

A
SUBSURFACE HYDROGEOLOGIC INVESTIGATION

**ERNIE'S QUICK STOP MOBIL STATION ROUTE 105
SHELDON SPRINGS, VERMONT**

**KSKGeoS™ PROJECT #96004
DEC SPILL #95-1948
UST FACILITY ID #1370
PREPARED FOR:**

**MR. CARL RUPRECHT
S. B. COLLINS, INC.
P.O. BOX 671, 74 LOWER WELDON STREET
ST. ALBANS, VERMONT 05478**

SUBMITTED BY

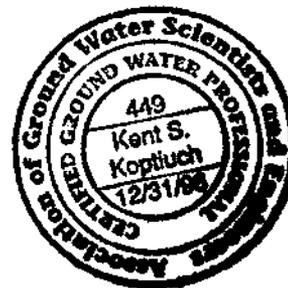
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MARCH 22, 1996

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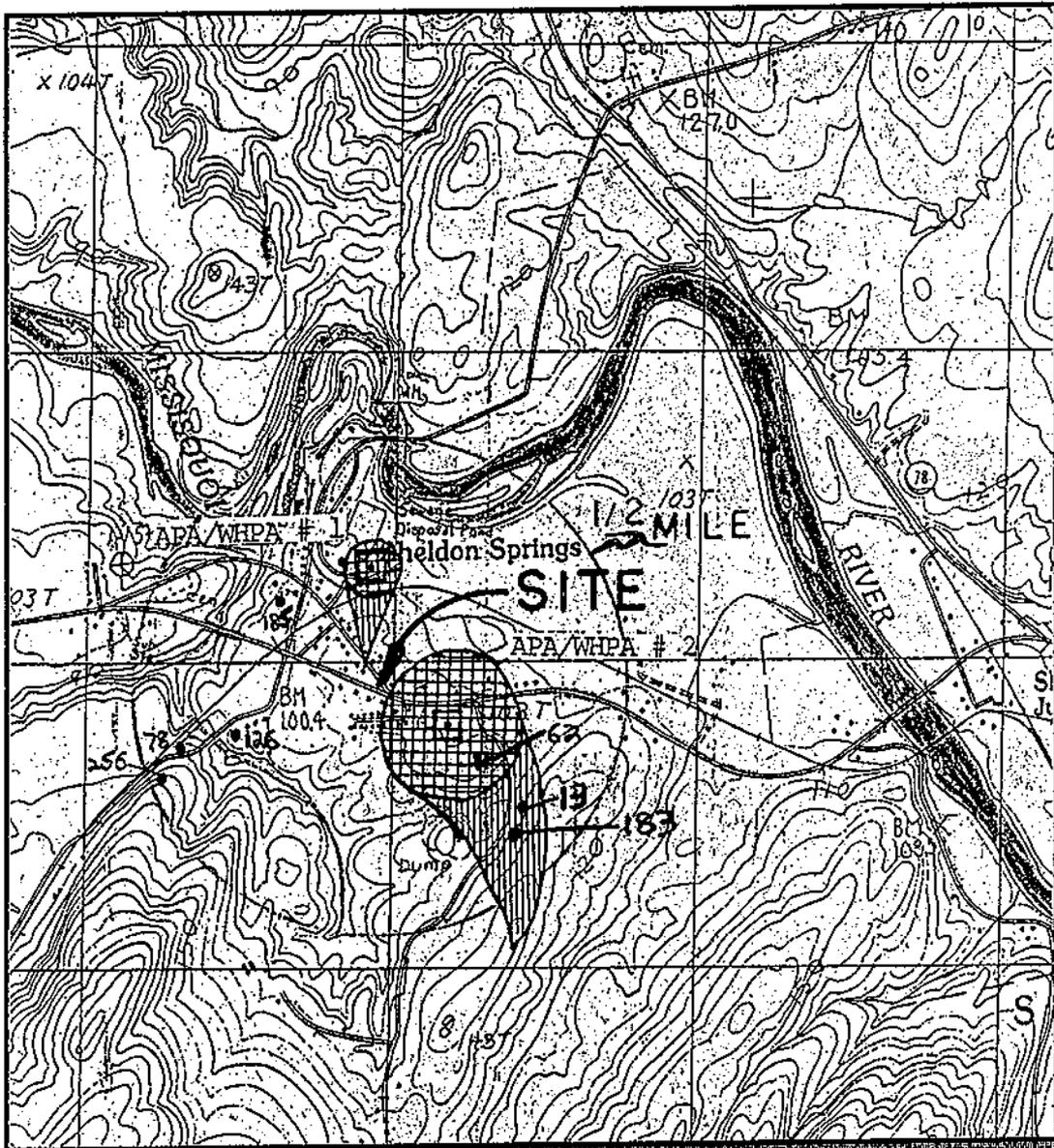
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Figure 1

Site Location Map with Well Head Protection Areas

PROJECT: SBC/Ernie's Quick Stop
LOCATION: Sheldon Springs, Vermont
PROJECT #: 96004

DEC SITE #: 95-1948
UST Facility ID#: 1370
SITE OWNER: S. B. Collins, Inc.



0 2,000 4,000 6,000 8,000 Feet

SCALE: 1" = 2,000 Feet

SOURCE: Sheldon Springs (7.5 -Minute) Quadrangle
Franklin County, Vermont
United States Geological Survey, Washington, D.C. 1964

NORTH

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TABLE OF CONTENTS

	DESCRIPTION	PAGE
1.0	INTRODUCTION	1
1.1	Authorization	1
1.2	Goals	1
1.3	Scope of Work	1
1.4	Site Use	2
2.0	INVESTIGATIVE METHODOLOGY	2
2.1	Groundwater Monitoring Well Installation	2
2.2	Groundwater Monitoring, Sampling, and Analysis	3
2.3	Potential Receptor Survey	3
3.0	RESULTS	4
3.1	Geologic, Overburden Lithologic, Geomorphologic, & Hydrogeologic Characteristics	4
3.2	Specific Hydrogeologic Characteristics	4
3.3	Field Screening of Split-Spoon Soil Samples	5
3.4	Groundwater Laboratory Chemical Analytical Results	5
3.5	Potential Receptor Survey	6
3.5.1	Surrounding Land Uses	6
3.5.2	Site Utilities	6
3.6.2	Potable Water Sources - ½ Mile Radius of Site	6
4.0	FINDINGS	8
5.0	RECOMMENDATIONS	9
6.0	LIMITATIONS	10
7.0	REFERENCES	11

FIGURES

1	SITE LOCATION MAP	
2	SITE MAP WITH GROUNDWATER CONTOURS & CONTAMINANT CONCENTRATIONS	

SUMMARY TABLES

1	GROUNDWATER ELEVATIONS; February 21, 1996	4
2	LABORATORY CHEMICAL ANALYTICAL RESULTS;	6
3	POTABLE WATER SOURCES WITHIN ½ MILE OF SITE	7

ATTACHMENTS

A	CORRESPONDENCE	
B	SOIL BORING & WELL COMPLETION LOGS	
C	LABORATORY CHEMICAL ANALYTICAL RESULTS; February 21, 1996	

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1.0 INTRODUCTION

1.1 Authorization

On January 31, 1996, KENT S. KOPTIUCH, Inc Geo-Environmental Services (KSKGeoS™) was contacted by Mr. Carl Ruprecht, of S. B. Collins, inc. (SBC) in St. Albans, Vermont, to conduct a subsurface assessment of Ernie's Quick Stop Mobil Station (the site) in Sheldon Springs, Vermont. The site is located at the intersection of Route 105 and Town Road #1 in the center of Sheldon Springs Village. **Figure 1** is a Site Location Map depicting the facility's relative geographic location and proximal delineated well head protection areas (WHPAs).

This assessment was requested by Mr. Ruprecht to comply with the requirements set forth in a letter from Mr. Richard F. Spiese of the Vermont Agency of Natural Resources Department of Environmental Conservation Hazardous Materials Management Division (ANR DEC HMMD) Sites Management Section (SMS) dated January 29, 1996. A copy of this letter is included as **Attachment A**. Mr. Spiese's letter was prompted by the *October 20, 1995 UST Closure Site Assessment* prepared by Hoffer and Associates when the site's 1,000 gallon diesel UST was closed by removal. KSKGeoS™ received purchase order authorization from SBC to conduct the assessment on February 2, 1996.

1.2 Goals

The goals of KSKGeoS™'s investigation at this site were defined as follows:

- To assess the current environmental conditions in the overburden soils and in the unconsolidated groundwater aquifer by *further defining* the extent and concentrations (if any) of separate-phase and/or dissolved-phase petroleum hydrocarbon product plume(s),
- To identify and evaluate impacts (if any) to potential receptors in the vicinity of the site, and
- To identify a potential remedial action program or future monitoring program suitable to address identified impacts (if any) revealed through the course of this investigation.

1.3 Scope of Work

KSKGeoS™'s scope of work on this site included the completion of the following tasks:

- Preparation of a site-specific health and safety plan (HASP) in accord with OSHA 29 CFR 1910.120.
- Field identification of potential receptors, including but not limited to: potable water supply sources, surface waterbodies and waterways, possible preferential subsurface migratory pathways, and building basements within the immediate site vicinity.
- Installation, and development of four (4), two-inch (2") diameter, PVC groundwater monitoring wells in accordance with ANR DEC guidelines.
- Split-barreled (split spoon) sampling of the overburden soils during monitoring well installation activities. All samples were screened for volatile organic compounds (VOCs), using jarred head-space methodology, with an H-Nu PI-101, 10.2 ev lamp, photoionization detector (PID).
- Survey of groundwater monitoring well locations tied into a previously assigned datum encompassing previously installed wells installed by others: elevational accuracy is $\pm 0.01'$; spatial accuracy is $\pm 1.0'$.
- Laboratory chemical analysis of groundwater samples from the monitoring well network for

benzene, toluene, ethylbenzene, xylenes (BTEX), and methyl tert-butyl ether (MTBE) by EPA method 8020; and for total petroleum hydrocarbons (TPH) by modified EPA method 8015.

- Summary report preparation including all investigative results, documentation, interpretation, and findings and recommendations.

1.4 Site Use

Currently the site is not in use; the building is vacant and no petroleum distribution, sales, or storage activities are in evidence. **Figure 2** is a Site Map showing property layout, with completed groundwater monitoring well locations, groundwater contours, and BTEX, MTBE, and TPH concentrations on February 21, 1996.

2.0 INVESTIGATIVE METHODOLOGY

2.1 Groundwater Monitoring Well Installation

All monitoring well locations were chosen by KSKGeoSTTM's supervising geologist and Certified Ground Water Professional (CGWP), Kent S. Koptiuch. Monitoring well locations were sited to best represent the groundwater conditions on a site-wide basis. Wells were installed by Tri-State Drilling and Boring, Inc. under the direct supervision of Mr. Koptiuch.

On February 13, 1996, a Mobile B-57 drill rig with 4/4 -inch inside diameter hollow-stem augers was used to install the wells. As borings were advanced, soils were sampled with a two (2) -inch diameter by twenty-four (24) -inch length split-barrel sampler (split-spoon) in conformance with ASTM Standard D1586. Split-spoons were advanced with a 140 pound drop-hammer. Hammer blows were recorded at six (6) -inch intervals, as the split-spoons were advanced, for density determination. Samples were secured at the 5.0 - 7.0', 7.0 - 9.0', 10.0 - 12.0', and 15.0 - 17.0' depth intervals.

All sampling equipment was thoroughly decontaminated prior-to, and after each use utilizing a distilled water / Liquinox® non-phosphate detergent solution. This was followed up with a distilled water rinse.

Recovered soil samples were logged in accordance with the Universal Soil Classification System (USCS) and screened for volatile organic compounds (VOCs) by jarred head-space methodology with an H-Nu PI-101, 10.2 ev lamp, photoionization detector (PID) by Mr. Koptiuch. The unit was calibrated on-site, prior to use, for benzene in calibration gas equivalents (CGE) of 100% isobutylene (H₂SO₄) at 70 ppm. Sample jars were warmed to room temperature in the cab of the service vehicle prior to recording VOC results due to the -10° F ambient temperature.

Upon achieving the desired boring depth at each location, a pre-constructed two (2) -inch diameter, flush-threaded PVC screen and casing well was installed within the hollow stem augers. Screening was factory slotted to 0.020'. The screened interval for each well was determined by the supervising geologist to extend at least five (5)-feet above, and five (5)-feet below the groundwater table where possible. The annulus of each borehole was then filter-packed with washed, #0 Moirie Sand to a depth of one (1)-foot above the screened interval as

the augers were extracted from the borehole. A one (1)-foot, hydrated bentonite seal was set in the annulus above the filter-pack. The remainder of the annular space was then backfilled with clean spoils from each boring. The top of each well casing was secured with a gripper cap. All four (4) wells were completed with flush-mounted, eight (8) -inch diameter, three (3) bolt steel manways set in concrete. Soil boring and well completion logs are included as **Attachment B**.

Upon completion of all monitoring well installation activity, the well top-of-casing elevations, and the grade elevation at each well, was surveyed in by KSKGeoS™'s field personnel. The top of the concrete, pump-island base was utilized as a benchmark with an assumed datum of 100' (see **Figure 2**). The pre-existing monitoring well, located adjacent to the former diesel UST location, was also surveyed for elevations and labelled as MW-5.

2.2 Groundwater Monitoring, Sampling, and Analysis

Following their installation, each groundwater monitoring well was developed by means of repetitive bailing and surging. The groundwater was allowed to stabilize and return to static level in the monitoring wells for one (1) week prior to conducting gauging and sampling activities. On February 21, 1996 an optical interface probe, capable of determining groundwater and separate-phase hydrocarbon petroleum product presence and thickness to within 0.01', was utilized to profile the elevations and the VOC characteristics of the overburden aquifer within each well. **Table 1** is a summary of groundwater elevations.

Water volumes were then calculated for each well, and the equivalent of three (3) well volumes were purged, by bailing, prior to sampling. Groundwater samples were secured from the monitoring well network in accordance with EPA method 8020 for BTEX and MTBE, and with modified EPA method 8015 for TPH.

The sampling bailer was decontaminated between each well utilizing a liquinox-distilled water solution followed by a distilled water rinse. Samples were packed securely on ice and hand-delivered to Endyne, Inc. for chemical analysis on February 21, 1996.

MW-5, the site's pre-existing groundwater monitoring well, could not be sampled. The manway cover for the well was not in place and the gripper cap was not secured; ice build-up had formed inside the well casing and sample procurement was not possible. Insertion of the interface probe was successful, and a groundwater elevation reading was taken.

2.3 Potential Receptor Survey

A physical survey was conducted to identify potential receptors, including surface water bodies, potable water sources, and likely routes of subsurface conductance, to petroleum hydrocarbon impact in the vicinity of the site. In addition, a review of the following data bases was conducted:

- well completion logs for private and public potable wells in the town of Sheldon at the ANR DEC Water Supply Division (WSD),
- the SMS Vermont Hazardous Sites List, and
- the Vermont CERCLIS Sites List.

Telecommunications with Ms. Jean Nicolai of the WSD were also conducted to define the status of VOC impact to the Sheldon Springs Water System (WSID #5128) that was discovered in 1993.

3.0 RESULTS

3.1 Geologic, Overburden Lithologic, Geomorphologic, & Hydrogeologic Summary

The site is located in the village of Sheldon Springs, Vermont, on the western reaches of the Green Mountains¹ approximately 300 -feet above mean sea level (msl). The village is situated on a sandy terrace overlooking the Missisquoi River. Just west of the village, the north-south trending *Hinesburg-Oak Hills Thrust* association defines the transition into the Champlain Lowlands. The topography at the site is almost level with an overall relief of approximately three (3) -feet. The site is located immediately on the southern side of a slight topographic high (expressed by Town Road #1 -Figure 2). To the north of Town Road #1, drainage is to the north, directly towards the Missisquoi River. To the south of Town Road #1, drainage is to the south-southwest into a small tributary basin which bends to the north and enters the Missisquoi River approximately 2,000 -feet northwest of the site. Regional drainage of the Missisquoi River is westwards into Missisquoi Bay of Lake Champlain, approximately ten (10) miles distant.

This area is mapped as well-drained, lacustrine sand and gravel paleo-terrace deposits associated with ancient Lake Vermont. The soil boring logs, compiled during monitoring well installation activities, reveal soil horizons of well-sorted medium and fine sands extending to depths of at least seventeen (17) -feet BG. These sands are interpreted as *Missisquoi loamy sand* of the 0 - 3% slope sub-category (*Windsor/Missisquoi Association*).² The Missisquoi series loamy sands are typically highly permeable with a low natural organic content. Subsurface logs describing the overburden lithology, well construction, sampling intervals, and PID results for each boring are included as Attachment C.

Bedrock was not encountered during boring activities at the site. According to the **Centennial Geologic Map of Vermont**³, bedrock in the vicinity is comprised of the lower Cambrian Age *Cheshire Quartzite*, however, well completion logs from the vicinity indicate upper bedrock horizons of limestone and schist (see Table 3).

3.2 Specific Hydrogeological Characteristics

Groundwater beneath the site was encountered at a depth of approximately 7 -feet BG on February 13, 1996 during well installation activities. On February 21, 1996 groundwater elevations ranged from 6.14 to 7.48 -feet BG. Groundwater flow direction is to the southwest

WELL	GRADE	TOP-OF-CASING	DEPTH-TO-WATER	ELEVATION
MW-1	99.79'	99.53'	7.22'	92.31'
MW-2	100.01'	99.36'	6.80'	92.56'
MW-3	98.10'	97.41'	6.58'	90.83'
MW-4	97.00'	96.76'	5.90'	90.86'
MW-5	97.96'	97.74'	6.23'	91.51'

Note: Elevations in feet relative to assumed datum of 100 -feet.

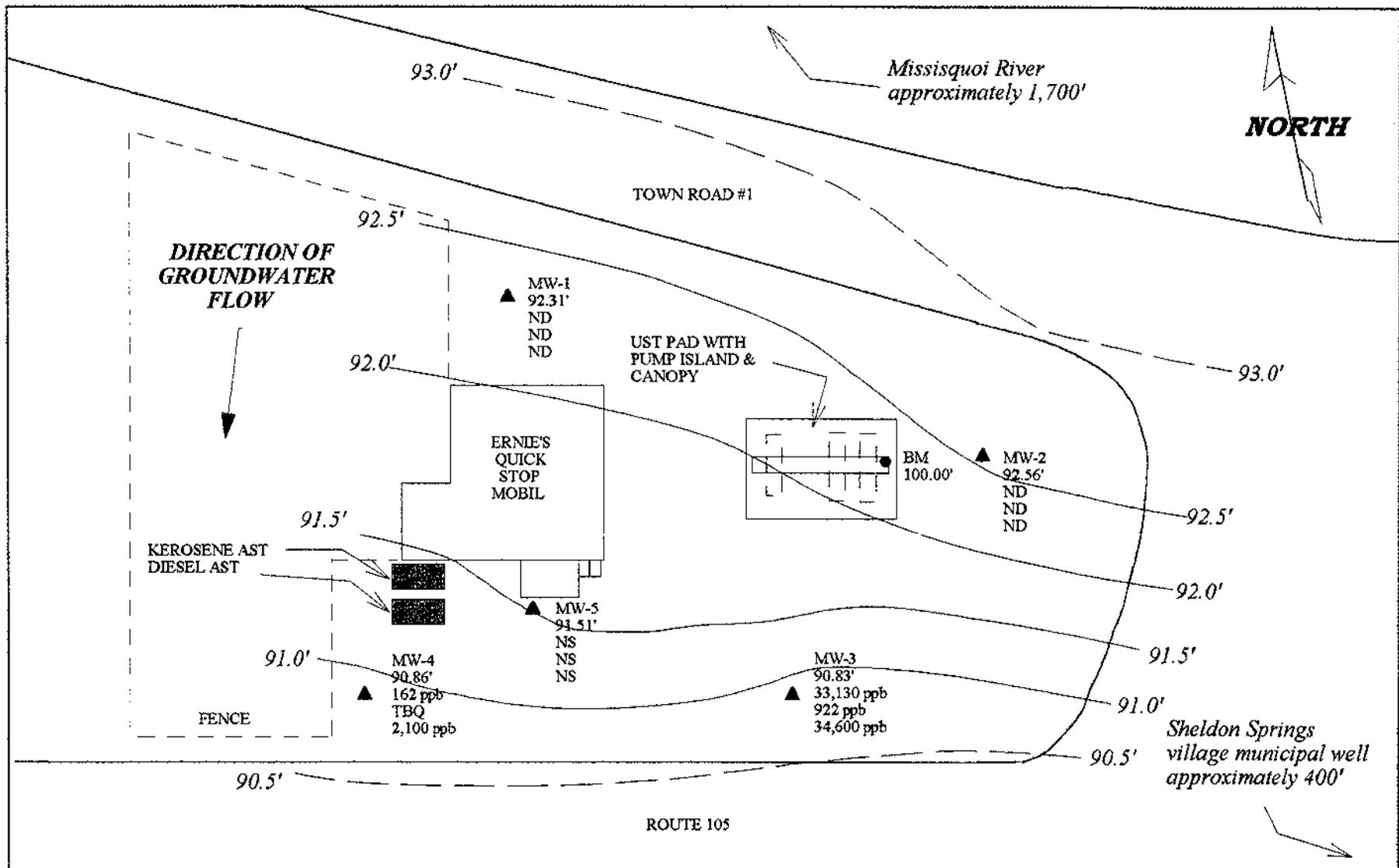


FIGURE 2 - GROUNDWATER CONTOUR MAP WITH BTEX, MTBE, & TPH CONCENTRATIONS

EXPLANATION

- ▲ MW-3
90.83'
33,130 ppb
922 ppb
34,600 ppb
- MONITORING WELL
GW ELEVATION
BTEX CONCENTRATION
MTBE CONCENTRATION
TPH CONCENTRATION
- 91.0' — GW CONTOUR (Elevations in Feet Relative to Assumed Datum of 100.00' BM)

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Geo-Environmental Services

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PROJECT: SBC/ERNIE'S QUICK STOP
SPILL #: 95-1948
LOCATION: SHELDON SPRINGS, VT
DATE: FEBRUARY 21, 1996
DRAWN BY: K. S. KOPTIUCH
SCALE: 1.00" = 30.00'

across the site with an approximate gradient of 1.8%. An approximate Rate-of-Travel (V_a) in the overburden aquifer was calculated through the application of Darcy's Law utilizing typical constants for horizontal hydraulic conductivity (K_H) and porosity (n) of the observed aquifer matrix:⁴

$$V_a = \{[K_H(h_1-h_2)] \div L\} \div n$$

where (h_1-h_2) is the difference in hydraulic head, and L is the distance along the flowpath for which the difference in hydraulic head is measured. When all known and assumed aquifer characteristics are entered into the above equation, the resulting Rate-of-Travel from MW-1 to MW-4 on February 21, 1996 is:

$$V_a = \{[30 \text{ gpd/ft}^2 \times (92.31' - 90.86')] \div 84'\} \div 25\%$$

$$V_a = \{[30 \text{ gpd/ft}^2 \times 1.45'] \div 84'\} \div 25\%$$

$$V_a = 2.07 \text{ gpd/ft}^2$$

Table 1 is the groundwater elevation data calculated from the gauging of the monitoring well network on February 21, 1996. **Figure 2** depicts Groundwater Contours of the overburden aquifer based upon this data.

3.3 Field Screening of Split-Spoon Soil Samples

Soil samples were secured with split-spoons during boring advancement in accordance with the methodology outlined in **Section 2.1** and field screened by PID utilizing head space methodology. Positive impact by VOCs was noted in samples secured from the boring for well MW-3 (5.0 - 300. ppm). The highest concentrations were noted at the groundwater interface, 5.0 - 7.0 -feet BG; concentrations decreased progressively with depth. A distinct, gasoline odor was associated with the soil samples. None of the samples from the borings for MW-1, MW-2, or MW-4 yielded positive VOC impact.

3.4 Groundwater Laboratory Chemical Analytical Results

Actual laboratory chemical analytical results for all analytes are included as **Attachment C** of this report. **Table 2** summarizes the results of these analyses.

- Of the four (4) new monitoring wells installed, MW-1 and MW-2 yielded no measurable impact above method detection limits (MDLs) from dissolved BTEX or MTBE constituents.
- MW-3 yielded 33,130 micrograms per liter ($\mu\text{g/L}$) of total dissolved BTEX constituents, 922 $\mu\text{g/L}$ of dissolved MTBE, and 34.6 milligrams per liter (mg/L) of TPH. The distribution and relative concentrations of dissolved BTEX constituents is indicative of a weathered gasoline.
- MW-4 yielded 162 $\mu\text{g/L}$ total dissolved BTEX, a trace of MTBE below quantitation levels, and 2.1 mg/L TPH. The relative concentrations of dissolved BTEX constituents are indicative of a diesel source.
- MW-5 could not be sampled due to ice blockage in the casing.
- Trip blank and field blank samples yielded no BTEX, MTBE, or TPH analytes above the MDLs.
- Dissolved-phase petroleum hydrocarbon impact in wells MW-3, and MW-4 indicate that the downgradient edge of the plume has not been fully defined by this investigation. The

SUMMARY TABLE 2 - 02/21/96 LABORATORY CHEMICAL ANALYTICAL RESULTS

WELL	MTBE µg/L	BENZENE µg/L	TOLUENE µg/L	ETHYLBENZENE µg/L	XYLENES µg/L	TOTAL BTEX µg/L	TPH mg/L
MW-1	ND	ND	ND	ND	ND	ND	ND
MW-2	ND	ND	ND	ND	ND	ND	ND
MW-3	922.	340.	18,300.	2,290.	12,200.	33,130.	34.6
MW-4	TBQ	11.9	14.1	35.0	101.	162.	2.1
MW-5	NS	NS	NS	NS	NS	NS	NS

Notes:

- | | | |
|---|------------|--|
| 1 | MTBE | Methyl tert-butyl ether. |
| 2 | Total BTEX | Total Dissolved Benzene, Toluene, Ethylbenzene, & Xylenes. |
| 3 | TPH | Total Petroleum Hydrocarbons. |
| 4 | µg/L | Micrograms per Liter (parts per billion). |
| 5 | mg/L | Milligrams per Liter (parts per million). |
| 6 | ND | None Detected. |
| 7 | TBQ | Trace Below Quantitation Limit. |
| 8 | NS | Not Sampled. |

potential for off-site migratory impact in the overburden aquifer is present.

3.5 Potential Receptor Survey

3.5.1 Surrounding Land Uses

Surrounding land uses were noted as follows:

- The site, being situated nearly in the center of Sheldon Springs village, is surrounded on all sides by residential housing.
- A Texaco retail petroleum station, the Sheldon Mini-Mart (DEC Spill #93-1484) is located approximately 900 -feet to the west of the site on the south side of Route 105. The *Vermont Hazardous Waste Sites Active list*⁵ notes that groundwater monitoring is ongoing at this property.
- A wood products mill (formerly Boise Cascade) is located 1,500 -feet to the north and west of the site. This site has two (2) DEC Spill numbers (77-0021 [north landfill/lagoon], and 77-0022[south landfill]). This site is also categorized under the December 19, 1995 *Vermont Active CERCLIS Sites Requiring a Final Decision list*.⁶ Post-Closure monitoring is ongoing.

3.5.2 Site Utilities

The site is served by a village municipal water supply well (WSID#5128) that is located approximately 500 feet southeast of the site. Electrical and telephone services at the site are provided by overhead lines. Wastewater disposal is by on-site septic tank and leachate absorption trenches.

3.5.3 Potable Water Sources - ½ Mile Radius of Site

There are nine potable water sources within a ½ mile radius of the site. **Summary Table 3** provides well completion details on each of these sources. Their locations have also been plotted

on **Figure 1** for reference. The Henry Reynolds well is the only private well downgradient of the site (well #126). The Henry Reynolds well is approximately 1,500 -feet to the southwest. The Menard well (#78) and the Leo Reynolds well (#256) are separated from the downgradient flow regime by the unnamed tributary to the Missisquoi River noted earlier.

The village municipal well (#36), depicted in the center of APA/WHPA #2 on **Figure 1**, although located on a lateral gradient to the site, can be considered downgradient due to the proximal primary zone of the WHPA as delineated by the Water Supply Division (WSD).

SUMMARY TABLE 3 - POTABLE WATER SOURCES WITHIN ¼ MILE OF SITE						
WELL #	OWNER	YIELD (gpm)	TOTAL DEPTH (ft)	BEDROCK DEPTH(ft)/TYPE	CASING LENGTH (ft)	STATIC LEVEL(ft)
256	Leo & Hyla Reynolds	3	127	37 /(Schist)	43	?
198	Boise Cascade	20	1007	2 /(Limestone)	21	?
185	Wilfred Commo	¾	425	70 /(Limestone)	81	60
183	Michael & Robin Austin	12	102	14 /(Limestone)	20	?
126	Henry Reynolds	1½	300	5 /(Schist)	20	20
78	Renald Menard	12	38	NA /(Gravel)	35	?
62	Paul Bedard	40	49	14 /(?)	20	?
36	Town of Sheldon (WSID #5128)	35	203	146 /(Limestone)	150	40
13	Maple Glen Inn	12	645	20 /(?)	29	75

Notes: Downgradient wells in bold type.

Source: Water Supply Division Files for Town of Sheldon, VT ANR DEC, 2/22/96.

In researching the files at the WSD, it was noted that impact from VOCs to the Sheldon village municipal well (WSID #5128) has occurred. This impact was first noted on October 11, 1993 when a homeowner called in a complaint to the HMMD concerning gasoline odor in their drinking water.

The ensuing investigation, conducted initially by the SMS and the Vermont Department of Health (DOH), and completed by Griffin International, Inc., found that the source of VOC contamination was through infiltration of the municipal water supply distribution lines by dissolved-phase gasoline from a leaking underground storage tank (LUST) at the Sheldon Mini-Mart Texaco approximately 900 feet west of the site. The DOH issued a *DO NOT DRINK* notice to affected water supply customers, and bottled water expenses by residents were reimbursed through the Petroleum Cleanup Fund (PCF).

The water system was flushed out by the operator (Mr. Andrew Reed) and resampled to isolate the infiltration zone. On June 20, 1994, Mr. Homer Durkee was issued a *Public Water System*

Permit to Construct by the WSD (Project #E-0349). This permit was for the relocation of the Sweet Hollow Road water line. This line serviced the Sheldon Mini-Mart and five (5) private residences immediately south of the mini-mart on Sweet Hollow Road. Follow-up sampling on October 25, 1994 revealed the only residual impact to the municipal system was at the well source itself (Well House #1) from chloroform (63.4 µg/L), bromodichloromethane (12.5µg/L), and dibromodichloromethane (2.6 µg/L). This residual is from the existing water treatment method and not related to VOC infiltration from outside sources. Engineer's certification of project completion was received by the WSD on November 21, 1994.

KSKGeoS™ conducted telecommunications with Ms. Jean Nicolai of the WSD on March 8, 1996. According to Ms. Nicolai, no subsequent analysis of the municipal water for VOCs has been completed, however, the WSD will be providing the system operator with a 1996 monitoring program.

4.0 FINDINGS

KENT S. KOPTIUCH, Inc. Geo-Environmental Services' subsurface investigation at Ernie's Quick Stop on Route 105 in Sheldon Springs, Vermont yielded the following results and findings:

- The overburden aquifer consists of a relatively homogeneous fine-to-medium sandy paleo-terrace deposit. Bedrock was not encountered within seventeen (17) -feet of grade. The groundwater table was noted at depths of five (5) to seven (7) -feet below grade at the time of this investigation.
- Groundwater flow conditions in the overburden aquifer exhibit a southwesterly flow direction across the site. Gradient is approximately 1.8%. The rate of groundwater travel through the sandy matrix of the overburden aquifer was approximated at 2.07 gpd/ft².
- Split spoon soil samples secured during the boring and installation of groundwater monitoring wells MW-1, MW-2, and MW-4 yielded no measurable VOC impact when measured by jarred head-space analysis with a photoionization detector.
- Split spoon samples secured during installation of monitoring well #3 (MW-3) yielded VOC impacts ranging from 5.0 to 300.0 parts per million when measured by jarred head-space analysis with a photoionization detector. Highest impact was noted at the water table interface approximately 5.0 - 7.0 -feet below grade. The impacted soils smelled distinctly of gasoline.
- No visible evidence of separate-phase petroleum hydrocarbon products was observed during soil boring, well installation, and groundwater sampling activities.
- Laboratory chemical analytical results of the groundwater sample secured from monitoring well MW-3 yielded positive impact by benzene; ethylbenzene; toluene; m-, p-, and o-xylenes (BTEX); and methyl tert-butyl ether (MTBE) at levels above ANR DEC preventive action levels for groundwater quality standards or guidance values. Based upon the relative concentrations of the various constituents, this combination of hydrocarbons appears to represent gasoline as dissolved in groundwater.

- Laboratory chemical analytical results of the groundwater sample secured from monitoring well MW-4 yielded positive impact by benzene at a level above the ANR DEC preventive action level for groundwater quality standards. Based upon the relative concentrations of the various petroleum hydrocarbon constituents detected, this combination of hydrocarbons appears to represent diesel fuel as dissolved in groundwater.
- No dissolved analytes were detected above the method detection limit (MDL) by laboratory chemical analysis of samples from wells MW-1, and MW-2.
- A review of the Vermont ANR DEC Water Supply Division (WSD) files has revealed 1993 and 1994 samples impacted by low levels of dissolved BTEX constituents in the water supply of five (5) residences and the Sheldon Mini-Mart. Potable water at these locations is provided by the Village of Sheldon Springs municipal water supply well (WSID#5128) located approximately 500 -feet southeast of the site; the municipal well itself did not yield any BTEX impact when sampled in this same time frame. SMS and DOH investigative activities determined that contaminant infiltration occurred at some point along the municipal distribution system servicing the Sweet Hollow Road area. The source of this contaminant impact was determined to be a leaking gasoline UST at the Sheldon Mini-Mart (DEC Site #93-1484), 900 -feet west of the site on Route 105. Relocation and repair of the Sweet Hollow Road water line was completed in the Summer of 1994 and the file was closed in November 1994. The leaking UST at the Sheldon Mini-Mart was closed by removal and groundwater monitoring is ongoing. The WSD will be providing the Sheldon municipal water system operator with a monitoring and analysis schedule for VOC constituents.
- Two (2) other hazardous waste sites (DEC Sites #77-0021 & 77-0022), both associated with the lagoon and landfill at the former Boise-Cascade wood products mill, are located approximately 1,500 -feet to the northwest of the site. These sites are undergoing post-closure monitoring; they are situated in a different groundwater drainage regime and no hydraulic connection is expected.
- The site is situated just outside the margin of the Primary (*protection*) Zone as delineated for the municipal well's Well Head Protection Area (WHPA). The municipal well is completed in limestone bedrock at 203 -feet BG. The well completion log for this well indicates overburden sands to 30 -feet BG, blue clay from 30 to 140 -feet BG, gravel from 140 to 146 -feet BG, and bedrock beginning at 146 -feet BG. Casing extends to 150 -feet BG. Although this well's construction does not meet current standards for a community water source (casing should extend 20 -feet into bedrock and should be grouted into the rock), the presence of 110 -feet of clay beneath the overburden aquifer should serve as a suitable confining horizon; the likelihood of dissolved-phase petroleum hydrocarbons from the study site being drawn into the capture zone of the municipal well is low.
- The extent and concentration of defined contaminants in the overburden aquifer at the site do not appear to pose any immediate threat to human life or health, however, the downgradient limits of the dissolved-phase plume have not yet been fully delineated.

5.0 RECOMMENDATIONS

Based upon the data presented presented in this investigation, KSKGeoS™ recommends the completion of the following tasks to further clarify the extent and degree of subsurface impact associated with the site:

- 1 The water in the three (3) private residences opposite Route 105, and downgradient of Ernie's Quick Stop (south) should be sampled by EPA method 524.2 (drinking water) to determine whether any contaminant infiltration of the municipal distribution lines is occurring in this vicinity.
- 2 A series of eight (8) shallow *hydro-probe* soil borings, with soil sampling for VOCs, should be completed on the south side of Route 105 to define the downgradient extent and concentration of the dissolved contaminant plume. Four (4) of these borings should be completed as mini-wells and a full round of groundwater sampling, to include all monitoring wells and newly completed mini-wells, should be conducted with analysis for BTEX and MTBE constituents by EPA method 8020.
- 3 The gasoline underground storage tanks (USTs) still present at the site (3) should be closed by removal in conformance with HMMD guidelines to eliminate their potential as an ongoing introductory source of contamination to the overburden aquifer.

Upon completion of items 1,2, and 3 above, the entire data base can be fully evaluated and an appropriate action and/or monitoring plan can be prepared.

6.0 LIMITATIONS

This report is based upon limited physical investigation of the site and vicinity, samples from a fixed number of groundwater monitoring wells, laboratory chemical analyses, and research of materials and files available at the time of the investigation. The findings presented in this report are based only on the observations drawn during this investigation, and upon data provided by others. This report presents a description of the subsurface conditions, in the overburden lithology at each test pit and well location, that were prevalent at the time of KSKGeoS™ investigation.

Subsurface conditions can vary significantly over time, particularly with respect to groundwater elevations and groundwater and soil quality. Findings and recommendations presented in this document are applicable only to the facts and conditions described at the time of this investigation.

In performing its professional services, KSKGeoS™ employs the degree of care and skill exercised under similar circumstances by members of the environmental profession practicing in the same or similar locality under similar conditions. The standard of care shall be judged exclusively as of the time these services are rendered, and not according to later standards. KSKGeoS™ makes no express or implied warranty beyond its conformance to this standard. KSKGeoS™ shall not be responsible for conditions or consequences arising from relevant facts that were concealed, withheld, or not fully disclosed for the preparation of this document. KSKGeoS™ believes that all information contained in this document is factual, but no guarantee is made or implied.

7.0 REFERENCES

- 1 Stewart, David P., Geology for Environmental Planning in the Milton-St. Albans Region, Vermont, Vermont Geological Survey, Water Resources Department, Montpelier, Vermont, Environmental Geology No. 5, 1974.
- 2 Flynn, Dennis J., and Robert V. Joslin, Soil Survey of Franklin County, Vermont, U.S.D.A. Soil Conservation Service, Vermont Agricultural Experiment Station, and the Vermont Agency of Environmental Conservation, Washington, D.C., April 1979.
- 3 Doll, Charles G., Wallace M. Cady, James B. Thompson, Jr., & Marland P. Billings, Centennial Geologic Map of Vermont, Vermont Geological Survey, 1961.
- 4 Driscoll, Fletcher G., Groundwater and Wells, second edition, Johnson Division, St. Paul, Minnesota, 1986.
- 5 Vermont Agency of Natural Resources Department of Environmental Conservation Hazardous Materials Management Division, Third Quarter 1995 Update, Vermont Hazardous Sites List, September 25, 1995.
- 6 Environmental Protection Agency, Vermont Active CERCLIS Sites Requiring A Final Decision, December 19, 1995.

Attachment A
JANUARY 29, 1996 CORRESPONDENCE FROM
RICHARD F. SPIESE, VT ANR DEC HMMD SMS

KENT S. KOPTIUCH, Inc. Geo-Environmental Services

164 OSGOOD HILL • ESSEX, VT 05452 • TELE/FAX (802) 878-1620



State of Vermont

Department of Fish and Wildlife
Department of Forests, Parks and Recreation
Department of Environmental Conservation
State Geologist
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

January 29, 1996

ATTN CARL RUPRECHT
SB COLLINS INC
54 LOWER WELDEN ST
ST ALBANS VT 05478

RE: Petroleum contamination at Ernie's Quick Stop
(Site #95-1948)

Dear Mr. Ruprecht:

The Sites Management Section (SMS) has received a site assessment report outlining the subsurface conditions for the above referenced site, submitted by Tim Schmalz of Hoffer and Associates on October 20, 1995. This report summarizes the degree and extent of contamination encountered during the assessment. The tank removed was a 1,000 gallon, diesel, underground storage tank (UST).

During the tank pull, soils screened on the western end of the UST (fill pipe end) at 6 feet below ground surface (bgs) had peak volatile organic compound (VOC) concentrations of 68 parts per million (ppm) as measured by a photoionization detector (PID). Soils throughout that end of the tank were found to be contaminated. A hole was found in the eastern end of the UST, however, no soil contamination was found in that portion of the tank pit. Neither groundwater nor free product were found to be present, however, the groundwater level in a monitoring well approximately 20 feet southeast of the eastern end of the UST was found to be at 7.13 feet bgs. All excavated soil was backfilled since the full extent of the contamination was unknown.

Based on the above information, the SMS has determined that additional work is necessary at the site in order to determine the severity of contamination present. Due to the possibility of contaminant impact to nearby receptors, the SMS is requesting that S.B. Collins, Inc. retain the services of a qualified environmental consultant to perform the following:

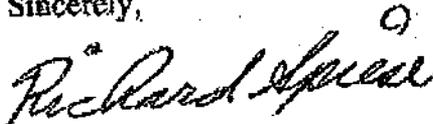
1. Further define the degree and extent of contamination to the soil. This may be accomplished by obtaining soil borings, digging test pits, or performing a soil gas survey.
2. Determine the degree and extent of contamination, if any, to groundwater. If soil is found to contain evidence of contamination at the water table, then a sufficient number of monitoring wells should be installed in locations which will adequately define the severity of contamination at the site. The one monitoring well located on site may be used as part of this requirement so long as it is in adequate condition. All groundwater samples taken should be analyzed for BTEX compounds and total petroleum hydrocarbons.

3. Perform an assessment of the site to determine the potential for sensitive receptors to be impacted by the contamination. This should include basements of adjacent buildings, nearby surface water (such as the Missisquoi River), and any public or private drinking water wells which are located within the vicinity of the site. If any water supplies appear at risk from this contamination, they should be sampled and analyzed using EPA 8020 or an acceptable alternative.
4. Determine the need for a long term treatment and/or monitoring plan which addresses the contamination present at the site. The need for such a plan should be based on the results of the above investigations.
5. Submit to the SMS a summary report which outlines the work performed as well as provides conclusions and recommendations. Included should be analytical data, site map, area map, a groundwater contour map, and if additional monitoring wells were installed, detailed well logs.

Please have your consultant submit a preliminary work plan and cost estimate within fifteen days of your receipt of this letter so that it may be approved prior to the initiation of onsite work.

The UST at Ernie's Quick Stop is covered by the Petroleum Cleanup Fund (PCF) as set forth in 10 V.S.A. Section 1941 as long as no private insurance exists which would apply to this situation. You must provide proof of no insurance before the PCF can be used to reimburse these expenses. An owner or permittee of a tank, who is not in significant violation of his or her permit, is eligible for reimbursement from the fund. The owner or permittee must pay for the removal or repair of the failed (or abandoned) tank and for the first \$10,000 of the cleanup; after that the fund will reimburse the tank owner or permittee for additional cleanup costs up to \$1 million. The fund may not pay for cleanup costs which are for cleanup work that is not pre-approved by the Agency. Please refer to the guidance document titled, "Procedures for Reimbursement from the Petroleum Cleanup Fund" for further information on this program. Additionally, the Secretary of the Agency of Natural Resources reserves the right to seek cost recovery of fund monies spent at the Ernie's Quick Stop site if the Secretary concludes that S.B. Collins, Inc. is in significant violation of the Vermont Underground Storage Tank Regulations and the Underground Storage Tank statute (10 V.S.A., Chapter 59). If you have any questions or comments, please feel free to call.

Sincerely,



Richard F. Spiese, Acting Supervisor
Sites Management Section

cc: Sheldon Selectboard
Sheldon Health Officer
DEC Essex Regional Office
Tim Schmalz, Hoffer and Associates

Attachment B
SOIL BORING & WELL COMPLETION LOGS

KENT S. KOPTUCH, Inc. Geo-Environmental Services

164 OSGOOD HILL • ESSEX, VT 05452 • TELE/FAX (802) 878-1620



KENT S. KOPTIUCH, INC.
 Geo-Environmental Services
 164 OSGOOD HILL • ESSEX, VERMONT 05452
 TELE/FAX (802) 878-1620

WELL LOG MW-1

INSTALLED: FEBRUARY 13, 1996
 LOGGED BY: KENT S. KOPTIUCH, CGWP

PROJECT # 96004	DRILLING COMPANY	DRILL RIG:	SAMPLING METHOD:
SBC/SHELDON SPRINGS	TRI-STATE DRILLING	MOBILE B-57, 4 1/4 ID HSA	SPLIT-SPOON & GRAB

BENTONITE WELL SEAL
 NATIVE BACKFILL
 #0 MORIE SAND PACK
 CASING: 2" DIAM., FLUSH-THREADED PVC
 CONCRETE SURFACE SEAL
 SCREEN: 2" DIAM., FLUSH-THREADED, 0.20" SLOT PVC

DEPTH (ft)	CONSTRUCTION	SAMPLE #	BLOWS/ft	RECOVERY	VOCs in ppm	SOILS/LITHOLOGY	COMMENTS
0.0							GRADE @ 99.79'
							TOC @ 99.53'
0.0 - 0.5'		GRAB			0.0	DRY, GREY-BROWN, SANDY GRAVEL	
0.5' - 5.0'		GRAB			0.0	DRY, GREY-BROWN, MEDIUM SAND	
5.0' - 5.8'		SS-1 (5-7')	10-10-10	0.8'	0.0	DRY, GREY-BROWN, MEDIUM SAND	
5.8' - 6.5'				0.7'	0.0	MOIST, GREY, MEDIUM SAND W/FEW SILT, FEW DISTINCT, MEDIUM, ORANGE MOTTLES	▼ WT @ 7.0' BG
7.0' - 9.0'		SS-2 (7-9')	10-12-10-10	2.0'	0.0	SATURATED, GREY-BROWN, MEDIUM SAND	
10.0' - 11.8'		SS-3 (10-12')	12-12-12-12	1.8'	0.0	SATURATED, GREY-BROWN, MEDIUM SAND	
15.0' - 17.0'		SS-4 (15-17')	11-12-10-10	2.0'	0.0	SATURATED, GREY-BROWN, MEDIUM SAND	EOB @ 15.0'



KENT S. KOPTUCH, INC.
 Geo-Environmental Services
 164 OSGOOD HILL • ESSEX, VERMONT 05452
 TELE/FAX (802) 878-1620

WELL LOG MW -2

INSTALLED: FEBRUARY 13, 1996
 LOGGED BY: KENT S. KOPTUCH, CGWP

PROJECT # 96004	DRILLING COMPANY	DRILL RIG:	SAMPLING METHOD:
SBC/SHELDON SPRINGS	TRI-STATE DRILLING	MOBILE B-57, 4 1/4 ID HSA	SPLIT-SPOON & GRAB

BENTONITE WELL SEAL
 NATIVE BACKFILL
 #0 Morie Sand Pack symbol"/> #0 MORIE SAND PACK
 CASING: 2" DIAM., FLUSH-THREADED PVC
 CONCRETE SURFACE SEAL
 SCREEN: 2" DIAM., FLUSH-THREADED, 0.20" SLOT PVC

DEPTH (ft)	CONSTRUCTION	SAMPLE #	BLOWS/ft	RECOVERY	VOCs in ppm	SOILS/LITHOLOGY	COMMENTS
0.0							GRADE @ 100.01'
0.0		GRAB			0.0	DRY, BROWN, MEDIUM SAND	TOC @ 99.36' 0.0' - 1.0'
1.0							
2.0		GRAB			0.0	DRY, GREY-BROWN, MEDIUM SAND	1.0' - 5.0'
3.0							
4.0							
5.0		SS-1 (5-7')	10-10-10	1.5'	0.0	DRY, ORANGE-BROWN, MEDIUM SAND	5.0' - 6.5'
6.0							
7.0		SS-2 (7-9')	10-10-11-10	1.8'	0.0	SATURATED, GREY-BROWN, MEDIUM-FINE SAND	WT @ 7.0 BG 7.0' - 8.8'
8.0							
9.0							
10.0		SS-3 (10-12')	9-11-9-10	2.0'	0.0	SATURATED, GREY-BROWN, MEDIUM SAND	10.0' - 12.0'
11.0							
12.0							
13.0							
14.0							
15.0		SS-4 (15-17')	11-11-9-9	1.9'	0.0	SATURATED, GREY-BROWN, MEDIUM SAND	EOB @ 15.0' 15.0' - 16.9'
16.0							



KENT S. KOPTIUCH, INC.
 Geo-Environmental Services
 164 OSGOOD HILL • ESSEX, VERMONT 05452
 TELE/FAX (802) 878-1620

WELL LOG MW-3

INSTALLED: FEBRUARY 13, 1996
 LOGGED BY: KENT S. KOPTIUCH, CGWP

PROJECT # 96004	DRILLING COMPANY	DRILL RIG:	SAMPLING METHOD:
SBC/SHELDON SPRINGS	TRI-STATE DRILLING	MOBILE B-57, 4 1/4 ID HSA	SPLIT-SPOON & GRAB

BENTONITE WELL SEAL
 NATIVE BACKFILL
 #0 MORIE SAND PACK
 CASING: 2" DIAM., FLUSH-THREADED PVC
 CONCRETE SURFACE SEAL
 SCREEN: 2" DIAM., FLUSH-THREADED, 0.20" SLOT PVC

DEPTH (ft)	CONSTRUCTION	SAMPLE #	BLOWS/ft	RECOVERY	VOCs in ppm	SOILS/LITHOLOGY	COMMENTS
0.0							GRADE @ 98.10'
0.0		GRAB			0.0	DRY, GREY-BROWN, SANDY GRAVEL	TOC @ 97.41'
1.0		GRAB			0.0	DRY, GREY-BROWN, GRAVELLY SAND	0.0' - 1.0'
2.0							1.0' - 1.2'
3.0		GRAB			0.0	DRY, GREY-BROWN, FINE SAND	1.2' - 5.0'
4.0							
5.0		SS-1 (5-7')	14-14-14-14	0.9'	300	MOIST, GREY-BROWN, FINE SAND W/PEW, DISTINCT, MEDIUM, ORANGE MOTTLES	5.0' - 5.9'
6.0							
7.0		SS-2 (7-9')	10-11-9-8	2.0'	175.0	SATURATED, GREY-BROWN, FINE SAND	WT @ 7.0' BG 7.0' - 9.0'
8.0							
9.0							
10.0		SS-3 (10-12')	7-7-7-7	2.0'	20.0	SATURATED, GREY-BROWN, FINE SAND	10.0' - 12.0'
11.0							
12.0							
13.0							
14.0							
15.0							EOB @ 15.0'
16.0		SS-4 (15-17')	4-4-3-3	2.0'	5.0	SATURATED, GREY-BROWN, FINE SAND	15.0' - 17.0'



KENT S. KOPTIUCH, INC.
 Geo-Environmental Services
 164 OSGOOD HILL • ESSEX, VERMONT 05452
 TELE/FAX (802) 878-1620

WELL LOG MW-4

INSTALLED: FEBRUARY 13, 1996
 LOGGED BY: KENT S. KOPTIUCH, CGWP

PROJECT # 96004

SBC/SHELDON SPRINGS

DRILLING COMPANY

TRI-STATE DRILLING

DRILL RIG:

MOBILE B-57, 4 1/4 ID HSA

SAMPLING METHOD:

SPLIT-SPOON & GRAB

BENTONITE WELL SEAL
 NATIVE BACKFILL
 #0 MORIE SAND PACK
 CASING: 2" DIAM., FLUSH-THREADED PVC
 CONCRETE SURFACE SEAL
 SCREEN: 2" DIAM., FLUSH-THREADED, 0.20" SLOT PVC

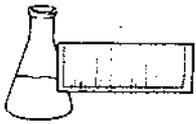
DEPTH (ft)	CONSTRUCTION	SAMPLE #	BLOWS/ft	RECOVERY	VOCs in ppm	SOILS/LITHOLOGY	COMMENTS
0.0							GRADE @ 97.00'
0.0 - 1.0					0.0	DRY, GREY-BROWN, MEDRUM-FINE SAND W/COMMON FINE GRAVELS	FOC @ 96.76'
1.0 - 5.0					0.0	DRY, BROWN, MEDIUM-FINE SAND	
5.0 - 5.8		SS-1 (5-7')	14-14-14-14	2.0'	0.0	MOIST, GREY-BROWN, FINE SAND W/FEW SILT & COMMON, DISTINCT MEDIUM, ORANGE MOTTLES	
7.0 - 9.0		SS-2 (7-9')	14-12-12-12	2.0'	0.0	SATURATED, GREY-BROWN, FINE SAND	WT @ 7.0 BG
10.0 - 11.9		SS-3 (10-12')	14-14-15-14	1.9'	0.0	SATURATED, GREY, FINE SAND	
15.0 - 17.0		SS-4 (15-17')	13-7-12-13	2.0'	0.0	SATURATED, GREY-BROWN, MEDIUM-FINE SAND	EOB @ 15.0'

Attachment C

**LABORATORY CHEMICAL ANALYTICAL RESULTS:
FEBRUARY 21, 1996 GROUNDWATER SAMPLING EVENT**

KENT S. KOPTIUCH, Inc. Geo-Environmental Services

164 OSGOOD HILL • ESSEX, VT 05452 • TELE/FAX (802) 878-1620



ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

REPORT OF LABORATORY ANALYSIS

CLIENT: KSK GeoS.
PROJECT NAME: SBC/Sheldon Springs
DATE REPORTED: February 27, 1996
DATE SAMPLED: February 21, 1996

PROJECT CODE: KSKG1910
REF. #: 86,019 - 86,024

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody record.

Chain of custody indicated no sample preservation.

All samples were prepared and analyzed by requirements outlined in the referenced methods and within the specified holding times.

All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced methods.

Blank contamination was not observed at levels affecting the analytical results.

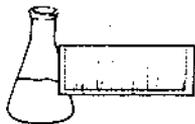
Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

Individual sample performance was monitored by the addition of surrogate analytes to each sample. All surrogate data was determined to be within Laboratory QA/QC guidelines unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures



ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020 COMPOUNDS BY EPA METHOD 8260

CLIENT: KSK GeoS.
PROJECT NAME: SBC/Sheldon Springs
REPORT DATE: February 27, 1996
SAMPLER: Kent Koptiuch
DATE SAMPLED: February 21, 1996
DATE RECEIVED: February 21, 1996

PROJECT CODE: KSKG1910
ANALYSIS DATE: February 26, 1996
STATION: MW-1
REF.#: 86,019
TIME SAMPLED: 11:00

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	ND ¹
Chlorobenzene	2	ND
1,2-Dichlorobenzene	2	ND
1,3-Dichlorobenzene	2	ND
1,4-Dichlorobenzene	2	ND
Ethylbenzene	1	ND
Toluene	2	ND
Xylene	3	ND
MTBE	3	ND

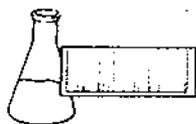
NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

ANALYTICAL SURROGATE RECOVERY:

Dibromofluoromethane: 92.%
Toluene-d8: 95.%
4-Bromofluorobenzene: 104.%

NOTES:

1 None detected



ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020 COMPOUNDS BY EPA METHOD 8260

CLIENT: KSK GeoS.
PROJECT NAME: SBC/Sheldon Springs
REPORT DATE: February 27, 1996
SAMPLER: Kent Koptiuch
DATE SAMPLED: February 21, 1996
DATE RECEIVED: February 21, 1996

PROJECT CODE: KSKG1910
ANALYSIS DATE: February 26, 1996
STATION: MW-2
REF.#: 86,020
TIME SAMPLED: 11:15

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	ND ¹
Chlorobenzene	2	ND
1,2-Dichlorobenzene	2	ND
1,3-Dichlorobenzene	2	ND
1,4-Dichlorobenzene	2	ND
Ethylbenzene	1	ND
Toluene	2	ND
Xylene	3	ND
MTBE	3	ND

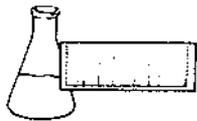
NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

ANALYTICAL SURROGATE RECOVERY:

Dibromofluoromethane: 91.%
Toluene-d8: 94.%
4-Bromofluorobenzene: 103.%

NOTES:

1 None detected



LABORATORY REPORT

EPA METHOD 8020 COMPOUNDS BY EPA METHOD 8260

CLIENT: KSK GeoS.
PROJECT NAME: SBC/Sheldon Springs
REPORT DATE: February 27, 1996
SAMPLER: Kent Koptiuch
DATE SAMPLED: February 21, 1996
DATE RECEIVED: February 21, 1996

PROJECT CODE: KSKG1910
ANALYSIS DATE: February 26, 1996
STATION: MW-3
REF.#: 86,021
TIME SAMPLED: 11:30

<u>Parameter</u>	<u>Detection Limit (ug/L)¹</u>	<u>Concentration (ug/L)</u>
Benzene	100	340.
Chlorobenzene	200	ND ²
1,2-Dichlorobenzene	200	ND
1,3-Dichlorobenzene	200	ND
1,4-Dichlorobenzene	200	ND
Ethylbenzene	100	2,290.
Toluene	200	18,300.
Xylene	300	12,200.
MTBE	300	922.

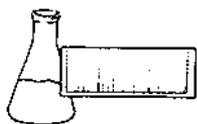
NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

ANALYTICAL SURROGATE RECOVERY:

Dibromofluoromethane: 82.%
Toluene-d8: 108.%
4-Bromofluorobenzene: 101.%

NOTES:

- 1 Detection limit increased due to high levels of contaminants. Sample run at a 1.% dilution.
- 2 None detected



ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020 COMPOUNDS BY EPA METHOD 8260

CLIENT: KSK GeoS.
PROJECT NAME: SBC/Sheldon Springs
REPORT DATE: February 27, 1996
SAMPLER: Kent Koptiuch
DATE SAMPLED: February 21, 1996
DATE RECEIVED: February 21, 1996

PROJECT CODE: KSKG1910
ANALYSIS DATE: February 26, 1996
STATION: MW-4
REF.#: 86,022
TIME SAMPLED: 11:45

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	11.9
Chlorobenzene	2	ND ¹
1,2-Dichlorobenzene	2	ND
1,3-Dichlorobenzene	2	ND
1,4-Dichlorobenzene	2	ND
Ethylbenzene	1	35.0
Toluene	2	14.1
Xylene	3	101.
MTBE	3	TBQ ²

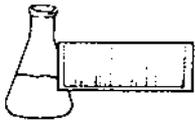
NUMBER OF UNIDENTIFIED PEAKS FOUND: > 10

ANALYTICAL SURROGATE RECOVERY:

Dibromofluoromethane: 94.%
Toluene-d8: 98.%
4-Bromofluorobenzene: 102.%

NOTES:

- 1 None detected
- 2 Trace below quantitation limit



ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020 COMPOUNDS BY EPA METHOD 8260

CLIENT: KSK GeoS.
PROJECT NAME: SBC/Sheldon Springs
REPORT DATE: February 27, 1996
SAMPLER: Kent Koptiuch
DATE SAMPLED: February 21, 1996
DATE RECEIVED: February 21, 1996

PROJECT CODE: KSKG1910
ANALYSIS DATE: February 26, 1996
STATION: Field Blank
REF.#: 86,023
TIME SAMPLED: 12:15

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	ND ¹
Chlorobenzene	2	ND
1,2-Dichlorobenzene	2	ND
1,3-Dichlorobenzene	2	ND
1,4-Dichlorobenzene	2	ND
Ethylbenzene	1	ND
Toluene	2	ND
Xylene	3	ND
MTBE	3	ND

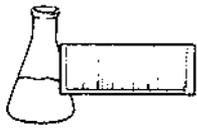
NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

ANALYTICAL SURROGATE RECOVERY:

Dibromofluoromethane: 94.%
Toluene-d8: 92.%
4-Bromofluorobenzene: 102.%

NOTES:

1 None detected



ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020 COMPOUNDS BY EPA METHOD 8260

CLIENT: KSK GeoS.
PROJECT NAME: SBC/Sheldon Springs
REPORT DATE: February 27, 1996
SAMPLER: Kent Koptiuch
DATE SAMPLED: February 21, 1996
DATE RECEIVED: February 21, 1996

PROJECT CODE: KSKG1910
ANALYSIS DATE: February 26, 1996
STATION: Trip Blank
REF.#: 86,024
TIME SAMPLED: 10:45

<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	ND ¹
Chlorobenzene	2	ND
1,2-Dichlorobenzene	2	ND
1,3-Dichlorobenzene	2	ND
1,4-Dichlorobenzene	2	ND
Ethylbenzene	1	ND
Toluene	2	ND
Xylene	3	ND
MTBE	3	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

ANALYTICAL SURROGATE RECOVERY:

Dibromofluoromethane: 82.%
Toluene-d8: 98.%
4-Bromofluorobenzene: 100.%

NOTES:

1 None detected

86,019 - 86,030
CHAIN-OF-CUSTODY RECORD

Project Name: SBC/SHELDON SPRINGS	Reporting Address: 164 OSGOOD HILL ESSEX, VT 05452	Billing Address: SAME
Site Location: SHELDON SPRINGS, VT		
Endyne Project Number: KSKG 1910	Company: KSK Geo5 802 878-1620	Sampler Name: KENT KOPTIUCH
KSK Geo5 Project #: 96004	Contact Name/Phone #: KENT KOPTIUCH	Phone #: 802 878 1620

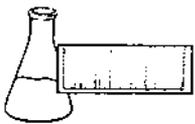
Lab #	Sample Location	Matrix	G R A B	C O M P	Date/Time	Sample Containers		Field Results/Remarks	Analysis Required	Sample Preservation	Rush
						No.	Type/Size				
86,019	MW-1	H ₂ O	X		2/21/96 1100	2	10ml VOO	8020 (BTX+MTBE)	8015 TPH	NO N/A	
86,020	MW-2	↓	X		1115	↓	↓	↓	↓	↓	↓
86,021	MW-3		X		1130						
86,022	MW-4		X		1145						
	MW-5		X		1200						
86,023	FIELD BLANK		X		1215						
86,024	TRIP BLANK		X		1045						
COULD NOT SAMPLE MW-5 - WELL BLOCKED W/ICE											

Relinquished by: Signature <i>KSK/A</i>	Received by: Signature <i>M. Chamber</i>	Date/Time 2/21/96 1440 hrs
Relinquished by: Signature	Received by: Signature	Date/Time

New York State Project: Yes No

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD ₅	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify):										



ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

REPORT OF LABORATORY ANALYSIS

CLIENT: KSK GeoS
PROJECT NAME: SBC/Sheldon Springs
DATE REPORTED: February 27, 1996
DATE SAMPLED: February 21, 1996

PROJECT CODE: KSKG1911
REF. #: 86,025 - 86,030

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody record.

Chain of custody indicated no sample preservation.

All samples were prepared and analyzed by requirements outlined in the referenced methods and within the specified holding times.

All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced methods.

Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy were monitored by laboratory control standards. These standards were determined to be within established laboratory method acceptance limits.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures



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Williston, Vermont 05495
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FAX 879-7103

LABORATORY REPORT

TOTAL PETROLEUM HYDROCARBONS (TPH) BY MODIFIED EPA METHOD 8015

DATE: February 27, 1996
CLIENT: KSK GeoS
PROJECT: SBC/Sheldon Springs
PROJECT CODE: KSKG1911
COLLECTED BY: Kent Koptiuch
DATE SAMPLED: February 21, 1996
DATE RECEIVED: February 21, 1996

<u>Reference #</u>	<u>Sample ID</u>	<u>Concentration(mg/L.)¹</u>
86,025	MW-1; 1100	ND ²
86,026	MW-2; 1115	ND
86,027	MW-3; 1130	34.6
86,028	MW-4; 1145	2.1
86,029	Field Blank; 1215	ND
86,030	Trip Blank; 1045	ND

Notes:

- 1 Method detection limit is 0.1 mg/L.
- 2 None detected

CHAIN-OF-CUSTODY RECORD

18212

Project Name: SBC/SHELDON SPRINGS Site Location: SHELDON SPRINGS, VT	Reporting Address: 164 OSGOOD HILL ESSEX, VT 05452	Billing Address: SAME
Endyne Project Number: KSKGEO/911 KSK GeoS Project # 96004	Company: KSK GeoS 802 878-1620 Contact Name/Phone #: KENT KOPTUCH	Sampler Name: KENT KOPTUCH Phone #: 802 878 1620

Lab #	Sample Location	Matrix	G R A B	C O M P	Date/Time	Sample Containers		Field Results/Remarks	Analysis Required	Sample Preservation	Rush
						No.	Type/Size				
86,025	MW-1	H ₂ O	X		2/21/96 1100	2	40ml VOA	8020 (BTX+MTBE)	8015 TPH	NONE	
86,026	MW-2	↓	X		1115	↓	↓	↓	↓	↓	↓
86,027	MW-3		X		1130						
86,028	MW-4		X		1145						
	MW-5		X		1200						
86,029	FIELD BLANK		X		1215						
86,030	TRIP BLANK	X		1045							
COULD NOT SAMPLE					MW-5 - WELL BLOCKED W/ICE						

Relinquished by: Signature <i>KSK/KA</i>	Received by: Signature <i>M. Gonzalez</i>	Date/Time 2/21/96 1140 hrs
Relinquished by: Signature	Received by: Signature	Date/Time

 New York State Project: Yes No
Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitric N	9	BOD ₅	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify):										