AUG 18 1999

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INITIAL SITE INVESTIGATION REPORT

PARIS RESIDENCE
Manchester Center, Vermont

(VT DEC SITE #98-2386)

9 August 1999

Prepared for:

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Document # 990004ISIdoc

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EXECUTIVE SUMMARY

Marin Environmental, Inc. (**Marin**) has conducted an initial site investigation (ISI) at the Paris Residence, located on McCoey Drive in Manchester Center, Vermont. The ISI was conducted following the discovery of petroleum contamination at the Paris Residence during the removal of one 500-gallon, No.2 fuel oil underground storage tank (UST).

The ISI included the installation of three soil borings/monitoring wells, collection and laboratory testing of soil samples from soil borings, laboratory testing of a water sample representing the on-site water-supply well, and an evaluation of potential threats to nearby sensitive receptors. **Marin's** findings related to this work are summarized as follows:

- Petroleum contamination in soils at the site appears to be limited to approximately ten cubic yards of soil in the immediate vicinity of the former UST. The contamination appears to extend down to the bedrock surface, approximately 15 feet below ground surface (bgs). The only location found to contain evidence of significant petroleum contamination, which was soil boring SB-1, was advanced into the former UST location.
- Napthalene, 1,3,5-trimethyl benzene, and 1,2,4-trimethyl benzene was detected in a soil sample collected from immediately above bedrock at SB-1 at levels above Vermont Department of Environmental Conservation (VT DEC) guidelines for approving thin-spreading of petroleum-contaminated soils. The total volatile organic compound (VOC) concentration in the SB-1 sample was 347 micrograms per kilogram (µg/kg).
- No petroleum compounds were detected in the soil samples collected from the soil borings located down gradient of the former UST location (SB-2 and SB-3).
- No petroleum-related VOCs were identified in a sample collected from the kitchen faucet of the Paris residence, suggesting that the bedrock supply well is not currently impacted by petroleum contaminants.

EXECUTIVE SUMMARY

- Soils encountered during drilling consisted generally of fine to coarse brown sand with gravel and some pebbles and cobbles. Ground water was not observed in any of the soil borings during drilling.
- No photoionization detector (PID) readings above background levels were measured in the basement of the Paris residence.
- The on-site bedrock-supply well may be at risk from the residual soil contamination, due to its close proximity (48 feet) to the former UST location, and the shallow depth to bedrock (15 feet). The entire thickness of soil above the bedrock surface appears to be contaminated and at least seasonally unsaturated, creating the potential for infiltrated precipitation to carry contaminants down into bedrock. On the other hand, contaminant concentrations in a soil sample collected above the bedrock surface were below the U.S Environmental Protection Agency's (EPA's) generic soil screening levels for migration to ground water.

Based on all the data collected at the site to date, **Marin** recommends the following:

1. The risk of impact to the on-site supply well should either be further investigated by collecting and analyzing ground-water samples from the on-site monitoring wells, or reduced by excavating and proper disposal of the estimated ten cubic yards of petroleum-contaminated soils above bedrock. Completion of the first option may involve several site visits before ground water is detected; if ground-water exceedances are observed, the soils should still be removed. The second option, while possibly somewhat more expensive at first, would permit faster site closure, and could prove less expensive over time.
2. The on-site supply well should be re-sampled and tested for the presence of VOCs using EPA Method 8021B.

1.0 INTRODUCTION

Marin Environmental, Inc. (**Marin**) has conducted an initial site investigation (ISI) at the Paris residence, in response to evidence of a petroleum release discovered during the removal of a heating oil underground storage tank (UST). Additional site characterization was requested by the Sites Management Section (SMS) of the Vermont Department of Environmental Conservation (VT DEC) in a letter dated 7 July 1998. This report details the results of the ISI.

The investigation was performed in accordance with **Marin's** ISI Work Plan for the site dated 3 March 1999.

1.1 Site Description and Physical Setting

The Paris Property is a residential property located on McCoey Drive, approximately one mile south of Manchester Center, Vermont (Figure 1). The residence has a concrete-poured basement with an attached garage. The ground surface at the site slopes gently to the southeast toward an intermittent stream located approximately ¼ mile southeast of the site. The site and surrounding properties are served by bedrock water-supply wells. The subject UST was located less than ten feet south of the Paris residence (Figure 2).

1.2 Site History

On 28 May 1998, subsurface petroleum contamination was discovered at the Paris residence during the removal of one 500-gallon, No.2 fuel oil UST. Aaron & Sons (Aaron) of Bennington, Vermont performed the UST removal and environmental assessment. The tank was reported to be in poor condition with evidence of holes and leakage. Photoionization detector (PID) readings from soils within the UST location were as high as 80 parts per million (ppm) at a depth of eight feet below ground surface (bgs). Approximately 0.5 cubic yards of excavated soil were disposed of off-site due to the presence of elevated PID readings. The remaining excavated soil, in addition to approximately three cubic yards of

purchased, clean gravel, was backfilled into the excavation. The limits of the contamination were reported as defined.

Site soils were reported as hardpacked gravel to approximately seven feet bgs, underlain by a clay layer. The thickness of the clay layer was not determined. Ground water was not encountered within the UST excavation to a maximum depth of approximately 8.5 feet bgs.

Potential sensitive receptors at the site identified as a part of the Aaron investigation included the basement of the Paris residence, and the bedrock supply well. No detectable PID readings were observed in the basement of the Paris residence.

Aaron sampled the supply well for analysis of total petroleum hydrocarbons (TPH) by modified EPA Method 8100. Analysis of the sample, performed by Maxmillian Technologies of Pittsfield, Massachusetts, indicated that no TPH was detected above the method detection limit of 0.5 milligrams per liter.

Based on the Aaron site assessment report information, additional site characterization to determine the severity of contamination was requested by the SMS.

1.3 Scope of Work

The following scope of work adopting Method #1 from **Marin's** site work plan was performed to complete the initial site investigation:

- Supervision of the installation of three soil boring/monitoring wells at the former UST location;
- Collection of soil samples from the soil borings and laboratory analysis for volatile petroleum compounds (VOCs) by EPA Method 8021B, and TPH by EPA Method 8015 diesel range organics (DRO);
- Screening of indoor air in Paris residence with a PID to evaluate the possible presence of vapor-phase petroleum compounds in the soil are entering into the building;

- Identification of potential contaminant migration pathways such as surface water and nearby water-supply wells;

- Collection of a water sample for laboratory analysis via EPA Method 8021B from the water-supply well; and

- Preparation of this summary report, which details the work performed, quantitatively assesses risks, provides conclusions, and offers recommendations for further action.

2.0 INVESTIGATIVE PROCEDURES AND RESULTS

2.1 Soil Boring / Monitoring Well Installation

On 30 April 1999, **Marin** supervised the installation of three soil borings/monitoring wells, designated SB-1 through SB-3 at the site as shown on Figure 2. Monitoring well SB-1 is located within the former UST excavation and extends to a depth of approximately 13.5 feet bgs. SB-2 is located approximately 45 feet south of the former UST location, approximately five feet southeast of the water-supply well, and extends to approximately ten feet bgs. SB-3 is located approximately 18 feet southwest of the former UST location and extends to approximately 11.5 feet bgs.

Soils encountered consisted generally of fine to coarse brown sand with gravel and some pebbles and cobbles. Light gray, fine sand and silt was encountered in SB-1 from approximately nine feet bgs to the bottom of the boring. Soil borings were advanced until refusal or apparent bedrock surface was encountered in each borehole. Ground water was not observed in any of the soil borings during drilling activities.

Soil boring/monitoring wells were installed by vibratory methods, using Adams Engineering of Underhill, Vermont, under the supervision of **Marin** personnel. The soil borings were advanced using a Mini Rig—a small drilling rig mounted on an F-350 truck.

Monitoring wells were constructed with 1.5 inch-diameter polyvinyl chloride (PVC) riser with ten foot-lengths of 0.010-inch slots at the bottom of each well. Sections of solid

PVC were added to bring the tops of the well casings to ground surface (except SB-2 where no riser was used). Clean silica #1 filter sand was placed in the borehole annulus around each well to one foot above the slotted interval (except SB-2). A granular bentonite seal, approximately one-foot thick, was set above the sand pack and the remainder of the annular space was backfilled with native material. Each completed monitoring well was protected by a road box pushed into place. Each well casing was topped with a watertight compression cap. Monitoring-well construction details are included on the soil-boring and well-construction logs in Appendix B.

Monitoring wells were not developed due to insufficient water quantities within the wells.

2.2 Soil Screening Results

Soil samples were taken continuously using a five-foot-long sampler lined with a polyethylene bag and were descriptively logged and screened for the possible presence of VOCs with a Photovac Model 2020 PID equipped with a 10.6 eV lamp. The PID was calibrated on site prior to screening with 100 ppm isobutylene span gas, referenced to benzene. Soil samples were placed into a Ziploc bag which was sealed and agitated. The PID probe was inserted into the bag headspace and the highest reading was recorded. PID readings ranging from 192 ppm (at nine feet bgs) to over 2,000 ppm (at 2, 7, 11, and 14 feet bgs) were recorded in SB-1. In the other two soil borings/monitoring wells, the highest PID reading of 8.8 ppm was recorded in SB-3 at approximately 11.5 feet bgs.

2.3 Sampling and Analysis

Discrete soil samples were collected for laboratory analysis at depths of 14 feet, 11 feet, and 11.5 feet bgs in SB-1, SB-2 and SB-3, respectively. Ground-water samples were not collected because no ground water had been observed during well installation. One water-supply well sample was collected from the kitchen faucet located in the Paris residence. Analytical results are included in Table 1, and on the Contaminant-Distribution Map on Figure 3. Laboratory analytical reports are included in Appendix C.

Total petroleum hydrocarbons was detected in the SB-1 soil sample at a concentration of 199 milligrams per kilogram (mg/kg). Total petroleum hydrocarbons is not regulated in soils in Vermont, but the VT DEC has established a guideline level of 1,000 mg/kg for approving thin-spresading of petroleum-contaminated soil stockpile. Several VOCs were detected in the SB-1 soil sample as follows: total xylenes - 39.0 µg/kg; 1,3,5-trimethyl benzene - 53.6 µg/kg; 1,2,4-trimethyl benzene - 195 µg/kg; and napthalene - 59.4 µg/kg.

No VOCs were detected in the water-supply well sample.

A duplicate soil sample was collected from soil boring SB-3 to ensure that adequate quality assurance/quality control (QA/QC) standards were maintained. All field procedures were conducted in accordance with Marin standard protocols.

The soil and water samples were submitted to Endyne, Inc. (Williston, Vermont). Soil samples were tested by EPA Methods 8021B for VOCs and 8015 DRO for TPH. The water sample was tested by EPA Method 8021B for VOCs.

3.0 SENSITIVE RECEPTOR SURVEY AND RISK ASSESSMENT

On 30 April 1999, Marin conducted a survey to identify potential sensitive receptors in the vicinity of the Paris Residence, and assessed the risks posed by the subsurface contamination to these receptors. The findings of this work are summarized as follows:

- The Paris residence basement was screened with a PID to evaluate the possible presence of petroleum compounds entering the structure. The residence is located less than ten feet north of the former UST location and has a concrete-poured basement. No structural cracks were observed in the foundation or walls. No PID readings above background levels were detected.

- A pond is located approximately 300 feet southeast of the former UST location site. Based on its crossgradient location relative to the site and its extended distance, the pond is not considered likely to be impacted.

- Surface soils at the former UST location appear to contain residual contamination as evidenced by elevated PID readings from the SB-1 soil boring which could pose a direct contact risk.

- The on-site water supply is located approximately 48 feet south of the former UST, in the cross-gradient direction. No petroleum compounds were detected in a tap-water sample collected from this well.

- A water-supply well was observed on adjacent property to the south approximately 165 feet from former UST location. Given that no petroleum compounds were detected in the on-site water-supply well, the observed well is not considered likely to be impacted.

- The State of Vermont has not established regulatory standards for soils. The VT DEC has, however, established guideline levels for TPH and VOCs below which it will approve thin-spreading of petroleum-contaminated soils. Contaminant concentration in the SB-1 soil sample were below guideline levels for TPH, but exceeded the guideline levels for 1,3,5-trimethyl benzene (5 µg/kg), 1,2,4-trimethyl benzene (4 µg/kg), and napthalene (20 µg/kg).

- U.S. EPA Region III has established risk-based concentration (RBC) soil guidelines for several exposure scenarios, including direct contact risks in residential areas. Although the soil samples were collected from deeper depths, they are considered likely to represent the most-contaminated soils. None of contaminants concentrations detected at the site exceeded the RBC levels for residential areas.

- U.S EPA has also established generic soil screening levels (SSLs) to evaluate the potential for soil contaminants to migrate to ground water. None of the petroleum contaminants detected in the on-site soils exceeded the EPA SSLs using a dilution attenuation factor of 1. The SSLs have not been established for 1,3,5-trimethyl benzene, or 1,2,4-trimethyl benzene.

4.0 CONCLUSIONS

Based on the results of the site investigation described above, **Marin** concludes the following:

- Petroleum contamination in soils at the site appears to be limited to approximately ten cubic yards of soil in the immediate vicinity of the former UST. The contamination appears to extend down to the bedrock surface, approximately 15 feet below ground surface (bgs). The only location found to contain evidence of significant petroleum contamination, which was soil boring SB-1, was advanced into the former UST location.

- Napthalene, 1,3,5-trimethyl benzene, and 1,2,4-trimethyl benzene was detected in a soil sample collected from immediately above bedrock at SB-1 at levels above Vermont Department of Environmental Conservation (VT DEC) guidelines for approving thin-spreading of petroleum-contaminated soils. The total volatile organic compound (VOC) concentration in the SB-1 sample was 347 micrograms per kilogram (µg/kg).

- No petroleum compounds were detected in the soil samples collected from the soil borings located down gradient of the former UST location (SB-2 and SB-3).

- No petroleum-related VOCs were identified in a sample collected from the kitchen faucet of the Paris residence, suggesting that the bedrock supply well is not currently impacted by petroleum contaminants.

- Soils encountered during drilling consisted generally of fine to coarse brown sand with gravel and some pebbles and cobbles. Ground water was not observed in any of the soil borings during drilling.

- No photoionization detector (PID) readings above background levels were measured in the basement of the Paris residence.

- The on-site bedrock-supply well may be at risk from the residual soil contamination, due to its close proximity (48 feet) to the former UST location, and the shallow depth to bedrock (15 feet). The entire thickness of soil above the bedrock surface appears to be contaminated and at least seasonally unsaturated, creating the potential for infiltrated precipitation to carry contaminants down into bedrock. On the other hand, contaminant concentrations in a soil sample collected above the bedrock surface were below the U.S Environmental Protection Agency's (EPA's) generic soil screening levels for migration to ground water.

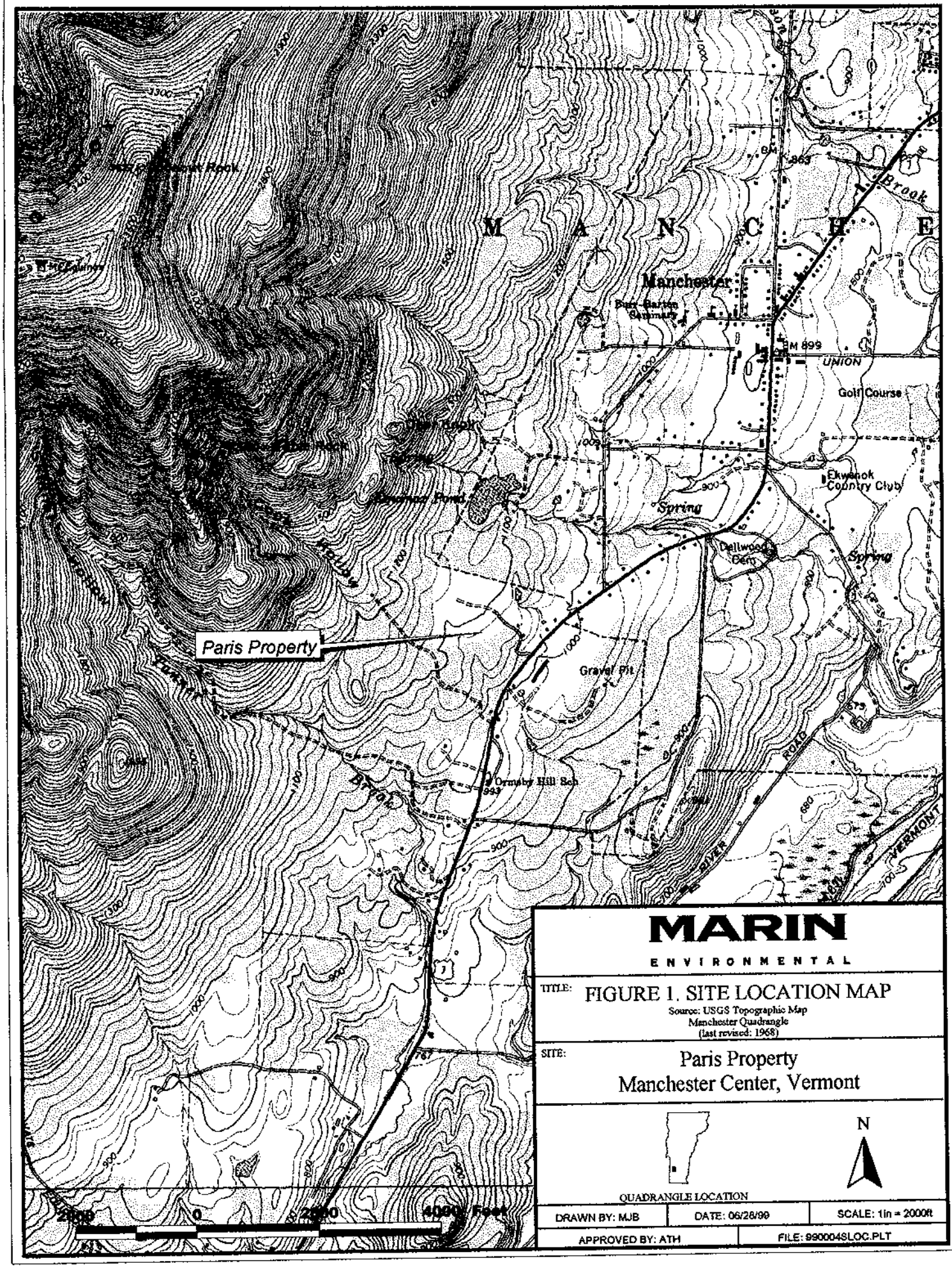
5.0 RECOMMENDATIONS

On the basis of the results of this investigation and the conclusions stated above, **Marin** recommends the following:

1. The risk of impact to the on-site supply well should either be further investigated by collecting and analyzing ground-water samples from the on-site monitoring wells, or reduced by excavating and proper disposal of the estimated ten cubic yards of petroleum-contaminated soils above bedrock. Completion of the first option may involve several site visits before ground water is detected; if ground-water exceedances are observed, the soils should still be removed. The second option, while possibly somewhat more expensive at first, would permit faster site closure, and could prove less expensive over time.
2. The on-site supply well should be re-sampled and tested for the presence of VOCs using EPA Method 8021B.

APPENDIX A

Figures and Tables



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TITLE: FIGURE 1. SITE LOCATION MAP

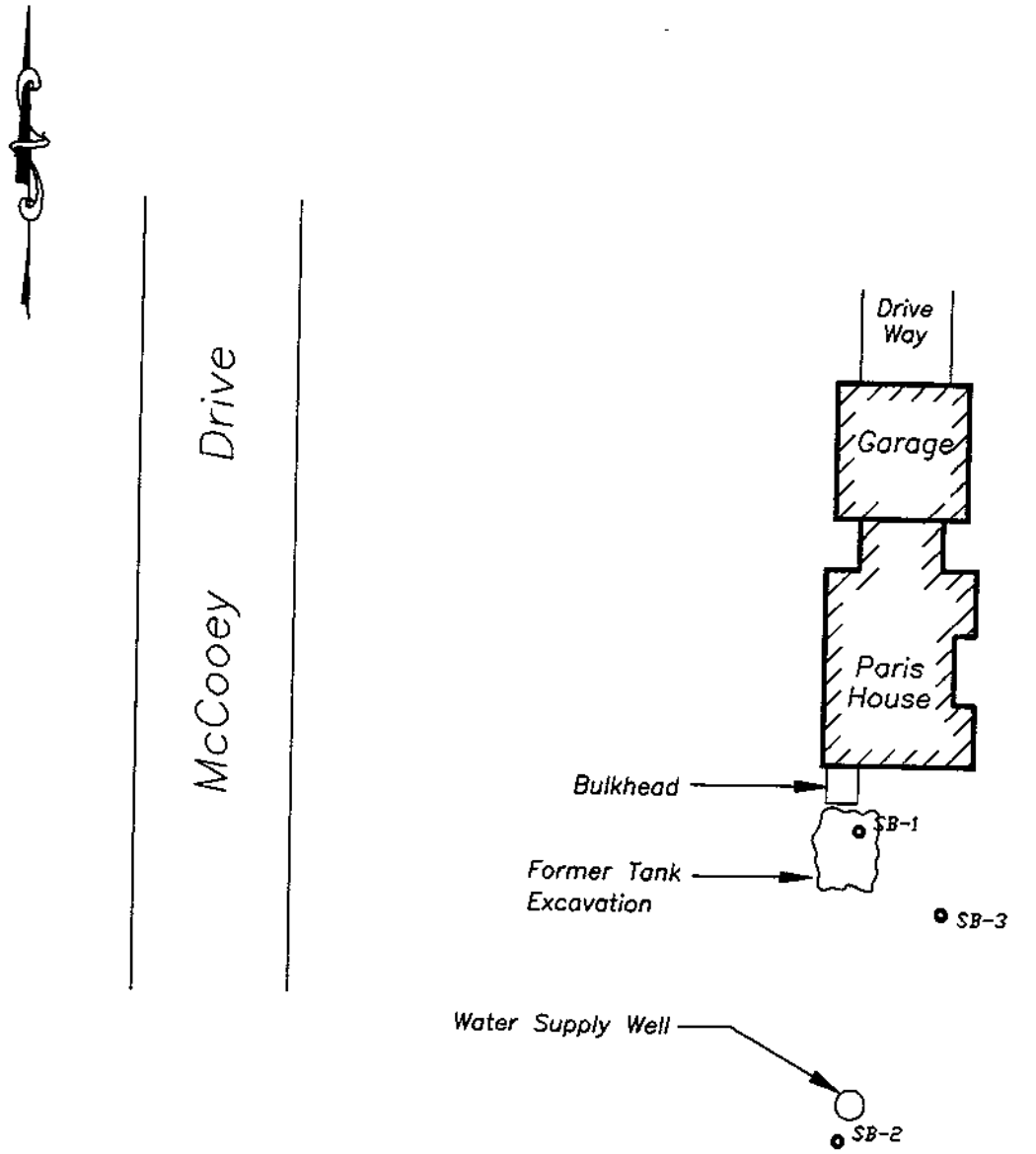
Source: USGS Topographic Map
Manchester Quadrangle
(last revised: 1968)

SITE: Paris Property
Manchester Center, Vermont

N

QUADRANGLE LOCATION

DRAWN BY: MJB	DATE: 06/28/99	SCALE: 1in = 2000ft
APPROVED BY: ATH		FILE: 990004SLOC.PLT



ALL LOCATIONS ARE APPROXIMATE

LEGEND

SB-1 SOIL BORING LOCATION

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FIGURE 2.

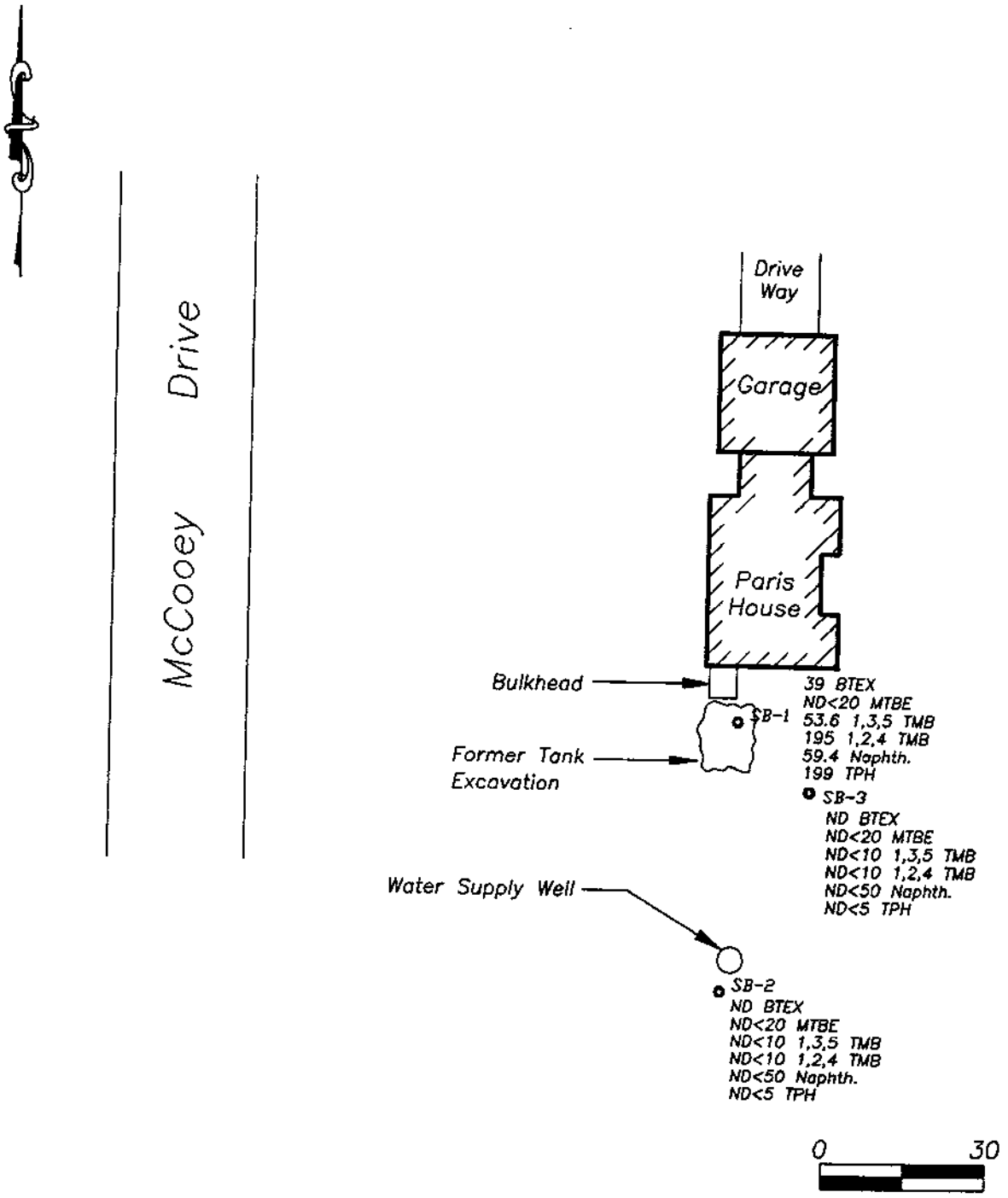
SITE MAP

With Monitoring Well Locations

Paris Residence

Manchester, VT

DRAWN BY: MJB	DATE: 06/22/99	SCALE: 1"= 30'
APPROVED BY: ATH		FILE No.: 990004sp



ALL LOCATIONS ARE APPROXIMATE

LEGEND

SB-1	SOIL BORING LOCATION
ND<10 1,3,5TMB OR 1,2,4TMB	TRIMETHYL BENZENE CONCENTRATION, µg/kg
ND<50 NAPHTH.	NAPHTHALENE CONCENTRATION, µg/kg
39 BTEX	TOTAL BTEX CONCENTRATION, µg/kg
ND<20 MTBE	MTBE CONCENTRATON, µg/kg
199 TPH	TOTAL PETROLEUM HYDROCARBON CONCEN., µg/kg

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FIGURE 3.

CONTAMINANT DISTRIBUTION MAP

Monitoring Date: 21 May 1999

Paris Residence

Manchester, VT

DRAWN BY: MJB	DATE: 06/22/99	SCALE: 1"= 30'	
APPROVED BY: ATH	FILE No.: 990004sp		

TABLE 1
LABORATORY ANALYTICAL RESULTS
(Petroleum Hydrocarbons)

Paris Residence

Manchester Center, Vermont

Collection Date: 30 April 1999

Sample Location	Sample Depth (feet bgs)	MTBE	Benzene	Toluene	Ethylbenzene	Total Xylenes	1,3,5 TMB	1,2,4 TMB	Napthalene	Total VOCs	TPH
SB-1	14	ND<20.0	ND<10.0	ND<10.0	ND<10.0	39	53.6	195	59.4	347.0	199
SB-2	11	ND<20.0	ND<10.0	ND<10.0	ND<10.0	ND<20.0	ND<10.0	ND<10.0	ND<50.0	ND	ND<5.00
SB-3	11.5	ND<20.0	ND<10.0	ND<10.0	ND<10.0	ND<20.0	ND<10.0	ND<10.0	ND<50.0	ND	ND<5.00
Supply Well	--	ND<2.0	ND<1.0	ND<1.0	ND<1.0	ND<2.0	ND<1.0	ND<1.0	ND<5.00	ND	NA
Duplicate (SB-3)	--	ND<20.0	ND<1.0	ND<1.0	ND<1.0	ND<20.0	ND<10.0	ND<10.0	ND<50.0	ND<1.0	ND<5.00
* VT DEC Guideline Level	--	*40*	*5*	*1,000*	*700*	*10,000*	*4*	*5*	*20*	--	*1,000*
EPA RBC-Residential	--	--	*22000*	*16,000,000*	*7,800,000*	*160,000,000*	*3,900,000*	*3,900,000*	*1,600,000*	--	--
EPA Soil Screening Level	--	--	*2*	*600*	*700*	*29,000*	--	--	*4,000*	--	--

Notes:
Concentrations reported in µg/kg, except TPH which is mg/kg for soil samples
Concentrations reported in µg/L for Supply Well water sample
VOCs = volatile organic compounds
ND = none detected above indicated detection limit
NA = not analyzed for indicated parameter
* Guideline levels are from VT DEC Waste Management Division guidelines for approving offsite thin-spreading of petroleum-contaminated soils.
Shaded areas indicate exceedances of VT DEC guideline levels.

APPENDIX B

Boring Logs /Monitoring Well Construction Diagrams

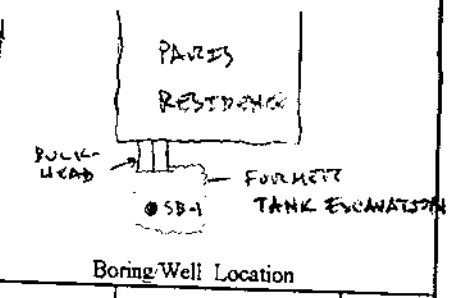
Marin Environmental, Inc.

SITE NAME: PARIS RESIDENCE
LOCATION: MANCHESTER, VT
JOB NO. 99004
DATE: 4/30/99

BORING NO: SB-1
TOTAL DEPTH: 14.5'
DEPTH TO WATER: NA

DRILLING METHOD: VIBRATORY
BORING DIAMETER: 4 3/4"

FIELD SUPERVISOR: A. HOAK
CONTRACTOR: ADAMS ENG.
DRILLERS: GERRY ADAMS



Boring/Well Location

Depth	SN	BLOW COUNTS PER 6" (0 / 6 / 12 / 18 / 24)	Rec.	SAMPLE DESCRIPTION/COMMENTS	WELL DETAIL	PID (ppm)
				DARK BROWN TOPSOIL AND DUFF		
				MEDIUM TO FINE BROWN SAND WITH SOME SMALL ANGULAR PEBBLES AND GRAVEL; WEATHERED TILL.		>2000
5'			28"			1768
				COURSE BROWN SAND AND GRAVEL, MOIST		
				LITE GREY FINE SAND AND SILT, SOME SMALL ANGULAR PEBBLES AND GRAVEL, TILL		>2000
10'			32"			192
				LITE GREY FINE SAND AND SILT, VERY DENSE, TILL, MOIST, PETROLEUM ODOR AFTER BAGGING SAMPLE		1682
			24"			>2000
15'						1840
				WELL INSTALLED - NO OBSERVED GROUNDWATER; SOIL SAMPLE COLLECTED @ 14'		>2000
20'						
25'						
30'						
40'						

AND	33-50%
OME	20-33%
TTLE	10-20%
TRACE	0-10%

BLOW COUNT	
0 - 4	VERY LOSE
4 - 10	LOOSE
10 - 30	MEDIUM
30 - 50	DENSE
> 50	VERY DENSE

MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	1/2" PVC	10'
SLOT SIZE	.010	
RISER	1 1/2" PVC	3 1/2'
GRADED SAND	13 1/2 - 2 BGS	
BENTONITE PELLETS	2-1' BGS	
BENTONITE GROUT		

BORING2.XLS

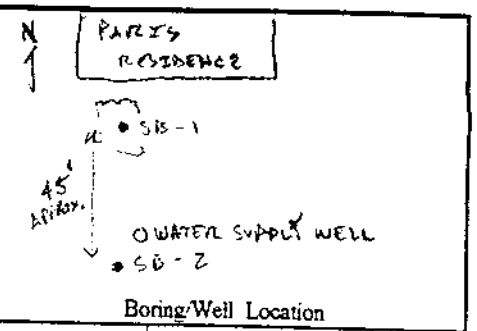
Marin Environmental, Inc.

SITE NAME: PARIS RESIDENCE
LOCATION: MANCHESTER, VT
JOB NO. 990004
DATE: 4/30/99

BORING NO: SB-2
TOTAL DEPTH: 11.7'
DEPTH TO WATER: NA

DRILLING METHOD: VIBRATORY
BORING DIAMETER: 4 3/4"

FIELD SUPERVISOR: A. Hook
CONTRACTOR: ADAMS ENG.
DRILLERS: GERRY ADAMS



Boring/Well Location

Depth	SN	BLOW COUNTS PER 6" (0-6 / 6-12 / 12-18 / 18-24)	Rec.	SAMPLE DESCRIPTION/COMMENTS	WELL DETAIL	PID (ppm)
				DARK BROWN TOPSOIL & DUFF		1.1
5'			20"	MEDIUM TO FINE BROWN SAND WITH SOME ANGULAR PEBBLES AND COBBLES OF QUARTZITE.		0.0
				MEDIUM TO FINE LITE BROWN SAND WITH ANGULAR PEBBLES AND COBBLES OF QUARTZITE MOIST AND DENSE		0.0
10'			24"			0.0
						0.0
			18"	LITE BROWN MEDIUM TO FINE SAND, DENSE TILL, MOIST; REFUSAL AT 11.7 FT		0.0
15'						
				WELL INSTALLED, NO OBSERVED GROUNDWATER; SOIL SAMPLE COLLECTED AT 11' BGS, PRESS CAP FELL OFF BOTTOM OF WELL DURING INSTALLATION, UNABLE TO ADVANCE WELL TO DEPTH OF BORING DUE TO PROTRUDING COBBLES IN ANNULAS		
20'						
25'						
30'						
35'						
40'						

AND	33-50%
SOME	20-33%
LITTLE	10-20%
TRACE	0-10%

BLOW COUNT	
0 - 4	VERY LOSE
4 - 10	LOOSE
10 - 30	MEDIUM
30 - 50	DENSE
> 50	VERY DENSE

MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	1½" PVC	10'
SLOT SIZE	0.010	
RISER		
GRADED SAND	10' - 2' BGS	
BENTONITE PELLETS	2 - 1' BGS	
BENTONITE GROUT		

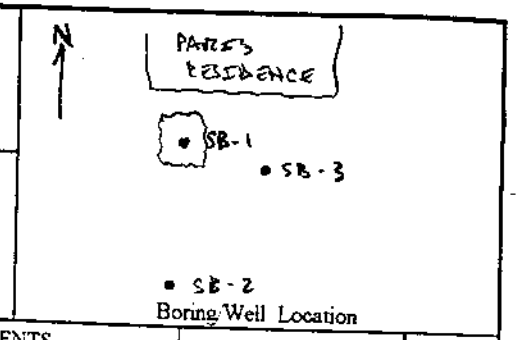
Marin Environmental, Inc.

SITE NAME: PARIS RESIDENCE
LOCATION: MANCHESTER, VT
JOB NO. 99004
DATE: 4/30/99

BORING NO: SB-3
TOTAL DEPTH: 11.5'
DEPTH TO WATER: NA

DRILLING METHOD: VIBRATORY
BORING DIAMETER: 4 3/4"

FIELD SUPERVISOR: A. HOAK
CONTRACTOR: ADAMS ENG.
DRILLERS: GERRY ADAMS



Depth	SN	BLOW COUNTS PER 6" (0–6 / 6–12 / 12–18 / 18–24)	Rec.	SAMPLE DESCRIPTION/COMMENTS	WELL DETAIL	PID (ppm)
				DARK BROWN TOPSOIL & DUFF		0.0
5'			24"	MEDIUM TO FINE BROWN SAND AND LITTLE ANGULAR PEBBLES AND TRACE COBBLES, WEATHERED TILL		0.0
				MEDIUM TO FINE BROWN SAND AND ANGULAR PEBBLES AND FEW LARGE QUARTZITE COBBLES, MOIST		0.0
10'			20"	SAME MATERIAL TO 11.5' REFUSAL		0.0
				WELL INSTALLED, NO OBSERVED GROUNDWATER; SOIL SAMPLE COLLECTED AT 11.5'		8.8
15'						
20'						
25'						
30'						
35'						
40'						

AND	33-50%
OME	20-33%
TTLE	10-20%
TRACE	0-10%

BLOW COUNT	
0 - 4	VERY LOSE
4 - 10	LOOSE
10 - 30	MEDIUM
30 - 50	DENSE
> 50	VERY DENSE

MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	1½" PVC	10'
SLOT SIZE	0.010	
RISER	1½ PVC	1½'
GRADED SAND	11.5 - 1.5' BGS	
BENTONITE PELLETS	1.5 - 0.5' BGS	
BENTONITE GROUT		

BORING2.XLS

APPENDIX C

Laboratory Report Forms

ENDYNE, INC.

Laboratory Services

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

LABORATORY REPORT

CLIENT: Marin Environmental
PROJECT: Paris Residence
REPORT DATE: May 25, 1999

ORDER ID: 2200
DATE RECEIVED: May 3, 1999

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Different groups of analyses may be reported under separate cover.

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

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

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

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

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures

ENDYNE, INC.

Laboratory Services

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

LABORATORY REPORT

CLIENT: Marin Environmental
PROJECT: Paris Residence
REPORT DATE: May 25, 1999

ORDER ID: 2200
DATE RECEIVED: May 3, 1999
SAMPLER: AH
ANALYST: 820

Ref. Number: 137834 | Site: SB-1 | Date Sampled: April 30, 1999 | Time: 12:00 PM

Parameter	Result	Unit	Method	Analysis Date
TPH 8015 DRO	199.	mg/Kg	SW 8015B	5/21/99

Ref. Number: 137835 | Site: SB-2 | Date Sampled: April 30, 1999 | Time: 2:00 PM

Parameter	Result	Unit	Method	Analysis Date
TPH 8015 DRO	< 5.00	mg/Kg	SW 8015B	5/21/99

Ref. Number: 137836 | Site: SB-3 | Date Sampled: April 30, 1999 | Time: 3:30 PM

Parameter	Result	Unit	Method	Analysis Date
TPH 8015 DRO	< 5.00	mg/Kg	SW 8015B	5/21/99

Ref. Number: 137837 | Site: Duplicate | Date Sampled: April 30, 1999 | Time: NI

Parameter	Result	Unit	Method	Analysis Date
TPH 8015 DRO	< 5.00	mg/Kg	SW 8015B	5/21/99

ENDYNE, INC.

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

2 of 2

CHAIN-OF-CUSTODY RECORD

Project Name: PARIS RESIDENCE Site Location: MANCHESTER, VT	Reporting Address: MARIN	Billing Address: MARIN
Endyne Project Number: 2200	Company: MARIN Contact Name/Phone #: A. HOAK 655-0011	Sampler Name: A. HOAK Phone #: 655-0011

Lab #	Sample Location	Matrix	GRAB	COMP	Date/Time	Sample Containers No.	Sample Containers Type/Size	Field Results/Remarks	Analysis Required	Sample Preservation	Rush
137835	SB-1 14'	SOIL	X		4/30/99 1200	2	40 ml		8021 B 8015 DRO	COLD	
137836	SB-2 11'	↓	↓		1400	↓	↓		↓	↓	
137837	SB-3 11.5'	↓	↓		1530	↓	↓		↓	↓	
137838	DUPLICATE	↓	↓		—	↓	↓		↓	↓	
	SUPPLY WELL	H_2O	↓		1600	↓	↓		8021 B	↓	

Relinquished by: Signature	[signature]	Received by: Signature	Allison Flowers
Date/Time	5/3/99 10:45		
Relinquished by: Signature		Received by: Signature	
Date/Time			

New York State Project: Yes ____ No ____

Requested Analyses

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

ENDYNE, INC.

Laboratory Services

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FAX 879-7103

LABORATORY REPORT

CLIENT: Marin Environmental
PROJECT: Paris Residence
REPORT DATE: May 13, 1999

ORDER ID: 2200
DATE RECEIVED: May 3, 1999

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Different groups of analyses may be reported under separate cover.

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

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

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

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

Reviewed by,

for

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

CLIENT: Marin Environmental
PROJECT: Paris Residence
REPORT DATE: May 13, 1999

ORDER ID: 2200
DATE RECEIVED: May 3, 1999
SAMPLER: AH
ANALYST: 725

Ref. Number: 137834 | Site: SB-1 | Date Sampled: April 30, 1999 | Time: 12:00 PM

Parameter	Result	Unit	Method	Analysis Date
MTBE	< 20.0	ug/kg, dry	SW 8021B	5/11/99
Benzene	< 10.0	ug/kg, dry	SW 8021B	5/11/99
Toluene	< 10.0	ug/kg, dry	SW 8021B	5/11/99
Ethylbenzene	< 10.0	ug/kg, dry	SW 8021B	5/11/99
Xylenes, Total	39.0	ug/kg, dry	SW 8021B	5/11/99
1,3,5 Trimethyl Benzene	53.6	ug/kg, dry	SW 8021B	5/11/99
1,2,4 Trimethyl Benzene	195.	ug/kg, dry	SW 8021B	5/11/99
Naphthalene	59.4	ug/kg, dry	SW 8021B	5/11/99
UIP's	> 10.		SW 8021B	5/11/99
Percent Solid	94.	%	SW 8021B	5/11/99
Surrogate 1	100.%	%	SW 8021B	5/11/99

Ref. Number: 137835 | Site: SB-2 | Date Sampled: April 30, 1999 | Time: 2:00 PM

Parameter	Result	Unit	Method	Analysis Date
MTBE	< 20.0	ug/kg, dry	SW 8021B	5/11/99
Benzene	< 10.0	ug/kg, dry	SW 8021B	5/11/99
Toluene	< 10.0	ug/kg, dry	SW 8021B	5/11/99
Ethylbenzene	< 10.0	ug/kg, dry	SW 8021B	5/11/99
Xylenes, Total	< 20.0	ug/kg, dry	SW 8021B	5/11/99
1,3,5 Trimethyl Benzene	< 10.0	ug/kg, dry	SW 8021B	5/11/99
1,2,4 Trimethyl Benzene	< 10.0	ug/kg, dry	SW 8021B	5/11/99
Naphthalene	< 50.0	ug/kg, dry	SW 8021B	5/11/99
UIP's	0.		SW 8021B	5/11/99
Percent Solid	91.	%	SW 8021B	5/11/99
Surrogate 1	102.%	%	SW 8021B	5/11/99

ENDYNE, INC.

Laboratory Services

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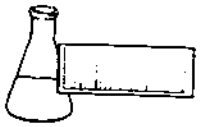
Ref. Number: 137836 Site: SB-3 Date Sampled: April 30, 1999 Time: 3:30 PM

Parameter	Result	Unit	Method	Analysis Date
MTBE	< 20.0	ug/kg, dry	SW 8021B	5/12/99
Benzene	< 10.0	ug/kg, dry	SW 8021B	5/12/99
Toluene	< 10.0	ug/kg, dry	SW 8021B	5/12/99
Ethylbenzene	< 10.0	ug/kg, dry	SW 8021B	5/12/99
Xylenes, Total	< 20.0	ug/kg, dry	SW 8021B	5/12/99
1,3,5 Trimethyl Benzene	< 10.0	ug/kg, dry	SW 8021B	5/12/99
1,2,4 Trimethyl Benzene	< 10.0	ug/kg, dry	SW 8021B	5/12/99
Naphthalene	< 50.0	ug/kg, dry	SW 8021B	5/12/99
UIP's	0.		SW 8021B	5/12/99
Percent Solid	92.	%	SW 8021B	5/12/99
Surrogate 1	102.%	%	SW 8021B	5/12/99

Ref. Number: 137837 Site: Duplicate Date Sampled: April 30, 1999 Time: NI

Parameter	Result	Unit	Method	Analysis Date
MTBE	< 20.0	ug/kg, dry	SW 8021B	5/11/99
Benzene	< 10.0	ug/kg, dry	SW 8021B	5/11/99
Toluene	< 10.0	ug/kg, dry	SW 8021B	5/11/99
Ethylbenzene	< 10.0	ug/kg, dry	SW 8021B	5/11/99
Xylenes, Total	< 20.0	ug/kg, dry	SW 8021B	5/11/99
1,3,5 Trimethyl Benzene	< 10.0	ug/kg, dry	SW 8021B	5/11/99
1,2,4 Trimethyl Benzene	< 10.0	ug/kg, dry	SW 8021B	5/11/99
Naphthalene	< 50.0	ug/kg, dry	SW 8021B	5/11/99
UIP's	0.		SW 8021B	5/11/99
Percent Solid	93.	%	SW 8021B	5/11/99
Surrogate 1	103.%	%	SW 8021B	5/11/99



ENDYNE, INC.

Laboratory Services

32 James Brown Drive
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(802) 879-4333
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Ref. Number: 137838 Site: Supply Well Date Sampled: April 30, 1999 Time: 4:00 PM

Parameter	Result	Unit	Method	Analysis Date
MTBE	< 2.0	ug/L	SW 8021B	5/11/99
Benzene	< 1.0	ug/L	SW 8021B	5/11/99
Toluene	< 1.0	ug/L	SW 8021B	5/11/99
Ethylbenzene	< 1.0	ug/L	SW 8021B	5/11/99
Xylenes, Total	< 2.0	ug/L	SW 8021B	5/11/99
1,3,5 Trimethyl Benzene	< 1.0	ug/L	SW 8021B	5/11/99
1,2,4 Trimethyl Benzene	< 1.0	ug/L	SW 8021B	5/11/99
Naphthalene	< 5.0	ug/L	SW 8021B	5/11/99
UIP's	0.		SW 8021B	5/11/99
Surrogate 1	102.%	%	SW 8021B	5/11/99