GRIFFIN INTERNATIONAL INC

December 20, 1993

Mr. E. Matt Germon
State of Vermont
Department of Environmental Conservation
Hazardous Materials Management Division
103 South Main Street/West Building
Waterbury, Vermont 05671-0404

RE: Report on the Investigation and Remediation at Proctor Junior-Senior High School (VTDEC Site #93-1373)

Dear Mr. Germon:

Enclosed please find the initial comprehensive report on the investigation and remediation of subsurface petroleum contamination at Proctor Junior-Senior High School.

If you have any questions about the contents of this report, please do not hesitate to call.

Sincerely,

Kevin McGraw

Kevin McGraw
Hydrogeologist

cc: Mr. James Cioffi, Superintendent of Schools, Rutland Central Supervisory Union

Enc.

2B Dorset Lane • Williston, VT 05495 • 802-879-7708

INITIAL REPORT ON THE INVESTIGATION AND REMEDIATION OF SUBSURFACE PETROLEUM CONTAMINATION

at

PROCTOR HIGH SCHOOL

PARK STREET
PROCTOR, VERMONT

(VTDEC Site # 93-1373)

DECEMBER 1993

Prepared by:

GRIFFIN INTERNATIONAL, INC.
2B Dorset Lane
Williston, Vermont 05495
(802) 879-7708

Griffin Project #: 7934399

TABLE OF CONTENTS

APPENDICES

I. INTRODUCTION

This report summarizes the investigation of subsurface petroleum contamination at Proctor Junior/Senior High School in Proctor, Vermont. In addition, this report describes the installation and operation of an automated product recovery system at the site. Data obtained during weekly site visits are presented as well as the results of groundwater sampling which was performed in October 1993. This work has been conducted by Griffin International, Inc. (Griffin) for the Rutland Central Supervisory Union.

II. SITE BACKGROUND

A. Site Description

Proctor High School is located on Park Street, just east of Route 3 in Proctor, Vermont (see Site Location Map, Appendix A). The high school is located adjacent to the flood plain of Otter Creek. The Surficial Geologic Map of Vermont maps the surrounding area as glaciolacustrine littoral sediments consisting of well sorted sands lacking pebbles or gravel. The adjacent flood plain is mapped as lake bottom silt, silty clay and clay. Actual subsurface materials consist of homogeneous fine to medium sand.

The immediate area surrounding the high school is entirely residential. Surrounding residences and the high school itself are served by the Proctor Municipal Water Supply, which draws water from a mountain spring near Mt. Carmel, located approximately eight miles to the north.

B. Site History

Proctor High School is heated using #2 Fuel Oil which is stored in a 10,000-gallon underground storage tank (UST) on-site. This tank is located near the northeast corner of the building (see Site Map, Appendix A). In April 1993, a break was discovered in the PVC piping used as feed and return product lines for the UST system. The piping was replaced and the tank was pressure tested at 5 psi for 24 hours. The test indicated that the tank was tight.

On April 21, 1993, Marc Coleman of the Vermont Department of Environmental Conservation (VTDEC) was present at the site to investigate the leak. A test pit was dug ten feet away from the UST, in the presumed downgradient direction, using a backhoe. Soils from this pit were screened for volatile organic compounds (VOCs) using an HNU photoionization device (PID). PID readings increased with depth from 10 parts per million (ppm) at 5 feet below grade to 130 ppm at 14 feet below grade. Two inches of free product were observed floating on the exposed water table at approximately 14.5 feet below grade. An 8-inch culvert well and a 2-inch PVC monitoring well (designated MW-1) were installed in the excavated test pit.

In response to the petroleum contamination detected in the test pit, the Rutland Central Supervisory Union received a letter dated May 6, 1993 from the Sites Management Section (SMS) of the VTDEC requesting further investigation. The union contracted Griffin to perform this investigation which included the installation of two monitoring wells (MW-2 and MW-3). The results of this investigation are presented in this report.

During the course of the investigation, more than two feet of floating product was measured in the 8-inch culvert well and in MW-1. On August 5, 1993, a Griffin technician visited with high school personnel to instruct them on the proper method for bailing MW-1 and the culvert well. Bailed product was placed in the product recovery drum which was transported to the site that day.

Due to the significant quantity of product in the culvert well and MW-1, the SMS requested a proposal to install a product recovery system at the site as an emergency response action. On August 17, 1993, Griffin submitted a proposal for this installation. Manual bailing continued at the site until the installation of the automated product recovery system at the end of August. A description of the installation and operation of this system is presented in this report.

After installation of the product recovery system, two additional monitoring wells were installed (MW-4 and MW-5) to further define the degree and extent of subsurface contamination at the site. This additional investigation was conducted in October 1993; results are presented in this report.

III. SUBSURFACE INVESTIGATION

On August 3, 1993, two monitoring wells were installed using a hollow-stem auger drill rig. These wells, designated MW-2 and MW-3, were installed to help define the degree and extent of petroleum contamination in the vicinity of the 10,000-gallon UST. Soil samples were obtained in each boring at five-foot intervals using a split-spoon. These soil samples were screened for VOCs using a MicroTIP HL-2000 PID. The locations of the new wells are shown on the Site Map in Appendix A.

In the borings for both monitoring wells, homogeneous fine sands were predominant from ground surface to 20 feet below grade. In the boring for MW-3, a four-inch layer of wet silt was encountered at 11.5 feet below grade. Groundwater was encountered at approximately 14 feet below grade in both borings. Contamination was not detected in either boring with the use of a PID; however, a slight petroleum odor was noted in the 14' to 16' split-spoon sample of the MW-3 boring. The screened portion of both wells was set from 10 to 20 feet below grade.

MW-2 and MW-3 were constructed with two-inch diameter, Schedule 40 PVC riser and 0.010" slotted screen. A silica sand pack was placed around the screened portion of each well to above the top of the screen. A bentonite seal was placed in the annulus

immediately above the sand pack. Native soil was used as backfill for the remainder of the annular space up to one foot below grade. To complete the construction of the well, a road box was set in concrete at grade level. The boring logs and well construction details for these wells are included in Appendix B.

On October 21, 1993, two additional monitoring wells, designated MW-4 and MW-5, were installed to help define the degree and extent of contamination in the presumed downgradient direction to the west of the tank (see Site Map). This drilling was again accomplished using a hollow-stem auger drill rig.

In the borings for both monitoring wells, silty fine sands were predominant from ground surface to 10 feet below grade, and fine to medium sands were predominant from 10 feet 17 feet below grade. Groundwater was encountered at approximately 8.5' and 9.5' below grade in MW-4 and MW-5, respectively. In the boring for MW-4, PID readings of the soil were at a peak of 95 ppm near the surface and decreased with depth: 8 ppm at 5'-7', 7.5 ppm at 10'-12', and 3 ppm at 14'-16'. In the MW-5 boring, PID readings ranged from 4 ppm at 5'-7' to 147 ppm at 10'-12'. The highest readings were measured in samples near the water table. MW-4 was screened from 4 to 14 feet; MW-5 from 5 to 15 feet.

MW-4 and MW-5 were constructed in the same fashion as MW-2 and MW-3 (see above). The boring logs and well construction details for these wells are also included in Appendix B.

IV. WATER LEVELS AND WATER QUALITY

A. Water Table Elevations

Water table elevation measurements were collected from MW-1, MW-2, MW-3 and the culvert well during regular site visits. Measurements were taken from all five monitoring wells prior to sampling on October 27, 1993. From August 30 to October 27, water table elevations decreased approximately 8 to 11 inches in MW-1 through MW-3. Water level data for August 30, September 28, and October 27 are presented in Appendix C.

Water table elevations measured during the October 27 site visit have been plotted and contoured to illustrate the gradient and direction of groundwater flow beneath the site (see Groundwater Contour Map, Appendix A). According to these data, it appears that groundwater flow in the vicinity of the UST is to the north-northeast at a hydraulic gradient of 1.5%.

B. Water Quality

On October 27, 1993, Marc Roy from the Technical Services Section of the VTDEC collected groundwater samples at the site. Samples were collected from MW-2, MW-3, MW-4 and MW-5, and analyzed for volatile organic compounds by EPA Method 8240.

MW-1 contained free product and therefore was not sampled. The analytical results have been plotted to show the distribution of dissolved contamination across the site (see Contaminant Distribution Map, Appendix A).

Appendix D contains groundwater quality summaries for all of the monitoring wells at the site. These tables summarize the total concentration of benzene, toluene, ethylbenzene and xylenes (BTEX), methyl tertiary butyl ether (MTBE, which is a gasoline additive) and Total Volatile Hydrocarbons (TVH).

As expected, no MTBE was detected in the samples since the contamination at this site is due to #2 Fuel Oil and not gasoline. Petroleum contamination was not detected in the samples from MW-2 and MW-4. Ethylbenzene and xylenes were detected in MW-3 at 80 parts per billion (ppb) and 650 ppb, respectively. In addition, TVH was calculated to be 40,000 ppb in MW-3. In MW-5, xylenes and TVH were detected at 225 ppb and 28,200 ppb, respectively.

The trip blank and duplicate sample results indicate that proper quality assurance/quality control was maintained during the sampling and analysis. The laboratory analytical report from the VTDEC is also included in Appendix D.

V. PRODUCT RECOVERY SYSTEM

Due to the significant quantity of product observed in the culvert well and MW-1, the SMS requested a proposal to install a product recovery system at the site as an emergency response action. On August 17, 1993, Griffin submitted a proposal for the installation of a Clean Earth Technology, Spillbuster Jr., product recovery system.

A. Installation

On August 26, 1993, Griffin installed the automated Spillbuster system. The product pump was set in the culvert well. This product recovery system utilizes an Automatic Level Seek (ALS) system which allows the product probe to track the elevation of the product in the well, thereby allowing for continued product recovery even when the water table fluctuates over time. The system was designed and constructed as proposed in the August 1993 Work Plan. The control panel for the Spillbuster, Jr., is housed in an Immediate Response Box as shown in Appendix E. The product recovery drums are stored in a wooden enclosure (two-drum capacity) directly adjacent to the Immediate Response Box. The location of these enclosures is shown on the Site Map in Appendix A. Two system schematics are also shown in Appendix E.

B. Operation

The product recovery system was initiated on August 26, after the completion of the installation. The system has operated continuously since that date, with the exception of brief shutdowns for system maintenance and pump replacement. A Griffin technician has visited the sites weekly to check system operation and collect data on system operating parameters.

Total product recovery from this system has been estimated from measurements of depth to product and depth to water in the product recovery drum. As of November 22, 1993, the system had recovered approximately 37.9 gallons of #2 Fuel Oil. In addition to this automated product recovery, approximately 18.7 gallons of product was recovered initially by hand bailing prior to system startup. Total estimated petroleum recovery, from August 5, 1993 (when bailing was initiated) to November 22, 1993, is presented in Table 1 and Figure 1 in Appendix E. Approximately 56.6 gallons of petroleum have been recovered by hand bailing and automated product removal.

To accomplish the above product recovery, the product pump motor was replaced on September 9. The old motor had seized most likely due to sand entering the pump. In addition, to protect the new pump, a "sock" was placed over the exposed area on the product probe to minimize the amount of sand and silt entering the pump.

The product recovery rate from the Spillbuster system decreased greatly after September 23. There are two probable reasons for this observation, both of which are related to the seasonal decrease in the water table. The drop in the water table (1) has left some product "trapped" in the vadose zone above, and (2) has prevented the proper operation of the Spillbuster's Automatic Level Seek system. By mid-September, there was only a foot and a half of water and/or product in the bottom of the culvert well, making it difficult for the sensors of the probe to function correctly in the ALS system. In fact, the manual for the Spillbuster states that there should be a minimum of 2 feet of water thickness in the well below the product/water interface.

As of November 18, 1993, the ALS system has been shut off due to the limited thickness of product/water in the bottom of the culvert well. The probe was set at a certain depth to try to recover at least some product. This setup, however, does not work very well since any fluctuation in the water table may result in the product inlet being located out of the layer of product in the well.

VI. RISK ASSESSMENT

From the investigations to date, it is apparent that the soils and groundwater in the vicinity of the UST at Proctor High School have been impacted by a probable leak of #2 Fuel Oil from the previous piping system. A substantial amount of free product accumulated in the eight-inch culvert well just west of the UST as a result of the leak. The major potential

sensitive receptors of the fuel oil contamination at this site are the basement of the school and Otter Creek. All nearby residences and the high school itself obtain water from the Municipal Water Supply which is not at risk from the contamination at this site.

During each Griffin site visit, the high school basement was screened for VOCs using a PID. No elevated PID readings have been measured in the basement during any of these visits. The risk of vapors entering the building is deemed to be low but significant. During the springtime, the threat of vapors entering the building may increase.

Otter Creek is located approximately 1200 to 1300 feet to the west of the high school. The risk to this potential receptor appears to be minimal at this time, however, the northerly downgradient extent of dissolved groundwater contamination has not been determined.

VII. CONCLUSIONS

Based on the investigations at this site to date, Griffin has reached the following conclusions:

1. Groundwater flow in the vicinity of the UST appears to be to the north-northeast, away from the high school building, at a hydraulic gradient of 1.5%. This suggests that any dissolved groundwater contamination in the area will not be flowing underneath the high school to the south or west.

2. Dissolved groundwater contamination was not detected in the westernmost (MW-4) and easternmost (MW-2) monitoring wells at the site. MW-3 and MW-5, however, contained low levels of BTEX compounds and significant concentrations of dissolved Total Volatile Hydrocarbons (which is typical of groundwater that has been impacted by #2 Fuel Oil). The downgradient extent of contamination has not been determined yet. The upgradient extent of contamination is most likely underneath the northeastern corner of the high school building.

3. A total of approximately 56.6 gallons of product has been removed from the subsurface as of November 22, 1993. The automated product recovery system worked very well until mid-September when the water table lowered to the point where the ALS system could not function properly. There is likely a significant amount of free product remaining in the subsurface. For example, on November 22, there was still greater than 1.5 feet of floating product in MW-1 located only a few feet away from the culvert well containing the product pump.

4. The greatest potential risk posed by the on-site contamination appears to be to the faculty and students of Proctor High School if petroleum vapors enter the basement. At this time, Griffin believes that the risk to the building is relatively low, however, the risk may increase in the springtime.

VIII. RECOMMENDATIONS

1. Three additional monitoring wells should be installed downgradient from the source area to more clearly define the degree and extent of subsurface contamination at the site. These wells should be constructed in the same fashion as the existing drilled monitoring wells.

2. Due to the significant amount of free product at the site, Griffin recommends the installation of a product recovery system using groundwater table depression. This system will be more successful than the present one at recovering the free product in the vicinity of the UST.

   After installation of the additional monitoring wells, a drilled recovery well should be installed for this system using a hollow-stem auger drill rig. The recovery well should be a six-inch diameter well with 15 feet of wire wound, stainless steel well screen. The well would be screened from two feet above the water table to 13 feet below the water table.

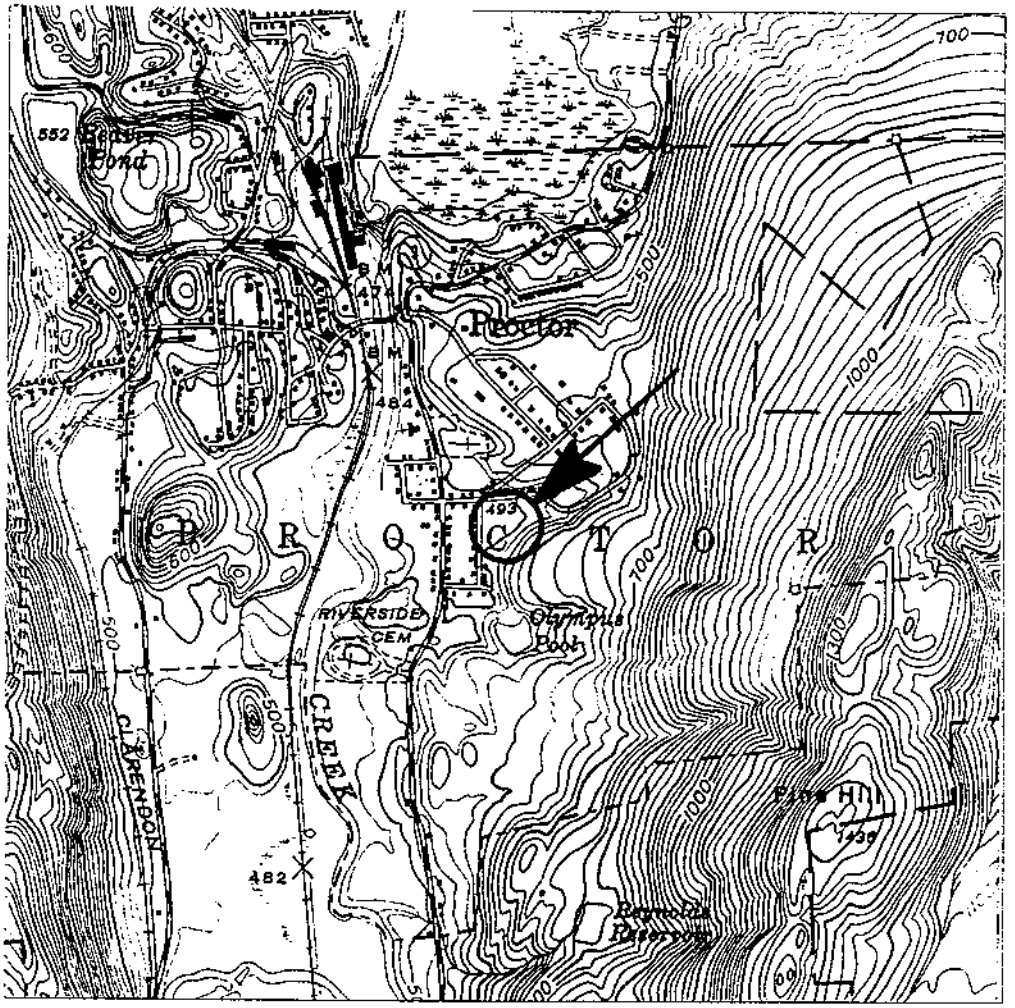
   Griffin recommends the use of a Clean Earth Technology Spillbuster, Sr., recovery system, which is very similar to the present system except that the Sr. system utilizes groundwater table depression. Recovered product will be stored in a tank on-site prior to proper transportation and disposal off-site. Due to the low levels of dissolved VOCs in the groundwater, contaminated groundwater pumped from the well can be treated with activated carbon; three drums connected in series should be sufficient. The Spillbuster, Sr., system and carbon drums would be located in a small heated shed near the recovery well. Treated groundwater could be discharged to the on-site storm sewer.

3. After the system is installed, site visits should be conducted weekly to collect site data and maintain constant system operation. These site visits would include water table elevation measurements in several monitoring wells surrounding the recovery well, and screening of the high school basement with a PID.

APPENDIX A

Maps

Site Location Map
Site Map
Groundwater Contour Map
Contaminant Distribution Map



N

JOB #: 7934399

SOURCE: USGS

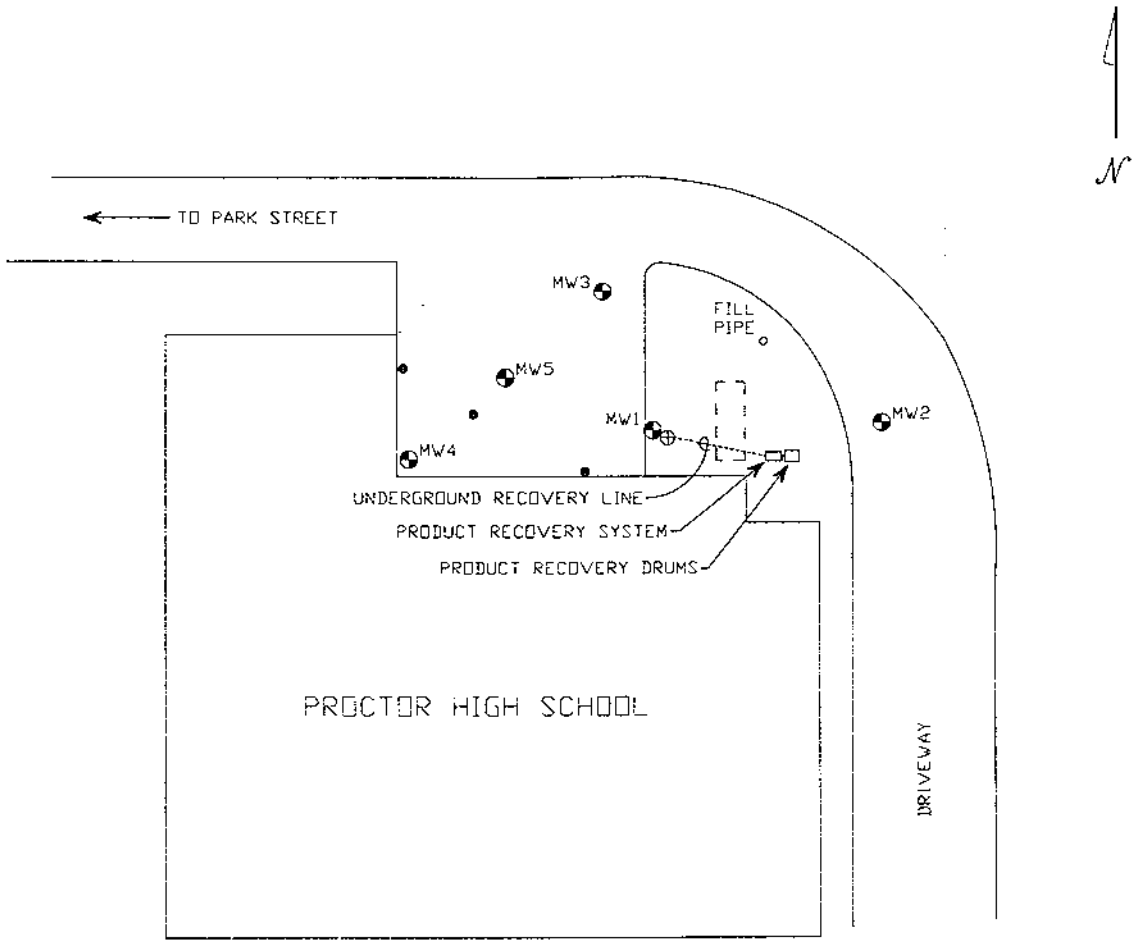
GRIFFIN INTERNATIONAL INC

PROCTOR HIGH SCHOOL

PROCTOR, VERMONT

SITE LOCATION MAP

DATE: 10/21/93 | DWG.#: 1 OF 4 | SCALE: 1:24000 | DRN: SB APP: KV



LEGEND

- MW2 — MONITORING WELL
- ⊕ — CULVERT WELL
- UNDERGROUND STORAGE TANK
- STORM DRAIN

JOB #: 7934399

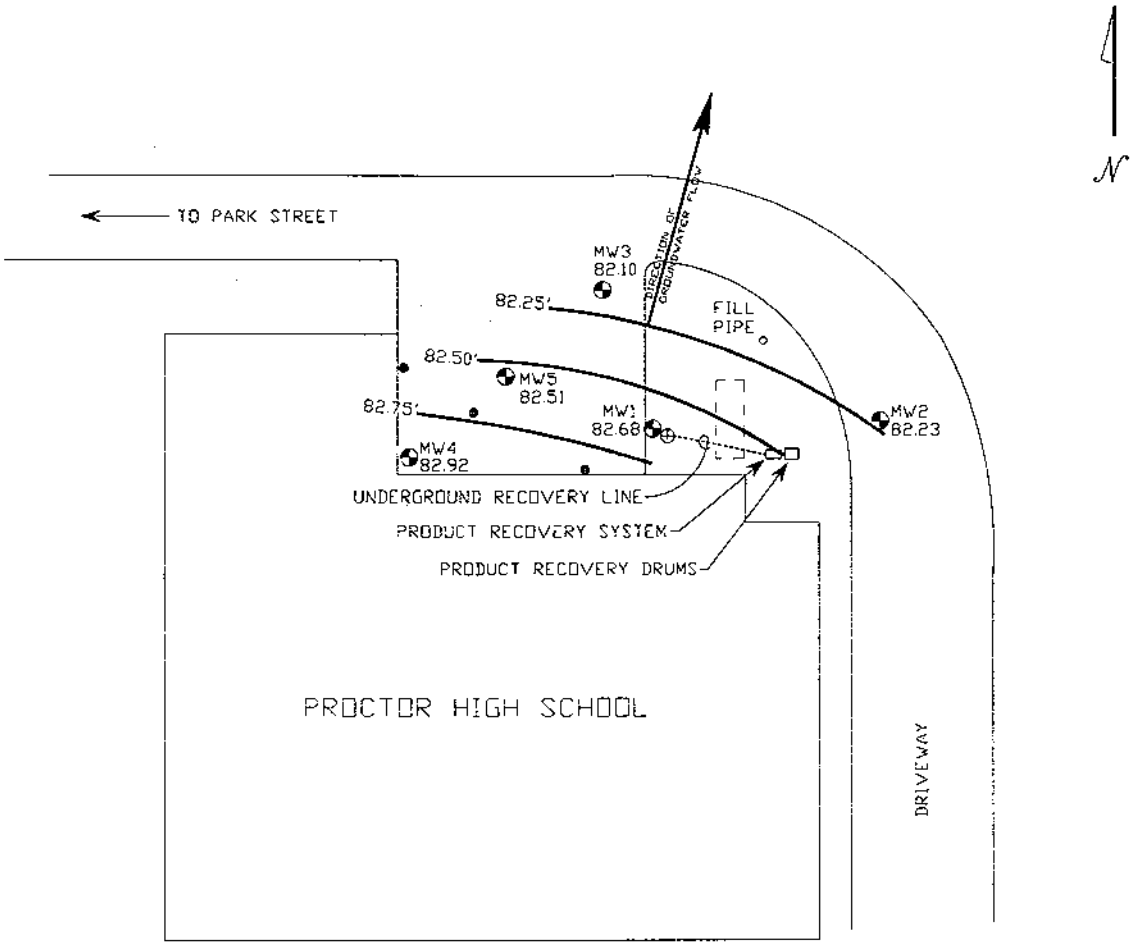
GRIFFIN INTERNATIONAL INC

PROCTOR HIGH SCHOOL

PROCTOR, VERMONT

SITE MAP

DATE: 10/21/93	DWG.#: 2 OF 4	SCALE: 1"=50'	DRN.: SB	APP.: KM



LEGEND

MW2 82.23	MONITORING WELL AND WATER TABLE ELEVATION IN FEET
⊕	CULVERT WELL
[ ]	UNDERGROUND STORAGE TANK
•	STORM DRAIN
82.50'	GROUNDWATER CONTOUR

JOB #: 7934399
MONITORING DATE: 10/27/93

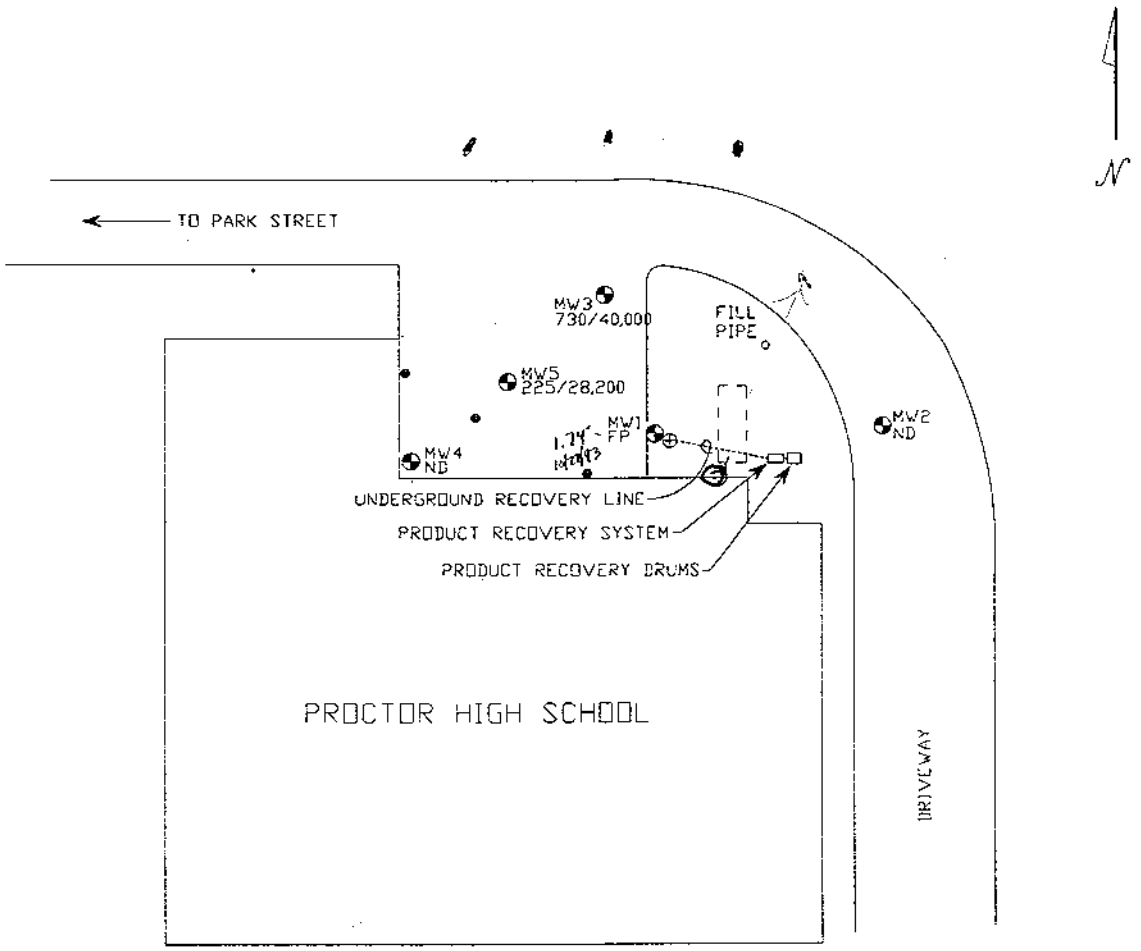
GRIFFIN INTERNATIONAL INC

PROCTOR HIGH SCHOOL

PROCTOR, VERMONT

GROUNDWATER CONTOUR MAP

DATE: 12/3/93	DWG.#: 3 OF 4	SCALE: 1"=50'	DRN.: SB	APP.: KM



LEGEND

MW3 730/40,000	MONITORING WELL AND TOTAL BTEX / TOTAL VOLATILE HYDROCARBONS (ppb)
⊕	CULVERT WELL
[ ]	UNDERGROUND STORAGE TANK
o	STORM DRAIN
ND	NONE DETECTED
FP	FLOATING PRODUCT

JOB #: 7934399
SAMPLING DATE: 10/27/93

GRIFFIN INTERNATIONAL INC

PROCTOR HIGH SCHOOL

PROCTOR, VERMONT

CONTAMINANT DISTRIBUTION MAP

DATE: 12/3/93 | DWG #: 4 OF 4 | SCALE: 1"=50' | DRN: SB | APP: KM

APPENDIX B

Well Logs

PROJECT Proctor Jr./Sr. High School

LOCATION Proctor, Vermont

DATE DRILLED 8/3/93 TOTAL DEPTH OF HOLE 20'

DIAMETER 4.25"

SCREEN DIA. 2" LENGTH 10' SLOT SIZE 0.010"

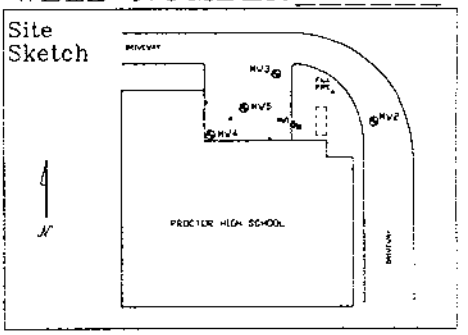
CASING DIA. 2" LENGTH 9.5' TYPE sch 40 pvc

DRILLING CO. GMB DRILLING METHOD HSA

DRILLER BERNASCONI LOG BY K. MCGRAW

WELL NUMBER MW2

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		ROAD BOX LOCKING WELL CAP CONCRETE	0'-1' 0 ppm	PAVEMENT Reddish brown fine SAND, dry, no odor	0 1
1-4		NATIVE BACKFILL			2-4
4-5		WELL RISER			5
5-7		BENTONITE	5'-7'- 4,4,6,6 0 ppm	Reddish brown fine SAND, very homogeneous, dry, no odor	6-7
7-10					8-10
10-12		SAND PACK	10'-12'- 5,11,15,20 0 ppm	Light brown fine SAND, homogeneous, dry, no odor	11-12
13-14				14.0' WATER TABLE	13-14
15		WELL SCREEN			15
15-17			15'-17'- 15,13,17,25 0 ppm	Light brown fine to medium SAND, homogeneous, wet, no odor	16-17
18-19		BOTTOM CAP			18-19
20		UNDISTURBED NATIVE SOIL		BASE OF WELL AT 20' END OF EXPLORATION AT 20'	20
21-25					21-25

PROJECT Proctor Jr./Sr. High School

LOCATION Proctor, Vermont

DATE DRILLED 8/3/93 TOTAL DEPTH OF HOLE 20'

DIAMETER 4.25"

SCREEN DIA. 2" LENGTH 10' SLOT SIZE 0.010"

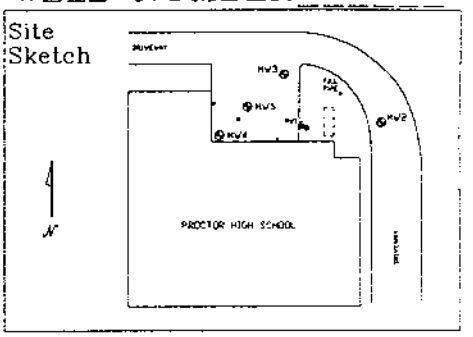
CASING DIA. 2" LENGTH 9.5' TYPE sch 40 pvc

DRILLING CO. GMB DRILLING METHOD HSA

DRILLER BERNASCONI LOG BY K. MCGRAW

WELL NUMBER MW3

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		ROAD BOX LOCKING WELL CAP		PAVEMENT	0
1		CONCRETE	0'-1' 0 ppm	Reddish brown fine SAND, dry, no odor	1
2		NATIVE BACKFILL			2
3					3
4		WELL RISER			4
5					5
6		BENTONITE	5'-7'- 6,6,7,9 0 ppm	Reddish brown fine SAND, dry, no odor	6
7					7
8					8
9					9
10					10
11			10'-12'- 8,4,5,6 0 ppm	Light brown fine SAND, dry, no odor At 11.5' : 4" SILT Layer, wet	11
12		SAND PACK			12
13			12'-14'- 8,11,14,12 0 ppm	Light brown fine SAND, homogeneous, moist, no odor	13
14				14.0' WATER TABLE	14
15		WELL SCREEN	14'-16'- 9,8,13,18 0 ppm	Light brown fine SAND, homogeneous, wet, slight odor	15
16					16
17					17
18					18
19		BOTTOM CAP			19
20		UNDISTURBED NATIVE SOIL		BASE OF WELL AT 20' END OF EXPLORATION AT 20'	20
21					21
22					22
23					23
24					24
25					25

PROJECT Proctor Jr./Sr. High School

LOCATION Proctor, Vermont

DATE DRILLED 10/21/93 TOTAL DEPTH OF HOLE 16'

DIAMETER 4.25"

SCREEN DIA. 2" LENGTH 10' SLOT SIZE 0.010"

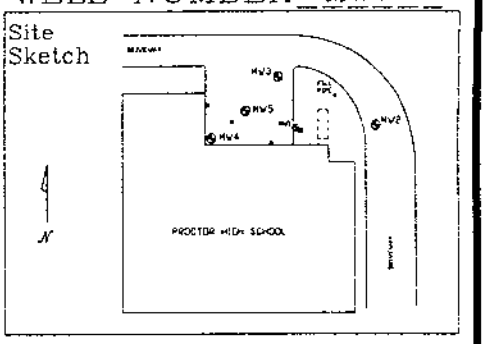
CASING DIA. 2" LENGTH 3.5' TYPE sch 40 pvc

DRILLING CO. GMB DRILLING METHOD HSA

DRILLER GARNEAU LOG BY K. MCGRAW

WELL NUMBER MW4

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		ROAD BOX LOCKING WELL CAP			0
1		CONCRETE	0'-1' 95 ppm	PAVEMENT Light brown, silty fine SAND, dry, moderate odor	1
2		NATIVE BACKFILL			2
3		BENTONITE			3
4		WELL RISER			4
5					5
6		SAND PACK	5'-7'- 6,9,16,17 8 ppm	Tan, silty fine SAND, homogeneous, dry, no odor	6
7		WELL SCREEN			7
8				8'-6" WATER TABLE ▼	8
9					9
10					10
11			10'-12'- 8,9,12,12 7.5 ppm	Light brown fine to medium SAND, saturated, slight odor	11
12					12
13		BOTTOM CAP			13
14					14
15			14'-16'- 5,8,10,11 3 ppm	Light brown fine to medium SAND w/trace gravel, saturated, slight odor	15
16		UNDISTURBED NATIVE SOIL		BASE OF WELL AT 14' END OF EXPLORATION AT 16'	16
17					17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
25					25

PROJECT Proctor Jr./Sr. High School

LOCATION Proctor, Vermont

DATE DRILLED 10/21/93 TOTAL DEPTH OF HOLE 17'

DIAMETER 4.25"

SCREEN DIA. 2" LENGTH 10' SLOT SIZE 0.010"

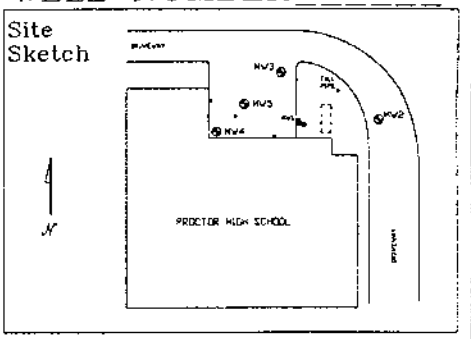
CASING DIA. 2" LENGTH 4.5' TYPE sch 40 pvc

DRILLING CO. GMB DRILLING METHOD HSA

DRILLER GARNEAU LOG BY K. MCGRAW

WELL NUMBER MW5

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		ROAD BOX LOCKING WELL CAP CONCRETE		PAVEMENT	0
1				BASEROCK FOR PAVEMENT	1
2		NATIVE BACKFILL	1'-2' 58 ppm	Reddish brown silty fine SAND, dry, homogeneous, slight odor	2
3		BENTONITE			3
4		WELL RISER			4
5					5
6			5'-7'- 12,7,7,5 4 ppm	Reddish brown silty fine SAND, dry, homogeneous, slight odor	6
7		SAND PACK			7
8					8
9			8'-10'- 9,11,14,12 55 ppm	Tan, silty fine to medium SAND, homogeneous, moderate odor	9
10		WELL SCREEN		9'-6" WATER TABLE	10
11			10'-12'- 7,7,8,8 147 ppm	Tan, fine to medium SAND, saturated moderate odor	11
12					12
13					13
14		BOTTOM CAP			14
15					15
16			15'-17'- 9,12,15,11 85 ppm	15'-16' grayish brown, 16'-17' light brown, fine to medium SAND, saturated, moderate odor	16
17		UNDISTURBED NATIVE SOIL		BASE OF WELL AT 15' END OF EXPLORATION AT 17'	17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
25					25

APPENDIX C

Water Level Data

Liquid Level Monitoring Data
Proctor High School

8/30/93

Well I.D.	Well Depth	Top of Casing Elevation	Depth To Product	Depth To Water	Product Thickness	Specific Gravity Of Product	Water Equivalent	Corrected Depth To Water	Corrected Water Table Elevation
MW-1	16.64	97.45	13.75	15.85	2.10	0.88	1.85	14.00	83.45
MW-2	20.00	100.00		16.85					83.15
MW-3	20.00	98.19		15.39					82.80

9/28/93

Well I.D.	Well Depth	Top of Casing Elevation	Depth To Product	Depth To Water	Product Thickness	Specific Gravity Of Product	Water Equivalent	Corrected Depth To Water	Corrected Water Table Elevation
MW-1	16.64	97.45	14.29	15.66	1.37	0.88	1.21	14.45	83.00
MW-2	20.00	100.00		17.33					82.67
MW-3	20.00	98.19		15.78					82.41

10/27/93

Well I.D.	Well Depth	Top of Casing Elevation	Depth To Product	Depth To Water	Product Thickness	Specific Gravity Of Product	Water Equivalent	Corrected Depth To Water	Corrected Water Table Elevation
MW-1	16.64	97.45	14.56	16.30	1.74	0.88	1.53	14.77	82.68
MW-2	20.00	100.00		17.77					82.23
MW-3	20.00	98.19		16.09					82.10
MW-4	14.00	92.53		9.61					82.92
MW-5	15.00	92.87		10.36					82.51

All Values Reported in Feet
Top-of-Casing Elevations Measured in Feet Relative to MW-2 set at 100.00'

APPENDIX D

Groundwater Quality Summaries

Groundwater Quality Summary
Proctor High School
Proctor, Vermont

MW-1

PARAMETER	Date of Sample Collection					Vermont Drinking Water Standards
	10/27/93					
Benzene	FP					5.0*
Chlorobenzene	(1.74')					100**
1,2-DCB						-
1,3-DCB	Not					-
1,4-DCB	Sampled					-
Ethylbenzene						680**
Toluene						2,420**
Xylenes						400**
Total BTEX						-
MTBE						40**
BTEX+MTBE						-
TVH						-

MW-2

PARAMETER	Date of Sample Collection					Vermont Drinking Water Standards
	10/27/93					
Benzene	ND					5.0*
Chlorobenzene	ND					100**
1,2-DCB	ND					-
1,3-DCB	ND					-
1,4-DCB	ND					-
Ethylbenzene	ND					680**
Toluene	ND					2,420**
Xylenes	ND					400**
Total BTEX	ND					-
MTBE	ND					40**
BTEX+MTBE	ND					-
TVH	ND					-

MW-3

PARAMETER	Date of Sample Collection					Vermont Drinking Water Standards
	10/27/93					
Benzene	ND					5.0*
Chlorobenzene	ND					100**
1,2-DCB	ND					-
1,3-DCB	ND					-
1,4-DCB	ND					-
Ethylbenzene	80					680**
Toluene	ND					2,420**
Xylenes	650					400**
Total BTEX	730					-
MTBE	ND					40**
BTEX+MTBE	730					-
TVH	40,000					-

All Values Reported in ug/L (ppb)
* - Maximum Contaminant Level
** - Health Advisory Level

ND - None Detected
TVH - Total Volatile Hydrocarbons

Groundwater Quality Summary
Proctor High School
(Continued)

MW-4

PARAMETER	Date of Sample Collection					Vermont Drinking Water Standards
	10/27/93					
Benzene	ND					5.0*
Chlorobenzene	ND					100**
1,2-DCB	ND					-
1,3-DCB	ND					-
1,4-DCB	ND					-
Ethylbenzene	ND					680**
Toluene	ND					2,420**
Xylenes	ND					400**
Total BTEX	ND					-
MTBE	ND					40**
BTEX+MTBE	ND					-
TVH	ND					-

MW-5

PARAMETER	Date of Sample Collection					Vermont Drinking Water Standards
	10/27/93					
Benzene	ND					5.0*
Chlorobenzene	ND					100**
1,2-DCB	ND					-
1,3-DCB	ND					-
1,4-DCB	ND					-
Ethylbenzene	ND					680**
Toluene	ND					2,420**
Xylenes	225					400**
Total BTEX	225					-
MTBE	ND					40**
BTEX+MTBE	225					-
TVH	28,200					-

Quality Assurance/Quality Control Samples

PARAMETER	10/27/93		
	Trip Blank	Equipment Blank	Duplicate of MW-5
Benzene	ND		ND
Chlorobenzene	ND	None	ND
1,2-DCB	ND		ND
1,3-DCB	ND		ND
1,4-DCB	ND		ND
Ethylbenzene	ND		ND
Toluene	ND		ND
Xylenes	ND		200
Total BTEX	ND		200
MTBE	ND		ND
BTEX+MTBE	ND		200
TVH	ND		27,300

All Values Reported in ug/L (ppb)
* - Maximum Contaminant Level
** - Health Advisory Level

ND - None Detected
TVH - Total Volatile Hydrocarbons

KM

11/18/93 Department of Environmental Conservation Laboratory
Method 8240 - Volatile Organics in Water GJD

Lab Id: 5823 Report To: m.rooy Phone: 241-3888 Date Collected: 10/27/93
Location: tb Program: 41 1373 Chain of Custody? No

Notes:

RECEIVED DEC 0 3 1993

Date Analyzed: 11/08/93 Over hold? No Dilution factor: 1

Parameter	Units are ug/l PQL	Result	Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
Vinyl chloride	10	N.D.				
Chloromethane	10	N.D.				
Bromomethane	10	N.D.				
Chloroethane	10	N.D.				
Trichlorofluoromethane	10	N.D.				
Acetone	100	N.D.				
1,1-Dichloroethene	5	N.D.				
Carbon disulfide	100	N.D.				
Methylene chloride	5	N.D.				
Methyl-t-butylether (MTBE)	10	N.D.				
1,2-Dichloroethene	5	N.D.				
1,1-Dichloroethane	5	N.D.				
Vinyl acetate	50	N.D.				
2-Butanone	100	N.D.				
Chloroform	5	N.D.				
1,1,1-Trichloroethane	5	N.D.				
Carbon tetrachloride	5	N.D.				
Benzene	5	N.D.				
1,2-Dichloroethane	5	N.D.				
Trichloroethene	5	N.D.				
1,2-Dichloropropane	5	N.D.				
Bromodichloromethane	5	N.D.				
4-Methyl-2-pentanone	50	N.D.				
cis-1,2-Dichloropropene	5	N.D.				
Toluene	5	N.D.				
trans-1,3-Dichloropropene	5	N.D.				
1,1,2-Trichloroethane	5	N.D.				
2-Hexanone	50	N.D.				
Tetrachloroethene	5	N.D.				
Dibromochloromethane	5	N.D.				
Chlorobenzene	5	N.D.				
Ethylbenzene	5	N.D.				
Xylenes	5	N.D.				
Styrene	5	N.D.				
Bromoform	5	N.D.				
1,1,2,2-Tetrachloroethane	5	N.D.				
Total Volatile Hydrocarbons	100	N.D.				

Surrogate Percent Recoveries (S=Surrogate recovery out of range)

1,2-Dichloroethane-D4 94% D8-Toluene . . . . . 96% 4-Bromofluorobenzene . 94%

Notes: Capillary column used with EPA approval.

Remarks: E=Estimated Value J=Value may be in Error O=Value outside Standard Curve

11/18/93 Department of Environmental Conservation Laboratory
Method 8240 - Volatile Organics in Water GJD

Lab Id: 5818 Report To: m.rooy Phone: 241-3888 Date Collected: 10/27/93
Location: mw 2 Program: 41 1373 Chain of Custody? No

Notes:

Date Analyzed: 11/08/93 Over hold? No Dilution factor: 1

Parameter	Units are ug/l PQL	Result	Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
Vinyl chloride	10	N.D.				
Chloromethane	10	N.D.				
Bromomethane	10	N.D.				
Chloroethane	10	N.D.				
Trichlorofluoromethane	10	N.D.				
Acetone	100	N.D.				
1,1-Dichloroethene	5	N.D.				
Carbon disulfide	100	N.D.				
Methylene chloride	5	N.D.				
Methyl-t-butylether (MTBE)	10	N.D.				
1,2-Dichloroethene	5	N.D.				
1,1-Dichloroethane	5	N.D.				
Vinyl acetate	50	N.D.				
2-Butanone	100	N.D.				
Chloroform	5	N.D.				
1,1,1-Trichloroethane	5	N.D.				
Carbon tetrachloride	5	N.D.				
Benzene	5	N.D.				
1,2-Dichloroethane	5	N.D.				
Trichloroethene	5	N.D.				
1,2-Dichloropropane	5	N.D.				
Bromodichloromethane	5	N.D.				
4-Methyl-2-pentanone	50	N.D.				
cis-1,2-Dichloropropene	5	N.D.				
Toluene	5	N.D.				
trans-1,3-Dichloropropene	5	N.D.				
1,1,2-Trichloroethane	5	N.D.				
2-Hexanone	50	N.D.				
Tetrachloroethene	5	N.D.				
Dibromochloromethane	5	N.D.				
Chlorobenzene	5	N.D.				
Ethylbenzene	5	N.D.				
Xylenes	5	N.D.				
Styrene	5	N.D.				
Bromoform	5	N.D.				
1,1,2,2-Tetrachloroethane	5	N.D.				
Total Volatile Hydrocarbons	100	N.D.				

Surrogate Percent Recoveries (S=Surrogate recovery out of range)

1,2-Dichloroethane-D4 94% D8-Toluene . . . . . 96% 4-Bromofluorobenzene . 90%

Notes: Capillary column used with EPA approval.

Remarks: E=Estimated Value J=Value may be in Error O=Value outside Standard Curve

11/19/93 Department of Environmental Conservation Laboratory
Revised report Method 8240 - Volatile Organics in Water GJD

Lab Id: 5819 Report To: m.rooy Phone: 241-3888 Date Collected: 10/27/93
Location: mw 3 Program: 41 1373 Chain of Custody? No

Notes:

Date Analyzed: 11/08/93 Over hold? No Dilution factor: 10

Parameter	Units are ug/l PQL	Result	Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
Vinyl chloride	100	N.D.				
Chloromethane	100	N.D.				
Bromomethane	100	N.D.				
Chloroethane	100	N.D.				
Trichlorofluoromethane	100	N.D.				
Acetone	1000	N.D.				
1,1-Dichloroethene	50	N.D.				
Carbon disulfide	1000	N.D.				
Methylene chloride	50	N.D.				
Methyl-t-butylether (MTBE)	100	N.D.				
1,2-Dichloroethene	50	N.D.				
1,1-Dichloroethane	50	N.D.				
Vinyl acetate	500	N.D.				
2-Butanone	1000	N.D.				
Chloroform	50	N.D.				
1,1,1-Trichloroethane	50	N.D.				
Carbon tetrachloride	50	N.D.				
Benzene	50	N.D.				
1,2-Dichloroethane	50	N.D.				
Trichloroethene	50	N.D.				
1,2-Dichloropropane	50	N.D.				
Bromodichloromethane	50	N.D.				
4-Methyl-2-pentanone	500	N.D.				
cis-1,2-Dichloropropene	50	N.D.				
Toluene	50	N.D.				
trans-1,3-Dichloropropene	50	N.D.				
1,1,2-Trichloroethane	50	N.D.				
2-Hexanone	500	N.D.				
Tetrachloroethene	50	N.D.				
Dibromochloromethane	50	N.D.				
Chlorobenzene	50	N.D.				
Ethylbenzene	50	80				
Xylenes	50	650				
Styrene	50	N.D.				
Bromoform	50	N.D.				
1,1,2,2-Tetrachloroethane	50	N.D.				
Total Volatile Hydrocarbons	1000	40000	E			

Surrogate Percent Recoveries (S=Surrogate recovery out of range)

1,2-Dichloroethane-D4 94% D8-Toluene . . . . . 96% 4-Bromofluorobenzene . 96%

Notes: Capillary column used with EPA approval.

Remarks: E=Estimated Value J=Value may be in Error O=Value outside Standard Curve

11/18/93 Department of Environmental Conservation Laboratory
Method 8240 - Volatile Organics in Water GJD

Lab Id: 5820 Report To: m.rooy Phone: 241-3888 Date Collected: 10/27/93
Location: mw 4 Program: 41 1373 Chain of Custody? No

Notes:

Date Analyzed: 11/08/93 Over hold? No Dilution factor: 1

Parameter	Units are ug/l PQL	Result	Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
Vinyl chloride	10	N.D.				
Chloromethane	10	N.D.				
Bromomethane	10	N.D.				
Chloroethane	10	N.D.				
Trichlorofluoromethane	10	N.D.				
Acetone	100	N.D.				
1,1-Dichloroethene	5	N.D.				
Carbon disulfide	100	N.D.				
Methylene chloride	5	N.D.				
Methyl-t-butylether (MTBE)	10	N.D.				
1,2-Dichloroethene	5	N.D.				
1,1-Dichloroethane	5	N.D.				
Vinyl acetate	50	N.D.				
2-Butanone	100	N.D.				
Chloroform	5	N.D.				
1,1,1-Trichloroethane	5	N.D.				
Carbon tetrachloride	5	N.D.				
Benzene	5	N.D.				
1,2-Dichloroethane	5	N.D.				
Trichloroethene	5	N.D.				
1,2-Dichloropropane	5	N.D.				
Bromodichloromethane	5	N.D.				
4-Methyl-2-pentanone	50	N.D.				
cis-1,2-Dichloropropene	5	N.D.				
Toluene	5	N.D.				
trans-1,3-Dichloropropene	5	N.D.				
1,1,2-Trichloroethane	5	N.D.				
2-Hexanone	50	N.D.				
Tetrachloroethene	5	N.D.				
Dibromochloromethane	5	N.D.				
Chlorobenzene	5	N.D.				
Ethylbenzene	5	N.D.				
Xylenes	5	N.D.				
Styrene	5	N.D.				
Bromoform	5	N.D.				
1,1,2,2-Tetrachloroethane	5	N.D.				
Total Volatile Hydrocarbons	100	N.D.				

Surrogate Percent Recoveries (S=Surrogate recovery out of range)

1,2-Dichloroethane-D4 94% D8-Toluene . . . . . 98% 4-Bromofluorobenzene . 94%

Notes: Capillary column used with EPA approval.

Remarks: E=Estimated Value J=Value may be in Error O=Value outside Standard Curve

11/18/93 Department of Environmental Conservation Laboratory
Method 8240 - Volatile Organics in Water GJD

Lab Id: 5821 Report To: m.rooy Phone: 241-3888 Date Collected: 10/27/93
Location: mw 5 Program: 41 1373 Chain of Custody? No

Notes:

Date Analyzed: 11/08/93 Over hold? No Dilution factor: 25

Parameter	Units are ug/l PQL	Result	Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
Vinyl chloride	250	N.D.				
Chloromethane	250	N.D.				
Bromomethane	250	N.D.				
Chloroethane	250	N.D.				
Trichlorofluoromethane	250	N.D.				
Acetone	2500	N.D.				
1,1-Dichloroethene	125	N.D.				
Carbon disulfide	2500	N.D.				
Methylene chloride	125	N.D.				
Methyl-t-butylether (MTBE)	250	N.D.				
1,2-Dichloroethene	125	N.D.				
1,1-Dichloroethane	125	N.D.				
Vinyl acetate	1250	N.D.				
2-Butanone	2500	N.D.				
Chloroform	125	N.D.				
1,1,1-Trichloroethane	125	N.D.				
Carbon tetrachloride	125	N.D.				
Benzene	125	N.D.				
1,2-Dichloroethane	125	N.D.				
Trichloroethene	125	N.D.				
1,2-Dichloropropane	125	N.D.				
Bromodichloromethane	125	N.D.				
4-Methyl-2-pentanone	1250	N.D.				
cis-1,2-Dichloropropene	125	N.D.				
Toluene	125	N.D.				
trans-1,3-Dichloropropene	125	N.D.				
1,1,2-Trichloroethane	125	N.D.				
2-Hexanone	1250	N.D.				
Tetrachloroethene	125	N.D.				
Dibromochloromethane	125	N.D.				
Chlorobenzene	125	N.D.				
Ethylbenzene	125	N.D.				
Xylenes	125	225				
Styrene	125	N.D.				
Bromoform	125	N.D.				
1,1,2,2-Tetrachloroethane	125	N.D.				
Total Volatile Hydrocarbons	2500	28200	E			

Surrogate Percent Recoveries (S=Surrogate recovery out of range)

1,2-Dichloroethane-D4 96% D8-Toluene . . . . . 96% 4-Bromofluorobenzene . 94%

Notes: Capillary column used with EPA approval.

Remarks: E=Estimated Value J=Value may be in Error O=Value outside Standard Curve

11/18/93 Department of Environmental Conservation Laboratory
Method 8240 - Volatile Organics in Water GJD

Lab Id: 5822 Report To: m.rooy Phone: 241-3888 Date Collected: 10/27/93
Location: mw 5 dup Program: 41 1373 Chain of Custody? No

Notes:

Date Analyzed: 11/09/93 Over hold? No Dilution factor: 20

Parameter	Units are ug/l PQL	Result	Remark Code	Rel % Diff.	Spiked Dups ?	Percent Recovery
Vinyl chloride	200	N.D.				
Chloromethane	200	N.D.				
Bromomethane	200	N.D.				
Chloroethane	200	N.D.				
Trichlorofluoromethane	200	N.D.				
Acetone	2000	N.D.				
1,1-Dichloroethene	100	N.D.				
Carbon disulfide	2000	N.D.				
Methylene chloride	100	N.D.				
Methyl-t-butylether (MTBE)	200	N.D.				
1,2-Dichloroethene	100	N.D.				
1,1-Dichloroethane	100	N.D.				
Vinyl acetate	1000	N.D.				
2-Butanone	2000	N.D.				
Chloroform	100	N.D.				
1,1,1-Trichloroethane	100	N.D.				
Carbon tetrachloride	100	N.D.				
Benzene	100	N.D.				
1,2-Dichloroethane	100	N.D.				
Trichloroethene	100	N.D.				
1,2-Dichloropropane	100	N.D.				
Bromodichloromethane	100	N.D.				
4-Methyl-2-pentanone	1000	N.D.				
cis-1,2-Dichloropropene	100	N.D.				
Toluene	100	N.D.				
trans-1,3-Dichloropropene	100	N.D.				
1,1,2-Trichloroethane	100	N.D.				
2-Hexanone	1000	N.D.				
Tetrachloroethene	100	N.D.				
Dibromochloromethane	100	N.D.				
Chlorobenzene	100	N.D.				
Ethylbenzene	100	N.D.				
Xylenes	100	200				
Styrene	100	N.D.				
Bromoform	100	N.D.				
1,1,2,2-Tetrachloroethane	100	N.D.				
Total Volatile Hydrocarbons	2000	27300	E			

Surrogate Percent Recoveries (S=Surrogate recovery out of range)

1,2-Dichloroethane-D4 102% D8-Toluene . . . . . 92% 4-Bromofluorobenzene . 96%

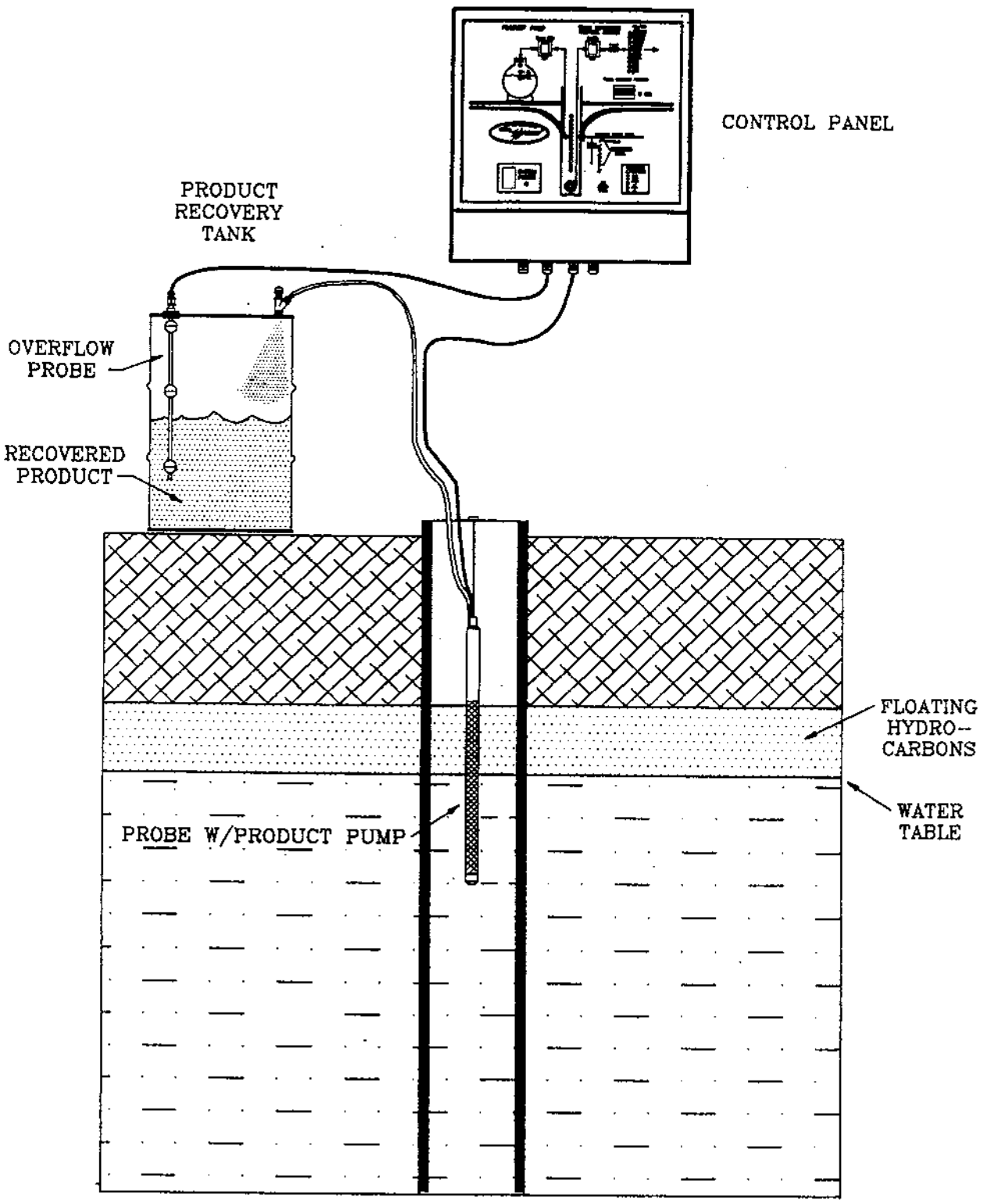
Notes: Capillary column used with EPA approval.

Remarks: E=Estimated Value J=Value may be in Error O=Value outside Standard Curve

APPENDIX E

Tables and Figures

System Diagrams
Table 1: Petroleum Recovery Estimate
Figure 1: Total Product Recovery



PRODUCT ONLY SYSTEM SCHEMATIC
2" OR LARGER WELL W/NO DEPRESSION PUMP

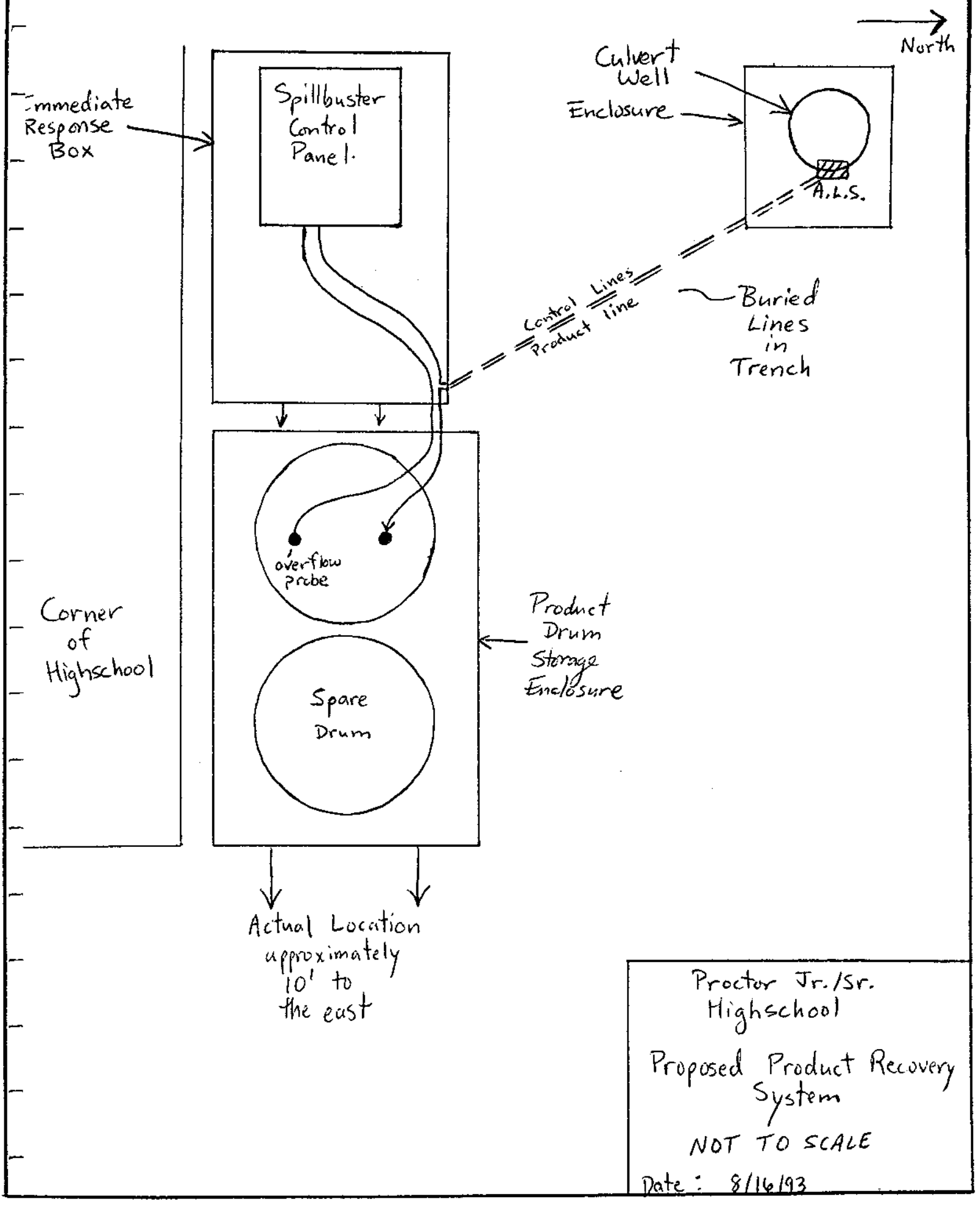

North
Culvert Well Enclosure
A.L.S.
Immediate Response Box
Spillbuster Control Panel
Control Lines
Product line
Buried Lines in Trench
overflow probe
Corner of Highschool
Product Drum Storage Enclosure
Spare Drum
Actual Location approximately 10' to the east
Proctor Jr./Sr. Highschool
Proposed Product Recovery System
NOT TO SCALE
Date: 8/16/93

Table 1
Petroleum Recovery Estimate
Proctor High School
Proctor, Vermont
8/5/93 - 11/22/93

Date	Product Recovery Since Last Site Visit (Gallons)	Total Product Recovery to Date (Gallons)
8/26/93	18.7	18.7
8/30/93	4.1	22.8
9/9/93	10.2	33.0
9/17/93	11.6	44.6
9/23/93	8.1	52.7
9/28/93	1.0	53.7
10/27/93	2.5	56.2
11/22/93	0.4	56.6

Figure 1.
Total Product Recovery
Proctor High School