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CASE DEVELOPMENT PLAN

SECTION IV thru VIII

THIRD DRAFT

STAUFFER CHEMICAL COMPANY

DELAWARE CITY, DELAWARE

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IV. FACILITY

A. Types of Operation

The Stauffer Chemical Company manufacturers polyvinyl chloride (PVC), polyvinyl acetate, and other polymers.[1] The plant is an average size PVC production plant. It employs two different methods to make PVC: the suspension process and the dispersion process. As can be seen from the attached figures (in Exhibit B), these processes are very much alike as far as major equipment is concerned.[2]

In the manufacture of dispersion resins, vinyl chloride monomer (VCM) is emulsified in water with surface active agents such as detergents; a water soluble polymerization initiator is added, usually a peroxide; and the reaction begins. Since the reaction is exothermic, the reactor must be cooled to keep the reaction under control.[2]

Suspension resin production differs in that the VCM is suspended using vigouous agitation opposed to the more gentle mixing of dispersion resin manufacture. Chemicals are also added to maintain the suspension. One such chemical is methylcellulose, a derivative of which is used to thicken ice

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cream. This reaction is also exothemic and can be initiated using peroxides.[2]

Ref: 1. State of Delaware, Department of Natural Resources and Environmental Control (DNREC), Surface Impoundment Assessment Report - 4/26/79. (Exhibit A)

2. Memo from Peter Schaul to Steve Wassersug - 6/28/78. (Exhibit B)

B. Manner of Storage, Treatment, or Disposal

There are five earthen ponds at the plant. One pond holds primarily stormwater runoff from the plant area, while the other four hold primarily PVC solids. There are also two large concrete lined ponds in this same area. These two ponds are aeration lagoons and are part of the wastewater treatment system 1 and 2

The stormwater pond, called the RV pond, collects stormwater runoff and chemical and oil spills from the plant area. Occasionally E11 process wastewater, which is mainly latex emulsion resin, is sent to the RV-pond when the pump system in the plant blocks up. The contents of the pond are pumped into

the plant treatment system for treatment and disposal, but sometimes, especially in heavy rains, the pond overflows when it can't be pumped into the treatment system fast enough. This pond was built in 1976 and is 140 feet by 160 feet by 7 feet deep. An unidentified Stauffer employee says the pond is clay-lined but this fact is questionable since no specific details about the lining or its construction are available. The walls of the pond have been sprayed with a bituminous coating to prevent erosion. No flow information is available for this pond.[1 and 2]

Two connected earth lagoons built in 1970, one called the off-grade batch pit, and the other called the sludge pit, are used to store off-grade batches of PVC. Occasionally, process wastewater is pumped into these ponds when the pump used to pump the effluent to the river is out of service. Also, overflow from the pilot plant and the treatment plant sometimes goes into these lagoons. The off-grade batch pit was approximately 80% full of solids and the sludge pit contained liquids when the site was inspected by the State in September, 1978. These lagoons are also supposedly lined with clay but construction plans for them do not mention any liner. The walls of these ponds were also sprayed with a bituminous coating for erosion control. The off-grade batch pit measures

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160 feet by 210 feet and is 5 feet deep. The sludge pit is 160 feet by 70 feet and is 3 feet deep.[1 and 2]

The other two earthen ponds were built around 1971 and filled with PVC sludge with the intent of eventually selling it. They were filled in 1974 and have not been used since. One measures 180 feet by 60 feet and the other measures 160 feet by 110 feet. These pits have no liners and are of unknown depths.

Ref: 1. State of Delaware, DNREC, Surface Impoundment Assessment Report - 4/26/79. (Exhibit A)

2. Memo, State of Delaware, DNREC to Judy Morton from Ron Stoufer - 9/26/78. (Exhibit C)

C. Size, Area of Contamination, Depth of Contamination

Samples were collected from test wells located adjacent to the PVC disposal batch pits, from a stream about 75 yards southeast of the off-grade batch pit, from a domestic well 500 yards northwest of the site, and from a leak in the influent to the aeration lagoons.[1]

The results of the analyses indicate the ground water in the immediate area of the PVC sludge pits to be contaminated

principally with vinyl chloride, 1, 2-dichloroethane, acrolein, and chloroethane. Several other priority pollutants are also present. The results of the analysis of the off site well sample were negative (relatively speaking) for any priority pollutants. The stream sample analysis showed contamination mainly with 1, 2-dichloroethane. The leak sample showed high concentrations of a number of pollutants with acrolein, acrylonitrile, 1, 2-dichloroethane, trichloroethylene, and vinyl chloride being the more conspicnous.[2]

It appears that the contamination is generated in the area of the PVC sludge pits.

Ref: 1. Site Inspection Report, Cover memo, trip Report, William Thomas Inspector - 3/11/80. (Exhibit D)

2. Sample analysis results, West Coast Technical Service Inc. - 3/28/80. (Exhibit E)

D. Amount of Waste

There are principally three types of waste at the facility, the PVC sludge, the plant industrial waste, and the plant sanitary waste. It has been estimated that the total amount of PVC waste in all the ponds is approximately 2300 tons[1] or from

2-3 million gallons.[2] All ponds are filled to capacity except for the off-grade batch pit which is only 80% full.[3]

Concerning the plant wastes, the facility is allowed to discharge 0.9 million gallons per day (MGD) into the Delaware River. 0.5 MGD of this is treated waste from industrial processes, while the remaining 0.4 MGD is blowdown from boilers, cooling towers, deionizers, and softeners.[4] They also discharge separately 0.004 MGD of treated sanitary waste from a package sanitary sewage treatment plant.[4] See Exhibit K for maps of outfall locations.

Ref: 1. Eckhart List (Exhibit F)

2. Site Inspection Report, Page 4, Wayne Naylor says it is a rough estimation by the State - 3/11/80. (Exhibit G)

3. State of Delaware DNREC, Surface Impoundment Assessment Report - 4/26/79. (Exhibit A)

4. NPDES Permit #DE0000612 - 6/30/75 (Exhibit H)

E. Maps

1. Site Map - State of Delaware DNREC, Surface Impoundment Assessment Report - 4/26/80 (Exhibit A). Accuracy of Map verified by William Thomas EPA-AFO, Attached seperately as Exhibit I.

2. USGS facility location map - St. Georges and Delaware City Quadrants (Exhibit J).

3. NPDES Outfall Maps, NPDES Pemit #DE0000612 - 6/30/73 (Exhibit H) - Someone from State of Delaware would have to testify. Attached seperately as Exhibit K.

F. Photographs

1. Well #11 - 2/21/80
2. Batch pits near Wells #8 and #9 - 2/21/80
3. Stream below batch pits 75 yards downstream from Well #7 - 2/21/80
4. Well #8 - 2/21/80
5. Well #9 - 2/21/80
6. Well #11, batch pit in foreground - 2/21/80
7. Well #11, after leak fixed and spill cleaned up - 5/13/80

All photographs refrained in files and available as Exhibit L.

Ref: Photographs #1-#6 taken by William Thomas, EPA-AFO - 2/21/80

Photograph #7 taken by Wayne Naylor, EPA-Region III - 5/13/80

V. SUSPECTED HAZARDOUS SUBSTANCES

A. Samples Taken at the Site on 3/11/80 by EPA

1) Test well #11 - located in central portion of site between northern earthen lagoons and aeration lagoons. (Sample #C0001)

2) Test well #8 - located on southern portion of site near southeast corner of off-grade batch pit, approximately 10 yards from pit. (Sample #C0002)

3) Test well #9 - located on southern portion of site directly South of center of off-grade batch pit, approximately 30 yards west of well #8. (Sample #C0003)

4) Stream flowing to the southwest from southeast corner of off-grade batch pit to Dragon Creek - sample taken 75 yards south-southeast of well #7. (Sample #C0004)

5) Domestic well - located northwest of facility on Stauffer owned property approximately 500 yards from site. (Sample #C0005)

6) Leak sample - leak from influent line to aeration lagoon. Possible contamination of well #11. (Sample #C0019)

All sample locations are designated on site map attached as Exhibit I.

B. Sample Analysis Results - Summary (Based on Sax)*

Compound	Well #11	Well #8	Well #9	Stream Sample	Leak Sample	Drinking Water Criteria	Hazard *
acrolein	116		178		28	6.5	PP
1,2-dichloroethane	10,916	1637	135	634	29,209	0 (0.7)	EC
chloroethane	44	23	18		<10	-	PP
Trichloroethylene	16	<10	-		143	0 (2.1)	SC
vinyl chloride (KC)	1,002	←	43	40		1,400	0 (51.7) ↑

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Note: All concentrations in ppb

( ) = concentration for $1x10^{-6}$ risk level; an increase of one cancer case for every 1,000,000 people.

*Ref: "Dangerous Properties of Industrial Materials" Fifth Edition, N. Irving Sax

PP = priority pollutant

EC = experimental carcinogen

SC = suspected carcinogen

KC = known carcinogen

Ref: Taken from prepared summary chart of sample results (Exhibit E). Summary chart attached seperately as Exhibit M.

All on site well samples were contaminated with a number of priority pollutants. The more conspicuous pollutants were acrolein, 1,2-dichloroethane (experimental transplacental carcinogen, mutagen, and teratogen), chloroethane, and vinyl chloride (recognized carcinogen). Levels of these compounds were, for the most part, well above the recommended drinking water criteria.

In addition, all on site wells showed trace amounts of 1,1-dichloroethylene (experimental carcinogen) and trichloroethylene (suspected carcinogen), well #11 also showing trace amounts of chloroform (known carcinogen).

Since all on site wells are very close to the PVC sludge pits, it seems the pits may be the source of contamination. However, in the case of well #11, because the influent leak to the wastewater treatment system is here, this well may also be receiving some above ground contamination in addition to the seepage from te PVC sludge pits (note priority pollutant concentrations of the leak sample are the highest of any of the samples).

Finally, the domestic well sample proved to be negative. Due to its location approximately 500 yards northwest of the PVC sludge pits, this is not improbable as the ground water "appears" to be flowing in a southernly direction. This finding gives evidence to the postulate that the contamination is originating on site.

1-2 Dichloroethane was detected in the stream sample at a concentration of 634 ppb. Contamination could be originating from either the surface leak or the PVC sludge pits. Delaware State Water Quality Standards for Streams[1] state that concentrations of toxic substances should be - "none in concentrations harmful (synergistically or otherwise) to humans, fish, wildlife, and aquatic life as prescribed in the Environmental Protection Agency's "Quality Criteria for Water," 1976." 1,2 Dischloroethane does not appear in this document. However, the newly proposed criteria for this toxic compound set

protection levels at zero for human health (0.7 ppb for a $1x10^{-6}$ risk factor) and 3900 ppb (24 hour average) for freshwater aquatic life.[2]

Ref: 1) State of Delaware DNREC, Water Quality Standards for Streams, March 25, 1979 - (Exhibit N).

2) Federal Register, Vol. 44, No. 191, Monday, October 1, 1979, pp. 56642-56647 - (Exhibit P).

C. Form, Toxicity, and other Information

All information in this section was taken from "Dangerous Properties of Industrial Materials," Fifth Edition by N., Irving Sax, published by Van Nostrand Reinhold Company, 1979.

acrolein (CH_2CHCHO) - It is a water quality criteria priority pollutant. It is a colorless or yellowish liquid with a disagreeable choking odor. Toxicity is high through the oral route and moderate via dermal routes. In air, due to its extreme lachrymatory effect, it serves as its own warning agent. It affects particularly the membranes of the eyes and respiratory tract. It is a weak sensitizer.

acrylonitrile (CH_2CHCN) - It is a water quality criteria priority pollutant and suspected carcinogen. Toxicity is high via both oral and dermal routes. It closely resembles hydrocyanic acid in its toxic action. By inhibiting the respiratory enyzmes of tissue, it renders the tissue cells incapable of oxygen absorption. Its poisoning action is acute. There is little evidence of cumulative action on repeated exposure. Exposure to low concentrations is followed by flushing of the face and increased salivation; further exposure results in irritation of the eyes, photophobia, irritation of the nose, deepened respiration, and, if exposure continues, shallow respiration, nausea, vomiting, weakness, and oppressive feeling in the chest, and occasionally headache, and diarrhea are other complaints. Several cases of mild jaundice accompanied by mild anemia have been reported. Urinalysis is generally negative, except for an increase in bile pigment. Serum and bile thiocyanates are raised.

1,2 - dichloroethane (ethylene dichloride) ($CH_2Cl_2CH_3$) - It is a water quality criteria priority pollutant. It is a colorless liquid with a pleasant odor and a sweet taste. Toxicity is high to moderate via oral and dermal routes. It causes a pulmonary edema upon inhalation. It is an experimental transplacental carcinogen, mutagen, and

teratogen. Ethylene dichloride has a distinctive odor and strong irritation effects which give warning of its presence in relatively safe concentrations. Dermatitis in man has been observed. In short, exposures to high concentrations the picture is one of irritation of the eyes, nose, and throat, followed by dizziness, nausea, vomiting, increasing stupor, cyanosis, rapid pulse, and loss of consciousness.

Chronic poisoning, where exposure has occurred over a period of several months, may cause loss of appetite, nausea and vomiting, epigastric distress, tremors, nystagmus, leucocytosis, low blood sugar levels, and possibly dermatitis if there has been skin contact. A soil fumigant. Used as a food additive permitted in food for human consumption. It is to be treated as a human carcinogen. (That's what the book says!)

<u>1,1,1 - trichloroethane</u> - (α-trichloroethane) (CH_3CCl_3) - It is a water quality criteria priority pollutant. It is a colorless liquid. Toxicity via intraperitoneal and oral routes is moderate. It causes a proarrhythmic activity which sensitizes the heart to epinephrin - induced arrhythmias. This sometimes will cause a cardiac arrest particularly when this material is massively inhaled as in drug abuse for euphoria.

1,1 - dichloroethane (ethylidene chloride) (CH_3CHCl_2) - It is a water quality criteria priority pollutant. It is a colorless liquid with an aromatic, ethereal odor and a hot saccharine taste. Toxicity is moderate via the oral route. It is an experimental teratogen. Liver injury has been reported in experimental animals.

1,1,2 - trichloroethane (β - trichloroethane) ($CH_2ClCHCl_2$) - It is a priority pollutant. It is a liquid with a pleasant odor. Its toxicity is high via intravenous and and subcutaneous routes. Its toxicity is moderate via intraperitoneal, inhalation, oral and probably dermal routes. It has narcotic properties and acts as a local irritant to the eyes, nose, and lungs. It may also be injurious to the liver and kidneys. Trichloroethane is a fumigant.

chloroethane (ethyl chloride) (CH_3CH_2Cl) - Chloroethane is a water quality criteria priority pollutant. It is a colorless liquid or gas with an ether-like odor and a burning taste. Toxicity is moderate via oral and inhalation routes. The liquid is harmful to the eyes and can cause some irritation. It gives warning of its presence because it is irritating, but it is possible to tolerate exposure to it until one becomes unconscious. It is the least toxic of all the chlorinated

hydrocarbons. It can cause narcosis, although the effects are usually transient.

chloroform ($CHCl_3$) - Chloroform is a water quality criteria priority pollutant. It is a colorless liquid with a heavy ethereal odor. Its toxicity is moderate via oral and inhalation routes. It is a carcinogen. The material is well known as an anesthetic. In the initial stages there is a feeling of warmth of the face and body, then an irritation of the mucous membrane and skin followed by nervous aberration. Prolonged inhalation will bring on paralysis accompanied by cardiac respiratory failure and death.

It has been widely used as an anesthetic. However, due to its toxic effects, this use is being abandoned. The maximum concentration tolerated for several hours or for prolonged exposure with slight symptoms is 2000-2500 ppm. The harmful effects are narcosis, and damage to the liver and heart.

1,1 - dichloroethylene (vinylidene chloride) (CH_2CCl_2) - It is a water quality criteria priority pollutant. It is a colorless and volatile liquid. It is an experimental carcinogen via the inhalation route.

1,2 - trans-dichloroethylene ($ClCHCHCl$) - It is a water quality criteria priority pollutant. It is a colorless liquid with a pleasant odor. Toxicity is low via the inhalation route but moderate via oral routes. Exposure to high concentrations of vapor can cause nausea, vomiting, weakness, tremor, and cramps. Recovery is usually prompt following removal from exposure. Dermatitis may result from de-fatting action on skin.

1,2 - dichloropropane ($C_3H_6Cl_2$) - It is a water quality criteria priority pollutant. It is a colorless liquid. Toxicity is moderate via oral inhalation, and dermal routes. It can cause dermatitis and is regarded as one of the more toxic chlorinated hydrocarbons.

ethylbenzene ($C_6H_5C_2H_5$) - Ethylbenzene is a water quality criteria priority pollutant. It is a colorless liquid with an aromatic odor. Toxicty is moderate via irritation to the skin, eyes, mucous membrane and also via oral and inhalation routes. Erythema and inflamation of the skin may result from contact of the skin with the liquid. Exposure to the vapor causes lachrymation and irritation of the nose and

throat, dizziness, and a sense of constriction of the chest. An atmosphere containing 0.5% of the vapor will cause irritation.

methylene chloride (CH_2Cl_2) - It is a water quality criteria priority pollutant. It is a colorless heavy liquid. Toxicity is moderate via oral, intraperitoneal, subcutaneous, and inhalation routes. Except for its property of inducing narcosis, it has very few other acute toxic effects. It can cause a dermatitus upon prolonged skin contact.

methyl chloride (CH_3Cl) - It is a water quality criteria priority pollutant. It is a colorless gas. It has very slight irritant properties and may be inhaled without noticeable discomfort. It has some narcotic action, but this effect is weaker than that of chloroform. Acute poisoning, characterized by the narcotic effect, is rare in industry. Repeated exposure to low concentrations causes damage to the central nervous system (CNS), and less frequently to the liver, kidneys, bone marrow, and cardiovascular system.

dichlorobromoethane (bromodichloromethane) ($CHBrCl_2$) - It is a water quality criteria priority pollutant. It is a colorless liquid. Its toxicity is unknown, but is is probably narcotic in high concentrations.

trichloroethylene (TCE) ($CHClCCl_2$) - It is a water quality criteria priority pollutant. It is a stable colorless heavy and mobile liquid with a chloroform-like odor. It is a suspected carcinogen. Inhalation of high concentrations causes narcosis and anesthesia. Prolonged inhalation of moderate concentrations causes headache and drowsiness. There is damage to the liver and other organs from chronic exposure. TCE is a food additive permitted in food for human consumption. It is a common air contaminant.

vinyl chloride (CH_2CHCl) - It is a water quality criteria priority pollutant. It is a colorless liquid or gas (when inhibited) with a faintly sweet odor. It is a recognized carcinogen via the inhalation route. Through this route it causes irritation to the skin, eyes, and mucous membrane. In high concentrations it acts as an anesthetic. Chronic exposure has shown liver damage in rats and rabbits. Circulatory and bone changes in the figertips have been reported in workers handling unpolymerized materials.

dichlorodifluoromethane (CF_2Br_2) - It is a water quality criteria priority pollutant. It is a colorless heavy liquid. It causes moderate irritation via the inhalation route.

acenaphthene ($C_{10}H_6(CH_2)_2$) - It is a water quality criteria priority pollutant. It is white with elongated crystals. It causes irritation to the skin and mucous membrane. In experiments it has caused neoplasms. It may cause acute vomiting if swallowed in large quantities.

bis - (2-ethylhexyl) phthalate (di - (2 - ethylhexyl phthalate) ($C_6H_4[CO_2CH_2CH(C_2H_5)C_4H_9]_2$) - It is a water quality criteria priority pollutant. It is a stable light-colored liquid with a mild odor. Its toxicity is low to none via oral and dermal routes. On a chronic basis, it is an experimental teratogen.

di-n-butyl phthalate (dibutyl-o-phthalate) ($C_6H_4(COOC_4H_9)_2$) - It is a priority pollutant. It is an oily liquid with a mild odor. Its toxicity is moderate via the intraperitoneal route and high via oral routes.

anthracene ($C_6H_4(CH)_2C_6H_4$) - It is composed of colorless crystals which have a violet fluorescence. It is a allergen and a mild irritant. It is a recognized carcinogen of the skin, hands, forearms, and scrotum. It is an experimental carcinogen of the bladder.

phenanthrene ($C_6H_4CH_2$) - It is a solid or composed of monoclinic crystals. Its toxicity is moderate via the oral route. It is a skin photo-sensitizer. It is an experimental carcinogen via the dermal route.

D. Person to Testify:

Sam Rotenberg, EPA Toxicologist

VI. EXPOSURE ROUTES

A. General Geography, Nearby Land Uses

The Stauffer Chemical Company is located approximately 2 miles west of Delaware City, Delaware, and the Delaware River. Elevations in the immediate area average about 50 feet above sea level with a range from 0-80 feet above sea level. The company lies between the Red Lion Creek to the north and Dragon Creek to the south. Some marshy areas are found along these creeks.[1]

The company is located in an industrialized area with the Getty Refining and Marketing Company situated to the its east.[2] The closest city is Delaware City (population 2024).[3]

Ref: 1. USGS facility location map - St. Georges & Delaware City Qaudrants - (Exhibit J).

2. State of Delaware, Surface Impoundment Assessment Report - 4/26/80 (Exhibit A)

3 All State Road Atlas

B. Population At Risk

There are two immediate populations at risk, the people in nearby residential areas and the people working at the facility. Due to the facility's location, in an industrialized area, the former population is estimated to number less than 20 people.[1] The nearest residences are 3 houses (one occupied by Mr. Matt Figgs) on site about 1/4 mile northwest of the facility[1] and a Getty gas station, a car dealership, and a house about 1/4 mile southwest of the facility[2 and 3]. The latter population at risk numbers less than 50 people.[1]

Ref: 1. Site Inspection Report, Page 8, William Thomas, Site Inspector, EPA-AFO - 3/11/80 (Exhibit D).

2. Conversation with William Thomas, Site Inspector, EPA-AFO - 5/13/80.

3. Memo from Robert A. Beadley to Ruthanne Gordon - 6/4/80. (Exhibit O-1)

C. Security Of Site

Security at the site is fairly tight. There are fences or buildings to the north and east of the facility, however, access can be made to the pits from open fields to the south and west of the site.

Ref: Conversation with William Thomas, Site Inspector, EPA - AFO - 5/13/80

D. Surface Runoff

The facility is located in a rather flat lowland area. There is a small stream originating along the southeast corner of the off batch pit flowing southwest which drains the site. Generally surface water tends to flow to the south discharging into Dragon Run Creek which is less than half a mile away.[1] The principle uses of Dragon Run Creek are for industrial water supply; secondary contact recreation (e.g. boating, fishing, picnicking, hiking, wading); fish, aquatic life, and wildlife; nontidal agriculture; drainage; and anadromous fish.[2]

Ref: 1. USGS facility location Map - St. Georges and Delaware City Quadrants (Exhibit J).

2. Water Quality Standards, State of Delaware DNREC, 3/25/79 (Exhibit N). Conversation with Dennis Brown, Delaware DNREC - 5/21/80.

E. Entry of Contaminants Into Ground and/or Groundwater

1. Potential for Groundwater Contamination

The potential for groundwater contamination from this site is moderate to high. The five impoundments have varying risk factors, but are all in the same range of values.

The sediments beneath the impoundments are silty to a depth of the water table, (approximately 10 feet thick). The water table could rise into some or all of the lagoons during high level conditions. Beneath the silt, sand with some gravel and silt extends to a depth of approximately 45 below the ground surface where a gray silty clay is found, which represents the contact between the Columbia and Merchantville Formations.

Since this is an industrialized area, there are several other surface impoundment sites in the vicinity. No underground injection wells are known to exist within 5 miles. There are no large wells in the Columbia near these ponds.

The groundwater appears to flow to the south towards Dragon Run Creek. There may be a few private wells along Route 72 which could possibly intercept contaminants, although, to date, no contamination has been reported.

Based on this information, a risk factor for groundwater pollution was calculated for the site. In general, although each impoundment's risk factor may be different, a value of 20 was ascertained as a result of the thickness of the unsaturated zone, (3), the groundwater availability, (5), groundwater quality, (5), and waste hazard potential, (7). The site associated health hazard factor is (5), based on the distance to the private wells mentioned above. The maximum rating for these parameters are 20 and 9 respectively. Therefore, the risk potential for goundwater is moderate to high.[1]

Ref:1. Report of Jeffrey Burke, Groundwater Protection Section, Water Supply Branch - 4/7/80. Attached as Exhibit O.

Person to Testify: Steve Platt, Groundwater Protection Section, Water Supply Branch, EPA-Region III.

2. Private Wells

The closest properties to the plant located on the south side of Route 72 are a Getty gasoline station, a Chevrolet/Oldsmobile car dealer, and a residence located behind the car dealer.1

The Getty station is owned and operated by Warren Foraker, telephone number 302-834-4766.[1] The private well at the station descends to a depth of 68 ft. with 63.5 ft. of it surrounded by a 6 inch casing. The water table is at a depth of 36 feet below the land surface (or approximately 25 feet above sea level). The types of soil at the various depths are as follows:

Depth	Soil Type
0-3 ft.	topsoil
3-18	yellow sand and clay
18-25	yellow clay
25-53	yellow sand and clay
53-68	coarse sand

The well fills at a rate of 20 gallons per minute at a depth of 42 feet and at a rate of 40 gallons per minute at a depth of 60 feet.[2]

The car dealer is Stapleford Chevrolet/Oldsmobile, telephone number 302-834-4568. It is owned by Charles Stapleford Sr. He and his wife reside in the house located behind the

dealership. Both the car dealership and the house obtain water from a single well located on the property. The house previously used a separate well but it recently ran dry.[1] The present well on the property was drilled in 1948. Its depth is 70 ft. 4 in. with a 4 in. casing to 65 ft. 4 1/2 in. The water table is 37.5 ft. below the land surface (or approximately 25 feet above sea level).

The type of soils at the various depths are as follows:

Depth	Soil Type
0-2 ft.	topsoil
2-7	yellow clay
7-18	sand, gravel, and clay
18-44	sand and clay
44-57	clay and little sand
57-70.5	coarse sand and gravel

The well fills at a rate of 42 gallons per minute at a depth of 60 feet.[2] In an interview with our investigator, Charles Stapleford Jr. stated that he was not aware of any problems with the well water and to his knowledge it had not been recently tested.

Ref: 1) Memo from Robert A. Boodey to Ruthanne Gordon - 4-6-80. (Exhibit 0-1)

2) Data from Delaware Geological Survey via Jeff Burke. (Exhibit 0-2)

3. Sole Source Aquifer Designation

On April 21, 1980, the City of New Castle, Delaware, requested in the Federal Register that the EPA make a determination that a portion of the aquifer underlying New Castle County be designated a sole source aquifer.[1] A sole source aquifer is one which is the sole or principal drinking water source of an area. If the aquifer were contaminated, it would create a significant hazard to public health. Comments are due on the proposal by July 21 and a final decision should be made on the request by September.[2]

Stauffer Chemical Company does not lie in the petitioned area, but some of the comments received have requested the area be extended.[2] Stauffer then could possibly be included.

It should be stressed that if a designation is made, it would require EPA to review only Federal financially assisted projects in the designation would have no effect on present hazardous waste sites or on future sites that have no Federal financial assistance.[2]

Ref: 1) Federal Register Notice of Monday, April 21, 1980, pp. 26804-26806. (Exhibit 0-3)

2) Memo from R.M. Twitchell to Thomas C. Voltaggio - 6/10/80. (Exhibit 0-4)

4. Groundwater Uses

The uses of groundwater for New Castle County are contained in the table below. The table shows changes in the amounts of water for the various uses between 1954 and 1966.

Average Daily Use of Ground Water and Surface Water in New Castle County for Municipal, Industrial, Irrigation and Rural Purposes in 1954 and 1966

Type of Use	Groundwater MGD	Surface Water MGD	Total MGD
		1954	
Municipal	4.5	24.0	28.5
Industrial	2.8	30.0	32.8
Irrigation	.6	0.6	1.2
Rural	1.1	--	1.1
		1966	
Municipal	10.2	40.3	50.5
Industrial	4.6	40.0	44.6
Irrigation	1.0	1.2	2.2
Rural	2.0	--	2.0

Ref: "The Availability of Groundwater in New Castle County Delaware" by R.W. Sundstrom and T.E. Pickett, University of Delaware Water Resources Center, July 1971. ~~Attached~~ as (Exhibit O-5)

F. - Air

According to 40 C.F.R. Part 61, Subpart F - National Emission Standard for Vinyl Chloride § 61.65(b)(9)(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 stram 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."

In Stauffer's most recent quarterly report, it is stated that they violated this standard approximately three times in the period from March to August 1979. See table[2] below:

Date/Time	VCM Range in Wastewater
7/16/79 (1200-2400)	72-283 ppm
8/11-12/79 (2000-0200)	12-58
8/14/79 (1400-1600)	22-62

A 114 letter[3] was sent to the company on ~~June~~ May 16, 1980, in order to obtain VCM concentrations for all surface impoundments and to find out about the reported leak in the area of well #11. A response dated June 3, 1980, was received on June 16 by this office. The response stated that the VCM concentrations in the surface impoundments were as follows:

Impoundment	VCM Conc.[4]
Stormwater (RV) pond	0.53-1.67 ppm
Off-grade batch pits (earthen)	2.1-121 ppm
Inactive sludge pits	Non-detectable

It appears that the off-grade batch pits or the RV pond could be the source or sources of the well contamination.

Concerning the leak, it took place 10 working days during the period February 13-28, 1980.[4] Because the leak was intermittent the actual amount discharged was unknown. The concentratin of vinyl chloride in the discharge was 2 ppm.[4]

Ref: 1) 40 C.F.R. Part 61, Subpart F - National Emission Standard for Vinyl Chloride, § 61.65(b)(9)(i) - (Exhibit 0-6)

2) Stauffer Chemical Company Semi-Annual Report dated September 14, 1979 for period March 15, 1979 through August 15, 1979 - (Exhibit 0-7)

3) 114 letter dated May 16, 1980 (Exhibit 0-8)

4) 114 letter response by company dated June 3, 1980 - (Exhibit 0-9)

G. Explosion or Fire

In evaluating the 114 response from the company, the two northerly sludge pits appear to be inert and therefore have low explosion or fire potential. The off-grade batch pits, due to their VCM concentrations of from 2.1-121 ppm could pose a hazard depending on the other constituents of the medium. The RV pond poses no hazard as its main constituent is water.

There are no known incidents involving these impoundments.

Ref: 1) Conversation with William Thomas, Site Inspector, EPA-AFO - 3/13/80.

2) Conversation with Walter Lee.

Person to Testify: ?

VII. HEALTH IDENTIFICATION

A. Health Information

There is no data on actual health effects. The people most likly to demonstrate any possible effects would be plant personnel or any nearby residents. The former would probably be exposed from air dispersion of the pollutants. Possible immediate effects could be inflamation of the membranes of the eyes, nose, and throat or irritations of the skin. In comparison the latter would probably be exposed to the pollutants via a contaminated water supply or eating contaminated fish. Ingestion of the pollutants at low concentrations would most likely show no immediate health effects. In both cases, however, the potential long term effects would be an increase in the incidence of cancer. (See Part IV for a list of substances and their health effects).

Person to Testify: Sam Rotenberg, EPA - Toxicologist.

B. Environmental Information

There is no data concerning actual effects on the environment. The sampling showed contamination of the small stream southeast of the off grade batch pit with 1,2-dichloroethane. But any

possible effects are unlikely due to its low bioaccumulatory potential, 4.6 fold.[1] Also, the recommend water quality criteria for 1,2-dichloroethane is 3900 ppb for aquatic life[1] while the amount detected was only 634 ppb. However, heavy rains could possibly cause the pits to overflow resulting in increased surface water contamination. Even so, the pollutants would be so diluted, there would still be virtually no effect on the environment.

Ref: 1. Water Quality Criteria Documents for Toxic Pollutants, Fed. Reg. Oct. 1, 1979, Vol. 44, No. 191, Page 56646 (Exhibit P).

Persons to testify: Sam Rotenberg - EPA - Toxicologist

REMEDIES

A. Remedial Efforts To Date

None

B. Needed Short Term

Short term remedies should include:

1) repair of leak in wastewater influent to wastewater treatment lagoons (completed)[1],

2) monitoring of any on site or nearby wells for priority pollutants.

C. Intermediate Remedies

Intermediate remedies should include:

1) removal of PVC sludge form the earthen pits and storage in barrels, tanks, or lined pits,

2) removal of contaminated soils from pits and shipment to an appropriate disposal site,

3) relining of pits with an impermeable liner or filling them in with uncontaminated soil,

4) if pits are relined, filling them again with the PVC sludge.

D. Long Term Remedies

Long term remedies should involve the complete removal of the PVC sludge from the site. The sludge could be disposed of in the following ways:

1) reprocess the sludge by separating out solids and running the acqueous portion through the wastewater treatment facility,

2) disposal of PVC sludge by incineration,

3) shipping PVC sludge to a proper landfill site.

Ref: 1) Phone call from Wayne Naylor, EPA - 5/21/80.

2) Photograph #7 - Well #11 after leak fixed and spill cleaned up - 5/13/80. Photograph enclosed with Exhibit L.

Person to testify: Walter Lee - EPA
James Miller - EPA

Exhibits

A. State of Delaware DNREC, Surface Impoundments Assessment Report - 4/26/79.

B. Memo from Peter Schaul to Steve Wassersug - 6/28/78.

C. Memo, State of Delaware DNREC, to Judy Morton from Ron Stoufer - 9/26/78.

D. Site Inspection Report, Cover Memo, Trip Report, William Thomas, Inspector - 3/11/80.

E. Sample analysis results, West Coast Technical Service Inc. - 3/28/80.

F. Echkardt List

G. Site Inspection Report, Page 4, Wayne Naylor says figure is a rough estimate by the State of Delaware - 3/11/80.

H. NPDES Permit #DE0000612 - 6/30/75.

I. Site Map from State of Delaware DNREC, Surface Impoundment Assessment Report - 4/26/80.

J. USGS facility location map - St. Georges and Delaware City Quadrants.

K. NPDES outfall maps for NPDES permit #DE0000612 - 6/30/75.

L. Photographs.

M. Summary chart of sample results.

N. Water Quality Standards, State of Delaware DNREC - 3/25/79.

O. Groundwater report from Jeff Burke, Groundwater Protection Section, Water Supply Branch - 4/7/80.

O-1 Memo from Robert A. Boodey to Ruthanne Gordon - 4/6/80.

O-2 Data from Delaware Geological Survey via Jeff Burke (Exhibit O-2).

O-3 Federal Register Notice, Monday Apirl 21, 1980, pp. 26804-26806.

O-4 Memo from R.M. Twitchell to Thomas C. Voltaggio - 6/10/80.

O-5 "The Availability of Groundwater in New Castle County Delaware by R.W. Sundstrom and T.E. Pickett, University for Delaware Water Resources Center, July 1971.

O-6 40 C.F.R. Part 61, Subpart F - National Emission Standard for Vinyl Chloride, § 61.65(b)(9)(i).

O-7 Stauffer Chemical Company Semi-Annual Report dated September 14, 1979 for period March 15, 1979 through August 15, 1979.

O-8 114 letter dated May 16, 1980.

O-9 114 letter response by company dated June 3, 1980.

P. Water Quality Criteria Documents for Toxic Pollutants, Fed. Reg., Oct. 1, 1979, Vol. 44, No. 191, pp. 56642-56647.

Stauffer Chemical Co. - Delaware City

State Site Number 30

The Stauffer Chemical Company is located on State Route 13 just east of t Getty Refining and Marketing Company between Red Lion Creek to the north and Dragon Creek to the south. The facility manufactures polyvinyl chloride (PVC) polyvinyl acetate, and other polymers. There are five earthen ponds at the pla Four of them hold primarily PVC solids and one holds primarily storm water run- off from the plant area. None of these basins are on line with the wastewater treatment system at the plant and have regular influents and effluents but rath are used for storage either prior to treatment, as with the storm-water pond, o for disposal of PVC solids.

Two large aerated lagoons are part of the wastewater treatment system. Si their bottoms and sides are made of concrete, they will not be considered furth here.

The storm-water pond (#1 on the map), called the RV pond, collects stormwate run-off from the plant area and chemical and oil spills around the plant. Occasi Ell process wastewater, which is mainly latex emulsion resin, is sent to the RV-pond when the pump system in the plant blocks up. The contents of the pond is pumped into the plant treatment system for treatment and disposal but sometimes; especially in heavy rains, the pond overflows when it can't be pumped to the treatment system fast enough. Some mention has been made by Stauffer of obtainir a discharge permit for the pond but nothing has been resolved to date. This pond was built in 1976 and is 140 feet by 160 feet by 7 feet below the ground surface. A Stauffer employee says the pond is clay-lined but this fact is questionable no specific details about the lining or its construction are available. The wall of the pond have been sprayed with a bituminous coating to prevent erosion. No flow information is available for this pond.

Two connected earth lagoons built in 1970, one called the off-grade batch pit (#2 on the map), and the other called the sludge pit (#3 on the map), are used to store off-grade batches of PVC. Occasionally, process wastewater is pump into these ponds when the pump used to pump the effluent to the river is out of service. Also, overflow from the pilot plant and the treatment plant sometimes goes into these lagoons. The off-grade batch pit was approximately 80% full of solids and the sludge pit contained liquids when the site was inspected by the St in September, 1978. These lagoons are also supposedly lined with clay but construction plans for them do not mention any liner. The walls of these ponds w also sprayed with a bituminous coating for erosion control. The off-grade batch pit measures 160 feet by 210 feet and is 5 feet below the ground surface. The sl pit is 160 feet by 70 feet and 3 feet below the ground surface.

The other two earthern ponds were built around 1971 and filled with PVC slud with the intent of enentually selling it. They were filled in 1974 and have not used since. One (#4 on the map) measures 180 feet by 60 feet and the other (#5 on the map) measures 160 feet by 110 feet. These pits have no liners and are of unknown depths.

Good subsurface information was obtained for these ponds from thirteen mo. it wells put in around them. These wells were not required and as far as anyone kn they have not been sampled. Stauffer would not say why they were put in in the f place.

The sediments beneath the lagoons are silty to the depth of the watertable

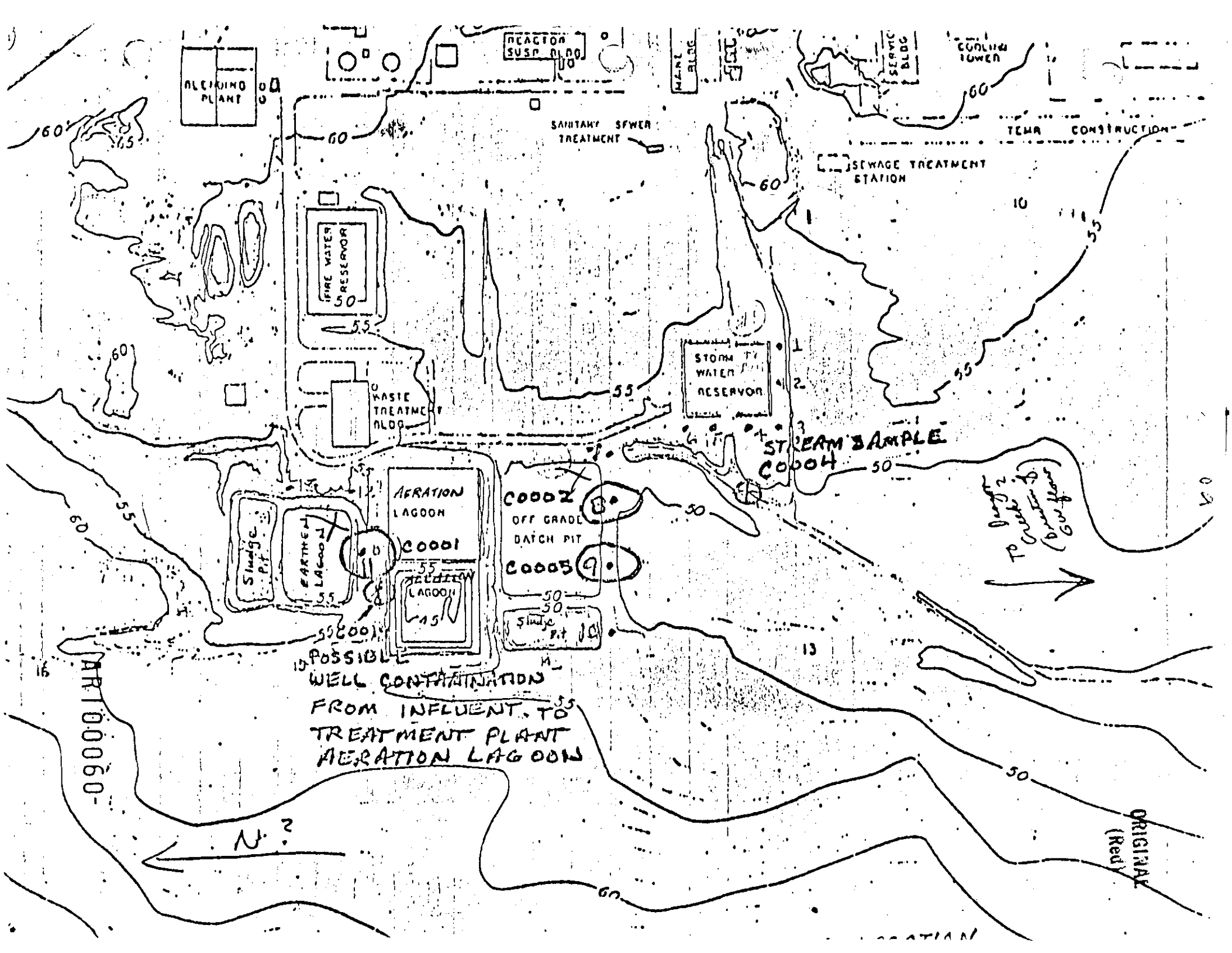
water level measurements were taken in late October, 1978. Since the water table in this area generally fluctuate seven to eight feet over a year, and October water levels are relatively low, it can be expected to be less than 10 feet below the ground surface much of the year. The water table could rise into the base of the RV-pond which is seven feet below the ground surface or possibly into the off-grade batch pit which has its base 5 feet below the ground surface. Since the depth of the two PVC sludge pits is not known, there is no way to know if the watertable could rise into the sludge or not. Since the sediments beneath the lagoons are silty, contaminant migration through them would probably be slower than in sandy sediments.

ORIGINAL
(Red)

Beneath the silt, sand with some gravel and silt extends to a depth of approximately 45 feet below the ground surface where what is described as a gray silty clay is found which represents the contact between the Columbia Formation and the Merchantville Formation.

There are no large wells in the Columbia near these ponds which could effect the ground-water flow direction at the site. From the water level measurements a the Geohydrologic Atlas maps, the groundwater appears to flow to the south toward Dragon Creek. There are a few private dwellings which probably have shallow well between the ponds and Dragon Creek along State Route 72 which could possibly intercept contaminants in the groundwater. To date no contamination has been reported

↓ Silt observed only remains
8 dwellings


ALKYLATION PLANT
REACTOR SUSP BLDG
MAIN BLDG
SERVICE BLDG
COOLING TOWER
SANITARY SEWER TREATMENT
TEMA CONSTRUCTION
SEWAGE TREATMENT STATION
FIRE WATER RESERVOIR
WASTE TREATMENT BLDG
STORM WATER RESERVOIR
STREAM SAMPLE C0004
AERATION LAGOON
C0001
C0002
OFF GRADE DITCH PIT
C0005
EARTHEN LAGOON
Sludge Pit
AERATION LAGOON
Sludge Pit
C0003
POSSIBLE WELL CONTAMINATION FROM INFLUENT TO TREATMENT PLANT AERATION LAGOON
ART00060-
N ?
ORIGINAL (Red)

UNITED · ATES ENVIRONMENTAL PROTECT J AGENCY

Region III – 6th & Walnut Sts.
Philadelphia, Pa. 19106

ORIGINAL
(Red)

SUBJECT: Briefing on Vinyl Chloride Standard as Applied to Stauffer Chemical Company, Delaware City, Delaware

DATE: JUL 2 · 19/3

FROM: Peter W. Schaul, Environmental Engineer
Special Enforcement Section, AEB (3EN11)

TO: Stephen R. Wassersug, Director
Enforcement Division (3EN00)

THRU: Leland Marshall, Chief
Special Enforcement Section, AEB (3EN11)

In January 1974, B. F. Goodrich notified NIOSH that several of its workers, who had a history of vinyl chloride exposure, had contracted angiosarcoma, a rare form of liver cancer. This added to the growing suspicion about a chemical which had previously been considered innocuous and even tested as an anesthetic. By mid-1975 the National Cancer Institute confirmed 27 cases of angiosarcoma and implicated vinyl chloride as the causal agent. Since a significant number of these cases were workers with low level, indirect exposure to vinyl chloride, EPA's concern for the safety of the public was further heightened. As a result, vinyl chloride was added to the list of hazardous air pollutants on December 24, 1975 and an emission standard was proposed. This standard was adopted with some changes on October 21, 1976. A summary of the standard is presented in Table I.

The standard regulated the production of vinyl chloride monomer (VCM), its intermediate ethylene dichloride and poly-vinyl chloride (PVC). At the time of the standard proposal, 85% of the VCM emitted to the atmosphere came from PVC plants, while 11% came from vinyl chloride plants using the ethylene dichloride production route. The remaining VCM came from various fabricators, warehouses and miscellaneous users of PVC.

(ORIGINAL (Red)

Region III has no vinyl chloride plants within its borders. Most of these plants (82%) are located on the gulf coast, where ethylene is readily available from the oil refining industry. However, six (6) PVC plants are located in the Region: two (2) in West Virginia, one (1) in Pennsylvania, two (2) in Delaware and one (1) in Maryland (see figure I). As can be seen from Table II, these plants account for approximately 18% of the National PVC capacity. VCM to manufacture PVC is brought in by rail or river barge.

The Stauffer Chemical Company facility in Delaware City, Delaware is an average size PVC production plant. It employs two different methods to make PVC: the suspension process and the dispersion process. As can be seen from Figure II and III these processes are very much alike as far as major equipment is concerned.

In the manufacture of dispersion resins, VCM is emulsified in water with surface active agents such as detergents; a water soluable polymerization initiator is added, usually a peroxide; and the reaction begins. Since the reaction is exothermic, the reactor must be cooled to keep the reactin under control. If cooling capacity is lost or impaired, the reaction rate increases causing the temperature and pressure to rise. If the operator does not respond quickly, the pressure relief valves on the reactor will open, releasing VCM to the atmosphere. Proper operator responses include placing the reactor in the maximum cooling mode, venting it to an empty reactor or gas holder and/or adding a reaction terminating chemical called a shorstop (e.g. alphamethylstyrene (AMS)).

Suspension resin production differs in that the VCM is suspended using vigouous agitation opposed to the more gentle mixing of dispersion resin manufacture. Chemicals are also added to maintain the suspension. One such chemical is methylcellulose, a derivitive of which is used to thicken ice cream. This reaction is also exothemic and can be initiated using peroxides. The same problems can occur with relief valves for suspension polymerization.

When the vinyl chloride standards were promulgated, Stauffer Chemical Company (along with the other five PVC producers) was not in compliance and it requested a waiver. This was granted in February 1977. A summary of the schedule is attached as Table III. The last column gives

ORIGINAL (Red)

the current status of each project. As can be seen, Stauffer is violating its waiver for several major process areas viz. strippers (003), monomer recovery (005), post stripper sources (006) and several minor areas. Stauffer has requested a revision, however, the requested dates leave very little time to debug and optimize the systems prior to October 21, 1978, the end of the two year waiver period. (After this point, only presidential action could extend the waiver. EPA must seek its remedies under §113. We are currently preparing a strategy to deal with any vinyl chloride NESHAPS cases which may arise. DSSE has advised that, due to the close proximity of the deadlines, no waiver modifications should be made unless the Region is certain that the sources will meet the deadline.) In Stauffer's case, we think that the schedules are very tight and may not in fact be met. For this reason, we have not modified the waiver inspite of Stauffer's requests. During the inspection, Stauffer may raise this as an issue. It should be noted that they have worked through an attorney, Gary L. Ford, since the beginning of the program. He is expected to be present during the inspection.

Other issues which may arise would relate to EPA's policy on double mechanical seal failures and emergency relief valve discharges. Double mechanical seals are required on pumps, agitators and compressors to minimize fugitive emissions of VCM which escape from the drive shaft. These seals present some operating and maintenance problems and seem to fail more often than the less complex single mechanical seal. Stauffer has installed double mechanical seals on all of its operating equipment, but cannot get seals for the spares. Thus, in the event of a seal failure on a primary pump, Stauffer could not start up the spare without violating the NESHAPS standard. In some cases, this would require a total plant shutdown. To date, this has not occurred and the seals are expected by mid-August. DSSE would rather not deal with this problem in the abstract, but wants to wait for a seal failure to decide what to do. However, they are looking into the seal supply problem.

ORIGINAL (Red)

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The second issue relates to the circumstances under which EPA will allow a relief valve discharge. EPA has consistently taken the position that the emergency discharges allowed by the standard only relate to natural disasters and do no permit those caused by power failures, instrument or equipment failures, or operator errors. We are in the process of preparing letters to all of the vinyl chloride sources. I have attached a draft of a letter which we are preparing for another source.

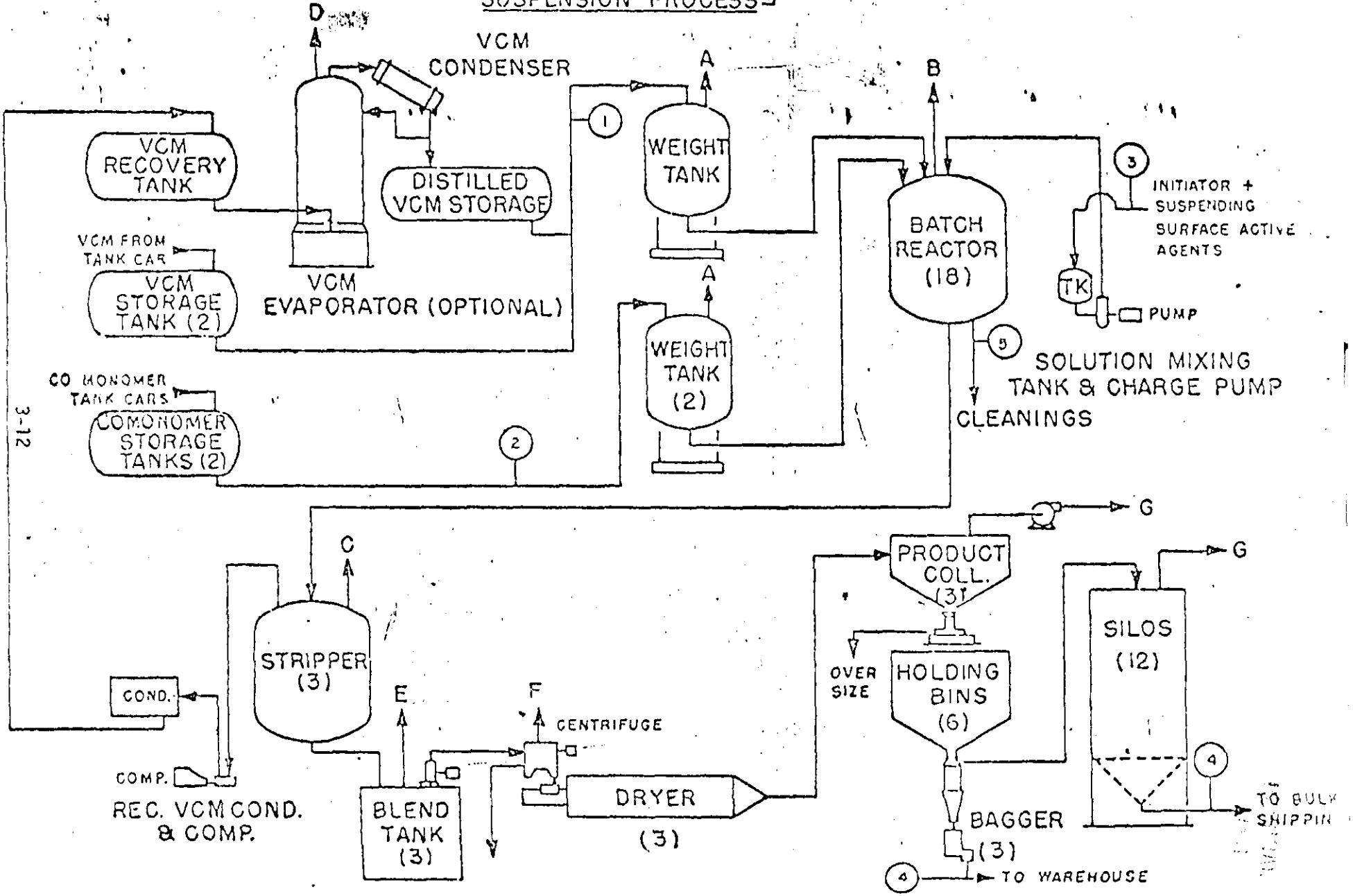
I apologize for the length of this memo, but since I will be inspecting another PVC plant on Monday, oral explanations will not be possible until we meet on Tuesday morning. If there are any questions, we can probably resolve them during the trip to Delaware City.

GENII: PSCHAUL: mtcl: 7/28/78: 3427.

Figure

POLYVINYL CHLORIDE PLANT

SUSPENSION PROCESS [4]

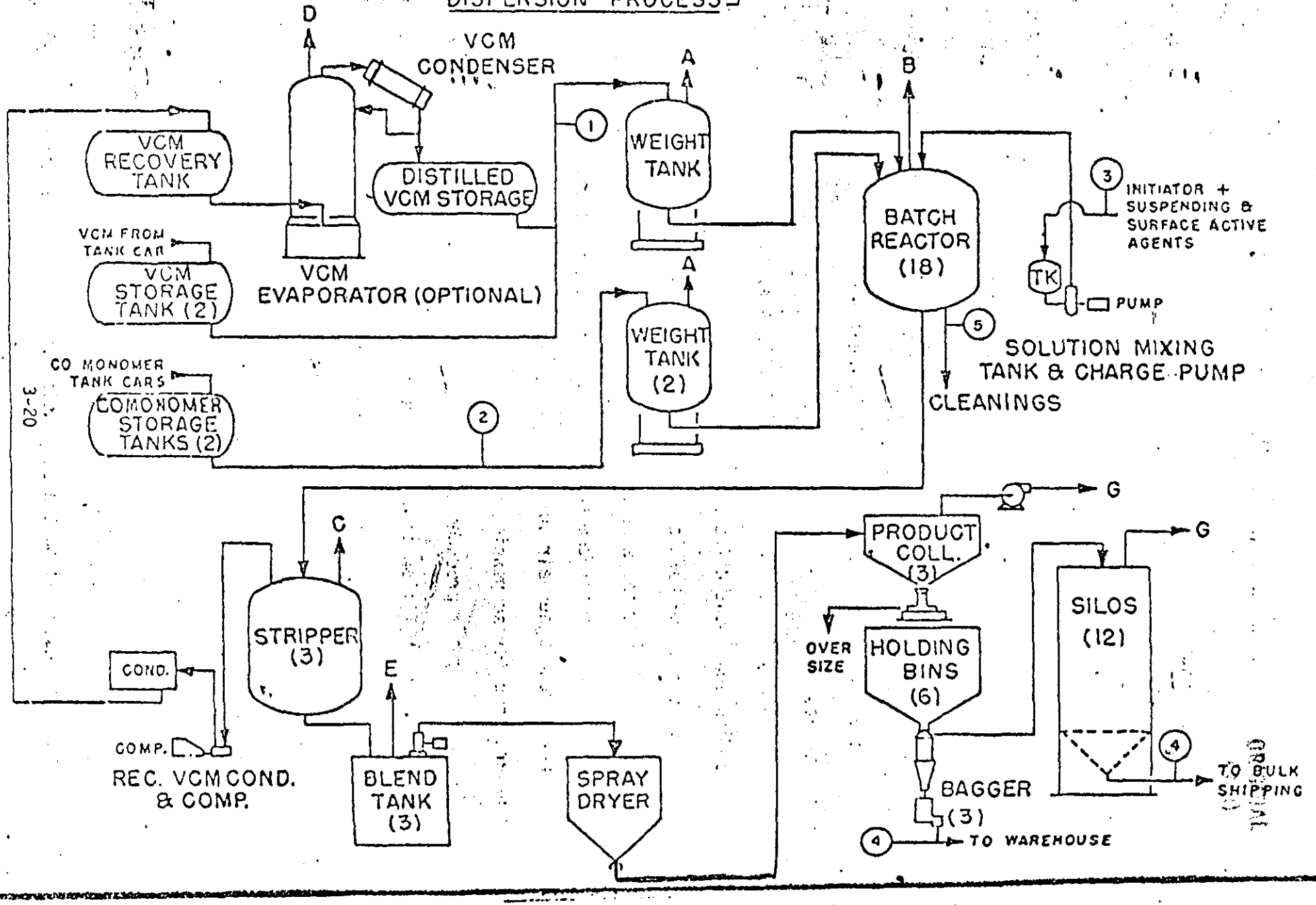


3-12

Figure III

POLYVINYL CHLORIDE PLANT

DISPERSION PROCESS 4/



MEMORANDUM

TO: Judy Morton

FROM: Ron Stoufer R.N.S.

DATE: September 26, 1978

SUBJECT: Waste lagoons at Stauffer Chemical PVC plant in Delaware City

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I am writing this to document a visit Ken Weiss and I made on September 19, 1978 to talk to Charles Markowitz of Stauffer Chemcial Company's PVC plant in Delaware City and to tour their waste lagoons. This plant polymerizes vinyl chloride to make polyvinyl chloride (PVC).

The attached plan at a scale of 1 inch = 200 feet shows the locations of the waste lagoons. The two areas marked "lagoon" are aerated lagoons which are part of the wastewater treatment process. The exposed part of the sides of the aerated lagoons are concr

The storm water reservoir, also called the RV pond, collects storm water runoff from the plant area. This water is then pumped from the RV pond to the aerated lagoons. However, during heavy rains, the pumping cannot keep up with the inflow and the RV pond overflows. Stauffer was fined for a discharge from such an overflow within the last several months. If there is any kind of a chemical or oil spill in the plant area, those materials would also go into the RV pond. If there are blockages in the pumping system from the plant to the aerated lagoons, the E 11 process wastewater, mainly latex emulsion resin, occasionally goes to the RV pond. Since this pond is unlined, these spills are a potential source of groundwater contamination. The RV pond was being cleaned out by excavating it while we were there because they hope to get a discharge permit for this lagoon.

The lagoon called the off grade batch pit on the plan is also called the earth lagoon. It is apparently an unlined excavation. It is at least 80% full of what are called PVC solids. This lagoon is connected to the smaller lagoon west of it which is all liquids. Markowitz guessed that these 2 lagoon and the aerated lagoons are all about 10-12 feet deep. The earth lagoon was used to store off grade batches of PVC and when the pumps that pump the effluent to the Delaware River are out of service, the effluent has occasionally been pumped into the earth lagoon. The earth lagoon also receives overflows from the pilot plant and overflows from the treatment plant. Markowitz said they are trying not to discharge to the earth lagoon at the present time. The bottom of the earth lagoon was tarred at one time. This lagoon is also a potential source of groundwater contamination. It is possible that some vinyl chloride could have gone into any of these ponds, but it is very volatile and may not have gone into the ground. The PVC itself is quite insoluble. The greatest potential threat to groundwater quality may be the organic chemicals used to start, maintain, and stop the polymerization reactions. I do not know the names of these compounds.

ORIGINAL

There are also 2 lagoons north of the aerated lagoons that are full of PVC sludge. Apparently when there is a high demand for PVC, waste PVC sludge or solids can be sold at a profit. That may be why they have several pits full of PVC solids.

I am writing a letter to Markowitz requesting additional information on the lagoons for our use in the SIA.

/ovc

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region III, Annapolis Field Office

DATE: March 11, 1980

SUBJECT: Hazardous Waste Site Inspection and Trip Report for: Stauffer Chemical, School House Road, Delaware City, DE 19706

FROM: William M. Thomas (3SA21) WMT
Engineering Technician

ORIGINAL (Red)

TO: Jeffrey Hass (3SA30)
Acting Chief, Environmental Emergency Branch

On February 21, 1980, a Hazardous Waste Site Inspection was conducted at Stauffer Chemical, Delaware City PVC Plant. The site was inspected and sampled to determine possible groundwater and surface water contamination caused by PVC waste generated by the plant.

Samples were collected from test wells located adjacent to PVC disposal batch pits. A stream on site, and a domestic well off site were also sampled.

All samples were collected by EPA personnel and split with Stauffer representatives to be analyzed by organic scan for volatile and extractable organics and pesticides using the GC/MS methodology. The domestic well sample was not split with the company.

The following is a list of sampling sources and locations:

Sample #C00001
Test Well #11, located between earthen lagoon and aeration lagoons. Exact location on map of facility.

Sample #C0002
Test Well #8, located near southeast corner of off grade batch pit, approximately 10 yards from pit.

Sample #C0003
Test Well #9, also located adjacent to off grade batch pit, approximately 30 yards west of Well #8.

Sample #C0004
Stream flowing southwest from off grade batch pit to Dragon Creek. Sample taken 75 yards S.W. of Well #7, located on facility map.

Sample #C0005
Domestic well sample taken from Stauffer owned dwelling, located west of facility on U.S. Route 13, approximately 500 yards from site. Dewlling rented by Mr. Matt Figgs, 1338 S. DuPont Highway, New Caste, Delaware from Stauffer Chemical.

Sample #C0019
Sample taken from leak of influent line to aeration lagoon. Taken to determine possible contamination of Well #11.

ORIGINAL (Red)

The lagoon called the off grade batch pit on the plan is also called the earth lagoon. It is apparently an unlined excavation. It is at least 80% full of what are called PVC solids. This lagoon is connected to the smaller lagoon west of it which is all liquids. Markowitz guessed that these 2 lagoons and the aerated lagoons are all about 10-12 feet deep. The earth lagoon was used to store off grade batches of PVC and when the pumps that pump the effluent to the Delaware River are out of service, the effluent has occasionally been pumped into the earth lagoon. The earth lagoon also receives overflows from the pilot plant and overflows from the treatment plant. Markowitz said they are trying not to discharge to the earth lagoon at the present time. The bottom of the earth lagoon was tarred at one time. This lagoon is also a potential source of groundwater contamination. It is possible that some vinyl chloride could have gone into any of these ponds, but it is very volatile and may not have gone into the ground. The PVC itself is quite insoluble . The greatest potential threat to groundwater quality may be the organic chemicals used to start, maintain, and stop the polymerization reactions.[1]

There are also 2 lagoons north of the aerated lagoons that are full of PVC sludge. Apparently when there is a high demand for PVC, waste PVC sludge or solids can be sold at a profit. That may be why they have several pits full of PVC solids.[1]

[1]This section taken from Delaware DNREC Files.

cc: Leonard Mangiaracina (3EN00)
Orterio Villa, Jr. (3SA20)

Enclosure (1)

Facility Maps Attached

ORIGINAL
(Red)

Original Sample
Results Documents
(in file)

AR100072

SITE: NUMBER 396 PAGE 1 FOR THIS SITE
DELAWARE CITY PVC PLANT
BOX 320 SCHOOL HOUSE ROAD
DELAWARE CITY,DE 19706

COMPANY: COMPANY-FACILITY NUMBER 46056
STAUFFER CHEMICAL COMPANY
PLASTICS DIVISION
DELAWARE CITY PVC PLANT
P.O. BOX 320, SCHOOL HOUSE ROAD
DELAWARE CITY,DE 19706

FIRST YEAR USED: 1966
LAST YEAR USED: 1979

HUNDRED TONS: 23
THOUSAND CUBIC YDS.: .
THOUSAND GALLONS: .

ORIGINAL (Red)

COMPOSITION OF WASTE:

ORGAN1
ORGAN10
ORGAN11
ORGAN12
ORGAN6
ORGAN7
ORGAN15
ORGAN16
ORGAN17
ORGAN20
ORGAN21
ORGAN24
INORG1
INORG3
MISC1
MISC8

AR100073

IF LISTED, THEN PRESENT IN WASTED. IF NOT LISTED, THEN NOT PRESENT, NOT KNOWN IF PRESENT, OR DATA MISSING.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

III

GENERAL INSTRUCTIONS: Complete Sections I and III through XV of this form as completely as possible. Then use the information on this form to develop a Tentative Disposition (Section II). File this form in its entirety in the regional Hazardous Waste Site File. Be sure to include all appropriate Supplemental Reports in the file. Submit a copy of the form to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force (EN-335), 401 M St., SW, Washington, DC 20

I. SITE IDENTIFICATION

A. SITE NAME: Delaware City PVC Plant (Stauffer Chem)
B. STREET (or other identifier): School House Rd
C. CITY: Delaware City
D. STATE: DE
E. ZIP CODE: 19706
F. COUNTY NAME: New Castle

G. SITE OPERATOR INFORMATION
1. NAME: Stauffer Chemical
2. TELEPHONE NUMBER: 302-834-4575
3. STREET: School House Rd
4. CITY: Delaware City
5. STATE: DE
6. ZIP CODE: 19706

H. REALTY OWNER INFORMATION (if different from operator of site)
1. NAME:
2. TELEPHONE NUMBER:
3. CITY:
4. STATE:
5. ZIP CODE:

I. SITE DESCRIPTION: Four disposal pits for off grade PVC

J. TYPE OF OWNERSHIP
☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☒ 5. PRIVATE

II. TENTATIVE DISPOSITION (complete this section last)

A. ESTIMATE DATE OF TENTATIVE DISPOSITION (mo., day, & yr.):
B. APPARENT SERIOUSNESS OF PROBLEM
☐ 1. HIGH ☒ 2. MEDIUM ☐ 3. LOW ☐ 4. NONE

C. PREPARER INFORMATION
1. NAME: William M Thomas
2. TELEPHONE NUMBER: 301/224-2740
3. DATE (mo., day, & yr.):

III. INSPECTION INFORMATION

A. PRINCIPAL INSPECTOR INFORMATION
1. NAME: William Thomas
2. TITLE: Engineering Technician
3. ORGANIZATION: EPA
4. TELEPHONE NO. (area code & n

B. INSPECTION PARTICIPANTS

1. NAME	2. ORGANIZATION	3. TELEPHONE NO.
Gerald W. Crutchley	EPA S&A Division	FTS 8-922-3752
Wayne S Naylor	EPA ATHM Division	FTS 8-597-7239
Robert Touhey	DNREC	302-678-4761

C. SITE REPRESENTATIVES INTERVIEWED (corporate officials, workers, residents)

1. NAME	2. TITLE & TELEPHONE NO.	3. ADDRESS
Paul Roux	Geologist 203-222-3551	Stauffer Chemical West Port Connecticut
Charlie Markowitz	Environmental Sup. 302-834-4575	Stauffer Chemical Delaware City DE 19706

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III. INSPECTION INFORMATION (continued)

D. GENERATOR INFORMATION (sources of waste)

1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE GENERAT
Stauffer		DEL. CITY, DEL.	
			ORIGINAL (Red)

E. TRANSPORTER/HAULER INFORMATION

1. NAME	2. TELEPHONE NO.	3. ADDRESS	4. WASTE TYPE TRANSPORT
N/A			

F. IF WASTE IS PROCESSED ON SITE AND ALSO SHIPPED TO OTHER SITES, IDENTIFY OFF-SITE FACILITIES USED FOR DISPOSAL.

1. NAME	2. TELEPHONE NO.	3. ADDRESS
N/A		

G. DATE OF INSPECTION (mo., day, & yr.)	H. TIME OF INSPECTION	I. ACCESS GAINED BY: (credentials must be shown in all cases)
2/21/80	10:00 AM	☒ 1. PERMISSION ☐ 2. WARRANT

J. WEATHER (describe)
40° F Partly Cloudy

IV. SAMPLING INFORMATION

. Mark 'X' for the types of samples taken and indicate where they have been sent e.g., regional lab, other EPA lab, contractor, etc. and estimate when the results will be available.

1. SAMPLE TYPE	2. SAMPLE TAKEN (mark 'X')	3. SAMPLE SENT TO:	4. DATE RESULTS AVAILABLE
a. GROUNDWATER	X	CONTRACTOR LAB, CERRITOS CALIF. + EPA REGION III LAB; AFO	3/31/80
b. SURFACE WATER	X	" "	3/31/80
c. WASTE			
d. AIR			
e. RUNOFF			
f. SPILL			
g. SOIL			
h. VEGETATION			
i. OTHER (specify)			

B. FIELD MEASUREMENTS TAKEN (e.g., radioactivity, explosivity, PH, etc.)

1. TYPE	2. LOCATION OF MEASUREMENTS	3. RESULTS
		AR100075

Continued From Page 2

IV. SAMPLING INFORMATION (continued)

C. PHOTOS

1. TYPE OF PHOTOS: [X] a. GROUND [ ] b. AERIAL

2. PHOTOS IN CUSTODY OF: W. Thomas — ORIGINAL (Red)

D. SITE MAPPED?

[X] YES. SPECIFY LOCATION OF MAPS:

E. COORDINATES

1. LATITUDE (deg.-min.-sec.): 39° 35' 7"

2. LONGITUDE (deg.-min.-sec.): 75° 39' 10"

V. SITE INFORMATION

A. SITE STATUS

[X] 1. ACTIVE (Those industrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if infrequently.)

[ ] 2. INACTIVE (Those sites which no longer receive wastes.)

[ ] 3. OTHER (specify): _____ (Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)

B. IS GENERATOR ON SITE?

[ ] 1. NO [X] 2. YES (specify generator's four-digit SIC Code): _____

C. AREA OF SITE (in acres): 3

D. ARE THERE BUILDINGS ON THE SITE?

[X] 1. NO [ ] 2. YES (specify): No construction directly over pits

VI. CHARACTERIZATION OF SITE ACTIVITY

Indicate the major site activity(ies) and details relating to each activity by marking 'X' in the appropriate boxes.

X	A. TRANSPORTER	X	B. STORER	X	C. TREATER	X	D. DISPOSER
	1. RAIL		1. PILE		1. FILTRATION		1. LANDFILL
	2. SHIP		2. SURFACE IMPOUNDMENT		2. INCINERATION		2. LANDFARM
	3. BARGE		3. DRUMS		3. VOLUME REDUCTION		3. OPEN DUMP
	4. TRUCK		4. TANK, ABOVE GROUND		4. RECYCLING/RECOVERY	X	4. SURFACE IMPOUNDMENT
	5. PIPELINE		5. TANK, BELOW GROUND		5. CHEM./PHYS./TREATMENT		5. MIDNIGHT DUMPING
	6. OTHER (specify):		6. OTHER (specify):		6. BIOLOGICAL TREATMENT		6. INCINERATION
					7. WASTE OIL REPROCESSING		7. UNDERGROUND INJECTION
					8. SOLVENT RECOVERY		8. OTHER (specify):
					9. OTHER (specify):		

E. SUPPLEMENTAL REPORTS: If the site falls within any of the categories listed below, Supplemental Reports must be completed. Indicate which Supplemental Reports you have filled out and attached to this for..

[ ] 1. STORAGE [ ] 2. INCINERATION [ ] 3. LANDFILL [X] 4. SURFACE IMPOUNDMENT [ ] 5. DEEP WELL

[ ] 6. CHEM/BIO/PHYS TREATMENT [ ] 7. LANDFARM [ ] 8. OPEN DUMP [ ] 9. TRANSPORTER [ ] 10. RECYCLOR/RECLAIMER

VII. WASTE RELATED INFORMATION

A. WASTE TYPE

[X] 1. LIQUID [X] 2. SOLID [X] 3. SLUDGE [ ] 4. GAS

B. WASTE CHARACTERISTICS

[ ] 1. CORROSIVE [ ] 2. IGNITABLE [ ] 3. RADIOACTIVE [ ] 4. HIGHLY VOLATILE

[ ] 5. TOXIC [ ] 6. REACTIVE [X] 7. INERT [ ] 8. FLAMMABLE

[X] 9. OTHER (specify): ?

C. WASTE CATEGORIES

Are records of wastes available? Specify items such as manifests, inventories, etc. below.

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VII. WASTE RELATED INFORMATION (continued)

a. Estimate the amount (specify unit of measure) of waste by category, mark 'X' to indicate which wastes are present.

a. SLUDGE	b. OIL	c. SOLVENTS	d. CHEMICALS	e. SOLIDS	f. OTHER
AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT
				2-3 MILLION	
T OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE
				GALLONS (OR TONS)	
X (1) PAINT, PIGMENTS	X (1) OILY WASTES	X (1) HALOGENATED SOLVENTS	X (1) ACIDS	X (1) FLYASH	X (1) LABORATORY, PHARMACEUT.
(2) METALS SLUDGES	(2) OTHER(specify):	(2) NON-HALOGNTD. SOLVENTS	(2) PICKLING LIQUORS	(2) ASBESTOS	(2) HOSPITAL
(3) POTW		(3) OTHER(specify):	(3) CAUSTICS	(3) MILLING/MINE TAILINGS	(3) RADIOACTIVE
(4) ALUMINUM SLUDGE			(4) PESTICIDES	(4) FERROUS SMELTING WASTES	(4) MUNICIPAL
(5) OTHER(specify):			(5) DYES/INKS	(5) NON-FERROUS SMLTG. WASTES	(5) OTHER(specify
			(6) CYANIDE	X (6) OTHER(specify):	
			(7) PHENOLS	PVC WASTE	
			(8) HALOGENS		
			(9) PCB		
			(10) METALS		
			(11) OTHER(specify)		

LIST SUBSTANCES OF GREATEST CONCERN WHICH ARE ON THE SITE (place in descending order of hazard)

1. SUBSTANCE	2. FORM (mark 'X')			3. TOXICITY (mark 'X')				4. CAS NUMBER	5. AMOUNT	6. UNIT
	a. SOLID	b. LIQ.	c. VAPOR	a. HIGH	b. MED.	c. LOW	d. NONE			
Vinyl Chloride		X	X	X						
Organics										

VIII. HAZARD DESCRIPTION

FIELD EVALUATION HAZARD DESCRIPTION: Place an 'X' in the box to indicate that the listed hazard exists. Describe the hazard in the space provided.

☒ A. HUMAN HEALTH HAZARDS

AR100077

POSSIBLE PVC WASTE HAZARD

WOMEN OF CHILD BEARING AGE NOT ALLOWED ON SITE.

DNREC FEMALE INSPECTOR NOT ALLOWED TO VISIT SITE.

☐ C. WORKER INJURY/EXPOSURE

☐ D. CONTAMINATION OF WATER SUPPLY

☐ E. CONTAMINATION OF FOOD CHAIN

☒ F. CONTAMINATION OF GROUND WATER

POSSIBLE

☒ G. CONTAMINATION OF SURFACE WATER

POSSIBLE

AR100078

☐ H. DAMAGE TO FLORA/FAUNA

☐ I. FISH KILL

☐ J. CONTAMINATION OF AIR

☐ K. NOTICEABLE ODORS

☒ L. CONTAMINATION OF SOIL

POSSIBLE

☐ M. PROPERTY DAMAGE

AR100079

☐ N. FIRE OR EXPLOSION

Unknown
(Past)

☒ O. SPILLS/LEAKING CONTAINERS/RUNOFF/STANDING LIQUID

LEAK FROM INFLUENT LINE TO AERATION LAGOON, STANDING LIQUID AROUND WELL CASING #11, POSSIBLE GROUND WATER COTAMINATION

☐ P. SEWER, STORM DRAIN PROBLEMS

☐ Q. EROSION PROBLEMS

☐ R. INADEQUATE SECURITY

☐ S. INCOMPATIBLE WASTES

AR100080

VIII. HAZARD DESCRIPTION (continued)

T. MIDNIGHT DUMPING

U. OTHER (specify):

IX. POPULATION DIRECTLY AFFECTED BY SITE

A. LOCATION OF POPULATION	B. APPROX. NO. OF PEOPLE AFFECTED	C. APPROX. NO. OF PEOPLE AFFECTED WITHIN UNIT AREA	D. APPROX. NO. OF BUILDINGS AFFECTED	E. DISTANCE TO SITE (specify units)
1. IN RESIDENTIAL AREAS	< 20		3 houses	1/4 mi.
2. IN COMMERCIAL OR INDUSTRIAL AREAS	Plant Work < 50			On site
3. IN PUBLICLY TRAVELLED AREAS	None			
4. PUBLIC USE AREAS (parks, schools, etc.)	None			

X. WATER AND HYDROLOGICAL DATA

A. DEPTH TO GROUNDWATER (specify unit)	B. DIRECTION OF FLOW	C. GROUNDWATER USE IN VICINITY
10 feet (average)	South	Drinking
D. POTENTIAL YIELD OF AQUIFER	**E. DISTANCE TO DRINKING WATER SUPPLY (specify unit of measure)**	**F. DIRECTION TO DRINKING WATER SUPPLY**
	1/4 mi	East

TYPE OF DRINKING WATER SUPPLY

- [ ] 1. NON-COMMUNITY < 15 CONNECTIONS*
- [x] 2. COMMUNITY (specify town) > 15 CONNECTIONS — Wilmington Suburbs Christiana
- [ ] 3. SURFACE WATER
- [ ] 4. WELL

Continue On Page 9

Continued From Page 8

X. WATER AND HYDROLOGICAL DATA (continued)

H. LIST ALL DRINKING WATER WELLS WITHIN A 1/4 MILE RADIUS OF SITE

1. WELL	2. DEPTH (specify unit)	3. LOCATION (proximity to population/buildings)	4. NON-COMMUNITY (mark 'X')	5. COMMUNITY (mark 'X')
	UNKNOWN	3 DWELLINGS LOCATED ON COMPANY PROPERTY, OWNED BY STAUFFER CHEMICAL, ONE WELL SAMPLED, HOUSE RENTED BY MR. MATT FIGGS	X	

I. RECEIVING WATER

1. NAME: Dragon Run

☐ 2. SEWERS ☒ 3. STREAMS/RIVERS ☐ 4. LAKES/RESERVOIRS ☐ 5. OTHER (specify):

6. SPECIFY USE AND CLASSIFICATION OF RECEIVING WATERS

XI. SOIL AND VEGITATION DATA

LOCATION OF SITE IS IN:

☐ A. KNOWN FAULT ZONE ☐ B. KARST ZONE ☐ C. 100 YEAR FLOOD PLAIN ☐ D. WETLAND

☐ E. A REGULATED FLOODWAY ☐ F. CRITICAL HABITAT ☒ G. RECHARGE ZONE OR SOLE SOURCE AQUIFER

XII. TYPE OF GEOLOGICAL MATERIAL OBSERVED

Mark 'X' to indicate the type(s) of geological material observed and specify where necessary, the component parts.

'X'	A. OVERBURDEN	'X'	B. BEDROCK (specify below)	'X'	C. OTHER (specify below)
	1. SAND				
	2. CLAY				
	3. GRAVEL				

XIII. SOIL PERMEABILITY

☐ A. UNKNOWN ☐ B. VERY HIGH (100,000 to 1000 cm/sec.) ☐ C. HIGH (1000 to 10 cm/sec.)

☐ D. MODERATE (10 to .1 cm/sec.) ☒ E. LOW (.1 to .001 cm/sec.) ☐ F. VERY LOW (.001 to .00001 cm/sec.)

G. RECHARGE AREA

☒ 1. YES ☐ 2. NO 3. COMMENTS:

H. DISCHARGE AREA

☐ 1. YES ☐ 2. NO 3. COMMENTS:

I. SLOPE

1. ESTIMATE % OF SLOPE

2. SPECIFY DIRECTION OF SLOPE, CONDITION OF SLOPE, ETC.

J. OTHER GEOLOGICAL DATA

Continued From Front

XIV. PERMIT INFORMATION

List all applicable permits held by the site and provide the related information.

A. PERMIT TYPE (e.g., RCRA, State, NPDES, etc.)	B. ISSUING AGENCY	C. PERMIT NUMBER	D. DATE ISSUED (mo., day, & yr.)	E. EXPIRATION DATE (mo., day, & yr.)	F. IN COMPLIANCE (mark 'X') 1. YES	2. NO	
NPDES	State	DE.0000612	6/30/75	6/30/80			?
State	State	WPCC 3025/75	6/30/75	6/30/80			?

XV. PAST REGULATORY OR ENFORCEMENT ACTIONS

☐ NONE ☐ YES (summarize in this space)

NOTE: Based on the information in Sections III through XV, fill out the Tentative Disposition *(Section II)* information on the first page of this form.

(Supplemental Report)

Answer and Explain as Necessary.

1. TYPE OF IMPOUNDMENT

EARTHEN LAGOONS OR PONDS (FOUR)

2. STABILITY/CONDITION OF EMBANKMENTS

3. EVIDENCE OF SITE INSTABILITY (Erosion, Settling, Sink Holes, etc.)

☐ YES ☒ NO

4. EVIDENCE OF DISPOSAL OF IGNITABLE OR REACTIVE WASTE

☐ YES ☒ NO

5. ONLY COMPATIBLE WASTES ARE STORED OR DISPOSED OF IN THE IMPOUNDMENT

ORIGINAL (RCP)

☒ YES ☐ NO

6. RECORDS CHECKED FOR CONTENTS AND LOCATION OF EACH SURFACE IMPOUNDMENT

☒ YES ☐ NO

7. IMPOUNDMENT HAS LINER SYSTEM

☐ YES ☒ NO

7a. INTEGRITY OF LINER SYSTEM CHECKED

☐ YES ☐ NO

7b. FINDINGS

8. SOIL STRUCTURE AND SUBSTRUCTURE

BENEATH THE SILT, SAND, SOME GRAVEL AND SILT EXTENDS TO A DEPTH OF APPROX. 45 FT. BELOW GROUND SURFACE WHERE GRAY SILTY CLAY IS FOUND

9. MONITORING WELLS

☒ YES ☐ NO 13 WELLS

10. LENGTH, WIDTH, AND DEPTH

LENGTH WIDTH DEPTH DIMENSIONS FOUND IN IMPOUND. ASSESS.

11. CALCULATED VOLUMETRIC CAPACITY

12. PERCENT OF CAPACITY REMAINING

3 ARE FILLED TO CAPACITY OFF GRADE RATCH PIT 20% REMA

13. ESTIMATE FREEBOARD

14. SOLIDS DEPOSITION

☐ YES ☐ NO

15. DREDGING DISPOSAL METHOD

~~16. OTHER EQUIPMENT~~

SURFACE IMPOUNDMENT ASSESSMENT ATTACHED

AR100084

EPA Form T2070-3C (10-79)

State Permit Number WPCC 3025/75
NPDES Permit Number DE0000612
Effective Date JUN 30 1975
Expiration Date June 30, 1980

AUTHORIZATION TO DISCHARGE UNDER THE

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

AND THE LAWS OF THE

STATE OF DELAWARE

ORIGINAL
(Red)

1. In compliance with the provisions of the Federal Water Pollution Control Act, as amended (33 U.S.C. 1151 et seq.) (hereinafter referred to as "the Act"), and pursuant to the provisions of 7 Del. C., §6003

Stauffer Chemical Company
PVC Plant
P.O. Box 320
Schoolhouse Road, Delaware City, Delaware 19706

is authorized to discharge from the facility (Point Sources 001, 002) located at

Delaware City, Delaware 19706

to receiving waters named

Delaware River

2. The effluent limitations, monitoring requirements and other permit conditions are set forth in Part I, II and III hereof.

N.C. Vasuki

N.C. Vasuki, Director
Division of Environmental Control
Department of Natural Resources
and Environmental Control

June 30, 1975

Date Signed

AR100085

General Description of Discharges

001 - Combined effluents composed of:

a. Discharge from industrial waste water treatment facility which includes biological oxidation, flocculation, clarification and filtration (avg. flow 0.5 MGD).

b. Blowdown from boilers, cooling towers, deionizers and softeners (avg. flow 0.36 MGD).

002 - Effluent from a package sanitary sewage treatment plant.

A. 1 EFFLUENT LIMITATIONS FINAL

During the period beginning date of issue and lasting through permit expiration the permittee is authorized to discharge from point source(s) 001 (a) . the quantity and quality of effluent specified below:

The average quantity of effluent discharged from the wastewater treatment facility shall not exceed 0.9 million gallons per day (mgd) or 3407 cubic meters per day.

Parameter	Average Daily lbs/day	kg/day	Concentration		Maximum Daily lbs/day	kg/day	Max. Inst. Concentration	
BOD5	90	41	12	mg/l	320	145	52	mg/l
Total Suspended Solids	455	207	60	mg/l	825	375	160	mg/l
COD	1645	745	220	mg/l	3205	1455	430	mg/l

AR100087

The ph shall not be less than 6.0 standard units nor greater than 9.0 standard units. This discharge shall be free from floating solids, sludge deposits, debris, oil and scum.

ORIGINAL (RED)

A. 2 EFFLUENT LIMITATIONS FINAL

During the period beginning date of issue and lasting through permit expiration the permittee is authorized to discharge from point source(s) 002 (a) the quantity and quality of effluent specified below:

The average quantity of effluent discharged from the wastewater treatment facility shall not exceed 0.004 million gallons per day (mgd) or 15 cubic meters per day.

AR100088

Parameter	Average Daily lbs/day	Average Daily kg/day	Average Daily Concentration	Maximum Daily lbs/day	Maximum Daily kg/day	Maximum Daily Max. Inst. Concentration
OD_5	1	0.5	30 mg/l	1.5	0.7	45 mg/l
otal Suspended Solids	1	0.5	30 mg/l	1.5	0.7	45 mg/l
ot[illegible] Coliform						10,000 colonies/100 ml
ecal Coliform						400 colonies/100 ml

The free chlorine residual shall not be less than 1 mg/l nor greater than 4 mg/l after 30 minutes contact at maximum flow.

The ph shall not be less than 6.0 standard units nor greater than 9.0 standard units. This discharge shall be free from floating solids, sludge deposits, debris, oil and scum.

(a) effl[illegible]nt from package sanitary sewage treatment plan[illegible]

B. 1 MONITORING REQUIREMENTS EFFLUENTS

During the period beginning effective date and lasting through expiration date the permittee is authorized to discharge from outfall(s) serial number(s) 001 (a)

Such discharge(s) shall be monitored by the permittee as specified below:

Effluent Parameter	Monitoring Requirement	
	Measurement Frequency	Sample Type
BOD_5	Weekly	24 hour composite
Total Suspended Solids	Weekly	24 hour composite
COD	Weekly	24 hour composite
pH	Daily	Grab
Flow	Continuous	Recorded

Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location: After combination of all treatment and blowdown streams as defined under the general description.

B. 2 MONITORING REQUIREMENTS INTERIM

During the period beginning effective date and lasting through October 31, 1975
the permittee is authorized to discharge from outfall(s) serial number(s) 002 (a)

Such discharge(s) shall be monitored by the permittee as specified below:

Effluent Parameter	Monitoring Requirement	
	Measurement Frequency	Sample Type
BOD_5	Monthly	24 hour composite
Total Suspended Solids	Monthly	24 hour composite
Total Coliform	Monthly	Grab
Fecal Coliform	Monthly	Grab
Flow	Monthly	Estimated
pH	Daily	Grab
Free Residual Chlorine	Daily	Grab

( ) ( ) ( )

...monitoring requirements specified above shall be taken at the

B. -2-1 MONITORING REQUIREMENTS FINAL

During the period beginning November 1, 1975 and lasting through permit expiration the permittee is authorized to discharge from outfall(s) serial number(s) 002 (a)

Such discharge(s) shall be monitored by the permittee as specified below:

Effluent Parameter	Monitoring Requirement	
	Measurement Frequency	Sample Type
BOD_5	once per month	24 hour composite
Total Suspended Solids	once per month	24 hour composite
Total Coliform	once per month	Grab
Fecal Coliform	once per month	Grab
Flow	Continuous	Recorded
pH	once per day	Grab
Free Chlorine Residual	once per day	Grab

Samples taken in compliance with the monitoring requirements specified above shall be taken at the

Schedule of Compliance

1. The permittee shall achieve compliance with the effluent limitations specified for discharges in accordance with the following schedule:

Discharge 002

November 1, 1975 - Complete installation of continuous recording type flow meter on effluent from package sanitary sewage treatment plant.

ORIGINAL (Red)

2. No later than 14 calendar days following a date identified in the above schedule of compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

D. Monitoring and Reporting

1. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. Reporting

Monitoring results obtained during the previous one (1) month shall be summarized for each month and reported on a Discharge Monitoring Report Form (EPA No. 3320-1), postmarked no later than the 28th day of the month following the completed reporting period. The first report is due on July 28, 1975 . Signed copies of these, and all other reports required herein, shall be submitted to the State at the following address:

DELAWARE DEPT. OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL, DIVISION OF ENVIRONMENTAL CONTROL, TATNALL BUILDING, DOVER, DELAWARE 19901 TELEPHONE: 302/678-4761

3. Definitions

a. The "daily average" discharge means the total discharge by weight during a calendar month divided by the number of days in the month that the production or commercial facility was operating. Where less than daily sampling is required by this permit, the daily average discharge shall be determined by the summation of all the measured daily discharges by weight divided by the number of days during the calendar month when the measurements were made.

b. The "daily maximum" discharge means the total discharge by weight during any calendar day.

c. Maximum instantaneous concentration means the concentration of a pollutant in terms of milligrams per liter which represents the value obtained from a grab sample of an effluent. The maximum instantaneous concentration shall be based on a review of the degree of fluctuation experienced in comparable systems. For purposes of compliance, the maximum instantaneous concentration shall be based on the actual analysis of the grab sample.

d. "Immersion Stabilization" means a calibrated device is immersed in the effluent stream until the reading is stabilized.

4. Test Procedures

Test procedures for analysis of pollutants shall conform to regulations published pursuant to Section 304(g) of the Act under which such procedures may be required. These regulations (40 CFR Part 136) were published on October 16, 1973.

5. Recording of Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

a. The exact place, date, and time of sampling;

b. The dates the analyses were performed;

c. The person(s) who performed the analyses;

An operator log must be kept on site at all times. This log should include time spent at the treatment facility on any date, and the nature of operation and maintenance performed.

All necessary records and reports shall be kept on site all times.

MANAGEMENT REQUIREMENTS

1. Change in Discharge

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit. Any anticipated facility expansions, production increases, or process modifications which will result in new, different, or increased discharges of pollutants must be reported by submission of a new State application or, if such changes will not violate the effluent limitations specified in this permit, by notice to the permit issuing authority of such changes. Following such notice, the permit may be modified to specify and limit any pollutants not previously limited.

2. Noncompliance Notification

If, for any reason, the permittee does not comply with or will be unable to comply with any daily maximum effluent limitation specified in this permit, the permittee shall provide the State with the following information, in writing, within five (5) days of becoming aware of such condition:

a. A description of the discharge and cause of noncompliance; and

b. The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

3. Facilities Operation

The permittee shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

4. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to waters of the State resulting from this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

5. Bypassing

Any diversion from or bypass of facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited, except (i) where unavoidable to prevent loss of life or severe property damage, or (ii) where excessive storm drainage or runoff would damage any facilities necessary for compliance with the effluent limitations and prohibitions of this permit. The permittee shall promptly notify the Department in writing of each such division or bypass.

6. Start-up Notification

If this permit involves construction of new facilities or modifications to existing facilities, the permittee shall notify the Department of their intent to initiate operation at least ten (10) days in advance of start-up.

7. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of waste water shall be disposed of in a manner such as to prevent any pollutant from such materials from entering the surface water or groundwater.

8. Power Failures

In order to maintain compliance with the effluent limitations and prohibitions of this permit, the permittee shall:

a. In accordance with the Schedule of Compliance contained in Part I, provide an alternative power source sufficient to operate the waste water control facilities, or if such alternative power source is not in existence, and no date for its implentation appears in Part I,

b. Halt, reduce or otherwise control production and/or all discharges upon the reduction, loss, or failure of the primary source of power to the wastewater control facilities.

PONSIBILITIES

Upon expiration of the permit, a new permit may be issued by the Secretary, upon application and after notice and opportunity for public hearing and upon condition that the discharge meets or will meet all applicable State and Federal Water Quality Standards, regulations and effluent limitations. Any permittee who wishes to continue to discharge after the expiration date of a NPDES permit must file for reissuance of the permit at least one hundred and eighty (180) days prior to its expiration. The duration of each issued or reissued NPDES permit shall have a fixed term not to exceed five (5) years. At the time of filing for reissuance, the discharger shall report any significant change in the quality or quantity of his discharge from levels reported in his previous permit application or reissuance filing.

2. Within 90 days following completion of construction, the permittee shall submit to the Department a "as built" set of plans of the facility bearing the seal and signature of a Professional Engineer registered in the State of Delaware.

3. Right of Entry

The permittee shall allow the head of the State Water Pollution Control Agency, or his authorized representatives, upon the presentation of credentials:

a. To enter upon the permittee's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit; and

b. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; and to sample any discharge of pollutants.

4. Transferability

This permit is transferable provided that an intention to transfer accompanied by a copy of the permit is provided to the Department, signed by both the transferor and the transferee at least ten (10) days prior to the actual transfer.

5. Availability of Reports

All reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the State water Pollution Control Agency. Effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in 7 Del. C. §6013. Any person who causes or contributes to the discharge of a pollutant into State waters either in excess of any conditions specified in this permit or in absence of a specific permit condition shall report such an incident to the Department required under 7 Del. C. §6028.

6. Permit Modification

This permit may be modified, suspended or revoked in whole or in part during its term for cause including, but not limited to, the following:

a. Violation of any terms of conditions of this permit;

ORIGINAL (Red)

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

7. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under 7 Del. C. Chapter 60.

8. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation.

9. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

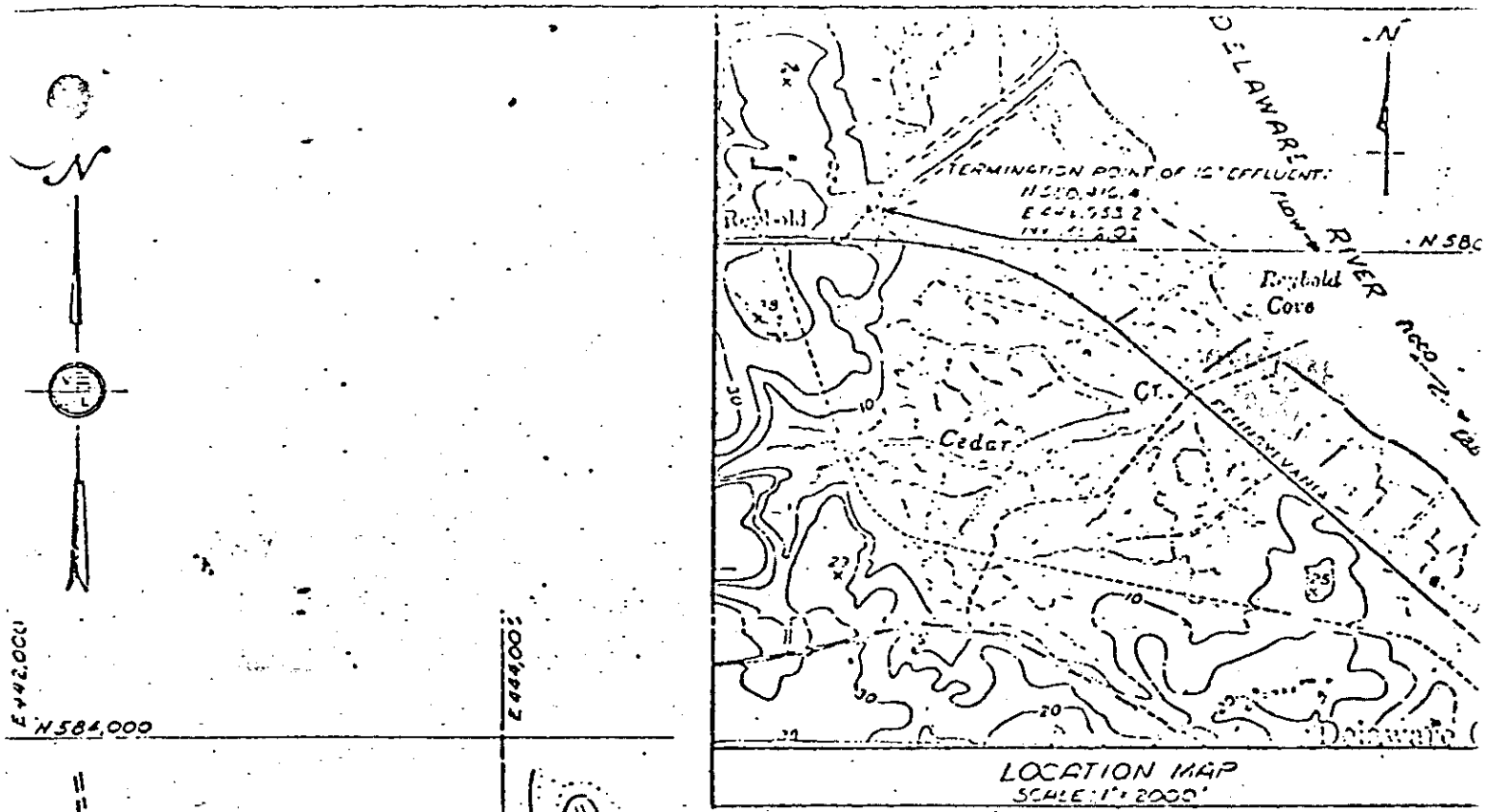
10. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstances, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

Special Conditions

This permit supersedes state permits WPCC 0888 dated July 20, 1971 and WPCC 0105 dated February 10, 1971.

ORIGINAL (Red)



NOTE:
FOR DETAILS SEE SH. #2

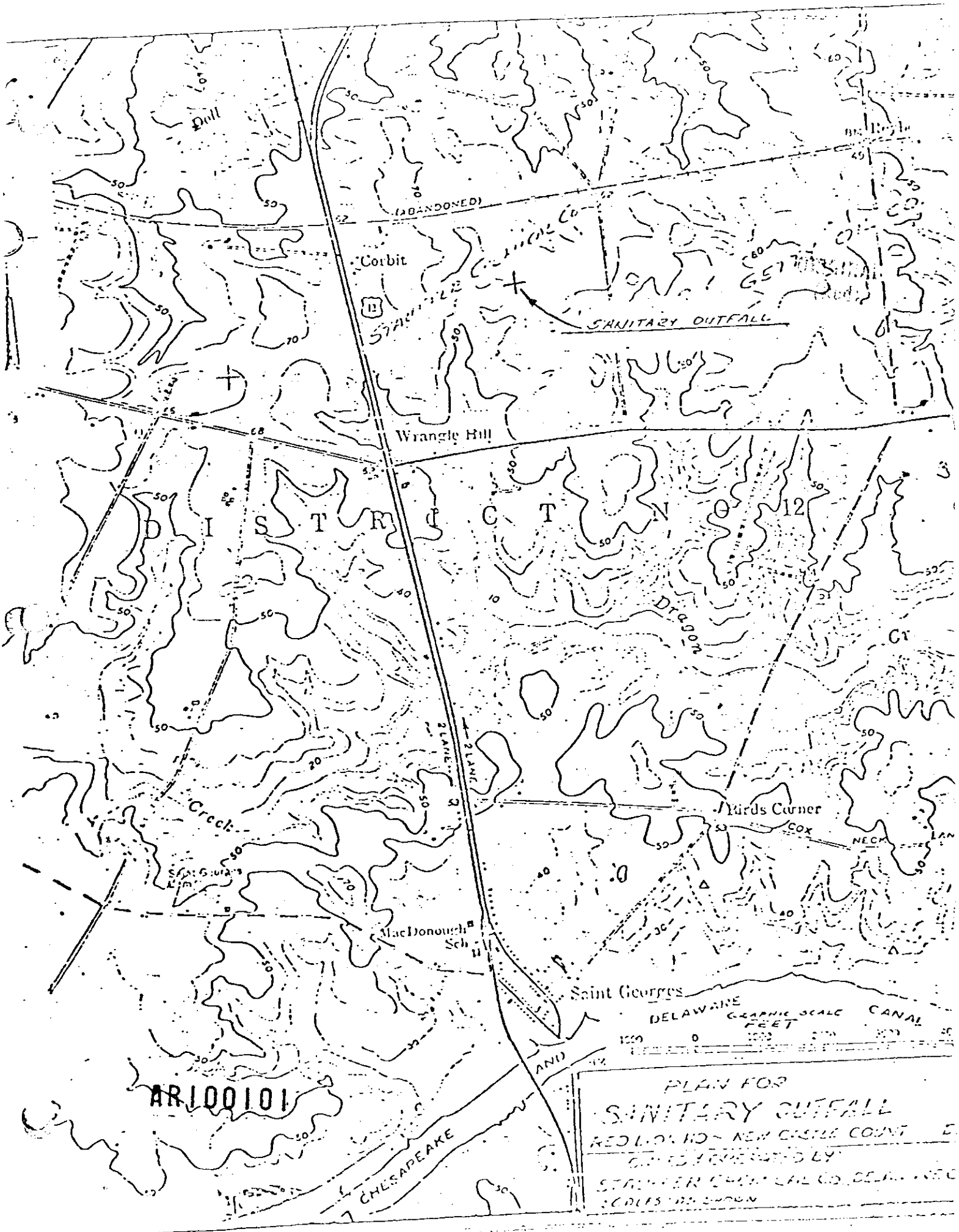
PLAN FOR
16"ø EFFLUENT LINE
RED LION HD - NEW CASTLE COUNTY - D.

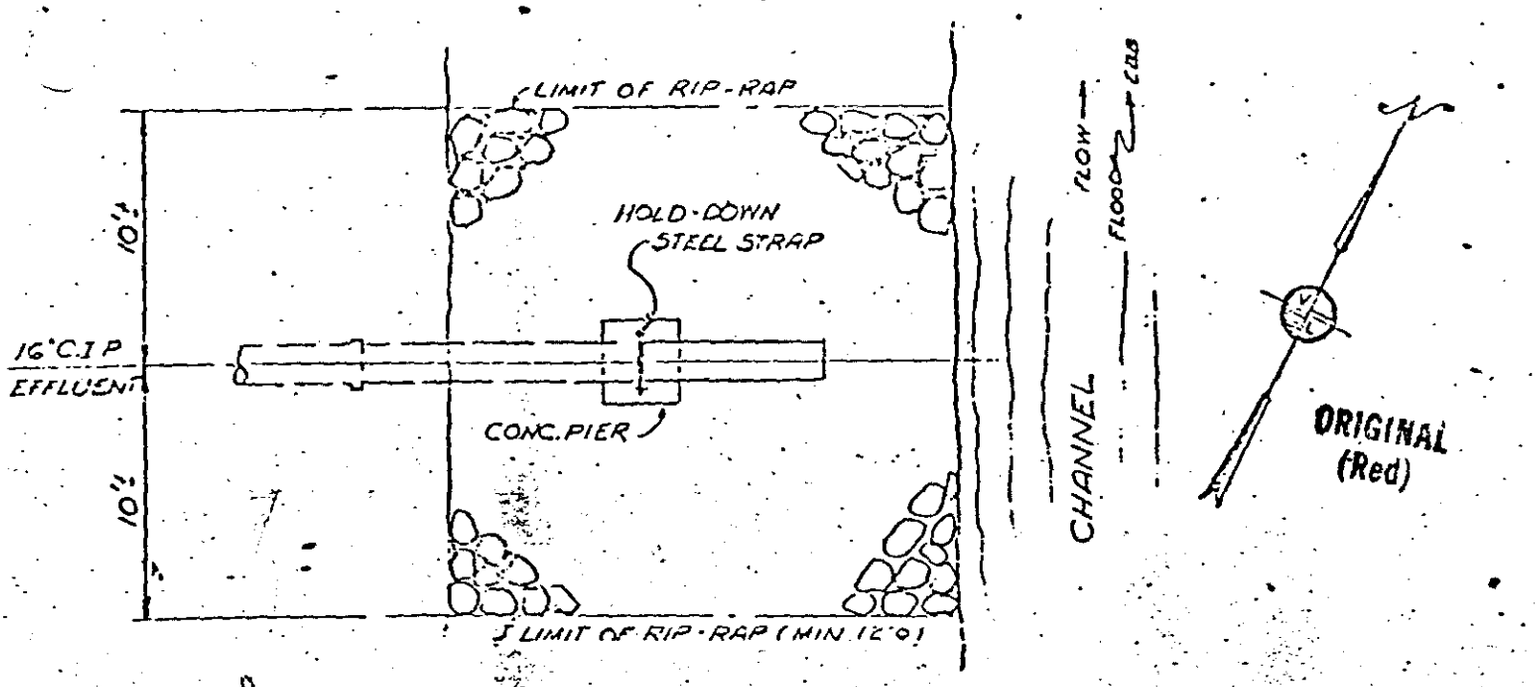
ENGINEERED BY:
VON CEDERN & LYNCH, INC.
CIVIL ENGINEERS, SURVEYORS,

OWNED & OPERATED BY:
STAUFFER CHEMICAL CO. DELAWARE C
SCALES AS SHOWN MAY 20 19??

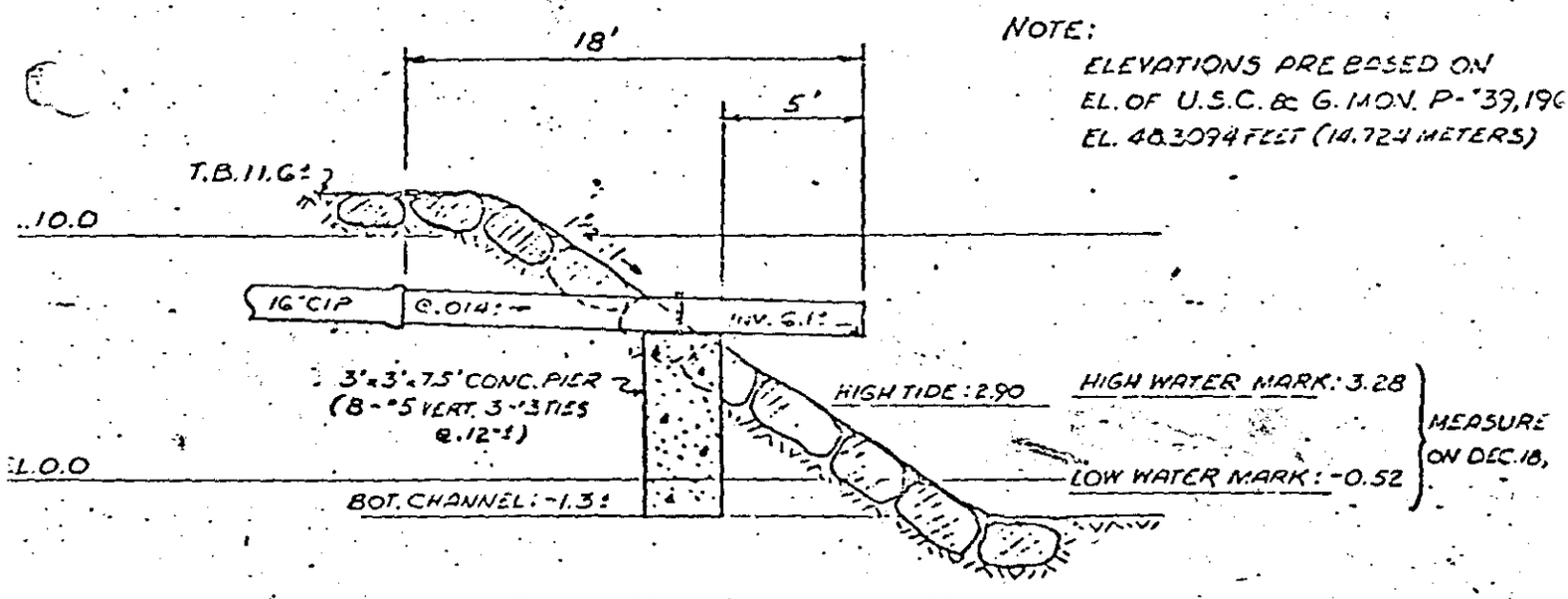
12 087 - 17 203 SH. 1 OF

AR100100


Corbit
Wrangle Hill
DISTRICT NO 12
Dragon
Creek
Yards Corner
Saint Georges
MacDonough
Sch
CHESAPEAKE
AND
DELAWARE
CANAL
GRAPHIC SCALE
FEET
PLAN FOR
SANITARY OUTFALL
SCALE AS SHOWN
AR100101



EFFLUENT END DETAIL



NOTE:
ELEVATIONS ARE BASED ON
EL. OF U.S.C. & G. MON. P-'39, 19
EL. 48.3094 FEET (14.724 METERS)

SECTION
SCALE: 1/8" = 1'-0" HOR. & VERT.

AR100102

DETAILS FOR
16"ϕ EFFLUENT LINE
RED LION HD - NEW CASTLE COUNTY - D.

OWNED & OPERATED BY:
STAUFFER CHEMICAL CO., DELAWARE
SCALES AS SHOWN MAY 0, 1974

ENGINEERED BY:
VON DEMARK & LYNCH, INC.
CIVIL ENGINEERS SURVEYORS
DEL.

PHYSICAL DESCRIPTION OF INTAKE WATER AND DISCHARGE

(Office use only)

Intake / Discharge

Discharge Serial: 001

Parameter and Code	UNTREATED INTAKE WATER (1)	TREATED INTAKE WATER (2)	AVERAGE (DAILY) (3)	MINIMUM (OPERATING YEAR) (4)	MAXIMUM (OPERATING YEAR) (5)	SAMPLE FREQUENCY (6)	CONTINUOUS MONITORING
Flow (Gallons per day) 00056	Varies See Remarks		500,000	300,000	880,000	Mnly	Rec
pH 00400	7.5		7.7	6	9	"	"
Temperature (Winter) (°F) 74028	40		50	35	80	"	"
Temperature (Summer) (°F) 74027	75		75	60	80	"	"

ORIGINAL (Red)

23. DISCHARGE CONTENTS

PARAMETER	PRESENT	ABSENT	PARAMETER	PRESENT	ABSENT	PARAMETER
Color 00050	X		Aluminum 01105	X		Nickel 01067
Turbidity 00070	X		Antimony 01097		X	Selenium 01147
Radioactivity 74050		X	Arsenic 01002		X	Silver 01077
Hardness 00900	X		Beryllium 01012		X	Potassium 00937
Solids 00500	X		Barium 01007		X	Sodium 00929
Ammonia 00610	X		Boron 01022		X	Titanium 01152
Organic Nitrogen 00605	X		Cadmium 01027		X	Tin 01102
Nitrate 00620	X		Calcium 00916	X		Zinc 01092
Nitrite 00615	X		Cobalt 01037		X	Algicides 74051
Phosphorus 00665	X		Chromium 01029	X		Oil and Grease 00550
Sulfate 00945	X		Copper 01042	X		Phenols 32730
Sulfide 00745		X	Iron 01045	X		Surfactants 38260
Sulfite 00740		X	Lead 01051		X	Chlorinated Hydrocarbons 74052
Bromide 71870		X	Magnesium 00927	X		Pesticides 74053
Chloride 00940	X		Mercury 01045	X		Fecal Streptococcal Bacteria 74054
Cyanide 00720		X	Mercury 71900		X	Coliform Bacteria 74055

AR100103

22. PHYSICAL DESCRIPTION OF INTAKE WATER AND DISCHARGE

Intake / Discharge	(Office use only)
	Discharge Serial No.

Parameter and (Code)	UNTREATED INTAKE WATER (1)	TREATED INTAKE WATER (2)	AVERAGE (DAILY) (3)	MINIMUM (OPERATING YEAR) (4)	MAXIMUM (OPERATING YEAR) (5)	SAMPLE FREQUENCY (6)	CONTINUOUS MONITORING (7)
Flow (Gallons per day) 00056	4,000		4,000			Monthly GRAB (Red)	No
pH 00400	7.2		7.0	6	9	"	"
Temperature (Winter) (°F) 74028	40		50	35	45	"	"
Temperature (Summer) (°F) 74027	75		75	60	85	"	"

23. DISCHARGE CONTENTS

PARAMETER	PRESENT	ABSENT	PARAMETER	PRESENT	ABSENT	PARAMETER	PRESENT
Color 00080	X		Aluminum 01106	X		Nickel 01067	
Turbidity 00070	X		Antimony 01097		X	Selenium 01147	
Radioactivity 74050		X	Arsenic 01002		X	Silver 01077	
Hardness 00900	X		Beryllium 01012		X	Potassium 00937	X
Solids 00500	X		Barium 01007		X	Sodium 00929	X
Ammonia 00610	X		Boron 01022		X	Titanium 01152	
Organic Nitrogen 00605	X		Cadmium 01027		X	Tin 01102	
Nitrate 00620	X		Calcium 00916	X		Zinc 01092	
Nitrite 00615	X		Cobalt 01037		X	Algicides 74051	
Phosphorus 00665	X		Chromium 01034		X	Oil and Grease 00550	
Sulfate 00945	X		Copper 01042	X		Phenols 32730	
Sulfide 00745		X	Iron 01045	X		Surfactants 38260	
Sulfite 00740		X	Lead 01051		X	Chlorinated Hydrocarbons 74052	
Bromide 71870		X	Magnesium 00927	X		Pesticides 74053	
Chloride 00940	X		Manganese 01055		X	Fecal Streptococci Bacteria 74054	
Cyanide 00720		X	Mercury 71900		X	Coliform Bacteria 74056	
Fluoride 00951		X	Molybdenum 01062		X		

INDUSTRIAL PROCESS EVALUATION BRANCH

First Issue Date FEB 19, 1974

Final Issue Date

Mr. T. J. Sayer
Administrator, Environmental Control
Stauffer Chemical Company
Westport, Connecticut 06880

Check:

(X) Major

( ) Minor

(X) Effluent Limited

( ) Water Quality Limited

( ) Possible Interstate Effect

ORIGINAL (Red)

2nd Revision

HSH

SUMMARY REPORT 6-14-74

FOR

Stauffer Chemical Company
PVC Plant
P.O. Box 320
Delaware City, Delaware 19706

# of Outfalls: Two

SIC Code(s): 2821

Company Contact: Mr. T. J. Sayers
Administrator, Environmental Control
Phone: 203-226-1511

Engineer: H. Harbold

Section: Consumer Industry

Reviewer: W. Lee 6-14
WWB 6/18

Application #'s:

STATE:
COE: 25D 0X0 3 000362
EPA: DE 0000612

AR100105

Effluent Limitation Rationale: - Interim

All interim conditions are based on the applicants reported levels

ORIGINAL (Red)

Monitoring Rationale:

Monitoring considered adequate to ensure compliance.

Calculations for polyvinyl chloride production based on promulgated guidelines for plastics and synthetics published in the Federal Register on April 5, 1974. ~~as follows~~

Basis: 54,840 lb/day production by emulsion polymerization
403,200 lb/day production by suspension polymerization

ORIGINAL
(Red)

	BOD_5		COD		TSS	
	Avg	Max	Avg	Max	Avg	Max
Suspension	145.36	282.71	1451.36	2822.71	399.99	726 1.8
Emulsion	7.13	14.26	71.13	143 2.6	20.36	36.66
Total (lb/day)	152	296	1522	2965	419	762

1. BOD-5 day (average): Limitation based on DRBC load allocation which is more stringent than EPA determination of BPCTCA
2. BOD-5 day (maximum): Limitation based on EPA determination of BPCTCA using promulgated guidelines, plastics and synthetics industry.
3. TSS, COD: Limitations based on applicants reported levels which are more stringent than EPA determination of BPCTCA.
4. Total Chromium: Limitation based on EPA Region III determination of BPCTCA.
5. pH: Effluent standards, State of Delaware

Flow and final effluent limitations

	Avg (mg/l)	Max (mg/l)
BOD_5	21.6	71.0
COD	100.9	179.9
TSS	54.9	91.8

ORIGINAL
(Red)

Effluent Limitation Rationale: - Final

(Attached)

Monitoring Rationale:

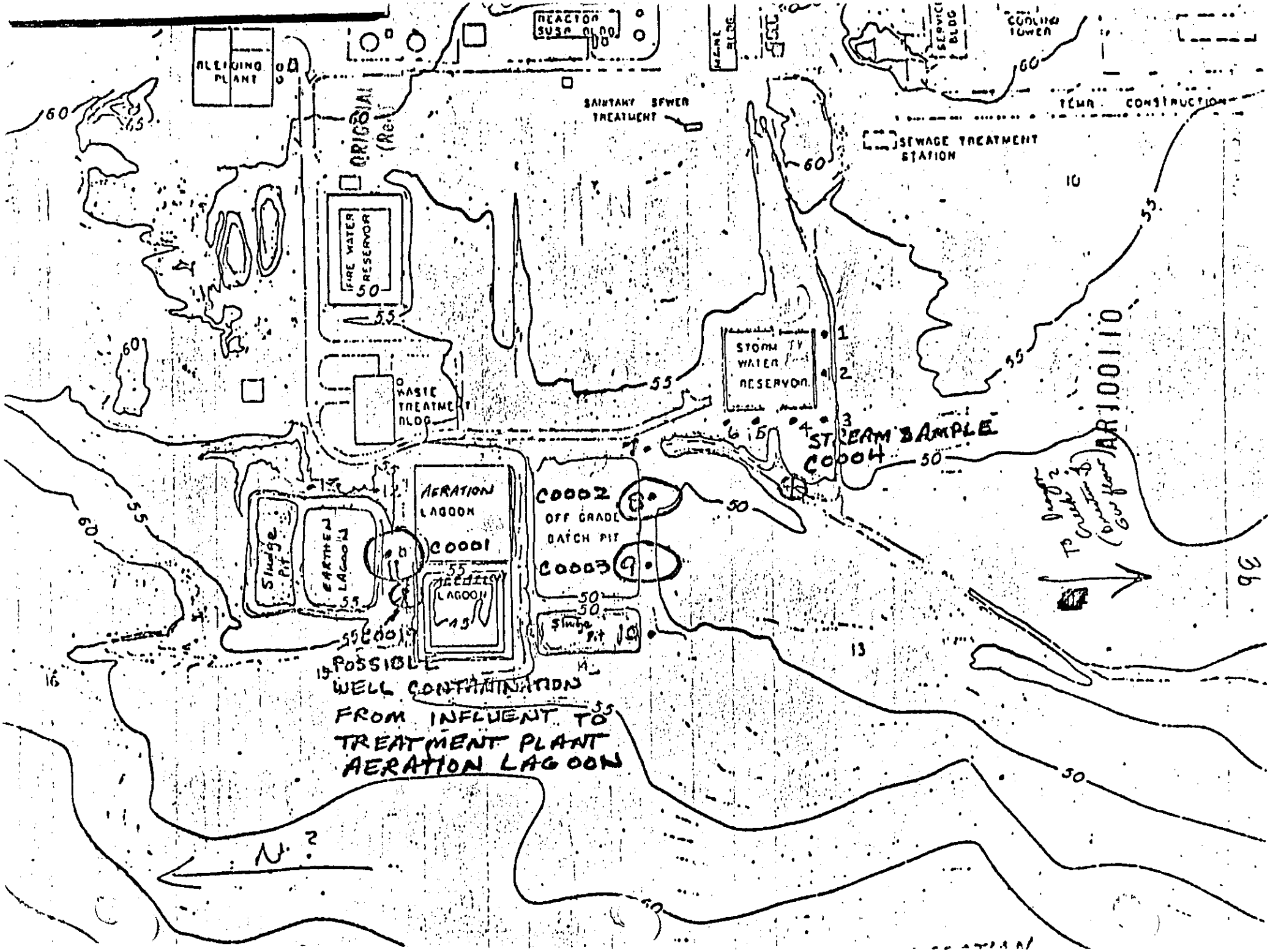
Monitoring considered adequate to insure compliance

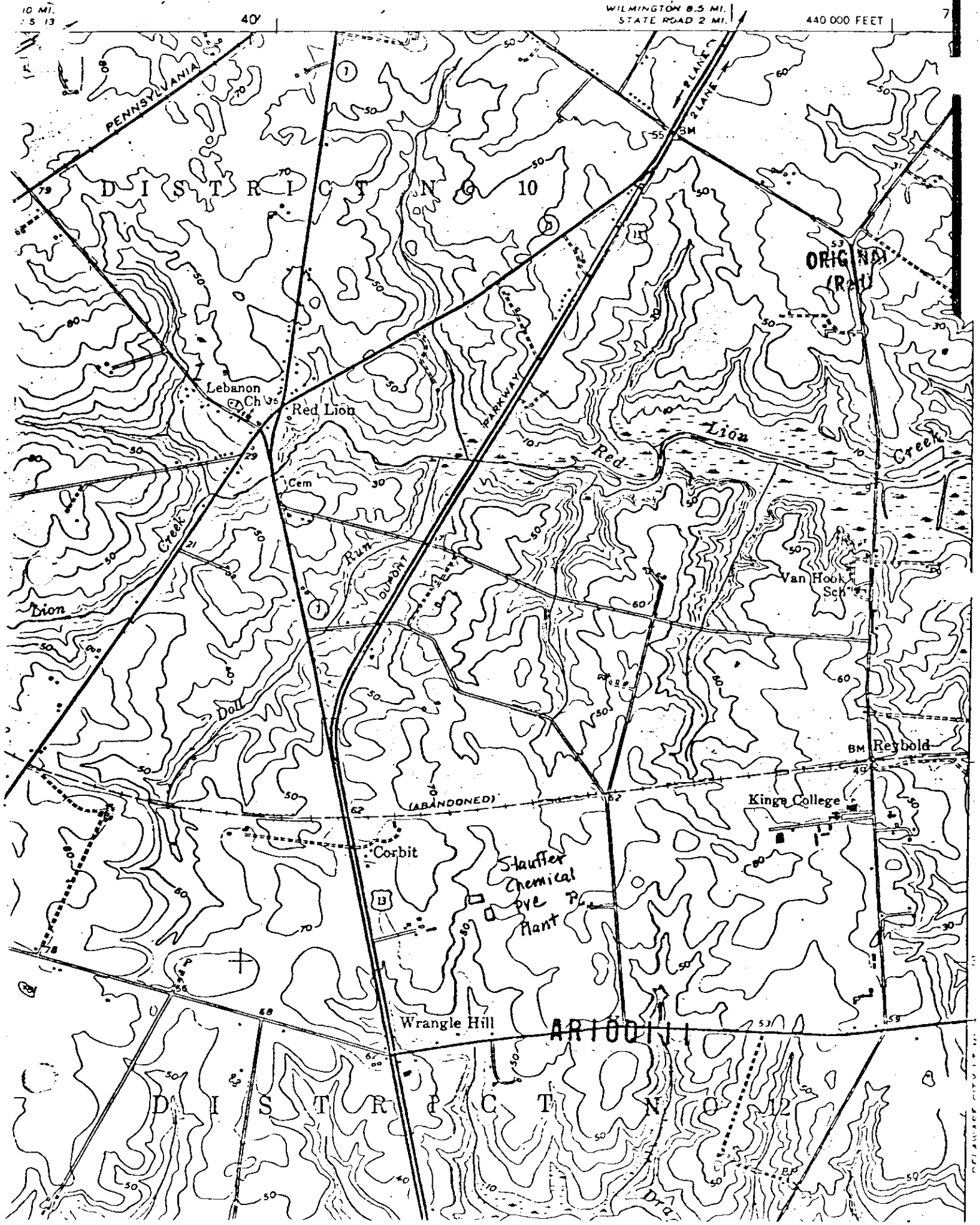
Implementation Schedule Rationale

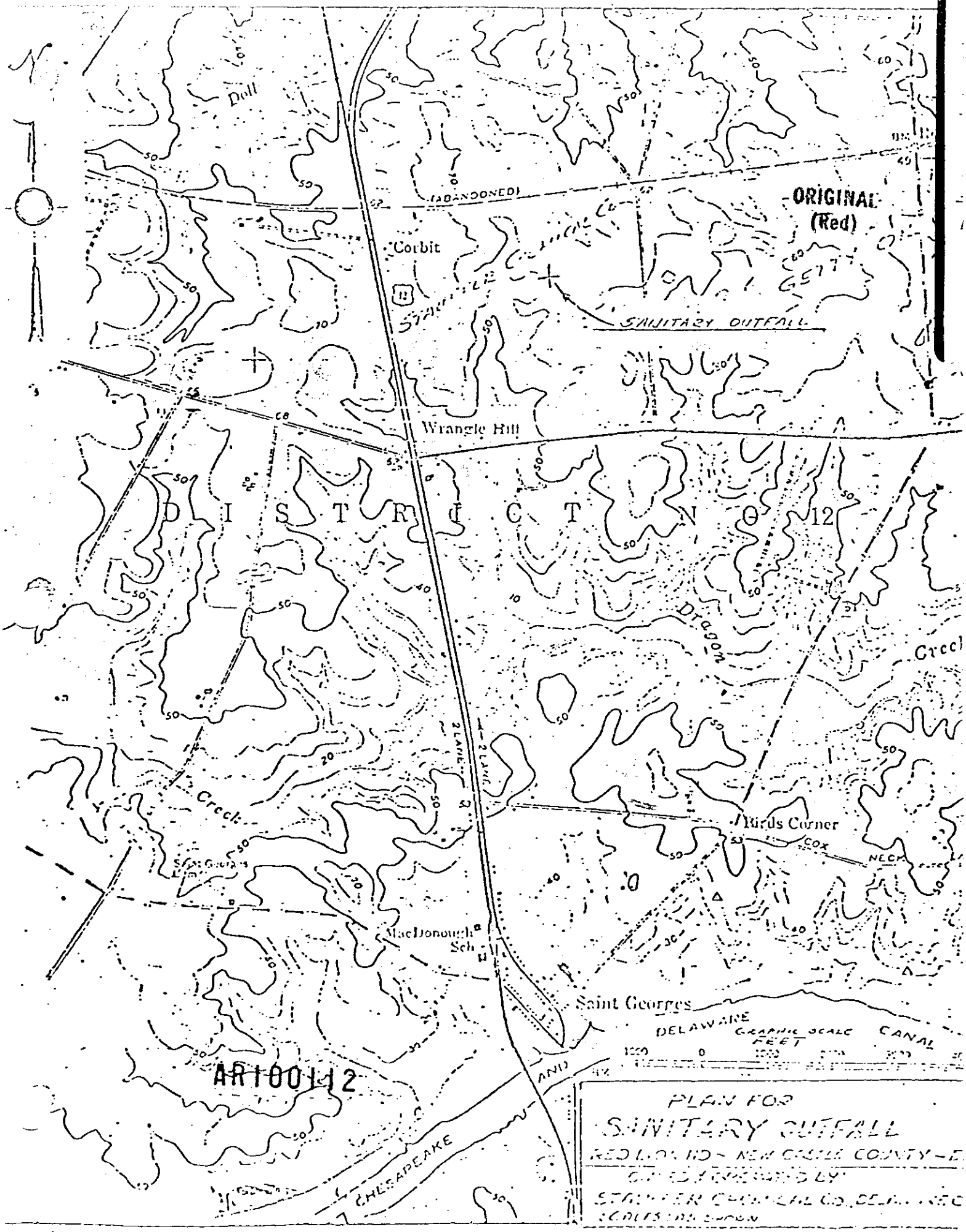
Schedule proposed by EPA for applicant meet proposed BOD_5 and Cr^T limitations. Construction schedule has been extended to allow for equipment delays.

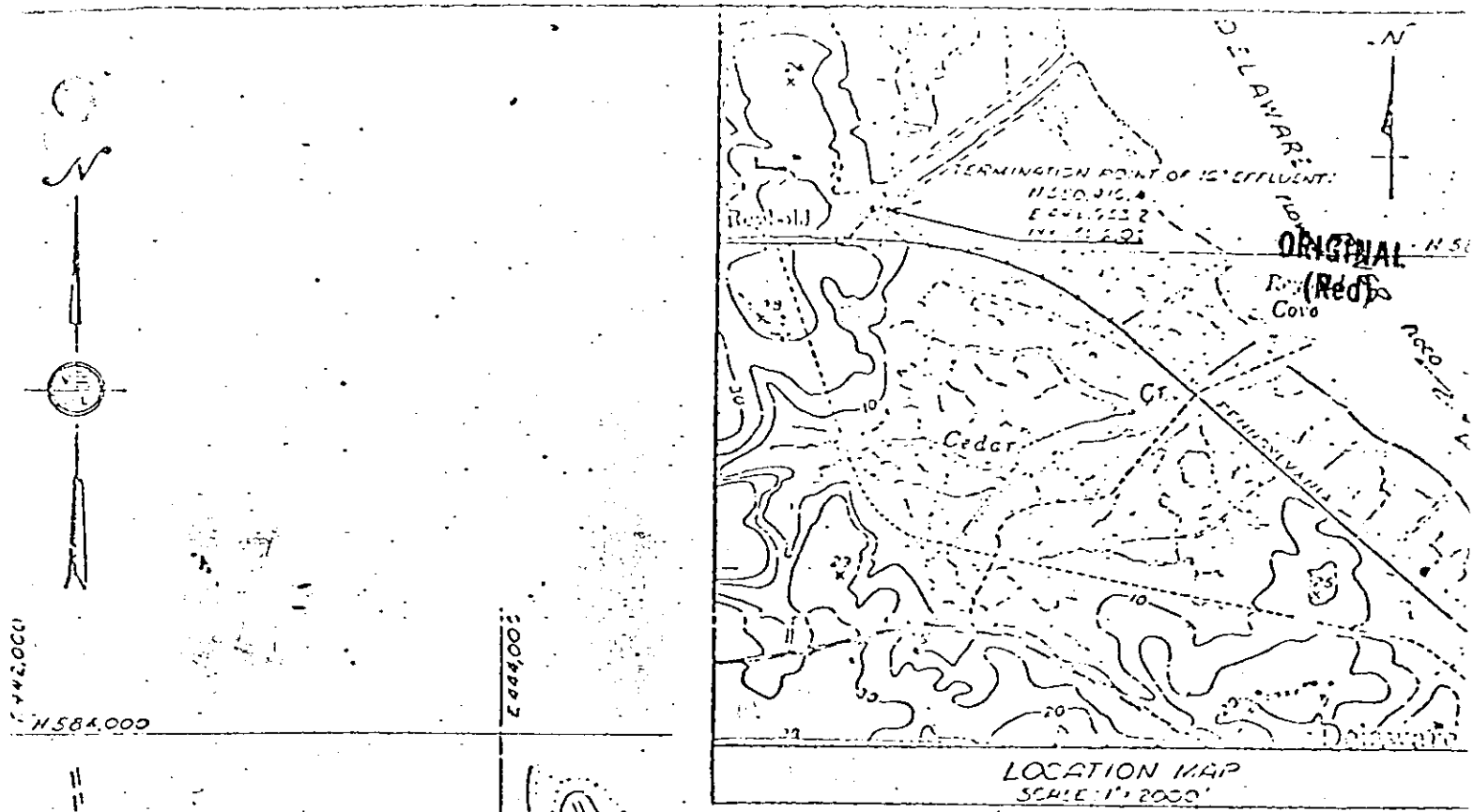
Other Requirements Rationale

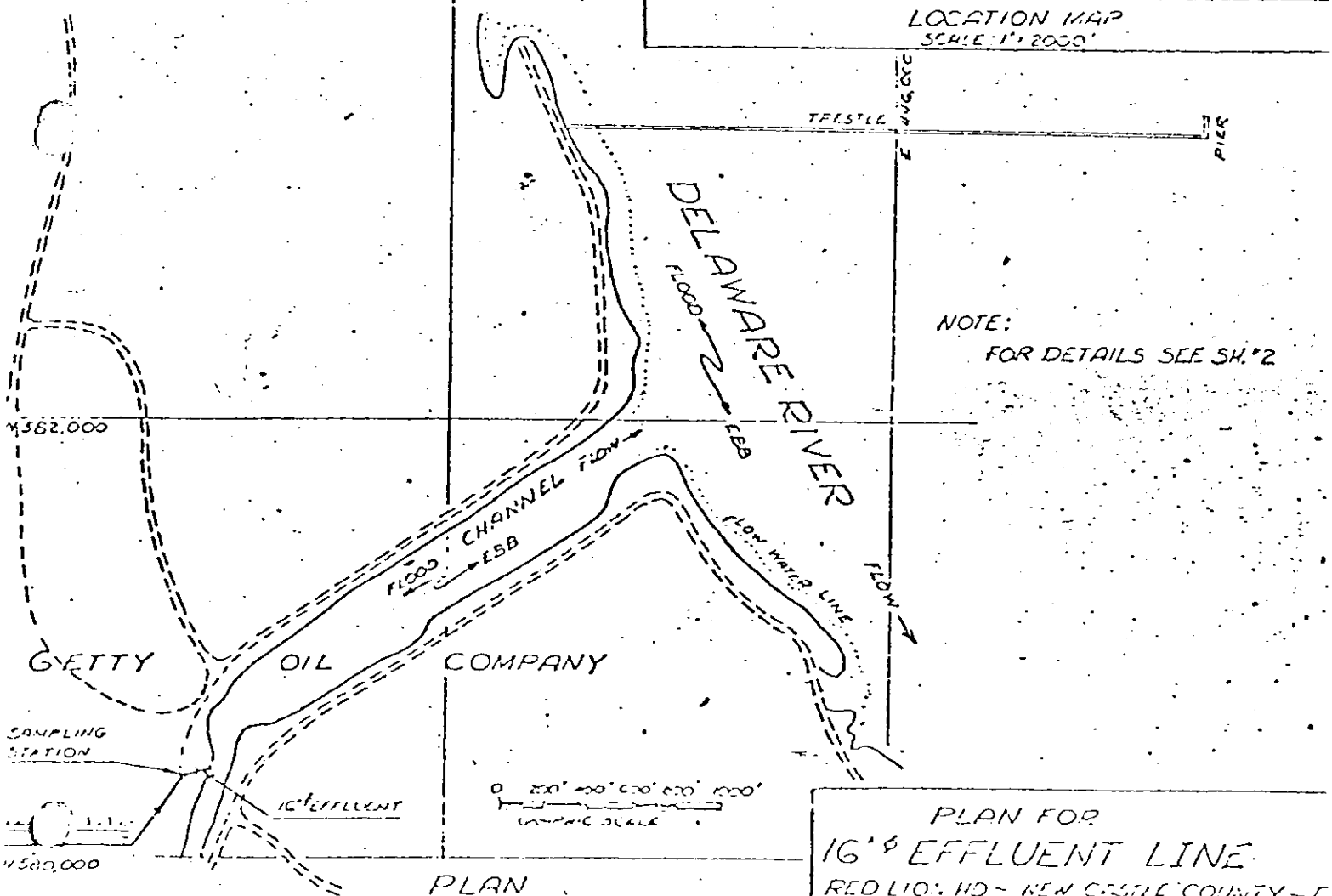
None


REACTOR BLDG
SERVICE BLDG
COOLING TOWER
SANITARY SEWER TREATMENT
TEMP CONSTRUCTION
SEWAGE TREATMENT STATION
ORIGINAL (Rel
FIRE WATER RESERVOIR
WASTE TREATMENT BLDG
STORM TY WATER RESERVOIR
AERATION LAGOON
C0001
EARTHEN LAGOON
Sludge Pit
C0002
OFF GRADE DITCH PIT
C0003
Sludge Pit
C0004
STREAM SAMPLE
AR100110
POSSIBLE WELL CONTAMINATION FROM INFLUENT TO TREATMENT PLANT AERATION LAGOON
N. 2


WILMINGTON 8.5 MI.
STATE ROAD 2 MI.
440 000 FEET
PENNSYLVANIA
DISTRICT NO 10
Lebanon Ch
Red Lion
PARKWAY
Red Lion Creek
Cem
Dion
Creek
Run
DUPONT
Van Hook Sch
Doll
BM Reybold
(ABANDONED)
Kings College
Corbit
Stauffer Chemical Dye Plant
Wrangle Hill
ARTODI
DISTRICT NO 12


ORIGINAL
(Red)
ABANDONED
Corbit
SANITARY OUTFALL
Wrangle Hill
DISTRICT NO 12
Dragon
Creek
Birds Corner
COX
MacDonough Sch
Saint Georges
DELAWARE
CANAL
CHESAPEAKE
AND
PLAN FOR
SANITARY OUTFALL
NEW CASTLE COUNTY





PLAN FOR
16" ø EFFLUENT LINE
RED LION IND - NEW CASTLE COUNTY - D
OWNED & OPERATED BY:
STAUFFER CHEMICAL CO., DELAWARE C
SCALES AS SHOWN MAY 30 1971

PREPARED BY:
CONSTANTINE & LYNCH, INC.
CIVIL ENGINEERS & SURVEYORS
WILMINGTON, DELAWARE

AR100113

EPA Samples (4/24/80) - Stauffer Chemical Company

(4/80)

Priority Pollutant #		Compound	1 C0001 Well #1	2 C0002 Well #8	3 C0003 Well #9	4 C0004 Stream Sample	5 C0005 Domestic Well	6 C0019 Influent Leak	7	8 Drinking Water Criteria	9 Fresh Water Aquatic Life 24 hr. Avg.	10 Fresh Water Aquatic Life Maximum Daily Value
2	V	acrolein	116		178			28		6.5	1.2	2.7
3	V	acrylonitrile						76		0(0.008)	130	300
	V	benzene	<10	<10	"			"		0 (1.5)	3100	7000
15	V	1,2-dichloroethane	10916	1637	135	634		29209		0 (0.7)	3900	8800
15	V	1,1,1-trichloroethane						13		15,700	5300	12000
16	V	1,1-dichloroethane	<10	<10	<10			<10		—	—	—
15	V	1,1,2-trichloroethane						<10		0 (0.27)	310	710
15	V	chloroethane	44	23	18			<10		—	—	—
19	V	chloroform	<10		<10			<10		0 (0.21)	500	1200
87	V	1,1-dichloroethylene	<10	<10	<10			<10		0 (0.13)	530	1200
27	V	1,2-trans-dichloroethylene	11	<10	<10			18		—	620	1400
29	V	1,2-dichloropropane	<10					14		200	920	2100
26	V	ethylbenzene						<10		1100	—	—
28	V	methylene chloride	2628*	2129*	2606*	10	<10	<10		2	4000	9000
36	V	methyl chloride	0		<10			<10		2	7000	16000
32	V	dichlorobromomethane						<10		2	—	—
85	V	trichloroethylene	16	<10		<10		143		0(2.1)	1500	3100
87	V	vinyl chloride	1002	43	<10	<10		1400		0(5.1)	—	—
33	V	dichlorodifluoromethane	260							3000	—	—
	A	phenol			<10					3400	600	3400
1	B	acenaphthene	<10							20	110	240
59	B	bis-(2-ethylhexyl) phthalate	<10	<10	<10	<10	<10			10000	—	—
59	B	di-n-butyl phthalate	<10	<10	<10	<10	<10			5000	—	—
	B	anthracene	<10							0(?)	—	—
	B	phenanthrene	<10							0(?)	—	—

V = volatile fraction
B = base extraction fraction
A = acid extraction fraction
* = possible sampling contamination

( ) = concentration for 1×10^{-6} risk level

Ref: Sampling Results Doc.

ORIGINAL (Red)

AR100114

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region III – 6th & Walnut Sts.
Philadelphia, Pa. 19106

ORIGINAL (Red)

SUBJECT: DE 7 Stauffer Chemical PVC Plant Site Inspection- Water Supply Branch

DATE: April 7, 1980

FROM: Jeffrey Burke Jeffrey Burke 7-9082
Groundwater Protection Section (3WA32)

TO: J. Gary Gardner, (3AH00)
Robert L. Allen, (3AH30)
Leonard Mangiaracina, (3EN00)
Jeffrey W. Hass, (3SA00)
Benjamin A. Lacy, (3WA32)

The potential for groundwater contamination from this site is moderate to high. The five impoundments have varying risk factors, but are all in the same range of values. This site was analyzed for the "Surface Impoundment Assessment for Delaware", which serves as the basis for this report.

The sediments beneath the impoundments are silty to a depth of the water table, (approximately 10 feet thick). The water table could rise in to some or all of the lagoons during high level conditions. Beneath the silt, sand with some gravel and silt extends to a depth of approximately 45 below the ground surface where a gray silty clay is found, which represents the contact between the Columbia and Merchantville Formations.

Since this is an industrialized area, there are several other surface impoundment sites in the vicinity. No underground injection wells are known to exist within 5 miles. There are no large wells in the Columbia near these ponds.

The groundwater appears to flow to the south towards Dragon Creek. There may be a few private wells along Route 72 which could possibly intercept contaminants, although, to date, no contamination has been reported.

Based on this information, a risk factor for groundwater pollution was calculated for the site, in general, although each impoundment's risk factor may be different. A value of 20 was ascertained as a result of the thickness of the unsaturated zone, (3), the groundwater availability, (5), groundwater quality, (5), and waste hazard potential, (7). The site associated health hazard factor is 5, based on the distance to the private wells mentioned above. The maximum rating for these parameters are 29 and 9 respectively.

Therefore, the risk potential for groundwater is moderate to high. This may be further substantiated by the water samples taken during the preliminary site investigation. We do not believe that any site specific hydrological work will be required. The data available seems quite reliable.

EPA III 013-73-T

Region III — 6th & Walnut Sts.
Philadelphia, Pa. 19106

SUBJECT: Memorandum of Contacts
STAUFFER CHEMICAL PLANT

DATE: June 4, 1980

FROM: Robert A. Boodey
Criminal Investigator (3EN33)

ORIGINAL (Red)

TO: Ruthanne Gordon
Attorney, Legal Branch (3EN33)

Per your request I observed the area near the Stauffer Chemical Plant, Delaware City, Delaware on June 4, 1980. The closest properties to the plant located on the South side of Route 72 are a Getty gasoline station, a Chevrolet/Oldsmobile car dealer and a residence located behind the car dealer.

The Getty station is owned and operated by Warren Foraker, telephone number 302-834-4766. Mr. Foraker was not present at the time of my contact.

The car dealer is Stapleford Chevrolet Oldsmobile, telephone number 302-834-4568. Mr. Charles Stapleford, Jr. stated that the dealership is owned by his father, Charles Stapleford, Sr. Mr. Stapleford, Sr. and his wife reside in the house located behind the dealership. Both the car dealership and the house obtain water from a single well located on the property. The house previously used a separate well but it recently ran dry. Mr. Stapleford, Jr. stated that he was not aware of any problems with the well water and to his knowledge it had not been tested recently.

Del. Geologic Survey

EC-11-1 N.B Stapleford Well at New Garage - 1948 b.l.s
70'5" depth 65' 4½ of 4" casing 37½' w.t.
0-2 soil 2-7 yellow clay. 7-18 sand, gravel, and clay
18-44 sand & clay -- 44-57 clay & lt. sand 57-70.5 coarse sand & gravel
42 gpm @ 60'

EC-11-4 test hole w.t = 14' b.l.s.

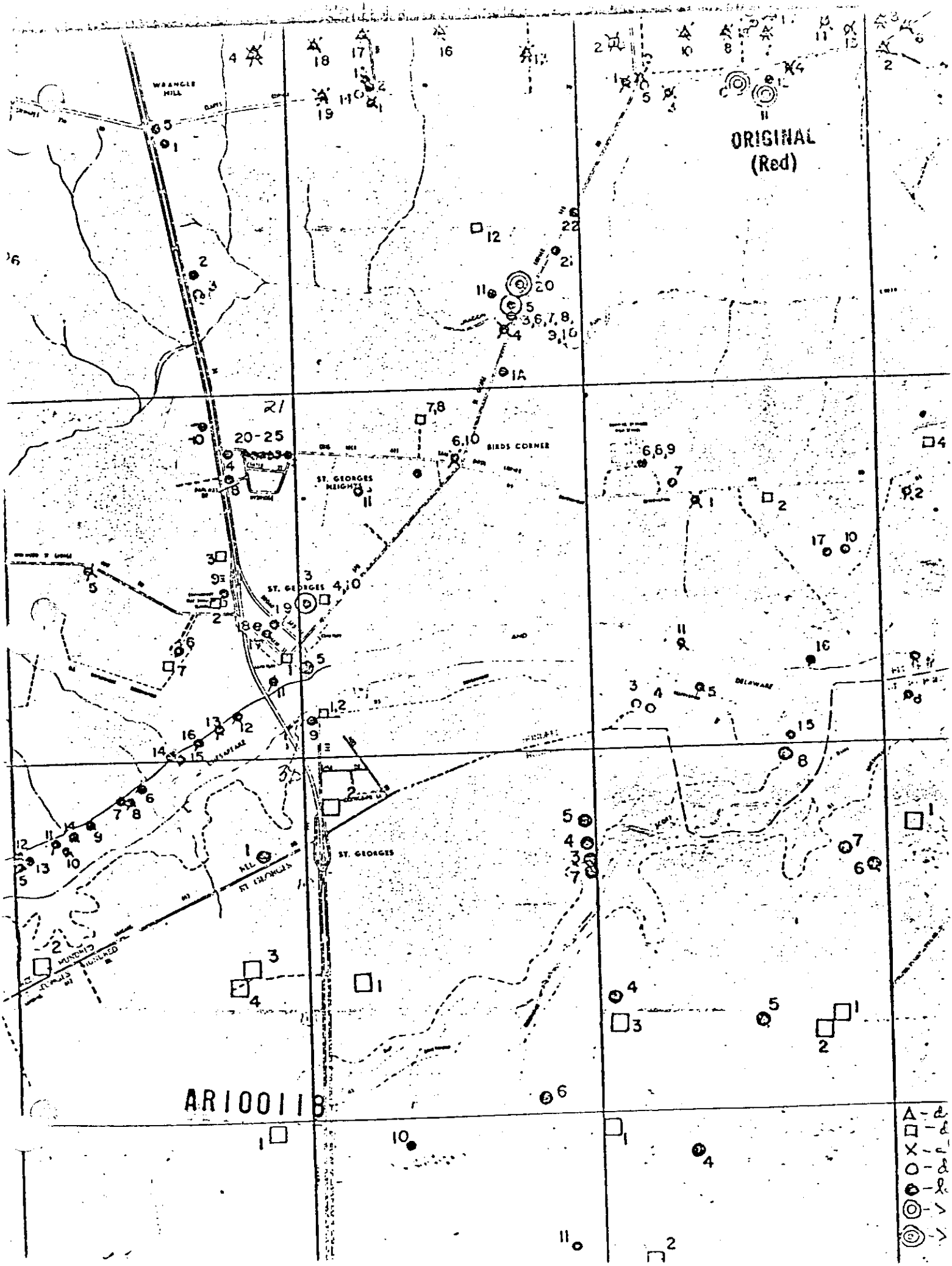
EC-11-5 Getty Gas Station
Depth - ~~88~~ 63.5' of 6" casing 36' w.t - b.l.s.
0-3 soil 3-18 yellow sand & clay 18-25 y. clay 25-53 y. sand & clay
53-68 coarse sand 20 gpm @ 42' 40 gpm @ 60'

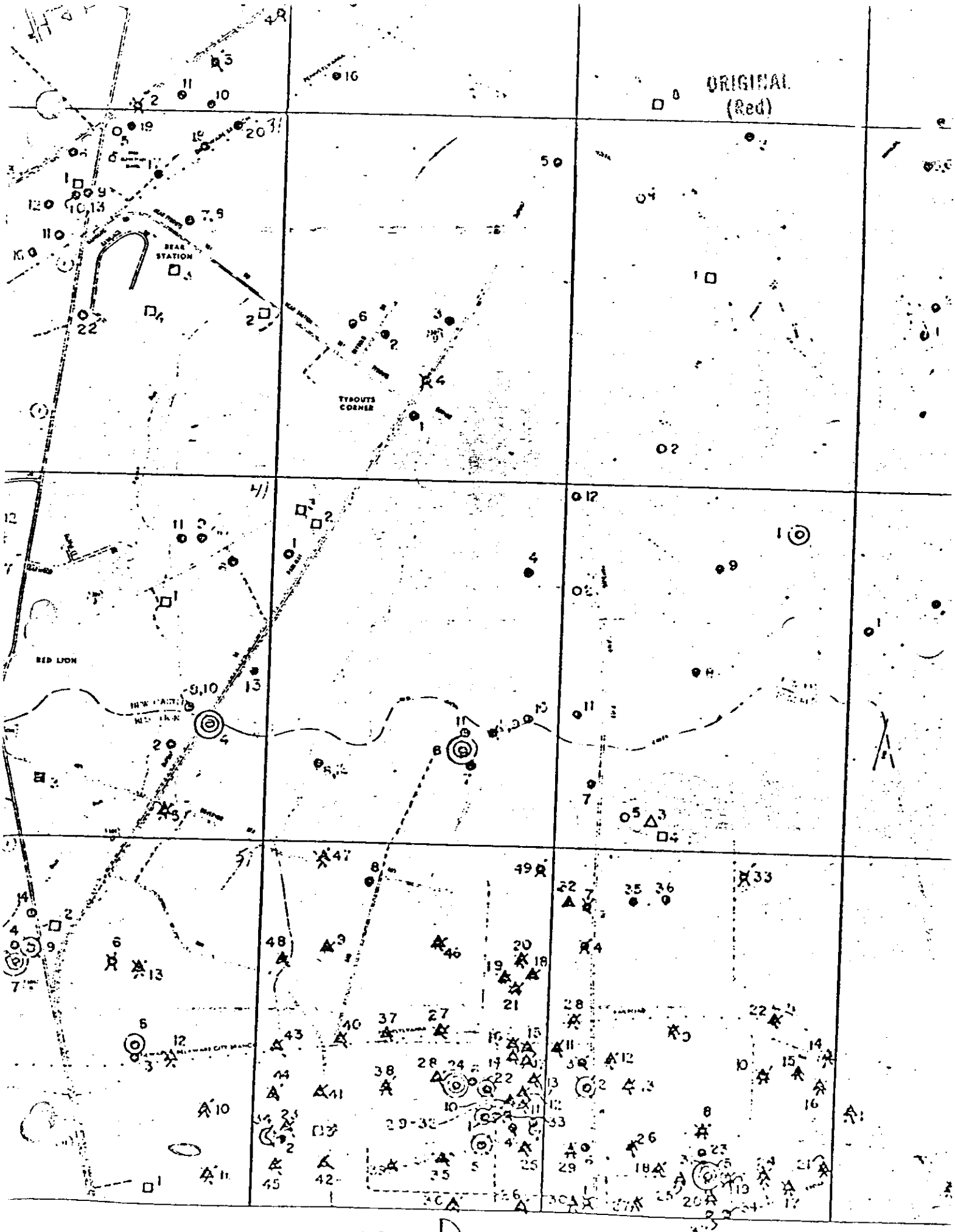
EC-12-2 - 608 ~~734~~ ft depth - 549' of 3" casing Log avail ↓ 605'
EC-12-15 ~~345~~ ft depth 570' of 12-10-3 casing Log avail ↓ 634'

I 51-10 test hole w.t-17' b.l.s.

Dc 52-2 481' depth 475' casing w.t - 33' b.l.s. log avail ↓ ~~815~~
Dc 52-23 70' depth test hole w.t 36.5' b.l.s.
Dc 52-34 505' depth cased - 465
Dc-52-44 27' depth 27' w.t test hole
Dc-52-45 29' depth 24' w.t test hole

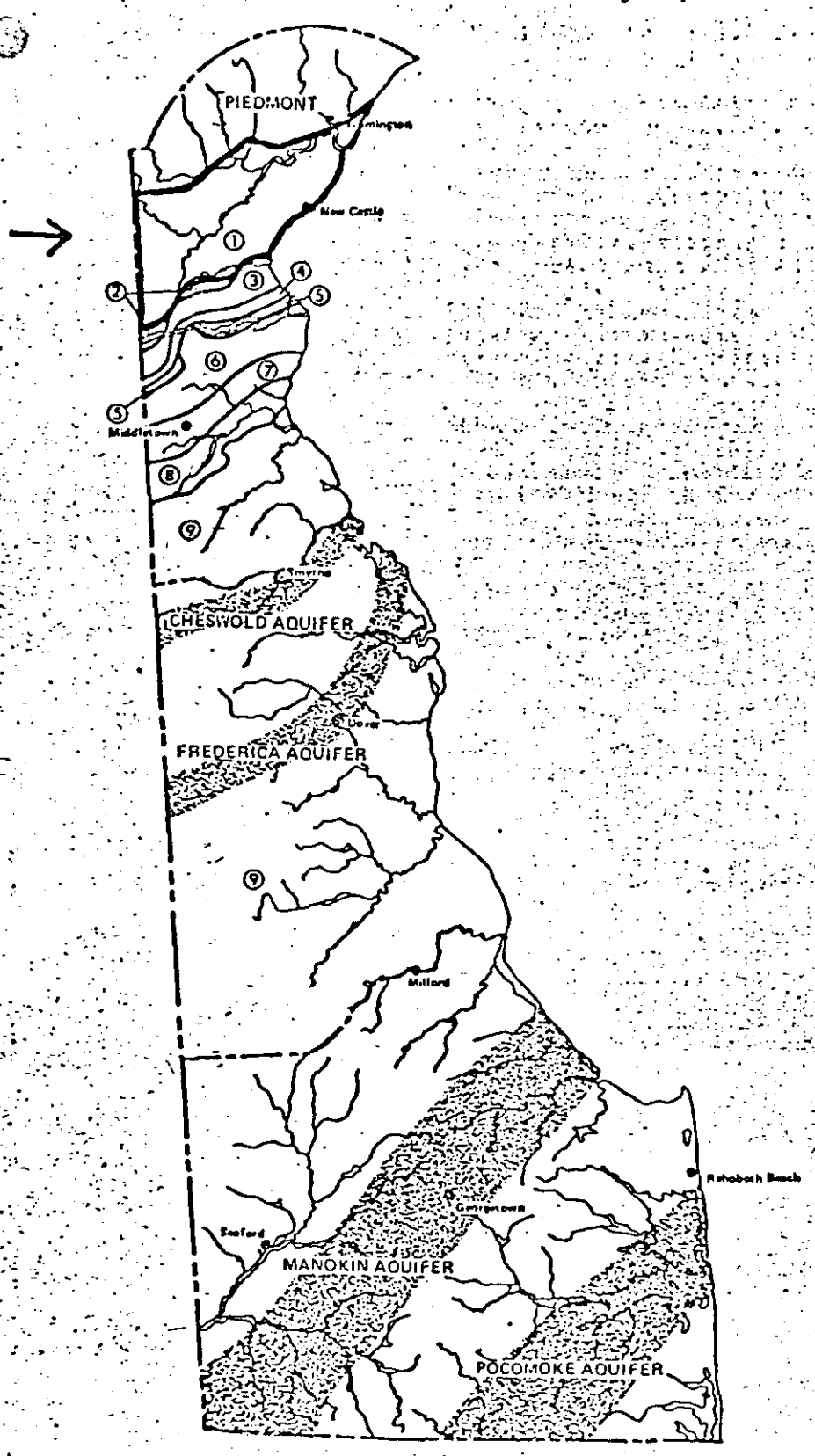
Dc 51-12 76' depth 25 w.t b.l.s. test hole
Dc 51-3 250' depth 245' casing 50' w.t b.l.s. log avail ↓ 464'
Dc 51-1 40' depth TD - casing (brick)


ORIGINAL
(Red)
WRANGLE HILL
BIRDS CORNER
ST. GEORGES
ST. GEORGES HEIGHTS
DELAWARE
AR100118



AR100119 Dc

Exhibit 2—A Geologic Map of Delaware



(Red)

(1) Kpt; Potomac Formation; Variegated red, gray, purple, yellow and white, frequently lignitic silts and clays containing interbedded white, gray, and rust-brown quartz sands and some gravel. Individual beds usually laterally restricted.

(2) Km; Magothy Formation; White and buff, frequently sugary, clean quartz sand with beds of gray and black clayey silt containing much lignite, pyrite-filled limey clay concretions and sulfate blooms. Formation discontinuous along strike in subcrop.

(3)Kmv; Merchantville Formation; Dark gray to dark blue, micaceous, glauconitic sandy silt and silty fine sand; very sticky when wet. *Placenticeras placenta*, small siderite nodules, burrows by benthic organisms.

(4) Ket; Englishtown Formation; Light gray and rust brown, well sorted, micaceous, sparingly glauconitic, often "fluffy", fine sand with thin interbedded layers of dark gray silty sand. Abundant nodulose burrows of *Callionassa*, particularly in upper sands.

(50 Kmt; Marshalltown Formation; Dark greenish-gray, massive, highly glauconitic very silty sand. Abundant *Exogyra ponderosa*.

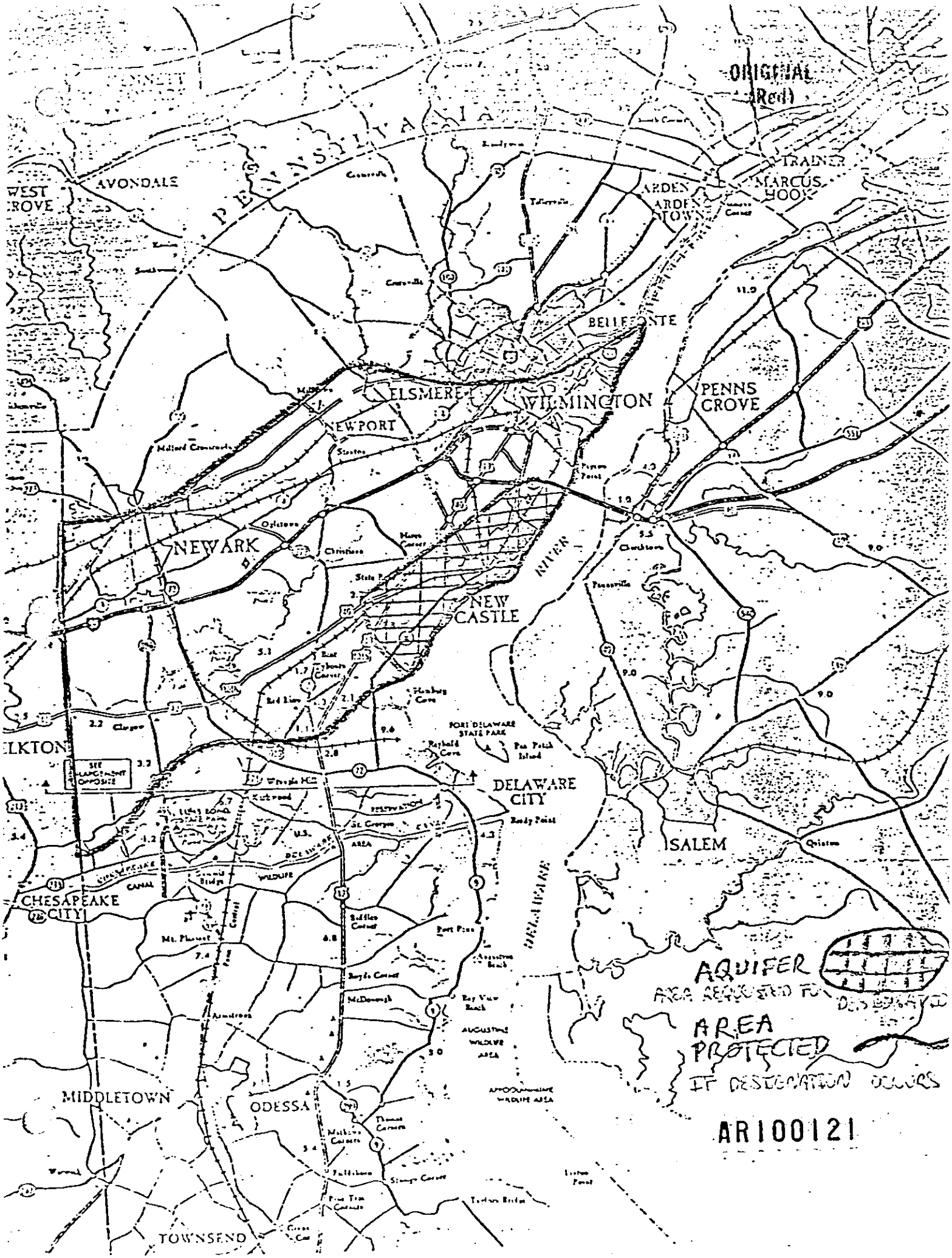
(6) Kml; Mount Laurel Formation; Gray, green and red-brown, glauconitic, fine to medium quartz sand with some silt.

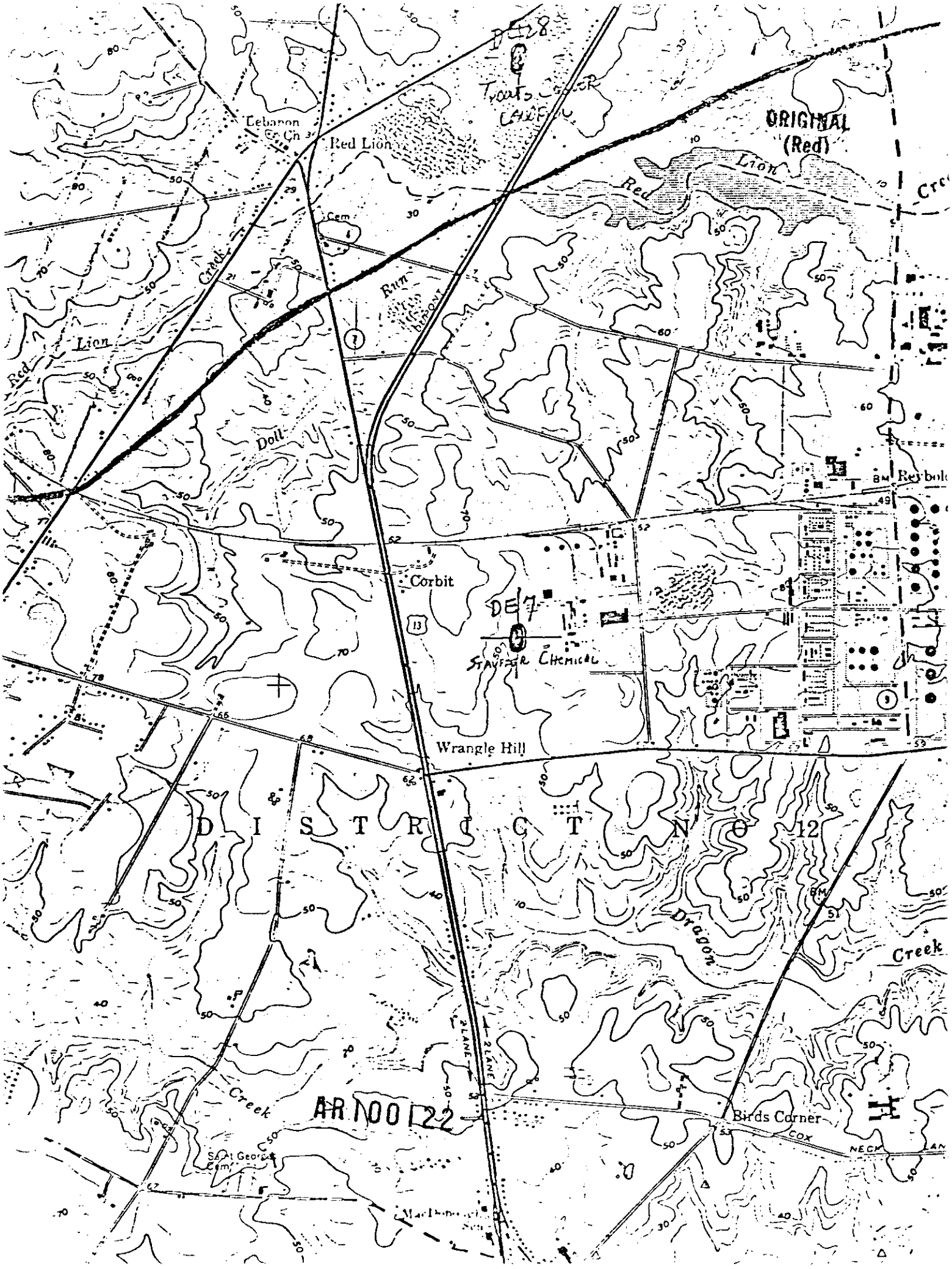
(7) Tht; Hornerstown Formation; Green, gray and reddish-brown, fine to medium silty, highly glauconitic sand and sandy silt. Red sands are found locally in Odessa area.

(8) Tvt; Vincentown Formation; Green, gray and reddish-brown, fine to coarse, highly quartzose glauconitic sand with some silt.

(9) Te; Chesapeake Group; Gray and bluish-gray silt, with some fine sand and silt beds.

[FR Doc. 80-12050 Filed 4-18-80; 8:45 am]
BILLING CODE 6560-01-M


ORIGINAL
(Red)
PENNSYLVANIA
AVONDALE
WEST GROVE
TRAINER
MARCUS HOOK
ARDEN
ARDENTOWN
BELLEFONTE
ELSMERE
NEWPORT
WILMINGTON
PENNS GROVE
NEWARK
NEW CASTLE
DELAWARE CITY
SALEM
CHESAPEAKE CITY
MIDDLETOWN
ODESSA
TOWNSEND
AQUIFER
AREA REQUESTED FOR
AREA PROTECTED
IF DESIGNATION OCCURS
AR100121


ORIGINAL
(Red)
Red Lion
Lebanon Ch
Cem
Red Lion Creek
Red Lion
Doll
Corbit
DE7
Stauffer Chemical
Wrangle Hill
DISTRICT NO 12
Dragon Creek
Creek
Birds Corner
Cox Neck
AR00122

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region III – 6th & Walnut Sts.
Philadelphia, Pa. 19106

ORIGINAL
2 (Red)

SUBJECT: Coastal Plain Aquifer in Delaware

DATE: June 10, 1980

RMT

FROM: R. M. Twitchell
Ground Water Protection Section 3WA32

TO: J. Gary Gardner 3AH00
Robert L. Allen 3AH30
Thomas C. Voltaggio 3EN10
Jeffrey Hass 3SA00

THRU: Benjamin A. Lacy, Chief
Ground Water Protection Section 3WA32

Attached is a copy of the petition published in the Federal Register requesting determination that a portion of the aquifer underlying New Castle County be designated as a Sole Source Aquifer. You will note that the public comment period extends to July 21st. At that time we will make a Regional recommendation to Headquarters. This should not take us more than a month, however, it may take some time before Headquarters reaches a final determination. A Regional recommendation was made to Headquarters regarding a "sole source" aquifer in Maryland on March 27, 1980 and we still have not received an answer.

The area requested for designation and the associated recharge area of the aquifer in the attached petition includes the following hazardous waste sites for which a risk analysis has been made:

Site No.	Name	Contamination Potential
DE 6	Delaware Works (Allied)	High
DE 15	Denton Landfill - New Castle	Low
DE 17	Del. Sand & Gravel - New Castle	High
DE 20	Newport Pigments (DuPont)	Moderate
DE 26	Cherry Island Industrial Landfill	High
DE 28	Tybout Corner Industrial Landfill	Moderate
DE 7*	Stauffer PVC Plant, Delaware City	Moderate
DE 9*	Diamond Shamrock, Delaware City	High

* These sites are not in the petitioned area but some of the comments we have received have requested the area be extended and these areas could possibly be included.

It should be stressed that if a designation is made it would require EPA to review only Federal financially assisted projects in the designated area from the time of the designation. The designation would have no bearing on present hazardous waste sites or on future sites that have no Federal financial assistance.

If you should have further questions please contact Steve Platt at X9017.

EPA-III-013-73-T

STAUFFER SEMI-ANNUAL REPORT
FOR MARCH - AUGUST, 1979
SUMMARY OF VIOLATIONS

I. SUSPENSION RESIN: STRIPPED PPM (limit = 400 ppm)

Date	ppm	Date	ppm
5/13/79	551	7/22/79	418
7/7/79	640	7/31/79	671
7/11/79	1120	8/8/79	574

II. DISPERSION RESIN: STRIPPED PPM (limit = 2000 ppm)

Date	ppm	Date	ppm
4/28/79	2098	6/23/79	2039
6/3/79	2175	7/26/79	2099
6/22/79	2158		

III. REACTOR OPENING LOSS
- no excess emissions

IV. In-PROCESS WASTEWATER (limit = 10 ppm)

Date	ppm range
7/16/79	72-283
8/11/79	12-58
8/14/79	22-62

AR100124

PLASTICS DIVISION
Stauffer
Stauffer Chemical Company
P.O. Box 320 / Delaware City, Delaware 19706 / Telephone (302) 834-4575

J. Schramm

September 14, 1979

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable Douglas M. Costle, Administrator
United States Environmental Protection Agency
401 North Street, S.W.
Washington, D. C. 20460

Dear Sir:

RE: Subpart F - National Emission Standard for Vinyl Chloride - Part 61 of Chapter I, Title 40 of the Code of Federal Regulations

Enclosed herewith is the Semi-Annual Report to be submitted in Section 61.70 of Part 61, the EPA's National Emission Standard for Vinyl Chloride.

It includes:

1. Daily averages since March 15, 1979, of vinyl chloride content determined from representative samples of poly-vinyl chloride suspension and dispersion resin taken immediately after the stripping operation and weighed according to the quantity of resin processed by the reactor.

2. A record of reactor openings for suspension and dispersion resins since March 15, 1979, for which an emission limit is prescribed in Paragraph 61.64 (a) (2) of the Standard.

3. A record of emissions in excess of emission limits of 61.65 (b) (1) (i) - (unloading lines), 61.65 (b) (6) (i) - opening of equipment, 61.64 (c) - Mixing, weighing and holding containers), 61.64 (d) - (Monomer Recovery System), 61.65 (b) (5) (Manual Venting of Gases), 61.65 (b) (9) (ii) - (Inprocess Wastewater).

ORIGINAL
(Red)

If you have any questions concerning this report, please contact me.

Sincerely,

F. J. Doyle

F. J. Doyle
Plant Manager

Enclosure

FJD/ges

bcc: P. D. Cunningham P. E. Roggi F. J. Doyle
G. Ford T. Sayers C. Markowitz

APPENDIX I

Semi-Annual Report
Sept. 15, 1979

ORIGINAL
(Red)

1 data is for suspension resin since 3/15/79.

DATE	PPM	DATE	PPM	DATE	PPM
3/15	153	5/16	332	7/17	258
3/16	284	5/17	175	7/18	295
3/17	296	5/18	127	7/19	314
3/18	156	5/19	108	7/20	270
3/19	204	5/20	202	7/21	301
3/20	250	5/21	286	7/22	418
3/21	202	5/22	158	7/23	106
3/22	172	5/23	135	7/24	37
3/23	106	5/24	372	7/25	24
3/24	113	5/25	249	7/26	155
3/25	129	5/26	210	7/27	44
3/26	115	5/27	183	7/28	140
3/27	120	5/28	53	7/29	328
3/28	149	5/29	76	7/30	307
3/29	169	5/30	187	7/31	671
3/30	94	5/31	202	8/1	141
3/31	67				
		6/1	163	8/2	256
4/1	68	6/2	106	8/3	396
4/2	125	6/3	93	8/4	281
4/3	241	6/4	146	8/5	362
4/4	197	6/5	205	8/6	210
4/5	139	6/6	187	8/7	350
4/6	109	6/7	204	8/8	574
4/7	101	6/8	170	8/9	283
4/8	222	6/9	266	8/10	226
4/9	91	6/10	151	8/11	256
4/10	142	6/11	204	8/12	397
4/11	195	6/12	254	8/13	309
4/12	314	6/13	282	8/14	160
4/13	251	6/14	234	8/15	143
4/14	212	6/15	227	8/16	206
4/15	239	6/16	266	8/17	136
4/16	289	6/17	186	8/18	165
4/17	315	6/18	284	8/19	226
4/18	295	6/19	213	8/20	160
4/19	276	6/20	317	8/21	251
4/20	306	6/21	299	8/22	319
4/21	142	6/22	220	8/23	207
		6/23	262	8/24	192
4/22	293	6/24	395	8/25	193
		6/25	205	8/26	201
4/23	93	6/26	216	8/27	134
4/24	96	6/27	186	8/28	176
4/25	72	6/28	208	8/29	209
4/26	226	6/29	139	8/30	167
4/27	214	6/30	223	8/31	215
4/28	349				
4/29	98	7/1	234		
4/30	136	7/2	398		

ORIGINAL

DATE	PPM	DATE	PPM	DATE	PPM (Red)
		7/3	186		
5/1	378	7/4	160		
5/2	336	7/5	228		
5/3	122	7/6	207		
5/4	236	7/7	640		
5/5	217	7/8	265		
5/6	197	7/9	275		
5/7	252	7/10	191		
5/8	265	7/11	1120		
5/9	115	7/12	152		
5/10	148	7/13	288		
5/11	223	7/14	287		
5/12	265	7/15	272		
5/13	551	7/16	227		
5/14	169				
5/15	261				

APPENDIX II

ORIGINAL (Red)

Semi-Annual Report
Sept. 15, 1979

All data is for dispersion resin since 3/15/79.

DATE	PPM	DATE	PPM	DATE	PPM
3/15	579	5/16	1645	7/17	1198
3/16	579	5/17	1316	7/18	934
3/17	489	5/18	1206	7/19	1717
3/18	887	5/19	906	7/20	897
3/19	562	5/20	912	7/21	712
3/20	1090	5/21	958	7/22	851
3/21	830	5/22	1341	7/23	1183
3/22	713	5/23	1677	7/24	1972
3/23	383	5/24	1503	7/25	1357
3/24	477	5/25	914	7/26	2099
3/25	428	5/26	777	7/27	1541
3/26	1112	5/27	874	7/28	1743
3/27	494	5/28	1374	7/29	1939
3/28	1371	5/29	1408	7/30	1982
3/29	539	5/30	862	7/31	1410
3/30	643	5/31	1987		
3/31	721			8/1	1484
		6/1	1985	8/2	1221
4/1	654	6/2	1797	8/3	1420
4/2	589	6/3	2175	8/4	1418
4/3	956	6/4	1672	8/5	1375
4/4	1582	6/5	1945	8/6	1161
4/5	1308	6/6	1872	8/7	1276
4/6	1661	6/7	1692	8/8	1376
4/7	1471	6/8	1826	8/9	1448
4/8	1599	6/9	1851	8/10	1383
4/9	1638	6/10	1458	8/11	1294
4/10	1729	6/11	1668	8/12	798
4/11	1749	6/12	1238	8/13	1471
4/12	1336	6/13	1630	8/14	1546
		6/14	1558	8/15	1125
4/13	1848	6/15	872	8/16	1393
4/14	1841	6/16	987	8/17	1217
4/15	1800	6/17	1707	8/18	1224
4/16	784	6/18	1212	8/19	1798
4/17	1163	6/19	996	8/20	1491
4/18	472	6/20	1477	8/21	1576
4/19	970	6/21	1702	8/22	1849
4/20		6/22	2158	8/24	1680
4/21	891	6/23	2039	8/25	1695
		6/24	1483	8/26	1732
4/22	962	6/25	1379	8/27	1555
4/23	1073	6/26	1221	8/28	1609
4/24	1011	6/27	1731	8/29	1583
4/25	1602	6/28	1883	8/30	1357
4/26	1142	6/29	1977	8/31	1446
4/27	1348	6/30	1325		

2V Chloroethane	44	23	18		<10
3V Chloroform	<10		<10		<10
9V 1,1-dichloroethylene	<10	<10	<10		<10
11V 1,2-trans-dichloroethylene	11	<10	<10	ORIGINAL (Red)	48
27V 1,2-dichloropropane					49
85V ethylbenzene	possible sampling contamination				<10
44V methylene chloride	2628	2429	2604		<10
45V methyl chloride			<10		<10
48V dichlorobromomethane					<10
87V trichloroethylene	16	<10		<10	143
88V vinyl chloride	1002	43	<10	<10	1400
50V dichlorodifluoromethane	280				
Base Extraction					
5B acenaphthene	<10				
6B bis(2-ethylhexyl) phthalate	<10		<10		
8B di-n-butyl phthalate	<10		<10	<10	
18B anthracene	<10				
81B phenanthrene	<10				

Sample C0001 Test well # 11

C0002 Test well # 8

C0003 Test well # 9

C0004 Receiving Stream

C0019 Leak from treatment unit influent

C0605

ORIGINAL (Red)

Stauffer Chem. PVC plant
Analytical Results (ppb)

Volatiles	C0001 #11	C0002 #8	C0003 #9	C0004	C0019
acrolein	116		178		28
acrylonitrile					26
1,2-dichloroethene	10916	1637	135	634	29209
1,1,1-trichloroethane					13
1,1,1-dichloroethane	<10	<10	<10		<10
1,1,2 trichloroethane					<10
chloroethane	44	23	18		<10
chloroform	<10		<10		<10
1,1-dichloroethylene	<10	<10	<10		<10
1,2-trans-dichloroethylene	11	<10	<10		48
1,2-dichloropropane					49
ethylbenzene		possible sampling contamination			<10
methylene chloride	2628	2429	2604		<10
methyl chloride			<10		<10
dichlorobromomethane					<10
trichloroethylene	16	<10		<10	143
vinyl chloride	1002	43	<10	<10	1400
dichlorodifluoromethane	280				
Extractables					
acenaphthene	<10				
bis(2-ethylhexyl) phthalate	<10		<10		
<10					
di-n-butyl phthalate	<10		<10	<10	
anthracene	<10				
phenanthrene	<10				

AR100131

APPENDIX II
Page Two

ORIGINAL
(Red)

DATE	PPM	DATE	PPM	DATE	PPM
4/28	2098				
4/29	1425	7/1	1363		
4/30	1670	7/2	1115		
		7/3	989		
5/1	1491	7/4	1277		
5/2	1724	7/5	1933		
5/3	1193	7/6	1686		
5/4	1154	7/7	1396		
5/5	1679	7/8	1637		
5/6	1435	7/9	1631		
5/7	NP	7/10	1714		
5/8	692	7/11	1607		
5/9	1024	7/12	1221		
5/10	1363	7/13	1109		
5/11	725	7/14	1317		
5/12	1215	7/15	823		
5/13	1323	7/16	1049		
5/14	893				
5/15	1562				

NP - NO PRODUCTION

APPENDIX III

Semi-Annual Report
Sept. 14, 1979

ORIGINAL
(Red)

(Allowable VCM-per batch 2300-2500 ppm)

REACTOR OPENING LOSS/S-1 PLANT

TYPE	BATCH NO.	DATE	ROL (PPM)
SCC-133	P-867	3/19/79	345
KR-1	P-899	3/21/79	1110
SCC-421	P-1037	3/29/79	5
KR-1	P-2222	6/18/79	180
SCC-616	P-2283	6/22/79	95
SCC-600	P-2425	7/3/79	130
KR-1	P-2526	7/9/79	140
SCC-676	P-2935	8/6/79	77
SCC-686	P-3022	8/13/79	183
SCC-676	P-3225	8/27/79	15

REACTOR OPENING LOSS/S-2 PLANT

TYPE	BATCH NO.	DATE	ROL (PPM)
SCC-608	S-738	3/16/79	2000
SCC-676P	S-825	3/22/79	10
SCC-614	S-893	3/26/79	260
SCC-676P	S-2172	6/18/79	1296
SCC-614	S-2518	7/9/79	208
SCC-676P	S-2841	8/7/79	507

REACTOR OPENING LOSS/E-2 PLANT

TYPE	BATCH NO.	DATE	ROL (PPM)
SCC-24W	D-547	3/31/79	80
SCC-28C	D-644	4/11/79	111
SCC-NV	D-711	4/18/79	78
SCC-OH	D-828	5/1/79	315
SCC-40C	D-895	5/12/79	410
SCC-24W	D-1008	5/25/79	400
SCC-28C	D-1133	6/8/79	281
SCC-NV	D-1336	7/2/79	224
SCC-NV	D-1532	7/22/79	190
SCC-24W	D-1797	8/20/79	403
SCC-28C	D-1830	8/23/79	214

SEPT. 15, 1979

EXCESS EMISSIONS

ORIGINAL

[illegible]	SOURCE	LBS. VCM EMITTED (Est)
-17-79	PP302A (VCM PUMP)	500
-30-79	DR-404 (Reactor)	2200
-14-79	DR-406 (Reactor)	253
-28-79	DT-105 (Unloading Line)	208

These four emissions as well as the emergency relief valve discharges have already been reported to the United States Environmental Protection Agency, Region III.

In-process wastewater - Determinations of VCM in wastewater are made every two hours to insure compliance is met. Average levels are less than 1 ppm VCM. There have been a few times process difficulties have caused two consecutive reading to be above 10 ppm;

DATE/TIME	VCM PPM RANGE IN WASTEWATER
7/16/79 (1200-2400)	72-283
8/11-12/79 (2000-0200)	12-58
8/14/79 (1400-1600)	22-62

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
6TH AND WALNUT STREETS
PHILADELPHIA, PENNSYLVANIA 19106

ORIGINAL (Red)

In Reply Refer To: 3EN12

MAY 16 1990

Mr. Charles Markowitz
Environmental Supervisor
Stauffer Chemical Company
P.O. Box 320
Delaware City, Delaware 19706

Re: Request for Information on the Polyvinyl Chloride Plant at Delaware City, Delaware

Dear Mr. Markowitz:

On October 21, 1976, under the authority of Section 112 of the Clean Air Act, as amended, 42 U.S.C §§ 7401 et seq. (the "Act"), the Administrator of the Environmental Protection Agency (EPA) promulgated regulations for the control of the hazardous air pollutant vinyl chloride. Among the provisions so approved is § 61.65(b)(9) regulating the vinyl chloride concentrations of inprocess wastewater.

In order to determine whether the above referenced facility is in compliance with these provisions, you are hereby required under the authority granted by Section 114(a) of the Act, 42 U.S.C. § 7414(a), to provide the following information:

1) All sampling results for vinyl chloride from all surface impoundments including:

a) the off-grade batch pit,
b) the three earthen polyvinyl chloride sludge pits,
c) the stormwater reservoir,
d) the two aeration lagoons associated with the wastewater treatment system.

The results should include the date the samples were taken and the concentration of vinyl chloride in parts per million.

2) Any information regarding a discharge or leak from the influent to the aeration lagoons in the area of monitoring well #11 as observed in the EPA inspection of February 21, 1980. Such information should include:

a) length of time of discharge,
b) amount of material discharged,
c) any sampling results of vinyl chloride concentrations of this discharge.

Failure to provide the information requested may result in the imposition of sanctions set forth in Section 113 of the Act, 42 U.S.C. § 7413.

ORIGINAL (red)

The information hereby required must be submitted no later than seven (7) days from the date of receipt of this letter. Any change in the information supplied must be reported no later than seven (7) days after such change occurs. This continuing requirement to provide notification of changes in the information required by this letter shall remain in effect until expressly terminated in writing by this office.

Pursuant to regulations appearing at 40 C.F.R. Part 2, Subpart B, 41 Fed. Reg. 36907, (September 1, 1976), as modified at 43 Fed. Reg. 39997, (September 8, 1978) you are entitled to assert a claim of business confidentiality covering any part of the submitted information which is not "emission data" as defined at 40 C.F.R. Section 2.301(a)(2). Unless such a confidentiality claim is asserted at the time requested information is submitted, EPA may make this information available to the public without further notice to you. Information subject to a claim of business confidentiality will be made available to the public only in accordance with the regulations appearing at 40 C.F.R. Part 2, Subpart B.

All correspondence to this office should contain the file number referenced above.

If you have any questions concerning this matter, please contact James Miller, Air Enforcement Branch, at (215) 597-3535. Thank you for your cooperation.

Sincerely yours,

Stanley L. Laskowski
Acting Director, Enforcement Division

PLASTICS DIVISION Stauffer CHEMICALS

Stauffer Chemical Company

P. O. Box 320 / Delaware City, DE 19706 / Telephone (302) 834-4575

June 3, 1980

ORIGINAL (Red)

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Stanley L. Laskowski
Acting Director, Enforcement Division
United States Environmental Protection Agency
Region III
6th and Walnut Streets
Philadelphia, PA 19106

Re: 3EN12

Dear Mr. Laskowski:

In your request for information, the Stauffer Chemical Company does not believe that the cited provision 61.65(b)9 inprocess wastewater is applicable to vinyl chloride concentrations in the surface impoundments of process wastewater treatment system. The Stauffer Polymers Plant at Delaware City complies with 61.65(b)9 by stripping all process water before the strippers to below 10 ppm vinyl chloride and using improved stripping technology for process water after the stripper. All process water would have met either of these requirements before being discharged into the process wastewater treatment system.

Since the NPDES permit for the process wastewater treatment system does not include the removal of or the analysis for vinyl chloride, not much of the inforamtion requested is available. Stauffer is voluntarily submitting the following information for vinyl chloride in water:

	PPM VCM
Stormwater reservoir (RV Pond)	0.53-1.67

and the residual vinyl chloride ranges for sludges in the following impoundments:

	PPM RVCM
Off-grade batch pits (earth lagoon)	2.1-121
Inactive sludge pits	ND(non-detectable)

As far as information concerning a discharge into well #11, the cleaning out of this process water line took place 10 working

ORIGINAL
(Red)

days during the period February 13 to February 28. Any discharge would have been intermittent depending on the amount of water in the line. Such an amount would be very difficult to estimate. The amount of vinyl chloride in this discharge was 2 ppm.

If there are further questions concerning this information submitted, feel free to contact me.

Sincerely,

Charles A. Markowitz

Charles A. Markowitz
Associate Regulatory Affairs Specialist

CAM/bam

The recommended water quality criterion for pentachlorobenzene is 0.5 µg/l.

Hexachlorobenzene. Among the studies reviewed by this document, only two appear suitable for use in the risk assessment: the mouse study of Cabral, et al. (1978) and the hamster study of Cabral, et al. (1977). These two studies are described in detail in Appendix I.

Under the Consent Decree in *NRDC v. Train*, criteria are to state "recommended maximum permissible concentrations (including where appropriate, zero) consistent with the protection of aquatic organisms, human health, and recreational activities." HCB is suspected of being a human carcinogen. Because there is no recognized safe concentration for a human carcinogen, the recommended concentration of HCB in water for maximum protection of human health is zero.

Because attaining a zero concentration level may be unfeasible in some cases, and in order to assist the Agency and States in the possible future development of water quality regulations, the concentrations of HCB corresponding to several incremental lifetime cancer risk levels have been estimated. A cancer risk level provides an estimate of the additional incidence of cancer that may be expected in an exposed population. A risk of 10^{-5} for example, indicates a probability of one additional case of cancer for every 100,000 people exposed, a risk of 10^{-6} indicates one additional case of cancer for every million people exposed, and so forth.

In the Federal Register notice of availability of draft ambient water quality criteria, EPA stated that it is considering setting criteria at an interim target risk level of 10^{-5}, 10^{-6}, or 10^{-7} as shown in the table below:

Exposure assumption (per day)	Risk levels and corresponding criteria [1]			
	0	10^{-7} (ng/l)	10^{-6} (ng/l)	10^{-5} (ng/l)
2 liters of drinking water and consumption of 18.7 grams fish and shellfish[2]	0	0.0125	0.125	1.25
Consumption of fish and shellfish only	0	0.0126	0.126	1.26

[1] Calculated by applying a modified "one-hit" extrapolation model described in the FEDERAL REGISTER, 44 FR 15926, March 15, 1979. Appropriate bioassay data used in the calculation of the model is presented in Summary of Pertinent Data. Since the extrapolation model is linear at low doses, the additional lifetime risk is directly proportional to the water concentration. Therefore, water concentrations corresponding to other risk levels can be derived by multiplying or dividing one of the risk levels and corresponding water concentrations shown in the table by factors such as 10, 100, 1,000, and so forth.

[2] Ninety-nine percent of the HCB exposure results from the consumption of aquatic organisms which exhibit an average bioconcentration potential of 12,000-fold. The remaining one percent of HCB exposure results from drinking water.

Concentration levels were derived assuming a lifetime exposure to various amounts of HCB, (1) occurring from the consumption of both drinking water and aquatic life grown in waters containing the corresponding HCB concentrations and, (2) occurring solely from consumption of aquatic life grown in the waters containing the corresponding HCB concentrations. Because data indicating other sources of HCB exposure and their contributions to total body burden are inadequate for quantitative use, the figures reflect the incremental risks associated with the indicated routes only.

Summary of Recommended Criterion for Chlorinated Benzenes

Substance	Criterion	Basis for criterion
Monochlorobenzene [1]	20µg/l	Organoleptic effects.
Trichlorobenzene	13µg/l	Organoleptic effects.
Tetrachlorobenzene	17µg/l	Toxicity studies.
Pentachlorobenzene	.5µg/l	Toxicity study.
Hexachlorobenzene [2]	1.25ng/l	Carcinogenicity.

[1] A toxicological evaluation of monochlorobenzene resulted in a level of 450 µg/l, however, organoleptic effects have been reported at 20 µg/L.

[2] The value 1.25 ng/l is at a risk level of 1 in 100,000.

Summary of Pertinent Data

The water quality criterion for HCB is based on the induction of hepatomas and hemangioendotheliomas in male Syrian Golden hamsters given a daily oral dose of 100 ppm for 80 weeks (Cabral, et al. 1977). The hepatoma incidence was 26/30 in the treated group compared with 0/40 in the control group, and the hemangioendothelioma incidence was 6/30 in the treated group compared with 0/40 in the control group. The criterion was calculated from the following parameters.

n^t hepatoma = 26
N^t hepatoma = 30
n^c hepatoma = 0
N^c hepatoma = 40
n^t hemangioendothelioma = 6
N^t hemangioendothelioma = 30
n^c hemangioendothelioma = 0
N^c hemangioendothelioma = 40
Le = 80 wk
le = 80 wk
L = 80 wk
d = 100 ppm × 0.8 = 8 mg/kg/day
W = .100 kg
F = .0187 kg
R = 12,000

Based on these parameters, the one hit slope (B_{il}) is 2.2363 (mg/kg/day)$^{-1}$ hepatomas and 0.2477 (mg/kg/day)$^{-1}$ hemangioendotheliomas. The resulting water concentration of HCB calculated to keep the individual lifetime cancer risk below 10^{-5} is 1.25 nanograms per liter.

ORIGINAL (Red)

Chlorinated Ethanes

Criteria Summary

Freshwater Aquatic Life. The data base for freshwater aquatic life is insufficient to allow use of the Guidelines. The following recommendation is inferred from toxicity data on pentachloroethane and saltwater organisms.

For 1,2-dichloroethane the criterion to protect freshwater aquatic life as derived using procedures other than the Guidelines is 3,900 µg/l as a 24-hour average and the concentration should not exceed 8,800 µg/l at any time.

For 1,1,1-trichloroethane the criterion to protect freshwater aquatic life as derived using procedures other than the Guidelines is 5,300 µg/l as a 24-hour average and the concentration should not exceed 12,000 µg/l at any time.

For 1,1,2-trichloroethane the criterion to protect freshwater aquatic life as derived using procedures other than the Guidelines is 310 µg/l as a 24-hour average and the concentration should not exceed 710 µg/l at any time.

For 1,1,1,2-tetrachloroethane the criterion to protect freshwater aquatic life as derived using procedures other than the Guidelines is 420 µg/l as a 24-hour average and the concentration should not exceed 960 µg/l at any time.

For 1,1,2,2-tetrachloroethane the criterion to protect freshwater aquatic life as derived using procedures other than the Guidelines is 170 µg/l as a 24-hour average and the concentration should not exceed 380 µg/l at any time.

For pentachloroethane the criterion to protect freshwater aquatic life as derived using procedures other than the Guidelines is 440 µg/l as a 24-hour average and the concentration should not exceed 1,000 µg/l at any time.

For hexachloroethane the criterion to protect freshwater aquatic life as derived using procedures other than the Guidelines is 62 µg/l as a 24-hour average and the concentration should not exceed 140 µg/l at any time.

For hexachloroethane the criterion to protect saltwater aquatic life as derived using procedures other than the Guidelines is 7.0 µg/l as a 24-hour average and the concentration should not exceed 16 µg/l at any time.

Saltwater Aquatic Life. The data base for saltwater aquatic life is insufficient to allow use of the Guidelines. The following recommendation is inferred from toxicity data on pentachloroethane and saltwater organisms.

For 1,2-dichloroethane the criterion to protect saltwater aquatic life as derived using procedures other than the Guidelines is 880 μg/l as a 24-hour average and the concentration should not exceed 2,000 μg/l at any time.

For 1,1,1-trichloroethane the criterion to protect saltwater aquatic life as derived using procedures other than the Guidelines is 240 μg/l as a 24-hour average and the concentration should not exceed 540 μg/l at any time.

For saltwater aquatic life, no criterion for 1,1,2-trichloroethane can be derived using the Guidelines, and there are insufficient data to estimate a criterion using other procedures.

For saltwater aquatic life, no criterion for 1,1,1,2-tetrachloroethane can be derived using the Guidelines, and there are insufficient data to estimate a criterion using other procedures.

For 1,1,2,2-tetrachloroethane the criterion to protect saltwater aquatic life as derived using procedures other than the Guidelines is 70 μg/l as a 24-hour average and the concentration should not exceed 160 μg/l at any time.

For pentachloroethane the criterion to protect saltwater aquatic life as derived using the Guidelines is 38 μg/l as a 24-hour average and the concentration should not exceed 87 μg/l at any time.

Human Health. For the maximum protection of human health from the potential carcinogenic effects of exposure to 1,2-dichloroethane, 1,1,2-trichloroethane, 1,1,2,2-tetrachloroethane and hexachloroethane through ingestion of water and contaminated aquatic organisms, the ambient water concentration is zero. Concentrations of these chlorinated ethanes estimated to result in additional lifetime cancer risks ranging from no additional risk to an additional risk of 1 in 100,000 are presented in the Criterion Formulation section of this document. The Agency is considering setting criteria at an interim target risk level in the range of 10^{-5}, 10^{-6}, or 10^{-7} with corresponding criteria as follows:

Compound	Risk levels and corresponding criteria		
	10^{-5} μg/l	10^{-6} μg/l	10^{-7} μg/l
1,2-dichloroethane	7.0	.70	.07
1,1,2-trichloroethane	2.7	.27	.027
1,1,2,2-tetrachloroethane	1.8	.18	.018
hexachloroethane	5.9	.59	.059

For the protection of human health from the toxic properties of 1,1,1-trichloroethane ingested through the consumption of water and fish, the criterion is 15.7 mg/l.

At the present, there are insufficient data to derive criteria for monochloroethane, 1,1-dichloroethane, 1,1,1,2-tetrachloroethane and pentachloroethane.

Basis for the Criteria

Freshwater Aquatic Life. No freshwater criterion can be derived for any chlorinated ethane using the Guidelines because no Final Chronic Value for either fish or invertebrate species or a good substitute for either value is available.

However, data for pentachloroethane and saltwater organisms can be used as the basis for estimating criteria.

For pentachloroethane and saltwater organisms, 0.44 times the Final Acute Value is less than the Final Chronic Value derived from a life cycle test with the mysid shrimp. Therefore, a reasonable estimate of criteria for other chlorinated ethanes and freshwater organisms would be 0.44 times the Final Acute Value.

1,2-dichloroethane. The maximum concentration of 1,2-dichloroethane is the Final Acute Value of 8,800 μg/l and the estimated 24-hour average concentration is 0.44 times the Final Acute Value. No important adverse effects on freshwater aquatic organisms have been reported to be caused by concentrations lower than the 24-hour average concentration.

For 1,2-dichloroethane the criterion to protect freshwater aquatic life as derived using procedures other than the Guidelines is 3,900 μg/l as a 24-hour average and the concentration should not exceed 8,800 μg/l at any time.

1,1,1-trichloroethane. The maximum concentration of 1,1,1-trichloroethane is the Final Acute Value of 12,000 μg/l and the estimated 24-hour average concentration is 0.44 times the Final Acute Value. No important adverse effects on freshwater aquatic organisms have been reported to be caused by concentrations lower than the 24-hour average concentration.

For 1,1,1-trichloroethane the criterion to protect freshwater aquatic life as derived using procedures other than the Guidelines is 5,300 μg/l as a 24-hour average and the concentration should not exceed 12,000 μg/l at any time.

1,1,2-trichloroethane. The maximum concentration of 1,1,2-trichloroethane is the Final Acute Value of 710 μg/l and the estimated 24-hour average concentration is 0.44 times the Final Acute Value. No important adverse effects on freshwater aquatic organisms have been reported to be caused by concentrations lower than the 24-hour average concentration.

For 1,1,2-trichloroethane the criterion to protect freshwater aquatic life as derived using procedures other than the Guidelines is 310 μg/l as a 24-hour average and the concentration should not exceed 710 μg/l at any time.

1,1,1,2-tetrachloroethane. The maximum concentration of 1,1,1,2-tetrachloroethane is the Final Acute Value of 960 μg/l and the estimated 24-hour average concentration is 0.44 times the Final Acute Value. No important adverse effects on freshwater aquatic organisms have been reported to be caused by concentrations lower than the 24-hour average concentration.

For 1,1,1,2-tetrachloroethane the criterion to protect freshwater aquatic life as derived using procedures other than the Guidelines is 420 μg/l as a 24-hour average and the concentration should not exceed 960 μg/l at any time.

1,1,2,2-tetrachloroethane. The maximum concentration of 1,1,2,2-tetrachloroethane is the Final Acute Value of 380 μg/l and the estimated 24-hour average concentration is 0.44 times the Final Acute Value. No important adverse effects on freshwater aquatic organisms have been reported to be caused by concentrations lower than the 24-hour average concentration.

For 1,1,2,2-tetrachloroethane the criterion to protect freshwater aquatic life as derived using procedures other than the Guidelines is 170 μg/l as a 24-hour average and the concentration should not exceed 380 μg/l at any time.

Pentachloroethane. The maximum concentration of pentachloroethane is the Final Acute Value of 1,000 μg/l and the estimated 24-hour average concentration is 0.44 times the Final Acute Value. No important adverse effects on freshwater aquatic organisms have been reported to be caused by concentrations lower than the 24-hour average concentration.

For pentachloroethane the criterion to protect freshwater aquatic life as derived using procedures other than the Guidelines is 440 μg/l as a 24-hour average and the concentration should not exceed 1,000 μg/l at any time.

Hexachloroethane. The maximum concentration of hexachloroethane is the Final Acute Value of 140 μg/l and the estimated 24-hour average concentration is 0.44 times the Final Acute Value. No important adverse effects on freshwater aquatic organisms have been reported to be caused by concentrations lower than the 24-hour average concentration.

For hexachloroethane the criterion to protect freshwater aquatic life as derived using procedures other than the Guidelines is 62 μg/l as a 24-hour average and the concentration should not exceed 140 μg/l at any time.

Summary of Available Data

The concentrations below have been rounded to two significant figures.

1,2-dichloroethane

Final Fish Acute Value = 68,000 μg/l
Final Invertebrate Acute Value = 8,800 μg/l
Final Acute Value = 8,800 μg/l
Final Fish Chronic Value = not available
Final Invertebrate Chronic Value = not available
Final Plant Value = not available
Residue Limited Toxicant Concentration = not available
Final Chronic Value = not available
0.44 × Final Acute Value = 3,900 μg/l

1,1,1-trichloroethane

Final Fish Acute Value = 12,000 μg/l
Final Invertebrate Acute Value = not available
Final Acute Value = 12,000 μg/l
Final Fish Chronic Value = not available
Final Invertebrate Chronic Value = not available
Final Plant Value = not available
Residue Limited Toxicant Concentration = not available
Final Chronic Value = not available
0.44 × Final Acute Value = 5,300 μg/l

1,1,2-trichloroethane

Final Fish Acute Value = 5,700 μg/l
Final Invertebrate Acute Value = 710 μg/l
Final Acute Value = 710 μg/l
Final Fish Chronic Value = not available
Final Invertebrate Chronic Value = not available
Final Plant Value = not available
Residue Limited Toxicant Concentration = not available
Final Chronic Value = not available
0.44 × Final Acute Value = 310 μg/l

1,1,1,2-tetrachloroethane

Final Fish Acute Value = 2,700 μg/l
Final Invertebrate Acute Value = 960 μg/l
Final Acute Value = 960 μg/l
Final Fish Chronic Value = not available
Final Invertebrate Chronic Value = not available
Final Plant Value = not available
Residue Limited Toxicant Concentration = not available
Final Chronic Value = not available
0.44 × Final Acute Value = 420 μg/l

1,1,2,2-tetrachloroethane

Final Fish Acute Value = 3,000 μg/l
Final Invertebrate Acute Value = 380 μg/l
Final Acute Value = 380 μg/l
Final Fish Chronic Value = not available
Final Invertebrate Chronic Value = not available
Final Plant Value = 140,000 μg/l
Residue Limited Toxicant Concentration = not available
Final Chronic Value = 140,000 μg/l
0.44 × Final Acute Value = 170 μg/l

Pentachloroethane

Final Fish Acute Value = 1,000 μg/l
Final Invertebrate Acute Value = 2,500 μg/l
Final Acute Value = 1,000 μg/l
Final Fish Chronic Value = not available
Final Invertebrate Chronic Value = not available
Final Plant Value = 120,000 μg/l
Residue Limited Toxicant Concentration = not available
Final Chronic Value = 120,000 μg/l
0.44 × Final Acute Value = 440 μg/l

Hexachloroethane

Final Fish Acute Value = 140 μg/l
Final Invertebrate Acute Value = 330 μg/l
Final Acute Value = 140 μg/l
Final Fish Chronic Value = not available
Final Invertebrate Chronic Value = not available
Final Plant Value = 87,000 μg/l
Residue Limited Toxicant Concentration = not available
Final Chronic Value = 87,000 μg/l
0.44 × Final Acute Value = 62 μg/l

Saltwater Aquatic Life

Pentochloroethane. The maximum concentration of pentachloroethane is the Final Acute Value of 67 μg/l and the 24-hour average concentration is the Final Chronic Value of 38 μg/l. No important adverse effects on saltwater aquatic organisms have been reported to be caused by concentrations lower than the 24-hour average concentration.

For pentachloroethane the criterion to protect saltwater aquatic life as derived using the Guidelines is 38 μg/l as a 24-hour average and the concentration should not exceed 87 μg/l at any time.

No saltwater criteria can be derived for other chlorinated ethanes using the Guidelines because no Final Chronic Value for either fish or invertebrate species or a good substitute for either value is available.

However, data for pentachloroethane and saltwater organisms can be used as the basis for estimating criteria.

For pentachloroethane and saltwater organisms, 0.44 times the Final Acute Value is less than the Final Chronic Value derived from a life cycle test with the mysid shrimp. Therfore, a reasonable estimate of criteria for other chlorinated ethanes and saltwater organisms would be 0.44 times the Final Acute Value.

1,2-dichloroethane. The maximum concentration of 1,2-dichloroethane is the Final Acute Value of 2,000 μg/l and the estimated 24-hour average concentration is 0.44 times the Final Acute Value. No important adverse effects on saltwater aquatic organisms have been reported to be caused by concentrations lower than the 24-hour average concentration.

For 1,2-dichloroethane the criterion to protect saltwater aquatic life as derived using procedures other than the Guidelines is 880 μg/l as a 24-hour average and the concentration should not exceed 2,000 μg/l at any time.

1,1,1—trichloroethane. The maximum concentration of 1,1,1-trichloroethane is the Final Acute Value of 540 μg/l and the estimated 24-hour average concentration is 0.44 times the Final Acute Value. No important adverse effects on saltwater aquatic organisms have been reported to be caused by concentrations lower than the 24-hour average concentration.

For 1,1,1-trichloroethane the criterion to protect saltwater aquatic life as derived using procedures other than the Guidelines is 240 μg/l as a 24-hour average and the concentration should not exceed 540 μg/l at any time.

1,1,2,2-tetrachlorethane. The maximum concentration of 1,1,2,2-tetrachloroethane is the final Acute Value of 160 μg/l and the estimated 24-hour average concentration is 0.44 times the Final Acute Value. No important adverse effects on saltwater aquatic organisms have been reported to be caused by concentrations lower than the 24-hour average concentration.

For 1,1,2,2-tetrachloroethane the criterion to protect saltwater aquatic life as derived using procedures other than the Guidelines is 70 μg/l as a 24-hour average and the concentration should not exceed 160 μg/l at any time.

Hexachloroethane. The maximum concentration of hexachloroethane is the Final Acute Value of 16 μg/l and the estimated 24-hour average concentration is 0.44 times the Final Acute Value. No important adverse effects on saltwater aquatic organisms have been reported to be caused by concentrations lower than the 24-hour average concentration.

For hexachloroethane the criterion to protect saltwater aquatic life as derived using procedures other than the Guidelines is 7.0 μg/l as a 24-hour average and the concentration should not exceed 16 μg/l at any time.

Summary of Available Data

The concentrations below have been rounded to two significant figures.

1,2-dichloroethane

Final Fish Acute Value = not available
Final Invertebrate Acute Value = 2,000 μg/l
Final Acute Value = 2,000 μg/l
Final Fish Chronic Value = not available
Final Invertebrate Chronic Value = not available
Final Plant Value = greater than 433,000 μg/l
Residue Limited Toxicant Concentration = not available
Final Chronic Value = greater than 433,000 μg/l
0.44 × Final Acute Value = 880 μg/l

1,1,1-Trichloroethane

Final Fish Acute Value = 10,000 µg/l
Final Invertebrate Acute Value = 540 µg/l
Final Acute Value = 540 µg/l
Final Fish Chronic Value = not available
Final Invertebrate Chronic Value = not available
Final Plant Value = greater than 669,000 µg/l
Residue Limited Toxicant Concentration = not available
Final Chronic Value = greater than 669,000 µg/l
0.44 × Final Acute Value = 240 µg/l

1,1,2,2-tetrachloroethane

Final Fish Acute Value = 1,800 µg/l
Final Invertebrate Acute Value = 160 µg/l
Final Acute Value = 160 µg/l
Final Fish Chronic Value = not available
Final Invertebrate Chronic Value = not available
Final Plant Value = 6,200 µg/l
Residue Limited Toxicant Concentration = not available
Final Chronic Value = 6,200 µg/l
0.44 × Final Acute Value = 70 µg/l

Pentachloroethane

Final Fish Acute Value = 17,000 µg/l
Final Invertebrate Acute Value = 87 µg/l
Final Acute Value = 87 µg/l
Final Fish Chronic Value = not available
Final Invertebrate Chronic Value = 110 µg/l
Final Plant Value = 58,000 µg/l
Residue Limited Toxicant Concentration = not available
Final Chronic Value = 110 µg/l
0.44 × Final Acute Value = 38 µg/l

Hexachloroethane

Final Fish Acute Value = 350 µg/l
Final Invertebrate Acute Value = 16 µg/l
Final Acute Value = 16 µg/l
Final Fish Chronic Value = not available
Final Invertebrate Chronic Value = not available
Final Plant Value = 7,800 µg/l
Residue Limited Toxicant Concentration = not available
Final Chronic Value = 7,800 µg/l
0.44 × Final Acute Value = 7.0 µg/l

Human Health

Table 1.—*Criteria for Chloroethanes*

Compound	Criterion	Reference
Monochloroethane	None	
1,1-Dichloroethane	None	
1,2-Dichloroethane	7.9 µg/l—Carcinogenicity data	NCI, 1978a
1,1,1-Trichloroethane	15.7 mg/l—Mammalian toxicity data	NCI, 1977
1,1,2-Trichloroethane	2.7 µg/l—Carcinogenicity data	NCI, 1978b
1,1,1,2-Tetrachloroethane	None	
1,1,2,2-Tetrachloroethane	1.8 µg/l—Carcinogenicity data	NCI, 1978c
Pentachloroethane	None	
Hexachloroethane	5.9 µg/l—Carcinogenicity data	NCI, 1978d

At the present time, there is insufficient mammalian toxicological information to establish a water criterion for human health for the following chloroethanes: monochloroethane, 1,1-dichloroethane, 1,1,1,2-tetrachloroethane and pentachloroethane. Available evidence indicates that the general population is exposed to only trace levels of 1,1-dichloroethane, 1,1,1,2-tetrachloroethane and pentachloroethane. Although inhalation exposure to monochloroethane is more widespread, it is considered one of the least toxic of the chloroethanes. Should significant levels of exposure be documented in the future, it will be necessary to conduct more extensive toxicologic studies with these chloroethanes.

The criterion for 1,1,1-trichloroethane is based on the National Cancer Institute bioassay for possible carcinogenicity (1977). Results of the study showed that the survival of both Osborne-Mendel rats and B6C3F1 mice was significantly decreased in groups receiving oral doses of 1,1,1-trichloroethane. Chronic murine pneumonia may have been responsible for the high incidence of natural deaths. A variety of neoplasms was observed in both species, however, the incidence of specific malignancies was not significantly different from those observed in control animals. Survival time was significantly decreased in rats receiving the high dose, therefore, the criterion for 1,1,1-trichloroethane is based on the low dose in rats (750 mg/kg body weight, 5 days/week for 78 weeks) which produced toxic effects in a number of systems. It should be recognized that the actual no-observable-adverse-effect level (NOAEL) will be lower. However, use of the lowest-minimal-effect dose as an estimate of an "acceptable daily intake" has been practiced by the National Academy of Sciences (1977). Thus, assuming a 70 kg body weight and using a safety factor of 1,000 (Natl. Acad. Sci., 1977) the following calculation can be derived:

$$\frac{750\ \text{mg/kg} \times 70\ \text{kg} \times 5/7\ \text{day}}{1000} = 37.5\ \text{mg/day}$$

Therefore, consumption of 2 liters of water daily and 18.7 grams of contaminated fish having a bioconcentration factor of 21, would result in, assuming 100 percent gastrointestinal absorption of 1,1,1-trichloroethane, a maximum permissible concentration of 15.7 mg/l for ingested water:

$$\frac{37.5\ \text{mg/day}}{2\ \text{liters} + (21 \times .0187) \times 1.0} = 15.7\ \text{mg/l}$$

Based on available literature, 1,1,2-tri-, 1,1,2,2-tetra-, and hexachloroethane are considered to be carcinogenic in at least one rodent species (Natl. Cancer Inst., 1978b,c,d). In the case of these three chloroethanes, a statistical evaluation of the incidences of hepatocellular carcinomas revealed a significant positive association between the administration of the respective chloroethanes and tumor incidence. It can be concluded that under the conditions of the NCI bioassay, 1,1,2-tri; 1,1,2,2-tetra-; and hexachloroethane are carcinogenic in B6C3F1 mice, inducing (in all cases) hepatocellular carcinomas, in either male or female mice.

Estimated risk levels for these chloroethanes in water can be calculated using a linear, non-threshold model with the results from the NCI bioassays (see Summary of Pertinent Data). The model assumes a risk of 1 in 100,000 of developing cancer as a result of drinking 2 liters of water per day containing chloroethane at the concentrations used in the bioassays. Allowances are also made for consuming fish from chloroethane contaminated waters. Based upon these assumptions, the following criteria can be calculated:

Chloroethane	Dose* (mg/kg)	Criteria (µg/l)
1,1,2-trichloroethane	279	2.7
1,1,2,2-tetrachloroethane	203	1.8
hexachloroethane	842	4.4

*Five days per week for 78 weeks.

Under the conditions of an NCI bioassay (1978a) 1,2-dichloroethane is carcinogenic, inducing a statistically significant number of squamous cell carcinomas of the forestomach and hemangiosarcomas of the circulatory system in male rats, mammary adenocarcinomas in female rats and mice, and endometrial tumors in female mice. The criterion for 1,2-dichloroethane is based on the high dose (107 mg/kg/body weight, 5 days/week for 78 weeks) which induced mammary

adenocarcinomas in female rats. Using a linear, non-threshold model and including the consumption of fish from chloroethane contaminated waters the criterion for 1,2-dichloroethane is 7.0 μg/l.

It must be recognized that the NCI studies were designed to provide a "yes/no" answer to the carcinogenicity of a chemical in rats and mice. In some cases, it is difficult to justify extrapolation of data from NCI studies. In order to assess the risk to man of chronic exposure to low concentrations of a chemical. Those who assess risk should be aware of the following: Impurities in technical grade chloroethanes were not identified; chloroethanes were administered in oil which may affect absorption and metabolism; high concentrations were used; a time-weighted average dose was reported; however, doses causing toxic responses were often administered cyclically (one week, no treatment, followed by four weeks of treatment, five days/week); during some experiments dose levels were lowered or raised; for criteria calculations, doses administered five days/week were adjusted to an average daily dose as if administered seven days/week.

Under the Consent Decree in NRDC vs. Train, criteria are to state "recommended maximum permissible concentrations (including where appropriate, zero) consistent with the protection of aquatic organisms, human health, and recreational activities." 1,2-Dichloroethane, 1,1,2-trichloroethane, 1,1,2,2-tetrachloroethane and hexachloroethane are suspected of being human carcinogens. Because there is no recognized safe concentration for a human carcinogen, the recommended concentration of these chlorinated ethanes in water for maximum protection of human health is zero.

Because attaining a zero concentration level may be infeasible in some cases and in order to assit the Agency and States in the possible future development of water quality regulations, the concentrations of these chlorinated ethanes corresponding to several incremental lifetime cancer risk levels have been estimated. A cancer risk level provides an estimate of the additional incidence of cancer that may be expected in an exposed population. A risk of 10^{-5} for example, indicates a probability of one additional case of cancer for every 100,000 people exposed, a risk of 10^{-6} indicates one additional case of cancer for every million people exposed, and so forth.

In the Federal Register notice of availability of draft ambient water quality criteria, EPA stated that it is considering setting criteria at an interim target risk level of 10^{-5}, 10^{-6} or 10^{-7} as shown in the table below.

Exposure assumptions	Risk levels and corresponding criteria[1]			
	0	10^{-7} μg/l	10^{-6} μg/l	10^{-5} μg/l
2 liters of drinking water and consumption of 18.7 grams of fish and shellfish:				
1,2-dichloroethane	0	0.07	0.07	7.0
1,1,2-trichloroethane	0	0.027	0.27	2.7
1,1,2,2-tetrachloroethane	0	0.018	0.18	1.8
hexachloroethane	0	0.059	0.59	5.9
Consumption of fish and shellfish only:				
1,2-dichloroethane	0	1.708	17.08	170.8
1,1,2-trichloroethane	0	0.483	4.83	49.3
1,1,2,2-tetrachloroethane	0	0.127	1.27	12.7
hexachloroethane	0	0.079	0.79	7.9

[1] Calculated by applying a modified "one hit" extrapolation model described in the 44 FR 15926, March 15, 1979 Anaerobic bioassay data used in the calculation of the model are presented in the summary of pertinent data. Since the extrapolation model is linear to low doses, the additional lifetime risk is directly proportional to the water concentration. Therefore, water concentrations corresponding to other risk levels can be derived by multiplying or dividing one of the risk levels and corresponding water concentrations shown in the table by factors such as 10, 100, 1,000 and so forth.

[2] Four percent of 1,2-dichloroethane exposure results from the consumption of aquatic organisms which exhibit an average bioconcentration potential of 4.6 fold. The remaining 96 percent of 1,2-dichloroethane exposure results from drinking water.

Six percent of 1,1,2-trichloroethane exposure results from the consumption of aquatic organisms which exhibit an average bioconcentration potential of 6.3 fold. The remaining 94 percent of 1,1,2-trichloroethane exposure results from drinking water.

Fourteen percent of 1,1,2,2-tetrachloroethane exposure results from the consumption of aquatic organisms which exhibit an average bioconcentration potential of 18 fold. The remaining 86 percent of 1,1,2,2-tetrachloroethane exposure results from drinking water.

Seventy-five percent of hexachloroethane exposure results from the consumption of aquatic organisms which exhibit an average bioconcentration potential of 3[illegible]. The remaining 25 percent of hexachloroethane exposure results from drinking water.

Concentration levels were derived assuming a lifetime exposure to various amounts of these chlorinated ethanes (1) occurring from the consumption of both drinking water and aquatic life grown in water containing the corresponding chlorinated ethane concentrations and, (2) occurring solely from the consumption of aquatic life grown in the waters containing the corresponding chlorinated ethane concentrations.

Although total exposure information for the above chlorinated ethanes is discussed and an estimate of the contributions from other sources of exposure can be made, this data will not be factored into the ambient water quality criteria formulation because of the tenuous estimates. The criteria presented, therefore, assume an incremental risk from ambient water exposure only.

Summary of Pertinent Data for 1,2-Dichloroethane

The water quality criterion for 1,2-dichloroethane is based on the induction of mammary adenocarcinomas in female Osborne-Mendel rats, given an average oral dose of 107 mg/kg/day 1,2-dichloroethane over a period of 78 weeks (NCI, 1978a). The incidences of mammary adenocarcinomas were 18/50 and 0/20 in the treated and control groups, respectively. The criterion was calculated from the following parameters:

$n_t = 18$
$N_t = 50$
$n_c = 0$
$N_c = 20$
$Le = 110$ wks.
$le = 89$ wks.
$L = 110$ wks.
$d = 76.4$ mg/kg/day (107 mg/kg/day × 5/7)
$f = 0.0187$ kg/day
$R = 4.6$
$w = 0.319$ kg

Based on these parameters, the one-hit slope (B_H) is 0.04765 (mg/kg/day)$^{-1}$. The concentration of 1,2-dichloroethane in water, calculated to keep the lifetime cancer risk below 10^{-5} is 7.0 μg/l.

Summary of Pertinent Data for 1,1,2-trichloroethane

The water quality criterion for 1,1,2-trichloroethane is based on the induction of hepatocellular carcinomas in female B6C3F1 mice, given an average oral dose of 390 mg/kg/day over a 78

week period (NCI, 1978b). The incidences of hepatocellular were 40/45 and 0/20 in the treated and control groups, respectively. The criterion was calculated from the following parameters:

$n_t = 40$
$N_t = 45$
$n_c = 0$
$N_c = 20$
Le = 91 wks.
le = 78 wks.
L = 91 wks.
d = 279 mg/kg/day (390 mg/kg/day × 5/7)
F = 0.0187 kg/day
R = 6.3
w = 0.029 kg

Based on these paramcters, the one-hit slope (B_H) is 0.123 $(mg/kg/day)^{-1}$. The concentration of 1,1,2-trichloroethane in water, calculated to keep the lifetime cancer risk below 10^{-5} is 2.7 µg/l.

Summary of Pertinent Data for 1,1,2,2-Tetrachloroethane

The water quality criterion for 1,1,2,2-tetrachloroethane is based on the induction of hepatocellular carcinomas in male B6C3F1 mice, receiving average oral doses of 284 mg/kg/day over a 78-week period (NCI, 1978c). The incidences of hepatocellular carcinomas were 44/49 and 1/18 in the treated and control groups, respectively. The criterion was calculated from the following parameters:

$n_t = 44$
$N_t = 49$
$n_c = 1$
$N_c = 18$
Le = 91 wks
le = 78 wks
L = 91 wks
d = 203 mg/kg/day (284 mg/kg/day × 5/7)
F = 0.0187 kg/day
R = 18
w = 0.035 kg

Based on these parameters, the one-hit slope (B_H) is 0.1638 $(mg/kg/day)^{-1}$. The concentration of 1,1,2,2-tetrachloroethane in water, calculated to keep the lifetime cancer risk below 10^{-5}, is 1.8 µg/l.

Summary of Pertinent Data for Hexachloroethane

The water quality criterion for hexachloroethane is based on the induction of hepatocellular carcinomas in male B6C3F1 mice, given an average oral dose of 1,179 mg/kg/day over a 78-week period (NCI, 1978d). The incidences of hepatocellular carcinomas were 31/49 and 3/20 in the treated and control groups, respectively. The criterion was calculated from the following parameters:

$n_t = 31$
$N_t = 49$
$n_c = 3$
$N_c = 20$
Le = 91 wks
le = 78 wks
L = 91 wks
d = 842 mg/kg/day (1179 mg/kg/day × 5/7)
F = 0.0187 kg/day
R = 320
w = 0.032 kg

Based on these parameters, the one-hit slope (B_H) is 0.0149 $(mg/kg/day)^{-1}$. The concentration of hexachloroethane in water, calculated to keep the lifetime cancer risk below 10^{-5}, is 5.9 µg/l.

Chromium

Criteria Summary

Freshwater Aquatic Life. For trivalent chromium the criterion to protect freshwater aquatic life as derived using the Guidelines is "e(0.83·ln (hardness) + 2.94)" as a 24-hour average and the concentration should not exceed "e(0.83·ln(hardness) + 3.72)" at any time.

For hexavalent chromium the criterion to protect freshwater aquatic life as derived using the Guidelines is 10 µg/l as a 24-hour average concentration and the concentration should not exceed 110 µg/l at any time.

Saltwater Aquatic Life. For saltwater aquatic life, no criterion for trivalent chromium can be derived using the Guidelines, and there are insufficient data to estimate a criterion using other procedures.

For hexavalent chromium the criterion to protect saltwater aquatic life as derived using the Guidelines is 25 µg/l as a 24-hour average and the concentration should not exceed 230 µg/l at any time.

Human Health. For the protection of human health from the toxic properties of chromium (except hexavalent chromium) ingested through water and contaminated aquatic organisms, the recommended water quality criterion is 50 µg/l.

For the maximum protection of human health from the potential carcinogenic effects of exposure to hexavalent chromium through ingestion of water and contaminated aquatic organisms, the ambient water concentration is zero. Concentrations of hexavalent chromium estimated to result in additional lifetime cancer risks ranging from no additional risk to an additional risk of 1 in 100,000 are presented in the Criterion Formulation section of this document. The Agency is considering setting criteria at an interim target risk level in the range of 10^{-5}, 10^{-6}, or 10^{-7} with corresponding criteria of 8 ng/l, 0.8 ng/l, and .08 ng/l, respectively.

Basis for the Criteria

Freshwater Aquatic Life

Hexavalent chromium. The maximum concentration of hexavalent chromium is the Final Acute Value of 110 µg/l and the 24-hour average concentration is the final Chronic Value of less than 10 µg/l. No important adverse effects on freshwater aquatic organisms have been reported to be caused by concentrations lower than the 24-hour average concentration.

For hexavalent chromium the criterion to protect freshwater aquatic life as derived using the Guidelines is 10 µg/l as a 24-hour average and the concentration should not exceed 110 µg/l at any time.

Trivalent chromium. The maximum concentration of trivalent chromium is the Final Acute Value of e(0.83·ln (hardness) + 3.72) and the 24-hour average concentration is the Final Chronic Value of e(0.83·ln (hardness) + 2.94). No important adverse effects on freshwater aquatic organisms have been reported to be caused by concentrations lower than the 24-hour average concentration.

For trivalent chromium the criterion to protect freshwater aquatic life as derived using the Guidelines is "e(0.83·ln (hardness) + 2.94)" as a 24-hour average and the concentration should not exceed "e(0.83·ln (hardness) + 3.72)" at any time.

Summary of Available Data

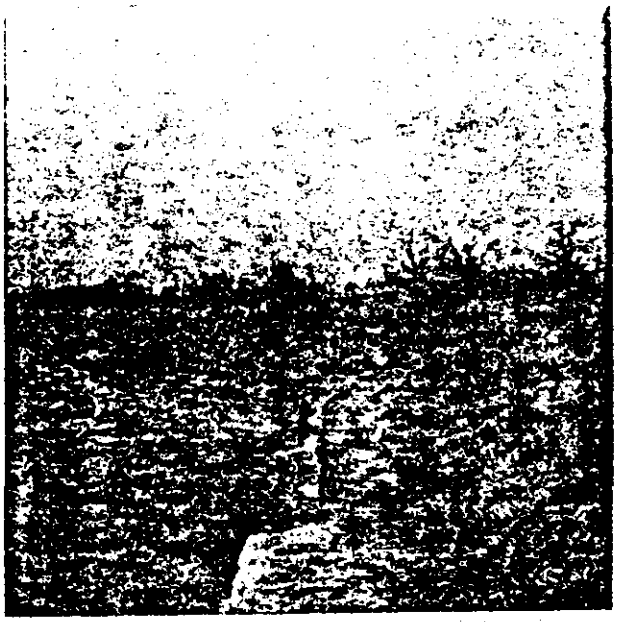
The concentrations below have been rounded to two significant figures. All concentrations herein are expressed in terms of chromium.

Hexavalent chromium

Final Fish Acute Value = 13,079 µg/l
Final Invertebrate Acute Value = 110 µg/l
Final Acute Value = 110 µg/l
Final Fish Chronic Value = 26 µg/l
Final Invertebrate Chronic Value = less than 10 µg/l
Final Plant Value = 10 µg/l
Residue Limited Toxicant Concentration = not available
Final Chronic Value = less than 10 µg/l
0.44 × Final Acute Value = 48 µg/l

Trivalent chromium

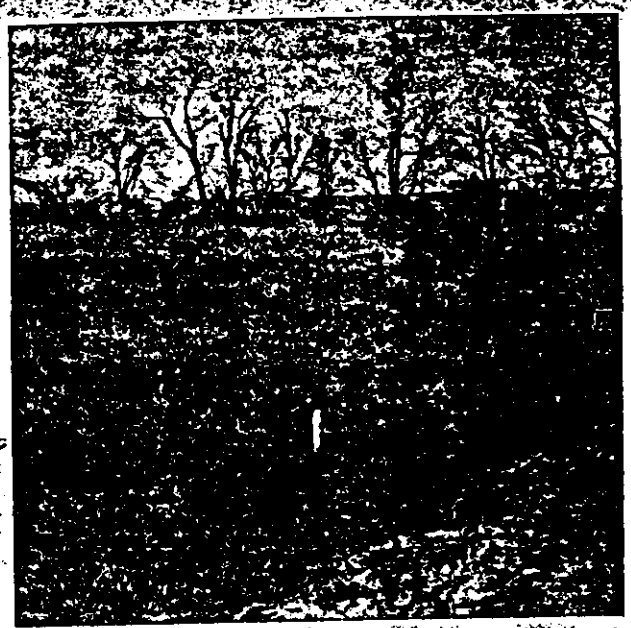
Final Fish Acute Value = e(0.83·ln (hardness) + 4.45)
Final Invertebrate Acute Value = e(0.83·ln (hardness) + 3.72)
Final Acute Value = e(0.83·ln (hardness) + 3.72)
Final Fish Chronic Value = not available
Final Invertebrate Chronic Value = e(0.83·ln (hardness) + 2.94)
Final Chronic Value = e(0.83·ln (hardness) + 2.94)
Final Plant Value = not available
Residue Limited Toxicant Concentration = not available



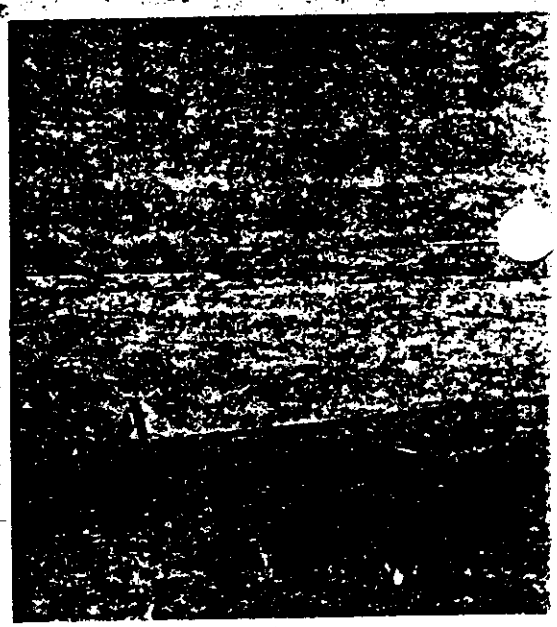
STAUFFER CHEM. (3)
STREAM BELOW BATCH PIT
75 YDS DOWNSTREAM FROM
WELL # 7 2-21-80

ORIGINAL
(Red)

STAUFFER CHEM. PVC
PLA
WELL # 9
2-21-80



STAUFFER CHEM. PVC
PLANT
WELL # 8
2-21-80 (4)



STAUFFER CHEM. PVC PL
BATCH PITS - NEAR WELL
8 +
2-21-80

ARCADIS

...ENTAL ... AGENCY - ...
... Alexandria, VA 22313 - 703/557-0335

Sample Number
ORIGINAL
(Red)

ORGANICS TRAFFIC REPORT

NUMBER: 31

SAMPLE SITE NAME:
STAUFFER CHEMICAL
P.V.C. PLANT

SAMPLE TYPE: (Check One)
- ___ RUN OFF
- ___ WELL
- ___ RECEIVING WATER
- ___ LEACHATE
- ___ EFFLUENT
- ✓ OTHER INFLUENT (specify)

SHIP TO:
WEST COAST TECHNICAL SERVICE
17605 FABRICA WAY
CERRITOS, CALIF 90701

ATTN: JACK NORTHING

REGIONAL OFFICE:
REGION III

Sampling Personnel:
(Name) GERRY CRUTCHLEY
(Phone) (301) 224-2740
Sampling Date:
(Begin) (End)

SHIPPING INFORMATION
Name of Shipper:
BILL THOMAS
Date Shipped:
Airbill Number:

Mark Volume Level on Sample Bottle

	Date Sampled	Sample Condition on Receipt
EXTRACTABLE		
EXTRACTABLE		
EXTRACTABLE		
EXTRACTABLE		
VOA UNPRESERVED	80021 1050	Fine
VOA UNPRESERVED (Duplicate)		

ANALYSIS LAB:
Rec'd by: [signature]
Date/Time Rec'd: 2-27-80

DESCRIPTION OF SAMPLE LOCATION:
LEAK CAUSING POSSIBLE CONTAMINATION OF WELL #11

SPECIAL HANDLING INSTRUCTIONS:
(Safety precautions, hazardous nature)

AR100146

WEST COAST TECHNICAL SERVICE INC. INDUSTRIAL CATEGORY

SAMPLE ID C0019
LAB ID 19005V15
DATE INJECTED 3/11/80
STD ID DFTPP975 19005V12
CONC. FACTOR

SAMPLE ID NO SAMPLE
LAB ID
DATE EXTRACTED
DATE INJECTED
STD ID
CONC. FACTOR

Volatiles		ug/l
2V	acrolein	28
3V	acrylonitrile	26
4V	benzene	ND
6V	carbon tetrachloride	ND
7V	chlorobenzene	ND
10V	1,2-dichloroethane	29209
11V	1,1,1-trichloroethane	13
13V	1,1-dichloroethane	*
14V	1,1,2-trichloroethane	*
15V	1,1,2,2-tetrachloroethane	ND
16V	chloroethane	*
17V	bis(chloromethyl) ether	ND
19V	2-chloroethylvinyl ether	ND
23V	chloroform	*
29V	1,1-dichloroethylene	*
30V	1,2-trans-dichloroethylene	48
32V	1,2-dichloropropane	49
33V	1,3-dichloropropylene	ND
38V	ethylbenzene	*
44V	methylene chloride	*
45V	methyl chloride	*
46V	methyl bromide	ND
47V	bromoform	ND
48V	dichlorobromomethane	*
49V	trichlorofluoromethane	ND
50V	dichlorodifluoromethane	ND
51V	chlorodibromomethane	ND
85V	tetrachloroethylene	ND
86V	toluene	ND
87V	trichloroethylene	143
88V	vinyl chloride	1400

Pesticides		ug/l
89P	aldrin	
90P	dieldrin	
91P	chlordane	
92P	4,4'-DDT	
93P	4,4'-DDE	
94P	4,4'-DDD	
95P	alpha-endosulfan	
96P	beta-endosulfan	
97P	endosulfan sulfate	
98P	endrin	
99P	endrin aldehyde	
100P	heptachlor	
101P	heptachlor epoxide	
102P	alpha-BHC	
103P	beta-BHC	
104P	gamma-BHC	
105P	delta-BHC	
106P	PCB-1242	
107P	PCB-1254	
108P	PCB-1221	
109P	PCB-1232	
110P	PCB-1248	
111P	PCB-1260	
112P	PCB-1016	
113P	toxaphene	

* = Less than 10 ug/l
(pesticides less than 5 ug/l)
ND = Not detected
** = Not confirmed by GCMS

AR100147

17605 Fabrication Way, Suite D Cerritos, California 90701 213/921-9831

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region III, Annapolis Field Office

DATE: April 16, 1980

(Rec'd)

JECT: Tentative Disposition - Stauffer Chemical, Delaware City, DE (DE-7)

FROM: William M. Thomas, Jr. WMT (3SA21)
Engineering Technician

TO: Jeffrey W. Haas (3SA30)
Acting Chief, Environmental Emergency Branch

Enclosed is the Tentative Disposition form and analytical results from Stauffer Chemical.

cc: Heather Gray (3EN31)

AR100148

EPA FORM 1320-6 (REV. 3-76)

POTENTIAL HAZARDOUS WASTE SITE
TENTATIVE DISPOSITION

III | DE 7

...form in the regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency, Site Tracki... Hazardous Waste Enforcement Task Force (EN-335), 401 M St., SW, Washington, DC 20460.

I. SITE IDENTIFICATION

A. NAME: STAUFFER CHEMICAL (PVC PLANT)
B. STREET: SCHOOLHOUSE RD.
C. CITY: DELAWARE CITY
D. STATE: DE.
E. ZIP CODE: 19706

II. TENTATIVE DISPOSITION

Indicate the recommended action(s) and agency(ies) that should be involved by marking 'X' in the appropriate boxes.

RECOMMENDATION	MARK 'X'	ACTION AGENCY: EPA	STATE	LOCAL	PRIVA
A. NO ACTION NEEDED — NO HAZARD					
B. INVESTIGATIVE ACTION(S) NEEDED (If yes, complete Section III.)	X	X			
C. REMEDIAL ACTION NEEDED (If yes, complete Section IV.)	X	X			X
D. ENFORCEMENT ACTION NEEDED (If yes, specify in Part E whether the case will be primarily managed by the EPA or the State and what type of enforcement action is anticipated.)	X	X			•

E. RATIONALE FOR DISPOSITION
The results of the preliminary assessment reveal ground water contamination. High concentrations of Vinyl chloride and sev other priority pollutants were detected. Enforcement actio is needed, but to determine the source of contaminat further investigations and sample analysis is necessary.

F. INDICATE THE ESTIMATED DATE OF FINAL DISPOSITION (mo., day, & yr.): JUNE 30, 1980

G. IF A CASE DEVELOPMENT PLAN IS NECESSARY, INDICATE ESTIMATED DATE ON WHICH THE PLAN WILL BE DEVELOP (mo., day, & yr.): MAY 25, 1980

H. PREPARER INFORMATION
1. NAME: WILLIAM M. THOMAS
2. TELEPHONE NUMBER: FTS 922-3752
3. DATE (mo., day, & yr.): April 15, 19

III. INVESTIGATIVE ACTIVITY NEEDED

A. IDENTIFY ADDITIONAL INFORMATION NEEDED TO ACHIEVE A FINAL DISPOSITION.
Treatment plant inspection

B. PROPOSED INVESTIGATIVE ACTIVITY (Detailed information)

1. METHOD FOR OBTAINING NEEDED ADDITIONAL INFO.	2. SCHEDULED DATE OF ACTION (mo, day, & yr)	3. TO BE PERFORMED BY (EPA, Contractor, State, etc.)	4. ESTIMATED MANHOURS	5. REMARKS
a. TYPE OF SITE INSPECTION (1) Treatment Plant Inspection	5-15-80	EPA	16	Determine whether ground water contamination is caused by treatment or batch pits contain vinyl chloride waste
(2)				
(3)				
b. TYPE OF MONITORING (1)				
(2)				
c. TYPE OF SAMPLING (1) Volatile organic sampling & analysis	5-15-80	EPA	32	SAMPLE TEST WELLS
(2)				

AR100149

EPA Form T2070-3 (10-79)

Continue On Reverse

Site inspection	6-15-80	EPA	Approx 65 miles	approx 6 sample sources
(specify)				

ORIGINAL (2 pgs)

C. ELABORATE ON ANY OF THE INFORMATION PROVIDED IN PART B (on front & above) AS NEEDED TO IDENTIFY ADDITIONAL INVESTIGATIVE WORK.

D. ESTIMATED MANHOURS BY ACTION AGENCY

1. ACTION AGENCY	2. TOTAL ESTIMATED MANHOURS FOR INVESTIGATIVE ACTIVITIES	1. ACTION AGENCY	2. TOTAL ESTIMATED MANHOURS FOR INVESTIGATIVE ACTIVITIES
a. EPA	50 hrs.	b. STATE	
c. EPA CONTRACTOR		d. OTHER (specify)	

IV. REMEDIAL ACTIONS

A. SHORT TERM/EMERGENCY STRATEGY (On Site & Off-Site): List all emergency actions needed to bring site under immediate control, e.g., restrict access, provide alternate water supply, etc. See instructions for a list of Key Words for each of the actions to be used in the space below.

1. ACTION	2. EST. START DATE (mo,day,&yr)	3. EST. END DATE (mo,day,&yr)	4. ACTION AGENCY (EPA, State, Private Party)	5. ESTIMATED COST	6. SPECIFY 311 OR OTHER ACTION; INDICATE THE MAGNITUDE OF THE WORK REQUIRED
Contain leak from treatment Unit by Stauffer Chem.	immediately		EPA inspect	$ unknown	
			Stauffer	$	
				$	
				$	
				$	
				$	

B. LONG TERM STRATEGY (On Site & Off-Site): List all long term solutions, e.g., excavation, removal, ground water monitoring wells, etc. See instructions for a list of Key Words for each of the actions to be used in the spaces below.

1. ACTION	2. EST. START DATE (mo,day,&yr)	3. EST. END DATE (mo,day,&yr)	4. ACTION AGENCY (EPA, State Private Party)	5. ESTIMATED COST	6. SPECIFY 311 OR OTHER ACTION; INDICATE THE MAGNITUDE OF THE WORK REQUIRED
Pump monitoring wells to restore original integrity of ground water			Stauffer	$ unknown	
				$	
				$	
				$	
				$	
				$	

C. ESTIMATED MANHOURS AND COST BY ACTION AGENCY

1. ACTION AGENCY	2. TOTAL EST. MANHOURS FOR REMEDIAL ACTIVITIES	3. TOTAL EST. COST FOR REMEDIAL ACTIVITIES	1. ACTION AGENCY	2. TOTAL EST. MANHOURS FOR REMEDIAL ACTIVITIES	3. TOTAL EST. COST FOR REMEDIAL ACTIVITIES
a. EPA	16 HRS		b. STATE		
c. PRIVATE PARTIES			d. OTHER (specify) AR100150		

DELAWARE PVC PLANT

ORIGINAL (Red)

F3-8201-32 DE-7

FILE INVENTORY

8201-32-00 Original Report to DPO (Report Folder)
8201-32-01 TOD
8201-32-02 Maps (4)
8201-32-03 Copies of Air Photos (5)
8201-32-04 Letters: Walter Lee to Jack Sheehan and
8201-32-05 → Charles Markowitz. Feb 16, 1982. (2pp)
Attendan letters from 2/23/82 and 3/9/82 meetings (2pp)
8201-32-06 Letter: J.D. Sheehan to Christine Hladchuk.
March 8, 1982. (3pp).
8201-32-07 Memo: Chris Hladchuk to Files. 3-15-82 (3pp).
8201-32-08 Letter: A.D. Stone and C.K. Lee to Chris Hladchuck.
Feb 8, 1982. (3pp)
8201-32-08A Duplicate of 8201-32-08
8201-32-09 Site Safety and Work Plans. (12pp)
8201-32-09A Duplicate of 8201-32-09
8201-32-09-1 Letter: AD Stone to FJ Doyle and D. McBride. March 3, 1982
8201-32-10 Stauffer Chemical Company. Emergency and
8201-32-10 Disaster Control Plan. (15pp)
8201-32-11 Notes on OSHA regs for the PVC Plant
8201-32-12 Field, Sample log (3pp)
8201-32-13 Notes on Sample C5047 and C5048.
Report from WCTS. April 22, 1982. (5pp)
8201-32-14 Sample Analytical Data Quality Assurance Review
8201-32-15 Field Log Notes. (4pp)
8201-32-16 Field Notes. Log Book 5-117-22 (6pp)
8201-32-17 Field Notes Log 5-117-25 (16pp)
8201-32-18 Photo Processing Log.
8201-32-19 Eckhardt Printout.
8201-32-20 Information Tables (4)

ORIGINAL
(Red)

8201-32-21	Memo: Ron Stouter to Judy Morton. Sept. 26, 1978 (2pp).
8201-32-22	Stake Report 020. April 26, 1979. (3pp)
8201-32-23	Reply 3AW23. March 3, 1982 (8pp)
8201-32-24	Letter: Wayne C. Jaeschke to Peter Bibko. January 7, 1982.
8201-32-23A	Duplicate of 8201-32-23
8201-32-24A	Duplicate of 8201-32-24
8201-32-25	Mitre Model.
8201-32-26	Letter: Wayne C. Jaeschke to Peter Bibko. January 7, 1982. Stauffer Chemical Report and Reply to Mitre model. (20pp).
201-32-27	Mitre Model Draft April 30, 1982
8201-32-27A	Duplicate of 8201-32-27
8201-32-28	Q.A. sample data. (large Packet)
8201-32-29	Mitre Model and Stauffer Co. reply and discussion 1/18/82 (In second folder)
8201-32-30	Map
8201-32-31	Extra Photos.

Void Tags 3-4879, 3-4898, 3-4876, 3-4897, 3-4875, 3-4878

F3-8006-17

INVENTORY SHEET
FOR
STOUFFER CHEMICAL CO.

ORIGINAL (Red)

F3-8006-17-01	(1 page)	General Task Description (TDD)
~~02~~		~~Contractor Performance Evaluation~~
03	(1 page)	Acknowledgment of completion for TDD
04	(1 page)	Dumpsite Summary Sheet
05	(1 page)	To: Joe McGovern From: Michael Musheno Subject: cancellation of TDD, Date 7/8/80
06	(16 pages)	Site Inspection Plan
07	(5 pages)	Memo: From: Leslie M. Greenbaum To: EPA Staff Subject: E& E (refusal of entery) (Hold Harmless/Indeminity) Date: 7/26/80
08	(1 page)	News (Chemical Week 7/11/80) Article on EPA Court Case

09 (1 PAGE) CPAF POLYM. IND. PERF. EVENT

F3-8006-17-10 - CASE DEVELOPMENT PLAN- EPA REGION III (IN SEPARATE LOOSE-LEAF BINDER)

AR100153

INVENTORY SHEET
of

DELAWARE CITY PVC

TDD No. F3-8111-04

EPA No. DE-07

ORIGINAL
(Red)

F3-8111-04-01	TDD
F3- -02	ACK. OF COMPLETION
F3- -03	ORIGINAL HYDRO REVIEW 2/25/82
F3- -04	EPA PEER REVIEW
F3- -05	MEMO FROM FIT III TO EPA, CORRECTIONS
F3- -06	REVISED REPORT 6/3/82
F3- -07	COPY OF EPA FILE (AS SENT TO MR SMITH)
F3-	(SEPERATE FOLDER
F3-	
F3-	
F3-	
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F3-	
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AR100154

INVENTORY SHEET
of

ORIGINAL
(Red)

Delaware City PVC

TDD No. F3- 8204-05

EPA No. DE 07

F3- 8204-05-1	A of a
F3- 8204-05-2	TDD 2 pgs
F3- 8204-05-3	Samples 2 pgs
F3- 8204-05-4	Chain Custody
F3- 8204-05-5	Samples 3 pgs
F3- 8204-05-6	Chain Cust
F3- 8204-05-7	Letter report
F3-	
F3-	
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INVENTORY SHEET
of

STAUFFER CHEM

TDD No. F3-8107-13

EPA No. DE 7

ORIGINAL
(Red)

F3-8107 13-1	TDD
F3- -2	Acknowledgement for TDD Completion
F3- -3	Final Strategy Determination - 2 Pages
F3- -4	Mitre Model - 9 Pages
F3-	
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#1

1a

ORIGINAL
(Red)

V. SUSPECTED HAZARDOUS SUBSTANCES

A. Samples Taken at the Site on 3/11/80 by EPA

1) Test well #11 - located between earthen lagoon and aeration lagoons. (Sample #C0001)

2) Test well #8 - located near southeast corner of off-grade batch pit, approximately 10 yards from pit. (Sample #C0002)

3) Test well #9 - located adjacent to off-grade batch pit, approximately 30 yards west of well #8. (Sample #C0003)

4) Stream flowing southwest from off-grade batch pit to Dragon Creek - sample taken 75 yards southwest of well #7. (Sample #C0004)

5) Domestic well - located northwest of facility approximately 500 yards from site. (Sample #C0005)

6) Leak sample - leak from influent line to aeration lagoon. Possible contamination of well #11. (Sample #C0019)

All sample locations are designated on the attached maps.

ORIGINAL (Red)

Ref: Site Inspection Report - 3/11/80

B. Sample Analysis Results - Summary

All well samples were contaminated with a number of priority pollutants. The more conspicuous pollutants were acrolein, 1,2-dichloroethane (experimental transplacental carcinogen, mutagen, and teratogen), chloroethane, and vinyl chloride (recognized carcinogen). Levels of these compounds were, for the most part, well above the recommended drinking water criteria.

Compound	Well #11	Well #8	Well #9	Drinking Water Criteria	Hazard *
acrolein	116		178	6.5	PP
1,2-dichloroethane	10916	1637	135	0 (0.7)	EC
chloroethane	44	23	18	-	PP
vinyl chloride	1002	43	40	0 (51.7)	KC

ORIGINAL
(Red)

Note: all concentrations in ppb

( ) = concentration for $1x10^{-6}$ risk level.

*Ref: "Dangerous Properties of Industrial Materials" Fifth Edition, N. Irving Sax

PP = priority pollutant

EC = experimental carcinogen

KC = known carcinogen

In addition, all wells showed trace amounts of 1,1 -dichloroethylene (experimental carcinogen) and trichloroethylene (suspected carcinogen) with well #11 also showing trace amounts of chloroform (known carcinogen).

Since all wells are very close to the PVC sludge pits, it seems the pits are the source of contamination. However, in the case of well #11, because the influent leak to the wastewater treatment ~~system~~ lagoons is here, this well may also be receiving some above ground contamination (note priority pollutant concentrations in leak sample).

Finally, the domestic well sample proved to be negative. Due to its location northwest of site, this is not improbable as the ground water appears to be flowing in a southerly direction.

Person to testify: Dr. Sam Rotenberg

← EPA - Region III Toxicologist

Delaware State Files

#2

Exhibit C

MEMORANDUM

ORIGINAL (Red)

TO: Judy Morton

FROM: Ron Stoufer R.N.S.

DATE: September 25, 1978

SUBJECT: Waste lagoons at Stauffer Chemical PVC plant in Delaware City

---

I am writing this to document a visit Ken Weiss and I made on September 19, 1978 o talk to Charles Markowitz of Stauffer Chemcial Company's PVC plant in Delaware City nd to tour their waste lagoons. This plant polymerizes vinyl chloride to make poly-inyl chloride (PVC).

The attached plan at a scale of 1 inch = 200 feet shows the locations of the waste agoons. The two areas marked "lagoon" are aerated lagoons which are part of the waste-ater treatment process. The exposed part of the sides of the aerated lagoons are concrete

The storm water reservoir, also called the RV pond, collects storm water runoff om the plant area. This water is then pumped from the RV pond to the aerated lagoons. r, during heavy rains, the pumping cannot keep up with the inflow and the RV pond verflows. Stauffer was fined for a discharge from such an overflow within the last everal months. If there is any kind of a chemical or oil spill in the plant area, those aterials would also go into the RV pond. If there are blockages in the pumping system om the plant to the aerated lagoons, the E 11 process wastewater, mainly latex mulsion resin, occasionally goes to the RV pond. Since this pond is unlined, these pills are a potential source of groundwater contamination. The RV pond was being cleaned ut by excavating it while we were there because they hope to get a discharge permit or this lagoon.

The lagoon called the off grade batch pit on the plan is also called the earth agoon. It is apparently an unlined excavation. It is at least 80% full of what are alled PVC solids. This lagoon is connected to the smaller lagoon west of it which is ll liquids. Markowitz guessed that these 2 lagoon and the aerated lagoons are all bout 10-12 feet deep. The earth lagoon was used to store off grade batches of PVC and hen the pumps that pump the effluent to the Delaware River are out of service, the ffluent has occasionally been pumped into the earth lagoon. The earth lagoon also eceives overflows from the pilot plant and overflows from the treatment plant. Markowitz aid they are trying not to discharge to the earth lagoon at the present time. The bottom f the earth lagoon was tarred at one time. This lagoon is also a potential source of roundwater contamination. It is possible that some vinyl chloride could have gone into ny of these ponds, but it is very volatile and may not have gone into the ground. The VC itself is quite insoluble. The greatest potential threat to groundwater quality may e the organic chemicals used to start, maintain, and stop the polymerization reactions. ot know the names of these compounds.

ORIGINAL
(Red)

There are also 2 lagoons north of the aerated lagoons that are full of PVC sludge. Apparently when there is a high demand for PVC, waste PVC sludge or solids can be sold at a profit. That may be why they have several pits full of PVC solids.

I am writing a letter to Markowitz requesting additional information on the lagoons for our use in the SIA.

/ovc

Stauffer Chemical Co. — Delaware City

State Site Number 30

#3 Report 2

STATE REPORT ORIGINAL (Red)

Exhibit 9

The Stauffer Chemical Company is located on State Route 13 just east of th Getty Refining and Marketing Company between Red Lion Creek to the north and Dragon Creek to the south. The facility manufactures polyvinyl chloride (PVC), polyvinyl acetate, and other polymers. There are five earthen ponds at the pla Four of them hold primarily PVC solids and one holds primarily storm water run-off from the plant area. None of these basins are on line with the wastewater treatment system at the plant and have regular influents and effluents but rath are used for storage either prior to treatment, as with the storm-water pond, o for disposal of PVC solids.

Two large aerated lagoons are part of the wastewater treatment system. Si their bottoms and sides are made of concrete, they will not be considered furth here.

The storm-water pond (#1 on the map), called the RV pond, collects stormwater run-off from the plant area and chemical and oil spills around the plant. Occasiona all process wastewater, which is mainly latex emulsion resin, is sent to the RV-pond when the pump system in the plant blocks up. The contents of the pond is pumped into the plant treatment system for treatment and disposal but sometimes; especially in heavy rains, the pond overflows when it can't be pumped to the treatment system fast enough. Some mention has been made by Stauffer of obtaining a discharge permit for the pond but nothing has been resolved to date. This pond was built in 1976 and is 140 feet by 160 feet by 7 feet below the ground surface. Stauffer employee says the pond is clay-lined but this fact is questionable since no specific details about the lining or its construction are available. The walls of the pond have been sprayed with a bituminous coating to prevent erosion. No flow information is available for this pond.

Two connected earth lagoons built in 1970, one called the off-grade batch pit (#2 on the map), and the other called the sludge pit (#3 on the map), are used to store off-grade batches of PVC. Occasionally, process wastewater is pumped into these ponds when the pump used to pump the effluent to the river is out of service. Also, overflow from the pilot plant and the treatment plant sometimes goes into these lagoons. The off-grade batch pit was approximately 80% full of solids and the sludge pit contained liquids when the site was inspected by the State in September, 1978. These lagoons are also supposedly lined with clay but construction plans for them do not mention any liner. The walls of these ponds were also sprayed with a bituminous coating for erosion control. The off-grade batch pit measures 160 feet by 210 feet and is 5 feet below the ground surface. The sludge pit is 160 feet by 70 feet and 3 feet below the ground surface.

The other two earthern ponds were built around 1971 and filled with PVC sludge with the intent of eventually selling it. They were filled in 1974 and have not been used since. One (#4 on the map) measures 180 feet by 60 feet and the other (#5 on the map) measures 160 feet by 110 feet. These pits have no liners and are of unknown depths.

Good subsurface information was obtained for these ponds from thirteen monitor wells put in around them. These wells were not required and as far as anyone knows they have not been sampled. Stauffer would not say why they were put in in the firs place.

Stauffer Chemical Co. - Delaware City

State Site Number 30

#3 water

State Report

ORIGINAL (Red)

EXHIBIT 4

The Stauffer Chemical Company is located on State Route 13 just east of t Getty Refining and Marketing Company between Red Lion Creek to the north and Dragon Creek to the south. The facility manufactures polyvinyl chloride (PVC), polyvinyl acetate, and other polymers. There are five earthen ponds at the pl Four of them hold primarily PVC solids and one holds primarily storm water run-off from the plant area. None of these basins are on line with the wastewater treatment system at the plant and have regular influents and effluents but rath are used for storage either prior to treatment, as with the storm-water pond, o for disposal of PVC solids.

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Good subsurface information was obtained for these ponds from thirteen monit wells put in around them. These wells were not required and as far as anyone kno they have not been sampled. Stauffer would not say why they were put in in the f place.

water level measurements were taken in late October, 1978. Since the water table in this area generally fluctuate seven to eight feet over a year, and October water levels are relatively low, it can be expected to be less than 10 feet below the ground surface much of the year. The water table could rise into the base of the RV-pond which is seven feet below the ground surface or possibly into the off-grade batch pit which has its base 5 feet below the ground surface. Since the depth of the two PVC sludge pits is not known, there is no way to know if the watertable could rise into the sludge or not. Since the sediments beneath the lagoons are silty, contaminant migration through them would probably be slower than in sandy sediments.

Beneath the silt, sand with some gravel and silt extends to a depth of approximately 45 feet below the ground surface where what is described as a gray silty clay is found which represents the contact between the Columbia Formation and the Merchantville Formation.

There are no large wells in the Columbia near these ponds which could effect the ground-water flow direction at the site. From the water level measurements and the Geohydrologic Atlas maps, the groundwater appears to flow to the south towards Dragon Creek. There are a few private dwellings which probably have shallow wells between the ponds and Dragon Creek along State Route 72 which could possibly intercept contaminants in the groundwater. To date no contamination has been reported.

/ 7

↓ Bill observed only remains of dwellings.

ORIGINAL
(Red)

L-NJ1011 1

#4

SITE: NUMBER 356 PAGE 1 FOR THIS SITE
DELAWARE CITY PVC PLANT
BOX 320 SCHOOL HOUSE ROAD
DELAWARE CITY,DE 19706

COMPANY: COMPANY-FACILITY NUMBER 46056
STAUFFER CHEMICAL COMPANY
PLASTICS DIVISION
DELAWARE CITY PVC PLANT
P.O. BOX 320, SCHOOL HOUSE ROAD
DELAWARE CITY,DE 19706

FIRST YEAR USED: 1966
LAST YEAR USED: 1979

HUNDRED TONS: 23
THOUSAND CUBIC YDS.: .
THOUSAND GALLONS: .

COMPOSITION OF WASTE:

ORGAN1
ORGAN6 ORGAN7
ORGAN10 ORGAN11 ORGAN12 ORGAN15 ORGAN16
ORGAN17 ORGAN20 ORGAN21 ORGAN24
INORG1 INORG3
MISC1 MISC8

AR100165

ORIGINAL
(Red)

IF LISTED, ITEM PRESENT IN WASTE. IF NOT LISTED, ITEM IS NOT PRESENT, NOT KNOWN IF PRESENT, OR DATA UNAVAILABLE

#5 ORIGINAL (Red)

Based on this information, a risk factor for groundwater pollution was calculated for the site. In general, although each impoundment's risk factor may be different, a value of 20 was ascertained as a result of the thickness of the unsaturated zone, (3), the groundwater availability, (5), groundwater quality, (5), and waste hazard potential, (7). The site associated health hazard factor is (5), based on the distance to the private wells mentioned above. The maximum rating for these parameters are 20 and 9 respectively. Therefore, the risk potential for goundwater is moderate to high.[1]

Ref:1. Report of Jeffrey Burke, Groundwater Protection Section, Water Supply Branch - 4/7/80. Attached as Exhibit O.

Person to Testify: Steve Platt, Groundwater Protection Section, Water Supply Branch, EPA-Region III.

2. Private Wells

The closest properties to the plant located on the south side of Route 72 are a Getty gasoline station, a Chevrolet/Oldsmobile car dealer, and a residence located behind the car dealer.1

ORIGINAL
(Red)

The Getty station is owned and operated by Warren Foraker, telephone number 302-834-4766.[1] The private well at the station descends to a depth of 68 ft. with 63.5 ft. of it surrounded by a 6 inch casing. The water table is at a depth of 36 feet below the land surface (or approximately 25 feet above sea level). The types of soil at the various depths are as follows:

Depth	Soil Type
0-3 ft.	topsoil
3-18	yellow sand and clay
18-25	yellow clay
25-53	yellow sand and clay
53-68	coarse sand

The well fills at a rate of 20 gallons per minute at a depth of 42 feet and at a rate of 40 gallons per minute at a depth of 60 feet.[2]

The car dealer is Stapleford Chevrolet/Oldsmobile, telephone number 302-834-4568. It is owned by Charles Stapleford Sr. He and his wife reside in the house located behind the

ORIGINAL
(Red)

dealership. Both the car dealership and the house obtain water from a single well located on the property. The house previously used a separate well but it recently ran dry.[1] The present well on the property was drilled in 1948. Its depth is 70 ft. 4 in. with a 4 in. casing to 65 ft. 4 1/2 in. The water table is 37.5 ft. below the land surface (or approximately 25 feet above sea level).

The type of soils at the various depths are as follows:

Depth	Soil Type
0-2 ft.	topsoil
2-7	yellow clay
7-18	sand, gravel, and clay
18-44	sand and clay
44-57	clay and little sand
57-70.5	coarse sand and gravel

The well fills at a rate of 42 gallons per minute at a depth of 60 feet.[2] In an interview with our investigators Charles Stapleford Jr. stated that he was not aware of any problems with the well water and to his knowledge it had not been recently tested.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region III – 6th & Walnut Sts.
Philadelphia, Pa. 19106

#6 file

ORIGINAL

SUBJECT: DE 7 Stauffer Chemical PVC Plant Site Inspection- Water Supply Branch

DATE: April 7, 1980(Red)

FROM: Jeffrey Burke Jeffrey Burke 7-30-80
Groundwater Protection Section (3WA32)

TO: J. Gary Gardner, (3AE00)
Robert L. Allen, (3AH30)
Leonard Mangiaracina, (3EN00)
Jeffrey W. Hass, (3SA00)
Benjamin A. Lacy, (3WA32)

The potential for groundwater contamination from this site is moderate to high. The five impoundments have varying risk factors, but are all in the same range of values. This site was analyzed for the "Surface Impoundment Assessment for Delaware", which serves as the basis for this report.

The sediments beneath the impoundments are silty to a depth of the water table, (approximately 10 feet thick). The water table could rise in to some or all of the lagoons during high level conditions. Beneath the silt, sand with some gravel and silt extends to a depth of approximately 45 below the ground surface where a gray silty clay is found, which represents the contact between the Columbia and Merchantville Formations.

Since this is an industrialized area, there are several other surface impoundment sites in the vicinity. No underground injection wells are known to exist within 5 miles. There are no large wells in the Columbia near these ponds.

The groundwater appears to flow to the south towards Dragon Creek. There may be a few private wells along Route 72 which could possibly intercept contaminants, although, to date, no contamination has been reported.

Based on this information, a risk factor for groundwater pollution was calculated for the site, in general, although each impoundment's risk factor may be different. A value of 20 was ascertained as a result of the thickness of the unsaturated zone, (3), the groundwater availability, (5), groundwater quality, (5), and waste hazard potential, (7). The site associated health hazard factor is 5, based on the distance to the private wells mentioned above. The maximum rating for these parameters are 29 and 9 respectively.

Therefore, the risk potential for groundwater is moderate to high. This may be further substantiated by the water samples taken during the preliminary site investigation. We do not believe that any site specific hydrological work will be required. The data available seems quite reliable.

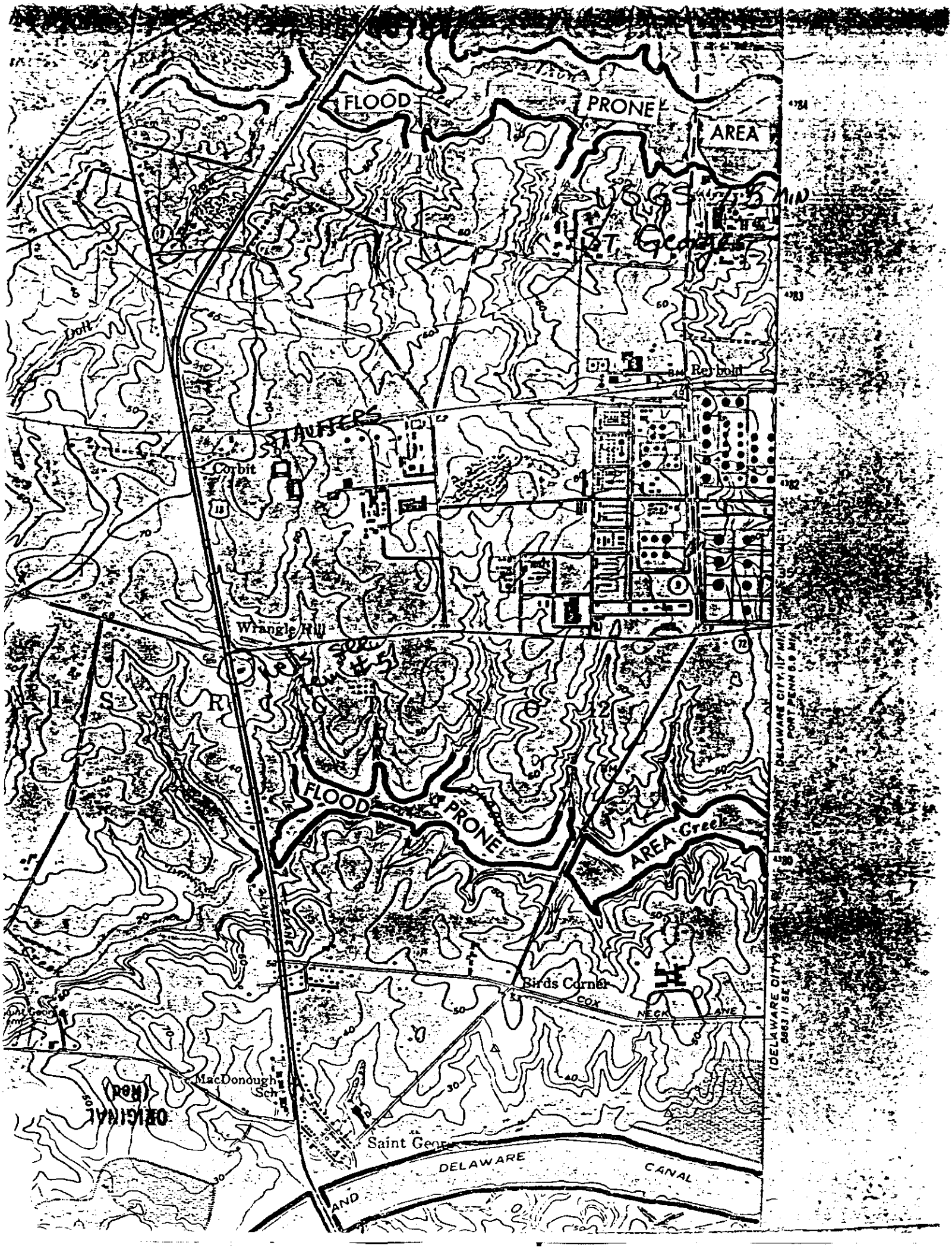
EPA III-513-73-7

(Joins sheet 31)

NEW CASTLE COUNTY, DELAWARE NO. 30

NEW CASTLE COUNTY, DELAWARE NO. 31

(Joins sheet 30)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PRONE
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Corbit
Wrangle Hill
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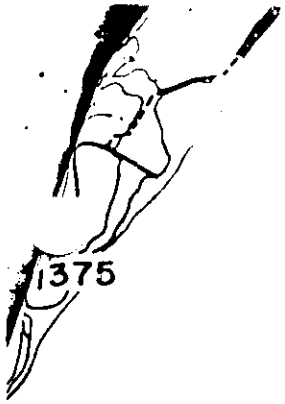
Saint Geo
DELAWARE
CANAL
AND
Rebuilt
Creek

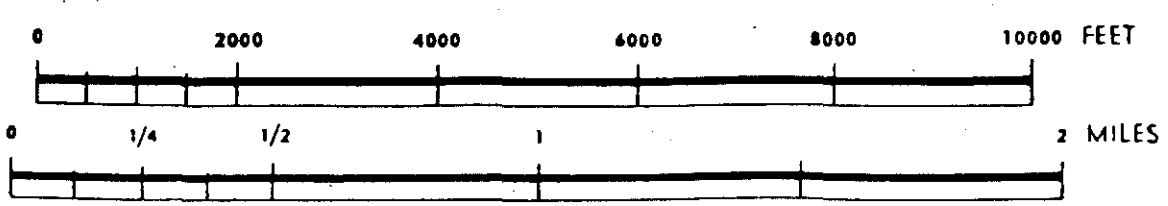


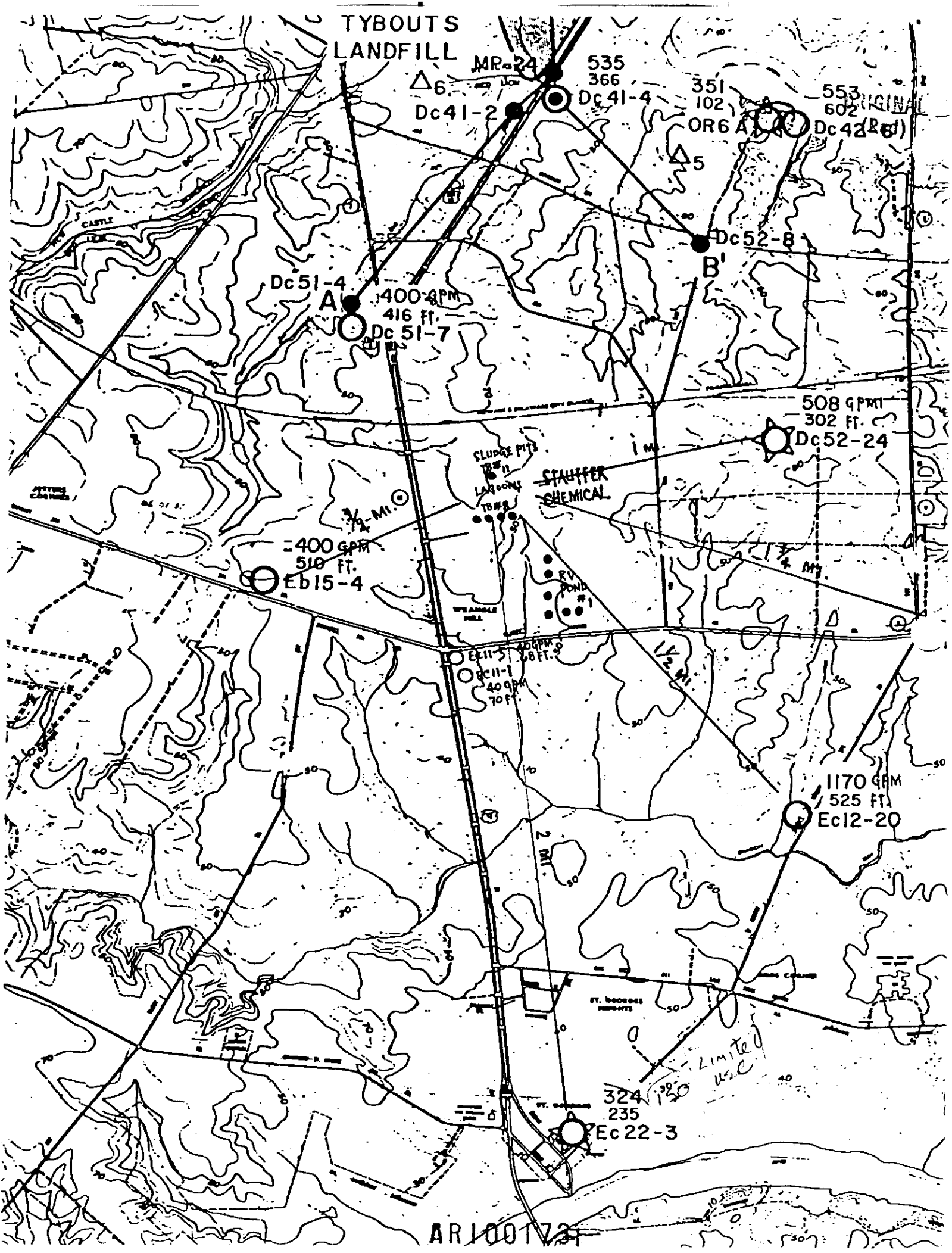
ORIGINAL
(Red)

LEGEND

○	PRODUCTION WELL GREATER THAN 300 gpm
○	PRODUCTION WELL LESS THAN 300 gpm
●	CROSS SECTION WELL
◉	PRODUCTION WELL AND CROSS SECTION WELL
△	THEORETICAL OBSERVATION WELL FOR CALCULATED DRAWDOWN
370	PUMPING RATE (gpm)
[75]	MAXIMUM ALLOCATED DRAWDOWN (FEET BELOW LAND SURFACE)
130	DEPTH TO TOP OF SCREENED INTERVAL (FEET BELOW LAND SURFACE)
☆	PRODUCTION WELLS IN UPPEP HYDROLOGIC ZONE

SCALES

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LANDFILL
MP-24
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366
Dc41-4
Dc41-2
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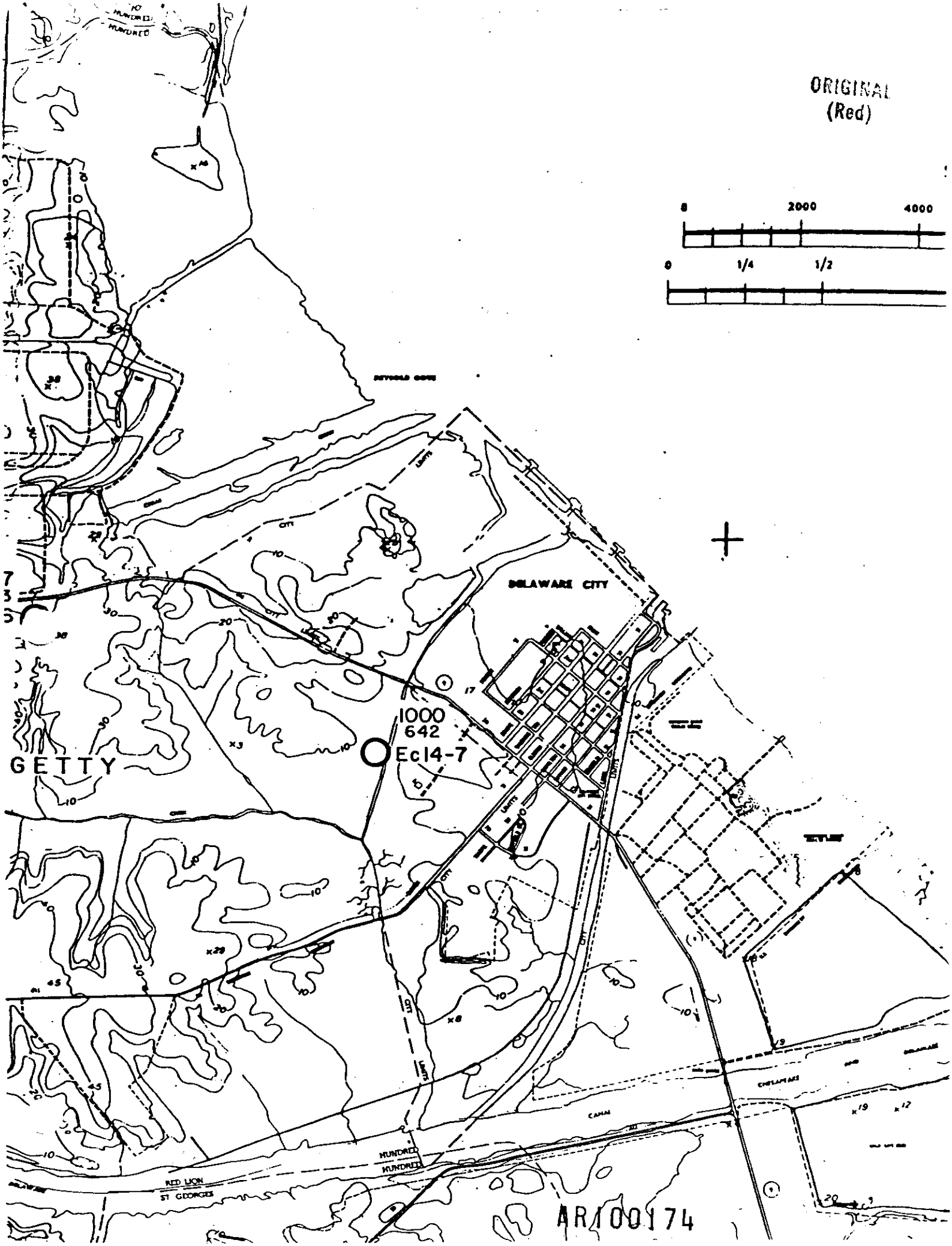
102
OR6A
553
602
Dc42-1
Dc52-8
B'
Dc51-4
A
400 GPM
416 FT.
Dc51-7
508 GPM
302 FT.
Dc52-24
SLUDGE PITS
LAGOONS
STAUFFER
CHEMICAL
1 MI.
3/4 MI.
400 GPM
510 FT.
Eb15-4
Ec11-3
Ec11-1
40 GPM
70 FT.
1 1/2 MI.
1170 GPM
525 FT.
Ec12-20
2 MI.
324
235
Ec22-3
limited use
ARI001731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ST GEORGES
HUNDRED
AR100174

Stauffer Chemical Company

Westport, Connecticut 06880 / Tel. (203) 222-3000 / Cable "Staufchem"

ORIGINAL (Red)

January 7, 1982

Mr. Peter Bibko
Regional Administrator
EPA Region III
Sixth and Walnut Streets
Philadelphia, Pennsylvania 19106

Dear Mr. Bibko:

Thank you for the opportunity to discuss our objections to the listing of the Delaware City PVC site on the "Superfund" priority list of 115 sites. We appreciated this opportunity to be heard and the courtesy extended by you and your staff.

Stauffer Chemical believes that listing the Delaware City PVC plant site was not warranted and requested delisting. This site is not abandoned and is a working plant covered by many operating permits issued under the Clean Water Act and Clean Air Act. Stauffer's experts in hydrogeology and waste disposal have investigated the site thoroughly and found no cause for remedial action. EPA had inspected the site in July 1980, and apparently did not find that the site posed a serious threat to the environment or public health since EPA did not request any action or additional information between July 1980, and the listing of the site under Superfund.

This letter and the attached reports are provided per your request, to delineate the concerns expressed at our meeting held on December 14, 1981, in your office and facilitate your further review.

You had requested that we list separately, differences in facts used to score the site and differences in how the Mitre Model should be used. I will summarize the key facts contained in the attached reports - Attachment 1, Comparison of Mitre Model Scores EPA - Stauffer, Attachment 2 - Hydrogeological Report - Paul Roux, Consultant Hydrogeologist. As we pointed out at the meeting there are significant differences of material facts which should result in a Mitre Model score from zero to five rather than EPA's initial score of 58.

Needless to say, Stauffer was astonished when this site appeared on the list, and we remain perplexed as to how this site could possibly be considered one of the highest priority waste disposal sites in the country. Representatives of the State of Delaware also indicated their surprise to us since they do not consider this a hazardous site. The listing of this site is an unjustified embarrassment to our Company and to our management who take pride in the responsible way in which we handle our wastes and other environmental concerns.

We think that as a minimum, this site does not deserve being carried forward to the statutory list of 400 to be published in mid-1982 for the following reasons:

1) No drinking water supply is threatened since there are no wells downgradient of the direction of groundwater flow under the site (see Attachment 2 - Paul Roux, Consultant Hydrogeologist's report).

2) The site poses no threat to the public supply wells located within three (3) miles upgradient of the site. These wells are in a deeper aquifer than the shallow aquifer where the releases were measured. The deeper aquifer is hydraulically separated from the shallow aquifer by a forty (40)-foot clay barrier. In addition, industrial supply wells located between the Delaware City (PVC) plant site and the public supply wells probably create an effective barrier to migration of pollutants from the plant site. The industrial wells have been sampled and show no contamination that can be attributed to the site.

3) The quantity of hazardous waste contained as an impurity in the otherwise non-hazardous polyvinyl chloride resin is extremely small, i.e., between about 300-1,000 lbs. vinyl chloride monomer. With such a small amount of hazardous type waste, we cannot understand how this site can pose a substantial threat to the public health. We calculated the quantity of VCM present in the waste based upon a recent analysis of the wastewater treatment sludge removed from the settling ponds and disposed at an approved landfill. The concentration of VCM was about 25-50 ppm and the disposal pits contain about 3,300 tons of wastewater treatment sludge called "off grade resin".

4) There is no measured evidence of release of EDC or VCM to a surface water. The measurement of .634 ppm EDC used by EPA as evidence of release to a surface water body was not in fact a surface water. It was a ditch adjacent to the wastewater treatment pond in which water normally does not flow. Our measurements of the true surface waters downgradient of the site showed no detectable EDC or VCM (using EPA priority pollutant detection limit of 10 ppb) in Dragon Creek or its normally flowing tributaries (see Table 3).

5) Stauffer removed the waste PVC resin from the ponds prior to sale of the property to Formosa Chemical and took it to an approved landfill.

6) The two disposal pits were capped in accordance with our Company program to provide assurances that past waste disposal areas do not cause environmental or public health problems.

Attachment 1 gives a detailed comparison of the Mitre Model score used to list the site and Stauffer's evaluation using what we believe are the correct facts. We conclude that the score should have been zero because the hazardous waste quantity was less than 20 tons - only about 300-1,000 lbs. In any event, the score could not reasonably be more than 5.2 even if the hazardous waste quantity was based upon the total PVC resin. Therefore,

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(Red)

we think that the EPA score of 58 used to list the site is inappropriate based on the facts as we know them. It raises serious questions about the credibility of the Mitre Model system for priority selection of sites under "Superfund".

As you indicated at our meeting, you and your staff will review the Delaware City (PVC) plant site within the next couple of months, reevaluate the criteria used for listing, and determine if the site should be listed on the statutory list of '400'. We feel confident you will find that this site should not be carried forward to that list.

Thanks once again for the courteous and attentive hearing on Dec. 14, 1981.

Very truly yours,

Wayne C. Jaeschke
Vice President,
Environmental Services Dept.

WCJ:db

attach.

cc: T. W. Field, EPA

ORIGINAL
(Red)

ATTACHMENT 1

GEOLOGY AND GROUND WATER FLOW
STAUFFER CHEMICAL CO.
DELAWARE CITY, DE

ORIGINAL
(Red)

INTRODUCTION

Low ppm concentrations of EDC and low ppb concentrations of VCM were detected in shallow monitoring wells adjacent to a lagoon and two pits at the Formosa Plastics plant (formerly Stauffer Chemical Co.) in Delaware City, DE. Because of this finding, it is important that ground-water flow directions in the vicinity of the plant be considered and the potential for impact to any water supply be evaluated.

Available data, including boring logs and topographic maps, were used to determine ground-water flow directions and potential discharge areas. It was found that there are several aquifers underlying the Formosa site. Flow in the shallow aquifer where the monitoring wells are screened is toward Dragon Creek. There are no wells other than the monitoring wells located between the plant and the creek. The shallow aquifer appears to be hydraulically separated from deeper aquifers by a thick clay layer. Following is a discussion of the geology of the site and the ground-water flow in the water table and deeper aquifers and the potential for contamination of these aquifers and nearby surface water bodies.

GEOLOGY

Figure 1 is a generalized geologic log of a boring that was drilled on the Formosa plant site. As shown, the upper 25 feet of sediments (Pleistocene) comprises the shallow water table aquifer. Beneath this sand layer is a clay layer that is at least 40 feet thick. The formation to which this clay layer(s) belongs is not known; it could be either the Merchantville, Magothy or Potomic. The top of the Potomic formation (Cretaceous) which contains the major aquifers of the region, is reported to be about 75 feet below land surface at the Formosa site. However, since there are no wells penetrating this formation at the Formosa or Stauffer sites, the actual depth is not known.

Because of its thickness, the clay layer will probably hydraulically separate the deeper aquifers of the Potomic formation from the water table aquifer. Also, because of its thickness (more than 40 feet) the clay layer is most likely continuous over the entire area between the Formosa site and Dragon Creek.

WATER TABLE AQUIFER

The direction of ground-water flow in the water table

aquifer at the Delaware City plant site was determined with the aid of the USGS 15' topographic map for the area (Saint Georges, Del.). This method was necessary because there are not a sufficent number of properly located wells in the area to construct a water table map from water level measurments. However, for general flow patterns, the method used is satisfactory. ORIGINAL (Red)

To construct a water table map using land surface topography, the elevations of flowing streams is determined at a number of points, generally where contour lines cross the streams. In the coastal plain sediments of the northeast, the water table is normally similar to the land surface topography. Thus, in constructing the water table map shown on figure 2, both land surface contours and stream elevations were considered.

Figure 2 shows that the shallow ground water in the vicinity of the lagoon and pits at the Formosa plant flows either into or adjacent and parallel to the tributary to the south of the lagoon and possibly as far south as Dragon Creek. The figure also shows that the nearest wells to the south of the plant, located at the gas station near the intersection of Wrangle Hill Road and Route 13, are upgradient of the tributary. The only other nearby wells are at the houses along Route 13 west of the plant. These are generally upgradient of the lagoon and pit area. Thus it is concluded that there are no wells downgradient of the plant site other than monitoring wells.

Since the water table aquifer discharges into the tributary to Dragon Creek and possibly into Dragon Creek itself, water samples were collected and analyzed to determine if there were a measurable release of EDC or VCM to any surface water body. The locations of the four stream sampling points and one spring sample (ground water that was exposed at the surface but was not flowing into a surface water body) are shown on figure 3. No detectable EDC or VCM was found in any of the surface water samples. Note that sampling point C is the closest flowing surface water to the plant and therefore the most likely point to be impacted.

The ground water sample collected at the spring, point D, contained no detectable VCM and about 8 ppb (below the normal 10 ppb detection limit required by the priority pollutant protocol) of EDC. Since the concentration of EDC (The predominant compound in the monitoring wells) is so low in the ground water directly downgradient of the lagoon, it is concluded that there is probably no measurable level of EDC or VCM in the ground water flowing off the plant's property or reaching and flowing stream.

ORIGINAL
(Red)

DEEPER AQUIFERS

Ground-water gradients in the deeper aquifers of the Potomic formation are not known. However, in all likelihood they are influenced by local pumpage from these aquifers. In this case it will be the closest wells that intercept flow from deep under the Formosa plant site. The closest deep wells belong to Getty Oil Company and are distributed throughout the area. The nearest public supply wells, also in deep aquifers, belong to the Artesian Water Company and are located about two to three miles to the north of the Formosa plant.

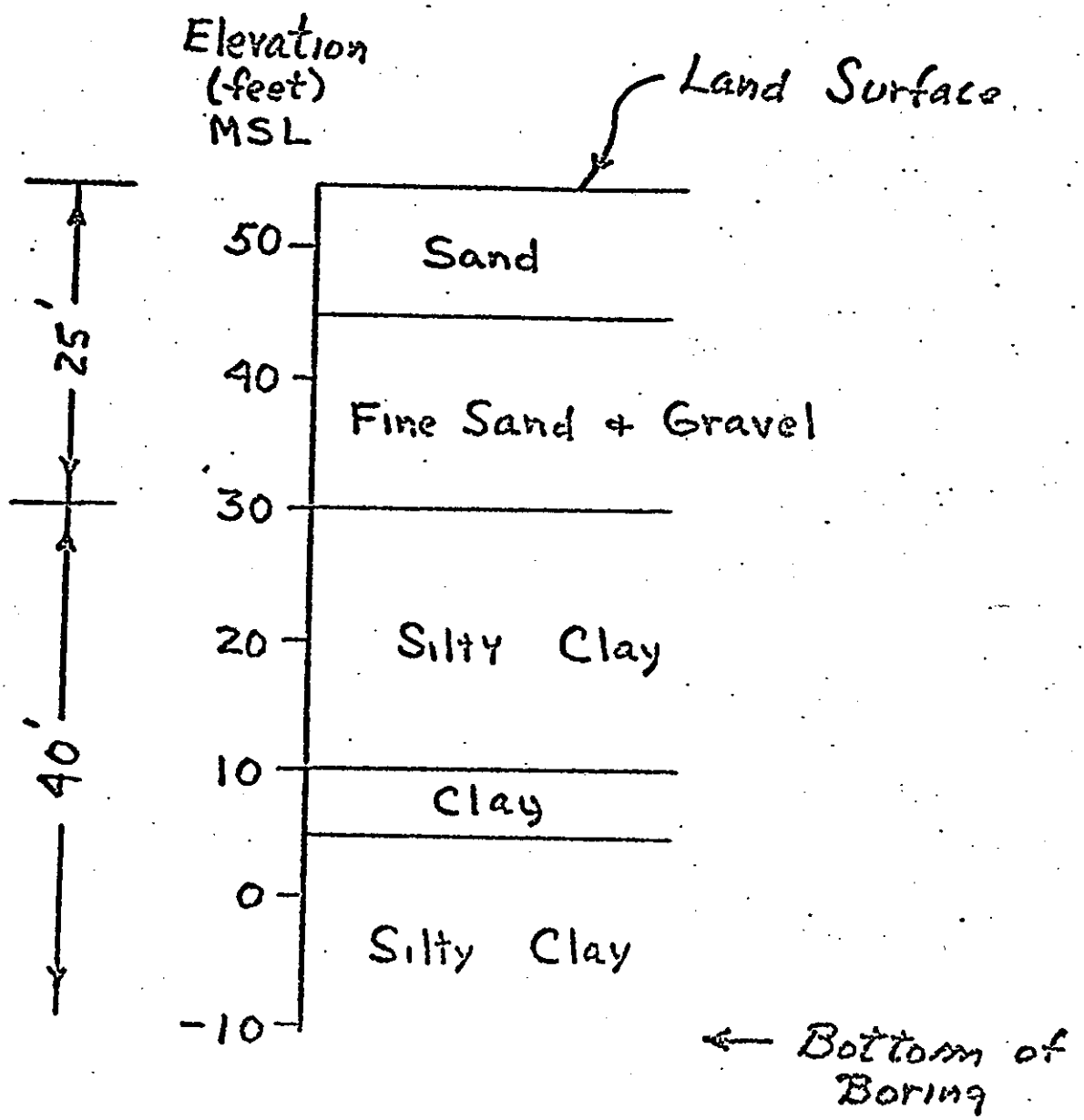
Flow of water in the deep aquifers from under the Formosa plant site to the Artesian Company wells is not a realistic possibility because of the intervening Getty wells. These industrial supply wells reportedly pump large volumes of water and would have large cones of depression to intercept flow. Also, two of these intervening Getty wells (located along Red Lion Creek as shown on figures 2 and 3) have been sampled and found to contain no detectable EDC or VCM. Since the plant has been in operation for 16 years, it is unlikely that EDC or VCM will ever reach these wells. In addition, considering the low concentrations at the source and geologic conditions at the site, the possibility of finding a detectable concentration of EDC or VCM from the Formosa plant in any well in the Potomic aquifers is virtually nil.

December 23, 1981

Paul H. Roux

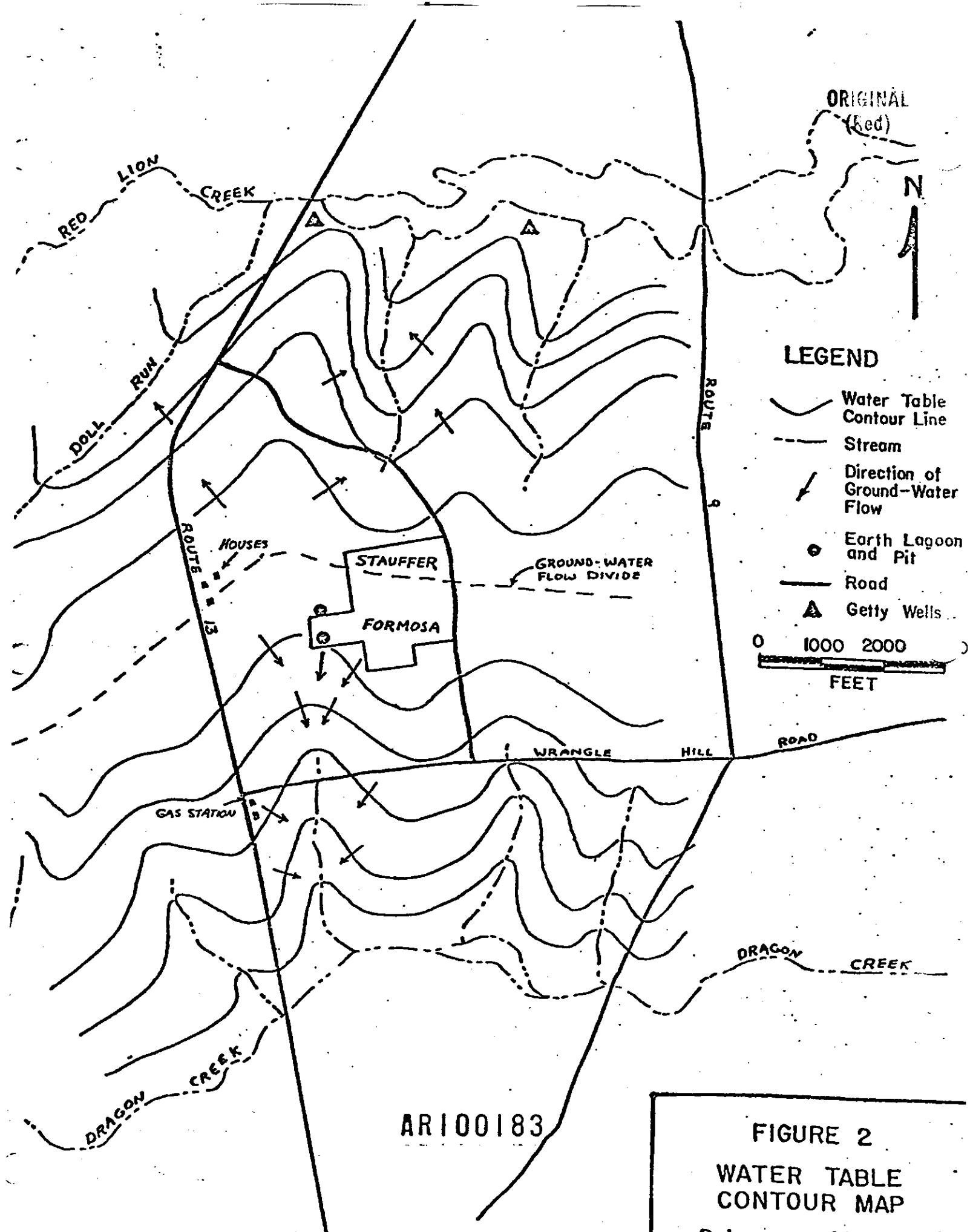
Paul H. Roux
Hydrogeologist
CPGS # 4538

ORIGINAL
(Red)



AR100182

FIGURE 1
Generalized
Geologic Log
Delaware City, DE



AR100183

FIGURE 2

WATER TABLE CONTOUR MAP

Delaware City, DE

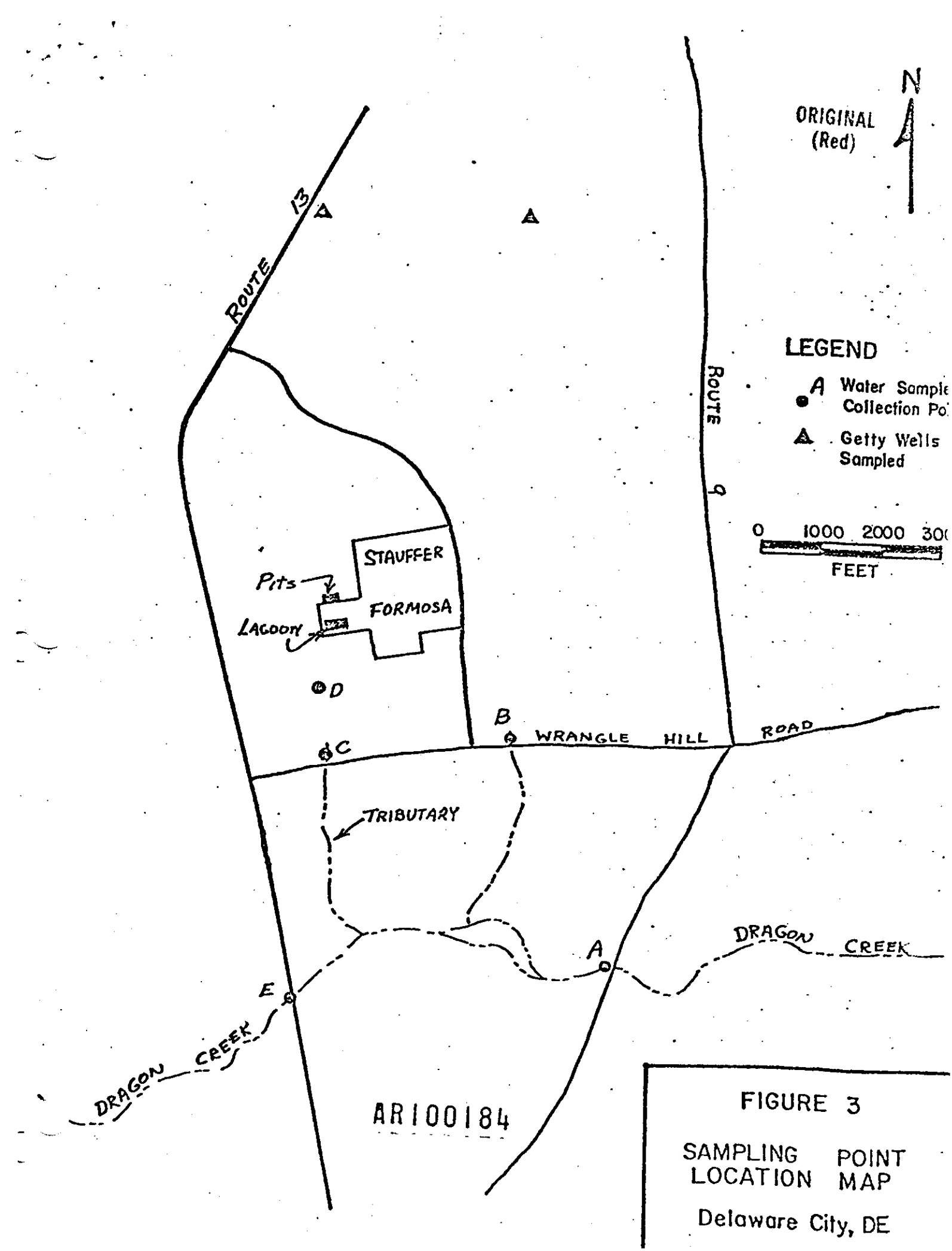
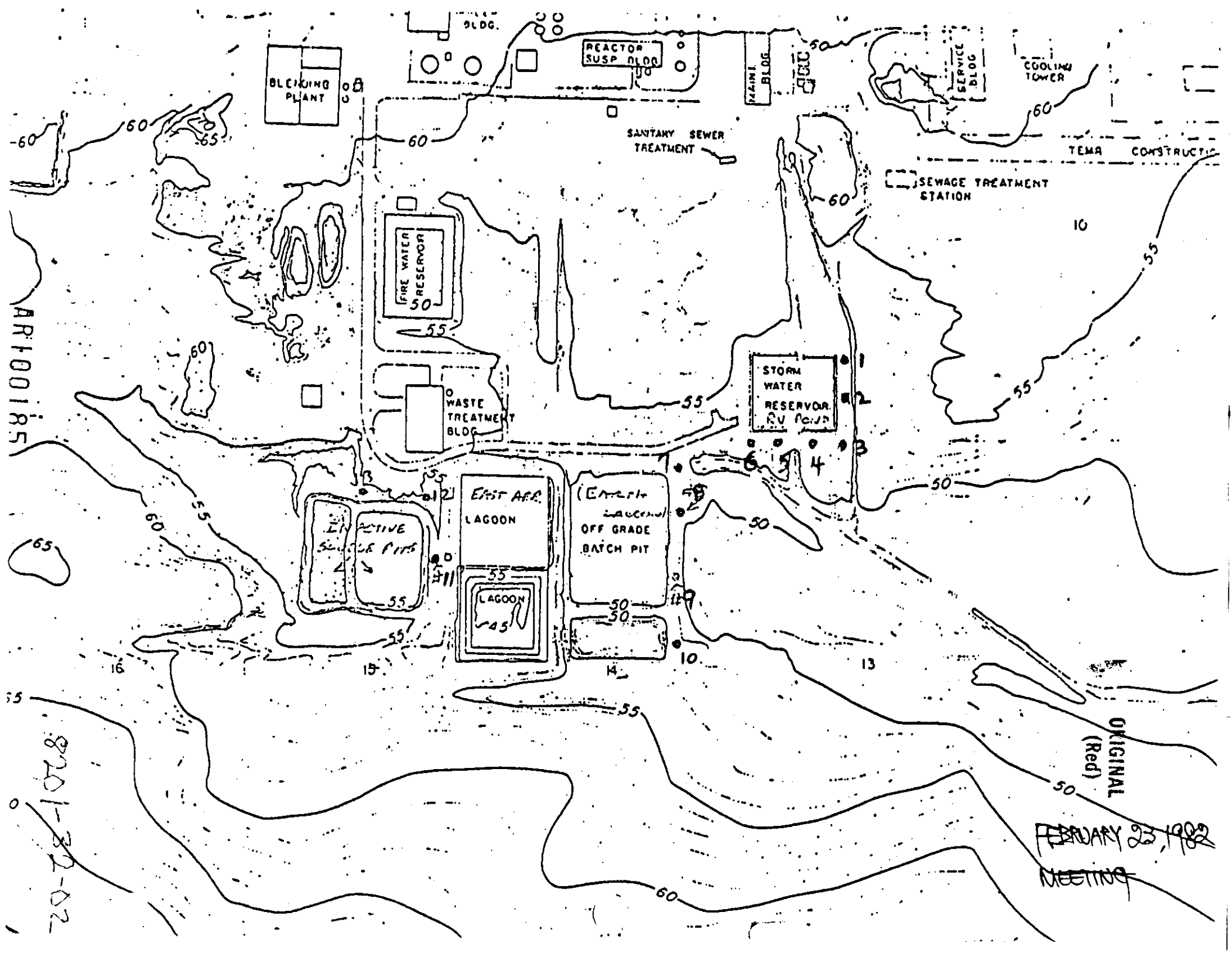


FIGURE 3

SAMPLING POINT LOCATION MAP

Delaware City, DE


BLDG.
REACTOR SUSP BLDG
MAINT. BLDG
SERVICE BLDG
COOLING TOWER
BLEACHING PLANT
SANITARY SEWER TREATMENT
TEMA CONSTRUCTION
SEWAGE TREATMENT STATION
FIRE WATER RESERVOIR
WASTE TREATMENT BLDG
STORM WATER RESERVOIR
EAST AREA LAGOON
OFF GRADE BATCH PIT
LAGOON
AR100185
8201-22-02
ORIGINAL (Red)
FEBRUARY 23, 1982 MEETING

ORIGINAL
(red)