PHASE II SITE INVESTIGATION

SUMMARY REPORT

OK TOOL COMPANY INC.

MILFORD, N.H.

4939

Prepared for

OK TOOL COMPANY, INC.
Milford, N.H.

Prepared by

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R-569

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LIST OF ABBREVIATIONS USED IN THIS REPORT

Ace	acetone
1,2 DCE	1,2-trans-dichloroethylene
EPA	United States Environmental Protection Agency
ft	feet
GC	gas chromatography
HNu	HNu Model 101 photoionization analyzer
MS	mass spectroscopy
NAI	Normandeau Associates, Inc.
ND	not detected
OK Tool	OK Tool Company, Inc.
OVA	organic vapor analyzer
ppb	parts per billion
ppm	parts per million
PCE	tetrachloroethylene
TCE	trichloroethylene
TR	trace
VOC	volatile organic compound
WSPCC	New Hampshire Water Supply and Pollution Control Commission
XYL	xylene

1.0 INTRODUCTION

This report summarizes the results of the Phase II site investigation, performed during May 1984. The results of the investigation further characterized the hydrogeology and soil chemistry as related to past on-site waste management practices at the O.K. Tool Company, Inc. (OK Tool) site in Milford, New Hampshire. The Phase II investigation was performed in response to the detection of volatile organic compounds (VOC's) in ground water samples obtained from on-site monitoring wells located down gradient of the OK Tool manufacturing plant.

1.1 PURPOSE AND SCOPE

This report presents the results of the Phase II investigation to evaluate potential on-site sources of VOC's and other chemical compounds.

The objectives of this investigation were to:

1) further delineate the vertical distribution of waste or soil/waste located in the rear areas of the OK Tool property, where VOC's were previously observed,

2) address each area's potential as a source for VOC's found in ground water,

3) evaluate other potential sources of VOC's, including the abandoned well and the outdoor tetrachloroethylene (perc) storage tank.

2.0 PHASE II EVALUATION OF POTENTIAL ON-SITE SOURCES OF VOLATILE ORGANIC COMPOUNDS

2.1 WASTE OR SOIL/WASTE AREAS 1, 2, AND 3

2.1.1 Purpose and Methods

Areas 1, 2, and 3, shown on Figure 2.1-1, contain a variety of materials including stained soil, sludges, oily waste and metal cuttings, shavings and broken tools. These materials are commonly mixed with natural soils. Concentrations of VOC's observed in the surface materials of these areas and the approximate lateral extent of waste materials were described in the NAI report "Hydrogeologic Study and Waste Evaluation, The OK Tool Company Site", dated December 1983.

The Phase II investigation of these areas was carried out on May 7-9, 1984. As previously mentioned, the purpose of the Phase II study was to outline the vertical distribution of VOC's in waste or soil/waste, and to assess each area's potential as a source for VOC's in the ground water.

The method of investigation involved digging test-pits at selected points within the suspect areas with a backhoe, obtaining waste or soil/waste samples at 2- to 3-foot depth intervals, and sampling ground water from pits, where possible. In an effort to minimize cross-contamination of samples, the backhoe bucket was decontaminated with a steam-cleaner prior to beginning each pit and also at the time the bucket reached the bottom of the layer of visually affected soil. Other equipment, such as sampling buckets, spoons and shovels, were also steam-cleaned prior to digging at each location. The soil/waste and water samples submitted for chemical analysis were analyzed for VOC's by GC/MS methods. The laboratory report containing the results of all analyses performed during this investigation is included as Appendix A.

Test-pits were designated according to grid location and sequence of digging (See Figure 2.1-1 for map and grid). For example,

test-pit F-14-7 was excavated at grid location F-14 and was the seventh pit dug during the Phase II investigation.

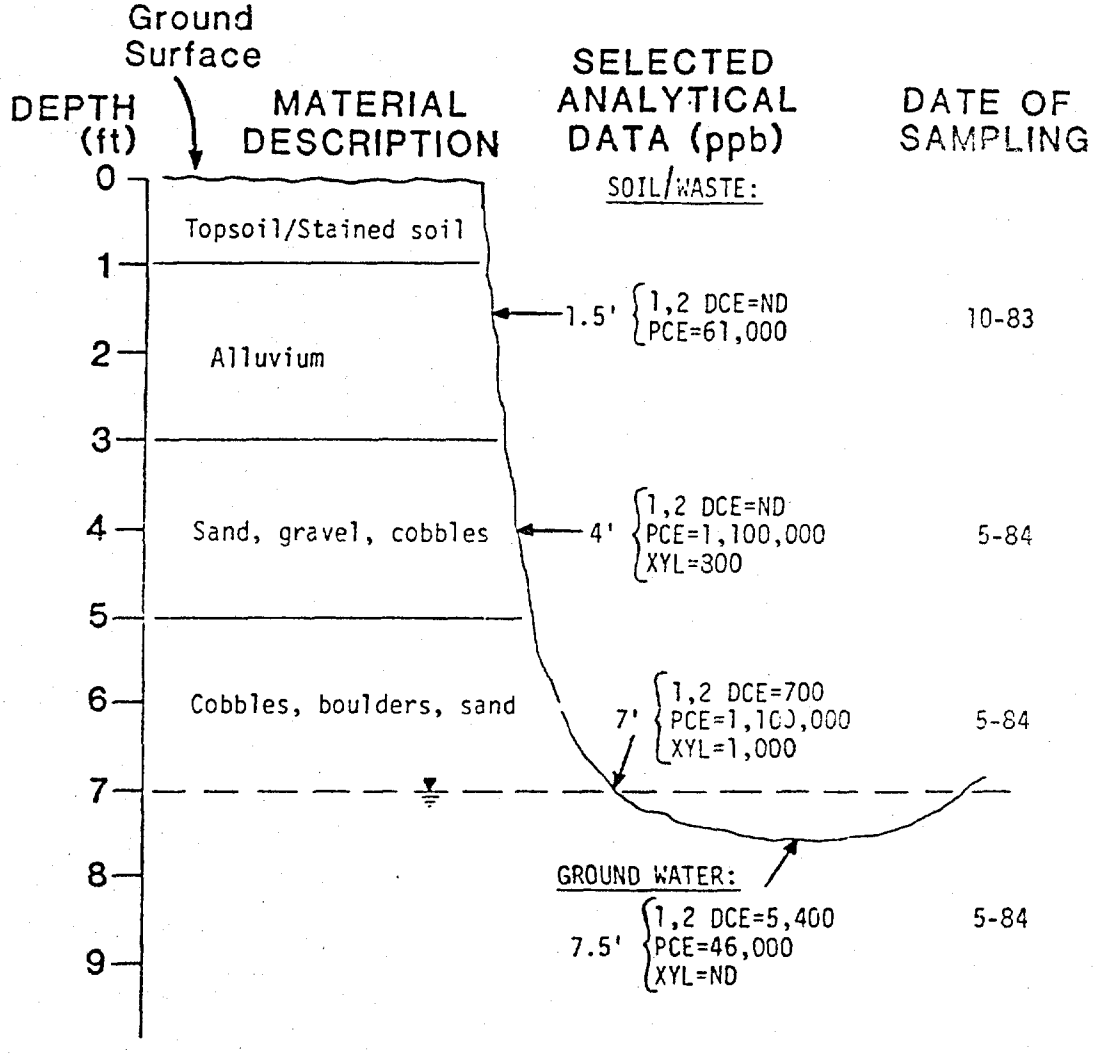
2.1.2 Results

The December 1983 NAI report discussed four areas of soil/waste (Areas 1 to 4), distinguished primarily by their individual appearance, i.e., each contains a different kind of waste. For this reason, NAI anticipated that each area may have other distinct characteristics, including the lateral extent and concentration of VOC presence. Thus, these four areas are addressed separately here. Selected results of the sampling performed in October 1983 have also been incorporated in the discussion.

Area 1. Area 1 is approximately 8 square feet in size. Two test-pits were dug in Area 1 (see Figure 2.1-1). Test-pit D-20-1 was located in an area of unvegetated soil, where some of the freshest appearing wastes were found. Odorous, stained soil was observed to a depth of roughly one foot. HNu and OVA readings up to 200 to 300 ppm were noted in the soils at all depths (0 to 7.5 feet) in pit D-20-1. The natural soil strata, containing topsoil overlying alluvium and a boulder zone (units discussed in NAI report of December 1983), had not apparently been previously disturbed. See Figure 2.1-2 for a log of test pit D-20-1 and associated sample depths.

A second pit, D-20-2, was begun but was terminated at a depth of 2.5 feet because the presence of VOC's was not indicated in the soil by either the HNu or OVA, nor did there appear to be any stained soil.

Six VOC's were identified in samples of the unsaturated soils from Area 1. Tetrachloroethylene (PCE) was present in the greatest concentration (up to 1,100,000 ppb), followed by 1,1,1-trichloroethane (1,800 ppb), xylenes (up to 1,000 ppb), 1,2-trans-dichloroethylene (700 ppb), trichloroethylene (TCE) (400 ppb), and ethylbenzene (<200 ppb). In general, the concentrations of VOC's were greater at depth. Based on



NOTES: 1,2 DCE = 1,2 - trans-dichloroethylene
PCE = tetrachloroethylene
XYL = xylenes
ND = not detected
⏚ = ground water level

Figure 2.1-2. General log of test-pit D-20-1 and selected analytical data for soil/waste and ground water samples. O.K. Tool Company Report, November 1984.

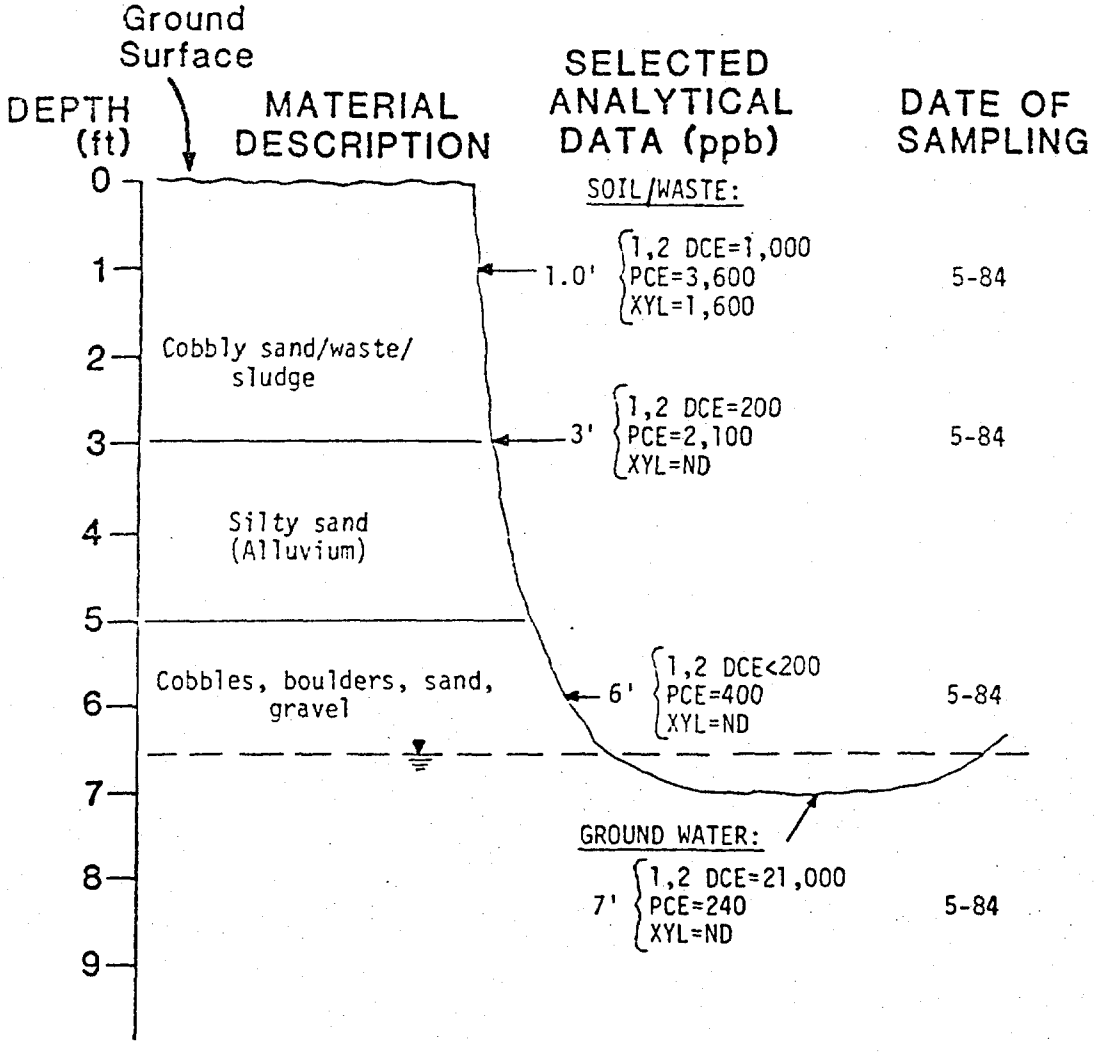
field observations, it appeared that wastes disposed of in Area 1 were primarily liquids which may have quickly infiltrated the unsaturated zone and reached the water table. Lower VOC concentrations noted near the surface may be due to volatilization or infiltration.

Ground water obtained from the bottom of pit D-20-1 contained dilute concentrations of two VOC's which were present in the overlying unsaturated soils: PCE (46,000 ppb), and 1,1,1-trichloroethane (130 ppb). Two other VOC's, 1,2-trans-dichloroethylene (5400 ppb) and trichloroethylene (560 ppb) were present in higher concentrations than observed in the overlying unsaturated materials. Xylenes and ethylbenzene, most of which are lighter than water, were not detected.

The hydrogeologic conditions present at the site and the above data suggest that Area 1 is probably a significant source for the VOC's found in on-site ground water monitoring wells M-3a and M-3b.

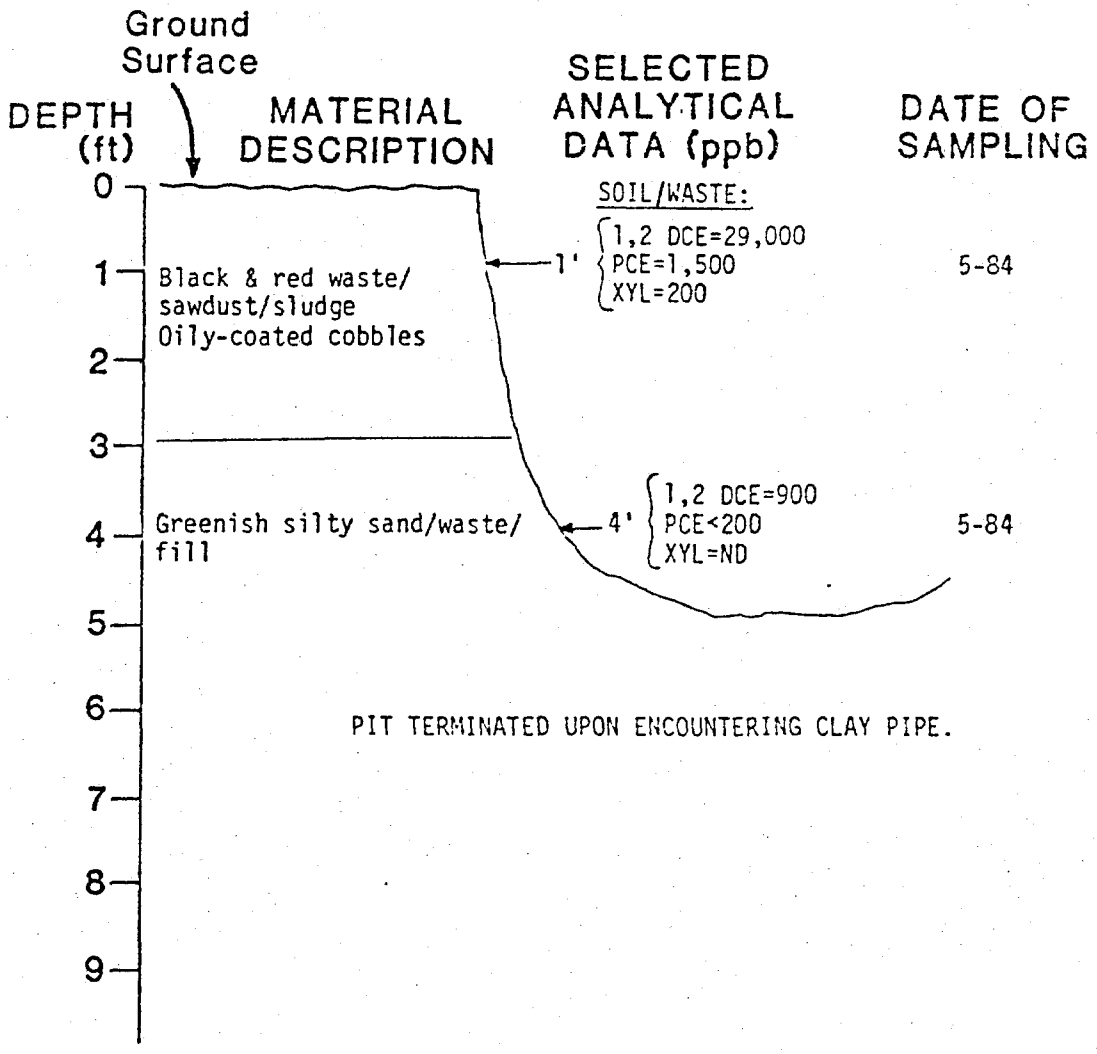
Area 2. Area 2 borders the rear parking lot and contains a variety of odorous sludges, oily wastes, and stains combined with fill, natural soil and sawdust. NAI excavated test-pits in five locations in Area 2 (see Figure 2.1-1). Wastes were encountered down to depths of one to four feet. OVA and HNu readings of VOC's emanating from soil/waste were typically in the range of 10-60 ppm. However, readings of 100 ppm or higher were found in pits E-16-5 and F-14-7. Pits E-17-4 and F-14-7 were terminated above the water table upon encountering drainage pipes; thus, ground water was not obtained from these pits. See Figures 2.1-3 to 2.1-7 for logs of these test pits.

Six VOC's were detected in unsaturated materials in Area 2. PCE was found in soils from each of the test pits in concentrations of 100 ppb to 220,000 ppb. TCE (ND (200) ppb to 5200 ppb) and 1,2-trans-dichloroethylene (ND (200 ppb) to 29,000 ppb) were also generally present. Ethylbenzene (up to 3,500 ppb), toluene (11,000 ppb), and xylenes (up to 270,000 ppb) were much less common. Concentrations of VOC's in unsaturated materials normally declined considerably with



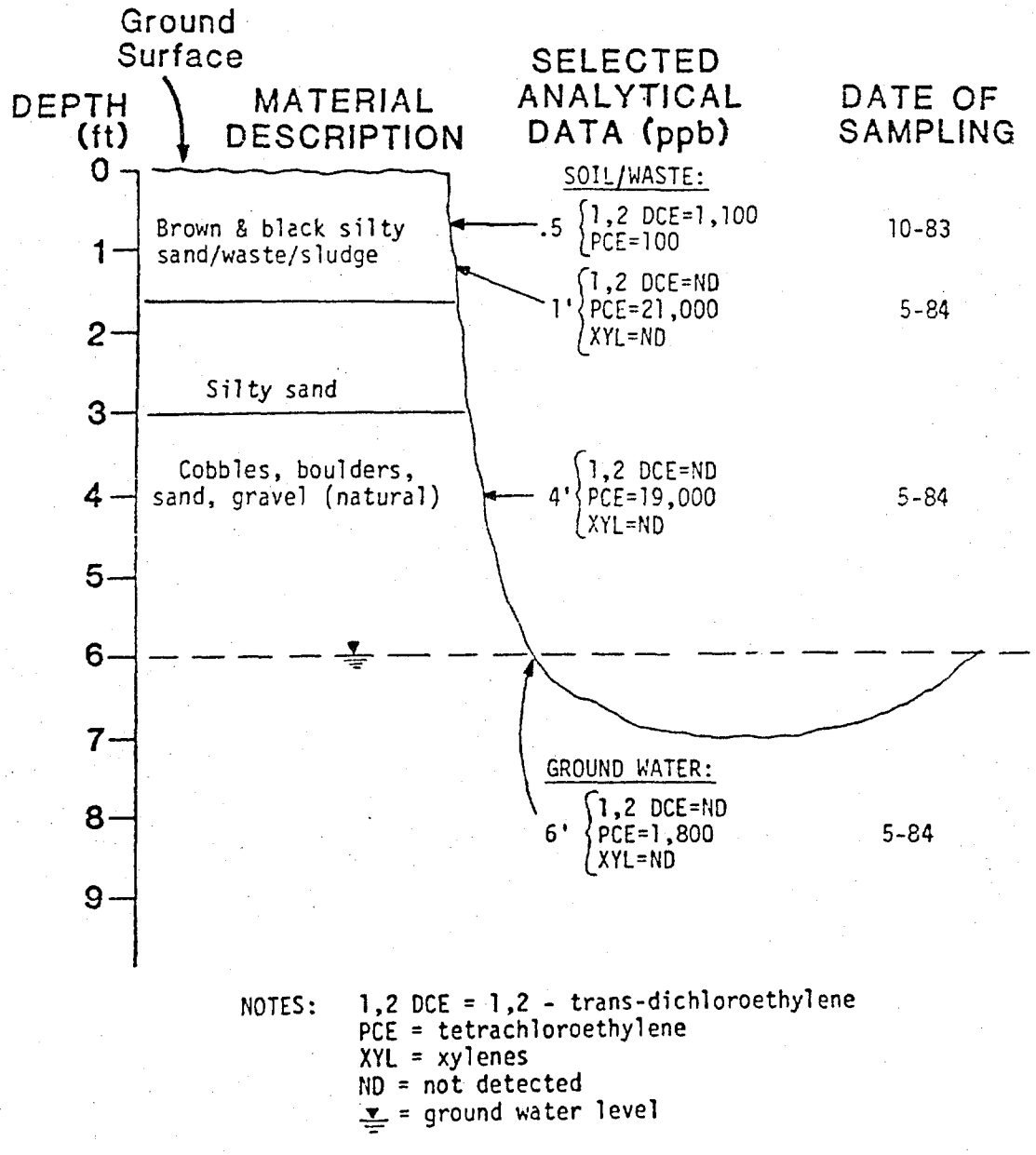
NOTES: 1,2 DCE = 1,2 - trans-dichloroethylene
PCE = tetrachloroethylene
XYL = xylenes
ND = not detected
▼ = ground water level

Figure 2.1-3. General log of test-pit E-18-3 and selected analytical data for soil/waste and ground water samples. O.K. Tool Company Report, November 1984.



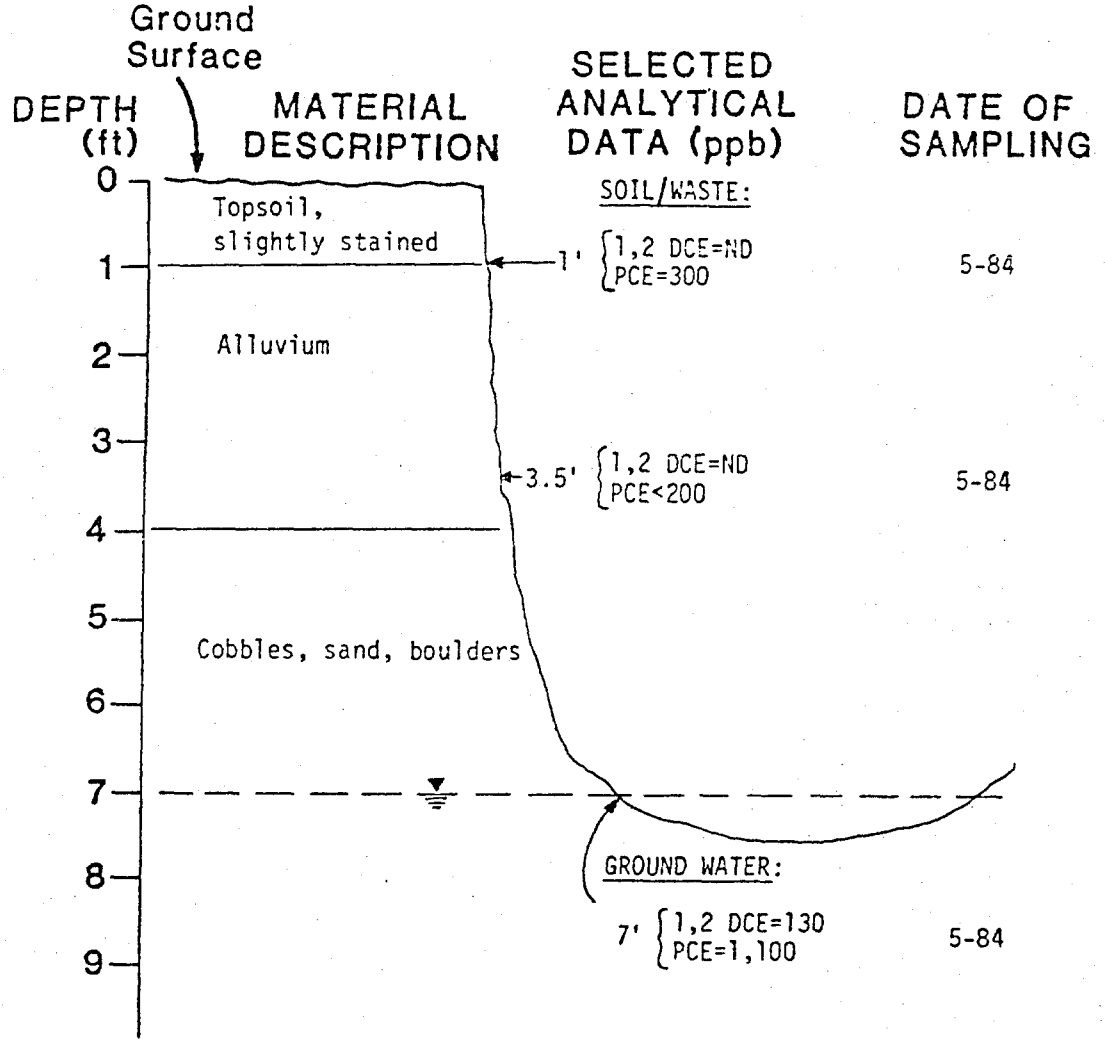
NOTES: 1,2 DCE = 1,2 - trans-dichloroethylene
PCE = tetrachloroethylene
XYL = xylenes
ND = not detected

Figure 2.1-4. General log of test-pit E-17-4 and selected analytical data for soil/waste samples. O.K. Tool Company Report, November 1984.



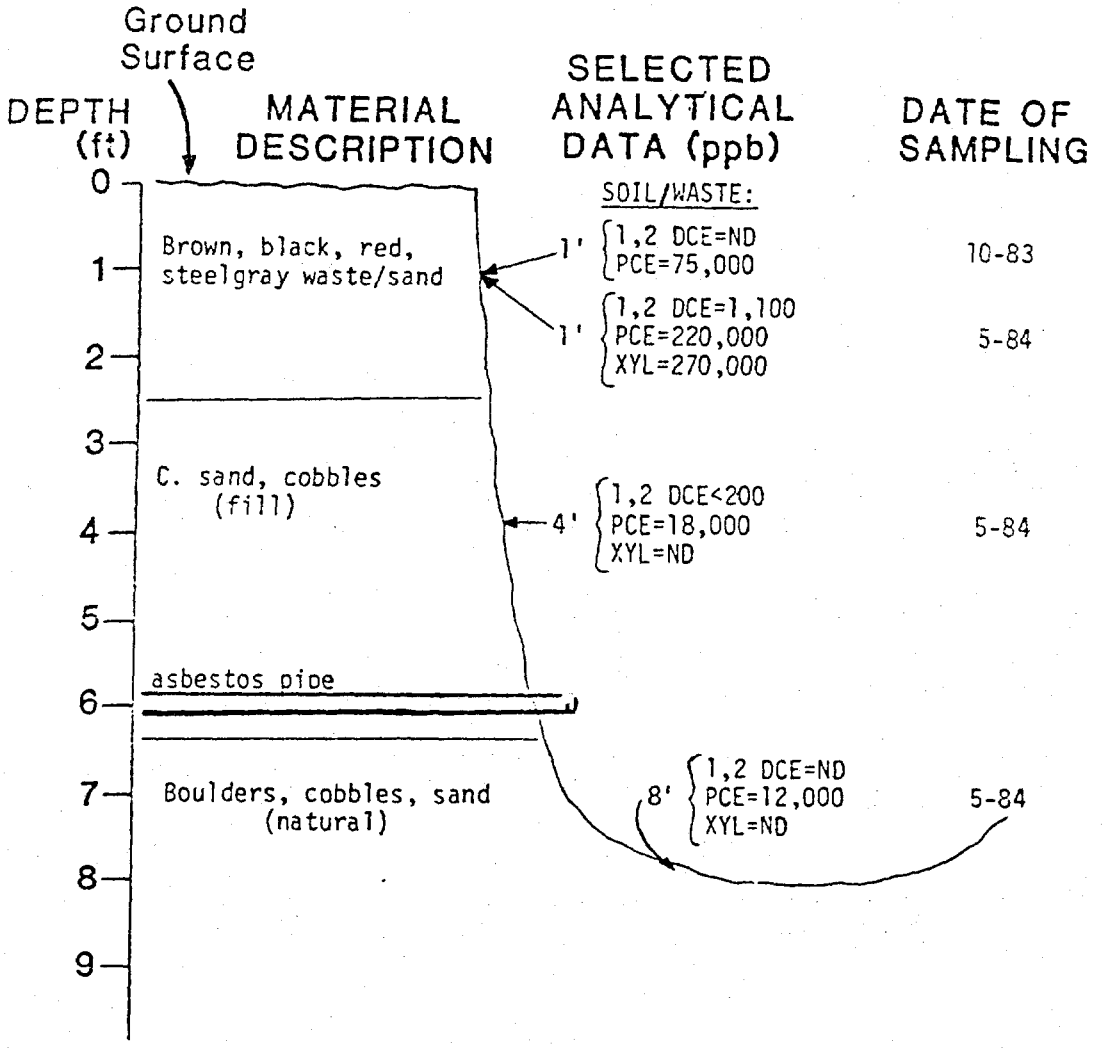
NOTES: 1,2 DCE = 1,2 - trans-dichloroethylene
PCE = tetrachloroethylene
XYL = xylenes
ND = not detected
▽ = ground water level

Figure 2.1-5. General log of test-pit E-16-5 and selected analytical data for soil/waste and ground water samples. O.K. Tool Company Report, November 1984.



NOTES: 1,2 DCE = 1,2 - trans-dichloroethylene
PCE = tetrachloroethylene
XYL = xylenes
ND = not detected
▼ = ground water level

Figure 2.1-6. General log of test-pit D-17-6 and selected analytical data for soil/waste and ground water samples. O.K. Tool Company Report, November 1984.



NOTES: 1,2 DCE = 1,2 - trans-dichloroethylene
PCE = tetrachloroethylene
XYL = xylenes
ND = not detected

Figure 2.1-7. General log of test-pit F-14-7 and selected analytical data for soil/waste samples. O.K. Tool Company Report, November 1984.

increasing depth. For example, in pit F-14-7, samples from 1', 4', and 8' contained PCE in concentrations of 220,000 ppb, 18,000 ppb, and 12,000 ppb, respectively. Xylenes, present in concentrations of 270,000 ppb at 1', were not detected at lower depths. Further, the highest concentrations occurred in the waste layers themselves, as might be expected.

Seven VOC's were identified in ground water samples obtained from three test-pits. Included were 1,2-trans-dichloroethylene (up to 21,000 ppb), PCE (up to 1,800 ppb), TCE (up to 210 ppb), 1,1,1-trichloroethane (32 ppb), 1,1-dichloroethylene (20 ppb), ethylbenzene (10 ppb), and toluene (<10 ppb). Concentrations of VOC's were often lower in ground water than in overlying unsaturated materials. For example, in pit E-16-5, PCE concentrations dropped from 21,000 ppb at 1' to 19,000 ppb at 4', to 1,800 ppb in ground water at a 6' depth. This may be attributed to dilution of the constituents in the ground water. In one instance (pit E-18-3), 1,2-trans-dichloroethylene sharply increased in concentration from <200 ppb in unsaturated materials at 6' to 21,000 ppb in ground water at 7'. This may be due to ground water transport from more severely affected areas adjacent to the pit.

An evaluation of ground water flow paths and the above data suggest that Area 2 contains pockets of waste that are probable sources of VOC's found in ground water in monitoring wells M-3a, M-3b, M-4, M-5a, M-5b, and M-6.

Area 3. The two test-pits dug in Area 3 (see Figure 2.1-1) revealed a waste layer, 4' to 5' in thickness, dominated by rusted metal tools, shavings, and cuttings. Wastes in this area appear older than those in Areas 1 and 2 because of partial revegetation of the land surface, general lack of odor, and the encrustation of material due to deep oxidation.

Only two VOC's were detected in unsaturated materials in Area 3: PCE (up to 500 ppb) and acetone (up to 190,000 ppb). VOC's were not

detected in test-pit ground water samples. Concentrations of VOC's generally declined with increasing depth. For instance, in pit SP-3-8, acetone levels in soil samples declined from 190,000 ppb at 1.5' to 74,000 at 6' and were not detected in the ground water at 7'. The relative absence of VOC's in Area 3 may indicate that VOC's were either never very concentrated or that they have been nearly completely flushed from the waste. Logs of test pits G-11-9 and SP-3-8 are presented as Figures 2.1-8 and 2.1-9. Based on these data, Area 3 is not considered a major source for VOC's found in ground water on-site.

2.2 WASTE OR SOIL/WASTE AREA 4.

2.2.1 Purpose and Methods

A fourth waste area was identified in the December 1983 NAI report. At that time, waste materials in Area 4 (see Figure 2.1-1) appeared very similar to those in Area 3 (rusted cuttings, etc.). However, unlike Areas 1, 2 and 3, VOC's were not detected in Area 4. However 4,000 ppb of phenanthrene, a base/neutral compound, were detected. In order to assess the leachability of phenanthrene and other base/neutral compounds, ground water was collected from monitoring well M-1b on May 11, 1984 and analyzed by GC/MS for organic base/neutral compounds. M-1b is located roughly 100 feet downgradient of Area 4.

2.2.2 Results

The ground water samples were tested for a total of 56 organic base/neutral compounds, none of which were detected (detection limits of 10 to 25 ppb). These results indicate that base/neutral compounds in Area 4 do not pose a significant threat to the ground water. Therefore, Area 4 is not considered as a significant source of contaminants to the ground water.

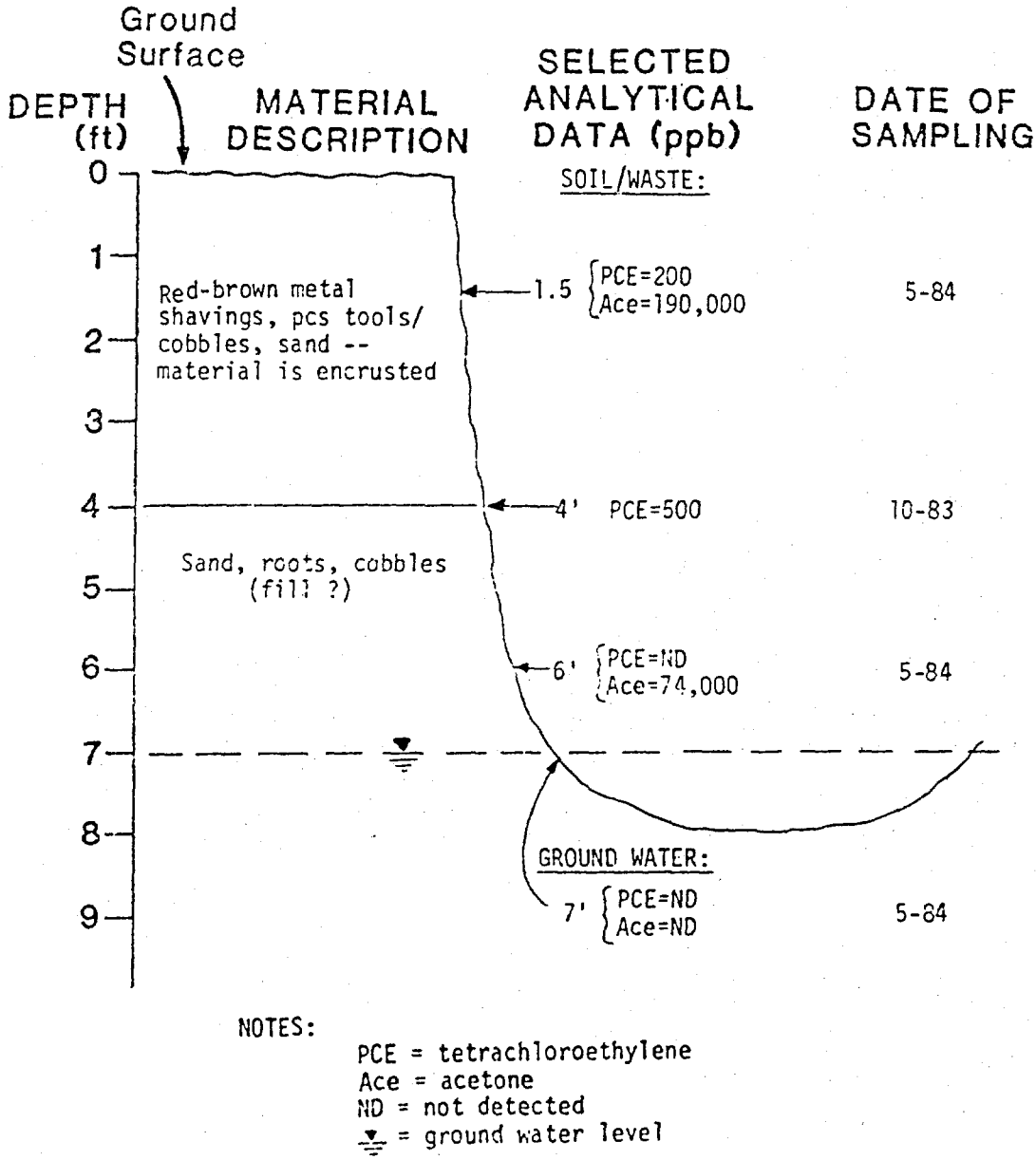
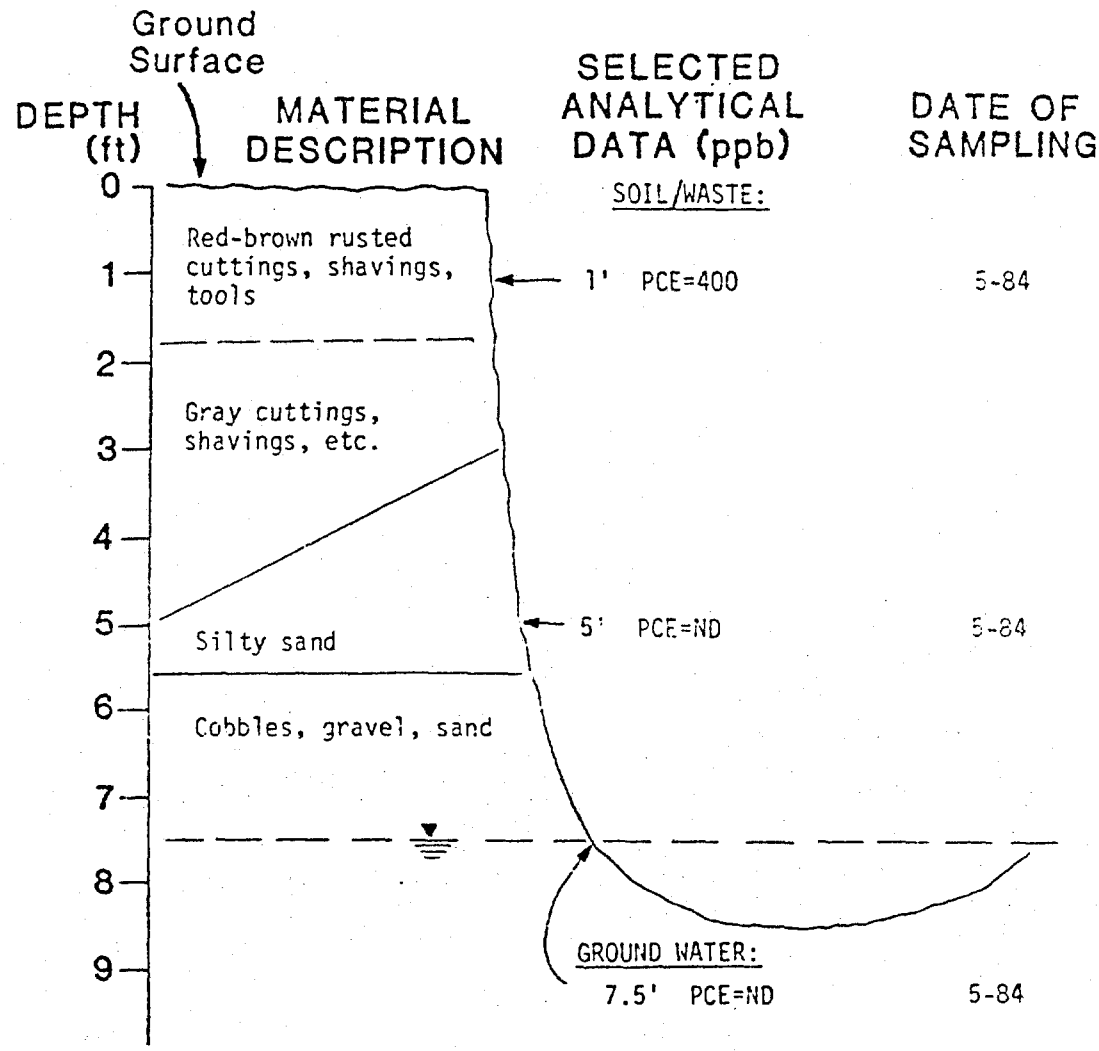


Figure 2.1-8. General log of test-pit SP-3-8 and selected analytical data for soil/waste and ground water samples. O.K. Tool Company Report, November 1984.



NOTES:

PCE = tetrachloroethylene

ND = not detected

▼ = ground water level

Figure 2.1-9. General log of test-pit G-11-9 and selected analytical data for soil/waste and ground water samples. O.K. Tool Company Report, November 1984.

2.3 STAINED SOIL IN VICINITY OF OUTDOOR "PERC" STORAGE TANK

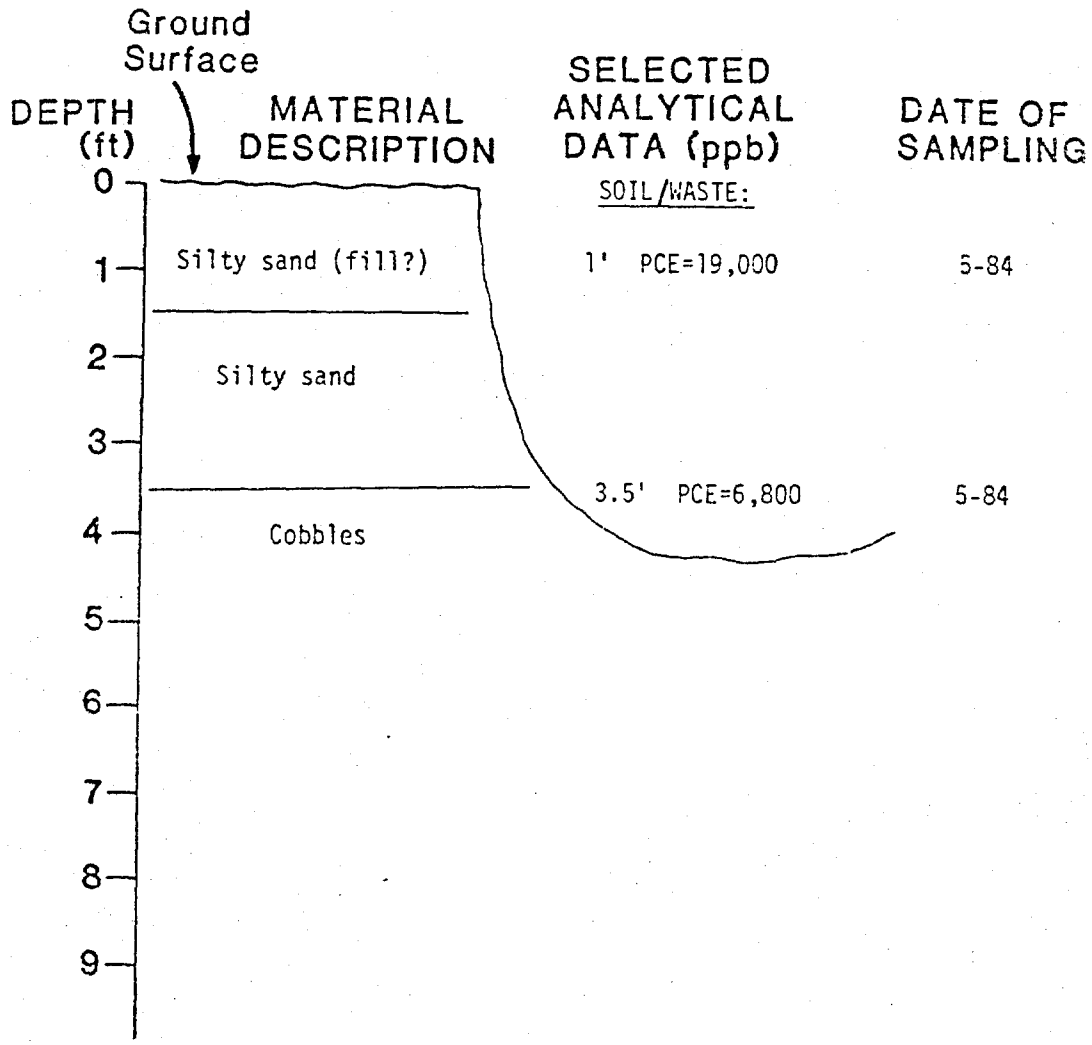
2.3.1 Purpose and Methods

As previously stated, the purpose of investigating the area of the outdoor "Perc" storage tank was to assess the vertical distribution of VOC's at this location. Because of the closeness of the pavement and building to the tank, a backhoe could not be used to excavate this area (See Figure 2.1-1). Further, digging with a backhoe could have resulted in undermining the storage tank. Thus, a single hole was excavated with hand shovels and augers, and was terminated on cobbles buried at a depth of roughly 4'. Three soil samples were obtained and two were analyzed for VOC's.

2.3.2 Results

Soils found at the base of the "Perc" tank were stained and slightly odorous. The test hole penetrated mostly sandy fill material until it reached cobbles at 4' (See Figure 2.3-1). HNu readings from soil did not exceed 30 ppm.

Only PCE (up to 19,000 ppb) and methylene chloride (up to 500 ppb) were identified in soils adjacent to the tank. PCE concentrations declined from 19,000 ppb at 1' depth to 6,800 at 3.5' depth, similar to trends observed at most other excavation locations. Methylene chloride, detected at a concentration of 500 ppb at 1' depth, was not found in the deeper sample but is occasionally found in samples at this concentration due to its use as a cleaning agent for sample bottles. Based on these data and the size of the affected area, the outdoor "perc" tank is not considered to be a significant source of VOC's found in ground water.



NOTE: PCE = tetrachloroethylene

Figure 2.3-1. General log of test-pit at outdoor "PERC" storage tank and selected analytical data for soil samples O.K. Tool Company Report, November 1984.

2.4 ABANDONED WELL

2.4.1 Purpose and Methods

During previous investigations, both the State of New Hampshire Water Supply and Pollution Control Commission (WSPCC) and NAI identified an abandoned well located inside the O.K. Tool plant as a potential source of VOC's in ground water (See Figure 2.1-1). A further investigation of the well was performed on May 8, 1984 with the intention of obtaining water samples at various depths and bottom sediment samples, if possible. However, incremental water sampling proved to be impractical, as the well was found to be only about five feet in depth. For this reason, a water sample was obtained from the bottom of the well with a peristaltic pump. Bottom sediment could not be retrieved using a clam-shell type apparatus or a hand auger. When using the auger as a probe, it was found that the well bottom appeared to be concrete with little or no sediment present.

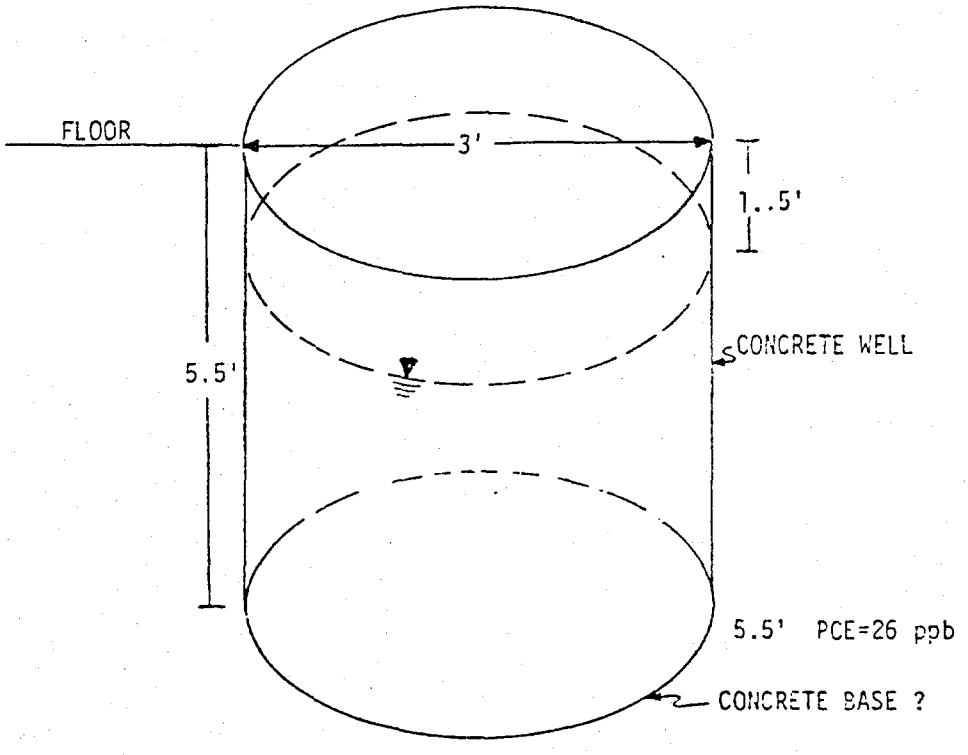
2.4.2 Results

Laboratory GC/MS testing for VOC's showed that the only VOC present in water at the bottom of the well (5.5') was PCE at a level of 26 ppb (Figure 2.4-1). This low level of VOC's indicates that the well does not appear to be a source of VOC's to ground water. Furthermore, it is uncertain whether the well is in direct communication with the groundwater or whether it acts as a sump, containing the liquids in it.

2.5 FLOOR DRAIN AREA

2.5.1 Review of Previous Evaluation

NAI explored soils in the areas of the floor drain (Holes A, B, and C; See Figures 2.1-1 and 2.5-1) adjacent to the indoor "Perc" tank in September 1983. At that time, the soil appeared to be stained



Notes: PCE= tetrachloroethlene
▼ = ground water level

Figure 2.4-1. General log of abandoned well and selected analytical data for water sample. O.K. Tool Company Report, November 1984.

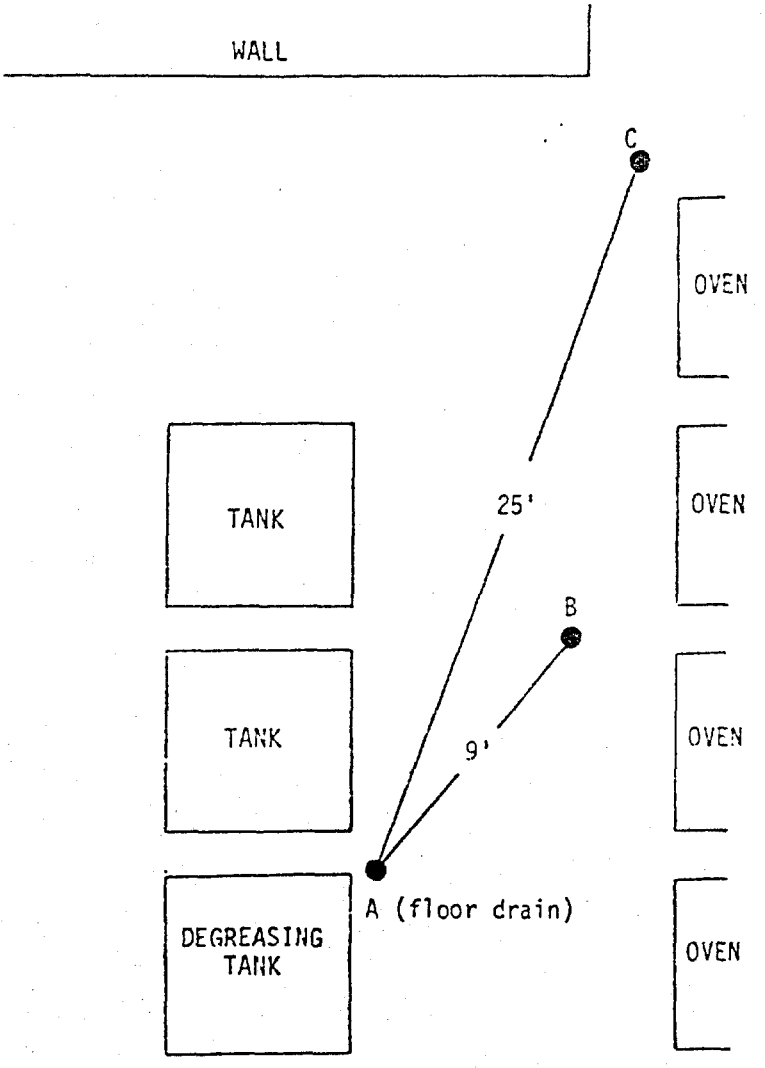


Figure 2.5-1. Location of test holes in the vicinity of the degreasing tank in the main plant building. O.K. Tool Company Report, November 1984.

within a few inches of the surface, but was otherwise dry and powdery. Maximum HNu and OVA readings for soils obtained from the floor drain (Hole A) were 300 ppm, and >1000 ppm, respectively. Laboratory GC/MS testing indicated concentrations of up to 300,000 ppb PCE in soils from Hole A (Table 2.5-1).

Because of the cobbley material encountered in the floor drain (Hole A), the hole was terminated at roughly 2'. Since both the area in the vicinity of test pit D-20-1 and the floor drain apparently received discharges of liquids containing primarily PCE, one may gain some insight into the vertical distribution of VOC's under the floor drain by comparing it with test-pit D-20-1.

Based on ground water flow patterns observed at the site and the analytical data resulting from the initial and Phase II investigations, the floor drain area was considered to be the most significant source of VOC's detected in ground water samples from monitoring wells M-6, M-5a, M-5b, M-4 and possibly, M-3. Additionally, it was believed that soil in this area contained the largest amount (by weight) of PCE on the OK Tool property, and thus, was the most significant single on-site contributor of PCE to the ground water.

Based on these findings, OK Tool developed and implemented a remedial program for the floor drain area to minimize the impacts of the area on the ground water. The elements of the remedial program consisted of closure and removal of the degreasing tank containing the PCE, removal of the concrete floor in the floor drain area, and excavation of a 9-foot by 9-foot hole down to the water table to remove as great an amount of affected soil as possible. Excavation of a larger area was considered and rejected as the larger excavation would have threatened the structural integrity of the plant building. The elements of the remedial program, methodology of the remedial activities, and the proposed sampling program were reviewed with the appropriate state agencies prior to implementation.

The floor drain remedial program was initiated and completed in August 1984 and resulted in the removal of approximately 30-cubic yards of affected soil from the subject area. The removal of this soil was a significant contaminant source control measure and will result in depressed PCE levels in the ground water. A report describing the activities and results of this program is scheduled for completion later this month.

TABLE 2.5-1. RESULTS OF THE SUBFLOOR SOIL TESTS CONDUCTED ON SEPTEMBER 14 AND 15, 1983.

HOLE	SOIL TYPE	DEPTH	MAX OVA (ppm)	MAX HNu (ppm)	SAMPLE NUMBER	RESULTS (PPB) TETRACHLOROETHYLENE	TRICHLOROETHYLENE	1,1,1-TRICHLOROETHANE
A	Fill-fine sand, silt, gravel, cobbles, yellow to buff	1-2 inches	9	10-30	A1	12,000	TR	TR
	Same	2 feet	>1000	300	A2	300,000	TR	TR
B	Fill-fine sand silt, gravel cobbles, medium brown	1-2 inches	6	10-15	B1	28,000	-	TR
	Same	1 foot 6 inches	24	10-15	B2	3,400	-	TR
C	Fill-fine to medium sand, cobbles, medium brown	1-2 inches	--	0	C1	1,900	-	-
	Same	2 feet	--	4	C2	4,200	-	TR

TR = Trace

3.0 SUMMARY

3.1 CONCLUSIONS

1. Four potential significant source areas for volatile organic chemicals have been identified at the OK Tool site. Apparently, the sole potential indoor source of VOC's is the drain near the degreasing tank. The three outside areas include stained soils in Area 1, stained soils, sludges and other wastes in Area 2, and stained soil beneath the "Perc" (PCE) storage tank. PCE is the prevalent VOC on-site.

2. Area 1 contains concentrations of up to 1,100 ppm of PCE in unsaturated soil (7 feet thick). Concentrations are reasonably uniform in the vertical dimension.

3. The southern portion of Area 2 contains a 3-foot-thick layer of stained soil, sludges and other wastes all of which occur at the surface. Concentrations of VOC's (up to 21 ppm of PCE) drop off in unsaturated soils beneath the waste layer.

4. The northern portion of Area 2 contains a layer of stained soil, roughly 1 foot thick, which may have resulted from displacement of soil/waste originating from the southern portion of Area 2 by means of a plow. Low concentrations of VOC's (<0.3 ppm of PCE) are found in the northern portion of Area 2.

5. The small western portion of Area 2 includes stained soil and other multicolored wastes in layers to a depth of roughly 2.5'. Concentrations of VOC's in the waste layers (220 ppm of PCE) exceed those found in underlying unsaturated soils by a factor of greater than 10.

6. Concentrations of PCE in unsaturated soils beneath the "Perc" storage tank are highest at the surface (19 ppm). Due to the limited size of the area and the decline of PCE concentration with depth, the soil beneath the "Perc" storage tank is considered to be a minimal source of VOC's to the ground water.

7. The indoor floor drain was identified as the most likely major source of VOC's found in the ground water. Up to 300 ppm of PCE have been found in soil at this location. A remedial source control program was completed by OK Tool at the floor drain area in August 1984 to remove as great a volume of affected soil from the area as was technically feasible. This action significantly reduced the role of the area as a source of PCE to the ground water.

8. Area 3 and the abandoned well inside the building are considered to be insignificant contributors of PCE to ground water.

9. Area 4 is not a source of VOC's nor is it an important source of organic base/neutral compounds.

APPENDIX A

ANALYTICAL RESULTS - ANALYSES FOR VOLATILE ORGANIC COMPOUNDS IN SOIL/WASTE AND WATER BY RESOURCE ANALYSTS, INC. (RAI), HAMPTON, NEW HAMPSHIRE

RAI

Resource Analysts, Incorporate
Box 4778 Hampton, NH 0384
(603) 926-777

TO:

Mr. Doug DeNatale
Normandeau Associates
25 Nashua Road
Bedford, NH 03106

PO # 830739

Date Received: 5-10-84

Lab Number: 3381

Date Reported: 5-29-84

IDENTIFICATION

Water and Soil Samples from OK Tool

PARAMETER	SAMPLE DESIGNATION

please see attached

Robert E. Moore
ANALYST

DIRECTOR

RAI

Resource Analysts, Incorporate
Box 4778 Hampton, NH 038
(603) 926-77

VOLATILE PRIORITY POLLUTANT DETERMINATION

Lab No. 3381 Analyst REM Date Analyzed 17 May 1984

EPA Method 624 [x] ASTM Method D 3781-79 [ ]

	SAMPLE DESIGNATION			
	D-20-1 4'	D-20-1 7'	E-18-3 1.0'	E-18-3 3'
Acrolein				
Acrylonitrile				
Benzene				
Bromoform				
Carbon Tetrachloride				
Chlorobenzene				
Chlorodibromomethane				
Chloroethane				
2-Chloroethylvinylether				
Chloroform				
Dichlorobromomethane				
Dichlorodifluoromethane				
1,1-Dichloroethane				
1,2-Dichloroethane				
1,1-Dichloroethylene				
1,2-Dichloropropane				
1,3-Dichloropropylene				
Ethylbenzene	Trace	Trace	Trace	
Methyl bromide				
Methyl chloride				
Methylene chloride				
1,1,2,2-Tetrachloroethane				
Tetrachloroethylene	1100	1100	3.6	2.1
Toluene				
1,2-trans-Dichloroethylene		0.7	1.0	0.2
1,1,1-Trichloroethane				
1,1,2-Trichloroethane				
Trichloroethylene	Trace	0.4		
Trichlorofluoromethane				
Vinyl chloride				
Method Detection Limit:	0.2 ug/g	0.2 ug/g	0.2 ug/g	0.2 ug/g
Acetone				
MEK				
MIBK				
Xylenes	0.8	1.0	1.6	

NOTES: Sample preperation and workup as per SW 846 Methods 5030. All results are expre as ug/g. No entry denotes "not detected".

RAI

Resource Analysts, Incorp
Box 4778 Hampton, N
(603) 9

VOLATILE PRIORITY POLLUTANT DETERMINATION

Lab No. 3381 Analyst REM Date Analyzed 18 May 1984

EPA Method 624 [X] ASTM Method D 3781-79 [ ]

	SAMPLE DESIGNATION			
	E-18-3 6'	E-17-4 1'	E-17-4 4'	E-16-5
Acrolein				
Acrylonitrile				
Benzene				
Bromoform				
Carbon Tetrachloride				
Chlorobenzene				
Chlorodibromomethane				
Chloroethane				
2-Chloroethylvinylether				
Chloroform				
Dichlorobromomethane				
Dichlorodifluoromethane				
1,1-Dichloroethane				
1,2-Dichloroethane				
1,1-Dichloroethylene				
1,2-Dichloropropane				
1,3-Dichloropropylene				
Ethylbenzene				
Methyl bromide				
Methyl chloride				
Methylene chloride				
1,1,2,2-Tetrachloroethane				
Tetrachloroethylene	0.4	1.5	Trace	21
Toluene				
1,2-trans-Dichloroethylene	Trace	29	0.9	
1,1,1-Trichloroethane				
1,1,2-Trichloroethane				
Trichloroethylene		0.4	Trace	Trace
Trichlorofluoromethane				
Vinyl chloride				
Method Detection Limit:	0.2 ug/g	0.2 ug/g	0.2 ug/g	0.2 u
Acetone				
MEK				
MIBK				
Xylenes		0.2		

NOTES: Sample preperation and workup as per SW 846 Method 5030. All results are exp as ug/g. No entry denotes "not detected".

RAI

Resource Analysts, Incorpor
Box 4778 Hampton, NH
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VOLATILE PRIORITY POLLUTANT DETERMINATION

Lab No. 3381 Analyst REM Date Analyzed 22 May 1984

EPA Method 624 [X] ASTM Method D 3781-79 [ ]

	SAMPLE DESIGNATION			
	SP-3-8 1.5'	SP-3-8 6'	D-17-6 1'	D-17-6 3.
Acrolein				
Acrylonitrile				
Benzene				
Bromoform				
Carbon Tetrachloride				
Chlorobenzene				
Chlorodibromomethane				
Chloroethane				
2-Chloroethylvinylether				
Chloroform				
Dichlorobromomethane				
Dichlorodifluoromethane				
1,1-Dichloroethane				
1,2-Dichloroethane				
1,1-Dichloroethylene				
1,2-Dichloropropane				
1,3-Dichloropropylene				
Ethylbenzene				
Methyl bromide				
Methyl chloride				
Methylene chloride				
1,1,2,2-Tetrachloroethane				
Tetrachloroethylene	0.2		0.3	Trace
Toluene				
1,2-trans-Dichloroethylene				
1,1,1-Trichloroethane				
1,1,2-Trichloroethane				
Trichloroethylene				
Trichlorofluoromethane				
Vinyl chloride				
Method Detection Limit:	0.2 ug/g	0.2 ug/g	0.2 ug/g	0.2 ug/g
Acetone	190	74		
MEK				
MIBK				
Xylenes				

NOTES: Sample preperation and workup as per SW 846 Method 5030. All results are expres as ug/g. No entry denotes "not detected".

RAI

Resource Analysts, Incorporate
Box 4778 Hampton, NH 038
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VOLATILE PRIORITY POLLUTANT DETERMINATION

Lab No. 3381 Analyst BEM Date Analyzed 22 May 1984

EPA Method 624 [X] ASTM Method D 3781-79 [ ]

	SAMPLE DESIGNATION			
	E-16-5 4'	F-14-7 1'	F-14-7 7'	F-14-7 8'
Acrolein				
Acrylonitrile				
Benzene				
Bromoform				
Carbon Tetrachloride				
Chlorobenzene				
Chlorodibromomethane				
Chloroethane				
2-Chloroethylvinylether				
Chloroform				
Dichlorobromomethane				
Dichlorodifluoromethane				
1,1-Dichloroethane				
1,2-Dichloroethane				
1,1-Dichloroethylene				
1,2-Dichloropropane				
1,3-Dichloropropylene				
Ethylbenzene		3.5		
Methyl bromide				
Methyl chloride				
Methylene chloride				
1,1,2,2-Tetrachloroethane				
Tetrachloroethylene	19	220	18	12
Toluene		11		
1,2-trans-Dichloroethylene		4.8	Trace	
1,1,1-Trichloroethane				
1,1,2-Trichloroethane				
Trichloroethylene	Trace	5.2	Trace	
Trichlorofluoromethane				
Vinyl chloride				
Method Detection Limit:	0.2 ug/g	0.2 ug/g	0.2 ug/g	0.2 ug/g
Acetone				
MEK				
MIBK				
Xylenes		270		

NOTES: Sample preperation and workup as per SW 846 Method 5030. All results are expre as ug/g. No entry denotes "not detected".

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Resource Analysts, Incorporat
Box 4778 Hampton, NH 03
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VOLATILE PRIORITY POLLUTANT DETERMINATION

Lab No. 3381 Analyst REM Date Analyzed 23 May 1984

EPA Method 624 [X] ASTM Method D 3781-79 [ ]

	SAMPLE DESIGNATION			
	G-11-9 1'	G-11-9 5'	Perc 1.0'	Perc 3.5'
Acrolein				
Acrylonitrile				
Benzene				
Bromoform				
Carbon Tetrachloride				
Chlorobenzene				
Chlorodibromomethane				
Chloroethane				
2-Chloroethylvinylether				
Chloroform				
Dichlorobromomethane				
Dichlorodifluoromethane				
1,1-Dichloroethane				
1,2-Dichloroethane				
1,1-Dichloroethylene				
1,2-Dichloropropane				
1,3-Dichloropropylene				
Ethylbenzene				
Methyl bromide				
Methyl chloride				
Methylene chloride			0.5	
1,1,2,2-Tetrachloroethane				
Tetrachloroethylene	0.4		19	6.8
Toluene				
1,2-trans-Dichloroethylene				
1,1,1-Trichloroethane				
1,1,2-Trichloroethane				
Trichloroethylene				
Trichlorofluoromethane				
Vinyl chloride				
Method Detection Limit:	0.2 ug/g	0.2 ug/g	0.2 ug/g	0.2 ug/g
Acetone				
MEK				
MIBK				
Xylenes				

NOTES: Sample preperation and workup as per SW 846 Method 5030. All results are expr as ug/g. No entry dnotes "not detected".

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Resource Analysts, Incorporat
Box 4778 Hampton, NH 03
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VOLATILE PRIORITY POLLUTANT DETERMINATION

Lab No. 3381 Analyst REM Date Analyzed 23 May 1984

EPA Method 624 [X] ASTM Method D 3781-79 [ ]

	SAMPLE DESIGNATION			
	Perc 3.5' lab replicate			
Acrolein				
Acrylonitrile				
Benzene				
Bromoform				
Carbon Tetrachloride				
Chlorobenzene				
Chlorodibromomethane				
Chloroethane				
2-Chloroethylvinylether				
Chloroform				
Dichlorobromomethane				
Dichlorodifluoromethane				
1,1-Dichloroethane				
1,2-Dichloroethane				
1,1-Dichloroethylene				
1,2-Dichloropropane				
1,3-Dichloropropylene				
Ethylbenzene				
Methyl bromide				
Methyl chloride				
Methylene chloride				
1,1,2,2-Tetrachloroethane				
Tetrachloroethylene	6.4			
Toluene				
1,2-trans-Dichloroethylene				
1,1,1-Trichloroethane				
1,1,2-Trichloroethane				
Trichloroethylene				
Trichlorofluoromethane				
Vinyl chloride				
Method Detection Limit:	0.2 ug/g			

NOTES: Sample preperation and workup as per SW 646 Method 5030. All results are expres ug/g. No entry denotes :not detected".

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Resource Analysts, Incorporate
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VOLATILE PRIORITY POLLUTANT DETERMINATION

Lab No. 3381 Analyst REM Date Analyzed 22 May 1984

EPA Method 624 [X] ASTM Method D 3781-79 [ ]

	SAMPLE DESIGNATION			
	D-20-1 7.5'	E-18-3 7'	E-16-5 6'	SP-3-8 7'
Acrolein				
Acrylonitrile				
Benzene				
Bromoform				
Carbon Tetrachloride				
Chlorobenzene				
Chlorodibromomethane				
Chloroethane				
2-Chloroethylvinylether				
Chloroform				
Dichlorobromomethane				
Dichlorodifluoromethane				
1,1-Dichloroethane				
1,2-Dichloroethane				
1,1-Dichloroethylene		[illegible]		
1,2-Dichloropropane				
1,3-Dichloropropylene				
Ethylbenzene		10		
Methyl bromide				
Methyl chloride				
Methylene chloride				
1,1,2,2-Tetrachloroethane				
Tetrachloroethylene	46,000	240	1800	
Toluene		Trace		
1,2-trans-Dichloroethylene	5,400	21,000		
1,1,1-Trichloroethane	130			
1,1,2-Trichloroethane				
Trichloroethylene	560	210	60	
Trichlorofluoromethane				
Vinyl chloride				
Method Detection Limit:	500 ug/L	10 ug/L	50 ug/L	5 ug/L
Acetone				
MEK				
MIBK				
Xylenes				

NOTES: All results are expressed as ug/L. No entry denotes "not detected".

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Resource Analysts, Incorporat
Box 4778 Hampton, NH 03
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VOLATILE PRIORITY POLLUTANT DETERMINATION

Lab No. 3381 Analyst REM Date Analyzed 23 May 1984

EPA Method 624 [X] ASTM Method D 3781-79 [ ]

	SAMPLE DESIGNATION			
	A Well B 5.5'	D-17-6 7'	G-11-9 7.5'	
Acrolein				
Acrylonitrile				
Benzene				
Bromoform				
Carbon Tetrachloride				
Chlorobenzene				
Chlorodibromomethane				
Chloroethane				
2-Chloroethylvinylether				
Chloroform				
Dichlorobromomethane				
Dichlorodifluoromethane				
1,1-Dichloroethane				
1,2-Dichloroethane				
1,1-Dichloroethylene				
1,2-Dichloropropane				
1,3-Dichloropropylene				
Ethylbenzene				
Methyl bromide				
Methyl chloride				
Methylene chloride				
1,1,2,2-Tetrachloroethane				
Tetrachloroethylene	26	1100		
Toluene				
1,2-trans-Dichloroethylene		130		
1,1,1-Trichloroethane		32		
1,1,2-Trichloroethane				
Trichloroethylene		130		
Trichlorofluoromethane				
Vinyl chloride				
Method Detection Limit:	5 ug/L	10 ug/L	5 ug/L	
Acetone				
MEK				
MIBK				
Xylenes				

NOTES: All results are expressed as ug/L. No entry denotes "not detected".

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Resource Analysts, Incorporat
Box 4778 Hampton, NH 03
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VOLATILE PRIORITY POLLUTANT DETERMINATION

Lab No. 3381 Analyst REM Date Analyzed 22 MAY 1984

EPA Method 624 [X] ASTM Method D 3781-79 [ ]

	SAMPLE DESIGNATION			
	E-16-5 6' lab replicate			
Acrolein				
Acrylonitrile				
Benzene				
Bromoform				
Carbon Tetrachloride				
Chlorobenzene				
Chlorodibromomethane				
Chloroethane				
2-Chloroethylvinylether				
Chloroform				
Dichlorobromomethane				
Dichlorodifluoromethane				
1,1-Dichloroethane				
1,2-Dichloroethane				
1,1-Dichloroethylene				
1,2-Dichloropropane				
1,3-Dichloropropylene				
Ethylbenzene				
Methyl bromide				
Methyl chloride				
Methylene chloride				
1,1,2,2-Tetrachloroethane				
Tetrachloroethylene	2100			
Toluene				
1,2-trans-Dichloroethylene				
1,1,1-Trichloroethane				
1,1,2-Trichloroethane				
Trichloroethylene	60			
Trichlorofluoromethane				
Vinyl chloride				
Method Detection Limit:	50 ug/L			

NOTES: All results are expressed as ug/L. No entry denotes "not detected".

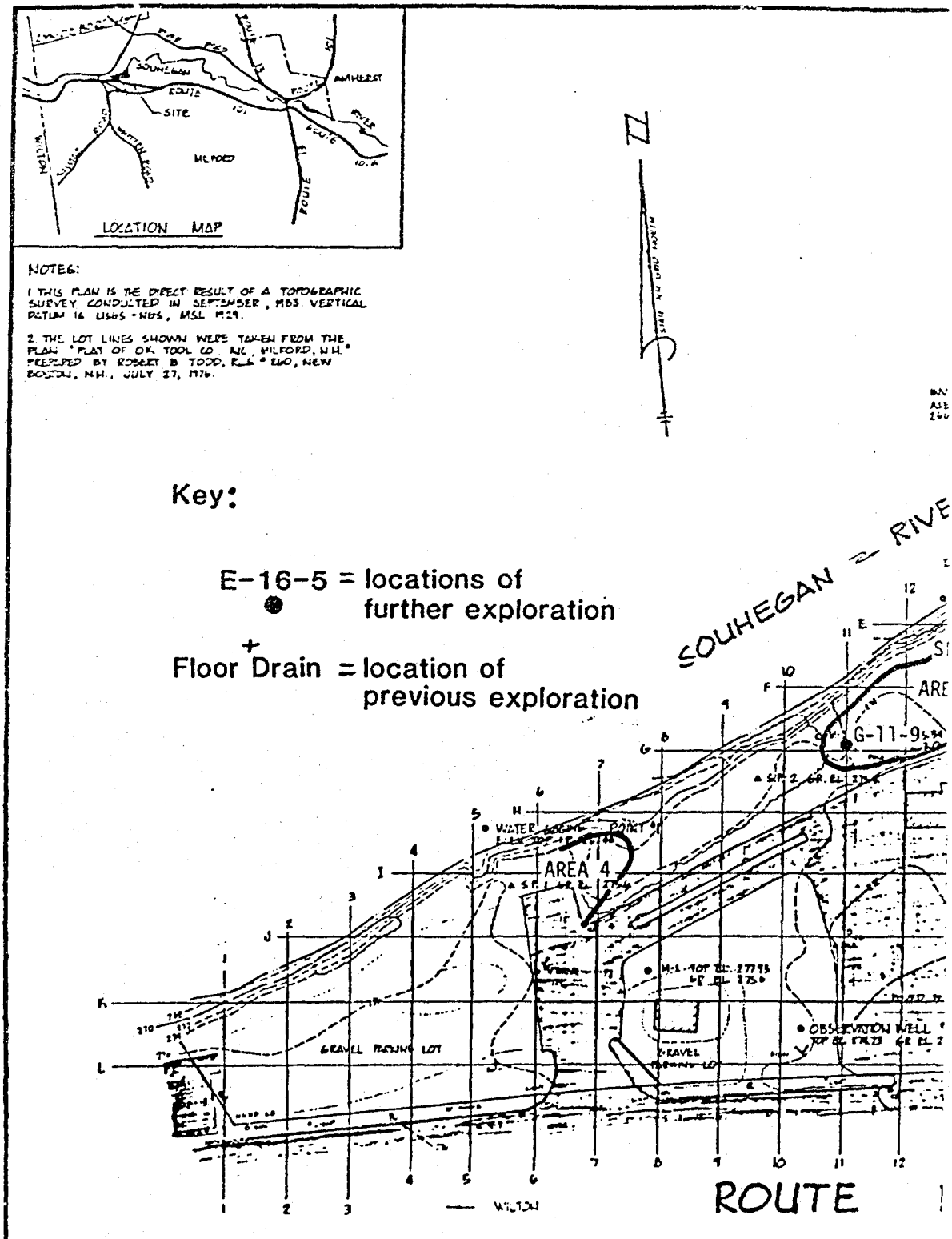
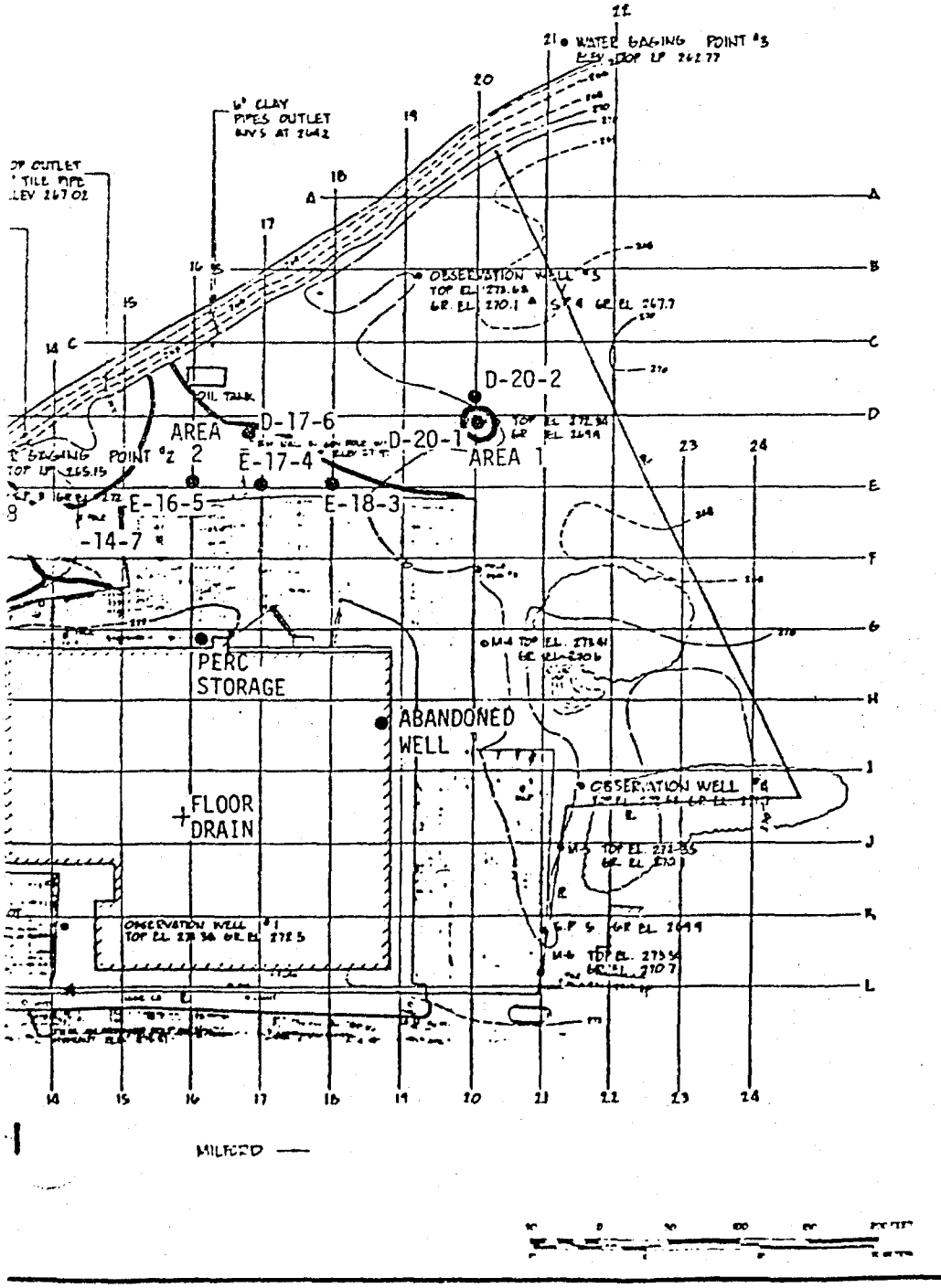


Figure 2.1-1. Exploration locations, further waste evaluation May 7 to May 9, 19



PREPARED BY:

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03102

TOPOGRAPHIC PLAN AND LOCATION OF SAMPLING POINTS
O.K. TOOL COMPANY INC., ROUTE 101, MILFORD, N.H.
SCALE 1" = 50'
OCTOBER, 1983