rule," R 86-14, and have continued through the Federal Implementation Plan ("FIP") "generic rule" and currently pending state and federal site-specific RACT proceedings. As will be discussed later in these comments, Stepan believes that this rulemaking will provide a more reasonable regulatory approach for its batch processes than the "generic rule approach," and, thus, allow Stepan to withdraw its site-specific petitions.

Stepan was an active participant in the hearing on January 4, 1994 (See Transcript, pp. 19 to 43) and, both prior to and subsequent to the hearing, provided the Illinois Environmental

Protection Agency ("Agency") with comments on the proposed rule and suggestions designed to clarify and improve the rule.

In response to Stepan's comments and those of other affected parties, including the Illinois Environment Regulatory Group ("IERG"), the Agency has agreed to a number of interpretations of and revisions to the proposed regulatory language which in Stepan's opinion will make this rule a workable regulatory approach. Stepan attempted to clarify interpretational issues with the Agency in the hearing. The agreed upon revisions to the language of the proposal have been filed with the Agency's comments and are also attached hereto. (Attachment A.) Stepan's comments herein are offered in support of this revised language and as an explanation of the concerns some of those revisions are designed to address.

I. APPLICABILITY TO STEPAN

Section 500[1]/ states that the proposed rule will apply to batch operations at sources with the four-digit standard industrial classification ("SIC") codes. Stepan has certain batch operations, e.g. Stepan's surfactants, which do not fall within the specified SIC codes but which are chemically and operationally similar to those which do. Therefore, the Agency has agreed that regardless of SIC codes the rule should apply to all of Stepan's batch operations except as otherwise stated in

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1/ For brevity's sake, Stepan will use only the three digit section number for sections which may be proposed for either Part 218 or 219.

Section 500(b). This is reflected in the First Notice proposal in Section 500(a)(2).

II. <u>CONTROL DEVICES v.s. PROCESS OR RECOVERY DEVICES</u>

Although several provisions in the proposed rule reference the use of condensers and other devices as control devices, the Agency, in response to questions in the hearing, made it clear that in many instances these devices are not control devices but rather process or recovery devices. (Transcript pp. 23-25.) For example, a condenser may be used primarily as a recovery device or may function as an integral part of the process, such as a reflux condenser or a steam vacuum system. The significance of this point is that when a device is functioning as a "control device," as opposed to a process or recovery device, emissions must be measured <u>before</u> the device. When a device is used for product recovery or is otherwise functioning as an integral part of the process, emissions are appropriately measured at the outlet of the condenser. In Stepan's experience, ambiguity as to where "uncontrolled total emissions" are to be measured can result in significant disagreements in the permitting process. Thus, the Agency's clarification on this point is very helpful. The Agency's testimony makes it clear that where emissions are measured will be based on how an owner or operator chooses to design and operate the device in a given chemical process. (Transcript pp. 24-25.)

A. **Condensers**

The Agency's discussion of the principle of operation and applicability of condensers in Section 3.1 of the Agency's November 1994 "Technical Support Document for Batch Processes", AQPSTR 94-10, ("Agency TSD") further support this point. (See Agency TSD, pp. 18-20.) In that section, the Agency notes "condensers servicing reactors and distillation columns often function in refluxing material. This refluxing is an integral part of the process, and therefore these condensers are often not considered to be emission control devices." (Id. p. 18) The Agency also notes "shell and tube condensers are usually employed as refluxing devices on batch distillation units." (Id. p. 19)

In a Technical Support Document USEPA developed specifically for Stepan's batch processes, "Stepan Company Millsdale Plant, Elwood, Illinois, Non-CTG RACT Evaluation Technical Support Document," March 1992 ("Stepan TSD"), USEPA discusses the concept that a device may be "integral" to an operation in the sense that it contributes to the efficiency of the operation. (Attachment B hereto.) An example of a device which is necessary to efficient operation is a condenser which condenses alcohol and which, although not technically necessary to operate the process, nonetheless is necessary for the operation to be run efficiently and economically. The recovery of material is an integral step in the overall operations. This could even include material recovered from one process which is then used in a different process. In some cases, the material recovered from the recovery device may be further processed, even off-site, and then returned to be used in the same or another process. Whenever recovered material is used beneficially it contributes to the efficiency and economy of the operation and reduces waste and redundancy. Therefore, recovery devices should generally be treated as process devices rather than control devices, even though they do help reduce emissions.

B. **Other Devices**

Several of Stepan's batch processes also include other systems which function as an integral part of the process, but also provide some control.

For example, the primary function of vacuum systems and eductor systems at the Millsdale facility is to allow manufacturing and processing of Stepan's products without detrimentally affecting product quality. For example, in Stepan's Esters processes, some products generate alcohols as by-products which must be removed.

In certain processes, the alcohol is removed by vacuum stripping, e.g. in Stepan's Methyl Esters Esterifier. In another process, the crude esters are purified by vacuum distillation. If the stripping were carried out at atmospheric pressure, the temperature required to remove the alcohol efficiently would degrade the product. Therefore, a vacuum eductor system is necessary to reduce the pressure inside Esters reactors so that the stripping operation can proceed at a temperature which ensures product quality is not jeopardized. Clearly, without the vacuum producing equipment, the process could not operate. It should be clear that in this instance the vacuum eductor system is part of the process and not a pollution control device.

The same degradation would occur with the product if the distillation process were carried out at atmospheric pressure. In that case, a three stage vacuum system is necessary to operate the process and ensure product quality. It should be clear, again, that this vacuum system is an integral part of the process, and not a pollution control device.

III. <u>BATCH PROCESS TRAIN DETERMINATIONS</u>

The proposed rule provides that both the emissions from a "single unit operation" and the aggregated emissions from all "single unit operations" functioning as a part of a "batch process train" must meet the stated "de minimis" levels or be subject to the control requirements of Section 501. (See Section 500(c) and (d)). The Agency's TSD neither discusses the concept of a "batch process train" nor provides guidance on the aggregating of emissions for de minimis determinations and control purposes. While USEPA's model batch process rule contained in its "Control of Volatile Organic Compound Emissions from Batch Processes" ("CTG") (Nov. 1993, Doc. EPA-453/R-93-017), defines "batch process train" very broadly, it also provides little guidance on applying this concept. (See Appendix G to the CTG.) In fact, many questions about aggregating emissions from a "batch process train" arise when one tries to apply this rule to a sophisticated chemical manufacturing plant where a number of products may be produced from a given feed stock using overlapping configurations of equipment designed to maximize efficiency. The fundamental question is which "single unit operations" are to be included in which "batch process train"? Other related questions are: Where does a "batch process train" begin and end? How does one account for a "single unit operation" that functions as a part of more than one "batch process train"? How can one actually aggregate for control purposes emissions from chemically incompatible product lines?

These concerns drove Stepan and IERG to work with the Agency to develop a definition of "batch process train" which to the extent possible would delineate the key characteristics of a "batch process train." That definition was included in the First Notice Proposal. Notwithstanding this new definition, it is still difficult to determine what to include in a "batch process train" for a complex chemical process, such as Stepan's hydrotropes process.

A. **Multi-Train Units**

The Agency's testimony in response to Stepan's hydrotropes process example is instructive on several otherwise confusing aspects of the "batch process train" concept. (See Transcript pp. 25-31 and Exhibit 3.) Stepan's hydrotropes process involves four reactors, each of which independently feed xylene sulfonic acid to either an ammonia neutralizer or a sodium neutralizer. Two distinct and incompatible products are produced. In the hearing, the Agency noted that in this case each reactor is a part of two distinct "batch process trains" and each neutralizer is a part of four distinct "batch process trains." Thus, eight "batch process trains" utilize these six "single unit operations." (Transcript pp. 25-29.) Based on this guidance, it is clear that a "single unit operation" can indeed participate in more than one "batch process train." The Agency also testified that the volume of emissions attributable to each "batch process train" from such a unit should be only those generated during "batch cycles" running through that particular "batch process train". (Transcript pp. 29-31.) Thus, for aggregation purposes, the emissions from a "multi-train" unit, should be distributed over the "batch process trains" involved.

B. **Product Produced**

It is important to note from this example, that while a "batch process train" can be identified based on the product produced, not all units that make the same products are a part of the same "batch process train". This is clearest in the situation where a plant has two distinct but parallel process lines producing the same product. These are clearly separate "batch process trains," not based on the end product, but because they each operate independently of one another. In order for the aggregation regulatory approach to make sense, a "train" must be composed of units which are linked or dependent operations from which emissions can, in fact, be aggregated for control purposes.

C. **Dependent/Independent Operation**

In response to a question in the hearing, the Agency concurred that the independence of one "batch process train" from other "batch process trains" or other "single unit operations" is fundamental to defining the "batch process train." The Agency stated that if a "batch process train" is operated independently of another "batch process train," it is considered a separate "batch process train". (Transcript pp. 29-30.) This should be true even though both trains may use some of the same individual units and even though they may produce the same product.2/

D. **Geographic Proximity**

Stepan notes that geographic proximity of units is obviously a key consideration for determining whether emissions can be aggregated for control purposes. However, it must be emphasized that independent "batch process trains" even if they simultaneously produce the same products and even if they are located in the same geographical area, are still separate and distinct "batch process trains". Although geographical proximity is a key consideration for controlling emissions, the units which are included in a "batch process train" must, in the first instance, must be based on whether the units are independent or interdependent.

2/ As the Agency noted in the record, any concern that one is not accounting for all of the emissions that a single "multi-train" unit is producing is taken care of by the provision that each "single unit operation" must itself also either meet de minimis levels or be controlled. (Transcript pp. 30-31.)

E. **Compatibility**

Another fundamental consideration must be the compatibility of the materials being processed. For example, Stepan's blended detergent area (M Building) has seven batch neutralizers of different sizes capable of manufacturing the same or different products. Because each neutralizer may be processing different, incompatible materials during any particular day, separate vents must be provided and those vent streams cannot be combined without causing an adverse chemical reaction. It should be noted that each of these neutralizers also has a separate feed and storage system which enables it to operate independently of the others.

At the Millsdale facility, the type of chemical being processed in a batch vessel may change from day to day. Stepan has several batch blenders or reactors in one building that are capable of processing several products, but from batch to batch and at any given time, the contents of the vessels can be different and incompatible. If manifolded together, this could result in an adverse chemical reaction and/or product cross contamination. Also, a reactor that provides the feed to a blender one day may be producing an incompatible feed for another blender the next day, and the tying together of the reactor to the blender through a common vent manifold could result in product contamination due to chemical residues.

F. **Can Emissions Be Vented Through A Common Control Device?**

It is our understanding that the concept of aggregating emissions was included in the proposed rule on the assumption that the "single unit operation" vents can be reasonably manifolded together to feed a common pollution control device. However, unless reasonably applied, such manifolding may result in adverse chemical reactions, product contamination, and unreasonable expense (i.e. to connect geographically distant vents.) The practical ability to physically aggregate and control emissions must be considered a fundamental limitation on any abstract requirement to aggregate.

G. **Continuous Process Units**

In some instances at Millsdale, several batch neutralizers are fed by a continuous sulfonator. Since a batch process differs from a continuous process in its operating characteristics (for example, a batch vessel may be going through a cleaning or maintenance cycle while the continuous process is operating) and continuous operations are covered under other regulations, the owner or operator of a "batch process train" generally should not aggregate emissions from continuous units with batch units.

Given the complexity of this issue and the lack of Agency or USEPA written guidance on this point, Stepan requests that the Board make it clear in its Opinion and Order that in aggregating emissions from a process train, owners and operators (and Agency permit writers) should consider the following factors: i) Is the

<u>unit used in more than one train? ii) Are the units interdependent? iii) Are the materials used chemically compatible? iv) Are the units geographically close and accessible? v) Are the units operated as a process train throughout the year? vi) Are any continuous units involved? and vii) Can emissions be vented to a common control device?</u>

IV. **USE OF TOTAL PRODUCTION DATA TO DETERMINE COMPLIANCE**

As originally proposed by the Agency, Section 502(a)(2) provides that uncontrolled total annual emissions can be calculated based upon engineering estimates of uncontrolled VOM emissions <u>per</u> <u>batch</u> <u>cycle</u> multiplied by the number of <u>batch</u> <u>cycles</u> per year. Stepan pointed out that this "batch cycle approach" will work only for batch units or trains that have uniform batch cycles. (See Transcript pp. 31-33.) In many of Stepan's batch operations, the volume and duration of different batch cycles vary, and the VOM emissions generated during each batch cycle varies depending on the duration, type and volume of the product being produced, as well as the conditions under which it is produced, e.g., temperature and pressure. Since the pertinent parameters of Stepan's batch cycles vary, simply using the number of batch cycles would yield an inaccurate emissions estimate for Stepan. The simplest example is batch cycles of varying volumes. Two 5,000 lb. batches may emit as much VOM as a single 10,000 lb. batch. Similarly, two six hour batches may emit as much as a single twelve hour batch.

A second problem for Stepan with the "batch cycle approach" to estimating total emissions is the fact that Stepan does not compile batch cycle data on an annual, or even monthly basis, and is not permitted on a batch cycle basis. The variability in Stepan's batches make the information pertaining to individual batches less useful than the overall production numbers, and, therefore, Stepan's documentation and permits are based on pounds per hour and hours of operation which equate to total annual production. After considering Stepan's comments on this point, the Agency has agreed that, as long as total production is reflected in the data on which a valid Agency permit is based, this approach is a workable alternative. (Transcript p. 32.)

The Board will note that the agreed upon revised language does not delete the per batch cycle approach, but simply adds the total production approach as an alternative both in Section 502 (emission determinations) and Section 505 (reporting and recordkeeping).

V. ALTERNATIVE TEST PROCEDURES FOR BATCH CYCLES OF GREATER THAN 8 HOURS

A. The Issue Posed By Long Batch Cycles

As originally proposed, Section 503(f) provided that emission testing using Method 25A or Method 18 when requested by the Agency to demonstrate compliance would have to be performed over the entire length of the batch cycle. Stepan and IERG pointed out that some batch operations may run as long as 18-36 hours. The difficulty and expense involved in testing for the full length of these very long batch cycles is not justified if the representative emission events within the batch cycle (e.g., charging, venting or vacuum distillation) can be characterized and measured by shorter tests.

The Agency and Stepan together discussed this matter with Randy MacDonald of the United States Environmental Protection Agency's ("USEPA") Research Triangle Park. Mr. MacDonald is the USEPA regulatory development engineer who was principally responsible for the USEPA documents which form one of the basis of this rulemaking, the CTG and Alternative Control Techniques Document ("ACT") (Feb. 1994). Mr. MacDonald is also currently working on USEPA's MACT standards for batch processes. Mr. MacDonald admitted that USEPA had not adequately addressed this issue when it developed its model rule in the CTG. (See CTG, Appendix G.) He agreed that it was reasonable to test for less than the full duration of a batch cycle of greater than 8 hours as discussed in the CTG document itself. (See CTG, Section 7.3, p. 7-10.)

In discussions with Randy MacDonald and the Agency, the variety and the variability of the emission events in a typical batch process of the CTG were discussed. Included in the discussion was the reference to the high cost of sampling a batch process as compared to a continuous process and the need to take periodic samples. (See CTG, p. 7-10.) Mr. MacDonald and the Agency indicated agreement that sampling a batch process is considerably more expensive than sampling an equivalent continuous process that emits the same annual amount of VOM and, that the potential reduction in emissions that may be gained from actual sampling is considerably less as well. Mr. MacDonald repeatedly emphasized that actual emission testing is not routinely required under the CTG. Rather, engineering estimates should form the basis of the owner's or operator's compliance demonstration, and be supplemented by testing only as necessary. However, testing remains an issue because it may be necessary to resolve disputes between the owner or operator and the permit writer and to define unusual or unpredictable emission events.

B. **The Proposed Sampling Strategy**

To develop a reasonable approach to quantifying emissions from a batch process, such as a vacuum batch reactor, it must be understood that a typical batch process will go through a number of discrete process steps, although not every step generates or vents emissions. A typical process would be:

1) Charging Raw Materials
2) Heat up
3) Reaction
4) Apply vacuum (evacuation)
5) Vacuum distillation/stripping
6) Cool down
7) Pump out
8) Clean up

During the initial process of developing a sampling strategy for these longer emission events, an engineering estimate of the emissions from each emission event has to be made in order to define the emission events that contribute the major amount of the total emissions. In many cases, 90% of the total emissions will be obtained from one or two emission events in the batch cycle. The emissions from the batch process are then determined by sampling the emissions from the significant emission events of the cycle and then adding the engineering estimate of the emissions from the least significant emission events of the cycle. The emissions from each emission event, including the engineering estimates, are summed to determine the total emissions per batch and finally the total emissions per batch is divided by the total batch cycle to determine the average emission rate for the process.

For emission events of 4 hours or less that are not accurately represented by a constant emission rate (for example, vacuum stripping that utilizes an ever increasing vacuum to strip off the volatile emissions), it may be necessary to sample over the entire period of the emission event in order to quantify the emissions. However, for batch cycles of greater than 8 hours and emission events of greater than 4 hours, while the variability in emissions is likely to be the same as for shorter events, the emission event takes place over a longer period of time. Therefore, Stepan, IERG, and the Agency have agreed that emissions from these long events can be accurately quantified based on three one hour samples taken during the emission event.

C. **The Revised Proposed Language**

To address the issue of testing these long batch cycles, Stepan, IERG and the Agency have developed revised language for Section 503(f)(3)(A). Section 503(f)(3)(A)(i) provides for continuous testing throughout the entire batch cycle for cycles of less than 8 hours. For cycles of 8 hours or more, Section

503(f)(3)(A)(ii) provides for testing "only during those periods of the emission event which define the emission profile of the emission event." For these long batch cycles, the owner or operator must test continuously over every emission event of less than 4 hours. But, for emission events of greater than 4 hours, the owner or operator has the option of either testing continuously or performing three one hour tests. To test anything less than continuously, the owner or operator must provide a demonstration that the periods tested are those which "define the emission profile for the emission event."

Stepan believes this provision sets a very rigorous standard for testing, when testing is required, but at the same time will be less onerous than continuous testing for long batch cycles or developing a separate protocol for every stack test.

D. **Maximum Intervals In Testing**

On a related point, Stepan pointed out and the Agency agreed at the hearing that the maximum 15 minute interval in the continuous testing requirement was unworkable over batch cycles where Method 18 must be used. (Transcript pp. 36-37.) Method 18 involves the use of an impinger containing absorbent material which must be "changed out" manually when it becomes saturated. In Stepan's experience, the process of "changing out" the impinger can require at least 30 minutes.

Mr. MacDonald of USEPA and the Agency have agreed that an interval of 30 minutes in this situation will not adversely affect the accuracy of the testing. (See Transcript p. 37.)

Section 503(f)(3)(A)(i) of the revised proposal contains revised language reflecting this agreement.

E. **"Emission Event" Definition**

In order to address the above-referenced testing issues, Stepan, IERG and the Agency agreed it was necessary to define the term "emission event." The agreed upon definition which appears in Section 503(f)(3)(A)(iii) of the revised proposal, was largely taken from the definition of "emission event" provided in the Batch Process CTG. (See CTG, Sec. 7.1, p. 7-3.) One significant difference, however, is the last sentence of the revised proposed subsection which is designed to address periods of zero flow. Consistent with the CTG definition which defines an "emission event" as a "discrete venting episode," this language simply clarifies the fact that zero flow periods do not involve venting and, thus, are not "emissions events."

VI. **CALENDAR YEAR**

As a point of clarification, Stepan asked the Agency at the hearing whether determinations of "uncontrolled total annul mass emissions" and associated reporting and recordkeeping under this rule were intended to be based on a calendar year or a rolling 12-month period. Stepan notes, for the record, that the Agency unequivocally stated that the Agency intends that a calendar year be used for all purposes under this rule. (Transcript pp. 38-39.)

Stepan requests that the Board make this point clear in its Opinion and Order.

VII. **EFFECTIVE DATE**

The Agency noted that although the compliance date for this rule is March 1996, it is the Agency's intent that this rule be effective when the final rule is published in the Illinois Register.

Stepan supports this position and urges the Board to make these regulations effective upon publications.

VIII. **EFFECT OF THIS RULE ON STEPAN'S SITE SPECIFIC RULEMAKING DOCKETS**

Stepan's unique position was first brought to the Board's attention in R86-18, the Board's initial "generic rule" proceeding. In that proceeding, Stepan provided testimony as to the unreasonable impact of the generic rule on its processes, including its batch processes. However, because the full ramification of the rule did not become apparent until the economic impact stage and the Board preferred not to address the merits of the issue at that stage, the Board recommended that Stepan seek site-specific relief from the generic rule. Thereafter, Stepan filed a petition for an adjusted standard (AS 88-2) which has been pending before the Board since 1988 due to the intervening imposition of a federal "generic rule" in the Federal Implementation Plan ("FIP") and Stepan's subsequent FIP appeal. The state adjusted standard proceeding has been stayed pending the outcome of the federal appeal and USEPA's development of a site-specific standard for Stepan. Last year USEPA proposed a site-specific rule for Stepan and Stepan provided extensive comments on that rule; however, USEPA review of Stepan's comments has been repeatedly delayed.

Adopting the agreed upon language provided with the Agency's comments (and attached hereto) offers an opportunity to cut-through several layers of site specific proceedings and finally get a rule in place for these Stepan emission units.3/ Both IEPA and USEPA agree that this procedural approach makes sense. Although USEPA has not formally reviewed the IEPA proposed rule and its application to Stepan, Stepan has discussed this matter with counsel for USEPA. In response to that discussion, USEPA has filed a status report with the 7th Circuit Court of Appeals in Stepan's FIP appeal indicating it will withhold further action on the federal site specific rule until it has had an opportunity to formally review a SIP revision for this rulemaking. (Attachment C.)

CONCLUSION

Stepan urges the Board to adopt the revised language provided by the Agency in its comments and to provide

3/ AS 88-2 and the federal proceeding address both Stepan's continuous reactors and distillation processes and Stepan's batch processes. Stepan has made a request to include Stepan's continuous reactor and distillation processes in the pending rulemaking docket, R 94-21. If both this proposed rule and the R94-21 proposal are adopted by the Board and federally approved, Stepan will be in a position to move to withdraw both its pending adjusted standard petition and its federal appeal and associated USEPA site specific rulemaking.

clarification in the Board's Opinion and Order as requested herein.

Respectfully submitted,

Date: January 30, 1995

STEPAN COMPANY
By One of Its Attorneys

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POLLUTION CONTROL BOARD

NOTICE OF PROPOSED AMENDMENTS

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

PART 218
ORGANIC MATERIAL EMISSION STANDARDS AND LIMITATIONS FOR THE CHICAGO AREA

SUBPART A: GENERAL PROVISIONS

SUBPART B: ORGANIC EMISSIONS FROM STORAGE AND LOADING OPERATIONS

SUBPART C: ORGANIC EMISSIONS FROM MISCELLANEOUS EQUIPMENT

ATTACHMENT A

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SUBPART F: COATING OPERATIONS

SUBPART G: USE OF ORGANIC MATERIAL

SUBPART H: PRINTING AND PUBLISHING

SUBPART Q: LEAKS FROM SYNTHETIC ORGANIC CHEMICAL AND POLYMER MANUFACTURING PLANT

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218.881 Compliance Plan (Repealed)
218.883 Special Requirements for Compliance Plan (Repealed)
218.886 Emissions Testing (Renumbered)

SUBPART PP: MISCELLANEOUS FABRICATED PRODUCT MANUFACTURING PROCESSES

Section
218.920 Applicability
218.923 Permit Conditions (Repealed)
218.926 Control Requirements
218.927 Compliance Schedule
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SUBPART QQ: MISCELLANEOUS FORMULATION MANUFACTURING PROCESSES

Section
218.940 Applicability
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SUBPART RR: MISCELLANEOUS ORGANIC CHEMICAL MANUFACTURING PROCESSES

Section

SUBPART TT: OTHER EMISSION UNITS

Section

SUBPART UU: RECORDKEEPING AND REPORTING

Section

AUTHORITY: Implementing Section 10 and authorized by Section 28.5 of the Environmental Protection Act (Ill. Rev. Stat. 1991, ch. 111½, par. 1010) (P.A. 87-1213, effective September 26, 1992) [415 ILCS 5/10 and 28.5].

SOURCE: Adopted at R91-7 at 15 Ill. Reg. 12231, effective August 16, 1991; amended in R91-23 at 16 Ill. Reg. 13564, effective August 24, 1992; amended in R91-28 and R91-30 at 16 Ill. Reg.

13864, effective August 24, 1992; amended in R93-9 at 17 Ill. Reg. 16636, effective September 27, 1993; amended in R93-14 at 18 Ill. Reg. at 1945, effective January 24, 1994; amended in R94-12 at 18 Ill. Reg. 14973, effective September 21, 1994; amended in R94-15 at 18 Ill. Reg.16379, effective November 4, 1994; amended in R94-___ at ______ Ill. Reg. ________, effective ________________ _______.

SUBPART V: BATCH OPERATIONS AND AIR OXIDATION PROCESSES

Section 218.500 Applicability for Batch Operations

a) The control requirements set forth in Section 218.501 of this Subpart shall apply to:

1) Process vents associated with batch operations at sources identified by any of the following four-digit standard industrial classification ("SIC") codes, as defined in the 1987 edition of the Federal Standard Industrial Classification Manual: SIC 2821, 2833, 2834, 2861, 2865, 2869, and 2879; and

2) All batch operations at Stepan Company's Millsdale manufacturing facility, Elwood, Illinois.

b) The requirements of Sections 218.500 through 218.506 shall not apply to:

1) Any emission unit included within the category specified in 35 Ill. Adm. Code Part 218, Subparts B or T;

2) Any emission unit included within the category specified in Sections 218.520 through 218.527 of this Subpart; and

3) Any emission unit included within an Early Reduction Program, as specified in 40 CFR Part 63, and published in 57 Fed. Reg. 61970 (December 29, 1992), evidenced by a timely enforceable commitment approved by USEPA.

c) The following single unit operations and batch process trains are subject to this Subpart but are considered to be de minimis and are, therefore, exempt from the control requirements of Section 218.501 of this Subpart. However, the recordkeeping and reporting requirements in Section 218.505 of this Subpart shall apply to such de minimis single unit operations and batch process trains:

1) Within a batch operation, any single unit operation with uncontrolled total annual mass emissions of less than or equal to 500 lb/yr of VOM. Such single unit operations are also excluded from the calculation of the total annual mass emissions for a batch process train. If the uncontrolled total annual mass emissions from such exempt single unit operation exceed 500 lb/yr of VOM in any subsequent year, the source shall calculate applicability in accordance with subsection (d) of this Section for both the individual single unit operation and the batch process train containing the single unit operation; and

2) Any batch process train containing process vents that have, in the aggregate, uncontrolled total annual mass emissions, as determined in accordance with Section 218.502(a) of this Subpart, of less than 30,000 lb/yr of VOM for all products manufactured in such batch process train.

d) The applicability equations in subsection (e) of this Section, which require the calculation of uncontrolled total annual mass emissions and flow rate value, shall be used to determine whether a single unit operation or a batch process train is subject to the control requirements set forth in Section 218.501 of this Subpart. The applicability equation shall be applied to the following:

1) Any single unit operation with uncontrolled total annual mass emissions that exceed 500 lb/yr and with a VOM concentration greater than 500 ppmv. In this individual determination, no applicability analysis shall be performed for any single unit operation with a VOM concentration of less than or equal to 500 ppmv; and

2) Any batch process train containing process vents

which, in the aggregate, have uncontrolled total annual mass emissions of 30,000 lb/yr or more of VOM from all products manufactured in the batch process train. Any single unit operation with uncontrolled total annual mass emissions exceeding 500 lb/yr, regardless of VOM concentration, shall be included in the aggregate applicability analysis.

e) Applicability equations

1) The applicability equations in this subsection are specific to volatility.

2) For purposes of this subsection, the following abbreviations apply:

A) FR = Vent stream flow rate, scfm;

B) UTAME = Uncontrolled total annual mass emissions of VOM, expressed as lb/yr;

C) WAV = Weighted average volatility;

D) $MVOM_i$ = Mass of VOM component i; and

E) $MWVOM_i$ = Molecular weight of VOM component i; and

F) VP_i = Vapor pressure of VOM component i.

3) Weighted average volatility shall be calculated as follows:

$$WAV = \frac{\sum_{i=1}^{n} \left[(VP_i) \times \frac{(MVOM_i)}{(MWVOM_i)} \right]}{\sum_{i=1}^{n} \left[\frac{(MVOM_i)}{(MWVOM_i)} \right]}$$

4) For purposes of determining applicability, flow rate values shall be calculated as follows:

A) Low WAV has a vapor pressure less than or equal to 75 mmHg at 20°C (68°F), and shall use the following equation:

FR = [0.07 (UTAME)] - 1,821

B) Moderate WAV has a vapor pressure greater than 75 mmHg but less than or equal to 150 mmHg at 20°C (68°F), and shall use the following equation:

FR = [0.031 (UTAME)] - 494

C) High WAV has a vapor pressure greater than 150 mmHg at 20°C (68°F), and shall use the following equation:

FR = [0.013 (UTAME)] - 301

5) To determine the vapor pressure of VOM, the applicable methods and procedures in Section 218.111 of this Part shall apply.

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

Section 218.501 Control Requirements for Batch Operations

a) Every owner or operator of a single unit operation with an average flow rate, as determined in accordance with Section 218.502(b) of this Subpart, below the flow rate value calculated by the applicability equations contained in Section 218.500(e) of this Subpart, shall reduce uncontrolled VOM emissions from such single unit operation by an overall efficiency, on average, of at least 90 percent, or 20 ppmv, per batch cycle.

b) Every owner or operator of a batch process train with an average flow rate, as determined in accordance with Section 218.502(b)(2) of this Subpart, below the flow rate value calculated by the applicability equations contained in Section 218.500(e) of this Subpart, shall reduce uncontrolled VOM emissions from such batch process train by an overall efficiency, on average, of at least 90 percent, or 20 ppmv, per batch cycle. For purposes of demonstrating compliance with the emission limitations set forth in this Section, any control device meeting the criteria in subsection (c) of this Section shall be deemed to achieve a control efficiency of 90 percent, or 20 ppmv, per batch cycle, as applicable.

c) Notwithstanding subsections (a) or (b) of this Section, any source that has installed on or before March 15, 1995, any control device which is demonstrated to the Agency's satisfaction to be unable to meet the applicable control requirements of this Section, scrubber, or shell and tube condenser using a non-refrigerated cooling media, and such device achieves at least 81 percent control efficiency of VOM emissions, is required to meet the 90 percent emission limitation or 20 ppmv VOM concentration set forth in subsections (a) or (b) of this Section, as applicable, upon the earlier to occur of the date the device is replaced for any reason, including, but not limited to, normal maintenance, malfunction, accident, and obsolescence, or December 31, 1999. A scrubber, shell and tube condenser using a non-refrigerated cooling media, or other control device meeting the criteria of this subsection is considered replaced when:

1) All of the device is replaced; or

2) When either the cost to repair the device or the cost to replace part of the device exceeds 50 percent of the cost of replacing the entire device with a control device that complies with the 90 percent emission limitation or 20 ppmv VOM concentration level in subsection (a) of this Section, as applicable.

d) If a boiler or process heater is used to comply with this Section, the vent stream shall be introduced into the flame zone of the boiler or process heater.

e) If a flare is used to comply with this Section, it shall comply with the requirements of 40 CFR 60.18, incorporated by reference at Section 218.112 of this Part. The flare operation requirements of 40 CFR 60.18 do not apply if a process, not subject to this Subpart, vents an emergency relief discharge into a common flare header and causes the flare servicing the process subject to this Subpart to not comply with one or more of the provisions of 40 CFR 60.18.

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

Section 218.502 Determination of Uncontrolled Total Annual Mass Emissions and Average Flow Rate Values for Batch Operations

a) Uncontrolled total annual mass emissions shall be determined by the following methods:

1) Direct process vent emissions measurements taken prior to any release to the atmosphere, following any recovery device and prior to any control device, provided such measurements conform with the requirements of measuring the mass flow rate of VOM incoming to the ~~single unit operation~~ control device as set forth in Section 218.503(f)(2), (f)(3)(A) and (f)(3)(B) of this Subpart; or

2) Engineering estimates of the uncontrolled VOM emissions from a process vent or process vents, in the aggregate, within a batch process train, using either ~~multiplied by~~ the potential or permitted number of batch cycles per year or total production as represented in the source's operating permit as follows:

A) Engineering estimates of the uncontrolled VOM emissions shall be based upon accepted chemical engineering principles, measurable process parameters, or physical or chemical laws and their properties. Examples of methods include, but are not limited to, the following:

i) Use of material balances based on process stoichiometry to estimate maximum VOM concentrations;

ii) Estimation of maximum flow rate based on physical equipment design such as pump or blower capacities; and

iii) Estimation of VOM concentrations based on saturation conditions.

B) All data, assumptions and procedures used in any engineering estimate shall be documented.

b) Average flow rate shall be determined by any of the following methods:

1) Direct process vent flow rate measurements taken prior to any release to the atmosphere, following any recovery device and prior to any control device, provided such measurements conform with the requirements of measuring incoming volumetric flow rate set forth in Section 218.503(e)(2) of this Subpart;

2) Average flow rate for a single unit operation having multiple emission events or batch process trains shall be the weighted average flow rate, calculated as follows:

$$WAF = \frac{\sum_{i=1}^{n} [AFR_i \times ADE_i)]}{\sum_{i=1}^{n} (ADE_i)}$$

where:

WAF	=	Actual weighted average flow rate for a single unit operation or batch process train;
AFR_i	=	Average flow rate per emission event;
ADE_i	=	Annual duration of emission event; and
n	=	Number of emission events.

For purposes of this formula, the term "emission event" shall be defined as a discrete period of venting that is associated with a single unit operation. For example, a displacement of vapor resulting from the charging of a single unit operation with VOM will result in a discrete emission event that will last through the duration of the charge and will have an average flow rate equal to the rate of the charge. The expulsion of expanded vapor space when the single unit operation is heated is also an emission event. Both of these examples of emission events and others may occur in the same single unit operation during the course of the batch cycle. If the flow rate measurement for any emission event is zero, according to Section 218.503(f)(2) of this Subpart, then such event is not an emission event for purposes of this Section.

3) Engineering estimates calculated in accordance with the requirements in subsection (a)(2) of this Section.

c) For purposes of determining the average flow rate for steam vacuuming systems, the steam flow shall be included in the average flow rate calculation.

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

Section 218.503 Performance and Testing Requirements for Batch Operations

a) Upon the Agency's request, the owner or operator of a batch operation shall conduct testing to demonstrate compliance with Section 218.501 of this Subpart. The owner or operator shall, at its own expense, conduct such tests in accordance with the applicable test methods and procedures specified in Section 218.503(d), (e), and (f) of this Subpart.

b) Notwithstanding subsection (a) of this Section, flares and process boilers used to comply with control requirements of Section 218.501 of this Subpart shall be exempt from performance testing requirements.

c) When a flare is used to comply with the control requirements of Section 218.501 of this Subpart, the flare shall comply with the requirements of 40 CFR 60.18, incorporated by reference at Section 218.112 of this Part.

d) The owner or operator of a batch operation that is exempt from the control requirements of Section 218.501 of this Subpart shall demonstrate, upon the Agency's request, the absence of oversized gas moving equipment in any manifold. Gas moving equipment shall be considered oversized if it exceeds the maximum requirements of the exhaust flow rate by more than 30 percent.

e) For the purpose of demonstrating compliance with the control requirements in Section 218.501 of this Subpart, the batch operation shall be run at representative operating conditions and flow rates during any performance test.

f) The following methods in 40 CFR 60, Appendix A, incorporated by reference at Section 218.112 of this Part, shall be used to demonstrate compliance with the reduction efficiency requirement set forth in Section 218.501 of this Subpart:

1) Method 1 or 1A, as appropriate, for selection of the sampling sites if the flow measuring device is not a rotameter. The control device inlet sampling site for determination of vent stream VOM composition reduction efficiency shall be prior to the control device and after the control device;

2) Method 2, 2A, 2C, or 2D, as appropriate, for determination of gas stream volumetric flow rate flow measurements, which shall be taken continuously. No traverse is necessary when the flow measuring device is an ultrasonic probe;

3) Method 25A or Method 18, if applicable, to determine the concentration of VOM in the control device inlet and outlet;

A) The sampling time for each run shall be as follows: ~~will be the entire length of the batch cycle in which readings shall be taken continuously, if Method 25A is used, or as often as is possible using Method 18, with a maximum of 15 minute intervals between measurements throughout the batch cycle;~~

i) For batch cycles less than eight hours in length, readings shall be taken continuously over the entire length of the batch cycle with a maximum of 15-minute intervals between measurements if using Method 25A. If using Method 18, readings shall be taken continuously with a maximum of 15-minute intervals between measurements throughout the batch cycle unless it becomes necessary to change the impinger train, in which case a 30-minute interval shall not be exceeded.

ii) For batch cycles of eight hours and greater in length, the owner or operator may either test in accordance with the test procedures defined in subsection (f)(3)(A)(i) of this Section or the owner or operator may elect to perform tests, pursuant to either Method 25A or Method 18, only during those portions of each emission event which define the emission profile of each emission event occurring within the batch cycle. For each emission event of less that four hours in duration, the owner or operator shall test continuously over the entire emission event as set forth in subsection (f)(3)(A)(i) of this Section. For each emission event of greater than four hours in duration, the owner or operator shall elect either to perform a minimum of three one hour test runs during the emission event or shall test continuously over the entire emission even within each single unit operation in the batch process train. To demonstrate that the portion of the emission event to be tested define the emission profile for the emission event, the owner or operator electing to rely on this option shall develop an emission profile for the entire emission event. Such emission profile shall be based upon either process knowledge or test data collected. Examples of information that could constitute process knowledge include, but are not limited to, calculations based on material balances and process stoichiometry. Previous test results may be used provided such results are still relevant to the current process vent stream conditions.

iii) For purposes of subsection (f)(3) of this Section, the term "emission event" shall be defined as a discrete period of venting that is associated with a single unit operation. For example, a displacement of vapor resulting from the charging of a single unit operation with VOM will result in a discrete emission event that will last through the duration of the charge and will have an average flow rate equal to the rate of the charge. The expulsion of expanded single unit operation vapor space, when the vessel is heated is also an emission event. Both of these examples of emission events and others may occur in the same single unit operation during the course of the batch cycle. If the flow rate measurement for any emission event is zero, in accordance with Section 218.503(f)(2) of this Subpart, then such event is not an emission event for purposes of this Section.

B) The mass emission rate from the process vent or inlet to the control device shall be determined by combining concentration and flow rate measurements taken simultaneously at sampling sites selected in accordance with subsection (f)(1) of this Section throughout the batch cycle;

C) The mass emission rate from the control device outlet shall be obtained by combining concentration and flow rate measurements taken simultaneously at sampling sites selected in accordance with subsection (f)(1) of this Section throughout the batch cycle; and

D) The efficiency of the control device shall be determined by integrating the mass emission rates obtained in subsections ~~(c)(3)(A)~~ <u>(f)(3)(B)</u> and ~~(c)(3)(B)~~ <u>(f)(3)(C)</u> of this Section, over the time of the batch cycle and dividing the difference in inlet and outlet mass flow totals by the inlet mass flow total.

g) Upon request by the Agency to conduct testing, an owner or operator of a batch operation which has installed a scrubber, a shell and tube condenser using a non-refrigerated cooling media, or any other control device which meets the criteria of Section 218.501(c) of this Subpart, shall demonstrate that such device achieves the control efficiency applicable within Section 218.501 of this Subpart upon the earlier to occur of the date the device is replaced or December 31, 1999.

h) The owner or operator of a batch operation may propose an alternative test method or procedures to demonstrate compliance with the control requirements set forth in Section 218.501 of this Subpart. Such method or procedures shall be approved by the Agency and USEPA as evidenced by federally enforceable permit conditions.

<u>i)</u> <u>In the absence of a request by the Agency to conduct performance testing in accordance with the provisions of this Section, a source may demonstrate compliance by the use of engineering estimates or process stoichiometry.</u>

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

Section 218.504 Monitoring Requirements for Batch Operations

a) Every owner or operator using an afterburner to comply with Section 218.501 of this Subpart, shall install, calibrate, maintain and operate, according to manufacturer's specifications, temperature monitoring devices with an accuracy of ± 1 percent of the temperature being measured expressed in degrees Celsius, equipped with continuous recorders.

1) Where a catalytic afterburner is used, temperature monitoring devices shall be installed in the gas stream immediately before and after the catalyst bed.

2) Where an afterburner other than a catalytic afterburner is used, a temperature monitoring device shall be installed in the combustion chamber.

b) Every owner or operator using a flare to comply with Section 218.501 of this Subpart, shall install, calibrate, maintain and operate, according to manufacturer's specifications, a heat sensing device, such as an ultra-violet beam sensor or thermocouple, at the pilot light to indicate continuous presence of a flame.

c) Every owner or operator using a scrubber to comply with this Section 218.501 of this Subpart, shall install, calibrate, maintain, and operate, according to manufacturer's specifications, the following:

1) A temperature monitoring device for scrubbant liquid having an accuracy of ± 1 percent of the temperature being monitored expressed in degrees Celsius and a specific gravity device for scrubbant liquid, each equipped with a continuous recorder; or

2) A VOM monitoring device used to indicate the concentration of VOM exiting the control device based on a detection principle such as infra-red photoionization, or thermal conductivity, each equipped with a continuous recorder.

d) Every owner or operator using a condenser to comply with Section 218.501 of this Subpart, shall install, calibrate, maintain, and operate, according to manufacturer's specifications, the following:

1) A condenser exit temperature monitoring device equipped with a continuous recorder and having an

accuracy of ± 1 percent of the temperature being monitored expressed in degrees Celsius; or

2) A VOM monitoring device used to indicate the concentration of VOM such as infra-red, photoionization, or thermal conductivity, each equipped with a continuous recorder.

e) Every owner or operator using a carbon adsorber to comply with this Subpart shall install, calibrate, maintain, and operate, according to the manufacturer's specifications the following equipment:

1) An integrating regeneration ~~stream~~ steam flow monitoring device having an accuracy of ± 10 percent, and a carbon bed temperature monitoring device having an accuracy of ± 1 percent of the temperature being monitored expressed in degrees Celsius, both equipped with a continuous recorder; or

2) A VOM monitoring device used to indicate the concentration level ~~or~~ of VOM exiting such device based on a detection principle such as infra-red, photoionization, or thermal conductivity, each equipped with a continuous recorder.

f) Every owner or operator using a boiler or process heater with a design heat input capacity less than 44 Mw to comply with Section 218.501 of this Subpart, shall install, calibrate, maintain, and operate, according to the manufacturer's specifications, a temperature monitoring device in the firebox with an accuracy of ± 1 percent of the temperature being measured expressed in degrees Celsius, equipped with a continuous recorder. Any boiler or process heater in which all process vent streams are introduced with primary fuel is exempt from this requirement.

g) The owner or operator of a process vent shall be permitted to monitor by an alternative method or may monitor parameters other that those listed in subsections (a) through (f) of this Section, if approved by the Agency and USEPA. Such alternative method or parameters shall be contained in the source's operating permit as federally enforceable permit conditions.

h) Notwithstanding subsections (a) through (g) of this Section, sources using a scrubber, shell and tube condenser using a non-refrigerated cooling media, or other control device meeting the criteria of Section 218.501(c) of this Subpart, are required to monitor compliance with the requirements of this Subpart on and after the earlier to occur of the date such device is replaced for any reason or December 31, 1999.

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

Section 218.505 Reporting and Recordkeeping for Batch Operations

a) Every owner or operator of a de minimis single unit operation or batch process train exempt under Section 218.500(c)(1) or (c)(2) of this Subpart, shall keep records of the uncontrolled total annual mass emissions for any de minimis single unit operation or batch process train, as applicable, and documentation verifying these values or measurements. The documentation shall include the engineering calculations, any measurements made in accordance with Section 218.503 of this Subpart, and the potential or permitted number of batch cycles per year or, in the alternative, total production as represented in the source's operating permit. ~~or measurements coupled with the potential or permitted number of batch cycles per year if the uncontrolled total annual mass emissions is obtained from measurements made in accordance with Section 218.503 of this Subpart.~~

b) Every owner or operator of a single unit operation exempt under Sections 218.500(b)(3) or (d) of this Subpart shall keep the following records:

1) The uncontrolled total annual mass emissions and documentation verifying these values or measurements. The documentation shall include any engineering calculations, any measurements made in accordance with Section 218.503 of this Subpart, and the potential or permitted number of batch cycles per year, or, in the alternative, total