The Vinyl Institute

August 26, 1986

TO: The Vinyl Institute Health, Safety, & Environment Committee

RE: Items: For your information and files.

For your information and/or comments, I have enclosed an article prepared by Frank Fire of Americhem on "Vinyl Chloride" that appeared in the August 1986 edition of Fire Engineering magazine.

Also enclosed is a series of items courtesy of John Barr that may be of interest. As John notes, they are "all bad news".

Meredith M Scheck

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BOR 012559

Chemical Data Notebook Series:

Vinyl Chloride

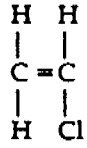
BY FRANK L. FIRE

Vinyl chloride, a colorless flammable gas that is always shipped in its easily liquified state, is primarily used in the polymerization of polyvinyl chloride (PVC), the second highest volume plastic in the United States (polyethylene is the largest volume of plastic).

PROPERTIES AND APPEARANCE

Vinyl chloride is the monomer of PVC, which adds another hazard to this chemical's already flammable nature. Monomers are short-chained molecules that have the unique capability of reacting with themselves to form polymers. This chemical reaction, called polymerization, liberates tremendous quantities of heat. If the polymerization gets out of control, or if vinyl chloride, also known as vinyl chloride monomer or VCM, is exposed to excessive energy in the form of heat or sunlight, a situation called runaway polymerization may occur. Under the proper conditions (if proper is the correct word), this reaction will transit to an explosion. There may be some debate as to whether the explosion is a BLEVE (boiling liquid-expanding vapor explosion) or a runaway polymerization explosion, but the results will be the same—disaster!

Vinyl chloride, whose chemical formula is C_2H_3Cl, and whose structural formula is



is stable under "ordinary" conditions. The double bond, however, is reactive, and this is what makes VCM so valuable as a monomer. VCM has limited use as a raw material in the manufacture of other chemicals besides PVC, and can be used as a refrigerant and solvent.

Vinyl chloride has a very pleasant, sweet odor. It is just slightly less dense than water, having a specific gravity of 0.92, and only slightly soluble in water, which means that it will float on water. The molecular weight of vinyl chloride is 62.5, which makes the vapor density of the gas 2.16 (62.5 divided by 29, the average molecular weight of air). The implication of a vapor density of 2.16 is that any escaping gas will "hang together" and flow along the ground, seeking low spots. Since the gas is flammable, it may find an ignition source (VCM's ignition temperature is 882°F) and flash back to the source of the vapor. VCM's flammable range is from 3.6% to 33% in air.

IDENTIFICATION

Vinyl chloride's UN (United Nations) designation is 1086, its STCC number (Standard Transportation Commodity Code) is 4905792. Its DOT (U.S. Department of Transportation) classification is flammable gas, and the IMO (International Maritime Organization) designation is 2.1. Its NFPA (National Fire Protection Association) 704 numbers are 2-4-1. Its CAS (Chemical Abstract Series) number is 75014.

Vinyl chloride has several synonyms in addition to vinyl chloride monomer and VCM. These include 1-chlorothylene, chloroethylene, monovinyl chloride, chloroethene, chlorethene, monochloroethylene, vinyl C monomer, VC, VCL, MVC, and ethylene monochloride.

HAZARDS

Personal

VCM is not corrosive, but since it is shipped as a liquid (whose boiling point is 7.2°F), it will be very cold and may cause frostbite. Short-term exposure to high concentrates of vinyl chloride (2.5% in air, or 25,000 ppm) can cause dizziness, nausea, headache, dulling of the senses, unconsciousness, and eventually death. There have been reports of people being exposed to 5,000 ppm over several hours without suffering any observable harmful effects. However, VCM is a carcinogen, and repeated exposures to these lower concentrations over long periods of time will be very dangerous.

The TLV (threshold limit value) for vinyl chloride is 5 ppm, while OSHA (Occupational Safety and Health Administration) permits only a 1 ppm TWA (time weighted average). Since VCM is so pleasant smelling, its health hazards may be easily overlooked.

PROTECTIVE CLOTHING

The emergency responder may protect himself from VCM by wearing protective clothing that is impervious to cold liquids. This will include rubber gloves and boots, and full faceshields with airtight eye protection. Positive pressure self-contained breathing apparatus is always recommended in a spill where one may be exposed to vapors. For low amounts of gas (less than 25 ppm) an approved organic vapor cartridge respirator

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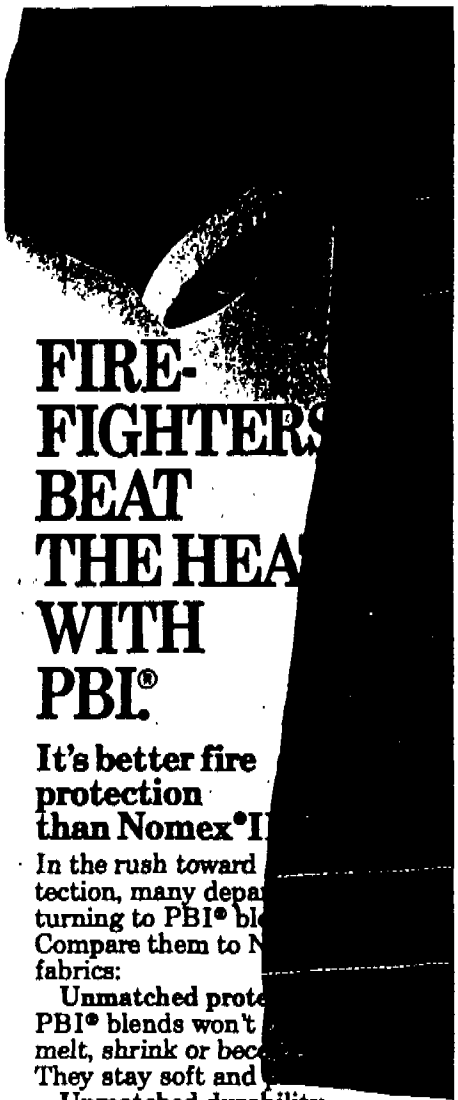

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(specific for VCM) will provide sufficient protection.

HANDLING

Even though VCM is stable to most chemicals, it is very reactive with copper and all copper alloys. Handling an incident involving VCM is one instance where brass tools should not be used. Since the gas is so flammable, you must eliminate all chances of sparks as ignition sources.

Precaution in an incident involving VCM would be the same as with any flammable gas that has been liquified. If liquid is leaking, large quantities of vapor will form as the material seeks to return to its natural state. Should the vapor ignite, the flame should *not* be extinguished until the flow of gas can be stopped.

Above all else, be aware that a BLEVE or runaway polymerization explosion may be imminent if the container has had direct flame impingement. Even without direct flame impingement, an explosion is possible if the container has been exposed to high heat (radiant heat). The containers should be cooled by unmanned monitors because of the threat of explosion.

VCM is stabilized for transportation (a material such as phenol is added to prevent premature polymerization); however, if this material is volatilized (driven out of the VCM by heat), the polymerization reaction may begin in a violent manner, resulting in an explosion.

Where unignited leaking vapors are the problem, the high vapor density of the gas alone will allow the vapors to travel great distances before dissipating, even if there is no appreciable wind. Any turbulence caused by the application of water, fog, or spray will aid in the early dissipation of vapors, lowering the chances of the vapors contacting an ignition source.

If fire does occur in a large VCM spill, treat it as any other flammable liquid. Since tremendous quantities of carbon monoxide and hydrogen chloride may be generated, respiratory protection is mandatory. All firefighters realize the hazards of carbon monoxide (CO), but might not be aware of the corrosiveness of hydrogen chloride (HCl). HCl is very soluble in water, forming hydrochloric acid when it dissolves. You may easily remove the HCl from the combustion gases downwind by "sweeping" the air with high pressure fog nozzles, but you must then contain the runoff water, which will be somewhat acidic.

Evacuation

If it is not possible to use water to disperse the gas and remove HCl from the vapors, evacuation must

Glossary

BLEVE—Boiling liquid-expanding vapor explosion.

Double bond—Two covalent bonds between two atoms.

Easily liquifiable gas—A gas with a relatively high boiling point that can be reached easily by refrigerative.

Molecule—A chemical combination of two or more atoms.

Monomer—A short chain molecule capable of combining with itself to form a polymer.

NFPA 704—National Fire Protection Association's standard for hazard warning for stationary containers.

Polymer—A very long chain molecule formed by hundreds and thousands of monomer molecules combining with themselves.

Polymerization—The chemical reaction in which monomers combine with themselves to form a polymer.

ppm—Parts per million (of air).

Runaway polymerization—The almost instantaneous conversion of monomers to polymers with a great release of heat energy. Under the "right" conditions, this is an explosion.

Specific gravity—The weight of a solid or liquid as compared to the weight of an equal volume of water.

Vapor density—The ratio of the molecular weight of a vapor or gas to the average molecular weight of air (29).

BOR 012561

be carried out downwind for as far as vapors may be detectable. This could be as much as two miles on a relatively calm day.

Since VCM is shipped in railcars and tank trucks (and perhaps in smaller containers) evacuation and withdrawal distances will also depend on the amount of product involved in the incident. Evacuation distances of one-half mile to a full mile are recommended where tank trucks and railcars are involved.

In addition to the harmful effects of VCM vapor inhalation, evacuation may be necessary because of the explosion hazard. All ignition sources must be removed, and any liquid must be prevented from entering waterways.

Containment

If entry into a waterway occurs, notify users of downstream water and all agencies charged with protection of the environment.

If the stream is small, containment dikes or dams may be built to hold r divert the contaminated water to another holding area. However, care must be given to maintenance of the structure to prevent unexpected collapse and release of large quantities of contaminated water.

Where the amount of liquid VCM entering a stream has been small, absorbing agents, such as activated charcoal and peat moss, may be used to capture dissolved contaminant. Be advised that as spilled liquid enters waterways, the water will be significantly warmer than the VCM, causing evaporation to accelerate.

Prevention of contamination in sewers is much simpler because the openings of catch basins and other entryways into the sewer system are easily dammed by soil, sand, or other sorbents.

Wherever liquid vinyl chloride monomer is released on land, the material may be contained by building containment dikes of soil, sand, or other sorbents. All contaminated soil will have to be removed and taken to a qualified landfill.

If containment of the spill is called for in a particular incident, one must keep uppermost in mind the fact that an easily liquifiable flammable gas is involved. During the incident, emergency responders can become so engrossed in containment techniques that they forget the principal hazard of the spilled material. Remember that as long as the liquid remains exposed to the atmosphere at temperatures above its boiling point, flammable vapors are being produced—vapors that are significantly heavier than air and that have the capability of moving along the ground great distances before contacting an ignition source.

Again, in all cases of release of VCM, the proper authorities must be notified. If containment is successful, the manufacturers, shippers, and consignees of the VCM should be contacted to see if they can help keep the production of vapors down. These people will also prove helpful in recovering any remaining liquid by transfer-

Patent No 0222 527/0237 357/0235 619/3 823 907/3 667 714/3 204 775
CAN 40334/3 971 591/U K 972 722/3 204 775

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ring it into undamaged containers.

Ditches and trenches may be dug at the site to lead the liquid to a safer place of containment, perhaps a deep pit that can be covered to prevent vapor release.

After the liquid is contained, it must be pumped into secure pressure containers as soon as possible to lessen the dangers of explosion and/or contamination.

If the VCM container is ruptured, the liquid will be forced out under some pressure. If the liquid can be contained or caught in a container of some sort, a portable pump may be used to recirculate the liquid back into the leaking container. This may not be possible in warm weather, since vapor pressure inside the tank may prevent liquid from reentering. If this technique is attempted, remember that you are dealing with a flammable gas. *All* ignition sources must be eliminated, or tragedy will follow. Even the pump used must be explosion-proof to prevent *it* from being an ignition source.

First aid for those exposed to the gas include fresh air, artificial respiration, and immediate medical attention. Where contact has been made with the liquid, flushing with water for 15 minutes is recommended, especially for the eyes. All contaminated clothing should be removed, and skin should be washed with water and mild soap. All unprotected personnel should remain upwind and out of contact with the liquid.

SUMMARY

Knowing the major use of vinyl chloride, emergency responders who have PVC polymerizing plants in their response districts should prepare themselves for an eventual spill. By contacting the railroads and trucking companies, responders can determine the routes by which VCM is shipped through their districts.

Since VCM releases can accumulate in basements and other confined spaces, care must be taken to ventilate all such low-lying or confined areas. An otherwise successful mitigation of a VCM incident might be marred by an explosion or asphyxiation occurring because someone failed to look for it in likely places. ■

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3 items of interest —
all bad news —

19 Aug

BOR 012564

Mitch Snow, an Interior Department spokesman, told BNA Aug. 8 that Congress has 30 days to review the settlement before the government takes it to the federal district court in Fresno, Calif., but Congress cannot veto the proposal.

Snow said that if the Senate does not pass a bill opposing the settlement by late August, when the 30-day period lapses "my guess is [the federal government] would go ahead" and bring the settlement to the court. While he noted the secretary said he "regretted" the House's amendment, Snow doubted that would stop Interior from acting.

EDF: Form of Drain 'Left Wide Open'

Tom Graft, an Environmental Defense Fund attorney, told BNA Aug. 8 that the question of who will pay for some form of drain in the Water District is "left wide open" under the agreement.

The proposed requirement that the district put up $100 million for drainage is "a good start," he said, but added that the district has always claimed it is the federal government's responsibility to pay for the drain.

The agreement should require that the district "acknowledge that the drain is their responsibility," according to Graft.

Background of Settlement Proposal

The origins of the dispute stretch back to 1963 when then-President John F. Kennedy and then-Interior Secretary Stuart L. Udall provided for a fixed water service charge of $8 per acre-foot in Westlands and allowed 1,008,000 acre-feet of water to be supplied until 1979, according to Interior Department documents. In 1979, the rate was to be cut to 900,000 acre-feet. Also in 1979, the Interior solicitor issued an opinion that the fee charged for drainage was insufficient and should be raised, and that only 500,000 acres were eligible for the federal water. That year the Westlands farmers filed their first suit, challenging the federal action. The district continued receiving 1,100,000 acre-feet of water at the same rate while the court decided the matter, with the disputed money held in a trust fund, according to Interior documents.

Interior's settlement proposal would reverse the 1979 solicitor's opinion and is based largely on an analysis by the current Interior solicitor Ralph Tarr, according to Hodel's letter to McClure. It would allow the district to continue receiving 900,000 acre-feet of water a year at the original $8 per acre-foot and 250,000 acre-feet at $16.40 per acre-foot, reflecting actual costs, less interest charges, according to Snow. It also would allow the department to provide an additional 100,000 acre-feet a year in the future. Among other provisions, the settlement would require the district to deposit $5 million per year in a trust fund to accumulate up to $100 million to be used for construction and design of future drainage facilities, but would limit the district's responsibility to 35 percent of design and construction costs.

Lost Revenues and Environmental Damage

Critics of the proposal object on two accounts: lost revenues and environmental damage. Hamilton Candee, an attorney with the Natural Resources Defense Council Inc., told BNA Aug. 8 that the settlement was an "illegal exemption" to the water reclamation law passed in 1982 that requires that all future or amended water projects in the Westlands be renegotiated to cover full costs of water.

Dan Beard, staff director of the House Interior and Insular Affairs Subcommittee on Energy and Water, told BNA Aug. 8 that if Westlands adhered to the Reclamation and Reform Act, the cost for 900,000 acre-feet would be approximately $10 per acre-foot rather than $8, a yearly difference of at least $1.8 million, and he said the 100,000 acre-foot addition would require congressional approval. He too said Hodel was using the settlement as a means to avoid the Act. "All we ask is that the district and Interior comply with Act," Beard said.

Candee accused the Interior Department of "going in the wrong direction."

"There is excessive demand for water in California," Candee said. He described increased pollution in San Francisco Bay and said Interior's plan would require diverting more water to Westlands rather than supplying fresh water to the bay. He said that actions allowed by the settlement would contribute more selenium-contamination drain water to the San Joaquin Valley.

In a "fact sheet," NRDC claimed that for water use beyond the 900,000 acre-foot limit, the Reclamation Reform Act requires that large Westlands operators with more than 960 acres must pay full costs for water including interest or $45 per acre-foot, the same amount paid by industrial and municipal users.

Candee also called for an overall "soil classification study" of the area with Congress being put in control of water development in the Westlands as required by the Act.

Hazardous Waste

CLEANUP OF DELAWARE PVC SITE ESTIMATED TO COST FROM $715,000 TO $2.285 MILLION

PHILADELPHIA — (By a BNA Staff Correspondent) — Remedial measures were proposed by the Environmental Protection Agency to control and abate groundwater contamination at the Formosa Plastics Corp.'s polyvinyl chloride (PVC) plant in Delaware City, Del.

Ray Germann, EPA spokesman in Region III, said initial estimated cleanup costs at the superfund site range from $715,000 to $2.285 million to control an existing plume of groundwater contaminated with volatile organic chemicals used in the manufacture of PVC resin and the processing of vinyl chloride monomer.

Sampling tests from groundwater monitoring wells resulted in findings of ethylene dichloride at levels of up to 3,400 parts per billion, vinyl chloride monomer at up to 310 ppb, and trichloroethylene at 15 to 20 ppb, he said.

In announcing the proposed remediation July 25, EPA said PVC manufacturing operations at the site since 1966 resulted in the contamination of groundwater under the site. Germann said no contamination has been found in nearby residential water wells.

EPA will seek an agreement with Formosa Plastics and Stauffer Chemical Co. of Westport, Conn., former owner of the site, to pay for the cleanup, the agency spokesman added.

The remedial study by EPA and the Delaware Department of Natural Resources and Environmental Control proposed pumping and treating the groundwater and monitoring the plume movement, providing alternate water supplies as necessary. Proposed source abatement measures include excavation and lining of containment cells, regrading and capping to prevent rain water infiltration, and installation of slurry walls or grout curtains to contain groundwater contamination. Germann said no cost estimate was available for source abatement.

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0013-9211/86/$0+.50

CHEMICAL REVIEW: VINYL CHLORIDE

CAS RN 75-01-4
NIOSH # KU 9625000
SIC Code 2813

See N.I. Sax. 1984. *Dangerous Properties of Industrial Materials*, 6th ed. New York: Van Nostrand Reinhold, p. 2728.

SYNS Chloroethene (9CI); chloroethylene (8CI); chlorethene; chlorethylene; chloroethene; chlorethylene; chlorure de vinyle (French); cloruro di vinile (Italian); ethylene monochloride; EXON 470; monochloroethene; monochloroethylene; trovidur; vinyl chloride monomer; vinyl chloride, inhibited; vinyl C monomer; vinylchlorid (German); VC; VCM; winylu chlorek (Polish).

STRUCTURAL FORMULA

$$ClCH = CH_2$$

mf C_2H_3Cl
mw 62.50

SPECIES IN MIXTURE 99.42% pure.

COMMON USES Approximately 96% is used in production of vinyl chloride homopolymer and copolymer resins. It is also used in production of methyl chloroform and as a comonomer with vinylidene chloride in the production of resiins. Polyvinyl chloride resins are used in production of plastic piping and conduit. Other uses are in floor covering, consumer goods, electrical applications, and transport applications. Vinyl chloride has been used as a refrigerant, extraction solvent, and aerosol propellant. (R-63)

STORAGE AND HANDLING INFORMATION

TRANSPORT. RAIL (%) 90.0

TRANSPORT. BARGE (%) 2.0.

TRANSPORT. PIPE (%) 8.0

CONTAINERS Pressure cylinders, tank cars, tank barges.

GENERAL STORAGE PROCEDURE Protect against physical damage. Outside or detached storage is preferable. Inside storage should be in a fire resistive storage room, provided with adequate ventilation and free of sources of ignition and heat.

GENERAL HANDLING PROCEDURE Guard against all sources of ignition.

ADDITIVE (%) Phenol.

STANDARD CODES NFPA, 2,4T,1; ICC, flammable gas, red gas label, 300 lbs in an outside container; USCG, liquefied flammable gas; IATA (inhibited) flammable gas, red label, not acceptable passenger, 140 kg cargo, (inhibited) flammable gas, not acceptable.

PRODUCTION

Manufacturer	*Location*	*Year/Volume*	*Ref*
Nine companies	U.S.	1977/2,580 mill kg	R-63
Dow Chemical Co.	Midland, MI		R-63
The B. F. Goodrich Co.	Cleveland, OH		R-63
PPG Industries, Inc.	Guayanilla, PR		R-63
Allied Chemical Corp.	Moundsville, WV		R-47
American Chemical Corp.	Watson, CA		R-47
Cumberland Chemical Corp.	Calvert City, KY Charleston, WV		R-47
Dow Chemical Corp.	Freeport, TX Plaquemine, LA		R-47
Ethyl Corp.	Baton Rouge, LA Houston, TX		R-47
U.S. Tire and Rubber Co.	Ashtabula, OH		R-47
U.S. Rubber Co.	Painesville, OH		R-47
Goodyear Tire and Rubber Co.	Niagara Falls, NY		R-47
Monchem, Inc.	Geisman, LA		R-47
Monsanto Co.	Texas City, TX		R-47
Tenneco Chemical Co.	Houston, TX		R-47
Union Carbide Corp., Chemicals Div.	Texas City, TX		R-47
Goodrich Chemical Co.	Louisville, KY Calvert City, KY Niagara Falls, NY	1969/ 3,735,942 lb (sales measured by U.S. Tariff Comm. 2,358,741 lb)	R-70

BOR 012566

DANGEROUS PROPERTIES OF INDUSTRIAL MATERIALS

REPORT

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July/August 1986 Vol.6 No.4

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TECHNICAL REPORT DATA (Please read instructions on the reverse before completing)		
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9. PERFORMING ORGANIZATION NAME AND ADDRESS Environmental Criteria and Assessment Office Office of Research and Development U.S. Environmental Protection Agency Cincinnati, OH 45268		10. PROGRAM ELEMENT NO. 11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS Office of Emergency and Remedial Response Office of Solid Waste and Emergency Response U.S. Environmental Protection Agency Washington, DC 20460		13. TYPE OF REPORT AND PERIOD COVERED 14. SPONSORING AGENCY CODE
15. SUPPLEMENTARY NOTES		

16. ABSTRACT

This document represents a brief, quantitatively oriented scientific summary of health effects data. It was developed by the Environmental Criteria and Assessment Office to assist the Office of Emergency and Remedial Response in establishing chemical-specific health-related goals of remedial actions. If applicable, chemical-specific subchronic and chronic toxicity interim acceptable intakes are determined for systemic toxicants, or q_1^* values are determined for carcinogens for both oral and inhalation routes.

A q_1^* was determined for vinyl chloride based on both oral and inhalation exposure.

17. KEY WORDS AND DOCUMENT ANALYSIS		
a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
18. DISTRIBUTION STATEMENT Public	19. SECURITY CLASS (This Report) Unclassified	21. NO. OF PAGES 67
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PB86-134475

EPA/540/1-86/036
September 1984

HEALTH EFFECTS ASSESSMENT FOR VINYL CHLORIDE

U.S. Environmental Protection Agency
Office of Research and Development
Office of Health and Environmental Assessment
Environmental Criteria and Assessment Office
Cincinnati, OH 45268

U.S. Environmental Protection Agency
Office of Emergency and Remedial Response
Office of Solid Waste and Emergency Response
Washington, DC 20460

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PREFACE

This report summarizes and evaluates information relevant to a preliminary interim assessment of adverse health effects associated with vinyl chloride. All estimates of acceptable intakes and carcinogenic potency presented in this document should be considered as preliminary and reflect limited resources allocated to this project. Pertinent toxicologic and environmental data were located through on-line literature searches of the Chemical Abstracts, TOXLINE, CANCERLINE and the CHEMFATE/DATALOG data bases. The basic literature searched supporting this document is current up to September, 1984. Secondary sources of information have also been relied upon in the preparation of this report and represent large-scale health assessment efforts that entail extensive peer and Agency review. The following Office of Health and Environmental Assessment (OHEA) sources have been extensively utilized:

U.S. EPA. 1980a. Ambient Water Quality Criteria for Vinyl Chloride. Environmental Criteria and Assessment Office, Cincinnati, OH. EPA 440/5-80-078. NTIS PB 81-117889.

U.S. EPA 1982. Health and Environmental Effects Profile for Vinyl Chloride. Prepared by the Environmental Criteria and Assessment Office, Cincinnati, OH, OHEA for the Office of Solid Waste and Emergency Response, Washington, DC.

U.S. EPA. 1983a. Reportable Quantity Document for Vinyl Chloride. Prepared by the Environmental Criteria and Assessment Office, Cincinnati, OH, OHEA for the Office of Solid Waste and Emergency Response, Washington, DC.

U.S. EPA. 1983b. Review of Toxicologic Data in Support of Evaluation for Carcinogenic Potential of: Vinyl Chloride. Prepared by the Carcinogen Assessment Group, OHEA, Washington, DC for the Office of Solid Waste and Emergency Response, Washington, DC.

The intent in these assessments is to suggest acceptable exposure levels whenever sufficient data were available. Values were not derived or larger uncertainty factors were employed when the variable data were limited in scope tending to generate conservative (i.e., protective) estimates. Nevertheless, the interim values presented reflect the relative degree of hazard associated with exposure or risk to the chemical(s) addressed.

Whenever possible, two categories of values have been estimated for systemic toxicants (toxicants for which cancer is not the endpoint of concern). The first, the AIS or acceptable intake subchronic, is an estimate of an exposure level that would not be expected to cause adverse effects when exposure occurs during a limited time interval (i.e., for an interval that does not constitute a significant portion of the lifespan). This type of exposure estimate has not been extensively used or rigorously defined, as previous risk assessment efforts have been primarily directed towards

BOR 012570

exposures from toxicants in ambient air or water where lifetime exposure is assumed. Animal data used for AIS estimates generally include exposures with durations of 30-90 days. Subchronic human data are rarely available. Reported exposures are usually from chronic occupational exposure situations or from reports of acute accidental exposure.

The AIC, acceptable intake chronic, is similar in concept to the ADI (acceptable daily intake). It is an estimate of an exposure level that would not be expected to cause adverse effects when exposure occurs for a significant portion of the lifespan [see U.S. EPA (1980b) for a discussion of this concept]. The AIC is route specific and estimates acceptable exposure for a given route with the implicit assumption that exposure by other routes is insignificant.

Composite scores (CSs) for noncarcinogens have also been calculated where data permitted. These values are used for ranking reportable quantities; the methodology for their development is explained in U.S. EPA (1983c).

For compounds for which there is sufficient evidence of carcinogenicity, AIS and AIC values are not derived. For a discussion of risk assessment methodology for carcinogens refer to U.S. EPA (1980b). Since cancer is a process that is not characterized by a threshold, any exposure contributes an increment of risk. Consequently, derivation of AIS and AIC values would be inappropriate. For carcinogens, q_1^*s have been computed based on oral and inhalation data if available.

BOR 012571

ABSTRACT

In order to place the risk assessment evaluation in proper context, refer to the preface of this document. The preface outlines limitations applicable to all documents of this series as well as the appropriate interpretation and use of the quantitative estimates presented.

Vinyl chloride following inhalation exposure has been shown to be carcinogenic in humans, rats, mice and hamsters. Using data for tumor incidence in rats, a q_1^* for humans of 2.5×10^{-2} $(mg/kg/day)^{-1}$ was estimated.

No data are available concerning oral exposure in humans and cancer risk. On the basis of total tumors in female rats fed vinyl chloride-containing diets, a human q_1^* of 2.3 $(mg/kg/day)^{-1}$ was estimated for oral exposure.

BOR 012572

BCP
Borden Chemicals and Plastics

To: Distribution June 2, 1992
From: R. M. Garner
Subject: Vinyl Institute Annual Meeting - Health, Safety and Environmental Meeting Minutes

On Thursday May 28, 1992 the Vinyl Institute Health, Safety and Environmental Committee held its quarterly meeting. Following are the meeting notes.

I. Opening/Introductions
-J. Ledvina (Vista) has accepted an assignment in Belgium, Frank Jeanson will represent Vista

II. Update on Legal Issues
A. Fire litigation - most likely the plaintiff will not pursue additional action
B. Dumping - foreign dumping of PVC has been alleged by Brazil, leading to a 16% tariff increase, increase may become permanent.
C. California Environmental Impact Report - sponsored in part by VI and the state of California. SRI did the report. Draft and final draft were favorable to industry. CA state Attorney General disagreed with parts of the report, therefore, asked for a change in scope. SRI refused to do additional work at their expense. VI refused to pay more, having contributed more than planned.
D. Office of Toxic Substances re: EDC producers - will recirculate draft of proposed response.
E. Derived from Rules - new regulations to be reviewed by a VI subgroup. CMA has been following closely.

III. VCNet - purpose is to enhance the safety of VCM shipments. F. Borrelli is coordinating with the CMA. Tuition is charged for training. A video for safety training will be completed this year. VCSA covers process safety, VCNet covers transportation.
* - DONE 6/4/92 Send name of the Safety rep for each company, for a VI contact.

IV. Safety Subcommittee

V. Roundtable Discussion
A. Use of non-flammable clothing - several options on weight of fabric and protection offered. Oxychem petro-plants have gone to Nomex. PPG is switching to Nomex clothing by the end of the year. Vista, BCP, and Certainteed do not offer Nomex clothing. Issue: what would visitors wear? BCP sited by OSHA for not providing non-flammable clothing. The group is seeing a change in posture by OSHA, less reasonable, less willing to negotiate.
B. OSHA Confined Space Regulations - the real question dealt with lock out/tag out procedures. Most members use real locks and tags not just tags. Confined space regs were not the issue.
C. OSHA EDC PEL - nothing new, last meeting with minutes was 3/91.
D. Reporting Practices to Federal Agencies - caution on signing broad orders where you agreed to follow NESHAP, can be fined for breaking the order on every release. Include end of order date if possible. The group would like to know the outcome of BCP's OSHA inspection when the final verdict is in.
*
NOTE: some companies report everything

VI. Old Business

A. Waste Minimization - initiator containers (HDPE) could be sold for recycling. Per DOT the bottles cannot be reused.

B. Polymerization Plant Scrap - drop from agenda.

C. Clean Air Act

D. Hazardous Organic NESHAP - regs to be distributed late this summer.

E. VI Awards program - other alternatives were discussed. VI to gather data before continuing this discussion.

F. Update of brochure: Facts about Working with PVC - call M. Scheck with comments.

G. RVCM data for Uni-Bell. Contact M. Scheck if interested in helping analyze data. -RMG VOLUNTEERED TO HELP

VII. New Business

A. Multimedia Inspections - group would like to know what to expect, BCP comments on the process and results when negotiations have been completed.

B. Carpool requirements - for severe and extreme ozone non-attainment areas for employers with 100 or more employees.

VIII. Next Meeting

- Wednesday 9/30/92, in Baltimore, 9am - 2pm