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June 14, 1995

Richard Spiese, Acting Supervisor
Sites Management Section
VT DEC - Hazardous Materials Management Division
103 So. Main Street/West Building
Waterbury, Vermont 05671-0404

Re: Report on UST Site Investigation,
Former South Hero Grocery, So. Hero, VT, SMS Site #94-1730

Dear Mr. Spiese:

On behalf of S.B. Collins, Inc., we are submitting the enclosed report on a UST site investigation performed at the former South Hero Grocery in South Hero.

If you have any questions, please give us a call.

Sincerely,

HOFFER & ASSOCIATES



Jefferson P. Hoffer
Principal Hydrogeologist

enc.

cc: Carl Ruprecht, S.B. Collins

REPORT ON UST SITE INVESTIGATION

**FORMER SOUTH HERO GROCERY
SOUTH HERO, VERMONT**

SMS SITE # 94-1730

Report Date: June 12, 1995

Prepared For:

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1.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Three underground storage tanks (USTs) were closed in November 1994 at the former South Hero Grocery in South Hero, Vermont. Holes were observed in the two tanks removed from the site. A third tank was closed in place because it is partially located underneath the building. Elevated photoionization detector (PID) readings were measured in soils surrounding and underlying the tanks during the closure excavations. A sample collected from an existing monitoring well was found to contain benzene, toluene, ethylbenzene, xylenes (BTEX), and methyl-tert-butyl-ether (MTBE) at concentrations exceeding Vermont Groundwater Enforcement Standards. A site investigation was implemented to define the extent of petroleum contamination at the site. Seven groundwater monitoring wells were installed during two rounds of well drilling at the site.

The site stratigraphy includes fine-grained lacustrine or marine sediments, ranging from silty fine sands to silty clay. The water table at the site occurs at a depth of 16 to 17 feet, although one well has exhibited an anomalous water level (10 - 12 feet) indicative of a perched zone. Considering the water levels measured in the other site wells, groundwater flow direction appears to be to the northwest.

Groundwater sampling results indicate high concentrations of BTEX and MTBE in the vicinity of the former USTs and pump island. Monitoring wells on the perimeter of the site show trace or no contamination. Considering the fine-grained nature of site soils and the lack of contamination in perimeter monitoring wells, groundwater contamination at the site appears to be limited to a small area in the vicinity of the former USTs and pump island.

As presently defined, site contamination does not appear to pose a threat to any sensitive receptors such as water supplies or surface water. Residences and businesses in the vicinity are served by municipal water. The nearest surface water feature is over 2000 feet from the site.

Based on the site investigation results, we recommend quarterly groundwater monitoring to further evaluate groundwater flow directions and to monitor contaminant concentrations.

2.0 BACKGROUND INFORMATION

2.1 Introduction And Site History

On November 22, 1994, two underground storage tanks, one 3,000-gallon gasoline and one 2,000-gallon diesel fuel, were closed at the former South Hero Grocery in South Hero, Vermont. A third tank, a 4,000-gallon gasoline tank, is partially located underneath a structure and was closed in place. The three single-walled steel USTs were owned and maintained by S. B. Collins, Inc., of St. Albans, Vermont. The USTs had not been in use for two years prior to their removal.

The 3,000-gallon steel tank was found to be lined with fiberglass. A fiberglass patch was visible on top of the tank, suggesting that the fiberglass surface had been applied while the tank was in place. A number of corrosion holes were found on the western bottom of the tank. The fiberglass was visible through the holes in the steel. These observations suggest that historical leaks from this tank may have prompted the fiberglass lining effort.

Corrosion holes were also found in the 2,000-gallon diesel tank, which was not fiberglass-lined. The corrosion holes were distributed uniformly along the lower 1/3 of the tank. Since the 4,000-gallon tank was closed in place, it was not possible to visually examine the entire exterior surface of the tank. The visible portion of the tank appeared to be in good condition, and personnel from the tank-cleaning contractor (Environmental Products & Services) indicated that the interior surface of the tank was in good condition and free of pitting or corrosion.

Two soil types were observed during the UST excavations; a dense reddish-brown gravelly silty sand believed to have been used as backfill during the UST installations, and

a dense silty clay believed to be native soil. No groundwater was encountered during the excavation of the tanks.

Soils surrounding and underlying the USTs were screened with a PID¹. Readings in soil beneath and alongside the 3,000-gallon tank exceeded the maximum capacity (2500 ppm) of the instrument. All soil removed during the UST closures was placed back into the excavation after removal of the tanks.

Five leak-detection monitoring wells were in place at the site at the time of the UST closures. Each of the monitoring wells was approximately 13 feet deep, and were equipped with a petroleum vapor sensor. One of the wells was destroyed during excavation of the USTs. During the UST closure activities, water was measured in only one of the remaining four wells (MW-3), at a depth of 11.85 feet below the top of the casing. This well was located on the western edge of the former pump island, and a sample collected from this well was found to contain benzene (5960 ug/L), toluene (8750 ug/L), ethylbenzene (1610 ug/L), xylenes (15380 ug/L), and MTBE (392).

Based on these observations, a site investigation was implemented to define the extent of contamination at the site, and to evaluate the threat posed by site contamination to sensitive receptors. At the request of S.B. Collins, the site investigation was initiated by Hoffer & Associates under the Vermont Sites Management Section's "Expressway" program. Initially, three monitoring wells were constructed at the site and sampled in December (1994) and January (1995). Based on these results, a status report and scope of work for additional work (see Appendix A) was submitted to the Sites Management Section. Four additional monitoring wells were installed at the site in April 1995. A

¹ MicroTIP HL-2000, 10.6 eV lamp, set to respond to isobutylene, readings in parts per million (ppm) isobutylene equivalents.

complete round of groundwater monitoring was performed on April 19, 1995. This report presents the results of all investigative efforts at the site.

2.2 Site Environmental Setting

The former South Hero Grocery is located in a residential and commercial setting along U.S. Route 2 in the Town of South Hero, Vermont (see Figure 1). The South Hero Grocery has not been in operation for two years. The structure that housed the store is a two-story concrete-block building. The store was located on the first floor, and the second floor contains rental apartments. The structure is connected to a building which currently houses the Island Video store. A small craft store is located immediately east of the Island Video store. A seasonal fast food and ice cream shop is located immediately west of the property. McGregors' Island Pharmacy is located further to the west along Route 2. Undeveloped agricultural lands are present behind (north) the site. Properties across Route 2 from the site include residences, the South Hero Rescue Squad, the Town Clerk's office, and the South Hero Mobil. An investigation of petroleum contamination at the South Hero Mobil (SMS Site #90-0414) has been on-going. The Island Bait Shop, which is located across Route 2 from the site, is planning to relocate to the space formerly occupied by the South Hero Grocery. Property boundaries in the vicinity are shown on Figure 2, which was taken from the South Hero tax maps. Figure 3 presents a site map.

The site is situated within the Champlain Islands region, and the surrounding landscape is relatively flat. Keeler Bay of Lake Champlain is located about 2,500 feet north of the site. Lowland marshes and wetlands are present 3,000 feet west of the site. According to the USGS topographic map of the region, elevation at the site is approximately 140 feet, which is about 40 feet higher than the mean elevation of Lake Champlain. Topography in the vicinity of the site grades gently to the west and to the north.

The surficial geology of the area has been mapped by Stewart (1974) as lacustrine and marine clays and silts, and glacial till. The bedrock geology of the vicinity is described by Stewart (1974) as interbedded slate, dolomite, shale sandstone, and limestone. The Centennial Geologic Map of Vermont (Doll, 1961) has the Ordovician Stony Point Formation (calcareous black shales grading into limestone) mapped beneath the site.

The area between the building at the site and Route 2 is paved. Catch-basins along Route 2 collect runoff in the vicinity. Stormwater flow direction is believed to be westward along Route 2 toward a discharge point at the lowland marshes and wetlands 3,000 feet west of the site.

The site and surrounding buildings are served by municipal water. During the site investigation, a survey of the surrounding properties did not locate any domestic drinking water wells in use within a 500-foot radius of the site. Interviews with individuals in the town office confirmed that there are no known water wells in use in this area. The nearest water supply wells identified in the Water Supply Division's well inventory database are shown on Figure 4. The closest well is located about 1000 feet southwest of the site.

3.0 FIELD PROCEDURES

3.1 Monitoring Well Installations

Three monitoring wells (MW-102, MW-103, and MW-105) were installed by Adams Engineering in December of 1994. These wells were installed at the same locations of original leak-detection wells MW-2, MW-3, and MW-5. Drilling procedures were documented in the March 1, 1995 letter to Carl Ruprecht of S.B. Collins from Hoffer & Associates (see Appendix A).

Four additional monitoring wells were installed at the site in April 1995. Drilling services were provided by Tri-State Drilling and Boring, of West Burke, Vermont. The four additional monitoring wells were installed in order to more accurately determine the direction of groundwater flow and the extent of contamination at the site.

The locations of the new monitoring wells (MW-106, MW-107, MW-108, and MW-109), are shown on Figure 3. Boreholes were advanced using 4.25-inch hollow-stem augers. Soil samples were obtained at 5-foot intervals and when a change in stratigraphy was noted, both for soil characterization and for PID soil headspace measurements. Soil samples were described using the USDA/Soil Conservation Service classification scheme. Soil headspace analysis was conducted by placing representative soil samples in plastic zip-lock bags, and measuring the headspace with the PID.

Soil borings were advanced through the water table before the wells were constructed. The total depth of the soil borings averaged about 20 feet. Wells were constructed with 2-inch diameter PVC well screens (10 foot sections of 10-slot screen) and riser pipe. The wells were positioned in an attempt to straddle the inferred water table, with 5 feet of

screen below the water table. A sandpack, consisting of #1 grade sand, was placed by gravity in the annular space from the base of the borehole to at least one foot above the top of the screen. A bentonite seal was placed above the sandpack. The remaining annular space was backfilled with cuttings generated during drilling. The wells were finished with steel covers and cemented in place. Soil boring and monitoring well construction logs are provided in Appendix B.

Prior to sampling, the wells were developed using dedicated 2-inch bailers. Where possible, three well volumes were removed from the wells during development efforts. Volumes removed during development ranged from 0.5 to 3.25 gallons. Water generated during the bailing effort was contained on-site in a 55-gallon drum.

3.2 Groundwater Sampling and Analysis

A complete round of groundwater sampling for BTEX and MTBE was conducted on April 19, 1995. Prior to sampling the wells, water level and PID well headspace measurements were obtained from each well. Water levels were taken from the top of the PVC riser pipe, and were used to calculate the volume of standing water present in each well. The wells were purged of standing water prior to sampling. The target volume for purging was three well volumes, although some of the wells began to go dry prior to three well volumes. These wells were sampled as the water level recovered. Water levels, PID headspace measurements, purge volumes, and other sampling data were recorded on a field data sampling sheet, which is included in Appendix C.

Sampling was conducted with either 1.5-inch PVC dedicated, or 2.0-inch polyethylene dedicated bailers, depending upon the size of the well. Groundwater samples were collected by either the use of a bottom-emptying device or by decanting directly from the

1.5-inch bailers into 40 mL vials. The sampling vials contained hydrochloric acid for sample preservation. Immediately after collection, the samples were placed in a cooler with ice. Quality assurance/quality control (QA/QC) samples included a trip blank, a field blank, and a blind duplicate sample. The trip blank consisted of two 40 mL vials filled with deionized water, which were prepared by the laboratory. The trip blanks were handled in a similar manner as the samples, and were returned to the laboratory for analysis with the samples. A field blank was collected at the conclusion of sampling by pouring deionized water into the vials at the site at the conclusion of the sampling event. The blind duplicate was collected according to the same sampling protocol as the samples, and was given a fictitious sample name and collection time. The duplicate was collected at MW-106, and was labeled MW-01.

The samples were submitted to Scitest Laboratory Services, of Randolph, Vermont, and were analyzed for BTEX and MTBE using EPA Method 8020. The laboratory reports and chain-of-custody are given in Appendix C.

3.3 PID Measurements

During monitoring well installations and groundwater sampling, a Photovac MicroTIP HL-2000 photoionization detector, equipped with a 10.6 eV lamp, was used to obtain soil and monitoring well headspace measurements, and to monitor worker breathing spaces for health and safety. Prior to each day's activities, the PID was calibrated and set to respond to isobutylene. Readings are reported as parts per million (ppm), and represent parts per million equivalents relative to isobutylene.

4.0 RESULTS

4.1 Monitoring Well Installations

Geologic and well construction logs are provided in Appendix B.

4.1.1 Stratigraphy

Soils observed during the UST closures consisted of dense reddish-brown gravelly silty sand interpreted as backfill during the UST installations, and a dense silty clay interpreted as native soil. During monitoring well drilling, two predominant soil types were identified; a dense silty clay, and a silty fine sand. In general, the silty clay soils were present from the surface to depths of 13 to 16 feet, underlain by silty fine sands. However, thin silt and clay lenses were observed in the silty fine sands, and some fine sand gravel was observed in the dense silty clay soils.

4.1.2 PID Measurements of Soil Sample Headspaces

PID headspace readings of soil samples collected during monitoring drilling are included on the well logs in Appendix B. The highest reading detected in soil sample headspaces was 9.9 ppm for a sample from 10 - 12 feet in MW-106.

4.2 Groundwater Elevations

Table 1 presents groundwater elevation data for the site monitoring wells. Depth to groundwater at the site has generally been in the 15 to 17 foot range, although water levels in MW-103 have been in the 10 to 12 foot range.

Figure 5 presents a groundwater elevation contour map for April 27, 1995. The anomalous water level in MW-103 was not included in the contouring, since this water level is believed to be the result of a perched zone in the vicinity of this well. Water levels in the remaining wells depict a relatively flat gradient, and display a northwestward direction of groundwater flow.

4.3 Groundwater Sampling Results

The results of the April 19, 1995 groundwater sampling event are presented in Table 2. Table 3 presents the data for each well, and includes data from the initial sampling round in January 1995. Isoconcentration contour maps for benzene and xylenes for the April 19 sampling event are shown on Figures 6 and 7.

Vermont Groundwater Enforcement Standards were exceeded in the three monitoring wells near the former USTs and pump island. Standards were exceeded for all BTEX constituents in MW-103, for benzene in MW-102, and for benzene and xylenes in MW-105.

Of the remaining four monitoring wells, only trace concentrations of BTEX and MTBE were observed. In MW-107, benzene and toluene was detected at 1 ug/L. In MW-109, xylenes were detected at 1 ug/L, and MTBE was detected at 2 ug/L. Aside from the detection in MW-109, MTBE was not detected in any other wells (although detection limits were relatively high in MW-102, MW-103, and MW-104) during this sampling

round. MTBE had been detected in MW-102, MW-103, and MW-105 in the January 1995 sampling round.

5.0 DISCUSSION OF RESULTS

5.1 Site Hydrogeology

Site soils include a reddish-brown gravelly silty sand present in the vicinity of the former USTs, interpreted to be UST backfill material. Two native soil types were observed during drilling efforts, a dense silty clay, and silty fine sands. The silty fine sands were generally present below depths ranging from 13 to 16 feet, although no discrete boundary between the two predominant soil types was observed. In general, soil samples collected during drilling efforts indicate that while site soils are not homogeneous, they are primarily fine-grained sediments. These soils are interpreted as marine or lacustrine in origin.

The depth to groundwater in site monitoring wells has ranged from about 10 - 12 feet in MW-103, and from 15 - 17 feet in the remaining wells. Water levels in MW-103 suggest that this well is located in a perched zone. During drilling of this well (which was drilled at the former location of original well MW-3), a dense silty clay was observed in a sample collected from 13.5 to 14.8 feet. By eliminating MW-103 measurements from the groundwater elevation contouring, the site groundwater elevations depict a shallow gradient (0.002) indicating a northwestward flow direction.

Although no measurements of hydraulic conductivity were taken at the site, recharge rates of the wells during sampling efforts were relatively low, reflecting the fine-grained nature of the site soils.

5.2 Source, Degree, and Extent of Contamination

Holes found in the two former site USTs indicate that petroleum releases likely occurred over time from these tanks. Fiberglass lining was observed in one of the tanks which

contained corrosion holes, suggesting that the tank had a history of leaking. Soil and groundwater sampling results also show contamination near the former pump island (MW-103), suggesting that releases may have also occurred at the pumps or from piping.

Relatively high levels of dissolved BTEX are currently present in groundwater in the vicinity of the former USTs and pump island. Vermont Groundwater Enforcement Standards were exceeded in the three monitoring wells nearest the former USTs and pump island during the latest sampling round. The highest concentrations were detected in MW-103, which is on the western side of the former pump island and is believed to be screened in a perched zone.

Of the four monitoring wells on the perimeter of the site property, only trace concentrations of contaminants were detected (in MW-107 and MW-109). Due to the fine-grained nature of site soils, contaminant migration at the site appears to be limited to a small area near the source area.

5.3 Potential Receptors

Residences and business in the vicinity of the site are served by municipal water. The nearest water well is located 1000 feet southwest of the site and is completed in bedrock. Due to the northwesterly groundwater flow direction and limited area of contamination at the site, there does not appear to be any threat to drinking water supplies.

The nearest surface water bodies are Keeler Bay (2,500 feet north) and marshlands to the west (3,000 feet). Based on the fine-grained nature of site soils, transport of site contaminants to these receptors via groundwater flow is unlikely.

5.4 Recommendations

In order to further evaluate site groundwater conditions (flow directions and quality), a quarterly groundwater monitoring program is recommended. The monitoring should include water-level measurements in the site monitoring wells, and groundwater sampling and analysis for BTEX and MTBE by EPA Method 8020. A cost estimate for quarterly groundwater monitoring and reporting at the site is provided in Table 4.

6.0 REFERENCES

- Doll, Charles G. (Ed.), 1961, *Centennial Geologic Map of Vermont*, Vermont Geological Survey, State of Vermont.
- Stewart, David P., 1974, *Geology for Environmental Planning in the Milton-St. Albans Region, Vermont*, Environmental Geology No. 5, Vermont Geological Survey.

TABLE 1
 Groundwater elevation measurements,
 former South Hero Grocery, South Hero, Vermont, SMS Site #94-1730.

DEPTH TO WATER
 (feet below TOC)

WELL ID	Elev of TOC	1/4/95	4/17/95	4/19/95	4/27/95
MW-4	101.26	dry	dry	dry	dry
MW-102	101.67	17.09	16.58	16.48	16.46
MW-103	101.00	12.11	10.45	11.72	12.58
MW-105	101.66	17.03	16.54	16.40	16.48
MW-106	99.81	-	14.60	14.43	14.54
MW-107	101.22	-	16.04	16.85	15.96
MW-108	102.20	-	17.09	17.00	17.04
MW-109	100.47	-	15.71	15.46	15.46

GROUNDWATER ELEVATIONS (feet)

WELL ID	Elev of TOC	1/4/95	4/17/95	4/19/95	4/27/95
MW-4	101.26	dry	dry	dry	dry
MW-102	101.67	84.58	85.09	85.19	85.21
MW-103	101.00	88.89	90.55	89.28	88.42
MW-105	101.66	84.63	85.12	85.26	85.18
MW-106	99.81	-	85.21	85.38	85.27
MW-107	101.22	-	85.18	84.37	85.26
MW-108	102.20	-	85.11	85.20	85.16
MW-109	100.47	-	84.76	85.01	85.01

NOTES

TOC = top of casing (pvc)
 Elevations are in feet relative to on-site datum of 100.00 feet.

TABLE 2
 Groundwater sampling results for April 19, 1995,
 former South Hero Grocery, South Hero, Vermont, SMS Site #94-1730
 (results in ug/L)

WELL ID	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
MW-102	241	39	<10	17	<10
MW-103	2450	3890	1230	16100	<100
MW-105	688	383	<50	2000	<50
MW-106	<1/<1	<1/<1	<1/<1	<1/<1	<1/<1
MW-107	1	1	<1	<1	<1
MW-108	<1	<1	<1	<1	<1
MW-109	<1	<1	<1	1	2
Trip Blank	<1	<1	<1	<1	<1
Field Blank	<1	<1	<1	<1	<1

Notes:

< 1 = below a detection level of 1
 <1 / <1 = sample result / field duplicate result

REGULATORY THRESHOLDS
 (ug/L)

Standard	Benzene	Toluene	Ethylbenzene	Xylenes	MBTE
VT GES	5	2420	680	400	-
VT PAL	0.5	1210	340	200	-
VHA	1	1000	-	-	40
MCL	5	1000	700	10000	-

Notes:

VT GES = Vermont Groundwater Enforcement Standard
 VT PAL = Vermont Preventative Action Limit
 VHA = Vermont Health Advisory
 MCL = Maximum Contaminant Level

TABLE 3
 Groundwater analytical data by well,
 former South Hero Grocery, South Hero, Vermont, SMS Site #94-1730.
 (results in ug/L)

MW-102

Sample Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
1/4/95	258 / 247	89 / 81	<1 / <1	25 / 22	69 / 65
4/19/95	241	39	<10	17	<10

MW-103

Sample Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
11/22/94	5960	8750	1610	15380	392
1/4/95	4620	6940	1390	15700	255
4/19/95	2450	3890	1230	16100	<100

MW-105

Sample Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
1/4/95	1290	1290	363	3490	1640
4/19/95	688	383	<50	2000	<50

MW-106

Sample Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
4/19/95	<1 / <1	<1 / <1	<1 / <1	<1 / <1	<1 / <1

MW-107

Sample Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
4/19/95	1	1	<1	<1	<1

MW-108

Sample Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
4/19/95	<1	<1	<1	<1	<1

MW-109

Sample Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
4/19/95	<1	<1	<1	1	2

TABLE 3 (continued)
 Groundwater analytical data by well,
 former South Hero Grocery, South Hero, Vermont, SMS Site #94-1730.
 (results in ug/L)

QA / QC

Sample Date	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
1/4/95					
Duplicate (MW-102)	258 / 247	89 / 81	<1 / <1	25 / 22	69 / 65
Trip Blank	<1	<1	<1	<1	<1
Field Blank	<1	<1	<1	<1	<1
4/19/95					
Duplicate (MW-106)	<1 / <1	<1 / <1	<1 / <1	<1 / <1	<1 / <1
Trip Blank	<1	<1	<1	<1	<1
Field Blank	<1	<1	<1	<1	<1

Notes:

< 1 = below a detection level of 1
 <1 / <1 = sample result / field duplicate result

TABLE 4

Cost estimate for quarterly groundwater monitoring,
former South Hero Grocery, South Hero, Vermont (SMS Site #94-1730).

LABOR

<u>ITEM</u>	<u>Staff</u>	<u>Hours</u>	<u>Rate</u>	<u>Cost</u>
Sampling Preparation	TFS	0.5	\$30.00	\$15.00
Field Sampling	TFS	5	\$30.00	\$150.00
Data Tabulation	HP	2	\$15.00	\$30.00
Figure Preparation	JPH	2	\$40.00	\$80.00
Quarterly Report Preparation	JPH	6	\$40.00	\$240.00

Sub-Total Labor **\$515.00**

EXPENSES

<u>ITEM</u>	<u>Quantity</u>	<u>Rate</u>	<u>Cost</u>
Mileage, 1 trip, 90 miles round trip	90	\$0.28	\$25.20

Sub-Total Expenses **\$25.20**

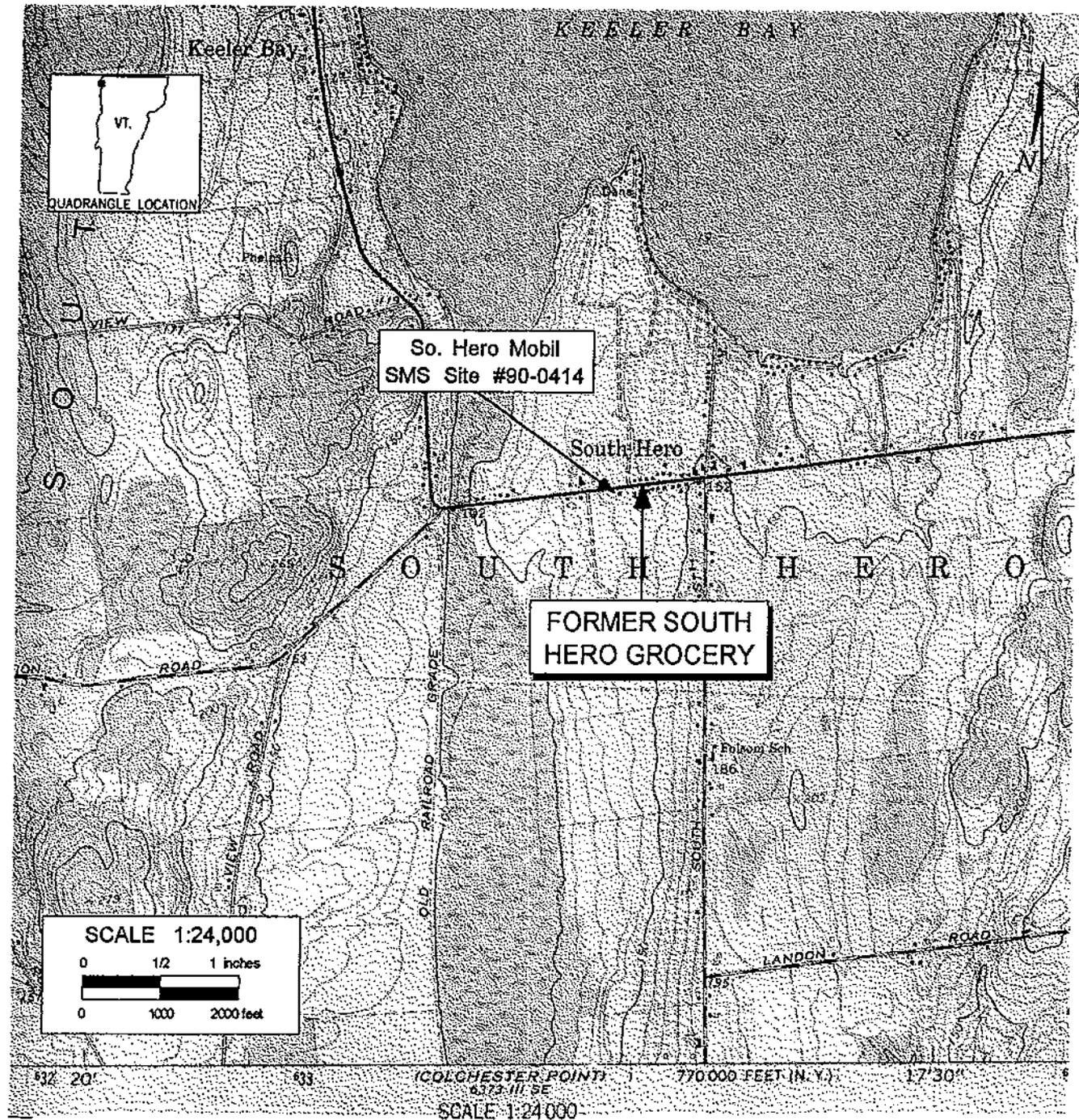
Total Hoffer & Associates **\$540.20**

SUB-CONTRACTORS

<u>Laboratory - Scitest Laboratory Services</u>	<u>Quantity</u>	<u>Rate</u>	<u>Cost</u>
8020 analysis for BTEX/MTBE, groundwater, QA/QC	10	\$55.00	\$550.00

Total Sub-Contractors **\$550.00**

ESTIMATED COST PER QUARTER **\$1,090.20**



Base from U.S. Geological Survey, 1:24,000;
South Hero, VT-NY, VT, 1966

FIGURE 1
Site location map, former South Hero Grocery,
328 Route 2, South Hero, Vermont (SMS Site #94-1730).

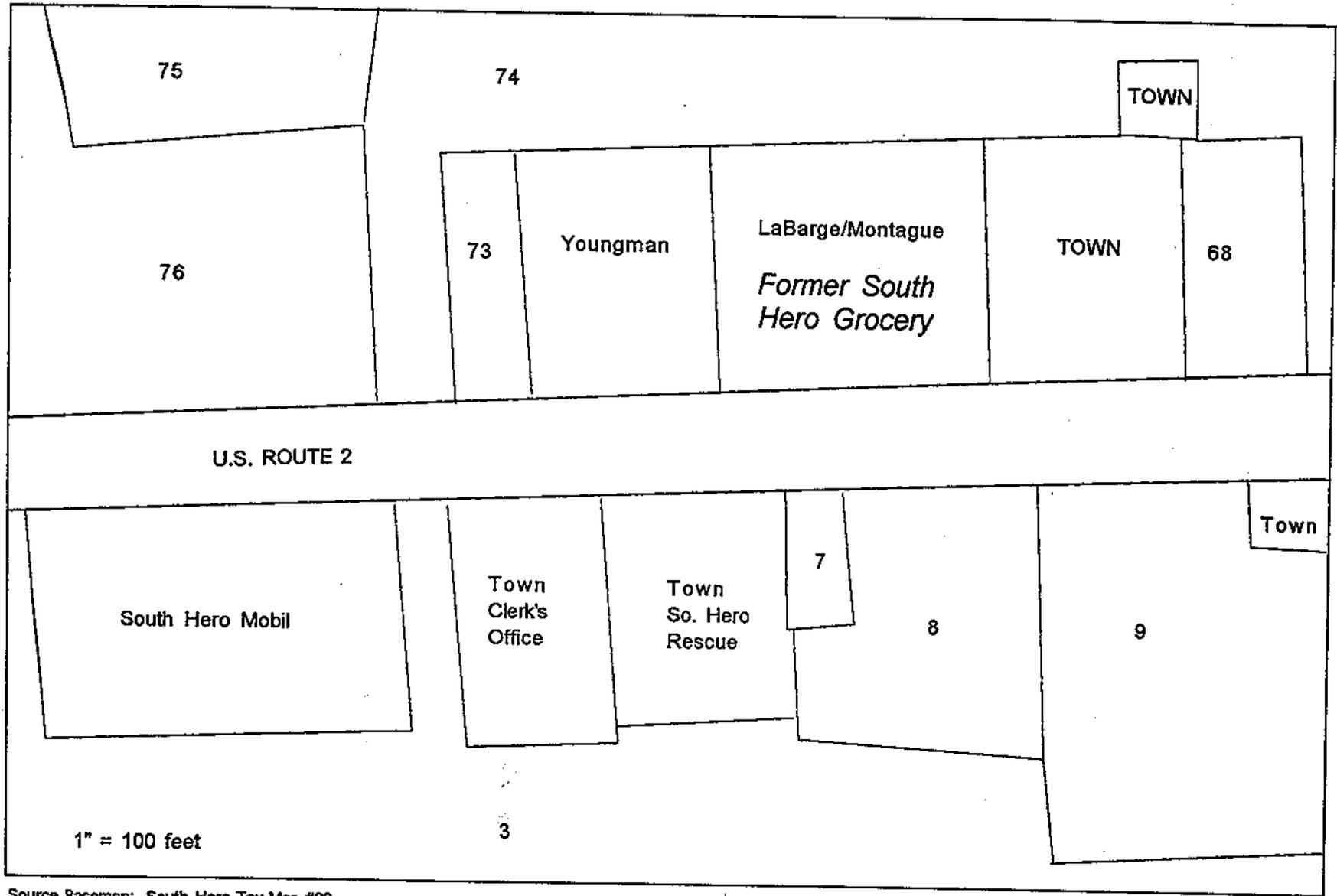


FIGURE 2
South Hero tax map showing location of former South Hero Grocery,
South Hero Mobil, and surrounding property owners.

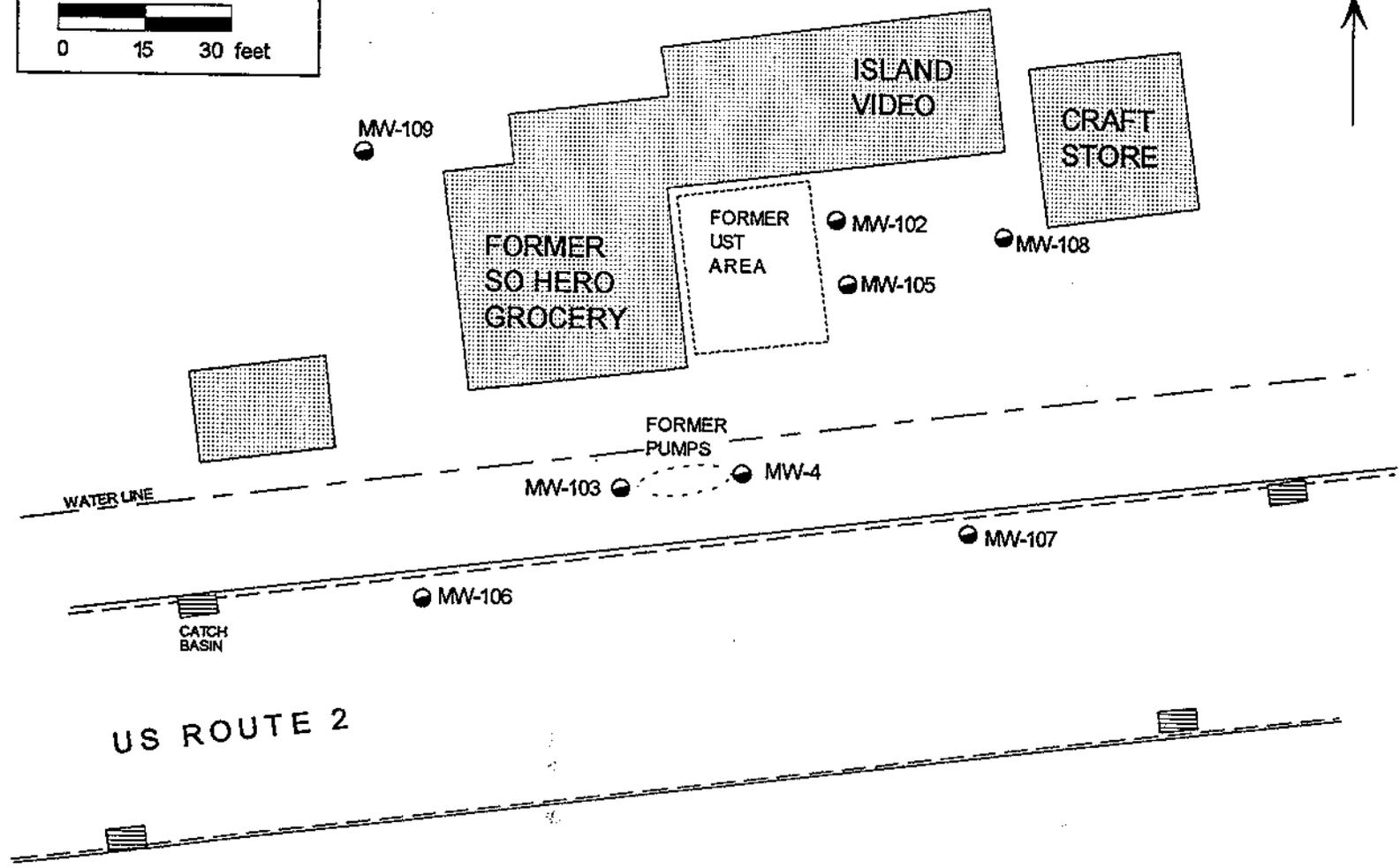
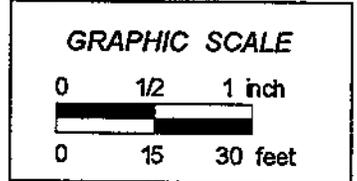
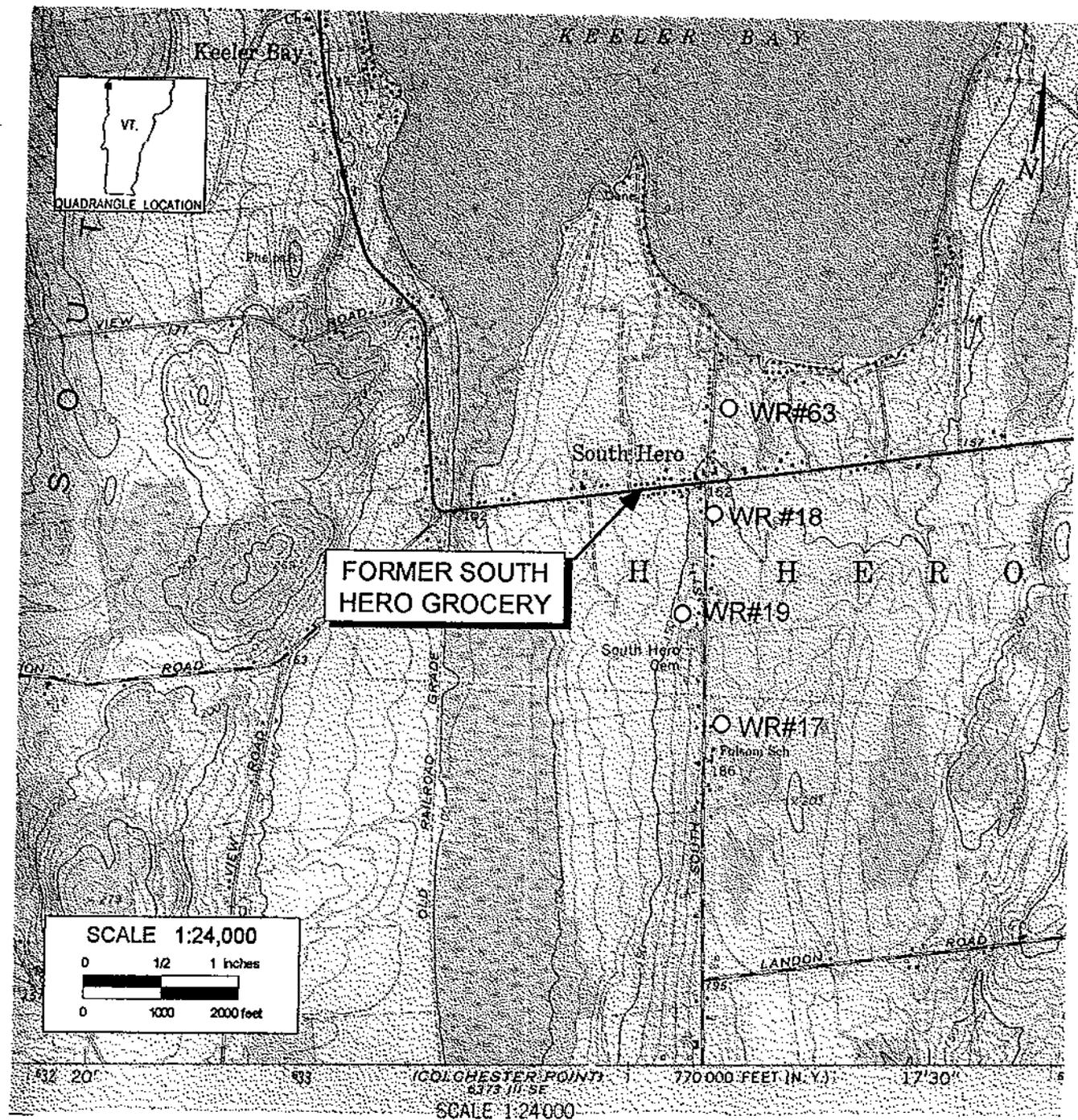


FIGURE 3
Site map, former South Hero Grocery,
South Hero, Vermont, SMS (Site #94-1730).



Base from U.S. Geological Survey, 1:24,000;
 South Hero, VT-NY, VT, 1966

Well Locations from Vermont Water Supply Division's Well
 Inventory for South Hero, Vermont

○ WR#17 - well location/log #

FIGURE 4
 Locations of nearest private wells,
 former South Hero Grocery UST site investigation,
 South Hero, Vermont (SMS Site #94-1730).

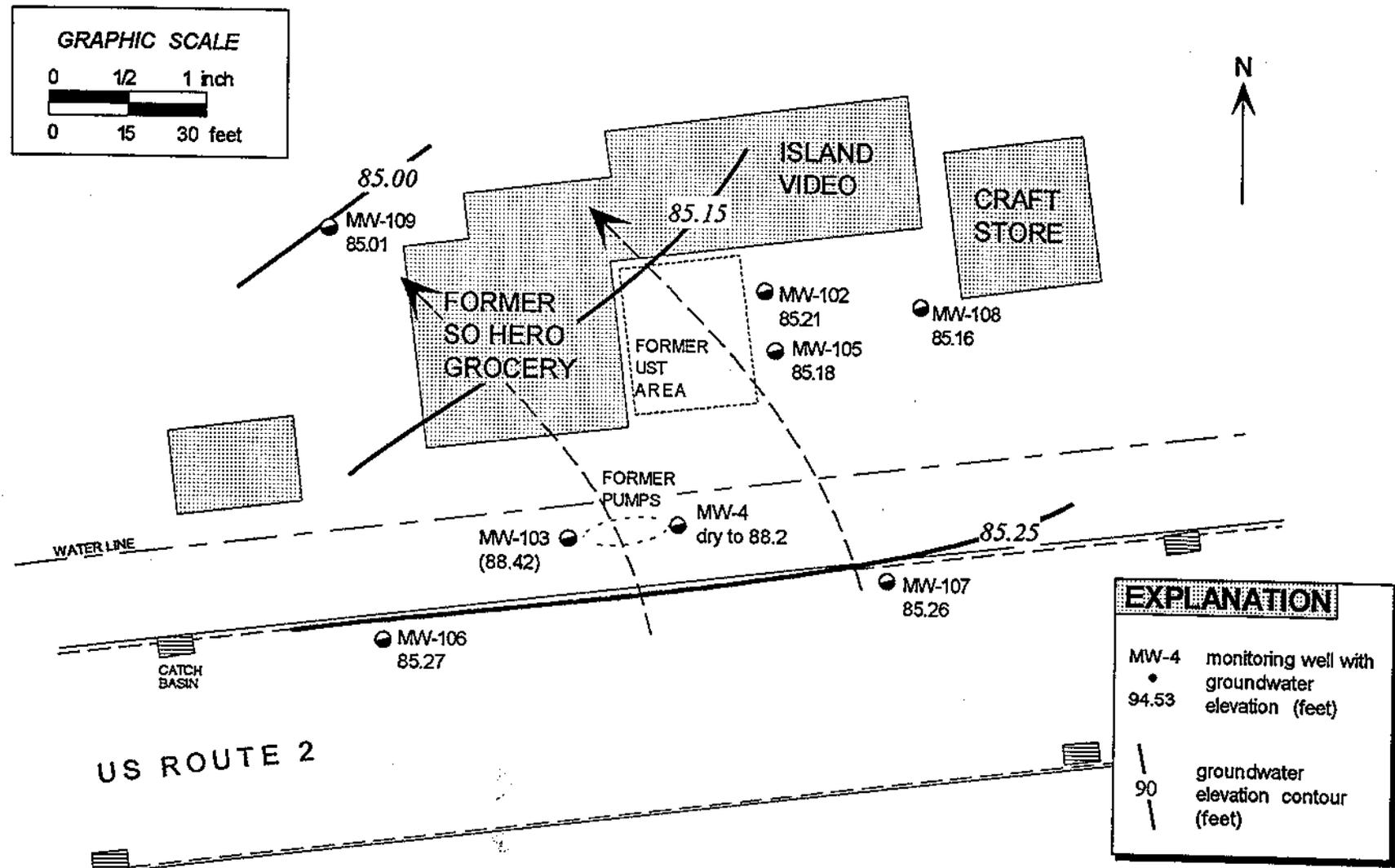


FIGURE 5
 Groundwater elevation contour map, April 27, 1995,
 former South Hero Grocery,
 South Hero, Vermont, (SMS Site #94-1730).

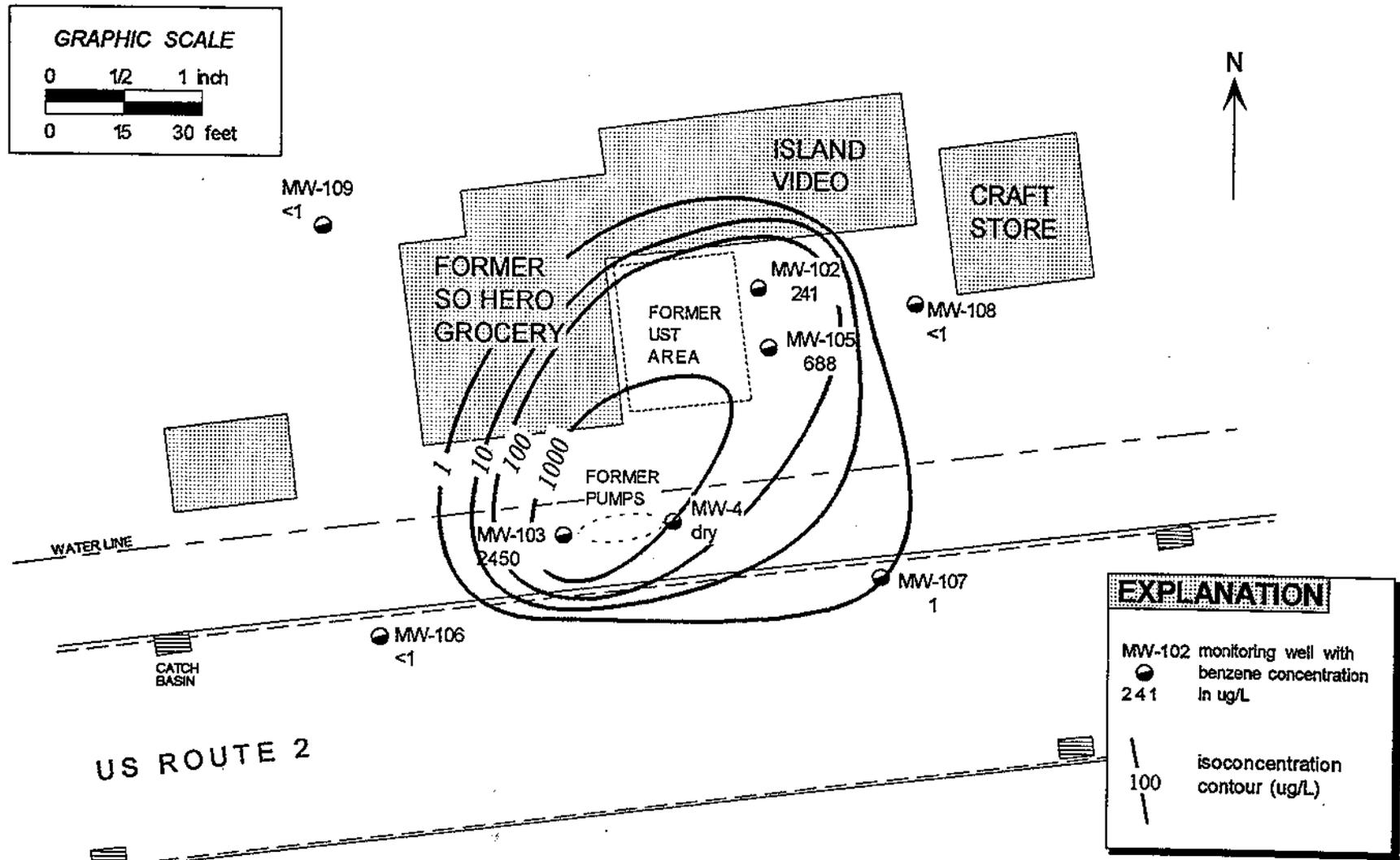


FIGURE 6
 Isoconcentration contour map for benzene, April 19, 1995,
 former South Hero Grocery,
 South Hero, Vermont, (SMS Site #94-1730).

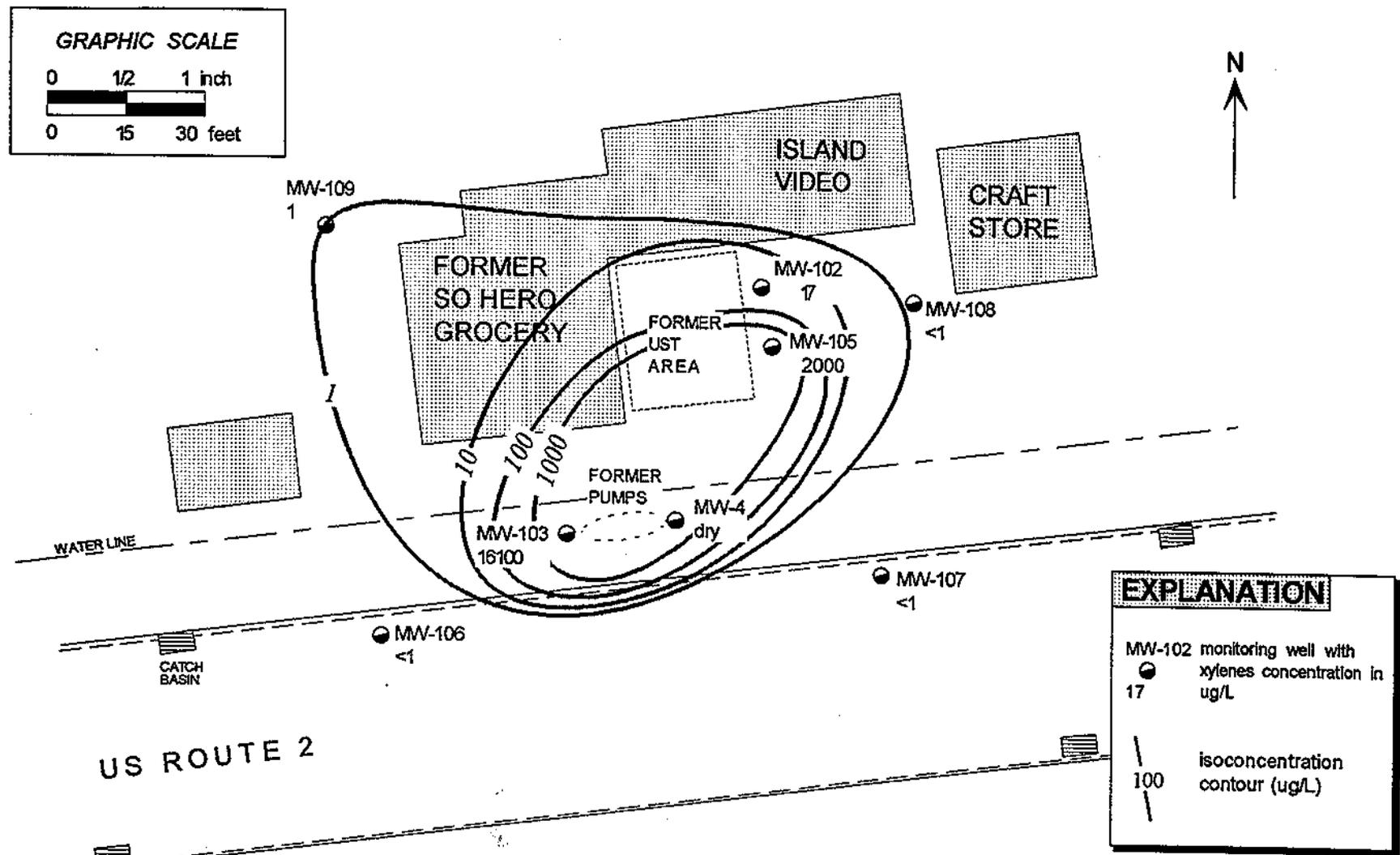


FIGURE 7
 Isoconcentration contour map for xylenes, April 19, 1995,
 former South Hero Grocery,
 South Hero, Vermont, (SMS Site #94-1730).



State of Vermont

Department of Fish and Wildlife
Department of Forests, Parks and Recreation
Department of Environmental Conservation
State Geologist
Natural Resources Conservation Council
RELAY SERVICE FOR THE HEARING IMPAIRED
1-800-253-0191 TDD>Voice
1-800-253-0195 Voice>TDD

AGENCY OF NATURAL RESOURCES
Department of Environmental Conservation
Hazardous Materials Management Division
103 South Main Street/West Office
Waterbury, Vermont 05671-0404
(802) 241-3888
FAX (802) 241-3296

March 29, 1995

Jefferson Hoffer
Hoffer & Associates
P.O. Box 428
Waterbury, VT 05676

RE: Status Report and Work Scope for Additional Investigation
Former South Hero Grocery, South Hero, VT
(Site #94-1730)

Dear Mr. Hoffer:

The Sites Management Section (SMS) has reviewed the Hoffer & Associates Status Report and Workscope for Additional Investigation dated March 1, 1995 that you have developed for the above referenced site. The status report of the expressway investigation indicated that all three monitoring wells, which were further developed and sampled, contained elevated concentrations of BTEX and MTBE compounds. Since the degree and extent of groundwater contamination has not been defined, the SMS concurs with Hoffer & Associates recommendation to further characterize the dissolved-phase contamination through the installation of an additional five monitoring wells. In addition to installing five monitoring wells, the Hoffer & Associates Workscope includes the sampling all eight wells using EPA Method 8020, completing the receptor survey by conducting a water well inventory, conducting a site survey for the production of a groundwater contour map and a base site map, and submitting a report that includes detailed well logs, analytical results, conclusions, and recommendations. The SMS approves the workscope as submitted for costs not to exceed \$5,228.40, and requests that onsite work be initiated as soon as possible.

At future sites, please consider performing this additional work under the expressway before submitting a status report. Please refer to the "Site Investigation Guidance" for more information on this program.

The SMS looks forward to the completion of this work. If you have any questions, please feel free to call.

Sincerely,

Matthew Moran
Matthew Moran, Site Project Manager
Sites Management Section

cc: Carl Ruprecht, S.B. Collins, Inc.

March 1, 1995

Mr. Carl Ruprecht, UST Manager
S.B. Collins, Inc.
54 Lower Welden Street
St. Albans, VT 05478

Re: Status Report on Site Investigation
Work Scope for Additional Investigation
Former South Hero Grocery, South Hero, VT
Facility ID #3724266

Dear Carl:

This letter summarizes site investigation efforts at the former South Hero Grocery in South Hero, Vermont. The site investigation was prompted by evidence of a release of petroleum from site USTs which were removed in November of 1994. A site investigation expressway notification was submitted to the Sites Management Section (SMS), along with the UST closure report, at that time. The estimated date of completion of the site investigation was identified as February 1, 1995.

Three monitoring wells have been installed and sampled. Based on the data collected at the site to date, additional monitoring wells are needed to characterize the extent of contamination. As a result, we recommend proceeding with additional field efforts prior to preparing a formal site investigation report. This letter provides a status report on the work performed to date, and presents a scope of work and cost estimate for the additional field efforts. Figures, tables, well logs, and sampling results are attached.

Because the additional work will result in increased project costs, in excess of the SMS's fee schedule for initial site investigations, we should obtain the SMS's approval of the additional work items prior to proceeding.

MONITORING WELL INSTALLATIONS

Prior to the UST closures in November of 1994, five existing wells at the site were used as vapor detection wells. These wells were screened from about 3 to 13 feet below grade, and were equipped with petroleum vapor sensing devices. During the UST closures, water was observed in only one of the wells (MW-3). A water sample collected from MW-3 at that time showed high concentrations of dissolved BTEX and slightly lower concentrations of MTBE.

Three of the existing wells (MW-2, and MW-3, and MW-5) were pulled on December 16, 1994, and new wells were drilled at the same locations (MW-102, MW-103, MW-105). Drilling services were provided by Adams Engineering using "mini-rig" drilling techniques, including four inch solid-stem augers, a 2 ³/₈-inch thin wall sampling tube, and small diameter split spoons.

In MW-103, a sample collected from the interval 12 to 15 feet showed saturated sand (former sand pack of MW-3) underlain by stiff, brown, sandy silt and clay. A strong gasoline odor was noted in this sample, and photoionization (PID) headspace readings were in the 2000 ppm range. A soil sample from this interval displayed a small amount of free product when it was mixed with water and shaken. MW-103 was constructed with a screened interval from 4.7 to 14.7 feet.

Soil samples retrieved from beneath the sand pack of the former wells MW-2 and MW-5 included gray silty sands. Saturation was noted at an approximate depth of 17 feet. The boreholes were advanced to total depths of 23.6 feet for MW-102, and 20.5 feet for MW-105. Well screens were installed across the interval of 10.3 to 20.3 feet below grade for both wells. PID headspace screening results are presented below:

MW-102		MW-103		MW-105	
Depth (feet)	PID (ppm)	Depth (feet)	PID (ppm)	Depth (feet)	PID (ppm)
15.0-15.4	29.0	12.5-13.5	2400	12.8-17.8	126
		13.5-14.8	1900	15.0-20.0	120

Well logs are enclosed.

WATER LEVELS

Table 1 presents groundwater elevations measured on January 4, 1994. Water levels in MW-102 and MW-105 were nearly equal, while the water level in MW-103 was about five feet higher. Since MW-103 is less than 50 feet from the MW-102 and MW-105, the disparity in water levels suggests that MW-103 is screened into a separate unit (perched zone). Figure 3 presents a cross section which illustrates the two water levels. Based on this data, it is difficult to assess groundwater flow directions at the site.

GROUNDWATER SAMPLING

The three new monitoring wells were sampled on January 4, 1995, for BTEX and MTBE using EPA Method 8020. Table 1 presents the analytical results, which show relatively high levels of dissolved BTEX and MTBE in each of the three wells. The highest BTEX concentrations were observed in MW-103:

MW-103 (sampled on 1/4/95)	
<u>Constituent</u>	<u>Concentration (µg/L)</u>
Benzene	4,620
Toluene	6,940
Ethylbenzene	1,390
Xylenes	15,700

Without additional information of groundwater flow directions, it is difficult to interpret the distribution of contamination. For example, contamination present in MW-103 could have originated from the former pump dispensers and/or piping, or could have migrated to MW-103 from releases originating from the tanks.

EXTENT OF CONTAMINATION/POTENTIAL RECEPTORS

Dissolved-phase contamination is present in groundwater at the site, and soil-adsorbed free product was observed in soil samples collected during the installation of MW-103. Groundwater flow patterns/contaminant migration at the site is difficult to assess due to the apparent complexity of the hydrogeologic setting. In general, site soils appear to be low-permeability in nature, which may limit contaminant migration rates. Subsurface utilities may influence contaminant distribution at the site.

The vicinity is served by municipal water (South Hero Fire District). The Water Supply Division's water-well inventory for South Hero was reviewed to identify private wells in the vicinity. The enclosed Figure 4 presents the locations of the nearest four wells, as identified in the water-well inventory (locations have not been verified). Well WR#18 is closest to the site, at a distance of over 1000 feet, and the well log shows a depth to bedrock of 20 feet.

The former South Hero Grocery building and adjacent addition (Island Video) do not have basements. During the UST closures, personnel at Island Video reported that they had not noticed petroleum odors. No positive readings were obtained with the PID in the former Grocery building, which was vacant at the time.

The nearest surface waters include wetlands to the west, and Keeler Bay to the north. The distance to these surface waters is greater than 2000 feet.

Mr. Carl Ruprecht

March 1, 1995

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SMS FILE REVIEW - SOUTH HERO MOBIL

In order to gain insight into the site hydrogeologic setting, the SMS files on the South Hero Mobil (SMS Site #90-0414) were reviewed. The location of the South Hero Mobil relative to the former South Hero Grocery is shown on Figure 5, a tax map of the vicinity. The initial subsurface investigation at the South Hero Mobil (then known as the McDonough Service Center) was performed by Griffin International (GI) in 1990. GI installed three monitoring wells at the site. Soils observed during the installation of the monitoring wells included gravelly fill underlain by silts and clays. Water levels in the wells ranged from five to eight feet below grade and portrayed a northeastward groundwater flow direction.

Additional field efforts at the site have been performed by Wagner, Heindel, & Noyes (WH&N), including the installation of numerous wells. The additional wells were installed at different intervals, in an attempt to define vertical flow patterns and contaminant distribution. Native soils encountered by WH&N during drilling and test pit excavating have included a shallow silt and clay unit underlain by a permeable sandy till. Water level data collected by WH&N portrays a northwestward groundwater flow direction. Groundwater flow patterns and contaminant migration at the site are influenced by the presence of subsurface utilities along Route 2.

PROPOSED ADDITIONAL MONITORING WELL INSTALLATIONS

It is recommended that another set of monitoring wells be drilled on the former South Hero Grocery property to assist in the delineation of groundwater flow directions and contaminant distribution. Five monitoring wells are proposed (Figure 6), and are sited on the perimeter of the property.

SCOPE OF WORK

- **Groundwater Monitoring Well Installation** - We recommend using hollow-stem augers to collect soil samples and install 2-inch diameter monitoring wells at the site. Boreholes will be advanced using hollow stem augers to the first zone of saturation, estimated to be at a maximum of 17 feet. Split spoon samples will be collected as necessary to define the stratigraphy and depth to water. A total of five split-spoon samples have been budgeted per well. Soil samples will be classified using the SCS classification scheme, and soil-sample headspaces will be evaluated with a PID.

Wells will be constructed with 10 foot sections of 2-inch diameter factory-slotted (10 or 20-slot), flush-thread, PVC well screen. The well screens will be positioned so that the top of the screen remains above the seasonal high water table, as judged by observations during well drilling. Flush-thread PVC riser will be extended from the top of the screen to the ground surface. An appropriately-sized, commercially-sorted sandpack will be installed around the well screens. Geologic and monitoring well construction logs will be prepared to document the stratigraphy and well construction details. After well installation, the wells will be developed by either bailing or pumping. All development waters will be collected and placed into a 55-gallon drum at the site.

Mr. Carl Ruprecht

March 1, 1995

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During the well drilling and installation activities, a PID will be utilized to monitor for the presence of organic vapors. The vapor monitoring will be used to detect zones of contamination, and also to monitor worker air-space for health and safety concerns. Drilling equipment will be steam-cleaned between each borehole.

Prior to drilling, DIG-SAFE will be contacted to alert subsurface utility owners of the well drilling activities. In addition, arrangements will be made with the local water utility company to locate water lines.

Five tentative monitoring well locations are shown on Figure 6. Since groundwater flow directions are uncertain, well locations are sited on the perimeter of the property. Final well placement may be altered due to the presence of utilities or access.

A price quote for the installation of five monitoring wells at the site was obtained from Tri-State Drilling and Boring, West Burke, Vermont, and is enclosed.

- **Groundwater Sampling** - One set of groundwater samples will be collected from all site monitoring wells (five proposed wells, and MW-102, MW-103, and MW-105). Prior to sampling, depth to water, PID well headspace, and free product thickness (if present) determinations will be made. The monitoring wells will be purged of three well volumes or until dry prior to sampling. Samples will be collected from the new 2-inch monitoring wells using dedicated polyethylene bailers. Samples will be collected from the 1.5-inch wells (MW-102, MW-103, and MW-105) using dedicated PVC bailers. Quality assurance/quality control samples will include a trip blank, a field blank, and a blind duplicate.

The samples will be properly labeled and placed into a cooler with water ice. The samples will be transported to the laboratory and analyzed for MTBE and BTEX using EPA Method 8020. A laboratory chain-of-custody and a field sampling data sheet will be utilized to document the sampling event.

For the purposes of this scope of work, we have used unit prices from Scitest Laboratory Services, Randolph, Vermont, for the analytical work.

- **Water well inventory** - Due to the uncertainty with regard to locations of private wells, the immediate vicinity (500 foot radius) of the site will be canvassed to look for the presence of private wells. In addition, the South Hero town clerk will be interviewed concerning the presence of private water supplies in the vicinity.

- **Groundwater elevation surveys** - Depth to water measurements will be taken in the site monitoring wells on at least two occasions. Depth to water measurements will be converted to groundwater elevations to allow preparation of groundwater elevation contour maps depicting groundwater flow directions.

- **Site survey/basemap preparation** - A basemap at an approximate scale of 1 inch to 50 feet will be prepared for the site. The basemap will include relevant site features and monitoring well elevations (ground surface and top of casing). If possible, site elevations will be measured relative to a USGS benchmark in feet above mean sea level. If not, an on-site benchmark will be assigned an arbitrary reference elevation. In our cost estimate, we have included an estimated cost of \$200 for the surveying work.

Mr. Carl Ruprecht
March 1, 1995
Page 6

• **Report preparation** - All information collected during the investigation will be incorporated into a bound report. The report will describe the environmental setting, the nature and extent of contamination found at the site, identify potential receptors, and discuss the qualitative risks posed by site contamination to potential receptors. The report will include well logs, tabulated groundwater elevation and analytical results, contour maps, isoconcentration maps, cross-sections, and all raw data collected during the investigation. The report will provide recommendations concerning the need for further characterization, remedial approaches if deemed appropriate, and/or monitoring frequencies.

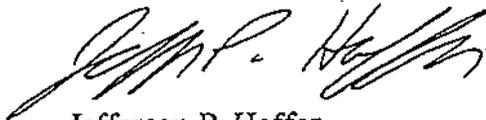
The costs to perform this site investigation are estimated as follows:

Contractor	Cost
Jefferson P. Hoffer, Consulting Hydrogeologists	\$1883.40
Tri-State Drilling & Boring	\$2540.00
Scitest Laboratory Services	\$ 605.00
Surveyor	\$ 200.00
TOTAL	\$5228.40

If you would like to discuss this proposal, please give us a call.

Sincerely,

HOFFER & ASSOCIATES



Jefferson P. Hoffer
Principal Hydrogeologist

enc.

Letter to Carl Ruprecht
March 1, 1995
Re: Former South Hero Grocery UST Site Investigation

LIST OF ATTACHMENTS

ITEM

Table 1 - Groundwater elevations and analytical results
Figure 1 - Site location map
Figure 2 - Site map
Figure 3 - Cross section
Figure 4 - Locations of nearest private wells
Figure 5 - South Hero tax map
Figure 6 - Proposed monitoring well locations
Adams Engineering Well Logs
MW-102 Well Log
MW-103 Well Log
MW-104 Well Log
Scitest Laboratory Report
Chain-of-custody
Field Data Sampling Sheet
Hoffer & Associates Cost Estimate
Tri-State Drilling and Boring Cost Estimate

TABLE 1

Groundwater elevations and analytical results for BTEX constituents and MTBE,
Former So. Hero Grocery, So. Hero, Vermont, Facility ID #3724266

GROUNDWATER ELEVATIONS

Well ID	Elevation of Top of Casing (feet*)	1/4/1995	
		Depth to Water from TOC (feet)	Groundwater Elevation (feet*)
MW-102	99.88	17.09	82.79
MW-103	99.23	12.11	87.12
MW-105	99.88	17.03	82.85

*Relative to arbitrary on-site benchmark of 100.00 feet

Sampling Date: 1/4/1995
ANALYTICAL RESULTS (µg/L)

Well ID	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
MW-102	258 / 247	89 / 81	<1 / <1	12400	69 / 65
MW-103	4620	6940	1390	15700	255
MW-105	1250	1290	363	3490	1640
Trip Blank	<1	<1	<1	<1	<1
Field Blank	<1	<1	<1	<1	<1

<1 = less than a detection limit of 1
258 / 247 = sample/ field duplicate results

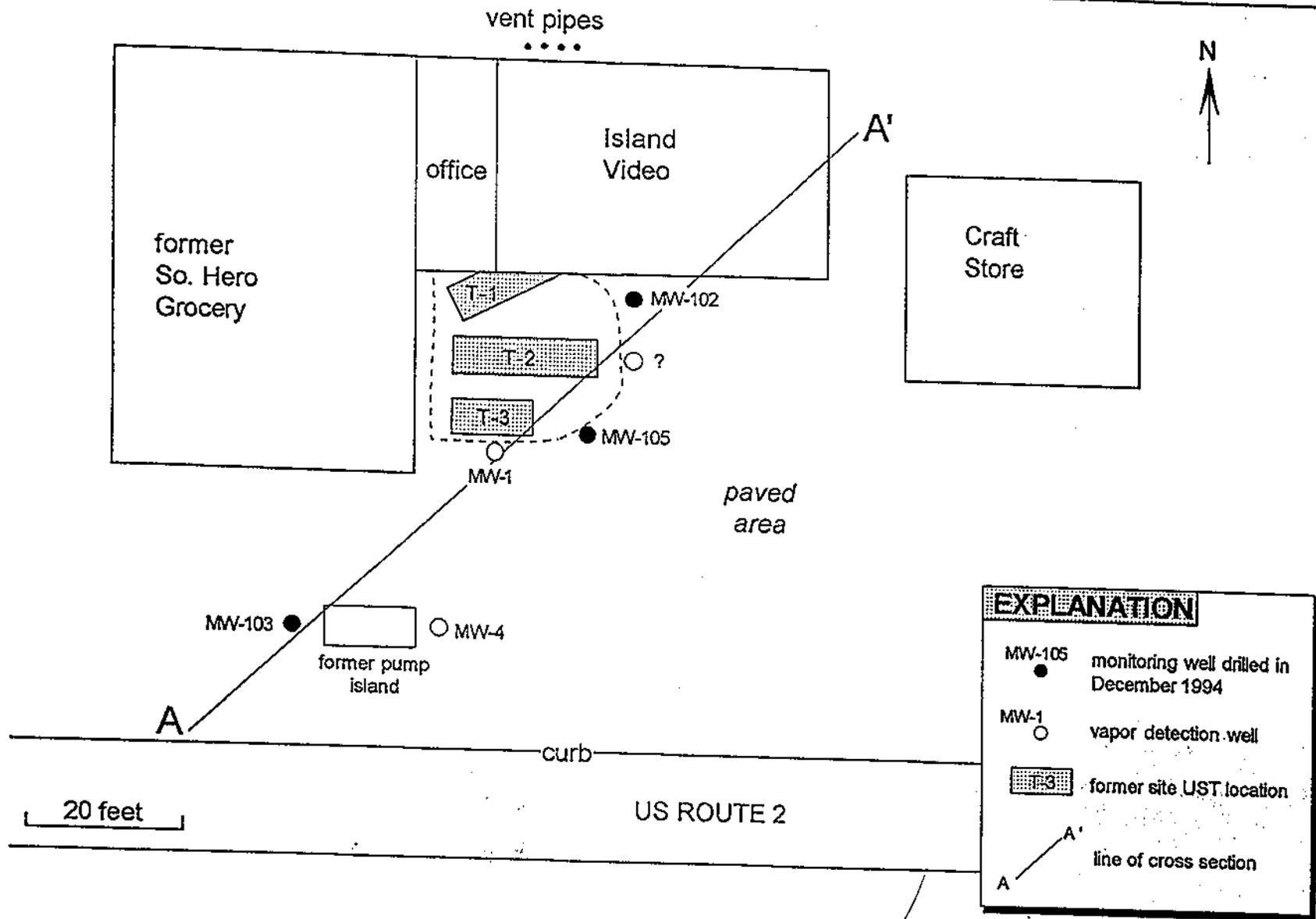


FIGURE 2
 Site map of the former South Hero Grocery UST site,
 328 Route 2, South Hero, Vermont (Facility ID #3724266).

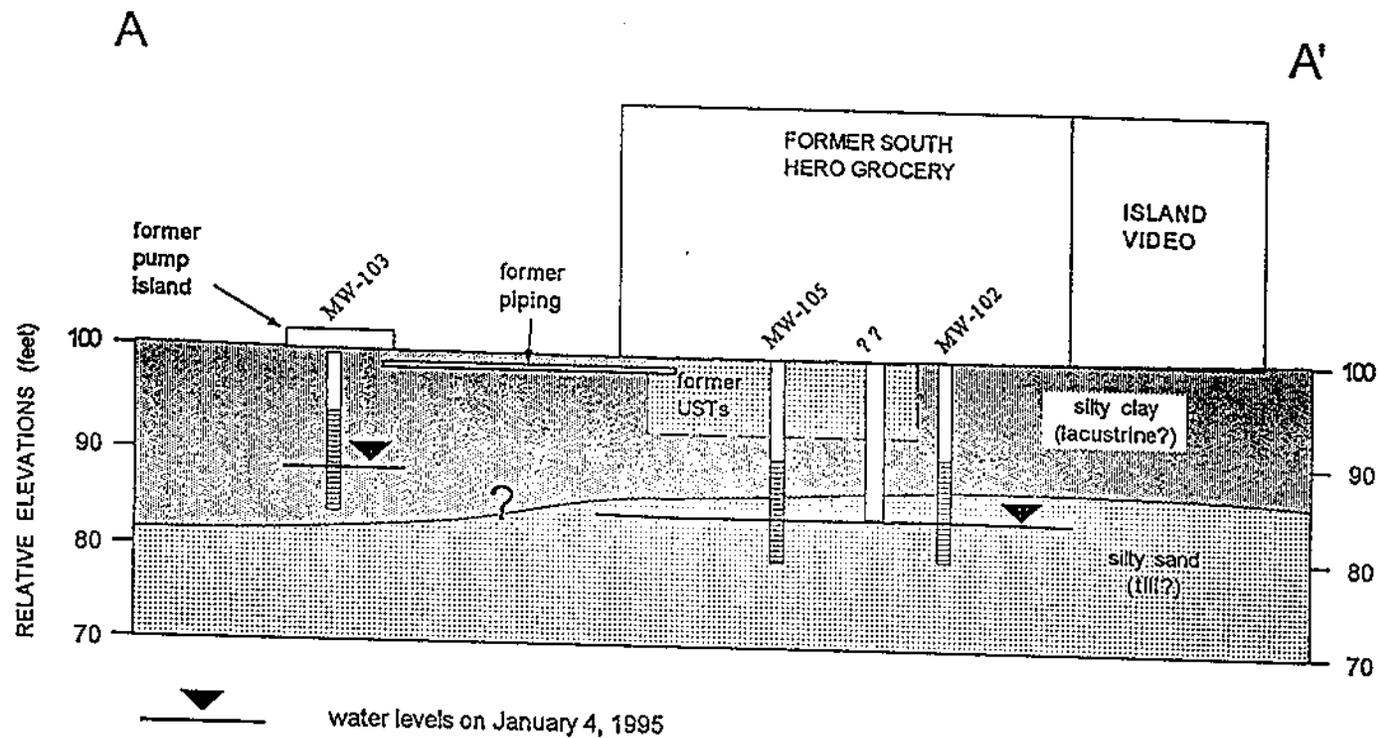
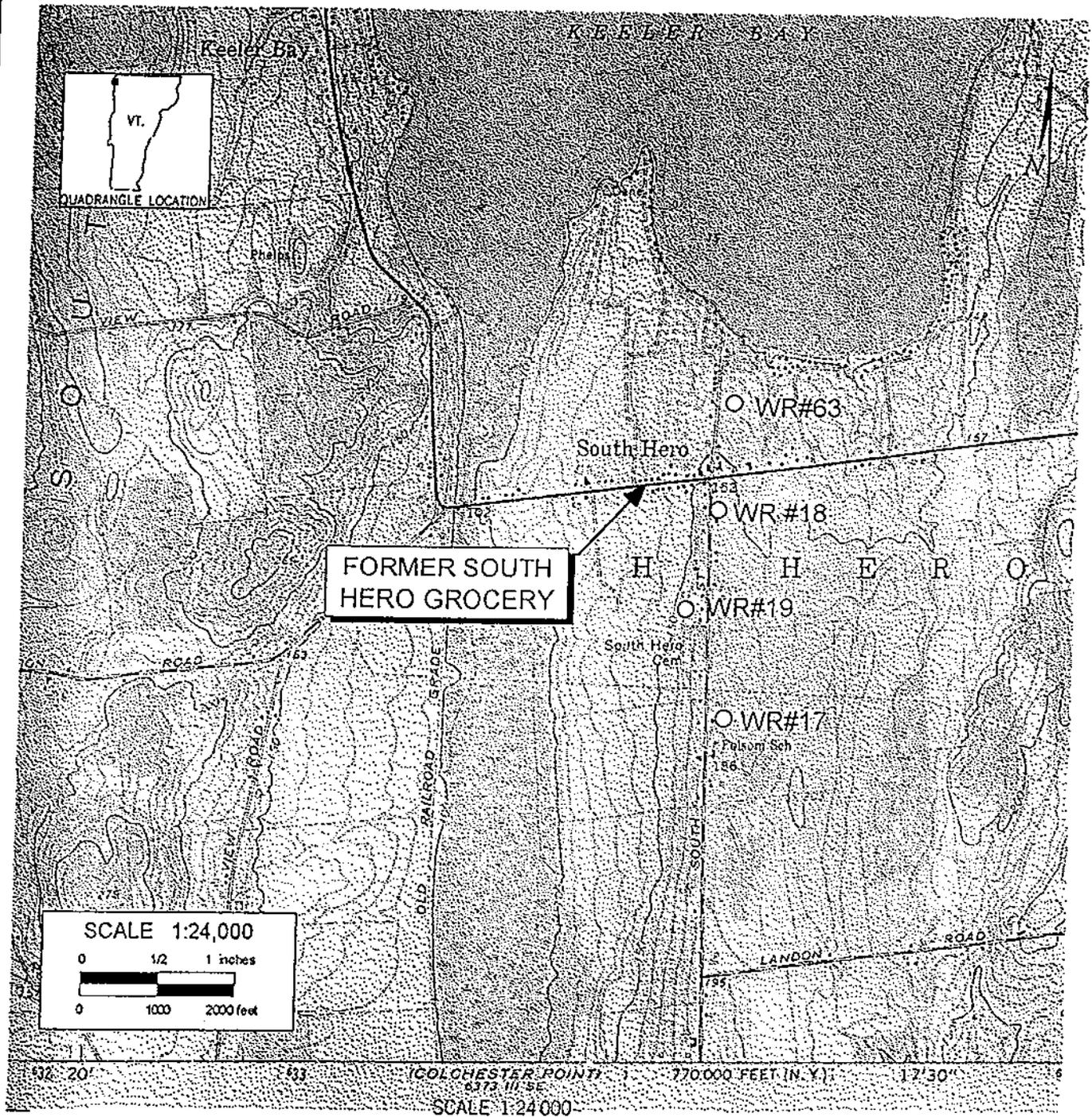


FIGURE 3
 Cross section (line of section A-A' shown on Figure 2),
 Former South Hero Grocery UST site investigation,
 328 Route 2, South Hero, Vermont (Facility ID #3724266).

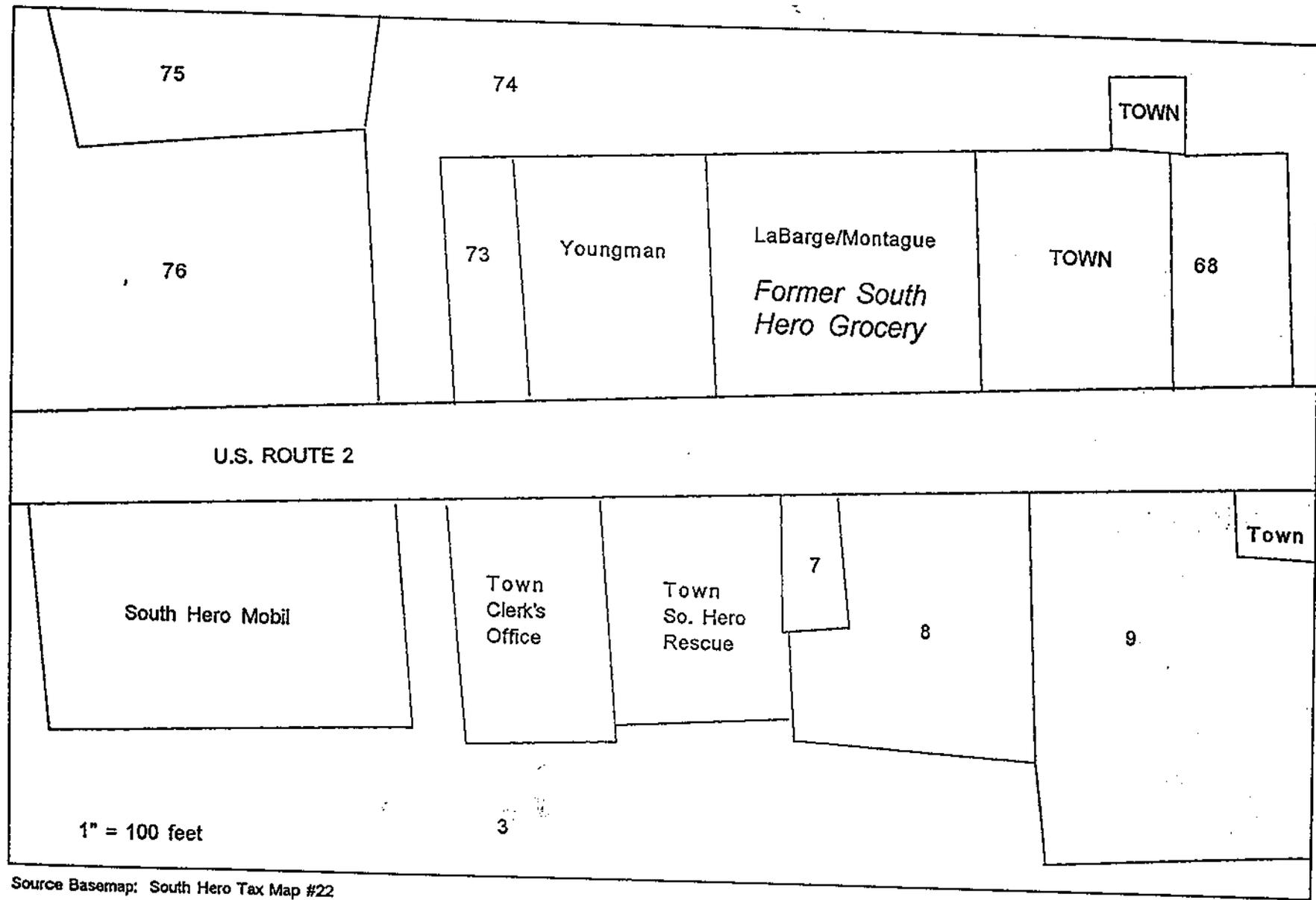


Base from U.S. Geological Survey, 1:24,000;
 South Hero, VT-NY, VT, 1966

Well Locations from Vermont Water Supply Division's Well
 Inventory for South Hero, Vermont

○ WR#17 - well location/log #

FIGURE 4
 Locations of nearest private wells,
 former South Hero Grocery UST site investigation,
 South Hero, Vermont (Facility ID #3724266).



Source Basemap: South Hero Tax Map #22

FIGURE 5
South Hero tax map showing location of former South Hero Grocery,
South Hero Mobil, and surrounding property owners.

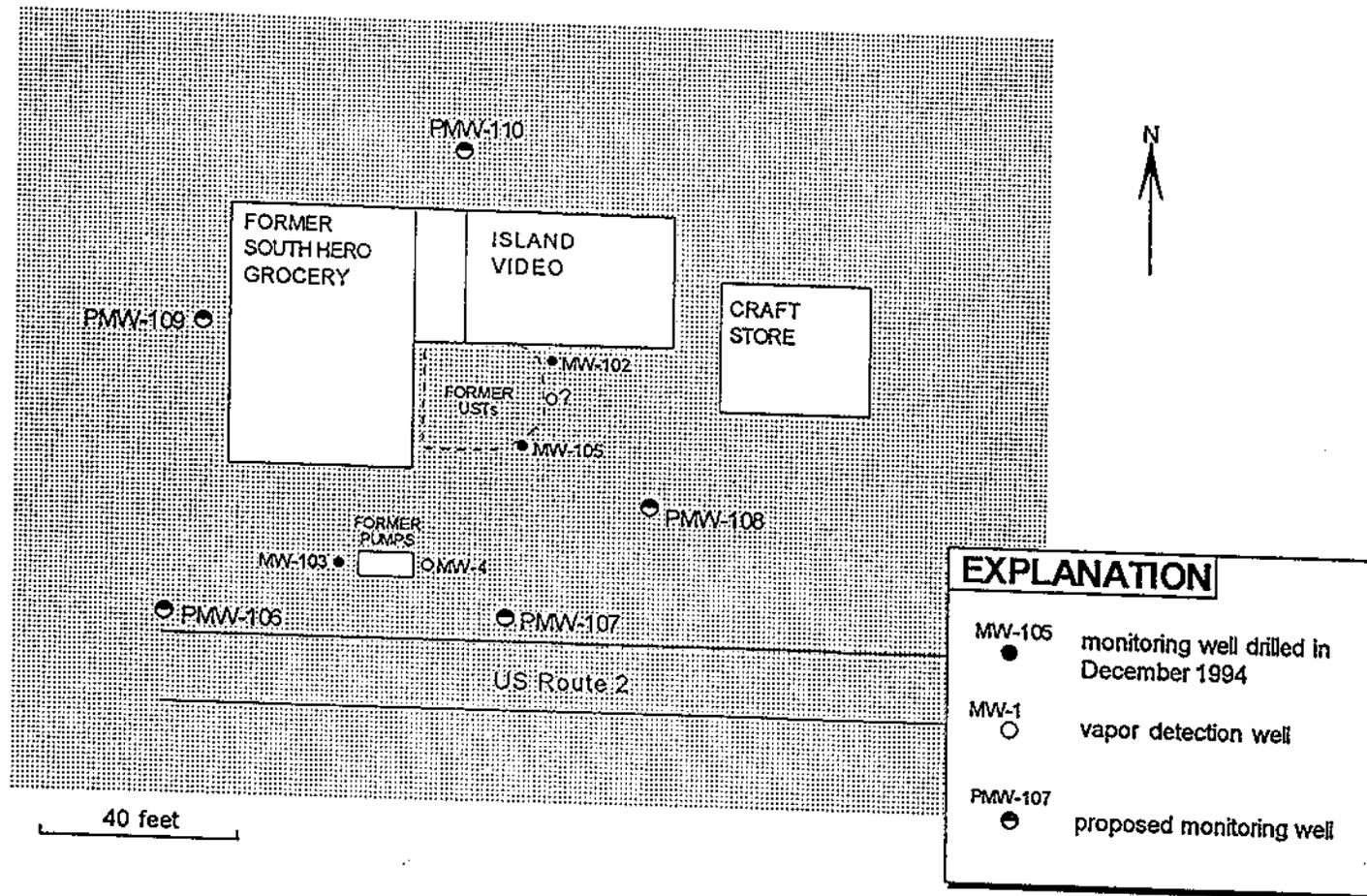


FIGURE 6
 Proposed monitoring well locations,
 former South Hero Grocery UST site investigation,
 South Hero, Vermont, Facility ID #3724266.

ADAMS ENGINEERING
Gerard Adams
RD #1, Box #3700, Underhill, VT 05489

December 18, 1994
Revised February 27, 1995

Mr. Tim Schmalz
Jefferson P. Hoffer Hydrgeologist.

Well Logs: South Hero Grocery.

Pulled existing 2" X 12.8' wells, used existing manways, sampled with polyethylene (PE) lined 5' X 2.375" ID NQ vibrated to depth, pulled & sample vibrated from casing in PE liner for examination; well with slip cap to create annulus & sandpack vibrated to depth in open 2.75" borehole left by sampler; bentonite slurry placed in open hole. Not developed.

12/15/94 MW #102.

SOILS WELL

- 0.3' Top of well 10' X 1.5" solid riser, typ.
- 1.5' Top bentonite slurry.
- 4' Bottom of bentonite top native backfill.
- 7' Bottom of native backfill top of sandpack #1 NJ, typ.
- 10.3' Top of well screen 2-5' X 1.5" X .010" slot Hi. Flo. screen, typ.
- 12 > 15.2' Two tries NQ sampler & 1 try EW (1.5" ID) very dense light brown very silty sand
- 15 > 20.5' 4" solid augers, silty sand saturated.
- 20.3' Bottom of screen & well with slip & threaded caps.
- 20.5 > 23.6' NQ sampler, fine sand spoil // (over) saturated silty medium sand// very silty medium sand.

MW #105, Original 2" well frozen into manway.

- 0.3' Top of well 10' solid riser.
- 2.0' Top bentonite slurry.
- 5.8' Bottom of bentonite top of sandpack #1 NJ.
- 10.3' Top of well screen 2-5' X 1.5" X .010" slot Hi. Flo. screen.
- 12 > 14' Refusal rock in tip, light brown silty sand.
- 15 > 20.5' 4" solid augers, rubble.
- 20.3' Bottom of screen & well with slip & threaded caps.
- 20.5 > 23.6' NQ sampler, fine sand spoil // (over) saturated silty medium sand// very silty medium sand.

MW #103

- 0.3' Top of well 5' solid riser.
- 1.0' Top bentonite slurry.
- 3' Bottom of bentonite top of sandpack #1 NJ.
- 4.7' Top of well screen 10'.
- 12 > 14.8' Saturated coarse sand//saturated silty fine sand//tough DRY dark brown fine sandy silt & stones, water with sheen @ 9.7', tried to sample deeper with no success.
- 15 > 20.5' 4" solid augers, rubble.
- 14.7' Bottom of screen & well with point.

G. Adams



SOIL BORING/MONITORING WELL CONSTRUCTION LOG

Well/Boring ID: MW-102

Project Name: S.B. Collins, South Hero, Vermont	WELL CONSTRUCTION
Site: South Hero Grocery	Total Depth Drilled: 23.6'
Project Number: 04-15	Screen Type/Interval: 10-slot, 1.5" PVC, 20.3' - 10.3'
Driller: Adams Engineering	Sandpack Type/Interval: #1 filter sand, 20.3' - 4.0'
Drilling Method: 2.375" Hollow Barrel Sampler	Riser Type/Interval: 2.0" PVC, 10.3' - 0.0'
Geologist: T. Schmalz	Seal Type/Interval: bentonite slurry, 4.0' - 1.5'
Sampling Method: 2.375" Hollow Barrel Sampler	Measuring Point/Stickup: top of PVC casing, flushmount
Date/Time Started: 12/16/94, 0940	Water Level/Date/Time: 16.97, 12/16/94, 1658
Date/Time Completed: 12/16/94, 1120	Elevation of Top of PVC: 99.88'
Weather: 20°, overcast	
Surface Conditions: Level asphalt south of video store	

Sample Interval (feet)	Recovery (feet)	Sample Description	Comments	PID Reading (ppm)*
0.0-12.7'	NR (not sampled)	Pushed spoon to base of former well, through brown, m to c sand and silt	Prev. well s.pack to 12.7' approx.	
12.7-17.7'	2.3	2.0' -Brown SILTY SAND, moist, loose f to m sand 0.3' - fine sand, firm	Prev. well s.pack? Native material?	0.2
15.0-15.4'	0.4	0.4' Grey SILTY SAND, moist, f sand	Sampled with 1.5" spoon, ref. @ 15.4	29.0
15.4-20.5'	not sampled	cuttings from augers - same as above, saturation at 17'	4" SS Augers to 20.5, no samples	(0.0-5.8) (off augers)
20.5-23.6'	no return	cuttings from augers - same as above	2.375" spoon to 23.6', no return	

GENERALIZED GEOLOGIC LOG and OTHER OBSERVATIONS

- 0.0 - 12.7' Removed existing well (TD=12.7'), spooned through collapsed sandpack (brown SILTY SAND) to native material
- 12.7 - 15.0' Brown silty sand, loose (previous sandpack?) becoming more firm and finer (native?) with depth
- 15.0 - 23.6' Gray lacustrine silt and fine sand, firm to very firm, moist to wet

NOTES:

- * Peak Headspace Reading, Photovac MicroTIP HL-2000, calibrated to isobutylene
- BGS - Below Ground Surface, BTOC - Below Top of Casing, f - fine, m - medium, c - coarse

SOIL BORING/MONITORING WELL CONSTRUCTION LOG

Well/Boring ID: MW-103

Project Name: S.B. Collins, South Hero, Vermont	WELL CONSTRUCTION
Site: South Hero Grocery	Total Depth Drilled: 14.8' BGS
Project Number: 04-15	Screen Type/Interval: 10-slot, 1.5" PVC, 14.7' - 4.7'
Driller: Adams Engineering	Sandpack Type/Interval: #1 filter sand, 14.8' - 3.0'
Drilling Method: 2.375" Hollow Barrel Sampler	Riscr Type/Interval: 2.0" PVC, 4.7' - 0.0' BGS
Geologist: T. Schmalz	Seal Type/Interval: bentonite slurry, 3.0' - 1.0'
Sampling Method: 2.375" Hollow Barrel Sampler	Measuring Point/Stickup: top of PVC casing, flushmount
Date/Time Started: 12/16/94, 1505	Water Level/Date/Time: 16.97, 12/16/94, 1710
Date/Time Completed: 12/16/94, 1540	Elevation of Top of PVC: 99.23'
Weather: 20°, overcast	
Surface Conditions: Level asphalt south of grocery	

Sample Run Depth (feet)	Recovery (feet)	Sample Description	Comments	PID Reading (ppm)*
0.0-12.5	not sampled	12.8' Pushed spoon to base of former well, through brown, m to c sand and silt	Prev. well s.pack	
12.5-14.8	2.3'	1.0' Brown SILTY SAND, c to m sand and silt, wet, rounded to subrounded sand, poorly graded, loose	Prev. well s.pack strong gas odor	2400.0
		1.3' Brown silt and clay, stiff, slightly moist to moist,	Sheen on samples, fp in bag/H2O test	1900.0

GENERALIZED GEOLOGIC LOG and OTHER OBSERVATIONS

- 0.0 - 12.5' Removed existing well (TD=12.5'), sampled through collapsed sandpack (brown SILTY SAND) to native material
- 12.5 - 13.5' Sandpack from pre-existing well, soft, m to c sand and silt, saturated
- 13.5 - 14.8' Brown, stiff, slightly moist silts and clays, lacustrine, sand above is saturated

NOTES:

- * Peak Headspace Reading, Photovac MicroTIP HL-2000, calibrated to isobutylene
- BGS - Below Ground Surface, BTOC - Below Top of Casing, f - fine, m - medium, c - coarse

SOIL BORING/MONITORING WELL CONSTRUCTION LOG

Well/Boring ID: MW-105

Project Name: S.B. Collins, South Hero, Vermont	WELL CONSTRUCTION DETAILS
Site: former South Hero Grocery	Total Depth Drilled: 20.5'
Project Number: 04-15	Screen Type/Interval: 10-slot, 1.5" PVC, 20.3' - 10.3'
Driller: Adams Engineering	Sandpack Type/Interval: #1 filter sand, 20.5' - 5.8'
Drilling Method: 2.375" Hollow Barrel Sampler	Riser Type/Interval: 2.0" PVC, 10.3' - 0.0'
Geologist: T. Schmalz	Seal Type/Interval: bentonite slurry, 5.8' - 2.0'
Sampling Method: 2.375" Hollow Barrel Sampler	Measuring Point/Stickup: top of PVC casing, flushmount
Date/Time Started: 12/16/94, 1230	Water Level/Date/Time: 16.92, 12/16/94, 1652
Date/Time Completed: 12/16/94, 1310	Elevation of Top of PVC: 99.88'
Weather: 20°, overcast	
Surface Conditions: Level asphalt south of video store	

Sample Interval (feet)	Recovery (feet)	Sample Description	Comments	PID Reading (ppm)*
0 - 12.8'	not sampled	Pushed sampler to base of former well, through brown, m to c sand and silt	Prev. well s.pack to 12.8' approx.	
12.8-17.8'	2.2	Dark gray SILTY SAND, moist, dense, f to m sand	Gasoline odor in sample	126.0
15.0-15.8	0.8	Same as above	Sampler refusal at 15.8' BGS	120.0
15.8-20.5'	not sampled	cuttings from augers - same as above, saturation @ approx 17"	4" solid augers to 20.5'	(0.0-125.0) (off augers)

GENERALIZED GEOLOGIC LOG and OTHER OBSERVATIONS

0.0 - 12.8' Removed existing well (TD=12.8'), sampled through collapsed sandpack (brown SILTY SAND) to native material
 12.8 - 20.5' Dark gray alternating lacustrine silts and sands, f to m sand, dense, saturated below 17'

NOTES:

* Peak Headspace Reading, Photovac MicroTIP HL-2000, calibrated to isobutylene
 BGS - Below Ground Surface, BTOC - Below Top of Casing, f - fine, m - medium, c - coarse



P.O. Box 339
Randolph, Vermont 05060-0339
(802) 728-6313

LABORATORY REPORT

CLIENT: SB Collins, Inc.
ADDRESS: 54 Lower Welden St.
St. Albans, VT 05478

LABORATORY NO: 5-0025
PROJECT NO: 70249
DATE OF SAMPLE: 1/04/95
DATE OF RECEIPT: 1/05/95
DATE OF ANALYSIS: 1/13/95
DATE OF REPORT: 1/23/95

SITE: South Hero Grocery
ATTENTION: Carl Ruprecht

RESULTS

(Results expressed in micrograms per liter (ug/L))

MW-102 duplicate

PARAMETER	MW-102	MW-105	QC REP MW-105	MW-103	MW-C	Field Blank	Trip Blank
Methyl Tertiary Butyl Ether	69	1640	1510	255	65	BPQL	BPQL
Benzene	258	1250	1150	4620	247	BPQL	BPQL
Toluene	89	1290	1230	6940	81	BPQL	BPQL
Ethylbenzene	BPQL	363	414	1390	BPQL	BPQL	BPQL
Total Xylenes	25	3490	2950	15700	22	BPQL	BPQL
Chlorobenzene	BPQL	< 20	< 40	< 100	BPQL	BPQL	BPQL
1,2-Dichlorobenzene	BPQL	< 20	< 40	< 100	BPQL	BPQL	BPQL
1,3-Dichlorobenzene	BPQL	< 20	< 40	< 100	BPQL	BPQL	BPQL
1,4-Dichlorobenzene	BPQL	< 20	< 40	< 100	BPQL	BPQL	BPQL

EPA Method 8020
BPQL = Below Practical Quantitation Limit, 1 ppb

c: Jeff Hoffer

Respectfully submitted,

SCITEST, INC.

Roderick J. Lamothe
Roderick J. Lamothe
Laboratory Director

80 COLLINS, INC
64 LOR WOODEN ST

ST. ALBANS VT 05479

HOFFER & HOFFER,
(BELOW)

Scitest, Inc.

P.O. Box 339
Route 66 Professional Center, Randolph, VT 05060
Phone: (802)728-6313 Fax: (802)728-6044

Client: Jeff Hoffer Address: P.O. Box 428 Project # 70249
Contact: Jeff Hoffer Waterbury, VT 05676 Phone No: *
Date requested: 12/28/94 Requested by: JH/KED
Project Name: South Hero Grocery Date shipped: Pick Up
Date scheduled:

Additional Comments or Directions:
[Redacted]

CHAIN OF CUSTODY RECORD				DATE	TIME
Sampled By:*	<i>Walter Schudy</i>	DATE	TIME	Relinquished By: <i>Walter Schudy</i>	1/4/94
Accepted By:				Relinquished By:*	*
Accepted By:				Received by Scitest: <i>Kathie Dugg</i>	1/05/95 9:10a

Item Nos	Client ID or Description	Sampling Date	Sampling Time	Matrix	Preservative or Label	Bottle Type <small>Plastic/Glass</small>	Container Volume	Bottles per Sample	Parameters and Expiration Time 7days
①	MW-102	1/4/94	1015	GW	HCl	G	40 mL	2	EPA 8020
②	MW-105		1030	GW	HCl	G	40 mL	2	EPA 8020
③	MW-103		1040	GW	HCl	G	40 mL	2	EPA 8020
④	MW-C		1145	GW	HCl	G	40 mL	2	EPA 8020
⑤	Field Blank		1050	GW	HCl	G	40 mL	2	EPA 8020
⑥	Trip Blank		0830	GW	HCl	G	40 mL	2	EPA 8020

*Parameters correct as listed Client Initial: _____
Please fill in ALL areas marked with an asterisk (*). Thank you.

w:\requests\jeffhoffer

Report Reviewed By:	Preserve Check:	Project Nos 70249	LABORATORY NUMBER: 5-0025
Date:			LOGIN: <i>K Dugg</i>

December 9, 1994

Carl Ruprecht, UST Manager
S.B. Collins, Inc.
54 Lower Welden Street
St. Albans, Vermont 05478

Re: UST Closure Sampling Results, South Hero Grocery, South Hero, VT
Facility ID #3724266

Dear Carl:

Enclosed is a copy of the laboratory results for a groundwater sample collected from monitoring well MW-3 at the former South Hero Grocery. The sample was collected during the site UST closures on November 22, 1994. Groundwater was not found in any of the other site monitoring wells. The laboratory results indicate high levels of dissolved BTEX and slightly lower levels of MTBE.

A site investigation is being implemented at this site under the "Expressway" program. I've tentatively scheduled monitoring well installations with Adams Engineering for the week of December 12 - 16. The plan is to pull the existing monitoring wells (MW-1, MW-2, and MW-5) and re-drill three new wells at these same locations. We will obtain water levels and reference elevations from these wells in order to map the groundwater flow direction and determine if additional wells will be needed.

I am sending a copy of this letter and lab results to Ted Unkles as a follow up to my November 23, 1994, site assessment report. Please call me if you have any questions.

Sincerely,



Jefferson P. Hoffer
Principal Hydrogeologist

enc.

cc: Ted Unkles, VTDEC



P.O. Box 339
Randolph, Vermont 05060-0339
(802) 728-6313

LABORATORY REPORT

CLIENT:	Carl Ruprecht	LABORATORY NO:	4-3119
ADDRESS:	SB Collins, Inc. 54 Lower Welden St. St. Albans, VT. 05478	PROJECT NO:	70249
		DATE OF SAMPLE:	11/22/94
		DATE OF RECEIPT:	11/23/94
		DATE OF ANALYSIS:	12/06/94
SITE:	SB Collins South Hero, Vermont	DATE OF REPORT:	12/07/94
ATTENTION:	Carl Ruprecht		

Results
(Results expressed in micrograms per liter (ug/L))

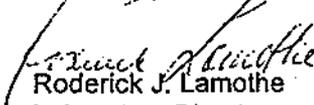
PARAMETER	MW-3
Methyl Tertiary Butyl Ether	392
Benzene	5960
Toluene	8750
Ethylbenzene	1610
Total Xylenes	15380
Chlorobenzene	< 200
1,2-Dichlorobenzene	< 200
1,3-Dichlorobenzene	< 200
1,4-Dichlorobenzene	< 200
Surrogate % Recovery	88%

EPA Method 8020

c: Jefferson P. Hoffer

Respectfully submitted,

SCITEST, INC.


Roderick J. Lamothe
Laboratory Director

54 LOWER WELDEN ST.
ST ALBANS, VT. 05478

OF RESULTS TO: CONSULTING HYDROGEOLOGISTS

Scitest, Inc.

P.O. Box 339
Route 66 Professional Center, Randolph, VT 05060
Phone: (802)728-6313 Fax: (802)728-6044

LABORATORY NUMBER:

LOGIN: *KLG*

Client: Jeff Hoffer - ~~Esplanade~~'s
Contact: **SBC-S. HERO**
Date requested: 9/6/94
Date shipped: 9/6/94
Date scheduled:

Project # **004015** 70249 Address: P.O. Box 428
Phone No: Waterbury, VT 05676
Requested by: **KLG**
Cooler #(s):

Cals Checked by:
Date:
Report Prepared by:
Date:
Data Tran Checked by:
Date:

CHAIN OF CUSTODY	DATE	TIME	Additional Comments:
SAMPLED BY: <i>[Signature]</i>			
RELINQUISHED BY: <i>[Signature]</i>	11/23	1455	
RECVD BY SCITEST INC: <i>[Signature]</i>	11/23/94	1455	

Item Nos	Client ID or Description	Sampling Date/Time	Type Comp/Grab	Matrix	Preserve/ Label	Preserve Check	Bottle Type	Reqd. Volume	Bottles/ Sample	ASAP	Parameters and Holding Times			
											24 hrs	48 hrs	7days	>7days
1	MW-3	11/22 1236	Grab	GW	HCl		Glass	40 mL	2				EPA 8020	
2			Grab		HCl		Glass	40 mL	2				EPA 8020	
3			Grab		HCl		Glass	40 mL	2				EPA 8020	
4			Grab		HCl		Glass	40 mL	2				EPA 8020	
5			Grab		HCl		Glass	40 mL	2				EPA 8020	
6			Grab		HCl		Glass	40 mL	2				EPA 8020	
7			Grab		HCl		Glass	40 mL	2				EPA 8020	
8			Grab		HCl		Glass	40 mL	2				EPA 8020	
9			Grab		HCl		Glass	40 mL	2				EPA 8020	
10			Grab		HCl		Glass	40 mL	2				EPA 8020	
11	Trip Blank		Grab		HCl		Glass	40 mL	2				EPA 8020	

November 23, 1994

Carl Ruprecht, UST Manager
S.B. Collins, Inc.
54 Lower Welden Street
St. Albans, Vermont 05478

Re: UST Closure Site Assessment Report, South Hero Grocery, South Hero, VT
Facility ID #3724266

Dear Carl:

This letter presents a site assessment report for the closure of three underground storage tanks (USTs) at the former South Hero Grocery, 328 Route 2, South Hero, Vermont. UST Program tank pull forms are enclosed for your signature and submittal to the State. Two sets of photographs are also enclosed.

I arrived at the site at noon on Tuesday, November 22, 1994. S.B. Collins (SBC) personnel had excavated down to the tops of the tanks, and Environmental Products & Services (EPS) personnel were in the process of inerting and cleaning the tanks in place. I took photoionization detector (PID) readings of the excavated soil, and checked water levels and PID headspaces of the four accessible monitoring wells while EPS was cleaning the tanks. I collected a sample from monitoring well MW-4, the only well which had water. After two of the USTs were removed from the excavation, I screened the excavation floor and sidewalls, and inspected the integrity of the USTs. The third UST extends underneath the building foundation and plans were apparently being made to close this tank in place. At the time of the preparation of this letter, the plan was to fill the tank with a slurry mixture on Wednesday, November 23, 1994, pending approval from the State.

ENVIRONMENTAL SETTING AND GENERAL SITE OBSERVATIONS

The site is the former South Hero Grocery, 328 Route 2, South Hero, Vermont. Figure 1 presents a site location map. According to SBC personnel at the site, the South Hero Grocery has not operated for about two years. SBC had maintained the tanks during their use by the Grocery, and the USTs were being removed from service. A site sketch is provided as Figure 2. The building at the site includes the former Grocery, which is a two-story concrete-block structure. The Island Video store and office are located in an apparent addition to the former Grocery building. Neither structure has a basement. Personnel in the video store have not noticed any petroleum odors.

As shown on Figure 1, the site is located in a residential and commercial neighborhood along Route 2 in the Champlain Islands. Keeler Bay of Lake Champlain is located about 2000 feet north of the site. Elevation at the site is approximately 140 feet above mean sea level, about 40 feet higher than the mean elevation of Lake Champlain. Topography in the vicinity grades gently westward and northward. Stewart's (1974) surficial geologic map shows till and lacustrine and marine silts and clay in the area. According to the South Hero Town Clerk, the residences and businesses along Route 2 are served by municipal water, the South Hero Fire District #1.

Five leak-detection monitoring wells were in place at the site at the time of the UST closure. Each of these monitoring points was approximately 13 feet deep, and equipped with a vapor sensor device. MW-5 was apparently covered with excavated soil when I arrived at the site, and the top of MW-1 was broken during the soil excavating. Water was detected only in MW-3, at a depth of 11.85 feet below the top of the casing. A grab water sample was collected from this well using a polyethylene bailer. The sample was later submitted to Scitest Laboratory Services (Randolph, Vermont) for analysis of BTEX and MTBE. PID (MicroTIP HL-2000, 10.6 eV lamp, calibrated to respond to isobutylene) readings were taken in the well headspaces and are given below:

WELL ID	PID HEADSPACE (ppm)
MW-1	300
MW-2	3.5
MW-3	34.2
MW-4	149

Approximately 15 to 20 cubic yards of soil were excavated from the top of the tanks to allow access for inerting and cleaning. This soil (reddish-brown gravelly silty sand) was temporarily placed on the asphalt immediately adjacent to the tank excavation. At six locations in the stockpile, a shovel was used to remove about six inches of soil. The PID tip was placed near the freshly-exposed soil to obtain a reading. Readings were in the 1 to

2 ppm range, with a maximum of 10 ppm. SBC personnel were planning to place this soil back in the excavation after the closure of Tank T-1 was completed.

TANK EXCAVATIONS

The three tanks included two used for gasoline and one for diesel. Tanks locations are shown on Figure 2. Tanks sizes are given below:

- Tank T-1, 4000 gallons, formerly used for gasoline storage
- Tank T-2, 3000 gallons, formerly used for gasoline storage
- Tank T-3, 2000 gallons, formerly used for diesel fuel storage

As shown on Figure 2, Tank T-1 extends underneath the building occupied by Island Video. As a result, this tank could not be removed and was cleaned in place by EPS personnel. EPS personnel reported that the interior surface of the tank appeared to be in relatively good shape. The visible portion of the exterior surface of the tank appeared to be in relatively good shape.

The 3000-gallon Tank T-2 was lined with fiberglass. A fiberglass patch was visible on the top of the tank, suggesting that the fiberglass surface was applied while the tank was in place. Upon removal from the ground, the tank was visually inspected. Although the overall condition of the tank was relatively good, a number of corrosion holes were found on the western end (bottom 1/6) of the tank. The interior layer of fiberglass was visible through the holes in the steel. Based on these observations, it appears that historical leaks from this tank prompted the fiberglass lining.

After removal of Tank T-2, the excavation underneath and alongside the former tank location was screened with a PID. Soil directly underlying the tank was silty clay. PID readings in the silty clay directly below the spine of the tank and on the western end registered over the maximum capacity (2500 ppm) of the instrument. Soils in contact with the tank showed two color zones. Above the middle of the tank, soils were orangish-red indicative of oxidizing conditions. Below the middle of the tank, soils were darker-colored, due to either reducing conditions and/or product staining.

Holes were also observed in the former diesel tank, T-3. The holes were visible on the lower 1/3 of the tank distributed uniformly along the tank's length. There was no fiberglass lining in this tank. Soil underlying and surrounding the tank was silty clay with PID readings exceeding 2500 ppm. PID readings in the backfill gravelly silty sands on the southern sidewall of the T-3 excavation were in the 10 to 15 ppm range.

The enclosed Figure 3 presents plan view and cross-section sketches of the tank excavation pit. Two main soil types were encountered; a fairly dense reddish-brown gravelly sand (backfill), and a dry, dense, silty clay (apparently native). No groundwater was encountered in the excavation.

EXTENT OF CONTAMINATION

Evidence of releases of petroleum hydrocarbons at the site include holes in the tanks, and elevated PID readings in soil underneath and surrounding the tanks. PID readings of soil exposed in the tank excavation ranged from 10 to 15 ppm in the overlying gravelly silty sand fill to >2500 ppm in the silty clay directly underneath the tanks. Elevated PID readings were detected in the headspace of a dry monitoring well located adjacent to the USTs (MW-1). Elevated PID readings were obtained in the two monitoring wells which are located on the ends of the former pump island, suggesting contamination from the USTs has reached this location, or that other leakage occurred from the pumps or piping. Water was present in one of these wells, MW-3, and a grab sample was collected and submitted for laboratory analysis.

POTENTIAL RECEPTORS

As stated above, the businesses and residences along Route 2 in the vicinity of the site are serviced by municipal water. As a result, there are no known water supplies which appear to be threatened by contamination at the site. However, the State's water well inventory should be checked to see if any domestic water wells are located near the site.

There are no basements in the structures immediately adjacent to the former UST locations. Personnel of the Island Video store have not reported any petroleum vapors in their building, which is directly above Tank T-1.

The nearest surface waters include wetlands to the west, and Keeler Bay to the north. Distances to these surface waters is greater than 2000 feet. Based on the low permeability soils observed during the UST excavations, site contamination, although presently undefined, does not appear to pose a risk to these surface waters.

SUMMARY AND RECOMMENDATIONS

Closure of three out-of-service USTs at the South Hero Grocery began on November 22, 1994. One of the tanks extends under the building, and in-place closure of this tank was planned. The remaining two tanks were excavated and removed, and holes were observed in both tanks. Elevated PID readings in soil and monitoring well headspaces indicate that releases of petroleum hydrocarbons have occurred at the site.

Although this preliminary evaluation has not determined that potential receptors are threatened by site contamination, additional investigation is needed to define the nature and extent of contamination at the site.

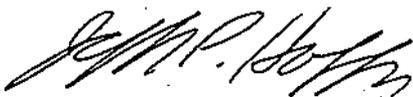
Mr. Carl Ruprecht
November 23, 1994
Page 5

It is recommended that this site be investigated under the Sites Management Section's "Expressway" program. Groundwater monitoring wells should be installed at the site to define the stratigraphy and groundwater flow directions, and to perform groundwater sampling to define the impact of site releases to groundwater.

Since the direction of groundwater flow at the site is unknown, a phased approach to monitoring well installation is recommended. One option would be to use the existing monitoring well locations (i.e., pull existing wells and re-drill). By deepening and installing new wells at three locations, the groundwater flow direction can be defined. At that point in time, groundwater sampling results and flow direction can be utilized to determine if and where additional monitoring wells are needed.

Please call me if you any questions.

Sincerely,

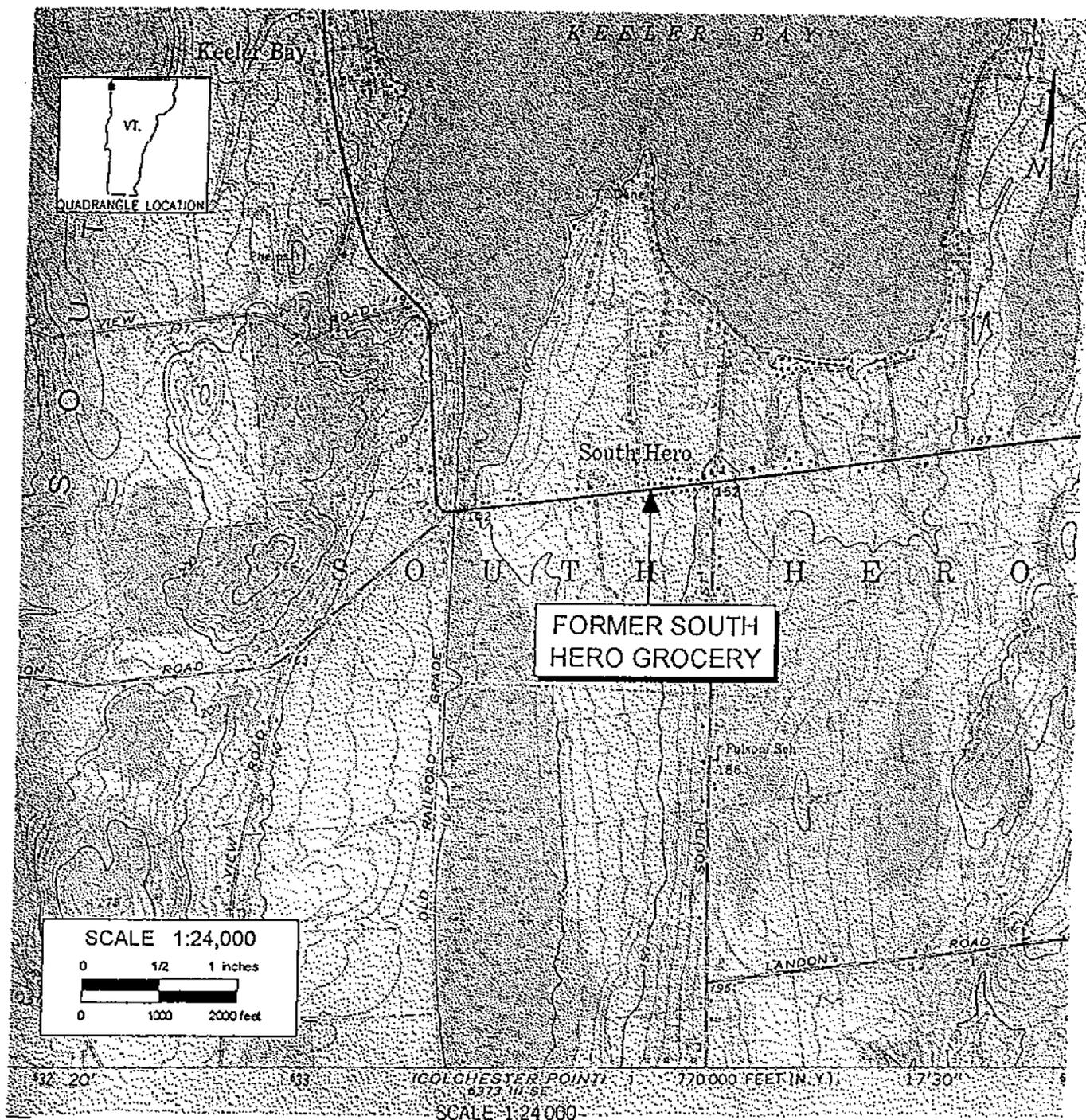


Jefferson P. Hoffer
Principal Hydrogeologist

enc.

REFERENCES

Stewart, D.P., 1974, Geology for Environmental Planning in the Milton-St. Albans Region, Vermont, Vermont Geological Survey, Environmental Geology No. 5.



Base from U.S. Geological Survey, 1:24,000;
 South Hero, VT-NY, VT, 1966

FIGURE 1
 Site location map, former South Hero Grocery,
 328 Route 2, South Hero, Vermont (Facility ID #3724266).

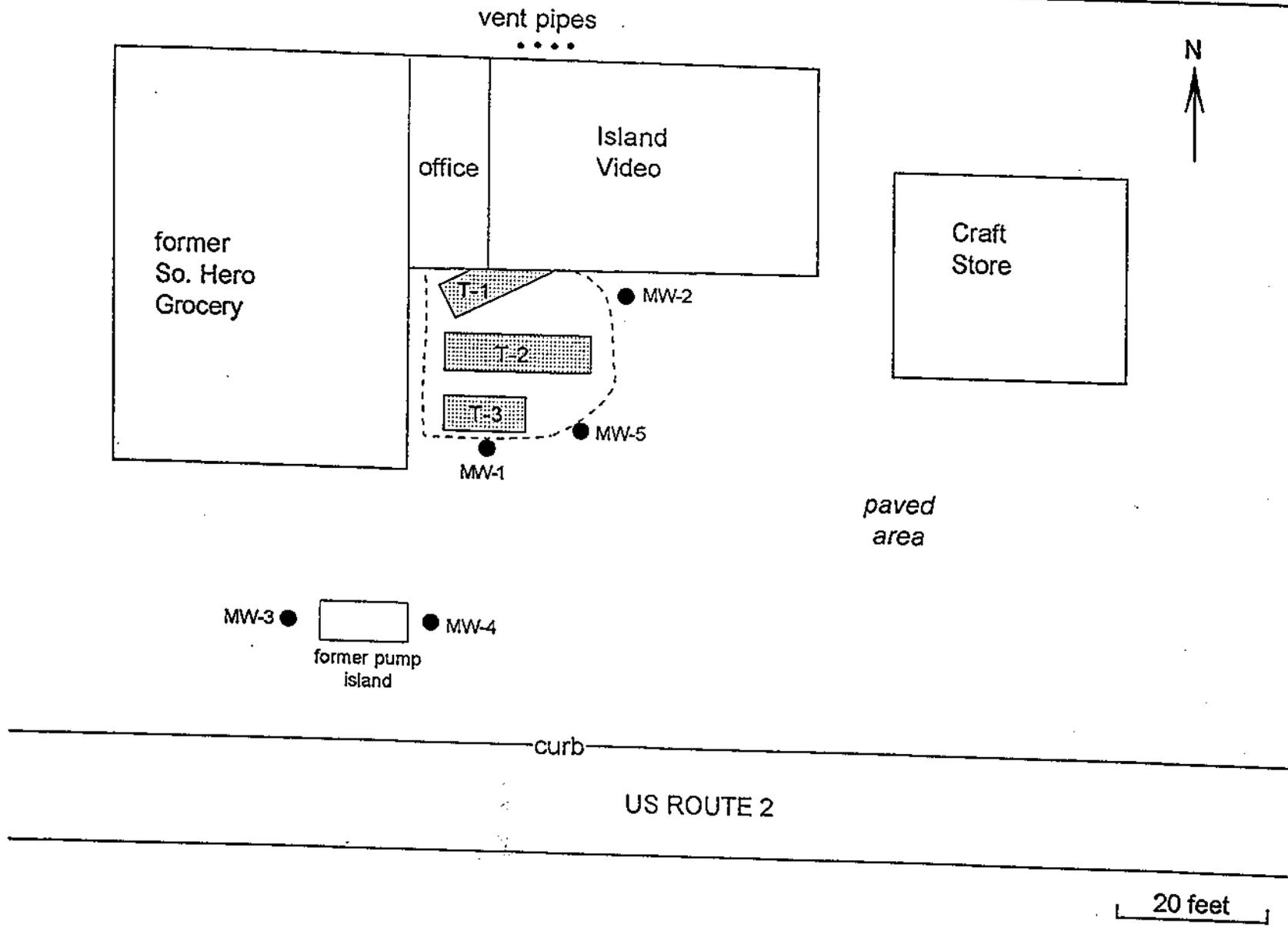


FIGURE 2
Site sketch of the former South Hero Grocery USTs,
328 Route 2, South Hero, Vermont (Facility ID #3724266)

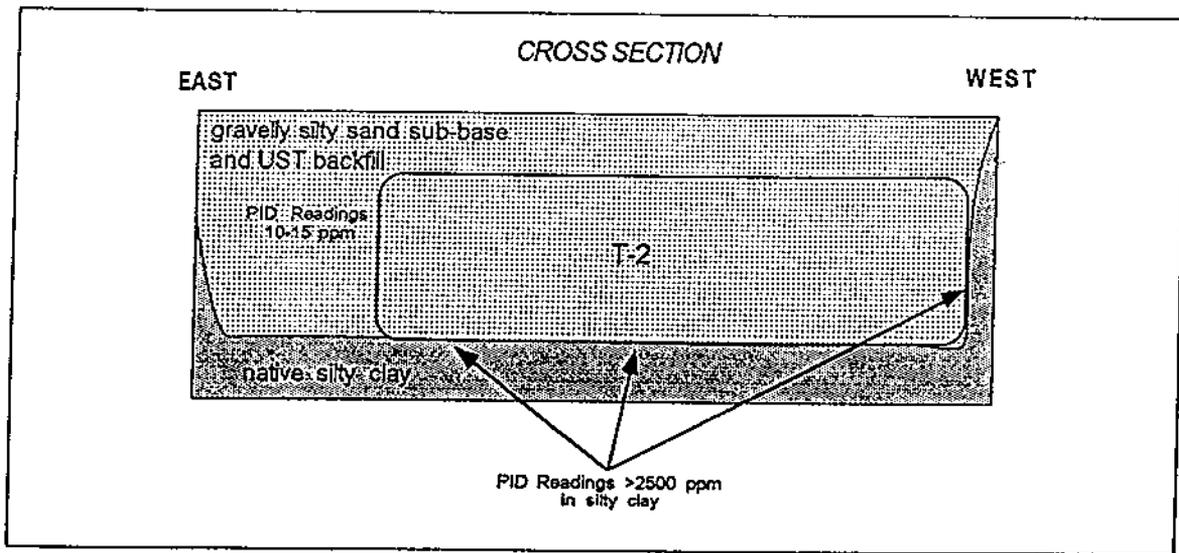
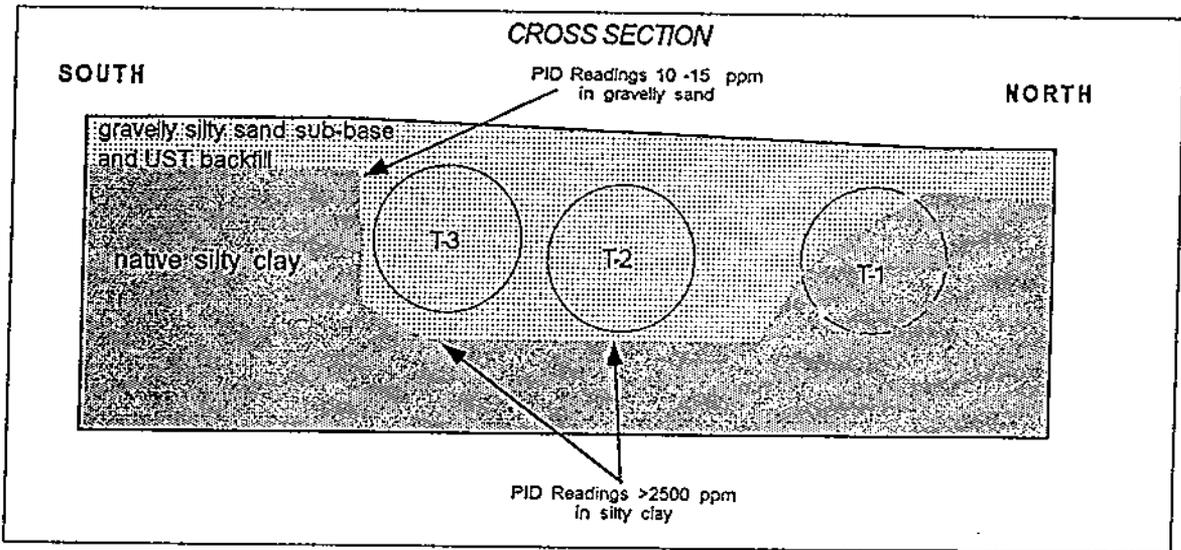
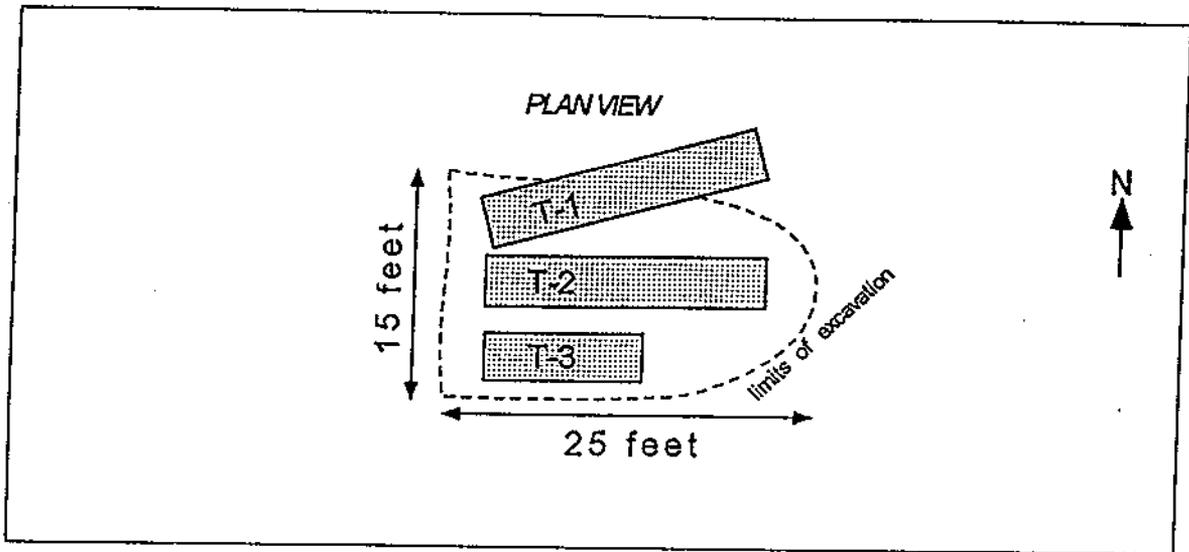


FIGURE 3
Plan view and cross-section sketches of UST excavation,
former South Hero Grocery, South Hero, Vermont (Facility ID #3724266)

SOIL BORING / MONITORING WELL CONSTRUCTION LOG

Well Boring ID: MW-102

Project Name:	S.B. Collins/So. Hero Grocery
Site:	Former South Hero Grocery
Project Number:	04-15
Driller:	Adams Engineering
Drilling Method:	2.375" hollow barrel sampler
Geologist:	T. Schmalz
Sampling Method:	2.375" hollow barrel sampler
Date/Time Started:	12/16/94, 0940
Date/Time Completed:	12/16/94, 1120
Weather:	Overcast, 20°
Surface Conditions:	Level asphalt

Well Construction	
Total Depth Drilled:	23.6' BGS
Screen Type/Interval:	1.5" PVC #10 slot, 20.3' to 10.3' BGS
Sandpack Type/Interval:	#1 filter sand, 20.3' to 4.0' BGS
Riser Type/Interval:	2" PVC, 10.3' to 0.0' BGS
Seal Type/Interval:	Bentonite slurry, 4.0' to 1.5' BGS
Measuring Point/Stickup:	Top of PVC casing, flush mount
Water Level/Date/Time:	16.97', 12/16/94, 1658
Elevation of Top of PVC:	99.88'
Well Development:	none

Sample Run Depth (feet)	Recovery (feet)	Sample Description	SCS Classification	PID Reading* (ppm)
0.0 - 12.7	NR (not sampled)	12.7 Brown, moist, soft silty sand (70% medium to coarse well-sorted brown subangular sand, 30% brown silt and clay).	sandy loam	
12.7 - 15.0	2.3	2.0 Same (as above). 0.3 Same (as above), fine to medium sand, becoming firm.	sandy loam	0.2
15.0 - 15.4	0.4	0.4 Gray, moist, silty sand (65% fine sand, 35% silt and clay).	sandy loam	29
15.4 - 23.6	NR (not sampled)	8.2 Same (as above), saturation at 17.0' BGS.	sandy loam	(0.0 - 5.8) (off augers)

Generalized Geologic Log and Other Observations

0.0 - 12.7 Removed existing well (TD=12.7'), spooned through collapsed sandpack (brown silty sand) to native material.

12.7 - 15.0 Brown, lacustrine silty sand, loose, becoming more firm.

15.0 - 23.6 Solid stem auger through lacustrine silty sands interlayered with firm wet silts, saturation at 17.0' BGS.

Notes:

* = Peak Headspace Reading, Photovac MircoTIP HL-2000, calibrated to isobutylene

BGS = Below Ground Surface

SOIL BORING / MONITORING WELL CONSTRUCTION LOG

Well Boring ID: MW-103

Project Name:	S.B. Collins/So. Hero Grocery
Site:	Former South Hero Grocery
Project Number:	04-15
Driller:	Adams Engineering
Drilling Method:	2.375" hollow barrel sampler
Geologist:	T. Schmalz
Sampling Method:	2.375" hollow barrel sampler
Date/Time Started:	12/16/94, 1505
Date/Time Completed:	12/16/94, 1540
Weather:	Overcast, 20°
Surface Conditions:	Level asphalt

Well Construction	
Total Depth Drilled:	14.8' BGS
Screen Type/Interval:	1.5" PVC #10 slot, 14.7' to 4.7' BGS
Sandpack Type/Interval:	#1 filter sand, 14.8' to 3.0' BGS
Riser Type/Interval:	2" PVC, 4.7' to 0.0' BGS
Seal Type/Interval:	Bentonite slurry, 3.0' to 1.0' BGS
Measuring Point/Stickup:	Top of PVC casing, flush mount
Water Level/Date/Time:	16.97', 12/16/94, 1710
Elevation of Top of PVC:	99.23'
Well Development:	none

Sample Run Depth (feet)	Recovery (feet)	Sample Description	SCS Classification	PID Reading* (ppm)
0.0 - 12.5	NR (not sampled)	12.5 Brown, moist, soft silty sand (70% medium to coarse well-sorted brown subangular sand, 30% brown silt and clay).	sandy loam	
12.5 - 14.8	2.3	1.0 Brown, wet, loose silty sand (85% well-sorted, medium to fine sand, 15% silt and clay).	loamy sand	2400
		1.3 Brown, slightly moist, dense sandy silt (80% stiff, brown silt and clay, 20% fine sand).	silty clay loam	1900

Generalized Geologic Log and Other Observations

0.0 - 12.5 Removed existing well (TD=12.7'), spooned through collapsed sandpack (brown silty sand) to native material.
 12.5 - 13.5 Brown, loose silty sand - old sandpack. Saturation at 13.0' approximately, strong gasoline odor.
 13.5 - 14.8 Brown, stiff, lacustrine silts, slightly moist.

Notes:

* = Peak Headspace Reading, Photovac MircoTIP HL-2000, calibrated to isobutylene
 BGS = Below Ground Surface

SOIL BORING / MONITORING WELL CONSTRUCTION LOG

Well Boring ID: MW-105

Project Name:	S.B. Collins/So. Hero Grocery
Site:	Former South Hero Grocery
Project Number:	04-15
Driller:	Adams Engineering
Drilling Method:	2.375" hollow barrel sampler
Geologist:	T. Schmalz
Sampling Method:	2.375" hollow barrel sampler
Date/Time Started:	12/16/94, 1230
Date/Time Completed:	12/16/94, 1310
Weather:	Overcast, 20°
Surface Conditions:	Level asphalt

Well Construction	
Total Depth Drilled:	20.3' BGS
Screen Type/Interval:	1.5" PVC #10 slot, 20.3' to 10.3' BGS
Sandpack Type/Interval:	#1 filter sand, 20.3' to 5.8' BGS
Riser Type/Interval:	2" PVC, 10.3' to 0.0' BGS
Seal Type/Interval:	Bentonite slurry, 5.8' to 2.0' BGS
Measuring Point/Stickup:	Top of PVC casing, flush mount
Water Level/Date/Time:	16.92', 12/16/94, 1652
Elevation of Top of PVC:	99.88'
Well Development:	none

Sample Run Depth (feet)	Recovery (feet)	Sample Description	SCS Classification	PID Reading* (ppm)
0.0 - 12.8	NR (not sampled)	12.8 Brown, moist, soft silty sand (70% medium to coarse well-sorted brown subangular sand, 30% brown silt and clay).	sandy loam	
12.8 - 14.0	2.2	2.2 Dark gray, moist, firm silty sand (65% fine to medium sand, 35% dense silt and clay).	sandy loam	126
14.0 - 14.8	0.8	0.8 Same (as above).	sandy loam	120
14.8 - 20.5	NR (not sampled)	5.7 Same (as above).	sandy loam	(0.0 - 125.0) (off augers)

Generalized Geologic Log and Other Observations

0.0 - 12.8 Removed existing well (TD=12.7'), spooned through collapsed sandpack (brown silty sand) to native material.

12.8 - 20.5 Dark gray, lacustrine sands with interbedded silts and clays. Solid stem augered from 15.8' to 20.5', saturation at 17.0' BGS.

Notes:

* = Peak Headspace Reading, Photovac MircoTIP HL-2000, calibrated to isobutylene

BGS = Below Ground Surface

SOIL BORING / MONITORING WELL CONSTRUCTION LOG

Well Boring ID: MW-106

Project Name:	S.B. Collins/So. Hero Grocery
Site:	Former South Hero Grocery
Project Number:	04-15
Driller:	Tri-State Drilling & Boring
Drilling Method:	4.25" hollow stem auger
Geologist:	T. Schmalz
Sampling Method:	2" split spoon
Date/Time Started:	4/11/95, 1440
Date/Time Completed:	4/11/95, 1530
Weather:	Clear, calm, 60°
Surface Conditions:	Level asphalt

Well Construction	
Total Depth Drilled:	20.0' BGS
Screen Type/Interval:	2" PVC #10 slot, 20.0' to 10.0' BGS
Sandpack Type/Interval:	#1 filter sand, 20.0' to 9.0' BGS
Riser Type/Interval:	2" PVC, 10.0' to 0.0' BGS
Seal Type/Interval:	Granular bentonite, 9.0' to 8.0' BGS
Measuring Point/Stickup:	Top of PVC casing, flush mount
Water Level/Date/Time:	14.43', 4/19/95, 1238
Elevation of Top of PVC:	
Well Development:	2" polyethylene bailer

Sample Run Depth (feet)	Blow Count, Recovery (feet)	Sample Description	SCS Classification	PID Reading* (ppm)
5.0 - 7.0	7-9-11-13 (2.0)	2.0 Dark brown, slightly moist, firm silty clay, little sand, some gray mottling (85% brown silt and clay, 15% sand and fine angular gravel).	silty clay	1.3
10.0 - 12.0	7-8-8-10 (1.8)	1.8 Same (as above), increasing sand and gravel content, becoming sandy clay loam (70% silt and clay, 30% coarse sand).	sandy clay loam	9.9
15.0 - 17.0	5-6-9-15 (1.7)	1.2 Same (as above).	sandy clay loam	0.6
		0.5 Dark gray, firm, moist, gravelly clay loam (55% tough gray silt and clay, 25% fine sand, 20% fine, angular gravel).	gravelly clay loam	2.3

Generalized Geologic Log and Other Observations

0.0 - 13.8 Lacustrine/marine brown sandy silts and clay loam.

13.8 - 20.0 Lacustrine/marine gray gravelly clay loams, some sand (30% sand). Saturation at 15.0' BGS.

Notes:

* = Peak Headspace Reading, Photovac MircoTIP HL-2000, calibrated to isobutylenc

BGS = Below Ground Surface

SOIL BORING / MONITORING WELL CONSTRUCTION LOG

Well Boring ID: MW-107

Project Name:	S.B. Collins/So. Hero Grocery
Site:	Former South Hero Grocery
Project Number:	04-15
Driller:	Tri-State Drilling & Boring
Drilling Method:	4.25" hollow stem auger
Geologist:	T. Schmalz
Sampling Method:	2" split spoon
Date/Time Started:	4/11/95, 1140
Date/Time Completed:	4/11/95, 1300
Weather:	Clear, calm, 60°
Surface Conditions:	Level asphalt

Well Construction	
Total Depth Drilled:	22.0' BGS
Screen Type/Interval:	2" PVC #10 slot, 20.0' to 10.0' BGS
Sandpack Type/Interval:	#1 filter sand, 20.0' to 9.0' BGS
Riser Type/Interval:	2" PVC, 10.0' to 0.0' BGS
Seal Type/Interval:	Granular bentonite, 9.0' to 8.0' BGS
Measuring Point/Stickup:	Top of PVC casing, flush mount
Water Level/Date/Time:	16.85', 4/19/95, 1227
Elevation of Top of PVC:	
Well Development:	2" polyethylene bailer

Sample Run Depth (feet)	Blow Count, Recovery (feet)	Sample Description	SCS Classification	PID Reading* (ppm)
5.0 - 7.0	6-10-12-14 (1.2)	1.2 Dark red brown, slightly moist, silt and clay, trace gravel (95% red-brown, firm, tough silt and clay, 5% fine subangular gravel).	silty clay	2.9
10.0 - 12.0	7-12-13-18 (1.8)	1.8 Brown and gray, slightly moist, gravelly silt and clay with sand (70% brown, firm silt and clay, 20% fine gravel, 10% fine to coarse sand).	gravelly clay loam	1.9
15.0 - 17.0	18-19-20-25 (1.3)	1.3 Light brown and dark gray, wet silty sand (80% fine, well-sorted sand, 20% silt and clay).	loamy sand	6.9
20.0 - 22.0	18-30-25-12 (1.0)	1.0 Same (as above), slightly more gray.	loamy sand	2.1

Generalized Geologic Log and Other Observations

0.0 - 13.0 Brown and gray, lacustrine/marine gravelly sandy silts.

13.0 - 22.0 Brown and gray, moist to wet lacustrine sands with silt. Saturation at 16.0' BGS.

Notes:

* = Peak Headspace Reading, Photovac MircoTIP HL-2000, calibrated to isobutylene

BGS = Below Ground Surface

SOIL BORING / MONITORING WELL CONSTRUCTION LOG

Well Boring ID: MW-108

Project Name:	S.B. Collins/So. Hero Grocery
Site:	Former South Hero Grocery
Project Number:	04-15
Driller:	Tri-State Drilling & Boring
Drilling Method:	4.25" hollow stem auger
Geologist:	T. Schmalz
Sampling Method:	2" split spoon
Date/Time Started:	4/11/95, 1300
Date/Time Completed:	4/11/95, 1430
Weather:	Clear, calm, 60°
Surface Conditions:	Level asphalt

Well Construction	
Total Depth Drilled:	22.0' BGS
Screen Type/Interval:	2" PVC #10 slot, 20.0' to 10.0' BGS
Sandpack Type/Interval:	#1 filter sand, 20.0' to 8.5' BGS
Riser Type/Interval:	2" PVC, 10.0' to 0.0' BGS
Seal Type/Interval:	Granular bentonite, 8.5' to 7.5' BGS
Measuring Point/Stickup:	Top of PVC casing, flush mount
Water Level/Date/Time:	17.00', 4/19/95, 1225
Elevation of Top of PVC:	
Well Development:	2" polyethylene bailer

Sample Run Depth (feet)	Blow Count, Recovery (feet)	Sample Description	SCS Classification	PID Reading* (ppm)
5.0 - 7.0	2-12-13-20 (1.8)	1.8 Dark brown and gray, slightly moist, firm sandy silt (80% dark brown and gray firm silt and clay, 20% fine, well sorted sand).	silty clay loam	1.0
10.0 - 12.0	10-12-16-30 (1.8)	1.8 Dark gray and brown, slightly moist, stiff gravelly silt with sand (65% dark gray firm silt and clay, 20% fine subangular gravel, 15% sand).	gravelly silty clay loam	2.2
15.0 - 17.0	8-20-30-50/3 (1.4)	1.4 Light brown and dark gray, wet silty sand (85% fine, well-sorted sand, 15% silt and clay).	loamy sand	1.0
20.0 - 22.0	9-12-16-26 (1.6)	1.6 Same (as above), gray, wet.	loamy sand	1.0

Generalized Geologic Log and Other Observations

0.0 - 13.0 Brown, lacustrine/marine sandy silts.

13.0 - 22.0 Gray, lacustrine sands with silt. Saturation at 16.0 - 17.0' BGS.

Notes:

* = Peak Headspace Reading, Photovac MircoTIP HL-2000, calibrated to isobutylene

BGS = Below Ground Surface

SOIL BORING / MONITORING WELL CONSTRUCTION LOG

Well Boring ID: MW-109

Project Name:	S.B. Collins/So. Hero Grocery
Site:	Former South Hero Grocery
Project Number:	04-15
Driller:	Tri-State Drilling & Boring
Drilling Method:	4.25" hollow stem auger
Geologist:	T. Schmalz
Sampling Method:	2" split spoon
Date/Time Started:	4/10/95, 1635
Date/Time Completed:	4/11/95, 0910
Weather:	Clear, calm, 60°
Surface Conditions:	Level lawn

Well Construction	
Total Depth Drilled:	22.0' BGS
Screen Type/Interval:	2" PVC #10 slot, 20.0' to 10.0' BGS
Sandpack Type/Interval:	#1 filter sand, 20.0' to 9.0' BGS
Riser Type/Interval:	2" PVC, 10.0' to 0.0' BGS
Seal Type/Interval:	Granular bentonite, 9.0' to 8.0' BGS
Measuring Point/Stickup:	Top of PVC casing, flush mount
Water Level/Date/Time:	15.46', 4/19/95, 1240
Elevation of Top of PVC:	
Well Development:	2" polyethylene bailer

Sample Run Depth (feet)	Blow Count, Recovery (feet)	Sample Description	SCS Classification	PID Reading* (ppm)
0.0 - 2.0	2-4-9-8 (0.6)	0.6 Dark brown, slightly moist, soft gravelly sandy silt (75% dark brown, soft silt and clay, 15% fine to coarse angular sand, 10% fine gravel).	silty clay loam	0.1
5.0 - 7.0	4-7-12-16 (1.6)	1.6 Dark brown, slightly moist, stiff gravelly sandy silt (70% dark brown, slightly moist, stiff, slightly plastic silt and clay, 15% sand, 15% angular to subrounded gravel).	silty clay	0.5
10.0 - 12.0	6-10-12-17 (1.9)	1.9 Same (as above).	silty clay	2.6
15.0 - 17.0	12-18-20-30 (2.0)	1.0 Same (as above).	silty clay	1.0
		1.0 Dark brown, moist, sandy silt with gravel (60% dark brown, soft silt and clay, 30% fine to medium sand, 10% angular fine gravel).	clay loam	0.9
20.0 - 22.0	8-8-17-36 (1.6)	1.6 Dark brown and gray, wct, soft silty sand (80% fine brown sand, 20% silt and clay).	loamy sand	0.8

Generalized Geologic Log and Other Observations

0.0 - 3.0 Dark brown, sandy silts and clays, some gravel, large humic component (20%), (topsoil).
 3.0 - 17.0 Brown, lacustrine/marine silts and clays with gravel and sand. Saturation at 17.0' BGS.
 17.0 - 22.0 Dark brown, lacustrine silty fine sands.

Notes:

* = Peak Headspace Reading, Photovac MircoTIP HL-2000, calibrated to isobutylene
 BGS = Below Ground Surface



LABORATORY REPORT

CLIENT: SB Collins, Inc.
 ADDRESS: 54 Lower Welden St.
 St. Albans, VT 05478

LABORATORY NO: 5-0968
 PROJECT NO: 70249
 DATE OF SAMPLE: 04/19/95
 DATE OF RECEIPT: 04/20/95
 DATE OF ANALYSIS: 04/25/95
 DATE OF REPORT: 04/28/95

ATTENTION: Carl Ruprecht
 SITE: South Hero Grocery
 MATRIX: Ground Water

Results
 (Results expressed in micrograms per liter (ug/L))

PARAMETER	1 MW-109	2 MW-108	3 MW-107	4 MW-106	5 MW-103	6 MW-102	7 MW-105	8 MW-01	9 FB-01	10 TB
Methyl Tertiary Butyl Ether	2	BPQL	BPQL	BPQL	< 100	< 10	< 50	BPQL	BPQL	BPQL
Benzene	BPQL	BPQL	1	BPQL	2450	241	688	BPQL	BPQL	BPQL
Toluene	BPQL	BPQL	1	BPQL	3890	39	383	BPQL	BPQL	BPQL
Ethylbenzene	BPQL	BPQL	BPQL	BPQL	1230	< 10	< 50	BPQL	BPQL	BPQL
Total Xylenes	1	BPQL	BPQL	BPQL	16100	17	2000	BPQL	BPQL	BPQL
Chlorobenzene	BPQL	BPQL	BPQL	BPQL	< 100	< 10	< 50	BPQL	BPQL	BPQL
1,2-Dichlorobenzene	BPQL	BPQL	BPQL	BPQL	< 100	< 10	< 50	BPQL	BPQL	BPQL
1,3-Dichlorobenzene	BPQL	BPQL	BPQL	BPQL	< 100	< 10	< 50	BPQL	BPQL	BPQL
1,4-Dichlorobenzene	BPQL	BPQL	BPQL	BPQL	< 100	< 10	< 50	BPQL	BPQL	BPQL

Note: Samples # 3, 5, 6, & 7 contained several non-target compounds. GC/MS analysis on samples # 3 & 6 confirmed target compound values.

EPA Method 8020
 BPQL = Below Practical Quantitation Limit, 1 ppb

c: Hoffer & Associates

Respectfully submitted,

SCITEST, INC.

Roderick J. Lamothe
 Roderick J. Lamothe
 Laboratory Director

GROUNDWATER SAMPLING DATA SHEET

LOCATION: SOUTH HERO GROCERY
 DATE: APRIL 19, 1995

SAMPLE METHOD: 1.5" AND 2.0" DEDICATED BAILERS Page 1 of 1
 SAMPLING TEAM: T. SCHMALEZ

WELL ID	PID Head Space (ppm)	Depth to Water (ft)	Total Well Depth (ft)	Water Column (ft)	3 Well Volumes* (gals)	Total Purged (gals)	Sample Time	Sample Type	Chain-of-Custody		Remarks
									Number	Time	
TB-01	NA						0800	TB	TB-01	0800	TRIP BLANK
MW-109	4.6	15.46	18.89	3.43	1.65	1.50	1310	S	MW-109	1310	BROWN, TURBID
MW-108	0.0	17.00	18.65	1.65	0.79	0.25	1320	S	MW-108	1320	BROWN, VERY TURBID - SANDY
MW-107	22.8	16.85	17.65	0.80	0.38	1.50	1330	S	MW-107	1330	DARK BROWN, VERY TURBID
MW-106	2.5	14.43	19.32	4.89	2.35	2.50	1355	S	MW-106	1355	DARK GRAY, VERY TURBID
MW-106	↓	↓	↓	↓	↓	↓	↓	DP	MW-01	1450	DUPLICATE OF MW-106
MW-103	330	11.72	~14'	2.28	0.63	0.33	1405	S	MW-103	1405	DARK GRAY, VERY TURBID
MW-102	1910	16.48	19.82	3.34	0.92	0.75	1425	S	MW-102	1425	" BROWN, " "
MW-105	2500+	16.40	1916	2.70	0.75	0.33	1446	S	MW-105	1440	DARK GRAY-BROWN, V. TURBID
FB-01	NA						1600	FB	FB-01	1600	FIELD BLANK

* (1.5" = 0.092 gals/ft, 2" = 0.16 gals/ft, 4" = 0.65 gals/ft, 6" = 1.5 gals/ft)

REMARKS _____

BILL TO CARL RUPRECHT
88 COLLINS, INC
54 LOWER WELDEN ST.

ST. ALBANS,
VT
05478

COPY BELTS TO.
H + ASSOC.

Report:

Invoice:

Scitest, Inc.

P.O. Box 339
Route 66 Professional Center, Randolph, VT 05060
Phone: (802)728-6313 Fax: (802)728-6044

Client: Jeff Hoffer & Associates
Contact Tim Schmalz

Address: P.O. Box 428
Waterbury, VT 05676

Project # 70249
Phone No: *
Requested by: KLG

Additional Comments or Directions:

AS ABOVE

Project Name: South Hero Grocery
Date requested: 04/17/95
Date shipped: 04/17/95 WITH ROD
Date scheduled: Week of 04/17/95

CHAIN OF CUSTODY RECORD				DATE	TIME
Sampled By:*	<i>Wendy J. Schmalz</i>	DATE	TIME	Relinquished By: <i>Wendy J. Schmalz</i>	<i>4/19/95</i>
Accepted By:				Relinquished By:*	*
Accepted By:				Received by Scitest:	

Item Nos	Client ID or Description	Sampling Date	Sampling Time	Matrix	Preservative or Label	Bottle Type Plastic/Glass	Container Volume	Bottles per Sample	ASAP	Parameters and Expiration Time			
										24 hrs	48 hrs	7days	>7days
1	MW-109	4/19/95	1310	GW	HCL	G	40 mL	2				EPA 8020	
2	MW-108	*	1320	GW	HCL	G	40 mL	2				EPA 8020	
3	MW-107	*	1330	GW	HCL	G	40 mL	2				EPA 8020	
4	MW-106	*	1355	GW	HCL	G	40 mL	2				EPA 8020	
5	MW-103	*	1405	GW	HCL	G	40 mL	2		* 1 vial only		EPA 8020	
6	MW-102	*	1425	GW	HCL	G	40 mL	2				EPA 8020	
7	MW-105	*	1440	GW	HCL	G	40 mL	2				EPA 8020	
8	MW-01	*	1450	GW	HCL	G	40 mL	2				EPA 8020	
9	FB-01	*	1600	GW	HCL	G	40 mL	2				EPA 8020	
10	*	*	*	GW	HCL	G	40 mL	2				EPA 8020	
11	Trip Blank	*	0800	GW	HCL	G	40 mL	2				EPA 8020	

w:\requests\jeffhoffer\sohero.gr.wb1

Report Reviewed By: Date:	Preserve Check:	Project Nos	LABORATORY NUMBER: LOGIN:
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