D R A F T

Sheldon Meyers, Director
Office of Air Quality, Planning and Standards
Environmental Protection Agency
41 M Street, S.W.
Washington, D.C.

Re: Revision of the Vinyl Chloride Standard

Dear Mr. Meyers:

This letter follows your meeting with representatives of the Vinyl Institute on May 26, 1983. The meeting concerned the Environmental Protection Agency's (EPA) review of the vinyl chloride standard. 40 C.F.R. § 61.60 *et seq*. In particular, discussion focused on problems presented by the relief valve discharge provision of the standard. *Id*. at § 61.65(a). You suggested that we provide written comments indicating the basis of our difficulty with this provision and suggestions for improvement.

There are a number of administrative provisions of the current standard which we have discussed previously with the Agency and which are being considered in EPA's current review of the vinyl chloride standard. The single major difficulty with the standard is the relief valve discharge provision. Our mutual goal is to establish a standard of performance that is reasonable, adequately protects the public health and provides guidance to the industry while retaining enough flexibility to incorporate improved control technologies.

> A relief discharge will be considered an emergency discharge only if it occurs as the result of an unpreventable disaster (i.e., tornado, hurricane, earthquake, flood, riot, sabotage, etc.). Discharges which could have been prevented thorugh the use of backup equipment and/or proper operation and maintenance procedures will be considered vioaltions of § 61.65(a). Some examples of conditions uder which discharges will be considered violations include power outages, operator errors, preventable equipment failures and malfunctions, etc. In these instances, vinyl chloride releases could be avoided through use of backup power supplies, backup equipment, employee training, and proper operation and maintenance procedures.

This restrictive approach has been the hallmark of EPA's enforcement efforts. For example, EPA recently represented in civil enforcement proceedings that the relief valve and manual vent valve discharge provisions "are emission standards setting a quantifiable limit of zero emissions but which also allow the violator to assert an affirmative defense of emergency discharge under certain conditions." United States v. Ethyl Corp., Civil Action No. 83-0120-A (M.D. La. July 1, 1983)(slip op. at 8).

EPA's radical change in interpretation since the vinyl chloride standard was initially promulgated has created a serious problem, lead to unwarranted expenditures of public and private resources, deprived industry of any realistic standard of conduct, and robbed a significant regulatory provision of its intended meaning. Such a state of affairs merits the effort needed to chloride (PVC) or VCM production during a calendar year. A numerical limit would establish a clear goal for industry and simplify EPA enforcement activity.

2. Relief Valve Discharge Prevention Plan

As an alternative to a finite limit, we suggest that a relief valve discharge prevention plan be added to the current regulation. Each facility would be required to submit a plan to the Agency detailing the training, maintenance, written procedures and other actions the facility will routinely follow to prevent relief valve discharges. Following approval of the plan by EPA, sources would be deemed to violate the Act and the relief valve discharge provisions if they fail to comply with the plan. EPA would retain authority to require revisions to the plan if a facility's history of relief valve discharges indicates to the Agency that additional preventive measures are needed.

By establishing specific work practices and other criteria to be followed, industry would have a clear and specific list of actions that must be followed to comply with the standard. From the Agency's perspective, enforcement proceedings will be simplified because disputes over what constitutes an "emergency" should not arise. Rather, once it is demonstrated that a facility failed to follow its plan, the source would be subject to penalization under the enforcement provisions of the Clean Air

C. Industry Compliance Efforts

Existing safety regulations and insurance company requirements mandate the use of safety relief devices on the pressurized equipment used to produce VCM and PVC. See Vinyl Chloride--A Review of National Emission Standards at pp. 3-35 and 4-17 (EPA) (Feb. 1982) (hereinafter referred to as the TRW Report). The vinyl chloride standard prohibits relief valve discharges except for emergency relief discharges.

As proposed by EPA in 1975, the definition of an emergency relief discharge was "a discharge which could not have been avoided by taking all available measures to prevent the discharge," 40 Fed. Reg. 59,545 (Dec. 24, 1975) (emphasis added). Industry objected to the use of the term "all available" in the definition and argued that reasonable practices and procedures to prevent relief valve discharges should be sufficient. In response to these comments, EPA deleted the term "all available" from the final definition which lists an emergency relief discharge as one "which could not have been avoided by taking measures to prevent the discharge." 41 Fed. Reg. 46,565 (Oct. 21, 1976).

Involved members of industry, through discussions with the EPA staff at Research Triangle Park, believed that they had a working understanding of how the relief valve discharge provisions would be interpreted. Quite simply, industry anticipated that if it made a best effort to eliminate discharges, it would be considered to be in compliance by the Agency.

tinues to spend its time, money, and resources in an on-going effort to limit relief valve and other discharges. According to EPA estimates, the vinyl chloride industry will spend $235.57 million on investments and $765.72 million on annual costs during the 1977-1986 period (in 1977 dollars). The Cost of Clean Air and Clean Water, Annual Report of the Administrator of the Environmental Protection Agency, 96th Cong., 1st Sess., Doc. No. 96-38, p. 58 (Dec. 1979). A revision to this 1979 report is being prepared for EPA by Development Planning and Research Associates, Inc. Their initial draft estimates total annual costs for the 1981-1990 period to be $981.46 million. A 1979 survey also showed that this billion dollar effort was coupled with a 10-to-12% average loss in production capacity as a result of compliance requirements. TRW Report at 2-11.

While the industry has made great strides in reducing VCM emissions overall and in reducing relief valve discharges in particular, the relief valve discharge provisions of the standard have created a major difficulty for industry and led to disputes and litigation. We view this provision as the major substantive difficulty with the standard.

Past EPA action has obscured the meaning of the relief valve discharge provisions. The lack of a clear standard has placed a drain on Agency resources. For example, EPA has had a continuing review of the vinyl chloride standard for several

18, 1980. In addition to the Section 114 letters, a conference was held in Atlanta in April, 1979.

Two years after the last information was submitted, a complaint was filed in U.S. District Court. In all, approximately four years elapsed between the initial phone request for information and the filing of a complaint. BF Goodrich estimates that the vinyl chloride standard would have permitted the release of approximately 618,000 pounds of vinyl chloride assuming that there were no relief valve discharges. Including the relief valve discharges, the actual total amount of emissions was approximately 292,000 pounds. In other words, the facility emitted 326,000 pounds less than that allowed under the standard.

2. Louisville, Kentucky

BF Goodrich operates a PVC suspension and latex polymerization process facility in Louisville, Kentucky. The Agency sent Section 114 letters on November 2, 1979, March 14, 1980, June 27, 1980, and October 22, 1982. Conferences, inspection and plant visits were held. A complaint was filed in U.S. District Court on April 28, 1983, with 17 counts, all for relief valve discharges. In this instance, four and one-half years elapsed from the initial inspection to the filing of a complaint. Under the regulation, this facility could have emitted 445,000 pounds of VCM. Its actual total emissions were 115,000 pounds or "over-control" of 330,000 pounds.

(2) an act of war; or

(3) an act of sabotage; or

(4) an unauthorized act or omission of an employee outside the scope of his employment; or

(5) an unauthorized act or omission of a third party who is not an agent or contractor of the owner or operator of the stationary source.

This list is derived from Section 107 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (Superfund), 42 U.S.C.A. § 9607. This list is also part of the Louisiana emission standards for hazardous air pollutants recently approved by EPA. *See* Section 76.2 of Louisiana Hazardous Pollutant Regulations.

F. Relief Valve Discharge Elimination Plan

We also suggest that each facility be required to develop a specific plan to prevent relief valve discharges. At a minimum, the plan should address training, written standard operating procedures to be followed during the production process, preventive maintenance/inspection plans and equipment. Facilities could add additional topics as warranted. Plans would be subject to mandatory periodic review every three to five years.

vinyl chloride standard. Similarly, if the Agency feels that the work practices, procedures or other techniques employed to prevent relief valve discharges are inadequate, the ability to require revision of the plan permits the Agency to force changes without court action. If a facility is operating without an approved plan, relief valve discharges would be subject to Agency enforcement action as under the current standard.

The major benefit for industry will be the development of specific obligations that will constitute compliance with the standard. It also will provide an administrative mechanism short of litigation for resolving concerns relating to relief valve discharges.

The plan concept was derived from EPA's regulations for a Spill Prevention Control and Countermeasure Plans (SPCC Plans) under the Clean Water Act. 40 C.F.R. § 112.2. Our proposal is more demanding than the SPCC Plan regulations and would involve somewhat increased Agency supervision at the outset. However, given the small number of facilities that would file relief valve discharge elimination plans, we do not believe that the amount of Agency resources involved is unjustified. Although we disagree with EPA's enforcement activity, if the Agency deems this issue important enough to litigate, it must be important enough to merit a prospective solution as opposed to retrospective litigation.

Draft - July 13, 1983

MANUFACTURING PRACTICES COMMITTEE
VINYL INSTITUTE
THE SOCIETY OF THE PLASTICS INDUSTRY, INC.

SUGGESTED AMENDMENTS TO
THE VINYL CHLORIDE STANDARD

40 C.F.R. § 61.65.

An owner or operator of an ethylene dichloride, vinyl chloride, and/or polyvinyl chloride plant shall comply with the requirements of this Section.

(a) Relief Valve and Rupture Discharge.

(i) Except for an emergency discharge, there is to be no discharge to the atmosphere from any relief valve or rupture disk on any equipment in vinyl chloride service. An emergency discharge means a discharge which could not have been avoided by taking measures to prevent the discharge.

(ii) Discharges resulting from the following causes shall be deemed to be emergency discharges:

(A) an act of God; or

(B) an act or war; or

(C) an act of sabotage; or

(D) an unauthorized act or omission of an employee outside the scope of his employment; or

(E) an unauthorized act or omission of a third party who is not an agent or contractor of the owner or operator of the stationery source; or

(F) any one or a combination of the above circumstances.

The Society of the Plastics Industry, Inc.
Vinyl Institute
Manufacturing Practices Committee

Borden Dairy Division
Columbus, Ohio

Monday, June 20, 1983
9:30 a.m.

MINUTES

Attendees:

W.C. Holbrook, Chairman, B.F. Goodrich Co.
6100 Oak Tree Boulevard, Cleveland, Ohio 44131

Joseph C. Ledvina, Conoco Chemicals Co.
P.O. Box 19029, Houston, Texas 77224

J.A. Mullins, Shell Oil Co.
1 Shell Plaza, Houston, Texas 77001

W. Bailey Barton, Borden, Inc.
180 East Broad Street, Columbus, Ohio 43215

Peter L. de la Cruz, Keller & Heckman
1150 17th Street, N.W., Washington, D.C. 20036

1. Chairman Holbrook called the meeting to order at 9:30 a.m.

2. The attendees discussed the current status of the Environmental Protection Agency's (EPA) review of the vinyl chloride standard and related enforcement activity. The EPA staff at Research Triangle Park is continuing to review the standard, but their progress seemed slow and uncertain. Based on this, representatives from the Committee met with Sheldon Meyers, Director of EPA's Office of Air Quality, Planning and Standards. Mr. Meyers recommended that the Committee communicate its concerns with the vinyl chloride standard in a letter to him.

3. A substantial discussion ensued concerning the various ways to approach the letter to Meyers and what suggestions the Committee should present. The central problem is defining the term "emergency release." Mr. Mullins suggested using a concept derived from EPA's Spill Prevention Control and Counter-Measure Plan (SPCC Plan) under the Clean Water Act. The plans would cover emergency discharges and be submitted to EPA for approval. Mr. Holbrook reviewed various criteria or procedures that might be specified as satisfactory work practices for EPA.

ATTACHMENT A

96TH CONGRESS 1st Session	SENATE	DOCUMENT No. 96-38

THE COST OF CLEAN AIR AND CLEAN WATER

ANNUAL REPORT

OF THE

ADMINISTRATOR OF THE ENVIRONMENTAL PROTECTION AGENCY

TO THE

CONGRESS OF THE UNITED STATES

IN COMPLIANCE WITH

SECTION 312(c) OF THE CLEAN AIR ACT, AS AMENDED

AND

SECTION 516(b) OF THE FEDERAL WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972

DECEMBER 1979

55-094 O

U.S. GOVERNMENT PRINTING OFFICE
WASHINGTON : 1979

TEN 5062

Table 5.2-1
Vinyl Chloride Emission Limitations

Ethylene dichloride-vinyl chloride plants	Vinyl Chloride Emissions
EDC formation and purification	10 ppm
VCM formation and purification	0.01 g/kg (0.02 lb/ton)
Oxychlorination process	0.2 g/kg (0.4 lb/ton) EDC
Relief valve discharges	prohibited*
Manual venting of gases	prohibited*
Polyvinyl chloride plants	
Equipment through stripper	10 ppm
Equipment following stripper	2000 ppm (dispersion resins) 400 ppm (all other resins)
Reactor openings	0.02 g/kg (0.04 lb/ton) PVC
Relief valve discharge	prohibited*
Manual venting of gases	prohibited*

* Except under emergency conditions

Table 5.2-2.
Uncontrolled Sources of Vinyl Chloride
Emissions in VCM Production

Emission Source	Percent of Uncontrolled Emissions at Average Plant
Vinyl chloride formation and purification	54
Fugitive emission sources	27
Ethylene dichloride purification	11
Oxychlorination reactor	8
Total	100

The best available control technology for balanced EDC-VCM plants involves the collection and incineration of all emissions from the formation and purification of vinyl chloride and ethylene dichloride (by oxychlorination) and the control of fugitive emission sources. Fugitive emissions can be controlled by the use of:

- multipoint and portable detectors,
- control systems on sampling and transfer operations,
- collection header systems to connect equipment undergoing maintenance or inspection to either the monomer recovery system or to an add-on control device,
- rupture discs and pressure gauges prior to safety discharge valves on pressure vessels, and
- dual mechanical seals on pumps and compressors.

It is anticipated that fugitive emissions can be reduced by 90 percent by applying these above measures in the typical plant. Incineration should reduce emissions from the other sources by at least 95 percent.

Polyvinyl chloride is produced by suspension (78 percent), dispersion or emulsion (13 percent), bulk (6 percent), and solution (3 percent) polymerization processes. The percentages refer to 1973 capacity. The contributions of various emission sources to total emissions of vinyl chloride differ somewhat from process to process, but the breakdown shown in Table 5.2-3 for the dispersion process is generally typical for other processes:

Table 5.2-3.
Uncontrolled Sources of Vinyl Chloride
Emissions in PVC Production (dispersion process)

Emission Source	Total Uncontrolled Emissions at Average Plant, Percent
Sources following stripper*	33
Stripper	8
Fugitive emissions sources	38
Monomer recovery system	12
Relief valve discharge	5
Reactor opening	4
Total	100

* Slurry blend tanks, concentrators, dryers, bulk storage, etc.

The best available control technology for PVC plants varies somewhat with the type of process. For all processes, fugitive emissions can generally be controlled through containment, capture, and ducting of emissions to a control system, and early leak detection and repair. Losses on opening equipment can be reduced by using water to displace VCM to a control system before opening the equipment. Reactor relief valve discharges can generally be eliminated by chemically shortstopping the polymerization reaction or manually venting gases to a recovery system. Strippers are used to remove vinyl chloride from the polymer, and carbon adsorption systems can be used to recover the monomer from the stripper.

Improved stripper effectiveness solves most of the emissions problems in operations that follow the stripper, including emissions of VCM in PVC fabrication operations, although incineration with scrubbing to remove HCl is an alternative control strategy. Emission control effected by the stripper, however, is not uniformly applicable to all processes. Current technology is available to strip the majority of resins except dispersion resins to 400 ppm or lower. Dispersion resins, however, are sensitive to the high temperatures used in stripping other resins, but they can be stripped effectively to 2,000 ppm. Most of the remaining VCM is removed from dispersion resins in the drying process.

Suspension resins and dispersion resins are polymerized in water and are ultimately blended in water slurry. This water contains some vinyl chloride, which can be removed by steam distillation. No water is involved in the bulk polymerization

Development Planning and Research Associates, Inc.
P.O. Box 727, Manhattan, Kansas 66502

Issued by DPRA ______ Date ______ Initials

EPA Review ______ Date ______ Initials

Received by DPRA ______ Date ______ Initials

1981 COST OF CLEAN

INITIAL DRAFT

CHAPTER REVIEW PACKAGE

A5.2 VINYL CHLORIDE

Contract No. 68-01-6103
EPA Program Officer: Anne Cassin
Office of Policy Analysis
Office of Policy and Resource Management
Washington, D.C.

Prepared by:

Development Planning and Research Associates, Inc.
in association with
TCS Management Group, Inc.
and
Pope-Reid Associates, Inc.

P. 359
January 1983

Ethylene dichloride is also produced by two methods: the catalytic chlorination of ethylene with chlorine and the oxychlorination of ethylene with hydrogen chloride and oxygen.

The major use for ethylene dichloride in the United States is in the production of vinyl chloride. It is usually convenient and economical to manufacture both products in the same plant in a balanced operation in which part of the ethylene dichloride requirement for the plant is produced by the chlorination of ethylene with chlorine. After purification, the ethylene dichloride is converted to vinyl chloride and hydrogen chloride in a cracking furnace operating at about 510 C (950 F) (dehydrochlorination of ethylene dichloride). Hydrogen chloride is recovered and recycled to an oxychlorination process for the conversion of additional ethylene to additional ethylene dichloride (oxychlorination of ethylene). In this manner, essentially all of the chlorine that is used eventually winds up in vinyl chloride.

Polyvinyl chloride (and copolymers) is produced by the catalyzed polymerization of vinyl chloride (and comonomers).

Four types of processes are used in the United States to effect this polymerization. These processes and the percentage of total U.S. capacity each represented in 1973 are as follows: suspension polymerization (78 percent), dispersion or emulsion polymerization (13 percent), bulk polymerization (6 percent), and solution polymerization (3 percent).

The production of ethylene dichloride, vinyl chloride, and polyvinyl chloride was 1.15, 0.91, and 0.82 million metric tons (1.27, 1.0 and 0.91 million short tons), respectively, in 1965. By 1974 these had grown to 4.2, 2.60, and 2.15 million metric tons (4.6, 2.9, and 2.4 million short tons). Growth of the production of these chemicals is projected to continue at an average annual rate of approximately 4 percent. This report and its estimations of air-pollution control costs are based on the current regulations for controlling vinyl chloride emissions. It is not believed

- Rupture discs and pressure gauges prior to safety discharge valves on pressure vessels and
- Dual mechanical seals on pumps and compressors.

It is anticipated that fugitive emissions can be reduced by 90 percent by applying these above measures in the typical plant. Incineration should reduce emissions from the other sources by at least 95 percent.

The best available control technology for PVC plants varies somewhat with the type of process. For all processes, fugitive emissions can generally be controlled through containment, capture, and ducting of emissions to a control system, and early leak detection and repair. Losses on opening equipment can be reduced by using water to displace VCM to a control system before opening the equipment. Reactor relief valve discharges can generally be eliminated by chemically short-stopping the polymerization reaction or manually venting gases to a recovery system. Strippers are used to remove vinyl chloride from the polymer, and carbon adsorption systems can be used to recover the monomer from the stripper.

Improved stripper effectiveness solves most of the emissions problems in operations that follow the stripper, including emissions of VCM in PVC fabrication operations, although incineration with scrubbing to remove HCl is an alternative control strategy. Emission control effected by the stripper, however, is not uniformly applicable to all processes. Current technology is available to strip the majority of resins except dispersion resins to 400 ppm or lower. Dispersion resins, however, are sensitive to the high temperatures used in stripping other resins, but they can be stripped effectively to 2,000 ppm. Most of the remaining VCM is removed from dispersion resins in the drying process.

Suspension resins and dispersion resins are polymerized in water and are ultimately blended in water slurry. This water contains some vinyl chloride, which can be removed by steam distillation. No water is involved

Table A5.2-1. Vinyl chloride emissions limitations

Emission source/process	Limitation
Balanced ethylene dichloride - vinyl chloride plants	
EDC formation and purification	10 ppm
VCM formation and purification	10 ppm
Oxychlorination process	0.2 g/kg (0.4 lb/ton) EDC
Relief valve discharges	prohibited*
Manual venting of gases	prohibited*
Polyvinyl chloride plants	
Equipment through stripper	10 ppm
Equipment following stripper	2000 ppm (dispersion resins)
	400 ppm (all other resins)
Reactor openings	0.02 g/kg (0.04 lb/ton) PVC
Relief valve discharges	prohibited*
Manual venting of gases	prohibited*

*Except under emergency conditions

CHAPTER: 5. 2 VINYL CHLORIDE
AIR POLLUTION CONTROL COSTS
(IN MILLIONS OF DOLLARS)
CAPITAL IN PLACE (KIP): .138E+08

	1981	1970-78	1979-81	1979-84	1981-90
INVESTMENT					
EXISTING PLANTS					
SIP	0.0	0.0	0.0	0.0	0.0
REVISED SIP	0.0	0.0	0.0	0.0	0.0
NEW PLANTS					
NSPS	0.0	0.0	0.0	0.0	0.0
LAER/BACT	0.0	0.0	0.0	0.0	0.0
NESHAPS	0.0	99.61	204.15	204.15	0.0
TOTAL	0.0	99.61	204.15	204.15	0.0
ANNUAL COSTS					
ANNUAL CAPITAL COSTS					
EXISTING PLANTS					
SIP	0.0	0.0	0.0	0.0	0.0
REVISED SIP	0.0	0.0	0.0	0.0	0.0
NEW PLANTS					
NSPS	0.0	0.0	0.0	0.0	0.0
LAER/BACT	0.0	0.0	0.0	0.0	0.0
NESHAPS	39.94	15.97	116.59	236.40	399.37
TOTAL	39.94	15.97	116.59	236.40	399.37
ANNUAL O & M COSTS					
EXISTING PLANTS					
SIP	0.0	0.0	0.0	0.0	0.0
REVISED SIP	0.0	0.0	0.0	0.0	0.0
NEW PLANTS					
NSPS	0.0	0.0	0.0	0.0	0.0
LAER/BACT	0.0	0.0	0.0	0.0	0.0
NESHAPS	49.15	29.32	139.23	302.08	582.09
TOTAL	49.15	29.32	139.23	302.08	582.09
TOTAL ANNUAL COSTS	89.08	45.29	255.82	538.48	981.46

TEN 5068