

HOFFER & ASSOCIATES

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December 8, 1997

Bruce Linton, Site Project Manager
Sites Management Section
VT ANR - DEC - Waste Management Division
103 South Main Street/West Office
Waterbury, Vermont 05671-0404

Re: Site Investigation of Heating-Oil Contamination
Common Ground Warehouse (Robert Houle), Hyde Park, Vermont
SMS Site #97-2192

Dear Bruce:

This letter documents a groundwater monitoring event performed at the Common Ground Warehouse site in Hyde Park (see Figures 1, 2, and 3). In accordance with your letter dated October 22, this monitoring event included analyzing samples from the four monitoring wells for BTEX and MTBE (EPA Method 8020), measuring groundwater elevations, and identifying the sources of drinking water for two downgradient residences.

GROUNDWATER ELEVATIONS AND FLOW DIRECTIONS

Water levels were measured in the four monitoring wells on November 19, 1997 (see Table 1). A thickness of 0.35 feet of floating free product (heating oil) was found in MW-1. Groundwater levels in the wells ranged from 0.10 feet below the top of casing (BTOC) in MW-2 to 2.98 feet BTOC in MW-1. These water levels were the highest levels measured since monitoring began in September 1997. Figure 4 provides a graph of water table fluctuations at the site.

Groundwater elevations indicate that groundwater is flowing radially northward away from the high area surrounding MW-1 (Figure 5).

GROUNDWATER QUALITY

Groundwater samples were collected from the four wells on November 19 and analyzed for benzene, toluene, ethylbenzene, xylenes (BTEX), and methyl-tert-butyl-ether (MTBE) by EPA Method 8020. Samples were retrieved from MW-2 and MW-3 using dedicated PVC bailers, and from MW-1 and MW-4 using a Waterra Inertial Pump™ system. Quality Assurance/Quality Control (QA/QC) samples included a trip blank, a field blank, and a field duplicate. The field duplicate was collected from MW-1 and labeled MW-100. The sampling event was recorded on a sampling sheet and a laboratory chain-of-custody, copies of which are enclosed.

The analytical results for November 19 are summarized on Table 2. Previous sampling results are included on Table 3. Dissolved BTEX constituents continue to be detected at relatively high concentrations in MW-1. The benzene concentration in MW-1 exceeds the Vermont Primary

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Groundwater Quality Enforcement Standard (GQES). Benzene was also detected in MW-2 at a concentration of 9 ug/L, which exceeds the GQES. Toluene was reported as "trace" in MW-2. BTEX compounds were not detected in either MW-3 or MW-4. Low concentrations of MTBE (2 and 9 ug/L) were found in the samples from MW-2 and MW-4. The source of MTBE is uncertain, but may have originated from vehicles that have leaked gasoline on the unpaved parking areas surrounding the wells.

For the QA/QC samples, no contaminants were detected in the trip or field blanks, and the results of the MW-1 duplicate sample were generally similar to the MW-1 sample results.

POTENTIAL RECEPTORS

As part of this sampling event, the location of the Choivin domestic well was identified. The well serving the Choivin residence is located immediately in front of the house, as indicated on Figure 2. No well was observed on the Hess property during the survey.

Although groundwater flow directions at the site have depicted radial flow away from the former UST, the regional flow pattern is presumed to be eastward based on surface topography. None of the nearby drilled bedrock wells (site well, Shackett, or Choivin) are directly east of the former UST. Based on the locations of these wells, and relatively small area groundwater contamination, none of these wells appear to be at high risk of being impacted. Nonetheless, it may be prudent to sample these wells at least once during future monitoring events.

CONCLUSIONS AND RECOMMENDATIONS

Groundwater samples collected on November 19 indicate that BTEX and MTBE contamination persists in shallow groundwater at the site. The highest BTEX concentrations remain in MW-1, and low levels of benzene and toluene were detected in MW-2. MTBE continues to be detected at low concentrations in MW-2 and MW-4. Water levels measured during the November 19 sampling event were at their highest level recorded for the site. The November 19 groundwater elevations define a radial groundwater flow direction originating from the release area.

Floating free product (heating oil) remains in monitoring well MW-1, and was present in greater thickness (0.35 feet) than previously observed.

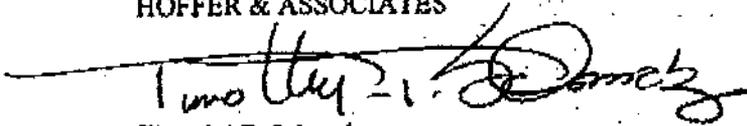
Due to the continued presence of free product in MW-1, we recommend taking action to recover free product. Given the shallow depths to groundwater at the site, we recommend using a backhoe to excavate and install a recovery trench between MW-1 and MW-2. Figure 6 illustrates the proposed location and schematic of the trench design. The trench will consist of a three-foot wide, five-foot deep excavation, lined with geotextile and backfilled with 1/4-inch washed stone. The stone will be capped with geotextile and topsoil. A four-inch PVC recovery well, consisting of 20-slot screen and riser pipe, will be set in the stone in order to facilitate product removal. Free product entering the trench will be bailed by hand on a weekly basis, until a definite pattern of free product recovery rates is established. After establishment of recovery rates, automated systems may be considered. The estimated costs to install the trench and site visits to recover product are given on Table 4.

Bruce Linton
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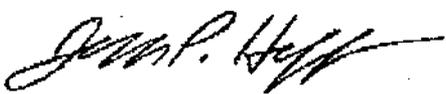
To monitor contaminant concentrations and distribution in site groundwater, we recommend continued quarterly groundwater monitoring. Groundwater monitoring will include measuring water levels in the four monitoring wells, and analyzing samples for BTEX compounds and MTBE using EPA method 8020. In addition, we recommend that the site bedrock well, Choivin well, and Shackett well be sampled and analyzed for BTEX and MTBE during the first quarter 1998 sampling event.

If you have any questions regarding this sampling event or these recommendations, please give us a call.

Sincerely,
HOFFER & ASSOCIATES



Timothy F. Schmalz
Project Geologist



Jefferson P. Hoffer, P.G.
Principal Hydrogeologist

enc.

cc: Robert Houle

TABLE 1
 Groundwater depths and elevations,
 Common Ground, Hyde Park, Vermont, SMS Site # 97-2192.

DEPTH TO WATER (feet below TOC)				
<i>Well ID</i>	<i>Elevation of TOC (feet)</i>	<i>9/15/97</i>	<i>10/3/97</i>	<i>11/19/97</i>
MW-1	98.34	4.34 (4.33 to FP)	3.12 (3.11 to FP)	2.98 (2.63 to FP)
MW-2	95.06	1.35	0.89	0.10
MW-3	95.46	2.42	0.99	0.49
MW-4	97.14	4.97	2.72	2.16
GROUNDWATER ELEVATIONS (feet)				
<i>WELL ID</i>	<i>Elevation of TOC (feet)</i>	<i>9/15/97</i>	<i>10/3/97</i>	<i>11/19/97</i>
MW-1	98.34	94.00	95.22	95.88 *
MW-2	95.06	93.71	94.17	94.96
MW-3	95.46	93.04	94.47	94.97
MW-4	97.14	92.17	94.42	94.98

Notes:

FP = Free Product

TOC = top of casing

Elevations are in feet relative to arbitrary reference elevation of 100.00 feet

* - corrected for free product

TABLE 2
 Groundwater sampling results for November 19, 1997,
 Common Ground, Hyde Park, Vermont, SMS Site # 97-2192.

<i>November 19, 1997 (results in ug/L)</i>					
WELL ID	EPA 8020 Benzene	EPA 8020 Toluene	EPA 8020 Ethylbenzene	EPA 8020 Xylenes	EPA 8020 MTBE
MW-1 / Duplicate	45 / 45	33 / 34	226 / 237	1060 / 1130	<20 / <20
MW-2	9	TRACE			2
MW-3	<1	<1			<1
MW-4	<1	<1			9
Field Blank	<1	<1			<1
Trip Blank	<1	<1			<1
REGULATORY THRESHOLDS					
VT Primary Groundwater Quality Enforcement Standard	5	1000	700	10000	40
VT Primary Groundwater Quality Preventative Action Level	0.5	500	350	5000	20

Notes:
 < 1 = below a detection level of 1
 202 / 158 = sample result / field duplicate result
 TRACE = detected below practical quantitation limit of 1 ug/L

TABLE 3
 Water quality summary,
 Common Ground, Hyde Park, Vermont, SMS Site # 97-2192.

WELL ID	DATE	EPA 8020 Benzene	EPA 8020 Toluene	EPA 8020 Ethylbenzene	EPA 8020 Xylenes	EPA 8020 MTBE	EPA 8100m TPH *	Depth to Depth to water (feet below TOC)
MW-1	15-Sep-97	202 / 158	< 100 / 49	216 / 232	783 / 943	< 100 / < 50	137,000	4.34
	19-Nov-97	45 / 45	33 / 34	226 / 237	1060 / 1130	20 / 20	not tested	2.98
MW-2	15-Sep-97	17	< 1	< 1	< 1	2	230	1.35
	19-Nov-97	9	TRACE	< 1	< 1	2	not tested	0.10
MW-3	15-Sep-97	< 1	< 1	< 1	< 1	< 1	13270	2.42
	19-Nov-97	< 1	< 1	< 1	< 1	< 1	not tested	0.49
MW-4	15-Sep-97	< 1	< 1	< 1	< 1	2	< 230	4.97
	19-Nov-97	< 1	< 1	< 1	< 1	9	not tested	2.16

Notes:

< 1 = below a detection level of 1

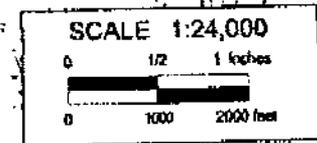
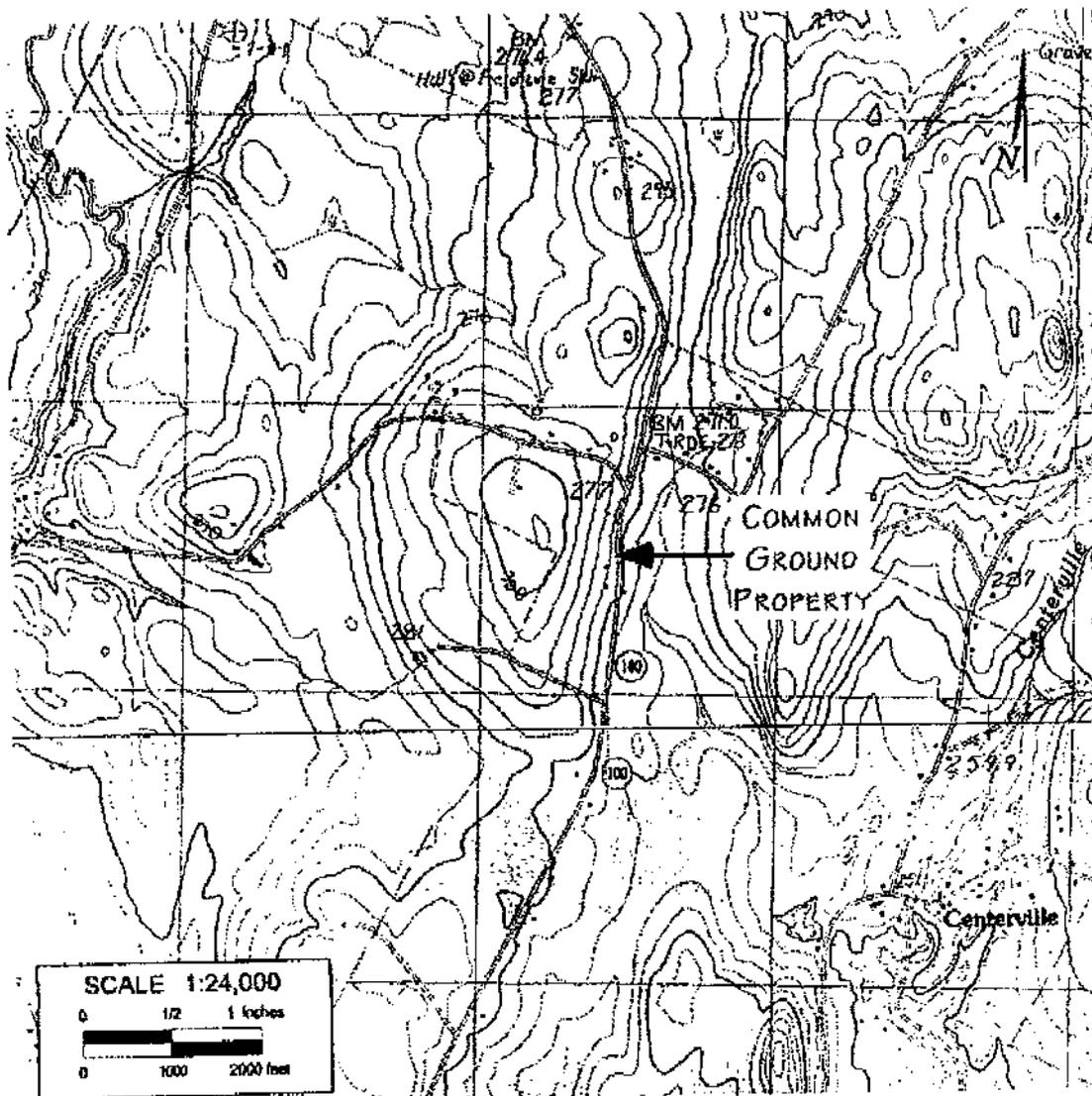
202 / 158 = sample result / field duplicate result

TRACE = detected below practical quantitation limit of 1 ug/L

* TPH quantified as Fuel Oil No. 2

TABLE 4
 Cost estimate for recovery trench installation and 1st quarter 1998 monitoring,
 Common Ground, Hyde Park, Vermont, SMS Site # 97-2192.

LABOR				
Task	Hours	Rate	Amount	
Trench installation	10.00	\$45.00	\$450.00	
Free product gauging and removal (4 hrs. weekly, 4 wks.)	16.00	\$45.00	\$720.00	
1st QTR 1998 Groundwater Sampling	6.00	\$45.00	\$270.00	
Data Tabulation/Figure Preparation/Report Generation	10.00	\$45.00	\$450.00	
			SUB-TOTAL LABOR \$1,890.00	
EXPENSES				
Expenses	Quantity	Rate	Mark Up	Amount
Mileage - Well installation	80	\$0.28	\$0.00	\$22.40
Mileage - Free Product Monitoring	320	\$0.28	\$0.00	\$89.60
Mileage - GW Sampling	80	\$0.28	\$0.00	\$22.40
Interface Probe rental	4	\$20.00	\$0.00	\$80.00
Trench Construction Materials (4" Screen, Gravel, Filter Fabric)		\$300.00	\$30.00	\$330.00
Excavator-Bruce Pepe				
Mobilization charge	1	\$50.00	\$0.00	\$50.00
Backhoe and Operator (hourly)	4	\$45.00	\$0.00	\$180.00
SCITEST Laboratory				
8020 Analyses for BTEX/MTBE (4 wells, 3 QA/QC, 3 domestic well)	8	\$55.00	\$0.00	\$440.00
			SUB-TOTAL EXPENSES \$1,214.40	
TOTAL ESTIMATED COST				\$3,104.40

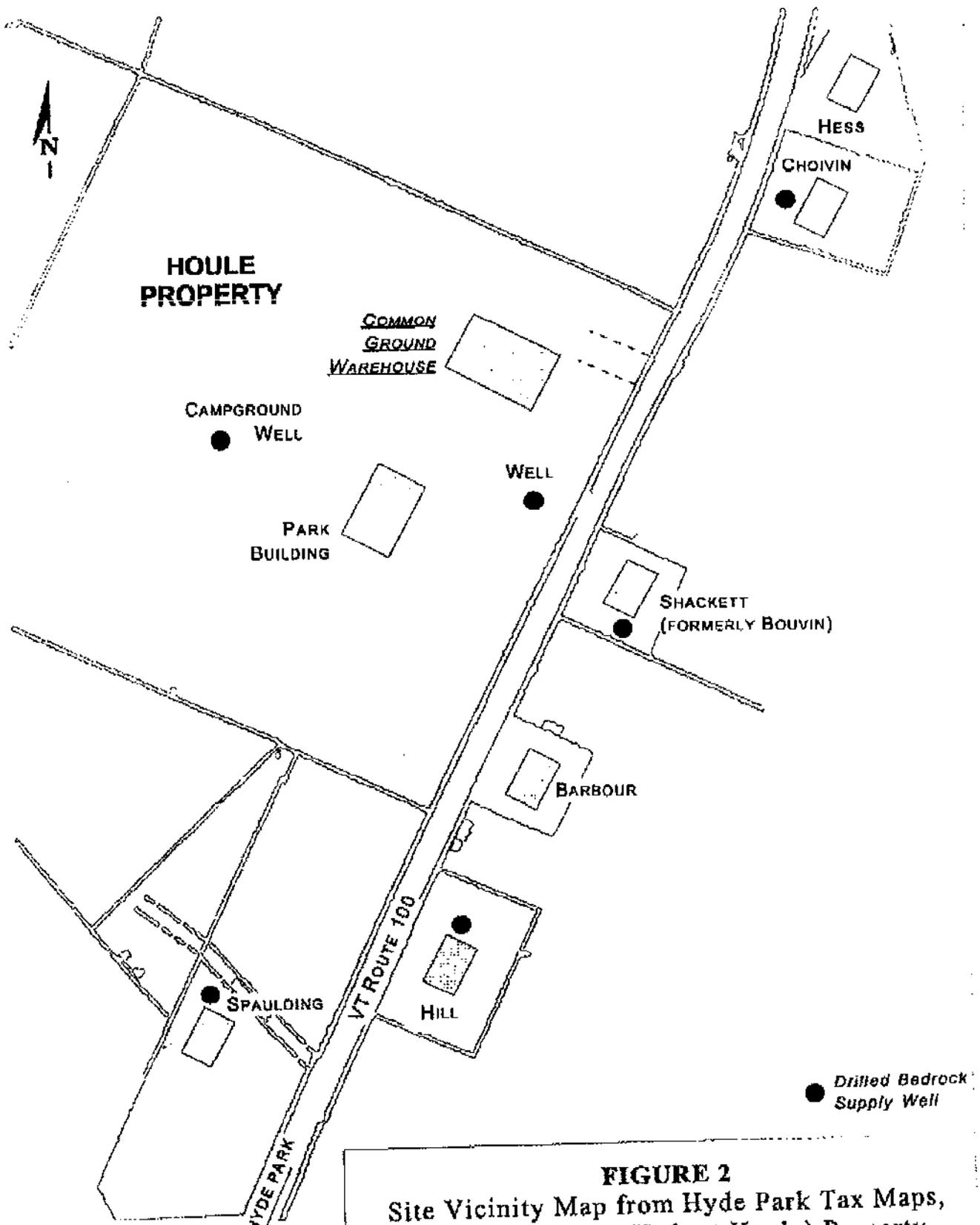


BASE FROM U.S. GEOLOGICAL SURVEY, 1:24,000;
 MORRISVILLE & EDEN QUADRANGLES.

FIGURE 1
 USGS Topographic Map,
 Common Ground (Robert Houle) Property,
 Hyde Park, Vermont, SMS Site # 97-2192.

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SCALE - 1:5000
 1 inch = 416.7 feet
 Building Locations Approximate

FIGURE 2
 Site Vicinity Map from Hyde Park Tax Maps,
 Common Ground (Robert Houle) Property,
 Hyde Park, Vermont, SMS Site # 97-2192.

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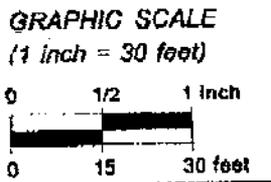
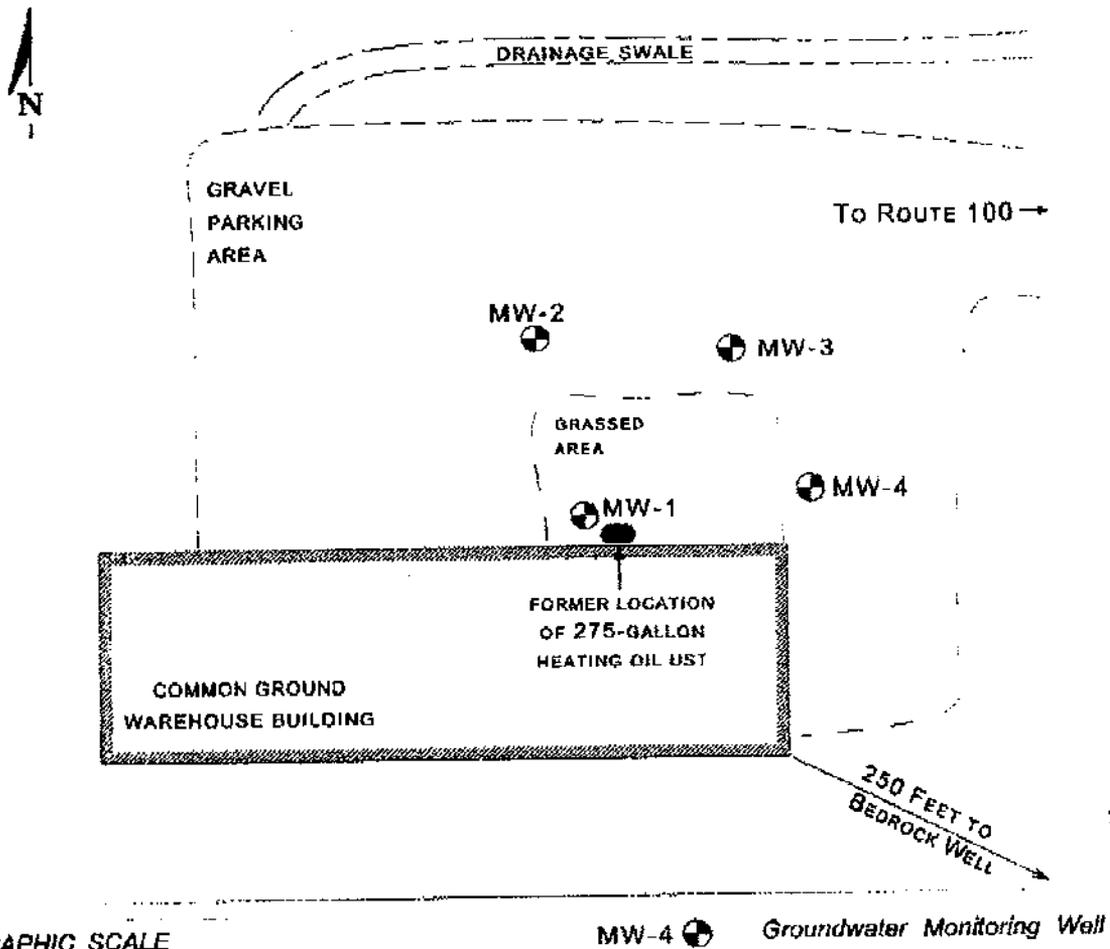


FIGURE 3
 Site Basemap, Common Ground (Robert Houle) Property,
 Hyde Park, Vermont, SMS Site # 97-2192.

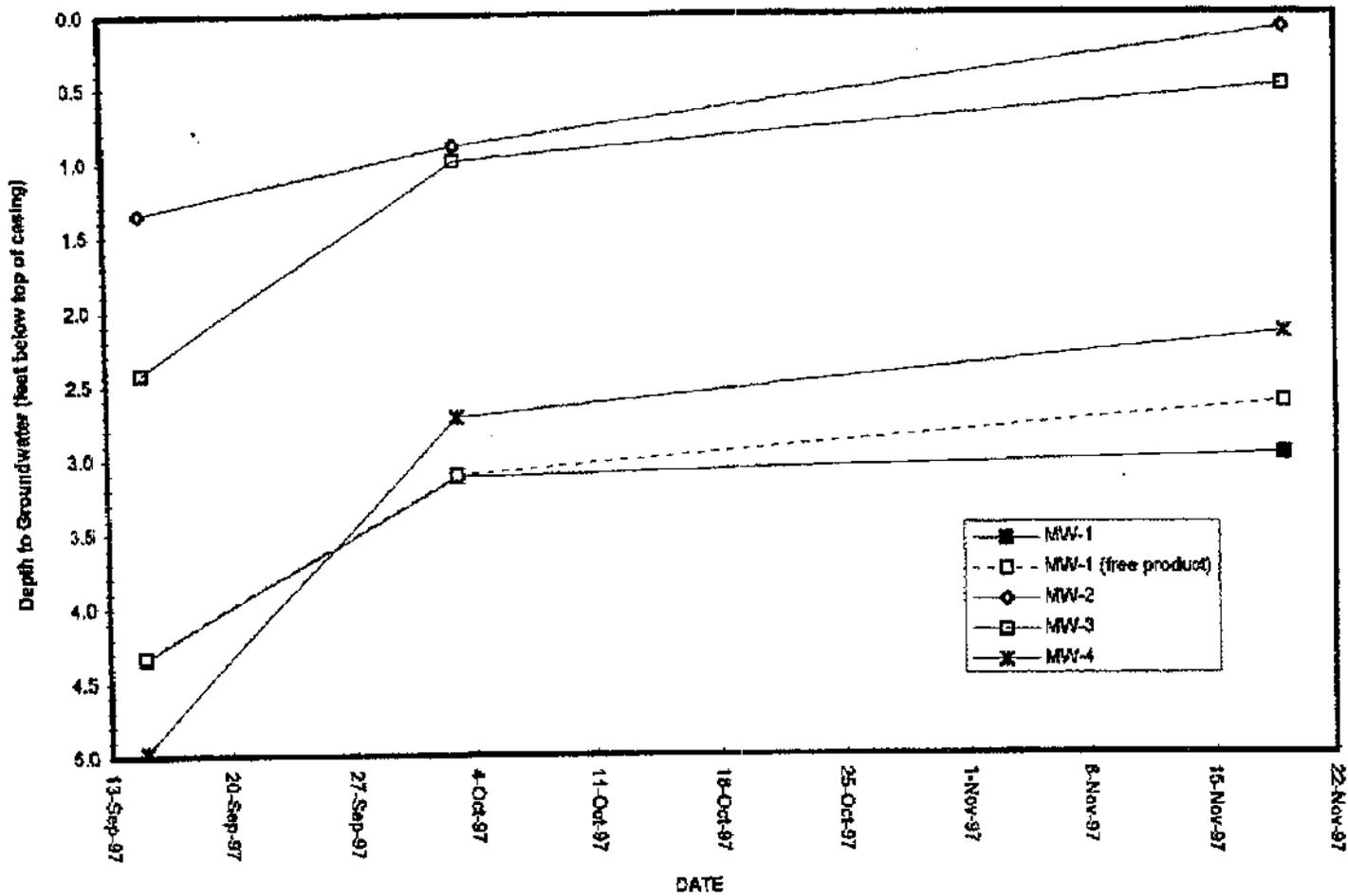
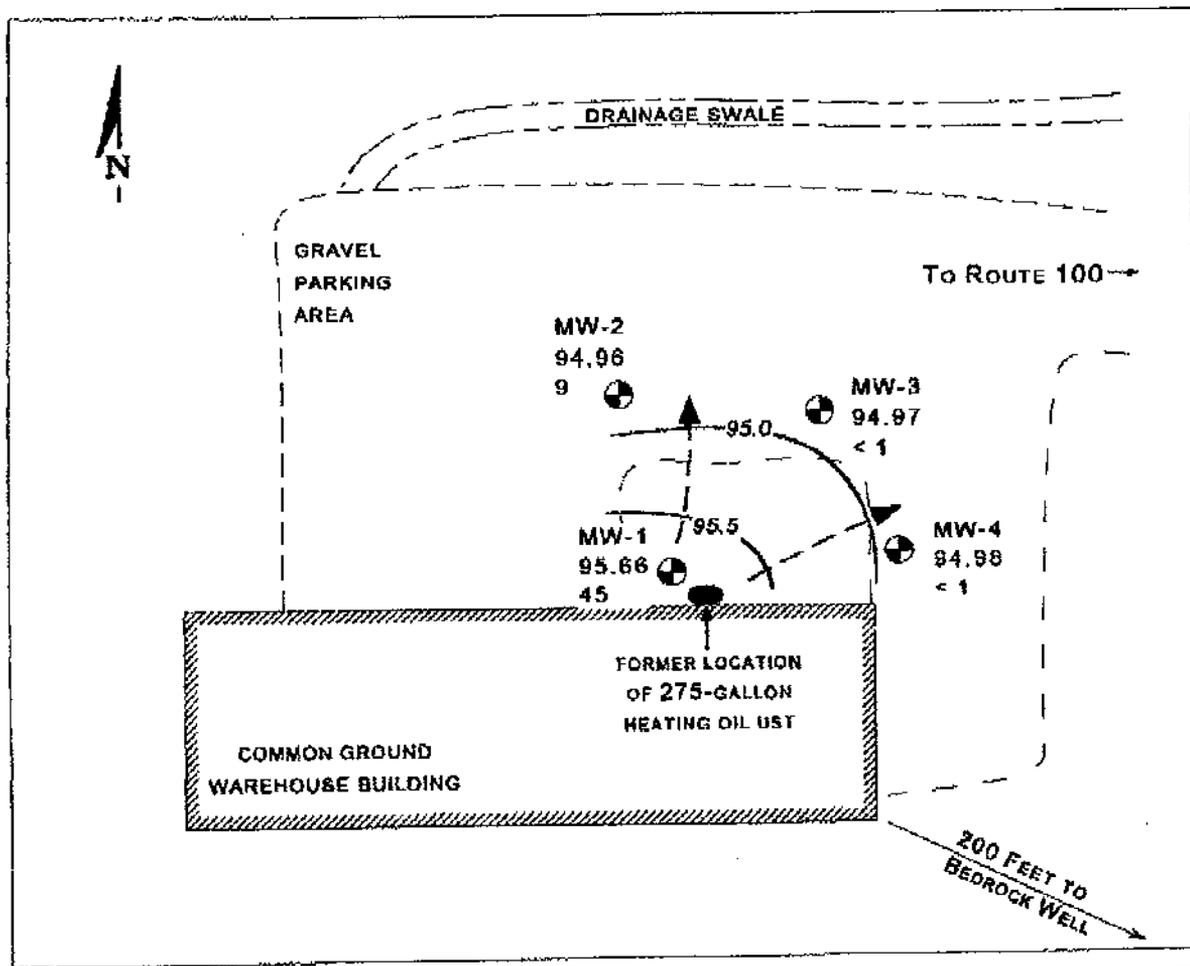


FIGURE 4
Groundwater elevation fluctuations,
Common Ground, Hyde Park, Vermont, SMS Site #97-2192.



- MW-2
94.96
9
 - MW-3
94.97
< 1
 - MW-1
95.66
45
 - MW-4
94.98
< 1
- Groundwater Monitoring Well with groundwater elevation (feet) and dissolved benzene (ug/L)
- Groundwater Elevation Contour (ft)
- Groundwater Flow Direction

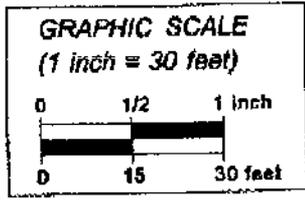


FIGURE 5
 Water-Table Map & Dissolved Benzene Distribution,
 November 19, 1997, Common Ground, Hyde Park, Vermont,
 SMS Site # 97-2192.

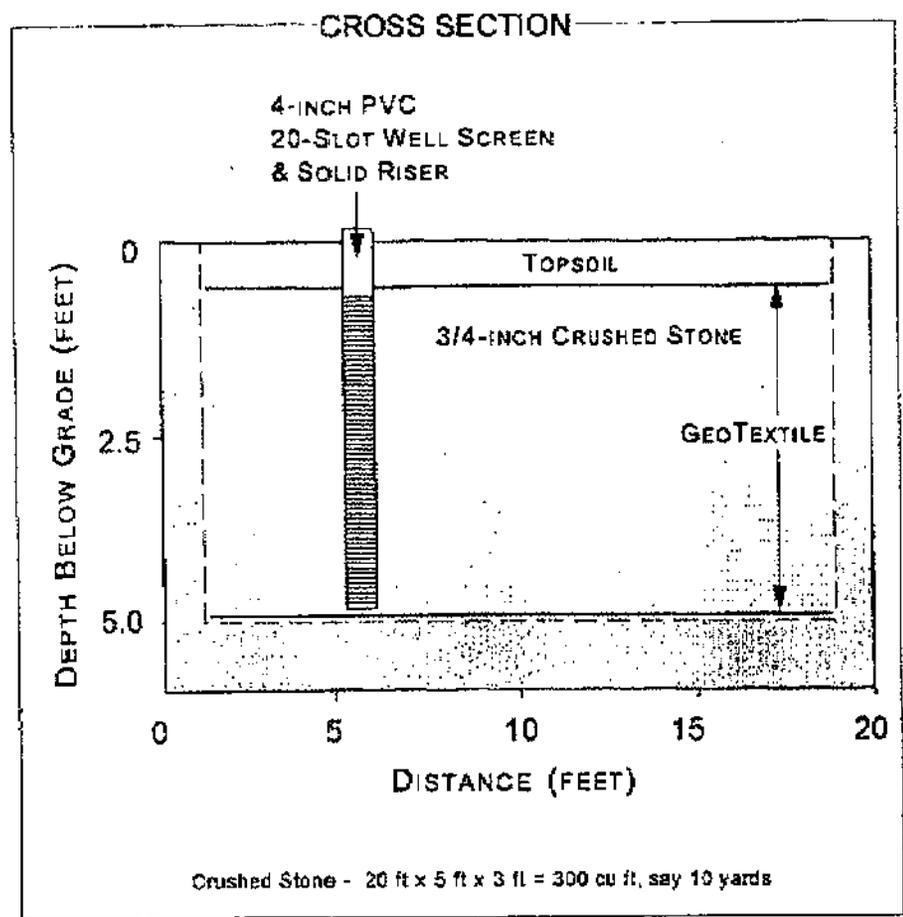
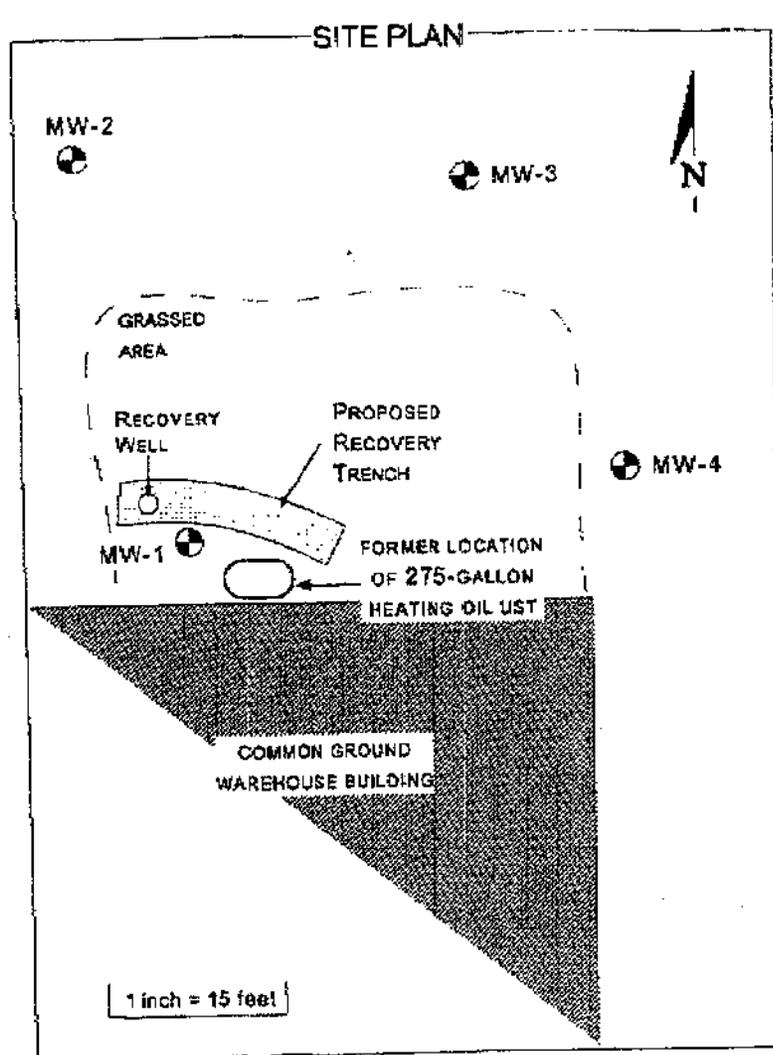


FIGURE 6
Location and Schematic of Proposed Recovery Trench,
Common Ground (Robert Houle) Property,
Hyde Park, Vermont, SMS Site # 97-2192.

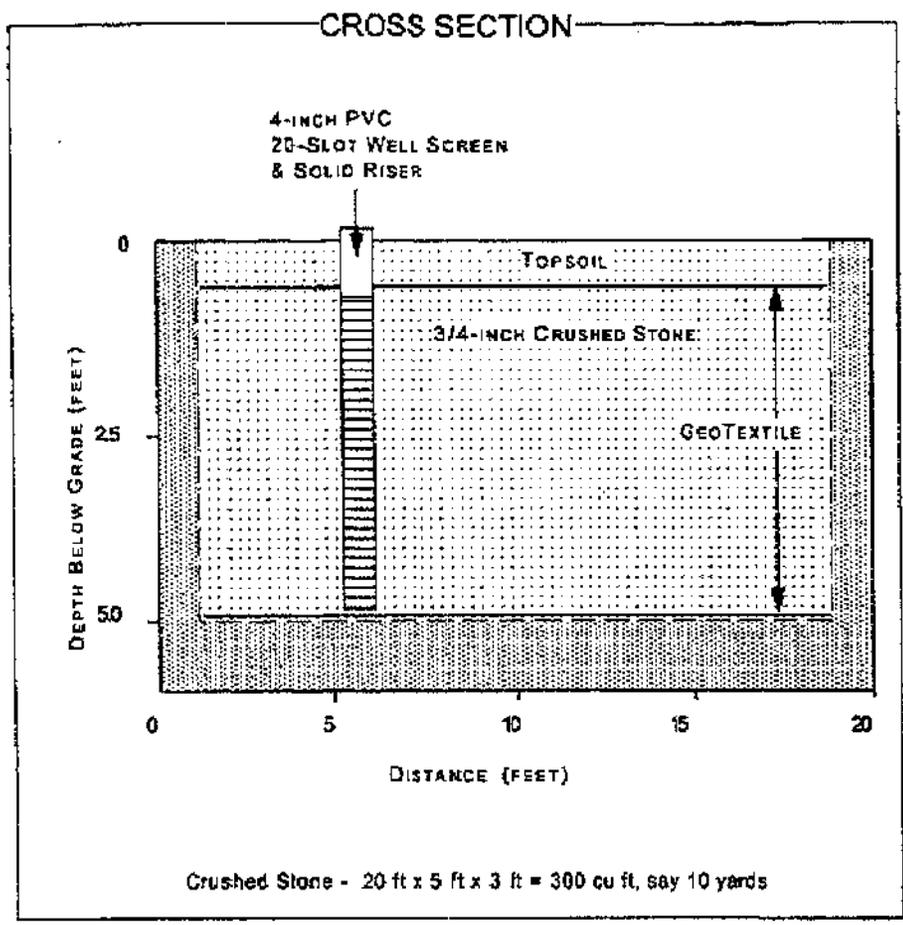
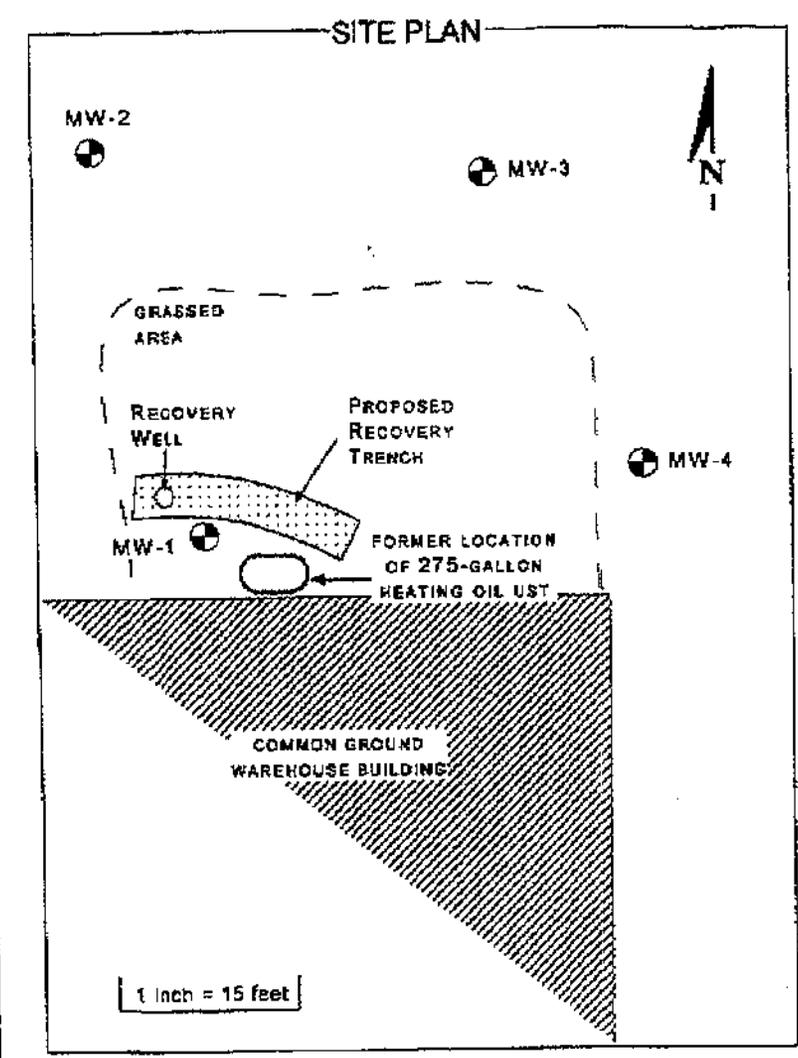


FIGURE 6
 Location and Schematic of Proposed Recovery Trench,
 Common Ground (Robert Houle) Property,
 Hyde Park, Vermont, SMS Site # 97-2192.

FAX TRANSMITTAL

To: *Bruce Linton*

Company: *SMS*

Fax:

From: *T. Schmalz*

Date: *2/5/98*

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