Geneva Industries ROD

RECORD OF DECISION
REMEDIAL ALTERNATIVE SELECTION

Site: Geneva Industries, 9334 Caniff Road, Houston, Texas

DOCUMENTS REVIEWED

I have reviewed the following documents describing the analysis of cost-effectiveness of remedial alternatives for the Geneva Industries site:

- Geneva Industries Site Investigation Report, IT Corporation, June 1985
- Geneva Industries Feasibility Study, IT Corporation, April 1986.
- Summary of Remedial Alternative Selection, Geneva Industries, September 1986.
- Responsiveness Summary, September 1986.
- Staff summaries and recommendations.

DESCRIPTION OF SELECTED REMEDY

- Remove and dispose of surface structures in an offsite hazardous waste landfill.
- Excavate soils contaminated with greater than 100 ppm of polychlorinated biphenyls and all buried drums onsite.
- Dispose of excavated soils and drums at an EPA-approved offsite disposal facility.
- Construct a multi-layer surface cap over the site and a slurry wall tied into the clay below the 30-foot sand around the perimeter of the site.
- Recover trichloroethylene contaminated groundwater from the 30 and 100-foot sand, treat onsite by carbon adsorption, and discharge into the adjacent flood control channel.

DECLARATION

Consistent with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the National Contingency Plan (40 CFR Part 300), I have determined that the selected remedy for the Geneva Industries site is a cost-effective remedy and provides adequate protection of public health, welfare, and the environment. The State of Texas has been consulted and agrees with the approved remedy. In addition, the action will require future operation and maintenance activities to ensure the continued effectiveness of the remedy. These activities will be considered part of the approval action and eligible for Trust Fund monies for a period of one year. I have also determined that the action being taken is appropriate when balanced against the availability of Trust Fund monies for use at otner sites.

Sept. 18, 1986
DATE

Dick Whittington
Dick Whittington, P.E.
Regional Administrator

GENEVA INDUSTRIES RECORD OF DECISION CONCURRENCES

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SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

GENEVA INDUSTRIES

HOUSTON, TEXAS

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SUMMARY OF REMEDIAL ALTERNATIVE SELECTION
GENEVA INDUSTRIES
HOUSTON, TEXAS

BACKGROUND

The Geneva Industries site is an abandoned refinery which manufactured a variety of organic compounds including biphenyl, polychlorinated biphenyls (PCBs), phenyl phenol, naptha, and Nos. 2 and 6 fuel oils from 1967 through 1978. These products, along with chlorinated hydrocarbon solvents, volatile organics, and polynuclear aromatic hydrocarbons associated with the manufacturing processes are the major contaminants at Geneva Industries.

Site Location and Description

The Geneva Industries site is a 13.5 acre tract located at 9334 Caniff Road in Houston, Texas immediately adjacent to the corporate limits of the city of South Houston. The site is within one mile of Interstate Highway 45 and within two miles of William P. Hobby Airport. The property is bound on the north by Caniff Road, on the southwest by Easthaven Boulevard, and on the east by a Harris County Flood Control Channel. Location and site maps are shown in Figures 1 and 2.

Approximately 35,000 people live within one mile of Geneva. The closest residences are located less than 50 feet from the east and southwest site boundaries, and two businesses are located 300 feet west of the site.

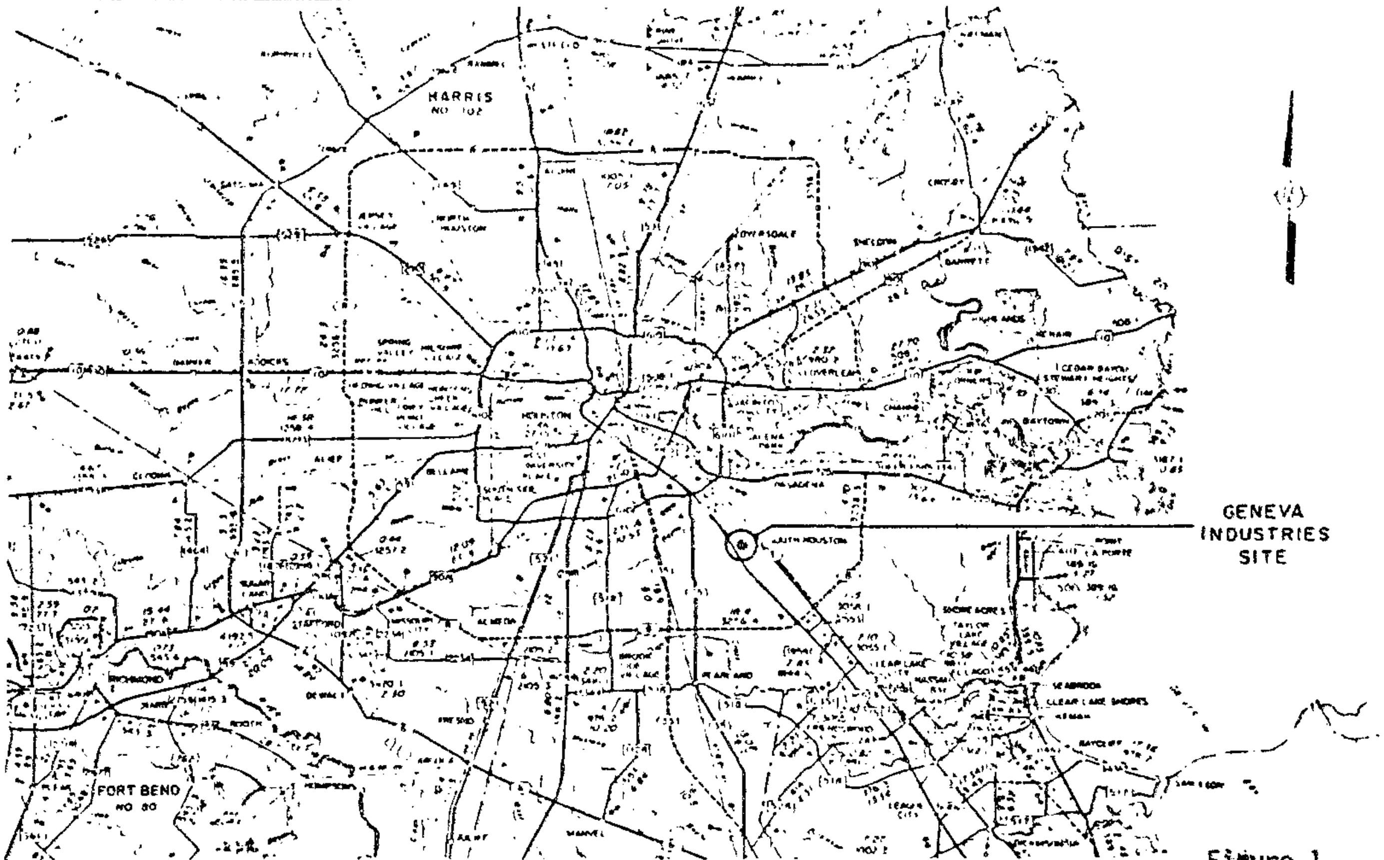
The topography in the site vicinity is flat with a maximum grade elevation of 35 feet above mean sea level (msl). The site is currently located in the 100-year floodplain and is drained by the adjacent flood control channel. Channel improvements planned for this area are expected to lower the 100-year floodplain elevation to 31.4 feet msl.

While several manufacturing units have been removed from the site, a substantial number of tanks as well as process equipment remain. The historical plant layout and current site conditions are illustrated in Figures 3 and 4, respectively.

Site History

Prior to 1967, the property was used for petroleum exploration and production. Geneva Industries began manufacturing biphenyl by distillation of toluene dealkylation bottoms in June 1967, began producing PCBs in June 1972, and declared bankruptcy in November 1973. Since that time, four other corporations owned and operated the Geneva facility, including:

Pilot Industries, February 1974 - December 1976
Intercoastal Refining, December 1976 - December 1980
Lonestar Fuel Co., December 1980 - May 1982
Fuhrmann Energy, May 1982 - Present.



REFERENCE:
TEXAS STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION, TRANSPORTATION PLANNING DIVISION FILE D-10, CONTROL-SECTION MAP, DISTRICT 12 HOUSTON.

SCALE
6 0 6 12 18 MILES

Figure 1
LOCATION MAP
GENEVA INDUSTRIES SITE
SITE INVESTIGATION

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AUSTIN, TEXAS

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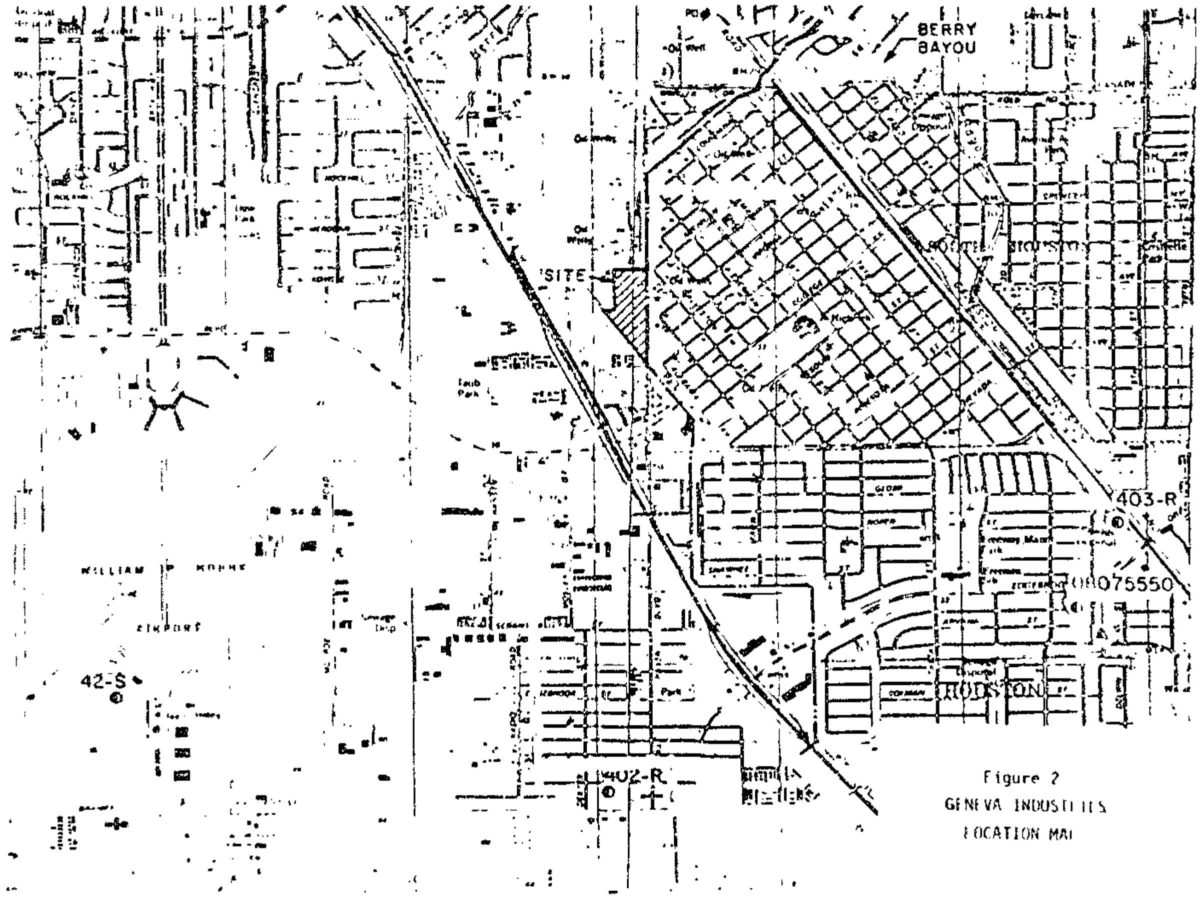

Figure 2
GENEVA INDUSTRIES
LOCATION MAP

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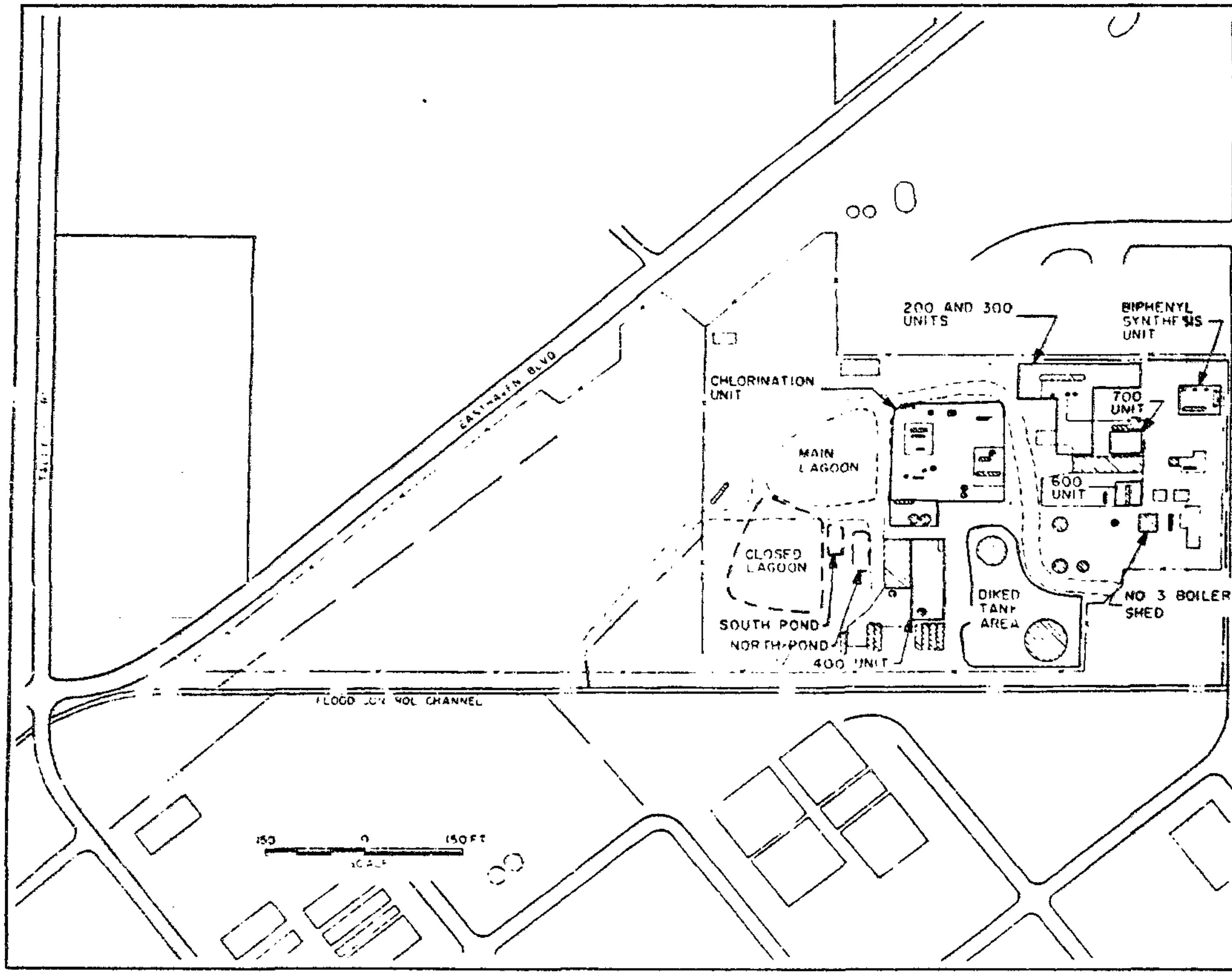

Figure 3
HISTORIC PLANT LAYOUT
GENEVA INDUSTRIES SITE
SITE INVESTIGATION

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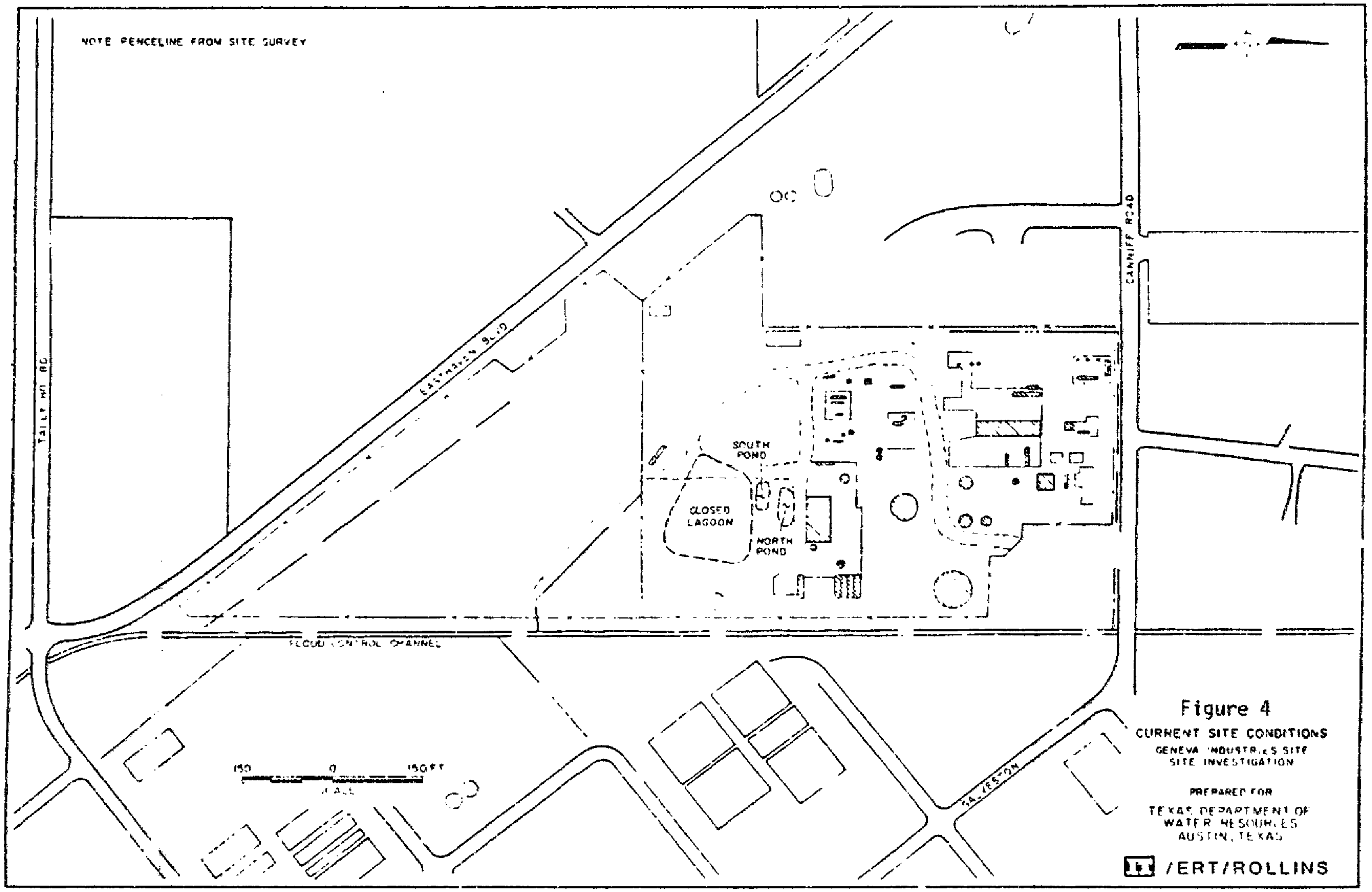

Figure 4

CURRENT SITE CONDITIONS
GENEVA INDUSTRIES SITE
SITE INVESTIGATION

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Operation of the facility ceased in September 1978 and was never resumed by the future owners. The current owner, Fuhrmann Energy, has salvaged much of the equipment onsite for resale.

Records from the Texas Water Quality Board and the Harris County Pollution Control District indicate that several citations were issued to the various owners for unauthorized discharges of wastewater into the adjacent flood control channel. These records also indicate that plant operation was marked by numerous spills and process leaks and that housekeeping and disposal practices deteriorated with time. As of 1981, the site contained processing tanks, piping, and equipment, three open and one closed wastewater lagoon, a diked tank area, several drum storage areas, a landfill, and possibly a landfarm.

In a preliminary investigation, the U.S. Environmental Protection Agency (EPA) found onsite soils contaminated with up to 9,000 parts per million (ppm) of PCBs and up to 104 ppm in sediments in the flood control channel. Samples from six monitoring wells installed by the Region VI Field Investigation Team indicated that the shallow water-bearing zone (30-foot sand) was contaminated with PCBs and other organic compounds. Based on the results of this investigation, the site was ranked with the Hazard Ranking System (HRS score = 59.46) and is currently on the National Priorities List.

A Planned Removal was performed by EPA during the period from October 1983 to February 1984 to close out three onsite lagoons, remove all drummed waste on the surface, remove all offsite soils containing greater than 50 ppm PCBs, install a cap over all onsite soils containing greater than 50 ppm PCBs, and improve site drainage. Approximately 3,400 cubic yards of contaminated soils and sludges, 550 drums, and 30 tons of asbestos were removed and transported to an approved disposal facility in Emmelle, Alabama. Other removal actions to plug abandoned wells onsite and remove storage tank materials were performed in May and September 1984, respectively. The total cost of removal actions performed to date is $1,748,179.

A Cooperative Agreement for a Remedial Investigation and Feasibility Study (RI/FS) for $630,000 was awarded by EPA to the State of Texas in December 1983. D'Appolonia, Inc., now IT Cooperation, in association with Environmental Research and Technology, Inc., and Rollins Environmental Services (TX) Inc., was contracted by the State to conduct the RI/FS. The initial site work was completed in September 1984, at which time it was determined that additional field work would be required. An amendment to the grant for $300,000 was awarded in March 1985 to investigate possible asiesmic faulting at the site. All field work was completed in October 1985.

The Remedial Investigation was completed in December 1985. The Feasibility Study began in December 1984 and completed in April 1986. The long feasibility study period was due to the need for the extensive fault investigation conducted in September 1985. The detailed development and evaluation of remedial alternatives could not be done until the effects of possible faulting across the site could be determined.

Current Site Status

The Geneva Industries site investigation consisted of surficial soil sampling, soil borings, lagoon borings, trenching, groundwater sampling, sediment sampling, stormwater/surface water sampling, and air monitoring. The investigation focused on the identification of the geologic and hydrologic characteristics of the site, the wastes present, the migration pathways, the extent of contamination from the site, and the target receptors and population at risk.

Site Geology and Hydrology

The shallow stratigraphy at the site is characterized by the following general horizons (Figure 5):

- A silty clay to clay (Horizon 1) extends from land surface to a depth of 12 to 19 feet;
- A sandy silt to silty sand (Horizon 2, or 30-foot sand) from Horizon 1 to a depth of 35 feet;
- A clay layer with occurrences of silty to sandy clay (Horizon 3) with a thickness of 13 to 27 feet;
- A well-sorted sandy layer (Horizon 4, or 100-foot sand) containing zones of coarse sand and gravel, with a measured thickness of 50 to 91 feet;
- A clay (Horizon 5) with a thickness of approximately 100 feet begins at 107 to 140 feet below ground surface.

The groundwater in the area is supplied by two aquifers, the Chicot and the Evangeline. The upper unit of the Chicot, a minor water supply in the area, consists of the 30-foot and 100-foot sands under the site and extends to a depth of about -160 feet NGVD (National Geodetic Vertical Datum). The lower unit of the Chicot provides most of the groundwater used for public and industrial water supplies in southeastern Harris County, including the city of South Houston, and Galveston County. The base of this unit occurs at approximately -600 feet NGVD. The Evangeline aquifer lies below the Chicot and is the major source of groundwater for the city of Houston. The base of the Evangeline occurs at an elevation of -2500 NGVD. A generalized stratigraphic and hydrologic column for the region is presented in Figure 6.

A water well inventory was conducted in the vicinity of the site. As shown in Figure 7 and listed in Table 1, seventeen wells were identified within approximately one mile of the site. The only active municipal well, LJ-65-23-707, is screened below the Chicot aquifer. However, other municipal wells farther from the site are screened at depths of 600 to 700 feet in the Chicot. Also, three private domestic were identified, at least one of which is screened in the 100-foot sand approximately 0.2 miles southeast of the site.

Horizon 2 (30-foot sand) is the shallowest water-bearing zone underlying the site. Water in this zone occurs under apparently semi-confined conditions and rises in monitoring wells to 5 to 8 feet below land surface.

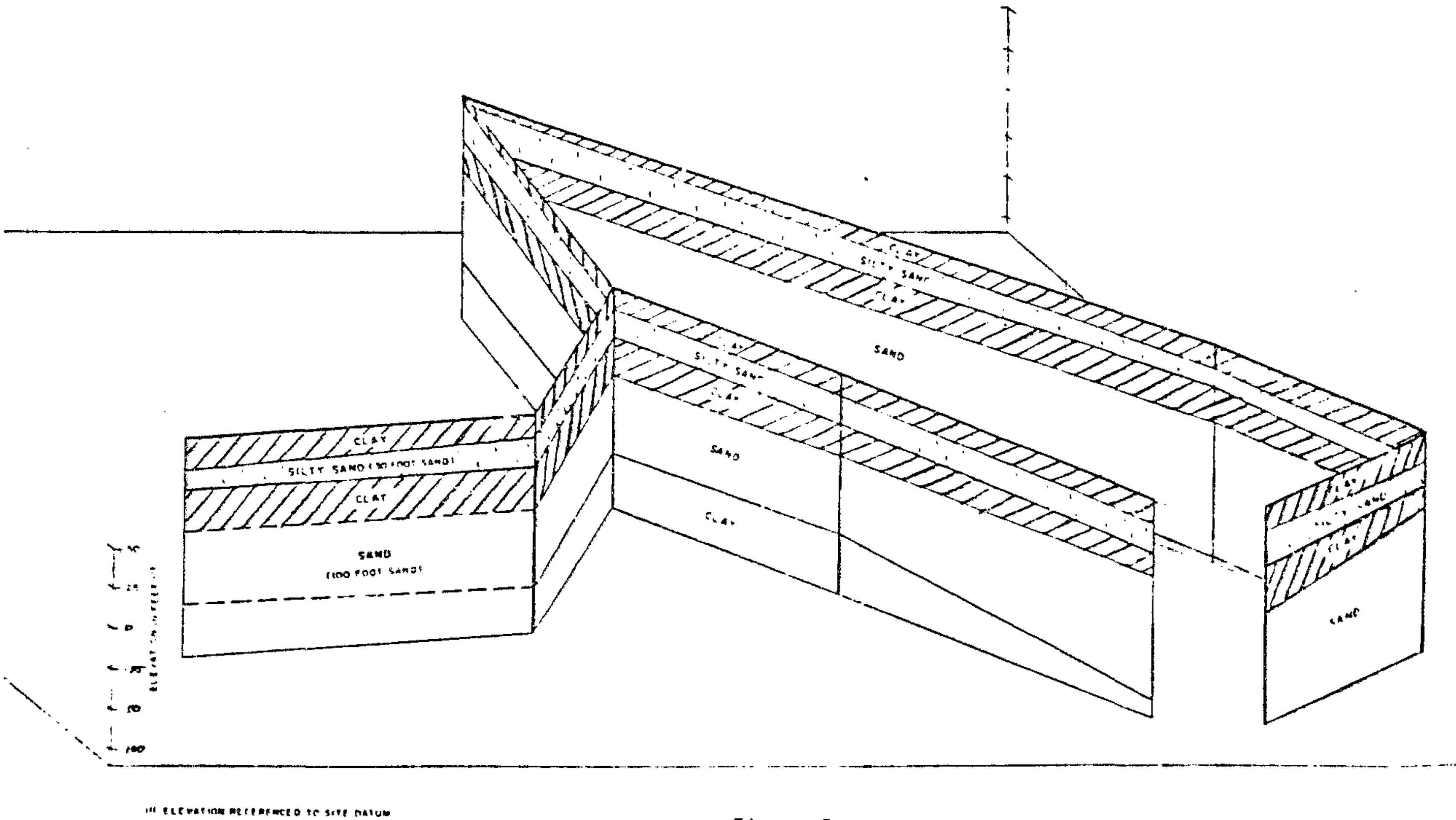

Figure 5
Stratigraphic Zones at Geneva Industries

SYSTEM	SERIES	UNIT	AQUIFER	APPROXIMATE ELEVATION FT. NGVD
QUATERNARY	PLEISTOCENE	BEAUMONT FORMATION	UPPER UNIT CHICOT AQUIFER	
		MONTGOMERY FORMATION		- 160' -
		BENTLEY FORMATION	LOWER UNIT CHICOT AQUIFER	
		WILLIS FORMATION		
				- 550' -
TERTIARY	PLIOCENE	GOLIAD SAND	EVANGELINE AQUIFER	
				- 2500' -
	MIOCENE	FLEMING FORMATION	BURKEVILLE CONFINING LAYER	
				- 2700' -
			UPPER UNIT JASPER AQUIFER	
			LOWER UNIT JASPER AQUIFER	

NOTES:

1. DRAWING NOT TO SCALE.
2. MODIFIED FROM GABRYSCH, 1980.
3. NGVD REFERS TO NATIONAL GEODETIC VERTICAL DATUM.

Figure 6
GENERALIZED STRATIGRAPHIC AND HYDROLOGIC COLUMN
SITE VICINITY
GENEVA INDUSTRIES SITE
SITE INVESTIGATION

TEXAS DEPARTMENT OF WATER RESOURCES
AUSTIN, TEXAS

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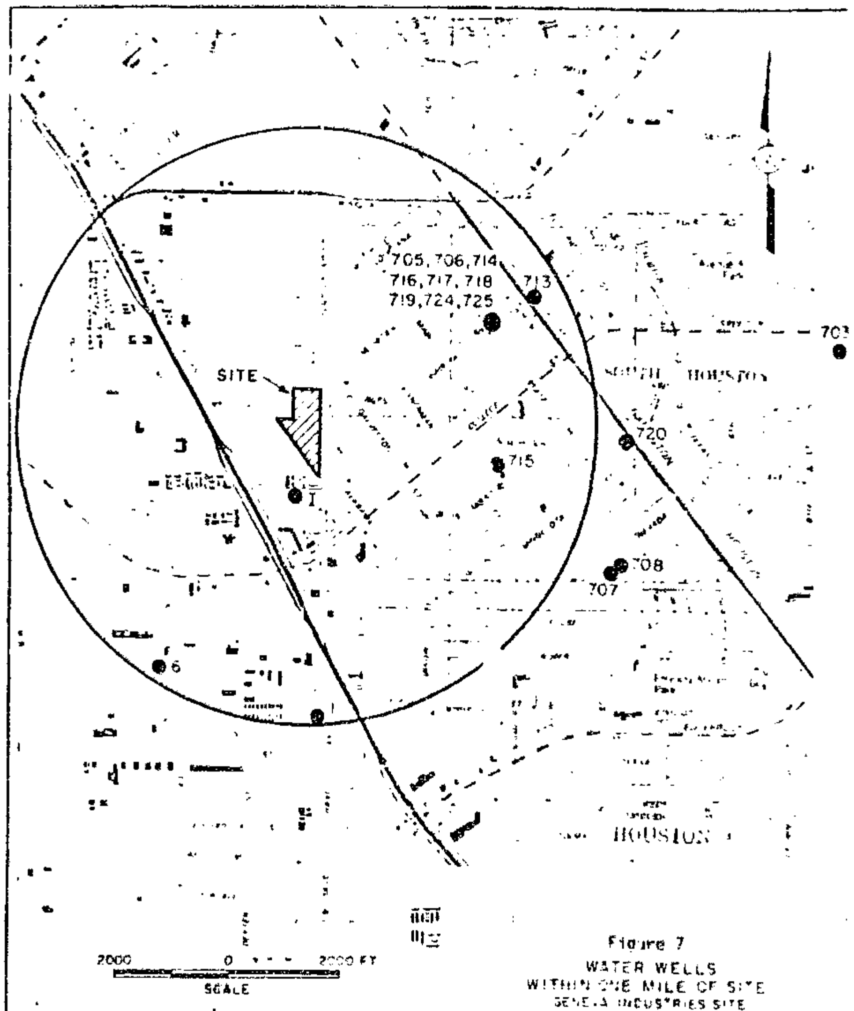

Figure 7
WATER WELLS
WITHIN ONE MILE OF SITE
GENEVA INDUSTRIES SITE
SITE INVESTIGATION
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Table 1
WATER WELL INVENTORY
ONE MILE RADIUS
GENEVA INDUSTRIES SITE

Well Inventory From City Records

Well No.	Location	Street address
1	Garner Mobil Home Park	9343 Redford
6	Fields Trailer Park	8302 Hansen

Well Inventory from USGS Records

I.D. No.	Ownership	Approx. Depth (ft.)	Status
LJ-65-23-705	City of So. Houston	795	Inactive
LJ-65-23-706	City of So. Houston	778	Inactive
LJ-65-23-707	City of So. Houston	1067	Active
LJ-65-23-708	City of So. Houston	1170	Inactive
LJ-65-23-713	Harris County	620	Destroyed
LJ-65-23-714	City of So. Houston	600	Destroyed
LJ-65-23-715	Harris County	1200	Destroyed
LJ-65-23-716	City of So. Houston	771	Destroyed
LJ-65-23-717	City of So. Houston	668	Destroyed
LJ-65-23-718	City of So. Houston	316	Destroyed
LJ-65-23-719	City of So. Houston	916	Destroyed
LJ-65-23-720	City of So. Houston	650	Destroyed
LJ-65-23-724	City of So. Houston	657	Destroyed
LJ-65-23-725	City of So. Houston	916	Destroyed

Other Wells Located by Survey of Area

Well No.	Location	Reported Depth (ft)	Status
I	9310 Tallyho Road	100	Active-Domestic

Potentiometric contours, as shown in Figure 8, indicate that the gradient in this zone under the site is oriented toward the adjacent flood control channel. The potentiometric data also indicates that some discharge into the flood control channel is possible on a periodic basis.

Permeability of the silty sand in Horizon 2 has been estimated as ranging from 10^{-4} to 10^{-5} cm/sec. The transmissivity of the zone is estimated to be 2 to 3 square feet per day. This zone is not suitable as a source of water supply in the site vicinity due to the high Total Dissolved Solids concentrations (to 10,000 ppm) found during the site investigation. For comparison, the secondary standard for Total Dissolved Solids in drinking water is 250 ppm.

Horizon 4 (100-foot sand) is the next shallowest water-bearing zone under the site. Water in this zone occurs under more confined conditions than Horizon 2 but is considered to be semi-confined, and rises in monitoring wells to about 16 to 18 feet below the ground surface. Based upon potentiometric data developed during the site investigation, the gradient is relatively constant across the site and groundwater flow is toward the west and southwest (Figure 9).

The primary surface water features in the vicinity of the site include:

- Harris County Flood Control District channel along the eastern boundary of the site. The 10-foot deep channel receives all of the runoff from the site and flows in a northerly direction into Berry Bayou.

- Berry Bayou is intersected approximately one mile northeast of the site. Berry Bayou drains into Sims Bayou about two miles north of the site. Sims Bayou, in turn, flows into the Houston Ship Channel.

Surface drainage patterns are illustrated in Figure 10. There are three principal drainage paths at the site, all of which drain into the flood control channel. These are:

- A drainage ditch along the western boundary of the site flowing south to north, draining into a roadside ditch west along Caniff Road into the channel.

- A drainage ditch starting south at the center of the site flowing to the southeast. This path drains the central portion of the site and discharges into the flood control channel.

- A drainage ditch running parallel to the southern fence and discharging into the flood control channel at the southernmost point of the site.

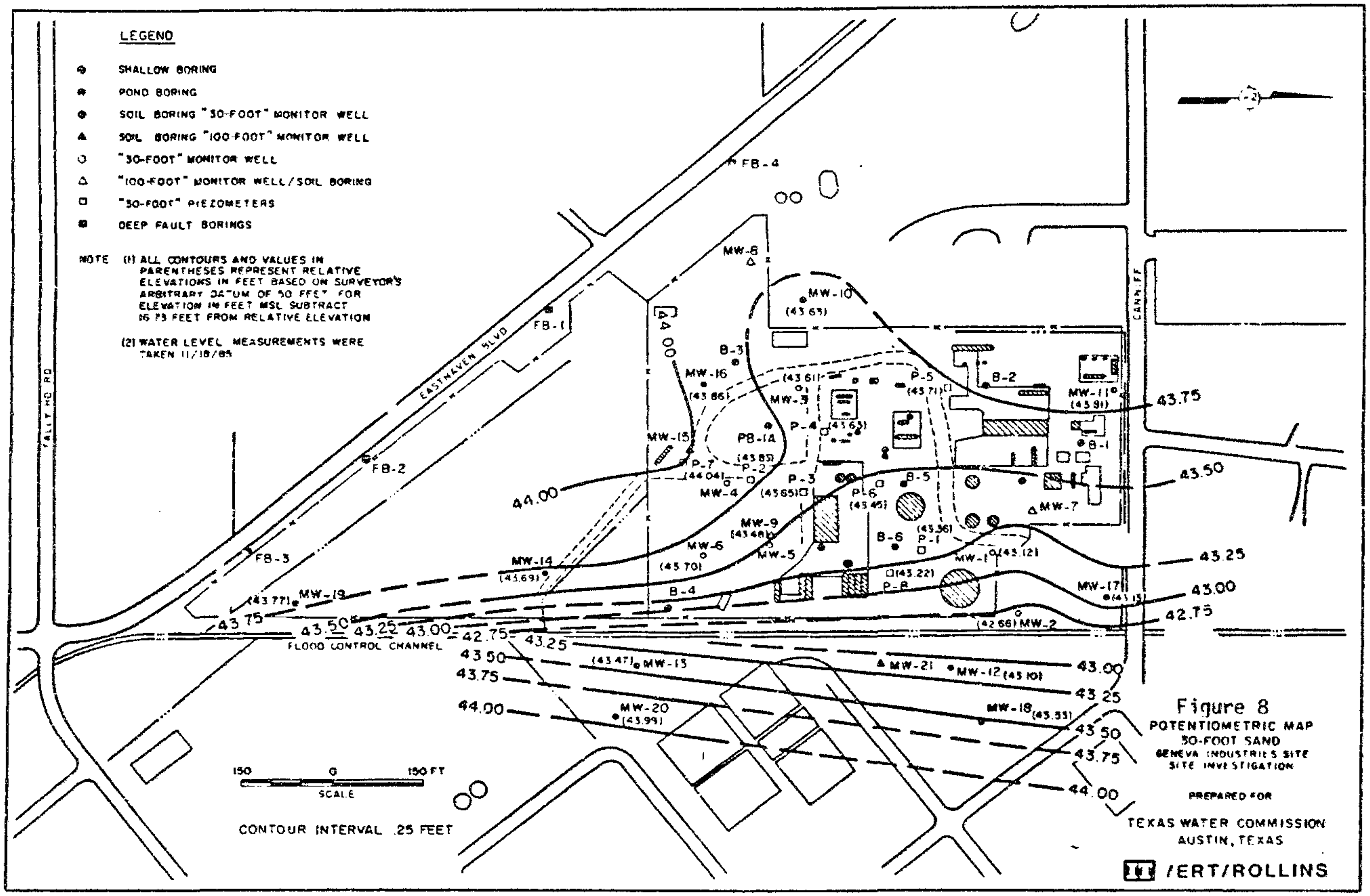

Figure 8
POTENTIOMETRIC MAP
30-FOOT SAND
GENEVA INDUSTRIES SITE
SITE INVESTIGATION

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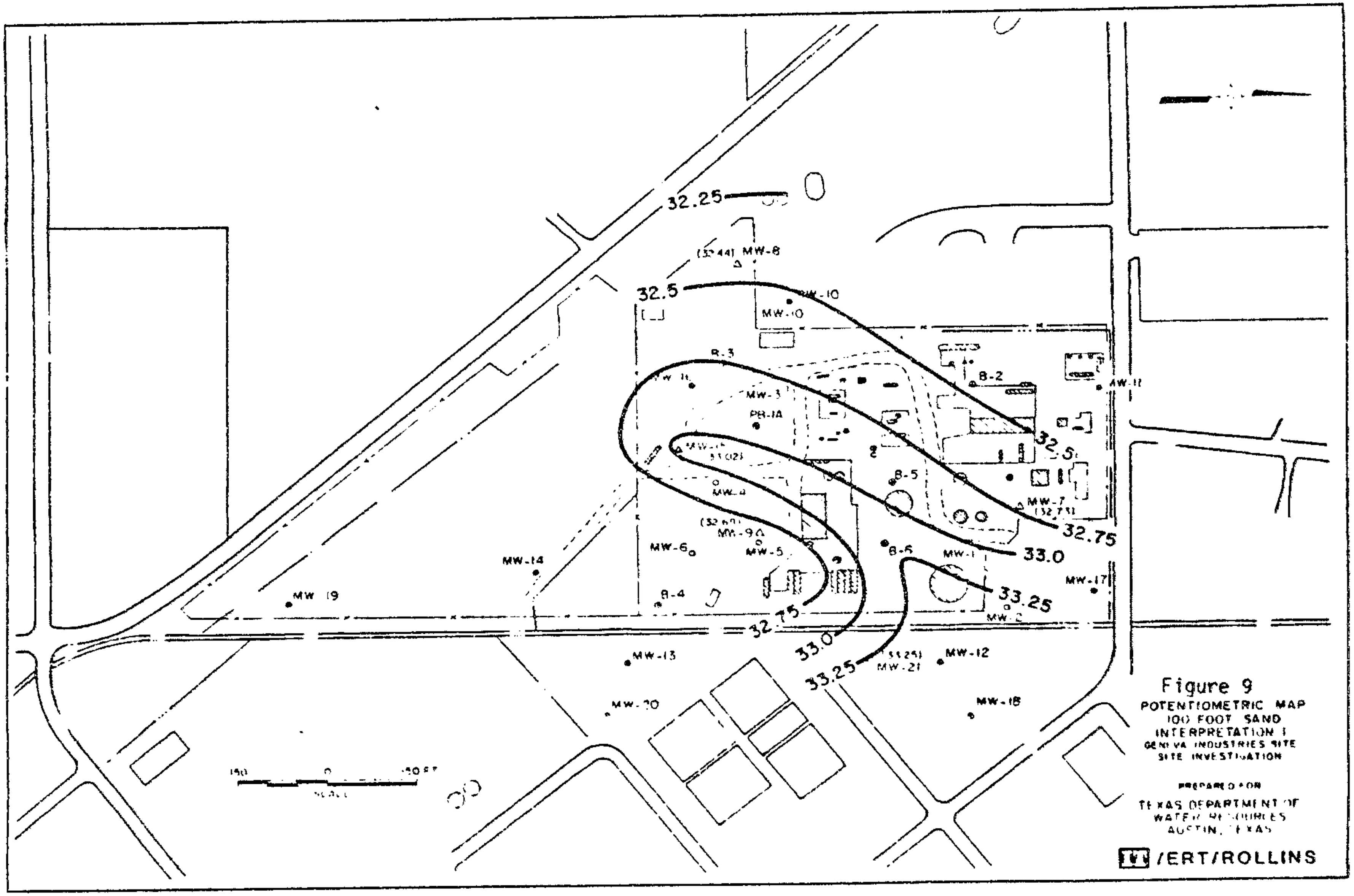

Figure 9
POTENTIOMETRIC MAP
100 FOOT SAND
INTERPRETATION I
GENEVA INDUSTRIES SITE
SITE INVESTIGATION

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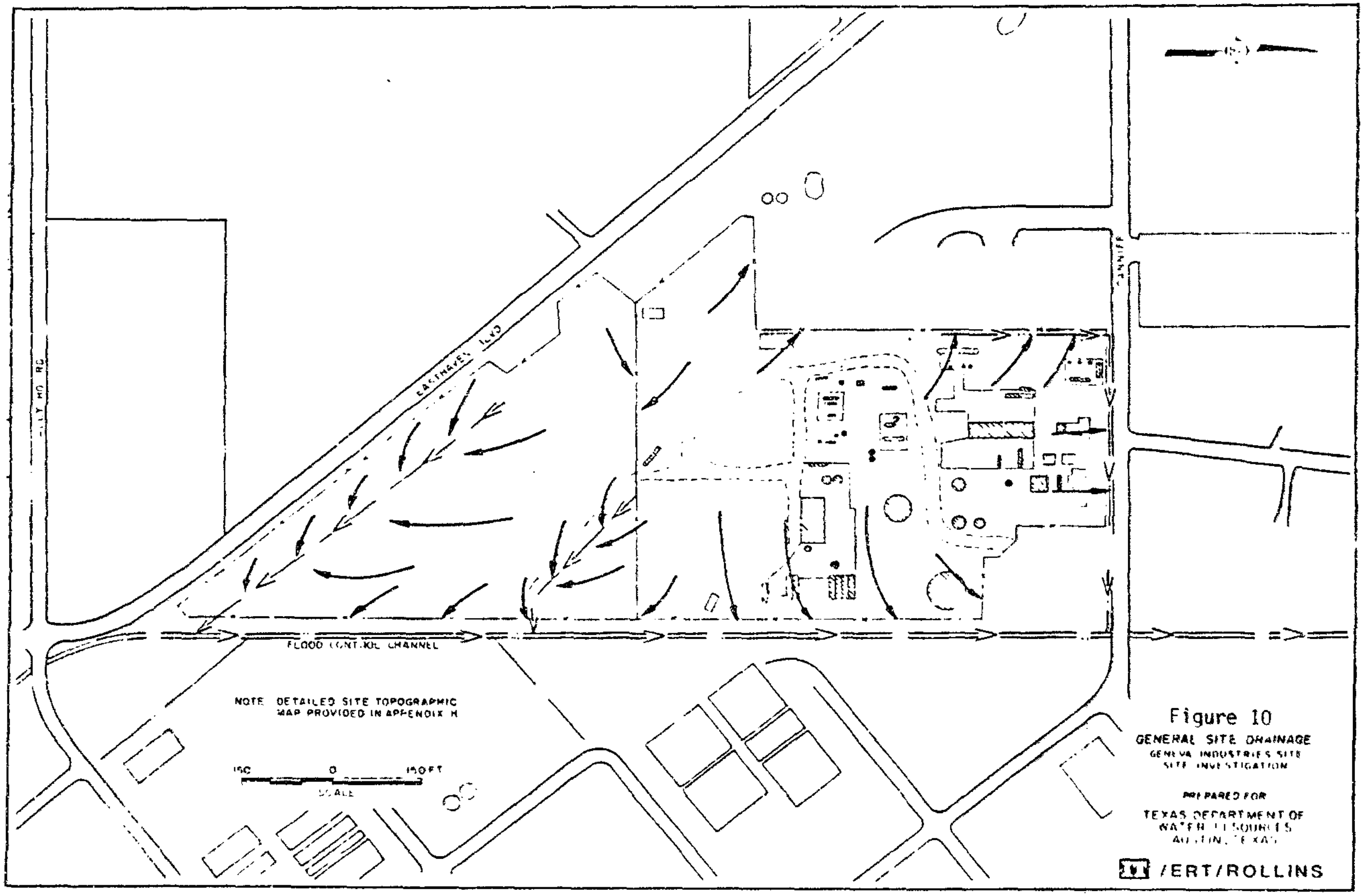

Figure 10

GENERAL SITE DRAINAGE

GENEVA INDUSTRIES SITE
SITE INVESTIGATION

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The flood control channel, being the recipient of the site runoff, is the most likely surface water feature to be impacted by contaminants from surface soils at Geneva.

Due to the temporary protective cap placed on the site during the 1984 Planned Removal, on-site surface expressions of faulting were not discovered during the site investigation. However, faulting in the vicinity of Geneva Industries has been documented by the United States Geologic Survey. To further define the potential for faulting at the site, an area survey was conducted to locate surficial expressions of faulting within 1/2 mile of the site.

One interpretation of the initial fault survey data, shown in Figure 11 and 12, suggested that a surface fault might affect the Geneva site. In an effort to confirm or refute the presence of a fault onsite, a detailed fault investigation was conducted in September 1985. Four borings were drilled perpendicular to the "Fault of Concern" (Figures 11 and 13) along the southwest boundary of the site. Based on the logs of these borings, presented schematically in Figure 14, faulting in the area does not impact the Geneva Industries site. Faulting would be indicated by a discontinuity of the markers along the line of borings. It appears that the "Fault of Concern" terminates about 900 feet southwest of the site boundary, and is moving horizontally at a rate of 0.03 inch per year.

The current subsidence rate in the vicinity of the site appears to be in the range of 0.05 to 0.15 feet per year. The rate of subsidence has been decreasing gradually over the past several years, primarily due to efforts by the Harris-Galveston Coastal Subsidence District to control groundwater withdrawl in areas of previously high pumping rates. Based on projected continued use of groundwater for industrial and water supply purposes it is expected that subsidence will continue at a rate of 0.05 to 0.15 feet per year. Subsidence across the site is expected to be uniform, based on the lack of faulting across the site.

The site has been inundated several times in recent years by heavy precipitation. This inundation is due primarily to inadequate capacity in the adjacent flood control channel to drain water away from the site. Modifications to widen and line the channel, currently being planned by the Harris County Flood Control District, should alleviate inundation problems at the site. These plans would lower the predicted 100-year flood elevation to 31.4 feet msl. This is 3.5 feet below the current site surface evaluation.

Review of the data generated prior to and during the remedial investigation leads to the following conclusions concerning the characteristics and extent of contamination from the Geneva site:

- The principal sources of contamination at the site are waste lagoons and ponds, buried drums, landfarming, surface storage of material in drums and piles, and operational leaks and spills.

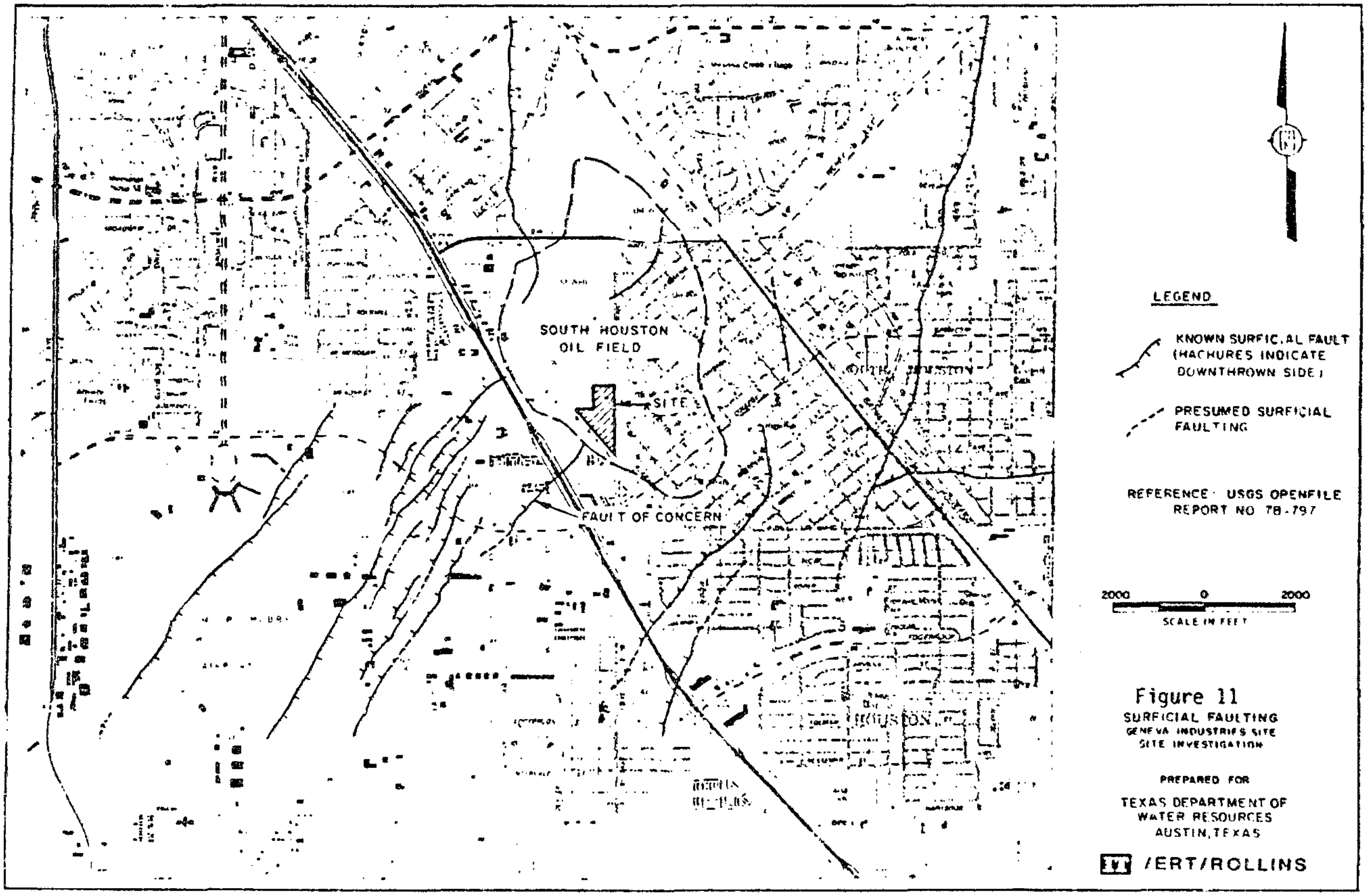

Figure 11
SURFICIAL FAULTING
GENEVA INDUSTRIES SITE
SITE INVESTIGATION

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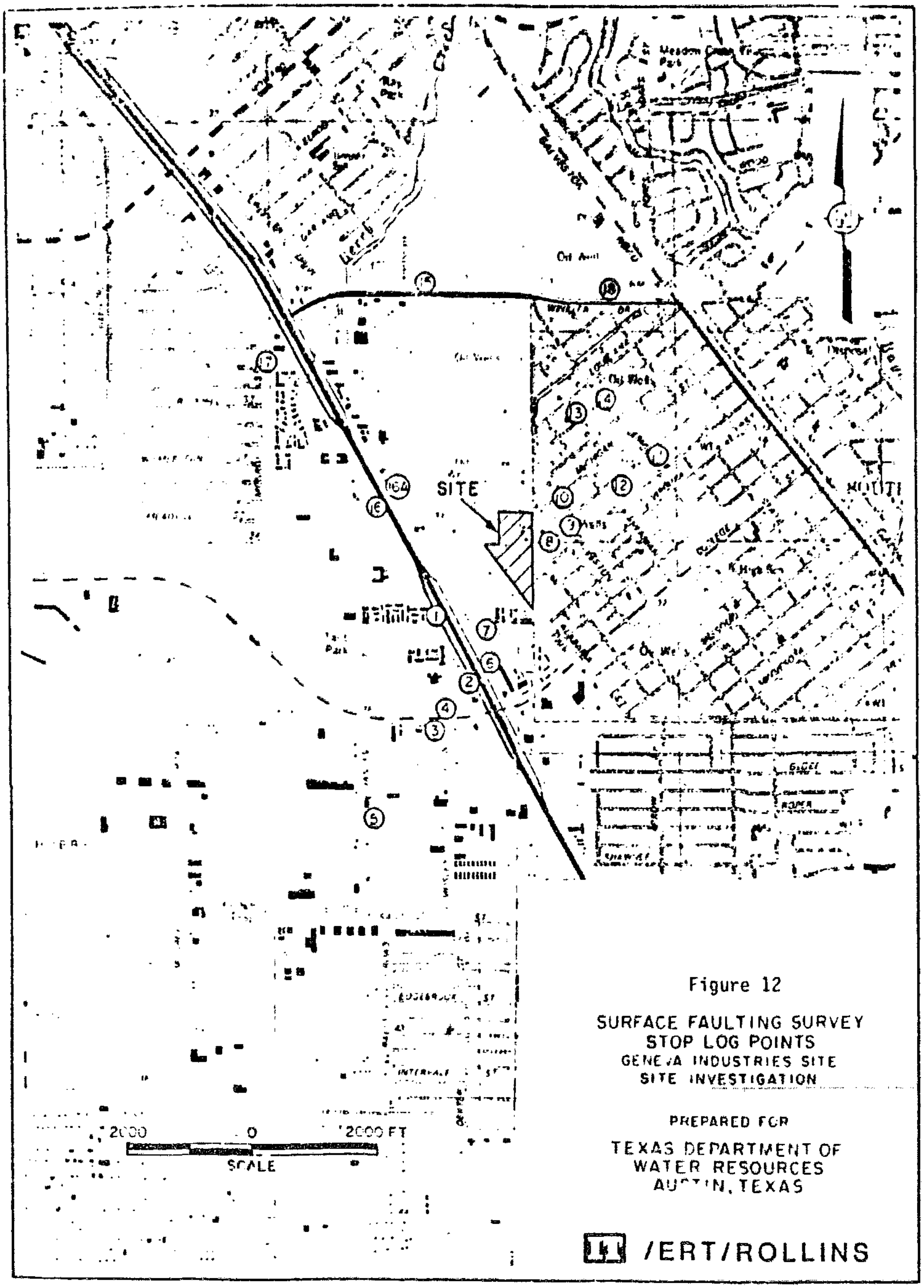

Figure 12

SURFACE FAULTING SURVEY
STOP LOG POINTS
GENEVA INDUSTRIES SITE
SITE INVESTIGATION

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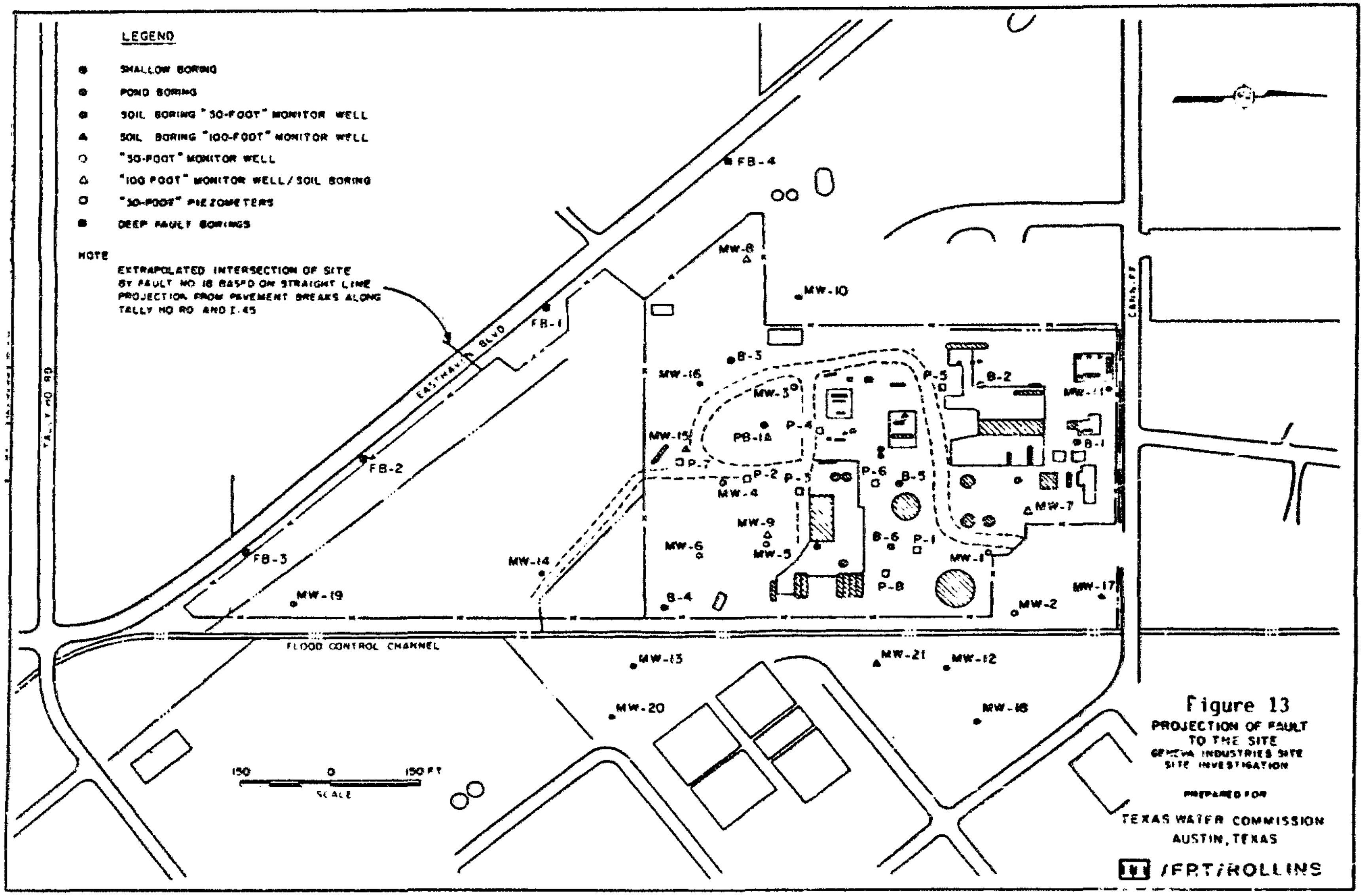

Figure 13
PROJECTION OF FAULT TO THE SITE
SITE INVESTIGATION

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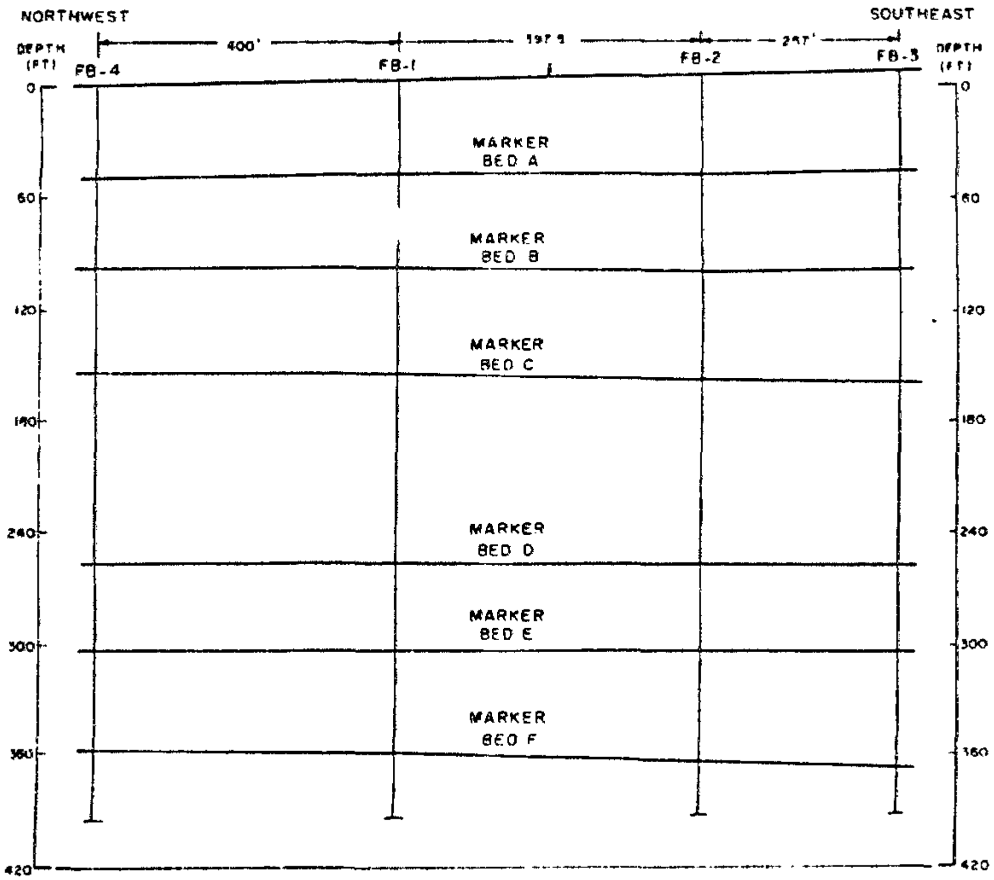

NOTE: FIGURE 3-5 WAS MODIFIED FROM APPENDIX E ATTACHMENT III

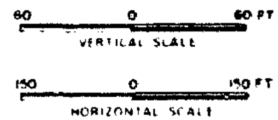

Figure 14

CORRELATION OF HORIZONTAL STRATIGRAPHIC MARKERS
GENEVA INDUSTRIES SITE
SITE INVESTIGATION

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- The principal contaminants are polychlorinated biphenyls (PCBs), aromatic solvents (benzene), nonaromatic chlorinated solvents (trichloroethylene), and polynuclear aromatic hydrocarbons (PAHs).

- Surface and subsurface onsite soils have been contaminated as a result of operational spills, leaking drums, tanks, and lagoons, and landfill/landfarming operations.

- Offsite soils have not been measurably impacted by site activities.

- Sediments in the adjacent flood control channel have been contaminated in the past.

- Shallow groundwater (30-foot sand) is contaminated onsite; some offsite migration has occurred east of the site.

- Intermediate groundwater (100-foot sand) is slightly contaminated onsite.

Soil Contamination

Concentrations of PCBs in surface soils onsite range from less than 1.0 ppm to 1,750 ppm. One sample taken during the 1984 Planned Removal contained 12,200 ppm PCB. Sample locations and analytical results are illustrated in Figure 15. The highest concentrations of PCBs were found in the biphenyl chlorination unit area (12,200 ppm), the landfill/landfarm area (1,170 ppm) and the diked tank area. Relatively high levels of contamination (50 ppm to 500 ppm) are associated with lagoons and containerized storage areas where spills have occurred. Based on the data presented in Figure 16 and Table 2, dioxins and dibenzofurans do not represent a threat to human health or the environment at Geneva.

Based on analytical data from onsite soil borings and trenches, the highest concentrations of PCB are generally within the upper 5-6 feet of soil. Boring and trench locations are shown in Figures 17 and 18, respectively. Analytical data from samples are presented in Tables 3, 4, and 5. As the results indicate, contamination in the pond area extends to a depth of at least 13 feet. Ponds provide a source of liquid waste and the hydraulic head necessary to drive migration downward. Considering the potentiometric data already discussed and vertical driving force from the ponds, it is possible that contamination in the pond area extends vertically to the shallow groundwater.

Volumes of surface and subsurface onsite soils contaminated above various concentrations of PCB were estimated in the remedial investigation. These estimates are presented below:

PCB (ppm)	Soil Volume (cubic yard)
500	9,000
100	22,500
50	31,000
25	42,000
1	65,000

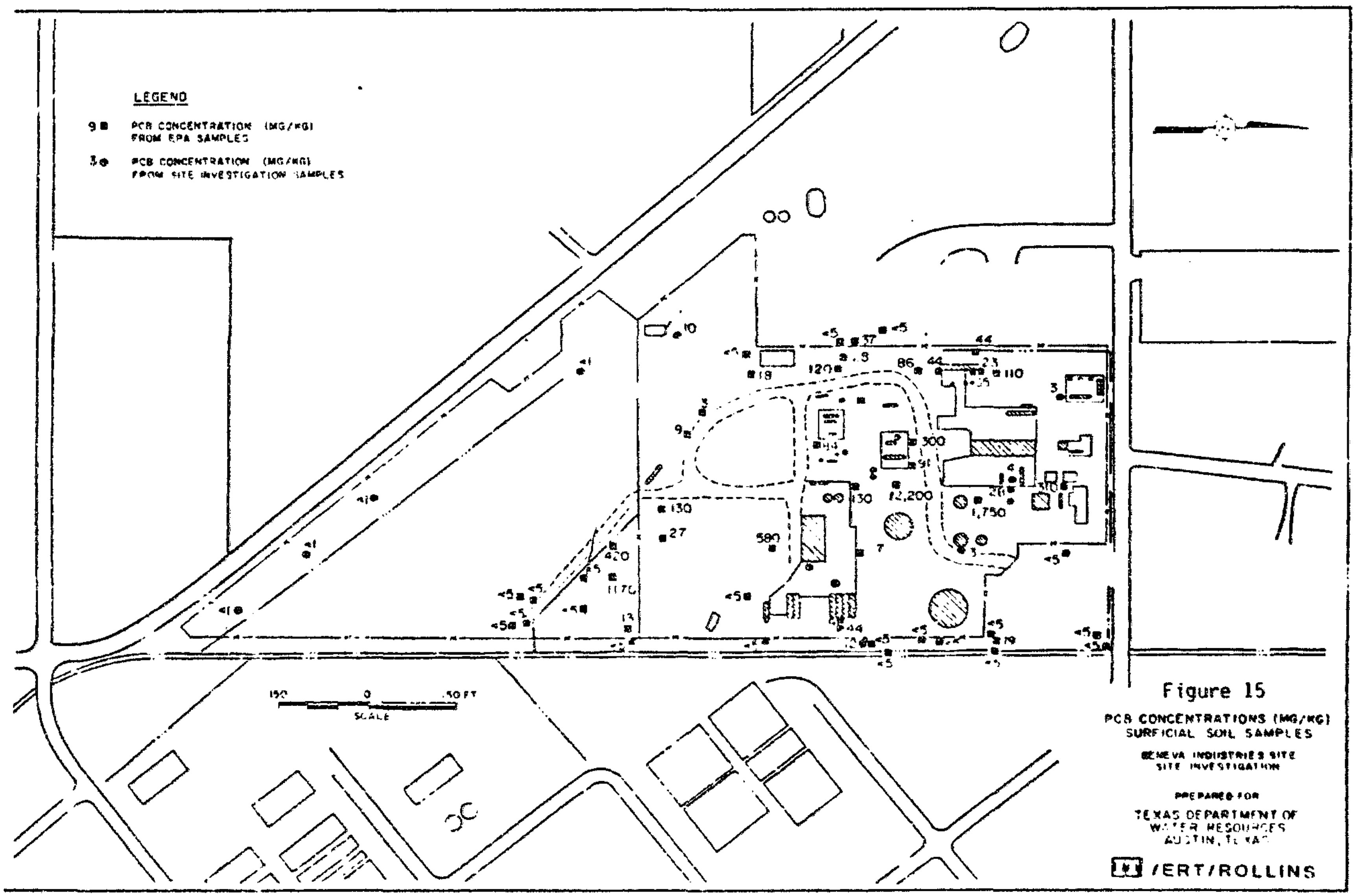

Figure 15

PCB CONCENTRATIONS (MG/KG) SURFICIAL SOIL SAMPLES

GENEVA INDUSTRIES SITE SITE INVESTIGATION

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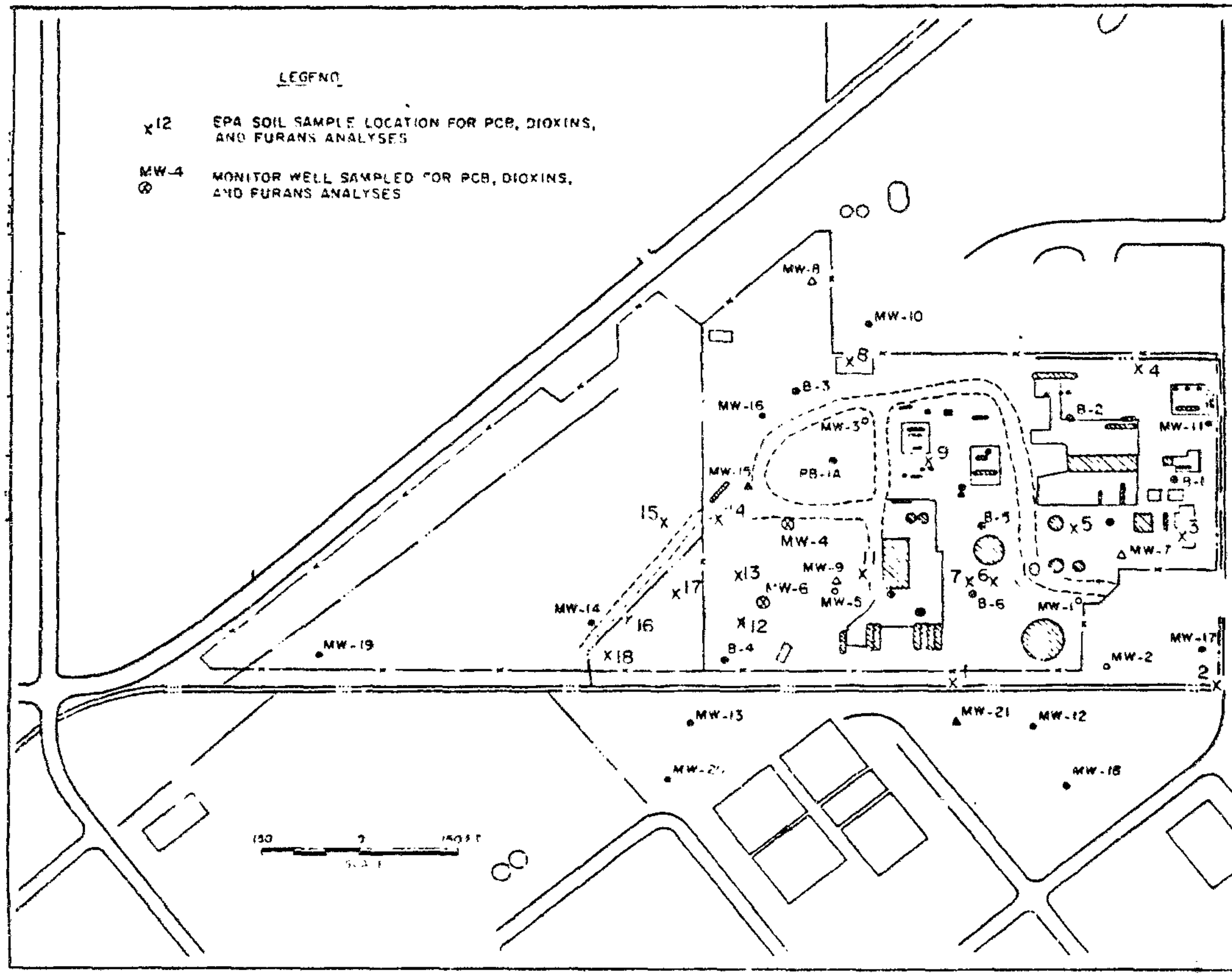

Figure 16
EPA REMFIT
SAMPLING LOCATIONS
GENEVA INDUSTRIES SITE
SITE INVESTIGATION
AND FEASIBILITY STUDIES

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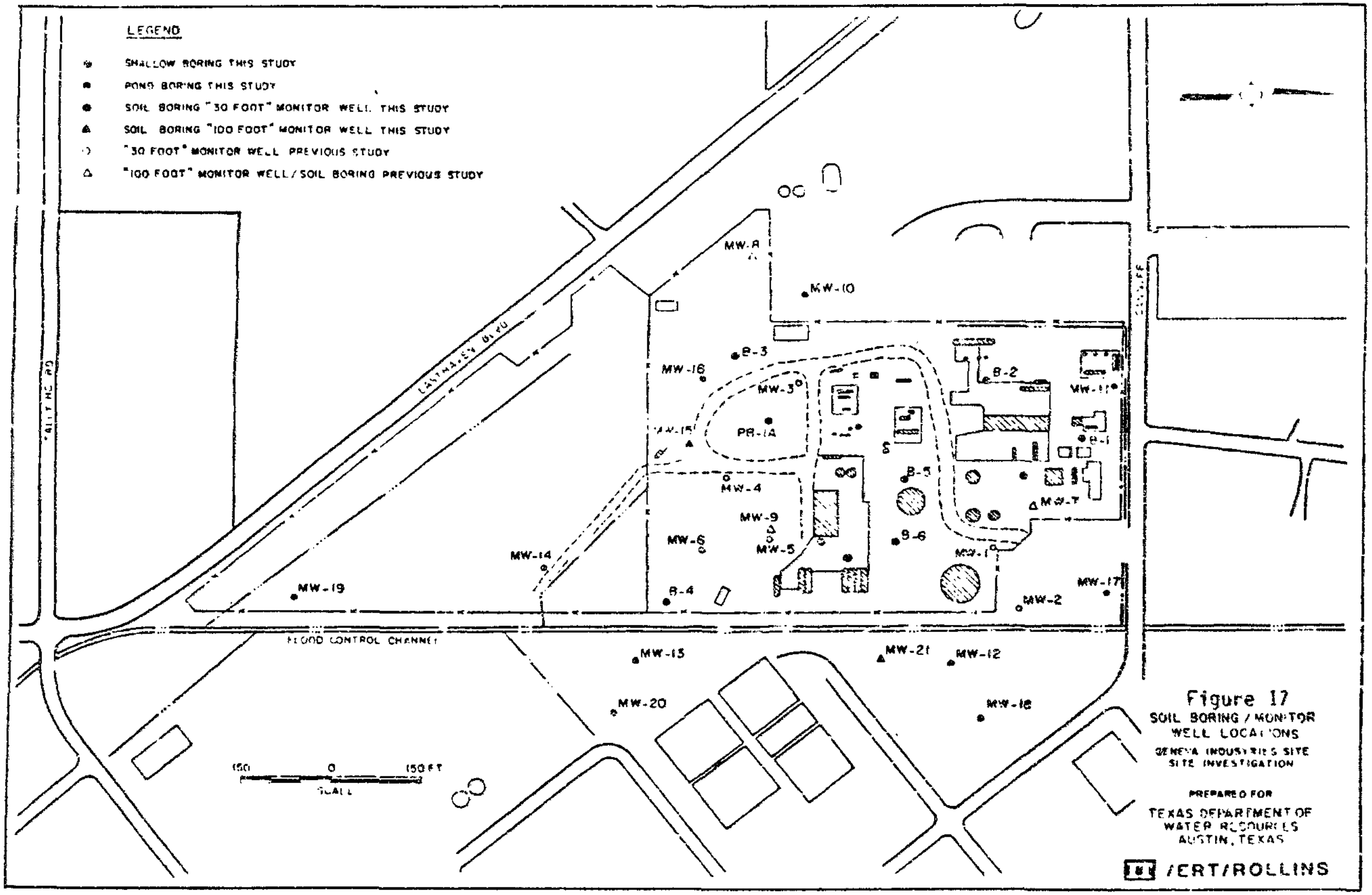
Table 2

SUMMARY OF PCB, DIOXIN AND FURAN DATA FROM EPA REMFIT SAMPLING

SAMPLE LOCATION(1)	TOTAL PCB(2)	TETRA CDD(3)	PENTA CDD(3)	HEXA CDD(3)	HEPTA CDD(3)	OCTA CDD(3)	TETRA CDF(3)	PENTA CDF(3)	HEXA CDF(3)	HEPTA CDF(3)	OCTA CDF(3)
17	2,300.0	ND	ND	ND	ND	0.15	3.76	0.28	ND	ND	0.28
18	18.0	ND	ND	0.07	0.38	1.54	19.51	0.49	0.32	0.57	1.68
1	16.0	ND	ND	0.01	1.04	7.7	3.07	ND	0.04	0.24	0.41
2	16.0	ND	ND	0.07	0.95	2.73	3.07	ND	0.12	0.45	0.47
MW-6	87.0	ND	ND	ND	ND	ND	0.54	ND	ND	ND	ND
MW-6	36.0	ND	ND	ND	ND	ND	0.33	0.03	ND	ND	ND
MW-4	10,000.0	ND	ND	ND	0.40	0.86	80.6	14.59	1.02	1.98	4.07
15	5.3	ND	ND	0.06	0.78	3.2	1.21	0.32	0.09	0.14	0.13
16	530.0	ND	ND	0.14	0.66	4.82	46.19	1.74	ND	2.62	4.31
3	0.6	ND	ND	ND	ND	0.33	0.1	0.01	ND	0.02	ND
13	29.0	ND	ND	ND	0.02	0.11	0.55	0.04	ND	0.09	0.21
14	350.0	0.02	ND	ND	0.08	3.16	16.12	ND	ND	0.13	2.66
12	930.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11	98.0	ND	ND	ND	ND	6.38	38.95	0.19	1.18	0.16	1.23
05	65.0	ND	ND	ND	0.75	3.22	13.52	ND	0.29	0.63	1.25
09	58.0	ND	ND	ND	ND	0.19	9.18	0.39	ND	ND	ND
04	ND	ND	ND	ND	0.07	0.12	ND	ND	ND	ND	ND
08	870.0	ND	ND	ND	ND	3.53	1.58	ND	ND	ND	0.74
10	ND	ND	ND	ND	ND	0.84	ND	ND	ND	ND	ND
06	ND	ND	ND	ND	ND	0.13	ND	ND	ND	ND	ND
07	0.2	ND	ND	ND	ND	0.27	ND	ND	ND	ND	ND
DUP07	0.3										
19	3.1	ND	ND	ND	0.06	0.37	2.33	ND	ND	ND	ND

ND = Not Detected
NA = Not Analyzed

(2) PCB concentration in micrograms per liter for water samples (MW-6 and MW-4) and in milligrams per liter for soil samples (all other samples).
(3) Concentration in parts per trillion for water samples (MW-6 and MW-4) and in micrograms per liter for soil samples (all other samples).



LEGEND
SHALLOW BORING THIS STUDY
POND BORING THIS STUDY
SOIL BORING "30 FOOT" MONITOR WELL THIS STUDY
SOIL BORING "100 FOOT" MONITOR WELL THIS STUDY
"30 FOOT" MONITOR WELL PREVIOUS STUDY
"100 FOOT" MONITOR WELL/SOIL BORING PREVIOUS STUDY
MW-8
MW-10
B-3
MW-16
MW-3
PB-1A
B-2
MW-15
MW-4
B-5
B-1
MW-7
MW-9
MW-6
MW-5
B-6
MW-1
MW-14
MW-19
B-4
MW-2
MW-17
FLOOD CONTROL CHANNEL
MW-13
MW-21
MW-12
MW-20
MW-18
150 0 150 FT
SCALE
Figure 17
SOIL BORING / MONITOR WELL LOCATIONS
GENEVA INDUSTRIES SITE
SITE INVESTIGATION
PREPARED FOR
TEXAS DEPARTMENT OF WATER RESOURCES
AUSTIN, TEXAS
/ERT/ROLLINS

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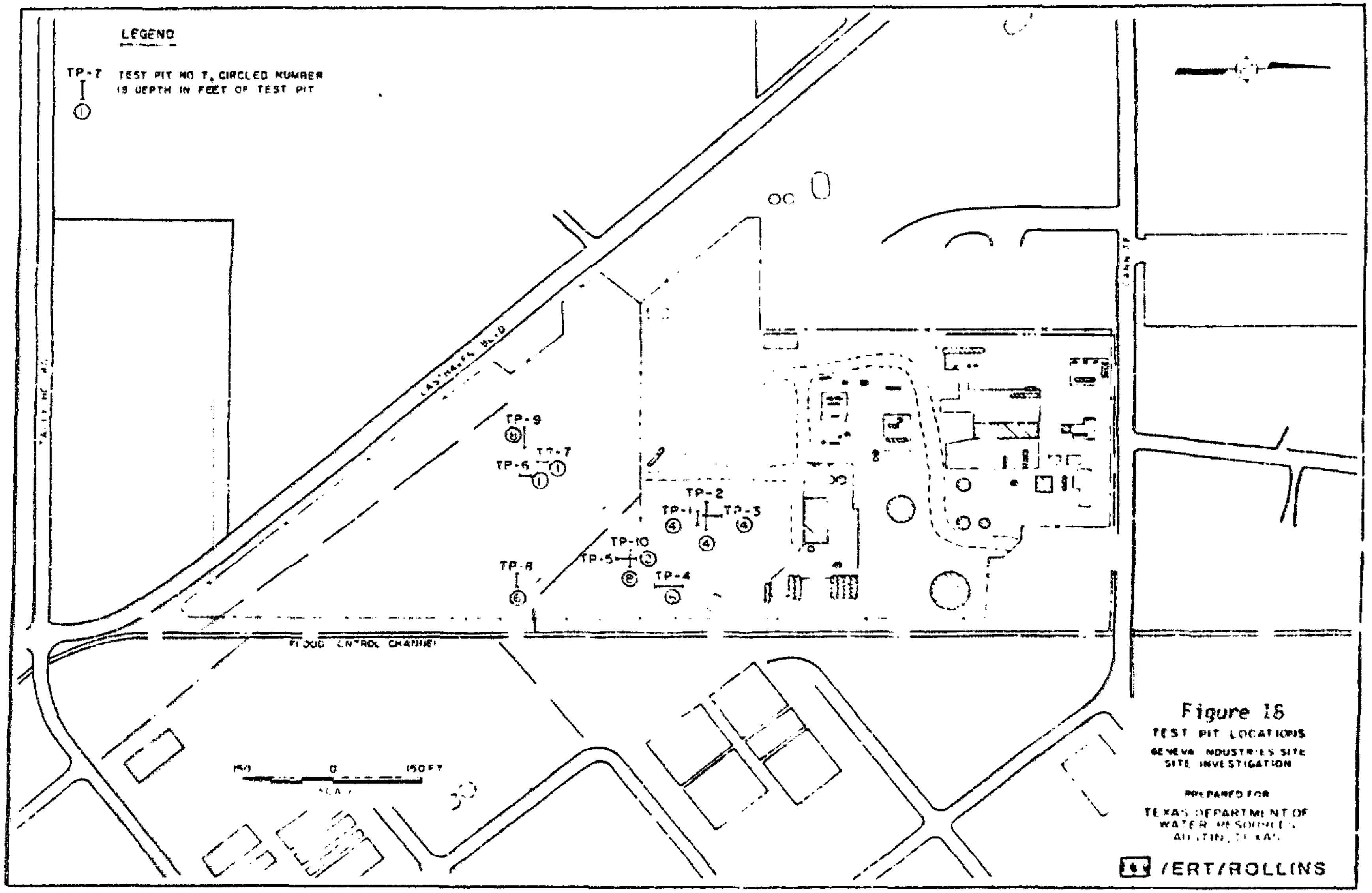

Figure 18
TEST PIT LOCATIONS
GENEVA INDUSTRIES SITE
SITE INVESTIGATION
PREPARED FOR
TEXAS DEPARTMENT OF
WATER RESOURCES
AUSTIN, TEXAS
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005379

Table 3

SHALLOW BORING SAMPLE ANALYSES
SITE INVESTIGATION
GENEVA INDUSTRIES SITE

Sample Identification(1)	Sample Depth (Ft.)	Concentration (ppm) PCB	Total Base-Neutrals(2)
B-1,C-1	1.0-2.0	32	N.D.(3)
B-1,C-2	3.0-4.0	11	N.A.(4)
B-1,C-3	5.0-6.0	N.D.	N.A.
B-1,C-4	6.5-7.0	N.D.	N.A.
B-2,C-1	0-1.0	18	N.A.
B-2,C-3	2.0-3.0	8	N.A.
B-3,C-1	1.5-2.5	2	N.A.
B-3,C-3	4.0-5.0	2	N.A.
B-4,C-1	1.0-2.0	2	N.A.
B-4,C-2	3.0-4.0	15	N.A.
B-4,C-3	5.0-6.0	N.D.	N.A.
B-5,S-1	1.0-2.0	364	162
B-5,S-2	3.0-4.0	72	N.A.
B-5,S-4	6.0-7.0	N.A.	0.75
B-5,S-5	7.0-8.0	N.D.	N.A.
B-6,C-2	1.0-2.0	22	N.A.
B-6,C-3	3.0-4.0	10	N.A.
B-6,C-4	4.0-5.0	6	N.A.
PB-1A,C-4	8.0-8.5	2	N.A.
PB-1A,C-5	8.5-9.5	101	N.A.
PB-1A,C-6	9.5-10.5	2700	116.2
PB-1A,C-7	10.5-11.5	437	N.A.
PB-1A,C-8	11.5-12.0	387	N.A.
PB-1A,C-9	12.0-13.0	91	N.A.

(1) See Figure 4-10 for boring locations. See Appendix D for boring logs.
(2) Sum of individual base-neutral organic compounds.
See Section 5-5 for specific compound concentrations.
(3) N.D. = Not Detected.
(4) N.A. = Not Analyzed.

Table 4
MONITOR WELL SOIL BORING SAMPLE ANALYSES
SITE INVESTIGATION
GENEVA INDUSTIRES SITE

Sample Identification[1]	Sample Depth (Ft.)	Concentration (ppm) PCB	Total Base-Neutrals[2]
MW-10,ST-1	24.5-25.5	N.D.[3]	N.A.[4]
MW-11,ST-1	30.0-32.0	N.D.	N.A.
MW-12,C-5	7.0-8.0	N.D.	N.A.
MW-12,C-6	9.0-10.0	N.D.	N.A.
MW-12,C-7	12.0-13.0	N.D.	N.A.
MW-12,ST-1	39.5-40.5	N.D.	N.A.
MW-13,ST-1A	37.0-38.0	N.D.	N.A.
MW-14,C-1	0-1.0	4	N.A.
MW-14,C-3	3.0-4.0	2	N.A.
MW-14,C-4	5.0-6.0	N.A.	N.D.
MW-14,C-9	13.0-13.5	2	N.A.
MW-15,ST-3	5.5-6.5	N.D.	N.A
MW-15,ST-6	11.0-13.0	N.A.	N.D.
MW-15,ST-8	40.5-41.5	N.D.	N.A.
MW-15,ST-9	45.0-47.0	N.A.	N.D.
MW-15,ST-10	108.5-109.5	N.D.	N.A.
MW-16,C-2	2.5-3.0	7	N.A.
MW-16,C-3	4.5-5.0	2	N.A.
MW-16,C-5	12.0-13.0	N.D.	N.A.
MW-16,ST-1	34.0-36.0	2	N.A.

(1) See Figure 4-10 for boring location. See Appendix D for soil boring logs.
(2) Sum of base-neutral organic compounds.
(3) N.D. = None Detected.
(4) N.A. = Not Analyzed.

TABLE 5
TEST PIT SAMPLE ANALYSES[1]
SITE INVESTIGATION
GENEVA INDUSTRIES SITE

Test Pit Number	Sample Number	Depth Below Land Surface (Ft)	PCB[2] (mg/kg)	Base Neutrals (mg/kg)
TP-1	S-1	0-1 Composite	308	N.D.
	S-3	2 Composite	N.D.	N.A.
	S-4	3 Composite	N.D.	N.A.
	S-5	4 Composite	N.D.	N.A.
TP-2	S-1	0-1 Composite	281	N.A.
	S-3	2 Composite	329	N.A.
	S-4	3 Composite	402	Total Base Neutrals = 30[3]
	S-5	4 Composite	418	N.A.
	S-7	2 (West End)	511	N.A.
	S-8	3 Grab Sample	519	N.A.
TP-3	S-1	0-1 Composite	23	N.A.
	S-3	4 Composite	3	N.A.
TP-4	S-1	0-1 Composite	949	Total Base Neutrals = 38[4]
	S-2	4 Composite	2	N.A.
	S-3	6 Composite	2	N.A.
TP-5	S-1	0-1 Composite	1180	N.A.
	S-2	2 Composite	730	N.A.
	S-3	1 Grab Sample	1610	N.A.
TP-6	S-1	1 Grab Sample	1410	N.A.
TP-7	S-1	1 Grab Sample	2	N.A.
TP-8	S-1	0-1 Composite	N.D.	N.A.
	S-2	2 Composite	N.D.	N.A.
	S-3	4 Composite	N.D.	N.A.
	S-4	6 Composite	N.D.	N.A.
TP-9	S-1	0-1 Composite	N.D.	N.A.
	S-2	2 Composite	N.D.	N.A.
	S-3	4 Composite	N.D.	N.A.
	S-4	6 Composite	N.D.	N.A.
	S-5	8 Composite	N.D.	N.A.

As seen in Table 6 and Figure 19, PCB concentrations in onsite drainageway and adjacent flood control channel sediment samples taken during the site investigation were generally below 1.0 ppm. This is due primarily to the placement of the temporary cap on the site, which minimized direct contact between runoff and contaminated surface soils. Runoff carrying contaminated soil into the flood control channel had a greater impact on channel sediments prior to the 1984 Planned Removal. Since minimizing the contaminant load to the channel by capping, PCBs in the sediments have been diluted and carried downstream during storm events. Erosion of the thin cap currently on the site would increase the exposure of contaminated soils to runoff, thus increasing the risk of channel contamination in the future.

Offsite soils were not found to be contaminated during the remedial investigation. Because drainage of the site is toward the flood control channel, migration of waste to the south or west of the site is considered extremely unlikely. Contamination east of the flood control channel was not detected in soil samples taken during monitoring well installation.

Drums

In order to estimate the number of drums buried onsite, a magnetometer survey of the site was performed as part of the site investigation. Probable areas of buried drums were identified as the landfill area, the southern lagoon, and areas indicating buried metal in the magnetometer survey. The estimated number of drums in the site investigation report is 400 to 700 drums. This estimate could increase to as high as 2300 drums if all areas of buried metal, as indicated in the survey, contain drums.

Groundwater Contamination

Data from the remedial investigation, presented in Table 7, indicate that elevated concentrations of PCBs are present onsite in the groundwater in the 30-foot sand. The highest concentrations were found in MW-3, MW-4, and MW-5 (Figure 17). A film of oil was also present in MW-4, MW-5, and MW-12. Measured PCB concentrations in oil/water samples taken during a pump test in MW-4 were 400 to 600 ppb, indicating that the oil layer contains elevated concentrations of PCB relative to the groundwater.

Significant concentrations of other priority pollutants were detected in the 30-foot sand. These contaminants were primarily in the volatile organic (3.0-5800 ppb) and base-neutral extractables (1.0-1900 ppb) classes of compounds. As seen from the data in Table 7, the highest concentrations of base-neutral compounds were detected in MW-12, east of the site. These priority pollutants are more water-soluble than PCBs, and therefore, one would expect a more extensive contaminant plume (Figure 20).

Contamination in the 100-foot sand is restricted to a small area near MW-9. Trichloroethylene (TCE) was detected in two samples taken from the well. Because TCE was detected in an adjacent monitoring well in the 30-foot sand, MW-5, a hydraulic interconnection between the two water-bearing zones appears to exist, or did exist at one time.

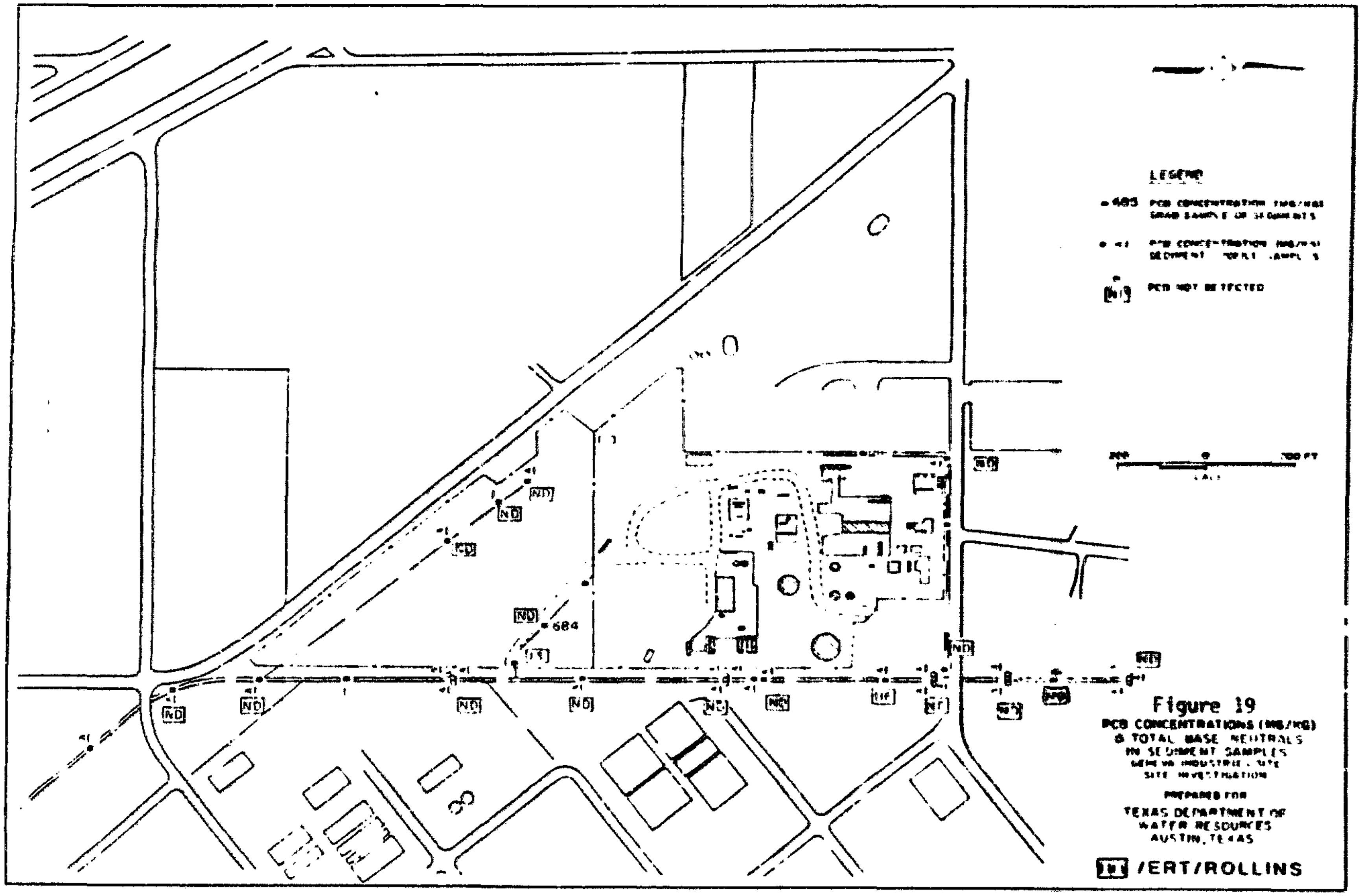

Figure 19
PCB CONCENTRATIONS (MG/KG)
& TOTAL BASE NEUTRALS
IN SEDIMENT SAMPLES
SITE INVESTIGATION
TEXAS DEPARTMENT OF
WATER RESOURCES
AUSTIN, TEXAS
/ERT/ROLLINS

Table 6
STORMWATER SAMPLE ANALYSES
GENEVA INVESTIGATION

Sample No.	Location[2]	PCB (ug/l)[3]	TOC (ug/l)	Other Analyses[4]
SW-1	South of tank	158	9	PNA's - None detected
SW-2	South of south drum storage building	55	47	PNA's - None detected
SW-3	South drainage ditch	6	37	PNA's - Naphthalene 2 μg/l
SW-4	Site roadway	28	10	
SW-5[5]	Northeast site drainage ditch	<1		VOA - None detected
SW-6	Northwest site drainage ditch	<1	----	

Notes

(1) Grab samples of standing water on next day following evening or night storm events, except SW-5 (see note 5).
(2) General location of standing water, see also Figure 5-4.
(3) PCB concentration in micrograms per liter (ug/l).
(4) PNA = Polynuclear aromatics, VOA = volatile organics
(5) Sample of water seeping into drainageway 24 to 48 hours following storm event.

Table 7

GROUND WATER SAMPLES AND CONCENTRATIONS
SITE INVESTIGATION
GENEVA INDUSTRIES SITE

Sample Identification[1]	Location[2]	PCB(ppb)	Total Volatiles (ppb)[3]	Total Acid Extractables (ppb)[3]	Total Base Neutral Extractables (ppb)[3]	Total Organic Carbon(mg/l)
			SHALLOW WELLS 30-FOOT SAND			
GW-1	MW-1	16	N.D.[4]	N.D.	4.2	8
GW-2	MW-2	18	17	N.D.	195.7	8
GW-3	MW-3	81	818.1	N.D.	90	8
GW-4	MW-4	82	5807.3	N.D.	275	58
GW-17	MW-4	714 Pump Test	N.A.	N.A.	N.A.	N.A.
GW-20	MW-4	591 Pump Test	N.A.	N.A.	N.A.	N.A.
GW-5	MW-5	29	867.2	N.D.	488	16
GW-6	MW-6	7	6.1	N.D.	90	16
GW-12	MW-10	N.D.	2.1	N.D.	14	14
GW-31	MW-10	<10[6]	N.D.	N.A.	N.D.	N.A.
GW-41[7]	MW-10	N.D.	N.A.	N.A.	N.A.	N.A.
GW-15	MW-11	N.D.	N.D.	N.A.	N.D.	15
GW-24	MW-11	N.D.	N.D.	N.A.	N.A.	N.A.
GW-38[7]	MW-11	N.D.	N.A.	N.A.	N.A.	N.A.
GW-10	MW-12	950	N.A.	N.A.	N.A.	N.A.
GW-16	MW-12	N.D.	91	N.A.	1908	25
GW-30	MW-12	<10[6]	31.8	N.A.	1222	N.A.
GW-36[7]	MW-12	N.D.	N.A.	N.A.	N.A.	N.A.
GW-11	MW-13	N.D.	36.6	N.D.	16	40
GW-25	MW-13	N.D.	N.D.	N.A.	1.2	N.A.
GW-34[7]	MW-13	N.D.	N.A.	N.A.	N.A.	N.A.
GW-13	MW-14	2	696.6	N.D.	18	19
GW-14	MW-16	N.D.	230.6	N.D.	16	36
GW-28	MW-17	N.D.	N.D.	N.A.	7.4	N.A.
GW-37[7]	MW-17	N.D.	N.A.	N.A.	N.A.	N.A.
GW-27	MW-18	N.D.	3.2	N.A.	N.D.	N.A.
GW-35[7]	MW-18	N.D.	N.A.	N.A.	N.A.	N.A.
GW-29	MW-19	<10[6]	N.D.	N.A.	N.D.	N.A.
GW-40[7]	MW-19	N.D.	N.A.	N.A.	N.A.	N.A.
GW-32	MW-20	N.D.	3.4	N.A.	N.D.	N.A.
			DEEP WELLS 100-FOOT SAND			
GW-33[7]	MW-20	N.D.	N.A.	N.A.	N.A.	N.A.
GW-18	MW-9	N.A.	8.5	N.D.	2.2	N.A.
GW-7	MW-7	N.A.[5]	N.D.	N.D.	N.D.	10
GW-21	MW-7	N.D.	N.D.	N.A.	N.A.	N.A.
GW-8	MW-8	N.D.	174.3	N.D.	N.D.	15
GW-22	MW-8	N.D.	N.D.	N.A.	1.2	N.A.
GW-39	MW-8	N.A.	N.D.	N.A.	N.D.	N.A.

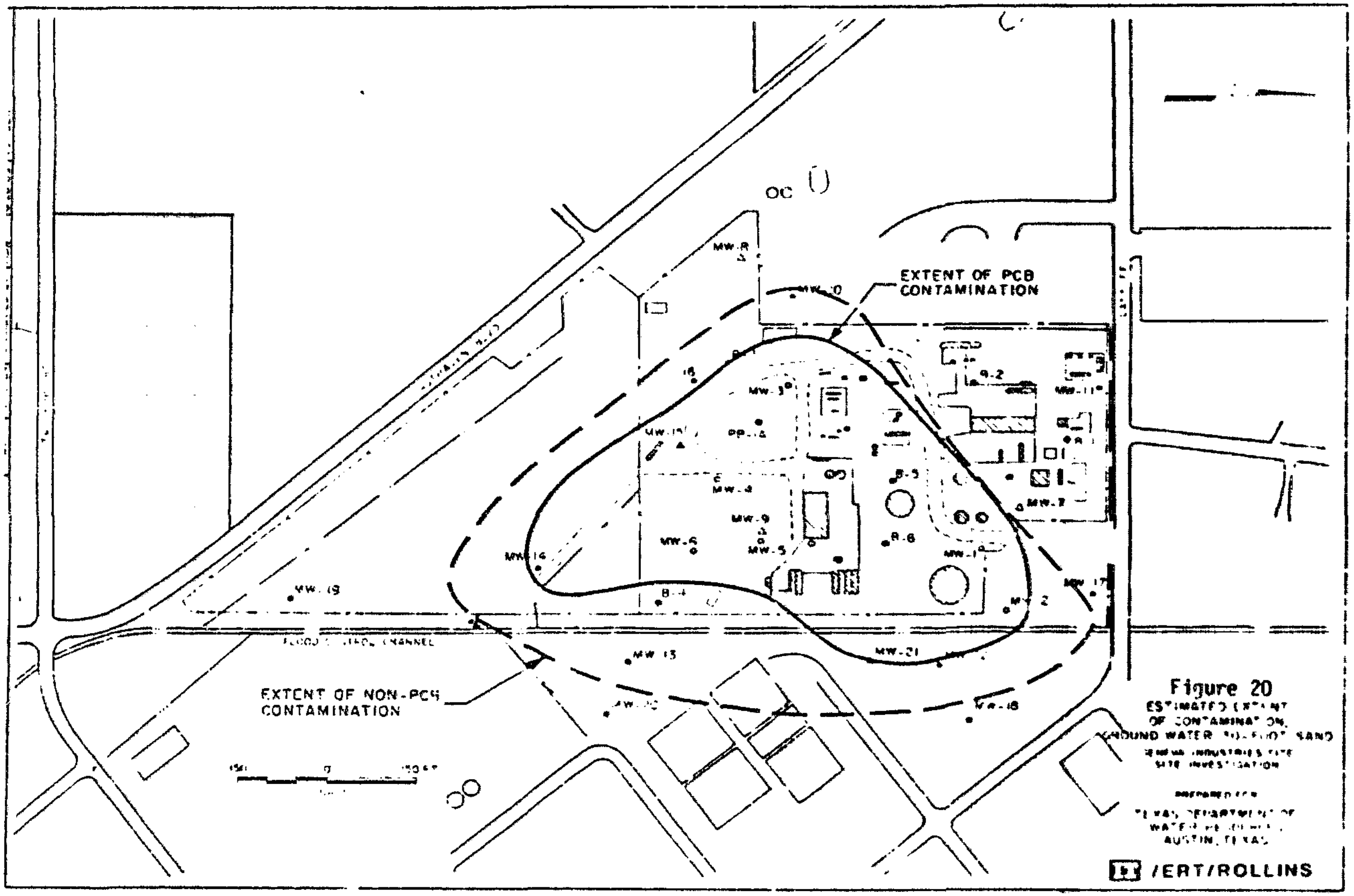

Figure 20
ESTIMATED EXTENT
OF CONTAMINATION,
GROUND WATER ... SAND
... SITE INVESTIGATION
PREPARED FOR
TEXAS DEPARTMENT OF
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005387

No contamination was found in any offsite domestic wells screened in the 100 foot sand. Also, no contamination was found in samples taken from the 250-foot, 600-foot, and 700-foot sands onsite. These deeper sands represent a portion of the municipal water supply for the city of South Houston.

Contaminant Migration Pathways

Air

Air quality monitoring during the remedial investigation indicated that PCBs are not currently being transported by wind and do not pose an immediate threat to the public. This is primarily due to the temporary clay cover on the site. However, significant disturbance of the site or lack of maintenance of a protective cover could cause future air quality degradation in the vicinity of the site.

Surface Water

Data collected during the 1984 Planned Removal and the remedial investigation indicate that contaminated soil is carried offsite via surface runoff. This soil at least partially settles out in the flood control channel. Consequently, surface waters on and near the site represent a potential migration pathway. Soil particles that have settled out could be re-suspended and carried downstream and/or consumed by biota in the channel.

Currently, the temporary cap onsite minimizes the contact between precipitation and contaminated soils. As a result, particulate matter in the runoff is not contaminated. This is confirmed by comparing the sediment sample data from the Planned Removal with sample data from the site investigation. Lack of maintenance of the current cover would cause a reversal of the current conditions in the channel (i.e., contamination in the channel would increase).

Groundwater

The primary migration route via the groundwater pathway is horizontal migration in the 30-foot sand. It is probable that liquids from the lagoons were driven downward by hydraulic head and were in direct contact with the groundwater. PCBs and most polynuclear aromatic hydrocarbons exhibit relatively low mobility, low water-solubility, and a high affinity for adsorption to soil. Chlorinated solvents are much more mobile and soluble in water and would be expected to migrate farther in the groundwater. Free phase oil, found in MW-4 and MW-5, will increase the mobility of the less water-soluble organics, particularly the PCBs. The current migration rate in the 30-foot sand was estimated from values of transmissivity and hydraulic gradient developed in the remedial investigation. The estimated flow rate in this zone is less than 5 feet per year. Because of the effects of adsorption and dispersion, migration of the contaminants will probably be less, except for contaminants carried in the free oil phase.

Migration of contaminants in the 30-foot sand is particularly important because of the relationship between this sand zone and the flood control channel. As mentioned previously, it is possible that the shallow water-bearing zone could discharge into the channel. Concentrated PCBs in the oil phase would then be transported downstream, providing a possible human exposure route.

Vertical migration from the 30-foot sand to the 100-foot sand is of concern via two pathways. First, the potential exists for migration directly through the intervening aquitard. Second, a potential exists for migration through an improperly plugged oil well onsite. TCE has been detected in the 100-foot sand and directly above in the 30-foot sand. Based on this data, some hydraulic connection between the two sands has existed or currently exists. Concentrated trichloroethylene can react with clay soils to increase the permeability; this may have been the case at Geneva. It is also possible that an improperly plugged oil well, since plugged by EPA in 1984, provided the migration route. However, the conclusion that plugging the abandoned well has eliminated the vertical migration route may not be drawn with 100% certainty.

Horizontal migration routes in the 100-foot sand have been estimated in the remedial investigation at about 25 feet per year. The direction of flow, based on potentiometric data, is to the west and southwest. One active water well reported to be screened in the 100-foot sand is located 0.2 mile southwest of the site. Samples taken from this well were not found to be contaminated.

Target Receptors

The following target receptors were identified in the remedial investigation:

- Children and adults walking, playing, or working in the adjacent flood control channel;

- Persons consuming fish and crawfish from the flood control channel;

- Persons consuming water from the 100-foot sand;

- Residents in nearby houses, trailers, and apartments, and employees in nearby commercial facilities who could be affected by future airborne contaminant migration from the site.

Enforcement

As noted previously, operations at Geneva Industries had been marked by frequent spills, leaks and unauthorized discharges. Past owners have been cited twice by regulatory authorities for improper activities at the site.

EPA has identified ten Potentially Responsible Parties (PRPs) for the site. Notice letters and information requests were sent to all known PRPs in February and May of 1983. PRPs have also been given the opportunity to participate in all actions that have been taken at the site to date. Pilot Industries of Texas, Inc., offered $150,000 to pay for a portion of the 1984 Planned Removal in exchange for a total release of liability. This offer was not accepted by EPA.

During a June 1983 removal action, the current owner refused to give EPA access to the site unless he received a "hold harmless" statement from EPA to free him of any liabilities from Federal response actions. Work was delayed for two days, until EPA issued an Administrative Order requiring him to grant EPA access to the site.

A second Administrative Order was issued on August 28, 1984, to Lawrence Fuhrmann; Pilot Industries of Texas, Inc.; Winston Petroleum Company; Intercoastal Refining; Herbert Koen, doing business as Fox Vacuum Service; and Texaco, Inc. This order was issued for the removal of tank contents and onsite asbestos insulation, and the plugging of an abandoned onsite water well. In September that same year, EPA issued a withdrawal of this Order to Texaco and instead entered into a Consent Decree which required Texaco to remove the contents of three of the storage tanks onsite.

Due to the current financial conditions of the parties involved with Geneva Industries, remedial action may not be implemented in a timely fashion through PRP involvement. However, the PRPs will be offered the opportunity to participate in the implementation of the selected remedy.

ALTERNATIVES EVALUATION

The Feasibility Study (FS) for the Geneva Industries site was performed to determine what actions, if any, would be appropriate as part of a permanent remedy for the site. Several alternative remedial methods were developed by the IT Corporation, Environmental Research and Technology, Inc., and Rollins Environmental Services (TX) team. The ultimate objective of the feasibility study was to develop alternatives to cost-effectively mitigate damage to, and provide adequate protection of public health, welfare, and the environment from past and potential releases of contaminants currently onsite.

The major threats to public health and the environment attributed to the site are:

- Direct contamination of groundwater by leaching from the soil and possible deterioration of buried drums;
- Contamination of surface waters by runoff from the site or possible discharge of shallow groundwater to the flood control channel;
- Potential airborne transport of contaminated particulates.

Remedial Objectives

The remedial action objectives developed in the feasibility study include:

- Prevent future contamination to the adjacent flood control channel;
- Minimize direct contact with contaminated soils onsite;
- Prevent degradation of offsite soils;
- Prevent further degradation of offsite groundwater in the 30-foot sand, and reduce the risk of degradation of deeper sands;
- Reduce contamination in the 100-foot sand;

Criteria to measure the accomplishment of these objectives were established based on:

- Published criteria and regulatory standards, advisories, or guidance;
- Risk assessment performed as part of the feasibility study.

In accordance with the National Contingency Plan (NCP), the requirements of Federal environmental regulations, guidances, and advisories are appropriate in determining the extent of remedial action at a site. Alternatives should be developed that meet, exceed, and do not attain appropriate and relevant Federal standards.

The following criteria were selected for each migration pathway at the Geneva site:

Pathway	Criteria
Offsite soil	PCB < 25 ppm in the industrial area PCB < 10 ppm in residential area
Onsite soil	PCB concentration of 25 ppm, 50 ppm, 100 ppm
Surface water	Minimal PCB in runoff (< 1.0 ppb)
Groundwater: 30-foot sand	Existing concentration offsite TCE < 1.0 ppb onsite
Groundwater: 100-foot sand	TCE < 1.0 ppb

The selected remedial action objectives and criteria are specific to the Geneva Industries site and provide the basis for identifying and evaluating possible remedial action alternatives for the site. A more complete discussion of the objectives and criteria identification and screening process can be found in Chapter 3 of the feasiblity study.

The process by which potential remedial alternatives are developed is outlined in Section 300.68 of the NCP. The NCP, 40 CFR 300.68 (f)(1), states:

> "To the extent that it is both possible and appropriate, at least one remedial alternative shall be developed as part of the feasibility study (FS) in each of the following categories:
>
> a. Alternatives for treatment or disposal in an off-site facility, as appropriate;
>
> b. Alternatives that attain applicable or relevant and appropriate Federal public health and environmental requirements;
>
> c. As appropriate, alternatives that exceed applicable or relevant and appropriate public health and environmental requirements;
>
> d. As appropriate, alternatives that do not attain applicable or relevant and appropriate public health and environmental requirements but will reduce the likelihood of present or future threat from the hazardous substances and that provide significant protection to public health and welfare and environment. This must include an alternative that closely approaches the level of protection provided by the applicable or relevant and appropriate requirements.
>
> e. A no action alternative."

Identification and Screening of Technologies

The first step in the alternative development process is the identification and screening of potentially applicable technologies. Screening was done by applying the following criteria:

- Capability of satisfying remedial objectives;
- Reliability based on prior performance under similar conditions;
- Consistency with environmental limitations associated with the site.

Technologies which have not been proven effective under similar site conditions and contaminant concentrations were eliminated. Also, technologies judged incapable of satisfying the remedial objectives were eliminated. A summary of the identification and screening of potentially applicable technologies is presented in Tables 8 and 9.

Table 8

SUMMARY OF REVIEW OF TECHNOLOGIES
FEASIBILITY STUDY
GENEVA INDUSTRIES SITE

Technology	Applicability [1]	Comments
Capping	A	Combination clay/synthetic membrane cap preferred.
Dust Control	a	Applicable with capping, excavation and grading.
Grading	a	Applicable with excavation and capping.
Revegetation	a	Applicable with other technologies.
Diversion and Collection Systems	a	Channels and dikes may have applicability for intercepting runoff or runon when used in combination with other technologies.
ontainment Barriers	A	Soil bentonite wall preferred for a long term containment. For dewatering of deep excavation, a cement bentonite wall or sheet piles preferred.
roundwater Pumping, Well Systems	A	Groundwater pumping depends on level or remediation necessary to prevent long term risk to water supply aquifers. Groundwater recovery wells with submersible pumps potentially applicable to 100-foot sand. Recovery wells for pumping groundwater and/or oil are potentially applicable to the 30-foot sand. Treatment with discharge of treated groundwater or offsite disposal are potentially applicable with pumping.
ell Plugging and bandonment	a	Applicable to the monitor wells when their use is no longer necessary.
Deep Well Injection	a	Applicable to the monitor wells when their use is no longer necessary.
Subsurface Collection Drains	NA	Not applicable for groundwater recovery due to depth and trench stability considerations. Could be applicable if recovery of oil from the 30-foot sand but not the contaminated water is required.

1. A = Applicable major technology
   a = Applicable minor technology used in conjunction with major technologies.
   NA = Not applicable technology

Table 8
SUMMARY OF REVIEW OF TECHNOLOGIES
(Continued)

Technology	Applicability	Comments
Permeable Treatment Bed	NA	Not applicable due to potential plugging problems, potential channeling within the bed, difficulty of replacing treatment media, and absence of proven application for similar contaminants.
Gas Collection and/or Recovery	NA	Subsurface conditions and waste characteristics are not conducive to subsurface gas collection. In addition, technologies that control waste and groundwater migration should control subsurface gas.
Drum/Tank/Surface Facilities Removal	a	Excavation of buried drums is potentially applicable. Removal of surface tanks, process equipment and foundations is applicable prior to surface capping or excavation.
Liquid Removal	a	Pumping of runoff from wastes temporarily exposed during remediation is potentially applicable.
Incineration	A	Rotary-kiln incinerator can destroy both PCB contaminate liquids and solids; whereas, the liquid injection incinerator can destroy PCB contaminated liquids only.
Solidificaton	a	Applicable with excavation and landfill technologies. Cement-based, lime-based, thermoplastic, vitrification and self-cementing technologies offer best potential for applicability. Solidification can eliminate free moisture, increase ignition temperature and reduce leachability of the waste.
Biological	a	Biological land application is infeasible due to the large volume of contaminated soil and the limited surface area available.
Chemical Treatment of Water	NA	Not generally applicable to site contamination. Liquid-liquid extraction is potentially applicable for the free oil phase if sufficient volumes are treated. Chemical dechlorination is potentially applicable to the PCBs and dibenzofurans in oils. These methods are applicable with groundwater pumping.

(1) A = Applicable major technology.
a = Applicable minor technology used in conjunction with major technologies.
NA = Not applicable technology.

Table 3
SUMMARY OF REVIEW OF TECHNOLOGIES
(Continued)

Technology	Applicability[2]	Comments
Physical Treatment of Water	a	Applicable with groundwater pumping. Flocculation/precipitation/sedimentation filtration/oil-water separators are potentially applicable pretreatment schemes for suspended solids or oil removal from pumped groundwater. Carbon adsorption is potentially applicable for treatment of the dissolved organics. Air or stream stripping are potentially applicable for the volatile organics present.
In-Situ Treatment of Water	NA	Not generally applicable due to waste characteristics. Could be applicable if only reducing the concentration of some contaminants is necessary.
Offsite Wastewater	a	Applicable only for disposal of water already treated to remove PCBs. Also limited by economics of transport.
Onsite Landfill	NA	Potentially applicable in combination with excavation, soldification and other technologies.
Excavation	NA	Applicable in combination with other technologies that treat or dispose of excavated waste.
ater & Sewer Line Protection	NA	Technologies that control waste and groundwater contamination will protect water and sewer lines.
lternate Drinking Water Supply	NA	Drinking water supplies not Water Supply currently contaminated or at immediate risk. Applicable only if long term risk is demonstrated.
ffsite Landfill Disposal of Soil/ urface Facilities	A	In combination with excavation, solidification (as required) and other technologies, offsite landfill disposal is potentially applicable.

(2) A = Applicable major technology.
a = Applicable minor technology used in conjunction with major technologies.
NA = Not applicable technology.

Table 9

SUMMARY OF VIABLE REMEDIAL ACTIONS

Removal of Surface Facilities

This is a preliminary action common to all action alternatives. Disposal of these facilities is an associated activity.

Plugging and Abandonment of Monitor Wells/Piezometers

This is a preliminary action common to all action alternatives.

Excavation

This is a major action for all alternatives requiring removal of contaminated soil. Associated actions include:

- grading/backfilling
- revegetation
- liquid removal requiring disposal
- possibly solidification (in limited volumes)
- diversion/collection systems
- disposal of soil
- capping

Capping

This is a major action which can occur with or without prior excavation of soil. Associated actions include the following:

- grading
- revegetation
- pressure relief wells

Containment Barrier

This is a major action which is common to all actions which do not include ground water recovery option (3). A pressure relief well system is an associated action.

Pressure Relief Well System

This action is common to all actions involving a containment barrier and capping. Disposal of contaminated water is an associated action.

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Table 9
Summary of Viable Remedial Actions
(Continued)

Disposal of Contaminated Water

This is an action common to all actions including ground water recovery (or pressure relief wells) or excavation. Disposal can occur by the following means:

- offsite deep well injection
- onsite treatment with subsequent discharge

Disposal of Contaminated Soil/Surface Facilities

This action is common to all excavation actions and to the removal of surface facilities. Disposal can occur by the following means:

- offsite landfill
- onsite landfill
- incineration, onsite
- incineration, offsite.

Ground Water Recovery Well Systems (Optional)

This action is optional and would supplement or replace the containment barrier and capping actions. Three optional systems are possible to meet the objectives.

Development and Screening of Alternatives

The potential technologies were grouped into remedial methods and a matrix combining the operable units into alternative remedial plans was developed. Combinations which were duplicates or essentially equivalent to other combinations were eliminated. Incompatible or noncomplimentary combinations were also eliminated.

A "No Action" alternative was included in order to assess the worst case conditions. Evaluation of the "No Action" alternative is required in Section 300.68(f)(1) of the NCP. This alternative is carried through the full screening process.

Section 300.68(g) states that the following broad criteria should be used in the screening of alternative plans:

(1) Cost. For each alternative, the cost of implementing the remedial action must be considered, including operation and maintenance costs. An alternative that far exceeds the costs of other alternatives evaluated and that does not provide substantially greater public health or environmental protection or technical reliability shall usually be excluded from further consideration. For purposes of this paragraph, an alternative that meets or exceeds applicable or relevant and appropriate Federal public health and environmental requirements provides substantially greater protection than do alternatives that do not meet such requirements.

(2) Acceptable Engineering Practices. Alternative must be feasible for the location and conditions of the release, applicable to the problem, and represent a reliable means of addressing the problem.

(3) Effectiveness. Those alternatives that do not effectively contribute to the protection of public health and welfare and the environment shall not be considered further. If an alternative has significant adverse effects, and very limited environmental benefits, it shall also be excluded from further consideration.

Prior to the implementation of major remedial activities, certain actions common to all alternatives must take place. These actions are listed in Table 10. The costs associated with these actions are also common to all of the remedial alternatives.

Detailed Evaluation of Alternatives

Alternatives retained from the initial screening and the "No Action" alternative were evaluated to assess their relative effectiveness in protecting public health and the environment. Conceptual plans for each alternative were prepared consisting of:

- Facility designs including cross sectional and plan review;
- Construction sequence and implementation schedules.

Table 10

RESPONSE ACTIONS COMMON TO ALL ALTERNATIVES

- Removal of remaining onsite structures*
- Slurry wall*
- Plugging and abandonment of monitoring wells and piezomters
- Groundwater monitoring
- Offsite soil sampling*

* Except "No Action" alternative

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A summary of the retained source control alternatives, and components of these alternatives is presented in Table 11. The conceptual plans for these alternatives are illustrated in Section 6 of the feasibility study.

The detailed evaluation included:

- Detailed refinement and specifications;
- Assessment of extent of public health and environmental protection;
- Analysis of adverse environmental impacts;
- Construction sequence and implementation schedules;
- Detailed cost estimates, including operation and maintenance and net present values;
- Implementation, reliability, and constructability.

The final evaluation consisted of a comparison of the relative levels of protection and costs of each alternative. Total remedial costs, in terms of net present worth, were compared with other considerations for each alternative. These considerations included:

- Ability to meet remedial criteria;
- Long term reliability;
- Implementability;
- Operation and maintenance requirements;
- Net health and environmental benefits.

Brief discussions of each alternative, including the results of the evaluations, are given below. An in-depth discussion of the detailed evaluation can be found in Section 6 of the feasibility study. Remedial activities involving removal of surface facilities, groundwater monitoring, and plugging monitoring wells are common to all of the source control alternatives. Construction of a slurry wall barrier and a pressure relief well system is also required unless a complete groundwater restoration was implemented. For comparative purposes, the estimated costs of these methods are included in the total remedial alternative estimates.

Removal of Surface Structures

Removal of surface structures (buildings, tanks, and process equipment) is necessary to construct a reliable long-term cap over the site. Waste materials from the facilities have been addressed during previous removal actions. Therefore, the structures may be disposed of in a hazardous waste landfill.

Foundations would be demolished and disposed of where necessary for excavation. Where excavation is not required the foundations would be covered by the onsite cap.

Table 11

SUMMARY OF INITIAL EVALUATION OF ALTERNATIVES
FEASIBILITY STUDY
GENEVA INDUSTRIES SITE

REMAINING ALTERNATIVES	DESCRIPTION
A	No Action
B	Containment: Removal and disposal of surface facilities, plugging and abandonment of monitor wells, capping, slurry wall and pressure relief well system, disposal of contaminated water.
C	Removal and disposal of surface facilities, plugging and abandonment of monitor wells, excavation of soil with PCB > 100 ppm, capping, slurry wall and pressure relief well system, disposal of contaminated water and disposal of contaminated soil at an offsite landfill, or by offsite or onsite incineration.
D	Removal and disposal of surface facilities, plugging and abandonment of monitor wells, excavation of soil with PCB > 50 ppm, capping, slurry wall and pressure relief well system, disposal of contaminated water and disposal of contaminated soil at an offsite landfill or by offsite or onsite incineration.
E	Removal and disposal of surface facilities, plugging and abandonment of monitor wells, excavation of soil with PCB > 25 ppm, capping, slurry wall and pressure relief well system, disposal of contaminated water and disposal of contaminated soil at an offsite landfill or by offsite or onsite incineration.
F1, F2, F3	Removal and disposal of surface facilities, plugging and abandonment of monitor wells, excavation of soil, stockpiling of soil onsite with disposal of remaining soil at an offsite landfill, construction of an onsite RCRA landfill with placement of the stockpiled soil in the landfill, slurry wall and pressure relief well system, and disposal of contaminated water. Soil excavation is to the following criteria: o F1 PCB >25 ppm, o F2 PCB >50 ppm, and o F3 PCB >100 ppm.

Groundwater Monitoring

Groundwater monitoring in both the 30-foot and 100-foot sand will be necessary to demonstrate that the selected source control action is meeting the objectives. For compliance with the post-closure requirements of the Resource Conservation and Recovery Act (RCRA), monitoring for a period of at least 30 years will be required.

Plugging and Abandonment of Monitoring Wells

The existing monitoring wells and piezometers that are not included in the groundwater monitoring system would be plugged prior to implementing major construction activities onsite. Plugging is necessary to eliminate any potential vertical migration pathways through the 30-foot or 100-foot sands. The plugging procedure will include:

- Flushing out the bottom of the well;
- Filling the well with a low shrink cement-bentonite grout;
- Cut the surface casing and mark the location of the well.

Construction of the Slurry Well Barrier

Construction of a soil-bentonite slurry wall would be necessary in conjunction with all source control remedies unless complete restoration of the 30-foot sand was implemented. The slurry wall would be built around the inside perimeter of the site (linear distance of about 3,250 feet) and keyed into the aquitard underlying the 30-foot sand. The wall would be about 2.5 feet thick, and average 35 feet deep.

In conjunction with the slurry wall, a pressure relief well system would be installed onsite. The purpose of the relief system is to keep the water table onsite wall lower than the water table offsite. By doing so, the hydraulic gradient across the wall will drive any seepage through the slurry wall onto the site, preventing offsite migration of contaminated groundwater.

Sampling and Analysis of Offsite Soil

This activity is included to demonstrate whether or not PCBs have been transported offsite by runoff or wind dispersion since completion of the remedial investigation. Analytical results will be compared with the established remedial criteria for offsite soils and appropriate remedial actions will be taken.

Groundwater Alternatives

Three groundwater recovery systems were developed and evaluated in the feasibility study. These alternatives address different levels of remediation, and were developed to be implemented in combination with the selected source control alternative.

Option 1 - Recover offsite contamination in the 30-foot sand.

Option 1 would be implemented in conjunction with the slurry wall barrier, and provide for the recovery of contaminated groundwater outside the wall. The system would require the installation of twelve recovery wells and use an onsite carbon adsorption unit for groundwater treatment. Treated groundwater would be discharged into the adjacent flood control channel. Estimated capital costs are $265,760; operation and maintenance (O&M) costs are estimated to be $410,500 per year until recovery of the offsite contamination is completed.

Option 2 - Recovery of onsite trichloroethylene (TCE) contaminated groundwater for the 30-foot sand and 100-foot sand.

This alternative would involve the recovery of TCE contamination in the vicinity of MW-5 in the 30-foot sand and MW-9 in the 100-foot sand. This alternative would also be used in conjunction with a slurry wall, and would require four new recovery wells and an onsite carbon adsorption treatment unit. Capital costs are estimated to be $92,000 and O&M costs are estimated to be $426,000 per year until remediation of the 100-foot sand has been completed. The annual O&M cost will then be reduced to $375,000 until remediation of the TCE plume in the 30-foot sand has been completed.

Option 3 - Complete Recovery of Groundwater Contamination.

Option 3 provides for both onsite and offsite recovery of contaminated groundwater in the 30-foot sand and recovery of the TCE plume near the MW-9 in the 100-foot sand. The system would include 25 new recovery wells in the 30-foot sand plus recovery from MW-9. Onsite carbon adsorption and subsequent discharge into the adjacent flood control channel would be required. Total capital costs for the system are estimated at $382,880. O&M costs would be approximately $652,200 for 2 years and $507,700 for years 3 through 30.

Summary descriptions and costs for the three groundwater alternatives are given in Table 12. For comparative purposes, costs are presented as net present worth. The O&M costs have been discounted at 10% for 30 years to calculate present worth.

Option 1 was eliminated as a viable groundwater alternative primarily because of other, naturally occurring, conditions in the 30-foot sand. This water-bearing zone has never been used as a water supply for any purpose due to the high total dissolved solids concentrations in the water (2,000 to 10,000 mg/l). The EPA Secondary Drinking Water Criteria is 250 mg/l. Recovery of the small offsite organic plume would have virtually no effect on the overall suitability of the 30-foot sand as a groundwater resource. Also, Option 1 would have no effect on the 100-foot sand, a documented water supply zone. Therefore, Option 1 is not considered to be a cost-effective alternative.

TABLE 12

SUMMARY OF GROUNDWATER ALTERNATIVES

Option	Description	Net Present Worth
1	Recover Offsite Contamination in 30-Foot Sand	$3,303,000
2	Recover TCE in 30-Foot and 100 foot Sand	$3,820,000
3	Recover all Offsite and Onsite Contamination	$17,298,000

Option 3 was also eliminated as a viable alternative. The net present worth of this alternative is considerably higher than the costs of Option 1 or 2 ($17,298,000 vs. $3,303,000 and $3,820,000, respectively). However, this alternative does not provide a commensurate increase in health and environmental benefits. Option 3 would provide some additional benefits to the 30-foot sand in comparison to Option 1 by recovering all of the contamination. However, the high total dissolved solids concentrations occurring naturally in this zone would still preclude its use as a resource after completion of the remedial action.

Currently, the only potential exposure routes associated with the contamination in the 30-foot sand are the flood control channel and the 100-foot sand. The 30-foot sand may, periodically, provide a base flow for the flood control channel. The construction of a slurry wall barrier and pressure relief system would effectively prevent any contamination, including the free oil phase, from impacting the flood control channel. The cost of the slurry wall system , $378,560, is significantly lower than 1 year of O&M costs for Option 3, while providing the same benefit to the flood control channel. The slurry wall is therefore considered to be the most cost-effective method of controlling contamination in the 30-foot sand and protecting the flood control channel.

Option 2 provides a level of protection to potential users of the 100-foot sand equivalent to the level of a protection afforded by Option 3. The primary contaminant of concern regarding the 100-foot sand is trichloroethylene. Recovering the TCE from both sands would minimize the threat of further contamination of the 100-foot sand and potential exposure to current or future human receptors. Although contamination would remain in the 30-foot sand in the form of PCBs and base neutrals, these contaminants are not expected to impact the 100-foot zone. PCBs are not very water-soluble and will adsorb onto the soil in the upper water-bearing zone.

The base-neutral compounds are more water-soluble than PCBs, but will not effect the permeability of the aquitard. Therefore, base-neutrals will tend to migrate horizontally with the flow in the 30-foot sand.

The recommended alternative for groundwater remediation at Geneva is Option 2 implemented in conjunction with a slurry wall barrier around the site. Recovering the TCE would effectively protect the groundwater supply in the 100-foot sand by reducing concentrations below the 10^{-6} health risk level (2.8 ppb). The slurry wall would offer two benefits:

- Prevent migration of contaminants in the 30-foot sand offsite and possible exposure of the flood control channel to a free phase PCB-contaminated oil;

- Increase the efficiency of the recovery system by minimizing the amount of uncontaminated water pumped through the recovery system from the 30-foot sand.

As mentioned previously, the capital cost of this alternative is $91,470; O&M costs are $426,000 for 2 years, then $3[illegible]5,500 for years 3 through 7. This alternative would be implemented with a slurry wall, a pressure relief system, and a source control (soils) remedial action. The source control alternatives developed in the feasibility study are discussed below.

Soils Alternatives

Alternative A - No Action

Section 300.58(f) of the NCP specifies that the "No Action" alternative be evaluated. Under this alternative, no remedial action would be implemented at Geneva Industries. Section 300.68(g)(3) states:

> "Those alternatives that do not effectively contribute to the protection of public health and welfare and the environment shall not be considered further."

The absence of remedial action would allow for long term erosion of the site due to wind, precipitation, and possible flooding as erosion continues. Exposure of soils contaminated with up to PCBs to 12,000 ppm would occur. The following threats to public health and the environment would be posed if no remedy was implemented at the site:

- Direct contact with surface soils;
- Migration due to surface water runoff;
- Fugitive dust migration offsite;
- Migration due to leaching and subsequent groundwater contamination;
- Consumption of contaminated groundwater.

The only activities associated with the site under the "No Action" would be groundwater monitoring and periodic inspections. Because the risks to public health and the environment associated with the "No Action" alternative are unacceptable, this alternative is eliminated.

Alternative B - Containment by Cap and Slurry Wall

Alternative B involves leaving all contaminated soils in place and the construction of a multi-layer cap across the site. The cap would be designed in accordance with performance standards in the Resource Conservation and Recovery Act (RCRA). Containment of the contamination would be completed by the construction of a slurry wall barrier around the site perimeter and a pressure relief system to control infiltration into the containment cell. Net present worth of this alternative is $4,459,000.

Alternative C, D, E - Partial Excavation and Disposal

Alternatives C, D, and E all involve excavation of contaminated soils and buried drums and disposal of these materials. Three methods of disposal were evaluated in detail in the feasibility study: offsite landfill, offsite incineration, and onsite incineration. The differences among the three alternatives are associated with the extent of excavation as defined by the concentrations of PCB in soils remaining onsite. Alternatives C, D, and E require excavation of soil with PCB greater than 100 ppm, 50 ppm and 25 ppm, respectively. The net present worth of these alternatives is presented below:

Alternative	Offsite Landfill	Onsite Incineration	Offsite Incineration
C	$15,867,000	$21,406,000	$32,100,000
D	$20,184,000	$26,175,000	$43,000,000
E	$25,695,000	$32,273,000	$57,000,000

Net present worth includes capital cost and operation and maintenance (O&M) costs. O&M costs are discounted using a discount rate of 10% for 30 years.

Alternative F - Partial Excavation and Disposal in Onsite Landfill

Alternative F has three options defined by levels of excavation. Alternatives F1, F2, and F3 refer to excavation soils contaminated with greater than 25 ppm, 50 ppm, and 100 ppm of PCBs, respectively. A slurry wall would also be constructed to prevent migration of contamination via the shallow groundwater. Construction of the vault would be consistent with the performance requirements for landfills outlined in RCRA.

The vault would primarily be an above ground facility. Due to the limited space available for stockpiling excavated soil onsite, extensive offsite disposal would be required during construction. Total excavation and offsite disposal soil volumes for the landfill alternative are greater than for Alternatives C, D, And E.

The net present worth of the on-site landfill alternatives are:

F1	$36,903,000
F2	$34,251,000
F3	$31,472,000

Community Relations

Public interest in Geneva Industries during the initial phases of the project was moderate. Informational meetings were held in South Houston prior to the Planned Removal and the site investigation. Approximately 55 people attended these meetings.

Public interest in the site increased significantly upon completion of the feasibility study. The two-week public notice period began on May 3, 1986. This was followed by a public comment period which closed on June 10, 1986. The comment period was extended one week in response to the extensive interest shown at the May 22, 1986, public meeting to present the results of the feasibility study. Approximately 450 people attended the meeting to express opposition to onsite incineration as a disposal method for the contaminated soils. Responses to the comments received during the comment period are outlined in the "Community Relations Responsiveness Summary" attached to this Record of Decision.

Consistency with Other Environmental Laws

The Environmental Protection Agency's policy is to select a remedial action that attains or exceeds applicable or relevant and appropriate Federal environmental and public health requirements. Other Federal criteria and advisories and State standards may also be used, with adjustments for site-specific circumstances. The Federal regulations which will have an impact on the proposed remedy for the Geneva Industies site include:

1. The Resource Conservation and Recovery Act (RCRA), 40 CFR Part 264: technical requirements for the surface cap, incinerators, and landfills;

2. The Toxic Substances Control Act (TSCA), 40 CFR Part 761: disposal requirements for PCB-contaminated materials; technical standards for landfills and incinerators.

Offsite facilities used for the disposal of hazardous materials from a Superfund site must be in compliance with the requirements of the applicable and relevant environmental laws, including all appropriate permits and authorizations. Also, wastes may not be taken to an offsite facility if the receiving Regional Administrator determines that the facility has significant RCRA violations.

The regulation set forth in RCRA and TSCA were reviewed to determine if the recommended alternative (Alternative C) meets these requirements. This alternative will be designed to meet the design standards for a surfac cap in RCRA. Free liquids found in drums excavated from the site will be solidified prior to disposal in order to comply with the free liquid land disposal ban. Also, it is anticipated that the excavation and disposal activities can be completed prior to November 8, 1988, the effective date of the ban on land disposal of solvents, should this apply to the soils at Geneva Industries.

This alternative also meets the technical requirements for the disposal of materials contaminated with greater than 50 ppm of PCBs. Offsite facilities used for the disposal of these materials will be permitted for PCB disposal under TSCA and will be compliant with the offsite disposal policy under Superfund. TSCA staff has been consulted and a clean-up level of 100 ppm onsite with a surface cap is considered acceptable.

The recommended alternative will include a groundwater monitoring program to determine if future conditions warrant additional remedial action. This program will continue for at least 30 years. If it found that the remedy did not correct the problems associated with the site, further remedial actions will be evaluated.

Recommended Alternative

Section 300.68(i) of the NCP states that "The appropriate extent of remedy shall be determined by the lead agency's selection of a cost effective remedial alternative that effectively mitigates and minimizes threats to and provides adequate protection of public health and welfare and the environment." To this end, Alternative C in combination with groundwater Option 2 is the recommended remedial action for the Geneva Industries site. The components of this alternative are as follows:

- Remove and dispose of all surface facilities;
- Plug and abandon unnecessary monitoring wells;
- Excavation of 22,500 cubic yards of soils contaminated with greater than 100 ppm PCBs;
- Excavation of all buried drums onsite;
- Disposal of excavated material in an EPA-approved offsite facility;
- Construction of a slurry wall barrier around the site with a pressure relief well system;
- Construction of a permanent protective cap across the site surface;
- Recovery of the TCE contaminated groundwater in both the 30-foot and 100-foot sands.

The areas of soil and groundwater contamination addressed by the recommended alternative are illustrated in Figures 21 and 22. Figure 23 is a cross-sectional view of the soil excavation and surface cap. The rationale for the selection of Alternative C and offsite landfill disposal is outlined below.

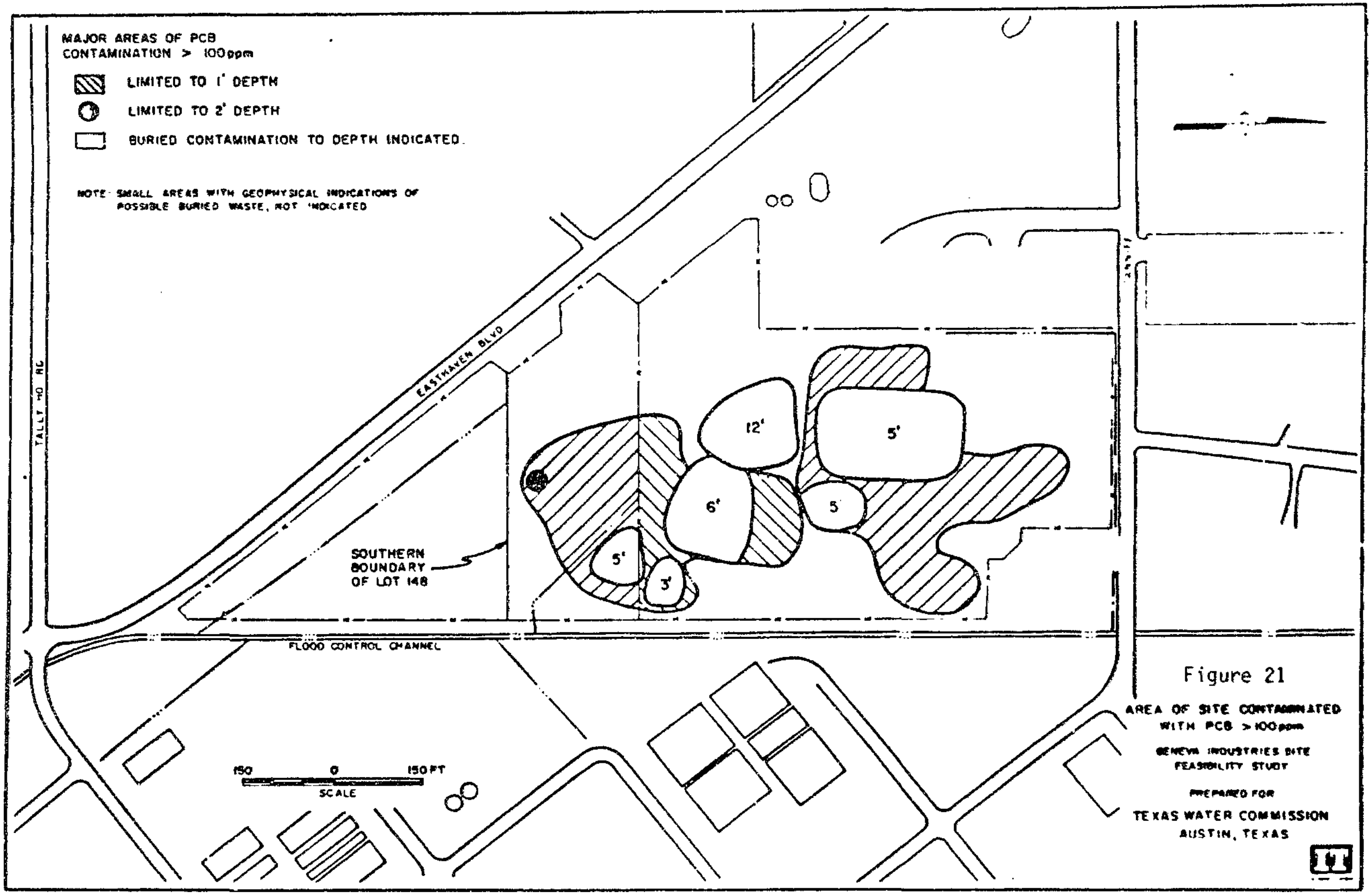


Figure 21

AREA OF SITE CONTAMINATED WITH PCB > 100ppm

GENEVA INDUSTRIES SITE FEASIBILITY STUDY

PREPARED FOR

TEXAS WATER COMMISSION
AUSTIN, TEXAS

005409

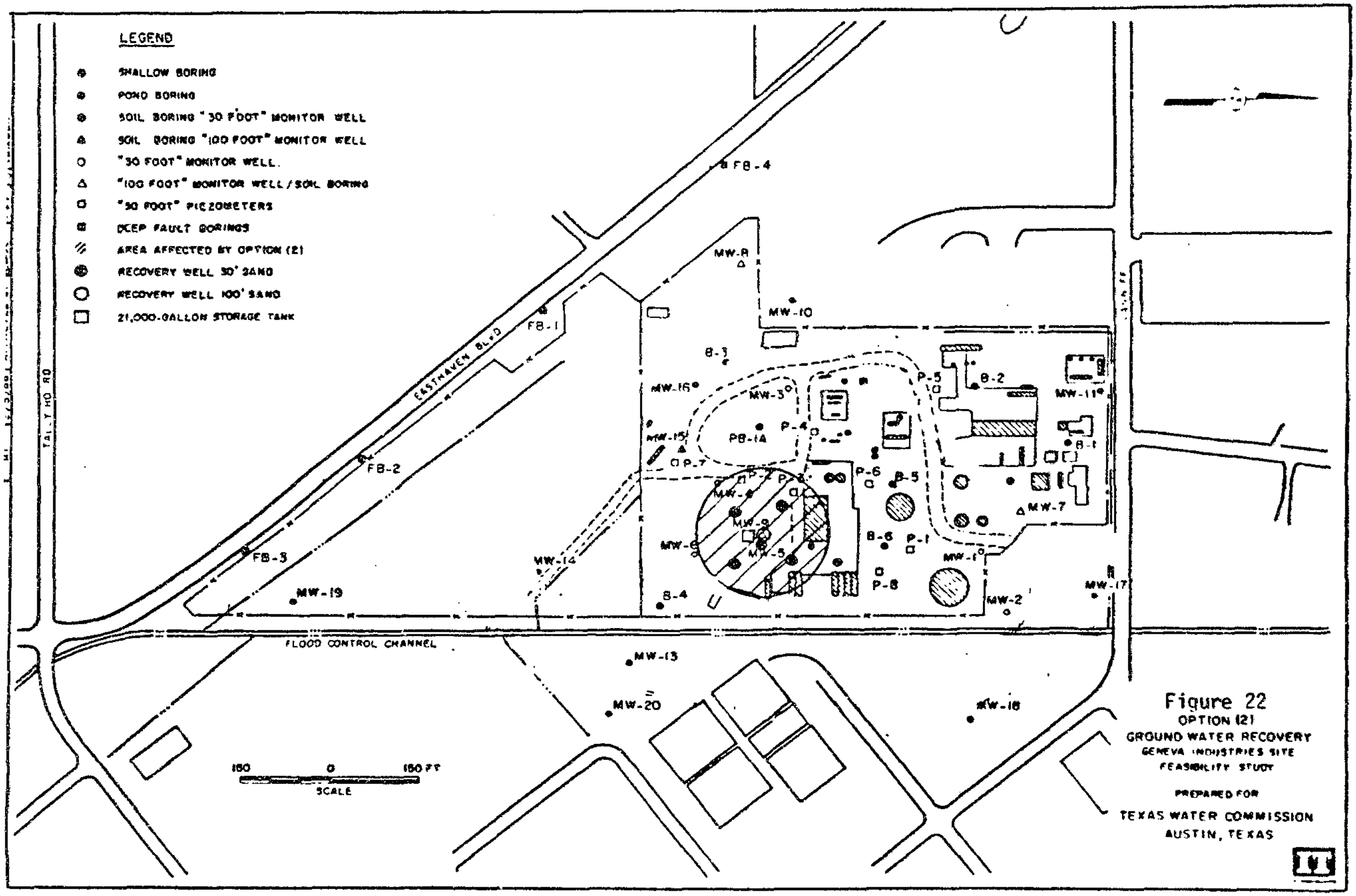
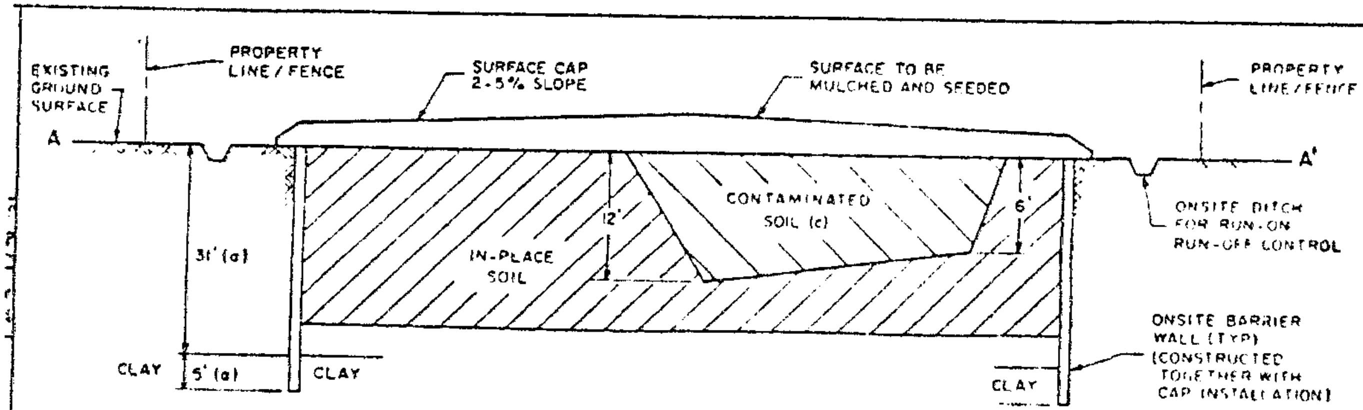


Figure 22
OPTION (2)
GROUND WATER RECOVERY
GENEVA INDUSTRIES SITE
FEASIBILITY STUDY
PREPARED FOR
TEXAS WATER COMMISSION
AUSTIN, TEXAS

005410



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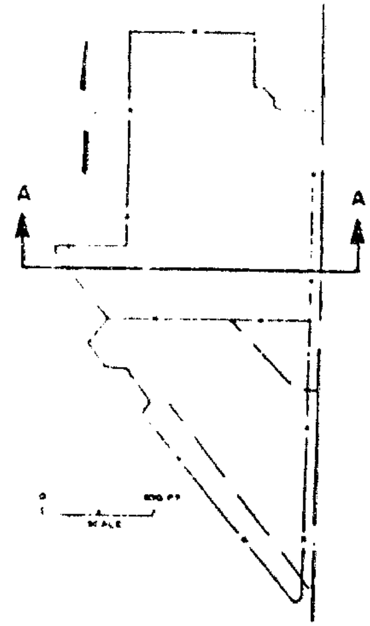

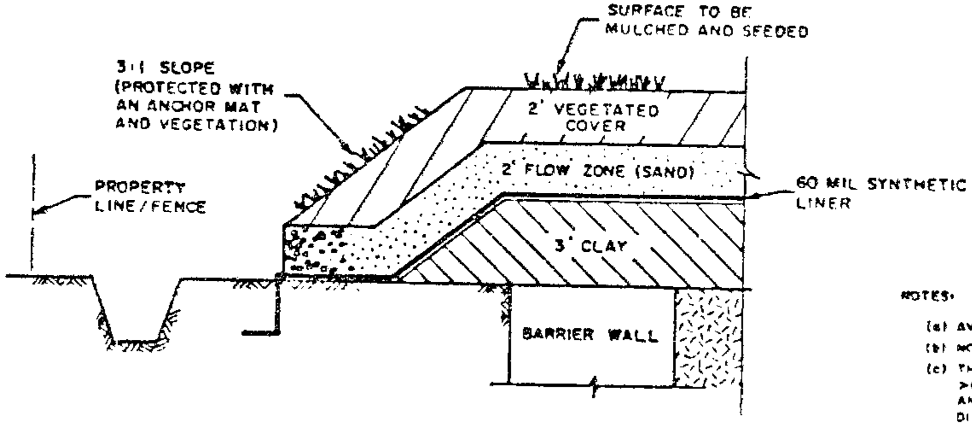

TYPICAL DETAIL OF SURFACE CAP

NOTES:

(a) AVERAGE DEPTH
(b) NOT DRAWN TO SCALE
(c) THIS PORTION CONTAINING SOIL >100 ppm OF PCB WILL BE EXCAVATED AND BACKFILLED WITH UNCONTAMINATED DIRT/SOIL

Figure 23

CROSS-SECTIONAL VIEW
ALTERNATIVE C
PARTIAL SOIL REMOVAL
TO 100 PPM PCB AND CONTAINMENT
GENEVA INDUSTRIES SITE
FEASIBILITY STUDY

PREPARED FOR

TEXAS WATER COMMISSION
AUSTIN, TEXAS

Alternative B (cap and slurry wall) was eliminated because adequate protection of public health and the environment would not be provided. While direct contact with and migration of contaminated soil would be eliminated, protection of the 30-foot sand would not be afforded. The contents of the buried drums, if allowed to remain onsite, could leak and migrate vertically into the 30-foot and possibly the 100-foot sand, then horizontally offsite.

Alternatives D and E were eliminated because the excavation of additional soil would not provide a commensurate increase in protection of public health and the environment. As long as the surface cap is properly maintained, direct contact and contaminant migration by runoff and wind will be prevented. Therefore, Alternative C offers the same level of protection as Alternatives D and E at substantially lower costs, even though the concentration of PCBs in the soil under the cap are higher with Alternative C.

Alternatives F1, F2, and F3 were eliminated for several reasons. First, a landfill at Geneva Industries would not comply with the siting requirements set forth in the Toxic Substances Control Act (TSCA). These requirements state that the water table must be at least 50 feet below the bottom of the landfill. The water at Geneva has been measured at 15 feet below the ground surface, and the first water-bearing zone is 30 feet below the ground surface. A variance to the TSCA requirement would be necessary in order to construct a landfill onsite.

The second reason for eliminating the onsite landfill options involves site constraints associated with landfill construction. A landfill would take up the entire site area, leaving no place for temporary storage of contaminated soils excavated during installation of the bottom landfill liners. This would result in approximately 50,000 cubic yards of soils requiring disposal at an EPA-approved offsite landfill. This volume is higher than the volume considered in the remedy (22,500 cu. yd.). The additional disposal volume is not considered to provide additional benefits and therefore is not a cost-effective alternative.

The third reason for eliminating Alternatives F1, F2, and F3 is a result of the required offsite disposal. Transport and offsite disposal of soil increases the cost of the these alternatives by almost $10,000,000 compared to the corresponding offsite landfill alternatives. Again, the increased cost is not justified by a commensurate increase in protection.

Of the three disposal methods evaluated for Alternative C, removal of wastes offsite for land disposal or incineration was selected over onsite incineration. Significant public concern was voiced regarding the safety and effectiveness of onsite incineration at the Geneva site during the official comment period. It is the Environmental Protection Agency's position - backed by a great amount of operating data from other locations - that incinerators can be designed, constructed, and operated in a manner that is environmentally sound and protective of public health. Incineration also destroys organic contaminants and removes them from the environment. However, since all of the disposal methods evaluated under Alternative C offer the same level of protection for public health and the environment and since onsite incineration was found to generally cost more than offsite remedies, offsite disposal has been selected as the remedy for this site.

Currently, offsite incineration has limitations in terms of its cost and the availability of facilities. Only three commercial, non-transportable incinerators now exist which are permitted for PCB disposal. These incinerators are operating at very close to full capacity. The high cost is a direct result of the limited number of facilities currently available. These limitations are expected to become less of an obstacle in the near future as additional incinerators are designed and permitted.

The availability of more permitted thermal destruction facilities in the near future may lower the costs associated with the technology. EPA plans to design the onsite logistics and construction activities associated with Alternative C, and evaluate the availability and costs of offsite landfills and incinerators at 70% completion of the remedial design. Based on the results of the evaluation, the offsite disposal method will be selected, and the remedial design completed.

Cost of Selected Alternative

The estimated capital cost of Alternative C, with offsite land disposal of soils and drums, is estimated to be $14.9 million. Disposal of the excavated material by offsite incineration would increase the estimated capital costs to $32.1 million. Operation and maintenance costs are estimated to be $107,000 per year for 30 years. Groundwater Option 2 increases the capital cost of the remedial action by $92,000 and the operation and maintenance cost by $425,000 for years 1 and 2, and by $376,000 for years 3 through completion of the groundwater remedy.

Operation and Maintenance

Operation and maintenance (O&M) activities are required during implementation of the remedy and during the post-closure period. The major O&M during implementation are associated with the groundwater recovery system of Groundwater Option 2. This includes replacement of pumps, wells, and spent carbon and electricity and labor required to operate the system. O&M associated with the post-closure period includes periodic inspection and repair of the surface cap, operation of the pressure relief and leachate collection systems, and semi-annual groundwater monitoring. A detailed operation and maintenance plan will be written as part of the remedial design.

The Trust Fund is available for O&M costs for the selected remedy for a period of up to one year after completion of construction of the remedy. For the trichloroethylene recovery system, O&M begins when groundwater recovery begins. The State of Texas will be responsible for the operation and maintenance of the system through the completion of the groundwater remedy.

Operation and maintenance of the cap and slurry wall and the pressure relief system and post-closure groundwater monitoring will become the responsibility of the State after completion of the remedial construction and continue for a period of at least 30 years. If significant offsite contamination is detected during the post-closure period, additional corrective measures will be evaluated.

Schedule

The schedule for the remedial design and construction of the remedy at Geneva Industries is currently dependent upon reauthorization of Superfund. The design phase of the project will begin as soon as funding becomes available, either through reauthorization or a continuing resolution. When funding becomes available, the design of the remedy will take an estimated 12 to 18 months to complete. Remedial construction will begin as soon as possible after completion of the design, and take approximately 18 to 24 months to complete, depending on the disposal method selected.

TEXAS WATER COMMISSION

Paul Hopkins, Chairman
Ralph Roming, Commissioner
John O. Houchins, Commissioner

Larry R. Soward, Executive Director
Mary Ann Hefner, Chief Clerk
James K. Rourke, Jr., General Counsel

September 10, 1986

RECEIVED
EPA REGION VI
SEP 10 PM 12:51
SUPERFUND BRANCH

Mr. Dick Whittington, P.E.
Regional Administrator
U. S. Environmental Protection Agency
Region VI
1201 Elm Street
Dallas, Texas 75270

Dear Mr. Whittington:

Re: Geneva Proposed Record of Decision

We have reviewed the proposed Record of Decision (ROD) for the Geneva Industries Superfund Site. We have no objection to the selected remedy as described in the proposed ROD of disposal of contaminated soils with greater than 100 ppm of PCB's at an EPA-approved off-site land disposal facility. We would like to note, however, that the obligation of State monies for a period of 30 years after the remedial construction activities are complete may be a violation of Article VIII, Section 6 of the Texas Constitution which addresses the appropriation of money beyond a two year period.

Sincerely,

Larry R. Soward

Larry R. Soward
Executive Director

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
1201 ELM STREET
DALLAS, TEXAS 75270

Geneva Industries, Houston, Texas
Responsiveness Summary

This community relations responsiveness summary is divided into the following sections:

Section I. Overview. This section discusses EPA's preferred alternatives for remedial action, and the public's response.

Section II. Background on Community Involvement and Concerns. This section provides a brief history of community interest and concerns raised during the remedial planning activities at the Geneva Industries site.

Section III. Summary of Comments Received during the Public Comment Period. Comments are categorized by topics and EPA's responses are provided.

I. OVERVIEW

At the time of the public comment period, EPA announced several alternatives for corrective action at the Geneva site.

EPA's recommended plan included excavating approximately 22,500 cubic yards of contaminated soil throughout the site. EPA considered three disposal options for the excavated soils: offsite land disposal, onsite incineration, and offsite incineration. The excavations, ranging in depth from one foot to approximately twelve feet, would affect about half of the 13-acre site. The excavated areas would be backfilled, graded, and replanted.

A slurry wall, averaging 35 feet deep, would be built around the site. The entire site would be covered with a seven foot thick cap consisting of three feet of clay, a .24-inch thick plastic liner, two feet of sand, two feet of topsoil, and new vegetation. The multi-layered cap would eliminate direct contact with the remaining contaminants and prevent them from being carried offsite in stormwater runoff.

EPA also proposed to pump groundwater from sands at 30 feet and 100 feet and decontaminate it through the process of carbon adsorption. The decontaminated water would be discharged into the flood control ditch adjacent to the site.

The estimated cost of the cleanup ranged from $15,000,000 to $28,000,000, depending on the disposal method selection. Ground water monitoring, cap repair and the cost of onsite incineration, offsite incineration, and landfilling are comparable. Erosion control for thirty years would cost an additional $4,461,000.

Judging from the comments received during the public comment period, the public is opposed to and will protest if onsite incineration is the selected remedy for the Geneva site.

II. BACKGROUND ON COMMUNITY INVOLVEMENT

Pre-Superfund (1971-1982) community involvement at the Geneva site has historically centered around numerous public hearings to solicit comments from interested parties prior to the issuance or amendment of the facility's wastewater discharge permit. The general public was notified of each hearing through a notice published in the local newspaper; in addition, local governmental groups, and other affected state agencies were also notified.

With the onset of Superfund activities at the site, community involvement and awareness increased significantly. On July 6, 1983, a town meeting, sponsored by U. S. Representative Michael A. Andrews (25th Congressional District), was held at the City Cafe in South Houston. Approximately 100 people were in attendance, including State Representative Ralph Wallace, South Houston Mayor Lyn Brasher, South Houston City Aldermen Homer Roades and J. B. Anthony, and various residents of the area.

On October 6, 1983, a public meeting was held by EPA at the South Houston Intermediate School to explain the planned removal action to mitigate the immediate surface hazards at the Geneva site. Approximately 60 residents were present as well as representatives from the EPA, Texas Department of Water Resources (now the Texas Water Commission), Railroad Commission of Texas, the Centers for Disease Control in Atlanta, and local city officials.

Frequent and substantive communication, both oral and written, continued between the Texas Water Commission (TWC) and the officials of the City of South Houston.

Early discussions with area residents revealed that the most significant concern of the South Houston community was the impact of the Geneva site on the area's drinking water supply. The City of South Houston relies entirely on ground water wells for drinking water. Officials and residents of the city expressed their fear that contamination from the site might seep down old oil wells in the area and contaminate water taken from sand layers 600 to 1,300 feet deep. Of particular concern was the existence of a City of South Houston water well located approximately 1,300 feet away from the site. Residents also expressed concern with regard to children playing in drainage ditches which receive storm water run-off from the Geneva site.

III. SUMMARY OF PUBLIC COMMENT DURING THE PUBLIC COMMENT PERIOD

Comments/questions raised during the Geneva Industries site public comment period are summarized briefly. The press release announcing the public comment period and public meeting was issued on May 2, 1986. The comment period began on May 16 and ended on June 10, 1986. The public meeting to outline the results of the remedial investigation and feasibility study was held May 22, 1986, at the South Houston Community Center in South Houston. 397 people registered at the meeting with 37 people making oral statements or asking questions. Twenty-three written comments or questions were received during the comment period as well as petitions opposed to on-site incineration containing 523 signatures, and resolutions from the City Councils of Houston and South Houston.

During the public comment period, there were comments/questions regarding:

Comment #1: Why is the incineration of PCBs suspended during an air stagnation advisory?

Response: Incineration of PCBs is suspended in order to prevent the accumulation of stack emissions in the immediate vicinity of the incinerator.

Comment #2: Has EPA studied the quantities of dioxins and dibenzofurans created when incineration of PCBs is shut down?

Response: Yes. During the trial burns conducted for the permitting of the Rollins incinerator in Deer Park, Texas and ENSCO incinerator in El Dorado, Arkansas, sampling was performed to assess the emission of dioxins and dibenzofurans. The incinerators were tested while burning: 1) waste fuel; 2) waste fuel and PCBs; and 3) clean fuel and PCBs. Under the last two conditions, the incinerators were operated at temperatures of greater than 1200°C. The results of the tests indicated that 1.8×10^{-11} grams of dioxin per cubic foot of emission air were produced while incinerating a mixture of waste fuel and PCBs at the Rollins facility. Also, 2.8×10^{-11} grams of dibenzofurans per cubic meter were produced. The results of the test burn using a mixture of clean fuel and PCBs indicate that 2.4×10^{-11} grams of dibenzofurans cubic foot of emission air were produced and that no detectable dioxins were produced.

Research has also shown that PCBs can be completely destroyed at temperatures of 1475°F - 1830°F. The specific minimum operating temperature would be set in the design stage of the project.

Comment #3: Will the toxicities of emissions and effluents from an incinerator be tested? Under what conditions? Will it be done prior to incineration at Geneva?

Response: Yes. The toxicities of emissions will be tested during the trial burn and periodically thereafter. However, in cases where public concern over the incineration of PCBs exists, an environmental assessment of the incinerator operation may be performed. This assessment would include air pollution and risk assessment modelling to determine more site-specifically the input and effect of emissions on the surrounding environment. Such an assessment was done for the Rollins incinerator permit, and could be done for Geneva Industries.

Prior to conducting the test burn for an incinerator, a test burn plan must be written and approved by the Regional Administrator. Part of the plan should identify a range of operating conditions within which the incinerator can achieve the required level of performance. Testing of the incinerator would be performed over the entire range of operating parameters, including carbon monoxide, waste feed rate, thermal input rate, temperature, and combustion gas flow rate. Based on the results of the test burn, the range of operating conditions would be set in the permit.

Testing of the incinerator would be performed prior to transporting the unit to the site. Once operation of the incinerator onsite began, monitoring and inspection schedules as set in 40 CFR 761.70 and the incinerator permit would be instituted.

Comment #4: Will EPA guarantee that fugitive emissions and accidental spills will not release as much or more toxic material to the environment than direct emissions?

Response: The incinerator would be designed to minimize fugitive emissions by maintaining a negative atmospheric pressure inside the unit. This is part of the technical requirement an incinerator contract. Also, daily visual inspections of the incinerator must be performed. Any leaks of solid waste material from the incinerator would be detected and corrected prior to continued operation of the unit.

An accidental spill of material at Geneva would not have a significant immediate consequence, since the contaminated material is soil and would not migrate if spilled. Also, PCBs will remain absorbed on the soil particles in the event of a spill, and would not contribute to a significant degradation of air quality.

Comment #5: Will analysis of emissions be expanded to include all chemicals and will the analytical methodologies be validated?

Response: No. The selection of compounds for analysis is based on the Principal Organic Hazardous Constituents (POHCs) in the waste to be treated by incineration. The selection is based on the constituents of the waste which are the most difficult to destroy or in the highest concentration. Chemicals in the waste which are less difficult to destroy and less abundant in the waste are considered to be sufficiently removed by the incinerator.

The test burn plan should identify the procedures used for sampling and analyzing the waste feed, the incinerator stock gas, and incineration residues. Sampling and analysis methods that are not standard EPA procedures should be documented. However, the EPA approved procedures in "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods (SW-846, Second Edition, July 1982) and "Sampling and Analysis Methods for Hazardous Waste Incineration (SW-846 Addendum, First Edition 1982) should be used where possible. This would assure the validity of the analytical techniques used.

Comment #6: Will EPA quantify the types and amounts of emissions from a PCB incinerator at Geneva with the PCB incinerator at Rollins, Deer Park?

Response: The effects of the Rollins incinerator would not be measurable at Geneva Industries, and quantifying the two incinerators would not be feasible because of the variety of materials routinely incinerated at the Rollins facility.

Comment #7: Have any previous risk assessments been performed for the emissions from PCB incinerators?

Response: Yes. With the assistance of the EPA Caricinogen Assessment Group, an upper limit risk assessment was developed for the Rollins and ENSCO incinerators. The assessment was based on a "worst case" exposure scenario for the toxicology associated with dioxins and dibenzafurans and the ambient air concentrations discussed in the previous comment. The resulting individual risk for the Rollins unit was found to be less than 1 increased cancer case in 50,000 exposed persons. For the ENSCO facility the value was less than one additional case per 2,500,000 people The numbers do not represent an estimate of the actual individual risk from operation of the incinerators, but are an estimate of the upper level of risk possible if all the worst case assumptions occurred. Such an occurrence is virtually not possible.

Comment #8: Will emissions be monitored after the initial test burn? What will be monitored and why? How often?

Response: Yes. Monitoring of the following parameters would be performed continuously during the operation of an incinerator: oxygen and carbon monoxide in the stack emissions and combustion temperature. Periodic monitoring (at least once every 24 hours) will be performed for carbon dioxide, hydrochloric acid, and oxides of nitrogen in the stack emissions. Periodic sampling and analysis of the waste and exhaust emissions may be carried out, at the request of the Regional Administrator, to verify that the operating requirements established in the permit achieve the required performance standards. This would involve monitoring the POHCs and calculating destruction and removal efficiencies on a periodic basis.

Performance monitoring is done by the incinerator operator. On a periodic basis, a private contractor makes unannounced inspection visits and reports on the overall condition of the incinerator and reviews the monitoring records of the facility for compliance with the permit specifications. The contractor monitors the incinerator 5 times per month at varied intervals. A verbal report of each monitoring event is given to the EPA Project Officer as soon as possible. A full written report on several visits is prepared every 90 days.

Comment #9: Will the public be informed as to the results of monitoring? How and when will the information be made public?

Response: Yes. Monitoring data will be shared with the public. The specific details of how and when the public is informed would be developed as part of the "Remedial Action Community Relations Plan." A bulletin would be published on a monthly basis.

Comment #10: Will monitoring specifically be conducted for dioxin and dibenzofurans emissions?

Response: Yes, during the trial burn for the incinerator. However, based on data developed during the trial burns for the Rollins and ENSCO incineration permits, these compounds were not detected when a combination of clean fuel and PCBs were incinerated at 2190°F. Air quality monitoring and risk assessments were also performed indicated that the emissions from an incinerator permitted in accordance with PCB regulations will not present an unreasonable risk of injury to health or the environment. Therefore, monitoring specifically for dioxins and dibenzofurans would not be necessary.

Comment #11: One commentor offered a proposal to ship the excavated materials overseas for disposal.

Response: Such an alternative was not to be evaluated in the feasibility study because sufficient technology exists in the United States to handle PCB-contaminated materials. Also, it was not possible to assess the potential risks to citizens in other countries.

Comment #12: One commentor suggested that a bias exists in Superfund regulations and guidance toward containment and incineration remedies.

Response: The National Contingency Plan (40 CFR Part 300) and the Superfund feasibility study guidance indicate that preference is to be given to technologies that have been proven effective under waste and site conditions similar to those conditions anticipated during the remedial action. For Geneva Industries, containment and incineration are the two technologies most proven for PCB-contaminated materials.

Comment #13: One commentor suggested that a conflict of interest exists between the contractor performing the feasibility study and recommendation of on-site incineration.

Response: Because the contractor must prepare the feasibilty study in accordance with the National Contingency Plan and EPA must select the remedy in accordance with the Plan a conflict of interest did not exist during the RI/FS for Geneva Industies.

Comment #14: Exactly how many cubic yards of soil would be incinerated, and what criteria will be used to make this determination?

Response: A volume of 35,000 cubic yards is estimated for the remedial action. This volume is defined by soils contaminated with greater than 100 ppm of PCBs.

Comment #15: Would a transportable incinerator placed at Geneva Industries be previously permitted, or would it be tested and permitted onsite?

Response: Only a previously tested unit would be considered for use at Geneva Industries.

Comment #16: What safeguards would be in place to protect citizens during incineration?

Response: As part of the requirements for a hazardous waste management facility (40 CFR Part 264), a contingency plan and emergency procedures must be developed in the permit application. While EPA would not need a permit to operate an incinerator at the site, the Agency would have to comply with all of the requirements of a permit, including all emergency planning activities.

Comment #17: Several commentors were apprehensive about the type of auxillary fuel that would be used at Geneva Industries. One commentor also wanted to know how fuel would be transported and stored onsite, and who would pay for the fuel?

Response: Either fuel oil or natural gas would be used as an auxiliary fuel at Geneva. Hazardous or solid wastes from another site would not be used. The transportation and storage of fuel onsite will be addressed in the remedial design.

The cost of fuel for the incinerator would be considered as a capital cost, not an operation and maintenance item. As such, the Federal government would pay 90%, and the State of Texas, 10% of the fuel cost.

Comment #18: The ash from the incinerator is still considered to be a hazardous material. Will this material be used as backfill at Geneva?

Response: Yes. The ash from the incineration of waste from Geneva will be sampled and analyzed on a random basis. If the analytical results indicate that the contaminants of concern are not present in significant concentrations, the ash may be considered non-hazardous. This ash may then be used as backfill at Geneva Industries.

Comment #19: Can and will EPA guarantee that there will be no groundwater contamination as a result of any process associated with incineration, similar to the problems currently at the Rollins facility in Baton Rouge, La?

Response: A properly designed and maintained cap and slurry wall at Geneva Industries will minimize the amount of leachate generated during the post-closure period. Operation of the pressure relief system will insure that any leakage through the slurry wall will move toward the site. Also, a groundwater monitoring program will be in place to detect any groundwater problems long before a significant health threat would exist.

Comment #20: Two commentors believed that the cap and slurry wall should be the selected alternative, suggesting that 1) the Fund may not provide much more than $5,000,000 for a remedy at Geneva, and 2) the buried drums may be deteriorated and their contents adsorbed onto the subsurface soils.

Response: Superfund does not have a pre-set maximum cost of a remedy for a site. That remedy which provides adequate protection of public health and the environment is considered to be cost-effective. The drums buried at Geneva Industries may have deteriorated. However, EPA cannot be sure that all of the drums, or even most of the drums have deteriorated. Therefore, EPA must consider proper disposal of the drums and possible contents.

Comment #21: Solids cannot be fed into an incinerator under the same steady state conditions as liquids can. Batch feeding of solids result in temperature variations, uneven combustion, and increased probability of the emission of hazardous constituents.

Response: While solids may be batch fed into an incinerator, the rate of heat input to the unit, in BTU/hour, is constant and close to steady state. For incinerating the solids at Geneva, the source of heat would be auxiliary fuel, not the contaminated solids. Since the auxiliary fuel can be fed at a constant rate, temperature variations due to changes in the solids feed should be minimized. Also, the incinerator would be operated at a temperature of at least 2012°F. Because the heat value of the soil is already extremely low, it is unlikely that changes in the soils feed will cause significant changes in the operating temperature.

Comment #22: Changes in waste composition, moisture, particle size will have an effect on the operation of the incinerator.

Response: Shredding the solids can reduce the particle size of the solids to an efficient level. The release of volatile organics can be controlled by using a totally enclosed shredder, such as the shredder at the ENSCO facility in Arkansas. The effects of soil moisture variations can be overcome by reducing the soils feed rate during rainy periods, thereby maintaining the desired total heat input on a BTU/hour basis.

Comment #23: Monitoring carbon dioxide and carbon monoxide in the flue gas may not be adequate to detect incomplete combustion quickly enough to prevent incomplete combustion of wastes. If a shutdown occurs due to high CO or low oxygen, then unburned material in the incinerator will create additional problems.

Response: Changes in carbon monoxide concentrations are reliable indicators of combustion upset as excess air is lowered toward stoichiometric conditions and combustion temperature is lowered. The maximum allowable carbon monoxide concentration set in a permit is usually the maximum concentration reported from the trial burn demonstrating compliance with the performance standards for PCB incineration. By setting the maximum CO concentration in this manner, CO monitoring can be an effective indicator of incinerator performance.

When a shutdown occurs due to upsets such as excessive CO in the stack, the temperature in the incinerator is still sufficiently high for combustion of the waste to occur. The shutdown causes the feeding of PCB materials to stop. Auxiliary fuel would still be fed to the unit.

Comment #24: What kind of track record have incinerators had in the past?

Response: Based on previous inspection reports from the Rollins and ENSCO incinerators, no major problems have occurred from the operation of PCB units in Region VI.

Comment #25: One commentor was concerned that the contractor conducting the remedial action would be granted special concessions and be allowed to contribute to pollution in the Houston area.

Response: By regulation, all on-site remedial actions must be able to comply with the technical requirements of any permits that would be applicable to the type of operation being implemented. No special concessions would be granted through Superfund.

Comment #26: One commentor was concerned about the possibility of dioxin and dibenzofuran formation as a result of a 1983 grass fire at the site.

Response: On November 19 and 20, 1985, EPA took 23 surface soil and three groundwater samples to be analyzed for dioxins and dibenzofurans. The analytical results from these samples were included in the remedial investigation report, and submitted to the staff at the Centers for Disease Control in Atlanta, Georgia for review. Based on this review the staff at the Center concluded that the concentrations of dioxins found at Geneva Industries do not represent a chronic health threat.

Comment #27: During the installation of shallow monitoring well, PCB 1232 was detected in a core sample at a concentration of 1500 ppm at a depth of 34-36 feet. However, this is not being considered during the remedial action.

Response: This sample was taken during the installation of a monitoring well, in a tight clay six feet below a contaminated water-bearing zone. No PCBs were detected in other soil samples taken during this depth at other well locations onsite. EPA does not believe that the PCBs detected in the core samples in question were actually at that depth (35 feet), but were inadvertently carried down with soils from a lesser depth during the installation procedure.

Comment #28: Three commentors expressed concern over a Housing and Urban Development housing project near the site, and the effect the site has had on the citizens living there.

Response: EPA forwarded information to the Housing and Urban Development staff in 1983 indicating that Geneva Industries would not pose an immediate threat to the senior citizens living in the project. This assessment has since been substantiated by the remedial investigation. No soil contamination was detected within several hundred yards of the site and groundwater contamination has not migrated offsite. EPA still believes that the housing project is a safe place to live. EPA would also not recommend or select a remedy that would pose a health threat to the citizens in the project.

Comment #29: Several commentors suggested that more public participation was needed in the remedial investigation and decision-making process.

Response: EPA believes that the current community relations regulations set forth in the National Contingency Plan provide for adequate public participation in the Superfund program.

Comment #30: One commentor expressed concern about the drinking water aquifer not being addressed in the remedial investigation.

Response: The drinking water aquifers were not investigated in the remedial investigation because EPA and the Texas Water Commission did not find PCBs in the 100-foot sand during investigations prior to the RI. It was considered highly unlikely that immobile

PCBs would have migrated vertically to the 600-foot sand zone and not be detected in the upper zones.

Comment #31: One commentor expressed a concern about permitting of incinerators or requirements to dismantle an incinerator after a remedial action is completed at a Superfund site.

Response: Permits are not required for onsite remedial actions at Superfund sites. However, the technical and performance requirements that would be included in an applicable permit must be met. An incinerator placed at Geneva Industries would be dismantled upon completion of the remedial action.

Comment #32: What data was used to assess faulting in the vicinity of the site?

Response: Several maps and diagrams were presented in the remedial investigation and fault study documents to support the conclusion that faulting in the vicinity of Geneva Industries will not have an effect on migration of the contaminants from the site.

Comment #33: Several commentors suggested that methods of thermal destruction other than rotary-kiln incineration exist.

Response: This is true. Rotary-kiln incineration was used in the feasibility study as a concept for the purpose of developing a cost estimate for comparison with other categories of technologies. It was also used because the two mobile incinerators in Region VI currently permitted for PCB destruction are rotary-kiln units. During the design of the remedy, any permitted thermal destruction unit would be evaluated, and any unit meeting the required performance criteria for PCB destruction would be eligible to bid on the remedial action contract.

Comment #34: Two commentors questioned the lack of detailed evaluation of biodegradation in the feasibility study.

Response: Biodegradation as a possible remedy was eliminated during the initial screening of alternatives. Data exists in research literature and in field work to suggest that biodegradation of PCBs in liquid media is possible. Several people have done work with both batch and continuous flow aeration basins and reported varying degrees of success. However, landfarming or land treatment of PCB-contaminated soils has not been documented in research literature.

One company has presented data indicating a reduction in PCB concentrations in a mixture of transformer oil, sludge, water and soil in a batch reactor aeration unit pilot study. This technology is not considered feasible at Geneva Industries for several reasons. First, no data was developed to show what effects the other contaminants at Geneva may have on biodegradation, such as toxicity to highly specialized microorganisms. Second, a bioreactor would have to be very large in order to address the volume of soils at Geneva Industries. Based on the pilot study, the contaminated mixture would have to be a liquid for proper aeration and mixing, resulting in a much larger volume of material to be handled during remedial action. This in turn may lead to problems of: 1) dewatering the basin material prior to ultimate disposal, and 2) ensuring that any effluent from the reactor would meet discharge requirements. Treatment of the effluent may be required prior to discharge.

Site constraints would have an effect on the size of a reactor that could be built onsite and still provide a reasonable time in which to complete the remedial actions. Data from one pilot study indicated that about 4 months were required for degradation of one ton of material. While a larger basin may permit treatment of larger volumes, a balance between the size of the reactor and the size of the site would be required.

Application of a microbial population directly to contaminated soils in-situ would present several problems. First, the clay soils at Geneva may have an inhibitory effect on biodegradation. Dense clays may inhibit the dispersion of microbial suspensions applied to the soils unless accompanied by soil tilling. Soil tilling is limited by depth; excavation of soil to a treatment cell would be necessary, as would some stockpiling of contaminated soils. Land treatment would be done under much dryer conditions than bioreactor degradation. The low soil moisture in a land treatment/landform would allow for more exposure of microbes to sudden and wide variations in climate conditions. Also, low soil moisture content would inhibit the dilution of products of metabolism which may be toxic themselves.

Comment #35: How will EPA address the asbestos present at Geneva?

Response: The asbestos at Geneva Industries was removed from the site as part of a removal action in September 1984. The material, used as insulation for the process equipment, was placed in plastic bags and transported to a hazardous waste landfill. Asbestos introduced into the incinerator would be captured by the wet scrubbers in the stacks. A minimal amount of particulate may escape, but it would not be anticipated that this amount would pose a significant health threat.

Comment #36: How will scrubbers be cleansed? What will be done with toxic materials found?

Response: Water from the scrubbers will be neutralized and analyzed for PCBs. Scrubber water containing no PCBs is discharged from the site. If PCB's are detected, water would be treated by carbon adsorption prior to discharge from the site.

Comment #37: Health effects from the transportation of wastes to potential land disposal sites in Alabama or Nevada can be expected to exceed those caused by other remedial alternatives.

Response: No studies have been done, to EPA's knowledge, comparing transportation related health effects to on-site remedial alternative health effects. EPA therefore cannot adequately comment on such a relationship or comparision.

Comment #38: Criteria for quantatively evaluating options for their potential to minimize health impacts should be more fully developed in the feasibility study.

Response: Any remedial alternative must comply with applicable Federal environmental regulations and will adequately protect human health and the environment and minimize health and welfare impacts.

Comment #39: Particulates from the flue gases are toxic and must be permanently contained. The particulates could be stabilized in a block matrix.

Response: The specific design of the pollution control equipment is beyond the scope of the feasibility study. Pollution control equipment for an incinerator will be designed such that all applicable Federal and State regulations and guidelines will be met.

The performance standards for particulate emissions set forth in the Resource Conservation and Recovery Act and the Toxic Substances Control Act provide adequate protection of health and the environment. The disposal of particulate material captured by the stack scrubbers is a consideration to be addressed in the design of the remedial alternative.

Comment #40: No mobile incinerators are adequately equipped with process controls and emission controls including a bag house.

Response: Mobile incinerators that have been granted operating permits are equipped with adequate controls to comply with current Federal performance standards. Bag houses may be retro-fitted to existing permitted units for additional particulate control.

Comment #41: Municipal refuse should be used as an auxillary fuel for the incinerator.

Response: Because research has shown that municipal refuse may contribute to the formation of chlorinated dioxins when used as a fuel, refuse will not be used at Geneva Industries.

Comment #42: One commentor submitted data for consideration in setting emission standards for incinerator units.

Response: Emissions standards are set to minimize impacts on human health and the environment. As toxicological assessments become more refined, adjustments may be made to the regulations setting incinerator performance standards.

Comment #43: One commentor suggested that the property should be usable after the remedial action is completed.

Response: EPA is bound by regulation to implement the most cost-effective remedy which adequately protects public health and the environment. Potential future land use is generally not a consideration in selecting a remedy although current land use may be considered.

Comment #44: One commentor suggested that solidification and/or stabilization of the soils may be a viable remedy for the site.

Response: Solidification/stabilization of waste was eliminated during the initial evaluation of technologies in the feasibility study. Major drawbacks to this technology, as applied to Geneva Industries, include: 1) possible problems due to organic content of the waste and silt/clay content of the soil; and 2) possible high energy cost involved in some of the solidification methods such as vitrification or micro-encapsulation.

Comment #45: What effect will changes in soil moisture have on incinerator performance?

Response: Extremely wet soils will be fed into the incinerator more slowly than dry soils. This will maintain the overall BTU/hr feed at the design rate. Standing water in the excavated areas will be treated by granular activated carbon and discharged into the adjacent flood control channel.

Comment #46: Several people demanded that a new feasibility study be done for Geneva Industries.

Response: EPA believes that the feasibility study that has been completed is adequate. No second feasibility study is necessary.

Comment #47: What would be the short-term and long-term liability for damages sustained as a result of onsite incineration at Geneva if such damages were to occur? Who would be liable?

Response: The concern seems to be that people in the vicinity of the Geneva site, who may be in a position of possible contamination by hazardous emissions from a malfunctioning incinerator, might experience injuries not immediately discoverable; i.e., cancer. Under tort law, the statute of limitations for damages under the circumstances described would begin to run when the injury is discovered. Liability would attach to the party or parties proximately responsible for any injury. The Federal Tort Claims Act provides that its general waiver of sovereign immunity is not applicable to circumstances in which a federal agency is exercising or performing a discretionary function or duty.

Comment #48: EPA should assist in the establishment of permanent facilities for the disposal of hazardous waste.

Response: EPA is not in the business of commercial hazardous waste disposal. The Agency prefers to let private enterprise handle the disposal.

Comment #49: EPA should limit testimony to scientists and affected citizens.

Response: EPA's regulations and policies do not allow us to prevent anyone from making a statement at a public meeting. These regulations and policies were created to ensure that every citizen of the United States would be represented by the Agency in its endeavor to protect human health and the environment.

Attachment A

Community Relations Activities Conducted at the Geneva Industries Sites

Community relations activities conducted at the Geneva Industries site to date include the following:

- An EPA press release of June 2, 1983, announced immediate action to fence the Geneva site.
- Congressman Andrews held a town meeting on July 6, 1983, to discuss the Geneva site. EPA representatives were speakers at this meeting.
- Geneva was added to the NPL in Septemeber of 1983.
- EPA press release of September 15, 1983, announced a public meeting to discuss the planned removal. The meeting was held October 6, 1983, and 63 persons attended, including media.
- In Janaury 1984, TWC announced the approval of the Cooperative Agreement for Geneva.
- On February 3, 1984, EPA announced the completion of the surface cleanup.
- The TWC announced the selection of a contractor to begin the RI/FS on April 9, 1984.
- TWC conducted community interviews with local officals and interested residents and finalized the Community Relations Plan in May 1984.
- Information repostiories were established at the City Secretary's office in Houston; Houston Public Library; University of Houston M. D. Anderson Library; Rice University Fondren Library; South Houston Branch Library; Houston-Galveston Area Council; and the Texas Water Commission offices in Deer Park and Austin.
- EPA issued a press release on June 29, 1984, announcing that an abandoned oil well had been plugged.
- The Feasibility Study was released for public review and comment in May 1986
- EPA held a public meeting at the South Houston Community Center in South Houston to describe the RI/FS reports and to respond to citizens' questions. 397 people registered at the public meeting on May 22, 1986.
- The transcript of the public meeting was sent to the area repositories on June 5, 1986.
- The public comment period closed on June 10, 1986.
- This Responsiveness Summary was provided to all speakers at the public meeting on May 22 and all citizens who commented during the public comment period.