GRIFFIN INTERNATIONAL INC

October 9, 1997

Dr. Gary Koop
201 West Grand Avenue
Montvale, NJ 07645

RE: Investigation of Subsurface Petroleum Contamination, Koop Residence, Killington, VT
VTDEC Site # (Site Expressway)

Dear Dr. Koop

Please find enclosed a summary report for the Investigation of Subsurface Petroleum Contamination at your property located at South View Path in Killington, Vermont. This work has been conducted in accordance with the Vermont Site Investigation Expressway Procedure, following verbal notification from the Vermont Department of Environmental Conservation (VTDEC) that a site investigation would be required.

Griffin is pleased to have conducted this work for you. Please feel free to call me if you have any questions regarding this report.

Sincerely,

Erik C. Sandblom
Engineer

Enclosure

cc: Steve Counter, Counter Adjusting
Chuck Schwer, VTDEC

P.O. Box 943 • Williston, VT 05495 • 802-865-4288

REPORT ON THE INVESTIGATION OF SUSPECTED SUBSURFACE PETROLEUM CONTAMINATION

OCTOBER 9, 1997

Site Location:
KOOP RESIDENCE
SOUTH VIEW PATH
KILLINGTON, VERMONT

VTDEC SITE #(Site Expressway)

Prepared For:

DR. GARY KOOP
201 WEST GRAND AVENUE
MONTVALE, NJ 07645

Prepared By:

GRIFFIN INTERNATIONAL

P.O. Box 943 / 19 Commerce Street Williston, VT 05495 (802) 865-4288

TABLE OF CONTENTS

I. INTRODUCTION

The following report summarizes an investigation of suspected subsurface petroleum contamination that was conducted at the residential property owned by Dr. Gary Koop, located on South View Path in Killington, Vermont. This work has been conducted by Griffin International, Inc. (Griffin) for Dr. Koop following the requirements of the Vermont Site Investigation Expressway Procedure. Petroleum contamination was first suspected at the subject property during the removal of an underground storage tank (UST) that was used to store No. 2 fuel oil used for heating the on-premise house.

All work at the site was conducted in accordance with the August 12, 1997 Work Plan and Cost Estimate prepared by Griffin, which was approved by Dr. Koop and his homeowner insurance carrier for the property, USAA. All coordination with USAA has been conducted through Mr. Steve Counter of Counter Adjusting. Work conducted at the site includes the excavation of four test pits in the vicinity of the former UST and the collection and analysis of soil samples collected from the test pits. In addition, a sensitive receptor risk assessment was conducted to assess the risk that subsurface petroleum contamination at the site may pose to sensitive receptors in the area.

II. SITE BACKGROUND

A. Site History

On June 30, 1997, a 1,000 gallon capacity UST, used to contain No. 2 fuel oil for on-premise heating, was permanently closed and removed from the ground. The UST was replaced by an aboveground storage system located in the basement of the house. During the UST closure, contractors detected strong petroleum odors in the excavation and observed a petroleum sheen on standing water present in the excavation. On July 9, 1997, Griffin conducted a post-UST closure inspection in order to preliminarily determine the level and degree of petroleum contamination at the site. The results of the inspection verified the presence of petroleum contamination in the former UST excavation; however, the full extent of contamination was not defined. The Vermont Department of Environmental Conservation (VTDEC) was notified, by the homeowner, of the petroleum release from the UST system, at this time.

Petroleum contamination detected in subsurface soil during the post-UST closure inspection was above VTDEC action levels, indicating that an Initial Site Investigation would be required, according to VTDEC guidelines. In order to further define the extent and degree of subsurface petroleum contamination at the site, and determine the need for corrective action, a Site Investigation was proposed, in accordance with the VTDEC Site Investigation Expressway Procedure. This procedure allows for the completion of an Initial Site Investigation, in accordance with VTDEC guidelines, without VTDEC formal approval. A Work Plan and Cost Estimate, dated August 12, 1997, was prepared by Griffin and approved by the owner of the property, Dr. Koop, and the insurance carrier, USAA, represented by Mr. Counter. This report summarizes the Site Investigation.

B. Site Description

The subject site is a residential property located on the south side of South View Path, approximately 1/8 mile east of the Killington Access Road in Killington, Vermont (see Site Location Map in Appendix A). Two building structures are located at the site comprising a house and a garage. The only public utilities at the site are telephone and electric power. A drilled water supply well is located on the property, approximately 15 feet to the north of the house. A 1,000 gallon UST used for the storage of No. 2 fuel oil was formerly buried on the east side of the house. This UST has been permanently closed and removed from the ground.

Nearly the entire subject property appears to consist of natural terrain. Some fill material may be located on the north side of the house for grading purposes. The property is abutted primarily by residences, many of which are used seasonally. South View Path abuts the site to the north. Residences are located to the east and west of the site. The southern edge of the site slopes down to a meadow and wooded area, toward a swamp. The Roaring Brook is located approximately 1,200 feet to the southeast of the site.

The *1970 Surficial Geologic Map of Vermont* indicates that the overburden at the subject property consists of glacial till. Observation has indicated the presence of silty sand and some cobbles. Overburden thicknesses in the area are likely less than 50 feet. The groundwater flow direction, if present in the overburden at the site, is likely to the southeast, toward the Roaring Brook. No water table has been encountered in the overburden at the subject property.

III. INVESTIGATIVE PROCEDURES

A. Test Pit Excavation

On August 13, 1997, four test pits (TP-1, TP-2, TP-3, and TP-4) were excavated in and in the vicinity of the former location of the UST. The locations of the test pits are displayed on the Site Map in Appendix A. Excavation services were provided by Mel Colton Excavating, and coordinated through Ken Zuba, a general contractor conducting renovations at the subject property. All test pits were excavated under the direct supervision of a Griffin engineer.

All test pits were excavated with a tractor mounted back hoe. Soil samples were collected from each excavation at intervals of approximately two feet. All samples collected from a depth greater than three feet from grade were collected with the use of the backhoe bucket. Each test pit was excavated to a maximum depth equal to the minimum elevation of detected petroleum contamination in the UST excavation. Soil types from each test pit were classified and logged in detail. Each soil sample was screened in the field for volatile organic compounds (VOCs) with a properly calibrated H-Nu HW-101 photo-ionization detector (PID).

Soil encountered in all four test pits consisted primarily of dry dark to light brown silt and medium to fine sand. Some cobbles or coarse gravel was observed in test pits away from the

immediate vicinity of the former UST. Groundwater was not encountered in any of the test pits. No petroleum odor was detected or petroleum sheens observed in the bottom of any of the test pits. The only petroleum odor in soil detected on this day was in soil excavated from 4-5 feet below grade in test pit TP-1.

Soil samples collected from test pit TP-1, excavated in the same location as the former UST, contained a significant concentration of VOCs as measured with a PID. A concentration of 98 parts per million (ppm) was detected in a soil sample collected from 4-5 feet below grade, which is approximately at the bottom of the former UST excavation. Below this depth, VOC concentrations measured in the soil reduced significantly. A VOC concentration of 5.8 ppm was detected at 6-7 feet below grade, 1.5 ppm at 7-8 feet below grade, 1.1 ppm at 8-9 feet below grade, and 0.0 ppm at 9-10 feet below grade. VOCs were detected in samples collected from test pit TP-3 at a concentration of 0.3 ppm at 4-5 feet below grade and at 0.1 ppm at 6-7 feet below grade. All other samples collected from this and other test pits on this day did not contain a detectable concentration of VOCs, as measures with a PID.

B. Soil Sample Collection and Analysis

A soil sample was collected from the maximum depth for each of the test pits conducted in order to verify the results of PID screening, and to quantify the concentrations of specific petroleum compounds. All samples were analyzed for benzene, toluene, ethyl benzene, and xylenes (BTEX) and methyl tertiary butyl ether (MTBE), common constituents of petroleum products, per EPA Method 602. The concentration of total petroleum hydrocarbons (TPH) in the samples was also determined by modified EPA Method 8100. Results of the laboratory analyses for those wells sampled on this date are summarized in Appendix C.

According to the results of the analyses, no compounds tested for were present in the soil samples collected from test pits TP-1, TP-2, or TP-4 at concentrations greater than detectable limits. A concentration of 27.0 parts per billion (ppb) of toluene was detected in the sample collected from TP-3. This is well below applicable state soil or groundwater standards for this compound. A trace concentration of TPH below the detection limit of 5.0 parts per million (ppm) was detected in the sample collected form TP-2.

All samples were collected according to Griffin's soil sampling protocol which complies with industry and state standards. All samples were analyzed within the specified holding times.

C. Water Supply Well Sample Collection and Analysis

A water supply well is located at the subject property, approximately 15 feet to the north of the house. Water is delivered to the house via a buried water pipe, which extends from the well, along the east side of the house, into the basement near the southeast corner of the house. The water line had reportedly broken, which caused the infiltration of sand and silt into the house water distribution system. The water pipe was in the process of being replaced on the same day

as test pit excavation. In addition, all of the water pipes within the building were to be flushed, cleaned, and disinfected in order to eliminate all foreign material that may have infiltrated into the distribution system.

As a result of the water line repair operations that were being conducted at the site, a sample was not collected from the on-site water supply, on the same day as test pit excavation. A sample of the water supply was collected on September 25, 1997, after the new water supply pipe was installed, and all pipes has been flushed and cleaned. The sample was collected from the outdoor spigot located on the west side of the house. This sample location was chosen so that the water from the spigot flowed through much of the water distribution system before it was collected, in order to determine if any petroleum contamination that may have entered the distribution system remained following flushing.

The water sample was analyzed for BTEX and MTBE in accordance with EPA Method 602, and for TPH per modified EPA Method 8100. Sample collection and handling was conducted in accordance with Griffin protocols which conform to state and industry standards. Sample analysis results indicate that none of the compounds tested for in the analyses were detected in the water sample. A copy of the laboratory report is included in the Appendix.

D. Sensitive Receptor Risk Assessment

A receptor risk assessment was conducted to identify any known or potential receptors of residual contamination detected at the Koop residence. A visual survey was conducted at the time of test pit excavation and soil sample collection. Based on these observations, a determination of the potential risk to identified receptors was conducted based on source proximity, likely groundwater flow direction, and contaminant concentration levels. Interviews and historical research were also conducted as part of the survey.

Water Supplies

A drilled supply well services the water needs of the residence located at the site. The well is located approximately 30 feet upgradient of the former UST. The water line for this supply well passes along the east side of the house, through the former UST excavation. Based on the separation distance between the supply well and the source area of petroleum contamination, the on-site water supply well could be at risk of petroleum contamination impact. However, the characterization of the contaminant plume, as determined through the excavation of test pits and soil screening and analysis, indicates that the contamination is contained within a relatively small volume of soil, which does not extent within 20 feet of the supply well. Petroleum contamination that has been detected at the subject site is also located away from the water supply well in the downgradient direction. Based on these factors, the limited amount petroleum contamination detected in the subsurface at the subject property does not appear to pose a significant risk to the water supply well.

The water supply line leading into the house was recently replaced due to a breach in the former pipe, which allowed sand and silt to infiltrate into the house water distribution system. The water pipe was reportedly constructed of galvanized steel. The location of the break in the pipe is unknown. Since this water line passed through the area of detected petroleum contamination, there is a possibility that petroleum contamination also migrated into the pipe and into the house water distribution system. The buried water line was in the process of being completely replaced by high density polyethylene (HDPE) pipe, and the water distribution system was to be completely flushed with detergent and disinfected.

Historical research has revealed that the water supply well at the Koop residence has been monitored for the presence of petroleum contamination in association with the investigation of a petroleum release to the subsurface, which occurred at the Summit Lodge, located approximately 1,000 feet to the north of the subject property. According to VTDEC records, a water sample has been collected from the Koop residence water supply on a monthly basis, and then later on a quarterly basis, since November of 1993. Samples have been analyzed for BTEX and MTBE. The most recent sample analysis conducted in March of 1997, indicated that no petroleum compounds were detected in the water supply. All other water quality data indicate that no compounds have been detected greater than detection limits, with the exception of one monitoring event in July of 1995, in which 3.6 parts per billion (ppb) of BTEX was detected. This concentration is below Vermont Drinking Water Standards for all constituents of BTEX. No explanation for this detection has been obtained.

The drilled water supply well at the Koop residence does not appear to be at significant risk of petroleum contamination impact by residual contamination in soil near the vicinity of the former fuel oil UST at the property. This assessment is based on recent water sample analysis results, which indicate the absence of target petroleum compounds, and that the water supply pipe has been replaced, and the source of petroleum contamination at the site has been removed.

Surface Waters

The only surface water that was identified which is in close enough proximity to be considered at risk of petroleum contamination impact from the Koop property is the Roaring Brook which flows to the northeast, approximately 1,200 feet to the southeast of the property. The extent of residual adsorbed petroleum contamination detected at the site has been defined to within the immediate vicinity of the former UST. In addition, is not likely that the relatively low level of residual petroleum detected in soil at the site would migrate to the Roaring Brook at a significant concentration. Therefore, surface waters do not appear to be at significant risk of petroleum contamination impact as a result of the former fuel oil UST at the Koop residence.

Buildings in the Vicinity

Two buildings are located at the subject property, only one of which is located in close enough proximity to the former UST to be at risk of impact by residual petroleum contamination in soil. The former UST was located beside the eastern side of the house. Inspection of the house foundation that was exposed in the excavation, revealed that it was constructed of poured

concrete, and in relatively good condition, with no evidence of holes or significant cracks which would allow the infiltration of petroleum vapors into the basement. The limited quantity of low level petroleum contaminated soils at the site are not likely to cause a significant impact on the air quality of the building. Screening of the breathing space in the basements of the house with a PID indicated that there were no VOCs above background levels. No complaints have been reported of petroleum odors within the house. Therefore, on-site buildings do not appear to be at risk of petroleum vapor impact.

IV. CONCLUSIONS

Based on currently available data regarding the Koop residential property, located in Killington, Vermont, the following conclusions are presented:

1) Residual adsorbed petroleum contamination has been detected in soil located on the eastern side of the house building at the subject property. The horizontal and vertical extents of contamination has been defined to unsaturated soil in the immediate vicinity of a former 1,000 gallon UST which was used for the storage of No. 2 fuel oil. Groundwater has not been impacted.

2) Soil encountered in the vicinity of the former UST consist of silty sand with some cobbles. No groundwater was encountered at the site, nor was any evidence of a high water table (mottling) observed in excavations conducted at the site. Bedrock was not observed in any of the excavations.

3) No identified sensitive receptors in the area are at significant risk of petroleum contamination impact due to the sufficient distance of receptors from the site and/or the very low levels of contamination detected at the site.

4) Over time, the natural processes of biodegradation and dispersion will reduce contaminant concentrations in the subsurface at the Koop residence in Killington, Vermont to non-detect.

V. RECOMMENDATIONS

Based on the above conclusions, the following recommendations are presented concerning petroleum contamination detected in the subsurface at the Koop residential property in Killington, Vermont:

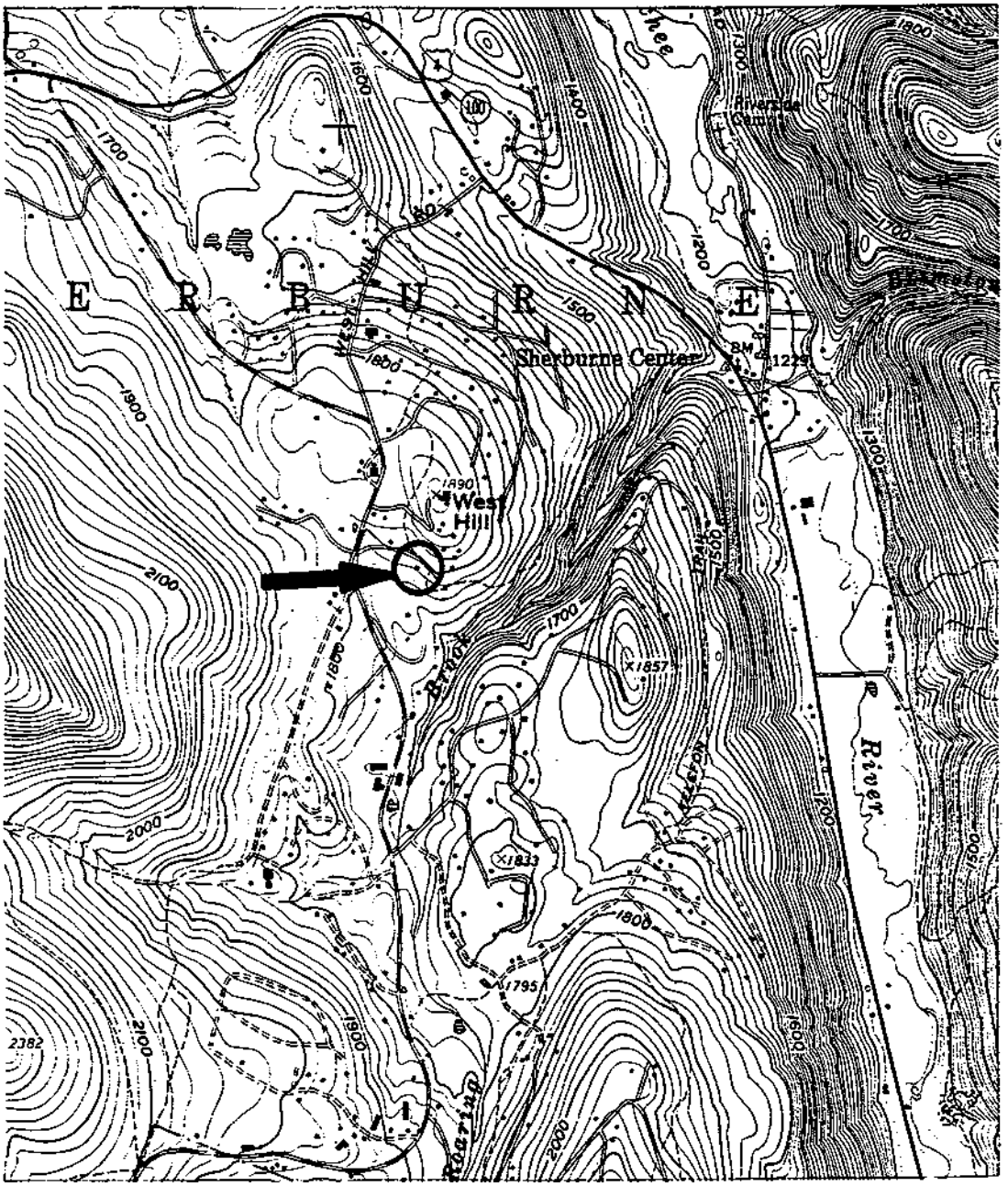
1) No further investigative action is recommended at this time. If this site has been added to the Vermont Active Hazardous Sites List, it should be recommended for Site Management Activity Completed (SMAC) status and removed from the list based on the above conclusions.

2) Residual petroleum contamination in subsurface soil at the site will decrease over time. However, if it is preferred to eliminate the petroleum contaminated soil from the subject property in an expedited manner, it may be feasible to excavate all significantly impacted soil for off-site treatment. This action should be approved by the VTDEC prior to commencing any work, however, in order to coordinate reimbursement of costs by the Petroleum Cleanup Fund (PCF), and to approve of the transport of petroleum contaminated soil.

APPENDIX A

SITE MAPS

1) Site Location Map
2) Site Map



JOB #: 89741082
SOURCE: USGS- PICO PEAK, VERMONT QUADRANGLE

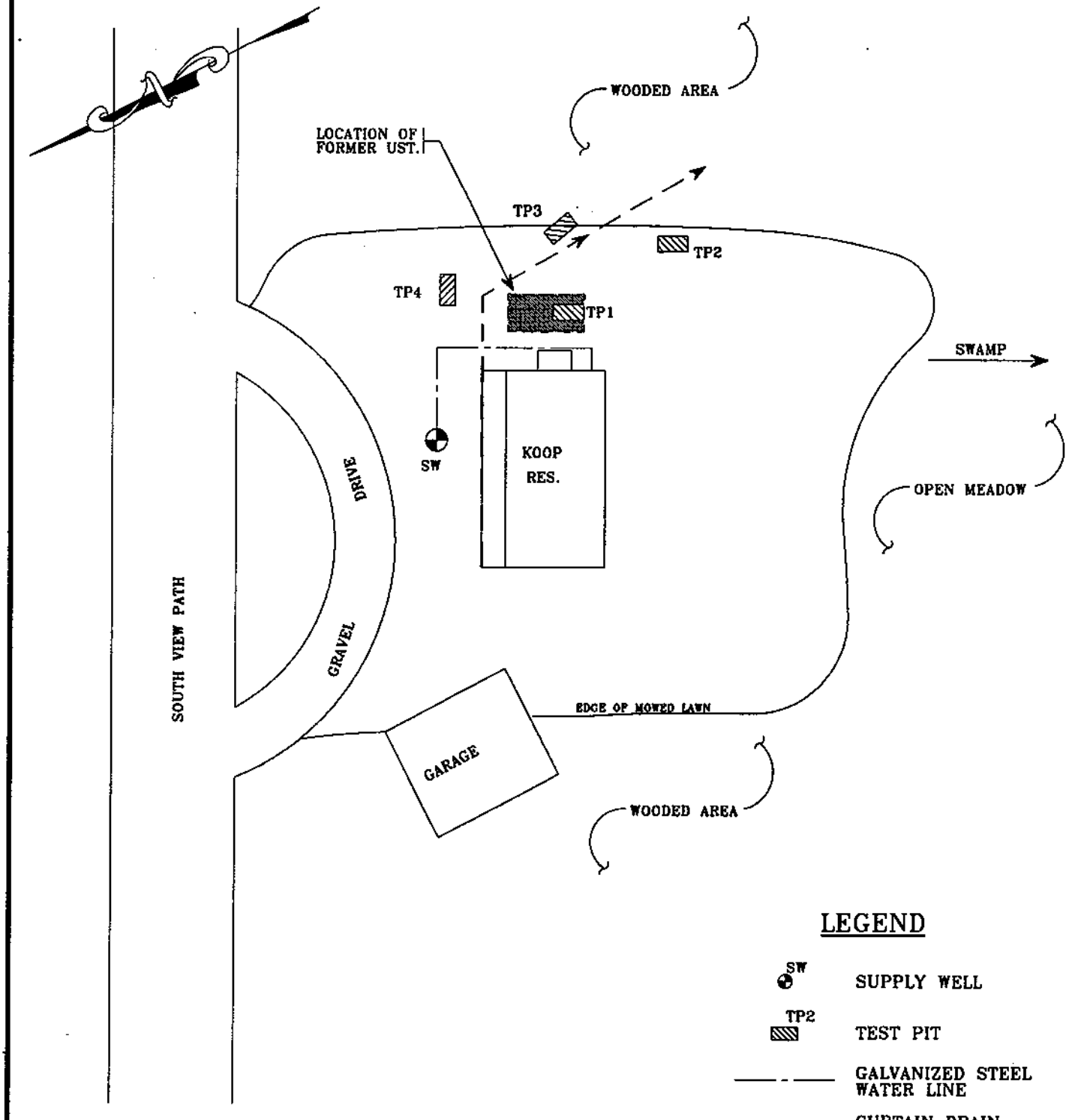
GRIFFIN INTERNATIONAL INC

KOOP RESIDENCE

KILLINGTON, VERMONT

SITE LOCATION MAP

DATE: 9/11/97	DWG.#:1	SCALE: 1:24000	DRN.:SB	APP.:ES



JOB #: 89741082

GRIFFIN INTERNATIONAL INC

KOOP RESIDENCE

KILLINGTON, VERMONT

SITE SKETCH

DATE: 9/11/97	DWG.#:2	SCALE: ~ 1"=30'	DRN.:SB	APP.:ES

APPENDIX B

TEST PIT LOGS

WELL NUMBER TP1

PROJECT KOOP RESIDENCE

LOCATION KILLINGTON, VERMONT

DATE DRILLED 8/13/97 TOTAL DEPTH OF HOLE 10.0'

DIAMETER NA

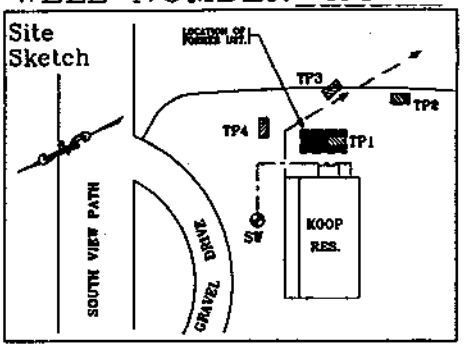
SCREEN DIA. NA LENGTH NA SLOT SIZE NA

CASING DIA. NA LENGTH NA TYPE NA

DRILLING CO. COLTON EXCAVATING DRILLING METHOD BACKHOE

DRILLER _____ LOG BY E. SANDBLOM

Site Sketch



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					0
4			4'–5' 98 ppm	Brown and gray, wet, silty SAND with some gravel.	4
5		NATIVE BACKFILL	5'–7' 5.8 ppm	Light brown, dry, silty SAND with little fine gravel.	5
7			7'–8' 1.5 ppm	Dark brown, silty SAND.	7
8			8'–9' 1.1 ppm	Light brown, dry, silty SAND.	8
9			9'–10' 0 ppm	Light brown, dry, silty SAND.	9
10		UNDISTURBED NATIVE SOIL		END OF EXPLORATION AT 10'	10
25					25

PROJECT KOOP RESIDENCE

LOCATION KILLINGTON, VERMONT

DATE DRILLED 8/13/97 TOTAL DEPTH OF HOLE 4.5'

DIAMETER NA

SCREEN DIA. NA LENGTH NA SLOT SIZE NA

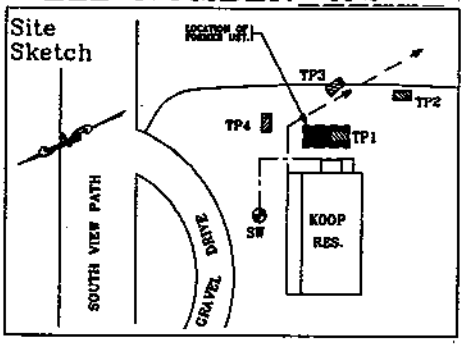
CASING DIA. NA LENGTH NA TYPE NA

DRILLING CO. COLTON EXCAVATING DRILLING METHOD BACKHOE

DRILLER _____ LOG BY E. SANDBLOM

WELL NUMBER TP2

Site Sketch



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					0
1			1'-2' 0 ppm	Dark brown, dry, medium to fine, silty SAND with cobbles.	1
2		NATIVE BACKFILL			2
3			2'-3' 0 ppm	Brown, dry, silty, medium SAND with cobbles.	3
4			3.5'-4.5' 0 ppm	Brown, dry, medium to fine SAND and SILT with some medium to coarse gravel.	4
5		UNDISTURBED NATIVE SOIL		END OF EXPLORATION AT 4.5'	5
6					6
7					7
8					8
9					9
10					10
11					11
12					12
13					13
14					14
15					15
16					16
17					17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
25					25

WELL NUMBER TP3

PROJECT KOOP RESIDENCE

LOCATION KILLINGTON, VERMONT

DATE DRILLED 8/13/97 TOTAL DEPTH OF HOLE 7.0'

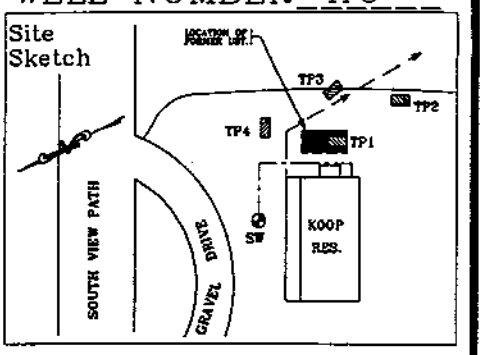
DIAMETER NA

SCREEN DIA. NA LENGTH NA SLOT SIZE NA

CASING DIA. NA LENGTH NA TYPE NA

DRILLING CO. COLTON EXCAVATING DRILLING METHOD BACKHOE

DRILLER _____ LOG BY E. SANDBLOM



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					0
1					1
2			2'-3' 0 ppm	Brown, dry, medium to fine SAND and SILT.	2
3		NATIVE BACKFILL			3
4			4'-5' 0.3 ppm	Brown, dry, medium to fine SAND, SILT and COBBLES.	4
5					5
6			6'-7' 0.1 ppm	Light brown, dry, medium SAND and SILT, with some fine gravel.	6
7		UNDISTURBED NATIVE SOIL		END OF EXPLORATION AT 7.0'	7
8					8
9					9
10					10
11					11
12					12
13					13
14					14
15					15
16					16
17					17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
25					25

10/9/97

Water and Soil Quality Data Summary
Koop Residence
Killington, Vermont

SOIL SAMPLE ANALYSIS RESULTS

Sample Collection Date: 8/13/97	Test Pit 1	Test Pit 2	Test Pit 3	Test Pit 4	
PARAMETER	10.0' B.G.	4.5' B.G.	7.0' B.G.	9.0' B.G.	
Benzene	ND < 10	ND < 10	ND < 10	ND < 10	
Chlorobenzene	ND < 10	ND < 10	ND < 10	ND < 10	
1,2 - Dichlorobenzene	ND < 10	ND < 10	ND < 10	ND < 10	
1,3 - Dichlorobenzene	ND < 10	ND < 10	ND < 10	ND < 10	
1,4 - Dichlorobenzene	ND < 10	ND < 10	ND < 10	ND < 10	
Ethylbenzene	ND < 10	ND < 10	ND < 10	ND < 10	
Toluene	ND < 10	ND < 10	**27.0**	ND < 10	
Xylenes	ND < 20	ND < 20	ND < 20	ND < 20	
Total BTEX	**ND**	**ND**	**27.0**	**ND**	
MTBE	ND < 20	ND < 20	ND < 20	ND < 20	
BTEX+MTBE	**ND**	**ND**	**27.0**	**ND**	
TPH (ppm)	ND < 5	**TBQ < 5**	ND < 5	ND < 5	

ON-SITE WATER SUPPLY WELL ANALYSIS RESULTS

	Sample Collection Date:				
PARAMETER	8/13/97	9/25/97			
Benzene		ND < 1			
Chlorobenzene	No	ND < 1			
1,2 - Dichlorobenzene	Sample	ND < 1			
1,3 - Dichlorobenzene	Collected	ND < 1			
1,4 - Dichlorobenzene	This Day	ND < 1			
Ethylbenzene		ND < 1			
Toluene		ND < 1			
Xylenes		ND < 1			
Total BTEX		**ND**			
MTBE		ND < 1			
BTEX+MTBE		**ND**			
TPH (ppm)		ND < 0.8			

All values reported in ug/L (ppb) unless noted.
ND - Non Detect

TBQ - Trace Below Quantitation Limit

Ref: KOOP.XLS

APPENDIX D

LABORATORY ANALYSIS REPORTS

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: Koop Residence
DATE REPORTED: August 28, 1997
DATE SAMPLED: August 13, 1997

PROJECT CODE: GIKO1860
REF. #: 108,026 - 108,029

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

Chain of custody indicated proper sample preservation.

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

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

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

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

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures

ENDYNE, INC.

Laboratory Services

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

LABORATORY REPORT

EPA METHOD 8020 COMPOUNDS BY EPA METHOD 8260

CLIENT: Griffin International
PROJECT NAME: Koop Residence
REPORT DATE: August 29, 1997
SAMPLER: E. Sandblom
DATE SAMPLED: August 13, 1997
DATE RECEIVED: August 14, 1997

PROJECT CODE: GIKO1861
ANALYSIS DATE: August 22, 1997
STATION: TP-1 10' B.G.
REF.#: 108,030
TIME SAMPLED: 9:45

Parameter	Detection Limit (ug/kg)	Concentration As Received (ug/kg)
Benzene	10	ND[1]
Chlorobenzene	10	ND
1,2-Dichlorobenzene	10	ND
1,3-Dichlorobenzene	10	ND
1,4-Dichlorobenzene	10	ND
Ethylbenzene	10	ND
Toluene	10	ND
Xylene	20	ND
MTBE	20	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 5

ANALYTICAL SURROGATE RECOVERY:

Dibromofluoromethane:	89.%
Toluene-d8:	107.%
4-Bromofluorobenzene:	95.%

PERCENT SOLIDS: 88.%

NOTES:
1 None detected

ENDYNE, INC.

Laboratory Services

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

LABORATORY REPORT

EPA METHOD 8020 COMPOUNDS BY EPA METHOD 8260

CLIENT: Griffin International
PROJECT NAME: Koop Residence
REPORT DATE: August 29, 1997
SAMPLER: E. Sandblom
DATE SAMPLED: August 13, 1997
DATE RECEIVED: August 14, 1997

PROJECT CODE: GIKO1861
ANALYSIS DATE: August 22, 1997
STATION: TP-2 4.5' B.G.
REF.#: 108,031
TIME SAMPLED: 10:42

Parameter	Detection Limit (ug/kg)	Concentration As Received (ug/kg)
Benzene	10	ND[1]
Chlorobenzene	10	ND
1,2-Dichlorobenzene	10	ND
1,3-Dichlorobenzene	10	ND
1,4-Dichlorobenzene	10	ND
Ethylbenzene	10	ND
Toluene	10	ND
Xylene	20	ND
MTBE	20	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

ANALYTICAL SURROGATE RECOVERY:

Dibromofluoromethane:	89.%
Toluene-d8:	107.%
4-Bromofluorobenzene:	86.%

PERCENT SOLIDS: 84.%

NOTES:

1 None detected

ENDYNE, INC.

Laboratory Services

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

LABORATORY REPORT

EPA METHOD 8020 COMPOUNDS BY EPA METHOD 8260

CLIENT: Griffin International
PROJECT NAME: Koop Residence
REPORT DATE: August 29, 1997
SAMPLER: E. Sandblom
DATE SAMPLED: August 13, 1997
DATE RECEIVED: August 14, 1997

PROJECT CODE: GIKO1861
ANALYSIS DATE: August 24, 1997
STATION: TP-3 7' B.G.
REF.#: 108,032
TIME SAMPLED: 11:17

Parameter	Detection Limit (ug/kg)	Concentration As Received (ug/kg)
Benzene	10	ND[1]
Chlorobenzene	10	ND
1,2-Dichlorobenzene	10	ND
1,3-Dichlorobenzene	10	ND
1,4-Dichlorobenzene	10	ND
Ethylbenzene	10	ND
Toluene	10	27.0
Xylene	20	ND
MTBE	20	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

ANALYTICAL SURROGATE RECOVERY:

Dibromofluoromethane:	103.%
Toluene-d8:	107.%
4-Bromofluorobenzene:	87.%

PERCENT SOLIDS: 81.%

NOTES:
1 None detected

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LABORATORY REPORT

EPA METHOD 8020 COMPOUNDS BY EPA METHOD 8260

CLIENT: Griffin International
PROJECT NAME: Koop Residence
REPORT DATE: August 29, 1997
SAMPLER: E. Sandblom
DATE SAMPLED: August 13, 1997
DATE RECEIVED: August 14, 1997

PROJECT CODE: GIKO1861
ANALYSIS DATE: August 25, 1997
STATION: TP-4 9' B.G.
REF.#: 108,033
TIME SAMPLED: 11:39

Parameter	Detection Limit (ug/kg)	Concentration As Received (ug/kg)
Benzene	10	ND[1]
Chlorobenzene	10	ND
1,2-Dichlorobenzene	10	ND
1,3-Dichlorobenzene	10	ND
1,4-Dichlorobenzene	10	ND
Ethylbenzene	10	ND
Toluene	10	ND
Xylene	20	ND
MTBE	20	ND

NUMBER OF UNIDENTIFIED PEAKS FOUND: 0

ANALYTICAL SURROGATE RECOVERY:

Dibromofluoromethane:	106.%
Toluene-d8:	108.%
4-Bromofluorobenzene:	91.%

PERCENT SOLIDS: 86.%

NOTES:
1 None detected

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CHAIN-OF-CUSTODY RECORD

22331

Project Name: KOOP RESIDENCE Site Location: BILLINGTON, VT	Reporting Address: GRIFFIN	Billing Address: GRIFFIN
Endyne Project Number: GIKO 1861	Company: GRIFFIN Contact Name/Phone #: B. SANDBLOM	Sampler Name: B. SANDBLOM Phone #: (802) 865-4288

Lab #	Sample Location	Matrix	GRAB	COMP	Date/Time 8/13/97	Sample Containers No.	Sample Containers Type/Size	Field Results/Remarks	Analysis Required	Sample Preservation	Rush
108030	TP-1 10' B.G.	Soil	X		9:45	2	250 mL-Glass		27, 30	Ice	
108031	TP-2 4.5' B.G.	↓	↓		10:42	2	↓		↓	↓	
108032	TP-3 7' B.G.				11:17	2		One container broke			
108033	TP-4 9' B.G.	↓	↓		11:39	2	↓		↓	↓	

Relinquished by: Signature	Received by: Signature	Date/Time 8/13/97 16:40
Relinquished by: Signature	Received by: Signature	Date/Time 8/14/97 11:20am

New York State Project: Yes ___ No X

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020 - BTEX + MTBE
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD_5	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify): EPA 8100 mod for TPH										

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REPORT OF LABORATORY ANALYSIS

CLIENT: Griffin International
PROJECT NAME: Koop Residence
DATE REPORTED: August 29, 1997
DATE SAMPLED: August 13, 1997

PROJECT CODE: GIKO1861
REF. #: 108,030 - 108,033

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

Chain of custody indicated proper sample preservation.

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

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

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

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

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

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

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LABORATORY REPORT

TOTAL PETROLEUM HYDROCARBONS (TPH) BY MODIFIED EPA METHOD 8100

DATE: August 28, 1997
CLIENT: Griffin International
PROJECT: Koop Residence
PROJECT CODE: GIKO1860
COLLECTED BY: E. Sandbloom
DATE SAMPLED: August 13, 1997
DATE RECEIVED: August 14, 1997

Reference #	Sample ID	Concentration (mg/kg)[1]
108,026	TP-1 10' B.G.; 9:45	ND[2]
108,027	TP-2 4.5' B.G.; 10:42	TBQ[3]
108,028	TP-3 7' B.G.; 11:17	ND
108,029	TP-4 9' B.G.; 11:39	ND

Notes:

1 Method detection limit is 5.0 mg/kg.
2 None detected
3 Trace below quantitation limit

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CHAIN-OF-CUSTODY RECORD

22331

Project Name: KOOP RESIDENCE Site Location: BILLINGTON, VT	Reporting Address: GRIFFIN	Billing Address: GRIFFIN
Endyne Project Number: GIKO 1860	Company: GRIFFIN Contact Name/Phone #: G. SANDBLOM	Sampler Name: G. SANDBLOM Phone #: (802) 865-4288

Lab #	Sample Location	Matrix	GRAB	COMP	Date/Time 8/13/97	Sample Containers No.	Sample Containers Type/Size	Field Results/Remarks	Analysis Required	Sample Preservation	Rush
108026	TP-1 10' B.G.	Soil	X		9:45	2	250 mL-Glass		27, 30	Ice	
108027	TP-2 4.5' B.G.	↓	↓		10:42	2	↓		↓	↓	
108028	TP-3 7' B.G.				11:17	1		One container broke			
108029	TP-4 9' B.G.	↓	↓		11:39	2	↓		↓	↓	

Relinquished by: Signature	Received by: Signature	Date/Time 8/13/97 16:40
Relinquished by: Signature	Received by: Signature	Date/Time 8/14/97 11:20am

New York State Project: Yes ___ No X

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020 - BTEX + MTBE
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD_5	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify): EPA 8100 mod for TPH										

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REPORT OF LABORATORY ANALYSIS

CLIENT: Griffin International
PROJECT NAME: Koop Residence
REPORT DATE: October 3, 1997
DATE SAMPLED: September 25, 1997

PROJECT CODE: GIKR1546
REF.#: 110,421

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

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EPA METHOD 602--PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: Koop Residence
CLIENT PROJ. #: 89741082

DATE RECEIVED: September 26, 1997
REPORT DATE: October 3, 1997
PROJECT CODE: GIKR1546

Ref. #:	110,421				
Site:	SW				
Date Sampled:	9/25/97				
Time Sampled:	1:07				
Sampler:	R. Higgins				
Date Analyzed:	10/1/97				
UIP Count:	0				
Dil. Factor (%):	100				
Surr % Rec. (%):	101				
Parameter	Conc. (ug/L)				
Benzene	<1				
Chlorobenzene	<1				
1,2-Dichlorobenzene	<1				
1,3-Dichlorobenzene	<1				
1,4-Dichlorobenzene	<1				
Ethylbenzene	<1				
Toluene	<1				
Xylenes	<1				
MTBE	<10				

Note: UIP = Unidentified Peaks TBQ = Trace Below Quantitation NI = Not Indicated

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CHAIN-OF-CUSTODY RECORD

24006

Project Name: Koop Residence Site Location: Killington VT	Reporting Address: GRIFFIN	Billing Address:
Endyne Project Number: GIKR1546	Company: Contact Name/Phone #: E Sandblom	Sampler Name: R. Hughes Phone #:

Lab #	Sample Location	Matrix	GRAB	COMP	Date/Time	Sample Containers No.	Sample Containers Type/Size	Field Results/Remarks	Analysis Required	Sample Preservation	Rush
119421	SW	H2O	✓		9/25/97 1:07	2	40ml G	TPH 8100 mod + 602	HCl		

Relinquished by: Signature	Received by: Signature	Date/Time 9-25-97 10:40
Relinquished by: Signature	Received by: Signature	Date/Time

New York State Project: Yes ____ No ✓

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD_5	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify):										