SUBPART F - National Emission Standards for Vinyl Chloride
(Delegation Effective 11/21/77: Rev. Effective 6/16/78)

RULE 361.60. APPLICABILITY

(a) This subpart applies to plants which produce:

(1) Ethylene dichloride by reaction of oxygen and hydrogen chloride with ethylene,

(2) Vinyl chloride by any process, and/or

(3) One or more polymers containing any fraction of polymerized vinyl chloride.

(b) This subpart does not apply to equipment used in research and development if the reactor used to polymerize the vinyl chloride processed in the equipment has a capacity of no more than 50 gallons (189.25 liters).

(c) Sections of this subpart other than 361.64(a)(1), (b), (c), and (d) do not apply to equipment used in research and development if the reactor used to polymerize the vinyl chloride processed in the equipment has a capacity of greater than 50 gallons (189.25 liters) and no more than 1100 gallons (4163.5 liters).

RULE 361.61. DEFINITIONS

As used in this subpart, all items not defined herein shall have the meaning given them in Subpart A of this regulation.

(1) **"Bulk Resin"** means a resin which is produced by a polymerization process in which no water is used.

(2) **"Dispersion Resin"** means a resin manufactured in such a way as to form fluid dispersions when dispersed in a plasticizer or plasticizer/diluent mixtures.

(3) **"Emergency Relief Discharge"** is a discharge which could not have been avoided by taking measures to prevent the discharge.

(4) **"Ethylene Dichloride Plant"** includes any plant which produces ethylene dichloride by reaction of oxygen and hydrogen chloride with ethylene.

(5) **"Ethylene Dichloride Purification**" includes any part of the process of ethylene dichloride production which follows ethylene dichloride formation and in which finished ethylene dichloride is produced.

(6) **"Grade of Resin"** means the subdivision of resin classification with no further subdivision.

(7) **"In Vinyl Chloride Service"** means that a piece of equipment contains or contacts either a liquid that is at least 10 percent by weight vinyl chloride or a gas that is at least 10 percent by volume vinyl chloride.

(8) **"Inprocess Wastewater"** means any water which, during manufacturing or processing, comes into direct contact with vinyl chloride or polyvinyl chloride, or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product containing vinyl chloride or polyvinyl chloride, but which has not been discharged to a wastewater treatment process or discharged untreated as wastewater.

(9) **"Latex Resin"** means a resin which is produced by a polymerization process which initiates from free radical catalyst sites and is solid undried.

(10) **"Polyvinyl Chloride Plant"** includes any plant where vinyl chloride alone or in combination with other materials is polymerized.

(11) **"Reactor"** includes any vessel in which vinyl chloride is partially or totally polymerized into polyvinyl chloride.

(12) **"Reactor Opening Loss"** means the emissions of vinyl chloride occurring when a reactor is vented to the atmosphere for any purpose other than an emergency relief discharge.

(13) **"Run"** means the net period of time during which an emission sample is collected.

(14) **"Slip Gauge"** means a gauge which has a probe that moves through the gas/liquid interface in a storage or transfer vessel and indicates the level of vinyl chloride in the vessel by the physical state of the material the gauge discharges.

(15) **"Standard Operating Procedure"** means a formal written procedure officially adopted by the plant owner or operator and available on a routine basis to those persons responsible for carrying out the procedure.

(16) **"Stripper"** includes any vessel in which residual vinyl chloride is removed from polyvinyl chloride resin, except bulk resin, in the slurry form by the use of heat and/or vacuum. In the case of bulk resin, stripper includes any vessel which is used to remove residual vinyl chloride from polyvinyl chloride resin immediately following the polymerization step in the plant process flow.

(17) **"Type of Resin"** means the broad classification of resin referring to the basic manufacturing process for producing that resin, including, but not limited to, the suspension, dispersion, latex, bulk, and solution processes.

(18) **"Vinyl Chloride Plant"** includes any plant which produces vinyl chloride by any process.

(19) **"Vinyl Chloride Purification"** includes any part of the process of vinyl chloride production which follows vinyl chloride formation and in which finished vinyl chloride is produced.

(20) **"Wastewater Treatment Process"** includes any process which modifies characteristics such as BOD, COD, TSS, and pH, usually for the purpose of meeting effluent guidelines and standards: it does not include any process the purpose of which is to remove vinyl chloride from water to meet requirements of this subpart.

RULE 361.62. EMISSION STANDARD (Rev. Effective 6/16/78)

(a) Except for an emergency relief discharge, vinyl chloride emission shall not exceed 10 ppm in all exhaust gases discharged to the atmosphere from the following equipment:

(1) Equipment used in ethylene dichloride purification

(2) Equipment used in vinyl chloride formation and/or purification

(3) Reactor in polyvinyl chloride plant

(4) Stripper in polyvinyl chloride plant

(5) Mixing, weighing, or holding container in vinyl chloride service

(6) Monomer recovery system

The provisions of this subdivision do not apply to equipment that has been opened, is out of operation, and met the requirement of Rule 361.62(f)(6)(i) before being opened.

(b) Oxychlorination Reactor; Ethylene Dichloride Plants

Except for an emergency relief discharge, emissions of vinyl chloride to the atmosphere from any oxychlorination reactor shall not exceed 0.0002 lb/lb (0.2 g/kg) of the 100 percent ethylene dichloride product from the reactor.

(c) Reactor Opening Loss

Vinyl chloride loss from a reactor opening shall not exceed 0.00002 lb/lb (0.02 g/kg) of polyvinyl chloride product, with the product determined on a dry solid basis. In the bulk process, the product means the gross product of prepolymerization and postpolymerization.

The provisions of this subdivision 'C' apply to any vessel which is used as a reactor or, a reactor and a stripper.

(d) Sources following the Stripper(s) and Reactor(s)

The following requirements apply to emissions of vinyl chloride to the atmosphere from the combination of all sources following the stripper(s) [or the reactor(s) if the plant has no stripper(s)] in the plant process flow including but not limited to, centrifuges, concentrators,

blend tanks, filters, dryers, conveyor air discharges, baggers, storage, containers, and inprocess wastewater:

(1) In polyvinyl chloride plants using stripping technology to control vinyl chloride emissions, the weighted average residual vinyl chloride concentration in all grades of polyvinyl chloride resin processed through the stripping operation on each calendar day, measured immediately after the stripping operation is completed, shall not exceed:

(i) 2000 ppm for polyvinyl chloride dispersion resins, excluding latex resins;

(ii) 400 ppm for all other polyvinyl chloride resins, including latex resins, averaged separately for each type of resin; or

(2) In polyvinyl chloride plants controlling vinyl chloride emissions with technology other than stripping or in addition to stripping, emissions of vinyl chloride to the atmosphere shall not exceed:

(i) 0.002 lb/lb (2 g/kg) product from the stripper(s) [or reactor(s) if the plant has no stripper(s)] for dispersion polyvinyl chloride resins, excluding latex resins, with the product determined on a dry solids basis; or

(ii) 0.0004 lb/lb (0.4 g/kg) product from the stripper(s) [or reactor(s) if the plant has not stripper(s)] for all other polyvinyl chloride resins, including latex resins, with the product determined on a dry solids basis.

(e) Relief Valve Discharge

Except for an emergency relief discharge, there is to be no discharge to the atmosphere from any relief valve on any equipment in vinyl chloride service. Within 10 days of any relief valve discharge, the owner or operator of the source from which the relief valve discharge occurs shall submit to the Control Officer a report in writing containing nature and cause of the discharge, the date and time of the discharge, the approximate total vinyl chloride loss during the discharge, the method used for determining the vinyl chloride loss, the action that was taken to prevent the discharge, and measures adopted to prevent future discharges.

(f) Fugitive Emissions Sources (Rev. Effective 6/16/78)

(1) Loading and Unloading Lines

Vinyl chloride emissions from loading and unloading lines in vinyl chloride service which are opened to the atmosphere after each loading or unloading operation are to be minimized as follows:

(i) After each loading or unloading operation and before opening a loading or unloading line to the atmosphere, the quantity of vinyl chloride in all parts of each loading or unloading line that are to be opened to the atmosphere is to be reduced so that the parts combined contain no greater than 0.0038 m^3 (0.13 ft^3) of vinyl chloride, at standard temperature and pressure; and

(ii) Any vinyl chloride removed from a loading or unloading line in accordance with Subsection (f)(1)(i) of this rule is to be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm or equivalent as provided in Rule 361.66.

(2) Slip Gauges

During loading and unloading operations, the vinyl chloride emissions from each slip gauge in vinyl chloride service are to be minimized by ducting any vinyl chloride discharged from the slip gauge through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in Rule 361.66.

(3) Pump, Compressor, and Agitator Seals

(i) Rotating pumps or compressors: Vinyl chloride emissions from seals on all rotating pumps or compressors in vinyl chloride service are to be minimized by installing sealless pumps, compressors or pumps with double mechanical seals, or equivalent as provided in Rule 361.66.

(ii) Reciprocating pumps or compressors: Vinyl chloride emissions from seals on all reciprocating pumps and compressors in vinyl chloride service are to be minimized by installing double outboard seals, or equivalent as provided in Rule 361.66.

(iii) Agitator: Vinyl chloride emissions from seals on all agitators in vinyl chloride service are to be minimized by installing agitators with double mechanical seals, or equivalent as provided in Rule 361.66.

For purposes of Subsection (f)(3), if double mechanical seals or double outboard seals are used, vinyl chloride emissions from the seals are to be minimized by maintaining the pressure between the two seals so that any leak that occurs is into the compressor, pump or agitated vessel; by ducting any vinyl chloride between the two seals through a control system from which the concentration of vinyl chloride in the exhaust gases shall not exceed 10 pm; or equivalent as provided in Rule 361.66.

(4) Leakage from Relief Valves

Vinyl chloride emissions due to leakage from each relief valve on equipment in vinyl chloride service are to be minimized by installing a rupture disk between the equipment and the relief valve, by connecting the relief valve discharge to a process line or recovery system, or equivalent as provided in Rule 361.66.

(5) Manual Venting of Gases

Except as provided in Rule 361.62(e), all gases which are manually vented from equipment in vinyl chloride service are to be ducted through a control system from which

the concentration of vinyl chloride in the exhaust gases shall not exceed 10 ppm; or equivalent as provided in the Rule 361.66.

(6) Opening of Equipment

Vinyl chloride emissions from opening of equipment (including loading or unloading lines that are not opened to the atmosphere after each loading or unloading operation) are to be minimized as follows:

(i) Before opening any equipment for any reason, the quantity of vinyl chloride is to be reduced so that the equipment contains no more than 2.0 percent by volume vinyl chloride or 25 gallons (94.62 liters) of vinyl chloride, whichever is larger, at standard temperature and pressure; and

(ii) Any vinyl chloride removed from the equipment in accordance with Subsection (f)(6)(i) of this rule is to be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in Rule 36.166.

(7) Samples

Unused portions of samples containing at least 10 percent by weight vinyl chloride are to be returned to the process, and sampling techniques are to be such that sample containers in vinyl chloride service are purged into a closed process system.

(8) Leak Detection and Elimination

Vinyl chloride emissions due to leaks from equipment in vinyl chloride service are to be minimized by instituting and implementing a formal leak detection and elimination program. The owner or operator shall submit a description of the program to the Control Officer for approval. The program is to be submitted within 45 days of the effective date of these regulations, unless a waiver of compliance is granted under Rule 361.11. If a waiver of compliance is granted, the program is to be submitted on a date scheduled by the Control Officer. Approval of a program will be granted by the Control Officer provided he finds:

(i) It includes a reliable and accurate vinyl chloride monitoring system for detection of major leaks and identification of the general area of the plant where a leak is located. A vinyl chloride monitoring system means a device which obtains air samples from one or more points on a continuous sequential basis and analyzes the samples with gas chromatography or, if the owner or operator assumes that all hydrocarbons measured are vinyl chloride, with infrared spectrophotometry flame ion detection, or an equivalent or alternative method.

(ii) It includes a reliable and accurate portable hydrocarbon detector to be used routinely to find small leaks and to pinpoint the major leaks indicated by the vinyl chloride monitoring system. A portable hydrocarbon detector means a device

which measures hydrocarbons with a sensitivity of at least 10 ppm and is of such design and size that it can be used to measure emissions from localized points.

(iii) It provides for an acceptable calibration and maintenance schedule for the vinyl chloride monitoring system and portable hydrocarbon detector. For the vinyl chloride monitoring system, a daily span check is to be conducted with a concentration of vinyl chloride equal to the concentration defined as a leak according to Subsection (f)(8)(vi) of this rule. The calibration is to be done with either:

(A) a calibration gas mixture prepared from the gases specified in Sections 5.2.1 and 5.2.2 of Test Method 106, Appendix B to 40 CFR 61, and in accordance with Section 7.1 of Test Method 106, or

(B) a calibration gas cylinder containing the appropriate concentration of vinyl chloride. The gas composition of the calibration gas cylinder standard is to have been certified by the manufacturer. The manufacturer must have recommended a maximum shelf life for each cylinder so that the concentration does not change greater than ±5 percent from the certified value.

The date of gas cylinder preparation, certified vinyl chloride concentration and recommended maximum shelf life must have been affixed to the cylinder before shipment from the manufacturer to the buyer. If a gas chromatograph is used as the vinyl chloride monitoring system, these gas mixtures may be directly used to prepare a chromatograph calibration curve as described in Section 7.3 of Test Method 106. The requirements in Sections 5.2.3.1 and 5.2.3.2 of Test Method 106 for certification of cylinder standards and for establishment and verification of calibration standards are to be followed.

(iv) The location and number of points to be monitored and the frequency of monitoring provided for in the program are acceptable when they are compared with the number of pieces of equipment in vinyl chloride service and the size and physical layout of the plant.

(v) It contains an acceptable plan of action to be taken when a leak is detected.

(vi) It contains a definition of leak which is acceptable when compared with the background concentrations of vinyl chloride in the areas of the plant to be monitored by the vinyl chloride monitoring system. Measurements of background concentrations of vinyl chloride in the areas of the plant to be monitored by the vinyl chloride monitoring system are to be included with the description of the program. The definition of leak for a given plant may vary among the different areas within the plant and is also to change over time as background concentrations in the plant are reduced.

(9) Inprocess Wastewater:

Vinyl chloride emissions to the atmosphere from inprocess wastewater are to be reduced as follows:

(i) The concentration of vinyl chloride in each inprocess wastewater stream containing greater than 10 ppm vinyl chloride measured immediately as it leaves a piece of equipment and before being mixed with any other inprocess wastewater stream is to be reduced to no more than 10 ppm by weight before being mixed with any other inprocess wastewater stream which contains less than 10 ppm vinyl chloride; before being exposed to the atmosphere, before being discharged to a wastewater treatment process; or before being discharged untreated as a wastewater. This section does apply to water which is used to displace vinyl chloride from equipment before it is opened to the atmosphere in accordance with Rule 361.62(c) or Subsection (f)(6) of this rule, but does not apply to water which is used to wash out equipment after the equipment has already been opened to the atmosphere in accordance with Rule 361.62(c) of Subsection (f)(6) of this rule.

(ii) Any vinyl chloride removed from the inprocess wastewater in accordance with Subsection (f)(9)(i) of this section is to be ducted through a control system from which the concentration of vinyl chloride in the exhaust gases does not exceed 10 ppm, or equivalent as provided in Rule 361.66.

(g) The requirements of this rule shall be incorporated into a standard operating procedure, and made available upon request for inspection by the Control Officer.

RULE 361.63. [RESERVED]

RULE 361.64. [RESERVED]

RULE 361.65. [RESERVED]

RULE 361.66. EQUIVALENT EQUIPMENT AND PROCEDURES

Upon written application from an owner or operator, the Control Officer may approve use of equipment or procedures which have been demonstrated to his satisfaction to be equivalent in terms of reducing vinyl chloride emissions to the atmosphere to those prescribed for compliance with a specific rule of this Subpart F. For an existing source, any request for using an equivalent method as the initial measure of control is to be submitted to the Control Officer within 30 days of the effective date. For a new source, any request for using an equivalent method is to be submitted to the Control Officer with the application for approval of construction of modification required by Rule 361.07.

RULE 361.67. EMISSIONS TESTS (Rev. Effective 6/16/78)

(a) Unless a waiver of emission testing is obtained under Rule 361.13, the owner or operator of a source to which this Subpart F applies shall test emissions from the source:

(1) Within 90 days of the effective date in the case of an existing source or a new source which has an initial startup date preceding the effective date; or

(2) Within 90 days of startup in the case of a new source, initial startup of which occurs after the effective date.

(b) The owner or operator shall notify the Control Officer at least 30 days prior to an emission test.

(c) Any emission test is to be conducted while the equipment being tested is operating at the maximum production rate at which the equipment will be operated and under other relevant conditions as may be specified by the Control Officer based on representative performance of the source.

(d) Each emission test is to consist of three runs. For the purpose of determining emissions, the average of results of all runs is to apply. The average is to be computed on a time weighted basis.

(e) All samples should be analyzed within 24 hours, but in no case in excess of 72 hours of sample collection. Vinyl chloride emissions are to be determined within 30 days after the emission test. The owner or operator shall report the determinations to the Control Officer by a registered letter dispatched before the close of the next business day following the determination.

(f) The owner or operator shall retain at the plant and make available, upon request for inspection by the Administrator or Control Officer, for a minimum of 2 years records.

(g) The owner or operator shall use test methods specified in Part 61, Title 40, Code of Federal Regulations, Section 61.17(g) to determine vinyl chloride emissions from any source for which an emission limit is prescribed in this Subpart F.

RULE 361.68. EMISSION MONITORING

The owner or operator subject to the provisions of this subpart shall monitor emissions as set forth in Part 61, Title 40, Code of Federal Regulations, Section 61.68.

RULE 361.69. [RESERVED]

RULE 361.70. REPORTING

In addition to the reporting requirement of Rule 361.10, an owner or operator of any source to which this Subpart F applies shall submit to the Control Officer on September 15 and March 15 of each year a report in writing containing the information as required in Part 61, Title 40, Code of Federal Regulations, Section 61.70.

RULE 361.71. RECORDKEEPING

(a) The owner or operator of any source to which this Subpart F applies shall retain the following information at the source and make it available for inspection by the Control Officer for a minimum of 2 years;

(1) A record of the leaks detected by the vinyl chloride monitoring system as required by Rule 361.62(f)(8), including the concentrations of vinyl chloride as measured, analyzed, and recorded by the vinyl chloride detector, the location of each measurement and the date and approximate time of each measurement.

(2) A record of the leaks detected during routine monitoring with the portable hydrocarbon detector and the action taken to repair the leaks, as required by Rule 361.62 (f)(8), including a brief statement explaining the location and cause of each leak detected with the portable hydrocarbon detector, the date and time of the leak and any action taken to eliminate the leak measured in accordance with Rule 361.68.

(3) For the relief discharges from reactors subject to the provisions of Rule 361.62(e), a daily operating record for each reactor, including pressures and temperatures.