

ACTION  FEEDBACK TO
 ITEM  WENDY BY 03/02/97

April __, 1997

(LHS EXHIBITED
 FOR INFORMATION)

Ms. Kim E. Jenkins
 Division of Toxicology
 Agency for Toxic Substances and Disease Registry
 Mailstop E-29
 1600 Clifton Road, N.E.
 Atlanta, Georgia 30333

Re: Vinyl Chloride Toxicological Profile

Dear Ms. Jenkins:

On behalf of the CMA Vinyl Chloride Panel, I am writing to bring to the attention of the Agency for Toxic Substances and Disease Registry (ATSDR) a number of corrections that should be made in the next update of the Toxicological Profile for Vinyl Chloride. These corrections account for changes in corporate ownership and/or operation of certain facilities identified as manufacturers or processors of vinyl chloride, and provide clarification of the estimated range of maximum amounts of vinyl chloride present at certain facilities. The corrections apply to Part 4, Production, Import Use, and Disposal, and mainly involve Table 4-1:

p. 137

Second Paragraph, fifth line:

- Vista Chemical Company is located in West Lake, Louisiana (not Lake Charles).
- The BF Goodrich facility in LaPorte, Texas, is now owned by Geon Company. Geon purchased this and certain other BF Goodrich facilities in April 1993.

Ms. Kim E. Jenkins

April __, 1997

Page 2

- p. 138
- Table 4-1. On the fourth line, the Georgia Gulf Corp. facility in Delaware City, DE should be deleted.
 - BF Goodrich facilities identified on the seventh line (Henry, IL) and ninth line (Louisville, KY) are now Geon Company facilities. The Panel is informed, however, that BF Goodrich continues to operate a latex manufacturing plant at the Louisville site, which reportedly uses some vinyl chloride.
 - For the Geon facility located in Henry, IL (identified on the seventh line), under the "activities and uses" column, "as a product component" should be deleted; vinyl chloride is used only as a reactant at this facility.
- p. 139
- Table 4-1 (cont'd). The facility identified on the first line, BF Goodrich of Plaquemine, LA (which changed to Geon Company ownership in April 1983) should be deleted. Vinyl chloride-related activity ceased at this facility in June 1992, prior to its sale to Geon, and no vinyl chloride-related manufacturing or processing has taken place since then.
 - The entry on the fifth line should be deleted or revised. The Addis, LA facility identified as Occidental Chemical Corp. was sold to Borden.
 - On the thten line, BF Goodrich of ^wPedrickton, NJ should be changed to Geon Company.
 - On the 13th line, BF Goodrich Avon Lake should be changed to Geon Company, and the entry in the column entitled "Range of maximum amounts on site in pounds" (hereinafter "Range column") for this facility should read "100,000-999,999." The current operation at the Geon facility at Avon Lake, OH, is limited to pilot plant or developmental activities. The primary vinyl chloride-related activity was discontinued prior to the acquisition by Geon.

Ms. Kim E. Jenkins

April __, 1997

Page 3

p. 139

(cont'd)

However, BF Goodrich reportedly still operates a small pilot plant at the site where it uses some vinyl chloride.

- Under the Range column for Formosa Plastics Corp. (fifth row from the bottom), replace "No Data" with "1,000,000-9,999,999."

- ~~The first entry on page 3 of Table 4-1~~ *The entry Occidental Chemical, La Porte, TX*
The entry on the second to the last row should be deleted. Occidental does not own a facility in La Porte, TX.

p. 140

- Table 4-1 (cont'd). ~~On the first row,~~ *for* Occidental Chemical of Pasadena, TX, "100,000-999,999" should be listed in the Range column. *instead of no data*
- BF Goodrich of Deer Park, TX, ~~the second entry,~~ should be changed to Geon Company.
- ~~The third entry,~~ Occidental Chemical Corp. of Deer Park, TX should be deleted. Occidental does not conduct activities involving vinyl chloride at the facility.
- ~~The fifth entry,~~ Occidental Chemical of Gregory, TX should state "100,000-999,999" in the Range column.

p. 145

- Under "5.2.1 Air," fifth line, it is noted that 1992 TRI data are used to estimate the total amount of vinyl chloride released into the air. More recent data are available, and would provide a more accurate estimate.

p. 155

- At section 5.6, the title "POPULATIONS WITH POTENTIALLY HIGH EXPOSURES" should read "POPULATIONS WITH POTENTIAL EXPOSURES." Use of the term "high" may wrongly suggest that exposure levels for the populations identified are above effect levels.

A revised version of Table 4-1, reflecting these changes, is enclosed.

Ms. Kim E. Jenkins

April __, 1997

Page 4

Does
The Panel recommends that ATSDR change the format of Table 4-1 to provide information more useful than the wide ranges shown as "maximum amounts on site in pounds." While the Panel ~~not~~ have access to any specific storage data, we would be pleased to provide the nameplate capacity of each of these facilities if ATSDR would present this information in lieu of the ranges.

If you would like more detailed information on any of the corrections the Panel recommends, please do not hesitate to call me at (703) 741-5637. Thank you for your consideration.

Very truly yours,

~~Hasmukh C. Shah, Ph.D.~~ *Wendy K. Sherman*

Manager

Vinyl Chloride Panel

Health Committee

Table 4-1. Facilities That Manufacture or Process Vinyl Chloride

Facility	Location*	Range of maximum amounts on site in pounds	Activities and uses
KEYSOR-CENTURY CORP.	SAUGUS, CA	1,000,000 - 9,999,999	As a reactant
UNION CARBIDE CORP.	TORRANCE, CA	10,000 - 99,999	As a reactant
FORMOSA PLASTICS CORP.	DELAWARE CITY, DE	1,000,000 - 9,999,999	As a reactant
GEORGIA GULF CORP.	DELAWARE CITY, DE	1,000,000 - 9,999,999	As a reactant
WESTLAKE PVC CORP.	PACE, FL	1,000,000 - 9,999,999	As a reactant
UNION CARBIDE CHEMICALS	TUCKER, GA	100,000 - 999,999	As a reactant
GEON CO. BF-GOODRICH CO.	HENRY, IL	1,000,000 - 9,999,999	As a reactant; As a product component
BORDEN CHEMICALS & PLASTICS	ILLIOPOLIS, IL	No Data	As a reactant
GEON CO. BF-GOODRICH CO.	LOUISVILLE, KY	1,000,000 - 9,999,999	As a reactant
AIR PRODS. & CHEMICALS INC.	CALVERT CITY, KY	10,000 - 99,999	As a reactant
WESTLAKE PVC CORP.	CALVERT CITY, KY	1,000,000 - 9,999,999	As a reactant
WESTLAKE MONOMERS CORP.	CALVERT CITY, KY	1,000,000 - 9,999,999	Produce; For sale/distribution
VULCAN MATERIALS CO.	GEISMAR, LA	100,000 - 999,999	Produce; For on-site use/processing; As a by-product; As a reactant
BORDEN CHEMICALS & PLASTICS	GEISMAR, LA	No Data	Produce; For on-site use/processing; For sale/distribution; As a reactant
PPG IND. INC.	LAKE CHARLES, LA	No Data	Produce; For sale/distribution; As a by-product; As an impurity; As a reactant
CERTAINTEEED CORP.	SULPHUR, LA	1,000,000 - 9,999,999	As a reactant
VISTA CHEMICAL CO.	WESTLAKE, LA	No Data	Produce; For sale/distribution
FORMOSA PLASTICS CORP.	BATON ROUGE, LA	1,000,000 - 9,999,999	Produce; For on-site use/processing; For sale/distribution; As a by-product; As a reactant
RHONE POULENC BASIC CHEMICALS	BATON ROUGE, LA	10,000 - 99,999	Ancillary uses
DOW CHEMICAL CO.	PLAQUEMINE, LA	No Data	Produce; For sale/distribution; As a reactant; As a manufacturing aid; Ancillary uses

238497

- 1 -

Table 4-1. Facilities That Manufacture or Process Vinyl Chloride (continued)

Facility	Location	Range of maximum amounts on site in pounds		Activities and uses
BF GOODRICH CO.	PLAQUEMINE, LA	100,000 - 999,999	As a reactant	
GEORGIA GULF CORP.	PLAQUEMINE, LA	No Data	Produce; For on-site use/processing; For sale/distribution; As a reactant	
UNION CARBIDE CORP.	HAHNVILLE, LA	No Data	As a by-product	
MARINE SHALE PROCESSORS INC.	AMELIA, LA	1,000 - 9,999	As a reactant	
OCCIDENTAL CHEMICAL CORP.	ADRIAS, LA	100,000 - 999,999	As a reactant	
DOW CHEMICAL USA	MIDLAND, MI	100,000 - 999,999	As a reactant; Ancillary uses	
MILES INC.	KANSAS CITY, MO	100,000 - 999,999	As a reactant	
VISTA CHEMICAL CO.	ABERDEEN, MS	No Data	As a reactant	
OCCIDENTAL CHEMICAL CORP.	BURLINGTON, NJ	1,000,000 - 9,999,999	As a reactant	
Green Co. BF GOODRICH CO.	PEDRICKTOWN, NJ	1,000,000 - 9,999,999	As a reactant	
GOODYEAR TIRE & RUBBER CO.	NIAGARA FALLS, NY	100,000 - 999,999	As a reactant	
VYGEN CORP.	ASHTABULA, OH	1,000,000 - 9,999,999	As a reactant	
GEON CO. BF GOODRICH AVON LAKES	AVON LAKE, OH	100,000 - 999,999	As a reactant	
		1,000,000 - 9,999,999	As a reactant	
VISTA CHEMICAL CO.	OKLAHOMA CITY, OK	1,000,000 - 9,999,999	As a reactant	
OCCIDENTAL CHEMICAL CORP.	POTTSTOWN, PA	1,000,000 - 9,999,999	As a reactant	
GREENWOOD PLATING	GREENWOOD, SC	1,000,000 - 9,999,999	As a product component	
DOW CHEMICAL CO.	FREESPORT, TX	No Data	Produce; As a by-product; As an impurity; As a reactant; As a chemical processing aid	
SHINTECH INC.	FREESPORT, TX	No Data	Import; For on-site use/processing; As a reactant	
FORMOSA PLASTICS CORP.	POINT COMFORT, TX	1,000,000 - 9,999,999	Produce; For on-site use/processing; As a by-product; As a reactant	
UNION CARBIDE CHEMICALS &	GARLAND, TX	100,000 - 999,999	As a reactant	
UNION CARBIDE CHEMICALS	TEXAS CITY, TX	1,000,000 - 9,999,999	As a reactant	

238497

-2-

Table 4-1. Facilities That Manufacture or Process Vinyl Chloride (continued)

Facility	Location ^a	Range of maximum amounts on site in pounds	Activities and uses
OCCIDENTAL CHEMICAL CORP.	LA PORTE, TX	1,000,000 - 9,999,999	Ancillary uses
RHONE-POULENC BASIC CHEMICALS	HOUSTON, TX	10,000 - 99,999	Ancillary uses
OCCIDENTAL CHEMICAL CORP.	PASADENA, TX	100,000 - 999,999	As a reactant
		No Data	
GEON CO. BF GOODRICH CO.	DEER PARK, TX	1,000,000 - 9,999,999	As a reactant
OCCIDENTAL CHEMICAL CORP.	DEER PARK, TX	No Data	Produce; For sale/distribution
GEON CO.	LA PORTE, TX	No Data	Produce; For sale/distribution
OCCIDENTAL CHEMICAL CORP.	GREGORY, TX	100,000 - 999,999	Produce; For sale/distribution
		No Data	
BONDCOTE CORP.	PULASKI, VA	100,000 - 99,999	As a formulation component

Source: TRI92 1994

^a Post office state abbreviation used

Frank Zollman
BFGoodrich

4. PRODUCTION, IMPORT, USE, AND DISPOSAL

4.1 PRODUCTION

Production of vinyl chloride monomer in the United States was approximately 13.75 billion pounds in 1993 (C&EN 1994; USITC 1994), an increase of nearly 22%. This exceeds the latest available U.S. estimated total production capacity figures (beginning of 1993) of 12.79 billion pounds at the beginning of 1993 (SRI 1993) and represents a substantial recent increase in production and capacity, even if vinyl chloride production is at full capacity. Previously, vinyl chloride production had grown only 1-5% per year over the last 5 years (C&EN 1994). Over the last 10 years, vinyl chloride production has grown at an average rate of about 7%, not including the large increase in 1993, although production volumes were fairly volatile (C&EN 1994).

Vinyl chloride is currently produced in the United States by 10 companies at 12 facilities, which are as follows (SRI 1994): Westlake Monomers Corporation in Calvert City, Kentucky; Borden Chemicals and Plastics in Geismar, Louisiana; Dow Chemical in Oyster Creek, Texas, and in Plaquemine, Louisiana; Georgia Gulf Corporation in Plaquemine, Louisiana; PPG Industries in Lake Charles, Louisiana; Vista Chemical Company in Lake Charles, Louisiana; ~~B.F. Goodrich~~ ^{The Goodyear} Company in LaPorte, Texas; Formosa Plastics Corporation in Baton Rouge, Louisiana, and in Point Comfort, Texas; Occidental Chemical Corporation in Deer Park, Texas; and Oxymer in Ingleside, Texas. Table 4-1 summarizes the facilities in the United States that manufacture or process vinyl chloride. This information was obtained from the 1992 Toxic Chemical Release Inventory (TRI92), and it summarizes the reported release data for 1992 (TRI92 1994). Table 4-1 also lists the maximum amounts of vinyl chloride that are present at these sites and the end uses of the vinyl chloride.

Vinyl chloride was first produced commercially in the 1930s by reacting hydrogen chloride with acetylene. Currently, vinyl chloride is produced commercially by the chlorination of ethylene through one of two processes, direct chlorination or oxychlorination. Direct chlorination reacts ethylene with chlorine to produce 1,2-dichloroethane. Similarly, oxychlorination produces 1,2-dichloroethane, but this is accomplished by reacting ethylene with dry hydrogen chloride and oxygen. After both processes, the 1,2-dichloroethane is subjected to high pressures (2.5-3.0 megapascals) and temperatures

Table 4-1. Facilities That Manufacture or Process Vinyl Chloride

Facility	Location ^a	Range of maximum amounts on site in pounds	Activities and uses
KEYSOR-CENTURY CORP.	SAUGUS, CA	1,000,000-9,999,999	As a reactant
UNION CARBIDE CORP.	TORRANCE, CA	10,000-99,999	As a reactant
FORMOSA PLASTICS CORP.	DELAWARE CITY, DE	1,000,000-9,999,999	As a reactant
GEORGIA GULF CORP.	DELAWARE CITY, DE	1,000,000-9,999,999	As a reactant
WESTLAKE PVC CORP.	PACE, FL	1,000,000-9,999,999	As a reactant
UNION CARBIDE CHEMICALS	TUCKER, GA	100,000-999,999	As a reactant
BF GOODRICH CO.	HENRY, IL	1,000,000-9,999,999	As a reactant; As a product component.
BORDEN CHEMICALS & PLASTICS	ILLIOPOLIS, IL	No Data	As a reactant
BF GOODRICH CO.	LOUISVILLE, KY	1,000,000-9,999,999	As a reactant
AIR PRODS. & CHEMICALS INC.	CALVERT CITY, KY	10,000-99,999	As a reactant
WESTLAKE PVC CORP.	CALVERT CITY, KY	1,000,000-9,999,999	As a reactant
WESTLAKE MONOMERS CORP.	CALVERT CITY, KY	1,000,000-9,999,999	Produce; For sale/distribution
VULCAN MATERIALS CO.	GEISMAR, LA	100,000-999,999	Produce; For on-site use/processing; As a by-product; As a reactant
BORDEN CHEMICALS & PLASTICS	GEISMAR, LA	No Data	Produce; For on-site use/processing; For sale/ distribution; As a reactant
PPG IND. INC.	LAKE CHARLES, LA	No Data	Produce; For sale/distribution; As a by-product; As an impurity; As a reactant
CERTAINTIED CORP.	SULPHUR, LA	1,000,000-9,999,999	As a reactant
VISTA CHEMICAL CO.	WESTLAKE, LA	No Data	Produce; For sale/distribution
FORMOSA PLASTICS CORP.	BATON ROUGE, LA	1,000,000-9,999,999	Produce; For on-site use/processing; For sale/distribution; As a by-product; As a reactant
RHONE POULENC BASIC CHEMICALS	BATON ROUGE, LA	10,000-99,999	Ancillary uses
DOW CHEMICAL CO.	PLAQUEMINE, LA	No Data	Produce; For sale/distribution; As a reactant; As a manufacturing aid; Ancillary uses

...DRAFT FOR PUBLIC COMMENT...

BFG 00437

4. PRODUCTION, IMPORT, USE, AND DISPOSAL

Table 4-1. Facilities That Manufacture or Process Vinyl Chloride (continued)

Facility	Location ^a	Range of maximum amounts on site in pounds	Activities and uses
BF GOODRICH CO.	PLAQUEMINE, LA	100,000-999,999	As a reactant
GEORGIA GULF CORP.	PLAQUEMINE, LA	No Data	Produce; For on-site use/processing; For sale/distribution; As a reactant
UNION CARBIDE CORP.	HAHNVILLE, LA	No Data	As a by-product
MARINE SHALE PROCESSORS INC.	AMELIA, LA	1,000-9,999	As a reactant
OCCIDENTAL CHEMICAL CORP.	ADDIS, LA	100,000-999,999	As a reactant
DOW CHEMICAL USA	MIDLAND, MI	100,000-999,999	As a reactant; Ancillary uses
MILES INC.	KANSAS CITY, MO	100,000-999,999	As a reactant
VISTA CHEMICAL CO.	ABERDEEN, MS	No Data	As a reactant
OCCIDENTAL CHEMICAL CORP.	BURLINGTON, NJ	1,000,000-9,999,999	As a reactant
BF GOODRICH CO.	FREDERICKTOWN, NJ	1,000,000-9,999,999	As a reactant
GOODYEAR TIRE & RUBBER CO.	NIAGARA FALLS, NY	100,000-999,999	As a reactant
VYGEN CORP.	ASHTABULA, OH	100,000-999,999	As a reactant
BF GOODRICH CO. AVON-LAKE	AVON-LAKE, OH	1,000,000-9,999,999	As a reactant
VISTA CHEMICAL CO.	OKLAHOMA CITY, OK	1,000,000-9,999,999	As a reactant
OCCIDENTAL CHEMICAL CORP.	POTTSTOWN, PA	1,000,000-9,999,999	As a reactant
GREENWOOD PLATING	GREENWOOD, SC	1,000,000-9,999,999	As a product component
DOW CHEMICAL CO.	FREEPORT, TX	No Data	Produce; As a by-product; As an impurity; As a reactant; As a chemical processing aid
SHINTECH INC.	FREEPORT, TX	No Data	Import; For on-site use/processing; As a reactant
FORMOSA PLASTICS CORP.	POINT COMFORT, TX	No Data	Produce; For on-site use/processing; As a by-product; As a reactant
UNION CARBIDE CHEMICALS &	GARLAND, TX	100,000-999,999	As a reactant
UNION CARBIDE CHEMICALS	TEXAS CITY, TX	1,000,000-9,999,999	As a reactant
OCCIDENTAL CHEMICAL CORP.	LA PORTE, TX	1,000,000-9,999,999	Ancillary uses
RHONE-POULENC BASIC CHEMICALS	HOUSTON, TX	10,000-99,999	Ancillary uses

...DRAFT FOR PUBLIC COMMENT...

4. PRODUCTION, IMPORT, USE, AND DISPOSAL

Table 4-1. Facilities That Manufacture or Process Vinyl Chloride (continued)

Facility	Location ^a	Range of maximum amounts on site in pounds	Activities and uses
OCCIDENTAL CHEMICAL CORP.	PASADENA, TX	No Data	As a reactant
BF GOODRICH CO.	DEER PARK, TX	1,000,000-9,999,999	As a reactant
OCCIDENTAL CHEMICAL CORP.	DEER PARK, TX	No Data	Produce; For sale/distribution
GEON CO.	LA PORTE, TX	No Data	Produce; For sale/distribution
OCCIDENTAL CHEMICAL CORP.	GREGORY, TX	No Data	Produce; For sale/distribution
BONDCOTE CORP.	PULASKI, VA	100,000-999,999	As a formulation component

Source: TRI92 1994

^a Post office state abbreviation used

...DRAFT FOR PUBLIC COMMENT...

4. PRODUCTION, IMPORT, USE, AND DISPOSAL

BFG 00439

(550–550°C). This causes the 1,2-dichloroethane to undergo pyrolysis, or thermal cracking, which forms the vinyl chloride monomer and hydrogen chloride. The vinyl chloride monomer is then isolated (Cowfer and Magistro 1985). The technical grade product is available in 99.9% purity (HSDB 1994). Efforts are being made to minimize by-product formation in 1,2-dichloroethane pyrolysis (Cowfer and Magistro 1985).

4.2 IMPORT/EXPORT

Imports of vinyl chloride totaled 119 million pounds in 1992 and 164 million pounds in 1991 (CPS 1993). Imports have been steadily declining from a high of 302 million pounds in 1989, prior to which they had been increasing (CPS 1993). Exports of vinyl chloride were 1.63 billion pounds in 1992, down from the all time high of 1.78 billion pounds in 1991. Over the past 20 years, exports of vinyl chloride have fluctuated fairly widely, but have been generally increasing an average of about 17% per year since 1975.

4.3 USE

Vinyl chloride is an important industrial chemical because of its wide variety of end-use products and the low cost of producing polymers from it. Furthermore, polyvinyl chloride (PVC) is one of the most efficient construction materials available when analyzed on an energy-equivalent basis (Cowfer and Magistro 1985). Major end-use products include PVC products, such as automotive parts and accessories, furniture, packaging materials, pipes, wall coverings, and wire coatings, as well as vinyl chloride-vinyl acetate copolymer products, such as films and resins (Cowfer and Magistro 1985; Eveleth et al. 1990). End-use data for 1992 indicate that 98% of vinyl chloride monomer production is for making polyvinyl chloride and various polyvinyl chloride copolymers; the other 2% is for miscellaneous uses (CPS 1993).

Vinyl chloride has been used in the past as a refrigerant, as an extraction solvent for heat-sensitive materials, and in the production of chloroacetaldehyde and methyl chloroform (IARC 1979). In the United States, limited quantities of vinyl chloride were used as an aerosol propellant and as an ingredient of drug and cosmetic products; however, these practices were banned by the EPA in 1974 (IARC 1979; HSDB 1994).

4.4 DISPOSAL

Since vinyl chloride has been identified by EPA as a hazardous material, its disposal is regulated under the Federal Resource Conservation and Recovery Act (RCRA) (EPA 1993d). The transportation of hazardous materials for disposal is regulated by the Department of Transportation in compliance with this act (DOT 1993). The recommended method of disposal is total destruction by incineration. The temperature of the incinerator must be sufficient to ensure the complete combustion of the vinyl chloride in order to prevent the formation of phosgene. The recommended temperature range for incineration is 450–1,600°C, with residence times of seconds for gases and liquids, and hours for solids (HSDB 1994). If in solution, the vinyl chloride product may need to be adsorbed onto a combustible material prior to incineration. Recommended materials include vermiculite, sawdust, or a sand-soda ash mixture (90/10) covered with wood and paper (OHM/TADS 1985). The vinyl chloride can also be dissolved in a flammable solvent prior to incineration. An acid scrubber should be used in conjunction with the incinerator in order to remove any hydrogen chloride that is produced by the combustion process (HSDB 1994; OHM/TADS 1985). Alternatively, chemical destruction may be used, especially with small quantities. One-to-two days is generally sufficient for complete destruction (HSDB 1994).

Aqueous by-product solutions from the production of vinyl chloride are usually steam-stripped to remove volatile organic compounds, neutralized, and then treated in an activated sludge system to remove nonvolatile organic compounds remaining in the waste water (Cowfer and Magistro 1983).