



March 16, 2000 MAR 20 9 41 AM '00

WASTE MANAGEMENT
DIVISION

Mr. Charles Schwer
Sites Management Section
Vermont Department of
Environmental Conservation
103 South Main Street
Waterbury, Vermont 05676

RE: Town of Lincoln, Municipal Garage, River Road, Lincoln, VT (VDEC Site #99-2689) -
Subsurface Contaminant Investigation Report

Dear Mr. Schwer:

Lincoln Applied Geology, Inc. (LAG) is pleased to present this Subsurface Contaminant Investigation Report for the Town of Lincoln, Municipal Garage, located on River Road in Lincoln, Vermont. The enclosed report includes well logs, monitoring data, ground water quality results, observations made during the sensitive receptor survey, and our findings and recommendations for the site.

Results of the investigation show that ground water in the vicinity of the former UST area is impacted by detectable concentrations of dissolved phase petroleum related constituents. The dissolved phase contamination present beneath the site is adequately defined by the existing monitor well array, and there are no impacts to surrounding sensitive receptors other than soil and ground water beneath the site.

We recommend that site monitoring and ground water sampling be performed on a semiannual basis (spring and fall) for one year. This sampling frequency will provide sufficient data to document the status of the dissolved phase contamination over time. If the data collected during the next two site monitoring and water quality sampling events shows that dissolved phase contaminant concentrations are stable to declining across the site, then we will formally request that a Site Management Activity Completed (SMAC) status be granted to the subject property.

Please do not hesitate to call me or Steve Revell, LAG Senior Hydrogeologist, at (800) 477-4384, if you have any questions or comments regarding the attached report.

Sincerely,
Lincoln Applied Geology, Inc.

Jason S. Barnard
Geologist

JSB/jb
cc: William Masterson, Lincoln Select Board
enclosures

Subsurface Contaminant Investigation Report
Town of Lincoln, Municipal Garage
River Road, Lincoln, Vermont
(VDEC Site #99-2689)

Prepared for:

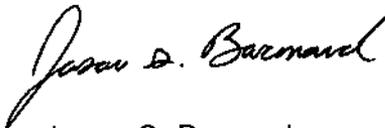
Town of Lincoln
Lincoln, Vermont 05443
Contact: William Masterson
Phone: (802) 453-2980

Prepared by:

Lincoln Applied Geology, Inc.
Revell Drive
Lincoln, Vermont 05443
Contact: Jason S. Barnard
Phone: (800) 477-4384

March 16, 2000

Prepared by:



Jason S. Barnard
Geologist

Reviewed and Approved by:



William D. Norland
Senior Project Manager



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Environmental Consultants

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**Subsurface Contaminant Investigation Report
Town of Lincoln, Municipal Garage
River Road, Lincoln, Vermont
(VDEC Site #99-2689)**

Executive Summary

On August 26, 1999, Lincoln Applied Geology, Inc. (LAG), in conjunction with John Masterson & Son Excavating, completed the removal, permanent closure, and assessment of two underground storage tanks (USTs) and related piping at the Town of Lincoln, Municipal Garage, located on River Road in Lincoln, Vermont. The UST closure report was submitted to the Vermont Department of Environmental Conservation (VDEC), Underground Storage Tank Program (USTP) on August 30, 1999. During the assessment, one 500 gallon and one 1,000 gallon, single wall steel, diesel USTs were removed and noted in poor condition (several holes were found on the bottom and sides of both USTs). During the tank removal, a significant petroleum sheen was noted on the ground water and elevated photoionization detector (PID) readings were measured from soils surrounding the USTs. Based on these findings, all petroleum impacted soils were backfilled. To quantify the magnitude of ground water contamination LAG installed two ground water monitor wells (MW-1 and MW-2) in the former UST area on August 26. Ground water sample results obtained from these wells showed that various petroleum related constituents were quantified above the VDEC Ground Water Quality Enforcement Standards (GQES).

Based on the results of the UST removals and subsequent water quality data, the VDEC Sites Management Section (SMS) requested that additional work be performed to further define the extent and magnitude of the soil and ground water contamination present beneath the site. On January 21, 2000, LAG installed four additional monitor wells (MW-3, 4, 5, and 6) to further define the extent and magnitude of the soil and ground water contamination. LAG also conducted a sensitive receptor survey of the site and surrounding area, and identified the indoor air in the garage and the New Haven River as potential contaminant receptors.

LAG sampled the new and existing wells on February 2, 2000 and the results show that detectable concentrations of petroleum related VOCs (above some GQES) and TPH remain associated residual contamination in the former USTs area. No other petroleum related constituents or TPH concentrations were quantified in the newly installed wells above the GQES. Based on data collected during this initial subsurface investigation, we recommend that performing site monitoring and ground water sampling on a semiannual basis for one year is warranted to evaluate the ground water contaminant level trends. We also recommend that the installation of additional ground water monitor wells are not necessary at this time.



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**Subsurface Contaminant Investigation Report
Town of Lincoln, Municipal Garage
River Road, Lincoln, Vermont
(VDEC Site #99-2689)**

Site Description

The Town of Lincoln, Municipal Garage is located on River Road in Lincoln, Vermont (**Figure 1**). The property is bound by River Road, the New Haven River, and the Green residential property (**Figure 2**). The garage facility does not contain a potable water source or an on-site wastewater disposal system. The Green and Dipietro residences are both served by on-site wastewater disposal systems and shallow well type water supplies. The Dipietro water supply is located approximately 250 feet upgradient of the source area, and the Green shallow well is also located upgradient, but on the opposite side (north) of the New Haven River (**Figure 1**).

Site History

Lincoln Applied Geology, Inc. (LAG), in conjunction with John Masterson & Son Excavating, completed the excavation, removal, and permanent closure of one 500 gallon and one 1,000 gallon, single wall steel underground storage tanks (USTs), and associated piping on August 26, 1999. During the work, LAG provided excavation oversight and assessment of the UST systems and soils. The UST Permanent Closure Form, photoionization detector (PID) data, and photographs of the site were submitted by LAG to the Vermont Department of Environmental Conservation (VDEC), Underground Storage Tank Program (USTP) in a report dated August 30, 1999. During the UST removal and assessment, ground water with a petroleum sheen was noted at approximately 6 feet below ground surface (BGS). In addition, soils surrounding the removed USTs were assayed with a PID and contained detectable [>20 parts per million (ppm)] concentrations of volatile organic compounds (VOCs). A decision to backfill the excavated contaminated soil was made since the ground water was already impacted (visual sheen). LAG installed two monitor wells (MW-1 and MW-2) in the UST area to quantify the impact to ground water. Once completed, the wells were developed and sampled that day. The collected samples were analyzed for dissolved phase petroleum related VOCs by EPA Method 8021B and for total petroleum hydrocarbons (TPH) by EPA Methods 8015 and 8100M. The water quality results were submitted to the VDEC, USTP in a letter dated September 22, 1999. The analytical results indicated that ground water in the vicinity of the former USTs is impacted with dissolved phase petroleum constituents above the VDEC Groundwater Quality Enforcement Standards (GQES). Based on the data collected during the August 1999 UST removal and the water quality results, the VDEC Sites Management Section (SMS) requested that additional work be performed to further define the extent and magnitude of



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the soil and ground water contamination beneath the site.

Monitor Well Installation and Site Geology

Four additional monitor wells (MW-3, 4, 5, and 6) were drilled and installed using hollow stem auger drilling techniques on January 21, 2000 by T&K Drilling, Inc. The locations of the four new monitor wells and two existing wells are shown on **Figure 2**. Descriptions of the sediments encountered during the drilling, the monitor well construction details, and the soil PID data from the split spoon samples, are included in the detailed well logs (**Appendix A**).

Unconsolidated sediments encountered during drilling of MW-3, 4, and 6 included moderately permeable, silty very fine to coarse sands, with some fine to medium gravel. Sediments encountered during drilling of monitor well MW-5 consist of highly permeable, coarse sand and gravel (non-native fill) from the surface to approximately 12 feet below ground surface (BGS). The sand and gravel fill overlies native silty coarse sand between 15 feet and 17 feet. These native sediments were probably deposited fluvially by the adjacent New Haven River (**Figure 2**).

Review of the Centennial Geologic Map of Vermont (C.G. Doll, 1961) indicates that the underlying bedrock formation consists of the Lower Cambrian (540 to 570 million years old) Pinnacle formation of the Camels Hump Group. The Pinnacle formation is described as a schistose graywacke (metamorphosed sandstone).

Site Survey and Monitoring

On January 31, 2000, LAG conducted a stadia survey of the site in order to determine the relative location and elevation of the six monitor wells and other features pertinent to the subsurface investigation.

On February 2, 2000, LAG collected ground water level measurements from the six on-site monitor wells using an electronic interface probe capable of measuring 0.01 feet of free-floating petroleum product. As part of the monitoring, LAG also assayed the headspace of each monitor well for the presence of petroleum related VOCs using a properly calibrated PID.

The ground water elevation data are summarized and presented as **Table 1**. Review of the data indicates that no free-floating petroleum product was present in any of the wells. Depth to ground water ranged between 2.57 feet (MW-2) and 11.5 feet (MW-5) across the site.

PID assay results are included as **Table 2**. Review of the data indicates that the well



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headspace PID readings ranged between background (BG) and 6.6 ppm. In general, the PID data collected during the monitor well installations and site monitoring event suggest that only a very limited amount of detectable vadose zone contamination is present beneath the site in the vicinity of the former UST area. However, since approximately 50 cubic yards of contaminated soil was backfilled in the vicinity of MW-1 and MW-2 during the UST work, the presence of limited vadose zone contamination is expected.

Site Hydrogeology

Ground water elevation data collected during the February 2nd monitor event was used to develop a Ground Water Contour Map (**Figure 3**). Review of **Figure 3** shows that ground water flows across the site in a northwesterly direction, along a relatively steep gradient of 0.11 feet/foot (calculated using data from MW-1 and MW-5). The ultimate receptor of ground water migrating from the site is the adjacent New Haven River (**Figure 2**).

Water Quality Sampling

On February 2, LAG collected water quality samples from the six on-site monitor wells (MW-1, 2, 3, 4, 5, and 6) using industry accepted methods. The collected samples were delivered to Green Mountain Laboratories, Inc. in Middlesex, and analyzed along with a trip blank for the presence of VOCs using EPA Method 8021B and for TPH using EPA Method 8100.

The water quality results are summarized in **Table 3** and are spatially depicted on the Water Quality Summary Map included as **Figure 4**. Copies of the laboratory reports are included as **Appendix B**. Review of the February 2, 2000, water quality data indicates that detectable concentrations of benzene, toluene, ethylbenzene, and xylenes (BTEX) were detected in source area wells MW-1 and MW-2. However, concentrations of BTEX declined since the initial sampling of these wells (**Table 3**). Concentrations of 1,3,5-trimethylbenzene (1,3,4-TMB) and 1,2,4-TMB were also detected in wells MW-1 and MW-2. Naphthalene was detected at 170 parts per billion (ppb) in well MW-1. Low levels of benzene were detected at 1.1 and 1.4 ppb in MW-3 and MW-5 (respectively) represent the only VOC detections in the new wells (MW-3, 4, 5, and 6). Methyl-tert-butyl-ether (MTBE) was not quantified in any of the on-site monitor wells above method detection limits. TPH concentrations of 36 ppm, 5 ppm, and 1.4 ppm were detected in wells MW-1, MW-2, and MW-5. Benzene, 1,3,5-TMB, 1,2,4-TMB in MW-1 and MW-2, and naphthalene in MW-1 were quantified above the GQES.

With regard to the MTBE that was present in MW-2 in August 1999, the recent non-detect analytical results and information that gasoline was last stored at the site in 1975 (prior to the widespread use of MTBE), we believe that the MTBE detection was the result of



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small scale spills from parked employee vehicles, small quantity gasoline storage (<5 gallons), and/or carry over from petroleum delivery trucks that supplied diesel to the former USTs. The February 2nd water quality results clearly show that MTBE is not a significant contaminant at this site.

Sensitive Receptor Survey

On January 21, 2000, LAG conducted a sensitive receptor survey of the site and surrounding residential properties. Potential sensitive receptors identified during the survey include the indoor air of the municipal garage and surface water of the New Haven River (**Figure 2**). The municipal garage is constructed of a concrete slab on-grade and is not served by a potable water source or wastewater disposal system (municipal or on-site). During the survey, two residences [(Dipietro and Green) **Figure 2**] were noted in the vicinity of the municipal garage facility. Both of these residences are served by shallow well type water supplies and on-site wastewater disposal systems. Based on the location of Dipietro (250 feet upgradient of the source area) and Green (opposite side of the New Haven River and also upgradient) water supplies, it is our professional opinion that these two shallow well water supplies are not threatened by this petroleum contamination.

As part of the survey, LAG screened the indoor air of the garage with a PID for the presence of VOCs, and visually inspected the New Haven River for any evidence petroleum impacts. The PID results are presented in **Table 2**. No PID assays above background (BG) were detected in the garage. In addition, no visual evidence of petroleum impacts was noted in the New Haven River.

Summary of Findings

Based on the data collected and observations made during the course of this investigation the following conditions exist at the site:

1. Ground water in the vicinity of the former USTs has been impacted by relatively low concentrations of dissolved phase petroleum related compounds. Some petroleum compounds were quantified above the GQES in source area wells MW-1 and MW-2.
2. The dissolved phase contaminant plume is completely delineated by the existing monitor well array.
3. Other than soils and ground water in the former USTs source area, no surrounding sensitive receptors have been impacted by the limited contamination present beneath the site.



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Recommendations

Based on the existing site conditions, the following recommendations are made:

1. No additional subsurface investigational work needs to be performed at this site. We do recommend conducting semiannual (spring and fall) monitoring and sampling of the six existing wells for one year. We believe that this sampling frequency will provide sufficient data to document the status and trends of the relatively low contaminant concentrations over time. During the semiannual site visits, LAG will visually inspect the New Haven River for any evidence of petroleum related impacts (i.e. sheen) or ground water seeps. If evidence of petroleum related impacts are noted, we will collect a surface water sample at that location and have it analyzed for dissolved phase petroleum VOCs.
2. We also recommend that semiannual summary reports be prepared following each sampling event.

If the data collected during the next two semiannual monitoring events shows stable to declining dissolved phase contaminant concentrations and no significant contaminant migration (i.e. receptor impacts), we will request that a Site Management Activity Completed (SMAC) status be granted. A cost estimate to implement the recommended semiannual site monitoring and ground water sampling events is included as **Appendix C**.

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Project: Town of Lincoln, Municipal Garage
Location: Lincoln, Vermont

Table 1
VDEC Site # 99-2689
Sheet 1 of 1

Ground Water Elevation/Product Level (feet)

Data Point	TOC	02/02/00				
MW-1	100.00	96.30				
MW-2	99.21	96.64				
MW-3	102.09	94.27				
MW-4	99.94	96.22				
MW-5	99.11	87.61				
MW-6	98.07	92.99				

Notes:

1 - Elevation datum assumed

2 - Reference elevation is elevation of top of PVC well casing

Light Grey Cell = DRY

Dark Grey Cell = Inaccessible

Project: Town of Lincoln, Municipal Garage
Location: Lincoln, Vermont

Table 2
VDEC Site # 99-2689
Sheet 1 of 1

Photoionization Results (PID - ppm)

Data Point	01/21/00	02/02/00			
MW-1		6.6			
MW-2		3.3			
MW-3		BG			
MW-4		2.4			
MW-5		BG			
MW-6		BG			
Town Shed	BG	BG			

Notes:
BG - Background
SL - Saturated Lamp

Ground Water Quality Results (ppb)

Data Point	Compound	VDEC, GQES	08/26/99	02/02/00
MW-1	Benzene	5	160	24
	Toluene	1,000	290	28
	Ethylbenzene	700	130	39
	Xylenes	10,000	760	240
	1,3,5-Trimethylbenzene	4	<200	47
	1,2,4-Trimethylbenzene	5	320	170
	Naphthalene	20	<500	170
	MTBE	40	<500	<50
	BTEX		1340	718
	TPH (8015M)		4.27	
	TPH (8100M)		50	36
	BTEX + MTBE		1840	768
MW-2	Benzene	5	63	10
	Toluene	1,000	71	<10
	Ethylbenzene	700	20	16
	Xylenes	10,000	140	100
	1,3,5-Trimethylbenzene	4	12	20
	1,2,4-Trimethylbenzene	5	42	61
	Naphthalene	20	37	<50
	MTBE	40	140	<50
	BTEX		294	136
	TPH (8015M)		0.733	
	TPH (8100M)		<1	5
	BTEX + MTBE		434	186
MW-3	Benzene	5		1.1
	Toluene	1,000		<1
	Ethylbenzene	700		<1
	Xylenes	10,000		<3
	1,3,5-Trimethylbenzene	4		<2
	1,2,4-Trimethylbenzene	5		<2
	Naphthalene	20		<5
	MTBE	40		<5
	BTEX			6.1
	TPH (8015M)			
	TPH (8100M)			<1
	BTEX + MTBE			11.1
MW-4	Benzene	5		<1
	Toluene	1,000		<1
	Ethylbenzene	700		<1
	Xylenes	10,000		<3
	1,3,5-Trimethylbenzene	4		<2
	1,2,4-Trimethylbenzene	5		<2
	Naphthalene	20		<5
	MTBE	40		<5
	BTEX			<6
	TPH (8015M)			
	TPH (8100M)			<1
	BTEX + MTBE			<11

NOTES:

< - Contaminant not detected at specified detection limit

Light Grey Cell = Constituent exceeds VDEC, Ground Water Enforcement Standards (GQES)

Total petroleum hydrocarbons (TPH) quantified in parts per million (ppm)

Ground Water Quality Results (ppb)

Data Point	Compound	VDEC, GQES	08/26/99	02/02/00
MW-5	Benzene	5		1.4
	Toluene	1,000		<1
	Ethylbenzene	700		<1
	Xylenes	10,000		<3
	1,3,5-Trimethylbenzene	4		<2
	1,2,4-Trimethylbenzene	5		<2
	Naphthalene	20		<5
	MTBE	40		<5
	BTEX			6.4
	TPH (8015M)			
	TPH (8100M)			1.4
	BTEX + MTBE			11.4
MW-6	Benzene	5		<1
	Toluene	1,000		<1
	Ethylbenzene	700		<1
	Xylenes	10,000		<3
	1,3,5-Trimethylbenzene	4		<2
	1,2,4-Trimethylbenzene	5		<2
	Naphthalene	20		<5
	MTBE	40		<5
	BTEX			<6
	TPH (8015M)			
	TPH (8100M)			<1
	BTEX + MTBE			<11
TRIP BLANK	Benzene	5		<1
	Toluene	1,000		<1
	Ethylbenzene	700		<1
	Xylenes	10,000		<3
	1,3,5-Trimethylbenzene	4		<2
	1,2,4-Trimethylbenzene	5		<2
	Naphthalene	20		<5
	MTBE	40		<5
	BTEX			<6
	TPH (8015M)			
	TPH (8100M)			<1
	BTEX + MTBE			<11

NOTES:

< - Contaminant not detected at specified detection limit

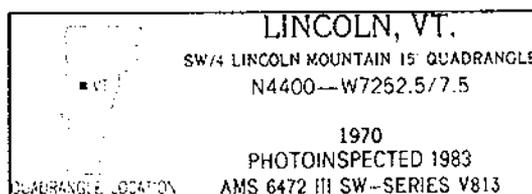
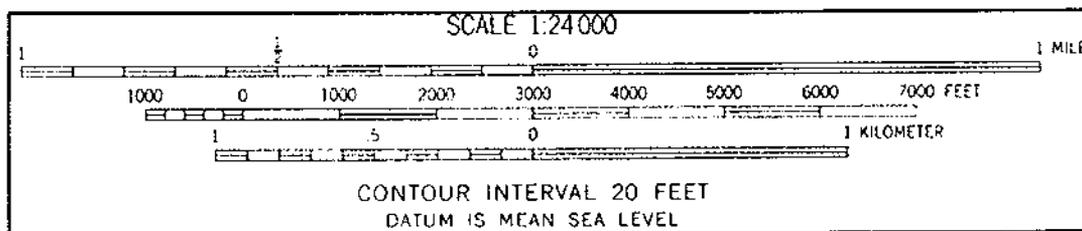
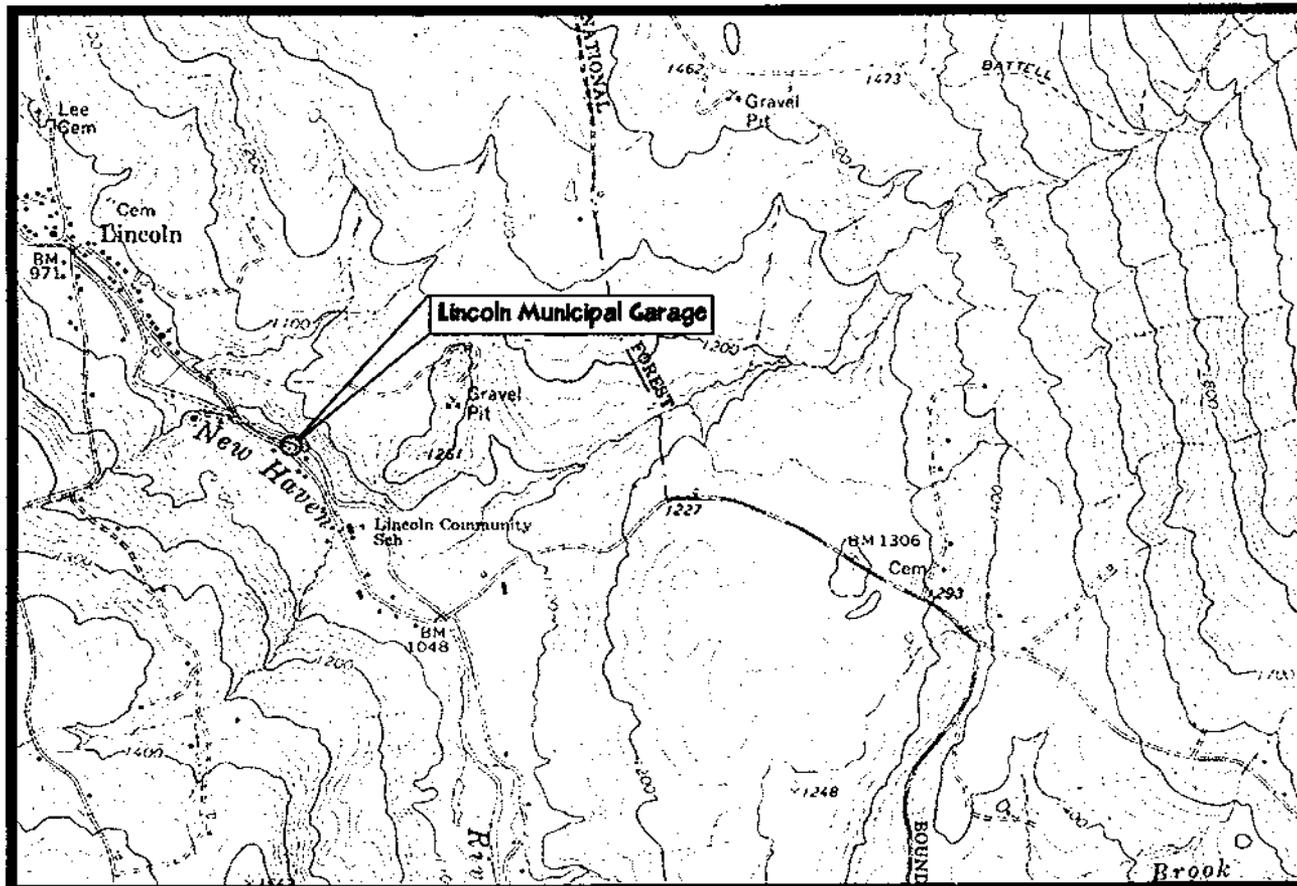
Light Grey Cell = Constituent exceeds VDEC, Ground Water Enforcement Standards (GQES)

Total petroleum hydrocarbons (TPH) quantified in parts per million (ppm)

Figure 1

**Town of Lincoln
Municipal Garage
Lincoln, Vermont**

GENERAL LOCATION MAP



Appendix A
Detailed Well Logs

WELL LOG

WELL: MW-3
LOCATION: Town of Lincoln, Municipal Garage, Lincoln, Vermont - Upgradient of former UST area.
DRILLER: T&K Drilling, Inc. - Troy, New Hampshire
HYDROGEOLOGIST: Jason S. Barnard, Lincoln Applied Geology, Inc.
DATE: January 21, 2000

Soils Description: (BG = Background [0.5], SL = Saturated Lamp [>500], ppm = Parts Per Million)

<u>Depth</u>	<u>Description</u>	<u>PID (ppm)</u>
0.0 - 2.0'	Tan-brown, silty fine sand, with fine to medium gravel; dry. No hydrocarbon odor.	1.3
3.0 - 5.0'	Orangish brown, silty fine sand, with medium gravel; moist. No hydrocarbon odor.	1.8
5.0 - 7.0'	Dark to light brown, silty medium coarse sand, with gravel; saturated. No hydrocarbon odor.	0.9
10.0 - 12.0'	Orange-brown, silty fine sand, with some medium to coarse gravel; saturated. No hydrocarbon odor.	3.2
12.0 - 14.0'	Grey, silty fine sand; saturated. No hydrocarbon odor.	4.4

Well Construction:

Bottom of Boring: 14.0'
Bottom of Well: 12.0'
Well Screen: 9.0' (3.0 - 12.0') of 2.0" sch. 40 PVC, with 0.010" slot
Solid Riser: 2.5' (0.5 - 3.0') of 2.0" sch. 40 PVC
Sand Pack: 10.0' (2.0 - 12.0') of No. 2 sand
Bentonite Seal: 1.0' (1.0 - 2.0') of chips
Backfill: None
Well Box: Cemented flush

WELL LOG

WELL: MW-4
LOCATION: Town of Lincoln, Municipal Garage, Lincoln, Vermont - Sidegradient of former UST area
DRILLER: T&K Drilling, Inc. - Troy, New Hampshire
HYDROGEOLOGIST: Jason S. Barnard, Lincoln Applied Geology, Inc.
DATE: January 21, 2000

Soils Description: (BG = Background [0.5], SL = Saturated Lamp [>500], ppm = Parts Per Million)

<u>Depth</u>	<u>Description</u>	<u>PID (ppm)</u>
3.0 - 5.0'	Orangish brown, coarse sand and gravel; dry. No hydrocarbon odor.	9.7
5.0 - 7.0'	Orangish brown, silty medium to coarse sand, with some medium gravel; saturated. No hydrocarbon odor.	2.0
10.0 - 12.0'	No sample collected, large piece of gravel wedged in spoon.	N/A

Well Construction:

Bottom of Boring: 9.5'
Bottom of Well: 9.5'
Well Screen: 7.0' (2.5 - 9.5') of 2.0" sch. 40 PVC, with 0.010" slot
Solid Riser: 2.0' (0.5 - 2.5') of 2.0" sch. 40 PVC
Sand Pack: 7.5' (2.0 - 9.5') of No. 2 sand
Bentonite Seal: 1.0' (1.0 - 2.0') of chips
Backfill: None
Well Box: Cemented flush

WELL LOG

WELL: MW-5
LOCATION: Town of Lincoln, Municipal Garage, Lincoln, Vermont - Downgradient of former UST area.
DRILLER: T&K Drilling, Inc. - Troy, New Hampshire
HYDROGEOLOGIST: Jason S. Barnard, Lincoln Applied Geology, Inc.
DATE: January 21, 2000

Soils Description: (BG = Background [0.5], SL = Saturated Lamp [>500], ppm = Parts Per Million)

<u>Depth</u>	<u>Description</u>	<u>PID (ppm)</u>
5.0 - 7.0'	Brown, coarse sand and gravel; dry. No hydrocarbon odor.	BG
10.0 - 12.0'	Brown, coarse sand and gravel; dry. No hydrocarbon odor.	BG
15.0 - 17.0'	Orange to brown, silty coarse sand; saturated. No hydrocarbon odor.	BG

Well Construction:

Bottom of Boring: 18.0'
Bottom of Well: 18.0'
Well Screen: 10.0' (8.0 - 18.0') of 2.0" sch. 40 PVC, with 0.010" slot
Solid Riser: 7.5' (0.5 - 8.0') of 2.0" sch. 40 PVC
Sand Pack: 11.0' (7.0 - 18.0') of No. 2 sand
Bentonite Seal: 1.0' (6.0 - 7.0') of chips
Backfill: 5.0' (1.0 - 6.0') of drill cuttings
Well Box: Cemented flush

WELL LOG

WELL: MW-6
LOCATION: Town of Lincoln, Municipal Garage, Lincoln, Vermont - Side/down gradient of former UST area.
DRILLER: T&K Drilling, Inc. - Troy, New Hampshire
HYDROGEOLOGIST: Jason S. Barnard, Lincoln Applied Geology, Inc.
DATE: January 21, 2000

Soils Description: (BG = Background [0.5], SL = Saturated Lamp [>500], ppm = Parts Per Million)

<u>Depth</u>	<u>Description</u>	<u>PID (ppm)</u>
3.0 - 5.0'	Tan to dark brown, silt and medium to coarse sand; moist. No hydrocarbon odor.	BG
5.0 - 7.0'	Orange-brown, silty coarse sand, with some medium to coarse gravel; saturated. No hydrocarbon odor.	BG
10.0 - 12.0'	Olive grey, silty fine sand, with some medium gravel; saturated. No hydrocarbon odor.	1.1

Well Construction:

Bottom of Boring: 12.0'
Bottom of Well: 12.0'
Well Screen: 9.0' (3.0 - 12.0') of 2.0" sch. 40 PVC, with 0.010" slot
Solid Riser: 2.5' (0.5 - 3.0') of 2.0" sch. 40 PVC
Sand Pack: 10.0' (2.0 - 12.0') of No. 2 sand
Bentonite Seal: 1.0' (1.0 - 2.0') of chips
Backfill: None
Well Box: Cemented flush

Appendix B

Laboratory Reports for February 2,
2000

GREEN MOUNTAIN LABORATORIES, INC.

27 Cross Road

Middlesex, Vermont 05602

Phone (802) 223-1468

Fax (802) 223-8688

LABORATORY RESULTS

CLIENT NAME:	Lincoln Applied Geology	REFERENCE NO.:	6261
ADDRESS:	163 Revell Drive Lincoln, VT 05443	PROJECT NO.:	NA
SAMPLE LOCATION:	Lincoln Town Garage	DATE OF SAMPLE:	02/02/00
SAMPLER:	Joseph Hagan	DATE OF RECEIPT:	02/03/00
ATTENTION:	Jason Barnard	DATE OF ANALYSIS:	02/16/00
		DATE OF REPORT:	02/18/00

Pertaining to the analyses of specimens submitted under the accompanying chain of custody form, please note the following:

- Water samples submitted for VOC analysis were preserved with HCl. The trip blank was prepared by the client from reagent water supplied by the laboratory.
- Specimens were processed and examined according to the procedures outlined in the specified method.
- Holding times were honored.
- Instruments were appropriately tuned and calibrations were checked with the frequencies required in the specified method.
- Blank contamination was not observed at levels interfering with the analytical results.
- Continuing Calibration standards were monitored at intervals indicated in the specified method. The resulting analytical precision and accuracy were determined to be within method QA/QC limit.
- The efficiency of analyte recovery for individual samples was monitored by the addition of surrogate analytes to all samples, standards, and blanks. Surrogate recoveries were found to be within laboratory QA/QC acceptance limits, unless noted otherwise.

Reviewed by:



Raul Sanchez
Chemical Services

GREEN MOUNTAIN LABORATORIES, INC.

27 Cross Road
Middlesex, Vermont 05602

Phone (802) 223-1468

Fax (802) 223-8688

LABORATORY RESULTS

GC/MS METHOD - 8260M

GML REF. #: 6261
SAMPLE ID: MW - 1
ANALYSIS DATE: 02/16/2000
SAMPLE DATE: 02/02/2000
SAMPLE TYPE: WATER

<u>PARAMETER</u>	<u>PQL (ug/L)</u>	<u>RESULT (ug/L)</u>
Benzene	10	24
Toluene	10	28
Ethylbenzene	10	39
1,3,5-Trimethylbenzene	20	47
1,2,4-Trimethylbenzene	20	170
Xylenes	30	240
Naphthalene	50	170
MTBE	50	ND

Surrogate % Recovery: 102 %

ND = Not Detected

BPQL = Below Practical Quantitation Limit

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LABORATORY RESULTS

GC/MS METHOD - 8260M

GML REF. #: 6261
SAMPLE ID: MW - 2
ANALYSIS DATE: 02/16/2000
SAMPLE DATE: 02/02/2000
SAMPLE TYPE: WATER

<u>PARAMETER</u>	<u>PQL (ug/L)</u>	<u>RESULT (ug/L)</u>
Benzene	10	10
Toluene	10	ND
Ethylbenzene	10	16
1,3,5-Trimethylbenzene	20	20
1,2,4-Trimethylbenzene	20	61
Xylenes	30	100
Naphthalene	50	ND
MTBE	50	ND

Surrogate % Recovery: 99.2 %

ND = Not Detected

BPQL = Below Practical Quantitation Limit

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LABORATORY RESULTS

GC/MS METHOD - 8260M

GML REF. #: 6261
SAMPLE ID: MW - 3
ANALYSIS DATE: 02/16/2000
SAMPLE DATE: 02/02/2000
SAMPLE TYPE: WATER

<u>PARAMETER</u>	<u>PQL (ug/L)</u>	<u>RESULT (ug/L)</u>
Benzene	1	1.1
Toluene	1	ND
Ethylbenzene	1	ND
1,3,5-Trimethylbenzene	2	ND
1,2,4-Trimethylbenzene	2	ND
Xylenes	3	ND
Naphthalene	5	ND
MTBE	5	ND

Surrogate % Recovery: 101 %

ND = Not Detected

BPQL = Below Practical Quantitation Limit

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LABORATORY RESULTS

GC/MS METHOD - 8260M

GML REF. # : 6261
SAMPLE ID: MW - 4
ANALYSIS DATE: 02/16/2000
SAMPLE DATE: 02/02/2000
SAMPLE TYPE: WATER

<u>PARAMETER</u>	<u>PQL (ug/L)</u>	<u>RESULT (ug/L)</u>
Benzene	1	ND
Toluene	1	ND
Ethylbenzene	1	ND
1,3,5-Trimethylbenzene	2	ND
1,2,4-Trimethylbenzene	2	ND
Xylenes	3	ND
Naphthalene	5	ND
MTBE	5	ND

Surrogate % Recovery: 102 %

ND = Not Detected

BPQL = Below Practical Quantitation Limit

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LABORATORY RESULTS

GC/MS METHOD - 8260M

GML REF. # : 6261
SAMPLE ID: MW - 5
ANALYSIS DATE: 02/16/2000
SAMPLE DATE: 02/02/2000
SAMPLE TYPE: WATER

<u>PARAMETER</u>	<u>PQL (ug/L)</u>	<u>RESULT (ug/L)</u>
Benzene	1	1.4
Toluene	1	ND
Ethylbenzene	1	ND
1,3,5-Trimethylbenzene	2	ND
1,2,4-Trimethylbenzene	2	ND
Xylenes	3	ND
Naphthalene	5	ND
MTBE	5	ND

Surrogate % Recovery: 98.5 %

ND = Not Detected

BPQL = Below Practical Quantitation Limit

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LABORATORY RESULTS

GC/MS METHOD - 8260M

GML REF. # : 6261
SAMPLE ID: MW - 6
ANALYSIS DATE: 02/16/2000
SAMPLE DATE: 02/02/2000
SAMPLE TYPE: WATER

<u>PARAMETER</u>	<u>PQL (ug/L)</u>	<u>RESULT (ug/L)</u>
Benzene	1	ND
Toluene	1	ND
Ethylbenzene	1	ND
1,3,5-Trimethylbenzene	2	ND
1,2,4-Trimethylbenzene	2	ND
Xylenes	3	ND
Naphthalene	5	ND
MTBE	5	ND

Surrogate % Recovery: 100 %

ND = Not Detected

BPQL = Below Practical Quantitation Limit

GREEN MOUNTAIN LABORATORIES, INC.

ND = Not Detected
Middlesex, Vermont 05602

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LABORATORY RESULTS

GC/MS METHOD - 8260M

GML REF. #: 6261
SAMPLE ID: TRIP BLANK
ANALYSIS DATE: 02/16/2000
SAMPLE DATE: 02/02/2000
SAMPLE TYPE: WATER

<u>PARAMETER</u>	<u>PQL (ug/L)</u>	<u>RESULT (ug/L)</u>
Benzene	1	ND
Toluene	1	ND
Ethylbenzene	1	ND
1,3,5-Trimethylbenzene	2	ND
1,2,4-Trimethylbenzene	2	ND
Xylenes	3	ND
Naphthalene	5	ND
MTBE	5	ND

Surrogate % Recovery: 96.3 %

ND = Not Detected

BPQL = Below Practical Quantitation Limit

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LABORATORY RESULTS

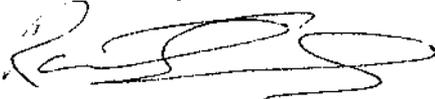
CLIENT NAME:	Lincoln Applied Geology	GML REFERENCE #:	6261
CLIENT ADDRESS:	163 Revell Drive Lincoln, VT 05443	PROJECT NO.:	NA
PROJECT NAME:	Lincoln Town Garage	DATE OF SAMPLE:	02/02/2000
SAMPLER:	Jason Barnard	DATE OF RECEIPT:	02/03/2000
ATTENTION:	Joseph Hagan	DATE OF ANALYSIS:	02/22-02/25/2000
		DATE OF REPORT:	02/29/2000

Total Petroleum Hydrocarbons (TPH) by EPA Method 8100M (mg/L - ppm)

Sample	PQL	TPH Results
Trip Blank	1.0	<1.0
MW-5	1.0	1.4
MW-6	1.0	<1.0
MW-3	1.0	<1.0
MW-4	1.0	<1.0
MW-2	1.0	5.0
MW-1	1.0	36

PQL = Practical Quantitation Limit
BPQL = Below Practical Quantitation Limit

Reviewed by:



Raul Sanchez
Chemical Services



G M L S A M P L E #	Green Mountain Laboratories, Inc. 27 Cross Road Middlesex, Vermont 05602 Phone (802) 223-1468 Fax (802) 223-8688 E-mail: GML@together.net						Analysis Requested						Page <u>1</u> of <u>1</u>
	Client Name Lincoln Applied Geology						EPA 8021 B + MTBE TPH 8100						GML #
	Address 163 Revell Dr. Lincoln Vt 05443												6 2 6 1
	Phone / Fax (802) 453-4384 / (802) 453-5399												Remarks
	Project Name Lincoln Town Garage.												
	Project Number												
	Project Manager Jason Barnard												
Sampler Joseph Hagan Joseph Hagan													
	Sample Location	Date	Time	# of Cont.	Pres.	Sample Type							
1	Trip Blank	2/2/00	2800	4 ^{40 ml.} Vials	HCL / none	H ₂ O							
2	MW-5		1130										
3	MW-6		1135										
4	MW-3		1140										
5	MW-4		1150										
6	MW-2		1155										
7	MW-1		1205										

Chain of Custody

Relinquished By: <i>Joseph Hagan</i>	Date/Time: 2/2/00 1320	Received By: <i>[Signature]</i>	Date/Time: 2/2/00 1350
Relinquished By: <i>[Signature]</i>	Date/Time: 2/2/00 1010	Received By: <i>[Signature]</i>	Date/Time: 02/03/00 10:00
Relinquished By: <i>[Signature]</i>	Date/Time:	Received By:	Date/Time:
Temperature Blank:	Vial Lot ID #:		

Appendix C
Cost Estimate

Town of Lincoln, Municipal Garage
River Road, Lincoln, Vermont
VDEC Site #99-2689
10-Mar-00

Cost Estimate for Semiannual Ground Water Monitoring and Sampling, and Summary Reporting

Task A. Semiannual Site Monitoring and Ground Water Sampling (one round)

Senior Scientist/Project Manager -	0.5	hr(s) @	\$75.00 per hour	\$	37.50
Field Technician -	8	hr(s) @	\$35.00 per hour	\$	280.00
PID and Interface Probe -	1	day(s) @	\$75.00 per day	\$	75.00
Disposable Bailer (1.5") -	6	@	\$8.89 each	\$	53.34
EPA 8021B -	7	@	\$60.00 each	\$	420.00
(6-monitor wells and 1-Trip Blank)					
Nitrile Gloves -	8	@	\$1.93 pair	\$	15.44
Mileage (includes trip to lab) -	75	mile(s) @	\$0.35 per mile	\$	26.25
Sampling Equipment -	1	day(s) @	\$110.00 per day	\$	110.00
			Semiannual Subtotal	\$	1,017.53
			Annual Total	\$	2,035.06

Task B. Preparation of Summary Report

Senior Hydrogeologist -	0.5	hr(s) @	\$85.00 per hour	\$	42.50
Senior Scientist/Project Manager -	1	hr(s) @	\$75.00 per hour	\$	75.00
Geologist -	6	hr(s) @	\$55.00 per hour	\$	330.00
Computer/CAD Technician -	3	hr(s) @	\$55.00 per hour	\$	165.00
Administrative Assistant -	2	hr(s) @	\$35.00 per hour	\$	70.00
			Semiannual Subtotal	\$	682.50
			Annual Total	\$	1,365.00
			Grand Total >>>	\$	3,400.06