Environmental
Resources
Management, Inc.

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6 November 1985

Mr. Henry J. Mitchell
Allied/Amphenol-Bendix Connector Operations
40-60 Delaware Avenue
Sidney, New York, 13838

Dear Mr. Mitchell:

Introduction

Environmental Resources Management, Inc. (ERM) was retained by Allied/Amphenol - Bendix Connector Operations, Sidney, New York, to conduct an assessment of the potential impact of surface oil, found near a former buried waste oil tank, on the surrounding ground water system. The former underground tank was used from 1981 to 1983 for the storage of waste oils. Evidently, surface spillage associated with the tank is the source of the subsurface oil, as no leaks were apparent in the tank upon its removal. The initial field investigation was completed in March 1985 and the conclusions from this study were presented in ERM's April 1985 report, "Investigation of Subsurface Oil Near the Plant Boiler Room." In this report ERM recommended that additional monitoring be conducted monthly to verify ground water flow directions in the very low gradient flow regime and determine the extent of oil-derived benzene, toluene, and xylene (BTX) compounds at the site. This report presents the results of that additional monitoring.

After the analysis of the June BTX samples, O'Brien and Gere Laboratory informed ERM that there were several prominent peaks on the gas chromatagraph (GC) that represented volatile organic compounds (VOCs) other than BTX compounds. Consequently, ERM collected samples for VOC analysis in July and August. These additional ground water quality data are also presented in this report.

The objectives of this addendum study were to:

- monitor ground water elevations monthly from May through September to determine ground water flow directions at the site.
- collect monthly samples for BTX from May through September to better establish the extent of the BTX plume configuration.

- determine the potential extent of VOCs in the ground water surrounding the former underground storage tanks.
- summarize the data collected and issue an addendum report to clarify the ground water conditions.
- recommend any further action, if necessary.

The results of this addendum study have provided sufficient data to meet the objectives stated above.

Background

In the preliminary site assessment two different flow patterns were defined; a northward direction in January 1985, and a northeastward direction in March 1985. The flow gradients at the site were low and ERM felt that these slight gradients were influenced by variations in seasonal recharge or by the heterogeneous sequence of layered impermeable silts and permeable sands. Because of the apparently variable ground water flow gradients the direction and extent of BTX migration was difficult to determine. Consequently, ERM proposed the collection of the water level elevations and BTX samples to better assess the ground water conditions at the site.

Ground Water Level Measurements and Ground Water Sampling

Water level elevations were collected monthly from April to September. Measurements were taken to the nearest hundredth of a foot using an electronic water level indicator. The ground water elevations are shown in Table 1. For sampling, the wells were purged of three casing volumes using a PVC bailer. Because the sumps have filled with silt and sand they were not purgable before sampling. After the water levels recovered, dedicated PVC bailers were used to collect ground water samples in the wells and the sumps. From May through September samples were collected for BTX analysis, and in July and August additional samples were collected for VOC analysis. Samples were not collected from Sump 1 in August and September because blacktopping operations have temporarily rendered the sump inaccessible. All samples were collected in laboratory-supplied 40-ml glass vials with Teflon-lined septa. The samples collected from May through August were submitted to O'Brien and Gere Laboratory, Syracuse,

New York, and the samples collected in September were submitted to Lancaster Laboratories, Lancaster, Pennsylvania for analysis.

Ground Water Flow Directions

Using the January and March ground water elevation data presented in the preliminary report, and the elevation data collected monthly from April to September, ERM has determined that the configuration shown in Figure 1 represents the principal ground water flow pattern at the site. This northwestward ground water flow direction was present during seven of the eight monitoring events conducted at the site. Furthermore, ERM's assessment of the regional overburden flow directions has shown that the area flow gradients are northwestward toward the discharge area at the Susquehanna River. Although the general northwest gradient was predominant, the configuration of the northwest-trending swale shown in Figure 1 varied from month to month. Inspection of the water level data indicated that the swale was present during the low flow and high flow conditions and does not appear to be related to seasonal ground water changes. It is more likely that the swale in the contours is related to individual recharge events.

The water level data indicate that the northward gradient measured in January 1985 was anomalous and does not reflect a true ground water flow direction. As shown in Figure 2, the northward configuration is controlled by the water level elevation difference of .10 foot between Well BR-5 and BR-3. This difference is very slight and may be due to the limitations of precision using the electronic water level meter.

Ground Water Quality Results

BTX Results

The results of the BTX analyses are shown in Table 2. These results indicate that the extent of BTX compounds in the shallow ground water flow component is very limited. The highest BTX concentrations were consistently detected in Sump 1 while the monitoring wells showed trace to no detectable BTX constituents. Generally, the BTX results are sporadic with moderate concentrations detected in January and September and trace to non-detectable levels occurring from May to August. Ground water elevations were low in both January and August, and thus there appears to be no seasonal relationship between the increase and

decrease in BTX concentrations. Again, these differences may be related to individual precipitation events.

The absence of free oil on the ground water surface and the low BTX concentrations confirm ERM's previous conclusion that the volume of oil spilled at the site was minimal. Furthermore, since the major source for the dissolved oil constituents was the oil-saturated sediments surrounding the tank, and these have been removed and the area paved over, the potential for future BTX migration is minimized.

VOC Data

The results of the chlorinated VOC analysis are summarized in Table 3. As shown, only 4 ppb of chlorinated VOCs were detected at Sump 1. The results from the remaining wells show that trans 1,2 - dichloroethene and trichloroethylene were the major volatile constituents detected in the ground water. Well BR-2, adjacent to the former tank location, contained the highest VOC with 332 ppb and 369 ppb detected in July and August, respectively. Downgradient Wells BR-3, BR-4, and BR-5 all contained similar concentrations of total VOCs, while upgradient Well BR-1 showed trace VOC concentrations.

Figure 3 shows an isoconcentration map of the volatile data from the August monitoring. The center of the plume appears to be in the area between Wells BR-2 and BR-4 indicating that the former tank was the source for the VOCs in the ground water. The main axis of plume migration is directed northwestward following the principal direction of ground water flow, contrary to the BTX distribution. The low flow gradients have resulted in plume dispersion in the lateral directions. The 12 ppb in Well BR-1 indicates that there has been little upgradient VOC migration at the site. The extent of the plume appears to be limited by additional downgadient dispersion and dilution by the saturated, permeable sediments. Also, the removal of the soil in the tank area and the paving of the area should ultimately reduce the VOC concentration migrating downgradient.

Potential Impacts

The potential impacts of the VOC and BTX associated with the Boiler Room tank area are very limited, given the following conditions:

- The concentrations of VOCs present are quite low, all being below 500 ppb, with none detected in some samplings.

- Several sampling events of the Amphenol North well have shown no detectable VOC concentrations, indicating that plume does not extend to its pumping cone influence.

- No other water supply wells are known to exist immediately downgradient from the VOC plume. The Village of Sidney wells are located over 2,000 feet downgradient, and are unlikely to be impacted by the limited plume of concern.

- The VOC plume undergoes significant dilution and dispersion in the thick sequence of permeable, saturated glacial sediments.

- Although seasonal events may cause fluctuations in VOC concentrations due to variable degrees of dilution, there will be an overall decrease in VOC as a result of source removal and paving operations.

- There are no potential paths of exposure to humans or aquatic life from the VOC in the ground water.

Conclusions

1. The principal ground water flow direction affecting VOC migration is northwestward.

2. Concentrations of BTX in the ground water are very limited, having decreased to the few tens of ppb level since the removal of the tank and surrounding soil.

3. VOCs associated with the former tank area were detected in the ground water at the site in the 200 to 300 ppb range.

4. VOC migration is northwestward, with downgradient dispersion and dilution dissipating the concentrations over a short distance.

5. The low VOC concentrations are expected to decrease over time, since the source area has been removed and surface paving installed.

6. No existing or potential adverse impacts have been identified in relation to this site.

Recommendations

Two remedial actions have already been taken at this site:

- the removal of the source area from the former tank location, and

- the paving of the area preventing infiltration through the affected sediments.

Due to the occurrence of only trace to low BTX/VOC concentrations, and the lack of downgradient impact on any potable water supplies, ERM proposes that Amphenol should conduct a limited program which will verify the long term abatement of the plume in the shallow flow component. ERM does not believe that off-site investigation is required for this very limited plume. Rather, ERM recommends that the five monitoring wells and two sumps, and the North Well should be sampled semiannually for VOCs and BTX. Should this monitoring clearly indicate an increasing trend in VOC concentrations, or their arrival at the North Well, further remedial action may be considered at that time. This monitoring should continue until a clear downward trend in BTX/VOC concentrations verifies that the existing remedial actions have abated the problem.

ERM believes that this recommended remedial plan will address the VOC and BTX migration effectively to minimize impacts, and to monitor the progress of its abatement. If you have any questions concerning the data presented, please feel free to call me.

Very truly yours,

Marilyn A. Hewitt

Marilyn A. Hewitt, P.G.
Project Manager

MAH/RWK:veb

TABLE 1

GROUND WATER LEVEL ELEVATIONS

Well No.	Depth (feet)	Elevation of Measuring Point (ft)	-- Ground Water Elevations --							
			January 28	March 27	April 15	May 30	June 26	July 31	August 27	September 19
BR-1	25.0	987.17	971.67	972.41	972.14	971.90	971.13	969.47	970.49	970.39
BR-2	25.0	987.92	971.48	971.77	971.72	970.98	970.56	970.31	970.17	970.24
BR-3	25.0	986.96	971.45	971.77	971.69	971.09	970.48	970.66	970.15	970.22
BR-4	25.0	986.54	971.47	971.63	970.65	970.97	970.44	970.48	970.15	970.32
BR-5	25.0	984.46	971.55	971.58	971.66	971.05	970.09	970.39	970.14	970.22
Sump 1	19.0	985.89	971.60	971.70	971.19	971.03	970.55	970.56	---	---
Sump 2	19.0	986.47	971.56	971.68	971.77	971.00	970.52	---	970.29	970.35

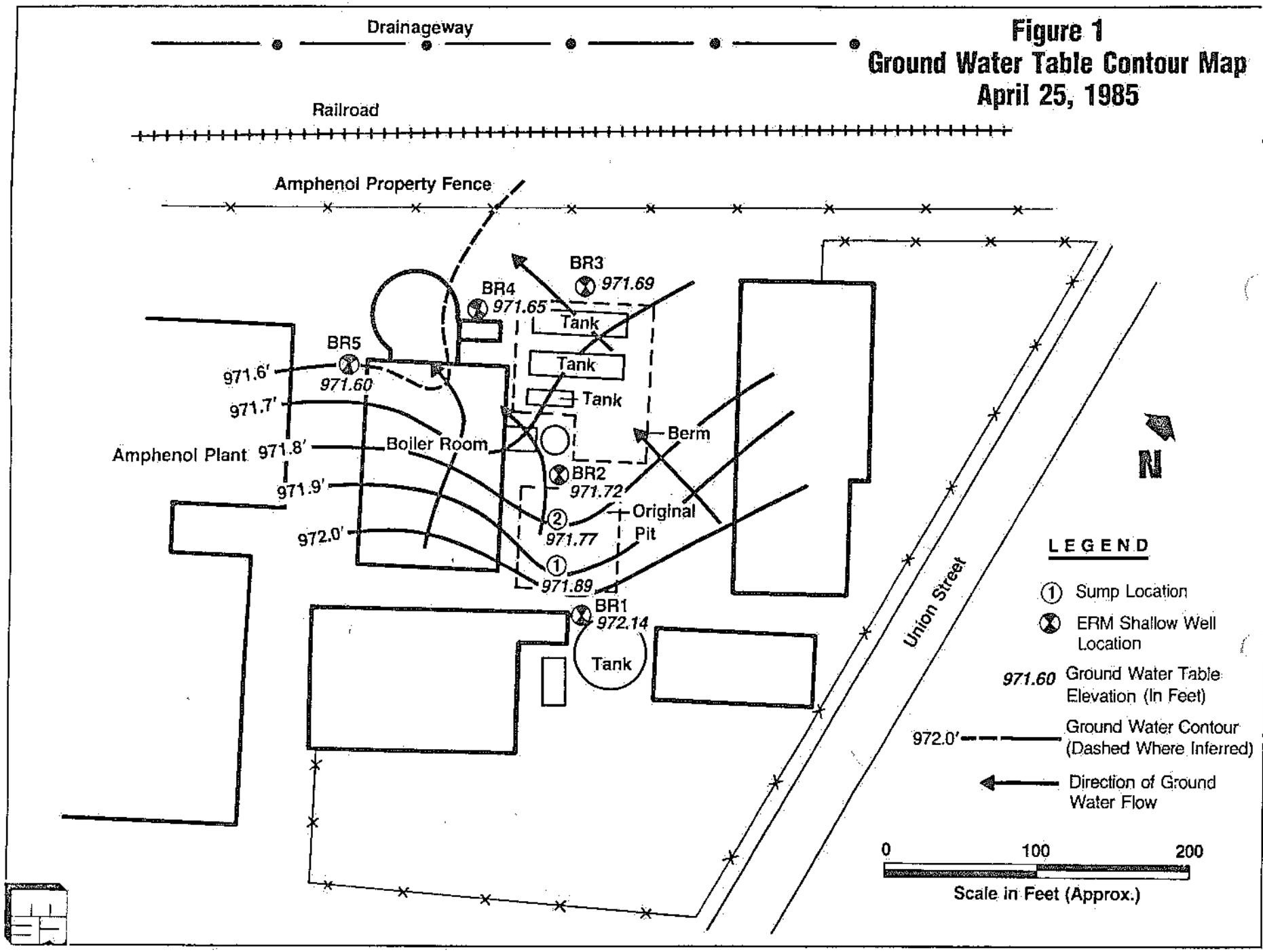

Figure 1
Ground Water Table Contour Map
April 25, 1985

The ERM Group

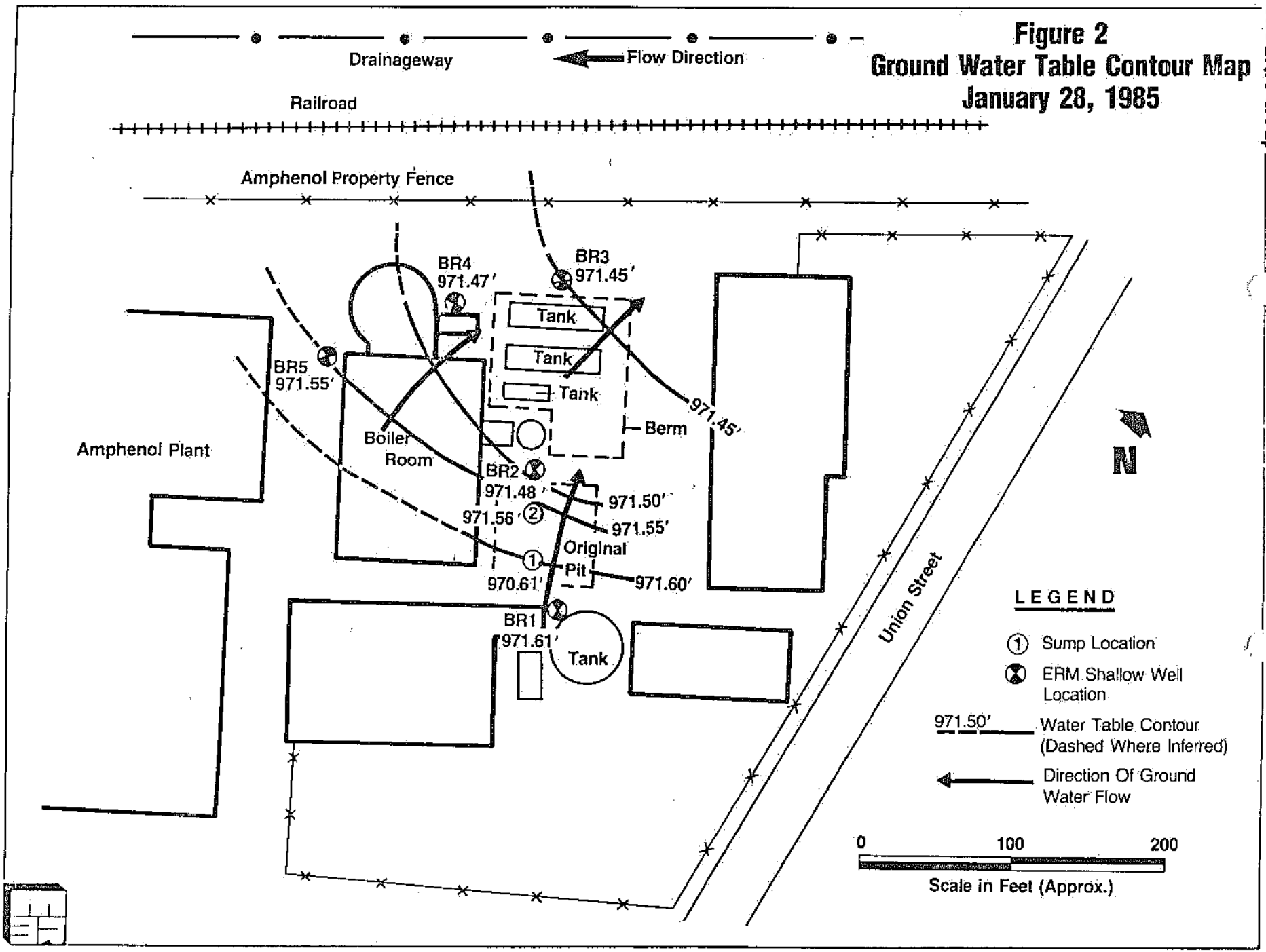

Figure 2
Ground Water Table Contour Map
January 28, 1985

The ERM Group

TABLE 2

TOTAL BTX RESULTS

(Results in ppb. Detection limits <1 ppb. Fr = Friend Laboratory, Lanc = Lancaster, O & G = O'Brien and Gere)

Well No.	November Fr	January Fr	January Lanc	May O&G	June O&G	July O&G	August O&G	September Lanc
BR-1	---	231	200	6	92	ND	5	6
BR-2	---	43	72	6	6	ND	4	74
BR-3	---	4	44	ND	5	ND	5	49
BR-4	---	80	27	ND	1	ND	ND	42
BR-5	---	32	11	1	1	ND	ND	6
Sump 1	1,590	3,259	556	266	384	347	---	---
Sump 2	27	9	4	ND	15	ND	7	2

TABLE 3

TOTAL CHLORINATED VOLATILE ORGANIC RESULTS

Well No.	Date	Chlorinated Total Volatiles	Vinyl chloride	1,1-Dichloroethane	Trans 1,2 Dichloroethylene	Chloroform	Trichloroethylene	Tetrachloroethylene
BR-1	7/31	10			4	4	2	
	8/27	7			4		3	
BR-2	7/31	332		12	180		140	
	8/27	365	45	9	130		180	1
BR-3	7/31	200		8	91		81	
	8/27	197	21	5	70		100	1
BR-4	7/31	315		8	140		160	7
	8/27	241	16	4	76		140	5
BR-5	7/31	259		7	110	6	130	6
	8/27	172	8	2	52		110	
Sump 1	7/31	4		2		2		
Sump 2	7/31	4				2	2	
	8/27	2					2	

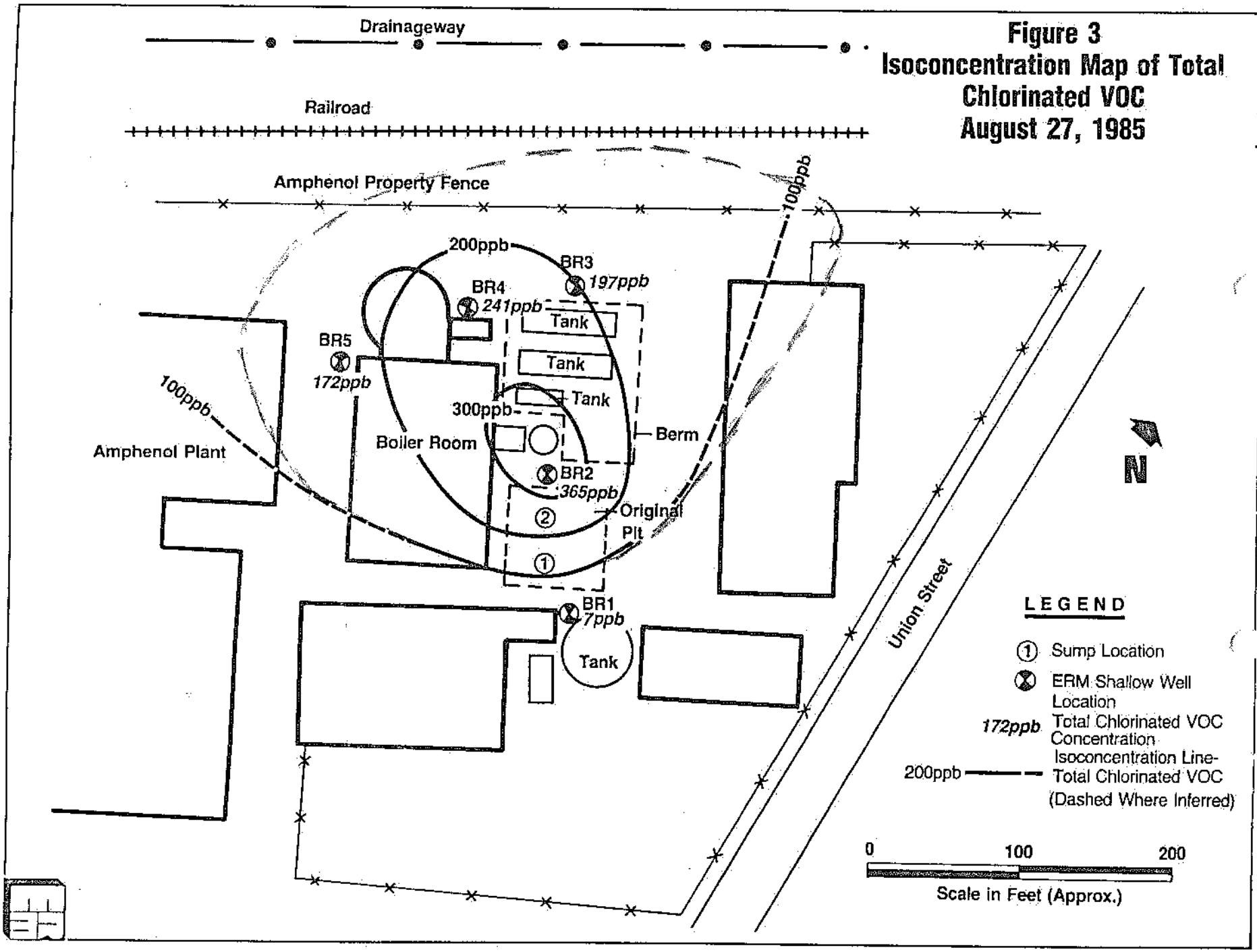

Figure 3
Isoconcentration Map of Total Chlorinated VOC August 27, 1985