RESULTS OF SOIL VAPOR EXTRACTION PILOT-SCALE TEST

PREPARED FOR
COOK COMPOSITES AND POLYMERS
SAUKVILLE, WISCONSIN

PREPARED BY
RMT, INC.
MADISON, WISCONSIN

SEPTEMBER 1993

Frederick M. Swed, Jr., P.E.
Consulting Engineer

Peter J. Glassen
Project Scientist

Stacy McAnulty, P.E.
Senior Project Engineer

James S. Rickun
Vice President, Northern Region/
Air Program Manager

RMT, INC. — MADISON
744 HEARTLAND TRAIL ▪ MADISON, WI ▪ 53717-1934
P.O. BOX 8923 ▪ MADISON, WI ▪ 53708-8923
608/831-4444 ▪ 608/831-3334 FAX

2460604330

Cook Composites and Polymers

Headquarters
P.O. Box 419389
Kansas City, MO 64141-6389
(816) 391-6000
FAX (816) 391-6116

September 19, 1993

Mr. Tim Mulholland, Ph.D.
Waste Management Engineer
Hazardous Waste Management Section
Bureau of Solid and Hazardous Waste Management
Wisconsin Department of Natural Resources
P.O. Box 7921
Madison, WI 53707

RE: Cook Composites and Polymers Co.
Results of Soil Vapor Extraction Pilot-Scale Test

Dear Tim:

In response to your August 4, 1993, letter, enclosed are two copies of the RMT report entitled "Results of Soil Vapor Extraction Pilot-Scale Test," dated September, 1993. This submittal complies with Condition #4 of the September 14, 1992, closure plan modification conditional approval.

This report submittal should comply with each of the items enumerated in your August 4, 1993, letter. As you are aware, RMT encountered significantly elevated groundwater levels during the pilot-scale test. Based on the limited results obtained from the tests, it appears that volatile organic compounds can be extracted at comparatively high concentrations under reasonable source vacuum conditions. It is believed that additional pilot-scale testing is necessary to proceed with final remedial design. As discussed previously, CCP suggests that groundwater elevations be monitored for the next six months to determine if the elevations recede to historical levels. In fact, CCP has been monitoring the elevations for the past several weeks and has already noted a considerable drop in the level.

Please review the enclosed report and confirm the acceptability of the suggested approach. If you have any questions, please contact me directly at (816) 391-6025.

Sincerely,
Cook Composites and Polymers Co.

Craig R. Bostwick

Craig R. Bostwick
Corporate Manager Environmental & Safety

Enclosure

cc: J. Rickun-RMT
E. Lynch-SW/3
J. Fermanich-SW/3
W. Ebersohl-SED
D. Grasset-CCP
E. Naimark-CCP Saukville

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EXECUTIVE SUMMARY

In pursuing final closure of a former hazardous waste incinerator at its Saukville, Wisconsin, facility, Cook Composites and Polymers (CCP) retained RMT, Inc. (RMT), to conduct two soil vapor extraction (SVE) tests on June 15, 1993. The results of the tests indicate that SVE is an effective technique for removing volatile organic contaminants from unsaturated soil at the former hazardous waste incinerator area.

Benzene, toluene, ethylbenzene, and xylenes (BTEX) were removed from the soils of the former hazardous waste incinerator area, in the 10^{-4} to 10^{-5} lb/ft^3 range, which is moderately high compared to other sites.

The water table was encountered 5 to 6 feet below grade, which is 2 to 5 feet higher than normal. The unusually high water table limited the rate of airflow through the soil, and a radius of influence could not be determined for design of the well spacing. The low air flow rate achieved with the high water table would limit the total mass removed over time.

RMT recommends monitoring the groundwater levels on a monthly basis until the levels decrease to previous levels. The radius of influence could then increase levels of vacuum, which would form the basis for the final design.

Section 1
INTRODUCTION

1.1 Background

CCP is pursuing final closure of a former hazardous waste incinerator at the Saukville, Wisconsin, facility (Figure 1). RMT was retained by CCP to conduct pilot-scale tests to determine the efficiency of SVE to address residual soil contamination at the site.

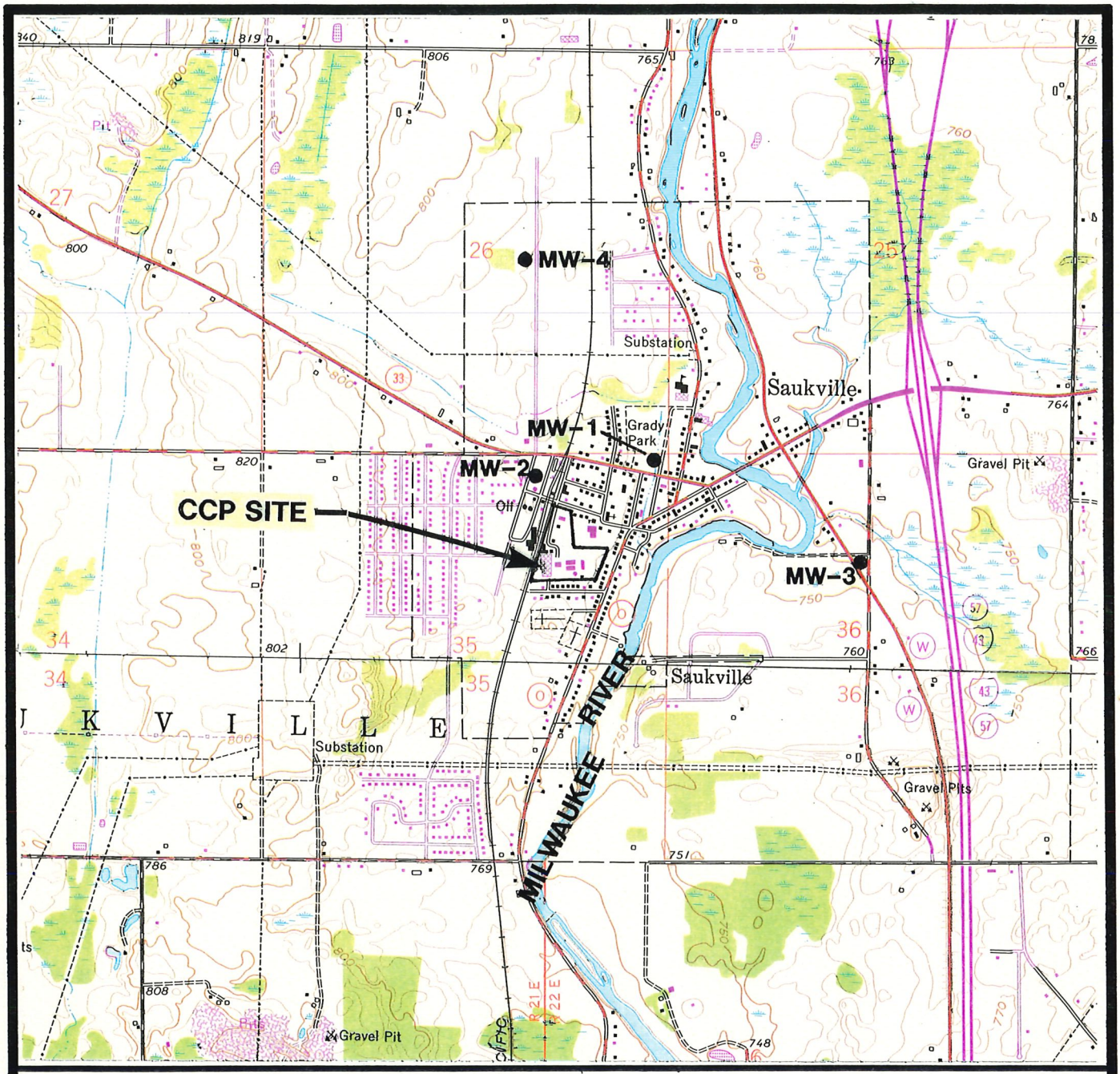
This report was prepared to satisfy Condition #4 of the September 14, 1992, closure plan modification conditional approval issued by the Wisconsin Department of Natural Resources (WDNR).

1.2 Purpose and Scope

The purposes of this work were to complete pilot-scale tests on two new soil vapor extraction (SVE) wells, to monitor influence with two new soil vapor monitoring wells, and to procure information on the effectiveness of treating the impacted soils in the incinerator area with SVE. This information would be used for designing a full-scale SVE system in the former hazardous waste incineration area if the technology was shown to be effective.

The scope of the work included the following activities:

- Installed four SVE/vacuum monitoring (VM) wells within the affected area, to a depth of 10 feet
- Collected and laboratory-analyzed seven soil samples from the SVE borings
- Collected and performed moisture content, Atterberg limit, and grain-size distribution on seven soil samples from the SVE borings
- Using a vacuum blower, induced a vacuum on the SVE wells and measured the subsequent flow rate and the induced vacuum on the VM wells, which are screened above the water table
- Extracted subsurface air samples for on-site analysis by a Photovac 10S50 portable gas chromatograph (GC)
- Recorded wellhead vacuum and flow rates throughout the test
- Examined the effectiveness of SVE technology to remove residual volatile organic compounds (VOCs) from the soil



STATE LOCATION

0 2000 4000

SCALE: 1"=2000'

N

SITE LOCATION MAP
COOK COMPOSITES AND POLYMERS

SOURCE: BASE MAP FROM PORT WASHINGTON WEST AND CEDARBURG WISCONSIN 7.5 MINUTE USGS QUADRANGLES.

RMT INC.

DWN. BY:	DJW
DATE:	JANUARY 1993
PROJ.#	1832.33
FILE #	18323301

FIGURE 1

Section 2

RECOMMENDATIONS

Based on the limited results gained from the SVE pilot tests, it appears that VOCs can be extracted at comparatively high concentrations under reasonable source vacuum conditions. RMT recommends that CCP monitor groundwater elevations for the next 6 months on a weekly basis to determine when the high groundwater levels recede to historical levels. RMT recommends performing an additional pilot test at that time to substantiate data for a final remedial design.

If the groundwater does not recede to historical levels after 6 months, CCP will contact the WDNR to discuss the next course of action.

Section 3
DISCUSSION

3.1 Well Installation

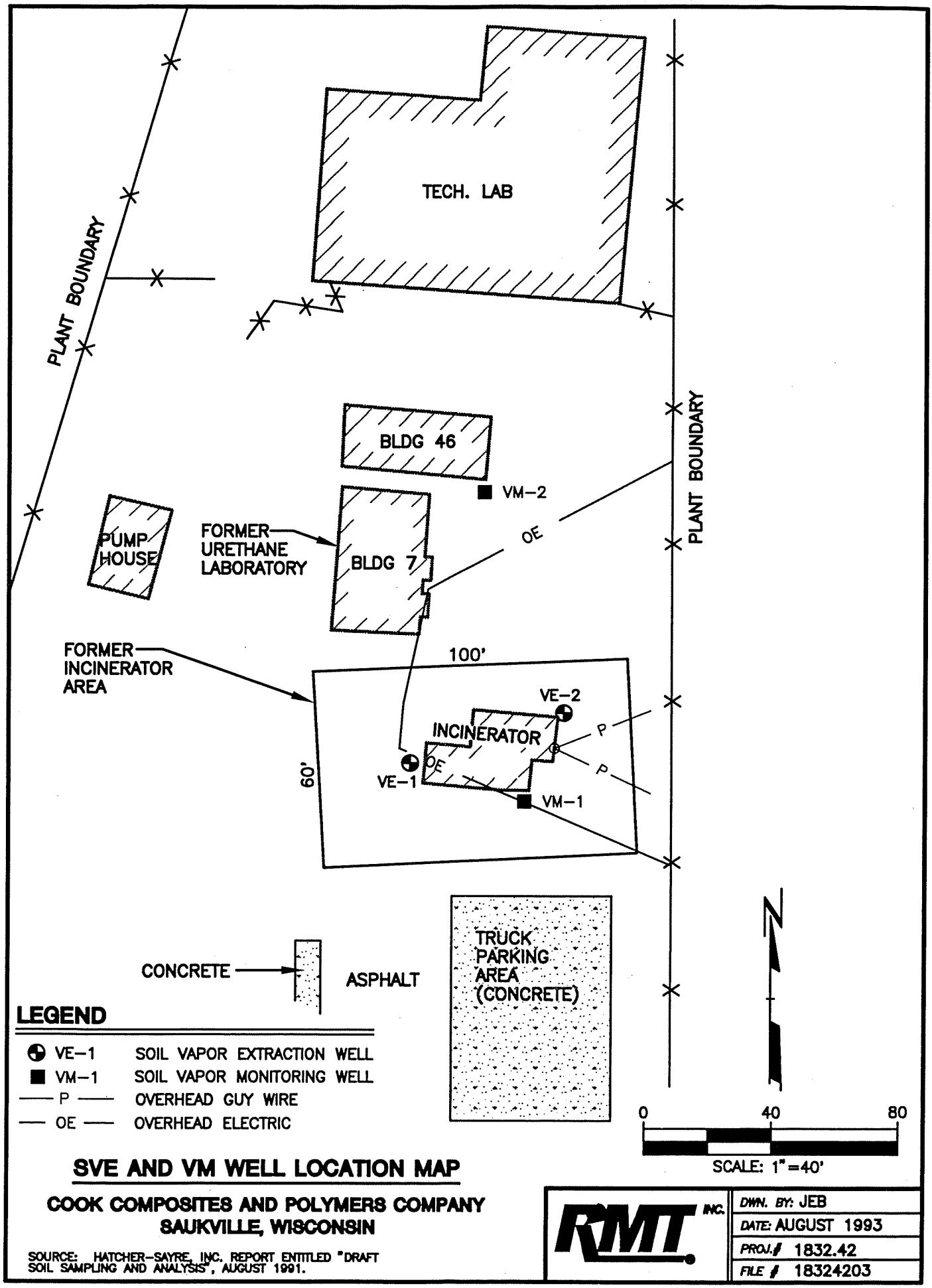
Two SVE wells and two VM wells were installed June 14, 1993, by Environmental & Foundation Drilling, Inc. (EF&D). The two SVE wells were installed in the former hazardous waste incinerator area, and the two VM wells were located strategically for monitoring vacuum level from both SVE wells. Figure 2 contains well locations, and Appendix A contains well construction logs and soil boring logs.

RMT had planned to install the two SVE wells in the unsaturated zone of the soils, where historical groundwater levels were 8 to 10 feet below grade (RMT, 1993). During drilling of the SVE and VM wells, the groundwater was encountered between 5 and 6 feet below grade. With the above-normal rainfall this year, the water table appears to have risen 2 to 5 feet. During installation of the two SVE wells, RMT collected seven soil samples for laboratory analysis of VOCs 8020, moisture content, Atterberg limit, and grain-size distribution. See Appendix B for laboratory results and Appendix C for soil characteristics.

3.2 Field Procedures

Two SVE pilot tests were conducted on June 15, 1993. Each wellhead (VE-1 and VE-2) was equipped with instrumentation to monitor airflow rate, vacuum, and temperature during testing. Each well was also equipped with a sample port for collection of air samples during the test. A small explosion-proof regenerative blower was connected to each well and was used to extract air from the subsurface of the incinerator area.

One measure of the performance of the SVE system is to measure vacuum in the soils at a distance from the vapor extraction wells. It is possible to measure vacuum in soils at a distance from the air extraction well by taking vacuum readings in surrounding wells. The measured vacuums at a distance can be used to determine whether soil vapor is being induced to flow toward the vapor extraction well. The maximum distance (from the vapor extraction well) from which soil vapor is induced toward the well is called the "radius of influence." The radius of influence is dependant on the vacuum developed in the vapor extraction well so that, typically, the higher the vacuum, the greater the radius of influence.



SVE AND VM WELL LOCATION MAP

COOK COMPOSITES AND POLYMERS COMPANY
SAUKVILLE, WISCONSIN

SOURCE: HATCHER-SAYRE, INC. REPORT ENTITLED "DRAFT SOIL SAMPLING AND ANALYSIS", AUGUST 1991.

RMT INC.

DWN. BY:	JEB
DATE:	AUGUST 1993
PROJ.#	1832.42
FILE #	18324203

FIGURE 2

Soil off-gas samples were collected from each vapor extraction well during each pilot test. Gas was collected in a 200-mL glass sampling bottle using a vacuum hand pump. The bottle was then sampled using a gas-tight syringe, which was injected into a portable GC for analysis. The GC was calibrated for the compounds of interest (BTEX).

The GC was operated following procedures set forth in the Photovac, Inc., instruction manual. Gas standards were prepared by appropriately diluting the headspace over the pure solvent. Quality assurance and control measures for gas analysis are included in Appendix D.

3.3 Results

Two separate pilot tests were conducted over a 3-hour period, each producing similar results. The first pilot test (VE-1) was located at the west end of the incinerator area and was started at 9:30 a.m. For this test, a higher vacuum (approximately 40 inches water column) was applied and it induced a flow rate of approximately 45 scfm. After 2 hours, the vacuum level had to be reduced due to the increase in water level in the well, which caused water to be drawn through the vacuum blower. A reduction to 21 inches of water column reduced the flow rate to approximately 40 scfm, but did not reduce the water level in the well. A limited vacuum was observed at VM-1 during this test, approximately 25 feet away. Six off-gas samples, which were collected routinely throughout the test, contained measurable concentrations of BTEX.

The second pilot test (VE-2), located at the east end of the incinerator area, was started at 1 p.m. For this test, a lower vacuum (approximately 22 inches water column) was applied, which induced a flow rate of approximately 33 scfm, to try to reduce the effect on the water table level. However, even at the low vacuum rate, the water level in the vapor extraction well increased. After 1.5 hours of operation and with groundwater levels already increasing, the vacuum was increased to 35 inches of water column at an approximate flow rate of 44 scfm so that the effect of increased vacuum levels on off-gas concentrations could be observed. During the test, no vacuum was observed at the VM wells or at VE-1. Six off-gas samples, which were collected throughout the test, contained measurable concentrations of BTEX.

For a summary of both pilot tests and operational logs, see Appendix E. For the analytical results, see Appendix F.

In addition, the groundwater beneath the former incinerator area is within the capture zone of a downgradient recovery well (MW-47). Thus, any BTEX enrichment of the groundwater due to the elevated water table would still be effectively controlled.

If after 6 months of groundwater monitoring the water table has not lowered, the WDNR will be contacted by CCP to discuss the next course of action.

3.5 Air Emissions

Assuming that a full-scale SVE system is eventually built and operated, the system must operate within the following limits:

- Total VOC emissions are to be under 15 lbs/day and 3.1 lbs/hr (24 hr/day operation) (NR 424). If emissions exceed these levels, CCP would be required to control emissions by 85 percent or demonstrate that control is technologically infeasible.
- The following emissions are not to be exceeded for release points less than 25 feet in height (NR 445):
  - Toluene - 31.2 pounds per hour averaged over 24 hours
  - Ethylbenzene - 36.2 pounds per hour averaged over 24 hours
  - Xylenes - 36.2 pounds per hour averaged over 24 hours
  - Benzene - 300 pounds per year

If the system meets these criteria, no permit or air pollution control will be required for the remediation.

The level of benzene in system emissions would need to be monitored to ensure that the system does not exceed the limit of 300 pounds per year. A full-scale system should be monitored daily for the first 3 days of operation, weekly for the next 3 weeks, and monthly thereafter to provide data to calculate cumulative emissions of benzene from the system during operation. However, the cumulative emissions from the system may not exceed 300 pounds of benzene per year without obtaining an air pollution control permit and conducting a Best Available Control Technology (BACT) analysis.

The emissions resulting from the pilot tests were at low enough levels that an air emission permit was not required for the test. The maximum potential emission rate without a permit is 5.7 pounds per hour (NR 406.04). However, during initial operation, a reduced flow rate may be required at VE-1 in order to stay within the 15-pound-per-day/3.1-pound-per-hour limit. During the pilot test, a total of 15 pounds of organics were discharged over the approximate 5 hours of testing. The results of each pilot test summarizing cumulative emissions are presented in Appendix E.

Section 4

REFERENCES

RMT, Inc. 1992. Closure Plan Modifications, Cook Composites and Polymers. April 1992.

RMT, Inc. 1993. Semivolatiles Investigation Report for Closure of the Former Hazardous Waste Incinerators and Storage Area at Cook Composites and Polymers. January 1993.

APPENDIX A

WELL CONSTRUCTION AND BORING LOGS

Environmental &
Foundation
Drilling, Inc.
217 Raemisch Road Waunakee, WI 53597
(608) 849-9896

SOIL BORING LOG

BORING # VM-1

Date started 6 / 14 / 93
Date completed 11 / 11 / 11
Page ____ of ____
JOB # 1448A

PROJECT: Cook Composites

LOCATION: 12' FROM OFFICE

ELEVATION ____

DEPTH 0'-0"	SOIL CLASSIFICATION & NOTES	SAMPLE NUMBER	SAMPLE DEPTH	BLOW COUNTS	MOISTURE REC		Q P
	ASPHALT	1	1.0/3.0	2 2 1 2	19	M	
0.7			1.0/2.5				
	BL-BR- CLAY SAND, some silt	2	3.5/5.5	2 3 4 15	14	M	
	AND GRAVEL		3.5/5.0				
6.0		3	6.0/8.0	17 9 19 17	9	S	
	BR- FINE SAND, some silt		6.0/7.5				
	some GRAVEL, TRACE CLAY						
			8.5/10				
9.0	E.O.B.		13.5/15				
			18.5/20				
	INSTALLED WELL						

WATER LEVEL MEASUREMENTS

5.2 +- at comp.

DRILLING METHOD 4.25 HSA

SPECIAL NOTES ON BACK PLG/LLM/DRD

Environmental &
Foundation
Drilling, Inc.
217 Raemisch Road Waunakee, WI 53597
(608) 849-9896

MONITORING WELL LOG

PROJECT Cook Composites

LOCATION 12' FROM OFFICE

JOB # 1448A

WELL # VM-1

DATE COMPLETED: 6/14/93

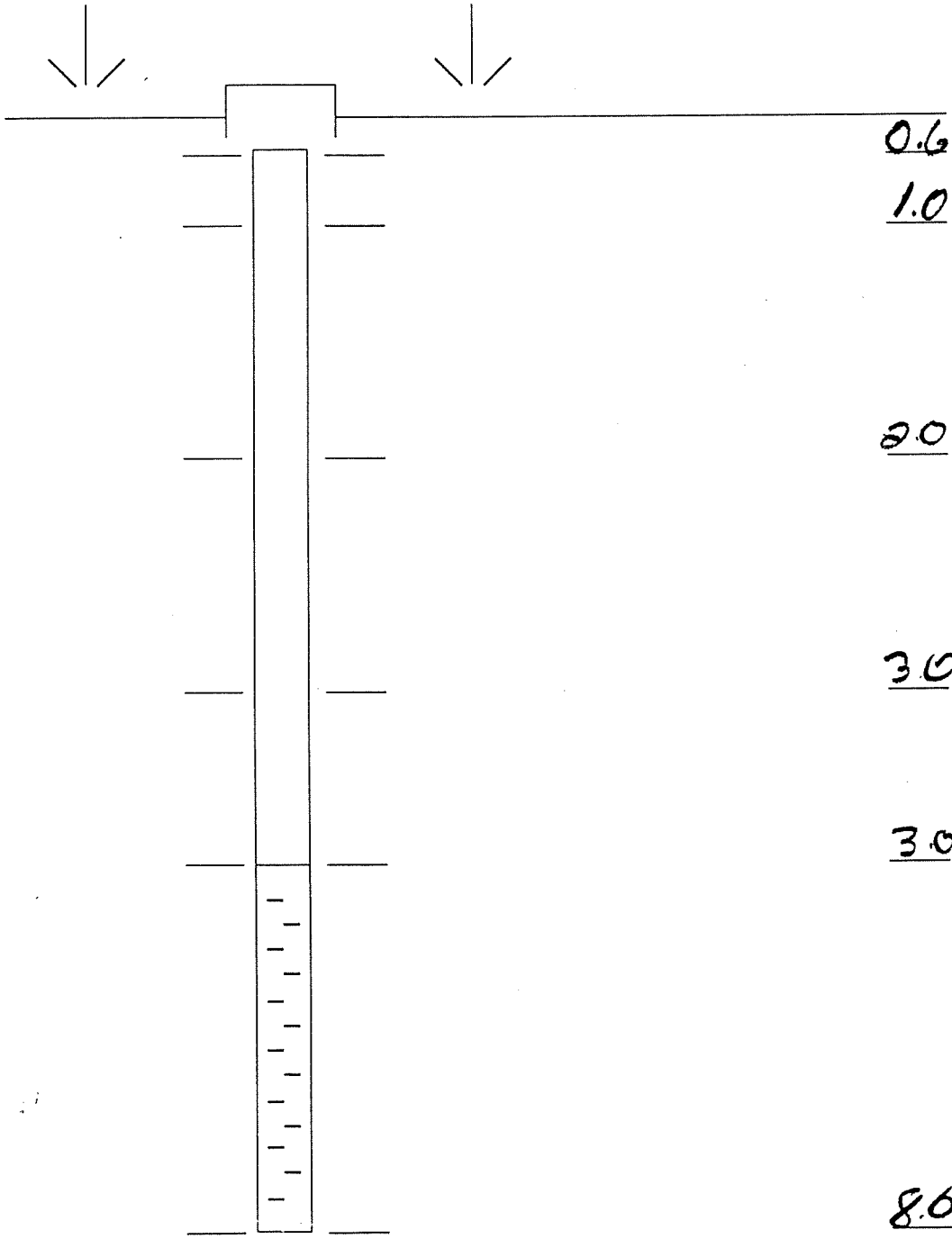
BORING METHOD: 4.25 HSA

BORE HOLE DIAMETER: 8.25 OD.

PROTECTOR PIPE: FLUSH MOUNT

Depth below top of casing

Depth below ground surface



RISER PIPE
Type: PVC 2" Sch 40 FJT

Length: 2.5'

0.6 Top of Riser Pipe

1.0 Top of backfill

Type: Bentonite chips

Amount: 1 BAG

2.0 Top of Seal

Type: Silica Sand

Amount: 1 50# LB. BAG

3.0 Top of gravel pack

Type: 3/8" washed PEA gravel

Amount: 5-50# BAGS

3.0 Top of screen

Type: PVC 2" Sch 40 FJT
20 SLOT

Length: 5'

8.6 Bottom of screen point

Depth drilled (below G.S.) = 9.0

(not-to-scale)

ENVIRONMENTAL & FOUNDATION DRILLING INC.

Environmental &
Foundation
Drilling, Inc.
217 Raemisch Road Waunakee, WI 53597
(608) 849-9896

SOIL BORING LOG

BORING # VM-2

Date started 6 / 14 / 93
Date completed " / " / "
Page ____ of ____
JOB # 1448A

PROJECT: Cook Composites

LOCATION: 9' from Bld. 7

ELEVATION ____

DEPTH 0'-0"	SOIL CLASSIFICATION & NOTES	SAMPLE NUMBER	DEPTH	BLOW COUNTS	MOISTURE REC		Q P
	ASPHALT	1	1.0/3.0	13,12,5,4	12	D	
0.7			1.0/2.5				
	BR-Silty Sand ROAD BASE	2	3.5/5.5	2,6,9,17	19	M	
1.5			3.5/5.0				
	BL clayey silty Sand	3	6.0/8.0	9,12,15,9	9	S	
4.0			6.0/7.5				
	A Mix of BR clayey silty Sand, Some GRAVEL		8.5/10				
6.0							
	BR-BL-F-To M SAND AND GRAVEL		13.5/15				
	some silt						
			18.5/20				
9.0	EOB						
	INSTALLED WELL						

WATER LEVEL MEASUREMENTS

5.2 ft 17 comp.

DRILLING METHOD 4.25 HSA

SPECIAL NOTES ON BACK BOG/LLM/ORD

Environmental &
Foundation
Drilling, Inc.
217 Raemisch Road Waunakee, WI 53597
(608) 849-9896

MONITORING WELL LOG

PROJECT Cook Composites

LOCATION 9' FROM Bld NO 7

JOB # 1448A

WELL # VM-2

DATE COMPLETED: 6/14/93

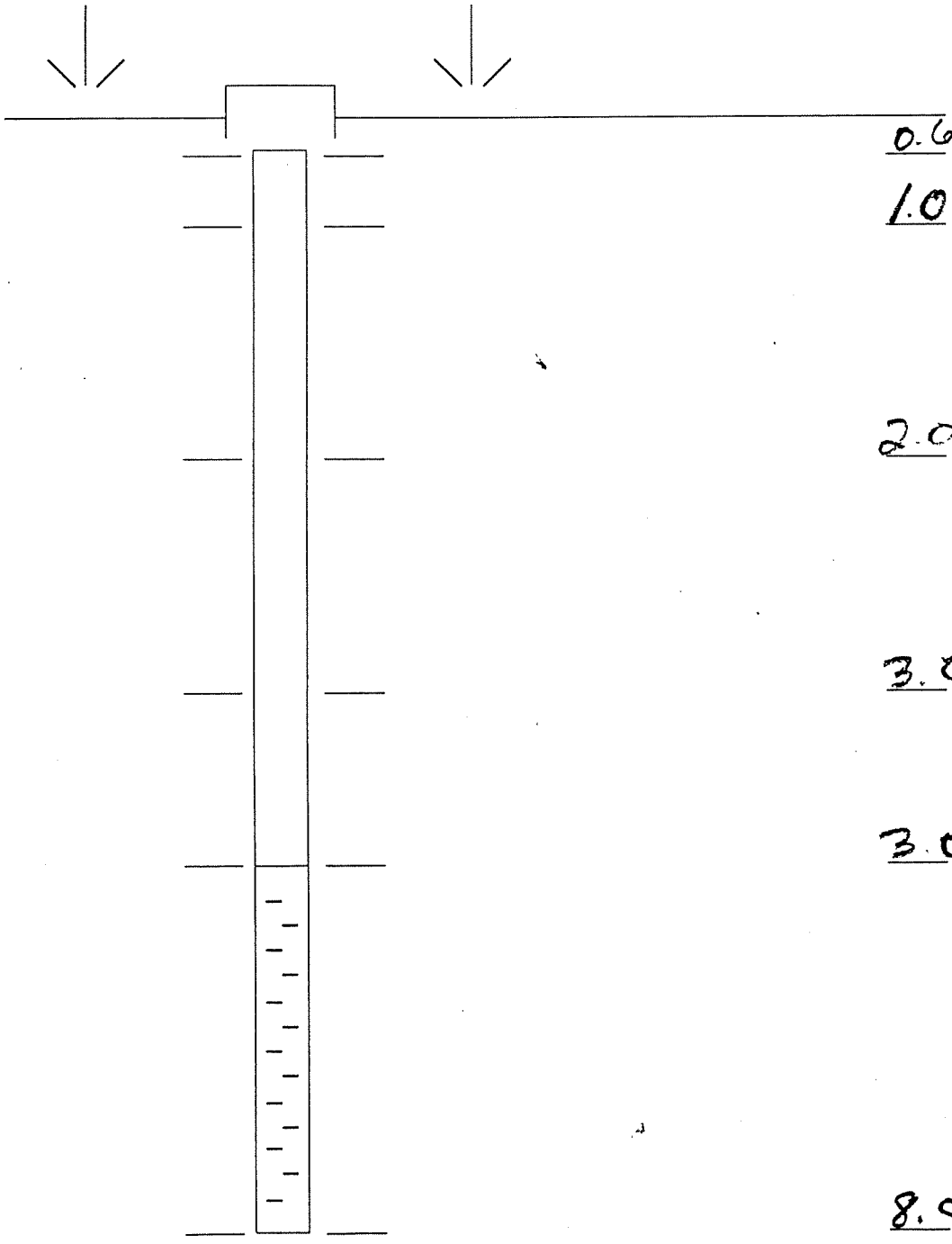
BORING METHOD: 4 1/4 HSA

BORE HOLE DIAMETER: 8.25 OD

PROTECTOR PIPE: FLUSH MOUNT

Depth below top of casing

Depth below ground surface



RISER PIPE
Type: PVC 2" Sch 40 FJT

Length: 2.5'

0.6 Top of Riser Pipe

1.0 Top of backfill

Type: Bentonite chips

Amount: 1 BAG

2.0 Top of Seal

Type: SILICA SAND

Amount: 1 50LB. BAG

3.0 Top of gravel pack

Type: 3/8" PEA GRAVEL WASHED

Amount: 5-50 LB. BAGS

3.0 Top of screen

Type: PVC 2" sch 40 FJ
20 SLOT

Length: 5'

8.0 Bottom of screen point

—X——X——X——X——X——X——X— Depth drilled (below G.S.) = 9.0

(not-to-scale)

ENVIRONMENTAL & FOUNDATION DRILLING INC.

Environmental &
Foundation
Drilling, Inc.
217 Raemisch Road Waunakee, WI 53597
(608) 849-9896

SOIL BORING LOG

BORING # VE-1

Date started 6/14/93
Date completed "/"/"
Page ____ of ____
JOB # 1448A

PROJECT: Cook Composites

LOCATION: 6' FROM FIRE ALARM

ELEVATION ____

DEPTH 0'-0"	SOIL CLASSIFICATION & NOTES	SAMPLE NUMBER	DEPTH	BLOW COUNTS	MOISTURE REC		Q P
	ASPHALT	1	1.0/3.0	5,3,4,3	13	M	
0.8			1.0/2.5				
	BR-Silty SAND and GRAVEL	2	3.5/5.5	2,3,5,7	12	M	
1.5			3.5/5.0				
	BL-Silty SAND	3	6.0/8.0	8,13,8,5	11	M	
3.5			6.0/7.5				
	BR-Silty SAND, some GRAVEL	4	8.5/10.5				
			8.5/10				
9.0	E.O.B.		13.5/15				
			18.5/20				

WATER LEVEL MEASUREMENTS

5.2 +- At comp.

DRILLING METHOD 6.25 HSA

SPECIAL NOTES ON BACK

POB/LLM/JRD

Environmental &
Foundation
Drilling, Inc.
217 Raemisch Road Waunakee, WI 53597
(608) 849-9896

MONITORING WELL LOG

PROJECT Cook Composites

LOCATION 6' FROM FIRE ALARM

JOB # 1448 A

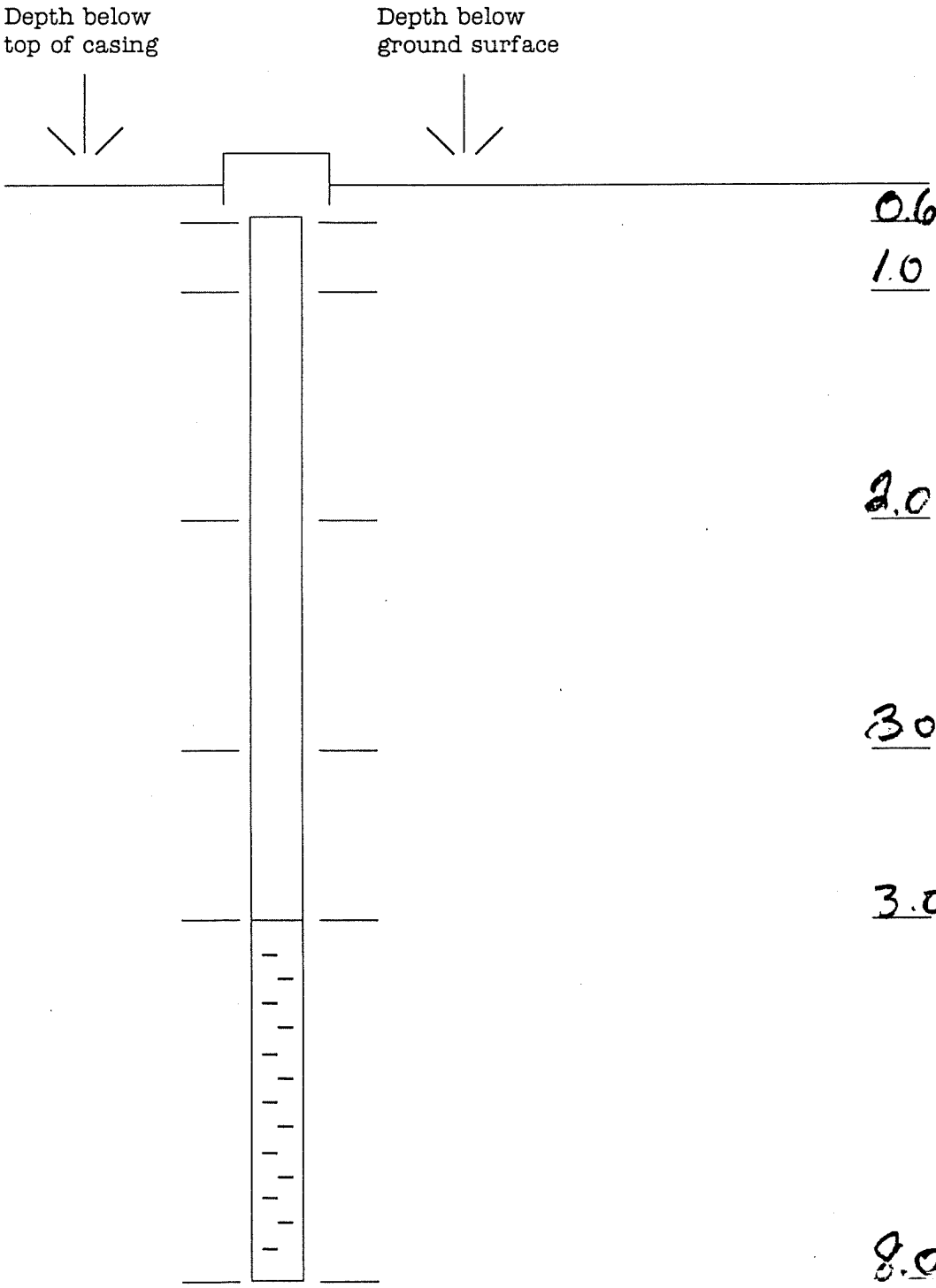
WELL # VE-1

DATE COMPLETED: 6/14/93

BORING METHOD: 6.25 HSA

BORE HOLE DIAMETER: 8.25 OSL

PROTECTOR PIPE: FLUSH MONT



RISER PIPE
Type: PVC 4" SCH-80 FJT

Length: 2.5

0.6 Top of Riser Pipe

1.0 Top of backfill

Type: Benton. te chips

Amount: 1 BAG CHIPS

2.0 Top of Seal

Type: Silica SAND

Amount: 1 50# LB BAG

3.0 Top of gravel pack

Type: 3/8 WASHED PEA GRAVEL

Amount: 6 - 5 gal. PAILS

3.0 Top of screen

Type: PVC 4" WIREWRAP SCH.80 20 SLOT

Length: 5'

9.0 Bottom of screen point

—X——X——X——X——X——X——X— Depth drilled (below G.S.) = 9.0

(not-to-scale)

ENVIRONMENTAL & FOUNDATION DRILLING INC.

222-1204

Environmental & Foundation Drilling, Inc.
217 Raemisch Road Waunakee, WI 53597
(608) 849-9896

SOIL BORING LOG

BORING # VE-2

Date started 6/14/93
Date completed 11/11/11
Page ____ of ____
JOB # 1448A

PROJECT: Cook Composites

LOCATION: 18' FROM ENSEMBLE

ELEVATION ____

DEPTH 0'-0"	SOIL CLASSIFICATION & NOTES	SAMPLE NUMBER	DEPTH	BLOW COUNTS	MOISTURE REC		Q P
	ASPHALT	1	1.0/3.0	2 2 2 2	6	M	
0.8			1.0/2.5				
	ROAD BASE silty SAND and GRAVEL	2	3.5/5.5	2,3,5,12	18	M	
1.5			3.5/5.0				
	BL-SILTY SAND	3	6.0/8.0	13 13 16 14	15	S	
4.6			6.0/7.5				
	BR-SILTY SAND and GRAVEL	4	8.5/10.5	3,4,7,8	7	S	
8.0			8.5/10				
	GRAY CLAY TRACE GRAVEL						
			13.5/15				
			18.5/20				
10.5	EOB.						
	INSTALLED WELL						

WATER LEVEL MEASUREMENTS

5.2' At Comp

DRILLING METHOD 6.25 H

SPECIAL NOTES ON BACK

DRD/PDG/LLM

Environmental &
Foundation
Drilling, Inc.
217 Raemisch Road Waunakee, WI 53597
(608) 849-9896

MONITORING WELL LOG

PROJECT Cook Composites

LOCATION 18' FROM ENSEPORATOR

JOB # 1448A

WELL # VE-2

DATE COMPLETED: 6/14/93

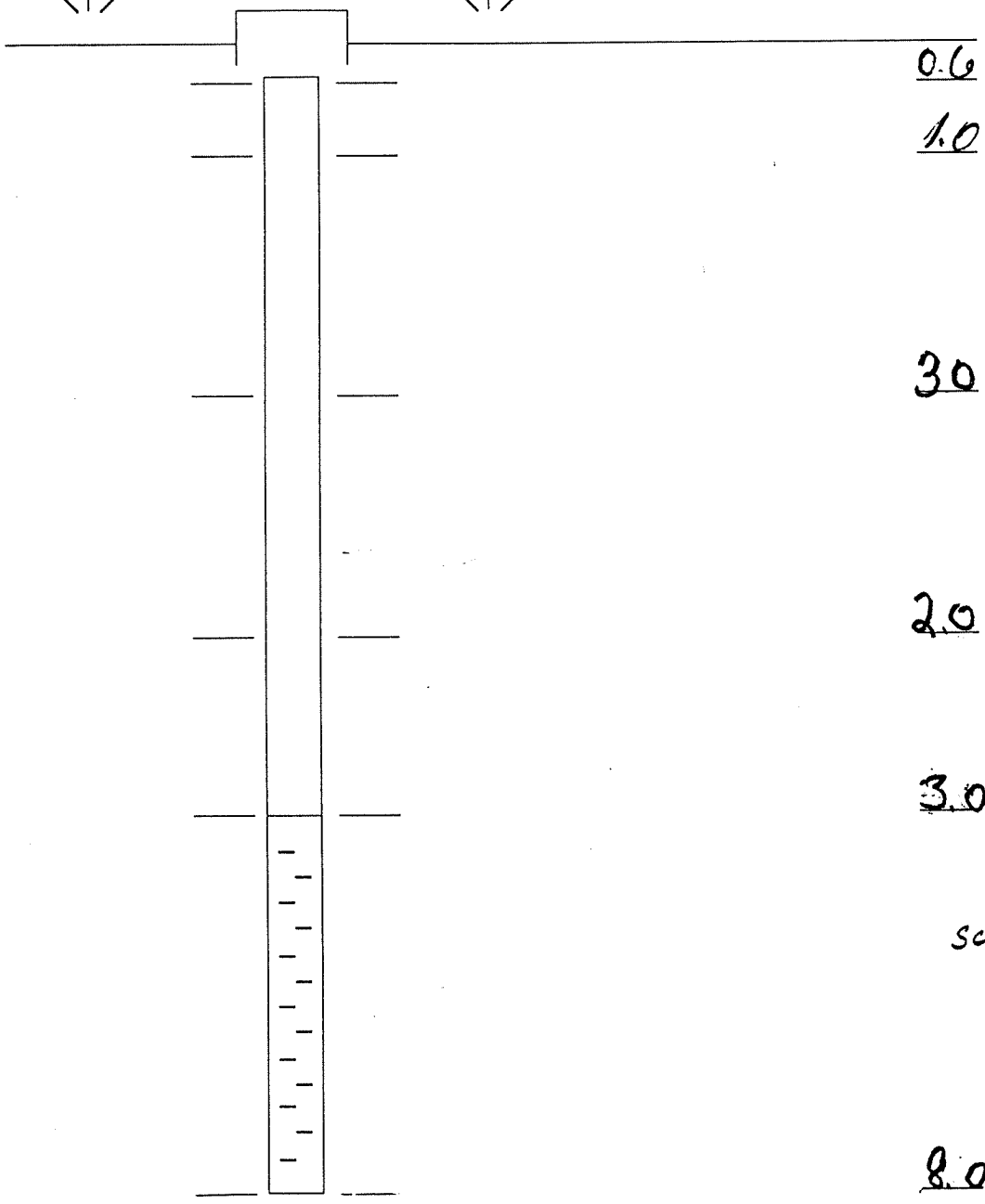
BORING METHOD: 6.25 HSA

BORE HOLE DIAMETER: 10.25 OSL

PROTECTOR PIPE: FLUSH MOUNT

Depth below top of casing

Depth below ground surface



RISER PIPE
Type: PVC 4" sch 80 FJT

Length: 2.5

0.6 Top of Riser Pipe

1.0 Top of backfill

Type: Bentonite chips

Amount: 1 BAG

3.0 Top of Seal

Type: Silica SAND

Amount: 1-50 LB. BAG

2.0 Top of gravel pack

Type: 3/8" PEA Washed gravel

Amount: 6-5 gal. pails

3.0 Top of screen

Type: PVC 4" WIRERAP sch.80 20 SLOT

Length: 5'

8.0 Bottom of screen point

Depth drilled (below G.S.) = 10.5

(not-to-scale)

ENVIRONMENTAL & FOUNDATION DRILLING INC.

State of Wisconsin
Department of Natural Resources

Route to:
Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☐ Underground Tanks ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION

Form 4400-113A Rev. 4-90

Facility/Project Name	Local Grid Location of Well	Well Name
Cook Composites/Milwaukee	☐ N. ☐ E. _____ ft. ☐ S. _____ ft. ☐ W.	VE-1
Facility License, Permit or Monitoring Number	**Grid Origin Location**	**Wis. Unique Well Number / DNR Well Number**
_ _ _ _ _ _ _	Lat. ____ ____ ____ Long. ____ ____ ____ or	_ _ _ _ _ _ _ / _ _ _
Type of Well Water Table Observation Well ■ 11; Piezometer ☐ 12	St. Plane _____ ft. N, _____ ft. E.	**Date Well Installed** 0 6 / 1 4 / 9 3
Distance Well Is From Waste/Source Boundary - ft.	**Section Location of Waste/Source** ☐ E. ___1/4 of ___1/4 of Sec. ____, T. ____ N, R. ____ ☐ W.	**Well Installed By: (Person's Name & Firm)** Lonnie McCauley; Environmental & Foundation Drilling, Inc.
Is Well A Point of Enforcement Std. Application? ☐ Yes ☐ No	**Location of Well Relative to Waste/Source** u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known	

A. Protective Pipe, top elevation _ _ _0.0_ ft. MSL

B. Well casing, top elevation _ _ _0.6_ ft. MSL

C. Land surface elevation _ _ _ _._ ft. MSL

D. Surface seal, bottom _ _ _ _._ ft MSL or _ _._ ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ■ MH ☐ CL ☐ CH ☐
Bedrock ☐

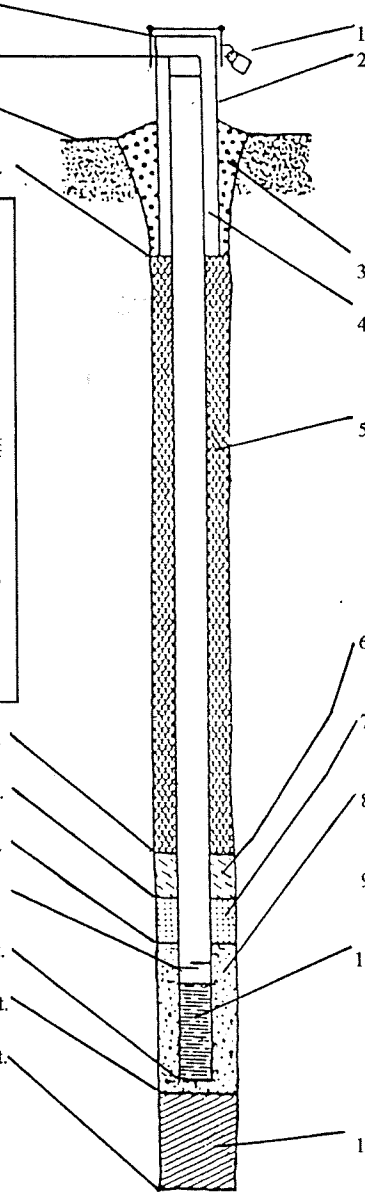
13. Sieve analysis attached? ☐ Yes ■ No

14. Drilling method used: Rotary ☐ 5 0; Hollow Stem Auger ■ 4 1; _____ Other ☐

15. Drilling fluid used: Water ☐ 0 2 Air ☐ 0 1; Drilling Mud ☐ 0 3 None ■ 9 9

16. Drilling additives used? ☐ Yes ■ No
Describe _____

17. Source of water (attach analysis):
_____



E. Bentonite seal, top _ _ _ _._ ft. MSL or _ _1.0 ft.

F. Fine sand, top _ _ _ _._ ft. MSL or _ _2.0 ft.

G. Filter pack, top _ _ _ _._ ft. MSL or _ _3.0 ft.

H. Screen joint, top _ _ _ _._ ft. MSL or _ _5.0 ft.

I. Well bottom _ _ _ _._ ft. MSL or _ _8.0 ft.

J. Filter pack, bottom _ _ _ _._ ft. MSL or _ _9.0 ft.

K. Borehole, bottom _ _ _ _._ ft. MSL or _ _9.0 ft.

L. Borehole, diameter _8.3 in.

M. O.D. well casing _4.2_ in.

N. I.D. well casing _4.0_ in.

1. Cap & lock? ■ Yes ☐ No

2. Protective cover pipe:
a. Inside diameter: _8.0 in.
b. Length: _1.0 ft.
c. Material: Steel ■ 0 4; _____ Other ☐
d. Additional protection? ☐ Yes ☐ No
If yes, describe: _____

3. Surface seal: Bentonite ■ 3 0; Concrete ☐ 0 1; _____ Other ☐

4. Material between well casing & protective pipe: Bentonite ☐ 3 0; Annular space seal ☐; _____ Other ☐

5. Annular space seal: a. Granular Bentonite ■ 3 3
b. _____Lbs/gal mud weight..... Bentonite-sand slurry ☐ 3 5
c. _____Lbs/gal mud weight..... Bentonite slurry ☐ 3 1
d. _____% Bentonite..... Bentonite-cement grout ☐ 5 0
e. 50# _____Ft³ volume added for any of the above
f. How installed: Tremie ☐ 0 1; Tremie pumped ☐ 0 2; Gravity ■ 0 8

6. Bentonite seal: a. Bentonite granules ■ 3 3
b. ☐ ¼ in. ☐ ⅜ in. ☐ ½ in. Bentonite pellets ☐ 3 2
c. _____ Other ☐

7. Fine sand material: Manufacturer, product name and mesh size
a. Portage, Silica, Fine
b. Volume added 50# ft³

8. Filter pack material: Manufacturer, product name and mesh size
a. Pea Gravel
b. Volume added 300# ft³

9. Well casing: Flush threaded PVC schedule 40 ☐ 2 3; Flush threaded PVC schedule 80 ■ 2 4; _____ Other ☐

10. Screen Material: PVC
a. Screen Type: Factory Cut ■ 1 1; Continuous slot ☐ 0 1; _____ Other ☐
b. Manufacturer Northern Air
c. Slot size: 0.010 in.
d. Slotted Length: 4.6 ft.

11. Backfill material (below filter pack): None ☐ 1 4
Flint Sand Other ■

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm
	Environmental & Foundation Drilling, Inc.

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than $10, nor more than $5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more that $10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

Route to:
Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☐ Underground Tanks ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION

Form 4400-113A Rev. 4-90

Facility/Project Name	Local Grid Location of Well	Well Name
Cook Composites/Milwaukee	☐ N. ☐ E. _____ ft. ☐ S. _____ ft. ☐ W.	VE-2
Facility License, Permit or Monitoring Number	**Grid Origin Location**	**Wis. Unique Well Number / DNR Well Number**
_ _ _ _ _ _ _	Lat. ___ ___ ___ Long. ___ ___ ___ or	_ _ _ _ _ _ _ _ _ _ / _ _ _
Type of Well Water Table Observation Well ■ 11 Piezometer ☐ 12	St. Plane _____ ft. N, _____ ft. E.	**Date Well Installed** 0 6 / 1 4 / 9 3
Distance Well Is From Waste/Source Boundary - ft.	**Section Location of Waste/Source** ☐ E. ___1/4 of ___1/4 of Sec. ____, T. ____ N, R. ____ ☐ W.	**Well Installed By: (Person's Name & Firm)** Lonnie McCauley, Environmental & Foundation Drilling, Inc.
Is Well A Point of Enforcement Std. Application? ☐ Yes ☐ No	**Location of Well Relative to Waste/Source** u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known	

A. Protective Pipe, top elevation ___0.0_ ft. MSL

B. Well casing, top elevation ___0.6_ ft. MSL

C. Land surface elevation _____._ ft. MSL

D. Surface seal, bottom _____._ ft MSL or ___._ ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ■ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ■ No

14. Drilling method used: Rotary ☐ 5 0; Hollow Stem Auger ■ 4 1; _____ Other ☐

15. Drilling fluid used: Water ☐ 0 2 Air ☐ 0 1 Drilling Mud ☐ 0 3 None ■ 9 9

16. Drilling additives used? ☐ Yes ■ No
Describe _____

17. Source of water (attach analysis):
_____

E. Bentonite seal, top _____._ ft. MSL or __1.0 ft.

F. Fine sand, top _____._ ft. MSL or __2.0 ft.

G. Filter pack, top _____._ ft. MSL or __3.0 ft.

H. Screen joint, top _____._ ft. MSL or __5.0 ft.

I. Well bottom _____._ ft. MSL or __8.0 ft.

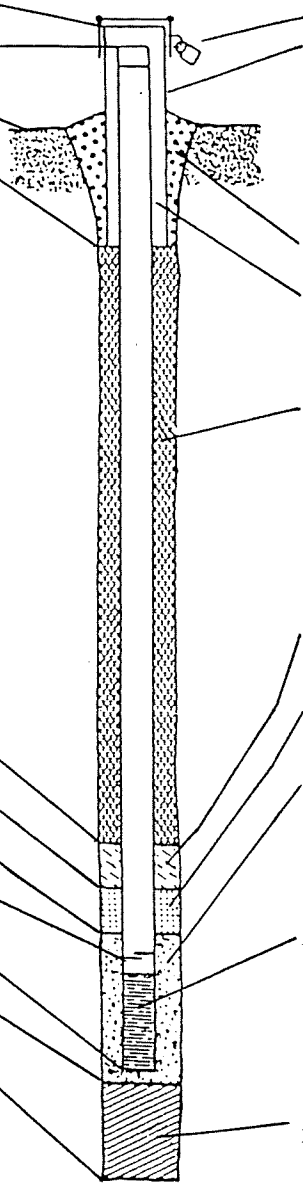
J. Filter pack, bottom _____._ ft. MSL or __8.0 ft.

K. Borehole, bottom _____._ ft. MSL or __9.0 ft.

L. Borehole, diameter _8.3 in.

M. O.D. well casing _4.2_ in.

N. I.D. well casing _4.0_ in.



1. Cap & lock? ■ Yes ☐ No
2. Protective cover pipe:
a. Inside diameter: _8.0 in.
b. Length: _1.0 ft.
c. Material: Steel ■ 0 4; _____ Other ☐
d. Additional protection? ☐ Yes ☐ No
If yes, describe: _____
3. Surface seal: Bentonite ■ 3 0; Concrete ☐ 0 1; _____ Other ☐
4. Material between well casing & protective pipe: Bentonite ☐ 3 0; Annular space seal ☐; _____ Other ☐
5. Annular space seal: a. Granular Bentonite ■ 3 3
b. _____Lbs/gal mud weight..... Bentonite-sand slurry ☐ 3 5
c. _____Lbs/gal mud weight..... Bentonite slurry ☐ 3 1
d. _____% Bentonite..... Bentonite-cement grout ☐ 5 0
e. 50# Ft³ volume added for any of the above
f. How installed: Tremie ☐ 0 1; Tremie pumped ☐ 0 2; Gravity ■ 0 8
6. Bentonite seal: a. Bentonite granules ■ 3 3
b. ☐ ¼ in. ☐ ⅜ in. ☐ ½ in. Bentonite pellets ☐ 3 2
c. _____ Other ☐
7. Fine sand material: Manufacturer, product name and mesh size
a. Portage, Silica, Fine
b. Volume added 50# ft³
8. Filter pack material: Manufacturer, product name and mesh size
a. Pea Gravel
b. Volume added 300# ft³
9. Well casing: Flush threaded PVC schedule 40 ☐ 2 3; Flush threaded PVC schedule 80 ■ 2 4; _____ Other ☐
10. Screen Material: PVC
a. Screen Type: Factory Cut ■ 1 1; Continuous slot ☐ 0 1; _____ Other ☐
b. Manufacturer Northern Air
c. Slot size: 0.010 in.
d. Slotted Length: 4.6 ft.
11. Backfill material (below filter pack): None ☐ 1 4
Flint Sand Other ■

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm
	Environmental & Foundation Drilling, Inc.

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APPENDIX B

SVE WELL SOIL LABORATORY RESULTS

RMT INC.
LABORATORIES

SAMPLE NARRATIVE
VOLATILE ORGANIC GC ANALYSIS

PROJECT NAME: CCP
PROJECT NUMBER: 1832.42
SAMPLE NUMBER(S): 1724-004
ANALYSIS TYPE: 8020
DATE: 07/12/93

Sample number 1724-004 had surrogate* recoveries that were outside acceptable limits. The recoveries achieved in the analyses were as follows:

Sample Number	Surrogate	Recovery Analysis 1 (%)	Recovery Analysis 2 (%)	Acceptable Recovery (%)	Analysis Reported
1724-004	1,4-Difluorobenzene 3-Chlorotoluene	99 316	85 132	45-121 44-118**	2nd

* Surrogates are organic compounds that are similar to analytes of interest in chemical composition, extraction, and chromatography, but that are not normally found in environmental samples. These compounds are spiked into all blanks, standards, samples, and spiked samples before analysis (USEPA SW846 9/86 3rd edition).

** There can be a number of reasons for surrogate "failure." It is not uncommon to encounter "low" surrogate recoveries during the analysis of soil samples because some soil constituents (i.e., clays) have an affinity to absorb the surrogate compounds. "High" surrogate recovery (more apparent surrogate is measured than what was added to the sample) can be caused by other compound(s) in the sample eluting at the same time as the surrogate, or more commonly encountered, by a relatively dirty sample being analyzed with many non-targeted compounds, which elute through the gas chromatograph column and effectively raise the "baseline" measure. In this case, sample VE-1 3.5-5.5', had a relatively clean chromatogram, and the apparent "high" surrogate recovery was probably a result of a single non-target compound co-eluting with the 3-chlorotoluene (there was also evidence of a few other non-target compound peaks present in other areas of the chromatogram). Because of this, we believe that the measured amounts of ethylbenzene and xylene are not substantively affected by the "high" surrogate recovery in sample VE-1 3.5-5.5' and that the data are usable for the objectives of this study.

RMT INC.
LABORATORIES

CLIENT: CCP
SAMPLE #: 1724-005
PROJECT #: 01832.42
WORK ORDER #: 1724
WI DNR LAB ID: 113138520

REPORT DATE: 07/12/93
COLLECTION DATE: 06/14/93
STATION ID: VE-1 6-8'

VOLATILE ORGANIC ANALYSIS REPORT

PARAMETER	RESULT	UNITS
Benzene	<6000	ug/kg dry wt.
Toluene	12000	ug/kg dry wt.
Chlorobenzene	<6000	ug/kg dry wt.
Ethylbenzene	37000	ug/kg dry wt.
Xylene, total	160000	ug/kg dry wt.
1,3-Dichlorobenzene	<6000	ug/kg dry wt.
1,2-Dichlorobenzene	<6000	ug/kg dry wt.
1,4-Dichlorobenzene	<6000	ug/kg dry wt.

Kevin P. Mack 7/12/93
Approval Signature

744 Heartland Trail, P.O. Box 8923, Madison, WI 53708-8923, Phone:(608) 831-4444

RMT INC.
LABORATORIES

CLIENT: CCP
SAMPLE #: 1724-006
PROJECT #: 01832.42
WORK ORDER #: 1724
WI DNR LAB ID: 113138520

REPORT DATE: 07/12/93
COLLECTION DATE: 06/14/93
STATION ID: VE-1 8.5-10.5'

VOLATILE ORGANIC ANALYSIS REPORT

PARAMETER	RESULT	UNITS
Benzene	<6000	ug/kg dry wt.
Toluene	24000	ug/kg dry wt.
Chlorobenzene	<6000	ug/kg dry wt.
Ethylbenzene	35000	ug/kg dry wt.
Xylene, total	160000	ug/kg dry wt.
1,3-Dichlorobenzene	<6000	ug/kg dry wt.
1,2-Dichlorobenzene	<6000	ug/kg dry wt.
1,4-Dichlorobenzene	<6000	ug/kg dry wt.

Kevin P. Meade 7/12/93
Approval Signature

744 Heartland Trail, P.O. Box 8923, Madison, WI 53708-8923, Phone:(608) 831-4444

RMT INC.
LABORATORIES

CLIENT: CCP
SAMPLE #: 1724-007
PROJECT #: 01832.42
WORK ORDER #: 1724
WI DNR LAB ID: 113138520

REPORT DATE: 07/12/93
COLLECTION DATE: 06/14/93
STATION ID: VE-2 1-3'

VOLATILE ORGANIC ANALYSIS REPORT

PARAMETER	RESULT	UNITS
Benzene	<290000	ug/kg dry wt.
Toluene	<290000	ug/kg dry wt.
Chlorobenzene	<290000	ug/kg dry wt.
Ethylbenzene	600000	ug/kg dry wt.
Xylene, total	3100000	ug/kg dry wt.
1,3-Dichlorobenzene	<290000	ug/kg dry wt.
1,2-Dichlorobenzene	<290000	ug/kg dry wt.
1,4-Dichlorobenzene	<290000	ug/kg dry wt.

Kevin P. Mack 7/12/93
Approval Signature

744 Heartland Trail, P.O. Box 8923, Madison, WI 53708-8923, Phone:(608) 831-4444

RMT INC.
LABORATORIES

CLIENT: CCP -
SAMPLE #: 1724-008
PROJECT #: 01832.42
WORK ORDER #: 1724
WI DNR LAB ID: 113138520

REPORT DATE: 07/12/93
COLLECTION DATE: 06/14/93
STATION ID: VE-2 3.5-5.5'

VOLATILE ORGANIC ANALYSIS REPORT

PARAMETER	RESULT	UNITS
Benzene	<280000	ug/kg dry wt.
Toluene	<280000	ug/kg dry wt.
Chlorobenzene	<280000	ug/kg dry wt.
Ethylbenzene	840000	ug/kg dry wt.
Xylene, total	3900000	ug/kg dry wt.
1,3-Dichlorobenzene	<280000	ug/kg dry wt.
1,2-Dichlorobenzene	<280000	ug/kg dry wt.
1,4-Dichlorobenzene	<280000	ug/kg dry wt.

Kevin P. Meech 7/12/93
Approval Signature

744 Heartland Trail, P.O. Box 8923, Madison, WI 53708-8923, Phone:(608) 831-4444

RMT INC.
LABORATORIES

CLIENT: CCP -
SAMPLE #: 1724-009
PROJECT #: 01832.42
WORK ORDER #: 1724
WI DNR LAB ID: 113138520

REPORT DATE: 07/12/93
COLLECTION DATE: 06/14/93
STATION ID: VE-2 6-8'

VOLATILE ORGANIC ANALYSIS REPORT

PARAMETER	RESULT	UNITS
Benzene	<110000	ug/kg dry wt.
Toluene	<110000	ug/kg dry wt.
Chlorobenzene	<110000	ug/kg dry wt.
Ethylbenzene	300000	ug/kg dry wt.
Xylene, total	1200000	ug/kg dry wt.
1,3-Dichlorobenzene	<110000	ug/kg dry wt.
1,2-Dichlorobenzene	<110000	ug/kg dry wt.
1,4-Dichlorobenzene	<110000	ug/kg dry wt.

Kevin P. Meeh 7/12/93
Approval Signature

744 Heartland Trail, P.O. Box 8923, Madison, WI 53708-8923, Phone:(608) 831-4444

RMT INC.
LABORATORIES

Organic GC Data Qualifier Sheet

B(n)	Analyte present in the method blank. If the processes that were applied to the sample were applied to the method blank, the value of the analyte in the method blank would likely be "n".
C	Elevated detection limit (see Case Narrative).
E	Analyte concentration exceeds calibration range (see Case Narrative).
F	Repeated surrogate failure (see Case Narrative).
H(n)	Analysis performed "n" days past holding time.
NR	Not required.
P	Sample vial used for previous analysis.
R	Relative percent difference high (see Case Narrative).
T	Retention time variance; analyte identification not confirmed.
W	Sample received with headspace.

Effective 06/15/93

APPENDIX C

SVE WELL SOIL CHARACTERISTICS

RMT Soils Laboratory - Moisture Content Determination

PROJECT:CCP

JOB #:1832.42

Tech: DEO 06/21/93 QC DLH 6-23-93
Input: DLH 06/22/93 QA DLH 6-28-93

BORING	SAMPLE	DEPTH	TARE	WET WT	DRY WT	% MOISTURE
VE-1		1-3'	84.78	340.93	321.35	8.3
VE-1		3.5-5.5'	83.30	255.73	233.30	15.0
VE-1		6-8'	84.18	255.42	240.11	9.8
VE-2		1-3'	86.81	203.08	188.99	13.8
VE-2		3.5-5.5'	86.56	380.56	330.18	20.7
VE-2		6-8'	87.43	352.40	329.23	9.6
VE-2		8.5-10.5'	86.70	235.32	211.35	19.2

RMT Soils Laboratory - Atterberg Limit Determination

PROJECT: CCP

JOB #: 1832.42

Tech: DEO 06/21/93 By QC [signature] Date 6-25-93
Input: DLH 06/25/93 QA [signature] 6-28-93

BORING: VE-1 DEPTH: 1-3'

	Natural Moisture	LIQUID LIMIT		OVEN LL	PLASTIC LIMIT
TARE		115.39	114.57		114.59
BLOWS		24	24		
WET WT		142.10	143.02		188.52
DRY WT		137.81	138.45		178.39
% WATER		19.0	19.0		15.9

BORING	VE-1
DEPTH	1-3'
% WATER	
LL	19
PL	16
PI	3
CLASS	ML

BORING: VE-1 DEPTH: 3.5-5-5'

	Natural Moisture	LIQUID LIMIT		OVEN LL	PLASTIC LIMIT
TARE		116.34	115.07		114.93
BLOWS		26	28		
WET WT		143.12	143.69		183.23
DRY WT		138.39	138.65		173.68
% WATER		21.6	21.7		16.3

BORING	VE-1
DEPTH	3.5-5-5'
% WATER	
LL	22
PL	16
PI	6
CLASS	CL-ML

BORING: VE-1 DEPTH: 6-8'

	Natural Moisture	LIQUID LIMIT		OVEN LL	PLASTIC LIMIT
TARE		114.01	115.13		
BLOWS		23	23		NO P.L.
WET WT		143.16	147.18		
DRY WT		139.36	142.95		
% WATER		14.8	15.1		

BORING	VE-1
DEPTH	6-8'
% WATER	
LL	15
PL	0
PI	NP
CLASS	NP

RMT Soils Laboratory - Atterberg Limit Determination

PROJECT: CCP

JOB #: 1832.42

Tech: DEO 06/21/93 QC
Input: DLH 06/25/93 QA

By Date
6-25-93
6-28-93

BORING: VE-2 DEPTH: 1-3'

	Natural Moisture	LIQUID LIMIT		OVEN DRY LL	PLASTIC LIMIT
TARE		115.41	114.36		115.32
BLOWS		23	24		
WET WT		140.19	139.12		166.74
DRY WT		132.98	131.93		156.57
% WATER		40.6	40.7		24.7

BORING	VE-2
DEPTH	1-3'
% WATER	
LL	41
PL	25
PI	16
CLASS	CL

BORING: VE-2 DEPTH: 3.5-5.5'

	Natural Moisture	LIQUID LIMIT		OVEN DRY LL	PLASTIC LIMIT
TARE		115.47	114.19		115.98
BLOWS		26	26		
WET WT		144.76	142.51		171.22
DRY WT		137.62	135.61		162.05
% WATER		32.4	32.4		19.9

BORING	VE-2
DEPTH	3.5-5.5'
% WATER	
LL	32
PL	20
PI	12
CLASS	CL

USE CURSOR

BORING: VE-2 DEPTH: 6-8'

	Natural Moisture	LIQUID LIMIT		OVEN DRY LL	PLASTIC LIMIT
TARE		115.60	116.35		115.39
BLOWS		22	24		
WET WT		143.87	142.97		182.88
DRY WT		138.87	138.30		172.56
% WATER		21.2	21.2		18.1

BORING	VE-2
DEPTH	6-8'
% WATER	
LL	21
PL	18
PI	3
CLASS	ML

RMT Soils Laboratory - Atterberg Limit Determination

PROJECT: CCP

JOB #: 1832.42

Tech: DEO 06/21/93 QC
Input: DLH 06/25/93 QA

By Date

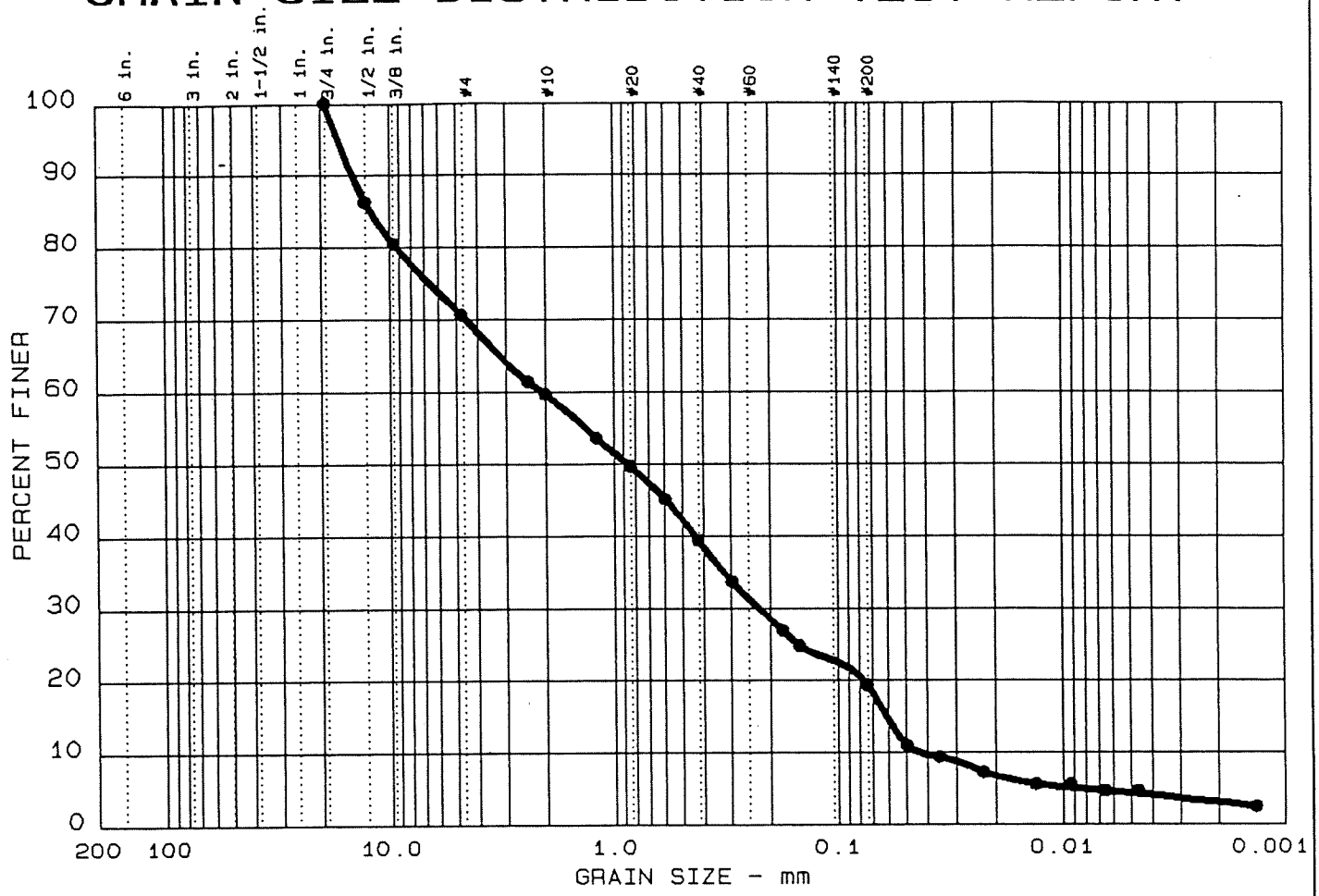
BORING: VE-2 DEPTH: 8.5-10.5'

	Natural Moisture	LIQUID LIMIT		OVEN LL	PLASTIC LIMIT
TARE		115.24	114.22		114.32
BLOWS		23	24		
WET WT		144.85	144.24		182.22
DRY WT		138.22	137.51		173.11
% WATER		28.6	28.8		15.5

BORING	VE-2
DEPTH	8.5-10.5'
% WATER	
LL	29
PL	15
PI	14
CLASS	CL

✓ DLH 6-30-93
✓ [illegible] 7-1-93

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
●	2	0.0	29.3	51.3	15.1	4.3

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	19	3	12.02	2.07	0.87	0.226	0.0603	0.0437	0.57	47.3

MATERIAL DESCRIPTION	USCS	AASHTO
● Silty sand with gravel	SM	

Project No.: 1832.42
Project: CCP
◆ Location: VE-1, 1-3'

Date: 06-28-93

GRAIN SIZE DISTRIBUTION TEST REPORT

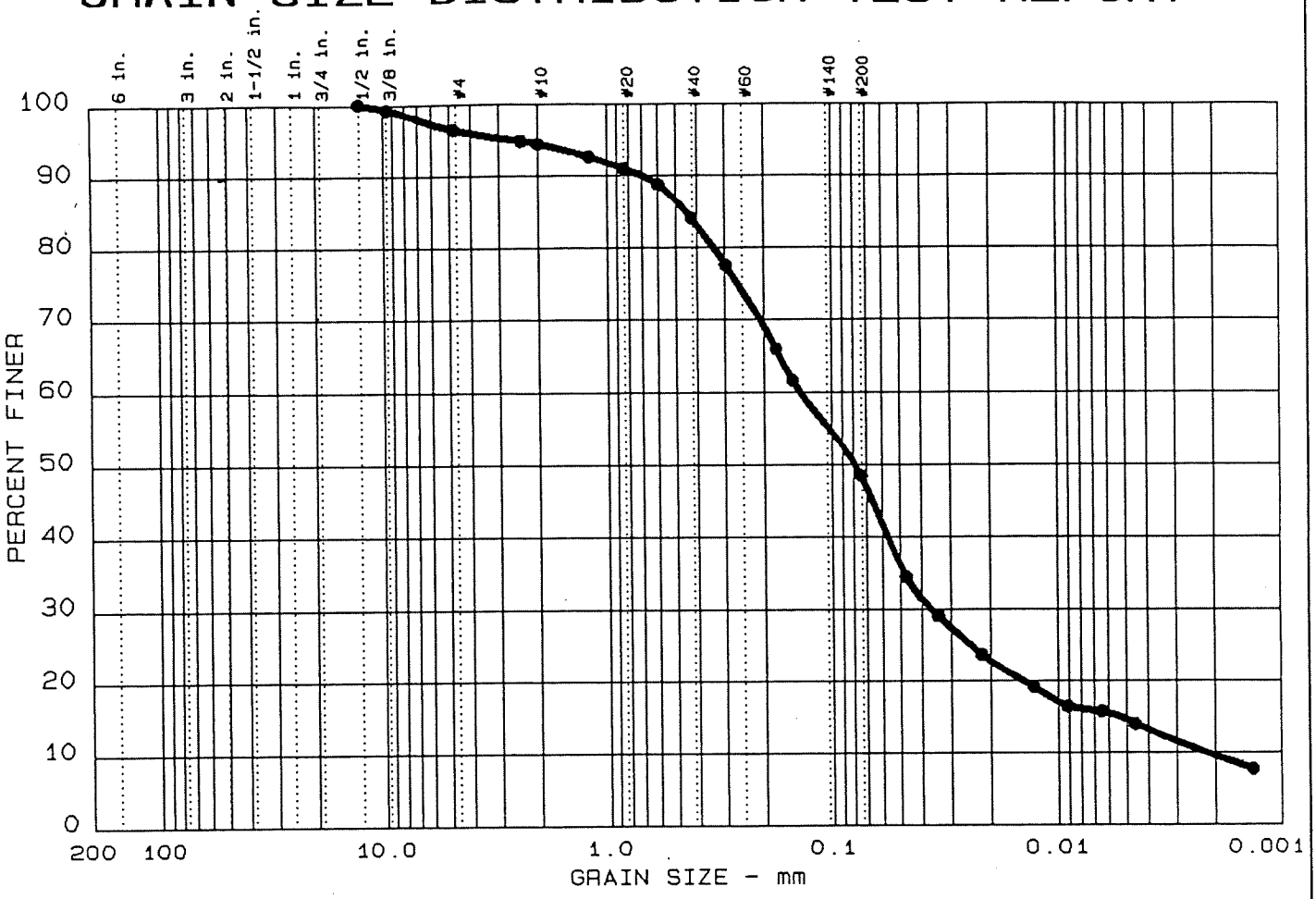
RMT, INC.

Remarks:

Figure No. _____

✓ DLH 6-30-93
✓ JDL 7-1-93

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
●	3	0.0	3.5	48.1	33.8	14.6

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	22	6	0.44	0.14	0.08	0.036	0.0054	0.0022	4.37	63.1

MATERIAL DESCRIPTION	USCS	AASHTO
● Silty, clayey sand	SC-SM	

Project No.: 1832.42
Project: CCP
● Location: VE-1, 3.5-5.5'

Date: 06-28-93

GRAIN SIZE DISTRIBUTION TEST REPORT

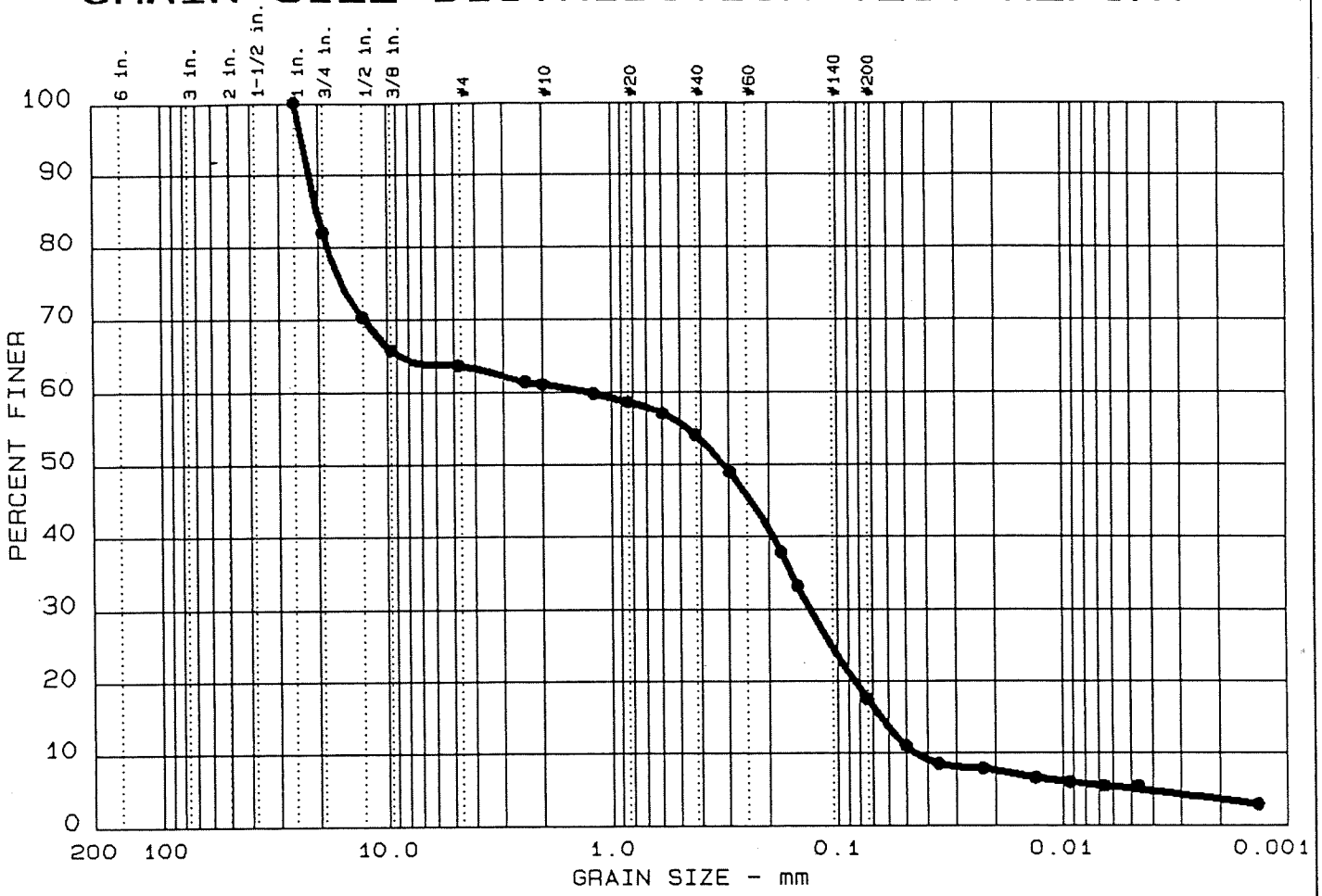
RMT, INC.

Remarks:

Figure No. _____

✓ PLH 6-30-93
✓ JDH 7-1-93

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
●	4	0.0	36.3	46.2	12.4	5.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	NP	NP	20.14	1.26	0.32	0.132	0.0644	0.0451	0.31	27.9

MATERIAL DESCRIPTION	USCS	AASHTO
● Silty sand with gravel	SM	

Project No.: 1832.42
Project: CCP
● Location: VE-1, 6-8'

Date: 06-28-93

Remarks:

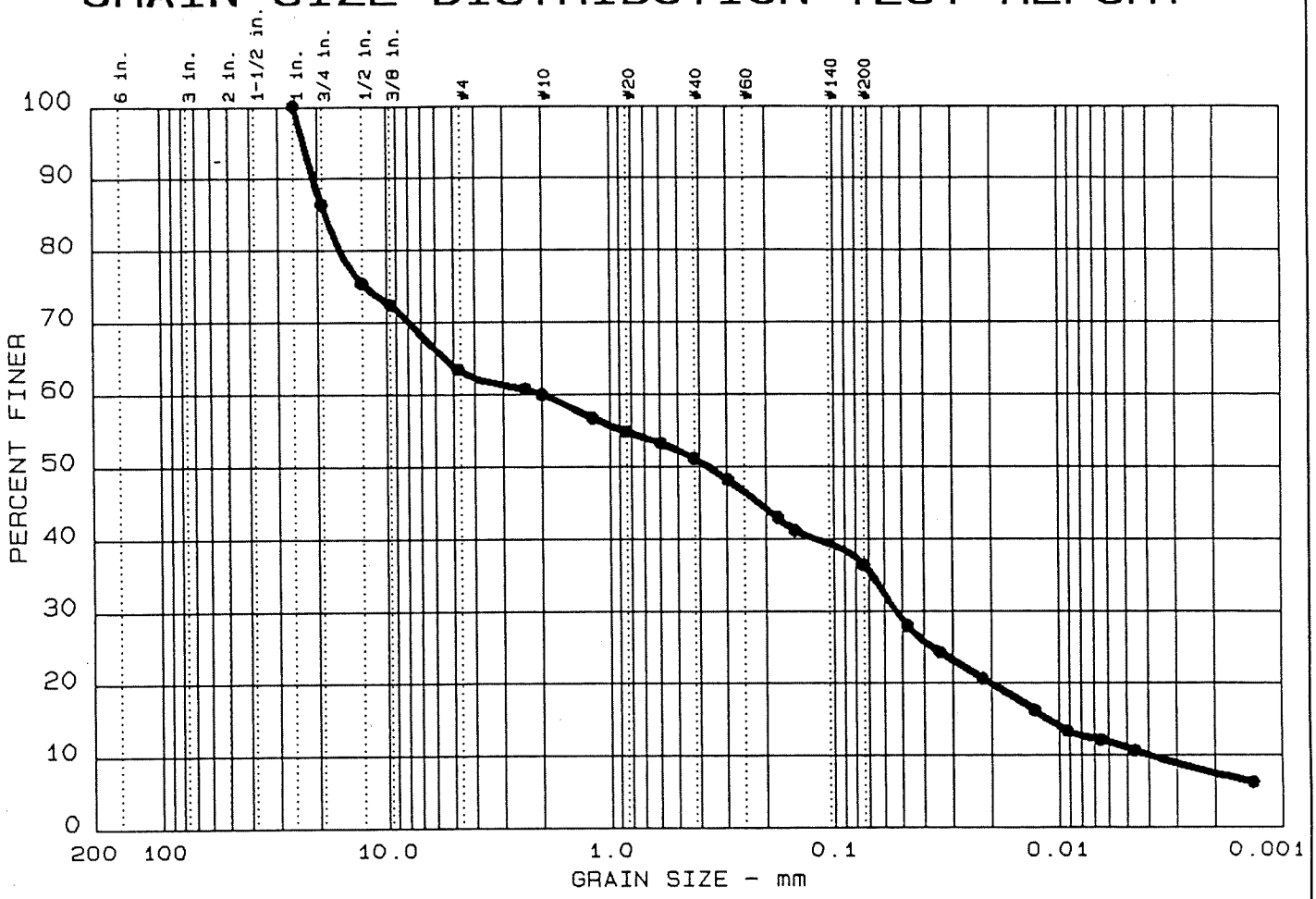
GRAIN SIZE DISTRIBUTION TEST REPORT

RMT, INC.

Figure No. _____

✓ DLH 6-30-93
✓ DLH 7-1-93

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
●	5	0.0	36.5	27.1	25.4	11.0

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_U
●	41	16	18.41	2.00	0.36	0.053	0.0112	0.0040	0.35	501.2

MATERIAL DESCRIPTION	USCS	AASHTO
● Clayey gravel with sand	GC	

Project No.: 1832.42
Project: CCP
● Location: VE-2, 1-3'

Date: 06-28-93

GRAIN SIZE DISTRIBUTION TEST REPORT

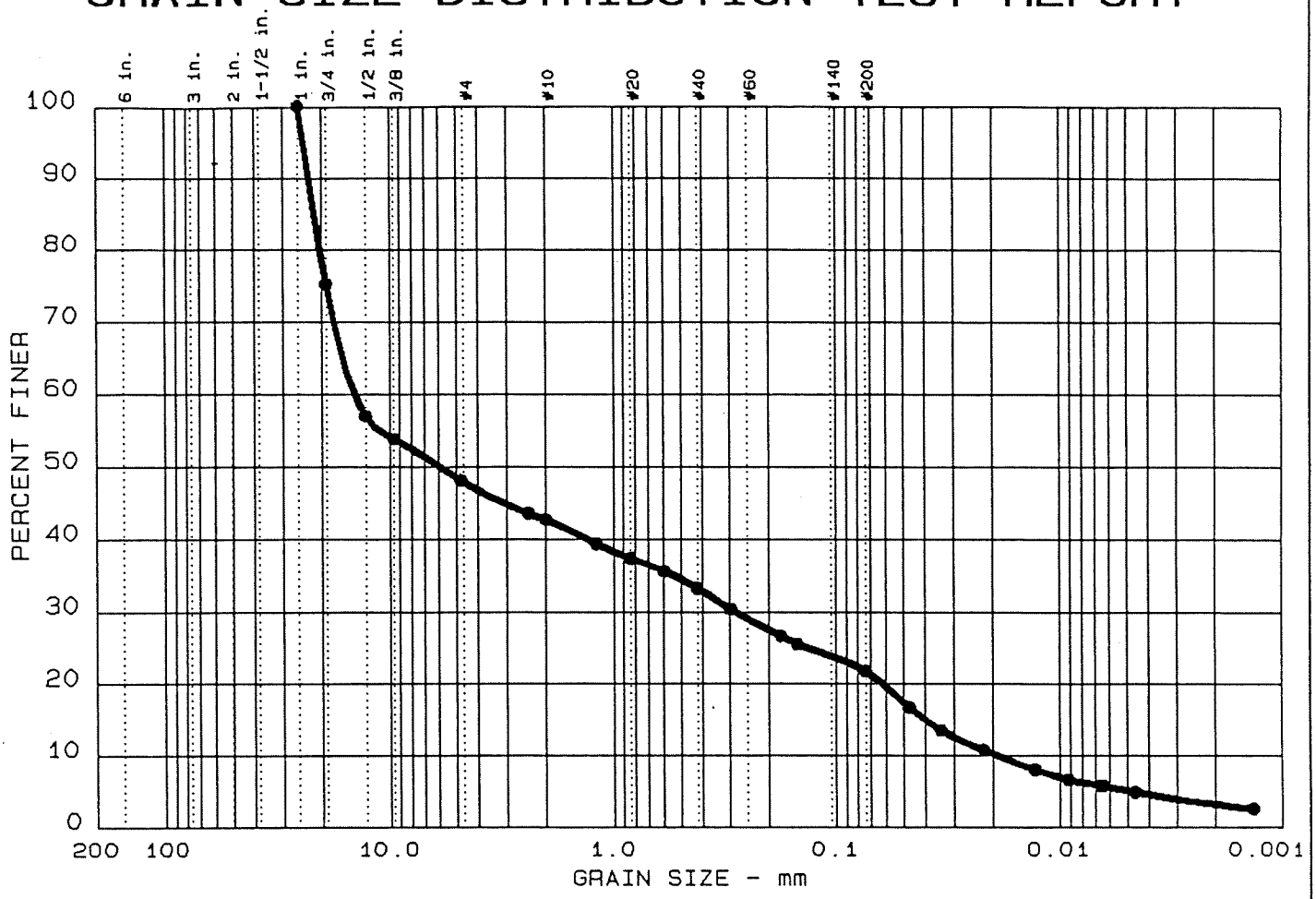
RMT, INC.

Remarks:

Figure No. _____

✓ DLH 6-30-93
✓ DH 7-1-93

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
●	7	0.0	52.0	26.3	16.7	5.0

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	21	3	21.50	14.21	5.92	0.283	0.0400	0.0189	0.30	749.9

MATERIAL DESCRIPTION	USCS	AASHTO
● Silty gravel with sand	GM	

Project No.: 1832.42
Project: CCP
● Location: VE-2, 6-8'

Date: 06-28-93

Remarks:

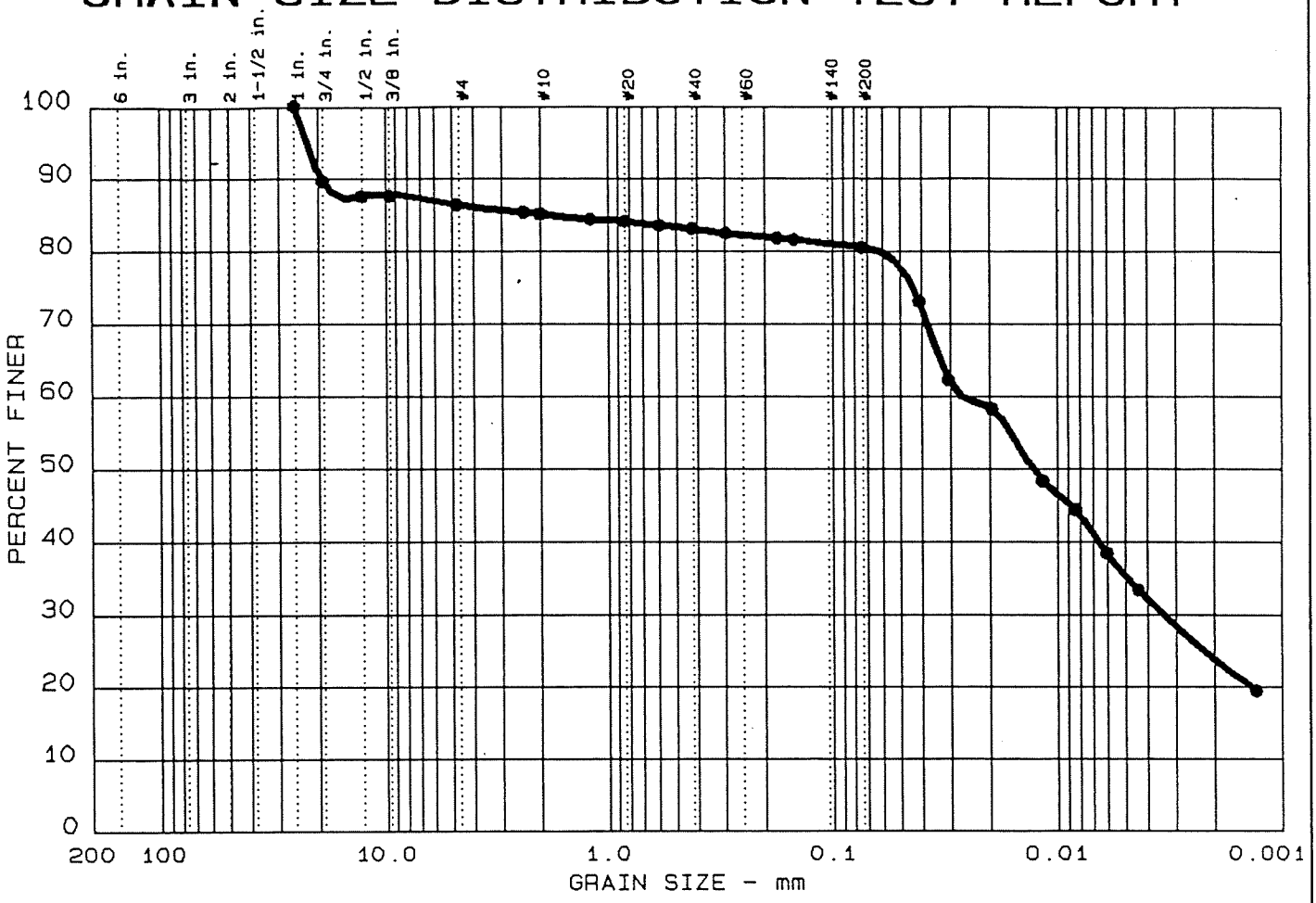
GRAIN SIZE DISTRIBUTION TEST REPORT

RMT, INC.

Figure No. _____

✓DLH 7-2-93
✓JDF 7-2-93

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
●	8	0.0	13.6	5.9	45.3	35.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	29	14	1.78		0.01	0.003				

	MATERIAL DESCRIPTION	USCS	AASHTO
●	Lean clay with gravel	CL	

Project No.: 1832.42
Project: CCP
● Location: VE-2, 8.5-10.5'

Date: 06-28-93

GRAIN SIZE DISTRIBUTION TEST REPORT

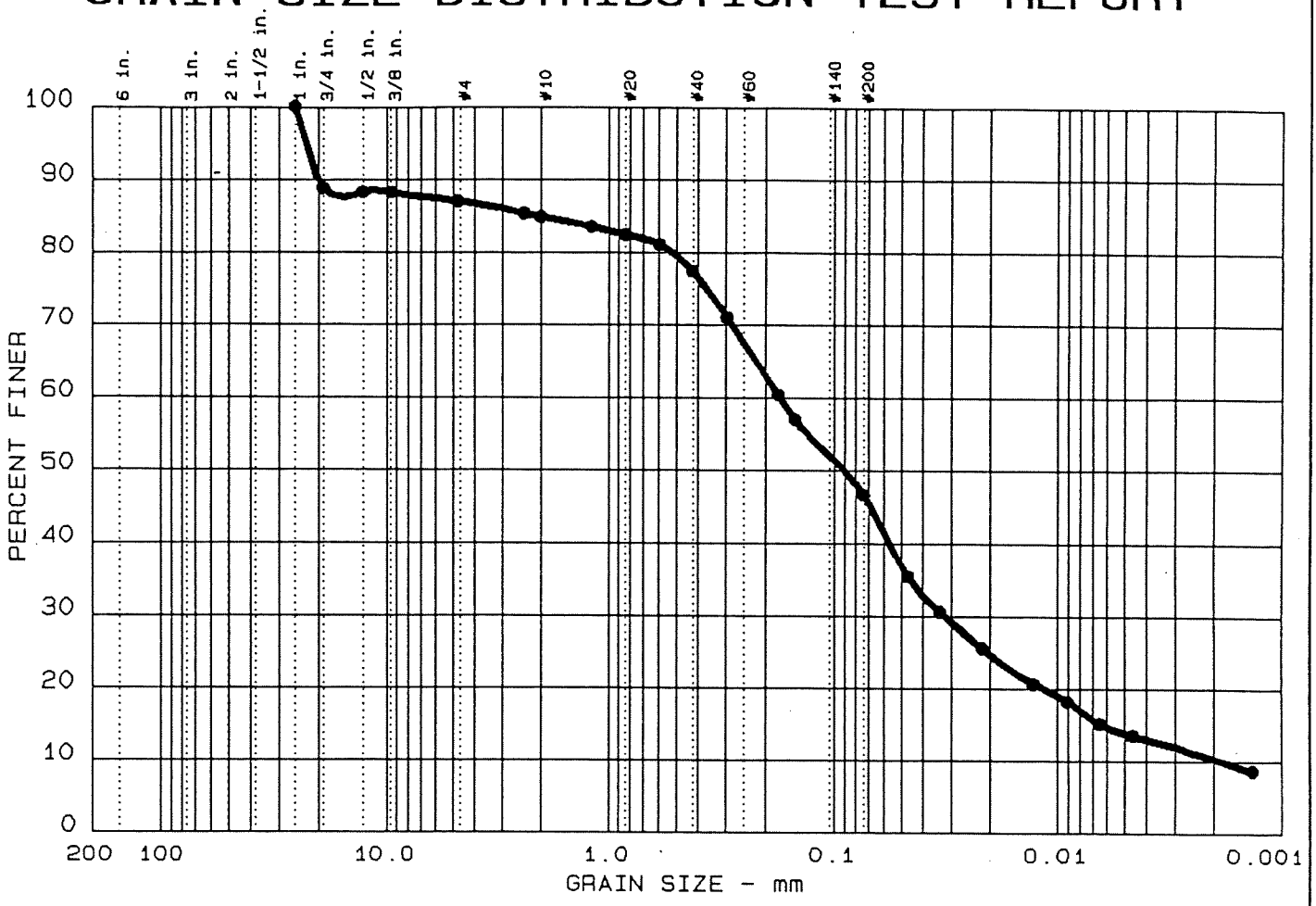
RMT, INC.

Remarks:

Figure No. _____

✓ HDW 7-2-93 ✓ RLT 7-2-93

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
●	6	0.0	12.9	40.5	32.7	13.9

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	32	12	2.04	0.17	0.09	0.032	0.0063	0.0018	3.24	95.5

MATERIAL DESCRIPTION	USCS	AASHTO
● Clayey sand	SC	

Project No.: 1832.42
Project: CCP
● Location: VE-2, 3.5-5.5'

Date: 06-28-93

GRAIN SIZE DISTRIBUTION TEST REPORT

RMT, INC.

Remarks:

Figure No. _____

APPENDIX D

GC QUALITY ASSURANCE AND CONTROL MEASURES

APPENDIX D

GC QUALITY ASSURANCE AND CONTROL MEASURES

Quality assurance and control for the gas analysis included the following steps:

- The run (series of samples) is started with an instrument blank and syringe blank. A standard is injected for calibration. Two different instrument libraries were used to keep soil and water calibration separate.

- Gas from the sample bottles was injected and analyzed. Injections were repeated until the peaks of interest were on scale. If there were any questions about an injection, it was repeated until the measurement was duplicated to within 15 percent.

- Syringe cleanliness was checked by injecting room air whenever there was a question regarding syringe contamination. If syringe contamination was found, the syringe needle was replaced, the syringe was cleaned with air, and the syringe was rechecked before being put back into service.

- Sample VOC concentrations from duplicated runs were recorded on sample data sheets and stored with the GC operating sheets in the GC analysis project notebook.

- Every GC injection was recorded on the GC operations sheets, with information on the injection number, injection time, injection volume, gain, and sample identification.

- The GC recorder output was marked with the date, the run number, and the well boring number and was saved for future reference.

- Results were checked for quality assurance/quality control in RMT's Madison office by comparing the tabulated results with the original chromatogram.

- Limits of Detection (LOD) were calculated from the detector response (in PPB-V/V-sec), the minimum area recorded by the GC (100 mV-sec), and the injection volume as follows.

$$\text{LOD, PPB} = (\text{response to standard, } \frac{\text{PPB-V}}{\text{V-sec}})(0.100 \text{ V-sec})\ \frac{\text{std. inj. vol. uL}}{\text{(sample inj. vol. uL)}}$$

APPENDIX E

PILOT TESTS AND OPERATIONAL LOGS

SOIL VAPOR EXTRACTION SYSTEM
OPERATIONS LOG

CCP-SAUKVILLE

File:SVECCP.WK1
Author:PJG
Revision:org

PROJECT NUMBER: 1832.42

		-- SYSTEM DATA --				-- OFF-GAS ANALYSIS --				-- CALCULATED DATA --				-- CUMULATIVE RECOVERY --	
Sample Date	Time	W'head Vacuum (in w.c.)	System Vacuum (in w.c.)	Diff. Press. (in w.c)	W'head Temp. (deg F)	Benzene (lb/cf)	Ethyl-Benzene (lb/cf)	Toluene (lb/cf)	Total Xylenes (lb/cf)	Cum'tive Run Time (hrs)	Airflow (cfm)	Total VOC Em'sion Rate (lb/hr)	Benzene Em'sion Rate (lb/hr)	Total VOC's (lbs)	Benzene (lbs)
VE-1															
15-Jun-93	09:30 AM	42	42	0.60	58					0.00	45				
15-Jun-93	10:00 AM	40	40	0.59	59		7.9E-06	6.1E-06	3.7E-05	0.50	44	1.4E-01			
15-Jun-93	10:30 AM	37	37	0.60	59		9.6E-06	8.3E-06	4.1E-05	1.00	45	1.6E-01			
15-Jun-93	11:00 AM	36	36	0.66	59		9.2E-06	7.7E-06	4.0E-05	1.50	47	1.6E-01			
15-Jun-93	11:30 AM	36	36	0.60	59		7.3E-06	5.1E-06	3.4E-05	2.00	44	1.2E-01			
15-Jun-93	12:00 PM	21	21	0.51	59		5.9E-06	4.6E-06	2.8E-05	2.50	40	9.3E-02			
15-Jun-93	12:15 PM	21	21	0.50	59					2.75	40				
15-Jun-93	12:25 PM	21	21	0.50	59		7.3E-06	5.4E-06	3.3E-05	2.92	40	1.1E-01			
VE-2															
15-Jun-93	12:30 PM	21	21	0.36	59					0.00	34				
15-Jun-93	01:00 PM	24	24	0.33	59	2.0E-07	1.6E-05	1.2E-05	6.2E-05	0.50	32	1.8E-01	3.9E-04		
15-Jun-93	01:30 PM	24	24	0.34	59	2.3E-07	1.8E-05	1.4E-05	6.9E-05	1.00	33	2.0E-01	4.5E-04		
15-Jun-93	02:00 PM	24	24	0.34	59	2.4E-07	1.9E-05	1.3E-05	7.0E-05	1.50	33	2.0E-01	4.7E-04		
15-Jun-93	02:30 PM	36	36	0.68	59	2.8E-07	2.2E-05	1.5E-05	7.7E-05	2.00	47	3.2E-01	8.0E-04		
15-Jun-93	03:00 PM	35	35	0.58	59	2.7E-07	2.1E-05	1.5E-05	7.8E-05	2.50	44	3.0E-01	7.1E-04		
15-Jun-93	03:30 PM	35	35	0.50	59	2.2E-07	1.8E-05	1.2E-05	6.4E-05	3.00	41	2.3E-01	5.4E-04		

APPENDIX F
ANALYTICAL RESULTS

PORTABLE GC RESULTS SUMMARY

6/15/93 Project Name: CCP SAUKVILLE PROJ. #1832.42

Note: All Units in lbs/ft^3

Sample ID	Benzene	Toluene	Ethyl-benzene	Total Xylene	Total
SVE1 10:00		6.1 E-6	7.9 E-6	3.7 E-5	5.1 E-5
" 10:30		8.3 E-6	9.6 E-6	4.1 E-5	5.9 E-5
" 11:00		7.7 E-6	9.2 E-6	4.0 E-5	5.7 E-5
" 11:30		5.1 E-6	7.3 E-6	3.4 E-5	4.6 E-5
" 12:00		4.6 E-6	5.9 E-6	2.8 E-5	3.9 E-5*
" 12:00		5.4 E-6	7.3 E-6	3.3 E-5	4.6 E-5
*GC FLOW-PRESSURE ADJUSTED					
SVE2 13:00	2.0 E-7	1.2 E-5	1.6 E-5	6.2 E-5	9.0 E-5
" 13:30	2.3 E-7	1.4 E-5	1.8 E-5	6.9 E-5	1.0 E-4
" 14:00	2.4 E-7	1.3 E-5	1.9 E-5	7.0 E-5	1.0 E-4
" 14:30	2.8 E-7	1.5 E-5	2.2 5-5	7.7 E-5	1.1 E-4
" 15:00	2.7 E-7	1.5 E-5	2.1 E-5	7.8 E-5	1.1 E-4
" 15:30	2.2 E-7	1.2 E-5	1.8 E-5	6.4 E-5	9.4 E-5

Notes:

BD = Below detection (using maximum sensitivity of operation conditions described in sampling procedures).

ND = Nondetect (no concentration detected for operation conditions less than maximum sensitivity).