



3/22/96 10:20:36

22 March 1996

Mr. Lutz Saborowski
Lutz's Automotive
Box 331, Main Street
Montgomery Center, VT 05471

Re: Initial Site Investigation Report — Final Copy

Dear Mr. Saborowski,

Please find enclosed a final copy of the initial site investigation report for your property. As we discussed by telephone today, I am forwarding copies of the report to Jason Feingold of the VT DEC and to Mike Mancuso of Cincinnati Insurance Company.

Ground Water of Vermont has appreciated the opportunity to assist you.

Sincerely,

Ron Miller
Hydrogeologist and Regional Manager

cc. Jason Feingold, VT DEC
Mike Mancuso, Cincinnati Insurance Co.

Enclosure
RM:rm/95037L03.SAM

MAR 26 1996

INITIAL SITE INVESTIGATION REPORT

Lutz's Automotive

Montgomery Center, Vermont

VT DEC SITE #95-1789

22 March 1996

Prepared for:

Lutz's Automotive
Box 331 Main Street
Montgomery Center, VT 05471

Contact: Lutz Saborowski
Phone: 802-326-4528

Prepared by:

Ground Water of Vermont
1 Mill Street, Box C-5
Burlington, VT 05401
Phone: 802-860-6065

GWV Project #V95-037

GWV Document #95037R01.SAM

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EXECUTIVE SUMMARY

Ground Water of Vermont (GWV) has conducted an initial site investigation at Lutz's Automotive, located on Main Street in Montgomery Center, Vermont. Investigation activities, conducted following the replacement of leaking product supply lines, included installation of three monitoring wells; field screening of subsurface soils for volatile organic compounds (VOCs); sampling and analysis of ground water from the three monitoring wells; and a site survey to identify and assess potential risks to environmental and public health.

The principal findings of this investigation are summarized below.

1. An unknown quantity of gasoline has been released to the subsurface, apparently from leaks in the product lines running between the underground storage tanks (USTs) and the former pump island. Repairs have been made and there is no evidence that releases are ongoing.
2. Adsorbed-phase soil contamination in the unsaturated zone constitutes a potential source of ongoing ground-water contamination. The rate of direct contaminant leaching may be reduced, however, by the presence of newly installed asphalt paving over the entire potential source area.
3. No measurable accumulation of free-phase contamination has been detected in any of the three monitoring wells installed. A heavy petroleum sheen was observed in the monitoring well located adjacent to the USTs, however, and lighter sheens were observed on the two downgradient wells.
4. A plume of dissolved-phase gasoline contamination has formed downgradient from the source area. Contaminant concentrations detected in the initial ground-water samples from the monitoring wells exceeded applicable Vermont standards with benzene levels from 127 to 464 times above the 5 part per billion limit.
5. The unconsolidated surficial materials comprising the shallow aquifer at the site consist of fine to coarse sand and gravel with little or no clay and silt content — typical stream bed deposits. The water table lies about nine feet below ground surface and exhibits a southwesterly-trending gradient of about 2.2 percent. Published data for sand-and-gravel aquifers suggest that the range of possible ground-water flow velocities at the site is from 0.12 to 31.1 feet per day.
6. A site survey identified the nearby Trout River, and the basements of Lutz's Automotive and the neighboring Kilgore's General Store as the only sensitive receptors with the potential for impact from the contamination. At the time of the UST removal, no visual or olfactory evidence of impact to the river was noted. Screening of ambient air in the basements for VOC vapors conducted on 4 March 1996 suggested that indoor air quality has not been impacted. No public water supplies are threatened and direct contact with contaminated soil is unlikely.

On the basis of these findings, GWV recommends installation of a shallow piezometer along the north bank of the Trout River and directly downgradient of MW-1. An additional round of sampling should be conducted as soon as possible, to include: resampling of the monitoring wells; sampling of the piezometer; and sampling of surface water from three locations along the Trout River — upgradient, adjacent to the piezometer and downgradient. The results of this sampling round will be used to assess the need for additional monitoring and/or remediation at the site.

1.0 INTRODUCTION

This report details the results of an initial site investigation conducted at Lutz's Automotive, located on Main Street (Vermont Route 118) in Montgomery, Vermont (Figure 1). This report has been prepared by Ground Water of Vermont (GWV) for Mr. Lutz Saborowski, owner of Lutz's Automotive. The site investigation was initiated at the request of the Vermont Department of Environmental Conservation (VT DEC) following the discovery, during a routine piping inspection and replacement procedure conducted on 15 May 1995, that an unknown quantity of gasoline had leaked to the subsurface from at least two faulty product supply lines.

1.1 Site Location and Physical Setting

The site is located on the south side of Main Street along the north bank of the Trout River in the heart of Montgomery Center (Figure 1). The garage building is situated between Town Hall and Kilgore's General Store with the river flowing by to the west within 20 feet of the garage's south corner (Figure 2). The area is comprised of relatively level ground lying at about 530 feet above sea level within the flood plain of the river, which controls area drainage. The local direction of presumed ground-water flow is toward the river; the regional ground-water flow direction is presumed to be in the west-northwest direction of the river's flow.

Montgomery Center is zoned for mixed residential and commercial use. All buildings in the area are supplied with water from a public distribution system — there are no local on-site water-supply wells. Bedrock in the area is comprised of interbedded chlorite schist, quartzite and gneiss of Cambrian age (Doll, 1961). Bedrock outcrops occur on the hillsides around the river valley. Recent alluvial deposits comprise the native surficial materials in the vicinity of the site (Stewart and MacClintock, 1970). Overburden thicknesses may vary widely depending on bedrock topography and appear to be less than 15 feet in some spots on the Saborowski property.

1.2 Site History

According to information supplied by Mrs. Saborowski, her husband purchased the property in 1985 from Mr. Robert Cota of Montgomery Center, Vermont, who also had operated it as an automotive service and gasoline retail station prior to selling. The property consisted of the garage building, one pump island with two dispensers and three gasoline underground storage tanks (USTs) at the time of the Saborowskis' purchase.

In 1987, the old USTs were removed and replaced with three new, registered, single-walled steel tanks equipped with cathodic protection: a 6,000-gallon and two 4,000-gallon tanks (Figure 2). In order to upgrade their piping system — by installing double-wall suction supply pipe, Veeder-Root product-level and tank moisture monitors and an in-tank leak-detection system, a stage II vapor-recovery system and contaminant manhole sumps — prior to moving the pump island and paving the property, Mr. Saborowski had the piping

excavated on 16 May 1995. The discovery that gasoline had been leaked to the subsurface via faulty piping junctions around the USTs and the pump island was made at this time.

Repairs to the leaking lines, as well as the planned equipment upgrades and pump island relocation were completed in a timely fashion and the VT DEC was notified of the apparent release by telephone and via a letter report prepared by GWV on 17 May 1995 and submitted to Mr. Ted Unkles. In a 1 June 1995 letter to Mr. Saborowski, Mr. Jason Feingold of the VT DEC requested that he have his environmental consultant prepare a work plan and cost estimate for the performance of an initial site investigation. GWV submitted a work plan/cost estimate to Mr. Saborowski on 5 July 1995, which was accepted and approved by him and Mr. Feingold on 22 January 1996.

Field work for the initial site investigation commenced on 31 January 1996.

1.3 Purpose and Scope of Work

The purposes of this initial site investigation include:

- Determination of the extent of free-phase gasoline contamination in unsaturated soils and along the ground-water table at the site.
- Determination of the extent and degree of dissolved-phase gasoline contamination in ground water at the site.
- Qualitative assessment of the risks to environmental and public health via relevant sensitive receptors and potential contaminant migration pathways.
- Provision of preliminary recommendations for future action.

To accomplish these purposes, GWV has:

- Reviewed existing historical site data.
- Supervised the installation of three soil borings (SB-4a, b and c) and three soil boring/monitoring wells (MW-1, 2, and 3), and determined the local ground-water flow direction, gradient and approximate velocity.
- Screened subsurface soils from the well borings for volatile organic compound (VOC) content using a photoionization detector (PID).
- Collected and submitted ground-water samples for laboratory analysis of purgeable aromatics via EPA Method 8020 from the three monitoring wells.
- Identified sensitive receptors in the area.
- Assessed the risk posed by the contamination to these potential receptors.
- Evaluated the need for treatment and/or a long-term monitoring plan for the site.
- Prepared this summary report, which details the work performed, qualitatively assesses risks, provides conclusions and offers recommendations for further action.

2.0 INVESTIGATIVE PROCEDURES AND RESULTS

GWV has conducted field investigations designed to obtain the data necessary for fulfilling the objectives outlined in Section 1.3 above. All work has been conducted in a safe, professional and expeditious manner in accordance with state requirements and GWV established protocols.

2.1 Product Line Replacement Assessment

A detailed product line replacement assessment report for the excavation work conducted on 16 May 1995 was provided to Mr. Ted Unkles of the VT DEC on 17 May 1995. Evidence that gasoline had been released to the subsurface included: odor, staining, and VOC soil headspace readings as high as 1,472 parts per million (ppm). The headspace readings were collected using a Thermo Environmental Model 580B PID calibrated with an isobutylene standard gas to a benzene reference.

The excavation extended to a depth of four feet — only as deep as necessary to expose the piping and the tops of the USTs. Neither water nor free-phase liquid gasoline were encountered. Two eight-foot deep leak detection wells located immediately adjacent to the tanks (Figure 2) were also dry at the time of the excavation. The north bank of the Trout River, passing about 60 feet south of the USTs, was surveyed for signs of contamination on 16 May and found to be free of sheens, odors and unusual bacterial activity. All excavated soils were backfilled.

Mr. Saborowski has informed GWV that, to the best of his knowledge, no other USTs exist at the site.

2.2 Monitoring Well Installation

On 31 January 1996, GWV supervised the installation of three soil boring/monitoring wells, as well as three additional borings advanced in an unsuccessful attempt to install a fourth monitoring well. Wells MW-1 and MW-2 were placed 30 to 40 feet toward the river from the USTs in the presumed direction of ground-water flow. MW-3 was placed immediately adjacent to the USTs, near the north corner of the garage building. Three attempts were made to install a fourth monitoring well just downgradient of the pump island, but each of the borings encountered refusal before reaching ground water at depths of between 6.5 and 7.5 feet below ground surface (bgs) — possibly on bedrock or an old building foundation. The locations of the three wells and the three soil borings (SB-4a, 4b and 4c) are shown on Figure 2. The soil borings and monitoring wells were installed by Adams Engineering of Underhill, Vermont using a vibratory drill rig.

Continuous soil samples were collected at each monitoring-well boring location using a five-foot polyethylene-lined core barrel with a 2.375 -inch inner diameter. The core barrel, which also served as the drill bit with an outer diameter of 3.0 inches, was simultaneously pushed and vibrated into place to advance the boring. The sample cores obtained were screened for the presence of gasoline products with a PID and logged for lithology by GWV

personnel. All downhole drilling equipment was decontaminated and the polyethylene core barrel liner changed between borings. The PID soil screening results are discussed in Section 2.3 below.

The soils encountered in each boring consisted of fine to coarse sand and gravel containing little or no silt and clay. Alternating beds from one to several feet thick were defined by differing grain size distributions and variations in color from brown to gray. Well borings MW-1, 2 and 3 were completed to 18 feet, 17.5 feet and 13.5 feet bgs, respectively. The boring for MW-3 encountered refusal. Out of three attempts to drill a boring in which to install the proposed fourth monitoring well, all hit refusal at 7.5 feet bgs or less and none encountered ground water. Detailed stratigraphic soil descriptions are included on the soil boring and well construction logs in Appendix B.

Ground water was encountered in each of the borings for MW-1, 2 and 3 at between 7.5 and 8.5 feet bgs. Monitoring wells consisting of 1.5-inch PVC pipe with 10.0 feet of 0.010-inch slot screen were installed in each of these three borings. The screen sections were placed so as to accommodate seasonal ground-water level fluctuations. Sections of unslotted PVC risers were added to bring the tops of the well casings to approximately 0.5 feet bgs. Clean silica #2 filter sand was placed in the borehole annulus around each well to nominally one foot above the screened intervals. A bentonite-slurry seal at least one-foot thick was installed above the sand pack and the remainder of the annular space was filled with native material. Each completed monitoring well was protected by a flush-mounted steel roadbox cemented into place. Each well casing was topped with a compression cap. Monitoring-well construction details are included on the soil boring and well construction logs in Appendix B.

Monitoring wells MW-1 and 2 were developed with a peristaltic pump immediately following installation. A minimum of three well volumes of fluid were removed from each well in order to establish good hydrologic communication with the surrounding surficial aquifer. Due to the possibility of free-phase product accumulating in MW-3, it was not immediately developed. Development water was discharged directly to the ground surface in the vicinity of each well.

2.3 Subsurface Soil Screening

Soil headspace screening for the presence of volatile organic compounds (VOCs) was conducted in the field on samples composited from every three to four feet of core. In general, a headspace measurement was collected from each distinct lithology encountered. Each sample was sealed in a plastic bag, agitated, warmed, allowed to equilibrate at approximately 50 degrees Fahrenheit, and finally measured for VOC vapor concentration using a Thermo Environmental Model 580B PID. Readings ranged from 0.0 ppm in the shallow samples from the downgradient borings to over 2,000 ppm near the water table in the boring for MW-3. PID screening results are included on the boring logs in Appendix B.

2.4 Determination of Ground-Water Flow Direction and Gradient

On 9 February 1996, fluid levels were measured in the three monitoring wells. The depth to water varied from 8.72 feet below top-of-casing in MW-3 to 9.46 feet in MW-1. All three of the wells displayed a heavy sheen of free-phase product, but no measurable accumulation. Static water-table elevations were computed for each monitoring well by subtracting the measured depth-to-water readings from the surveyed top-of-casing elevations, which are relative to an arbitrary 100.00-foot datum. Water-level measurements and elevation calculations for 9 February 1996 are presented in Table 1. The ground-water contour map (Figure 3) was prepared using this data. Recharge rates observed in all the wells were moderately low.

Ground water in the unconfined surficial aquifer directly beneath the site appears to be flowing in a southwesterly direction toward the Trout River, as originally presumed. The average gradient of the local ground-water table on 9 February 1996 was about 2.2 percent. As discussed in Section 2.2 above, unconsolidated surficial materials comprising the shallow aquifer at the site consist largely of fine to coarse sand and gravel. Such materials typically exhibit effective porosities of about 0.2 to 0.5 and hydraulic conductivities of about 2.8 to 283 feet per day (Fetter, 1994). Assuming Darcian flow, these estimated ranges of porosity and conductivity combine with the calculated ground-water gradient of 2.2 percent to yield an estimated range of ground-water flow velocity in the surficial aquifer of between 0.12 and 31.1 feet per day.

2.5 Ground-Water Sampling and Analysis

Ground-water samples were collected from monitoring wells MW-1, 2 and 3 on 9 February 1996 using dedicated Waterra pumps. Each monitoring well was purged of at least three standing well volumes of water and then sampled. MW-3, which contained the heaviest sheen of free-phase product but still no measurable quantity, was developed and purged in a single step prior to sampling. A blind duplicate sample from MW-3 and a trip-blank sample were collected to ensure that adequate quality assurance/quality control (QA/QC) standards were maintained. All field procedures were conducted in accordance with GWV standard protocols. Purge water was discharged directly to the ground in the vicinity of each well.

The ground-water samples were submitted to Endyne, Inc. of Williston, Vermont where they were analyzed for the presence of VOCs by EPA Method 8020. Analytical results from the QA/QC samples indicate that adequate QA/QC was maintained during sample collection and analysis: no VOCs were detected in the trip-blank; analytical results for the duplicate fell within 16 percent of the original sample results.

Analytical results for all the samples are summarized in Table 2. A contaminant distribution map for total BTEX (benzene, toluene, ethylbenzene and xylenes) and MTBE (methyl-tertiary butyl ether) is presented in Figure 4. Laboratory report forms are included in Appendix C. The sample analysis results indicate that ground water at the site has been impacted, with a plume of dissolved-phase gasoline contamination extending southwestward toward the Trout

River from the area of the USTs and former pump island. The state of Vermont has established groundwater enforcement standards (VGESs) for the BTEX components: 5 parts per billion (ppb) for benzene, 2,420 ppb for toluene, 680 ppb for ethylbenzene and 400 ppb for xylenes. A nonenforceable health advisory (VHA) standard of 40 ppb has been issued by the state for MTBE. Established standards were exceeded for every contaminant in all three samples, except for ethylbenzene detected at 625 ppb in MW-2. Total BTEX concentrations were 37,310 ppb, 14,932 ppb and 87,240 ppb in MW-1, 2 and 3, respectively. MTBE concentrations were 3,730 ppb, 1,380 ppb and 4,490 ppb, respectively.

3.0 SENSITIVE RECEPTOR SURVEY AND RISK ASSESSMENT

GWV conducted a survey to identify sensitive receptors near the site that could potentially be impacted, and to assess the related potential risks to human health.

- All buildings in Montgomery Center near Lutz's Automotive obtain their water from the public water-supply distribution system — there are no water-supply wells in the immediate area.
- Information obtained from the pre-excavation and drilling utility clearances and GWV's site survey indicate that there are no buried utilities in the area of the contaminant plume that could function as preferred contaminant migration pathways.
- An old basement approximately 12 x 20 feet in size, with concrete walls and a dirt floor lies beneath the present concrete slab foundation of the Lutz's Automotive building. The subgrade space is accessible from one end and is located parallel to and about three feet in from the north-facing garage walls. It is not currently in use and is kept covered as per Vermont OSHA regulations. Kilgore's General Store also has a basement. Indoor air monitoring of these basements conducted with a PID on 4 March 1996 yielded readings of 0.0 ppm above background for Kilgore's General Store; and between 0.6 and 0.8 ppm for Lutz's Automotive, both in the basement and on the ground floor. Readings of less than 1 ppm are considered to be within the range of normal background concentrations, suggesting that indoor air quality in the buildings has not been impacted by the contamination.
- Two dry wells lie in the path of apparent contaminant migration (Figure 2). One serves the indoor plumbing at Lutz's Automotive, the other serves Kilgore's General Store. Given that the bacterial activity associated with organic decay in these dry wells will also consume contaminant VOCs that may pass through them, they are not considered to be of concern.
- Evidence indicates that, if an area of free-phase gasoline contamination exists at the site, it is small and remains confined to the immediate area of the USTs and pump island.
- The Trout River is the only surface water body near the site and constitutes the likely final destination for all surficial-aquifer ground water flowing through the source area. As stated in Section 2.1 above, no visual or olfactory evidence of gasoline contamination to the river was evident in May 1995 during the piping replacement excavation. GWV had intended to resurvey the river bank and collect a near-bank surface water sample for laboratory analysis during the monitoring well sampling event on 9 February 1996. This was not, however, possible due to the build-up of ice and snow.

- PID soil-screening data from the monitoring-well borings indicate that near-surface VOC concentrations at the site are generally less than 1 ppm. Furthermore, the entire area is paved and monitoring well access is controlled, thus virtually eliminating the chance of incidental dermal, ingestive or inhalation exposure to contamination.

In summary, available evidence suggests that the nearby, and downgradient Trout River is the only sensitive receptor likely to be impacted by subsurface contamination at the site. The only other plausible avenue for human contaminant contact would be the inhalation of gasoline vapors that could conceivably accumulate in the two adjacent subgrade basements, although evidence to date suggests that indoor air has not been impacted.

4.0 SUMMARY AND CONCLUSIONS

Based on the investigation results described above, GWV concludes the following.

1. An unknown quantity of gasoline has been released to the subsurface at the site, apparently from leaks in the product lines running between the USTs and the former pump island. The equipment has been repaired and there is no evidence of ongoing releases.
2. Petroleum contamination adsorbed to soils in the unsaturated zone between where the leaks occurred (at about four feet bgs) and the ground-water table (at about nine feet bgs) constitutes a potential source of ongoing ground-water contamination. The presence of newly installed pavement over the source area, however, has likely reduced the rate of direct contaminant leaching to the water table via percolating precipitation.
3. No measurable accumulation of free-phase contamination has been observed in any of the monitoring wells, although sheens have been noted in all three. A heavy sheen has been noted in MW-3, which is located immediately adjacent to the USTs.
4. A plume of dissolved-phase gasoline contamination has formed in the downgradient direction and likely intersects the Trout River. Concentrations of contaminants detected in ground-water samples from monitoring wells MW-1, 2 and 3 were in excess of VGESs, with benzene levels ranging from 127 to 464 times greater than the 5 ppb standard. No visual or olfactory evidence of impact to the river has been observed, however.
5. The unconsolidated materials comprising the shallow aquifer at the site consist of fine to coarse sand and gravel with little or no clay and silt content. On 9 February 1996, the water table was about nine feet bgs, with a southwestward gradient toward the Trout river of about 2.2 percent. Published data on sand-and-gravel aquifers suggest a possible range of ground-water flow velocities at the site of from 0.12 to 31.1 feet per day.
6. A site survey identified the nearby Trout River, and the basements of Lutz's Automotive and the neighboring Kilgore's General Store as the only sensitive receptors with the potential for impact from the contamination. At the time of the UST removal, no visual or olfactory evidence of impact to the river was noted. Screening of air for VOC vapors conducted in the basements suggests that indoor air quality has not been impacted. No public water supplies are threatened and direct contact with contaminated soil is unlikely.

5.0 RECOMMENDATIONS

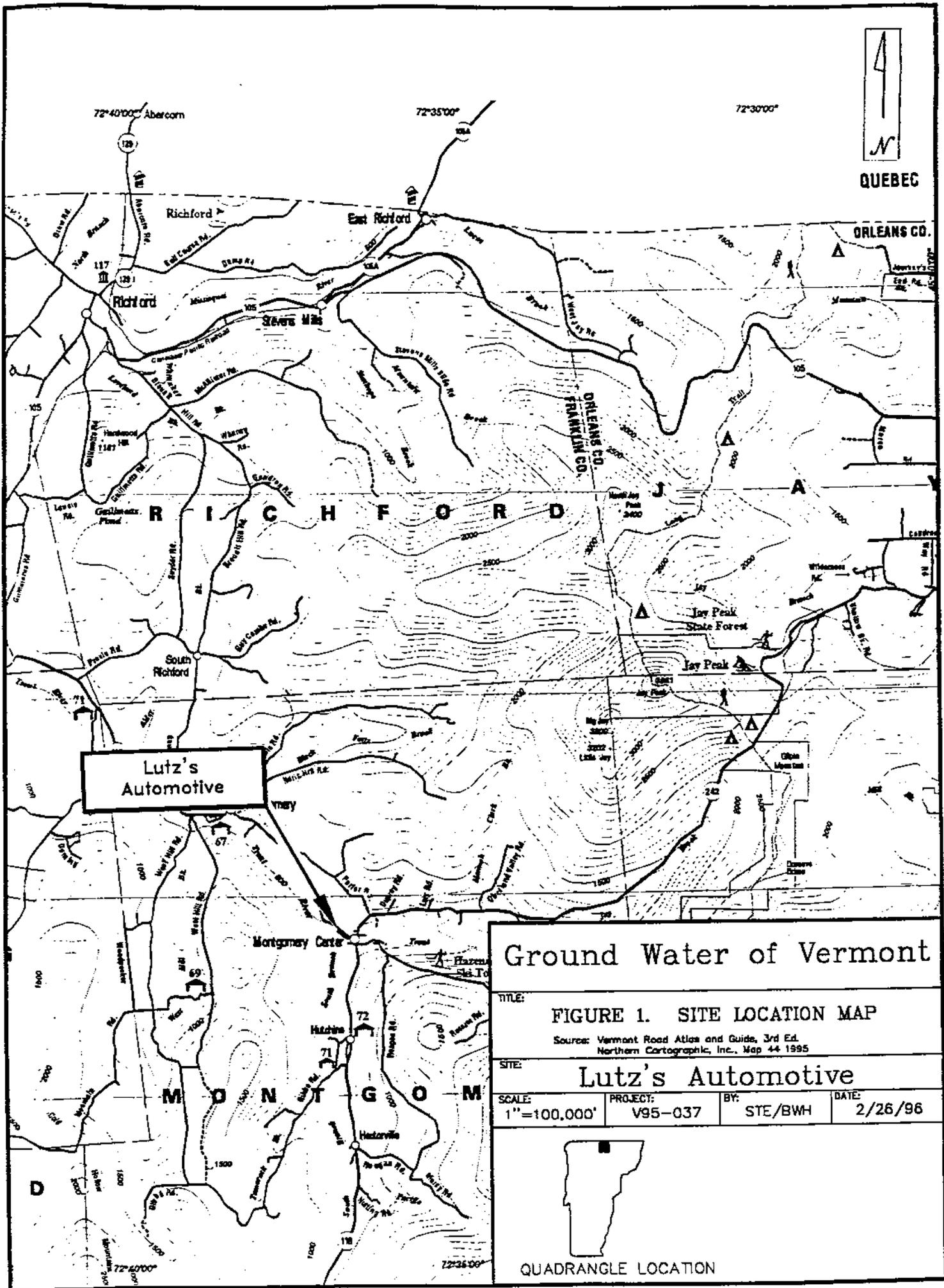
On the basis of our interpretation of the initial site investigation results presented in this report, GWV recommends that a shallow piezometer suitable for sampling be installed along the north bank of the Trout River and directly downgradient of MW-1. An additional round of sampling should then be conducted as soon as weather conditions permit sampling of the river. At that time ground-water samples should be collected from all the monitoring wells and the newly installed piezometer. Surface-water samples should be collected from three locations along the Trout River: upgradient, adjacent to the piezometer and downgradient. The results of this sampling round will be used to assess the need for additional monitoring and/or remediation at the site.

6.0 REFERENCES

- Doll, C.G. and others, 1961. *Geologic Map of Vermont*, Office of the State Geologist.
- Domenico, P.A., and Schwartz, F.W., 1990. *Physical and Chemical Hydrogeology*, John Wiley and Sons, New York, 824 p.
- Fetter, C.W., 1994. *Applied Hydrogeology, 3rd Ed.*, Prentice Hall, Englewood Cliffs, New Jersey, 691 p.
- Stewart, D.P. and MacClintock, P., 1970. *Surficial Geologic Map of Vermont*, Office of the State Geologist.

APPENDIX A

Figures and Tables



QUEBEC

Lutz's
Automotive

Ground Water of Vermont

TITLE: **FIGURE 1. SITE LOCATION MAP**
 Source: Vermont Road Atlas and Guide, 3rd Ed.
 Northern Cartographic, Inc., Map 44 1995

SITE: **Lutz's Automotive**

SCALE: 1"=100,000'	PROJECT: V95-037	BY: STE/BWH	DATE: 2/26/96
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QUADRANGLE LOCATION



MAIN STREET
(VT ROUTE 118)

NEW PUMP ISLAND

FORMER PUMP ISLAND [] • SB-4b
SB-4a • SB-4c

KILGORE'S
GENERAL
STORE

6K UST

4K UST

4K UST

MW-3

LUTZ'S
AUTOMOTIVE

TOWN
HALL

MW-2

MW-1

TROUT RIVER

- ⊕ MONITORING WELL
- ⊙ LEAK DETECTION WELL
- SOIL BORING
- DRY WELL



Ground Water of Vermont

1 Mill St., Box C-5
Burlington, VT 05401
(802) 860-6065

LUTZ'S AUTOMOTIVE
MONTGOMERY, VT

FIGURE 2.
SITE MAP
WITH MONITORING WELL LOCATIONS

DRAWN BY: BWH/STE

DATE: FEB 1996

APPROVED BY: RM

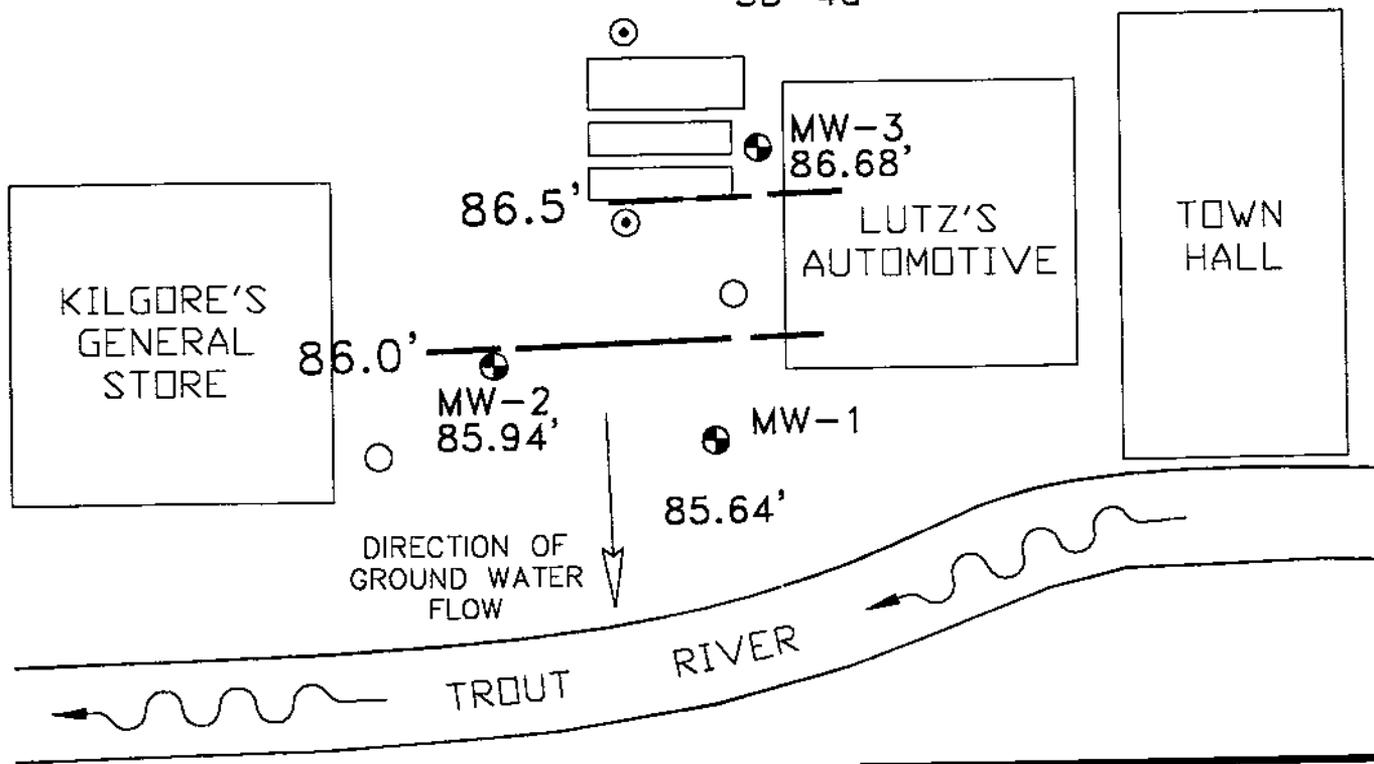
FILE No.: 95037



MAIN STREET
(VT ROUTE 118)

NEW PUMP ISLAND

FORMER PUMP ISLAND [] • SB-4b
SB-4a • SB-4c



- MONITORING WELL
- ⊙ LEAK DETECTION WELL
- SOIL BORING
- DRY WELL

85.64' GROUND WATER ELEVATION
—86.5' GROUND WATER CONTOUR LINE



Ground Water of Vermont

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LUTZ'S AUTOMOTIVE
MONTGOMERY, VT

FIGURE 3.
GROUND WATER CONTOUR MAP

DRAWN BY: BWH/STE	DATE: FEB 1996
APPROVED BY: RM	FILE No.: 95037



MAIN STREET
(VT ROUTE 118)

NEW PUMP ISLAND

FORMER PUMP ISLAND SB-4b
SB-4a SB-4c

KILGORE'S
GENERAL
STORE

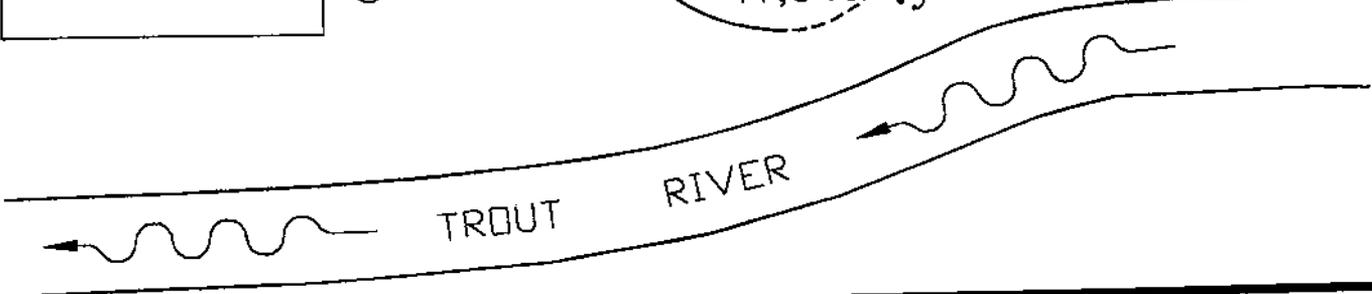
MW-2
16,312

MW-1
41,040

MW-3
91,730

LUTZ'S
AUTOMOTIVE

TOWN
HALL



TROUT RIVER

- ⊕ MONITORING WELL
- ⊙ LEAK DETECTION WELL
- SOIL BORING
- DRY WELL



41,040 BTEX+MTBE CONCENTRATION, ppb
— 90,000 BTEX+MTBE CONTOUR LINE, ppb



Ground Water of Vermont

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(802) 860-6065

LUTZ'S AUTOMOTIVE
MONTGOMERY, VT

FIGURE 4.
BTEX AND MTBE DISTRIBUTION MAP

DRAWN BY: BWH/STE DATE: FEB 1996

APPROVED BY: RM FILE No.: 95037

TABLE 1. Ground-Water Elevation Calculations

**Lutz's Automotive
Montgomery Center, Vermont**

Monitoring Date: 9 February 1996

Well I.D.	Top of Casing Elevation	Depth to Product	Depth to Water	Product Thickness	Corrected Depth to water	Water Table Elevation
MW-1	95.1	---	9.46	---	---	85.64
MW-2	94.98	---	9.04	---	---	85.94
MW-3	95.4	---	8.72	---	---	86.68

All values reported in feet relative to arbitrary 100.00-foot datum.

**TABLE 2. Ground-Water Sample Analytical Results
Lutz's Automotive
Montgomery Center, Vermont**

Sampling Date	Location	Benzene	Toluene	Ethyl benzene	Xylenes	Total BTEX	MTBE
02/09/96	MW-1	1,380	17,700	1,330	16,900	37,310	3,730
	MW-2	637	7,020	625	6,650	14,932	1,380
	MW-3	2,320	44,500	3,020	37,400	87,240	4,490
	Dup. (MW-3)	2,690	48,300	3,110	38,200	92,300	4,580
	Trip Blank	ND <1	ND <1	ND <1	ND <1	ND	ND <1
	VGES	5	2,420	680	400	None	40

Notes: Results given in parts per billion (ppb).
 ND = Non-detect at specified detection limit.
 VGES = Vermont Groundwater Enforcement Standard
 (Vermont Health Advisory level for MTBE).

APPENDIX B

Soil Boring and Well Construction Logs

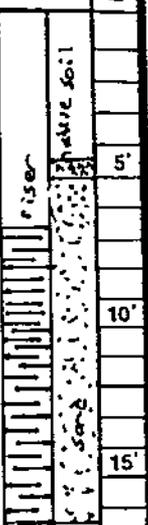


Ground Water of Vermont

FIELD SUPERVISOR Brian Storer
 CONTRACTOR Adams Engineering
 DRILLERS Jerry Adams

JOB LOCATION Lutz's Automotive
 DATE 1/31/96

DRILLING METHOD		BORING DIAMETER		AND		BORING LOCATION		BORING #						
Vibratory		2.375"		40 - 50%		sketch on back or on-site plan		MW-1						
				10 - 40%		with measurements		TOTAL DEPTH						
				TRACE 0 - 10%				18'						
DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6"					REC.	SAMPLE DESCRIPTION	STRAT CHG	PID Readings in parts per million (ppm)	GENERAL DESCRIPTION	WELL DETAIL	DEPTH
			0	6	12	18	24							
											Drilled due to frost			
											0.0 ppm			
											Drilled due to frost			
5'							3.0	med. to fine light brown sand			0.2 ppm			5'
								med. to fine light brown sand						
								2" layer of dk organics			0.5 ppm			
								med. to fine brown sand						
10'							4.8	poorly sorted brown to grey sand			22.3 ppm			10'
								coarse sand and gravel						
								pebble size to 2"						
								light brown to gray			16.4 ppm			
15'							4.0							15'
								same as above			16.6 ppm			
								light gray silt layer						
20'							2.5				dryer			20'
											17.6 ppm			
											bottom of boring			



MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	.010 1.5" PVC	10'	GROUT		yes
SLOT SIZE	.010	10'	BACKFILL		yes
RISER PIPE	1.5" PVC	1'	WATER USED		no
GRADED SAND	#2	50lbs	STEAM CLEANER		yes
PELLET BENTONITE					
GRANULAR BENTONITE	yes				



Ground Water of Vermont

FIELD SUPERVISOR Brian Storer
 CONTRACTOR Adams Engineering
 DRILLERS Jerry Adams

JOB LOCATION Lutz's Automotive
 DATE 1/31/96

DRILLING METHOD *vibratory*

BORING DIAMETER 2.375"

AND 40 - 50%
 SOME 10 - 40%
 TRACE 0 - 10%

BORING LOCATION BORING #
 sketch on back or on-site plan mw-2
 with measurements TOTAL DEPTH
 16.5'

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6"					REC.	SAMPLE DESCRIPTION	STRAT CHG	P10 Readings in GENERAL DESCRIPTION Parts per million (ppm)	WELL DETAIL	DEPTH	
			0	6	12	18	24							
5'							3.0	med to fine light brown sand			0.5 ppm	riser by nature of soil	5'	
								med to fine light brown sand			0.6 ppm			
10'							2.5	coarse sand and gravel pebble size to 2.5" light brown to gray			12.7 ppm - weathered gasoline odor			10'
								same but even larger gravel 2.75"			24.6 ppm - strong weathered gasoline odor			
15'							4.0							15'
								same material			27.1 ppm - strong odor			
							2.8	gray silt layer			15.6 ppm odor			
20'													20'	
25'													25'	
30'													30'	
35'													35'	
40'													40'	

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	.010 1.5" PVC	20'	GROUT		yes
SLOT SIZE	.010	10'	BACKFILL		yes
RISER PIPE	1.5" PVC	6.5'	WATER USED		no
GRADED SAND	#2	40 lbs	STEAM CLEANER		yes
PELLET BENTONITE					
GRANULAR BENTONITE	yes				



Ground Water of Vermont

FIELD SUPERVISOR Brian Storer
CONTRACTOR Adams Engineering
DRILLERS Jerry Adams

JOB LOCATION Lutz Automotive
DATE 1/31/96

DRILLING METHOD *vibratory*

BORING DIAMETER 2.375"

AND 40 - 50%
SOME 10 - 40%
TRACE 0 - 10%

BORING LOCATION BORING # *SB-4*
new well set
sketch on back or on-site plan
with measurements TOTAL DEPTH
refusal ~ 6.5 - 7.5'

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6"				REC.
			0	6	12	18	
			6	12	18	24	
5'							1.5
10'							
15'							
20'							
25'							
30'							
35'							
40'							

SAMPLE DESCRIPTION

STRAT CHG

PID Reading
GENERAL DESCRIPTION
parts per million

WELL DETAIL

DEPTH

pavement
medium to fine reddish brown sand

- strong gasoline odor, fresh 304 ppm

medium to fine reddish brown sand

- strong gasoline odor, fresh 479 ppm

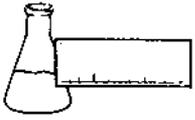
- hit rocks switched to drill
refusal first 2 borings
refusal last boring

- attempted 3 borings near old pump island
- refusal all 3 times between 6.5 - 7.5'
- possibly bedrock or old building foundation

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN			GROUT		
SLOT SIZE			BACKFILL		
RISER PIPE			WATER USED		
GRADED SAND			STEAM CLEANER		
PELLET BENTONITE					
GRANULAR BENTONITE					

APPENDIX C

Laboratory Report Forms



ENDYNE, INC.

Laboratory Services

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

REPORT OF LABORATORY ANALYSIS

CLIENT: GroundWater of Vermont
PROJECT NAME: Lutz's Automotive
REPORT DATE: February 13, 1996
DATE SAMPLED: February 8, 1996

PROJECT CODE: GWVT1797
REF.#: 85,608 - 85,612

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Chain of custody indicated sample preservation with HCl.

All samples were prepared and analyzed by requirements outlined in the referenced method and within the specified holding times. All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced method. 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 recovery data was determined to be within laboratory QA/QC guidelines unless otherwise noted.

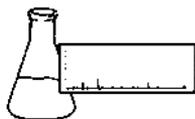
Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

FEB 15 1996

RECEIVED

enclosures



ENDYNE, INC.

Laboratory Services

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

LABORATORY REPORT

EPA METHOD 8020--PURGEABLE AROMATICS

CLIENT: GroundWater of Vermont
PROJECT NAME: Lutz's Automotive
REPORT DATE: February 13, 1996
DATE SAMPLED: February 8, 1996
DATE RECEIVED: February 8, 1996
DATE ANALYZED: February 9, 1996

PROJECT CODE: GWVT1797
REF.#: 85,608
STATION: Trip Blank
TIME SAMPLED: 11:45
SAMPLER: Brian Starer

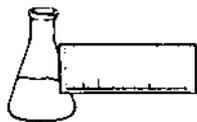
<u>Parameter</u>	<u>Detection Limit (ug/L)</u>	<u>Concentration (ug/L)</u>
Benzene	1	ND ¹
Chlorobenzene	1	ND
1,2-Dichlorobenzene	1	ND
1,3-Dichlorobenzene	1	ND
1,4-Dichlorobenzene	1	ND
Ethylbenzene	1	ND
Toluene	1	ND
Xylenes	1	ND
MTBE	1	ND

Bromobenzene Surrogate Recovery: 98%

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

NOTES:

1 None detected



ENDYNE, INC.

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LABORATORY REPORT

EPA METHOD 8020--PURGEABLE AROMATICS

CLIENT: GroundWater of Vermont
PROJECT NAME: Lutz's Automotive
REPORT DATE: February 13, 1996
DATE SAMPLED: February 8, 1996
DATE RECEIVED: February 8, 1996
DATE ANALYZED: February 9, 1996

PROJECT CODE: GWVT1797
REF.#: 85,609
STATION: Duplicate
TIME SAMPLED: Not Indicated
SAMPLER: Brian Starer

<u>Parameter</u>	<u>Detection Limit (ug/L)¹</u>	<u>Concentration (ug/L)</u>
Benzene	500	2,690.
Chlorobenzene	500	ND ²
1,2-Dichlorobenzene	500	ND
1,3-Dichlorobenzene	500	ND
1,4-Dichlorobenzene	500	ND
Ethylbenzene	500	3,110.
Toluene	500	48,300.
Xylenes	500	38,200.
MTBE	500	4,580.

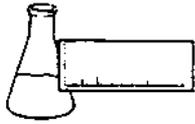
Bromobenzene Surrogate Recovery: 94%

NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

NOTES:

1 Detection limit raised due to high levels of contaminants. Sample run at a 0.2% dilution.

2 None detected



ENDYNE, INC.

Laboratory Services

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Williston, Vermont 05495
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FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020--PURGEABLE AROMATICS

CLIENT: GroundWater of Vermont
PROJECT NAME: Lutz's Automotive
REPORT DATE: February 13, 1996
DATE SAMPLED: February 8, 1996
DATE RECEIVED: February 8, 1996
DATE ANALYZED: February 12, 1996

PROJECT CODE: GWVT1797
REF.#: 85,610
STATION: MW-1
TIME SAMPLED: 12:15
SAMPLER: Brian Starer

<u>Parameter</u>	<u>Detection Limit (ug/L)¹</u>	<u>Concentration (ug/L)</u>
Benzene	100	1,380.
Chlorobenzene	100	ND ²
1,2-Dichlorobenzene	100	ND
1,3-Dichlorobenzene	100	ND
1,4-Dichlorobenzene	100	ND
Ethylbenzene	100	1,330.
Toluene	100	17,700.
Xylenes	100	16,900.
MTBE	100	3,730.

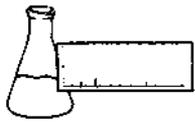
Bromobenzene Surrogate Recovery: 96%

NUMBER OF UNIDENTIFIED PEAKS FOUND: > 10

NOTES:

1 Detection limit raised due to high levels of contaminants. Sample run at a 1% dilution.

2 None detected



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LABORATORY REPORT

EPA METHOD 8020--PURGEABLE AROMATICS

CLIENT: GroundWater of Vermont
PROJECT NAME: Lutz's Automotive
REPORT DATE: February 13, 1996
DATE SAMPLED: February 8, 1996
DATE RECEIVED: February 8, 1996
DATE ANALYZED: February 12, 1996

PROJECT CODE: GWVT1797
REF.#: 85,611
STATION: MW-2
TIME SAMPLED: 12:45
SAMPLER: Brian Starer

<u>Parameter</u>	<u>Detection Limit (ug/L)¹</u>	<u>Concentration (ug/L)</u>
Benzene	50	637.
Chlorobenzene	50	ND ²
1,2-Dichlorobenzene	50	ND
1,3-Dichlorobenzene	50	ND
1,4-Dichlorobenzene	50	ND
Ethylbenzene	50	625.
Toluene	50	7,020.
Xylenes	50	6,650.
MTBE	50	1,380.

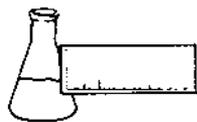
Bromobenzene Surrogate Recovery: 98%

NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

NOTES:

1 Detection limit raised due to high levels of contaminants. Sample run at a 2% dilution.

2 None detected



ENDYNE, INC.

Laboratory Services

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FAX 879-7103

LABORATORY REPORT

EPA METHOD 8020--PURGEABLE AROMATICS

CLIENT: GroundWater of Vermont
PROJECT NAME: Lutz's Automotive
REPORT DATE: February 13, 1996
DATE SAMPLED: February 8, 1996
DATE RECEIVED: February 8, 1996
DATE ANALYZED: February 12, 1996

PROJECT CODE: GWVT1797
REF.#: 85,612
STATION: MW-3
TIME SAMPLED: 1:15
SAMPLER: Brian Starer

<u>Parameter</u>	<u>Detection Limit (ug/L)¹</u>	<u>Concentration (ug/L)</u>
Benzene	500	2,320.
Chlorobenzene	500	ND ²
1,2-Dichlorobenzene	500	ND
1,3-Dichlorobenzene	500	ND
1,4-Dichlorobenzene	500	ND
Ethylbenzene	500	3,020.
Toluene	500	44,500.
Xylenes	500	37,400.
MTBE	500	4,490.

Bromobenzene Surrogate Recovery: 95%

NUMBER OF UNIDENTIFIED PEAKS FOUND: >10

NOTES:

1 Detection limit raised due to high levels of contaminants. Sample run at a 0.2% dilution.

2 None detected



Groundwater of Vermont

The Chace Mill, One Mill Street, Box C-5, Burlington, Vermont, 05401
(802)-860-6065 (802)-860-6076 Fax

CHAIN OF CUSTODY RECORD

LABORATORY

ANALYSIS STATUS:

- RUSH (2-DAY)
- PRIORITY (4-DAY)
- BEST AVAILABLE TIME

PROJECT NUMBER: V95-037
 PROJECT NAME: Lutz's Automotive
 PROJECT LOCATION: Montgomery, VT
 PROJECT MANAGER: Ben Miller
 COLLECTED BY: Brian Storr
 DATE: 2/8/96

GWVT-1797 ⁸⁵ 2/8/96

ANALYSIS REQUESTED

METALS - PLEASE LIST: MA () EP-TOX () (P)
 OIL & GREASE: IR () GRV. ()
 VOLATILE ORGANICS: 624 () 601 () 602 ()
 8010 () 8015 () 8020 & MTBE ()
 EXTRACTABLES: AOCOS () B-H () PCBs ()
 PESTS () 6046000 ()
 TSS () TDS () PH () SPEC CONO ()
 BACTERIA: SPC () TOT COU () FEC COU ()
 CYANIDE: AMEN () TOT ()
 CL () F () SO4 ()
 NO3 () NO2 () NH3 ()
 TELP: METALS () VOLATILES () PESTICIDES ()
 SEMIVOLATILES () HERBICIDES ()
 OTHER: ()
 OTHER: ()

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SAMPLE ID	DATE	TIME	SAMPLE MATRIX	TYPE OF CONTAINER	# CONT.	PRESRVD	METALS - PLEASE LIST: MA () EP-TOX () (P)	OIL & GREASE: IR () GRV. ()	VOLATILE ORGANICS: 624 () 601 () 602 () 8010 () 8015 () 8020 & MTBE ()	EXTRACTABLES: AOCOS () B-H () PCBs () PESTS () 6046000 ()	TSS () TDS () PH () SPEC CONO ()	BACTERIA: SPC () TOT COU () FEC COU ()	CYANIDE: AMEN () TOT ()	CL () F () SO4 ()	NO3 () NO2 () NH3 ()	TELP: METALS () VOLATILES () PESTICIDES () SEMIVOLATILES () HERBICIDES ()	OTHER: ()	OTHER: ()	REMARKS
Trip Blank	2/8/96	1145A	W	VOA	2	I/A			X										85608
Duplicate									X										85609
mw-1		1215P							X										85610
mw-2		1245P							X										85611
mw-3		115P							X										85612

MATRIX
 W = AQUEOUS
 S = SOLIDS

PRESERVATIVE
 I = ICED
 A = ACIDIFIED (1:1 HCl. 4 drops)
 B = BASE
 N = SODIUM BISULFATE

RELINQUISHED BY	DATE	TIME	RECEIVED BY
<i>[Signature]</i>	2/8/96		
<i>[Signature]</i>	2/8/96	4:31	<i>[Signature]</i>



GroundWater of Vermont

The Chace Mill, One Mill Street, Box C-5, Burlington, Vermont, 05401
(802)-860-6065 (802)-860-6076 Fax

CHAIN OF CUSTODY RECORD

LABORATORY

PROJECT NUMBER: V95-037
PROJECT NAME: Lutz's Automotive
PROJECT LOCATION: Montgomery, VT
PROJECT MANAGER: Bon Miller
COLLECTED BY: Brian Storr
DATE: 2/8/96

ANALYSIS STATUS:

RUSH (2-DAY)
 PRIORITY (4-DAY)
 BEST AVAILABLE TIME

ANALYSIS REQUESTED

METALS - PLEASE LIST: NA () BR-TDX () (P)
OIL & GREASE: IR () GRAY ()
VOLATILE ORGANICS: 624 () 601 () 602 ()
6010 () 6015 () 8020 & MTBE ()
EXTRACTABLES: ACIDS () B-H () PCBs ()
604/6090 ()
TSS () TDS () PH () SPEC COND ()
BACTERIA: SFC () TOT COU () FEC COU ()
CYANIDE: AMEN () TOT ()
CL () F () SO4 ()
NO3 () NO2 () NH3 ()
TCP: METALS () VOLATILES () PESTICIDES ()
SEMI-VOLATILES () HERBICIDES ()
OTHER
OTHER

[Handwritten signature]

REMARKS

SAMPLE ID	DATE	TIME	SAMPLE MATRIX	TYPE OF CONTAINER	# CONT.	PRESRVD	METALS - PLEASE LIST: NA () BR-TDX () (P)	OIL & GREASE: IR () GRAY ()	VOLATILE ORGANICS: 624 () 601 () 602 () 6010 () 6015 () 8020 & MTBE ()	EXTRACTABLES: ACIDS () B-H () PCBs () 604/6090 ()	TSS () TDS () PH () SPEC COND ()	BACTERIA: SFC () TOT COU () FEC COU ()	CYANIDE: AMEN () TOT ()	CL () F () SO4 ()	NO3 () NO2 () NH3 ()	TCP: METALS () VOLATILES () PESTICIDES () SEMI-VOLATILES () HERBICIDES ()	OTHER	OTHER	REMARKS	
Trip Blank	2/8/96	1145A	W	VOA	2	I/A			X											
Duplicate		-							X											
MW-1		1215P							X											
MW-2		1245P							X											
MW-3		115P							X											

MATRIX
W = AQUEOUS
S = SOLIDS

PRESERVATIVE
I = ICED
A = ACIDIFIED (1:1 HCl. 4 drops)
B = BASE
N = SODIUM BISULFATE

RELINQUISHED BY	DATE	TIME	RECEIVED BY
<i>[Signature]</i>	2/8/96		
<i>[Signature]</i>	2/8/96	4:31	<i>[Signature]</i>