

Analysis of Shintech's Part 70 Permit Applications for Compliance With MACT
(Revision 1, prepared by Gary Miller, 11/19/96)

Summary

1) General Comments.

Shintech's applications include Permit Shields in Chapter 9 of each application. The one for the PVC plant looks especially bad. Shintech invokes the heretofore unknown term "Clarification of Non-Applicability" in Table 4-1 of each application as a reason for not having to comply with MACT standards.

Shintech didn't have to have a fugitive emissions plan or an ambient air modeling program approved by DEQ. This is inconsistent with the treatment of other major sources.

Shintech submitted a revision to the Part 70 permits on November 6, 1996. The public notices were published on November 7, 1996. This means that the DEQ didn't have time to study the changes before including them in the draft permit, which they made available on November 7, 1996.

Since the federal MACT standards for polyvinyl chloride production aren't final, this facility shouldn't be built until the federal MACT standards are available.

2) The VCM Plant.

The VCM (Vinyl Chloride Monomer) plant is required to meet federal MACT standards under 40 CFR 63 Subparts F, G, H and I. Collectively these subparts are known as the HON which stands for Hazardous Organic NESHAPS (National Emissions Standards for Hazardous Air Pollutants). The HON sets the MACT standards for the chemical manufacturing industry.

Shintech's Part 70 Permit application did not include all of the information required in LAC 33:III Chapter 5, Section 517.B. Specifically they did not provide sufficient calculations or an adequate description for emissions sources M-4 and M-5, which are thermal oxidizers with scrubbers. More importantly the permit application doesn't meet the MACT requirements of the HON in Subpart G 63.113 (c)(1)(i) which requires that chlorine be reduced by 99% or be reduced to 0.45 kilograms per hour, whichever is less stringent.

The VCM application doesn't meet MACT for source M-13, described as an analyzer vent. This stream is actually the combined vents from five different analyzers with the majority coming from the "reactor recycle gas stream analyzer". Shintech incorrectly stated that this vent isn't a process vent and doesn't need to be controlled. This vent should have been controlled under Subpart G 63.113.

3) PVC Plant.

The PVC (Polyvinyl Chloride) plant doesn't have federal MACT standards yet. These standards will be in the Resins/Polymers category and aren't expected to be final until the year 2000. Under state law LAC 33:III 5111.B.4 this facility will still have to meet MACT to get a permit. Since no MACT exists for this facility DEQ has stated that the HON will be used. State law LAC 33:III 5109.B.1 requires that Shintech submit a MACT Compliance Plan to demonstrate MACT compliance. DEQ has stated that

Shintech won't have to submit a plan and that the permit will suffice. This doesn't seem correct.

The PVC plant has two major air emissions sources. These are vents from the finished PVC dryer and are referred to as P-1 and P-2. Shintech states that MACT for these vents is LAC 33:III 5121.E.5 (Subchapter F). This is Louisiana's vinyl chloride emissions standard. There is no evidence given or other reason to believe that Subchapter F meets the definition of MACT for a new source in LAC 33:III 5103. Shintech should have used the HON as MACT, which would require that they meet Subpart G 63.113 for sources P-1 and P-2.

Analysis of the VCM Plant Part 70 Permit Application.

The VCM Plant produces vinyl chloride monomer from 1,2-dichloroethane, which is then polymerized into polyvinyl chloride in the PVC Plant. The VCM Plant is part of a major source of hazardous air pollution as defined in the 1990 Clean Air Act Amendments (CAA). The CAA defines 189 chemicals as hazardous air pollutants (HAP's). The VCM Plant permit application requests a total HAP emission of 14.3135 tons per year (equal to 28,627 pounds per year). The largest HAP emissions from the VCM plant are:

<u>Chemical</u>	<u>Emissions in tons per year</u>
1,2-dichloroethane	7.6465
vinyl chloride	2.9468
ethyl chloride	2.1606

The major problems in this plant are with the thermal oxidizers exhaust streams, referred to as sources M-4 and M-5, and with source M-13 called the Analyzer Vent-II.

Sources M-4 and M-5.

Descriptions and information about these emissions sources are given in several parts of the permit application, including Chapter 3, Chapter 4, Figure 3, Appendix A and Appendix F. In chapter 3 an Emission Inventory Questionnaire (EIQ) for Air Pollutants is filled out for each source. In the EIQ they are referred to as VCM Plant Thermal Oxidizer A and B, when they are actually thermal oxidizers followed by caustic scrubbers. The EIQ gives the total emissions from the source, the emissions of each chemical emitted by the source and the control efficiency for each chemical.

Chapter 4 gives the regulatory applicability of each emissions source. Table 4.1 states that the HON (40 CFR 63) Subpart G is a current applicable requirement for M-4 and M-5. This is reiterated in Table 4.2 Page 10 for M-4 and in Table 4.2 Page 16 for M-5. In this table the Compliance Method/Provision is described as:

"The thermal oxidizer followed by a scrubber is the ultimate control device for many units subject to the HON. Therefore, the thermal oxidizer system complies with HON requirements."

Under Notes the application states:

"The thermal oxidizer will be followed by a scrubber. Nonhalogenated HC and Halogenated HC will be controlled with a 99.99% efficiency. Chlorine will be controlled with a minimum 95% efficiency. Hydrochloric acid will be controlled with a 99% efficiency."

This is the correct interpretation of the HON for treating nonhalogenated HC (hydrocarbons) and Halogenated HC as required in 63.113(a)(2). The control efficiency for hydrochloric acid and chlorine are required in 63.113(c). Shintech's control

efficiency for hydrochloric acid is correct but the control efficiency for chlorine should be 99% as described in 63.113(c)(1)(i):

40 CFR 63.113 (c)

"(c) Halogenated Group 1 process vent streams that are combusted shall be controlled according to paragraph (c)(1) or (c)(2) of this section.

(1) If a combustion device is used to comply with paragraph (a)(2) of this section for a halogenated vent stream, then the vent stream shall be ducted from the combustion device to an additional control device, including but not limited to a scrubber, before it is discharged to the atmosphere.

(i) Except as provided in paragraph (c)(1)(ii) of this section, the additional control device shall reduce overall emissions of hydrogen halides and halogens, as defined in §63.111 of this subpart, by 99 percent or shall reduce the outlet mass of total hydrogen halides and halogens to less than 0.45 kilogram per hour, whichever is less stringent.

(ii) If a scrubber or other halogen control device was installed prior to December 31, 1992, the control device shall reduce overall emissions of hydrogen halides and halogens, as defined in §63.111 of this subpart, by 95 percent or shall reduce the outlet mass of total hydrogen halides and halogens to less than 0.45 kilograms per hour, whichever is less stringent."

Shintech doesn't meet the control requirement of 99% removal of chlorine or the removal to less than 0.45 kilogram per hour provision as required in 63.113(c)(1)(i). The permit application states that chlorine emissions from these sources is 1.284 kilograms per hour and is reduced to only greater than 95%.

The sources M-4 and M-5 are shown in Figure 3 as thermal oxidizers. The scrubbers aren't shown. Figure 3 is the General Flow Sheet for the VCM plant. Appendix A contains the calculations for M-4 and M-5. The calculations are incomplete as they only show what goes into the oxidizers and what comes out of the scrubbers. More complete calculations would show everything that comes out of the oxidizer, and subsequently goes into the scrubber. The type and amount of supplemental fuels used in the oxidizer are not stated, nor is the air/fuel ratio.

Appendix F gives the MACT determination. This correctly states that MACT for M-4 and M-5 will be 40 CFR 63, Subpart G.

Source M-13.

Descriptions and information about this emissions source is also given in Chapter 3, Chapter 4, Figure 3, Appendix A and Appendix F. The EIQ, in Chapter 3, describes M-13 as VCM Plant Analyzer Vents-II. The control efficiency is given as 0.0 for all pollutants. The major HAP's emitted from M-13 are 1,2-dichloroethane (4.98 tons per year), ethyl chloride (1.75 tons per year) and hydrochloric acid (HCl at 5.02 tons per year).

Table 4.1 states that M-13 doesn't have to meet the HON, 40 CFR 63, due to "Clarification of Non-Applicability". This is described in the permit applications as:

"- The regulations apply to this general type of emissions source (i.e., vents, furnaces, towers, fugitives), but do not apply to this particular emissions source.

Example: NSPS NNN for Distillation tower vents does not apply to an absorber tower vent."

Table 4.1 further states that M-13 is subject only to LAC 33:III Chapter 21.

Table 4.2 Page 18 states that the applicable requirement for M-13 is "Hazardous Organic NESHAP (HON) Process Vents (40 CFR 63.110)". The Compliance Method/Provision is then given as"

"DOES NOT APPLY. This analyzer vent does not meet the definition of "process vent" defined in 40 CFR 63.101."

Under NOTES the application states:

"This vent will not discharge from an air oxidation reactor, other reactor, or distillation unit."

This isn't correct. Appendix A shows that the majority of this stream comes from analyzers on the recycle gas stream and the reactor vent gas stream. The General Flow Diagram, Figure 3, doesn't show where the vents in M-13 originate and Shintech should have included sufficient information to determine exactly where these vents originate as required in LAC 33:III Chapter 5, Section 517.B. The definition of process vent from 40 CFR 63.101 is:

40 CFR 63.101 - Definition of a process vent

" Process vent means a gas stream containing greater than 0.005 weight percent total organic hazardous air pollutants that is continuously discharged during operation of the unit from an air oxidation reactor, other reactor, or distillation unit (as defined in this section) within a chemical manufacturing process unit that meets all applicability criteria specified in §63.100(b)(1) through (b)(3) of this subpart. Process vents include vents from distillate receivers, product separators, and ejector-condensers. Process vents include gas streams that are either discharged directly to the atmosphere or are discharged to the atmosphere after diversion through a product recovery device. Process vents exclude relief valve discharges and leaks from equipment regulated under subpart H of this part."

The reactor vent gas presumably comes directly from the reactor. The reactor consists of the cracking furnaces, M-1, M-2 and M-3, which take ethylene dichloride and convert it to vinyl chloride and HCl. Simply because the stream passes through an analyzer before being vented Shintech presumes that the stream is no longer a process vent. **This should still be considered a process vent and subject to 40 CFR 63.113.**

The recycle gas stream is also not shown on the General Flow Diagram. This is probably the recycle stream from the VCM purification train back to the EDC purification train. This is a separation process that is fed from the reactor. **A vent from the recycle gas stream should be considered a process vent and subject to 40 CFR**

63.113. A vent from this recycle line is a vent from a product separator. Simply because it then goes to an analyzer doesn't preclude it from being a process vent.

Analysis of the PVC Plant Part 70 Permit Application.

The PVC Plant produces the finished product, polyvinyl chloride. The PVC Plant is part of a major source of hazardous air pollution as defined in the 1990 Clean Air Act Amendments (CAA). The PVC Plant permit application requests a total HAP emission of 229.556 tons per year (equal to 459,112 pounds per year). The largest HAP emissions from the PVC plant are:

<u>Chemical</u>	<u>Emissions in tons per year</u>
methanol	180.2532
vinyl chloride	49.3028

The major problems in this plant are with Scrubber A and Scrubber B, referred to as sources P-1 and P-2.

The federal MACT standards for polyvinyl chloride production aren't complete. The best I can tell is that for compliance with federal MACT standards Shintech will have to meet LAC 33:III.517.E.3, which states:

"E. Additional Application Requirements for Part 70 Sources. In addition to those elements listed under Subsection D of this Section, each application pertaining to a Part 70 source shall include the following:

3. for applicable requirements that will become effective during the permit term, a statement that the source will meet such requirements on a timely basis;"

This statement is required to be in the application, but I have not seen it.

Under state law Shintech will still have to meet MACT, which for new sources is defined in LAC 33:III 5103 as:

LAC 33:III 5103 - Definition of MACT for New Sources

"2. The degree of reduction in emissions deemed achievable for new sources in a category or subcategory shall not be less stringent than the most stringent emissions level achieved in practice by the best controlled similar source in the same category or subcategory, as determined by the administrative authority upon review of submitted MACT compliance plans and other relevant information, and may be more stringent where feasible."

The requirement that Shintech meet MACT standards in the permit application is stated in LAC 33:III 5111.B.4:

LAC 33:III 5111.B.4

"4. Any application corresponding to a major source that emits or is permitted to emit any Class I or Class II toxic air pollutant at a rate equal to or greater than the minimum emission rate listed for that pollutant in Table 51.1 shall include a description of equipment and/or procedures to be used for control and monitoring of emissions that will

constitute MACT. The application shall also include the rationale for determining MACT."

Sources P-1 and P-2.

Descriptions and information about these emissions sources are given in several parts of the permit application, including Chapter 3, Chapter 4, Figure 3, Appendix A and Appendix F. In chapter 3 an Emission Inventory Questionnaire (EIQ) for Air Pollutants is filled out for each source. In the EIQ they are referred to as Scrubber A and Scrubber B. The EIQ gives the total emissions from the source, the emissions of each chemical emitted by the source and the control efficiency for each chemical.

Chapter 4 gives the regulatory applicability of each emissions source. Table 4.1 states that P-1 and P-2 need to meet LAC 33:III Chapters 13, 21 and 51. Table 4.2 Page 1 and 2 further specify that P-1 and P-2 need to meet LAC 33.III.1305, 1311.B, 1311.C, 2115, 5121.E.5 and 5109 A. In this table the Compliance Method/Provision is described as:

"This source emits vinyl chloride a Class I toxic air pollutant for which facility-wide emissions exceed the MER. Therefore this source will be controlled as required by MACT."

Under Notes the applications states:

"Emissions of vinyl chloride will be controlled by stripping to < 150 ppm prior to this source. This is considered MACT."

The Requirements section must also include LAC 33:III 5111.B.4. However, Shintech correctly identified that they must meet the definition of MACT, which is defined in LAC 33:III 5103.

Shintech states that stripping to <150 ppm is considered MACT. There is absolutely no evidence or other indication given that this does meet the definition of MACT. Since there is no MACT standard for polyvinyl chloride production the best recourse left to Shintech is to use the HON as MACT. Shintech stated this in Table 4.1, but also declared that any potential application of the HON was treated with a "Clarification of Non-Applicability". **Fugitive emissions under the HON are very applicable to Shintech and should be used as MACT for fugitive emissions.**

The HON should also be used as MACT for P-1 and P-2. Instead, Appendix F of the application states:

"This source is subject to the requirements of LAC 33:III.5121.E.5 (Subchapter F) Emissions Standard for Polyvinyl Chloride Plants by stripping PVC slurry to < 400 ppm prior to this source. Shintech Inc. and Its Affiliates considers compliance with the requirements of Subchapter F to be MACT."

Again, there is no evidence given that this would meet the required definition of MACT.

If the HON is used as MACT, the sources P-1 and P-2 would be process vents and would be subject to 40 CFR 63.113. Figure 3, the Process Flow Diagram, shows that P-1

and P-2 are actually vents from the dryer that pass through a particulate scrubber. These vents originate in the polymerizer, which is a reactor, then pass through several product recovery devices and separators, including the scrubbers. As process vents, P-1 and P-2 should be sent to a thermal oxidizer with a scrubber.

Other Sources.

The entire plant should be using the HON to satisfy MACT requirements of the applicable state laws. This is true for all the tanks, the silo's, fugitive emissions, and the reactor vent P-15.