CL-ABC-1.01

03.01-05/13/88-00081

UNITED STATES MARINE CORPS
Marine Corps Base
Camp Lejeune, North Carolina 28542-5001

6280/9
FAC
MAY 13 1988

From: Commanding General, Marine Corps Base, Camp Lejeune, North Carolina 28542-5001
To: Commandant of the Marine Corps, LFL

Subj: GROUNDWATER CONTAMINATION AT TARAWA TERRACE WATER SUPPLY

Ref: (a) CG MCB CamLej ltr 6280/9 FAC of 22 Apr 88 w/encl

Encl: (1) SJA ltr 6280 SJA41 of 3 Feb 88
(2) Site Insp Rpt NC Solid & HW Mgmt Branch of 27 May 87

1. We are forwarding the enclosures to keep you abreast of information related to the Tarawa Terrace contamination from an off-site source. We are also maintaining contact with the State of North Carolina and EPA Region IV to determine their response and plans for groundwater clean-up efforts.

2. Please refer your questions and comments on this matter to Bob Alexander, MCB Environmental Engineer, autovon 484-3034.

T. J. DALZELL
By direction

Copy to:
LANTNAVFACENGCOM (114)

Civlaw
88-57
Env. Law

CERCLA
(SARA)

6280
SJA41

FEB 0 8 1988

Received
- 4/29/88
Mark

Ms. Lee Crosby
State of North Carolina
Department of Justice
Office of the Attorney General
P.O. Box 629
Raleigh, North Carolina 27611

Dear Ms. Crosby:

This letter is to follow-up your phone conversation with Captain C. E. Dougherty of this Command on 29 January 1988. As you are aware, Camp Lejeune is currently involved in an Installation Restoration Program to clean up various contamination areas aboard the installation. One contamination site aboard Camp Lejeune is located at Tarawa Terrace, a housing area located off Highway 24. For this particular site, it is believed that the groundwater contamination was not caused by Camp Lejeune, but by years of improper solvent disposal by a civilian entity, doing business as ABC Cleaners, located across Highway 24 from Tarawa Terrace. I understand that your Office, in conjunction with the Environmental Protection Agency (Region IV), has initiated a preliminary assessment of the ABC Cleaners contamination, and that your Office is in the initial stages of taking enforcement action against ABC Cleaners. Marine Corps Base, Camp Lejeune, is extremely interested in following the enforcement efforts of your Office against ABC Cleaners because the Department of Defense or the Federal Government may ultimately be required to seek contribution from ABC Cleaners for its on-Base clean-up costs. It would be greatly appreciated if you could keep Marine Corps Base, Camp Lejeune, apprised of your enforcement efforts against ABC Cleaners.

I received your Site Inspection report which was prepared by your staff, and thank you for such a prompt response to our request. Your point of contact at this Command is Captain C. E. Dougherty, Office of the Staff Judge Advocate, Marine Corps Base, Camp Lejeune, North Carolina 28542 ((919) 451-5177).

Sincerely,

A. P. TOKARZ
Colonel, U.S. Marine Corps
Staff Judge Advocate

Encl: (1)

SITE INSPECTION REPORT

ABC One Hour Cleaners
NC D024644494
2127 Lejeune Boulevard
Jacksonville, NC 28540

27 May 1987

By

Cheryl A. McMorris, Environmental Chemist
NC Solid and Hazardous Waste Management Branch
Environmental Health Section
CERCLA Unit

ENCL: (2)

EXECUTIVE SUMMARY

ABC One Hour Cleaners is located at 2127 Lejeune Boulevard, Jacksonville, North Carolina in Onslow County. The site consist of three buildings joined to form one complex, situated on an acre of land.

The company has been operating as a dry cleaners at the site since 1954. Tetrachloroethylene (TCE) has been used at the facility to dry clean clothes since operations began. The solvent is stored in a 250-gallon above ground tank in the rear building of the complex. Spent tetrachloroethylene is reclaimed through a filtration-distillation process in the building. Still bottoms generated from the recycling process are the only known hazardous waste generated at the site. Reportedly, "all" spent tetrachloroethylene is recycled on the site. The still bottom waste has been transported off site for disposal by Safety-Kleen for the past two years. Prior to that, the waste was disposed of on the site, sometimes it was used to fill pot holes. A septic tank-soil absorption system (ST-SAS) is also located in this rear building complex. The ST-SAS consists of an underground concrete tank with a concrete lid, situated within four feet of the TCE tank. ABC One Hour Cleaners has always used the ST-SAS for the disposal of wastewater.

In 1984, the U.S. Marine Corps collected samples from 40 community supply wells. Organic contaminants were detected in three wells that were located near two off-base dry cleaning facilities. Since both cleaners, C One Hour Cleaners and Glam-O-Rama Dry Cleaners, were potential sources, ..e Marine Corps requested assistance from North Carolina Department of Natural Resources and Community Development (NRCD). In addition to the three community wells, NRCD drilled three monitoring wells to help conduct a groundwater pollution study to define the source of contamination. Tetrachloroethylene was detected in all six wells. However, TCE levels were significantly higher in a monitoring well at the ABC site (12,000 ppb) and two community wells southeast of the site (1580 and 132 ppb) than TCE levels detected in a monitoring well at the Glam-O-Rama site (2.2 ppb). In addition, TCE odor was detected in the formation from 0-15 feet at the monitoring well on the ABC One Hour Cleaners site. Inspection of the area where TCE is stored shows that TCE can and does enter the septic tank-soil absorption system. Groundwater flow in the vicinity of the site is southeast. From the study NRCD was able to conclude that ABC One Hour Cleaners was the source of tetrachloroethylene contamination to groundwater.

Trichloroethene, 1,2-trans dichloroethylene, vinyl chloride, benzene, and toluene were also detected at low levels in some of the wells. It is not yet known if the source of these contaminants is tetrachloroethylene. There have been suggestions that the technical grade tetrachloroethylene used by the cleaners contains some of these contaminants and the contaminants entered groundwater through the ST-SAS, as did TCE. Evidence is inconclusive concerning theories of the microbial degradation of tetrachloroethylene in soil to generate these compounds. It has also been stated that the compounds, detected at such low levels as these were, are not uncommon to groundwater and should be addressed only because the elevated levels of TCE need to be addressed.

The three contaminated community wells were part of the Tarawa Terrace well field, which furnish drinking water to 6274 people in the area. In February 1985 the two highest contaminated wells were disconnected from the system. A water line from the Holcomb Boulevard System was connected to the Tarawa Terrace system to supplement the water supply. Within a three mile radius of the site there are several community well systems, including Tarawa Terrace, serving groundwater to approximately 13,452 residents.

BACKGROUND

Location

The site is located at 2127 Lejeune Boulevard, Jacksonville, North Carolina, in Onslow County. The coordinates are: latitude: 34° 44' 25"; Longitude: 077° 21' 50" (Appendix A, Map 1).

Site Layout

ABC One Hour Cleaners is housed in two buildings that have been joined to form one; additional improvements have been made to the buildings. Located approximately 25 feet behind the buildings is a smaller building which houses the septic tank system, two dry cleaning machines, a 250 gallon tank containing tetrachloroethylene and equipment used in the spent tetrachloroethylene recycling process. The buildings are located on an acre plot in a business district of Jacksonville (Appendix C, Ref. 1, Appendix A, Map 1). South of the site is the Seaboard Coastline Railroad tracks. Approximately 4400 feet southeast of the site is Northeast Creek, which flows in a southwestwardly direction to New River. Camp Lejeune Marine Corps Base is located south of the site (Appendix A, Map 1).

Ownership History

The site at 2127 Lejeune Boulevard was originally owned by Walter Morgan who constructed the buildings. In 1954 Mr. Morgan leased the buildings to Milton Melts of ABC One Hour Cleaners. Around 1957 Mr. Melts purchased the buildings and improvements from Mr. Morgan. Prior to ABC One Hour Cleaners, one of the buildings housed a liquor store; it is unknown what type of business was housed in the other building (Appendix C, Ref. 1).

Site Use History

ABC One Hour Cleaners has been operating at this site since 1954. The only known hazardous substances used at the facility is tetrachloroethylene, which is used to dry clean clothes. The solvent is stored in a 250 gallon above ground tank in a building situated approximately 25 feet behind the main buildings. Also located in this building is a septic tank-soil absorption system, two dry cleaning machines, and equipment used for recycling spent tetrachloroethylene. Spent tetrachloroethylene is reclaimed by a filtration-distillation process. This process generates still bottoms which have been disposed off-site for approximately two years. Prior to that, the still bottom waste was disposed of on the site (Appendix C, Ref. 1).

ermit and Regulatory History

There have been no environmentally related permits obtained for the site (Appendix C, Ref. 2).

Remedial Actions to Date

In July 1984 the U.S. Marine Corps discovered organic contaminants in three of eight wells that are part of the Tarawa Terrace well-field. Because there were two potential sources for the contaminants, ABC One Hour Cleaners and Glam-O-Rama Dry Cleaners, the Marine Corps requested assistance from North Carolina Department of Natural Resources and Community Development (NRCD). NRCD drilled additional wells to help conduct a groundwater pollution study to define the source of contamination. ABC One Hour Cleaners was found to be the source (Appendix C, Ref. 3).

The contaminated wells are part of a community well system which furnish drinking water to 6274 people in the area. In February 1985 the two highest contaminated wells were disconnected from the system. A water line from the Holcomb Boulevard System was connected to the Tarawa Terrace system to supplement the water supply (Appendix C, Ref. 3,19,26).

Summary Trip Report

ABC One Hour Cleaners has not been inspected by CERCLA Unit personnel. Most information pertaining to the site was obtained from CERCLA Unit files.

ENVIRONMENTAL SETTING

Topography

Onslow County lies in the Coastal Plain province. The land surface is a plain which slopes gently eastward to the Atlantic Ocean at an overall rate of less than 3 feet per mile. This plain is relatively flat in the broad interstream areas, but is broken by low escarpments adjacent to the stream valleys (Appendix C, Ref. 4). The site's facility slope is approximately .5% toward the southeast. There is a 30 ft. drop in the elevation between the southeast corner of the site and Northeast Creek. This drop occurs over a horizontal distance of roughly 4400 feet. The terrain average slope is therefore estimated at .68% toward the southeast (Appendix A, Map 1).

Surface Waters

The nearest surface water to the site is Northeast Creek. Northeast Creek is approximately 4400 feet southeast of the site and flows in a southwestwardly direction to New River (Appendix A, Map 1). Northeast Creek is classified as a SC-Sw waterway and New River is classified as a SB-Sw waterway, which means they are protected for recreational activities. Within three miles of the site swimming, water skiing, boating and fishing (recreational and commercial) occurs on both water bodies (Appendix C, f. 11 & 12).

Geology and Soils

The oldest formation penetrated by a water well in Onslow County is the Peedee. It is not known to crop out but lies within 30 feet of the surface in some valleys northwest of Richlands. Coastward the Peedee is more deeply buried, lying under a wedge of Castle Hayne limestone that thickens toward the coast. The Castle Hayne is exposed at many places along New River between Richlands and Jacksonville. The Yorktown formation overlies the Castle Hayne. A thin layer of sand and clay - chiefly sand of Pleistocene age conceals the older formations in the interstream areas (Appendix C, Ref. 4).

Soils of the area belong to the Onslow fine sandy soil association. Most of the surface comprises large flat to slightly undulating areas with the natural surface drainage of the county very poor (Appendix C, Ref. 5). The soil layer is believed to be relatively permeable with a hydraulic conductivity ranging between 10^{-3} and 10^{-5}cm/sec (Appendix C, Ref. 6 & 7).

roundwater

There are three aquifers in Onslow County; the surficial aquifer, the Tertiary limestone aquifer, and the Peedee aquifer. Of the three only two aquifers, the surficial and Tertiary limestone, furnish water to the wells in the area. In this area, water contained in the Peedee aquifer is brackish, making it unsuitable for drinking water (Appendix C, Ref. 8, 4, pg. 67). The surficial aquifer can be as shallow as 1 ft. bls (Appendix C, Ref. 4, pg. 72, well #55). The Tertiary limestone aquifer is approximately 58 ft. bls (Appendix C, Ref. 4, pg. 69, well #54). There are no continuous confining layers separating the surficial aquifer from the Tertiary limestone aquifers (Appendix C, Ref. 3,8,4, pg. 69).

Northeast Creek is located approximately 4400 feet southeast of the site. Although the creek transects a three mile radius of the site, it is not considered a groundwater divide. The deepest part of the creek is only 9 ft. deep (Appendix A, Map 1). As stated before, wells in the area receive groundwater from the surficial and Tertiary limestone aquifer. The Tertiary limestone aquifer is approximately 58 ft. bls (Appendix C, Ref. 4, pg. 69). Therefore, Northeast Creek is not a discontinuity for the much deeper Tertiary Limestone aquifer.

Within a three mile radius of the site there are several community well systems serving groundwater to approximately 13,452 residents (Appendix C, Ref. 21). One of the community systems, the Tarawa Terrace, which serves pproximately 6274 residents was sampled by NRCD in 1985 (Appendix C, ef. 19). Organic solvent contamination was found in three of the eight wells. The wells are split between the surficial and Tertiary limestone aquifers, which could possibly mean that both of the aquifers are contaminated. ABC One Hour Cleaners was realized as the source of contamination after extensive groundwater studies by NRCD (Appendix C, Ref. 3).

Climate and Meteorology

In the Onslow County area, average temperatures range from 45°F in January to 79°F in July. The mean annual wind speed is 12 miles per hour and the prevailing wind is from the south (Appendix C, Ref. 9). Mean annual precipitation is 56 inches per year with mean evaporation 42 inches per year. The net precipitation of the Jacksonville area is 14 inches per year. The one year 24-hour rainfall is 3.5 inches. Thunderstorms occur approximately 40 to 60 days each year (Appendix C, Ref. 7 & 9).

Land Use

Land use in the area of the site is primarily residential. The site is located in the city of Jacksonville, a densely populated urban area (Appendix A, Map 1).

Population Distribution

The population living within a 1, 2, and 3 mile radius of the site is approximately 2759, 4811, and 13,452 persons, respectively (Appendix C, Ref. 10).

Water Supply

Groundwater is the only water supply source for residents within a three mile radius of the site. Groundwater is obtained from both the surficial and Tertiary limestone aquifers. There are no continuous confining layers between these two aquifers (Appendix C, Ref. 3,4,8). Since there are no surface water distribution lines in the city of Jacksonville, groundwater is the sole source of drinking water for the 13,452 residents within three miles of the site (Appendix C, Ref. 13,14,15,20,21). There are no surface water supply intakes in Onslow County. The nearest surface water reservoir is located on the Cape Fear River in Pender County, approximately 55 miles southwest of the site (Appendix C, Ref. 16).

Critical Habitats

There are no critical habitats of endangered species within a three mile radius of the site. However, alligators, a federally listed species, were sited within three miles of the site on Scales Creek (Appendix C, Ref. 7).

There are however estuary wetlands within three miles of the site. These wetlands are located approximately 3200 ft. southeast of the site on Northeast Creek. The wetlands are greater than three acres (Appendix A, Map 1, Appendix C, Ref. 8,19).

WASTE TYPES AND QUANTITIES

Waste Quantities

The exact quantity of tetrachloroethylene that was released into the septic tank-soil absorption system on the site is unknown. The quantity of still bottoms, deposited on the site which were generated through the spent tetrachloroethylene recycling process, is unknown also. The facility is classified as a small generator under RCRA and generates less than 1,000 kg/month of hazardous waste (Appendix C, Ref. 1,18).

Waste Disposal Methods and Locations

ABC One Hour Cleaners uses and has always used tetrachloroethylene to dry clean clothes. Tetrachloroethylene is kept in a 250 gallon tank inside a building located directly behind the main buildings. Spent tetrachloroethylene is recycled in this building by a filtration-distillation process. The still bottoms generated through the recycling process are picked up by Safety-Kleen and disposed of off-site. From 1954 to about 1984/85 the still bottoms were disposed of on the site. Pot holes on the site were once filled with these still bottoms (Appendix C, Ref. 1).

Located in the area of the tetrachloroethylene tank is the septic ank-soil absorption system. This system has always been used for the isposal of sewage and wastewater generated at the site. The system consists of an underground concrete tank with a concrete lid and is situated within four feet of the tetrachloroethylene tank. An inspection by NRCD of the building in which the tetrachloroethylene is stored, used and recycled has shown that solvent releases enter the septic tank (Appendix C, Ref. 1,3).

Waste Type

The only known hazardous waste generated at the facility is spent tetrachloroethylene, which is recycled, and the still bottoms generated by the recycling process (Appendix C, Ref. 1,3).

LABORATORY DATA

In April 1985, NRCD began a groundwater pollution investigation at the site, per the request of the U.S. Marine Corps. Three wells from the Tarawa Terrace well field along with three NRCD monitoring wells were sampled. Tetrachloroethylene was detected in all six wells. TCE levels were significantly higher in a monitoring well at the site and two community wells southeast of the site than TCE levels found in a monitoring well at the Glam-O-Rama site (another dry cleaners in the area) (Table 1, Appendix C, Ref. 3). Groundwater flow in the area of the site is southeast (Appendix C, Ref. 3). From the study, NRCD was able to conclude that ABC One Hour Cleaners was the source of tetrachloroethylene contamination to groundwater.

Trichloroethylene, 1,2-trans dichloroethylene, vinyl chloride, benzene, and toluene were also detected at low levels in some of the wells (Table 1, Appendix C, Ref. 3). It is not yet known if the source of these contaminants is tetrachloroethylene. There have been suggestions that the technical grade TCE used by the cleaners contains some of these contaminants, and the contaminants entered groundwater via the septic tank as did TCE (Appendix C, Ref. 27). Evidence is inconclusive concerning theories of the microbial degradation of TCE in soil to generate these compounds (Appendix C, Ref. 22,27). It has also been stated that the compounds, detected at such low levels as these were, are not uncommon to groundwater and should be addressed only because the elevated levels of TCE need to be addressed (Appendix C, Ref. 22).

SUMMARY OF LABORATORY ANALYSES

Wells sampled in 1985 by NRCD
Table 1

Well No.	1	1	1	1	2	2	2	2	3	4	5	6
Dates Sampled	1/16	2/19	4/9	9/25	1/16	2/19	3/11	9/25	9/25	9/25	9/25	9/
Parameters (ug/l)												
Tetrachloroethylene	1580	64	630	1100	132	26	41	4	0.43	2.2	4.9	12
Trichloroethylene	57	--	18	---	---	53	---	---	---	---	0.98	2.
1,2-trans-Dichloroethylene	92	---	1.4	---	---	---	---	---	---	---	---	--
Vinyl Chloride	27	---	---	---	---	---	---	---	---	---	---	--
Toluene	---	---	---	---	---	---	---	---	---	2.3	---	--
Benzene	---	---	---	---	---	---	---	---	---	---	2.3	--

Well Number	Sample Location
1	Community well approx. 975 ft. southeast of site.
2	Community well approx. 1575 ft. southeast of site.
3	Community well approx. 950 ft. southeast of site (At the Glam-O-Rama Dry Cleaning site).
4	NRCD monitoring well approx. 425 ft. southeast of site.
5	NRCD monitoring well at ABC One Hour Dry Cleaning site.
---	Not detected.

TOXICOLOGICAL/CHEMICAL CHARACTERISTICS
of
Tetrachloroethylene

perchloroethylene (tetrachloroethylene)
$Cl_2C:CCl_2$.
Properties: Colorless liquid; ether-like odor. Extremely stable. Resists hydrolysis. Sp. gr. (20/20° C) 1.625; b.p. 121° C; f.p. −22.4° C; weight 13.46 lb/gal (26° C); refractive index 1.5029 (25° C); flash point, none. Miscible with alcohol, ether, and oils, in all proportions. Insoluble in water. Nonflammable.
Derivation: (a) By chlorination of hydrocarbons, and pyrolysis of the carbon tetrachloride also formed; (b) from acetylene and chlorine via trichloroethylene.
Method of purification: Distillation.
Grades: Purified; technical; U.S.P., as tetrachloroethylene; spectrophotometric.
Containers: Drums; tank cars.
Hazard: Moderately toxic. Irritant to eyes and skin. Tolerance, 100 ppm in air.
Uses: Dry-cleaning solvent; vapor-degreasing solvent; drying agent for metals and certain other solids; vermifuge; heat-transfer medium; mfg. of fluorocarbons.

From: The Condensed Chemical Dictionary, Tenth Edition, Revised by Gessner G. Hawley. Van Nostrand Reinhold Company, NY, 1981.

TOXICOLOGICAL/CHEMICAL CHARACTERISTICS
of
Tetrachloroethylene

From: Dangerous Properties of Industrial Materials, Sixth Edition, N. Irving Sax. Van Nostrand Reinhold Company, NY, 1984.

1,1,2,2-TETRACHLOROETHYLENE

CAS RN: 127184 NIOSH #: KX 3850000
mf C_2Cl_4; mw: 165.82

Colorless liquid, chloroform-like odor. mp: −23.35°, bp: 121.20°, flash p: none, d: 1.6311 @ 15°/4°, vap. press: 15.8 mm @ 22°, vap. d: 5.83.

SYNS:

CARBON BICHLORIDE
CARBON DICHLORIDE
CZTEROCHLOROETYLEN (POLISH)
[illegible]-PER
ETHYLENE TETRACHLORIDE
[illegible]04580
PERCHLOORETHYLEEN, PER (DUTCH)
PERCHLORAETHYLEN, PER (GERMAN)
PERCHLORETHYLENE, PER (FRENCH)
PERCHLOROETHYLENE
PERCLENE
PERCLOROETILENE (ITALIAN)
TETRACHLOORETHEEN (DUTCH)
TETRACHLORAETHEN (GERMAN)
TETRACHLOROETHYLENE (DOT)
TETRACLOROETENE (ITALIAN)

TOXICITY DATA: 3

	CODEN:
rat TCLo:1000 ppm/24H (14D pre/1-22D preg)	APTOD9 19,A21.80
rat TCLo:1000 ppm/24H (1-22D preg)	APTOD9 19,A21.80
rat TCLo:900 ppm/7H (7-13D preg)	TJADAB 19,41A,79
rat TCLo:300 ppm/7H (6-15D preg)	TXAPA9 32,84,75
ihl-mus TCLo:300 ppm/7H (6-15D preg)	TXAPA9 32,84,75
skn-rbt 810 mg/24H SEV	JETOAS 9,171,76
eye-rbt 162 mg MLD	JETOAS 9,171,76
mmo-sat 50 uL/plate	NIOSH* 5AUG77
mma-sat 200 uL/plate	NIOSH* 5AUG77
orl-mus TDLo:195 gm/kg/50W-I:CAR	NCITR* NCI-CG-TR-13,77
orl-mus TD:240 gm/kg/62W-I:CAR	NCITR* NCI-CG-TR-13,77
ihl-hmn TCLo:96 ppm/7H:SYS	NTIS** PB257-185
ihl-man TCLo:280 ppm/2H:EYE	AMIHBC 5,566,52
ihl-man TCLo:600 ppm/10M:CNS	AMIHBC 5,566,52
orl-rat LD50:8850 mg/kg	NPIRI* 1,96,74
ihl-rat LCLo:4000 ppm/4H	JOCMA7 4,262,62
orl-mus LD50:8100 mg/kg	NTIS** PB257-185
ihl-mus LCLo:23000 mg/m3/2H	AHBAAM 116,131,36
ipr-mus LD50:4700 mg/kg	NTIS** PB257-185
orl-dog LDLo:4000 mg/kg	AJHYA2 9,430,29
ipr-dog LD50:2100 mg/kg	TXAPA9 10,119,67
ivn-dog LDLo:85 mg/kg	QJPPAL 7,205,34
orl-cat LDLo:4000 mg/kg	AJHYA2 9,430,29
orl-rbt LDLo:5000 mg/kg	AJHYA2 9,430,29
scu-rbt LDLo:2200 mg/kg	QJPPAL 7,205,34

Aquatic Toxicity Rating: TLm96: 100-10 ppm WQCHM* 3,-,74. Carcinogenic Determination: Animal Positive IARC** 20,491,79.

TLV: Air: 50 ppm (skin) DTLVS* 4,325,80. *Toxicology Review:* AJMEAZ 38,409,65; 27ZTAP 3,139,69. OSHA Standard: Air: TWA 100 ppm; CL 200; Pk 300/5M/3H (SCP-J) FEREAC 39,23540,74. DOT: ORM-A, Label: None FEREAC 41,57018,76. Occupational Exposure to Tetrachloroethylene recm std: Air: TWA 50 ppm; CL 100 ppm/15M NTIS**. NCI Carcinogenesis Bioassay Completed; Results Positive: Mouse (NCITR* NCI-CG-TR-13,77). NCI Carcinogenesis Bioassay Completed; Results Negative: Rat (NCITR* NCI-CG-TR-13,77). Currently Tested by NTP for Carcinogenesis by Standard Bioassay Protocol as of December 1980."NIOSH Manual of Analytical Methods" VOL 1 127, VOL 3 S335. NIOSH Current Intelligence Bulletin 20, 1978. Reported in EPA TSCA Inventory, 1980. EPA TSCA 8E No: 05780146-Followup Sent as of April, 1979.

THR: MOD via inhal, oral, scu, ipr and dermal routes. HIGH via ivn route. Not corrosive or dangerously acutely reactive, but toxic by inhal, by prolonged or repeated contact with the skin or mu mem, or when ingested by mouth. The liquid can cause injuries to the eyes; however, with proper precautions it can be handled safely. The symptoms of acute intoxication from this material are the result of its effects upon the nervous system.

Exposures to higher conc than 200 ppm cause irr, lachrymation and burning of the eyes and irr of the nose and throat. There may be vomiting, nausea, drowsiness, an attitude of irresponsibility, and even an appearance resembling alcoholic intoxication. This material also acts as an anesthetic, through the inhalation of excessive amounts within a short time. The symptoms of fatal intoxication are irritation of the eyes, nose and throat, then fullness in the head, mental confusion; there may be headache stupefaction, nausea and vomiting, personnel suffering from subacute poisoning may suffer from such symptoms as headache, fatigue, nausea, vomiting, mental confusion and temporary blurring of the vision. This can occur when inadequate ventilation results in concentrations higher than 200 ppm, or where the vapor conc are intermittently high due to faulty handling of the material, or when an individual fails to take adequate precautionary measures.

This material can cause dermatitis, particularly after repeated or prolonged contact with the skin. The dermatitis is preceded by a reddening and burning and more rarely, a blistering of the skin. In any event, the skin becomes rough and dry, due largely to the removal of skin oils by material. The skin then cracks easily and is readily susceptible to infection. Upon ingestion it causes irr of the gastrointestinal tract, which, in turn, causes nausea, vomiting, diarrhea and bloody stools. However, such effects are usually less severe than the effects of swallowing similar amounts of other chlorinated hydrocarbons. An exper CARC. MUT data.

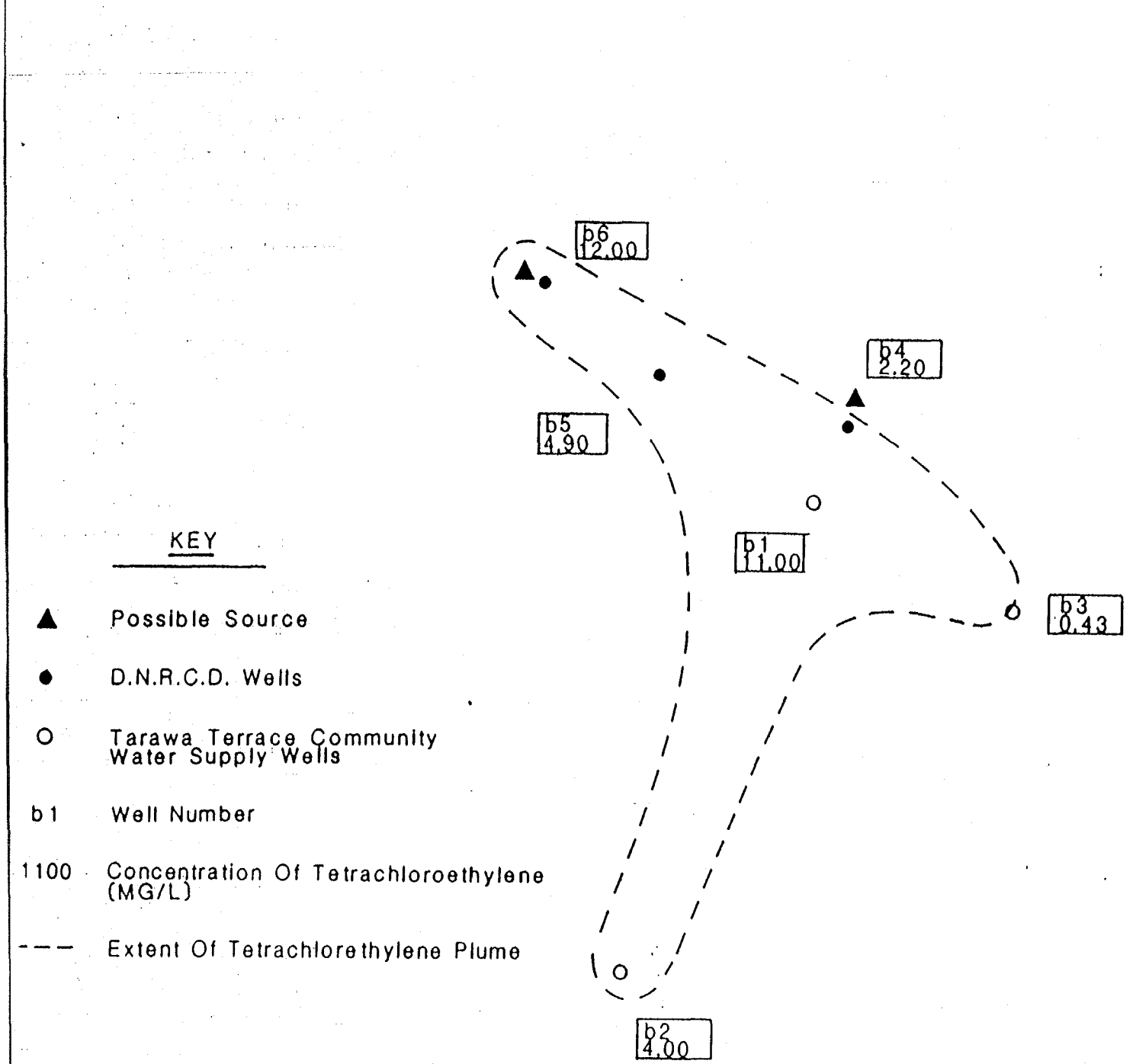
It may be handled in the presence or absence of air, water, and light with any of the common construction materials at temp. up to 140°C. This material is extremely stable and resists hydrolysis. A common air contaminant. Reacts violently with Ba, Be, Li; N_2O_4; metals; NaOH.

Disaster Hazard: Dangerous; when heated to decomp it emits high tox fumes of chlorides.

For further information see Perchloroethylene Vol. 1, No. 2 of *DPIM Report.*

Appendix A

Maps



Map # 2

Figure 4: Map That Shows The Concentration Of Tetrachloroethylene