



DEC 30 9 42 AM '98

December 28, 1998

Mr. Matthew Moran
Vermont ANR/DEC
Waste Management Division
103 South Main St. /West Building
Waterbury, VT 05671-0404

RE: Investigation of Suspected Subsurface Petroleum Contamination
12 Lake Street, Swanton, Vermont (VTDEC Site #97-2131)

Dear Mr. Moran:

Enclosed please find the summary report for the site investigation conducted at the above referenced site.

I am recommending that the 12 Lake Street site be considered for closure and removed from the VTDEC Active Hazardous Waste Sites List.

Please contact me if you have any questions or comments.

Sincerely,

Christine Ward
Hydrogeologist

Enclosure

c.: Lisa Randall, NEFCU (w/o encl.)
Phil Bellmore, NEFCU (w/o encl.)
Ed Fitzpatrick, Esq. (w/o encl.)
GI#1976701

**INVESTIGATION OF
SUSPECTED SUBSURFACE PETROLEUM
CONTAMINATION**

**12 LAKE STREET
SWANTON, VERMONT**

(VTDEC SITE #97-2131)
GI #1976701

December 1998

Prepared for

New England Federal Credit Union
P.O. Box 527
Williston, VT 05495

Prepared by



P.O. Box 943
Williston, Vermont 05495
(802) 865-4288

Dec 30 9 42 AM '98

TABLE OF CONTENTS

I. INTRODUCTION.....	1
II. SITE BACKGROUND.....	1
A. SITE HISTORY	1
B. SITE DESCRIPTION.....	1
C. SITE GEOLOGY	2
III. INVESTIGATIVE PROCEDURES	2
A. MONITORING WELL INSTALLATION	2
B. GROUNDWATER FLOW DIRECTION AND GRADIENT.....	3
C. GROUNDWATER AND SURFACE WATER SAMPLING AND ANALYSES.....	4
D. INDOOR AIR SCREENING	4
E. BASEMENT SOIL SCREENING	4
F. SENSITIVE RECEPTOR SURVEY	5
IV. CONCLUSIONS.....	6
V. RECOMMENDATIONS.....	7
REFERENCES.....	8

APPENDICES

Appendix A - Maps

 Site Location Map

 Site Map

 Basement Sketch

 Groundwater Contour Map

Appendix B - Soil Logs and Monitoring Well Specifications

Appendix C - Liquid Level Monitoring Data

Appendix D - Water Quality Data

I. INTRODUCTION

This report summarizes the investigation of suspected subsurface petroleum contamination at the 12 Lake Street Property in Swanton, Vermont (see Site Location Map, Appendix A). This work was requested by Mr. Matthew Moran of the Vermont Department of Environmental Conservation (VTDEC) in a letter to Ms. Lisa Randall of the New England Federal Credit Union (NEFCU), dated June 22, 1998. This work was performed in accordance with the July 30, 1998, *Work Plan for Investigation of Subsurface Petroleum Contamination* prepared by Griffin. The Work Plan was approved by Mr. Moran (VTDEC) in a letter to Mr. Laurie Reed (Griffin), dated September 30, 1998, with the addition that a soil sample be collected from the basement in the area around SB-5 (see Basement Sketch, Appendix A).

II. SITE BACKGROUND

A. Site History

Petroleum contamination was caused at the 12 Lake Street site by a release of #2 fuel oil from a 275-gallon capacity above ground storage tank (AST) located in the basement of the residence. An estimated 200+ gallons of #2 fuel oil spilled in the basement of the residence when the furnace burner was removed without shutting off the fuel line to the fuel tank. Environmental Hazards Management, Inc. (EHM) of Williston, Vermont, cleaned up the bulk of the fuel spill, in January 1997, by excavating the contaminated soils [2]. On July 30, 1997, approximately 28 tons of petroleum contaminated soils from 12 Lake Street were recycled into asphaltic cold-patch by MTS in Littleton, New Hampshire. However, residual petroleum contaminated soil remained, because all of the material could not practically be excavated due to the limits imposed by surrounding infrastructure [2].

As a result of the petroleum contamination in the basement, the VTDEC requested that additional work be conducted at the site in order to determine the extent and degree of petroleum contamination to the soils and to the groundwater.

B. Site Description

The Site is located in a residential area on the west side of the Village of Swanton. The house on the property is two-stories high of wood-frame construction with a dirt-floor basement under the front portion of the house. Lake Street borders the subject property on the south-southwest. The ground surface at the Site slopes down to the east-southeast toward the Missisquoi River. The subject property is bordered on the east by railroad tracks. There is a drainage ditch adjacent to and on the southwest side of the railroad tracks. Standing water was present in portions of the ditch on November 30, 1998.

C. Site Geology

According to the Surficial Geologic Map of Vermont [3], the site is underlain by marine beach gravel deposited in the Champlain Sea. Bedrock below the site is mapped as the Iberville formation consisting of noncalcareous black shale interbedded with occasional dolomite beds and in the lower part with calcareous shale [4].

III. INVESTIGATIVE PROCEDURES

To further define the extent of subsurface petroleum contamination at the site, the following investigative tasks were undertaken: soil borings; monitoring well installations; determination of groundwater flow direction and gradient; groundwater sample collection and analyses for petroleum related constituents; indoor air screening; basement soil screening; and a sensitive receptor survey.

A. Monitoring Well Installation

Four shallow monitoring wells, MW-1 through MW-4, were installed on November 30, 1998, by Adams Engineering, under the direct supervision of a Griffin hydrogeologist. The soil borings for the monitoring wells were advanced with a truck mounted vibratory soil core sampler. The monitoring well locations are indicated on the Site Map (Appendix A).

Undisturbed soil samples were collected from the borings with the core sampler, were logged by the supervising hydrogeologist and screened for the presence VOCs using an HNu™ systems Model HW-101 photoionization detector (PID) equipped with a 10.2 eV bulb. Prior to screening, the PID was calibrated with isobutylene referenced to benzene. Soils were screened using the Griffin Jar/Polyethylene Bag Headspace Screening Protocol which conforms to state and industry standards. Soil characteristics and contaminant concentrations were recorded by the hydrogeologist in detailed well logs which are presented in Appendix B.

Based on the ground surface topography at the site and the relatively close proximity of the Missisquoi River, the groundwater flow at the site was estimated to be generally in a northeasterly to southeasterly direction. Monitoring wells MW-1, MW-2, and MW-4 were installed on the east side of the house, in the presumed downgradient directions from the basement area where the spill occurred. Monitoring well MW-3 was installed on the west side of the house in a presumed upgradient direction from the basement area where the spill occurred.

Soils encountered in the four borings consisted primarily of gray-brown silt and sand with some gravel from grade to approximately 10 feet below grade. This was underlain by a dense gray till, composed of silt, sand, gravel and clay. Refusal was encountered with the sampler in the boring for MW-1 at a depth of 14.2 feet and in the boring for monitoring well MW-2 at a depth of 17.2

feet. Refusal was not encountered in the borings for MW-3 and MW-4, each to a depth of 15 feet. Groundwater was encountered in the borings at a depth of 12 feet in MW-2, at 13 feet in MW-3, and at 9 feet in MW-4. The water table was not established in MW-1 on the day of the drilling, likely due to the very dense soils.

Very low to non-detect VOC readings (0 ppm to 0.4 ppm) were measured with the PID from the soil samples from the four soil borings. No olfactory or visual indications of petroleum were noted from the soil samples.

Each of the new monitoring wells was constructed in a similar fashion with 1.5 inch diameter, Schedule 40 PVC well screen and riser. Each well contains a ten-foot length of 0.010-inch, factory-slotted screen. The well screen was placed so that the estimated water table approximately intersected the midpoint of the screen length. A sand pack was installed in the annular space around the well screen from the bottom of the boring to approximately one and one-half to four feet above the top of the screened interval in each borehole. Above the sand pack, the annulus was filled with a one to two foot thick bentonite clay grout seal to prevent surface water from entering the borehole. Each well was fitted with a gripper cap and secured with a water-tight road box. The road box on each well is flush-mounted, set in concrete, and is suitable for vehicular traffic. The new monitoring wells were developed with a peristaltic pump immediately after installation, with the exception of MW-1 which was dry and therefore not developed on the day of drilling.

B. Groundwater Flow Direction and Gradient

Water table elevation measurements were collected from the four on-site monitoring wells on December 7, 1998. The top of casing elevations were determined relative to MW-4, which was arbitrarily set at 100 feet. The depth to water in each well was subtracted from the top of casing elevation to obtain the relative water table elevation. Water level data are presented in Appendix C. No free phase product was detected in the wells on December 7, 1998. Water table elevations were plotted on the site map to generate the Groundwater Contour Map figure presented in Appendix A.

The relative water table elevations measured on December 7, 1998, suggest that groundwater flow at the site is directed generally toward the southeast at a hydraulic gradient of approximately 4.4%. The depth to groundwater measured on December 7, 1998, was approximately 7 to 9.5 feet below ground surface.

Based on this flow direction, monitoring wells MW-2 and MW-4 are located in a downgradient direction from the basement spill area. Monitoring well MW-1 is located in a crossgradient direction from the basement spill area. Monitoring well MW-3 is located in an upgradient direction from the basement spill area.

C. Groundwater and Surface Water Sampling and Analyses

Griffin collected groundwater samples from the four on-site monitoring wells on December 7, 1998. The groundwater samples were analyzed by Endyne, Inc. of Williston, Vermont, by EPA Method 8021B for the presence of benzene, toluene, ethylbenzene, and xylenes (BTEX), methyl tertiary butyl ether (MTBE), naphthalene, and the alkylbenzenes: 1,3,5-trimethylbenzene and 1,2,4-trimethylbenzene.

The laboratory analysis report is contained in Appendix D. Analytical results of the trip blank and duplicate samples indicate that adequate quality assurance and control were maintained during sample collection and analysis.

The groundwater samples collected from monitoring wells MW-1, MW-2, MW-3, and MW 4 had no detectable levels of petroleum compounds.

D. Indoor Air Screening

Griffin screened the indoor air of the basement and of the kitchen for the presence of VOCs using a PID on November 30, 1998.

No VOCs were detected with the PID.

The current occupant of the residence has not noticed any fuel oil odors in the house.

E. Basement Soil Screening

In the Work Plan approval letter, Mr. Matthew Moran of the VTDEC requested that a soil sample be collected from the vicinity of SB-5 at a depth of approximately 20 inches (see Basement Sketch, Appendix A) and screened for VOCs. If VOCs readings, as measured with the PID, exceeded 10 ppm, the soil sample should be submitted for laboratory analysis.

On November 30, 1998, a soil sample was collected from a depth of approximately 8 inches with a hand auger. The soil sample had a VOC reading of 0.4 ppm as measured with the PID. Further auguring through the hard-packed sub-basement soils was not possible with the particular blunt-ended hand auger that was used on this day.

On December 7, 1998, a second attempt was made to hand auger in the vicinity of SB-5. The soil sample collected from a depth of 24 inches had a VOC reading of 0.8 ppm as measured with the PID. Since no VOC readings were detected exceeding 10 ppm from the collected basement soils, the soil samples were not submitted for laboratory analysis.

F. Sensitive Receptor Survey

A qualitative risk assessment was conducted to identify known and potential receptors of the contamination resulting from the fuel oil spilled in the basement at the Site. A visual survey was conducted during the monitoring well installation on November 30, 1998. Based on these observations and on the results of the soil screening and groundwater sample analyses, a determination of the potential risk to identified receptors was made.

The soil, groundwater, and indoor air space in the vicinity of the basement spill area are potential sensitive receptors. The risk to the soil is considered minimal based on the non-detect concentrations of VOCs with the PID from soil samples collected from the borings for the monitoring wells and from the soil sample collected from the basement subsurface. The bulk of the contaminated soils were excavated in January 1997 and removed from the Site in February 1997.

The risk to the groundwater is considered minimal based on the non-detection of VOCs by laboratory analytical methods in the groundwater samples collected at the site hydraulically downgradient of the basement spill area. Additionally, the Village of Swanton is serviced by municipal water. According to Mr. Mike Maynard of the Swanton Public Works Department, the Village of Swanton gets its water from Lake Champlain. Mr. Maynard was not aware of any water supply wells in the area surrounding the Site.

The risk to the indoor air posed by the past fuel oil spill in the basement is considered minimal based on the negligible residual source area strength and based on the non-detection of VOCs in the basement airspace with the PID on November 30, 1998.

The nearest surface water is the Missisquoi River, located approximately 500 feet southeast of the site. The risk to the Missisquoi River posed by the fuel oil spill at the site is considered minimal based on the negligible residual source area strength.

Standing water was observed in the drainage ditch on the east side of the property on November 30, 1998. The drainage ditch is in a downgradient direction from the basement spill area with respect to the shallow groundwater flow direction at the site. No evidence of petroleum contamination, such as sheens or stains, were observed in the drainage ditch or on the standing water in the ditch.

IV. CONCLUSIONS

Based on the results of this investigation at 12 Lake Street, Griffin presents the following conclusions:

- 1) The release is the result of a #2 fuel oil spill from an AST located in the basement of the 12 Lake Street residence. Approximately 200+ gallons of fuel oil were estimated to have been released from the AST when the furnace burner was removed without shutting off the fuel line from the AST.
- 2) Approximately 28 tons of petroleum contaminated soils were excavated from the site by EHM in January 1997 and delivered to MTS on February 28, 1997. The petroleum contaminated soils from the site were recycled into asphalt by MTS on July 30, 1997.
- 3) Four groundwater monitoring wells, MW-1 through MW-4, were installed by Griffin at the 12 Lake Street property on November 30, 1998. VOCs were not detected (i.e., less than 1 ppm) by field screening methods in soil samples collected from the borings for the monitoring wells.
- 4) The depth to groundwater measured on December 7, 1998, was approximately 7 to 9.5 feet below the ground surface. The shallow groundwater flow beneath the site on this date was estimated to be directed toward the southeast at a hydraulic gradient of approximately 4.4%.
- 5) Groundwater samples were collected from the four site monitoring wells on December 7, 1998. No VOCs were detected by laboratory analysis in the groundwater samples. Detection limits in the analyses were well below the VGES.
- 6) The air space of the basement and the kitchen on the first floor was screened for the presence of VOCs using a PID on November 30, 1998. No VOCs were detected.
- 7) A soil sample was collected at a depth of 2 feet from the basement in the vicinity of SB-5 on December 7, 1998. VOCs were not detected (i.e., less than 1 ppm) by field screening methods in this soil sample.
- 8) The Site and the area surrounding the Site are served by municipal water supplies.
- 9) There appear to be no significant potential risks to identified sensitive receptors based on currently available data.

V. RECOMMENDATIONS

Based on the results of this site investigation, Griffin recommends that the 12 Lake Street site in Swanton, Vermont be considered for closure and be removed from the VTDEC Active Hazardous Waste Sites List. This recommendation is offered based upon achievement of the following closure criteria, as per the VTDEC Site Management Activity Completed (SMAC) Checklist (dated December 1, 1997):

- 1) The source(s), nature, and extent of the petroleum contamination at the site has been adequately defined.

See Conclusions #1, #3, #5 and #7.

- 2) Source(s) has been removed, remediated, or adequately contained.

See Conclusion #2.

- 3) Levels of contaminants in soil and groundwater shall be stable, falling, or non-detectable.

See Conclusion #3, #5, and #7.

- 4) Groundwater enforcement standards are met at the following compliance points:

Any point of present use of groundwater as a source of potable water: See Conclusions #5 and #8.

Any point at or within the boundary of any Class I groundwater area: 12 Lake Street is not within a Class I groundwater area.

Any point at the boundary of the property on which the contaminant source is located: See Conclusion #5.

- 5) Soil guideline levels are met. If not, engineering or institutional controls are in place.

See Conclusion #3 and #7.

- 6) No unacceptable threat to human health or the environment exists on site.

See Conclusions #3, #5, #6, #7, #8, and #9.

- 7) Site meets RCRA requirements.

Available records indicate that the 12 Lake Street property is not in violation of the Resource Conservation and Recovery Act (RCRA) as defined in 40 CFR 264.

- 8) Site meets CERCLA requirements.

Available records indicate that the 12 Lake Street property is not in violation of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as defined in 40 CFR 300.

REFERENCES

1. USGS 7.5 Minute Topographic Map, East Alburg, VT quadrangle, dated 1964 and photorevised 1987.
2. Environmental Hazards Management, Inc., March 3, 1997, #2 *Fuel Oil Spill - Property Held by the New England Federal Credit Union*.
3. Doll, Charles G., ed., 1970, *Surficial Geologic Map of Vermont*, Vermont Geological Survey.
4. Doll, Charles G., ed., 1961, *Centennial Geologic Map of Vermont*, Vermont Geological Survey.

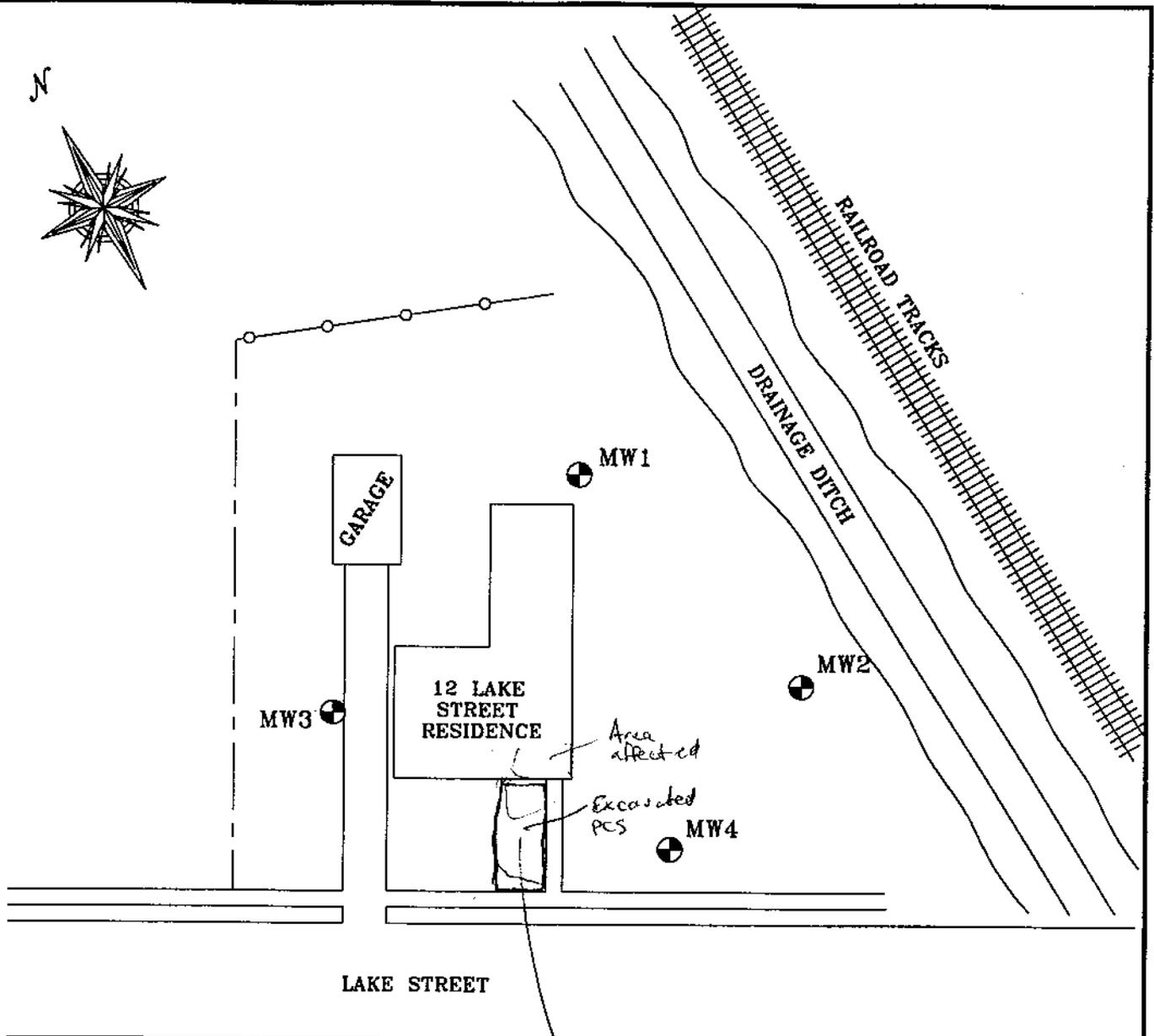
APPENDIX A

Site Location Map

Site Map

Basement Sketch

Groundwater Contour Map



LEGEND

-  MW2 MONITORING WELL
-  APPROXIMATE LOCATION OF PROPERTY LINE
-  FENCELINE



JOB #: 1976701

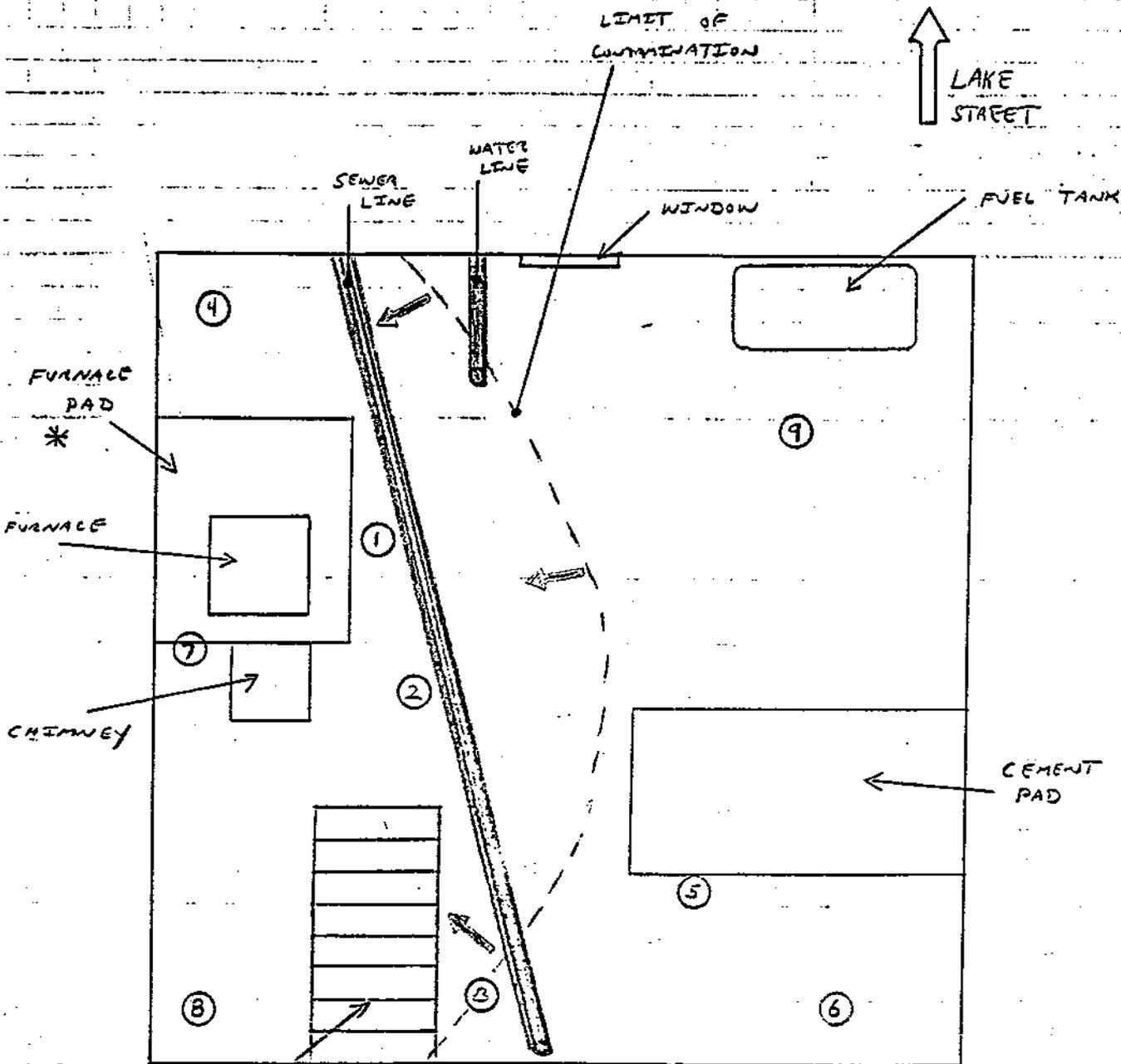
12 LAKE STREET

SWANTON, VERMONT

SITE MAP

DATE: 12/2/98	DWG.#:2	SCALE: 1"=30'	DRN.:SB	APP.:CW
---------------	---------	---------------	---------	---------

141 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS



STAIRS

SAMPLE #	DEPTH	P.P.M.
SB 1	18"	32 PPM
SB 2	18"	144
SB 2	24"	196
SB 3	23"	66
SB 4	28"	86
SB 5	19"	32
SB 6	18"	1.5
SB 6	30"	1.6
SB 7	24"	148
SB 8	22"	130
SB 9	19"	3.6

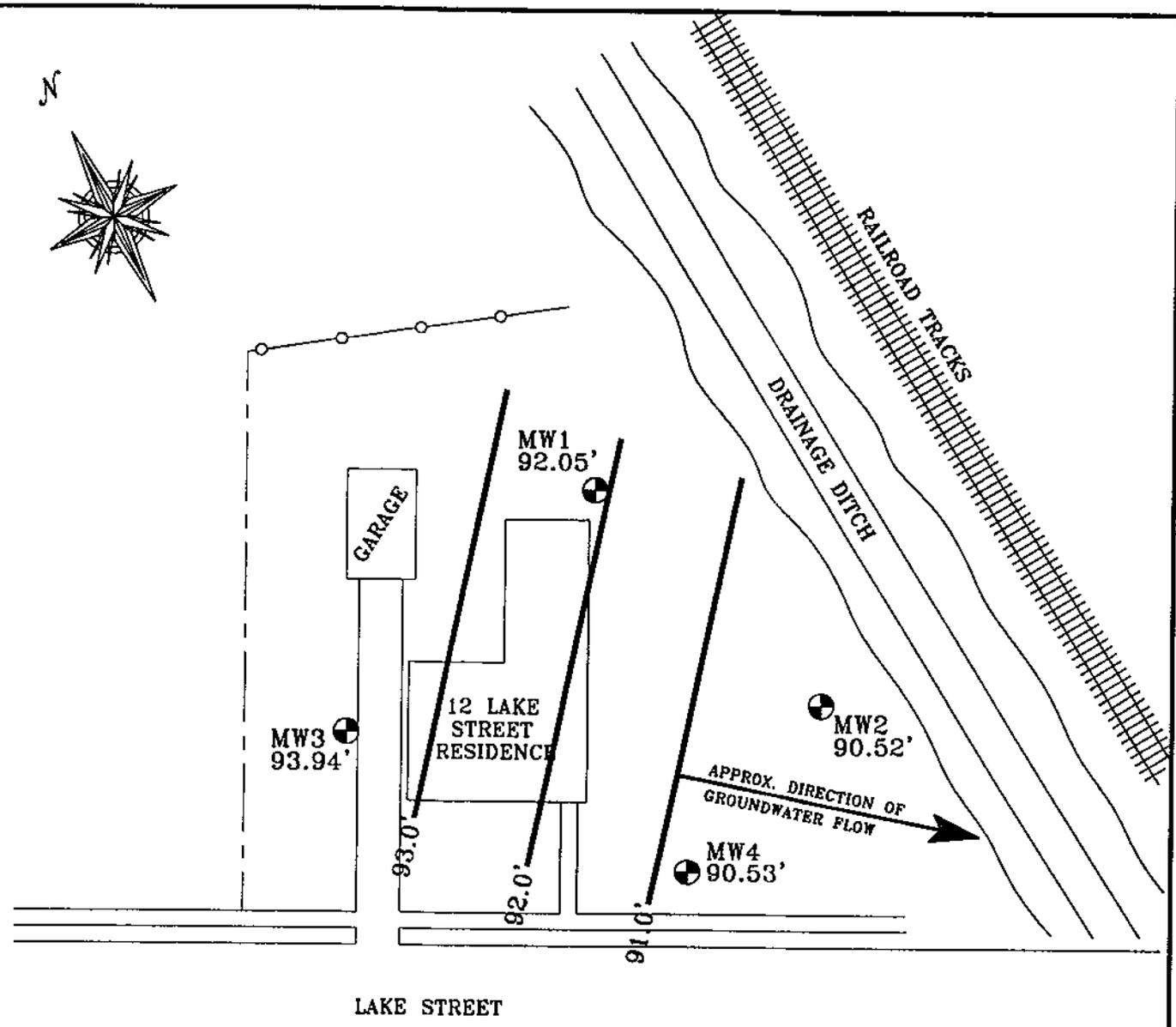
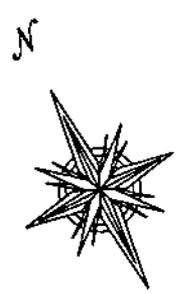
← = LIMITS OF CONTAMINATION ESTABLISHED W/ LIMITED EXCAVATION REMAINING

Σ NOT TO SCALE Z

*

BASEMENT SKETCH
Showing Fuel Tank, Furnace, and Area of Excavation
From: EHM, Inc., March 3, 1997 Report

← 1 PPM BACKGROUND



LEGEND

⊕ MW2 90.52' MONITORING WELL AND WATER TABLE ELEVATION IN FEET

— 92.0' GROUNDWATER CONTOUR IN FEET (DASHED WHERE INFERRED)

⊕ MW2 MONITORING WELL

--- APPROXIMATE LOCATION OF PROPERTY LINE

○ FENCELINE



JOB #: 1976701

12 LAKE STREET

SWANTON, VERMONT

GROUNDWATER CONTOUR MAP
MEASUREMENT DATE: 12/7/98

DATE: 12/21/98

DWG.#:3

SCALE: 1"=30'

DRN.:SB

APP.:CW

APPENDIX B

Soil Logs and Monitoring Well Specifications

PROJECT 12 LAKE STREET

LOCATION SWANTON, VERMONT

DATE DRILLED 11/30/98 TOTAL DEPTH OF HOLE 14.2'

DIAMETER 2.75"

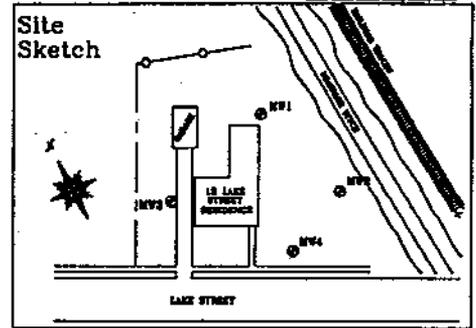
SCREEN DIA. 1.5" LENGTH 10.0' SLOT SIZE 0.010"

CASING DIA. 1.5" LENGTH 3.7' TYPE sch 40 pvc

DRILLING CO. ADAMS ENGR. DRILLING METHOD VIBRATORY

DRILLER GERRY ADAMS LOG BY C. WARD

WELL NUMBER MW1

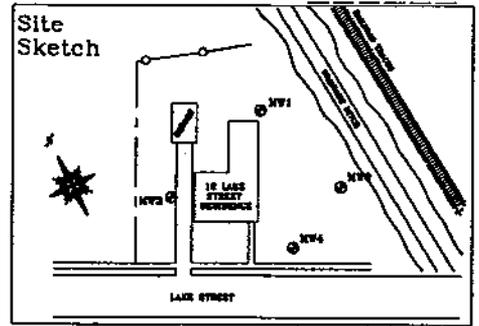


GRIFFIN INTERNATIONAL, INC

DEPTH IN FEET	WELL CONSTRUCTION	NOTES	BLOWS PER 6" OF SPOON & PID READINGS	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)	DEPTH IN FEET
0		ROAD BOX			0
0		LOCKING WELL CAP			0
1		CONCRETE	0'-1' 0 ppm	Dark brown SILT, some sand, organic matter/rootlets.	1
2		BENTONITE		Gray/brown SAND, SILT and fine GRAVEL.	2
2			1'-4' 0.2 ppm		2
3					3
4		WELL RISER	4'-5' 0.1 ppm	Gray/brown CLAY and fine GRAVEL.	4
5					5
6				Gray/brown SILT, SAND, GRAVEL and CLAY, moist, very dense - TILL.	6
7		SAND PACK	5'-10' 0.2 ppm		7
8					8
9		WELL SCREEN			9
10			10'-11' 0.4 ppm	Same as above.	10
11					11
12			11'-14.2' 0.3 ppm	Gray SILT, SAND, GRAVEL and CLAY, moist - TILL.	12
13		BOTTOM CAP			13
14		UNDISTURBED NATIVE SOIL			14
15				BASE OF WELL AT 14.0' SAMPLER REFUSAL AT 14.2'	15
16					16
17					17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
25					25

PROJECT 12 LAKE STREET
 LOCATION SWANTON, VERMONT
 DATE DRILLED 11/30/98 TOTAL DEPTH OF HOLE 17.2'
 DIAMETER 2.75"
 SCREEN DIA. 1.5" LENGTH 10.0' SLOT SIZE 0.010"
 CASING DIA. 1.5" LENGTH 6.7' TYPE sch 40 pvc
 DRILLING CO. ADAMS ENGR. DRILLING METHOD VIBRATORY
 DRILLER GERRY ADAMS LOG BY C. WARD

WELL NUMBER MW2

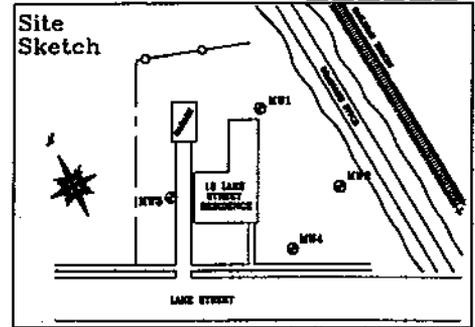


GRIFFIN INTERNATIONAL, INC

DEPTH IN FEET	WELL CONSTRUCTION	NOTES	BLOWS PER 6" OF SPOON & PID READINGS	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)	DEPTH IN FEET
0		ROAD BOX			0
0		LOCKING WELL CAP			0
0-1		CONCRETE	0 ppm	Dark brown SILT, some sand, organic matter/rootlets.	0-1
1-2		BENTONITE	0 ppm	Brown SAND, some silt.	1-2
2-3		WELL RISER	0 ppm	Gray/brown mottled SILT and CLAY, some fine gravel.	2-3
3-4		SAND PACK	0 ppm	Gray/brown mottled CLAY, stiff.	3-4
4-5		WELL SCREEN	0 ppm		4-5
5-6			0 ppm	Gray/red/brown mottled CLAY, stiff, platy when broken.	5-6
6-7			0 ppm		6-7
7-8			0 ppm	Gray/brown SILT, CLAY, GRAVEL-TILL.	7-8
8-9			0 ppm		8-9
9-10			0.2 ppm		9-10
10-11			0.2 ppm	Gray SILT, SAND, GRAVEL, trace clay, dense, moist-TILL.	10-11
11-12			0.2 ppm	12.0' WATER TABLE	11-12
12-13			0.2 ppm		12-13
13-14			0.1 ppm		13-14
14-15			0.1 ppm		14-15
15-16		BOTTOM CAP	0.2 ppm	Gray CLAY, SAND, SILT and GRAVEL, saturated- TILL.	15-16
16-17		UNDISTURBED NATIVE SOIL	0.2 ppm		16-17
17-18				BASE OF WELL AT 17.0' SAMPLER REFUSAL AT 17.2'	17-18
18-19					18-19
19-20					19-20
20-21					20-21
21-22					21-22
22-23					22-23
23-24					23-24
24-25					24-25

PROJECT 12 LAKE STREET
 LOCATION SWANTON, VERMONT
 DATE DRILLED 11/30/98 TOTAL DEPTH OF HOLE 15.0'
 DIAMETER 2.75"
 SCREEN DIA. 1.5" LENGTH 10.0' SLOT SIZE 0.010"
 CASING DIA. 1.5" LENGTH 4.5' TYPE sch 40 pvc
 DRILLING CO. ADAMS ENGR. DRILLING METHOD VIBRATORY
 DRILLER GERRY ADAMS LOG BY C. WARD

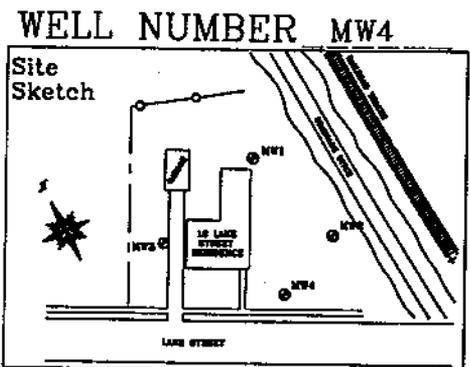
WELL NUMBER **MW3**



GRIFFIN INTERNATIONAL, INC

DEPTH IN FEET	WELL CONSTRUCTION	NOTES	BLOWS PER 6" OF SPOON & PID READINGS	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)	DEPTH IN FEET
0		ROAD BOX			0
0		LOCKING WELL CAP			0
0-1		CONCRETE	0.1 ppm	Dark brown SILT, some sand, organic matter/rootlets.	1
1-2		BENTONITE	0.1 ppm	Brown SILT and SAND.	2
2-5		WELL RISER	0.2 ppm	Gray/brown SILT and fine SAND, some gravel, moist, TILL.	3
5-7.5		SAND PACK	0.3 ppm	Gray/brown SILT, fine SAND and GRAVEL, moist to wet, dense TILL.	6
7.5-10		WELL SCREEN	0.2 ppm	Gray/brown SILT, fine SAND and GRAVEL, damp, very dense TILL.	8
10-15		BOTTOM CAP	0.1 ppm	Gray SILT, SAND and GRAVEL, dense, wet.	10
13.0'				13.0' WATER TABLE	13
14.8'		UNDISTURBED NATIVE SOIL		BASE OF WELL AT 14.8'	15
15.0'				END OF EXPLORATION AT 15.0'	16
17					17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
25					25

PROJECT 12 LAKE STREET
 LOCATION SWANTON, VERMONT
 DATE DRILLED 11/30/98 TOTAL DEPTH OF HOLE 15.0'
 DIAMETER 2.75"
 SCREEN DIA. 1.5" LENGTH 10.0' SLOT SIZE 0.010"
 CASING DIA. 1.5" LENGTH 3.2' TYPE sch 40 pvc
 DRILLING CO. ADAMS ENGR. DRILLING METHOD VIBRATORY
 DRILLER GERRY ADAMS LOG BY C. WARD



GRIFFIN INTERNATIONAL, INC

DEPTH IN FEET	WELL CONSTRUCTION	NOTES	BLOWS PER 6" OF SPOON & PID READINGS	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)	DEPTH IN FEET
0		ROAD BOX			0
0		LOCKING WELL CAP			0
1		CONCRETE	0'-1' 0 ppm	Dark brown SILT, SAND, organic matter/rootlets.	1
2		BENTONITE		Gray brown/orange brown mottled SILT and SAND, little clay, dense, moist to wet.	2
3		WELL RISER	1'-5' 0 ppm		3
4					4
5					5
6			5'-7.5' 0.1 ppm	Gray/brown SILT and GRAVEL, some sand, some clay, moist to wet- TILL.	6
7		SAND PACK			7
8					8
9		WELL SCREEN	7.5'-10' 0.1 ppm	Gray SILT, SAND and GRAVEL, trace clay, moist- TILL.	9
9				9.0' WATER TABLE	9
10					10
11				Gray, SILT, SAND, CLAY and GRAVEL, wet-TILL.	11
12		BOTTOM CAP	10'-15' 0.1 ppm		12
13					13
14					14
15		UNDISTURBED NATIVE SOIL			15
15				BASE OF WELL AT 13.5'	15
16				END OF EXPLORATION AT 15.0'	16
17					17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
25					25

APPENDIX C

Liquid Level Monitoring Data

LIQUID LEVEL MONITORING DATA

**12 LAKE STREET
SWANTON, VERMONT**

12/7/98

Well I.D.	Well Depth bgs	Top of Casing Elevation	Depth To Product btoc	Depth To Water btoc	Product Thickness	Specific Gravity Of Product	Water Equivalent	Corrected Depth To Water	Corrected Water Table Elevation
MW-1	14.00	99.09	-	7.04	-	-	-	-	92.05
MW-2	17.00	97.89	-	7.37	-	-	-	-	90.52
MW-3	15.00	101.68	-	7.74	-	-	-	-	93.94
MW-4	13.50	100.00	-	9.47	-	-	-	-	90.53

All Values Reported in Feet

btoc - Below Top of Casing

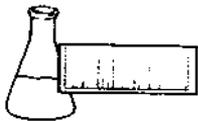
bgs - Below Ground Surface

Elevations determined relative to top of casing of MW-4, which was arbitrarily set at 100'

Top of Casing Elevations surveyed by Griffin on 11/30/98

APPENDIX D

Water Quality Data



ENDYNE, INC.

Laboratory Services

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

REPORT OF LABORATORY ANALYSIS

CLIENT: Griffin International
PROJECT NAME: 12 Lake Street
REPORT DATE: December 14, 1998
DATE SAMPLED: December 7, 1998

PROJECT CODE: GILA1959
REF.#: 132,432 - 132,437

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

enclosures

