

AD-A281 934



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Final Remedial Investigation Report

Volume II of III
Appendices

Phase II Remedial Investigation for
Cold Regions Research and Engineering
Laboratory (CRREL)
Hanover, New Hampshire

20030305221

Submitted to

U.S. Army Environmental
Center (USAEC)
Aberdeen, Maryland

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Revision 2
March 18, 1994

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ADL Reference 67063-61

94 7 12 4 1

DAAA15-91-D-0016

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REPORT DOCUMENTATION PAGE

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1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE MARCH 18, 1994	3. REPORT TYPE AND DATES COVERED FINAL: 30 DEC 92 - 31 MAY 94	
4. TITLE AND SUBTITLE TITLE: PHASE II REMEDIAL INVESTIGATION FOR COLD REGIONS RESEARCH & ENGINEERING LABORATORY (CRREL), HANOVER, N.H. SUBTITLES: 1 - volume 1 of IV, Sections 1.0 THRU 8.0. 2. VOLUME 2 OF 3, APPENDICES 3-VOL 3OF3, APPEN.			5. FUNDING NUMBERS C-DAAA15-91-D-0016 TA-0003	
6. AUTHOR(S)				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) ARTHUR D. LITTLE, INC. ACORN PARK CAMBRIDGE, MASSACHUSETTS 02140-2390			8. PERFORMING ORGANIZATION REPORT NUMBER ADL REFERENCE 67063-61	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. ARMY ENVIRONMENTAL CENTER ATTN: SFIM-AEC-IRA ABERDEEN PROVING GROUND, MD 21010-5401			10. SPONSORING / MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION / AVAILABILITY STATEMENT UNLIMITED			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) THE DOCUMENT DRAWS CONCLUSIONS AS TO THE NATURE AND EXTEND OF SOIL AND GROUNDWATER CONTAMINATION CREATED BY PAST SPILLS, DISPOSAL PRACTICES, AND OPERATIONS AND DRAWS CONCLUSIONS REGARDING THE RISKS THE CONTAMINANTS POSE TO HUMAN HEALTH AND THE ENVIRONMENT AT CRREL. TWO PRIMARY CLASSES OF CONTAMINANTS, CHLORINATED HYDROCARBONS AND PETROLEUM HYDROCARBONS ARE PRESENT AT THE SITE. THEY ARE PRESENT AT THE SOURCE AREAS AS VAPORS TRAPPED IN THE PORES OF THE FINE GRAINED SOILS. LOCALLY, THE CONTAMINANTS ARE ADSORBED ONTO SOILS. CONTAMINANTS ARE ALSO PRESENT IN THE GROUND-WATER MOVING BELOW THE SITE. THE PRJMARY GRO'NDWATER CONTAMINANT, TRICHLOROETHYLENE WAS FOUND IN ALL WELLS AT THE SITE, BOTH OVERBURDEN AND BEDROCK EXCEPT FOR ONE PRODUCTION WELL NEAR THE SITE'S SOUTHERN BOUNDARY. FRACTURES IN BEDROCK ARE INFRE-QUENT. PETROLEUM HYDROCARBONS WERE DETECTED PRIMARILY IN SOIL SAMPLES, WITH LOW CONCENTRATIONS IDENTIFIED IN SAMPLES FROM THE MONITORING WELLS. EVALUATION OF THE HEALTH RISK POSED BY THE CONTAMINANTS WAS PERFORMED BY IDENTIFYING POTENTIAL SCENARIOS THROUGH WHICH ON-SITE WORKERS, CHILDREN AND VISITORS MAY COME IN CONTACT WITH THE CONTAMINATED MATERIALS. FOR ALL PRESENT AND FORESEEABLE FUTURE USE SCENARIOS, NO RISK WAS IDENTIFIED. NO ECOLOGICAL RISKS OR IMPACTS WERE IDENTIFIED.				
14. SUBJECT TERMS REMEDIAL INVESTIGATION, ENVIRONMENTAL INVESTIGATION, TRICHLOROETHYLENE, TETRACHLOROETHYLENE, SOLVENTS			15. NUMBER OF PAGES APPROX. 800	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED	19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED	20. LIMITATION OF ABSTRACT SAR	

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**Final Remedial
Investigation Report**

**Volume II of III
Appendices**

Arthur D Little

**Phase II Remedial
Investigation for Cold
Regions Research
and Engineering
Laboratory (CRREL)
Hanover, NH**

Robert Lambe 24 MAY 94
Program Manager, Robert Lambe Date

James E. Rice 5/24/94
Task Manager, James E. Rice Date

Submitted to

U.S. Army Environmental
Center (USAEC)
Aberdeen, Maryland

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ADL Reference 67063-61

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**Appendix A: Analytical Results From Previous RI (Ecology and Environment,
1992)**

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INSTALLATION RESTORATION PROGRAM

CHEMICAL REPORT
Mon Jun 1 08:28:09 1992

For Parameters :

Installation - Cold Regions Res & Eng Lab, NH
Beginning Date - 01-jan-92
Ending Date - 01-jun-92
Media Type - Chemical Soil
Maximum (X, Y) = (719933, 4844996)
Minimum (X, Y) = (719326, 4844457)
Booleans - Y

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Jun 1, 1992

Installation: Cold Regions Res & Eng Lab. NHPage 2
Analytical Results for Chemical Soil
From: 01-jan-92 To: 01-jun-92

Site: BORE 10SB1 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	14-jan-1992	LM16	ACET	ND	1.00e-02	UGG
0.0	14-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
0.0	14-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
0.0	14-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
0.0	14-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG
0.0	14-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG
0.0	14-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG
0.0	14-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
0.0	14-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
0.0	14-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
0.0	14-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
0.0	14-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
0.0	14-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
0.0	14-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
0.0	14-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
0.0	14-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
0.0	14-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
0.0	14-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
0.0	14-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
0.0	14-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
0.0	14-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
0.0	14-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
0.0	14-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
0.0	14-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
0.0	14-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
0.0	14-jan-1992	LM16	CH2CL2		5.36e-03	UGG
0.0	14-jan-1992	LM16	CH2CL2		5.42e-03	UGG
0.0	14-jan-1992	LM16	CH2CL2		5.50e-03	UGG
0.0	14-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
0.0	14-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
0.0	14-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
0.0	14-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
0.0	14-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
0.0	14-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
0.0	14-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
0.0	14-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
0.0	14-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
0.0	14-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
0.0	14-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
0.0	14-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
0.0	14-jan-1992	LM16	C12H5	LT	2.80e-03	UGG
0.0	14-jan-1992	LM16	C12H5	LT	2.80e-03	UGG
0.0	14-jan-1992	LM16	C12H5	LT	2.80e-03	UGG
0.0	14-jan-1992	LM16	CS1	ND	5.00e-03	UGG
0.0	14-jan-1992	LM16	CS2	ND	5.00e-03	UGG
0.0	14-jan-1992	LM16	CS2	ND	5.00e-03	UGG
0.0	14-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
0.0	14-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG

Jun 1, 1992

Installation: Cold Regions Res & Eng Lab. NHPage 3
 Analytical Results for Chemical Soil
 From: 01-jan-92 To: 01-jun-92

Site: BORE 10SB1 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	14-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
0.0	14-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
0.0	14-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
0.0	14-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
0.0	14-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
0.0	14-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
0.0	14-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
0.0	14-jan-1992	LM16	MEK	ND	1.00e-02	UGG
0.0	14-jan-1992	LM16	MEK	ND	1.00e-02	UGG
0.0	14-jan-1992	LM16	MEK	ND	1.00e-02	UGG
0.0	14-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
0.0	14-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
0.0	14-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
0.0	14-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
0.0	14-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
0.0	14-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
0.0	14-jan-1992	LM16	STYR	ND	5.00e-03	UGG
0.0	14-jan-1992	LM16	STYR	ND	5.00e-03	UGG
0.0	14-jan-1992	LM16	STYR	ND	5.00e-03	UGG
0.0	14-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
0.0	14-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
0.0	14-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
0.0	14-jan-1992	LM16	TCLEA	LT	1.60e-03	UG
0.0	14-jan-1992	LM16	TCLEA	LT	1.60e-03	UG
0.0	14-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
0.0	14-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
0.0	14-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
0.0	14-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
0.0	14-jan-1992	LM16	TRCLE	LT	3.80e-03	UGG
0.0	14-jan-1992	LM16	TRCLE	LT	3.80e-03	UGG
0.0	14-jan-1992	LM16	TRCLE	LT	3.80e-03	UGG
0.0	14-jan-1992	LM16	UNK166		3.80e-03	UGG

Site: BORE 13SB1

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
6.5	20-jan-1992	00	TPHC	LT	7.44e+01	UGG
2.5	20-jan-1992	00	TPHC	LT	7.45e+01	UGG
6.5	20-jan-1992	00	TPHC	LT	7.45e+01	UGG
18.0	20-jan-1992	00	TPHC	LT	7.46e+01	UGG
18.0	20-jan-1992	00	TPHC	LT	7.46e+01	UGG
2.5	20-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
6.5	20-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
6.5	20-jan-1992	LM16	111TCE	LT	4.20e-03	UGG

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Installation: Cold Regions Res & Eng Lab, NHPage 4
Analytical Results for Chemical Soil
From: 01-jan-92 To: 01-jun-92

Site: BORE 13S81 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
18.0	20-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
18.0	20-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
2.5	20-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
6.5	20-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
6.5	20-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
18.0	20-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
18.0	20-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
2.5	20-jan-1992	LM16	11DCE	LT	1.90e-02	UGG
6.5	20-jan-1992	LM16	11DCE	LT	1.90e-02	UGG
6.5	20-jan-1992	LM16	11DCE	LT	1.90e-02	UGG
18.0	20-jan-1992	LM16	11DCE	LT	1.90e-02	UGG
18.0	20-jan-1992	LM16	11DCE	LT	1.90e-02	UGG
2.5	20-jan-1992	LM16	11DCLE	LT	1.70e-03	UGG
6.5	20-jan-1992	LM16	11DCLE	LT	1.70e-03	UGG
6.5	20-jan-1992	LM16	11DCLE	LT	1.70e-03	UGG
18.0	20-jan-1992	LM16	11DCLE	LT	1.70e-03	UGG
18.0	20-jan-1992	LM16	11DCLE	LT	1.70e-03	UGG
6.5	20-jan-1992	LM16	12DCE	LT	1.17e-03	UGG
2.5	20-jan-1992	LM16	12DCE	LT	2.00e-03	UGG
6.5	20-jan-1992	LM16	12DCE	LT	2.00e-03	UGG
18.0	20-jan-1992	LM16	12DCE	LT	2.00e-03	UGG
18.0	20-jan-1992	LM16	12DCE	LT	2.00e-03	UGG
2.5	20-jan-1992	LM16	12DCLB	LT	1.20e-03	UGG
6.5	20-jan-1992	LM16	12DCLB	LT	1.20e-03	UGG
6.5	20-jan-1992	LM16	12DCLB	LT	1.20e-03	UGG
18.0	20-jan-1992	LM16	12DCLB	LT	1.20e-03	UGG
18.0	20-jan-1992	LM16	12DCLB	LT	1.20e-03	UGG
2.5	20-jan-1992	LM16	12DCLE	LT	3.10e-03	UGG
6.5	20-jan-1992	LM16	12DCLE	LT	3.10e-03	UGG
6.5	20-jan-1992	LM16	12DCLE	LT	3.10e-03	UGG
18.0	20-jan-1992	LM16	12DCLE	LT	3.10e-03	UGG
18.0	20-jan-1992	LM16	12DCLE	LT	3.10e-03	UGG
2.5	20-jan-1992	LM16	12DCLP	LT	2.20e-03	UGG
6.5	20-jan-1992	LM16	12DCLP	LT	2.20e-03	UGG
6.5	20-jan-1992	LM16	12DCLP	LT	2.20e-03	UGG
18.0	20-jan-1992	LM16	12DCLP	LT	2.20e-03	UGG
18.0	20-jan-1992	LM16	12DCLP	LT	2.20e-03	UGG
2.5	20-jan-1992	LM16	12DMB	ND	2.00e-03	UGG
6.5	20-jan-1992	LM16	12DMB	ND	2.00e-03	UGG
6.5	20-jan-1992	LM16	12DMB	ND	2.00e-03	UGG
18.0	20-jan-1992	LM16	12DMB	ND	2.00e-03	UGG
18.0	20-jan-1992	LM16	12DMB	ND	2.00e-03	UGG
2.5	20-jan-1992	LM16	13DCLB	LT	2.00e-03	UGG
6.5	20-jan-1992	LM16	13DCLB	LT	2.00e-03	UGG
6.5	20-jan-1992	LM16	13DCLB	LT	2.00e-03	UGG
18.0	20-jan-1992	LM16	13DCLB	LT	2.00e-03	UGG
18.0	20-jan-1992	LM16	13DCLB	LT	2.00e-03	UGG
2.5	20-jan-1992	LM16	13DCP	LT	1.30e-03	UGG

Arthur D Little

Jun 1, 1992

Installation: Cold Regions Res & Eng Lab, NH Page 5
 Analytical Results for Chemical Soil
 From: 01-jan-92 To: 01-jun-92

Site: BORE 13S81 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
6.5	20-jan-1992	LM16	13DCP	LT	1.30e-03	UGG
6.5	20-jan-1992	LM16	13DCP	LT	1.30e-03	UGG
18.0	20-jan-1992	LM16	13DCP	LT	1.30e-03	UGG
18.0	20-jan-1992	LM16	13DCP	LT	1.30e-03	UGG
2.5	20-jan-1992	LM16	13DMB	ND	2.00e-03	UGG
6.5	20-jan-1992	LM16	13DMB	ND	2.00e-03	UGG
6.5	20-jan-1992	LM16	13DMB	ND	2.00e-03	UGG
18.0	20-jan-1992	LM16	13DMB	ND	2.00e-03	UGG
18.0	20-jan-1992	LM16	13DMB	ND	2.00e-03	UGG
2.5	20-jan-1992	LM16	14DCLB	LT	9.00e-04	UGG
6.5	20-jan-1992	LM16	14DCLB	LT	9.00e-04	UGG
6.5	20-jan-1992	LM16	14DCLB	LT	9.00e-04	UGG
18.0	20-jan-1992	LM16	14DCLB	LT	9.00e-04	UGG
18.0	20-jan-1992	LM16	14DCLB	LT	9.00e-04	UGG
2.5	20-jan-1992	LM16	2CLEVE	LT	4.80e-02	UGG
6.5	20-jan-1992	LM16	2CLEVE	LT	4.80e-02	UGG
6.5	20-jan-1992	LM16	2CLEVE	LT	4.80e-02	UGG
18.0	20-jan-1992	LM16	2CLEVE	LT	4.80e-02	UGG
18.0	20-jan-1992	LM16	2CLEVE	LT	4.80e-02	UGG
2.5	20-jan-1992	LM16	ACET	ND	1.00e-02	UGG
6.5	20-jan-1992	LM16	ACET	ND	1.00e-02	UGG
6.5	20-jan-1992	LM16	ACET	ND	1.00e-02	UGG
18.0	20-jan-1992	LM16	ACET	ND	1.00e-02	UGG
18.0	20-jan-1992	LM16	ACET	ND	1.00e-02	UGG
2.5	20-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
6.5	20-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
6.5	20-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
18.0	20-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
18.0	20-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
18.0	20-jan-1992	LM16	C12DCE		7.64e-03	UGG
6.5	20-jan-1992	LM16	C12DCE		1.17e-02	UGG
6.5	20-jan-1992	LM16	C12DCE		3.58e-02	UGG
2.5	20-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG
6.5	20-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG
6.5	20-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG
18.0	20-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG
18.0	20-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG
2.5	20-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
6.5	20-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
6.5	20-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
18.0	20-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
18.0	20-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
2.5	20-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
6.5	20-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
6.5	20-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
18.0	20-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
18.0	20-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
2.5	20-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG

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 Analytical Results for Chemical Soil
 From: 01-jan-92 To: 01-jun-92

Site: BORE 13SB1 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOQL	CONCENTRATION	UNITS
6.5	20-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
6.5	20-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
18.0	20-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
18.0	20-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
2.5	20-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
6.5	20-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
6.5	20-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
18.0	20-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
18.0	20-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
2.5	20-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
6.5	20-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
6.5	20-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
18.0	20-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
18.0	20-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
2.5	20-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
6.5	20-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
6.5	20-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
18.0	20-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
18.0	20-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
2.5	20-jan-1992	LM16	CH2CL2		5.76e-03	UGG
6.5	20-jan-1992	LM16	CH2CL2		6.90e-03	UGG
6.5	20-jan-1992	LM16	CH2CL2		7.95e-03	UGG
18.0	20-jan-1992	LM16	CH2CL2		8.60e-03	UGG
18.0	20-jan-1992	LM16	CH2CL2		8.81e-03	UGG
2.5	20-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
6.5	20-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
6.5	20-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
18.0	20-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
18.0	20-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
2.5	20-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
6.5	20-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
6.5	20-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
18.0	20-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
18.0	20-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
2.5	20-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
6.5	20-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
6.5	20-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
18.0	20-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
18.0	20-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
2.5	20-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
6.5	20-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
6.5	20-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
18.0	20-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
18.0	20-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
2.5	20-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG
6.5	20-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG
6.5	20-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG
18.0	20-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG

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Site: BORE 13SB1 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
18.0	20-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG
2.5	20-jan-1992	LM16	CS2	ND	5.00e-03	UGG
6.5	20-jan-1992	LM16	CS2	ND	5.00e-03	UGG
6.5	20-jan-1992	LM16	CS2	ND	5.00e-03	UGG
18.0	20-jan-1992	LM16	CS2	ND	5.00e-03	UGG
18.0	20-jan-1992	LM16	CS2	ND	5.00e-03	UGG
2.5	20-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
6.5	20-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
6.5	20-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
6.5	20-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
18.0	20-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
18.0	20-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
2.5	20-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
6.5	20-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
6.5	20-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
18.0	20-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
18.0	20-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
2.5	20-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
6.5	20-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
6.5	20-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
18.0	20-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
18.0	20-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
2.5	20-jan-1992	LM16	MEK	ND	1.00e-02	UGG
6.5	20-jan-1992	LM16	MEK	ND	1.00e-02	UGG
6.5	20-jan-1992	LM16	MEK	ND	1.00e-02	UGG
18.0	20-jan-1992	LM16	MEK	ND	1.00e-02	UGG
18.0	20-jan-1992	LM16	MEK	ND	1.00e-02	UGG
2.5	20-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
6.5	20-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
6.5	20-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
18.0	20-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
18.0	20-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
2.5	20-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
6.5	20-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
6.5	20-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
18.0	20-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
18.0	20-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
2.5	20-jan-1992	LM16	STYR	ND	5.00e-03	UGG
6.5	20-jan-1992	LM16	STYR	ND	5.00e-03	UGG
6.5	20-jan-1992	LM16	STYR	ND	5.00e-03	UGG
18.0	20-jan-1992	LM16	STYR	ND	5.00e-03	UGG
18.0	20-jan-1992	LM16	STYR	ND	5.00e-03	UGG
2.5	20-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
6.5	20-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
6.5	20-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
6.5	20-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
18.0	20-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
18.0	20-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
2.5	20-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
6.5	20-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG

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Site: BORE 13SB1 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
6.5	20-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
18.0	20-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
18.0	20-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
2.5	20-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
6.5	20-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
6.5	20-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
18.0	20-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
18.0	20-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
2.5	20-jan-1992	LM16	TRCLE		1.29e-02	UGG
2.5	20-jan-1992	LM16	TRCLE		1.68e-02	UGG
6.5	20-jan-1992	LM16	TRCLE		4.81e-02	UGG
18.0	20-jan-1992	LM16	TRCLE		2.16e-01	UGG
18.0	20-jan-1992	LM16	TRCLE		2.34e-01	UGG
6.5	20-jan-1992	LM16	UNK252		4.77e-03	UGG

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SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
26.0	15-jan-1992	00	TPHC		1.72e-02	UGG
20.0	15-jan-1992	00	TPHC	LT	7.43e-01	UGG
0.5	15-jan-1992	00	TPHC	LT	7.44e-01	UGG
34.0	15-jan-1992	00	TPHC	LT	7.47e-01	UGG
0.0	15-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
0.0	15-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
0.0	15-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
0.0	15-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
0.0	15-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
0.0	15-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
0.0	15-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
0.0	15-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
0.0	15-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
0.0	15-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
0.0	15-jan-1992	LM16	11DCE	LT	1.90e-02	UGG
0.0	15-jan-1992	LM16	11DCE	LT	1.90e-02	UGG
0.0	15-jan-1992	LM16	11DCE	LT	1.90e-02	UGG
0.0	15-jan-1992	LM16	11DCE	LT	1.90e-02	UGG
0.0	15-jan-1992	LM16	11DCE	LT	1.90e-02	UGG
0.0	15-jan-1992	LM16	11DCLE	LT	1.70e-03	UGG
0.0	15-jan-1992	LM16	11DCLE	LT	1.70e-03	UGG
0.0	15-jan-1992	LM16	11DCLE	LT	1.70e-03	UGG
0.0	15-jan-1992	LM16	11DCLE	LT	1.70e-03	UGG
0.0	15-jan-1992	LM16	11DCLE	LT	1.70e-03	UGG
0.0	15-jan-1992	LM16	12DCE	LT	2.00e-03	UGG
0.0	15-jan-1992	LM16	12DCE	LT	2.00e-03	UGG
0.0	15-jan-1992	LM16	12DCE	LT	2.00e-03	UGG
0.0	15-jan-1992	LM16	12DCE	LT	2.00e-03	UGG
0.0	15-jan-1992	LM16	12DCE	LT	2.00e-03	UGG
0.0	15-jan-1992	LM16	12DCLB	LT	1.20e-03	UGG
0.0	15-jan-1992	LM16	12DCLB	LT	1.20e-03	UGG

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SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	15-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
0.0	15-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
0.0	15-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
0.0	15-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
0.0	15-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
0.0	15-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
0.0	15-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
0.0	15-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
0.0	15-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
0.0	15-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
0.0	15-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
0.0	15-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
0.0	15-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
0.0	15-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
0.0	15-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
0.0	15-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
0.0	15-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
0.0	15-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
0.0	15-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
0.0	15-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
0.0	15-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
0.0	15-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
0.0	15-jan-1992	LM16	CH2CL2		5.17e-03	UGG
0.0	15-jan-1992	LM16	CH2CL2		5.46e-03	UGG
0.0	15-jan-1992	LM16	CH2CL2		5.96e-03	UGG
0.0	15-jan-1992	LM16	CH2CL2		6.01e-03	UGG
0.0	15-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
0.0	15-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
0.0	15-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
0.0	15-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
0.0	15-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
0.0	15-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
0.0	15-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
0.0	15-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
0.0	15-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
0.0	15-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
0.0	15-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
0.0	15-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
0.0	15-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
0.0	15-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
0.0	15-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
0.0	15-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
0.0	15-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG
0.0	15-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG
0.0	15-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG
0.0	15-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG
0.0	15-jan-1992	LM16	CS2	ND	5.00e-03	UGG
0.0	15-jan-1992	LM16	CS2	ND	5.00e-03	UGG

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SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	15-jan-1992	LM16	CS2	ND	5.00e-03	UGG
0.0	15-jan-1992	LM16	CS2	ND	5.00e-03	UGG
0.0	15-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
0.0	15-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
0.0	15-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
0.0	15-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
0.0	15-jan-1992	LM16	ETC6HS	LT	8.91e-03	UGG
0.0	15-jan-1992	LM16	ETC6HS	LT	3.30e-03	UGG
0.0	15-jan-1992	LM16	ETC6HS	LT	3.30e-03	UGG
0.0	15-jan-1992	LM16	ETC6HS	LT	3.30e-03	UGG
0.0	15-jan-1992	LM16	MEC6HS	LT	8.40e-03	UGG
0.0	15-jan-1992	LM16	MEC6HS	LT	8.40e-03	UGG
0.0	15-jan-1992	LM16	MEC6HS	LT	8.40e-03	UGG
0.0	15-jan-1992	LM16	MEC6HS	LT	8.40e-03	UGG
0.0	15-jan-1992	LM16	MEK	ND	1.00e-02	UGG
0.0	15-jan-1992	LM16	MEK	ND	1.00e-02	UGG
0.0	15-jan-1992	LM16	MEK	ND	1.00e-02	UGG
0.0	15-jan-1992	LM16	MEK	ND	1.00e-02	UGG
0.0	15-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
0.0	15-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
0.0	15-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
0.0	15-jan-1992	LM15	MIBK	ND	1.00e-02	UGG
0.0	15-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
0.0	15-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
0.0	15-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
0.0	15-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
0.0	15-jan-1992	LM16	STYR	ND	5.00e-03	UGG
0.0	15-jan-1992	LM16	STYR	ND	5.00e-03	UGG
0.0	15-jan-1992	LM16	STYR	ND	5.00e-03	UGG
0.0	15-jan-1992	LM16	STYR	ND	5.00e-03	UGG
0.0	15-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
0.0	15-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
0.0	15-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
0.0	15-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
0.0	15-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
0.0	15-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
0.0	15-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
0.0	15-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
0.0	15-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
0.0	15-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
0.0	15-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
0.0	15-jan-1992	LM16	TRCLE	LT	3.80e-03	UGG
0.0	15-jan-1992	LM16	TRCLE	LT	3.80e-03	UGG
0.0	15-jan-1992	LM16	TRCLE	LT	3.80e-03	UGG
0.0	15-jan-1992	LM16	TRCLE	LT	3.80e-03	UGG
0.0	15-jan-1992	LM15	UNK106		7.37e-03	UGG
0.0	15-jan-1992	LM16	UNK114		2.46e-02	UGG

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Site: BORE 15SB1 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	15-jan-1992	LM16	UNK125		1.23e-02	UGG
0.0	15-jan-1992	LM16	UNK127		9.83e-03	UGG
0.0	15-jan-1992	LM16	UNK133		2.46e-02	UGG
0.0	15-jan-1992	LM16	UNK143		2.46e-02	UGG
0.0	15-jan-1992	LM16	UNK144		2.46e-02	UGG
0.0	15-jan-1992	LM16	UNK147		9.83e-03	UGG
0.0	15-jan-1992	LM16	UNK149		1.23e-02	UGG
0.0	15-jan-1992	LM16	UNK157		1.01e-02	UGG
0.0	15-jan-1992	LM16	UNK157		7.37e-02	UGG
0.0	15-jan-1992	LM16	UNK160		2.46e-02	UGG
0.0	15-jan-1992	LM16	UNK163		7.37e-03	UGG
0.0	15-jan-1992	LM16	UNK164		1.23e-02	UGG
0.0	15-jan-1992	LM16	UNK165		2.46e-02	UGG
0.0	15-jan-1992	LM16	UNK166		2.46e-02	UGG
0.0	15-jan-1992	LM16	UNK170		4.91e-02	UGG
0.0	15-jan-1992	LM16	UNK171		1.01e-02	UGG
0.0	15-jan-1992	LM16	UNK171		4.91e-02	UGG
0.0	15-jan-1992	LM16	UNK173		1.23e-02	UGG
0.0	15-jan-1992	LM16	UNK175		1.27e-02	UGG
0.0	15-jan-1992	LM16	UNK175		9.83e-02	UGG
0.0	15-jan-1992	LM16	UNK176		1.14e-02	UGG
0.0	15-jan-1992	LM16	UNK176		8.60e-02	UGG
0.0	15-jan-1992	LM16	UNK178		1.27e-02	UGG
0.0	15-jan-1992	LM16	UNK178		1.23e-01	UGG
0.0	15-jan-1992	LM16	UNK179		7.50e-03	UGG
0.0	15-jan-1992	LM16	UNK179		7.37e-02	UGG
0.0	15-jan-1992	LM16	UNK181		4.91e-03	UGG
0.0	15-jan-1992	LM16	UNK182		2.53e-02	UGG
0.0	15-jan-1992	LM16	UNK182		2.46e-01	UGG
0.0	15-jan-1992	LM16	UNK185		2.46e-02	UGG
0.0	15-jan-1992	LM16	UNK186		2.46e-02	UGG
0.0	15-jan-1992	LM16	UNK187		3.69e-02	UGG
0.0	15-jan-1992	LM16	UNK189		5.07e-03	UGG
0.0	15-jan-1992	LM16	UNK189		2.46e-02	UGG
0.0	15-jan-1992	LM16	UNK189		3.80e-03	UGG
0.0	15-jan-1992	LM16	UNK190		1.27e-02	UGG
0.0	15-jan-1992	LM16	UNK192		9.83e-02	UGG
0.0	15-jan-1992	LM16	UNK192		1.27e-02	UGG
0.0	15-jan-1992	LM16	UNK194		8.60e-02	UGG
0.0	15-jan-1992	LM16	UNK194		3.69e-03	UGG
0.0	15-jan-1992	LM16	UNK195		3.69e-02	UGG
0.0	15-jan-1992	LM16	UNK196		2.53e-02	UGG
0.0	15-jan-1992	LM16	UNK197		4.91e-02	UGG
0.0	15-jan-1992	LM16	UNK198		5.07e-03	UGG
0.0	15-jan-1992	LM16	UNK200		3.69e-02	UGG
0.0	15-jan-1992	LM16	UNK200		2.46e-02	UGG
0.0	15-jan-1992	LM16	UNK201		5.07e-03	UGG
0.0	15-jan-1992	LM16	UNK202		2.46e-02	UGG
0.0	15-jan-1992	LM16	UNK202		2.46e-02	UGG

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Site: BORE 15SB1 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	15-jan-1992	LM16	UNK204		3.80e-03	UGG
0.0	15-jan-1992	LM16	UNK204		2.46e-02	UGG
0.0	15-jan-1992	LM16	UNK206		5.07e-03	UGG
0.0	15-jan-1992	LM16	UNK207		6.14e-03	UGG
0.0	15-jan-1992	LM16	UNK207		8.87e-03	UGG

Site: BORE 16SB1

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.5	16-jan-1992	00	TPHC	LT	7.42e+01	UGG
7.5	16-jan-1992	00	TPHC	LT	7.44e+01	UGG
10.0	16-jan-1992	00	TPHC	LT	7.45e+01	UGG
0.5	16-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
7.5	16-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
10.0	16-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
0.5	16-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
7.5	16-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
10.0	16-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
0.5	16-jan-1992	LM16	11DCCE	LT	1.90e-02	UGG
7.5	16-jan-1992	LM16	11DCCE	LT	1.90e-02	UGG
10.0	16-jan-1992	LM16	11DCCE	LT	1.90e-02	UGG
0.5	16-jan-1992	LM16	11DCLE	LT	1.70e-03	UGG
7.5	16-jan-1992	LM16	11DCLE	LT	1.70e-03	UGG
10.0	16-jan-1992	LM16	11DCLE	LT	1.70e-03	UGG
0.5	16-jan-1992	LM16	12DCCE	LT	2.00e-03	UGG
7.5	16-jan-1992	LM16	12DCCE	LT	2.00e-03	UGG
10.0	16-jan-1992	LM16	12DCCE	LT	2.00e-03	UGG
0.5	16-jan-1992	LM16	12DCLB	LT	1.20e-03	UGG
7.5	16-jan-1992	LM16	12DCLB	LT	1.20e-03	UGG
10.0	16-jan-1992	LM16	12DCLB	LT	1.20e-03	UGG
0.5	16-jan-1992	LM16	12DCLE	LT	3.10e-03	UGG
7.5	16-jan-1992	LM16	12DCLE	LT	3.10e-03	UGG
10.0	16-jan-1992	LM16	12DCLE	LT	3.10e-03	UGG
0.5	16-jan-1992	LM16	12DCLP	LT	2.20e-03	UGG
7.5	16-jan-1992	LM16	12DCLP	LT	2.20e-03	UGG
10.0	16-jan-1992	LM16	12DCLP	LT	2.20e-03	UGG
0.5	16-jan-1992	LM16	12DMB	ND	2.00e-03	UGG
7.5	16-jan-1992	LM16	12DMB	ND	2.00e-03	UGG
10.0	16-jan-1992	LM16	12DMB	ND	2.00e-03	UGG
0.5	16-jan-1992	LM16	13DCLB	LT	2.00e-03	UGG
7.5	16-jan-1992	LM16	13DCLB	LT	2.00e-03	UGG
10.0	16-jan-1992	LM16	13DCLB	LT	2.00e-03	UGG
0.5	16-jan-1992	LM16	13DCP	LT	1.30e-03	UGG
7.5	16-jan-1992	LM16	13DCP	LT	1.30e-03	UGG

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Site: BORE 16SB1 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
10.0	16-jan-1992	LM16	13DCP	LT	1.30e-03	UGG
0.5	16-jan-1992	LM16	13DMB	ND	2.00e-03	UGG
7.5	16-jan-1992	LM16	13DMB	ND	2.00e-03	UGG
10.0	16-jan-1992	LM16	13DMB	ND	2.00e-03	UGG
0.5	16-jan-1992	LM16	14DCLB	LT	9.00e-04	UGG
7.5	16-jan-1992	LM16	14DCLB	LT	9.00e-04	UGG
10.0	16-jan-1992	LM16	14DCLB	LT	9.00e-04	UGG
0.5	16-jan-1992	LM16	2CLEVE	LT	4.80e-02	UGG
7.5	16-jan-1992	LM16	2CLEVE	LT	4.80e-02	UGG
10.0	16-jan-1992	LM16	2CLEVE	LT	4.80e-02	UGG
0.5	16-jan-1992	LM16	ACET	ND	1.00e-02	UGG
7.5	16-jan-1992	LM16	ACET	ND	1.00e-02	UGG
10.0	16-jan-1992	LM16	ACET	ND	1.00e-02	UGG
0.5	16-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
7.5	16-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
10.0	16-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
0.5	16-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG
7.5	16-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG
10.0	16-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG
0.5	16-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
7.5	16-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
10.0	16-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
0.5	16-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
7.5	16-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
10.0	16-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
0.5	16-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
7.5	16-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
10.0	16-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
0.5	16-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
7.5	16-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
10.0	16-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
0.5	16-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
7.5	16-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
10.0	16-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
0.5	16-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
7.5	16-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
10.0	16-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
0.5	16-jan-1992	LM16	CH2CL2	LT	3.14e-03	UGG
7.5	16-jan-1992	LM16	CH2CL2	LT	5.70e-03	UGG
10.0	16-jan-1992	LM16	CH2CL2	LT	5.70e-03	UGG
0.5	16-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
7.5	16-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
10.0	16-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
0.5	16-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
7.5	16-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
10.0	16-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
0.5	16-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
7.5	16-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG

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Site: BORE 16SB1 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
10.0	16-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
0.5	16-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
7.5	16-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
10.0	16-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
0.5	16-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG
7.5	16-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG
10.0	16-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG
0.5	16-jan-1992	LM16	CS2	ND	5.00e-03	UGG
7.5	16-jan-1992	LM16	CS2	ND	5.00e-03	UGG
10.0	16-jan-1992	LM16	CS2	ND	5.00e-03	UGG
0.5	16-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
7.5	16-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
10.0	16-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
0.5	16-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
7.5	16-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
10.0	16-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
0.5	16-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
7.5	16-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
10.0	16-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
7.5	16-jan-1992	LM16	MEK	ND	1.37e-02	UGG
0.5	16-jan-1992	LM16	MEK	ND	1.00e-02	UGG
10.0	16-jan-1992	LM16	MEK	ND	1.00e-02	UGG
0.5	16-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
7.5	16-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
10.0	16-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
0.5	16-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
7.5	16-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
10.0	16-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
0.5	16-jan-1992	LM16	STYR	ND	5.00e-03	UGG
7.5	16-jan-1992	LM16	STYR	ND	5.00e-03	UGG
10.0	16-jan-1992	LM16	STYR	ND	5.00e-03	UGG
0.5	16-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
7.5	16-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
10.0	16-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
0.5	16-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
7.5	16-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
10.0	16-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
0.5	16-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
7.5	16-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
10.0	16-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
0.5	16-jan-1992	LM16	TRCLE	LT	3.80e-03	UGG
7.5	16-jan-1992	LM16	TRCLE	LT	3.80e-03	UGG
10.0	16-jan-1992	LM16	TRCLE	LT	3.80e-03	UGG

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Site: BORE 2SB1

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
10.0	18-jan-1992	00	TPHC	LT	7.40e+01	UGG
25.0	18-jan-1992	00	TPHC	LT	7.42e+01	UGG
16.0	18-jan-1992	00	TPHC	LT	7.43e+01	UGG
45.0	18-jan-1992	00	TPHC	LT	7.43e+01	UGG
25.0	18-jan-1992	00	TPHC	LT	7.46e+01	UGG
16.0	18-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
25.0	18-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
25.0	18-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
45.0	18-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
16.0	18-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
25.0	18-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
25.0	18-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
45.0	18-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
16.0	18-jan-1992	LM16	11DCE	LT	1.90e-02	UGG
25.0	18-jan-1992	LM16	11DCE	LT	1.90e-02	UGG
25.0	18-jan-1992	LM16	11DCE	LT	1.90e-02	UGG
45.0	18-jan-1992	LM16	11DCE	LT	1.90e-02	UGG
16.0	18-jan-1992	LM16	11DCLF	LT	1.70e-03	UGG
25.0	18-jan-1992	LM16	11DCLF	LT	1.70e-03	UGG
25.0	18-jan-1992	LM16	11DCLF	LT	1.70e-03	UGG
45.0	18-jan-1992	LM16	11DCLF	LT	1.70e-03	UGG
16.0	18-jan-1992	LM16	12DCE	LT	2.00e-03	UGG
25.0	18-jan-1992	LM16	12DCE	LT	2.00e-03	UGG
25.0	18-jan-1992	LM16	12DCE	LT	2.00e-03	UGG
45.0	18-jan-1992	LM16	12DCE	LT	2.00e-03	UGG
16.0	18-jan-1992	LM16	12DCLB	LT	1.20e-03	UGG
25.0	18-jan-1992	LM16	12DCLB	LT	1.20e-03	UGG
25.0	18-jan-1992	LM16	12DCLB	LT	1.20e-03	UGG
45.0	18-jan-1992	LM16	12DCLB	LT	1.20e-03	UGG
16.0	18-jan-1992	LM16	12DCLF	LT	3.10e-03	UGG
25.0	18-jan-1992	LM16	12DCLF	LT	3.10e-03	UGG
25.0	18-jan-1992	LM16	12DCLF	LT	3.10e-03	UGG
45.0	18-jan-1992	LM16	12DCLF	LT	3.10e-03	UGG
16.0	18-jan-1992	LM16	12DCLP	LT	2.20e-03	UGG
25.0	18-jan-1992	LM16	12DCLP	LT	2.20e-03	UGG
25.0	18-jan-1992	LM16	12DCLP	LT	2.20e-03	UGG
45.0	18-jan-1992	LM16	12DCLP	LT	2.20e-03	UGG
16.0	18-jan-1992	LM16	12DMB	ND	2.00e-03	UGG
25.0	18-jan-1992	LM16	12DMB	ND	2.00e-03	UGG
25.0	18-jan-1992	LM16	12DMB	ND	2.00e-03	UGG
45.0	18-jan-1992	LM16	12DMB	ND	2.00e-03	UGG
16.0	18-jan-1992	LM16	13DCLB	LT	2.00e-03	UGG
25.0	18-jan-1992	LM16	13DCLB	LT	2.00e-03	UGG
25.0	18-jan-1992	LM16	13DCLB	LT	2.00e-03	UGG
45.0	18-jan-1992	LM16	13DCLB	LT	2.00e-03	UGG
16.0	18-jan-1992	LM16	13DCP	LT	1.30e-03	UGG
25.0	18-jan-1992	LM16	13DCP	LT	1.30e-03	UGG

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SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
25.0	18-jan-1992	LM16	13DCP	LT	1.30e-03	UGG
45.0	18-jan-1992	LM16	13DCP	LT	1.30e-03	UGG
16.0	18-jan-1992	LM16	13DMB	ND	2.00e-03	UGG
25.0	18-jan-1992	LM16	13DMB	ND	2.00e-03	UGG
25.0	18-jan-1992	LM16	13DMB	ND	2.00e-03	UGG
45.0	18-jan-1992	LM16	13DMB	ND	2.00e-03	UGG
16.0	18-jan-1992	LM16	14DCLB	LT	9.00e-04	UGG
25.0	18-jan-1992	LM16	14DCLB	LT	9.00e-04	UGG
25.0	18-jan-1992	LM16	14DCLB	LT	9.00e-04	UGG
45.0	18-jan-1992	LM16	14DCLB	LT	9.00e-04	UGG
16.0	18-jan-1992	LM16	2CLEVE	LT	4.80e-02	UGG
25.0	18-jan-1992	LM16	2CLEVE	LT	4.80e-02	UGG
25.0	18-jan-1992	LM16	2CLEVE	LT	4.80e-02	UGG
45.0	18-jan-1992	LM16	2CLEVE	LT	4.80e-02	UGG
25.0	18-jan-1992	LM16	ACET	LT	4.22e-02	UGG
45.0	18-jan-1992	LM16	ACET	LT	6.19e-02	UGG
16.0	18-jan-1992	LM16	ACET	ND	1.00e-02	UGG
25.0	18-jan-1992	LM16	ACET	ND	1.00e-02	UGG
16.0	18-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
25.0	18-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
16.0	18-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
25.0	18-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
45.0	18-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
16.0	18-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG
25.0	18-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG
25.0	18-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG
45.0	18-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG
16.0	18-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
25.0	18-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
25.0	18-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
25.0	18-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
45.0	18-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
16.0	18-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
25.0	18-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
25.0	18-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
45.0	18-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
16.0	18-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
25.0	18-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
25.0	18-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
45.0	18-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
16.0	18-jan-1992	LM16	C5H6	LT	2.90e-03	UGG
25.0	18-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
25.0	18-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
25.0	18-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
45.0	18-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
16.0	18-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
25.0	18-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
25.0	18-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
45.0	18-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
16.0	18-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
25.0	18-jan-1992	LM16	CCL4	LT	5.60e-03	UGG

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Site: BORE 2S81 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
25.0	18-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
45.0	18-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
45.0	18-jan-1992	LM16	CH2CL2		7.74e-03	UGG
25.0	18-jan-1992	LM16	CH2CL2		9.21e-03	UGG
25.0	18-jan-1992	LM16	CH2CL2		9.80e-03	UGG
25.0	18-jan-1992	LM16	CH2CL2		1.11e-02	UGG
16.0	18-jan-1992	LM16	CH2CL2		1.00e-02	UGG
16.0	18-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
25.0	18-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
25.0	18-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
45.0	18-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
16.0	18-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
25.0	18-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
25.0	18-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
25.0	18-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
45.0	18-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
16.0	18-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
25.0	18-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
25.0	18-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
45.0	18-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
16.0	18-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
25.0	18-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
25.0	18-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
45.0	18-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
16.0	18-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG
25.0	18-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG
25.0	18-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG
45.0	18-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG
16.0	18-jan-1992	LM16	CS2	ND	5.00e-03	UGG
25.0	18-jan-1992	LM16	CS2	ND	5.00e-03	UGG
25.0	18-jan-1992	LM16	CS2	ND	5.00e-03	UGG
45.0	18-jan-1992	LM16	CS2	ND	5.00e-03	UGG
16.0	18-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
25.0	18-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
25.0	18-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
25.0	18-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
45.0	18-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
16.0	18-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
25.0	18-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
25.0	18-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
45.0	18-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
16.0	18-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
25.0	18-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
25.0	18-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
45.0	18-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
45.0	18-jan-1992	LM16	MEK		1.44e-02	UGG
16.0	18-jan-1992	LM16	MEK	ND	1.00e-02	UGG
25.0	18-jan-1992	LM16	MEK	ND	1.00e-02	UGG
25.0	18-jan-1992	LM16	MEK	ND	1.00e-02	UGG
16.0	18-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
25.0	18-jan-1992	LM16	MIBK	ND	1.00e-02	UGG

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Site: BORE 2SB1 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
25.0	18-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
45.0	18-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
16.0	18-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
25.0	18-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
25.0	18-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
45.0	18-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
16.0	18-jan-1992	LM16	STYR	ND	5.00e-03	UGG
25.0	18-jan-1992	LM16	STYR	ND	5.00e-03	UGG
25.0	18-jan-1992	LM16	STYR	ND	5.00e-03	UGG
45.0	18-jan-1992	LM16	STYR	ND	5.00e-03	UGG
16.0	18-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
25.0	18-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
25.0	18-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
45.0	18-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
16.0	18-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
25.0	18-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
25.0	18-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
45.0	18-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
16.0	18-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
25.0	18-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
25.0	18-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
45.0	18-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
16.0	18-jan-1992	LM16	TRCLE	LT	2.87e+00	UGG
25.0	18-jan-1992	LM16	TRCLE	LT	3.80e-03	UGG
25.0	18-jan-1992	LM16	TRCLE	LT	3.80e-03	UGG
45.0	18-jan-1992	LM16	TRCLE	LT	3.80e-03	UGG

Site: BOPE 2SB2

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
2.0	20-jan-1992	00	TPHC	LT	7.44e+01	UGG
9.0	20-jan-1992	00	TPHC	LT	7.46e+01	UGG
2.0	20-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
9.0	20-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
2.0	20-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
9.0	20-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
2.0	20-jan-1992	LM16	11DCE	LT	1.90e-02	UGG
9.0	20-jan-1992	LM16	11DCE	LT	1.90e-02	UGG
2.0	20-jan-1992	LM16	11DCLE	LT	1.70e-03	UGG
9.0	20-jan-1992	LM16	11DCLE	LT	1.70e-03	UGG
2.0	20-jan-1992	LM16	12DCE	LT	2.00e-03	UGG
9.0	20-jan-1992	LM16	12DCE	LT	2.00e-03	UGG
2.0	20-jan-1992	LM16	12DCLB	LT	1.20e-03	UGG
9.0	20-jan-1992	LM16	12DCLB	LT	1.20e-03	UGG

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Site: BORE 2SB2 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
2.0	20-jan-1992	LM16	12DCLE	LT	3.10e-03	UGG
9.0	20-jan-1992	LM16	12DCLE	LT	3.10e-03	UGG
2.0	20-jan-1992	LM16	12DCLP	LT	2.20e-03	UGG
9.0	20-jan-1992	LM16	12DCLP	LT	2.20e-03	UGG
2.0	20-jan-1992	LM16	12DMB	ND	2.00e-03	UGG
9.0	20-jan-1992	LM16	12DMB	ND	2.00e-03	UGG
2.0	20-jan-1992	LM16	13DCLB	LT	2.00e-03	UGG
9.0	20-jan-1992	LM16	13DCLB	LT	2.00e-03	UGG
2.0	20-jan-1992	LM16	13DCP	LT	30e-03	UGG
9.0	20-jan-1992	LM16	13DCP	LT	30e-03	UGG
2.0	20-jan-1992	LM16	13DMB	ND	2.00e-03	UGG
9.0	20-jan-1992	LM16	13DMB	ND	2.00e-03	UGG
2.0	20-jan-1992	LM16	14DCLB	LT	9.00e-04	UGG
9.0	20-jan-1992	LM16	14DCLB	LT	9.00e-04	UGG
2.0	20-jan-1992	LM16	2CLEVE	LT	4.80e-02	UGG
9.0	20-jan-1992	LM16	2CLEVE	LT	4.80e-02	UGG
2.0	20-jan-1992	LM16	ACET	ND	1.00e-02	UGG
9.0	20-jan-1992	LM16	ACET	ND	1.00e-02	UGG
2.0	20-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
9.0	20-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
2.0	20-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG
9.0	20-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG
2.0	20-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
9.0	20-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
2.0	20-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
9.0	20-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
2.0	20-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
9.0	20-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
2.0	20-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
9.0	20-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
2.0	20-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
9.0	20-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
2.0	20-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
9.0	20-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
2.0	20-jan-1992	LM16	CH2CL2		6.84e-03	UGG
9.0	20-jan-1992	LM16	CH2CL2		7.26e-03	UGG
2.0	20-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
9.0	20-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
2.0	20-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
9.0	20-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
2.0	20-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
9.0	20-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
2.0	20-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
9.0	20-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
2.0	20-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG
9.0	20-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG
2.0	20-jan-1992	LM16	CS2	ND	5.00e-03	UGG
9.0	20-jan-1992	LM16	CS2	ND	5.00e-03	UGG

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Site: BORE 2SB2 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
2.0	20-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
9.0	20-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
2.0	20-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
9.0	20-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
2.0	20-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
9.0	20-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
2.0	20-jan-1992	LM16	MEK	ND	1.00e-02	UGG
9.0	20-jan-1992	LM16	MEK	ND	1.00e-02	UGG
2.0	20-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
9.0	20-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
2.0	20-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
9.0	20-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
2.0	20-jan-1992	LM16	STYR	ND	5.00e-03	UGG
9.0	20-jan-1992	LM16	STYR	ND	5.00e-03	UGG
2.0	20-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
9.0	20-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
2.0	20-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
9.0	20-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
2.0	20-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
9.0	20-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
2.0	20-jan-1992	LM16	TRCLE	LT	3.80e-03	UGG
9.0	20-jan-1992	LM16	TRCLE	LT	3.80e-03	UGG
9.0	20-jan-1992	LM16	UNK251		2.21e-02	UG

Site: BORE 6SB1

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
2.0	20-jan-1992	00	TPHC	LT	7.43e+01	UGG
9.5	20-jan-1992	00	TPHC	LT	7.43e+01	UGG
2.0	20-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
9.5	20-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
2.0	20-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
9.5	20-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
2.0	20-jan-1992	LM16	11DCE	LT	1.90e-02	UGG
9.5	20-jan-1992	LM16	11DCE	LT	1.90e-02	UGG
2.0	20-jan-1992	LM16	11DCLC	LT	1.70e-03	UGG
9.5	20-jan-1992	LM16	11DCLC	LT	1.70e-03	UGG
2.0	20-jan-1992	LM16	12DCE	LT	2.00e-03	UGG
9.5	20-jan-1992	LM16	12DCE	LT	2.00e-03	UGG
2.0	20-jan-1992	LM16	12DCLB	LT	1.20e-03	UGG
9.5	20-jan-1992	LM16	12DCLB	LT	1.20e-03	UGG
2.0	20-jan-1992	LM16	12DCLC	LT	3.10e-03	UGG
9.5	20-jan-1992	LM16	12DCLC	LT	3.10e-03	UGG
2.0	20-jan-1992	LM16	12DCLP	LT	2.20e-03	UGG

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Site: BORE 6Sb1 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
9.5	20-jan-1992	LM16	12DCLP	LT	2.20e-03	UGG
2.0	20-jan-1992	LM16	12DMB	ND	2.00e-03	UGG
9.5	20-jan-1992	LM16	12DMB	ND	2.00e-03	UGG
2.0	20-jan-1992	LM16	13DCLB	LT	2.00e-03	UGG
9.5	20-jan-1992	LM16	13DCLB	LT	2.00e-03	UGG
2.0	20-jan-1992	LM16	13DCP	LT	1.30e-03	UGG
9.5	20-jan-1992	LM16	13DCP	LT	1.30e-03	UGG
2.0	20-jan-1992	LM16	13DMB	ND	2.00e-03	UGG
9.5	20-jan-1992	LM16	13DMB	ND	2.00e-03	UGG
2.0	20-jan-1992	LM16	14DCLB	LT	9.00e-04	UGG
9.5	20-jan-1992	LM16	14DCLB	LT	9.00e-04	UGG
2.0	20-jan-1992	LM16	2CLEVE	LT	4.80e-02	UGG
9.5	20-jan-1992	LM16	2CLEVE	LT	4.80e-02	UGG
2.0	20-jan-1992	LM16	ACET	ND	1.00e-02	UGG
9.5	20-jan-1992	LM16	ACET	ND	1.00e-02	UGG
2.0	20-jan-1992	LM15	BRDCLM	LT	3.30e-03	UGG
9.5	20-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
2.0	20-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG
9.5	20-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG
2.0	20-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
9.5	20-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
2.0	20-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
9.5	20-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
2.0	20-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
9.5	20-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
2.0	20-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
9.5	20-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
2.0	20-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
9.5	20-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
2.0	20-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
9.5	20-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
2.0	20-jan-1992	LM16	CH2CL2		7.26e-03	UGG
9.5	20-jan-1992	LM16	CH2CL2		8.30e-03	UGG
2.0	20-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
9.5	20-jan-1992	LM16	CH3BR	ND	1.00e-02	UGG
2.0	20-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
9.5	20-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
2.0	20-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
9.5	20-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
2.0	20-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
9.5	20-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
2.0	20-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG
9.5	20-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG
2.0	20-jan-1992	LM16	CS2	ND	5.00e-03	UGG
9.5	20-jan-1992	LM16	CS2	ND	5.00e-03	UGG
2.0	20-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
9.5	20-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
2.0	20-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG

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Installation: Cold Regions Res & Eng Lab. NHPage 23
 Analytical Results for Chemical Soil
 From: 01-jan-92 To: 01-jun-92

Site: BORE 6SB1 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
9.5	20-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
2.0	20-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
9.5	20-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
2.0	20-jan-1992	LM16	MEK	ND	1.00e-02	UGG
9.5	20-jan-1992	LM16	MEK	ND	1.00e-02	UGG
2.0	20-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
9.5	20-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
2.0	20-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
9.5	20-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
2.0	20-jan-1992	LM16	STYR	ND	5.00e-03	UGG
9.5	20-jan-1992	LM16	STYR	ND	5.00e-03	UGG
2.0	20-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
9.5	20-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
2.0	20-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
9.5	20-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
2.0	20-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
9.5	20-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
2.0	20-jan-1992	LM16	TRCLE	LT	3.80e-03	UGG
9.5	20-jan-1992	LM16	TRCLE	LT	3.80e-03	UGG

Site: BORE 9SB1

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
18.0	16-jan-1992	00	TPHC	LT	7.43e+01	UGG
3.0	16-jan-1992	00	TPHC	LT	7.46e+01	UGG
14.0	16-jan-1992	00	TPHC	LT	7.46e+01	UGG
54.0	17-jan-1992	00	TPHC	LT	7.46e+01	UGG
3.0	16-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
14.0	16-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
18.0	16-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
54.0	17-jan-1992	LM16	111TCE	LT	4.20e-03	UGG
3.0	16-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
14.0	16-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
18.0	16-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
54.0	17-jan-1992	LM16	112TCE	LT	2.00e-02	UGG
3.0	16-jan-1992	LM16	11DCE	LT	1.90e-02	UGG
14.0	16-jan-1992	LM16	11DCE	LT	1.90e-02	UGG
18.0	16-jan-1992	LM16	11DCE	LT	1.90e-02	UGG
54.0	17-jan-1992	LM16	11DCE	LT	1.90e-02	UGG
3.0	16-jan-1992	LM16	11DCLE	LT	1.70e-03	UGG
14.0	16-jan-1992	LM16	11DCLE	LT	1.70e-03	UGG
18.0	16-jan-1992	LM16	11DCLE	LT	1.70e-03	UGG
54.0	17-jan-1992	LM16	11DCLE	LT	1.70e-03	UGG
3.0	16-jan-1992	LM16	12DCE	LT	2.00e-03	UGG

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Installation: Cold Regions Res & Eng Lab. NHPage 24
 Analytical Results for Chemical Soil
 From: 01-jan-92 To: 01-jun-92

Site: BORE 9SB1 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
14.0	16-jan-1992	LM16	12DCE	LT	2.00e-03	UGG
18.0	16-jan-1992	LM16	12DCE	LT	2.00e-03	UGG
54.0	17-jan-1992	LM16	12DCE	LT	2.00e-03	UGG
3.0	16-jan-1992	LM16	12DCLB	LT	1.20e-03	UGG
14.0	16-jan-1992	LM16	12DCLB	LT	1.20e-03	UGG
18.0	16-jan-1992	LM16	12DCLB	LT	1.20e-03	UGG
54.0	17-jan-1992	LM16	12DCLB	LT	1.20e-03	UGG
3.0	16-jan-1992	LM16	12DCLP	LT	3.10e-03	UGG
14.0	16-jan-1992	LM16	12DCLP	LT	3.10e-03	UGG
18.0	16-jan-1992	LM16	12DCLP	LT	3.10e-03	UGG
54.0	17-jan-1992	LM16	12DCLP	LT	3.10e-03	UGG
3.0	16-jan-1992	LM16	12DCLP	LT	2.20e-03	UGG
14.0	16-jan-1992	LM16	12DCLP	LT	2.20e-03	UGG
18.0	16-jan-1992	LM16	12DCLP	LT	2.20e-03	UGG
54.0	17-jan-1992	LM16	12DCLP	LT	2.20e-03	UGG
3.0	16-jan-1992	LM16	12DMB	ND	2.00e-03	UGG
14.0	16-jan-1992	LM16	12DMB	ND	2.00e-03	UGG
18.0	16-jan-1992	LM16	12DMB	ND	2.00e-03	UGG
54.0	17-jan-1992	LM16	12DMB	ND	2.00e-03	UGG
3.0	16-jan-1992	LM16	13DCLB	LT	2.00e-03	UGG
14.0	16-jan-1992	LM16	13DCLB	LT	2.00e-03	UGG
18.0	16-jan-1992	LM16	13DCLB	LT	2.00e-03	UGG
54.0	17-jan-1992	LM16	13DCLB	LT	2.00e-03	UGG
3.0	16-jan-1992	LM16	13DCP	LT	1.30e-03	UGG
14.0	16-jan-1992	LM16	13DCP	LT	1.30e-03	UGG
18.0	16-jan-1992	LM16	13DCP	LT	1.30e-03	UGG
54.0	17-jan-1992	LM16	13DCP	LT	1.30e-03	UGG
3.0	16-jan-1992	LM16	13DMB	ND	2.00e-03	UGG
14.0	16-jan-1992	LM16	13DMB	ND	2.00e-03	UGG
18.0	16-jan-1992	LM16	13DMB	ND	2.00e-03	UGG
54.0	17-jan-1992	LM16	13DMB	ND	2.00e-03	UGG
3.0	16-jan-1992	LM16	14DCLB	LT	9.00e-04	UGG
14.0	16-jan-1992	LM16	14DCLB	LT	9.00e-04	UGG
18.0	16-jan-1992	LM16	14DCLB	LT	9.00e-04	UGG
54.0	17-jan-1992	LM16	14DCLB	LT	9.00e-04	UGG
3.0	16-jan-1992	LM16	2CLEVE	LT	4.80e-02	UGG
14.0	16-jan-1992	LM16	2CLEVE	LT	4.80e-02	UGG
18.0	16-jan-1992	LM16	2CLEVE	LT	4.80e-02	UGG
54.0	17-jan-1992	LM16	2CLEVE	LT	4.80e-02	UGG
18.0	16-jan-1992	LM16	ACET		9.77e-03	UGG
14.0	16-jan-1992	LM16	ACET		4.34e-02	UGG
3.0	16-jan-1992	LM16	ACET	ND	1.00e-02	UGG
54.0	17-jan-1992	LM16	ACET	ND	1.00e-02	UGG
3.0	16-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
14.0	16-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
18.0	16-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
54.0	17-jan-1992	LM16	BRDCLM	LT	3.30e-03	UGG
3.0	16-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG

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Installation: Cold Regions Res & Eng Lab, NHPage 25
 Analytical Results for Chemical Soil
 From: 01-jan-92 To: 01-jun-92

Site: BORE 9SB1 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
14.0	16-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG
18.0	16-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG
54.0	17-jan-1992	LM16	C13DCP	ND	5.00e-03	UGG
3.0	16-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
14.0	16-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
18.0	16-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
54.0	17-jan-1992	LM16	C2AVE	ND	1.00e-02	UGG
3.0	16-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
14.0	16-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
18.0	16-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
54.0	17-jan-1992	LM16	C2H3CL	LT	1.50e-02	UGG
3.0	16-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
14.0	16-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
18.0	16-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
54.0	17-jan-1992	LM16	C2H5CL	LT	2.70e-02	UGG
3.0	16-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
14.0	16-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
18.0	16-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
54.0	17-jan-1992	LM16	C6H6	LT	2.90e-03	UGG
3.0	16-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
14.0	16-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
18.0	16-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
54.0	17-jan-1992	LM16	CCL3F	ND	5.00e-03	UGG
3.0	16-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
14.0	16-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
18.0	16-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
54.0	17-jan-1992	LM16	CCL4	LT	5.60e-03	UGG
3.0	16-jan-1992	LM16	CH2CL2		3.13e-03	UGG
14.0	16-jan-1992	LM16	CH2CL2		3.57e-03	UGG
18.0	16-jan-1992	LM16	CH2CL2		8.01e-03	UGG
54.0	17-jan-1992	LM16	CH2CL2		8.97e-03	UGG
14.0	16-jan-1992	LM16	CH3BR	NO	1.00e-02	UGG
3.0	16-jan-1992	LM16	CH3BR	NO	1.00e-02	UGG
14.0	16-jan-1992	LM16	CH3BR	NO	1.00e-02	UGG
18.0	16-jan-1992	LM16	CH3BR	NO	1.00e-02	UGG
54.0	17-jan-1992	LM16	CH3BR	NO	1.00e-02	UGG
3.0	16-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
14.0	16-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
18.0	16-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
54.0	17-jan-1992	LM16	CH3CL	LT	1.70e-02	UGG
3.0	16-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
14.0	16-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
18.0	16-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
54.0	17-jan-1992	LM16	CHBR3	LT	1.80e-02	UGG
3.0	16-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
14.0	16-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
18.0	16-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
54.0	17-jan-1992	LM16	CHCL3	LT	2.30e-03	UGG
3.0	16-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG

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Analytical Results for Chemical Soil
From: 01-jan-92 To: 01-jun-92

Site: BORE 9SB1 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
14.0	16-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG
18.0	16-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG
54.0	17-jan-1992	LM16	CLC6H5	LT	2.80e-03	UGG
3.0	16-jan-1992	LM16	CS2	ND	5.00e-03	UGG
14.0	16-jan-1992	LM16	CS2	ND	5.00e-03	UGG
18.0	16-jan-1992	LM16	CS2	ND	5.00e-03	UGG
54.0	17-jan-1992	LM16	CS2	ND	5.00e-03	UGG
3.0	16-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
14.0	16-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
18.0	16-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
54.0	17-jan-1992	LM16	DBRCLM	LT	1.40e-02	UGG
3.0	16-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
14.0	16-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
18.0	16-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
54.0	17-jan-1992	LM16	ETC6H5	LT	3.30e-03	UGG
3.0	16-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
14.0	16-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
18.0	16-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
54.0	17-jan-1992	LM16	MEC6H5	LT	8.40e-03	UGG
3.0	16-jan-1992	LM16	MEK	ND	1.00e-02	UGG
14.0	16-jan-1992	LM16	MEK	ND	1.00e-02	UGG
18.0	16-jan-1992	LM16	MEK	ND	1.00e-02	UGG
54.0	17-jan-1992	LM16	MEK	ND	1.00e-02	UGG
3.0	16-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
14.0	16-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
18.0	16-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
54.0	17-jan-1992	LM16	MIBK	ND	1.00e-02	UGG
3.0	16-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
14.0	16-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
18.0	16-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
54.0	17-jan-1992	LM16	MNBK	ND	1.00e-02	UGG
3.0	16-jan-1992	LM16	STYR	ND	5.00e-03	UGG
14.0	16-jan-1992	LM16	STYR	ND	5.00e-03	UGG
18.0	16-jan-1992	LM16	STYR	ND	5.00e-03	UGG
54.0	17-jan-1992	LM16	STYR	ND	5.00e-03	UGG
3.0	16-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
14.0	16-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
18.0	16-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
54.0	17-jan-1992	LM16	T13DCP	ND	5.00e-03	UGG
3.0	16-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
14.0	16-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
18.0	16-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
54.0	17-jan-1992	LM16	TCLEA	LT	1.60e-03	UGG
3.0	16-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
14.0	16-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
18.0	16-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
54.0	17-jan-1992	LM16	TCLEE	LT	1.90e-03	UGG
3.0	16-jan-1992	LM16	TRCLE	LT	1.68e-02	UGG

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Analytical Results for Chemical Soil
From: 01-jan-92 To: 01-jun-92

Site: BORE 9SB1 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
14.0	16-jan-1992	LM16	TRCLE		5.09e-02	UGG
18.0	16-jan-1992	LM16	TRCLE		1.06e-01	UGG
54.0	17-jan-1992	LM16	TRCLE	LT	3.80e-03	UGG

Report completed normally.

INSTALLATION RESTORATION PROGRAM

CHEMICAL REPORT
Mon Jun 1 08:25:57 1992

For Parameters :

Installation = Cold Regions Res & Eng Lab. NH
Beginning Date = 01-mar-92
Ending Date = 31-mar-92
Media Type = Chemical Ground Water
Maximum (X, Y) = (719933, 4844996)
Minimum (X, Y) = (719326, 4844457)
Booleans = Y

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Installation: Cold Regions Res & Eng Lab., NHPage 1
 Analytical Results for Chemical Ground Water
 From: 01-mar-92 To: 31-mar-92

Site: WELL CECRL01

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	09-mar-1992	00	TPHC	LT	1.15e+03	UGL
0.0	09-mar-1992	UM33	111TCE	LT	4.10e+00	UGL
0.0	09-mar-1992	UM33	112TCE	LT	6.30e-01	UGL
0.0	09-mar-1992	UM33	11DCE	LT	1.42e+00	UGL
0.0	09-mar-1992	UM33	11DCLE	LT	1.10e+00	UGL
0.0	09-mar-1992	UM33	12DCE	LT	1.10e+00	UGL
0.0	09-mar-1992	UM33	12DCLB	LT	9.70e+00	UGL
0.0	09-mar-1992	UM33	12DCLE	LT	7.60e+00	UGL
0.0	09-mar-1992	UM33	12DCLP	LT	2.80e+00	UGL
0.0	09-mar-1992	UM33	12DMB	ND	2.00e+00	UGL
0.0	09-mar-1992	UM33	13DCLB	LT	9.20e+00	UGL
0.0	09-mar-1992	UM33	13DCP	LT	3.80e+00	UGL
0.0	09-mar-1992	UM33	13DMB	ND	5.00e-00	UGL
0.0	09-mar-1992	UM33	14DCLB	LT	8.10e+00	UGL
0.0	09-mar-1992	UM33	2CLEVE	LT	8.20e+01	UGL
0.0	09-mar-1992	UM33	ACET	ND	1.00e-01	UGL
0.0	09-mar-1992	UM33	BRDCLM	LT	7.90e+00	UGL
0.0	09-mar-1992	UM33	C13DCP	ND	5.00e-00	UGL
0.0	09-mar-1992	UM33	C2AVE	ND	1.00e-01	UGL
0.0	09-mar-1992	UM33	C2H3CL	LT	5.00e-01	UGL
0.0	09-mar-1992	UM33	C2H5CL	LT	2.12e+00	UGL
0.0	09-mar-1992	UM33	C6H6	LT	2.40e+00	UGL
0.0	09-mar-1992	UM33	CCL4	LT	3.70e+00	UGL
0.0	09-mar-1992	UM33	CH2CL2	LT	8.43e+00	UGL
0.0	09-mar-1992	UM33	CH3BR	ND	1.00e+01	UGL
0.0	09-mar-1992	UM33	CH3CL	LT	1.60e+00	UGL
0.0	09-mar-1992	UM33	CHBR3	LT	8.20e+00	UGL
0.0	09-mar-1992	UM33	CHCL3	LT	5.03e-01	UGL
0.0	09-mar-1992	UM33	CLC6H5	LT	1.40e+00	UGL
0.0	09-mar-1992	UM33	CS2	ND	5.00e+00	UGL
0.0	09-mar-1992	UM33	DBRCLM	LT	6.50e+00	UGL
0.0	09-mar-1992	UM33	ETC6H5	LT	9.30e+00	UGL
0.0	09-mar-1992	UM33	MEC6H5	LT	8.70e+00	UGL
0.0	09-mar-1992	UM33	MEK	ND	1.00e+01	UGL
0.0	09-mar-1992	UM33	MIBK	ND	1.00e+01	UGL
0.0	09-mar-1992	UM33	MNBR	ND	1.00e+01	UGL
0.0	09-mar-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	09-mar-1992	UM33	T13DCP	ND	5.00e+00	UGL
0.0	09-mar-1992	UM33	TCLEA	LT	4.70e+00	UGL
0.0	09-mar-1992	UM33	TCLEE	LT	5.00e-01	UGL
0.0	09-mar-1992	UM33	TRCLE	LT	5.31e+02	UGL

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 Analytical Results for Chemical Ground Water
 From: 01-mar-92 To: 31-mar-92

Site: WELL CECRL02

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	13-mar-1992	00	TPHC	LT	1.12e+03	UGL
0.0	13-mar-1992	UM33	111TCE	LT	4.10e+00	UGL
0.0	13-mar-1992	UM33	112TCE	LT	6.30e-01	UGL
0.0	13-mar-1992	UM33	11DCE	LT	1.42e+00	UGL
0.0	13-mar-1992	UM33	11DCLE	LT	1.10e+00	UGL
0.0	13-mar-1992	UM33	12DCE	LT	1.10e+00	UGL
0.0	13-mar-1992	UM33	12DCLB	LT	9.70e+00	UGL
0.0	13-mar-1992	UM33	12DCLE	LT	7.60e+00	UGL
0.0	13-mar-1992	UM33	12DCLP	LT	2.80e+00	UGL
0.0	13-mar-1992	UM33	12DMB	ND	5.00e+00	UGL
0.0	13-mar-1992	UM33	13DCLB	LT	9.20e+00	UGL
0.0	13-mar-1992	UM33	13DCP	LT	3.80e+00	UGL
0.0	13-mar-1992	UM33	13DMB	ND	5.00e+00	UGL
0.0	13-mar-1992	UM33	14DCLB	LT	8.10e+00	UGL
0.0	13-mar-1992	UM33	2CLEVE	LT	8.20e-01	UGL
0.0	13-mar-1992	UM33	ACET		8.60e+00	UGL
0.0	13-mar-1992	UM33	BRDCLM	LT	7.90e+00	UGL
0.0	13-mar-1992	UM33	C12DCE		8.10e-01	UGL
0.0	13-mar-1992	UM33	C13DCP	ND	5.00e+00	UGL
0.0	13-mar-1992	UM33	C2AVE	ND	1.00e+01	UGL
0.0	13-mar-1992	UM33	C2H3CL	LT	5.00e-01	UGL
0.0	13-mar-1992	UM33	C2H5CL	LT	2.12e+00	UGL
0.0	13-mar-1992	UM33	C6H6	LT	2.40e+00	UGL
0.0	13-mar-1992	UM33	CCL4	LT	3.70e+00	UGL
0.0	13-mar-1992	UM33	CH2CL2		3.24e+00	UGL
0.0	13-mar-1992	UM33	CH3BR	ND	1.00e-01	UGL
0.0	13-mar-1992	UM33	CH3CL	LT	1.60e-00	UGL
0.0	13-mar-1992	UM33	CHBR3	LT	8.20e-00	UGL
0.0	13-mar-1992	UM33	CHCL3		3.82e+00	UGL
0.0	13-mar-1992	UM33	CLC6H5	LT	1.40e+00	UGL
0.0	13-mar-1992	UM33	CS2	ND	5.00e+00	UGL
0.0	13-mar-1992	UM33	DBRCLM	LT	6.50e+00	UGL
0.0	13-mar-1992	UM33	ETC6H5	LT	9.30e+00	UGL
0.0	13-mar-1992	UM33	MEC6H5	LT	8.70e+00	UGL
0.0	13-mar-1992	UM33	MEK	ND	1.00e+01	UGL
0.0	13-mar-1992	UM33	MIBK	ND	1.00e-01	UGL
0.0	13-mar-1992	UM33	MNBK	ND	1.00e-01	UGL
0.0	13-mar-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	13-mar-1992	UM33	T13DCP	ND	5.00e+00	UGL
0.0	13-mar-1992	UM33	TCLEA	LT	4.70e+00	UGL
0.0	13-mar-1992	UM33	TCLEE	LT	5.00e-01	UGL
0.0	13-mar-1992	UM33	TRCLE		2.97e-01	UGL

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Site: WELL CECRL03

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	09-mar-1992	00	TPHC	LT	1.18e+03	UGL
0.0	09-mar-1992	UM33	111TCE	LT	4.10e+00	UGL
0.0	09-mar-1992	UM33	112TCE	LT	6.30e-01	UGL
0.0	09-mar-1992	UM33	11DCE	LT	1.42e+00	UGL
0.0	09-mar-1992	UM33	11DCLE	LT	1.10e+00	UGL
0.0	09-mar-1992	UM33	12DCE	LT	1.10e+00	UGL
0.0	09-mar-1992	UM33	12DCLB	LT	9.70e+00	UGL
0.0	09-mar-1992	UM33	12DCLE	LT	7.60e+00	UGL
0.0	09-mar-1992	UM33	12DCLP	LT	2.80e+00	UGL
0.0	09-mar-1992	UM33	12DMB	ND	2.00e+00	UGL
0.0	09-mar-1992	UM33	13DCLB	LT	9.20e+00	UGL
0.0	09-mar-1992	UM33	13DCP	LT	3.80e+00	UGL
0.0	09-mar-1992	UM33	13DMB	ND	5.00e+00	UGL
0.0	09-mar-1992	UM33	14DCLB	LT	8.10e+00	UGL
0.0	09-mar-1992	UM33	2CLEVE	LT	8.20e+01	UGL
0.0	09-mar-1992	UM33	ACET	ND	1.00e+01	UGL
0.0	09-mar-1992	UM33	BRDCLM	LT	7.90e+00	UGL
0.0	09-mar-1992	UM33	C13DCP	ND	5.00e+00	UGL
0.0	09-mar-1992	UM33	C2AVE	ND	1.00e+01	UGL
0.0	09-mar-1992	UM33	C2H3CL	LT	5.00e-01	UGL
0.0	09-mar-1992	UM33	C2H5CL	LT	2.12e+00	UGL
0.0	09-mar-1992	UM33	C6H6	LT	2.40e+00	UGL
0.0	09-mar-1992	UM33	CCL4	LT	3.70e+00	UGL
0.0	09-mar-1992	UM33	CH2CL2	LT	7.75e+00	UGL
0.0	09-mar-1992	UM33	CH3BR	ND	1.00e+01	UGL
0.0	09-mar-1992	UM33	CH3CL	LT	1.60e+00	UGL
0.0	09-mar-1992	UM33	CHBR3	LT	8.20e+00	UGL
0.0	09-mar-1992	UM33	CHCL3	LT	8.30e-01	UGL
0.0	09-mar-1992	UM33	CLC6H5	LT	1.40e+00	UGL
0.0	09-mar-1992	UM33	CS2	ND	5.00e+00	UGL
0.0	09-mar-1992	UM33	DBRCLM	LT	6.50e+00	UGL
0.0	09-mar-1992	UM33	ETC6H5	LT	9.30e+00	UGL
0.0	09-mar-1992	UM33	MEC6H5	LT	8.70e+00	UGL
0.0	09-mar-1992	UM33	MEK	ND	1.00e+01	UGL
0.0	09-mar-1992	UM33	MIBK	ND	1.00e+01	UGL
0.0	09-mar-1992	UM33	MNBK	ND	1.00e+01	UGL
0.0	09-mar-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	09-mar-1992	UM33	T13DCP	ND	5.00e+00	UGL
0.0	09-mar-1992	UM33	TCLEA	LT	4.70e+00	UGL
0.0	09-mar-1992	UM33	TCLEE	LT	5.00e-01	UGL
0.0	09-mar-1992	UM33	TRCLE	LT	5.00e-01	UGL

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**Appendix A: Analytical Results From Previous RI (Ecology and Environment,
1992)**

The compound codes listed in this Appendix can be found along with the corresponding full name for each compound, on the following CRREL Phase II RI List of Methods and Analyte CRLs. In the text, all compounds are documented by their full names, with the exception of trichloroethene and tetrachloroethene. These two compounds are abbreviated by TCE and PCE respectively, the common abbreviations for each compound. TCE and PCE can be cross-referenced in the Appendices and the List of Methods and Analyte CRLs by their respective compound codes of TRCLE and TCLEE.

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Site: WELL CECRL04

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	09-mar-1992	00	TPHC	LT	1.24e+03	UGL
0.0	09-mar-1992	UM33	111TCE	LT	4.10e+00	UGL
0.0	09-mar-1992	UM33	112TCE	LT	6.30e-01	UGL
0.0	09-mar-1992	UM33	11DCE	LT	1.42e+00	UGL
0.0	09-mar-1992	UM33	11DCLE	LT	1.10e+00	UGL
0.0	09-mar-1992	UM33	12DCE	LT	1.10e+00	UGL
0.0	09-mar-1992	UM33	12DCLB	LT	9.70e+00	UGL
0.0	09-mar-1992	UM33	12DCLE	LT	7.60e+00	UGL
0.0	09-mar-1992	UM33	12DCLP	LT	2.80e+00	UGL
0.0	09-mar-1992	UM33	12DMB	ND	2.00e+00	UGL
0.0	09-mar-1992	UM33	13DCLB	LT	9.20e+00	UGL
0.0	09-mar-1992	UM33	13DCP	LT	3.80e+00	UGL
0.0	09-mar-1992	UM33	13DMB	ND	5.00e+00	UGL
0.0	09-mar-1992	UM33	14DCLB	LT	8.10e+00	UGL
0.0	09-mar-1992	UM33	2CLEVE	LT	8.20e+01	UGL
0.0	09-mar-1992	UM33	ACET	ND	1.00e+01	UGL
0.0	09-mar-1992	UM33	BRDCLM	LT	7.90e+00	UGL
0.0	09-mar-1992	UM33	C13DCP	ND	5.00e+00	UGL
0.0	09-mar-1992	UM33	C2AVE	ND	1.00e+01	UGL
0.0	09-mar-1992	UM33	C2H3CL	LT	5.00e-01	UGL
0.0	09-mar-1992	UM33	C2H5CL	LT	2.12e-00	UGL
0.0	09-mar-1992	UM33	C6H6	LT	2.40e-00	UGL
0.0	09-mar-1992	UM33	CCL4	LT	3.70e+00	UGL
0.0	09-mar-1992	UM33	CH2CL2	LT	6.76e+00	UGL
0.0	09-mar-1992	UM33	CH3BR	ND	1.00e+01	UGL
0.0	09-mar-1992	UM33	CH3CL	LT	1.60e+00	UGL
0.0	09-mar-1992	UM33	CHBR3	LT	8.20e+00	UGL
0.0	09-mar-1992	UM33	CKCL3	LT	8.30e-01	UGL
0.0	09-mar-1992	UM33	CLC6H5	LT	1.40e+00	UGL
0.0	09-mar-1992	UM33	CS2	ND	5.00e+00	UGL
0.0	09-mar-1992	UM33	DBRCLM	LT	6.50e+00	UGL
0.0	09-mar-1992	UM33	ETC6H5	LT	9.30e+00	UGL
0.0	09-mar-1992	UM33	MEC6H5	LT	8.70e+00	UGL
0.0	09-mar-1992	UM33	MEK	ND	1.00e+01	UGL
0.0	09-mar-1992	UM33	MIBK	ND	1.00e+01	UGL
0.0	09-mar-1992	UM33	MNBK	ND	1.00e+01	UGL
0.0	09-mar-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	09-mar-1992	UM33	T13DCP	ND	5.00e+00	UGL
0.0	09-mar-1992	UM33	TCLEA	LT	4.70e+00	UGL
0.0	09-mar-1992	UM33	TCLEE	LT	5.00e-01	UGL
0.0	09-mar-1992	UM33	TRCLE	LT	6.05e+00	UGL

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Site: WELL CECRL05

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	09-mar-1992	00	TPHC	LT	1.14e+03	UGL
0.0	09-mar-1992	UM33	111TCE	LT	4.10e+00	UGL
0.0	09-mar-1992	UM33	112TCE	LT	6.30e-01	UGL
0.0	09-mar-1992	UM33	11DCE	LT	1.42e+00	UGL
0.0	09-mar-1992	UM33	11DCLE	LT	1.10e+00	UGL
0.0	09-mar-1992	UM33	12DCE	LT	1.10e+00	UGL
0.0	09-mar-1992	UM33	12DCLB	LT	9.70e+00	UGL
0.0	09-mar-1992	UM33	12DCLE	LT	7.60e+00	UGL
0.0	09-mar-1992	UM33	12DCLP	LT	2.80e+00	UGL
0.0	09-mar-1992	UM33	12DMS	ND	2.00e+00	UGL
0.0	09-mar-1992	UM33	13DCLB	LT	9.20e+00	UGL
0.0	09-mar-1992	UM33	13DCP	LT	3.80e+00	UGL
0.0	09-mar-1992	UM33	13DMS	ND	5.00e+00	UGL
0.0	09-mar-1992	UM33	14DCLB	LT	8.10e+00	UGL
0.0	09-mar-1992	UM33	2CLEVE	LT	8.20e+01	UGL
0.0	09-mar-1992	UM33	ACET	ND	1.00e+01	UGL
0.0	09-mar-1992	UM33	BRDCLM	LT	7.90e+00	UGL
0.0	09-mar-1992	UM33	C13DCP	ND	5.00e+00	UGL
0.0	09-mar-1992	UM33	C2AVE	ND	1.00e+01	UGL
0.0	09-mar-1992	UM33	C2H3CL	LT	5.00e-01	UGL
0.0	09-mar-1992	UM33	C2H5CL	LT	2.12e+00	UGL
0.0	09-mar-1992	UM33	C6H6	LT	2.40e+00	UGL
0.0	09-mar-1992	UM33	CCL4	LT	3.70e+00	UGL
0.0	09-mar-1992	UM33	CH2CL2	LT	7.45e+00	UGL
0.0	09-mar-1992	UM33	CH3BR	ND	1.00e+01	UGL
0.0	09-mar-1992	UM33	CH3CL	LT	1.60e+00	UGL
0.0	09-mar-1992	UM33	CHBR3	LT	8.20e+00	UGL
0.0	09-mar-1992	UM33	CHCL3	LT	8.30e-01	UGL
0.0	09-mar-1992	UM33	CLC6H5	LT	1.40e+00	UGL
0.0	09-mar-1992	UM33	CS2	ND	5.00e+00	UGL
0.0	09-mar-1992	UM33	DBRCLM	LT	6.50e+00	UGL
0.0	09-mar-1992	UM33	ETC6H5	LT	9.30e+00	UGL
0.0	09-mar-1992	UM33	MEC6H5	LT	8.70e+00	UGL
0.0	09-mar-1992	UM33	MEK	ND	1.00e+01	UGL
0.0	09-mar-1992	UM33	MIBK	ND	1.00e+01	UGL
0.0	09-mar-1992	UM33	MNBK	ND	1.00e+01	UGL
0.0	09-mar-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	09-mar-1992	UM33	T13DCP	ND	5.00e+00	UGL
0.0	09-mar-1992	UM33	TCLEA	LT	4.70e+00	UGL
0.0	09-mar-1992	UM33	TCLEE	LT	5.00e-01	UGL
0.0	09-mar-1992	UM33	TRCLE	LT	4.99e+01	UGL

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Site: WELL CECRL06

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	13-mar-1992	00	TPHC		5.44e+05	UGL
0.0	13-mar-1992	UM33	111TCE	LT	4.10e+02	UGL
0.0	13-mar-1992	UM33	112TCE	LT	6.30e+01	UGL
0.0	13-mar-1992	UM33	11DCCE	LT	1.42e+02	UGL
0.0	13-mar-1992	UM33	11DCLE	LT	1.10e+02	UGL
0.0	13-mar-1992	UM33	12DCE	LT	1.10e+02	UGL
0.0	13-mar-1992	UM33	12DCLB	LT	9.70e+02	UGL
0.0	13-mar-1992	UM33	12DCLE	LT	7.60e+02	UGL
0.0	13-mar-1992	UM33	12DCLP	LT	2.80e+02	UGL
0.0	13-mar-1992	UM33	12DMB	ND	5.00e+02	UGL
0.0	13-mar-1992	UM33	13DCLB	LT	9.20e+02	UGL
0.0	13-mar-1992	UM33	13DCP	LT	3.80e+02	UGL
0.0	13-mar-1992	UM33	13DMB	ND	5.00e+02	UGL
0.0	13-mar-1992	UM33	14DCLB	LT	6.10e+02	UGL
0.0	13-mar-1992	UM33	2CLEVE	LT	8.20e+03	UGL
0.0	13-mar-1992	UM33	ACET	ND	1.00e+03	UGL
0.0	13-mar-1992	UM33	BRDCLM	LT	7.90e+02	UGL
0.0	13-mar-1992	UM33	C12DCE	ND	5.00e+02	UGL
0.0	13-mar-1992	UM33	C13DCP	ND	5.00e+02	UGL
0.0	13-mar-1992	UM33	C2AVE	ND	1.00e+03	UGL
0.0	13-mar-1992	UM33	C2H3CL	LT	5.00e+01	UGL
0.0	13-mar-1992	UM33	C2H5CL	LT	2.12e+02	UGL
0.0	13-mar-1992	UM33	C6H6	LT	2.40e+02	UGL
0.0	13-mar-1992	UM33	CCL4	LT	3.70e+02	UGL
0.0	13-mar-1992	UM33	CH2CL2		2.94e+02	UGL
0.0	13-mar-1992	UM33	CH3BR	ND	1.00e+03	UGL
0.0	13-mar-1992	UM33	CH3CL	LT	1.60e+02	UGL
0.0	13-mar-1992	UM33	CHBR3	LT	8.20e+02	UGL
0.0	13-mar-1992	UM33	CHCL3	LT	8.30e+01	UGL
0.0	13-mar-1992	UM33	CLC6H5	LT	1.40e+02	UGL
0.0	13-mar-1992	UM33	CS2	ND	5.00e+02	UGL
0.0	13-mar-1992	UM33	DBRCLM	LT	6.50e+02	UGL
0.0	13-mar-1992	UM33	ETC6H5	LT	9.30e+02	UGL
0.0	13-mar-1992	UM33	MEC6H5	LT	8.70e+02	UGL
0.0	13-mar-1992	UM33	MEK	ND	1.00e+03	UGL
0.0	13-mar-1992	UM33	MIBK	ND	1.00e+03	UGL
0.0	13-mar-1992	UM33	MNBK	ND	1.00e+03	UGL
0.0	13-mar-1992	UM33	STYR	ND	5.00e+02	UGL
0.0	13-mar-1992	UM33	T13DCP	ND	5.00e+02	UGL
0.0	13-mar-1992	UM33	TCLEA	LT	4.70e+02	UGL
0.0	13-mar-1992	UM33	TCLEE		1.29e+03	UGL
0.0	13-mar-1992	UM33	TRCLE		1.38e+04	UGL
0.0	13-mar-1992	UM33	UNK172		1.00e+03	UGL
0.0	13-mar-1992	UM33	UNK176		7.00e+02	UGL
0.0	13-mar-1992	UM33	UNK180		3.00e+02	UGL
0.0	13-mar-1992	UM33	UNK184		7.00e+02	UGL
0.0	13-mar-1992	UM33	UNK191		2.00e+04	UGL

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Site: WELL CECRL07

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	12-mar-1992	00	TPHC	LT	1.14e+03	UGL
0.0	12-mar-1992	UM33	111TCE	LT	4.10e+00	UGL
0.0	12-mar-1992	UM33	112TCE	LT	6.30e-01	UGL
0.0	12-mar-1992	UM33	11DCE	LT	1.42e+00	UGL
0.0	12-mar-1992	UM33	11DCLE	LT	1.10e+00	UGL
0.0	12-mar-1992	UM33	12DCE	LT	1.10e+00	UGL
0.0	12-mar-1992	UM33	12DCLB	LT	9.70e+00	UGL
0.0	12-mar-1992	UM33	12DCLE	LT	7.60e+00	UGL
0.0	12-mar-1992	UM33	12DCLP	LT	2.80e+00	UGL
0.0	12-mar-1992	UM33	12DMB	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	13DCLB	LT	9.20e+00	UGL
0.0	12-mar-1992	UM33	13DCP	LT	3.80e+00	UGL
0.0	12-mar-1992	UM33	13DMB	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	14DCLB	LT	8.10e+00	UGL
0.0	12-mar-1992	UM33	2CLEVE	LT	8.20e+01	UGL
0.0	12-mar-1992	UM33	ACET		1.20e+01	UGL
0.0	12-mar-1992	UM33	BRDCLM	LT	7.90e+00	UGL
0.0	12-mar-1992	UM33	C12DCE	ND	1.10e+00	UGL
0.0	12-mar-1992	UM33	C13DCP	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	C2AVE	ND	1.00e+01	UGL
0.0	12-mar-1992	UM33	C2H3CL	LT	5.00e-01	UGL
0.0	12-mar-1992	UM33	C2H5CL	LT	2.12e+00	UGL
0.0	12-mar-1992	UM33	C6H6	LT	2.40e+00	UGL
0.0	12-mar-1992	UM33	CCL4	LT	3.70e+00	UGL
0.0	12-mar-1992	UM33	CH2CL2		3.43e+00	UGL
0.0	12-mar-1992	UM33	CH3BR	ND	1.00e+01	UGL
0.0	12-mar-1992	UM33	CH3CL	LT	1.60e+00	UGL
0.0	12-mar-1992	UM33	CHBR3	LT	8.20e+00	UGL
0.0	12-mar-1992	UM33	CHCL3	LT	8.30e-01	UGL
0.0	12-mar-1992	UM33	CLC6H5	LT	1.40e+00	UGL
0.0	12-mar-1992	UM33	CS2	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	DBRCLM	LT	6.50e+00	UGL
0.0	12-mar-1992	UM33	ETC6H5	LT	9.30e+00	UGL
0.0	12-mar-1992	UM33	MEC6H5	LT	8.70e+00	UGL
0.0	12-mar-1992	UM33	MEK	ND	1.00e+01	UGL
0.0	12-mar-1992	UM33	MIBK	ND	1.00e+01	UGL
0.0	12-mar-1992	UM33	MNBK	ND	1.00e+01	UGL
0.0	12-mar-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	T13DCP	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	TCLEA	LT	4.70e+00	UGL
0.0	12-mar-1992	UM33	TCLEE	LT	5.00e-01	UGL
0.0	12-mar-1992	UM33	TRCLE		5.94e+00	UGL

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Site: WELL CECRL08 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	13-mar-1992	UM33	CCL4	LT	3.70e+00	UGL
0.0	13-mar-1992	UM33	CH2CL2		3.04e+00	UGL
0.0	13-mar-1992	UM33	CH2CL2		3.43e+00	UGL
0.0	13-mar-1992	UM33	CH3BR	ND	1.00e+01	UGL
0.0	13-mar-1992	UM33	CH3BR	ND	1.00e+01	UGL
0.0	13-mar-1992	UM33	CH3CL	LT	1.60e+00	UGL
0.0	13-mar-1992	UM33	CH3CL	LT	1.60e+00	UGL
0.0	15-mar-1992	UM33	CH3CL	LT	1.60e+00	UGL
0.0	13-mar-1992	UM33	CHBR3	LT	8.20e+00	UGL
0.0	13-mar-1992	UM33	CHBR3	LT	8.20e+00	UGL
0.0	13-mar-1992	UM33	CHCL3	LT	8.30e-01	UGL
0.0	13-mar-1992	UM33	CHCL3	LT	8.30e-01	UGL
0.0	13-mar-1992	UM33	CLC6H5	LT	1.40e+00	UGL
0.0	13-mar-1992	UM33	CLC6H5	LT	1.40e+00	UGL
0.0	13-mar-1992	UM33	CS2	ND	5.00e+00	UGL
0.0	13-mar-1992	UM33	CS2	ND	5.00e+00	UGL
0.0	13-mar-1992	UM33	DBRCLM	LT	6.50e+00	UGL
0.0	13-mar-1992	UM33	DBRCLM	LT	6.50e+00	UGL
0.0	13-mar-1992	UM33	ETC6H5	LT	9.30e+00	UGL
0.0	13-mar-1992	UM33	ETC6H5	LT	9.30e+00	UGL
0.0	13-mar-1992	UM33	MEC6H5	LT	8.70e+00	UGL
0.0	13-mar-1992	UM33	MEC6H5	LT	8.70e+00	UGL
0.0	13-mar-1992	UM33	MEK		5.20e+01	UGL
0.0	13-mar-1992	UM33	MEK		7.30e+01	UGL
0.0	13-mar-1992	UM33	MIBK	ND	1.00e+01	UGL
0.0	13-mar-1992	UM33	MIBK	ND	1.00e+01	UGL
0.0	13-mar-1992	UM33	MNBK	ND	1.00e+01	UGL
0.0	13-mar-1992	UM33	MNBK	ND	1.00e+01	UGL
0.0	13-mar-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	13-mar-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	13-mar-1992	UM33	T13DCP	ND	5.00e+00	UGL
0.0	13-mar-1992	UM33	T13DCP	ND	5.00e+00	UGL
0.0	13-mar-1992	UM33	TCLEA	LT	4.70e+00	UGL
0.0	13-mar-1992	UM33	TCLEA	LT	4.70e+00	UGL
0.0	13-mar-1992	UM33	TCLEE	LT	5.00e+01	UGL
0.0	13-mar-1992	UM33	TCLEE	LT	5.00e+01	UGL
0.0	13-mar-1992	UM33	TRCLE		1.10e+03	UGL
0.0	13-mar-1992	UM33	TRCLE		1.19e+03	UGL

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Site: WELL CECRL09

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	12-mar-1992	00	TPHC	LT	1.16e+03	UGL
0.0	12-mar-1992	UM33	111TCE	LT	2.05e+02	UGL
0.0	12-mar-1992	UM33	112TCE	LT	3.15e+01	UGL
0.0	12-mar-1992	UM33	11DCE	LT	7.10e+01	UGL
0.0	12-mar-1992	UM33	11DCLE	LT	5.50e+01	UGL
0.0	12-mar-1992	UM33	12DCE	ET	5.50e+01	UGL
0.0	12-mar-1992	UM33	12DCLB	LT	4.85e+02	UGL
0.0	12-mar-1992	UM33	12DCLC	LT	3.80e+02	UGL
0.0	12-mar-1992	UM33	12DCLP	LT	1.40e+02	UGL
0.0	12-mar-1992	UM33	12DMB	ND	2.50e+02	UGL
0.0	12-mar-1992	UM33	13DCLB	LT	4.60e+02	UGL
0.0	12-mar-1992	UM33	13DCP	LT	1.90e+02	UGL
0.0	12-mar-1992	UM33	13DMB	ND	2.50e+02	UGL
0.0	12-mar-1992	UM33	14DCLB	LT	4.05e+02	UGL
0.0	12-mar-1992	UM33	2CLEVE	LT	4.10e+03	UGL
0.0	12-mar-1992	UM33	ACET	ND	5.00e+02	UGL
0.0	12-mar-1992	UM33	BROCLM	LT	3.95e+02	UGL
0.0	12-mar-1992	UM33	C12DCE	ND	5.50e+01	UGL
0.0	12-mar-1992	UM33	C13DCP	ND	2.50e+02	UGL
0.0	12-mar-1992	UM33	C2AVE	ND	5.00e+02	UGL
0.0	12-mar-1992	UM33	C2H3CL	LT	2.50e+01	UGL
0.0	12-mar-1992	UM33	C2H5CL	LT	1.06e+02	UGL
0.0	12-mar-1992	UM33	C6H6	LT	1.20e+02	UGL
0.0	12-mar-1992	UM33	CCL4	LT	1.85e+02	UGL
0.0	12-mar-1992	UM33	CH2CL2	LT	2.70e+02	UGL
0.0	12-mar-1992	UM33	CH3BR	ND	5.00e+02	UGL
0.0	12-mar-1992	UM33	CH3CL	LT	8.00e+01	UGL
0.0	12-mar-1992	UM33	CHBR3	LT	4.10e+02	UGL
0.0	12-mar-1992	UM33	CHCL3	LT	4.15e+01	UGL
0.0	12-mar-1992	UM33	CLC6H5	LT	7.00e+01	UGL
0.0	12-mar-1992	UM33	CS2	ND	2.50e+02	UGL
0.0	12-mar-1992	UM33	DBRCLM	LT	3.25e+02	UGL
0.0	12-mar-1992	UM33	ETC6H5	LT	4.65e+02	UGL
0.0	12-mar-1992	UM33	MEC6H5	LT	4.35e+02	UGL
0.0	12-mar-1992	UM33	MEK	ND	3.00e+02	UGL
0.0	12-mar-1992	UM33	MIBK	ND	5.00e+02	UGL
0.0	12-mar-1992	UM33	MNBK	ND	5.00e+02	UGL
0.0	12-mar-1992	UM33	STYR	ND	2.50e+02	UGL
0.0	12-mar-1992	UM33	T13DCP	ND	2.50e+02	UGL
0.0	12-mar-1992	UM33	TCLEA	LT	2.35e+02	UGL
0.0	12-mar-1992	UM33	TCLEE	LT	2.50e+01	UGL
0.0	12-mar-1992	UM33	TRCLE		6.37e+04	UGL

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Site: WELL CECRL10

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	12-mar-1992	00	TPHC	LT	1.12e+03	UGL
0.0	12-mar-1992	UM33	111TCE	LT	4.10e+00	UGL
0.0	12-mar-1992	UM33	112TCE	LT	6.30e-01	UGL
0.0	12-mar-1992	UM33	11DCE	LT	1.42e+00	UGL
0.0	12-mar-1992	UM33	11DCLE	LT	1.10e+00	UGL
0.0	12-mar-1992	UM33	12DCE	LT	1.10e+00	UGL
0.0	12-mar-1992	UM33	12DCLB	LT	9.70e+00	UGL
0.0	12-mar-1992	UM33	12DCLF	LT	7.60e+00	UGL
0.0	12-mar-1992	UM33	12DCLP	LT	2.80e+00	UGL
0.0	12-mar-1992	UM33	12DMB	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	13DCLB	LT	9.20e+00	UGL
0.0	12-mar-1992	UM33	13DCP	LT	3.80e+00	UGL
0.0	12-mar-1992	UM33	13DMB	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	14DCLB	LT	8.10e+00	UGL
0.0	12-mar-1992	UM33	2CLEVE	LT	8.20e-01	UGL
0.0	12-mar-1992	UM33	ACET		1.10e+01	UGL
0.0	12-mar-1992	UM33	BRDCLM	LT	7.90e+00	UGL
0.0	12-mar-1992	UM33	C12DCE	ND	1.10e+00	UGL
0.0	12-mar-1992	UM33	C13DCP	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	C2AVE	ND	1.00e+01	UGL
0.0	12-mar-1992	UM33	C2H3CL	LT	5.00e-01	UGL
0.0	12-mar-1992	UM33	C2H5CL	LT	2.12e+00	UGL
0.0	12-mar-1992	UM33	C6H6	LT	2.40e+00	UGL
0.0	12-mar-1992	UM33	CCL4	LT	3.70e+00	UGL
0.0	12-mar-1992	UM33	CH2CL2		3.53e+00	UGL
0.0	12-mar-1992	UM33	CH3BR	ND	1.00e+01	UGL
0.0	12-mar-1992	UM33	CH3CL	LT	1.60e-00	UGL
0.0	12-mar-1992	UM33	CHBR3	LT	8.20e+00	UGL
0.0	12-mar-1992	UM33	CHCL3	LT	8.30e-01	UGL
0.0	12-mar-1992	UM33	CLC6HS	LT	1.40e+00	UGL
0.0	12-mar-1992	UM33	CS2	ND	5.00e-00	UGL
0.0	12-mar-1992	UM33	DBRCLM	LT	6.50e+00	UGL
0.0	12-mar-1992	UM33	ETC6HS	LT	9.30e+00	UGL
0.0	12-mar-1992	UM33	HEC6HS	LT	8.70e+00	UGL
0.0	12-mar-1992	UM33	MEK	ND	1.00e-01	UGL
0.0	12-mar-1992	UM33	MIBK	ND	1.00e+01	UGL
0.0	12-mar-1992	UM33	MNBK	ND	1.00e+01	UGL
0.0	12-mar-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	T13DCP	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	TCLEA	LT	4.70e+00	UGL
0.0	12-mar-1992	UM33	TCLEE	LT	5.00e-01	UGL
0.0	12-mar-1992	UM33	TRCLE		1.70e+02	UGL

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Site: WELL CECRL11

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	12-mar-1992	00	TPHC	LT	1.12e+03	UGL
0.0	12-mar-1992	UM33	111TCE	LT	4.10e+00	UGL
0.0	12-mar-1992	UM33	112TCE	LT	6.30e-01	UGL
0.0	12-mar-1992	UM33	11DCE	LT	1.42e+00	UGL
0.0	12-mar-1992	UM33	11DCLE	LT	1.10e+00	UGL
0.0	12-mar-1992	UM33	12DCE	LT	1.58e+00	UGL
0.0	12-mar-1992	UM33	12DCLB	LT	9.70e+00	UGL
0.0	12-mar-1992	UM33	12DCLE	LT	7.60e+00	UGL
0.0	12-mar-1992	UM33	12DCLP	LT	2.80e+00	UGL
0.0	12-mar-1992	UM33	12DMB	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	13DCLB	LT	9.20e+00	UGL
0.0	12-mar-1992	UM33	13DCP	LT	3.80e+00	UGL
0.0	12-mar-1992	UM33	13DMB	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	14OCLB	LT	8.10e+00	UGL
0.0	12-mar-1992	UM33	2CLEVE	LT	8.20e+01	UGL
0.0	12-mar-1992	UM33	ACET	LT	3.30e+01	UGL
0.0	12-mar-1992	UM33	BRDCLM	LT	7.90e+00	UGL
0.0	12-mar-1992	UM33	C12DCE	ND	9.50e+00	UGL
0.0	12-mar-1992	UM33	C13DCP	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	C2AVE	ND	1.00e+01	UGL
0.0	12-mar-1992	UM33	C2H3CL	LT	5.00e-01	UGL
0.0	12-mar-1992	UM33	C2H5CL	LT	2.12e+00	UGL
0.0	12-mar-1992	UM33	C6H6	LT	2.40e+00	UGL
0.0	12-mar-1992	UM33	CCL4	LT	3.70e+00	UGL
0.0	12-mar-1992	UM33	CH2CL2	LT	3.92e+00	UGL
0.0	12-mar-1992	UM33	CH3BR	ND	1.00e+01	UGL
0.0	12-mar-1992	UM33	CH3CL	LT	1.60e+00	UGL
0.0	12-mar-1992	UM33	CHBR3	LT	8.20e+00	UGL
0.0	12-mar-1992	UM33	CHCL3	LT	1.71e+00	UGL
0.0	12-mar-1992	UM33	CLC6H5	LT	1.40e+00	UGL
0.0	12-mar-1992	UM33	CS2	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	DBRCLM	LT	6.50e+00	UGL
0.0	12-mar-1992	UM33	ETC6H5	LT	9.30e+00	UGL
0.0	12-mar-1992	UM33	MEC6H5	LT	8.70e+00	UGL
0.0	12-mar-1992	UM33	MEK	LT	1.00e+01	UGL
0.0	12-mar-1992	UM33	MIBK	ND	1.00e+01	UGL
0.0	12-mar-1992	UM33	MNBK	ND	1.00e+01	UGL
0.0	12-mar-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	T13DCP	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	TCLEA	LT	4.70e+00	UGL
0.0	12-mar-1992	UM33	TCLEE	LT	5.00e-01	UGL
0.0	12-mar-1992	UM33	TRCLE	LT	1.55e+03	UGL

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Site: WELL CECRL12

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	12-mar-1992	00	TPHC	LT	1.12e+03	UGL
0.0	12-mar-1992	UM33	111TCE	LT	4.10e+00	UGL
0.0	12-mar-1992	UM33	112TCE	LT	6.30e-01	UGL
0.0	12-mar-1992	UM33	11DCE	LT	1.42e+00	UGL
0.0	12-mar-1992	UM33	11DCLE	LT	1.10e+00	UGL
0.0	12-mar-1992	UM33	12DCE	LT	1.10e+00	UGL
0.0	12-mar-1992	UM33	12DCLB	LT	9.70e+00	UGL
0.0	12-mar-1992	UM33	12DCLC	LT	7.60e+00	UGL
0.0	12-mar-1992	UM33	12DCLP	LT	2.80e+00	UGL
0.0	12-mar-1992	UM33	12DMB	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	13DCLB	LT	9.20e+00	UGL
0.0	12-mar-1992	UM33	13DCP	LT	3.80e+00	UGL
0.0	12-mar-1992	UM33	13DMB	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	14DCLB	LT	8.10e+00	UGL
0.0	12-mar-1992	UM33	2CLEVE	LT	8.20e+01	UGL
0.0	12-mar-1992	UM33	ACET		4.60e+01	UGL
0.0	12-mar-1992	UM33	BRDCLM	LT	7.90e+00	UGL
0.0	12-mar-1992	UM33	C12DCE		3.30e+00	UGL
0.0	12-mar-1992	UM33	C13DCP	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	C2AVE	ND	1.00e+01	UGL
0.0	12-mar-1992	UM33	C2H3CL	LT	5.00e-01	UGL
0.0	12-mar-1992	UM33	C2H5CL	LT	2.12e+00	UGL
0.0	12-mar-1992	UM33	C6H6	LT	2.40e+00	UGL
0.0	12-mar-1992	UM33	CCL4	LT	3.70e+00	UGL
0.0	12-mar-1992	UM33	CH2CL2		3.24e+00	UGL
0.0	12-mar-1992	UM33	CH3BR	ND	1.00e+01	UGL
0.0	12-mar-1992	UM33	CH3CL	LT	1.60e+00	UGL
0.0	12-mar-1992	UM33	CHBR3	LT	8.20e+00	UGL
0.0	12-mar-1992	UM33	CHCL3	LT	8.30e-01	UGL
0.0	12-mar-1992	UM33	CLC6H5	LT	1.40e+00	UGL
0.0	12-mar-1992	UM33	CS2	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	DBRCLM	LT	6.50e+00	UGL
0.0	12-mar-1992	UM33	ETC6H5	LT	9.30e+00	UGL
0.0	12-mar-1992	UM33	MEC6H5	LT	8.70e+00	UGL
0.0	12-mar-1992	UM33	MEK		3.60e+01	UGL
0.0	12-mar-1992	UM33	MIBK	ND	1.00e+01	UGL
0.0	12-mar-1992	UM33	MNBK	ND	1.00e+01	UGL
0.0	12-mar-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	T13DCP	ND	5.00e+00	UGL
0.0	12-mar-1992	UM33	TCLEA	LT	4.70e+00	UGL
0.0	12-mar-1992	UM33	TCLEE		3.17e-01	UGL
0.0	12-mar-1992	UM33	TRCLE		1.91e+02	UGL

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Site: WELL HANOVER

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	06-mar-1992	00	TPHC	LT	1.12e+03	UGL
0.0	06-mar-1992	UM33	111TCE	LT	4.10e+00	UGL
0.0	06-mar-1992	UM33	112TCE	LT	6.30e-01	UGL
0.0	06-mar-1992	UM33	11DCE	LT	1.42e+00	UGL
0.0	06-mar-1992	UM33	11DCLE	LT	1.10e+00	UGL
0.0	06-mar-1992	UM33	12DCE	LT	1.10e+00	UGL
0.0	06-mar-1992	UM33	12DCLB	LT	9.70e+00	UGL
0.0	06-mar-1992	UM33	12DCLP	LT	7.60e+00	UGL
0.0	06-mar-1992	UM33	12DCLP	LT	2.80e+00	UGL
0.0	06-mar-1992	UM33	12DMB	ND	2.00e+00	UGL
0.0	06-mar-1992	UM33	13DCLB	LT	9.20e+00	UGL
0.0	06-mar-1992	UM33	13DCP	LT	3.80e+00	UGL
0.0	06-mar-1992	UM33	13DMB	ND	5.00e+00	UGL
0.0	06-mar-1992	UM33	14DCLB	LT	8.10e+00	UGL
0.0	06-mar-1992	UM33	2CLEVE	LT	8.20e+01	UGL
0.0	06-mar-1992	UM33	ACET	ND	1.00e+01	UGL
0.0	06-mar-1992	UM33	BRDCLM	LT	7.90e+00	UGL
0.0	06-mar-1992	UM33	C13DCP	ND	5.00e+00	UGL
0.0	06-mar-1992	UM33	C2AVE	ND	1.00e+01	UGL
0.0	06-mar-1992	UM33	C2H3CL	LT	5.00e-01	UGL
0.0	06-mar-1992	UM33	C2H5CL	LT	2.12e+00	UGL
0.0	06-mar-1992	UM33	C6H6	LT	2.40e+00	UGL
0.0	06-mar-1992	UM33	CCL4	LT	3.70e+00	UGL
0.0	06-mar-1992	UM33	CH2CL2	LT	6.37e+00	UGL
0.0	06-mar-1992	UM33	CH3BR	ND	1.00e+01	UGL
0.0	06-mar-1992	UM33	CH3CL	LT	1.60e+00	UGL
0.0	06-mar-1992	UM33	CHBR3	LT	8.20e+00	UGL
0.0	06-mar-1992	UM33	CHCL3	LT	8.30e-01	UGL
0.0	06-mar-1992	UM33	CLC6H5	LT	1.40e+00	UGL
0.0	06-mar-1992	UM33	CS2	ND	5.00e+00	UGL
0.0	06-mar-1992	UM33	DBRCLM	LT	6.50e+00	UGL
0.0	06-mar-1992	UM33	ETC6H5	LT	9.30e+00	UGL
0.0	06-mar-1992	UM33	MEC6H5	LT	8.70e+00	UGL
0.0	06-mar-1992	UM33	MEK	ND	1.00e+01	UGL
0.0	06-mar-1992	UM33	MIBK	ND	1.00e+01	UGL
0.0	06-mar-1992	UM33	MNBK	ND	1.00e+01	UGL
0.0	06-mar-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	06-mar-1992	UM33	T13DCP	ND	5.00e+00	UGL
0.0	06-mar-1992	UM33	TCLEA	LT	4.70e+00	UGL
0.0	06-mar-1992	UM33	TCLEE	LT	5.00e-01	UGL
0.0	06-mar-1992	UM33	TRCLE	LT	5.00e-01	UGL

Report completed normally.

Arthur D Little

INSTALLATION RESTORATION PROGRAM

CHEMICAL REPORT
Mon Jun 1 08:27:01 1992

For Parameters :

Installation - Cold Regions Res & Eng Lab, NH
Beginning Date - 01-apr-92
Ending Date - 30-apr-92
Media Type - Chemical Ground Water
Maximum (X, Y) - (719933, 4844996)
Minimum (X, Y) - (719326, 4844457)
Booleans - Y

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Installation: Cold Regions Res & Eng Lab, NHPage 1
Analytical Results for Chemical Ground Water
From: 01-apr-92 To: 30-apr-92

Site: WELL CECRL01

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	08-apr-1992	00	TPHC	LT	1.05e+03	UGL
0.0	08-apr-1992	UM33	111TCE	LT	8.20e+01	UGL
0.0	08-apr-1992	UM33	112TCE	LT	1.26e+01	UGL
0.0	08-apr-1992	UM33	11DCE	LT	2.84e+01	UGL
0.0	08-apr-1992	UM33	11DCLE	LT	2.20e+01	UGL
0.0	08-apr-1992	UM33	12DCE	LT	2.20e+01	UGL
0.0	08-apr-1992	UM33	12DCLB	LT	1.94e+02	UGL
0.0	08-apr-1992	UM33	12DCLE	LT	1.52e+02	UGL
0.0	08-apr-1992	UM33	12DCLP	LT	5.60e+01	UGL
0.0	08-apr-1992	UM33	12DMB	ND	1.00e+02	UGL
0.0	08-apr-1992	UM33	13DCLB	LT	1.84e+02	UGL
0.0	08-apr-1992	UM33	13DCP	LT	7.60e+01	UGL
0.0	08-apr-1992	UM33	13DMB	ND	1.00e+02	UGL
0.0	08-apr-1992	UM33	14DCLB	LT	1.62e+02	UGL
0.0	08-apr-1992	UM33	2CLEVE	LT	1.64e+03	UGL
0.0	08-apr-1992	UM33	ACET	ND	2.00e+02	UGL
0.0	08-apr-1992	UM33	BRDCLM	LT	1.58e+02	UGL
0.0	08-apr-1992	UM33	C12DCE	ND	1.00e+02	UGL
0.0	08-apr-1992	UM33	C13DCP	ND	1.00e+02	UGL
0.0	08-apr-1992	UM33	C2AVE	ND	2.00e+02	UGL
0.0	08-apr-1992	UM33	C2H3CL	LT	1.00e+01	UGL
0.0	08-apr-1992	UM33	C2H5CL	LT	4.24e+01	UGL
0.0	08-apr-1992	UM33	C6H6	LT	4.80e+01	UGL
0.0	08-apr-1992	UM33	CCL4	LT	7.40e+01	UGL
0.0	08-apr-1992	UM33	CH2CL2	LT	1.96e+02	UGL
0.0	08-apr-1992	UM33	CH3BR	ND	2.00e+02	UGL
0.0	08-apr-1992	UM33	CH3CL	LT	3.20e+01	UGL
0.0	08-apr-1992	UM33	CHBR3	LT	1.64e+02	UGL
0.0	08-apr-1992	UM33	CHCL3	LT	1.65e+01	UGL
0.0	08-apr-1992	UM33	CLC6H5	LT	2.80e+01	UGL
0.0	08-apr-1992	UM33	CS2	ND	1.00e+02	UGL
0.0	08-apr-1992	UM33	DBRCLM	LT	1.30e+02	UGL
0.0	08-apr-1992	UM33	ETC6H5	LT	1.86e+02	UGL
0.0	08-apr-1992	UM33	MEC6H5	LT	1.74e+02	UGL
0.0	08-apr-1992	UM33	MEK	ND	2.00e+02	UGL
0.0	08-apr-1992	UM33	MIBK	ND	2.00e+02	UGL
0.0	08-apr-1992	UM33	MNBK	ND	2.00e+02	UGL
0.0	08-apr-1992	UM33	STYR	ND	1.00e+02	UGL
0.0	08-apr-1992	UM33	T13DCP	ND	1.00e+02	UGL
0.0	08-apr-1992	UM33	TCLEA	LT	9.40e+01	UGL
0.0	08-apr-1992	UM33	TCLEE	LT	1.00e+01	UGL
0.0	08-apr-1992	UM33	TRCLE	LT	8.49e+02	UGL

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Installation: Cold Regions Res & Eng Lab, NHPage 2
Analytical Results for Chemical Ground Water
From: 01-apr-92 To: 30-apr-92

Site: WELL CECRL02

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	10-apr-1992	UM33	111TCE	LT	4.10e+00	UGL
0.0	10-apr-1992	UM33	112TCE	LT	6.30e-01	UGL
0.0	10-apr-1992	UM33	11DCE	LT	1.42e+00	UGL
0.0	10-apr-1992	UM33	11DCLE	LT	1.10e+00	UGL
0.0	10-apr-1992	UM33	12DCE	LT	1.10e+00	UGL
0.0	10-apr-1992	UM33	12DCLB	LT	9.70e+00	UGL
0.0	10-apr-1992	UM33	12DCLE	LT	7.60e+00	UGL
0.0	10-apr-1992	UM33	12DCLP	LT	2.80e+00	UGL
0.0	10-apr-1992	UM33	12DMB	ND	5.00e+00	UGL
0.0	10-apr-1992	UM33	13DCLB	LT	9.20e+00	UGL
0.0	10-apr-1992	UM33	13DCP	LT	3.80e+00	UGL
0.0	10-apr-1992	UM33	13DMB	ND	5.00e+00	UGL
0.0	10-apr-1992	UM33	14DCLB	LT	8.10e+00	UGL
0.0	10-apr-1992	UM33	2CLEVE	LT	8.20e+01	UGL
0.0	10-apr-1992	UM33	ACET	ND	1.00e+01	UGL
0.0	10-apr-1992	UM33	BRDCLM	LT	7.90e+00	UGL
0.0	10-apr-1992	UM33	C12DCE	ND	5.00e+00	UGL
0.0	10-apr-1992	UM33	C13DCP	ND	5.00e+00	UGL
0.0	10-apr-1992	UM33	C2AVE	ND	1.00e+01	UGL
0.0	10-apr-1992	UM33	C2H3CL	LT	5.00e-01	UGL
0.0	10-apr-1992	UM33	C2H5CL	LT	2.12e+00	UGL
0.0	10-apr-1992	UM33	C6H6	LT	2.40e+00	UGL
0.0	10-apr-1992	UM33	CCL4	LT	3.70e-00	UGL
0.0	10-apr-1992	UM33	CH2CL2	LT	8.33e+00	UGL
0.0	10-apr-1992	UM33	CH3BR	ND	1.00e+01	UGL
0.0	10-apr-1992	UM33	CH3CL	LT	1.60e+00	UGL
0.0	10-apr-1992	UM33	CHBR3	LT	8.20e+00	UGL
0.0	10-apr-1992	UM33	CHCL3	LT	1.41e+00	UGL
0.0	10-apr-1992	UM33	CLC6H5	LT	1.40e+00	UGL
0.0	10-apr-1992	UM33	CS2	ND	5.00e+00	UGL
0.0	10-apr-1992	UM33	DBRCLM	LT	6.50e+00	UGL
0.0	10-apr-1992	UM33	ETC6H5	LT	9.30e+00	UGL
0.0	10-apr-1992	UM33	MEC6H5	LT	8.70e+00	UGL
0.0	10-apr-1992	UM33	MEK	ND	1.00e+01	UGL
0.0	10-apr-1992	UM33	MIBK	ND	1.00e+01	UGL
0.0	10-apr-1992	UM33	MNBK	ND	1.00e+01	UGL
0.0	10-apr-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	10-apr-1992	UM33	T13DCP	ND	5.00e+00	UGL
0.0	10-apr-1992	UM33	TCLEA	LT	4.70e+00	UGL
0.0	10-apr-1992	UM33	TCLEE	LT	5.00e-01	UGL
0.0	10-apr-1992	UM33	TRCLE	LT	7.64e+00	UGL
0.0	10-apr-1992	UM 33	TPHC	LT	1.05e-03	UGL

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Analytical Results for Chemical Ground Water
From: 01-apr-92 To: 30-apr-92

Site: WELL CECRL03

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	08-apr-1992	00	TPHC	LT	1.07e+03	UGL
0.0	08-apr-1992	UM33	111TCE	LT	4.10e+00	UGL
0.0	08-apr-1992	UM33	112TCE	LT	6.30e-01	UGL
0.0	08-apr-1992	UM33	11DCE	LT	1.42e+00	UGL
0.0	08-apr-1992	UM33	11DCLE	LT	1.10e+00	UGL
0.0	08-apr-1992	UM33	12DCE	LT	1.10e+00	UGL
0.0	08-apr-1992	UM33	12DCLB	LT	9.70e+00	UGL
0.0	08-apr-1992	UM33	12DCLC	LT	7.60e+00	UGL
0.0	08-apr-1992	UM33	12DCLP	LT	2.80e+00	UGL
0.0	08-apr-1992	UM33	12DMB	ND	5.00e+00	UGL
0.0	08-apr-1992	UM33	13DCLB	LT	9.20e+00	UGL
0.0	08-apr-1992	UM33	13DCP	LT	3.80e+00	UGL
0.0	08-apr-1992	UM33	13DMB	ND	5.00e+00	UGL
0.0	08-apr-1992	UM33	14DCLB	LT	8.10e+00	UGL
0.0	08-apr-1992	UM33	2CLEVE	LT	8.20e+01	UGL
0.0	08-apr-1992	UM33	ACET	ND	1.00e+01	UGL
0.0	08-apr-1992	UM33	BRDCLM	LT	7.90e+00	UGL
0.0	08-apr-1992	UM33	C12DCE	ND	5.00e+00	UGL
0.0	08-apr-1992	UM33	C13DCP	ND	5.00e+00	UGL
0.0	08-apr-1992	UM33	C2AVE	ND	1.00e+01	UGL
0.0	08-apr-1992	UM33	C2H3CL	LT	5.00e-01	UGL
0.0	08-apr-1992	UM33	C2H5CL	LT	2.12e+00	UGL
0.0	08-apr-1992	UM33	C6H6	LT	2.40e+00	UGL
0.0	08-apr-1992	UM33	CCL4	LT	3.70e+00	UGL
0.0	08-apr-1992	UM33	CH2CL2	LT	6.18e+00	UGL
0.0	08-apr-1992	UM33	CH3BR	ND	1.00e+01	UGL
0.0	08-apr-1992	UM33	CH3CL	LT	1.60e+00	UGL
0.0	08-apr-1992	UM33	CHBR3	LT	8.20e+00	UGL
0.0	08-apr-1992	UM33	CHCL3	LT	8.30e-01	UGL
0.0	08-apr-1992	UM33	CLC6HS	LT	1.40e+00	UGL
0.0	08-apr-1992	UM33	CS2	ND	5.00e+00	UGL
0.0	08-apr-1992	UM33	DBRCLM	LT	6.50e+00	UGL
0.0	08-apr-1992	UM33	ETC6HS	LT	9.30e+00	UGL
0.0	08-apr-1992	UM33	MEC6HS	LT	8.70e+00	UGL
0.0	08-apr-1992	UM33	MEK	ND	1.00e+01	UGL
0.0	08-apr-1992	UM33	MIBK	ND	1.00e+01	UGL
0.0	08-apr-1992	UM33	MNBK	ND	1.00e+01	UGL
0.0	08-apr-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	08-apr-1992	UM33	T13DCP	ND	5.00e+00	UGL
0.0	08-apr-1992	UM33	TCLEA	LT	4.70e-00	UGL
0.0	08-apr-1992	UM33	TCLEE	LT	5.00e-01	UGL
0.0	08-apr-1992	UM33	TRCLE	LT	5.00e-01	UGL

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Installation: Cold Regions Res & Eng Lab, NHPage 4
Analytical Results for Chemical Ground Water
From: 01-apr-92 To: 30-apr-92

Site: WELL CECRL04

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	08-apr-1992	00	TPHC	LT	1.06e+03	UGL
0.0	08-apr-1992	UM33	111TCE	LT	4.10e+00	UGL
0.0	08-apr-1992	UM33	112TCE	LT	6.30e-01	UGL
0.0	08-apr-1992	UM33	11DCE	LT	1.42e+00	UGL
0.0	08-apr-1992	UM33	11DCLE	LT	1.10e+00	UGL
0.0	08-apr-1992	UM33	12DCE	LT	1.10e+00	UGL
0.0	08-apr-1992	UM33	12DCLB	LT	9.70e+00	UGL
0.0	08-apr-1992	UM33	12DCLC	LT	7.60e+00	UGL
0.0	08-apr-1992	UM33	12DCLP	LT	2.80e+00	UGL
0.0	08-apr-1992	UM33	12DMB	ND	5.00e+00	UGL
0.0	08-apr-1992	UM33	13DCLB	LT	9.20e+00	UGL
0.0	08-apr-1992	UM33	13DCP	LT	3.80e+00	UGL
0.0	08-apr-1992	UM33	13DMB	ND	5.00e+00	UGL
0.0	08-apr-1992	UM33	14DCLB	LT	8.10e+00	UGL
0.0	08-apr-1992	UM33	2CLEVE	LT	8.20e-01	UGL
0.0	08-apr-1992	UM33	ACET	ND	1.00e-01	UGL
0.0	08-apr-1992	UM33	BRDCLM	LT	7.90e-00	UGL
0.0	08-apr-1992	UM33	C12DCE	ND	5.00e+00	UGL
0.0	08-apr-1992	UM33	C13DCP	ND	5.00e+00	UGL
0.0	08-apr-1992	UM33	C2AVE	ND	1.00e-01	UGL
0.0	08-apr-1992	UM33	C2H3CL	LT	5.00e-01	UGL
0.0	08-apr-1992	UM33	C2H5CL	LT	2.12e+00	UGL
0.0	08-apr-1992	UM33	C6H6	LT	2.40e+00	UGL
0.0	08-apr-1992	UM33	CCL4	LT	3.70e+00	UGL
0.0	08-apr-1992	UM33	CH2CL2	LT	6.27e-01	UGL
0.0	08-apr-1992	UM33	CH3BR	ND	1.00e-01	UGL
0.0	08-apr-1992	UM33	CH3CL	LT	1.60e+00	UGL
0.0	08-apr-1992	UM33	CHBR3	LT	8.20e-00	UGL
0.0	08-apr-1992	UM33	CHCL3	LT	8.30e-01	UGL
0.0	08-apr-1992	UM33	CLC6H5	LT	1.40e+00	UGL
0.0	08-apr-1992	UM33	CS2	ND	5.00e+00	UGL
0.0	08-apr-1992	UM33	DBRCLM	LT	6.50e+00	UGL
0.0	08-apr-1992	UM33	ETC6H5	LT	9.30e+00	UGL
0.0	08-apr-1992	UM33	MEC6H5	LT	8.70e+00	UGL
0.0	08-apr-1992	UM33	MEK	ND	1.00e-01	UGL
0.0	08-apr-1992	UM33	MIBK	ND	1.00e-01	UGL
0.0	08-apr-1992	UM33	MNBK	ND	1.00e-01	UGL
0.0	08-apr-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	08-apr-1992	UM33	T13DCP	ND	5.00e+00	UGL
0.0	08-apr-1992	UM33	TCLEA	LT	4.70e+00	UGL
0.0	08-apr-1992	UM33	TCLEE	LT	5.00e-01	UGL
0.0	08-apr-1992	UM33	TRCLE	LT	3.72e+00	UGL

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Analytical Results for Chemical Ground Water
From: 01-apr-92 To: 30-apr-92

Site: WELL CECRL05

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	09-apr-1992	00	TPHC	LT	1.08e+03	UGL
0.0	09-apr-1992	UM33	111TCE	LT	4.10e+00	UGL
0.0	09-apr-1992	UM33	112TCE	LT	6.30e-01	UGL
0.0	09-apr-1992	UM33	11DCE	LT	1.42e+00	UGL
0.0	09-apr-1992	UM33	11DCLE	LT	1.10e+00	UGL
0.0	09-apr-1992	UM33	12DCE	LT	1.10e+00	UGL
0.0	09-apr-1992	UM33	12DCLB	LT	9.70e+00	UGL
0.0	09-apr-1992	UM33	12DCLE	LT	7.60e+00	UGL
0.0	09-apr-1992	UM33	12DCLP	LT	2.80e+00	UGL
0.0	09-apr-1992	UM33	12DMB	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	13DCLB	LT	9.20e+00	UGL
0.0	09-apr-1992	UM33	13DCP	LT	3.80e+00	UGL
0.0	09-apr-1992	UM33	13DMB	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	14DCLB	LT	8.10e+00	UGL
0.0	09-apr-1992	UM33	2CLEVE	LT	3.20e+01	UGL
0.0	09-apr-1992	UM33	ACET	ND	1.00e-01	UGL
0.0	09-apr-1992	UM33	BRDCLM	LT	7.90e+00	UGL
0.0	09-apr-1992	UM33	C12DCE	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	C13DCP	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	C2AVE	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	C2H3CL	LT	5.00e-01	UGL
0.0	09-apr-1992	UM33	C2H5CL	LT	2.12e+00	UGL
0.0	09-apr-1992	UM33	C6H6	LT	2.40e+00	UGL
0.0	09-apr-1992	UM33	CCL4	LT	3.70e+00	UGL
0.0	09-apr-1992	UM33	CH2CL2	LT	5.20e+00	UGL
0.0	09-apr-1992	UM33	CH3BR	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	CH3CL	LT	1.60e+00	UGL
0.0	09-apr-1992	UM33	CHBR3	LT	8.20e+00	UGL
0.0	09-apr-1992	UM33	CHCL3	LT	8.30e-01	UGL
0.0	09-apr-1992	UM33	CLC6H5	LT	1.40e+00	UGL
0.0	09-apr-1992	UM33	CS2	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	DBRCLM	LT	6.50e+00	UGL
0.0	09-apr-1992	UM33	ETC6H5	LT	9.30e+00	UGL
0.0	09-apr-1992	UM33	MEC6H5	LT	8.70e+00	UGL
0.0	09-apr-1992	UM33	MEK	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	MIBK	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	MNBK	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	T13DCP	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	TCLEA	LT	4.70e+00	UGL
0.0	09-apr-1992	UM33	TCLEE	LT	5.00e-01	UGL
0.0	09-apr-1992	UM33	TRCLE	LT	2.97e+01	UGL

Arthur D Little

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 Analytical Results for Chemical Ground Water
 From: 01-apr-92 To: 30-apr-92

Site: WELL CECRL06

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	10-apr-1992	UM33	111TCE	LT	8.20e+02	UGL
0.0	10-apr-1992	UM33	112TCE	LT	1.26e+02	UGL
0.0	10-apr-1992	UM33	11DCE	LT	2.84e+02	UGL
0.0	10-apr-1992	UM33	11DCLE	LT	2.20e+02	UGL
0.0	10-apr-1992	UM33	12DCE	LT	2.20e+02	UGL
0.0	10-apr-1992	UM33	12DCLB	LT	1.94e+03	UGL
0.0	10-apr-1992	UM33	12DCLE	LT	1.52e+03	UGL
0.0	10-apr-1992	UM33	12DCLP	LT	5.60e+02	UGL
0.0	10-apr-1992	UM33	12DMB	ND	1.00e+03	UGL
0.0	10-apr-1992	UM33	13DCLB	LT	1.84e+03	UGL
0.0	10-apr-1992	UM33	13DCP	LT	7.60e+02	UGL
0.0	10-apr-1992	UM33	13DMB	ND	1.00e+03	UGL
0.0	10-apr-1992	UM33	14DCLB	LT	1.62e+03	UGL
0.0	10-apr-1992	UM33	2CLEVE	LT	1.64e+04	UGL
0.0	10-apr-1992	UM33	ACET	ND	2.00e+03	UGL
0.0	10-apr-1992	UM33	BRDCLM	LT	1.58e+03	UGL
0.0	10-apr-1992	UM33	C12DCE	ND	1.00e+03	UGL
0.0	10-apr-1992	UM33	C13DCP	ND	1.00e+03	UGL
0.0	10-apr-1992	UM33	C2AVE	ND	2.00e+03	UGL
0.0	10-apr-1992	UM33	C2H3CL	LT	1.00e+02	UGL
0.0	10-apr-1992	UM33	C2H5CL	LT	4.24e+02	UGL
0.0	10-apr-1992	UM33	C6H6	LT	4.80e+02	UGL
0.0	10-apr-1992	UM33	CCL4	LT	7.40e+02	UGL
0.0	10-apr-1992	UM33	CH2CL2	LT	1.55e+03	UGL
0.0	10-apr-1992	UM33	CH3BR	ND	2.00e+03	UGL
0.0	10-apr-1992	UM33	CH3CL	LT	3.20e+02	UGL
0.0	10-apr-1992	UM33	CHBR3	LT	1.64e+03	UGL
0.0	10-apr-1992	UM33	CHCL3	LT	1.66e+02	UGL
0.0	10-apr-1992	UM33	CLC6H5	LT	2.80e+02	UGL
0.0	10-apr-1992	UM33	CS2	ND	1.00e+03	UGL
0.0	10-apr-1992	UM33	DBRCLM	LT	1.30e+03	UGL
0.0	10-apr-1992	UM33	ETC6H5	LT	1.86e+03	UGL
0.0	10-apr-1992	UM33	MEC6H5	LT	1.74e+03	UGL
0.0	10-apr-1992	UM33	MEK	ND	2.00e+03	UGL
0.0	10-apr-1992	UM33	MIBK	ND	2.00e+03	UGL
0.0	10-apr-1992	UM33	MNBK	ND	2.00e+03	UGL
0.0	10-apr-1992	UM33	STYR	ND	1.00e+03	UGL
0.0	10-apr-1992	UM33	T13DCP	ND	1.00e+03	UGL
0.0	10-apr-1992	UM33	TCLEA	LT	9.40e+02	UGL
0.0	10-apr-1992	UM33	TCLEE		1.52e+04	UGL
0.0	10-apr-1992	UM33	TRCLE		3.40e+04	UGL
0.0	10-apr-1992	UM33	TRIMBZ		6.00e+03	UGL
0.0	10-apr-1992	UM33	UNK173		1.60e+03	UGL
0.0	10-apr-1992	UM33	UNK182		1.60e+03	UGL
0.0	10-apr-1992	UM33	UNK197		2.00e+03	UGL
0.0	10-apr-1992	UM33	UNK199		2.00e+03	UGL
0.0	10-apr-1992	UM33	UNK205		6.00e+03	UGL
0.0	10-apr-1992	UM33	UNK209		8.00e+03	UGL

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Site: WELL CECRL06 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	10-apr-1992	UM33	UNK212		2.00e+03	UGL
0.0	10-apr-1992	UM33	UNK213		1.60e+03	UGL
0.0	10-apr-1992	UM33	UNK215		6.00e+03	UGL
0.0	10-apr-1992	UM33	UNK216		6.00e+03	UGL
0.0	10-apr-1992	UM33	UNK221		6.00e+03	UGL
0.0	10-apr-1992	UM33	UNK223		1.00e+04	UGL
0.0	10-apr-1992	UM33	UNK229		1.20e+03	UGL
0.0	10-apr-1992	UM33	UNK233		1.80e+03	UGL
0.0	10-apr-1992	UM33	UNK236		1.20e+03	UGL
0.0	10-apr-1992	UM33	UNK238		1.40e+03	UGL
0.0	10-apr-1992	UM33	UNK239		1.80e+03	UGL
0.0	10-apr-1992	UM33	UNK243		1.60e+03	UGL
0.0	10-apr-1992	UM33	UNK246		2.00e+04	UGL
0.0	10-apr-1992	UM33	UNK249		6.00e+03	UGL
0.0	10-apr-1992	UM33	UNK252		4.00e+03	UGL
0.0	10-apr-1992	UM33	UNK254		4.00e+03	UGL
0.0	10-apr-1992	UM33	UNK256		4.00e+03	UGL

Site: WELL CECRL07

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	07-apr-1992	00	TPHC	LT	1.04e+03	UGL
0.0	07-apr-1992	UM33	111TCE	LT	4.10e+00	UGL
0.0	07-apr-1992	UM33	112TCE	LT	6.30e-01	UGL
0.0	07-apr-1992	UM33	11DCE	LT	1.42e+00	UGL
0.0	07-apr-1992	UM33	11DCLE	LT	1.10e+00	UGL
0.0	07-apr-1992	UM33	12DCE	LT	1.10e+00	UGL
0.0	07-apr-1992	UM33	12DCLB	LT	9.70e+00	UGL
0.0	07-apr-1992	UM33	12DCLP	LT	7.60e+00	UGL
0.0	07-apr-1992	UM33	12DCLP	LT	2.80e+00	UGL
0.0	07-apr-1992	UM33	12DMB	ND	5.00e+00	UGL
0.0	07-apr-1992	UM33	13DCLB	LT	9.20e+00	UGL
0.0	07-apr-1992	UM33	13DCP	LT	3.80e+00	UGL
0.0	07-apr-1992	UM33	13DMB	ND	5.00e+00	UGL
0.0	07-apr-1992	UM33	14DCLB	LT	8.10e+00	UGL
0.0	07-apr-1992	UM33	2CLEVE	LT	8.20e+01	UGL
0.0	07-apr-1992	UM33	ACET	ND	1.00e+01	UGL
0.0	07-apr-1992	UM33	BRDCLM	LT	7.90e+00	UGL
0.0	07-apr-1992	UM33	C12DCE	ND	5.00e+00	UGL
0.0	07-apr-1992	UM33	C13DCP	ND	5.00e+00	UGL
0.0	07-apr-1992	UM33	C2AVE	ND	1.00e+01	UGL
0.0	07-apr-1992	UM33	C2H3CL	LT	5.00e-01	UGL
0.0	07-apr-1992	UM33	C2H5CL	LT	2.12e+00	UGL
0.0	07-apr-1992	UM33	C6H6	LT	2.40e+00	UGL

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Site: WELL CECRL07 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	07-apr-1992	UM33	CCL4	LT	3.70e+00	UGL
0.0	07-apr-1992	UM33	CH2CL2		6.86e+00	UGL
0.0	07-apr-1992	UM33	CH3BR	ND	1.00e+01	UGL
0.0	07-apr-1992	UM33	CH3CL	LT	1.60e+00	UGL
0.0	07-apr-1992	UM33	CHBR3	LT	8.20e+00	UGL
0.0	07-apr-1992	UM33	CHCL3	LT	8.30e-01	UGL
0.0	07-apr-1992	UM33	CLC6H5	LT	1.40e+00	UGL
0.0	07-apr-1992	UM33	CS2	ND	5.00e+00	UGL
0.0	07-apr-1992	UM33	DBRCLM	LT	6.50e+00	UGL
0.0	07-apr-1992	UM33	ETC6H5	LT	9.30e+00	UGL
0.0	07-apr-1992	UM33	MEC6H5	LT	8.70e+00	UGL
0.0	07-apr-1992	UM33	MEK		1.30e+01	UGL
0.0	07-apr-1992	UM33	MIBK	ND	1.00e+01	UGL
0.0	07-apr-1992	UM33	MNBK	ND	1.00e+01	UGL
0.0	07-apr-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	07-apr-1992	UM33	T13DCP	ND	5.00e+00	UGL
0.0	07-apr-1992	UM33	TCLEA	LT	4.70e+00	UGL
0.0	07-apr-1992	UM33	TCLEE	LT	5.00e-01	UGL
0.0	07-apr-1992	UM33	TRCLE		8.92e+01	UGL

Site: WELL CECRL08

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	09-apr-1992	UM33	111TCE	LT	8.20e+01	UGL
0.0	09-apr-1992	UM33	111TCE	LT	8.20e+01	UGL
0.0	09-apr-1992	UM33	112TCE	LT	1.26e+01	UGL
0.0	09-apr-1992	UM33	112TCE	LT	1.26e+01	UGL
0.0	09-apr-1992	UM33	11DCE	LT	2.84e+01	UGL
0.0	09-apr-1992	UM33	11DCE	LT	2.84e+01	UGL
0.0	09-apr-1992	UM33	11DCLE	LT	2.20e+01	UGL
0.0	09-apr-1992	UM33	11DCLE	LT	2.20e+01	UGL
0.0	09-apr-1992	UM33	12DCE	LT	2.20e+01	UGL
0.0	09-apr-1992	UM33	12DCE	LT	2.20e+01	UGL
0.0	09-apr-1992	UM33	12DCE	LT	2.20e+01	UGL
0.0	09-apr-1992	UM33	12DCE	LT	2.20e+01	UGL
0.0	09-apr-1992	UM33	12DCLB	LT	1.94e+02	UGL
0.0	09-apr-1992	UM33	12DCLB	LT	1.94e+02	UGL
0.0	09-apr-1992	UM33	12DCLB	LT	1.52e+02	UGL
0.0	09-apr-1992	UM33	12DCLB	LT	1.52e+02	UGL
0.0	09-apr-1992	UM33	12DCLP	LT	5.60e+01	UGL
0.0	09-apr-1992	UM33	12DCLP	LT	5.60e+01	UGL
0.0	09-apr-1992	UM33	12DCLP	LT	5.60e+01	UGL
0.0	09-apr-1992	UM33	12DCLP	LT	5.60e+01	UGL
0.0	09-apr-1992	UM33	12DMB	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	12DMB	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	13DCLB	LT	1.84e+02	UGL
0.0	09-apr-1992	UM33	13DCLB	LT	1.84e+02	UGL
0.0	09-apr-1992	UM33	13DCP	LT	7.60e+01	UGL
0.0	09-apr-1992	UM33	13DCP	LT	7.60e+01	UGL

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Site: WELL CECRL08 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	09-apr-1992	UM33	13DMB	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	13DMB	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	14DCLB	LT	1.62e+02	UGL
0.0	09-apr-1992	UM33	14DCLB	LT	1.62e+02	UGL
0.0	09-apr-1992	UM33	2CLEVE	LT	1.64e+03	UGL
0.0	09-apr-1992	UM33	2CLEVE	LT	1.64e+03	UGL
0.0	09-apr-1992	UM33	ACET	ND	2.00e+02	UGL
0.0	09-apr-1992	UM33	ACET	ND	2.00e+02	UGL
0.0	09-apr-1992	UM33	BRDCLM	LT	1.58e+02	UGL
0.0	09-apr-1992	UM33	BRDCLM	LT	1.58e+02	UGL
0.0	09-apr-1992	UM33	C12DCE	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	C12DCE	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	C13DCP	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	C13DCP	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	C2AVE	ND	2.00e+02	UGL
0.0	09-apr-1992	UM33	C2AVE	ND	2.00e+02	UGL
0.0	09-apr-1992	UM33	C2H3CL	LT	1.00e+01	UGL
0.0	09-apr-1992	UM33	C2H3CL	LT	1.00e+01	UGL
0.0	09-apr-1992	UM33	C2H5CL	LT	4.24e+01	UGL
0.0	09-apr-1992	UM33	C2H5CL	LT	4.24e+01	UGL
0.0	09-apr-1992	UM33	C6H6	LT	4.80e+01	UGL
0.0	09-apr-1992	UM33	C6H6	LT	4.80e+01	UGL
0.0	09-apr-1992	UM33	CCL4	LT	7.40e+01	UGL
0.0	09-apr-1992	UM33	CCL4	LT	7.40e+01	UGL
0.0	09-apr-1992	UM33	CH2CL2		1.76e+02	UGL
0.0	09-apr-1992	UM33	CH2CL2		1.76e+02	UGL
0.0	09-apr-1992	UM33	CH3BR	ND	2.00e+02	UGL
0.0	09-apr-1992	UM33	CH3BR	ND	2.00e+02	UGL
0.0	09-apr-1992	UM33	CH3CL	LT	3.20e+01	UGL
0.0	09-apr-1992	UM33	CH3CL	LT	3.20e+01	UGL
0.0	09-apr-1992	UM33	CHBR3	LT	1.64e+02	UGL
0.0	09-apr-1992	UM33	CHBR3	LT	1.64e+02	UGL
0.0	09-apr-1992	UM33	CHCL3	LT	1.66e+01	UGL
0.0	09-apr-1992	UM33	CHCL3	LT	1.66e+01	UGL
0.0	09-apr-1992	UM33	CLC6H5	LT	2.80e+01	UGL
0.0	09-apr-1992	UM33	CLC6H5	LT	2.80e+01	UGL
0.0	09-apr-1992	UM33	CS2	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	CS2	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	DBRCLM	LT	1.30e+02	UGL
0.0	09-apr-1992	UM33	DBRCLM	LT	1.30e+02	UGL
0.0	09-apr-1992	UM33	ETC6H5	LT	1.86e+02	UGL
0.0	09-apr-1992	UM33	ETC6H5	LT	1.86e+02	UGL
0.0	09-apr-1992	UM33	MEC6H5	LT	1.74e+02	UGL
0.0	09-apr-1992	UM33	MEC6H5	LT	1.74e+02	UGL
0.0	09-apr-1992	UM33	MEK	ND	2.00e+02	UGL
0.0	09-apr-1992	UM33	MEK	ND	2.00e+02	UGL
0.0	09-apr-1992	UM33	MIBK	ND	2.00e+02	UGL
0.0	09-apr-1992	UM33	MIBK	ND	2.00e+02	UGL

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Site: WELL CECRL08 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	09-apr-1992	UM33	MNBK	ND	2.00e+02	UGL
0.0	09-apr-1992	UM33	MNBK	ND	2.00e+02	UGL
0.0	09-apr-1992	UM33	STYR	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	STYR	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	T13DCP	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	T13DCP	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	TCLEA	LT	9.40e+01	UGL
0.0	09-apr-1992	UM33	TCLEA	LT	9.40e+01	UGL
0.0	09-apr-1992	UM33	TCLEE	LT	1.00e+01	UGL
0.0	09-apr-1992	UM33	TCLEE	LT	1.00e+01	UGL
0.0	09-apr-1992	UM33	TRCLE	LT	1.06e+04	UGL
0.0	09-apr-1992	UM33	TRCLE	LT	1.06e+04	UGL
0.0	09-apr-1992	UM33	TPHC	LT	1.08e+03	UGL

Site: WELL CECRL09

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	09-apr-1992	UM33	111TCE	LT	4.10e+03	UGL
0.0	09-apr-1992	UM33	112TCE	LT	6.30e+02	UGL
0.0	09-apr-1992	UM33	11DCE	LT	1.42e+03	UGL
0.0	09-apr-1992	UM33	11DCLE	LT	1.10e+03	UG
0.0	09-apr-1992	UM33	12DCE	LT	1.10e+03	UGL
0.0	09-apr-1992	UM33	12DCLB	LT	9.70e+03	UGL
0.0	09-apr-1992	UM33	12DCLE	LT	7.60e+03	UGL
0.0	09-apr-1992	UM33	12DCLP	LT	2.80e+03	UGL
0.0	09-apr-1992	UM33	12DMB	ND	5.00e+03	UGL
0.0	09-apr-1992	UM33	13DCLB	LT	9.20e+03	UGL
0.0	09-apr-1992	UM33	13DCP	LT	3.80e+03	UGL
0.0	09-apr-1992	UM33	13DMS	ND	5.00e+03	UGL
0.0	09-apr-1992	UM33	14DCLB	LT	8.10e+03	UGL
0.0	09-apr-1992	UM33	2CLEVE	LT	8.20e+04	UGL
0.0	09-apr-1992	UM33	ACET	ND	1.00e+04	UGL
0.0	09-apr-1992	UM33	BRDCLM	LT	7.90e+03	UGL
0.0	09-apr-1992	UM33	C12DCE	ND	5.00e+03	UGL
0.0	09-apr-1992	UM33	C13DCP	ND	5.00e+03	UGL
0.0	09-apr-1992	UM33	C2AVE	ND	1.00e+04	UGL
0.0	09-apr-1992	UM33	C2H3CL	LT	5.00e+02	UGL
0.0	09-apr-1992	UM33	C2H5CL	LT	2.12e+03	UGL
0.0	09-apr-1992	UM33	C6H6	LT	2.40e+03	UGL
0.0	09-apr-1992	UM33	CCL4	LT	3.70e+03	UGL
0.0	09-apr-1992	UM33	CH2CL2	LT	8.82e+03	UGL
0.0	09-apr-1992	UM33	CH3BR	ND	1.00e+04	UGL
0.0	09-apr-1992	UM33	CH3CL	LT	1.60e+03	UGL
0.0	09-apr-1992	UM33	CHBR3	LT	8.20e+03	UGL
0.0	09-apr-1992	UM33	CHCL3	LT	8.30e+02	UGL
0.0	09-apr-1992	UM33	CLC6H5	LT	1.40e+03	UGL

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Site: WELL CECRL09 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	09-apr-1992	UM33	CS2	ND	5.00e+03	UGL
0.0	09-apr-1992	UM33	DBRCLM	LT	6.50e+03	UGL
0.0	09-apr-1992	UM33	ETC6H5	LT	9.30e+03	UGL
0.0	09-apr-1992	UM33	MEC6H5	LT	8.70e+03	UGL
0.0	09-apr-1992	UM33	MEK	ND	1.00e+04	UGL
0.0	09-apr-1992	UM33	MIBK	ND	1.00e+04	UGL
0.0	09-apr-1992	UM33	MNBK	ND	1.00e+04	UGL
0.0	09-apr-1992	UM33	STYR	ND	5.00e+03	UGL
0.0	09-apr-1992	UM33	T13DCP	ND	5.00e+03	UGL
0.0	09-apr-1992	UM33	TCLEA	LT	4.70e+03	UGL
0.0	09-apr-1992	UM33	TCLEE	LT	5.00e+02	UGL
0.0	09-apr-1992	UM33	TRCLE	LT	2.12e+05	UGL
0.0	09-apr-1992	UM33	TPHC	LT	1.08e+03	UGL

Site: WELL CECRL10

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	09-apr-1992	00	TPHC	LT	1.08e+03	UGL
0.0	09-apr-1992	UM33	111TCE	LT	4.10e+00	UGL
0.0	09-apr-1992	UM33	112TCE	LT	6.30e-01	UGL
0.0	09-apr-1992	UM33	11DCE	LT	1.42e+00	UGL
0.0	09-apr-1992	UM33	11DCLE	LT	1.10e+00	UGL
0.0	09-apr-1992	UM33	12DCE	LT	1.10e+00	UGL
0.0	09-apr-1992	UM33	12DCLB	LT	9.70e+00	UGL
0.0	09-apr-1992	UM33	12DCLE	LT	7.60e+00	UGL
0.0	09-apr-1992	UM33	12DCLP	LT	2.80e+00	UGL
0.0	09-apr-1992	UM33	12DMB	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	13DCLB	LT	9.20e+00	UGL
0.0	09-apr-1992	UM33	13DCP	LT	3.80e+00	UGL
0.0	09-apr-1992	UM33	13DMB	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	14DCLB	LT	8.10e+00	UGL
0.0	09-apr-1992	UM33	2CLEVE	LT	8.20e+01	UGL
0.0	09-apr-1992	UM33	ACET	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	BRDCLM	LT	7.90e+00	UGL
0.0	09-apr-1992	UM33	C12DCE	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	C13DCP	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	C2AVE	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	C2H3CL	LT	5.00e-01	UGL
0.0	09-apr-1992	UM33	C2H5CL	LT	2.12e+00	UGL
0.0	09-apr-1992	UM33	C6H6	LT	2.40e+00	UGL
0.0	09-apr-1992	UM33	CCL4	LT	3.70e+00	UGL
0.0	09-apr-1992	UM33	CH2CL2	LT	6.08e+00	UGL
0.0	09-apr-1992	UM33	CH3BR	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	CH3CL	LT	1.60e+00	UGL
0.0	09-apr-1992	UM33	CHBR3	LT	8.20e+00	UGL

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 From: 01-apr-92 To: 30-apr-92

Site: WELL CECRL10 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	09-apr-1992	UM33	CHCL3	LT	8.30e-01	UGL
0.0	09-apr-1992	UM33	CLC6H5	LT	1.40e+00	UGL
0.0	09-apr-1992	UM33	CS2	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	DBRCLM	LT	6.50e+00	UGL
0.0	09-apr-1992	UM33	ETC6H5	LT	9.30e+00	UGL
0.0	09-apr-1992	UM33	MEC6H5	LT	8.70e+00	UGL
0.0	09-apr-1992	UM33	MEK	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	MIBK	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	MNBK	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	T13DCP	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	TCLEA	LT	4.70e+00	UGL
0.0	09-apr-1992	UM33	TCLEE	LT	5.00e-01	UGL
0.0	09-apr-1992	UM33	TRCLE		3.18e+02	UGL

Site: WELL CECRL11

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	08-apr-1992	00	TPHC	LT	1.04e+03	UGL
0.0	08-apr-1992	UM33	111TCE	LT	8.20e+01	UGL
0.0	08-apr-1992	UM33	112TCE	LT	1.26e+01	UGL
0.0	08-apr-1992	UM33	11DCE		3.45e+01	UGL
0.0	08-apr-1992	UM33	11DCLE		1.40e+01	UGL
0.0	08-apr-1992	UM33	12DCE		1.98e+01	UGL
0.0	08-apr-1992	UM33	12DCLB	LT	1.94e+02	UGL
0.0	08-apr-1992	UM33	12DCLE	LT	1.52e+02	UGL
0.0	08-apr-1992	UM33	12DCLP	LT	5.60e+01	UGL
0.0	08-apr-1992	UM33	12DMB	ND	1.00e+02	UGL
0.0	08-apr-1992	UM33	13DCLB	LT	1.84e+02	UGL
0.0	08-apr-1992	UM33	13DCP	LT	7.60e+01	UGL
0.0	08-apr-1992	UM33	13DMB		8.00e+01	UGL
0.0	08-apr-1992	UM33	14DCLB	LT	1.62e+02	UGL
0.0	08-apr-1992	UM33	2CLEVE	LT	1.64e+03	UGL
0.0	08-apr-1992	UM33	ACET	ND	2.00e+02	UGL
0.0	08-apr-1992	UM33	BRDCLM	LT	1.58e+02	UGL
0.0	08-apr-1992	UM33	C12DCE	ND	1.00e+02	UGL
0.0	08-apr-1992	UM33	C13DCP	ND	1.00e+02	UGL
0.0	08-apr-1992	UM33	C2AVE	ND	2.00e+02	UGL
0.0	08-apr-1992	UM33	C2H3CL	LT	1.00e+01	UGL
0.0	08-apr-1992	UM33	C2H5CL	LT	4.24e+01	UGL
0.0	08-apr-1992	UM33	C6H6	LT	4.80e+01	UGL
0.0	08-apr-1992	UM33	CCL4	LT	7.40e+01	UGL
0.0	08-apr-1992	UM33	CH2CL2		1.96e+02	UGL
0.0	08-apr-1992	UM33	CH3BR	ND	2.00e+02	UGL

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 Analytical Results for Chemical Ground Water
 From: 01-apr-92 To: 30-apr-92

Site: WELL CECRL11 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	08-apr-1992	UM33	CH3CL	LT	3.20e+01	UGL
0.0	08-apr-1992	UM33	CHBR3	LT	1.64e+02	UGL
0.0	08-apr-1992	UM33	CHCL3		1.81e+01	UGL
0.0	08-apr-1992	UM33	CLC6H5		4.08e+01	UGL
0.0	08-apr-1992	UM33	CS2	ND	1.00e+02	UGL
0.0	08-apr-1992	UM33	DBRCLM	LT	1.30e+02	UGL
0.0	08-apr-1992	UM33	ETC6H5	LT	1.86e+02	UGL
0.0	08-apr-1992	UM33	MEC6H5	LT	1.74e+02	UGL
0.0	08-apr-1992	UM33	MEK	ND	2.00e+02	UGL
0.0	08-apr-1992	UM33	MIBK	ND	2.00e+02	UGL
0.0	08-apr-1992	UM33	MNBK	ND	2.00e+02	UGL
0.0	08-apr-1992	UM33	STYR	ND	1.00e+02	UGL
0.0	08-apr-1992	UM33	T13DCP	ND	1.00e+02	UGL
0.0	08-apr-1992	UM33	TCLEA	LT	9.40e+01	UGL
0.0	08-apr-1992	UM33	TCLEE		3.96e+01	UGL
0.0	08-apr-1992	UM33	TRCLL		4.25e+03	UGL

Site: WELL CECRL12

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	07-apr-1992	00	TPHC	LT	1.04e+03	UGL
0.0	07-apr-1992	00	TPHC	LT	1.05e+03	UGL
0.0	07-apr-1992	UM33	111TCE	LT	4.10e+00	UGL
0.0	07-apr-1992	UM33	111TCE	LT	4.10e+00	UGL
0.0	07-apr-1992	UM33	112TCE	LT	6.30e-01	UGL
0.0	07-apr-1992	UM33	112TCE	LT	6.30e-01	UGL
0.0	07-apr-1992	UM33	11DCE	LT	1.42e+00	UGL
0.0	07-apr-1992	UM33	11DCE	LT	1.42e+00	UGL
0.0	07-apr-1992	UM33	11DCLE	LT	1.10e+00	UGL
0.0	07-apr-1992	UM33	11DCLE	LT	1.10e+00	UGL
0.0	07-apr-1992	UM33	12DCE	LT	1.10e+00	UGL
0.0	07-apr-1992	UM33	12DCE	LT	1.10e+00	UGL
0.0	07-apr-1992	UM33	12DCE	LT	1.10e+00	UGL
0.0	07-apr-1992	UM33	12DCLB	LT	9.70e+00	UGL
0.0	07-apr-1992	UM33	12DCLB	LT	9.70e+00	UGL
0.0	07-apr-1992	UM33	12DCLE	LT	7.60e+00	UGL
0.0	07-apr-1992	UM33	12DCLE	LT	7.60e+00	UGL
0.0	07-apr-1992	UM33	12DCLP	LT	2.80e+00	UGL
0.0	07-apr-1992	UM33	12DCLP	LT	2.80e+00	UGL
0.0	07-apr-1992	UM33	12DMB	ND	5.00e+00	UGL
0.0	07-apr-1992	UM33	12DMB	ND	5.00e+00	UGL
0.0	07-apr-1992	UM33	13DCLB	LT	9.20e+00	UGL
0.0	07-apr-1992	UM33	13DCLB	LT	9.20e+00	UGL
0.0	07-apr-1992	UM33	13DCP	LT	3.80e+00	UGL
0.0	07-apr-1992	UM33	13DCP	LT	3.80e+00	UGL

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From: 01-apr-92 To: 30-apr-92

Site: WELL CECRL12 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	07-apr-1992	UM33	13DMB	ND	5.00e+00	UGL
0.0	07-apr-1992	UM33	13DMB	ND	5.00e+00	UGL
0.0	07-apr-1992	UM33	14DCLB	LT	8.10e+00	UGL
0.0	07-apr-1992	UM33	14DCLB	LT	8.10e+00	UGL
0.0	07-apr-1992	UM33	2CLEVE	LT	8.20e+01	UGL
0.0	07-apr-1992	UM33	2CLEVE	LT	8.20e+01	UGL
0.0	07-apr-1992	UM33	ACET		9.80e+00	UGL
0.0	07-apr-1992	UM33	ACET		1.10e+01	UGL
0.0	07-apr-1992	UM33	BRDCLM	LT	7.90e+00	UGL
0.0	07-apr-1992	UM33	BRDCLM	LT	7.90e+00	UGL
0.0	07-apr-1992	UM33	C12DCE		5.00e+00	UGL
0.0	07-apr-1992	UM33	C12DCE		5.00e+00	UGL
0.0	07-apr-1992	UM33	C13DCP	ND	5.00e+00	UGL
0.0	07-apr-1992	UM33	C13DCP	ND	5.00e+00	UGL
0.0	07-apr-1992	UM33	C2AVE	ND	1.00e-01	UGL
0.0	07-apr-1992	UM33	C2AVE	ND	1.00e-01	UGL
0.0	07-apr-1992	UM33	C2H3CL	LT	5.00e-01	UGL
0.0	07-apr-1992	UM33	C2H3CL	LT	5.00e-01	UGL
0.0	07-apr-1992	UM33	C2H5CL	LT	2.12e+00	UGL
0.0	07-apr-1992	UM33	C2H5CL	LT	2.12e+00	UGL
0.0	07-apr-1992	UM33	C6H6	LT	2.40e+00	UGL
0.0	07-apr-1992	UM33	C6H6	LT	2.40e+00	UGL
0.0	07-apr-1992	UM33	CCL4	LT	3.70e+00	UGL
0.0	07-apr-1992	UM33	CCL4	LT	3.70e+00	UGL
0.0	07-apr-1992	UM33	CH2CL2		6.18e+00	UGL
0.0	07-apr-1992	UM33	CH2CL2		6.96e+00	UGL
0.0	07-apr-1992	UM33	CH3BR	ND	1.00e+01	UGL
0.0	07-apr-1992	UM33	CH3BR	ND	1.00e+01	UGL
0.0	07-apr-1992	UM33	CH3CL	LT	1.60e+00	UGL
0.0	07-apr-1992	UM33	CH3CL	LT	1.60e+00	UGL
0.0	07-apr-1992	UM33	CHBR3	LT	8.20e+00	UGL
0.0	07-apr-1992	UM33	CHBR3	LT	8.20e+00	UGL
0.0	07-apr-1992	UM33	CHCL3	LT	8.30e-01	UGL
0.0	07-apr-1992	UM33	CHCL3	LT	8.30e-01	UGL
0.0	07-apr-1992	UM33	CLC5H5	LT	1.40e+00	UGL
0.0	07-apr-1992	UM33	CLC5H5	LT	1.40e+00	UGL
0.0	07-apr-1992	UM33	CS2	ND	5.00e+00	UGL
0.0	07-apr-1992	UM33	CS2	ND	5.00e+00	UGL
0.0	07-apr-1992	UM33	DBRCLM	LT	6.50e+00	UGL
0.0	07-apr-1992	UM33	DBRCLM	LT	6.50e+00	UGL
0.0	07-apr-1992	UM33	ETC6H5	LT	9.30e+00	UGL
0.0	07-apr-1992	UM33	ETC6H5	LT	9.30e+00	UGL
0.0	07-apr-1992	UM33	MEC6H5	LT	8.70e+00	UGL
0.0	07-apr-1992	UM33	MEC6H5	LT	8.70e+00	UGL
0.0	07-apr-1992	UM33	MEK		1.10e+01	UGL
0.0	07-apr-1992	UM33	MEK		1.20e+01	UGL
0.0	07-apr-1992	UM33	MIBK	ND	1.00e+01	UGL
0.0	07-apr-1992	UM33	MIBK	ND	1.00e+01	UGL

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Installation: Cold Regions Res & Eng Lab, NH
 Analytical Results for Chemical Ground Water
 From: 01-apr-92 To: 30-apr-92

Site: WELL CECRL12 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	07-apr-1992	UM33	MNBR	ND	1.00e+01	UGL
0.0	07-apr-1992	UM33	MNBR	ND	1.00e+01	UGL
0.0	07-apr-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	07-apr-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	07-apr-1992	UM33	T13DCP	ND	5.00e+00	UGL
0.0	07-apr-1992	UM33	T13DCP	ND	5.00e+00	UGL
0.0	07-apr-1992	UM33	TCLEA	LT	4.70e+00	UGL
0.0	07-apr-1992	UM33	TCLEA	LT	4.70e+00	UGL
0.0	07-apr-1992	UM33	TCLEE	LT	5.00e-01	UGL
0.0	07-apr-1992	UM33	TCLEE	LT	5.00e-01	UGL
0.0	07-apr-1992	UM33	TRCLE		2.12e+02	UGL
0.0	07-apr-1992	UM33	TRCLE		2.65e+02	UGL

Site: WELL HANOVER

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	08-apr-1992	00	TPHC	LT	1.05e+03	UGL
0.0	08-apr-1992	UM33	111TCE	LT	4.10e+00	UGL
0.0	08-apr-1992	UM33	112TCE	LT	6.30e-01	UGL
0.0	08-apr-1992	UM33	11DCE	LT	1.42e+00	UGL
0.0	08-apr-1992	UM33	11DCLE	LT	1.10e+00	UGL
0.0	08-apr-1992	UM33	12DCE	LT	1.10e+00	UGL
0.0	08-apr-1992	UM33	12DCLB	LT	9.70e+00	UGL
0.0	08-apr-1992	UM33	12DCLC	LT	7.60e+00	UGL
0.0	08-apr-1992	UM33	12DCLP	LT	2.80e+00	UGL
0.0	08-apr-1992	UM33	12DMB	ND	5.00e+00	UGL
0.0	08-apr-1992	UM33	13DCLB	LT	9.20e+00	UGL
0.0	08-apr-1992	UM33	13DCP	LT	3.80e+00	UGL
0.0	08-apr-1992	UM33	13DMB	ND	5.00e+00	UGL
0.0	08-apr-1992	UM33	14DCLB	LT	8.10e+00	UGL
0.0	08-apr-1992	UM33	2CLEVE	LT	8.20e+01	UGL
0.0	08-apr-1992	UM33	ACET	ND	1.00e+01	UGL
0.0	08-apr-1992	UM33	BRDCLM	LT	7.90e+00	UGL
0.0	08-apr-1992	UM33	C12DCE	ND	5.00e+00	UGL
0.0	08-apr-1992	UM33	C13DCP	ND	5.00e+00	UGL
0.0	08-apr-1992	UM33	C2AVE	ND	1.00e+01	UGL
0.0	08-apr-1992	UM33	C2H3CL	LT	5.00e-01	UGL
0.0	08-apr-1992	UM33	C2H5CL	LT	2.12e+00	UGL
0.0	08-apr-1992	UM33	C6H6	LT	2.40e+00	UGL
0.0	08-apr-1992	UM33	CCL4	LT	3.70e+00	UGL
0.0	08-apr-1992	UM33	CH2CL2		6.67e+01	UGL
0.0	08-apr-1992	UM33	CH3BR	ND	1.00e+01	UGL
0.0	08-apr-1992	UM33	CH3CL	LT	1.60e+00	UGL
0.0	08-apr-1992	UM33	CHBR3	LT	8.20e+00	UGL

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Analytical Results for Chemical Ground Water
From: 01-apr-92 To: 30-apr-92

Site: WELL HANOVER (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	08-apr-1992	UM33	CHCL3	LT	8.30e-01	UGL
0.0	08-apr-1992	UM33	CLC6H5	LT	1.40e+00	UGL
0.0	08-apr-1992	UM33	CS2	ND	5.00e+00	UGL
0.0	08-apr-1992	UM33	DBRCLM	LT	6.50e+00	UGL
0.0	08-apr-1992	UM33	ETC6H5	LT	9.30e+00	UGL
0.0	08-apr-1992	UM33	MEC6H5	LT	8.70e+00	UGL
0.0	08-apr-1992	UM33	MEK	ND	1.00e+01	UGL
0.0	08-apr-1992	UM33	MIBK	ND	1.00e+01	UGL
0.0	08-apr-1992	UM33	MNBK	ND	1.00e+01	UGL
0.0	08-apr-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	08-apr-1992	UM33	T13DCP	ND	5.00e+00	UGL
0.0	08-apr-1992	UM33	TCLEA	LT	4.70e+00	UGL
0.0	08-apr-1992	UM33	TCLEE	LT	5.00e-01	UGL
0.0	08-apr-1992	UM33	TRCLE	LT	5.00e-01	UGL

Report completed normally.

INSTALLATION RESTORATION PROGRAM

CHEMICAL REPORT

Tue May 26 11:01:42 1992

For Parameters :

Installation = Cold Regions Res & Eng Lab. 44
Beginning Date = 01-apr-92
Ending Date = 26-may-92
Media Type = Chemical Surface Water
Maximum (X, Y) = (719933, 484499c)
Minimum (X, Y) = (719326, 4844457)
Booleans = Y

CCM

Arthur D Little

May 26, 1992

Installation: Cold Regions Res & Eng Lab, WHPage 1
 Analytical Results for Chemical Surface Water
 From: 01-apr-92 To: 26-may-92

Site: IVER COMMSW1

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOUL	CONCENTRATION	UNITS
0.0	09-apr-1992	00	TPHC	LT	1.12e+03	UGL
0.0	09-apr-1992	UM33	1111CE	LT	4.10e+00	UGL
0.0	09-apr-1992	UM33	1121CE	LT	6.30e-01	UGL
0.0	09-apr-1992	UM33	1110CE	LT	1.42e+00	UGL
0.0	09-apr-1992	UM33	1100LE	LT	1.10e+00	UGL
0.0	09-apr-1992	UM33	1200CE	LT	1.10e+00	UGL
0.0	09-apr-1992	UM33	1200LE	LT	9.70e+00	UGL
0.0	09-apr-1992	UM33	1200CE	LT	7.60e+00	UGL
0.0	09-apr-1992	UM33	1210CLP	LT	2.80e+00	UGL
0.0	09-apr-1992	UM33	1200M6	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	1300LE	LT	9.20e+00	UGL
0.0	09-apr-1992	UM33	1300CP	LT	3.80e+00	UGL
0.0	09-apr-1992	UM33	1300M6	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	1400LE	LT	8.10e+00	UGL
0.0	09-apr-1992	UM33	20LEVE	LT	9.20e+01	UGL
0.0	09-apr-1992	UM33	ACEY	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	BBCLM	LT	7.90e+00	UGL
0.0	09-apr-1992	UM33	C12DCE	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	C13DCE	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	CDAVE	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	CDMSCL	LT	5.00e-01	UGL
0.0	09-apr-1992	UM33	CDMSCL	LT	2.12e+00	UGL
0.0	09-apr-1992	UM33	C6M6	LT	2.40e+00	UGL
0.0	09-apr-1992	UM33	DECLA	LT	3.70e+00	UGL
0.0	09-apr-1992	UM33	CHCCLD	ND	6.27e+00	UGL
0.0	09-apr-1992	UM33	CHXER	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	CHXCL	LT	1.60e+00	UGL
0.0	09-apr-1992	UM33	CHXES	LT	8.20e+00	UGL
0.0	09-apr-1992	UM33	CHCCLD	LT	8.30e-01	UGL
0.0	09-apr-1992	UM33	CHC6M6	LT	1.40e+00	UGL
0.0	09-apr-1992	UM33	CS2	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	DBRCLM	LT	6.50e+00	UGL
0.0	09-apr-1992	UM33	ETC6M6	LT	9.30e+00	UGL
0.0	09-apr-1992	UM33	HEG6M6	LT	8.70e+00	UGL
0.0	09-apr-1992	UM33	HEK	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	MIRK	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	MNEK	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	STR	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	T13DCE	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	TELEA	LT	4.70e+00	UGL
0.0	09-apr-1992	UM33	TELEE	LT	5.00e-01	UGL
0.0	09-apr-1992	UM33	TRCLE	LT	5.00e-01	UGL

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 Analytical Results for Chemical Surface Water
 From: 01-apr-92 To: 26-may-92

Site: RIVER CONNSW2

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	POOL	CONCENTRATION	UNITS
0.0	09-apr-1992	UM33	111TCE	LT	4.10e+00	UGL
0.0	09-apr-1992	UM33	111TCE	LT	4.10e+00	UGL
0.0	09-apr-1992	UM33	112TCE	LT	6.30e-01	UGL
0.0	09-apr-1992	UM33	112TCE	LT	6.30e-01	UGL
0.0	09-apr-1992	UM33	110CE	LT	1.42e+00	UGL
0.0	09-apr-1992	UM33	110CE	LT	1.42e+00	UGL
0.0	09-apr-1992	UM33	110CLE	LT	1.10e+00	UGL
0.0	09-apr-1992	UM33	110CLE	LT	1.10e+00	UGL
0.0	09-apr-1992	UM33	120CE	LT	1.10e+00	UGL
0.0	09-apr-1992	UM33	120CE	LT	1.10e+00	UGL
0.0	09-apr-1992	UM33	120CLP	LT	9.70e+00	UGL
0.0	09-apr-1992	UM33	120CLP	LT	9.70e+00	UGL
0.0	09-apr-1992	UM33	120CLE	LT	7.60e+00	UGL
0.0	09-apr-1992	UM33	120CLE	LT	7.60e+00	UGL
0.0	09-apr-1992	UM33	120CLP	LT	2.80e+00	UGL
0.0	09-apr-1992	UM33	120CLP	LT	2.80e+00	UGL
0.0	09-apr-1992	UM33	120MR	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	120MR	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	120CLR	LT	9.20e+00	UGL
0.0	09-apr-1992	UM33	120CLR	LT	9.20e+00	UGL
0.0	09-apr-1992	UM33	130CP	LT	2.80e+00	UGL
0.0	09-apr-1992	UM33	130CP	LT	2.80e+00	UGL
0.0	09-apr-1992	UM33	130MR	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	130MR	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	140CLR	LT	8.10e+00	UGL
0.0	09-apr-1992	UM33	140CLR	LT	8.10e+00	UGL
0.0	09-apr-1992	UM33	20LEVE	LT	8.20e+01	UGL
0.0	09-apr-1992	UM33	20LEVE	LT	8.20e+01	UGL
0.0	09-apr-1992	UM33	ACET	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	ACET	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	BRICLM	LT	7.90e+00	UGL
0.0	09-apr-1992	UM33	BRICLM	LT	7.90e+00	UGL
0.0	09-apr-1992	UM33	C12DCE	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	C12DCE	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	C13DCP	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	C13DCP	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	C2AVE	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	C2AVE	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	C2MSCL	LT	5.00e-01	UGL
0.0	09-apr-1992	UM33	C2MSCL	LT	5.00e-01	UGL
0.0	09-apr-1992	UM33	C2MSCL	LT	2.12e+00	UGL
0.0	09-apr-1992	UM33	C2MSCL	LT	2.12e+00	UGL
0.0	09-apr-1992	UM33	C6H6	LT	2.40e+00	UGL
0.0	09-apr-1992	UM33	C6H6	LT	2.40e+00	UGL
0.0	09-apr-1992	UM33	CCL4	LT	3.70e+00	UGL
0.0	09-apr-1992	UM33	CCL4	LT	3.70e+00	UGL
0.0	09-apr-1992	UM33	CH2CL2	UGL	5.00e+00	UGL
0.0	09-apr-1992	UM33	CH2CL2	UGL	5.00e+00	UGL

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Installation: Cold Regions Res & Eng Lab. Page 3
 Analytical Results for Chemical Surface Water
 From: 01-apr-92 To: 26-may-92

Site: RVER COMMSW2 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	POOL	CONCENTRATION	UNITS
0.0	09-apr-1992	UM33	CH3BR	ND	1.50e+01	UGL
0.0	09-apr-1992	UM33	CH3BR	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	CH3CL	LI	1.60e+00	UGL
0.0	09-apr-1992	UM33	CH3CL	LI	1.60e+00	UGL
0.0	09-apr-1992	UM33	CH3Br	LI	8.20e+00	UGL
0.0	09-apr-1992	UM33	CH3Br	LI	8.20e+00	UGL
0.0	09-apr-1992	UM33	CHCl3	LI	8.30e-01	UGL
0.0	09-apr-1992	UM33	CHCl3	LI	8.30e-01	UGL
0.0	09-apr-1992	UM33	ClC6H5	LI	1.40e+00	UGL
0.0	09-apr-1992	UM33	ClC6H5	LI	1.40e+00	UGL
0.0	09-apr-1992	UM33	CSD	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	CSD	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	D38CLA	LI	6.50e+00	UGL
0.0	09-apr-1992	UM33	D38CLA	LI	6.50e+00	UGL
0.0	09-apr-1992	UM33	ETC6H5	LI	9.30e+00	UGL
0.0	09-apr-1992	UM33	ETC6H5	LI	9.30e+00	UGL
0.0	09-apr-1992	UM33	MEC6H5	LI	8.70e+00	UGL
0.0	09-apr-1992	UM33	MEC6H5	LI	8.70e+00	UGL
0.0	09-apr-1992	UM33	MEK	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	MEK	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	MIBK	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	MIBK	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	MWBK	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	MWBK	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	T130CP	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	T130CP	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	TCLEA	LI	4.70e+00	UGL
0.0	09-apr-1992	UM33	TCLEA	LI	4.70e+00	UGL
0.0	09-apr-1992	UM33	TCLEE	LI	5.00e-01	UGL
0.0	09-apr-1992	UM33	TCLEE	LI	5.00e-01	UGL
0.0	09-apr-1992	UM33	TRCLE		2.02e+02	UGL
0.0	09-apr-1992	UM33	TRCLE		2.23e+02	UGL
C.C	09-apr-1992	UM33	TPHC	LT	1.12e+03	UGL

Site: RVER COMMSW3

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	POOL	CONCENTRATION	UNITS
0.0	09-apr-1992	UM33	111TCE	LI	4.10e+00	UGL
0.0	09-apr-1992	UM33	111TCE	LI	6.30e-01	UGL
0.0	09-apr-1992	UM33	112CE	LI	1.42e+00	UGL
0.0	09-apr-1992	UM33	112CLE	LI	1.10e+00	UGL
0.0	09-apr-1992	UM33	112CE	LI	1.10e+00	UGL
0.0	09-apr-1992	UM33	122CLB	LI	9.70e+00	UGL
0.0	09-apr-1992	UM33	122CLE	LI	7.50e+00	UGL

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Analytical Results for Chemical Surface Water
From: 01-apr-92 To: 26-may-92

Site: IVER COMWSW3 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOUL	CONCENTRATION	UNITS
0.0	09-apr-1992	UM33	12DCLP	LT	2.80e+00	UGL
0.0	09-apr-1992	UM33	12DWB	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	13DCLB	LT	9.20e+00	UGL
0.0	09-apr-1992	UM33	13DCP	LT	3.80e+00	UGL
0.0	09-apr-1992	UM33	13DWB	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	14DCLB	LT	8.10e+00	UGL
0.0	09-apr-1992	UM33	2CLVE	LT	8.20e+01	UGL
0.0	09-apr-1992	UM33	ACET	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	BRICLA	LT	7.90e+00	UGL
0.0	09-apr-1992	UM33	C12DCE	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	C13DCP	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	C2AVE	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	C2WSCL	LT	5.00e+01	UGL
0.0	09-apr-1992	UM33	C2HSCL	LT	2.10e+00	UGL
0.0	09-apr-1992	UM33	C6HS	LT	2.40e+00	UGL
0.0	09-apr-1992	UM33	CCL4	LT	3.70e+00	UGL
0.0	09-apr-1992	UM33	CH2CL2	ND	5.20e+00	UGL
0.0	09-apr-1992	UM33	CH2SK	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	CH2CL	LT	1.60e+00	UGL
0.0	09-apr-1992	UM33	CHRR3	LT	8.20e+00	UGL
0.0	09-apr-1992	UM33	CNCL3	LT	8.20e+01	UGL
0.0	09-apr-1992	UM33	CLOSH5	LT	1.40e+00	UGL
0.0	09-apr-1992	UM33	CS2	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	D4KCLA	LT	6.50e+00	UGL
0.0	09-apr-1992	UM33	EDGSH5	LT	9.30e+00	UGL
0.0	09-apr-1992	UM33	HEGSH5	LT	8.70e+00	UGL
0.0	09-apr-1992	UM33	MEK	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	MIBK	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	MEK	ND	1.00e+01	UGL
0.0	09-apr-1992	UM33	STYR	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	T13DCP	ND	5.00e+00	UGL
0.0	09-apr-1992	UM33	TCLEA	LT	4.70e+00	UGL
0.0	09-apr-1992	UM33	TCLEE	LT	5.00e+01	UGL
0.0	09-apr-1992	UM33	TRCLE	LT	5.00e+01	UGL
0.0	09-apr-1992	UM33	TPHC	LT	1.12e+03	UGL

Report completed normally.

Arthur D Little

INSTALLATION RESTORATION PROGRAM

CHEMICAL REPORT
Tue May 26 11:00:55 1992

For Parameters :

Installation = Cold Regions Res & Eng Lab, MN
Beginning Date = 01-apr-92
Ending Date = 26-may-92
Media Type = Chemical Sediment
Maximum (X, Y) = (719933, 4844996)
Minimum (X, Y) = (719526, 4844457)
Boolean = Y

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Analytical Results for Chemical Sediment
From: 01-apr-92 To: 26-may-92

Site: RVER COMWSED1

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	ROOL	CONCENTRATION	UNITS
0.0	09-apr-1992	00	TPHC	LI	6.95e-01	UGG
0.0	09-apr-1992	LM16	111TCE	LI	4.20e-03	UGG
0.0	09-apr-1992	LM16	112TCE	LI	2.00e-02	UGG
0.0	09-apr-1992	LM16	110TCE	LI	1.90e-02	UGG
0.0	09-apr-1992	LM16	110CDE	LI	1.70e-03	UGG
0.0	09-apr-1992	LM16	120TCE	LI	2.00e-03	UGG
0.0	09-apr-1992	LM16	120CDE	LI	1.20e-03	UGG
0.0	09-apr-1992	LM16	120CLE	LI	3.10e-03	UGG
0.0	09-apr-1992	LM16	120CLP	LI	2.20e-03	UGG
0.0	09-apr-1992	LM16	120MB	ND	2.00e-03	UGG
0.0	09-apr-1992	LM16	130CDE	LI	2.00e-03	UGG
0.0	09-apr-1992	LM16	130CLP	LI	1.30e-03	UGG
0.0	09-apr-1992	LM16	130MB	ND	2.00e-03	UGG
0.0	09-apr-1992	LM16	140CDE	LI	9.00e-04	UGG
0.0	09-apr-1992	LM16	20LEVE	LI	4.80e-02	UGG
0.0	09-apr-1992	LM16	ACEP	ND	1.00e-02	UGG
0.0	09-apr-1992	LM16	PHOCLP	LI	3.30e-03	UGG
0.0	09-apr-1992	LM16	C130CP	ND	5.00e-03	UGG
0.0	09-apr-1992	LM16	CEAVE	ND	1.00e-02	UGG
0.0	09-apr-1992	LM16	CMOCL	LI	1.50e-02	UGG
0.0	09-apr-1992	LM16	CMOCL	LI	2.70e-02	UGG
0.0	09-apr-1992	LM16	CGMS	LI	2.90e-03	UGG
0.0	09-apr-1992	LM16	CEL3F	ND	5.00e-03	UGG
0.0	09-apr-1992	LM16	CCL4	LI	5.60e-03	UGG
0.0	09-apr-1992	LM16	CMOCL2	LI	8.94e-03	UGG
0.0	09-apr-1992	LM16	CM3BK	ND	1.00e-02	UGG
0.0	09-apr-1992	LM16	CMOCL	LI	1.70e-02	UGG
0.0	09-apr-1992	LM16	CM4K3	LI	1.80e-02	UGG
0.0	09-apr-1992	LM16	CMOCL3	LI	2.30e-03	UGG
0.0	09-apr-1992	LM16	CLC6MS	LI	2.80e-02	UGG
0.0	09-apr-1992	LM16	CSD	ND	5.00e-03	UGG
0.0	09-apr-1992	LM16	DBVCLM	LI	1.40e-02	UGG
0.0	09-apr-1992	LM16	ETC6MS	LI	3.30e-02	UGG
0.0	09-apr-1992	LM16	MEC6MS	LI	8.40e-03	UGG
0.0	09-apr-1992	LM16	MEK	ND	1.00e-02	UGG
0.0	09-apr-1992	LM16	MIBK	ND	1.00e-02	UGG
0.0	09-apr-1992	LM16	MWBK	ND	1.00e-02	UGG
0.0	09-apr-1992	LM16	STYB	ND	5.00e-03	UGG
0.0	09-apr-1992	LM16	T130CP	ND	5.00e-03	UGG
0.0	09-apr-1992	LM16	TCLEA	LI	1.60e-03	UGG
0.0	09-apr-1992	LM16	TCLEE	LI	1.90e-03	UGG
0.0	09-apr-1992	LM16	TRCLE	LI	2.80e-03	UGG

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 Analytical Results for Chemical Sediment
 From: 01-apr-92 To: 26-may-92

Site: RIVER CONNSD2

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	POOL	CONCENTRATION	UNITS
0.0	09-apr-1992	00	TPHC	LT	6.95e+01	UGG
0.0	09-apr-1992	00	TPHC	LT	6.95e+01	UGG
0.0	09-apr-1992	LM16	111TCE	LT	4.20e-03	UGG
0.0	09-apr-1992	LM16	111TCE	LT	4.20e-03	UGG
0.0	09-apr-1992	LM16	112TCE	LT	2.00e-02	UGG
0.0	09-apr-1992	LM16	112TCE	LT	2.00e-02	UGG
0.0	09-apr-1992	LM16	113TCE	LT	1.90e-02	UGG
0.0	09-apr-1992	LM16	113TCE	LT	1.90e-02	UGG
0.0	09-apr-1992	LM16	118CE	LT	1.70e-02	UGG
0.0	09-apr-1992	LM16	118CE	LT	1.70e-02	UGG
0.0	09-apr-1992	LM16	118CLE	LT	1.70e-02	UGG
0.0	09-apr-1992	LM16	118CLE	LT	1.70e-02	UGG
0.0	09-apr-1992	LM16	120CE	LT	2.00e-02	UGG
0.0	09-apr-1992	LM16	120CE	LT	2.00e-02	UGG
0.0	09-apr-1992	LM16	120CLE	LT	1.20e-02	UGG
0.0	09-apr-1992	LM16	120CLE	LT	1.20e-02	UGG
0.0	09-apr-1992	LM16	120CLB	LT	3.10e-02	UGG
0.0	09-apr-1992	LM16	120CLB	LT	3.10e-02	UGG
0.0	09-apr-1992	LM16	120CLF	LT	2.20e-02	UGG
0.0	09-apr-1992	LM16	120CLF	LT	2.20e-02	UGG
0.0	09-apr-1992	LM16	120MB	NO	2.00e-02	UGG
0.0	09-apr-1992	LM16	120MB	NO	2.00e-02	UGG
0.0	09-apr-1992	LM16	130CLE	LT	2.00e-02	UGG
0.0	09-apr-1992	LM16	130CLE	LT	2.00e-02	UGG
0.0	09-apr-1992	LM16	130CLB	LT	1.30e-02	UGG
0.0	09-apr-1992	LM16	130CLB	LT	1.30e-02	UGG
0.0	09-apr-1992	LM16	130CF	LT	1.30e-02	UGG
0.0	09-apr-1992	LM16	130CF	LT	1.30e-02	UGG
0.0	09-apr-1992	LM16	130MB	NO	2.00e-02	UGG
0.0	09-apr-1992	LM16	130MB	NO	2.00e-02	UGG
0.0	09-apr-1992	LM16	140CLE	LT	9.00e-04	UGG
0.0	09-apr-1992	LM16	140CLE	LT	9.00e-04	UGG
0.0	09-apr-1992	LM16	ZCLEVE	LT	4.80e-02	UGG
0.0	09-apr-1992	LM16	ZCLEVE	LT	4.80e-02	UGG
0.0	09-apr-1992	LM16	ACET	NO	1.00e-02	UGG
0.0	09-apr-1992	LM16	ACET	NO	1.00e-02	UGG
0.0	09-apr-1992	LM16	88DCLM	LT	3.30e-03	UGG
0.0	09-apr-1992	LM16	88DCLM	LT	3.30e-03	UGG
0.0	09-apr-1992	LM16	C13DCP	NO	5.00e-03	UGG
0.0	09-apr-1992	LM16	C13DCP	NO	5.00e-03	UGG
0.0	09-apr-1992	LM16	C2AVE	NO	1.00e-02	UGG
0.0	09-apr-1992	LM16	C2AVE	NO	1.00e-02	UGG
0.0	09-apr-1992	LM16	C2H3CL	LT	1.50e-02	UGG
0.0	09-apr-1992	LM16	C2H3CL	LT	1.50e-02	UGG
0.0	09-apr-1992	LM16	C2H5CL	LT	2.70e-02	UGG
0.0	09-apr-1992	LM16	C2H5CL	LT	2.70e-02	UGG
0.0	09-apr-1992	LM16	C6H6	LT	2.90e-02	UGG
0.0	09-apr-1992	LM16	C6H6	LT	2.90e-02	UGG
0.0	09-apr-1992	LM16	CCL3F	NO	5.00e-03	UGG
0.0	09-apr-1992	LM16	CCL3F	NO	5.00e-03	UGG
0.0	09-apr-1992	LM16	CCL4	LT	5.60e-03	UGG

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Installation: Cold Regions Res & Eng Lab, MPPage 3
 Analytical Results for Chemical Sediment
 From: 01-apr-92 To: 26-may-92

Site: RVER CONWSED2 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	POOL	CONCENTRATION	UNITS
0.0	09-apr-1992	LM16	CCL4	LT	5.60e-03	UGG
0.0	09-apr-1992	LM16	CH2CL2		8.67e-03	UGG
0.0	09-apr-1992	LM16	CH2CL2		8.92e-03	UGG
0.0	09-apr-1992	LM16	CH3BR	ND	1.00e-02	UGG
0.0	09-apr-1992	LM16	CH3BR	ND	1.00e-02	UGG
0.0	09-apr-1992	LM16	CH3CL	LT	1.70e-02	UGG
0.0	09-apr-1992	LM16	CH3CL	LT	1.70e-02	UGG
0.0	09-apr-1992	LM16	CH3R3	LT	1.80e-02	UGG
0.0	09-apr-1992	LM16	CH3R3	LT	1.90e-02	UGG
0.0	09-apr-1992	LM16	CHCL3	LT	2.30e-03	UGG
0.0	09-apr-1992	LM16	CHCL3	LT	2.30e-02	UGG
0.0	09-apr-1992	LM16	CLC6MS	LT	2.80e-03	UGG
0.0	09-apr-1992	LM16	CLC6MS	LT	2.80e-03	UGG
0.0	09-apr-1992	LM16	CS2	ND	5.00e-03	UGG
0.0	09-apr-1992	LM16	CS2	ND	5.00e-03	UGG
0.0	09-apr-1992	LM16	DBPCLM	LT	1.40e-02	UGG
0.0	09-apr-1992	LM16	DBPCLM	LT	1.40e-02	UGG
0.0	09-apr-1992	LM16	ETC6MS	LT	3.30e-02	UGG
0.0	09-apr-1992	LM16	ETC6MS	LT	3.30e-03	UGG
0.0	09-apr-1992	LM16	AEC6MS	LT	8.40e-03	UGG
0.0	09-apr-1992	LM16	AEC6MS	LT	8.40e-03	UGG
0.0	09-apr-1992	LM16	HEX	ND	1.00e-02	UGG
0.0	09-apr-1992	LM16	HEX	ND	1.00e-02	UGG
0.0	09-apr-1992	LM16	MIBK	ND	1.00e-02	UGG
0.0	09-apr-1992	LM16	MIBK	ND	1.00e-02	UGG
0.0	09-apr-1992	LM16	MIBK	ND	1.00e-02	UGG
0.0	09-apr-1992	LM16	MIBK	ND	1.00e-02	UGG
0.0	09-apr-1992	LM16	STYR	ND	5.00e-03	UGG
0.0	09-apr-1992	LM16	STYR	ND	5.00e-03	UGG
0.0	09-apr-1992	LM16	TI3DCP	ND	5.00e-03	UGG
0.0	09-apr-1992	LM16	TI3DCP	ND	5.00e-03	UGG
0.0	09-apr-1992	LM16	TCLEA	LT	1.60e-03	UGG
0.0	09-apr-1992	LM16	TCLEA	LT	1.60e-03	UGG
0.0	09-apr-1992	LM16	TCLEE	LT	1.90e-03	UGG
0.0	09-apr-1992	LM16	TCLEE	LT	1.90e-03	UGG
0.0	09-apr-1992	LM16	TRCLE	LT	3.80e-03	UGG
0.0	05-apr-1992	LM16	TRCLE	LT	3.80e-03	UGG

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May 25, 1992

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Analytical Results for Chemical Sediment
From: 01-apr-92 To: 26-may-92

Site: RVER COMMSD3

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	ROOL	CONCENTRATION	UNITS
0.0	09-apr-1992	00	TPHC	LI	6.95e-01	UGG
0.0	09-apr-1992	LN16	111TCE	LI	4.20e-03	UGG
0.0	09-apr-1992	LN16	112TCE	LI	2.00e-02	UGG
0.0	09-apr-1992	LN16	110CE	LI	1.90e-02	UGG
0.0	09-apr-1992	LN16	110CLE	LI	1.70e-03	UGG
0.0	09-apr-1992	LN16	12TCE	LI	2.00e-03	UGG
0.0	09-apr-1992	LN16	12DCLB	LI	1.20e-03	UGG
0.0	09-apr-1992	LN16	12DCLC	LI	3.10e-03	UGG
0.0	09-apr-1992	LN16	12DCLP	LI	2.20e-03	UGG
0.0	09-apr-1992	LN16	12DDE	ND	2.00e-03	UGG
0.0	09-apr-1992	LN16	13DCLB	LI	2.00e-03	UGG
0.0	09-apr-1992	LN16	13DCLP	LI	1.30e-02	UGG
0.0	09-apr-1992	LN16	13DDE	ND	2.00e-03	UGG
0.0	09-apr-1992	LN16	14DCLB	LI	9.00e-04	UGG
0.0	09-apr-1992	LN16	DCLEVE	LI	4.80e-02	UGG
0.0	09-apr-1992	LN16	ACEY	ND	1.00e-02	UGG
0.0	09-apr-1992	LN16	BPCDLM	LI	3.30e-03	UGG
0.0	09-apr-1992	LN16	C13DOP	ND	5.00e-03	UGG
0.0	09-apr-1992	LN16	CAVE	ND	1.00e-02	UGG
0.0	09-apr-1992	LN16	CMOCL	LI	1.50e-02	UGG
0.0	09-apr-1992	LN16	CMOCL	LI	2.70e-02	UGG
0.0	09-apr-1992	LN16	CMG	LI	2.90e-03	UGG
0.0	09-apr-1992	LN16	CCLF	ND	5.00e-03	UGG
0.0	09-apr-1992	LN16	CCl4	LI	5.60e-03	UGG
0.0	09-apr-1992	LN16	CMOCL2	LI	5.40e-03	UGG
0.0	09-apr-1992	LN16	CM33P	ND	1.00e-02	UGG
0.0	09-apr-1992	LN16	CMOCL	LI	1.70e-02	UGG
0.0	09-apr-1992	LN16	CM883	LI	1.80e-02	UGG
0.0	09-apr-1992	LN16	CMOCL3	LI	2.30e-03	UGG
0.0	09-apr-1992	LN16	CLGMS	LI	2.80e-03	UGG
0.0	09-apr-1992	LN16	CS2	ND	5.00e-03	UGG
0.0	09-apr-1992	LN16	DBRCLM	LI	1.40e-02	UGG
0.0	09-apr-1992	LN16	ETGMS	LI	3.30e-03	UGG
0.0	09-apr-1992	LN16	MEGMS	LI	8.40e-03	UGG
0.0	09-apr-1992	LN16	MEK	ND	1.00e-02	UGG
0.0	09-apr-1992	LN16	MIBK	ND	1.00e-02	UGG
0.0	09-apr-1992	LN16	MMSK	ND	1.00e-02	UGG
0.0	09-apr-1992	LN16	STY	ND	5.00e-03	UGG
0.0	09-apr-1992	LN16	T13DOP	ND	5.00e-03	UGG
0.0	09-apr-1992	LN16	TCLEA	LI	1.60e-03	UGG
0.0	09-apr-1992	LN16	TCLEE	LI	1.90e-03	UGG
0.0	09-apr-1992	LN16	TCLE	LI	3.60e-03	UGG

Report completed normally.

Jun 1, 1992

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 Analytical Results for Chemical Ground Water
 From: 01-apr-92 To: 30-apr-92

Site: WELL CECRL08 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	09-apr-1992	UM33	MNBK	ND	2.00e+02	UGL
0.0	09-apr-1992	UM33	MNBK	ND	2.00e+02	UGL
0.0	09-apr-1992	UM33	STYR	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	STYR	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	T13DCP	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	T13DCP	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	TCLEA	LT	9.40e+01	UGL
0.0	09-apr-1992	UM33	TCLEA	LT	9.40e+01	UGL
0.0	09-apr-1992	UM33	TCLEE	LT	1.00e+01	UGL
0.0	09-apr-1992	UM33	TCLEE	LT	1.00e+01	UGL
0.0	09-apr-1992	UM33	TRCLE		1.06e+04	UGL
0.0	09-apr-1992	UM33	TRCLE		1.06e+04	UGL
0.0	09-apr-1992	UM33	TPHC	LT	1.08e+03	UGL

Site: WELL CECRL09

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	09-apr-1992	UM33	111TCE	LT	4.10e+03	UGL
0.0	09-apr-1992	UM33	112TCE	LT	6.30e+02	UGL
0.0	09-apr-1992	UM33	11DCE	LT	1.42e+03	UGL
0.0	09-apr-1992	UM33	11DCLE	LT	1.10e+03	UGL
0.0	09-apr-1992	UM33	12DCE	LT	1.10e+03	UGL
0.0	09-apr-1992	UM33	12DCLB	LT	9.70e+03	UGL
0.0	09-apr-1992	UM33	12DCLE	LT	7.60e+03	UGL
0.0	09-apr-1992	UM33	12DCLP	LT	2.80e+03	UGL
0.0	09-apr-1992	UM33	12DMB	ND	5.00e+03	UGL
0.0	09-apr-1992	UM33	13DCLB	LT	9.20e+03	UGL
0.0	09-apr-1992	UM33	13DCP	LT	3.80e+03	UGL
0.0	09-apr-1992	UM33	13DMB	ND	5.00e+03	UGL
0.0	09-apr-1992	UM33	14DCLB	LT	8.10e+03	UGL
0.0	09-apr-1992	UM33	2CLEVE	LT	8.20e+04	UGL
0.0	09-apr-1992	UM33	ACET	ND	1.00e+04	UGL
0.0	09-apr-1992	UM33	BRDCLM	LT	7.90e+03	UGL
0.0	09-apr-1992	UM33	C12DCE	ND	5.00e+03	UGL
0.0	09-apr-1992	UM33	C13DCP	ND	5.00e+03	UGL
0.0	09-apr-1992	UM33	C2AVE	ND	1.00e+04	UGL
0.0	09-apr-1992	UM33	C2H3CL	LT	5.00e+02	UGL
0.0	09-apr-1992	UM33	C2H5CL	LT	2.12e+03	UGL
0.0	09-apr-1992	UM33	C6H6	LT	2.40e+03	UGL
0.0	09-apr-1992	UM33	CCL4	LT	3.70e+03	UGL
0.0	09-apr-1992	UM33	CH2CL2		8.82e+03	UGL
0.0	09-apr-1992	UM33	CH3BR	ND	1.00e+04	UGL
0.0	09-apr-1992	UM33	CH3CL	LT	1.60e+03	UGL
0.0	09-apr-1992	UM33	CHBR3	LT	8.20e+03	UGL
0.0	09-apr-1992	UM33	CHCL3	LT	8.30e+02	UGL
0.0	09-apr-1992	UM33	CLC6H5	LT	1.40e+03	UGL

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 Analytical Results for Chemical Ground Water
 From: 01-apr-92 To: 30-apr-92

Site: WELL CECRL08 (continued)

SAMPLE DEPTH (ft)	SAMPLE DATE	TEST METHOD	COMPOUND	BOOL	CONCENTRATION	UNITS
0.0	09-apr-1992	UM33	13DMB	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	13DMB	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	14DCLB	LT	1.62e+02	UGL
0.0	09-apr-1992	UM33	14DCLB	LT	1.62e+02	UGL
0.0	09-apr-1992	UM33	2CLEVE	LT	1.64e+03	UGL
0.0	09-apr-1992	UM33	2CLEVE	LT	1.64e+03	UGL
0.0	09-apr-1992	UM33	ACET	ND	2.00e+02	UGL
0.0	09-apr-1992	UM33	ACET	ND	2.00e+02	UGL
0.0	09-apr-1992	UM33	BRDCLM	LT	1.58e+02	UGL
0.0	09-apr-1992	UM33	BRDCLM	LT	1.58e+02	UGL
0.0	09-apr-1992	UM33	C12DCE	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	C12DCE	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	C13DCP	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	C13DCP	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	C2AVE	ND	2.00e+02	UGL
0.0	09-apr-1992	UM33	C2AVE	ND	2.00e+02	UGL
0.0	09-apr-1992	UM33	C2H3CL	LT	1.00e-01	UGL
0.0	09-apr-1992	UM33	C2H3CL	LT	1.00e-01	UGL
0.0	09-apr-1992	UM33	C2H5CL	LT	4.24e-01	UGL
0.0	09-apr-1992	UM33	C2H5CL	LT	4.24e-01	UGL
0.0	09-apr-1992	UM33	C2H5CL	LT	4.24e-01	UGL
0.0	09-apr-1992	UM33	C6H6	LT	4.80e-01	UGL
0.0	09-apr-1992	UM33	C6H6	LT	4.80e-01	UGL
0.0	09-apr-1992	UM33	CCL4	LT	7.40e+01	UGL
0.0	09-apr-1992	UM33	CCL4	LT	7.40e+01	UGL
0.0	09-apr-1992	UM33	CH2CL2		1.76e+02	UGL
0.0	09-apr-1992	UM33	CH2CL2		1.76e+02	UGL
0.0	09-apr-1992	UM33	CH3BR	ND	2.00e+02	UGL
0.0	09-apr-1992	UM33	CH3BR	ND	2.00e+02	UGL
0.0	09-apr-1992	UM33	CH3CL	LT	3.20e+01	UGL
0.0	09-apr-1992	UM33	CH3CL	LT	3.20e+01	UGL
0.0	09-apr-1992	UM33	CHBR3	LT	1.64e+02	UGL
0.0	09-apr-1992	UM33	CHBR3	LT	1.64e+02	UGL
0.0	09-apr-1992	UM33	CHCL3	LT	1.66e+01	UGL
0.0	09-apr-1992	UM33	CHCL3	LT	1.66e+01	UGL
0.0	09-apr-1992	UM33	CHCL3	LT	1.66e+01	UGL
0.0	09-apr-1992	UM33	CLC6H5	LT	2.80e+01	UGL
0.0	09-apr-1992	UM33	CLC6H5	LT	2.80e+01	UGL
0.0	09-apr-1992	UM33	CS2	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	CS2	ND	1.00e+02	UGL
0.0	09-apr-1992	UM33	DBRCLM	LT	1.30e+02	UGL
0.0	09-apr-1992	UM33	DBRCLM	LT	1.30e+02	UGL
0.0	09-apr-1992	UM33	ETC6H5	LT	1.86e+02	UGL
0.0	09-apr-1992	UM33	ETC6H5	LT	1.86e+02	UGL
0.0	09-apr-1992	UM33	MEC6H5	LT	1.74e+02	UGL
0.0	09-apr-1992	UM33	MEC6H5	LT	1.74e+02	UGL
0.0	09-apr-1992	UM33	MEK	ND	2.00e+02	UGL
0.0	09-apr-1992	UM33	MEK	ND	2.00e+02	UGL
0.0	09-apr-1992	UM33	MIBK	ND	2.00e+02	UGL
0.0	09-apr-1992	UM33	MIBK	ND	2.00e+02	UGL

Appendix B: Summary Tables of the Sampling and Analytical Program

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Table B-1: Summary of Ground Water Samples for Phase II RI at CRREL
Page 1 of 4

Site ID	Date	Site Type	Parameters			
			VOC	BTEX	TPH	NAP
CECRL01	09-30-93	WELL	X			
CECRL01	08-25-93	WELL	X			
CECRL02	12-01-93	WELL	X			
CECRL02	08-25-93	WELL	X			
CECRL03	12-01-93	WELL	X			
CECRL03	09-30-93	WELL	X			
CECRL03	08-25-93	WELL	X			
CECRL04	12-01-93	WELL	X			
CECRL04	10-07-93	WELL	X			
CECRL04	08-25-93	WELL	X			
CECRL04	10-07-93	TRIP	X			
CECRL05	12-03-93	WELL	X			
CECRL05	10-07-93	WELL	X			
CECRL05	08-25-93	WELL	X			
CECRL06	12-02-93	WELL	X	X	X	
CECRL06	10-01-93	WELL	X	X	X	
CECRL06	08-25-93	WELL	X	X	X	
CECRL06	10-01-93	FBLK	X	X	X	
CECRL06	10-01-93	TRIP	X			
CECRL07	12-01-93	WELL	X	X	X	
CECRL07	12-01-93	WELL	X*	X*	X*	
CECRL07	08-24-93	WELL	X	X	X	
CECRL07	09-28-93	WELL	X	X	X	
CECRL07	12-01-93	RNSW	X	X	X	
CECRL07	12-01-93	FBLK	X	X	X	
CECRL07	12-01-93	TRIP	X			

Notes:

BORE = borehole

TRIP = trip blank

VOC = volatile organic compound

TPH = total petroleum hydrocarbons

BTEX = benzene, toluene, ethylbenzene, xylene

RNSW = rinsate blank

FBLK = field blank

NAP = naphthalene

* = duplicate sample

11-Jan-94,GW1.WQ1

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Table B-1: Summary of Ground Water Samples for Phase II RI at CRREL
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Site ID	Date	Site Type	Parameters			
			VOC	BTEX	TPH	NAP
CECRL08	11-30-93	WELL	X	X	X	
CECRL08	11-30-93	WELL	X*	X*	X*	
CECRL08	09-28-93	WELL	X	X	X	
CECRL08	08-26-93	WELL	X	X	X	
CECRL08	08-26-93	WELL	X*	X*	X*	
CECRL08	11-30-93	RNSW	X	X	X	
CECRL08	09-28-93	RNSW	X	X	X	
CECRL08	11-30-93	TRIP	X			
CECRL08	08-26-93	TRIP	X			
CECRL09	11-30-93	WELL	X	X	X	
CECRL09	09-29-93	WELL	X	X	X	
CECRL09	08-26-93	WELL	X	X	X	
CECRL09	09-29-93	RNSW	X	X	X	
CECRL10	11-30-93	WELL	X	X	X	
CECRL10	09-28-93	WELL	X	X	X	
CECRL10	08-23-93	WELL	X	X	X	
CECRL10	11-30-93	TRIP	X			
CECRL10	09-28-93	TRIP	X			
CECRL10	08-23-93	TRIP	X			
CECRL11	12-03-93	WELL	X	X	X	
CECRL11	09-30-93	WELL	X	X	X	
CECRL11	09-30-93	WELL	X*	X*	X*	
CECRL11	08-27-93	WELL	X	X	X	
CECRL11	12-03-93	RNSW	X	X	X	
CECRL11	12-03-93	TRIP	X			
CECRL11	09-29-93	TRIP	X			
CECRL11	08-27-93	TRIP	X			

Notes:

BORE = borehole

TRIP = trip blank

VOC = volatile organic compound

TPH = total petroleum hydrocarbons

BTEX = benzene, toluene, ethylbenzene, xylene

RNSW = rinsate blank

FBLK = field blank

NAP = naphthalene

* = duplicate sample

Table B-1: Summary of Ground Water Samples for Phase II RI at CRREL
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Site ID	Date	Site Type	Parameters			
			VOC	BTEX	TPH	NAP
CECRL12	12-01-93	WELL	X	X	X	
CECRL12	09-28-93	WELL	X	X	X	
CECRL12	08-25-93	WELL	X	X	X	
CECRL12	08-25-93	RNSW	X	X	X	
CECRL13	12-02-93	WELL	X	X	X	
CECRL13	09-29-93	WELL	X	X	X	
CECRL13	08-24-93	WELL	X	X	X	
CECRL13	09-29-93	TRIP	X			
CECRL14	12-02-93	WELL	X	X	X	
CECRL14	12-02-93	WELL	X*	X*	X*	
CECRL14	09-30-93	WELL	X	X	X	
CECRL14	08-26-93	WELL	X	X	X	
CECRL14	12-02-93	RNSW	X	X	X	
CECRL14	08-26-93	RNSW	X	X	X	
CECRL14	12-02-93	TRIP	X			
CECRL14	09-30-93	TRIP	X			
CECRL15	12-02-93	WELL	X	X	X	
CECRL15	09-30-93	WELL	X	X	X	
CECRL15	08-26-93	WELL	X	X	X	
CECRL15	08-26-93	TRIP	X			
CECRL15	09-30-93	TRIP	X			
CECRL16	12-01-93	WELL	X	X	X	
CECRL16	09-29-93	WELL	X	X	X	
CECRL16	09-29-93	WELL	X*	X*	X*	
CECRL16	08-27-93	WELL	X	X	X	
CECRL16	08-27-93	WELL	X*	X*	X*	
CECRL16	08-27-93	RNSW	X	X	X	
CECRL16	08-27-93	FBLK	X	X	X	
CECRL16	12-01-93	TRIP	X			
CECRL16	08-27-93	TRIP	X			

Notes:

BORE = borehole

TRIP = trip blank

VOC = volatile organic compound

TPH = total petroleum hydrocarbons

BTEX = benzene, toluene, ethylbenzene, xylene

RNSW = rinsate blank

FBLK = field blank

NAP = naphthalene

* = duplicate sample

Table B-1: Summary of Ground Water Samples for Phase II RI at CRREL
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Site ID	Date	Site Type	Parameters			
			VOC	BTEX	TPH	NAP
CECRL17	12-03-93	WELL	X	X	X	
CECRL17	10-01-93	WELL	X	X	X	
CECRL17	08-27-93	WELL	X	X	X	
CECRL17	12-03-93	TRIP	X			
CECRL18	12-01-93	WELL	X	X	X	X
CECRL18	09-30-93	WELL	X	X	X	X
CECRL18	08-27-93	WELL	X	X	X	X
CECRL18	08-27-93	WELL	X*	X*	X*	X*
CECRL18	09-30-93	RNSW	X	X	X	
CECRL18	12-01-93	TRIP	X			
CECRL18	09-30-93	TRIP	X			
CECRL19	12-02-93	WELL	X	X	X	X
CECRL19	10-01-93	WELL	X	X	X	X
CECRL19	08-27-93	WELL	X	X	X	X
CECRL19	10-01-93	RNSV/	X	X	X	
CECRL19	12-02-93	TRIP	X			
CECRL19	10-01-93	TRIP	X			
CECRL19	08-27-93	TRIP	X			
CECRL20	11-30-93	WELL	X	X	X	
CECRL20	09-29-93	WELL	X	X	X	
CECRL20	09-29-93	WELL	X*	X*	X*	
CECRL20	08-25-93	WELL	X	X	X	
CECRL20	08-25-93	TRIP	X			
HANOVER	12-01-93	WELL	X			
HANOVER	09-30-93	WELL	X			
HANOVER	08-27-93	WELL	X			

Notes:

BORE = borehole

TRIP = trip blank

VOC = volatile organic compound

TPH = total petroleum hydrocarbons

BTEX = benzene, toluene, ethylbenzene, xylene

RNSW = rinsate blank

FBLK = field blank

NAP = naphthalene

* = duplicate sample

Table B-2: Summary of Laboratory Soil Samples for Phase II RI at CRREL
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Location	Site ID	Date	Site Type	Total Depth FT BGS	Sample Interval FT BGS
AOC 2	2SB1	1-18-92	BORE	45	24-26*
AOC 2	2SB1	1-18-92	BORE	45	15-17
AOC 2	2SB1	1-18-92	BORE	45	24-26
AOC 2	2SB1	1-18-92	BORE	45	9-11
AOC 2	2SB1	1-18-92	BORE	45	44-46
AOC 2	2SB2	1-20-92	BORE	10.5	1-3
AOC 2	2SB2	1-20-92	BORE	10.5	8-10
AOC 2	2SB3	7-21-93	BORE	67	25-27
AOC 2	2SB3	7-21-93	RNSW	67	0
AOC 2	2SB3	7-21-93	BORE	67	20-22
AOC 2	2SB3	7-21-93	BORE	67	30-32
AOC 2	2SB3	7-21-93	TRIP	67	0
AOC 2	2SB3	7-21-93	BORE	67	35-37
AOC 2	2SB4	7-27-93	BORE	119	119-121
AOC 2	2SB4	7-27-93	BORE	119	119-121*
AOC 2	2SB4	7-26-93	FBLK	119	0
AOC 2	2SB4	7-26-93	TRIP	119	0
AOC 2	2SB4	7-26-93	BORE	119	44-46
AOC 2	2SB4	7-26-93	BORE	119	94-96
AOC 2	2SB4	7-26-93	RNSW	119	0
AOC 2	2SB4	7-26-93	BORE	119	14-16
AOC 2	2SB5	7-23-93	RNSW	120	0
AOC 2	2SB5	7-23-93	BORE	120	25-27
AOC 2	2SB5	7-23-93	BORE	120	20-22
AOC 2	2SB5	7-23-93	BORE	120	45-47
AOC 2	2SB5	7-23-93	BORE	120	120-122
AOC 2	2SB6	7-22-93	BORE	120	45-47
AOC 2	2SB6	7-22-93	BORE	120	35-37
AOC 2	2SB6	7-22-93	TRIP	120	0
AOC 2	2SB6	7-22-93	BORE	120	60-62
AOC 2	2SB6	7-22-93	BORE	120	65-67
AOC 2	2SB6	7-22-93	RNSW	120	0
AOC 6	6SB1	1-20-92	BORE	10.5	8.5-10.5
AOC 6	6SB1	1-20-92	BORE	10.5	1-3

Notes:

All BORE, RNSW and FBLK samples analyzed for VOC, BTEX, and TPH.

All TRIP samples analyzed for VOC.

* Indicates duplicate sample

FT BGS feet below ground surface

BORE= borehole

RNSW= rinsate blank

TRIP= trip blank

FBLK= field blank

Table B-2: Summary of Laboratory Soil Samples for Phase II RI at CRREL
Page 2 of 4

Location	Site ID	Date	Site Type	Total Depth FT BGS	Sample interval FT BGS
AOC 9	9SB1	1-16-92	BORE	55	2-4
AOC 9	9SB1	1-16-92	BORE	55	13-15
AOC 9	9SB1	1-17-92	BORE	55	53-55
AOC 9	9SB1	1-16-92	BORE	55	17-19
AOC 9	9SB2	8-09-93	BORE	101	49-51
AOC 9	9SB2	8-09-93	BORE	101	54-56
AOC 9	9SB2	8-09-93	BORE	101	89-91
AOC 9	9SB2	8-09-93	BORE	101	69-71
AOC 9	9SB3	8-09-93	BORE	115	100-102
AOC 9	9SB3	8-09-93	BORE	115	40-42
AOC 9	9SB3	8-09-93	RNSW	115	0
AOC 9	9SB3	8-10-93	BORE	115	115-117*
AOC 9	9SB3	8-09-93	BORE	115	10-12
AOC 9	9SB3	8-09-93	TRIP	115	0
AOC 9	9SB3	8-10-93	BORE	115	115-117
AOC 9	9SB4	9-07-93	TRIP	51	0
AOC 9	9SB4	8-07-93	RNSW	51	0
AOC 9	9SB4	8-07-93	RNSW	51	0
AOC 9	9SB4	8-07-93	BORE	51	19-21
AOC 9	9SB4	8-07-93	BORE	51	19-21
AOC 9	9SB4	8-07-93	BORE	51	14-16
AOC 9	9SB4	8-07-93	BORE	51	9-11
AOC 9	9SB4	8-07-93	BORE	51	4-6
AOC 10	10SB1	1-14-92	BORE	10	0-2
AOC 10	10SB1	1-14-92	BORE	10	4-6
AOC 10	10SB1	1-14-92	BORE	10	9-10
AOC 13	13SB1	1-20-92	BORE	18.5	5.5-7.5*
AOC 13	13SB1	1-20-92	BORE	18.5	17-19*
AOC 13	13SB1	1-20-92	BORE	18.5	17-19
AOC 13	13SB1	1-20-92	BORE	18.5	5.5-7.5
AOC 13	13SB1	1-20-92	BORE	18.5	1.5-3.5
AOC 13	13SB2	8-10-93	BORE	50	30-32
AOC 13	13SB2	8-10-93	BORE	50	20-22
AOC 13	13SB2	8-10-93	BORE	50	50-52

Notes:

All BORE, RNSW and FBLK samples analyzed for VOC, BTEX, and TPH.

All TRIP samples analyzed for VOC.

* Indicates duplicate sample

FT BGS feet below ground surface

BORE= borehole RNSW= rinsate blank

TRIP= trip blank FBLK= field blank

Table B-2: Summary of Laboratory Soil Samples for Phase II RI at CRREL
Page 3 of 4

Location	Site ID	Date	Site Type	Total Depth FT BGS	Sample Interval FT BGS
AOC 13	13SB3	8-11-93	BORE	70	5-7
AOC 13	13SB3	8-11-93	BORE	70	70-72
AOC 13	13SB3	8-11-93	TRIP	70	0
AOC 13	13SB3	8-11-93	BORE	70	45-47
AOC 13	13SB3	8-11-93	BORE	70	25-27
AOC 13	13SB4	8-11-93	BORE	90	20-22
AOC 13	13SB4	8-11-93	BORE	90	90-92*
AOC 13	13SB4	8-11-93	BORE	90	90-92
AOC 13	13SB4	8-11-93	BORE	90	5-7
AOC 13	13SB4	8-11-93	RNSW	90	0
AOC 13	13SB4	8-11-93	FBLK	90	0
AOC 13	13SB4	8-11-93	TRIP	90	0
AOC 13	13SB5	8-10-93	BORE	50	9-11
AOC 13	13SB5	8-10-93	BORE	50	20-22
AOC 13	13SB5	8-10-93	FBLK	50	0
AOC 13	13SB5	8-10-93	BORE	50	50-52
AOC 13	13SB5	8-10-93	RNSW	50	0
AOC 15	15SB1	1-15-92	BORE	35.5	25-27
AOC 15	15SB1	1-15-92	BORE	35.5	33-35
AOC 15	15SB1	1-15-92	BORE	35.5	0-2
AOC 15	15SB1	1-15-92	BORE	35.5	19-21
AOC 15	15SB2	8-06-93	BORE	57	28-30
AOC 15	15SB2	8-06-93	FBLK	57	0
AOC 15	15SB2	8-06-93	BORE	57	46-48
AOC 15	15SB2	8-06-93	BORE	57	24-26
AOC 15	15SB2	8-06-93	BORE	57	5-7
AOC 15	15SB3	7-28-93	BORE	54	54-56
AOC 15	15SB3	7-28-93	BORE	54	4-6
AOC 15	15SB3	7-28-93	BORE	54	34-36
AOC 15	15SB3	7-28-93	RNSW	54	0
AOC 15	15SB3	7-28-93	TRIP	54	0

Notes:

All BORE, RNSW and FBLK samples analyzed for VOC, BTEX, and TPH.

All TRIP samples analyzed for VOC.

* Indicates duplicate sample

FT BGS feet below ground surface

BORE= borehole

RNSW= rinsate blank

TRIP= trip blank

FBLK= field blank

Table B-2: Summary of Laboratory Soil Samples for Phase II RI at CRREL

Page 4 of 4

Location	Site ID	Date	Site Type	Total Depth FT BGS	Sample Interval FT BGS
AOC 15	15SB4	8-06-93	BORE	49	31-33
AOC 15	15SB4	2-06-93	TRIP	49	0
AOC 15	15SB4	8-06-93	BORE	49	49-51
AOC 15	15SB4	8-06-93	BORE	49	41-43
AOC 15	15SB4	8-06-93	BORE	49	9-11
AOC 15	15SB4	8-06-93	BORE	49	49-51*
AOC 15	15SB4	8-06-93	RNSW	49	0
AOC 15	CECRL19	7-26-93	BORE	175	35-37
AOC 15	CECRL19	7-26-93	BORE	175	10-12
AOC 15	CECRL19	7-26-93	BORE	175	5-7
AOC 15	CECRL19	7-27-93	TRIP	175	0
AOC 15	CECRL19	7-27-93	BORE	175	80-82
AOC 15	CECRL19	7-27-93	RNSW	175	0
AOC 16	16SB1	1-16-92	BORE	11.5	6-7.5
AOC 16	16SB1	1-16-92	BORE	11.5	0-2
AOC 16	16SB1	1-16-92	BORE	11.5	9.5-11.5

Notes:

All BORE, RNSW and FBLK samples analyzed for VOC, BTEX, and TPH.

All TRIP samples analyzed for VOC.

* Indicates duplicate sample

FT BGS feet below ground surface

BORE= borehole

RNSW= rinsate blank

TRIP= trip blank

FBLK= field blank

Table B-3: Summary of Surface Soil Samples for Phase II RI at CRREL

Date	Location	Site ID	Site Type	Sample Depth FT BGS	Parameters		
					VOC	BTEX	TPH
8-02-93	Background Area I	SSS01	AHOL	0.5	X	X	X
8-02-93	AOC 2	SSS02	AHOL	0.5	X	X	X
8-02-93	AOC 2	SSS04	AHOL	0.5	X	X	X
8-02-93	AOC 2	SSS05	AHOL	0.5	X	X	X
8-02-93	AOC 2	SSS06	AHOL	0.5	X	X	X
8-02-93	AOC 9	SSS07	AHOL	0.5	X	X	X
8-02-93	AOC 9	SSS08	AHOL	0.5	X	X	X
8-02-93	AOC 9	SSS09	AHOL	0.5	X	X	X
8-02-93	AOC 9	SSS10	AHOL	0.5	X	X	X
8-02-93	AOC 9	SSS11	AHOL	0.5	X	X	X
8-02-93	Child Care Center	SSS12	AHOL	0.5	X	X	X
8-02-93	Child Care Center	SSS14	AHOL	0.5	X	X	X
8-02-93	Background Area II	SSS15	AHOL	0.5	X	X	X
8-02-93	AOC 9	SSS09	RNSW	0.0	X	X	X
8-02-93	AOC 9	SSS09	TRIP	0.0	X		
8-03-93	Child Care Center	SSS13	AHOL	0.5	X	X	X
8-03-93	CRREL Site	SSS20	AHOL	0.5	X	X	X
8-03-93	CRREL Site	SSS21	AHOL	0.5	X	X	X
8-03-93	CRREL Site	SSS22	AHOL	0.5	X	X	X
8-03-93	CRREL Site	SSS23	AHOL	0.5	X	X	X
8-03-93	CRREL Site	SSS24	AHOL	0.5	X	X	X
8-03-93	CRREL Site	SSS25	AHOL	0.5	X	X	X
8-03-93	CRREL Site	SSS26	AHOL	0.5	X	X	X
8-03-93	CRREL Site	SSS27	AHOL	0.5	X	X	X
8-03-93	AOC 15	SSS28	AHOL	0.5	X	X	X
8-03-93	CRREL Site	SSS29	AHOL	0.5	X	X	X
8-03-93	CRREL Site	SSS29	AHOL	0.5	X*	X*	X*
8-03-93	CRREL Site	SSS29	RNSW	0.0	X	X	X
8-03-93	CRREL Site	SSS29	FBLK	0.0	X	X	X
8-03-93	Child Care Center	SSS13	TRIP	0.0	X		
8-04-93	Background Area I	SSS03	AHOL	0.5	X	X	X
8-04-93	AOC 13	SSS16	AHOL	0.5	X	X	X
8-04-93	AOC 13	SSS17	AHOL	0.5	X	X	X
8-04-93	AOC 13	SSS18	AHOL	0.5	X	X	X
8-04-93	AOC 13	SSS19	AHOL	0.5	X	X	X
8-04-93	CRREL Site	SSS30	AHOL	0.5	X	X	X
8-04-93	CRREL Site	SSS31	AHOL	0.5	X	X	X
8-04-93	CRREL Site	SSS32	AHOL	0.5	X	X	X
8-04-93	CRREL Site	SSS33	AHOL	0.5	X	X	X
8-04-93	CRREL Site	SSS34	AHOL	0.5	X	X	X
8-04-93	CRREL Site	SSS35	AHOL	0.5	X	X	X
8-04-93	CRREL Site	SSS36	AHOL	0.5	X	X	X
8-04-93	CRREL Site	SSS33	RNSW	0.0	X	X	X
8-04-93	CRREL Site	SSS33	TRIP	0.0	X		
8-13-93	AOC 9	SSS37	AHOL	0.5	X	X	X
8-13-93	AOC 9	SSS37	TRIP	0.0	X		

Notes:

BORE = borehole
TRIP = trip blank

RNSW = rinsate blank
FBLK = field blank

* = Indicates duplicate sample

Table B-4: Sediment and Surface Water Sampling and Analytical Program

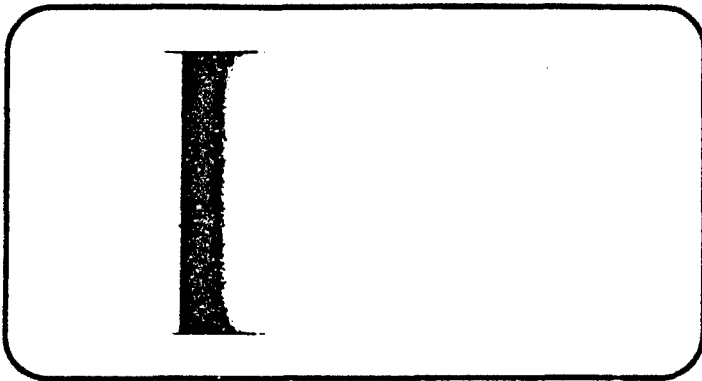
Sampling Round	Site ID	Date	Matrix	Site Type	Parameters		
					VOC	BTEX	TPH
ROUND 1	CONN_01	04-09-92	CSE/CSW	RVER	X		X
	CONN_02	04-09-92	CSE/CSW	RVER	X		X
	CONN_03	04-09-92	CSE/CSW	RVER	X		X
		04-09-92	CSW	RNSW	X	X	X
		04-09-92	CSW	TRIP	X		
ROUND 2	CONN_04	06-24-93	CSE/CSW	RVER	X	X	X
	CONN_05	06-24-93	CSE/CSW	RVER	X	X	X
	CONN_06	06-24-93	CSE/CSW	RVER	X	X	X
	CONN_07	06-24-93	-	-			
	CONN_08	06-24-93	-	-			
	CONN_09	06-24-93	-	-			
	CONN_10	06-24-93	CSE	RVER	X	X	X
	CONN_11	06-24-93	CSE	RVER	X	X	X
	CONN_12	06-24-93	CSE	RVER	X	X	X
	CONN_13	06-24-93	CSE	RVER	X	X	X
	CONN_14	06-24-93	-	-			
	CONN_15	06-24-93	-	-			
	110	06-24-93	CSW	FLBK	X	X	X
	300	06-24-93	CSW	TRIP	X		
	210	06-24-93	CSW	RNSW	X	X	X
ROUND 3	CONN_04	10-27-93	CSE	RVER	X	X	X
	CONN_05	10-27-93	CSE	RVER	X	X	X
	CONN_06	10-27-93	CSE	RVER	X	X	X
	CONN_10	10-27-93	CSE	RVER	X	X	X
	CONN_11	10-27-93	CSE	RVER	X	X	X
	CONN_12	10-27-93	CSE	RVER	X	X	X
	CONN_13	10-27-93	CSE	RVER	X	X	X
CRREL P	POND_01	10-01-93	CSE/CSW	POND	X	X	X
	POND_02	10-01-93	CSE/CSW	POND	X	X	X

Notes:

- = Sediment Sampling Not Possible Due To Gravelly Substrate
- = Duplicate Sample
- CSE = Sediment Sample
- CSW = Surface Water Sample
- RVER = River
- POND = Pond
- FLBK = Field Blank
- TRIP = Trip Blank
- RNSW = Rinsate Blank
- VOC = Volatile organic compounds
- BTEX = Benzene, toluene, ethylbenzene, xylenes
- TPH = Total petroleum hydrocarbons

Appendix C: Geophysical Survey Report

Arthur D Little



HAGER-RICHTER
GEOSCIENCE, INC.



HAGER-RICHTER
GEOSCIENCE, INC.

**GEOPHYSICAL SURVEYS
COLD REGIONS RESEARCH &
ENGINEERING LABORATORY
HANOVER, NEW HAMPSHIRE**

**PURCHASE ORDER NO. 571324
PRIME CONTRACT NO. DAAA15-91-D-0016/0003**

Prepared for:

Arthur D. Little, Inc.
20 Acorn Park
Cambridge, Massachusetts 02140-2390

Prepared by:

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File 92D44
August, 1993

0. EXECUTIVE SUMMARY

Hager-Richter Geoscience, Inc. conducted geophysical surveys at the Cold Regions Research and Engineering Laboratory (CRREL), Hanover, New Hampshire for Arthur D. Little, Inc. (ADL) in June, 1993. The geophysical surveys were performed in support of ADL's Prime Contract No. DAAA15-91-D-0016/0003 with the U.S. Army Armament, Munitions, and Chemical Command. The geophysical surveys are part of a Phase II Remedial Investigation of the site.

The scope of work for the subject geophysical surveys was specified by ADL and consisted of tasks in and near two Areas of Concern (AOC's):

- AOC 11: Seismic Refraction to determine the depth of bedrock under an esker.
- AOC 15: Terrain Conductivity Survey (EM) and Ground Penetrating Radar (GPR) Survey to determine the location of a former drainage ditch.

The locations and limits of the geophysical survey area at each site were specified by ADL. The results of the geophysical surveys at CRREL may be summarized as follows:

- The seismic refraction survey at AOC 11 consisted of three lines, each 230 feet long. One line is oriented perpendicular to the reported orientation of the esker, and the other lines are oriented sub-parallel to the reported orientation of the esker. Bedrock depths could not be determined for the line oriented perpendicular to the esker, but the data indicate that bedrock must be greater than about 74 feet deep (elevation no higher than about 394 feet). Bedrock depths ranged from 83 to 90 feet (elevation 380 to 387 feet) for the seismic line closest to AOC 11, and from 53 to 60 feet (elevation 407 to 411 feet) along the seismic line located closer to the Connecticut River. The seismic refraction data imply that the bedrock surface rises between AOC 11 and the Connecticut River.
- The GPR data for AOC 15 indicate that a possible trench is present south of the greenhouse.
- The apparent terrain conductivity data for AOC 15 support the interpretation of the GPR data, but cannot be used alone to determine location of the former drainage ditch.

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TABLE

1. Seismic Refraction Results

FIGURES

1. Site Location
2. Site Plan
3. Seismic Line 1, AOC 11
4. Seismic Line 2, AOC 11
5. Seismic Line 3, AOC 11
6. GPR Survey, AOC 15
7. Portion of GPR record for traverse N, AOC 15
8. Terrain Conductivity Survey, AOC 15

APPENDICES

1. Seismic Refraction Method
2. Ground Penetrating Radar
3. Terrain Conductivity Method

1. INTRODUCTION

Hager-Richter Geoscience, Inc. conducted geophysical surveys at the Cold Regions Research and Engineering Laboratory (CRREL) in Hanover, New Hampshire for Arthur D. Little, Inc. (ADL) of Cambridge Massachusetts in June, 1993. The geophysical surveys are part of a Phase II Remedial Investigation of the site. The surveys were performed in support of ADL's Prime Contract No. DAAA15-91-D0016/0003 with the U.S. Army Armament, Munitions, and Chemical Command.

CRREL is an Army research facility located on a 30-acre campus in the Town of Hanover. Figure 1 shows the general location of the site, and Figure 2 is a site plan provided by ADL. The campus is situated between the Connecticut River and Route 10 on a stepped glacial terrace consisting of unconsolidated sediments. Several areas of environmental interest, designated as Areas of Concern (AOC's), have been identified in previous work at the site.

The scope of work for the subject geophysical surveys was specified by ADL and consisted of tasks designed to investigate the subsurface for two AOC's:

- AOC 11: Seismic Refraction to determine the depth of bedrock under an esker that passes through or near the AOC.
- AOC 15: Ground Penetrating Radar (GPR) and Terrain Conductivity Survey (EM) Survey to determine the location of a former drainage ditch in the vicinity of the AOC.

AOC 11 is located in the northwestern part of the site (Figure 2). According to information provided by ADL, AOC 11 is a fenced concrete pad used for the storage of containerized wastes, including TCE. The general area outside the pad is relatively level. An esker, oriented approximately north-south, reportedly passes through or near the AOC.

AOC 15 is located in the west central portion of the CRREL site (Figure 2), and is the area of a former 2,000 gallon UST that served the greenhouse. At the time of survey, construction activities were occurring at the western border of the AOC, and heavy

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equipment and construction materials were located within the AOC. Other objects on the surface in the AOC that might interfere with the collection and/or interpretation of the geophysical data include an aboveground propane tank, and the greenhouse structure.

Hager-Richter personnel were on Site on June 9 and 10, 1993. The weather was sunny and mild. Roger Cunhui Yang and Jonathon Puliafico conducted the field operations. The project was coordinated with Mr. James Rice and Ms. Melissa Regatti of ADL, who observed portions of the field work. All work was conducted under Level D personal protection. Data analysis and interpretation were completed at the Hager-Richter offices. Original data and field notes will be retained in the Hager-Richter files for a minimum of three years.

2. EQUIPMENT AND PROCEDURES

2.1 SEISMIC REFRACTION

2.1.1 General

The general equipment and procedures for seismic refraction surveys as conducted by Hager-Richter are described in Appendix 1.

2.1.2 Limitations of the Method

Like all geophysical methods, the seismic refraction method is based on the assumption that the local geology is uncomplicated. In particular, the seismic refraction method assumes that interfaces between geologic materials correlate with sharp increases in seismic velocity and that the interfaces are relatively flat-lying. The method is not very sensitive to lateral variations within layers, and relatively subtle features such as fracture zones within bedrock are generally difficult to detect unless there is a topographic expression of the feature. The accuracy of the method is degraded in areas with strong topographic relief at the surface and/or where the interfaces have apparent dips greater than about 20°.

Where two materials do not exhibit contrasting velocities, or where velocities gradually increase with depth, a clear refracted signal is not generated, and the seismic refraction method cannot be used to distinguish the two materials. In some cases, the

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"geophysical contact" between materials with contrasting velocities does not correlate exactly with the "geologic contact." For example, where a highly weathered bedrock is overlain by a dense material such as till, the velocity range of the weathered bedrock might overlap or approach the velocity range of the till, and the two materials cannot be distinguished seismically. In such cases, the depth determined by seismic refraction is the depth of *competent* bedrock, which might be located at some depth below the geologic contact.

The depth relations of the water table and bedrock may constitute a significant problem for the seismic refraction technique. This problem is that of a "blind layer." A blind layer occurs where the thickness of the saturated overburden is less than about half the depth of bedrock. In such cases, the water-saturated material immediately above bedrock is "blind" in the sense that no refracted seismic energy from it will be received as a first arrival of seismic energy, and all methods used to reduce the seismic data to determine the depth of bedrock, the objective of this survey, use *only* first arrivals. Thus, the saturated layer will not be detected where it is close to bedrock, and most methods of seismic data reduction will indicate that bedrock is considerably deeper than it actually is. Although GRM, the method used by Hager-Richter to reduce the seismic refraction data, does not use first arrivals through the water saturated zone (because there is none to use) in such cases, GRM determines the depth of bedrock correctly by using the *average* velocity of the saturated and unsaturated zones.

A "hidden layer" occurs where a lower velocity material underlies a higher velocity material, a common situation in stratified sediments. An example is where sands are present under layers of clay or till. As in the case of a "blind layer," most methods of seismic refraction data reduction will indicate that bedrock is considerably deeper than it actually is, if a hidden layer is present but not detected. Internal tests in the seismic refraction data reduction software that we use (GREMIX by Interpex) indicate that such layers might be present, and an average velocity of the two layers is used to determine the depth of bedrock.

2.1.3 Site Specific

The locations of the seismic refraction lines at AOC 11 are shown on Figure 2. The locations of seismic refraction lines were constrained by site conditions such as the presence of structures and construction activities. The seismic line locations were adjusted in concurrence with the ADL site representatives.

The seismic refraction survey consisted of three lines, each 230 feet long. Seismic spread cables with a 10-foot geophone spacing were used.

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The seismic source was a Bison EWG, a hydraulically operated accelerated weight drop. Five shot points were used per 24-channel spread. Shot points were located at the first, twelfth, and 24th geophones. Offsets shots of up to 460 feet were made from the ends of seismic lines. Elevations of the seismic lines and offset shotpoints were estimated from a topographic plan of the CRREL site provided by ADL.

2.2 GROUND PENETRATING RADAR

2.2.1 General

The equipment and general procedures for the GPR survey as conducted by Hager-Richter are described in Appendix 3.

2.2.2 Limitations of the Method

The maximum depth to which GPR signals can penetrate depends on the electrical properties of the subsurface materials. The higher the electrical conductivity of the subsurface materials, the lower the radar signal penetration. The presence of clay minerals and/or brackish water in the subsurface, for example, attenuates the GPR signal, so reflections are not received from materials below such material.

Accurate determination of the depth to any interface requires calibration of the site specific GPR signal velocity. Where targets of a known depth are not available at a site, the time-to-depth conversion of the GPR signal can be estimated from handbook values, but such depth estimations might contain significant error. The depth of the water table is an important factor in converting the times measured by GPR to depths, particularly for clean sands and gravels for which the velocity of GPR signals in unsaturated sands and gravels is approximately twice that in the same materials saturated.

Interpretation of GPR data is subjective. As noted above, "ground truth" through correlation with borings and excavations is required for positive identification of most objects detected on the basis of GPR data.

2.2.3 Site Specific

The GPR survey was conducted in the area specified by ADL within, and adjacent to, AOC 15. All GPR traverses were located using the same grid used by ADL for soil sampling and other purposes.

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The GPR data were recorded with a 500 MHz antenna and a time window of 80 nsec. The 80 nsec time window represents a maximum possible depth of investigation of about 11-16 feet, using a handbook time-to-depth conversion of 5-7 nsec/foot two-way travel time for unsaturated sands and silts. However, the *effective* depth of investigation was less in most places. The GPR signals were returned for a minimum of about 60 nsec for most of the Site; thus, we estimate that the minimum effective GPR signal penetration was approximately 8 to 12 feet. The GPR antenna was pulled by hand for all profiles.

2.3 TERRAIN CONDUCTIVITY

2.3.1 General

The equipment and general procedures for the Terrain Conductivity survey as conducted by Hager-Richter are included in Appendix 2.

2.3.2 Limitations of the Method

As with any of the electrical geophysical methods, terrain conductivity data are subject to interference from such cultural features as buildings, fencing, and underground and overhead power lines. Thus, for certain applications, the use of the terrain conductivity method in built-up settings might be inappropriate.

The usefulness of terrain conductivity soundings for delineating stratigraphic changes with depth is limited by the relatively small combination of coil separations and dipole orientations available with Geonics' equipment. The instruments were not designed for detailed vertical soundings but, according to the manufacturer's literature (Geonics Technical Note TN-8, rev. 1983), give the most accurate results where the earth can be approximated by a two-layer model. Models of the earth calculated from terrain conductivity data are non-unique; models with more than two layers can always satisfy the observed data.

The terrain conductivity meter instrument response varies with the orientation of the dipoles. In the horizontal dipole mode (coils vertical and co-planar), the instrument is more sensitive to near-surface conductive layers than it is in the vertical dipole mode (coils horizontal and co-planar). In the horizontal dipole mode, the high sensitivity to near-surface conductivity might mask the effects of changes at depth.

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2.3.3 Site Specific

The terrain conductivity survey was conducted in the area specified by ADL, between the greenhouse and the west side of the roadway, at AOC 15. All data stations were located using the same grid used by ADL for soil sampling and other purposes. Terrain conductivity data (quadrature phase and in-phase) were recorded automatically at 2-second intervals using the timer function of the digital datalogger, approximately equivalent to a 5-foot station spacing, while traversing the survey lines spaced 5 feet apart.

3. RESULTS AND DISCUSSION

3.1 AOC 11 - Seismic Refraction Survey

3.1.1 General. The seismic refraction survey at AOC 11 consisted of three 230-foot lines for a total of 690 feet of seismic profile. The locations of the seismic lines are shown on Figure 2. Seismic Line 1 is oriented approximately perpendicular to the reported orientation of the esker, and Seismic Lines 2 and 3 are oriented sub-parallel to the reported orientation of the esker. The results are shown in profile form in Figures 3-5 and are listed in Table 1.

3.1.2 Data Quality. The quality of the unprocessed seismic refraction data for Seismic Line 1 is poor, and for Seismic Lines 2 and 3, is fair. Vibration "noise" from nearby construction activity and vehicular traffic contributed to the lower quality of the seismic signals. In addition, Seismic Line 1 was located in an area with soft granular soil, making good coupling of the geophones with the earth difficult to achieve. The accuracy of the *depths* of bedrock (equivalent to overburden thickness) determined by the seismic refraction survey are probably about $\pm 15\%$.

The strength of the arrival signals for all of the seismic lines might have been improved if explosives had been used as a seismic source at this site. However, the use of explosives was impractical at CRREL because of the presence of utilities and structures. In addition, permission would have been required for the several off-CRREL property shots critical for obtaining arrivals from bedrock (i.e., the shots located offset from the ends of the seismic lines).

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3.1.3 Interpretation of Velocities. Materials with two distinct velocity ranges were detected at the Site. The upper material, with a velocity range of 1200 to 1850 fps, is interpreted to consist of unsaturated overburden. The lower material was detected only along Seismic Lines 2 and 3; it exhibited a velocity range of approximately 8800-11000 fps, and is interpreted to consist of relatively competent bedrock..

As noted above, the materials with a velocity range of approximately 8800-11000 fps, are interpreted to consist of bedrock. Bedrock at the CRREL site is described as phyllite, a material that can exhibit a wide range of seismic velocities, depending on the degree of weathering and orientation of foliation. We note that the velocities exhibited here are slightly low for most bedrock, and that dense till can have velocities in the 9000 fps range. However, till has not been described in any borings on site, and we conclude that the lower material is bedrock.

3.1.4 Bedrock Depth. Seismic signals from bedrock were detected only along Seismic Lines 2 and 3 at the CRREL site. For Seismic Line 1, bedrock arrival signals were not detected in the seismic records due to the local site conditions, but based on the data from the offset shots for the lines, we calculate that the *minimum depth* of bedrock along Seismic Line 1 is about 74 feet; i.e., if bedrock were any shallower than about 74 feet, seismic signals would have been detected based on the geometry of the seismic lines and shot points. On Figure 3, we show the maximum elevation of bedrock along Seismic Line 1 as a dotted line.

A boring was advanced by ADL in the vicinity of Seismic Line 1 after the seismic refraction survey was completed, and reportedly, it intersected bedrock at a depth of about 175 feet. In order to have received fully reversed bedrock arrivals from all geophones along Seismic Line 1, the offset shot points would need to have been located about 600 feet symmetrically from both ends of the line and, as discussed in section 3.1.2, the use of explosives would have been necessary. A steep topographic drop to the Connecticut River is present less than 200 feet to the west of Seismic Line 1, however, and a shot point could not have been located there practically. On the east side of the line, the offset shot point would have been located on non-CRREL property close to Route 10.

Bedrock depths along Seismic Line 2 are between 83 and 90 feet (elevations between 380 and 387 feet, Figure 3). Along Seismic Line 3, the depth of bedrock is between 53 and 60 feet (elevations between 407 and 411 feet, Figure 4). Bedrock along Seismic Line 2 is evidently about 30 feet deeper than along Seismic Line 3. Both lines are oriented generally south-north, and Seismic Line 3 is located closer to the Connecticut River. The difference in depths implies that the bedrock surface rises between AOC 11 and the Connecticut River.

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3.2 AOC 15 - Ground Penetrating Radar Survey

Fourteen parallel GPR traverses, generally spaced about 25 feet apart, were made in the area between coordinates 450N and 765N. The locations of the GPR survey lines are shown in Figure 7. The total length of survey was over 1000 feet.

Sandy soils such as those found at CREL generally provide conditions suitable for good penetration of the GPR signal. The GPR records for AOC 15 exhibit reflections from materials at depths greater than 10 feet. Reflections typical of buried objects, probable utilities, were detected, and the locations of the objects are shown in Figure 6.

The GPR records for AOC 15 exhibit patterns indicative of disturbed soils and trench-like excavations in several locations. Figure 7 is an example of such a feature in the record for the traverse at 450N. In Figure 6, we outline the area a possible trench located south of the greenhouse based on the patterns in the GPR records.

3.3 AOC 15 - Terrain Conductivity Survey

The terrain conductivity survey in ACC 15 was conducted in the area between the greenhouse and the west side of the roadway. Data were measured at 349 stations. Several surface objects that affect the apparent terrain conductivity values measured by the EM31-DL were present in the survey area at the time of the field work. Such objects include the metal in the greenhouse structure itself, the aboveground tanks, and construction equipment and materials associated with an active construction project on the west side of the roadway.

The objective of the terrain conductivity survey in AOC 15 was to determine the location of a former drainage trench in the soil. If no metal drainage pipe were present in the trench, as was expected in AOC 15, one would expect that the former drainage trench might produce a slight variation in the apparent terrain conductivity, perhaps in the range of a few to no more than about +10 mmho/m. Values of apparent terrain conductivity measured outside of AOC 15 in an area removed from surface interference were about 4-5 mmho/m, typical values for undisturbed sandy soils in the northeast. Thus, one might expect that a former drainage trench might produce apparent terrain conductivity values between about 0 mmho/m and about 15 mmho/m.

The apparent conductivity data are contoured in Figure 8. The data exhibit a wide range in values, from <0 mmho/m to >120 mmho/m. We attribute the wide range in values of apparent terrain conductivity to the presence of surface metal objects in the survey area.

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We note that the location of the possible trench detected in the GPR survey generally correlates with the pattern of apparent terrain conductivity values in the southern part of the survey area, but the pattern is not sufficiently distinctive of a trench that it would have been identified as such without the benefit of the GPR data. We conclude that the apparent terrain conductivity data for AOC 15 support the interpretation of the GPR data, but cannot be used alone to determine the location of a former drainage trench at AOC 15.

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4. CONCLUSIONS

Based on the geophysical surveys at the CRREL site in Hanover, New Hampshire, we conclude the following:

- Bedrock depths could not be determined for Seismic Line 1, oriented perpendicular to the esker, but the data indicate that bedrock elevation must be less than about 394 feet. Bedrock elevations ranged from 380 - 387 feet for Seismic Line 2, located closest to AOC 11, and from 407 to 411 feet along Seismic Line 3, located closer to the Connecticut River. The seismic refraction data imply that the bedrock surface rises between AOC 11 and the Connecticut River.
- The GPR data for AOC 15 indicate that a possible trench is present south of the greenhouse.
- The apparent terrain conductivity data for AOC 15 support the interpretation of the GPR data, but cannot be used alone to determine location of the former drainage ditch.

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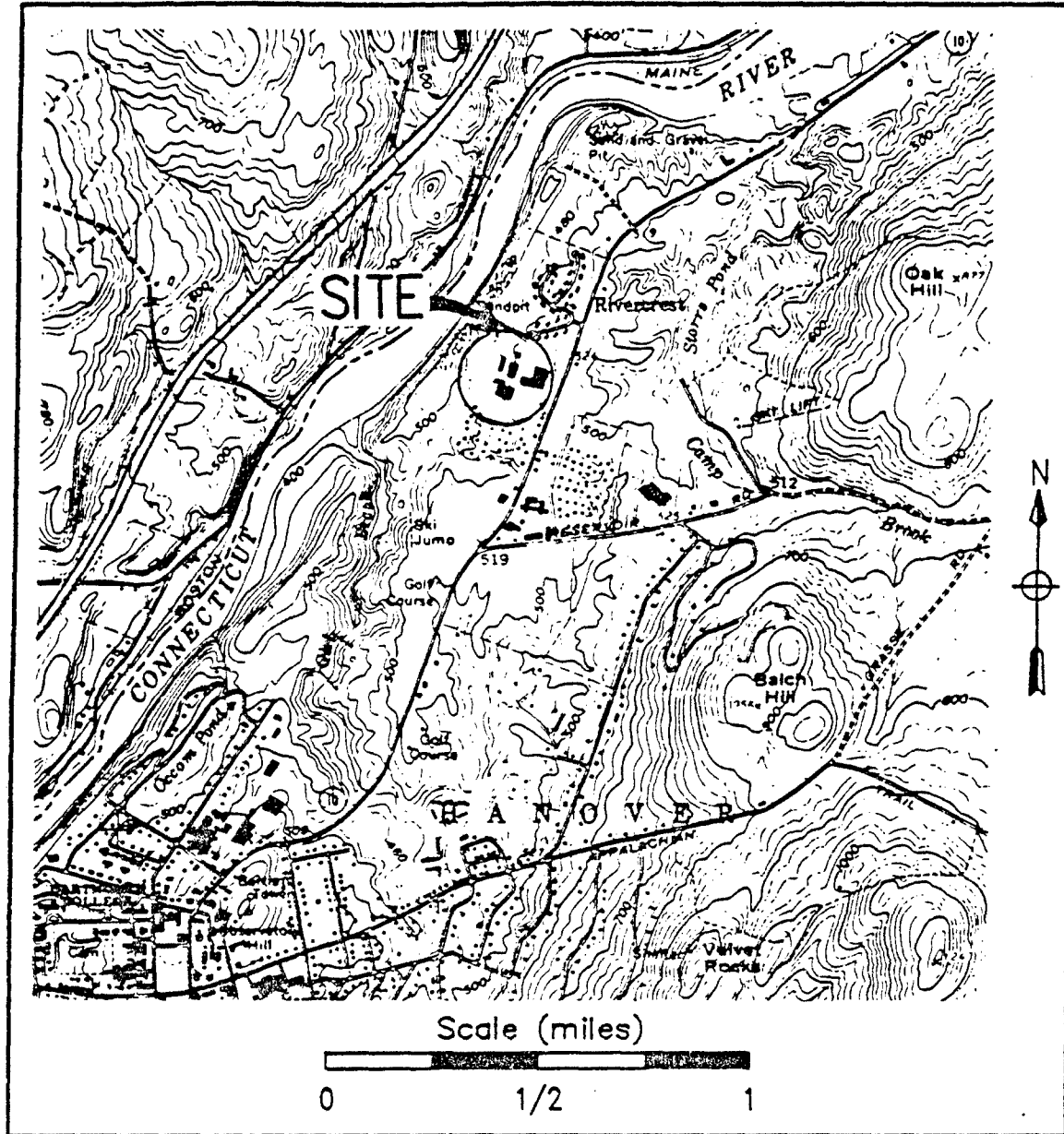
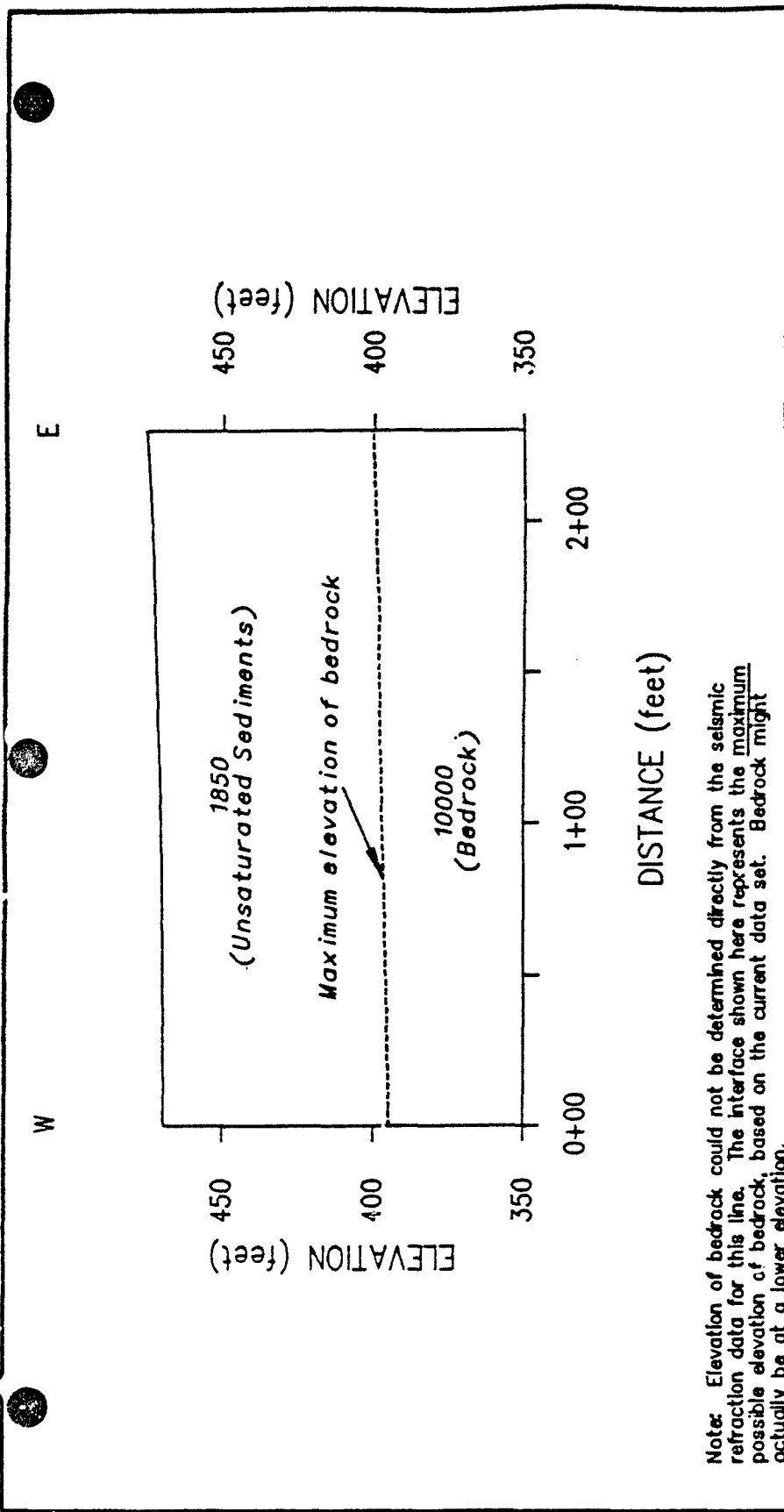


Figure 1. Site Location. Base map USGS Hanover NH topographic quadrangle.



Note: Elevation of bedrock could not be determined directly from the seismic refraction data for this line. The interface shown here represents the maximum possible elevation of bedrock, based on the current data set. Bedrock might actually be at a lower elevation.

LEGEND

- 1600 Velocity (fps) ——— Inferred interface
- 1850 Velocity (fps) - - - - Interface determined from seismic refraction data
- CEORL12 Boring with depth of bedrock

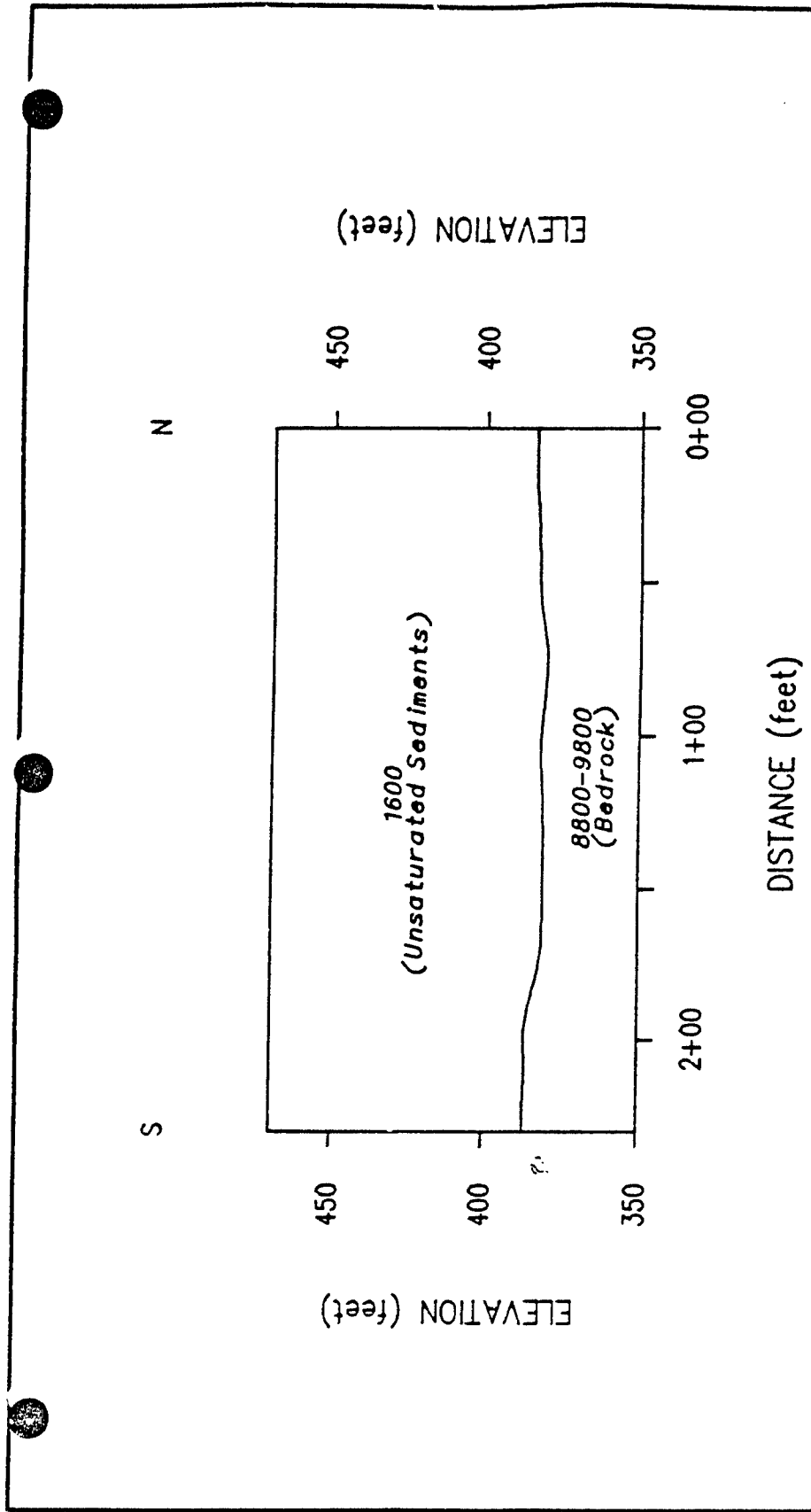
SCALE (feet)

0 50 100

Figure 3
Seismic Line 1
 CRREL
 AOC 11
 Hanover, New Hampshire

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 8 Industrial Way, D-10
 Salem, New Hampshire 03079



LEGEND

1600 Velocity (fps)

----- Inferred interface

----- Interface determined from seismic refraction data

CECR112 Boring with depth of bedrock

SCALE (feet)

0 50 100

Figure 4
 Seismic Line 2
 CRREL
 AOC 11
 Hanover, New Hampshire

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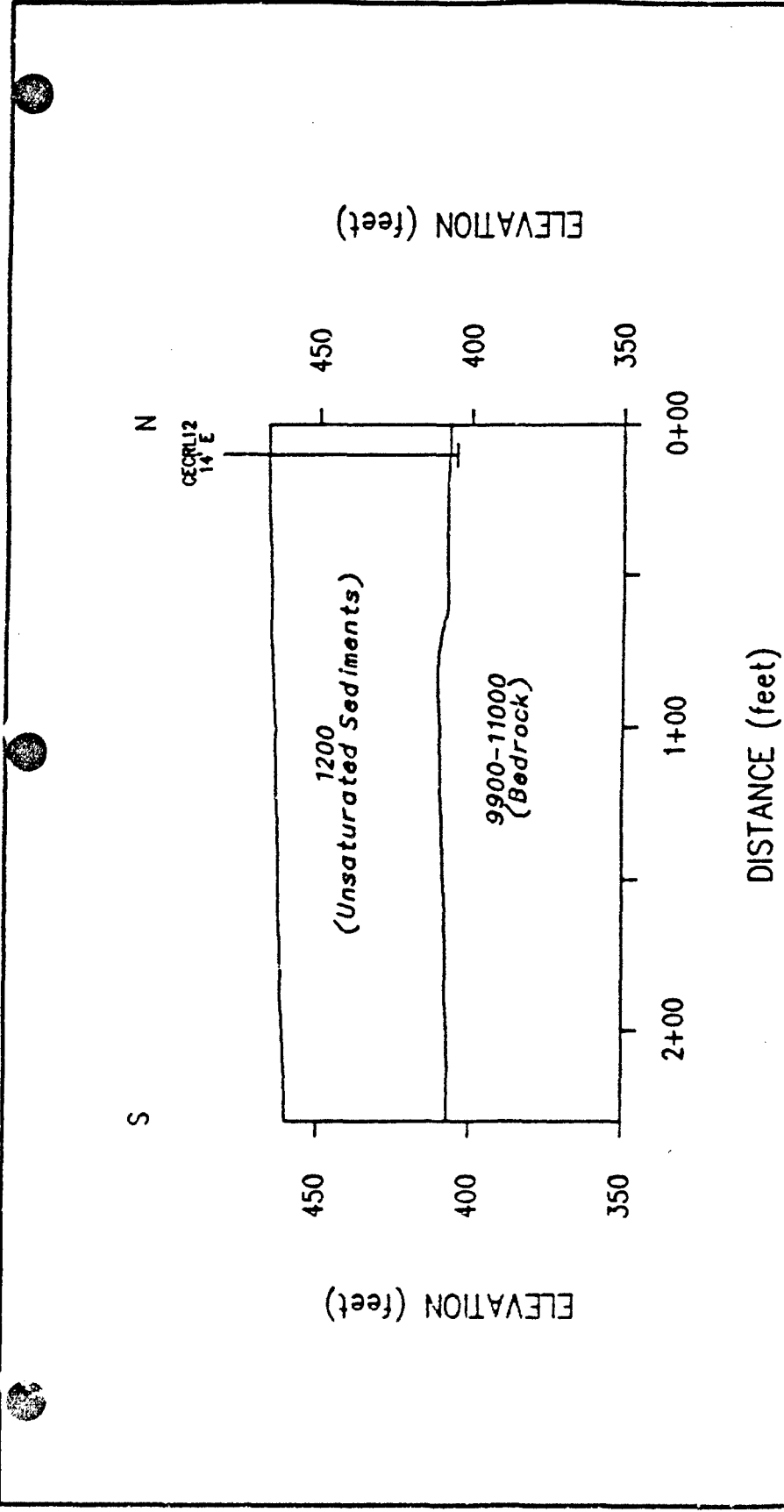


Figure 5
 Seismic Line 3
 CRREL
 AOC 11
 Hanover, New Hampshire

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LEGEND

1600 Velocity (fps)

----- Inferred interface

----- Interface determined from seismic refraction data

CECR12 Boring with depth of bedrock

SCALE (feet)

0 50 100

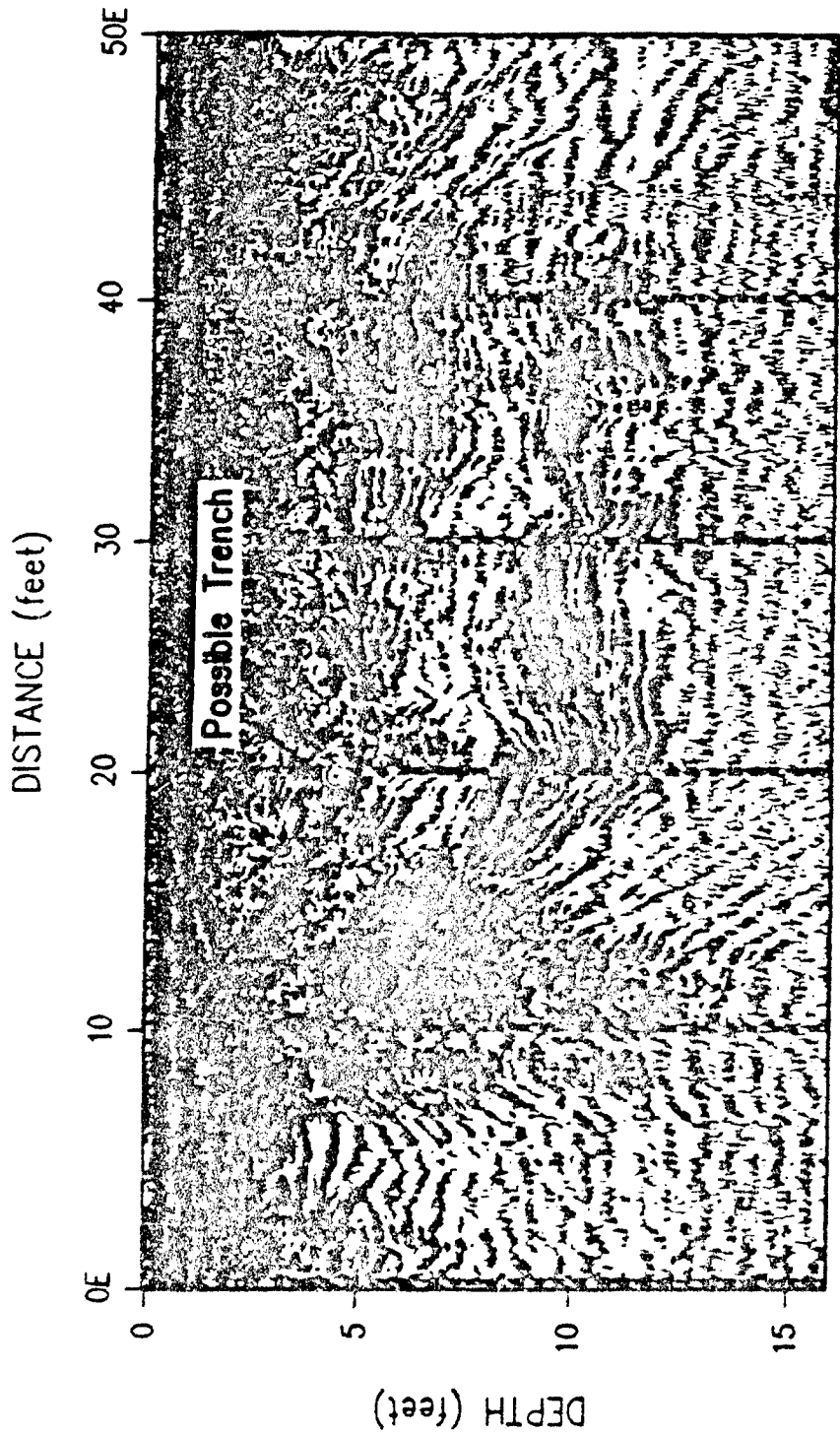


Figure 7
 Portion of GPR Record for Traverse 450N
 AOC 15
 CRREL
 Hanover, New Hampshire

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Notes: See Figure 7 for location of the traverses for these GPR records.

Depth scale is estimate only. The actual time-to-depth conversion for the GPR signal varies with the dielectric properties of the materials in the subsurface and is not necessarily linear.

Colors represent relative amplitude of reflected signals. Grey and white are lowest amplitudes; brightest colors are highest amplitude.

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APPENDIX 1 SEISMIC REFRACTION METHOD

Field Work. We used a 48-channel Bison Model 9048 Digital Instantaneous Floating Point Stacking Seismograph to perform the seismic refraction survey. The Model 9048 is a "state of the art" microprocessor controlled instrument that records data digitally and on paper seismograms. The stored data were transferred to floppy disk and the hard disk of a laptop computer at the end of each field day.

The seismograph was coupled to two 24-element seismic spread cables for a total of 48 geophones. The geophones measure only the vertical component, and their resonant frequency is 14 Hz.

Seismic energy was provided by a 12-lb sledge hammer striking a steel base plate or a Betsy seisgun. The Betsy seisgun uses a shotgun blank as the seismic source and is not classified as a weapon or explosive under Federal regulations. The number of stacks per shot point is variable, and the quality of the stacked seismic signal for each shot point was verified in the field with the paper record. Five shot points were used for each 48-geophone spread -- one shot off each end of the cable, one shot at each end of the cable, and one at the 24th geophone. This configuration provides reversed profiles. Shot points (and geophone locations, if necessary) were flagged in the field.

Data Analysis and Interpretation. The seismic data were analyzed using the Generalized Reciprocal Method (GRM) of seismic refraction interpretation. The method is described in detail in Palmer (1980).¹ GRM allows for some variation in the surface topography as well as lateral variation in the seismic velocity of the upper layers. The method uses the principle of migration whereby the refractor need only be planar over a short distance, thus allowing the calculation of depth to an undulating interface. In addition, GRM is relatively insensitive to dip angles as high as 20°, unlike most other methods that can be sensitive to dips as low as 5°. GRM also allows for the calculation of depth below each geophone instead of below only the shot points as in the Time-Intercept and Crossover Distance methods. The GRM software that we use for data analysis (GREMIX by Interpex) contains several internal tests for data consistency.

¹Palmer, Derecke (1980) The Generalized Reciprocal Method of Seismic Refraction Interpretation. Society of Exploration Geophysicists, 104 p.

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The results are used to construct an interpreted velocity profile of the subsurface for each seismic line. The velocities of seismic waves are functions of the types of geologic material through which they pass. One can thus infer the general subsurface stratigraphy from the velocities determined. Seismic velocities are expressed in feet per second (fps).

A widespread misconception about the seismic refraction method is that one cannot detect velocity inversions (layers of lower velocity material underlying higher velocity material) or hidden layers (layers of intermediate velocity too thin to produce first arrival signals), common conditions in stratified sediments. If present and undetected, such layers can cause large errors in the depths calculated for the various layers. However, using GRM, the presence of such layers can be inferred readily, and more importantly, the method uses average velocities for the detected and undetected layers to determine accurate depths to the refractors that are detected. Typical uncertainties in depths determined seismically are 10% or 2 feet, whichever is larger.

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APPENDIX 2 GROUND PENETRATING RADAR METHOD

Field Work A Geophysical Survey Systems, Inc. Model SIR-3:VDU-38 ground penetrating radar system was used for the survey. The system consists of an electronics unit, power supply, graphic recorder, color video display unit and transmitting/receiving antenna. Figure 3 shows the basic elements of the GPR system. The transmit/receive antenna is housed in a box that is moved across the surface. The antenna transmits electromagnetic signals into the subsurface and then detects, amplifies, and displays reflections of the signals in real-time on a graphic recorder and a color video display unit. The result is a radar record of the subsurface. The data are also recorded on a tape recorder for later computer processing and detailed interpretation.

The maximum depth of penetration of the GPR signal and the resolution of the reflections are controlled in part by the frequency of the antenna used and in part by the electrical properties of the subsurface. The total time during which radar signals are recorded can be varied from a few to 1,000 nanoseconds (nsec). However, there is a trade-off between total time, corresponding to depth range, and resolution. As the total time of recording is increased, the resolution of the GPR records decreases. For a given site, the total time window is set to detect features located somewhat below the maximum expected target depths.

2.1.2 Data Analysis. The horizontal axis of a GPR record represents distance across the surface and the vertical axis represents round-trip travel time of the radar signal. The round-trip travel time can be converted to approximate depth by correlating with reflections from targets of known depth or by using handbook values of velocities for materials in the subsurface. For those sites where the subsurface is electrically heterogeneous, the travel times of the radar signal may be different in the various materials, and the vertical scale for the radar records is not necessarily uniform with depth.

The reflections in a GPR record are produced by spatial changes in the physical properties (e.g., type of material, subsurface fluids, porosity, etc.) and related changes in the electrical properties (dielectric constant) of the subsurface materials in the path of the signals. The greater the difference in electrical properties between two materials in the subsurface, the stronger the reflection observed in the GPR record.

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The size, shape, and amplitude of the GPR reflections are the characteristics that are considered in the interpretation of the data from any site. Because the electrical properties of metal USTs, utilities, and conduits differ significantly from those of the soils in which they are buried, such objects produce GPR reflections with high amplitude and distinctive shapes that permit identification with a high degree of reliability. Most other objects, although readily detectable, require "ground truth" for identification. Only excavations provide positive identification for most objects identified in GPR surveys.

For GPR profiles oriented perpendicular to the long axis of a tank, the signature is a similar to a hyperbola, the shape of which is a function of the diameter and depth of burial of the tank. For GPR profiles oriented parallel to the long axis of a tank, the signature is a set of parallel, high amplitude reflections that terminate sharply at the ends of the tank. GPR, then, is useful for determining the exact location and dimensions of USTs.

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APPENDIX 3 TERRAIN CONDUCTIVITY METHOD

Field Work. We used a Geonics EM31-DL Terrain Conductivity Meter for the survey. This unit is an induction type instrument and provides measurement of both the quadrature-phase and in-phase components of terrain conductivity without ground electrodes or contact. The data for both components are recorded on a digital data logger. The EM31-DL is calibrated to read ground conductivity directly in millimhos per meter with a resolution of 2% of full scale and an accuracy of 1 mmho/meter.

The EM31-DL has coils mounted with a fixed separation of 12 feet in a rigid boom. In normal operation, it is used with a vertical dipole, and the nominal depth of earth sampled by the EM31-DL is about 18 feet. In the horizontal dipole mode, the nominal depth of earth sampled by the EM31-DL is about 9 feet.

Two components of the induced magnetic field measured by the EM31-DL are recorded: (1) the quadrature-phase component and (2) the in-phase component. The quadrature-phase component is a measure of the average terrain conductivity of the subsurface materials located between the receiver and transmitter of the EM31-DL. The in-phase component is a sensitive indicator of the presence of conductive metal objects; however, the exact identification of the object cannot be determined from the terrain conductivity data alone.

Data Analysis and Interpretation. Terrain conductivity data are most commonly plotted in either profile format or as contour maps, depending on the density of the data. At sites free of metal objects and other cultural interference, the terrain conductivity measured at a particular location is controlled by the subsurface fluid. The instrument response is more affected by near-surface material than by deeper material, particularly horizontal dipole data. In cases where the terrain conductivity meter coil is directly over a buried metal target, the apparent conductivity reading may be a negative number.

Terrain conductivity surveys are commonly included in environmental investigations because they can be used to determine the lateral extent of disposal areas and/or landfills, to detect buried metal objects, and to detect the presence of conductive leachate plumes. Typically, terrain conductivity values measured in disposal areas are irregular and highly variable over short distances due to the heterogeneous materials in the subsurface. The edges of disposal areas can be determined, then, where there is a change to smoothly varying values of terrain conductivity. In areas of buried metal objects, terrain conductivity meters commonly yield apparently negative values. Leachate plumes are generally recognized on the basis of terrain conductivity data as relatively smoothly varying, but anomalously elevated, values compared to the background values for a given site.

Appendix C: Geophysical Survey Report



Appendix D: Borehole Geophysical Report

Arthur D Little

CRREL SITE, HANOVER NH
GEOPHYSICAL LOG SUMMARY
WELL CECRL-13

The caliper and televiewer logs in this hole reveal breakout zones at 182' (just below casing), 183', 186.5', 187.5' and 191.7'. The electric logs have resistivity/resistance lows at the lower four anomalies with no accompanying gamma peaks. This indicates that the electric anomalies are due to fluid filled zones in the formation rather than lithology changes. Both the fluid resistivity and temperature logs have anomalies at the bottom of the hole (202') but this is probably due to the sediment which was discovered while logging the ATV. Other fluid resistivity anomalies exist at 189' and 185'. Temperature anomalies exist at 192', 188' and 185.5'. These temperature and fluid resistivity anomalies suggest flow between the zones at 191.7' and possible very slight flow in the bottom portion of the well (191.7' to TD) based on a reversed temperature gradient (cooling with depth). The temperature gradient cannot be fully anticipated due to recent drilling and the possibility of cultural interference from tests conducted at the site by CRREL.

Arthur D Little

CRREL SITE, HANOVER NH
GEOPHYSICAL LOG SUMMARY
WELL CECRL-14

The caliper and ATV logs show anomalies at 237', 239.5' and 245.5'. The electric logs have low anomalies at 239.5' and 242', but these zones correspond to a significant gamma peak and are probably due to lithology changes (increase in clay content). The fluid resistivity and temperature logs show only one anomaly at 250' which is most likely due to sediment in the bottom of the well rather than flow. These logs do not indicate any significant flow in this well.

CRREL SITE, HANOVER NH
GEOPHYSICAL LOG SUMMARY
WELL CECRL-15

The caliper log reveals several small anomalies throughout the borehole with the most significant at 182.5' and 186'. There are very few ATV anomalies, at 169', 172', 173.5' and 182.5'. The electric logs have a low point at 182' with no accompanying gamma peak, suggesting that the anomaly is due to a higher porosity zone rather than a lithology change. There is a major anomaly in the fluid resistivity and temperature logs at 177' due to sediment in the bottom of the well. This may mask any anomaly due to possible flow from the breakouts from the caliper log below this depth. The other major anomalies in these logs are at 169.5' and 168' (near the bottom of casing). This may indicate flow between 169.5' and 168'. Some low flow may exist between 169.5' and the bottom of the well based on a reversed temperature gradient (cooling with depth) but this is far from certain because of other factors which may affect the gradient in this area.

Arthur D Little

CRREL SITE, HANOVER NH
GEOPHYSICAL LOG SUMMARY
WELL CECRL-18

The ATV log in this well reveals several anomalies throughout the borehole. From 186' to TD the ATV shows two parallel, vertical grooves in the borehole wall probably due to drilling. The caliper log indicates anomalies at 186', 188', 193' and 198', each with accompanying ATV anomalies. The electric logs have subtle low anomalies at 181', 185', 189' and 194.5'. There are no accompanying gamma peaks with these electric anomalies, suggesting that they are due to higher porosity zones rather than lithology changes. The fluid resistivity and temperature logs indicate a major anomaly at 194.5' due to sediment in the hole. The upper portion of this anomaly zone is smeared out with several slope breaks (at 193.5', 192.2', 188.5' and 186.5'). The only other fluid resistivity/temperature anomaly is at 175.5' (bottom of casing). Based on these anomalies and the flat, vertical character of the temperature log from 175.5' to the bottom of the well, the zones at 194.5', 183.5', 182.2', 188.5', 186.5' and 175.5' may all be flowing.

CRREL SITE, HANOVER NH
ATV FEATURE TABLE
WELL CECRL-13

<u>Depth</u>	<u>Dip Dir. (°)</u>	<u>Dip Amnt (°)</u>	<u>Aper. (IN)</u>
183.13	319.6	26.8	3.64
183.26	156.4	49.6	0.79
183.92	140.5	27.2	0.41
184.73	284.3	51.3	0.72
185.88	133.7	47.3	0.89
186.44	37.9	35.9	2.56
186.44	37.9	35.9	2.56
186.55	303.6	35.9	2.29
187.57	143.8	4.4	7.84
190.98	291.9	33.0	1.35
191.28	302.0	35.9	0.62
191.83	323.8	34.4	5.66

Arthur D Little

CRREL SITE, HANOVER NH
ATV FEATURE TABLE
WELL CECRL-14

<u>Depth</u>	<u>Dip Dir (°)</u>	<u>Dip Amnt (°)</u>	<u>Aper (IN)</u>
236.5 -237.5	Small vug or vertical feature		
237.17	146.9	23.4	0.63
238.71	129.1	8.1	0.92
239.13	227.5	11.8	0.58
240.36	313.3	29.6	0.54
240.74	107.8	35.3	0.58
245.80	142.6	51.9	0.60
248.16	126.5	48.6	1.11
251.76	152.8	56.1	0.56

CRREL SITE, HANOVER NH
ATV FEATURE TABLE
WELL CECRL-15

<u>Depth</u>	<u>Dip Dir (°)</u>	<u>Dip Amnt (°)</u>	<u>Aper (IN)</u>
169.02	210.9	34.6	0.52
172.16	305.1	32.3	0.50
173.40	48.0	49.6	0.58
182.42	175.7	31.9	0.50

CRREL SITE, HANOVER NH
ATV FEATURE TABLE
WELL CECRL-18

<u>Depth</u>	<u>Dip Dir (°)</u>	<u>Dip Amnt (°)</u>	<u>Aper (IN)</u>
177.04	312.0	44.5	0.34
177.47	316.5	39.3	0.39
179.01	333.8	39.3	0.23
180.50	318.0	39.3	0.39
181.00	300.8	33.2	0.36
181.89	330.8	33.2	0.28
184.96	258.8	42.0	0.16
186.25-TD	vertical tool grooves		
186.59	319.5	42.0	0.41
187.74	345.8	44.5	0.43
188.47	333.8	33.2	0.28
189.11	324.8	41.6	0.41
189.43	316.5	39.3	0.39
193.23	316.5	46.3	0.27
193.74	322.5	44.1	0.51
194.38	325.5	44.5	0.51

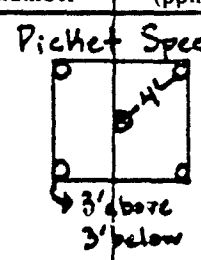
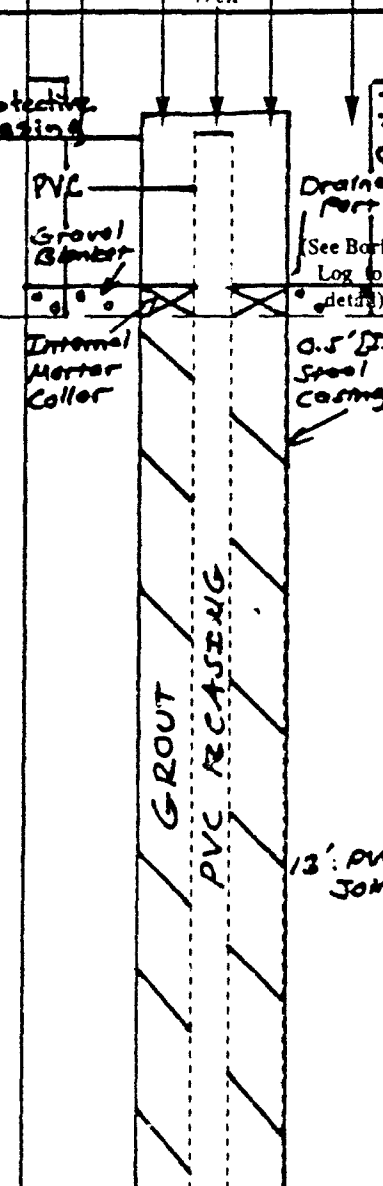
Appendix E: Monitoring Well Construction Diagrams

Arthur D Little

Monitoring Well Design

Boring No. CECRL 13
 Client USAEC
 Project CRREL
 Case No. 67063

Date Start 7-29-93 Date Complete 7-30-93 Hole Diameter 0.49' Casing Size 0.33'
 Contractor EDT Geologist W. Dowling
 Drill Method Mud Rotary - Coring Boring Depth 206'
 Type Of Rig Acker AD-2, 5 Cyl. Grout method Tremie
 Datum NGVD of 1929 Development Method Submersible Pump
 Notes 950 Gallons Removed During Pre-Development

Scale in Feet	SAMPLE		Well Construction Diagram		Construction Specifications
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
19.0 18.0 17.0 16.0 15.0 14.0 13.0 12.0 11.0 10.0 9.0 8.0 7.0 6.0 5.0 4.0 3.0 2.0 1.0 0.0 1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 10.0 11.0 12.0 13.0 14.0 15.0 16.0 17.0 18.0 19.0 20.0	Picket Specs: 		Stratigraphy Annulus Well	Elevation Top Of Casing <u>525.32'</u> Elevation Top Of Riser Pipe <u>524.90'</u> Elevation Ground Surface <u>523.0'</u> (surveyed elevations) (depth from ground surface) Type of Surface Casing <u>Steel</u> LD. Surface Casing <u>0.5'</u> Type Of Riser Pipe <u>PVC, Sched. 40</u> LD. Riser Pipe <u>0.33'</u> Diameter Of Borehole <u>0.49'</u> Type Of Backfill <u>Cement-Bent. Grout</u> Type Of Seal <u>Bentonite Slurry</u> Depth To Top Of Seal <u>183'</u> Type Of Sand Pack <u>Grade 2</u> Depth To Top Of Sand Pack <u>188'</u> Type Of Screen <u>PVC</u> Slot Size <u>0.010</u> LD. Screen <u>0.33'</u> Screened Interval <u>203-173'</u> Depth To Bottom Of Well <u>203'</u> Depth To Bottom Of Borehole <u>206'</u>	

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. CECL 13
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
20						
25						
30						
35		0.0				23: PVC Joint 33': Top of 3 rd Grout Lift PVC Joint
40						
45						43: PVC Joint

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. CECRL 13
Client USAEC
Project CRRBL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
50						
55						53: PVC Joint
60						63: PVC Joint
65						
70						
75						73: PVC Joint

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. *CFECL 13*
Client *USAEC*
Project *CRREL*
Case No. *67063*

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
80						
85		0.0				83': Top of 2 nd Grout Lift PVC Joint
90						
95						93: PVC Joint
100						
105		0.0				103: PVC Joint

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. *CECRL 13*

Client *USAEC*

Project *CRREL*

Case No. *67063*

Scale in Feet	SAMPLE		Well Construction Diagram					Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well			
110								
115							118: PVC Joint	
120							123: PVC Joint	
125								
130							133: Top of 1 st Grout Lift PVC Joint	
135								

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. CECRL 13

Client USAEC

Project CRRBL

Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
135						
140		0.0				143: PVC Joint
145						
150						153: PVC Joint
155		0.0				
160						163: PVC Joint
		0.0				

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. CECRL 13
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
165						
170						
175						173: PVC Joint
180		0.0				179.6 Top of Bedrock
185		0.0				182.6: Bottom of 6" Steel Casing 183: Top of Bentonite Seal PVC Joint
190						188: Top of Sand Pack 193: Top of Screen

Arthur D Little

Monitoring Well Design

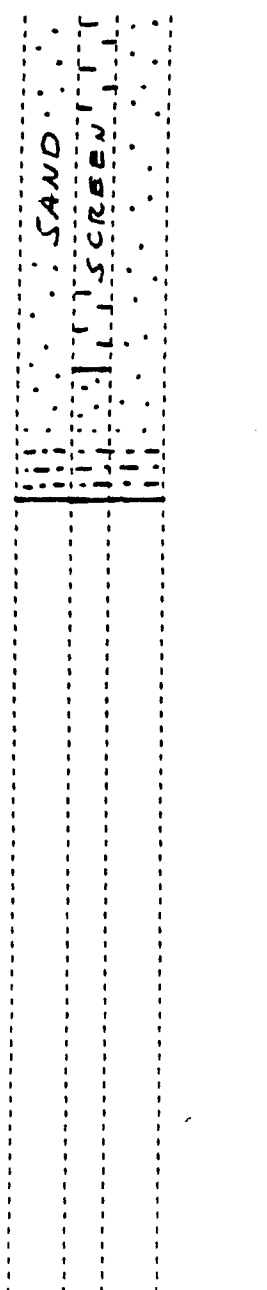
(Continuation Page)

Boring No. *CECRL 13*

Client *USAC*

Project *CRREL*

Case No. *67063*

Scale in Feet	SAMPLE		Well Construction Diagram				Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well		
<i>195</i> 200 <i>205</i>							<p><i>198.9: Water-Bearing Fracture NS3W/50N</i></p> <p><i>203: Bottom of Screen</i></p> <p><i>204.5: Bottom of Sand Pack</i></p> <p><i>206: Bottom of Borehole</i></p> <p>BOREHOLE DIAMETERS: <i>- 6" STEEL CASING = 8 3/4"</i> <i>- 4" PVC [IN BEDROCK] = 5 7/8"</i></p>

Arthur D Little

Monitoring Well Design

Boring No. CECBL14
 Client USAEC
 Project CBREL
 Case No. 67068

Date Start 8/3/93 Date Complete 8/4/93 Hole Diameter .49 ft. Casing Size .33 ft.

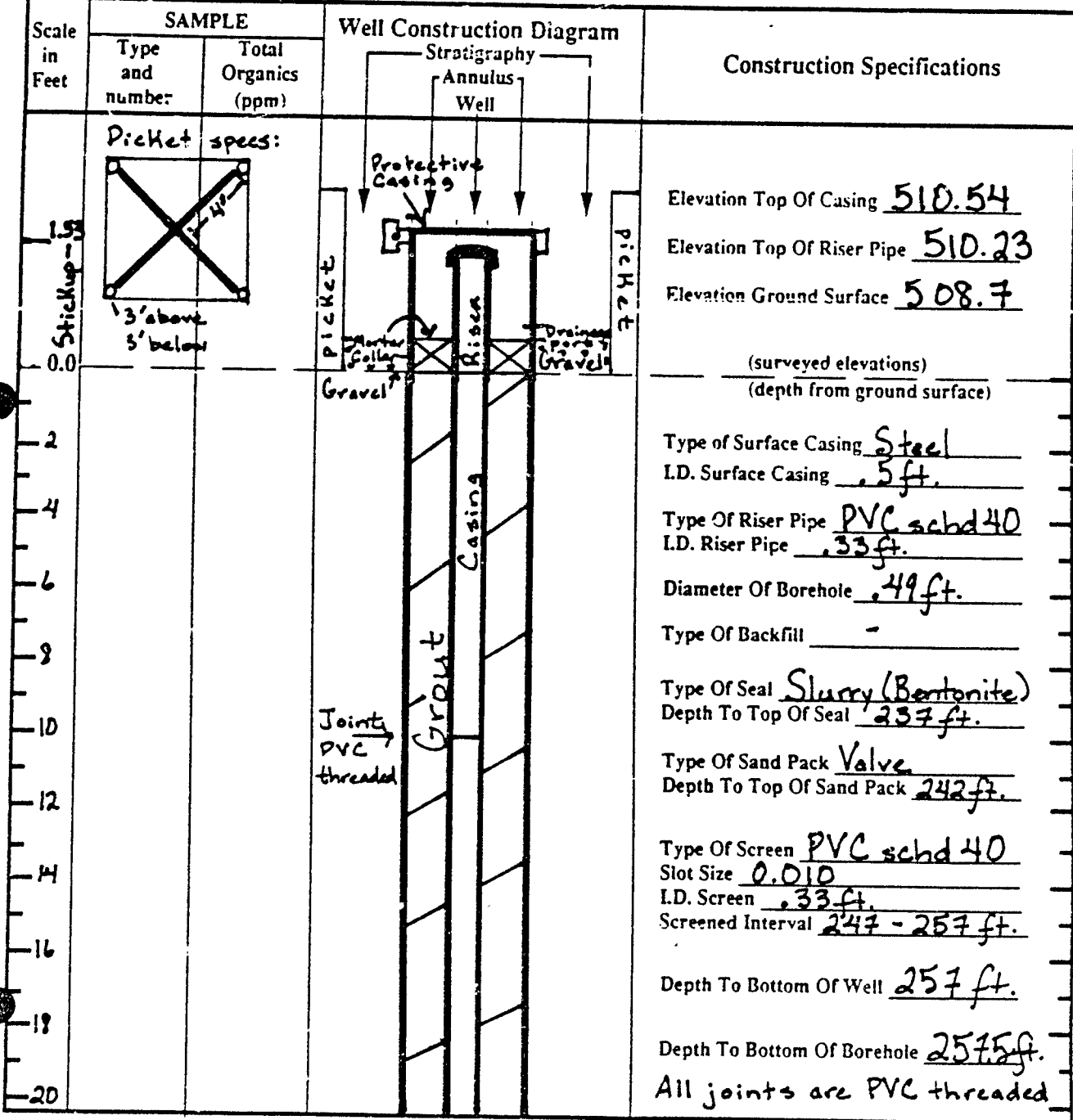
Contractor Environmental Drilling Geologist C. Stover

Drill Method Mud Rotary / Coring Boring Depth 257.5 ft.

Type Of Rig Reich T-650-W / Aker AD2 Grout method Tremie

Datum NGVD of 1929 Development Method Submersible Pump

Notes See (*) below



*All joints on the following pages should be displaced up by 3 ft. / All are PVC threaded.

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. CECRL14
Client USAEC
Project CBREL
Case No. 69063

Scale in Feet	SAMPLE		Well Construction Diagram		Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
20			Joint	PVC threaded	Note: Dark border of annulus represents 6" ID steel casing / 6 3/8" OD
22					
24		0.3			
26					
28					
30			Joint		
32					
34					
36					
38					
40			Joint		Top of grout lift #4
42					
44					
46		0.0			
48					
49					

* Breathing space

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. CECB114
Client USAEC
Project CBREL
Case No. 63063

Scale in Feet	SAMPLE		Well Construction Diagram				Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well		
49			Joint				
51							
53							
55							
57							
59			Joint				
61							
63							
65							
67							
69							
71		0.0	Joint				
73							
75							
77							

* All joints PVC threaded and should be displaced in 31" diameter

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. CEC8L14
Client USAEC
Project CBREL
Case No. 63063

Scale in Feet	SAMPLE		Well Construction Diagram				Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well		
78							
80							
82							
84							
86		0.0					
88							
90		0.0					
92							
94		0.0					
96							
98							
100		0.0					
102							
104							
106							

* All joints PVC threaded and displaced up 3'

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. CECB114
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram				Notes and Comments
	Type and number	Total Organics #88 (ppm)	Stratigraphy	Annulus	Well		
107		0.0					
109			Joint				
111							
113							
115		0.0		Grout			
117							
119			Joint				
121		0.0			Casing		
123							
125							
127							
129			Joint		Grout		
131		0.0					
133							
135							

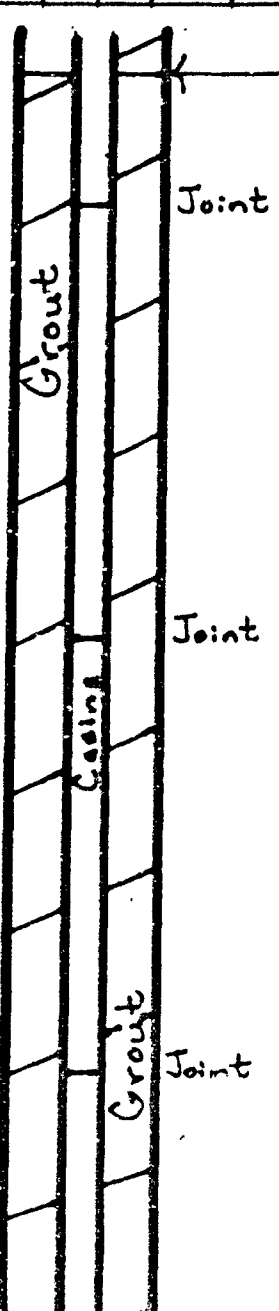
* All joints PVC threaded and displaced up 3'

Arthur D Little

Monitoring Well Design (Continuation Page)

Boring No. CECRL14
Client USAEC
Project CRREL
Case No. 107063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
136						
138						
140						
142		O.D.				
144						
146						
148						
150		O.D.				
152						
154						
156						
158						
160						
162		O.D.				
164						



Top of grout lift #2

* All joints PVC threaded and displaced up 3'

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. **CECRL14**
Client **USAEC**
Project **CRREL**
Case No. **63063**

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics** (ppm)	Stratigraphy	Annulus	Well	
165						
167						
169						
171		0.0				
173						
175						
177						
179						
181		0.0				
183						
185						
187						
189						
191		0.0				
193						



* All joints PVC threaded and displaced up 3'.

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. CECRL14
 Client USAEC
 Project CBREL
 Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm) **	Stratigraphy	Annulus	Well	
194						
196						
198						
200		0.0				
202						
204						
206						
208						
210		0.0				
212						
214						
216						
218						
220						
222						

* All joints PVC threaded and displaced up by 3'
 ** R... .. force

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. CECRL14
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm) **	Stratigraphy	Annulus	Well	
223						
225						
227						
229						
231		0.0				
233						Top of bedrock: 232.5ft. Bottom of 6" ID steel casing/Top of 5 7/8" borehole.
235						
237						Top of slurry seal: 237.0ft.
239						Joint at 237'
241						Top of sand pack: 242.0ft.
243						
245						Note: Light border of annulus denotes 5 7/8" borehole.
247						
249						Screened Interval: 247.0 - 257.0 ft
251						

** Breathing Space

Arthur D Little

Monitoring Well Design
(Continuation Page)

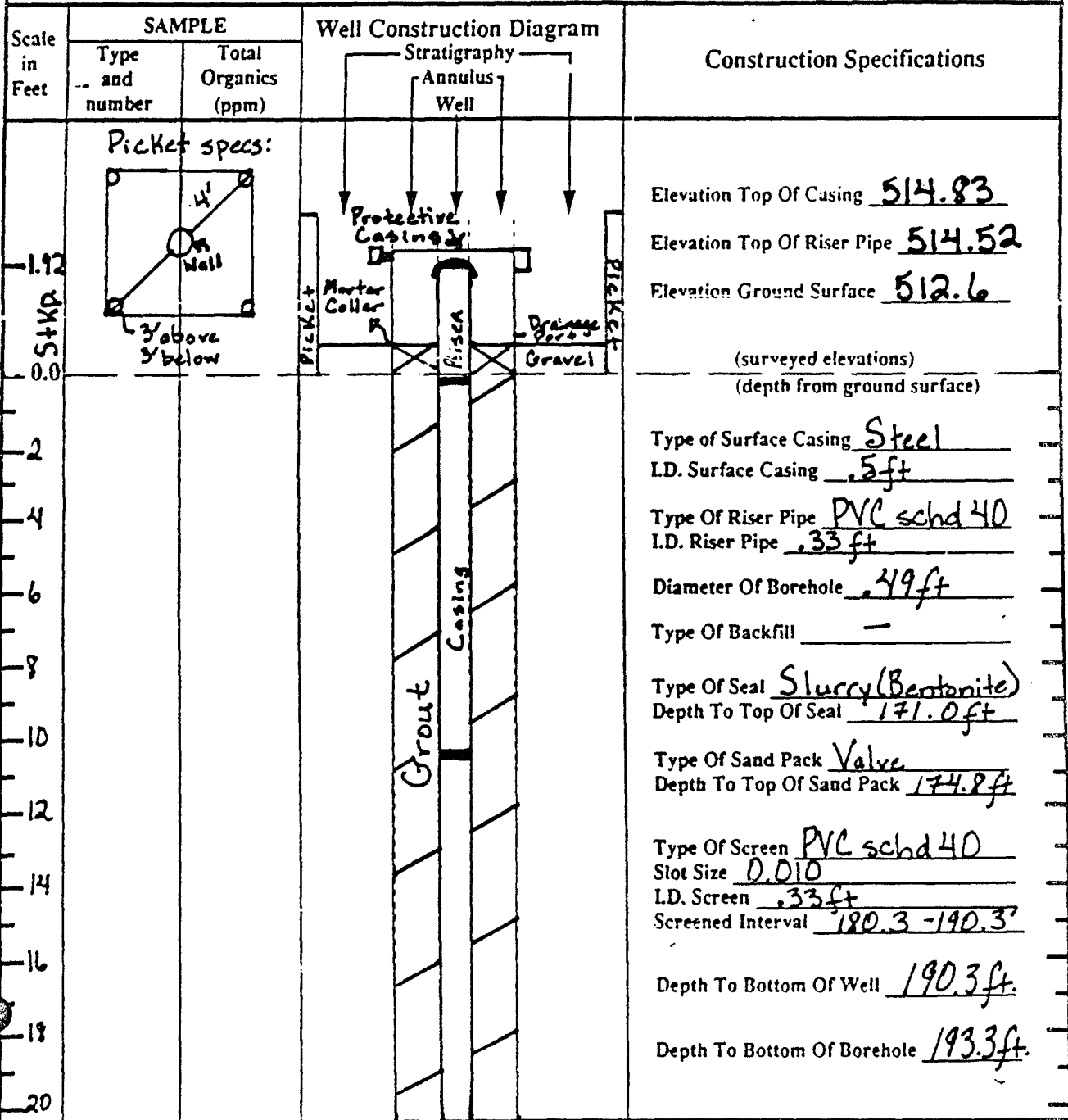
Boring No. CECBL14
Client USAEC
Project CRREL
Case No. 107063

Scale in Feet	SAMPLE		Well Construction Diagram		Notes and Comments
	Type and number	Total Organics** (ppm)	Stratigraphy	Annulus Well	
252					Bottom of well: 257.0 ft. Bottom of borehole: 257.5 ft.
254					
256					
258					

** Breathing Space

Arthur D Little	Monitoring Well Design		Boring No. <u>CECRL15</u>
			Client <u>USAEC</u>
			Project <u>CBREL</u>
			Case No. <u>67063</u>
Date Start <u>8/2/93</u>	Date Complete <u>8/3/93</u>	Hole Diameter <u>.49ft</u>	Casing Size <u>.33ft</u>
Contractor <u>Environmental Drilling, Inc.</u>		Geologist <u>C. Stover</u>	
Drill Method <u>Coring / Mud Rotary</u>		Boring Depth <u>193.3ft.</u>	
Type Of Rig <u>Acker AD2 / Reich T-650H</u>		Grout method <u>Tremie</u>	
Datum <u>NGVD of 1929</u>		Development Method <u>Submersible Pump</u>	

Notes



■ indicate PVC threaded joints

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. CECRL15
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram		Notes and Comments
	Type and number	Total Organics* (ppm)	Stratigraphy	Anaullus Well	
20					<p>Top of grout expected for lift # 3, but lift # 3 rose to ground surface</p> <p>$V_{\text{Expected Total}} = 105.2 \text{ gal}$</p> <p>$V_{\text{Actual Total}} = 96 \pm 8 \text{ gal}$</p> <p>(See field book #3 for further details)</p>
22					
24					
26					
28					
30					
32					
34					
36					
38		0.7			
40					
42		0.5			
44					
46					
48					

* Measured at hole unless otherwise indicated.

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. CECR15
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram				Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well		
49		0.0					
51							
53							
55							
57		1.0 BK=0.0					
59							
61							
63							
65							
67		0.0					
69							
71							
73							
75							
77							

*Measured at hole unless otherwise indicated
BK = background

→ Top of grout lift #2

Grout

PVC Casing

Grout

Joint

Joint

Joint

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. CECRL15
Client USAEC
Project CRBEL
Case No. 14063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics* (ppm)	Stratigraphy	Annulus	Well	
78						
80		3.0				Joint
82						
84		1.0				
86		BS=0.0				
88						
90		0.2				Joint
92		BS=0.0				
94						
96						
98						
100		1.0				Joint
102		BS=0.0				
104						
106						

* Hole measurements unless otherwise indicated
BS = Breathing Space

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. CECRL15

Client USAEC

Project CBREL

Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
107						
109						
111						
113		0.5 BS=0.0				
115						
117						
119						
121						
123						
125						
127						
129						
131		2.0 BS=0.0				
133						
135						

Grout

PVC Casing

Grout

Joint

Joint

Joint

→ Top of grout lift #1

* Hole measurements unless otherwise indicated
BS = Breathing Space

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. **CECBL15**
Client **USAEC**
Project **CBEL**
Case No. **67063**

Scale in Feet	SAMPLE		Well Construction Diagram		Notes and Comments
	Type and number	Total Organics* (ppm)	Stratigraphy	Annulus Well	
136					
138					
140					
142					
144					
146					
148					
150		0.0			
152		BS=0.0			
154					
156					
158					
160		0.0			
162					
164					

* Hole measurements unless otherwise indicated
BS = Breathing Space

Arthur D Little

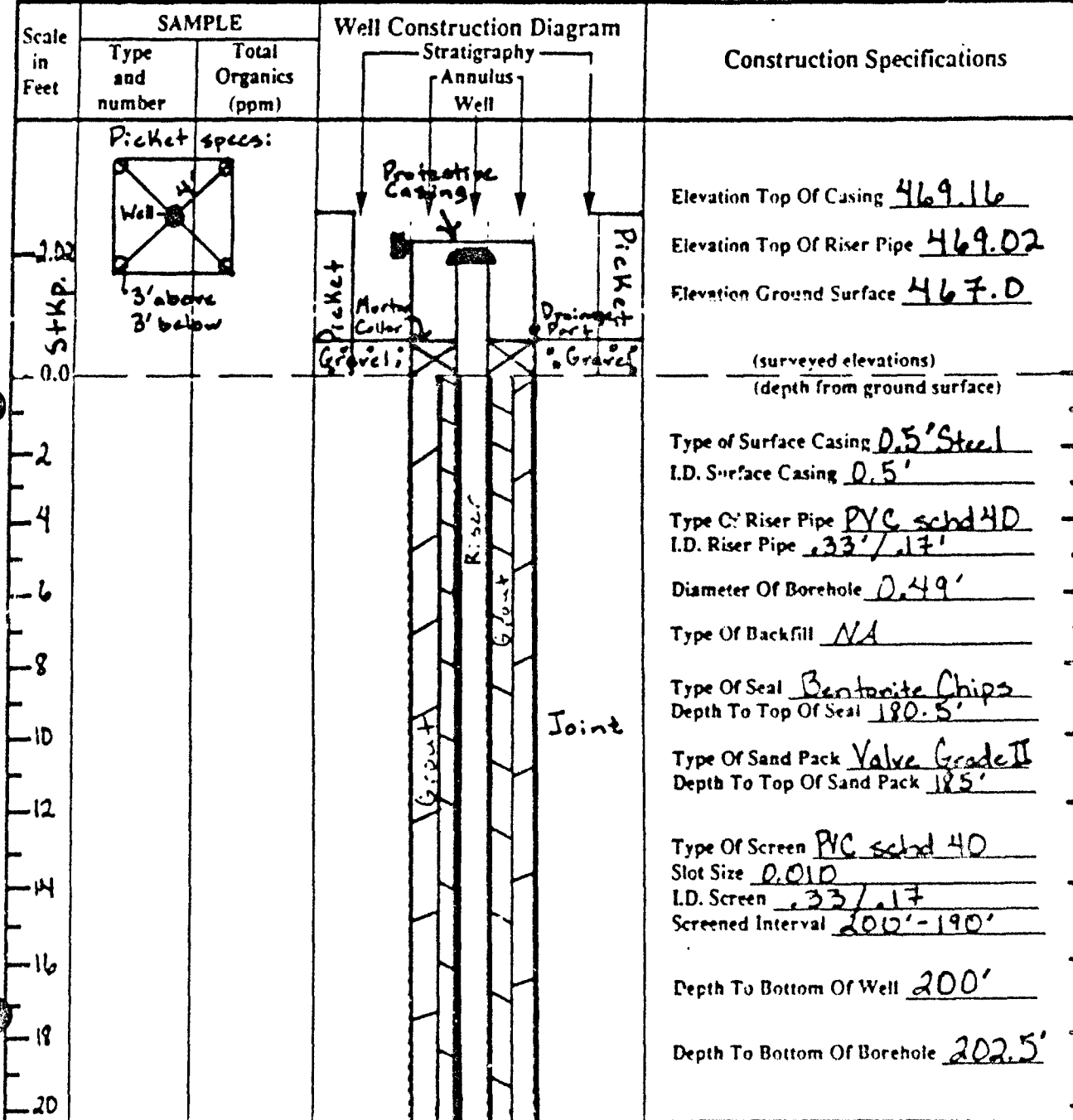
Monitoring Well Design

(Continuation Page)

Boring No. CECBL13
Client USAEC
Project CBEL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram				Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well		
165							
167							
169						Top of competent bedrock: 168.25'	
171						Top of seal: 171.0'	
173							
175						Top of sand pack: 174.8'	
177							
179							
181						180.3 - 190.3: Screened Interval	
183							
185							
187							
189						190.3': Bottom of well	
191							
193						193.3': Bottom of borehole	

Arthur D Little	Monitoring Well Design		Boring No. <u>CECB116</u>
			Client <u>USAEC</u>
			Project <u>CRBEL</u>
			Case No. <u>67063</u>
Date Start <u>8/5/93</u>	Date Complete	Hole Diameter <u>0.49'</u>	Casing Size <u>0.17'</u>
Contractor <u>Environmental Drilling</u>		Geologist <u>C. Stover</u>	
Drill Method <u>Mud Rotary / Oriented Casing</u>		Boring Depth <u>202.5'</u>	
Type Of Rig <u>Reich T-150-W / Acker AD2</u>		Grout method <u>Tremie</u>	
Datum <u>NGVD of 1929</u>		Development Method <u>Watercra pump</u>	
Notes			



Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. CECBL16
Client USAEC
Project ARREL
Case No. 67DL3

Scale in Feet	SAMPLE		Well Construction Diagram					Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well			
20								
22								
24								
26								
28		BS = 0.3						
30								
32								
34								
36								
38								
40								
42								
44		BS = 0.0						
46								
48								

BS = breathing space

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. CECB116
Client USAEC
Project CABEL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram				Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well		
49		BS = 0.2					
51							
53							
55							
57							
59							
61							
63		BS = 0.3					
65							
67							
69		BS = 0.1					
71							
73							
75							
77							

BS = breathing space

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. CECRL11
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
78						
80						
82		BS = 0.2				
84						
86						
88						
90		BS = 0.2				
92						
94						
96						
98						
100						
102		BS = 0.0				
104						
106						

BS = breathing space

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. CECR116
Client USAEC
Project CRBEL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
107						
109						
111		BS=0.0				Joint
113						
115						
117						
119						Joint
121		BS=0.4				
123						
125						
127						
129						Joint
131						
133						
135						

BS= breathing space

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. CECBL16
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
136						
138						
140						
142		BS=0.0				
144						
146						
148						
150						
152		BS=0.0				
154						
156						
158						
160		BS=0.0				
162						
164						

BS=breathing space

Top of native sand between 6" casing and 4" ID PVC casing at 158.5' BGS

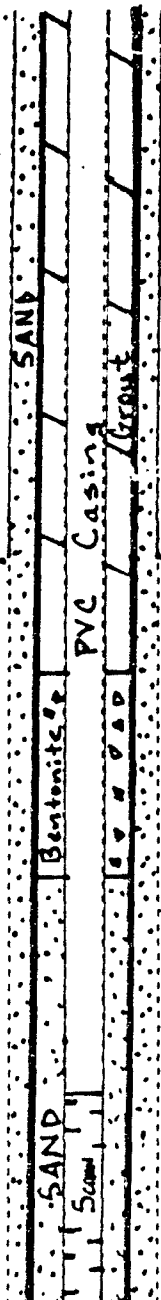
Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. CECBL16
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
165						
167						
169						
171						
173						
175						
177						
179						
181						
183						
185						
187						
189						
191						
193						



Top of bedrock at 177.5' BGS
Top of bentonite seal at 180.5' BGS
Top of sand pack at 185' BGS
PVC threaded joint
Top of screen at 190.0 ft.

BS = breathing space

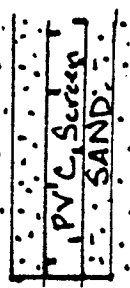
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Monitoring Well Design

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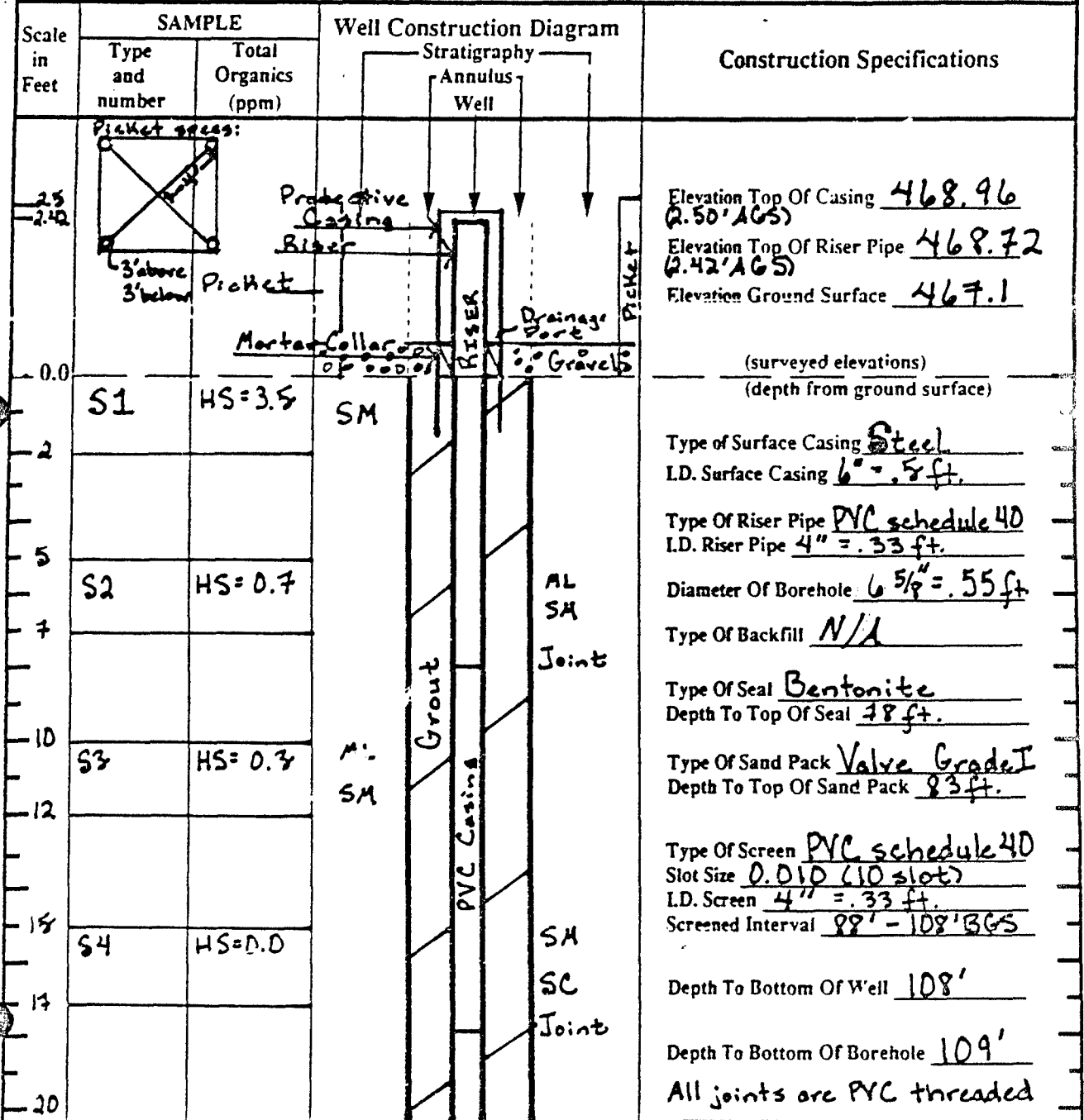
Boring No. CECRL16
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram		Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
194					
196					
198					
200					Bottom of well at 200' BGS.
202					Bottom of borehole at 202.5' BGS



Arthur D Little	Monitoring Well Design		Boring No. <u>CECRL17</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>
Date Start <u>7/12/93</u>	Date Complete <u>7/20/93</u>	Hole Diameter <u>.60 ft.</u>	Casing Size <u>.33 ft.</u>
Contractor <u>Environmental Drilling</u>		Geologist <u>C. Stover</u>	
Drill Method <u>Hollowstem Auger/Aud Rotary</u>		Boring Depth <u>178 ft.</u>	
Type Of Rig <u>Failing Truck Mounted F-6</u>		Grout method <u>Tremie tubes</u>	
Datum <u>NGVD of 1929</u>		Development Method <u>N/A until 7</u> : <u>Water</u>	

Notes



HS = headspace of split spoon

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. **CECAL17**
 Client **USAEC**
 Project **CRREL**
 Case No. **67063**

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
20	S5	HS=0.0	SC			<p><u>Grout mixture:</u> One bag (94 lbs) of Blue Circle Portland Cement: 4.5 lbs. Super Gel-X Bentonite powder: 7 gal water.</p> <p>Top of grout lift</p>
22			ML			
24						
25	S6	HS=D.0			ML	
27					Joint	
30	S7	HS=D.0	ML			
32						
35	S8	HS=0.1			ML	
37					SC	
40	S9	HS=0.1	CL		Joint	
42						
45	S10	HS=0.2			CL	
47						
48					Joint	

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. **CECRL17**
Client **USAEC**
Project **CBREL**
Case No. **67063**

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
50	S11	HS=D.D	CL			
52			ML			
55	S12	HS=D.D				
57						
60	S13	HS=D.D	ML			
62						
65	S14	HS=D.D				
67						
70	S15	HS=D.D	CL			
72						
75	S16	HS=D.D				
77						
78						

The diagram shows a vertical well with several components. The **Stratigraphy** column shows alternating layers of CL (Clay) and ML (Mudstone). The **Annulus** column shows a **Riser / Casing** and **Grout** sections. The **Well** column shows **Joint** locations and a **78' Top of bentonite seal (Pure Gold Medium Chips)** at the bottom. Arrows point from the Stratigraphy, Annulus, and Well columns to the corresponding layers in the well diagram.

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. CEB17
Client USAEC
Project CRBEL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram		Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
80	S17 Water Table at PLH	HS=0.0			
			Bentinite		83' BGS: Top of sand pack (Valve Grade I)
	S18	HS=0.0	ML	Riser / Casing	
90	S19	HS=0.0	ML		88' Top of well screen (PVC 10-slot)
	S20	HS=0.0	ML	SAND	
100	S21	HS=0.0	ML	PVC 10-slot screen	
	S22	HS=0.0	ML		
109					108' Bottom of screen 109' Bottom of borehole

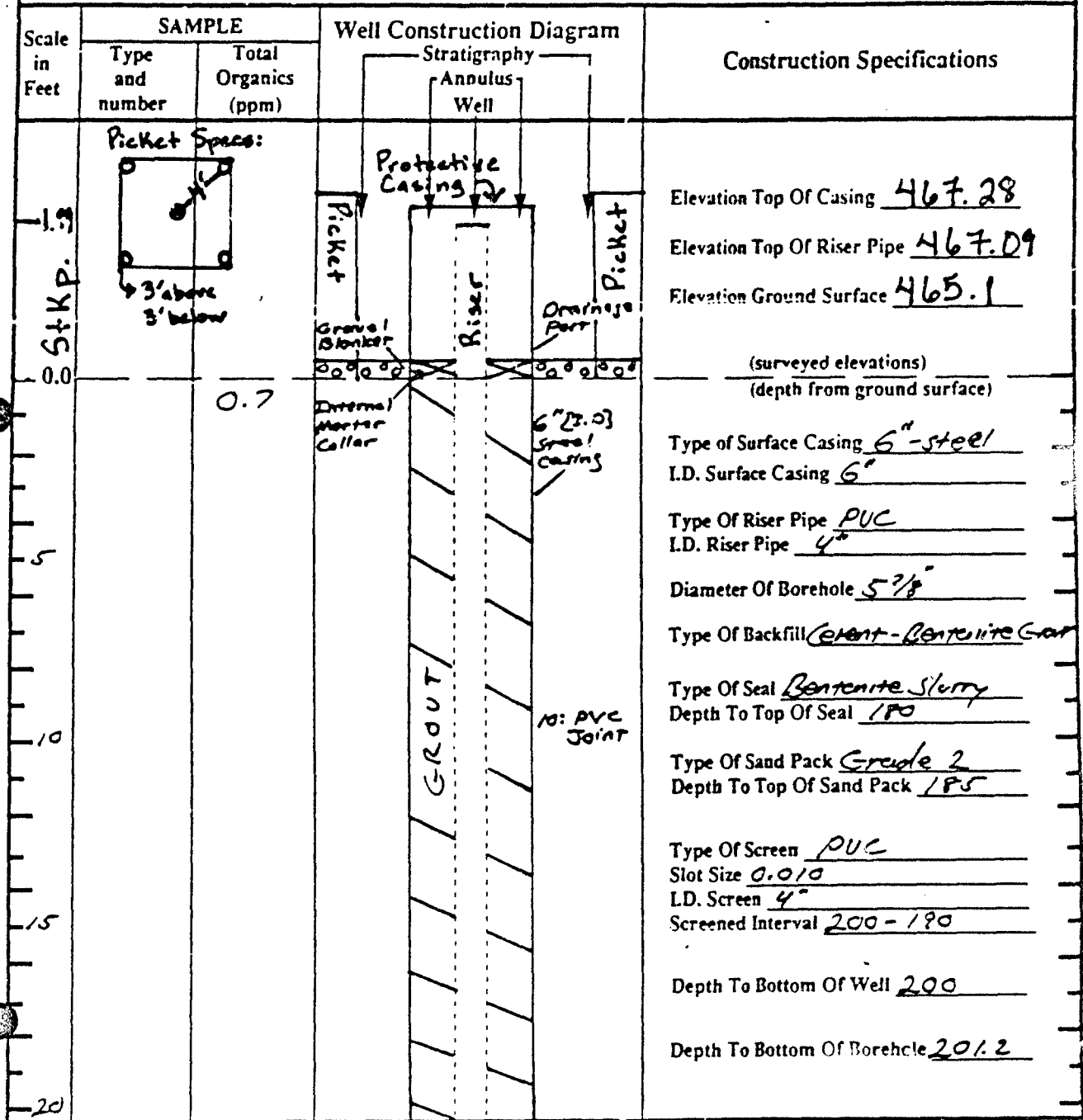
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Monitoring Well Design

Boring No. CECL 18
 Client USAEC
 Project CRREL
 Case No. 67063

Date Start 8-3-93 | Date Complete 8-1-93 | Hole Diameter 5 7/8" = 0.49' | Casing Size 4" = 0.33'
 Contractor EOI | Geologist W. Dowling
 Drill Method Mud Rotary - Casing | Boring Depth 201.2
 Type Of Rig Acker 40-2, 5 cyl. | Grout method Tremie
 Datum NGVD of 1929 | Development Method

Notes



Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. CECRL 1
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram					Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well			
20							20: PVC Joint	
25								
30		20					30: Top of 1 st Grout Lift PVC Joint	
35								
40		10					40: PVC Joint	
45								

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Monitoring Well Design

(Continuation Page)

Boring No. CECRL1
Client USAEC
Project CRRL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram					Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well			
50		20						50: PVC JOINT
55								
60								60: PVC JOINT
65								
70		10						70: PVC JOINT
75								

GROUT

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. CECR 218
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram				Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well		
80						80: Top of 2nd Grout Lift - PVC JOINT	
85		2					
90						90: PVC JOINT	
95							
100		8				100: PVC JOINT	
105							

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. CECRL 18
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
-110		2.5				110: PVC Joint
-115						
-120		5				120: PVC Joint
-125						
-130		15				130: Top of 1 st Grout Lift PVC Joint
-135		12				

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. *C5CRL 18*
Client *USAEC*
Project *CRRL*
Case No. *67063*

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Anulus Well		
142						
145						
150		10				140: PVC Joint
155		23	GROUT			150: PVC Joint
160						160: PVC Joint
165						

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Monitoring Well Design

(Continuation Page)

Boring No. *CECRL 18*
Client *USAEC*
Project *CRRL*
Case No. *67063*

Scale in Feet	SAMPLE		Well Construction Diagram				Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well		
170		1.8				170: PVC Joint	
175						178.0: Top of Bedrock 179: Bottom of 6" Steel Casing	
180						180: PVC Joint	
185						185: Top of Sand Pack	
190						190: Top of Screen	
195						198.5: Water Bearing Fractures N41E/35E and N50W/44N	

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Monitoring Well Design

(Continuation Page)

Boring No. CECL 18
Client USAEC
Project CRRBL
Case No. 67063

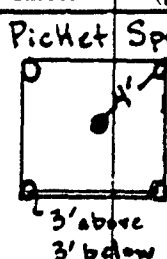
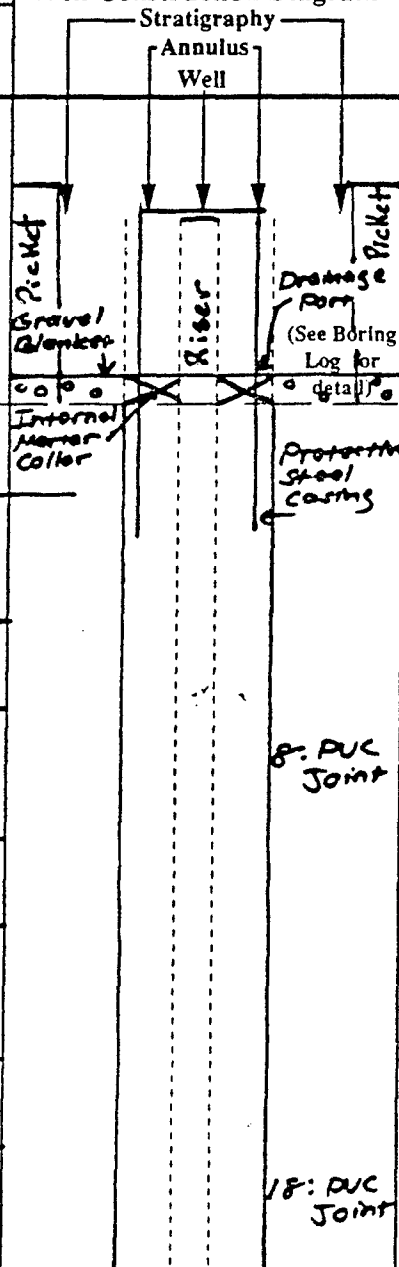
Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
200						200': Bottom of Screen
						201.2': Bottom of Borehole
205						BOREHOLE DIAMETERS: - 6" STEEL CASING = 8 3/4" - 4" PVC [IN BEDROCK] = 5 7/8"

Monitoring Well Design

Boring No. CECRL19
 Client USABC
 Project CRREL
 Case No. 67063

Date Start 8-3-93 | Date Complete 8-4-93 | Hole Diameter 0.85' | Casing Size 0.33'
 Contractor EDI | Geologist W. Dowling
 Drill Method Hollow Stem Auger | Boring Depth 175'
 Type Of Rig Failing F-6 | Grout method Tremie
 Datum NGVD of 1929 | Development Method Watera Submersible Pa

Notes

Scale in Feet	SAMPLE		Well Construction Diagram		Construction Specifications
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
1.72 Stickup 0.0 5 10 15 20	Picket Specs: 				Elevation Top Of Casing <u>467.11</u> Elevation Top Of Riser Pipe <u>466.72</u> Elevation Ground Surface <u>465.0</u> (surveyed elevations) (depth from ground surface) Type Of Surface Casing <u>Steel</u> I.D. Surface Casing <u>0.5'</u> Type Of Riser Pipe <u>PVC</u> I.D. Riser Pipe <u>0.33'</u> Diameter Of Borehole <u>0.85'</u> Type Of Backfill <u>Cement-Bant. Grout</u> Type Of Seal <u>Bentonite Pellets</u> Depth To Top Of Seal <u>28'</u> Type Of Sand Pack <u>Grade 2</u> Depth To Top Of Sand Pack <u>83'</u> Type Of Screen <u>PVC</u> Slot Size <u>0.010</u> I.D. Screen <u>0.33'</u> Screened Interval <u>108-88'</u> Depth To Bottom Of Well <u>108'</u> Depth To Bottom Of Borehole <u>175'</u>
	S-1	MS=0.4	Internal Marker Collar		
	S-2	MS=349 BS=0.5		8" PVC Joint	
	S-3	MS=589			
	S-4	MS=282 BS=0.7		18" PVC Joint	

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Monitoring Well Design
(Continuation Page)

Boring No. CEERL 19
Client USAEC
Project CRRBL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram		Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
20	S-5	HS=117 BS=10	ML		
25	S-6	HS=62	ML		
30	S-7	HS=27	CL		28': Top of 1 st Grout Lift PVC Joint
35	S-8	HS=68	CL		
40	S-9	HS=27	CL		32': PVC Joint
45	S-10	HS=6.9	CL		
					48': PVC Joint

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Monitoring Well Design
(Continuation Page)

Boring No. CECRL 19
Client USATC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram		Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus-Well	
50	S-11	HS=1.0	CL	/	
55	S-12	HS=7.0	CL	/	58: PVC Joint
60	S-13	HS=27	CL	/	
65	S-14	HS=24	ML	/	68: PVC Joint
70	S-15	HS=3.4	ML	/	
75	S-16	HS=2.4 BS=1.8	ML	/	78: Top of Bentonite Seal PVC Joint

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. CECRL 19
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram				Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well		
80	S-17	HS=2.4	ML	BEURONITE	PVC CASING		83': Top of Sand Pack
85	S-18	HS=3.1 BS=1.0	ML				88': Top of Screen PVC Joint
90	S-19	HS=2.7	ML				
95	S-20	HS=3.8	SM / ML	SAND	SCREEN		99': PVC Joint
100	S-21	HS=2.1	SM				
105	S-22	HS=1.4	SM				109-175: Grout

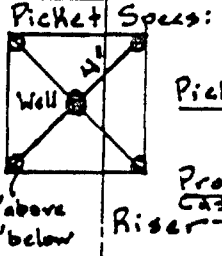
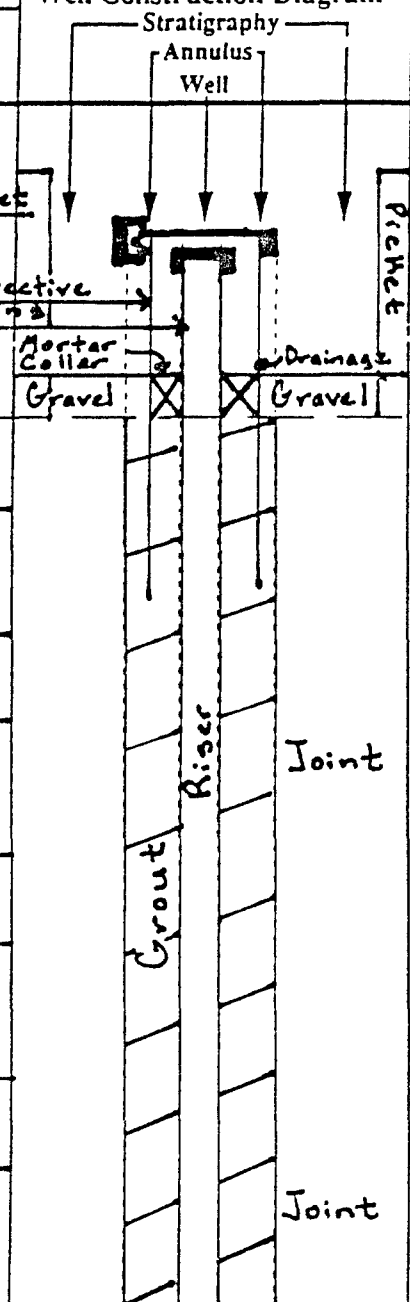
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Monitoring Well Design

Boring No. CECRL20
 Client USAEC
 Project CRREL
 Case No. 67063

Date Start 7/8/93 | Date Complete _____ | Hole Diameter 0.85' | Casing Size 0.33'
 Contractor Environmental Drilling | Geologist C. Stover
 Drill Method Hollowstem Auger | Boring Depth 139.0 ft
 Type Of Rig Failing Truck Mounted F-6 | Grout method Tremie
 Datum NGVD of 1929 | Development Method Submersible Pump

Notes

Scale in Feet	SAMPLE		Well Construction Diagram		Construction Specifications
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus - Well	
1.69'	Picket Specs: 				Elevation Top Of Casing <u>497.26</u> (2.5 ft. AGS) Elevation Top Of Riser Pipe <u>496.98</u> (2.3 ft AGS) Elevation Ground Surface <u>495.3</u> _____ (surveyed elevations) (depth from ground surface)
0.0	S1	HS=0.0			Type of Surface Casing <u>Steel</u> I.D. Surface Casing <u>0.5'</u>
2					Type Of Riser Pipe <u>PVC schd 40</u> I.D. Riser Pipe <u>0.33'</u>
4					Diameter Of Borehole <u>0.85'</u>
6	S2	HS=0.0			Type Of Backfill <u>NA</u>
8					Type Of Seal <u>Bentonite Chips</u> Depth To Top Of Seal <u>117.5 ft.</u>
10	S3	HS=0.0			Type Of Sand Pack <u>Valve Grade II</u> Depth To Top Of Sand Pack <u>123.0 ft</u>
12					Type Of Screen <u>PVC schd 40</u> Slot Size <u>0.010 in.</u> I.D. Screen <u>.33'</u> Screened Interval <u>128-138'</u>
14					Depth To Bottom Of Well <u>138 ft</u>
16	S4	HS=0.0			Depth To Bottom Of Borehole <u>139 ft</u>
18					All joints PVC threaded
20					

HS = headspace of split spoon

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Monitoring Well Design
(Continuation Page)

Boring No. CECR127
 Client USAEC
 Project CRREL
 Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
20	S5	HS=0				<p><u>Grout composition:</u> One 94 lb. bag of Blue Circle Portland Cement: 4.5 lbs Super Gel-X bentonite: 7 gallons water</p>
22						
24						
26	S6	HS=0	ML			
28					Joint	
30	S7	HS=0				
32						
34						
36	S8	HS=.1	ML	Grout RISER		
38					Joint	
40						
42	S9	HS=.4			ML	
44						
46	S10	HS=.4	CL SM			
48					Joint	

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Monitoring Well Design
(Continuation Page)

Boring No. CECK170
Client USAEC
Project CBREL
Case No. 67063

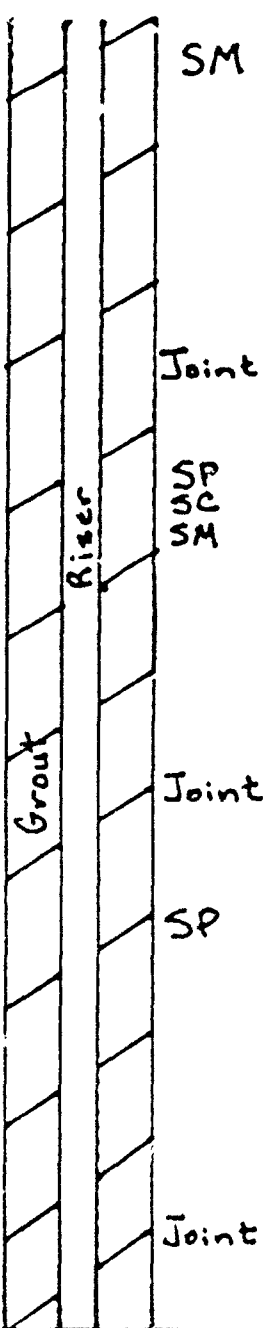
Scale in Feet	SAMPLE		Well Construction Diagram				Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy				
			Annulus Well				
50	S11	HS=0				AL SM	
52							
54							
56	S12	HS=.1	SM				
58						Joint	
60	S13	HS=.4				SM	
62							
64							
66	S14	HS=0	SM	Grout			Top of grout lift #1
68						Joint	
70	S15	HS=1.2		Riser		SM	
72							
74							
76	S16	HS=.4	SM				
78						Joint	

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Monitoring Well Design
(Continuation Page)

Boring No. CECRL21
Client USAEC
Project CRREL
Case No. 67068

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
80	S17	HS=.4				
82			SP			
84						
86	S18	H3=0	SM			
88						Joint
90	S19	HS=0				SP SC SM
92						
94						
96	S20	HS=0	SP			
98						Joint
100	S21	HS=0				SP
102						
104						
106	S22	HS=0	SP			
108						Joint



Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. CECRL21
Client USAEC
Project CRREL
Case No. 67068

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
110						
112	S23	HS=0				
114						
116	S24	HS=2.4	SP	Grout		
118	Water table at 118' based on saturated soil sample at 120-22' sand heave at 128' and very moist sample at 125'.		Δ			Top of bentonite (Pure Gold medium chips) seal: 117.5'
120						
122	S25	HS=0		Bentonite Chips		
124						Top of sand pack: 123'
126	S26	HS=0	SW	RISER		
128						Top of screen: 128' Screen is 10 ft. below water table. Open Area /ft. for slotted screen: 2.48 /ft.
130						
132						
134						
136						
138						Bottom of screen: 138' PVC plug Bottom of borehole: 139'

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Monitoring Well Design

Boring No. 9SBZ
 Client USAEC
 Project CRREL
 Case No. 67063

Date Start 8-9-93 | Date Complete 8-11-93 | Hole Diameter 0.85' | Casing Size 0.33'
 Contractor E. D. I. | Geologist S. C. Stover / C. Kovatch
 Drill Method Hollow Stem Auger | Boring Depth 91'
 Type Of Rig ACK ADZ | Grout method tremie
 Datum NA | Development Method NA

Notes Soil Venting Well

Scale in Feet	SAMPLE		Well Construction Diagram		Construction Specifications
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
0.0					Elevation Top Of Casing <u>NA</u> Elevation Top Of Riser Pipe <u>NA</u> Elevation Ground Surface <u>NA</u> (surveyed elevations) (depth from ground surface)
1	S1	HS=0.0	ML		Type of Surface Casing <u>none</u> I.D. Surface Casing <u>none</u>
2	1005	BS=0.0			Type Of Riser Pipe <u>0.33' PVC</u> I.D. Riser Pipe <u>0.33'</u>
3					Diameter Of Borehole <u>0.85'</u>
4					Type Of Backfill <u>none</u>
5	S2	HS=0.0	CL		Type Of Seal <u>Cement-Bentonite</u> Depth To Top Of Seal <u>0'</u>
6	1015	BS=0.0	ML	GROUT	Type Of Sand Pack <u>No. 2 Sand</u> Depth To Top Of Sand Pack <u>49'</u>
7				RISER	Type Of Screen <u>0.33' PVC</u> Slot Size <u>0.010"</u> I.D. Screen <u>0.33'</u> Screened Interval <u>91-49'</u>
8					Depth To Bottom Of Well <u>91'</u>
9	S3	HS=0.0	ML		Depth To Bottom Of Borehole <u>91'</u>
10	1025		CL	PVC Joint Threaded	

↑ 2.55' Stickup

GROUT
RISER
GROUT

← PVC Joint Threaded

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Monitoring Well Design
(Continuation Page)

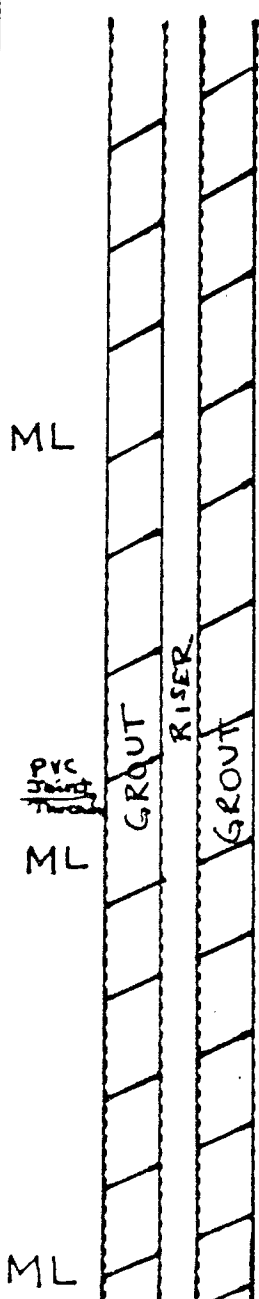
Boring No. 95B2

Client USAEC

Project CRREL

Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram		Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
10					
11					
12					
13					
14					
15	S4	HS=0.0 BS=0.0 H=0.0	ML		
16	1032				
17					
18					
19	S5	HS=0.0 BS=0.0 H=0.0	ML		
20					
21	1045				
22					
23					
24	S6 1055	HS=0.0 BS=0.0	ML		



Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 9SB2
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
25						
26						
27						
28						
29						
30	S7	HS=0.0 BS=0.0 H=0.0	ML			
31	1110					
32						
33						
34						
35	S8	HS=0.0 BS=0.0 H=0.0	ML			
36	1122					
37						
38						
39	S9 Shelby	NA				39-41' Shelby Tube

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Monitoring Well Design
(Continuation Page)

Boring No. 9SB2
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
40						
41						
42						
43						
44						
45	S9	HS=0.0 BS=0.0	ML	GROUT	RISER	GROUT
46	1150					
47						
48						
49						
50	S10	HS=49.0 BS=0.0	ML			
51	1215	H=0.0				
52						
53				SAND	SAND	
54	S11 1345	HS=162.1 BS=0.0	ML SM			

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 9SB2
Client USAEC
Project CRREL
Case No. 107063

Scale in Feet	SAMPLE		Well Construction Diagram		Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
55					
56					
57					
58					
59	S12	HS=52.1	ML SM	SAND SCREEN SAND	
60		BS=0.0			
61	1358				
62					
63					
64					
65	S13 1420	HS=1.5 BS=0.0 H=7.7	SM		
66					
67					
68					
69	S14 1450	HS=18.2 BS=0.0	SM		

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 9SBZ
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram		Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
70					
71					
72					
73					
74					
75	S15	HS=7.2 BS=0.0	SM		
76	1510	H=0			
77					
78					
79					
80	S16	HS=26.0 BS=0.0	SM		
81	1544	H=0.0			
82					
83					
84	S17 1610	HS=7.2 BS=0.0	SM		

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. 9SB2

Client USAEC

Project CRREL

Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram		Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
85					
86					
87					
88					
89					
90	S18	HS=20.8 BS=0.0	SAND SCREEN SAND	SM	91' - Bottom of 6" Auger bore 8-9-93 - Sampled from 0-101' with 4" Augers. Pulled out 4" Augers and hole caved in up to 83'.
91	1645				
92					
93					
94					
95	S19	HS=0.0 BS=0.0	SM	SM	8-10-93 - Auger down with 6" Augers to 91'.
96	1720				
97					
98					
99	520	HS=0.0	SM	SM	99' - Bottom of 4" Auger borehole.
100	1745	BS=0.0 H=0.0			

Arthur D Little	Monitoring Well Design		Boring No. <u>9583</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>
Date Start <u>8-9-93</u>	Date Complete <u>8-10-93</u>	Hole Diameter <u>0.85'</u>	Casing Size <u>0.33'</u>
Contractor <u>Environmental Drilling Inc.</u>		Geologist <u>C. Kovatch</u>	
Drill Method <u>Hollow Stem Auger</u>		Boring Depth <u>115'</u>	
Type Of Rig <u>Failing F-6</u>		Grout method <u>gravity</u>	
Datum <u>NA</u>		Development Method <u>NA</u>	

Notes Soil Venting Well

Scale in Feet	SAMPLE		Well Construction Diagram		Construction Specifications
	Type and number	* Total Organics (ppm)	Stratigraphy	Annulus Well	
0.0					Elevation Top Of Casing <u>NA</u> Elevation Top Of Riser Pipe <u>NA</u> Elevation Ground Surface <u>NA</u> (surveyed elevations) (depth from ground surface)
1	S-1	15.1	OL		Type of Surface Casing <u>none</u> I.D. Surface Casing <u>none</u>
2					Type Of Riser Pipe <u>0.33' PVC</u> I.D. Riser Pipe <u>0.33'</u>
3					Diameter Of Borehole <u>0.85'</u>
4					Type Of Backfill <u>none</u>
5					Type Of Seal <u>Cement-Bentonite</u> Depth To Top Of Seal <u>0'</u>
6	S-2	9.2	ML		Type Of Sand Pack <u>No. 2 Sand</u> Depth To Top Of Sand Pack <u>10'</u>
7		BS=0.0			Type Of Screen <u>0.33' PVC</u> Slot Size <u>0.010"</u> I.D. Screen <u>0.33'</u> Screened Interval <u>10-115'</u>
8					Depth To Bottom Of Well <u>115'</u>
9					Depth To Bottom Of Borehole <u>115'</u>
10					

*Total Organics = headspace unless otherwise noted.
BS = Breathing Space

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Monitoring Well Design

(Continuation Page)

Boring No. 9583
 Client USAEC
 Project CRREL
 Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram		Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
10					<p>10'-Top of screen + Sand Bottom of Risers Grout</p> <p>Samples taken: Chemical- BTEX, VOCs Geologic -</p> <p>Note: Drilling began with 4" Augers; at 50', drillers switched to 6" Auger when we saw a well would be necessary.</p>
11	S-3	69.5	ML CL ML		
12		BS=0			
13					
14					
15					
16	S-4	92.5	ML		
17					
18					
19					
20					
21	S-5	244	ML		
22		BS=0			
23					
24					

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Monitoring Well Design
(Continuation Page)

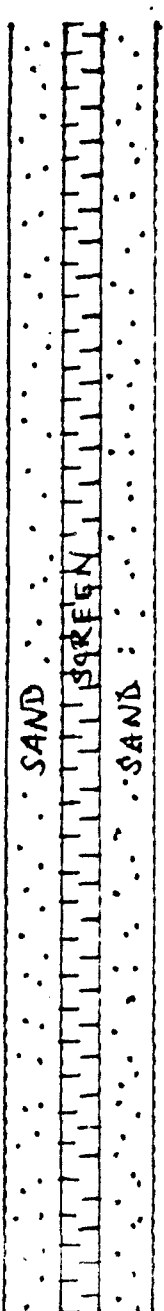
Boring No. 9SB3

Client USAEC

Project CRREL

Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram				Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well		
25							
26	S-6	1365	ML				
27							
28							
29							
30							
31	S-7	1145 BS=0	ML				
32							
33							
34							
35							
36	S-8	2477	ML				
37							
38							
39							

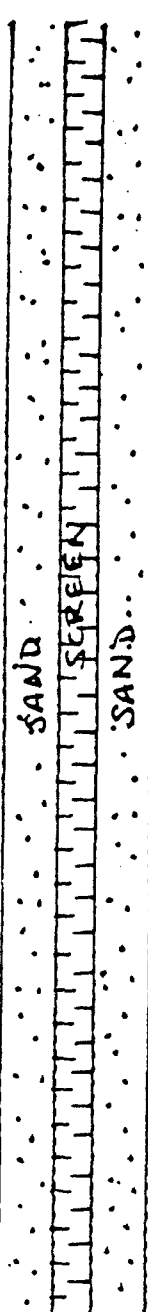


Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 95B3
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
40						
41	S-9	3068	ML			
42						
43						
44						
45						
46	S-10	580	ML			
47						
48						
49						
50						
51	S-11	1357	ML			
52		BS=0				
53						
54						



Arthur D Little

Monitoring Well Design
(Continuation Page)

Drawing No. 7383
Client USAEC
Project CRREL
Case No. 67063

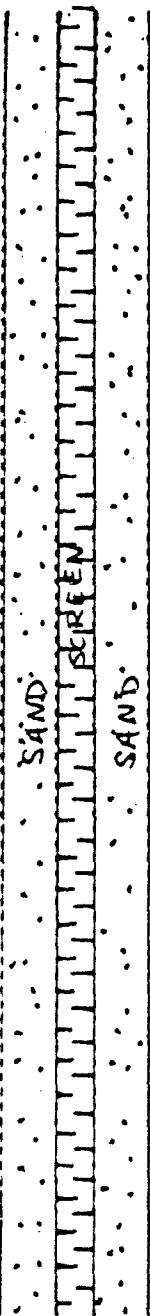
Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
55						
56	S-12	213	ML			
57		BS=0				
58						
59						
60						
61	S-13	80.4	ML			
62		BS=0				
63						
64						
65						
66	S-14	30.6	ML			
67						
68		BS=0				
69						

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 9SB3
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram		Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
70			ML		
71	S-15	95.2	SM		
72					
73					
74					
75					
76	S-16	5.0	sm		
77		BS = 0			
78		BS = 0			
79					
80					
81	S-17	66.7	SM		
82					
83		BS = 0			
84					



Arthur D Little

Monitoring Well Design
(Continuation Page)

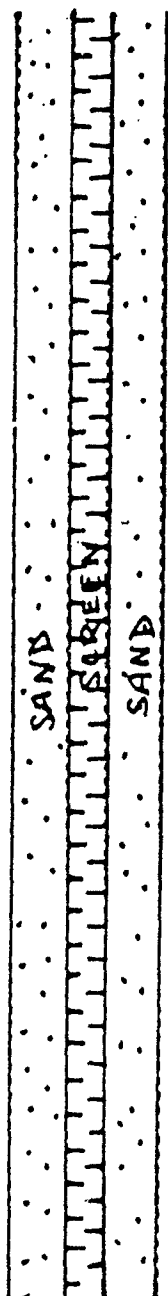
Boring No. 95B3

Client USAEC

Project CRREL

Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram				Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well		
85							
86	S-18	0.0	SM				
87							
88		BS=0					
89							
90							
91	S-19	5.0	SM				
92							
93		BS=0					
94							
95							
96	S-20	0.0	SM				
97							
98							
99							



Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. 95B3
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
100						
101	S-21	700	SM			
102						
103						
104						
105						
106	S-22	272	SM			
107						
108						
109						
110						
111	S-23	100	SM			
112						
113						
114						
115						

SAND
SCREEN
SAND

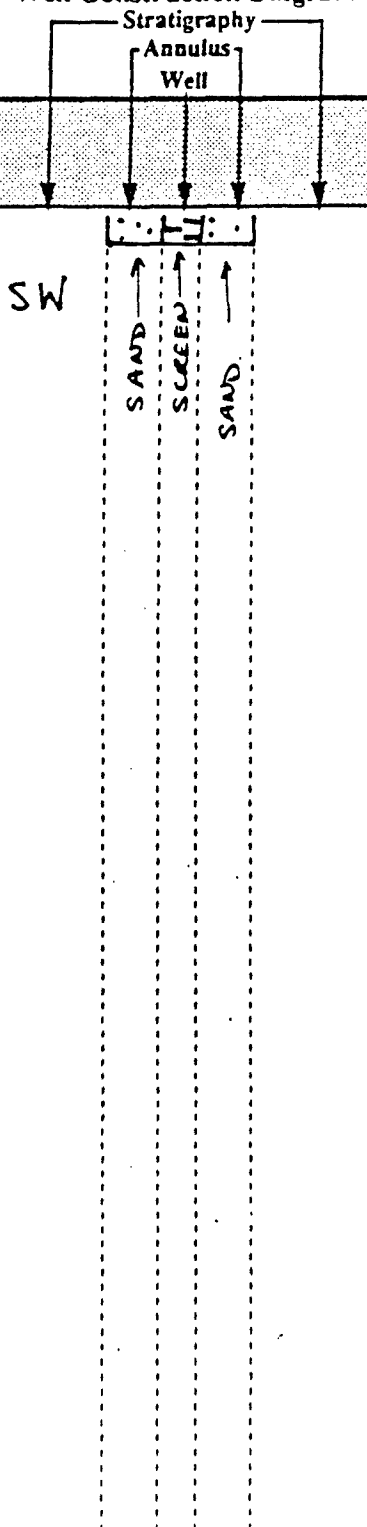
last sample taken 8-9-93

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. 9SB3
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram		Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
115					
116	S-24	13	SW		115' - Bottom of borehole Bottom of Screen. only sample taken 8-10-93
117					

Screened Interval:
10-115'

Arthur D Little

Monitoring Well Design

Boring No. 95B4
 Client USAEC
 Project CRREL
 Case No. 67063

Date Start 8/7/93	Date Complete 8/7/93	Hole Diameter 0.60'	Casing Size .33'
Contractor Environmental Drilling		Geologist C. Stoyer	
Drill Method Hollowstem Auger		Boring Depth 51.0'	
Type Of Rig Acker AD2		Grout method Tremie	
Datum NA		Development Method -	

Notes Ventilation Well

Scale in Feet	SAMPLE		Well Construction Diagram		Construction Specifications
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
14.5 15 16 17 18 19 20					Elevation Top Of Casing <u>NA</u> Elevation Top Of Riser Pipe <u>NA</u> (2.5 ft AGS) Elevation Ground Surface <u>NA</u> (surveyed elevations) (depth from ground surface)
0.0	S1	HS=0.0 BS=0.0 MOLE=0.0	ML		Type of Surface Casing <u>NONE</u> I.D. Surface Casing <u>NONE</u>
2					Type Of Riser Pipe <u>PVC schd 40</u> I.D. Riser Pipe <u>.33'</u>
4	S2	HS=120.0 BS=0.0		PVC Joint ML	Diameter Of Borehole <u>.60'</u> Type Of Backfill <u>-</u>
6					Type Of Seal <u>Cement-Bentonite</u> Depth To Top Of Seal <u>0' / 21'</u>
8			ML		Type Of Sand Pack <u>Valve No. 2</u> Depth To Top Of Sand Pack <u>4'</u>
10	S3	HS=159.0 BS=0.0		PVC Joint ML	Type Of Screen <u>PVC schd 40</u> Slot Size <u>0.010</u> I.D. Screen <u>.33'</u> Screened Interval <u>21-4'</u>
12					Depth To Bottom Of Well <u>21'</u>
14	S4	HS=118.0 BS=0.0			Depth To Bottom Of Borehole <u>51'</u>
16			ML		
18					
20	S5	HS=111.1 BS=0.0			

HS = headspace

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 9534
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
20			ML			Screened interval: 21-4' BGS Top of grout: 21.0' BGS
22						
24	S6	HS=0.0 BS=0.0			ML	
26						
28			ML			
30	S7	HS=0.0 BS=0.0 Hole=0.0			ML	
32						
34	S8	HS=0.0 BS=0.0	ML			
36						
38					ML	
40	S9	HS=0.0 BS=0.0	ML			
42						
44	S10	HS=0.0 BS=0.0			ML	
46						
48						
	S11	HS=0.0 BS=0.0				

HS = headspace
BS = breathing space

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No.	95B4
Client	USAEC
Project	CBREL
Case No.	67063

Scale in Feet	SAMPLE		Well Construction Diagram		Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus-Well	
48 50					Bottom of borehole at 51.0'

Arthur D Little

Monitoring Well Design

Boring No. 95B4

Client USAEC

Project CBREL

Case No. 67063

Date Start 8/7/93

Date Complete 8/7/93

Hole Diameter .61'

Casing Size .33'

Contractor Environmental Drilling

Geologist C. Stoyer

Drill Method Hollowstem Auger

Boring Depth 51.0'

Type Of Rig Acker AD2

Grout method Tremie

Datum NA

Development Method -

Notes -

Scale in Feet	SAMPLE		Well Construction Diagram		Construction Specifications
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
0.0					Elevation Top Of Casing <u>NA</u>
					Elevation Top Of Riser Pipe <u>NA</u> (2.5 ft AGS)
					Elevation Ground Surface <u>NA</u>
					(surveyed elevations)
					(depth from ground surface)
2	S1	HS=0.0 BS=0.0 HOLE=0.0	ML		Type of Surface Casing <u>NONE</u>
4	S2	HS=120.0 BS=0.0	ML		I.D. Surface Casing <u>NONE</u>
6			ML		Type Of Riser Pipe <u>PVC schd 40</u>
8			ML		I.D. Riser Pipe <u>.33'</u>
10	S3	HS=159.0 BS=0.0	ML		Diameter Of Borehole <u>.61'</u>
12			ML		Type Of Backfill <u>-</u>
14	S4	HS=118.0 BS=0.0	ML		Type Of Seal <u>Cement-Bentonite</u>
16			ML		Depth To Top Of Seal <u>0' / 21'</u>
18			ML		Type Of Sand Pack <u>Valve No. 2</u>
20	S5	HS=111.1 BS=0.0	ML		Depth To Top Of Sand Pack <u>4'</u>
					Type Of Screen <u>PVC schd 40</u>
					Slot Size <u>0.010</u>
					I.D. Screen <u>.33'</u>
					Screened Interval <u>21-4'</u>
					Depth To Bottom Of Well <u>21'</u>
					Depth To Bottom Of Borehole <u>51'</u>

NA - Not Applicable

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 95B4
Client USAEC
Project CBREL
Case No. 167063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
20			ML			Top of grout: 21.0' BGS
22						
24	S6	HS=0.0 BS=0.0			ML	
26						
28			ML			
30	S7	HS=0.0 BS=0.0 Hole=0.0			ML	
32						
34	S8	HS=0.0 BS=0.0	ML			
36						
38					ML	
40	S9	HS=0.0 BS=0.0	ML			
42						
44	S10	HS=0.0 BS=0.0			ML	
46						
48						
	S11	HS=0.0 BS=0.0				

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 95B4
 Client USAEC
 Project CBEL
 Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
48 50			ML		ML	Bottom of borehole at 51.0'

Monitoring Well Design

Boring No. 25B3
 Client USAEC
 Project CRREL
 Case No. 67063

Date Start 7-21-93 | Date Complete 7-21-93 | Hole Diameter 0.60' | Casing Size 0.33'
 Contractor EOI | Geologist W. Dowling
 Drill Method Hollow Stem Auger | Boring Depth 67'
 Type Of Rig Failing F-6 | Grout method Tremie
 Datum NA | Development Method N/A

Notes Soil Ventilation Well

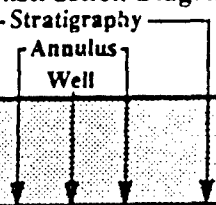
Scale in Feet	SAMPLE		Well Construction Diagram		Construction Specifications
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
240 Stickup			↓	↓	Elevation Top Of Casing <u>NA</u>
0.0			↓	↓	Elevation Top Of Riser Pipe <u>NA</u>
1	S-1	HS=0	↓	↓	Elevation Ground Surface <u>NA</u>
2			↓	↓	(surveyed elevations)
3			↓	↓	(depth from ground surface)
4			↓	↓	Type of Surface Casing <u>None</u>
5			↓	↓	I.D. Surface Casing <u>None</u>
6	S-2	HS=0	↓	↓	Type Of Riser Pipe <u>0. PVC, Sched. 40</u>
7			↓	↓	I.D. Riser Pipe <u>0.33'</u>
8			↓	↓	Diameter Of Borehole <u>0.60</u>
9			↓	↓	Type Of Backfill <u>None</u>
10			↓	↓	Type Of Seal <u>Cement-Bent. Grout</u>
			↓	↓	Depth To Top Of Seal <u>0'</u>
			↓	↓	Type Of Sand Pack <u>Grade 2</u>
			↓	↓	Depth To Top Of Sand Pack <u>5'</u>
			↓	↓	Type Of Screen <u>PVC</u>
			↓	↓	Slot Size <u>0.010</u>
			↓	↓	I.D. Screen <u>0.33'</u>
			↓	↓	Screened Interval <u>57'-5'</u>
			↓	↓	Depth To Bottom Of Well <u>57'</u>
			↓	↓	Depth To Bottom Of Borehole <u>67'</u>

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 2583
 Client USAF
 Project CAREL
 Case No. 67063

in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
10			ML		ML	
11	S-3	0				
12						
13						
14						
15			ML		ML	
16	S-4	100				
17						
18						
19						
20			ML		ML	
21	S-5	800				
22						
23						
24						



SAND
SCREEN

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 2503
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram		Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
25			ML	ML	
26	S-6	2000			
27					
28					
29					
30			ML	ML	
31	S-7	900			
32					
33					
34					
35			ML	ML	
36	S-8	130			
37					
38					
39					

SAND
SCREEN

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. 25B3
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram		Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
40			SM	SM	
41	S-9	0			
42					
43					
44					
45			SM	SM	
46	S-10	0			
47					
48					
49					
50			SM	SM	
51	S-11	19			
52					
53					
54					

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 2533
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram				Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well		
55			SM			SM	
56	S-12	47					
57							
58							BOTTOM OF SAND: 58' TOP OF G-ROUT: 58'
59							
60			SM			SM	
61	S-13	0					
62							
63							
64							
65			SP			SP	
66	S-14	0					
67							BOTTOM OF BORE HOLE = 67'

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Monitoring Well Design

Boring No. 2584

Client USAEC

Project CRREL

Case No. 67063

Date Start 8-5-93 Date Complete 8-5-93 Hole Diameter 0.85' Casing Size 0.33'

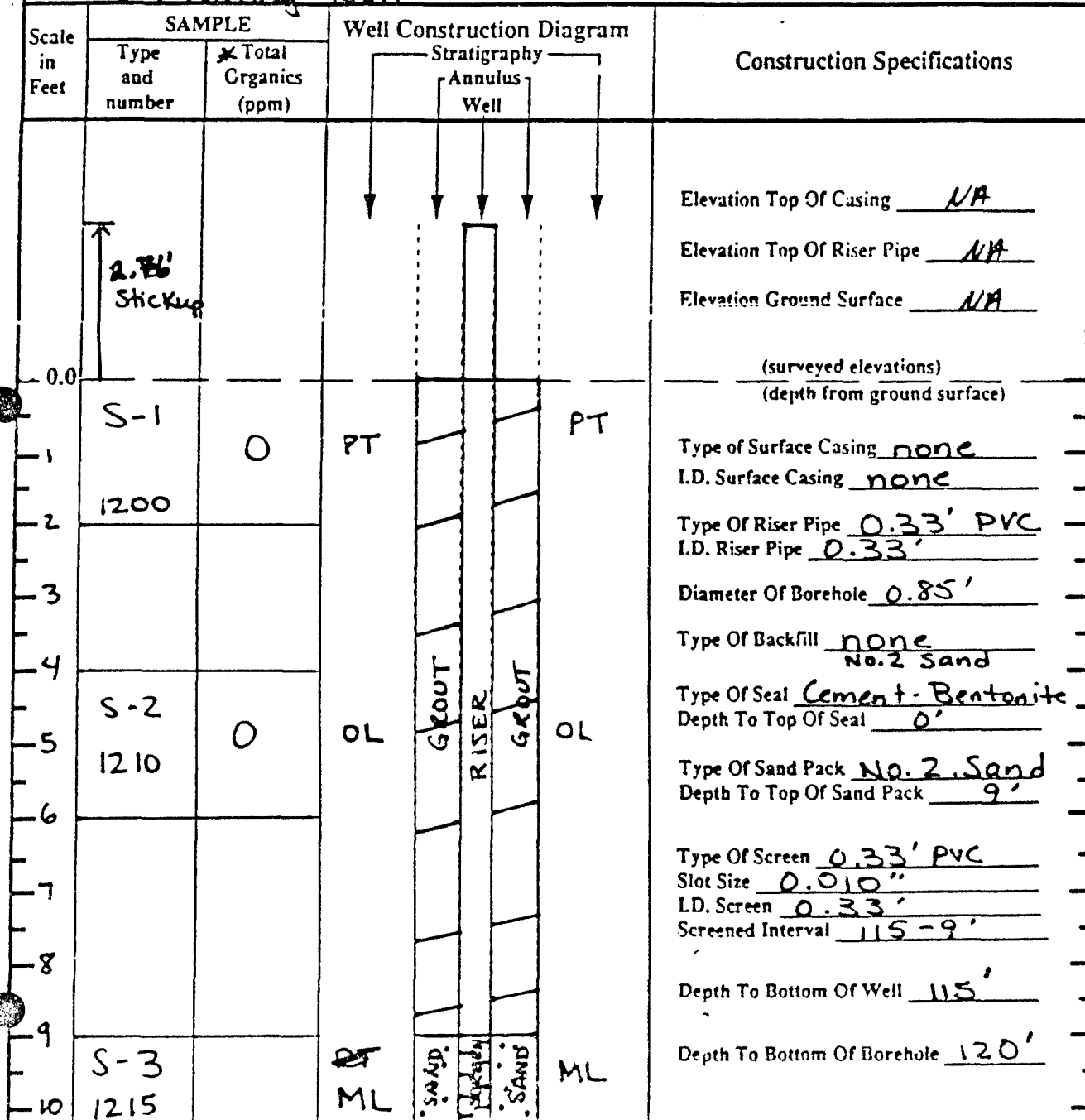
Contractor Environmental Drilling Inc. Geologist C. Kovatch

Drill Method Hollow Stem Auger Boring Depth 120'

Type Of Rig Acker AD2 Grout method gravity

Datum NA Development Method NA

Notes Soil Venting Well



* Total organics = headdress unless otherwise noted

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. 25B4

Client USAEC

Project CRREL

Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
10						<p>Top of Screen: 9'</p> <p>Note: Screened interval was planned to be 14-120', however, 5' were lost; the well rose up + could not be pushed down, therefore screen is from 9-115'</p> <p>115-120' is No. 2 sand</p>
11						
12						
13						
14						
15	S-4 12:30	23	ML		ML	
16						
17						
18						
19						
20	S-5 12:42	56	ML		ML	
21						
22						
23						
24	S-6 12:50	16	ML		ML	

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. 2SB4
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
25						
26						
27						
28						
29						
30	S-7 13:25	0	SM	SAND	SCREEN	SM
31						
32						
33						
34						
35	S-8 13:33	112	SM	SAND	SCREEN	SM
36						
37						
38						
39	S-9 13:45	105	SM	SAND	SCREEN	SM

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. <i>25B4</i>
Client <i>USAEC</i>
Project <i>CRREL</i>
Case No. <i>67063</i>

Scale in Feet	SAMPLE		Well Construction Diagram					Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy					
			Annulus Well					
-40								
-41								
-42								
-43								
-44								
-45	<i>S-10 13:55</i>	<i>207</i>	<i>SM</i>	<i>SAND</i>	<i>SPREW</i>	<i>SAND</i>	<i>SM</i>	
-46								
-47								
-48								
-49								
-50	<i>S-11 14:08</i>	<i>17</i>	<i>SM</i>				<i>SM</i>	
-51								
-52								
-53								
-54	<i>S-12 14:18</i>	<i>15.2</i>	<i>SM</i>				<i>SM</i>	

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 25B4
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram					Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy					
			Annulus Well					
55								
56								
57								
58								
59								
60	S-13 14:30	0	SM	SAND	SCREEN	SAND	SM	
61								
62								
63								
64								
65	S-14 14:47	45.8	SM				SM	
66								
67								
68								
69	S-15 15:10	1.4	SM				SM	

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. 25B4
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
70						
71						
72						
73						
74						
75	S-16 15:30	14.9	SM			SM
76						
77						
78						
79						
80	S-17 15:54	55.7	SM			SM
81						
82						
83						
84	S-18 16:20	120	SM			SM

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 2584
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy			
			Annulus Well			
85						
86						
87						
88						
89						
90	S-19 16:53	0	GM SM	SAND SCREEN SAND	GM SM	
91						
92						
93						
94						
95	S-20 17:17	123	GM SM		GM SM	94' End of boring 7-26-93
96						
97						
98						
99	S-21 07:47	50.1	SM		SM	Begin sampling boring 7-27-93

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 2584
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
100						
101						
102						
103						
104						
105	S-22 0815	15.2	SM SM			SM
106						
107						
108						
109						
110	S-23 0845	5.4	SM SW			SW
111						
112						
113						
114	S-24 0917	115	SW			SW

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. 2 SB4

Client USAEC

Project CRREL

Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram		Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus - Well	
115					115' - Bottom of Screen.
116					
117					See note, page 2.
118					
119	S-25				
120	0955	68.8	SW	SW	120' - Bottom of Borehole.

Arthur D Little

Monitoring Well Design

Boring No. 2SB5
 Client USAEC
 Project CRREL
 Case No. 67063

Date Start 7-26-93 | Date Complete 8/7/93 | Hole Diameter 0.85' | Casing Size 0.33'

Contractor E.D.I. | Geologist C. Kovatch

Drill Method Hollow Stem Auger | Boring Depth 120'

Type Of Rig Failing F-6 | Grout method tremie

Datum NA | Development Method NA

Notes Soil Venting Well

Scale in Feet	SAMPLE		Well Construction Diagram			Construction Specifications
	Type and number	* Total Organics (ppm)	Stratigraphy	Annulus	Well	
						Elevation Top Of Casing <u>NA</u>
						Elevation Top Of Riser Pipe <u>NA</u>
						Elevation Ground Surface <u>NA</u>
						(surveyed elevations)
						(depth from ground surface)
0.0						Type of Surface Casing <u>none</u>
1	S-1	4.5	PT			I.D. Surface Casing <u>none</u>
2						Type Of Riser Pipe <u>0.33' PVC</u>
3						I.D. Riser Pipe <u>0.33'</u>
4						Diameter Of Borehole <u>0.85'</u>
5						Type Of Backfill <u>none</u>
6	S-2	4.8	PT ML SM	GROUT	RISER	Type Of Seal <u>Cement-Bentonite</u>
7				GROUT		Depth To Top Of Seal <u>0'</u>
8						Type Of Sand Pack <u>No. 2 Sand</u>
9						Depth To Top Of Sand Pack <u>20'</u>
10						Type Of Screen <u>0.33' PVC</u>
						Slot Size <u>0.010"</u>
						I.D. Screen <u>0.33'</u>
						Screened Interval <u>120-20'</u>
						Depth To Bottom Of Well <u>120'</u>
						Depth To Bottom Of Borehole <u>120'</u>

2.55' Stickup

PVC Joint + Threaded PT

GROUT

RISER

GROUT

ML SM

* Total Organics by mass = 100% of total sample

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 2SBS
Client USAEC
Project CRREL
Case No. 67063

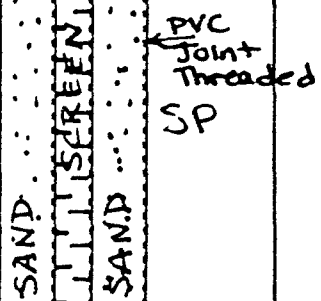
Scale in Feet	SAMPLE		Well Construction Diagram				Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well		
10							
11	S-3	3	SM			SM	Note: Workers were tarring rooftops about 100' away + could be smelled very strongly. (Samples may have picked up some tar.)
12			OL			OL	
13							Note: Split Spoons were impossible to open by hand and therefore had to be opened with wrenches. This took a longer amount of time than usual to get samples from split spoons.
14							
15							
16	S-4	4.1	SM	GROUT	RISER	SM	
17							
18							
19							
20							
21	S-5 001	42.7	SM			SM	← PVC Joint Threaded 20' Top of screen
22							
23	S-6 007	NA		SAND	SCREEN	SAND	22-24' - Shelby Tube
24							

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 2SBS
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
25						
26	S-7 002	71	SM		SM	
27						
28						
29						
30						
31	S-8	49	SP		SP	
32						
33						
34						
35						
36	S-9	28	SP		SP	
37						
38						
39						



Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. 2SBS
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
40						
41	S-10	92	SP CL SP			PVC Joint Threaded SP CL SP
42						
43						
44						
45						
46	S-11 003	290	SP ML ML	SAND	SCREEN	SP ML
47						
48						
49						
50						
51	S-12	29	SP	SAND		PVC Joint Threaded SP
52						
53						
54						

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 2585
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
55						
56	S-13	54	SP		SP	
57						
58						
59						
60						
61	S-14	84	ML SP		PVC Joint Threaded ML SP	
62						
63						
64						
65						
66	S-15	37	SP		SP	
67						
68						
69						

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 2585
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
70						
71	S-16	73	SP SM SP			PVC Joint Threaded SP SM SP
72						
73						
74						
75						
76	S-17	59	SP	SCREEN		SP
77						
78						
79						
80						PVC Joint Threaded
81	S-18	93	SP			SP
82						
83						
84						

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. 25B5
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
85						
86	S-19	34	SP		SP	
87						
88						
89						
90						
91	S-20	56	SP		SP	
92						
93						
94						
95						
96	S-21	20	SP		SP	
97						
98						
99						

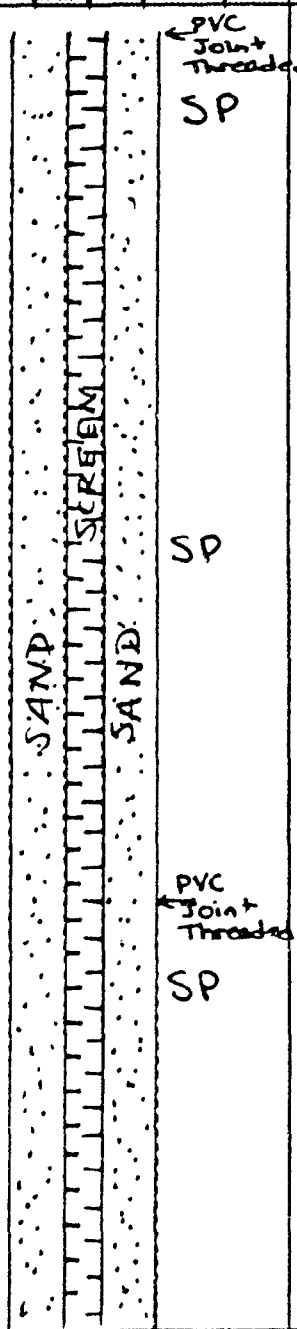
Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. 2SB5
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
100						
101	S-22	63	SP			SP
102						
103						
104						
105						
106	S-23	16	SP			SP
107						
108						
109						
110						
111	S-24	87	SP			SP
112						
113						
114						



Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. 2S85
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
115						
116	S-25	43	SP		SP	
117						
118						
119						
120	S-26 004	54	SP		SP	

120-20' = Screened interval
120' - Bottom of bore hole + bottom of well

Arthur D Little	Monitoring Well Design		Boring No. <u>2SB6</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>
Date Start <u>7-22-93</u>	Date Complete <u>7-22-93</u>	Hole Diameter <u>0.60'</u>	Casing Size <u>0.33'</u>
Contractor <u>E.D.I.</u>		Geologist <u>C. Kovatch</u>	
Drill Method <u>Hollow Stem Auger</u>		Boring Depth <u>120'</u>	
Type Of Rig <u>Failing F-6</u>		Grout method <u>tremie</u>	
Datum <u>NA</u>		Development Method <u>NA</u>	

Notes Soil Venting Well

Scale in Feet	SAMPLE		Well Construction Diagram				Construction Specifications
	Type and number	Total Organics (ppm)	Stratigraphy				
			Annulus Well				
			Well				
							Elevation Top Of Casing <u>NA</u>
							Elevation Top Of Riser Pipe <u>NA</u>
							Elevation Ground Surface <u>NA</u>
							(surveyed elevations)
							(depth from ground surface)
0.0							Type of Surface Casing <u>none</u>
1	SS-1	1.7 HS 0.1 BK	PT			PT	I.D. Surface Casing <u>none</u>
2							Type Of Riser Pipe <u>0.33' PVC</u>
3							I.D. Riser Pipe <u>0.33'</u>
4							Diameter Of Borehole <u>0.</u>
5							Type Of Backfill <u>none No. 2 Sand + caved in soil.</u>
6	SS-2	1.3 HS	ML	GROUT	RISER	GROUT	Type Of Seal <u>Cement-Bentonite</u>
7							Depth To Top Of Seal <u>0'</u>
8							Type Of Sand Pack <u>No. 2 Sand</u>
9							Depth To Top Of Sand Pack <u>20'</u>
10							Type Of Screen <u>PVC 0.33'</u>
							Slot Size <u>0.010"</u>
							I.D. Screen <u>0.33'</u>
							Screened Interval <u>115-20'</u>
							Depth To Bottom Of Well <u>115'</u>
							Depth To Bottom Of Borehole <u>120'</u>

(Total Organics = headspace (HS) unless otherwise noted. 1 of 9
 BK = Background; RS = Breathing Space

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 2586

Client USAEC

Project CRREL

Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram				Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy				
			Annulus Well				
10							
11	SS-3	1.2 HS 0.2 BK	ML				
12							
13							
14							
15							
16	SS-4	2.6	ML CL ML				
17							
18	SS-5 005	NA					17-19' Shelby Tube
19							
20							
21	SS-6	11.6 HS 0.0BS	ML ML SM				
22							
23							
24							

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 2586
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram				Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy				
			Annulus Well				
25			ML			ML	
26	SS-7	41.5	SM			SM	
27							
28							
29							
30							
31	SS-8	71	SM	SAND	SAND	SM	
32				SCREEN			
33							
34							
35							
36	SS-9 001	225	ML SM ML			SM ML	
37							
38							
39							
40							

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. 2586
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram				Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well		
40							
41	SS-10	33.5 HS 0.0 BS	SW			SW	
42							
43							
44							
45							
46	SS-11 002	226	ML SM			ML SM	
47							
48							
49							
50							
51	SS-12	79	SM SM	SAND	SCREEN	SAND SM	
52							
53							
54							

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 25B6
 Client USAEC
 Project CRREL
 Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
55						
56	SS-13	82	SM	SAND	SM	
57						
58						
59						
60						
61	SS-14	99	ML	SAND	ML	
62						
63						
64						
65						
66	SS-15 004	121 HS 0.0 BS	SM	GRAVEL	SM	
67						
68						
69						

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. JSB6
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy			
			Annulus Well			
70						
71	SS-16	85 HS	SP		SP	
72		0.0 BS				
73						
74						
75						
76	SS-17	61	SP		SP	
77						
78						
79						
80						
81	SS-18	96	SP		SP	
82						
83						
84						

Arthur D Little

Monitoring Well Design (Continuation Page)

Boring No. 25B6
Client USAEC
Project CRREL
Case No. 67063

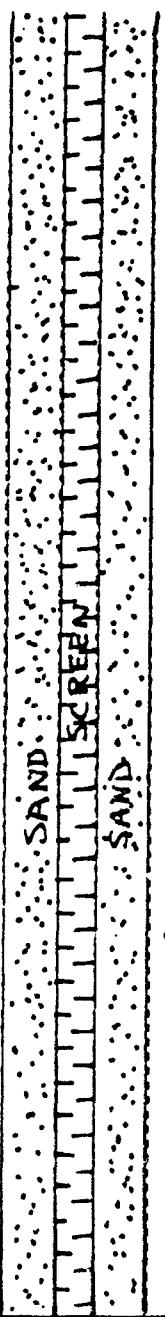
Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy			
			Aneculus Well			
85						
86	SS-19	38	SP		SP	
87						
88						
89						
90						
91	SS-20	0.6 BS 34 HS	SP	SAND SCREEN SAND	SP	
92						
93						
94						
95						
96	SS-21	77	SP		SP	
97						
98						
99						

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 25B6
Client USAFC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
100						
101	SS-22	24 HS 0.0BS	SP			
102						
103						
104						
105						
106	SS-23	38 HS 0.5BS	SP			
107						
108						
109						
110						
111	SS-24	51	SP			
112						
113						
114						



Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No.	25B6
Client	USAEC
Project	CRREL
Case No.	67063

Scale in Feet	SAMPLE		Well Construction Diagram		Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
115					
116	SS-25	53 HS 0.0 BS	SP		Bottom of Screen - 115'
117					115-120' - Silica Sand and backfill (caved in a bit).
118					
119					
120	SS-26	0.0 HS	SP		120' - End of Boring 120-122' - Last Split Spoon

Arthur D Little	Monitoring Well Design		Boring No. <u>135B2</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>

Date Start <u>8/10/93</u>	Date Complete <u>8/11/93</u>	Hole Diameter <u>7.25" = .60'</u>	Casing Size <u>4" = .33'</u>
Contractor <u>Environmental Drilling, Inc</u>		Geologist <u>C. Stover</u>	
Drill Method <u>Hollowstem Auger</u>		Boring Depth <u>50.0'</u>	
Type Of Rig <u>Acker AD2</u>		Grout method <u>Tremie</u>	
Datum <u>NA</u>		Development Method <u>N/A</u>	

Notes Ventilation Well

Scale in Feet	SAMPLE		Well Construction Diagram		Construction Specifications
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
0.0					Elevation Top Of Casing <u>NA</u>
2					Elevation Top Of Riser Pipe <u>NA</u>
4					Elevation Ground Surface <u>NA</u>
6	S1 VOC/BTEX TPH	HS=311.2 BS=0.0	SP		(surveyed elevations) (depth from ground surface)
8					Type of Surface Casing <u>Flush Mount</u>
10	S2 VOC/BTEX TPH	HS=34.8 BS=0.0			L.D. Surface Casing <u>0.5'</u>
12					Type Of Riser Pipe <u>PVC schd 40</u>
14					L.D. Riser Pipe <u>4" → .33'</u>
16	S3 VOC/BTEX TPH	HS=0.0 BS=0.0 H=0.0	ML		Diameter Of Borehole <u>.60'</u>
18					Type Of Backfill <u>-</u>
20	S4 VOC/BTEX TPH	HS=0.0 BS=0.0 H=0.0			Type Of Seal <u>Cement-Bentonite</u>
					Depth To Top Of Seal <u>32' / 20'</u>
					Type Of Sand Pack <u>Valve Grade II</u>
					Depth To Top Of Sand Pack <u>20' BGS</u>
					Type Of Screen <u>PVC schd 40</u>
					Slot Size <u>0.010</u>
					L.D. Screen <u>4" = .33'</u>
					Screened Interval <u>20-32' BGS</u>
					Depth To Bottom Of Well <u>32'</u>
					Depth To Bottom Of Borehole <u>50'</u>

HS = headspace BS = breathing space H = hole 1 of 3

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
20	S5 VOC/BTEX TPH	HS= 10.2 BS= 0.0 H= 0.0	CL			PVC threaded joint
22			ML			
24						
26	S6 VOC/BTEX TPH	HS= 11.2 BS= 0.0 H= 0.0			CL	
28						
30	S7 VOC/BTEX TPH	HS= 11.8 BS= 0.0 H= 0.0	ML			
32						
34						
36	S8 VOC/BTEX TPH	HS= 0.0 BS= 0.0 H= 0.0			ML	
38						
40	S9 VOC/BTEX TPH	HS= 0.0 BS= 0.0 H= 0.0	ML			
42						
44						
46	S10 VOC/BTEX TPH	HS= 0.0 BS= 0.0 H= 0.0			ML	
48						

HS = head space
 BS = breathing space
 H = hole

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. 13582

Client USAEC

Project CRBEL

Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
50	S11 VOC/BTEX TPH	HS = 0.0 BS = 0.0 H = 0.0	ML			Bottom of borehole at 50' End sampling w/ 50-52' spoon sample

HS = headspace
BS = breathing space
H = hole

Arthur D Little	Monitoring Well Design		Boring No. <u>135B3</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>
Date Start <u>8/11/93</u>	Date Complete <u>8/11/93</u>	Hole Diameter <u>0.60'</u>	Casing Size <u>0.33'</u>
Contractor <u>E. D. I.</u>		Geologist <u>C. Kovatch / S. C. Stover</u>	
Drill Method <u>Hollow Stem Auger</u>		Boring Depth <u>70'</u>	
Type Of Rig <u>Failing F-6</u>		Grout method <u>gravity</u>	
Datum <u>NA</u>		Development Method <u>NA</u>	

Notes Soil Venting Well

Scale in Feet	SAMPLE		Well Construction Diagram		Construction Specifications
	Type and number	* Total Organics (ppm)	Stratigraphy	Annulus - Well	
0.0					Elevation Top Of Casing <u>NA</u>
					Elevation Top Of Riser Pipe <u>NA</u>
					Elevation Ground Surface <u>NA</u>
					(surveyed elevations)
					(depth from ground surface)
1	S1	HS=512.0 BS=0.0 H=0	SP		Type of Surface Casing <u>Flush mounted</u>
2					I.D. Surface Casing <u>0.5'</u>
3					Type Of Riser Pipe <u>0.33' PVC</u>
4					I.D. Riser Pipe <u>0.33'</u>
5					Diameter Of Borehole <u>0.60'</u>
6	S2	HS: BS=0.0	ML		Type Of Backfill <u>caved in soil</u>
7					<u>57-70'</u>
8					Type Of Seal <u>Cement - Bentonite</u>
9					Depth To Top Of Seal <u>0'</u>
10					Type Of Sand Pack <u>No. 2 Sand</u>
					Depth To Top Of Sand Pack <u>5'</u>
					Type Of Screen <u>0.33' PVC</u>
					Slot Size <u>0.010"</u>
					I.D. Screen <u>0.33'</u>
					Screened Interval <u>5-57'</u>
					Depth To Bottom Of Well <u>57'</u>
					Depth To Bottom Of Borehole <u>70'</u>

* HS = headspace; BS = breathing space; H = hole

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. 13SB3

Client USAEC

Project CRREL

Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
10	S3	HS:	ML	SAND	SAND	
11		BS=0.0				
12	S4	HS:	ML	SAND	SAND	
13		BS=0.0				
14		H=0.0				
15	S5	HS=6.7.	ML	SAND	SAND	
16		BS=0.0				
17		H=0.0				
18						
19						
20						
21						
22						
23						
24						

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. 13SB3

Client USAFC

Project CRREL

Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
25						
26	S6	HS = 1.0 BS = 0.0 H = 0.0	CL			
27						
28						
29						
30						
31	S7	HS = 87.2 BS = 0.0	CL ML	SAND	SCREEN	
32						
33						
34						
35						35-37' - Shelby Tube
36	Shelby	BS = 0.0 H = 0.0				
37						
38						
39						

Arthur D Little

Monitoring Well Design

(Continuation Page)

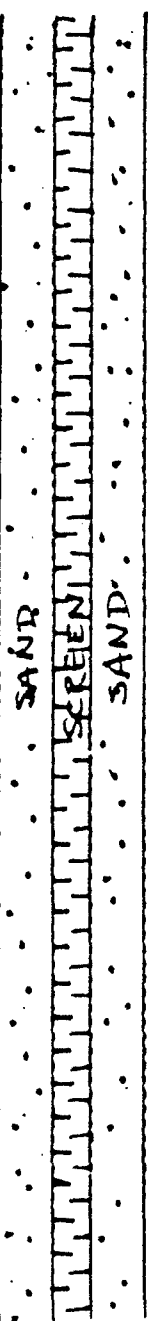
Boring No. 135B3

Client USAEC

Project eRREL

Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
40						
41	S8	HS=20.8 BS=0.0 H=0.0	ML			
42						
43						
44						
45						
46	S9	HS=48.2 BS=0.0 H=0.0	ML			
47						
48						
49						
50						
51	S10	HS=21.7 BS=0.0 H=0.0	ML			
52						
53						
54						



Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. 13583

Client USAEC

Project CRREL

Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
55						
56	S11	HS=10.3 BS=0.0 H=0.0	ML	SAND	SCREEN	
57						57' Bottom of well
58						57-70': Caved in dirt.
59						
60						
61	S12	HS=0.6 BS=0.0 H=0.0	ML			
62						
63						
64						
65						
66	S13	HS=0.0 BS=0.0 H=0.0	ML			
67						
68						
69						
70						

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. 13583

Client USAEC

Project CRREL

Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram					Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well			
70	S14	MS=0.0	SM					70-72' : Last sample taken 8/11/93
72		BS=0.0						
72		H=0.0						

Arthur D Little

Monitoring Well Design

Boring No. 13504ALT
 Client USAEC
 Project CRREL
 Case No. 67063

Date Start 8/13/93 Date Complete 8/13/93 Hole Diameter .85' Casing Size .33'

Contractor Environmental Drilling Geologist C. Stover / C. Kovatch

Drill Method Hollowstem Auger Boring Depth 47.0'

Type Of Rig Acker AD2 Grout method Tremie

Datum NA Development Method -

Notes Ventilation Well

Scale in Feet	SAMPLE		Well Construction Diagram			Construction Specifications
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
0.0						Elevation Top Of Casing <u>NA</u> Elevation Top Of Riser Pipe <u>NA</u> Elevation Ground Surface <u>NA</u> (surveyed elevations) (depth from ground surface)
2	S1 VOC/ BTEX TPH 1340	HS=5.4 BS=0.0 H=0.0	SP	Grout	Riser	Type of Surface Casing <u>Flush Mount</u> I.D. Surface Casing <u>0.5'</u> Type Of Riser Pipe <u>PVC schd 40</u> I.D. Riser Pipe <u>.33'</u> Diameter Of Borehole <u>.85'</u> Type Of Backfill <u>-</u>
5					PVC Joint	Type Of Seal <u>Cement - Bentonite</u> Depth To Top Of Seal _____
7	S2 VOC/ BTEX TPH 1348	HS=83.1 BS=0.0 H=0.0			ML	Type Of Sand Pack <u>Valve Grade II</u> Depth To Top Of Sand Pack <u>5.0'</u> Type Of Screen <u>PVC schd 40</u> Slot Size <u>0.010</u> I.D. Screen <u>.33'</u> Screened Interval <u>47-5' BGS</u>
10				SAND	Screen	Depth To Bottom Of Well <u>47.0'</u> Depth To Bottom Of Borehole <u>47.0'</u>

HS = headspace H = hole
 BS = breathing space

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. 13SB4ALT
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram		Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
10	S3	HS=169.0	<p>ML</p>		
11	VOC/ BTEX TPH	BS=0.0 H=0.0			
12	1400				
13					
14					
15	S4	HS=101.0			
16	VOC/ BTEX TPH	BS=0.0 H=0.0			
17	1410				
18					
19					
20					
21	S5	HS=85.9			
22	VOC/ BTEX TPH	BS=0.0 H=0.0			
23	1420				
24					

HS = headspace
BS = breathing space
H = hole

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. 13524LT

Client USAEC

Project CRREL

Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
-25	Shelby SL*	BS=0.0				Shelby tube yielded 0.0' recovery / Came up dripping water.
-26						
-27						
-28						
-29						
-30	SL VOC/ BTEX TPH 1440	HS=30.2 BS=0.0 H=0.0			ML	
-31						
-32						
-33						
-34						
-35	Shelby	BS=0.0				
-36						
-37	S7 VOC/ BTEX TPH 1455	HS=72.4 BS=0.0 H=0.0	ML			
-38						
-39						

HS = headspace
 BS = breathing space
 H = hole

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 135B4ALT
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram		Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
40	S8 VOC/ BTEX TPH 1506	HS = 52.0 BS = 0.0 H = 0.0	ML		
41					
42					
43					
44					
45	S9 VOC/ BTEX TPH 1515	HS = 26.0 BS = 0.0 H = 0.0		ML	
46					
47					Bottom of borehole at 47!

HS = headspace
BS = breathing space
H = hole

Arthur D Little	Monitoring Well Design		Boring No. <u>15SB2</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>

Date Start <u>8/11/93</u>	Date Complete <u>8/11/93</u>	Hole Diameter <u>0.85'</u>	Casing Size <u>0.33'</u>
Contractor <u>E.D.I.</u>		Geologist <u>C. Kovatch / S.C. Stover</u>	
Drill Method <u>Hollow Stem Auger</u>		Boring Depth <u>31' (55')</u>	
Type Of Rig <u>Failing F-6</u>		Grout method <u>gravity</u>	
Datum <u>NA</u>		Development Method <u>NA</u>	

Notes Venting Well in perched layer

Scale in Feet	SAMPLE		Well Construction Diagram		Construction Specifications
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus Well	
0.0					Elevation Top Of Casing <u>NA</u>
					Elevation Top Of Riser Pipe <u>NA</u>
					Elevation Ground Surface <u>NA</u>
					(surveyed elevations)
					(depth from ground surface)
1	S1	PID=0.0	ML	GROUT RISER GROUT	Type of Surface Casing <u>none</u>
2	0809	Hnu=0.0			I.D. Surface Casing <u>none</u>
3			SW	SAND SCREEN SAND	Type Of Riser Pipe <u>0.33' PVC</u>
4					I.D. Riser Pipe <u>0.33'</u>
5					Diameter Of Borehole <u>0.85'</u>
6	S2	PID=59			Type Of Backfill <u>compacted soil</u>
7	0819	Hnu=0.0			Depth To Top Of Seal <u>0'</u>
8					Type Of Seal <u>Cement-Bentonite</u>
9					Depth To Top Of Seal <u>0'</u>
10					Type Of Sand Pack <u>No. 2 Sand</u>
					Depth To Top Of Sand Pack <u>5'</u>
					Type Of Screen <u>0.33' PVC</u>
					Slot Size <u>0.010"</u>
					I.D. Screen <u>0.33'</u>
					Screened Interval <u>5-31'</u>
					Depth To Bottom Of Well <u>31'</u>
					Depth To Bottom Of Borehole <u>55'</u>

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. *15SBZ*
Client *USAEC*
Project *CRREL*
Case No. *67063*

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
10	S3	PID=210	SW			
11		Hnu=0.0	ML			
12	0830					
12	S4	PID=50.0	SW			
13		Hnu=0.0	ML			
14						
15	Shelby	NA				14-16' Shelby Tube, 2.0' Stainless Steel. Recovery = 2.0'
16	0850					
17	S5	PID=50.8	ML			
18	0900	Hnu=0.0				
19	S6	PID=4.0	ML			
20	0915	Hnu=0.0				
21	S7	PID=59.2	ML			
22	0930	Hnu=0.0	SM			
23	S8	PID=6.4	ML			
24	0947	Hnu=0.0				
24	S9	PID=7.2	ML			
	0950	Hnu=3.5				

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 15382

Client USAEC

Project CRREL

Case No. 67263

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
25						
26						
27	S10	PID=4.1	SM	SAND	SCREEN	SAND
28	0955	H _{nu} =1.9				
29	S11	PID=34.	SM			
30	0959	H _{nu} =0.2				
31	S12	PID=3.3	SM			31': Bottom of venting well.
32	1000	H _{nu} =0.9				
33	S13	PID=26.1	ML			Note: 8/5/93 borehole was augered with 4" Augers. waited for army decision. 8/11/93: pull out 4" Augers, caved in. Drillers push soil cuttings down so that the well can be set in. Therefore, 31-57' is caved in cuttings.
34	1020	H _{nu} =0.0				
35	S14	PID=34.2	ML			
36	1030	H _{nu} =0.0				
37	S15	PID=0.0	ML			
38	1040	H _{nu} =0.1				
39	S16	PID=18.0	ML			
	1045	H _{nu} =0.1				

Arthur D Little

Monitoring Well Design
(Continuation Page)

Boring No. 155B2
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram					Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy					
			Annulus Well					
40	S17	PID=11.4	ML					
41		H _{nu} =2.5						
42	1048							
43	S18	PID=6.1	ML					
44	1055	H _{nu} =1.0						
45	S19	PID=7.9	ML					
46	1103	H _{nu} =4.0						
47	S20	PID=10.9	ML					
48	7112	H _{nu} =14.5	SM					
49	S21	PID=0.0	SM					
50	1120	H _{nu} =0.0	ML					
51	S22	PID=0.0	ML					
52	1135							
53								
54								

Arthur D Little

Monitoring Well Design

(Continuation Page)

Boring No. 155B2

Client USAEC

Project CRREL

Case No. 67063

Scale in Feet	SAMPLE		Well Construction Diagram			Notes and Comments
	Type and number	Total Organics (ppm)	Stratigraphy	Annulus	Well	
55	S23	PID=0.0	SM			55-57': Last sample taken 8/5/93 Bottom of Boring at 55'
56	1405					
57						

Appendix F: Rock Core Orientation Data Sheets

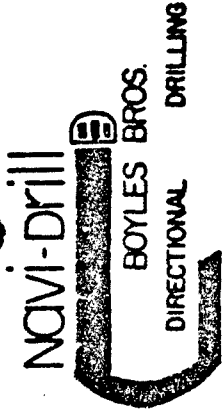
Arthur D Little

Discussion of Rock Core Orientation Procedure

The fractures were oriented in a goniometer. A goniometer can determine the strike and dip of a planar surface if directional information from the compass including the inclination angle, the drift direction, and the azimuth are provided. The inclination angle is the angle (in degrees) from vertical that the boring was drilling. Ideally this value should be 0, indicating a vertical borehole. The drift direction measures the amount of clockwise rotation occurring in the core barrel during the coring process. The azimuth measures the absolute orientation (0 to 360 degrees) of the master scribe line. The following is a description of the step-by-step methodology for orienting bedrock core.

- After a water-bearing fracture was selected for orientation, the depth to the middle of the fracture was measured from the top of the run. Orientation data from the photographed interval that most closely matched the fractured interval was used for the analysis.
- The segment of rock core that contained the bottom of the fracture was loosely set into the center of the goniometer and the inclination angle was adjusted to the appropriate setting.
- The goniometer was rotated to the proper drift direction. At this point, a directional needle was used to align the drift direction and the master scribe line.
- The azimuth direction was then rotated to the correct position. At this point the strike and dip of the fracture plane were set to be measured.
- To measure the strike and dip, a girdle was placed over the goniometer and rotated so that it was positioned parallel with the same plane as the fracture. The strike was measured at the base of the goniometer. The dip was measured from an inclinometer on the side of the girdle.

COMPANY LL HOLE NO. 1
 DATE 11-11-57
 LOCATION 1
 TECHNICIAN LL
 LOG NO. 22-0129-12
 ORIENTATION START 0-0
 INTERVAL CORDED: FINISH
 TIMER INTERVAL MIN.

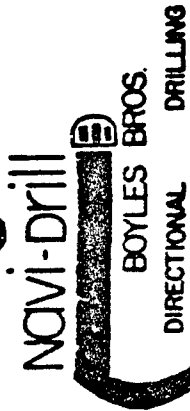


DECLINATION EAST - WEST
 AZIMUTH CORRECTION FOR DECLINATION
 EAST ADD TO AZIMUTH
 WEST SUB. FROM AZIMUTH
 REFERENCE GROOVE CORRECTION:
 FROM ABOVE, GROOVE IS DEGR. R - L
 OF ORIENTATION LUG
 RIGHT, ADD TO LUG AZIMUTH
 LEFT, SUB. FROM LUG AZIMUTH

CORE ORIENTATION

STATION	PIC NO.	DEPTH	ANG.	DIRECTION		ORIENTING LUG, MAGNETIC		DECL.		LUG, TRUE		DIP		STRIKE	
				MAGNETIC	TRUE	DIRECTION	AZIMUTH	CORR.	AZ.	DIRECTION	DIR.	ANG.	DIR.		
1		82.0'	2°	S 50° E		S 50° W									
2		87'	2°	S 70° W		N 40° E									
3			2°	S 75° W		N 82° E									
4			1.75	N 86° E		N 65° E									
5	81	191'													
6		21.5'	1.75	S 30° W	S 14.5° W	N 60° E	60	-15.5	44.5	N 44.5° E					
7		122.5'	2°	S 19° W	S 3.5° W	S 45° W	225	-15.5	209.5	S 29.5° W					
8		196'	2°	S 18° W	S 2.5° W	S 66° W	246	-15.5	230.5	S 50.5° W					
9		177'	2.25	S 19° W	S 3.5° W	N 57° W	303	-15.5	287.5	N 72.5° W					
10		114.5'	2.25	S 20° W	S 4.5° W	N 32° W	328	-15.5	312.5	N 47.5° W					
11		156'	2.25	S 23° W	S 7.5° W	N 24° W	336	-15.5	320.5	N 39.5° W					
12		201.2'	2°	S 13° W	S 2.5° E	S 14° W	194	-15.5	178.5	S 1.5° E					
13		151.5'	2°	S 10° W	S 5.5° E	S 26° W	206	-15.5	190.5	S 10.5° W					
14		202'	2.25	S 9° W	S 6.5° E	S 27° W	207	-15.5	191.5	S 11.5° W					

COMPANY Boyle Bros. HOLE NO. 100
 DATE 1-2-50
 LOCATION 100
 OCCASIONAL 100
 OR NO. 100
 ORIENTATION 100 START 100
 INTERVAL CORDED: 100 FINISH 100
 TIMER INTERVAL 100 MIN.



CORE ORIENTATION

DECLINATION WEST EAST - WEST
 AZIMUTH CORRECTION FOR DECLINATION
 EAST ADD TO AZIMUTH
 WEST SUB. FROM AZIMUTH
 REFERENCE GROOVE CORRECTION:
 FROM ABOVE, GROOVE IS DE.G. R - L
 OF ORIENTATION LUG
 RIGHT, ADD TO LUG AZIMUTH
 LEFT, SUB. FROM LUG AZIMUTH

NO	STATION		DEPTH	ANG.	DRIFT		ORIENTING LUG, MAGNETIC			ORIENTATION		DIP		STRIKE	
	TIME	PIC NO.			MAGNETIC	TRUE	DIRECTION	DIRECTION	AZIMUTH	DECL	AZ.	LUG, TRUE	DIR.	ANG.	DIR.
1	1-1	30	175'	175°	N175°E	N175°E	N40°E	177	-15.5°	74.5	83.5				
2	1-2	40	175'	175°	N175°E	N175°E	N40°E	177	-15.5°	74.5	83.5				
3	1-3	50	175'	175°	N175°E	N175°E	N40°E	177	-15.5°	74.5	83.5				
4	1-4	60	175'	175°	N175°E	N175°E	N40°E	177	-15.5°	74.5	83.5				
5	1-5	70	175'	175°	N175°E	N175°E	N40°E	177	-15.5°	74.5	83.5				
6	1-6	80	175'	175°	N175°E	N175°E	N40°E	177	-15.5°	74.5	83.5				
7	1-7	90	175'	175°	N175°E	N175°E	N40°E	177	-15.5°	74.5	83.5				
8	1-8	100	175'	175°	N175°E	N175°E	N40°E	177	-15.5°	74.5	83.5				

Appendix G: Soil and Rock Boring Logs

Arthur D Little

Soil Boring Log

Boring No. 2583
 Client USAEC
 Project CRREL
 Case No. 67063

LOCATION
Buildings
 * 2583 *
 * * *
 * * *
 * * *
 * * *
 * * *
 * * *

Parking Lot ↙

Date Start 7-21-93 Contractor EDI
 Date Complete 7-21-93 Drill Method Hollow Stem Auger
 Hole Diameter 0.6' Type Of Rig Failing F-6
 Casing Size 0.33' Drilling Additives -
 Boring Depth 67' Geologist W. Dowling
 Sampling Method SALET SPOON

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
0.0						
1	S-1	0-2	0	5 7 7 7	HS=0	
2						
3						
4						
5						
6	S-2 0829	5-7	0.7	7 7 7 5	HS=0	{ML}, Moderate-yellowish-brown {10 YR 5/4}, v-fine sandy SILT. Dry, no odor. >10% f-sand.
7						
8						
9						
10						
11	S-3 0837	10-12	1.2	7 7 7 7	HS=0	{ML}, Moderate-yellowish-brown {10 YR 5/4} SILT. Dry, no odor.
12						
13						

HS = Head Space
 BS = Breathing Space

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 25B3
Client USAEC
Project 67063CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
13						
14						
15						
16	SS-4 0848	15-17	1.8	7 6 6 5	HS= 100 BS=0	{ML}, Dark-yellowish-brown {10 YR 4/2} SILT. Slightly moist to dry.
17						
18						
19						
20						
21	SS-5 0857 1001	20-22	1.5	9 9 12 17	HS= 800 BS=0	{ML}, Moderate-yellowish-brown {10 YR 5/4} SILT. Dry, no odor.
22						
23						
24						
25						
26	SS-6 0910 1002	25-27	1.5	9 9 11 13	HS= 2000 BS=0	{ML}, Dark-yellowish-brown {10 YR 4/2} SILT. Dry, no odor, slight
27						
28						
29						

HS = Head Space
BS = Breathing Space

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 2533
Client USABC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
29						
30				6	HSE	0-1.5 {ML}, Olive-gray {5Y 3/2}, SILT. Damp. No odor. 1.5-2 {ML}, Pale-yellowish-brown {10YR 6/2}, fine sandy SILT. Dry, no odor.
31	SS-7 0918 <u>003</u>	30-32	2.0	6 14 14	900	
32						
33						
34						
35						
36	SS-8 0932 <u>004</u>	35-37	1.8	10 14 14 19	HSE 130 BS=0	{ML}, Light-olive gray {5Y 3/2} very fine sandy SILT. Dry, no odor.
37						
38						
39						
40						
41	SS-9 0947	40-42	1.8	17 17 19 22	HSE 0.0 BS=0	{SM} Moderate yellowish-brown {10YR 4/2}, very fine SAND, w. some {>20%} silt. Dry, loose, no odor.
42						
43						
44						
45						

HSE = Head Space
BS = Breathing Space

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 25B3
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
45				16	HS=	{SM} Moderate yellowish-brown [10YR 4/2], very fine SAND, some {>20%} silt. Dry, loose, no odor.
46	SS-10 1000	45-47	2.0	17 17 19	0	
47						
48						
49						
50				17	HS=	{SM} Moderate yellowish-brown [10YR 4/2], very fine SAND, some {>20%} silt. Dry, loose, no odor.
51	SS-11 1010	50-52	1.8	15 16 16	19 BS=0	
52						
53						
54						
55				13	HS=	{SM} Light-olive-gray [5Y 5/2], very fine SAND, some {>20%} silt. Dry, loose, no odor.
56	SS-12 1025	55-57	1.5	18 20 15	47	
57						
58						
59						
60				13	HS=	{SM} Moderate yellowish-brown [10YR 4/2] very fine SAND, some {>10%} silt. Dry, loose, no odor.
61	SS-13 1105	60-62	1.7	15	0	

HS = Head Space
BS = Breathing Space

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 25B3
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
61	SS-13 1105	60-62	1.7	21 23	HS=0	SEE PREV. PG
62						
63						
64						
65	SS-14	65-67	2.0	17	HS=0	[SP] Light olive-gray [5Y 5/2], very fine - fine SAND. Very loose, dry, no odor. END OF BORING 67'
66	1122			16 14 10	BS=0	
67						

HS = Head Space
BS = Breathing Space

Arthur D Little

Soil Boring Log

Boring No. 2584
 Client USAEC
 Project CRREL
 Case No. 67063

Date Start 7-26-93 Contractor E.D.I.
 Date Complete 7-27-93 Drill Method Hollow Stem Auger
 Hole Diameter 0.60' Type Of Rig Acker AD2
 Casing Size 2 1/2" Auger Drilling Additives NA
 Boring Depth 119' Geologist C. Kovatch
 Sampling Method Split Spoon (2' Stainless Steel)

LOCATION
 CECILOR CECILIS Parking Lot
 02584
 Lab building

Scale in Feet	SAMPLE			Blows Per 6"	* Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
0.0						
1	S-1	0-2'	1.1'	8 11 12	0	[PT] yellowish brown-gray (10YR 5/3) Organic PEAT, moderately sorted, dry, no unusual odor or sheen.
2	1200					
3						
4	S-2	4-6'	0.5'	8 8 8	0	[OL] yellowish brown (10YR 5/2) Organic SILT, moderately well-sorted, dry, loose, no unusual odor or sheen. Iron staining at the bottom.
5	1210					
6						
7						
8						
9	S-3	9-11'	1.2'	5 6 6	0	0-0.5' of spoon: [ML] Moderate olive gray (5Y 4/2) Clayey SILT, well-sorted to moderately well-sorted, damp, soft to medium dense, no unusual odor or sheen. 0.5-1.2' of spoon: [ML] Moderate olive gray (5Y 4.5/2) SILT, well-sorted, dry, loose to medium dense, no unusual odor or sheen. Iron staining from 0.5-0.75'.
10	1215					
11						
12						
13						

* Total organics = headspace unless otherwise specified.
 † 140 lb. hammer, 30" drop

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 25B4
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
13						
14						
15	S-4 001	14-16'	1.6'	5 6 4 4	23	0-0.6' of spoon: [ML] Moderate olive gray (5Y 4/2) clayey SILT, moderately well-sorted, dry, medium dense, no unusual odor or sheen. 0.6-1.6' of spoon: [ML] Moderate olive gray (5Y 4/2) SILT, well-sorted, dry, medium dense to loose, no unusual odor or sheen.
16	1230					
17						
18						
19						
20	S-5	19-21'	1.5'	5 6 4 3	56	0-1.25' of spoon: [ML] yellowish brown (10YR 5/2) SILT, well-sorted, dry, medium dense to loose, no unusual odor or sheen. 1.25-1.5' of spoon: [ML] Moderate olive gray (5Y 4/2) clayey SILT, damp, medium dense, no unusual odor or sheen.
21	1242					
22						
23						
24						
25	S-6	24-26'	1.9'	6 8 8 7	16	[ML] Moderate olive gray (5Y 4/2) clayey SILT, 48% clay, 52% silt, moderately sorted, damp, medium dense to dense, cohesive, no unusual odor or sheen. Iron staining in bottom 0.2' of spoon.
26	1250					
27						
28						
29						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 2SB4
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
29						
30	S-7	29-31'	0.4'	6 8 8 10	0	* Sample fell out of spoon. [SM] Light olive gray (5Y 5/2) fine-grained Sandy SILT, moderately well-sorted, dry, loose, no unusual odor or sheen.
31	1325					
32						
33						
34						
35	S-8	34-36'	1.8'	11 9 10 9	112	[SM] Olive gray-brown (5Y 4/3) fine-grained Sandy SILT, moderately well-sorted, dry, loose, no unusual odor or sheen.
36	1333					
37						
38						
39						
40	S-9	39-41'	1.9'	12 17 17 18	105	[SM] Medium olive-gray-brown (5Y 4/3) Sandy SILT, moderately well-sorted, dry, loose to medium dense, no unusual odor or sheen.
41	1345					
42						
43						
44						
45	S-10 002	44-46'	1.9'	11 15 16 28	207	[SM] Medium Olive gray brown (5Y 4/3) fine-grained Sandy SILT, moderately well-sorted, dry, loose, no unusual odor or sheen.

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 2SB4
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
45	1355					Sheen. Iron staining as well as some reddish grains on top of sample.
46						
47						
48						
49	S-11	49-51'	1.8'	13 18 20 18	17	0-0.8' of spoon: [SM] Light olive gray (SY 5/2) Sandy SILT, moderately well-sorted, dry, loose, no unusual odor or sheen. 0.8-1.8' of spoon: [SM] Medium olive gray (SY 4.5/2) fine-grained (more than above) Sandy SILT, dry, loose, no unusual odor or sheen.
50	1408					
51						
52						
53						
54	S-12	54-56'	1.8'	8 8 10 10	15.2	[SM] Moderate olive gray brown (SY 4/3) fine-grained Sandy SILT, moderately well sorted, dry, loose, no unusual odor or sheen. Iron staining in horizontal bands throughout.
55	1418					
56						
57						
58						
59	S-13	59-61'	1.9'	9 14 14 18	0	[SM] Same as above, except iron staining is random throughout. 40% Sand, 60% silt
60	1430					
61						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 2584

Client USAEC

Project CRREL

Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
61						
62						
63						
64						
65	S-14 1447	64-66'	1.75'	11 20 22 25	45.8	[Sm] Light olive gray (5Y 5/2) Sandy SILT, 40% sand, 60% silt, moderately well-sorted, dry, loose, no unusual odor or sheen. Iron staining throughout.
66						
67						
68						
69						
70	S-15 1510	69-71'	1.9'	18 19 22 25	1.4	[Sm] Moderate olive gray-brown (5Y 4/3) Sandy SILT, 40% sand, 60% silt, moderately well-sorted, dry, loose, no unusual odor or sheen. Iron staining throughout.
71						
72						
73						
74						
75	S-16 1530	74-76'	1.8'	20 26 30 30	14.9	[Sm]: Same as above.
76						
77						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 2584
Client USA EC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
77						
78						
79						
80	S-17	79-81'	1.8'	24 21 21 20	55.7	[Sm] Light olive gray (5Y 5/2) fine-grained Sandy SILT, 45% Sand, 55% silt, moderately well-sorted, dry, loose, no unusual odor or sheen, iron staining throughout; iron staining in horizontal bands from 0.85-1.1' of spoon.
81	1554					
82						
83						
84						
85	S-18	84-86'	1.9'	28 28 30 30	120	[SM]: Same as above; same staining also
86	1620					
87						
88						
89						
90	S-19	89-91'	1.6'	20 24 20 20	0	0-0.2' of spoon: yellowish gray (5Y 7/2) fine to coarse grained silty GRAVELS, poorly to moderately sorted, dry, very loose, no unusual odor or sheen.
91	1653					0.2-1.6' of spoon: [Sm] moderate olive gray-brown (5Y 4/3) fine-grained Sandy SILT, moderately well-sorted, dry, loose, no unusual odor or sheen, iron staining throughout.
92						
93						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 2584
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
-93						
-94	S-20			16		
-95	003	94-96'	1.7'	16 18 18	123	0-0.3' of spoon: [Gm] Light olive gray (5Y5/2) silty GRAVEL, fine to coarse grained, poorly sorted, dry, very loose, no unusual odor or sheen. 0.3-1.7': [Sm] Light olive gray (5Y5/2) fine-grained silty SAND, 55% sand, poorly sorted, dry, loose, no unusual odor or sheen.
-96	1717					
-97						
-98						
-99						
-100	S-21	99-101'	1.8'	33 33 30 45	50.1	[Sm] Light olive gray (5Y5/2) fine-grained silty SAND, 60% sand, 40% silt, poorly sorted, dry, medium dense, no unusual odor or sheen, iron staining in bands at 1.35-1.5' of spoon.
-101	0747					
-102						
-103						
-104						
-105	S-22	104-106'	1.9'	12 18 30 35	15.2	[sm]-Same as above except iron staining is random.
-106	0815					
-107						
-108						
-109						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 2584
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
109	S-23 0845	109-111'	1.8'	12	5.4	[SW] Medium olive gray (5Y 4/2) fine to medium grained SAND, poorly sorted, barely damp, medium dense, no unusual odor or sheen.
110				20		
111				25		
112				28		
113						
114	S-24 0917	114-116'	1.75'	15	115	[SW]: Same as above.
115				20		
116				30		
117				35		
118						
119	S-25 004 DUP 005 0955	119-121'	1.5'	14	688	119': Bottom of Borehole. [SW] Light olive gray to yellowish gray (5Y 4.5/2) fine-grained SAND, poorly sorted, dry, medium dense, no unusual odor or sheen.
				15		
				15		
				13		

Arthur D Little	Soil Boring Log	Boring No. 2SB5
		Client USAEC
Date Start 7-23-93		Project CRREL
Date Complete 7-23-93		Case No. 07063
Contractor E.D.I.		Park Lot LOCATION LAB
Drill Method Hollow Stem Auger		
Hole Diameter 0.60'	Type Of Rig Failing F-6	02385
Casing Size 0.33'	Drilling Additives NA	
Boring Depth 120'	Geologist C. Kovatch	CECLIS
Sampling Method Split Spoon (2' Stainless Steel)		0

Scale in Feet	SAMPLE			Blows Per 6"	* Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
-0.0						
-1	S-1 TPH VOC/ BTEX 0935	0-2'	1.3'	6 6 6 7	4.5	[PT] Light olive gray yellow (5Y 4/4) Organic SOIL, moderately sorted, dry, medium dense, no unusual odor or sheen.
-2						
-3						
-4						
-5						
-6	S-2 0940	5-7'	1.5'	7 10 11 11	4.8	0-0.6': [ML] olive gray (5Y 3/2) clayey SILT, 10% clay, damp, medium dense, does not compact well, no unusual odor or sheen. 0.6'-1.5' of spoon: [SM] olive gray (5Y 3/2) sandy SILT, 80% silt, dry, medium dense, no unusual odor or sheen.
-7						
-8						
-9						
-10						
-11	S-3 0955	10-12'	1.75'	7 5 6 7	3	0-1.25' of spoon: [SM] Light olive gray yellow (5Y 4/4) sandy SILT, dry, medium dense to loose, organic smell, no unusual odor or sheen. 1.25-1.4' of spoon: [OL] Moderate olive gray (5Y 4/2) silty CLAY, 48% silt, 52% clay, moist, medium stiff, no unusual odor or sheen. 1.4-1.75' of spoon: [OL] yellowish brown gray (10YR 5/3) Organic SILT, dry, medium dense, no unusual odor or sheen.
-12						
-13						

Total Organics = Headspace (HS) unless otherwise noted. Page 1 of 8
 BS = Breathing Space
 140 lb. hammer, 20" drop
 [00x] - Lab sample number

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 25B5
Client USAEC
Project CRREL
Case No. 670a3

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
13						
14						
15						
16	S-4 1005	15-17'	1.67'	7 11 13 8	4.1	[Sm] Moderate olive gray (5Y4/2) Sandy SILT, 30% Sand, dry, loose, no unusual odor or sheen.
17						
18						
19						
20						
21	S-5 001 1015	20-22'	1.75'	9 12 12 14	42.7	[Sm] Yellow olive gray (5Y6/3) very fine-grained silty SAND, 80% Sand, dry, loose, no unusual odor or sheen. Iron staining (faint) in horizontal bands throughout
22						
23	S-6 007 1020	22-24'				Shelby Tube - 2'
24					0.085	
25						
26	S-7 002 1025	25-27'	1.96'	10 10 13 15	71	0-1.25, 1.4-1.96' of spoon: [Sm] Moderate olive gray (5Y4.5/2) Silty SAND, fine-grained, dry, loose, no unusual odor or sheen.
27						1.25-1.4' of spoon: [Sm] moderate olive gray (5Y4/2), silty SAND, more silt than above. More dense than above - medium, dry, no unusual odor or sheen.
28						dense than above - medium, dense, dry, no unusual odor or sheen.
29						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 2885

Client USAEC

Project CRREL

Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
29						
30	S-8	30-32'	1.75'	13 15 16	49	[SP] Yellow Olive gray (SY 6/3) very fine-grained SAND, well-sorted, dry, loose, no unusual odor or sheen.
31	1035					
32						
33						
34						
35	S-9	35-37'	2'	11 17 15 16	28	[SP] Yellow Olive Gray (SY 6/3) very fine-grained SAND, moderately well-sorted, dry, medium dense to loose, more compact than S-8, holds form of spoon a bit, no unusual odor or sheen. Faint iron staining in horizontal bands in areas.
36	1048					
37						
38						
39						
40	S-10	40-42'	2'	13 16 16 17	92	0-0.6' of spoon: [SP] yellow olive gray (SY 6/3) fine-grained SAND, moderately well sorted, dry, medium dense, no unusual odor or sheen. Clay Lense [CL] 10Y4/2 for 1mm.
41	1052					
42						0.6-1.4' of spoon: [SP] olive gray-brown (SY 4/3) fine-grained SAND, dry, loose, no unusual odor or sheen.
43						
44						
45						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 2585
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
45						
46	S-11 003	45-47'	1.8'	9 10 13 17	290	[ESP]: Same as above except from 0.5-1.1' of spoon: [ML] moderate olive gray (5Y 4/2) Clayey SILT, dry, medium dense, no unusual odor or sheen.
47	1055					
48						
49						
50						
51	S-12	50-52'	1.8'	13 14 16 18	29	[ESP] Same as S-10 but with faint iron staining in horizontal bands through the middle of the sample.
52	1103					
53						
54						
55						
56	S-13	55-57'	2'	9 14 25 25	54	[ESP] Olive gray brown (5Y 4/3) fine-grained SAND, moderately well-sorted, dry, medium dense to dense, holds shape of spoon well. Iron staining in areas; Iron staining on the outside of sample, lining spoon.
57	1110					
58						
59						
60	S-14	60-62'	2'	7 15 22 29	84	0-0.5' of spoon: [ML] olive gray (5Y 3.5/2) SILT, dry, dense, no unusual odor or sheen.
61	1117				0.085	0.5-2.0' of spoon: [ESP] Light yellow

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 25A5
Client USAEC
Project CEREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
61						olive gray (5Y 5.5/2) fine-grained SAND, larger grained than above, moderately well-sorted, dry, loose, no unusual odor or sheen.
62						
63						
64						
65						
66	S-15	65-67'	2'	18 24 38 39	37	[ESP] yellow olive gray (5Y 6/3) SAND, moderately well-sorted, dry, loose, no unusual odor or sheen.
67	1125					bottom 0.5' - same but more dense with iron staining in horizontal bands; mostly all quartz.
68						
69						
70						
71	S-16	70-72'	2'	18 28 34 37	73	[ESP] Moderate olive gray brown (5Y 4/3) SAND, well-sorted, dry, dense to very dense, iron staining in horizontal bands throughout. No unusual odor or sheen.
72	1137					from 0.4-0.5' of spoon: [SM] Moderate olive gray (5Y 4/2) sandy SILT, 48% sand, 52% silt, damp, dense to very dense, no unusual odor or sheen.
73						
74						
75						
76	S-17	75-77'	2'	20 21 28 33	59 0.085	[ESP] yellow olive gray (5Y 6/3) SAND, moderately sorted, dry, medium dense to loose, no unusual odor or sheen. Iron staining in horizontal bands throughout.
77	1144					

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 2SB5
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
77						
78						
79						
80						
81	S-18	80-82'	2'	26 32 35 40	93	[ESP] light Olive gray (5Y5/3) Fine-grained SAND, moderately well-sorted, dry, medium dense to loose, no unusual odor or sheen. Iron staining in bands in top 0.5' and Bottom 0.5' of spoon.
82	1153				0.085	
83						
84						
85						
86	S-19	85-87'	2'	17 20 26 32	34	[ESP] Olive gray - yellow (5Y6/2) Fine-grained SAND, moderately sorted, dry, dense, no unusual odor or sheen.
87	1200					
88						
89						
90						
91	S-20	90-92'	2'	20 25 32 39	56	[ESP] Light Olive gray (5Y 5.5/2) Fine grained SAND, moderately sorted, lots of Quartz, feldspar, possibly hornblende, dry, loose to medium dense, no unusual odor or sheen. Iron staining in horizontal bands throughout sample.
92	1325					
93						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 2585
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
93						
94						
95						
96	S-21	95-97'	1.7'	14 15 19 25	20	[SP] Same as above?
97	1330					
98						
99						
100						
101	S-22	100-102'	2'	16 22 24 33	63	[SP] Same as above
102	1348					
103						
104						
105						
106	S-23	105-107'	2'	20 22 40 43	16	[SP] same as above.
107	1400					
108						
109						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 2585
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
109						
110	S-24	110-112'	2'	12 15 22 26	87	[SP] - Same as above with orange staining in horizontal bands throughout.
111	1425					
112						
113						
114						
115	S-25	115-117'	2'	14 17 19 23	43	[SP] Light olive gray (5Y 5/2) fine-grained SAND, moderately sorted, dry, loose to medium dense, one thick band of iron staining at 0.5'. No unusual odor or sheen.
116	1433					
117						
118						
119						
120						120': End of Boring.
	S-26	120-122'	2'	18 20 23 20	54	[SP] Moderate olive gray (5Y 4/2) fine to medium grained SAND, moderately to poorly sorted, dry, loose to slightly dense, no unusual odor or sheen.
	004 1505					

Arthur D Little	Soil Boring Log	Boring No. 2586
		Client USAEC
Date Start 7-22-93		Project CRREL
Date Complete 7-22-93		Case No. 67063
Hole Diameter 0.601	Contractor E. D. I.	Parking Lot LOCATION LAB CECL08 CECL14 2586
Casing Size 4" PVC (0.33)	Drill Method Hollow stem Auger	
Boring Depth 120'	Type Of Rig Failing truck mounted FE	
Sampling Method Split Spoon (2' long; stainless steel)	Drilling Additives NA	
	Geologist C. Kovatch	Parking Lot

Scale in Feet	SAMPLE			Blows Per 6"	* Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
0.0	SS-1	0-2'	1'	4	1.7 HS	[PT] Moderate olive brown (5Y 4/4) Organic material. No unusual odor or sheen.
1	TPH BTEX VOCs GEOLOGIC			5	0.1BK	
2	0815			6		
3						
4						
5						
6	SS-2	5-7'	1.7'	3	1.3 HS	[ML] Moderate olive brown (5Y 4/4) Well-sorted SILT; No unusual odor or sheen.
7	0822			4		
8				4		
9						
10						
11	SS-3	10-12'	1.4'	5	1.2 HS	[ML] Same as above
12	0830			6	0.2BK	
13				4		

+ 140 lb. hammer, 30" drop
 * HS = Headspace; BS = Breathing Space; BK = Background
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 Lab Number

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 2586
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
13						
14						
15						
16	SS-4 0840	15-17'	1.75'	4 5 6	2.6 HS	Top 0-1.6': [CL] Olive gray (5Y 3/2) Silty CLAY; moist, no unusual odor or sheen. 1.6 - 1.75': [ML] Moderate olive brown (5Y 4/4) SILT, well-sorted, damp, No unusual odor or sheen.
17						
18	SS-5 005 0845	17-19'				Shelby Tube: 2' stainless steel.
19						
20						
21	SS-6 0853	20-22'	1'	7 9 12 12	11.6 HS 0.0BS	0-0.5' of spoon: [ML] Moderate olive brown (5Y 4/4) SILT, dry, no unusual odor or sheen. 0.5-1' of spoon: [SM] Olive brown (5Y 5/4) light olive gray-yellow (5Y 5/4) Sandy SILT, dry, no unusual odor or sheen. Nice [ML] / [SM] contact
22						
23						
24						
25						
26	SS-7 0859	25-27'	1.6'	8 10 12 13	41.5 HS	0-0.25' of spoon: [ML] Moderate olive gray (5Y 4/2) SILT, dry, no unusual odor or sheen. 1.25-1.6' of spoon: [SM] Light olive gray (5Y 5/2) well-sorted SILT, dry, no unusual odor or sheen.
27						
28						
29						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 2586

Client USAEC

Project CRREL

Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
29						
30						
31	SS-8	30-32'	1.8'	11 16 14 17	71 HS	[SM] Moderate Olive-gray-brown (5Y 4/3) fine-grained SAND; small lenses of silt, moderately well- sorted, dry, loose, no unusual odor or sheen.
32	0907					
33						
34						
35						
36	SS-9	35-37'	1.5'	16 17 14 17	225 HS	0-1' of spoon: [SM] (10Y 4/2) dry SAND, no unusual odor or sheen. 1-1.5' of spoon: [ML] Moderate olive gray (5Y 4/2) SILT, dry, no unusual odor or sheen.
37	001 0914					
38						
39						
40						
41	SS-10	40-42'	1.75'	11 13 14 16	33.5 HS 0.085	[SW] Moderate olive gray-brown (5Y 4/3) fine-grained SAND, well-sorted, dry, medium dense, no unusual odor or sheen.
42	C922					
43						
44						
45						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 2586
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
45	SS-11 002 0930	45-47'	1.4'	7	226 HS	0-0.5' of spoon: [ML] moderate olive gray (5Y 4/2) clayey SILT, well-sorted, barely damp, no unusual odor or sheen. 0.5-1.4' of spoon: [SM] Light olive gray (5Y 5/2) Silty SAND, 80% sand, Moderately sorted, dry, medium dense; no unusual odor or sheen.
46				16		
47				15		
48				19		
49						
50						
51	SS-12 0937	50-52'	1.8'	11	79 HS	[SM] Moderate olive gray (5Y 4/2) Silty SAND, 90% Sand, dry, loose, no unusual odor or sheen.
52				12		
53				12		
54				15		
55						
56	SS-13 0946	55-57'	1.8'	18	82 HS	0-1.5' of spoon: [SM] Light olive gray (5Y 5/2) fine-grained silty SAND, 90% sand, moderately well-sorted, dry, loose, no unusual odor or sheen. 1.5-1.8' of spoon: [SM] Moderate olive gray (5Y 4/2) fine-grained silty SAND, 80% sand, moderately well-sorted, dry, loose but a bit firmer than above, no unusual odor or sheen.
57				23		
58				25		
59				27		
60						
61	SS-14 003 0956	60-62'	1.6'	21	99 HS	[ML] Light olive gray (5Y 5/2) SILT, Well-sorted, dry, loose, no unusual odor or sheen.
61				21		
				18		
				16		

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 2586
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
61						
62						
63						
64						
65	SS-15	65-67'	1.75'	21	121 HS	[5M] moderate olive gray (5Y4/2) Silty SAND, dry, loose, no unusual odor or sheen.
66	004			23		
				25		
67	1011			27	0.0BS	
68						
69						
70	SS-16	70-72'	1.75'	18	85 HS	[5P] Light olive gray (5Y5/2) fine-grained SAND, well-sorted, dry, very loose, no unusual odor or sheen. Orange staining throughout.
71				22		
				25	0.0BS	
72	1100			27		
73						
74						
75	SS-17	75-77'	1.8'	19	61 HS	[5P] 5Y6/2, fine-grained SAND, Dry, loose to very loose, no unusual odor or sheen, Orange staining occurs throughout in horizontal bands.
76				27		
				33		
				36		
77	1115					

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 2SB6

Client USAEC

Project CRREL

Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
77						
78						
79						
80	S	80-82'	1.58'	11 17 20 26	96	[ESP] Light olive yellow-gray (5Y6.5/2) fine-grained SAND, dry, loose, no unusual odor or sheen. Very little orange staining.
81						
82						
83						
84						
85	SS-19	85-87'	1.92'	27 30 33 40	38	Same as above: [ESP]
86	1136					
87						
88						
89						
90	SS-20	90-92'	1.8'	9 11 17 26	34 HS 0.6BS	[ESP] 5Y6/2, fine-grained SAND, a bit larger than above, dry, loose, to very loose, no unusual odor or sheen, orange staining occurs randomly and in specks.
91	1204					
92						
93						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 2SB6
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
93						
94						
95	SS-21	95-97'	1.83'	17 21 22 29		[SP] Light olive gray (5Y5/2) fine-grained SAND, dry, very loose, well-sorted, No unusual odor or sheen. 2 areas with orange staining.
96	1220					
97						
98						
99						
100	SS-22	100-102'	1.67'	15 20 21 26	24 HS 0.0BS	[SP] Light olive gray (5Y5/2) fine-grained sand, well-sorted, dry, very loose, no unusual odor or sheen. No orange staining.
101	1236					
102						
103						
104						
105	SS-23	105-107'	1.58'	WOR 27 27 32	38 HS 0.5BS	[SP] light yellow-olive-gray (5Y6/2) fine-grained SAND, lots of quartz grains, dry, very loose, no unusual odor or sheen, orange staining 0.5' from top of spoon.
106						
107						
108						
109						

WOR = Weight of rod

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 2596
Client USAEC
Project CRREL
Case No. 67063

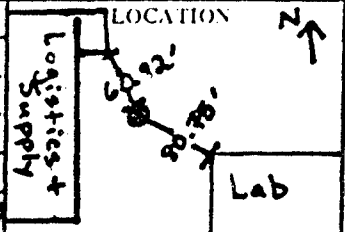
Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
109						
110	SS-24	110-112'	1.92'	15 21 29 32	51	[SP] Same as above but no iron staining.
111	1345					
112						
113						
114						
115	SS-25	115-117'	1.92'	22 25 37 26	53 0.085	[SP] Same as above but light olive gray (5Y 5/2). Iron staining in horizontal rings on bottom 0.25'
116	1410					
117						
118						
119						
120	SS-26	120-122'	1.92'	19 22 23 27	0.085	120': Bottom of Bore hole. (V=130') [SP] - Same as above but no iron staining
	1440					

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Soil Boring Log

Boring No. 95B2
 Client USAEC
 Project CBREL
 Case No. 67063

Date Start 8/9/93 Contractor Environmental Drilling
 Date Complete 8/9/93 Drill Method Hollowstem Auger
 Hole Diameter 7.25" = 1.04' Type Of Rig Acker AD2
 Casing Size - Drilling Additives -
 Boring Depth 101.0' Geologist C. Stover



Sampling Method Standard 24" length split spoon (stainless steel)

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
0.0	S1 BTEX/ VOC TPH 100%	0-2'	1.2'	5- 6- 7- 5	HS=0.0 BS=0.0	[MLI], dk yellowish brn (10YR 4/2), SILT, w/ trace (<6%) clay, loose, dry, fine, no odor/sheen
2						
4	S2 BTEX/ VOC TPH 101%	4-6'	2.0'	11- 7- 7- 7	HS=0.0 BS=0.0	Top 1.2' of spoon: [CLI], olive gry (5Y 3/2), CLAY w/~30% silt, silty clay, medium stiff, fine, damp, no odor/sheen, breaks along horie planes. Bottom .8' of spoon: [MLI] dk yellowish brown (10YR 4/2), SILT, loose, dry, fine, no odor/sheen
6						
9	S3 BTEX/ VOC TPH 102%	9-11'	1.7'	5- 7 11- 11	HS=0.0	Top 1.3' of spoon: [MLI] same as bottom 0.8' above, Fe staining at 0.5' above bottom. Bottom 0.4': [CLI], same as top 1.2' above, but silt ~ 40-50%.
11						

HS = headdress

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 95B2
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
13						
14	S1 BTEX/ VOC TPH 1032	14-16'	1.84'	6- 6 12- 15	BS=0.0 H=0.0 HS=0.0	[ML], (5Y 3/2) olive gray, SILT, clayey silt w ~30% clay, loose, no odor/sheen, fine, dry, well-sorted
16						
19	S5 BTEX/ VOC TPH 1045	19-21'	1.40'	12- 14- 22- 23	BS=0.0 H=0.0 HS=0.0	[ML], (10YR 4/2) dk yel brn, SILT, fine, loose, dry, well-sorted, no odor/sheen
21						
24	S6 BTEX/ VOC TPH 1055	24-26'	2.0'	12- 20- 25- 32	BS=0.0 HS=0.0	[ML], (10YR 4/2) same as above but Fe staining at 1.3' and .35' from bottom: .01' in width
26						
29						

HS = headspace
BS = breathing space

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 9SB2
Client USAEC
Project CBBEL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
29	S7 BTEX/ VOC TPH 1110	29-31'	1.65'	10- 19- 22- 22	HS=0.0 BS=0.0 H=0.0	[ML], same as above but w/ trace (~5%) clay, clay banding in bottom .2' of spoon, some breaking along horizontal planes.
31						
34	S8 BTEX/ VOC TPH 1122	34-36'	1.60'	12- 16- 22- 22	HS=0.0 BS=0.0 H=0.0	[ML], same as above but w/ Fe staining at 5' from top of spoon.
36						
39	Shelby 005 1130	39-41'	1.16'		BS=0.0	Shelby tube taken from 39-41' 14" of recovery.
41						
44	S9 BTEX/ VOC	44-46'	2.0'	24- 22- 18-22	HS=0.0 BS=0.0	[ML], same as 34-36, but no staining, clay banding in bottom .3" of spoon

HS = headspace
BS = breathing space

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 9SB2
Client USAEC
Project CRBEL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
46	TPH 1160					
49	S10 BTEX/ VOC TPH 1214 001	49-51'	1.60'	16- 16- 23- 20	HS=49.0 BS=0.0 H=0.0	[MLI], dk yel brn (10YR 4/2), SILT, fine, loose, dry, well-sorted, no odor/sheen
54	S11 BTEX/ VOC TPH 1345 002	54-56'	0.9'	8- 22- 35- 45	HS=162.1 BS=0.0	Bottom 0.6' of spoon: [MLI], same as above, but Fe staining 0.5' from bottom Top 0.3': [SMI], (10YR 5/4) mod yel brn, SAND, silty sand ~40% silt, fine, dry, well-sorted, poorly graded, med-dense to dense, no odor/sheen.
59	S12 BTEX/ VOC TPH 1358	59-61'	1.75'	16- 22- 23- 33	HS=52.1 BS=0.0	Bottom 0.9': same as top .3' of above Top 0.85': [MLI], 10YR 4/2 dk yel brn, SILT, sandy silt ~30% sand, fine, loose, dry, well-sorted, no odor

HS = headspace H = hole
RC = Location

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Soil Boring Log
Continuation Page

Boring No. 9SB2
Client USAEC
Project CBREL
Case No. 67068

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
61						
64	S17 VOC/ BTEX TPH 1420	64-66'	1.75'	18- 28- 28- 28	BS=0.0 HS=1.5 H=7.7	[SM], (10YR 5/4) mod yel brn, SAND, silty sand, ~40% silt, fine, dry, well-sorted, med dense to dense, poorly graded, no odor/sheen.
66						
69	S14 VOC/ BTEX TPH 1450	69-71	1.75'	22- 33- 34- 30	BS=0.0 HS=19.2	[SM], same as above, but few coarse gravel grains, Fe staining 0.23' - 0.25' from top of spoon.
71	003					
74	S15 VOC 1510	74-76	1.60'	23- 31- 40- 49	BS=0.0 HS=7.2 H=0.0	[SM], same as above, no Fe staining
76						

BS = breathing space
HS = head space

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Soil Boring Log
Continuation Page

Boring No. 9SB2
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
77						
79	S16 VOC/ BTEX TPH 1544	79-81'	2.0'	24- 32- 40- 37	BS=0.0 HS=26.0 H=0.0	[SM], same as above, Fe staining at bottom 0.1' of spoon.
81						
84	S17 VOC/ BTEX TPH 1610	84-86'	1.8'	23- 34- 37- 47	BS=0.0 HS=7.2	[SM], same as above but only 10% silt.
86						
89	S18 VOC/ BTEX TPH 1645	89-91'	1.95'	23- 31- 39- 41	BS=0.0 HS=20.3	[SM], (5Y 6/1) lt. olive gry, SAND, w/ trace (~5-10%) silt, fine, dry, medium dense to dense, well-sorted, poorly graded, no odor/sheen
91	004					Equipment blanks taken at 1650

BS= breathing space
HS= head space

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Soil Boring Log
Continuation Page

Boring No. 95B2
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
93						
94	S19 VOC/ BTEX TPH 1720	94-95'	1.90'	19- 24- 39- 24	BS=0.0 HS=0.0	[SM], same as above but w/a few coarse sand grains.
96						
99	S20 VOC/ BTEX TPH 1745	99-101'	1.90'	16- 44- 32- 31	BS=0.0 HS=D.0 H=0.0	[SM], same as above but no coarse grains, Fe staining at top 0.2' of spoon.
101						Second consecutive 0.0 ppm reading @ 99-100' / End of drilling for 8/9/93 at 1800.

HS = headspace
BS = breathing space

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Soil Boring Log

Boring No. 9SB3

Client USAEC

Project CRREL

Case No. 67063

Date Start 8-9-93

Contractor E.D.I.

Date Complete 8-10-93

Drill Method Hollow Stem Auger

Hole Diameter ~~6.875~~ 0.85

Type Of Rig Failing F-6

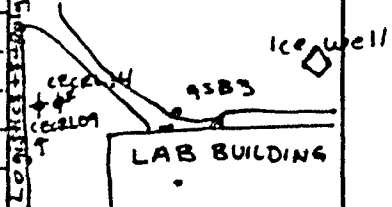
Casing Size 6" Auger (0.5')

Drilling Additives NA

Boring Depth 115'

Geologist C. Kovatch

LOCATION



Sampling Method Split Spoon

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
0.0	S-1 10:28 TPH VOC BTEX	0-2'	0.67'	10	15.1	[OL] Moderate Olive gray brown (5Y 4/3) organic SILT with rounded pebbles, 5% pebbles, moderately sorted, dry, loose, no unusual odor or sheen.
1				35		
2				10		
3				16		
4						Note: 140 lb hammer, 30" drop
5						
6	S-2 10:34	5-7'	0.83'	2	9.2	[ML] Moderate olive brown (5Y 4/4) SILT, moderately well-sorted, dry, loose, no unusual odor or sheen; large chunks of red brick and/or concrete.
7				3		
8				3		
9				3		
10				2	69.5	Top 0-1.41(67' of spoon): [ML] Olive gray (5Y 4.5/2) SILT, well-sorted, dry, loose, no unusual odor or sheen;
11	S-3 10:45 001	10-12'	1.83'	2		
12				2	BS=0	1.41-1.58': [EC:] Olive gray (5Y 4/2) Silty CLAY, 15% silt, moderately sorted, soft, no unusual odor or sheen.
13				3		

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Soil Boring Log
Continuation Page

Boring No. 9383
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
13						
14						
15						
16	S-4 10:55	15-17'	1.17'	12 14 12 12	92.5	[ML] moderate olive gray (5Y 4/2) SILT, well-sorted, dry, loose, no unusual odor or sheen.
17						
18						
19						
20						
21	S-5 11:00	20-22'	1.75'	12 14 17 17	244 BS=0	Same as above: [ML]
22						
23						
24						
25						
26	S-6 11:08	25-27'	2'	12 15 17 21	1365	Same as above, 0-0.92': [ML] but has horizontal bands of iron staining as well and strong odor. 0.92-1.17': [ML] Moderate olive gray (5Y 4/2) clayey SILT, 10% clay, moderately well-sorted, damp, medium dense, strong sweet chemical odor through entire spoon.
27						
28						
29						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 9SB3
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sleet), and general stratigraphic description
	Type and number	Interval	Recovery			
29						
30						
31	S-7 11:15	30-32'	1.67'	17 20 21 21	1145 BS=0	[ML] moderate olive gray (5Y4/2) SILT, well-sorted, dry, loose, iron staining in horizontal bands; a few coarse, angular white particles, look like concrete(?). Very strong sweet chemical odor.
32						
33						
34						
35						
36	S-8 11:25	35-37'	1.5'	15 19 22 26	2477	0-1.08': Same as above [ML] but no white particles. 1.08-1.5' of spoon: Same as above [ML] but medium dense to dense, dark horizontal band across center.
37						
38						
39						
40						
41	S-9 11:35 002	40-42'	2.0'	15 17 19 17	3068	Same as above, 0-1.5' of spoon: [ML], iron staining extreme odor, top 0.5' is light olive gray (5Y5/2) 0.5-1.5' is moderate olive gray (5Y4.5/2) 1.5-2.0' of spoon: [ML] moderate olive gray (5Y4/2) clayey SILT, 40% Clay, moderately well-sorted, barely damp, medium dense to dense, extreme sweet chemical odor.
42						
43						
44						
45						

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Soil Boring Log
Continuation Page

Boring No. 9583
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
45	S-10 11:38	45-47'	1.25'	17	580	Top 0 - 0.92' of spm [ML] Moderate olive gray (5Y 4/2) clayey SILT, 10% clay, moderately well-sorted, damp, medium dense to dense, faint sweet chemical odor.
46				17		
47				19		
48				23		
49						0.92' - 1.25' of spm [ML] Moderate yellowish brown (10YR 5/4) due to extreme iron staining, bright orange, well-sorted, dry, loose, faint odor.
50						
51	S-11 11:49	50-52'	0.75'	19	1357 BS=0	[ML] Light Olive gray Brown (5Y 4/3) SILT, well-sorted, dry, loose, extremely strong sweet chemical odor.
52				21		
53				23		
54				23		
55						
56	S-12 15:20	55-57'	1.42'	14	213 BS=0	[ML] Moderate Olive gray brown (5Y 4/3) SILT, well-sorted, dry, loose, sweet chemical odor. from 1.17 - 1.25' : Clayey SILT lense, Olive gray (5Y 3.5/2) 45% Clay, soft, sweet chemical odor, moderately well sorted, dry, medium dense to dense.
57				21		
58				24		
59				30		
60						
61	S-13 15:43	60-62	2'	13 33 36 74	80.4	[ML] yellowish olive gray (5Y 6/2) SILT, well-sorted, dry, loose, sweet + chemical odor, iron staining in horizontal bands in bottom 0.25', Top 0.42 - 0.58' iron flakes

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Soil Boring Log
Continuation Page

Boring No. 9583
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
61						on outside edge of sample; may be due to spoons.
62						
63						
64						
65						
66	S-14 16:02	65-67'	2'	26 44 46 44	30.6	[ML] Light Olive gray Brown (5Y 5/3) SILT, well to moderately well sorted, dry, loose, no unusual odor or sheen.
67						
68						
69						
70						
71	S-15 16:34	70-72'	1.75'	17 31 37 47	95.2	0-1.25' of spoons [ML] moderate Olive gray-Brown (5Y 4/3) SILT with grayish olive (10Y 3.5/2) clay lenses at moderately well-sorted, dry, medium dense, faint odor, bright orange iron staining 1.25-1.75' of spoons [SM]: light olive gray-yellow (5Y 5/4) sandy SILT, 30% sand, moderately sorted, loose, dry, no unusual odor or sheen
72						
73						
74						
75						
76	S-16 16:42	75-77'	2'	26 29 27 37	5.0 BS=0	Same as above: [SM] but only 25% sand, medium dense for top 0.8', loose for bottom 1.2'
77						

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Soil Boring Log
Continuation Page

Boring No. 9SB43
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
77						
78					BS=0.0	
79						
80						
81	S-17 17:08	80-82'	1.75'	16 30 42 62	66.7	Top 0 - 1.5' of spm: [SM] Olive gray (5Y 4/2) Sandy SILT, 10% Sand, fine-grained, moderately sorted, dry, medium dense, no unusual odor or sheen. Iron staining + clay lenses in horizontal bands.
82						1.5 - 1.75' of spm: [SM] Olive yellow-gray (5Y 6/4) Sandy SILT, 45% fine-grained sand, moderately sorted, dry, loose, no unusual odor or sheen. White angular flakes as in S-7.
83						
84						
85						
86	S-18 17:25	85-87'	2'	15 36 36 41	0.0	[SM] Light Olive-gray yellow (5Y 5.5/4) fine-grained Sandy SILT, 15% Sand, moderately sorted, dry, loose, no unusual odor or sheen, faint iron staining in horizontal bands.
87						
88						
89						
90						
91	S-19 17:50	90-92'	1.75'	19 35 37 42	5.0	Same as above: [SM]
92						
93						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 95B3
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
93						
94						
95						
96	S-20 18:15	95-97'	1.58'	15 37 39 46	0.0	Same as above: [SM]
97						
98						
99						
100						
101	S-21 18:41 003	100-102'	1.58'	24 29 37 40	700	[SM] Fine-grained silty SAND, 10% sand, light olive gray-yellow (5Y 5/3) moderately sorted, dry, loose, no unusual odor or sheen.
102						
103						
104						
105						
106	S-22 19:23	105-107'	0.92'	30 32 39 40	272	[SM] Light olive gray yellow (5Y 5/3) sand SILT, 10% fine-grained sand, moderately sorted, dry, loose, no unusual odor or sheen. white angular flakes, resembles eggshells are on the top of spoon. sample.
107						
108						
109						

Arthur D Little

Soil Boring Log

Boring No. 95B4

Client USAEC

Project CBREL

Case No. 67063

Date Start 8/7/93 Contractor Environmental Drilling

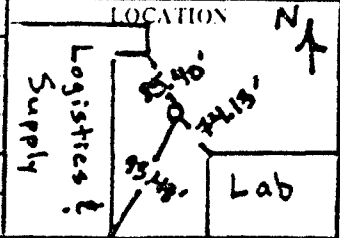
Date Complete 8/7/93 Drill Method Hollowstem Auger

Hole Diameter 7.25" = 0.604 Type Of Rig Acker AD2

Casing Size 4" ID = 0.33" Drilling Additives -

Boring Depth 51.0' Geologist C. Stever

Sampling Method Standard Split Spoon (24" length)



Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
0.0	S1 VOC/ BTEX TPH 0726	0-2'	13" 1.08'	4- 6- 6- 6	0.0: HS 0.0: Hole 0.0" BS	[ML], 10YR 4/2 dk yellowish brn, SILT w/ ~30% sand, silty sand, roots, few gravel grains (coarse), fine, well-sorted, no odor/sheen, dry, loose. Note: 140 lb. hammer / 30" blow lengths
2						
4	S2 VOC/ BTEX TPH 0741 001	4-6'	19" 1.58'	6- 7- 8- 7	120: HS BS=0.0	[ML], mod yellowish brn (10YR 5/4), SILT w/ a few coarse gravel grains, fine, dry, loose, no odor, well-sorted.
6						
9	S3 VOC/ BTEX TPH 0750 002	9-11'	18" 1.50'	7- 8- 8- 7	HS=159.0 BS=0.0	[ML], same as above but w/ orange staining at 7" from top and 18" from top. [7" = 0.58, 18" = 1.50]
11						

HS = headspace of spoon
BS = breathing space

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 4SB4
Client USAEC
Project CBREL
Case No. 67067

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
13						
14	S4 VOC/ GTEX TPH 0800 003	14-16'	2.0ft	4- 6- 8- 12	11.8 HS 0.0 BS	[MLZ], (SY 3/2) olivegy, SILT, up to 20% clay, clayey silt, medium stiff, fine, damp, no odor/sheen, well-sorted, breaks along horiz. planes.
16						
19	S5 VOC/ GTEX TPH 0809 004	17-21'	1.45'	7- 9- 10- 16	11.1 HS BS=00	[MLZ], same as above
21						
24	S6 VOC/ GTEX TPH 0822	24-26'	1.7'	4- 11- 16- 16	HS=00 BS=00	[MLZ], same as above, but w/~30-40% clay * = 1st 0.0 HS reading after 1st hit
26						
29						

BS = breathing space
HS = headspace

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 9SB4
Client USAEC
Project CBREL
Case No. 67067

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
29	S7	29-31'	2.0ft.	8- 10- 10- 15	BS=0.0 HS=0.0 Hole=0.0	[ML], same as above, but drier.
31	0840					
34	S8	34-36'	1.7'	7- 11- 14- 20	HS=0.0 BS=0.0	[ML], same as above, but clay % = ~45%, barely damp.
36	0855					
39	S9	39-41'	1.68'	11- 19- 21- 29	HS=0 BS=0	[ML], clay % = 20%, same as above
41	0910					
44	S10	44-46'	1.72'	11- 17- 19-24	HS=0.0 BS=0.0	[ML], same as above but clay ~10%
	0923					

HS = headspace
BS = breathing space

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 9584
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
46						
49	S11	49-51'	1.7'	12-14-21-29	HS=00 BS=00	[ML], same as above iron staining from 1.4 - 1.5' from bottom of spoon, few coarse gravel grains
51	0442					Bottom of borehole at 51.0' Last sample at 49-51'. End of drilling for 8/7/93 at 51.0'. Ventilation well will be installed.

HS = headspace
BS = breathing space

Arthur D Little

Soil Boring Log

Boring No. 13SB2
 Client USAEC
 Project CRREL
 Case No. 67063

Date Start 8/10/93 Contractor Environmental Drilling
 Date Complete 8/10/93 Drill Method Hollowstem Auger
 Hole Diameter .604' Type Of Rig Acker AD2
 Casing Size .33' Drilling Additives -
 Boring Depth 50.0' Geologist C. Stover
 Sampling Method Standard 2' length split spoon (stainless steel)

LOCATION
 Storage Bldg. N
 ↑
 Logistics & Supply

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
0.0	S1 YOC/ BTEX TPH 1341	0-2'	1.50'	7- 3- 12- 4	HS=311.2 BS=0.0 H=0.0	[SP], 5Y 3/2 olive gry, SAND, w/~10% silt, fine to coarse grained, few cobbles, loose, dry, no odor/sheen, Fe staining in bottom 0.3' of spoon.
2						
5	S2 YOC/ BTEX TPH 1346	5-7'	1.35'	7- 10- 9- 9	HS=34.9 BS=0.0 H=0.0	Top 0.6': same as above w/more cobbles Bottom 0.75': [ML], mod olive brn (5Y 4/4), loose, dry, fine, well-sorted, no odor/sheen.
7						
10	S3 YOC/ BTEX TPH 1351	10-12'	1.0'	9- 4- 10- 10	HS=0.0 BS=0.0 H=0.0	Same as above, Fe staining at 1.0', 0.75', and 0.3' from top of spoon
12						

HS = headspace H = hole
 BS = breathing space

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 13582
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
13						
15	S4 VOC/ BTEX TPH 1405	15-17'	1.60'	2- 3- 3- 7	HS=0.0 BS=0.0 H=0.0	[CL], 5Y 3/2 olive gry, CLAY w/~20% silt, silty clay, medium stiff, fine, damp, no odor/sheen, breaks along horis. planes
17						
20	S5 VOC/ BTEX TPH 1410 066	20-22'	1.40'	14- 9- 12- 14	HS=10.2 BS=0.0 H=0.0	Top 0.5' of spoon: [CL], same as above Bottom 0.9' of spoon: [ML], mod ol brn (5Y 4/4), SILT, dry, fine, loose, well-sorted, no odor/sheen.
22						
25	S6 VOC/ BTEX TPH 1420	25-27'	1.75'	7- 11- 11- 15	HS=11.2 BS=0.0 H=0.0	[CL], 5Y 3/2 ol gry, CLAY, silty clay, ~40-50% silt, medium stiff, damp, fine, no odor/sheen.
27						

HS= head space
BS= breathing space

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 13552
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
29						
30	S7 VOC BTEX TPH 1430	30-32'	1.45'	13- 13- 15- 18	HS=11.8 BS=0.0 H=0.0	[MLI], mod ol brn 5Y 4/4, SILT, dry, fine, loose, well-sorted, no odor/sheen, trace (<5%) clay, breaks along horizontal planes.
32	007					
35	S8 VOC BTEX TPH 1442	35-37'	1.05'	11- 20- 22- 25	HS=0.0 BS=0.0 H=0.0	Same as above [MLI]
37						
40	S9 VOC BTEX TPH 1450	40-42'	1.65'	16- 18- 22- 22	HS=0.0 BS=0.0 H=0.0	Same as above [MLI], but <u>no</u> clay
42						
44						

HS = headspace
BS = breathing space

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 13982
Client USAEC
Project CBREL
Case No. 67068

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
45	S10 VOC/ BTEX TPH 1505	45-47'	1.45	9- 11- 20- 20	HS=0.0 BS=0.0 H=0.0	[MLI], 10 YR 4/2 dk yel brn, SILT, fine, dry, loose, well-sorted, no odor / sheen
47						
50	S11 VOC/ BTEX TPH 1520	50-52'	1.70'	15- 17- 15- 17	HS=0.0 BS=0.0 H=0.0	[MLI], same as above
52	008					Second consecutive 0.0 ppm reading obtained @ 50-52! End of drilling @ 50' 8/10/93

HS = headspace
BS = breathing space

Arthur D Little

Soil Boring Log

Boring No. 135B3

Client USAEC

Project CRREL

Case No. 67063

Date Start 8/11/93 Contractor Environmental Drilling

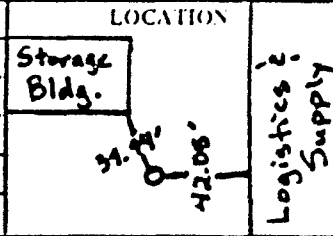
Date Complete 8/11/93 Drill Method Hollowstem Auger

Hole Diameter .604' Type Of Rig Acker AD2

Casing Size .33' Drilling Additives -

Boring Depth 70.0' Geologist C. Stover

Sampling Method 2' length stainless steel split spoon



Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
0.0	S1 VOC/ BTEX TPH 0755	0-2'	1.02'	30- 10- 20- 30	HS=512.0 BS=0.0 H=0.0	[SP1, (10YR 4/2) dk yel brn, SAND w/a few cobble, fine to coarse, dry, poorly-sorted, well-graded, loose, no odor/sheen.
2						Note: 140 lb hammer / 30" blow length
5	S2 VOC/ BTEX TPH 0803 009	5-7'	1.50'	5- 5- 5- 7	HS=444 BS=0.0 H=0.0	[ML1, 5Y 3/2 olive gry, SILT, w/ trace (±5%) clay, fine, loose, dry, diesel like odor, no sheen, well-sorted.
7						
10	S3 VOC/ BTEX TPH 0815	10-12'	1.75'	8- 12- 15- 15	HS=444 BS=0.0 H=0.0	[ML1, same as above, but no clay. Fe staining in top 0.75' of spoon and 1.15' from spoon.
12						

HS = headspace

H = hole

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 135B3
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
13						
15	S4 VOC/ BTEX TPH 0820	15-17'	1.72'	5- 5- 8- 8	HS=4914 BS=0.0 H=0.0	[ML], same as above but w/~10-20% clay, Fe staining at .68' from top of spoon, breaks along horizontal planes, medium stiff.
17						
20	S5 VOC/ BTEX TPH 0830	20-22'	2.00'	4- 5- 8- 8	HS=6.7 BS=0.0 H=0.0	[ML], SILT same as above but wet and no odor/sheen.
22						
25	S6 VOC/ BTEX TPH 0842 010	25-27'	1.65'	2- 6- 6- 7	HS=1.0 BS=0.0 H=0.0	[CL] 5Y 3/2 olive gry, CLAY w/~30% silt, ^{2cs} clayey silty clay, medium stiff, wet, breaks along horizontal planes, fine, no odor/sheen.
27						

HS = headspace
BS = breathing space

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 133B3
Client USAEC
Project CBEL
Case No. 670123

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
29						
30	S7 VOC/ BTEX TPH 0850	30-32'	1.68'	3- 6- 14- 14	HS=87.2 BS=0.0 H=0.0	Top 1.0' of spoon: [CL], same as above Bottom 0.68' of spoon: [ML], BY 3/2 olive gry, SILT, fine, loose, damp, well-sorted, no odor/sheen.
32						
35	Shelby 013 0902	35-37'	2.00'		BS=0.0 H=0.0	Shelby taken from 35-37.0' / pushed 2.0' / full recovery from visual and tape measuring
37						
40	S8 VOC/ BTEX TPH 0915	40-42'	1.50'	8- 12- 12- 20	HS=20.8 BS=0.0 H=0.0	[ML], BY 3/2 olive gry, SILT, same as bottom 0.68' of 30-32' sample, but trace of clay (<5%) and breaks along horizontal planes.
42						
45						

HS = head space
BS = breathing space
H = hole

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 135B3
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
45	S9 VOC/ BTEX TPH 0935	45-47'	1.65'	12- 12- 12- 17	HS=48.2 BS=0.0 H=0.0	[ML], same as above but no clay
47	011					
50	S10 VOC/ BTEX TPH 0950	50-52'	1.40'	6- 8- 12- 17	HS=21.7 BS=0.0 H=0.0	[ML], 5Y 4/2 mod ol gry, SILT, fine, loose, damp, well-sorted, no odor/sheen, Fe staining at 0.25' from bottom of spoon, breaking along horizontal planes.
52						
55	S11 VOC/ BTEX TPH 1010	55-57'	1.65'	6- 9- 20- 22	HS=10.3 BS=0.0 H=0.0	[ML], 5Y 3/2 ol gry, SILT w/~30% clay, clayey silt, fine, damp, well-sorted, med stiff to stiff, no odor/sheen, Fe staining 0.25' from bottom.
57						
60	S12 VOC/ BTEX	60-62'	1.60'	8- 13- 13- 13	HS=0.6 BS=0.0 H=0.0	[ML], 5Y 4/2 mod ol gry, SILT, fine, loose, damp, well-sorted, no odor/sheen, breaking along horizontal

HS = headspace
BS = breathing space
H = hole

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 135B3
Client USAEC
Project CBREL
Case No. 67013

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
61	TPH					planes.
62	1025					
65	S13 VOC/ BTEX TPH 1040	65-67'	1.40'	7- 13- 13- 15	HS=0.0 BS=20 H=0.0	[MLI], same as above but trace of (<10%), sand.
70	S14 VOC/ BTEX TPH 1055	70-72'	0.95'	12- 16- 23- 23	HS=0.0 BS=0.0 H=0.0	[SM], 10YR 4/2 dk yel brn, SAND w/40-50% silt, silty sand, fine, dry, loose, well-sorted, no odor/sheen, Fe staining 0.25' from bottom of spoon.
72	012					Second consecutive 0.0 ppm headspace reading. End drilling at 70'. Last sample taken at 70.0 - 72.0' BGS.

HS = headspace

H = hole

BS = breathing space

Arthur D Little

Soil Boring Log

Boring No. 135B4

Client USAEC

Project CRREL

Case No. 67063

Date Start 8/11/93 Contractor Environmental Drilling
 Date Complete 8/11/93 Drill Method Hollowstem Auger
 Hole Diameter .604' Type Of Rig Ackar AD2
 Casing Size - Drilling Additives -
 Boring Depth 90.0' Geologist C. Staver

LOCATION
 Storage Bldg. N
 ↑
 0
 Logistics & Supply

Sampling Method 2.0' length stainless steel splitspoon

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
0.0	S1 VOC/ BTEX TPH 1340	0-2'	0.98'	17- 47- 27- 27	HS=3.4 BS=0.0 H=0.0	[SP], (UOYR 4/2) dk yel brn, SAND, w/~10% silt, few cobbles, fine to coarse grained, loose, dry, poorly-sorted, no odor/sheen.
2						Note: 140 lb. hammer and 30" drop length for blows.
5	S2 VOC/ BTEX TPH 1348	5-7'	1.25'	6- 10- 10- 12	HS=83.1 BS=0.0 H=0.0	[ML], 5Y 4/2 mod ol gry, SILT w/ trace (±5%) sand, fine, loose, dry, well-sorted, no odor/sheen, some roots.
7	015					
10	S3 VOC/ BTEX TPH 1400	10-12'	1.80'	3- 4- 7- 7	HS=1640 BS=0.0 H=0.0	[ML], 5Y 3/2 ol gry, SILT w/ trace (±5%) clay, fine, loose, dry, well-sorted, sewage-like odor, breaks along horizontal planes.
12						

HS = headspace H = hole
 BS = breathing space

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 13884
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
15	S4 VOC/ BTEX TPH 1410	15-17'	1.42'	6- 9- 9- 9	HS=10.0 BS=0.0 H=0.0	[ML], same as above, but Fe staining all throughout spoon and no roots
17						
20	S5 VOC/ BTEX TPH 1420 016	20-22'	1.60'	4- 5- 7- 2	HS=8.9 BS=0.0 H=0.0	[ML], mod ol gry (SY 4/2), SILT w/ ~ 5-10% clay, clayey silt, wet, soft to medium stiff, fine, well-sorted, no odor/sheen
22						
25	S6* VOC BTEX TPH 1426	25-27'	0.0'			Shelby tube taken from 25-27'. Shelby pushes down full 2.0', but comes up soaking wet w/no recovery. A spoon will be taken next, to be followed by another tube.
27						

S6* = Shelby tube H=hole
HS = headspace
BS = breathing space

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 135B4

Client USAEC

Project CABEL

Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
29						
30	S6 VOC/ BTEX TPH 1440	30-32'	1.10'	7- 11- 10- 14	HS=30.0 BS=0.0 H=0.0	[ML], mod ol brn 5Y 4/4, SILT, w/ trace (~5-10%) sand, loose, dry, fine, well-sorted, no odor/ sheen; no recovery in top of spoon, but water/silt streaks evident
32						
35	Shelby 1446	35-37'	2.0'			Shelby pushes full 2.0! Full recovery measured w/ tape/folding ruler.
37	S7 VOC/ BTEX TPH 1455	37-39'	1.5'	9- 10- 17- 14	HS=72.4 BS=0.0 H=0.0	[ML], 5Y 3/2 ol gry, SILT w/ ~20% clay, clayey silt, damp, fine, medium stiff, no odor/sheen, breaks along horizontal planes, Fe- staining 0.4' from spoon bottom.
40						
42	S8 VOC/ BTEX TPH 1506	40-42'	1.5'	10- 10- 15- 15	HS=52.0 BS=0.0 H=0.0	Top 1.0': [ML], same as above Bottom 0.5': [ML], (5Y 4/4) mod ol brn, SILT w/ no clay, loose, fine, dry, no odor/sheen, Fe staining at contact.
45						

HS=headspace
BS=breathing space
H=hole

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 13SB4
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
45	S9 VOC/ BTEX TPH 1515	45-47'	1.61'	10- 19- 17- 20	HS=26.0 BS=0.0 H=0.0	Same as bottom 0.5' of 40-42' sample, [ML]
47						
50	S10 VOC/ BTEX TPH 1530	50-52'	1.51'	15- 14- 15- 31	HS=7.2 BS=0.0 H=0.0	[ML], 5Y 4/2 mod ol gry, SILT w/ ~5-10% clay (trace), fine, damp, medium stiff to stiff, well-sorted, no odor or sheen, Fe staining 0.8' from spoon bottom, breaks along horizontal planes.
52						
55	S11 VOC/ BTEX TPH 1545	55-57'	1.75'	15- 17- 15- 17	HS=4.7 BS=0.0 H=0.0	[ML], same as above, Fe staining at top 0.1' of spoon and 0.75' from bottom.
57						
60	S12 VOC/ BTEX	60-62'	1.55'	9- 10- 12- 14	HS=0.7 BS=0.0 H=0.0	[ML], same as above, but no Fe staining

HS = headspace
BS = breathing space
H = hole

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 13504
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
62	TPH 1555					
65	S13 VOL/ BTEX TPH 1610	65-67'	1.80'	7- 10- 12- 21	HS=0.6 BS=0.0 H=0.0	[ML], same as above
67						Equipment blanks and field blanks taken at 1618.
70	S14 VOL/ BTEX TPH 1630	70-72'	1.85'	17- 18- 12- 16	HS=0.4 BS=0.0 H=0.0	[ML], 5Y 3/2 ol gry, SILT w/ ~20-30% sand, sandy silt, fine, loose, damp, well-sorted, no odor/sheen, Fe staining 0.4' from top of spoon.
75	S15 VOL/ BTEX TPH 1650	75-77'	1.85'	16- 17- 13- 13	HS=0.2 BS=0.0 H=0.0	[SM], 10YR 4/2 dk yel brn, SAND w/ ~30-45% silt, silty sand, loose, fine, dry, well-sorted, no odor/sheen.

HS = headspace
BS = breathing space
H = hole

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 135B4
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
77						
80	S16 VOC/ BTEX TPH 1710	80-82'	1.82'	18- 24- 22- 28	HS=0.7 BS=0.0 H=0.0	[SM], same as above
82						
85	S17 VOC/ BTEX TPH 1725	85-87'	2.00'	15- 25- 29- 35	HS=0.0 BS=0.0 H=0.0	[SM], same as above, but w/only 10% silt.
87						
90	S18 VOC/ BTEX TPH 1750	90-92'	2.00'	12- 23- 26- 37	HS=0.0 BS=0.0 H=0.0	[SM], (SY 4/6) lt. ol brn, SAND w/~ 10% silt, fine, loose, dry, well-sorted, no odor/sheen, some clay banding at 1.25' from top of spoon.
92	017 +DUP 018					Second consecutive 0.0 ppm headspace reading. End drilling at 90'. Last sampling at 90-92! 8/11/93

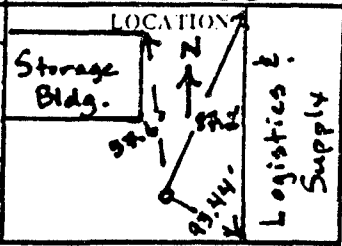
HS = head space
BS = breathing space
H = hole

Arthur D Little

Soil Boring Log

Boring No. 13335
Client USAEC
Project CRREL
Case No. 67063

Date Start 8/10/93 Contractor Environmental Drilling
Date Complete 8/10/93 Drill Method Hollowstem Auger
Hole Diameter .604' Type Of Rig Acker AD2
Casing Size - Drilling Additives -
Boring Depth 50.0' Geologist C. Stover
Sampling Method Standard 24" length split spoon (stainless steel)



Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
0.0	S1 VOC/ BTEX TPH 0938	0-2'	1.35'	5- 6- 7- 10	BS=0.0 HS=364.4 H=0.0	[ML], (10YR 4/2) dk yel brn, fine, SILT, dry, loose, well-sorted, no odor/sheen, Fe staining 0.25' from bottom of spoon.
2						
5	S2 VOC/ BTEX TPH 0945	5-7'	1.35'	2- 4- 7- 7	BS=0.0 HS=0.0 H=0.0	[ML], (5Y 4/4) mod ol brn, SILT, fine, dry, loose, well-sorted, no odor/sheen, Fe staining 0.3' from top of spoon.
7						
10	S3 VOC/ BTEX TPH 0950 001	10-12'	1.95'	5- 6- 6- 6	BS=0.0 HS=0.0 H=0.0	[ML], (5Y 4/2), mod ol gry, SILT, trace of clay ($\leq 5\%$), damp, medium stiff, fine, well-sorted, no odor/sheen, Fe staining .35' from top and 1.9' from top.
12						

BS = breathing space HS = headspace H = hole

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. B5B5
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
13						
15	S4 VOC BTEX TPH 1000	15-17'	1.45'	4- 5- 6- 6	HS=0.0 BS=0.0 H=0.0	[ML], same as above, Fe staining 0.7' from top of spoon
17						
20	S5 VOC BTEX TPH 1010 002	20-22'	2.0'	6- 4- 6- 8	HS=0.0 BS=0.0 H=0.0	[CL], (5Y 3/2) olive gry, CLAY w/ ~20-30% silt, silty clay, moist, medium stiff, fine, no odor/sheen.
22						
25	S6 VOC BTEX TPH 1021	25-27'	1.75'	3- 2- 4- 4	HS=0.0 BS=0.0 H=0.0	Top 1.4' of spoon: [CL] same as above Bottom 0.35': [ML], (5Y 5/2) lt. olive gry, SILT, loose, fine, dry, well-sorted, no odor/sheen.
27						

BS = breathing space HS = headspace H = hole

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 13SB5
Client USAEC
Project CBEL
Case No. 67067

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
29						
30	S7 VOC/ BTEX TPH 1040	30-32'	1.50'	10- 10- 20- 20	HS=0.0 BS=0.0 H=0.0	[ML], same as above bottom 0.85', but clay banding at 1.35', 0.65', and 0.32' from top of spoon, breaks along horizontal planes
32						
35	S8 VOC/ BTEX TPH 1048	35-37'	1.45'	11- 15- 20- 20	HS=0.0 BS=0.0 H=0.0	[ML], same as above, but clay banding at 0.85' from top of spoon, Fe staining at 0.48' from top of spoon.
37						
40	S9 VOC/ BTEX TPH 1100	40-42'	1.85'	15- 17- 17- 20	HS=0.0 BS=0.0 H=0.0	Same as above, breaks along horizontal planes before becoming loose.
42						
45						

HS = headspace
BS = breathing space

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 13SB5
Client USAEC
Project CRIEL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
45	S10 VOC/ BTEX TPH 1115	45-47'	1.55'	7- 17- 22- 22	BS=0.0 H=0.0 HS=0.0	Same as above, [ML], but clay banding .0-0.35' from bottom.
47						
50	S11 VOC/ BTEX TPH 1130	50-52'	1.60'	7- 17- 22- 24	BS=0.0 H=0.0 HS=0.0	[ML], same as above, clay banding 0.65-0.70' from bottom of spoon.
52	003					End Drilling at 52.0' -- 50.0'-52.0' sample. 8/10/93

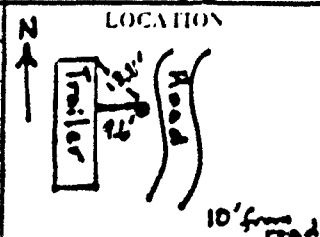
BS = breathing space
HS = head space

Arthur D Little

Soil Boring Log

Boring No. 155B2
 Client USAEC
 Project CBREL
 Case No. 67063

Date Start 8/5/93 Contractor Environmental Drilling
 Date Complete 8/5/93 Drill Method Hollowstem Auger
 Hole Diameter 10 1/4" = 0.95' Type Of Rig Failing F-6
 Casing Size — Drilling Additives —
 Boring Depth 57 ft. Geologist C. Stover



Sampling Method Standard 24" length stainless steel split spoon

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (pptw)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
0.0	S1 VOC/ BTEX TPH OB09	0-2'	1.42'	8-	H _{nu} =0.0 P _d =0.0	[MLI], (10YR 4/2) dk yellowish brn, SILT w/a few coarse gravel grains (from fill?), fine, dry, well-sorted, loose, no odor/sheen
2				9-		
				10-		
				12		
5	S2 VOC/ BTEX TPH OB19 001	5-7'	1.0'	3-	H _{nu} =0.0 P _d =59.0	[SW], (10YR 2/2), dusky yellowish brn, SAND w/~10% silt, few cobbles and roots, fine to med grained, well-sorted, dry, loose, no odor/sheen.
7				3-		
				11-		
				12		
10	S3 VOC/ BTEX TPH OB30	10-12'	.74'	3-	H _{nu} =0.0 P _d =21.0	Top .54' of spoon: [SW], same as above, but damp Bottom .25' of spoon: [MLI], (10YR 4/2) dk yellowish brn, SILT, damp, fine, soft, loose, no odor/sheen
				3-		
				2-		
				4		
12	S4 VOC/ BTEX TPH	12-14'	2.0 ft.	3-	H _{nu} =0.0 P _d =50.0	Bottom 1.0': [SW], (10YR 4/2) dk yellowish brn, SAND, fine, wet, well-sorted, loose, no odor/sheen Top 1.0 ft: [MLI], same as bottom
				3-		
				3-3		

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 65B2

Client USAEC

Project CBREL

Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
						.25' of above, but wet.
14	Shelby 005 0850	14-16'	2.0'			Shelby tube. 2.0 ft. Stainless steel
16	S5 VOC/ BTEX TPH 0900	16-18'	1.0'	1- 2- 3- 3-	Hms=0.0 Pid=50.8	[ML], (5Y 3/2) olive gray, SILT w/ trace (~5%) clay, wet, loose, fine, well-sorted, slight organic odor, no sheen
18	S6 VOC/ BTEX TPH 0915	18-20'	1.0'	1- 3- 2- 3-	Hms=0.0 Pid=4.0	[ML], (5Y 3/2) olive gray, SILT w/~10% clay, wet, fine, soft/ loose, well-sorted, no odor/sheen
20	S7 VOC/ BTEX TPH 0950	20-22'	2.0'	1- 1- 2- 3	Hms=0.0 O.D Pid=59.2	Top .5 ft: same as above Bottom .5 ft: [SM], (10YR 4/2) dk yellowish brn, SAND w/ ~40% silt, silty sand, fine, wet, well-sorted, no odor/sheen.
22	S8 VOC/ BTEX TPH 0947	22-24'	2.0'	2- 2- 2- 2	Hms=0.0 O.D Pid=6.4	[ML], (5Y 3/2) olive gray, SILT w/~10% clay, wet, fine, loose, well-sorted, no odor/sheen.
24	S9 VOC/ BTEX TPH 0952	24-26'	1.25'	5- 5- 8- 10	Hms=3.5 Pid=7.2	Same as above, but w/ trace of sand (25%), slight odor
26	S10 VOC/ BTEX TPH 0955	26-28'	1.25'	10- 10- 10- 12	Hms=1.9 Pid=4.1	[SM], (5Y 3/2) olive gray, SAND w/~20% silt, wet, fine, loose, no odor/sheen, well-sorted, poorly graded; iron staining at .92' from top.
28	S11 VOC/ BTEX	28-30'	2.0'	9 10 10-15	Hms=0.2 Pid=34.1	[SM], (5Y 3/2) olive gray, SAND w/ ~10% clay, 5% silt, wet, loose, fine, well-sorted, no odor/sheen

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 155B2

Client USAEC

Project CRBEL

Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
	TPH 0959 203					
30	S12 VOC/ BTEX TPH 1000	30-32'	1.0'	7- 11- 10- 16	H _{nu} = 0.9 P _d = 3.3	Same as above but ~30% silt
32	S13 VOC/ BTEX TPH 1020	32-34'	1.0'	17- 14- 17- 19	H _{nu} = 0.0 P _d = 26.1	[MLI], (5Y 3/2)-(N3) olive gry to dk gry, SILT w/~ 30% sand (25% clay), fine, wet, medium dense, no odor/sheen
34	S14 VOC/ BTEX TPH 1030	34-36'	1.41'	12- 12- 14- 14	H _{nu} = 0.0 P _d = 34.2	[MLI], dk gry(N3), same as above, but <u>damp</u>
36	S15 VOC/ BTEX TPH 1040	36-38'	1.0'	14- 15- 14- 23	H _{nu} = 0.1 P _d = 0.0	[MLI], same as above but 210% sand
38	S16 VOC/ BTEX TPH 1045	38-40'	1.25'	10- 14- 14- 16	H _{nu} = 0.1 P _d = 18.0	[MLI], same as above but no sand, breaks along horizontal planes
40	S17 VOC/ BTEX TPH 1048	40-42'	1.41'	5- 5- 2- 5	H _{nu} = 2.5 P _d = 11.4	[MLI], same as above but ~20% sand
42	S18 VOC/ BTEX TPH 1055	42-44'	1.58'	6- 7- 10- 14	H _{nu} = 1.0 P _d = 6.1	[MLI], same as above but 210% sand
44	S19 VOC/ BTEX	44-46'	1.58'	7- 8- 14-14	H _{nu} = 4.0 P _d =7.9	[MLI], (N3) dk gry, SILT, ~10% clay, Wet, breaks along horizontal planes, loose, fine, no odor/sheen

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Soil Boring Log
Continuation Page

Boring No. 155B2
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
46	TPH 1103					
48	S20 VOC/ BTEX TPH 11134	46-48'	2.0'	9- 10- 16- 17	Hnu: 14.5 P:d= 10.9	Top .83' of spoon: [ML], same as above but w/~30% clay, damp Bottom 1.17' of spoon: [SM], (N4) med dk gry SAND, dry, loose, fine, well-sorted, ~40-50% silt, no odor
50	S21 VOC/ BTEX TPH 1120	48-50'	1.5'	11- 12- 14- 22	Hnu: 0.0 P:d= 0.0	Top .42' of spoon: same as bottom 1.17' of above 46-48' sample but damp Bottom 1.08' of spoon: [ML], (N3) dk gry, SILT, clayey silt (~30-40% clay), fine damp, med dense, breaks on horiz. planes, no odor/sheen
52	S22 VOC/ BTEX TPH 1135	50-52'	2.0'	22- 23- 17- 20	P:d= 0.0	[ML], same as Bottom 1.08' of spoon above
55	S23 VOC/ BTEX TPH 1405	55-57'	2.0'	18- 16- 17- 22	P:d= 0.0	[SM], (N4) med. dk gry, SAND w/~50% silt, silty sand, fine, loose, well-sorted, barely damp, no odor/sheen.
57						Last sample taken at 57' (55-57' range)

Arthur D Little

Soil Boring Log

Boring No. 155B3

Client USAEC

Project CRREL

Case No. 67063

Date Start 7-28-93

Contractor E.D.I.

LOCATION

Date Complete 7-28-93

Drill Method Hollow Stem Auger

ROAD

Hole Diameter 0.60'

Type Of Rig Acker AD2

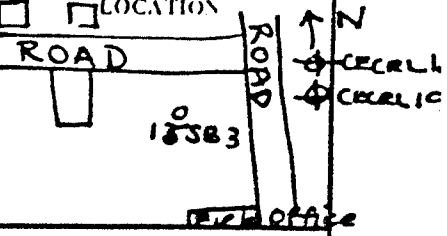
Casing Size 0.33' Auger

Drilling Additives NA

Boring Depth 54'

Geologist C. Kovatch

Sampling Method Split Spoon (2' Stainless Steel)



Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION
	Type and number	Interval	Recovery			
0.0	S-1	0-2'	1.1'	12	0.0	0-0.2' of spoon: [PT] Olive gray (5Y3/2) Fine grained organic SOIL, moderately well sorted, dry, compact, no unusual odor or sheen. 0.2-1.1' of spoon: [OL] moderate olive gray-brown (5Y4/3) Organic SILT, moderately well sorted, dry, medium dense, no unusual odor or sheen.
1	TPH VOC BTEX 0951			18		
2				18		
3						
4	S-2	4-6'	1.3'	4	0.0	0-0.7' of spoon: [Sm] Moderate olive gray brown (5Y4/3) Fine to medium grained silty SAND, moderately well sorted, dry, medium dense, no unusual odor or sheen. 0.7-1.1' of spoon: [ML] moderate olive gray-brown (5Y4/3) SILT, well sorted, dry, medium dense, no unusual odor or sheen. 1.1-1.3' of spoon: [ML] Olive gray (5Y3/2) Clayey SILT, well sorted, dry, Medium dense to dense, no unusual odor or sheen.
5	[001]			4		
6	1004					
7						
8						
9	S-3	9-11'	1.2'	3	0.0	0-0.8' of spoon: [ML] Medium dark gray (N3.5) Clayey SILT, well sorted, wet, dense to very dense, no unusual odor or sheen. 0.8-1.2' of spoon: [SW] Moderate Brown (5YR3/4) Fine to medium grained SAND with clay lenses, poorly sorted, damp, medium dense to loose, no unusual odor or sheen.
10				3		
11	1018			6		
12						
13						

* Total Organics: Headspace (HS)
T 1401b Hammer, 30" drop

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 15SB3
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	* Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
13						
14						
15	S-4 10:30	14-16'	0.8	WOR WOR 1 2	0.0	[SM], Moderate Olive gray (5Y 4/2) fine-grained Sandy SILT, 20% Sand, 80% SILT. Moderately well sorted, Wet, loose, no unusual odor or sheen.
16						
17						
18						
19						
20	S-5 10:45	19-21'	1.1'	WOR 3 2 1	0.0	Same as above: [SM]
21						
22						
23						
24						
25	S-6 10:50	24-26'	1.1'	WOR WOR 3 2	0.0	Same as above: [SM]
26						
27						
28						
29						

Measurements in "Geologic Description" are in spoon length Page 2 of 4
 [] - Lab sample number
 * Total Organics = headspace

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 15SB3
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	* Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
29	S-7	29-31'	1.2'	WOR	0.0	Top 1': Same as above: [SM] Bottom 0.2': [SP], Moderate Olive gray (5Y 4/2) Medium to fine grained SAND, Poorly sorted, some micaceous, damp, Medium Dense, No unusual odor or sheen.
30	10:57			WOR 5 4		
31						
32						
33						
34	S-8	34-36'	2.0'	WOR	60.8	[SP], Moderate Olive gray (5Y 4/2) Medium grained SAND, poorly sorted, Wet, Dense to medium Dense, No unusual odor or sheen. 0.5 to 1.5' - same but fine-grained. Bottom 0.3' - silt lenses within [SP]
35	11:12			WOR 3 5 7		
36	002					
37						
38						
39	S-9	39-41'	1.8'	6		Top 0.2': [ML], Moderate Olive gray (5Y 4/2) clayey SILT, Well-sorted, Wet, Medium Dense, No unusual odor or sheen. 0.2 - 1.5': [SM], Moderate Olive gray (5Y 4/2) fine-grained Silty SAND. Moderately sorted, Damp, Medium Dense, No unusual odor or sheen. Iron staining in horizontal bands throughout. 1.5 to 1.8' of spoon: [SM], Moderate Olive gray (5Y 4/2) fine-grained Sandy SILT, 10% sand, 90% silt, Well-sorted, extremely wet, loose to very loose, No unusual odor or sheen.
40	11:24			10		
41				11		
42				15		
43						
44						
45	next page					

Measurements in "Geologic Description" are in spoon lengths. Page 2 of 4
 [00x] - Lab sample number
 * Total Organics = Headspace

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 15SB3
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	*Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
45	S-10 11:44	44-46'	1.2'	10 15 18	0.0	[ML] Medium Dark Gray (N 3.5), SILT, Moderately sorted, barely damp, Dense, No unusual odor or sheen. Mica.
46						
47						
48						
49						
50	S-11 11:55	49-51'	1.1'	10 14 16 20	0.0	[ML] Medium Dark Gray (N 3.5) SILT, Well-Sorted, damp, dense to very dense, No unusual odor or sheen.
51						
52						
53						
54						
55	S-12 12:10 003	54-56'	1.75'	10 20 20 30	0.0	Same as above: [ML]
56						

Measurements in "Geologic Description" are in spoon length. Page 4 of 4

003 Lab Sample number

*Total Organics = Headspace

Arthur D Little

Soil Boring Log

Boring No. 15SB4

Client USAEC

Project CRREL

Case No. 67063

Date Start 8-6-93

Contractor E.D.I.

Date Complete 8-6-93

Drill Method Hollow Stem Auger

Hole Diameter 0.60'

Type Of Rig Ackler AD2

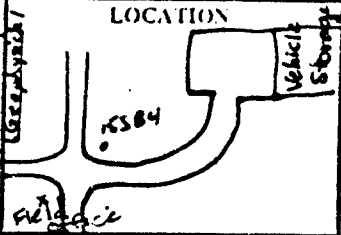
Casing Size 4" Auger (0.33')

Drilling Additives NA

Boring Depth 51' 49'

Geologist C. Kovatch

LOCATION



Sampling Method Split Spoon

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
0.0	S-1	0-2'	1.4'	4	0	0-0.3' of spoon: [PT] moderate olive gray (5Y 4/2) PEAT with fine to coarse sand grains, poorly sorted, dry, loose, no unusual odor or sheen.
1	0809			6	(3.0)	
2	TPH VOC/ BTEX			8		0.3-1.4': [OL] moderate olive gray (5Y 4/2) SILT with pebbles up to 1 cm. in diameter, poorly to moderately sorted, dry, loose, no unusual odor or sheen.
3						Note: 140 lb hammer, 30" drop
4						
5	S-2	4-6'	1.4'	6	0	0-0.35' of spoon: [ML] moderate olive gray brown (5Y 3.5/3) clayey SILT, 10% clay, moderately well sorted, dry, medium dense, no unusual odor or sheen.
6	0820			4	(0)	0.32-1.4' of spoon: [SM] moderate olive gray brown (5Y 4/3) sandy SILT, 20% sand, well sorted, dry, loose. No odor or sheen.
7						
8						
9						
10	S-3	9-11'	1.6'	3	0	[ML] moderate olive gray (5Y 3/2) clayey SILT, 48% clay, 52% SILT, well sorted, damp, stiff. No odor or sheen. Iron staining randomly throughout.
11	0832 [001]			4	(2.9)	
12	S-4	11-13'	1.7'	7	0	Top 0.6' of spoon: [ML] moderate olive gray (5Y 3/2) clayey SILT, 25% clay, 75% SILT, well sorted, damp, stiff, no odor or sheen. Iron staining
13	0838			8	(2.5)	Bottom 1.1' of spoon: [SM] moderate olive gray (5Y 3/2) sandy SILT, 20% sand, moderately well sorted, fine-grained, damp, stiff, no odor or sheen. Iron staining in thick Page 1 of 9 horiz. band in bottom 0.1'.

Total Organics: HNu reading (PID) reading
 [000] - Lab number

Sheen. Iron staining in thick Page 1 of 9 horiz. band in bottom 0.1'.

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 15SB4
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
13	S-5 0850	13-15'	0.8'	7	0 (0)	Same as above but Olive gray (5Y3/2):
14				10		
15	S-6 0905	15-17'	0.85'	4	0 (0)	[ML] Olive Gray (5Y3/2) Clayey Silt, well-sorted, 10% clay, moist, dense, no unusual odor or sheen. middle 0.4-0.5' of spoon: Same but 40% clay, medium dense.
16				4		
17	S-7 0915	17-19'	1.8'	7	0 (0)	[ML] Moderate Olive Gray (5Y4/2) Clayey SILT, 25% Clay, well-sorted, moist, medium stiff to soft, no odor or sheen. Bottom 1.3' of spoon: [ML] Moderate Olive Gray (5Y4/2) SILT, very well sorted, damp, stiff, no odor or sheen.
18				10		
19	S-8 0921	19-21'	1.1'	6	0 (0)	[ML]: Olive Gray (5Y3/2) SILT, well-sorted, moist, dense, no unusual odor or sheen.
20				9		
21	S-9 9:31	21-23'	2.0'	8	0 (0)	[ML]: Same as above but damp
22				12		
23	S-10 0940	23-25'	1.8'	4	0 (0)	[ML] Moderate olive gray (5Y3/2) Clayey SILT, 8% CLAY, well-sorted, damp, stiff, no unusual odor or sheen. Bottom 0.6'. [SM] silty SAND, olive gray brown (5Y3/4), moderately well sorted, 70% SAND, wet, medium dense.
24				8		
25	S-11 9:55 DUP	25-27'	2'	2	0 (0)	[ML]: Same as above. but: 0.5-0.6' - Sand lense: [SM] Silty SAND, moderate olive gray (5Y4/2), moderately sorted, moist, medium dense to loose, no unusual odor or sheen.
26				2		
27	S-12 10:08	27-29'	1.75'	3	0 (0)	[ML]: Olive gray (5Y3/2) SILT, well-sorted, moist, dense, No unusual odor or sheen. Reddish-brown Iron bacteria or staining; occurs in areas throughout. Occurs on horizontal planes.
28				3		
29				4		
				9		
				14		
				14		

Total organics: HNu Reading
headspace (PID) Reading
[] - Lab sample number

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 15SB4
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
29-30-31	S-13 10:18	29-31'	1.75'	3 3 7	0 (0)	[ML] Moderate Olive Gray (5Y 4/2) clayey SILT, 48% Clay, 52% SILT, moderately well-sorted, damp, dense, no unusual odor or sheen. Iron staining, as above, throughout.
32-33	S-14 10:30 002	31-33'	2'	12 15 15 25	0 (0)	[CL] Olive gray (5Y 3/2) Silty CLAY, moderately well-sorted, very moist, very stiff, no unusual odor or sheen. 0.16-1.7' of Spoon: [ML] Olive Gray (5Y 3/2) SILT, well-sorted, moist, medium dense, no unusual odor or sheen.
34-35	S-15 10:43	33-35'	1.7'	5 15 22 25	0 (0)	0-1.5' of spoon: [ML] Moderate Olive Gray (5Y 4/2) clayey SILT, 20% Clay, 80% SILT, Moderately well-sorted, moist, dense, no unusual odor or sheen. 1.5-1.7' of spoon: [ML] same as above but 45% clay, WET.
36-37	S-16 10:52	35-37'	1.5'	5 6 16 25	0 (0)	Top 0-0.4' of spoon: [ML] Moderate olive gray (5Y 4/2) clayey SILT, 40% Clay, Moderately well-sorted, wet, medium dense to dense, No unusual odor or sheen. 0.4-1.5' Same [ML] but 5% Clay, dense to very dense, moist.
38-39	S-17 11:07 DUP	37-39'	1.4'	22 32 50 50	0 (0)	Top 0-0.8' of spoon: same as above [ML] but 10% Clay only, WET. 0.8-1.4' - [ML] moderate grayish Olive (10Y 5/2) SILT, well-sorted, DRY, very dense, no unusual odor or sheen.
40-41	S-18 11:20 DUP	39-41'	1.65'	18 22 25 35	0.2 (0)	[ML] Moderate olive gray (5Y 4/2) SILT, well-sorted, dry, dense, no unusual odor or sheen, More dense toward the bottom.
42-43	S-19 11:27 003	41-43'	1.15'	38 40 50 50	0.8 (0)	Same as above: [ML] but light olive gray (5Y 5/2). Also has iron staining in bands striking as shown, along bedding
44-45	S-20 11:43	43-45'	1.2'	19 25 35 30	0.5 (0)	Same as above: [ML]

Total Organics: H Nu Reading
headspace (PID) reading
00x Lab sample number

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. 15SB4
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
45						
46						
47						
48						
49						49' end of boring.
50	S-21 12:00	49-51	1.4'	22 28 38 38	0 (0)	Same as above: [EM4]
51	004					
52						
53						
54						
55						
56						
57						
58						
59						
60						
61						

Total Organics: HNu Reading
headspace (PID) reading

Arthur D Little	Soil Boring Log	Boring No. CER013
		Client US AEC
		Project CRREL
		Case No. 67063
Date Start 7-7-93	Contractor ENVIRONMENTAL DRILLING INC	LOCATION ↑ N
Date Complete	Drill Method MUD ROTARY / BORING	
Hole Diameter 8 3/4"	Type Of Rig ACKER NO 2, 5 Cy In.	
Casing Size 6" steel, 4" PVC	Drilling Additives BENTONITE / WATER	
Boring Depth 206'	Geologist DOWLING / VESPER	
Sampling Method ORIENTED ROCK CORE / MUD CUTTINGS		

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
0.0						NO SAMPLES TAKEN IN OVERBORDEN - DESCRIPTIONS BASED ON MUD CUTTINGS
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						-NO SAND IN CUTTINGS - LIKELY SILT
11						
12						
13						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CERCL 13
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
13						
14						
15						
16						
17						
18						
19						
20						
21						- NO SAND IN CUTTINGS - LIKELY SILT
22						
23						
24						
25						
26						
27						
28						
29						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CERCL 13
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
29						
30						MED-COARSE SAND IN CUTTINGS
31						
32						
33						
34						
35						
36				BS = 0.0		
37						
38						
39						
40						MED-COARSE SAND IN CUTTINGS
41						
42						
43						
44						
45						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CERCL 13
Client US REC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
45					0.00	
46						
47						
48						
49						
50						
51						
52						
53						
54						
55						
56						
57						
58						
59						
60						MED-FINE SAND
61						

Arthur D Little

Soil Boring Log

Continuation Page

Boring No. CERCL 13

Client USAEC

Project CRREL

Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
61						
62						
63						
64						
65						
66						
67						
68						
69						
70						AT FINE SAND - POSSIBLY SOME SILT - LIMITED SAMPLE IN STRAINER
71						
72						
73						
74						
75						MUD BECOMING THICK ADDING WATER
76						
77						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CERCL 13

Client USAEC

Project CRREL

Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
77						
78						
79						
80						
81						
82						
83						
84						
85					BS = 0.0	
86						
87						
88						
89						
90						
91						
92						
93						SILT WITH SOME FINE SAND

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CRCL13

Client USAEC

Project CRREL

Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
93						
94						
95						
96						
97						
98						
99						
100						
101						NO SAMPLE CAUGHT
102						
103						
104						
105					BS= 0.0	
106						
107						
108						
109						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CERCL 13
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
110						
111						
112						
113						
114						
115						
116						
117						
118						
119						
120						
121						SILTY MUD - CUTTINGS AS ABOVE
122						
123						
124						
125						
126						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CEBGL13
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
126						
127						
128						
129						
130						
131						
132						
133						
134						
135						
136						
137						
138						
139						
140						
141					BS ² 0.0	
142						

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Soil Boring Log

Continuation Page

Boring No. CEPCL13
Client US AEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
143						
144						
145						
146						
147						
148						
149						
150						
151						
152						
153						
154						
155					BS = 0.0	
156						157 - INCREASE IN DRILLING SPEED COARSE SAND
157						
158						
159						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CERCL 13

Client USAEC

Project CRREL

Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
159						
160						
161						
162						
163						
164				BS=	0.0	MED-COARSE QTZ. SAND WITH GNEISS AND PHYLLITE ROCK FRGTS.
165						
166						
167						
168						
169						
170						
171						
172						
173						
174						
175						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CERGL-13
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			PR Blows Per 6" (RSD)	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	R Recovery RQD			
175						
176						
177						
178						
179						179.6' Bedrock (?) SLIGHT AUGER REFUSAL
180						
181						
182						182.6' Cuttings - chlorite phyllite (schistose). Set 6" casing at 182.6'
183	CORE #1	182-183	R=1.2 RQD=100	3:45/6" 4:22/6"		CORE - Metavolcanic greenstone. Mostly plagioclase, hornblende, chlorite. Dk greenish gray (5.6 4/1). Some iron staining at 183'. LOSING WATER AT 183'
184	CORE #2	183-186	R=2.95' L=2.13	9:33		CORE - Metavolcanic greenstone. Mostly plagioclase, hornblende, chlorite, trace pyrites. Fracture (high angle) at top of core - iron stained. 4-5 fractures, mostly calcite healed. Some calcite veins or fractures. Bottom 3" coarser, small phenocrysts (<0.5") of plagioclase.
RQD=73%			4:59/6" 4:47/6"			
			7:40			
185						
186						chatter
187	CORE #3	186-191	R=4.9' L=2.08'	10:43		CORE - Metavolcanic greenstone. More fractured than above. Fractures range from nearly horizontal to high angle. Some iron stained, chatter. Some with calcite healing. Lots of calcite healed at small high angle fractures (based on calcite veins.).
RQD=43			4:61			
			3:40/6" -/6"			
			6:24			
			6:27			
188						
189						
190						
191						chatter

L = sum of all lengths > 4"
- = missed reading

R = Recovery RQD = rock quality designations

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Soil Boring Log
Continuation Page

Boring No. CERCL-13
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			PR Blows Per ft	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery R&D			
191	CORE RUN #4	191-196	R=4.6	3:54/6"	/	191.5' - chatter CORE: Metavolcanic Greenstone - calcite fills healed fractures throughout. Iron staining on some fractures. Fractures are high angle. Mostly hornblende chlorite calcite; possibly also fergusonite or rhodocrosite. 193 - chatter stops
192			L=3.96	2:31/6"		
193			R&D=86%	8:12		
194				6:56/6"		
195				3:16/6"		
196				9:27		
197	CORE RUN #5	195/ (sublog) 196-201	R=4.7'	~8:00	/	CORE: Metavolcanic greenstone, some fracturing to 198.6 - may be from drilling. 2/3 fractures fibrous calcite-healed veins - no iron staining. chatter 197' much smoother drilling CORE: Almost vertical fracture from approx 198.6-199.6. Iron staining and secondary alteration. Vertical break cross-cuts lower angle calcite filled veins. CORE: Approx 199.6-201' only 1 fracture - possibly from drilling. (like 4).
198			L=3.17	5:41		
199			R&D=67%	2:36/6"		
200				1:56/6"		
201				4:25		
202	CORE RUN #6	201-206	R=5.14	1:32/6"	/	CORE: Metavolcanic greenstone, 4 breaks - all likely due to drilling. Top 0.15' have multiple striations indicating nub left from previous core.
203			L=	-/6"		
204			R&D=100'	5:17		
205				1:23/6"		
206				1:20/6"		
207						Bottom of Boring 206'

R = Recovery
L = sum of lengths > 4"

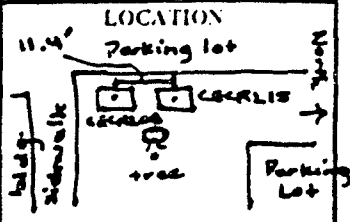
PR = Penetration rate min:sec/ft
- = missed reading

Arthur D Little

Soil Boring Log

Boring No. CEURL15
Client USAEC
Project CRREL
Case No. 67063

Date Start 7-13-93 Contractor EDI
Date Complete 7-21-93 Drill Method mud Rotary
Hole Diameter 0.73' (8.75") Type Of Rig Reich T-630-W
Casing Size 0.5' Drilling Additives Bentonite/Water
Boring Depth 168.25 ft Geologist Agnes Ayuso
Sampling Method -



Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
0.0						
5						
10	aa Abo					10 ft - About 2 or 3 med-coarse sand grains Prob. silt
15						
20						20 ft - medium-coarse sand Sub-angular to sub-rounded
25						

OB = Overburden
RN = Rock

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECL15
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
30						30 ft - med-coarse sand
35						
40						38 ft - Air monitoring 0.7 ppm @ hole
45						42 ft - med-coarse sand. Some small, thin root fragments - Air monitoring 0.5 ppm @ hole
50						50 ft - Air monitoring 0.0 ppm @ hole - med-coarse sand. Some root fragments
55						57 ft - Air monitoring 1 ppm @ hole, 0 ppm @ background location (10 ft upwind)

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECRL15
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
60						60 ft - med-coarse sand Some root fragments. Less recovery.
65						
70						68 ft - Air monitoring 0.0 ppm @ hole 70 ft - A few grains of med-coarse sand. Prob. silt.
75						
80						81 ft - Air monitoring = 3 ppm @ hole - med-coarse, few grains of sand in a very fine sand or silt
85						85 ft - Air monitoring = 1 ppm @ hole, 0 ppm @ breat. zone
90						90 ft - Air monitoring = 0 ppm @ breat. zone, 0.2 ppm @ hole - A few medium sand grains in a very fine clay based sand or silt.

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Soil Boring Log

Continuation Page

Boring No. CECRLIS
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
95						
100						100 ft - Air monitoring = 0.0 ppm @ breathing zone 1.0 ppm @ hole 100 ft - very fine clay based sand or silt
105						
110						110 ft - med-coarse sand grains of different colors
115						113 ft - Air monitoring = 0.0 ppm @ breat. zone 0.5 ppm @ hole
120						120 ft - med-coarse sand of diff. colors, some very fine clay based sand or silt also - Added 0.5 bag of Super-Gel-XX
125						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECRL15
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
130						130ft - med-coarse grains of sand, diff. colors. - Air monitoring = 0.0 ppm @ Breat. zone 2.0 ppm @ hole
135						
140						140ft - med-coarse sand of diff. colors
145						
150						151ft - Air monitoring = 0.0 ppm @ breath zone + hole - med-coarse sand of diff. colors
155						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECRL17
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			PR Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
158						160 ft. - Med-coarse sand of diff. colors. Less recovery. - Air monitoring = 0.0ppm @ hole.
168						166.5 ft. - Very weathered grn-blk schistose rock. Low pull down pressure ~400 psi. 168.25 - Competent bedrock
173	Core Run #1	168'-173'	R=5.0' L=3.6' RQD=72%	3:15/6" 3:39/6" 4:59 2:08/6" 2:04/6" 4:04 3:58		168.4-168.8: Fractured zone: Recrys. calcite-chlorite. Fracture parallel to dominant foliation. 169.1: Fracture: calcite-chlorite recrys. Fracture at a high α to foliation. 169.6: Fracture: Calcite-Chlorite-Pyrite recrys. Fracture at a high α to foliation. 170.3: Fracture: calcite-chlorite recrys. Fracture at a high α to foliation. Dark grn, fine grained, banded, plag-hbl chlo. Gneiss/Amphibolite, light bands.
178	Core Run #2	173'-178'	R=4.9 L=4.6 RQD=44%	1:45/6" 1:34/6" 3:25 1:44/6" 1:57/6" 4:41 4:57		173-175.2: DK grn, fine grained, banded, plag, hornblende, chlorite Amphibolite. 173.5 - Fracture: Minor recrys. of chlorite parallel to foliation 175.2 - Qtz. vein ~1.5cm 175.2 - 178: Fine grained, banded, hornblende plag., qtz, chlorite Gneiss. Abundant qtz. veins parallel to foliation 175.9-176.2: Fractures: abundant recrys. calcite, parallel to dominant foliation. 177.5 Fractures: Recrys. calcite, high α to foliation, rust staining.
179	Core Run #3	178'-189'	R=4.8 L=4.8 RQD=100%	2:00/6" 3:15/6"		178-179.2: DK grn, fine grained, banded, hornblende, plag, chlorite Amphibolite, qtz. veins abundant w/ occasional bands of calcite. vein thickness 1mm-2.2cm.

R = Recovery
L = Sum of lengths > 4"

PR = penetration rate [min:sec] at 200 psi

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECBL 15
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			PR Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
179	Core Run #3 (cont'd)			8:53		179.2: Fracture: recryst. w/ chlorite and qtz., high % to foliation 179.2-185: Chlorite, hornblende, plaggite gn - dk grn, fine-medium grained, possible plag. phenocrysts // to foliation at 179.9, qtz. vein much less abundant, amphibole 179.9-183: Old healed fractures at high % to foliation, recrystallized w/ calcite.
180				4:36/6"		
181				2:54/6"		
182				7:19		
183				6:14		
183	Core Run #4	183'-188'	R=5.0 L=5.0 RQD=100%	2:03/6"		183-188: Chlorite, hornblende, plag, Amphibolite, fine grained, dk grn, hornblende may be more dominant in 184-188 than 183-184. Abundant qtz. in 183-184. 184: Fracture: recryst. w/ quartz, possible pyrite and mica, high % to dominant foliation, iron staining in fracture, qtz. veined adjacent to fracture 2.25' 184-184.2: possible phenocrysts 184-188: Old fractures recryst. w/ calcite, high % of intersection with the more recently healed fractures. Old, New 183.6: Iron staining
184				2:45/6"		
185				5:40		
186				3:46/6"		
186				2:53/6"		
187				6:43		
187	8:06					
188	Core Run #5	188'-193'	R=5.3 L=5.15 RQD=97%	2:57/6"		188-190.5: dk grn to blk, very fine grained, plag, hmbld, chlorite Amphibolite, calcite veining up to 1-2mm thick 190.5-193.3 - fine-medium grained, same as above, but veins are 1mm to 20mm thick 188.8: Fracture: Calcite recryst., high % to dominant formation, iron staining.
189				2:49/6"		
189				5:59		
190				2:50/6"		
191				2:36/6"		
191				5:05		
192	5:53					
193						End of boring at 193.3'

R = recovery
L = sum of lengths 74"

PR = penetration rate [min:sec] at 200 psi.

Arthur D Little

Soil Boring Log

Boring No. CECBL14

Client USAEC

Project CAREL

Case No. 67063

Date Start 7-9-93

Contractor Environmental Drilling

Date Complete 7-19-93

Drill Method Mud Rotary/Coring

Hole Diameter DB=0.73'/BD=0.49'

Type Of Rig Reich T-650-W/AckecAD2

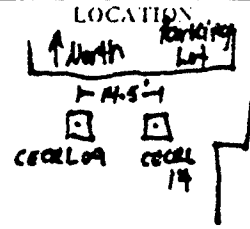
Casing Size 0.33'

Drilling Additives Bentonite/Water

Boring Depth 232.5'/257.5'

Geologist C. Kovatch/W. Dowling

Sampling Method Screen



Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
0.0						
5						
10						
15						
20						20ft - No sand in cutting. A very small amount of silt and clay size particles.
25				35 = 0.3		25ft - Air monitoring = 0.3 ppm

DB = Overburden

BD = bedrock

BS = breathing space

Arthur D Little

Soil Boring Log

Continuation Page

Boring No. CECRL14
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Sample number	Interval	Recovery			
30						31 ft - Small amount of clay. No sand.
35						
40						41 ft - No sample observed.
45						
50						47 ft - Air monitoring = 0.0 ppm
55						51 ft - Clay. Approx. 12 sand grains 1/2 mm in diameter are observed

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECKL14
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
60						61 ft - Clay. Approx. 15-20 fine-grained - medium particles, 0.4 mm in diameter. No odor.
65						
70						71 ft - Air monitoring 0.0 ppm Clay + coarse red sand. ~ 1-2 mm.
75						
80						81 ft - Clay + med sand. 0.5-2 mm. No odor. Various color grains (black, red, brown, white)
85						
90						87 ft - Air monitoring 0.0 ppm 91 ft - Same clay A very small amount of med sand (0.5mm) Air monitoring = 0.0 ppm

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECL 14
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
95						95 ft - Air monitoring = 0 ppm
100						101 ft - Some clay. med sand ($\sim 4\text{ mm}$) No odor. Air monitoring = 0 ppm
105						107 ft - Air monitoring = 0 ppm
110						112 ft - Clay + medium sand. No odor.
115						115 ft - Air monitoring = 0 ppm
120						121 ft - Silt. A few medium sand grains (0.5 mm) - Air monitoring 0 ppm
125						

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Soil Boring Log
Continuation Page

Boring No. CECRL14
Client USAEC
Project CKREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
130						131 ft - All silt or smaller, 2 med sand grains Air monitoring 0 ppm
135						
140						141 ft - A fine gritty sand with a clay base. No odor Air monitoring = 0 ppm
145						
150						151 ft - A fine gritty sand with a clay base. No odor. Particles of 0.5 - 1 mm diam of various colors - sub- rounded. Air monitoring = 0.0 ppm
155						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECL14
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
160						161 ft - A fine gritty sand with a clay base. No odor. 0.5 - 1mm particles of various colors (green, black, clear, brown, etc...) - Air monitoring 0 ppm
165						
170						171 ft - Same as above Air monitoring 0 ppm
175						
180						181 ft - med-coarse particles, still mostly fine gritty sand with a clay base. - Air monitoring 0 ppm
185						
190						191 ft - Same as above Air monitoring 0 ppm

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECRL14
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
195						
200						201 ft - Same as above Air monitoring = 0.0 ppm
205						
210						211 ft - Lots of clay-based sand, very fine grained, some med-coarse particles, no odor. Air monitoring = 0 ppm
215						
220						221 ft - Clay based sand, med-coarse particles. No odor. Sub-rounded to sub-angular.

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CBCRL 14
Client USAEC
Project CRRL
Case No. 67063

Scale in Feet	SAMPLE			PR Blows Per ft	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery RGD			
225						
230						
231						231: Air Monitoring: 0.0 ppm Top of weathered bedrock
232						232.5 Top of Competent Bedrock
233	Core Run #1	232.5	R=4.8	3:02/6"		Grn-blk, hornblende-plag. Amphibolite. Secondary bands of calcite-gte-plag [0.25-2cm] oriented along dominant foliation. Fractures at high γ to foliation filled w. calcite. at 235.7 to 236.0'
234		232.5	L=4.8	3:07/6"		
235			RGD=100%	5:04		
236				2:06/6"		
237				2:14/6"		
237				4:14		
238	Core Run #2	237.5	R=5.0	2:14/6"		237.5-237.8: Grn-blk hornblende-plag. Chlorite Amphibolite, w. white min. bands 237.8-238.1: Fractures, // and high γ to dominant foliation. 237.8-237.4: Banded plag.-gte-chlorite-biotite gneiss. Strong grn./white zonation along dominant foliation. 240.1: Fracture [Major] w. biotite-gte-chlorite recrystallization [$>2"$ thick]. Para. to foliation. 240.2-240.6': Biotite-chlorite rich zone. Fract. at low γ to dom. foliat. 240.6-242.5: Massive, f-gneiss, thinly banded gte-plag.-biotite 240.5: Fracture, // to foliation
239		242.5	L=3.6	2:15/6"		
239			RGD=72%	4:57		
240				2:18/6"		
241				2:13/6"		
242				5:51		
243	Core Run #3	242.5	R=5.0	2:31/6"		242.5-243.6: White, f-grn, gte-plag.-biotite-hornblende Gneiss. Thin zonation ($>1mm$) of light/dark minerals. No fractures
243		247.5	L=5.0	2:58/6"		
			RGD=100%			

R = Recovery
L = Sum of Lengths $> 4"$

P. R. = Penetration Rate [min/sec/1']
{At 200 psi}

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Soil Boring Log
Continuation Page

Boring No. CECRLM
Client USABC
Project CRREL
Case No. 67053

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
244	Core Run #3	237.5 - 242.5	R=5.0 L=5.0	4:30	XX	243.6 - Drk-grn and white banded f-grn plg-biotite-hornblende-chlorite-qtz gneiss. Mineral zonation between 1mm and 1cm. 245: Fracture at low γ to foliation 246.2: Fracture, // to foliation
245		242.5 - 247.5	R=0=100%	2:40/6" 1:20/6"		
246				5:46		
247				5:40		
248		Core Run #4	247.5 - 252.5	R=5.0 L=4.45		
249			R=0=89%	5:19		
250				2:33/6" 3:19/6"		
251				5:22		
252				7:21		
253	Core Run #5		252.5 - 257.5	R=5.0 L=4.6	2:04/6" 3:08/6"	XX
254			R=0=92%	5:18		
255				2:31/6" 2:05/6"		
256				3:52		
257				3:47		
						END OF BORING 257.5'

R = Recovery
L = Sum of Lengths γ 4"

P.R. = Penetration Rate (mins:sec) at 200 psi.

Arthur D Little

Soil Boring Log

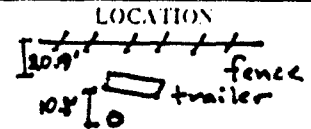
Boring No. CECRL17

Client USAEC

Project CRREL

Case No. 67063

Date Start 7/12/93 Contractor Environmental Drilling
 Date Complete 7/15/93 Drill Method Hollowstem Auger
 Hole Diameter ~8 in. 10.95' Type Of Rig Failing Truck Mounted E-6
 Casing Size N/A Drilling Additives
 Boring Depth 178' Geologist C. Stover
 Sampling Method Split spoon / Shelby tube (24" stainless)



Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
0.0	S1	0-2'			3.5	[SM], SAND w/ ~10% silt, 10YR 4/2 dk yellowish brown, no odor/sheen, loose, dry, fine, well-sorted
2						
5						
7	S2	5-7'	20" 1.67'	5- 4- 5-	0.7	.1'-1.47': [ML], 10Y 4/2 grayish olive, no odor/sheen, SILT, moist, fine 0-.1': [SM], 10YR 4/2 dk yellowish brown, SAND w/ ~10% silt, loose, dry, fine, no odor/sheen, well-sorted
10						Split spoon is very wet coming out of the hole. Sand heaves and free water at 13'
12	S3	10-12'	14" 1.17'	1- 1- 2- 1	0.3	0-.29': [ML], 10Y 4/2 grayish olive, SILT, very moist, fine, no odor/sheen, cohesive .29-1.17': [SM], 10YR 4/2 dk yellowish brown, SAND, very moist, loose, no odor/sheen, ~20% silt / 80% SAND, well-sorted, fine grains

* Headspace

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECBL17
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organic (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
13						
15	S4	15-17'	24" 2.0'	2- 3- 7- 7	0.0	0-.42': [SM], 10YR 4/2 dk yellowish brown, SAND w/~10% silt, orange staining from .25'-.33', no odor/sheen, wet, fine .42'-2': [SC], 5GY 4/1 dk greenish gray, SAND w/~10% clay, fine, wet, cohesive, no odor/sheen
17						
20						
22	S5	20-22'	24" 2.0'	7- 9- 13- 11	0.0	0-.92': [SC], 10YR 4/2 dk yellowish brown, SAND w/~10% clay, fine, well-sorted, wet, no odor .92'-2': [ML], N4 medium dk gray, wet, CLAYEY SILT → SILT, cohesive, fine, no odor/sheen
25						
27	S6	25-27'	20" 1.67'	10- 13- 14- 15	0.0	[ML], N4 medium dk gray, SILT, clayey silt, cohesive, fine, no odor/sheen, very moist
29	Shelby 001	27-29'				

* Headspace

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Soil Boring Log
Continuation Page

Boring No. GECBL17
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
30	S7	30-32'	15.5" 1.29'	10-14-13-14	0.0	[ML], N4 same as above
32						
35	S8	35-37'	21" 1.75'	6-12-12-12	0.1	0-.54': [ML], N4 dk gray, CLAYEY SILT, ~50% CLAY, 50% SILT, no odor/sheen, moderately cohesive, very moist, fine .54'-1.75': [SC], 10YR 4/2 dk yellowish brown, fine sand, ~50% SAND, 50% CLAY, very moist, well-sorted, no odor staining w/ the SAND, horizontal bedding w/ the clayey silts.
37						
40	S9	40-42'	24" 2.0'	10-13-13-14	0.1	[CL], N4 dk gray, CLAY, ~70% clay, 20% silt, cohesive, plastic, no odor/sheen, clay breaks along horizontal planes, very moist, fine
42						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECRL17
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics* (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen) and general stratigraphic description
	Type and number	Interval	Recovery			
45	S10	45-47'	24" 2.0'	10 11 10 14	0.2	[CL], N4 dk gray, CLAY w/ ~10% silt, cohesive, plastic stiff, no odor, no sheen, very moist, fine
47						
50	S11	50-52	23" 1.92'	6- 6- 12- 16	0.0	0-1.6': [CL], N4 dk gray, CLAY w/ ~5% silt, medium stiff, cohesive, very moist, no odor/sheen, fine 1.6'-1.92': [ML], (5Y) olive gray, cohesive, soft, very moist, no odor/sheen SILT w ~40% CLAY, fine
52						
55	S12	55-57'	23" 1.92'	7- 10- 14- 14	0.0	0-.75': [ML], olive gray 5Y 4/1, cohesive, medium stiff, very moist, no odor/sheen, SILT w/ ~40% clay .75-1.375': [CL], light olive gray 5Y 6/1, stiff, cohesive, CLAY w/ ~40% silt, no odor/sheen 1.375'-1.92': [ML] same as 0-.75' but soft.
57						
60	S13	60-62	20" 1.67'	4- 11- 12- 14	0.0	[ML], olive gray 5Y 4/1, cohesive, medium stiff, SILT w/ ~40% clay, no odor/sheen, moist, fine grained

* Headspace readings

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECRL17
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
61						
62	Shelby 002					
64						
65	S14	65-67'	22" 1.93'	WOR WOR WOR 13	0.0	[CL], 5Y 3/2 olive gray, CLAY, clayey silt: ~50% clay, ~50% silt, medium stiff to stiff, very moist, cohesive, plasticity leads one to believe clay may be 55% and silt 45% at the top - 5'; no odor/sheen, fine
67						
70						
71	S15	70-72'	17" 1.42'	10-14-20-22	0.0	[CL] same as above
72						
75						
76	S16	75-77'	20" 1.67'	10-12-12-15	0.0	[ML], olive gray 5Y 3/2, SILT, clayey silt, ~45% clay, 55% silt, cohesive, slightly plastic, very moist, no odor/sheen, fine
77						

* Headspace readings

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECRL17
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
77						
80	S17	80-82'	19" 1.58'	10- 12- 15- 17	0.0	[ML], medium olive gray 5Y 4/2, SILT w/ ~30% clay, no odor/sheen, cohesive, very moist to moist, fine.
82						
85	S18	85-87'	18" 1.50'	6- 8- 11- 12	0.0	[ML] same as above
87						∇ ...
90	S19	90-92'	24" 2.0'	12- 12- 13- 14	0.0	[ML] same as above, but % clay has dropped to 10%.
92						

* Headspace readings

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECRL17
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
93						
95						
97	S20	95-97'	23" 1.92'	11- 14- 10- 21	0.0	[ML], same as above
100						
102	S21	100-102'	14" 1.17'	5- 10- 14- 20	0.0	[ML], same as above, but wet
105						
107	S22	105-107'	24" 2.0'	17- 25- 40- 42	0.0	[ML], medium olive gray 5Y 4/2, wet, fine, SILT w/~ 5% sand, no odor/sheen, a few larger grains w/ shistocity were found in bottom .02' of split spoon
						End of sampling for 7/13/93 at 107' BGS. Begin drilling at 107' on 7/14/93

* Headspace readings

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECBL17
Client USAEC
Project CRREL
Case No. 670.3

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
109						
110						
111						
112						
113						
114						
116	S23	114-116	8" 0.67'	30- 38- 46- 45	0.7	[ML], medium olive gray 5Y 4/2, SILT, fine, 4 consolidated "chunks" of fine sand found in the bottom 1/2' of spoon, no odor/sheen, very moist to moist fin top of spoon to bottom
						Note: Samples are to be taken every 15'. Bit is added to the end of the 2" ID rods and rotated down.

* Headspace readings

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECR17
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
125						
129	S24	129-131'	6.5" 0.54'	30- 32- 40- 47	0.0	Top: 1/4' of spoon: [ML], medium olive gray 5Y 4/2, SILT, silt w/ ~10% sand, fine, no odor/ sheen, very moist, tiny grains of hornblende, small lenses of staining
131						Bottom .25-.54': [SM], medium olive gray, 5Y 4/2, SAND, ~20% silt w/ the sand, fine, no odor/ sheen, very moist, loose, well-sorted
141						

* Headspace reading

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECBL17
Client USAEC
Project CRREL
Case No. 67068

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
141						
145	525	145- 147'	10" 0.83'	25- 27- 40- 49	0.0	[SW], dk gray N3, SAND, gravelly sand w/ one cobble, poorly sorted, wet, loose to medium dense sand, well-graded, very little silt <5%, no odor/sheen, grains are comprised of quartz, smoky quartz, hornblende, and epidote, medium to fine grains.
147						
156						

* Headspace readings

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECL17
 Client USAEC
 Project CRREL
 Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
156						
160	S26	160-162'	14" 1.17'	20- 23- 21- 23	0.0	[SW], same as above, but without cobbles. Grades from coarse to fine throughout the spoon.
162						End of sampling for 7/14/93 at 162' BGS
164						Begin augering at 160' BGS on 7/15/93.
170						
172						

* Headspace readings

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECR17
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
172						
174						
176	S27	174-176'	9" 0.75'	46 48 36 20	12	Top .46' of spoon: [GC], medium dark gray N4, GRAVEL w/~20% clay and up to 10% silt, fine gravel to coarse grain, cohesive, plastic, no odor/sheen, very moist Bottom .46'-.75' of spoon: [GW], dk gray N5, GRAVEL, well-graded, poorly sorted, fine to coarse, one cobble, loose, no odor/sheen, very moist
178						Bedrock hit at 178' Trial water lost: 2180 gal End of drilling on 7/15/93 at 178.0' BGS.

* Headspace readings

Arthur D Little	Soil Boring Log	Boring No. <u>CECRL16</u>
		Client <u>USAEC</u>
Date Start <u>7-21-93</u>		Project <u>CRREL</u>
Date Complete <u>7-22-93</u>		Case No. <u>67063</u>
Contractor <u>EDI</u>		LOCATION
Drill Method <u>Mud Rotary/Oriented Casing</u>		
Type Of Rig <u>Reich T-650-W/AcKecADZ</u>		
Drilling Additives <u>Bentonite/Water</u>		
Geologist <u>C. Kovatch / C. Stover</u>		
Hole Diameter <u>DB: 0.73' / BD: 0.49'</u>		
Casing Size <u>0.33'</u>		
Boring Depth <u>177.45' / 202.5'</u>		
Sampling Method <u>Screen / Coring</u>		

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
0.0						
2						
4						
6						
8						7' - Dense brown clay w/a med to coarse sand; sub-angular to subrounded; No unusual odor or sheen [SM]
10						
12						
14						
16						
18						17' - Medium to coarse sand; [SM] sub-angular to sub-rounded; no odor or sheen
20						
22						
24						
26						

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECRL16
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
26						
28					0.3 BS	27' Brown clay; gray clay; Medium to coarse sand; sub-angular to sub-rounded; Organic material: Wood cuttings* No unusual odor or sheen. [ML]
30						
32						
34						
36						
38						37' Gray silty clay; Medium sand; sub-rounded to angular; Organic material: Wood cuttings* No unusual odor or sheen. [ML]
40						
42						
44					0.0 BS	
46						
48						47' Silt; gray clay; wood cuttings* No odor or sheen. [ML] [CL]
50					0.2 BS	
52						
54						
56						
58						57' Brown clay, some gray clay; approximately 5 medium sand grains

* Wood Cuttings most likely were in pan and circulated through

CPL

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CCCL16
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
58						57' cont. - Wood cuttings*. No odor or sheen.
60						
62						
64					0.3BS	
66						
68						67' - Equal amounts of brown clay and gray clay. Wood cuttings*. No odor or sheen. [CL] [ML]
70					0.1BS	
72						
74						
76						
78						77' - Gray clay; approximately 6 medium sand grains; angular to sub-angular. Wood cuttings*. No odor or sheen. [ML]
80						
82					0.2BS	
84						
86						
88						87' - Gray clay; Medium sand, approximately 10 grains, subrounded to subangular. One perfectly rounded pebble 0.3" in diameter. No odor or sheen.
90					0.2BS	

*Wood cuttings were most likely in mudstone and siltstone.

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECRL16
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
90						
92						
94						
96						
98						
100						
102					0.085	97' - Very small amount of grayish clay. Medium to coarse sand, sub-angular to sub-rounded. Wood cuttings*. No odor or sheen. [ML]
104						
106						
108						
110					0.085	107' - Brown clay, gray clay; Medium-grained sand; sub-angular. Wood cuttings*. No odor or sheen. [ML]
112						
114						
116						
118						
120						
122					0.485	117' - Brown - gray silty clay; Medium to coarse sand; sub-angular to angular. Wood cuttings*. No odor or sheen. [ML]

BS = breathing space

* Wood cuttings most likely in air and circulated through

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Soil Boring Log
Continuation Page

Boring No. CECRL16

Client USAEC

Project CRREL

Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
122						
124						
126						
128						127' - Brown-gray clayey silt; Medium grained sand; sub-rounded. Wood cuttings. No odor or sheen. (A piece of plastic-like material was also picked up - must have been in the bentonite slurry beforehand.)
130						[ML]
132						
134						
136						
138						137' - Brown clayey silt; Medium to coarse sand; sub-angular to sub-rounded. Wood and grass cuttings. No odor or sheen.
140						[ML]
142					0.0BS	
144						
146						
148						Chattering 147' Brown clayey silt - almost pure silt. Lots of medium to coarse sand; subrounded. Leaf/grass cuttings. No odor or sheen.
150						[CSW]
152					0.0BS	
154						

BS = breathing space

* Wood and leaf cuttings were most likely to have been in the bentonite slurry

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECR116
Client USAEC
Project CBREL
Case No. 17063

Scale in Feet	SAMPLE			PR Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
154						
					BS = 0.0	157' - Some brown silt; med to coarse sand; angular; lots of gts.; wood/leaf cuttings. No odor/sheen. [ESN]
						167' - Some gray clayey silt; med. to coarse sand; sub-rounded wood/leaf cuttings. No odor/sheen. [ML]
176						175' - Top of weathered bedrock
178.5						Top of competent bedrock at 177.5' End of boring 4/21/95
	Core Run #1	177.5-192.5'	R=4.6' L=44' RQD=96%	4:53/4" 4:51/4" 4:51 4:02 4:19	4:55 1N11 1N11 1N11	Begin coring on 4/22/95 at 177.5' 177.5-190: Gneiss, grayish blk N/2, hnbld, chl, cal/plag/gts, banding, pyrite and some hnbld in calcite bands, laminated bedding, fine grnd, unweathered, hard. 179: Fracture: // to dom. fol.; no recryst. 190-190.3: Gneiss, fine grnd, med. dk gry N4, unweathered, plag/hnbld & chl. Some pyrite in the plag. bands; poss. fractional crys. w/in plag. bands.

PR = penetration rate (min:sec)
R = recovery

BS = breathing space

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Soil Boring Log
Continuation Page

Boring No. CECRL116
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			PR Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
172.5				3:02	W1	180.3: Fracture at high $\frac{1}{2}$ to dom fol., some pyrite, chl recryst. 180.3-182.5: Gneiss, hnbld, chl, plag, calcite, plag bands up to 20 mm w/ epidote or chlorite grains (0.6 - 2.5 cm) w/in them
177.5	Core Run #2	182.5-187.5'	R=4.7 L=4.4 RQD=94%	3:06	W1	181: Frac. // to foliation; chl. recryst.
				2:51	W1	181.4: Frac // to foliation; pyrite; chl. recryst.
				5:52	W1	182.5-183: Amphib/poss. gneiss, 5G2/1, gmish blk, fine grned, hnbld, chl, plag, calcite, qtz; cal/plag/qtz bands; healed fractures at high $\frac{1}{2}$ to bedding ~.5 mm thick.
				3:01	W1	183: Frac. // to fol., some recryst. w/cal, chl, pyn
				1:35	W1	183-185: Gneiss, laminated, fine grned, hnbld chl, plag, cal, pyrite, grayish blk N/2
				4:40	W1	185.2: Frac. high $\frac{1}{2}$ to fol.; No recryst.
177.5	Core Run #3	187.5-192.5'	R=5.04' L=5.04' RQD=100%	3:00		185-186.3: Diorite, med bluish gry 5B 5/1, plag, hnbld, some chl, qtz, pyrite, no bands weathered. 185: Frac. high $\frac{1}{2}$ to fol.; Fe staining
				2:20		185.04: Frac high $\frac{1}{2}$ to fol.; Fe staining, chl. recryst. 185.7: Frac // to bedding, cal recryst. 185.8: Fracture at high $\frac{1}{2}$ to dom fol., some pyrite, chl recryst.
				7:03		186.3-187.5: same as 183-185.
				3:12		
				2:44		
				3:27		187.5-187.9: Gryish blk N2, fine gr, unweath GNEISS, 90% hnbld, 70% plag, 2% chl, hard
				6:28		187.9-189: GNEISS, med lt. gray N6, fine grn, very hard, unweath, plag 90%, hnbld 10%
182.5	Core Run #4	192.5-194.5'	R=5.01' L=4.96' RQD=89%	2:20		189-189.4: Diorite/Gneiss (little banding); fine med grn, 50% plag, 50% hnbld, some qtz/pyrite, med dk gry N4, unweath plag/qtz bands 1-1.3 cm.
				2:14	W1	189.4-192.5: GNEISS, dk gry N3, hnbld 80%, cal 10%, chl 10%, fine grned, hard, unweath. 191.5-191.6: Diorite of 189-192.4 (slight Δ). Distinct contacts
				5:22	W1	192.5-193.2: GNEISS, gmish blk 5G2/1, 8B% hnbld, plag/cal 10%, qtz 5%, fine, unweath, old frac. $\frac{1}{2}$ (high) to fol. healed w/cal cite. 193.2: Frac. high $\frac{1}{2}$ to fol. no recryst. except for cal.
				2:36	W1	193.2-193.8: Amphibolite, hnbld, chl, plag, (some plag phenocrysts at 193.8)
				2:24	W1	
				4:52	W1	
177.5				5:08	W1	

PR=penetration rate (min:sec)
R= recovery

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Soil Boring Log
Continuation Page

Boring No. CECRL16
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			PR Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
197.5	Core Run #5	197.5-202.5'	R=525'	2:35/6"	VXX	Same as 192.5-193.2 w/ some faulting in bands. 194.4: Frac. high to fol., Fe staining
			L=4.8%	3:01/6"		
			RQD=93%	7:13	VX	195.3: Frac. 60° to fol.; Fe staining; Chl recryst.
				5:18/6"		195.5: Frac. 60° to fol.; Fe staining
				3:27/6"	B5	195.6: Frac. 60° to fol.; Fe staining; Chl, cal recryst.
				5:17		196.6: Frac. 60° to fol.; no recryst.
				7:03		196.9: Frac. 11 to fol.; no recryst. (rigid)
202.5						
					197.7: Frac. 60° to fol.; chl/cal recryst	
					197.4-198.5: 1.27m band of gtz.	
					chl. recryst. old frac at high to fol.	
					198.8-200.5: med bluish gry, 85-57, fine grnd, hnbld, chl, plag, specks of K-spar + gtz. Old healed frac. of cal/Qtz at high to fol.	
					199: Frac. at 60° to fol, some K-spar, cal. recryst.	
					200.5-201.25: grayish blk N2, Amphibolite, hnbld. 90%, plag 90%	
					201.25-201.5 - same as 200.5-201.25	
					201.45: Frac. high to fol., recryst. w/pyrite, phlogopite, muscovite.	
					201.5-201.6 - Qtz. band w/ some pyrite and muscovite.	
					201.6-202.5 - same as 198.8-200.5	
					END of boring: 202.5'	

PR = penetration rate (min:sec)
R = recovery

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Soil Boring Log

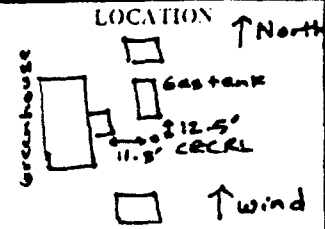
Boring No. CECRL 18

Client USAEC

Project CRREL

Case No. 67063

Date Start 7-16-93	Contractor EDI
Date Complete 7-19-93	Drill Method mud Rotary
Hole Diameter 0.73' (8 3/4")	Type Of Rig Reich T-650-W
Casing Size 0.5' (6")	Drilling Additives mud Sherry-Water - bentonite
Boring Depth 11.5'	Geologist Agnes Ayuso / Coring / Sterile
Sampling Method Oriented Coring	



Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
0.0						0 ft - Air monitoring = 1 ppm Background (10' upwind) = 0.7 ppm LEL = 0%
5						
10						10 ft - About 5 med-coarse sand grains. Prob. silt or clay.
15						
20						20 ft - About 5 medium sand grains Brown, grey or black. Smaller than before ~2mm Prob. silt or clay.
25						

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Soil Boring Log
Continuation Page

Boring No. CECRL 12
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
30						30 ft - Air monitoring = 20 ppm Background = 1.3 ppm LEL = 0% - Strong fuel odor - About 5 medium sand grains; brown, grey + black; size ~ 1-2 mm Prob. silt or clay.
35						
40						40 ft - About 5 med sand grains, grayish brown, ~ 1mm size. Prob. silt or clay. - Air monitoring = 10 ppm LEL = 0%
45						
50						50 ft - Air monitoring = 20 ppm LEL = 0% No sand. Prob silt or clay. CO alarm goes off, reads ~ 60 ppm.
55						

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Soil Boring Log
Continuation Page

Boring No. CECRL18
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
66						66 ft - Black scum floating in the mud pan - About 10 med-coarse sand grains, ~2-3 mm, gray
65						
70						70 ft - Air monitoring = 10 ppm LEL = 0% - Black scum floating in the mud pan - About 5-10 med-coarse sand grains, gray, size ~1-4 mm. Prob silt or clay.
75						
80						80 ft - medium sand to fine gravel
85						85 ft - Air monitoring = 2 ppm LEL = 0% Drill seems to chatter
90						90 ft - About 5-10 grains medium sand, gray. Mostly gray silt. Also a piece of gravel.

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Soil Boring Log
Continuation Page

Boring No. CECRL18
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
95						
100						100 ft - Air monitoring = 8 ppm LEL = 0% medium sand to fine gravel Different colors - gray, green, orange, brown.
105						
110						110 ft - Air monitoring = 2.5 ppm LEL = 0% - medium sand of diff. colors (as before), size 0.25 - 2 mm.
115						
120						118 ft - Air monitoring = 5 ppm LEL = 0% 120 ft - mostly gray-brown silt A few grains of medium sand.
125						

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Soil Boring Log
Continuation Page

Boring No. CECRL18
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
130						130 ft - Air monitoring at 130 ft = 15 ppm LEL = 0% - medium sand to fine gravel. Different colors (as before, also white). Size 1mm - 5mm
135						133 ft - Air monitoring = 12 ppm LEL = 0%
140						140 ft - med-coarse sand of different colors Air monitoring
145						
150						150 ft - Air monitoring = 10 ppm LEL = 0% - medium-coarse sand of different colors, mostly greenish gray.
155						157 ft - Air monitoring = 23 ppm LEL = 0%

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Soil Boring Log
Continuation Page

Boring No. CECRL18
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			PR Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description		
	Type and number	Interval	Recovery					
160						160 ft. - med - coarse sand of diff. colors, mostly greenish gray.		
165								
170						170 ft. - Med sand Greenish gray w/ some white grains. Size ~1-2 mm - Air monitoring = 18 ppm LEL = 0% (7/16/93) - Air monitoring = 38 ppm LEL = 1% (7/19/93)		
						176 ft. - Weathered bedrock. Raise pressure 72000 psi		
						178 ft. - Competent Bedrock med sand of diff colors Size ~1-2mm / Airmon. 48ppm		
178	Coring began on 7/22/93							
179	Core Run #1	178-183'	R=4.8' L=4.5' RQD=94%	2:03/6" 1:34/6" 3:40 3:16/6" 3:30/6"	W11	179-181: Amphibolite, grayish black (M), fine grained, massive w/ calcite bands // to foliation, hornblende, plag., chl, unweathered, very hard - hard. Calcite bands: .5 mm - 1.5 mm thick.		
180							179.41: Fracture: // to dominant foliation, some recryst. w/ calcite.	
181							179.41-179.1: Gneiss-like banding between the calcite/plag. and hnbld.	
182							181-183: Same as above, but more plag/calcite, and more irregular banding. 181.6: Fracture: // to foliation, lenticular veins of calcite/plag 2-3" above and below fracture. Poss. plag. phenocrysts. 182.7: Fracture // to dominant foliation, chl recryst., iron staining.	
183		Core Run #2	183-188'	R=4.9' L=4.6' RQD=94%		1:40/6" 1:14/6" 3:35	W11	183-184.1: Lt. gray - medium lt. gray N7-N6, hnbld, plag, chl, fine grnd, banding .5-1mm of calcite/plag., possible
184								
185								

PR = penetration rate (min:sec)

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECRL18
Client US AEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE			PR Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description	
	Type and number	Interval	Recovery				
185				2:04/6"	W11	plag. phenocrysts, unweathered, hard.	
186				1:43/6"	W11	183.8: Fracture: // to dominant foliation, no recryst. except for some calcite possible	
187				3:32		184.1: Fracture: // to dominant foliation, some calcite / chlorite recryst.	
188				4:31		184.1 - 185.4: Gneiss banding, plag / calcite hnbld, fine grned, unweathered, hard	
189	Core Run #3	188-193'	R=5.1' L=4.9' RQD=92%	1:57/6"		185.4-188: Amphibolite w/ phenocrysts, banding not as distinct as 184.1	
190				1:20/6"		188-193: Amphibolite, grayish blk, N2, hnbld, plag, chl, thicker (1mm-1.5mm) calcite/plag bands running at a 30° to bedding	
191				3:47		188-192: Distinct gneiss banding	
192				1:55/6"		192-193: Less banding, more massive Amphibolite, N2 grayish blk, old recryst. calcite fractures at high to foliation, bands .2mm-1mm thick.	
193				1:59/6"		193: Fracture: high to dom. foliation, iron staining, no recryst. End for 7/21/9	
194				4:06			
195	Core Run #4	193-198'	R=4.8' L=4.9' RQD=100%	3:06/6"	Begin at 193' for 7/22/9	193-196.3: Amphibolite, massive w/ occasional thin bedding, greenish blk (5GY 2/1), very hard - hard, fine-med. grained, unweathered, hnbld, chl, plag (calcite); calcite bands w/ pyrite abundant, // to foliation, 1-1.5mm; possible calcite, albite phenocrysts; healed fractures at high to dom. fol.	
196				2:17/6"			196.3-197: same as above, except 196.3-197 has more chl and plag, 5GY 4/1 dk greenish gray.
197				4:05			197.5: Fracture: high to dom. fol., recryst. chl / calcite. 197.9: Newly heated fracture, no apparent crys. yet / May be about to fracture instead of recently healed.
198				2:17/6"			
199				2:35/6"			
200	Core Run #5	198-203'	R=5.1' L=4.8' RQD=94%	4:11		198-203.1: Amphibolite, gmish blk (5GY 2/1), massive w/calcite banding, hard, fine-med grned, unweathered, hnbld, chl, plag (albite), calcite, pyrite; calcite bands (.5-1.5mm) w/ pyrite and plag (albite); pyrite also in primary	
201				4:49			
				1:55/6"			
				1:01/6"			
				3:09			
				2:02/6"			
				1:36/6"			

DR = penetration rate (min:sec)

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECBL18
Client USAEC
Project CEBEL
Case No. 67063

Scale in Feet	SAMPLE			PR Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell system), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general geographic description
	Type and number	Interval	Recovery			
201				4:26		matrix: bands // to foliation 198.6-199: possible plg (albite) phenocrysts calcite/pyrite/albite bands 0.5-1.0mm 200.25: Fracture: Chl. recryst., iron staining, // to dominant foliation 200.5 Fracture: Chl. recryst., // to dominant foliation.
202				4:12	INI	
203					INI	
						END of Coring Runs 7/22/73 at 203.1' BGS

Arthur D Little

Soil Boring Log

Boring No. CECRL19

Client USAEC

Project CRREL

Case No. 67063

Date Start 7/26/93 Contractor Environmental Drilling
 Date Complete 7/28/93 Drill Method Failing Truck Mounted
 Hole Diameter 8 in. 0.104' Type Of Rig Hollowstem Auger
 Casing Size 4 in. = 0.33' Drilling Additives -
 Boring Depth 175' Geologist C. Stover
 Sampling Method 2 ft. Stainless steel split spoon

LOCATION

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)*	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
0.0	S1 VOC/ BTEX TPH (1530)	0-2'	1.42'	4 3 3 3	0.4 (HS)	[ML], 10YR 4/2 dk yellowish brown, SILT, sandy silt w/ roots from the ground surface, no odor/sheen, fine, loose, dry.
5	S2 VOC/ BTEX TPH (1540) 001	5-7'	2.0'	3 3 4 4	349 (HS) 0.5 (BS)	[ML], 10YR 4/2 dk yellowish brown, SILT w/ ~10% sand (fine), some roots, fine, loose, moist, no sheen, but diesel odor.
10	S3 VOC/ BTEX TPH (1549) 002	10-12'	1.5'	2 1 1 1	589 (HS)	[ML], moderate olive brown 5Y 4/4, SILT, diesel odor, no sheen, fine, moist, some roots, cohesive (probably due to moisture).

Note: 140 lb. hammer used for blows. Drop length: 30".

HS = head space
 BS = breathing space

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECB119
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
13						
17	S4 VOC BTEX TPH (1600)	15-17'	2.0'	1- 2- 4- 6	282 (HS) 0.7 (BS)	[ML], 10YR 2/2, dusky yellowish brown, SILT, w/~5% sand / 5% clay, diesel odor, no sheen, moist, cohesive, Fe staining .83' from top of spoon, fine grained.
20						
22	S5 VOC BTEX (1610)	20-22'	1.5'	3- 4- 4- 5	117 (HS) 1.0 (BS)	[ML], 10YR 5/2 dk yellowish brown, SILT w/~10% sand, fine grained, diesel odor, no sheen, moist.
25						
27	S6 VOC BTEX TPH	22-24'	1.08'	1- 2- 3- 3	62 (HS)	[ML], olive gray 5Y 3/2, CLAY, clay w/~10% sand, some diesel odor, no sheen, fine grained, very moist.

* HS = head space
BS = breathing space

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECRL19
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
29						
30	S7 VOC/ BTEX TPH (1638)	30- 32'	1.5'	5- 6- 7- 7	27 (HS)	Top 1.25' of split spoon: [CL], 5Y 3/2 olive gray, CLAY, w/ ~10% silt, cohesive, fine, plastic - medium stiff, no odor/sheen. Bottom .25 of spoon: [ML], 10YR 2/2, dusky yellowish brown, SILT, very moist, loose, no odor/sheen fine.
35	S8 VOC/ BTEX TPH (1632) 003	35- 37'	1.17'	3- 4- 6- 6	68 (HS)	[CL], same as top 1.25' of spoon above, but w/ 10% sand.
37						
40	S9 VOC/ BTEX TPH	40- 42'	1.67'	6- 7- 8- 10	27 (HS)	[CL], same as above; iron staining at top 1/6' of spoon.
42						
44						

* HS = headspace
BS = breathing space

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECBL19
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
45	S10 VOC/ BTEX TPH (1650)	45- 47'	1.67'	10- 8- 8- 13	6.9 (HS)	[CL], olive gray 5Y 3/2, same as above, but no sand, CLAY
47						
50	S11 VOC/ BTEX TPH (1702)	50- 52'	2.0'	4- 8- 10- 14	1.0 (HS)	Top 1.5' of spoon: [CL], same as above Bottom 0.5' of spoon: [CL], same as above, but w/ 10% silt.
52						
55	S12 VOC/ BTEX TPH (1710)	55- 57'	1.5'	8- 14- 20- 32	7.0 (HS)	[CL], same as bottom 0.5' of spoon above
57						
60	S13 VOC/ BTEX	60- 62'	2.0'	14- 19- 20-23	27 (HS)	[CL], same as above, but also w/ 30% sandy silt.

HS = headspace

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECRL19
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm) [#]	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
61						
62						Note: Drillers continuously shovel excess silt into 55 gal drums which are labeled w/ ADL, date, level of contamination, well #, and depth.
65	S14 VOC/ BTEX TPH	65- 67'	1.04'	13- 19- 26- 29	24 (HS) LEL ₂ = 0	[ML], medium olive gray (5Y 4/2), SILT, clayey silt, moist, fine, cohesive, medium stiff to stiff, well sorted, no odor/sheen.
67	Shelby 005	67- 69'				Drilling Ends for 7/26/93 at 67'. Drilling Begins for 7/27/93 at 67'. Shelby tube
69						
70	S15 VOC/ BTEX TPH	70- 72'	1.42'	23- 33- 42- 49	3.4 (HS) LEL ₂ = 0	[ML], olive gray (5Y 3/2), SILT, clayey silt, moist, very stiff, cohesive, fine, well sorted, ~25% clay, two coarse sand grains, no odor/sheen.
72						
75	S16 VOC/ BTEX TPH	75- 77'	1.0'	16- 22- 37- 46	2.4 (HS) 1.8 (BS)	[ML], medium olive gray (5Y 4/2), SILT, clayey silt w ~ 10% clay, stiff, breaking along horizontal planes, fine, moist, no odor/sheen.
77						

HS = head space
BS = breathing space

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECBL19
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)*	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
77						
80	S17 VOC/ BTEX TPH 004	80- 82'	2.0'	18- 22- 25- 26	3.4 (HS)	Top 1.42' of spoon: [MLI], medium olive gray (5Y 4/2), SILT, stiff, fine, ~5% clay, no odor/sheen, moist, breaks along horizontal planes Bottom .58' of spoon: [MLI], olive gray (5Y 3/2), SILT w/ ~30% clay, clayey silt, very moist, fine, plastic, no odor/sheen.
82						
85	S18 VOC/ BTEX TPH	85- 87'	1.75'	13- 34- 43- 46	3.1 (HS) 1.0 (BS)	Top 1.17' of spoon: [MLI], same as top 1.42' of spoon above (80-82') Bottom .58' of spoon: [MLI], same as bottom .58' of spoon above (80-82').
87						▼ ...
90	S19 VOC/ BTEX TPH	90- 92'	1.33'	19- 21- 29- 30	2.7 (HS)	[MLI], medium olive gray (5Y 4/2), SILT, clayey silt (~5% clay), fine, moist, stiff, breaks along horizontal planes, no odor/sheen.
92	Shelby 006	92- 94'				Shelby tube taken: 92-94'

HS = headspace
BS = breathing space

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECRL19
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
93	Shelby	92-94				
94						
95	S20 VOC/ BTEX TPH (1006)	95-97'	2.0'	26- 29- 39- 47	3.8 (HS)	Bottom 1.125' of spoon: [SM], (DYR 4/2) dk yellowish brn, SAND w/ ~40% silt, fine, well-sorted, moist, no odor/sheen. Top .875' of spoon: same as 90-92', [ML].
97						
100	S21 VOC/ BTEX TPH (1100)	100-102'	1.42'	29- 31- 44- 50	2.1 (HS)	[SM], (SY 4/2) medium olive gray, SAND w/ ~40% silt, medium dense to dense, fine, well-sorted, no odor/sheen.
102						
105	S22 VOC/ BTEX TPH	105-107'	0.92'	22- 29- 38- 38	1.4 (HS)	[SM], same as above
107						
109						

* HS = headspace

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECBL19
Client USAEC
Project CRREL
Case No. 67068

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
109						
110	S23 VOC BTEX TPH	110- 112'	2.0'	8- 18- 16- 25	1.5 (HS)	[SM], same as above
112						
115	S24 VOC BTEX TPH	115- 117'	2.0'	10- 10- 17- 20	2.1 (HS)	[SM], same as above, but Fe staining in bottom .25' of spoon and a medium lt. gray (N6) band of silty sand from .25-.35' from top of spoon.
117						
120	S25 VOC BTEX TPH	120- 122'	1.83'	20- 21- 53- 55	1.7 (HS)	Top 1.67' of spoon: [SM], same as above but w/o the Fe staining and gray layer. 1.67'-1.75': [SM], (N5) med gry, SAND w/ ~20% silt and 25% clay, fine, well-sorted, med dense to dense, moist, no odor/sheen. 1.75'-1.83': [SM], (N4) med dk gry, SAND, gravelly sand w/ gneiss grains, fine to med to coarse grained, well-graded, poorly sorted, no odor/sheen.
122						

* Samples to be taken every 15 ft.

* HS = headspace

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECBL19
Client USAEC
Project CBREL
Case No. 67068

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
125						
130						
135	S26	135-137'	0.83'	29-44-50-60	5.2 (HS)	Top .46' of spoon: [SWI], dusky yellowish brn (10YR 2/2), SAND w/ 1 cobble, fine to coarse grained, poorly sorted, well-graded, med dense to dense, moist, no odor/sheen.
137						.46-.83: [SPI], dk gray (N3), SAND, gtz, hnbld, med grained, well-sorted, poorly graded, moist, no odor/sheen, med dense to dense.
						SAND heaves at 140' Heaved ~ 6'
						End drilling for 7/27/93 after setting up Mudpan. Begin drilling for 7/28/93 at 140'

* HS = headspace

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECRL19
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
141						Note: Drilling on 7/28/93 is through Mud Rotary. Samples taken every 15' until bedrock is hit.
145						
150	S27	150-152'	1.5'	40-42-54-48	7.6 (BS) 35.2 (HS) 7.4 (Bkg)	[SPI], dk gray (N3), quartz SAND w/ ~10% silt, medium-coarse grained, moist, well-sorted, poorly graded, dense to very dense, can see hbld in silt, no odor / sheen.
152						
154						

* HS = head space
BS = breathing space

BKgr = background

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECBL19
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
157						
160						
165	S28	165-167'	2.0'	52-70-74-79	35.4 (HS) BKgr= 2.4	Top 1.6': same as above, [SPI] Bottom 0.4': [SCI], med gry (N5), SAND w/~ 20% clay, fine, moist, well-sorted, poorly graded, dense to very dense, no odor/sheen.
167						Note: Separate HS readings taken as well as the combined reading documented as HS. HS on [SCI]: 2.4ppm HS on [SPI]: 35.0ppm
170						
173						

HS = headspace
BKgr = background

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CECRL19
Client USAEC
Project CBREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
173						
175						Bedrock hit at 175! End of drilling for 7/28/93.

Arthur D Little

Soil Boring Log

Boring No. CECRL20
 Client USAEC
 Project CBREL
 Case No. 17063

Date Start 7/7/93 Contractor Environmental Drilling
 Date Complete 7/9/93 Drill Method Hollowstem Auger
 Borehole Diameter 0.85' Type Of Rig Failing Truck Mounted F-6
 Sampling Size 0.33' Drilling Additives -
 Borehole Depth 139.0' Geologist C. Stover
 Sampling Method Standard 2' length split spoon (stainless steel)

LOCATION
 Ice Engineering Facility
 10.8' Hole

Sample No.	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
01	S1	0-2'	N/A		D.O.	[ML], (10YR 5/3) mod dk yel brown, SILT, dry, loose, fine, no odor or sheen
						Note: 140 lb hammer used for blows / 30" blow length fall
	S2	5-7'	1.46'	1- 2- 3- 4	D.O.	Top 0.5' of spoon: [ML], (10YR 4/2), dk yel brn, SILT, dry, loose, fine, no odor / sheen Bottom 0.96' of spoon: [ML], (10YR 5/2) pale to dk yel brn, SILT, moist, fine cohesive, no odor / sheen.
	S3	10-12'	1.92'	5- 10- 12- 12	D.O.	Top 0.33' of spoon: [ML], dk yel brn (10YR 4/2), SILT, dry, loose, no odor, breaks along horizontal planes at bottom. fine 0.33-1.92': [ML], med yel brn (10YR 5/2), SILT, moist, cohesive, fine, no odor

headsace readings

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CEPCL20
Client USAEC
Project CRREL
Case No. 670638

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
	S4 SLS					
15	S4	15-17	19" = 0.79'	5 13 16 12	0.0	[ML], pale-dk yellowish brown (10YR 5/2) SILT, top 12" of split spoon are moist, cohesive, no odor bottom 7" of split spoon are dry, loose, no odor Top 12" splits along horizontal planes
14			24" XS			
20	S5	20-22	24" = 2.0'	7 8 13 14	0.0	[ML], dark yellowish brown (10YR 4/2) SILT, no odor Top 6" very moist and cohesive Bottom 18" moist, cohesive, splitting along horizontal planes From 16.5" - 18" at the bottom of the spoon, iron staining
25	S6	25-27	17.5" = 1.46'	12 14 16 16	0.0	[ML], dark greenish gray (5GY 4/1) SILT, no odor Top 6" moist, cohesive, orange staining, horizontal splitting 6-11.5" dry, loose, no staining 11.5-17.5" moist, cohesive, staining, horizontal splitting
24						

* Headspace readings

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CERCL20
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
30	S7	30-32	18" 1.50'	12 15 18 12	0.0	[ML], dark greenish gray (5GY 4/1) SILTY CLAY Top 3.5" of spoon 95% silt SILT in the Bottom 14.5", horizontal splitting Both moist, cohesive 13-16" and 4-6" from top: orange staining no odor Iron flakes at top inch of spoon
32						
35	S8	35-37	22" 1.83'	7 10 11 11	0.1	[ML], olive gray (5Y 4/1), SILT, no odor, moist, cohesive, no staining, no horizontal splitting
37						
40	S9	40-42	15" 1.25'	7 16 17 19	0.4	Top 3" of spoon: [ML], (5Y 4/1) olive gray, SILT, no odor very moist, cohesive, orange staining Bottom 12" of spoon: [ML], (10YR 4/2) dark yellowish brown, SILTY SAND 90-95% SILT 10-05% Very fine SAND Orange staining, no odor slightly moist and cohesive
42						
45	S10	45-47	18" 1.50'	10 15 15-17	0.4	Top 9" of spoon [CL], olive gray (5Y 4/2) SILTY CLAY 90% SILT moist, cohesive, no odor 10% CLAY

* Headspace readings

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CERCL20
Client USAEC
Project CRREL
Case No. 67067

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
49						From 4-16" of spoon [SM], olive gray (5Y 3/2), moist, cohesive, no odor, heavy staining at top and bottom of this section
50	S11	50-52	19" 1.68'	13 15 12 15	0.0	From 16"-18" of spoon [SM], moderate yellowish brown (10YR 5/4), SAND SILT 85% F-SAND 18%. [ML] moderate yellowish brown (10YR 5/4) SILT, no odor, loose, dry Bottom 16", [SM], moderate yellowish brown (10YR 5/4), SILTY SAND, no odor, loose, dry, fine SAND Staining from 4-5" from top
51						
52						
53	S12	55-57	13" 1.08'	17 16 14	0.1	[SM], moderate yellowish brn (10YR 5/4) Silty SAND, no odor, loose, dry, fine 85% SAND 18% silt
54						
55						
56						
57						
58						
59						
60	S13	60-62	20" 1.67'	5 10 10 11	0.4	[SM], moderate yellowish brn (10YR 5/4) Silty SAND, no odor, loose, dry, fine ~95% sand ~5% silt
61						
62						

* Headspace readings *

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CERC120
Client USAEC
Project CRREL
Case No. 67068

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
63						
65						
66	S14	65-67	23" 1.92'	10 13 13 16	0.0	[SM], moderate yellowish brn (10YR 5/4), SAND w/ trace of silt and dark minerals, no odor, loose, dry, some orange staining, fine sand At the bottom 3" of spoon, silt amount increases to ~10%.
70						
72	S15	70-72	23" 1.92'	11 14 16 18	1.2	[SM], moderate yellowish brn (10YR, 5/4), SAND w/ trace of silt and clay, no odor, loose, dry loose - medium loose, some dk mins in w/ the grs. sand, fine sand
75						
77	S16	75-77	21" 1.75'	10 24 32 30	0.4	[SM], dk yellowish brn (10YR 4/2), SAND w/ ~10% silt and 90% SAND, medium dense - dense sand, no odor, dry, fine sand 6-9" from bottom of spoon: orange staining

* Headpace readings

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CERCL20
Client USAEC
Project CRREL
Case No. 670638

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
79						
80	S17	80-82'	21" 1.75'	10 21 26 27	0.4	[SM], moderate yellowish brn (10YR 5/4) SAND w/ trace of silt, fine sand, medium dense, dry, dk minerals w/ gtz., no odor
82						
84	S18	85-87'	20" 1.67'	19 31 31 36	0.0	Top 6" of spoon: [SP], light olive gray (5Y 5/2) SAND, well-sorted, poorly graded, fine, no odor, orange staining, dry, medium dense Bottom 14" of spoon: [SM], moderate yellowish brn (10YR 5/1) SAND w/ ~5% silt, fine, no odor, orange staining, medium dense to dense SAND, dry Orange staining found @ 5"-7" from top and 18"-19" from top.
86						
88	S19	90-92'	21.5" 1.79'	10 21 21 32	0.0	0-9" from top of spoon: [SP], light olive gray (5Y 5/2), SAND, fine, well-sorted, no odor, dry, loose to medium SAND, orange - rust staining 9-11.5" from top: [SC] medium olive gray (5Y 4/2), fine sand w/ ~25% clay, no odor, medium dense sand, dr 11.5-21.9" from top: [SM], light olive gray (5Y 5/2), 50% SAND, 50% SILT, slightly moist, fine, no odor, medium dense
90						
92						

* Headspace readings

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CERCL20
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
95	S20	95-97'	22" 1.83'	25 38 48 58	0.0	[SP], lt olive gray (5Y 5/2), fine SAND, medium SAND, trace of gravel, ~5% mica, ~5% hornblende, dry SAND, medium dense to dense, no odor, orange staining @ 15-19.5" from top of split spoon, well-sorted SAND.
101	S21	100-102'	21" 1.75'	24 30 38 39	0.0	[SP], lt olive gray (5Y 5/2), SAND, fine to medium, medium to dense type sand, well-sorted, gtz. SAND w/ trace of mica but ~5% hornblende, no odor, dry, no staining.
105	S22	105-107'	19" 1.58'	38 45 36 34	0.0	Top 9" of split spoon: [SP], lt olive gray (5Y 5/2), SAND, medium SAND, dense, dry, no odor Bottom (0" of spoon): [SP], lt olive gray (5Y 5/2), SAND, very fine - fine sand, orange staining, no odor Hornblende, biotite, gtz. visible in Top 9".
110	S23	110-112'	21" 1.75'	25 33-39 35	0.0	

* Headspace readings

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CEBCL20
Client USAEC
Project CRREL
Case No. 67063

Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
112						[SW], medium olive gray (5Y 4/2), loose to medium dense SAND, moist, gtz. and hornblende visible, ~5% hbl, well-sorted, no odor, fine to medium SAND size END of Drilling for 7/7/93 @ 112'
115						Beginning of Drilling for 7/8/93 @ 112'
117	S24	115-117'	23.5" 1.96'	19 31 43 40	2.4	[SP], olive gray (5Y 3/2), SAND, fine to medium, no odor, staining at 13-15.5" from top of split spoon, fairly ^{very} well saturated, medium dense to dense, very fine grains of hornblende in the SAND (~5%). Water Table at 118'
120						Water Table at 120' Note: The Drillers report sand heaves at 120'
122	S25	120-122'	24" 2.0'	20 39 25 34	0.0	[SW], olive gray (5Y 3/2), fine grained SAND w/a trace of silt grades into medium grade clean SAND, no odor, no staining, F-SAND near top of spoon, H-SAND in the bottom 13" of spoon, saturated, dense, well-graded, poorly sorted, non-cohesive.
125						
127	S26	125-127'	24" 2.0'	8 5 9 15	0.0	[SW], olive gray (5Y 3/2), fine to medium SAND, traces of silt ~5% in the bottom 5" of the spoon, saturated, loose, no odor, well-graded, poorly sorted.

* Headspace readings

Arthur D Little

Soil Boring Log
Continuation Page

Boring No. CERCL 20
Client USAEC
Project CAEL
Case No. 67063

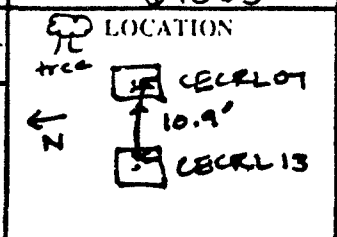
Scale in Feet	SAMPLE			Blows Per 6"	Total Organics (ppm)	GEOLOGIC DESCRIPTION Unified Soil Class ID, color (Munsell System), grain size, sorting, moisture, compaction, indication of contaminants (unusual odor or sheen), and general stratigraphic description
	Type and number	Interval	Recovery			
127						
30						
75						
139						Bottom of auger hole: 139' last sample at 125-127'

Appendix H: Monitoring Well Development Logs

Arthur D Little

Arthur D Little	<i>Pre</i> Well Development Report		Well No. CECRL13
			Client USAEC
			Project ERREL
			Case No. 67063

Installation Date -	Development Date 7-27-93
Depth To Screen Bottom 208.5'	Depth To Water Table 141.2'
Water Level (Relative To Top Of Well Riser)	
Before Development 141.2'	24 Hours After Development _____



WELL VOLUME (* use appropriate values in table for each code letter)

V well	Depth Screen Bottom	Depth Water	Gallons of Water (well)
1.5	208.5	141.2	101.0

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus	Depth Screen Bottom	Depth Bottom of Seal	Gallons of Water (annulus)
0			0

WATER TO BE REMOVED

Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons Removed
101.0	0	5	505 + 4,200

MEASUREMENTS						TABLE		
Number of Gallons Removed	pH	Turbidity			Dissolved Oxygen	Well	Annulus *	
		Conductivity	Temperature	V		V well	dia	V annulus
0.0 gallons	8.09	.413	110	18.0	9.72	2"	6.5	0.46gal/ft
20	8.03	.377	840	17.8	9.69	0.17gal/ft	7.25	0.59gal/ft
40	7.92	.403	7999	16.1	10.50		7.75	0.69gal/ft
80	7.88	.390	960	16.6	10.03	4"	8.25	0.64gal/ft
120	7.85	.385	296	16.1	10.11	0.66gal/ft	10.25	1.06gal/ft
160	7.85	.363	12	16.3	10.23	6"	12.25	1.63gal/ft
						1.5gal/ft		1.41gal/ft

204
209
214
224
234
304

Depth to Sediment: Before - After -
Type/Capacity of pump Elect Submersible Pump - Hermetor
Pumping Rate 4-10 gpm Recharge Time -
Time to Develop Well: Start 1204 Finish 1710 Duration 2.83 hr

COMMENTS (include description of water removed)

1050 Headspace of well = 0.0 ppm
 1204 water is clear
 1214 water is very turbid, greyish brown, lots of particulates
 1234 water is clearer

* Assumes 30% porosity for sand pack

* There were ~~one~~ three interruptions to dump water.

Arthur D Little	Well Development Report	Well No. CECRL13
		Client USAEC
		Project CRREL
		Case No. 67063

Installation Date _____	Development Date _____	LOCATION
Depth To Screen Bottom _____	Depth To Water Table _____	
Water Level (Relative To Top Of Well Riser)		
Before Development _____	24 Hours After Development _____	

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times \left[\left(\text{Depth Screen Bottom} - \text{Depth Water} \right) \right] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times \left[\left(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal} \right) \right] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$\left[\left(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)} \right) \right] \times \text{Removal Multiplier} = \text{Total Gallons Removed}$$

MEASUREMENTS						TABLE		
	pH	Conductivity	Turbidity		Dissolved Oxygen	Well	Annulus *	
			Temperature			V well	dia	V annulus
37	7.86	.393	12	15.3	10.68	2" 0.17ga/ft	6.5	0.46ga/ft
110	7.89	.369	2999	18.1	9.69		7.25	0.59ga/ft
420	7.89	.371	396	18.0	9.70		7.75	0.69ga/ft
135	7.87	.359	<10	17.9	9.72		8.25	0.79ga/ft
445	7.85	.393	<10	15.9	10.63	4" 0.66ga/ft	8.25	0.64ga/ft
450	8.19	.441	2999	17.6	9.64		10.25	1.06ga/ft
						12.25	1.63ga/ft	
						6" 1.5ga/ft	12.25	1.41ga/ft

Depth to Sediment: Before _____ After _____

Type/Capacity of pump _____

Pumping Rate _____ Recharge Time _____

Time to Develop Well: Start _____ Finish _____ Duration _____

COMMENTS (include description of water removed)

1244 Raise pump to 192' (from top of casing) then lower to 194'

1320 Stop to empty Tub #1 (~300 gallons)

1344 Tub #1 PID = 0.0 ppm

1400 Lower pump to 203' Pump is plugged

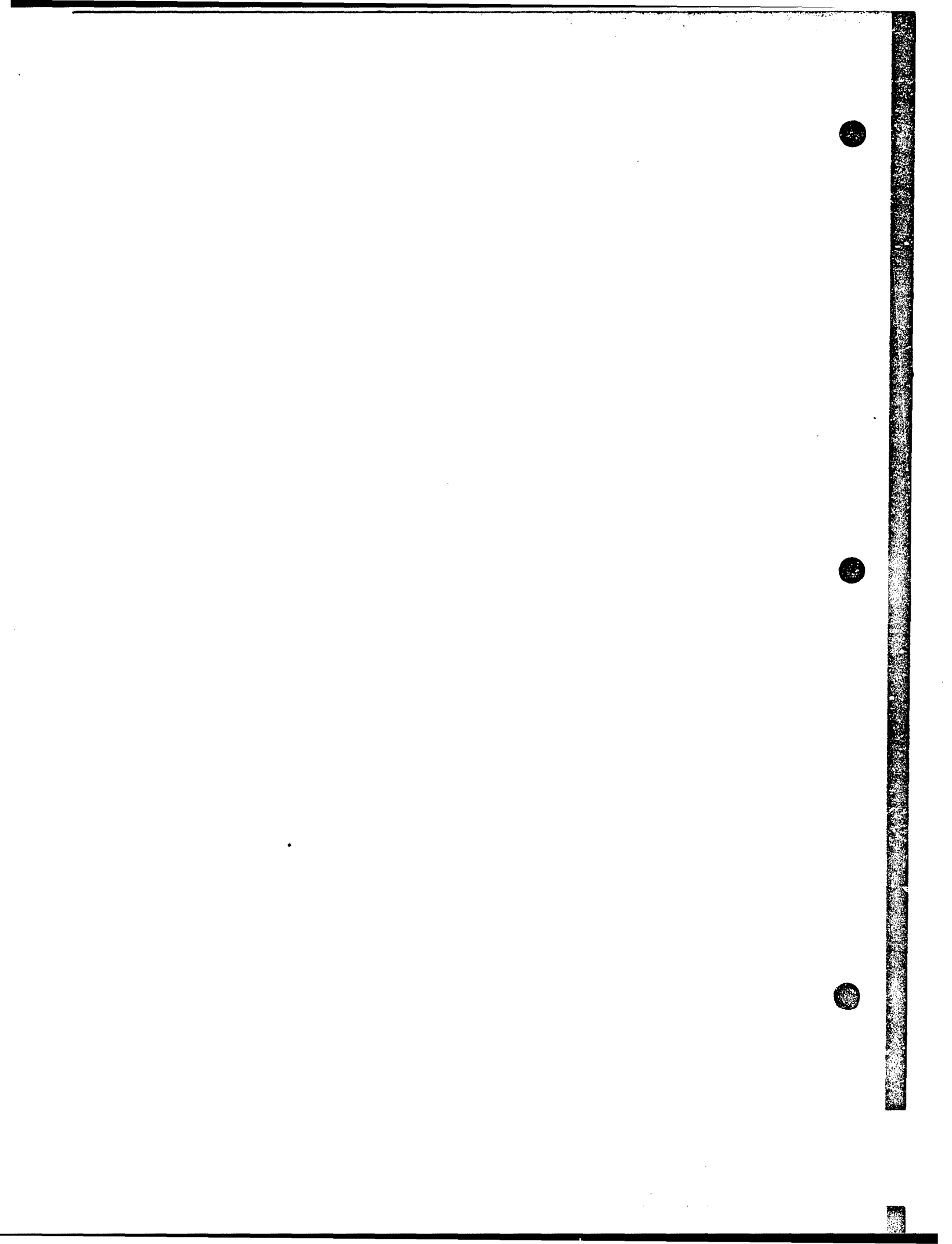
1405 Raise to ~~204~~ 194'

(20) * Assumes 30% porosity for sand pack

1445 Lower to 204' then raise to 199'

37
110
420
135
445
450

Arthur D Little	Well Development Report		Well No. <u>CECRL13</u>																											
			Client <u>USAEC</u>																											
			Project <u>CRREL</u>																											
			Case No. <u>64063</u>																											
Installation Date _____		Development Date _____																												
Depth To Screen Bottom _____		Depth To Water Table _____																												
Water Level (Relative To Top Of Well Riser)																														
Before Development _____		24 Hours After Development _____																												
WELL VOLUME (* use appropriate values in table for each code letter)																														
V well	Depth Screen Bottom	Depth Water	Gallons of Water (well)																											
[]	x [([] - [])]	=	[]																											
ANNULAR VOLUME (ASSUME 30% POROSITY)																														
V annulus	Depth Screen Bottom	Depth Bottom of Seal	Gallons of Water (annulus)																											
[]	x [([] - [])]	=	[]																											
WATER TO BE REMOVED																														
Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons Removed																											
[]	+ []	x []	= []																											
MEASUREMENTS			TABLE																											
Number of Gallons Removed 55 <u>595</u> 60 <u>600</u> 70 <u>645</u> 80 <u>690</u> 90 <u>700</u> 100 <u>750</u>	Feet below top of casing 199 184 197 200 185 185	pH 7.87 7.88 7.90 7.88 7.82 7.92	Turbidity Conductivity 0.317 0.310 0.312 0.356 0.385 0.358	Temperature 522 620 643 2999 352 98	Dissolved Oxygen 16.0 11.9 13.3 13.3 16.7 18.1	10.38 9.58 9.67 9.51 10.39 9.21	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Well</th> <th colspan="2">Annulus *</th> </tr> <tr> <th>V well</th> <th>dia</th> <th>V annulus</th> </tr> </thead> <tbody> <tr> <td rowspan="3">2" 0.17gal/ft</td> <td>6.5</td> <td>0.46gal/ft</td> </tr> <tr> <td>7.25</td> <td>0.59gal/ft</td> </tr> <tr> <td>7.75</td> <td>0.69gal/ft</td> </tr> <tr> <td rowspan="3">4" 0.66gal/ft</td> <td>8.25</td> <td>0.64gal/ft</td> </tr> <tr> <td>10.25</td> <td>1.06gal/ft</td> </tr> <tr> <td>12.25</td> <td>1.63gal/ft</td> </tr> <tr> <td>6" 1.5gal/ft</td> <td>12.25</td> <td>1.41gal/ft</td> </tr> </tbody> </table>	Well	Annulus *		V well	dia	V annulus	2" 0.17gal/ft	6.5	0.46gal/ft	7.25	0.59gal/ft	7.75	0.69gal/ft	4" 0.66gal/ft	8.25	0.64gal/ft	10.25	1.06gal/ft	12.25	1.63gal/ft	6" 1.5gal/ft	12.25	1.41gal/ft
	Well	Annulus *																												
V well	dia	V annulus																												
2" 0.17gal/ft	6.5	0.46gal/ft																												
	7.25	0.59gal/ft																												
	7.75	0.69gal/ft																												
4" 0.66gal/ft	8.25	0.64gal/ft																												
	10.25	1.06gal/ft																												
	12.25	1.63gal/ft																												
6" 1.5gal/ft	12.25	1.41gal/ft																												
Depth to Sediment: Before _____ After _____																														
Type/Capacity of pump _____																														
Pumping Rate _____		Recharge Time _____																												
Time to Develop Well: Start _____ Finish _____ Duration _____																														
COMMENTS (include description of water removed)																														
1505 - Stop pump to dump tub of water #2 PID = 15 ppm, backg = 15 ppm																														
1555 - Start pumping																														
1630 - Shut off the pump to dump tub. Clean down to 206' #3																														
* Assumes 30% porosity for sand pack																														



Arthur D Little

Well Development Report

Well No. CECRL 13

Client USAEC

Project CRREL

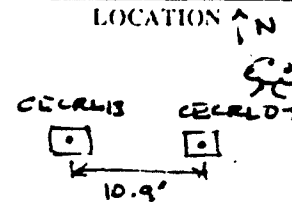
Case No. 67063

Installation Date 8-2-93 Development Date 8-2-93

Depth To Screen Bottom 205.5' Depth To Water Table 141.33'

Water Level (Relative To Top Of Well Riser)

Before Development 141.33' 24 Hours After Development 141.59'



WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

$$.66 \times [(205.5' - 141.33')] = 42.4$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

$$.64 \times [(205.5' - 170.5')] = 9.6$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)}) \times \text{Removal Multiplier}] = \text{Total Gallons Removed}$$

$$[(42.4 + 9.6)] \times 5 = 259.8$$

MEASUREMENTS

Number of Gallons Removed	pH	Conductivity	Temperature	Dissolved Oxygen
0.0 gallons	8.14	.346 291	24.5	8.78
100	12.13	1.96 681	24.6	8.36
101	11.98	1.94 799	25.2	8.39
154	12.02	1.49 535	23.8	8.33
163	12.05	1.65 560	20.4	10.06
199	11.91	1.05 720	21.5	8.99

Well	Annulus *	
	V well	V annulus
2" 0.17gal/ft	6.5	0.46gal/ft
	7.25	0.59gal/ft
	7.75	0.69gal/ft
4" 0.66gal/ft	8.25	0.64gal/ft
	10.25	1.06gal/ft
	12.25	1.63gal/ft
6" 1.5gal/ft	12.25	1.41gal/ft

Depth to Sediment: Before - After -

Type/Capacity of pump Aeromotor - Electric Submersible Pump

Pumping Rate 9-10 gpm Recharge Time ~ 1 hr

Time to Develop Well: Start 1448 Finish 1642 Duration .38 hr (8-2-93)

COMMENTS (include description of water removed)

Total = 1.9 hr

1448 Depth = 180' (from ground level) Water is clear, No odor

1452 Depth = 190'

1456 Depth = 197'

1500 Stop pumping. Water is turbid w/ grayish brown silt.

* Assumes 30% porosity for sand pack

Arthur D Little	Well Development Report		Well No. <u>CECRL13</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>
Installation Date <u>8-2-93</u>	Development Date <u>8-3-93</u>	X	
Depth To Screen Bottom <u>205.5'</u>	Depth To Water Table <u>141.33'</u>		
Water Level (Relative To Top (Of Well Riser))			
Before Development <u>141.33'</u>		24 Hours After Development _____	

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times \left[\left(\text{Depth Screen Bottom} - \text{Depth Water} \right) \right] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times \left[\left(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal} \right) \right] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$\left[\left(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)} \right) \right] \times \text{Removal Multiplier} = \text{Total Gallons Removed}$$

MEASUREMENTS						TABLE		
Number of Gallons Removed	pH	Conductivity	Turbidity		Dissolved Oxygen	Well	Annulus *	
			V	Temperature		V well	dia	V annulus
245	11.73	.780	410	19.2	9.52	2" 0.17gal/ft	6.5	0.46gal/ft
290	11.73	.782	799	18.3	9.55		7.25	0.59gal/ft
335	11.38	.486	575	20.0	9.26		7.75	0.69gal/ft
380	11.05	.386	710	23.6	8.35		8.25	0.79gal/ft
425	10.90	.282	900	26.6	8.09	4" 0.66gal/ft	8.25	0.64gal/ft
470	10.46	.218	799	31.0	8.11		10.25	1.06gal/ft
							12.25	1.63gal/ft
						6" 1.5gal/ft	12.25	1.41gal/ft

Depth to Sediment: Before _____ After _____

Type/Capacity of pump Aermotor

Pumping Rate 9 gpm Recharge Time 45 min - 1 hr

Time to Develop Well: Start 0710 Finish 1759 Duration 1 hr (8-3-93)

COMMENTS (include description of water removed)

0710 Start pump at 191' from ground. Water is clear, no odor.

0808 Lower pump to bottom, water becomes turbid with greyish brown silt

0917 Water is clear

* Assumes 30% porosity for sand pack

Arthur D Little	Well Development Report		Well No. <u>CECKL13</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>

Installation Date <u>8-2-93</u>	Development Date <u>8-3-93</u>	LOCATION
Depth To Screen Bottom <u>205.5'</u>	Depth To Water Table <u>141.33'</u>	
Water Level (Relative To Top (Of Well Riser))		
Before Development <u>141.33'</u> 24 Hours After Development _____		

WELL VOLUME (* use appropriate values in table for each code letter)

V well Depth Screen Bottom Depth Water Gallons of Water (well)

x [(-)] =

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus Depth Screen Bottom Depth Bottom of Seal Gallons of Water (annulus)

x [(-)] =

WATER TO BE REMOVED

Gallons of Water (well) Gallons of Water (annulus) Removal Multiplier Total Gallons Removed

[(+)] x =

MEASUREMENTS						TABLE		
Number of Gallons Removed	pH	Conductivity	Turbidity		Dissolved Oxygen	Well	Annulus *	
			V	Temperature		V well	dia	V annulus
<u>510</u>	<u>10.01</u>	<u>.209</u>	<u>940</u>	<u>29.1</u>	<u>9.01</u>	2" 0.17gal/ft	6.5	0.46gal/ft
<u>535</u>	<u>9.50</u>	<u>.223</u>	<u>790</u>	<u>29.4</u>	<u>7.89</u>		7.25	0.59gal/ft
<u>575</u>	<u>9.61</u>	<u>.218</u>	<u>830</u>	<u>28.9</u>	<u>8.34</u>		7.75	0.69gal/ft
<u>615</u>	<u>9.54</u>	<u>.226</u>	<u>840</u>	<u>27.3</u>	<u>8.27</u>		8.25	0.79gal/ft
<u>635</u>	<u>9.35</u>	<u>.238</u>	<u>672</u>	<u>28.5</u>	<u>7.89</u>	4" 0.66gal/ft	8.25	0.64gal/ft
							10.25	1.06gal/ft
						6" 1.5gal/ft	12.25	1.63gal/ft
							12.25	1.41gal/ft

Depth to Sediment: Before After

Type/Capacity of pump Aermotor

Pumping Rate 9 gpm Recharge Time ~ 50 min - 1 hr

Time to Develop Well: Start 0710 Finish 1759 Duration 1 hr (8-3-93)

COMMENTS (include description of water removed)

1215 water is cloudy, appears to have dissolved bentonite. (Looks like salt water)

* Assumes 30% porosity for sand pack

Arthur D Little	Well Development Report	Well No. <u>CECRL13</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Installation Date <u>8-2-93</u>	Development Date <u>8-4-93</u>	LOCATION
Depth To Screen Bottom <u>205.5'</u>	Depth To Water Table <u>141.33'</u>	
Water Level (Relative To Top Of Well Riser)		

Before Development 141.33' 24 Hours After Development _____

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times \left[\left(\text{Depth Screen Bottom} - \text{Depth Water} \right) \right] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times \left[\left(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal} \right) \right] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$\left[\left(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)} \right) \right] \times \text{Removal Multiplier} = \text{Total Gallons Removed}$$

MEASUREMENTS						TABLE		
Number of Gallons Removed	pH	Turbidity		Dissolved Oxygen	Well	Annulus *		
		Conductivity	Temperature		V well	dia	V annulus	
<u>695</u>	<u>9.00</u>	<u>.245</u>	<u>400</u>	<u>17.8</u>	2"	6.5	0.46gal/ft	
<u>0.0 gallons</u>					0.17gal/ft	7.25	0.59gal/ft	
<u>735</u>	<u>9.71</u>	<u>.275</u>	<u>350</u>	<u>16.5</u>		7.75	0.69gal/ft	
<u>775</u>	<u>9.47</u>	<u>.233</u>	<u>630</u>	<u>21.9</u>		8.25	0.79gal/ft	
<u>815</u>	<u>9.32</u>	<u>.223</u>	<u>794</u>	<u>29.0</u>	4"	8.25	0.64gal/ft	
<u>855</u>	<u>9.30</u>	<u>.232</u>	<u>850</u>	<u>29.3</u>	0.66gal/ft	10.25	1.06gal/ft	
<u>900</u>	<u>9.15</u>	<u>.232</u>	<u>790</u>	<u>26.5</u>		12.25	1.63gal/ft	
					6"	12.25	1.41gal/ft	
					1.5gal/ft			

+ After 15 min dropped to < 20 NTU

Depth to Sediment: Before After

Type/Capacity of pump Aerometer

Pumping Rate ~ 9 gpm Recharge Time ~ 1 hr

Time to Develop Well: Start 1710 Finish 1306 Duration .5 hr (8-4-93)

COMMENTS (include description of water removed)

0713 Water is less cloudy, no odor

1306 Water is clear, no odor.

* Assumes 30% porosity for sand pack

Arthur D Little	Well Development Report	Well No. CECRL14
		Client USREC
Installation Date 8/4/93		Development Date 8-6-93
Depth To Screen Bottom 259.50'		Depth To Water Table 130.4'
Project CRREL		Case No. 67063

LOCATION \uparrow North
 Parking Lot
 CECRL09 CECRL14
 0 0
 construction \rightarrow

Water Level (Relative To Top Of Well Riser) **(aa)**

Before Development **44.74'** 24 Hours After Development **139.45'**

WELL VOLUME (* use appropriate values in table for each code letter)

V well Depth Screen Bottom Depth Water Gallons of Water (well)

0.66 x [(**259.50'** - **130.4**)] = **84.9**

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus Depth Screen Bottom Depth Bottom of Seal Gallons of Water (annulus)

0.64 x [(**259.50'** - **239.50'**)] = **12.8**

WATER TO BE REMOVED

Gallons of Water (well) Gallons of Water (annulus) Removal Multiplier Total Gallons Removed

[(**84.9** + **12.8**)] x **5** = **488.4**

MEASUREMENTS						TABLE		
						Well	Annulus *	
Number of Gallons Removed	pH	Turbidity		Dissolved Oxygen	V well	dia	V annulus	
		Conductivity	Temperature					
0.0 gallons	11.24	0.500	515	32.4	2"	6.5	0.46gal/ft	
27	11.07	0.404	568	32.9	0.17gal/ft	7.25	0.59gal/ft	
55	11.22	0.508	524	25.2		7.75	0.69gal/ft	
65	8.78	0.358	160	22.3		8.25	0.79gal/ft	
74	8.31	0.326	799	23.4	4"	8.25	0.64gal/ft	
88	8.29	0.334	835	21.7	0.66gal/ft	10.25	1.06gal/ft	
						12.25	1.63gal/ft	
					6"	12.25	1.41gal/ft	
					1.5gal/ft			

Depth to Sediment: Before After

Type/Capacity of pump **Keck (8/6/93)**, **Ag motor (8/1/93)**

Pumping Rate **< 1 gpm (~.8 gpm)** Recharge Time **~ 24 hrs.**

Time to Develop Well: Start **8/6/93 1335** Finish **8/9/93 1215** Duration **5.23 hrs**

COMMENTS (include description of water removed)

0 - water is clear, no odor. Start pumping ~ 65' 865

74 - water is cloudy, whitish - prob. bentonite, no odor.

* Assumes 30% porosity for sand pack

Arthur D Little	Well Development Report	Well No. <u>CECRL14</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Installation Date <u>8/4/93</u>	Development Date <u>8/7/93</u>	LOCATION
Depth To Screen Bottom <u>259.50'</u>	Depth To Water Table <u>130.4'</u>	
Water Level (Relative To Top Of Well Riser)		
Before Development <u>44.74'</u>		24 Hours After Development <u>139.45'</u>

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons Removed}$$

MEASUREMENTS						TABLE		
Number of Gallons Removed	pH	Turbidity			Dissolved Oxygen	Well	Annulus *	
		Conductivity	Temperature	V		V well	dia	V annulus
<u>154</u>	<u>8.66</u>	<u>0.331</u>	<u>800</u>	<u>24.1</u>	<u>8.94</u>	2" 0.17gal/ft	6.5	0.46gal/ft
<u>203</u>	<u>8.90</u>	<u>0.325</u>	<u>410</u>	<u>22.1</u>	<u>8.92</u>		7.25	0.59gal/ft
<u>300 290</u>	<u>8.10</u>	<u>0.463</u>	<u>85</u>	<u>21.1</u>	<u>9.29</u>		7.75	0.69gal/ft
<u>360</u>	<u>8.57</u>	<u>0.403</u>	<u>65</u>	<u>23.5</u>	<u>8.89</u>	4" 0.66gal/ft	8.25	0.64gal/ft
							10.25	1.06gal/ft
							12.25	1.63gal/ft
						6" 1.5gal/ft	12.25	1.41gal/ft

8/7/93
8/9/93

Depth to Sediment: Before - After -

Type/Capacity of pump Aermotor

Pumping Rate ~ 0.8 gpm, 1.5 gpm Recharge Time ~ 24 hrs.

Time to Develop Well: Start 8/6/93 1335 Finish 8/9/93 1213 Duration 5.23 hrs

COMMENTS (include description of water removed)

203 Water is clear

290 Water has whitish cloudiness, like suspended bentonite, no odor.

360 Water is clear, no odor

* Assumes 30% porosity for sand pack

Arthur D Little	Well Development Report	Well No. CECR15
		Client USREC
		Project CRREL
		Case No. 67063

Installation Date 8/5/93	Development Date 8/5/93	LOCATION ↑ North Parking Lot ○ CECR15 ○ CECR08 Sidewalk Building
Depth To Screen Bottom 192.8'	Depth To Water Table ~130'	
Water Level (Relative To Top (Of Well Riser))		
Before Development 91.16' 24 Hours After Development 116.4'		

WELL VOLUME (* use appropriate values in table for each code letter)

V well	Depth Screen Bottom	Depth Water	Gallons of Water (well)
0.66	192.8	130	41.4

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus	Depth Screen Bottom	Depth Bottom of Seal	Gallons of Water (annulus)
0.64	192.8	177.3	9.92

WATER TO BE REMOVED

Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons Removed
41.4	9.92	5	256.8

MEASUREMENTS					TABLE		
					Well	Annulus *	
Number of Gallons Removed	pH	Turbidity		Dissolved Oxygen	V well	V annulus	
		Conductivity	Temperature		dia		
0.0 gallons	7.75	0.307	210	20.4	2"	6.5	0.46ga/ft
61	8.20	0.271	799	28.1	0.17ga/ft	7.25	0.59ga/ft
74	7.92	0.350	999	16.3		7.75	0.69ga/ft
82	8.90	0.288	645	16.6		8.25	0.79ga/ft
					4"	8.25	0.64ga/ft
					0.66ga/ft	10.25	1.06ga/ft
						12.25	1.63ga/ft
					6"	12.25	1.41ga/ft
					1.5ga/ft		

Depth to Sediment: Before **-** After **-**

Type/Capacity of pump **Aermotor Electric Submersible Pump**

Pumping Rate **9-10 gpm** Recharge Time **> 24 hrs**

Time to Develop Well: Start **8/5/93 1213** Finish **8/10/93 0920** Duration **13 min**

COMMENTS (include description of water removed)

0 - Water is clear, no odor

61 - Water is turbid with greyish brown silt

82 - Water is clearer, but has greyish brown silt

* Assumes 30% porosity for sand pack

8/5/93
8/6/93
8/7/93

Arthur D Little	Pre Well Development Report		Well No. <u>CECR L16</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>

Installation Date -	Development Date <u>7-28-93</u>	LOCATION \uparrow North ----- Fence white water [] O CECR L16 O CECR L16
Depth To Screen Bottom <u>205.0'</u>	Depth To Water Table <u>88.16'</u>	
Water Level (Relative To Top (Of Well Riser))		
Before Development <u>88.16'</u> 24 Hours After Development _____		

WELL VOLUME (* use appropriate values in table for each code letter)

V well	Depth Screen Bottom	Depth Water	Gallons of Water (well)
[1.5]	x [([205.0] - [88.16])]		= [175.26]

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus	Depth Screen Bottom	Depth Bottom of Seal	Gallons of Water (annulus)
[0]	x [([] - [])]		= [0]

WATER TO BE REMOVED

Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons Removed
[([175.26] + [0])]		x [5]	= [876.3] + 3950 (Coring Lab)

MEASUREMENTS							TABLE		
Number of Gallons Removed	pH	Turbidity			Dissolved Oxygen	Well	Annulus *		
		Conductivity	Temperature	V		V well	dia	V annulus	
1108 0.0 gallons	8.07	.301	730	24.2	7.70	2"	6.5	0.46gal/ft	
1118 105	8.09	.325	710	23.7	9.31	0.17gal/ft	7.25	0.59gal/ft	
1128 150	8.01	.380	704	25.4	8.44		7.75	0.69gal/ft	
1435 159	7.97	.319	799	30.8	7.78	4"	8.25	0.64gal/ft	
1445 168	7.90	.339	675	27.1	8.24	0.66gal/ft	10.25	1.06gal/ft	
1455 177	7.74	.379	770	27.5	8.14	6"	12.25	1.63gal/ft	
						1.5gal/ft	12.25	1.41gal/ft	

Depth to Sediment: Before 175.5' After 175.5'

Type/Capacity of pump Hermetor / Waterra

Pumping Rate 1-4.5 gpm Recharge Time -

Time to Develop Well: Start 1108 Finish 1820 Duration 4.18

COMMENTS (include description of water removed) Initial pump depth ~ 177 ft

1108 water is very turbid, gray brown, no odor, with gray + black med-fine sand particles. Start pumping @ 10 gpm, slow down to 4.5 gpm

1129 Well pumped dry, pump is plugged. Wait for recharge. Decide use Waterra instead of Groundfos pump.

1430 Start pumping at ~2gpm, 164 ft down

* Assumes 30% porosity for sand pack

1108
1118
1128
1435
1445
1455

Arthur D Little	Well Development Report	Well No. CECRL16
		Client USAEC
		Project CRREL
		Case No. 67063

Installation Date	Development Date 7-28-93	LOCATION
Depth To Screen Bottom	Depth To Water Table	
Water Level (Relative To Top Of Well Riser)		
Before Development	24 Hours After Development	

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$[\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)}] \times \text{Removal Multiplier} = \text{Total Gallons Removed}$$

MEASUREMENTS						TABLE		
Number of Gallons Removed	pH	Conductivity	Turbidity		Dissolved Oxygen	Well	Annulus *	
			Temperature			V well	dia	V annulus
1700 360 0.0 gallons	7.77	.399	7999	28.1	7.75	2"	6.5	0.46gal/ft
1715 410	7.66	.405	7999	27.5	7.73		7.25	0.59gal/ft
1815 465	7.80	.404	7999	26.8	8.23		7.75	0.69gal/ft
							8.25	0.79gal/ft
						4"	8.25	0.64gal/ft
							10.25	1.06gal/ft
							12.25	1.63gal/ft
						6"	12.25	1.41gal/ft
							1.5gal/ft	

Depth to Sediment: Before After

Type/Capacity of pump **Waterra Power Pump**

Pumping Rate **1-2 gpm** Recharge Time

Time to Develop Well: Start Finish Duration

COMMENTS (include description of water removed)

1540 med coarse gray r. black sand particles in sample. About 1/2 of sample volume consists of this sediment

1725 PID Drum #1, Drum #2 + Tub #1 0 ppm each

1745 PID Drum #3 0 ppm

1815 water much more clear, almost no sediment, finer sand.

* Assumes 30% porosity for sand pack

1820 Stop pumping

Arthur D Little	Well Development Report	Well No. <u>CECRL16</u>
		Client <u>USAEC</u>
		Project <u>CRAEL</u>
		Case No. <u>67063</u>

Installation Date <u>8/5/93</u>	Development Date <u>8/9/93 - 8/11/93</u>	LOCATION <u>Northern Bound.</u>
Depth To Screen Bottom <u>202.5'</u>	Depth To Water Table <u>88.4'</u>	<div style="border: 1px solid black; width: 100px; height: 20px; margin: 0 auto;"></div> White Trailer o CECRL17 o CECRL16

Water Level (Relative To Top Of Well Riser)

Before Development 88.4' 24 Hours After Development 88.59'

WELL VOLUME (* use appropriate values in table for each code letter)

V well	Depth Screen Bottom	Depth Water	Gallons of Water (well)
<u>0.17</u>	<u>202.5</u>	<u>88.4</u>	<u>19.4</u>

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus	Depth Screen Bottom	Depth Bottom of Seal	Gallons of Water (annulus)
<u>0.46</u>	<u>202.5</u>	<u>137.5</u>	<u>6.9</u>

WATER TO BE REMOVED

Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons Removed
<u>19.4</u>	<u>6.9</u>	<u>5</u>	<u>138.5</u>

MEASUREMENTS						TABLE		
Number of Gallons Removed	pH	Turbidity		Dissolved Oxygen	Well	Annulus *		
		Conductivity	Temperature		V well	dia	V annulus	
0.0 gallons	10.90	0.403	799	35.8	2"	6.5	0.46gal/ft	
<u>180</u>	<u>8.92</u>	<u>0.393</u>	<u>664</u>	<u>28.3</u>	0.17gal/ft	7.25	0.59gal/ft	
<u>600</u>	<u>8.64</u>	<u>0.469</u>	<u>320</u>	<u>18.8</u>	7.75	7.75	0.69gal/ft	
<u>1365</u>	<u>8.41</u>	<u>0.399</u>	<u>690</u>	<u>27.9</u>	8.25	8.25	0.79gal/ft	
<u>1545</u>	<u>8.15</u>	<u>0.417</u>	<u>600</u>	<u>26.0</u>	4"	8.25	0.64gal/ft	
<u>2085</u>	<u>8.01</u>	<u>0.436</u>	<u>450</u>	<u>21.6</u>	0.66gal/ft	10.25	1.06gal/ft	
					12.25	12.25	1.63gal/ft	
					6"	1.5gal/ft	1.41gal/ft	

Depth to Sediment: Before — After —

Type/Capacity of pump Waterira Power Pump

Pumping Rate 3 gpm Recharge Time < 3.4 hrs

Time to Develop Well: Start 8/9/93 1740 Finish 8/11/93 1016 Duration 14.6 hrs

COMMENTS (include description of water removed)

0 Water is turbid with greyish brown silt, no odor

180 water is clear, no odor.

Note: Pump at 190' BGS

* Assumes 30% porosity for sand pack

9/93
10/93

Arthur D Little	Well Development Report		Well No. <u>CECR L16</u>
			Client <u>USAEC</u>
			Project <u>CRAEL</u>
			Case No. <u>67063</u>

Installation Date <u>8/5/93</u>	Development Date <u>8/9/93 - 8/11/93</u>	LOCATION
Depth To Screen Bottom <u>202.5'</u>	Depth To Water Table <u>88.4'</u>	X
Water Level (Relative To Top (Of Well Riser))		
Before Development <u>88.4'</u>		24 Hours After Development <u>88.59'</u>

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times \left[\left(\text{Depth Screen Bottom} - \text{Depth Water} \right) \right] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times \left[\left(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal} \right) \right] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$\left[\left(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)} \right) \right] \times \text{Removal Multiplier} = \text{Total Gallons Removed}$$

MEASUREMENTS						TABLE			
Number of Gallons Removed	pH	Conductivity	Turbidity		Temperature	Dissolved Oxygen	Well	Annulus *	
			V well	dia			V annulus		
<u>2300</u>	<u>8.20</u>	<u>0.460</u>	<u>365</u>	<u>19.7</u>	<u>9.12</u>	2" 0.17gal/ft	6.5	0.46gal/ft	
<u>2330</u>	<u>7.97</u>	<u>0.454</u>	<u>250</u>	<u>19.3</u>	<u>9.07</u>		7.25	0.59gal/ft	
<u>2390</u>	<u>7.94</u>	<u>0.452</u>	<u>185</u>	<u>19.4</u>	<u>8.86</u>		7.75	0.69gal/ft	
<u>2480</u>	<u>7.96</u>	<u>0.434</u>	<u>490</u>	<u>21.2</u>	<u>8.50</u>	4" 0.66gal/ft	8.25	0.64gal/ft	
_____	_____	_____	_____	_____	_____		10.25	1.06gal/ft	
_____	_____	_____	_____	_____	_____		12.25	1.63gal/ft	
_____	_____	_____	_____	_____	_____	6" 1.5gal/ft	12.25	1.41gal/ft	

* After 5 min = 114

Depth to Sediment: Before — After —

Type/Capacity of pump Watera

Pumping Rate 3 gpm Recharge Time < 3.4 hrs

Time to Develop Well: Start 8/9/93 1740 Finish 8/11/93 1016 Duration 14.6 hrs

COMMENTS (include description of water removed)

2300 water is clear, no odor

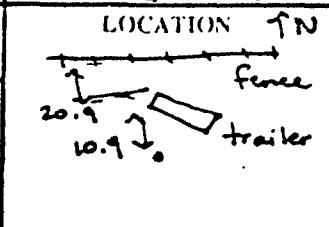
2480 water is clear, no odor.

PID of Drums = 0 ppm

* Assumes 30% porosity for sand pack

Arthur D Little	Well Development Report		Well No. <u>CECRL17</u>
			Client <u>USAEC</u>
			Project <u>CRAEL</u>
			Case No. <u>67063</u>

Installation Date 1-20-93 Development Date 7-22-93
 Depth To Screen Bottom 110.50' Depth To Water Table 81.71'



Water Level (Relative To Top Of Well Riser)

Before Development 81.71' 24 Hours After Development 81.91'

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

$$0.66 \times [(110.50 - 81.71)] = 19$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

$$0.64 \times [(110.50 - 85.50)] = 16$$

WATER TO BE REMOVED

2,355

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons Removed}$$

$$[(19 + 16)] \times 5 = 175 + 2,180$$

MEASUREMENTS							TABLE		
Number of Gallons Removed	pH	Turbidity			Dissolved Oxygen	Well	Annulus *		
		Conductivity	Temperature	V		V well	dia	V annulus	
0.0 gallons	10.12	0.411	412	22.0	0.21	2" 0.17gal/ft	6.5	0.46gal/ft	
10	10.26	0.314	341	21.2	0.22		7.25	0.59gal/ft	
17	9.98	0.323	319	20.9	0.22		7.75	0.69gal/ft	
18	9.84	0.328	460	20.9	5.80	4" 0.66gal/ft	8.25	0.64gal/ft	
19	10.22	0.358	878	21.1	0.16		10.25	1.06gal/ft	
27	10.09	0.326	160	21.4	0.29		12.25	1.63gal/ft	
						6" 1.5gal/ft	12.25	1.41gal/ft	

137
542
547
552
557
607

Depth to Sediment: Before N/A After N/A

Type/Capacity of pump Electric Submersible Pump - Aermetics

Pumping Rate 1-2 gpm Recharge Time > 1.5 hr

Time to Develop Well: Start 1537 Finish 1810 Duration 30 min = 0.5hr

COMMENTS (include description of water removed)

1537 water is turbid, greyish brown, lots of particulates, no odor
 1607 water is still turbid

* Assumes 30% porosity for sand pack

Arthur D Little	Well Development Report		Well No. <u>CECRLM</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>U1063</u>

Installation Date <u>7-20-93</u>	Development Date <u>7-26-93</u>	X
Depth To Screen Bottom <u>110.50'</u>	Depth To Water Table <u>81.10'</u>	
Water Level (Relative To Top Of Well Riser)		
Before Development <u>81.10'</u>		24 Hours After Development <u>81.91'</u>

WELL VOLUME (* use appropriate values in table for each code letter)

V well	Depth Screen Bottom	Depth Water	Gallons of Water (well)
<u>0.66</u>	<u>110.50</u>	<u>81.10</u>	<u>19.40</u>

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus	Depth Screen Bottom	Depth Bottom of Seal	Gallons of Water (annulus)
<u>0.64</u>	<u>110.50</u>	<u>85.50</u>	<u>16.00</u>

WATER TO BE REMOVED

Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons Removed
<u>19.40</u>	<u>16.00</u>	<u>5</u>	<u>177</u>

	MEASUREMENTS						TABLE			
	Number of Gallons Removed	pH	Conductivity	Turbidity		Dissolved Oxygen	Well	Annulus *		
				V well	dia		V annulus			
131	<u>27</u> <u>90 gallons</u>	<u>10.85</u>	<u>.416</u>	<u>200</u>	<u>23.2</u>	<u>9.75</u>	2"	6.5	0.46gal/ft	
136	<u>35</u>	<u>9.22</u>	<u>.283</u>	<u>2999</u>	<u>23.7</u>	<u>9.60</u>	0.17gal/ft	7.25	0.59gal/ft	
141	<u>37</u>	<u>10.09</u>	<u>.240</u>	<u>2999</u>	<u>23.8</u>	<u>9.04</u>	7.75	8.25	0.69gal/ft	
146	<u>43</u>	<u>10.92</u>	<u>.322</u>	<u>2999</u>	<u>22.3</u>	<u>9.36</u>	4"	8.25	0.64gal/ft	
151	<u>47</u>	<u>9.12</u>	<u>.284</u>	<u>2999</u>	<u>23.0</u>	<u>9.34</u>	0.66gal/ft	10.25	1.06gal/ft	
106	<u>54</u>	<u>8.96</u>	<u>.304</u>	<u>2999</u>	<u>22.6</u>	<u>9.37</u>	12.25	12.25	1.63gal/ft	
			<u>.149</u>				6"	1.5gal/ft	12.25	1.41gal/ft

Depth to Sediment: Before - After -

Type/Capacity of pump Waterra Power Pump

Pumping Rate < 1 gpm Recharge Time -

Time to Develop Well: Start 1031 Finish 1815 Duration 7.75 hr

COMMENTS (include description of water removed)

1020 - Well Headspace PID = 2ppm

1031 - Water is clear

1036 - water is very turbid, many particulates, greyish brown, smells like bentonite, could be clay.

1100 - Stop to refuel pump

* Assumes 30% porosity for sand pack

Arthur D Little	Well Development Report		Well No. <u>CECL19</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>

Installation Date <u>7-20-93</u>	Development Date <u>7-26-93</u>	LOCATION
Depth To Screen Bottom	Depth To Water Table	
Water Level (Relative To Top Of Well Riser)		
Before Development _____	24 Hours After Development _____	

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times \left[\left(\text{Depth Screen Bottom} - \text{Depth Water} \right) \right] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times \left[\left(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal} \right) \right] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$\left[\left(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)} \right) \right] \times \text{Removal Multiplier} = \text{Total Gallons Removed}$$

MEASUREMENTS						TABLE		
Number of Gallons Removed	pH	Conductivity	Turbidity		Dissolved Oxygen	Well	Annulus *	
			Temperature			V well	dia	V annulus
<u>57</u>	<u>8.94</u>	<u>.301</u>	<u>7999</u>	<u>23.0</u>	<u>8.54</u>	2" 0.17gal/ft	6.5	0.46gal/ft
<u>63</u>	<u>8.97</u>	<u>.296</u>	"	<u>24.5</u>	<u>8.46</u>		7.25	0.59gal/ft
<u>72</u>	<u>9.05</u>	<u>.303</u>	"	<u>22.4</u>	<u>8.68</u>		7.75	0.69gal/ft
<u>74</u>	<u>9.06</u>	<u>.306</u>	"	<u>21.3</u>	<u>9.04</u>	4" 0.66gal/ft	8.25	0.64gal/ft
<u>82</u>	<u>9.07</u>	<u>.308</u>	"	<u>21.5</u>	<u>9.12</u>		10.25	1.06gal/ft
<u>87</u>	<u>9.09</u>	<u>.296</u>	"	<u>23.0</u>	<u>8.80</u>		12.25	1.63gal/ft
						6"	12.25	1.41gal/ft

6
26
43
58
08

Depth-to-Sediment: Before - After -

Type/Capacity of pump _____

Pumping Rate _____ Recharge Time _____

Time to Develop Well: Start _____ Finish _____ Duration _____

COMMENTS (include description of water removed)

1154 Drum water PID = 1.8 (Drum #1, 55 gallons)

* Assumes 30% porosity for sand pack

Arthur D Little	Well Development Report	Well No. <u>CECRL 19</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Installation Date _____	Development Date <u>7-26-93</u>	LOCATION
Depth To Screen Bottom _____	Depth To Water Table _____	
Water Level (Relative To Top Of Well Riser)		
Before Development _____ 24 Hours After Development _____		

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$[\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)}] \times \text{Removal Multiplier} = \text{Total Gallons Removed}$$

MEASUREMENTS

Number of Gallons Removed	pH	Conductivity	Turbidity		Dissolved Oxygen
			Y	Temperature	
<u>91</u>	<u>9.04</u>	<u>.309</u>	<u>>999</u>	<u>20.9</u>	<u>9.51</u>
<u>95</u>	<u>9.08</u>	<u>.309</u>	"	<u>21.4</u>	<u>9.42</u>
<u>100</u>	<u>9.08</u>	<u>.294</u>	"	<u>23.4</u>	<u>8.25</u>
<u>104</u>	<u>9.13</u>	<u>.292</u>	"	<u>23.8</u>	<u>9.03</u>
<u>112</u>	<u>9.08</u>	<u>.305</u>	"	<u>24.2</u>	<u>8.06</u>
<u>122</u>	<u>9.15</u>	<u>.303</u>	"	<u>23.0</u>	<u>7.75</u>

TABLE

Well	Annulus *	
	V well	V annulus
2" 0.17gal/ft	6.5	0.46gal/ft
	7.25	0.59gal/ft
	7.75	0.69gal/ft
4" 0.66gal/ft	8.25	0.64gal/ft
	10.25	1.06gal/ft
	12.25	1.63gal/ft
6" 1.5gal/ft	12.25	1.41gal/ft

18
28
38
48
58
120

Depth to Sediment: Before _____ After _____
Type/Capacity of pump _____
Pumping Rate _____ Recharge Time _____
Time to Develop Well: Start _____ Finish _____ Duration _____

COMMENTS (include description of water removed)

1300 - Lunch, Bill authorizes to stop 15 minute sampling.
Ag (a)

* Assumes 30% porosity for sand pack

Arthur D Little	Well Development Report	Well No. CECL14
		Client USREC
		Project CRREL
		Case No. 67063

Installation Date _____	Development Date 7-26-93	LOCATION
Depth To Screen Bottom _____	Depth To Water Table _____	
Water Level (Relative To Top Of Well Riser)		
Before Development _____	24 Hours After Development _____	

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times \left[\left(\text{Depth Screen Bottom} - \text{Depth Water} \right) \right] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times \left[\left(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal} \right) \right] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$\left[\left(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)} \right) \right] \times \text{Removal Multiplier} = \text{Total Gallons Removed}$$

MEASUREMENTS						TABLE		
Number of Gallons Removed	pH	Turbidity		Dissolved Oxygen	Well	Annulus *		
		Conductivity	Temperature		V well	dia	V annulus	
137 <u>0.17 gallons</u>	9.19	.308	>999	21.5	2"	6.5	0.46gal/ft	
155	9.12	.301	>999	24.3	0.17gal/ft	7.25	0.59gal/ft	
280	9.39	.303	>999	20.6	0.17gal/ft	7.75	0.69gal/ft	
_____	_____	_____	_____	_____	4"	8.25	0.64gal/ft	
_____	_____	_____	_____	_____	0.66gal/ft	10.25	1.06gal/ft	
_____	_____	_____	_____	_____	6"	12.25	1.63gal/ft	
_____	_____	_____	_____	_____	1.5gal/ft	12.25	1.41gal/ft	

Depth to Sediment: Before _____ After _____	
Type/Capacity of pump _____	
Pumping Rate _____	Recharge Time _____
Time to Develop Well: Start _____	Finish _____ Duration _____

COMMENTS (include description of water removed)

1335 Drum #2 PID = 3.1 ppm . Backg (10' upwind) = 3.1 ppm
 Prob instrum. drift

1340 white foam floating in the water of drum #2

* Assumes 30% porosity for sand pack

35
10
15

Arthur D Little	Well Development Report	Well No. CECRL17
		Client USAEC
		Project CRREL
		Case No. 67063

Installation Date _____	Development Date 7-28-93	LOCATION
Depth To Screen Bottom _____	Depth To Water Table _____	
Water Level (Relative To Top Of Well Riser)		
Before Development _____	24 Hours After Development _____	

WELL VOLUME (* use appropriate values in table for each code letter)

V well Depth Screen Bottom Depth Water Gallons of Water (well)

_____ x [(_____ - _____)] = _____

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus Depth Screen Bottom Depth Bottom of Seal Gallons of Water (annulus)

_____ x [(_____ - _____)] = _____

WATER TO BE REMOVED

Gallons of Water (well) Gallons of Water (annulus) Removal Multiplier Total Gallons Removed

[(_____ + _____)] x _____ = _____

MEASUREMENTS

Number of Gallons Removed	pH	Conductivity	Turbidity		Dissolved Oxygen
			Temperature	Temperature	
346 * gallons	8.08	.395	7999	19.1	9.67
370	8.08	.416	7999	19.1	9.41
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

TABLE

Well	Annulus *	
	V well	dia V annulus
2"	0.17gal/ft	6.5 0.46gal/ft
		7.25 0.59gal/ft
		7.75 0.69gal/ft
		8.25 0.79gal/ft
4"	0.66gal/ft	8.25 0.64gal/ft
		10.25 1.06gal/ft
		12.25 1.63gal/ft
6"	1.5gal/ft	12.25 1.41gal/ft

Depth to Sediment: Before _____ After _____

Type/Capacity of pump **Waterra Power Pump**

Pumping Rate ~ _____ Recharge Time _____

Time to Develop Well: Start **0700** Finish **0755** Duration **0.6 hr**

COMMENTS (include description of water removed) * Well was pumped

0700 - Start pumping. Allan takes sample all day 7/21/93

0730 - Generator dies. Drillers fix it.

0745 - Start pumping.

0755 - Stop pumping.

* Assumes 30% porosity for sand pack

0750
0755

Arthur D Little	Well Development Report		Well No. CECRL18	
			Client USAEC	
		Project CRREL		
		Case No. 67063		
Installation Date 8/4/93	Development Date 8/7/93 - 8/11/93	LOCATION <input type="checkbox"/> ↑ North <input type="checkbox"/> Gastank <input type="checkbox"/> CECRL18 <input type="checkbox"/> CECRL18		
Depth To Screen Bottom 202.5'	Depth To Water Table ~87'			
Water Level (Relative To Top Of Well Riser)			Greenhouse	
Before Development 72.86'		24 Hours After Development 113.71'		
WELL VOLUME (* use appropriate values in table for each code letter)				
V well	Depth Screen Bottom	Depth Water	Gallons of Water (well)	
<input type="text" value="0.66"/>	<input type="text" value="202.5"/>	<input type="text" value="87"/>	<input type="text" value="76.2"/>	
ANNULAR VOLUME (ASSUME 30% POROSITY)				
V annulus	Depth Screen Bottom	Depth Bottom of Seal	Gallons of Water (annulus)	
<input type="text" value="0.64"/>	<input type="text" value="202.5"/>	<input type="text" value="187.5"/>	<input type="text" value="9.6"/>	
WATER TO BE REMOVED				
Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons Removed	
<input type="text" value="76.2"/>	<input type="text" value="9.6"/>	<input type="text" value="5"/>	<input type="text" value="429.2"/>	
MEASUREMENTS			TABLE	
Number of Gallons Removed 0.0 gallons <u>25</u> <u>40</u> <u>69</u> <u>87</u> <u>119</u>	pH <u>11.86</u> <u>11.91</u> <u>11.56</u> <u>11.13</u> <u>8.53</u> <u>10.18</u>	Turbidity		Well V well 2" 0.17gal/ft 4" 0.66gal/ft 6" 1.5gal/ft
		Conductivity	Temperature	
		<u>1.11</u> <u>526</u> <u>22.6</u>	<u>8.88</u>	6.5 0.46gal/ft
		<u>1.45</u> <u>90</u> <u>22.1</u>	<u>9.02</u>	7.25 0.59gal/ft
		<u>0.748</u> <u>200</u> <u>24.3</u>	<u>8.05</u>	7.75 0.69gal/ft
		<u>0.470</u> <u>195</u> <u>21.8</u>	<u>9.18</u>	8.25 0.79gal/ft
		<u>0.308</u> <u>160</u> <u>19.5</u>	<u>9.61</u>	8.25 0.64gal/ft
		<u>0.306</u> <u>458</u> <u>22.5</u>	<u>9.37</u>	10.25 1.06gal/ft
				12.25 1.63gal/ft
				12.25 1.41gal/ft
Depth to Sediment: Before <u>-</u> After <u>-</u>				
Type/Capacity of pump <u>Keck</u>				
Pumping Rate <u>0.5 gpm</u>		Recharge Time <u>> 24 hrs.</u>		
Time to Develop Well: Start <u>8/7/93 1202</u> Finish <u>8/11/93 1433</u> Duration <u>5.4 hrs</u>				
COMMENTS (include description of water removed)				
<u>0 water is clear, no odor</u>				
* Assumes 30% porosity for sand pack				

8/7/93

8/9/93

Arthur D Little	Well Development Report		Well No. CECRL18
			Client USAEC
			Project CRREL
			Case No. 67063

Installation Date 8/4/93	Development Date 8/7/93 - 8/11/93	LOCATION
Depth To Screen Bottom 202.5'	Depth To Water Table ~87'	
Water Level (Relative To Top Of Well Riser)		
Before Development 72.86' 24 Hours After Development 113.71'		

WELL VOLUME (* use appropriate values in table for each code letter)

V well	Depth Screen Bottom	Depth Water	Gallons of Water (well)
<input type="text" value="0.66"/>	<input type="text" value="202.5"/>	<input type="text" value="87"/>	<input type="text" value="76.2"/>

$0.66 \times [(202.5 - 87)] = 76.2$

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus	Depth Screen Bottom	Depth Bottom of Seal	Gallons of Water (annulus)
<input type="text" value="0.64"/>	<input type="text" value="202.5"/>	<input type="text" value="187.5"/>	<input type="text" value="9.6"/>

$0.64 \times [(202.5 - 187.5)] = 9.6$

WATER TO BE REMOVED

Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons Removed
<input type="text" value="76.2"/>	<input type="text" value="9.6"/>	<input type="text" value="5"/>	<input type="text" value="429.2"/>

$[(76.2 + 9.6)] \times 5 = 429.2$

MEASUREMENTS						TABLE		
Number of Gallons Removed	pH	Turbidity			Dissolved Oxygen	Well	Annulus *	
		Conductivity	Y	Temperature		V well	dia	V annulus
134	10.17	0.292	307	25.0	8.30	2" 0.17gal/ft	6.5	0.46gal/ft
150	8.58	0.337	280	19.4	9.61		7.25	0.59gal/ft
171	9.94	0.304	170	19.2	9.45		7.75	0.69gal/ft
180	8.62	0.304	290	19.7	9.10	4" 0.66gal/ft	8.25	0.64gal/ft
193	8.86	0.316	138	18.2	9.49		10.25	1.06gal/ft
210	10.03	0.318	63	18.5	9.41		12.25	1.63gal/ft
211	10.18	0.324	48	18.2	9.48	6" 1.5gal/ft	12.25	1.41gal/ft
213	10.32	0.326	40	18.7	9.20			

8/9/93
8/10/93
8/11/93

Depth to Sediment: Before After

Type/Capacity of pump **Keck (8/9/93) Aeromotor (8/10/93-8/11/93)**

Pumping Rate **0.5 (8/9/93), 1.5 (8/10-11)** Recharge Time **> 24 hrs**

Time to Develop Well: Start **8/7/93 1202** Finish **8/11/93 1433** Duration **5.4 hrs**

COMMENTS (include description of water removed)

171 water is clear except for whitish cloudiness, no odor

* Assumes 30% porosity for sand pack

Arthur D Little	Well Development Report		Well No. <u>CECRL18</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>

Installation Date <u>8/4/93</u>	Development Date <u>8/7/93 - 8/11/93</u>	X
Depth To Screen Bottom <u>202.5'</u>	Depth To Water Table <u>~87'</u>	
Water Level (Relative To Top Of Well Riser)		
Before Development <u>12.86'</u>		24 Hours After Development <u>113.71'</u>

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times \left[\left(\text{Depth Screen Bottom} - \text{Depth Water} \right) \right] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times \left[\left(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal} \right) \right] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$\left[\left(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)} \right) \right] \times \text{Removal Multiplier} = \text{Total Gallons Removed}$$

MEASUREMENTS						TABLE		
Number of Gallons Removed	pH	Conductivity	Turbidity		Dissolved Oxygen	Well	Annulus *	
			Temperature	V		V well	dia	V annulus
<u>218</u> <small>gallons</small>	<u>9.06</u>	<u>0.283</u>	<u>632</u>	<u>26.9</u>	<u>8.69</u>	2"	6.5	0.46gal/ft
<u>223</u>	<u>9.65</u>	<u>0.244</u>	<u>655</u>	<u>27.9</u>	<u>7.96</u>	0.17gal/ft	7.25	0.59gal/ft
_____	_____	_____	_____	_____	_____	8.25	7.75	0.69gal/ft
_____	_____	_____	_____	_____	_____	8.25	8.25	0.79gal/ft
_____	_____	_____	_____	_____	_____	4"	8.25	0.64gal/ft
_____	_____	_____	_____	_____	_____	0.66gal/ft	10.25	1.06gal/ft
_____	_____	_____	_____	_____	_____	12.25	12.25	1.63gal/ft
_____	_____	_____	_____	_____	_____	6"	12.25	1.41gal/ft
_____	_____	_____	_____	_____	_____	1.5gal/ft	12.25	1.41gal/ft

Depth to Sediment: Before - After -

Type/Capacity of pump Aermotor Electric Submersible

Pumping Rate 1.5 gpm | Recharge Time > 24 hrs

Time to Develop Well: Start 8/7/93 1202 Finish 8/11/93 1433 Duration 5.4 hrs

COMMENTS (include description of water removed)

223 water is clear, no odor
Turbidity was high due to presence of bubbles in water (caused by pump)

* Assumes 30% porosity for sand pack

8/11/93

Arthur D Little	Well Development Report		Well No. CECRL19
			Client USAEC
			Project CRREL
			Case No. 67063

Installation Date 8/4/93	Development Date 8-6-93	LOCATION
Depth To Screen Bottom 110.50'	Depth To Water Table 86.87'	
Water Level (Relative To Top Of Well Riser) Before Development 86.87' 24 Hours After Development 86.44'		

WELL VOLUME (* use appropriate values in table for each code letter)

V well Depth Screen Bottom Depth Water Gallons of Water (well)

0.66 x [(**110.50'** - **86.87'**)] = **15.6**

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus Depth Screen Bottom Depth Bottom of Seal Gallons of Water (annulus)

0.64 x [(**110.50'** - **85.50'**)] = **16.0**

WATER TO BE REMOVED

Gallons of Water (well) Gallons of Water (annulus) Removal Multiplier Total Gallons Removed

[(**15.6** + **16.0**)] x **5** = **158.0**

MEASUREMENTS					TABLE		
					Well	Annulus *	
Number of Gallons Removed	pH	Turbidity		Dissolved Oxygen	V well	dia	V annulus
		Conductivity	Temperature		2"	7.75	8.25
0 gallons	10.88	0.293	7999	29.1	7.92	6.5	0.46gal/ft
55	10.75	0.295	7999	24.7	8.66	7.25	0.59gal/ft
119	10.78	0.287	7999	23.0	8.91	7.75	0.69gal/ft
173	10.72	0.245	7999	17.5	9.92	8.25	0.79gal/ft
215	10.88	0.292	7999	16.7	9.82	4"	0.64gal/ft
310	10.65	0.290	7999	23.2	8.83	10.25	1.06gal/ft
						12.25	1.63gal/ft
						6"	1.5gal/ft

8/6/93
8/7/93

Depth to Sediment: Before **-** After **-**

Type/Capacity of pump **Waterma Power Pump**

Pumping Rate **1-2 gpm** Recharge Time **< 2.7 hrs**

Time to Develop Well: Start **8/6/93 1347** Finish **8/9/93 1305** Duration **12.7 hrs**

COMMENTS (include description of water removed)

0 Start pump at 93' BGS. Water is turbid with greyish brown silt, no odor.

310 water is cleaner, but still turbid.

* Assumes 30% porosity for sand pack

Arthur D Little	Well Development Report	Well No. <u>CECL19</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Installation Date <u>8-4-93</u>	Development Date <u>8-7-93</u>	LOCATION
Depth To Screen Bottom <u>110.50'</u>	Depth To Water Table <u>86.87'</u>	
Water Level (Relative To Top Of Well Riser)		
Before Development <u>86.87'</u>	24 Hours After Development <u>86.44'</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$V_{\text{well}} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$V_{\text{annulus}} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$

WATER TO BE REMOVED

$[\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)}] \times \text{Removal Multiplier} = \text{Total Gallons Removed}$

MEASUREMENTS						TABLE		
Number of Gallons Removed	pH	Conductivity	Turbidity		Dissolved Oxygen	Well	Annulus *	
			Temperature			V well	dia	V annulus
<u>406</u> <u>0.7</u> gallons	<u>10.95</u>	<u>0.251</u>	<u>>999</u>	<u>21.9</u>	<u>9.75</u>	2"	6.5	0.46gal/ft
						0.17gal/ft	7.25	0.59gal/ft
							7.75	0.69gal/ft
							8.25	0.79gal/ft
						4"	8.25	0.64gal/ft
						0.66gal/ft	10.25	1.06gal/ft
							12.25	1.63gal/ft
						6"	12.25	1.41gal/ft
						1.5gal/ft		

Depth to Sediment: Before - After -

Type/Capacity of pump Waterma

Pumping Rate 1-2 gpm Recharge Time < 2.7 hrs

Time to Develop Well: Start 8/6/93 1347 Finish 8/9/93 1305 Duration 12.7 hrs

COMMENTS (include description of water removed)

406 - water is turbid with greyish brown silt, no odor.

* Assumes 30% porosity for sand pack

Arthur D Little	Well Development Report	Well No. <u>CECRL 20</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Installation Date <u>7-7-93</u>	Development Date <u>7-20-93</u>	LOCATION Ice Eng. Facility ↑ North ↓ 10.8' • CECRL20
Depth To Screen Bottom <u>140.5'</u>	Depth To Water Table <u>115.5'</u>	
Water Level (Relative To Top Of Well Riser)		
Before Development <u>115.5'</u>		24 Hours After Development <u>115.3'</u>

WELL VOLUME (* use appropriate values in table for each code letter)

V well Depth Screen Bottom Depth Water Gallons of Water (well)

0.66 × [(140.5 - 115.5)] = 16.5

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus Depth Screen Bottom Depth Bottom of Seal Gallons of Water (annulus)

1.63 × [(140.5 - 120)] = 33.415

WATER TO BE REMOVED

Gallons of Water (well) Gallons of Water (annulus) Removal Multiplier Total Gallons Removed

[(16.5 + 33.415)] × 5 = 250

MEASUREMENTS					TABLE		
Number of Gallons Removed	Difficulty calibrating. Turb. pH	Conductivity (mS/cm)	Temperature (°C)	Dissolved Oxygen (mg/L)	Well	Annulus *	
					V well	dia	V annulus
0.0 gallons	7999 7.40	0.352	18.6	0.03	2" 0.17gal/ft	6.5	0.46gal/ft
55	7999 7.27	0.500	15.3	0.13		7.25	0.59gal/ft
110	7999 10.00	0.540	13.6	0.04		7.75	0.69gal/ft
165	760 9.96	0.567	13.3	0.20		8.25	0.79gal/ft
210	850 5.67	0.540	13.6	0.19	4" 0.66gal/ft	10.25	1.06gal/ft
255	360 5.55	0.565	13.1	0.26		12.25	1.63gal/ft
				(aa)	6" 1.5gal/ft	12.25	1.41gal/ft

Depth to Sediment: Before N/A After N/A

Type/Capacity of pump Grundfos Pump, 0-9 gpm

Pumping Rate 7.3 gpm Recharge Time 45 min

Time to Develop Well: Start 1147 Finish 1222 Duration 35 min

COMMENTS (include description of water removed)

At 0 gallons, water was very turbid (7999), had a grayish brown color, a lot of particulates + no odor.

At 255 gallons, water was clear (turb ~ 360), had less particulates + no odor. PID readings (all) = 0.0 ppm

* Assumes 30% porosity for sand pack

Appendix I: Ground Water Sampling Logs

Arthur D Little

Arthur D Little

Monitoring Well Sampling Data Sheet

Well No. CECB101
Client USAEC
Project CBREL
Case No. 167063

Evacuation Method N/A Date 8/25/93
Sampling Method — Equipment Used (Calibrated Y/N)
Horiba (Y)
Sampling Personnel C. Stover / W. Dowling Initial Well PID (ppm)
0.0 ppm

LOCATION

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed} = \text{Actual Gallons Removed}$$

MEASUREMENTS

						Well	Annulus *	
						V well	dia	V annulus
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen	2"	6.5	0.46gal/ft
	<u>7.92</u>	<u>0.695</u>	<u>25.0°C</u>			7.25	0.59gal/ft	
						7.75	0.69gal/ft	
						8.25	0.79gal/ft	
						4"	8.25	0.64gal/ft
						10.25	1.06gal/ft	
						12.25	1.63gal/ft	
Post Sampling						6"	12.25	1.41gal/ft
						1.5gal/ft		

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECB101</u>	<u>VDA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1115</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A.C. Stover Date 8/25/93 No. of Bottles 3

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECBL01</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>N/A</u>	Date <u>9-30-93</u>	LOCATION
Sampling Method	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>C. Stover / E. Friedenson</u>	Initial Well PID (ppm) <u>0.0 ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed} = \text{Actual Gallons Removed}$$

MEASUREMENTS						Well		Annulus *	
						V well	dia	V annulus	
Well Purgig						2" 0.17gal/ft	6.5	0.46gal/ft	
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen		7.25	0.59gal/ft	
	<u>7.55</u>	<u>0.490</u>	<u>8.9°C</u>		<u>11.624</u>		7.75	0.69gal/ft	
						8.25	0.79gal/ft		
						4" 0.65gal/ft	8.25	0.64gal/ft	
							10.25	1.06gal/ft	
							12.25	1.63gal/ft	
Post Sampling						6" 1.5gal/ft	12.25	1.41gal/ft	

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Used _____ Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash, Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECBL01</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amberglass</u>	<u>1015</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A. C. Stover Date 9-30-93 No. of Bottles 3

Arthur D Little

Monitoring Well Sampling Data Sheet

Well No. CECRLD2
Client USAEC
Project CRBEL
Case No. 67063

Evacuation Method N/A Date 8/25/93
Sampling Method --- Equipment Used (Calibrated Y/N) Horiba (Y)
Sampling Personnel C. Stover / W. Dowling Initial Well PID (ppm) 0.0 ppm

LOCATION

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed} = \text{Actual Gallons Removed}$$

MEASUREMENTS

						Well	Annulus *	
						V well	dia	V annulus
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen	2"	6.5	0.46gal/ft
	<u>6.95</u>	<u>0.536</u>	<u>26.1°C</u>		<u>3.94</u>	0.17gal/ft	7.25	0.59gal/ft
							7.75	0.69gal/ft
							8.25	0.79gal/ft
						4"	8.25	0.64gal/ft
						0.66gal/ft	10.25	1.06gal/ft
							12.25	1.63gal/ft
Post Sampling						6"	12.25	1.41gal/ft
						1.5gal/ft		

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRLD2</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1045</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A. C. Stover Date 8/25/93 No. of Bottles 3

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECR1D2</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Date Sampled: <u>12-1-93</u>	Sampled By: <u>C. Stover</u>	LOCATION	
Depth to Water: <u>Not measured</u>	Total Depth:		
O ₂ <u>—</u>	LEL <u>—</u>		PID <u>0.0ppm</u>
Measuring Point: <u>—</u>			
Equipment: <u>Horiba, Pid, Production Well Pump</u>			

WELL VOLUME (* use appropriate values in table for each code letter)

$$\text{V well} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$\text{V annulus} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed} = \text{Actual Gallons Removed}$$

MEASUREMENTS						Well	Annulus*	
Well Purging						V well	dia	V annulus
Time	Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity	1.5"		
<u>1410</u>	<u>—</u>	<u>7.94</u>	<u>549</u>	<u>10.1°C</u>	<u>10</u>	0.10gal/ft	4.0	0.29gal/ft
						2"	6.5	0.46gal/ft
						0.17gal/ft	7.25	0.59gal/ft
							7.75	0.69gal/ft
							8.25	0.79gal/ft
						4"	8.25	0.64gal/ft
						0.66gal/ft	10.25	1.06gal/ft
							12.25	1.63gal/ft
						6"	12.25	1.41gal/ft
						1.5gal/ft		
Post Sampling								

SAMPLING

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECR1D2</u>	<u>YDA</u>	<u>40</u>	<u>N</u>	<u>HCL, ICE</u>	<u>Amber Glass</u>	<u>1415</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

* Assumes 30% porosity

Signature A.C. Stover Date 12-1-93 No. of Bottles 3

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECRL03</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>N/A</u>	Date <u>8/25/93</u>	LOCATION
Sampling Method <u>—</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>C. Stover / W. Dowling</u>	Initial Well PID (ppm) <u>—</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed} = \text{Actual Gallons Removed}$$

MEASUREMENTS						Well	
						V well	Annulus *
Well Purging							
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen	2"	6.5
	<u>6.80</u>	<u>0.481</u>	<u>23.3°C</u>		<u>8.64</u>	0.17gal/ft	7.25
							0.59gal/ft
							7.75
							0.69gal/ft
							8.25
							0.79gal/ft
						4"	8.25
						0.66gal/ft	10.25
							1.06gal/ft
							12.25
							1.63gal/ft
Post Sampling						6"	12.25
						1.5gal/ft	1.41gal/ft

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRL03</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1015</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature S. C. Stover Date 8/25/93 No. of Bottles 3

Arthur D Little	Monitoring Well Sampling Data Sheet		Well No. <u>CEC8103</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>

Evacuation Method <u>N/A</u>	Date <u>9-30-93</u>	LOCATION
Sampling Method	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>C. Storer / E. Friedenson</u>	Initial Well PID (ppm) <u>0.0</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed} = \text{Actual Gallons Removed}$$

MEASUREMENTS						Well		Annulus *	
						V well	dia	V annulus	
Well Purging						2" 0.17gal/ft	6.5	0.46gal/ft	
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen		7.25	0.59gal/ft	
<u> </u>	<u>3.64</u>	<u>422</u>	<u>10.3°C</u>	<u> </u>	<u>13.0M</u>		7.75	0.69gal/ft	
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>		8.25	0.79gal/ft	
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	4" 0.66gal/ft	8.25	0.64gal/ft	
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>		10.25	1.06gal/ft	
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>		12.25	1.63gal/ft	
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	6" 1.5gal/ft	12.25	1.41gal/ft	
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>		<u> </u>	<u> </u>	
Post Sampling						<u> </u>	<u> </u>		

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CEC8103</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1115</u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A.C. Storer Date 9-30-93 No. of Bottles 3

Arthur D Little	Monitoring Well Sampling Data Sheet		Well No. <u>CECRLD3</u>
			Client <u>USAEC</u>
			Project <u>CRBEL</u>
			Case No. <u>67013</u>

Date Sampled: <u>12-1-93</u>	Sampled By: <u>C. Stover</u>	
Depth to Water: <u>Not measured</u>	Total Depth:	
O ₂ —	LEL —	PID <u>0.0 ppm</u>
Measuring Point:		
Equipment: <u>Horiba, Pid, Production Well Pump</u>		

LOCATION

WELL VOLUME (* use appropriate values in table for each code letter)

V well	Depth Screen Bottom	Depth Water	Gallons of Water (well)
[]	x [([] - [])]	=	[]

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus	Depth Screen Bottom	Depth Bottom of Seal	Gallons of Water (annulus)
[]	x [([] - [])]	=	[]

WATER TO BE REMOVED

Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons to be Removed	Actual Gallons Removed
[([] + [])]	x []	=	[]	[]

MEASUREMENTS						Well	Annulus *	
Well Purging						V well	dia	V annulus
Time	Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity	1.5"	4.0	0.29gal/ft
<u>1340</u>	<u>-</u>	<u>8.29</u>	<u>.435</u>	<u>8.8°C</u>	<u>0</u>	0.10gal/ft	6.5	0.46gal/ft
						2"	7.25	0.59gal/ft
						0.17gal/ft	7.75	0.69gal/ft
							8.25	0.79gal/ft
						4"	8.25	0.64gal/ft
						0.66gal/ft	10.25	1.06gal/ft
							12.25	1.63gal/ft
						6"	12.25	1.41gal/ft
						1.5gal/ft		
Post Sampling								

SAMPLING

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRLD3</u>	<u>VDA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1342</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Assumes 30% porosity

Signature S.C. Stover Date 12-1-93 No. of Bottles 3

Arthur D Little	Monitoring Well Sampling Data Sheet		Well No. <u>CECRL04</u>
			Client <u>USAEC</u>
			Project <u>CBREL</u>
			Case No. <u>67063</u>

Evacuation Method <u>N/A</u>	Date <u>8/25/93</u>	LOCATION
Sampling Method <u>—</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>C. Stover / W. Dowling</u>	Initial Well PID (ppm) <u>0.0ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$$\text{V well} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$\text{V annulus} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed} = \text{Actual Gallons Removed}$$

MEASUREMENTS						Well		Annulus *	
						V well	dia	V annulus	
Well Purging						2" 0.17gal/ft	6.5	0.46gal/ft	
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen		7.25	0.59gal/ft	
<u>—</u>	<u>7.85</u>	<u>0.395</u>	<u>26.0°C</u>	<u>—</u>	<u>3.98</u>		7.75	0.69gal/ft	
<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>		8.25	0.79gal/ft	
<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	4" 0.66gal/ft	8.25	0.64gal/ft	
<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>		10.25	1.06gal/ft	
<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>		12.25	1.63gal/ft	
Post Sampling						6" 1.5gal/ft	12.25	1.41gal/ft	
<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>		<u>—</u>	<u>—</u>	

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRL04</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>Hel, Ice</u>	<u>Amber Glass</u>	<u>1030</u>
<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>
<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>
<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>—</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A. C. Stone Date 8/25/93 No. of Bottles 3

Arthur D Little	Monitoring Well Sampling Data Sheet		Well No. <u>CECRL04</u>
			Client <u>USAEC</u>
			Project <u>CBREL</u>
			Case No. <u>67063</u>

Date Sampled: <u>12-1-93</u>	Sampled By: <u>C. Ste -</u>	LOCATION	
Depth to Water: <u>Not measured</u>	Total Depth:		
O ₂ —	LEL —		PID <u>0.0ppm</u>
Measuring Point: —			
Equipment: <u>Horiba, Pid, Production Well Pump</u>			

WELL VOLUME (* use appropriate values in table for each code letter)

$$\text{V well} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$\text{V annulus} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed} = \text{Actual Gallons Removed}$$

MEASUREMENTS						Well		Annulus *	
						V well	dla	V annulus	
Well Purging	Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity	1.5"	4.0	0.29gal/ft	
<u>1430</u>	<u>-</u>	<u>8.06</u>	<u>488</u>	<u>8.9°C</u>	<u>1</u>	0.10gal/ft	6.5	0.46gal/ft	
						2"	7.25	0.59gal/ft	
						0.17gal/ft	7.75	0.69gal/ft	
							8.25	0.79gal/ft	
						4"	8.25	0.64gal/ft	
						0.66gal/ft	10.25	1.06gal/ft	
Post Sampling						6"	12.25	1.63gal/ft	
						1.5gal/ft		1.41gal/ft	

SAMPLING

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRL04</u>	<u>YOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1434</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

* Assumes 30% porosity

Signature L.C. Stone Date 12-1-93 No. of Bottles 3

Arthur D Little	Monitoring Well Sampling Data Sheet		Well No. <u>CECB105</u>
			Client <u>USAEC</u>
			Project <u>CBREL</u>
			Case No. <u>67063</u>

Evacuation Method <u>N/A</u>	Date <u>8/25/93</u>	LOCATION
Sampling Method <u>—</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>C. Stover / W. Dawling</u>	Initial Well PID (ppm) <u>0.0ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed}$$

Actual Gallons Removed: —

MEASUREMENTS						Well	Annulus *	
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen	V well	dia	V annulus
	<u>3.64</u>	<u>0.389</u>	<u>23.1°C</u>		<u>8.20</u>	2" 0.17gal/ft	6.5	0.46gal/ft
							7.25	0.59gal/ft
							7.75	0.69gal/ft
							8.25	0.79gal/ft
						4" 0.66gal/ft	8.25	0.64gal/ft
							10.25	1.06gal/ft
							12.25	1.63gal/ft
						6" 1.5gal/ft	12.25	1.41gal/ft

SAMPLING

Decontamination Procedures Used — Solvent Used — Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECB105</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1100</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A. C. Stover Date 8/25/93 No. of Bottles 3

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECRL05</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Date Sampled: <u>12-3-93</u>	Sampled By: <u>C. Stover</u>	LOCATION	
Depth to Water: <u>Not measured</u>	Total Depth:		
O ₂ —	LEL —		PID <u>0.0ppm</u>
Measuring Point: —			
Equipment: <u>Horiba, Pid, Production Well Pump</u>			

WELL VOLUME (* use appropriate values in table for each code letter)

$$\text{V well} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$\text{V annulus} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed} = \text{Actual Gallons Removed}$$

MEASUREMENTS						Well		Annulus*	
						V well	dia	V annulus	
Well Purging	Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity	1.5"	4.0	0.29gal/ft	
<u>1035</u>	<u>—</u>	<u>7.99</u>	<u>416</u>	<u>8.4°C</u>	<u>5</u>	0.10gal/ft	6.5	0.46gal/ft	
						2"	7.25	0.59gal/ft	
						0.17gal/ft	7.75	0.69gal/ft	
							8.25	0.79gal/ft	
							8.25	0.64gal/ft	
						4"	10.25	1.06gal/ft	
						0.66gal/ft	12.25	1.63gal/ft	
							12.25	1.41gal/ft	
						6"			
						1.5gal/ft			

SAMPLING

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRL05</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1036</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

* Assumes 30% porosity

Signature A.C. Stover Date 12-3-93 No. of Bottles 3

Arthur D Little	Monitoring Well Sampling Data Sheet		Well No. <u>CECR106</u>
			Client <u>USAEC</u>
			Project <u>CBREL</u>
			Case No. <u>67063</u>

Evacuation Method <u>N/A</u>	Date <u>8/25/93</u>	LOCATION
Sampling Method <u>-</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>C. Storer/W. Dowling/P. Tolson</u>	Initial Well PID (ppm) <u>-</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$$\text{V well} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$\text{V annulus} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed}$$

Actual Gallons Removed _____

MEASUREMENTS						Well	Annulus *	
						V well	dia	V annulus
Well Purging								
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen	2"	6.5	0.46gal/ft
_____	_____	_____	_____	_____	_____	0.17gal/ft	7.25	0.59gal/ft
_____	_____	_____	_____	_____	_____		7.75	0.69gal/ft
_____	_____	_____	_____	_____	_____		8.25	0.79gal/ft
_____	_____	_____	_____	_____	_____	4"	8.25	0.64gal/ft
_____	_____	_____	_____	_____	_____	0.66gal/ft	10.25	1.06gal/ft
_____	_____	_____	_____	_____	_____		12.25	1.63gal/ft
Post Sampling						6"	12.25	1.41gal/ft
_____	_____	_____	_____	_____	_____	1.5gal/ft		

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Used _____ Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash, Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECR106</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1520</u>
<u>CECR106</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1520</u>
<u>CECR106</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>1520</u>
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A.C. Storer Date 8/25/93 No. of Bottles 7

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECR106</u>
		Client <u>USAEC</u>
		Project <u>CBREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>N/A</u>	Date <u>10-1-93</u>	LOCATION
Sampling Method	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>C. Stover / E. Friedenson</u>	Initial Well PID (ppm) <u>3.4 ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$$\text{V well} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$\text{V annulus} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed} = \text{Actual Gallons Removed}$$

MEASUREMENTS						Well		Annulus *	
						V well	dia	V annulus	
Well Purging						2" 0.17gal/ft	6.5	0.46gal/ft	
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen		7.25	0.59gal/ft	
	<u>9.32</u>	<u>0.082</u>	<u>6.5°C</u>		<u>12.46</u>		7.75	0.69gal/ft	
						8.25	0.79gal/ft		
						4" 0.66gal/ft	8.25	0.64gal/ft	
							10.25	1.06gal/ft	
							12.25	1.63gal/ft	
Post Sampling						6" 1.5gal/ft	12.25	1.41gal/ft	

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Used _____ Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
Tri: → CECR106	VOA	40	N	HCl, Ice	Amber Glass	0900
Blank → CECR106	VOA	40	N	HCl, Ice	Amber Glass	1100
CECR106	BTEX	40	N	HCl, Ice	Amber Glass	1100
CECR106	TPH	1 liter	N	Ice	"	1100
* CECR106	VOA	40	N	HCl, Ice	"	1100
* CECR106	BTEX	40	N	HCl, Ice	"	1100
* CECR106	TPH	1 liter	N	Ice	"	1100

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A. C. Stover Date 10-1-93 No. of Bottles 14

* Denotes field blank

Arthur D Little	Monitoring Well Sampling Data Sheet		Well No. <u>CECR106</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>
Date Sampled: <u>12/2/93</u>	Sampled By: <u>C. Stover/M. Bryant</u>		LOCATION
Depth to Water: <u>~56 ft.</u>	Total Depth: <u>~200 ft.</u>		
O ₂ <u>-</u>	LEL <u>-</u>	PID <u>5.4ppm</u> <u>well</u>	
Measuring Point: <u>~Center of well</u>			
Equipment: <u>Horiba not used*, Pid, bailer</u>			

WELL VOLUME (* use appropriate values in table for each code letter)

V well Depth Screen Bottom Depth Water Gallons of Water (well)

[() x [(-)] =]

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus Depth Screen Bottom Depth Bottom of Seal Gallons of Water (annulus)

[() x [(-)] =]

WATER TO BE REMOVED

Gallons of Water (well) Gallons of Water (annulus) Removal Multiplier Total Gallons to be Removed Actual Gallons Removed

[(+)] x =]

MEASUREMENTS						Well	Annulus *			
						V well	dia	V annulus		
Well Purging	Time	Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity	1.5"	4.0	0.29gal/ft	
							0.10gal/ft	6.5	0.46gal/ft	
							2"	7.25	0.59gal/ft	
								0.17gal/ft	7.75	0.69gal/ft
								8.25	0.79gal/ft	
							4"	8.25	0.64gal/ft	
0.66gal/ft	10.25	1.06gal/ft								
6"	12.25	1.63gal/ft								
	1.5gal/ft	12.25	1.41gal/ft							
Post Sampling										

SAMPLING

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECR106</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, ice</u>	<u>Amber glass</u>	<u>1130</u>
	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, ice</u>	<u>"</u>	
	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>ice</u>	<u>"</u>	

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

* Assumes 30% porosity

Signature S.C. Stover Date 12/2/93 No. of Bottles 8

* Potential for permanent damage to Horiba if used w/ a matrix

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECR107</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>Grundfos</u>	Date <u>8/24/93</u>	LOCATION
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>M. Hayes, C. Storer</u>	Initial Well PID (ppm) <u>9.7 ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

$$0.669 \text{ gal/ft} \times [(179.0 \text{ ft} - 141.9 \text{ ft})] = 24.49 \text{ gal}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

$$1.069 \text{ gal/ft} \times [(179.0 \text{ ft} - 164.0 \text{ ft})] = 15.9 \text{ gal}$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed}$$

$$[(15.9 \text{ gal} + 24.49 \text{ gal})] \times 5 = 201.95 \text{ gal}$$

Actual Gallons Removed: 203

MEASUREMENTS						Well	Annulus *		
Well Purging	Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen	V well	dia	V annulus
	0	8.54	.531	27.4		8.43	2"	6.5	0.46gal/ft
	20	7.90	.306	28.2		7.82	0.17gal/ft	7.25	0.59gal/ft
	60	7.59	.296	29.8		7.83		7.75	0.69gal/ft
	117	7.69	.260	33.8		7.36		8.25	0.79gal/ft
	161	7.26	.238	32.8		7.36	0.66gal/ft	8.25	0.64gal/ft
	183	7.87	.291	30.8		8.22		10.25	1.06gal/ft
	202	7.32	.300	27.0		9.01		12.25	1.63gal/ft
Post Sampling	203	7.95	.286	27.1		8.55	6"	12.25	1.41gal/ft

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECR107</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1505</u>
<u>CECR107</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>"</u>
<u>CECR107</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>"</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A.C. Storer Date 8/24/93 No. of Bottles 7

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECR107</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>Grundfos</u>	Date <u>8/24/93</u>	LOCATION
Sampling Method <u>Boiler</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>M. Hayes, C. Stover</u>	Initial Well PID (ppm) <u>9.7 ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

V well	Depth Screen Bottom	Depth Water	Gallons of Water (well)
<u>0.66 gal/ft.</u>	<u>179.0 ft.</u>	<u>141.9 ft.</u>	<u>24.49 gal</u>

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus	Depth Screen Bottom	Depth Bottom of Seal	Gallons of Water (annulus)
<u>1.06 gal/ft.</u>	<u>179.0 ft.</u>	<u>164.0 ft.</u>	<u>15.9 gal</u>

WATER TO BE REMOVED

Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons to be Removed	Actual Gallons Removed
<u>24.49 gal</u>	<u>15.9 gal</u>	<u>5</u>	<u>201.95</u>	<u>202</u>

MEASUREMENTS						Well		Annulus *	
						V well	dia	V annulus	
Well Purging						2"	0.17 gal/ft	6.5	0.46 gal/ft
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen			7.25	0.59 gal/ft
<u>0</u>	<u>8.34</u>	<u>.331</u>	<u>27.4</u>		<u>7.45</u>	7.75	0.69 gal/ft		
<u>20</u>	<u>7.90</u>	<u>.306</u>	<u>27.2</u>		<u>7.82</u>	8.25	0.79 gal/ft		
<u>60</u>	<u>7.59</u>	<u>.296</u>	<u>27.5</u>		<u>7.87</u>				
<u>117</u>	<u>7.69</u>	<u>.260</u>	<u>27.8</u>		<u>7.86</u>				
<u>161</u>	<u>7.26</u>	<u>.276</u>	<u>22.8</u>		<u>7.56</u>	4"	8.25	0.64 gal/ft	
<u>183</u>	<u>7.97</u>	<u>.27</u>	<u>20.9</u>		<u>7.32</u>		10.25	1.06 gal/ft	
<u>202</u>	<u>7.72</u>	<u>.20</u>	<u>27.0</u>		<u>7.01</u>	12.25	1.63 gal/ft		
Post Sampling						6"	1.5 gal/ft	8.25	0.64 gal/ft
<u>203</u>	<u>7.85</u>	<u>.286</u>	<u>27.1</u>		<u>6.55</u>			12.25	1.41 gal/ft

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature _____ Date _____ No. of Bottles _____

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. CECRLO7
		Client USAEC
		Project CRREL
		Case No. 67063

Evacuation Method Groundfos	Date 9-28-93	LOCATION
Sampling Method Boiler	Equipment Used (Calibrated Y/N) Horiba (Y)	
Sampling Personnel C. Stover / B. Nelson	Initial Well PID (ppm) 41.8	

WELL VOLUME (* use appropriate values in table for each code letter)

- Gallons of Water (well)

$$V_{\text{well}} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

$0.66 \text{ gal/ft} \times [(179.0 \text{ ft} - 141.98 \text{ ft})] = 24.43 \text{ gal}$

ANNULAR VOLUME (ASSUME 30% POROSITY)

Gallons of Water (annulus)

$$V_{\text{annulus}} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

$1.06 \text{ gal/ft} \times [(179.0 \text{ ft} - 164.0 \text{ ft})] = 15.90 \text{ gal}$

WATER TO BE REMOVED

Actual Gallons Removed

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)}) \times \text{Removal Multiplier}] = \text{Total Gallons to be Removed}$$

$[(24.43 + 15.9 \text{ gal}) \times 5] = 201.65$

Actual Gallons Removed: **205 gal**

MEASUREMENTS						Well	
						V well	Annulus *
Well Purging							
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen		
0	6.48	443	14.1°C		10.33	2"	0.46 gal/ft
20	7.55	360	12.6°C		10.59	0.17 gal/ft	7.25 0.59 gal/ft
40	7.34	363	12.4°C		10.81		7.75 0.69 gal/ft
60	7.33	389	12.4°C		10.86		8.25 0.79 gal/ft
80	7.33	363	12.6°C		11.08	4"	8.25 0.64 gal/ft
100	7.33	361	12.9°C		10.22	0.66 gal/ft	10.25 1.06 gal/ft
120	7.33	384	13.6°C		10.49		12.25 1.63 gal/ft
140	7.33						
160	7.33						
180	7.33						
200	7.33						
Post Sampling	7.64	362	12.4°C		10.58	6"	12.25 1.41 gal/ft
						1.5 gal/ft	

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
CECRLO7	VOA	40	N	HCl, Ice	Amber Glass	1400
CECRLO7	BTEX	40	N	HCl, Ice	"	"
CECRLO7	TPH	1 liter	N	Ice	"	"

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature S. C. Stover Date 9-28-93 No. of Bottles 7

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECR109</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>Grundfos</u>	Date <u>9/28/93</u>	LOCATION
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>C. Stover / L. Anderson</u>	Initial Well PID (ppm) <u>50-222*</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$$\text{V well} \quad \text{Depth Screen Bottom} \quad \text{Depth Water} \quad \text{Gallons of Water (well)}$$

$$0.66 \text{ gal/ft} \times [(146.5 \text{ ft}) - (133.72)] = 9.43 \text{ gal}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$\text{V annulus} \quad \text{Depth Screen Bottom} \quad \text{Depth Bottom of Seal} \quad \text{Gallons of Water (annulus)}$$

$$1.06 \text{ gal/ft} \times [(146.5 \text{ ft}) - (131.5 \text{ ft})] = 15.9 \text{ gal}$$

WATER TO BE REMOVED

$$\text{Gallons of Water (well)} \quad \text{Gallons of Water (annulus)} \quad \text{Removal Multiplier} \quad \text{Total Gallons to be Removed} \quad \text{Actual Gallons Removed}$$

$$[(9.43 \text{ gal}) + (15.9 \text{ gal})] \times 5 = 121.65 \quad 140 \text{ gal}$$

MEASUREMENTS						Well	Annulus *	
						V well	dia	V annulus
Well Purging						2" 0.17 gal/ft	6.5	0.46 gal/ft
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen		7.25	0.59 gal/ft
<u>0</u>	<u>7.98</u>	<u>1626</u>	<u>12.94</u>				7.75	0.69 gal/ft
							8.25	0.79 gal/ft
						4" 0.66 gal/ft	8.25	0.64 gal/ft
							10.25	1.06 gal/ft
							12.25	1.63 gal/ft
Post Sampling						6" 1.5 gal/ft	12.25	1.41 gal/ft
	<u>7.65</u>	<u>705</u>	<u>11.2°C</u>		<u>12:35</u>			

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash, Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECR109</u>	<u>VOA</u>	<u>40</u>		<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1710</u>
<u>CECR109</u>	<u>BTEX</u>	<u>40</u>		<u>HCl, Ice</u>	<u>"</u>	<u>"</u>
<u>CECR109</u>	<u>TPH</u>	<u>1 liter</u>		<u>Ice</u>	<u>"</u>	<u>"</u>
<u>CECR109</u>	<u>VOA</u>	<u>40</u>		<u>HCl, Ice</u>	<u>"</u>	<u>"</u>
<u>CECR109</u>	<u>BTEX</u>	<u>40</u>		<u>HCl, Ice</u>	<u>"</u>	<u>"</u>
<u>CECR109</u>	<u>TPH</u>	<u>1 liter</u>		<u>Ice</u>	<u>"</u>	<u>"</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A. C. Stover Date 9-28-93 No. of Bottles 14

*Difficulty w/ PID -- fluctuating readings in controlled

Arthur D Little	Monitoring Well Sampling Data Sheet		Well No. CECRL 07
			Client USAEC
			Project CRREL
			Case No. 67063
Date Sampled: 12-01-93	Sampled By: H. DONAGHEY & M. BRYANT		LOCATION FRONT LAWN BY ENTRANCE. ⊕ CECRL07
Depth to Water: 142.70 ft.	Total Depth: 179.0 ft.		
O ₂ NA	LEL NA	PID 0.0 ppm	
Measuring Point: INNER DATUM ON PVC AT BLACK MARK			
Equipment: GRUNDFOS PUMP # _____ HORIBA			Main Laboratory

WELL VOLUME (* use appropriate values in table for each code letter)

V well	Depth Screen Bottom	Depth Water	Gallons of Water (well)
0.66 gal/ft	(179.0 ft)	(142.7 ft)	23.96 gal

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus	Depth Screen Bottom	Depth Bottom of Sep!	Gallons of Water (annulus)
1.06 gal/ft	(179.0 ft)	(164.0 ft)	15.9 gal

WATER TO BE REMOVED

Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons to be Removed	Actual Gallons Removed
(24.0 gal)	(16.0 gal)	5	200 GAL	_____

MEASUREMENTS						Well	Annulus *	
Well Purging						V well	d/a	V annulus
Time	Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity	1.5"	4.0	0.29gal/ft
1100	0	7.51	0.382	7.9	29	0.10gal/ft	6.5	0.46gal/ft
1115	20	7.53	0.374	8.8	29	2"	7.25	0.59gal/ft
1125	40	7.82	0.386	8.8	34	0.17gal/ft	7.75	0.69gal/ft
1135	60	7.90	0.381	8.8	105	4"	8.25	0.79gal/ft
1155	80	8.04	0.385	9.3	6	6"	8.25	0.64gal/ft
1210	100	8.09	0.386	8.9	0	0.66gal/ft	10.25	1.06gal/ft
1220	120	7.72	0.383	8.8	1	6"	12.25	1.63gal/ft
1240	140	8.10	0.379	9.1	89	1.5gal/ft	12.25	1.41gal/ft
Post Sampling _____						200 (see page 2)		

SAMPLING						
Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
*CECRLO7	VOA	40	N	HCl, Ice	Amber glass	1000
CECRLO7	VOA	40	N	HCl, Ice	Amber glass	1445
CECRLO7	BTEX	40	N	HCl, Ice	Amber glass	1445
CECRLO7	TPH	1 liter	N	Ice	Amber glass	1445
*CECRLO7	VOA, BTEX	40	N	HCl, Ice	Amber glass	1345
*CECRLO7	TPH	1 liter	N	Ice	Amber glass	1345

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

* Assumes 30% porosity

Signature A.C. Storey Date 12-1-93 No. of Bottles 35

Duplicates
= Trip Blank

Arthur D Little	Monitoring Well Sampling Data Sheet			Well No. <u>CECRL07</u>				
				Client <u>USAEC</u>				
				Project <u>CRREL</u>				
				Case No. <u>67063</u>				
Date Sampled: <u>12-01-93</u>	Sampled By: <u>H. DONAGHEY & M. BRYANT</u>			LOCATION <u>FRONT LAWN BY ENTRANCE.</u>				
Depth to Water: <u>142.70</u>	Total Depth: <u>179.0 ft</u>							
O ₂ <u>NA</u>	LEL <u>NA</u>	PID <u>0.0 ppm</u>						
Measuring Point: <u>INNER DATUM ON PVC AT BLACK MARK</u>								
Equipment: <u>GRUNDFOS</u> <u>HORIBA</u>								
WELL VOLUME (* use appropriate values in table for each code letter)								
V well	Depth Screen Bottom	Depth Water	Gallons of Water (well)					
<u>0.66 gal/ft</u>	<u>179.0 ft</u>	<u>142.7 ft</u>	<u>23.9</u>					
ANNULAR VOLUME (ASSUME 30% POROSITY)								
V annulus	Depth Screen Bottom	Depth Bottom of Seal	Gallons of Water (annulus)					
<u>1.06 gal/ft</u>	<u>179.0 ft</u>	<u>164.0 ft</u>	<u>15.9 gal</u>					
WATER TO BE REMOVED								
Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons to be Removed	Actual Gallons Removed				
<u>24.0 gal</u>	<u>16.0 gal</u>	<u>5</u>	<u>200 gal</u>	<u>200 gal</u>				
MEASUREMENTS								
						Well	Annulus*	
						V well	dia	V annulus
Well Purging								
Time	Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity	1.5"		
<u>12:55</u>	<u>160</u>	<u>8.14</u>	<u>0.382</u>	<u>8.4</u>	<u>85</u>	0.10gal/ft	4.0	0.29gal/ft
<u>13:10</u>	<u>180</u>	<u>8.19</u>	<u>0.380</u>	<u>8.9</u>	<u>0</u>		6.5	0.46gal/ft
<u>13:30</u>	<u>200</u>	<u>8.22</u>	<u>0.381</u>	<u>8.7</u>	<u>0</u>	2"	7.25	0.59gal/ft
						0.17gal/ft	7.75	0.69gal/ft
							8.25	0.79gal/ft
							8.25	0.64gal/ft
						4"	10.25	1.06gal/ft
						0.66gal/ft	12.25	1.63gal/ft
							6"	12.25
						1.5gal/ft		1.41gal/ft
Post Sampling								
<u>14:48</u>		<u>8.56</u>	<u>0.373</u>	<u>7.8</u>	<u>241</u>			
SAMPLING								
Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time		
<u>CECRL07</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1550</u>		
<u>"</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1550</u>		
<u>"</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>1550</u>		
<u>"</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1630</u>		
<u>"</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1630</u>		
<u>"</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>1630</u>		
Notes (include data on floaters/sinkers with measuring device, well condition, etc.)								
* Assumes 30% porosity								

Signature A.C. Stone

Date 12-1-93

No. of Bottles _____

** = Equipment Blank
 ** = Field Blank

Arthur D Little	Monitoring Well Sampling Data Sheet		Well No. <u>CECRL 08</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>

Date Sampled: <u>11-30-93</u>	Sampled By: <u>H.D. & M.J.B</u>	LOCATION	
Depth to Water: <u>133.76 ft</u>	Total Depth: <u>146.5 ft.</u>		
O ₂ <u>NA</u>	LEL <u>NA</u>		PID <u>0.0 ppm</u>
Measuring Point: <u>INNER DATUM OF PVC AT BLACK MARK</u>			
Equipment: <u>GRUNDEOS PUMP # 9244; HORIBA</u>			

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times [(\text{Depth Screen Bottom}) - (\text{Depth Water})] = \text{Gallons of Water (well)}$$

$$0.66 \text{ gal/ft} \times [(146.5 \text{ ft}) - (133.76 \text{ ft})] = 8.4 \text{ gal}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times [(\text{Depth Screen Bottom}) - (\text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

$$1.06 \text{ gal/ft} \times [(146.5 \text{ ft}) - (131.5 \text{ ft})] = 15.90 \text{ gal}$$

WATER TO BE REMOVED

$$[\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)}] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed}$$

$$[(8.4 \text{ gal}) + (15.90 \text{ gal})] \times 5 = 121.5 \text{ gal}$$

Actual Gallons Removed: 160 gal

MEASUREMENTS							Well	Annulus*	
Well Purging							V well	dia	V annulus
Time	Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity		1.5"		
1145	0	8.16	0.632	7.7	258	0.10gal/ft	4.0	0.29gal/ft	
1155	20	8.15	0.735	8.8	14	2"	7.25	0.59gal/ft	
1200	40	8.01	0.728	8.9	4		7.75	0.69gal/ft	
1205	60	8.02	0.719	8.7	3		8.25	0.79gal/ft	
1315	80	8.15	0.694	8.3	3	4"	8.25	0.64gal/ft	
1325	100	8.12	0.672	8.4	2		10.25	1.06gal/ft	
1330	120	8.11	0.654	8.3	2		12.25	1.63gal/ft	
1340	140	8.01	0.647	8.4	2	6"	12.25	1.41gal/ft	
Post Sampling	160	8.17	0.644	8.4	2		1.5gal/ft		

SAMPLING						
Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
CECRL08	BTEX	40	N	HCl, ice	AMBER GLASS	1415
CECRL08	VOC	40	N	HCl, ice	"	"
CECRL08	TPH	1 liter	N	ice	"	"
CECRL08	VOC	40	N	HCl, ice	"	1615
CECRL08	BTEX	40	N	HCl, ice	"	"
CECRL08	TPH	1 liter	N	Ice	"	"

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

* Assumes 30% porosity

Signature Hugh Donaghy Date 11-30-93 No. of Bottles H.D. 8 + 19

* Equipment Blank

Page 1 of 2

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECRLO8</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Date Sampled:	Sampled By:	LOCATION	
Depth to Water:	Total Depth:		
O ₂	LEL		PID
Measuring Point:			
Equipment:			

WELL VOLUME (* use appropriate values in table for each code letter)

$$\text{V well} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$\text{V annulus} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed} = \text{Actual Gallons Removed}$$

MEASUREMENTS						Well		Annulus *	
						V well	dia	V annulus	
Well Purging	Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity	1.5"	4.0	0.29gal/ft	
_____	_____	_____	_____	_____	_____	0.10gal/ft	6.5	0.46gal/ft	
_____	_____	_____	_____	_____	_____	2"	7.25	0.59gal/ft	
_____	_____	_____	_____	_____	_____	0.17gal/ft	7.75	0.69gal/ft	
_____	_____	_____	_____	_____	_____		8.25	0.79gal/ft	
_____	_____	_____	_____	_____	_____	4"	8.25	0.64gal/ft	
_____	_____	_____	_____	_____	_____	0.66gal/ft	10.25	1.06gal/ft	
_____	_____	_____	_____	_____	_____		12.25	1.63gal/ft	
Post Sampling						6"	12.25	1.41gal/ft	
_____	_____	_____	_____	_____	_____	1.5gal/ft			

SAMPLING

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
** CECRLO8	VOC	40	N	HCl, ice	Amber glass	1200
*** CECRLO8	VOC	40	N	HCl, ice	"	1415
*** CECRLO8	BTEX	40	N	HCl, ice	"	1415
*** CECRLO8	TPH	1 liter	N	ice	"	1415
_____	_____	_____	_____	_____	_____	_____

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

* Assumes 30% porosity

Signature _____ Date _____ No. of Bottles _____

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECR109</u>
		Client <u>USAEC</u>
		Project <u>CBREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>Grundfos</u>	Date <u>8/25 - 8/26/93</u>	LOCATION
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>M. Hayes, E. Friedenson</u>	Initial Well PID (ppm) <u>0.0 ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$$V \text{ well} \quad \text{Depth Screen Bottom} \quad \text{Depth Water} \quad \text{Gallons of Water (well)}$$

$$0.66 \text{ gal/ft} \times [(136.5 \text{ ft}) - (129.5 \text{ ft})] = 4.62 \text{ gal}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V \text{ annulus} \quad \text{Depth Screen Bottom} \quad \text{Depth Bottom of Seal} \quad \text{Gallons of Water (annulus)}$$

$$1.06 \text{ gal/ft} \times [(136.5 \text{ ft}) - (121.5 \text{ ft})] = 15.90 \text{ gal}$$

WATER TO BE REMOVED

$$\text{Gallons of Water (well)} \quad \text{Gallons of Water (annulus)} \quad \text{Removal Multiplier} \quad \text{Total Gallons to be Removed} \quad \text{Actual Gallons Removed}$$

$$[(4.62) + (15.9)] \times 5 = 102.6 \text{ gal} \quad 105$$

MEASUREMENTS						Well	
						V well	Annulus *
Well Purging							
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen	2"	0.46gal/ft
<u>0</u>	<u>8.39</u>	<u>0.709</u>	<u>21.3</u>		<u>2.21</u>	0.17gal/ft	7.25
<u>25</u>	<u>8.96</u>	<u>0.803</u>	<u>20.7</u>		<u>2.37</u>	0.17gal/ft	7.75
						0.17gal/ft	8.25
						0.66gal/ft	8.25
						0.66gal/ft	10.25
						0.66gal/ft	12.25
						1.5gal/ft	12.25
Post Sampling						1.5gal/ft	1.41gal/ft
<u>105</u>	<u>7.79</u>	<u>0.723</u>	<u>25.4</u>		<u>16.90</u>		

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Used _____ Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash, Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECR109</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1040</u>
<u>CECR109</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1040</u>
<u>CECR109</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>1040</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A. C. Stover Date 8/26/93 No. of Bottles 7

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECR109</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>Grundfos</u>	Date <u>9-29-93</u>	LOCATION
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>C. Stover / E. Friedenson</u>	Initial Well PID (ppm) <u>39 ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

V well Depth Screen Bottom Depth Water Gallons of Water (well)

$0.66 \text{ gal/ft} \times [(136.5 - 129.05)] = 4.92$

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus Depth Screen Bottom Depth Bottom of Seal Gallons of Water (annulus)

$1.06 \text{ gal/ft} \times [(136.5 - 121.5)] = 15.90$

WATER TO BE REMOVED

Gallons of Water (well) Gallons of Water (annulus) Removal Multiplier Total Gallons to be Removed Actual Gallons Removed

$[(4.92 + 15.90)] \times 3 = 104.1$ 142

MEASUREMENTS						Well		Annulus *	
						V well	d/a	V annulus	
Well Purging						2"	0.17gal/ft	6.5	0.46gal/ft
Volume Removed	pH	Conduct.	Temp	Free CL ⁻ Y/N	Dissolved Oxygen			7.25	0.59gal/ft
<u>0</u>	<u>7.65</u>	<u>288</u>	<u>13.0</u>		<u>10.54</u>			7.75	0.69gal/ft
<u>44</u>	<u>7.37</u>	<u>271</u>	<u>13.1</u>		<u>10.36</u>			8.25	0.79gal/ft
<u>120</u>	<u>7.10</u>	<u>224</u>	<u>14.1</u>		<u>10.03</u>				
<u>132</u>	<u>7.57</u>	<u>214</u>	<u>14.5</u>		<u>10.85</u>				
Post Sampling						4"	0.66gal/ft	8.25	0.64gal/ft
								10.25	1.06gal/ft
						12.25		1.63gal/ft	
						6"	1.5gal/ft	12.25	1.41gal/ft
	<u>7.65</u>	<u>212</u>	<u>16.8</u>		<u>10.00</u>				

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Used _____ Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECR109</u>	<u>VDA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1510</u>
<u>CECR109</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>"</u>
<u>CECR109</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>"</u>
<u>CECR109</u>	<u>VDA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>"</u>
<u>CECR109</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>"</u>
<u>CECR109</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>"</u>

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Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A. C. Stover Date 9-29-93 No. of Bottles _____

Arthur D Little	Monitoring Well Sampling Data Sheet		Well No. <u>CECRL09</u>
			Client <u>USAEC</u>
			Project <u>CECEL</u>
			Case No. <u>67063</u>

Date Sampled: <u>11/30/93</u>	Sampled By: <u>W. PERKINS, D. TURTON</u>	LOCATION	
Depth to Water: <u>128.96</u>	Total Depth: <u>136.5 ft.</u>		
O ₂ <u>—</u>	LEL <u>—</u>		PID <u>1.4ppm</u>
Measuring Point: <u>Notches on PVC rim</u>			
Equipment: <u>Horiba, Pid, Grundfos pump</u>			

WELL VOLUME (* use appropriate values in table for each code letter)

V well	Depth Screen Bottom	Depth Water	Gallons of Water (well)
$.66 \text{ gal/ft.}$	$(136.5 \text{ FT} - 128.96)$		$= 4.98 \text{ gal.}$

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus	Depth Screen Bottom	Depth Bottom of Seal	Gallons of Water (annulus)
1.06 gal/ft.	$(136.5 - 121.5)$		$= 15.90 \text{ gal.}$

WATER TO BE REMOVED

Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons to be Removed	Actual Gallons Removed
$(4.98 + 15.90)$		5	$= 104.4 \text{ gal.}$	<u>110 gal</u>

MEASUREMENTS

Time	Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity	Well	Annulus*	
						V well	dia	V annulus
1313	0	9.98	1.06	9.0°C	100	1.5"		
1327	20	10.02	0.94	10.5°C	56	0.10gal/ft	4.0	0.29gal/ft
1336	40	10	0.94	10°C	74	2"	7.25	0.59gal/ft
1343	55	9.72	0.93	10.2°C	43		0.17gal/ft	7.75
1357	75	9.77	0.92	10.4°C	38	4"	8.25	0.79gal/ft
1410	95	9.53	0.947	8.5°C	160		0.66gal/ft	10.25
1418	110	9.66	0.93	10.1°C	23	6"	12.25	1.63gal/ft
Post Sampling	110	10.0	0.97	10.1°C	243		1.5gal/ft	12.25

SAMPLING

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRL 09</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>AMBER GLASS</u>	<u>1425</u>
<u>CECRL 09</u>	<u>VOC</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>AMBER GLASS</u>	<u>1425</u>
<u>CECRL 09</u>	<u>TPH</u>	<u>1 LITER</u>	<u>N</u>	<u>ICE</u>	<u>AMBER GLASS</u>	<u>1445</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

* Assumes 30% porosity

Signature S.C. Stone Date 12-1-93 No. of Bottles 8

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECRL10</u>
		Client <u>USAEC</u>
		Project <u>CBREL</u>
		Case No. <u>67D63</u>

Evacuation Method <u>Grundfus</u>	Date <u>8/23/93</u>	LOCATION
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba</u>	
Sampling Personnel <u>W. Dowling, M. Hayes, C. Stover</u>	Initial Well PID (ppm) <u>0.0 ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

V well Depth Screen Bottom Depth Water Gallons of Water (well)

$[0.66 \text{ gal/ft}] \times [127.0 \text{ ft} - 115.44 \text{ ft}] = 7.63 \text{ gal}$

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus Depth Screen Bottom Depth Bottom of Seal Gallons of Water (annulus)

$[1.06 \text{ gal/ft}] \times [127.0 \text{ ft} - 111.0 \text{ ft}] = 16.96 \text{ gal}$

WATER TO BE REMOVED

Gallons of Water (well) Gallons of Water (annulus) Removal Multiplier Total Gallons to be Removed Actual Gallons Removed

$[7.63 \text{ gal} + 16.96 \text{ gal}] \times 5 = 122.95$ 123 gal

MEASUREMENTS						Well	Annulus *	
						V well	dia	V annulus
Well Purging								
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen			
<u>0</u>	<u>6.13</u>	<u>0.498</u>	<u>25.7</u>		<u>17.75</u>	2"	6.5	0.46gal/ft
<u>27.5</u>	<u>6.21</u>	<u>0.415</u>	<u>30.1</u>		<u>16.30</u>	0.17gal/ft	7.25	0.59gal/ft
<u>55</u>	<u>6.29</u>	<u>0.388</u>	<u>31.8</u>		<u>15.68</u>		7.75	0.69gal/ft
<u>60</u>	<u>6.30</u>	<u>0.382</u>	<u>31.2</u>		<u>17.19</u>		8.25	0.79gal/ft
<u>95</u>	<u>6.36</u>	<u>0.356</u>	<u>33.2</u>		<u>15.11</u>	0.66gal/ft	8.25	0.64gal/ft
<u>103</u>	<u>6.31</u>	<u>0.389</u>	<u>32.0</u>		<u>16.07</u>		10.25	1.06gal/ft
							12.25	1.63gal/ft
Post Sampling								
<u>123</u>	<u>6.33</u>	<u>0.373</u>	<u>31.9</u>		<u>16.00</u>	6"	12.25	1.41gal/ft
						1.5gal/ft		

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRL10</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1735</u>
<u>CECRL10</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1735</u>
<u>CECRL10</u>	<u>TPH</u>	<u>1 Liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>1735</u>
<u>CECRL10</u>	<u>VOA</u>	<u>1 liter</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1735</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A.C. Stover Date 8/23/93 No. of Bottles 7
 Trip Blank (9 w/ trip blanks)

Arthur D Little	Monitoring Well Sampling Data Sheet		Well No. <u>CECRL10</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>

Evacuation Method <u>Groundfos</u>	Date <u>9-28-93</u>	LOCATION
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>M. Bryant / C. Stover</u>	Initial Well PID (ppm) <u>4.2 ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

$$0.612 \text{ gal/ft} \times [(127.0 \text{ ft} - 115.25 \text{ ft})] = 7.76 \text{ gal}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

$$1.06 \text{ gal/ft} \times [(127.0 \text{ ft} - 111.0 \text{ ft})] = 16.96 \text{ gal}$$

WATER TO BE REMOVED

Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons to be Removed	Actual Gallons Removed
[7.76]	[16.96]	[5]	= [123.6]	[125]

MEASUREMENTS						Well		Annulus *	
						V well	dia	V annulus	
Well Purging									
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen				
0	7.10	0.585	12.3		11.91	2"	6.5	0.46gal/ft	
15	7.32	0.543	11.5		11.58	0.17gal/ft	7.25	0.59gal/ft	
30	7.47	0.563	10.9		11.37		7.75	0.69gal/ft	
45	7.34	0.560	11.3		11.47		8.25	0.79gal/ft	
112	7.39	0.563	11.2		10.42	0.66gal/ft	8.25	0.64gal/ft	
125	7.36	0.551	11.5		11.48		10.25	1.06gal/ft	
							12.25	1.63gal/ft	
Post Sampling									
125	7.61	0.550	10.7		12.12	6"	12.25	1.41gal/ft	
						1.5gal/ft			

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRL10</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1210</u>
<u>CECRL10</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>"</u>
<u>CECRL10</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>"</u>
<u>CECRL10</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl</u>	<u>"</u>	<u>0700</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

.....

Signature A.C. Stover Date 9-28-93 No. of Bottles 10

Trip Blank

Arthur D Little	Monitoring Well Sampling Data Sheet		Well No. <u>CEPRL 10</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>

Date Sampled: <u>11/30/93</u>	Sampled By: <u>W. PERKINS, D. TURTON</u>	LOCATION	
Depth to Water: <u>115.22'</u>	Total Depth: <u>127.0 ft.</u>		
O ₂ <u>—</u>	LEL <u>—</u>		PID <u>3.5 ppm</u>
Measuring Point: <u>Notches on PVC rim</u>			
Equipment: <u>Grundfos, Horiba, Pid</u>			

WELL VOLUME (* use appropriate values in table for each code letter)

V well	Depth Screen Bottom	Depth Water	Gallons of Water (well)
<u>0.66 gal/ft</u>	<u>127.0 ft.</u>	<u>115.22 ft.</u>	<u>7.77 gal</u>

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus	Depth Screen Bottom	Depth Bottom of Seal	Gallons of Water (annulus)
<u>1.06 gal/ft</u>	<u>127.00 ft</u>	<u>111.0 ft</u>	<u>16.96 gal</u>

WATER TO BE REMOVED

Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons to be Removed	Actual Gallons Removed
<u>7.77 gal.</u>	<u>16.96 gal</u>	<u>5</u>	<u>123.65 gal</u>	<u>132</u>

MEASUREMENTS

Time	Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity	Well		Annulus*	
						V well	dia	V annulus	
8:30	0	9.48	0.157	4.0°C	4	1.5"	4.0	0.29gal/ft	
8:39	28	9.37	0.613	8.4°C	29	0.10gal/ft	6.5	0.46gal/ft	
8:52	40	9.2	0.597	8.4°C	8	0.17gal/ft	7.25	0.59gal/ft	
9:02	55	9.33	0.591	8.4°C	3		7.75	0.69gal/ft	
9:20	75	9.35	0.593	8.3°C	6	0.66gal/ft	8.25	0.79gal/ft	
9:38	95	9.04	0.587	8.6°C	1		8.25	0.64gal/ft	
9:48	110	9.67	0.587	7.6°C	3	0.66gal/ft	10.25	1.06gal/ft	
10:02	130	9.72	0.576	7.6°C	0		12.25	1.63gal/ft	
Post Sampling	<u>132</u>	<u>9.52</u>	<u>0.570</u>	<u>8.6°C</u>	<u>350</u>	6"	12.25	1.41gal/ft	
						1.5gal/ft			

SAMPLING

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CEPRL 10</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>AMBER GLASS</u>	<u>1025</u>
<u>CEPRL 10</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>AMBER GLASS</u>	<u>1025</u>
<u>CEPRL 10</u>	<u>TPH</u>	<u>1 LITER</u>	<u>N</u>	<u>Ice</u>	<u>AMBER GLASS</u>	<u>1025</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

* Assumes 30% porosity

Signature A. C. Stone Date 11-30-93 No. of Bottles 8

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECRLII</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>Grundfos</u>	Date <u>8/26 - 8/27/93</u>	LOCATION
Sampling Method <u>3ft. Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel	Initial Well PID (ppm) <u>3.4 ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

$$0.66 \text{ gal/ft} \times [(116.5 \text{ ft} - 99.6 \text{ ft})] = 11.15 \text{ gal}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

$$1.06 \text{ gal/ft} \times [(116.5 \text{ ft} - 101.5 \text{ ft})] = 15.90 \text{ gal}$$

WATER TO BE REMOVED

$$[\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)}] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed}$$

$$[(11.15 \text{ gal} + 15.90 \text{ gal})] \times 5 = 135.25 \text{ gal}$$

Actual Gallons Removed: 137 gal

MEASUREMENTS						Well	
						V well	Annulus *
Well Purging						dia	V annulus
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen		
<u>0</u>	<u>7.65</u>	<u>0.254</u>	<u>27.9°C</u>		<u>1.85</u>	2"	0.46gal/ft
<u>21</u>	<u>7.48</u>	<u>0.255</u>	<u>28.4</u>		<u>1.84</u>	7.25	0.59gal/ft
<u>30</u>	<u>6.61</u>	<u>0.293</u>	<u>20.1</u>		<u>2.92</u>	7.75	0.69gal/ft
						8.25	0.79gal/ft
						4"	0.64gal/ft
						10.25	1.06gal/ft
						12.25	1.63gal/ft
						6"	1.41gal/ft
						1.5gal/ft	

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Used _____ Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash, Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRLII</u>	<u>VDA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>0945</u>
<u>CECRLII</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>0945</u>
<u>CECRLII</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>0945</u>
* <u>CECRLII</u>	<u>VDA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>0900</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A. C. Stover Date 8/27/93 No. of Bottles 7
 (9 w/ trip blanks)

* Trio Blank

Arthur D Little	Monitoring Well Sampling Data Sheet		Well No. <u>CECRL11</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>

Evacuation Method <u>Grundfos</u>	Date <u>9-29 to 9-30-93</u>	LOCATION
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>W. Dowling / L. Anderson</u>	Initial Well PID (ppm)	

WELL VOLUME (* use appropriate values in table for each code letter)

V well Depth Screen Bottom Depth Water Gallons of Water (well)

0.16 x [(116.5 - 99.52)] = 11.21

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus Depth Screen Bottom Depth Bottom of Seal Gallons of Water (annulus)

1.06 x [(116.5 - 101.5)] = 15.90

WATER TO BE REMOVED

Gallons of Water (well) Gallons of Water (annulus) Removal Multiplier Total Gallons to be Removed Actual Gallons Removed

[(11.21 + 15.90)] x 5 = 135.6

MEASUREMENTS						Well	
						V well	dta
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen		
<u>0</u>	<u>7.96</u>	<u>.303</u>	<u>12.1</u>		<u>11.87</u>	2"	6.5 0.46gal/ft
<u>42</u>	<u>7.30</u>	<u>.269</u>	<u>9.6</u>		<u>10.98</u>	0.17gal/ft	7.25 0.59gal/ft
<u>73</u>	<u>8.36</u>	<u>.244</u>	<u>15.0</u>		<u>11.03</u>		7.75 0.69gal/ft
<u>90</u>	<u>8.24</u>	<u>.233</u>	<u>13.8</u>		<u>10.72</u>		8.25 0.79gal/ft
						0.66gal/ft	4" 8.25 0.64gal/ft
							10.25 1.06gal/ft
							12.25 1.63gal/ft
Post Sampling	<u>8.28</u>	<u>.233</u>	<u>14.3°C</u>		<u>11.36</u>	6" 12.25 1.41gal/ft	
						1.5gal/ft	

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
* CECRL11	VDA	40	N	HCl, Ice	Amber Glass	1447
CECRL11	VDA	40	N	HCl, Ice	Amber Glass	1447
CECRL11	BTEX	40	N	HCl, Ice	"	"
CECRL11	TPH	1 liter	N	Ice	"	"
* CECRL11	VDA	40	N	HCl, Ice	"	1300
* CECRL11	BTEX	40	N	HCl, Ice	"	1447
* CECRL11	TPH	1 liter	N	Ice	"	1447

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A.C. Stover Date 9-30-93 No. of Bottles 17

Arthur D Little Monitoring Well Sampling Data Sheet

Well No. CECRL11
 Client USAEC
 Project CRREL
 Case No. 67063

Date Sampled: 12/3/93 Sampled By: D. Turton/W. Perkins
 Depth to Water: 98.98 feet Total Depth: 117.0 ft.
 O₂ - LEL - PID 0.0 ppm
 Measuring Point: Notches on PVC rim
 Equipment: Horiba, Pid, Grundfos pump

WELL VOLUME (* use appropriate values in table for each code letter)

V well Depth Screen Bottom Depth Water Gallons of Water (well)
 $0.66 \text{ gal/ft} \times [(116.5 \text{ ft.}) - (98.98 \text{ ft.})] = 11.56$

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus Depth Screen Bottom Depth Bottom of Seal Gallons of Water (annulus)
 $1.06 \text{ gal/ft.} \times [(116.5 \text{ ft.}) - (101.5 \text{ ft.})] = 15.90$

WATER TO BE REMOVED

Gallons of Water (well) Gallons of Water (annulus) Removal Multiplier Total Gallons to be Removed Actual Gallons Removed
 $[(11.56 \text{ gal}) + (15.9 \text{ gal})] \times 5 = 137.3 \text{ gal}$ 70 gal

MEASUREMENTS						Well	Annulus *	
Well Purging						V well	dia	V annulus
Time	Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity	1.5"		
1024	0	8.32	0.241	7.3°C	58	0.10 gal/ft	4.0	0.29 gal/ft
1632	30	8.31	0.260	7.5	132	2"	7.25	0.46 gal/ft
1710	80	8.17	0.261	7.7	73	0.17 gal/ft	7.75	0.69 gal/ft
0740	31	7.30	0.245	11.3	33		8.25	0.79 gal/ft
						4"	8.25	0.64 gal/ft
							10.25	1.06 gal/ft
						0.66 gal/ft	12.25	1.63 gal/ft
							6"	12.25
Post Sampling						1.5 gal/ft		
1045	70	8.25	0.272	9.5	124			

SAMPLING

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
CECRL11	VOA	40	N	HCl, ice	Amber glass	0850
CECRL11	VOA	40	N	HCl, ice	"	1030
CECRL11	BTEX	40	N	HCl, ice	"	1030
CECRL11	TPH	1 liter	N	ice	"	1030
CECRL11	VOA	40	N	HCl, ice	"	1100
CECRL11	BTEX	40	N	HCl, ice	"	1100
CECRL11	TPH	1 liter	N	ice	"	1100

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

* Assumes 30% porosity

Signature S.C. Stover Date 12-3-93 No. of Bottles 19

= Trip Blank
 = Equipment Blank

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECBL12</u>
		Client <u>USAEC</u>
		Project <u>CBREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>Ground Gas</u>	Date <u>8/25/93</u>	LOCATION
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>P. Tolsma, M. Hayes</u>	Initial Well PID (ppm) <u>0.0 ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{well} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

$$0.66 \text{ gal/ft} \times [(98.0 \text{ ft.} - 86.64)] = 7.498 \text{ gal}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{annulus} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

$$1.06 \text{ gal/ft.} \times [(98.0 \text{ ft.} - 73.0 \text{ ft.})] = 26.5 \text{ gal}$$

WATER TO BE REMOVED

Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons to be Removed	Actual Gallons Removed
(<u>7.498 gal</u>)	(<u>26.5 gal</u>)	(<u>5</u>)	(<u>169.99</u>)	(<u>170</u>)

MEASUREMENTS						Well		Annulus *	
Well Purging						V well	dta	V annulus	
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen				
<u>0</u>	<u>7.47</u>	<u>434</u>	<u>24.0</u>	<u></u>	<u>8.79</u>	2"	6.5	0.46gal/ft	
<u>61.3</u>	<u>7.85</u>	<u>369</u>	<u>26.6</u>	<u></u>	<u>7.87</u>	0.17gal/ft	7.25	0.59gal/ft	
<u>189.0</u>	<u>7.75</u>	<u>378</u>	<u>25.9</u>	<u></u>	<u>2.65</u>		7.75	0.69gal/ft	
<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>		8.25	0.79gal/ft	
<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	4"	8.25	0.64gal/ft	
<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	0.66gal/ft	10.25	1.06gal/ft	
<u></u>	<u></u>	<u></u>	<u></u>	<u></u>	<u></u>		12.25	1.63gal/ft	
Post Sampling	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen	6"	12.25	1.41gal/ft	
<u>170</u>	<u>8.01</u>	<u>342</u>	<u>30.0</u>	<u></u>	<u>2.32</u>	1.5gal/ft			

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECBL12</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1345</u>
<u>CECBL12</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1345</u>
<u>CECBL12</u>	<u>TPH</u>	<u>1 Liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>1345</u>
<u>CECBL12</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1600</u>
<u>CECBL12</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1600</u>
<u>CECBL12</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>1600</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A. C. Stover Date 8/25/93 No. of Bottles 7
 * Rinse Blank (14 of 18)

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECBL12</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>Grunds</u>	Date <u>9/28</u>	LOCATION
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>C. Steyer/L. Anderson</u>	Initial Well PID (ppm) <u>97.5 (38.6 BKgr.)*</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \text{ (Gallons of Water (well))} = \left[\left(\frac{\pi}{4} \times \text{Depth Screen Bottom}^2 - \frac{\pi}{4} \times \text{Depth Water}^2 \right) \times \text{V well} \right]$$

0.46 gal/ft x [(98.0 ft. - 87.6 ft.)] = 6.86

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \text{ (Gallons of Water (annulus))} = \left[\left(\frac{\pi}{4} \times \text{Depth Screen Bottom}^2 - \frac{\pi}{4} \times \text{Depth Bottom of Seal}^2 \right) \times \text{V annulus} \right]$$

1.06 gal/ft x [(98.0 ft. - 73.0 ft.)] = 26.5

WATER TO BE REMOVED

Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons to be Removed	Actual Gallons Removed
[(<u>6.86</u> + <u>26.5</u>)]		<u>5</u>	= <u>166.8</u>	<u>180 gal</u>

MEASUREMENTS						Well	Annulus *	
						V well	dia	V annulus
Well Purging						2" 0.17gal/ft	6.5	0.46gal/ft
Volume Removed	pH	Conduct	Temp, °C	Free CL ⁻ Y/N	Dissolved Oxygen		7.25	0.59gal/ft
<u>0</u>	<u>7.87</u>	<u>442</u>	<u>13.1</u>		<u>11.34</u>		7.75	0.69gal/ft
<u>95</u>	<u>7.67</u>	<u>400</u>	<u>11.3</u>		<u>12.26</u>		8.25	0.79gal/ft
<u>169</u>	<u>7.30</u>	<u>407</u>	<u>11.7</u>		<u>12.44</u>	4" 0.66gal/ft	8.25	0.64gal/ft
							10.25	1.06gal/ft
							12.25	1.63gal/ft
Post Sampling						6" 1.5gal/ft	12.25	1.41gal/ft
	<u>7.77</u>	<u>389</u>	<u>10.7</u>		<u>12.95</u>			

SAMPLING

Decontamination Procedures Used _____ Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash, Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECBL12</u>	<u>VDA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1530</u>
<u>CECBL12</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>"</u>
<u>CECBL12</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>"</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature S. C. Steyer Date 9-28-93 No. of Bottles 7

Arthur D Little	Monitoring Well Sampling Data Sheet		Well No. <u>CECR112</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>

Date Sampled: <u>12-01-93</u>	Sampled By: <u>H. DONAGHEY & M. DEWITT</u>	LOCATION PROPERTY LINE NEAR RIVER	
Depth to Water: <u>87.19 ft</u>	Total Depth: <u>98.0 ft</u>		
O ₂ <u>—</u>	LEL <u>—</u>		PID <u>0.0 ppm</u>
Measuring Point: <u>INNER DATUM OF PVC AT BLACK MARK</u>			

Equipment: GRUNDIGS PUMP # 5215 HORIBA Pid

WELL VOLUME (* use appropriate values in table for each code letter)

V well	Depth Screen Bottom	Depth Water	Gallons of Water (well)
<u>0.66 gal/ft</u>	<u>98.0 ft</u>	<u>87.2 ft</u>	<u>7.13 gal</u>

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus	Depth Screen Bottom	Depth Bottom of Seal	Gallons of Water (annulus)
<u>1.06 gal/ft</u>	<u>98.0 ft</u>	<u>73.0 ft</u>	<u>26.5 gal</u>

WATER TO BE REMOVED

Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons to be Removed	Actual Gallons Removed
<u>7.13 gal</u>	<u>26.5 gal</u>	<u>5</u>	<u>168.15</u>	<u>170 gal</u>

MEASUREMENTS

Time	Well Purging Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity	Well	
						V well	Annulus*
<u>1445</u>	<u>0</u>	<u>7.81</u>	<u>0.454</u>	<u>6.1</u>	<u>5</u>	1.5"	4.0
<u>1455</u>	<u>30</u>	<u>7.8</u>	<u>0.471</u>	<u>6.1</u>	<u>9</u>	2"	7.25
<u>1505</u>	<u>40</u>	<u>7.96</u>	<u>0.407</u>	<u>6.6</u>	<u>13</u>	0.17 gal/ft	7.75
<u>1515</u>	<u>60</u>	<u>7.81</u>	<u>0.482</u>	<u>6.3</u>	<u>12</u>		8.25
<u>1530</u>	<u>80</u>	<u>7.53</u>	<u>0.404</u>	<u>6.6</u>	<u>12.6</u>		8.25
<u>1550</u>	<u>100</u>	<u>7.92</u>	<u>0.401</u>	<u>6.1</u>	<u>15.7</u>	4"	10.25
<u>1605</u>	<u>120</u>	<u>7.71</u>	<u>0.407</u>	<u>6.0</u>	<u>12.3</u>	0.66 gal/ft	12.25
<u>1615</u>	<u>170</u>	<u>7.71</u>	<u>0.466</u>	<u>6.4</u>	<u>2</u>		12.25
Post Sampling <u>1710</u>	<u>170</u>	<u>7.51</u>	<u>0.405</u>	<u>6.7</u>	<u>15.4</u>	6"	1.5 gal/ft

SAMPLING

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECR112</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, ICE</u>	<u>AMBER GLASS</u>	<u>1645</u>
<u>CECR112</u>	<u>VOC</u>	<u>40</u>	<u>N</u>	<u>HCl, ICE</u>	<u>"</u>	<u>"</u>
<u>CECR112</u>	<u>TPH</u>	<u>11.0</u>	<u>N</u>	<u>ICE</u>	<u>"</u>	<u>"</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

* Assumes 30% porosity

Signature Hugh Donaghey Date 12-01-93 No. of Bottles 8

Arthur D Little	Monitoring Well Sampling Data Sheet		Well No. <u>CECRL13</u>						
			Client <u>USAEC</u>						
			Project <u>CRREL</u>						
			Case No. <u>67063</u>						
Evacuation Method <u>Grundfos</u>	Date <u>8/24/93</u>	LOCATION							
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>								
Sampling Personnel <u>M. Hayes, C. Stover</u>	Initial Well PID (ppm) <u>0.0 ppm</u>								
WELL VOLUME (* use appropriate values in table for each code letter)									
V well <u>0.463 gal/ft</u>	Depth Screen Bottom <u>(203.0 ft)</u>	Depth Water <u>(141.20 ft)</u>	Gallons of Water (well) <u>30.8 gal</u>						
$\left[\left(\frac{0.463 \text{ gal}}{\text{ft}} \right) \times \left[(203.0 \text{ ft}) - (141.20 \text{ ft}) \right] \right] = 30.8 \text{ gal}$									
ANNULAR VOLUME (ASSUME 30% POROSITY)									
V annulus <u>0.174 gal/ft</u>	Depth Screen Bottom <u>(203.0 ft)</u>	Depth Bottom of Seal <u>(188.0 ft)</u>	Gallons of Water (annulus) <u>2.62 gal</u>						
$\left[\left(\frac{0.174 \text{ gal}}{\text{ft}} \right) \times \left[(203.0 \text{ ft}) - (188.0 \text{ ft}) \right] \right] = 2.62 \text{ gal}$									
WATER TO BE REMOVED									
Gallons of Water (well) <u>(40.8 gal)</u>	Gallons of Water (annulus) <u>(2.62 gal)</u>	Removal Multiplier <u>5</u>	Total Gallons to be Removed <u>217.1 gal</u>						
$\left[(40.8 \text{ gal}) + (2.62 \text{ gal}) \right] \times 5 = 217.1 \text{ gal}$			Actual Gallons Removed <u>218 gal</u>						
MEASUREMENTS									
Well Purging						Well	Annulus *		
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen	V well	dia	V annulus	
<u>0</u>	<u>6.75</u>	<u>0.271</u>	<u>22.5</u>	<u>---</u>	<u>2.80</u>	2"	6.5	0.46 gal/ft	
<u>16</u>	<u>7.40</u>	<u>0.254</u>	<u>24.8</u>	<u>---</u>	<u>2.60</u>	0.17 gal/ft	7.25	0.59 gal/ft	
<u>34</u>	<u>7.60</u>	<u>0.272</u>	<u>28.0</u>	<u>---</u>	<u>2.24</u>		7.75	0.69 gal/ft	
<u>53</u>	<u>7.48</u>	<u>0.275</u>	<u>27.0</u>	<u>---</u>	<u>2.62</u>		8.25	0.79 gal/ft	
<u>169</u>	<u>7.05</u>	<u>0.264</u>	<u>27.9</u>	<u>---</u>	<u>2.66</u>	4"	8.25	0.64 gal/ft	
						0.66 gal/ft	10.25	1.06 gal/ft	
							12.25	1.63 gal/ft	
Post Sampling						6"	12.25	1.41 gal/ft	
<u>218</u>	<u>7.13</u>	<u>0.309</u>	<u>28.6</u>	<u>---</u>	<u>7.97</u>	1.5 gal/ft			
SAMPLING									
Decontamination Procedures Used			<input type="checkbox"/> Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse			<input type="checkbox"/> Detergent Wash, Water Rinse			<input checked="" type="checkbox"/> Other
Solvent Used _____									
Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time			
<u>CECRL13</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1610</u>			
<u>CECRL13</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1610</u>			
<u>CECRL13</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice, -</u>	<u>"</u>	<u>1610</u>			
_____	_____	_____	_____	_____	_____	_____			
Notes (include data on floaters/sinkers with measuring device, well condition, etc.)									

Signature A.C. Stover Date 8/24/93 No. of Bottles 7

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECRL13</u>
		Client <u>USAEC</u>
		Project <u>CBREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>Grout-fos</u>	Date <u>9/28-9/29</u>	LOCATION
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba</u>	
Sampling Personnel <u>C. Stover / M. Bryant</u>	Initial Well PID (ppm) <u>2.0 ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

V well Depth Screen Bottom Depth Water Gallons of Water (well)

0.66 x [(203.0 - 141.25)] = 40.76

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus Depth Screen Bottom Depth Bottom of Seal Gallons of Water (annulus)

0.1746 x [(203.0 - 188.0)] = 2.62

WATER TO BE REMOVED

Gallons of Water (well) Gallons of Water (annulus) Removal Multiplier Total Gallons to be Removed Actual Gallons Removed

[(40.76 + 2.62)] x 5 = 216.9 223

MEASUREMENTS						Well					
						V well	dia	Annulus *			
Well Purging											
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen						
<u>0</u>	<u>7.81</u>	<u>242</u>	<u>14.1</u>		<u>10.93</u>	2"	6.5	0.46ga/ft			
<u>42</u>	<u>7.04</u>	<u>242</u>	<u>13.6</u>		<u>10.43</u>	0.17ga/ft	7.25	0.59ga/ft			
<u>91</u>	<u>3.18</u>	<u>182</u>	<u>18.1</u>		<u>10.68</u>		7.75	0.69ga/ft			
<u>113</u>	<u>9.29</u>	<u>303</u>	<u>14.4</u>		<u>10.81</u>		8.25	0.79ga/ft			
<u>137</u>	<u>9.22</u>	<u>324</u>	<u>12.5</u>		<u>10.35</u>	4"	8.25	0.64ga/ft			
<u>149</u>	<u>8.46</u>	<u>323</u>	<u>9.9</u>		<u>11.21</u>	0.66ga/ft	10.25	1.06ga/ft			
							12.25	1.63ga/ft			
Post Sampling	<u>8.98</u>	<u>339</u>	<u>11.0</u>		<u>11.22</u>	6"	12.25	1.41ga/ft			
						1.5ga/ft					

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRL13</u>	<u>VDA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1000</u>
<u>CECRL13</u>	<u>VDA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>0915</u>
<u>CECRL13</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>0915</u>
<u>CECRL13</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>0915</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A.C. Stover Date 9-29-93 No. of Bottles 10

Arthur D Little	Monitoring Well Sampling Data Sheet		Well No. <u>CECR13</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>

Date Sampled: <u>12/2/93</u>	Sampled By: <u>W. Perkins/D. Turton</u>	LOCATION	
Depth to Water: <u>141.72 ft.</u>	Total Depth: <u>203 ft.</u>		
O ₂ <u>—</u>	LEL <u>—</u>		PID <u>0.0 ppm</u>
Measuring Point: <u>Noches on PVC rim</u>			
Equipment: <u>Horiba, Pid, Grundfos pump</u>			

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} = 0.66 \text{ gal/ft.} \times [(203.0 \text{ ft.} - 141.72 \text{ ft.})] = 40.44$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} = 7.48 \text{ gal/ft.} \times 0.0778 \text{ ft.}^2 \times [(203.0 \text{ ft.} - 188.0 \text{ ft.})] = 8.73 \times 0.30 = 2.62 \text{ gal}$$

WATER TO BE REMOVED

$$[(40.44 + 2.62)] \times 5 = 215.80 \quad \text{Actual Gallons Removed} = 218$$

MEASUREMENTS						Well	Annulus*	
Well Purging						V well	dia	V annulus
Time	Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity	1.5"		
<u>1400</u>	<u>0</u>	<u>8.20</u>	<u>0.019</u>	<u>3.5°C</u>	<u>2</u>	0.10 gal/ft	4.0	0.29 gal/ft
<u>1430</u>	<u>40</u>	<u>8.39</u>	<u>0.308</u>	<u>3.1°C</u>	<u>16</u>	2"	6.5	0.46 gal/ft
<u>1140</u>	<u>88</u>	<u>8.51</u>	<u>0.331</u>	<u>3.3</u>	<u>9</u>	0.17 gal/ft	7.25	0.59 gal/ft
<u>1240</u>	<u>127</u>	<u>8.17</u>	<u>0.350</u>	<u>3.2</u>	<u>2</u>		7.75	0.69 gal/ft
<u>1359</u>	<u>183</u>	<u>8.32</u>	<u>0.346</u>	<u>3.2</u>	<u>2</u>	8.25	0.79 gal/ft	
<u>1417</u>	<u>183</u>	<u>8.30</u>	<u>0.342</u>	<u>3.2</u>	<u>1</u>	8.25	0.64 gal/ft	
						4"	10.25	1.06 gal/ft
						0.66 gal/ft	12.25	1.63 gal/ft
Post Sampling						6"	12.25	1.41 gal/ft
<u>1620</u>	<u>218</u>	<u>9.09</u>	<u>0.346</u>	<u>5.6</u>	<u>79</u>	1.5 gal/ft		

SAMPLING						
Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECR13</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, ice</u>	<u>Amber glass</u>	<u>1530</u>
<u>CECR13</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, ice</u>	<u>"</u>	<u>"</u>
<u>CECR13</u>	<u>TPH</u>	<u>1 Liter</u>	<u>N</u>	<u>ice</u>	<u>"</u>	<u>"</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

* Assumes 30% porosity

Signature A.C. Stover Date 12-2-93 No. of Bottles 8

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECRL14</u>
		Client <u>USAEC</u>
		Project <u>CAREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>Grundfos</u>	Date <u>8/25/93</u>	LOCATION
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>E. Friedenson, M. Hayes</u>	Initial Well PID (ppm) <u>0.0 ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$$V \text{ well} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

$$0.66 \text{ gal/ft} \times [(257.0 \text{ ft} - 180.0 \text{ ft})] = 83.79 \text{ gal}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V \text{ annulus} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

$$0.1746 \text{ gal/ft} \times [(257.0 \text{ ft} - 242.0 \text{ ft})] = 2.62 \text{ gal}$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed}$$

$$[(83.79 + 2.62)] \times 5 = 432$$

Actual Gallons Removed: 149 gal

MEASUREMENTS

Well Purging	Volume Removed	pH	Conduct	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen	Well	Annulus *	
							V well	dta	V annulus
8/25 8/26	0	8.26	0.513	30.4		3.07	2" 0.17gal/ft	6.5	0.46gal/ft
	31	8.66	0.839	20.6		2.90		7.25	0.59gal/ft
								7.75	0.69gal/ft
								8.25	0.79gal/ft
Post Sampling							4" 0.66gal/ft	8.25	0.64gal/ft
								10.25	1.06gal/ft
								12.25	1.63gal/ft
							6" 1.5gal/ft	12.25	1.41gal/ft

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRL14</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1550</u>
<u>CECRL14</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1550</u>
<u>CECRL14</u>	<u>TPH</u>	<u>1 Liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>1550</u>
<u>CECRL14</u>	<u>TPH (Rinseate Blank)</u>	<u>40</u>	<u>N</u>	<u>Ice</u>	<u>Amber Glass</u>	<u>1700</u>
<u>CECRL14</u>	<u>VOA (Rinseate Blank)</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1700</u>
<u>CECRL14</u>	<u>BTEX (Rinseate Blank)</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1700</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A.C. Stover Date 8/26/93 No. of Bottles 14

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECRL14</u>
		Client <u>USAF EC</u>
		Project <u>CBREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>Grundfos</u>	Date <u>9-29 to 9-30</u>	LOCATION
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>C. Stover / E. Friedenson</u>	Initial Well PID (ppm) <u>1.5 ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

$$0.66 \times [(257.0 - 129.39)] = 94.09$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

$$.746 \times [(257.0 - 242.0)] = 2.62$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed}$$

$$[(94.09 + 2.62)] \times 5 = 435.6$$

Actual Gallons Removed: 181

MEASUREMENTS						Well	Annulus *	
Well Purging						V well	dta	V annulus
Volume Removed	pH	Conduct.	Temp. °C	Free CL ⁻ Y/N	Dissolved Oxygen			
0	9.13	.612	11.2		12.32	2" 0.17gal/ft	6.5	0.46gal/ft
46	9.20	.616	9.1		11.95		7.25	0.59gal/ft
130	9.40	.753	7.2		13.36		7.75	0.69gal/ft
131	9.23	.642	13.3		10.46		8.25	0.79gal/ft
146	7.12	.590	15.3		10.51	4" 0.66gal/ft	8.25	0.64gal/ft
171	7.61	.422	13.9		8.70		10.25	1.06gal/ft
							12.25	1.63gal/ft
Post Sampling						6" 1.5gal/ft	12.25	1.41gal/ft

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Used _____ Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRL14</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1600</u>
<u>CECRL14</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>"</u>
<u>CECRL14</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>"</u>
<u>CECRL14</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1600</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature S. C. Stover Date 9-30-93 No. of Bottles 10

Arthur D Little	Monitoring Well Sampling Data Sheet			Well No. <u>CECRL14</u>																															
				Client <u>USAEC</u>																															
				Project <u>CRREL</u>																															
				Case No. <u>67063</u>																															
Date Sampled: <u>12/02/93</u>		Sampled By: <u>W. Perkins / D. Turton</u>		LOCATION																															
Depth to Water: <u>129.25 ft.</u>		Total Depth: <u>257.0 ft.</u>																																	
O ₂ <u>—</u>	LEL <u>—</u>	PID <u>5.1 ppm at well</u> <u>0.0 ppm BS*</u>																																	
Measuring Point: <u>Notches on PVC rim</u>																																			
Equipment: <u>Horiba, Pid, Grundfos pump</u>																																			
WELL VOLUME (* use appropriate values in table for each code letter)																																			
V well	Depth Screen Bottom	Depth Water	Gallons of Water (well)																																
0.66 gal/ft	(257.0)	(129.25)	$= 84.32$																																
ANNULAR VOLUME (ASSUME 30% POROSITY)																																			
V annulus	Depth Screen Bottom	Depth Bottom of Seal	Gallons of Water (annulus)																																
0.1746 gal/ft	(257.0)	(242.0)	$= 2.62$																																
WATER TO BE REMOVED																																			
Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons to be Removed	Actual Gallons Removed																															
(84.32)	(2.62)	(5)	$= 434.7$	(257.0)																															
MEASUREMENTS																																			
Well Purging																																			
Time	Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity																														
1512	0	10.08	0.653	8.6°C	145																														
1524	20	10.02	0.639	8.6	6																														
1532	40	10.00	0.625	9.9	10																														
1543	60	10.72	0.613	10.0	13																														
1554	80	10.15	0.593	10.1	16																														
1631	90	9.29	0.539	6.1	21																														
1649	110	9.48	0.617	7.6	59																														
1655	150	9.47	0.640	8.6	77																														
Post Sampling																																			
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2"></th> <th>Well</th> <th colspan="2">Annulus*</th> </tr> <tr> <th colspan="2"></th> <th>V well</th> <th>dia</th> <th>V annulus</th> </tr> </thead> <tbody> <tr> <td colspan="2">1.5"</td> <td>0.10gal/ft</td> <td>4.0</td> <td>0.29gal/ft</td> </tr> <tr> <td colspan="2">2"</td> <td>0.17gal/ft</td> <td>7.25</td> <td>0.59gal/ft</td> </tr> <tr> <td colspan="2">4"</td> <td>0.66gal/ft</td> <td>10.25</td> <td>1.06gal/ft</td> </tr> <tr> <td colspan="2">6"</td> <td>1.5gal/ft</td> <td>12.25</td> <td>1.63gal/ft</td> </tr> </tbody> </table>								Well	Annulus*				V well	dia	V annulus	1.5"		0.10gal/ft	4.0	0.29gal/ft	2"		0.17gal/ft	7.25	0.59gal/ft	4"		0.66gal/ft	10.25	1.06gal/ft	6"		1.5gal/ft	12.25	1.63gal/ft
		Well	Annulus*																																
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SAMPLING																																			
Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time																													
CECRL14	VOA	40	N	HCl, ice	Amber glass	0945																													
CECRL14	VOA, BTEX	40	N	HCl, ice	"	1715																													
CECRL14	TPH	1 Liter	N	ice	"	1715																													
CECRL14	VOA, BTEX	40	N	HCl, ice	"	1715																													
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Notes (include data on floaters/sinkers with measuring device, well condition, etc.)																																			
* Assumes 30% porosity																																			

Signature L. C. Stover Date 12-2-93 No. of Bottles 27

* BS = breathing space (*) = Total R.L. - V

Arthur D Little

Monitoring Well Sampling Data Sheet

Well No. CECRL14
 Client USAEC
 Project CRREL
 Case No. 67063

Date Sampled: 12/02/93 Sampled By: W. Perkins/D. Turton
 Depth to Water: 129.25 Total Depth:
 O₂ — LEL — PID 5.1 ppm at well
0.0 ppm 85'
 Measuring Point: Notches on PVC rim
 Equipment: Horita, Pid, Grundfos pump

LOCATION

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

$$0.66 \text{ gal/ft} \times [(257.0 - 129.25)] = 84.32$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

$$0.1746 \text{ gal/ft} \times [(257.0 - 242.0)] = 2.62$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed} = \text{Actual Gallons Removed}$$

$$[(84.32 + 2.62)] \times 5 = 434.7 = 257$$

MEASUREMENTS

Time	Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity	Well	
						V well	Annulus*
<u>1528</u>	<u>167</u>	<u>8.47</u>	<u>0.658</u>	<u>4.3°C</u>	<u>302</u>	1.5"	
<u>1605</u>	<u>232</u>	<u>8.52</u>	<u>0.622</u>	<u>4.8</u>	<u>17</u>	0.10gal/ft	4.0
							6.5
						2"	7.25
						0.17gal/ft	7.75
							8.25
							8.25
						4"	10.25
						0.66gal/ft	12.25
							12.25
						6"	12.25
						1.5gal/ft	1.41gal/ft
Post Sampling	<u>257</u>	<u>8.81</u>	<u>0.687</u>	<u>8.6</u>	<u>999</u>		

SAMPLING

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

* Assumes 30% porosity

Signature A.C. Stover Date 12/2/93 No. of Bottles 27

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECRL15</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>Grundfos</u>	Date <u>8/23/93 - 8/26/93</u>	LOCATION
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>B. Tolson, C. Stover</u>	Initial Well PID (ppm) <u>0.0 ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

$$0.66 \frac{\text{gal}}{\text{ft}} \times [(190.3 \text{ ft} - 137.6 \text{ ft})] = 34.73$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

$$0.1746 \frac{\text{gal}}{\text{ft}} \times [(190.3 \text{ ft} - 174.8 \text{ ft})] = 2.71 \text{ gal}$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed} = \text{Actual Gallons Removed}$$

$$[(34.73 + 2.71)] \times 5 = 187.2 = 34 \text{ gal}$$

MEASUREMENTS						Well		
						V well	Annulus *	
Volume Removed	pH	Conduct	Temp. °C	Free CL ⁻ Y/N	Dissolved Oxygen	2"	6.5	0.46 gal/ft
<u>0</u>	<u>6.30</u>	<u>0.555</u>	<u>28.1</u>		<u>17.29</u>	0.17 gal/ft	7.25	0.59 gal/ft
<u>18</u>	<u>11.71</u>	<u>1.06</u>	<u>30.0</u>		<u>3.20</u>		7.75	0.69 gal/ft
<u>22</u>	<u>11.68</u>	<u>1.03</u>	<u>29.1</u>		<u>2.17</u>		8.25	0.79 gal/ft
<u>27</u>	<u>11.74</u>	<u>0.910</u>	<u>19.5</u>		<u>2.91</u>	4"	8.25	0.64 gal/ft
						0.66 gal/ft	10.25	1.06 gal/ft
							12.25	1.63 gal/ft
Post Sampling						6"	12.25	1.41 gal/ft
<u>34</u>	<u>11.57</u>	<u>0.780</u>	<u>28.5</u>		<u>1.81</u>	1.5 gal/ft		

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRL15</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1445</u>
<u>CECRL15</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1445</u>
<u>CECRL15</u>	<u>TPH</u>	<u>1 Liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>1445</u>
<u>CECRL15</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>0830</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature S. C. Stover Date 8/26/93 No. of Bottles 9

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECRL15</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>Grundfos</u>	Date <u>9/28/93 - 9/30/93</u>	LOCATION
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>C. Stover / E. Friedenson</u>	Initial Well PID (ppm) <u>1.9 ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

$$0.66 \times [(190.3 - 133.11)] = 37.74$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

$$0.1746 \times [(190.3 - 174.9)] = 2.71$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed}$$

$$[(37.74 + 2.71)] \times 5 = 202.3$$

Actual Gallons Removed: _____

MEASUREMENTS						Well	
						V well	Annulus *
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen	dia	V annulus
<u>33</u>	<u>11.00</u>	<u>1870</u>	<u>11.9</u>			2" 0.17gal/ft	6.5 0.46gal/ft
<u>50</u>	<u>11.18</u>	<u>1832</u>	<u>5.6</u>		<u>13.06</u>		7.25 0.59gal/ft
							7.75 0.69gal/ft
							8.25 0.79gal/ft
						4" 0.66gal/ft	8.25 0.64gal/ft
							10.25 1.06gal/ft
							12.25 1.63gal/ft
Post Sampling	<u>10.83</u>	<u>1697</u>	<u>12.3</u>		<u>11.81</u>	6" 1.5gal/ft	12.25 1.41gal/ft

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse Detergent Wash, Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRL15</u>	<u>VDA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1200</u>
<u>CECRL15</u>	<u>VDA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1150</u>
<u>CECRL15</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>"</u>
<u>CECRL15</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>"</u>
<u>CECRL15</u>						

Notes - (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A.C. Stover Date 9-30-93 No. of Bottles 10

Trip →
Blank

Arthur D Little	Monitoring Well Sampling Data Sheet		Well No. <u>CECRL15</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>

Date Sampled: <u>12/02/93</u>	Sampled By: <u>M.B. / C.S.</u>	LOCATION	
Depth to Water: <u>132.36 ft.</u>	Total Depth: <u>190.3 ft.</u>		
O ₂ —	LEL —		PID <u>0.0ppm</u>
Measuring Point: <u>Notches on PVC rim</u>			
Equipment: <u>Horiba, Pid, Grundfos pump</u>			

WELL VOLUME (* use appropriate values in table for each code letter)

V well Depth Screen Bottom Depth Water Gallons of Water (well)

0.166 x [(190.3 - 132.36)] = 38.24

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus Depth Screen Bottom Depth Bottom of Seal Gallons of Water (annulus)

0.1746 x [(190.3 - 174.8)] = 2.71

WATER TO BE REMOVED

Gallons of Water (well) Gallons of Water (annulus) Removal Multiplier Total Gallons to be Removed Actual Gallons Removed

[(38.24 + 2.71)] x 5 = 204.8 60gal

MEASUREMENTS						Well		Annulus*	
						V well	dia	V annulus	
Time	Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity	1.5"			
<u>1500</u>	<u>0</u>	<u>8.27</u>	<u>0.920</u>	<u>8.2</u>	<u>59</u>	0.10gal/ft	4.0	0.29gal/ft	
<u>1520</u>	<u>20</u>	<u>8.74</u>	<u>0.925</u>	<u>8.3</u>	<u>66</u>	2"	6.5	0.46gal/ft	
<u>1540</u>	<u>38</u>	<u>8.69</u>	<u>0.704</u>	<u>9.0</u>	<u>283</u>		0.17gal/ft	7.25	0.59gal/ft
<u>0830</u>	<u>38</u>	<u>7.09</u>	<u>0.960</u>	<u>7.3</u>	<u>335</u>	4"	7.75	0.69gal/ft	
<u>0830</u>	<u>46</u>	<u>10.55</u>	<u>0.920</u>	<u>6.2</u>	<u>337</u>		8.25	0.79gal/ft	
						6"	8.25	0.64gal/ft	
							10.25	1.06gal/ft	
Post Sampling						12.25	1.63gal/ft		
<u>1900</u>	<u>60</u>	<u>9.61</u>	<u>0.739</u>	<u>7.5</u>	<u>999</u>	1.5gal/ft	12.25	1.41gal/ft	

SAMPLING

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRL15</u>	<u>YOA</u>	<u>40</u>	<u>N</u>	<u>HCl, ice</u>	<u>Amber glass</u>	<u>0945</u>
<u>CECRL15</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, ice</u>	<u>"</u>	<u>"</u>
<u>CECRL15</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>ice</u>	<u>"</u>	<u>"</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

* Assumes 30% porosity

Signature A.C. Stover Date 12/2/93 No. of Bottles 8

Arthur D Little

Monitoring Well Sampling Data Sheet

Well No. CECRL14
 Client USAEC
 Project CBREL
 Case No. 67063

Evacuation Method <u>Grundfos</u>	Date <u>8/27/93</u>	LOCATION
Sampling Method <u>3 ft. Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (calibrated)</u>	
Sampling Personnel <u>P. Tolson / C. Stover</u>	Initial Well PID (ppm) <u>0.0 ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

$$0.17 \text{ gal/ft} \times [(200.0 \text{ ft} - 88.68 \text{ ft})] = 18.92 \text{ gal}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

$$0.127 \text{ gal/ft} \times [(200.0 \text{ ft} - 185.0 \text{ ft})] = 1.905 \text{ gal}$$

WATER TO BE REMOVED

Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons to be Removed	Actual Gallons Removed
<u>18.92 gal</u>	<u>1.905 gal</u>	<u>5</u>	<u>204.13 gal</u>	<u>115.0</u>

MEASUREMENTS						Well	Annulus *	
Well Purging						V well	dia	V annulus
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen	2"	6.5	0.46 gal/ft
<u>0</u>	<u>7.56</u>	<u>0.506</u>	<u>20.5°C</u>		<u>8.95</u>	0.17 gal/ft	7.25	0.59 gal/ft
<u>40</u>	<u>7.53</u>	<u>0.426</u>	<u>20.3°C</u>		<u>1.33</u>		7.75	0.69 gal/ft
							8.25	0.79 gal/ft
						4"	8.25	0.64 gal/ft
						0.66 gal/ft	10.25	1.06 gal/ft
							12.25	1.63 gal/ft
Post Sampling						6"	12.25	1.41 gal/ft
<u>115</u>	<u>7.55</u>	<u>0.410</u>	<u>21.2</u>		<u>7.98</u>	1.5 gal/ft		

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash, Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRL16</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1055</u>
<u>CECRL16</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1055</u>
<u>CECRL16</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>1055</u>
<u>CECRL16</u>	<u>VOA, BTEX</u>	<u>40, 40</u>	<u>N, N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1055</u>
<u>CECRL16</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	
<u>CECRL16</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1000</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A.C. Stover Date 8/27/93 No. of Bottles 30

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECRL16</u>
		Client <u>USAEC</u>
		Project <u>CBREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>Grundfos</u>	Date <u>9-29-93</u>	LOCATION
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>L. Anderson / C. Stover</u>	Initial Well PID (ppm) <u>0.0 ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

V well Depth Screen Bottom Depth Water Gallons of Water (well)
 $0.17 \text{ gal/ft} \times [(200.0 \text{ ft}) - (89.9 \text{ ft})] = 18.72$

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus Depth Screen Bottom Depth Bottom of Seal Gallons of Water (annulus)
 $0.127 \text{ gal/ft} \times [(200.0 \text{ ft}) - (185.0 \text{ ft})] = 1.905 \text{ gal}$

WATER TO BE REMOVED

Gallons of Water (well) Gallons of Water (annulus) Removal Multiplier Total Gallons to be Removed Actual Gallons Removed
 $[(18.72) + (1.905 \text{ gal})] \times 5 = 103.2$ 120

MEASUREMENTS						Well		Annulus *	
						V well	dia	V annulus	
Well Purging						2" 0.17 gal/ft	6.5	0.46 gal/ft	
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen		7.25	0.59 gal/ft	
<u>0</u>	<u>7.95</u>	<u>2.449</u>	<u>14.2</u>		<u>10.84</u>		7.75	0.69 gal/ft	
<u>120</u>	<u>7.90</u>	<u>2.431</u>	<u>16.5</u>		<u>10.52</u>		8.25	0.79 gal/ft	
						4" 0.66 gal/ft	8.25	0.64 gal/ft	
							10.25	1.06 gal/ft	
							12.25	1.63 gal/ft	
Post Sampling						6" 1.5 gal/ft	12.25	1.41 gal/ft	
<u>120</u>	<u>7.50</u>	<u>0.403</u>	<u>13.7</u>		<u>10.19</u>				

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Used _____ Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash, Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRL16</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1100</u>
<u>CECRL16</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1100</u>
<u>CECRL16</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>1100</u>
<u>CECRL16</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1100</u>
<u>CECRL16</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1100</u>
<u>CECRL16</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>1100</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A.C. Stover Date 9-29-93 No. of Bottles 14

* Duplicate

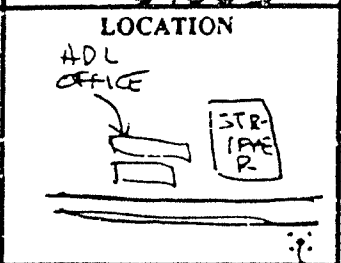
Arthur D Little

**Monitoring Well Sampling
Data Sheet**

Well No. CECRL 16
 Client USAEC
 Project CPREL
 Case No. 67063

Date Sampled: 12/1/93

Sampled By: W. PERKINS; D. TURTON



Depth to Water: 88.54

Total Depth: 200.0 ft.

O₂ -

LEL -

PID 8.65 @ well / 0.0 @

Measuring Point: Notch marks on PVC rim

Equipment: GRUNDFOS Pump, Horiba, Pid

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times \left[\left(\text{Depth Screen Bottom} - \text{Depth Water} \right) \right] = \text{Gallons of Water (well)}$$

$$.17 \text{ gal/ft} \times \left[\left(200.00 \text{ FT.} - 88.54 \right) \right] = 18.95 \text{ Gal.}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times \left[\left(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal} \right) \right] = \text{Gallons of Water (annulus)}$$

$$.127 \text{ gal/ft} \times \left[\left(200.00 \text{ FT.} - 185.00 \text{ FT.} \right) \right] = 1.905 \text{ Gal.}$$

WATER TO BE REMOVED

$$\left[\left(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)} \right) \right] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed} = \text{Actual Gallons Removed}$$

$$\left[\left(18.95 \text{ GAL} + 1.905 \text{ GAL.} \right) \right] \times 5 = 104.28 = 115 \text{ GAL.}$$

MEASUREMENTS

Well Purging						Well		Annulus*	
						V well	dia	V annulus	
Time	Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity	1.5"	4.0	0.29 gal/ft	
1112	0	9.55	0.112	7.2°C	4	0.10 gal/ft	6.5	0.46 gal/ft	
1117	20	9.67	0.517	9°C	5	2"	7.25	0.59 gal/ft	
1121	40	9.66	0.500	9°C	3		7.75	0.69 gal/ft	
1125	60	9.47	0.502	8.7°C	1	0.17 gal/ft	8.25	0.79 gal/ft	
1130	80	9.67	0.495	9.0°C	1		8.25	0.64 gal/ft	
1135	100	9.7	0.477	8.9°C	1	0.66 gal/ft	10.25	1.06 gal/ft	
							12.25	1.63 gal/ft	
Post Sampling						1.5 gal/ft	12.25	1.41 gal/ft	
1217	115	9.99	0.427	8.8°C	91				

SAMPLING

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
CECRL16	BTEX	40	N	HCl, Ice	AMBER GLASS	1200
CECRL16	VOA	40	N	HCl, Ice	" "	1200
CECRL16	TPH	1 LITER	N	ICE	" "	1215
CECRL16	VOA	40	N	HCl, ice	" "	1540

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

* Assumes 30% porosity

Signature A.C. Stover Date 12/1/93 No. of Bottles 11

+ = Breathing Space (**) = Trip Blank

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECR17</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>Grunds</u>	Date <u>8/27/93</u>	LOCATION
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>_____</u>	Initial Well PID (ppm) <u>0.0 ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times (\text{Depth Screen Bottom} - \text{Depth Water}) = \text{Gallons of Water (well)}$$

$$0.66 \text{ gal/ft} \times (108.0 \text{ ft} - 82.64) = 16.74 \text{ gal}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times (\text{Depth Screen Bottom} - \text{Depth Bottom of Seal}) = \text{Gallons of Water (annulus)}$$

$$0.3955 \text{ gal/ft} \times (108.0 \text{ ft} - 85.0 \text{ ft}) = 9.29 \text{ gal}$$

WATER TO BE REMOVED

$$(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)}) \times \text{Removal Multiplier} = \text{Total Gallons to be Removed}$$

$$(16.74 \text{ gal} + 9.29 \text{ gal}) \times 5 = 133.15$$

Actual Gallons Removed: _____

MEASUREMENTS						Well	
						V well	Annulus *
Well Purging						dia	V annulus
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen		
0	7.33	0.435	23.9°C		2.25	2"	0.46 gal/ft
14	7.40	0.437	23.3		2.00	0.17 gal/ft	7.25 0.59 gal/ft
21	7.47	0.436	24.2		1.69		7.75 0.69 gal/ft
							8.25 0.79 gal/ft
						4"	0.64 gal/ft
						0.66 gal/ft	10.25 1.06 gal/ft
							12.25 1.63 gal/ft
Post Sampling	7.30	0.435	23.0°C		10.09	6"	1.41 gal/ft
						1.5 gal/ft	12.25

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash, Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECR17</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1420</u>
<u>CECR17</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1420</u>
<u>CECR17</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>1420</u>
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A.C. Stover Date 8/27/93 No. of Bottles 7

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECBL17</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>Grunds</u>	Date <u>10-1-93</u>	LOCATION
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Hariba (Y)</u>	
Sampling Personnel <u>M. Bryant / E. Friedesson</u>	Initial Well PID (ppm) <u>1.0 ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

V well Depth Screen Bottom Depth Water Gallons of Water (well)

0.16 x [(108.0 - 93.02)] = 16.49

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus Depth Screen Bottom Depth Bottom of Seal Gallons of Water (annulus)

0.3955 x [(108.0 - 83.0)] = 9.89

WATER TO BE REMOVED

Gallons of Water (well) Gallons of Water (annulus) Removal Multiplier Total Gallons to be Removed Actual Gallons Removed

[(16.49 + 9.89)] x 5 = 131.9 46

MEASUREMENTS						Well	
						V well	Annulus *
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen	2"	V annulus
<u>9</u>	<u>7.39</u>	<u>443</u>	<u>15.0°C</u>		<u>10.13</u>	6.5	0.46ga/ft
<u>23</u>	<u>7.10</u>	<u>456</u>	<u>9.8°C</u>		<u>12.10</u>	7.25	0.59ga/ft
<u>37</u>	<u>7.20</u>	<u>456</u>	<u>10.6°C</u>		<u>10.87</u>	7.75	0.69ga/ft
<u>40</u>	<u>7.00</u>	<u>400</u>	<u>13.8°C</u>		<u>11.06</u>	8.25	0.79ga/ft
<u>46</u>	<u>7.60</u>	<u>432</u>	<u>12.1°C</u>		<u>11.25</u>	4"	0.64ga/ft
						10.25	1.06ga/ft
						12.25	1.63ga/ft
Post Sampling	<u>7.06</u>	<u>.541</u>	<u>16.8°C</u>		<u>10.27</u>	6"	1.11ga/ft
						1.5ga/ft	

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash, Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECBL17</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1600</u>
<u>CECBL17</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>		"
<u>CECBL17</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>		"

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A.C. Stever Date 10-1-93 No. of Bottles 7

Arthur D Little Monitoring Well Sampling Data Sheet

Well No. CECR17
 Client USAEC
 Project CRREL
 Case No. 67063

Date Sampled: 12/3/93 Sampled By: W. Perkins/D. Tuckon
 Depth to Water: 83.18 Total Depth: 108.0 ft.
 O₂ - LEL - PID 0.0 ppm
 Measuring Point: Notches on PVC rim
 Equipment: Horiba, Pid, Grundfos pump

LOCATION

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{well} \times [(Depth\ Screen\ Bottom - Depth\ Water)] = Gallons\ of\ Water\ (well)$$

$$.66\ gal/ft \times [(108.0\ ft. - 83.18\ ft.)] = 16.38\ gal$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{annulus} \times [(Depth\ Screen\ Bottom - Depth\ Bottom\ of\ Seal)] = Gallons\ of\ Water\ (annulus)$$

$$.3455\ gal/ft \times [(108.0\ ft. - 83.0\ ft.)] = 9.89\ gal$$

WATER TO BE REMOVED

Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons to be Removed	Actual Gallons Removed
[16.38]	[9.89]	[5]	[131.35]	[120]

MEASUREMENTS

Time	Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity	Well	
						V well	Annulus*
0811	0	7.42	0.474	7.3°C	180	1.5"	4.0
0825	25	7.80	0.550	6.2	78	6.5	0.29gal/ft
0855	40	7.72	0.575	7.3	99	2"	7.25
1330	55	7.67	0.576	7.3	71	0.17gal/ft	7.75
1420	75	7.60	0.561	9.3	965		8.25
1440	95	7.56	0.520	6.7	137	4"	8.25
0930	95	7.49	0.524	10.4	135	0.66gal/ft	10.25
0940	115	7.61	0.560	10.9	999		12.25
Post Sampling 1115	120	7.50	0.199	9.5	92	6"	12.25
						1.5gal/ft	1.41gal/ft

SAMPLING

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
CECR17	VOA	40	N	HCl, ice	Amber glass	1115
CECR17	BTEX	40	N	HCl, ice	"	1115
CECR17	TPH	1 Liter	N	ice	"	1115
CECR17	VOA	40	N	HCl, ice	"	1000

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Assumes 30% porosity

Signature A.C. Stone Date 12/3/93 No. of Bottles 11

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECRL18</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>Grunds</u>	Date <u>8/25 - 8/27/93</u>	LOCATION
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel	Initial Well PID (ppm)	

WELL VOLUME (* use appropriate values in table for each code letter)

Gallons of Water (well)

V well Depth Screen Bottom Depth Water

$0.66 \text{ gal/ft} \times [(200.0 \text{ ft}) - 98.20] = 73.79 \text{ gal}$

ANNULAR VOLUME (ASSUME 30% POROSITY)

Gallons of Water (annulus)

V annulus Depth Screen Bottom Depth Bottom of Seal

$0.1746 \text{ gal/ft} \times [(200.0 \text{ ft}) - 185.0 \text{ ft}] = 2.62 \text{ gal}$

WATER TO BE REMOVED

Total Gallons to be Removed Actual Gallons Removed

Gallons of Water (well) Gallons of Water (annulus) Removal Multiplier

$[(73.79 \text{ gal}) + (2.62 \text{ gal})] \times 5 = 382.05$ 136.0

MEASUREMENTS

						Well	Annulus *	
						V well	dia	V annulus
Well Purging								
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen	2"	6.5	0.46 gal/ft
<u>0</u>	<u>8.24</u>	<u>0.216</u>	<u>26.2</u>		<u>7.92</u>	0.17 gal/ft	7.25	0.59 gal/ft
<u>60</u>	<u>8.23</u>	<u>0.203</u>	<u>31.1</u>		<u>2.07</u>		7.75	0.69 gal/ft
<u>5 25 35</u>	<u>8.22</u>	<u>0.243</u>	<u>28.1</u>		<u>4.35</u>		8.25	0.79 gal/ft
<u>104</u>	<u>8.11</u>	<u>0.309</u>	<u>20.9</u>		<u>8.96</u>			
						4"	8.25	0.64 gal/ft
						0.66 gal/ft	10.25	1.06 gal/ft
							12.25	1.63 gal/ft
Post Sampling						6"	12.25	1.41 gal/ft
<u>136</u>	<u>8.74</u>	<u>0.260</u>	<u>29.5</u>		<u>1.71</u>	1.5 gal/ft		

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRL18</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1055</u>
<u>CECRL18</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1055</u>
<u>CECRL18</u>	<u>TPH</u>	<u>1 Liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>1055</u>
<u>CECRL18</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>		<u>1040</u>
<u>CECRL18</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>		<u>1040</u>
<u>CECRL18</u>	<u>TPH</u>	<u>1 Liter</u>	<u>N</u>	<u>Ice</u>		<u>1040</u>
<u>SIAXD20N</u>	<u>Amphibio</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>		<u>1040</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A.C. Stover Date 8/27/93 No. of Bottles 16

Arthur D Little	Monitoring Well Sampling Data Sheet		Well No. <u>CECRL18</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>

Evacuation Method <u>Grundfos</u>	Date <u>9-29-93 to 9-30-93</u>	LOCATION
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>E. Friedenson / C. Stover</u>	Initial Well PID (ppm) <u>0.0</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$$\text{V well} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

$$0.66 \text{ gal/ft} \times [(200.0 \text{ ft} - 87.38 \text{ ft})] = 74.56 \text{ gal}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$\text{V annulus} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

$$0.1746 \text{ gal/ft} \times [(200.0 \text{ ft} - 185.0 \text{ ft})] = 2.62 \text{ gal}$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed} \quad \text{Actual Gallons Removed}$$

$$[(74.56 + 2.62)] \times 5 = 385.90 \quad 130$$

MEASUREMENTS						Well			
						V well	Annulus *		
Well Purging						2"	0.17 gal/ft		
Volume Removed	pH	Conduct.	Temp. °C	Free CL ⁻ Y/N	Dissolved Oxygen			6.5	0.46 gal/ft
0	8.01	305	13.3		11.28	7.25		0.59 gal/ft	
36	8.30	323	13.3		10.26	7.75		0.69 gal/ft	
120	8.37	363	13.3		10.93	8.25	0.79 gal/ft		
130	8.34	342	13.4		10.97	4"	0.66 gal/ft		
	8.42	323	13.7		10.46			8.25	0.64 gal/ft
								10.25	1.06 gal/ft
						12.25	1.63 gal/ft		
Post Sampling	8.83	0.351	11.0 °C		13.20	6"	1.5 gal/ft		
						12.25	1.41 gal/ft		

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Used _____ Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash, Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRL18</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1400</u>
<u>CECRL18</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1600</u>
<u>CECRL18</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1600</u>
<u>CECRL18</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>1600</u>
<u>CECRL18</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>		<u>1430</u>
<u>CECRL18</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>		<u>1430</u>
<u>CECRL18</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>		<u>1430</u>
<u>CECRL18</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>Ice</u>		<u>1430</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature L. C. Stover Date 9-30-93 No. of Bottles 18

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECRL18</u>
		Client <u>USAEC</u>
		Project <u>CBREL</u>
		Case No. <u>67063</u>

Date Sampled: <u>12/02/93</u>	Sampled By: <u>M. Bryant / H. Donohay</u>	LOCATION	
Depth to Water: <u>87.50 ft.</u>	Total Depth: <u>200.0 ft.</u>		
O ₂ <u>—</u>	LEL <u>—</u>		PID <u>9.6 ppm @ well</u> <u>0.8 ppm @ BS</u>
Measuring Point: <u>Notches on PVC rim</u>			
Equipment: <u>Horiba, Pid, Grundfos pump</u>			

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

$$0.66 \text{ gal/ft.} \times [(200.0 \text{ ft.} - 87.50 \text{ ft.})] = 74.25 \text{ gal}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

$$0.1746 \text{ gal/ft.} \times [(200.0 \text{ ft.} - 125.0 \text{ ft.})] = 2.62 \text{ gal}$$

WATER TO BE REMOVED

Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons to be Removed	Actual Gallons Removed
[74.25]	[2.62]	[5]	[384.35]	[135 gal]

MEASUREMENTS						Well	Annulus *	
Well Purging						V well	dia	V annulus
Time	Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity	1.5"	4.0	0.29 gal/ft
1530	20	8.30	0.369	9.0	3	0.10 gal/ft	6.5	0.46 gal/ft
1537	20	8.35		8.7	2	2"	7.25	0.59 gal/ft
1603	60	8.13		8.7	21	0.17 gal/ft	7.75	0.59 gal/ft
0713	65	7.22	0.399	8.9	1		8.25	0.79 gal/ft
0723	85	8.11	0.355	9.1	0	4"	8.25	0.64 gal/ft
1515	100	8.48	0.337	9.4	0	0.66 gal/ft	10.25	1.06 gal/ft
1545	120	8.43	0.348	10.3	133		12.25	1.63 gal/ft
Post Sampling	135	8.45	0.348	9.6	57	6"	12.25	1.41 gal/ft
1600						1.5 gal/ft		

SAMPLING						
Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
CECRL18	VOA	40	N	HCl, ice	Amber glass	1640
CECRL18	BTEX	40	N	HCl, ice	"	"
CECRL18	TPH	1 liter	N	ice	"	"
CECRL18	Northlake	1 liter	N	ice	"	"
CECRL18	VOA	40	N	HCl, ice	"	0915

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

* Assumes 30% porosity

Signature A.C. Costore Date 12/2/93 No. of Bottles 12

* BS = breathing space (4*) Trip Blank

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECRL19</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>Grunds</u>	Date <u>8/27/93</u>	LOCATION
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>M. Hayes / E. Friedenson</u>	Initial Well PID (ppm) <u>0.0 ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

V well Depth Screen Bottom Depth Water Gallons of Water (well)

0.66 gal/ft. x [(108.0 ft. - 86.4 ft.)] = 14.4

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus Depth Screen Bottom Depth Bottom of Seal Gallons of Water (annulus)

0.395 gal/ft. x [(109.0 ft. - 83.0 ft.)] = 9.875 gal

WATER TO BE REMOVED

Gallons of Water (well) Gallons of Water (annulus) Removal Multiplier Total Gallons to be Removed Actual Gallons Removed

[(14.4 + 9.875 gal)] x 5 = 122 125 gal

MEASUREMENTS						Well	
						V well	Annulus *
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen	Well	V annulus
						2"	0.46ga/ft
						0.17ga/ft	7.25 0.59ga/ft
							7.75 0.69ga/ft
							8.25 0.79ga/ft
						4"	0.64ga/ft
						0.66ga/ft	8.25 1.06ga/ft
							10.25 1.63ga/ft
							12.25
						6"	1.41ga/ft
						1.5ga/ft	12.25

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRL19</u>	<u>VDA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>1350</u>
<u>CECRL19</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1350</u>
<u>CECRL19</u>	<u>TPH</u>	<u>1 Liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>1350</u>
<u>51HX0314</u>	<u>Naphthalene</u>	<u>1 Liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>1350</u>
<u>CECRL19</u>	<u>VDA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>1300</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A. C. Howell Date 8/27/93 No. of Bottles 8+2=10

* Trip Blank

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>CECRL19</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>Groundfos</u>	Date <u>9-30-93</u>	LOCATION
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>C. Stover / E. Friedenson</u>	Initial Well PID (ppm)	

WELL VOLUME (* use appropriate values in table for each code letter)

$$V \text{ well} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

$$0.66 \text{ gal/ft} \times [(108.0 \text{ ft} - 96.55)] = 14.16 \text{ gal}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V \text{ annulus} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

$$0.395 \text{ gal/ft} \times [(108.0 \text{ ft} - 83.0 \text{ ft})] = 9.875 \text{ gal}$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed}$$

$$[(14.16 \text{ gal} + 9.875 \text{ gal})] \times 5 = 120.2$$

Actual Gallons Removed:

MEASUREMENTS						Well		Annulus *	
						V well	dta	V annulus	
Volume Removed	pH	Conduct	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen	2"	6.5	0.46 gal/ft	
0	9.87	132	13.9°C		12.62	0.17 gal/ft	7.25	0.59 gal/ft	
25	9.39	132	14.1		12.33		7.75	0.69 gal/ft	
30	9.37	132	14.3		10.33		8.25	0.79 gal/ft	
45	9.33	204	9.5		11.37				
51	9.36	184	9.7		10.90	4"	8.25	0.64 gal/ft	
						0.66 gal/ft	10.25	1.06 gal/ft	
							12.25	1.63 gal/ft	
Post Sampling	9.92		8.8°C		10.69	6"	12.25	1.41 gal/ft	
	9.80	191				1.5 gal/ft			

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash, Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
CECRL19	VDA	40	N	HCl, Ice	Amber Glass	1130
CECRL19	BTEX	40	N	HCl, Ice		0930
CECRL19	TPH	1 liter	N	Ice		0930
CECRL19	Naphthalene	1 liter	N	Ice		0930
CECRL19	VDA	40	N	HCl		0930
CECRL19	BTEX	40	N	HCl		1130
CECRL19	TPH	1 liter	N	Ice		1130

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A.C. Stover Date 10-1-93 No. of Bottles 18

* Equipment Blanks

Arthur D Little	Monitoring Well Sampling Data Sheet		Well No. <u>CECRL19</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>

Date Sampled: <u>12.02.93</u>	Sampled By: <u>H. Donohue & M. Bryant</u>	LOCATION <u>NEXT TO GREENHOUSE.</u>	
Depth to Water: <u>86.40 ft</u>	Total Depth: <u>108.0 ft</u>		
O ₂ —	LEL —		PID <u>0.0 ppm</u>
Measuring Point: <u>SLOTS ON PVC</u>			
Equipment: <u>Horiba, Pid, Grundfos pump</u>			

WELL VOLUME (* use appropriate values in table for each code letter)

V well	Depth Screen Bottom	Depth Water	Gallons of Water (well)
$0.66 \frac{gal}{ft}$	(<u>108.0'</u> - <u>86.4'</u>)		<u>14.3</u>

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus	Depth Screen Bottom	Depth Bottom of Seal	Gallons of Water (annulus)
$0.395 \frac{gal}{ft}$	(<u>108.0'</u> - <u>83.0'</u>)		<u>9.875</u>

WATER TO BE REMOVED

Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons to be Removed	Actual Gallons Removed
(<u>14.3 gal</u> + <u>9.875 gal</u>)		<u>5</u>	<u>121</u>	<u>~140</u>

MEASUREMENTS

Well Purging	Time	Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity	Well		Annulus*	
							V well	d/a	V annulus	
	<u>0950</u>	<u>0</u>	<u>9.65</u>	<u>0.195</u>	<u>5.8</u>	<u>186</u>	<u>1.5"</u>	<u>4.0</u>	<u>0.29 gal/ft</u>	
	<u>1205</u>	<u>40</u>	<u>9.30</u>	<u>0.171</u>	<u>10.2</u>	<u>51.5</u>	<u>2"</u>	<u>6.5</u>	<u>0.46 gal/ft</u>	
	<u>1355</u>	<u>80</u>	<u>9.63</u>	<u>0.186</u>	<u>9.9</u>	<u>53.3</u>	<u>0.17 gal/ft</u>	<u>7.25</u>	<u>0.59 gal/ft</u>	
	<u>1430</u>	<u>100</u>	<u>9.60</u>	<u>0.177</u>	<u>9.9</u>	<u>43.2</u>		<u>7.75</u>	<u>0.69 gal/ft</u>	
	<u>1510</u>	<u>140</u>	<u>9.72</u>	<u>0.175</u>	<u>9.2</u>	<u>13.4</u>		<u>8.25</u>	<u>0.79 gal/ft</u>	
							<u>4"</u>	<u>8.25</u>	<u>0.64 gal/ft</u>	
							<u>0.66 gal/ft</u>	<u>10.25</u>	<u>1.06 gal/ft</u>	
								<u>12.25</u>	<u>1.63 gal/ft</u>	
							<u>6"</u>	<u>12.25</u>	<u>1.41 gal/ft</u>	
							<u>1.5 gal/ft</u>			
Post Sampling	<u>1645</u>	<u>140</u>	<u>9.49</u>	<u>0.185</u>	<u>6.7</u>	<u>595</u>				

SAMPLING

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRL19</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, ice</u>	<u>Amber glass</u>	<u>1445</u>
<u>CECRL19</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, ice</u>	<u>"</u>	<u>"</u>
<u>CECRL19</u>	<u>TPH</u>	<u>1 liter</u>	<u>N</u>	<u>ice</u>	<u>"</u>	<u>"</u>
<u>CECRL19</u>	<u>Naphthalene</u>	<u>1 liter</u>	<u>N</u>	<u>ice</u>	<u>"</u>	<u>"</u>
<u>CECRL19</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, ice</u>	<u>"</u>	<u>1449-1500</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

* Assumes 30% porosity

Signature S.C. Stross Date 12-02-93 No. of Bottles 12

NO Trip Blank

Arthur D Little

Monitoring Well Sampling Data Sheet

Well No. CECRL20
Client USAEC
Project CRREL
Case No. 67063

Evacuation Method <u>Grundfos</u>	Date <u>8/25/93</u>
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>
Sampling Personnel <u>E. Friedenson, M. Hayes</u>	Initial Well PID (ppm) <u>202.0 ppm</u>

LOCATION

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} \times (\text{Depth Screen Bottom} - \text{Depth Water}) = \text{Gallons of Water (well)}$$

$$0.669 \text{ gal/ft} \times (138.0 \text{ ft} - 116.8 \text{ ft}) = 13.99 \text{ gal}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} \times (\text{Depth Screen Bottom} - \text{Depth Bottom of Seal}) = \text{Gallons of Water (annulus)}$$

$$1.06 \text{ gal/ft} \times (138.0 \text{ ft} - 123.0 \text{ ft}) = 15.90 \text{ gal}$$

WATER TO BE REMOVED

$$(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)}) \times \text{Removal Multiplier} = \text{Total Gallons to be Removed} = \text{Actual Gallons Removed}$$

$$((13.99 \text{ gal} + 15.90 \text{ gal})) \times 5 = 149.5 \text{ gal} = 150 \text{ gal}$$

MEASUREMENTS

Well Purging

Volume Removed	pH	Conduct	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen	Well		Annulus *	
						V well	dia	V annulus	
0	6.31	362	74.3		8.61	2"	6.5	0.46 gal/ft	
						0.17 gal/ft	7.25	0.59 gal/ft	
							7.75	0.69 gal/ft	
							8.25	0.79 gal/ft	
							4"	8.25	0.64 gal/ft
						0.66 gal/ft	10.25	1.06 gal/ft	
							12.25	1.63 gal/ft	
Post Sampling							6"	12.25	1.41 gal/ft
150	7.47	448	26.2		7.93	1.5 gal/ft			

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
CECRL20	BTEX	40	N	HCl, Ice	Amber Glass	1030
CECRL20	VOA	40	N	HCl, Ice	"	"
CECRL20	TPH	1 liter	N	Ice	"	"

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature A. C. Sherrill Date 8/25/93 No. of Bottles 7

Arthur D Little	Monitoring Well Sampling Data Sheet		Well No. <u>CECRL20</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>

Evacuation Method <u>Ground fs</u>	Date <u>9-29-93</u>	LOCATION
Sampling Method <u>Bailer</u>	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>M. Bryant / C. Stover</u>	Initial Well PID (ppm) <u>0.0 ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

V well Depth Screen Bottom Depth Water Gallons of Water (well)

0.66 x [(138.0 - 116.38)] = 14.27

ANNULAR VOLUME (ASSUME 30% POROSITY)

V annulus Depth Screen Bottom Depth Bottom of Seal Gallons of Water (annulus)

1.06 x [(138.0 - 123.0)] = 15.9

WATER TO BE REMOVED

Gallons of Water (well) Gallons of Water (annulus) Removal Multiplier Total Gallons to be Removed Actual Gallons Removed

[(13.99427 + 15.90)] x 5 = 150.9 160

MEASUREMENTS						Well			
						V well	Annulus *		
Well Purging						2"	0.17gal/ft		
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen			6.5	0.46gal/ft
<u>0</u>	<u>7.30</u>	<u>0.486</u>	<u>13.0</u>		<u>10.70</u>	7.25	0.59gal/ft		
<u>20</u>	<u>7.66</u>	<u>0.509</u>	<u>13.0</u>		<u>11.69</u>	7.75	0.69gal/ft		
<u>50</u>	<u>7.66</u>	<u>0.522</u>	<u>12.7</u>		<u>11.53</u>	8.25	0.79gal/ft		
<u>75</u>	<u>7.69</u>	<u>0.533</u>	<u>12.5</u>		<u>11.32</u>	4"	8.25	0.64gal/ft	
<u>10</u>	<u>7.69</u>	<u>0.533</u>	<u>12.1</u>		<u>11.35</u>		10.25	1.06gal/ft	
<u>160</u>	<u>7.63</u>	<u>0.543</u>	<u>12.3</u>		<u>11.24</u>		12.25	1.63gal/ft	
Post Sampling						6"	1.5gal/ft	12.25	1.41gal/ft
<u>160</u>	<u>7.71</u>	<u>0.262</u>	<u>11.2</u>		<u>12.12</u>				

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Used _____ Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>CECRL20</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber glass</u>	<u>1400</u>
<u>CECRL20</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>"</u>
<u>CECRL20</u>	<u>TPH</u>	<u>1liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>"</u>
<u>CECRL20</u>	<u>BTEX</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>"</u>
<u>CECRL20</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>"</u>	<u>"</u>
<u>CECRL20</u>	<u>TPH</u>	<u>1liter</u>	<u>N</u>	<u>Ice</u>	<u>"</u>	<u>"</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature S. C. Stover Date 9/29/93 No. of Bottles 14

* = Duplicate

Arthur D Little	Monitoring Well Sampling Data Sheet		Well No. <u>CECRL 20</u>
			Client <u>USAEC</u>
			Project <u>CRREL</u>
			Case No. <u>67063</u>

Date Sampled: <u>11-30-93</u>	Sampled By: <u>H.D. & M.J.B.</u>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;">LOCATION</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"><u>ICE Engineering Facility</u></div>	
Depth to Water: <u>116.00 ft</u>	Total Depth: <u>138.0 ft</u>		
O ₂ <u>NA</u>	LEL <u>NA</u>		PID <u>0.0 ppm</u>
Measuring Point: <u>INNER DATUM OF PVC AT SLOTS</u>			
Equipment: <u>GRUNDFOS PUMP (#9244); HORIBA</u>			

WELL VOLUME (* use appropriate values in table for each code letter)

$$V_{\text{well}} = \text{Depth Screen Bottom} - \text{Depth Water} = 138.0 \text{ ft} - 116.0 \text{ ft} = 22.0 \text{ ft}$$

$$\text{Gallons of Water (well)} = 0.66 \frac{\text{gal}}{\text{ft}} \times 22.0 \text{ ft} = 14.52 \text{ gal}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$V_{\text{annulus}} = \text{Depth Screen Bottom} - \text{Depth Bottom of Seal} = 138.0 \text{ ft} - 123.0 \text{ ft} = 15.0 \text{ ft}$$

$$\text{Gallons of Water (annulus)} = 1.06 \frac{\text{gal}}{\text{ft}} \times 15.0 \text{ ft} = 15.90 \text{ gal}$$

WATER TO BE REMOVED

Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons to be Removed	Actual Gallons Removed
14.52 gal	15.90 gal	5	152.1 gal	160 gal

MEASUREMENTS						Well	Annulus*	
Well Purging						V well	dia	V annulus
Time	Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity	1.5"	4.0	0.29 gal/ft
0830	0	8.05	0.523	10.2	96	0.10 gal/ft	6.5	0.46 gal/ft
0845	20	8.21	0.520	10.1	10	2"	7.25	0.59 gal/ft
0900	40	8.23	0.535	8.9	11	0.17 gal/ft	7.75	0.69 gal/ft
0915	60	8.25	0.550	9.0	3		8.25	0.79 gal/ft
0930	80	8.20	0.548	9.0	1	4"	8.25	0.64 gal/ft
0945	100	8.16	0.561	8.8	0	0.66 gal/ft	10.25	1.06 gal/ft
1000	120	8.14	0.552	8.7	0		12.25	1.63 gal/ft
1015	140	8.06	0.556	8.4	0	6"	12.25	1.41 gal/ft
Post Sampling 1030	160	8.22	0.558	8.4	0	1.5 gal/ft		

SAMPLING						
Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
CECRL20	BTEX	40	N	HCl, ICE	AMBER GLASS	1030
CECRL20	VOC	40	N	HCl, ICE	"	"
CECRL20	TPH	1 liter	N	ICE	"	"

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

* Assumes 30% porosity

Signature Dough Donaghy Date 11-30-93 No. of Bottles 8

Arthur D Little	Monitoring Well Sampling Data Sheet	Well No. <u>Handover</u>
		Client <u>USAEC</u>
		Project <u>CRREL</u>
		Case No. <u>67063</u>

Evacuation Method <u>N/A</u>	Date <u>9/30/93</u>	LOCATION
Sampling Method	Equipment Used (Calibrated Y/N) <u>Horiba (Y)</u>	
Sampling Personnel <u>D. Dowling / E. Fridtson</u>	Initial Well PID (ppm) <u>0.0 ppm</u>	

WELL VOLUME (* use appropriate values in table for each code letter)

$$\text{V well} \times [(\text{Depth Screen Bottom} - \text{Depth Water})] = \text{Gallons of Water (well)}$$

ANNULAR VOLUME (ASSUME 30% POROSITY)

$$\text{V annulus} \times [(\text{Depth Screen Bottom} - \text{Depth Bottom of Seal})] = \text{Gallons of Water (annulus)}$$

WATER TO BE REMOVED

$$[(\text{Gallons of Water (well)} + \text{Gallons of Water (annulus)})] \times \text{Removal Multiplier} = \text{Total Gallons to be Removed}$$

Actual Gallons Removed

MEASUREMENTS						Well		Annulus *	
						V well	d/a	V annulus	
Well Purging						2" 0.17ga/ft	6.5	0.46ga/ft	
Volume Removed	pH	Conduct.	Temp.	Free CL ⁻ Y/N	Dissolved Oxygen		7.25	0.59ga/ft	
	<u>6.32</u>	<u>233</u>	<u>9.5°C</u>		<u>11.86</u>		7.75	0.69ga/ft	
							8.25	0.79ga/ft	
						4" 0.66ga/ft	8.25	0.64ga/ft	
							10.25	1.06ga/ft	
							12.25	1.63ga/ft	
						6" 1.5ga/ft	12.25	1.41ga/ft	
Post Sampling									

SAMPLING

Decontamination Procedures Used Detergent Wash, Water Rinse, Solvent Rinse, Water Rinse Detergent Wash Water Rinse Other

Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>Hanaysc</u>	<u>VOA</u>	<u>40</u>	<u>N</u>	<u>HCl, Ice</u>	<u>Amber Glass</u>	<u>0930</u>

Notes (include data on floaters/sinkers with measuring device, well condition, etc.)

Signature S.C. Stover Date 9/30/93 No. of Bottles 3

Arthur D Little	Monitoring Well Sampling Data Sheet				Well No. <u>HANOVER</u>	
					Client <u>USAEC</u>	
					Project <u>CRREL</u>	
					Case No. <u>67063</u>	
Date Sampled: <u>12-1-93</u>		Sampled By: <u>W. DOWLING</u>			LOCATION <u>N</u> <u>NE Hanover Well</u> ↑ <u>1000'</u> <u>↳ Northern Boundary of CRREL</u>	
Depth to Water: <u>NOT HEARD</u>		Total Depth: <u>UNKNOWN</u>				
O ₂ <u>-</u>	LEL <u>-</u>	PID <u>-</u>				
Measuring Point: <u>N/A</u>						
Equipment: <u>PRODUCTION WELL PUMP</u>						
WELL VOLUME (* use appropriate values in table for each code letter)						
V well	Depth Screen Bottom	Depth Water	Gallons of Water (well)			
-	-	-	-			
ANNULAR VOLUME (ASSUME 30% POROSITY)						
V annulus	Depth Screen Bottom	Depth Bottom of Seal	Gallons of Water (annulus)			
-	-	-	-			
WATER TO BE REMOVED						
Gallons of Water (well)	Gallons of Water (annulus)	Removal Multiplier	Total Gallons to be Removed	Actual Gallons Removed		
-	-	-	-	-		
MEASUREMENTS						
Well Purging						
Time	Number of Gallons Removed	pH	Conductivity	Temperature	Turbidity	Well V well dia V annulus
<u>1200</u>	<u>-</u>	<u>9.40</u>	<u>0.359</u>	<u>7.1°C</u>	<u>1</u>	<u>1.5"</u> <u>0.10gal/ft</u> <u>4.0</u> <u>0.29gal/ft</u>
						<u>2"</u> <u>0.17gal/ft</u> <u>6.5</u> <u>0.46gal/ft</u> <u>7.25</u> <u>0.59gal/ft</u> <u>7.75</u> <u>0.69gal/ft</u> <u>8.25</u> <u>0.79gal/ft</u>
						<u>4"</u> <u>0.64gal/ft</u> <u>8.25</u> <u>0.64gal/ft</u> <u>10.25</u> <u>1.06gal/ft</u> <u>12.25</u> <u>1.63gal/ft</u>
						<u>6"</u> <u>1.5gal/ft</u> <u>12.25</u> <u>1.41gal/ft</u>
Post Sampling						
SAMPLING						
Sample ID	Analysis	Volume (ml)	Filtered (Y/N)	Preservation	Container	Time
<u>HANOVER</u>	<u>VOG</u>	<u>40x3</u>	<u>N</u>	<u>HCL</u>	<u>Glass/Amber</u>	<u>0900</u>
Notes (include data on floaters/sinkers with measuring device, well condition, etc.)						

* Assumes 30% porosity

Signature W. Dowling Date 12-1-93 No. of Bottles 3

Appendix J: In Situ Hydraulic Conductivity Data

Arthur D Little

Appendix J-1: Summary of Well and Test Parameters for Hydraulic Conductivity Analysis

Well ID	Well Parameters										Test Parameters				Rising or Falling Test	Raw data file name
	Depth to bottom of sand pack, FT BGS	Screened interval, FT BGS	Length of screen, FT	Length of screen and sand pack, FT	Screen radius and sand pack (borehole), FT	Water table on date of slug test, FT BGS	Height of water column on date of slug test, FT	Water table above/near screened zone	Length of screen and sand pack, FT	Harmit data logger unit #	Harmit data logger test #	Date time of test				
CECRL07	179.4	160.0-179.0	10.0	15.0	.17	.43	139.91	39.40	ABOVE	<	00943	0	9-8-93/1406	F	CECRL07F	
CECRL08	147.0	136.5-146.5	10.0	15.0	.17	.43	131.49	15.51	ABOVE	<	00943	1	9-8-93/1445	R	CECRL07R	
CECRL09	137.0	126.5-135.5	10.0	15.0	.17	.43	127.21	19.79	IN	<	00943	1	9-9-93/1021	F	CECRL08F	
CECRL10	127.5	117.0-127.0	10.0	16.0	.17	.43	113.28	14.22	ABOVE	<	00943	0	9-8-93/1612	F	CECRL08F	
CECRL11	117.0	106.5-116.5	10.0	15.0	.17	.43	97.40	19.60	ABOVE	<	99999	0	9-8-93/1037	R	CECRL09R	
CECRL12	98.5	78.0-98.0	20.0	25.0	.17	.43	84.85	13.65	IN	<	99999	0	9-8-93/1218	F	CECRL10F	
CECRL13	204.5	193.0-203.0	10.0	15.0	.17	.25	140.0	63.0	ABOVE	<	00943	0	9-9-93/1159	R	CECRL11R	
CECRL14	257.5	247.0-257.0	10.0	15.0	.17	.25	128.45	128.55	ABOVE	<	00943	0	9-8-93/1044	F	CECRL12F	
CECRL15*	193.3	180.3-190.3	10.0	15.5	.17	.25	136.76	53.54	ABOVE	<	00943	0	9-8-93/1155	R	CECRL13R	
CECRL16	202.5	190.0-200.0	10.0	15.0	.09	.25	87.01	112.99	ABOVE	<	99999	0	9-10-93/0336	R	CECRL14R	
CECRL17	109.0	98.0-108.0	20.0	25.0	.17	.30	81.79	26.21	ABOVE	<	00943	0	9-8-93/1826	F	CECRL15F	
CECRL18	201.2	190.0-200.0	10.0	15.0	.17	.25	135.63	54.67	ABOVE	<	00943	0	9-10-93/1059	R	CECRL15R	
CECRL19	109.0	98.0-108.0	20.0	25.0	.17	.43	85.65	22.35	ABOVE	<	00943	2	9-10-93/1406	F	CECRL19F	
CECRL20	139.0	128.0-138.0	10.0	15.0	.17	.43	115.45	22.55	ABOVE	<	00943	0	9-7-93/1634	F	CECRL19R	
											00943	1	9-7-93/1654	R	CECRL20R	

* Tests on each well were performed during a single day with the exception of CECRL15
 - Falling head test not possible due to lack of aquifer response
 - Falling head test during head tests not possible due to rapid aquifer recharge
 BGS Below ground surface

BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL07

GENERAL DATA

Monitoring Well: CECRL07
 Test Type: Falling Head
 File Name: CRL07FBR
 Static Level, ft: 139.91
 Date: 9/8/93
 Time: 14:05

TEST PARAMETERS

Screen Length (ft), Le: 10
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.43
 Is well fully penetrating? no
 Well Depth from water table (ft) 39.49
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 0
 A: 2.3
 B: 0.5
 C: 1.9
 Le/rw: 23.3
 ln(Re/rw)= 1.848
 Initial water table height (ft), y(0.9
 Water table height at time t (ft), 0.069
 Change in time from y(a) to y(b) 6

TEST DATA

Environmental Logger
 Unit #: 943
 Test #: 0

Scale Factor: 10.019
 Reference Value 0.000

RESULTS

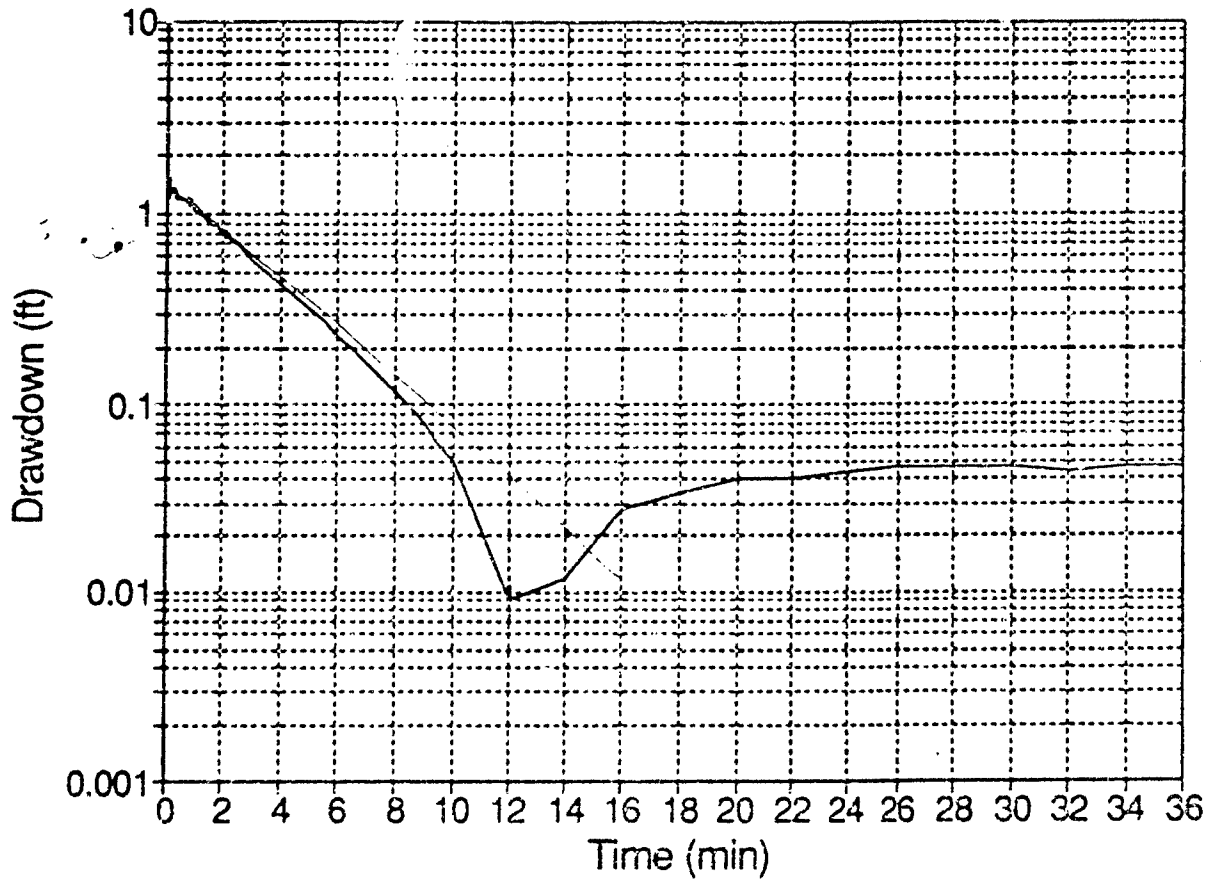
Hydraulic Conductivity (ft/min), 1.14E-03
 Hydraulic Conductivity (ft/sec), 1.90E-05
 Hydraulic Conductivity (m/sec) 5.81E-06
 Hydraulic Conductivity (cm/se 5.81E-04

TIME DATA
HERE

DRAWDOWN DATA
HERE

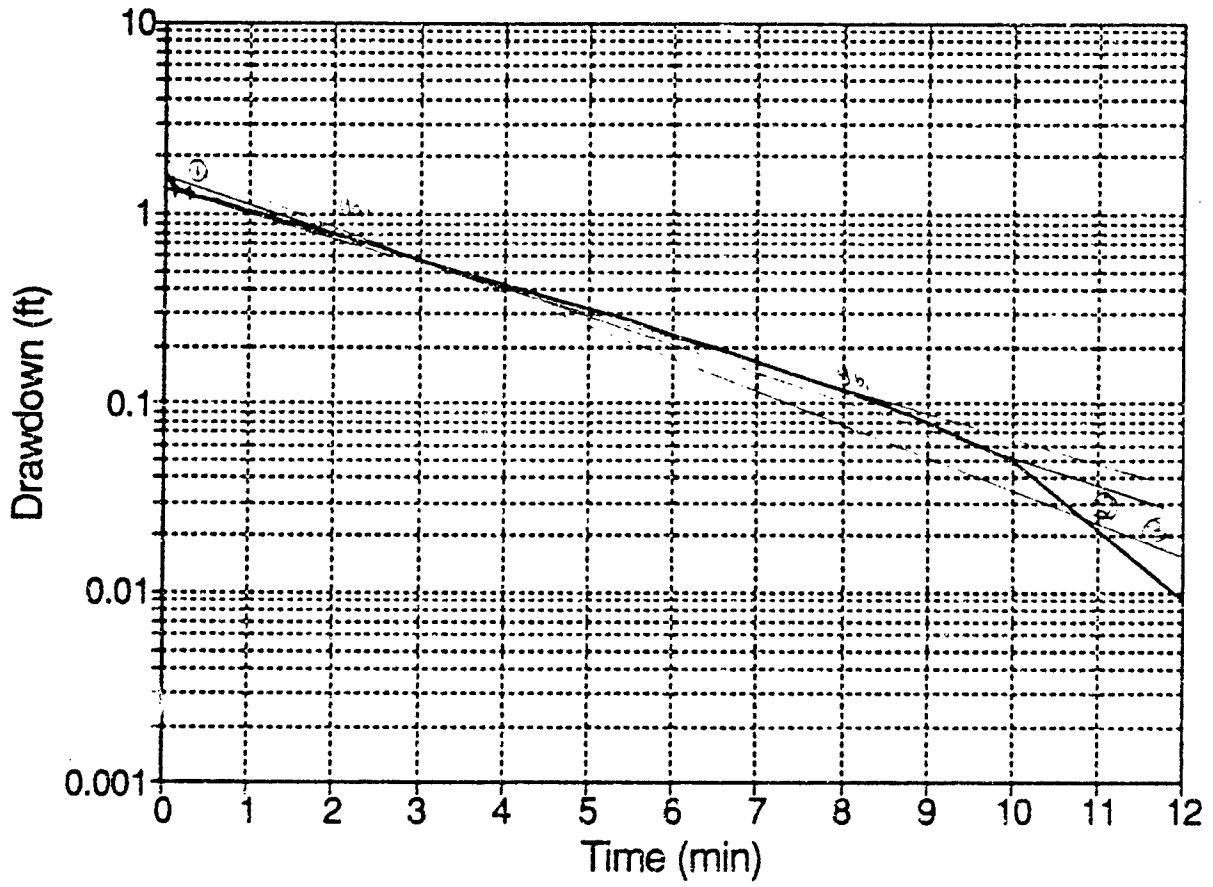
Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	-0.962	0.962
0.0033	-1.196	1.196
0.0066	-1.253	1.253
0.0100	-1.367	1.367
0.0133	-1.604	1.604
0.0166	-1.516	1.516
0.0200	-1.532	1.532
0.0233	-1.538	1.538

CECRL07 FALLING HEAD TEST



T3
C 35 S3
A 35 112

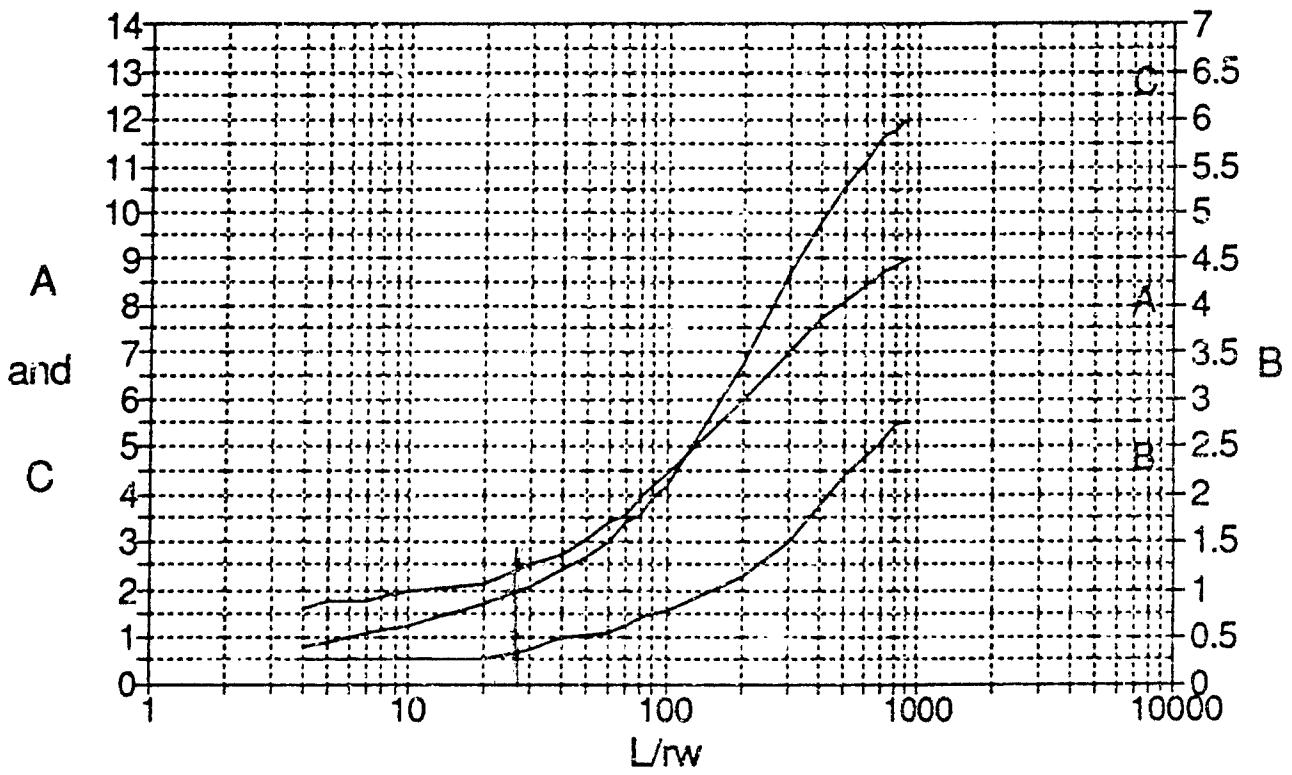
CECRL07 FALLING HEAD TEST



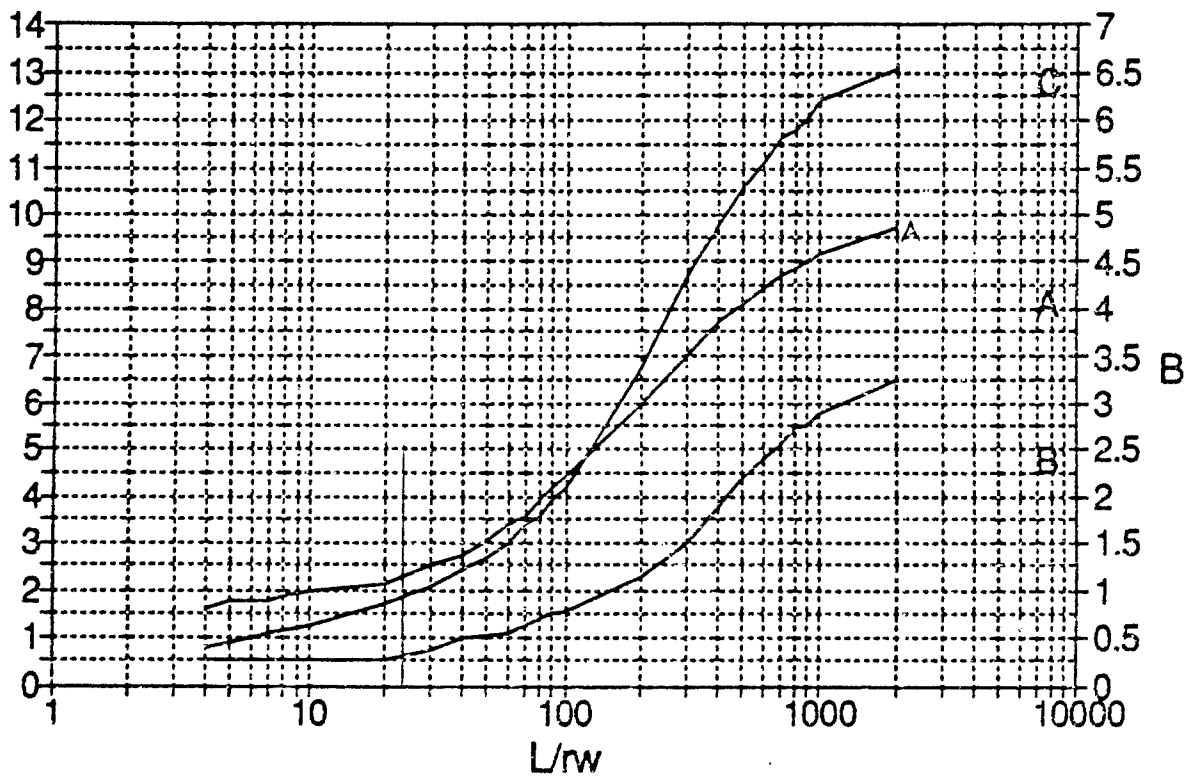
$h_0 = 1.2$
 $h_8 = 0.1$
 $t = 12$
 $K = 1$

$J_2 = 0.3$
 $J_0 = 0.0$
 $\Delta h =$
 $K = 1$

Curves Relating Coefficients
A, B, and C to L/rw



CECRL07 Curves Relating Coefficients
A, B, and C to L/rw



A
and
C

A = 0.3
B = 0.6
C = 0.9

BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL07

GENERAL DATA

Monitoring Well: CECRL07
 Test Type: Rising Head
 File Name: CRL07RBR
 Static Level, ft: 139.91
 Date: 9/8/93
 Time: 14:45

TEST DATA

Environmental Logger
 Unit #: 943
 Test #: 1

Scale Factor: 10.019
 Reference Value 0.000

TEST PARAMETERS

Screen Length (ft), Le: 10
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.43
 Is well fully penetrating? no
 Well Depth from water table (ft) 39.49
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 0
 A: 2.3
 B: 0.6
 C: 1.9
 Le/rw: 23.3
 ln(Re/rw)= 1.848
 Initial water table height (ft), y(0.6
 Water table height at time t (ft), 0.2
 Change in time from y(a) to y(b) 12

RESULTS

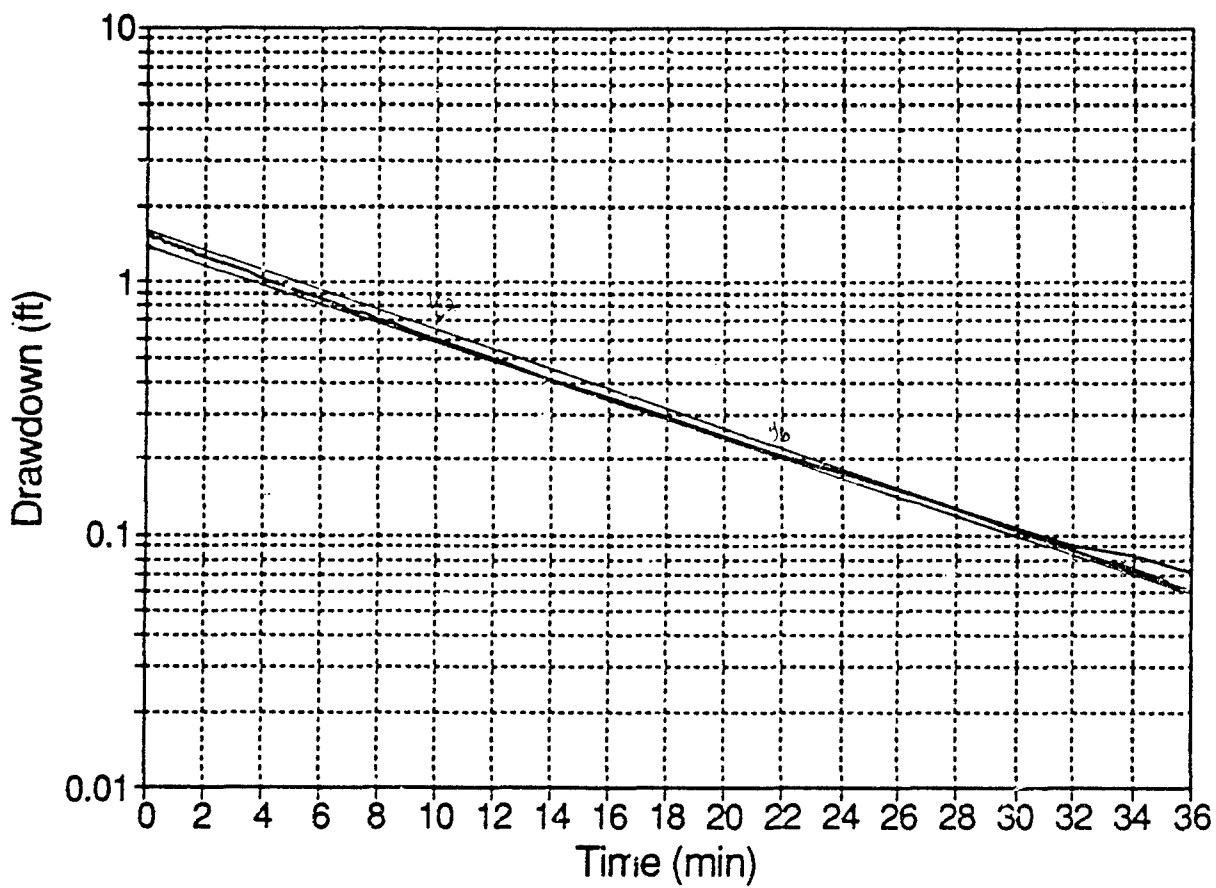
Hydraulic Conductivity (ft/min), 2.44E-04
 Hydraulic Conductivity (ft/sec), 4.07E-06
 Hydraulic Conductivity (m/sec) 1.24E-06
 Hydraulic Conductivity (cm/se 1.24E-04

TIME DATA
HERE

DRAWDOWN DATA
HERE

Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	1.085	1.085
0.0033	0.718	0.718
0.0066	0.886	0.886
0.0100	1.560	1.560
0.0133	1.592	1.592
0.0166	1.649	1.649
0.0200	1.617	1.617
0.0233	1.585	1.585

CECRL07 RISING HEAD TEST



$u_{a1} = 0.3$

$u_{b1} = 0.4$

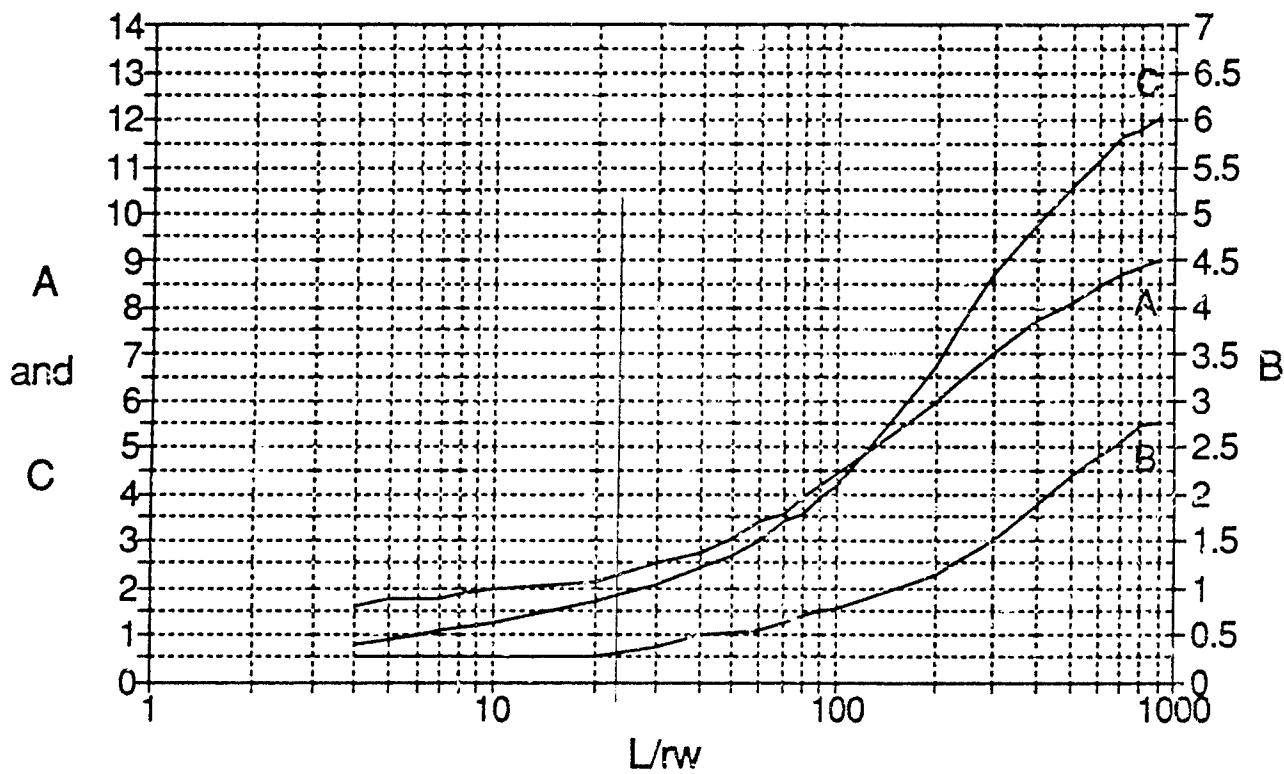
$u_{a2} = 0.3$

$u_{b2} = 0.4$

$\Delta t = 2$

$\Delta t = 2$

Curves Relating Coefficients
A, B, and C to L/rw



BOUWER AND RICE ANALYSIS OF DATA FROM MONITORING WELL CECRL08

GENERAL DATA

Monitoring Well: CECRL08
 Test Type: Falling Head
 File Name: CRL08FBR
 Static Level, ft: 131.49
 Date: 9/9/93
 Time: 10:21

TEST DATA

Environmental Logger
 Unit #: 943
 Test #: 0

Scale Factor: 10.019
 Reference Value 0.000

TEST PARAMETERS

Screen Length (ft), Le: 10
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.43
 Is well fully penetrating? no
 Well Depth from water table (ft) 15.51
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 0
 A: 2.3
 B: 0.6
 C: ERR
 Le/rw: 23.3
 ln(Re/rw)= 1.652
 Initial water table height (ft), y(0.23
 Water table height at time t (ft), 0.039
 Change in time from y(a) to y(b) 0.46

RESULTS

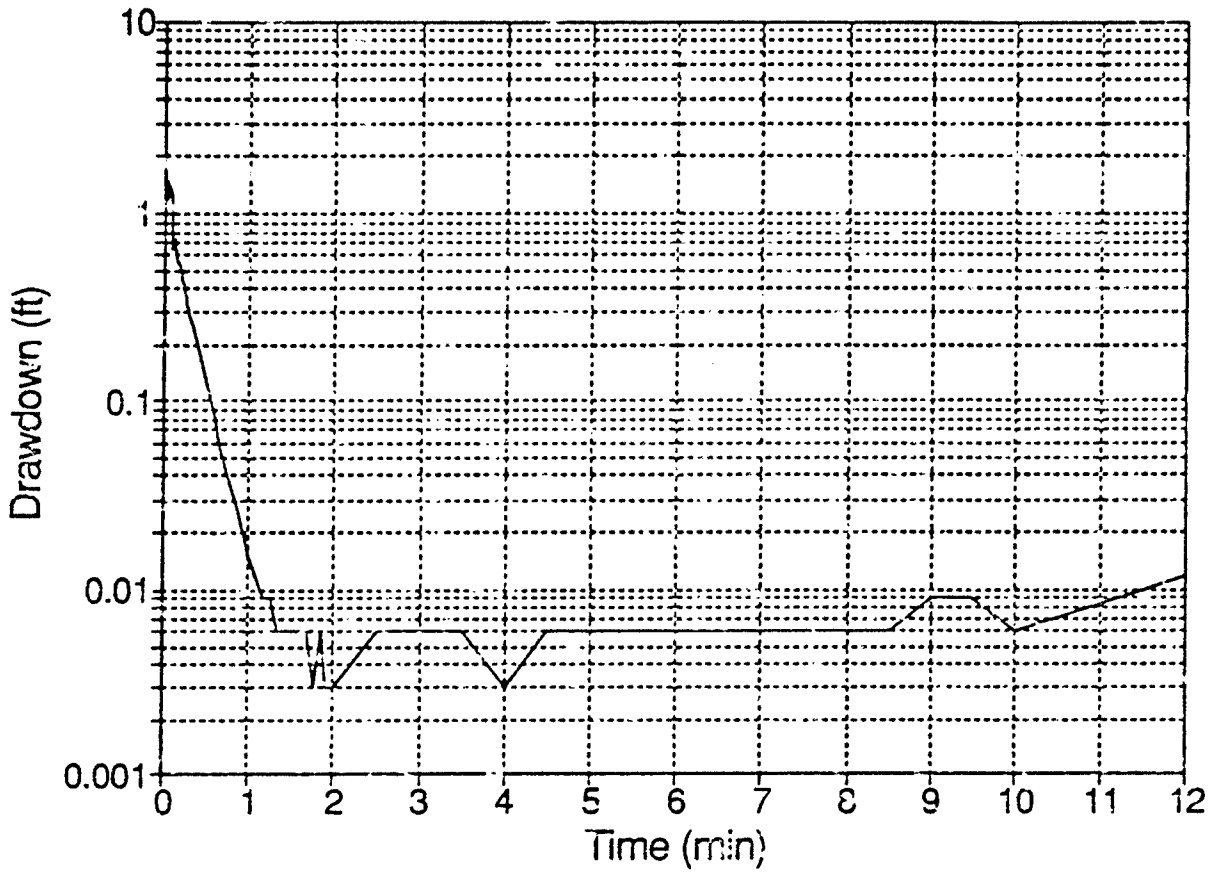
Hydraulic Conductivity (ft/min), 9.21E-03
 Hydraulic Conductivity (ft/sec), 1.53E-04
 Hydraulic Conductivity (m/sec) 4.68E-05
 Hydraulic Conductivity (cm/se 4.68E-03

**TIME DATA
 HERE**

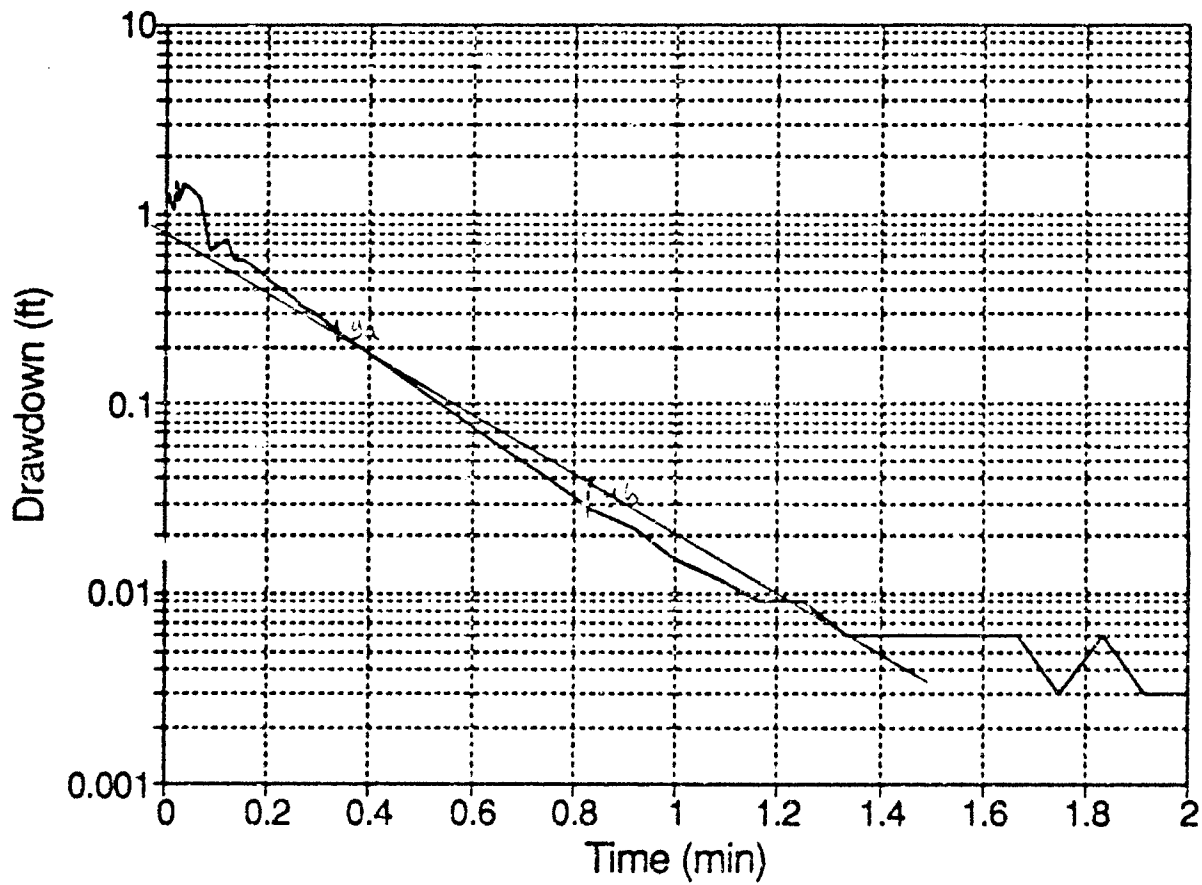
**DRAWDOWN DATA
 HERE**

Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	-0.553	0.553
0.0033	-1.196	1.196
0.0066	-1.297	1.297
0.0100	-1.155	1.155
0.0133	-1.050	1.050
0.0166	-1.339	1.339
0.0200	-1.528	1.528
0.0233	-1.408	1.408
0.0266	-1.212	1.212

CECRL08 FALLING HEAD



CECRL08 FALLING HEAD TEST

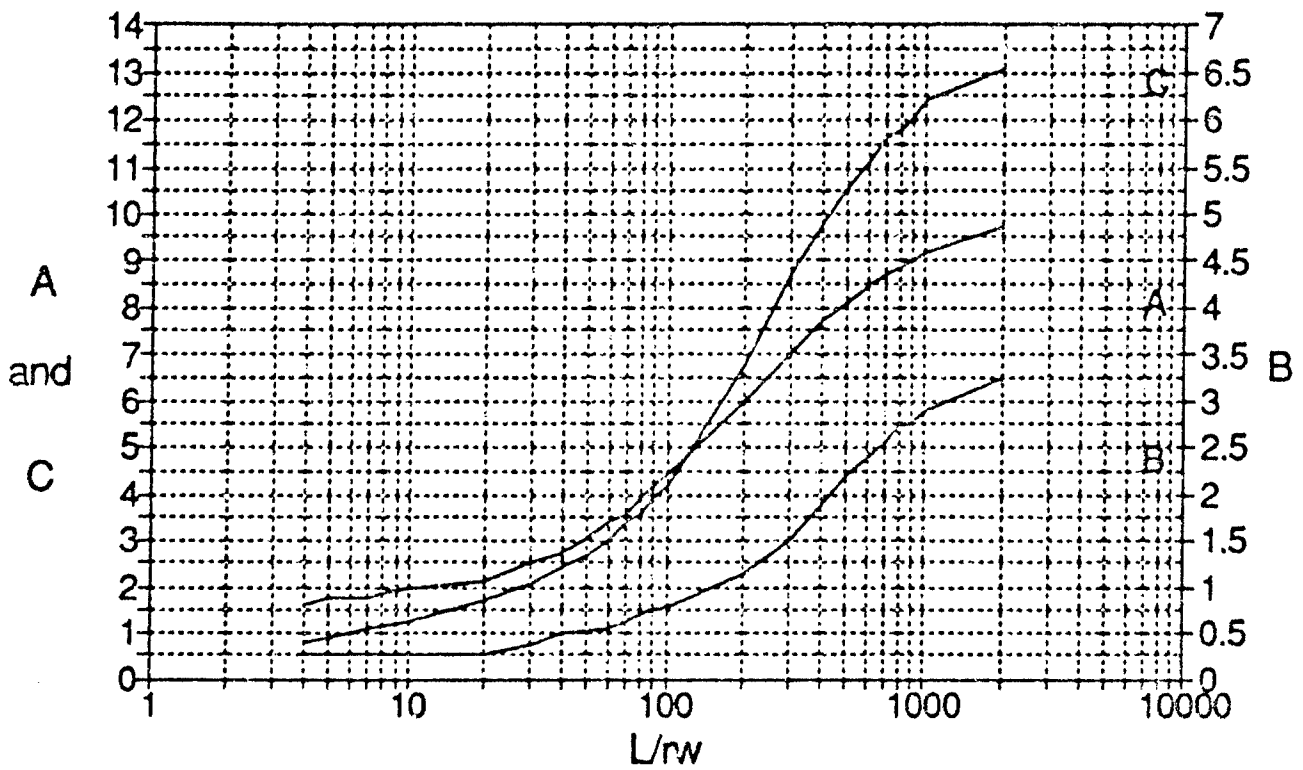


$t_1 = 0.3$

$t_2 = 0.87$

$\Delta t = t_2 - t_1 = 0.87 - 0.3 = 0.57$

CECRL08 Curves Relating Coefficients
A, B, and C to L/rw



BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL08

GENERAL DATA

Monitoring Well: CECRL08
 Test Type: Rising Head
 File Name: CRL08RBR
 Static Level, ft: 131.49
 Date: 9/9/93
 Time: 10:35

TEST DATA

Environmental Logger
 Unit #: 943
 Test #: 1

Scale Factor: 10.019
 Reference Value 0.000

TEST PARAMETERS

Screen Length (ft), Le: 10
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.43
 Is well fully penetrating? no
 Well Depth from water table (ft) 15.51
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 0
 A: 2.3
 B: 0.6
 C: 1.9
 Le/rw: 23.3
 ln(Re/rw)= 1.652
 Initial water table height (ft), y(0.19
 Water table height at time t (ft), 0.015
 Change in time from y(a) to y(b) 0.296

RESULTS

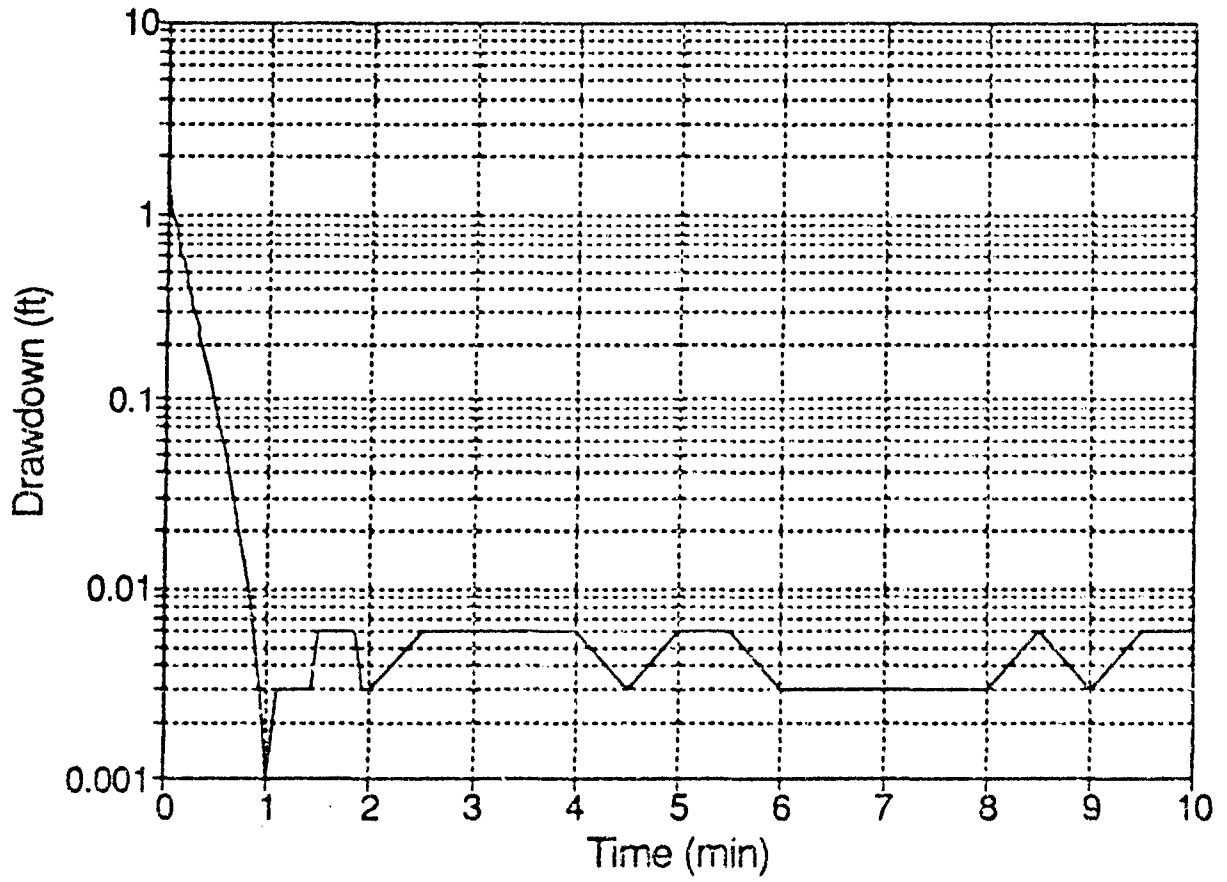
Hydraulic Conductivity (ft/min), 2.05E-02
 Hydraulic Conductivity (ft/sec), 3.41E-04
 Hydraulic Conductivity (m/sec) 1.04E-04
 Hydraulic Conductivity (cm/se 1.04E-02

TIME DATA
HERE

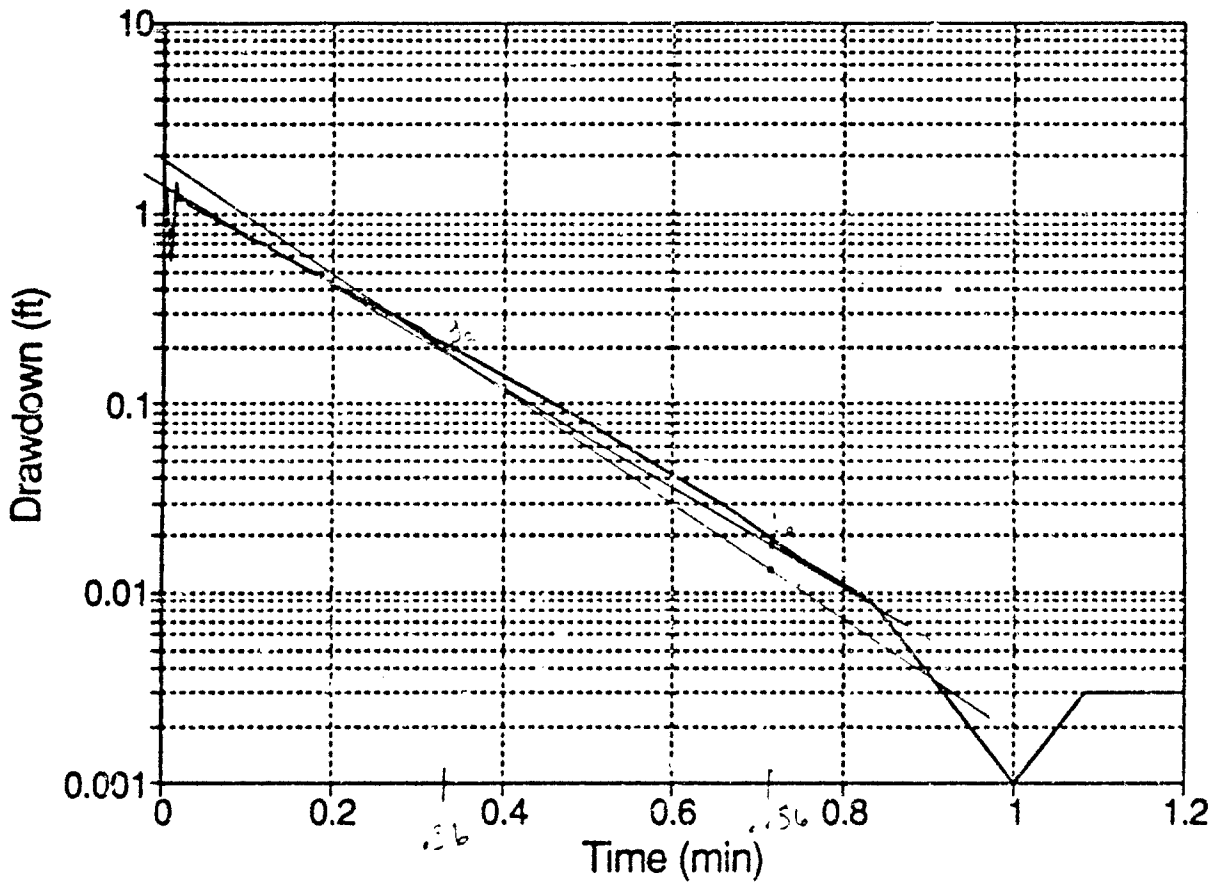
DRAWDOWN DATA
HERE

Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	1.316	1.316
0.0033	1.380	1.380
0.0066	0.569	0.569
0.0100	0.873	0.873
0.0133	1.471	1.471
0.0166	1.183	1.183
0.0200	1.199	1.199
0.0233	1.190	1.190

CECRL08 RISING HEAD



CECRL08 RISING HEAD



$U_0 = .17$

$S_0 = .0183$

$\Delta h = .570$

$K_1 = 1.88 \times 10^{-5}$

$U_0 = .2$

$S_0 = .015$

$\Delta h = .570$

$K_1 = 1.75 \times 10^{-5}$

BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL09

GENERAL DATA

Monitoring Well: CECRL09
 Test Type: Rising Head
 File Name: CRL09RRR
 Static Level, ft: 127.21
 Date: 9/8/93
 Time: 17:06

TEST DATA

Environmental Logger
 Unit #: 943
 Test #: 1

Scale Factor: 10.019
 Reference Value 0.000

TEST PARAMETERS

Screen Length (ft), Le: 10
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.43
 Is well fully penetrating? no
 Well Depth from water table (ft) 9.79
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 1
 A: 2.3
 B: 0.6
 C: 1.9
 Le/rw: 23.3
 ln(Re/rw)= 1.537
 Initial water table height (ft), y(0.22
 Water table height at time t (ft), 0.032
 Change in time from y(a) to y(b) 1

RESULTS

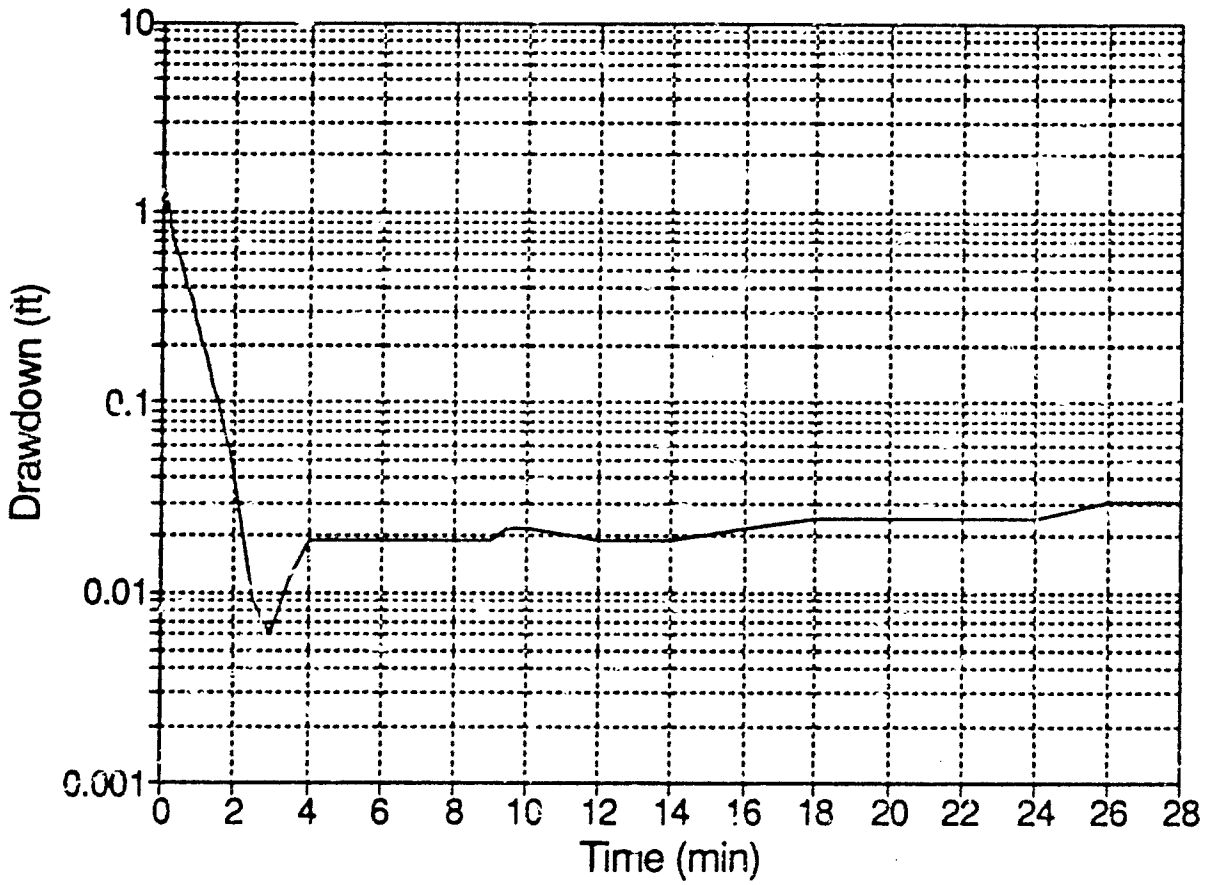
Hydraulic Conductivity (ft/min), 1.12E-02
 Hydraulic Conductivity (ft/sec), 1.87E-04
 Hydraulic Conductivity (m/sec) 5.70E-05
 Hydraulic Conductivity (cm/se 5.70E-03

TIME DATA
HERE

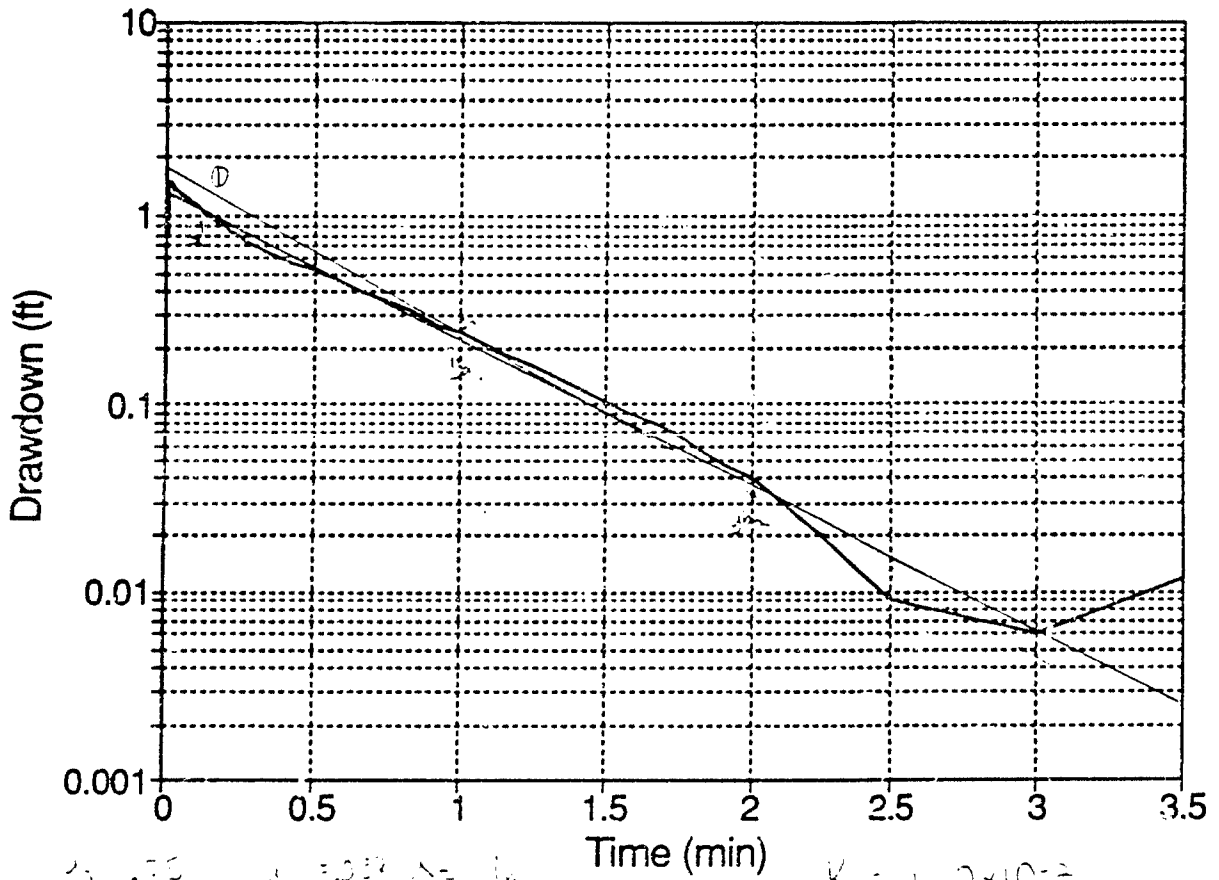
DRAWDOWN DATA
HERE

Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	0.886	0.886
0.0033	1.152	1.152
0.0066	0.816	0.816
0.0100	1.263	1.263
0.0133	1.513	1.513
0.0166	1.513	1.513
0.0200	1.433	1.433
0.0233	1.446	1.446

CECERL09 RISING HEAD TEST



CECRL09 RISING HEAD TEST



23.75

$h_0 = 0.017$ $\Delta h = 1.0$

$K = 1.10 \times 10^{-2}$

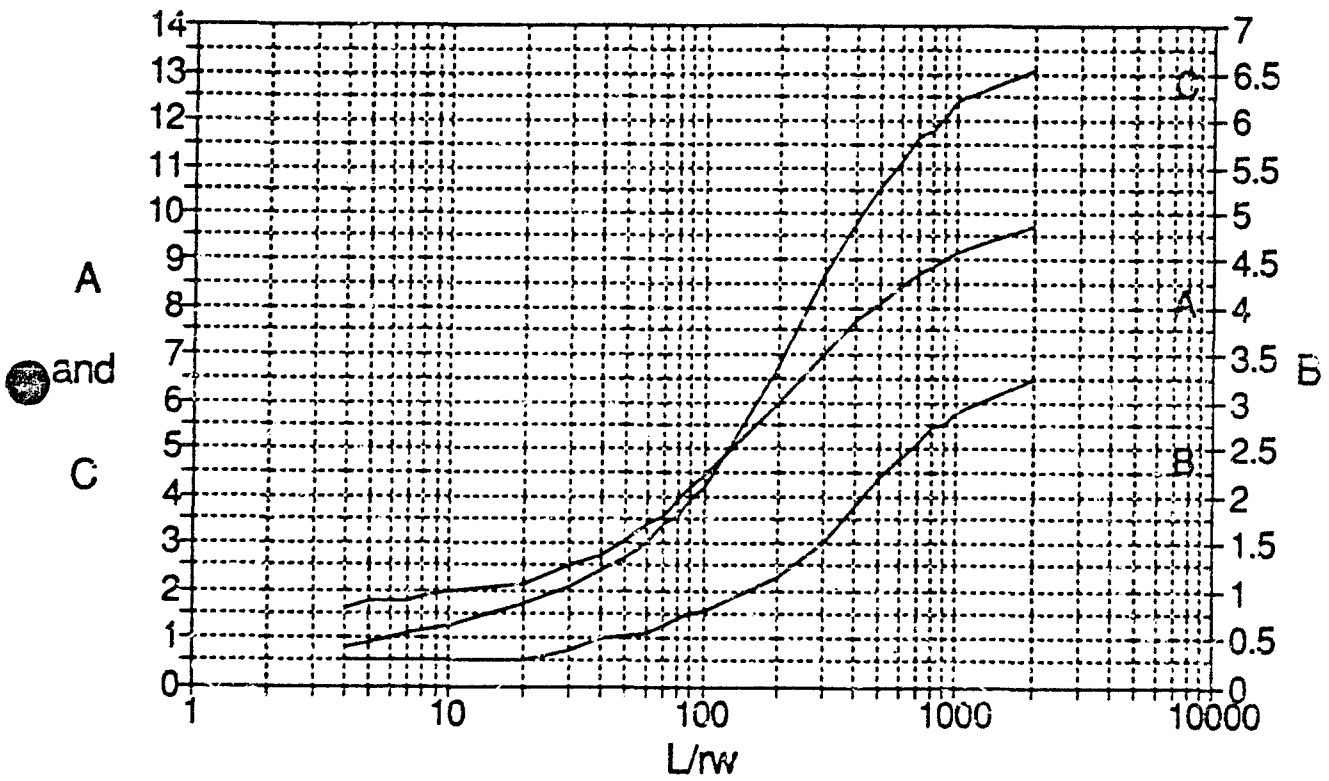
13.11

$h_0 = 0.032$ $\Delta h = 1.0$

$K = 1.12 \times 10^{-2}$

no significant difference

CECRL09 Curves Relating Coefficients
A, B, and C to L/rw



BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL09

GENERAL DATA

Monitoring Well: CECRL09
 Test Type: Falling Head
 File Name: CRL09FBR
 Static Level, ft: 127.21
 Date: 9/8/93
 Time: 16:12

TEST DATA

Environmental Logger
 Unit #: 943
 Test #: 0

Scale Factor: 10.019
 Reference Value 0.000

TEST PARAMETERS

Screen Length (ft), Le: 10
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.43
 Is well fully penetrating? no
 Well Depth from water table (ft): 9.79
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 1
 A: 2.3
 B: 0.6
 C: 1.9
 Le/rw: 23.3
 ln(Re/rw)= 1.537
 Initial water table height (ft), y(0.3
 Water table height at time t (ft), 0.19
 Change in time from y(a) to y(b) 0.8

RESULTS

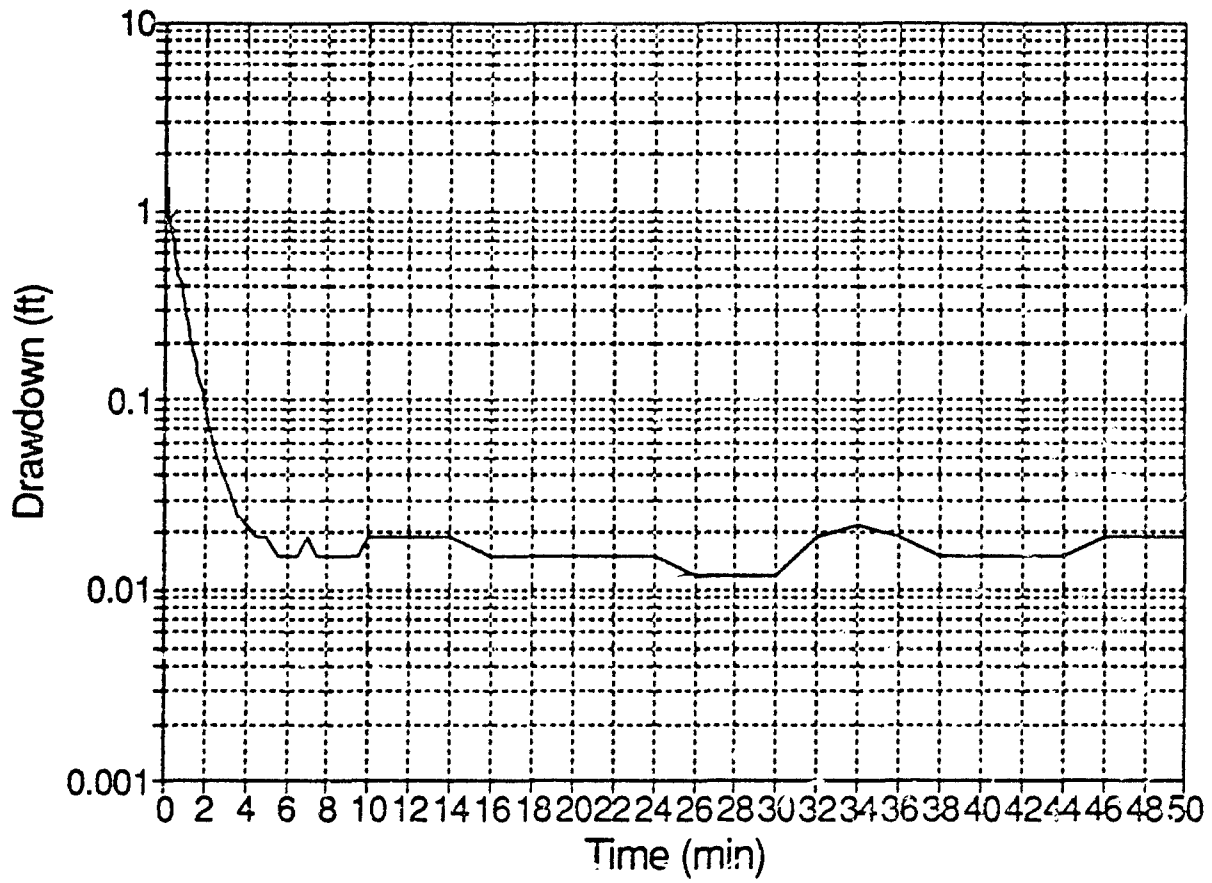
Hydraulic Conductivity (ft/min), 3.32E-03
 Hydraulic Conductivity (ft/sec), 5.54E-05
 Hydraulic Conductivity (m/sec) 1.69E-05
 Hydraulic Conductivity (cm/se) 1.69E-03

**TIME DATA
HERE**

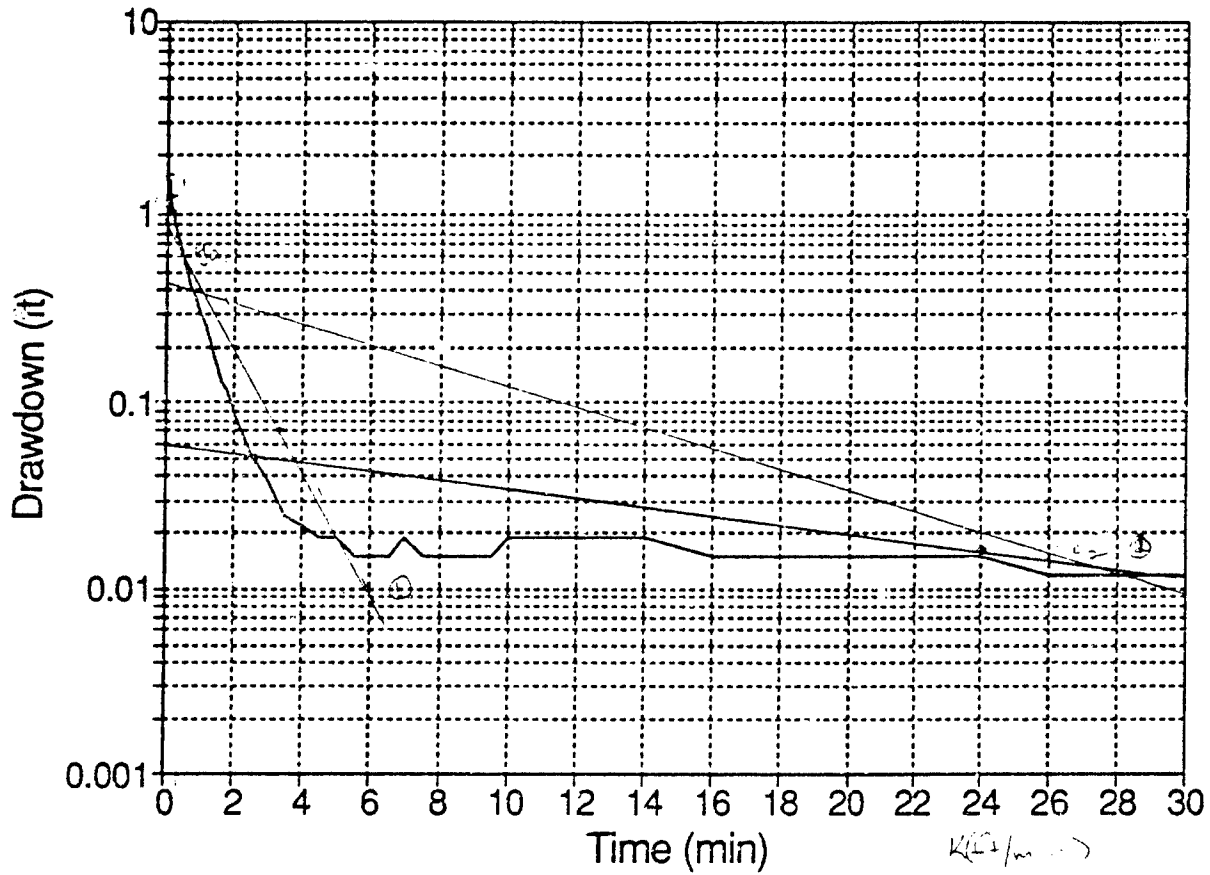
**DRAWDOWN DATA
HERE**

Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	-0.965	0.965
0.0033	-1.161	1.161
0.0066	-1.225	1.225
0.0100	-1.259	1.259
0.0133	-1.247	1.247
0.0166	-1.335	1.335
0.0200	-2.038	2.038
0.0233	-1.684	1.684

CECRL09 FALLING HEAD TEST

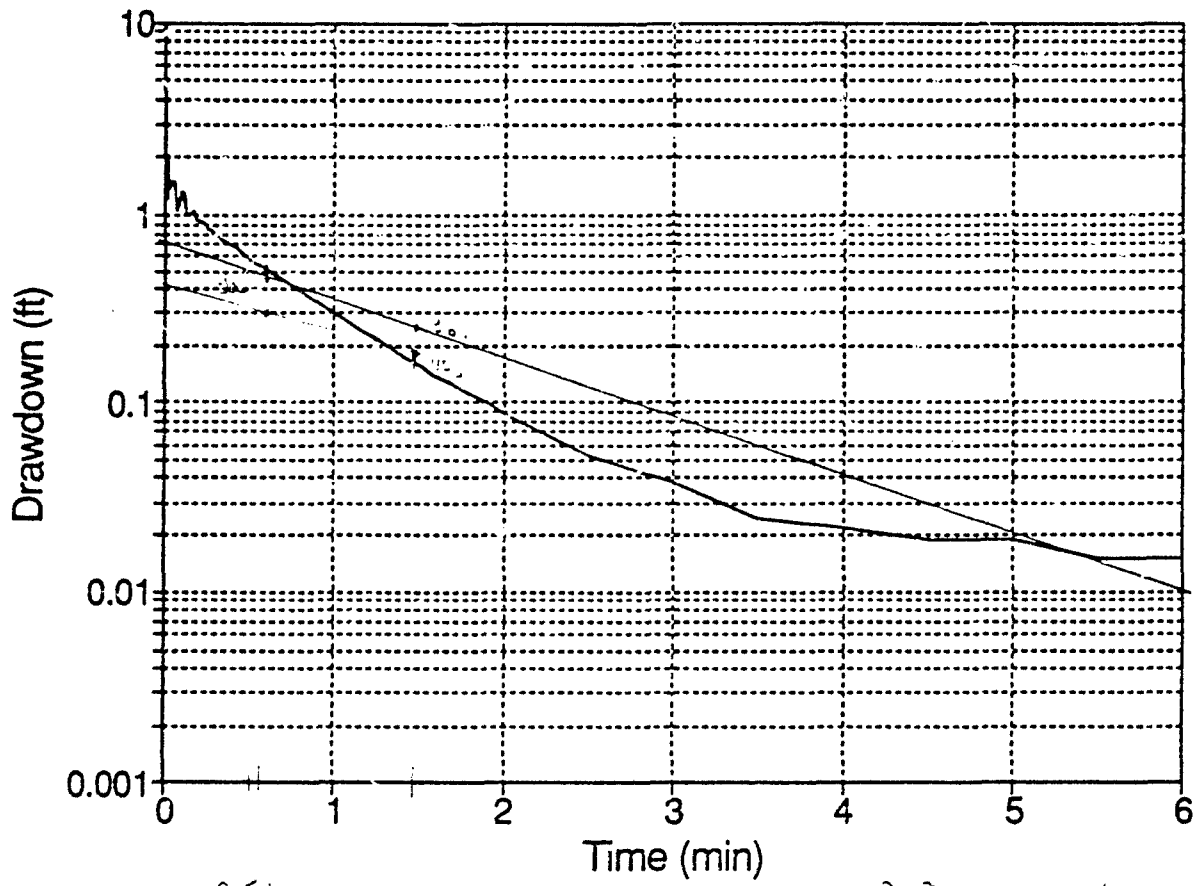


CECRL09 FALLING HEAD TEST



$y_0 = 0.27$
 $K(2/m...)$
 Additional handwritten notes and calculations are present but are mostly illegible due to fading and bleed-through.

CECRL09 FALLING HEAD TEST



$\Delta L_1 = 0.51$

$\Delta L_2 = 0.26$

$\Delta L_3 = 0.6 = 0.8$

$\Delta L_4 = 0.8$

$\Delta L_5 = 0.8$

$\Delta L_6 = 0.8$

BOUWER AND FICE ANALYSIS OF DATA FROM MONITORING WELL CECRL10

GENERAL DATA

Monitoring Well: CECRL10
 Test Type: Rising Head
 File Name: CRL10RBR
 Static Level, ft: 113.28
 Date: 9/8/93
 Time: 10.37

TEST DATA

Environmental Logger
 Unit #: 99999
 Test #: 1

Scale Factor: 9.995
 Reference Value: 0.000

TEST PARAMETERS

Screen Length (ft), Le: 10
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.43
 is well fully penetrating? no
 Well Depth from water table (ft) 14.22
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 0
 A: 2.3
 B: 0.6
 C: 1.9
 Le/rw: 23.3
 ln(Re/rw)= 1.532
 Initial water table height (ft), y(0.3
 Water table height at time t (ft), 0.062
 Change in time from y(a) to y(b) 7.5

RESULTS

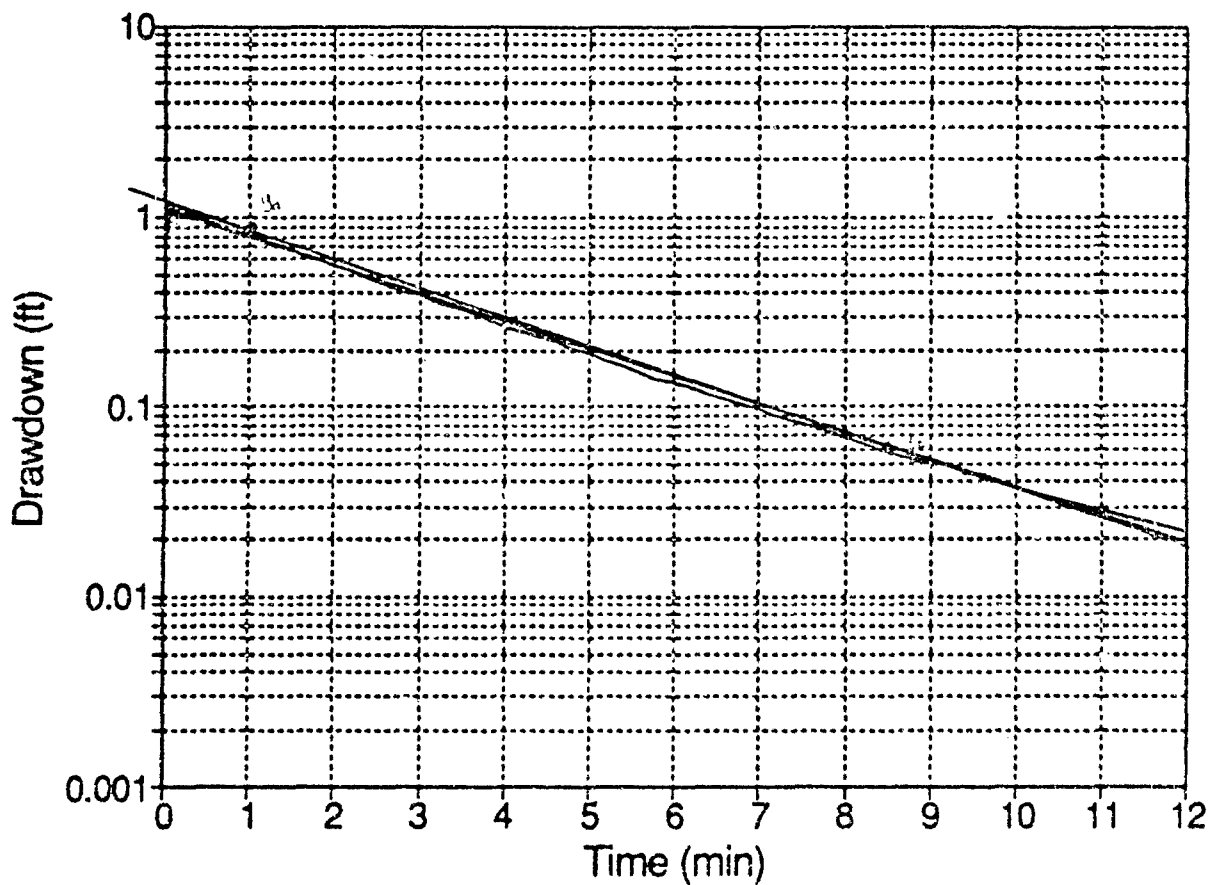
Hydraulic Conductivity (ft/min), 8.41E-04
 Hydraulic Conductivity (ft/sec), 1.40E-05
 Hydraulic Conductivity (m/sec) 4.27E-06
 Hydraulic Conductivity (cm/sec) 4.27E-04

TIME DATA
HERE

DRAWDOWN DATA
HERE

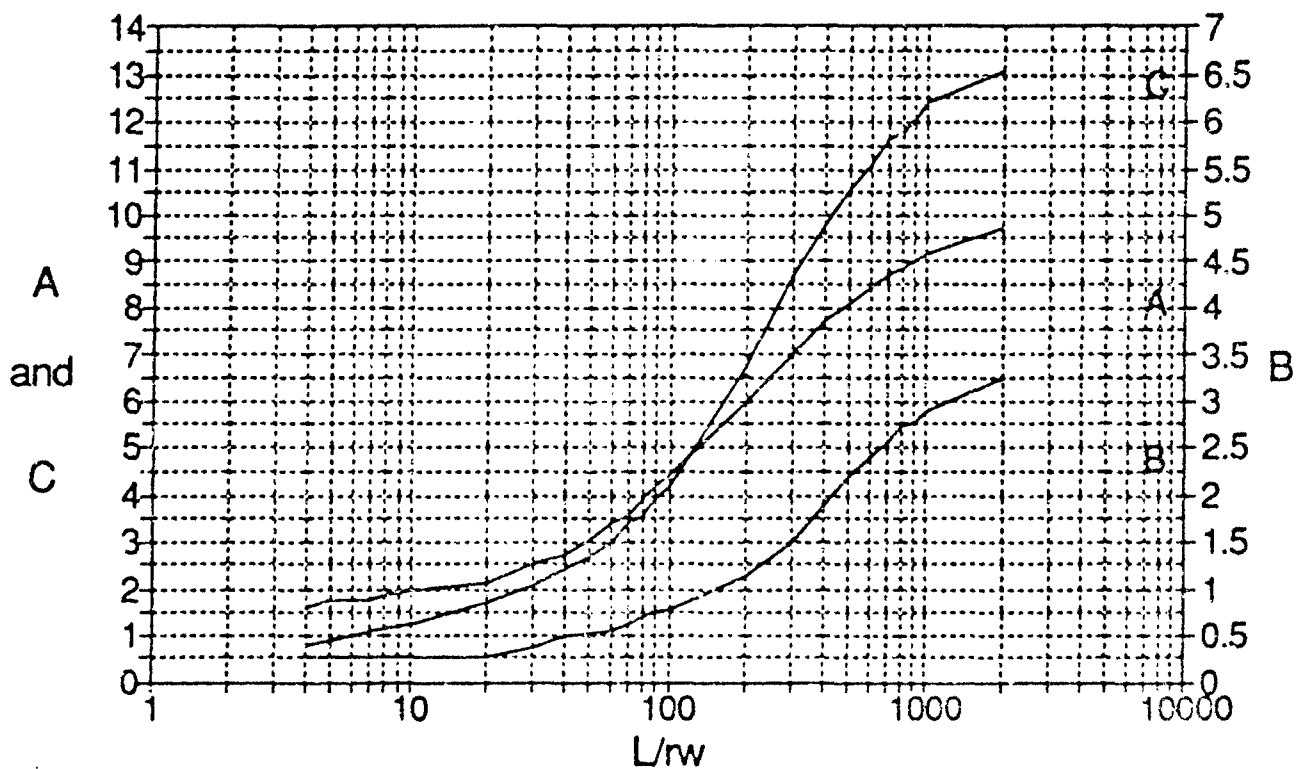
Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	0.857	0.857
0.0033	0.853	0.853
0.0066	0.853	0.553
0.0100	0.850	0.850
0.0133	0.850	0.850
0.0166	0.847	0.847
0.0200	0.847	0.847
0.0233	0.847	0.847

CECRL10 RISING HEAD



$y_0 = 0.9$ $u_0 = 0.05$ $s = 7.5$ $r = 3.0$

CECRL10 Curves Relating Coefficients
A, B, and C to L/rw



BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL10

GENERAL DATA

Monitoring Well: CECRL10
 Test Type: Falling Head
 File Name: CRL10FB17
 Static Level. ft: 113.28
 Date: 9/8/93
 Time: 09:57

TEST DATA

Environmental Logger
 Unit #: 99999
 Test #: 0

Scale Factor: 9.995
 Reference Value 0.000

TEST PARAMETERS

Screen Length (ft), Le: 10
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.43
 Is well fully penetrating? no
 Well Depth from water table (ft) 14.22
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 0
 A: 2.3
 B: 0.6
 C: 1.9
 Le/rw: 23.3
 ln(R₀/rw)= 1.632
 Initial water table height (ft), y(0.4
 Water table height at time t (ft), 0.05
 Change in time from y(a) to y(b) 3

RESULTS

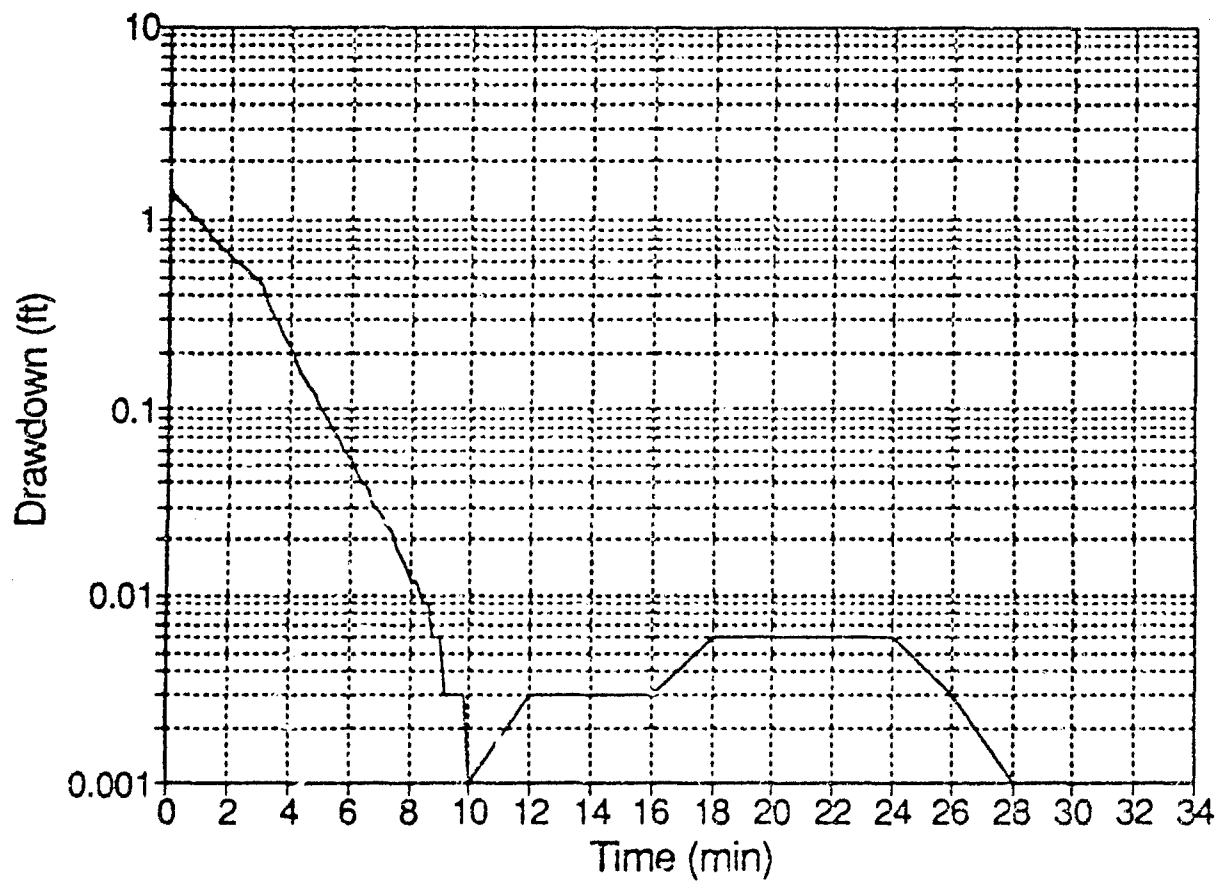
Hydraulic Conductivity (ft/min), 1.63E-03
 Hydraulic Conductivity (ft/sec), 2.72E-05
 Hydraulic Conductivity (m/sec) 8.30E-06
 Hydraulic Conductivity (cm/sec) 8.30E-04

TIME DATA
HERE

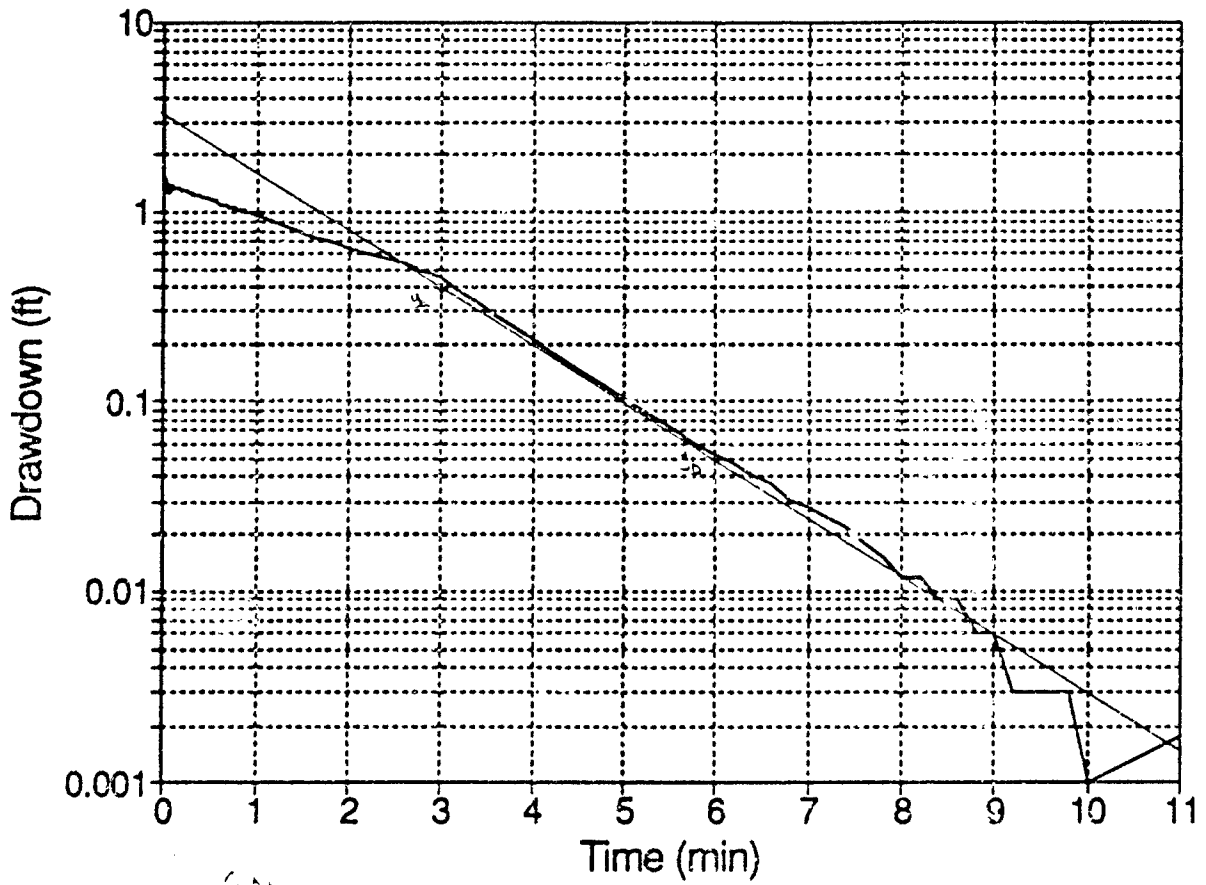
DRAWDOWN DATA
HERE

Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	-0.895	0.895
0.0033	-1.021	1.021
0.0066	-1.097	1.097
0.0100	-1.224	1.224
0.0133	-1.312	1.312
0.0166	-1.417	1.417
0.0200	-1.473	1.473
0.0233	-1.407	1.407

CECRL10 FALLING HEAD



CECRL10 FALLING HEAD



Q = 0.2
K = 0.05
S = 0.001

BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL11

GENERAL DATA

Monitoring Well: CECRL11
 Test Type: Falling Head
 File Name: CRL11FBR
 Static Level, ft: 97.4
 Date: 9/8/93
 Time: 12:18

TEST PARAMETERS

Screen Length (ft), L_s: 10
 Well Radius (ft), r_c: 0.17
 Well Radius + gravel pack (ft), r: 0.43
 Is well fully penetrating?: no
 Well Depth from water table (ft): 19.6
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 0
 A: 2.3
 B: 0.6
 C: 1.9
 L_s/r_w: 23.3
 ln(R_e/r_w)= 1.705
 Initial water table height (ft), y(: 1.4
 Water table height at time t (ft), : 0.88
 Change in time from y(a) to y(b) : 10

TEST DATA

Environmental Logger
 Unit #: 99999
 Test #: 0

Scale Factor: 9.995
 Reference Value 0.000

RESULTS

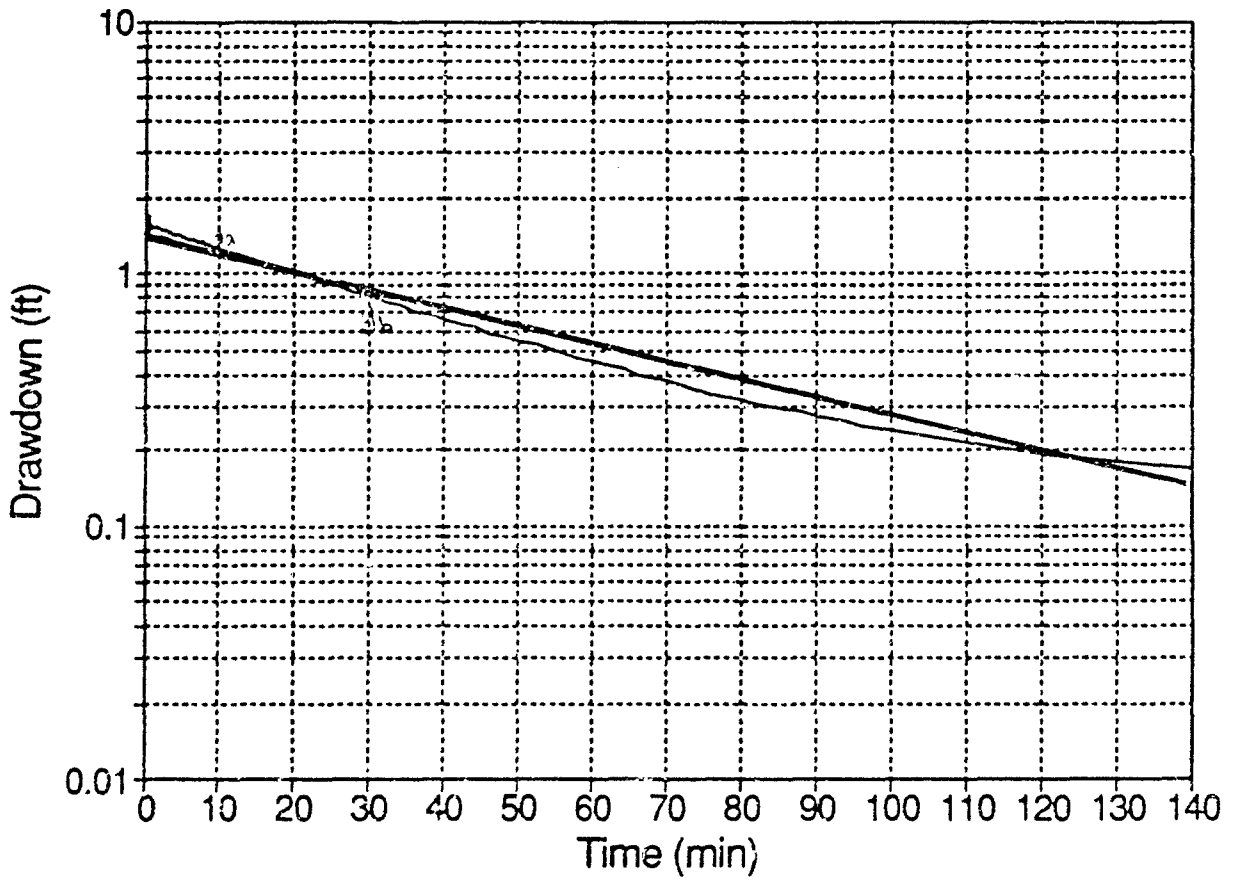
Hydraulic Conductivity (ft/min), 1.14E-04
 Hydraulic Conductivity (ft/sec), 1.91E-06
 Hydraulic Conductivity (m/sec) 5.81E-07
 Hydraulic Conductivity (cm/s) 5.81E-05

TIME DATA
HERE

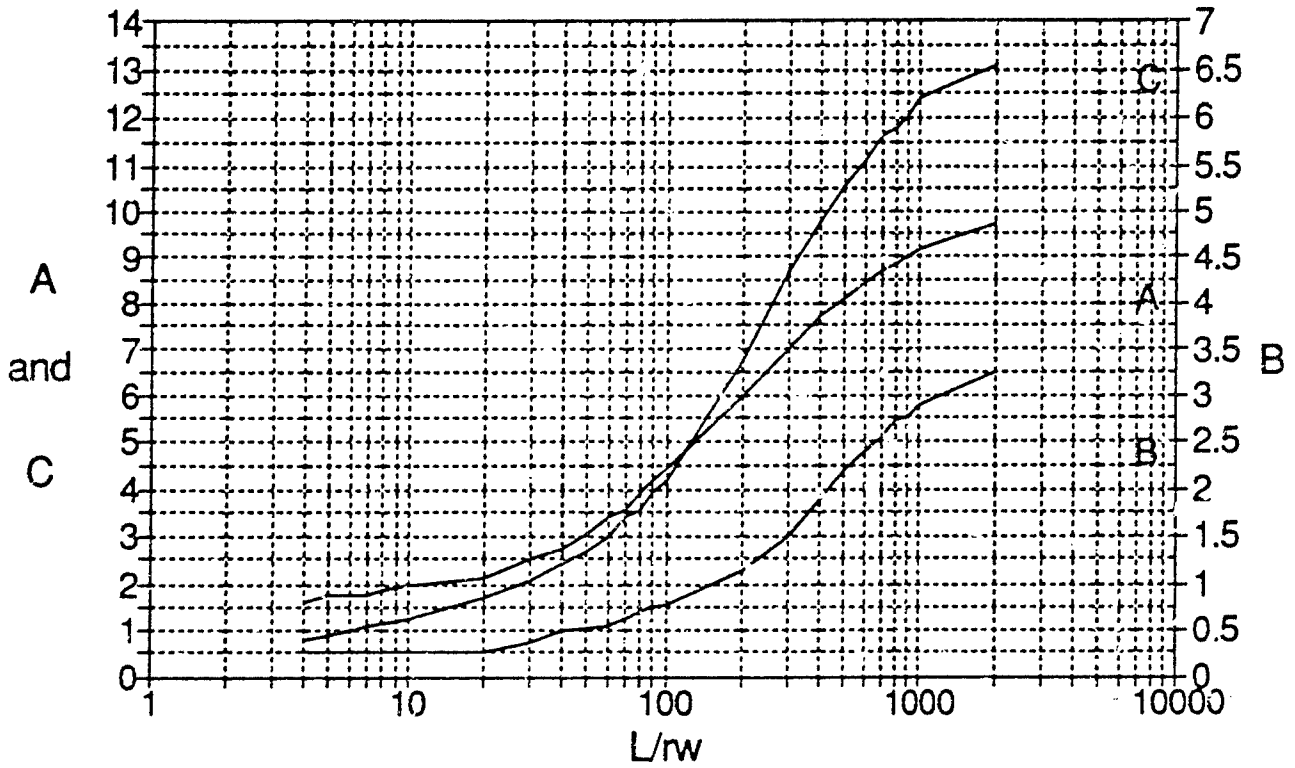
DRAWDOWN DATA
HERE

Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	-1.046	1.046
0.0033	-1.372	1.372
0.0066	-1.353	1.353
0.0100	-1.280	1.280
0.0133	-1.296	1.296
0.0166	-1.420	1.420
0.0200	-1.473	1.473
0.0233	-1.559	1.559

CECRL11 FALLING HEAD TEST



CECRL11 Curves Relating Coefficients
A, B, and C to L/rw



BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL11

GENERAL DATA

Monitoring Well: CECRL11
 Test Type: Rising Head
 File Name: CRL11RBR
 Static Level, ft: 97.4
 Date: 9/8/93
 Time: 14:53

TEST PARAMETERS

Screen Length (ft), Le: 10
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.43
 Is well fully penetrating? no
 Well Depth from water table (ft) 19.6
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 0
 A: 2.3
 B: 0.6
 C: 1.9
 Le/rw: 23.3
 ln(Re/rw)= 1.705
 Initial water table height (ft), y(0.99
 Water table height at time t (ft), 0.58
 Change in time from y(a) to y(b) 15

TEST DATA

Environmental Logger
 Unit #: 99999
 Test #: 1

Scale Factor: 9.995
 Reference Value 0.000

RESULTS

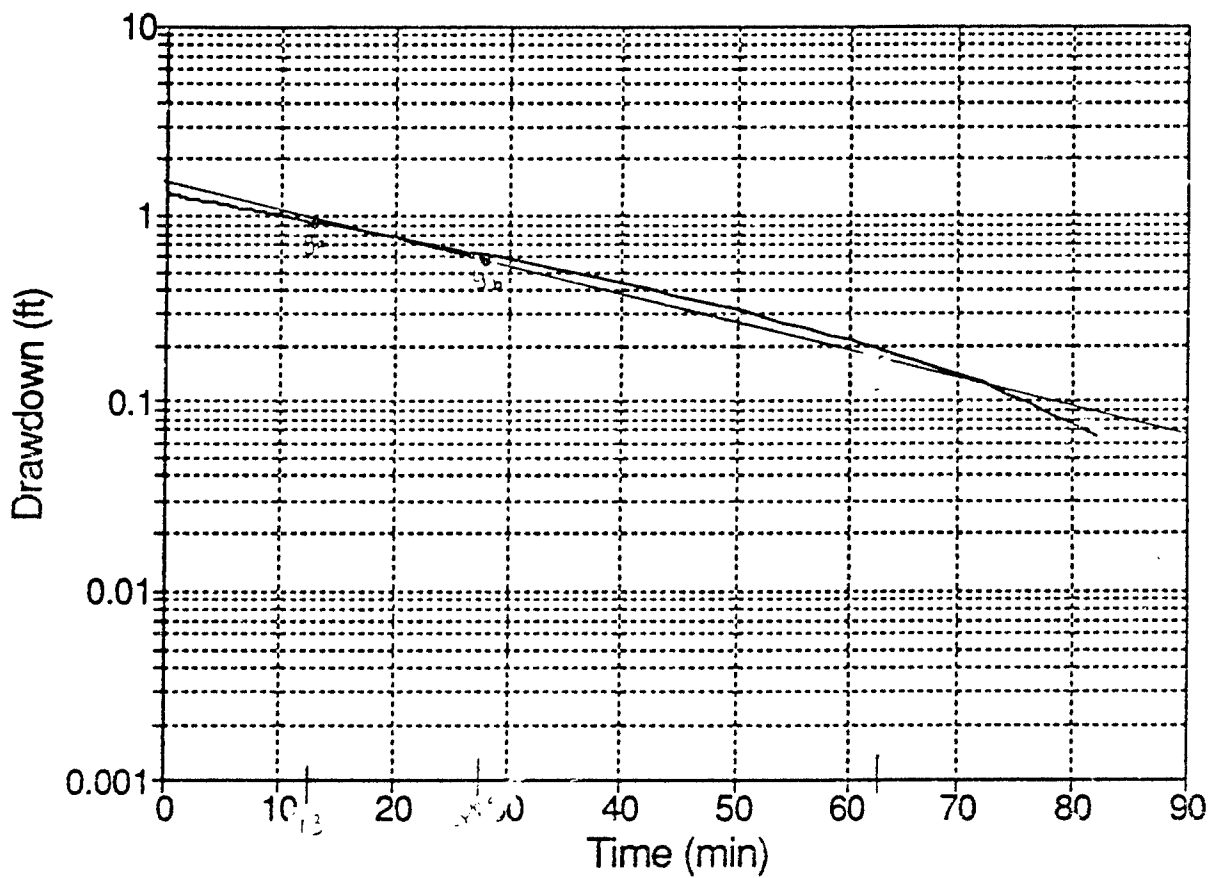
Hydraulic Conductivity (ft/min), 8.78E-05
 Hydraulic Conductivity (ft/sec), 1.45E-06
 Hydraulic Conductivity (m/sec) 4.46E-07
 Hydraulic Conductivity (cm/se 4.46E-05

TIME DATA
HERE

DRAWDOWN DATA
HERE

Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	1.366	1.366
0.0033	1.353	1.353
0.0066	1.347	1.347
0.0100	1.347	1.347
0.0133	1.340	1.340
0.0166	1.340	1.340
0.0200	1.343	1.343
0.0233	1.337	1.337

CECRL11 RISING HEAD TEST



1.79

0.58

13 = 15 min

2×10^{-5} ft

BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL12

GENERAL DATA

Monitoring Well: CECRL12
 Test Type: Falling Head
 File Name: CRL12FBR
 Static Level, ft: 84.95
 Date: 9/9/93
 Time: 11:59

TEST DATA

Environmental Logger
 Unit #: 943
 Test #: 0

Scale Factor: 10.019
 Reference Value 0.000

TEST PARAMETERS

Screen Length (ft), Le: 20
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.43
 Is well fully penetrating? no
 Well Depth from water table (ft): 13.65
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 1
 A: 2.95
 B: 1.01
 C: 2.55
 L_e/r_w: 46.5
 ln(R_e/r_w)= 1.820
 Initial water table height (ft), y(0.09
 Water table height at time t (ft), 0.018
 Change in time from y(a) to y(b) 2.12

RESULTS

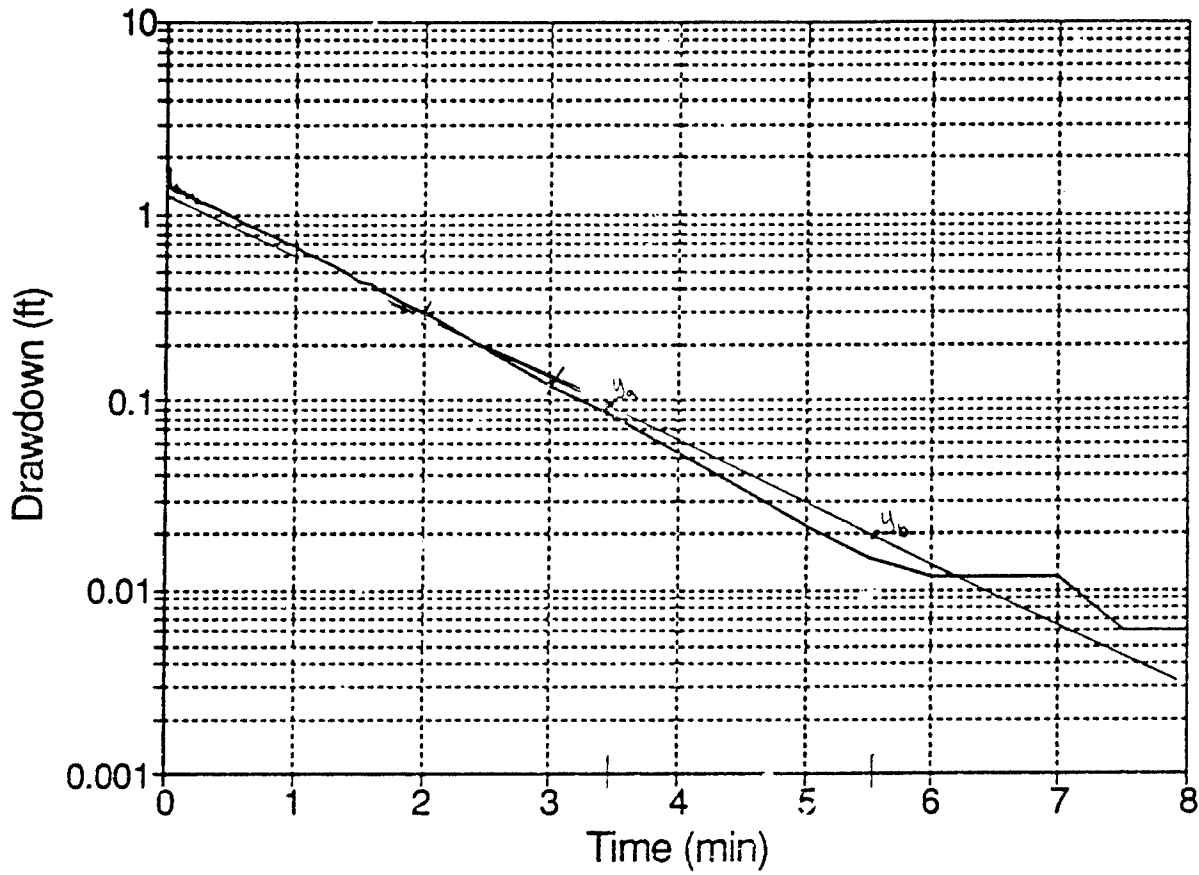
Hydraulic Conductivity (ft/min), 2.61E-03
 Hydraulic Conductivity (ft/sec), 4.36E-05
 Hydraulic Conductivity (m/sec) 1.33E-05
 Hydraulic Conductivity (cm/se 1.33E-03

TIME DATA
HERE

DRAWDOWN DATA
HERE

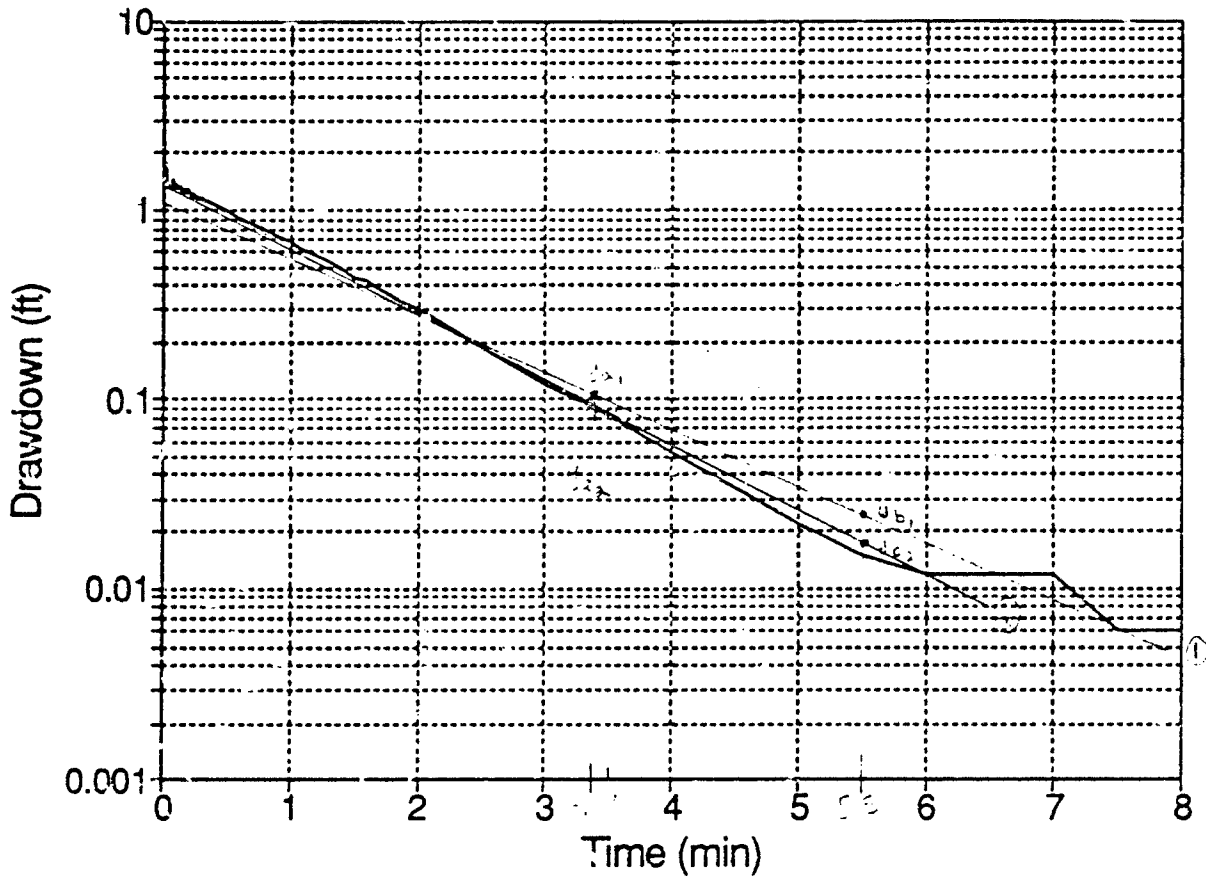
Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	-1.215	1.215
0.0033	-1.405	1.405
0.0066	-1.364	1.364
0.0100	-1.576	1.576
0.0133	-1.674	1.674
0.0166	-1.753	1.753
0.0200	-1.785	1.785
0.0233	-1.756	1.756

CECRL12 FALLING HEAD TEST



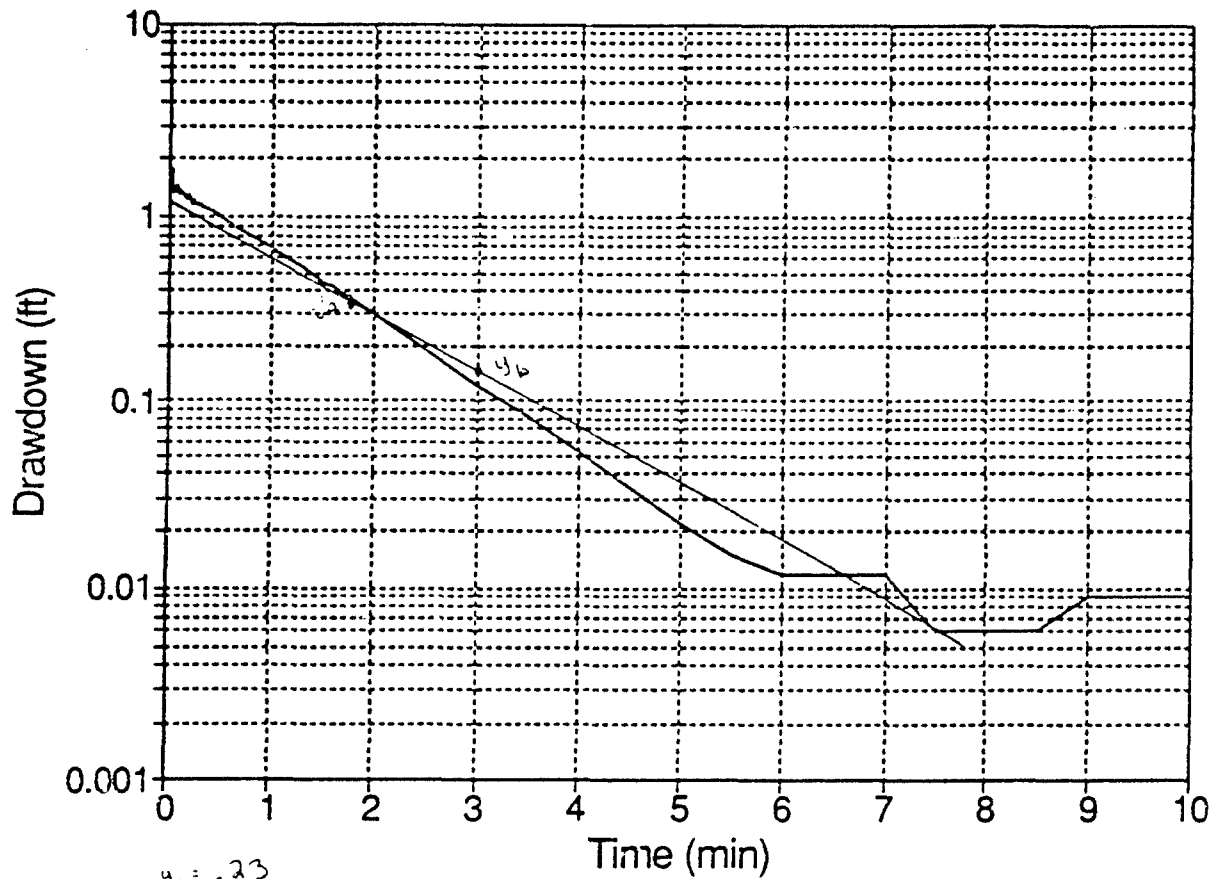
3.5 .09
 3.5 .09
 Δ = 5.52 - 3.43
 2.09

CECRL12 FALLING HEAD TEST



$b_1 = 2.5$ $\Delta = 0.001$
 $b_2 = 3.5$ $\Delta = 0.001$

CECRL12 FALLING HEAD TEST



$y_c = 0.23$

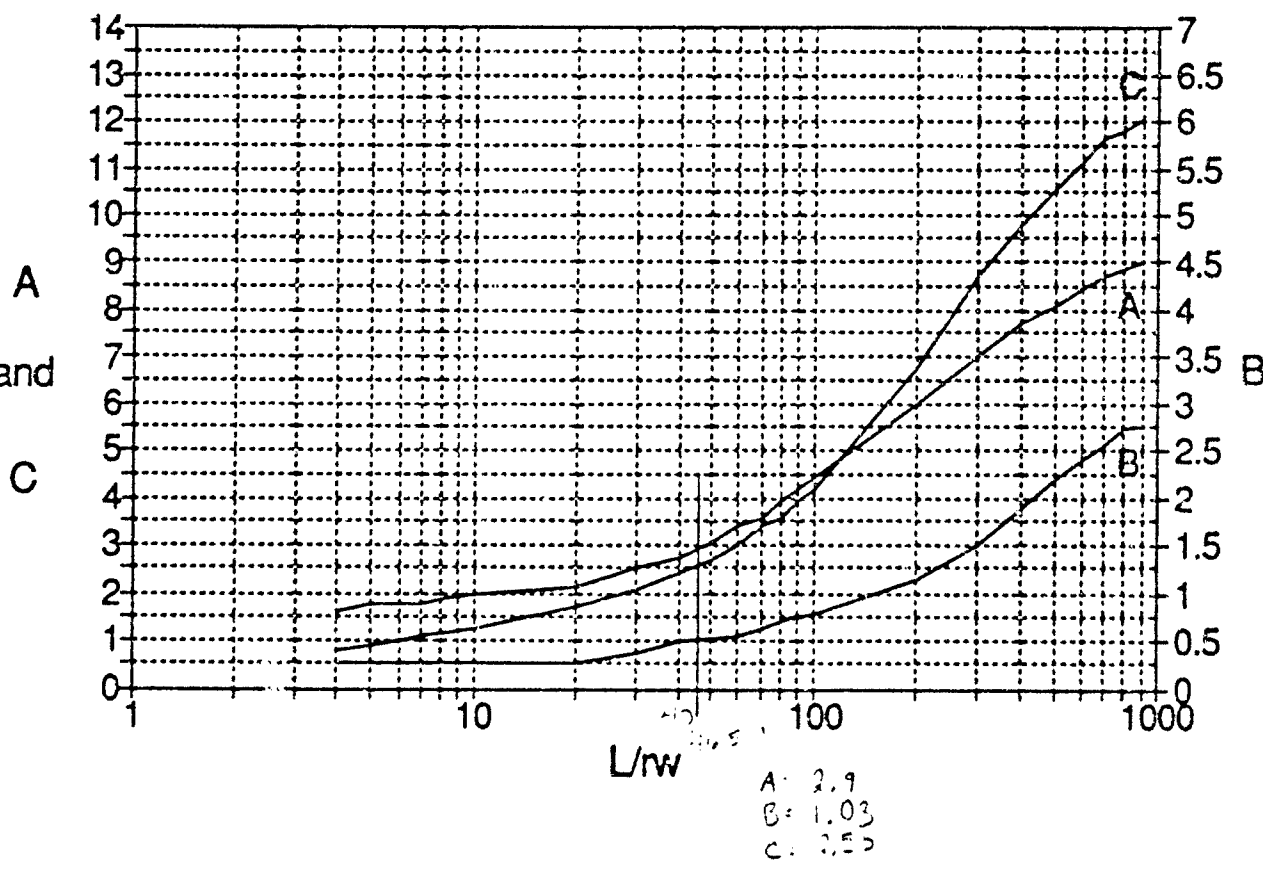
$s_c = 0.15$

$\lambda = 3.18 = 1.2 \dots$

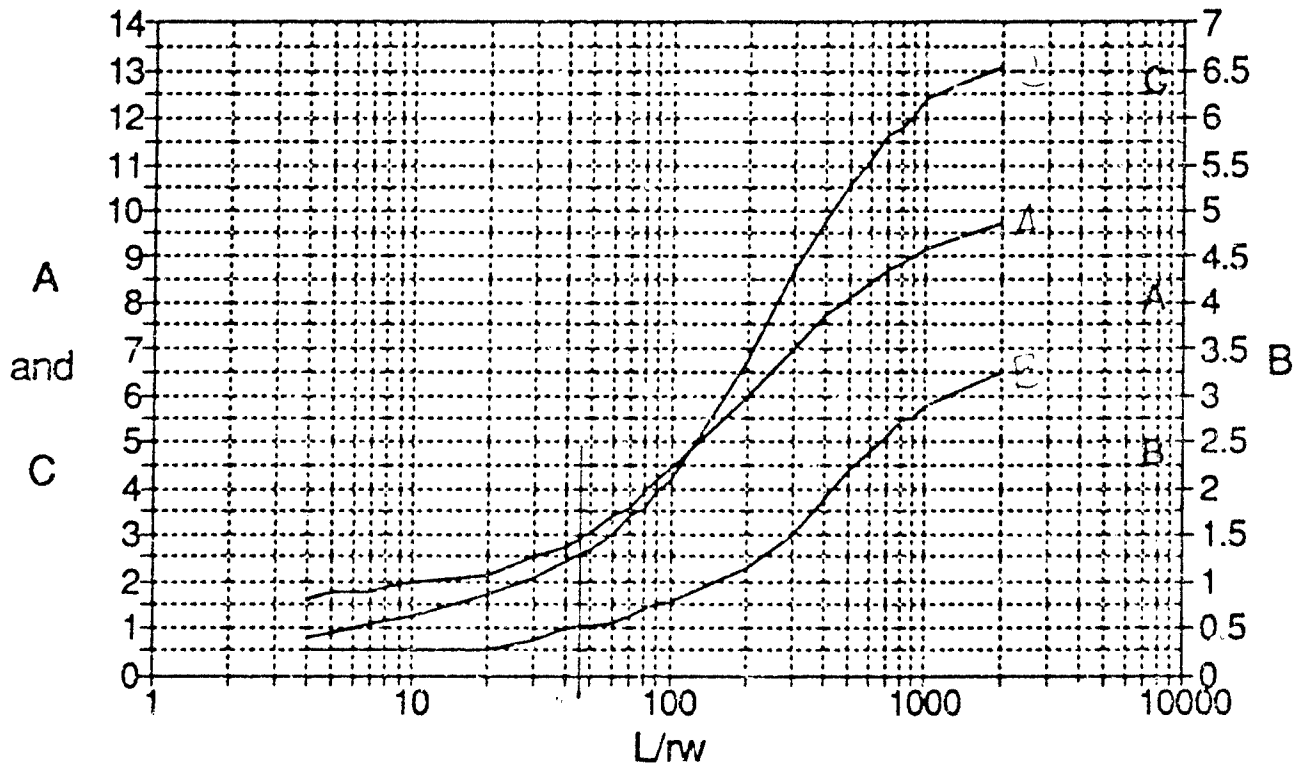
\dots

\dots

Curves Relating Coefficients
A, B, and C to L/rw



CECRL12 Curves Relating Coefficients
A, B, and C to L/rw



BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL12

GENERAL DATA

Monitoring Well: CECRL12
 Test Type: Rising Head
 File Name: CRL12RBR
 Static Level, ft: 84.85
 Date: 9/9/93
 Time: 12:12

TEST DATA

Environmental Logger
 Unit #: 943
 Test #: 1

Scale Factor: 10.020
 Reference Value 0.003

TEST PARAMETERS

Screen Length (ft), L_s: 20
 Well Radius (ft), r_c: 0.17
 Well Radius + gravel pack (ft), r: 0.43
 Is well fully penetrating? no
 Well Depth from water table (ft): 13.65
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 1
 A: 2.95
 B: 1.01
 C: 2.55
 L_s/r_w: 46.5
 ln(R_e/r_w)= 1.820
 Initial water table height (ft), y(0.08
 Water table height at time i (ft), 0.022
 Change in time from y(a) to y(b) 1.125

RESULTS

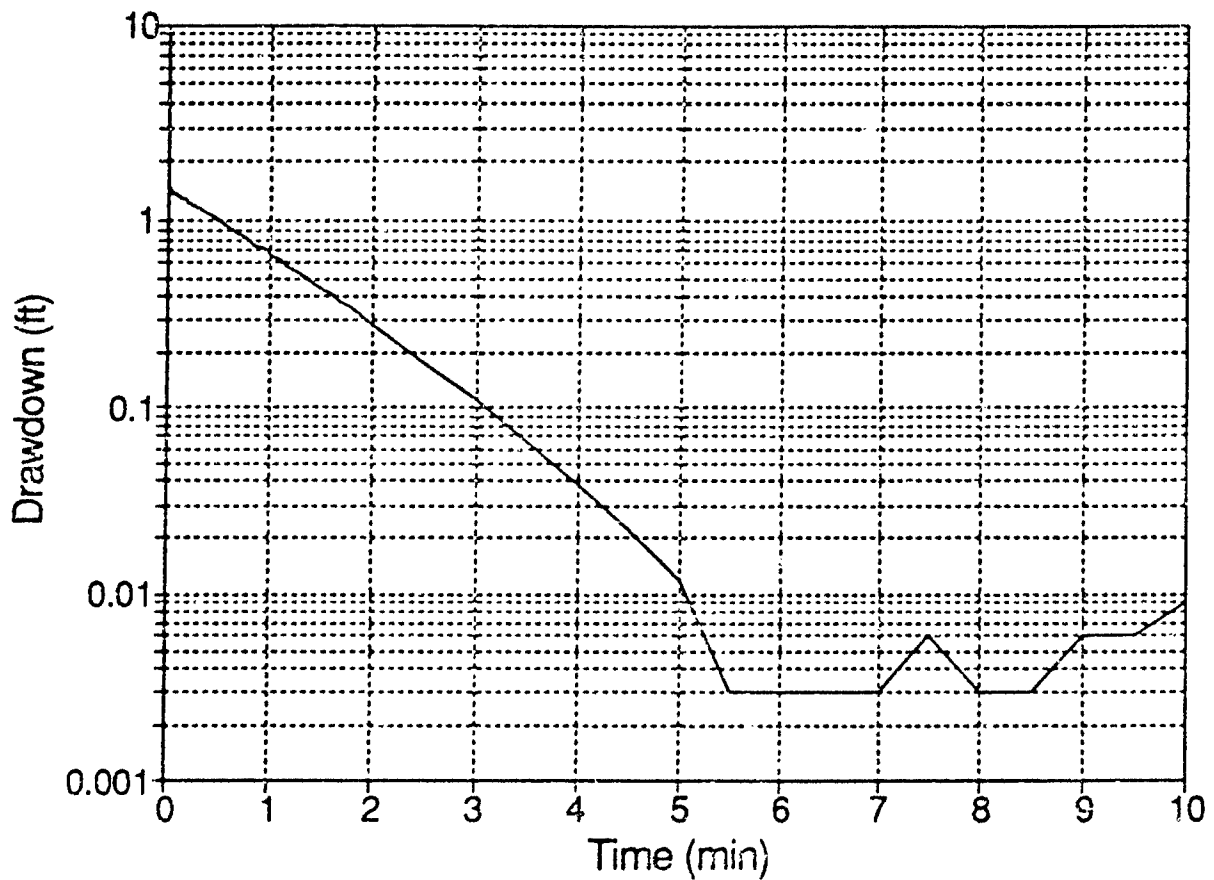
Hydraulic Conductivity (ft/min), 3.95E-03
 Hydraulic Conductivity (ft/sec), 6.59E-05
 Hydraulic Conductivity (m/sec) 2.01E-05
 Hydraulic Conductivity (cm/se 2.01E-03

TIME DATA
HERE

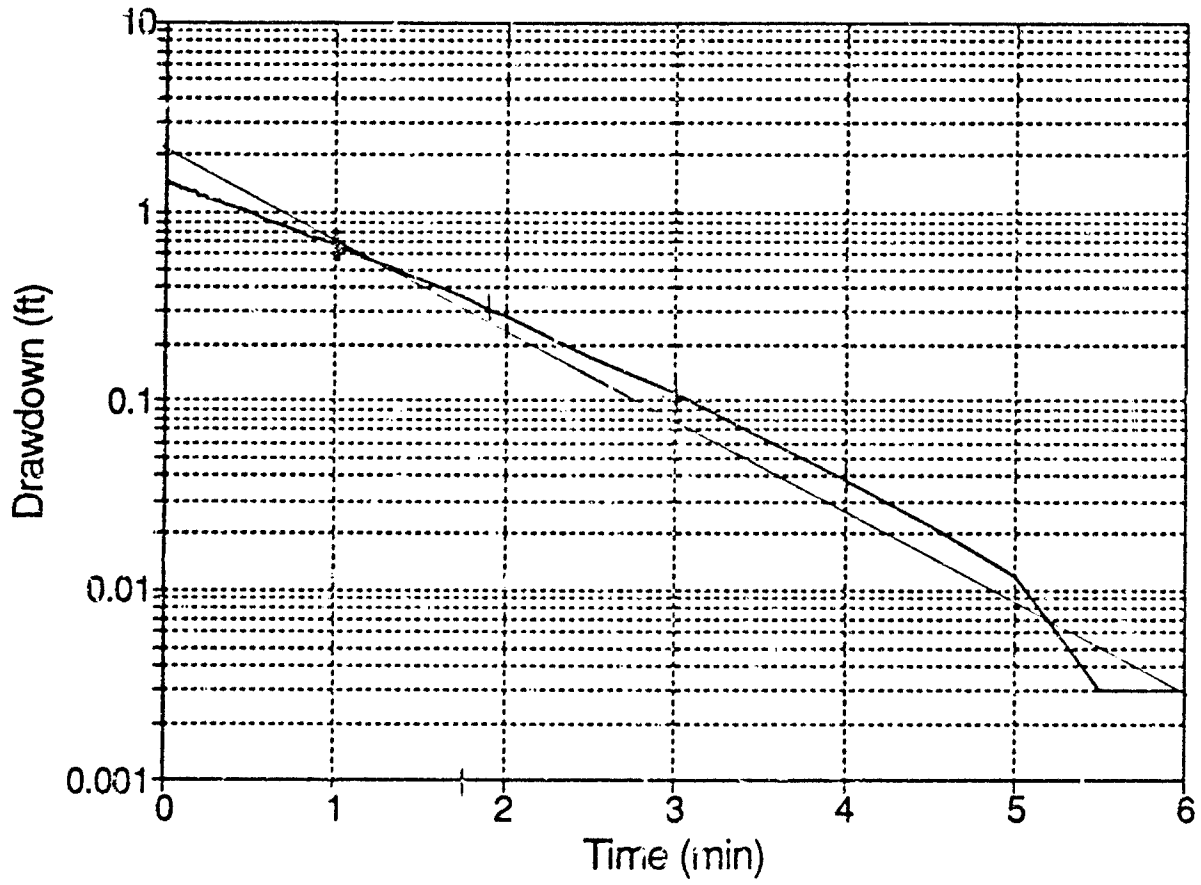
DRAWDOWN DATA
HERE

Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	1.468	1.468
0.0033	1.465	1.465
0.0066	1.462	1.462
0.0100	1.449	1.449
0.0133	1.446	1.446
0.0166	1.446	1.446
0.0200	1.434	1.434
0.0233	1.427	1.427

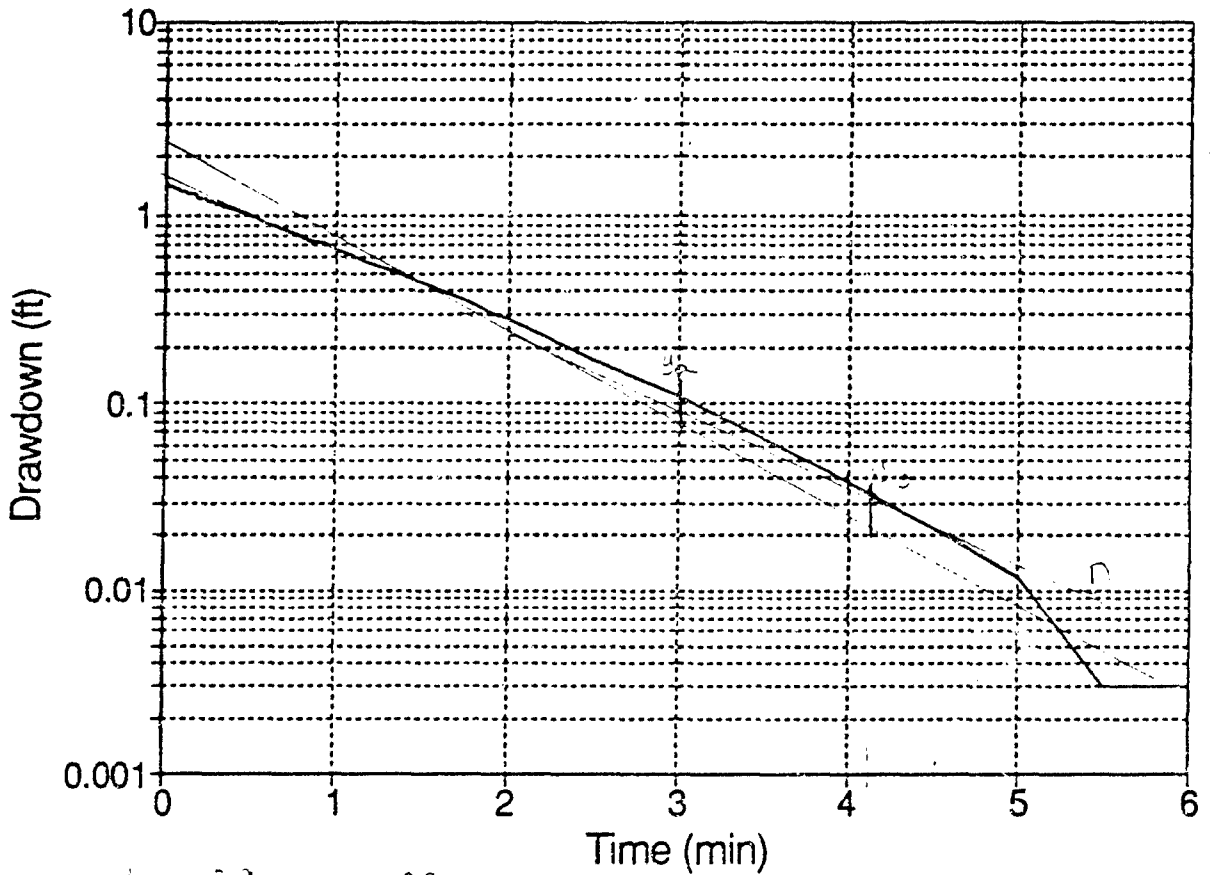
CECRL12 RISING HEAD



CECRL12 RISING HEAD



CECRL12 RISING HEAD



$u = 0.031$ $4.175 - 3 = 1.175$
 $D = 0.003$

BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL13

GENERAL DATA

Monitoring Well: CECRL13
 Test Type: Falling Head
 File Name: CRL13FBR
 Static Level, ft: 140
 Date: 9/8/93
 Time: 10:44

TEST DATA

Environmental Logger
 Unit #: 943
 Test #: 0

Scale Factor: 10.019
 Reference Value 0.000

TEST PARAMETERS

Screen Length (ft), Le: 10
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.25
 Is well fully penetrating? no
 Well Depth from water table (ft): 63
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 0
 A: 2.7
 B: 1
 C: 2.4
 Le/rw: 40.0
 ln(Re/rw)= 2.118
 Initial water table height (ft), y(0.2
 Water table height at time t (ft), 0.06
 Change in time from y(a) to y(b) 6

RESULTS

Hydraulic Conductivity (ft/min), 4.67E-04
 Hydraulic Conductivity (ft/sec), 7.79E-06
 Hydraulic Conductivity (m/sec) 2.37E-06
 Hydraulic Conductivity (cm/se 2.37E-04

**TIME DATA
 HERE**

**DRAWDOWN DATA
 HERE**

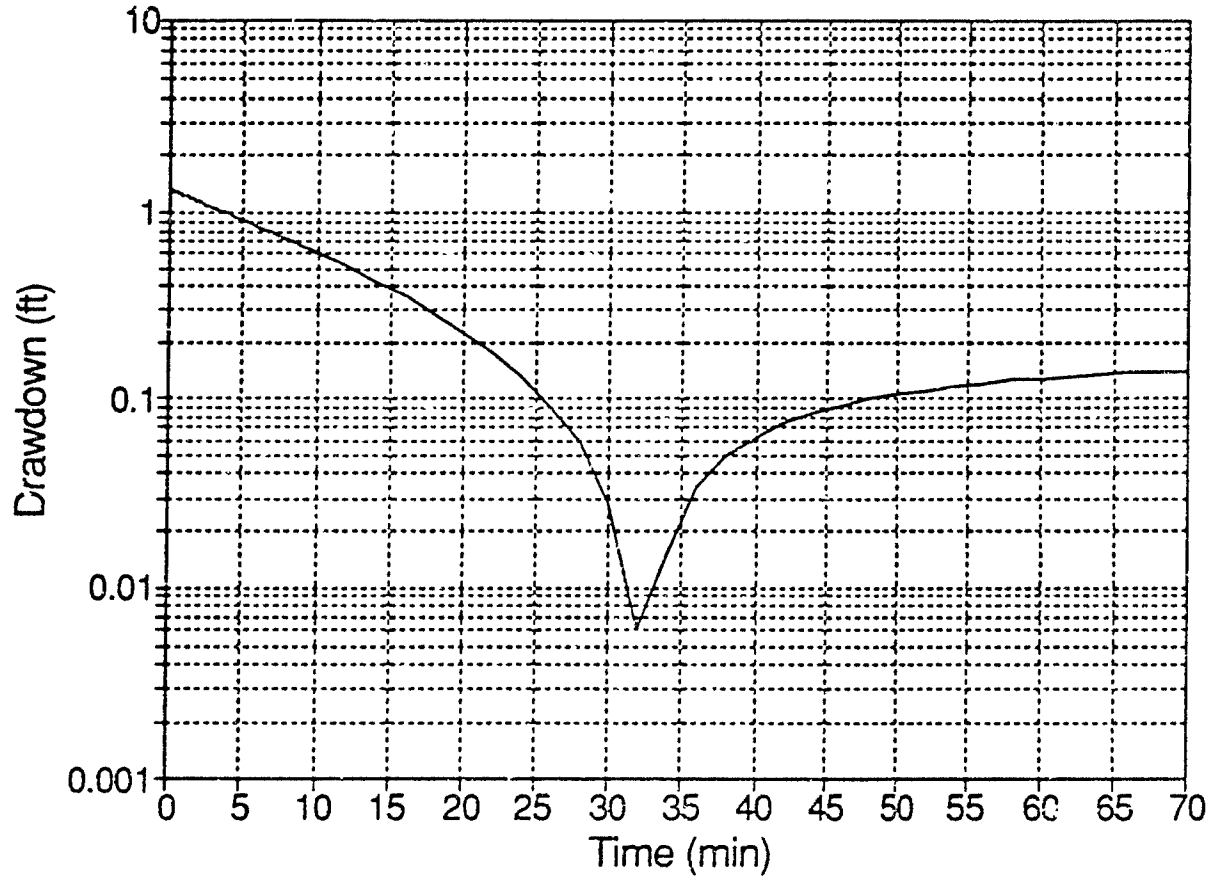
Elapsed Time
 t
 (min)

Drawdown
 y
 (ft)

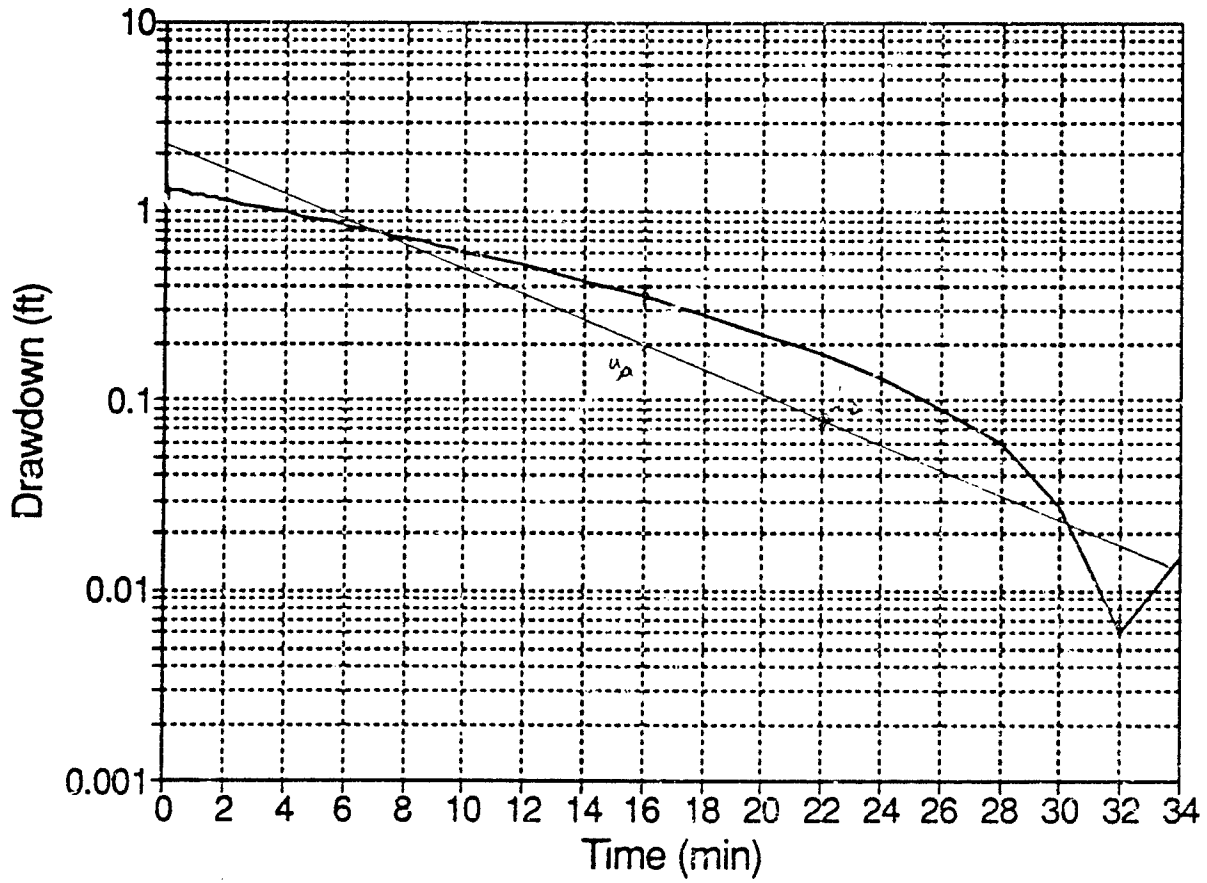
Absolute Value of Y

0.0000	-1.247	1.247
0.0033	-1.320	1.320
0.0066	-1.405	1.405
0.0100	-1.478	1.478
0.0133	-1.693	1.693
0.0166	-1.668	1.668
0.0200	-1.627	1.627
0.0233	-1.680	1.680

CECRL13 FALLING HEAD TEST

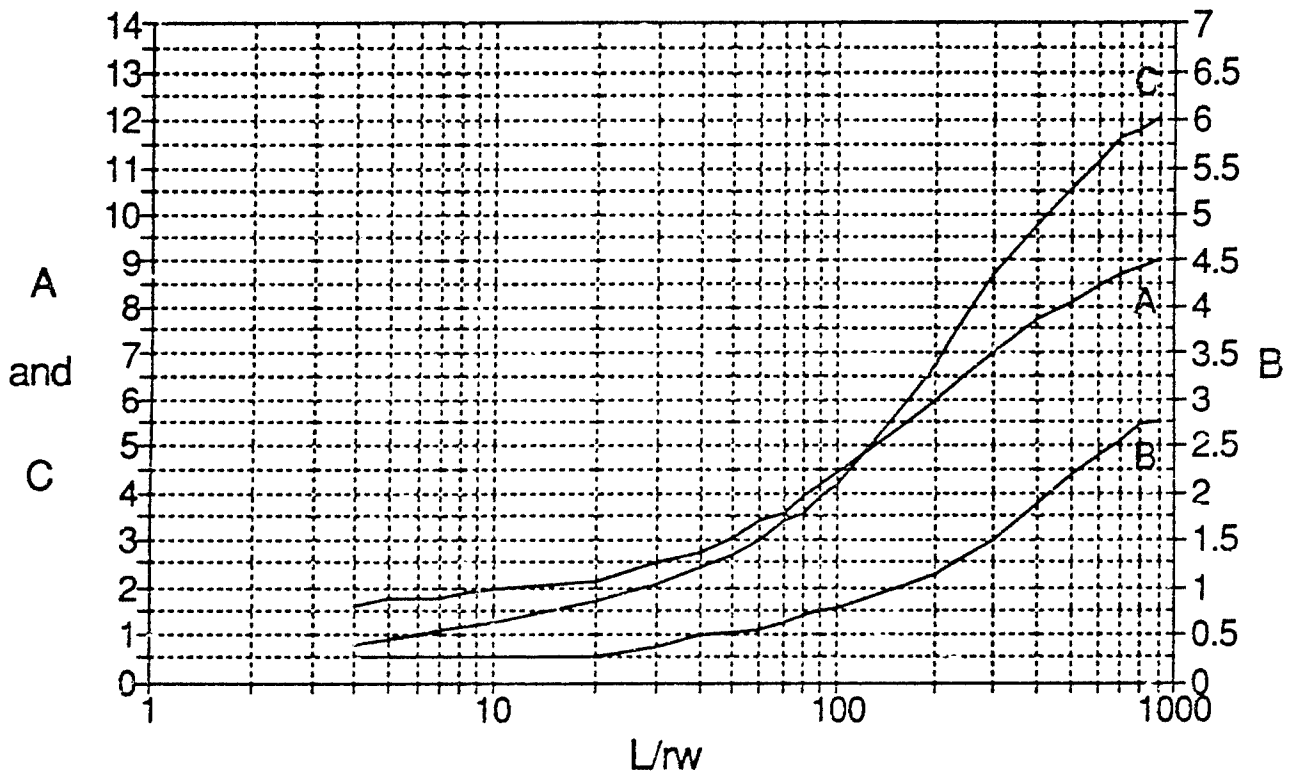


CECRL13 FALLING HEAD TEST

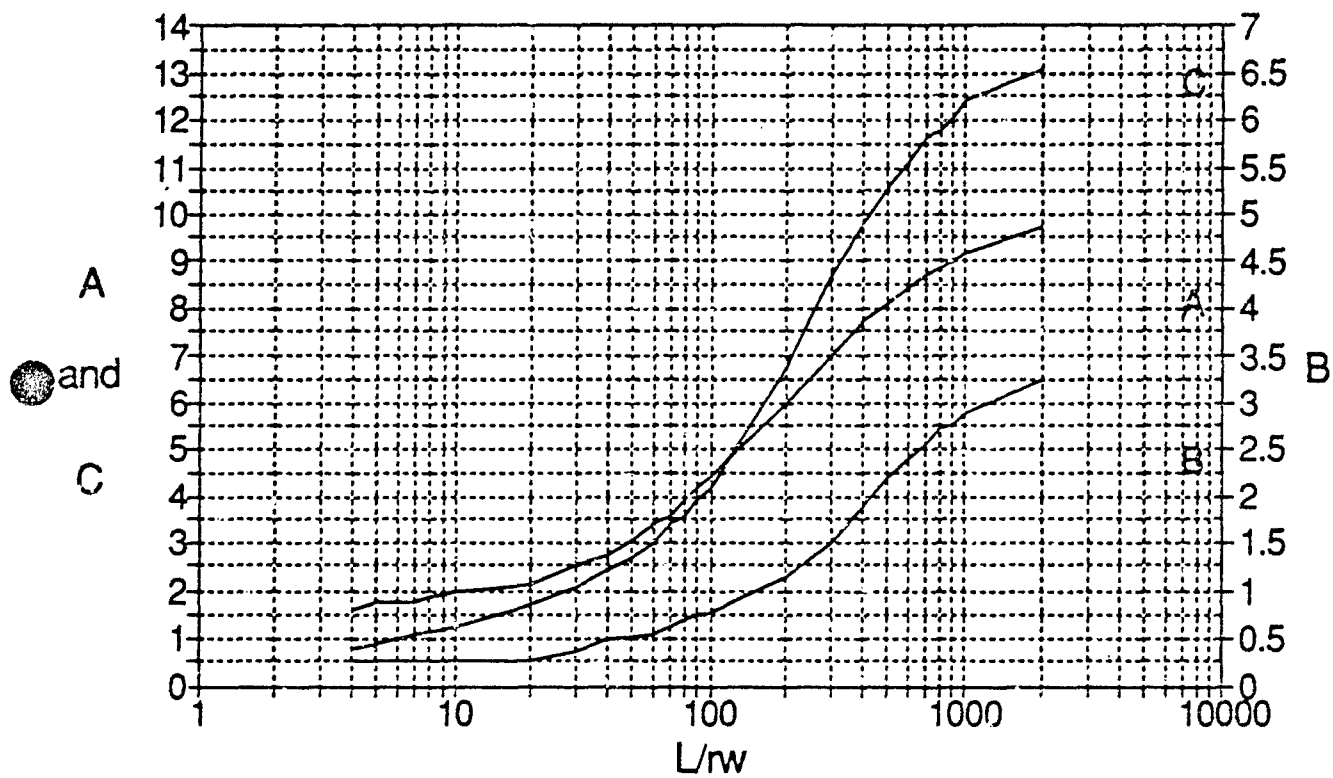


2. 0.1
3. 0.07
4.

Curves Relating Coefficients
A, B, and C to L/rw



CECRL13 Curves Relating Coefficients
A, B, and C to L/rw



BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL13

GENERAL DATA

Monitoring Well: CECRL13
 Test Type: Rising Head
 File Name: CRL13RBR
 Static Level, ft: 140
 Date: 9/8/93
 Time: 11:56

TEST DATA

Environmental Logger
 Unit #: 943
 Test #: 1

Scale Factor: 10.019
 Reference Value 0.000

TEST PARAMETERS

Screen Length (ft), Le: 10
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.25
 Is well fully penetrating? no
 Well Depth from water table (ft) 63
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 0
 A: 2.7
 B: 1
 C: 2.4
 Le/rw: 40.0
 ln(Re/rw)= 2.118
 Initial water table height (ft), y(1.01
 Water table height at time t (ft), 0.19
 Change in time from y(a) to y(b) 15.3

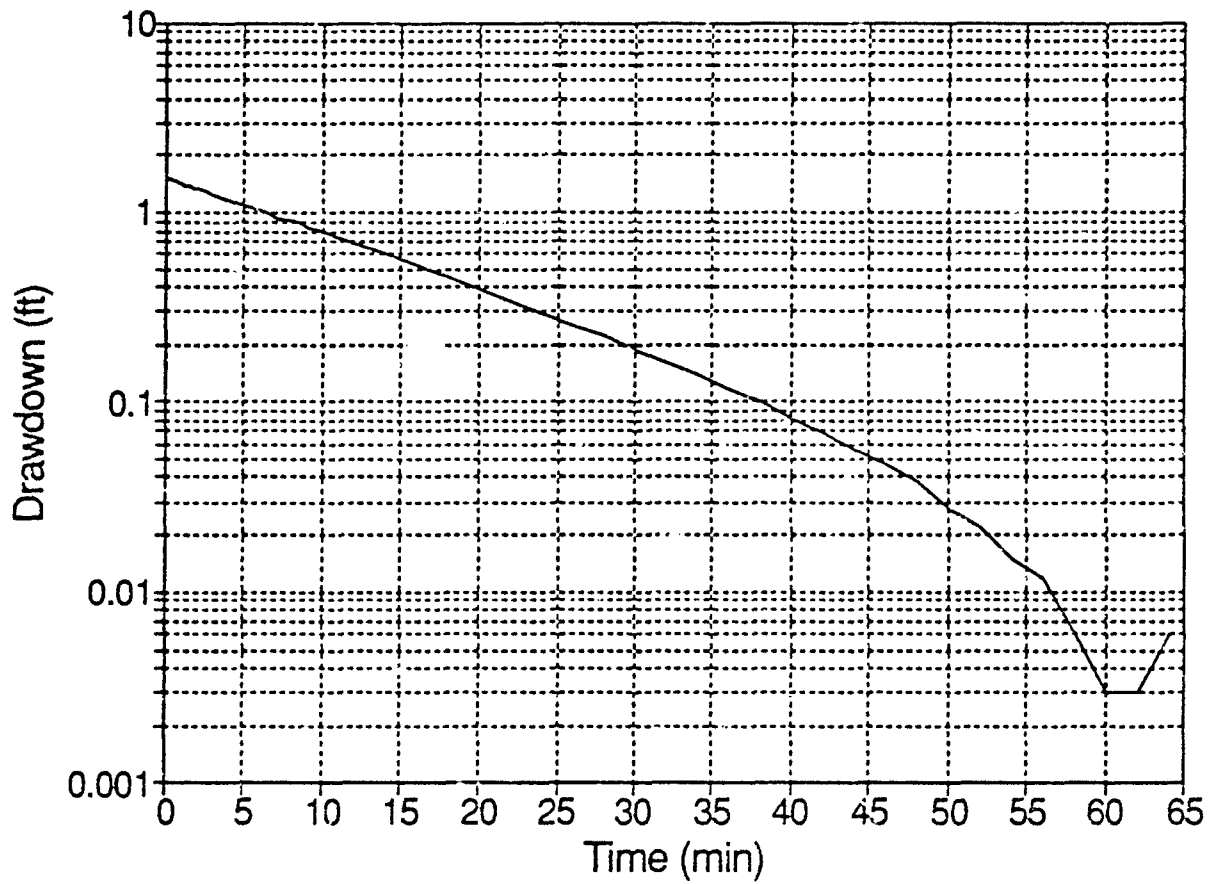
RESULTS

Hydraulic Conductivity (ft/min), 3.34E-04
 Hydraulic Conductivity (ft/sec), 5.57E-06
 Hydraulic Conductivity (m/sec) 1.70E-06
 Hydraulic Conductivity (cm/se 1.70E-04

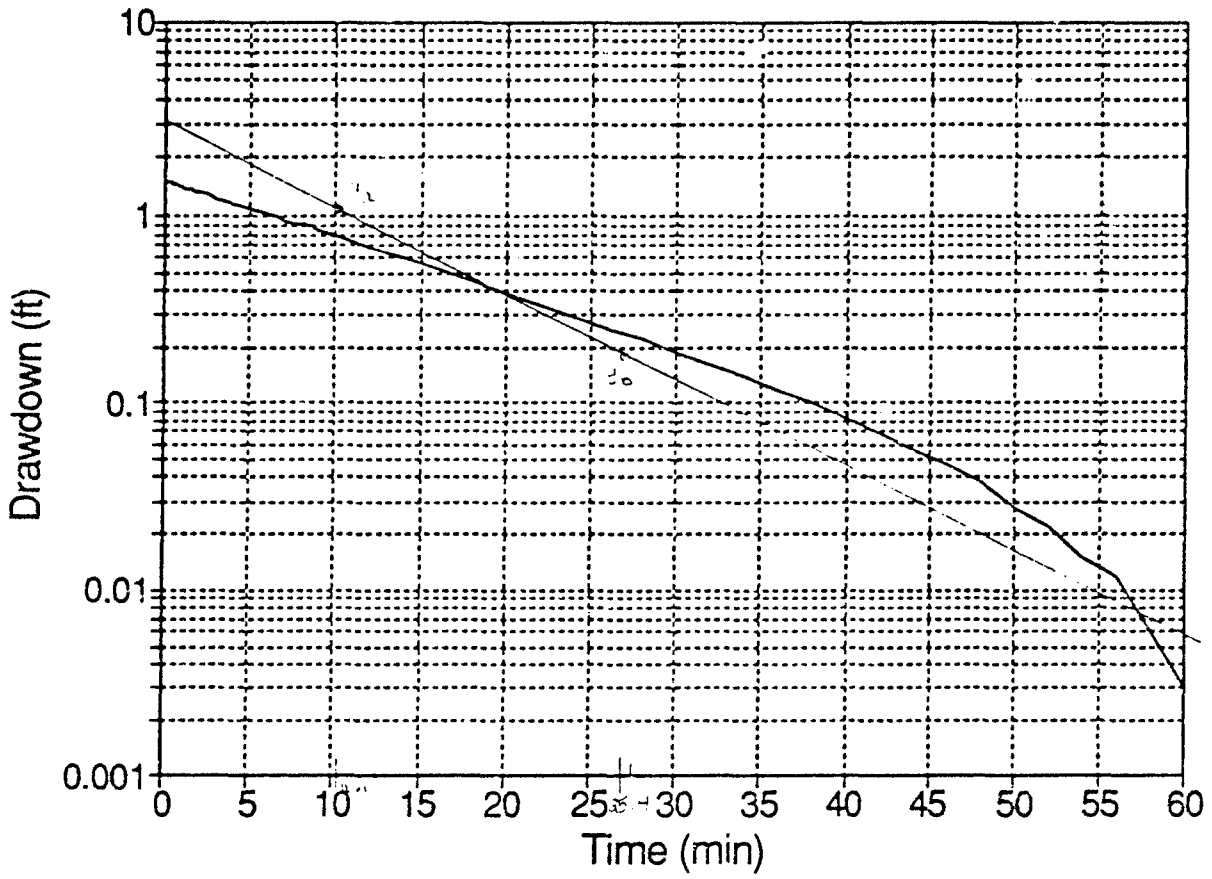
TIME DATA DRAWDOWN DATA
 HERE HERE

Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	1.528	1.528
0.0033	1.525	1.525
0.0066	1.522	1.522
0.0100	1.522	1.522
0.0133	1.522	1.522
0.0166	1.519	1.519
0.0200	1.525	1.525
0.0233	1.519	1.519

CECRL13 RISING HEAD TEST



CECRL13 RISING HEAD TEST



BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL14

GENERAL DATA

Monitoring Well: CECRL14
 Test Type: Rising Head
 File Name: CRL14RBR
 Static Level, ft: 128.45
 Date: 9/10/93
 Time: 09:36

TEST DATA

Environmental Logger
 Unit #: 943
 Test #: 0

Scale Factor: 9.995
 Reference Value 0.000

TEST PARAMETERS

Screen Length (ft), Le: 10
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.25
 Is well fully penetrating? no
 Well Depth from water table (ft) 128.55
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 0
 A: 2.7
 B: 1
 C: 2.4
 Le/rw: 40.0
 ln(Re/rw)= 2.234
 Initial water table height (ft), y(1.03
 Water table height at time t (ft), 1
 Change in time from y(a) to y(b) 80

RESULTS

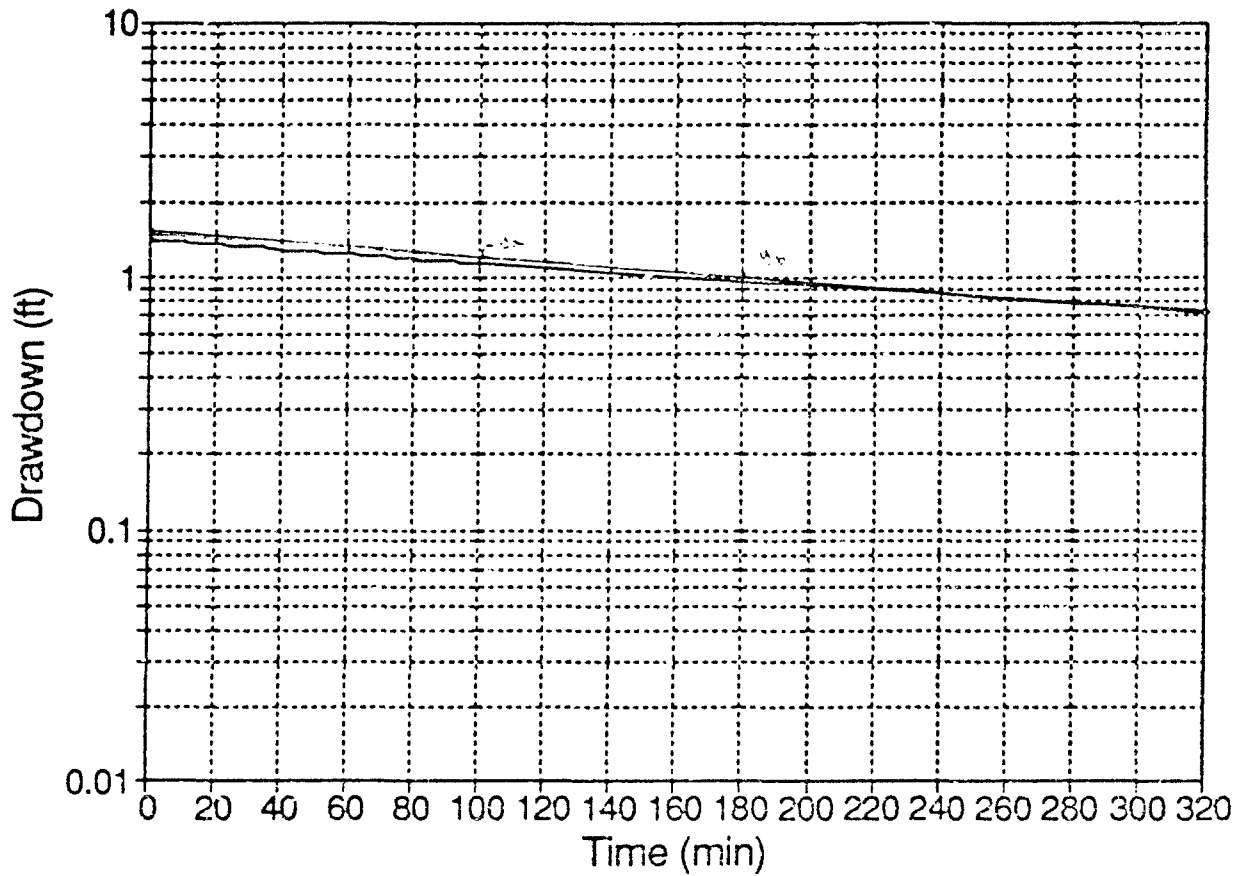
Hydraulic Conductivity (ft/min), 1.19E-06
 Hydraulic Conductivity (ft/sec), 1.99E-08
 Hydraulic Conductivity (m/sec) 6.06E-09
 Hydraulic Conductivity (cm/se 6.06E-07

TIME DATA
HERE

DRAWDOWN DATA
HERE

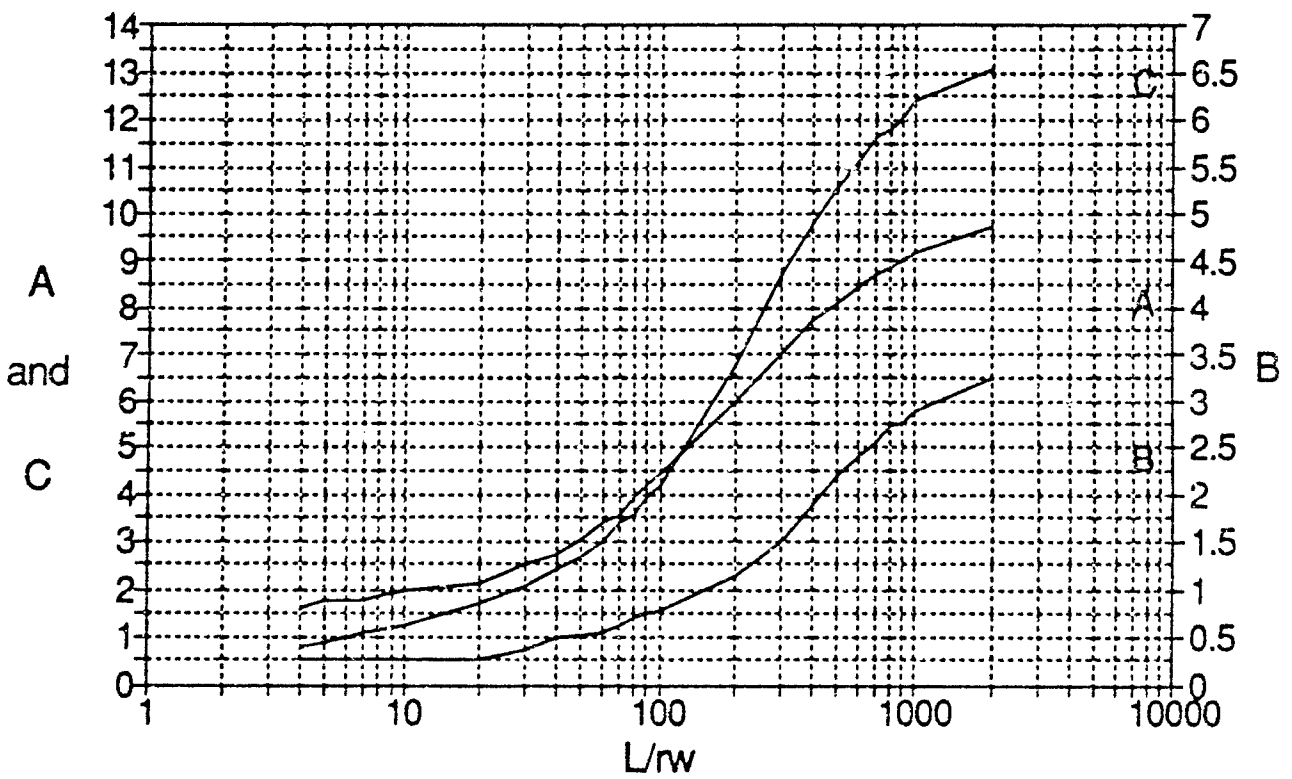
Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	1.416	1.416
0.0033	1.426	1.426
0.0066	1.419	1.419
0.0100	1.426	1.426
0.0133	1.423	1.423
0.0166	1.423	1.423
0.0200	1.423	1.423
0.0233	1.423	1.423

CECRL14 RISING HEAD



1.03
1.01
1.00

CECRL14 Curves Relating Coefficients
A, B, and C to L/rw



BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL15

GENERAL DATA

Monitoring Well: CECRL15
 Test Type: Rising Head
 File Name: CRL15RBR
 Static Level, ft: 135.63
 Date: 9/10/93
 Time: 10:59

TEST PARAMETERS

Screen Length (ft), Le: 10
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.25
 Is well fully penetrating? no
 Well Depth from water table (ft) 54.67
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 0
 A: 0 2.7
 B: 0 1.0
 C: 0 2.1
 Le/rw: 40.0
 ln(Re/rw)= 4.898
 Initial water table height (ft), y(0
 Water table height at time t (ft), 0
 Change in time from y(a) to y(b) 0

TEST DATA

Environmental Logger
 Unit #: 943
 Test #: 0

Scale Factor: 10.019
 Reference Value 0.000

RESULTS

Hydraulic Conductivity (ft/min), ERR *
 Hydraulic Conductivity (ft/sec), ERR
 Hydraulic Conductivity (m/sec) ERR
 Hydraulic Conductivity (cm/se) ERR

TIME DATA
HERE

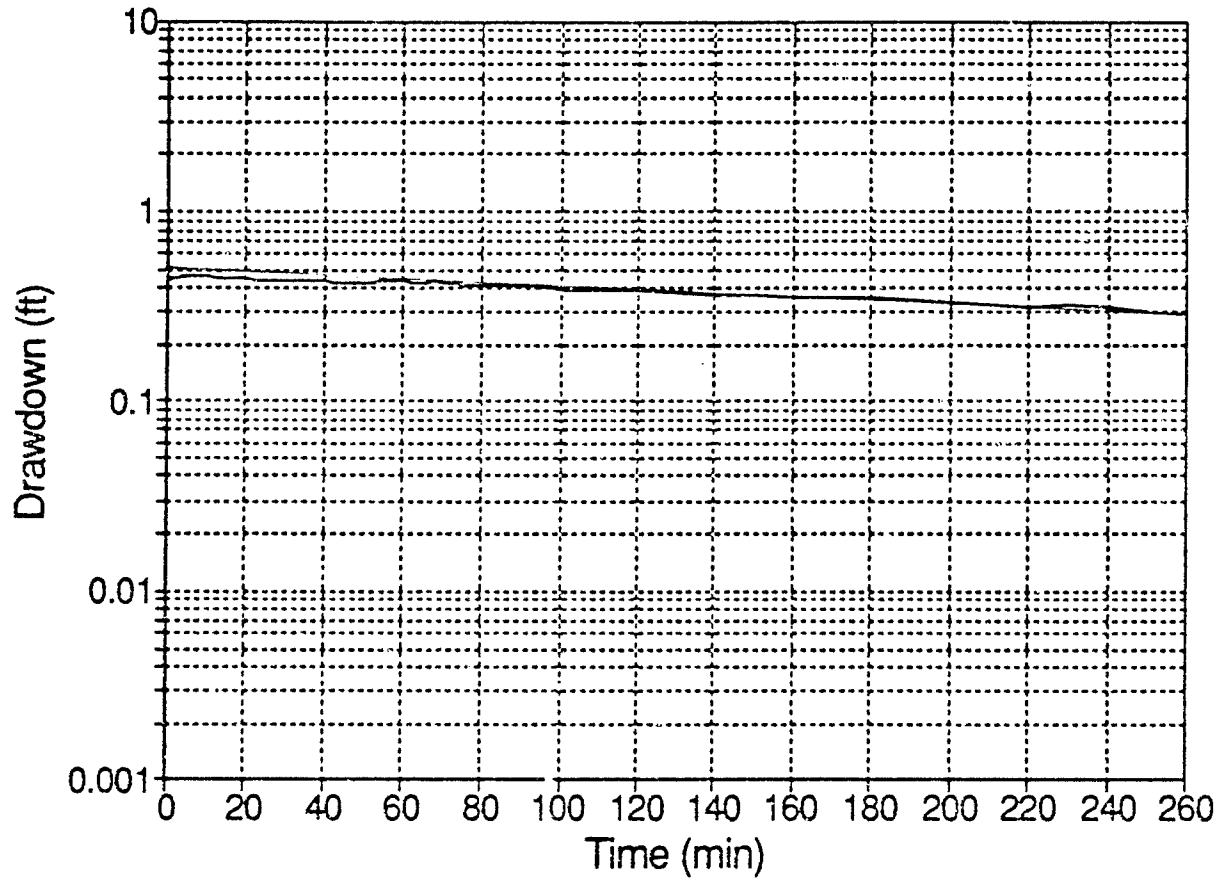
DRAWDOWN DATA
HERE

Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	0.449	0.449
0.0033	0.446	0.446
0.0065	0.446	0.446
0.0100	0.449	0.449
0.0133	0.446	0.446
0.0165	0.449	0.449
0.0200	0.449	0.449
0.0233	0.449	0.449

crrefslugtest/crl15/rbr

*NOTE. ERROR due to inability to analyse data -- lack of drawdown/recharge

CECRL15 RISING HEAD TEST



BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL15

GENERAL DATA

Monitoring Well: CECRL15
 Test Type: Falling Head
 File Name: CRL15FBR
 Static Level, ft: 136.76
 Date: 9/8/93
 Time: 18:26

TEST PARAMETERS

Screen Length (ft), Le: 10
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.25
 Is well fully penetrating? no
 Well Depth from water table (ft) 53.54
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 0

TEST DATA

Environmental Logger
 Unit #: 943
 Test #: 0

Scale Factor: 10.019
 Reference Value 0.000

A: 0
 B: 0
 C: 0

Le/rw: 40.0
 ln(Re/rw)= 4.879

Initial water table height (ft), y(0
 Water table height at time t (ft), 0
 Change in time from y(a) to y(b) 0

RESULTS

Hydraulic Conductivity (ft/min), ERR *
 Hydraulic Conductivity (ft/sec), ERR
 Hydraulic Conductivity (m/sec) ERR
 Hydraulic Conductivity (cm/se) ERR

TIME DATA
HERE

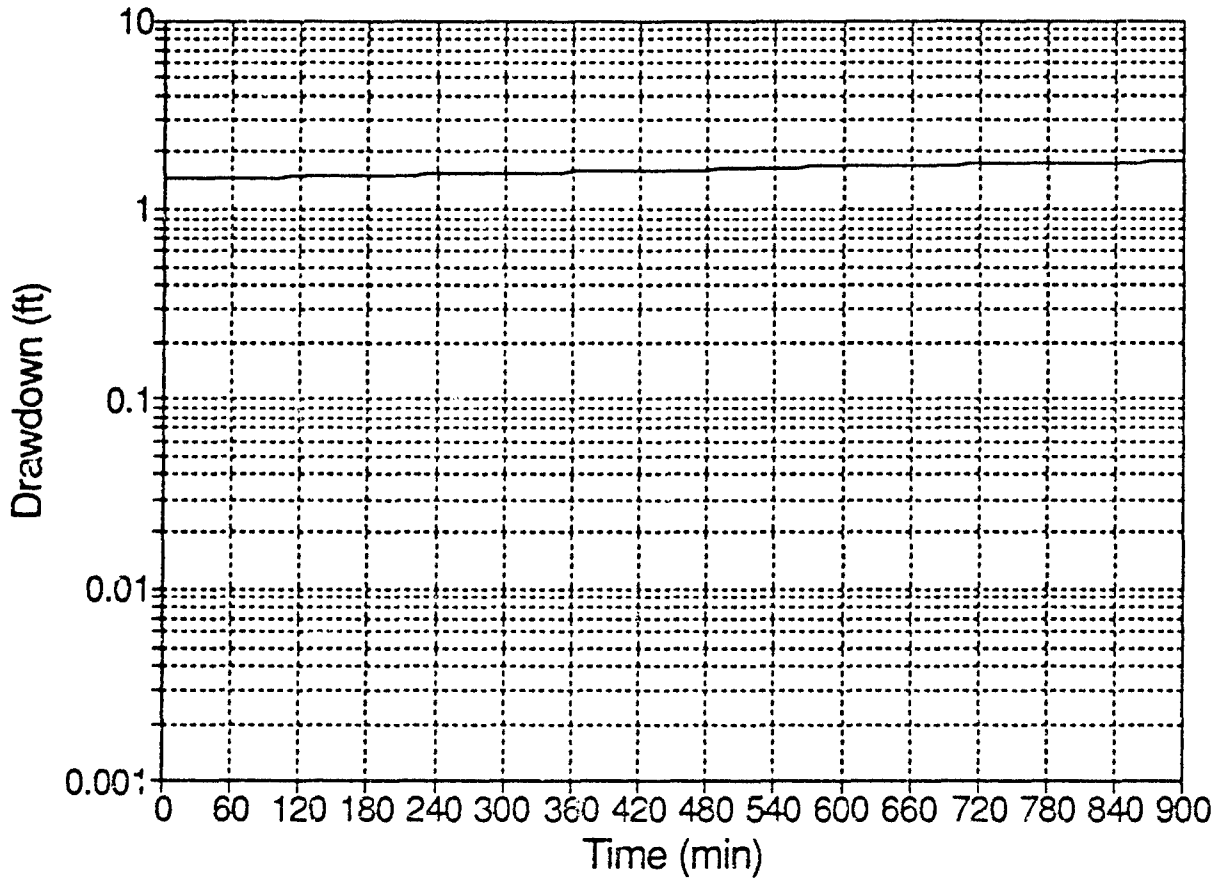
DRAWDOWN DATA
HERE

Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	-1.013	1.013
0.0033	-1.164	1.164
0.0066	-1.263	1.263
0.0100	-1.389	1.389
0.0133	-1.424	1.424
0.0166	-1.478	1.478
0.0200	-1.750	1.750
0.0233	-1.798	1.798

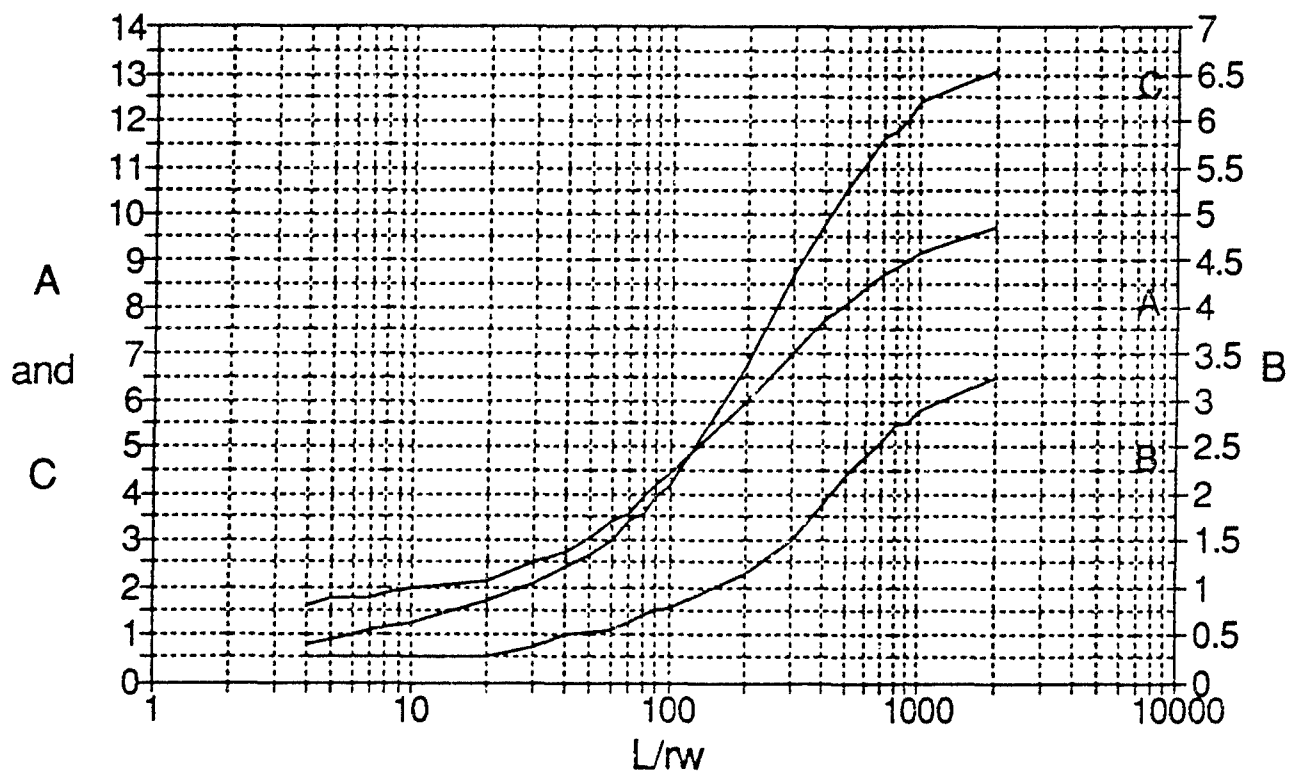
ccre\slg\test\crl14fbr

* NOTE: ERROR due to inability to analyze data lack of drawdown and recharge.

CECRL15 FALLING HEAD TEST



CECRL15 Curves Relating Coefficients
A, B, and C to L/rw



BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL17

GENERAL DATA

Monitoring Well: CECRL17
 Test Type: Falling Head
 File Name: CRL17FBR
 Static Level, ft: 81.79
 Date: 9/9/93
 Time: 12:56

TEST PARAMETERS

Screen Length (ft), Le: 20
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.30
 Is well fully penetrating? no
 Well Depth from water table (ft) 26.21
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 0

TEST DATA

Environmental Logger
 Unit #: 943
 Test #: 0

A: 3.5
 B: 1.2
 C: 3.25
 Le/rw: 66.7

Scale Factor: 10.019
 Reference Value 0.000

ln(Re/rw)= 2.252
 Initial water table height (ft), y(0.19
 Water table height at time t (ft), 0.062
 Change in time from y(a) to y(b) 8

RESULTS

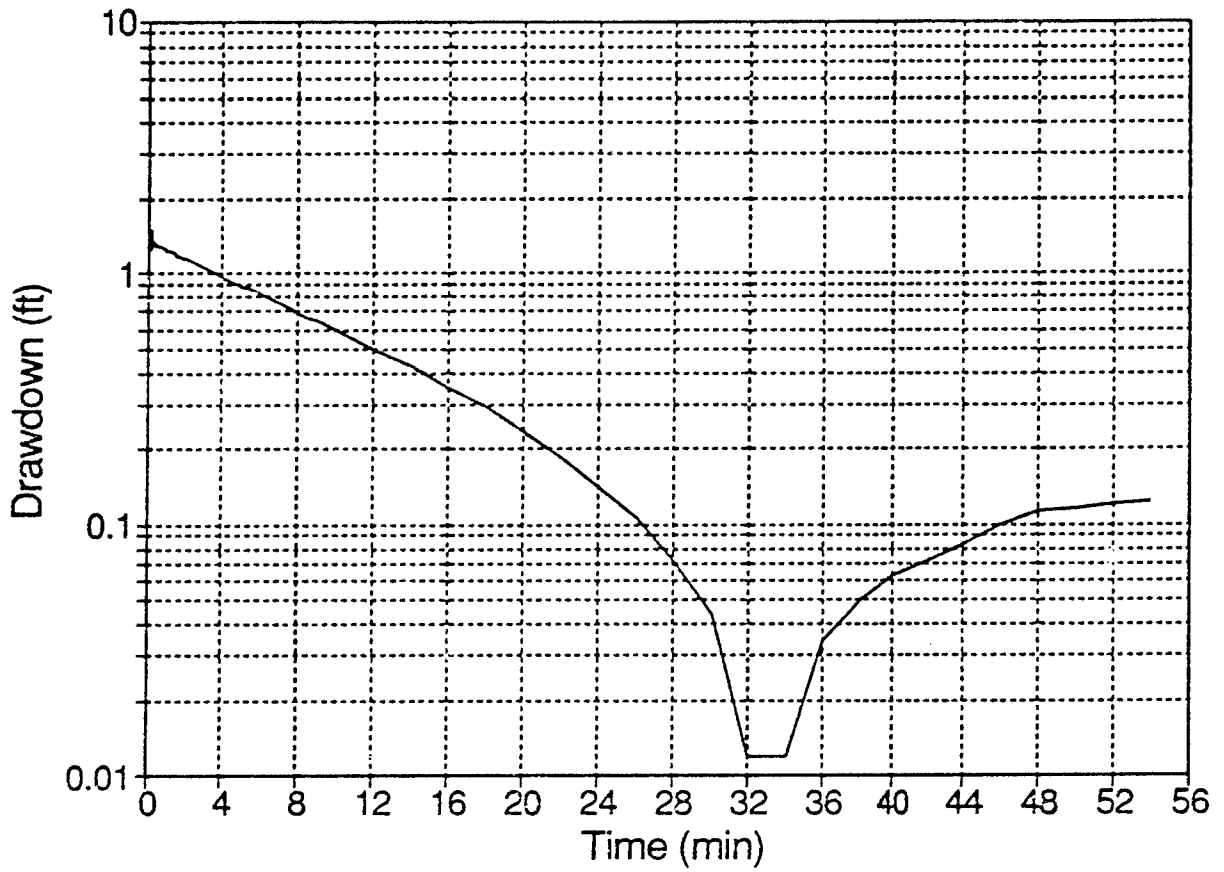
Hydraulic Conductivity (ft/min), 2.28E-04
 Hydraulic Conductivity (ft/sec), 3.80E-06
 Hydraulic Conductivity (m/sec) 1.16E-06
 Hydraulic Conductivity (cm/se 1.16E-04

TIME DATA
HERE

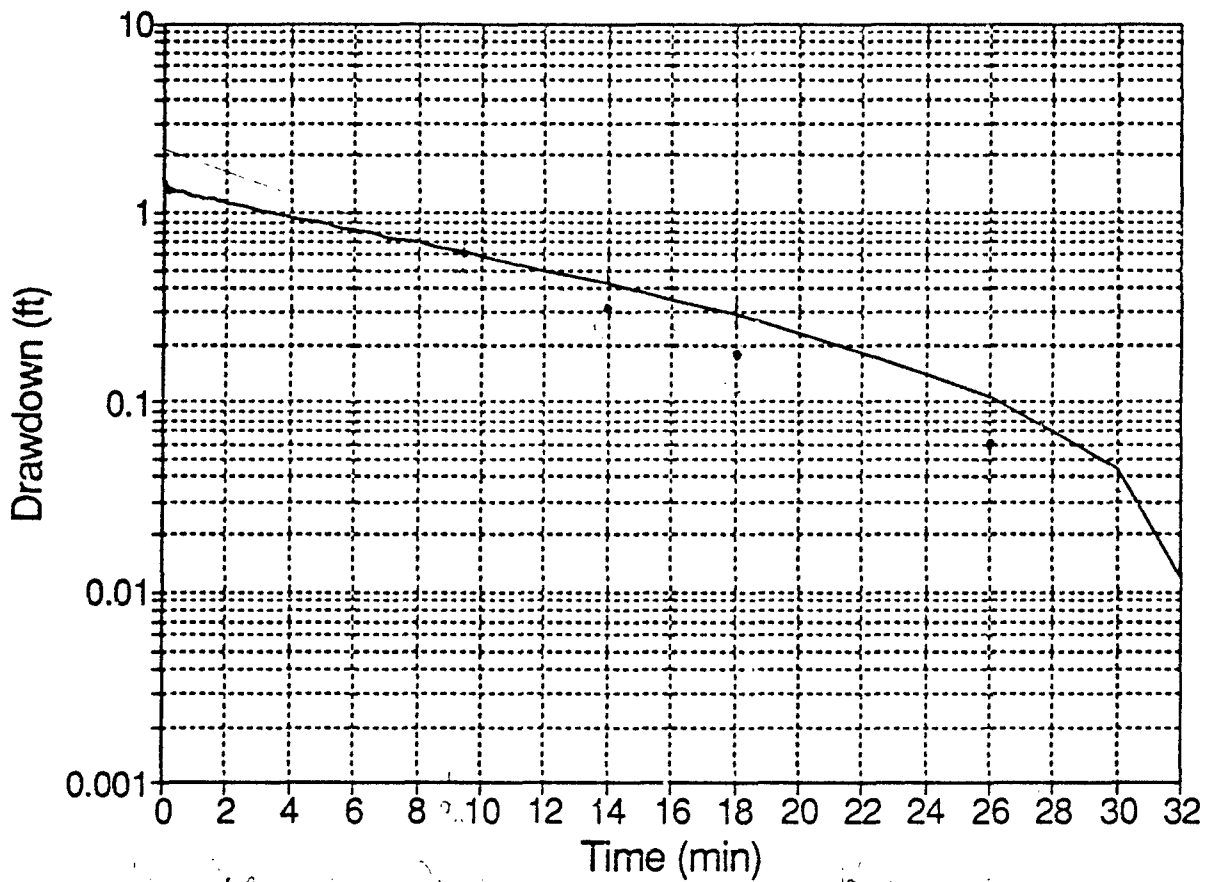
DRAWDOWN DATA
HERE

Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	-1.367	1.367
0.0033	-1.047	1.047
0.0066	-1.351	1.351
0.0100	-1.136	1.136
0.0133	-1.411	1.411
0.0166	-1.240	1.240
0.0200	-1.380	1.380
0.0233	-1.335	1.335

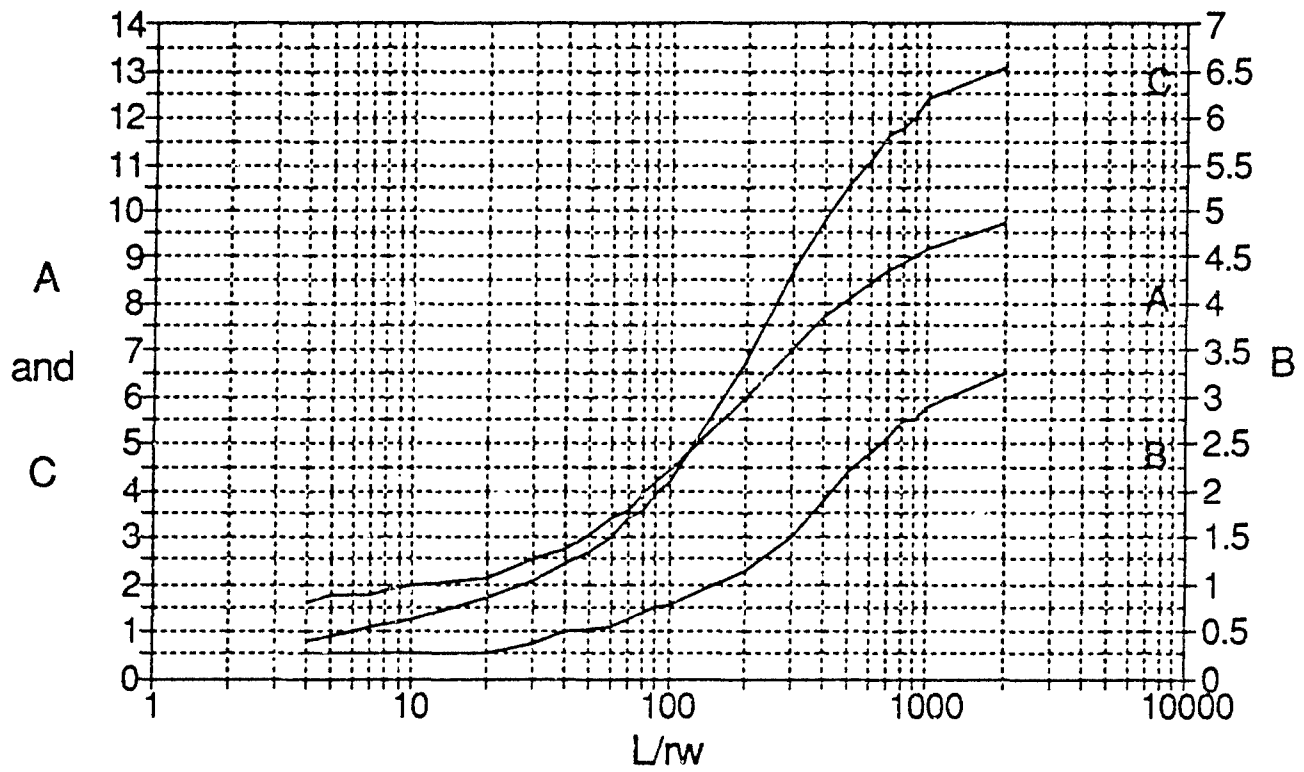
CECRL17 FALLING HEAD TEST



CECRL17 FALLING HEAD TEST



CECRL 17 Curves Relating Coefficients
A, B, and C to L/rw



BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL17

GENERAL DATA

Monitoring Well: CECRL17
 Test Type: Rising Head
 File Name: CRL17RBR
 Static Level, ft: 81.79
 Date: 9/9/93
 Time: 13:53

TEST DATA

Environmental Logger
 Unit #: 943
 Test #: 1

Scale Factor: 10.019
 Reference Value 0.000

TEST PARAMETERS

Screen Length (ft), Le: 20
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.30
 Is well fully penetrating? no
 Well Depth from water table (ft): 26.21
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 0
 A: 3.5
 B: 1.2
 C: 3.25
 Le/rw: 66.7
 ln(Re/rw)= 2.252
 Initial water table height (ft), y(0.6
 Water table height at time t (ft), 0.51
 Change in time from y(a) to y(b) 12

RESULTS

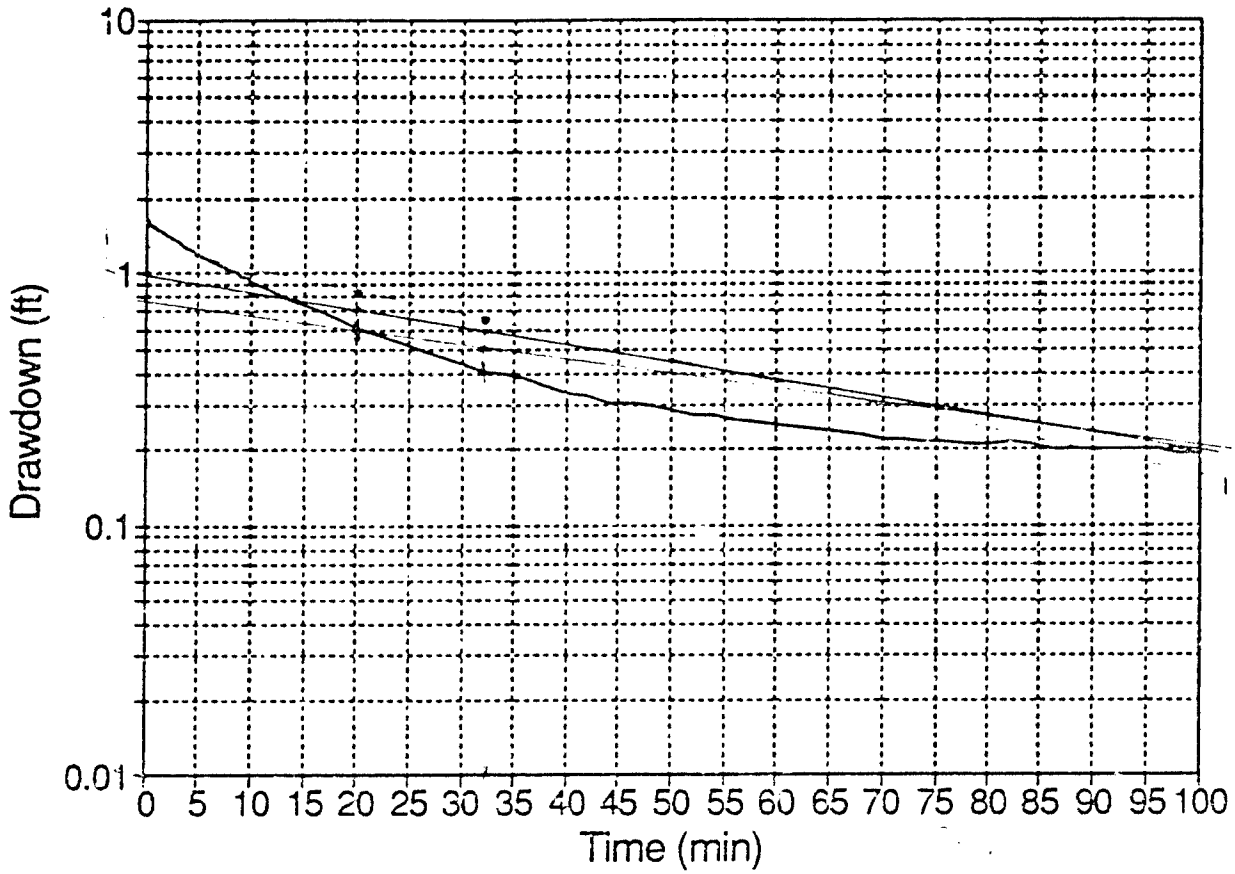
Hydraulic Conductivity (ft/min), 2.20E-05
 Hydraulic Conductivity (ft/sec), 3.67E-07
 Hydraulic Conductivity (m/sec) 1.12E-07
 Hydraulic Conductivity (cm/se 1.12E-05

**TIME DATA
HERE**

**DRAWDOWN DATA
HERE**

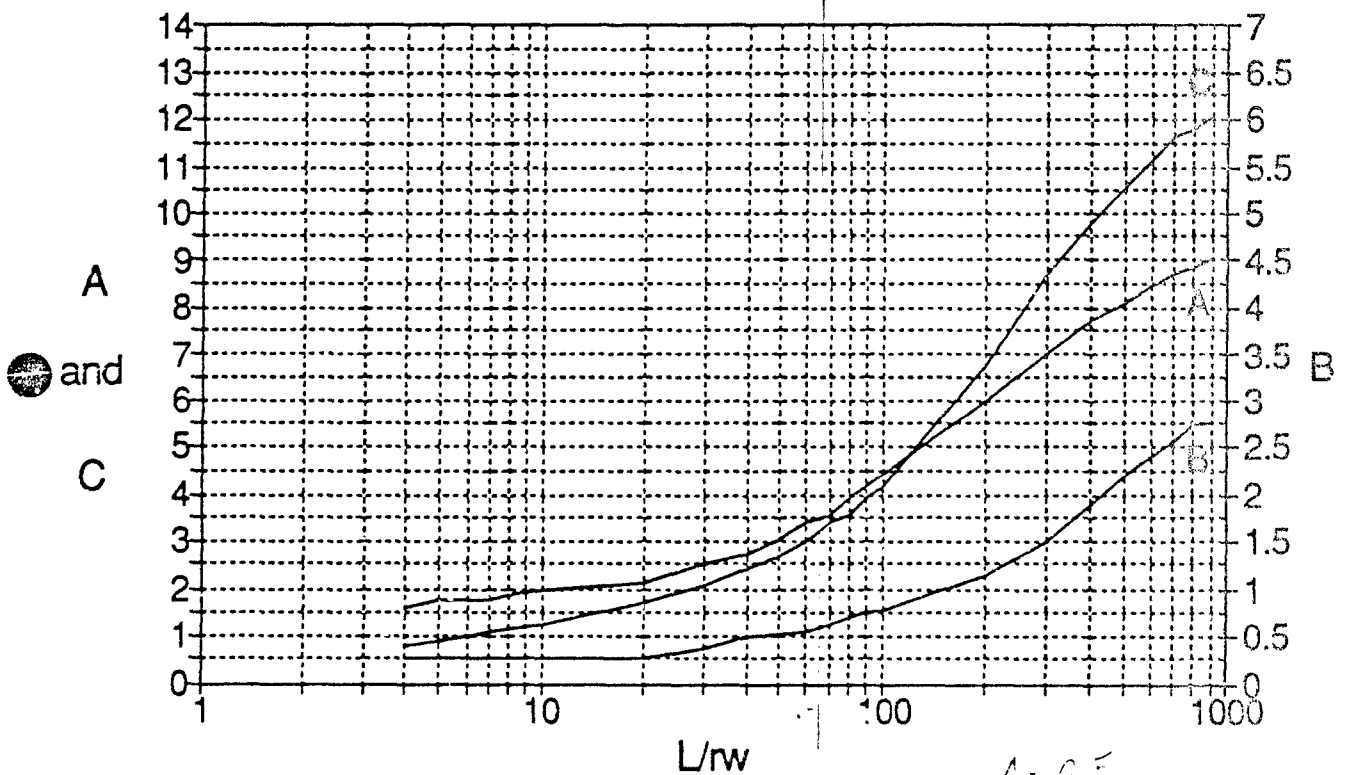
Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	0.573	0.573
0.0033	1.658	1.658
0.0066	1.737	1.737
0.0100	1.785	1.785
0.0133	1.582	1.582
0.0166	1.630	1.630
0.0200	1.665	1.665
0.0233	1.668	1.668

CECRL17 RISING HEAD TEST



0.05 0.05 0.12 0.05 0.05
 0.1 0.1 0.12 0.1 0.1
 0.2 0.2 0.12 0.2 0.2

CECRL 17 Curves Relating Coefficients A, B, and C to L/rw



A
and
C

A = 3.5
B = 1.5
C = 1.5

Handwritten note or signature

BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL18

GENERAL DATA

Monitoring Well: CECERL18
 Test Type: Falling Head
 File Name: CRL18FBR
 Static Level, ft: 86.32
 Date: 9/8/93
 Time: 17:29

TEST DATA

Environmental Logger
 Unit #: 99999
 Test #: 0

Scale Factor: 9.995
 Reference Value 0.000

TEST PARAMETERS

Screen Length (ft), Le: 10
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.25
 Is well fully penetrating? no
 Well Depth from water table (ft) 113.68
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 0
 A: 2.7
 B: 1
 C: 2.4
 Le/rw: 40.0
 ln(Re/rw)= 2.215
 Initial water table height (ft), y(1.02
 Water table height at time t (ft), 1.01
 Change in time from y(a) to y(b) 45

RESULTS

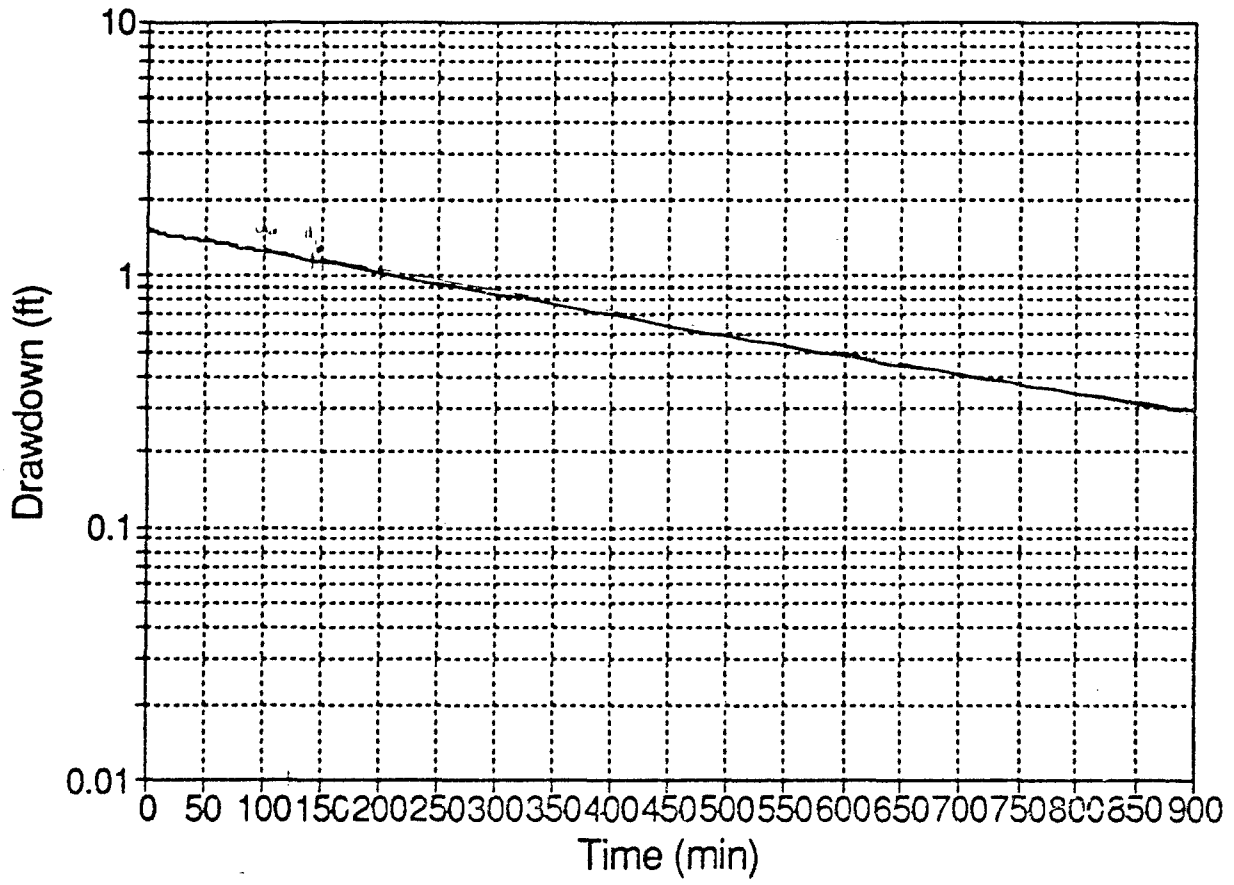
Hydraulic Conductivity (ft/min), 7.01E-07
 Hydraulic Conductivity (ft/sec), 1.17E-08
 Hydraulic Conductivity (m/sec) 3.56E-09
 Hydraulic Conductivity (cm/se 3.56E-07

TIME DATA
HERE

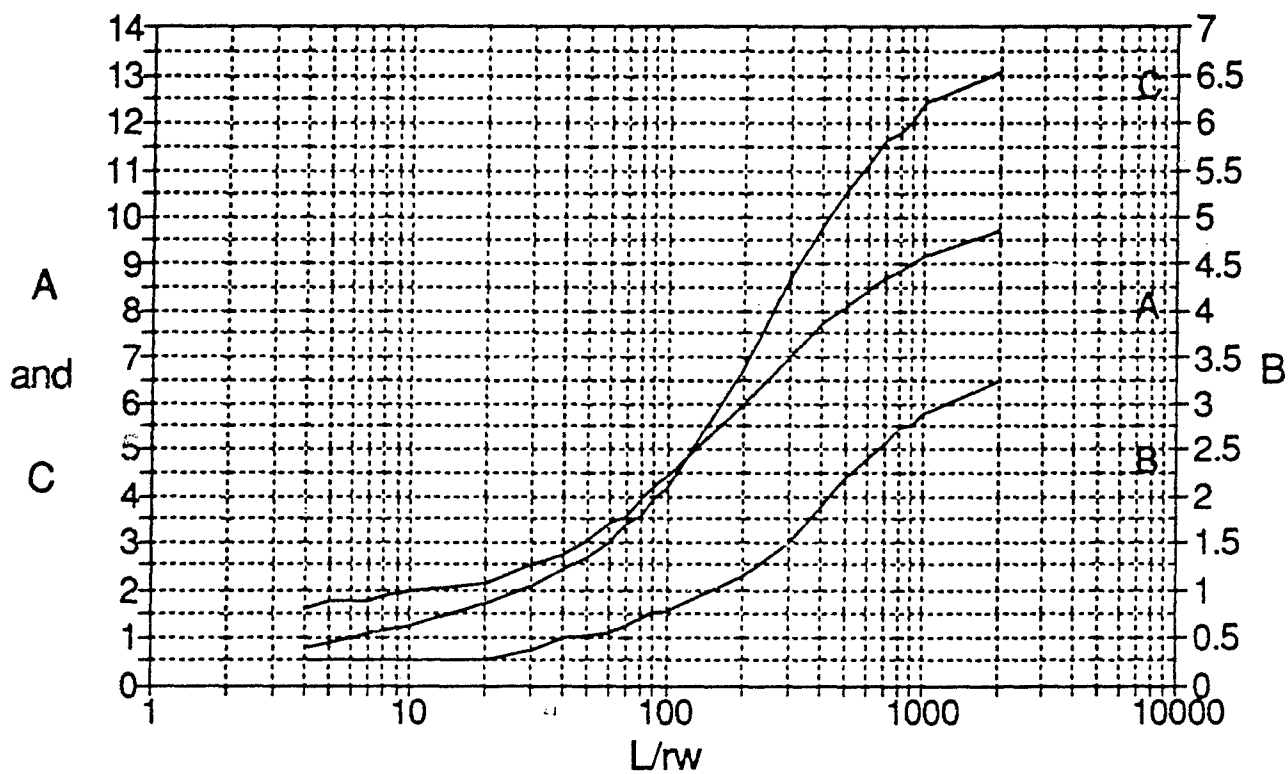
DRAWDOWN DATA
HERE

Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	-0.765	0.765
0.0033	-0.895	0.895
0.0066	-1.183	1.183
0.0100	-1.322	1.322
0.0133	-1.825	1.825
0.0166	-1.711	1.711
0.0200	-1.758	1.758
0.0233	-1.746	1.746

CECRL18 FALLING HEAD TEST



CECRL18 Curves Relating Coefficients
A, B, and C to L/rw



A = 27
 C = 10
 B = 1.5

BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL18

GENERAL DATA

Monitoring Well: CECRL18
 Test Type: Rising Head
 File Name: CRL18RBR
 Static Level, ft: 32
 Date: 9/9/93
 Time: 08:24

TEST PARAMETERS

Screen Length (ft), Le: 10
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.25
 Is well fully penetrating? no
 Well Depth from water table (ft) 113.68
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 0
 A: 2.7
 B: 1
 C: 2.4
 Le/rw: 40.0
 ln(Re/rw)= 2.215
 Initial water table height (ft), y 0.89
 Water table height at time t (ft), 0.62
 Change in time from y(a) to y(b) 112

TEST DATA

Environmental Logger
 Unit #: 99999
 Test #: 1

Scale Factor: 9.995
 Reference Value 0.000

RESULTS

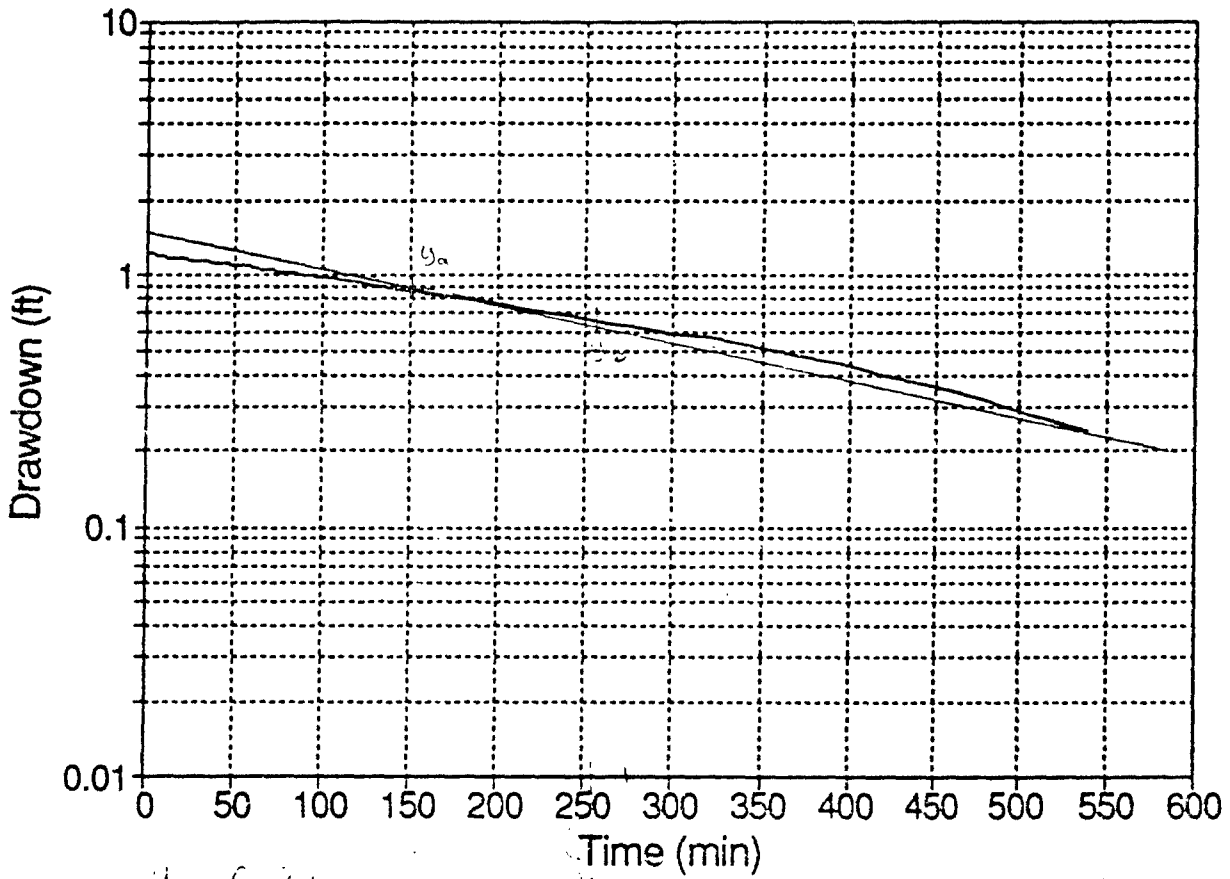
Hydraulic Conductivity (ft/min), 1.03E-05
 Hydraulic Conductivity (ft/sec), 1.72E-07
 Hydraulic Conductivity (m/sec) 5.25E-08
 Hydraulic Conductivity (cm/se 5.25E-06

TIME DATA
HERE

DRAWDOWN DATA
HERE

Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	0.740	0.740
0.0033	1.097	1.097
0.0066	1.302	1.302
0.0100	0.594	0.594
0.0133	0.876	0.876
0.0166	1.423	1.423
0.0200	1.211	1.211
0.0233	1.283	1.283

CECRL18 RISING HEAD TEST



Handwritten notes:
y = 0.24
x = 150
y = 0.15

BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL19

GENERAL DATA

Monitoring Well: CECRL19
 Test Type: Falling Head
 File Name: CRL19FBR
 Static Level, ft: 85.65
 Date: 9/10/93
 Time: 08:36

TEST DATA

Environmental Logger
 Unit #: 943
 Test #: 2

Scale Factor: 10.019
 Reference Value 0.000

TEST PARAMETERS

Screen Length (ft), Le: 20
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.43
 Is well fully penetrating? no
 Well Depth from water table (ft) 22.35
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 0
 A: 2.95
 B: 1.01
 C: 2.55
 Le/rw: 46.5
 ln(Re/rw)= 1.962
 Initial water table height (ft), y(0.35
 Water table height at time t (ft), 0.073
 Change in time from y(a) to y(b) 14

RESULTS

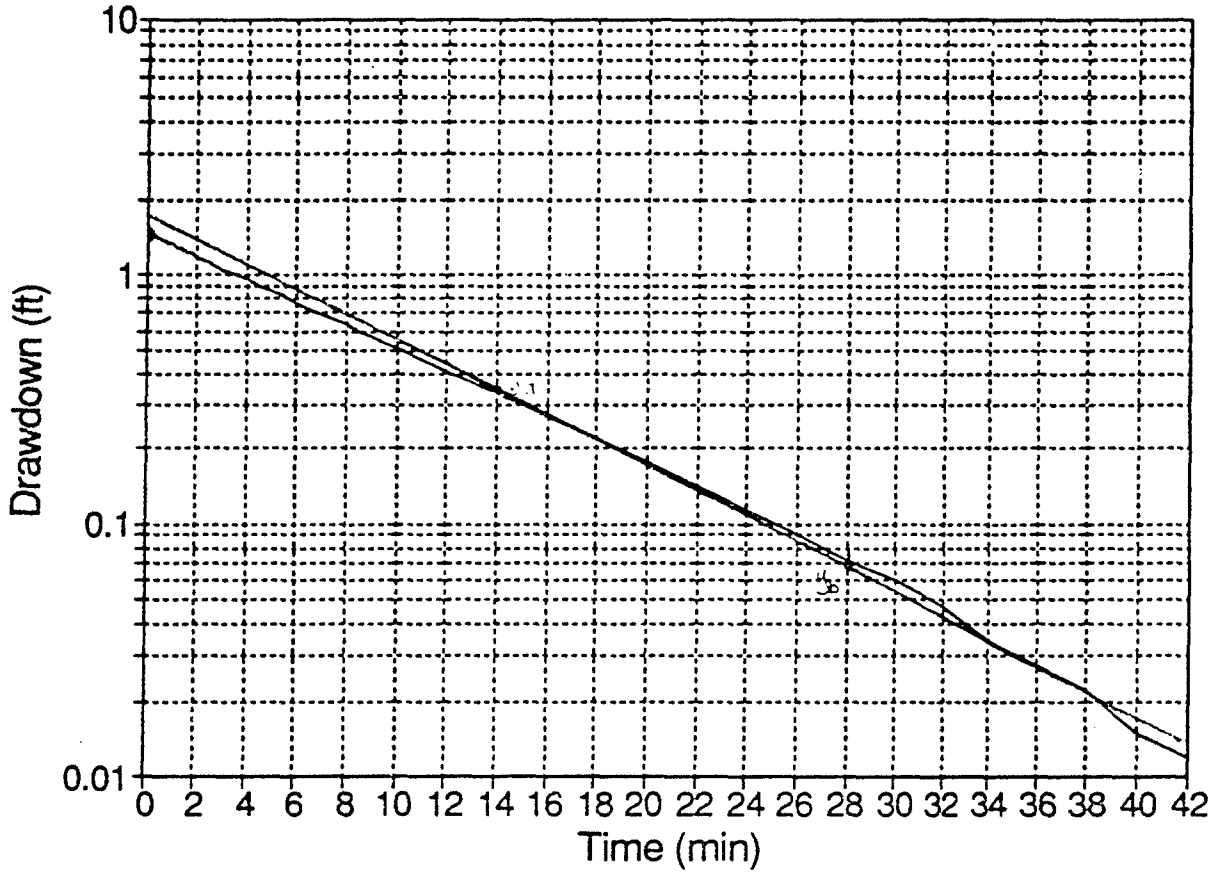
Hydraulic Conductivity (ft/min), 1.59E-04
 Hydraulic Conductivity (ft/sec), 2.65E-06
 Hydraulic Conductivity (m/sec) 8.06E-07
 Hydraulic Conductivity (cm/se 8.06E-05

**TIME DATA
HERE**

**DRAWDOWN DATA
HERE**

Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	-0.927	0.927
0.0033	-1.142	1.142
0.0066	-1.351	1.351
0.0100	-1.487	1.487
0.0133	-1.459	1.459
0.0166	-1.452	1.452
0.0200	-1.452	1.452
0.0233	-1.462	1.462

CECRL19 FALLING HEAD TEST



$u = 0.35$

$s_w = 0.073$

$\Delta = 1.42 \times 10^{-4} \text{ ft}^2/\text{s}$

BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL19

GENERAL DATA

Monitoring Well: CECRL19
 Test Type: Rising Head
 File Name: CRL19RBR
 Static Level, ft: 85.65
 Date: 9/10/93
 Time: 09:19

TEST DATA

Environmental Logger
 Unit #: 943
 Test #: 3

Scale Factor: 10.019
 Reference Value 0.000

TEST PARAMETERS

Screen Length (ft), Le: 20
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.43
 Is well fully penetrating? no
 Well Depth from water table (ft) 22.35
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 0
 A: 2.95
 B: 1.01
 C: 2.55
 Le/rw: 46.5
 ln(Re/rw)= 1.962
 Initial water table height (ft), y(0.69
 Water table height at time t (ft), 0.16
 Change in time from y(a) to y(b) 13.2

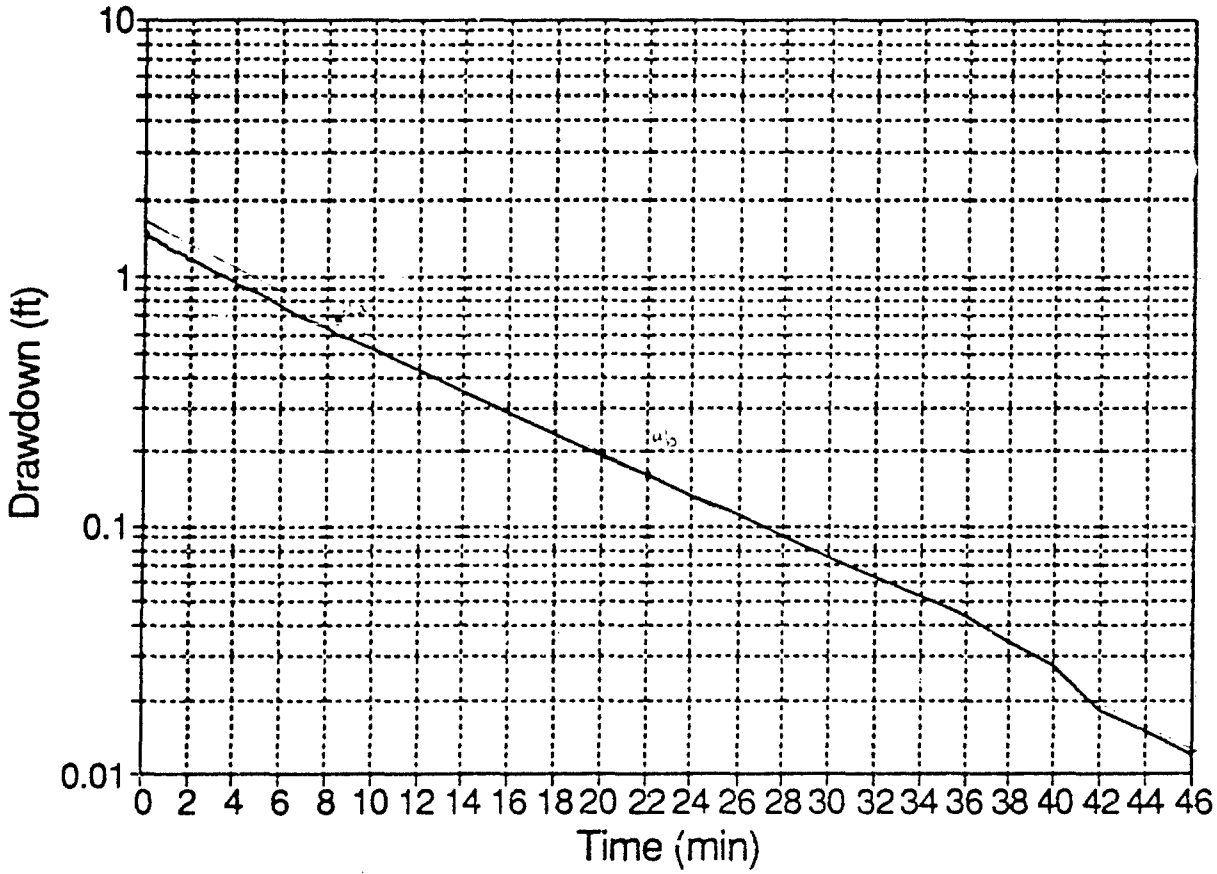
RESULTS

Hydraulic Conductivity (ft/min), 1.57E-04
 Hydraulic Conductivity (ft/sec), 2.62E-06
 Hydraulic Conductivity (m/sec) 7.97E-07
 Hydraulic Conductivity (cm/se 7.97E-05

TIME DATA DRAWDOWN DATA
 HERE HERE

Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	0.943	0.943
0.0033	1.829	1.829
0.0066	1.380	1.380
0.0100	1.494	1.494
0.0133	1.497	1.497
0.0166	1.503	1.503
0.0200	1.497	1.497
0.0233	1.497	1.497

CECRL19 RISING HEAD TEST



BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL20

GENERAL DATA

Monitoring Well: CECRL20
 Test Type: Falling Head
 File Name: CRL20FBR
 Static Level, ft: 115.45
 Date: 9/7/93
 Time: 16:34

TEST PARAMETERS

Screen Length (ft), Le: 10
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.43
 Is well fully penetrating? no
 Well Depth from water table (ft) 22.55
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 0
 A: 2.3
 B: 0.6
 C: 1.9
 Le/rw: 23.3
 ln(Re/rw)= 1.736
 Initial water table height (ft), y(0.22
 Water table height at time t (ft), 0.13
 Change in time from y(a) to y(b) 0.16

TEST DATA

Environmental Logger
 Unit #: 943
 Test #: 0

Scale Factor: 10.019
 Reference Value 0.000

RESULTS

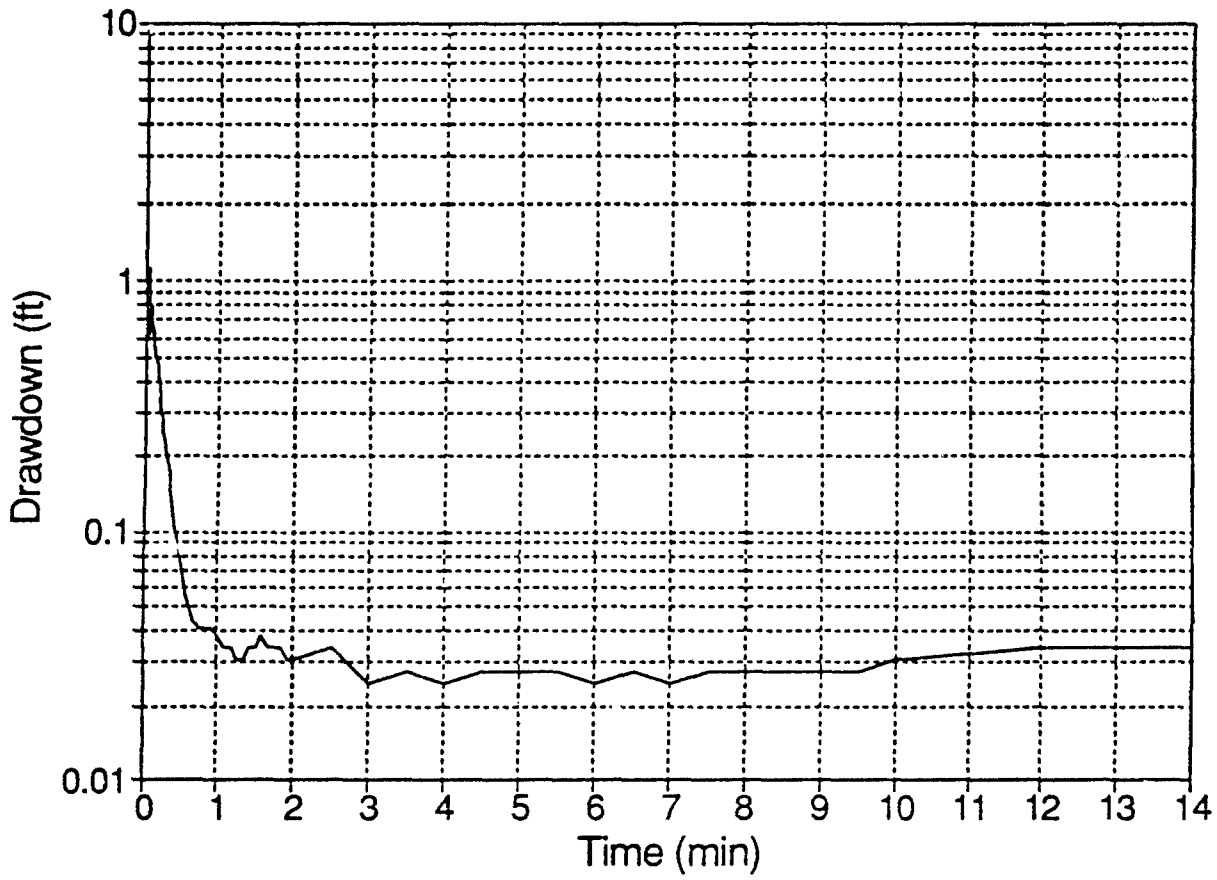
Hydraulic Conductivity (ft/min), 8.25E-03
 Hydraulic Conductivity (ft/sec), 1.37E-04
 Hydraulic Conductivity (m/sec) 4.19E-05
 Hydraulic Conductivity (cm/se 4.19E-03

TIME DATA
HERE

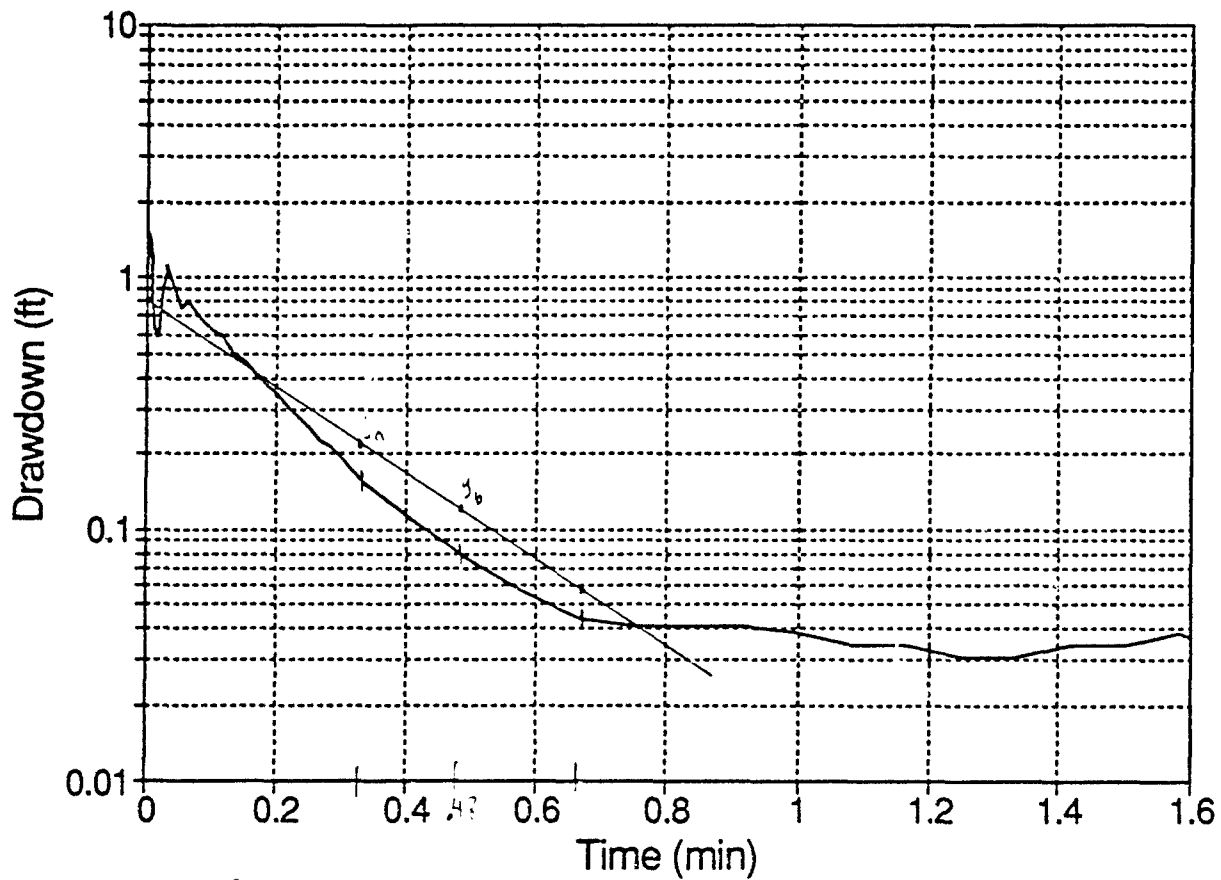
DRAWDOWN DATA
HERE

Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	-1.544	1.544
0.0033	-1.449	1.449
0.0066	-1.164	1.164
0.0100	-0.848	0.848
0.0133	-0.633	0.633
0.0166	-0.579	0.579
0.0200	-0.620	0.620
0.0233	-0.816	0.816

CECRL20 FALLING HEAD TEST



CECRL20 FALLING HEAD TEST



0.033
0.015
0.48 0.03 = 0.16

BOUWER AND RICE ANALYSIS FROM MONITORING WELL CECRL20

GENERAL DATA

Monitoring Well: CECRL20
 Test Type: Rising Head
 File Name: CRL20RBR
 Static Level, ft: 115.45
 Date: 9/7/93
 Time: 16:54

TEST DATA

Environmental Logger
 Unit #: 943
 Test #: 1

Scale Factor: 10.019
 Reference Value 0.000

TEST PARAMETERS

Screen Length (ft), Le: 10
 Well Radius (ft), rc: 0.17
 Well Radius + gravel pack (ft), r: 0.43
 Is well fully penetrating? no
 Well Depth from water table (ft) 22.55
 Gravel Pack porosity, n: 0.3
 Is water level in screen, yes=1, 0
 A: 2.3
 B: 0.6
 C: 1.9
 Le/rw: 23.3
 ln(Re/rw)= 1.736
 Initial water table height (ft), y(0.11
 Water table height at time t (ft), 0.03
 Change in time from y(a) to y(b) 0.16

RESULTS

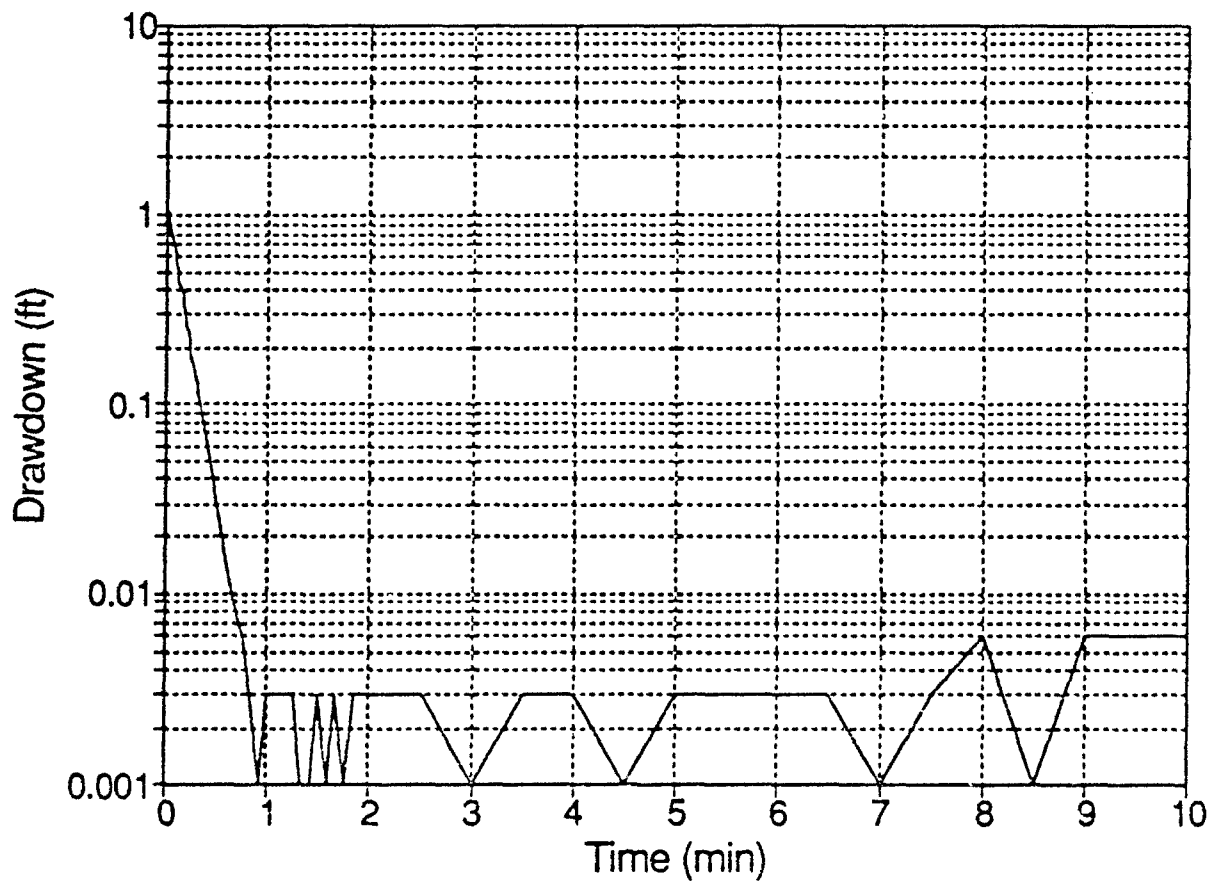
Hydraulic Conductivity (ft/min), 2.04E-02
 Hydraulic Conductivity (ft/sec), 3.39E-04
 Hydraulic Conductivity (m/sec) 1.03E-04
 Hydraulic Conductivity (cm/se 1.03E-02

TIME DATA
HERE

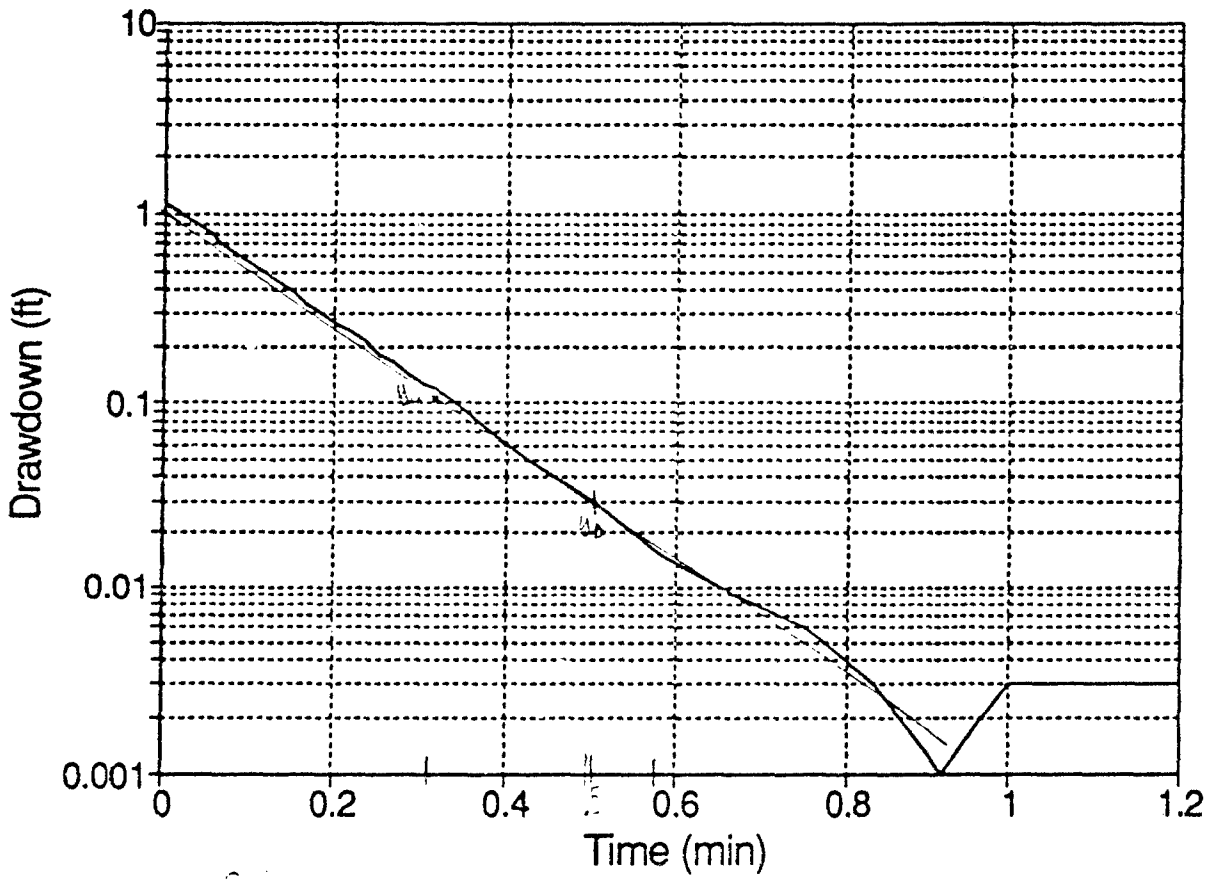
DRAWDOWN DATA
HERE

Elapsed Time t (min)	Drawdown y (ft)	Absolute Value of Y
0.0000	1.139	1.139
0.0033	1.126	1.126
0.0066	1.088	1.088
0.0100	1.073	1.073
0.0133	1.047	1.047
0.0166	1.022	1.022
0.0200	1.009	1.009
0.0233	0.978	0.978

CECRL20 RISING HEAD TEST



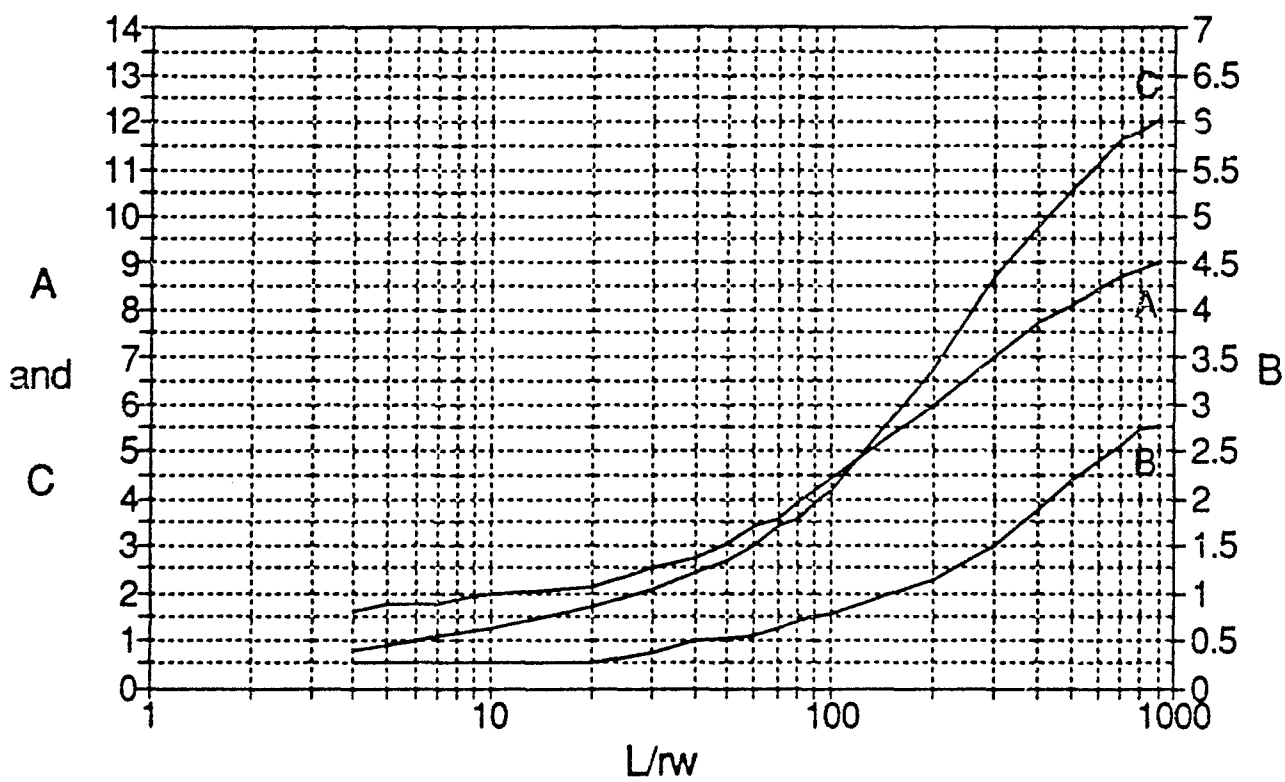
CECRL20 RISING HEAD TEST



0.01

0.001

CECRL 20 Curves Relating Coefficients
A, B, and C to L/rw



CECRL20 Curves Relating Coefficients A, B, and C to L/rw

