

Remedial Investigations Report -Group 1A Sites, Volume II Fort Devens, Massachusetts

April 1993 Contract No. DAAA15-90-D-0012 Delivery Order No. 001 ELIN A009

Prepared for:
Commander
U.S. Army Environmental Center
Aberdeen Proving Ground, Maryland 21010-5401

Prepared by:

ecology and environment, inc. 1700 North Moore Street Arlington, Virginia 22209

Final

1ARI.PM4

RI Report: Section No.:

Revision No:

Appendix A 2

Fort Devens

Date:

December 1992

APPENDIX A

WELL AND BORE LOGS

Appendix A contains well construction schematics and bore logs for wells installed at Shepley's Hill Landfill and Cold Spring Brook Landfill. A table is provided to clarify the identifiers assigned to the Shepley's Hill Landfill wells, and their corresponding aliases, if used. The well identifiers used at Cold Spring Brook Landfill are straightforward and require no further explanation. Also included are bore logs for locations SHL-14 and SHL-16 (which were drilled but were found to be dry holes and were then abandoned) and logs for four borings from which background soil samples were collected.

RC424

RI Report: Fort Devens Section No.: Appendix A

Revision No:

Date:

December 1992

WELL IDENTIFICATION TABLE FOR SHEPLEY'S HILL LANDFILL

Location	SEA ⁽¹⁾	CONTEST (2)	E & E (3)	Status
SHL-1	BAR-1	es.		Abandoned on 7/15/91 ⁽⁴⁾
SHL-1	WT-1/SHL-1A			Operational
SHL-2	WT-2/BAR-2A			Abandoned on 7/17/91 (5)
SHL-2	BAR-2			Abandoned on 7/18/91 (4)
SHL-3	WT-3			Operational
SHL-3	BAR-3			Closed with locked cap (4)
SHL-4	WT-4/BAR-4			Operational (5)
SHL-5	WT-5			Operational
SHL-5	BAR-5			Abandoned on 7/23/91 (4)
SHL-6	WT-6			Operational
SHL-7	WT-7			Operational
SHL-8	WT-8/BAR-8			Destroyed and replaced by SHL-8S/D 5
SHL-8S		SHL-85		Operational (Shallow)
SHL-8D SHL-9	WT-9/BAR-9	SHL-8D		Operational (Deep) Operational (5)
SHL-10		N-1		Operational
SHL-11		N-2		Operational
SHL-12		N-3		Operational
SHL-13		N-4		Destroyed and replaced
SHL-15			SHL-15	Operational
SHL-17			SHL-17	Operational
SHL-18			SHL-18	Operational
SHL-19			SHL-19	Operational
SHL-20			SHL-20	Operational
SHL-21			SHL-21	Operational
SHL-22			SHL-22	Operational
SHL-23			SHL-23	Operational
SHL-24			SHL-24	Operational
SHL-25		*	SHL-25	Operational
POL-1				Operational
POL-2				Operational
POL-3				Operational

RC424

Source: E & E, 1991

⁽¹⁾ Wells constructed by SEA Inc., in 1986

⁽²⁾ Wells, including replacements, constructed by CONTEST in 1989

⁽³⁾ Wells constructed by Ecology and Environment, Inc. in 1991

⁽⁴⁾ BARCAD wells

⁽⁵⁾ Hybrid: Wells that have a BARCAD unit in place below a regular well



Cambridge, MA. S. Portland, ME. Wethersfield, CT.

DRILLING CONTRACTOR: Soil Explor	ration	Corp.
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FOREMAN: Bob Seymour

METHOD: Hollow Stem Auger & NX Core Barrel

SEA GEOLOGIST/ENGINEER: M. Gitten

BARCAD SAMPLER

No. 1

GROUNDWATER DEPTH: 12.55'

DATE: 3/7/86

DATUM : Casing

MONITORING WELL NO. BAR-1

JOB NO: 392-8511 CLIENT: Barson's

LOCATION: Ft. Devens Landfill

DATE

START: 1/28/86 FINISH: 1/30/86

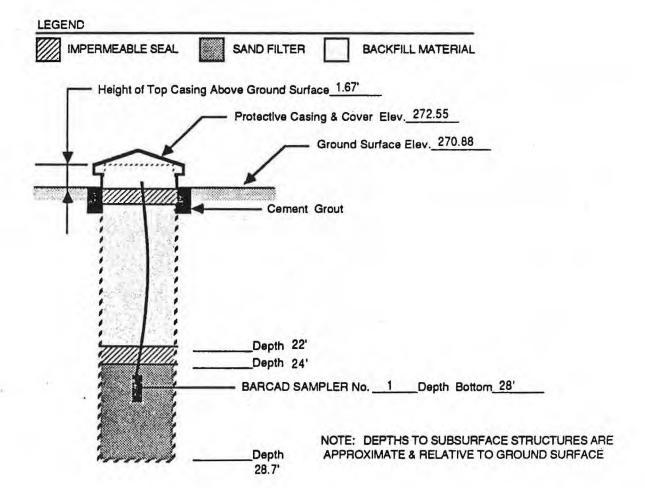
SOIL SAMPLES TAKEN: Yes

EQUIPMENT CLEANING: Yes

METHOD: Steam and methanol rinse

MATERIAL TO FACILITATE DRILLING: Yes

TYPE: Water



MONITORING WELL CROSS-SECTION WITH BARCAD SAMPLER INSTALLATION



Cambridge, MA. S. Portland, ME. Wethersfield, CT.

DRILLING CONTRACTOR: Soil Exploration Corp.

FOREMAN: Bob Seymour

METHOD: Hollow Stem Auger /Nx Core Barrel

SEA GEOLOGIST/ENGINEER: M Schultz

BARCAD WELL No. 1 WT-2

22.0

GROUNDWATER DEPTH: 21.8'

DATE: 3/7/86 3/7/86

DATUM: T.C. T.C.

MONITORING WELL NO. BAR-2A & WT-2 JOB NO: 392-8511 CLIENT: Barson's LOCATION: Ft Devens Landfill

DATE

START: 1/31/86 FINISH: 2/3/86

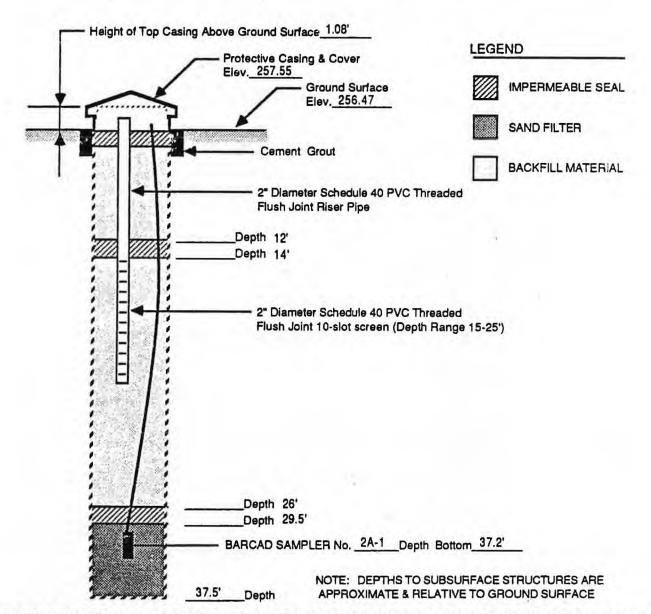
SOIL SAMPLES TAKEN: No

EQUIPMENT CLEANING: Yes

METHOD: Steam & Methanol Rinse

MATERIAL TO FACILITATE DRILLING: Yes

TYPE: Water



MONITORING WELL CROSS-SECTION WITH BARCAD SAMPLER INSTALLATION



Project : Barson's Construction

Landfill Closure Ft. Devens

Boring Log

Boring No. SEA-2 Ref. No. 392-8511

Contractor: Soil Exploration Corp. Date: 31 Jan-3 Feb 88 Engineer/Geologist: M. Gitten

Boring Location : See Site Plan Ground Surface Elev. :

254.90

Water Level :

Date : 3 Feb. 86

Casing Size: 3-1/4" I.D. Hollow Stem Sampler: 1-3/8" I.D. Split Spoon & NX Core Barrel

Casing at : 32'

A.T.T.		San	nple		S.L.O.		C11-1
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Sample Description	Remarks	Stratum Description
0.5 1 1.5 2 2.5	S-1	13/4	0-1.1	79 33 50/1*	Brown, find SAND, little coarse sand and fine gravel, trace inorganic silt with roots	(1)	Fine to medium SAND, little coarse sand and gravel (SP)
3 _{3.5}	S-2	18/16	4-5.5	7	Brown, fine SAND, little medium to		
5 5.5 6 6.5	52	1816	4-3.5	13	coerse sand and fine gravel		
7 _{7.5} 8 _{8.5}							
9 _{9,5} 10 _{10,5}	S-3	18/14	9-10.5	13 17 20	Brown, fine to medium SAND, little coarse sand and fine to medium gravel		
12 _{12.5} 13 _{13.5}							
14 _{14.5} 15 _{15.5}	S-4	18/15	14-15.5	10 20 23	Brown, fine SAND, little medium to coarse sand and fine gravel		
16 _{16.5} 17 _{17.5}							
18 _{18.5}							(18.0')_ Fine SAND, trace inorganic silt (SP)
20	S-5	18/18	19-20.5	12 17 16	Brown, fine SAND, trace inorganic silt		
Granula	r Soils	Cohesiv	a Soils	Remarks:			
Blows/Ft	Density	Blows/Ft.	Density	(2) Gravel p	unts high for S-1 due to frost penetration pieces include both subangular and ang		gments).
0-4	V.Loose	<2	V. Soft	(3) All corin	g times in minutes.		

Information on this log is a compilation of subsurface conditions and soil or rock classifications obtained from the field as well as laboratory testing of samples. Strata have been interpreted by commonly accepted procedures. The stratum lines may be transitional and approximate. Water level measurements have been made in the open boreholes at the time and location indicated, and may vary with time, geologic condition or construction activity.

4-10

10-30

30-50

>50

2-4

4-8

8-15

15-30

Loose

Dense

M. Dense

V. Dense

Soft

Stiff

M. Stiff

V. Stiff

Boring Log

Boring No. SEA-2 Ref. No. 392-8511

Ground Surface Elev. :

Project : Barson's Construction

Ft. Devens

Landfill Closure

Boring Lea

Boring No. SEA-2 Ref. No. 392-8511

Contractor: Soil Exploration Corp. Date: 31 Jan-3 Feb 86 Engineer/Geologiet: M. Gitten

Boring Location : See Site Plan

254.90

Water Level : 19.5

Date : 3 Feb. 86

Casing Size: 3-1/4" I.D. Hollow Stem Sampler: 1-3/8" I.D. Spirt Spoon & NX Core Barrel

Boring No. SEA-? Ref. No. 392-851

Casing at : 32'

30.74		Sam	ple		6.2.2.20		Stratum
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Sample Description	Remarks	Stratum Description
20.5							Fine SAND, trace inorganic silt
21 21.5							(SP)
22							
22.5	7						(22.5)
23.5							Fine SAND, little inorganic silt with lenses of inorganic SILT (SM/ML)
24 24.5	S-6	18/18	24-25.5	17	Brown, fine to coarse SAND, little		
25				20	Inorganic silt with lenses of SILT		
25.5				29			ľ
26	1 10 1						
27							Y
27.5							
28 28.5	T ELEG	7				7 ((28.0)
29	67	10/10	00.00.5	- 10	0.110	(2)	Fine to coarse SAND, little fine to coarse gravel, trace inorganic silt
29.5	S-7	18/12	29-30.5	18	Brown, fine to coarse SAND, little fine to coarse gravel, trace		(sw)
30				28	Inorganic silt		
31							
31.5							
32	S-8	0/0	32	100/0*			(32.0)
33	C-1	60/55	00.07	Coring Time	Fresh to slightly weathered biotite GRANODIORITE, with closely to	(3)	Very hard to hard, dark grey, equiangular to slightly porphyritic
33.5	<u> </u>	60/55	32-37	10	medium spaced, tight, planar joints; joints are flat (0° to 20°) to steeply		biotite GRANODIORITE with few
34	1 - 1			8	dipping (45° to 70°), few quartz		quartz stringers
35		Recovery	= 92%	9	stringers		
35.5						. 3	
36.5				11		0 1	
37			-	8			
37.5	+	7					
38.5	C-2	24/22	37-39	12			
39		Recovery	- 92%	12	Bottom of Exploration at 39'		(39.0)
39.5 40							
Granula	r Soils	Cohesiv	e Soils	Remarks:			
Blows/Ft	Density	Blows/Ft	Density	(2) Gravel	ounts high for S-1 due to frost penetration pieces include both subangular and any		gments).
0-4	V.Loose	<2	V. Soft		ng times in minutes.		3 4 7
4-10 10-30	Loose M. Dense	2-4 4-8	Soft M. Stiff				[n - n - n - n - n - n - n - n - n - n
30-50	Dense	8-15 15-30	Stiff				Boring Log

Information on this log is a compilation of subsurface conditions and soil or rock classifications obtained from the field as well as laboratory tosting of samples. Strata have been interpreted by commonly accepted procedures. The stratum lines may be transitional and approximate. Water level measurements have been made in the open boreholes at the time and location indicated, and may vary with time, geologic condition or construction activity.

>50

V. Dense

15-30

>30

V. Stiff

Hard



Cambridge, MA. S. Portland, ME. Wethersfield, CT.

DRILLING CONTRACTOR: Soil Exploration Corp.

FOREMAN: Bob Seymour
METHOD: Hollow Stem Auger & NX Core Barrel

SEA GEOLOGIST/ENGINEER: J. Jammallo

BARCAD SAMPLER

No. 1

GROUNDWATER DEPTH: 29.5'

DATE: 2/16/86

DATUM: G.S.

MONITORING WELL NO. BAR-3

JOB NO: 392-8511 CLIENT: Barson's

LOCATION: Ft. Devens Landfill

DATE

START: 2/5/86 FINISH: 2/6/86

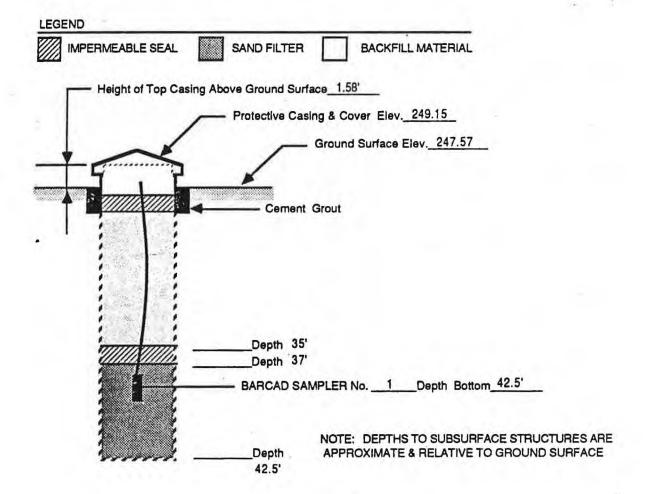
SOIL SAMPLES TAKEN: Yes

EQUIPMENT CLEANING: Yes

METHOD: Steam clean and methanol rinse

MATERIAL TO FACILITATE DRILLING: Yes

TYPE: Water

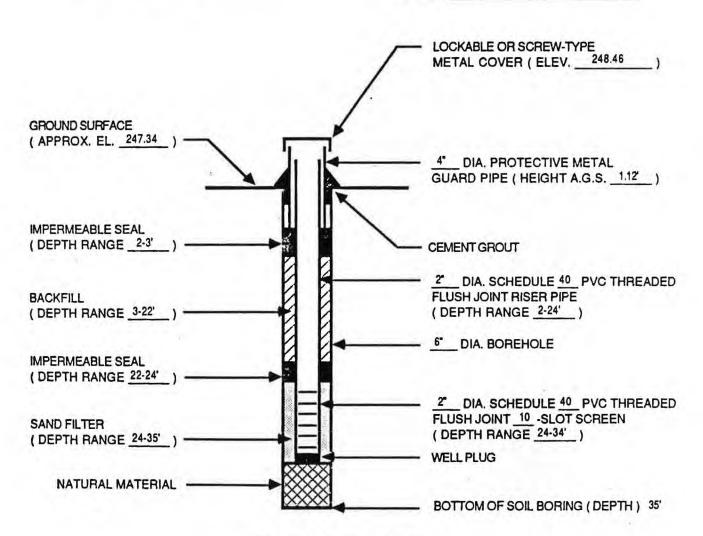


MONITORING WELL CROSS-SECTION WITH BARCAD SAMPLER INSTALLATION



Cambridge, MA. S. Portland, ME. Wethersfield, CT.

DRILLING CONTRACTOR: _____ Soil Exploration Corp. MONITORING WELL NO. FOREMAN: Bob Seymour JOB NO: 392-8511 CLIENT: Barson's METHOD: Hollow Stem Anger LOCATION: Ft. Devens DATE SEA GEOLOGIST/ENGINEER: ______J. Jammallo START: 2/6/86 FINISH: 2/6/86 SOIL SAMPLES TAKEN: No GROUNDWATER LEVEL: DATE: 3/7/86 EQUIPMENT CLEANING: Yes METHOD: Steam clean and methanol rinse METHOD: Tape DATUM: T.C. MATERIAL TO FACILITATE DRILLING: No TYPE:



MONITORING WELL CROSS SECTION SCHEMATIC



Project : Barson's Construction Landfill Closure Ft. Devens

Boring Log

Boring No. SEA-3 Ref. No. 392-8511

Contractor: Soil Exploration Corp. 5 Feb. & 6 Feb. 86 Engineer/Geologist: M. Schultz

Boring Location: See Site Plan Ground Surface Elev.: 247.57

Engineers/Architects

Water Level :

29.5

Date : 6 Feb. 86

Casing Size : 3-1/4" I.D. Hollow Stem Sampler : 1-3/8" I.D. Split Spoon &

NX Core Barrel

Casing at : 0'

Day to s		Sam	ple		C	1	Stratum
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Sample Description	Remarks	Description
0.5	S-1		05.		Brown, fine to medium SAND, trace to little coarse sand and fine gravel	(1)	Fine to medium SAND, trace to little coarse sand and fine gravel (SP)
1 1.5					with occasional roots		The section with Michael (OL)
2							
2.5							
3 3.5							
4 4.5	S-2	18/18	4-5.5	7	Brown, fine to medium SAND, trace		
5				8	coarse sand		
5.5				10			(
6 8.5				lagran - T			
7 7.5							
Q						1	(7.5')Coarse to fine SAND, trace fine
6.5							gravel (SW)
9 9.5	S-3	18/18	9-10.5	13	Brown, coarse to find SAND, trace fine gravel	0 3	
10,10.5				16	grand		
11							
11.5							
12							(12.5)
13					Υ.		(12.5) Fine to medium SAND, trace coarse
14,14.5	S-4	18/15	14-15.5	7	Brown, fine SAND, trace to little		sand and fine gravel (SP)
14.5	3-4	16/15	14-15.5	8	medium to coarse sand and fine	J. 1	
15,5				9	gravel		
16,5							
17						1 9	
17.5							
18							
19,5	S-5	18/16	19-20.5	7	Brown, fine to medium SAND, trace		
20				9	coarse sand		
CT							
Granula		Cohesiv		Remarks: (1) S-1 from	a quant		
lows/Ft	Density	Blows/Ft.	Density	(2) Semple	S-6 and above dry.		
0-4 4-10	V.Loose Loose	24	V. Soft Soft	(3) Sample:	S-7 wet.		
10-30	M. Dense	4-8 8-15	M. Stiff Stiff				Boring Log
30-50 >50	V. Dense	15-30	V. Stiff				Boring No. SEA-3
		>30	Hard				Ref. No. 392-8511

Information on this log is a compilation of subsurface conditions and soil or rock classifications obtained from the field as well as laboratory testing of samples. Strata have been interpreted by commonly accepted procedures. The stratum lines may be transitional and approximate. Water level measurements have been made in the open boreholes at the time and location indicated, and may very with time, geologic condition or construction activity.

Ground Surface Elev. :

Project: Barson's Construction

Landfill Closure

Ft. Devens

Boring Log

Boring No. SEA-3 Ref. No. 392-8511

Contractor: Soil Exploration Corp. 5 Feb. & 6 Feb. 86 Engineer/Geologist: M. Schultz

Boring Location : See Ste Plan

247.57

Water Level : 29.5

Date : 6 Feb. 86

Casing Size : 3-1/4" I.D. Hollow Stem Sampler : 1-3/8" I.D. Spit Spoon &

Casing at : 0'

NX Core Barrel

(Averal		San	nple		MTGRAPZ.	7.75	Ctentum
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Sample Description	Remarks	Stratum Description
20.5							Fine to medium SAND, trace to little
21 21.5							coarse sand (SP)
22	1000						1 2 2 2 2 2 2 2 2
22.5						1	
23							
24		7.54		البجوكا	and the second second second		
24.5	S-6	18/15	24-25.5	15	Brown, fine SAND, trace to little coarse sand	(2)	
25 25.5			-	22			
26				Teda-II			
28.5				1	-		
27	-						
27.5	5 = 3	2.23					
28.5		1 1					
29	S-7	18/15	29-30.5	8	Brown, fine to medium SAND, trace	(3)	
29.5		10.15	20.00.0	8	coarse sand	19)	
30				9			
31					8		
31.5							
32							
33						1 1	
33.5				_		1 8	
34	S-8	18/0	34-35.5	12			
34.5 35				16	0 1		
35.5				13			
36	S-9	18/0	35.5-37	8		1 1	
36.5				10			
37							
38	S-10	0/0	37.5-	50/0"	Service Service Services		(37.5')
38.5				Coring Time 7.5	Fresh to slightly weathered biotite GRANODIORITE with very closely		Very hard to hard, dark grey, equigranular biotite
39	C-1	60/	37.5 to	7,5	to closely spaced, tight, planar		GRANODIORITE
39.5 40		7 (2	42.5	11	joints; joints flat (0°-20°) to very steeply dipping (70° to 90°)		
40		Recovery=	70%				
Granule	e Saile	Cohesiv	e Soils	Remarks:			
Blows/Ft	Density	Blows/Ft	Density	(1) S-1 from	n auger.		
F-62-61/-24	10.0		2.000	(2) Sample (3) Sample	S-6 and above dry. a S-7 wet		
0-4 4-10	V.Loose Loose	24	V. Soft Soft	431	25,00000		
10-30	M. Dense	4-8	M. Stiff				Boring Log
30-50 >50	V. Dense	8-15 15-30	Still V. Still				Boring No. SEA-3
-50	v. Dense	>30	Hard				Ref. No. 392-8511

Information on this log is a compilation of subsurface conditions and soil or rock classifications obtained from the field as well as laboratory testing of samples. Strata have been interpreted by commonly accepted procedures. The stratum lines may be transitional and approximate. Water level measurements have been made in the open boreholes at the time and location indicated, and may vary with time, geologic condition or construction activity

Project : Barson's Construction

Landfill closure Ft. Devens

Boring Log

Boring No. SEA-3 Ref. No. 392-8511

Contractor: Soil Exploration Corp. Engineer/Geologist: M. Schultz

Casing Size: 3-1/4" I.D. Hollow Stem Sampler: 1-2/8" I.D. Split Spoon + NX Core Barrel

Boring Location : See Site Plan a Ech De

Ground S	urlace Elev.			Water Level :	29.5' Date : 6 Feb. 6		Casing at : 0'
Bank		San	ple		Sample	.00.00	Stratum
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Description	Remarks	Description
40.5							Very hard to hard, dark grey,
41				6		1.00	equigranular biotite GRANODIORITE
41.5				11			
42		-	_				
42.5					Bottom of exploration at 42.5	((42.5)
43							1
43.5							
44.5		*				- 1	
45		2			V 1		
45.5			201) A	
46							
46.5			_				
47							
47.5 48							
48.5							
19					7.		
49.5							
50						1	
50.5	-						
51							
51.5 5 2					6 3		
52.5						1	
53					P N		
53.5						(
54		-		-			
54.5							
55 _{55.5}							
56							
56.5	~						
57							- 1
57.5							
58							
58.5							
59 59.5							
60							
Granula	r Soils	Cohesive	e Soils	Remarks:			
ows/Ft.	Density	Blows/Ft.	Density				
0-4	V.Loose	42	V. Soft				
4-10	Loose	2-4	Soft				A CONTRACTOR AS
0-30	M. Dense	4-8 8-15	M. Stiff				Boring Lo
30-50 >50	V. Dense	15-30	V. Stiff				Boring No. SEA- Ref. No. 392-851
	7. Denise	>30	Herd		-		Ref. No. 392-851

Information on this log is a compilation of subsurface conditions and soil or rock classifications obtained from the field as well as laboratory testing of samples. Strata have been interpreted by commonly accepted procedures. The stratum lines may be transitional and approximate. Water level measurements have been made in the open boreholes at the time and location indicated, and may vary with time, geologic condition or construction activity



Cambridge, MA. S. Portland, ME. Wethersfield, CT.

DRILLING CONTRACTOR: Soil Exploration Corporation FOREMAN: Bob Seymour METHOD: Hollow Stem Auger & NX Cone Barrel

SEA GEOLOGIST/ENGINEER: J. Jammallo/M. Schultz

BARCAD SAMPLER WELL No. 1 No. 2

10.5 10.9 GROUNDWATER DEPTH: 10.5'

DATE: 3/17/86 3/17/86 3/17/86 TC TC TC DATUM :_

MONITORING WELL NO. BAR-4 & WT-4 JOB NO: 392-8511 CLIENT: Barson's LOCATION: Fort Devens Landfill

DATE

START: 2/7/86 FINISH: 2/10/86

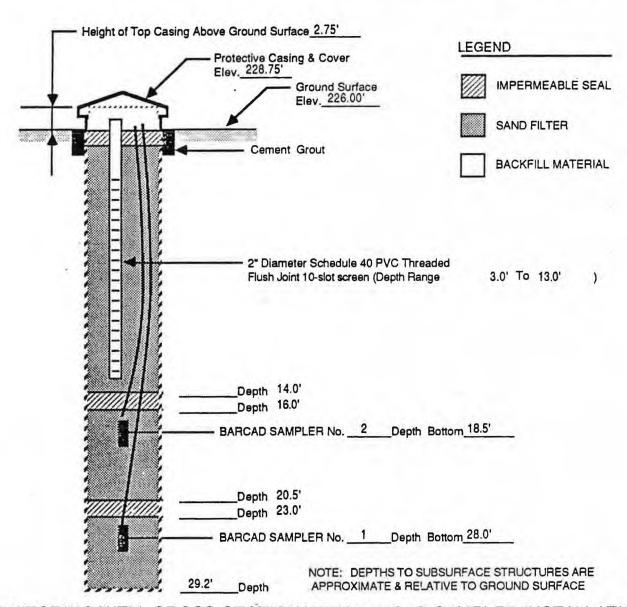
SOIL SAMPLES TAKEN: Yes

EQUIPMENT CLEANING: Yes

METHOD: Steam Clean and Methanol Rinse

MATERIAL TO FACILITATE DRILLING: Yes

TYPE: Water



MONITORING WELL CROSS-SECTION WITH BARCAD SAMPLER INSTALLATION



Project : Barson's Construction Landfill Closure

Ft. Devens

Boring Log

Boring No. SEA-4 Ref. No. 392-8511

Contractor: Soil Exploration Corp. Date: 8 Feb. -10 Feb. 86 Engineer/Geologist: J. Jammalio

Boring Location: See Site Plan . Ground Surface Elev.: 226.00

Water Level : 8.8

Date : 10 Feb. 88

Casing Size: 3-1/4" I.D. Hollw Stem Sampler: 1-9/8" Split Sppon & NX Core Barrel

Casing at : 0

		San	iple		Sample		Stratum
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Description	Remarks	Description
0.5		-	0'-2		FILL: Fine to medium SAND, trace to little coarse sand and fine to coarse gravel, trace silt with	(1)	FILL; Fine to medium SAND, trace to little coarse sand and fine to coarse gravel, trace silt with
1 _{1.5} 2 _{2.5}					occasional roots		occasional roots (SP)
3 3.5		7					(3.07)
4 4.5 5	S-2	18/8	4-5.5	8 5	Brown, fine to medium SAND, little coarse sand and fine gravel		sand and line gravel (SP/SW)
5.5 6 _{6.5}				8			4
7 7.5							(7.5)
8 8.5							Fine to coarse SAND (SW)
9 9.5	\$-3	18/16	9-10.5	5	Brown, fine to coarse SAND		
11 11.5							
12,12.5							
13 _{13.5} 14 _{14.5}	S-4	18/2	14-15.5	5	Brown, fine to coarse SAND, trace		- Trace fine gravel below 14'
15				3 5	fine gravel		•
16 _{16.5}							7
17.5 18 _{18.5}							(17.5')Fine SAND, little to some coarse
19	S-5	18/10	19-20.5	6	Brown, fine SAND, little to some		sand and fine gravel (SP/SW)
20				6 8	medium to coarse sand and fine gravel		
Granula	r Soils	Cahesiv	9 Soils	Remarka:	7.X		
Blows/FL	Density	Blows/Ft.	Density	(1) S-1 from (2) All corin	sauger. g times in minutes		
0-4 4-10 10-30 30-50 >50	V.Loose Loose M. Dense Dense V. Dense	22 2-4 4-8 8-15 15-30 >30	V. Soft Soft M. Stiff Stiff V. Stiff Hard				Boring Log Boring No. SEA-4 Ref. No. 392-8511

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Ground Surface Elev. :

Project : Barson's Construction Landfill Closure

Ft. Devens

Boring Log

Boring No. SEA-4 Ref. No. 392-8511

Contractor: Soil Exploration Corp. Date: 8 Feb. -10 Feb. 86

Engineer/Geologist: J. Jemmalio Boring Location : See Ste Plan

15-30

>30

V. Dense

V. Stiff

Hard

226.00 Water Level: 8.8

Date : 10 Feb. 88

Casing Size: 3-1/4" I.D. Hollw Stem Sampler: 1-3/8" Split Sppon & NX Core Barrel

Casing at : 0

Boring No. SEA-4 Ref. No. 392-85)1

		San	pie			1	Stratum Description
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Sample Description	Remarks	
20.5 21 21.5 22 22.5 23 23.5 24 24.5 25 25.5 26 28.5 27 27.5 28 28.5 29 29.5 30 30.5 31 31.5 32 32.5 33 33.5 34 34.5 35 35.5 36	S-6			15/2"- 60/0" CORING	Grey, SILT and fine SAND, trace medium to coarse sand and gravel (glacial fill) Fresh to slightly weathered, biotite GRANODIORITE with closely to medium spaced, tight, planar joints; steeply dipping (70° to 90°), some healed Bottom of Exploration at 29.2'	(2)	
36.5 37 37.5 38 38.5 39 39.5					4		
40							
Granule		Cohesiv	e Soils	Remarks; (1) S-1 from	1 aucer.		
Blows/FL	Density	Blows/Ft	Density		g times in minutes		
0-4 4-10 10-30 30-50	V.Loose Loose M. Dense Dense	<2 2-4 4-8 8-15	V. Soft Soft M. Suff Stiff				Boring Loc

Information on this log is a compilation of subsurface conditions and soil or rock classifications obtained from the field as well as laboratory testing of samples. Strata have been interpreted by commonly accepted procedures. The stratum lines may be transitional and approximate. Water level measurements have been made in the open boreholes at the time and location indicated, and may vary with time, geologic condition or construction activity.

>50



Cambridge, MA. S. Portland, ME. Wethersfield, CT.

DRILLING CONTRACTOR: Soil Exploration Corp.

FOREMAN: Bob Seymour
METHOD: 4* Seamless Casing, NX Core Barrel

SEA GEOLOGIST/ENGINEER: M. Schultz

BARCAD SAMPLER
No.1 No.2 No.3 No.4

GROUNDWATER DEPTH: 2.15' 3.50' 5.41' 4.2'

DATE: 3/7/86 3/7/86 3/7/86 3/7/86

DATUM: T.C. T.C. T.C. T.C.

MONITORING WELL NO. BAR-5
JOB NO: 392-8511 CLIENT: Barson's
LOCATION: Ft. Devens

DATE

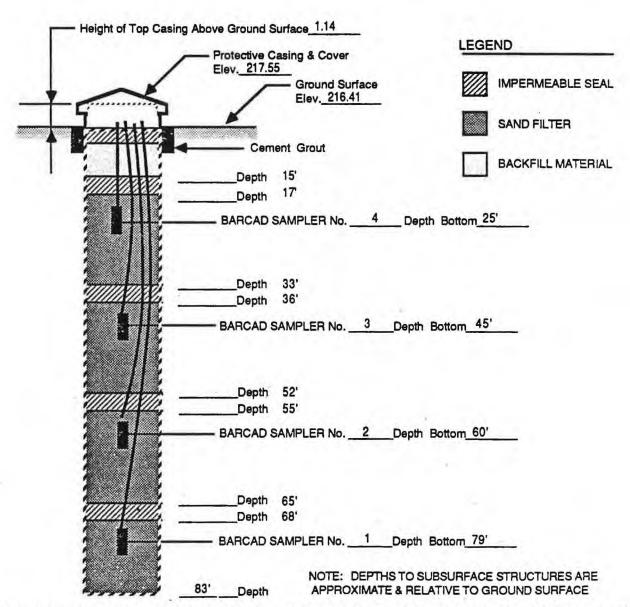
START: 2/12/86 FINISH: 2/27/86

SOIL SAMPLES TAKEN: Yes

EQUIPMENT CLEANING: Yes

METHOD: Steam clean and mehanol rinse

MATERIAL TO FACILITATE DRILLING: Yes
TYPE: Water

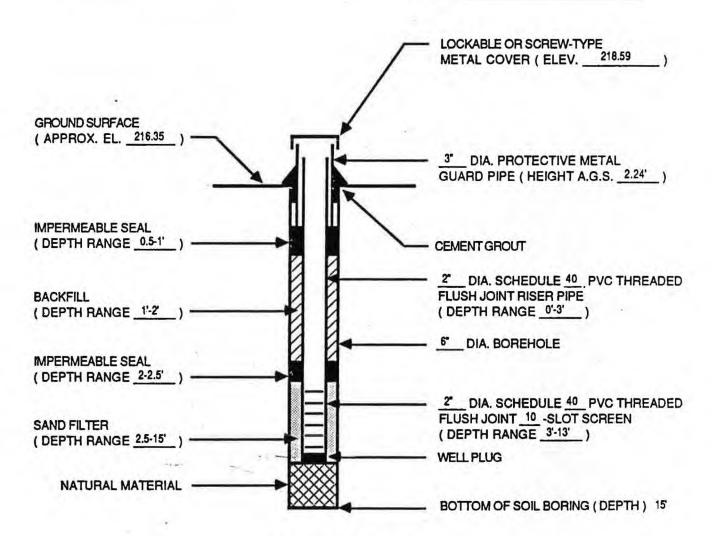


MONITORING WELL CROSS-SECTION WITH BARCAD SAMPLER INSTALLATION



Cambridge, MA. S. Portland, ME. Wethersfield, CT.

Soil Exploration Corp. DRILLING CONTRACTOR: MONITORING WELL NO. _ JOB NO: 392-8511 CLIENT: Barson's FOREMAN: Bob Seymour METHOD: Hollow Stem Anger LOCATION: Ft. Devens Landfill DATE M. Gitten START: 2/28/86 FINISH: 2/28/86 SEA GEOLOGIST/ENGINEER: __ GROUNDWATER LEVEL: SOIL SAMPLES TAKEN: No DATE: 2/27/86 TIME: 0 EQUIPMENT CLEANING: Yes FEET: 2'2" METHOD: Steam clean and methanol rinse METHOD: Tape DATUM: G.S. MATERIAL TO FACILITATE DRILLING: No TYPE:



MONITORING WELL
CROSS SECTION SCHEMATIC



Project : Barson's Construction Landfill Closure

Ft. Devens

Boring Log

Boring No. SEA-5 Ref. No. 392-8511

Contractor: Soil Exploration Corp. Date: 12 Feb.-27 Feb. 86 Engineer/Geologiet: M. Schultz

Boring Location : See Site Plan Ground Surface Elev. :

Water Level: 2.2

Date : 27 Feb. 86

Casing Size: 3-1/4" I.D. Hollow Stem Sampler: 1-3/6" I.D. Split Spoon &

NX Core Barrel

Casing at : 0

- N- 14		Sam	ple		Committee		Ctroture
Depth (ft)	No.	Pen (In) /Rec.	Depth (ft)	Blows/6"	Sample Description	Remarks	Stratum Description
0.5	S-1	1.4.	0-2		Peat	(1)	Peat (PT)
4						1.50	(0.5)
1 1.5	-		_				medium sand and peat (SP/OL)
2							
2.5							
3 3.5			X				
4	S-2	15/15	4-5.3	20	Dark Brown, fine SAND, some		
4.5	- 5-2	1313	4-5.5	60	organic silt, little medium sand and		8
5 5.5				60/3"	peat		
6							
6.5	-						
7 7.5							
							(7.5')
8 8.5							Fine to medium SAND, trace inorganic silt, coarse sand and fine
9	S-3	18/12"	9-10.5	17	Brown, fine to medium SAND, trace,		gravel (SP)
9.5		10.2	D 10.D	21	inorganic silt, coarse sand, and line		
10				15	gravel		
11				1000			
11.5			_				
12							
13							
13.5							
14,14.5	S-4	18/18	14-15.5	4	Brown, fine SAND, little inorganic		(14.0')
4 =		2000	T-1-20	2	silt, trace fine gravel		Fine SAND, little inorganic silt,
15,5				4			trace fine gravel (SM)
16						81 1	
16.5							
17					2 40		
18							(17.5')
18.51			A.				rine SAND, trace inorganic sill (SP)
19	S-5	18/18	19-20,5	2	Light brown, fine SAND, trace		
19.5				2	inorganic silt		
20				6	.,		
Granula	r Soils	Cahesive	Soils	Remarks:			
lows/FL	Density	Blows/Ft.	Density	(1) Sample	S-1 auger, very first attempt, redrove sampler to o	htain soil for	classification
0-4	V.Loose	. <2	V. Soft	(3) Drove c	asing to advance hole below 49 feet.	Dualin SUI TOP	CIGSOINCEUUTI.
4-10	Loose M. Dense	2-4 4-8	Soft M. Suff	(4) Evidence	e of soil type on end of sampler.		
10-30 30-50	M. Dense	8-15	Stiff	W			Boring Log
>50	V. Dense	15-30 >30	V. Stiff Hard				Boring No. SEA-5 Rel. No. 392-8511

Information on this log is a compilation of subsurface conditions and soil or rock classifications obtained from the field as well as laboratory testing of samples. Strata have been interpreted by commonly accepted procedures. The stratum lines may be transitional and approximate. Water level measurements have been made in the open boreholes at the time and location indicated, and may vary with time, geologic condition or construction activity.



Project : Barson Construction Landfill Closure

Ft. Devens

Boring Log

Boring No. SEA-5 Ref. No. 392-8511

Contractor: Soil Exploration Corp. Date: 12 Feb.-27 Feb. 86 Engineer/Geologist: M. Schukz

>30

Boring Location : See Site Plan Ground Surface Elev. : 216.41

Water Level: 2.2

Date : 27 Feb. 86

Casing Size: 3-1/4" i.D. Hollow Stern Sampler: 1-3/8" i.D. Spit Spoon & NX Core Barrel

Casing at : 0

EASS		Sam	ple		Comple		Stratum
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Sample Description	Remarks	Description
20.5 21 _{21.5} 22 _{22.5}							Fine SAND, trace inorganic silt (SP)
23 23.5 24 24.5 25.5	S-6	18/18	24-25.5	-5	Light brown, fine SAND, trace inorganic sit		
26 26.5 27 27.5 28							
28.5 29 29.5 30 30.5	S-7	18/18	29-30.5	1	Light brown, fine SAND, traca inorganic silt		
31,5 32 32,5 33 33,5							
34 34.5 35.5 36	S-8	18/18	34-35.5	7 7	Light brown, fine SAND, trace medium sand		- With trace medium sand below 3-
38.5 37 37.5 38 38.5							
39 39.5 40	S-9	18/12	39-40.5	6 7 5	Light brown, fine SAND, trace medium sand		
Granula	r Soils	Cohesiv	e Soils	Remarks:			
Blows/FL	Density	Blows/Ft	Density	(1) Sample	S-1 auger. overy first attempt, redrove sampler to o	htain soil for	classification
0-4 4-10 10-30 30-50 >50	V.Loose Loose M. Dense Dense V. Dense	<2 2-4 4-8 8-15 15-30	V. Soft Soft M. Stiff Stiff V. Stiff	(3) Drove c	asing to advance hole below 49 feet. e of soil type on end of sampler.	John John Juli	Boring Log

Information on this log is a compilation of subsurface conditions and soil or rock classifications obtained from the field as well as laboratory testing of samples. Strata have been interpreted by commonly accepted procedures. The stratum lines may be transitional and approximate. Water level measurements have been made in the open boreholes at the time and location indicated, and may vary with time, geologic condition or construction activity.



Ground Surface Elev. :

Project : Barson's Construction

Landfill closure Ft. Devens

Boring Log

Boring No. SEA-5 Ref. No. 392-8511

Casing Size: 3-1/4" I.D. Hollow Stem Sampler: 1-3/8" I.D. Split Spoon +

Contractor: Soil Exploration Corp. Engineer/Geologist: M. Schultz

Boring Location : See Site Plan

216.41

Water Level :

2.2

Date : 27 Feb. 86

NX Core Barrel Casing at : 0'

		Sam	ple				Chadua
Oepth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Sample Description	Remarks	Stratum Description
40.5 41 41.5 42 42.5 43							Fine to medium SAND, trace inorganic silt (SP)
43.5 44.5 45.5 45.5 46.5	S-10	18/0	44-45.5	11 22 15	Light brown, fine to medium SAND, trace inorganic silt	(2)	, "
7 47.5 8 48.5 9 49.5	S-11	18/12	49-50.5	13	Reddish brown, fine SAND, trace inorganic silt	(3)	
50.5 1 51.5 2 52.5				19		*	
53.5 4 54.5 5 55.5	S-12	18/6	54.5-56	33 100 60	Brown, fine to coarse SAND, little to some fine gravel, little inorganic slit (glacial till)		(53.0')_ Fine to coarse SAND, little to some fine to coarse gravel, little inorganic silt (SM/GM)
56.5 7 57.5 8 58.5							
59.5	S-13	6/3	59.5-60	180/6*	Brown, fine to coarse GRAVEL and fine to coarse SAND, little silt		

Granule	ar Soils	Cohesive Soils		
Blows/Ft	Density	Blows/Ft.	Density	
0-4	V.Loose	-22	V. Soft	
4-10	Loose	2-4	Soft	
10-30	M. Dense	4-8	M. Stiff	
30-50	Dense	8-15	Stiff	
>50	V. Dense	15-30	V. Stiff	

(2) No recovery first attempt, redrove sampler to obtain soil for classification.

(3) Drove casing to advance hole below 49 feet.

(4) Evidence of soil type on end of sampler.

(5) No recovery first attempt, redrove sampler to obtain soil for classification.

Boring Log Boring No. SEA-5 Ref. No. 392-8511

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Project : Barson's Construction

Landfill Closure Ft. Devens

Boring Log

Boring No. SEA-5 Ref. No. 392-8511

Contractor: Soil Exploration Corp.

Engineer/Geologiet : M. Schultz Boring Location : See Site Plan Ground Surface Elev. : 218.41

Water Level: 2.2'

Date : 27 Feb. 86

Casing Size: 3-1/4" I.D. Hollow Stem Sampler: 1-3/8" I.D. Split Spoon + NX Core Barrel Casing at : 0'

		Sam	pie		Sample	3.3.4	Stratum
Depth (ft)	No.	Pen (In) /Rec.	Depth (ft)	Blows/6"	Description	Remarka	Description
60.5							Fine to coarse SAND, little to some
61	_		_	-			fine to coarse gravel, little
61.5				30		10 30	inorganic silt (SM / GM)
62 62.5							
63	150	Commo		45.5		1 1	
63.5						1	
64	-		-	_			
64.5						1 1	
65.5							
66	70						
66.5		ut-seri					
67		-		-		1	
87.5							-
68 68.5							(68.0)
69		7-1 1 - 1					Fine SAND, trace inorganic silt (SP)
69.5	S-14	18/0	69.5-71	10	Brown, fine SAND, trace inorganic	(4)	(0.7
70	3114	10/0	05.5-71	11	silt	(4)	
70.5				15			
71						1 1	
72						1 1	
72.5						1 1	
73		-	-			1 1	
73.5						1 1	
74.5						1 1	
75							
75.5	S-15	18/0	75.5-77	8	Brown, fine SAND, trace inorganic	(5)	
76	0.10	1944	, 5,5 , 1	12	silt	101	
76.5 77				18			
77.5				- 0.00			
78	0.40	0/0	70	100/05		100	(70.0)
78.5	S-16	0/0	78	100/0° Coring Time		(6)	(78.0)
79	C-1	60/39	78-83	15	Fresh to slightly weathered, biotite		Very hard to hard, dark grey,
79.5		Acces.			GRANODIORITE with closely		equigranular biotite
80				18	spaced, tight, planar joints; flat (0° to 20°) [Description Continued]		GRANODIORITE
Granula	r Soils	Cohesiv	e Soils	Remarks:	wan feet allamet radiana assatis to	obtole coll for	clossification
Blows/Ft.	Density	Blows/Ft	Density	(3) Drove o	overy first attempt, redrove sampler to asing to advance hole below 49 feet.	UDIAM SON TOP	ciasailication,
0-4	V.Loose	<2	V. Soft		e of soil type on end of sampler. very first attempt, redrove sampler to o	htain sail les	classification
4-10	Loose	2-4 4-8	Soft M. Stiff	(5) 140 1800	very manatrampt, redrove sampler to c	Julain Sull IOF	AT THE STATE OF TH
10-30 30-50	M. Dense Dense	8-15	Stiff				Boring Log
>50	V. Dense	15-30 >30	V. Stiff Hard				Boring No. SEA-5 Rel. No. 392-8511

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Ground Surface Elev. :

Project : Barson's Construction

Landfill closure Ft. Devens

Boring Log

Boring No. SEA-5 Ref. No. 392-8511

Casing Size: 3-1/4" I.D. Hollow Stem Sempler: 1-3/8" I.D. Split Spoon +

Contractor: Soil Exploration Corp. Engineer/Geologist: M. Schultz

Boring Location : See Site Plan

216.41

Water Level :

2.2'

Date : 27 Feb. 86

NX Core Barrel Casing at : 0'

		Sam	ple		Sample		Stratum
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Description	Remarks	Description
80.5	C-1			10	[Description continued] and		Very hard to hard, dark grey,
81 81.5	(Continued)				steeply dipping (45° to 70°) with	(7)	equigranular biotite
82		Recovery	= 65%	5	some very steeply (70° to 90°) dipping healed joints - many seams		GRANODIORITE
82.5			-		below 81		
83				3			NAME AND
83.5					Bottom exploration at 83.0'		(83.0')
84							
84.5						1 1	
85.5 85.5							
36							
86.5		7					
37							
87.5			_				
38							
88.5							
89.5						3	
90							
90.5							
91						1	
91.5							
92.5							
93							
93.5							
94							
94.5							
95 _{95.5}							
96						1	
96.5		45					
97							
97.5						0.0	
98		-4					
98.5							
99,5							
00							
-							
Granula	r Soile	Cohesive	Soils	Remarks:			
ows/FL	Density	Blows/Ft.	Density	A Section of the Control of the Cont	ulation below 81 feet.		
0-4	V.Loose	<2	V. Soft	100 == 20			
4-10	Loose	2-4	Soft				

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10-30

30-50

>50

M. Dense

V. Dense

Dense

4-8

8-15

15-30

>30

M. Stiff

V. Stiff

Hard

Stiff

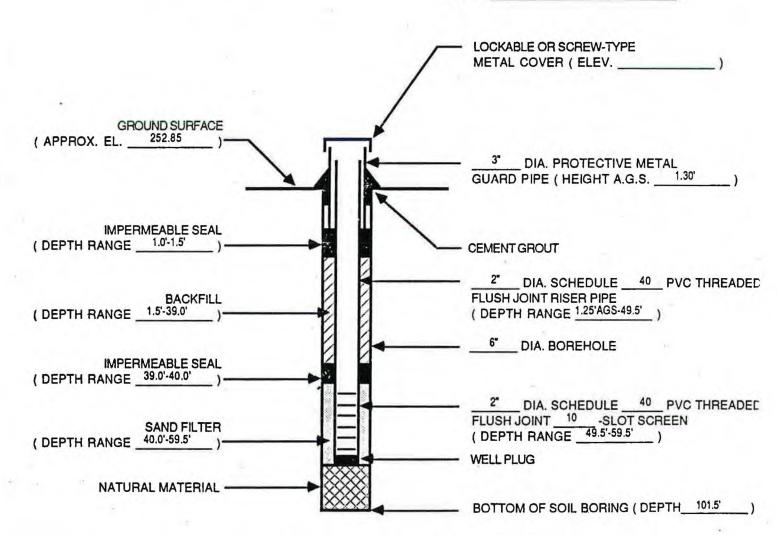
Boring Log

Boring No. SEA-5 Ref. No. 392-8511



Cambridge, MA. S. Portland, ME. Wethersfield, CT.

DRILLING CONTRACTOR: Soil Exploration Corporation WT-6 MONITORING WELL NO. FOREMAN: Jim Campbell JOB NO: 392-8611 CLIENT: Barson's METHOD: Hollow Stem Auger LOCATION: Fort Devens Landfill DATE SEA GEOLOGIST/ENGINEER: __ M.P. Clark START: 8/25/86 FINISH: 8/26/86 SOIL SAMPLES TAKEN: Yes **GROUNDWATER LEVEL:** DATE: 10/8/86 TIME: 10:00 FEET: 28.65 EQUIPMENT CLEANING: Yes METHOD: Steam Clean METHOD: Water Level Indicator DATUM: Top of Casing MATERIAL TO FACILITATE DRILLING: Yes TYPE: Water



MONITORING WELL CROSS SECTION SCHEMATIC

Project : Barsons' Construction Landfill Closure

Fort Devens

Boring Log

Boring No. SEA-6 Ref. No. 392-8611

Casing Size : See Note A Sampler : 1 3/8" I.D. Split Spoon

Contractor: Soil Exploration Corporation Engineer/Geologist: M.P. Clark

Boring Location : See Site Plan Ground Surface Elev. : 252.35'

Date: 8/25-8/26/86

Casing at : N/A

Ground S	urlace Elev.	: 25	2.35'	Water Level :	28.65' Date: 8/25-8	/26/86	Casing at : N/A
24030		San	nple		Comula		Stratum
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Sample Description	Remarks	Description
0.5	S-1	6/6	0-0.5	100	S-1 Brown, fine SAND, little medium		Fine SAND, little medium sand,
	S-1A	12/10	0.5-1.5	4	sand ,trace inorganic silt with roots. S-1A Brown to black fine SAND,	100	trace inorganic silt (SP)
1 1.5				7	little medium sand, trace inorganic		
2			-		silt		
2.5							
3	_				er .		
3.5				-			(4.5)
4							Medium SAND, little coarse and
4.5							fine sand, trace inorganic silt (S
5	S-2	18/12	5-6.5	7	Tan to grey, fine to medium SAND,		A STATE OF THE PARTY OF THE PAR
5.5				6	little coarse sand, trace inorganic		
6 6.5				7	silt		
				-			
7 7.5							
8							
8.5							
9			-			1	
9.5						/	
10	S-3	18/15	10-11.5	6	Tan to grey, medium to coarse		
10.5	3-3	1015	10-11.5	5	SAND. little fine sand, trace		
11				6	inorganic sift		
11.5							
12						Y 93	
40							
13					3	8	
4.4					-)		
14,14.5							
15		10115	2015	- 100			
15.5	S-4	18/15	15-16.5	4	Tan to grey, medium SAND, little fine sand, trace inorganic silt		
16				15	care, sace margaine one		
16.5				15			
17							
17.5							
18							
10.3							
19,5							
20					2020-02-02-03-03-03-03-03-03-03-03-03-03-03-03-03-		Lorenta Lie Santani
20	S-5	18/16	20-21.5	5	See Page 2 of 6 for Description		See Page 2 of 6 for Description
Granula	r Soils	Cohesiv	e Soils	Remarks:			
ws/Ft	Density	Blows/Ft.	Density	(A) 3 1/4" I.I	D. Hollow Stem Auger		
0-4	V.Loose	-2	V. Soft				-
4-10	Loase	2-4	Soft				
0-30	M. Dense	4-8	M. Stiff				Boring Lo
0-50 >50	V Dense	8-15 15-30	V. Stiff				Boring No. SEA-
-50	V. Dense	>30	Hard	0.			Ref. No. 392-861

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Ground Surface Elev. :

Project: Barson's' Construction Landfill Closure

Fort Devens

Water Level :

Boring Log

Boring No. SEA-6 Ref. No. 392-8611

Contractor: Soil Exploration Corporation Engineer/Geologiet: M.P. Clark

Boring Location : See Site Plan

252.35

28.65

Casing Size ; See Note A Sampler: 1 3/8" I.D. Split Spoon

Casing at : N/A

Date: 8/25-8/26/86

No. Pen (in) Depth (fit) Blows/5" Description Hemarks Description	L		Sam	ple		Sample		Stratum
21	(ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Description	Remarks	
21	and the second second second				5	Tan to grev, medium SAND, little		Medium to coarse SAND. little fin.
22.5 23.5 24.7 24.5 25.5 26.7 27.5 28.7 27.5 28.7 29.5 30.7 30.5 31.7 31.5 31.7 31.5 32.3 32.5 32.5 33.3 33.5 33.5 34.3 34.3 34.5 35.5 36.3 37.3 37.5 37.5 37.5 37.5 37.5 37.5 37	21							sand and fine gravel, trace
22.5 23 24 24.5 25 25 25 26 27 27.5 28 29 29.5 30 30.5 31 31.5 31.5 31 31.5 32 32.5 32.5 33.5 33.5 34.3 34.5 35.5 36.5 37.3 37.5 37.5 38.8 38.8 38.5								inorganic silt (SW)
23.5 24 24.5 25.5 25.5 25.5 25.5 26.6 27 27.5 28 28.5 29.5 29.5 30.5 30.5 30.5 31.5 31.5 31.5 32.5 33.5 33.5 33.5 33.5 33.5 34.5 35.5 36.6 37.5 37.5 37.5 37.5 37.5 37.5 38.8 38.8	22.5							
24.5 25.5 25.5 36.6 28.5 28.5 29.5 29.5 30.0 30.5 31.5 31.5 31.5 31.5 32.5 33.5 33.5 33.5 33.5 33.5 33.5 33		-						
24.5 25.5 26.6 26.5 27.7 27.5 28 29.5 29.5 30 30.5 31 31.5 31.5 32.5 32.5 33.5 33.5 33.5 33.5 33.5 33								
25.5	24.5							
26.5 28.5 27.5 27.5 28.8 29.5 29.5 30.0 30.5 S-7 18/12 30-31.5 9 31.5 31.5 32.5 33.5 33.5 33.5 34.5 35.5 36.6 36.5 37.5 38.8 38.8 38.8 38.8		9.2	19/15	25.26 6	7	Ten to gray medium to coarse		
28.5 28.5 29 29.5 30 30.5 31 31.5 31.5 32 32.5 33.5 34 34.5 35.5 35.5 36.6 36.5 37.5 38.8 38.5		- 00	1073	23-20.3		SAND, little fine sand, trace	1 1	
27.5 28 29.5 30.5 30.5 30.5 30.5 30.5 30.5 30.5 30	28.5					inorganic silt		
27.5 28.5 29.5 30.0 30.5 30.5 31.5 31.5 32.5 33.3 33.5 34.4 34.5 35.5 36.4 36.5 37.5 37.5 38.5 38.5 38.5 38.5 38.5								
28.5 29.5 30.5 30.5 30.5 30.5 30.5 30.5 30.5 30	27.5							
29.5 30.5 S-7 18/12 30-31.5 9 Brown to tan, coarse SAND, little fine to medium sand and fine gravel, trace inorganic silt 31.5 32.5 33.5 34.5 35.5 S-8 18/15 35-36.5 8 Brown to tan, coarse SAND, little fine to medium sand and fine gravel, trace inorganic silt Brown to tan, coarse SAND and fine GRAVEL, trace inorganic silt				-	900			
29.5 30.5 S-7 18/12 30-31.5 9 Brown to tan, coarse SAND, little fine to medium sand and line gravel, trace inorganic silt 31.5 32.5 33.5 34.5 35.5 S-8 18/15 35-36.5 8 Brown to tan, coarse SAND and line GRAVEL, trace inorganic silt Brown to tan, coarse SAND and line GRAVEL, trace inorganic silt	2.50.11							
30.5 3.7 1012 30-31.5 9 fine to medium send and fine gravel, trace inorganic silt 10 31.5 32.5 33.5 34.5 35.5 S-8 18/15 35-36.5 8 Brown to tan, coarse SAND and fine GRAVEL, trace inorganic silt 11 37.5 37.5 38.5 38.5 38.5 38.5 38.5 38.5 38.5 38	29.5				-			
31 31.5 32.5 33.5 33.5 33.5 33.5 33.5 33.5 33		S-7	18/12	30-31.5	9	Brown to tan, coarse SAND, little		
31.5 32.5 33.5 33.5 34.5 35.5 35.5 S-8 18/15 35.5 8 Brown to tan, coarse SAND and line GRAVEL, trace inorganic silt 11 37 37.5 38 38.5					10	fine to medium sand and fine gravel,		
32.5 33.5 34.5 35.5 35.5 36.5 36.5 37.5 37.5 38.5 38.5 38.5					10	trace inorganic sit		
33 33.5 34.5 34.5 35.5 5.8 18/15 35-36.5 8 Brown to tan, coarse SAND and line GRAVEL, trace inorganic silt 37 37.5 38 38.5								
33.5 34.5 35.5 35.5 36.5 36.5 37.5 37.5 38.5 38.5 38.5					- === :			
34.5 35.5 S-8 18/15 35-36.5 8 Brown to tan, coarse SAND and line GRAVEL, trace inorganic silt 37 37.5 38 38.5								
34.5 35.5 S-8 18/15 35-36.5 8 Brown to tan, coarse SAND and line GRAVEL, trace inorganic silt 37 37.5 38 38.5	34 -							
35.5 S-8 18/15 35-36.5 8 Brown to tan, coarse SAND and line GRAVEL, trace inorganic silt 11 37.5 37.5 38.5 38.5 38.5 38.5	34.5							
36 38.5 11 GHAVEL, trace inorganic silt 11 37.5 38.5 38.5 38.5		S-8	18/15	35-36.5	8			
37 38.5 38 38.5						GRAVEL, trace inorganic silt		
37.5 38 38.5	36.5				11			
38 38.5	37			_				
38.5								
	38.5							
39	39							
39.5								
10	10							
Granular Soils Cohesive Soils Remarks:		7.6		2.00	D			

Granular Soils Cohesive Soils Blows/FL Density Blows/Ft Density V. Soft <2 0-4 V.Loose 2-4 Soft 4-10 Loose 4-8 M. Stiff 10-30 M. Dense 8-15 Stiff 30-50 Dense 15-30 V. Stiff >50 V. Dense >30 Hard

(A) 3 1/4" I.D. Hollow Stern Auger

Boring Log Boring No. SEA Ref. No. 392-86

Information on this log is a compilation of subsurface conditions and soil or rock classifications obtained from the field as well as laboratory testing of samples. Strata have been interpreted by commonly accepted procedures. The stratum lines may be transitional and approximate. Water level measurements have been made in the open boreholes at the time and location indicated, and may vary with time, geologic condition or construction activity.



Ground Surface Elev. :

Project : Barson's Construction

Landfill Closure Fort Devens

Boring Log

Boring No. SEA-6 Ref. No. 392-8611

Contractor: Soil Exploration Corp. Engineer/Geologist: M.P. Clark

Boring Location : See Site Plan 252.85

Water Level :

28.65

Date: 8/25-8/26/86

Casing at : N/A

Casing Size : See Note A Sampler : 13/8° S.D. Split Spoon

1		Sam	ple		Comple		Stratum
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Sample Description	Remarks	Description
T PAGE	S-9	18/15	40-41.5	6	Brown, medium to coarse SAND,		Fine to medium SAND, little coarse
40.5				12	little fine gravel, trace inorganic silt		sand and fine gravel, trace
41,5				12			inorganic silt (SW)
42							
42.5							
43							
43.5							
44							
44.5						/ /	
45	S-10	18/16	45-46.5	9	Brown, medium SAND, little coarse		
45.5		10.0	10 10.0	4	sand and fine sand, trace inorganic		
46				6	silt		
46.5							
47							
48					S		
48.5							
49				Vi	R		
49.5							
50	0.44	1005	50.54.5		5-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1		
50.5	S-11	18/15	50-51.5	5	Brown, fine to medium SAND, little coarse sand, trace inorganic silt		
51				5	course saire, state morganie sin		
51.5	-			- 5		1	
52							
52.5							
53							
54						1	
54.5						. 1	
55			22.50	/	Carrier of the contract of the carrier		
55.5	S-12	18/14	55-56.5	10	Brown, fine to medium SAND, little		
56	-			12	coarse sand, trace inorganic silt		
56.5				12			
57	_						
57.5				-			
58					9		
58.5							
59		2					
59.5							
60	S-13	18/12	60-61.5	11	See Page 4 of 6 for Description		See Page 4 of 6 for Description
Committee	Caile	Cabasia	Caile	Remarks:			
Granula		Cohesive). Hollow Stern Auger		
Blows/Ft.	Density	Blows/Ft.	Density				
0-4 4-10	V.Loose Loose	2-4	V. Soft Soft				

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M. Dense

V. Dense

Dense

10-30

30-50

>50

4-8

8-15

15-30

>30

M. Stiff

V. Stiff

Stiff

Hard

Boring Log

Boring No. SEA-6 Ref. No. 392-8611



Project: Barson's Construction

Landfill Closure Fort Devens

Water Level :

28.65

Boring L

Boring No. SEA-6 Ref. No. 392-8611

Boring Log

Boring No. SE

Casing at : N/A

Contractor: Soil Exploration Corp. Engineer/Geologiet: M.P. Clark

Boring Location: See Site Plan Ground Surface Elev.: 252.85

M. Dense

V. Dense

Loose

Dense

4-10

10-30

30-50

>50

2-4

8-15

15-30

>30

Soft

Stiff

M. Stiff

V. Stiff

Hard

252.85

Casing Size : See Note A Sampler : 13/8" S.D. Split Spoon

Date: 8/25-8/26/86

		Sam	ple		A 2 2 2 2 2 2	17.23	Charles
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Sample Description	Remarks	Stratum Description
60.5				9	Brown, fine to medium SAND, trace		Fine to medium SAND, little coarse
61 61.5				9	inorganic silt		sand, trace inorganic silt (SW)
62							
62.5							
63.5							NA-A
64							
64.5							
65.5	S-14	18/16	65-66.5	12	Brown, fine to medium SAND, little coarse sand, trace inorganic silt		
66				14	coarse sarid, trace morganic sit		
66.5							
67.5							
68							
68.5						0 4	
69.5							
70	S-15	18/16	70-71.5	10	Brown, fine to medium SAND, little		
71.5			11.2.02	12	coarse sand, trace inorganic silt		
71.5				13			
72							
73.5							
73.5					Y		
74	5						
75							
75.5	S-16	18/8	75-76.5	10	Brown to tan, fine to medium SAND, little coarse sand, trace inorganic		
76.5				16	silt		
77							
77.5							(78.0)
78							Fine SAND, trace inorganic silt
79							(SP)
79.5				-		1	
80							
Granula	Soils	Cohesiv	e Soils	Remarks:			
Blows/Ft	Density	Blows/Ft	Density). Hollow Stem Auger		
0-4	V.Loose	<2	V. Soft				

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Project : Barson's Construction Landfill Closure Fort Devens

Boring Log

Boring No. SEA-6 Ref. No. 392-8611

Contractor: Soil Exploration Corp. Engineer/Geologist: M.P. Clark

Casing Size : See Note A Sampler : 13/8" I.D. Split Spoon

Boring Location : See Site Plan

252.85 28.65 Date: 8/25-8/26/86 Casing at : N/A Ground Surface Elev. : Water Level :

Dr. of	Sample	nple		0		Stratum	
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Sample Description	Remarks	Stratum Description
80,5	S-17	18/16	80-81,5	9	Brown, fine SAND, trace inorganic		Fine to very fine SAND, trace
81				12	silt		inorganic silt (SP)
81.5				12			
82							
82.5					1		Ü
83							D:
83,5	3-6-3						Maria de la companya
84				-			
84.5							
85	S-18	18/12	85-86,5	10	Brown fine SAND trans increasis		
85.5	3-18	10/12	03-00,5	9	Brown, fine SAND, trace inorganic silt	1	4
86	_			11			
86.5				1.0			
87		_					120
87.5		-		-			
88			-				
88.5	-						
89							
89.5			-				
90	S-19	18/18	90-91.5	6	Brown to tan, very fine SAND, trace		
90.5	5.10		20 0110	9	inorganic silt		
91			7	11	4.5		
91.5			-				
92					i R		
92.5		-					(93.0')
93							Fine SILTY SAND, trace clay (SM)
93.5			94			1	A STATE OF THE STA
94	77	-					
94.5							
95	S-20	18/12	95-96.5	4	Grey to blue, fine SILTY SAND,		
95.5	1-0-0-0			7	trace clay		
96				9			
96.5				16.07			
97							
97.5							
98							
98.5		0					
99							
99.5							
100	S-21	18/15	100-101.5	6	See Page 6 of 6 for Description		See Page 6 of 6 for Description
Granula	r Soils	Cohesiv	e Soils	Remarks:	W Diocheo		
lows/FL	Density	Blows/Ft.	Density	(A) 3 1/4" I.C). Hollow Stern Auger		
0-4	V.Loose	42	V. Soft				
410	Loose	2.4	Soft	9			
10-30	M. Dense	4-8	M. Stiff				Boring Log
30-50	Dense	8-15	Stiff				Boring Log
>50	V. Dense	15-30	V. Suff				Boring No. SEA-6 Ref. No. 392-8611
		>30	Hard				Mei. No. 392-8611

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Engineers/Architects

Project: Barson's Construction Landfill Closure

Fort Devens

Boring Log

Boring No. SEA-6 Ref. No. 392-8611

Casing Size : See Note A Sampler : 13/8" I.D. Split Spoon

Contractor: Soil Exploration Corp. Engineer/Geologiet: M.P. Clark

Boring Location: See Site Plan Ground Surface Elev.: 252.85

Water Level: 28.65'

Date: 8/25-8/26/86

Casing at : N/A

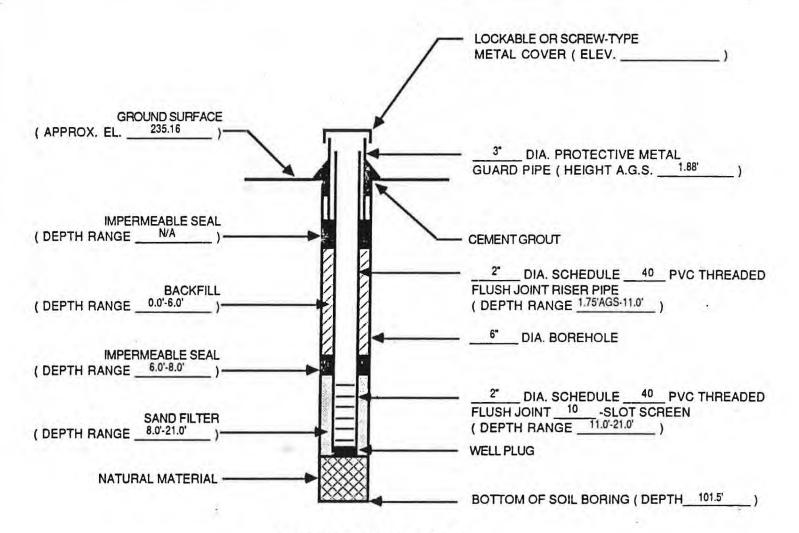
			ple		Sample	100	Stratum
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Description	Remarks	Description
100.5 101,101.5 102,102.5 103,103.5 104,104.5 105,106.5 107,108.5 107,108.5 109,5 110,108.5 111,105,5		/Rec.	(ft)	9 7	Grey to blue, fine SILTY SAND, trace clay (101.5) Bottom of Exploration		Fine SILTY SAND, trace clay (SM (101.5)
117.5 118 118.5 119 119.5 120							
Granula		Cohesiv		Remarks:	D. Hollow Stem Auger		
0-4 4-10 10-30 30-50 >50	V.Loose Loose M. Dense Dense V. Dense	2 2-4 4-8 8-15 15-30 >30	V. Soft Soft M. Stiff Stiff V. Stiff Hard	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			Boring Log Boring No. SE S Ref. No. 392-86

Information on this log is a compilation of subsurface conditions and soil or rock classifications obtained from the field as well as laboratory testing of samples. Strata have been interpreted by commonly accepted procedures. The stratum lines may be transitional and approximate. Water level measurements have been made in the open boreholes at the time and location indicated, and may vary with time, geologic condition or construction activity.



Cambridge, MA. S. Portland, ME. Wethersfield, CT.

DRILLING CONTRACTOR: Soil Expl FOREMAN: Jim Campbell	MONITORING WELL NO. WT-7 JOB NO: 392-8611 CLIENT: Barson's			
METHOD: Hollow Stem Auger/ Casing	LOCATION: Fort Deven's Landfill			
SEA GEOLOGIST/ENGINEER:	M.P. Clark	DATE START: 9/2/86	FINISH: 9/4/86	
GROUNDWATER LEVEL: DATE: 10/8/86		SOIL SAMPLES TAKE	EN: Yes	
TIME: 11:00 FEET: 18.65		EQUIPMENT CLEANIN METHOD: Steam Clean		
METHOD: Water Level Indicator DATUM: Top of Casing		MATERIAL TO FACIL TYPE: Water	ITATE DRILLING: Yes	



MONITORING WELL CROSS SECTION SCHEMATIC



Project : Barsons' Construction Landfill Closure Fort Devens

Boring Log

Boring No. SEA-7 Ref. No. 392-8611392 85

Ref. No. 392-86119

Contractor: Soil Exploration Corporation Engineer/Geologiet: M.P. Clark

Boring Location : See Site Plan Ground Surface Elev. : 2

235.16 Water Level :

18.65

Date: 9/2-9/4/86

Casing Size : See Note A Sampler : 1 3/8" I.D. Split Spoon

Casing at : N/A

0		Sam	ple		Sample	Land.	Stratum
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Description	Remarks	Description
0.5	S-1	18/16	0-1.5	4	Tan to brown, fine to medium SAND, little coarse sand, trace inorganic		Fine to medium SAND, little cos sand, trace inorganic silt (SW)
1 1.5				4	silt) V	Series, waste morganic sit (SVV)
1.5							
2 2.5							-
3 3.5							(3.0')
4 4.5							D,
5 5.5	S-2	18/15	5- 6.5	6	Tan, fine SAND, trace inorganic silt		
6				7		14	
8.5							
7 7.5							
8 8.5							
0				3			
9.5							
10,5	S-3	18/15	10-11.5	7	Tan, fine SAND, trace inorganic silt		
11		- 7.3		8			
11.51				8		11 10	
12,12.5				14-1-14			
13,5						1	
13.5							
14							
15,5	S-4	18/15	15-16.5	5	Tan, fine SAND, trace inorganic sitt		
16				8			
16,5				6			
17,5							
18							
18,18.5							
19,5		1					
20	S-5	18/15	20-21.5	4	See Page 2 of 6 for Description		See Page 2 of 6 for Description
Granula	r Soils	Cohesiv	e Soils	Remarks:			
ws/FL	Density	Blows/Ft.	Density	(A) 3 1/4" I.(D. Hollow Stem Auger		
0-4	V.Loose	<2	V. Soft				
10 0-30	Loose M. Dense	2-4 4-8	Soft M. Stiff				Baring Le
0-50 >50	Dense V. Dense	8-15 15-30	Stiff V. Stiff	K.			Boring Lo

Information on this log is a compilation of subsurface conditions and soil or rock classifications obtained from the field as well as laboratory testing of samples. Strata have been interpreted by commonly accepted procedures. The stratum lines may be transitional and approximate. Water level measurements have been made in the open boreholes at the time and location indicated, and may vary with time, geologic condition or construction activity.

Hard

>30

Project : Barsons' Construction Landfill Closure

Fort Devens

Boring Log

Boring No. SEA-7 Ref. No. 392-8611392-861

Contractor: Soil Exploration Corporation Engineer/Geologiet: M.P. Clark

Boring Location : See Ste Plan Ground Surface Elev. :

235,16

Water Level :

Date: 9/2-9/4/86

Casing Size : See Note A Sampler : 1 3/8" I.D. Split Spoon

Casing at : N/A

Lo ca		Sam	ple				Stratum
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Sample Description	Remarks	Description
20.5				7	Tan, fine SAND, trace inorganic silt		Very fine to fine SAND, trace
21 21.5				10	The second second second		inorganic silt (SP)
22						1 3	
22.5		-					Tax o
23							
24					Y		
24.5			688				
25 25.5	S-6	18/16	25-26.5	. 8	Tan, fine SAND, trace inorganic silt	1	4
26	-		-	9			
26.5				8			
27					•		
28	1233						
28.5						1	
29							
30	S-7	18/15	30-31.5	6	Brown, very fine SAND, trace		
30.5	3-7	10/13	30-31.5	8	inorganic silt		
31		-		11		/	
32				U.S. BEE			
32.5							
33							
34							
34.5					a .		
35	S-8	18/12	35-36.5	5	Brown, fine SAND, trace inorganic		
36				7	silt		7
36.5				-			
37	A- 33						
38							
38.5							
39					- A A I I		
40							
Granular	Soils	Cohesive	Soils	Remarks:			
lows/Ft	Density	Blows/Ft.	Density	(A) 3 1/4" I.D). Hollow Stern Auger		

Boring Log 8-15 Stiff 30-50 Dense Boring No. SEA-7 Ref. No. 392-86113 15-30 V. Stiff >50 V. Dense Hard >30 Information on this log is a compilation of subsurface conditions and soil or rock classifications obtained from the field as well as laboratory testing of samples. Strata have been interpreted by commonly accepted procedures. The stratum lines may be transitional and approximate. Water level

measurements have been made in the open boreholes at the time and location indicated, and may vary with time, geologic condition or construction activity.

0-4

4-10

10-30

V. Soft

M. Stiff

Soft

<2

4-8

V.Loose

M. Dense

Loose



Project : Barson's Construction

Landfill Closure Fort Devens

Boring Log

Boring No. SEA-7 Ref. No. 392-8611

rouna Si	irlace Elev.		5.16 t	Water Level :	18.65' Date: 9/2-9/	1	Casing at : N/A	
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Sample Description	Remarks	Stratum Description	
40.5	S-9	18/15	40-41.5	7	Brown, fine SAND, trace inorganic		Fine SAND, little to no medium	
41				9	silt		coarse sand, trace inorganic s (SP)	
41.5								
42.5 43.5								
44.5								
45 45.5	S-10	18/12	45-46.5	9	Brown, fine SAND, little medium to coarse sand, trace inorganic silt			
46.5				10	conse sand, vace morganic silt			
47.5								
48 48.5 49							}	
49 49.5 50								
50.5 51	S-11	18/15	50-51.5	11	Brown, fine SAND, trace inorganic silt			
51,5 52				16				
52.5 53								
53.5 54 54.5								
55 55.5	S-12	18/12	55-56.5	- 11	Brown, fine sand, trace inorgenic			
56 56.5				13	silt	V U		
57 57.5								
58 58.5								
59 59.5								
60	S-13	18/14	60-61.5	12	See Page 4 of 6 for Description		See Page 4 of 6 for Description	
Granular Soils Cohesive Soils		Remarke:	Mollow Stom Auges					
ows/Ft.	Density	Blows/FL	Density	(A) 3 1/4" I.L). Hollow Stem Auger			
0-4 4-10	V.Loose Loose	<2 2-4	V. Soft Soft				S	
10-30	M. Dense Dense	4-8 8-15	M. Stiff				Boring Lo	

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Project : Barson's Construction

Landfill Closure Fort Devens

Boring Log

Boring No. SEA-7 Ref. No. 392-8611

Contractor: Soil Exploration Corp. Engineer/Geologist: M.P. Clark Boring Location : See Site Plan Ground Surface Elev. : 235.16

Casing Size : See Note A Sampler : 13/8* I.D. Split Spoon

		San	ple		0		Stratum
epth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Sample Description	Remarks	Description
60.5				12	Brown, fine SAND, trace inorganic		Fine SAND, some medium sand
81.5				15	silt		trace inorganic silt (SP)
2		E				3	
62.5							
63.5							
4							
64.5 5							
85.5	S-14	18/15	65-66.5	10	Brown, fine SAND, trace inorganic		
6				10	silt		N
66.5				10			
7 67.5							
3							
68.5			-				
69.5							
0	S-15	18/15	70-71.5	8	Tan to brown, fine SAND, some		
70.5	5-15	18/12	70-71.5	11	medium sand, trace inorganic silt		
71.5				11			
2							
72.5							
3 73.5							
4	-						
74.5						2 4	
5 75.5	S-16	18/14	75-76.5	12	Tan to brown, fine SAND, some	1	
6				12	medium sand, trace inorganic silt		
76.5				10		1	
7 77.5				1			
3		.94				. 1	
78.5							
9 79.5							
0					37		
						1	
	ar Soils	Cohesive		Remarks: (A) 3 1/4° l.0). Hollow Stern Auger		
s/Ft	Density	Blows/Ft.	Density		•		
0	V.Loose Loose	<2 2-4	V. Soft Soft				
30	M. Dense	4-8	M. Stiff				Boring Lo
50	Dense V. Dense	8-15 15-30	V. Stiff				Boring No. SEA- Rel, No. 392-86
~	V. Dense	>30	Hard				Dol No. 392-86

Information on this log is a compilation of subsurface conditions and soil or rock classifications obtained from the field as well as laboratory testing of samples. Strata have been interpreted by commonly accepted procedures. The stratum lines may be transitional and approximate. Water level measurements have been made in the open boreholes at the time and location indicated, and may vary with time, geologic condition or construction activity.

Ground Surface Elev. :

Project : Barson's Construction

Landfill Closure Fort Devens

Boring Log

Boring No. SEA-7 Ref. No. 392-8611

Caming Size : See Note A Sampler : 13/8" I.D. Split Spoon

Contractor: Soil Exploration Corp. Engineer/Geologist: M.P. Clark

Boring Location : See Site Plan

235.16 Water Level :

18.65

Date: 9/2-9/4/86

Casing at : N/A

		San	nple		0	L = 1	Constitut
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Sample Description	Remarks	Stratum Description
80.5	S-17	18/18	80-81.5	15	Brown, fine SAND, trace inorganic silt		Fine SAND, little to no medium sand, trace Inorganic silt (SP)
81				16	Sit		sand, trace inorganic sit (SP)
81.5		-		20			
82	-	-					
82.5	-						
83							
83.5							V
84							
85							
85.5	S-18	18/16	85-86.5	12	Brown, fine SAND, trace inorganic		
86				15	silt		
86.5				19			
87							
87.5						V 9	
88							
88.5							
89						3	
89.5							
90	S-19	18/15	90-91.5	15	Brown, fine SAND, trace inorganic		
90.5	3-10	1010	80-91.5	15	silt		
91				17			
91.5	-		7				
92 92.5							
93						1	
93.5						1	
94		11.000					
94.5							
95	0.00	10/25	07.55.5				
95.5	S-20	18/15	95-96.5	19	Brown, fine SAND, trace inorganic silt		
96		-		16			
96.5				19			
97							
97.5							
98		1					
98.5							
99							
00	7						
50	S-21	18/16	100'-101.5	16	See Page 6 of 6 for Description		See Page 6 of 6 for Description
Granula	r Soils	Cohesiv	e Soils	Remarks:			
lows/FL	Density	Blows/Ft.	Density	(A) 31/4" I.D	. Hollow Stem Auger		
		-2	V. Soft				
0-4 4-10	V.Loose Loose	2-4	Soft				
10-30	M. Dense	4-8	M. Stiff				Boring Log
30-50	Dense	8-15	Stiff	(4.			Boring No. SEA-7
>50	V. Dense	15-30 >30	V. Stiff Hard				Ref. No. 392-8611
			· (ar o				1181.140, 002-0011

Information on this log is a compilation of subsurface conditions and soil or rock classifications obtained from the field as well as laboratory testing of samples. Strata have been interpreted by commonly accepted procedures. The stratum lines may be transitional and approximate. Water level measurements have been made in the open boreholes at the time and location indicated, and may vary with time, geologic condition or construction activity.



Project: Barson's Construction

Landfill Closure Fort Devens

Boring Log

Boring No. SEA-7 Ref. No. 392-8611

Contractor: Soil Exploration Corp. Engineer/Geologiet: M.P. Clark

Boring Location : See Site Plan Ground Surface Elev. : 235.16

235.16

18.65 Water Level :

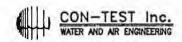
Date: 9/2-9/4/86

Casing Size : See Note A Sampler : 13/8" I.D. Split Spoon

Casing at : N/A

100.5 101 101.5 102 102.5 103	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Sample Description	Remarks	Stratum Description
101 _{101.5} 102 102.5							
102				20	Brown, fine SAND, little medium		Fine SAND, little to no medium
102				17	sand, trace inorganic silt		sand, trace inorganic silt
102.5		Victoria de la constante de la			(101.5')		(101.5)
					Bottom of Exploration	4	
103 1							
103.5							
04							
104.5						1 1	
05							
105.5						1	
06							
108.5							
107.5						1 1	
08						1 1	
108.5						1 1	
09						1 1	
109.5						1 1	
10			3			1	
110.5						1	
111.5							
12 -						51	
112.5							
13 -							
113.5	-						
14.5						1 1	
15						ė.	
115.5							
16 -							
116.5			-	-			
17			_				
117.5						1 1	
18							
19 -							
119.5							
20 -							
Granular Soils				Remarks: (A) 31/4" LD	Hollow Stern Auger		
lows/Ft	Density	Blows/Ft	Density	1.4 - 0.4			
0-4	V.Loose	-<2	V. Soft				
4-10 10-30	M. Dense	2-4 4-8	Soft M. Stiff				THE STATE OF THE S
30-50	Dense	8-15	Stiff				Boring Lo
>50	V. Dense	15-30 >30	V. Stiff Hard				Boring No. SEA-7 Ref. No. 392-861

Information on this log is a compilation of subsurface conditions and soil or rock classifications obtained from the field as well as laboratory testing of samples. Strata have been interpreted by commonly accepted procedures. The stratum lines may be transitional and approximate. Water level measurements have been made in the open boreholes at the time and location indicated, and may vary with time, geologic condition or construction activity.



SAMPLE NUMBER	BLOWS PER 6 INCHES	INCHES RECOVERED INCHES DRIVEN	WATER ELEVATION	DEPTH IN FEET	PIEZOMETER		PIEZOMETER CONSTRUCTION		CONSTRUCTION		GRAPHIC LOG	DATE DRI		
										PPB				
	3,3,5	12 12	<u>**</u>	-5' - -			May in	12" LIGH SOME AN FLECKS.	T BROWN MEDIUM SAND. IGULAR BLACK ROCK WET.	.8				
	4,5,6	12 12						FLECKS 5" LIGHT	FINE SAND BLACK ROCK BROWN FINE SAND LECKS ROCK	1.4				
	3,5,6	18 18		 _15' 	×			3" LIGHT COURSE	HT BROWN FINE SAND BROWN MEDIUM— SAND SOME FINE SUBROUNDED	N.D.				
	3,9,7	18 18			BENTONITE SLURRY			COURSE	DIUM BROWN MEDIUM— SAND TRACE OF SILT E GRAVEL	1.7				
	4,3,5	18 18			В			COURSE	NUM BROWN MEDIUM— SAND TRACE OF SILT E GRAVEL	1.8				
COMMENTS: AUGERS PLUGGED UP AFTER 25'. COULD NOT COLLECT A REPRESENTATIVE SAMPLE. GEOLOGIST: A. SIMMONS DRAWN BY: J.A.D.						BENTON SCREEN	PACK: NITE: N: Y:6'	_TO_6' _TO	WATER LEVEL MEASUREM CONTROL WATER LEVEL MEASUREM DATUM: PURGING:	MENTS				



SAMPLE NUMBER	BLOWS PER 6 INCHES	INCHES RECOVERED INCHES DRIVEN	WATER ELEVATION	DEPTH IN FEET	WEL PIEZO CONST	L OR DMETER RUCTIO	R ON TO	507	LOG OF DATE DRII PROJECT: JOB # DETECTOR	BORING NO. <u>8D&8S</u> LLED: <u>2/14-2/19/90</u> FORT DEVENS 8329 R: <u>TIP 2</u> DESCRIPTION	TESTS
					BENTONITE SLURRY						1.0 N.D.
				—45'— — — —	12.1						0.8
				—50'—— — —							1.4
	4			_55'	11111111	V:		¥			.6
				60' —		1.1.1					N.D.
Ξ	MENTS	:	NS DF		: J.A.D.	BENT	TONITE:	-	'_TO60' _TO _TO_52'5"	WATER I F V: 8S - 7.3 DATUM: TOP OF CASI PURGING: 140 GALLO	F ^



SAMPLE NUMBER	BLOWS PER 6 INCHES	INCHES RECOVERED INCHES DRIVEN	WATER ELEVATION	DEPTH IN FEET	WEL PIEZO CONST	L () ME RU(GRAPHIC LOG	LOG OF DATE DRI PROJECT: JOB # DETECTOR	BORING NO. BD&8S LLED: 2/14-2/19/90 FORT DEVENS 8329 R: TIP 2 DESCRIPTION	TESTS
					BENTONITE SLURRY						
	MMENTS	A. SIMMO	NS DF		: J.A.D.	BI	ENTON		<u>6[*]то 72'</u> '_то <u>66'6</u> * _то <u>69'6</u> *	WATER LEVEL MEASUREM	G



SEA Consultants Inc. Engineers/Architects

Cambridge, MA. S. Portland, ME. Wethersfield, CT.

DRILLING CONTRACTOR: Soil Exploration Corporation

FOREMAN: Jim Campbell METHOD: Auger, Drive and Wash

SEA GEOLOGIST/ENGINEER: M.P. Clark

BARCAD SAMPLER WELL

No. 1 No. 2

GROUNDWATER DEPTH: 10.85 10.41 10.40

DATE: 10/8/86 10/8/86 10/8/86

Top of Casing DATUM:

MONITORING WELL NO. Bar-9 & WT-9 JOB NO: 392-8611 CLIENT: Barson's LOCATION: Fort Deven's Landfill

DATE

START: 9/10/86 FINISH: 9/15/86

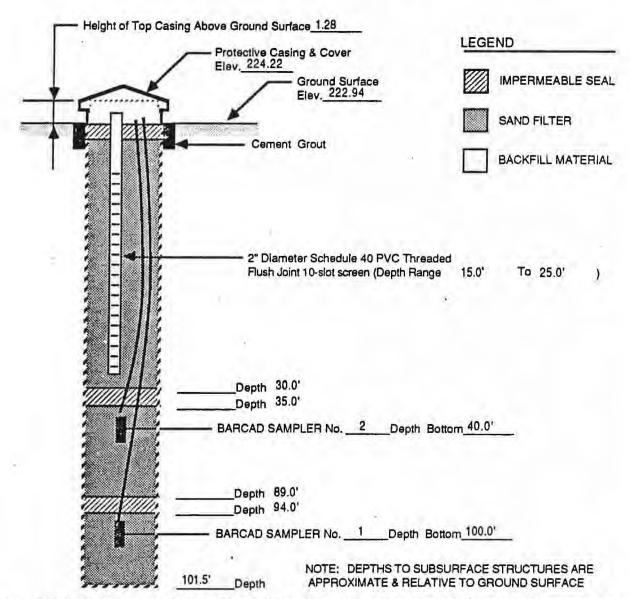
SOIL SAMPLES TAKEN:

EQUIPMENT CLEANING: Yes

METHOD: Steam Clean

MATERIAL TO FACILITATE DRILLING: Yes

TYPE: Water



MONITORING WELL CROSS-SECTION WITH BARCAD SAMPLER INSTALLATION



S E A Consultante Inc. Engineers/Architecte

Project : Barsons' Construction Landfill Closure

Fort Devens

Boring Log

Boring No. SE A-9 Ref. No. 392-8611

Contractor: Soil Exploration Corp. Engineer/Geologist: M.P. Clark Boring Location : See Site Plan

Casing Size : See Note A Sampler : 13/8' I.D. Split Spoon

البيوروات		Sam	ple		Carrela		Stratum
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Sample Description	Remarks	Description
0.5	S-1	18/16	0-1.5	EVIC	Brown, fine SAND, little medium sand, trace roots		Fine SAND, little medium sand, trace roots (SP)
				5	Sand, Date roots		(1.0)
1.5		2.					Fine to coarse SAND, little fine
2 2.5							gravel (SW)
3	-			_			
3.5							
4 4.5				1, 717	-		
5	S-2	18/15	5-6.5	4	Brown to tan, fine to coarse SAND,		
5,5	- 52	10/13	3-0.5	7	little fine gravel		
6 6.5		MASS.		6			
7		JE 257					
7.5						0 1/	(8.07)
8 8.5		7 5 1				1	Fine to coarse SAND, little fine gravel with occasional inorganic
9							layers (SW - SM)
9.5				-			
10,10.5	S-3	18/14	10-11.5	12	Brown to tan, fine to coarse SAND,		
11				14	little fine gravel with occasional inorganic silt leyers		
11.5				-11	morganic on tayora	1	
12							
13				~			
13.5					81	1	
14,14.5							
45					San Assert Care I		
15,5	S-4	18/15	15-16.5	6	Brown to tan, fine to coarse SAND, little fine gravel with occasional		
16,5				9	inorganic silt layers		
17							
17,5							
18,18.5							
10		C. =C.4			*		
19,5	-			-			
20	S-5	18/12	20'-21.5'	9	See Page 2 of 6 for Description		See Page 2 of 6 for Description
Granule	ar Soils	Cohesiv	e Soils	Remarks:			
lows/Ft	Density	Blows/Ft.	Density	(A) 3 1/4" 1.1 (1) Wash sa	D. Hollow Stem Auger		
0-4	V.Loose	-2	V. Soft	(1) 174011 30	3/3/		
4-10 10-30	Loose M. Dense	2-4 4-8	Soft M. Stiff				
30-50	Dense	8-15	Stiff				Boring Log
>50	V. Dense	15-30 >30	V. Stiff Hard				Boring No. SE A- Ref. No. 392-861

Information on this log is a compilation of subsurface conditions and soil or rock classifications obtained from the field as well as laboratory testing of samples. Strata have been interpreted by commonly accepted procedures. The stratum lines may be transitional and approximate. Water level measurements have been made in the open boreholes at the time and location indicated, and may vary with time, geologic condition or construction activity.



S E A Consultante Inc. Engineers/Architects

Ground Surface Elev. :

Project: Barsons' Construction

Landfill Closure Fort Devens

Boring Log

Boring No. SE A-9 Ref. No. 392-8611

Contractor: Soil Exploration Corp. Engineer/Geologist: M.P. Clark

Boring Location : See Site Plan

222.94 Water Level :

10.40

Date: 9/10-9/15/86

Casing Size : See Note A Sampler : 13/6' I.D. Split Spoon

Casing at : N/A

		San	ple		The second second		Ctratum
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Sample Description	Remarks	Stratum Description
20.5 21 21.5 22 22.5 23 23.5				9	Brown, fine to coarse SAND, little fine gravel, trace inorganic silt		Fine to coarse SAND, little fine gravel, trace inorganic silt (SW-SM) (22.0')
24,5 25,5 26,26,5 27	S-6	19/12	25-26.5	6 7 9	Brown, silty fine SAND		(27.0)
27.5 28 28.5 29.5 30 30.5 31	\$-7	18/0	30-31.5	7 7	Brown to grey, fine to medium SAND, little coarse sand, trace inorganic silt	(1)	Fine to medium SAND, little coarse sand, trace inorganic silt (SW-SM)
31.5 32 32.5 33 33.5 34 34.5				8			
35 36 36.5 37 37.5 38	S-8	WASH	30-35		Brown to grey, fine to medium SAND, little coarse sand, trace inorganic silt		
38.5 39 39.5 40							
Granule		Cohesive		Remarks: (A) 3 1/4" I.D	. Hollow Stern Auger		
0-4 4-10 10-30 30-50 >50	V.Loose Loose M. Dense Dense V. Dense	2 2-4 4-8 8-15 15-30 >30	V. Soft Soft M. Stiff Stiff V. Stiff Hard	(1) Wash sa	mple		Boring Log Boring No. SE A-9 Ref. No. 392-8611

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S E A Consultante Inc. Engineers/Architects

Project : Barson's Construction

Landfill Closure Fort Devens

Boring Log

Boring Log

Boring No. SEA-9 Ref. No. 392-8611

Boring No. SEA-9 Ref. No. 392-8611

Contractor: Soil Exploration Corp. Engineer/Geologist: M.P. Clark Engineer/Geologist :

Boring Location : See Site Plan

Ground Surface Elev. :

222.94

2-4

4-8

8-15

15-30

>30

Loose

Dense

M. Dense

V. Dense

4-10

10-30

30-50

>50

Soft

Stiff

Hard

M. Stiff

V. Suff

Water Level:

10.40

9/10-9/15/86

Casing Size : See Note A Sampler : 13/8" I.D. Split Spoon Casing at : N/A

Televis I		San	ple		Comple		Stratum
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6*	Sample Description	Remarks	Description
40.5	S-9	WASH	35-40		Brown to grey, fine to coarse SAND, trace inorganic silt		Fine to coarse SAND, some to no fine gravel, trace to little inorganic
41					nace uniform sur		silt (SW-SM)
41.5							14.
42 42.5							,
43							
43.5							
44.5						1907	
45							
45.5	S-10	18/0	45-46.5	12	No recovery		
46				15			
46.5				18			
47							
48							
48.5						17	
49							
49.5							
50 50,5	S-11	18/16	50-51.5	17	Brown to gray, fine to coarse SAND,		
51				19	some fine gravel, little inorganic silt		
51.5				14			
52		-				()	
52.5						(
53 53.5					,	1	
54							
54.5							
55	S-12	18/15	55-56.5	18	Brown to grey, fine to coarse SAND,		
55.5 56			30.0	16	some fine gravel, little inorganic silt		
56.5				13			
57							
57.5							
58							
58.5 59							
59.5							
60	S-13	18/6	60'-61.5'	9	See Page 4 of 6 for Description	14	See Page 4 of 6 for Description
Granula	r Soils	Cohesiv	e Soils	Remarks:			
Blows/Ft	Density	Blows/Ft.	Density	(A) 3 1/4" I.I (1) Wash sa	D. Hollow Stern Auger		
0-4	V.Loose	<2	V. Soft	(1) ************************************	n pro		

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S E A Consultante Inc. Engineers/Architects

Project: Barson's Construction

Landfill Closure Fort Devens

Boring Log

Boring No. SEA-9 Ref. No. 392-8611

Contractor: Soil Exploration Corp. Engineer/Geologist: M.P. Clark Boring Location : See Site Plan Ground Surface Elev. : 222.94

Water Level :

10.40

Date: 9/10-9/15/86

Casing Size : See Note A Sampler : 13/8* I.D. Split Spoon

Casing at : N/A

		San	iple		Sample		Stratum
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Description	Remarks	Description
60.5 61 61.5 62 62.5				14	Brown, fine to medium SAND, little coarse sand and fine gravel, trace inorganic silt		Fine to medium SAND, little coarse sand and fine gravel, trace inorganic sitt (63.07)
63.5 64 64.5 65 65.5	614	WASH	61.5-65		Grey, fine to medium SAND, little	1	Fine to medium SAND, little coarse sand (SW)
66 67 67.5 68.5					Coarse sano		
69 69.5 70 70.5 71 71.5 72	S-15	WASH	65-70		Grey, fine to medium SAND, little coarse sand	Ì	
73 74,5 75 75 76	S-16	WASH	70-75		Grey, fine to medium SAND, little coarse sand	i	
76.5 77 77.5 78 78.5 79							
80				Damaka:	×		
Granula llows/Ft	r Soils Density	Blows/Ft.	Soils Density	Remarks: (A) 3 1/4" I.D	. Hollow Stem Auger		
MONOT L	Density	DIOWS) L	Denany	(1) Wash sar	npie		

V. Soft 0-4 V.Loose 2-4 Solt 4-10 Loose 48 M. Stiff 10-30 M. Dense 8-15 Stiff 30-50 Dense 15-30 V. Stiff >50 V. Dense >30 Hard

Boring Log Boring No. SEA-9 Ref. No. 392-8611

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Engineers/Architects

Project : Barson's Construction

Landfill Closure Fort Devens

10.40

Boring Log

Boring No. SEA-9

Ref. No. 392-8611

Boring No. SEA-9 Ref. No. 392-8611

Contractor: Soil Exploration Corp.

Engineer/Geologist: M.P. Clark

Boring Location : See Site Plan Ground Surface Elev. : 2

15-30

V. Dense

>50

V. Stiff

Hard

222.94 Water Level : Casing Size : See Note A Sampler : 13/8" I.D. Split Spoon

Casing at : N/A

Date: 9/10-9/15/86

E a wish U		Sam	ple		Canada		Stratum
Depth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"	Sample Description	Remarks	Description
80.5	S-17	WASH	75-80		Grey, fine to medium SAND, little coarse sand, trace inorganic silt	1	Fine to medium SAND, little coars sand, trace inorganic silt (SW)
81 81.5							35.00
82							
82.5							
83.5 84							
84.5							
85 85.5	S-18	WASH	80-85		Grey, fine to medium SAND, little	1	
86		19.5			coarse sand, trace inorganic silt		8
86.5							
87.5 88						1	
88.5			_			1 8	
89				1			
90	S-19	WASH	85-90		Grey, fine to medium SAND, little	- 1	
91					coarse sand, trace inorganic silt		
91.5							
92.5		- A				1 .	
93.5							
94				100			
95.5	S-20	WASH	90-95		Grey, fine to medium SAND, little	1	
96					coarse sand, trace inorganic silt		
96.5 97							1
97.5							
98 98.5							
99,5						8	
100	S-21	WASH	95-100		See Page 6 of 6 for Description		See Page 6 of 6 for Description
Granula	r Soile	Cohesive	a Sails	Remarks:	**************************************		
Blows/FL	Density	Blows/Ft	Density). Hollow Stern Auger		
0-4	V.Loose	-2	V. Soft	(1) Wash sa	inpre		
4-10 10-30	Loose M. Dense	2-4 4-8	Soft M. Stiff				Boring Log
30-50	Dense	8-15 15-30	Stiff				Boring Log

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S E A Consultante Inc. Engineers/Architecta

Project: Barson's Construction Landfill Closure

Fort Devens

Boring Log

Boring No. SEA-9 Ref. No. 392-8611

Casing Size : See Note A Sampler : 13/8" I.D. Split Spoon

Contractor: Soil Exploration Corp.

Engineer/Geologiet: M.P. Clark Boring Location : See Site Plan Ground Surface Elev. : 222.94'

Water Level: 10.40'

Date: 9/10-9/15/86

Casing at : N/A

Name L		San	iple		Sample Description	Ly ne l	Stratum	
Oepth (ft)	No.	Pen (in) /Rec.	Depth (ft)	Blows/6"		Remarks	Description	
100.5					Grey, fine to medium SAND, little		Fine to medium SAND, little coar	
01					coarse sand, trace inorganic silt		sand, trace inotganic silt (SW)	
02					(101.5)		(101.5')	
102.5								
03						10		
103.5							h).	
04	_			-				
104.5								
)5								
105.5			Jan					
106.5								
7		1						
107.5	07.5							
8								
108.5								
9								
109.5								
10								
110.5	1							
111.5								
12								
112.5								
13								
113.5						1 1		
14					7			
଼ 114,5 I 5								
115.5				- 1				
16						1 1		
116.5								
17								
117.5								
18								
118.5					- U 0 0 1			
119.5								
20								
Granula	ar Soils	Cohesive	e Soils	Remarks:	. Hollow Stern Auger			
ws/FL	Density	Blows/Ft	Density	(1) Wash sar	nple			
0-4	V.Loose	<2	V. Soft					
-10	Loose	2-4 4-8	Soft M. Stiff				_	
0-30 0-50	M. Dense Dense	8-15	Stiff				Boring Log	
50	V. Dense	15-30	V. Stiff				Boring No. SEA-9	
		>30	Hard				Ref. No. 392-861	

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con-test

WATER AND AIR ENGINEERING

P.D. BDX 591 EAST LONGMEADOW MASSACHUSETTS 01028 (413)525-1198

AS-BUILT WELL DIAGRAM & GEOLOGIC DESCRIPTION

WELL NO1	PROJECT	ND.	7641

CLIENT, FORT DEVENS	
PP I NAME, SANITARY LANDFILL	
I DEATION FT. DEVENS, MASS.	
GEDLIGIST, DAVID A. MACLEAN	
DATE OF DRILL, 10/31/88	
START TIME 9:30 FINISH TIME 16:30	
BORING SIZE . 8'	3
CASING TYPE: PVC	
CASING ID SCHEDULE #40	
TYPE OF FILTER PACK NEW JERSEY SA	MI

GROUND WATER DBSERVATION

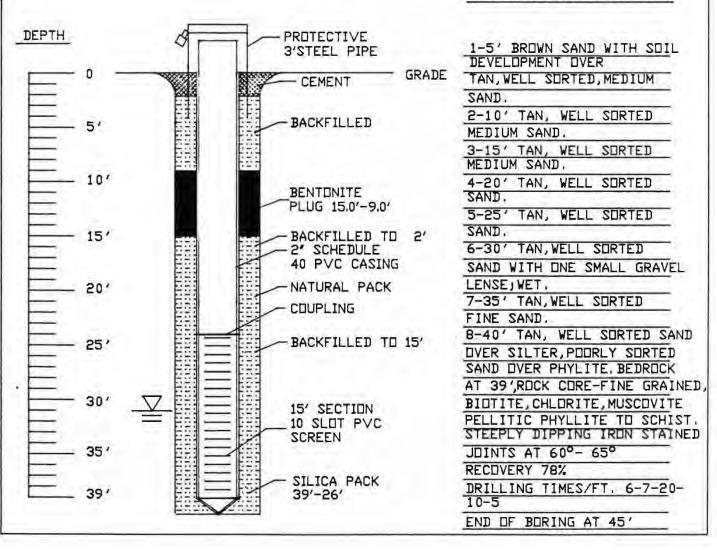
31.32 FT DN 1/19/89 DATE
MEASURED FROM PVC CASING

© ELEVATION249.11'= GROUND
WATER ELEVATION 217.79'
BENCH MARK WT 2

DRAWN BY P.ROSSI
DATE 2/10/89

APPROVED BY
DATE

SAMPLE NO. AND DESCRIPTION



con-test

WATER AND AIR ENGINEERING

P.O. BOX 591 EAST LONGMEADOW MASSACHUSETTS 01028 <413>525-1198

AS-BUILT WELL DIAGRAM & GEOLOGIC DESCRIPTION

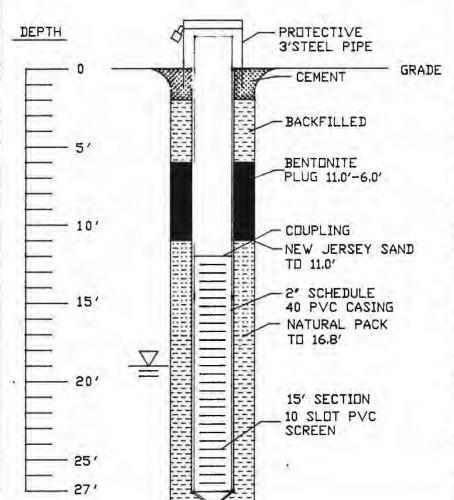
WELL NO. 2 PROJECT NO. 7641

CLIENTI FORT DEVENS
PRI NAME SANITARY LANDFILL
I DCATION, FT. DEVENS, MASS.
GEDLOGIST, DAVID A. MACLEAN
DATE OF DRILL 11/3/88
START TIME 9:30 FINISH TIME 16:30
BORING SIZE : 8'
CASING TYPE: SCHEDULE #40
CASING ID PVC
TYPE OF FILTER PACK NEW JERSEY SAND

GROUND WATER DBSERVATION

19.02 FT DN 1/19/89DATE
MEASURED FROM PVC CASING

© ELEVATION 236.43 GROUND
WATER ELEVATION 217.41'
BENCH MARK WT 2
DRAWN BY P.ROSSI
DATE 2/10/89
APPROVED BY
DATE



SAMPLE NO. AND DESCRIPTION

1-5' CDARSE, PODRLY SORTED SAND, MINOR SILT. 2-10' MEDIUM SAND, WELL SORTED, LITTLE SILT. 3-15' MEDIUM SAND, WELL SORTED, LITTLE SILT. 4-20' MEDIUM SAND, WELL SURTED, LITTLE SILT, SATURATED 5-25' MEDIUM SAND, WELL SORTED, LITTLE SILT. 6-30' MEDIUM SAND, WELL SURTED. 7-35' MEDIUM TO COARSE, POURLY SURTED SAND. 8-40' MEDIUM SAND POORLY SURTED. BEDROCK CORE DESCRIPTION-CDARSE GRAINED, LIGHT GREY QUARTZ, PLAGIDCLASE, BIDTITE, FOLIATED GNIESS, STEEPLY DIPPING FOLIATION OF BETWEEN 600- 700 DRILLING TIMES/MIN. 5-5-7-5-78% RECOVERY END OF BORING 45'

con-test

WATER AND AIR ENGINEERING

P.O. BOX 591 EAST LONGMEADOW MASSACHUSETTS 01028 (413)525-1198

AS-BUILT WELL DIAGRAM & GEOLOGIC DESCRIPTION

WELL NO. 3 PROJECT NO. 7641

CLIENTI FORT DEVENS
PR.J. NAME: SANITARY LANDFILL
LOCATION FT. DEVENS, MASS,
GEDLOGIST: DAVID A. MACLEAN
DATE OF DRILL, 12/8/88
START TIME 9:00 FINISH TIME 16:00
BORING SIZE 1 8'
CASING TYPE: PVC
CASING ID SCHEDULE #40
TYPE OF FILTER PACK NEW JERSEY SAND

GROUND WATER DBSERVATION

23.64 FT DN 1/19/89 DATE

MEASURED FROM PVC

ELEVATION 248.46 = GROUND

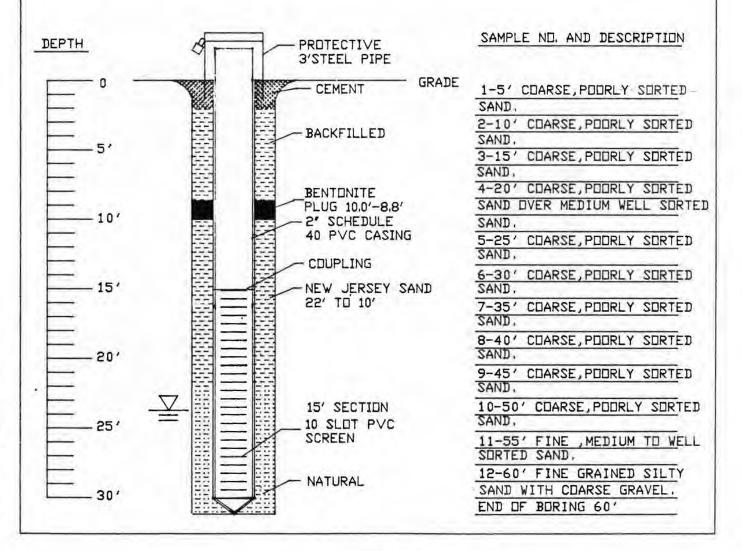
WATER ELEVATION 224.82

BENCH MARK WI 2

DRAWN BY P.RDSSI

DATE 2/10/89

APPROVED BY DATE





SAMPLE NUMBER	BLOWS PER 6 INCHES	INCHES RECOVERED INCHES DRIVEN	WATER ELEVATION	DEPTH IN FEET	WELL PIEZOI CONSTR	METER RUCTION	GRAPHIC LOG	DATE DRIL PROJECT:	BORING NO. 4 LED: 2/19/90 FORT DEVENS 8329 :TIP 2 DESCRIPTION	TESTS
	2,3,4	7 18 18 18 18 18					0.0.0 1.0.0.1 0.0.0.1	MEDIUM S 3' LIGHT SAND TRA 18' MEDIU 18' MEDIU TRACE SI	BROWN FINE-COARSE ACE FINE GRAVEL JM BROWN FINE SAND JM BROWN FINE SAND LT	ррь 0.4 0.2 х.р.
	MMENTS:	1	DF		J.A.D.	BENTO	PACK: 3'(NITE: 3'(N: 20	5"TO 1'8"	WATER LEVEL MEASUREM	

recycled paper

State		MASSACHUSETTS	Start Date	9				7/14/91
Locatio	n	FORT DEVENS	Completion	n Da	te			7/15/91
Drillin	ng Fir	m <u>E & E DRILLING</u>	Ground Ele	evat	ion		_	270.00
Type of	Dril	1DIEDRICH D-50	Total Dept	th o	f Bor	in	9 _	27.7'
Driller		PAUL BARTH						
Geologi	st	LISA HELTON						
Elev.	Depth	Description		ithology	Sample No. and	Symbo1	Blov Count	Remarks
270,00		Ground Surface						
265-	30	_O.O'-2.O': <u>SAND</u> (SM): medium brown to ligh _low moisture, fine grained, loose, some si _non-plastic; thick black rubber and burned _(fill) from 1'-1.5'.	1t.			100	11 10 12 13	Surface conditions: Grass covered slope above landfill. Spl Spn Run 1: 0.0'-2.0' 1.5' recovery. OVA: spoon (0 ppm), hole (> 1,000 ppm), head space (2 ppm). Augered from 2.0'-5.0'.
203-		5.0'-7.0': <u>SAND</u> (SM): gray-brown, moderate _coarse, loose, some silt, non-plastic; cle _plastics (fill) throughout.					5 6 6 7	Spl Spn Run 2: 5.0'-7.0' 0.5' recovery. OVA: spoon (40 ppm), hole (> 1,000 ppm), head space (59 ppm).
	8- 9-							Augered from 7.0'-10.0'.
260-	11-	10.0'-12.0': <u>CLA</u> Y (CH): light gray, modera _moisture, high plasticity, trace silt; few _subangular phyllite cobbles (fill).					46 57/1"	(6 ppm), hole (500 ppm).
	12-		lers, hard.					head space (200 ppm). Augered from 12.0'-13.0'. Auger refusal at 13.0'.
255-	14- 15-							Core Aun 1: 13.0'-18,4' RQD: .7%.

DRILLING LOG of BORING No. SHL-14A

Page 2 of 2

State		MASSACHUSETTS Location			RI	DEVENS
Elev.	Depth	Description	Lithology	Sample No. and Symbol	Blow	Remarks
250-	17 — 18 — 19 — 20 — 21 — 22 —	18.4'-24.0': <u>GRANODIORITE TO GNEIS</u> S: same as above.				Core Run 2: 18.4'-24.0' RQD: 0%.
245-	23 — 24 — 25 — 26 —	24.0'-25.1: <u>FOLIATED GRANITE</u> 25.1'-27.7': <u>GRANODIORIT</u> E: hard, fractures at 24.8' and 26.2', sound.	SCHOOL STATE OF THE STATE OF TH			Core Run 3: 24.0'-27.7' ROD: 47%. Abandoned boring was tremie grouted to ground surface on 7/15/91.
		*				CONSTUCTION SUMMARY Cem.: 564 dry 1bs., Cem./Bent.: 5%.

USATHAMA, ARMY CORPS OF ENGINEERS

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		NG LOG of BORING No. SH				-	-	Page 1 of 1
State		MASSACHUSETTS Star	t Date	E .			-	7/14/91
Locatio	n	FORT DEVENS Comp	letion	Da	te		-	7/14/91
Drillin	g Fi	rm <u>E & E DRILLING</u> Grou	nd Ele	vat	ion		-	270.00
Type of	Dri	11DIEDRICH_D-50Tota	l Dept	h o	f Bor	in	9 _	15.0'
Driller		PAUL BARTH						
Geologi	st	LISA HELTON						
Elev.	Depth	Description		ithology.	Sample No. and	Symbo]	Blow	Remarks
70,00		Ground Surface						
265-	2- 3- 4- 5- 6- 7- 8- 9-	_5.0'-10.0': <u>SAND</u> (SM): same as above, except gray-brown, clear plastic and a plastic ring (usinoid 6-packs) observed in cuttings (fill).	ed to					Cuttings. Auger Aun 1: 0.0'-5.0' OVA: hole (14 ppm), head space (70 ppm). Auger Aun 2: 5.0'-10.0' OVA: hole (60 ppm), head space (120 ppm).
260- 255-	10- 11- 12- 13- 14-	_10.0'-15.0': <u>SAND</u> (SM): same as above; much trasi(rags, plastic, metal can - fill)	1					Auger Run 3: 10.0'-15.0' OVA: hole (O ppm), head space (20 ppm). Abandoned boring was tremie grouted to ground surface on 7/14/91. CONSTUCTION SUMMMARY
255	- 15 -			47				CONSTUCTION SUMMMARY Cem.: 470 dry lbs., Cem./Bent.: 5%.

NHTL		NG LUG	0 †	RUHI	NG NO	. SHL-	141	,			Page 1 of 1
State			MASSA	CHUSE	TTS	_ Start Dat	е			_	7/15/91
Locatio	n	-	FORT	DEVEN	NS	_ Completio	n Da	te		_	7/15/91
Drillin	ng Fir	m <u> </u>	& E	DRILL	ING	_ Ground El	evat	ion		-	270.00
Type of	F Dril	1[DIEDE	ICH D-	-50	_ Total Dep	th o	f Bor	in	9 _	12.0'
Driller		-	PAU	BART		_					
Geologi	st	-	LISA	HELTO)N	-					
Elev.	Depth		•	Descript	ian		Lithology	Sample No. and	Symbo]	Blow	Remarks
70290		ي.0'-5.0': <u>ي</u>		d Surfac		u i u kodu	1.75				Descriptions are based o
265-	2- 3- 4- 5- 6- 7- 8- 9-	- - - 5.0'-10.0': _(plastic, ca	<u>SAN</u> D (S andy wra	M): same a opers, rag	s above; mu s – fill).						the examination of auger cuttings. Auger Aun 1: 0.0'-5.0' OVA: hole (80 ppm), head space (6 ppm). Auger Run 2: 5.0'-10.0' OVA: hole (500 ppm), hea space (15 ppm).
v	11-	10.0°-15.0°: - -	_SAND (SM): Same	as above (f:	111)					Auger Aun 3: 10.0'-12.0' Auger refusal at 12.0'. OVA: hole (600 ppm), hea space (14 ppm). Abandoned boring was tremie grouted to ground surface on 7/15/91. CONSTUCTION SUMMMARY Cem.: 188 dry lbs., Cem./Bent.: 5%.

State		MASSACHUSETTS Start	Date				7/12/91	
.ocat	ion	FORT_DEVENSComp)	etior	Date	?		7/13/91	
)rill	ing Fir	m <u>E & E DRILLING</u> Graun	d Ele	vatio	n		259.03	
ype	of Dril	1 <u>DIEDRICH D-50</u> Groun	dwate	r Dep	th			
rill	er	PAUL BARTH	at co	mplet	101	1	17.18♀	
eolo	gist	LISA HELTONTotal		2/ <u>12/</u> 9 th of		ring		
lev.	Depth	Description	ithology	Semple No. and	Symbo1	Blow	Lock #3217 Remarks	We 1
9.03		Ground Surface					Stickup = 1.72	
9.03		Ground Surface 0.0'-2.0': sandy <u>SIL</u> T (SM): brown-black, dry, loose, non-plastic, subangular cobbles and roots throughout.				3 5 10	Stickup = 1.72 Sp1 Spn Run 1: 0.0'-2.0' 0.3' recovery. OVA:	
9.03 _ _ 255-	1— 2 3— 4—	0.0'-2.0': sandy <u>SIL</u> T (SM): brown-black, dry, loose, non-plastic, subangular cobbles and roots				5	Spl Spn Run 1: 0.0'-2.0'	
	1 — 2 — 3 —	0.0'-2.0': sandy <u>SIL</u> T (SM): brown-black, dry, loose, non-plastic, subangular cobbles and roots throughout. 2.0'-5.0': <u>SAND</u> (SP): gray-brown, dry, medium to coarse grained, loose, subrounded gravels				5 10	Sp1 Spn Run 1: 0.0'-2.0' 0.3' recovery. OVA: spoon and hole (0 ppm), head space (0.4 ppm). Collected archive sample. Augered from	

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DHI	LLI	NG LOG of WELL NO. SHL-	15				Page 2	of 2
State		MASSACHUSETTS Local		_		FOR'	DEVENS	
Elev.	Depth	Description	Lithology	Sample No. and	Symbol Symbol	Blow	Remarks	Well Const
245-	11 — 12 — 13 — 14 — 15 — 16 — 17 —	10.0'-12.0': <u>SAND</u> (SP): gray-brown, moderate moisture, medium to coarse grained, loose, organics and subrounded pebbles throughout. 15.0'-17.0': <u>SAND</u> (SP): same as above, except wet.				6 7 9 13	Sp1 Spn Run 3: 10.0'-12.0' 1.3' recovery. OVA: spoon and hole (0 ppm), head space (0.2 ppm). Collected archive sample. Augered from 12.0'-15.0'. Sp1 Spn Run 4: 15.0'-17.0' 1.4' recovery. OVA: spoon and hole (0 ppm), head space (0.8 ppm).	
240-	19 — 	20.0'-22.0': <u>CLAY</u> (CL): medium brown, wet, moderate plasticity, subrounded pebbles and cobbles throughout, little sand.				12 38 15 12	Collected archive sample. Augered from 17.0'-20.0'. Sp1 Spn Aun 5: 20.0'-22.0' 0.7' recovery. OVA: spoon and hole (0 ppm), head space (0.8 ppm). Collected archive sample. Augered from 22.0'-25.0'. OVA: hole (0 ppm).	

Buffalo, New York

Well: Hole dia.: 10" screen/casing dia.:

slot size: 0.010".

Filter Pk.: 5001bs. Bent. Pel.: 15 dry

Cem.: 564 dry lbs., Cem./Bent.: 5%. Stickup measured from ground surface to top of inner casing.

Material Qty.:

gallons,

4",

State		MASSACHUSETTS	Start Date				6/15/91
200131			514747	n-+-			6/15/91
Locatio			Completion (
Drillin	ng Fin	E & E DRILLING	Ground Elev	atio	n	-	258.00
Type of	Dri:	DIEDRICH D-50	Total Depth	of	Borin	9 _	18.0'
Driller	•	PAUL BARTH					
Geologi	ist	AMIN AYUBCHA					
Elev.	Depth	Description	1	Aforout	No. and Symbol	Blav	Remarks
58.00		Ground Surface 0.0'-0.5': FILL: black, dry fill with mixtur	a nf			5	Sp1 Spn Run : 0.0'-2.0'
255- 250-	4- 5- 6-	charcoal. 0.5'-2.5': SAND (SP): tan to brown, slightly medium to coarse grained, with 1/4" size boundartz, <5% clay in matrix, low to very low plasticity, loose, mostly rounded elements. 2.5'-9.5': SAND (SP): gray, clear, trace of moisture, medium to coarse grained. 1/4-1/2' boulders; 80-90% quartz, 5-10% micas, 10% of metamorphosed minerals, no plasticity, loose angular elements.	lders; 60%			6 7 8 4 7 12	and hole (O ppm), head space (0.2 ppm). Collected archive sample Augered from 2.0'-5.0'. Spl Spn Run 2: 5.0'-7.0' 1.6' recovery. DVA: spoo and hole (O ppm), head space (0.1 ppm). Collected archive sample Augered from 7.0'-10.0'. Encountered a boulder at
200	9-	_9.5'-14.0': <u>SAND/GRAVE</u> L (SP): gray-yellowish _mixture, slightly moist, stiff, fine grained _quartz, 10-15% silt in matrix, abundant quar	1; 50%			17 35 75	9.5' BGS that was passed through with high pressure. Large boulders from 9.5' downward. Spl Spn Run 3: 10.0'-12. 1.7' recovery. DVA: spoo
245-	11- 12- 13-	_boulders, metamorphosed rock, slightly plast glacial deposits; large boulders encounterts drilling.	ic, dense, ed during			80	hole, and head space (O ppm). Collected archive sample Augered from 12.0'-15.0'

		N. A. A. Section		The state of the s		
DDTI	ITNIC	100	O.f	RODING	NO	SHL-16A
	LIVO	LUU		DUMINO	INU.	DITE TUA

Page 2 of 2

State		MASSACHUSETTS	Location			<u>=0</u>	BI	DEVENS
Elev.	Depth	Description)) Lithology	Sample No. and	Symbo1	Blow	Remarks
-	17-	subangular elements.		(((()				and hole (O ppm). Collected archive sample Water first encountered a 15° BGS.
								Augered 17.0'-17.5'. Abandoned boring was tremie grouted to surfac on 6/15/91. CONSTRUCTION SUMMARY Cem.: 658 dry 1bs., Cem./Bent.: 5%.
								11-
								•

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State		MASSACHUSETTS	Start Dat	e				7/10/91
Locatio	on _	FORT DEVENS			ite			7/10/91
Drillir	ng Firm _	E & E DRILLING	Ground El	levat	ion			258.00
Type of	f Drill _	DIEDRICH D-50	Total Dep	oth o	f Bor:	ing		23.7'
Driller	_	PAUL BARTH	_					
Geologi	ist _	LISA HELTON	_					
Elev.	Depth	Description		ithology	Sample No. and	Symbo1	Blow	Remarks
58.00		Ground Surface						Dry hole.
2 55-	2				x.			Abandoned boring. Boring was tremie groute to ground surface on 7/10/91.
250-	9-			į,				Auger refusal at 9.0'. MATERIAL QUANTITY:
245-	12-		=					Cem.: 470 dry 1bs. Cem./Bent.: 5%

DRTII	TNG	LOG	nf	BORING	No .	SHI -	-16R
DUTLE	_ IIVO		UI	DOUTING	110 .		TOD

Page 2 of 2

State		MASS	ACHUSETTS	Location			-0	BI	DEVENS
Elev.	Depth .		Description		Lithology	Sample No. and	Symbo1	Blow	Remarks
240-	17—								
240	19								
	21 —								
235-	23—								
			1						
4									

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_)	-		Page 1 of 3
State		MASSACHUSETTS	_ Start Date	2			-	7/12/91
Locatio	n	FORT DEVENS	_ Completion	n Da	te	_	7/12/91	
Drillin	ng Firm	E & E DRILLING	Ground Elevation258.00					
Type of	Drill	DIEDRICH D-50	Total Depth of Boring9.0'					9.0'
Driller		PAUL BARTH	-					
Geologi	st	LISA HELTON	-					
Elev.	Depth	Description		Lithology	Sample No. and	Symbo1	Blow Count	Remarks
58.00		Ground Surface				F		Dry hole.
255- 250-	3 — 4 — 5 — 6 — 7 — 8 — —							Abandoned boring. Boring was tremie groute to ground surface on 7/12/91.
	9							Auger refusal at 9.0'. MATERIAL QUANTITY: Cem.: 188 dry lbs. Cem./Bent.: 5%.

state		MASSACHUSETTS	_ Start D	Date				6/14/91			
Locati	ion	FORT DEVENS	_ Complet	ion	Date	2		6/14/91			
Drilli	ing Fir	E & E DRILLING	_ Ground	Ele	vatio	n		232.77			
Type o	of Dril	DIEDRICH D-50	_ Groundw	vate	r Dep	th					
Orille	er	PAUL BARTH	at completion 6.20 ¥					6.20 ₹			
Geolog		AMIN AYUBCHA	on	12	/12/9	91		5.66¥			
eniog	1121	APILIN ATOBOTIA	Total D	ept	h of	Bor	ring				
lev.	Depth	Description		ithology.	Semple No. and	Symbo1	Blow	Remarks	Well Const		
32.77	1-	Ground Surface 0.0'-0.25': <u>IOPSOIL</u> (MH): black clayey si 50-50% clay slightly moist, moderate plas	11	\times			3 12 17	Stickup = 1.80 - Sp1 Spn Run 1: 0.0'-2.0'			
230-	, _	0.0'-0.25': <u>TOPSOIL</u> (MH): black clayey si 50-50% clay slightly moist, moderate plas stiff, with vegetation. 0.25'-2.0': <u>SAND</u> (SP): gray, slightly moi coarse grained with abundant boulders of (gravel locally), >70% quartz, 5% clay in matrix, loose, well rounded elements.	st, quartz the	\mathbf{X}				Sp1 Spn Run 1:			
	3-4-	0.0'-0.25': <u>IOPSOIL</u> (MH): black clayey si 50-50% clay slightly moist, moderate plas stiff, with vegetation. 0.25'-2.0': <u>SAND</u> (SP): gray, slightly moi coarse grained with abundant boulders of (gravel locally), >70% quartz, 5% clay in matrix, loose, well rounded elements. 2.0'-6.0': <u>SAND</u> (SP): dark gray, wet, coa grained, 50-60% quartz, 20-30% micas and ferro-magnesian minerals, low or no plast	st, quartz the rse other	\boxtimes			12 17 23	Sp1 Spn Run 1: 0.0'-2.0' 1.5' recovery. OVA: spoon, hale, and head space (0 ppm). Collected archive sample. Augered from 2.0'-5.0'. Sp1 Spn run 2:	¥		
	3— 4— 5—	0.0'-0.25': <u>IOPSOIL</u> (MH): black clayey si 50-50% clay slightly moist, moderate plas stiff, with vegetation. 0.25'-2.0': <u>SAND</u> (SP): gray, slightly moi coarse grained with abundant boulders of (gravel locally), >70% quartz, 5% clay in matrix, loose, well rounded elements. 2.0'-6.0': <u>SAND</u> (SP): dark gray, wet, coa grained, 50-60% quartz, 20-30% micas and	st, quartz the rse other icity, 0-75%	\searrow			12 17 23	Sp1 Spn Run 1: 0.0'-2.0' 1.5' recovery. OVA: spoon, hale, and head space (0 ppm). Collected archive sample. Augered from 2.0'-5.0'.			

Buffalo, New York

tate		MASSACHUSETTS Locati				FOR:	DEVENS	
lev.	Depth	Description	Lithology	Sample No. and	Symbol	Blow	Remarks	Wel: Const
220-	11 — 12 — 13 — 14 — 15 — 16 —	10.5'-17.0': SAND (SP): dark gray, wet, very coarse grained sand and gravellous sand, boulders of black metamorphic roks; some thin layers of clear silty sand, 60% quartz, >20% ferro-magnesians, low or no plasticity, loose, rare grains of feldspar.		ST Z		1 2 3 4 5 6 6 7	Sp1 Spn Run 3: 10.0'-12.0' 1.7' recovery. OVA: spoon, hole, and head space (0 ppm). Collected samples: (1) 8oz. jar for TOC analysis, (2) 8oz. jars for Geotechnical archive. Augered from 12.0'-15.0'. Sp1 Spn Run 4: 15.0'-17.0' 1.8' recovery. OVA: spoon and head space (0 ppm), hole (0.2 ppm). Collected archive sample.	
	•						CONSTUCTION SUMMARY Well: Hole dia.: 10", screen/casing dia.: 4", slot size: 0.010". Material Gty.: Filter Pk.: 500lbs. Bent. Pel.: 15 dry gallons, Cem.: 470 dry lbs., Cem./Bent.: 5%. Stickup measured from ground surface to top of inner casing.	

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					-		_ ,,_ ,_ ,				
State		MASSACHUSETTS st	art Date	9			6/15/91	-			
Locat	ion	FORT DEVENS CO.	mpletio	n Date	3		6/16/91				
Drill	ing Fir	m <u>E & E DRILLING</u> Gr	ound Ele	evati	าก		236.59				
Туре	of Dril	1 <u>DIEDRICH D-50</u> Gr	Groundwater Depth								
Drill	er	PAUL BARTH	at completion17.80 ¥								
		AMENI AVUDOUA	on 12/ <u>12/</u> 9117.12 ₹								
Geolo	gist	AMIN AYUBCHA	tal Dept	th of	Bor	30.0'					
			- 1 s				Lock #3217				
Elev.	Depth	Description	thalogy	Sample No. and	Symbo]	Blow	Remarks	We 1			
36.59		Ground Surface					Stickup = 1.80				
36.59	_	0.0'-10.0': SAND (SP): gray, slightly moist,	15			2 3	Spl Spn Run 1:				
36.59 235-	1-	0.0'-10.0': <u>SAND</u> (SP): gray, slightly moist, fine to very fine grained, 80% quartz, <5% mic and other metamorphosed minerals. Trace of room	ts.			3	Spl Spn Run 1: 0.0'-2.0' 1.8' recovery. OVA:				
	1— 2—	0.0'-10.0': <u>SAND</u> (SP): gray, slightly moist, fine to very fine grained, 80% quartz, <5% mic and other metamorphosed minerals. Trace of room	ts.			3	Sp1 Spn Run 1: 0.0'-2.0' 1.8' recovery. OVA: spoon, hole, and head space (0 ppm).				
	1— 2— 3—	0.0'-10.0': <u>SAND</u> (SP): gray, slightly moist, fine to very fine grained, 80% quartz, <5% mic and other metamorphosed minerals. Trace of roothw plasticity, slightly moist on top 1'. Mix	ts.			3	Sp1 Spn Run 1: 0.0'-2.0' 1.8' recovery. OVA: spoon, hole, and head space (O ppm). Collected archive sample.				
	1— 2— 3— 4—	0.0'-10.0': <u>SAND</u> (SP): gray, slightly moist, fine to very fine grained, 80% quartz, <5% mic and other metamorphosed minerals. Trace of roothw plasticity, slightly moist on top 1'. Mix	ts.			3	Sp1 Spn Run 1: 0.0'-2.0' 1.8' recovery. OVA: spoon, hole, and head space (0 ppm). Collected archive sample. Augered from 2.0'-5.0'.				
	1 — 2 — 3 — 4 — 5 —	0.0'-10.0': <u>SAND</u> (SP): gray, slightly moist, fine to very fine grained, 80% quartz, <5% mic and other metamorphosed minerals. Trace of roothw plasticity, slightly moist on top 1'. Mix	ts.			3	Sp1 Spn Run 1: 0.0'-2.0' 1.8' recovery. OVA: spoon, hole, and head space (0 ppm). Collected archive sample. Augered from 2.0'-5.0'. Organic, blackish sam was observed at 4'-5'				
235-	1— 2— 3— 4—	0.0'-10.0': <u>SAND</u> (SP): gray, slightly moist, fine to very fine grained, 80% quartz, <5% mic and other metamorphosed minerals. Trace of roothw plasticity, slightly moist on top 1'. Mix	ts.			3 4 6	Sp1 Spn Run 1: 0.0'-2.0' 1.8' recovery. OVA: spoon, hole, and head space (0 ppm). Collected archive sample. Augered from 2.0'-5.0'. Organic, blackish sam was observed at 4'-5' on auger cuttings. Sp1 Spn Run 2:				
	1 — 2 — 3 — 4 — 5 —	0.0'-10.0': <u>SAND</u> (SP): gray, slightly moist, fine to very fine grained, 80% quartz, <5% mic and other metamorphosed minerals. Trace of roothw plasticity, slightly moist on top 1'. Mix	ts.			3 4 6	Sp1 Spn Run 1: 0.0'-2.0' 1.8' recovery. OVA: spoon, hole, and head space (O ppm). Collected archive sample. Augered from 2.0'-5.0'. Organic, blackish sam was observed at 4'-5' on auger cuttings. Sp1 Spn Run 2: 5.0'-7.0'				
235-	1— 2— 3— 4— 5—	0.0'-10.0': <u>SAND</u> (SP): gray, slightly moist, fine to very fine grained, 80% quartz, <5% mic and other metamorphosed minerals. Trace of roothw plasticity, slightly moist on top 1'. Mix	ts.			3 4 6	Sp1 Spn Run 1: 0.0'-2.0' 1.8' recovery. OVA: spoon, hole, and head space (0 ppm). Collected archive sample. Augered from 2.0'-5.0'. Organic, blackish sam was observed at 4'-5' on auger cuttings. Sp1 Spn Run 2: 5.0'-7.0' 1.7' recovery. OVA: spoon, hole, and head				
235-	1— 2— 3— 4— 5— 6— 7—	0.0'-10.0': <u>SAND</u> (SP): gray, slightly moist, fine to very fine grained, 80% quartz, <5% mic and other metamorphosed minerals. Trace of roothw plasticity, slightly moist on top 1'. Mix	ts.			3 4 6	Sp1 Spn Run 1: 0.0'-2.0' 1.8' recovery. OVA: spoon, hole, and head space (O ppm). Collected archive sample. Augered from 2.0'-5.0'. Organic, blackish sam was observed at 4'-5' on auger cuttings. Sp1 Spn Run 2: 5.0'-7.0' 1.7' recovery. OVA:				

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State		MASSACHUSETTS Locati				FOR	DEVENS	
Elev.	Depth	Description	Lithology	Sample No. and	Symbol Symbol	Blow	Remarks	Wel: Cons
225-	11-	10.0'-15.0': <u>SAN</u> D (SP): same as above, slightly coarser grained.				4 8 8 10	7.0'-10.0'. Spl Spn Run 3: 10.0'-12.0' 1.5' recovery. OVA: spoon, hole, and head space (0 ppm). Collected archive	
220-	14— 15— 16— 17— 18— 19—	15.0'-22.0': <u>SAND</u> (SP): same as 0-10' interval, wet at 16' BGS, small isolated boulders of quartz.				3 5 5 6	sample. Augered from 12.0'-15.0'. Spl Spn Run 4: 15.0'-17.0' 1.8' recovery. OVA: spoon, hole, and head space (0 ppm). Collected archive sample Augered from 17.0'-20.0'.	
215-	20— 21— 22— 23— 23—	22.0'-30.0': <u>SAND</u> (SP): same as above, highly saturated, slightly darker.				4 3 5 5	Spl Spn Run 5: 20.0'-22.0' 1.8' recovery. OVA: spoon and hole (0 ppm). Collected archive sample and TOC sample. Split Spoon was pushe	
210-	25 — 25 — 26 —					4 3 5 5	and a second spoon was driven to obtain a sufficient sample volume Augered from 22.0'-25.0'. Spl Spn Run 5: 25.0'-27.0' Collected archive sample. Augered from 27.0'-30.0'.	
							CONSTRUCTION SUMMARY Well: Hole dim.: 10", screen/casing dim.:	

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DRTI	ING	ING	nf	WELL	NO	SHI -	-18
			UI	77	140.	0:1	10

Page 3 of 3

State	MASSACHUSETTS	Location		_	FOR	DEVENS	
Elev.	Description	Lithelogy Uotateon	Sample No. and	Symbol	Blow	Remarks	Well Const
						4", slot size: 0.010". Material Qty.: Filter Pk.: 900lbs. Bent. Pel.: 17.5 dr gallons, Cem.: 564 dry lbs., Cem./Bent.: 5%. Stickup measured from ground surface to top of inner casing.	n
4							

USATHAMA, ARMY CORPS OF ENGINEERS

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	10 200 01 1122 110. 011		_		_		, ugc 1	U 1 .	
	<u>MASSACHUSETTS</u> s	Start Da	ate				6/16/91		
ion	FORT DEVENS C	Complet	ion	Date			6/17/91		
ing Fir	E & E DRILLING G	iround (Ele	vatio	n		239.45		
of Dril	1 <u>DIEDRICH D-50</u> G	0-50 Groundwater Depth							
er	PAUL BARTH	at	СО	mplet	ior	1	22.00₹		
	- Wall	on 12/ <u>12/</u> 91 <u>20.67 ₹</u>							
gist	AMIN_AYUBCHA	otal De	ept	h of	Bor	ing	The second secon		
		- 1	36	-			Lock #3217	18.52	
Depth	Description		1tholog	Sample No. and	Symbo]	Blov Count	Remarks	Well Const	
	Ground Surface 0.0'-1.0': SAND (SP): dark gray, slightly mo:	ist,				1	Stickup = 1.89 Spl Spn Run 1:	\mathbb{H}	
	Ground Surface						Stickup = 1.89		
	<4-5% clay in matrix, very low plasticity, lo					1 2 4	0.0'-2.0' 1.7' recovery. OVA: spoon, hole, and head		
-	1.0'-4.5': SAND (SP): gray, dry, clear, fine						space (O ppm). Collected archive	1	
-	[[[보다] 보니라이어, [보다 보다 보다 이 전에 가는 보다 보니다. 그런 사람들은 보다 하는 사람들이 되었다. [[[[[[[[[[[[[[[[[[[ty,					sample.	1	
-		n to					2.0'-5.0'.		
5-						3	Sp1 Spn Run 2:		
6-	coarse grained, 50% quartz, 30-40% micas and					5	1.B' recovery. OVA:	11	
	coarse grained, 50% quartz, 30-40% micas and metamorphosed rock debris, low to very low plasticity, loose, subangular grains, trace o				-			1	
7-	coarse grained, 50% quartz, 30-40% micas and metamorphosed rock debris, low to very low				П	8	spoon, hale, and head space (0 ppm).		
7— 8—	coarse grained, 60% quartz, 30-40% micas and metamorphosed rock debris. low to very low plasticity, loose, subangular grains, trace coxidized minerals, occasional thin layer (2-3)					θ			
	ion ing Fir of Dril er gist Depth	MASSACHUSETTS ion FORT DEVENS ing Firm E & E DRILLING of Drill DIEDRICH D-50 or PAUL BARTH gist AMIN AYUBCHA Description Description Description Ground Surface - 0.0'-1.0': SAND (SP): dark gray, slightly mo 1 fine grained, vegetation on top, 50-70% quart - <4-5% clay in matrix, very low plasticity, In 2 subangular to well rounded grains. 1.0'-4.5': SAND (SP): gray, dry, clear, fine very fine grained quartz sand, 70-80% quartz, 5-10% ferro-magnesians of micas, no plasticity slightly angular element. 4.5'-16.0': SAND (SP): dark gray, dry, medium coarse grained, 50% quartz, 30-40% micas and	MASSACHUSETTS Start D FORT DEVENS Complet Ing Firm E & E DRILLING Ground of Drill DIEDRICH D-50 Groundw PAUL BARTH at DN AMIN AYUBCHA Total D Depth Description Ground Surface - 0.0'-1.0': SAND (SP): dark gray, slightly moist, fine grained, vegetation on top, 50-70% quartz, c4-5% clay in matrix, very low plasticity, loose, subangular to well rounded grains. 1.0'-4.5': SAND (SP): gray, dry, clear, fine to very fine grained quartz sand, 70-B0% quartz, 5-10% ferro-magnesians of micas, no plasticity, alightly angular element. 5 4.5'-16.0': SAND (SP): dark gray, dry, medium to coarse grained, 50% quartz, 30-40% micas and	FORT DEVENS Completion Ing Firm E & E DRILLING Ground Ele Of Drill DIEDRICH D-50 Groundwate PAUL BARTH at co On 12 Gist AMIN AYUBCHA Total Dept Description Ground Surface - 0.0'-1.0': SAND (SP): dark gray, slightly moist, fine grained, vegetation on top, B0-70% quartz, - <4-5% clay in matrix, very low plasticity, loose, subangular to well rounded grains. 1.0'-4.5': SAND (SP): gray, dry, clear, fine to very fine grained quartz sand, 70-B0% quartz, 5-10% ferro-magnesians of micas, no plasticity, slightly angular element. 5	MASSACHUSETTS Start Date FORT DEVENS Completion Date Ing Firm E & E DRILLING Ground Elevation of Drill DIEDRICH D-50 Groundwater Dep at complet on 12/12/s Total Depth of Ground Surface O.0'-1.0': SAND (SP): dark gray, slightly moist, fine grained, vegetation on top, 50-70% quartz, <4-5% clay in matrix, very low plasticity, loose, subangular to well rounded grains. 1.0'-4.5': SAND (SP): gray, dry, clear, fine to very fine grained quartz sand, 70-80% quartz, 5-10% ferro-magnesians of micas, no plasticity, slightly angular element. 4.5'-16.0': SAND (SP): dark gray, dry, medium to coarse grained, 50% quartz, 30-40% micas and	MASSACHUSETTS Start Date FORT DEVENS Completion Date Ing Firm E & E DRILLING Ground Elevation DIFDRICH D-50 Groundwater Depth at completion on 12/12/91 Total Depth of Bor Description Ground Surface 0.0'-1.0': SAND (SP): dark gray, slightly moist, fine grained, vegetation on top, 50-70% quartz, <4-5% clay in matrix, very low plasticity, loose, subangular to well rounded grains. 1.0'-4.5': SAND (SP): gray, dry, clear, fine to yery fine grained quartz sand, 70-80% quartz, 5-10% ferro-magnesians of micas, no plasticity, slightly angular element. 5 4.5'-16.0': SAND (SP): dark gray, dry, medium to coarse grained, 50% quartz, 30-40% micas and	MASSACHUSETTS Start Date FORT DEVENS Completion Date ing Firm E & E DRILLING Ground Elevation DIEDRICH D-50 Groundwater Depth at completion on 12/12/91 Total Depth of Boring Description Ground Surface O.0'-1.0': SAND (SP): dark gray, slightly moist, fine grained, vegetation on top, 50-70% quartz, <a-5% (sp):="" -5.10%="" 1.0'-4.5':="" 3.5="" 30-40%="" 4.5'-16.0':="" 5.4.5'-16.0':="" 50%="" 70-80%="" and="" and<="" angular="" clay="" clear,="" coarse="" dark="" dry,="" element.="" ferro-magnesians="" fine="" grained="" grained,="" gray,="" in="" loose,="" low="" matrix,="" medium="" micas="" micas,="" no="" of="" plasticity,="" quartz="" quartz,="" sand="" sand,="" slightly="" td="" to="" very="" wery=""><td>MASSACHUSETTS Start Date 6/16/91 ion FORT DEVENS Completion Date 6/17/91 ing Firm E & E DRILLING Ground Elevation 239.45 of Drill DIFDRICH D-50 Groundwater Depth at completion on 12/12/91 20.67 ▼ AMIN AYUBCHA Total Depth of Boring 31.0' Lock #3217 Depth Description Description Description Description Description Description Single Part Single Pa</td></a-5%>	MASSACHUSETTS Start Date 6/16/91 ion FORT DEVENS Completion Date 6/17/91 ing Firm E & E DRILLING Ground Elevation 239.45 of Drill DIFDRICH D-50 Groundwater Depth at completion on 12/12/91 20.67 ▼ AMIN AYUBCHA Total Depth of Boring 31.0' Lock #3217 Depth Description Description Description Description Description Description Single Part Single Pa	

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State		MASSACHUSETTS Locati				FOR:	DEVENS	
Elev.	Depth	Description	Lithology	Sample No. and	Symbol Symbol	Blow	Remarks	Wel Cons
225-	11 — 12 — 13 — 14 — 15 —					5 5 7 9	Sp1 Spn Run 3: 10.0'-12.0' 1.7' recovery. OVA: spoon, hole, and head space (0 ppm). Collected archive sample. Augered from 12.0'-15.0'. Sp1 Spn Run 4: 15.0'-17.0'	
220-	17 — 18 — 19 — 20 —	15.0'-21.0': silty <u>SAN</u> D (SM): white-grayish, dry, very similar to the 4.5-16' interval, loose, no plasticity, rounded to subangular grains, trace of isolated boulder of metamorphosed rock.				5 g	1.3' recovery. OVA; spoon, hole, and head space (0 ppm). Collected archive sample. Augered from 17.0'-20.0'. Spl Spn Run 5:	
215-	23 — 24 — 25 —	21.0'-21.5': SAND (SM): same as above, slightly coarser, more sand than silt. 21.5'-22.0': SAND (SP): orange and black (organic), very wet, coarse grained, abundant boulders of quartz, 2" of oily black and rusty sand, numerous fragments of schist and granitic rock, 50-60% quartz, 30% metamorphosed ferro-magnesians and micas, no plasticity. 22.0'-30.0': SAND (SP): gray, wet, medium to coarse grained, some boulders of quartz, thin layer (2-3") of fine grained sand, 60-70% quartz, 5-10% metamorphosed ferro-magnesians, trace of oxidized grains, no plasticity, loose.	H.			12 13 14 3 5 8 12	20.0'-22.0' 1.4' recovery. OVA: spoon, hole, and head space (0 ppm). Collected archive sample. Augered from 22.0'-25.0'. Water at 22' BGS. Measured after stabilization. Sp1 Spn Run 6: 25.0'-27.0' 1.5' recovery. OVA: spoon and hole (0 ppm), head space (0.4	E
210-	29— — 30						ppm). Collected archive sample. Augered from 27.0'-31.0'. CONSTRUCTION SUMMARY Well: Hole dia.: 10", screen/casing dia.:	

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Buffalo, New York

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DRILLING	LOG	o f	WELL	NO.	SHL-19
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	MASSACHUSETTS		ion	T	_	1 411	DEVENS	-
Depth	Description		Lithology	Sample No. and	Symbol	Blow	Remarks	Well Const
							4:, slot size: 0.010°. Material Gty.: Filter Pk.: 400lbs. Bent. Pel.: 20 dry gallons, Cem.: 554 dry lbs., Cem./Bent.: 5% Stickup measured from ground surface to top of inner casing.	
						,		
		*					*	
	•							
								4:, slot size: 0.010°. Material Oty.: Filter Pk.: 400lbs. Bent. Pel.: 20 dry gallons, Cem.: 554 dry lbs., Cem./Bent.: 5% Stickup measured from ground surface to top of inner casing.

USATHAMA, ARMY CORPS OF ENGINEERS

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State MASSACHUSETTS Star Location FORT DEVENS Comp Drilling Firm E & E DRILLING Grou Type of Drill ACKER 82 Grou Driller DON CAMPBELL		Start D	ate				7/10/91			
		Completion Date					7/13/91			
		Ground	Ele	vatio	n		235.55			
		Groundw	ate	r Dep	th					
		at	CO	mplet	101	1	15.00 ¥			
31 7776			on	12	/12/	91		17.63 ₹		
Geolog	gist	ROBERT A. MEYERS	Total D	ept	n of	Bor	ring	64.0'		
								Lock #3217	1	
Elev.	Depth	Description		ithology.	Sample No. and	Symbo]	Blow	Remarks	We1 Cons	
	100									
95 . 55	***	Ground Surface		1				Stickup = 1.29		
95 . 55 235-	1-	0.0'-0.4': <u>SIL</u> J (MH): tan, dry, with fine sar and some rounded grave).	3	man			4 6	Sp1 Spn Run 1: 0.0'~2.0'		
		0.0'-0.4': <u>SIL</u> I (MH): tan, dry, with fine sar and some rounded gravel. 0.4'-2.0': <u>SAND</u> (MH): tan to brown, fine to medium grained, with some rounded to subangul	ılar	man to the same same				Sp1 Spn Run 1: 0.0'-2.0' 1.2' recovery. OVA: spoon and nole (0		
	3-	0.0'-0.4': <u>SIL</u> I (MH): tan, dry, with fine sar and some rounded grave]. 0.4'-2.0': <u>SAND</u> (MH): tan to brown, fine to	lar s of	man (man) man (man)			6 10	Sp1 Spn Run 1: 0.0'-2.0' 1.2' recovery. OVA: spoon and nole (0 ppm). Collected archive sample.		
	3-	0.0'-0.4': <u>SIL</u> J (MH): tan, dry, with fine sar and some rounded gravel. 0.4'-2.0': <u>SAND</u> (MH): tan to brown, fine to medium grained, with some rounded to subangul gravel. Sand is composed of angular fragments 90% quartz, 10% mafics, (<1%) mica for this s	lar s of	man (man) man)			6 10	Sp1 Spn Run 1: 0.0'-2.0' 1.2' recovery. OYA: spoon and nole (0 ppm). Collected archive		
235-	3-	0.0'-0.4': <u>SIL</u> J (MH): tan, dry, with fine sar and some rounded gravel. 0.4'-2.0': <u>SAND</u> (MH): tan to brown, fine to medium grained, with some rounded to subangul gravel. Sand is composed of angular fragments 90% quartz, 10% mafics, (<1%) mica for this s	olar s of split	400 to 1000 to			6 10	Sp1 Spn Run 1: 0.0'-2.0' 1.2' recovery. OVA: spoon and nole (0 ppm). Collected archive sample. Augered from		
235-	3 5 6	0.0'-0.4': SILI (MH): tan, dry, with fine sar and some rounded gravel. 0.4'-2.0': SAND (MH): tan to brown, fine to medium grained, with some rounded to subangul gravel. Sand is composed of angular fragments 90% quartz, 10% mafics, (<1%) mica for this spoon.	alar s of split	man and and and and and and and and and a			6 10 14	Sp1 Spn Run 1: 0.0'-2.0' 1.2' recovery. OVA: spoon and nole (0 ppm). Collected archive sample. Augered from 2.0'-5.0'.		
	3 4 5	0.0'-0.4': SILI (MH): tan, dry, with fine san and some rounded gravel. 0.4'-2.0': SAND (MH): tan to brown, fine to medium grained, with some rounded to subangul gravel. Sand is composed of angular fragments 90% quartz, 10% mafics, (<1%) mica for this spoon. 5.0'-7.0': SAND (SP): tan to gray, moist, med grained, with some limonitic staining, 90% quarts.	alar s of split	man (man) (m			6 10 14 4 5 5	Sp1 Spn Run 1: 0.0'-2.0' 1.2' recovery. OVA: spoon and nole (0 ppm). Collected archive sample. Augered from 2.0'-5.0'. Sp1 Spn Run 2: 5.0'-7.0' 1.0' recovery. OVA:		

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State		MASSACHUSETTS Location				FOR	DEVENS	
Elev.	Depth	Description	Lithology	Sample No. and	Symbol	Blow	Remarks	Well Const
225-	11 — 12 — 13 — 14 —	10.0'-12.0': <u>SAN</u> D (SP): same as above, dry, with less staining.				4 3 4 5	Sp1 Spn Run 3: 10.0'-12.0' 1.1' recovery. OVA: spoon and hole (0 ppm). Collected archive sample. Augered from 12.0'-15.0'.	
220-	15— 16— 17— 18— 19—	15.0'-17.0': <u>SAND</u> (SP): wet at 15.2', fine to medium grained, heavily stained with rust (limpnitic), 90% quartz, 10% mafics, <1% mica.				5 5 7 6	Spl Spn Run 4: 15.0'-17.0' 1.7' recovery. OVA: spoon and hole (0 ppm). Collected archive sample. Augered from 17.0'-20.0'.	*
215-	20— 21— 22— 23— 24—	20.0'-22.0': <u>SAND</u> (SP): saturated, fine to coarse grained, no staining, subrounded to angular, 75% quartz, 25% mafics, <1% mica.				4 7 7 6	Sp1 Spn Run 5: 20.0'-22.0' 1.4' recovery. OVA: spcon (5 ppm) and hol (60 ppm). (methane) Collected archive sample. Augered from	
210-	25 —	25.0'-27.0': <u>SAND</u> (SP): gray-brown, saturated, fine to coarse grained, 85% quartz, 13% mafics, 2% pink feldspar, <1% mica, rounded to angular grains.				0 2 3 4	22.0'-25.0'. Sp1 Spn Run 5: 25.0'-27.0' 1.8' recovery. OVA: spoon (4 ppm) and hol (80 ppm). (methane) Collected archive sample. Augered from	
205-	30 — 31 — 32 — 33 —	30.0'-32.0': <u>SAND</u> (SP): gray-brown, saturated, fine to coarse grained, with little rounded grayel, 90% quartz, 10% mafics, <1% mica, rounded to angular grains.				1 3 3 4	27.0'-30.0'. Spl Spn Run 7: 30.0'-32.0' 1.7' recovery. OVA: spoon (2 ppm) and hol (40 ppm). (methane) Collected archive sample.	

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State		MASSACHUSETTS Location				FOR	DEVENS	in a
Elev.	Depth	Description	Lithology	Sample No. and	Symbol Symbol	Blow	Remarks	Wel Cons
200-	34 — 35 — 36 — 37 —	35.0'-37.0': <u>SAND</u> (SP): gray-brown, saturated, fine to medium grained, 90% quartz, 10% mafics, <1% mica.				5 5 6 7	Augered from 32.0'-35.0'. Sp1 Spn Aun 8: 35.0'-37.0' 1.6' recovery. OVA: spoon (3 ppm) and hole (>100 ppm). (methane)	
195-	38 — 39 — 40 — 41 —	40.0'-42.0': <u>SAND</u> (SP): same as above, with few rounded peobles of mafic material.				0 3 5	Collected archive sample. Augered from 37.0'-40.0'. Spl Spn Run 9: 40.0'-42.0' 1.5' recovery. OVA:	
190-	42 — 43 — 44 — 45 —	45.0'-47.0': <u>SAND</u> (SP): gray to tan, saturated, fine to coarse grained, 90% quartz, 10% mafic, <1%				11 11	spoon (3 ppm) and hole (>100 ppm) (methane). Collected archive sample. Augered from 42.0'-45.0'. Spl Spn Run 10: 45.0'-47.0'	
185-	45 — 47 — — — — 48 —	mica, rounded to angular grains. 48'-49': Cuttings are indicative of weathered	×			17 25	1.8' recovery. OVA: spoon (3 ppm) and hols (80 ppm) (methane). Collected archive sample.	
	49 — 50 — 51 — 52 — 53 —	granodiorite. 49.0'-54.0': <u>DIARO-QUARTZITIC GNEIS</u> S: very hard, metamorphic, microcrystalline, with several high angle fractures and iron staining in fractures.					Attempted to auger from 47.0'-50.0'. Casing and split spoor refusal at 48'. Top of bedrock at 48'. Tri-cone roller bit used to drill from 48'-49'. Core Run 1:	
180-	54 — 55 — 55 — 56 —	54.0'-59.0': <u>DIARO-QUARTZITIC GNEIS</u> S: same as above.					49.0'-54.0' Core Run 2: 54.0'-59.0'	

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State		MASSACHUSETTS Locati			1 1	FOR	DEVENS	
Elev.	Depth	Description	Lithology	Sample No. and	Symbo1	Blow Count	Remarks	Well Const
175-	58 — 59 — 60 — 61 — 62 —	59.0'-64.0': <u>DIARO-QUARTZITIC GNEIS</u> S: same as above, with an approximately 2' vertical fracture which has partially healed.					Core Run 3: 59.0'-64.0' CONSTRUCTION SUMMARY Well: Hole dia.: 10", screen/casing dia.: 4", slot size: 0.010". Stickup measured from	
	- 64						ground surface to top of inner casing. All cuttings with hea space readings above 10 ppm were containerized in 55-gallon drums.	

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State		MASSACHUSETTS	Start D	Date				6/18/91	
Locat	ion	FORT DEVENS	Complet	ior	Date	1		6/19/91	
Drill	ing Fir	E & E DRILLING	Ground	Ele	vatio	in		257.93	
		DON CAMPBELL	Groundw		r Dep		1	40.60⊻	
Drill Geolo		BOBERT A MEYERS			2/ <u>12/</u> 9 h of			42.66 ¥ 53.0' Lock #3217	
E]ev.	Depth	Description		Lithology	Sample No. and	Symbo]	Blow	Remarks	Well Const
									5 ,000
57.93		Ground Surface 0.0'- 0.1': TOPSOIL (OL): organic material	and /	Y			3	Stickup = 1.82 Spl Spn Run 1:	
57.93 - 255-	1 - 2 - 3 -	1 14 14 14 10 14 10 14 10 14 10 10 10 10 10 10 10 10 10 10 10 10 10	y arse range sive,	\			3 5 9 12		

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State		MASSACHUSETTS Locati				FOR	DEVENS	
Elev.	Depth	Description	Lithology	Sample No. and	Symbo1	810¥ Count	Remarks	Wel:
245-	11— 12— 13— 14—	10.0'-12.0': SAND (SM): light gray, dry, very fine to fine grained, loose, non-plastic, angular to subrounded, 90% quartz, 10% ferro-magnesians, mica, and feldspar.				5 8 10 12	Sp1 Spn Run 3: 10.0'-12.0' 1.2' recovery. OVA: spcon (0 ppm) and hole (0.2 ppm). Collected archive sample. Augered from 12.0'-15.0'.	
240-	16 — 16 — 17 — 18 — 19 —	15.0'-17.0': <u>SAND</u> (SM): same as above, fine to very fine grained.				3 3 5 9	Spl Spn Run 4: 15.0'-17.0 1.5' recovery. OVA: spoon (0.1 ppm) and hole (0 ppm). Collected archive sample. Augered from 17.0'-20.0'.	
235-	21 — 22 — 23 — 24 —	20.0°-22.0°: <u>SAND</u> (SM): same composition as above, but slightly more finely grained, with some silt, slightly moist, no staining or inclusions.				5 - 9 11 12	Sp1 Spn Run 5: 20.0'-22.0' 1.9' recovery. OVA: spoon (0.1 ppm) and hole (0 ppm). Collected archive sample. Augered from 22.0'-25.0'.	
230-	25 — 26 — 27 — 28 — 29 —	25.0'-27.0': <u>SAND</u> (SM): same as above, light gray to white, very slightly moist, with three (1/2") seams of tan silt, non-plastic, non-cohesive.				7 9 11 15	Sp1 Spn Run 5: 25.0'-27.0'- 1.6' recovery, OYA: spoon and hole (0 ppm). Collected archive sample. Augered from 27.0'-30.0'.	
225-	30 — 31 — 32 — 33 —	30.0'-32.0': <u>SAND</u> (MH): light gray to white, dry, very fine, non-plastic, non-cohesive, 90% quartz, 10% ferro-magnesians, mica, and feldspar.				3 5 8 11	Spl Spn Aun 7: 30.0'-32.0' 1.5' recovery. OVA: spoon (0 ppm) and hole (0.4 ppm). Collected archive sample.	

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Remarks Co
on Run B: -37.0' recovery. OVA: and hole (0 cted archive e. ed from -40.0'.
-42.0' recovery, OVA: and head space () recovery oval ted archive e. encountered at
piked at 2 ppm spoon was opened, ed from -45.0'. on Aun 10: -47.0' spoon (0.2 ppm) ble (0 ppm). cted mrchive e. cther sampling d sands flowing duger. e (with cate) was taken DC analysis. AUCTION SUMMARY Hole dia.: 10", een/casing dia:
Spread and a sprea

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DOTLI	TNIC	100	- (WELL	NIO	CIII	01
111111	11117	1 111-	() T	M - 1	MILL	THI	- ~ 1
					140 .	0111	

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State	MASSACHUSETTS	Location	-		FOR'	DEVENS	
Elev.	Description	Lithology	Sample No. and	Symbo1		Remarks	Wel: Const
						Cem.: 1,316 dry lbs Cem./Bent.: 5%. Stickup measured from ground surface to top of inner casing.	
						4	
						2.0	

USATHAMA, ARMY CORPS OF ENGINEERS

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State		MASSACHUSETTS	Start Date	е			7/14/91			
Locati	ion	FORT DEVENS	Completion	n Date	2		7/23/91			
Drilli	ing Fir	m E & E DRILLING	Ground Ele	evati	חכ		219.58			
Туре с	of Dril	ACKER 82	Groundwate	er De	oth					
Drille	er.	DON CAMPBELL	at co	omple	tion	1	8.50♀			
eologist	ROBERT A. MEYERS Tota		2/12/		nine.	4.86¥ 129.6′				
					100	1119	Lock #3217			
Elev.	Depth	Description	ithology	Sample No. and	Symbo]	Blow	Remarks	Well Const		
19.58		Ground Surface 0.0'-1.2': SAND (SP): tan, damp, loose, men				2	Stickup ≈ 0.91 Spl Spn Run 1:			
19.58										
19.58	- 1- 2-	0.0'-1.2': <u>SAND</u> (SP): tan, damp, loose, ments coarse grained, with little fine sand, rounded pebbles, roots, 90% quartz, 10% ma	trace fics.			2 2 2 2 2				
19.58	-	0.0'-1.2': <u>SAND</u> (SP): tan, damp, loose, mento coarse grained, with little fine sand, rounded pebbles, roots, 90% quartz, 10% mathraletts. SILT (NH): medium brown, damp, organic silt with fine sand, rounded to any	trace fics. Joose,			2	Spl Spn Run 1: 0.0'-2.0' 1.4' recovery. OVA: spoon and hole (0 ppm), head space (2 ppm).			
	-	0.0'-1.2': <u>SAND</u> (SP): tan, damp, loose, mento coarse grained, with little fine sand, rounded pebbles, roots, 90% quartz, 10% materials and the same of the same	trace fics. Joose,			2	Spl Spn Run 1: 0.0'-2.0' 1.4' recovery. OVA: spoon and hole (0 ppm), head space (2 ppm). Collected archive sample.			
	3-4-5-	0.0'-1.2'; SAND (SP): tan, damp, loose, mento coarse grained, with little fine sand, rounded pebbles, roots, 90% quartz, 10% mail 1.2'-1.4'; SILT (NH): medium brown, damp, organic silt with fine sand, rounded to any sand grains, 90% quartz, 10% mafics. 5.0'-5.8'; SILT (NH): same as above, damp,	trace fics. loose, gular			2	Spl Spn Run 1: 0.0'-2.0' 1.4' recovery. OVA: spoon and hole (0 ppm), head space (2 ppm). Collected archive sample. Augered from 2.0'-5.0'. Spl Spn Run 2:	*		
	3 — 4 — 5 — 6 —	0.0'-1.2'; SAND (SP): tan, damp, loose, mento coarse grained, with little fine sand, rounded pebbles, roots, 90% quartz, 10% mandatorial file sand, sand grains, 90% quartz, 10% mafics.	trace fics. loose, gular			2 2 2 2 2 2 2 47	Spl Spn Run 1: 0.0'-2.0' 1.4' recovery. OVA: spoon and hole (0 ppm), head space (2 ppm). Collected archive sample. Augered from 2.0'-5.0'. Spl Spn Run 2: 5.0'-7.0' 1.8' recovery. OVA:			
215-	3— 4— 5— 6— 7—	0.0'-1.2'; SAND (SP): tan, damp, loose, mento coarse grained, with little fine sand, rounded pebbles, roots, 90% quartz, 10% mail 1.2'-1.4'; SILT (MH): medium brown, damp, organic silt with fine sand, rounded to any sand grains, 90% quartz, 10% mafics. 5.0'-5.8'; SILT (MH): same as above, damp, compact, with some rounded pebbles; pebbles crystalline, metamorphosed, and highly quarts.	trace fics. loose, gular s are rtzitic mp,			2 2 2 2 2 2 37	Spl Spn Run 1: 0.0'-2.0' 1.4' recovery. OVA: spoon and hole (0 ppm), head space (2 ppm). Collected archive sample. Augered from 2.0'-5.0'. Spl Spn Run 2: 5.0'-7.0' 1.8' recovery. OVA: spoon (5 ppm), hole (ppm), and head space			
	3— 4— 5— 6— 7— 8—	0.0'-1.2': <u>SAND</u> (SP): tan, damp, loose, mento coarse grained, with little fine sand, rounded pebbles, roots, 90% quartz, 10% mail 1.2'-1.4': <u>SILI</u> (MH): medium brown, damp, organic silt with fine sand, rounded to any sand grains, 90% quartz, 10% mafics. 5.0'-5.8': <u>SILI</u> (MH): same as above, damp, compact, with some rounded pebbles; pebbles crystalline, metamorphosed, and highly quark	trace fics. loose, gular s are rtzitic mp, trace es are			2 2 2 2 2 2 2 47	Spl Spn Run 1: 0.0'-2.0' 1.4' recovery. OVA: spoon and hole (0 ppm), head space (2 ppm). Collected archive sample. Augered from 2.0'-5.0'. Spl Spn Run 2: 5.0'-7.0' 1.8' recovery. OVA: spoon (5 ppm), hole (

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State		MASSACHUSETTS Locati	00			FOR	DEVENS		_
	Depth	Description	1thology	Sample No. and	Symbo 1	Blow	Remarks	Con	ell nst
	11-	10.0'-12.0': <u>SAND</u> (SP): tan, loose, very fine to coarse, with some silt and trace gravel, trace limonitic staining, 90% quartz, 10% mafic, <1%				3 4 5	Water at 8.5' BGS. Spl Spn Run 3: 10.0'-12.0'		1
	12-	mica.				9	1.9' recovery, OVA: spoon and hole (0		1
1	13-						ppm), head space (9. ppm). Collected archive		1
205-	14—						sample. Augered from		-
		15.0'~17.0': <u>SAND</u> (SP): saturated, loose, medium to coarse grained, 90% quartz, 10% mafic, angular			ı	1 2	12.0'-15.0'. Spl Spn Run 4:	1	1
	17—	to subrounded grains, with trace gravel.				5	15.0'-17.0' 1.7' recovery. OVA:		1
	18 —						spoon and hole (0 ppm), head space (2. ppm).		1
200-	19 —						Collected archive sample.		1
Luu	20 —	20.0'-22.0': <u>SAN</u> D (SP): saturated, loose, very				2	Augered from 17.0'-20.0'.		1
		fine to coarse grained, with trace silt and gravel, 90% quartz, 10% mafic.				4 7 13	Sp1 Spn Run 5: 20.0'-22.0' 1.8' recovery. OVA:		1
	22 —	•				15	spoon and hole (0 ppm), head space (4.)	5	1
	24—						ppm). Collected archive		1
195-	25 —						sample. Augered from		1
	26 —	25.0'-27.0': <u>SAN</u> D (SP): same as above, saturated, loose, with no gravel, <1% mica.				7 7 11	22.0'-25.0'. Sp1 Spn Run 6: 25.0'-27.0'		1
	27—					11	2.0' recovery, OVA: spoon and hole (0		1
	28 —		57	7			ppm), head space (2. ppm).	B	1
190-	29 —						Collected archive sample.		1
	30 —	30.0'-32.0': <u>SAND</u> (SP): same composition as above, gray, saturated, loose, fine to medium			F	7 5	Augered from 27.0'-30.0'. Spl Spn Run 7:		1
	31	grained, with some coarse sand, trace silt and gravel.				7 8	30.0'-32.0' 2.0' recovery. OVA:		1
	33	9.0461.	No. of the last					Mr. I	

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State		MASSACHUSETTS Location	n			FOR'	DEVENS		
	Depth	Description	1the logy	Sample No. and	Symbo1	810W Count	Remarks	We Con	
185-	34-						Collected archive sample. Augered from	1	
	35 — -	35.0'-37.0': SAND (SP): saturated, loose,				3 B	32.0'-35.0'. Spl Spn Run 8:		
	36 -	coarse, 75% quartz, 15% mafics, 10% feldspar, with some gravel and some fine to medium grained sand;				0	35.0'-37.0' 1.7' recovery. OVA:		
1	37	gravel composed of granitic and microcrystalline rocks.				12	apoon and hole (0		
	38 —						ppm), head space (3.8 ppm).		
180-	39 —						Collected archive sample.		
100	40 —	40.0'-42.0': <u>SAND</u> (SP): gray, saturated, loose,			T	7	Augered from 37.0'-40.0'.		
	41 —	medium grained, angular, trace fine sand and rounded gravel, 95% quartz, 5% mafics.				7 11	Sp1 Spn Run 9: 40.0'-42.0'		
	42 —				ī	7	1.7' recovery. OVA: spoon and noile (0		
	43 —						ppm), head space (6.2		
	44 —						Collected archive		
175-	45 —	45.0 '-47.0': No recovery.				4	Augered from	1	
	46 —	45.0 -47.0 . No recovery				3	Spl Spn Run 1C: 45.0'-47.0'		
	47 —					6	No recovery due to		
	48 —						flowing sands. OVA: spoon and hole (0		
	49 —						ppm). Augered from		
170-	50 —						47.0'~50.0'.		
	51 	50.0'-52.0': No recovery.				3 15	Spl Spn Run 11: 50.0'-52.0'	1	
	52-					35 17	No recovery due to flowing sands. The		
	53-						sample is being washe		
	54-						by water. OVA: spoon and hole (O ppm).		
165-							Augered from 52.0'-55.0'.		
	55 — -	55.0'-57.0': <u>SAND</u> (SP): fine to coarse grained, with angular to rounded grains of BO% quartz, and				3	Spl Spn Run 12: 55.0'-57.0'		
	56 —	20% mafics, trace silt and gravel.				5	1.2' recovery, OVA: spoon and hole (0	1	

State		MASSACHUSETTS Locati	on			FOR	<u> DEVENS</u>	
lev.	Depth	Description	Lithology	Sample No. and	Symbo1	Blow	Remarks	Wel Cors
160-	58 — 59 — 60 — 61 —						ppm), head space (0.5 ppm). Collected archive sample. The sand rose 10' int the casing and was then sampled. The bottom of the casing is at 55' BGS. Augered from 57.0'-63.0'.	
155-	63 — 64 — 65 — 66 — 67 —	63.0'-65.0': <u>SAND</u> (SP); gray, medium and coarse grained, with some fine sand/silt, some gravel, 80% quartz, 20% mafics.				32 15 10 22	Sp1 Spn Run 13: 63.0'-65.0' 1.1' recovery. OVA: spoon and hole (0 ppm), head space (4.5 ppm). Collected archive sample. Augered from	
150-	68 — 69 — 70 — 71 —						65.0'-73.0'.	
145-	72— 73— 74— 75— 76— 77— 78—	73.0'-75.0': <u>SAND</u> (SM): gray, saturated, firm, fine grained, with some rounded gravel and trace coarse sand, 80% quartz, 20% mafics.				32 26 18 18	Spl Spn Run 14: 73.0'-75.0' 1.0' recovery, OVA: spoon and hole (0 ppm), head space (6 ppm). Collected archive sample. (methane) Augered fro 75.0'-83.0'.	
140-	79 — 80 —							

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State		MASSACHUSETTS Locati	on Ain	9 P		FOR		Wel
Elev.	Depth	Description	Lithology	Sample No. and	Symbol	Blow	Remarks	Cons
	81 —							
	82-							
	83—	83.0'-85.0': <u>SAND</u> (SM): gray, saturated, medium				12	Spl Spn Run 15:	
135-	84—	grained, angular, with trace fine sand, 90% quartz, 10% mafics.				12 16	83.0'-85.0' 0.6' recovery. OVA:	В
130-	85 —	85.0'-115.0': <u>TILL</u> (SP): consists most probably				42	spoon and hole (0 ppm), head space (196	G
	86—	of tight till, containing both gravel and cobbles.					ppm). (methane)	
	87 —						Collected archive sample.	
	88 —						Some sand flowed back into casing,	
130-	89 —						approximately 1'. Unable to sample	
	90 —						beyond 85°.	
	91 —							
	92 —							
	93						1	
125-	94—							
	95 -						- 20	
	96—							
	97—							
	98-							
120-	99 —							
	101—							
	101—							
	103 —							
	-							

State		MASSACHUSETTS Locati				FOR'	DEVENS	
Elev.	Depth	Description	Lithology	Sample No. and	Symbo1	Blow	Remarks	Wel: Const
115-	105—							
	106-							E
	107—							Œ
	108—							E
	109—						Hit a large (9") cobble at 108' BGS.	E
110-	110-							E
	111-							E
	112-							E
	113—							Ē
	114—							E
105-	115				Ц			() =
	116—	115.0'-120.0': <u>QUARTZO-FELDSPATHIC GNEISS</u> : with quartz seams, few open 45 degree angle fractures,					Bedrock at 115' BGS. Natural sand pack at	
	117—	mostly mechanical breaks and healed fractures, contains mica.	\bigotimes				in. Unable to obtain a	
	118—		\otimes				Geotechnical or TOC	
	119—		\otimes				sample from within th screened interval	2
100-	120 —		\bigotimes				(105'-115') due to increased grain size	
	121-	120.0'-125.0': QUARTZO-FELDSPATHIC GNEISS: with mica, few open 45 degree angle fractures, mostly	\bigotimes				in that zone.	
	122-	fractures healed with quartz or are mechanical breaks.	\bigotimes				Core Run 1: 115.0'-120.0'	
	123-						2.9' recovery. Core loss from top of core.	
027	124-						Core Run 2: 120.0'-125.0'	
95-	125—	125.0'-129.6': QUARTZO-FELDSPATHIC GNEISS: same					4.6' recovery. Core Run 3:	
	126 —	as above.					125.0'-129.6' 1.7' recovery.	
X	127		\bigotimes				Core loss from bottom	

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State		MASSACHUSETTS	Location			FOR	DEVENS	
Elev.		Description	Lithe logy U	Sample No. and	Symbol Symbol		Remarks	Well Const
90-	128—						CONSTRUCTION SUMMARY Well: Hole dia.: 10", screen/casing dia.:	
							4", slot size: 0.010". Stickup measured from ground surface to top of inner casing.	
)	

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DKI	LLIP	NG LOG of WELL No.	SHL-2	3				Page 1	lof	
State		MASSACHUSETTS	Start	Date				7/16/91		
Locat	ion	FORT DEVENS	Comple	tion	Date	2		7/17/91		
Drill	ing Fir	m <u>E & E DRILLING</u>	Ground	Ele	vatio	n		240.37		
Туре	of Dril	1DIEDRICH D-50	Ground	wate	r Dep	th				
Drill	er	PAUL BARTH	а	t co	mplet	io	25.84 ¥			
			0	n 12	2/12/9	91		24.11₹		
Geolo	gist	LISA_HELTON	— Total	Dept	n of	Bor	ring	<u>35.0'</u>		
	15-1-1			λħ	a 2		ند	Lock #3217	Well	
Elev.	Depth	Description		ithology.	Sample No. and	Symbo1	Blow	Remarks	Const	
40.37		Ground Surface						Stickup = 1.77		
240-	1— 2— 3—	0.0'-2.0': <u>SILT</u> (MH): medium brown, dry, non-plastic, loose, fine grained; little light brown, medium brown, clasts.					4 6 8 18	Spl Spn Aun 1: 0.0'-2.0' 1.0' recovery. OVA: spoon. hole, and head space (0 ppm). Collected archive sample. Augered from 2.0'-5.0'.		
	4-			11 4 1	-	1 1			11	

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State		MASSACHUSETTS Locati				FOR	DEVENS	
Elev.	Depth	Description	Lithology	Sample No. and	Symbol	Blow	Remarks	Wel Cons
230-	11— 12— 13— 14—	10.0'-12.0': <u>SAND</u> (SP): same as above.				4 7 7 14	Sp1 Spn Run 3: 10.0'-12.0' 1.7' recovery. OVA: spoon, hole, and head space (0 ppm). Collected archive sample. Augered from 12.0'-15.0'.	
225-	15— 16— 17— 18— 19—	15.0'-17.0': <u>SAND</u> (SP): same as above, except medium to coarse grained, loose to medium compactness.				4 7 11 15	Spl Spn Run 4: 15.0'-17.0' 1.0' recovery. OVA: spoon, hole, and head space (0 ppm). Collected archive sample. Augered from 17.0'-20.0'.	
220-	20— 21— 22— 23— 24—	20.0'-22.0': <u>SAN</u> D (SW): same as above, except gravelly, moderate moisture.				9 12 14 20	Sp1 Spn Aun 5: 20.0'-22.0' 1.0' recovery. OVA: spoon, hole, and head space (0 ppm). Collected archive sample. Augered from 22.0'-25.0'.	
215-	25— 26— 27— 28— 29—	25.0'-27.0': SAND (SW): gray-brown, wet, coarse grained, medium compactness, organics, gravelly. 27.0'-30.0': SAND (SW): medium brown, wet, medium grained, some silt, non-plastic, gravelly.				10 17 17 20	Sp1 Spn Run 5: 25.0'-27.0' 1.2' recovery. OVA: spoon, hole, and head space (0 ppm). Collected archive sample. Augered from 27.0'-30.0'.	
210-	30 — 31 — 32 — 33 —	30.0'-35.0': <u>SAN</u> D (SW): medium brown, wet, medium grained, some silt, non-plastic, gravelly.					OVA: hole and head space (O ppm). Augered from 30.0'-35.0'. OVA: hole and head space (O ppm).	

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State	MASSACHUSETTS	Location			FOR	T DEVENS	
lev. Depth	Description	Lithology	Sample No. and	Symbol	Blow	Remarks	Wel: Const
34—						CONSTRUCTION SUMMARY Well: Hole dia.: 10", screen/casing dia.: 4", slot size: 0.010". Material Qty.: Filter Pk.: 600lbs. Bent. Pel.: 17.5 dr gallons, Cem.: 517 dry lbs., Cem./Bent.: 5%. Stickup measured from ground surface to top of inner casing.	,

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State		MASSACHUSETTS	_ Start	Date	9			7/19/91	
Locat	ion	FORT DEVENS	_ Comple	tion	Date			7/24/91	
Drill	ing Firm	E & E DRILLING	_ Ground	E16	evatio	n		237.68	
Туре	of Drill	ACKER 82	_ Ground	lwate	er Dep	th			
Drill	riller DON CAMPBELL		at completion					15.30 ¥	
		ROBERT A. MEYERS	o Total		2/ <u>12/</u> 9 th of				
lev.	Depth	Description		Lithology	Sample No. and	Symbo]	Blow	Lock #3217 Remarks	We 1
37.68		Ground Surface	th fine				5	Stickup = 1.92	
37.68	1 - 5	Ground Surface .0'-0.6': <u>SIL</u> J (MH): dark brown, dry, with and trace roots. .6'-2.0': <u>SAN</u> D (SP): tan, dry, fine to co		×			5 8 2 4	Stickup = 1.92 Spl Spn Run 1: 0.0'-2.0' 1.8' recovery. OVA: spoon, hole, and head	
37 . 68 - 235-	1 - 5	.0'-0.6': <u>SILT</u> (MH): dark brown, dry, with and trace roots.		\boxtimes			8	Spl Spn Run 1: 0.0'-2.0' 1.8' recovery. OVA: spoon. hole, and head space (0 ppm). Collected archive sample. Augered from	
	2 0 2 0 3 - 9 3 - 5 6 9	.0'-0.6': <u>SILT</u> (MH): dark brown, dry, with and and trace roots. .6'-2.0': <u>SAND</u> (SP): tan, dry, fine to co	parse	\boxtimes			8	Spl Spn Run 1: 0.0'-2.0' 1.8' recovery. OVA: spoon, hole, and head space (O ppm). Collected archive sample.	

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State		MASSACHUSETTS Locati				FOR	DEVENS	
Elev.	Depth	Description	Lithology	Sample No. and	Symbo 1	Blow Count	Remarks	We1: Const
225-	12-	10.0'-12.0': <u>SAND</u> (SP): dry, fine to coarse grained, subrounded to angular, with trace silt, 90% quartz, 10% mafics.				5 8 8 11	Sp1 Spn Run 3: 10.0'-12.0' 1.8' recovery. OVA: spoon, hole, and head space (0 ppm). Collected archive sample. Augered from 12.0'-15.0'.	
220-	15— 16— 17— 18— 19—	15.0'-17.0': <u>SAND</u> (SP): tan, wet at 15', medium grained, some fine, trace coarse sand and gravel, limonitic staining.				4 4 7 7	Spl Spn Run 4: 15.0'-17.0' 1.2' recovery. OVA: spoon, hole, and head space (0 ppm). Collected archive sample. Augered from 17.0'-20.0'.	
215-	21 — 22 — 23 — 24 —	20.0'-22.0': <u>SAND</u> (SP): same as above, saturated, no limpnitic staining, <1% mica.				4 7 14 11	Spl Spn Run 5: 20.0'-22.0' 1.9' recovery. OVA: spoon (0.5 ppm), hole and head space (0 ppm). Collected archive sample.	
210-	*25 —	25.0'-27.0': <u>SAND</u> (SP): tan, saturated, fine grained, trace coarse, angular to subangular, starting to flow, some silt, 95% quartz, 5% mafics.				4 4 8 13	Augered from 22.0'-25.0'. Sp1 Spn Run 6: 25.0'-27.0' 1.6' recovery. OVA: spoon, hole, and head Space (D ppm). Collected archive sample. Augered from 27.0'-30.0'.	
205-	30 — 31 — 32 — 33 —	30.0'-32.0': <u>SAND</u> (SP): same as above, trace coarse grained sand, no medium grained, flowing.				6 11 11 12	Sp1 Spn Aun 7: 30.0'-32.0' 1.5' recovery. OVA: spoon, hole, and head space (0 ppm). Collected archive	

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State		MASSACHUSETTS Local			11	FOR:	DEVENS	
Elev.	Depth	Description	Lithology	Sample No. and	Symbol Symbol	810W Count	Remarks	We I
	34 —						Augered from 32.0'-35.0'.	
-	- 35	35.0'-37.0': SILT (MH): tan, saturated, trace	111			0	Sp1 Spn Run 8:	1
	36—	very fine sand, flowing, no inclusions.	Ш			0	35.0'-37.0'	
	-		1111			0	1.8' recovery. OVA: spoon, hole, and head	
المناوع	37—		1111			•	space (O ppm).	M
200-	38-		11		П		Collected archive	
	20		1		П		sample. Augered from	V
	39 —						37.0'-40.0'.	1
	40 —	40.0'-42.0': <u>SIL</u> T (MH): same as above.				0	Spl Spn Run 9:	
	41-	40.0 42.01 DIE (PHY). Some SS SSSS.	1111			0	40.0'-42.0'	1
	- 4		111			10	2.0' recovery. OVA: spoon, hole, and head	
Co. Co.	42 —			l i	П	10	space (0 ppm).	
195-	43-				П		Collected archive	N
	-		1111		П		sample. Augered from	
	44-				П		42.0'-45.0'.	1
-	45	45.0'-47.0': <u>SAND</u> (SP): tan, saturated, very	- 111			0	Spl Spn Run 10:	1
	46 —	fine to fine grained, angular, flowing, 99%			I V	10	45.0'-47.0'	1
	-	quartz, 1% mafic.			П	14 15	1.2' recovery. OVA: spoon, hole, and head	
	47—				Ш	10	space (O ppm).	
190-	48-				П		Collected archive	
	45				П		sample. Augered from	
	49				П		47.0'-53.0'.	1
	50 —		100		П			
	51-							
				- 1				
	52-		2.5					
185-	53-						2002.5.200.50	
	-	53.0'-55.0': No recovery due to flowing sands, saturated.				9	Sp1 Spn Run 11: 53.0'-55.0'	
	54-	333				24	No recovery due to	1
	55 —					21	fine flowing sands. DVA: spoon, hole, and	
	56 —		953				head space (0 ppm).	1
	30	*					Augered from 55.0'-63.0'.	

Ecology and Environment, Inc.

USATHAMA, ARMY CORPS OF ENGINEERS

State		MASSACHUSETTS Location				FOR'	DEVENS	
lev.	Depth	Description	Lithology	Sample No. and	Symbo 1	Blow	Remarks (Well Const
180-	58— 59— 60— 61—							
175-	62 — 63 — 64 — 65 — 66 — 67 —	53.0'-65.0': <u>SAND</u> (SP): tan, saturated, very fine to fine grained, flowing, with some silt, 95% quartz, 4% mafic, 1% mics, limonitic staining.				13 21 19 19	Sp1 Spn Run 12: 63.0'-65.0' 0.9' recovery. OVA: spoon, hole, and head space (0 ppm). Collected archive sample. Augered from	
170-	68 — 69 — 70 — 71 — 72 —	-					65.0'-73.0'.	
100-	73— 74— 75— 76— 77—	73.0'-75.0': <u>SAND</u> (SP): tan, saturated, very fine to fine grained, flowing, with trace silt, limonitic staining.				14 11 14 21	Sp1 Spn Run 13: 73.0'-75.0' 1.3' recovery. OVA: spoon, hole, and head space (0 ppm). Collected archive sample. Augered from	
160-	78 — 79 — 80 —						75.0'-83.0'.	

Part of the second						
DDTLL	TAIO	100	- 1	VACE I	110	SHI -24
	1 1 1 1 -	I I II a	O t	WHI	MU	5-11 - 24

Page 5 of 7

State		MASSACHUSETTS Locat				FUR	DEVENS	
Elev.	Depth	Description	Lithology	Sample No. and	Symbo1	Blow Count	Remarks	Wel: Const
155-	81— 82— 83— 84— 85—	83.0'-85.0': <u>SAND</u> (SP): gray to tan, saturated, very fine to fine grained, limonitic staining.				13 13 13 22	Spl Spn Run 14: 83.0'-85.0' 0.9' recovery. OVA: spoon, hole, and head	
150-	86 — 87 — 88 — 89 — 90 —						space (O ppm). Collected archive sample. Augered from 85.0'-93.0'.	
145-	91— 92— 93— 94—	93.0'-95.0': <u>SIL</u> T (MH): gray to tan, saturated, with some very fine to fine grained sand.			•	16 16 19	Spl Spn run 15: 93.0'—95.0' 0.6' recovery. OVA:	
140-	95— 96— 97— 98— 99— 100—					24	spoon, hole, and head space (0 ppm). Collected archive sample. No Geotechnical or TO samples taken from 95'-114.5' (bedrock) due to split spoon refusal.	
135-	101-							

USATHAMA, ARMY CORPS OF ENGINEERS

Ecology and Environment, Inc.

State		MASSACHUSETTS Lo	cation			FOR'	DEVENS	
lev.	Depth	Description	Lithology	Semple No. and	Symbo1	Blow	Remarks	Wel Cons
130-	105— 106— 107— 108— 109—							
125-	111— 112— 113— 114—							
120-	115 114.6 116 break	'-114.65': <u>GRANITIC COBBL</u> E 5'-119.5': <u>PHYLLIT</u> E: gray, with mechanica s.	al .				Core Aun 1: 114.5'-119.5' 3.5' recovery. OYA: hole (O ppm). Monitoring well did not actually penetrat into the bedrock.	3
115-	121 slick	'-124.5': <u>PHYLLIT</u> E: same as above, with a e vertical fracture from 123.8'-124.5'; ensides along vertical fracture.					Core Run 2: 119.5'-124.5' 4.6' recovery.	
	124 - 124.5	'-129.5': <u>PHYLLIT</u> E: same as above, no cal fractures.					Core Run 3: 124.5'-129.5' 1.3' recovery. Bottom of core left in the hole.	

DRILLING LOG of WELL NO. SHL-24

Page 7 of 7

	MASSACHUSETTS	LUC	ition		-	FUR	DEVENS	
Depth	Description		Lithology	Sample No. and	Symbol Symbol	Blow	Remarks	Wel: Const
128—							CONSTRUCTION SUMMARY Well: Hole dia.: 10",	
							screen/casing dia.: 4", slot size: 0.010'. Stickup measured from ground surface to top of inner casing.	
							3	
				3				
		Depth Description	128—	Depth Description Property 128—	128—	128	128—	128— 129— CONSTRUCTION SUMMARY Well: Hole dia.: 10", screen/casing dia.: 4", slot size: 0.010'. Stickup measured from ground surface to top

USATHAMA, ARMY CORPS OF ENGINEERS

Ecology and Environment, Inc.

NHI	LLIN	NG LOG of WELL No. S	HL-25)				Page	1 of :
State		MASSACHUSETTS	_ Start D	ate				7/17/91	
Locat	ion	FORT DEVENS	Complet	ion	Date	1		7/18/91	
Drill	ing Fir	m <u>E & E DRILLING</u>	_ Ground I	Ele	vatio	n		257.10	
Туре	of Dril	1DIEDRICH D-50	Groundw	ate	r Dep	th		24.00 ¥	
Drill	er	PAUL BARTH	at	СО	mplet	1or	1		
Geolo	gist	WALTER KNOTTS	on 12/ <u>12/</u> 91 Total Depth of Boring				22.79¥ 35.0'		
				>				Lock #3217	
Elev.	Depth	Description		Lithology	Sample No. and	Symbo]	Blow	Remarks	Well Const
57.10		Ground Surface	damo .i	E, f.			6	Stickup = 1.77	
	-	0.0'-12.0': SAND (SP): light medium brown,	damp.				6	Spl Spn Run 1: 0.0'-2.0'	1 1
255-	3-4-5-	medium dense, fine to coarse grained, quar trace feldspar and mica, occasional igneou metamorphic rock fragments.	tzose,				7 7 8	1.6' recovery. OVA: spoon and hole (O ppm). Collected archive sample. Augered from 2.0'-5.0'.	

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DRILLING LOG of WELL NO. SHL-25

Page 2 of 3

State		MASSACHUSETTS Locati				FOR	DEVENS	1
Elev.	Depth	Description	Lithology	Sample No. and	Symbol Symbol	Blow	Remarks	Wel:
245-	11 — 12 — 13 — 14 —	12.0'-29.0': SAND (SP): medium brown, moist, medium dense, very fine to fine, little silt, trace clay, quartzose, subangular to subrounded, trace mica.				5 8 9 10	Spl Spn Run 3: 10.0'-12.0' 1.7' recovery. OVA; spoon and hole (0 ppm). Collected archive sample. Augered from 12.0'-15.0'.	
240-	15 — 16 — 17 — 18 — 19 —					6 10 9 7	Spl Spn Run 4: 15.0'-17.0' 1.7' recovery. OVA: spoon and hole (0 ppm). Collected archive sample. Augered from 17.0'-20.0'.	45.04
235-	20 — 21 — 22 — 23 — 24 —					5 7 9 14	Sp1 Spn Run 5: 20.0'-22.0' 1.6' recovery. OVA: 6poon and hole (O ppm). Collected archive sample. Augered from 22.0'-25.0'.	
230-	25 — 26 — 27 — 28 — 29 —	29.0'-35.0': SAND AND SILTY CLAY (SP): medium brown, wet, dense, trace rock fragments - possibly				4 7 7 14	Sp1 Spn Run 6: 25.0'-27.0' 1.8' recovery. OVA: spoon and hole (0 ppm). Collected archive sample. Augered from 27.0'-34.5' OVA: hole (0 ppm).	
225-	30 — 31 — 32 — 33 —	till.					CONSTRUCTION SUMMARY Well: Hole dia.: 10", screen/casing dia.: 4", slot size: 0.010". Material Qty.: Filter Pk.: 400lbs	III E

Ecology and Environment, Inc.

	DEVENS	FOR			on	Locati	MASSACHUSETTS		State
Wel Cons	Remarks	Blow	Symbo1	Sample No. and	Lithology		Description	Depth	Elev.
	Bent. Pel.: 10 dry gallons,							34	
	Cem.: 329 dry 1bs., Cem./Bent.: 5%. Stickup measured from ground surface to top of inner casing.							- 35	
							X.		
				÷.					

	LING	LOG of BORING N	10. SUIL-	-1/			Page 1 of 1	
State		MASSACHUSETTS	Start Dat	e		-	8/29/91	
Locatio	on _	FORT DEVENS	Completio	n Da	te	_	8/29/91	
Drilli	ng Firm _	E & E DRILLING	Ground El	evat	10N	_		
Type o	f Drill _	DIEDRICH D-50	Total Dep	th o	f Borin	g _	10,0'	
Drille	r _	PAUL BARTH						
Geolog:	ist _	AMIN AYUBCHA	_					
Elev.	Depth	Description		Lithology	Sample No. and Symbol	Blov	Remarks	
	2 3 4 5 5.0	e grained, 60-80% quartz, 30% ferro e medium size boulders of quartz an '-10.0': <u>SAND</u> (SM): same as above, rser, with larger size boulders.	nd igneous rock.				Auger Aun 2: 5.0'-10.0'	
	7 — 8 — 9 —						Hand auger used at 10'	

	LIN	G LOG of BORING No.	SOIL-	18			Page 1 of	
State		MASSACHUSETTS	Start Date	i .		_	8/28/91	
Locatio	on	FORT_DEVENS	Completion	Dat	e	_	8/28/91	
Drilli	ng Firm	E & E DRILLING	Ground Ele	vati	.on		10.0'	
Type o	f Drill	DIEDRICH D-50	Total Dept	h of	Boring	9 _		
Drille	,	PAUL BARTH						
Geolog:	ist	AMIN AYUBCHA						
Elev.	Depth	Description		ithology	Sample No. and Symbol	Blow	Remarks	
	2-3	0.0'-1.5': TOPSOIL (MH): gray, sandy, some gravel with roots and vegetation. 1.5'-8.0': SAND/GRAVEL (SW): gray sand and dry, angular to subangular, 30-40% quartz, silt, some silt in the matrix, 2.4" cobblet and metamorphosed rocks.	gravel, 20-30%	\bigotimes			Auger Run 1: 0.0'-5.0'	
	9-	3.0'-10.0': <u>SAND</u> (SP): gray to dark brown, moist, medium to coarse grained, 20-40% qu silt in matrix, rare boulder, more ferro-m	artz, some				Sample was collected from fly auger at 10'. The hole caved in as th auger was pulled out.	

State		MASSACHUSETTS	Start Dat	te				8/29/91	
_ocati	00	FORT DEVENS			te			8/29/91	
		E & E DRILLING	Ground El						
				es, , 9/5			-	40.0'	
Type o	f Dri	11DIEDRICH D-50	Total Dep	. 10tal Depth of Burning		-	10.0		
Orille Geolog		PAUL_BARTHAMIN_AYUBCHA	_						
Elev.	Depth	Description		ithology	Sample No. and	Symbo1	Blov	Remarks	
	28			Li.	San No.	Syl	<u>=</u> 8		
		Ground Surface _0.0'-1.0': <u>TOPSOIL</u> (SM): dark gray, sand vegetation.	iy, roots.	X				Auger Aun 1: 0.0'-5.0'	
	4-	quartz and 10-15% organics in top 2'.							
	5-	5.0'-10.0': <u>SAND</u> (SP); same as above expravel, more homogeneous grain size with combles.						Auger Run 2: 5.0'-10.0' Hand auger used at 10'	

01111	LLI	NG LOG of BORING No	o. SOIL-	-20)			Page 1 of 1
State		MASSACHUSETTS	Start Date	е			_	8/29/91
Locati	.on	FORT DEVENS	Completion	n Da	te		_	8/29/91
Drilli	ng Fi	E & E DRILLING	Ground Ele	evat	ion		_	
Type o	f Dri	DIEDRICH D-50	Total Dep	_ Total Depth of Boring		_	10.0'	
Drille	ır	PAUL BARTH						
Geolog	ist	AMIN AYUBCHA	_					
Elev.	Depth	Description		ithology	Sample No. and	Symbol .	Blov	Remarks
		Ground Surface _0.0'-0.5': TOPSOIL (MH): yellowish-brow		7		T		Auger Aun 1: 0.0'-5.0'
	3- 4- 5-	_0.5'-5.0': <u>SILT/SILTY SAN</u> D (SM): yellow_fine to very fine sand and silt, 40-45% _pf micas, 5-15% clay in matrix. Dry, no_ferro-magnesians, some iron staining, r	K quartz, trace on-cohesive, <2% rare boulders. as above,				٠	Auger Run 2: 5.0'-10.0'
	. 7- 8- 9-	in ferro-magnesians.						Hand auger used at 10'

DRILLING LOG

(The proponent of this form is HSHB-ES)

PROJECT -	FT Devens	DATE -13	July 1988
LOCATION	Cold Spring Brook		thson, Rodriguez
	ion Debris Landfill	Jacobwith,	
DRILL RIG	Mobile B-53 with 6-inch	BORE HOLE	CBW-1
DIVIEL NIO	Hollow Stem Auger	DONE HOLL	

	SAMP LE TYPE		
(Feet) DEPTH	BLOWS PER 6 IN	DESCRIPTION	REMARKS
0		Sand, medium to fine grained, silt and gravel, tan (fill material)	, Dry
-			
		Silt and sand, fine grained, siltstone, dark gray	Very difficult drilling
5			
-		Sand, coarse to fine grained, trace of gravel, gray at top, tan below 8 feet	eSaturated
-			
10 ——			
-			
\ -	7		
-			
15		Bottom of Hole-	

AEHA Form 130, 1 Nev 82

DRILLING LOG (The proponent of this form is HSHB-ES)

PROJECT -	FT Devens	DATE -	13 July 1988
LOCATION	Cold Spring Brook	DRILLERS Smit	thson, Rodriguez
Construct	ion Debris Landfill	Jacobwith,	Fox
DRILL RIG	Mobile B-53 with 6-inch	BORE HOLE -	CBW- 2
D	Hollow Stem Auger	DOIL HOLL	

SAMPLE TYPE BLOWS DEPTH PER 6 IN	DESCRIPTION	REMARKS
0	Sand, coarse to fine grained, with trace of gravel, tan	Dry
5 —	-A	
10		

AEHA Form 130, 1 Nev 82

DRILLING LOG

(The proponent of this form is HSHB-ES)

PROJECT	FT Devens	– DATE –	13 July 1988	
LOCATION Cold Spring Brook		- DRILLERS	Smithson, Rodriguez	
Construct	ion Debris Landfill	Jacobwith,	Fox	
DRILL RIG	Mobile B-53 with 6-inch	BORE HOLE	CBW-2	
	Hollow Stem Auger	20.12 11022		

	SAMP LE TYPE		
(Feet) DEPTH	BLOWS PER 6 IN	DESCRIPTION	REMARKS
15		Same as above	Damp
-	,		
_			
-	-		
_			
20		Sand, coarse to medium grained,	Saturated
-		and fine gravel, medium brown to tan. Gravel material is a gray sandstone and siltstone.	
_			Maria de la composición dela composición de la composición de la composición dela composición dela composición dela composición de la composición dela composición de la composición del composición dela composición del composición
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AEHA Form 130, 1 Nev 82

DRILLING LOG (The proponent of this form is HSHB-ES)

PROJECT -	FT Devens	DATE -	13 July 1988	
LOCATION	Cold Spring Brook	DRILLERS	Smithson, Rodrigue	
	on Debris Landfill	Jacobwith, Fox		•
DRILL RIG	Mobile B-53 with 6-inch	BORE HOLE	CBW-2	
DUILT VIG	Hollow Stem Auger	DONE HOLE	-	

(Feet)	SAMPLE TYPE BLOWS PER 6 IN	T	
(Feet) DEPTH	PER 6 IN	DESCRIPTION	REMARKS
30		Same as above	
_			
		1	
-	1		
_	-		
35			
-		- 1	
_			
-			
		.س	
40			
_		Sand, medium to fine grained tan	
-		**	
-	1		
_			
45			

AEHA Form 130, 1 Nev 82

DRILLING LOG (The proponent of this form is HSHB-ES)

PROJECT	FT Devens	DATE -	13 July 1988
LOCATION Cold Spring Brook		DRILLERS	Smithson, Rodriguez
Constru	ction Debris Landfill	Jacobwit	h, Fox
DRILL RIG	Mobile B-53 with 6-inch Hollow Stem Auger	BORE HOLE	CBW-2

(feet) DEPTH	SAMPLE TYPE BLOWS PER 6 IN	DESCRIPTION	REMARKS
45		Same as above	
_			
-	1		
-	1		
50			-2 feet of sand inside
			auger, drilling slower
-			
	i		
-	1		
55		Bottom of Hole-	
-			
_			
4		,	

AEHA Form 130, 1 Nev 82

DRILLING LOG (The proponent of this form is HSHB-ES)

PROJECT -	FT Devens	DATE 13	July 1988	.988	
LOCATION	Cold Spring Brook	DRILLERS	Smithson,	Rodriguez	
Construction Debris Landfill		Jacobwith, Fox		•	
DRILL RIG	Mobile Drill B-53 with	BORE HOLE CBW-3			
DKIFF VIO	6-inch Hollow Stem Auger	DUNL HULL			

SAMP LE TYPE					
(feet) BLOWS DEPTH PER 6 IN	DESCRIPTION		REMARKS		
0 _		Sand, medium to coarse grained, gravel, and cobbles, medium brown to tan	Dry		· ·
_		Sand medium to coarse grained, and gravel, medium brown to tan			
-					
5					
-					
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-					
10			¥		
_					¥.
_					
-					
-					
15					

- AEHA Form 130, 1 Nev 82

DRILLING LOG (The proponent of this form is HSHB-ES)

PROJECT -	FT Devens DATE 13 July 1988		
LOCATION	Cold Spring Brook on Debris Landfill	DRILLERS Smithson, Rodrigue Jacobwith, Fox	ez
DRILL RIG	Mobile Drill B-53 with	BORE HOLE CBW-3	
DIVIEL KIO	6-inch Hollow Stem Auger	DONE HOLL	

(Feet) DEPTH	SAMPLE TYPE BLOWS PER 6 IN	DESCRIPTION	REMARKS
15		Same as above	
-	1		High percentage of grave difficult drilling
-			difficult diffing
-			
20			
-			
-			
_	+	Sand, coarse to medium grained,	Saturated
		tan	
25			
-		71	
-			
_			
_			
30		Bottom of Hole	

AEHA Form 130, 1 Nev 82

DRILLING LOG (The proponent of this form is HSHB-ES)

PROJECT .	FT Devens	DATE -15	July 1988	
LOCATION	Cold Spring Brook	DRILLERS	Smithson, Rodriguez	
	ion Debris Landfill	Jacobwith,	Fox	
DRILL RIG	General Hole Digger -Model	70BORE HOLE	CBW-4	
DIVIET MIC	(2 man auger) with 4 inch	DOIL HOLL		

	SAMP LE TYPE			
(Feet) DEPTH	BLOWS PER 6 IN	DESCRIPTION	REMARKS	
)		Peat and silt, dark brown	Dry	
_				
-		Silt and clay with some organic matter, dark gray	Moist	
-		matter, dark gray		
14				
5			Saturated	
-				
_				
-	1	Bottom of Hole	-	
10 —	-		4	
-			7	
-				
-				
V2-		17.91		
15				

AEHA Form 130, 1-Nev 82

Replaces HSHB Form 78, I Jun 80. which will be used.

DRILLING LOG

(The proponent of this form is HSHB-ES)

MECT	FT Devens	DATE -14	July 1988
ATION	Cold Spring Brook	DRILLERS	Smithson, Rodriguez
Care .	on Debris Landfill	Jacobwith,	Fox
ILL RIG	General Hole Digger -Model (2 man auger) with 4 inch	⁷⁰ BORE HOLE	CBW-6
	solid stem auger		

	SAMP LE TYPE		
(Feet) DEPTH	BLOWS PER 6 IN	DESCRIPTION .	REMARKS
0-		Organic silt and sand, dark brown	
		Sand, medium to very fine grained, tan	
-		V - V - 1	
-			Saturated
5			
-			
-			
-			0.4
-		Bottom of Hole-	
10 ——			
-			
-		*	
: 3 -2			

AEHA Form 130, 1-Nov 82

Replaces HSH8 Form 78,1 Jun 80, which will be used.

DRILLING LOG (The proponent of this form is HSHB-ES)

PROJECT	FT Devens	DATE -1	4 July 1988
LOCATION Cold Spring Brook		— DRILLERS — Smithson, Ro	
Construction Debris Landfill		Jacobwith, Fox	
DRILL RIG	Mobile Drill B-53 with	BORE HOLE	CBW-7
DILLE ILLO	6-inch Hollow Stem Auger	DOILE HOLL	

SAMPLE TYPE (Feet) BLOWS DEPTH PER 6 I	SAMP LE TYPE			
	BLOWS PER 6 IN	DESCRIPTION	REMARKS	
0		Organic silt and sand, dark brown	Dry	
_		Sand, medium to very fine grained, with silt, trace of gravel, tan	Dry	
_	-			
-				
5 —				
-	1			
-				
-	-			
-			Maria Art	
10	-		Moist	
_				
_				
-			TIV 6 W.Y	
_				
15				

AEHA Form 130, 1 Nev 82

Replaces HSHB Form 78, I Jun 80, which will be used.

DRILLING LOG
(The proponent of this form is HSHB-ES)

PROJECT	FT Devens	DATE	
LOCATION	Cold Spring Brook	DRILLERS	Smithson, Rodriguez
Construction Debris Landfill		Jacobwith, Fox	
DRILL RIG	Mobile Drill B-53 with	BORE HOLE	CBW-7
DKILL KIG	6-inch Hollow Stem Auger	DOIL HOLL	

	SAMP LE TYPE		
(Feet) DEPTH	BLOWS PER 6 IN	DESCRIPTION	REMARKS
15		Same as above	
-			
_			
-			-Saturated
20			
_			
_		2	
_			
_			
25	-	Bottom of Hole	-
_			
-			
_			
_			
30			

AEHA Form 130, 1 Nev 82

Replaces HSHB Form 78, I Jun 80, which wil; be used.

DRILLING LOG (The proponent of this form is HSHB-ES)

PROJECT .	FT Devens	DATE -	16 July 1988	
LOCATION	Cold Spring Brook	DRILLERS	Smithson, Rodriguez	
Construct	ion Debris Landfill	Jacobwith, Fox		
DRILL RIG	Mobile Drill B-53 with 6-inch Hollow Stem Auger	BORE HOLE	CBW-8	

	SAMP LE TYPE		4
(Feet) DEPTH	BLOWS PER 6 IN	DESCRIPTION	REMARKS
0		Sand, medium to fine grained, and fine to coarse gravel, medium brown	Dry
-			
s —			
-			
• =		Sand, coarse to fine grained, with fine gravel (gray) tan	Damp
10			
-			
-		Sand, medium to fine grained, silt and coarse gravel, medium brown	Moist
 15		Sand, medium to very fine grained and silt, medium brown	Saturated

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Replaces HSHB Form 78, I Jun 80, which will be used.

DRILLING LOG (The proponent of this form is HSHB-ES)

PROJECT .	FT Devens	$-$ DATE $-\frac{16}{}$	July 1988	
LOCATION	Cold Spring Brook	— DRILLERS	Smithson, Rodriguez	
Construction Debris Landfill		Jacobwith,	Fox	
DRILL RIG	Mobile Drill B-53	BORE HOLE	CBW-8	
DIVIER IVIO		DOIL HOLL		

	SAMP LE TYPE		0
(Feet) BLOWS DEPTH PER 6 IN	DESCRIPTION	REMARKS	
15		Same as above	
-			
-			
_	1		
T.			
20			n A
_			
_	-		M .
-			ř.
_			kiji
25		Bottom of Hole	
-			
10			
-			160
_			

AEHA Form 130, 1 Nev 82

RI Report: Fort Devens Section No.: Appendix B

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Date: June 1992

APPENDIX B

SLUG TESTS

RI Report: Fort Devens Section No: Appendix B

Revision No:

Date:

June 1992

PREFACE

The material contained in this appendix includes the complete text of the "Aquifer Hydraulic Characterization" report being submitted to USATHAMA under separate cover. This report was written using information gathered during both SI and RI activities at Fort Devens.

AQUIFER
HYDRAULIC CHARACTERIZATION
(SLUG TESTING)
FORT DEVENS
AYER, MASSACHUSETTS

Delivery Order No. 0001 ELIN A004 December 1991

Prepared for:

Commander

United States Army Toxic and Hazardous Materials Agency Aberdeen Proving Ground, MD 21010-5400

Prepared by:
Ecology and Environment, Inc.
Arlington, VA 22209

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1. INTRODUCTION

The United States Army Toxic and Hazardous Materials Agency (USATHAMA) retained Ecology and Environment, Inc. (E & E) to conduct Remedial Investigations (RIs) at four Areas of Contamination (AOCs) within two landfills, and Site Investigations (SIs) at six Study Areas (SAs) at Fort Devens, in Ayer, Massachusetts.

As part of the RI/SI activities at the Fort Devens site, E & E conducted hydraulic conductivity tests in all existing wells and in the new wells installed by subcontractors under E & E's supervision during the summer of 1991. This report documents the results of the slug tests conducted for monitoring wells at Shepley's Hill Landfill, Cold Spring Brook Landfill, Explosive Ordnance Demolition (EOD) ranges, and Building No. 202. Section 2 of this report describes the objectives of the tests, while Sections 3 and 4 detail the field methodology and data reduction and interpretation methodologies. The results of the tests are summarized in Section 5, the retesting program is discussed in Section 6, and conclusions and recommendations are presented in Section 7. The data that resulted from the slug tests are reproduced in Appendix A. The retesting program data sheets are reproduced in Appendix B.

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2. OBJECTIVES

E & E conducted hydraulic conductivity (slug) tests in the majority of existing wells and in all the new wells at Fort Devens. The main objectives of these tests were as follows:

- o To determine the hydraulic conductivity of the water-bearing geological formations near and around the installed monitoring wells. The hydraulic conductivity of a formation will indicate the capacity for water conductance in each geological unit that is tested.
- o To characterize and calculate the transmissivity of the waterbearing formations near and/or around the monitoring well screens. The transmissivity of an aquifer is the capacity of the aquifer to transmit water through a unit cross-sectional area of the formation.
- o To help determine the rate of groundwater flow.
- o To help evaluate mass loading of the contaminant from the groundwater to the surface water bodies.
- o To help estimate the transport rate of contaminants within the groundwater and from the groundwater to surface bodies such as Plow Shop Pond, Cold Spring Brook Pond, and adjacent streams.

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3. FIELD METHODOLOGY

As originally planned, a total of 42 monitoring wells, including 17 new wells and 25 existing wells, were to be tested at the Fort Devens site. However, only 34 wells could be tested. Of the wells not tested, five (SHL-3, SHL-4, POL-2, EOD-2, EOD-3) did not have sufficient water, one was dry (SHL-1), one abandoned (SHL-2), and one permanently damaged (CSB-5). Table 3-1 summarizes the slug test data, providing information on those monitoring wells tested and the equipment used for the tests.

E & E conducted slug tests at the Fort Devens site using the Hermit 2000 electronic data logger and 10 and/or 20 pounds per square inch (PSI) transducers. To confirm the data in wells with technical difficulties of slug size and/or well condition, data were also collected using an electronic water level indicator. The field methodology used for conducting the slug test at the Fort Devens site is described below.

Slugs of various sizes (2 feet and 5 feet in length with 1.25-inch, 1.50-inch, and 3.75-inch outside diameters (OD)) were made from new PVC casing. The PVC slugs were filled with clean sand (commercial sand used for the well construction) and sealed at both ends.

E & E conducted both rising and falling head slug tests at each well. Both tests involved water displacement using various slug sizes. As the slug was lowered rapidly into a monitoring well, the water level rose in response. The water level then decreased as the well returned to equilibrium with the outside water level. The changes in the water level (with respect to time) were measured and recorded by the transducer and data logger. After the well had returned to its initial condition, the slug was rapidly removed causing an immediate drop in the water level. Measurements were again recorded as the water level returned to its original condition. E & E performed this procedure for each monitoring well tested.

OVA readings were taken before starting each test to determine if volatile organics from the well opening were possible health hazards. The total depth and depth to the water table were measured and recorded, and other data, pertinent to the tested well, were recorded on the slug test data sheet. Total depth and depth to the water were measured using a weighted tape and an audible electronic water level meter. These measurements were used to determine the length of the water column and to determine the appropriate slug length. A minimum of 3 to 4 feet of water was needed to run the slug test with a 2-foot slug.

With the Hermit 2000, two or more monitoring wells could be tested simultaneously. However, due to a generally fast well recovery, E & E tested all the wells individually, with the exception of monitoring

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Table 3-1 SLUG TEST DATA

Well Number	Total Depth/TOC (TD in ft)	Water Depth/TOC (ft)	Casing Indisde Diameter (ID)	Slug Length and OD	Instrument Used/Date Remarks
SHL-1	Dry	14	2"		Well was dry
SHL-2	Abandoned	-	2"	- <u>-</u>	Abandoned
SHL-3	33.7	30.80	2"	-	Insufficient water
SHL-4	13.7	11.30	2"	=	Insufficient water
SHL-5	13.54	5.73	2"	5'/1.25"	Hermit 2000/7-11-91
SHL-6	56.00	27.48	2 "	5'/1.25"	Hermit 7-12-91
SHL-7	23.30	18.80	2 "	2'/1.25"	Hermit 7-12-91
SHL-8S	56.00	10.29	2 "	5'/1.25"	Hermit 7-14-91
SHL-8D	73.1	8.44	2 "	5'/1.25"	Hermit 7-11-91
SHL-9	26.30	10.35	2 "	5'/1.25"	Hermit 7-11-91
SHL-10	36.63	32.08	2"	2'/1.25"	Hermit 7-13-91
SHL-11	28.5	19.4	2 "	5'/1.25"	Hermit 7-11-91
SHL-12	28.7	23.3	2"	2'/1.25"	Hermit 7-12-91
SHL-13	21.27	8.13	2"	5'/1.25"	Hermit 7-11-91
SHL-14	Bedrock	-	11 - 1,		Not Constructed
SHL-15	26.58	19.44	4"	5'/1.5"	Hermit 7-14-91
SHL-16	Bedrock	-	-	-	Not Constructed
SHL-17	18.6	8.48	4."	5'/1.5"	Hermit 7-11-91
SHL-18	28.54	20.1	4 "	5'/1.5"	Hermit 7-12-91
SHL-19	32.53	23.76	4"	5'/1.5"	Hermit 7-12-91
SHL-20	50.34	19.34	4"	5'/1.5"	Hermit 7-14-91
SHL-21	54.42	46.08	4"	5'/1.5"	Hermit
SHL-22	114.70	6.66	4"	5'/1.5"	Hermit Wtr Level Meter 8/7/91
SHL-23	33.2	27.40	4"	5'/1.5"	Hermit
SHL-24	119.00	15.86	4"	5'/1.5"	Hermit Wtr Level Meter 8-7-91
SHL-25	35.00	27.2	4"	5'/1.50"	Hermit Wtr Level Meter 8-7-91
POL-1	27.89	19.88	2"	5'/1.25"	Hermit 7-12-91
POL-2	30.55	28.75	2"	V. 19. 19.00	Insufficient Water
POL-3	31.98	26.82	2"	2'/1.25"	Hermit 7-12-91
B202-1	35.4	28.30	4"	5'/1.5"	Hermit 7-11-91
B202-2	40.24	31.86	4"	5'/1.5"	Hermit 7-12-91
B202-3	39.58	31.11	4"	5'/1.5"	Hermit 7-12-91
CSB-1	15.26	8.3	2"	5'/1.25"	Hermit 7-13-91
CSB-2	52.02	18.20	2"	5'/1.25"	Hermit 7-13-91
CSB-3	31.78	25.08	2"	5'/1.25"	Hermit 7-13-91
CSB-4	10.22	6.45	2"	2'/1.25"	Hermit 7-13-91
CSB-5	7	7.5		f Service,	Permanetly Damaged
CSB-6	9.62	5.10	2"	2'/1.25"	Hermit 7-13-91
CSB-7	24.56	16.71	2"	2'/1.25"	Hermit 7-13-91
CSB-8	25.02	18.34	2"	5'/1.25"	Hermit 7-13-91
EOD-1	27.24	20.92	4"	5'/1.5"	Hermit
EOD-2	27.14	25.96	4"	-	Insufficient Water
EOD-3	30.72	29.24	4"		Insufficient Water
EOD-4	37.06	31.80	4"	2'/1.25	Hermit

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wells SHL-8S and SHL-8D, which were constructed at different levels inside the same borehole. Prior to running any test, the scale factor, linearity, offset, and other transducer and test parameters were set on the data logger in accordance with the specifications provided by the data logger operations manual and transducer being used. E & E used Input 1, with a specific transducer, to test single wells. If an additional well was tested simultaneously, E & E used Input 2 and set corresponding parameters and transducers as Input 2. Once all the parameters are set, they do not need to be reset between tests. After the data logger is initially set, it is ready to record the data.

E & E rinsed all tapes, transducers, slugs and meters with distilled water before and after placement and at the time of slug removal from the monitoring well. The transducer probe, which is about 7 inches long, cannot fit inside a 2-inch well adjacent to the slug. Therefore, E & E lowered the transducer probe to the bottom of the monitoring well and then raised it a minimum of several inches to avoid interferences from potential sediment. Before testing each well, E & E carefully measured the rope connected to the slug to a length that allowed the slug to be completely submerged while allowing enough room for the transducer probe below the slug.

At each well location, the test number was entered into the data logger and recorded on the slug test data sheet. The slug was then lowered into the well and was held above the water level. The data logger reference value was then set at zero (since E & E was interested only in changes in water depth). The water level, as read by the transducer, was checked to ensure that the water level was stable and the drawdown was zero. If for some reason the drawdown indicated some change, the reference was reset at zero. The slug was then lowered quickly but steadily into the water at the same time the test was started on the data logger. The data logger then recorded the falling head data until the static level was reached or the water fell to within 10 percent of the initial elevation. The recovery time for the majority of the tested wells at Fort Devens was between a few minutes and 1 hour. After recording the head, drawdown, and time, E & E performed the rising head test. To start the rising head test, the slug was removed and simultaneously the start/stop button was depressed on the data logger. The rising head test was run as a step test and the data recorded as Step 1 rather than Step 0. This produced a separate data file for each falling and rising head test with both starting times as zero. After a minimum of 90 percent recovery to the initial water level, E & E recorded the drawdown and time and stopped the test.

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4. DATA REDUCTION AND INTERPRETATION

E & E electronically transferred data collected in the field to an IBM or IBM compatible microcomputer for data reduction and interpretation. Since the data logger can only hold up to 10 tests, the recorded data were downloaded periodically to a computer and/or printed using an on-site printer. In most cases, both hard copies and diskettes were generated for the files. However, to avoid delay in field work, occasionally only diskette files or printouts were generated so the Hermit data logger could be made available for further slug testing.

The following steps were used in data reduction:

- o Checked the data transferred from the Hermit to floppy diskettes for corrections and completeness.
- o Generated a second type of file, which included only the time and drawdown, to be used by the slug interpretation package (SLUGIX).
- o Developed an in-house computer program to generate a printout of raw Hermit data files (Appendix A).
 - o Imported the data into the SLUGIX file for interpretation.

The data were interpreted using SLUGIX. SLUGIX, a program written by Interpex in Denver, is designed to match the data to theoretical type curves to determine the hydraulic parameters of the tested media. Slug test data for unconfined aquifers were analyzed using the Bower and Rice (1976) method. This was the procedure for all Fort Devens monitoring wells since none of the well logs indicated confining conditions. Interpreted graphics files were used after a good match was obtained between the observed data and the average regression line, and were saved as input files to a Surfer graphics package. The graphics files were then used to plot the slug test (Appendix A).

The hydraulic conductivity and transmissivity values derived from the curve matching were then reviewed for consistency with the hydraulic conductivity of the type of formation encountered at the site (e.g., glacial till, silty sand, fine, or medium grain sands) as derived from literature.

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SLUG TEST RESULTS

• The results of the slug tests conducted at Fort Devens RI/SI site monitoring wells are summarized on Table 5-1.

Data for tests at SHL-6, SHL-23 and CSB-2 were missing from the data file when it was examined in the office. It was not clear if this was due to failure to record in the field or loss during data transfer. These wells were retested in December 1991. The retesting program is discussed in Section 6.

The calculated hydraulic conductivity values from the slug test results range from 2.3 x 10⁻⁸ feet per minute, which is the minimum value at SHL-24, to 0.25 feet per minute, which is the maximum value calculated for the well SHL-19 during the rising head test. It should be noted that the monitoring well SHL-24 indicated a very slow recovery during well development. This is consistent with the finding of the slug test regarding the hydraulic conductivity of the formation around the screen in this well. However, the hydraulic conductivity value of 0.25 feet per minute at SHL-19 may be related to interferences during the measurement process. In fact, the data seem to indicate significant fluctuation in the water level during the falling head test. Moreover, this elevated hydraulic conductivity value is not consistent with the conductivity value of 0.00265 feet per minute calculated for the falling head test conducted in the same well (see Table 5-1).

Although differences of an order of magnitude in the hydraulic conductivity as estimated from falling head and rising head tests conducted on the same well are not uncommon (see Table 5-1), this discrepancy at SHL-19 could not be resolved since each data set was internally consistent. The well was retested in December 1991. The retesting program is discussed in Section 6.

The calculated average hydraulic conductivity from the slug testing for the Fort Devens site is 0.0264 feet per minute, with a standard deviation of 0.0464 feet per minute. Calculated average conductivity values for each RI and SI site are as follows:

Site Name	Average Hydraulic Conductivity (in feet/minute)
Shepley's Hill Landfill RI Site	0.02530
Cold Spring Brook Landfill RI Site	0.0175
Building 202 SI Site	0.0770
EOD SI Site	0.000142

NOTE: The POL data were included in the Shepley's Hill Landfill site data.

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Table 5-1
SLUG TEST DATA INTERPRETATION

File Name	Hydraulic Conductivity (ft/min.)	Transmissivity (ft ² /min.)	Remarks
SHL-5A	0.023	0.183	
SHL-5B	0.0269	0.2098	
SHL-6A		-	No data
SHL-6B	-	-	No data
SHL-7A	0.0253	0.139	
SHL-7B	0.002659	0.0146	
SHL-8SA	0.01173	0.05292	
SHL-8SB	0.0014	0.0634	
SHL-8DA	0.00379	0.1732	
SHL-8DB	0.00615	0.2749	
SHL-9A	0.017	0.2713	
SHL-9B	0.0087	0.1389	
SHL-10A	0.00839	0.0382	
SHL-10B	0.0044	0.0198	
SHL-11A	0.000345	0.00316	
SHL-11B	0.000696	0.0063	
SHL-12A	0.01924	0.1050	
SHL-12B	0.02341	0.1278	
SHL-13A	0.0088	0.1161	
SHL-13B	0.000941	0.01236	
SHL-15A	0.01631	0.1164	
SHL-15B	0.042	0.3027	
SHL-17A	0.005460	0.0553	
SHL-17B	0.1761	1.783	
SHL-18A	0.029	0.2451	
SHL-18B	0.06923	0.0584	
SHL-19A	0.2543	2.231	
SHL-19B	0.00265	0.02324	
SHL-20A	0.057	1.76	
SHL-21A	0.0201	0.1673	
SHL-21B	0.0166	0.1388	
SHL-22	0.0004512	Unknown	Not used in the statistic
SHL-23A			Missing test data
SHL-23B			Missing test data
SHL-24	0.00000023	0.0000028	The second of th
SHL-25	0.000176	0.02094	
POL-1A	0.0005159	0.000552	
POL-1B	0.0005982	0.0006401	
POL-3A	0.0009442	0.004872	
POL-3B	0.001479	0.007631	

A = Rising head test
B = Falling head test

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Table 5-1 (cont'd) SLUG TEST DATA INTERPRETATION

File Name ¹	Hydraulic Conductivity (ft/min.)	Transmissivity (ft /min.)			Remarks			
B202-1A	14		Rac	d da	ta			
B202-1B	0.1228	1.040	-					
B202-2A	0.03413	0.286						
B202-2B	0.02349	0.1969						
B202-3A	0.1065	0.9027						
B202-3B	0.09825	0.8322						
CSB-1A	0.0049	0.0345						
CSB-1B	0.0067	0.0469						
CSB-2A	-	_	No	dat	a			
CSB-2B	- -	-	No	dat				
CSB-3A	0.00385	0.0258						
CSB-3B	0.000867	0.0058						
CSB-4A	0.000309	0.001103						
CSB-4B	0.0002535	0.000905						
CSB-6A	0.06503	0.2939		00				
CSB-6B	0.0729	0.3297						
CSB-7A	0.03341	0.2623						
CSB-7B	0.0188	0.1478						
CSB-8A	0.001683	0.0112						
CSB-8B	0.00129	0.0086						
EOD-1A	0.00000613	0.000748						
EOD-1B	0.0000301	0.003678						
EOD-4A	0.000138	0.0169						
EOD-4B	0.0000395	0.0048						
STATISTICAL AMALYSIS								
Maximum	0.25 (at SHL-19A)	2.231 (SHL-19A)						
Minimum	2.3 10 (at SHL-24)	2.8 10 (at SHL-24)						
Average	0.0264	0.2378	x a	nd i	based	on	56	data
Standard Deviation (sD)	0.0464	0.460275	x a	nd i	based	on	56	data
3* (sD)	0.14	1.38						

A = Rising head test
B = Falling head test

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 $[\]overline{x}$ = sample mean s = sample standard deviation

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It should be noted that the calculated values of hydraulic conductivity correspond to the hydraulic conductivity of fine- to medium-grain sand, which is the most widespread formation type encountered at the Fort Devens site.

The calculated transmissivity values range from 2.8 x 10^{-6} feet minute (minimum at SHL-24) to 2.231 feet minute (maximum at SHL-19A). Again, the maximum value is somewhat suspect and was not consistent between the rising and falling head tests of the same well.

The calculated average transmissivity is 0.2378 feet² per minute, with a standard deviation of 0.46028. The calculated transmissivity values are equivalent to those reported for silty, and fine- to very-fine-grain sand aquifers. The calculated average transmissivity value for each tested RI and SI site is as follows:

Site Name	Average Transmissivity Value (in feet /minute)
Shepley's Hill Landfill RI Site (including POLs)	0.2533
Cold Spring Brook Landfill RI Site	0.0974
Building 202, SI Site	0.6516
EOD, SI Site	0.0065

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6. RETESTING PROGRAM

In December 1991, another attempt was made to test the hydraulic conductivity in wells at which unsuccessful attempts were made in July 1991. The following wells were revisited: SHL-1, SHL-4, SHL-6, SHL-19, SHL-22, SHL-23, CSB-2, POL-2, EOD-2, and EOD-4.

POL-2 and EOD-2 had insufficient water to permit a slug test. All the other wells recovered too quickly to give meaningful measurements, except to conclude that they exceeded 0.05 feet/minute, and are clearly in clean sands or equivalent.

The field log sheets are attached as Appendix B.

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CONCLUSIONS

E & E tested a total of 34 wells at the Fort Devens RI and SI sites. The following are principal findings and conclusions of these tests.

- o In general, the results of the slug tests confirm field observations made during the monitoring well installation, well development, and well purging (e.g., the lowest hydraulic parameters were identified for SHL-25, and EOD wells, which are among the less-productive wells at the site).
- o Shepley's Hill Landfill water-bearing formations are characterized by an average hydraulic conductivity of 0.03 feet per minute and by an average transmissivity of 0.25 feet per minute. Areas of elevated hydraulic conductivity are in the vicinity of SHL-17, SHL-19, and SHL-20. Areas of relatively low permeability or hydraulic conductivity are southwest of the landfill, in the area of underground storage tanks (POL wells), and near wells SHL-24 and SHL-25.
- o The Cold Spring Brook Landfill aquifer is characterized by an average hydraulic conductivity of 0.02 feet per minute and by an average transmissivity of 0.09 feet per minute. The areas of elevated hydraulic conductivity were located near wells CSB-6 and CSB-7 east of the landfill. The remaining tested area is characterized by relatively low hydraulic parameters indicating fine sand and silty sand formations. The aquifer beneath the Cold Spring Brook Landfill seemed to be composed of materials that are comparable to the water-bearing formations at Shepley's Hill Landfill.
- o Both hydraulic conductivity and transmissivity of the waterbearing formations at Building 202, south of Shepley's Hill Landfill, were relatively higher than the Shepley's Hill Landfill aquifer. The aquifer in this area is composed of medium- to coarse-grain sands.
- o The lowest hydrologic parameters were identified at the EOD range. These results are consistent with the slow rate of recharge and low yield of monitoring wells at the EOD range.
- o Some wells did not yield usable results, either because of high hydraulic conductivity greater than 0.05 feet/minute, or because the thickness of saturated zone was too small to fully submerge the slug and the displacement was too low.

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APPENDIX A SLUG TEST DATA

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Shepley's Hill Landfill Data

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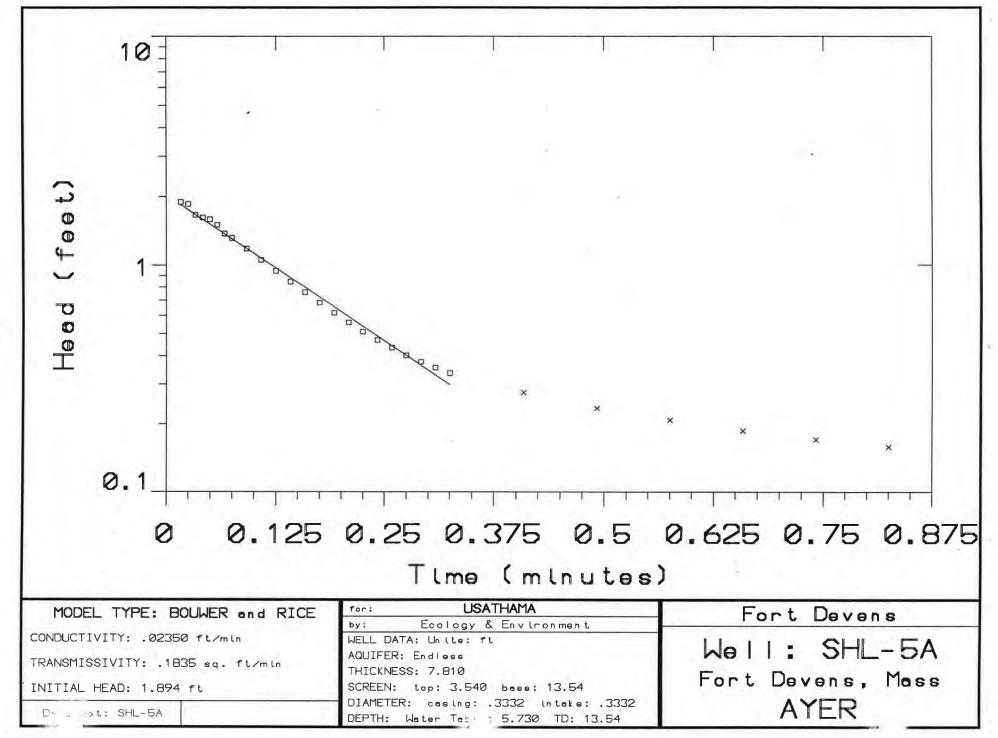
ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-5A

Reference	0.000	Scale Factor	10.036
SG	1.000	Offset	-0.029
Linearity	0.000	Delay mSEC	50.000
Time	05:57	Date	07/12/91
Logger Test	3	INPUT 1: Level	(F)

Step 1 07/11 12:44:54

Elapsed Time	INPUT 1	Elapsed Time	INPUT 1
0.0000	-1.667	1.3333	-0.117
0.0083	-4.128	1.4166	-0.113
0.0166	-1.663	1.5000	-0.110
0.0250	-1.894	1.5833	-0.104
0.0333	-1.856	1.6666	-0.101
0.0416	-1.660	1.7500	-0.098
0.0500	-1.619	1.8333	-0.094
0.0583	-1.591	1.9166	-0.091
0.0666	-1.502	2.0000	-0.091
0.0750	-1.376	2.5000	-0.072
0.0833	-1.315	3.0000	-0.060
0.1000	-1.179	3.5000	-0.053
0.1166	-1.053	4.0000	-0.047
0.1333	-0.942	4.5000	-0.044
0.1500	-0.844	5.0000	-0.037
0.1666	-0.759	5.5000	-0.037
0.1833	-0.683	6.0000	-0.034
0.2000	-0.616	6.5000	-0.031
0.2166	-0.559	7.0000	-0.031
0.2333	-0.509	7.5000	-0.031
0.2500	-0.468	8.0000	-0.028
0.2666	-0.433	8.5000	-0.031
0.2833	-0.401	9.0000	-0.028
0.3000	-0.376	9.5000	-0.028
0.3166	-0.354	10.0000	-0.031
0.3333	-0.335	11.0000	-0.031
0.4166	-0.275	12.0000	-0.028
0.5000	-0.234	13.0000	-0.028
0.5833	-0.208	14.0000	-0.025
0.6666	-0.186	15.0000	-0.025
0.7500	-0.170	16.0000	-0.025
0.8333	-0.158	17.0000	-0.025
0.9166	-0.151	END	
1.0000	-0.142		
1.0833	-0.136		
1.1666	-0.126		
1.2500	-0.123		





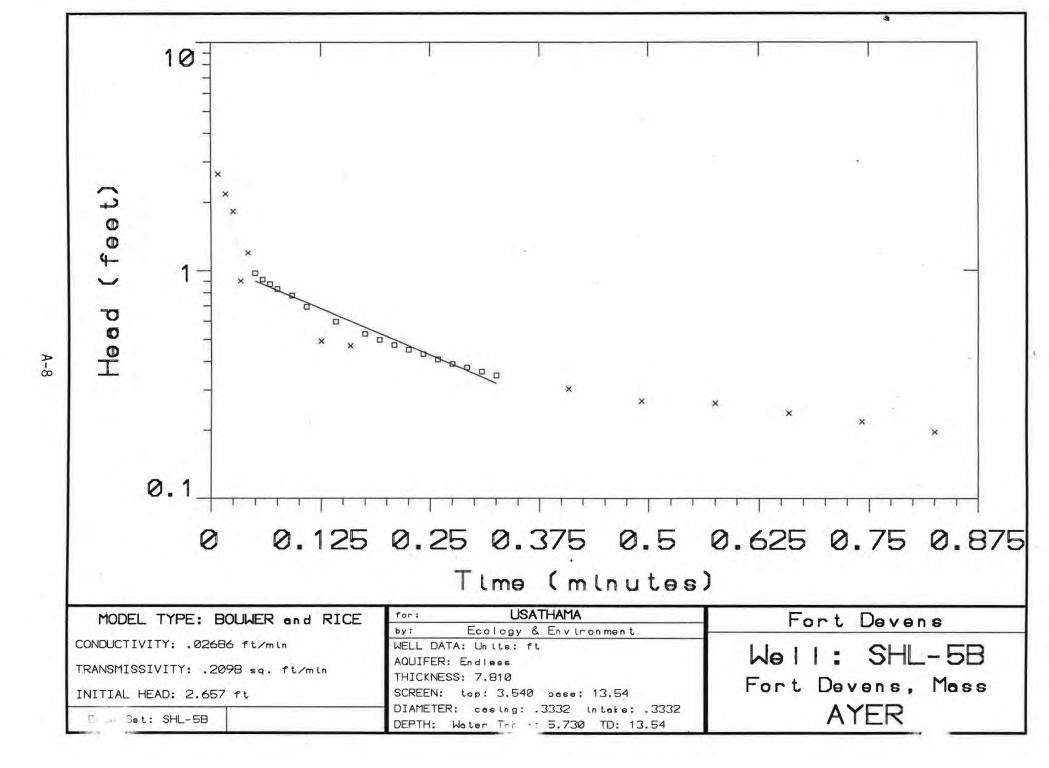
ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger

Unit# 569 Monitoring Well SHL-5B

Reference	0.000	Scale Factor	10.036
SG	1.000	Offset	-0.029
Linearity	0.000	Delay mSEC	50.000
Time	05:59	Date	07/12/91
Logger Test	3	INPUT 1: Level	(F)

Step 0 07/11 12:26:18

Elapsed Time	INPUT 1	Elapsed Time	INPUT 1
0.0000	0.000	1.3333	0.145
0.0083	4.159	1.4166	0.142
0.0166	2.657	1.5000	0.136
0.0250	2.176	1.5833	0.129
0.0333	1.822	1.6666	0.126
0.0416	0.901	1.7500	0.123
0.0500	1.198	1.8333	0.120
0.0583	0.974	1.9166	0.117
0.0666	0.914	2.0000	0.113
0.0750	0.873	2.5000	0.094
0.0833	0.831	3.0000	0.088
0.1000	0.778	3.5000	0.075
0.1166	0.695	4.0000	0.069
0.1333	0.490	4.5000	0.063
0.1500	0.597	5.0000	0.056
0.1666	0.468	5.5000	0.050
0.1833	0.528	6.0000	0.047
0.2000	0.496	6.5000	0.047
0.2166	0.471	7.0000	0.041
0.2333	0.449	7.5000	0.041
0.2500	0.430	8.0000	0.037
0.2666	0.408	8.5000	0.034
0.2833	0.389	9.0000	0.034
0.3000	0.376	9,5000	0.034
0.3166	0.360	10.0000	0.031
0.3333	0.347	11.0000	0.034
0.4166	0.303	12.0000	0.028
0.5000	0.268	13.0000	0.025
0.5833	0.262	14.0000	0.025
0.6666	0.237	15.0000	0.022
0.7500	0.218	16.0000	0.018
0.8333	0.196	17.0000	0.015
0.9166	0.177	18.0000	0.022
1.0000	0.180	END	
1.0833	0.158	450 25	
1.1666	0.158		
1.2500	0.148		



page 1 of 1

ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-6A

Reference	0.000
SG	1.000
Linearity	0.000
Time	11:20
Logger Test	4

Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/12 /91 INPUT 1: Level (F)

Step 1 07/12 10:36:20

Elapsed	Time	INPUT	1
20,000	3 (E) 935 65.		

0.0000	0.000
0.0083	0.000
0.0166	0.000
0.0250	0.000
0.0333	0.000
0.0416	0.000
0.0500	0.000
0.0583	0.000
0.0666	0.000
0.0750	0.000
0.0833	0.000
0.1000	0.000
0.1166	0.000
0.1333	0.000
0.1500	0.000
0.1666	0.000
0.1833	0.000
0.2000	0.000
0.2166	0.000
0.2333	0.000
0.2500	0.000
0.2666	0.000
0.2833	0.000
0.3000	0.000
0.3166	0.000
0.3333	0.000
0.4166	0.000
0.5000	0.000
0.5833	0.000
0.6666	0.000
0.7500	0.000
0.8333	0.000
0.9166	0.000
1.0000	0.000
1.0833	0.000
1.1666	0.000
1.2500	d paper 0.000

Elapsed Time INPUT 1

-	1.3333	0.000
	1.4166	0.000
	1.5000	0.000
	1.5833	0.000
	1.6666	0.000
	1.7500	0.000
	1.8333	0.000
	1.9166	0.000
	2.0000	0.000
	2.5000	0.000
	3.0000	0.000
	3.5000	0.000

page 1 of .

ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-6B

Reference	0.000
SG	1.000
Linearity	0.000
Time	11:21
Logger Test	4

Scale Factor 10.036
Offset -0.029
Delay mSEC 50.000
Date 07/12 /91
INPUT 1: Level (F)

Step 0 07/12 10:32:55

Elapsed Time	INPUT 1
0.0000	0.000
0.0083	0.000
0.0166	0.000
0.0250	0.000
0.0333	0.000
0.0416	0.000
0.0500	0.000
0.0583	0.000
0.0666	0.000
0.0750	0.000
0.0833	0.000
0.1000	0.000
0.1166	0.000
0.1333	0.000
0.1500	0.000
0.1666	0.000
0.1833	0.000
0.2000	0.000
0.2166	0.000
0.2333	0.000
0.2500	0.000
0.2666	0.000
0.2833	0.000
0.3000	0.000
0.3166	0.000
0.3333	0.000
0.4166	0.000
0.5000	0.000
0.5833	0.000
0.6666	0.000
0.7500	0.000
0.8333	0.000
0.9166	0.000
1.0000	0.000
1.0833	0.000
1.1666	0.000

1.2500

0.000

Elapsed Time	INPUT 1
1.3333	0.000
1.4166	0.000
1.5000	0.000
1.5833	0.000
1.6666	0.000
1.7500	0.000
1.8333	0.000
1.9166	0.000
2.0000	0.000
2.5000	0.000
3.0000	0.000
3.5000	0.000

ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger

page 1 of 1

Unit# 569 Monitoring Well SHL-7A

Reference	0.000
SG	1.000
Linearity	0.000
Time	11:22
Logger Test	3

Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/12 /91 INPUT 1: Level (F)

Step 1 07/12 09:19:35

Elapsed Time INPU	T	1
-------------------	---	---

0.0000	-1.720
0.0083	-0.844
0.0166	-0.825
0.0250	-0.768
0.0333	-0.718
0.0416	-0.689
0.0500	-0.645
0.0583	-0.601
0.0666	-0.572
0.0750	-0.540
0.0833	-0.506
0.1000	-0.468
0.1166	-0.404
0.1333	-0.360
0.1500	-0.319
0.1666	-0.284
0.1833	-0.253
0.2000	-0.224
0.2166	-0.199
0.2333	-0.177
0.2500	-0.158
0.2666	-0.142
0.2833	-0.126
0.3000	-0.113
0.3166	-0.101
0.3333	-0.091
0.4166	-0.063
0.5000	-0.047
0.5833	-0.037
0.6666	-0.031
0.7500	-0.028
0.8333	-0.028
0.9166	-0.025
	1.72

Elapsed Time INPUT 1

1.3333	-0.022
1.4166	-0.022
1.5000	-0.022
1.5833	-0.022
1.6666	-0.022
1.7500	-0.022
1.8333	-0.022
1.9166	-0.022
2.0000	-0.022
2.5000	-0.022
3.0000	-0.025
3.5000	-0.022

-0.025

-0.025

-0.025

-0.025

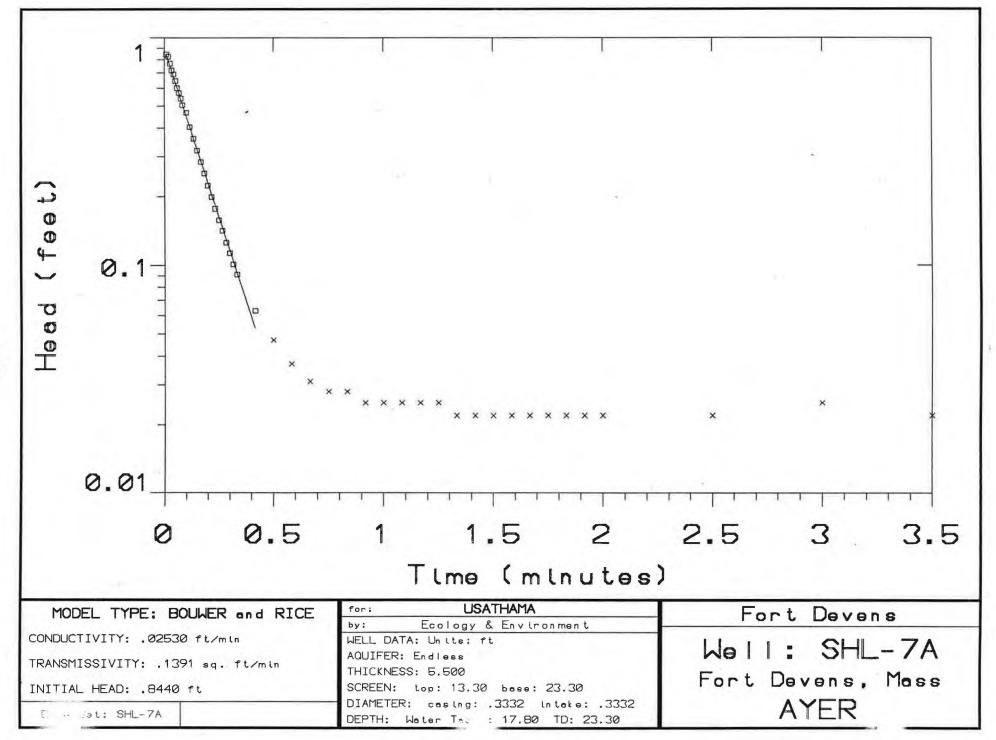
1.0000

1.0833

1.1666

1.2500





page 1 of 1

ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-7B

Reference	0.000
SG	1.000
Linearity	0.000
Time	11:23
Logger Test	3

Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/12 /91 INPUT 1: Level (F)

Step 0 07/12 09:16:56

Elapsed Time INPUT 1	E	laps	ed	Time	INPUT	1
----------------------	---	------	----	------	-------	---

0.0000	0.009
0.0083	0.012
0.0166	0.000
0.0250	0.012
0.0333	-0.006
0.0416	-1.834
0.0500	0.945
0.0583	0.765
0.0666	0.395
0.0750	0.335
0.0833	0.240
0.1000	0.385
0.1166	0.227
0.1333	0.202
0.1500	0.180
0.1666	0.161
0.1833	0.148
0.2000	0.132
0.2166	0.123
0.2333	0.110
0.2500	0.104
0.2666	0.094
0.2833	0.088
0.3000	0.082
0.3166	0.075
0.3333	0.072
0.4166	0.056
0.5000	0.044
0.5833	0.034
0.6666	0.028
0.7500 0.8333	0.025
0.8333	0.022
1.0000	0.022
1.0000	OTOTO

Elapsed Time INPUT 1

	And and and administration
1.3333	0.012
1.4166	0.009
1.5000	0.009
1.5833	0.009
1.6666	0.009
1.7500	0.006
1.8333	0.006
1.9166	0.003
2.0000	0.003
2.5000	0.000

0.015

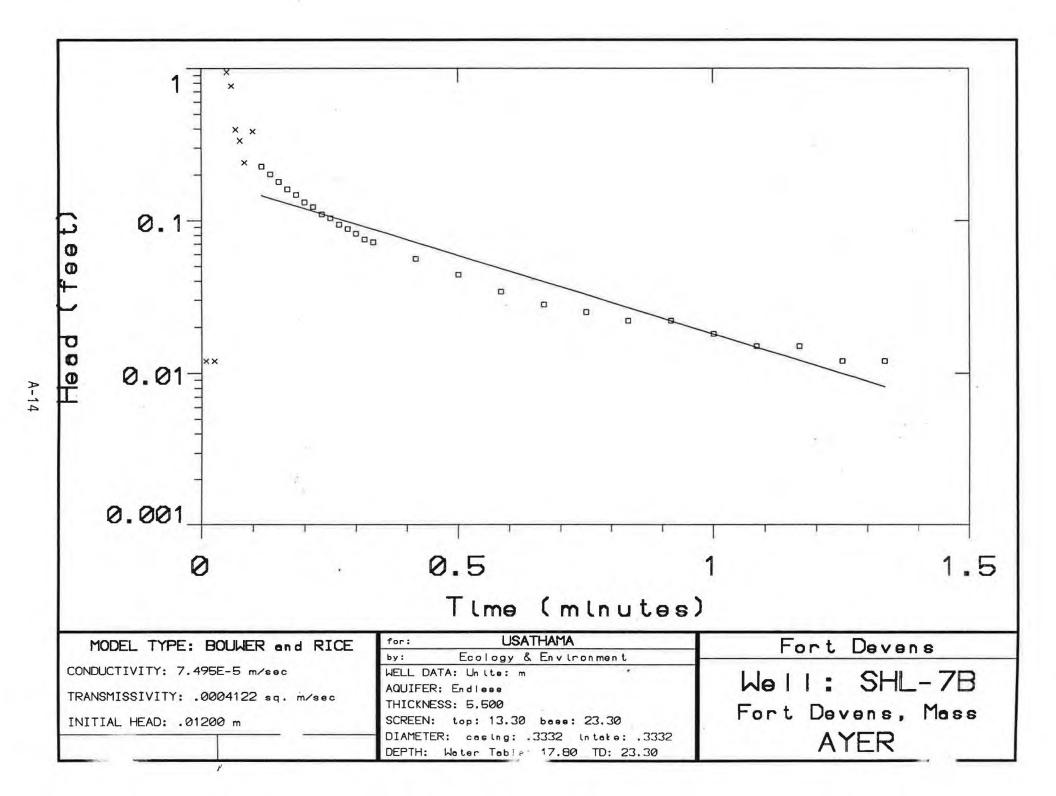
0.015

0.012

1.0833

1.1666

1.2500



ECOLOGY AND ENVIRONMENT SE2000

page 1 of 1

Environmental Logger Unit# 569

Monitoring Well SHL-8SA

Reference	0.000
SG	1.000
Linearity	0.000
Time	09:35
Logger Test	5

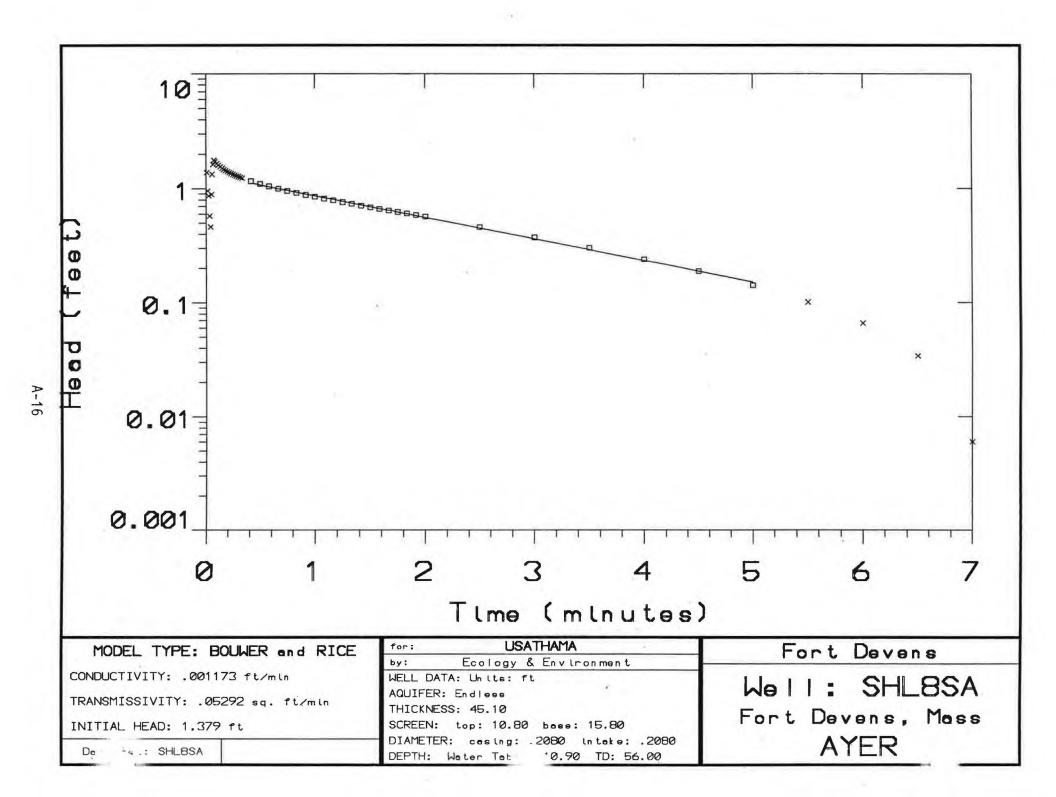
Scale Factor 10.036 Offset -0.029 50.000 Delay mSEC Date 07/15/91 INPUT 1: Level (F)

Step 1 07/14 13:45:46

Elapsed Time INP	UI	1
------------------	----	---

LIGHTOUG TIME	1111 01 1
0.0000	-0.582
0.0083	-1.379
0.0166	-0.955
0.0250	-0.869
0.0333	-0.578
0.0416	-0.464
0.0500	-0.892
0.0583	-1.334
0.0666	-1.622
0.0750	-1.765
0.0833	-1.717
0.1000	-1.651
0.1166	-1.600
0.1333	-1.549
0.1500	-1.508
0.1666	-1.467
0.1833	-1.439
0.2000	-1.410
0.2166	-1.385
0.2333	-1.357
0.2500	-1.334
0.2666	-1.312
0.2833	-1.290
0.3000	-1.274
0.3166	-1.252
0.3333	-1.239
0.4166	-1.164
0.5000	-1.103
0.5833	-1.050
0.6666	-1.002
0.7500	-0.958
0.8333 0.9166	-0.920 -0.882
	-0.850
1.0000 1.0833	-0.819
1.1666	-0.793
1.2500	-0.765
1.2300	-0.765

1.3333	-0.737
1.4166	-0.711
1.5000	-0.689
1.5833	-0.667
1.6666	-0.645
1.7500	-0.626
1.8333	-0.607
1.9166	-0.588
2.0000	-0.569
2.5000	-0.461
3.0000	-0.373
3.5000	-0.303
4.0000	-0.240
4.5000	-0.189
5.0000	-0.142
5.5000	-0.101
6.0000	-0.066
6.5000	-0.034
7.0000	-0.006
7.5000	0.015
8.0000	0.041
8.5000	0.056
9.0000	0.075
9.5000	0.094
END	



ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569

Monitoring Well SHL-8SB

Reference	0.000
SG	1.000
Linearity	0.000
Time	09:37
Logger Test	5

Scale Factor 10.036
Offset -0.029
Delay mSEC 50.000
Date 07/15/91
INPUT 1: Level (F)

Step 0 07/14 13:05:38

lapsed Time	INPUT 1	Elapsed Time I	NPUT 1
0.0000	0.037	1.3333	0.999
0.0083	2.100	1.4166	0.980
0.0166	2.100	1.5000	0.961
0.0250	2.100	1.5833	0.945
0.0333	2.100	1.6666	0.926
0.0416	2.100	1.7500	0.911
0.0500	2.100	1.8333	0.895
0.0583	2.100	1.9166	0.879
0.0666	1.562	2.0000	0.866
0.0750	1.708	2.5000	0.784
0.0833	1.784	3.0000	0.718
0.1000	1.648	3.5000	0.664
0.1166	1.638	4.0000	0.619
0.1333	1.616	4.5000	0.578
0.1500	1.600	5.0000	0.547
0.1666	1.572	5.5000	0.518
0.1833	1.556	6.0000	0.493
0.2000	1.534	6.5000	0.471
0.2166	1.512	7.0000	0.452
0.2333	1.496	7.5000	0.436
0.2500	1.480	8.0000	0.420
0.2666	1.464	8.5000	0.408
0.2833	1.448	9.0000	0.398
0.3000	1.432	9.5000	0.385
0.3166	1.420	10.0000	0.376
0.3333	1.404	11.0000	0.363
0.4166	1.350	12.0000	0.347
0.5000	1.300	13.0000	0.338
0.5833	1.255	14.0000	0.328
0.6666	1.217	15.0000	0.322
0.7500	1.183	16.0000	0.316
0.8333	1.151	17.0000	0.313
0.9166	1.119	18.0000	0.306
1.0000	1.094	19.0000	0.303
1.0833	1.069	20.0000	0.303
1.1666	1.043	21.0000	0.300
1.2500	1.021	22.0000	0.297

page 2 of 2

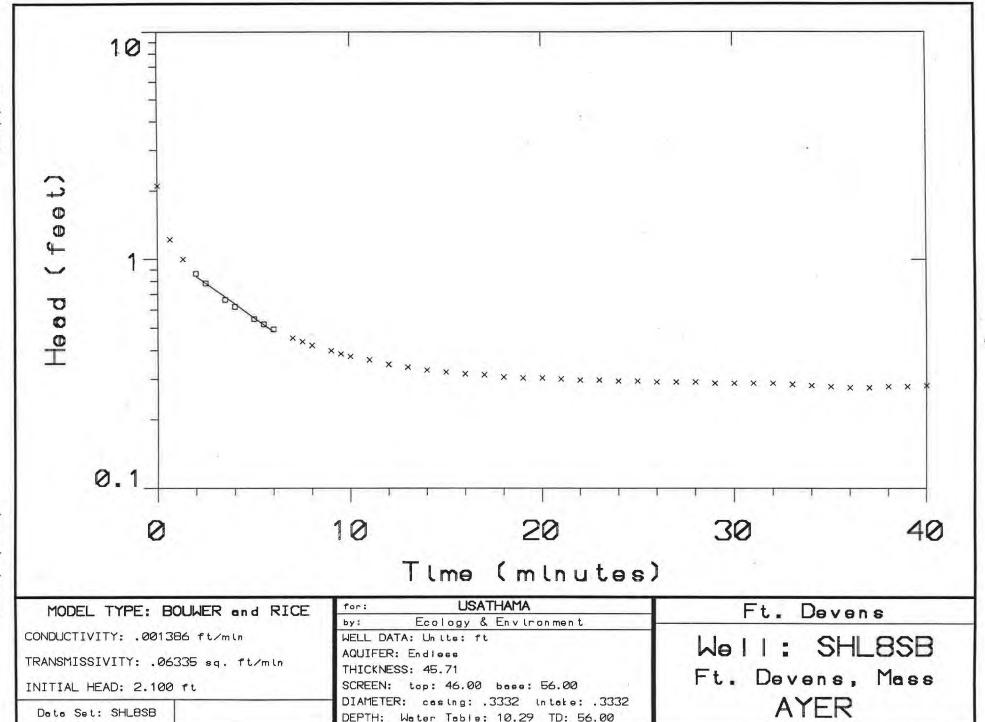
INPUT 1

ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-8SB

0.000	Scale Factor	10.036
1.000	Offset	-0.029
0.000	Delay mSEC	50.000
09:37	Date	07/15/91
5	INPUT 1: Level	(F)
	1.000	1.000 Offset 0.000 Delay mSEC 09:37 Date

Step 0 07/14 13:05:38

Elapsed Time	INPUT 1	Elapsed Time
23.0000	0.297	
24.0000	0.294	
25.0000	0.294	
26.0000	0.291	
27.0000	0.291	
28.0000	0.291	
29.0000	0.287	
30.0000	0.287	
31.0000	0.287	
32.0000	0.287	
33.0000	0.284	
34.0000	0.281	
35.0000	0.278	
36.0000	0.275	
37.0000	0.275	
38.0000	0.278	
39.0000	0.278	
40.0000	0.281	
END		



ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger

page 1 of 1

Unit# 569 Monitoring Well SHL-8DA

Reference	0.000
SG	1.000
Linearity	0.000
Time	06:04
Logger Test	1

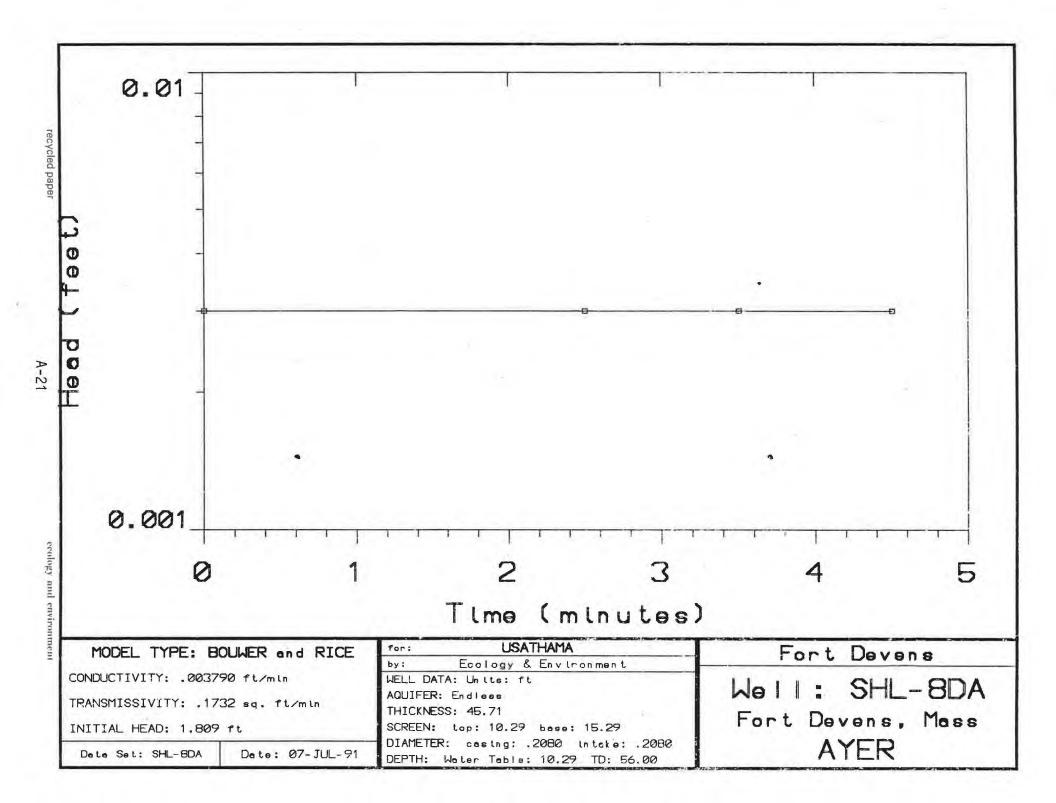
Scale Factor 16.000
Offset 4.000
Delay mSEC 50.000
Date 07/12/91
INPUT 2: Level (F)

Step 0 07/11 09:50:53

INPUT 2
-0.003
0.000
0.000
0.000
0.003
0.003
0.003

Elapsed Time INPUT 2

A-20



ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-8DB

Reference	0.000
SG	1.000
Linearity	0.000
Time	06:06
Logger Test	1

Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/12/91 INPUT 1: Level (F)

Step 0 07/11 09:50:53

Elapsed	Time	INPUT	1
r. r mb ma	1 4 111 4	2111 00 1	***

0.0000	1.920
0.0083	1.809
0.0166	2.432
0.0250	2.242
0.0333	2.562
0.0416	1.818
0.0500	1.837
0.0583	1.812
0.0666	2.068
0.0750	1.009
0.0833	1.331
0.1000	1.496
0.1166	1.258
0.1333	1.091
0.1500	1.277
0.1666	1.157
0.1833	0.977
0.2000	0.961
0.2166	0.996
0.2333	0.967
0.2500	0.917
0.2666	0.885
0.2833	0.854
0.3000	0.822
0.3166	0.793
0.3333	0.762
0.4166	0.648
0.5000	0.537
0.5833	0.446
0.6666	0.366
0.7500	0.309
0.8333	0.259
0.9166	0.218
1.0000	0.167

1.0833

1.1666

1.2500

0.151

0.123

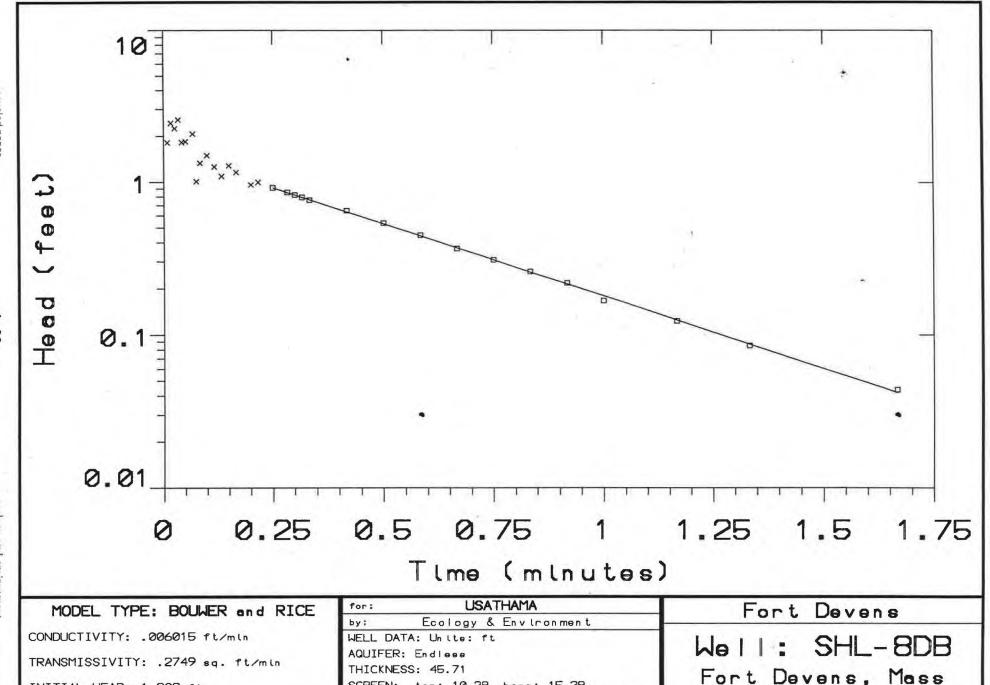
0.101

1.3333	0.085
1.4166	0.072
1.5000	0.060
1.5833	0.050
1.6666	0.044
1.7500	0.037
1.8333	0.031
1.9166	0.028
2.0000	0.022
2.5000	0.012
3.0000	
	0.006
3.5000	0.003
4.0000	0.003
4.5000	0.000
5.0000	0.006
5.5000	-0.920
6.0000	-0.309
6.5000	-0.104
7.0000	-0.037
7.5000	-0.015
8.0000	-0.006
END	

INITIAL HEAD: 1.809 ft

Data Set: SHL-8DB

Date: 07-JUL-91



SCREEN: top: 10.29 bese: 15.29

DIAMETER: casing: .2080 intake: .2080

DEPTH: Water Table: 10.29 TD: 56.00

AYER

ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-8DB

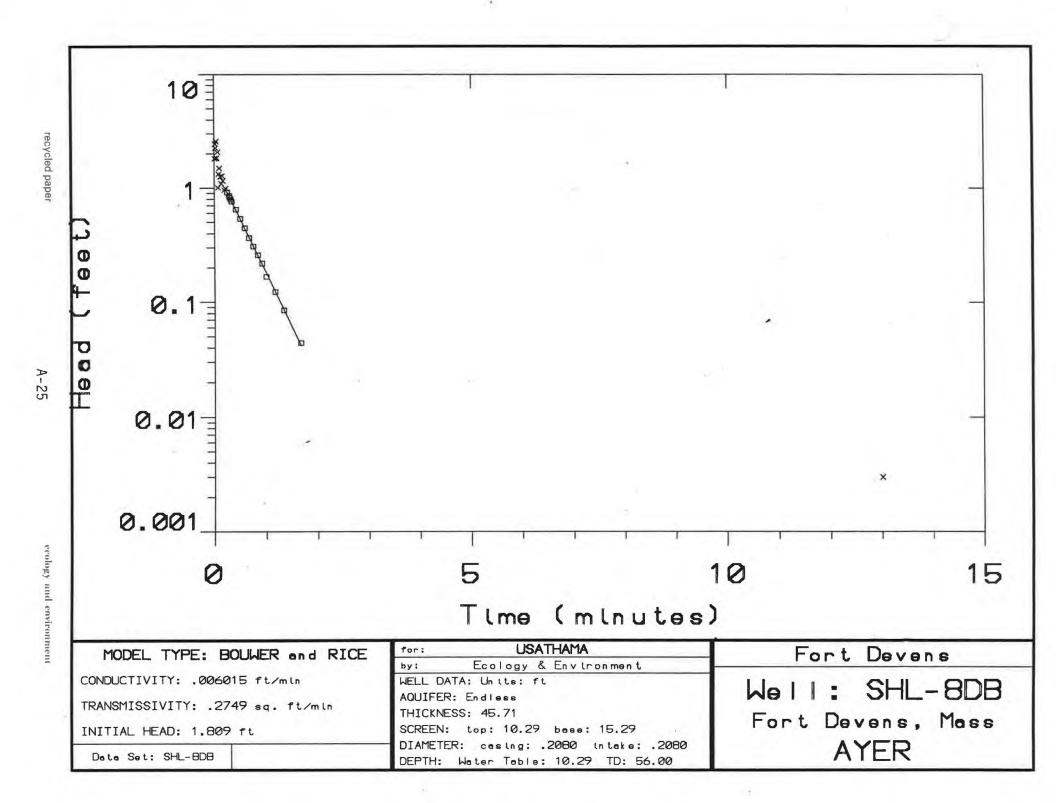
Reference	0.000
SG	1.000
Linearity	0.000
Time	06:06
Logger Test	1

Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/12/91 INPUT 1: Level (F)

Step 0 07/11 09:50:53

Elapsed Ti	me INPUT 1	
		_
0.0000	1.920	
0.0083	1.809	
0.0166	2.432	
0.0250	2.242	
0.0333	2.562	
0.0416	1.818	
0.0500	1.837	
0.0583	1.812	
0.0666	2.068	
0.0750	1.009	
0.0833	1.331	
0.1000	1.496	
0.1166	1.258	
0.1333	1.091	
0.1500	1.277	
0.1666	1.157	
0.1833	0.977	
0.2000	0.961	
0.2166	0.996	
0.2333	0.967	
0.2500	0.917	
0.2666	0.885	
0.2833	0.854	
0.3000	0.822	
0.3166	0.793	
0.3333	0.762	
0.4166	0.648	
0.5000	0.537	
0.5833	0.446	
0.6666	0.366	
0.7500	0.309	
0.8333	0.259	
0.9166	0.218	
1.0000	0.167	
1.0833	0.151	
1.1666	0.123	
1.2500	0.101	

Elapsed Time	INPUT 1
1.3333	0.085
1.4166	0.072
1.5000	0.060
1.5833	0.050
1.6666	0.044
1.7500	0.037
1.8333	0.031
1.9166	0.028
2.0000	0.022
2.5000	0.012
3.0000	0.006
3.5000	0.003
4.0000	0.003
4.5000	0.000
5.0000	0.006
5.5000	-0.920
6.0000	-0.309
6.5000	-0.104
7.0000	-0.037
7.5000	-0.015
8.0000	-0.006
8.5000	-0.003
9.0000	0.000
9.5000	0.000
10.0000	0.000
11.0000	0.003
12.0000	0.003
13.0000	0.003
END	



ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-9A

Reference	0.000
SG	1.000
Linearity	0.000
Time	05:53
Logger Test	4

Scale Factor 10.036
Offset -0.029
Delay mSEC 50.000
Date 07/12/91
INPUT 1: Level (F)

Step 1 07/11 13:25:40

Elapsed Time INPUT 1

-		
	0.0000	-0.259
	0.0083	-1.859
	0.0166	-0.793
	0.0250	-0.506
	0.0333	-0.996
	0.0416	-0.980
	0.0500	-1.401
	0.0583	-1.644
	0.0666	-1.600
	0.0750	-1.508
	0.0833	-1.426
	0.1000	-1.287
	0.1166	-1.167
	0.1333	-1.062
	0.1500	-0.974
	0.1666	-0.892
	0.1833	-0.822
	0.2000	-0.759
	0.2166	-0.699
	0.2333	-0.645
	0.2500	-0.594
	0.2666	-0.553
	0.2833	-0.512
	0.3000	-0.474
	0.3166	-0.442
	0.3333	-0.411
	0.4166	-0.300
	0.5000	-0.221
	0.5833	-0.167
	0.6666	-0.126
	0.7500	-0.098
	0.8333	-0.075

0.9166

1.0000

1.0833

1.1666

1.2500

-0.060

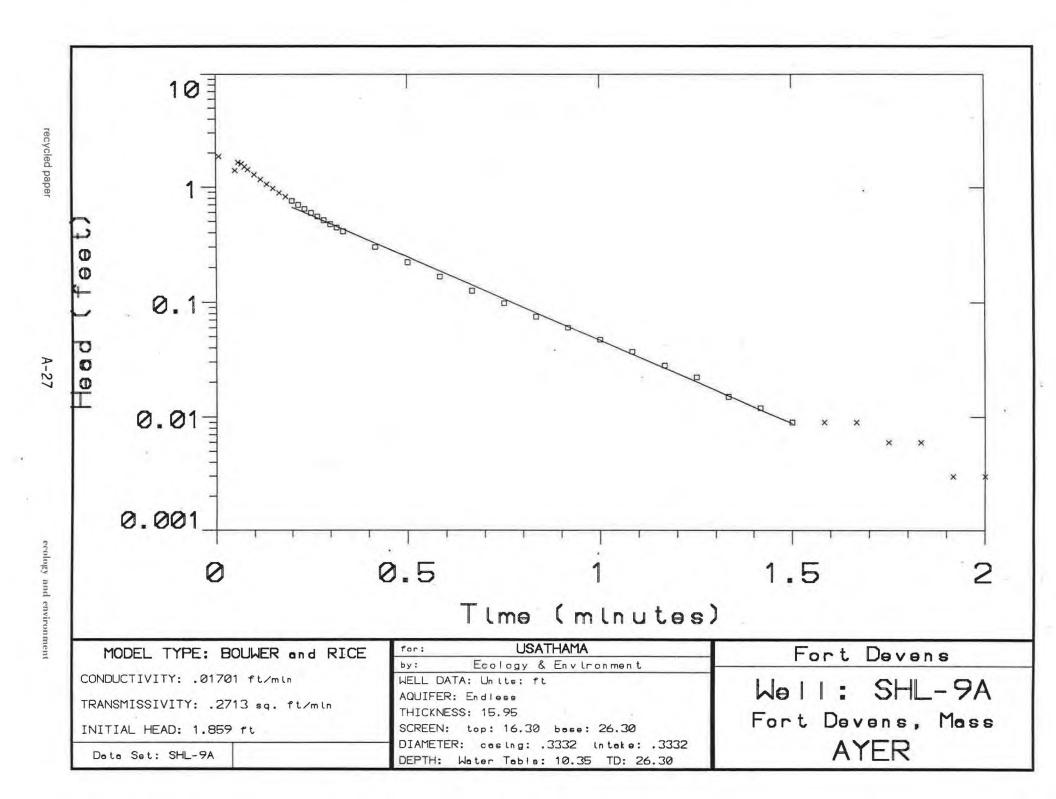
-0.047

-0.037

-0.028

-0.022

Elapsed Time	INPUT 1
1.3333	-0.015
1.4166	-0.012
1.5000	-0.009
1.5833	-0.009
1.6666	-0.009
1.7500	-0.006
1.8333	-0.006
1.9166	-0.003
2.0000	-0.003
2.5000	0.000
END	



ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-9B

Reference	0.000
SG	1.000
Linearity	0.000
Time	05:55
Logger Test	4

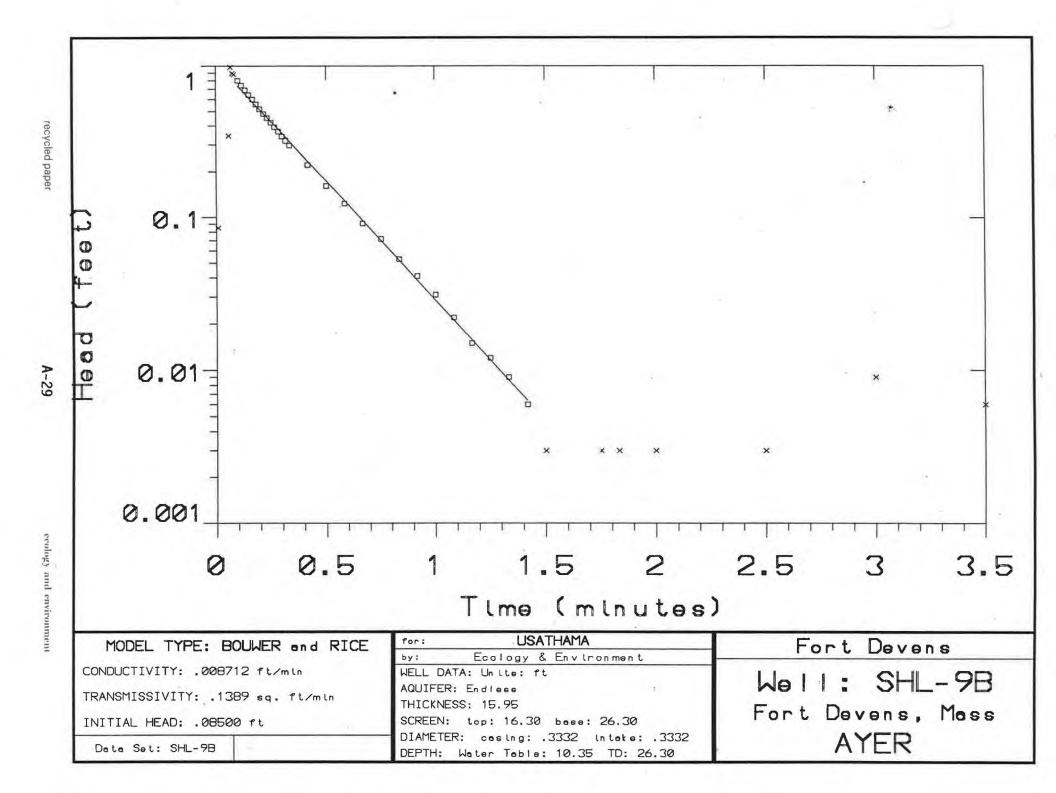
Scale Factor 10.036
Offset -0.029
Delay mSEC 50.000
Date 07/12/91
INPUT 1: Level (F)

Step 0 07/11 13:18:41

Elapsed Time	INPUT	1
--------------	-------	---

vaare Oat te day of Don't	
0.0000	-0.003
0.0083	0.085
0.0166	8.107
0.0250	1.701
0.0333	1.331
0.0416	2.268
0.0500	1.591
0.0583	0.344
0.0666	0.980
0.0750	0.895
0.0833	0.882
0.1000	0.800
0.1166	0.743
0.1333	0.692
0.1500	0.642
0.1666	0.601
0.1833	0.559
0.2000	0.518
0.2166	0.480
0.2333	0.452
0.2500	0.420
0.2666	0.392
0.2833	0.366
0.3000	0.341
0.3166	0.319
0.3333	0.297
0.4166	. 0.221
0.5000	0.161
0.5833	0.123
0.6666	0.091
0.7500	0.072
0.8333	0.053
0.9166	0.041
1.0000	0.031
1.0833	0.022
1.1666	0.015
1.2500	0.012

1.3333	0.009
1.4166	0.006
1.5000	0.003
1.5833	0.000
1.6666	0.000
1.7500	-0.003
1.8333	-0.003
1.9166	0.000
2.0000	-0.003
2.5000	-0.003
3.0000	-0.009
3.5000	-0.006
4.0000	-0.012
4.5000	-0.009
5.0000	-0.006
5.5000	-0.003
6.0000	0.000
6.5000	0.000
7.0000	0.000
END	



ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-10A

Reference	0.000
SG	1.000
Linearity	0.000
Time	09:44
Logger Test	3

Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/15/91 INPUT 1: Level (F)

Step 1 07/13 13:39:22

Elapsed	Time	INPUT	1

-0.154
-0.692
-0.610
-0.525
-0.455
-0.401
-0.354
-0.306
-0.265
-0.230
-0.199
-0.154
-0.123
-0.101
-0.085
-0.075
-0.066
-0.060
-0.053
-0.050
-0.047
-0.044
-0.044
-0.041
-0.037
-0.037
-0.031
-0.025
-0.022
-0.018
-0.018
-0.015
-0.015

-0.012

-0.012

-0.012

-0.012

1.0000

1.0833

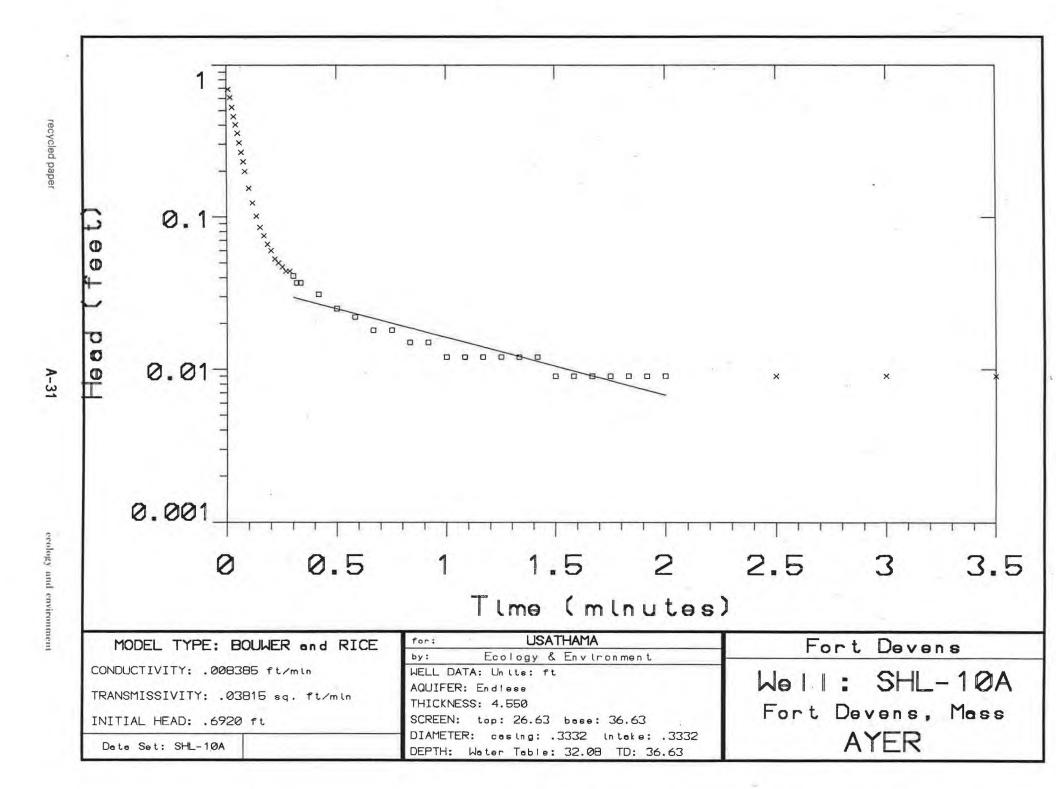
1.1666

1.2500

Elapsed Time INPUT 1

1.3333	-0.012
1.4166	-0.012
1.5000	-0.009
1.5833	-0.009
1.6666	-0.009
1.7500	-0.009
1.8333	-0.009
1.9166	-0.009
2.0000	-0.009
2.5000	-0.009
3.0000	-0.009
3.5000	-0.009
END	

A-30



ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-10B

Reference	0.000
SG	1.000
Linearity	0.000
Time	09:45
Logger Test	3

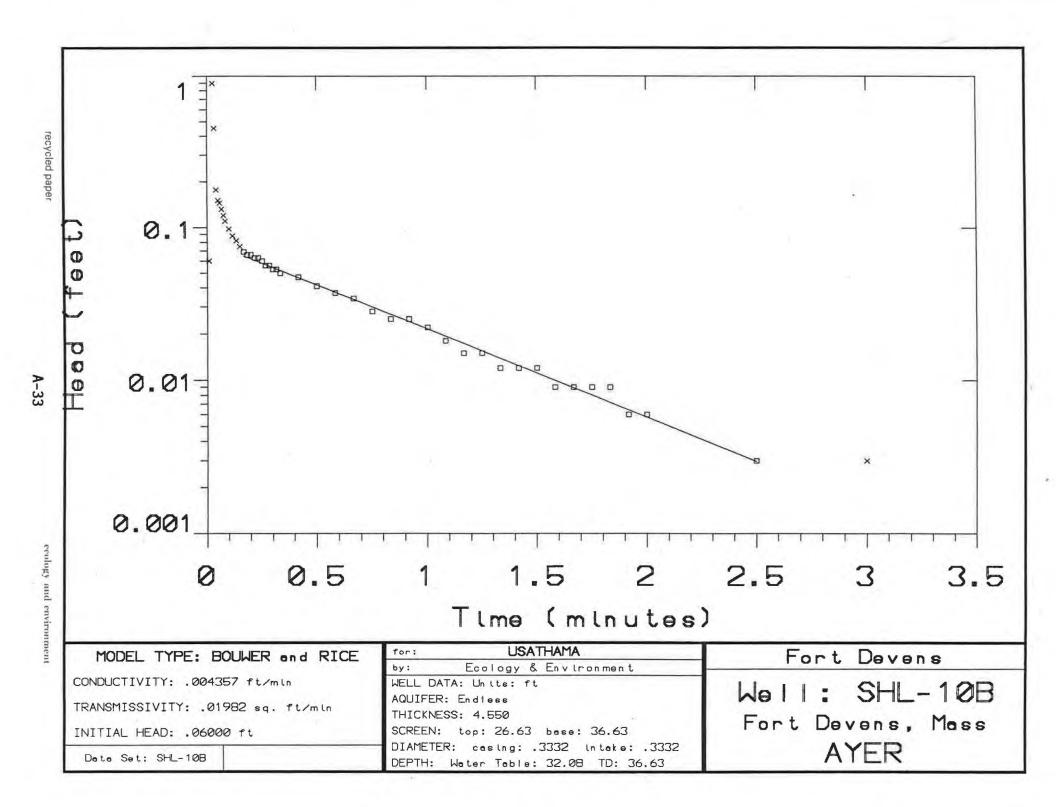
Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/15/91 INPUT 1: Level (F)

Step 0 07/13 13:35:44

F 1 -		72	TAIDLIT	1
1218	psed	Time	INPUT	1

mapsed Time	INPUT	-
0.0000	0.0	18
0.0083	0.0	
0.0166	6.3	
0.0250	0.8	
0.0333	0.4	
0.0416	0.1	
0.0500	0.1	
0.0583	0.1	
0.0666	0.1	32
0.0750	0.1	20
0.0833	0.1	10 .
0.1000	0.0	198
0.1166	0.0	88
0.1333	0.0	82
0.1500	0.0	75
0.1666	0.0	
0.1833	0.0	
0.2000	0.0	66
0.2166	0.0	
0.2333	0.0	
0.2500	0.0	
0.2666	0.0	
0.2833	0.0	
0.3000	0.0	
0.3166	0.0	
0.3333	0.0	
0.4166	0.0	
0.5000	0.0	
0.5833	0.0	
0.6666	0.0	
0.7500	0.0	
0.8333	0.0	
0.9166	0.0	
1.0000	0.0	
1.0833	0.0	
1.1666	0.0	
1.2500	0.0	172

1.3333	0.012
1.4166	0.012
1.5000	0.012
1.5833	0.009
1.6666	0.009
1.7500	0.009
1.8333	0.009
1.9166	0.006
2.0000	0.006
2.5000	0.003
3.0000	0.003
3.5000	0.000
END	



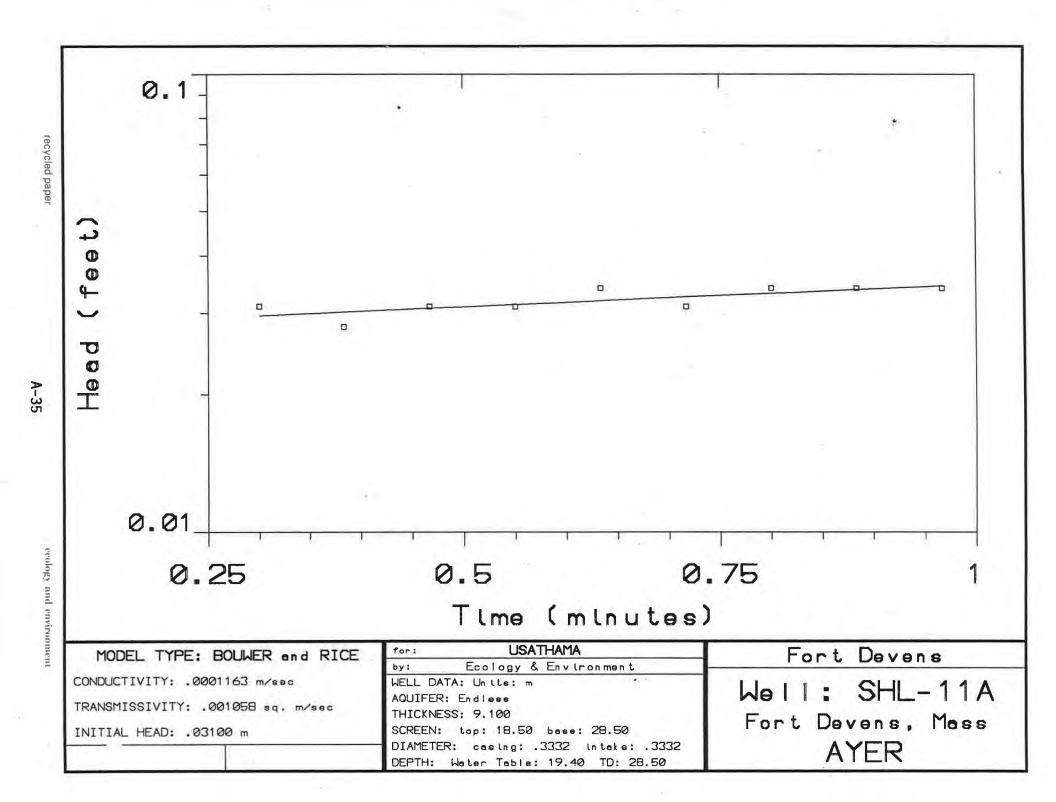
ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-11A

Reference	0.000
SG	1.000
Linearity	0.000
Time	05:49
Logger Test	5

Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/12/91 INPUT 1: Level (F)

Step 1 07/11 14:33:39

0.0000	-0.376		1.3333	0.034
0.0083	-0.009		1.4166	0.031
0.0166	-0.056		1.5000	0.031
0.0250	-0.455		1.5833	0.031
0.0333	-0.436		1.6666	0.031
0.0416	-0.474		1.7500	0.031
0.0500	-0.335		1.8333	0.034
0.0583	-0.408		1.9166	0.031
0.0666	-0.531		2.0000	0.031
0.0750	-0.518		2.5000	0.034
0.0833	-0.313		3.0000	0.031
0.1000	-0.110		3.5000	0.034
0.1166	-0.031		4.0000	0.028
0.1333	0.006		4.5000	0.028
0.1500	0.015		5.0000	0.025
0.1666	0.022		5.5000	0.018
0.1833	0.025		6.0000	0.022
0.2000	0.028		6.5000	0.018
0.2166	0.025		7.0000	0.025
0.2333	0.025		7.5000	0.022
0.2500	0.025		8.0000	0.031
0.2666	0.028		8.5000	0.028
0.2833	0.028		9.0000	0.025
0.3000	0.028		9.5000	0.018
0.3166	0.028		10.0000	0.018
0.3333	0.028	•	11.0000	0.018
0.4166	0.031		12.0000	0.022
0.5000	0.028		13.0000	0.018
0.5833	0.031		14.0000	0.015
0.6666	0.031		15.0000	0.022
0.7500	0.034		16.0000	0.025
0.8333	0.031		17.0000	0.025
0.9166	0.034		18.0000	0.028
1.0000	0.034		19.0000	0.025
1.0833	0.034		20.0000	0.025
1.1666	0.031		END	
1.2500	0.031			



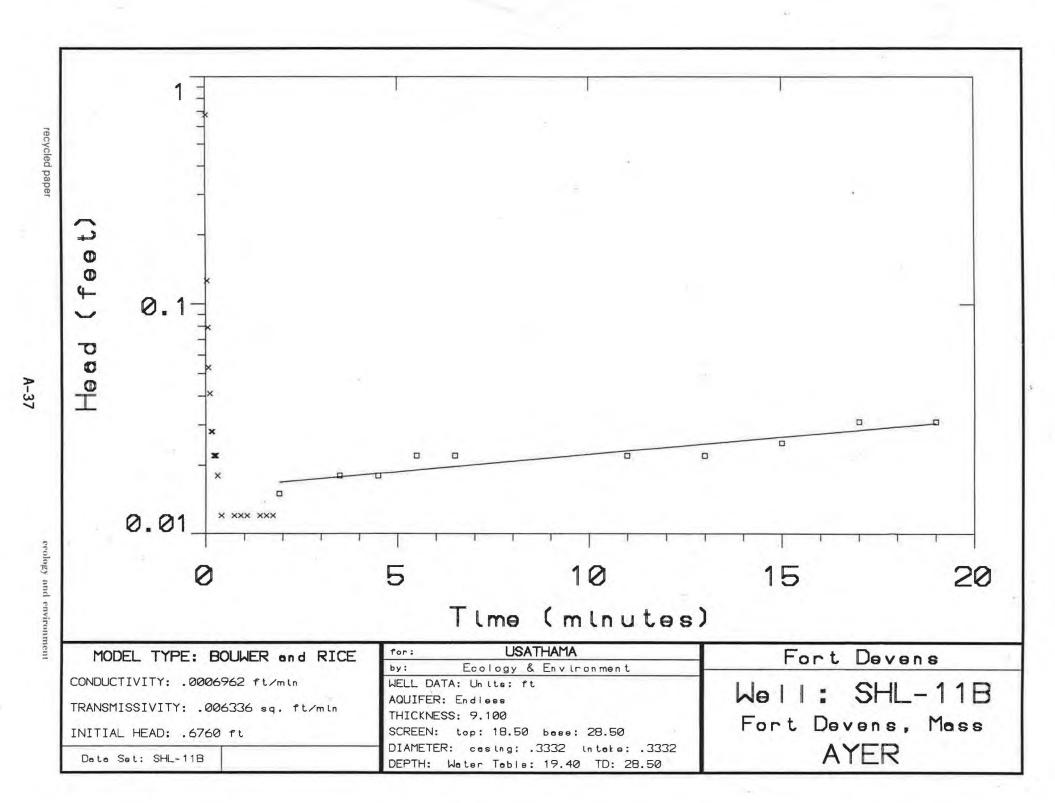
ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-11B

Reference	0.000
SG	1.000
Linearity	0.000
Time	05:52
Logger Test	5

Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/12/91 INPUT 1: Level (F)

Step 0 07/11 14:13:27

0.0000	0.028	1.3333 0.	012
0.0083	0.031		012
0.0166	3.583		012
0.0250	0.917		012
0.0333	0.676		012
0.0416	0.022		012
0.0500	0.126		009
0.0583	0.098		015
0.0666	0.079		012
0.0750	0.066		022
0.0833	0.053		018
0.1000	0.041		018
0.1166	0.041		018
0.1333	0.031		018
0.1500	0.028		022
0.1666	0.028		022
0.1833	0.028		022
0.2000	0.022		022
0.2166	0.022		018
0.2333	0.018		01.8
0.2500	0.022		022
0.2666	0.022		018
0.2833	0.022		022
0.3000	0.018		018
0.3166	0.018		022
0.3333	0.022		022
0.4166	0.012		018
0.5000	0.018		022
0.5833	0.015		015
0.6666	0.012		025
0.7500	0.012		028
0.8333	0.009		031
0.9166	0.012		031
1.0000	0.009		031
1.0833	0.012		028
1.1666	0.012	END	
1.2500	0.009	- · · · ·	



ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger

page 1 of

1

Environmental Logger Unit# 569

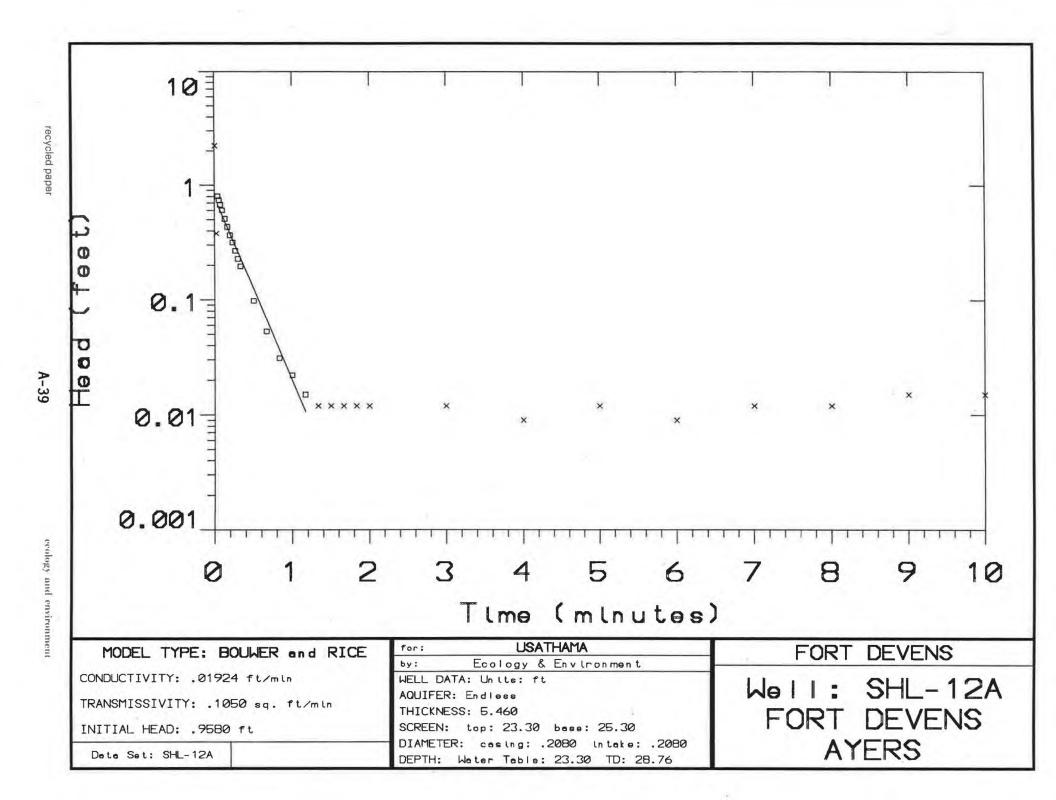
Monitoring Well SHL-12A

Reference	0.000	Scale Factor	10.036
SG	1.000	Offset	-0.029
Linearity	0.000	Delay mSEC	50.000
Time	18:02	Date	07/12/91
Logger Test	0	INPUT 1: Level	(F)

Step 1 07/12 12:48:18

END

Elapsed Time	INPUT 1			Elapsed	Time	INPU	Г
0.0083	2.2230						
0.0250	0.3790						
0.0416	0.8030						
0.0583	0.7400						
0.0750	0.6760						
0.1000	0.6040						
0.1333	0.5090						
0.1660	0.4330						
0.2000	0.3660						
0.2333	0.3160						
0.2666	0.2680	8					
0.3000	0.2270	_					
0.3333	0.1960						
0.5000	0.0980	7.					
0.6666	0.0530						
0.8333	0.0310						
1.0000	0.0220						
1.1666	0.0150						
1.3333	0.0120						
1.5000	0.0120						
1.6666	0.0120						
1.8333	0.0120						
2.0000	0.0120						
3.0000	0.0120						
4.0000	0.0090						
5.0000	0.0120						
6.0000	0.0090						
7.0000	0.0120						
8.0000	0.0120						
9.0000	0.0150						
10.000	0.0150						

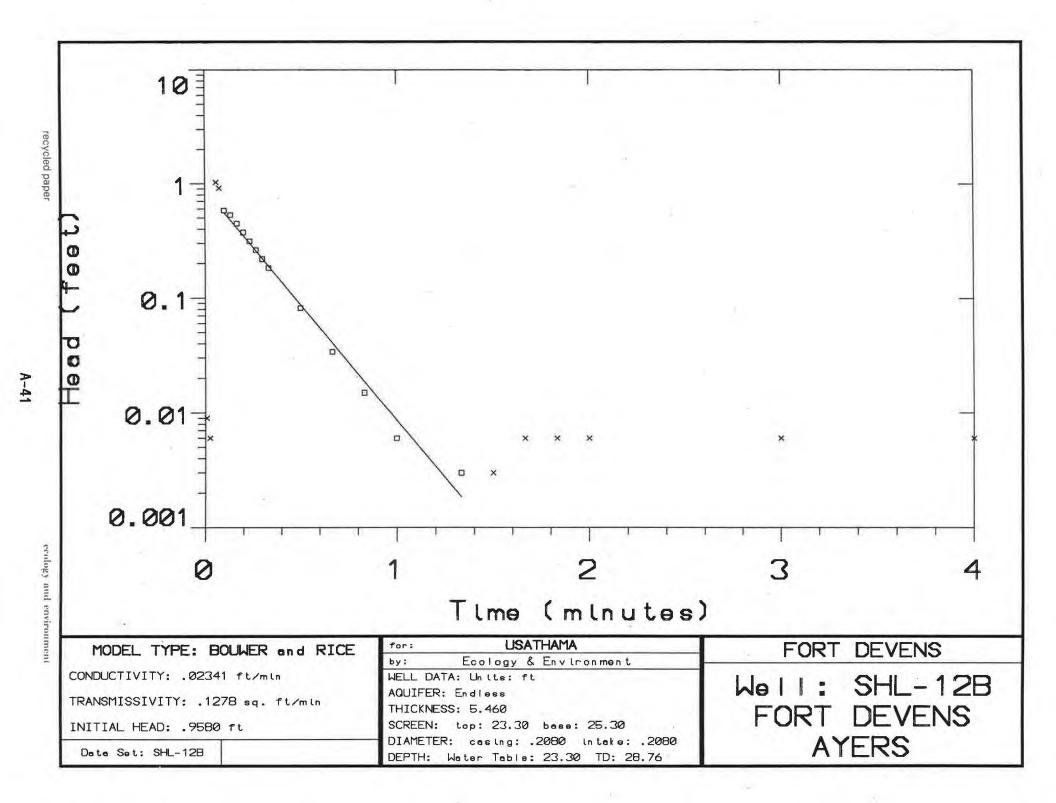


ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-12B

Reference	0.000	Scale Factor	10.036
SG	1.000	Offset	-0.029
Linearity	0.000	Delay mSEC	50.000
Time	18:05	Date	07/12/91
Logger Test	0	INPUT 1: Level	(F)
209901 1002			(.)

Step 1 07/12 12:43:38

E	lapsed Time	INPUT 1	Elapsed	Time	INPUT	1.
	0.0083	0.0090				
	0.0250	0.0060				
	0.0583	1.0280				
	0.0750	0.9140				
i k	0.1000	0.5820				
	0.1333	0.5310				
	0.1666	0.4460				
	0.2000	0.3730				
	0.2333	0.3130				
	0.2666	0.2620				
	0.3000	0.2180				
	0.3333	0.1830				
	0.5000	0.0820				
	0.6666	0.0340				
	0.8333	0.0150				
	1.0000	0.0060				
	1.3333	0.0030				
	1.5000	0.0030				
	1.6666	0.0060				
	1.8333	0.0060				
	2.0000	0.0060				
	3.0000	0.0060				
	4.0000	0.0060				
EN	4D					



ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-13A

Reference	0.000
SG	1.000
Linearity	0.000
Time	06:01
Logger Test	2

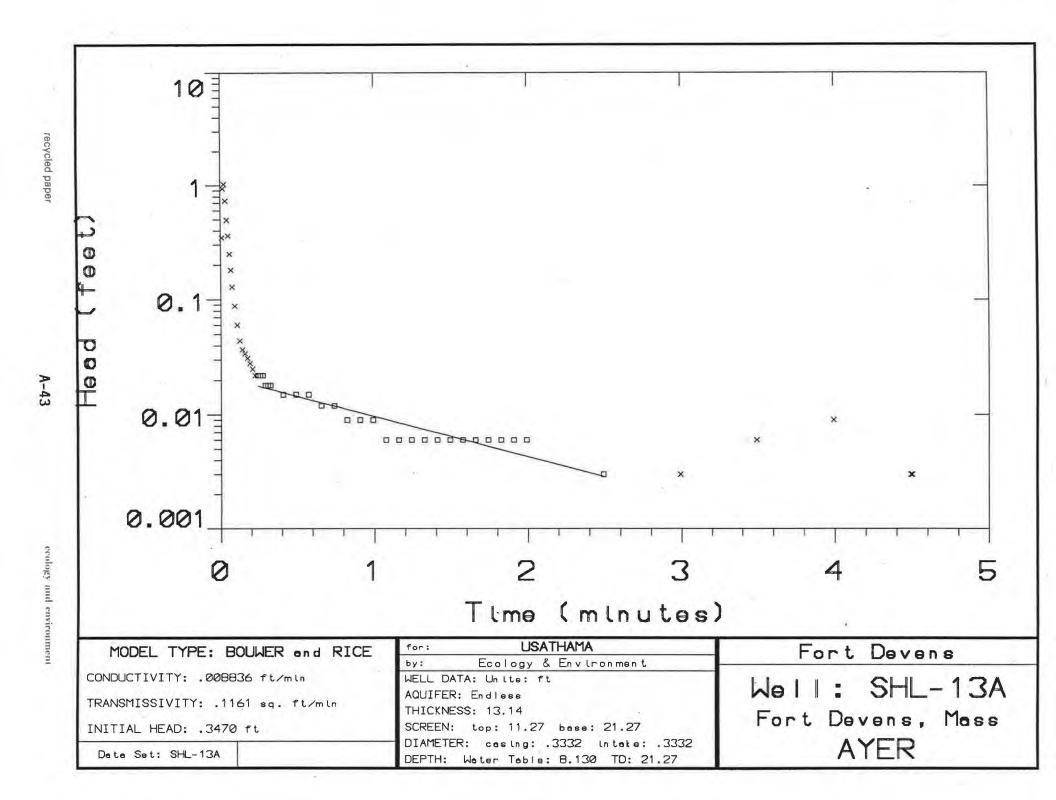
Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 07/12/91 Date INPUT 1: Level (F)

Step 1 07/11 10:38:10

0.0000	-0.022
0.0083	-2.233
0.0166	-0.347
0.0250	-0.936
0.0333	-1.024
0.0416	-0.733
0.0500	-0.496
0.0583	-0.360
0.0666	-0.249
0.0750	-0.180
0.0833	-0.129
0.1000	-0.088

Elapsed Time	INPUT 1
1.3333	-0.006
1.4166	-0.006
1.5000	-0.006
1.5833	-0.006
1.6666	-0.006
1.7500	-0.006
1.8333	-0.006
1.9166	-0.006
2.0000	-0.006
2.5000	-0.003
3.0000	-0.003
3.5000	0.006
4.0000	0.009
4.5000	0.003
END	

0.0166	-0.347
0.0250	-0.936
0.0333	-1.024
0.0416	-0.733
0.0500	-0.496
0.0583	-0.360
0.0666	-0.249
0.0750	-0.180
0.0833	-0.129
0.1000	-0.088
0.1166	-0.060
0.1333	-0.044
0.1500	-0.037
0.1666	-0.034
0.1833	-0.031
0.2000	-0.028
0.2166	-0.025
0.2333	-0.022
0.2500	-0.022
0.2666	-0.022
0.2833	-0.022
0.3000	-0.018
0.3166	-0.018
0.3333	-0.018
0.4166	-0.015
0.5000	-0.015
0.5833	-0.015
0.6666	-0.012
0.7500	-0.012
0.8333	-0.009
0.9166	-0.009
1.0000	-0.009
1.0833	-0.006
1.1666	-0.006
1.2500	-0.006



ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-13B

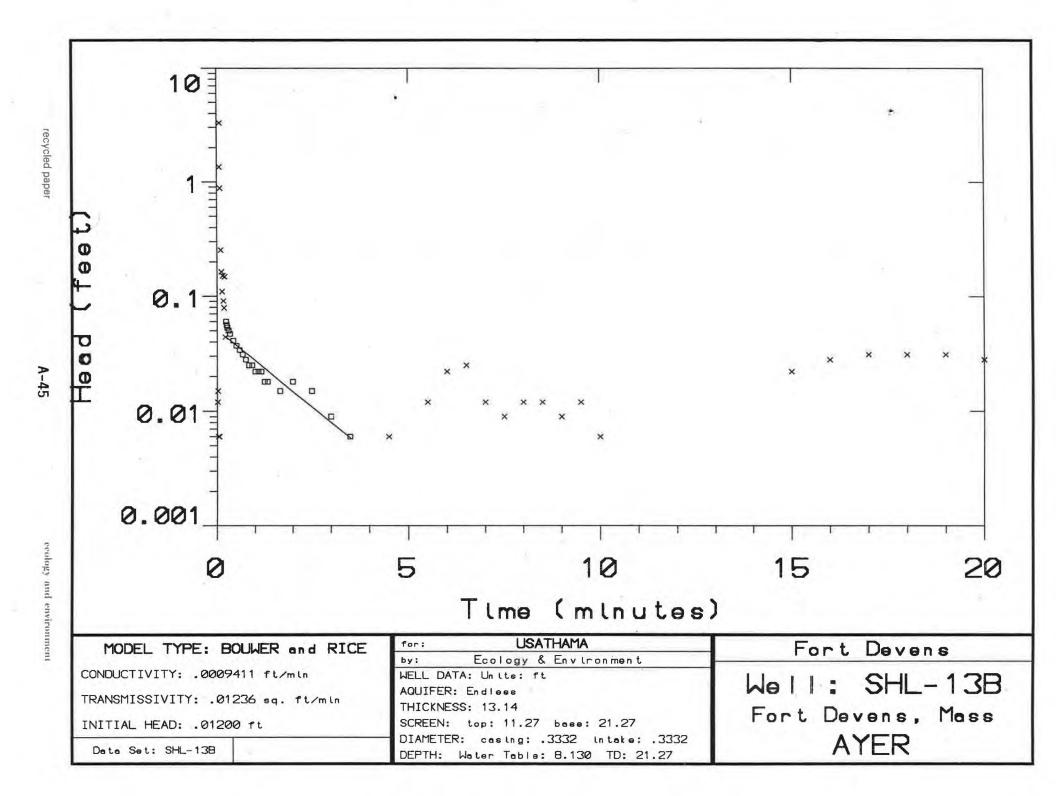
Reference	0.000
SG	1.000
Linearity	0.000
Time	06:02
Logger Test	2

Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/12/91 INPUT 1: Level (F)

Step 0 07/11 10:27:25

Elapsed Time	INPUT	1
0.0000	0.0	00
0.0083	0.0	
0.0166	-0.0	
0.0250	0.0	
0.0333	0.0	
0.0416	0.0	
0.0500	0.0	
0.0583	0.0	
0.0666	1.3	
0.0750	3.2	
0.0833	0.8	
0.1000	0.2	
0.1166	0.1	64
0.1333	0.1	10
0.1500	0.1	51
0.1666	0.0	91
0.1833	0.0	
0.2000	0.1	
0.2166	0.0	
0.2333	0.0	
0.2500	0.0	
0.2666	0.0	
0.2833	0.0	
0.3000	0.0	
0.3166	0.0	
0.3333	0.0	
0.4166	0.0	
0.5000	0.0	
0.5833	0.0	
0.6666	0.0	
0.7500	0.0	
0.8333	0.0	
0.9166	0.0	
1.0000 1.0833	0.0	
1.1666	0.0	
1.2500	0.0	
1.2500	0.0	T.()

Elapsed Time	INPUT	1
1.3333	0.01	8
1.4166	0.01	5
1.5000	0.01	5
1.5833	0.01	5
1.6666	0.01	5
1.7500	0.01	5
1.8333	0.01	5
1.9166	0.01	5
2.0000	0.01	8
2.5000	0.01	5
3.0000	0.00	9
3.5000	0.00	6
4.0000	0.00	6
4.5000	0.00	6
5.0000	0.00	6
5.5000	0.01	2
6.0000	0.02	2
6.5000	0.02	C3
7.0000	0.01	2
7.5000	0.00	
8.0000	0.01	2
8.5000	0.01	2
9.0000	0.00	
9.5000	0.01	2
10.0000	0.00	6
END		



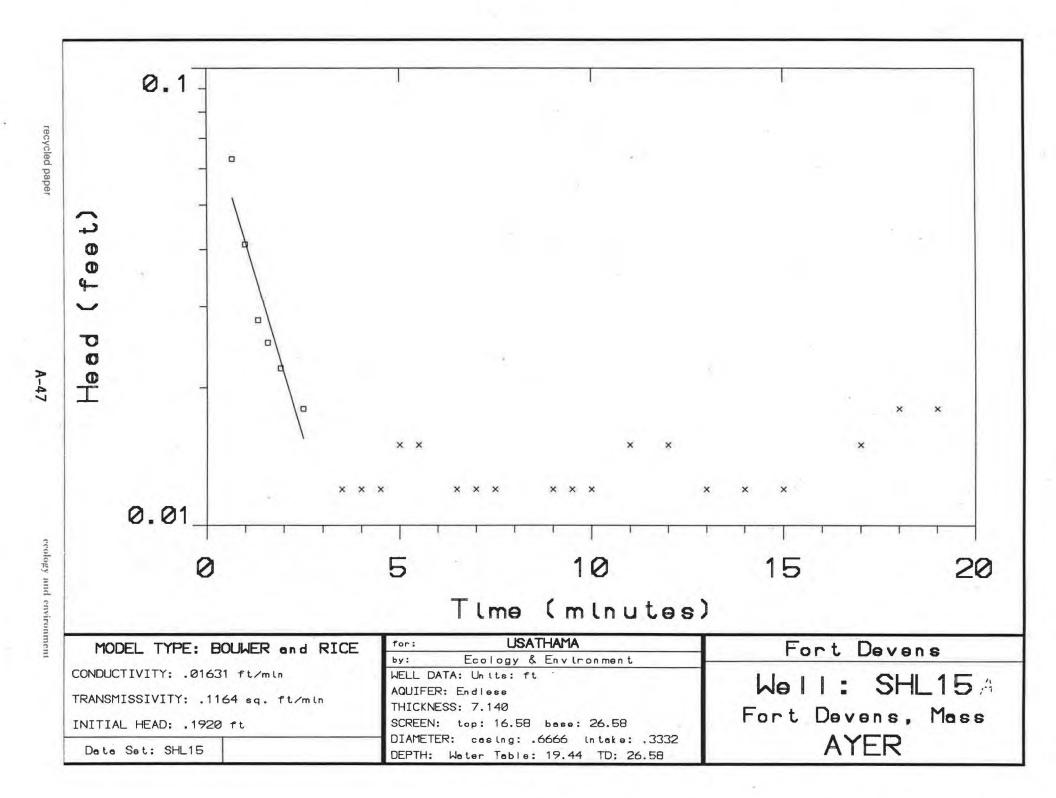
ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569

Monitoring Well SHL-15A

Reference	0.000	Scale Factor	10.036
SG	1.000	Offset	-0.029
Linearity	0.000	Delay mSEC	50.000
Time	09:28	Date	07/15/91
Logger Test	7	INPUT 1: Level	(F)

Step 1 07/14 15:12:56

apsed Time	INPUT 1	Elapsed Time	INPUT 1
0.0000	-0.680	1.3333	-0.028
0.0083	-0.192	1.4166	-0.028
0.0166	-0.680	1.5000	-0.028
0.0250	-0.793	1.5833	-0.025
0.0333	-0.752	1.6666	-0.025
0.0416	-0.711	1.7500	-0.025
0.0500	-0.680	1.8333	-0.022
0.0583	-0.651	1.9166	-0.022
0.0666	-0.623	2.0000	-0.022
0.0750	-0.597	2.5000	-0.018
0.0833	-0.572	3.0000	-0.009
0.1000	-0.525	3.5000	-0.012
0.1166	-0.483	4.0000	-0.012
0.1333	-0.439	4.5000	-0.012
0.1500	-0.395	5.0000	-0.015
0.1666	-0.366	5.5000	-0.015
0.1833	-0.335	6.0000	-0.009
0.2000	-0.306	6.5000	-0.012
0.2166	-0.281	7.0000	-0.012
0.2333	-0.256	7.5000	-0.012
0.2500	-0.237	8.0000	-0.009
0.2666	-0.218	8.5000	-0.009
0.2833	-0.202	9.0000	-0.012
0.3000	-0.186	9.5000	-0.012
0.3166	-0.170	10.0000	-0.012
0.3333	-0.161	11.0000	-0.015
0.4166	-0.120	12,0000	-0.015
0.5000	-0.091	13.0000	-0.012
0.5833	-0.075	14.0000	-0.012
0.6666	-0.063	15.0000	-0.012
0.7500	-0.053	16.0000	-0.009
0.8333	-0.047	17.0000	-0.015
0.9166	-0.044	18.0000	-0.018
1.0000	-0.041	19.0000	-0.018
1.0833	-0.037	END	
1.1666	-0.034		
1.2500	-0.031		



ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-15B

Reference	0.000
SG	1.000
Linearity	0.000
Time	09:30
Logger Test	7

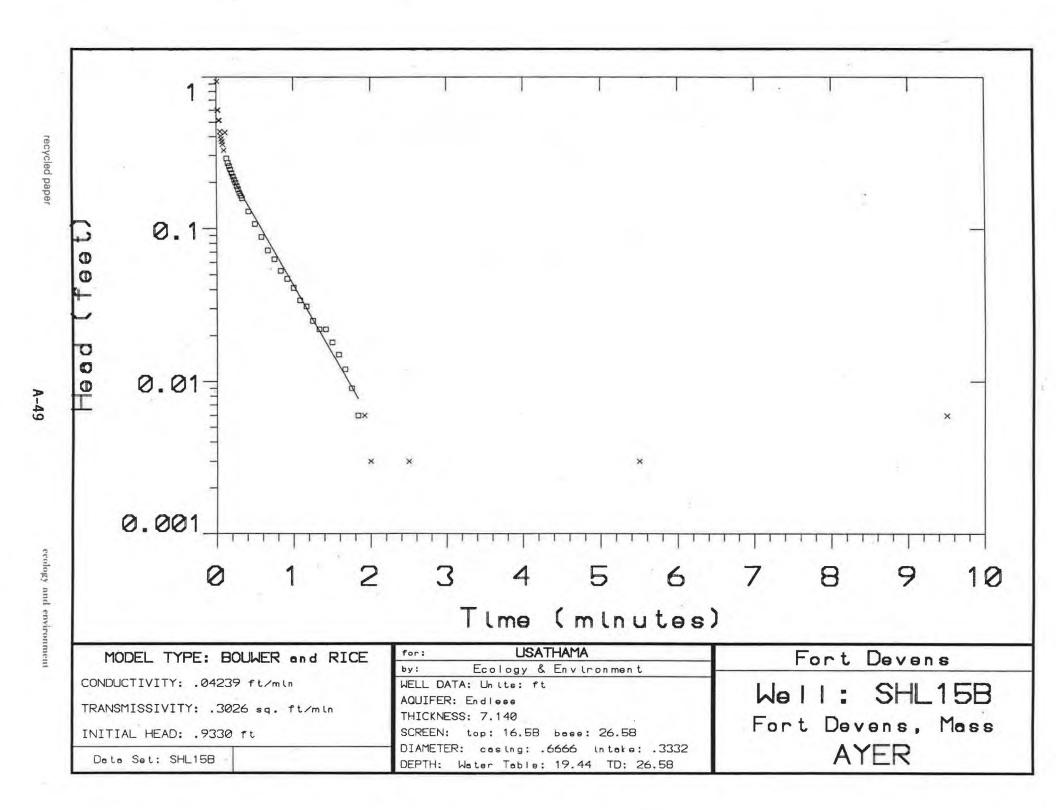
Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/15/91 INPUT 1: Level (F)

Step 0 07/14 15:10:04

Elapsed	Time	INPUT	1

-0.003
0.933
0.601
0.601
0.515
0.515
0.433
0.404
0.385
0.370
0.354
0.325
0.427
0.287
0.268
0.256
0.243
0.230
0.218
0.208
0.199
0.189
0.180
0.170
0.164
0.158
0.129
0.107
0.088
0.072
0.063
0.053
0.047
0.041
0.034
0.031
0.025

1.3333	0.022
1.4166	0.022
1.5000	0.018
1.5833	0.015
1.6666	0.012
1.7500	0.009
1.8333	0.006
1.9166	0.006
2.0000	0.003
2.5000	-0.003
3.0000	0.000
END	



ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-17A

Reference	0.000
SG	1.000
Linearity	0.000
Time	05:35
Logger Test	8

Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/12/91 INPUT 1: Level (F)

Step 1 07/11 16:26:24

Elapsed	Time	INPUT	1

Liapsed Time	1111-01 1
0.0000	-0.173
0.0083	-0.117
0.0166	0.230
0.0250	-0.196
0.0333	-0.300
0.0416	-0.404
0.0500	-0.506
0.0583	-0.540
0.0666	-0.572
0.0750	-0.487
0.0833	-0.427
0.1000	-0.328
0.1166	-0.259 -
0.1333	-0.196
0.1500	-0.154
0.1666	-0.120
0.1833	-0.094
0.2000	-0.075
0.2166	-0.060
0.2333	-0.047
0.2500	-0.041
0.2666	-0.031
0.2833	-0.025
0.3000	-0.022
0.3166	-0.018
0.3333	-0.015
0.4166	-0.009
0.5000	-0.006
0.5833	-0.006
0.6666	-0.006
0.7500	-0.006
0.8333	-0.006
0.9166	-0.006
1.0000	-0.006
1.0833	-0.006
1.1666	-0.006

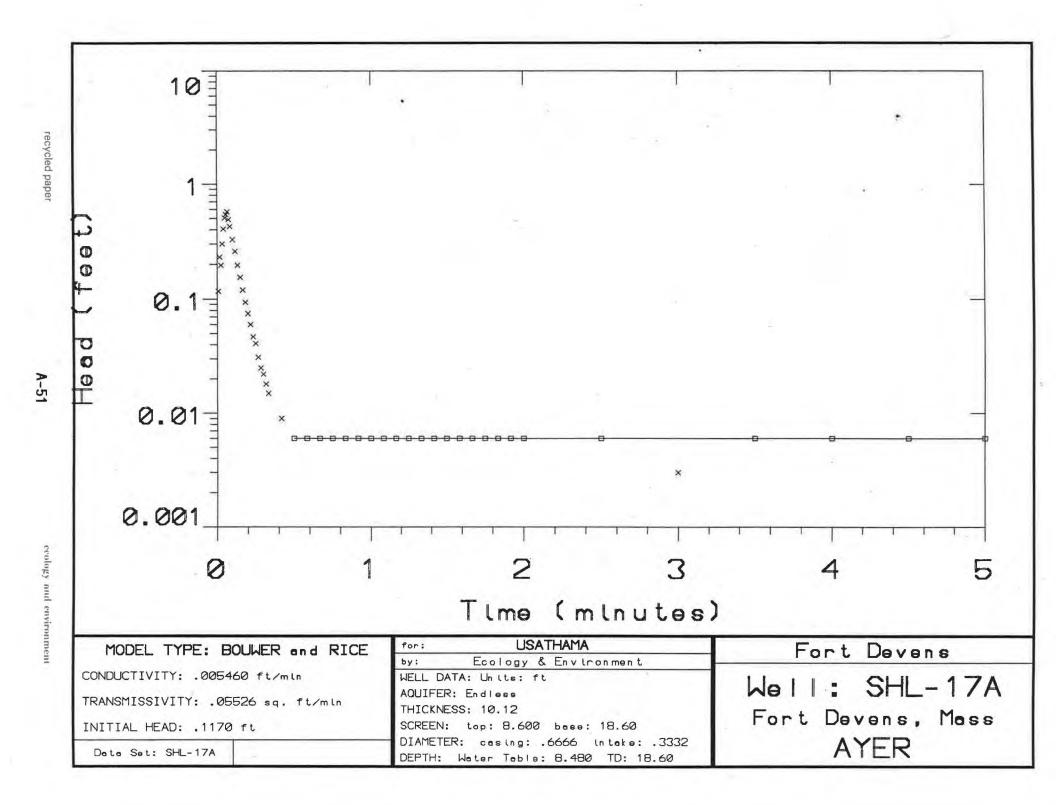
1.2500

-0.006

Elapsed Time INPUT 1

1.3333	-0.006
1.4166	-0.006
1.5000	-0.006
1.5833	-0.006
1.6666	-0.006
1.7500	-0.006
1.8333	-0.006
1.9166	-0.006
2.0000	-0.006
2.5000	-0.006
3.0000	-0.003
3.5000	-0.006
4.0000	-0.006
4.5000	-0.006
5.0000	-0.006
5.5000	-0.006
6.0000	-0.006
6.5000	-0.006
7.0000	-0.006
7.5000	-0.006
8.0000	-0.006
8.5000	-0.006
9.0000	-0.006
9.5000	-0.006
END	

EIAI



ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-17B

Reference	0.000
SG	1.000
Linearity	0.000
Time	05:37
Logger Test	8

Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/12/91 INPUT 1: Level (F)

Step 0 07/11 16:21:54

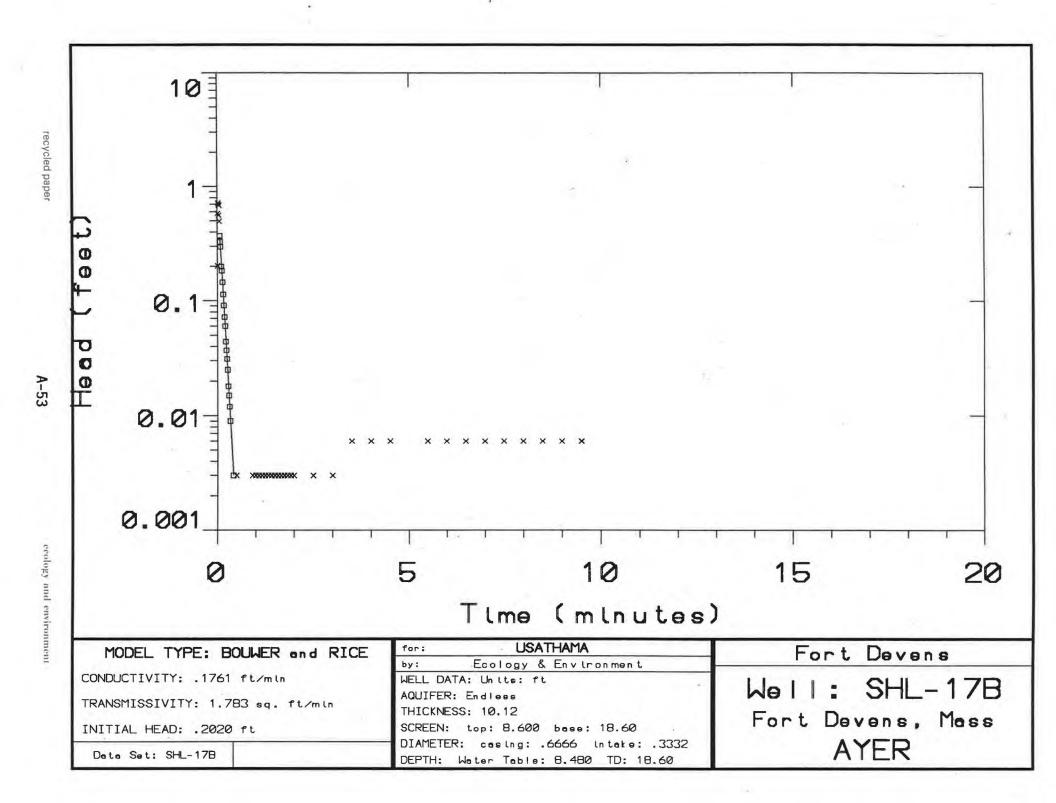
Elapsed	Time .	INPUT	1
crapsed	Time	INPUT	1

Elapsed Time	INPUT 1
0.0000	0.000
0.0083	0.202
0.0166	0.582
0.0250	0.718
0.0333	0.695
0.0416	0.559
0.0500	0.683
0.0583	0.496
0.0666	0.370
0.0750	0.328
0.0833	0.297
0.1000	0.199
0.1166	0.183
0.1333	0.145
0.1500	0.113
0.1666	0.091
0.1833	0.072
0.2000	0.060
0.2166	0.044
0.2333	0.037
0.2500	0.031
0.2666	0.025
0.2833	0.018
0.3000	0.015
0.3166	0.012
0.3333	0.009
0.4166	0.003
0.5000	0.003
0.5833	0.000
0.6666	0.000
0.7500	0.000
0.8333	0.000
0.9166	-0.003
1.0000	-0.003
1.0833	-0.003
1.1666	-0.003

1.2500

-0.003

1.3333	-0.003
1.4166	-0.003
1.5000	-0.003
1.5833	-0.003
1.6666	-0.003
1.7500	-0.003
1.8333	-0.003
1.9166	-0.003
2.0000	-0.003
2.5000	-0.003
3.0000	-0.003
3.5000	-0.006
4.0000	-0.006
4.5000	-0.006
END	



10.036

50.000 07/12 /91

1: Level (F)

INPUT 1

-0.012 -0.012 -0.012 -0.012 -0.012 -0.012 -0.012 -0.012 -0.009 -0.003

ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-18A

0.000	Scale Factor
1.000	Offset
0.000	Delay mSEC
11:24	Date
2	INPUT 1: Lev
	0.000

Step 1 07/12 09:00:45

0.6666

0.7500

0.8333

0.9166

1.0000

1.0833

1.1666

1.2500

-0.050

-0.031

-0.028

-0.022

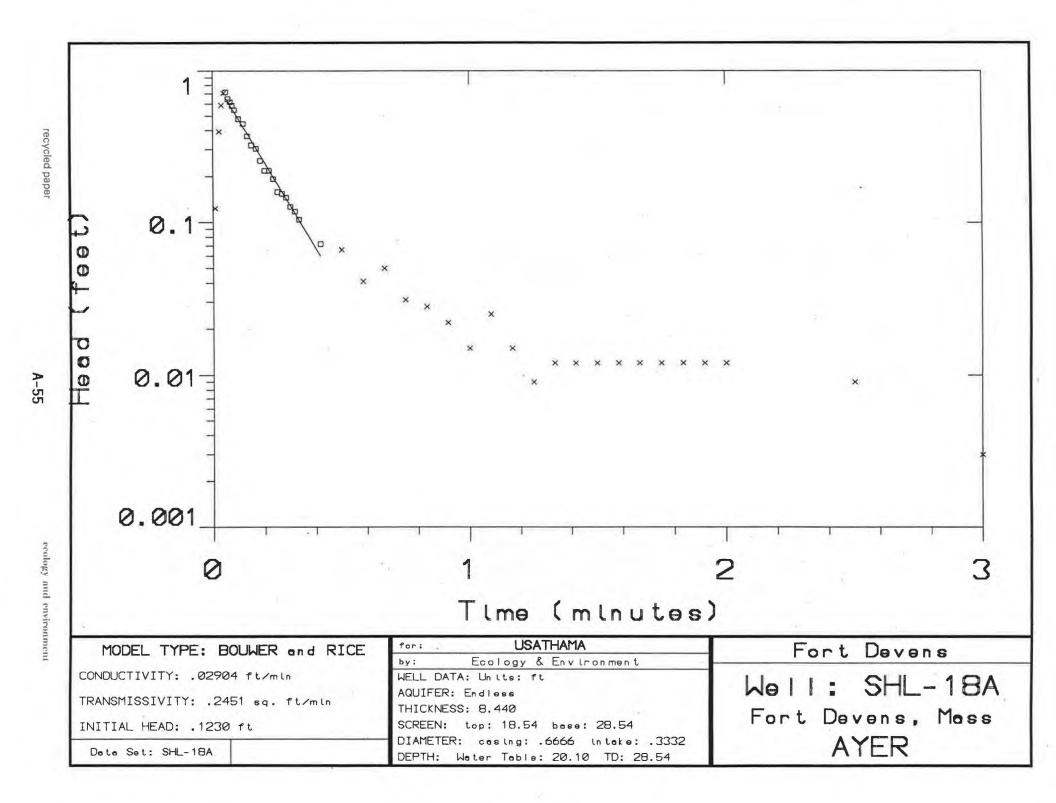
-0.015

-0.025

-0.015

-0.009

Elapsed Time	INPUT 1	Elapsed Time
0.0000	-0.066	1.3333
0.0083	-0.123	1.4166
0.0166	0.025	1.5000
0.0250	-0.392	1.5833
0.0333	-0.588	1.6666
0.0416	-0.708	1.7500
0.0500	-0.718	1.8333
0.0583	-0.648	1.9166
0.0666	-0.619	2.0000
0.0750	-0.585	2.5000
0.0833	-0.547	3.0000
0.1000	-0.477	
0.1166	-0.442	
0.1333	-0.366	
0.1500	-0.319	
0.1666	-0.303	
0.1833	-0.253	
0.2000	-0.218	
0.2166	-0.218	
0.2333	-0.192	
0.2500	-0.158	
0.2666	-0.154	
0.2833	-0.145	
0.3000	-0.126	
0.3166	-0.117	
0.3333	-0.104	
0.4166	-0.072	
0.5000	-0.066	
0.5833	-0.041	



ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-18B

Reference	0.000
SG	1.000
Linearity	0.000
Time	11:25
Logger Test	2

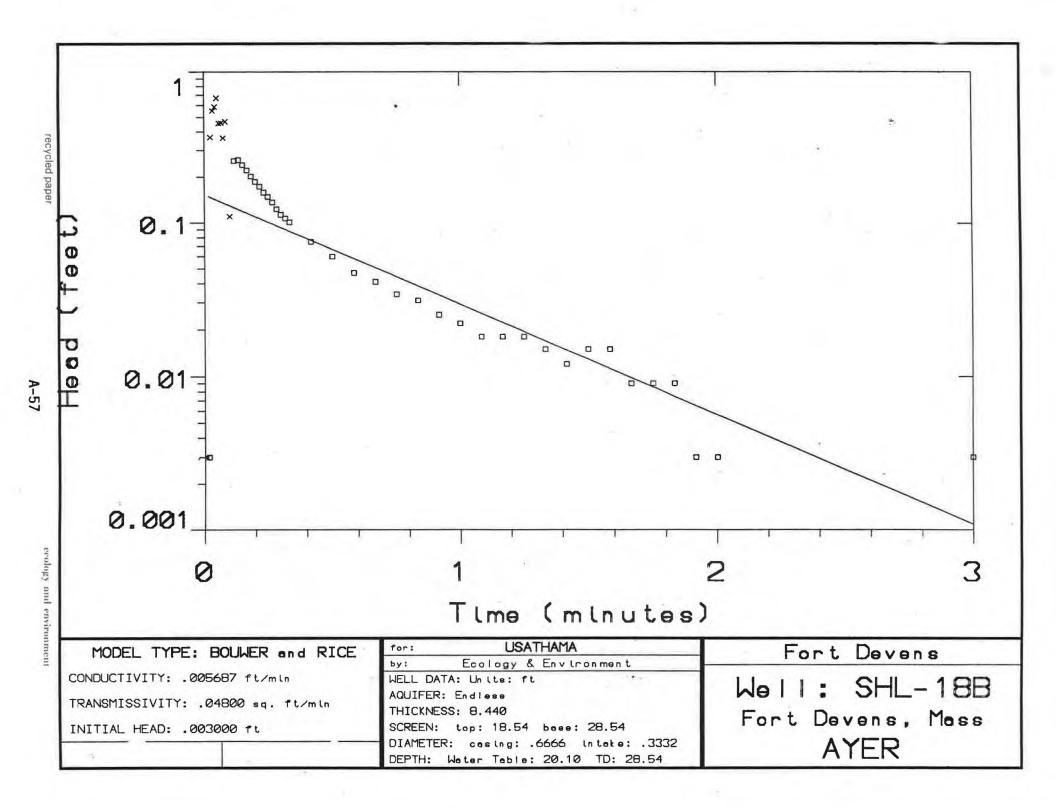
Scale Factor 10.036
Offset -0.029
Delay mSEC 50.000
Date 07/12 /91
INPUT 1: Level (F)

Step 0 07/12 08:57:54

Elapsed	Time	INPUT	1

Elapsed Ti	me	INPUT	1
0.0000		-0.0	03
0.0083		-0.0	03
0.0166		-0.0	
0.0250		0.3	
0.0333		0.5	
0.0416		0.5	85
0.0500		0.6	
0.0583		0.4	
0.0666		0.4	
0.0750		0.3	
0.0833		0.4	
0.1000		0.1	
0.1166		0.2	
0.1333		0.2	
0.1500		0.2	
0.1666		0.2	
0.1833		0.2	
0.2000		0.1	
0.2166		0.1	
0.2333		0.1	
0.2500		0.1	
0.2666	*	0.1	
0.2833		0.1	
0.3000		0.1	13
0.3166		0.1	07
0.3333		0.1	
0.4166		0.0	
0.5000		0.0	
0.5833		0.0	
0.6666		0.0	
0.7500		0.0	
0.8333		0.0	
0.9166		0.0	
1.0000		0.0	
1.0833		0.0	
1.2500	6	0.0	
1.2500		0.0	70

1.3333	0.015
1.4166	0.012
1.5000	0.015
1.5833	0.015
1.6666	0.009
1.7500	0.009
1.8333	0.009
1.9166	0.003
2.0000	0.003
2.5000	0.000



ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-19A

Reference	0.000
SG	1.000
Linearity	0.000
Time	11:26
Logger Test	1

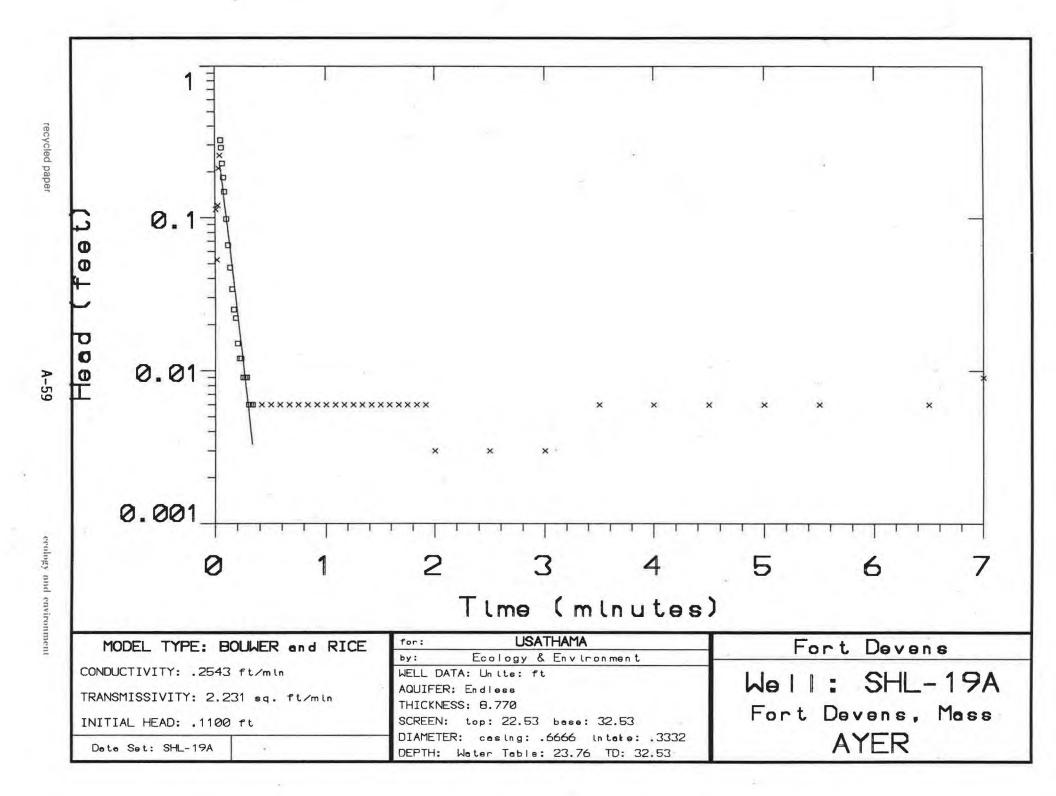
Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/12 /91 INPUT 1: Level (F)

Step 1 07/12 07:50:03

Elapsed	Time	INPUT	1

-0.0 -0.1 -0.0 -0.1 -0.2 -0.2	13 53 20 11
-0.1 -0.0 -0.1 -0.2	13 53 20 11
-0.0 -0.1 -0.2 -0.2	53 20 11
-0.1 -0.2 -0.2	20 11
-0.2 -0.2	11
-0.2	
	56
~O 3	
-0.2	87
-0.0	90
	-0.3 -0.2 -0.1 -0.1 -0.0 -0.0 -0.0 -0.0 -0.0 -0.0

1.3333	-0.006
1.4166	-0.006
1.5000	-0.006
1.5833	-0.006
1.6666	-0.006
1.7500	-0.006
1.8333	-0.006
1.9166	-0.006
2.0000	-0.003
2.5000	-0.003
3.0000	-0.003
3.5000	-0.006
4.0000	-0.006
4.5000	-0.006
5.0000	-0.006
5.5000	-0.006
6.0000	0.000
6.5000	-0.006
7.0000	-0.009



0.0060 0.0030

ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-19B

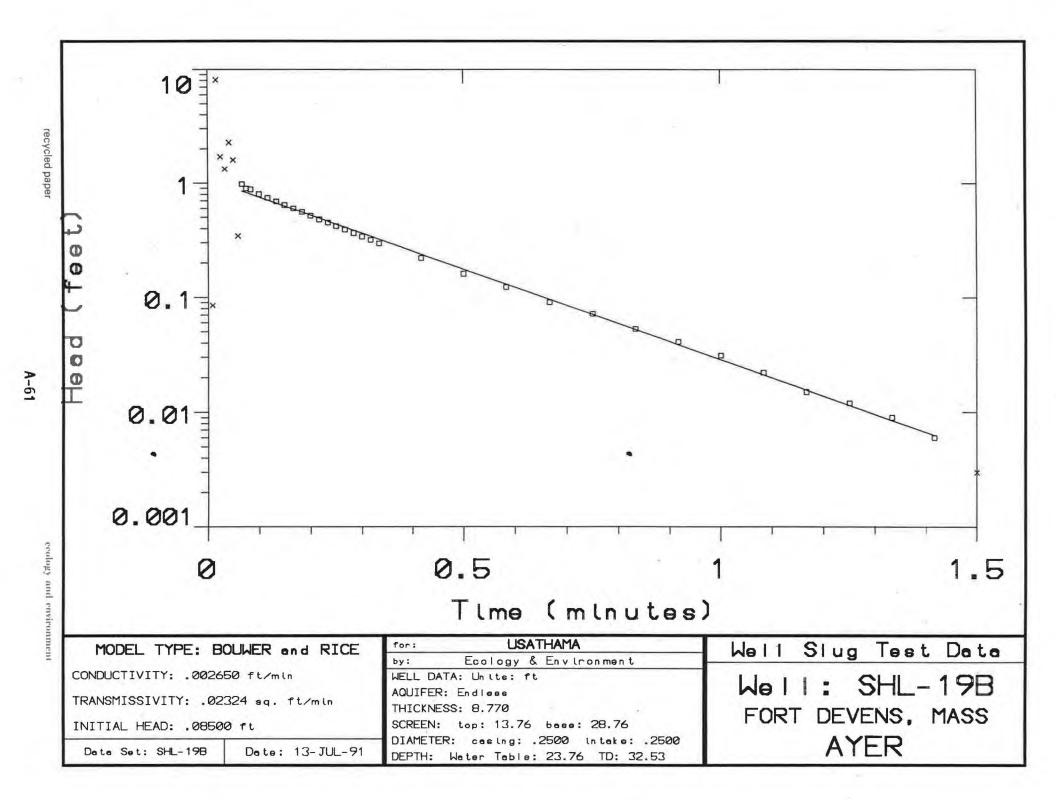
Reference	0.000	Scale Factor	10.036
SG	1.000	Offset	-0.029
Linearity	0.000	Delay mSEC	50.000
Time		Date	07/12/91
Logger Test	1	INPUT 1: Level	(F)

1.2500

1.3333

0.0120

Elapsed Time	INPUT 1		Elapsed Time	INPUT .
0.0083	0.0850		1.4166	0.006
0.0166	8.1070		1.5000	0.003
0.0250	1.7010		END	0.000
0.0333	1.3310		LND	
0.0416	2.2680			
0.0500	1.5910			
0.0583	0.3440			
0.0666	0.9800			
0.0750	0.8950			
0.0833	0.8820			
0.1000	0.8000			
0.1166	0.7430			
0.1333	0.6920			
0.1500	0.6420			
0.1666	0.6010			
0.1833	0.5590			
0.2000	0.5180			
0.2166	0.4800			
0.2333	0.4520			
0.2500	0.4200			
0.2666	0.3920			
0.2833	0.3660			
0.3000	0.3410			
0.3166	0.3190			
0.3333	0.2970			
0.4166	0.2210			
0.5000	0.1610			
0.5833	0.1230			
0.6666	0.0910			
0.7500	0.0720			
0.8333	0.0530			
0.9166	0.0410			
1.0000	0.0310	1.00		
1.0833	0.0220			
1.1666	0.0150			
4 5566				



ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-20A

Reference	0.000
SG	1.000
Linearity	0.000
Time	09:32
Logger Test	6

Scale Factor r 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/15/91 INPUT 1: Level (F)

Step 1 07/14 14:34:12

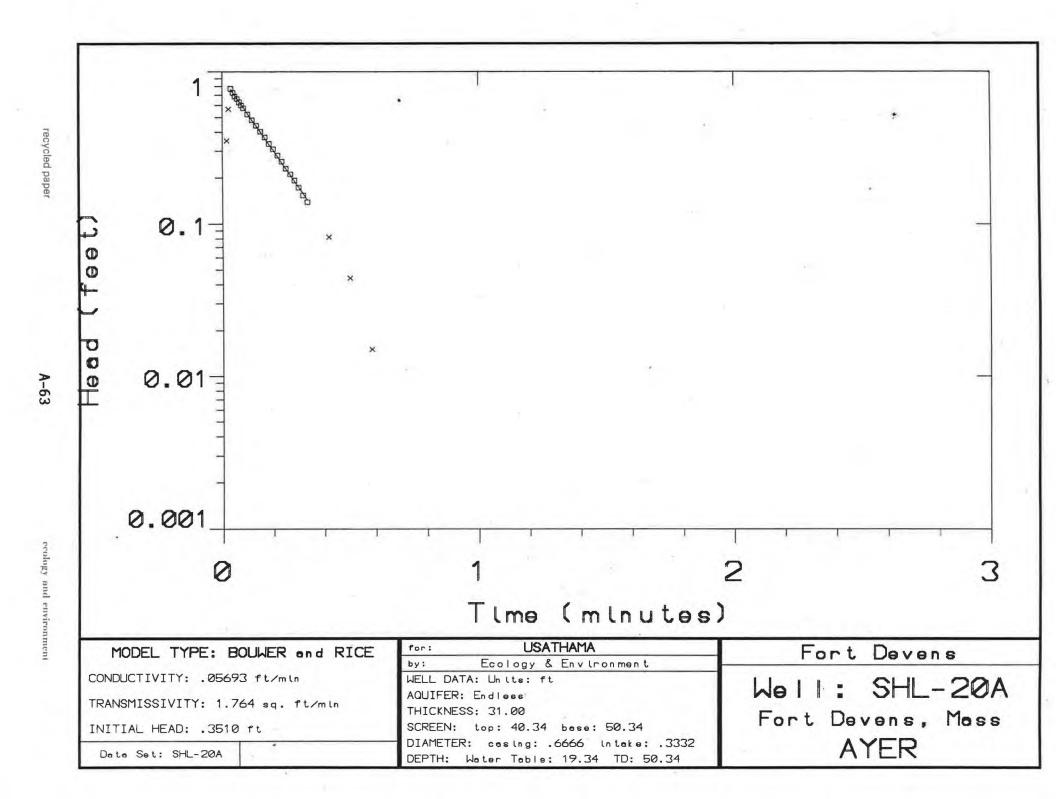
Elapsed Tim	e INPUT 1
0.0000	-0.142 0.000
0.0085	
0.0250	-0.351 -0.566
0.0333	-0.771
0.0416	-0.727
	-0.689
0.0500	-0.661
0.0583 0.0666	-0.629
0.0750	-0.601
0.0833	-0.575
0.1000	-0.525
0.1166	-0.480
0.1333	-0.442
0.1500	-0.404
0.1666	-0.370
0.1833	-0.335
0.2000	-0.309
0.2166	-0.281
0.2333	-0.256
0.2500	-0.230
0.2666	-0.211
0.2833 `	-0.192
0.3000	-0.173
0.3166	-0.154
0.3333	-0.139
0.4166	-0.082
0.5000	-0.044
0.5833	-0.015
0.6666	0.000
0.7500	0.000
0.8333	0.000
0.9166	0.000
1.0000	0.000
1.0833	0.000
The Control of the Co	and the second case

1.1666

1.2500

0.000

Elapsed Time	INPUT 1
1.3333	0.000
1.4166	0.000
1.5000	0.000
1.5833	0.000
1.6666	0.000
1.7500	0.000
1.8333	0.000
1.9166	0.000
2.0000	0.000
2.5000	0.000
END	



ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-20B

Reference	0.000
SG	1.000
Linearity	0.000
Time	09:34
Logger Test	6

Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/15/91 INPUT 1: Level (F)

Step 0 07/14 14:31:38

Ela	psed	Time	INPUT	1

0.0000	0.000
0.0083	0.000
0.0166	0.000
0.0250	-0.227
0.0333	0.000
0.0416	0.000
0.0500	0.000
0.0583	0.000
0.0666	0.000
0.0750	0.000
0.0833	0.000
0.1000	0.000
0.1166	0.000
0.1333	0.000
0.1500	0.000
0.1666	0.000
0.1833	0.000
0.2000	0.000
0.2166	0.000
0.2333	0.000
0.2500	0.000
0.2666	0.000
0.2833	0.000
0.3000	0.000
0.3166	0.000
0.3333	0.000
0.4166	0.000
0.5000	0.000
0.5833	0.000

0.6666 0.7500

0.8333

0.9166

1.0000

1.0833 1.1666

1.2500

0.000

0.000

0.000

0.000

0.000 0.000

0.000

0.000

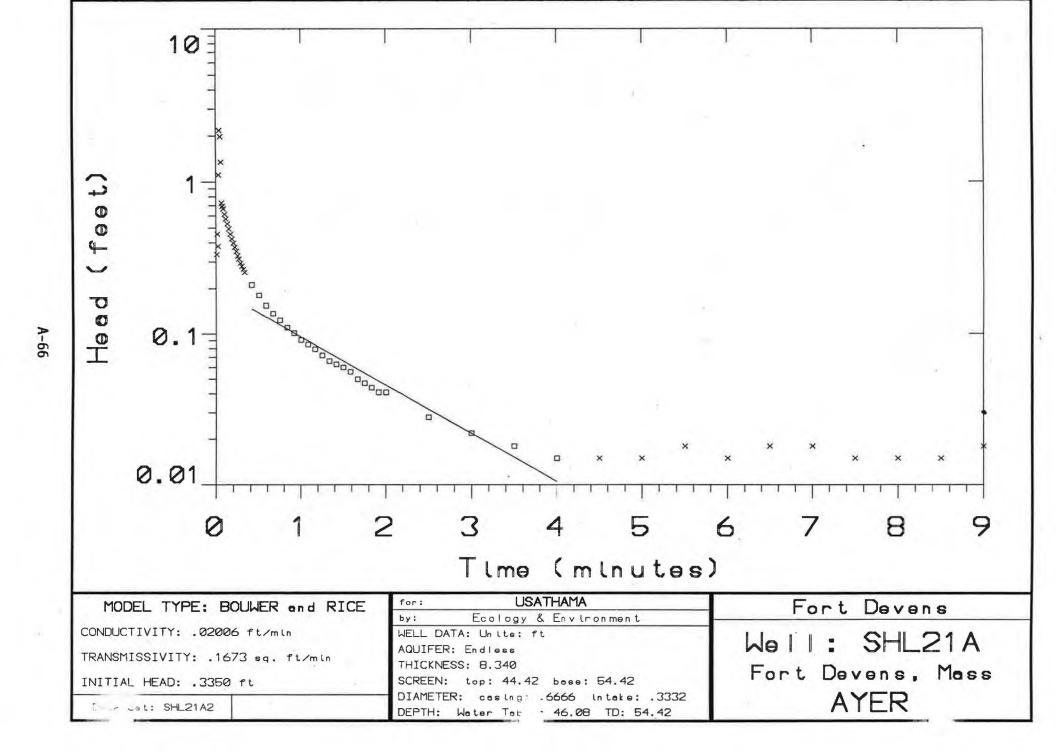
1.3333	0.000
1.4166	0.000
1.5000	0.000
1.5833	0.000
1.6666	0.000
1.7500	0.000
1.8333	0.000
1.9166	0.000
2.0000	0.000
2.5000	0.000
END	

ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well SHL-21A

Reference	0.000	Scale Factor	10.036
SG	1.000	Offset	-0.029
Linearity	0.000	Delay mSEC	50.000
Time	09:40	Date	07/15/91
Logger Test	4	INPUT 1: Level	(F)

Step 1 07/14 12:35:55

apsed Time	INPUT 1	Elapsed Time	INPUT :
0.0000	0.006	1.3333	-0.066
0.0083	-0.335	1.4166	-0.063
0.0166	0.455	1.5000	-0.060
0.0250	-0.379	1.5833	-0.05
0.0333	-1.113	1.6666	-0.05
0.0416	-2.173	1.7500	-0.04
0.0500	-1.977	1.8333	-0.04
0.0583	-1.350	1.9166	-0.04
0.0666	-0.727	2.0000	-0.04
0.0750	-0.695	2.5000	-0.02
0.0833	-0.667	3.0000	-0.02
0.1000	-0.616	3,5000	-0.01
0.1166	-0.572	4.0000	-0.01
0.1333	-0.531	4.5000	-0.01
0.1500	-0.493	5.0000	-0.01
0.1666	-0.455	5.5000	-0.018
0.1833	-0.423	6.0000	-0.01
0.2000	-0.398	6.5000	-0.01
0.2166	-0.373	7.0000	-0.018
0.2333	-0.351	7.5000	-0.01
0.2500	-0.328	8.0000	-0.01
0.2666	-0.313	8,5000	-0.01
0.2833	-0.294	9.0000	-0.01
0.3000	-0.281	END	
0.3166	-0.268		
0.3333	-0.256		
0.4166	-0.211		
0.5000	-0.180		
0.5833	-0.154		
0.6666	-0.136		
0.7500	-0.123		
0.8333	-0.110		
0.9166	-0.101		
1.0000	-0.091		
1.0833	-0.085		
1.1666	-0.079		
1.2500	-0.072		



ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569

Monitoring Well SHL-21B

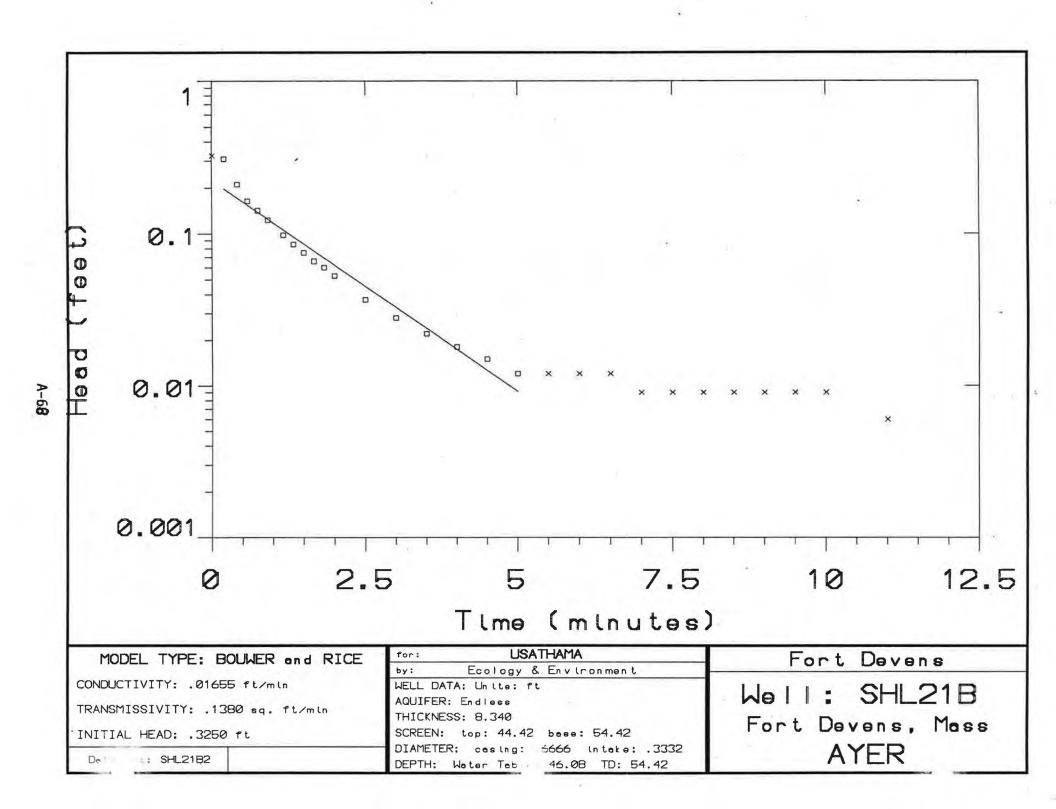
Reference	0.000
SG	1.000
Linearity	0.000
Time	09:42
Logger Test	4

Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/15/91 INPUT 1: Level (F)

Step 0 07/14 12:25:01

Elapsed Time	INPUT 1
0.0000	0.000
0.0083	0.325
0.0166	-1.866
0.0250	0.695
0.0333	0.623
0.0416	0.518
0.0500	0.442
0.0583	0.449
0.0666	0.430
0.0750	0.417
0.0833	0.404
0.1000	0.385
0.1166	0.370
0.1333	0.357
0.1500	0.344
0.1666	0.332
0.1833	0.322
0.2000	0.309
0.2166	0.300
0.2333	0.291
0.2500	0.281
0.2666	0.272
0.2833	0.262
0.3000	0.256
0.3166	0.249
0.3333	0.240
0.4166	0.211
0.5000	0.186
0.5833	0.164
0.6666	0.154
0.7500	0.142
0.8333	0.132
0.9166	0.123
1.0000	0.113
1.0833	0.107
1.1666	0.098
1.2500	0.091

Elapsed	Time	INPUT	1
1.333	33	0.0	85
1.41	56	0.082	
1.500		0.0	
1.583	33	0.0	72
1.666	56	0.0	
1.750		0.063	
1.833		0.0	
1.91		0.0	
2.000		0.0	
2.500		0.0	
3.000		0.0	
3.500		0.0	
4.000		0.0	
4.500		0.0	
5.000		0.0	
5.500		0.0	
6.000		0.0	
6.500		0.0	
7.000		0.0	
7.500		0.0	
8.000		0.0	
8.500		0.0	
9.000		0.0	
9.500		0.0	
10.000		0.0	
11.000	00	0.0	06
END			



ECOLOGY AND ENVIRONMENT SE2000

Environmental Logger Unit# 569

Monitoring Well SHL-22

page	1	ot	1

Reference	0.000
SG	1.000
Linearity	0.000
Time	
Logger Test	Ε,

Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/13/91 INPUT 1: Level (F)

Step 1 07/13

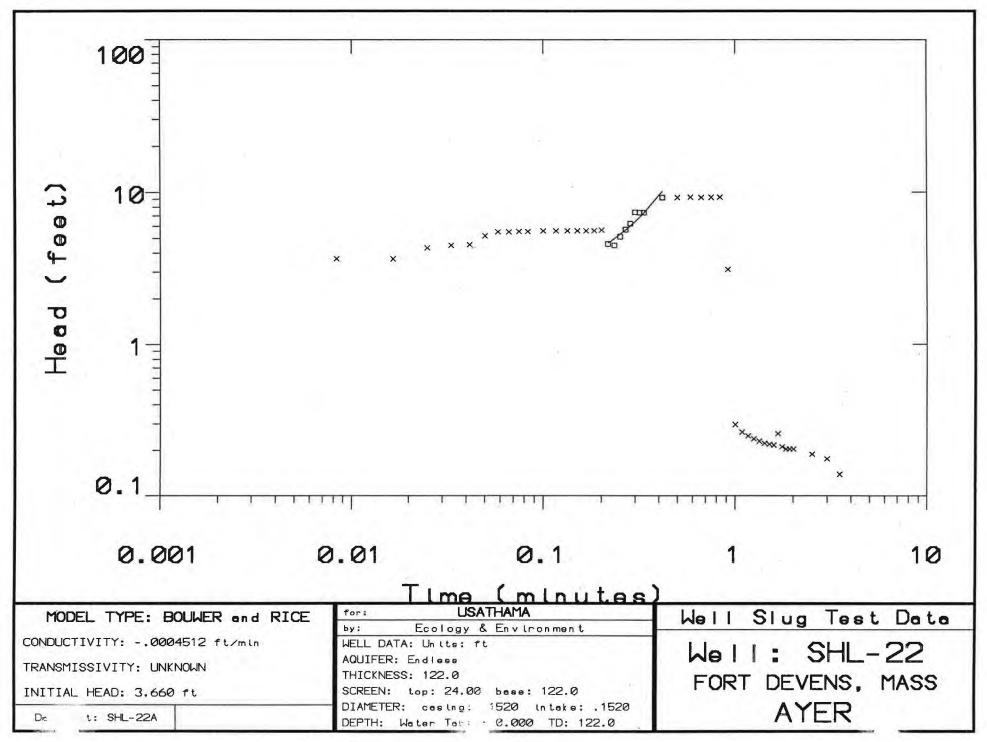
Elapsed	Time	INPUT	1
we we make an an			_

0.0083 3.6570 3.6510 0.0166 0.0250 4.3130 0.0333 4.4800

Elapsed Time	INPUT 1
1.4166	0.2230
1.5000	0.2200
1.5833	0.2170
1.6666	0.2580
1.7500	0.2110
1.8333	0.2040
1.9166	0.2040
2.0000	0.2040
2.5000	0.1890
3.0000	0.1760
3.5000	0.1390
END	

0.0555	4.4000
0.0416	4.5340
0.0500	5.1740
0.0583	5.5080
0.0666	5.5050
0.0750	5.5270
0.0833	5.5300
0.1000	5.5810
0.1166	5.5840
0.1333	5.5810
0.1500	5.5810
0.1666	5.5840
0.1833	5.5870
0.2000	5.6280
0.2166	4.5650
0.2333	4.4580
0.2500	5.1020
0.2666	5.6750
0.2833	6.2080
0.3000	7.3560
0.3166	7.3180
0.3333	7.3180
0.4166	9.2100
0.5000	9.2040
0.5833	9.2320
0.6666	9.2010
0.7500	9.2230
0.8333	9.2420
0.9166	3.0990
1.0000	0.2960
1.0833	0.2640
1.1666	0.2490
1.2500	0.2390
1.3333	0.2300

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ECOLOGY AND ENVIRONMENT

page 1 of 1

Water Level Indicator
Monitoring Well SHL-24A

Date

08/07/91

Elapsed T	ime	INPUT	1
4.9900		17.20	00
9.9900		17.19	00
14.990		17.18	00
19.990		17.17	00
24.990		17.16	00
29.990		17.15	00
34.990		17.13	00
39.990		17.12	00
44.990		17.12	00
49.990		17.10	00
54.990		17.07	00
END			

Elapsed	Time	INPUT	1

ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger

Unit# 569

Monitoring Well SHL-25

Reference	0.000
SG	1.000
Linearity	0.000
Time	
Logger Test	5

Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/13/91 INPUT 1: Level (F)

page 1 of 1

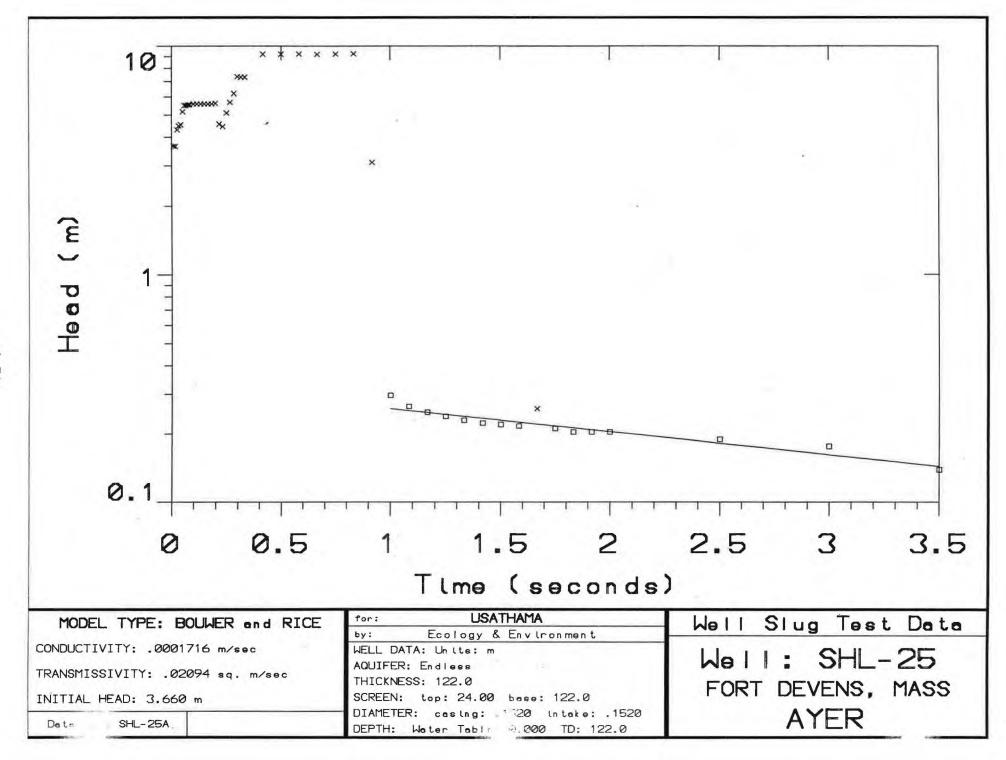
Step 1 07/13

Elapsed	Time	INPUT	1
made unito inferior			

Elapsed Time INPUT 1

0.0083	3.6570
0.0166	3.6510
0.0250	4.3130
0.0333	4.4800
0.0416	4.5340
0.0500	5.1740
0.0583	5.5080
0.0666	5.5050
0.0750	5.5270
0.0833	5.5300
0.1000	5.5810
0.1166	5.5840
0.1333	5.5810
0.1500	5.5810
0.1666	5.5840
0.1833	5.5870
0.2000	5.6280
0.2166	4.5650
0.2333	4.4580
0.2500	5.1020
0.2666	5.6750
0.2833	6.2080
0.3000	7.3560
0.3166	7.3180
0.3333	7.3180

END



Slug Test Report Section No.: Appendix A

Revision No: 0

Date:

December 1991

Cold Spring Brook Landfill Data

RC323

recycled paper

A-75

ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger

Unit# 569 Monitoring Well csb-la

Reference	0.000	Scale Factor	10.036
SG	1.000	Offset	-0.029
Linearity	0.000	Delay mSEC	50.000
Time	09:57	Date	07/15/91
Logger Test	0	INPUT 1: Level	(F)

Step 1 07/13 11:38:43

Elapsed Time INPUT 1	Elapsed Time	INPUT 1	
	was been take that the four was take their said		-
0.0000 -0.771	1.3333	-0.060	
0.0083 -0.291	1.4166	-0.053	
0.0166 -0.468	1.5000	-0.047	
0.0250 -0.942	1.5833	-0.044	
0.0333 -1.126	1.6666	-0.041	
0.0416 -1.315	1.7500	-0.037	
0.0500 -1.572	1.8333	-0.031	
0.0583 -1.489	1.9166	-0.031	
0.0666 -1.407	2.0000	-0.028	
0.0750 -1.325	2.5000	-0.012	
0.0833 -1.258	3.0000	0.000	
0.1000 -1.129	3.5000	0.009	
0.1166 -1.018	4.0000	0.015	
0.1333 -0.907	4.5000	0.018	
0.1500 -0.819	5.0000	0.022	
0.1666 -0.740	END		
0.1833 -0.667			
0.2000 -0.604			
0.2166 -0.547			
0.2333 -0.499			

0.2500

0.2666

0.2833

0.3000

0.3166

0.3333

0.4166

0.5000

0.5833

0.6666

0.7500

0.8333

0.9166

1.0000

1.0833

1.1666

1.2500

-0.452

-0.414

-0.379

-0.351

-0.325

-0.303

-0.227

-0.183

-0.154

-0.132

-0.117

-0.104

-0.091

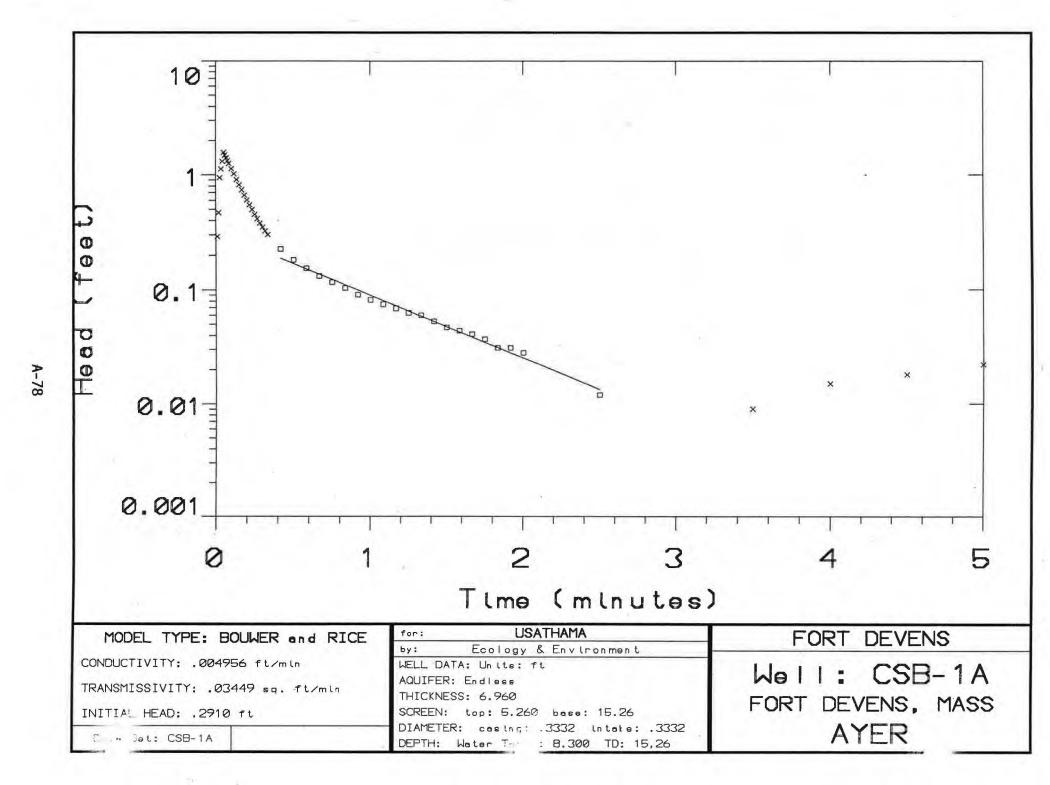
-0.082

-0.075

-0.069

-0.063

page 1 of 1



ECOLOGY AND ENVIRONMENT SE2000

Environmental Logger Unit# 569

Monitoring Well CSB-1B

Reference	0.000
SG	1.000
Linearity	0.000
Time	09:59
Logger Test	0

Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/15/91 INPUT 1: Level (F)

page 1 of 1

Step 0 07/13 11:31:04

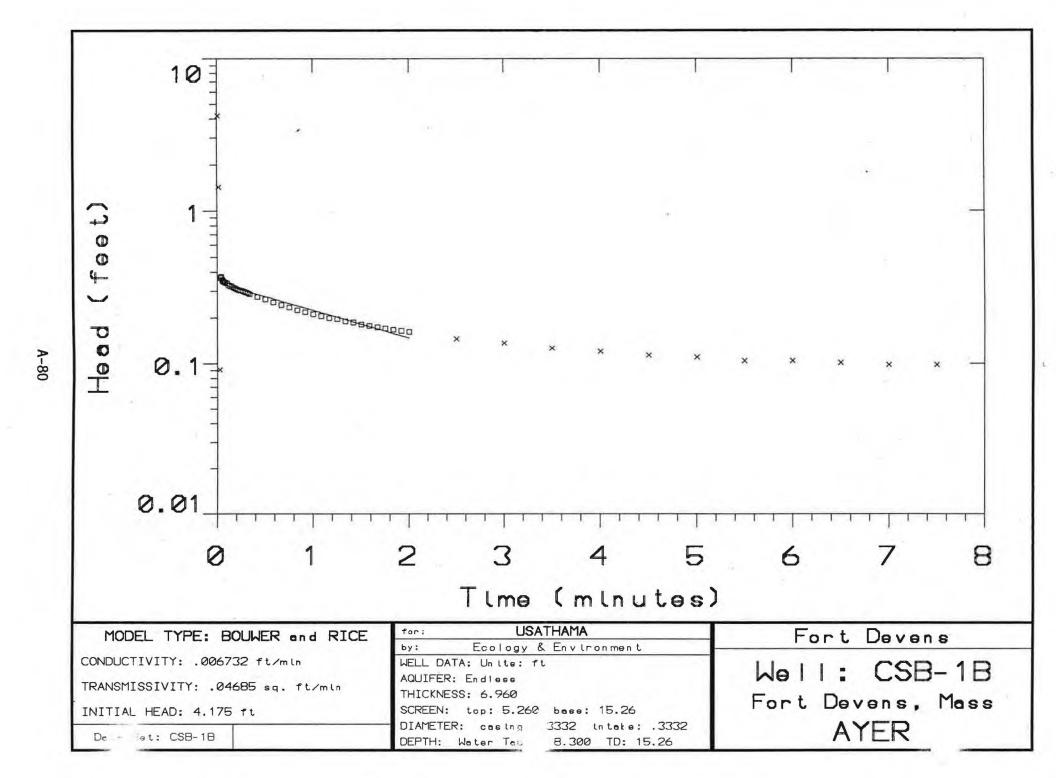
Elapsed Time I	NPUT 1	
----------------	--------	--

0.0000 0.000 0.0083 4.175 0.0166 1.429 0.0250 0.091 0.0333 0.366 0.0416 0.373 0.0500 0.357 0.0583 0.351 0.0666 0.347 0.0750 0.344 0.0833 0.341 0.338 0.1000 0.1166 0.328 0.1333 0.325 0.1500 0.322 0.1666 0.316 0.1833 0.313 0.2000 0.309 0.2166 0.306 0.2333 0.303 0.2500 0.303 0.2666 0.300 0.2833 0.297 0.3000 0.294 0.3166 0.291 0.3333 0.287 0.4166 0.275 0.5000 0.265 0.5833 0.253 0.243 0.6666 0.7500 0.234 0.8333 0.224 0.9166 0.218 1.0000 0.211 1.0833 0.205 1.1666 0.199

Elapsed Time INPUT 1

1.3333	0.189
1.4166	0.186
1.5000	0.180
1.5833	0.177
1.6666	0.173
1.7500	0.170
1.8333	0.167
1.9166	0.164
2.0000	0.161
2.5000	0.145
3.0000	0.136
3.5000	0.126
4.0000	0.120
4.5000	0.113
5.0000	0.110
5.5000	0.104
6.0000	0.104
6.5000	0.101
7.0000	0.098
7.5000	0.098
END	
•	

0.196



ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well CSB-2A

Reference	0.000
SG	1.000
Linearity	0.000
Time	09:58
Logger Test	8

Scale Factor 10.036
Offset -0.029
Delay mSEC 50.000
Date 07/13 /91
INPUT 1: Level (F)

Step 1 07/13 09:00:59

Elapsed	Time	INPUT	1
- I upou	1 2 1110	2111 -	-

Elapsed	Time	INPUT	1

	200.44
0.0000	0.000
0.0083	0.000
0.0166	0.000
0.0250	0.000
0.0333	0.000
0.0416	0.000
0.0500	0.000
0.0583	0.000
0.0666	0.000
0.0750	0.000
0.0833	0.000
0.1000	0.000
0.1166	0.000
0.1333	0.000
0.1500	0.000
0.1666	0.000
0.1833	0.000
0.2000	0.000
0.2166	0.000
0.2333	0.000
0.2500	0.000
0.2666	0.000
0.2833	0.000
0.3000	0.000
0.3166	0.000
0.3333	0.000
0.4166	0.000
0.5000	0.000
0.5833	0.000
0.6666	0.000
0.7500	0.000
0.8333	0.000
0.9166	0.000
1.0000	0.000
1.0833	0.000
1.1666	0.000
1.2500	0.000

recycled paper

1.3333	0.000
1.4166	0.000
1.5000	0.000
1.5833	0.000
1.6666	0.000
1.7500	0.000
1.8333	0.000
1.9166	0.000
2.0000	0.000

ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well CSB-2B

Reference	0.000
SG	1.000
Linearity	0.000
Time	09:59
Logger Test	8

Scale Factor 10.036
Offset -0.029
Delay mSEC 50.000
Date 07/13 /91
INPUT 1: Level (F)

Step 0 07/13 08:58:13

INPUT

1

0.000

0.000

0.000

0.000

0.000

Elapsed Time

0.0000	0.000
0.0083	0.000
0.0166	0.000
0.0250	0.000
0.0333	0.000
0.0416	0.000
0.0500	0.000
0.0583	0.000
0.0666	0.000
0.0750	0.000
0.0833	0.000
0.1000	0.000
0.1166	0.000
0.1333	0.000
0.1500	0.000
0.1666	0.000
0.1833	0.000
0.2000	0.000
0.2166	0.000
0.2333	0.000
0.2500	0.000
0.2666	0.000
0.2833	0.000
0.3000	0.000
0.3166	0.000
0.3333	0.000
0.4166	0.000
0.5000	0.000
0.5833	0.000
0.6666	0.000
0.7500	0.000

0.8333

0.9166

1.0000

1.0833

Elapsed Time	INPUT 1
1.3333	0.000
1.4166	0.000
1.5000	0.000
1.5833	0.000
1.6666	0.000
1.7500	0.000
1.8333	0.000
1.9166	0.000
2.0000	0.000
2.5000	0.000

ECOLOGY AND ENVIRONMENT page 1 of 1 SE2000

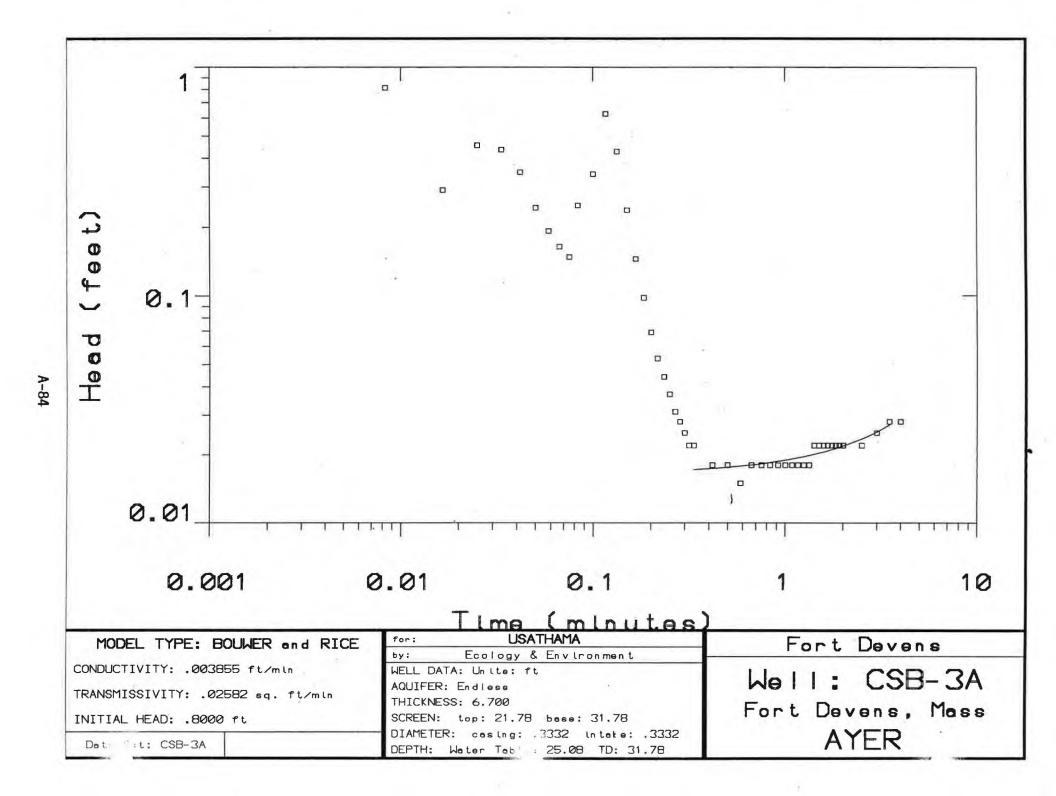
SE2000 Environmental Logger Unit# 569 Monitoring Well CSB-3A

Reference	0.000	Scale Factor	10.036
SG	1.000	Offset	-0.029
Linearity	0.000	Delay mSEC	50.000
Time	09:51	Date	07/15/91
Logger Test	1	INPUT 1: Level	(F)

Step 1 07/13 12:06:31

lapsed Time	INPUT 1	Elapsed Time	INPUT 1
		point many plant balant make many time balant days done their	
0.0000	-0.262	1.3333	-0.018
0.0083	-0.812	1.4166	-0.022
0.0166	0.291	1.5000	-0.022
0.0250	-0.455	1.5833	-0.022
0.0333	-0.436	1.6666	-0.022
0.0416	-0.347	1.7500	-0.022
0.0500	-0.243	1.8333	-0.022
0.0583	-0.192	1.9166	-0.022
0.0666	-0.164	2.0000	-0.022
0.0750	-0.148	2.5000	-0.022
0.0833	-0.249	3.0000	-0.025
0.1000	-0.341	3.5000	-0.028
0.1166	-0.626	4.0000	-0.028
0.1333	-0.427	END	
0.1500	-0.237		
0.1666	-0.145		
0.1833	-0.098		
0.2000	-0.069		
0.2166	-0.053		
0.2333	-0.044		
0.2500	-0.037		
0.2666	-0.031		
0.2833	-0.028		
0.3000	-0.025		
0.3166	-0.022		
0.3333	-0.022		
0.4166	-0.018		
0.5000	-0.018		
0.5833	-0.015		
0.6666	-0.018		
0.7500	-0.018		
0.8333	-0.018		
0.9166	-0.018		
1.0000	-0.018		
1.0833	-0.018		
1.1666	-0.018		

-0.018



ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger

page 1 of 1

Unit# 569
Monitoring Well CSB~3B

Reference	0.000
SG	1.000
Linearity	0.000
Time	09:55
Logger Test	1

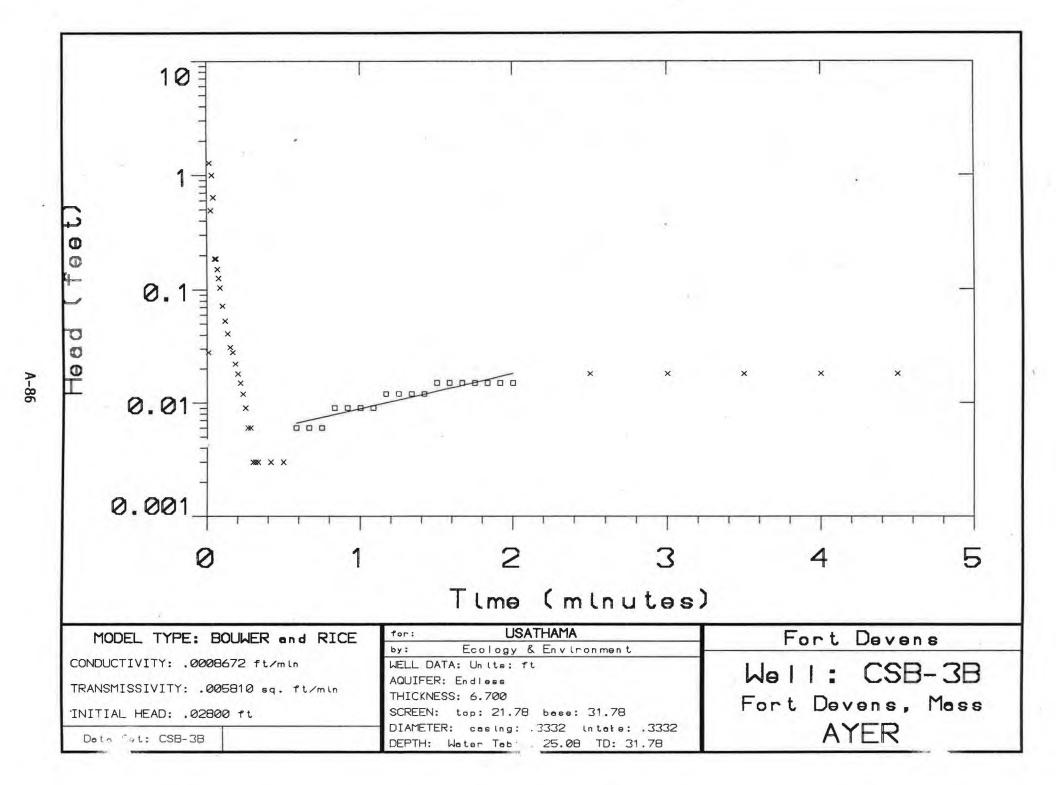
Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/15/91 INPUT 1: Level (F)

Step 0 07/13 12:01:54

Elabsed Tille Input	psed Time INPU	T 1
---------------------	----------------	-----

# 9 # W P P P P W W W W P W	
0.0000	0.000
0.0083	0.028
0.0166	1.281
0.0250	-0.490
0.0333	0.999
0.0416	0.638
0.0500	0.186
0.0583	0.186
0.0666	0.151
0.0750	0.126
0.0833	0.104
0.1000	0.072
0.1166	0.053
0.1333	0.041
0.1500	0.031
0.1666	0.028
0.1833	0.022
0.2000	0.018
0.2166	0.015
0.2333	0.012
0.2500	0.009
0.2666	0.006
0.2833	0.006
0.3000	0.003
0.3166	0.003
0.3333	0.003
0.4166	-0.003
0.5000	-0.003
0.5833	-0.006
0.6666	-0.006
0.7500	-0.006
0.8333	-0.009
0.9166	-0.009
1.0000	-0.009
1.0833	-0.009
1.1666	-0.012
1.2500	-0.012

1.3333	-0.012
1.4166	-0.012
1.5000	-0.015
1.5833	-0.015
1.6666	-0.015
1.7500	-0.015
1.8333	-0.015
1.9166	-0.015
2.0000	-0.015
2.5000	-0.018
3.0000	-0.018
3.5000	-0.018
4.0000	-0.018
4.5000	-0.018
END	



ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well CSB-4A

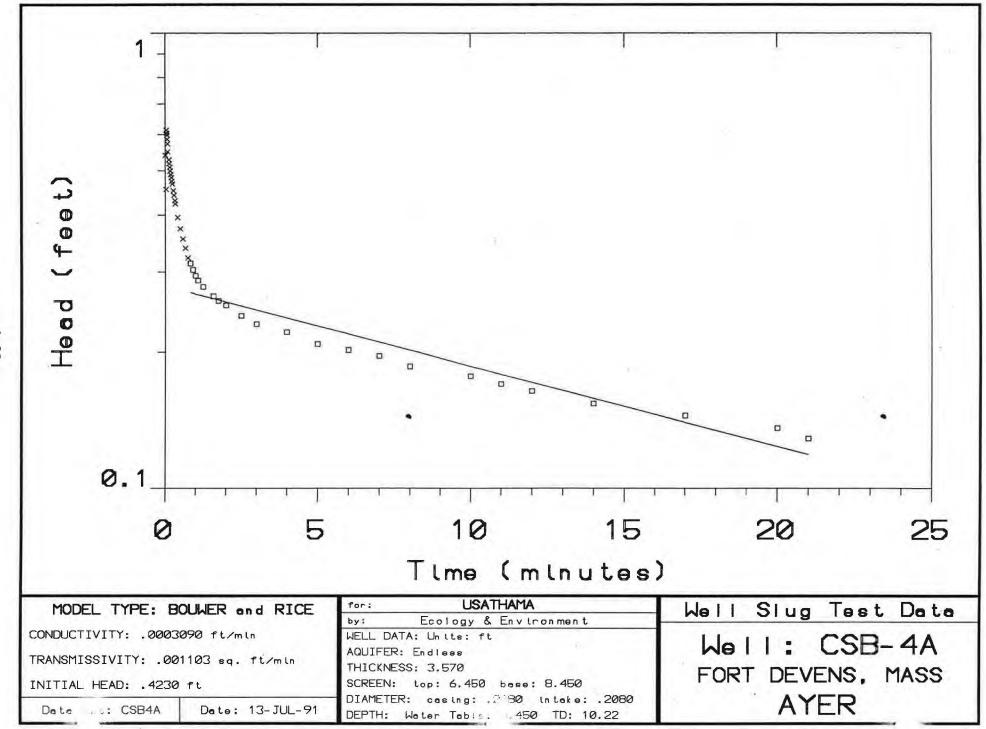
Reference	0.000
SG	1.000
Linearity	0.000
Time	
Logger Test	5

Scale Factor 10.036
Offset -0.029
Delay mSEC 50.000
Date 07/13/91
INPUT 1: Level (F)

Step 1 07/13

Elapsed Time	INPUT 1	Elapsed Time	INPUT 1
0,0000	-0.423	1.3333	-0.275
0.0083	-0.540	1.4166	-0.272
0.0166	-0.471	1.5000	-0.265
0.0250	-0.455	1.5833	-0.265
0.0333	-0.483	1.6666	-0.262
0.0416	-0.613	1.7500	-0.259
0.0500	-0.604	1.8333	-0.256
0.0583	-0.597	1.9166	-0.256
0.0666	-0.585	2.0000	-0.253
0.0750	-0.572	2.5000	-0.240
0.0833	-0.550	3.0000	-0.230
0.1000	-0.534	3.5000	-0.224
0.1166	-0.528	4.0000	-0.221
0.1333	-0.518	4.5000	-0.215
0.1500	-0.509	5.0000	-0.208
0.1666	-0.499	5.5000	-0.205
0.1833	-0.490	6.0000	-0.202
0.2000	-0.483	6.5000	-0.199
0.2166	-0.474	7.0000	-0.196
0.2333	-0.468	7.5000	-0.189
0.2500	-0.461	8.0000	-0.186
0.2666	-0.452	8.5000	-0.183
0.2833	-0.442	9.0000	-0.180
0.3000	-0.436	9.5000	-0.180
0.3166	-0.430	10.0000	-0.177
0.3333	-0.423	11.0000	-0.170
0.4166	-0.395	12.0000	-0.164
0.5000	-0.373	13.0000	-0.154
0.5833	-0.354	14.0000	-0.154
0.6666	-0.338	15.0000	-0.148
0.7500	-0.322	16.0000	-0.145
0.8333	-0.313	17.0000	-0.145
0.9166	-0.303	18.0000	-0.142
1.0000	-0.294	19.0000	-0.139
1.0833	-0.287	20.0000	-0.136
1.1666	-0.281	21.0000	-0.129
1.2500 recycled	paper0 . 278	END ecology at	nd environment





ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well CSB-4B

Reference	0.000
SG	1.000
Linearity	0.000
Time	
Logger Test	5

Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/13/91 INPUT 1: Level (F)

Step 1 07/13

Elapsed Time	INPUT 1
0.0000	2.242
0.0083	1.249
0.0166	0.379
0.0250	0.616
0.0333	0.597
0.0416	0.585
0.0500	0.578
0.0583	0.575
0.0666	0.569
0.0750	0.578
0.0833	0.569
0.1000	0.566
0.1166	0.528
0.1333	0.521
0.1500	0.518
0.1666	0.515
0.1833	0.512
0.2000	0.506
0.2166	0.502
0.2333	0.502
0.2500	0.496
0.2666	0.493
0.2833	0.493
0.3000	0.493
0.3166	0.487
0.3333	0.490
0.4166	0.490
0.5000	0.480
0.5833	0.477
0.6666	0.477
0.7500	0.474
0.8333	0.471
0.9166	0.474
1.0000	0.464
1.0833	0.471
1.1666	0.471
1.2500	0.468
recycled	paper

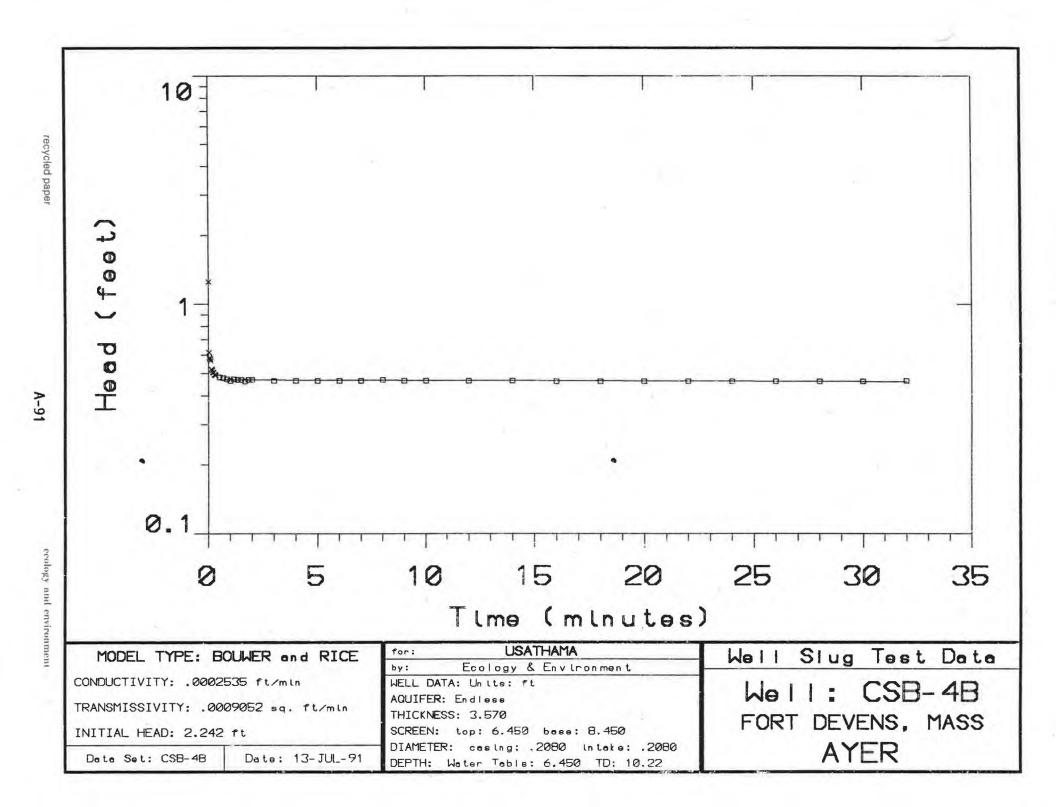
Elapsed Time	INPUT	1
1.3333	0.46	8
1.4166	0.46	
1.5000	0.46	8
1.5833	0.46	8
1.6666	0.46	1
1.7500	0.46	3
1.8333	0.46	8
1.9166	0.46	3
2.0000	0.46	8
2.5000	0.46	8
3.0000	0.46	4
3.5000	0.46	4
4.0000	0.46	4
4.5000	0.46	4
5.0000	0.46	4
5.5000	0.46	4
6.0000	0.46	4
6.5000	0.45	8
7.0000	0.46	4
7.5000	0.46	4
8.0000	0.46	8
8.5000	0.46	4
9.0000	0.46	
9:5000	0.46	
10.0000	0.46	
11.0000	0.46	4
12.0000	0.46	
13.0000	0.46	
14.0000	0.46	
15.0000	0.46	
16.0000	0.46	
17.0000	0.46	
18.0000	0.46	
19.0000	0.46	
20.0000	0.46	
21,0000	0.46	
22.0000	0.46	1
ecology an	id environmen	1

page 2 of 2

ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well CSB-4B

0.000	Scale Factor	10.036
1.000	Offset	-0.029
0.000	Delay mSEC	50.000
	Date	07/13/91
5	INPUT 1: Level	(F)
	1.000	1.000 Offset 0.000 Delay mSEC Date

Step 1 07	/13	E		
Elapsed Time	INPUT 1		Elapsed Time	INPUT 1
23.0000	0.461			
24.0000	0.461			
25.0000	0.461			
26.0000	0.461			
27.0000	0.464			
28.0000	0.461			
29.0000	0.461			
30.0000	0.461			
31.0000	0.461			
32.0000	0.464			
END				



ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569

Monitoring Well CSB-6A

Reference	0.000	Scale Factor 10.	036
SG	1.000	Offset -0.	029
Linearity	0.000	Delay mSEC 50.	000
Time	10:00	Date 07/	13/91
Logger Test	7	INPUT 1: Level (F)	

0.8333

0.9166

1.0000

1.0833

1.1666

1.2500

-0.025

-0.018

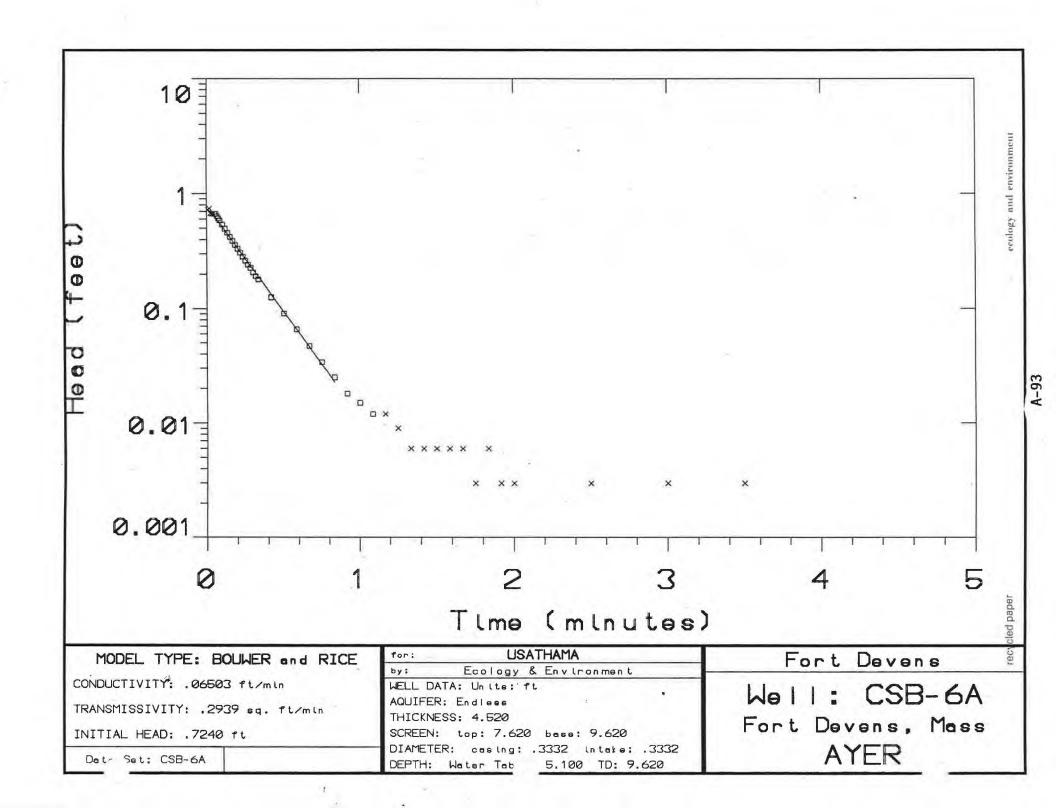
-0.015

-0.012

-0.012

-0.009

Elapsed Time	INPUT 1	Elapsed Time	INPUT 1
	200.000		
		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
0.0000	-0.120	1.3333	-0.006
0.0083	-0.724	1.4166	-0.006
0.0166	-0.743	1.5000	-0.006
0.0250	-0.673	1.5833	-0.006
0.0333	-0.667	1.6666	-0.006
0.0416	-0.670	1.7500	-0.003
0.0500	-0.664	1.8333	-0.006
0.0583	-0.664	1.9166	-0.003
0.0666	-0.635	-2.0000	-0.003
0.0750	-0.607	2.5000	-0.003
0.0833	-0.585	3.0000	-0.003
0.1000	-0.537	3.5000	-0.003
0.1166	-0.496	END	
0.1333	-0.458		
0.1500	-0.420		
0.1666	-0.389		
0.1833	-0.357		
0.2000	-0.332		
0.2166	-0.306		
0.2333	-0.284		
0.2500	-0.262		
0.2666 '	-0.243		
0.2833	-0.227		
0.3000	-0.208	1	
0.3166	-0.192		
0.3333	-0.180		
0.4166	-0.126		
0.5000	-0.091		
0.5833	-0.066		
0.6666	-0.047		
0.7500	-0.034		



## ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well CSB-6B

Reference	0.000	Scale Factor	10.036
SG	1.000	Offset	-0.029
Linearity	0.000	Delay mSEC	50.000
Time	10:01	Date	07/13/91
Logger Test	7	INPUT 1: Level	(F)

1.0833

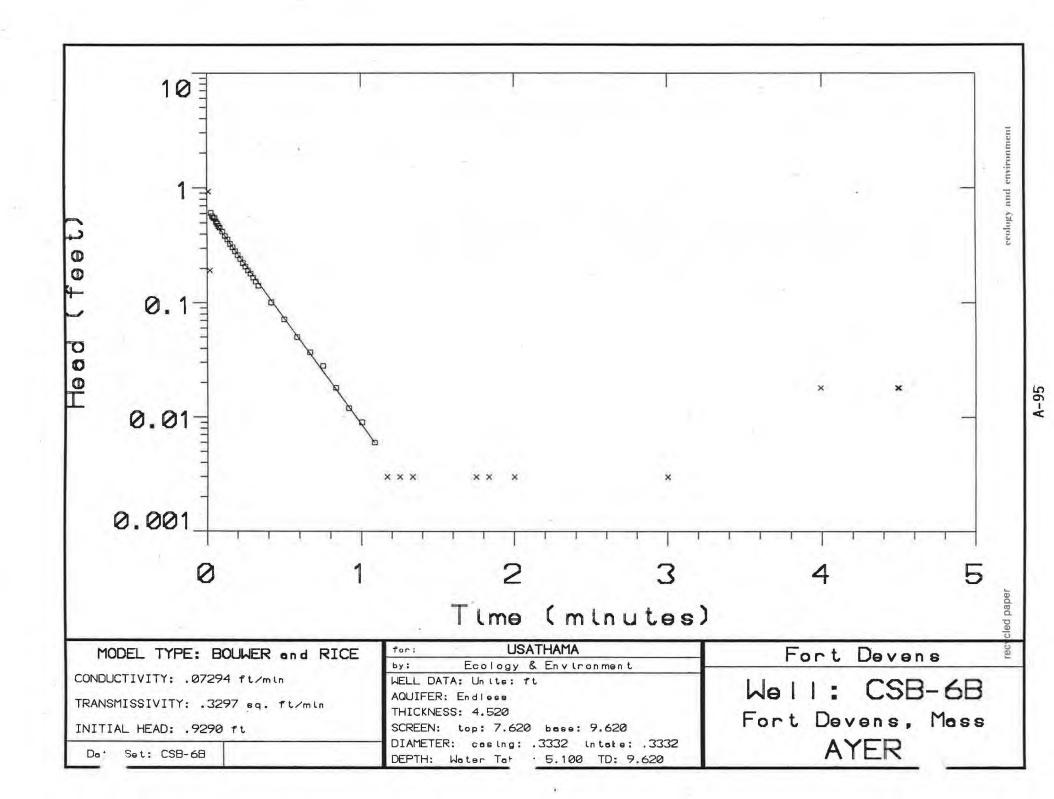
1.1666

1.2500

0.006

0.003

Elapsed Time	INPUT 1	Elapsed Time	INPUT 1
0.0000	0.186	1.3333	0.003
0.0083	0.929	1.4166	0.000
0.0166	0.192	1.5000	0.000
0.0250	0.607	1.5833	0.000
0.0333	0.569	1.6666	0.000
0.0416	0.553	1.7500	-0.003
0.0500	0.550	1.8333	-0.003
0.0583	0.512	1.9166	0.000
0.0666	0.493	2.0000	-0.003
0.0750	0.471	2.5000	0.000
0.0833	0.455	3.0000	-0.003
0.1000	0.420	END	
0.1166	0.385		
0.1333	0.357		
0.1500	0.328		
0.1666	0.306		
0.1833	0.284		
0.2000	0.262		
0.2166	0.243		
0.2333	0.224		
0.2500	0.208		
0.2666	0.192		
0.2833	0.180		
0.3000	0.167		
0.3166	0.154		
0.3333	0.142		
0.4166	0.101		
0.5000	0.072		
0.5833	0.050		
0.6666	0.037		
0.7500	0.028		
0.8333	0.018		
0.9166	0.012		
1.0000	0.009		
1 0077			



## ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well CSB-7A

Reference	0.000	Scale Factor	10.036
SG	1.000	Offset	-0.029
Linearity	0.000	Delay mSEC	50.000
Time	10:02	Date	07/13/91
Logger Test	6	INPUT 1: Level	(F)

Step 1 07/13 08:12:24

0.6666

0.7500

0.8333

0.9166

1.0000

1.0833

1.1666

1.2500

-0.012

-0.012

-0.009

-0.009

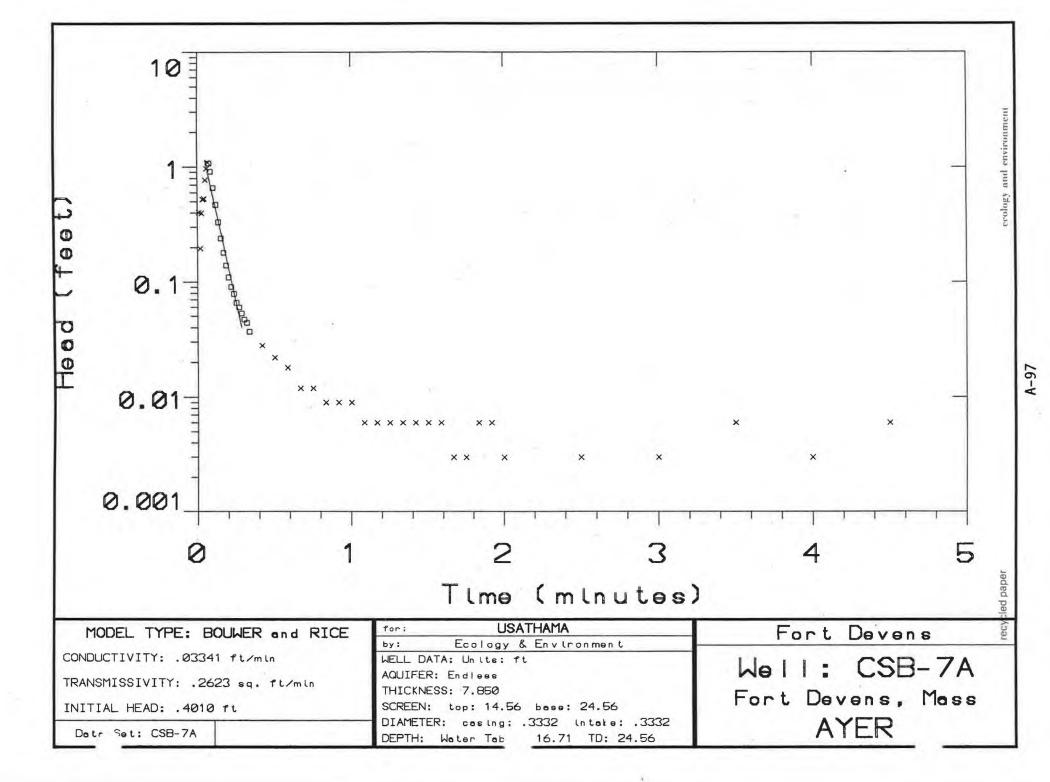
-0.009

-0.006

-0.006

-0.006

Elapsed Time	INPUT 1	Elapsed Time	INPUT 1
0.0000	-0.610	1.3333	-0.006
0.0083	-0.401	1.4166	-0.006
0.0166	-0.196	1.5000	-0.006
0.0250	-0.398	1.5833	-0.006
0.0333	-0.525	1.6666	-0.003
0.0416	-0.531	1.7500	-0.003
0.0500	-0.774	1.8333	-0.006
0.0583	-0.967	1.9166	-0.006
0.0666	-1.094	2.0000	-0.003
0.0750	-1.072	2.5000	-0.003
0.0833	-0.914	3.0000	-0.003
0.1000	-0.661	3.5000	-0.006
0.1166	-0.471	4.0000	-0.003
0.1333	-0.332	4.5000	-0.006
0.1500	-0.240	END	
0.1666	-0.180		
0.1833	-0.139		
0.2000	-0.110		
0.2166	-0.091		
0.2333	-0.079		
0.2500	-0.066		
0.2666	-0.060		
0.2833	-0.053		
0.3000	-0.047		
0.3166	-0.044		
0.3333	-0.037		
0.4166	-0.028		
0.5000	-0.022		
0.5833	-0.018		



#### ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well CSB-7B

Reference	0.000
SG	1.000
Linearity	0.000
Time	10:03
Logger Test	6

Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/13/91 INPUT 1: Level (F)

Step 0 07/13 08:09:27

Elapsed	Timm	INPUT	1
Elghaen	TIME	TIMEOI	4

0.0000	0.028
0.0083	0.588
0.0166	1.992
0.0250	0.705
0.0333	1.119
0.0416	0.537
0.0500	0.521
0.0583	0.408
0.0666	0.347
0.0750	0.322
0.0833	0.291
0.1000	0.243
0.1166	0.205
0.1333	0.177
0.1500	0.154
0.1666	0.142
0.1833	0.132
0.2000	0.132
0.2166	0.129
0.2333	0.120
0.2500	0.107
0.2666	0.094
0.2833	0.085
0.3000	0.079
0.3166	0.072
0.3333	0.066
0.4166	0.050
0.5000	0.041
0.5833	0.034
0.6666	0.025
0.7500	0.022
0.8333	0.022
0.9166	0.018
1.0000	0.012
1.0833	0.012

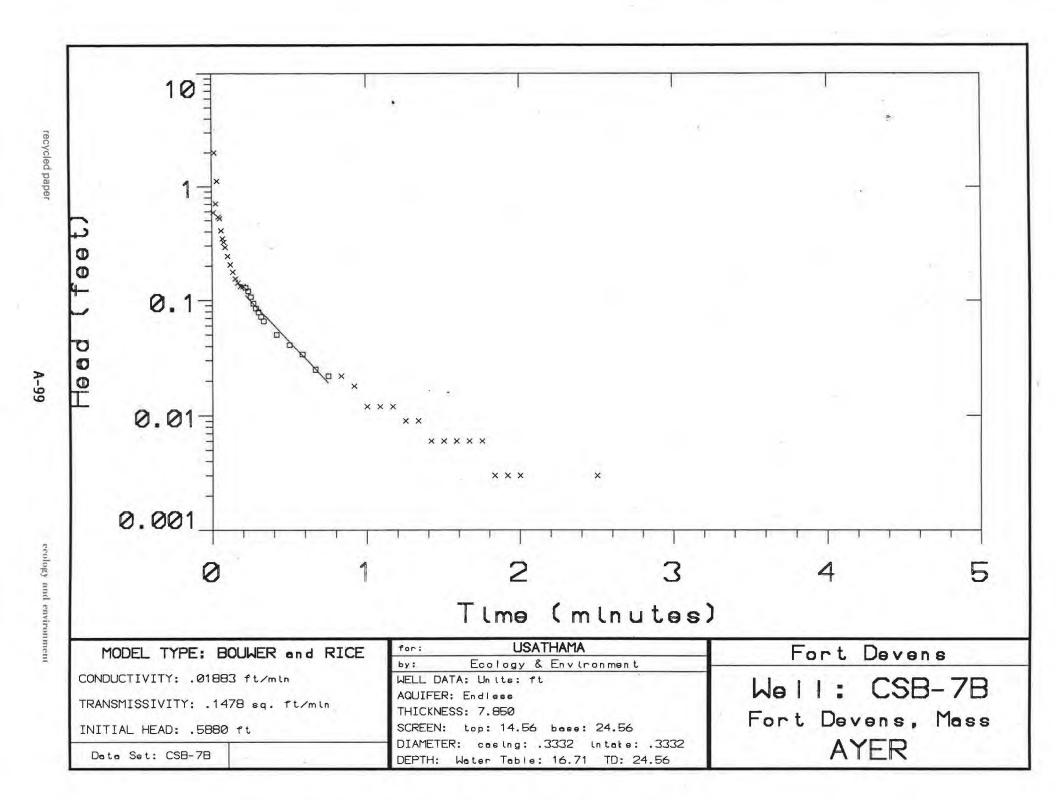
1.1666

1.2500

0.012 0.009

# Elapsed Time INPUT 1

2		
1.33	333	0.009
1.41	.66	0.006
1.50	000	0.006
1.58	333	0.006
1.66	66	0.006
1.75	500	0.006
1.83	333	0.003
1.91	.66	0.003
2.00	000	0.003
2.50	000	0.003
3.00	000	0.000
END		



# ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well CSB-8A

Reference	0.000	Scale Factor	10.036
SG	1.000	Offset	-0.029
Linearity	0.000	Delay mSEC	50.000
Time	09:47	Date	07/15/91
Logger Test	2	INPUT 1: Level	(F)

Step 1 07/13 12:34:34

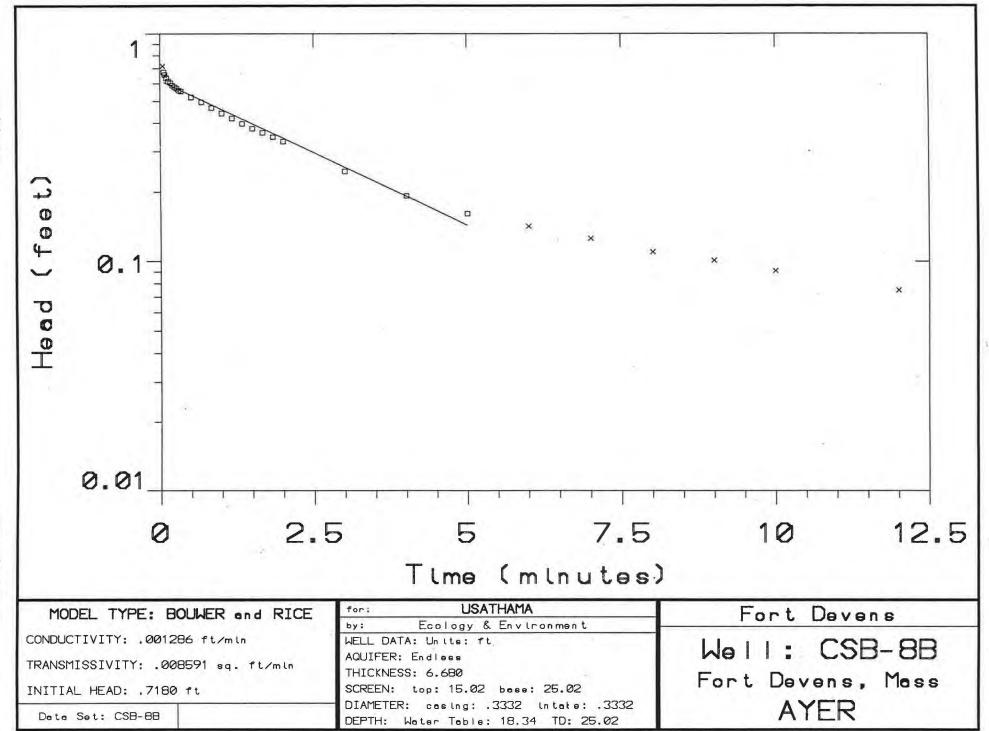
0 0000	0.000	1 7777	0 47/
0.0000	-0.888	1.3333	-0.436
0.0083	-0.787	1.4166	-0.433
0.0166	-0.990	1.5000	-0.427
0.0250	-1.401	1.5833	-0.420
0.0333	-1.746	1.6666	-0.41
0.0416	-1.825	1.7500	-0.40
0.0500	-1.777	1.8333	-0.39
0.0583	-1.723	1.9166	-0.38
0.0666	-1.673	2.0000	-0.37
0.0750	-1.629	2.5000	-0.31
0.0833	-1.581	3.0000	-0.26
0.1000	-1.486	3.5000	-0.20
0.1166	-1.407	4.0000	-0.16
0.1333	-1.341	4.5000	-0.12
0.1500	-1.281	5.0000	-0.10
0.1666	-1.164	5.5000	-0.07
0.1833	-1,135	6.0000	-0.06
0.2000	-1.037	6.5000	-0.04
0.2166	-0.974	7.0000	-0.03
0.2333	-0.923	7.5000	-0.02
0.2500	-0.857	8.0000	-0.02
0.2666	-0.835	8.5000	-0.02
0.2833	-0.797	9.0000	-0.01
0.3000	-0.765	END	
0.3166	-0.737		
0.3333	-0.714		
0.4166	-0.635		
0.5000	-0.591		
0.5833	-0.556		
0.6666	-0.528		
0.7500	-0.509		
0.8333	-0.493		
0.9166	-0.477		
1.0000	-0.468		
1.0833	-0.458		
1.1666	-0.452		
1.2500	-0.446		

# ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well CSB-8B

Reference	0.000	Scale Factor	10.036
SG	1.000	Offset	-0.029
Linearity	0.000	Delay mSEC	50.000
Time	09:49	Date	07/15/91
Logger Test	2	INPUT 1: Level	(F)

Step 0 07/13 12:22:32

ALTON MESSAGE			
Elapsed Time	INPUT 1	Elapsed Time	INPUT 1
0.0000	0.050	1.3333	0.398
0.0083	7.813	1.4166	0.389
0.0166	1.822	1.5000	0.379
0.0250	-1.186	1.5833	0.370
0.0333	0.759	1.6666	0.363
0.0416	0.718	1.7500	0.354
0.0500	0.689	1.8333	0.347
0.0583	0.673	1.9166	0.338
0.0666	0.670	2.0000	0.332
0.0750	0.657	2.5000	0.284
0.0833	0.651	3.0000	0.246
0.1000	0.635	3,5000	0.218
0.1166	0.626	4.0000	0.192
0.1333	0.613	4.5000	0.173
0.1500	0.607	5.0000	0.161
0.1666	0.604	5.5000	0.148
0.1833	0.594	6.0000	0.142
0.2000	0.588	6.5000	0.136
0.2166	0.582	7.0000	0.126
0.2333	0.578	7.5000	0.117
0.2500	0.572	8.0000	0.110
0.2666	0.569	8.5000	0.104
0.2833	0.566	9.0000	0.101
0.3000	0.559	9.5000	0.094
0.3166	0.556	10.0000	0.091
0.3333	0.553	11.0000	0.085
0.4166	0.537	12.0000	0.075
0.5000	0.521	END	
0.5833	0.509		
0.6666	0.496		
0.7500	0.480		
0.8333	0.468		
0.9166	0.455		
1.0000	0.442		
1.0833	0.430		
1.1666	0.420		
1.2500	0.408		



Slug Test Report Section No.: App Appendix A

Revision No: 0

Date:

December 1991

Building 202 Data

RC323

A-105

# ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well B202-1A

Reference	0.000
SG	1.000
Linearity	0.000
Time	05:43
Logger Test	6

Scale Factor 10.036
Offset -0.029
Delay mSEC 50.000
Date 07/12/91
INPUT 1: Level (F)

Step 1 07/11 15:33:54

Elapsed	Time	INPUT	1
---------	------	-------	---

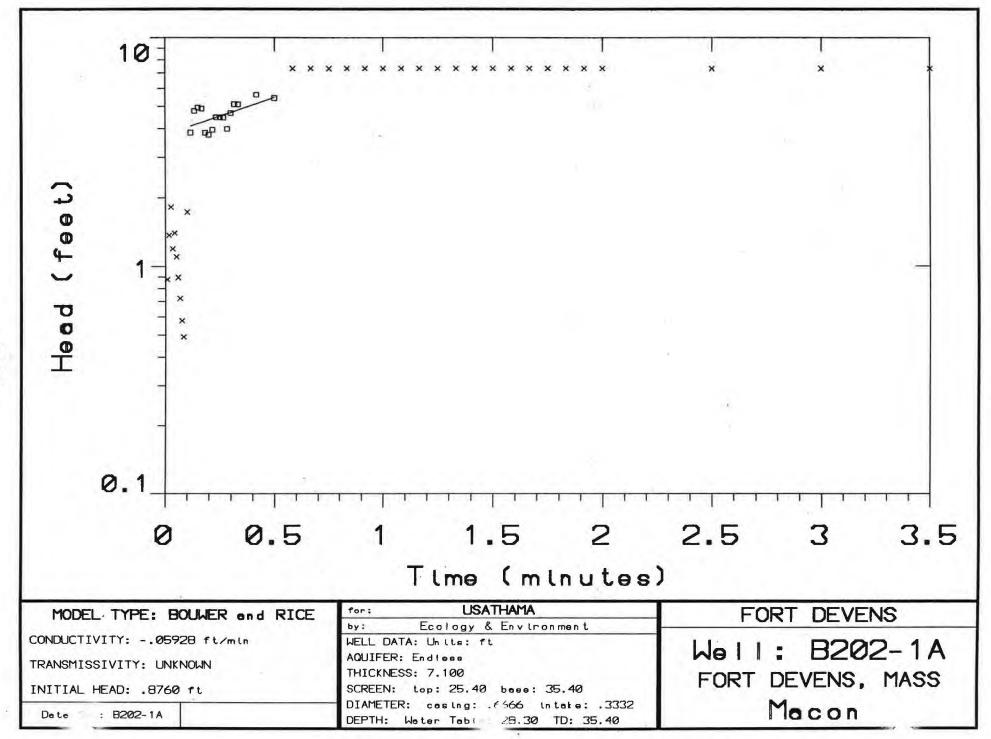
Liapsed	Tine	TIMEOT	1
		Completed from the back to be	
0.000	00	0.0	03
0.008	83	-0.8	76
0.016	56	-1.3	57
0.02	50	-1.8	1.8
0.033	33	-1.1	25
0.04	16	-1.4	21
0.050	00	-1.10	
0.058	53	-0.89	
0.066	66	-0.72	24
0.075		-0.5	
0.083		-0.4	
0.100		-1.7	
0.116		-3.8	
0.13		-4.78	
0.150		-4.90	
0.166		-4.89	
0.183	33	-3.8	
0.200		-3.76	
0.216		-3.95	
0.23		-4.48	
0.250		-4.4	
0.266		-4.47	
0.283		-3.99	
0.300		-4.67	
0.316		-5.11	
0.333		-5.10	
0.416		-5.63	
0.500		-5.43	
0.583		-7.31	
0.666		-7.33	
0.730	77	-7.31 -7.32	
0.916		-7.32	
1.000		-7.32	
1.083		-7.32	
1.166		-7.32	
T " TOC	,,,,	1 - 02	- 4.7

# Elapsed Time INPUT 1

1		
	1.3333	-7.326
	1.4166	-7.329
	1.5000	-7.332
	1.5833	-7.329
	1.6666	-7.326
	1.7500	-7.326
	1.8333	-7.322
	1.9166	-7.322
	2.0000	-7.322
	2.5000	-7.313
	3.0000	-7.316
	3.5000	-7.313
FN	D	

-7.326





## ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well B202-1b

Reference	0.000
SG	1.000
Linearity	0.000
Time	05:47
Logger Test	6

Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/12/91 INPUT 1: Level (F)

Step 0 07/11 15:29:56

ETapsed	Time	INPUT	7

0.0000	0.012
0.0083	0.047
0.0166	0.094
0.0250	2.695
0.0333	1.331
0.0416	0.676
0.0500	0.423
0.0583	0.395
0.0666	0.291
0.0750	0.218
0.0833	0.167
0.1000	0.117
0.1166	0.094
0.1333	0.082
0.1500	0.079
0.1666	0.075
0.1833	0.069
0.2000	0.066
0.2166	0.063
0.2333	0.056
0.2500	0.053
0.2666	0.050
0.2833	0.047
0.3000	0.044
0.3166	0.041
0.3333	0.041
0.4166	0.031
0.5000	0.028
0.5833	0.025
0.6666	0.018
0.7500	0.018
0.8333	0.015
0.9166	0.015
1.0000	0.012
1.0833	0.012

righted lime Tuent T		Elapsed	Time	INPUT	1
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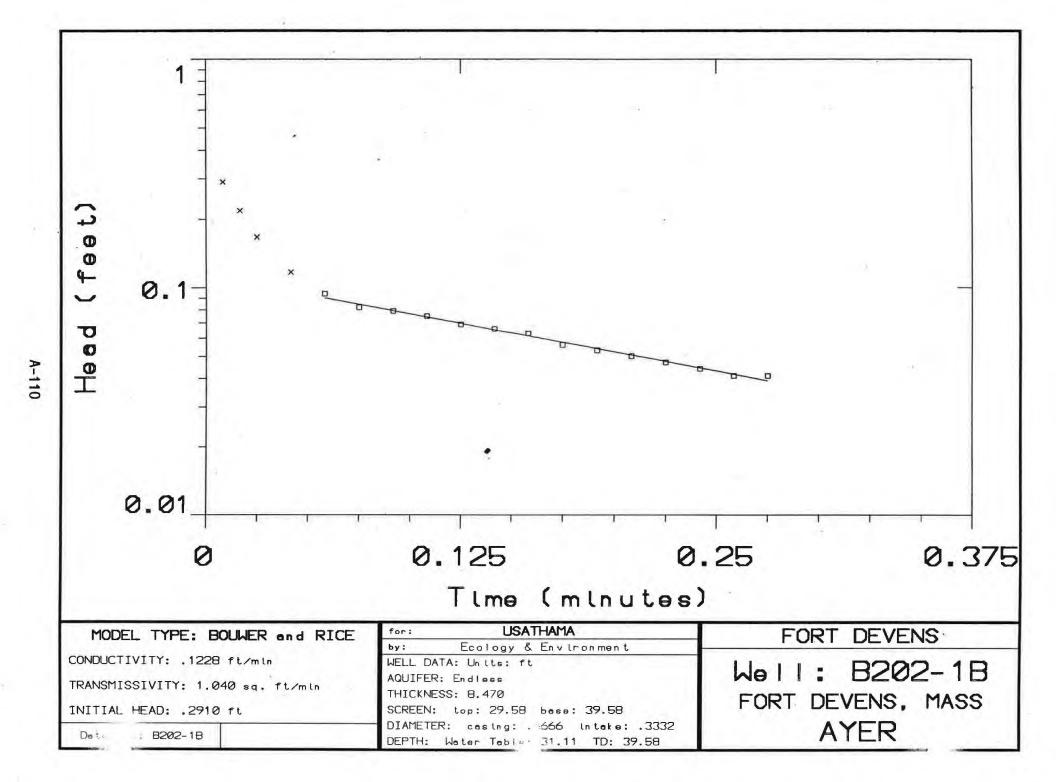
1.3333	0.006
1.4166	0.006
1.5000	0.003
1.5833	0.003
1.6666	0.003
1.7500	0.003
1.8333	0.003
1.9166	0.003
2.0000	0.003
2.5000	0.003
3.0000	0.003
3.5000	0.006
4.0000	0.003
END	

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0.009

0.009

1.1666



# ECOLOGY AND ENVIRONMENT SE2000

Environmental Logger Unit# 569

Monitoring Well B202-2A

Reference	0.000
SG	1.000
Linearity	0.000
Time	
Logger Test	5

Scale Factor 10.036
Offset -0.029
Delay mSEC 50.000
Date 07/12/91
INPUT 1: Level (F)

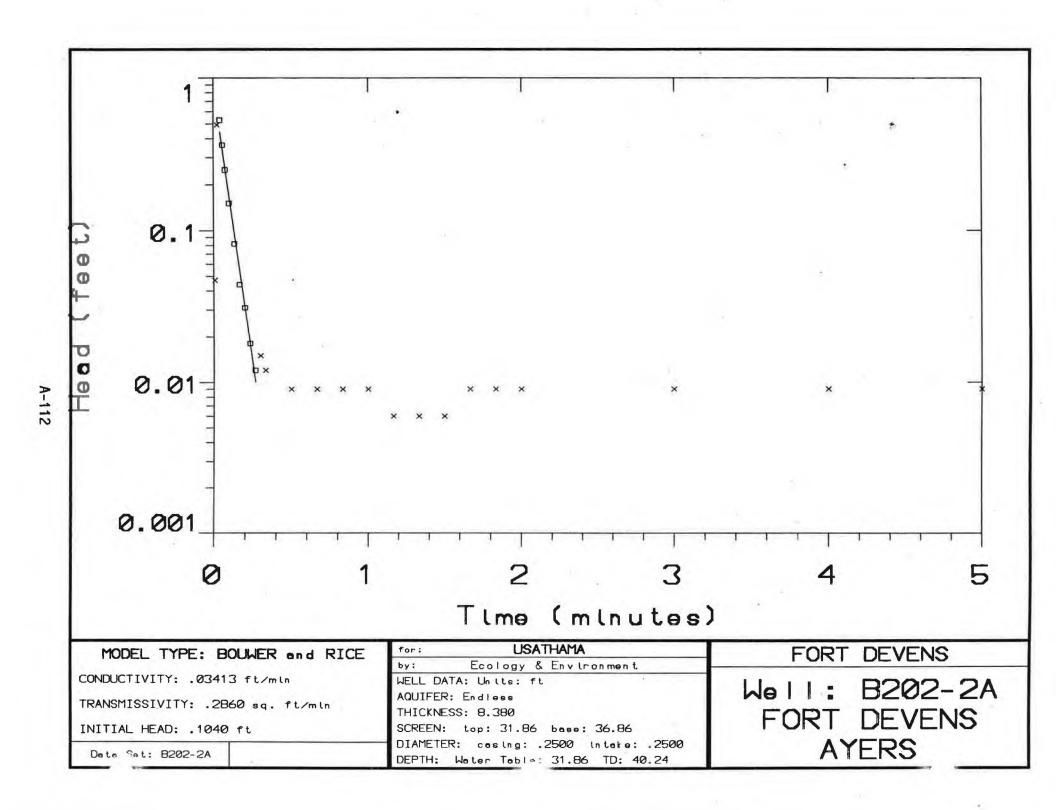
page 1 of 1

Step 1 07/12

Ela	psed	Time	INPUT	1
	0.008		0.04	
	0.025		0.49	
	0.041		0.52	
	0.058		0.36	
	0.075		0.24	
	0.100		0.15	
	0.133		0.08	20
	0.160	56	0.04	
	0.200	00	0.03	10
	0.233	33	0.01	80
	0.266	56	0.01	20
9	0.300	00	0.01	50
	0.333	33	0.01	20
(	0.500	00	0.00	90
	0.666	6	0.00	90
	0.833	33	0.00	90
	1.000	00	0.00	90
	1.166	56	0.00	60
-	1.333	53	0.00	60
	1.500	00	0.00	60
1	1.666	0	0.00	90
	1.833	33	0.00	90
- 1	2.000	00	0.00	90
	3.000	00	0.00	90
	4.000	00	0.00	90
	5.000	00	0.00	90
END				

= 1	ancad	Time	TNPLIT	1

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#### ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger

Unit# 569

Monitoring Well B202-2B

Reference 0.000 SG 1.000 Linearity 0.000 Time Logger Test

Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/12/91 INPUT 1: Level (F)

page 1 of 1

Step 1 07/12

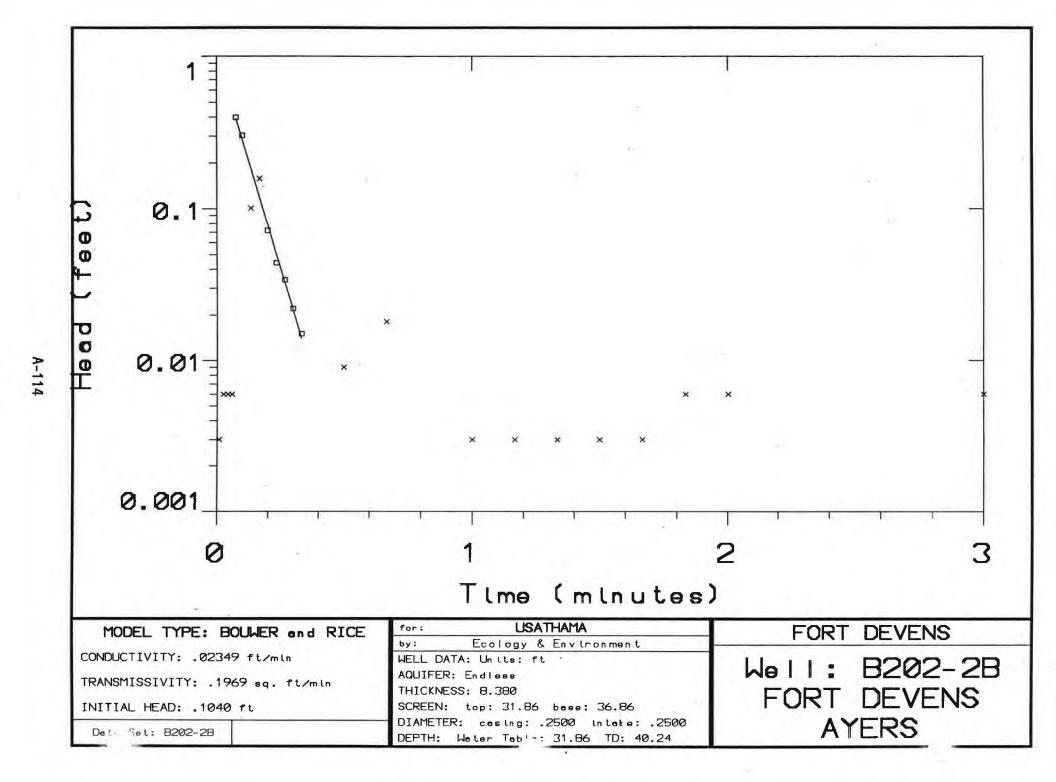
Elapsed	Time	INPUT	1

0.0083	0.0030
0.0250	0.0060
0.0416	0.0060
0.0583	0.0060
0.0750	0.3980
0.1000	0.3030
0.1333	0.1010
0.1666	0.1580
0.2000	0.0720
0.2333	0.0440
0.2666	0.0340
0.3000	0.0220
0.3333	0.0150
0.5000	0.0090
0.6666	0.0180
1.0000	0.0030
1.1666	0.0030
1.3333	0.0030
1.5000	0.0030
1.6660	0.0030
1.8333	0.0060
2.0000	0.0060

0.0060

Elapsed Time INPUT 1

END



# ECOLOGY AND ENVIRONMENT SE2000

page 1 of 1

Environmental Logger Unit# 569

Monitoring Well B202-3A

Reference	0.000
SG	1.000
Linearity	0.000
Time	
Logger Test	. 5

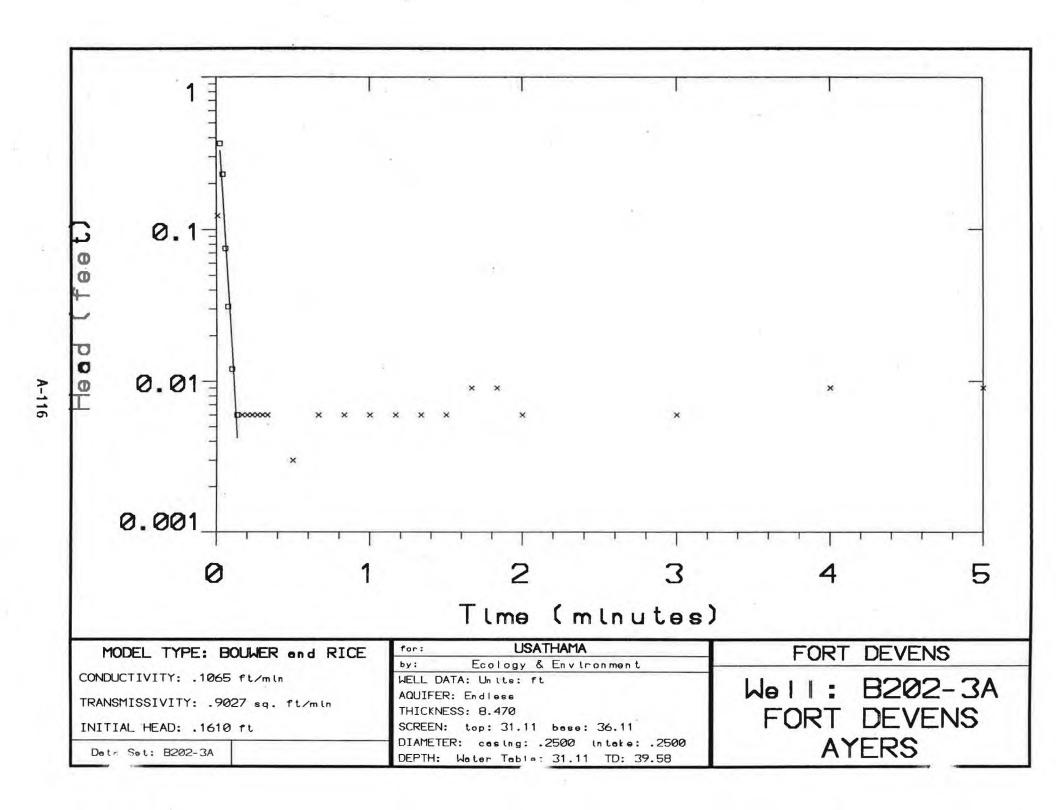
Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/12/91 INPUT 1: Level (F)

Step 1 07/12

Elapsed	Time	INPUT	1

Elapsed	Time	INPUT	1

	,
0.0083	0.1230
0.0250	0.3660
0.0416	0.2300
0.0583	0.0750
0.0750	0.0310
0.1000	0.0120
.0.1333	0.0060
0.1666	0.0060
0.2000	0.0060
0.2333	0.0060
0.2666	0.0060
0.3000	0.0060
0.3333	0.0060
0.5000	0.0030
0.6666	0.0060
0.8333	0.0060
1.0000	0.0060
1.1666	0.0060
1.3333	0.0060
1.5000	0.0060
1.6660	0.0090
1.8333	0.0090
2.0000	0.0060
3.0000	0.0060
4.0000	0.0090
5.0000	0.0090
END	



#### ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger

Environmental Logger Unit# 569

Monitoring Well B202-3B

Reference	0.000
SG	1.000
Linearity	0.000
Time	
Logger Test	5

Scale Factor 10.036
Offset -0.029
Delay mSEC 50.000
Date 07/12/91
INPUT 1: Level (F)

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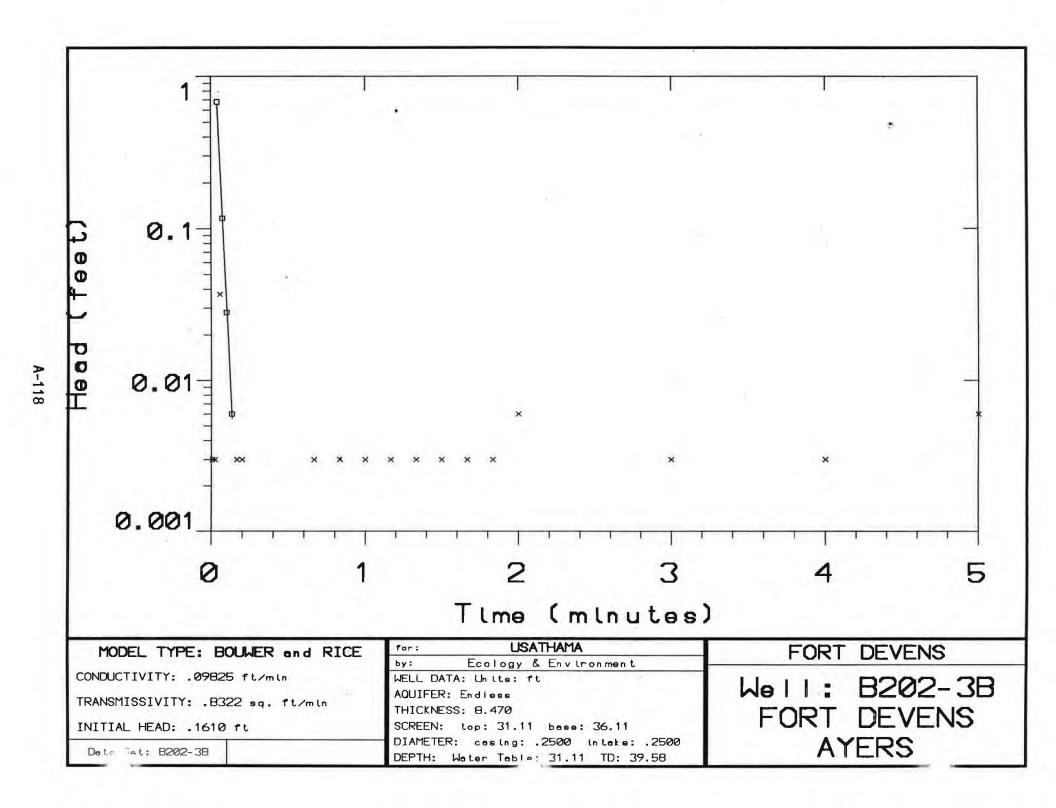
Step 1 07/12

Elapsed Time	INFUT 1
0.0083	0.0030
0.0250	0.0030
0.0416	0.6800
0.0583	0.0370
0.0750	0.1170
0.1000	0.0280
0.1333	0.0060
0.1666	0.0030
0.2000	0.0030
0.6666	0.0030
0.8333	0.0030
1.0000	0.0030
1.1666	0.0030
1.3333	0.0030
1.5000	0.0030
1.6660	0.0030
1.8333	0.0030
2.0000	0.0060
3.0000	0.0030
4.0000	0.0030
5.0000	0.0060

END

Elapsed Time INPUT 1

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Slug Test Report Section No.: Appendix A

Revision No: 0

December 1991 Date:

POL Data

A-119

# ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger

#### Environmental Logger Unit# 569

Monitoring Well POL-1A

Reference	0.000	Scale Factor	10.036
SG	1.000	Offset	-0.029
Linearity	0.000	Delay mSEC	50.000
Time		Date	07/12/91
Logger Test	5	INPUT 1: Level	(F)

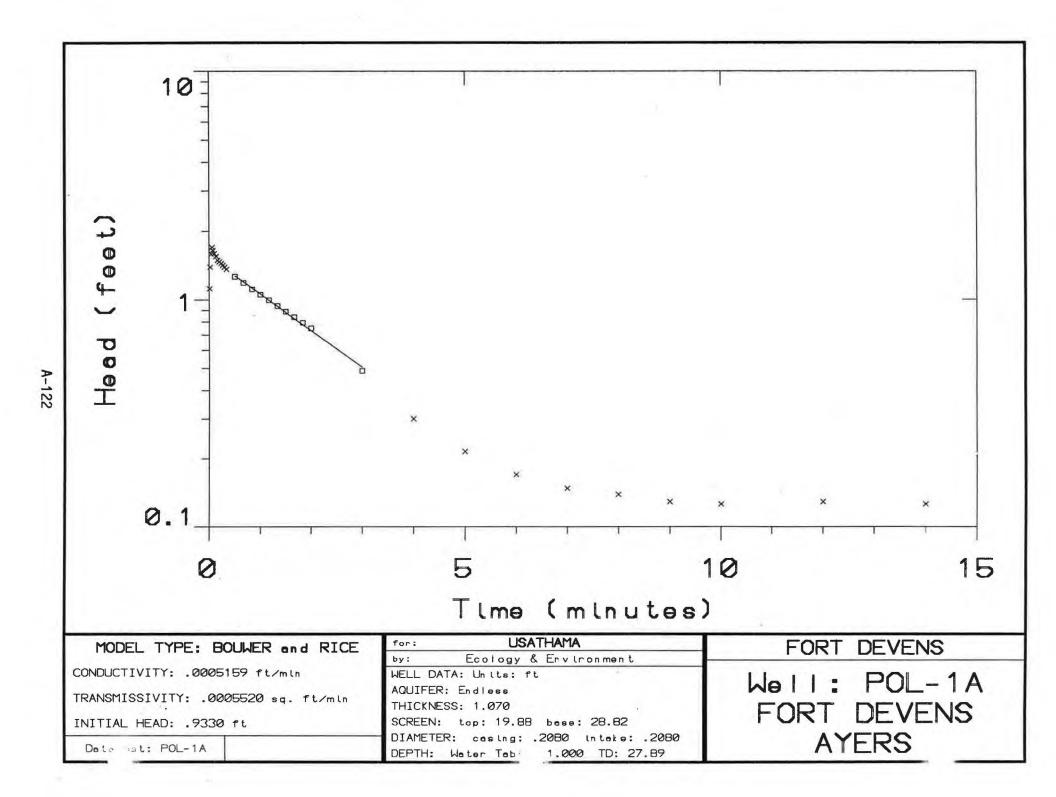
Step 1 07/12

Elapsed Time	INPUT	1	Elapsed Time	INPUT	1

0.0083	1.1190
0.0250	1.3910
0.0416	1.5910
0.0583	1.6980
0.0750	1.6510
0.1000	1.6000
0.1333	1.5530
0.1666	1.4930
0.2000	1.4700
0.2333	1.4450
0.2666	1.4170
0.3000	1.3910
0.3330	1.3600
0.5000	1.2650
0.6666	1.1860
0.8333	1.1130
1.0000	1.0530
1.1666	0.9960
1.3330	0.9390
1.5000	0.8880
1.6660	0.8410
1.8333	0.7930
2.0000	0.7490
3.0000	0.4870
4.0000	0.3000
5.0000	0.2150
6.0000	0.1700
7.0000	0.1480
8.0000	0.1390
9.0000	0.1290
10.000	0.1260
12.000	0.1290
14.000	0.1260
END	

ecology and environment

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10.036 -0.029 50.000 07/12/91

#### ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well POL-1B

Reference	0.000	Scale Factor	10.0
SG	1.000	Offset	-0.0
Linearity	0.000	Delay mSEC	50.0
Time		Date	07/1
Logger Test	5	INPUT 1: Level	(F)

Step 1 07/12

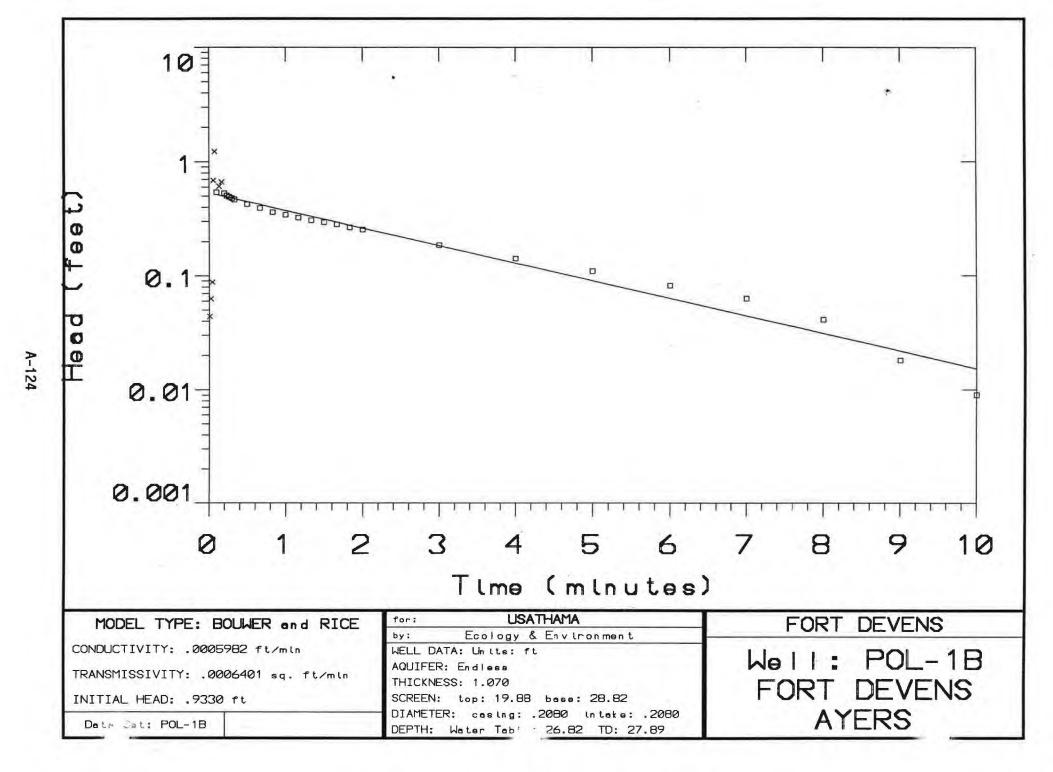
Elapsed Time INPUT 1	Elapsed	Time	INPUT	1
----------------------	---------	------	-------	---

0.008	3 0	.0440
0.025	0 0	.0630
0.041	6 0	.0880
0.058	3 0	.6890
0.075	0 1	.2330
0.100	0 0	.5400
0.133	3 0	.6100
0.166	6 0	.6640
0.200	0 0	.5310
0.233	3 0	.5060
0.266	5 0	.4930
0.300		.4800
0.333	0 0	.4680
0.500		.4270
0.666	5 0	.3950
0.833	3 0	.3630
1.000		.3440
1.166		.3250
1.3330	0 0	.3090
1.500		.2970
1.6660		.2840
1.833	3 0	.2680
2.0000	0	.2560
3.000		.1860
4.0000		.1420
5.000		.1100
6.000		.0820
7.000		.0630
8.000		.0410
9.000		.0180
10.000	0	.0090

FI	anead	Time	TNDIIT	1

_______

END



INPUT

## ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well POL-3A

Reference	0.000	Scale Factor	10.036
SG	1.000	Offset	-0.029
Linearity	0.000	Delay mSEC	50.000
Time		Date	07/12/91
Logger Test	5	INPUT 1: Level	(F)

Step 1 07/12

Elapsed Time	INPUT 1	1	Elapsed Time
0.0083	0.0500		
0.0250	0.3630		
0.0416	0.1130		
0.0583	0.1230		
0.0750	0.8120		
0.1000	0.8350		
0.1333	0.7900		
0.1666	0.7680		
0.2000	0.7490		
0.2333	0.7300		
0.2666	0.7110		
0.3000	0.6950		
0.3330	0.6800		
0.5000	0.6070		
0.6666	0.5440		
0.8333	0.4870		
1.0000	0.4300		
1.1666	0.3790		
1.3330	0.3320		
1.5000	0.2940		
1.6660	0.2560		
1.8333	0.2210		
2.0000	0.1960		
3.0000	0.1070		
4.0000	0.0880		
5.0000	0.0850		
6.0000	0.0850		
7.0000	0.0850		
8.0000	0.0820		
9.0000	0.0850		
10.000	0.0820		
12.000	0.0820		
14.000	0.0850		

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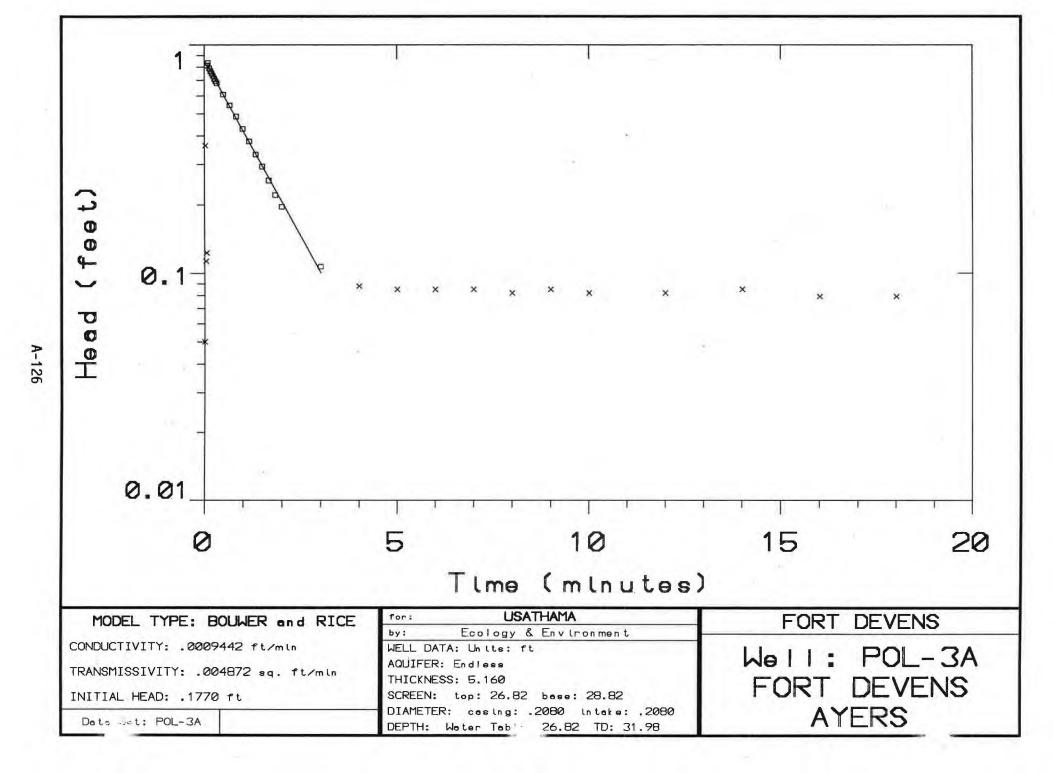
0.0790

0.0790

16.000

18.000

END



#### page 1 of 1

#### ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well POL-3B

Reference	0.000
SG	1.000
Linearity	0.000
Time	09:35
Logger Test	5

Scale Factor 10.036
Offset -0.029
Delay mSEC 50.000
Date 07/12/91
INPUT 1: Level (F)

Step 1 07/12

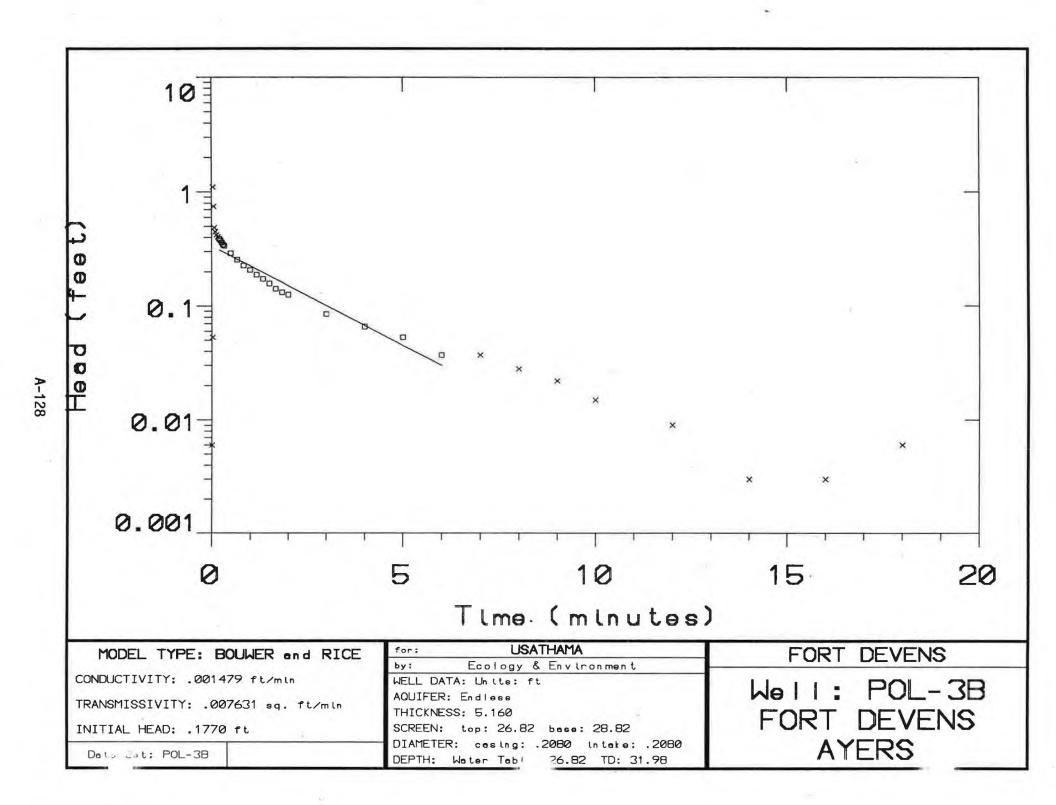
Ex comment	***	THIRIT	-
Elapsed	lime	INPUT	1

Elapsed Time INPUT 1

INFO	-4.
*	
0.00	60
	0.00 0.05 1.10 0.74 0.48 0.44 0.42 0.40 0.38 0.37 0.36 0.33 0.29 0.25 0.25 0.22 0.20 0.18 0.17 0.15 0.14 0.13 0.06 0.05 0.03 0.03 0.03

recycled paper

- END



Slug Test Report Section No.: Appendix A

Revision No: 0

Date:

December 1991

**EOD** Data

RC323

A-129

### ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well EOD-1A

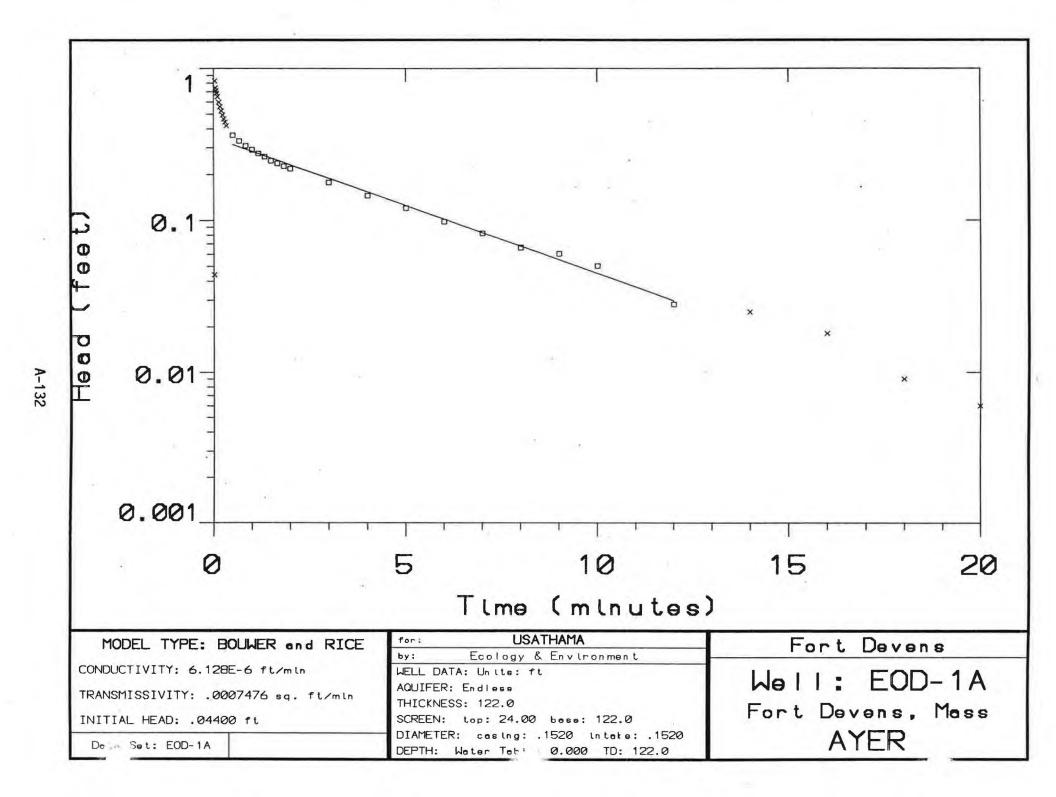
Reference	0.000
SG	1.000
Linearity	0.000
Time	06:13
Logger Test	0

Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/18/91 INPUT 1: Level (F)

Step 1 07/17 08:25:27

Elapsed Time	INPUT 1	
	220023032	
0.0000	-0.632	
0.0083	-0.044	
0.0166	-0.493	
0.0250	-0.825	
D.0333	-0.752	
0.0416	-0.743	
0.0500	-0.730	
0.0583	-0.711	
0.0666	-0.699	
0.0750	-0.686	
0.0833	-0.670	
0.1000	-0.651	
0.1166	-0.626	
0.1333	-0.597	
0.1500	-0.575	
0.1666	-0.559	
0.1833	-0.540	
0.2000	-0.525	
0.2166	-0.506	
0.2333	-0.493	
0.2500	-0.477	
0.2666	-0.464	
0.2833	-0.452	
0.3000	-0.442	
0.3166	-0.433	
0.3333	-0.420	
0.4166	-0.385	
0.5000	-0.363	
0.5833	-0.344	
0.6666	-0.332	
0.7500	-0.319	
0.8333	-0.309	
0.9166	-0.300	
1.0000	-0.291	
1.0833	-0.281	
1.1666	-0.275	
1.2500	-0.265	

Elapsed Time	INPUT 1
1.3333	-0.262
1.4166	-0.256
1.5000	-0.246
1.5833	-0.243
1.6666	-0.237
1.7500	-0.234
1.8333	-0.227
1.9166	-0.224
2.0000	-0.218
2.5000	-0.196
3.0000	-0.177
3.5000	-0.154
4.0000	-0.145
4.5000	-0.129
5.0000	-0.120
5.5000	-0.107
6.0000	-0.098
6.5000	-0.088
7.0000	-0.082
7.5000	-0.072
8.0000	-0.066
8.5000	-0.066
9.0000	-0.060
9.5000	-0.053
10.0000	-0.050
11.0000	-0.041
12.0000	-0.028
13.0000	-0.028
14.0000	-0.025
15.0000	-0.018
16.0000	-0.018
17.0000	-0.015
18.0000	-0.009
19.0000	-0.009
20.0000	-0.006
END	



### ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well EOD-18

Reference	0.000
SG	1.000
Linearity	0.000
Time	06:15
Logger Test	0

Scale Factor 10.036
Offset -0.029
Delay mSEC 50.000
Date 07/18/91
INPUT 1: Level (F)

Step 0 07/17 08:03:05

lapsed Time	INPUT 1	Elapsed Time	INPUT :
0.0000	0.006	1.3333	0.309
0.0083	0.006	1.4166	0.303
0.0166	4.317	1,5000	0.297
0.0250	2.442	1.5833	0.293
0.0333	-0.177	1.6666	0.28
0.0416	0.610	1.7500	0.28
0.0500	0.588	1.8333	0.27
0.0583	0.534	1.9166	0.26
0.0666	0.506	2.0000	0.26
0.0750	0.483	2.5000	0.243
0.0833	0.518	3.0000	0.22
0.1000	0.477	3.5000	0.20
0.1166	0.452	4.0000	0.18
0.1333	0.442	4.5000	0.17
0.1500	0.436	5.0000	0.16
0.1666	0.442	5.5000	0.15
0.1833	0.427	6.0000	0.14
0.2000	0.420	6.5000	0.13
0.2166	0.417	7.0000	0.12
0.2333	0.414	7.5000	0.12
0.2500	0.411	8.0000	0.11
0.2666	0.408	8.5000	0.10
0.2833 \	0.404	9.0000	0.09
0.3000	0.401	9.5000	0.09
0.3166	0.398	10.0000	0.08
0.3333	0.398	11.0000	0.07
0.4166	0.385	12.0000	0.06
0.5000	0.376	13.0000	0.06
0.5833	0.370	14.0000	0.05
0.6666	0.360	15.0000	0.05
0.7500	0.354	16.0000	. 0.05
0.8333	0.347	17.0000	0.05
0.9166	0.341	18.0000	0.04
1.0000	0.335	19.0000	0.04
1.0833	0.328	20.0000	0.04
1.1666	0.322	21.0000	0.04
	0.316	22.0000	0.047

# ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger

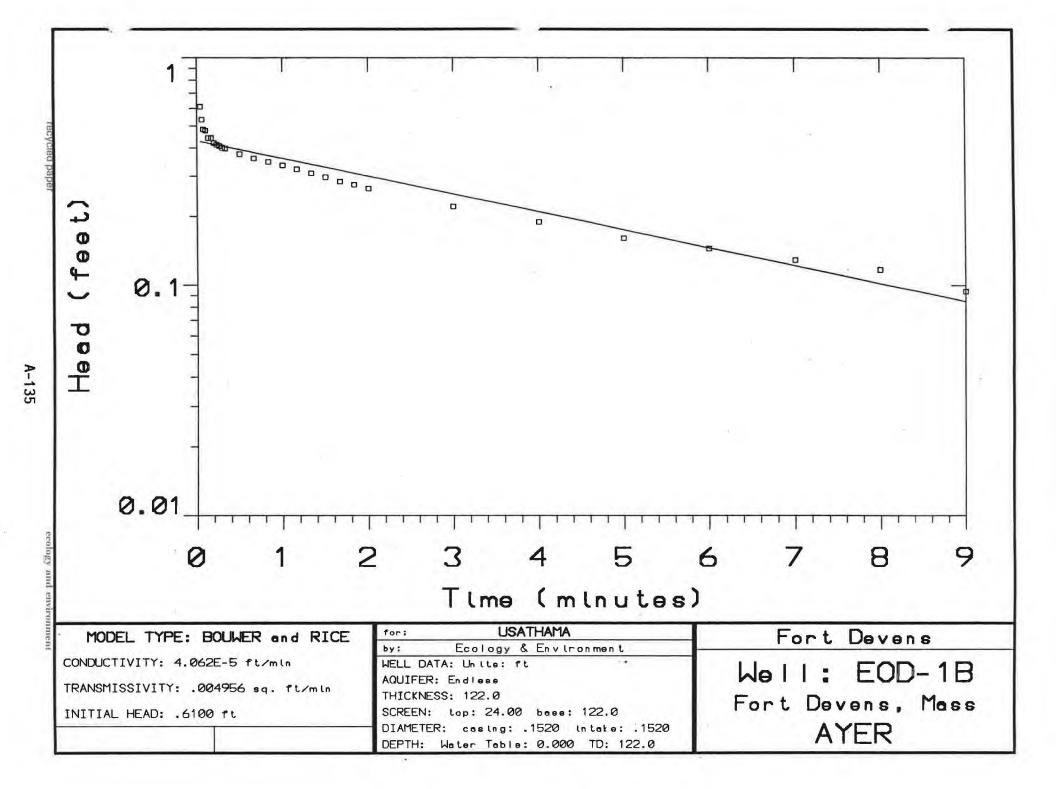
page 2 of 7

Environmental Logger Unit# 569 Monitoring Well EOD-18

Reference	0.000	Scale Factor	10.036
SG	1.000	Offset	-0.029
Linearity	0.000	Delay mSEC	50.000
Time	06:15	Date	07/18/91
Logger Test	0	INPUT 1: Level	(F)

Step 0 07/17 08:03:05

'Elapsed Time INPUT 1	Elapsed Time INPUT	1
FND		



# ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well EOD-4A

Reference	0.000
SG	1.000
Linearity	0.000
Time	06:07
Logger Test	1

Scale Factor 10.036
Offset -0.029
Delay mSEC 50.000
Date 07/18/91
INPUT 1: Level (F)

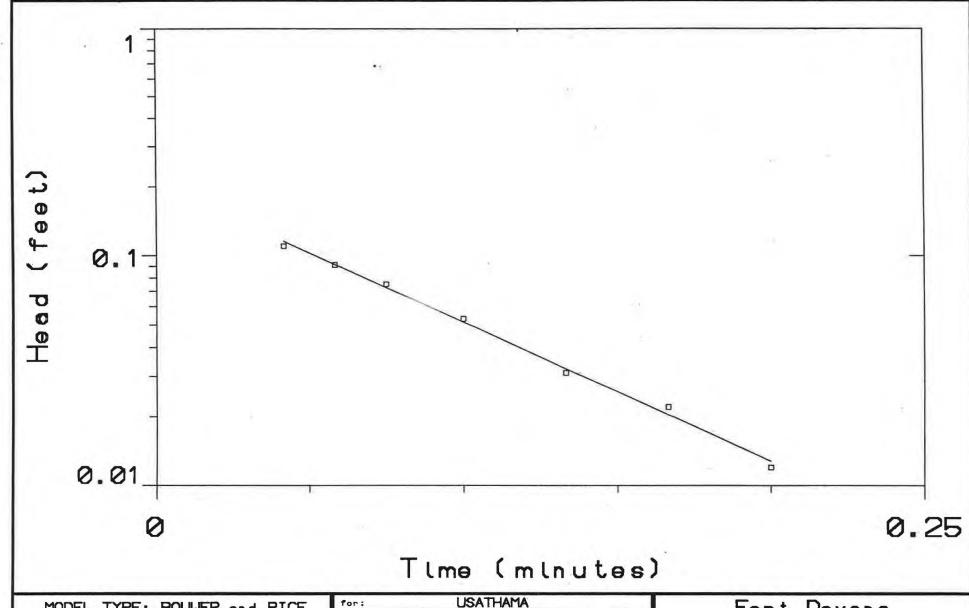
Step 1 07/17 09:27:00

Elapsed Time	INPUT	1
0.0000	0.0	
0.0083	0.2	
0.0166	0.1	61
0.0250	0.0	
0.0333	-0.1	
0.0416	-0.1	
0.0500	-0.1	
0.0583	-0.0	
0.0666	-0.0	
0.0750	-0.0	
0.0833	-0.0	
0.1000	-0.0	53
0.1166	-0.0	41
0.1333	-0.0	31
0.1500	-0.0	25
0.1666	-0.0	22
0.1833	-0.0	
0.2000	-0.0	
0.2166	-0.0	
0.2333	-0.0	06
0.2500	-0.0	06
0.2666	-0.0	03
0.2833	-0.0	03
0.3000	0.0	
0.3166	0.0	
0.3333	0.0	00
0.4166	0.0	00
0.5000	-0.0	06
0.5833	-0.0	09
0.6666	-0.0	12
0.7500	-0.0	18
0.8333	-0.0	1.8
0.9166	-0.0	22
1.0000	-0.0	25
1.0833	-0.0	25
1.1666	-0.0	28

1.2500

-0.028

Elapsed Time	INPUT	1
1.3333	-0.02	8
1.4166	-0.03	1
1.5000	-0.03	1
1.5833	-0.03	1
1.6666	-0.03	1
1.7500	-0.03	1
1.8333	-0.03	1
1.9166	-0.03	
2.0000	-0.03	1
2.5000	-0.03	1
3.0000	-0.02	8
3.5000	-0.02	
4.0000	-0.02	5
4.5000	-0.01	
5.0000	-0.01	
5.5000	-0.01	5
6.0000	-0.01	5
6.5000	-0.01	
7.0000	-0.00	
7.5000	-0.00	
8.0000	-0.00	
8.5000	-0.00	
9.0000	-0.00	
9.5000	-0.00	
10.0000	-0.00	
11.0000	-0.00	
12.0000	0.00	
13.0000	0.00	
14.0000	0.00	3
END		



# MODEL TYPE: BOUWER and RICE CONDUCTIVITY: .001998 ft/min TRANSMISSIVITY: .2438 aq. ft/min INITIAL HEAD: .1100 ft Tor: USATHAMA by: Ecology & Environment WELL DATA: Units: ft AQUIFER: Endless THICKNESS: 122.0 SCREEN: top: 24.00 boss: 122.0 DIAMETER: casing: .1520 intake: .1520 DEPTH: Water Table: 0.000 TD: 122.0 Fort Devens Fort Devens AYER

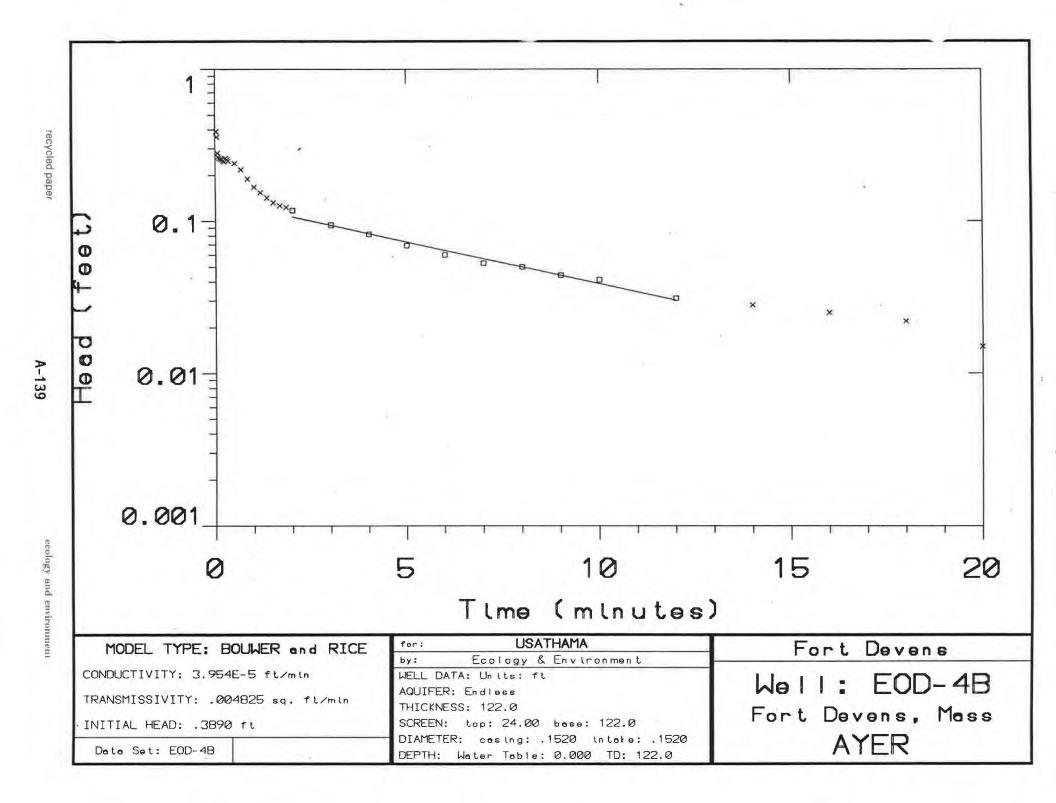
# ECOLOGY AND ENVIRONMENT SE2000 Environmental Logger Unit# 569 Monitoring Well EOD-4B

Reference	0.000
SG	1.000
Linearity	0.000
Time	06:09
Logger Test	1

Scale Factor 10.036 Offset -0.029 Delay mSEC 50.000 Date 07/18/91 INPUT 1: Level (F)

Step 0 07/17 09:05:51

		y and the same of	
Elapsed Time	INPUT 1	Elapsed Time	INPUT 1
****		the course of th	
0.0000	-0.003	1.3333	0.142
0.0083	-0.003	1.4166	0.139
0.0166	0.025	1.5000	0.132
0.0250	0.389	1.5833	0.126
0.0333	0.335	1.6666	0.126
0.0416	0.357	1.7500	0.123
0.0500	0.319	1.8333	0.123
0.0583	0.281	1.9166	0.117
0.0666	0.281	2.0000	0.117
0.0750	0.265	2.5000	0.104
0.0833	0.268	3.0000	0.094
0.1000	0.259	3.5000	0.085
0.1166	0.256	4.0000	0.082
0.1333	0.256	4.5000	0.072
0.1500	0.256	5.0000	0.069
0.1666	0.253	5.5000	. 0.066
0.1833	0.249	6.0000	0.060
0.2000	0.249	6.5000	0.060
0.2166	0.246	7.0000	0.053
0.2333	0.246	7.5000	0.053
0.2500	0.287	8.0000	0.050
0.2666	0.259	8.5000	0.047
0.2833	0.256	9.0000	0.044
0.3000	0.253	9.5000	0.041
0.3166	0.249	10.0000	0.041
0.3333	0.249	11.0000	0.034
0.4166	0.246	12.0000	0.031
0.5000	0.240	13.0000	0.028
0.5833	0.234	14.0000	0.028
0.6666	0.218	15.0000	0.025
0.7500	0.202	16.0000	0.025
0.8333	0.189	17.0000	0.022
0.9166	0.177	18.0000	0.022
1.0000	0.167	19,0000	0.015
1.0833	0.161	20.0000	0.015
1.1666	0.1.54	21.0000	0.015
1.2500	0.148	END	



Slug Test Report Section No.: Appendix B

Revision No: 0

Date:

December 1991

APPENDIX B RETESTING PROGRAM DATA SHEETS

# Wh

# ECOLOGY AND ENVIRONMENT INC.

### **SLUG TEST DATA SHEET**

3.240

WELL NO: SHL-I
TOTAL DEPTH: 8.88' ∠>
SLUG TYPE: ***** PVC
VOLUME OF WATER REMOVED:

STARTING TIME: 09:50 HERMIT TEST Do. manually tested

ENDTIME: 1026

SITE: FORT DEVENS
DEPTH TO THE WATER: 3.24' T.O.C.
SLUG SIZES (UD): 2' * 1.25"
RISING OF FALLING HD OR BOTH: F.F.B

E+E-PERSOLUEL: M. HECKEL
K. DAVISON

LAPSE OF TIME	HEAD VALUE	REMARKS
5 %c	3.00	
103ec	3.01	
15 See	3.01	
30 se	3.02	
40 Sec	3.03	
50 Sec	3.03	
1 min	3.04	
1.5 min	3.05	
2.00 Mic	3.06	
5.00 min	3,12	
7.00 Mic.	3.13	
10.00 Min	3.15	
15.00 Mic	3.16	
-	3.16	
	3.16	
35.004	3.16	END OF TEST
45.009		
50,000	A company to the control of the control of	
65.00 :		
15:00		
80:000		
	5 see 10 see 15 see 30 sec 40 sec 50 sec 1 min 1.5 min 2.00 min 1.00 min 1.00 min 15.00 min 15.0	5 see 3.00 10 see 3.01 15 see 3.01 30 sec 3.02 40 sec 3.03 50 sec 3.03 1 min 3.04 1.5 min 3.05 2.00 min 3.12 7.00 min 3.12 7.00 min 3.15 15.00 min 3.16 30.00 min 3.16 35.00 n 3.16 35.00 n 3.16 35.00 n 3.16

Note: Stop the test of 90% static water level inconvened

#### SLUG TEST DATA SHEET

WELL NO: SHIL-1

TOTAL DEPTH: 8.88 . T.O.C.

SLUG TYPE: PVC

**VOLUME OF WATER REMOVED:** 

STARTING TIME: 10 26

HEAPIT PEST No. : manually tested

EMDTIME: 1041

SITE: FORT DEVENS | 3 16 after

DEPTH TO THE WATER: 3. 16 T.O.C.

SLUG SIZES (LID): 2' x 1. 75"

RISING OR FALLING HD OR BOTH: R.F.B

ETE PERSOLUEL: M. HECKEL

K. DAVISON

TIME	LAPSE OF TIME	HEAD VALUE	REMARKS
1026.05	580	missed read	ing
1026.10	10 Sec	3.3 • 9	
1026:15	153ec	3 38	
1076:30	30 se	3.37	
1026:40	40 Sec	3.36	
1026:50	50 Sec	3.35	
1027:00	1 min	3 34	
1027:30	1.5 min	3.32	
1028.00	2.00 Mil	3 30	
1631:00	5.00 min	3 23	
1033:00	1.00 Mic.	3. 20	
1036.00	10.00 Min	3.18	
1041:00	15.00 Mic	3.15	END OF TEST
	20,00		
	30.00 min	9	
	35.004		
	40.004		
	45.009		
	50,000		
	60.000		
	10.00 · 10.00 ·		
	10.00.		
	15 000		
	80:000		

Note: stop the test if 90% static water level's recovered

#### SLUG TEST DATA SHEET

WELL NO: SHL-4 TOTAL DEPTH: 13.89 T.O.C.

SLUG TYPE: PVC

**VOLUME OF WATER REMOVED:** 

STARTING TIME: 1619
HEAPIT TEST No.: manually tested
END TIME: 1620

SITE: FORT DEVENS DEPTH TO THE WATER: 10.86 T.D.C.

SLUG SIZES (L/D): 2 ' x 1. 25"

RISING OR FALLING HD OR BOTH: R,F,B

E+E PERSOLUEL: M. HECKEL

K. DAVISON

TIME	LAPSE OF TIME	HEAD VALUE	REMARKS
1619:05	5 rc	10 79	
1619:10	103ec	10.83	
1619:15	15 See	10.85	
1619:30	30 se	10.85	
1619:40	403ec	10.85	
1619:50	50 Sec	10.86	
16 20:00	1 Min	10.86	END OF TEST
	1.5 min		
	2.00 Mic		
	5.00 Min		
	7.00 Mic.		
	10.00 Min		
	15.00 Mic	Activities and the second	
	20,00		
	30.00 min		
	35.004		
	40.000		
	45.009		
	50,000		
	60.000		
	65.00 4		
	10.00.		
	15:000	<u> </u>	
	80:000		

Note: stop the test if 90% state water level recovered

#### SLUG TEST DATA SHEET

WELL NO: SHL-4

TOTAL DEPTH: 13.89' T.O.C.

SLUG TYPE: PVC

**VOLUME OF WATER REMOVED:** 

STARTING TIME: 1621

HERMIT TEST No .: manually tested

SYDTIME: 1622

SITE: FORT DEVENS

DEPTH TO THE WATER: 10.86' T.O.C.

SLUG SIZES (L/D): 2' * 1.25"

(RISING OR FALLING HD OR BOTH: R,F,B

E+E PERSOLUEL : M. HECKEL

TIME	LAPSE OF TIME	HEAD VALUE	REMARKS
1621:05	5 sec	missed readi	Ng
1651:10	1.0 sec	10.98	
1621:15	15 sec		
1621:30	30 sec	10.86	
1621:40	40 sec	10.86	
1621:50	50 sec	10.86	
1655:00	.1 min	10.86	END OF TEST

Note: Stop the test if 90% static water level inconvered

# **SLUG TEST DATA SHEET**

WELL NO: SHL-6

TOTAL DEPTH:

SLUG TYPE:

**VOLUME OF WATER REMOVED:** 

STARTING TIME: HERMIT TEST NO .: END TIME ; SITE:

DEPTH TO THE WATER:

SLUG SIZES (LLD):

RISING OR FALLING HD OR BOTH: R,F,B

E+E PERSOLUEL:

ПМЕ	LAPSE OF TIME	HEAD VALUE	REMARKS
	Well recovered be	for first measure	ment
		- 11 - 1 - 1 - 1	
			######################################

#### SLUG TEST DATA SHEET

WELL NO: SHL-19

TOTAL DEPTH: 32.79 T.O.C.

SLUG TYPE: PVC

**VOLUME OF WATER REMOVED:** 

STARTING TIME: 1418

FUNTIME: manually tested

SITE: FORT DEVENS

DEPTH TO THE WATER: 23.20' T.O.C.

SLUG SIZES (L/D): 5' × 1.25"

RISING OR FALLING HD OR BOTH: F,F,B

E+E PERSOLUEL: M. HECKEL

TIME	LAPSE OF TIME	HEAD VALUE	REMARKS	
1418:05	5 500	23.20'		
1418:10	.LO sec	23.70′		
1418:15	15 sec	23.19′		10
1418:30	30.586	23.19		
1418:40	40 - sec	23.19′	END OF TEST	
	BEGIN SLUGOUT	TEST (DER	THE TO WATER =	23.19'T.C
1420:05	5 sec	missed rea	ding	100
1420:10	lo sec	23.19		
1420:15	15.586		END OF TEST	
	This well	ras stalilin	two quickly	
	The state of the s	te/meaningf	<b>u</b>	
	Jeoling.			
	<u> </u>		1	
		***************************************		
				g.
	<del></del>			

Note: stop the test if 90% static water level inconvened

#### SLUG TEST DATA SHEET

WELL NO: SHL-22 TOTAL DEPTH: ~ 115

SLUG TYPE: PVC

**VOLUME OF WATER REMOVED:** 

STARTING TIME: 1219

HERMIT TEST No :: manually tested

ENDTIME: 1229

SITE: FORT DEVENS

DEPTH TO THE WATER: 6.81' T.O.C.

SLUG SIZES (L/D): 5' x 1.25"

RISING OR FALLING HD OR BOTH: R,F,B

E+E PERSOLUEL: M. HECKEL

TIME	LAPSE OF TIME	HEAD VALUE	REMARKS
1219:05	5 sec	6.30	
1219:10	10. sec	6.31	
1219:15	15 Sec	6.33	
1219:30	30 sec	6.36	
1219:40	40. sec	6.38	2070
1219:50	50 sec_	6.41	
1550:00	1. min	6.43	
1220:30	1.5. min	6.48	
1551:00	2 min	6.58	
1224:00	5_ min	6.71	
1226:00	7, min	6.76	
12-29:00	10 min	6.80	END OF TEST
	Attemy	ted to use the	5' × 3" slug.
	but i	t was too wide	0,
	or and the second	when being los	

#### SLUG TEST DATA SHEET

MELL NO: SHL- 22 TOTAL DEPTH: ~ 115 SLUG TYPE: PVC

**VOLUME OF WATER REMOVED:** 

STARTING TIME: 1230 HEART TEST No.: manually tested

EMDTIME: 1245

SITE: FORT DEVENS

DEPTH TO THE WATER: 6.80'

SLUE SIZES (LID): 5' × 1,25" RISING OR FALLING HD OR BOTH: R,F,B

ETE PERSOLUEL : M. HECKEL

K. DAVISON

TIME	LAPSE OF TIME	HEAD VALUE	REMARKS
1230:05	5 %c	7.35	
1230:10	10 Sec	7.33	
1230:15	153ec	7.31	
1230:30	30 sc	7.29	
1230:40	40 Sec	7.26	
1230:50	50 Sec	7.24	
1231:00	1 min	7.22	
1231:30	1.5 min	7.16	
1232:00	2.00 Mic	7.12	
1235:00	5.00 miu	6.95	
1237:00	7.00 Mic.	6.89	
1240:00	10.00 min	6.85	
1245:00	15.00 Mic	6.82	END OF TEST
	20,00		
	30.00 min		
1294	35.00 4	45 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	
	40,000		
	45.004		
	50,000		-
	65.00 1		
	10.00.		
	10.00. 15 :000 80:000		
	80:000		

Note: stop the test if 90% static water level inconvered

#### SLUG TEST DATA SHEET

WELL NO: SHL-23

TOTAL DEPTH: 35.45 T.O.C.

SLUG TYPE: P.V.C.

**VOLUME OF WATER REMOVED:** 

STARTING TIME: 1302

HERMIT TEST No.: manually tested END TIME: 13817

SITE: FORT DEVENS

DEPTH TO THE WATER: 26 48' T.O.C.

SLUG SIZES (L/D): 5' x 1.25"

RISING OR FALLING HD OR BOTH: R,F,B

E+E PERSOLUEL: M. HECKEL

LAPSE OF TIME	HEAD VALUE	REMARKS
5 586	26.27	
10 sec	26.30	
15 sec	26.33	
30 Sec	26.38	
40 sec	26.40	
50 sec	26.42	
1 min	26.43	
1.5 min	26.45	
Zmin	26.45	
5 min	26.46	
	26.47	
	26.47	
15 min .	26.47	END OF TEST
	es o s e senare	
	~	
	5 sec 10 sec 15 sec 30 sec 40 sec 50 sec 1 min 1.5 min 2 min 5 min 7 min	5 586 26.27 10 500 26.30 15 500 26.33 30 500 26.38 40 500 26.40 50 500 26.40 1 min 26.43 1.5 min 26.45 2 min 26.45 5 min 26.45 7 min 26.47

#### SLUG TEST DATA SHEET

WELL NO: 3HL-23

TOTAL DEPTH: 35.45' T.O.C.

SLUG TYPE: PVC

**VOLUME OF WATER REMOVED:** 

STARTING TIME: 1321

HERMIT IEST Do :: manually tested

EMDTIME: 1326

SITE: FORT DEVENS

DEPTH TO THE WATER: 26.48 T.O.C.

SLUG SIZES (L/D): 5' . 1.25"

RISING OR FALLING HD OR BOTH: R.F.B

TIME	LAPSE OF TIME	HEAD VALUE	REMARKS
13.21:05	5 %c	missed readis	, i
1321:10	103ec	missed read	
1321:15	15 Sec	26,66	
13-21:30	30 se	26.58	
1321:40	403ec	76.55	
1321:50	50 Sec	26 53	
3 22:00	1 min	26.52	
1322:30	1.5 min	16.450	6
1323:00	2.00 Mic	76.49	1 (
1326:00	5.00 min	26.47	END OF TEST
	7.00 Mic.		
	10.00 Mil		
	15.00 Mic		
	20,00		
	30.00 min		4
	35.00 4		
	40,000		
	45.009		
	50,000		
	60.000		
	65.00 +		
	10.00.		
	15 000 80:000	-	
	85 0		

Note: Stop the test if 90% static water level is recovered

#### **SLUG TEST DATA SHEET**

WELL NO: CSB-2

TOTAL DEPTH: 52.43' T.O.C.

SLUG TYPE: PVC

**VOLUME OF WATER REMOVED:** 

STARTING TIME: 1519

HERMIT TEST UD: manually tested

EMDTIME: 1521

SITE: FORT DEVENS

DEPTH TO THE WATER: 17.91' T.O.C.

SLUG SIZES (LID): 5' * 1.25"

RISING OR FALLING HD OR BOTH: R,F,B

ETE PERSOLUEL: M. HECKEL

TIME	LAPSE OF TIME	HEAD VALUE	REMARKS
1519:05	5 sec	missed read	ling
1519:10	10. sec	17.94	
1519:15	15 sec	17.91	
1519:30	30 sec	17.91	
1519:40	40 sec	17.91	
1519:50	50 sec	17.91	
1520:00	1 minute	17.91	
1520:30	1.5. min	17.91	. married
1521:00	2 min	17.91	END OF TEST

#### SLUG TEST DATA SHEET

WELL NO: CSB-Z

TOTAL DEPTH: 52.43 T.O.L

SLUG TYPE: PVC

**VOLUME OF WATER REMOVED:** 

STARTING TIME: 1517

HERMIT TEST No .: manually tested

EMDTIME: 1519

SITE: FORT DEVENS

DEPTH TO THE WATER: 17 95 T.O.C SLUG SIZES (LID): 5' x 1.25"

RISING OF FALLING BO OR BOTH: R.F.B

E+E PERSOLUEL: M. HECKEL

TIME	LAPSE OF TIME	HEAD VALUE	REMARKS	
5 17:05	5%c	17.88		
1517:10	10 Sec	17.90		
1517:15	15 Sec	17.91		
1517:30	30 se	17.91		
1517:40	403ec	17.91		
1517:50	50 Sec	17.91		
1518:00	1 min	17.91		
1518:30	1.5 min	17.91		
15 19:00	2.00 Mic	17.91	END OF TEST	
	5.00 Min			
	7.00 Mic.			
	10.00 Min			
	15.00 Mic			
	20,00			
	30.00 min			
	35.004			
0	40.000			
	45.009			
	50,000			
	60.000			
	65.00 +			
	15.000			
	80:000	<del> </del>		
	85 0			

Note: Stop the test of 90% static water level's recovered

#### **SLUG TEST DATA SHEET**

WELL NO: POL - 2 TOTAL DEPTH: 29,25

SLUG TYPE:

**VOLUME OF WATER REMOVED:** 

STARTING TIME: HERMIT TEST NO .: FUDTIME .

SITE: FORT DEVENS DEPTH TO THE WATER: 28.71

SLUG SIZES (LLD):

RISING OR FALLING HD OR BOTH: R,F,B

E+E PERSOLUEL: KDAVISON

S ROBERTS

INSUFFICEINT WATER VOLUME TO PERFORM TEST	ARKS
TO PERFORM TEST	

Note: stop the test if 90% static water lace Prince oursed

#### **SLUG TEST DATA SHEET**

WELL NO: EOD - 2 TOTAL DEPTH: Z6.6' T.O.R.

SLUG TYPE:

**VOLUME OF WATER REMOVED:** 

STARTING TIME: HERAIT TEST VO .: ENDTIME: SITE: FORT DEVENS DEPTH TO THE WATER: Z5.3' T.O.P. SLUG SIZES (LLD):

RISING OR FALLING HD OR BOTH: R,F,B

E+E PERSOLUEL:

TIME	LAPSE OF TIME	HEAD VALUE	REMARKS
	INSUFFICIENT TO PERFORM	WATER VO	
	•		
		Sentence in Assess	

Note: stop the test of 90% static water level incorrect

#### **SLUG TEST DATA SHEET**

WELL NO: EOD -4

TOTAL DEPTH: 36.10 T.O.R.

SLUG TYPE: PVC

**VOLUME OF WATER REMOVED:** 

manually tested

EMDTIME:

SITE: FORT DEVENS 26 DEPTH TO THE WATER: 31. T.O.R. SLUG SIZES (LEPT) Z " × 1.25"

RISING OR FALLING HD OR BOTH: R,F,B E + E PERSOLUEL : S. NEWCHURCH

B. KOWALCYZK K. DAVISON

TIME	LAPSE OF TIME	HEAD VALUE	REMARKS
1340:05	5 sec	missed	
	10 sec	31.08	
	15 sec	31.10	
	ZO sec	31.11	
1340:30	30.586	31.15	
	40 sec _	71.12	
-	50. Sec	31.12	
341:00	1 min	31.125	:
1341:30	1.5 min	31.13	
342:00	Z min	31. 13	
1345:00	5 min	31.14	
1347: DO 1350: OO	16 min	31. 15	
1355:00	15 min .	31. 15	
1400:00	20. min.	31.15	END OF TEST
	30. min		
	35 min		
· ·	40 min		
	45 min		
NOTE	TEST PERFORMED	WITHIN THE	EE MOURS
	OF SAMPLING WEL		

Revision No: 1

Date:

June 1992

APPENDIX C

IRDMIS LEVEL 3 DATA

RC424

Revision No: 1

Date:

June 1992

#### APPENDIX C

The enclosed high density 3.5" diskette comprises Appendix C. This diskette contains all IRDMIS Level 3 data collected as part of the Remedial Investigation of Fort Devens Group 1A sites. These data are presented in two ways:

- o ASCII files containing easy to follow tables of analytical results for each sampling medium; and
- o ASCII files containing the analytical results for each medium in a data-only format to facilitate exchange of information with other software (such as dBase or Lotus).

The following files are condensed and included on this diskette:

	File Name	Contents
0	TBL CSO.RI	Table of soil analytical results
0	TBL CSE.RI	Table of sediment analytical results
0	TBL CGW.RI	Table of ground water analytical results
0	TBL_CSW.RI	Table of surface water analytical results
0	ASCII_SO.RI	Data-only format of soil analytical results
0	ASCII_SE.RI	Data-only format of sediment analytical results
0	ASCII_GW.RI	Data-only format of ground water analytical results
0	ASCII_SW.RI	Data-only format of surface analytical results
0	DV_CQC.OUT	Data-only format of quality control sample results.

To extract this information from its condensed form, follow the instructions given in the file README.TXT, also included on the diskette. A printed copy of the README.TXT file is provided on the following pages.

recycled paper

Revision No: 1

Date: June 1992

File: Readme.txt 26 March 1992

IRDMIS Level 3 Ft. Devens Group 1A RI Analytical Data Files

This diskette contains the following files: TBL_RI.EXE, ASCII_RI.EXE, and ASCII_QC.EXE. These files are self-extracting executable files, which hold all data in a condensed format.

#### FILE CONTENTS

TBL RI.EXE conta	ins the ASCII files:		
TBL CSO.RI	Chemical Soil Table	187,450	bytes,
TBL CSE.RI	Chemical Sediment Table	948,063	bytes,
TBL CGW.RI	Chemical Ground Water Table	2,328,641	bytes,
TBL_CSW.RI	Chemical Surface Water Table	857,300	
ASCII RI.EXE con	tains the ASCII files:		
ASCII SO.RI	Chemical Soil Data	103,813	bytes,
ASCII SE.RI	Chemical Sediment Data	551,287	bytes,
ASCII GW.RI	Chemical Ground Water Data	1,206,221	
ASCII_SW.RI	Chemical Surface Water Data	448,951	bytes.
ASCII QC.EXE con	tains the ASCII file:		
DV COC.OUT	Chemical OC Data	1,370,382	bytes.

Please note the space requirements for these files when preparing to extract the data.

#### FILE STRUCTURE

The four table files, when extracted, will be in an easy to follow format with titles, page numbers, headings, and data in a columnar layout. The four files will be in ASCII format, and will be ready to be printed.

The data files (except file DV_CQC.OUT), when extracted, will have the following structure:

Field Name	Columns	Data Type	Description
SA	1-2	Numeric 2,0	Study area
INST	3-4	Character 2	
LAB	5-6	Character 2	Lab
LOT	7-9	Character 3	Lot number
SITETYPE	10-13	Character 4	Site type
SITEID	14-23	Character 10	Site id
SAMPPROG	24-26	Character 3	Program
SAMPDATE	27-34	Character 8	Sample date
LAB	35-36	Character 2	Lab
TESTNAME	37-42	Character 6	Test name
METHNO	43-46	Character 4	Test method number
SAMPDEPTH	47-54	Character 8	Sample depth
MEASBOOL	55-56	Character 2	Code indicates test result
VAL	57-66	Character 10	
UNITSMEAS	67-70	Character 4	Unit of measure
FLAGCODE	71	Character 1	Flag
FSANNO	72-79	Character 8	Field sample number

Revision No: 1

Date: June 1992

The file DV_CQC.OUT, when extracted, will have the following structure:

Field Name	Columns	Data Type	Description
INST	1-2	Character 2	Installation
LAB	3-4	Character 2	Lab
LOT	5-7	Character 3	Lot number
QC TYPE	8-11	Character 4	QC type
SAMP TYPE	12	Character 1	Sample type
SAMPPROG	13-15	Character 3	Program
SAMPDATE	16-23	Character 8	Date sample collected
LAB	24-25	Character 2	Lab
TESTNAME	26-31	Character 6	Test name
METHNO	32-35	Character 4	Test method number
SAMPDEPTH	36-43	Numeric 8,1	Sample depth
MEASBOOL	44-45	Character 2	Code indicates test result
VAL	46-57	Numeric 12,3	Result of test
UNITMEAS	58-61	Character 4	Unit of measure
FLAGCODE	62	Character 1	Flag
FSANNO	63-70	Character 8	Field sample number

# INSTRUCTIONS FOR EXTRACTING FILES

The instructions for extracting information from any of the three executable files on this diskette are as follows:

- o Place the diskette in the 3.5" disk drive on a PC,

Example: to extract the four table files from the diskette which is in the "B" drive and place them into a hard disk area called "C:\IRDMIS", go to the C:\IRDMIS\> prompt and type the command; B:TBL RI.

End of file: Readme.txt

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RI Report: Section No.:

Revision No:

Date:

Appendix D

December 1992

Fort Devens

#### APPENDIX D

#### QA/QC RESULTS

(The field sampling and analytical programs for the Group 1A sites (RIs at Shepley's Hill Landfill and Cold Spring Brook Landfill) were integrated with the programs for the site investigations (SIs) for Group 1B sites. The general conclusions of the QA/QC program apply to the entire program and are necessarily reported as such. Data specific to the 1A sites are reported separately).

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RI Report: Section No.: Fort Devens Appendix D

Table D-1

Revision No: Date:

December 1992

#### SUMMARY OF FIELD BLAME/RIMSATES FOR FORT DEVENS SI/RI UNITS = $\mu q/1$

Sample Date	Method	Test Name	Concentration	Site ID
- S	20340	75. V2.		in tribute
06/27/91	Metal	Arsenic	3.050	Zulu1
		Barium	7.290	Zulu1
		Calcium	6600.000	Zulu1
		Iron	51.700	Zulu1
		Potassium	510.000	Zulul
		Magnesium	1700.000	Zulul
		Sodium	2640.000	Zulu1
		Zinc	53.700 0.113	Zulu1
	Pest	Beta-Benzenehexachloride	0.113	Zulul
		P, P'-DDT	0.113 ^U	Zulu1
	Explosives		ND	Zulul
	VOAs		ND	Zulu1
	BNA		ND	Zulu1
06/28/91	Metals	Barium	9.010	Zulu1
		Calcium	7000.000	Zulu1
		Copper	7.960	Zulu1
		Iron	61.100	Zulu1
		Potassium	581.000	Zulul
		Magnesium	1800.000	Zulu1
		Sodium	2790.000	Zulu1
		Zinc	58.200 _U	Zulu1
	Pest	Beta-Benzenehexachloride		Zulu1
		4,4'-DDT	0.153 _U	Zulu1
	VOA	1,2-Dichloroethane	1.180	Zulu1
	Explosives		ND	Zulu1
	TPHC		<1160	Zulu1
	BNA		ND	Zulul
07/02/91	TPHC		<1160	B202
07/09/91	Metal	Calcium	93.500	LF11
		Sodium	253.000,	LF11
	Pest	Alpha-Benzenehexachloride	0.032	LF11
		Beta-Benzenehexachloride	0.147	LF11
	VOA	Methylene Chloride	8.800	LF11
	TPHC	- Constitution of the cons	<1160	LF11
	BNA		ND	LF11
07/11/91	Metal	Barium	41.100 ^X	LF11
		Calcium	98.700	LF11
		Sodium	237.000	LF11
	VOA	Methylene Chloride	7.400	LF11
	Pest		ND	LF11
	TPHC		<1160	LF11
	BNA		ND	LF11
07/17/91	2	Total Organic Carbon	140000.000	SE-Zulu:
07/18/91	Metals	Calcium	53.700	EOD
01/10/51		Copper	12.800	EOD
		Vanadium		EOD
	Pest	Heptachlor	4.640 0.024	EOD
	VOA	Methylene Chloride	9.020	EOD
		MACHATANA CUTOLINA		
			ND	
	Explosives		ND	EOD
	Explosives Anions		ND	EOD
	Explosives			

RC424

Source: USATHAMA IRDMIS Level 3/E & E, 1992

ND = All compounds in analysis not detected. Detection limits for multi-

parameter tests are included in Appendix C. VOAs = Volatile Organic Compounds

PEST = Pesticide/Polychlorinated Biphenyls

BNA = Base Neutral/Acid Extractable Organic Compounds

TPHC = Total Petroleum Hydrocarbons

U = Not confirmed on a second column

X = Exceeds calibration range

^{*} Result reported in mg/l

Revision No:

Date: December 1992

Table D-1 (cont.)

SUMMARY OF FIELD BLANK/RINSATES FOR FORT DEVENS SI/RI UMITS =  $\mu g/1$ 

Sample Date	Method	Test Name	Concentration	Site		
07/23/91	Hard	Total Hardness*	0.300	B202		
,,	Metals	Barium	1.670	B202		
	337,777,7	Calcium	145,000	B202		
		Iron	40.500	B202		
		Silver	2.030	B202		
	VOA	Methylene Chloride	41.200	B202		
	Pest		ND	B202		
	Anions		ND	B202		
	TPHC		<1160	B202		
	BNA		ND	B202		
08/02/91	Metals	Aluminum	132,000	Zulu2		
,,		Aluminum	90.800	Zulu2		
		Barium	1.630	Zulu2		
		Barium	1.590	Zulu2		
		Calcium	92.400	EOD		
		Calcium	78.500	Zulu2		
		Calcium	159.000	Zulu2		
		Cadmium	3.210	Zulu2		
		Copper	4.840	EOD		
		Copper	5.240	Zulu2		
		Iron	34.900	EOD		
		Iron	29.600	Zulu2		
		Vanadium	4.220	EOD		
	VOA	Methylene Chloride	784.000	EOD		
		Methylene Chloride	26.500	Zulu2		
		Methylene Chloride	13,700	Zulu2		
	Pest	A CONTROL OF THE PARTY OF THE P	ND	Zulu2	and	EOD
	Explosives		ND	Zulu2	and	EOD
	Anions		ND	Zulu2	and	EOD
	TPHC		<1160	Zulu2	100 mg	
	BNAs		ND	Zulu2	and	EOD
08/06/91	Metal	Barium	4.190	SHL	Section 2	200
- Table 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		Calcium	133.000	SHL		
		Zinc	97.400	SHL		
	Pest		ND	SHL		
	VOA	Acetone	5.300	SHL		
		Methylene Chloride	30.400	SHL		
	Explosives		ND	SHL		
	BNA		ND	SHL		

RC424

Source: USATHAMA IRDMIS Level 3/E & E, 1992

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⁼ All compounds in analysis not detected. Detection limits for multi-ND parameter tests are included in Appendix C. VOAs = Volatile Organic Compounds

PEST = Pesticide/Polychlorinated Biphenyls

BNA = Base Neutral/Acid Extractable Organic Compounds

TPHC = Total Petroleum Hydrocarbons

U = Not confirmed on a second column

X = Exceeds calibration range

^{*} Result reported in mg/l

RI Report: Section No.: Fort Devens Appendix D

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Date:

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Table D-1 (cont.)

SUMMARY OF FIELD BLANK/RINSATES FOR FORT DEVENS SI/RI UNITS =  $\mu g/1$ 

Sample Date	Method	Test Name	Site	
			Concentration	ID
08/15/91	Metal	Calcium	66.900	SE-SHL
		Calcium	63.300	SOIL BACKGROUND
		Copper	9.290	SE-SHL
		Copper	14.700	SOIL BACKGROUND
		Iron	68.600	SE-SHL
		Iron	85.100	SOIL BACKGROUND
		Nickel	15.500	SOIL BACKGROUND
	VOA	Methylene Chloride	8.530	SE-SHL
		Methylethyl Ketone	12.000	SE-SHL
	Pest		ND	SE-SHL
	Explosives		ND	SE-SHL
	BNA		ND	SE-SHL
08/21/91	Metal	Calcium	77.200	CSB/Leachate Soil
		Copper	6.680	CSB/Leachate Soil
		Iron	28.300	CSB/Leachate Soil
	VOA	Methylene Chloride	9.410	CSB/Leachate Soil
	Pest		ND	CSB/Leachate Soil
	BNA		ND	CSB/Leachate Soil
08/22/91		Total Hardness*	0.300	CSB/Leachate Soil
	Metal	Barium	5.360	CSB/Leachate Soil
		Calcium	114.000	CSB/Leachate Soil
		Iron	41.200	CSB/Leachate Soil
		Zinc	78.000	CSB/Leachate Soil
	Anions	Nitrate	42.900	CSB/Leachate Soil
	AOV	Methylene Chloride	8.630	CSB/Leachate Soil
	Pest		ND	CSB/Leachate Soil
	Explosives		ND	CSB/Leachate Soil
	TPHC		<1160	CSB/Leachate Soil
	BNA		ND	CSB/Leachate Soil
08/23/91	Metal	Barium	2.590	SE-CSB
		Calcium	107.000	SE-CSB
		Copper	9.100	SE-CSB
		Iron	30.500 0.026	SE-CSB
	Pest	Heptachlor	0.026	SE-CSB
	VOA	Methylene Chloride	8.040	SE-CSB
		Methylethyl Ketone	15.000	SE-CSB
	Explosives		ND	SE-CSB
	TPHC		<1160	SE-CSB
	BNA		ND	SE-CSB
12/09/91	Metal	Calcium	150.000	SHL
		Iron	31.900	SHL
	Anions	Nitrate	13.600	SHL
	AOV	Methylene Chloride	7.940	SHL
	Pest		ND	SHL
	Explosives		ND	SHL
	TPHC		<1160	SHL
	BNA		ND	SHL

RC424

Source: USATHAMA IRDMIS Level 3/E & E, 1992

ND = All compounds in analysis not detected. Detection limits for multi-parameter tests are included in Appendix C.

VOAs = Volatile Organic Compounds

PEST = Pesticide/Polychlorinated Biphenyls

BNA = Base Neutral/Acid Extractable Organic Compounds

TPHC = Total Petroleum HydrocarbonsU = Not confirmed on a second column

U = Not confirmed on a second column
X = Exceeds calibration range

^{*} Result reported in mg/l

RI Report: Section No.: Revision No:

Site

Fort Devens Appendix D

RC424

Date:

December 1992

## SUMMARY OF TRIP BLANK RESULTS FOR FORT DEVENS SI/RI INVESTIGATIONS UNITS = $\mu g/1$

Table D-2

Date	Chloride	Acetone	Chloromethane	ID/Type
Round 1				
6/22/91	37.300	<10.00	<1.600	Zulu1/Bore
6/22/91	46.100	<10.00	<1.600	Zulu1/Bore
6/22/91	21.600	<10.00	<1.600	Zulu1/Bore
6/22/91	97.100	<10.00	<1.600	Zulu1/Bore
6/27/91	<5.400	<10.00	<1.600	Zulu1/Bore
6/27/91	6.370	<10.00	<1.600	Zulu1/Bore
6/27/91	<5.400	<10.00	<1.600	Zulu1/Bore
7/8/91	18.000	61.000	<1.600	LF11
7/8/91	12.000	31.000	<1.600	LF11
7/12/91*	8.630	10.000	1.280	Zulu1/Bore
7/12/91	9.510	20.000	<1.600	Zulu2/Bore
8/1/91	10.800	<10.000	<1.600	SHL/Weste
8/1/91	12.70	<10.000	3,650	EOD/Groundwater
8/1/91	12.70	<10.000	3.580	Zulu2/Bore
8/6/91	9.510	5.800	<1.600	SHL-Groundwater
8/7/91	7.060	<10.000	<1.600	SHL+CBS/Groundwater
8/13/91	9.120	<10.000	2.50	SHL/Surface Water
8/14/91	14.700	10.000	14.900	SHL/Surface Water
8/15/91	16,700	<10.000	3.850	SHL/Surface Water
8/20/91	34.300	13.000	8.110	CSB/Waters
8/21/91	9.020	<10.000	6.760	CSB/Waters
8/22/91	9.220	<10.000	8.110	CSB/Waters
8/23/91	11.800	<10.000	2.640	SHL+CSB/Waters
8/28/91	11.800	<10.000	8.110	SHL/Wastes
Mean	18.5	23.5	5.77	
Standard				
Deviation (STD)	20.8	20.4	3.93	
Mean+3 X STD	80.9	84.7	17.6	
Shipping Date	Methylene Chloride	Acetone	Chloroform	Site ID/Type
Round 2				
12/3/91	4.020	<10.000	<0.830	SHL/Groundwater
12/4/91	4.310	<10.000	<0.830	SHL/Groundwater
12/5/91	4.610	<10.000	<0.830	SHL+POL/Groundwater
12/6/91	4.220	<10.000	<0.830	SHL+POL/Groundwate:
12/7/91	5.880	<10.000	<0.830	SHL+CSB/Groundwate:
12/9/91	7.650	<10.000	<0.830	CSB/Groundwater
12/10/91	5.490	<10.000	0.996	CSB, POL+B202/ Groundwater
12/11/91	5.390	<10.000	(0.830	EOD/Groundwater
12/13/91	4.800	<10.000	0.996	
Mean	5.15		0.996	
Standard Deviation				
(STD)	1.13		0.0	
Mean+3 X STD	8.54		0.996	

^{* 1,2-}Dichloroethane was also detected at 1.550  $\mu g/l$ 

Source: USATHAMA IRDMIS Level 3/E & E, 1992

Shipping

Methylene

Fort Devens Appendix D

Revision No:

Date:

December 1992

Table D-3

SUMMARY OF METHOD BLANK RESULTS FOR FORT DEVENS SI/RI INVESTIGATIONS

Lot	Method	Test Name	Concentration
СВН	Pest-S	Heptachlor	0.003 ^U
		P.P'-DDT	0.019
CBI	Pest-S	Delta-Benzenehexachloride	0.006
CBJ	Pest-S	Heptachlor	0.001
CBK	Pest-W	Alpha-Benzenehexachloride	0.012
		P,P'-DDT	0.157
CBL	Pest-S	Beta-Benzenehexachloride	0.011
77.7	2757.2	Heptachlor	0.001C
		P,P'-DDT	0.044
CBM	Pest-W	Beta-Benzenehexachloride	0.174
4777	6.225.0	P.P'-DDT	0.199
CBN	Pest-S	Beta-Benzenehexachloride	0.010
		Heptachlor	0.002
		P.P'-DDT	0.045
СВО	Pest-S	Beta-Benzenehexachloride	0.012
		Endosulfan Sulfate	0.099
		Heptachlor	0.003
CBR	Pest-W	Heptachlor	0.017
CBS	Pest-S	neptuonitot	
CBT	Pest-W	Heptachlor	0.013
CBU	Pest-S	Heptachlor	0.001
CBV	Pest-W	Heptachlor	0.021
CBY	Pest-W	Heptachlor	0.028_
CCA	Pest-W	Endosulfan Sulfate	0.151
2500		Heptachlor	0.034
CCC	Pest-W	Heptachlor	0.018
CCL	Pest-W	Endosulfan Sulfate	0.155 ^U
CCN	Pest-W	Endosulfan Sulfate	0.177
CDG	Pest-W	Endrin	0.009
MDR	Metals-W	Aluminum	118.000
	201/23/23/34	Iron	297.000
MDW	Metals-W	Copper	22.700
MEA	Metals-S	Vanadium	2.690
MEC	Metals-W	Barium	1.580
MEL	Metals-W	Copper	8.390
SFX	BNA-S	Benzoic Acid	0.520
777		Tetradecanoic Acid	0.300
		Hexadecanoic Acid	2.000
SFY	BNA-S	Bis (2-Ethylhexyl) Phthalate	0.690
3.5		Benzoic Acid	0.650
		Hexadecanoic Acid	2.000
SFZ	BNA-W	Bis (2-Ethylhexyl) Phthalate	3.200

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Note: Soil blanks reported in  $\mu g/g$ Water blanks reported in  $\mu g/l$ 

Pest-W = Pesticide/PCB-Water Pest-S = Pesticide/PCB-Soil

BNA-W = Base Neutral/Acid Extractable - Water BNA-S = Base Neutral/Acid Extractable - Soil

VOA-W = Volatile Organic Compounds - Water VOA-S = Volatile Organic Compounds - Soil

U = Result not confirmed on a second column

C = Result confirmed

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Table D-3 (cont.)

### SUMMARY OF METHOD BLANK RESULTS FOR FORT DEVENS SI/RI INVESTIGATIONS

Lot	Method	Test Name	Concentration
SGA	BNA-S	Benzoic Acid	0.320
		Pentadecanoic Acid	0.200
		Hexadecanoic Acid	2.000
		Octadecanoic Acid	0.200
SGB	BNA-S	Benzoic Acid	0.500
SGC	BNA-S	Benzoic Acid	0.800
		Hexadecanoic Acid	0.600
		Octadecanoic Acid	0.200
GD	BNA-S	Benzoic Acid	0.780
		Pentadecanoic Acid	0.400
		Hexadecanoic Acid	1.000
GF	BNA-S	Benzoic Acid	0.820
		Hexadecanoic Acid	1.000
GI	BNA-S	Benzoic Acid	0.590
	7,000 7	Hexadecanoic Acid	0.500
SGK	BNA-S	Hexadecanoic Acid	0.700
SGN	BNA-S	Benzaldehyde	0.200
		Benzoic Acid	0.700
		Hexadecanoic Acid	0.700
GO	BNA-S	Benzoic Acid	0.740
-	5.00	Hexadecanoic Acid	0.700
GQ	BNA-S	Tetradecanoic Acid	0.300
	J 2	Pentadecanoic Acid	0.600
		Hexadecanoic Acid	2.000
		Pentanoic Acid	0.200
		Heptanoic Acid	0.500
SHA	BNA-S	Tetradecanoic Acid	0.200
	Dilli D	Pentadecanoic Acid	0.600
		Hexadecanoic Acid	2.000
		Heptanoic Acid	0.400
		Octadecanoic Acid	0.300
SHC	BNA-S	Benzoic Acid	0.300
,,,,	Dija. D	Tetradecanoic Acid	0.200
		Heptanoic Acid	0.400
SHK	BNA-S	Benzoic Acid	0.440
onk.	DINA-5	Hexadecanoic Acid	0.200
SIK	BNA-W	2-Butoxyethanol	5.000
SIN	BNA-W	2-Butoxyethanol	4.000
SIO	BNA-S	Benzoic Acid	0.500
310	DIA-3	Hexadecanoic Acid	2.000
		C17 Alkane	0.200
		Octadecanoic Acid	0.200
VEX	VOA-S	Methylene Chloride	0.008
VEZ	VOA-S	Acetone Chioride	0.008
V & 4	VUA-5	Methylene Chloride	7.7755
700 8	WON C	Acetone Chioride	0.008
VFA	VOA-S		
		Methylene Chloride	0.013
		Methylethyl Ketone	0.015

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Note: Soil blanks reported in  $\mu g/g$ Water blanks reported in  $\mu g/l$ 

Pest-W = Pesticide/PCB-Water

Pest-S = Pesticide/PCB-Soil
BNA-W = Base Neutral/Acid Extractable - Water
BNA-S = Base Neutral/Acid Extractable - Soil
VOA-W = Volatile Organic Compounds - Water
VOA-S = Volatile Organic Compounds - Soil
U = Result not confirmed on a second column

C = Result confirmed

Source: USATHAMA IRDMIS Level 3/E & E, 1992

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Table D-3 (cont.)

### SUMMARY OF METHOD BLANK RESULTS FOR FORT DEVENS SI/RI INVESTIGATIONS

Lot	Method	Test Name	Concentration
VFB	VOA-S	Acetone	0.010
		Methylene Chloride	0.007
VFC	VOA-S	Acetone	0.022
10.2	1,250	Methylene Chloride	0.010
VFD	VOA-W	Methylene Chloride	6.100
VFE	WOA-W	Methylene Chloride	7.000
VFF	VOA-W	Methylene Chloride	6.600
VFG	VOA-W	Methylene Chloride	7.500
VFI	VOA-S	Acetone	0.023
		Methylene Chloride	0.011
VFJ	VOA-S	Methylene Chloride	0.010
VFK	VOA-W	Methylene Chloride	8.500
VFL	VOA-W	Methylene Chloride	8.000
VFN	VOA-S	Acetone	0.037
	TON D	Methylene Chloride	0.007
VFO	W-AOV	Methylene Chloride	7.000
VFP	VOA-S	Acetone	0.036
VIE	VOA-5	Methylene Chloride	0.005
VFO	VOA-W	Acetone	16.000
ALG.	VOA-W	Methylene Chloride	7.000
VFR	VOA-W	Acetone	16.000
VFR	VOA-W	Methylene Chloride	27.000
VFS	VOA-W	Methylene Chloride	9.600
VFU			72.70.90
	W-AOV	Methylene Chloride	7.200
VFV	VOA-W	Methylene Chloride Acetone	8.500
VFW	VOA-S		0.027
		Methylene Chloride	0.009
	****	Methylethyl Ketone Acetone	0.013
VFX	VOA-S	FOR COMPANY OF THE PARTY OF THE	
		Methylene Chloride	0.006
VFZ	W-AOV	Methylene Chloride	12.000
VGB	VOA-S	Acetone	0.034
		Methylene Chloride	0.008
		UNK172	0.003
VGC	W-AOV	Methylene Chloride	12.000
VGE	VOA-W	Methylene Chloride	8.500
VGG	W-AOV	Acetone	10.000
		Methylene Chloride	7.300
OHD	W-AOV	Methylene Chloride	4.400
		Methyl-N-Butyl Ketone	6.200
VHG	W-AOV	Methylene Chloride	4.100
VHJ	W-AOV	Methylene Chloride	4.400
VHK	W-AOV	Methylene Chloride	4.400
VHL	W-AOV	Methylene Chloride	5.600
AHO	VOA-W	Methylene Chloride	5.200
VHS	W-AOV	Methylene Chloride	5.300
VHU	VOA-S	Methylene Chloride	0.007

RC424

Note: Soil blanks reported in  $\mu g/g$ Water blanks reported in  $\mu g/l$ 

Pest-W = Pesticide/PCB-Water Pest-S = Pesticide/PCB-Soil

BNA-W = Base Neutral/Acid Extractable - Water
BNA-S = Base Neutral/Acid Extractable - Soil
VOA-W = Volatile Organic Compounds - Water
VOA-S = Volatile Organic Compounds - Soil
U = Result not confirmed on a second column

C = Result confirmed

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Table D-4 AREA OF CONTAMINATION 5 FIELD DUPLICATE RESULTS IN µg/1 LEACHATE SOIL

Parameter	SEL-SHL-3	SEL-SHL-3 DUP	RPE
Total Organic Carbon	17400.000	11500.000	40
Aluminum	16000.000	18000.000	12
Arsenic	9.300	7.200	25
Barium	31.600	30.600	3.0
Beryllium	<0.078	0.150	-
Calcium	3200.000	4200.000	27
Chromium	16.200	15.900	1.9
Copper	14.300	15.900	11
Iron	13000.000	17000.000	27
Lead	47.800	50.800	6.9
Magnesium	4300.000	4500.000	4.6
Manganese	240.000	240.000	0.0
Mercury	0.086	0.101	16
Potassium	1100.000	980.000	12
Sodium	160.000	154.000	3.8
Vanadium	30.700	45.900	40
Methylene Chloride	0.011	0.012	8.7

RC424

RPD = Relative Percent Difference

-- RPD could not be calculated because one value was a detection limit

Source: USATHAMA IRDMIS Level 3/E & E, 1992

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Table D-5 AREA OF CONTAMINATION 5 FIELD DUPLICATE RESULTS IN µg/1 FIRST ROUND GROUNDWATER

Parameter	SHL-85	SHL-85 DUP	RPD
Chloride	7300.000	8200.000	12
Nitrate	36.000	40.400	12
Sulfate	2530.000	2510.000	0.8
Pyrene	<10.000	85.500	
Arsenic	4.150	4.880	16
Barium	11.900	6.680	56
Calcium	7800.000	7400.000	5.3
Copper	14.300	9.740	38
Iron	102.000	93.700	8.5
Lead	6.020	<4.740	
Magnesium	1200.000	1100.000	8.7
Manganese	2000.000	1900.000	5.1
Potassium	1170.000	1100.000	6.2
Zinc	158.000	39.600	120
Methylene Chloride	8.530	6.860	22
Alpha Chlordane	0.024*	0.008*	100
Heptachlor	0.038*	0.023*	49

RC424

RPD = Relative Percent Difference

^{*} Result not confirmed on a second column

⁻⁻ RPD could not be calculated because one value was a detection limit

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Table D-6 AREA OF CONTAMINATION 5 FIELD DUPLICATE RESULTS IN µg/1 FIRST ROUND GROUNDWATER

Parameter	SHL-21	SHL-21 DUP	RPD
Chloride	2360.000	2340.000	0.8
Nitrate	188.000	190.000	1.0
Sulfate	14000.000	11000.000	24
Aluminum	304.000	607.000	66
Arsenic	3.410	6.360	60
Barium	12.000	13.000	8.0
Calcium	11000.000	12000.000	8.7
Copper	19.900	23.900	18
Iron	458.000	900.000	65
Lead	8.900	14.600	48
Magnesium	1600.000	1600.000	0.0
Manganese	390.000	410.000	5.0
Potassium	1430.000	1310.000	8.6
Sodium	2420.000	2360.000	2.5
Zinc	39.200	28.300	32
Methylene Chloride	9.610	7.250	28

RC424

RPD = Relative Percent Difference

Source: USATHAMA IRDMIS Level 3/E & E, 1992

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Table D-7

#### AREA OF CONTAMINATION 5 FIELD DUPLICATE RESULTS IN µg/1 SECOND ROUND GROUNDWATER

Parameter	SHL-15	SHL-15A	RPD
Alkalinity	4000.000	2000.000	67
Total Kjeldahl Nitrogen	223.000	165.000	30
Chloride	5700.000	5600.000	1.8
Nitrate	2600.000	2800.000	7.4
Sulfate	13000.000	13000.000	0.0
Bromide	125.000	121.000	3.2
Aluminum	7600.000	6900.000	9.6
Arsenic ,	130.000	140.000	7.4
Barium	71.000	68.000	4.3
Beryllium	1.240	0.534	79
Cadmium	44.700	<2.670	
Calcium .	9300.000	10000.000	7.2
Chromium	<4.470	19.100	
Copper	71.500	13.900	135
Iron	14000.000	10000.000	33
Lead	26.200	29.700	12
Magnesium	2600.000	2790.000	7.0
Manganese	770.000	740.000	4.0
Potassium	2850.000	2400.000	17
Sodium	2870.000	<15000.000	-
Vanadium	75.000	4.370	178
Zinc	64.500	53.100	19
Methylene Chloride	4.510	4.310	162

RC424

RPD = Relative Percent Difference

-- RPD could not be calculated because one value was a detection limit

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Table D-8

#### AREA OF COSTAMINATION 5 FIELD DUPLICATE RESULTS IN µg/1 SURFACE WATER

Parameter	SW-SHL-8	SW-SHL-8 DUP	RPD
Alkalinity	24400.000	23000.000	5.9
Total Kjeldahl Nitrogen	614.000	442.000	32
Total Hardness	35300.000	39000.000	10
Total Suspended Solids	400.000	800.000	67
Chloride	49000.000	45000.000	8.5
Sulfate	5030.000	4550.000	10
Arsenic	2.990	3.340	11
Barium	4.090	4.210	2.9
Calcium	12000.000	13000.000	8.0
Copper	14.600	5.620	89
Iron	538.000	290.000	60
Magnesium	2000.000	2400.000	18
Manganese	7.810	11.700	40
Nickel	17.900	<8.760	
Potassium	830.000	807.000	2.8
Sodium	22000.000	24000.000	8.7
Methylene Chloride	7.750	8.730	12
Beta-BHC	0.040*	0.041*	2.5

RC424

RPD = Relative Percent Difference

^{*} Result not confirmed on a second column

⁻⁻ RPD could not be calculated because one value was a detection limit

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Table D-9

#### AREA OF CONTAMINATION 5 FIELD DUPLICATE RESULTS IN pg/g SEDIMENTS

Parameter	SE-SHL-8	SE-SHL-8 DUP	RPD
Total Organic Carbon	29500.000	22500.000	27
Aluminum	23000.000	4400.000	136
Arsenic	170.000	35.000	131
Barium	210.000	40.100	136
Beryllium	1.150	0.214	137
Cadmium	60.200	10.800	139
Calcium	6100.000	1200.000	134
Chromium	950.000	190.000	133
Copper	54.600	11.000	133
Iron	73000.000	15000.000	132
Lead	202.000	48.600	122
Magnesium	6900.000	1400.000	132
Manganese	8800.000	1700.000	135
Mercury	6.070	<0.260	
Nickel	70.100	12.100	141
Potassium	2350.000	549.000	124
Vanadium	74.800	13.300	140
Acetone	0.369	0.088	123
Methylene Chloride	0.072	0.022	106
Methylethylketone	<0.010	0.039	

RC424

RPD = Relative Percent Difference

-- RPD could not be calculated because one value was a detection limit

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Table D-10

#### AREA OF CONTAMINATION 40 FIELD DUPLICATE RESULTS IN µg/g LEACHATE SOIL

Parameter	SL-CSB-2	SL-CSB-2 DUP	RPD
Total Organic Carbon	5010.000	3900.000	25
Anthracene	0.514	0.736	36
Benzo(A)Anthracene	1.040	1.260	19
Benzo(A)Pyrene	1.300	1.500	14
Benzo(B)Fluoranthene	0.969	1.250	25
Benzo(g,h,i)Perylene	0.373	0.429	14
Benzo(k)Fluoranthene	1.720	1.890	9.4
Fluoranthene	2.560	3.110	19
Indeno(1,2,3-C,D)pyrene	0.275	0.307	11
Phenanthrene	1.110	1.640	38
Pyrene	2.490	3.210	25
Aluminum	10000.000	9500.000	5.1
Arsenic	22.000	22.000	0.0
Barium	23.600	21.600	8.8
Beryllium	0.128	0.123	4.0
Calcium	<1300.000	1400.000	
Chromium	24.300	23.100	5.1
Copper	13.000	12.500	3.9
Iron	16000.000	13000.000	21
Lead	35.200	36.400	3.3
Magnesium	4800.000	4800.000	0.0
Manganese	230.000	250.000	8.3
Mercury	0.095	<0.026	
Nickel	15.200	13.700	10
Potassium	1300.000	1200.000	8.0
Sodium	123.000	74.200	49
Vanadium	16.000	14.900	7.:
Methylene Chloride	0.006	0.006	0.0

RC424

RPD = Relative Percent Difference

⁻⁻ RPD could not be calculated because one value was a detection limit

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#### Table D-11

## AREA OF CONTAMINATION 40 FIELD DUPLICATE RESULTS IN $\mu g/1$ FIRST ROUND GROUNDWATER

Parameter	CSB-4	CSB-4 DUP	RPD
Methylene Chloride	7.350	7.350	0.0
			RC42

RPD = Relative Percent Difference

Source: USATHAMA IRDMIS Level 3/E & E, 1992

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Table D-12

## AREA OF CONTAMINATION 40 $^{\circ}$ FIELD DUPLICATE RESULTS IN $\mu g/1$ SECOND ROUND GROUNDWATER

Parameter	CSB-1	CSB-1A	RPD
Alkalinitý	30000.000	452000.000	40
Total Kjeldahl Nitrogen	182.000	156.000	15
Chloride	2900.000	2900.000	0.0
Nitrate	1100.000	1200.000	8.7
Sulfate	8400.000	8300.000	1.2
Aluminum	5600.000	6300.000	12
Arsenic	10.900	8.540	24
Barium -	33.400	34.600	3.5
Calcium	14000.000	14000.000	0.0
Chromium	6.120	9.130	39
Copper	11.400	12.700	11
Iron	6300.000	7200.000	13
Lead	5.580	7.120	24
Magnesium	3100.000	3200.000	3.2
Manganese	2400.000	2560.000	6.4
Potassium	1550.000	1670.000	7.4
Sodium	3320.000	<15000.000	
Zinc	92.000	95.100	3.3
Methylene Chloride	5.200	5.200	0.0
1,3,5-Trinitrobenzene	1.350	1.320	2.2
1,3-Dinitrobenzene	2.860	2.710	5.4

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RPD = Relative Percent Difference

-- RPD could not be calculated because one value was a detection limit

Source: USATHAMA IRDMIS Level 3/E & E, 1992

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Table D-13

## AREA OF CONTAMINATION 40 FIELD DUPLICATE RESULTS IN $\mu g/1$ SECOND ROUND GROUNDWATER

Parameter	CSB-7	CSB-7A	RPD	
Alkalinity	2000.000	2000.000	0.0	
Total Kjeldahl Nitrogen	91.300	156.000	52	
Chloride	3800.000	3800.000	0.0	
Nitrate	63.800	62.100	2.7	
Sulfate	8100.000	8100.000	0.0	
Aluminum	9100.000	7200.000	23	
Arsenic	29.000	25.000	15	
Barium	63.000	58.000	8.3	
Calcium	5000.000	4700.000	6.2	
Chromium	9.150	8.580	6.4	
Copper	16.700	14.800	12	
Iron	10000.000	9000.000	10	
Lead	15.100	12.700	17	
Magnesium	2900.000	2500.000	15	
Manganese	350.000	300.000	15	
Potassium	1470,000	1390.000	5.6	
Sodium	24000.000	23000.000	4.2	
Vanadium	4.180	<4.000		
Zinc	22.000	<19.400		
Methylene Chloride	5.200	5.290	1.7	

RC424

RPD = Relative Percent Difference

-- RPD could not be calculated because one value was a detection limit

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Table D-14

#### AREA OF CONTAMINATION 40 FIELD DUPLICATE RESULTS IN µg/1 SURFACE WATERS

Parameter	SW-CSB-6	SW-CSB-6 DUP	RPD
Alkalinity	58600.000	61000.000	4.0
Total Kjeldahl Nitrogen	526.000	476.000	10
Total Harndess	56500.000	68500.000	19
Total Suspended Solids	4000.000	6400.000	46
Chloride	20000.000	20000.000	0.0
Nitrate	<24.300	47.000	-
Sulfate	5290.000	5310.000	0.4
Arsenic	5.790	5.440	6.2
Barium	9.710	10.700	9.7
Calcium	19000.000	24000.000	23
Chromium	<4.470	4.660	
Iron	1200.000	1300.000	8.0
Magnesium	3000.000	2900.000	3.4
Manganese	85.600	86.900	1.5
Potassium	1530.000	1560.000	1.9
Zinc	<19.400	21.200	-
Methylene Chloride	6.670	6.860	2.8
Alpha-BHC	0.013*	0.013*	0.0

RC424

RPD = Relative Percent Difference

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Source: USATHAMA IRDMIS Level 3/E & E, 1992

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^{*} Result not confirmed on a second column

⁻⁻ RPD could not be calculated because one value was a detection limit

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Table D-15

#### AREA OF CONTAMINATION 40 FIELD DUPLICATE RESULTS IN pg/g SEDIMENTS

Parameter	SE-CSB-6	SE-CSB-6 DUP	RPD
Total Organic Carbon	57600.000	40200.000	36
Total Petroleum Hydroca	rbons 213.000	<74.400	
Benzo(A)Anthracene	0.734	0.911	22
Benzo(A)Pyrene	1.090	1.340	21
Benzo(B)Fluoranthene	0.878	1.190	30
Chrysene	1.140	1.500	27
Fluoranthene	2.050	2.710	28
Pyrene	2.180	2.910	29
Aluminum	17000.000	36000.000	72
Arsenic	43.000	59.000	31
Barium	52.300	120.000	78
Beryllium	0.408	0.656	47
Chromium	38.300	76.200	66
Copper	19.600	45.000	79
Iron	20000.000	36000.000	57
Lead	78.700	109.000	32
Magnesium	5100.000	12000.000	81
Manganese	500.000	750.000	40
Mercury	0.138	0.180	26
Nickel	13.400	33.500	86
Potassium	2100.000	4200.000	67
Sodium	217.000	431.000	66
Vanadium	24.900	52.800	72
Acetone	0.036	0.088	84
Methylene Chloride	0.026	0.035	30
Endrin	0.165	<0.075	
P,P'-DDD	0.723	0.718	0.7
P.P'-DDE	0.138	<0.040	

RC424

RPD = Relative Percent Difference

-- RPD could not be calculated because one value was a detection limit

#### Table D-16

#### VOLATILE ORGANICS

#### MATRIX SPIKE/MATRIX SPIKE DUPLICATE

#### RESULTS FOR SAMPLE SHL-17

Units =  $\mu g/1$ 

Parameter	Sample Concentration	Spiked Sample Concentration	Concentration of Spike Added	Percent Recovery	Duplicate Spiked Concentration	Percent Recovery	RPD
1,1-Dichloroethene	<1.420	44	50	88	45	90	14
Benzene	<2.400	50	50	100	51	71	11
Trichloroethene	<0.500	45	50	90	44	76	14
Toluene	<8.700	55	51	108	54	76	13
Chlorobenzene	<1.400	53	50	106	53	75	13

ND = Not detected

Source: E & E, 1992

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Table D-17

## PESTICIDES/PCBS MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS FOR SAMPLE SHL-17

Units =  $\mu g/1$ 

	Sample	Spiked Sample	Concent: of Sp: Add	ike	Percent	Duplicate Spiked	Percent	
Parameter	Concentration	Concentration	MS /	MSD	Recovery	Concentration	Recovery	RPI
Dieldrin	<0.022	0.372	0.400	0.400	93.0	0.408	102.0	9.2
Endrin	<0.008	0.102	0.080	0.080	126.3	0.109	136.3	7.6
alpha-Chlordane	<0.002	0.023	0.040	0.040	56.5	0.027	67.5	17
Heptachlor	<0.008	0.038	0.040	0.040	95.3	0.044	110.5	15
Lindane	<0.033	0.374	0.400	0.400	93.5	0.394	98.5	5.2
2,2-Bis(p-chlorophenyl)- 1,1-dichloroethane	<0.020	0.678	0.800	0.800	84.9	0.839	104.9	21
Aroclor 1016	<0.068	4.219	4.000	4.000	105.5	4.474	111.8	5.8
Aroclor 1260	<0.075	1.949	4.000	4.000	48.8	1.982	49.5	1.4

ND = Not detected

Source: E & E, 1992

RC424

RI Report: Section No.: Revision No: Date:

Table D-18

#### EXPLOSIVES

### MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS FOR SAMPLE SHL-17

Units =  $\mu g/g$ 

.024 <0.270 0.054	8.98 8.94	9.88 9.84	90.7	9.12	92.0	1.5
		9.84	22.2			
0.054			90.8	8.95	91.0	0.2
	18.1	20.5	88.1	17.9	87.2	1.0
0.101	17.5	21.7	80.3	17.2	78.8	1.9
<1.110	18.8	22.5	83.4	18.4	81.6	2.1
<0.869	16.0	21.9	73.0	15.8	72.3	0.9
<1.540	43.2	48.6	88.8	43.7	89.9	1.2
<0.617	20.1	21.7	92.7	20.3	93.7	1.0
<0.191	6.68	7.69	86.8	6.70	87.2	0.4
	<0.869 <1.540 <0.617	(0.869 16.0 (1.540 43.2 (0.617 20.1	20.869     16.0     21.9       21.540     43.2     48.6       20.617     20.1     21.7	20.869     16.0     21.9     73.0       21.540     43.2     48.6     88.8       20.617     20.1     21.7     92.7	20.869     16.0     21.9     73.0     15.8       21.540     43.2     48.6     88.8     43.7       20.617     20.1     21.7     92.7     20.3	20.869     16.0     21.9     73.0     15.8     72.3       21.540     43.2     48.6     88.8     43.7     89.9       20.617     20.1     21.7     92.7     20.3     93.7

Source: E & E, 1992

RI Report: Section No.: Revision No: Date:

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Table D-19

#### METALS MATRIX SPIKE RESULTS FOR SAMPLE SHL-17 Units = $\mu g/1$

	Sample	Spiked Sample	Concentration of Spike	Percent
Parameter	Concentration	Concentration	Added	Recovery
Aluminum	4,000	4,200	800	25.0
Antimony	<51.200	430	500	86.0
Barium	23	32.4	15.0	62.7*
Beryllium	<0.341	2.91	3.5	83.1
Cadmium	<2.670	34.5	40	86.2
Calcium	9,800	7,700	370	-561.57
Chromium	5.47	40.4	45	77.6
Cobalt	<25.000	138	180	76.7
Copper	7:53	43.3	45	79.5
Iron	4,400	3,900	400	-125
Magnesium	1,500	4,100	400	650
Manganese	88.4	212	160	77.2
Mercury	<0.566	2.762	3.0	92.1
Nickel	<8.760	96.0	120	80.0
Potassium	1,350	4,100	2,400	114.6
Sodium	<15000	<15000	2,800	0
Thallium	<114.000	1,220	1,600	76.2
Vanadium	<4.000	52.9	89.8	58.9*
Zinc	88.3	192	94.9	109.3

RC424

ND = Not detected

*This recovery is outside EPA CLP limits

Source: E & E, 1992

#### Table D-20

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### ANIONS MATRIX SPIKE/MATRIX SPIKE DUPLICATE

#### RESULTS FOR SAMPLE SHL-17

Units =  $\mu g/1$ 

Parameter	Sample Concentration	Spiked Sample Concentration	Concentration of Spike Added	Percent Recovery	Duplicate Spiked Concentration	Percent Recovery	RPD
Bromide	<50.000	717.16	759.75	94.4	708.62	93.3	1.2
Chloride	2,895.95	4,532.82	1,484.85	110.2	3,776.54	59.3	60.1
Fluoride	16.55	744.44	767.33	94.9	731.66	93.2	1.8
Nitrate	0.69	- 749.59	762.75	98.2	736.98	96.5	1.7
Nitrite	630.28	880.06	149.95	166.6	644.28	9.3	178.8
Phosphate	<33.000	707.656	750.26	94.3	697.32	92.9	1.5
Sulfate	11,880.04	15,126.7	4,008.0	81.0	13,509.1	40.6	66.4
							RC42

ND = Not detected

Source: E & E, 1992

RI Report: Section No.: Revision No: Date:

Table D-21

#### VOLATILE ORGANICS MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS FOR SAMPLE SHL-08D Units = $\mu g/1$

Parameter	Sample Concentration	Spiked Sample Concentration	Concentration of Spike Added	Percent Recovery	Duplicate Spiked Concentration	Percent Recovery	RPD
1,1-Dichloroethene	<1.420	44.9	50	90	50.5	101	12
Benzene	<2.400	48.3	50	97	56.2	112	14
Trichloroethene	<0.500	38.2	50	76	44.9	90	17
Toluene	<8.700	43.3	51	85	48.5	95	11
Chlorobenzene	<1.400	41.4	50	83	48.1	96	14

ND = Not detected

Source: E & E, 1992

RC424

RI Report: Section No.: Revision No: Date:

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#### Table D-22

#### PESTICIDES/PCBS MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS FOR SAMPLE SHL-08D Units = $\mu g/g$

Parameter	Sample Concentration	Spiked Sample Concentration	of Sp. Add	ike	Percent Recovery	Duplicate Spiked Concentration	Percent Recovery	RPD
alpha-Chlordane	.00489	.01727	.04	.04	30.9*	.02087	39.9	25.4
Dieldrin	<0.022	0.27519	.04	.04	68.8	0.31451	78.6	13.3
Endrin	<0.008	0.14395	.08	.08	179.9*	0.10617	132.7	30.2
Heptachlor	.05009	.07210	.04	.04	55.0	.07646	65.9	18.0
Lindane	<0.033	0.31382	0.4	0.4	78.4	0.36280	90.7	14.5
2,2-Bis(p-Chlorophenyl)- 1,1-dichloroethane	<0.020	0.42962	0.8	0.8	53.7	0.50094	62.6	15.3
Aroclor 1016	<0.068	4.19095	4.0	4.0	104.8	4.25381	106.3	1.4
Aroclor 1260	<0.075	1.63242	4.0	4.0	40.8	1.70179	42.5	4.1

*This recovery is outside EPA CLP limits

Source: E & E, 1992

RC424

RI Report: Section No.: Revision No: Date:

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Table D-23 METALS MATRIX SPIKE RESULTS FOR SAMPLE SHL-08D Units =  $\mu g/1$ 

	1200000	Spiked	Concentration	40000
	Sample	Sample	of Spike	Percent
Parameter	Concentration	Concentration	Added	Recovery
Aluminum	128.4	837.9	800	88.7
Antimony	<51.200	517.2	500	102.2
Arsenic	<3.090	16.806	15.0	112.0
Barium	15.87	35.22	15	129.0*
Beryllium	<0.341	3.138	3.5	89.2
Cadmium	<2.670	44.5	40	111.3
Calcium	16200	15400	370	0.0
Chromium	<4.470	43.3	45	90.3
Cobalt	<25.000	170	180	91.4
Copper	13.00	63.39	45	112.0
Iron	251.4	520.5	400	67.3*
Lead	6.99	33.976	30.0	89.9
Magnesium	2887	3468	400	145.3
Manganese	2144	2442	160	186.3
Mercury	<0.566	2.439	3.0	81.3
Nickel	<8.760	118.9	120	97.2
Potassium	1778	4836	2400	127.4*
Selenium	<4.100	13.348	15.0	89.0
Sodium	<15000	17450	2800	170.4*
Thallium	<114.000	1327	1600	82.9
Vanadium	<4.000	62	64	91.9
Zinc	179.2	247.0	160	42.4*

RC424

ND = Not detected

*This recovery is outside EPA CLP limits

Source: E & E, 1992

#### Table D-24

# ANIONS MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS FOR SAMPLE SHL-08D Units = $\mu$ g/1

Parameter	Sample Concentration	Spiked Sample Concentration	Concentration of Spike Added	Percent Recovery	Duplicate Spiked Concentration	Percent Recovery	RPD
Bromide	33.75	745.36	759.75	93.7	755.44	95.0	1.4
Chloride	6,046.94	7,030.77	1,484.85	66.3	6,948.91	60.7	8.7
Fluoride	31.99	756.26	767.33	94.4	744.29	92.8	1.7
Nitrate	3.41	762.61	762.75	99.5	753.97	98.4	1.1
Nitrite	784.47	818.76	149.95	22.9	833.69	32.8	35.8
Phosphate	<33.000	651.029	750.26	86.8	678.498	90.4	4.1
Sulfate	10,553.45	14,407.8	4,008.0	96.2	13,815.0	81.4	16.7

ND = Not detected

Source: E & E, 1992

RC424

RI Report: Section No.: Revision No: Date:

Table D-25

#### PESTICIDES/PCBS MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS FOR SAMPLE SHL-23

Units =  $\mu g/1$ 

	Sample	Spiked Sample	Concentration of Spike Added		Percent	Duplicate Spiked	Percent	
Parameter	Concentration	Concentration	MS /	MSD	Recovery	Concentration	Recovery	RPD
Dieldrin	<0.022	0.39	0.40	0.4	97	0.37	94	3.0
Endrin	<0.008	0.080	0.08	0.08	100	0.074	93	7.2
alpha-Chlordane	<0.002	0.033	0.040	0.04	84	0.033	82	2.4
Heptachlor	<0.008	0.038	0.040	0.04	94	0.036	90	4.3
Lindane	<0.033	0.32	0.40	0.4	81	0.31	79	2.5
2,2-Bis(p-chlorophenyl)- 1,1-dichloroethane	<0.020	0.69	0.80	0.80	86	0.66	82	4.8
Aroclor 1016	<0.068	3.8	4.00	4.0	96	3.9	97	1.0
Aroclor 1260	<0.075	4.07	4.00	4.0	102	4.3	109	6.6

ND = Not detected

Source: E & E, 1992

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Table D-26

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# PESTICIDES/PCBS MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS FOR SAMPLE SHL-23 Units = \( \psi g / 1 \)

Parameter	Concentration	Conce	entration	**** /		Percent	Duplicate Spiked	Percent	
2.4-Trichlorobenzene				MS /	MSD	Recovery	Concentration	Recovery	RPD
, c, r rerestorement	<2.800		80	75	75	107	61	81	0
,4-Dichlorobenzene	<4.400		76	76	76	100	56	74	30
2,4-Dinitrotoluene	<1.160		64	77	77	83	54	70	17
2-Chlorophenol	<10.000		31	149	149	21*	100	67	104
-Methyl-4-chlorophenol	<10.000		78	152	152	51	110	72	34
-Nitrophenol	<50.000		ND	148	148	0*	21	14	200
Acenapthene	<14.000		79	73	73	108	45	62	54
Nitrosodi-N-propylamine	<4.500		81	76	76	107	77	101	6
Pentachlorophenol	<50.000		ND	152	152	0	72	47	200
Phenol	<10.000		41	150	150	27	51	34	23
Pyrene	<17.000		83	74	74	112	94	127	13

ND = Not detected

* This value outside EPA CLP limits

Source: E & E, 1992

Table D-27

#### EXPLOSIVES

#### MATRIX SPIKE/MATRIX SPIKE DUPLICATE

#### RESULTS FOR SAMPLE SHL-23

Units =  $\mu g/1$ 

Parameter	Sample Concentration	Spiked Sample Concentration	Concentration of Spike Added	Percent Recovery	Duplicate Spiked Concentration	Percent Recovery	RPD
1,3,5-Trinitrobenzene	<0.388	9.20	9.86	93.3	9.24	93.7	0.4
1,3-Dinitrobenzene	<0.270	9.06	9.77	92.7	9.12	93.3	0.7
2,4,6-Trinitrotoluene	<0.767	18.7	20.7	90.3	18.7	90.3	0.0
2,4-Dinitrotoluene	<1.160	18.3	20.9	87.6	18.2	87.1	0.5
2,6-Dinitrotoluene	<1.110	18.5	21.0	88.1	18.6	88.6	0.5
Cyclotetramethylene-							
tetranitramine (HMX)	<0.869	19.1	21.5	88.8	19.3	89.8	1.0
Nitrobenzene	<1.540	41.0	45.3	90.5	40.9	90.3	0.2
Cyclonite (RDX)	<0.617	20.2	21.1	95.7	20.4	96.7	1.0
N-Methyl-N,2,4,6-tetra-							
nitroaniline	<0.191	4.17	4.57	91.2	4.21	92.1	1.0

ND = Not detected

Source: E & E, 1992

RC424

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#### Table D-28

#### VOLATILE ORGANICS MATRIX SPIKE/MATRIX SPIKE DUPLICATE

RESULTS FOR SAMPLE SE-SHL-16

Units =  $\mu g/g$ 

Parameter	Sample Concentration	Spiked Sample Concentration	Concentration of Spike Added	Percent Recovery	Duplicate Spiked Concentration	Percent Recovery	RPD
1,1-Dichloroethene	<0.019	51	50	102	46	92	10
Benzene	<0.003	53	50	106	57	114	7
Trichloroethene	<0.004	48	50	96	52	104	8
Toluene	<0.008	55	51	108	56	110	2
Chlorobenzene	<0.003	52	50	104	55	110	6

ND = Not detected

Source: E & E, 1992

RC424

RI Report: Section No.: Revision No: Date:

Table D-29

#### PESTICIDES/PCBS MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS FOR SAMPLE SE-SHL-16

Units =  $\mu g/g$ 

			Concent	ration				
			of Spike Added			Duplicate		
	Sample	Spiked Sample			Percent	Spiked	Percent	
Parameter	Concentration	Concentration	MS /	MSD	Recovery	Concentration	Recovery	RPD
Aldrin	<0.081	.0516	.0775	.0766	66.6	.0433	56.5	16.3
Dieldrin	<0.052	.029	.0388	.0383	74.7	.0242	63.2	16.8
Endrin	<0.075	.0763	.0775	.0766	98.5			
gamma-Chlordane	<0.038	.042	.0388	.0383	108.2	.0298	77.8	32.7
Heptachlor	.0062	.0133	.00775	.00776	91.6	.0112	64.4	
Lindane	<0.047	.0257	.0194	.0192	132.5	.0237	123.4	7.1
2,2-Bis(p-Chloropheny1)-	.0022	.0547	.0775	.0766	67.7	.0451	56.0	19.0
1,1-dichloroethane								
Aroclor 1016	<0.704	0.496	0.397	0.377	124.9	0.429	113.8	9.3
Aroclor 1260	(0.538	0.534	0.397	0.377	134.5	0.496	131.6	2.2
								20124

Source: E & E, 1992

RC424

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Table D-30 METALS MATRIX SPIKE RESULTS FOR SAMPLE SE-SHL-16 Units =  $\mu g/g$ 

		Spiked	Concentration	
	Sample	Sample	of Spike	Percent
Parameter	Concentration	Concentration	Added	Recovery
Aluminum	1,589	2,220	300	210.3
Antimony	<3.420	75.36	100	75.4
Barium	17.49	29.73	16	76.5
Beryllium	0.08081	1.528	2	72.4
Cadmium	3.96	14.80	10	108.4
Calcium	433.60	435.40	80	2.2
Chromium	74.7	101.8	40	67.8*
Cobalt	<1.420	27.64	40	69.1*
Copper	4.356	16.72	16	77.3
Iron	5,783	5,778	40	-12.5
Magnesium	490.5	933.2	100	442.7
Manganese	668.4	595.9	16	-453.1
Mercury	<0.260	0.35	0.65	53.8*
Nickel	4.255	24.37	25	80.5
Potassium	237.4	516.5	240	116.3
Sodium	<52.000	259.5	280	92.7
Thallium	<16.600	243	320	75.9
Vanadium	5.06	28.79	30	79.1
Zinc	38.82	53.2	18	79.9

RC424

ND = Not detected

*This recovery is outside EPA CLP limits

Source: E & E, 1992

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Table D-31

TOTAL ORGANIC CARBON AND TOTAL RECOVERABLE PETROLEUM HYDROCARBON
MATRIX SPIKE/MATRIX SPIKE DUPLICATE
RESULTS

Sample ID Parameter	Sample Concentration	Spiked Sample Concentration	Concentration of Spike Added MS / MSD		Percent Recovery	Duplicate Spiked Concentration	Percent Recovery	RPD
SE-CSB-06 TPHC (µg/g)	76.0	637	544	545	103.2	653	105.9	2.48
SW-CSB-06 TPHC (µg/1)	1,060	14,100	16,400	16,400	85.9	14,300	87.1	1.4
SE-SHL-16 Total Organic Carbon (µg	22,500 /g)	26,600	4,000	6,200	102.5	28,800	101.6	0.9
SE-CSB-06 Total Organic Carbon (µg	57,500 (/g)	63,600	5,819	2,787	105	60,000	90	15.4
SW-CSB-06 Total Kjeldahl Nitrogen	513 (µg/1)	1,077.5	500	500	112.9	1,140	125.4	10.5
								RC424

**This recovery is outside E & E, Inc.'s advisory limits

11.

Source: E & E, 1992

RI Report: Section No.: Revision No: Date:

#### Table D-32

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#### PESTICIDES/PCBS

#### MATRIX SPIKE/MATRIX SPIKE DUPLICATE

#### RESULTS FOR SAMPLE CSB-2

Units =  $\mu g/1$ 

			Concent of Sp	- C - C - C - C - C - C - C - C - C - C		Duplicate		
	Sample	Spiked Sample	Add		Percent	Spiked	Percent	
Parameter	Concentration	Concentration	MS /	MSD	Recovery	Concentration	Recovery	RPD
Dieldrin	<0.022	0.35	0.40	0.4	87	0.34	84	3.5
Endrin	<0.008	0.076	0.080	0.08	96	0.075	94	2.1
alpha-Chlordane	<0.002	0.032	0.040	0.04	79	0.031	77	2.6
Heptachlor	<0.008	0.039	0.040	0.04	97	0.038	96	1.0
Lindane	<0.033	0.31	0.40	0.4	78	0.30	76	2.6
2,2-Bis(p-chlorophenyl)- 1,1-dichloroethane	<0.020	0.62	0.80	0.8	78	0.60	76	2.6
Aroclor 1016	<0.068	3.50	4.00	4.0	87	3.4	86	1.2
Aroclor 1260	<0.075	4.30	4.00	4.0	108	4.2	105	2.8

ND = Not detected

Source: E & E, 1992

RC424

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Table D-33

## PESTICIDES/PCBS MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS FOR SAMPLE CSB-2

Units =  $\mu g/1$ 

			Concentr			22.30.38.5		
	2.0.2	6.1.3.2.74	of Spike			Duplicate	4.000	
	Sample	Spiked Sample	Adde		Percent	Spiked	Percent	
Parameter	Concentration	Concentration	MS /	MSD	Recovery	Concentration	Recovery	RPD
1,2,4-Trichlorobenzene	<2.800	34	75	75	45.3	34	45.3	0
1,4-Dichlorobenzene	<4.400	59	76	76	77.6	63	82.9	7
2,4-Dinitrotoluene	<1.160	67	77	77	87.0	68	88.3	1
2-Chlorophenol	<10.000	ND	150	150	0*	ND	0*	0*
3-Methyl-4-chlorophenol	<10.000	ND	150	150	0*	ND	0*	0*
4-Nitrophenol	<50.000	20	150	150	13.3	36	24	57*
Acenapthene	<14.000	64	73	73	87.7	68	93.2	6
Nitrosodi-N-propylamine	<4.500	58	76	76	76.3	61	80.3	5
Pentachlorophenol	<50.000	15	150	150	10*	45	30.0	100
Phenol	<10.000	ND	150	150	0 *	ND	0 *	0 *
Pyrene	<17.000	34	74	74	45.9	33	44.6	3

ND = Not detected

* This value is outside EPA CLP limits

Source: E & E, 1992

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RI Report: For Section No.: App Revision No: 2 Date: Dec

Table D-34

# VOLATILE ORGANICS MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS FOR SAMPLE SE-CSB-06 Units = $\mu$ g/g

Parameter	Sample Concentration	Spiked Sample Concentration	Concentration of Spike Added	Percent Recovery	Duplicate Spiked Concentration	Percent Recovery	RPD
1,1-dichloroethene	<0.019	44.7	50	89	50.1	96	12
Benzene	<0.003	44.4	50	89	49.7	99	11
Trichloroethene	<0.004	43.2	50	86	47.8	96	11
Toluene	<0.008	46.6	51	91	47.6	93	2
Chlorobenzene	<0.003	42.4	50	85	43.5	87	2

ND = Not detected

Source: E & E, 1992

RC424

RI Report: Section No.: Revision No: Date:

Table D-35

# PESTICIDES/PCBS MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS FOR SAMPLE SE-CSB-06 Units = $\mu$ g/g

	Sample	Spiked Sample	of S	tration pike ded	Percent	Duplicate Spiked	Percent	
Parameter	Concentration	Concentration	MS	/ MSD	Recovery	Concentration	Recovery	RPD
Aldrin	<0.081	.0473	0.08	.0798	59.1	.0502	62.9	6.2
Dieldrin	<0.052	.0228	0.04	.0399	57.0	.0239	59.9	5.0
Endrin	.0210	.0592	0.08	.0798	47.8	.0614	50.6	5.8
gamma-Chlordane	.0121	.0364	.0400	.04	60.8	.0389	67.2	10.0
Heptachlor	<0.280	.0116	0.008	0.00798	145.0	.0115	144.1	0.6
Lindane	<0.047	0.0243	0.02	.0199	121.5	0.0248	124.6	2.5
2,2-Bis(p-Chlorophenyl)- 1,1-dichloroethane	0.244	. 259	.08	.0798	18.1	0.279	44.1	83.5
Aroclor 1016	<0.704	0.469	0.4	0.4	117.2	0.462	116.1	1.0
Aroclor 1260	<0.538	0.484	0.4	0.398	121.0	.470	118.1	2.4

Source: E & E, 1992

RC424

RI Report: Section No.: Revision No: Date:

RI Report: Fort Devens Section No.: Appendix D

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Table D-36 METALS MATRIX SPIKE RESULTS FOR SAMPLE SE-CSB-06 Units =  $\mu g/1$ 

	4.00	Spiked	Concentration	1200000
2007	Sample	Sample	of Spike	Percent
Parameter	Concentration	Concentration	Added	Recovery
Aluminum	5,149	3,542	300	-535.7
Antimony	<3.420	63.33	100	63.3*
Arsenic	1.5	3.675	1.5	145.0*
Barium	18.81	27.11	16	51.9*
Beryllium	0.1268	1.809	2	84.1
Cadmium	<0.424	11.56	10	115.6
Calcium	1,330	1,254	80	-95.0
Chromium	12.61	43.49	40	77.2
Cobalt	<1.420	23.09	40	57.7*
Copper	6.366	16.91	16	65.9*
Iron	6,438	4,532	40	-4,765.0
Lead	<73.000	2.990	3.0	67.1
Magnesium	1,479	1,033	100	-446.0
Manganese	161.3	166.2	16	30.6
Mercury	0.049	0.415	0.350	104.7
Nickel	3.910	22.71	25	75.2
Potassium	757.9	665.4	240	-38.5*
Silver	<0.086	0.330	0.3	110.0
Sodium	77.14	282.3	280	73.3*
Thallium	<16.600	235.1	320	73.5*
Vanadium	7.776	30.08	30	74.3*
Zinc	44.12	61.55	18	96.8

RC424

ND = Not detected

*This recovery is outside EPA CLP limits

Source: E & E, 1992

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Table D-37

#### VOLATILE ORGANICS MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS FOR SAMPLE SW-CSB-06

Units =  $\mu g/1$ 

Parameter	Sample Concentration	Spiked Sample Concentration	Concentration of Spike Percent Added Recove		Duplicate Spiked Concentration	Percent Recovery	RPD
1,1-Dichloroethene	<18.000	46.4	50	93	50	100	7
Benzene	<2.400	46.5	50	93	51.2	102	9
Trichloroethene	<7.000	38.6	50	77	41.8	84	9
Toluene	<8.700	39.6	51	78	43.3	85	8
Chlorobenzene	<1.400	38.2	50	76	41.9	84	10

ND = Not detected

Source: E & E, 1992

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Table D-38

11 11

## EXPLOSIVES MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS FOR SAMPLE SE-CSB-06

Units =  $\mu g/g$ 

Parameter	Sample Concentration	Spiked Sample Concentration	Concentration of Spike Added	Percent Recovery	Duplicate Spiked Concentration	Percent Recovery	RPD
1,3,5-Trinitrobenzene	<0.352	0.677	2.07	32.7	0.499	24.1	30.2
1,3-Dinitrobenzene	<0.304	1.11	2.11	52.5	1.01	47.9	9.1
2,4,6-Trinitrotoluene	<0.931	1.55	3.92	39.6	0.648	16.5	82.3*
2,4-Dinitrotoluene	<0.390	2.31	4.34	53.2	2.24	51.7	2.9
2,6-Dinitrotoluene	<0.530	2.27	3.97	57.1	2.31	58.1	1.8
2-Nitrotoluene	<1.590	10.8	13.2	81.8	11.2	84.9	3.7
Cyclotetramethylene-							
tetranitramine (HMX)	<0.755	3.41	3.95	86.3	3.44	87.1	0.9
Nitrobenzene	<0.330						
Cyclonite (RDX)	<0.455	3.01	4.13	73.0	3.58	86.6	17.1
N-Methyl-N,2,4,6-tetra-							
nitroaniline	<1.040	0.834	3.87	21.6	1.64	42.3	64.9*
							RC424

ND = Not detected

* This value is outside E & E's advisory limits

Source: E & E, 1992

RI Report: Section No.:

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Table D-39

# METALS MATRIX SPIKE RESULTS FOR SAMPLE SW-CSB-06 Units = $\mu g/1$

		Spiked	Concentration	
	Sample	Sample	of Spike	Percent
Parameter	Concentration	Concentration	Added	Recovery
Aluminum	26.82	1,185	800	144.8
Antimony	<51.200	57.55	500	115.1
Arsenic	<3.090	20.6	20.0	103
Barium	9.724	39.77	15	200.3*
Beryllium	<0.341	3.4027	3.5	97.2
Cadmium	<2.670	55.92	40	139.8*
Calcium	15,180	22,410	370	1,954.1*
Chromium	<4.470	46.13	45	102.5
Cobalt	10.61	248.7	180	132.3*
Copper	5.639	65.50	45	133.0*
Iron	1,146	3,787	400	660.2*
Lead	<4.740	33.6	30.0	112
Magnesium	1,496	2,321	400	206.3*
Manganese	80.51	147.7	160	42.0*
Mercury	<0.566	3.18	3.0	106.1
Nickel	3.274	11.69	120	94.7
Potassium	2,209	6,016	2,400	158.6*
Selenium	<4.100	16.1	20.0	80.5
Sodium	419,200	332,300	2,800	-3,103.6
Thallium	<1100.000	1,403	1,600	87.7
Vanadium	<4.000	63.25	64	98.8
Zinc	15.80	194.0	160	111.4

RC424

*This recovery is outside EPA CLP limits

Source: E & E, 1992

#### Table D-40

#### ANIONS

### MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS FOR SAMPLE SW-CSB-06

Units = \mu g/1

Parameter	Sample Concentration	Spiked Sample Concentration	Concentration of Spike Added	Percent Recovery	Duplicate Spiked Concentration	Percent Recovery	RPD
Chloride	4,627.92	16,388.36	1,484.85	792.0*	17,309.05	854*	7.5
Nitrite	30.04	183.67	149.92	109.1	194.14	116.1	6.2
Sulfate	4,957.72	11,505.2	4,008.0	163.4	12,322.6	183.8*	11.8
							RC424

ND = Not detected

*This value is outside E & E's advisory limits

Source: E & E, 1992

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Table D-41
SUMMARY OF RI FIELD QUALITY CONTROL REQUIREMENTS
SHEPLEY'S HILL LANDFILL

Site Name	Analysis	Number of Samples Round One	Number of Samples Round Two
Shepley's Hill	TCL (groundwater rinsate)	1	1
AOC 4,5,18	TCL (groundwater duplicate)	2	1
200 200	TCL (surface water duplicate)*	1	0
	TCL (pond sediment duplicate)	1	0
	TCL (pond sediment rinsate)	1	0
	TCL (leachate soil duplicate)	1	0
	TAL (groundwater rinsate)	1	1
	TAL (groundwater duplicate)	2	1
	TAL (surface water duplicate)	1	0
	TAL (pond sediment rinsate)	1	0
	TAL (pond sediment duplicate)	1	0
	TAL (leachate soil duplicate)	1	0
	Explosives (groundwater rinsate)	1	1
	Explosives (groundwater duplicate)	2	1
	Explosives (surface water duplicate)	1	0
	Explosives (pond sediment rinsate)	1	0
	Explosives (pond sediment duplicate)	1	0
	TOC (pond sediment duplicate)	1	0
	TOC (leachate soil duplicate)	1	0
	Ions (groundwater duplicate)	2	1
V	Ions (groundwater rinsate)	. 0	1
	Water Quality (surface water duplicate	) D 1	0
	TCL VOA (trip blanks)	8	5

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TAL: Target Analyte List
TCL: Target Compound List
TOC: Total Organic Carbon
VOA: Volatile Organic Compounds

Source: E & E, 1992

^{*} One surface water was not analyzed for TCL volatiles due to a laboratory accident. a Ions: chloride, fluoride, sulfate, nitrate, nitrite, bromide, and total Kjeldahl

nitrogen (Cations: calcium, potassium, and magnesium are included in TAL).

b Water quality parameters include chloride, total Kjeldahl nitrogen, nitrate-nitrogen, sulfates, total phosphorous, hardness, alkalinity, and total suspended solids.

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Table D-42
SUMMARY OF RI FIELD QUALITY CONTROL REQUIREMENTS
COLD SPRING BROOK LAWDFILL

Site Name		Analysis	Number of Samples Round One	Number of Samples Round Tw
Cold Spring		TCL (groundwater rinsate)	1	0
Brook Landfill		TCL (groundwater duplicate)	1	2
OC 40		TCL (surface water duplicate)	1	0
		TCL (pond sediment rinsate)	1	0
		TCL (pond sediment duplicate)	1	0
		TCL (surface soil rinsate)	1	0
		TCL (surface soil duplicate)	1	0
		TAL (groundwater rinsate)*	1	0
		TAL (groundwater duplicate)	1	2
		TAL (surface water duplicate)	1	0
		TAL (pond sediment rinsate)	1	0
		TAL (pond sediment duplicate)	1	0
		TAL (surface soil rinsate)	1	0
		TAL (surface soil duplicate)	1	0
	•	Explosives (groundwater rinsate)*	1	0
		Explosives (groundwater duplicate)	1	2
		Explosives (surface water duplicate)	1	0
		Explosives (pond sediment rinsate)	1	0
		Explosives (pond sediment duplicate)	1	0
		TOC (surface soil duplicate)	1	0
		TOC (pond sediment duplicate)	1	0
		Ions (groundwater rinsate) a *	1	0
		Ions (groundwater duplicate)	1	2
		TPHC (groundwater rinsate)	1	0
		TPHC (groundwater duplicate)	1	2
		TPHC (surface water duplicate)	1	0
		TPHC (pond sediment rinsate)	1	0
		TPHC (pond sediment duplicate)	. 1	0
		Water Quality (surface water duplicate	) b 7	0
		TCL VOA (trip blanks)	4	3

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TAL: Target Analyte List TCL: Target Compound List TOC: Total Organic Carbon

TPHC: Total Petroleum Hydrocarbons VOA: Volatile Organic Compounds

Source: E & E, 1992

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^{*} Only limited volume could be obtained from well CSB-4

a Ions: chloride, fluoride, sulfate, nitrate, nitrite, bromide, and total kjeldahl nitrogen (Cations: calcium, potassium, and magnesium are included in TAL)

b Water quality parameters include chloride, total kjeldahl nitrogen, nitrate-nitrogen, sulfates, total phosphorous, hardness, alkalinity, and total suspended solids

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Date:

June 1992

#### APPENDIX E

#### ECOLOGICAL INVESTIGATION DATA

This appendix contains data supporting the ecological characterization performed under the RI at Shepley's Hill Landfill and at Cold Spring Brook Landfill. Included in this appendix are two sets of forms that were completed for each site. These forms are: the New England Corps of Engineers Wetlands Delineation Dataform, version 28Mar91, and the U.S. Fish and Wildlife Service Wetlands Functions Evaluation forms.

All forms were completed during the field surveys conducted by Ecology and Environment, Inc. during August 1991.

RC424

Fort Devens File Number: N/A DATA -- SOIL Soil Toxonomy: Ochric Udiosamme 's Shepley's Hill Corps of Engineers Regional Drainage Class: poorly drained criterion: 3a Transect: N/A Plot: Dale: 8-15-91 Is Published Soil Survey Available? Yes 2: No 1 Title/Date: Middlesex Co 1924 Soil Type Mapped: Deerfield loamy sand DATA --Dominance Stratum and Species Percent NWI Ratio VEGETATION Dominance Slatus (DOMINANTS ONLY) Matrix Color (Munsell, Moist) Depth Horizon Color of Mottles (Munsell, Moist) Abundance/Controst USDA Texture, iron or manganese nodules or concretions, restrictive Tree: layers, rool distribution, oxidized rhizospheres, elc. Acer rubrum 100 0-12" 7.5YR 3/0 FAC loamy sand Lianal 7.54R 5/8 7.54R 5/4" loamy sand none Common Sapling: UPL 2/2 Quercus coccinea 100 Shrubs: Viburnum lentago 29 FACW Vaccinium corymbosm 2/7 FACW Herb: Carex bromoides 15 FACU Thelypteris thelypteroides FACW Remarks: SUM: 6 Tally (Dominants ONLY) Skelch Landscape Position: 5/6 ×100 = 100 x Dominant(OBL+FACW+FAC)/Tally Sum = Describe Vegetation Disturbance: . None Describe Problem Vegetation:

SOIL	DETER M	NOTE: 2. It's checklist is	olicelog is evidence that the sell is NOT SYDRIC valid for use by the Her-England Corps of Englacery; at New England States may be inappropriate, routine may be inappropriate in unusual coors.	1. Hydrology is aften the most difficult feature to absence. 2. Interpretations must consider the appropriateness of the absence in the abse
	topographic bound Soil is frequently	ts are FACULTATIVE WET AND dary is abrupt. PONDED or FLOODED for a growing season. (attach an	furation longer than two explanation of the	Recorded Data: Stream, lake ar tidal gage Identification: Aerial Photograph Identification: Other Identification: No Recorded Data Available
_ 전 - -	VERY POORLY DRA hydrology. The soil meets th POORLY DRAINED	e Corps of Engineers region ANED SON [®] and there is no se Corps of Engineers region SON [®] and there is no evide	evidence of oltered	REPORT ANY OF THE FOLLOWING OBSERVATIONS:  Depth to Free Water: > 24 "  Depth to Saturation: > 24 "
□ <b>Ø</b>	SOMEWHAT POORS two characteristic Yes NO	Within & inches of the soil Yes No a. soil mottles w	ther of the following	Describe Altered Hydrology:
		C. distinct or pro	ony, distinct or prominent strix of chrome 3 or less; OR ominent oxidized rhizospheres o mottled throughout.	No Evidence of Significant Hydrological Modification AND there is one or more Morphological Plant Adoptation SUCH AS:    Pneumatophores
	مر لاليا مر	e common to many, distinct rome 2 or less, and one of Yes No o. In the horizon surface and direct the matrix is chro		Polymorphic Leaves hummacks  Hydric Soils and NO visible evidence of significant hydrological modification  Remarks:
ecology and		thick, wetness inc matter. Normally considered hydric ii. there is no iii. in the horizon the matrix color	Ap horizon is between 10 and 14 inches rephology may be masked by organic, these problem situations will be when: L. hydrophytes are prevalent, idence of altered hydrology, and that lies directly beneath the Ap horizon, is chroma 3 or less and mottles are at indence and distinct or prominent.	CONCLUSIONS Project Title: Shepleys Hill Landfill  Delineator: Robin Dirigle Chuck Rosenburg  Transact: N/A Plot: 1 (wetland) Date: 8-15-91
d environment	conclusions if on hydric soil deter- lest for ferrous measurements a • Typically in Ne in an aquic subc •• Note: a dark	ew England, soils having thes order or an aquic subgroup A or Ap is defined as having	ere chosen for your stentials, colormetric or other a morphologies will be classified in soil taxonomy.	Hydrophytic Vegetation Criterion Met?  Hydric Soils Criterion Met?  Wetland Hydrology Criterion Met?  Yes, No  Yes, No  Yes, No
Remorks:	and a chroma of	2 or less		Remarks:

	ort Deve epley's H		File	Number: N	/A	DATA	The second		rie Udips	samme 45.
Transect: N/A		upland	Dale	8-15	-91	Regional I	Engineers Drainage Clas	s: well dra	Sonica	Criterion: E
DATA	Stratum and Spe	cies	Dominance Ratio	Percent	I NWI	Soil Type			loamy	middlesex Co., 1924 sand
VEGETATION	(DOMINANTS ON	LY)	Pano	Dominonce	Status	Depth	Horizon	Matrix Color (Munsell, Moist)	Color of Mottles (Munsell, Moist) Abundance/Contrast	USDA Texture, iron or manganess nodules or concretions, restrictiv
Trees: Queveu	s cocciv	nea	520y	96	UPL	0-2"	0	7.5 YR 3/0	Abundance/Contrast	layers, root distribution, axidixed rhizospheres, etc.
Liana: none					, a	2-18".	А	7.54R 5/6	. N/A	loany sand
Sapling	:	inea	20/40	50	UPL				-:	
Querc	us alb	a	10/40	25	FACU					
Shrub:			3							(C)
Gaylu	Ssacia	baccata	75/80	94	FACU					W
Herb:									*	
non	e					S S S S S S S S S S S S S S S S S S S				
						1300 ZB				· .
		•			*					
		P	4 .			Dataform	5.	-		
				7 4		Delineation		4		
						Remarks:	1			
				4		ogineers of	30			
Tally (Dominants	OBL:	FACW: FAC:	FACU_2	UPL: 2	SUM: 4	ŭ	ondscape Po:	silion:		× 165
100 x Dominant(	OBL+FACW+FAC)/To	illy Sum = 0/			0	500				
Describe Vegelation  Describe Problem		None	, ,,,,,			England				

Project Tille: Fort Devens Shepley's Hill Transect: N/A Plot: 2 Wetland	:	8-16-	
DATA Stratum and Species VEGETATION (DOMINANTS ONLY)	Dominance Ratio		NWI Status
Trees: Acer rubrum Liana:	30/30	100	FAC
Sapling: Acer rubrum	60/70	86	FAC
Shrub: Cornus amomum	25/90	28	FACW
Hamamelis virginiana	25/40	28	FAC
Alnus sernulata Herb:	20/20	1.7	OBL
Thelypteris thelypteroides	15/40	38	FAC
Impatiens capensis			FACW
	*	· #1	Ξ
Tally (Dominants ONLY): OBL:   FACW: 3 FAC: 3	FACU	UPL: O	SUM: <b>7</b>
100 x Dominant(OBL+FACW+FAC)/Tally Sum = 7/9 x Describe Vegetation Disturbance:	100 =	100	

Depth	Horizon	Motrix Color	Color of Mollies	USDA Texture, iron or manganes
		(Munsell, Moist)	(Munsell, Moist) Abundance/Contrast	nodules or concretions, restrictions and distribution, oxidixed rhizospheres, etc.
0-6"	A	754R 4/6	NA	loamy coarse say
6-24"	В	7.5 YR 3/0	NA	fine sandy lan
		A		
			*	
	= 0.			
		31		1

SOIL	DEIEN. ANDM	NOTE: 2. This checklist to	olio-ing is evidence that the soll is FCT INTORIC valid for use by the New England Corps of Engineery; she than England States may be inappropriate. modine may be inappropriate in second cases.	1. Hydrology is alten the most difficult feature to observe.  2. Interpretations must consider the appropriateness of the observation.  ERMINATION DROLOGY  1. Hydrology is alten the most difficult feature to observation.  Eight of the season, recent eacher considere, and welershed alter:  1. Interpretation all hydrology may require supported absenzations ever more than one season.
Pocyon Company of the	Soil is frequently POI	ore FACULTATIVE WET AND y is obrupt. NDED or FLOODED for a lowing season. (ollock an	duration langer than two	Recorded Data: Stream, lake or tidal gage Identification:  Aerial Photograph Identification: Other Identification: No Recorded Data Available
(A) (B) (B) (C)	VERY POORLY DRAINE hydrology. The soil meets the C	corps of Engineers region ED SOL [®] and there is no Corps of Engineers region C and there is no evide	evidence of attered of criteria as a	REPORT ANY OF THE FOLLOWING OBSERVATIONS:  Depth to Free Water:  Depth to Saturation:  Describe Altered Hydrology:  Non-e
□ <b> ਓ</b>	SOMEWHAT POORLY I	ithin \$ Inches of the soil  a. soil mottles w and the subsoil in b. common to mottles with a mottles with a mottles with a mottles with a mottles of the so ommon to many, distinct a 2 or less, and one of as No a. In the horizon surface and directhe matrix is christing to chess.	surface there are:  Ithin an A or Ap horizon motifed throughout; OR  iany, distinct or prominent atrix of chroma 3 or less; OR  iminent axidized rhizospheres i motifed throughout.  If surface, there are motifes which or prominent, and that are the following:  that Ees within 10 inches of the soil ty beneath a dark* A or Ap horizon, ima 3 or less; the motifes are at least and distinct or prominent.	Inundated   Saturated in upper 12in.   Water Marks     Onidized Rhizospheres   Drift Lines   Water Stained Leaves     Water-borne Sediment   Surface Scoured Areas   Wetland Drainage Patterns     No Evidence of Significant Hydrological Modification AND there is one or more Morphological Plant Adaptation SUCH AS:   Pneumatophores   Buttressed Trees   Hypertrophied Lenticels     Staoling   Adventitious Roots   Inflated Leaves, Stems, or Roots     Shallow Root Systems   Floating Leaves   Aerenchyma in Roots & stems     Polymorphic Leaves   Hydric Soiks and NO visible evidence of significant hydrological modification     Remarks:
ecology and environment	Check here and atte conclusions if one of hydric soll determin- test for ferrous from measurements and • Typically in New E	thick, welness me matter. Hormally considered hydric B. there is no en like the horizon the matrix color least 10% in abu  ach a description of your of the following options w ation: measured redox p test (~,~,-Dipyridi), a observations.  England, soils having these	ere chosen for your otentiols, colormetric r other e morphologies will be clossified	CONCLUSIONS  Project Title: Shepley's Hill Landfill  Delineator: Robin Dingle, Chuck Rosenburg  Transect: N/A- Plot: 2 (wetland pate: 8-16-91  Hydrophylic Vegetation Criterion Met? Ves. No  Hydrophylic Vegetation Criterion Met?  Wetland Hydrology Criterion Met?  Wetland Hydrology Criterion Met?
Remorks:		er or an aquic subgroup or Ap is defined as having or less		Welloud Hydrology Criterion Mel? [M] is thes DATAPOINT WITHIN A WETLAND? [D]  Remorks: This wetland is a narrow Strip that occurs along the shore of Plow Shop Pond. Width varies Threfore, this is not a point but rather a

Project Tille: Fort Devens Shepley's Itill	File N	luimber: N	10	
Transect: N/A Plot: 2 upland	Date:	8-16	-9/	
DATA Stratum and Species VEGETATION (DOMINANTS ONLY)	Dominance Ratio	Percent Dominance	NWI Status	1
Tree: Quercus alba	404.3	55	FACU	c
Quercus coccinea Liana:	273.21 736.4	37	upl	2
none Sapling:			e e	
Quercus coccinea	20/	44	UPL	ž.
Acer rubrum	15/45	33	UPL FAC	
Shrubs: Vaccinium vacillans	25/	100	UPL	WAR91
Herb: WGaultheria procumbens	50/50	120	FACU	m Version 28
		. ,		neation Datafo
		*		irs Wetland Delin
Tally (Dominants ONLY):   FACW:   FAC: /	FACU 2	UPL:3	SUM: 6	s of Engineers
100 x Dominant(OBL+FACW+FAC)/Tally Sum = 100 x Describe Vegetation Disturbance:	100 =	17		England Corps of
Describe Problem Vegelalion:				. Engla

Depth	Horizon	Matrix Co	lor	Color of Mollles (Munsell, Moist)	USDA Text	ure, iron or m	15 &
			3	Abundance/Contrast	layers, roo	r concretions, of distribution, res, etc.	oxidixed
2-2	0	7.5 YR	3/2	N/A	Sapri	C	
<b>Հ-</b> 2ዛ".	Α	7.5 YR	4/6	NA	fine	sandy	loan
- )	X		÷				
				2 .			
				1		•	
							•
		×					

SOIL	DE. 💉 ON	1. "NO" in all the following is evidence that the soil is NOT HYDRIC NOTE: 2. This checklist is valid for use by the New England Corps of Engineery; use suitaids the six New England States may be inapprepriate. 3. This interpretive results may be inapprepriate in susual cases.	OCTEMINATION HYDROLOGY	1. Hydrology is often the most difficult feature to observe. 2. Interpretations must consider the appropriateness of the observation for the season, recent weather conditions, and watershed attendment of the protection of hydrology may require repeated observations ever more than one season.
	topographic boundary Soil is frequently PON	e FACULTATIVE WET AND OBLIGATE and the is abrupt. DED or FLOODED for a duration longer than two ing season. (allach an explanation of the	Recorded Data: Stream, lake or lidal Aerial Pholograph Other No Recorded Data Availa	Identification:
	VERY POORLY DRAINED hydrology.	rps of Engineers regional criteria as a SONE and there is no evidence of altered	REPORT ANY OF THE FOLLOW Depth to Free Woter:	>24"
	POORLY DRAINED SOIC hydrology.	and there is no evidence of altered	Depth to Saturation: Describe Altered Hydrol	logy; none
	SOMEWHAT POORLY DI two characteristics*: Yes NO	rps of Engineers regional criteria as a  MINED SOIL that has either of the following  hin & inches of the soil surface there are:	☐ Inundated☐ Oxidized Rhizosph	하다님 그렇게 되는데 그는 그는 그는 그는 그 모든 그들은 그들은 그들은 가입니다.
		No a. soil mollies within an A or Ap horizon and the subsoil is mollied throughout; OR	□ Water-borne Sedi Deposits □ No Evidence of Si	ignificant Hydrological Modification AND there is one
ė.		b. common to many, distinct or prominent mottles with a matrix of chroma 3 or less; OR  c. distinct or prominent exidized rhizospheres and the subsoil is mottled throughout.	or more Morpholo  Pneumatophor  Stooling	ogical Plant Adaptation SUCH AS:
	Chromo	nin 24 inches of the soil surface, there are mottles which nmon to mony, distinct or prominent, and that are 2 or less, and one of the following: No	Shallow Root S	
		a. In the horizon that lies within 10 inches of the soil surface and directly beneath a dark* A or Ap horizon, the matrix is chroma J or less; the mottles are at least 10% in abundance and distinct or prominent.	ē	parent hydrological indicators
ecology and		b. When a dark" Ap horizon is between 10 and 14 inches thick, welness morphology may be masked by organic matter. Normally, these problem situations will be considered hydric when: i. hydrophyles are prevalent, ii. there is no evidence of altered hydrology, and iii. In the horizon that lies directly beneath the Ap horizon, the matrix color is chroma 3 or less and mattles are at least 10% in abundance and distinct or prominent.	CONCLUSION	VS Project Title: Shepley's Hill Landfill  Delineator: Robin Dingle, Chuck Rosenbur
and environment	conclusions if one of hydric soll determinal	h a description of your procedures and the following options were chosen for your jon; measured redox potentials, colormetric lest («,«,—Dipyridit), or other bestrations	Transact: NA  Hydrophytic Vegetation Crit Hydric Soils Criterion Met?	
eni	Typically in New En in an aquic suborder     Note: a dark A or	gland, soils having these morphologies will be classified or an aquic subgroup in soil taxonomy. Ap is defined as having a value of 3 or less	3 Welland Hydrology Criterion	
Remarks:	and a chrome of 2 a	. 4113	Remarks:	

Fort Devens

Project Title:

NA DATA -- SOIL Soil Taxonomy: Terric Medisapr Cold Spring Brook Corps of Engineers
Regional Drainage Class: Very poorly drained Criterion: A 3
Is Published Soit Survey Available? Yes M No 1 Title/Date: Worcester Co , 1985 (wetland) Transect: NA Plot: Dole: 13 Aug. 1991 Swansea muck Soil Type Mapped: DATA --Stratum and Species Dominance Percent Ralia VEGETATION Dominance Status (DOMINANTS ONLY) Depth Horizon Matrix Color Color of Moltles (Munsell, Moist) Abundance/Contrast USDA Texture, iron or manganese (Munsell, Moist) nodules or concretions, restrictive Tree : layers, rool distribution, axidixed rhizospheres, etc. O 10 YR 2/2 few/low sapric, fine sandy loam

A 10 YR 3/2 few/low fine sandy loan 0-5" none Sapling: 5-12" none Shrub : 15/25 FACW 60 Cornus amonum Liana none Herb: Juncus effusus Typha latifolia 33 FACW 33 OBL Remarks: FACU: UPL: SUM: 3 0 Tally (Dominants ONLY): 0 0 Sketch Landscape Position: 100% 100 x Dominant(OBL+FACW+FAC)/Tally Sum = plot location Describe Vegetation Disturbance: DOUG . Describe Problem Vegelation:

File Number:

E-12

I. Hydrology is often the small difficult feelure to wherever

Project Title: Fort Devens File Number: NIA Cold Spring Brook Corps of Engineers Regional Drainage Class: poorly draine Ocriterion: AM (wetland) Plot: Transect: Dole: 13 Aug. 1991 Is Published Soil Survey Available? Tes No Title/Dale: Worcester Co, 1985 Soil Type Mapped: Sudbury fine sandy loam DATA --Dominance Stratum and Species Percent Ralia VECETATION Dominance Status (DOMINANTS ONLY) Depth Horizon Matrix Color Color of Mottles (Munsell, Moist) Abundance/Contrast USDA Texture, iron or manganese (Munsell, Moist) nodules or concretions, restrictive layers, rool distribution, oxidixed Tree! rhizospheres, etc. 39,2/ /39.2 100% 04" FAC 10YR - 3/2 tew/ low Sapric Acer rubrum few/low fine sandy loam 4-12" Liana none Sapling 40/40 100% FAC Acer rubrum Shrub: 70/90 שרד FACW Vaccinium corymbosum Alnus Serrulata OBL 20/90 22/ Herb: 20/60 33% Osmunda cinnamomea FACW Thelypteris thelypteroides 25% FACW Mapped soil type (Sudbury) does not extend this far down slope. Soils at this point similar to Scarboro mucky fire sandy lan FAC: FACU: UPL: Tally (Dominants ONLY) Sketch Landscape Position: SUM: 6 0 % = 100% 100 X 100 x Dominanl(OBL+FACW+FAC)/Tally Sum = Describe Vegetation Disturbance: none Describe Problem Vegelation: AAM A

DATA -- SOIL Soil Taxonomy: Ochric Histoguer

SOIL	DETES. ATTOM	NOTE: 2. This cha	all the following is evidence that the soil is NOT HYDRIC third in walf for use by the Hew England Corps of Englandrys ide the sin New England States may be inappropriate. prolive reading may be inappropriate in unusual coors.		A & YERMMATION STOROLOGY	NOTE:	light at the season, recent	et dificult (acture to observe, ider the appropriateness of the observation I weather conditions, and valurated otherwise, in 1 may require repealed observations over
Parson Color of the Color of th	All dominant p topographic be Soil is frequen weeks during basis for your	he growing season. (otto	or a duration longer than two th on explanation of the	≯ No	corded Dota: Streom, lake or tidal Aerial Photograph Other Recorded Data Availa	able	Identification: Identification: Identification:	
	VERY POORLY hydrology.  The solf meets POORLY DRAIN hydrology.  The solf meets	DRAINED SOIL and there  the Corps of Engineers ED SOIC and there is no the Corps of Engineers ORLY DRAINED SOIL that i stics.  1. Within B inches of th Yes No a. soil mot and the sut b. commor mottles with c. distinct and the sut 2. Within 24 inches of th ore common to many, d chroma 2 or less, and o Yes No yes No a. in the h surface and the motris	is no evidence of altered regional criteria as a evidence of altered regional criteria as a	D. D. I.	or mare Morpholo Pneumalophor Stocking Stocking Shollow Root S Polymorphic Li Hydric Soiks and N	ores ment gailicant gical Plan ss Systems	DOTICE    " ~   '2 "    DOTICE    Saturated in upper 12in   Surface Scoured Areas   Surface Scoured Areas   Hydrological Modification AND to it Adoptation SUCH AS:   Buttressed Trees   Adventitious Roots   Floating Leaves   evidence of significant hydrological surface of significan	Water Stained Leaves  Weltland Drainage Patterns  Here is one  Hypertrophied Lenticels  Inflated Leaves, Stems, or Roots  Agrenchyma in Roots & stems
eculogy and environment Remarks;	conclusions in hydric soil de lest for ferra measurement  • Typically in in an aquic :  • Note: a de	Ihick, welne matter. No considered & there is \$\overline{\text{in the h}}\$ the matrix least 10% is not attach a description of one of the following opticermination: measured reas iron test (\$\overline{\text{m}}, \overline{\text{m}}, \overline{\text{Dipyrity}}\$ and observations.  New England, soils having tuborder or an aquic subt	ons were chosen for your for potentials, colormetric di), or other g these morphologies will be classified	Trans Trans Hydr Hydr Wetk	NCLUSION  Ject: NA  Tophytic Vegetation Critic Solls Criterion Met?  and Hydrology Criterion  arks:	iterion Me	12 D	. 6 .

(	ort Devens Cold Spring Brook	File 1	luimber: )	u)-	-
Transect: N	JA Plot: 2 (upland)	Date:	13 Au	3. 1991	
DATA VECETATION	Stratum and Species (DOMINANTS ONLY)	Daminance Ratio	Percent Dominance	NWI Status	
Tree	: -cus Coccinea	153.8/		UPL	
Que	rcus alba	116.2/		FACU	
Pino	s strobus		21.7	FACU	
Liana		-	_	-	
Saplin	g.	30/30	100%	UPL	BIMAR9 1
Shrub Kaln	ria angustifolia	50/10	712	FAC	oform Version 2
Herb Lyco	podium obscurum	10/15	67%	FACU	Delineation Date
*				i.	Engineers Wetland
Tally (Dominant	s ONLY): OBL: O FACW: O FAC: 1	FACU:	UPL: 2	SUM: 6	8
	OBL+FACW+FAC)/Tally Sum = 100 %	× 96		5 %	Corps
Describe Vegetati	· None			<i>VC</i>	England
Describe Problem	· None				

Soil Type I	Mapped: S	sudbury fi	ne sandy 1	cam, 0-8%
Depth 9-2"	Horizon	Matrix Color (Munsell, Moist)	Color of Mottles (Munsell, Moist) Abundance/Contrast	USDA Texture, iron or manganes nodules or concretions, restriction layers, root distribution, oxidixed rhizospheres, etc.
2-8"	A	10 YR - 4/3	N/A	
8-24'	В	10 YR - 5/6	N/A	fine sandy loan
	Ş	- ×	k at 1	
*				
			Y	

Sketch Landscape Position: plot location

25% slope

1. Hydrology is often the most difficult feature to absence.

SOIL	DETER J	NOTE: 2. This chacklist to valid for use by the New England Corps of Englaners; use exhibits the six New England States may be inappropriate.  1. This interpretive multine may be inappropriate in unusual cases.	2. Interpretations must consider the appropriateness of the observations.  Light of the season, recent weather conditions, and watershad attending at 1. Interpretation of hydrology may require repeated absentitions over more than one season.
	topographic boundary Soil is frequently PC	ore FACULTATIVE WET AND OBLIGATE and the ry is abrupt.  ONDED or FLOODED for a duration longer than two owing season. (attach on explanation of the	Recorded Data: Stream, lake ar tidal gage Identification: Aerial Photograph Identification: Other Identification:
	very POORLY DRAIN hydrology. The soil meets the	Corps of Engineers regional criteria as a ED SOIL and there is no evidence of altered Corps of Engineers regional criteria as a DIL and there is no evidence of altered	Depth to Seturation:
00	The soil meets the	Corps of Engineers regional criteria as a DRAINED SOIL that has either of the following :	Describe Altered Hydrology:
		Within & inches of the soil surface there are:  Tes No a. soil mottles within an A or Ap horizon and the subsoil is mottled throughout; OR	Oxidized Rhizospheres Drift Lines Water Stained Leaves  Water-borne Sedkment Surface Scoured Areas Wetland Drainage Patterne Depasite
ž.		b. common to many, distinct or prominent motifies with a matrix of chroma 3 or less; OR  c. distinct or prominent exidized rhizospheres and the subsoil is motified throughout.	No Evidence of Significant Hydrological Modification AND there is one or more Morphological Plant Adaptation SUCH AS:  Preumatophores  Buttressed Trees  Hypertrophiad Lenticets  Adventitious Roots  Inflated Leaves, Stems, or Roots
	Chron	Within 24 Inches of the soil surface, there are mottles which common to many, distinct or prominent, and that are ma 2 or less, and one of the following:  (es No  a. In the horizon that lies within 10 inches of the soil surface and directly beneath a dark* A or Ap horizon, the matrix is chroma 3 or less; the mottles are at least 10% in abundance and distinct or prominent.	Shotlow Root Systems   Floating Leaves   Aerenchyma in Roots & stems   Polymorphic Leaves   Hydric Soils and NO visible evidence of significant hydrological modification   Remarks: no evidence of hydrological modification
ecology and		b. When a dark* Ap horizon is between 10 and 14 inches thick, welness morphology may be masked by organic matter. Hormally, these problem situations will be considered hydric when: L. hydrophytes are prevalent, if there is no evidence of altered hydrology, and if in the horizon that lies directly beneath the Ap horizon, the matrix color is chroma 3 or less and mattles are at least 10% in abundance and distinct or prominent.	CONCLUSIONS  Project Title: Cold Spring Brook  Delineator: Robin Dingle Chuck Rosenburg  Transect: NA Prot: 2 (upland) Dele: 13 Aug. 1991
environment	conclusions if one hydric soil determines test for ferrous iro measurements and • Typically in New in an aquic subord	of the following options were chosen for your nation: measured redox potentials, colormetric in test (<,=,-Dipyridii), or other i observations.  England, soils having these morphologies will be classified ler or an aquic subgroup in soil taxonomy. or Ap is defined as having a value of 3 or less	Hydrophytic Vegetation Criterion Met?  Hydric Soils Criterion Met?  Wetland Hydrology Criterion Met?  Remarks:
Remarks:			Remarks:

Depth 0-36"	Horizon	Matrix Color (Munsell, Moist)	Color of Mottles (Munsell, Moist) Abundance/Contrast	USDA Texture, iron or manganes nodules or concretions, restrictive layers, root distribution, oxidixed rhizospheres, etc.
		4		
		3	2	
4				
				** : 0
	•			
Remarks: depor	sit u	wetland is which is survey.	is located mapped	on a peat as "water"
Skelch La	ndscape Pos	sition:	plot location	Landfill

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ecology and environment

SOIL	DET MINION	1. "NO" in all the following is aridence that the soil is NOT HYDRIC NOTE: 2. This chacklet is valid for use by the New England Corps of Englaners; use autiside the six New England States may be inappropriate. 3. This interpretive, reading may be inappropriate in unusual cases.	I. Hydrology is often the mest difficult feature to absence.  2. Interpretations must consider the appropriateness at the absence in the abse
	topographic boundary Soil is frequently PON	re FACULTATIVE WET AND OBLICATE and the is abrupt.  IDED or FLOODED for a duration longer than two wing season. (attach an explonation of the	Recorded Data: Stream, lake or tidal gage Identification: Aerial Photograph Identification: Other Identification:
	VERY POORLY DRAINES hydrology.  The soil meets the Co POORLY DRAINED SOIC hydrology.  The soil meets the Co SOMEWHAT POORLY D two characteristics*:  Yes NO  1. With Yes	orps of Engineers regional criteria as a condition of there is no evidence of altered orps of Engineers regional criteria as a condition of the is no evidence of altered orps of Engineers regional criteria as a company of Engineers regional criteria as a company of Engineers regional criteria as a condition of the following of the soil surface there are:    No	REPORT ANY OF THE FOLLOWING OBSERVATIONS:  Depth to Free Water: /2  Depth to Saturation: 4  Describe Altered Hydrology:  Inundated Saturated in upper 12in. Water Marks  Oxidized Rhizospheres Drift Lines Water Stained Leaves  Water-borne Sediment Surface Scoured Areas Wetland Drainage Potterns  Deposits.  No Evidence of Significant Hydrological Madification AND there is one or more Marphological Plant Adaptation SUCH AS:  Pneumatophores Buttressed Trees Hypertraphied Lenticeis  Stooling Adventitious Roots Inflated Leaves, Stems, or Roots  Shallow Root Systems Floating Leaves Aerenchyma in Roots & stems  Polymorphic Leaves  Hydric Soils and NO visible evidence of significant hydrological modification  Remarks:
ecology and environment	conclusions if one of hydric soil determine test for ferrous fron measurements and c • Typically in New Er in an aquic suborder	thick, wetness morphology may be masked by organic motter. Normally, these problem situations will be considered hydric when: i. hydrophytes are prevalent, ii. there is no evidence of altered hydrology, and iii. In the horizon that lies directly beneath the Ap horizon, the matrix color is chroma 3 or less and mottles are at least 10% in abundance and distinct or prominent.  The following options were chosen for your tion: measured redox potentials, colormetric test ( *, *, *, *Dipyridi*), or other observations.  Ingland, soils having these morphologies will be classified or or an aguic subgroup in soil taxonomy.  Ap is defined as having a value of 3 or less	CONCLUSIONS  Project Title: Cold Spring Brook  Delineator: Robin Dingle Chuck Rosenburg  Transect: NA Plot: 3 (wetland) Date: 13 Aug. 1991  Yes No Hydrophytic Vegetation Criterion Met?  Hydric Soits Criterion Met?  Wetland Hydrology Criterion Met?  Remarks:  Project Title: Cold Spring Brook  Delineator: Robin Dingle Chuck Rosenburg  Transect: NA Plot: 3 (wetland) Date: 13 Aug. 1991  Yes No  Wetland Hydrology Criterion Met?  Remarks:
		1.	

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DATA	A Plot: 3 (upland)	Dole	: 13 Au	9.1991	ls Publish		y Available? Yes		Worcester, 1985
VECETATION	Stratum and Species (DOMINANTS ONLY)	Dominance Rotio	Percent Dominance	NWI Status	Depth	, Horizon	Matrix Colar (Munsell, Moist)	Color of Moltles (Munsell, Moist)	USDA Texture, iron or manganes nodules or concretions, restricti
Tree !					,,,,			Abundance/Contrast	layers, rool distribution, oxidixed rhizospheres, etc.
none	ح	_	-		0-5"	A	NA	Ma	N/A
Saplin	g :	151	مر م						
Pine	s resinosus	15/20	75%	FACU					
SI I.					4				
Shrub		30/60	50%	UPL		1	ν.		
Rub	s typhina us occidentalis	20/60	33%	UPL	4.0			4	
Liana			120		_				40
No	ne.	-	-	-	on 28MAR9				
Herb	1				V				
Par	ricum sp.	80/90	88	unknow	Datarérm				
		3		3-1	lineation		4.		
1					Remarks:	Plot	located u	within land	fill (not capped)
1					Soils Manu	are a obs	heavily	disturbed o	and there are not slabs).
ally (Dominants	ONLY): OBL: O FACW: O FAC:	FACU:	UPL:		m l	andscape Po			o' I plot location
00 × Dominant(	OBL+FACW+FAC)/Tally Sum = 100	× 3/4 :	15%		8				^
escribe Vegelalia	on Disturbance: , none				England			80%	slope 15'

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SOIL DETERMINATION	1. "NO" in all the following is evidence that the soil is NOT HYDRIC NOTE: 2. This chacklist is void for use by the New England Corps of Engineers; use outside the six New England States may be inappropriate. 3. This interpretive routine may be inappropriate in unusual cases.	DATA & DETERMINATION HYDROLOGY  I, Hydrology is after the most difficult feature to observe.  Interpretations must consider the appropriateness of the observation.  Sph of the season, recent weather conditions, and watershad elterations, stc.  J. Interpretation of hydrology may require repeated observations are more than one season.
topographic boundary  Soil is frequently POI weeks during the gro basis for your conch  The soil meets the C VERY POORLY DRAINE hydrology.	ore FACULTATIVE WET AND OBLIGATE and the y is abrupt.  INDED or FLOODED for a duration longer than two owing season. (attach an explanation of the	Recorded Data: Stream, lake or lidal gage Identification:  Aerial Photograph Identification: Other Identification: No Recorded Data Available  REPORT ANY OF THE FOLLOWING OBSERVATIONS: Depth to Free Water:  ONKNOWN Apparently > 24
	IC and there is no evidence of altered	Depth to Saturation: Unknown Apparently >24"  Describe Altered Hydrology: landfill - 15 of fill.
SOMEWHAT POORLY I	ithin 8 inches of the soil surface there are:  ss No a. soil mottles within an A or Ap horizon and the subsoil is mottled throughout; OR  b. common to many, distinct or prominent mottles with a metrix of chroma 3 or less; OR  c. distinct or prominent oxidized rhizospheres and the subsoil is mottled throughout.  ithin 24 inches of the soil surface, there are mottles which common to many, distinct or prominent, and that are in 2 or less, and one of the following:	Inundated
	thick, wetness morphology may be mosked by organic matter. Normally, these problem situations will be considered hydric when: i. hydrophytes are prevalent, ii. there is no evidence of altered hydrology, and iii. in the horizon that lies directly beneath the Ap horizon, the matrix color is chroma 3 or less and mattles are at least 10% in abundance and distinct or prominent.	CONCLUSIONS Project Title: Cold Spring Brook  Delineator: Robin Dingle, Chuck Rosen  Transect: NA Plot: 3 (upland) Date: 13 Aug. 1991
conclusions if one of hydric soil determine test for ferrous from measurements and a Typically in New Ein an aquic suborder	r or an aquic subgroup in soil taxonomy.	Hydrophytic Vegetation Criterion Met?  Hydric Soile Criterion Met?  Wetland Hydrology Criterion Met?  Yes No
Remarks:		Remorks:

	old Spring Brook 1A Mol: 4 (wetland)	) Date:	13 Au	. 1991	Corps of Regional	Engineers Oroinage Clas	s: poorle			3 a
DATA	Strotum and Species	Dominance	Percent	NWI				No   Tille/Dale:		1185
VEGETATION	(DOMINANTS ONLY)	Ralia	Dominance	Status	Depth	Horizon	Matrix Color (Munsell, Moist)	Color of Moltles (Munsell, Moist) Abundance/Contrast	USDA Texture, in nodules or conc loyers, root dist	relions, restricti ribution, oxidixed
Tree:					0-5"	0	7.5 YR 2/0	N/A	sopic	С.
	s strobus	2559.22	772	FACU	5-16"	A	7.54R 5/0	NA	fine so	ndy loan
Ące	er rubrum	591.45 2559.22	23%	FAC	16-24	В	7.5YR 3/2	7/4	fine sav	ndy loar
Liana				100						
non	•	-	-	_	x I					
Sapling	x									
non	5	_	_	-	. *			÷ *		
Shrub					5		1			3
	glus americana	6/10	60/2	FACU	raion 28MAR					
llo-h				. 1	*					
Herb Osn	nunda cinnamomea	75/90	837	FACW	n Detelerm			G.		
	4				Delineatia	*		*-1	₹	
				6.)	Remarks:	Not	located in	n area w	ith indic	ations
Tally (Dominants	ONLY): OBL: FACW: FAC:	FACU:	UPL:	Sur. 4	Skelch Le	ndscape Pos		<u> </u>		
100 x Dominant(C	DBL+FACW+FAC)/Tally Sum = 100 X	1.		)_	S Corps		plot locati		1-00	5)
Describe Problem	, none				New England	ater	wetland	5 lo 5	10pe	

SOIL	DETERMINATION	1. "NO" is all the following is evidence that the soil is NOT HYGRIC NOTE: 2. This checklist is void for use by the Hew England Corps of Engineers use outside the six New England Stoles may be inoprovious. 3. This interpretive results may be inoppropriate in unusual cases.	DATA & DETERMINATION HYDROLOGY  DATA & NOTE:  2. Interpretations must consider the appropriateness of the observations in light of the season, recent weather conditions, and watershed attentions, etc.  J. Interpretation of hydrology may require repeated observations over more than one season.
	All dominant p topographic bo Soil is frequen	idents are OBLICATE.  Idents are FACULTATIVE WET AND OBLICATE and the pundary is obtupt.  Ity PONDED or FLOODED for a duration longer than two the growing season. (ottach on explanation of the conclusions).	Recorded Data: Stream, lake or tidal gage Identification: Aerial Photograph Identification: Other Identification: No Recorded Data Available
		the Corps of Engineers regional criteria as a DRAINED SOIL and there is no evidence of altered	REPORT ANY OF THE FOLLOWING OBSERVATIONS:  Depth to Free Water: > 24 "
回口		the Carps of Engineers regional criteria as a ED SOIC and there is no evidence of altered	Depth to Saturation:
	hydrology.		Describe Altered Hydrology: Non-e
		s the Corps of Engineers regional criteria as a ORLY DRAINED SOIL that has either of the following islics*:	☐ Inundaled ☐ Saluraled in upper 12in. ☐ Water Marks
6	Yes NO		Oxidized Rhizospheres Drift Lines Water Stained Leaves
		1. Within 6 inches of the soil surface there are: Yes No  a. soil mottles within an A or Ap horizon and the subsoil is mottled throughout; OR	☐ Water—borne Sediment ☐ Surface Scoured Areas ☐ Wetland Drainage Patterns Deposits
		b. common to many, distinct or prominent mottles with a motrie of chroma 3 or less; OR	No Evidence of Significant Hydrological Modification AND there is one or more Morphological Plant Adaptation SUCH AS:    Pneumatophores
		c. distinct or prominent oxidized rhizospheres and the subsoil is mottled throughout.	Stooling Adventitious Roots Infloted Leaves, Stems, or Roots
	ÖΒ	2. Within 24 inches of the soil surface, there are mottles which are common to many, distinct or prominent, and that are chroma 2 or less, and one of the following:	Shallow Root Systems   Floating Leaves   Aerenchyma in Roots & stems   Polymorphic Leaves
		Yes No  a. In the horizon that lies within 10 inches of the soil surface and directly beneath a dark"* A or Ap horizon, the matrix is chroma 3 or less; the mattles are at least 10% in abundance and distinct or prominent.	Remarks:
		b. When a dark*Ap horizon is between 10 and 14 inches thick, welness morphology may be masked by organic matter. Normally, these problem situations will be considered hydric when: i. hydrophylas are prevalent,	· la
		ii. there is no evidence of altered hydrology, and iii. in the horizon that lies directly beneath the Ap horizon,	" [ S CONCLUSIONS ]
		the motrix color is chroma 3 or less and mottles are at least 10% in abundance and distinct or prominent.	Delineator: Robin Dingle, Chuck Rosenbur
	Check here or	nd atlach a description of your procedures and	Transact: N/A Plot: 4 (wetland) Date: 13 Aug. 1991
U	hydric soil del	one of the following options were chosen for your termination: measured redox potentials, colormetric us iron test ( <, ~Dipridi), or other a and observations.	Hydrophylic Vegetation Criterion Met?
	• Typically in in an aquic s •• Note: a da	New England, soils having these morphologies will be classified uborder or an aquic subgroup in soil taxonomy, rok A or Ap is defined as having a value of 3 or less to 2 or less	Hydric Sollis Criterion Met?  Wetland Hydrology Criterion Met?  Remarks:
Remarks:	3.15 4 4.11		3 Remarks:

recycled paper

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ecology and environment

S	OIL DETERMINATION	1. "NO" in all the following is evidence that the soil is NOT HYDRIC NOTE: 2. This checklist is valid for use by the New England Corps of Engineery; use autiside the six New England Stoles may be inappropriate. 3. This interpretive resulted may be inappropriate in unusual cases.	1. Hydrotopy is often the most difficult feature to observe.  2. Interpretations must consider the appropriateness of the observations in Eght of the season, record weather conditions, and watershed attentions, etc.  3. Interpretation of the declaration of the observations over more than one season.
Yes (	All dominant plants o	ore OBLIGATE.	Recorded Data: Stream, lake or lidal gage Identification:
U	topographic boundary		Aerial Photograph Identification:
		NDED or FLOODED for a duration longer than two wing season. (attach on explanation of the island).	Other Identification:
		orps of Engineers regional criteria as a D SOIC and there is no evidence of altered	No Recorded Data Available  REPORT ANY OF THE FOLLOWING OBSERVATIONS:  Depth to Free Water: > 24"  Depth to Saturation: > 24"  Describe Altered Hydrology: None
		orps of Engineers regional criteria as a	Depth to Saturation: >24 "
	hydrology.	C and there is no evidence of aftered	Describe Altered Hydrology: None
		orps of Engineers regional criteria as a PRAINED SOR, that has either of the following	
-	Yes NO	No. 8 June of the self-surface there was	Oxidized Rhizospheres Drift Lines Water Stained Leaves
		thin 8 inches of the soil surface there are:  No a. soil mottles within an A or Ap horizon and the subsoil is mottled throughout; OR	☐ Water—borne Sediment ☐ Surface Scoured Areas ☐ Wetland Drainage Patterns Deposits
	C	b. common to many, distinct or prominent mottles with a matrix of chroma 3 or less; OR	No Evidence of Significant Hydrological Modification AND there is one or more Morphological Plant Adaptotion SUCH AS:    Preumatophores
	E	c. distinct or prominent oxidized rhizospheres and the subsoil is mottled throughout.	Stooling Adventitious Roots Initated Leaves, Stems, or Roots
	니니 ore co	thin 24 inches of the soil surface, there are mottles which immon to many, distinct or prominent, and that are a 2 or less, and one of the following:	Shallow Root Systems   Floating Leaves   Aerenchyma in Roots & stems
	Ye C	a. In the horizon that les within 10 inches of the soil surface and directly beneath a dark** A or Ap horizon, the matrix is chroma 3 or less; the mottles are at least 10% in abundance and distinct or prominent.	Remarks: no evidence of hydrological indicators
		b. When a dark* Ap harizon is between 10 and 14 inches thick, welness morphology may be masked by organic motter. Normally, these problem situations will be considered hydric when: i. hydrophytes are prevalent, it. there is no evidence of altered hydrology, and iff. in the horizon that lies directly beneath the Ap horizon, the motrix color is chroma 3 or less and mottles are at least 10% in abundance and distinct or prominent.	CONCLUSIONS Project Title: Cold Spring Brook
		ch a description of your procedures and	Tronsect: N/A Plot: 4 (upland) Dole: 13 Aug. 1991
_	hydric soll determina	I the Collowing options were chosen for your tion: measured redox potentials, colormetric test ( ≪, ∞, – Dipyridii), or other sbservations.	Hydrophytic Vegetation Criterion Met?  Hydric Solls Criterion Met?  Yes No Yes No Yes No
	in an aquic suborder  Note: a dark A or	ngland, soils having these morphologies will be clossified r or an aquic subgroup in soil taxonomy.  Ap is defined as having a value of 3 or less	o   Westigna mydrology Criterion Metr
Remark	and a chrome of 2 o	or legs	Remarks:
			The state of the s

Transect: N/p	old Spring Brook + Phol: 5 (wetland)	Dole	14 A	ng 1991	ls Publishe	<u>Drainage Clas</u> ed Soil Surve	s: Very poor y Available? Yes	hy drained No Title/Dole:	Criterion: A.3
DATA VECETATION	Stratum and Species	Dominance Ratio	Percent Dominance	NWI Stotus	Soil Type	The second second		- muck	<del></del>
Tree:	(DOMINANTS ONLY)				Depth	Horizon	Matrix Color (Munsell, Moist)	Color of Mollles (Munsell, Moist) Abundance/Contrast	USDA Texture, iron or manganess nodules or concretions, restrictiv- layers, root distribution, oxidixed rhizospheres, etc.
	rubrum	190.77	59%	FAC	0-5"	0	7.5 YR 2/0	N/A	sapric
		323.44		.	5-20".	Α	7.5 YR 4/0	N/A	mucky fine sand
Pinus	strobus	323.44	41 %	FACU	20"-24"	В	7.5 YR 6/0	N/A	fine sandy loan
Salina			9 .						3
-, 5	is americana	40/80	50%	FACW		E .			
Ace	- fubrum	35/80	44%	FAC					
Shrub					**				
-	metis virginiana	10/30	30%	FAC	168				
Corni	us amonum	10/30	30%	FACW	ion 28W				F. 1
Herb:									
Leer	sia oryzoides	30/10	33%	OBL	graform				
Imp	atiens capensis	20/90	22 %	FACW	eation D		×	h - 1	
Osmi	unda cinnamomea	20/10	22%	FACW					32
					Remarks:				
Tally (Dominants	ONLY): OBL:   FACE: 3	FACU:	UPL:	SIM. 9		ondscape Po	silion:		= 44
100 × Dominant(	OBL+FACW+FAC)/Tally Sum = 100 ×	8/9:	89 '	20	e England Corps	brook		. /	20% slope

SOIL I	DETEN	1. "NO" in all the following is evidence that the sell is NOT INDRIC NOTE: 2. This checklet to valid for use by the New England Corps at Englaners; use autoide the six New England Stokes may be inappropriate. 3. This interpretive realine may be inappropriate in senses cases.	1. Hydrology is often the most difficult feeture to observe. 2. Interpretations must consider the appropriateness of the abservation — 1. The second recent weather conditions, and waterhad attention of the second recent weather conditions, and waterhad attention of the second recent weather conditions are more than one seeson.
**************************************	All dominant pla topographic bou Soil is frequently	ants are OBLIGATE.  Into are FACULTATIVE WET AND OBLIGATE and the Indary is abrupt.  By PONDED or FLOODED for a duration longer than two the growing season. (attach an explanation of the conclusions).	Recorded Data: Stream, take or tidal gage Identification:  Aerial Photograph Identification:  Other Identification:  No Recorded Data Avoilable
	VERY POORLY DI hydrology.  The soil meets in POORLY DRAINE in hydrology.  The soil meets SOMEWHAT POOl two characterists	the Corps of Engineers regional criteria as a RAINED SOIL and there is no evidence of altered  the Corps of Engineers regional criteria as a D SOIC and there is no evidence of altered  the Corps of Engineers regional criteria as a RLY DRAINED SOIL that has either of the following lics*:	REPORT ANY OF THE FOLLOWING OBSERVATIONS:  Depth to Free Water:  Depth to Saturation:  Describe Altered Hydrology:  Inundated  A Saturated in upper 12in,  Water Marks
es.	Yes NO	1. Within B inches of the sell surface there are: Yes No a. soil mattles within an A or Ap horizon and the subsoil is mattled throughout; OR	☐ Oxidized Rhizospheres ☐ Drift Lines ☑ Water Stained Leaves ☐ Water—borne Sediment ☐ Surface Scaured Areas ☑ Welland Drainage Palterns ☐ Deposits . ☐ No Evidence of Significant Hydrological Modification AND there is one
	، لابا	b. common to many, distinct or prominent motities with a matrix of chroma 3 or less; OR  c. distinct or prominent oxidized rhizospheres and the subsoil is motited throughout.  Within 24 inches of the soil surface, there are motities which are common to many, distinct or prominent, and that are chroma 2 or less, and one of the following:  Yes No  surface and directly beneath a dork** A or Ap horizon, the matrix is chroma 3 or less; the motites are at least 10% in abundance and distinct or prominent.	or more Morphological Plant Adaptation SUCH AS:    Pneumatophores
ecology and envi	conclusions II	b. When a dark" Ap horizon is between 10 and 14 inches thick, welness marphology may be masked by organic matter. Normally, these problem situations will be considered hydric when: i. hydrophytes are prevalent.  I. there is no evidence of altered hydrology, and iii. in the horizon that lies directly beneath the Ap horizon, the matrix color is chroma 3 or less and mattles are at least 10% in abundance and distinct or prominent.  d attack a description of your procedures and one of the following options were chosen for your	CONCLUSIONS  Project Title: Cold Spring Brook  Delineator: Robin Dingle, Chuck Rosenbur  Transact: N/A Plot: 5 (wetland) Date: 14 Aug. 1991  Yes No
Remarks:	neasurements  Typically in the in an aquic su	ermination: measured redox potentials, colormetric s kan test ( =, =, —Dipyridii), or ather and observations.  New England, soils having these marphologies will be classified aborder or an aquic subgroup in soil taxonomy.  It A or Ap is defined as having a value of 3 or less of 2 or less	Hydrophylic Vegetation Criterion Met?  Hydric Soile Criterion Met?  Wetland Hydrology Criterion Met?  Remarks:
	Ÿ.		

	Cold Spring Brook + Prol: 5 (upland)	Date	: 14 Au	1991	Regional D	rainage Clas	s: well drain	ned	Criterion: E
DATA	Stratum and Species	Dominance		NWI	Soil Type I		Ninigret	fine Sand	Worcester Co, 1985
Tree :	(DOMINANTS ONLY)	Ratio	Dominance	Status	Depth	Horizon	Matrix Color (Munsell, Maist)	Color of Mottles (Munsell, Moist) Abundance/Contrast	USDA Texture, iron ar mangane nadules or concretions, restrict layers, roal distribution, axidixe thizospheres, etc.
	strobus	983.63	1 66 /	FACU	0-5"	0	N/A	N/A	leaf litter
Acer	rubrum	331 .3/ 1494.7:	22%	FAC	5-18"	A	7.5 YR 4/3	N/A	fine sandy load
Liana				5- 0	18-24	В	7.54R 4/6	NA	sandy loam
non	·e	-	- *	-					- 4
Saplin	<u>9</u> :		•						,
Pino	s strobus	10/35	29 %	FACU					
Ac e	st Lopeon	10/35	29%	FAC	BMAR9 1				
Shrub	_1	X			Version				t
Cory	ylus americana	35	57%	FACU	atalom				
Herb			72		a e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i i e o i e o i i e o i i e o i i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o i e o		1.2		
Lyco	anthemum canadense podium tristachyum	10/34	29%	UPL	Remarks:				
Tally (Dominants	S ONLY): O FACW: FAC: 2	FACU:	UPL:	ISHM. /		ndšcape Pos	ilion:	lot location	1, 50
00 x Dominant((	OBL+FACW+FAC)/Tally Sum = 100	× 2/7 =			S Corps		50'	1	7
escribe Vegetation	· none				England	wetland		30	lo slope

1. Hydrology is often the most difficult feature to observe.

SOIL	DEI. W.ON	NOTE: 2. This checklist is valid for use by the Hew England Corps of Enghaery, use autoids the six item England States may be inapprepriate.  1. This interpretive reading may be inapprepriate in unusual cases.	TA &
POD DO DO DO DO DO DO DO DO DO DO DO DO D	Soil is frequently PON	e FACULTATIVE WET AND OBLICATE and the is obrupt.  DED or FLOODED for a duration longer than two ing season. (ottach an explanation of the	Recorded Data: Stream, take or tidal gage Identification: Aerial Photograph Identification: Other Identification:
	VERY POORLY DRAINED hydrology. The soil meets the Co POORLY DRAINED SOIC	rps of Engineers regional criteria as a SOIC and there is no evidence of altered rps of Engineers regional criteria as a and there is no evidence of altered	REPORT ANY OF THE FOLLOWING OBSERVATIONS:  Depth to Free Water: > 24 11  Depth to Saturation: > 24 11
口区	SOMEWHAT POORLY DR two characteristics*: Yes NO 1. Will	rps of Engineers regional criteria as a  ANNED SOIL that has either of the following  Im B inches of the soil surface there ere:  No a. soil mattles within an A or Ap harizon	Describe Attered Hydrology:    Non C     Inundated   Saturated In upper 12in.   Water Marks     Oxidized Rhizospheres   Drift Lines   Water Stained Leaves     Water-borne Sediment   Surface Scoured Areas   Wetland Drainage Patterns     Deposits   Deposi
,		b. common to mony, distinct or prominent mottles with a matrix of chroma 3 or less; OR  c. distinct or prominent exidized rhizospheres and the subsoil is mottled throughout.	No Evidence of Significant Hydrological Modification AND there is one or more Marphological Plant Adaptation SUCH AS:    Pneumatophores
	chrome Yes	2 or less, and one of the following:  No a. In the horizon that lies within 10 inches of the soil surface and directly beneath a dark* A or Ap horizon, the matrix is chroma 3 or less; the mattles are at least 10% in abundance and distinct or prominent.  b. When a dark* Ap horizon is between 10 and 14 inches	Polymorphic Leaves    Polymorphic Leaves
ecology as	. ,	thick, wetness morphology may be masked by organic matter. Normally, these problem situations will be considered hydric; when: i. hydrophytes are prevalent, ii. there is no evidence of altered hydrology, and iii. In the horizon that lies directly beneath the Ap horizon, the matrix color is chroma 3 or less and mattles are of least 10% in abundance and distinct or prominent.	CONCLUSIONS Project Title: Cold Spring Brook  Delineator: Robin Dinglo, Chuck Rosenbu  Transact: N/A Plot: 5 (upland) Date: 14 Aug. 1991
nd environment	conclusions if one of hydric soil daterminal test for ferrous fron measurements and o • Typically in New En in an aquic suborder •• Note: a dark A or	gland, soils having these morphologies will be classified or an aquic subgroup in soil taxonomy.  Ap is defined as having a value of 3 or less	Hydrophytic Vegetation Criterion Met?  Hydric Solls Criterion Met?  Wetland Hydrology Criterion Met?  Yes No  Yes No  Yes No  Yes No  Yes No
Remarks:	ond a shroma of 2 o	r less	Remarks:

Key Mederate High Project No. UC 2061 Untaverable Westend No. Shepleys Hill wetland . Absent Perennial Plow Shop Pand Comple TOPOGRAPHICAL ELEMENTS Ephemeral ECOLOGICAL ELEMENTS Stream or Brookside Wetland T Open Fresh Water D Deep Fresh March Topographic Configuration Wetland Subclasses Dominant Wetland Class Stream or prookside Wetland Closed Basin Semi-closed Basin Se Valley Hillside Open Fresh Water Non-vegetated Subclass Deep Fresh Marsh Shallow Fresh Marsh □ Dead Woody □ Scrub-Shrub D Yearly Floodplain O Shrub Size Blarge 24.6 acres ☐ Robust ☐ Wet Meadow □ Medium 1.1-4.5 □ Small ≤1 acre C Narrow-leaved C Broad-leaved C Shrub Swamp Shallow Fresh Marsh D Wooded Swamp Wetland Gradient ☐ Robust ☐ Narrow-leaved D Bog Surrounding Slopes

Sight 9-16 Steep >36

Slight 9-16 Steep >36 C Broad-leaved Floating-leaved D Fen Floodplain /Flats Other. Emergent Wetland Class Richness Topographic Position in Watershed C Shrubs and Trees DS C4 C3 X2 C1
Subclass Richness (Lateral Diversity)
D10 C5-6 X5-4 C3-2 C1
Vegetative Interspersion
CH CM XL Wet Mando-□ ungrased D Grazed Shrub Swamp GEOLOGICAL ELEMENTS C Sapting D Bushy □ Compact Surficial Geologic Material ☐ Aquatic Surrounding Habitat
D901 of 2 or more listed types Wooded Swamp Underlying Westand Till Alluvium

Stratified Sand and Gravel ☐ Deciguous D Evergreen \$30-90% of 1 or more; 90% of 1 De50% of 1 or more of listed types Bog Shrub Cranperry E Stratified Fine Sand and Silt C Wooded Cover Type \$26-75% scattered edrock Underlying Wetland E Ignaous and Metamorphic O Moss Sedimentary 526-751 peripheral C Emergent C Shrub D751 or <251 scattered Soil Type/Permeability

Pest/H Mineral/M Muck/L

Dominant Surficial Geological Ditto cover; >75% or <25% peripheral SPECIAL ELEMENTS Percent Open Water
D0-338 08.30-668 0 67-958 0 96-1008
Vegetative Species Richness
DH 04M DL Rare and/or Endangered Species (fransient C Aquatic Study Area enalt, Till Sanctuary or Refuge

Wildlife Management Area Proportion of Wildlife Food Plants

H DM DL

Vegetative Density

DH DM DL

Wetland Juxtaposition Favorability Stratified Sand and Grave C Stratified Fine Sand and Silt Thickness of Organics D Fisheries Management Area D Educational Study Area

C Historical Area Other Species ef concern G/W Note people fish in the pond.

#### HYDROLOGICAL ELEMENTS

Hydrologic Position of Wetland Perched Wetland
Water Table Wetland
Ownter/Artesian Wetland Artesian Wetland Groundwater Relationship C Discharge Wetland
C Recharge Wetland
Compination Transmissivity of Aquifer ☐ Low <10,000 gal/day/ft Moderate 10,000 - 40,000 gal/day/ft High >40,000 gal/day/ft Dominant Hydrologic Condition

C 1 C 2 C 3 C 4 D 5 C 5

Connection by Surface Water to a Riparian System
Di Yes O No
Watershed Land Use Rural Rural/Residential Surban Other_ Water Level Fluctuation

I H OL Elvernal Coolager

Groundwater Outflow From Wetland Absent A Present

Iniet
DA DP DE
Present, to wetland
Inlet
DA DP DE
D Present, to wetland
Injet
DA DP DE
Present, to wetland
Injet
CA OF DE
Present, to wetland
injet
DA DP DE
Present, to wetland
Outlet
DA DE DE
Present, to wetland
Outlet
DA MP DE
Present, to wetland
Percent Wetlands Bordering Open
□ <33% □ 38-66% □ 67-100%
T <335 T 34-996 T 64-1008
Does not border
Resch Db>2000 ft <2000 ft.
DE>2000 It. U <2000 It.
Depth of Lake
C Deep >6 ft. A Shallow <6 ft.

SOCIO-ECONOMICAL ELEMENTS Hydrologically Connected to a Small stream Combination ☐ Net connected Public Access to Wetland Within 100 ft. of road Access by pessable waterway C isolated Surrounding Population Density O <4 person/acre (<320/mi²)</p> 54.0.5 - 1.9 p/a (320-1220/mi²) D >2 p/a (>1220/mi²) Local Scarcity to Nearest Similar Type D<200 feet © 201 to 1000 feet □ >1000 feet Known Crop Value or Potential None

Supports 1 family for part of year Type Supports viable commercial interest Type Legal Accessibility to Wetland ecological Significance Archeological/Historic | None

l poort 1	Meight	Weight		(loonts	Never I		Conditions
nique fisheries ^a	EAD.	NA.	Present	Jorface Water	1	(i)	Connected to a small agree
and the second of the second			Bot Present			V	Commercial to a river
stence of	MA	<b>©</b>	Present			•	Connected to a late
dengered of reaconed Species ^a		M	Int Present				Connected to a combination
minant Welland	•	1	Stress or Brootside wotland				
Wr	-		Once fresh water	Le symmetric			Not cannocted
		(0)	Ques fresh marsh(aquatic bod)	Percent Metland Servering on			44.
		0	Shallow from marga	Open water		0	34-412
			Yearly Cleased Cleadelain			•	67-100E
			Not mades		1.5	(5)	Does not border
			Sent man	Size	5	•	Large 2 4.6 acres
			Manager (doctionous)			200	Medium 1.1-4.5 acres
		4	Unnied great (consferous)			Bango 29-753	Small g 1.0 acres
			be the same of the	1000000000		Rean 93	110) Mod.
5-7-5-1 Walter	Co.			bones applicable		- 1	
ummer of Vetland lazzes (Bichness)	4						
		Ċ	1				
		(1)					
	L col	1	1.				
unciases (Richness)	3	1	>10				
		-	6-1	Figure		haire legic Sessori	t Function Fude1
		0	4-5	Clamats	Liver		Conditions
		2	1-1	Size	4	6)	Large 2 4.6 servs
		1	4			1	Poderate 1.1-4.5 acres
logotative	4		ale:			1	Small c 1.8 acres
		-	Roberate	Topographic	1	1	Som-closed basin
		0	<b>L</b>	Configuration	1.5	(1)	Valley
Surremaing Habitat	3	3	1982 of two or more of Tisted types			$\circ$	Hillside
		(1)	M-NUS of one or more				Clases Sanna
		0	985 of and	Seminant Hydrologic	•	1	Condition
		1	cittle of one or more listed	Type		2	Compilion 2
Water/Cover Ratio (Cover Typed)	3		S-75 Mattered			1	Condition 3
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		2	25-755 perspieeral				Condition 4
		( )					
		0	THE P COL SCALLERES			3.32	Condition 5
		·	1605 cover:>755 or 255			0	Condition 5
homor of Plant		4		Mater (evol	,	<b>O</b>	
Species (Venetative		1	100E cover:>75E or 25E parameral	Mater Level Fluctuation		3.32	Candition 6
Species (Venetative	1	4	1005 cover:>755 or 255 puriphoral Law	Flestwatten		<b>O</b>	Condition 6
Species (Venetative Species Bichness) Presention of	1	) <del>()</del> -	1005 cover:>755 or 255 purisporti Law Redian			<b>O</b>	Condition 6 Low High
Species (Venetative Species Aichness) Propertion of		)- - •	1005 cover:>755 or 255 puriporal Law Redium High	Flestwatten		<b>O</b>	Condition 6 Low High Personnal Outlet Epomeral Outlet
Species (Venetative Species Bichness) Presention of		) <del>()</del> -	1005 cover:>755 or 255 puriphoral Law Redisin High Law	Flestwatten		(1) (2) (1)	Condition 6 Low High Perunnial Dutlet Ephemoral Dutlet Crommovator Outflow
Species (Venetative Species Richness) Presention of Hildlife Food Plants		)	1005 cover:>755 or 255 purishors! Law Redium High Low Ruderata	Flestwatten		(1) (2) (1)	Condition 6 Low High Personnal Outlet Epomeral Outlet
Species (Venetative Species Bichnesz) Presertion of Hildlife Food Plants	1	)	1005 cover:>755 or 255 puriphors! San Redium High Lor Rederata	Flestwatten		(1) (2) (1)	Condition 6 Low High Perunnial Dutlet Ephemoral Dutlet Cremmonator Outflow
Species (Venetative Species Bichnesz) Presertion of Hildlife Food Plants	1	)	1005 cover:>755 or 255 purishors! Saw Redium High Law Roderata High	flectuation Outlet			Condition 6 Low High Personnel Dutlet Epomeral Dutlet Cressource Outflow Absent
Species (Yeopelative Species Elchness) Proportion of Wildlife Food Plants Vegetative Commity	1	)	1005 cover:>755 or 255 purishorsi Lau Redium High Lau Roderata High Roderata	Flestwatten			Condition 6 Low High Perunnial Dutlet Ephemeral Dutlet Cremovator Outflow Absent
Species (Yeopelative Species Elchness) Proportion of Wildlife Food Plants Vegetative Commity	1	)	1005 cover:>755 or 255 purishors; Law Redium High Low Rederate High Rederate Low	flectuation Outlet		(i) - (i) (i) (i)	Condition 6 Low High Perunnial Outlet Epheneral Outlet Greenouster Outflow Absent Perunnial Epheneral
Species (Yeopelative Species Elchness) Proportion of Wildlife Food Plants Vegetative Commity	1	)	1005 cover:>755 or 255 purishors!  Law Redium High Lor Ruderata High Brigh Suderate Low Highly favorable	flectuation Cutlet			Condition 6 Low High Personal Outlet Ephoneral Outlet Greenouster Outline Absent Personal Enhances Absent
Species (Vegetative Species Eichness)  Prosortion of Wildlife Food Plants  Togotative Obnasty  Metland Justaposition  Hydrological Positio	1	)	1005 cover:>755 or 255 purishors!  Law Redium High Low Ruderata High Union Ruderata High Ruderata Law Righly favorable Ruderataly favorable	Flectuation  Cutlet  Inlet  Percont Metlands Bersering on		(i) - (i) (i) (i)	Condition 6 Low High Personnal Outlet Ephomeral Outlet Greenouster Outflow Absent Personnial Enhouses Absent 4335
Species (Vegetative Species Elchness) Prosection of Hildlife food Plants Vegetative Commany Vegetative Commany	1	)	1005 cover:>755 or 255 purishors! Law Redium High Low Ruderata High Unigh Ruderata Law Highly favorable Ruderataly favorable Unifavorable	Flactuation  Outlet  Inlet  Percont Votland®		(i) - (i) (i) (i)	Condition 6 Low High Personnal Outlet Ephomeral Outlet Grammator Outflow Absent  Personnial Ephomeral Absent 4235 34-665
Species (Vegetative Species Richness) Presention of Wildlife food Plants Vegetative Commity Vegetative Commity Wetland Justsposition Hydrological Position (Groundwater	1	)	1005 cover:>755 or 255 purishors!  Low Redium High Low Rederate High Rederate Low Highly favorable Anderately favorable Rederately favorable Rederately favorable Rederately favorable	Flectuation  Cutlet  Inlet  Percont Metlands Bersering on		(i) - (i) (i) (i)	Condition 6 Low High Personnal Outlet Ephomeral Outlet Creammenter Outflow Absent  Forumnial Ephomeral Absent 4335 34-662 67-1005
(Grounewater	1	)	1005 cover:>755 or 255 purishors!  Low Redium High Low Rederate High Stigh Staterate Low Engly favorable Staterately favorable Staterately favorable Staterately favorable Staterately favorable Staterately favorable	Flectuation  Cutlet  Inlet  Percont Metlands Bersering on		(1) (2) - (2)	Condition 6 Low High Personnal Dutlet Epomoral Dutlet Cremonator Outflow Absent  Personnal Lohemral Absent 4335 34-642 67-1025 Boes out borner
Secties (Vegetative Species Eichness) Presention of Hildlife Food Plants Vegetative Osmaity Vegetative Osmaity Vegetative Osmaity Vegetative Osmaity Vegetative Osmaity Vegetative Osmaity Commission (Section Osmait)	1	)	1005 cover:>755 or 255 purishorsi  Low Redium High Low Rederate High Suderate Low Physics Suderate Low Physics Suderate	Percent Wotlands Sensoring on Spee Hater		(1) (2) - (2) - 1 (3) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1	Condition 6 Low High Personnel Dutlet Epomeral Dutlet Cremonator Outflow Absent  Personnel Labourt Absent 4335 34-665 67-1025 Boes not beroer
Species (Venetative Species Richness)  Presention of Hildlife Food Plants  Vegotative Commity  Netland Justaposition  Hydrological Positio (Groundwater	1	)	1005 cover:>755 or 255 purishors!  Law Redium High Law Ruderata High Union High Ruderata Law Highly favorable Ruderataly favorable	Flectuation  Cutlet  Inlet  Percont Metlands Bersering on	i i	1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 1 2 1 1 1 2 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Candition 6 Low High Personnal Outlet Ephomeral Outlet Crommester Outflow Absent  Personnial Ephomeral Absent 4338 30-66% 67-100% Does not beroor

Figure 11. Aromanter function Rade

(laments	Element	Verght	Conditions
Serficial Seelegy	3	1	7611
		4	Streetflod sand and gravel
		(3)	Stratified fine sand and sill
		1	Allevium
Organic Material	2	(5)	Absent
		1	High permeability
		1	Los perseability
Hydrologic Pasition	3	2	Percood wetland
		0	Mater table wetland
		1	Noter table/artestes setland
		1	Artesian wetland
Treesmissivity	4	1	Les <10.000 gal/day/ft
of Aquifer		(2)	Red. 19.000-40.000 gal/day/fi
		1	High >40.000 gal/day/ft
Iniet	1	(1)	Absent
		1	Personal
		2	Ephanoral
Outlet	2	1	Absent
		(1)	Personal
		4	Canaderal
Size	3	(1)	Large 4.6 acres
		1	Redtum 1.1-4.5 acres
-	Tan	1 10-682	Sall 2 1.0 ocres 57) High

Total value for one iniet and one outlet har. Some wetteres may nave more than one iniet or outlet but the range above is for wetlands with only one select and one outlet.

Figure 12. Storm and Flood Mater Storage Function Rode)

[learnts	Verant	Bought	Conditions
Comment Welland	2	1	Stress or processes welland
Cini		1	Com fresh water
		1	Boop fresh marsh (aquatic bod)
		4	Shalles frush march
		4	Yearly Flooded Floodelain
		3	Wet messer
			Direct coase
			Noncod Steam
		3	beg
Percent Open Water	2	3	6-17E
		(2)	34-663
		1	67-915
			96-1003
Voqetative Density	4	3	High ,
			Rederate
		Y	Low
Topographic Configuration	2	4	Closed Basin .
Comit I gar at tion		3	Sens-closes basin
		(2)	Valley
		Y	H111ande
Temperaunic Position	1	(3)	Mesor
IN BACETINES		1	Latermetate
		1	Lower

Floors 12 (continued)

	Stratified sand and gravel Stratified fine sand and sill Alluvium Till Stratified sand and gravel Stratified find sand and sill Alluvium High permeability Low permeability Absent Condition 1 Condition 2 Condition 3 Condition 4 Condition 5 Condition 6
	Stratified fine sand and cili Alluvium Tell Stratified sand and gravel Stratified find sand and sili Alluvium High permeability Low permeability Absent Condition & Condition 4 Condition 5 Condition 6
	Allurium Till Stratified sand and gravel Stratified find sans and sile Allurium High permeability Low permeability Absent Condition 1 Condition 3 Condition 4 Condition 6
	Stratified sand and grave! Stratified find sans and sile Allerium High permeability Low permeability Absent Condition i Condition 2 Condition 4 Condition 5 Condition 6
	Stratified sand and gravel Stratified find sand and sile Allowing High permeability Low permeability Absent Condition 2 Condition 3 Condition 4 Condition 5 Condition 6
	Stratified find same and sile Allerium High permeability Low permeability Absent Condition 1 Condition 2 Condition 3 Condition 4 Condition 5 Condition 6
	Allurium High permeanility Low permeanility Absent Condition 1 Condition 2 Condition 3 Condition 4 Condition 5 Condition 6
· · · · · · · · · · · · · · · · · · ·	High permeability Low permeability Absent Condition i Condition 2 Condition 3 Condition 4 Condition 5 Condition 6
•	Low permeability Absent Condition i Condition 2 Condition 3 Condition 4 Condition 5 Condition 6
©	Absent Condition 2 Condition 3 Condition 4 Condition 5 Condition 6
©	Condition 1 Condition 2 Condition 3 Condition 4 Condition 5 Condition 6
٥	Condition 2 Condition 3 Condition 4 Condition 5 Condition 6
٥	Condition 3 Condition 4 Condition 5 Condition 6
٥	Condition 4 Condition 5 Condition 6
•	Condition &
•	Condition 6
•	
-	But part of riparian system
1	Part of riparion system
1	High
0	<b>1</b> =
2	Perennial
1	Cotomers
0	Absort
(1)	Permetal
1	Ephonoral
•	Absent
0	Large 2 4.6 acres
-	Redium 1.1-4.5 acres
	Smail e 1.0 scres
	0

eretal value for one inlet and one outlet only. Some vetlance may have more than one inlet or outlet, but the range above is for wetlance with only one inlet and one outlet.

Figure 13. Shoreline Protection function Acce

Figure 14 (continued)

(1eent	Element Wangnt	Seright .	Consission
Wetland Spreers	M)		Tes
Lake or Stream		M	
Vegetative Density	3		Open fresh meter
		•	Streem and properties
		(1)	Dees fresh marsh (squatte bed
		1	Dallos fresh marsh
		4	Yearly floodplan
		1	Net medow
			Shrua suana
		4	Hotel Susan
		1	Dog
Serficial Material Underlying sections	1		7111
Giory of Michael		1	Stratified sand and gravel
		(1)	Stratified find sand and silt
		3	Allurium
Fetch (Lakes mily)	4	<b>(1)</b>	Over 2000 ft.
		1	Under 2000 ft.
Depth of Lake	1	2	Deep & ft.
	_	6)	Shallow 6 ft.

(lessats	Me ignt	Condition Melant	Conditions
Desirant Hydrologic		1	Condition I
l libra		2	Condition 2
		3	Condition 1
			Candition 4
		(3)	Condition 5
		•	Condition &
Nydrologic	2	1	Bot part of the reserved system
Cannec L104		(1)	Pert of riperion system
laiet		2	Ferensal
		1	(preserva)
		0	Absent
Outlet	3	(1)	Permiss
		1	Estamoral
		0	Absent
Size	4	(1)	Large ≥ 4.6 acres
		1	Asserate 1.1-4.5 acres
		1	Small < 1.0 acres
		Range 18-96 ⁴ Nean 58	(70) Mod.

*Total value for one inlet and one outlet only.

Some settands day have more than one inlet or outlet but the range above is only for settands with one inlet and one outlet.

Figure 14. Inter Guelity Maintenance Function Radel

(Icents	Element	Consister Verget	Conditions	
Spennent Wetland	•	1	Street or processes wetland	
Class		0	Com fresh water	
			Does fresh mursh (squatte ped)	
		•	Dallor fresh marsh	
		4	fearly Classicia	Comes
		3	Net mades	Bentrant
			Shrish Samp	Class
		2	Monday Swamp	
		2	les .	
Percent som water	1	1	0-331	
			34-461	
		ĭ	67-95%	
			94-100%	
Vegetative Density	3	3	High	
		(1)	Rederate	
		<u> </u>	la-	Access
Topographic	3		Clased Bassa	
Configuration		1	Sem-closed basin	
		(2)	Talley	2120
		1	Hillside	
Teparreshit	2	(1)	Morr	
Position in Matershed		1	Intermediate	
	4	3	Leer	
Organic Reterial	1	1	High personality	
-27 <b>2</b> 24,02,02,000,000		2	Law permissiffity	
		0	Amens	
2				

Figure 15. Cultural and Economic Function Radel

Dames	Lignent	Condition Meight	Conditions
Bennant Wetland	4	0	Stream of breezestde
Class		•	Open fresh water
		0	Does fresh march
		•	Shellow fresh cursh
		0	Tearly Flooded Floodslain
		2	Net means
		3	Shrub seems
		\$	Mount sum (deciduous)
			model seem (conferns)
		3	lot
Access	3	0	Within 100' of read
		1	Accres by passable waterway
		1	Isolated
2120		$\odot$	Large ≥ 4.6 acres
		2	Redrew 1.1-4.5 acres
			Sme11 ≤ 1.0 acros
-		90 11 - 36	(49) High

Presentive

bast applicable

Figure 16. Accrestional Function Rada

Flaute 17. Assthatic function Rede

Figure 10. Michael Lanction womi		7,000			function Rodel		
() conts	Mesent	Condition	Conditions	() aments	Element.	Condition Veignt	Conditions
CONTRACT Metland	3	0	Streen or breesside	Beminent Wetland	4		Stream or processes wetland
lass			Open fresh water	Class			Open fresh mater
		(1)	Does fresh morsh "			1	Good fresh marsh
		5	Shellow fresh marsh			4	Shallow fresh marsh
		•	Yearly flooded floodelain			•	Yearly floomed floodslass
		0	Wet meadow			•	Wet mesers
		2	Show succes			2	Shree summe
		2	Mosard Swamp (deciduous)			3	Monded sweep (decidwout)
		3	Moses sweet (conferent)			3	Booted swamm (CERTTERES)
		2	log			1	Bog
ercent Open	3	1	0-332	Baser of	3	6	4-5
a Ler		(E)	34-461	(fichness)		3	1-1
		1	67-952			1	1
			96-1001	Percent Open Water		į	0-33%
urface water		(1)	Connected to a small stream			<b>(1)</b>	34-663
458C14E100		2	Connected to a river			4	67-95%
		3	Connected to a late			0	96-100s
		4	Connected to a comminetion	Access to Public	3	(1)	Within 100 ft. of room
		0	Not connected			2	Access by passable waterway
ccess to Public	2	(1)	Nithia 100" of rood			1	Isolated
	3	1	Access by passable maternay	Local Scarcity	3	1	4200 ft. to mearest similar typ
		1	Isolated			2	201-1000 ft to mearest storier type
120	4	0	Large > 4.6 acres			(1)	>1000 ft. to mearest
		1	Reduce 1.1-4.5 ocres			Hange 1-66	_ Similar type
		1	Smil ≤ 1.0 acres			Rean 37	(=0) 11' A
and Aires	2	0	Tes				(39) High
Lagal Actoss	•	0					0
Dutout from	3	,	High 116-158	•			
Biological Function	•	(1)	Anderste 73-115				
		1	Lan 29-72			140	
	-		-				
	Rec	me 11-74	(1)				

Figure 18. Educational Function Rade

[] ements	Eleme Mengi		
Subclass Richness (Lateral Diversity)	3	4	6-9
		1	4-5
		2	2-3
		1	1
Access to Public	4	O	Within 100' of reed
		2	Access by pessable waterwe
		1:	Isolated
		lange 7-24 lann 15	a High

Key		WETLAND INVENTORY DATA	
L Low			
M Moderate			
H High			11/2/1
U Untavorable			Project No. UC2061
A Absent			Westland No. Shepleus Hill We
P Perennial			
E Ephemeral _			forested 7 scrub- sh
e chuemater E	COLOCICAL ELEMENTS		TOPOGRAPHICAL ELEMENTS
Wetland Subclasses		Dominant Wetland Class	Topographic Configuration
Siream or brook	side Wetland	AStream or Brookside Wetland	Closed Basin
Open Fresh Wate	r -	C Open Fresh Water	Semi-closed Basin
C Non-vegetate		Deep Fresh Mersh	₩ Valley
Deep Fresh Mars		Shallow Fresh Marsh	E Hillside
C Dead Woody	☐ Shrub	D Yearly Floodplain	Size
D Scrub-Shrub	D Robust	☐ Wet Meadow	□ Large 24.6 acres
D Narrow-leave		TShrub Swamp	Z Medium 1.1-4.5
Shallow Fresh Me		B.Wooded Swamp	Small Stacre
D Robust	□ Narrow-leaved	D Bog	Wetland Gradient
D Broad-leaved			ESlight 6-31 D Steep >31
	☐ Floating-leaved	□ Fen	
Floodplain/Flats		Other	Surrounding Slopes
Emergent	0000	Wetland Class Richness	Slight 0-31 DSteep >31
Shrubs and T	Less.	DS C 4 D 3 2 2 D 1	Topographic Position in Watershed
Wet Meadow		Subclass Richness (Lateral Diversity)	Bupper   Intermediate   Lowe
□ Ungrated	□ Grazed	D10 0 9-6 0 5-4 0 3-2 0 1	
Shrub Swamp		Vegetative Interspersion	GEOLOGICAL ELEMENTS
C Sapling	Bushy	DH DW DL	
D Compact	1 Aquatic	Surrounding Habitat	Surficial Geologic Material
Wooded Swamp		10901 of 2 or more listed types	Underlying Wetland
Deciouous	☐ Evergreen	1 50-90% of 1 or more; 90% of 1	STIII SAlluvium
Bog		Do 504 of 1 or more of listed types	C Stratified Sand and Gravel
□ Shrub	C Wooded	Cover Type	X Stratified Fine Sand and Silt
C Cranberry	☐ Moss	\$26-75% scattered	Bearock Underlying Welland
Fen		D6-75% peripheral	Signeous and Metamorphic
C Emergent	C Shrub	D751 or <251 scattered	Sedimentary
			Soil Type/Permeability
SPECIAL E	LEMENTS	Percent Open Water	D Peat/H Mineral/M D Muck/L
		\$0-331 0 30-661 0 67-951 0 96-1001	Deminant Surficial Contoniest
C Rare and/or End	angered Species		Wateries of merdianen
C Aquatic Study A		Vegetative Species Richness	Till DAlluvium
C Sanctuary or Re		Proportion of Wildlife Food Plants	E Stratified Sand and Gravel
C Wildlife Managem			C Stratified Fine Sand and Silt
D Fisheries Manage	ment Area	LH DOW OL	Thickness of Organics
D Educational Stud	v Area	Vegetative Density	C <1 foot C 1-5 feet D>5 feet
D Historical Aces		XXH DM DL	
Domer Species	of Concern	Wetland Juxtaposition Favorability	
7		byt Dw Dn	
		1	10

### HYDROLOGICAL ELEMENTS

NYDROLDGICAL ELEMENT
Hydrologic Position of Wetland
Water Table Wetland
☐ Water/Artesian Wetland
Artesian Wetland
Groundwater Relationship
Discharge Wesland
☐ Recharge Wetland
□ Combination
Transmissivity of Aquifer
D Low <10,000 gal/day/ft
Moderate 10,000 - 40,000 gal/day/ft
High >40,000 gal/day/ft
Dominant Hydrologic Condition
Connection by Surface Water to a
Riparian System
MYes DNo
Watershed Land Use
□ Rural
E Rural / Residential
B Urban
Z-Industrial
O Other
Water Level Fluctuation
DH BL EVernal Pool
Groundwater Outflow From Westand
Absent Present

Inlet	
TO A DP DE	
Present, to wetland	
Inlet	_
DA DP DE	
D Present, to wetland	
Inlet	
DA OP DE	
Present, to wetland	
Inlet	
CA DP DE	
Present, to wetland	_
Inlet	-
DA OP DE	
Present, to wetland	_
Outlet	
DA MP DE	
U Present, to wetland	_
Outlet	
DA OP DE	
Percent Wetlands Bordering Open	_
Water vs. Upland	
B <331 0 34-661 0 67-1001	
Does not border	
Fetch	
₫ >2000 ft. □ <2000 ft.	
Depth of Lake	
C Deep >6 ft. Shallow <6 ft.	

#### SOCIO-ECONOMICAL ELEMENTS

Hydrologically Connected to a

Small stream

River

Lake

Combination

Not connected

Public Access to Wetland

Within 100 ft. of road

Access by passable waterway

Isolated

Surrounding Population Density

Isolated

Supports (320/mi²)

Local Scarcity to Nearest Similar Type

Isolated

Isolated

Isolated

Supports Viable or Potential

None

Supports Viable commercial Inter

Type

Legal Accessibility to Wetland

Public Private

Restricted

Company Accessibility to Wetland

Public Private

Archeological/Historic None

[1-mants	Element	Consilies Veight		(lemnts	Pengat	Condition	(and it ions
Unique fisheries ⁴	MAD.	(4)	Present	Serioce Water	1	0	Connected to a small atraum
		M	Bot Present				Commetted to a Pivor
Presence of	BA		Procent				Connected to a late
(neinqures or Threatened Specials		M	Bot Present				Connected to a combination
Commant Vetland		1	Stream or Brootside welland				Bot connected
Class			Open fresh water	Percent Wetland		0	dir.
		4	Spen frush parsh(aquatic bed)	Boroering on	•		24-462
		1	Shallow frank marsh	down water		1	67-100%
			Tearly Flooded Floodelain				
		2	Not more	20.5			Does out berder
			Sured sweep	Size			Large 2 4.6 acres
		(2)	Manded Sweet (decidences)			$\mathbf{O}$	Redius 1.1-4.5 acres
		•	Monded swam (consferous)			Manage 25-158	Small g 1.0 acres
		,	Dog		4	Mean 93	(99) Mod.
			H	Among applicable			
Classes (Richness)	4		7				
		6	0.5				
		(3)	1				
		1	1				
Super of Wetland Superasses (Richness)	3	1	>10				
		•	6-1	Figur	. 10. Nys	irelegic Suppor	t Function Radel
		3	4-5	Dants	Fiement	Lensition	Conditions
		•	2-3	Stee	4	3	Large 2 6.6 acres
		1	1	****	-	(2)	Recerate 1,1-4,5 acres
Voquiative	4	3	High			·	Smill g 1.6 acres
laterspersion		•	Rederate .			1	
		1	l=-	Topographic Configuration	1		Samt-closed basin
Servemeing Habitat	3	•	1985 of two or more of			0	Valley
			listed types			1	MtTlatde
		2	50-975 of one or more				Closes Santo
		1	citi of one or nors listed	Type	3	1	Condition I
Water/Cover Ratio	3	0	25-795 stattered			2	Condition 2
(Caver Types)		1	35-750 pertpieral			,	Condition 3
		3	THE OF COL MARKETON			6	Condition 4
		1	1805 cover:>755 or 255			1	Condition 5
			paripheral			•	Condition 6
Species (Vegetative	2	1	Lee	Water Level Fluctuation	2	<b>②</b>	Le-
Species Bichness)		\$	Redium	, , , , , , , , , , , , , , , , , , , ,		1	High
Properties of	1		Low	Cutlet		(1)	Perennial Dutlet
Wildlife Food Plants	•		Interate			1	Ephanoral Outlet
		0	ligh			1	Groundwater Outflow
alon to the best of	100	0	- 12.5				Absent
Vegetative Density	2	0	High				
		1	Reserve				
				talet	1	2	Personal
Metland Justemosition		1	Eighly favorable			1	(photors)
		2	Smirrataly favorable			•	Absent
		•	Infavores la	Percent Wetland		3	dn
Mydrelogical Position (Groundwater	. 2	1	Perched welland	Bornering on Spon Mater			34-661
Connection		0	Mater table setland			,	67-100%
		,	Motor table/ortestes wotland				Goes not horser
		1	british without			Eange 5-700 Reas 35	(0)
Water Level	1	(2)	Lon	A Applies only to th			(51) High
fiertuation		7	Versal pant	b lotal value for on	e iniet &	no one outlet o	miy.
			B1ga				
1							

Figure 11. Leasureter function Andel

[lements	Meight	Veight	Conditions
Serficial Goology	3	1	7111
		4	Stratified same and gravel
	(	5)	Stratified fine sand and sill
		•	Allerius
Gryanic Material	2	Ī	Absent
		1	High permeability
		1	Low permeability
Hydrologic Position	\$	1	Perceed watland
		(c)	Mater table wetland
		1	Noter table/artesian metland
		1	Artesian wetland
Trensmissivity	4	1	La <10.000 gal/day/ft
of Agesfer		(2)	Ned. 10,000-40,005 gal/64y/f
		1	#199 >40.000 gal/day/ft
Inlet	1	(1)	Absent
		1	Personal
		2	Ephamral
Outlet			Absent
			Permental
		1	Epococra)
Size	1	1	Large & 4.6 acres
			Redium 1.1-4.5 acres
	Kane	10-41	54) Mod .

Total value for one inlet and one outlet ent?. Some wetlands may have more than one inlet or buildt but the rampe above is for wetlands with only one inlet and one outlet.

Figure 12. Storm and Flood Mater Storage Function Ruse)

[lewett	Element Meight	Longit II	Comettions
Commant Wetland	1	1	Stream or brookside wetland
Class		1	Open fresh water
		2	Does from marsh (aquatic bed
		•	Shallow fresh marsh
		4	Tearly Flooded Floodylain
		3	Net mades
		5	Dens puss
		0	Nonced Strang
		3	log
Percent Open Water	2	0	6-375
		2	34-465
		1	47-935
			94-1005
Separative Density		(1)	Kigs ,
		2	Reserve
		1	Low
coographic	2	4	Closed Basto
Conriguration		3	Sens-closed basss
		(1)	Valley
		ĭ	Millande
opportunic Position	,	0	Opper
m watershed		2	latermetate
			law.

Figure 12 (continued)

flownts	Vergnt	Vergnt	Committees
Serficial Reterial	2		Till
of Valoranos		1_	Stratified sand and gravel
		1	Stratified fine sand and sile
		2	Allerian
Surficial Secionic Reteriol of Metians	2	1	T111
Banks		4	Stratified sand and gravel
		(1)	Stratified find same and sill
		3	Allerius
Organic Asternal	1	2	High permeasility
		1	Law personality
		(i)	Absent
Dominant Hydrologic Type		1	Condition
.,,,,,		2	Consission 2
		3	Condition 3
		•	Condition 4
		(3)	Candition 5
		•	Condition 6
Hydra lease Connection	4	1	Not part of reporter system
		(1)	Part of riperion system
Vator tovel Fluctuation	3	ī	El gà
		(7)	
lalet	1	1	Personal
		1	Cohomeral
		(1)	Absent
Dutlet	1		Perrenatal
		1	[phomral
		•	Absent
Stae	4	3	Large 2 4.6 acres
		0	Redtum 1.1-4.5 acres
		90 11-121	Small & 1.8 acres
	Per	a 17	(91) Mod.

ATotal value for one inlet and one outlet only. Some verlance may have more than one inlet or outlet but the range shows is for verlance with only one inlet and one outlet.

Figure 13. Shereline Protection function Acces

[] esent	[lement Mergnt	Landition Weignt	Condition
Welland Borders	BAD	(1)	Tes
Late or Street		<u> </u>	
Togetative Density	3		Open fresh water
		0	Streem and processide
		1	Deep fresh march (aquatic bed)
		2	Stalles fresh marsh
			Yearly floosplan
		1	Mrt meson
		4	Shrue suome
		(1)	Head Simile
		ĭ	Bog
Surficial Material Underlying metland	1	2	7111
controlling actions		1	Stratified sand and gravel
		(0)	Stratified find sand and silt
		3	Allerium
Fetch (Lakes only)	4	2	Over 2000 ft.
		(1)	Under 2000 ft.
Depth of Lake	1	1	Does 6 ft.
		(1)	Stalles & ft.
		nge 3-12 in 17	(22)

propertive

Figure 14. Mater Quality Maintenance Function Radel

[]eest1	Lignant	Condition	Consissions
Downnent Wetland	4	1	Streen or bronside wetland
Class			Com fresh water
		3	Does fresh mursh (squatte be
		4	Sallow fresh marsh
		4	feerly fleesplans
		3	Net mades
			Shrab Snamp
		0	Monded Swamp
			Bog
Percent open water	1	(3)	0-138
		1	34-461
		1	67-95%
		•	96-100%
Regulative Density	3	(2)	High
		2	Poderate
		1	Les .
logographic	1	4	Closed Bassa
Configuration		1	Sam-closed basin
		(3)	Velley
		ĭ	Hillside
lepagraph 1c	2	(1)	teer
Position in Materined		ĭ	Incorrect to to
		3	LONGT
Organic Material	1	1	migh personability
		2	Les sermosaility
		0	Absent
2		0	

flours 14 (continued)

Elements	tip 1 g n t		Conditions
Beninant Hydrologic		r	Condition 1
Type		2	Condition 2
		3	Condition 3
		4	Condition 4
		(3)	Condition 5
		•	Condition 6
Rydrologic	1	1	hat part of the reparter system
Connection		<b>①</b>	Part of riparion system
laiet	2	1	Permittal
		1	[passeral
		0	Assent
Outlet	1	<b>©</b>	Perennial
		1	Conserel
		0	Absent
Stae	4	3	Large ≥ 4.6 acres
		(1)	Recerate 1.1-4.5 acres
		1_	Small & 1.0 acres
		Ronge 18-98 ⁶ Rean 58	(66) Mod.

[&]quot;Tatal value for one inlet and one build only.

Some wellands may have more than one inlet or outlet but the range above is only
for mailands with one inlet and one outlet.

Figure 15. Cultural and Economic Function Madel

Claments	Liement	Condition Meight	Conditions
Impress metland	4	0	Stress of broncises
Class		0	Soon fresh mater
		4	Does fresh march
		4	Shellow fresh morsh
		0	Tearly Flooded Floodelain
		2	Net measur
		3	Shrute states
		(1)	Hoosed Swams (deciduous)
			Moded swarp (conferent)
			log
Access	1	1	Within 100' of read
		0	Access by possible waterway
		1	Isolated
5120		1	Large ≥ 4.6 acres
		(1)	Redium 1.1-4.5 acres
		1	Small ≤ 1.0 acres
	Resi	M (9:	2) mod.

Best applicable

Figure 16. Ascreational Function Rade

Finute 17. Acstholic function Rade

							Function Model
Elements	Reidur	Condition	Conditions	[] oments	Element	Cenetties Vetent	Conditions
perment setland	3		Streen or brookside	Ommant Votland			Stream or processed worland
lass		0	Open fresh water	Class		•	Open fresh water
		6	Boes fresh marsh			5	Goop fresh marsh
		4	Shellow fresh mersh			4	Shallow fresh marsh
			Tearly Flooded Floodslain				Tearly floored floodplain
		0	Wet meadow			•	Vet season
		2	Shrub swallo			2	Shree suame
		(D)	Monday swamp (deciduous)			(3)	Vocated swamp (deciduous)
		3	Monded Swamp (consferant)			1	Mossed swarp (consferous)
		1	log			5	log
Percent Open	3	(1)	0-111	Democr of	4	•	6-1
le ter		1	34-441	(Richness)		(I)	2-3
		3	67-951			1	1
120		. 0	96-1001	Percent Open Water	•	<b>©</b>	0-131
Surface water		(i)	Connected to a small stream			3	34-663
Association		1	Connected to a river			4	67-952
		1	Connected to a lone				96-100L
		4	Connected to a commination	Access to Public	3	1	Within 100 ft. of room
			Ant connected			<b>②</b>	Access by passable waterway
Access to Public	2	4	Within 100" of road			1	Isolated
		(1)	Access by passable metermay	Local Scarcity	3	1	<200 ft. to mearest similar typ
		·	Isolated			(1)	201-1000 ft to aparest station type
Stre		3	Large ≥ 4.6 acres			1	>1000 ft. to mearest
		(1)	Measur 1.1-4.5 acres			Mange 9-66	
		1	Smill ≤ 1.0 acres			Reen 37	(34) Mot.
Lens Access	2	2	Tes .				
		0					
Output from	3	3	High 116-158				
Biological Function		(2)	Rederate 73-115				
			Law 29-72				

Figure 18. Educational Function Rade

Claments	Element Mergat	Condition Beignt	Constitions	
Seciess Richness (Lateral Diversity)	1	4	6-9	
3,34,34,50,300,331		1	4-5	
		<b>①</b>	2-3	
		1	1	
Access to Public		1	MICHIA 100' (	of read
		0	Access by par	table waterway
		ī	Isolated	
	Range		(14)	Mod.

L Low			
M Moderate			
H High			Project No. UC 2061
U Untaverable			
A Absent			Westend No. Cold Spring Brook
P Perennial			
E Ephemeral	COLOGICAL ELEMENTS		TOPOGRAPHICAL ELEMENTS
Wetland Subclasses		Dominant Wetland Class	Topographic Configuration
Stream or brook	side Wetland	Stream or Brookside Wetland	Closed Basin
Open Fresh Wate		1 Open Fresh Water	Semi-closed Basin
Non-vegetate		Deep Fresh Marsh	2 Valley
Beep Fresh Mars	ih .	Shallow Fresh Marsh	C Hillside
C Dead Woody	O Shrub	☐ Yearly Floodplain	Size
Scrub-Shrub		☐ Wet Mendow	ELarge 28.6 acres
□ Narrow-leave	d Broad-leaved	C Shrub Swamp	☐ Medium 1.1-4.5
Shallow Fresh Ma		☐ Wooded Swamp	□ Small 51 acra
□ Robust	□ Narrow-leaved	□ Bog	Wetland Gradient
D Broad-leaved		□ Fen	10 Slight 0-31 D Steep >31
Floodplain /Fints		D Other	Surrounding Slopes
E Emergent			Slight 0-38 DSteep >38
C Shrubs and T	rees	Wetland Class Richness	Topographic Position in Watershed
Wet Meadow		Ds K 1 D3 D2 D1	DUpper   Intermediate   Lowe
□ Ungrazed	□ Grazed	Subclass Richness (Lateral Diversity)	A
Shrub Swamp	Daires	D10 0 9-6 70 5-4 0 3-2 0 1	GEOLOGICAL ELEMENTS
C Sapling	Bushy	Vegetative Interspersion	GEOGRAFIEM 12
Compact	DAquatic	OH DAM OL	Surficial Geologic Material
Wooded Swamp	D Adostic	Surrounding Habitat	Underlying Wetland
Deciguous	C Susanna	1990% of 2 or more listed types	B Till BAlluvium
	□ Evergreen	1 50-90% of 1 or more; 90% of 1	E Stratified Sand and Gravel
Bog Shrub	D.Warrand	D<50% of 1 or more of listed types	Stratified Sand and Cravel
	C Wooded	Cover Type	: - : - : - : - : - : - : - : - : -
C Cranberry	□ Moss	D26-75% scattered	Bedrock Underlying Wetland
Fen		225-751 peripheral	& Igneous and Metamorphic
□ Emergent	C Shrub	D751 or <251 scattered	Sedimentary
		DOOL cover; >75% or <25% peripheral	Soil Type/Permeability
SPECIAL E	LEMENTS	Percent Open Water	Peat/H Mineral/M Muck/L
<b>5</b>		DD-331 12 34-661 D 67-951 D 96-1001	Dominant Surficial Geological Material of Watershed
C Rare and/or End		Vegetative Species Richness	Watelite of Matelines
C Aquatic Study A		BOH DM DL	Till BAlluvium
C Sanctuary or Re		Proportion of Wildlife Food Plants	E Stratified Sand and Gravel
C Wildlife Managem		DH KOM DL	D Stratified Fine Sand and Silt
D Fisheries Manage		Vegetative Density	Thickness of Organics
☐ Educational Stud	y Area	KOH DM DL	A <1 foot A 1-5 feet D>5 feet
Historical Area		Wetland Juxtaposition Favorability	
Other		CH BM CU	

#### HYDROLOGICAL ELEMENTS

Hydrologic Position of Wetland Perched Wetland
Water Table Wetland
Water/Artesian Wetland Artesian Wetland Groundwater Relationship C Discharge Wetland
C Recharge Wetland
Compination
Transmissivity of Aquifer □ Low <10,000 gal/day/ft

E Moderate 10,000 - 40,000 gal/day/ft
□ High >40,000 gal/day/ft Dominant Hydrologic Condition

C 1 C 2 C 3 C 4 D 5 C 6

Connection by Surface Water to a Riparian System Silves DNo Watershed Land Use ☐ Rural Rural / Residential

Rurban

Industrial

Other

Water Level Fluctuation

Croundwater Outflow From Wetland

Absent Present Absent | Present recycled paper

Key

Injet DA DP DE DPresent, to wetland	
Inlet  DA DP DE  DPresent, to wetland	
Iniet  DA DP DE  DPresent, to wetland	
Inlet CA OP DE	_
D Present, to wetland Inlet DA DP DE	_
Outlet	_
Outlet	-
Percent, to wetland Percent Wetlands Bordering Open	_
Water vs. Upland    <33%   34-66%   0.67-100%     Does not border	
Fetch (R) >2000 ft. C <2000 ft. Depth of Lake	

### SOCIO-ECONOMICAL ELEMENTS

Comp!

Hydrologically Connected to a Small stream D Lake ☐ Combination Not connected Public Access to Wetland

Mithin 100 ft. of road

Access by passable waterway C Isolated Surrounding Population Density | <| person/acre (<320/mi²) | 0.5 - 1.9 p/s (320-1220/mi²) | >2 p/s (>1220/mi²) Local Scarcity to Nearest Similar Type O <200 feet C 201 to 1000 feet Known Crop Value or Potential None
D Supports 1 family for part of year Type Supports viable commercial Interest Type Legal Accessibility to Wetland Public Private PRestricted

ecology and environment

C Deep >6 ft. Shallow <6 ft.

Figure 1. Biological Function Rods

(pert 1 mm)

					11-12-1	4)
Veight	Vergat		[lements	Element	Condition Seignt	Conditions
BAD	NA.	Present	Serface Water	1	0	Connected to a small atreas
		Not Present			-	Connected to a river
MA.	BA	Present			1	Connected to a lake
	(III)	Not Present				Connected to a combination
\$	1	Stress or Brookside wetland				Not connected
		Open fresh water	Percent Watland		4	an '
	4	Boom fresh meren(aquatic bod)	Bergering sa			24-645
		Shallow fresh marsh			The state of the s	67-100%
		Yearly Clossed Closeplain				Does not border
	2	the maser	444	10	(3)	Large 2 4.6 acres
	(1)	Design manage	-164	•	·	Redius 1.1-4.5 acres
	Y	Special proces (decidents)				
		Manded Swam (Consferenz)			Margo 29-158	Small & 1.0 acres
			Acres de Colonia		REAR 53	
140			Bast applicable		(	126) High
100		Č.				<u> </u>
	0					
		3				
	1					
3		>10				
	•	4-1	Figure	18. Hy	trologic Suppor	t Function Model
	0	4-5	D			Parallel San
	2	1-1				Conditions
	1	1	2150		0	Large 2 4.6 acres
4	3	Righ				Roderste 1.1-4.5 acres
	(1)	Reservable				Small < 1.0 acres
	ĭ		Topographic Configuration	1		Sant-closed basin
3	(1)	year of two or more of	4.434.24		0	Valley
					1	H111side
	2				•	Cleses days
	1		Deminant Hydrologic		1	Condition [
•	1				2	Condition 2
	(1)				3	Condition 3
					•	Condition 4
					(5)	Consition 5
		baribasa			·	Candition 6
2	1	Lee	Mater Level		(1)	Low
	1_	Redius	Fluctuation		1	High
	0	High	Ostlet		(2)	Personnal Outlet
1	1_	Lee	-611116		· ·	Eshaperal Outlet
		Redevate				Grandster Outflee
		Migh				Absect
2	(3)	Biçà				A
	ĭ	Reservice				
	1					
	3	Bighly favorable	Inlet	1		Permaial
	10	Specrately fererable			-	(photore)
	0	Enfance and the second			(•)	Absent
. 2		Perces setland	Percent Wetland	4	Y	com .
	100	Nater table wetland	Spon Mater		2	34-668
	/ 4				-	44.00
	Ö				1	67-100%
	0	Natur table/artestan wetland			•	87-100% Does not border
	1	Nator table/artesian welland Artesian welland	ā.		_	Does not border
1		Natur table/artestan wetland	A Applies only to the	ose wetla	Eamps 6-750 Read 36	Does and borner  High
	Timens veight  RAP  A  1  2		A BA Present  BA BA Present  B Stream or Brookside wetland  B Good fresh water  4 Bood fresh mater  5 Shellow fresh maran  1 Tearly floomed floodplain  2 tot smane  3 Boy  4 S 36  4 G-9  3 A-5  2 2-3  1 1  4 B-9  3 A-5  2 2-3  1 1  4 B-9  3 B-90x of two or serve of listed types  2 BB-90x of two or serve of listed types  2 BB-90x of two or serve of listed types  2 BB-90x of two or serve of listed types  2 BB-90x of two or serve of listed types  2 BB-90x of two or serve of listed types  2 BB-90x of two or serve of listed types  3 FB or GESS Scattered  4 BB-708 Adattered  3 BB-708 Adattered  3 BB-708 Adattered  4 BB-708 Adattered  5 BB-708 Adattered  1 Loor  2 BB-60x or serve 25% perspectal  1 Loor  3 Bigh Favorable  5 Badersta  1 Loor  4 Badersta  1 Loor  4 Badersta  1 Loor  4 Badersta  2 Bighly favorable  5 Baderstally favorable  6 Baderstally favorable  8 Baderstally favorable  8 Baderstally favorable	Liments  All Present  All Bar	Constitute Select Selec	Committee   Comm

Flours II. Browningter function Rade

{lements	Velght		Conditions
Serficial Goology	1	1	TITLE
		4	Stretified same and gravel
		0	Stratified fine sand and sill
. ,		1	Allerius
Organic Natorial	2		Absent
		0	High permeability
		1	Low personality
Hydrologic Position	1	2	Perched wetland
		(1)	Nater table wetland
		i	Noter table/artestan wetland
		1	Artesian wetland
Transmissivity of Aguster	4	1	Les «10,000 qui/day/ft
or Additor		<b>②</b>	Nes. 10,000-40,000 qs1/6ay/ft
		1	High >40.000 gal/day/ft
Inlet	1	(1)	Moseet
8.0		ĭ	Personnal
		2	[phomral
Dutlet	2	1_	Absent
		<b>②</b>	Personnal
		1	(gamera)
Stae	3	(C)	Large < 4.6 acres
		1	Region 1.1-4.5 acres
		1 20-64	Small > 1.0 acres

Figure 12. Store and Flood Mater Storage Function Rose!

[lements	Berant	Vergnt	Committees
Dummant Wetland	2	1	Stream or processe vectame
Ciess		1_	Com fresh water
		(2)	Doop from maren (aquatic bes)
		-	Shallow fresh marsh
		4	Yearly flooded floodelate
		3	Net season
			Shree shake
		4	Proceed SHARP
		3	log
Percent Open Water	2	3	6-III
		(1)	34-663
		1	67-03%
		•	94-100S
Voqetative Density	•	(1)	High
		1	Reserve
		1	-
Topographic Lost iguration	2	4	Closed Basin
- Idanarian		1	Sens-closed basin
		(2)	Valley _
		1	Hillanda
Topographic Position	3	0	Upper
in vatersned		2	laterme late
		1	Lour

Figure 12 (continued)

[lecents	Vergnt		en Canditions
Spriicial Retorial	2		Till
of Watershoo		1	Stratified sand and gravel
		(1)	Stratified fine sand and sill
		1	Allerius
Surficial Geologic	1	1	7011
Anternal of Vetland		4	Stratified sand and gravel
		(1)	Stratified find same and silt
		3	Alleries
Organic Asternal	1	(1)	High personality
		1	Low permeability
			Absent
Deminant Hydrologic		1	Condition 1
Type		2	Concition 2
		1	Consition 3
			Condition 4
		(1)	Constition 5
		•	Condition 6
Hydra leave	4	1	Not part of reporter system
Connection		(1)	Part of Piparian system
later Level	3	1	#Ipa
/luctuation		0	Lev
alet	1	1	Perunnal
		1	(phoneral
		(0)	Absent
etlet	1		Pervental
		·	Ephomoral
			Absont
itze	4	(1)	Large 2 4.6 scree
		ĭ	Andium 1.1-4.5 acres
		ange 11-121	Small & 1.0 acres

Office value for one tolet and one outlet only. Somewillands may have more than see inict or outlet but the range above is for wallands with only one inict and one outlet.

figure 13. Shoreline Protection function Appel

[lesent	Element Merget	Land Ition Weight	Condition
Matiend Gorsers ⁶	M)		les
Pogetative Density	1	•	Open fresh meter
			Stream and proceside
		0	Does fresh marsh (aquatic bed
		2	Stallow fresh march
		4	Vestly floodslan
		1	Net meson
		4	Shrue sueste
		4	Nood Seams
		3	Bog
Serficial Material Underlying metland	1	2	TILL
enerry ying serians		1	Stratified sand and gravel
		(i)	Stratified find sand and silt
		3	Alluvium
Fetch (Lakes only)		1	Over 2000 ft.
		1	Under 2000 ft.
Depth of Laxe	1	2	Deep 6 ft.
	-	(A)	Shellow & ft.
		nge 3-32 an 17	(16)

Peat applicable

Figure 14. Mater Quality Reintenance function Rade

[lewists	Lignant	Landition Weight	Concitions
Dominant Metland	4	1	Streem or proposide methand
Class		0	Open frosh mater
		(1)	Bres fresh mirsh (aquatic be
		•	Stalles fresh marsh
		4	Touriy Timedalain
		3	Not ender
		4	Shrub Sooria
		2	Manded proper
		2	Bog
Percent som weer	1	3	0-171
		(1)	34-641
		1	67-951
			94-1075
Vegetative Density	3	0	High
		1	Poderate
		1	Les-
Topographic	3		Closed Bessn
Configuration		3	Sen-closed basin
		1	Talley
		1	Millerde
Tepographic	2	0	teer
Pasition in Materines		2	Jacormodiate
		3	LIMIT
Organic Material	1	0	High porerability
		2	Law correctifity
			Absent

Figure 14 (continued)

Clements	Floren		Conditions
Boninant Hydrologic		1	Condition 1
Type		2	Condition 2
		3	Condition 3
		4	Condition 4
		(E)	Condition 6
		•	Condition 6
Hydrologic Connection	2	1	Het mort of the rimerian system
Permet Flow		0	Port of rigarian system
Inlet	2	1	Personnal
		1	[pamera]
		(O)	Assent
Outlet	1	<b>©</b>	Perennial
		1	Egnamoral
		0	Absent
Size	4	(3)	Large ≥ 4.6 acres
		2	Passerate 1.1-4.5 acres
			Small ≤ 1.0 acres
		Mange 18-98 * Mean 58	(74) High

distal value for one inlet and one outlet only. Same wetlands may have more than one inlet or outlet but the range above is only for matlands with one inlet and one outlet.

Figure 15. Cultural and Commits Function Redail

Commits	Figurest	Canastian Beignt	Conditions
Duminant Metland	4		Stream of brookside
Class			Open fresh mater
			Dogo fresh morsh
		•	Shallow fresh marsh
		•	Yearly Flooded Floodelain
		2	Net meson
		3	Sind them
		\$	Hospit Seem (605104041)
			bassed succes (CENTERPUS)
		1	log
Access	1	(3)	Within 100' of road
		1	Access by possible miserap
		1	Isolated
\$120		(1)	Large ≥ 4.6 acres
		2	Redium 1.1-4.5 acres
	-	1	Small ≤ 1.0 acres
141	Report Report	L 11-57	19) High

Figure 16. Approactional Function Ande

Figure 17. Ansthatte function Bodel

.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					Figute 17.	Anthetic	Function Andel
[]emats	Beignt	Condition Wright	Conditions	[]esents	Element Morgnt	Cangition Veignt	Conditions
Dominant Metland	1	0	Streen or brookside	Surment Wetland		0	Stream or processed wetland
CIALL		0	Open fresh mater	Class		•	Open fresh water
		(6)	Bose fresh marsh			0	Goop fresh marsh
		5	Shellow fresh merch			·	Shallow fresh marsh
		0	Tearly fleesed fleeselain				Yearly floated floatsiass
		0	Net meadow				Net season
		2	Since succes			2	Shrub susse
		2	Massed Swann (deciduous)			3	Monded swamp (deciduous)
		1	Montes swamp (consferaus)			3	Mooned swamp (CONTERPRES)
		2	log			5	Bog
Percent Open	3	1	0-131	Super of Subclasses	3	:3	4.5
la ter		<b>①</b>	24-441	(Richmess)		, 6	1-1
		3	67-952			T.	1
		. 0	96-1005	Percent Open Water	4	i	0-111
Surface Water		(1)	Connected to a small stream			①	34-662
Association		1	Connected to a river			4	67-955
		3	Cornected to a lave			•	96-100%
		4	Connected to a commission	Access to Public	1	$\odot$	Within 106 ft. of road
		0	Not connected			2	Access by passable waterway
Access to Public	2	(3)	Mithin 100" of rood			1	Isolated
		1	Access by passable micerney	Local Scarcity	3	1	<200 ft. to mearest similar type
		1	Iselated			1	201-1000 ft to mearest similar type
Stee	4	$\odot$	Large > 4.6 acres			(D)	>1000 ft. to mearest
		1	Reduce 1.1-4.5 acres			Lange 1-66	_ Similar type
		1	Small ≤ 1.0 acres			Ross 37	(59) High
Logo i Access	2	1	Yes				0.3.
		0					
Output From	3	(1)	Migs 116-158	•			
Braingreal Function		2	Reserve 73-115				
		1	Lan 29-72				
	Bann	e 11-76					
		4 6	T) Hick				
	-	(-	J. Make				

Figure 18. Educational Function Rade

El counts	Elem		Conditions
Subclass Richness (Lateral Diversity)	1	4	6-9
		(1)	4-5
		1	1-3
		1_	1
Access to Public	4	(1)	Within 100' of read
		ĭ	Access by passable meterony
		1	Isoloted
		inge 7-24 man 15 (	(21) High

	Key		WETLAND INVENTORY DATA	
L	Low			
	Moderate			LA CONTRACTOR
H				Project No. UC 2061
U	Untaverable			
2	Absent			Westend No. Cold Spring Brook
	Perennial			East of Marine
	Ephemeral	ECOLOGICAL ELEMENTS		TOPOGRAPHICAL ELEMENTS
W	gland Subclasse		Dominant Wetland Class	Topographic Configuration
7	Stream or broc	side Wetland	Stream or Brookside Wetland	Closed Basin
•	Open Fresh Wa		D Open Fresh Water	☐ Sami-closed Basin
	C Non-vegeta		Deep Fresh Marsh	Z Valley
	Deep Fresh Ma	rsh	Shallow Fresh Marsh	D Hillside
	C Dead Woody	□ Shrub	☐ Yearly Floodplain	Size
	Scrub-Shru	b Robust	☐ Wet Meadow	D Large 24.6 acres
	C Narrow-less	red C Broad-leaved	C Shrub Swamp	Medium 1.1-4.5
	Shallow Fresh	Marsh	□ Wooded Swamp	Small 1 acre
	C) Robust	☐ Narrow-leaved	D Bog	Wetland Gradient
	G Broad-leave	d D Floating-leaved	□ Fen	E Slight 0-31 Steep >11
	Floodplain/Flat		D Other	Surrounding Slopes
	C Emergent			O Slight 0-31 CKSteep >31
	Shrubs and	Trees	Wetland Class Richness	Slight 0-38 DiSteep >38 Topographic Position in Watershed
	Wet Meadow		Ds C = D 3 C 2 X 1	DUpper   Intermediate C Lowe
	□ Ungrazed	□ Grazed	Subclass Richness (Lateral Diversity)	
	Shrub Swamp	3.77	D10 05-6 05-4 \$3-2 01	GEOLOGICAL ELEMENTS
	☐ Sapling	□ Bushv	Vegetative Interspersion	
	□ Compact	□ Aquatic	JOH DW DL	Surficial Geologic Material
	Wooded Swamp		Surrounding Habitat	Underlying Welland
	☐ Deciguous	□ Evergreen	D90% of 2 or more listed types	Till Balluvion
	Bog		50-90% of 1 or more; 90% of 1 D:50% of 1 or more of listed types	Till MAlluvium  Stratified Sand and Gravel
	C Shrub	C Wooded	LX30% of 1 or more of listed types	Stratified Fine Sand and Silt
	C Cranberry	□ Moss	Cover Type	Bedrock Underlying Wetland
	Fen	2 6000	D6-751 scattered	Signeous and Metamorphic
	C Emergent	C Shrub	Q6-75% peripheral	Sedimentary
			₽75% or <25% scattered	Soil Type/Permeability
	SPECIAL	ELEMENTS	2001 cover; >751 or <251 peripheral	D Pest/H & Mineral /M D Muck/L
			Percent Open Water	Deminus Chafferd Carlanges
	Rare and/or Er	dangered Species	80-331 34-668 G 67-958 G 96-1001	Material of Watershed
	Aquatic Study	Area	Vegetative Species Richness	E Stratified Sand and Gravel
-	Sanctuary or R	lefuge		C Stratified Sand and Gravel
	Wildlife Manage	ment Area	Proportion of Wildlife Food Plants	Stratified Fine Sand and Silt
	Fisheries Mana			Thickness of Organics
	Educational Stu		Vegetative Density  KSH DM DL	C ct foot C 1-5 feet D>5 feet
	Historical Area			The state of the s
	Other		Wetland Juxtaposition Favorability	
	74.1	· ·	CH DAY CO	

### HYDROLOGICAL ELEMENTS

HIDNOLOGICAL ELEMEN	• • •
Hydrologic Position of Wetland	
Perched Wetland	
Water Table Wetland	
Water/Artesian Wetland	
Artesian Wetland	
Groundwater Relationship	
C Discharge Wetland	
C Recharge Wetland	
Combination	
Transmissivity of Aquifer	
D_Low <10,000 gal/day/ft	
Moderate 10,000 - 40,000 gal/day/ft	
High >40,000 gal/day/ft	
Dominant Hydrologic Condition	
C1 C2 03 D6 D3 D6	
Connection by Surface Water to a	
Riparian System	
Yes DNo	
Watershed Land Use	
□ Rural	
Rural/Residential	
K Urban	
S.Industrial	
D Other	
Water Level Fluctuation	9
H TL EVernal Professor	
Groundweter Outflow From Wetland	
Absent   Present	

Iniet	
Present, to wetland	_
Iniet	
D Present, to wetland	
Inlet	
DA DP DE	
Present, to wetland	
Inlet	_
CA OP DE	
Present, to wetland	_
Inlet	_
DA DP DE	
Present, to wetland	
Outlet .	
DA OF DE	
Present, to wetland	
Outlet	
DA PDE	
Present, to wetland	
Percent Wetlands Bordering Open	_
Water vs. Upland	
DX<338 - 34-668 - 67-1008	
Does not border	
Fetch	64
□ >2000 ft. □ <2000 ft.	
Depth of Lake	
C Deep >6 ft. Shallow <6 ft.	

### SOCIO-ECONOMICAL ELEMENTS

Hydrologically Connected to a Small stream River Lake Combination Public Access to Wetland
[A.Within 100 ft. of road
[D. Access by passable waterway
[C. Isolated] Surrounding Population Density □ <{ person/acre (<\$20/mi²) ⊠ 0.5 - 1.9 p/a (320-1220/mi²) □ >2 p/a (>1220/mi²) D >2 p/a (>1220/m¹)
Local Scarcity to Nearest Similar Type
D <200 feet
D 201 to 1000 feet
M >1000 feet
Enown Crop Value or Potential
None
D Supports 1 family for part of year Type

Supports viable commercial Intel Legal Accessibility to Wetland
Color D Private Restricted
ecolor Significance
Archeological/Historic D None

170.770	Liount	Consitie	14	[leant]	Clemnt	Condition	Conditions
posA()	MAD .	MA	Present		Vergat	Se i dut	
ilous fisherius	-		But Present	Serface Water	1	0	Connected to a small street
	RA .	BA .	Present				Connected to a Piper
sence of angeros or	IN.	-3-3-	Not Present			,	Connected to a lake
Tationed Species ^a		(1)				4	Connected to a combination
singet Ketland	•	1	Stream or Brookside wetland			•	But connected
		•	Open fresh water	Percent Welland		0	an ,
		•	Boos fresh marsh(aquatic bod)	Open water		2	24-463
			Shallow fresh march			3	67-100%
		1	Tearly Flooded Floodelain			•	Does not border
		-	Unt smallow	Size		3	Large 2 4.6 acres
		0	Shot stee			(1)	Redius 1.1-4.5 acres
		2	Managed Seems (Sectionses)			Jamps 23-155	Small g 1.0 acres
		4	Booded summe (consferous)			Den 93	
		3	Beg	Descentive factors		(	102) Mod.
mber of Wetland	4	5	. 14	Bonot applicable		(	
asses (Richness)		4	•				
		3	1				
		2	1				
		(1)	1				
mer of Wetland	3	•	>10				
ociasses (Richaess)		4	6-1	Floor	10. Heri	rainase Summer	t Function Madel
		1	4-5		Liouent		
		0	2-3	Comets	Mosent	Weight	Conditions
		1	1	Size	4	1	Large 2 4.6 acres
	5	0				(2)	Reservte 1.1-4.5 acres
ppotative htersperiion			H <b>p</b>			Y	Small c 1.8 acres
		2	Roderate	Topographic	1	3	Sant-clased basts
		1	Lim	Configuration		(2)	Valley
errounding Habitat	3	3	1005 of two or more of listed types			7	Millaide
		1	50-90% of one or more				Closed Gas vo
		•	SSS of sea	Summant Hydrologic		1	Condition I
		1	cittle of mos or more listed	Type	100	1	Consisten 2
ter/Cover Astin	3		S-75 MARCENTAL			(1)	Condition 3
Cover Types)		2	25-750 perspieral		- 4	Ÿ	Condition 4
		1	THE OF COSE scattered			157	
		(1)	1605 cover:>755 or 255			•	Condition 5
	nu.	_	periporal	and the same	25	3	Condition 6
pecies (Yeastative	2	1		Sater Level Flectuation	2	(1)	
DOCIES BICAMOSSI		O	Redium High				Migh
				Ontlet	4	(1)	Personnal Outlet
	1	1	Low		•		
resertion of	1		Los Rederate			1	Ephomeral Dutlet
resertion of	1	0	Aniersta	Addition		1	Ephanoral Dutlet  Groundster Outflow
vegortion of Highlife food Plants		© ;	Amierate High			1	The state of the s
resertion of Hidlife Food Plants	1	① •	Anderste Bigh Bigh			1 1	Eroundester Outflow
resertion of		(i)	Moderate High Reservate				Groundwater Outflee
reportion of Hidlife Food Plants Operative Demanty	ı	(a)	Moderate High High Reservts Low	falet	1		Groundwater Outflee
resertion of Hidlife food Plants equiative Demanty	ı	©	Maderate High High Reservate Law Highly favorable				Eroundwater Outflow Absent
resertion of Hidlife food Plants Equipment of the Parts	ı	(a)	Maderate High High Reserate Law Highly favorable Redorately favorable		i		Eroundester Outflow Absent Personnial
vegortion of Highlife food Plants	ı	©	Maderate High High Reservate Law Highly favorable	falet		<u></u>	Eromouter Outflow Absent Forumnial Ephanoral Absent
reportion of sidilife food Plants operative Donaity operative Donaity operation of the side of the sid	1	© - ① · · -	Maderate High High Reserate Law Highly favorable Redorately favorable	Inlet  Percent Vetlande Baraering on	i		Eromoster Outflow Absent  Personnel Ephomeral Absent c235
reportion of Hidlife Food Plants Oquitative Demanty	1	© •	Mederate Itigh Itigh Reserate Law Itighly favorable Inderately favorable Unfavorable	Inlet Percent Votland ⁴	i		Eroundester Outflow Absent Personnial Ephomeral Absent <235 34-665
reportion of sidilife food Plants equiative Density equiative Density etland Justamosition epiconical Position Grandwater	1	© - ① · · -	Mederate Digh Digh Reserate Law Dighly favorable Rederately favorable Defavorable Percoed wetland	Inlet  Percent Vetlande Baraering on		·	Foremental Ephonoral Absent 425 34-655 67-1805
reportion of sidilife food Plants equiative Density equiative Density etland Justamosition epiconical Position Grandwater	1	© - • • - • • • • • • • • • • • • •	Haderate High High Haderate Law Highly favorable Haderately favorable Unfavorable Percase wetland Hater table wetland	Inlet  Percent Vetlande Baraering on	•	1 1 1 2 3 1 1 1 1 1 1 1 1	Eroundester Outflow Absent Personnial Ephomeral Absent <235 34-665
reportion of Hidilfo Food Plants equiative Density etland Justamestion purples of Pasition provinces of Pasition Groundwater annection)	1	©	Maderate High High Reserate Law Highly favorable Hederately favorable Unfavorable Fercase wetland Hater table wetland Hater table/ortestan wetland	Inlet  Percent Wetland® Bersering on Open Mater	1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Foremental Ephaneral Absent 4235 34-665 67-1605 Does not borner
opertion of lidite food Plants quiative Domesty stland Justamesition odraiogical Position croundwater	1 1	©	Mederate High High Reserate Law Highly favorable Reseratoly favorable Unfavorable Percood wetland Histor table wetland Water table/artesian wetland Artesian wetland	Inlet  Percent Vetlande Baraering on	1	2 1 0 1 2 2 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Foremental  Ephonoral  Absent  4235  34-465  67-1605  Does not beroor

Figure 11. Crammater function Rade

[lecents	Beight	Vergat.	Conditions
Serficial Goology	3	1	TOT
		•	Stratified sand and gravel
	6	(1)	Stratified fine same and sill
		1	Allerium
Organic Reterial	2	(3)	Absent
		1	High permeability
		1	Low personality
Hydrologic Position	1	2	Perched welland
	3		Mater table wetland
		1	Mater Lable/artesian wetland
		1	Arterian worland
Trensmissivity of Aguifer	4	1	Law <10,000 gal/day/ft
er Additer	(		Fme. 10,000-40,000 qal/64y/ft
		1	High >40.000 gal/day/ft
inlet	1	1	Mont
	(	1	Personal
		1	(phomera)
Outlet	2	3	Absent
	- 9	$\odot$	Personnal
		1	(pnesera)
Elza	1	1	Large 4.6 acres
	(	1	Redium 1.1-4.5 acres
	Eanor House	1 20-44*	(56) High

"otal value for one injet and one outlet any. Some metiands bey have more than one injet or nutlet but the range above is fer wetlands with only one injet and one outlet.

Figure 12. Store and Flood Mater Storage Function Recol

[lements	Vovent .	Vergnt	en Conditions
Deminant Metiand	2	1	Stream or brookside wetland
Ciall		1	Open fresh water
		2	Boss from marsh (aquatic bos
			Shallow fresh marsh
			Yearly Flooded Floodelain
		3	Not make
		(3)	Shree tours
		•	Noncot Strang
		3	log
Percent Open Water	2	(3)	6-17E
		2	H-463
		1	67-91%
			96-1005
Vogetative Consity		0	High
		2	Rederate
		1	
Tanagraunic Canieguration	2	4	Closed Basin
		1	Sen-closes basin
		0	Valley .
		T	Millaide
Topographic Position	1	0	Upper
(9)0521(11125)		2	Letermodiate
		1	1

Figure 12 (continued)

[leant:	Vergnt	Lone: L	len Comditions
Surficial Retorial of Vaterans	2		Till
at serestimed		1	Stratified send and gravel
		(1)	Stratified fine sand and sili
		2	Allurius
Surficial Seplogic Material of Mediand	2	1	tin
Banas			Stratified sand and gravel
		(1)	Stratified find same and still
		1	Alluyius
Organic Reterial	1	2	High personality
		1	Low personality
			Abtent
Deminant Hydrologic Type	5	1	Condition 1
		1	Condition 2
		(3)	Condition 3
		•	Condition 4
			Consisting 5
			Condition 6
Hydra loate Cannection		1	Not part of riparian system
		<b>(T)</b>	Part of riparian system
later Level Noctualisa	1	1	High
		$\odot$	Low
alet	1	(4)	Personal
10		1	Ephoneral
		•	Mimi
etlet	1	(1)	Perrenatal
		7	Eshoueral
		•	Absent
itze	4	3	Large 2 4.6 acres
		0	Redium 1.1-4.5 acres
	Hang	31-123	Small c 1.0 acres
	Per sa		(88) Mod.

Stetal value for one inlet and one outlet only. Some outlands may have more than one inlet or outlet but the range above is for wellands with only one inlet and one outlet.

[learn)	Element Weight	Candition by 1900	Condition
Wetland Borsers ^a Labo or Stream	M)	<b>(a)</b>	Tes
Cate as atrees		MA	<b>6</b>
Pogetative Density	2	0	Open from mater
**			Stress and brookside
		1	Born fresh murch (aquatic bed
		2	Shallow fresh carsh
			Yearly flandslan
		1	Mrt means
		(1)	Shrua susaa
		·	Need Susing
		1	log
Serficial Material Underlying metlans	1	2	T(11
meanlying merians		1	Stratified sand and gravel
		•	Stratified find sand and silt
		3	Allerium
Fetch (Lakes only)		2	Over 2000 ft.
		(1)	Under 2000 ft.
Depth of Lake	1	1	Down 6 ft.
	-	0	Shaller & ft.
		nge 3-12	21)

Clonents	tienent de ignt	Lane ( E ion We ignt	Canditions
Bennent Hydrologic		1	Condition 1
Type		1	Candition 2
		(3)	Condition 3
		•	Condition 4
		1	Condition 5
			Condition 6
Byerslegic	2	1	Not port of the reserved system
Connection		1	Part of riporion system
latet	2	O	Pergnatal
		ĭ	Epocaral
		0	Assent
Outlet	1	0	Perenasal
		1	Congress
			Absent
Size		3	Large ≥ 4.6 acres
		(3)	Moderate 1.1-4.5 acres
	-		Small & 1.0 acres
		inge LB-98 ⁴ Ian 56	To Mod.

Alatal value for one inlet and one outlet only.

Some worklands may have more than one inlet are outlet but the range above is only
for untilanes with one inlet and one doublet.

Figure 14. Water Quality Maintenance Function Andel

[lements	We sent	Weight	Conditions				
Sminent Metland		1	Stress or brockside wetland				
		•	Open fresh water				
		3	Ower fresh marsh (aquatic hed)	Figure 15.	Cultural and	Leanunic Func	tion Rodel
		4	Shillow fresh cursh		Lignent	Ceneration	Conditions
			Yearly Flandplain	Deserts	Menght	bergns	COMPTETENS
		1	Not sendor	Class	4		Streem of brookside
		(1)	Shree Swamp			•	Open fresh mater
		1	Messed traffit			4	Dres fresh morsh
		2	Bog				Shallow fresh marsh
Percent down water	1	(3)	8-331				Tearly Fluoded Fluodelain
		1	34-441			2	Not desdes
		1	67-953			(3)	Sind tues
		•	96-100K			5	Hosped Swamp (deciduous)
Toge Lative Dansity	3	(3)	Rign .			•	toosed soom (consferous)
		1	Rederate			3	log
		1	Lee	Access	3	(3)	Mithin 100' of reed
Topographic	3	4	Closed Sexyn			1	Access by potsable waterway
Configuration		1	Sem-closed basin			1	Isolated
		(1)	Valley	\$120		3	Large 2 4.6 acres
		1	Billande			(1)	Redium 1.1-4.5 ocres
Tesagreshic	2	(1)	Meer		_	<u> </u>	See   1 ≤ 1.0 acres
Position is Materished		1	Intermediate			go 11	
		3	Lower		Ree	. 34	(37) Mod
Organic Material	1	1	High personality				(3) IIIUM
e-el-ascharat		2	Low portugality				
		(1)	Absent				
8		0					

^{*}presentive

Figure 16. Sucreational Function Redail

Flaute 17. Assthatic function Rose

[lewets	Beignt	Constition	Conditions	[lowent:	go idul	Veignt	Conditions
Desirent Metland	1	0	Streen or branciste	Ommont Matland	4		Stream or proposate wetland
Class		٥	Open fresh water	Class			Open fresh water
			Does fresh marsh			5	Goos fresh morsh
		5	Shellow fresh morsh				Shallow fresh march
			Tearly Flanded Flandslain				Yearly floated floodslate
		•	Het meadow			•	Net season
		1	Sine sum				Shrup twom
		1	Monard Swams (deciduous)			3	Hooded swamp (deciduous)
		3	Hoosed sweet (consterous)			1	Boomed swamp (Consferent)
		2	log			4	les ·
Percent Goon			0-331	Sepriates	3	•	4-1
Moter		1	34-441	(Richness)		0	2-1
		1	67-952			1	1
· · · · · · · · · · · · · · · · · · ·		. 0	96-1001	Percent Open Water		1	0-135
Surface water	4	0	Connected to a small stream			1	34-661
Association		2	Connected to a river				67-952
		3	Connected to a lave			•	96-100%
-		4	Connected to a commination	Access to Public	3	0	Within 100 ft. of room
		0	Not connected			2	Access by passable waterway
Access to Public	2	(3)	Mithia 100° of read			1	Essisted
	- 5	Ç	Access by passable waterway	Local Scarcity	1	1	4200 ft. to mearest similar typ
		1	Isolated			2	201-1000 ft to mearest Similar type
Stge	4		Large 2 4.6 acres			(i)	>1000 ft, to mearest
7.5		0	Medium 1,1-4.5 acres			Europ 1-66	_ Similar type
			Small < 1.0 acres			Reen 37	
Lone   Access	2	2	la .			(36)	Mod.
Pades vecass		Ō					
Output /	1	Ÿ	Wish 116-155	•			
Biological Function		$\odot$	Roderate 73-115				
		$\circ$	Lan 29-72				

Figure 18. Educational Function Rade

Clarents	(1 emp		
Subclass Richness (Lateral Biversity)	3	•	6-1
		3	4-5
		(2)	2-3
7		Y	1
Access to Public	4	$\odot$	Within 100" of reed
		2	Access by passable untermy
		1	Isolotes
		lange 7-24 lann 15	(18) Mod.

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Date:

Appendix F

June 1992

APPENDIX F

GEOTECHNICAL DATA

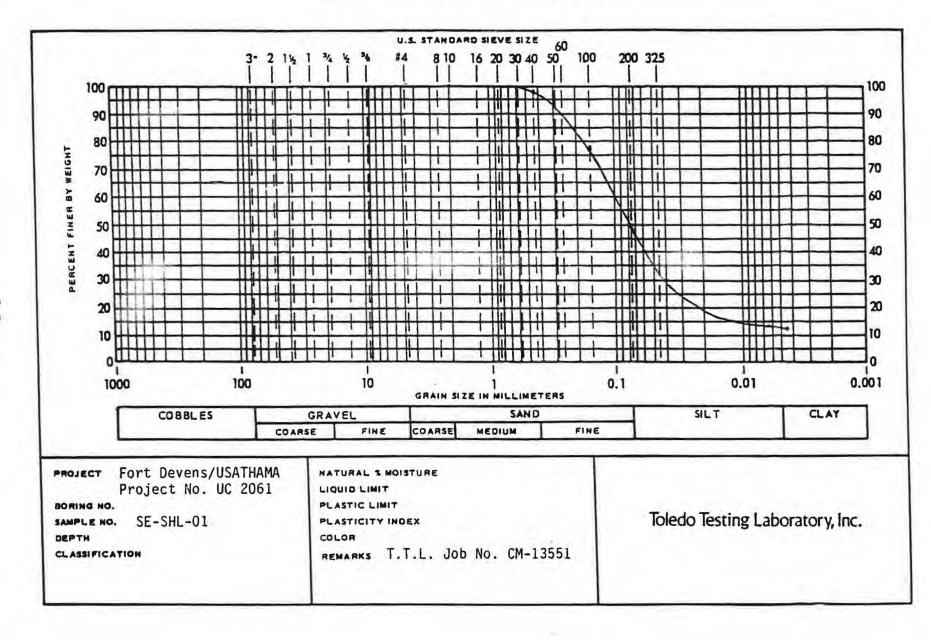
#### TABULATION OF TEST DATA (FOR RI SAMPLES)

1		Pa	Atterberg	Unified Soil					
Sample Number	Gravel	Coarse Sand	Medium Sand	Fine Sand	Silt	Clay	Colloids	Limits	Classificatio
SE-SHL-01			1	15	72	12			ML
SE-SHL-02			17	79					SP
SE-SHL-03			2	7	57	24			CL
SE-SHL-04			1	22	58	19			
SE-SHL-05			1	14	65	20			ML
SE-SHL-06			2	36	43	19			
SE-SHL-07			21	68					SP-SM
SE-SHL-08	2	4	47	45					SP
SE-SHL-09			1	37	36	26			
SE-SHL-10			3	58	13	26			
SE-SHL-11			2	38	37	23			
SE-SHL-12	18	6	37	37					SP
SE-SHL-13			3	88					SP-SM
SE-SHL-14	18	6	36	38					SP
SE-SHL-15	21	9	43	25					SW
SHL-14B	6	6	48	37				•	SP
SHL-15	33	11	18	32					SP-SM
SHL-21				69	25	6		NON-PLASTIC	SP-SM
SHL-22	34	16	27	17					SW-SM
SHL-23		1	40	53					SP-SM
SHL-24	4		1	97					SP
SHL-25			1	90					SP-SM
SE-CSB-01	52	10	18	16					GP-SP
SE-CSB-02			24	69					SP-SM
SE-CSB-03		1	6	51	35	7			SM
SE-CSB-04		1	13	64	13	9			SM
SE-CSB-05		1	24	69					SP-SM
SE-CSB-06		1	15	45	25	14			sc
SE-CSB-07		1	10	49	24	16			sc
SE-CSB-08	2	2	8	51	22	15			sc
SE-CSB-09	1	2	3	22	55	17			ML
SE-CSB-10	1	4	43	49					SP

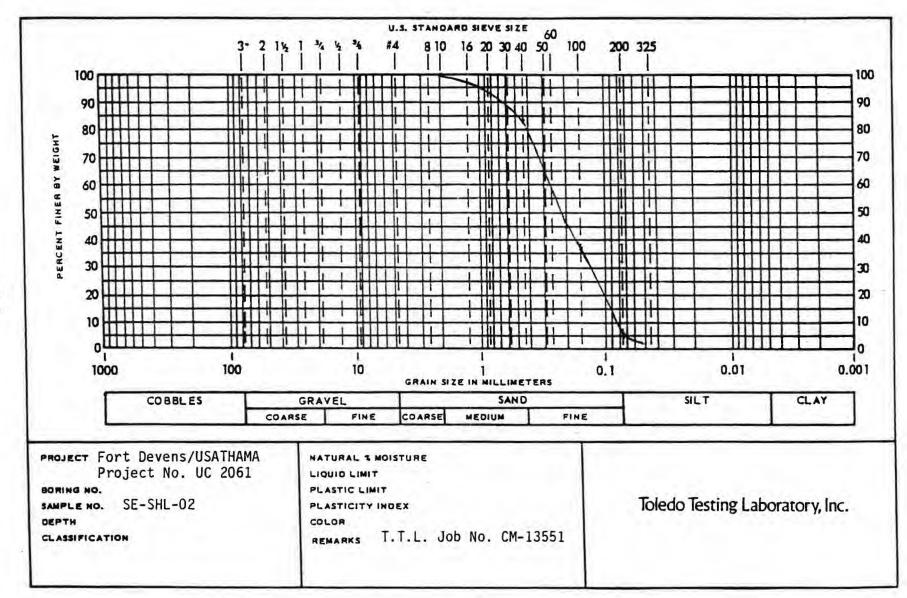
RI Report: Section No.: Revision No.: Date:

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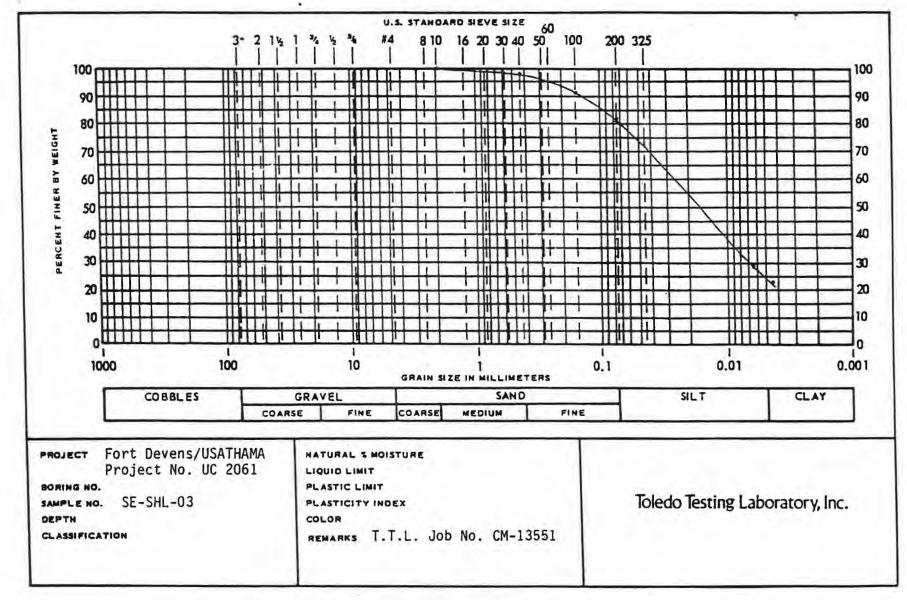


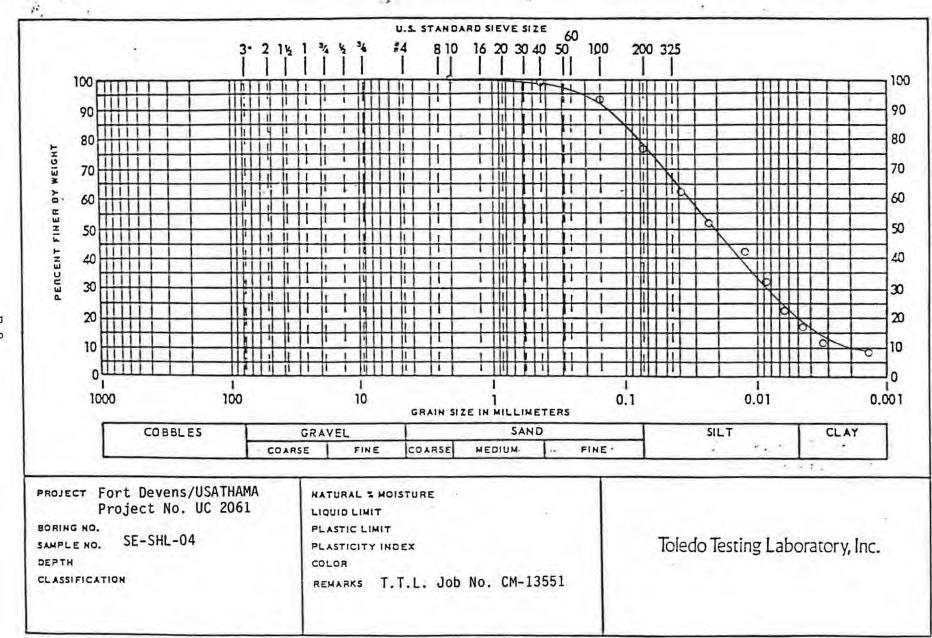




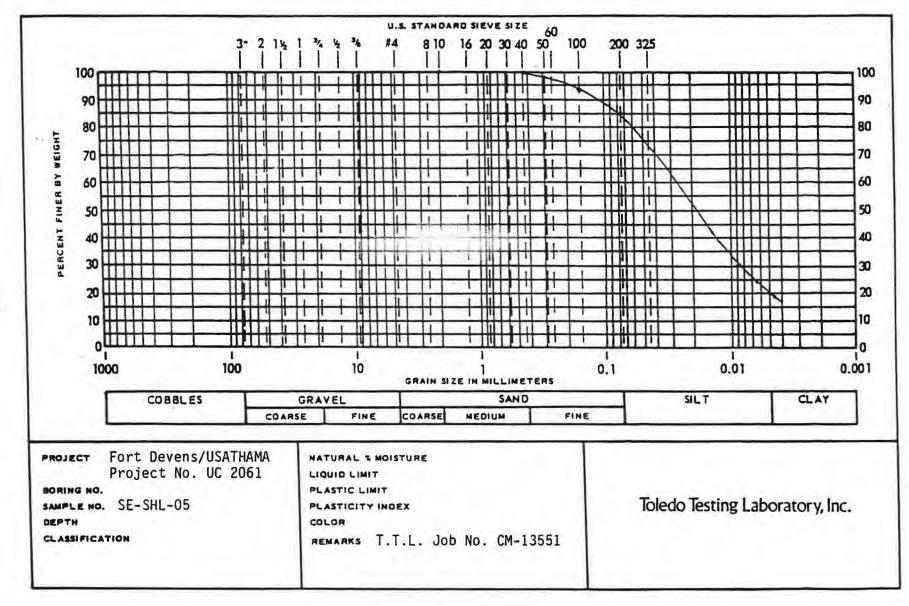




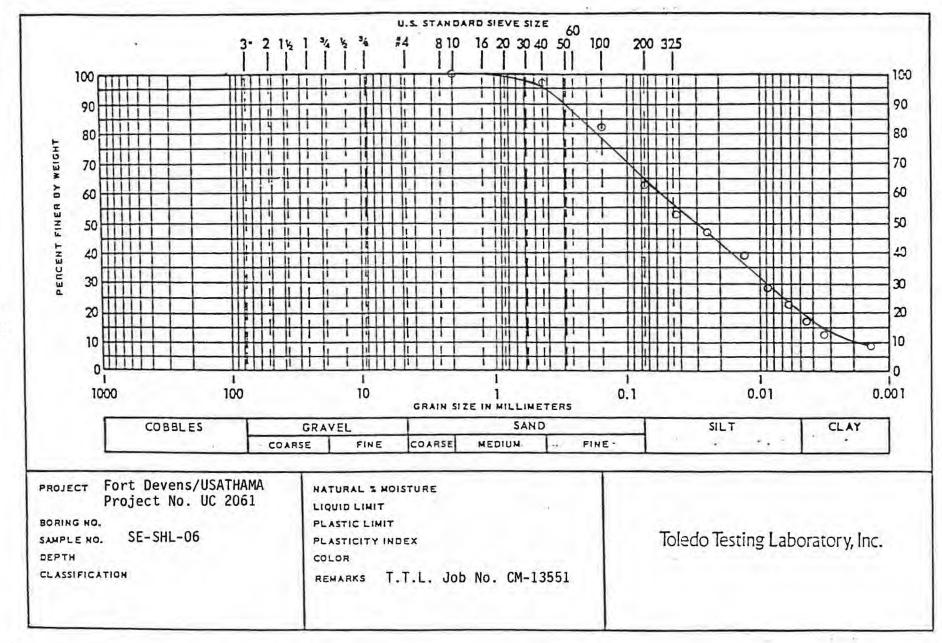


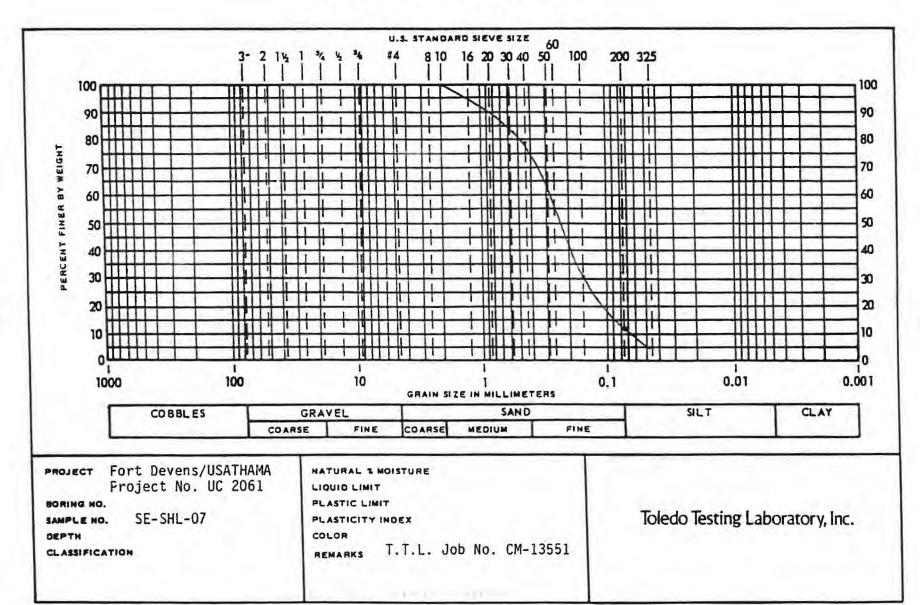


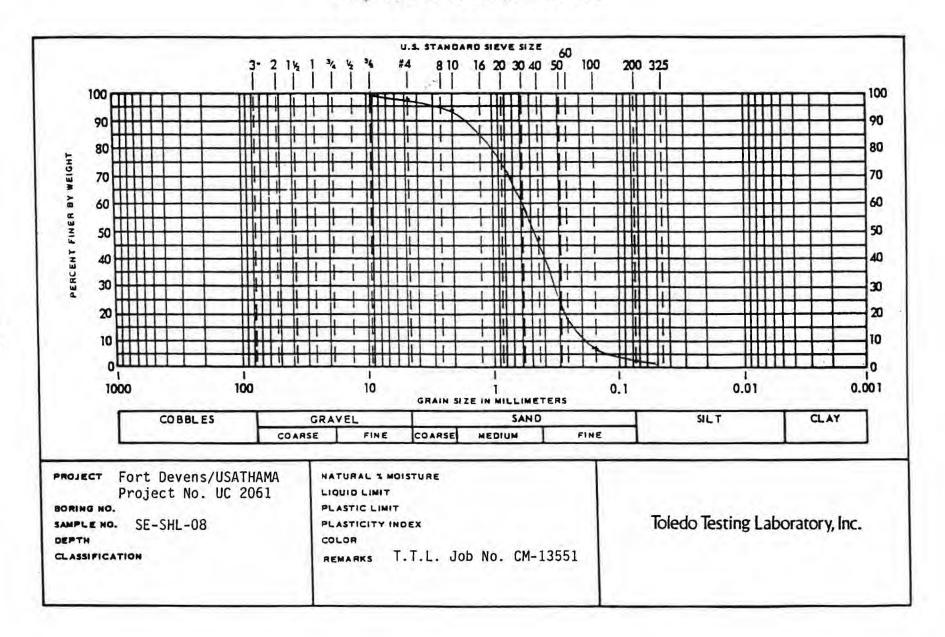
F-8

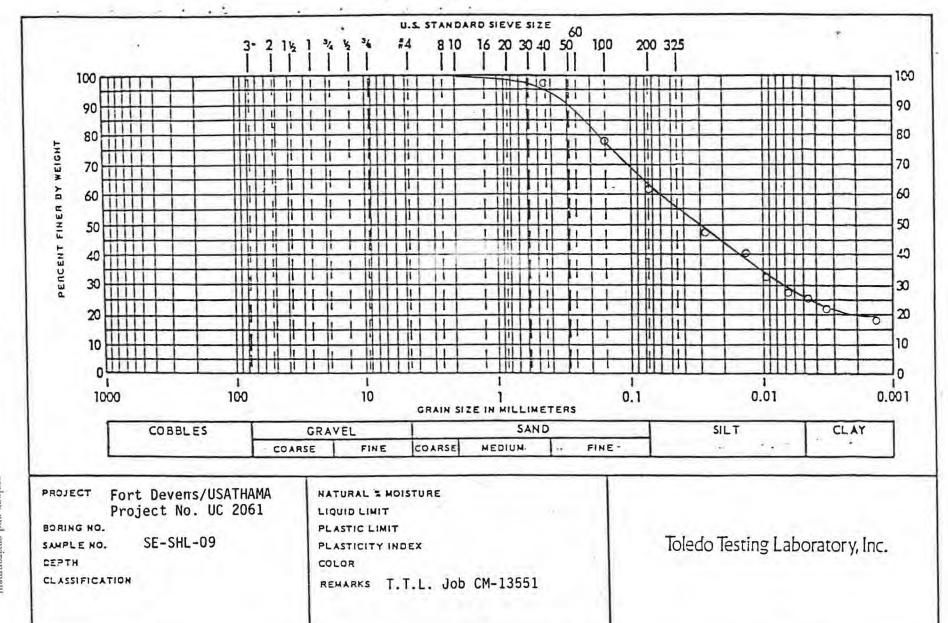


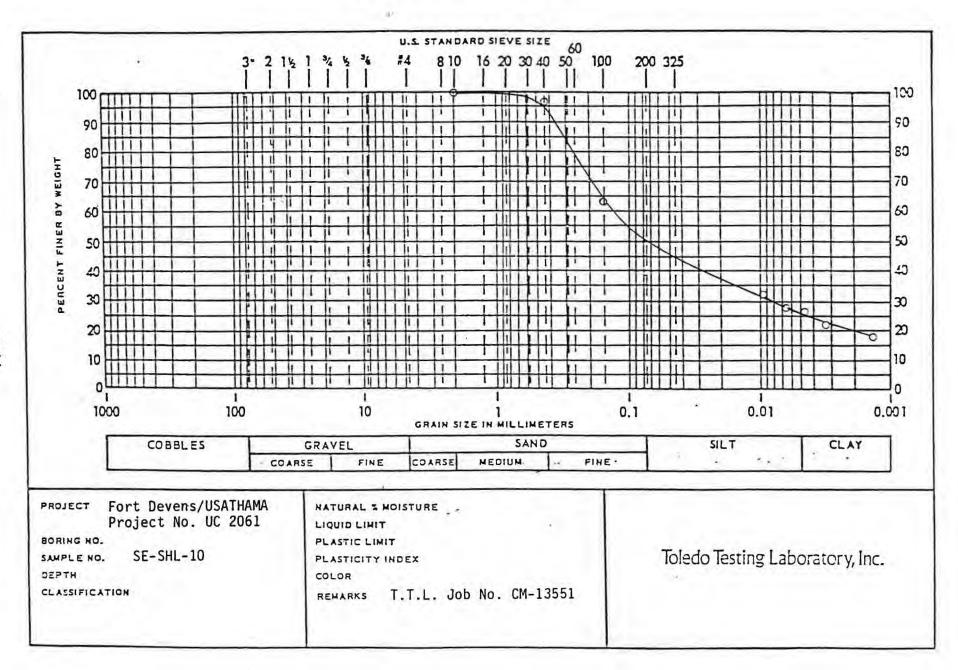
F-9

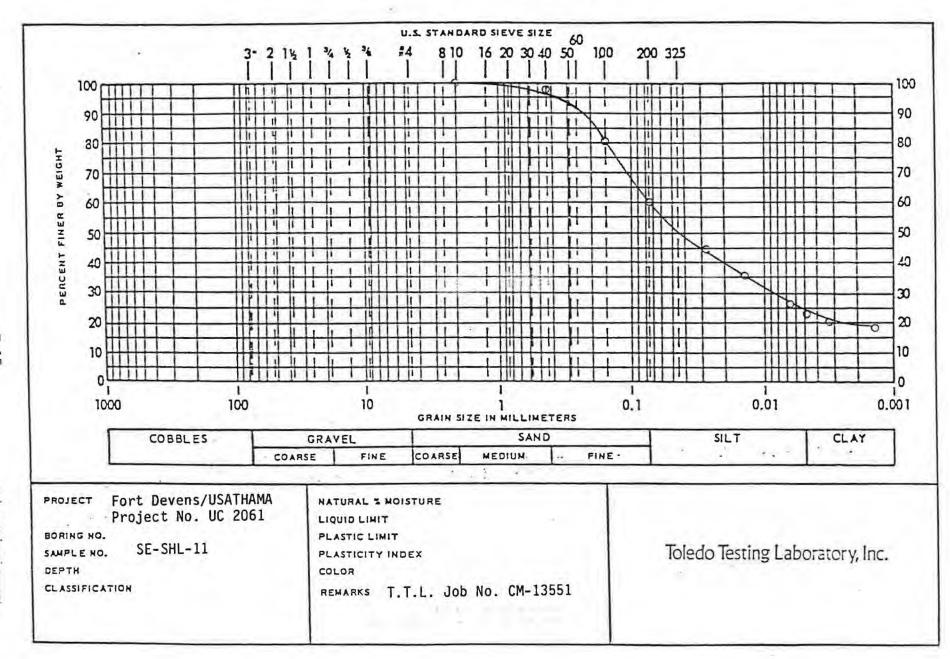


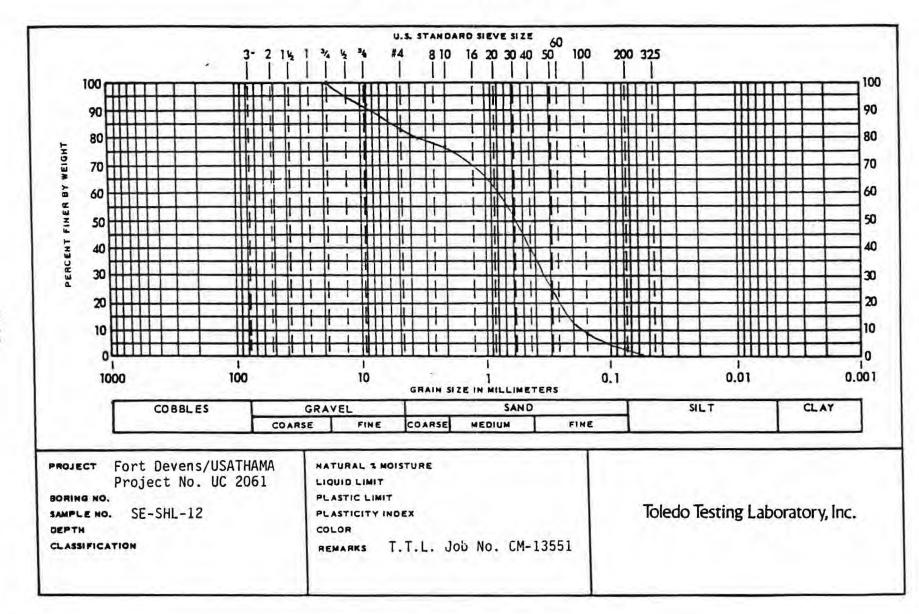


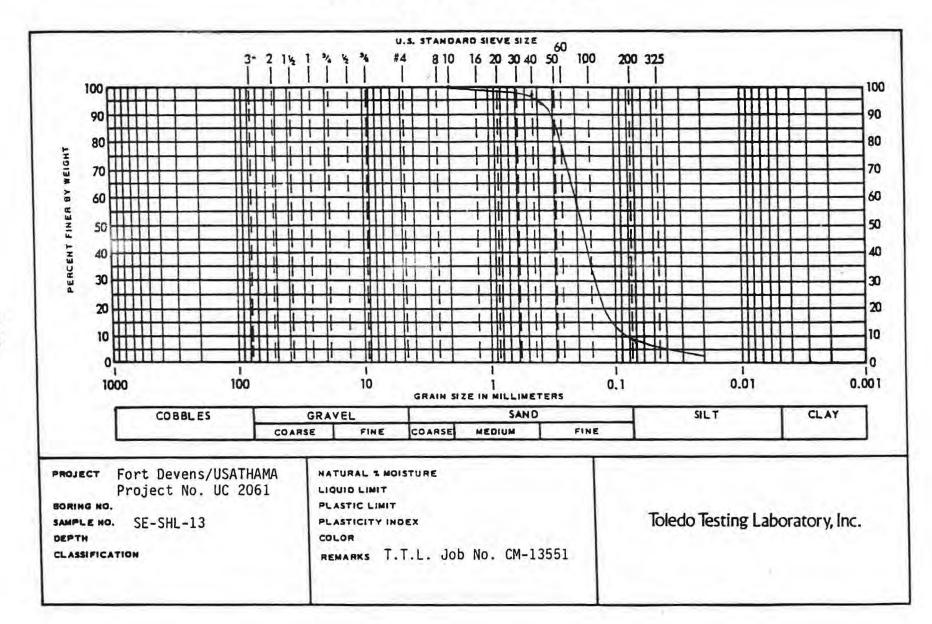


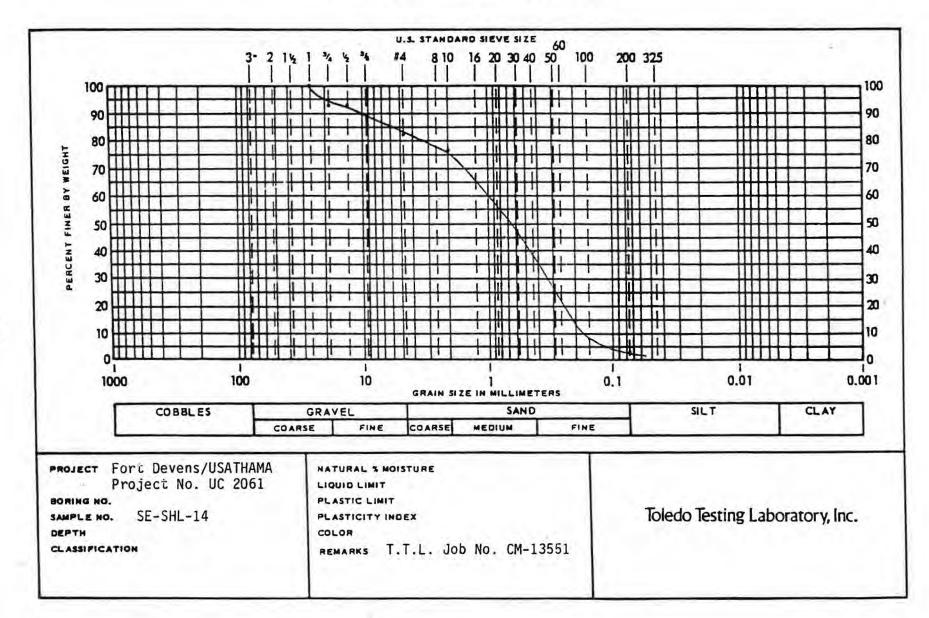


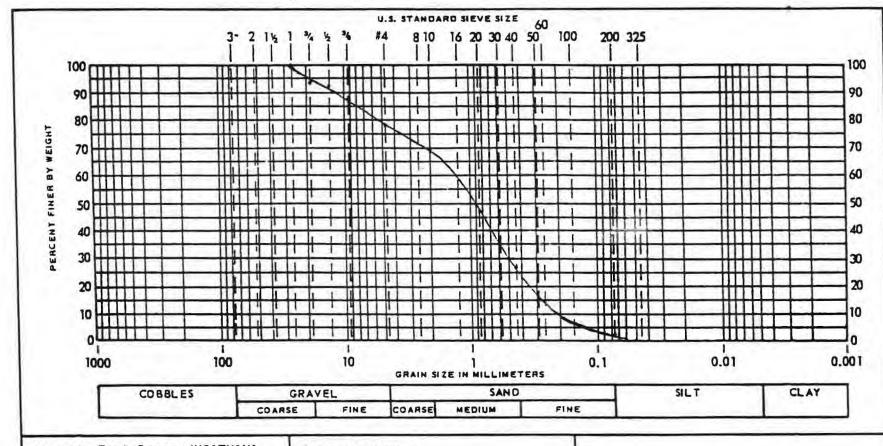












PROJECT Fort Devens/USATHAMA Project No. UC 2061

BORING NO.

SAMPLE NO. SE-SHL-15

DEPTH

CLASSIFICATION

NATURAL & MOISTURE

LIQUID LIMIT

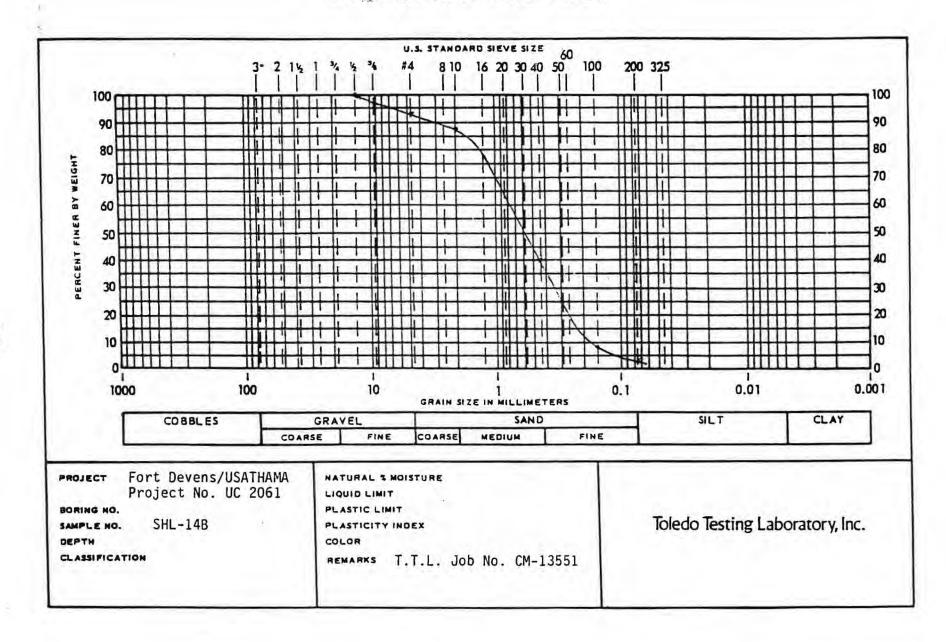
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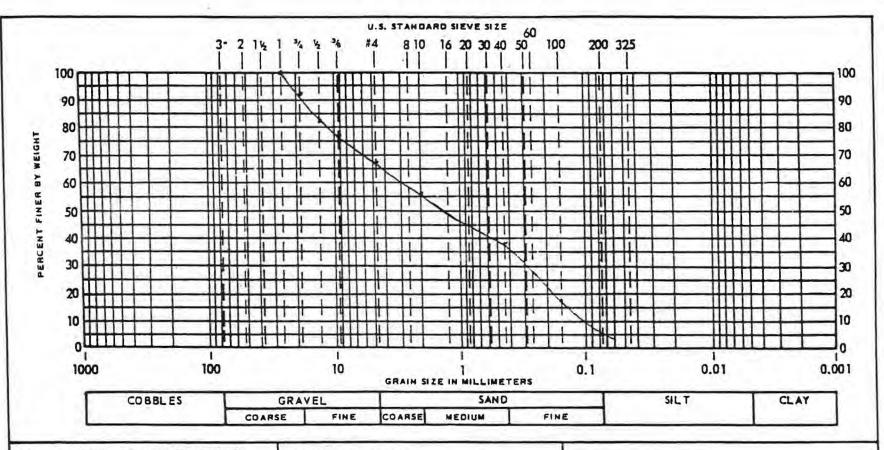
PLASTICITY INDEX

COLOR

REMARKS T.T.L. Job No. CM-13551

Toledo Testing Laboratory, Inc.





PROJECT Fort Devens/USATHAMA Project No. UC 2061

BORING NO.

SAMPLE NO.

SHL-15

DEPTH

CLASSIFICATION

NATURAL & MOISTURE

LIQUID LIMIT

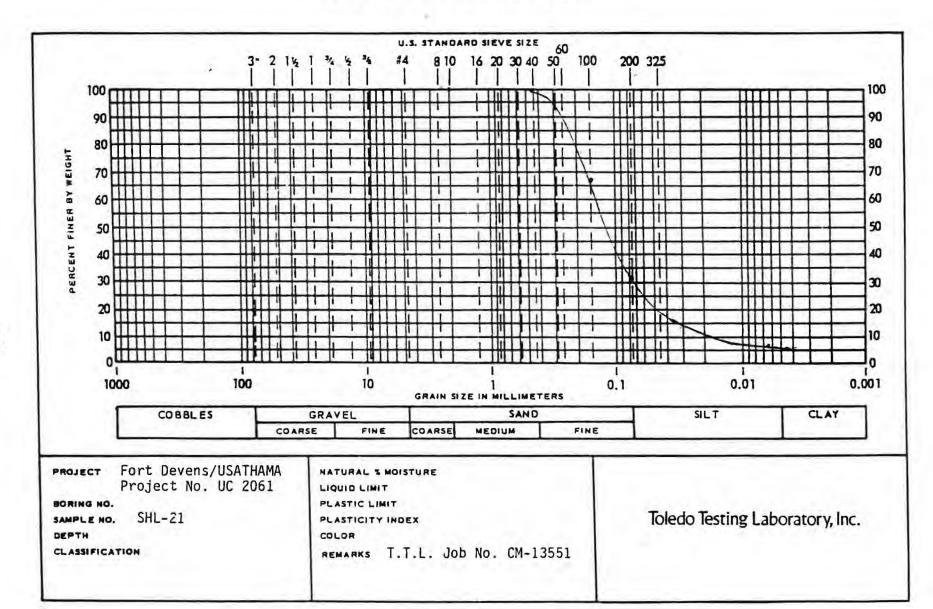
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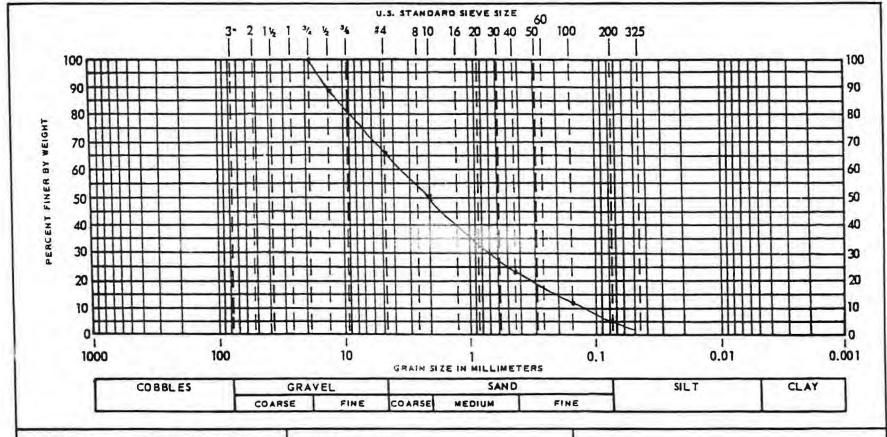
PLASTICITY INDEX

COLOR

REMARKS T.T.L. Job No. CM-13551

Toledo Testing Laboratory, Inc.





PROJECT Fort Devens/USATHAMA Project No. UC 2061

BORING NO.

SAMPLE NO. SHL-22

DEPTH

CLASSIFICATION

NATURAL & MOISTURE

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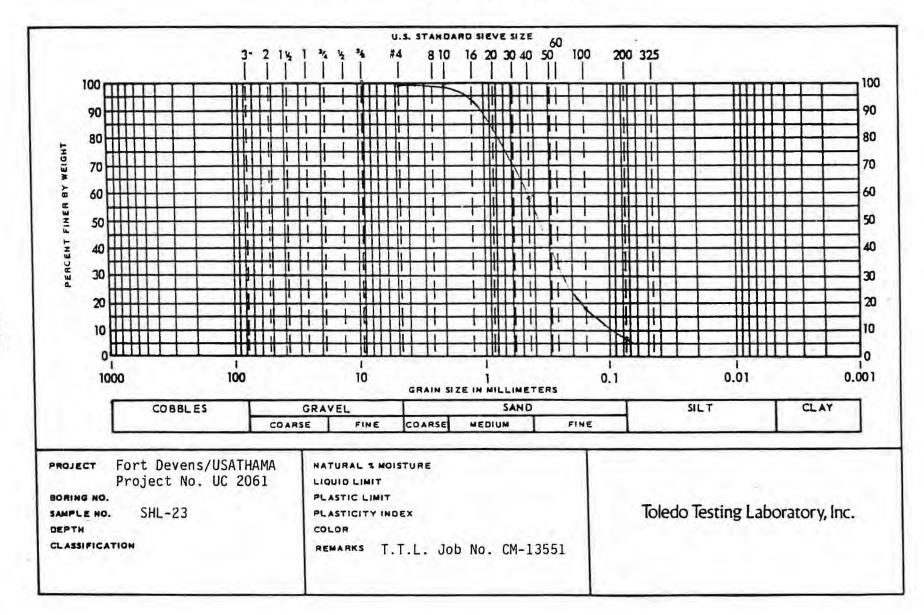
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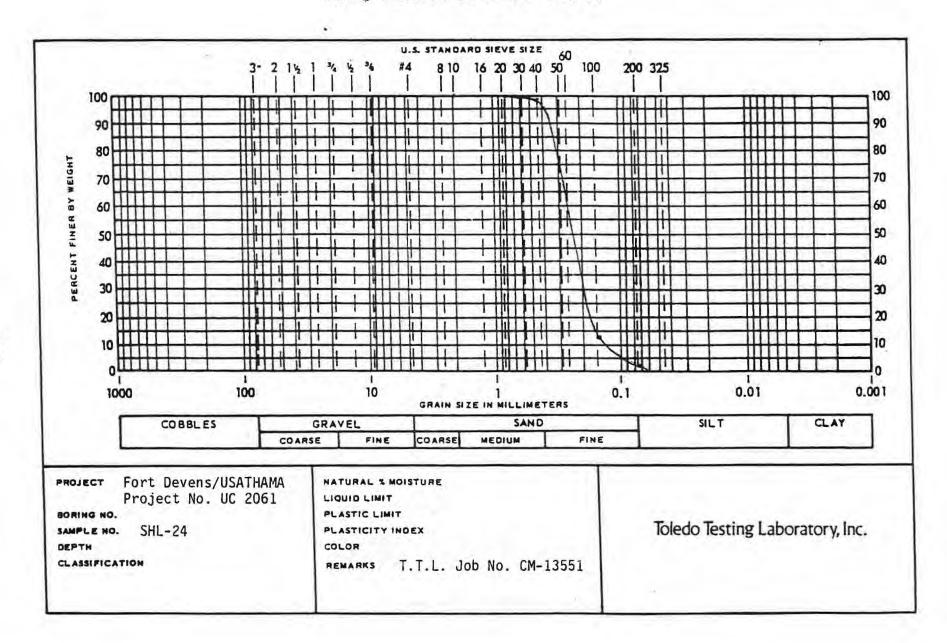
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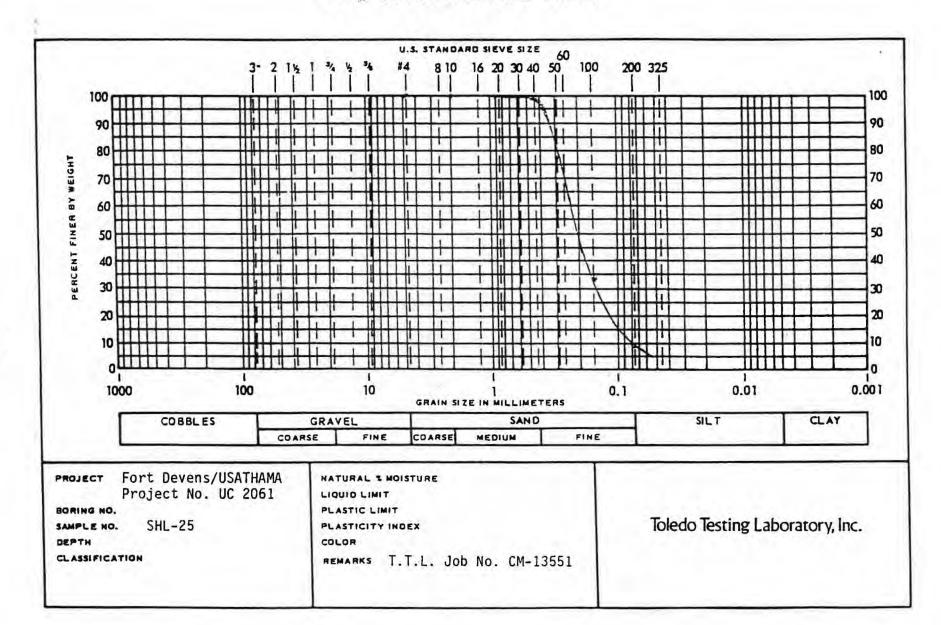
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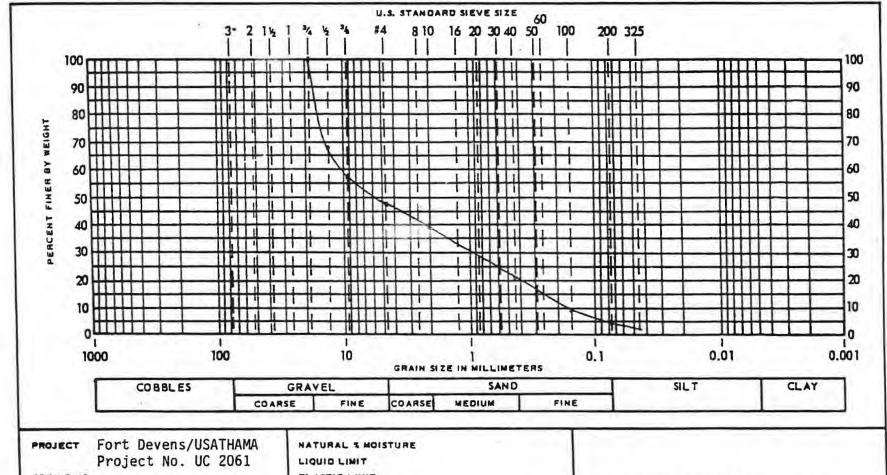
REMARKS T.T.L. Job No. CM-13551

Toledo Testing Laboratory, Inc.





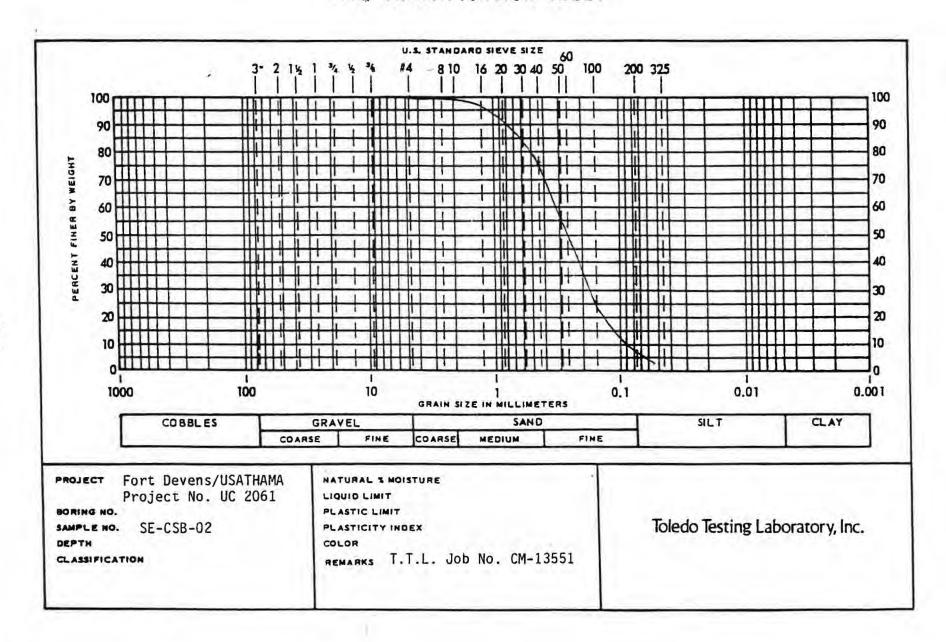




PROJECT Fort Devens/USATHAMA
Project No. UC 2061
BORING NO.
SAMPLE NO. SE-CSB-01
DEPTH
CLASSIFICATION

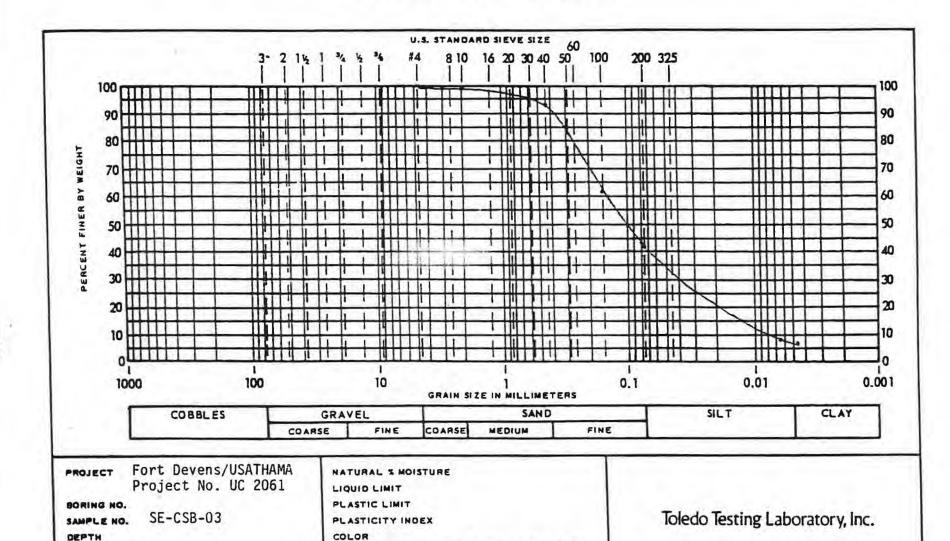
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Toledo Testing Laboratory, Inc.

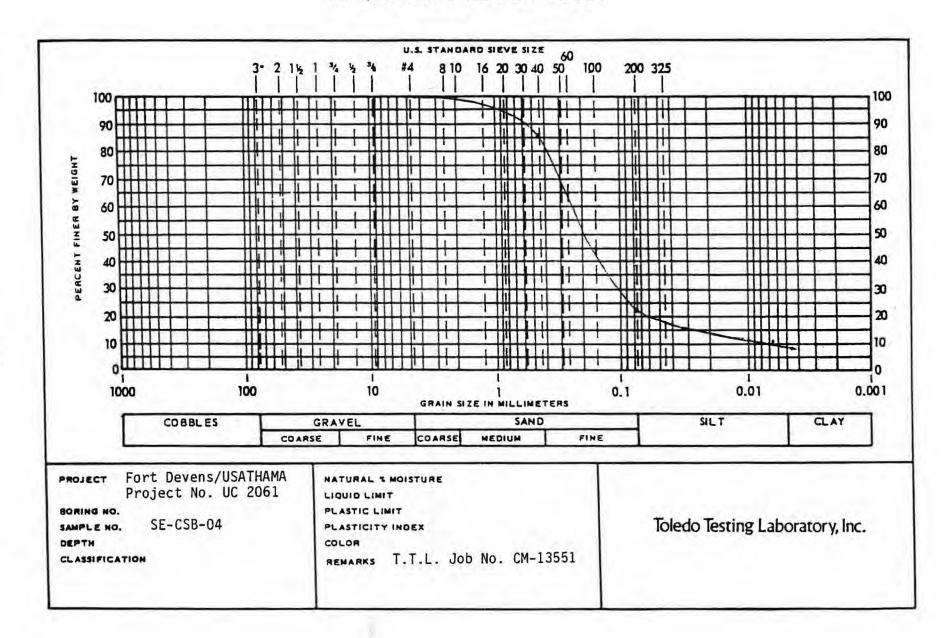


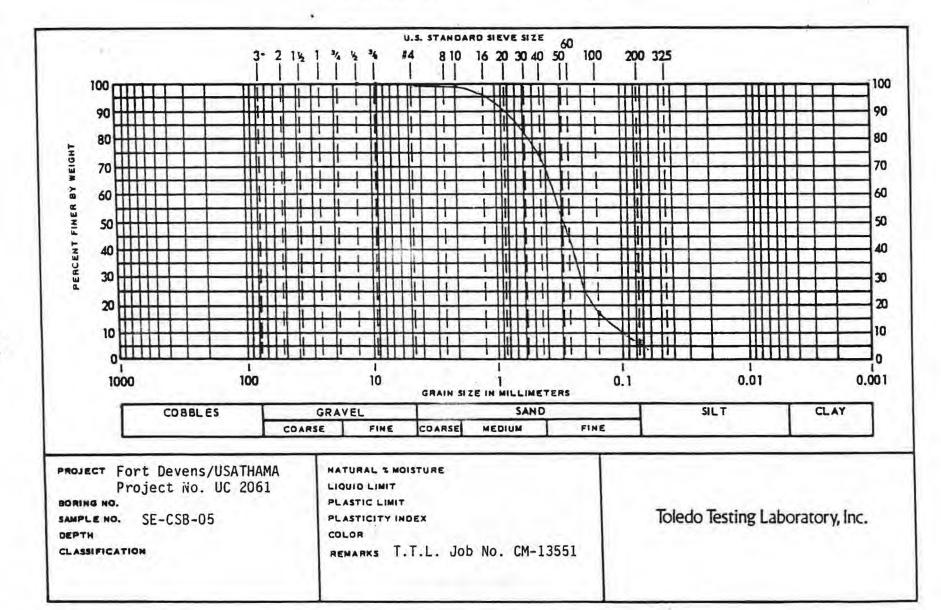


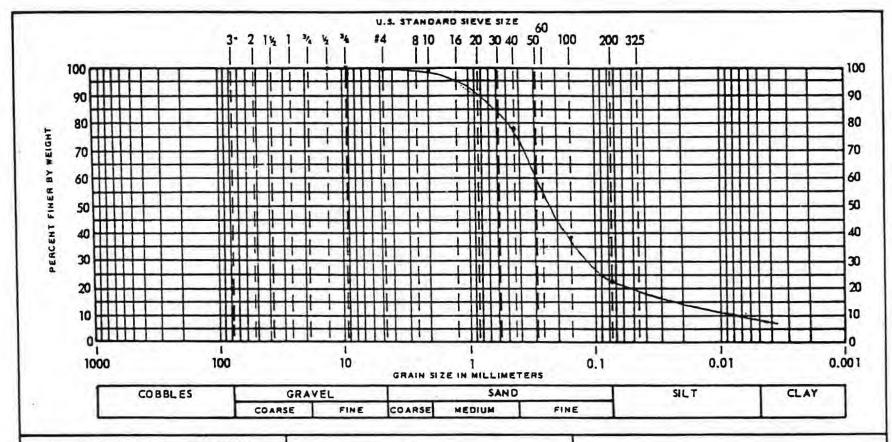
CLASSIFICATION



REMARKS T.T.L. Job No. CM-13551







PROJECT Fort Devens/USATHAMA Project No. UC 2061

BORING NO.

SAMPLE NO.

SE-CSB-06

DEPTH

CLASSIFICATION

NATURAL & MOISTURE

LIQUID LIMIT

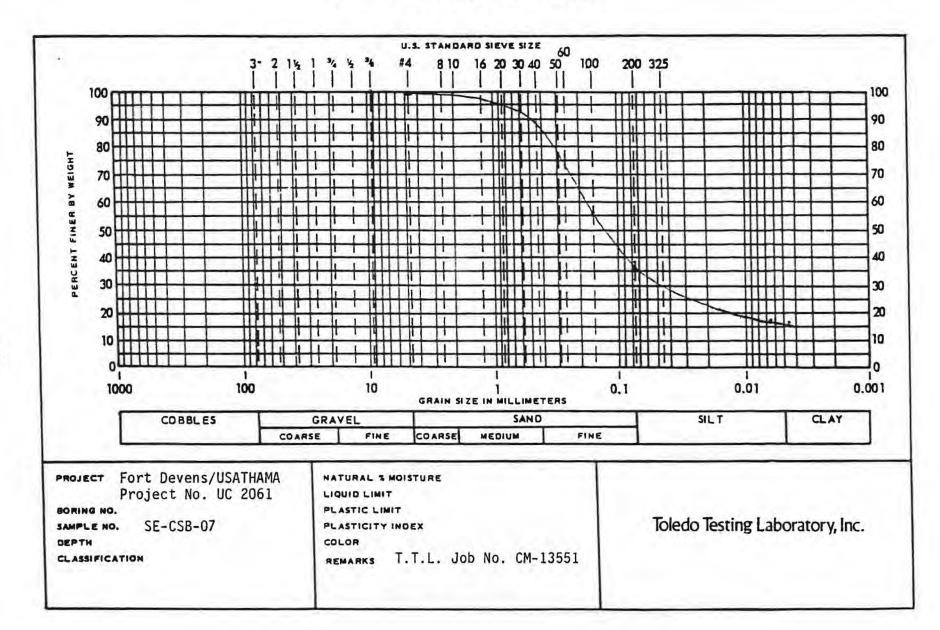
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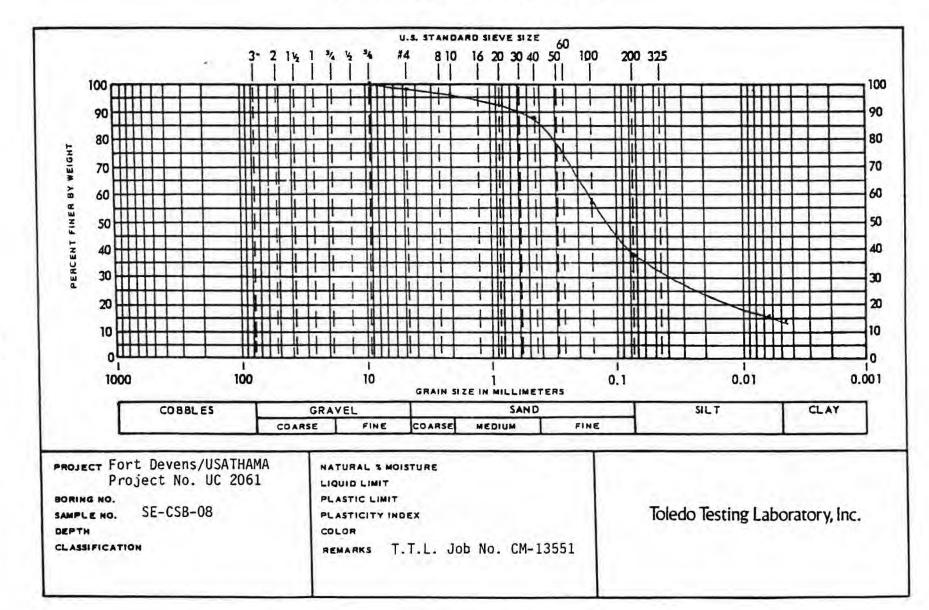
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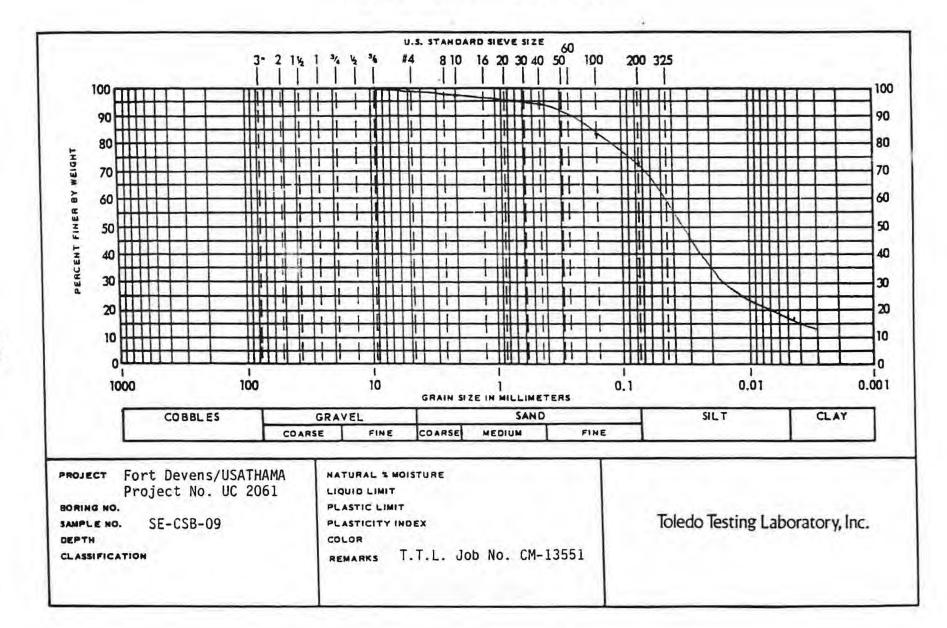
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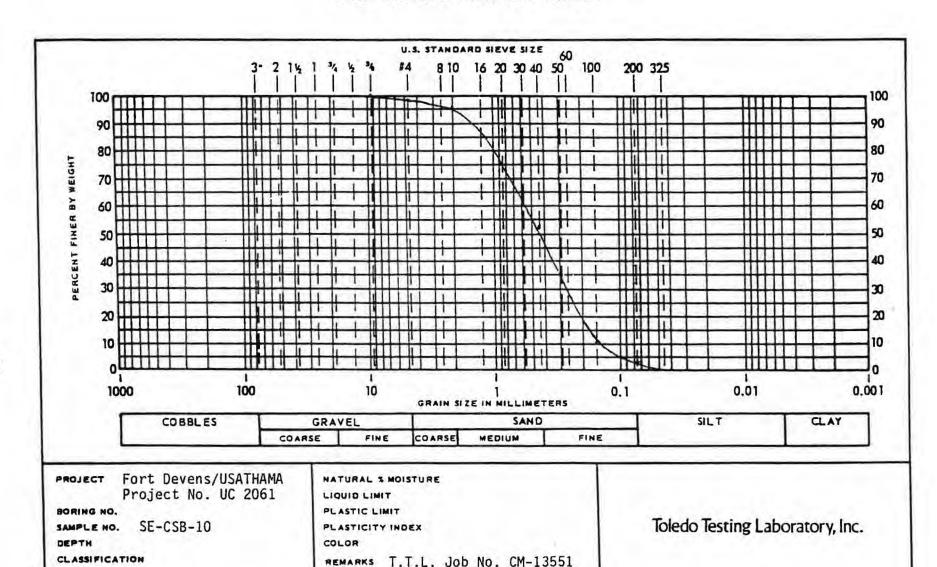
REMARKS T.T.L. Job No. CM-13551

Toledo Testing Laboratory, Inc.









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Fort Devens Appendix G

APPENDIX G

AIR MONITORING REPORT

RC424

# AIR MONITORING REPORT FOR FORT DEVENS, MASSACHUSETTS

Contract No. DAAA15-90-D0012 Delivery Order No. 0001 ELIN A004

January 1992

# Prepared for

Commander, U.S. Army Toxic and Hazardous Materials Agency Aberdeen Proving Ground, Maryland 21010-5401

Prepared by

Ecology and Environment, Inc. Arlington, Virginia 22209

Air Monitoring: Section No.:

Revision No.: Date:

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January 1992

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#### 1. INTRODUCTION

On 12 to 25 August 1991, Ecology and Environment, Inc. (E & E) conducted an air quality survey at Fort Devens, Massachusetts. The survey was conducted at the Shepley's Hill Landfill and Cold Spring Brook Landfill as part of the remedial investigation being conducted by E & E under Contract DAAA15-90-D0012, Delivery Order No. 0001. The objective of this study was to determine the ambient concentrations of volatile organic compounds (VOCs) and respirable particulate matter upwind and downwind of the two landfills. These measurements are to be used during the baseline risk assessment as source strength input parameters.

E & E obtained the required information with the following efforts, which are summarized in this report: meteorological monitoring (Section 2), sample site selection (Section 3), particulate matter sampling (Section 4), and VOC sampling (Section 5). Analytical results for samples collected at Shepley's Hill Landfill and Cold Spring Brook Landfill are summarized in Section 6, and a discussion of these results is included in Section 7. Supporting data used to generate this report are included as appendices: meteorological data (Appendix A), wind roses (Appendix B), calibration data (Appendix C), and laboratory results (Appendix D).

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## 2. METEOROLOGICAL MONITORING

The purpose of meteorological monitoring was to collect data that could be used to select appropriate sampling locations, and would document the meteorological conditions under which the air samples were taken. E & E monitored the following meteorological parameters: temperature, relative humidity, wind speed, wind direction, and barometric pressure. These parameters were monitored for the duration of the air quality survey. The standard deviation of wind direction, sigma theta, was calculated in real time from the wind direction measurements. Meteorological data are presented in Appendix A.

## 2.1 EQUIPMENT

The meteorological monitoring equipment consisted of a temperature/relative humidity sensor, a wind speed sensor; and a wind direction sensor mounted on a cross-arm atop a 5-meter aluminum tower secured by guy wires. A weather-proof box at the base of the tower housed an Odessa Engineering DSM-3260 data storage module and the barometric pressure sensor. The sensors were connected to a junction box mounted on the tower, which, in turn, was connected by a main cable to the data storage module. The system was powered by a 9-volt deep cycle marine battery. The data were accessed with a laptop computer and Odessa Engineering's ENVICOM software.

## 2.2 SITING THE METEOROLOGICAL STATION

The meteorological station was sited using the criteria set forth in the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume IV -- Meteorological Measurements prepared by the U.S. Environmental Protection Agency (EPA) in 1989. In this document, EPA recommends that a meteorological tower should be sited in "open terrain," which is defined as an area where the horizontal distance between the instruments and any obstruction is at least 10 times the height of that obstruction. The meteorological station was sited in the middle of Shepley's Hill Landfill (see Figure -1) in accordance with these criteria.

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#### SAMPLE SITE SELECTION

Sampling locations were selected based upon the on-site meteorological monitoring data and the physical constraints of the site. The type of sample collected also influenced the choice of sample locations. In general, there must be free, unobstructed flow around the sampler in order to obtain a representative sample. Obstructions can be in the form of changes in topography, vegetation, and buildings. E & E attempted to site all samplers using the following criteria:

- o sampler intakes should be approximately in the breathing zone (1.5 to 2 meters above the ground);
- samplers should be located at a horizontal distance of at least twice the height of any nearby obstructions;
- o samplers should have unrestricted airflow in an arc of 270 degrees around the sampler; and
- o samplers should be placed at a minimum distance of 25 meters from a roadway.

#### 3.1 SHEPLEY'S HILL LANDFILL

Air samples were collected at Shepley's Hill for respirable particulate (PM-10) and VOCs. Two PM-10 samples were collected downwind of the landfill and one upwind (background) sample was collected for each of two sampling events. Four VOC samples were collected downwind of the landfill and one background sample was collected upwind during each of the two sampling events. Data from the on-site meteorological monitoring were reviewed to determine the prevailing wind patterns at the landfill and the nature and extent of any diurnal wind shifts. Since the Shepley's Hill Landfill is wooded on all sides, downwind samples were placed on the landfill as far downwind as possible while still meeting the siting criteria. The locations of the downwind PM-10 and VOC samplers are shown in Figure 3-1. The upwind samplers were located to the west of Shepley's Hill in a field next to the elementary school.

## 3.2 COLD SPRING BROOK LANDFILL

The Cold Spring Brook Landfill is in a low-lying, densely-vegetated area that prevented sampler placement according to the conventions listed above. Samplers were placed directly on the landfill. The PM-10 sampler was placed within the only clearing on the site and the VOC sampler was placed in proximity to monitoring well CSB-04 (see Figure 3-2). The dense vegetation covering the site yields low wind speeds, thus decreasing the dispersion of pollutants leaving the site. Sampling directly on the landfill helped in determining whether any contaminants were emitted from the landfill area. However, downwind transport could not be quantified by sampling.

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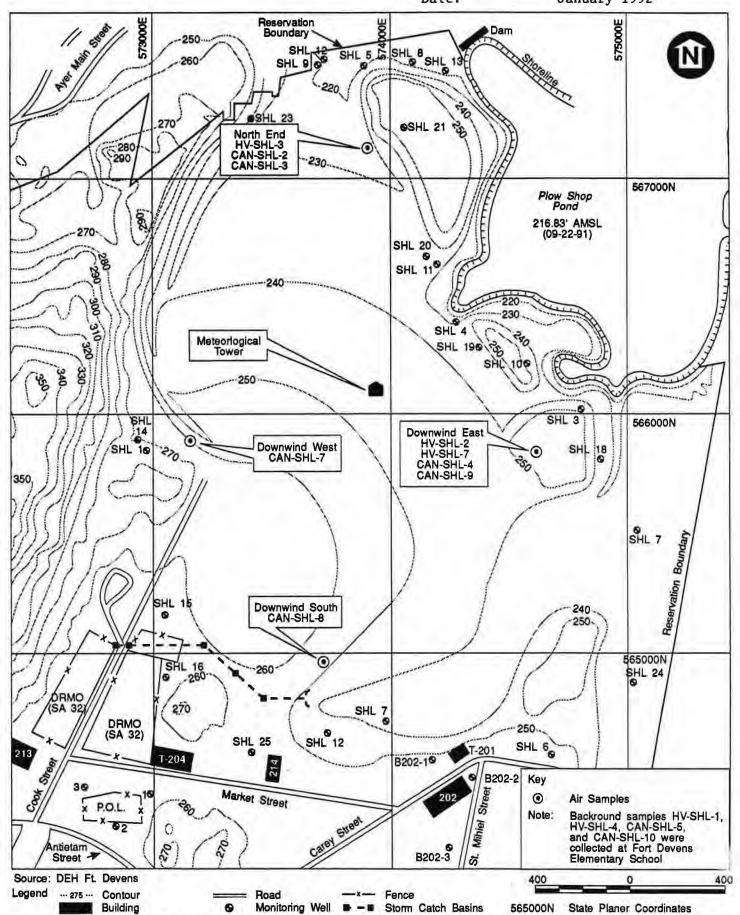


Figure 3-1 LOCATION OF AIR SAMPLES AT SHEPLEY'S HILL LANDFILL

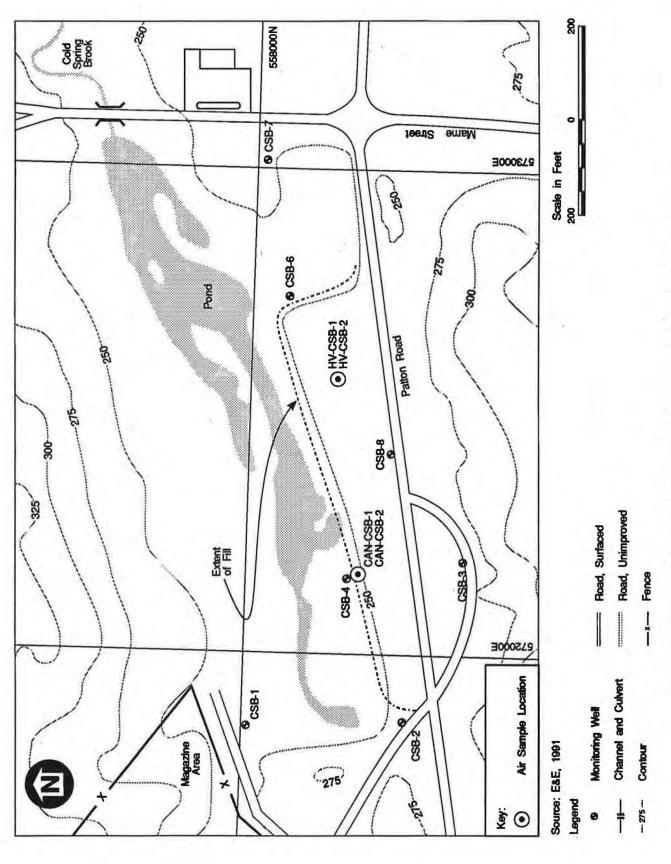
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## 4. RESPIRABLE PARTICULATE MATTER (PM-10) SAMPLING

Metal contamination has been associated with both the Shepley's Hill Landfill and the Cold Spring Brook Landfill. The air pathway for exposure to metals is through inhalation of respirable particulate matter. Respirable particulate matter (PM-10) is defined as particulate matter with a diameter of 10 microns or less. The EPA reference method for determination of the ambient concentration of PM-10 is given in 40 CFR 50 Appendix J. This method requires drawing an air sample at a constant flow rate first through a size-selective inlet, where particles greater than 10um are removed, and then through a filter medium. The filter medium can be weighed to determine the total mass of PM-10. 24-hour sample is accurately timed and the mass concentration of PM-10 can then be determined by the total volume of air sampled. The equipment used to sample PM-10 at Fort Devens was the General Metal Works HVPM-10 which consists of a high volume blower and filter housing, mass flow controller, size selective inlet, digital timer, and flow event recorder. The filter media used in this equipment is an 8 x 10 inch glass fiber filter. The samplers were programmed to run for 24 hours for each sample.

## 4.1 ANALYSIS OF PM-10 SAMPLES

Upon completion of sampling, the filters were sent to the analytical laboratory where the total particulate mass of each sample was determined gravimetrically. Following determination of total mass, each filter was then cut into one inch strips, digested with an acid solution, and analyzed for the presence of various metals. The PM-10 samples from Shepley's Hill Landfill were analyzed for lead, cadmium, arsenic, and total chromium. The PM-10 sample taken at Cold Spring Brook was analyzed for selenium, silver, and arsenic. The background samples and field blanks were analyzed for all of the metals listed above. Arsenic, cadmium, chromium, lead, and selenium were analyzed by graphite furnace atomic absorption and silver was analyzed by inductively coupled plasma spectroscopy.

## 4.2 SAMPLING PROCEDURES

## 4.2.1 Calibration

The HVPM-10 samplers were calibrated on site before being deployed in the field. Calibration of a high volume sampler refers to calibration of the sampler's flow-rate indicator. Once calibrated, the flow-rate indicator provides an accurate reading of the sample flow rate from which the volume of the sampled air can be calculated (EPA-60/4-77-027a 1983). The calibration procedure consists of the following steps:

 Assemble calibration equipment and install calibration orifice on sampler;

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o Perform a check to ensure that there are no leaks in the sampling system;

- o Install 18-hole plate in orifice device;
- o Turn on sampler and allow to warm up;
- o Record ambient pressure (Ta), barometric pressure (Pa), orifice serial number and calculated flow rate (Qa), calibration curve slope (m), y-intercept (b), and linear regression (r).
- o Record manometer deflection (ΔP H2O);
- o Record event recorder response (I);
- o Repeat last five steps with 13-, 10-, 7-, and 5-holed plates, then turn off sampler;
- o Calculate Qa: Qa=1/m{√ΔH2O(Ta/Pa)}-b;
- o Correct recorder response to actual conditions: IC=I[√(Ta/Pa)];
- o Correct calibration to seasonal conditions: ms=m/[√(Ts/Ps)], bs=b/[√(Ts/Ps)];
- o Calculate the set point flow rate (SFR) for the mass flow controller: SFR=1.13(Ps/Pstd)(Tstd/Ts);
- o Calculate the set point recorder response (SSP) for the mass flow controller:  $SSP=\{[m(SFR)+b][\sqrt{(Ps/Ts)}]\}$ ; and
- o Install filter, turn on sampler, and set mass flow controller to calibrated set point.

The calibration sheets for each of the PM-10 samplers used at Fort Devens are presented in Appendix A.

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## 5. VOC SAMPLE COLLECTION

Ambient VOC samples were collected in 6-liter SUMMA polished stainless steel canisters in accordance with EPA Method TO-14, "Determination of Volatile Organic Compounds (VOCs) in Ambient Air Using SUMMA Passivated Canister Sampling and Gas Chromatographic Analysis." This method is found in EPA document 600/4-84-041, Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air. Samples were drawn through Scientific Instrumentation Specialists (SIS) model AGS-1/D automated canister samplers. The AGS-1/D consists of a pump, timer, and flow controller. Tha AGS-1/D was used to collect a pressurized sample of approximately 14 liters over a period of 8 hours.

## 5.1 VOC SAMPLING PROCEDURES

- E & E used the following sampling and calibration procedures:
- o Connect sampler to 12-volt battery.
- o Measure sampler flow rate with a Buck Primary Gasflow Calibrator and adjust flow rate to approximately 30 cc/minute and record.
- Connect a 6-liter canister to sampler which is certified clean by analytical laboratory.
- o Program an 8-hour sampling period on the sampler timer.
- o Open valve on canister and record initial pressure.

When sampling is completed:

- o Record final pressure in canister.
- o Close valve on canister.
- o Check and record final flow rate using Buck Primary Gasflow Calibrator.

## 5.2 VOC ANALYSIS

Upon completion of sampling, E & E sent the canisters to an analytical laboratory for analysis for VOCs by gas chromatography/mass spectrometry following EPA Method TO-14. E & E requested analytical results for 39 volatile organic compounds. The detection limit was 1 ppb.

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## 6. ANALYTICAL RESULTS

#### 6.1 SHEPLEY'S HILL LANDFILL

## 6.1.1 PM-10/Metals Sampling Results

PM-10 levels of 12 to 32 micrograms per cubic meter (µg/m³) were found in the 24-hour samples taken at Shepley's Hill Landfill (see Table 6-1). Trace levels of cadmium, lead, and chromium were found in the upwind, downwind, and field blank PM-10 samples taken at Shepley's Hill Landfill. These trace levels are believed to be background levels since they were found in similar concentrations in all samples and the field blank.

## 6.1.2 VOC Sampling Results

The VOCs toluene, xylene, and dichlorodifluoromethane were detected at very low concentrations in the canister samples taken at Shepley's Hill Landfill (see Table 6-2). Toluene and xylene are constituents of motor vehicle exhaust. Dichlorodifluoromethane is a common propellant used in aerosol spray products. Sources for these VOCs are present at Fort Devens and in the surrounding areas. No VOCs were detected in the field blank (CAN-SHL-11). Toluene, xylene, and dichlorodifluoromethane were present in the upwind samples (CAN-SHL-5 and 10) at concentrations which suggest that the VOCs found in the downwind samples are background levels.

## 6.2 COLD SPRING BROOK

## 6.2.1 PM-10/Metals Sampling Results

PM-10 levels of 25 and 56  $\mu g/m^3$  were found at the Cold Spring Brook Landfill (Table 6-1). One of the two samples (HV-CSB-1) contained a trace amount of selenium (0.002  $\mu g/m^3$ ) and the other sample (HV-CSB-2) contained no detectable concentrations of cadmium, chromium, lead, arsenic, silver, or lead.

## 6.2.2 VOC Sampling Results

Sample CAN-CSB-1 contained 1.3 and 3.1 parts per billion (ppb) of toluene and xylene, respectively (Table 6-2). Sample CAN-CSB-2 contained 1.1 ppb of dichlorodifluoromethane. These are believed to be background concentrations since similar species and concentrations were observed upwind of Shepley's Hill landfill. All other VOCs were non-detectable in the samples analyzed.

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Table 6-1  $\label{eq:pm-10/metals} $$ PM-10/METALS RESULTS (\mu g/m^3) $$$ 

Sample #	Location	Total Mass	cd	Cr	Pb	Se
HV-SHL-1	Fort Devens Elementary (8/15 - 8/16)	26.44	0.0002	0.001	0.005	
HV-SHL-2	Downwind East (8/15 - 8/16)	31.79	0.0005	0.002	0.01	
HV-SHL-3	Downwind North (8/15 - 8/16)	30.47	0.0002	0.01	0.005	
HV-SHL-4	Fort Devens Elementary (8/16 - 8/17)	30.85	0.0002	0.002	0.003	
HV-SHL-7	Downwind East (8/24 - 8/25)	15.93	0.0002	0.002	0.01	
HV-SHL-8	Downwind South (8/24 - 8/25)	12.73	0.0002	0.001	0.003	T .
HV-SHL-9	Field Blank (8/15 - 8/25)		0.0001	0.002	0.0006	
HV-CSB-1	800' East 400' North (8/17 - 8/18)	56.21	÷			0.002
HV-CSB-2	800' East 400' North (8/24 - 8/25)	25.54				
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^{*} Arsenic and Silver not detected in any samples.

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Table 6-2 VOC AMALYTICAL RESULTS (ppb)

Sample #	Location	Toluene	Xylene	Dichlorodifluoro- methane
CAN-SHL-1	Met. Tower	1.7		
CAN-SHL-2	Northend	4.9		
CAN-SHL-3	Northend	1.3		1.1
CAN-SHL-4	Downwind East	1.1		
CAN-SHL-5	Fort Devens Elementary	1.4		1.1
CAN-SHL-6	Met. Tower	1.4		
CAN-SHL-7	Downwind West			
CAN-SHL-8	Met. Tower	1.3		1.4
CAN-SHL-9	Downwind East	1.3		1.2
CAN-SHL-10	Fort Devens Elementary	4.5	1.3	1.1
CAN-SHL-11	Trip Blank			
CAN-CSB-1	Near Well CSB-04	1.3	3.1	
CAN-CSB-2	Near Well CSB-04			1.1
Method Blank				

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7. DISCUSSION

As can be seen from Tables 6-1 and 6-2, none of the samples at either landfill had concentrations of PM-10, metals, or VOCs that were significantly above background. This indicates that the air pathway is not a significant route of exposure for these contaminants under these sampling conditions. This is consistent with the fact that both landfills are capped and the only pathways for emissions are through the vents (Shepley's Hill) and out the edges of the caps. The wind roses (Appendix B) and the site map (Figure 2-1) for all sampling periods demonstrate that the "downwind" samples were in fact downwind of the landfills and that the background samples were upwind of the landfills.

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APPENDIX A

METEOROLOGICAL DATA

# DAILY DATA SUMMARY

NAME: E&E	LO	CATION:	Ft.Deven	ıs		STATION	ID: 1
CHAN NAME	Temp W.D	IR W.SPD	R. Hum	Press	Sigél		
CHAN UNITS	Deg.C DE			in Hg	deg		
FULL SCALE	50.0 360	.0 100.0	100.0	32.00	99.9		
ZERO OFFSET	-30.0 0	.0 0.0		26.00	0.0		
START / CHANNEL	01	02 03	04	05	06		
****************							
08/14/91 00:00:00	Miss Mi	ss Miss	Miss	Miss			
08/14/91 01:00:00	Miss Mi	ss Miss	Miss	Miss	Miss		
08/14/91 02:00:00	Miss Mi	ss Miss	Miss	Miss	Miss		
08/14/91 03:00:00	Miss Mi	ss Miss	Miss	Miss	Miss		
08/14/91 04:00:00	Miss Mi	ss Miss	Miss	Miss	Miss		
08/14/91 05:00:00	Miss Mi	ss Miss	Miss	Miss	Miss		
08/14/91 06:00:00	Miss Mi	ss Miss	Miss	Miss	Miss		
08/14/91 07:00:00	Miss Mi	ss Miss	Miss	Miss	Miss		
08/14/91 08:00:00	Miss Mi	ss Miss	Miss	Miss	Miss		
08/14/91 09:00:00	Miss Mi			Miss	Miss		
08/14/91 10:00:00	Miss Mi	ss Miss	Miss	Miss	Miss		
08/14/91 11:00:00	31.6 248	.6 2.7	48.7	29.52	46.5		
08/14/91 12:00:00	33.3 237		44.6	29.50	55.8		
08/14/91 13:00:00	33.9 294				34.0		
08/14/91 14:00:00	33.8 301		45.2	29.46	27.3		
08/14/91 15:00:00	33.8 290			29.46	22.0		
08/14/91 16:00:00	32.5 284			29.48	20.8		
08/14/91 17:00:00	31.3 269			29.49	16.0		
08/14/91 18:00:00	30.9 264			29.46	15.2		
08/14/91 19:00:00	29.4 239		61.0	29.48	11.8		
08/14/91 20:00:00	25.4 235		71.2	29.51	13.8		
08/14/91 21:00:00	25.6 267	.8 2.5	78.2	29.56	15.0		
08/14/91 22:00:00	25.1 225				18.3		
08/14/91 23:00:00	25.0 232			29.66	10.9		
THE PLANES, THE STANDARDS.							
Daily average	30.1 261	.3 4.7	58.2	29.52	22.8		

# DAILY DATA SUMMARY

NAME: E&E	LOC	ATION:	Ft.Devens	STATION	ID:
CHAN NAME	Temp W.DI	R W.SPI	R.Hum Press		
CHAN UNITS	Deg.C DEG	. MPH	a in Ho		
FULL SCALE	50.0 360.	0 100.0	100.0 32.00	99.9	
ZERO OFFSET	-30.0 0.	0 0.0			
START / CHANNEL	01 0	2 03	04 05	06	
08/15/91 00:00:00	25.0 235.	3 4.7	78.3 29.66		
08/15/91 01:00:00	25.0 233.	2 4.1			
08/15/91 02:00:00	24.8 237.	3 4.1	80.8 29.59	12.5	
08/15/91 03:00:00	25.2 233.		79.4 29.55	12.7	
08/15/91 04:00:00	25.1 236.		80.7 29.54	12.9	
08/15/91 05:00:00	25.3 220.	9 4.9	79.8 29.5	13.5	
08/15/91 06:00:00	24.8 227.		83.3 29.54		
08/15/91 07:00:00	25.4 236.		83.3 29.60	13.7	
08/15/91 08:00:00		2 5.1		14.5	
08/15/91 09:00:00	24.5 224.			13.8	
08/15/91 10:00:00	24.6 225.		80.7 29.54		
08/15/91 11:00:00	24.7 219.	1 6.5	81.0 29.53		
08/15/91 12:00:00	24.7 213.	5 7.6	80.8 29.51		
08/15/91 13:00:00	25.0 214.				
08/15/91 14:00:00	26.4 200.	6 6.9	76.6 29.49		
08/15/91 15:00:00	24.9 191.				
08/15/91 16:00:00	25.8 207.				
08/15/91 17:00:00	25.2 228.				
08/15/91 18:00:00	23.6 271.	6 7.2	84.6 29.52		
08/15/91 19:00:00	19.6 239.			17.7	
08/15/91 20:00:00	19.6 271.		100.8 29.49	24.8	
08/15/91 21:00:00	20.4 224.				
08/15/91 22:00:00	21.4 237.		100.8 29.49		
08/15/91 23:00:00	20.3 246.		100.8 29.49	15.2	
Daily average	24.0 229.	3 5.3	85.2 29.53	15.3	

# DAILY DATA SUMMARY

NAME: E&E	LOC	ATION:	Ft.Deven	s		STATION	ID: 1
			:::::::				1111111
CHAN NAME	Temp W.DI	R W.SPD	R. Hum	Press	Sigél		
CHAN UNITS	Deg.C DEG			in Hg			
FULL SCALE	50.0 360.	0 100.0	100.0	32.00	99.9		
ZERO OFFSET	-30.0 0.		0.0	26.00	0.0		
START / CHANNEL	01 0		04	05	06		
***************		:::::::					
08/16/91 00:00:00	19.6 264.	1 8.8	100.6	29.49	11.5		
08/16/91 01:00:00	20.8 260.	2 7.5	100.6	29.50	13.4		
08/16/91 02:00:00	21.4 251.	6 4.4	100.8	29.50	17.8		
08/16/91 03:00:00	21.4 242.	4 4.2	100.8	29.50	19.7		
08/16/91 04:00:00	21.3 228.	3 4.1	100.8	29.51	14.6		
08/16/91 05:00:00	20.9 220.	9 4.0	100.8	29.52	17.3		
08/16/91 06:00:00	20.7 230.		100.7	29.54	19.3		
08/16/91 07:00:00	22.6 226.		92.8	29.58	15.9		
08/16/91 08:00:00	25.0 244.		85.0	29.54	21.6		
08/16/91 09:00:00	25.0 291.		77.3	29.64	21.6		
08/16/91 10:00:00	25.4 308.			29.67	20.0		
08/16/91 11:00:00	27.2 324.		66.9	29.67	19.4		
08/16/91 12:00:00	29.1 305.		62.6	29.67	22.7		
08/16/91 13:00:00		2 8.7	57.6	29.64	20.5		
08/16/91 14:00:00	29.2 321.		55.6	29.56	20.3		
08/16/91 15:00:00	29.4 321.	5 7.9	53.5	29.53	21.5		
08/16/91 16:00:00	29.9 311.		52.0	29.52	20.0		
08/16/91 17:00:00	29.9 310.			29.53	15.6		
08/16/91 18:00:00	29.4 306.		54.0	29.53	15.2		
08/16/91 19:00:00	28.7 292.		62.3	29.64	12.4		
08/16/91 20:00:00	25.2 194.		79.4	29.69	20.8		
08/16/91 21:00:00	22.8 150.			29.72	86.4		
08/16/91 22:00:00	20.7 234.			29.73	48.8		
08/16/91 23:00:00	20.0 134.		100.8	29.66	45.3		
Daily average	24.8 262.	1 5.5	80.1	29.59	23.4		
bully willage	21.0 202.		00.1	20.00	20.4		

Page 3

NAME: E&E	L	OCATION:	Ft.Deven	S		STATION	ID: 1
							1111111
CHAN NAME	Temp W.	DIR W.SPI	R. Hum	Press			
CHAN UNITS	Deg.C D	EG. MPI		in Hg	deg		
FULL SCALE		0.0 100.	0 100.0	32.00	99.9		
ZERO OFFSET	-30.0	0.0 0.0	0.0	26.00	0.0		
START / CHANNEL	01	02 0:	3 04	05	06		
							1111111
08/17/91 00:00:00	20.6 17	8.5 0.	5 100.8	29.66	51.8		
08/17/91 01:00:00	20.9 14	0.6 0.	7 100.8	29.65	35.2		
08/17/91 02:00:00	20.9 26	2.8 2.3		29.66	28.8		
08/17/91 03:00:00	20.7 18	4.1 1.3	3 100.8	29.66	26.6		
08/17/91 04:00:00	20.6 20	2.8 2.3 4.1 1.3 7.3 1.4	8 100.8	29.66	40.2		
08/17/91 05:00:00	20.5 11	1.9 0.1	8 100.8	29.66	55.5		
08/17/91 06:00:00		1.0 1.1	8 100.8	29.66	32.3		
08/17/91 07:00:00	23.2 21	9.3 3.	7 96.7	29.67	30.6		
08/17/91 08:00:00	24.9 22	7.9 4.		29.66	20.1		
08/17/91 09:00:00	29.2 22	8.8 4.	7 72.4	29.69	25.3		
08/17/91 10:00:00	29.3 22	6.7 6.	4 65.2	29.71	20.2		
08/17/91 11:00:00	31.9 21	7.6 9.	5 57.3	29.69	15.6		
08/17/91 12:00:00		9.2 11.3		29.66	15.3		
08/17/91 13:00:00		0.6 10.0	49.8	29.58	17.3		
08/17/91 14:00:00		2.7 10.		29.53	18.4		
08/17/91 15:00:00		9.5 9.1		29.50	17.5		
08/17/91 16:00:00		2.6 10.3		29.49	16.0		
08/17/91 17:00:00		1.8 11.		29.50	13.4		
08/17/91 18:00:00		1.3 10.		29.50	14.2		
08/17/91 19:00:00		3.0 9.9		29.51	14.2		
08/17/91 20:00:00		2.4 8.		29.53	12.3		
08/17/91 21:00:00		9.1 7.3		29.63	13.3		
08/17/91 22:00:00		6.8 7.		29.64	13.0		
08/17/91 23:00:00		1.9 7.9		29.55	13.4		
Daily average	26.8 21	1.6 6.3	3 75.8	29.61	23.3		

NAME: E&	E		LOCAT	ION: 1	Ft.Deven	S		STATION	ID: 1
CHAN NAME		Temp	W.DIR	W.SPD	R. Hum	Press	Sigé1		
CHAN UNIT	S	Deg.C	DEG.	MPH	*	in Hg	deg		
FULL SCAL	E	50.0	360.0			32.00	99.9		
ZERO OFFS		-30.0	0.0		0.0	26.00	0.0		
START / C	HANNEL	01	02	03	04	05	06		
	00:00:00		::::::						
08/18/91	00:00:00	23.7	218.6	6.5	95.1	29.54	15.1		
08/18/91	01:00:00	21.2	223.9	3.1	99.3	29.52	23.4		
08/18/91	02:00:00	20.4	251.3	1.8	100.7	29.51	29.2		
08/18/91	03:00:00	19.8	182.5	2.2		29.50	43.2		
08/18/91	04:00:00	20.0	205.0	2.8		29.49	23.1		
08/18/91	05:00:00	20.6	220.8	5.8	100.8	29.49	15.2		
08/18/91	06:00:00	20.9	225.5	4.7	100.8	29.50	20.4		
08/18/91	07:00:00	23.9	221.1	4.9	99.1	29.50	15.7		
08/18/91	08:00:00	25.0	223.3	6.1	89.2	29.49	18.2		
08/18/91	09:00:00	25.9	231.5	8.2	81.0	29.50	17.9		
08/18/91	10:00:00	28.8	238.8	10.7	73.2	29.49	16.3		
08/18/91	11:00:00	29.2	236.7	10.9	68.2	29.47	17.1		
	12:00:00	29.6	241.3	10.5	62.9	29.51	17.0		
08/18/91	13:00:00	30.8	259.8	12.5	55.8	29.53	16.8		
08/18/91	14:00:00	31.5	258.4	12.7	55.1	29.53	17.4		
08/18/91	15:00:00	31.8	243.0	11.7	55.4	29.52	16.0		
08/18/91	16:00:00	29.6	268.9	12.0	58.0	29.51	17.9		
08/18/91	17:00:00	23.0	280.8	4.3	83.3	29.50	41.1		
08/18/91	18:00:00	23.2	186.6	2.4	100.6	29.52	38.2		
08/18/91	19:00:00	21.8	211.7	2.4	100.8	29.55	51.6		
08/18/91	20:00:00	21.1	181.8	2.1	100.8	29.62	43.7		
08/18/91	21:00:00	20.9	207.4	1.3	100.8	29.66	51.2		
08/18/91	22:00:00	20.9	172.8			29.67	58.7		
08/18/91	23:00:00	21.0	130.5	1.3	100.8	29.66	32.2		
			201 6						
Daily ave	rade	24.4	221.8	5.9	86.8	29.53	27.4		

NAME: E&E	L	OCATION:	Ft.Devens			STATION	ID:	1
							11111	
CHAN NAME	Temp W.	DIR W.SPD	R. Hum P	ress S	Sigél			
CHAN UNITS	Deg.C D	EG. MPH	t % i	n Hg				
FULL SCALE	50.0 36			12.00	99.9			
ZERO OFFSET	-30.0	0.0 0.0	0.0 2	26.00	0.0			
START / CHANNEL	01	02 03	04	05	06			
							::::::	::
08/19/91 00:00:00	21.3 9	2.6 2.0	100.8 2	9.66	40.6			
08/19/91 01:00:00	20.7 9	3.7 4.5	100.8 2	9.65	10.4			
08/19/91 02:00:00	20.8 23	0.6 0.6	100.8 2	9.66	64.7			
08/19/91 03:00:00	21.5 17	0.6 2.3	100.8 2	9.64	32.2			
08/19/91 04:00:00	21 6 12	0.2 2.9	100.8 2	9.65	28.2			
08/19/91 05:00:00	21.3 12	9.8 3.3	100.8 2	9.65	14.0			
08/19/91 06:00:00	21.5 7	9.0 2.0	100.8 2	9.59	25.6			
08/19/91 07:00:00	21.4 3	9.8 3.3 9.0 2.0 6.7 2.9	100.8 2	9.53	28.1			
08/19/91 08:00:00	21.3 4	6.7 3.8	100.8 2	9.50	27.5			
08/19/91 09:00:00		2.3 5.0	100.8 2	9.50	34.8			
08/19/91 10:00:00	20.4 5	7.7 5.9	100.8 2	9.50	34.4			
08/19/91 11:00:00	19.9 7	1.5 7.1	100.8 2	9.41	29.6			
08/19/91 12:00:00	20.0 3	7.4 11.8	100.8 2		23.2			
08/19/91 13:00:00	21.2 2	8.9 17.8	100.8 2	9.15	15.7			
08/19/91 14:00:00		4.9 22.1	100.8 2	8.98	14.6			
08/19/91 15:00:00	19.7 1	5.2 24.8	100.8 2	8.94	17.5			
08/19/91 16:00:00		3.2 27.8	100.8 2	8.93	20.5			
08/19/91 17:00:00		6.7 22.4		8.99	16.7			
08/19/91 18:00:00		4.5 20.3		29.13	15.9			
08/19/91 19:00:00		4.2 13.0		9.30	16.4			
08/19/91 20:00:00		2.7 10.8		9.34	20.8			
08/19/91 21:00:00		3.1 9.9	100.8 2	9.50	15.5			
08/19/91 22:00:00	21.0 27	7.1 8.1	97.1 2	9.51	16.1			
08/19/91 23:00:00		9.4 7.4	94.8 2	9.49	14.2			
			244 S A	202	20.0			
Daily average	20.7 14	6.2 9.9	100.3 2	9.40	24.1			

NAME: E&E		LOCAT	ION: I	t.Deven	5		STATION	ID:	1
						:::::::		:::::	:::
CHAN NAME	Temp	W.DIR	W.SPD	R. Hum	Press	Sigél			
CHAN UNITS	Deg.C	DEG.	MPH	*	in Hq	deg			
FULL SCALE	50.0	360.0	100.0	100.0	32.00	99.9			
ZERO OFFSET	-30.0	0.0	0.0	0.0	26.00	0.0			
START / CHANNEL	01	02	03	04	05	06			
						******		11111	111
08/20/91 00:00:00	20.3	286.8	4.5	98.4	29.53	18.1			
08/20/91 01:00:00	19.5	299.4	4.0	100.7	29.58	20.1	-		
08/20/91 02:00:00	17.9	283.6	3.4	100.8	29.66	23.1			
08/20/91 03:00:00	16.6	290.6	3.8	100.8	29.67	15.2			
08/20/91 04:00:00	15.6	235.9	3.2	100.8	29.68	17.0			
08/20/91 05:00:00	16.6	213.6	1.2	100.8	29.70	77.9			
08/20/91 06:00:00	16.1	221.2	1.4	100.8	29.72	45.9			
08/20/91 07:00:00	18.5	105.4	1.8	99.8	29.70	36.9			
08/20/91 08:00:00	19.6	41.0	2.9	92.1	29.69	33.3			
08/20/91 09:00:00	20.4	54.5	3.7	79.5	29.66	36.0			
08/20/91 10:00:00	20.7	62.2	3.7	80.2	29.66	35.7			
08/20/91 11:00:00	23.2	102.9	5.7	76.3	29.68	22.0			
08/20/91 12:00:00	22.6	110.5	6.3	77.7	29.73	20.4			
08/20/91 13:00:00	21.4	121.0	7.3	78.1	29.73	17.5			
08/20/91 14:00:00	20.5	99.0	5.9	82.6	29.73	19.8			
08/20/91 15:00:00	20.5	84.5	5.4	83.6	29.68	26.8			
08/20/91 16:00:00	20.7	89.5	5.6	88.9	29.66	23.1			
08/20/91 17:00:00	19.9	95.4	7.1	93.6	29.67	20.1			
08/20/91 18:00:00	18.4	81.4	4.5	99.0	29.68	26.8			
08/20/91 19:00:00	16.1	80.2	4.2	100.2	29.69	27.9			
08/20/91 20:00:00	15.5	22.7	3.7	100.8	29.71	18.6			
08/20/91 21:00:00	15.3	16.7	4.8	100.8	29.71	14.1			
08/20/91 22:00:00	15.3	26.4	5.2	100.8	29.71	18.4			
08/20/91 23:00:00	15.3	22.1	5.1	100.8	29.71	14.4			
Daily average	18.6	126.9	4.3	93.2	29.68	26.2			

NAME: E&E	LOCA	TION: Ft.Devens	STATION ID:
CHAN NAME	Temp W.DIR	W.SPD R.Hum Pr	ess Sigél
CHAN UNITS	Deg.C DEG.		Hg deg
FULL SCALE	50.0 360.0	100.0 100.0 32	.00 99.9
ZERO OFFSET	-30.0 0.0		.00 0.0
START / CHANNEL	01 02	03 04	05 06
08/21/91 00:00:00	15.3 31.1	4.7 100.8 29	.70 22.0
08/21/91 01:00:00	15.3 36.7		.69 26.9
08/21/91 02:00:00	15.2 51.4	3.7 100.8 29	.68 23.2
08/21/91 03:00:00	15.0 45.7	4.7 100.8 29	.67 26.6
08/21/91 04:00:00	15.0 65.2		.66 29.2
08/21/91 05:00:00	16.8 31.4	5.0 100.8 29	.67 24.8
08/21/91 06:00:00	16.6 21.6	5.1 100.8 29	.69 16.5
08/21/91 07:00:00	16.6 30.7	5.1 100.8 29	.67 19.7
08/21/91 08:00:00	16.7 52.9		.67 33.5
08/21/91 09:00:00	16.1 51.7	4.2 100.8 29	.66 26.0
08/21/91 10:00:00	15.0 32.0	4.6 100.8 29	.66 21.2
08/21/91 11:00:00	15.3 43.2	4.2 100.8 29	.67 27.6
08/21/91 12:00:00	15.9 44.6	4.1 100.8 29	.73 25.6
08/21/91 13:00:00	15.9 44.6 16.4 59.2	3.1 100.8 29	.72 30.8
08/21/91 14:00:00	16.6 105.7	3.5 100.8 29	.71 19.8
08/21/91 15:00:00	17.1 84.0	1.8 100.8 29	.70 25.7
08/21/91 16:00:00	19.3 261.1		.70 46.5
08/21/91 17:00:00	19.6 196.1	2.4 100.8 29	.70 23.6
08/21/91 18:00:00	18.3 186.3		.71 12.8
08/21/91 19:00:00	16.7 197.2		.73 14.1
08/21/91 20:00:00	16.8 211.5		.71 18.1
08/21/91 21:00:00	16.5 177.3		.68 25.9
08/21/91 22:00:00	16.1 199.7		.72 51.8
08/21/91 23:00:00	16.7 141.2		.65 31.2
Daily average	16.5 98.2	3.6 100.8 29	.69 26.0
party average	10.5 90.2	3.0 100.0 29	.03 20.0

NAME: EGE		LOCATION:	Ft.Devens	5		STATION	ID: 1
							1111111
CHAN NAME	Temp W	.DIR W.SE	D R. Hum	Press	Sigé1		
CHAN UNITS	Deg.C	DEG. ME	PH %	in Hg	deg		
FULL SCALE	50.0 3	60.0 100.	0 100.0	32.00	99.9		
ZERO OFFSET	-30.0	0.0 0.	0.0	26.00	0.0		
START / CHANNEL	01	02 0	3 04	05	06		
08/22/91 00:00:00		06.1 2.		29.65	37.4		
08/22/91 01:00:00	16.3 1	94.9 1.	6 100.8	29.72	44.8		
08/22/91 02:00:00	16.1 2	81.0 2.	0 100.8	29.73	37.2		
08/22/91 03:00:00	16.4 1	97.1 1.	9 100.8	29.73	32.5		
08/22/91 04:00:00	17.1 2	02.8 1.	3 100.8	29.73	27.9		
08/22/91 05:00:00		26.3 1.	2 100.8	29.67	29.5		
08/22/91 06:00:00	17.1 2	13.4 2.	1 100.8	29.66	27.3		
08/22/91 07:00:00		39.2 4.	5 100.8	29.67	11.4		
08/22/91 08:00:00	22.8 2	42.1 4.	3 96.0	29.66	22.4		
08/22/91 09:00:00	25.1 2	79.2 6.		29.65	24.7	-	
08/22/91 10:00:00		80.6 6.		29.73	22.7		
08/22/91 11:00:00		Miss Mis		Miss	Miss		
08/22/91 12:00:00		Miss Mis		Miss	Miss		
08/22/91 13:00:00		Miss Mis		Miss	Miss		
08/22/91 14:00:00	Miss	Miss Mis	s Miss	Miss	Miss		
08/22/91 15:00:00		Miss Mis		Miss	Miss		
08/22/91 16:00:00	Miss !	Miss Mis		Miss	Miss		
08/22/91 17:00:00		Miss Mis	s Miss	Miss	Miss		
08/22/91 18:00:00	Miss	Miss Mis	s Miss	Miss	Miss		
08/22/91 19:00:00		Miss Mis		Miss	Miss		
08/22/91 20:00:00		Miss Mis		Miss	Miss		
08/22/91 21:00:00	Miss	Miss Mis	s Miss	Miss	Miss		
08/22/91 22:00:00		Miss Mis		Miss	Miss		
08/22/91 23:00:00	Miss	Miss Mis		Miss	Miss		
Dadday success	10 0 2	21 0 2	0 06 6	20 60	29.0		
Daily average	18.8 2	31.9 3.	0 96.6	29.69	29.0		

NAME: E&E	LO	CATION:	Ft.Devens	S		STATION I	D:
							1111
CHAN NAME	Temp W.D	IR W.SPD	R. Hum	Press	Sigé1		
CHAN UNITS	Deg.C DE	G. MPH	8	in Hg	deg		
FULL SCALE	50.0 360	.0 100.0	100.0	32.00	99.9		
ZERO OFFSET			0.0	26.00	0.0		
START / CHANNEL	01	02 03		05	06		
00 (25 (01 00-00-00	16 7 261		100.6	30.23	17.1		
08/25/91 01:00:00	15.4 0	.0 0.0	100.8		20.6		
08/25/91 02:00:00	14.5 181	.4 1.3		30.24	14.2		
08/25/91 03:00:00	12.2 269	.4 1.8	100.8		16.9		
08/25/91 00:00:00 08/25/91 01:00:00 08/25/91 02:00:00 08/25/91 03:00:00 08/25/91 04:00:00 08/25/91 05:00:00 08/25/91 06:00:00	11.6 265	.0 0.8	100.8	30.25	13.1		
08/25/91 05:00:00	11.1 173	.4 1.4	100.8	30.27	15.6		
08/25/91 06:00:00	12.3 256	.5 0.5	100.8	30.29	20.5		
08/25/91 07:00:00	16.1 7	.9 3.0	94.5	30.29	15.3		
08/25/91 08:00:00		.9 4.4	78.2	30.29	26.6		
08/25/91 09:00:00	21.1 72			30.29	40.1		
08/25/91 10:00:00	Miss Mi			Miss	Miss		
08/25/91 11:00:00	Miss Mi	ss Miss	Miss	Miss	Miss		
08/25/91 12:00:00	Miss Mi			Miss	Miss		
08/25/91 13:00:00	Miss Mi			Miss	Miss		
08/25/91 14:00:00	Miss Mi	ss Miss	Miss	Miss	Miss		
08/25/91 15:00:00	Miss Mi			Miss	Miss		
08/25/91 16:00:00	Miss Mi	ss Miss	Miss	Miss	Miss		
08/25/91 17:00:00	Miss Mi	ss Miss	Miss	Miss	Miss		
08/25/91 18:00:00	Miss Mi	ss Miss	Miss	Miss	Miss		
08/25/91 19:00:00	Miss Mi		Miss	Miss	Miss		
08/25/91 20:00:00	Miss Mi			Miss	Miss		
08/25/91 21:00:00	Miss Mi			Miss	Miss		
08/25/91 22:00:00	Miss Mi			Miss	Miss		
08/25/91 23:00:00	Miss Mi			Miss	Miss		
Daily average	14.6 159	.0 1.7	96.8	30.26	18.4		

NAME: E&E	L	OCATION:	Ft.Devens	STATION ID: 1
1111111111111111111111111				
CHAN NAME	Temp W.	DIR W.SPD	R. Hum Press	Sigé1
CHAN UNITS	Deg.C D	EG. MPH		
FULL SCALE		0.0 100.0		
ZERO OFFSET		0.0 0.0		
START / CHANNEL	01	02 03		
1111111111111111111111111	1111111111		***********	36.7
08/23/91 00:00:00	20.6 16	0.3 3.6	99.0 29.72	36.7
08/23/91 01:00:00		0.5 5.4	92.9 29.73	
08/23/91 02:00:00		0.7 6.3		
08/23/91 03:00:00		5.8 5.9	90.4 29.73	
08/23/91 04:00:00		1.2 5.5	89.4 29.67	
08/23/91 05:00:00	21.1 25	5.5 6.5	88.0 29.66	
08/23/91 06:00:00	20.8 24	4.1 3.8	90.4 29.68	19.8
08/23/91 07:00:00		1.8 1.5		35.2
08/23/91 08:00:00		6.4 2.8	82.6 29.73	34.4
08/23/91 09:00:00	24.7 27	0.9 4.6	77.1 29.73	19.7
08/23/91 10:00:00		4.0 6.4	66.3 29.73	21.8
08/23/91 11:00:00	29.5 32	6.2 6.5	58.2 29.72	26.2
08/23/91 12:00:00		6.5 7.6		
08/23/91 13:00:00	29.8 33	5.9 6.4		28.6
08/23/91 14:00:00		9.4 7.3	46.1 29.70	
08/23/91 15:00:00		9.8 6.0	46.5 29.70	
08/23/91 16:00:00		4.5 4.1	45.3 29.71	
08/23/91 17:00:00	30.2 26	7.0 4.1		23.3
08/23/91 18:00:00		9.4 1.5		
08/23/91 19:00:00		0.3 1.2	70.4 29.86	49.9
08/23/91 20:00:00		4.8 1.5		32.5
08/23/91 21:00:00		9.8 1.9		28.5
08/23/91 22:00:00	20.2 18		100.8 29.87	
08/23/91 23:00:00		4.2 4.6	100.6 29.89	
Daily average	24.6 24	2.5 4.5	75.1 29.75	24.2

Page 1

NAME: E&E	LOC	ATION:	Ft.Devens		STATION ID: 1
******************			***********		
CHAN NAME	Temp W.DI	R W.SPD	R.Hum Pres	s Sigél	
CHAN UNITS	Deg.C DEG				
FULL SCALE	50.0 360.	0 100.0		0 99.9	
ZERO OFFSET	-30.0 0.		0.0 26.0	0.0	
START / CHANNEL	01 0	2 03	04 0	5 06	
08/24/91 00:00:00	20.7 9.				
08/24/91 01:00:00	20.2 15.		97.3 29.9		
08/24/91 02:00:00	19.8 28.		87.7 30.0		
08/24/91 03:00:00	16.5 100.				
08/24/91 04:00:00	16.0 16.	2 3.4	92.3 30.0	7 20.1	
08/24/91 05:00:00	15.6 93.	7 4.0	96.7 30.0	9 10.2	
08/24/91 06:00:00	15.6 177.	4 3.2	99.6 30.1	0 13.5	
08/24/91 07:00:00	17.0 8.	4 4.6			
08/24/91 08:00:00	19.8 36.	5 4.8			
08/24/91 09:00:00	20.4 45.	0 5.1	67.3 30.0	3 28.9	
08/24/91 10:00:00	20.8 37.	2 5.5		6 26.5	
08/24/91 11:00:00	23.9 73.				
08/24/91 12:00:00	25.3 36.	2 4.7	57.7 30.0		
08/24/91 13:00:00	25.1 99.				
08/24/91 14:00:00	24.7 48.				
08/24/91 15:00:00	25.2 48.	2 3.6		6 39.1	
08/24/91 16:00:00	26.1 67.			5 34.6	
08/24/91 17:00:00	26.9 104.				
08/24/91 18:00:00	24.0 116.		65.2 30.0		
08/24/91 19:00:00	20.4 121.	7 7.1	73.9 30.0		
08/24/91 20:00:00	20.8 97.				
08/24/91 21:00:00	20.2 41.				
08/24/91 22:00:00	17.8 8.				
08/24/91 23:00:00	15.3 257.				
	77,5	7.15		2777	
Daily average	20.7 70.	4 4.1	76.2 30.0	6 24.1	

NAME: E&E		LOCATION:	Ft.Devens	STATION	ID: 1
***************					
CHAN NAME	Temp W	.DIR W.SPI	R.Hum Press	Sigé1	
CHAN UNITS	Deg.C	DEG. MP		deg	
FULL SCALE	50.0 3	50.0 100.0	100.0 32.00	99.9	
ZERO OFFSET	-30.0	0.0 0.0	0.0 26.00	0.0	
START / CHANNEL	01	02 03			552527
***************				***************	1111111
08/13/91 00:00:00		Miss Miss			
08/13/91 01:00:00		Miss Miss	Miss Miss	Miss	
08/13/91 02:00:00		Miss Miss		Miss	
08/13/91 03:00:00	Miss	Miss Miss			
08/13/91 04:00:00	Miss I	Miss Miss	Miss Miss	Miss	
08/13/91 05:00:00	Miss I	Miss Miss	Miss Miss	Miss	
08/13/91 06:00:00	Miss I	Miss Miss	Miss Miss	Miss	
08/13/91 07:00:00	Miss I	Miss Miss	Miss Miss	Miss	
08/13/91 08:00:00	25.0	56.9 1.3			
08/13/91 09:00:00	27.8	45.6 1.5	58.9 29.69	57.6	
08/13/91 10:00:00	29.8	44.2 3.6	50.7 29.72		
08/13/91 11:00:00	29.7	53.8 4.4	47.4 29.69	48.5	
08/13/91 12:00:00	29.3	74.0 4.1		48.7	
08/13/91 12:00:00 08/13/91 13:00:00 08/13/91 14:00:00	30.0	59.0 4.5	45.0 29.56	47.4	
08/13/91 14:00:00	33.0	78.6 4.5	41.5 29.52	47.9	
08/13/91 15:00:00	32.9	56.3 4.1	41.6 29.50	46.2	
08/13/91 16:00:00		79.5 4.9	41.6 29.48	39.2	
08/13/91 17:00:00	34.1	70.3 4.8	40.4 29.48	32.6	
08/13/91 18:00:00	32.3	32.0 5.3	43.8 29.47	22.9	
08/13/91 19:00:00	29.2	17.5 4.3			
08/13/91 20:00:00	25.0 23	29.3 3.6	68.2 29.51	16.4	
08/13/91 21:00:00	24.9 2		74.0 29.53	11.9	
08/13/91 22:00:00	24.7 1	79.3 3.5	77.2 29.54	15.6	
08/13/91 23:00:00	22.8 2	34.1 2.5			
Daily average	29.1	99.4 3.8	53.1 29.46	37.1	

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Air Monitoring: Section No.: Fort Devens

В Revision No.: 0

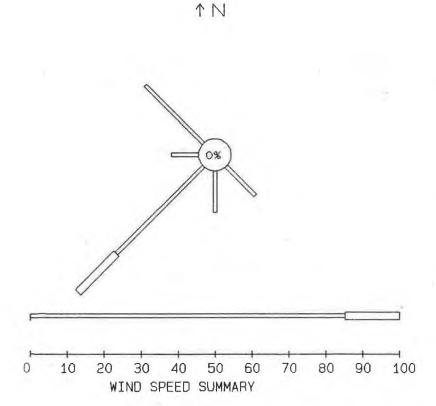
January 1992

Date:

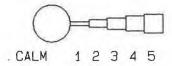
APPENDIX B

WIND ROSES

## WIND DATA 1500 8/16/91 - 1600 8/17/91 PM-10 SAMPLES SHL-004 TO SHL-006

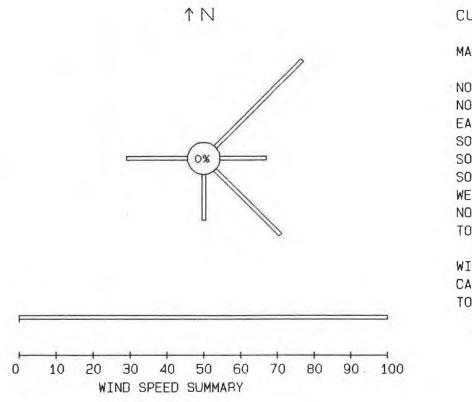


CUMULATIVE	WIND	SPE	ED SU	MMARY	(PE	RCENT)
MAGNITUDE	1	2	3	4	5	TOTAL
NORTH	0.0	0.0	0.0	0.0	0.0	0.0
NORTHEAST	0.0	0.0	0.0	0.0	0.0	0.0
EAST	0.0	0.0	0.0	0.0	0.0	0.0
SOUTHEAST	11.1	0.0	0.0	0.0	0.0	11.1
SOUTH	11.1	0.0	0.0	0.0	0.0	11.1
SOUTHWEST	33.3	14.8	0.0	0.0	0.0	48.1
WEST	7.4	0.0	0.0	0.0	0.0	7.4
NORTHWEST	22.2	0.0	0.0	0.0	0.0	22.2
TOTAL	85.2	14.8	0.0	0.0	0.0	
WINDS	100.0					
CALM -	0.0					
TOTAL	100.0					



MAGNITUDE: CALM - S = 0 : 1 - 0<S<=10 : 2 - 10<S<=21 : (S=KNOTS) 3 - 21<S<=33 : 4 - 33<S<=47 : 5 - S>47

### WIND DATA 0900 8/24/91 - 0900 8/25/91 • PM-10 SAMPLES SHL.007 & SHL-008



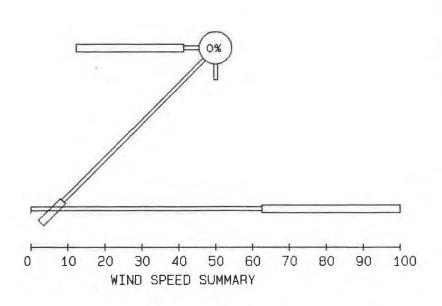
CUMULATIVE	WIND	SPEE	SPEED SUMMARY		(PE	RCENT)
MAGNITUDE	1	2	3	4	5	TOTAL
NORTH	0.0	0.0	0.0	0.0	0.0	0.0
NORTHEAST	33.3	0.0	0.0	0.0	0.0	33.3
EAST	12.5	0.0	0.0	0.0	0.0	12.5
SOUTHEAST	25.0	0.0	0.0	0.0	0.0	25.0
SOUTH	12.5	0.0	0.0	0.0	0.0	12.5
SOUTHWEST	0.0	0.0	0.0	0.0	0.0	0.0
WEST	15.7	0.0	0.0	0.0	0.0	16.7
NORTHWEST	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	100.0	0.0	0.0	0.0	0.0	
WINDS	100.0					
CALM	0.0					
TOTAL	100.0					

CALM 1 2 3 4 5

MAGNITUDE: CALM - S = 0 : 1 - 0<S<=10 : 2 - 10<S<=21 : (S=KNOTS) 3 - 21<S<=33 : 4 - 33<S<=47 : 5 - S>47  $M^2 F^2 A$ 

### WIND DATA 1700 8/17/91 - 1700 8/18/91 PM-10 SAMPLE CSB-001





### CUMULATIVE WIND SPEED SUMMARY (PERCENT)

MAGNITUDE	1	2	3	4	5	TOTAL	
NORTH	0.0	0.0	0.0	0.0	0.0	0.0	
NORTHEAST	0.0	0.0	0.0	0.0	0.0	0.0	
EAST	0.0	0.0	0.0	0.0	0.0	0.0	
SOUTHEAST	0.0	0.0	0.0	0.0	0.0	0.0	
SOUTH	4.2	0.0	0.0	0.0	0.0	4.2	
SOUTHWEST	54.2	8.3	0.0	0.0	0.0	62.5	
WEST	4.2	29.2	0.0	0.0	0.0	33.3	
NORTHWEST	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL	62.5	37.5	0.0	0.0	0.0		
WINDS	100.0						
CALM	0.0						

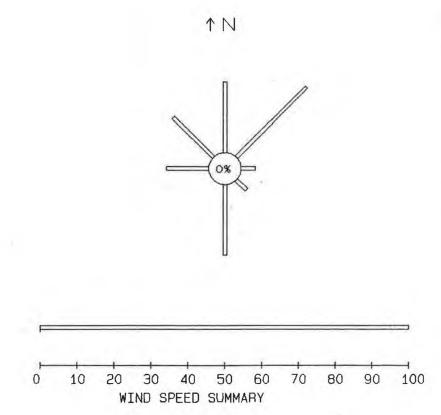
CALM 1 2 3 4 5

MAGNITUDE: CALM - S = 0 : 1 - 0<S<=10 : 2 - 10<S<=21 : (S=KNOTS) 3 - 21<S<=33 : 4 - 33<S<=47 : 5 - S>47

100.0

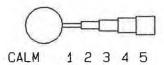
TOTAL

### WIND DATA 0800 8/24/91 - 0900 8/25/91 PM-10 SAMPLE CSB-002



MAGNITUDE	1	2	3	4	5	TOTAL	
NORTH	19.2	0.0	0.0	0.0	0.0	19.2	
NORTHEAST	26.9	0.0	0.0	0.0	0.0	26.9	
EAST	3.8	0.0	0.0	0.0	0.0	3.8	
SOUTHEAST	3.8	0.0	0.0	0.0	0.0	3.8	
SOUTH	19.2	0.0	0.0	0.0	0.0	19.2	
SOUTHWEST	0.0	0.0	0.0	0.0	0.0	0.0	
WEST	11.5	0.0	0.0	0.0	0.0	11.5	
NORTHWEST	15.4	0.0	0.0	0.0	0.0	15.4	
TOTAL	100.0	0.0	0.0	0.0	0.0		
WINDS	100.0						
CALM	0.0						

CUMULATIVE WIND SPEED SUMMARY (PERCENT)

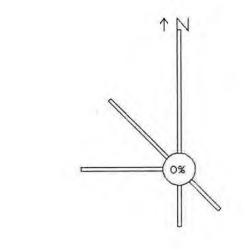


MAGNITUDE: CALM - S = 0 : 1 - 0<S<=10 : 2 - 10<S<=21 : (S=KNOTS) 3 - 21<S<=33 : 4 - 33<S<=47 : 5 - S>47

100.0

TOTAL

### WIND DATA 0700 - 1600 8/23/91 VOC SAMPLES SHL-001 TO SHL-005



MAGNITUDE	1	2
NORTH	33.3	0.
NORTHEAST	0.0	0.
EAST	0.0	0.
SOUTHEAST	11.1	0.
SOUTH	11.1	0.
SOUTHWEST	0.0	0.
WEST	22.2	0.
NORTHWEST	22.2	0.
TOTAL	100.0	0.
WINDS	100.0	

0.0

100.0

CALM

TOTAL

CUMULATIVE WIND SPEED SUMMARY

3

0.0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

(PERCENT)

5 TOTAL

0.0 33.3

0.0 11.1 0.0 11.1

0.0 22.2

0.0 22.2

0.0

0.0

0.0

0.0

0.0

0.0

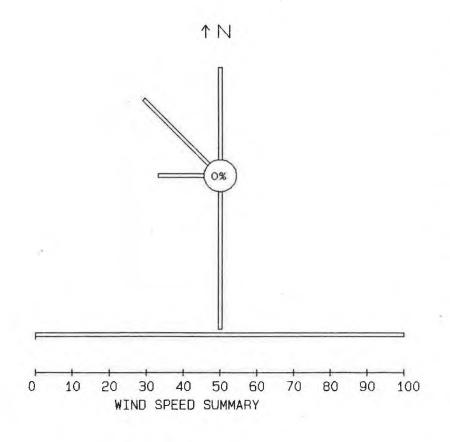
0.0

-		-+-	-		-1-	-1-	-+-		-1-	-1
0	10	20	30	40	50	60	70	80	90	10

CALM 1 2 3 4 5

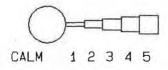
MAGNITUDE: CALM - S = 0 : 1 - 0<S<=10 : 2 - 10<S<=21 : (S=KNOTS) 3 - 21<S<=33 : 4 - 33<S<=47 : 5 - S>47

### WIND DATA 1600 - 0000 8/23/91 VOC SAMPLES SHL-006 TO SHL-010



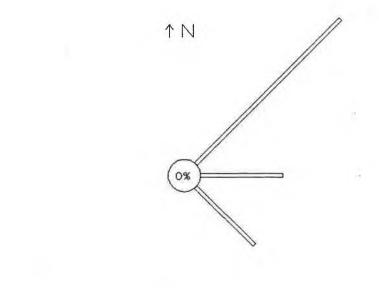
CUMULATIVE	MIND	SPEED	SUMMARY	(PERCENT)

MAGNITUDE	1	2	3	4	5	TOTAL	
NORTH	25.0	0.0	0.0	0.0	0.0	25.0	
NORTHEAST	0.0	0.0	0.0	0.0	0.0	0.0	
EAST	0.0	0.0	0.0	0.0	0.0	0.0	
SOUTHEAST	0.0	0.0	0.0	0.0	0.0	0.0	
SOUTH	37.5	0.0	0.0	0.0	0.0	37.5	
SOUTHWEST	0.0	0.0	0.0	0.0	0.0	0.0	
WEST	12.5	0.0	0.0	0.0	0.0	12.5	
NORTHWEST	25.0	0.0	0.0	0.0	0.0	25.0	
TOTAL	100.0	0.0	0.0	0.0	0.0		
WINDS	100.0						
CALM	0.0						
TOTAL	100.0						



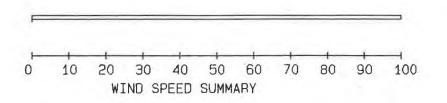
MAGNITUDE: CALM - S = 0 : 1 - 0<S<=10 : 2 - 10<S<=21 : (S=KNOTS) 3 - 21<S<=33 : 4 - 33<S<=47 : 5 - S>47

### WIND DATA 0900 - 1700 8/24/91 VOC SAMPLE CSB-001

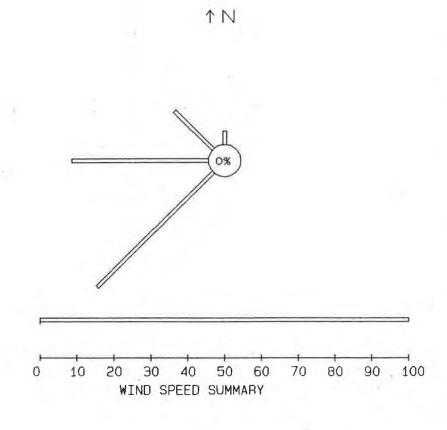


MAGNITUDE	1	2	3	4	5	TOTAL	
NORTH	0.0	0.0	0.0	0.0	0.0	0.0	
NORTHEAST	55.6	0.0	0.0	0.0	0.0	55.6	
EAST	22.2	0.0	0.0	0.0	0.0	22.2	
SOUTHEAST	22.2	0.0	0.0	0.0	0.0	22.2	
SOUTH	0.0	0.0	0.0	0.0	0.0	0.0	
SOUTHWEST	0.0	0.0	0.0	0.0	0.0	0.0	
WEST	0.0	0.0	0.0	0.0	0.0	0.0	
NORTHWEST	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL	100.0	0.0	0.0	0.0	0.0		
WINDS	100.0						
CALM	0.0						
TOTAL	100.0						

CUMULATIVE WIND SPEED SUMMARY (PERCENT)



### WIND DATA 1200 8/15/91 - 1400 8/16/91 . PM-10 SAMPLES SHL-001 TO SHL-003



001102711212			7- 7472			
MAGNITUDE	1	2	3	4	5	TOTAL
NORTH	3.7	0.0	0.0	0.0	0.0	3.7
NORTHEAST	0.0	0.0	0.0	0.0	0.0	0.0
EAST	0.0	0.0	0.0	0.0	0.0	0.0
SOUTHEAST	0.0	0.0	0.0	0.0	0.0	0.0
SOUTH	0.0	0.0	0.0	0.0	0.0	0.0
SOUTHWEST	44.4	0.0	0.0	0.0	0.0	44.4
WEST	37.0	0.0	0.0	0.0	0.0	37.0
NORTHWEST	14.8	0.0	0.0	0.0	0.0	14.8
TOTAL 1	00.0	0.0	0.0	0.0	0.0	
WINDS 1	00.0					
CALM	0.0					
TOTAL 1	0.00					

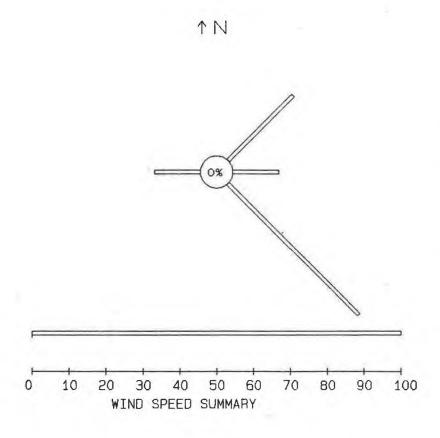
CUMULATIVE WIND SPEED SUMMARY (PERCENT)

CALM 1 2 3 4 5

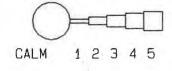
MAGNITUDE: CALM - S = 0 : 1 - 0<S<=10 : 2 - 10<S<=21 : (S=KNOTS) 3 - 21<S<=33 : 4 - 33<S<=47 : 5 - S>47

11015 HV 123

### WIND DATA 1600 - 0000 8/24/91 VOC SAMPLE CSB-002



CUMULATIV	E WIND	SPE	ED SU	MMARY	(PE	RCENT)
MAGNITUDE	1	2	3	4	5	TOTAL
NORTH	0.0	0.0	0.0	0.0	0.0	0.0
NORTHEAST	25.0	0.0	0.0	0.0	0.0	25.0
EAST	12.5	0.0	0.0	0.0	0.0	12.5
SOUTHEAST	50.0	0.0	0.0	0.0	0.0	50.0
SOUTH	0.0	0.0	0.0	0.0	0.0	0.0
SOUTHWEST	0.0	0.0	0.0	0.0	0.0	0.0
WEST	12.5	0.0	0.0	0.0	0.0	12.5
NORTHWEST	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	100.0	0.0	0.0	0.0	0.0	
WINDS	100.0					
CALM	0.0					
TOTAL	100.0					



MAGNITUDE: CALM - S = 0 : 1 - 0<S<=10 : 2 - 10<S<=21 : (S=KNOTS) 3 - 21<S<=33 : 4 - 33<S<=47 : 5 - S>47

Air Monitoring: Fort Devens

Section No.: C
Revision No.: 0

Date: January 1992

APPENDIX C

CALIBRATION DATA

Sampler Location: SHEPLEYS HILL LANDFILL FT DEVENS Date: 81

Conditions:

301.4 Ta(K):

Pa(mmHa):

Ts(K):

301.4

Ps(mmHg): 750.1

Sampler Model:

Sampler S/N: CAE 1170 Motor No ..

Orifice S/N:

Orifice Cal. Date: 8/35/90 Orifice Model: 25A

Orifice Qa Cal. Relationship:

m= 1.27

b= -0.40 = 19998

Calibration Conducted by:_

Cal. Point	Plate No.	Total ΔH20	Qa(orifice) flow rate m3/min	Sampler Response I	Corrected Response IC
-1	18	5,90	1.53	1.66	1.05
2	13	4.80	1.41	1,49	0.94
3	10	3.75	1,28	1:30	0.82
4	7	2,50	1,10	1.03	0.65
5	5	1.55	0.94	,80	0.50

Qa(orifice): =  $1/m \left[\sqrt{\Delta H20(Ta/Pa)}\right] - b$ 

IC = I (V(Ta/Pa))

Sampler's Qa Calibration Relationship:

Qa(orifice), x-axis, IC, y-axis

m= 0.93 b= -0.38 r= .999

Set Point Flow Rate: 1.13

SFR = 1.13(Ps/Pa)(Ta/Ts)

Sampler Seasonally Adjusted Calibration Relationship

ms = 1.47 bs= -0.6

 $ms = m / [\sqrt{(Ts/Ps)}]$ 

 $bs = b / [\sqrt{(Ts/Ps)}]$ 

Sampler Set Point: 1.06

Sampler Location: SHOPLAS HILL LANDFILL FT DEVAIS Date: 8 18 91

Conditions: Ta(K): 301.4 Pa(mmHq): 749.1

Ts(K): 301.4 Ps(mmHg): 750.1

Sampler Model: IP-ID : Sampler S/N: CAE 1170 Motor No:

Orifice S/N: S 49 Orifice Cal. Date: 8/3 5/90 Orifice Model: 25A

Orifice Qa Cal. Relationship: m= 1.27 b= -0.40 r= .9998

Calibration Conducted by: TWF

			X	*	. 4
Cal. Point	Plate No.	Total ΔH20	Qa(orifice) flow rate m3/min	Sampler Response I	Corrected Response IC
44 <b>1</b>	18	5,90	1.53	1.66	1.05
2	13	4.80	1.41	1,49	0.94
3	10	3.75	1,28	1:30	0.82
-4	7	2,50	1,10	1.03	0.65
5	5	1.55	0.94	,80	0.50

Qa(orifice): =  $1/m \left[\sqrt{\Delta H20(Ta/Pa)} - b\right]$ 

 $IC = I(\sqrt{Ta/Pa})$ 

Sampler's Qa Calibration Relationship:

Qa(orifice), x-axis, IC, y-axis

m= 0.93 b= -0.38 r= .999

Set Point Flow Rate: 1.13

SFR = 1.13(Ps/Pa)(Ta/Ts)

Sampler Seasonally Adjusted Calibration Relationship

ms = 1.47 bs= -0.6

 $ms = m / [\sqrt{(Ts/Ps)}]$ 

bs = b /[\(\(\tau\)Ps)]

Sampler Set Point: 1.06

Sampler Location: SHEPLEY'S HILL LANDFILL FT. DEVENS Date: 8 -15-91

298.6 Pa(mmHq): 749.8 Ta(K): _ Conditions:

> Ts(K): 299.2 Ps(mmHg): 749.6

Sampler Model: IP-10 Sampler S/N: CAE 556 Motor No:

Orifice Cal Date: 8-30-90 Orifice Model: 25A 5-49 Orifice S/N:

> Orifice Qa Cal. Relationship: m=_ 1.27 b= -0.40 r= .9998

> > TWF Calibration Conducted by:_

Cal. Point	Plate No.	Total ΔH20	Qa(orifice) flow rate m3/min	Sampler Response I	Corrected Response IC
1	18	5.75	1.51	54.0	34.0
2	13	4.45	1.37	49.0	30.9
3	10	3.45	1.24	43.5	77.4
4	7	2.30	1.07	35.5	22.4
5	5	1.50	0.93	28.0	17.6

Qa(orifice): =  $1/m [\sqrt{\Delta H20(Ta/Pa)}] \cdot b$ 

 $IC = I(\sqrt{Ta/Pa})$ 

Sampler's Qa Calibration Relationship:

Qa(orifice), x-axis, IC, y-axis

m= 28.33 b= -8.2 r= 0997

Set Point Flow Rate: 1.127

SFR = 1.13(Ps/Pa)(Ta/Ts)

Sampler Seasonally Adjusted Calibration Relationship

ms = 44.97 bs = -13.05  $ms = m / [\sqrt{(Ts/Ps)}]$ 

 $bs = b / [\sqrt{(Ts/Ps)}]$ 

Sampler Set Point: 37.5

Sampler Location: SHERLEY'S HILL LANDFILL - FTDEVENS Date: 8-15-91

Conditions: Ta(K): 298.6 Pa(mmHg): 749.8

Ts(K): 299.2 Ps(mmHg): 749.6

134-11-88

Sampler Model: TP-10 - 8000 Sampler S/N:cae 1170 Motor No:.

Orifice S/N: S49 Orifice Cal. Date: 8-30-90 Orifice Model: 25A

Orifice Oa Cal. Relationship: m= 1.27 b= -0.40 r= . 9998

Calibration Conducted by: TWF

Cal Point	Plate No.	Total ΔH20	Qa(orifice) flow rate m3/min	Sampler Response I	Corrected Response IC
1	18	5.70	1.50	1.75	1.10
2.	13	4.50	1.37	1.57	0.99
3	10	3.50	1.75	1.37	0.86
4	7	7.30	1.07	1.10	0.69
5	5	1.45	0.92	0.83	0.52

Qa(orifice): =  $1/m \left[ \sqrt{\Delta H20(Ta/Pa)} - b \right]$ 

 $IC = I(\sqrt{Ta/Pa})$ 

Sampler's Qa Calibration Relationship:

Qa(orifice), x-axis, IC, y-axis

m= 1.00 b= 0.39 r= .999

Set Point Flow Rate: 1.127

SFR = 1.13(Ps/Pa)(Ta/Ts)

Sampler Seasonally Adjusted Calibration Relationship

ms = 163 bs = -0.25

 $ms = m / [\sqrt{(Ts/Ps)}]$ 

 $bs = b/[\sqrt{(Ts/Ps)}]$ 

Sampler Set Point: (.16

Sampler Location: FT DEVENS BACKGROUND Date: 8-15-91

Ta(K): 298.1 Pa(mmHq): 750.6 Conditions:

Ps(mmHg): 749.6 Ts(K): 299.2

Sampler Model: IP-ID Sampler S/N: 4557 Motor No:.

Orifice Cal Date: 8-30-90 Orifice Model: 25A 549 Orifice S/N:

> m= 1.27 Orifice Qa Cal. Relationship: b= -0.40 r= .9998

> > Calibration Conducted by: TWF

Ca!. Point	Plate No.	Total ΔH20	Qa(orifice) flow rate m3/min	Sampler Response I	Corrected Response IC	
1	18	5.65	1.50	61	38.43	
2	13	4.40	1.36	54	34.02	
3	10	3.45	1.24	48	30.24	
4	7	7.30	1.07	39	24.57	
5	5	1.45	0.92	30	18.90	

Qa(orifice): =  $1/m \left[\sqrt{\Delta H20(Ta/Pa)}\right] \cdot b$ 

 $IC = I[\sqrt{Ta/Pa}]$ 

Sampler's Qa Calibration Relationship:

Qa(orifice), x-axis, IC, y-axis

m= 335 b= -11.57 r= ,999

Set Point Flow Rate: 1.125

SFR = 1.13(Ps/Pa)(Ta/Ts)

Sampler Seasonally Adjusted Calibration Relationship

ms = 53.2 bs = -18.4

ms = m /[\(\(\tau\)[\(\tay\)]

 $bs = b / [\sqrt{(Ts/Ps)}]$ 

Sampler Set Point: 41-3 41.4

Fort Devens

Air Monitoring: Section No.: D Revision No.: 0

Date: January 1992

APPENDIX D

LABORATORY REPORTS



# **ANALYTICAL**

### CERTIFICATE OF ANALYSIS

Ecology & Environment 368 Pleasantview Drive Lancaster, NY 14086

Attn: Tom Ferrera Date: September 27, 1991

Project Number 41072

This is the Certificate of Analysis for the following samples:

Client Project ID:

Ecology & Environment; Fort Devens RI

Date Received:

August 28, 1991

Work Order:

X1-08-196

Number of Samples:

10

Sample Type:

Air

#### I. Introduction

Ten air samples arrived at ITAS Cincinnati on August 28, 1991. The samples were labeled as follows:

HV-SHL-1	HV-SHL-8
HV-SHL-2	HV-SHL-9
HV-SHL-3	HV-CSB-01
HV-SHL-4	HV-CSB-02
HV-SHL-7	HV-SHL-5 (1)

- (1) This sample was not included on any Ecology & Environment paperwork submitted.
- II. Analytical Results/Methodology

m Rotella

The analytical results for this report are presented by analytical test. The data will include sample identification information, the analytical results, and the appropriate detection limits.

The analyses requested and methods used are listed on the following page.

Reviewed and Approved by:

Lauri Rotella Project Manager

108196

American Council of Independent Laboratories International Association of Environmental Testing Laboratories American Association for Laboratory Accreditation

Client: Ecology & Environment

Work Order: X1-08-196

10819601

IT ANALYTICAL SERVICES CINCINNATI, OH

### II. Analytical Results/Methodology (con't)

- * Arsenic, Cadmium, Chromium, Lead and Selenium by Graphite Furnace Atomic Absorption
- * Silver by Inductively Coupled Plasma Spectroscopy
- * Total particulate analyzed gravimetrically

### III. Quality Control

Immediately following the analytical data for the samples can be found the QA/QC information that pertains to these samples. The purpose of this information is to demonstrate that the data enclosed is scientifically valid and defensible. This QA/QC data is used to assess the laboratory's performance during the analysis of the samples it accompanies. All quantitations were performed within the calibrated range of the analytical instrument.

Client:

Ecology & Environment

Work Order: X1-08-196

10819602

IT ANALYTICAL SERVICES CINCINNATI, OH

### Analytical Results, mg

Olinat Cample ID	Tab Wa	7/1/ #	Total
Client Sample ID	Lab No.	Filter #	Particulate
HV-SHL-1	01	89952161	44
HV-SHL-2	02	89952164	46
HV-SHL-3	03	89952163	49
HV-SHL-4	04	89952165	55
HV-SHL-7	05	89952170	24
HV-SHL-8	06	89952171	21
HV-SHL-9	07	89952172	ND
HV-CSB-01	80	89952168	81
HV-CSB-02	09	89952169	38
HV-SHL-5	10	89952166	59
Detection Limit			0.002

ND = Not detected above the reported detection limit

Ecology & Environment

Work Order: X1-08-196

10819603

### IT ANALYTICAL SERVICES CINCINNATI, OH

### Analytical Results, ug

Client Sample ID	HV-SHL-1	HV-SHL-2	HV-SHL-3	HV-SHL-4	
Lab No.	01	02	03	04	
Analyte					Detection Limit
Arsenic	ND	ND	ND	ND	2
Cadmium	0.4	0.7	0.3	0.4	0.1
Chromium	2.3	2.4	9.5	2.9	0.2
Lead	7.9	8.2	7.8	4.6	0.9
Selenium	ND	325	- 325	ND	2
Silver	ND	-		ND	0.5
Client Sample ID	HV-SHL-7	HV-SHL-8	HV-SHL-9	HV-CSB-01	
A. A					
Lab No.	05	06	07	08	
					Detection
Analyte					Limit
Arsenic	ND	ND	ND	ND	2
Cadmium	0.3	0.4	0.2	-	0.1
Chromium	2.4	1.9	3.1	-	0.2
Lead	8.0	5.4	0.96	-	0.9
Selenium	_	44	ND	3.2	2
Silver	-	-	ND	ND	0.5
Client Sample ID	HV-CSB-02	HV-SHL-5			
Lab No.	09	10			<b>=</b> 27.00 (1.00)
Analyte		Service and the service of the servi	4		Detection Limit
Arsenic	ND	ND			2
Cadmium	-	0.4	1.5		0.1
Chromium	_	4.2			0.1
Lead		12			0.9
Selenium	ND	- 12	7		
Silver					2
PIIAGE	ND	7.7			0.5

ND = Not detected above the reported detection limit

- = Not requested

Client:

Ecology & Environment

Work Order: X1-08-196

10819604

IT ANALYTICAL SERVICES CINCINNATI, OH

### Quality Assurance Data

## Quality Control Standard Reference Solution

Analyte	Theoretical Value	Percent Recovery
Arsenic	0.075	92.5
Cadmium	0.0075	95.3
Chromium	0.0075	88.0
Lead	0.075	101
Selenium	0.075	85.5
Silver	1	110

ecology and environment, inc.

30 PLEASANTVIEW DRIVE, LANCASTER, NEW YORK 1408E, TEL 716/884-8080 Intermedian Security on the Environment

X1-08-196

							CHA	N-OF-CUST	ODY RECORD			1-	luci		Pa
Project No UC-2 Samples	061		+	De	/ens	/	Project Manager Bob Faeld Team Leas						1/2		
mã	then	K	im		her	ur faunce	Keit	h Dav	ison			1	200	2/// ne	MARKS
STATION NUMBER	DATE	TIME	SAN	PLE	-	SAMPLE INFORMATION EXPECTED COMPOUNDS (Concent		STATIO	N LOCATION	NUMBER OF CON TAINERS	1	100	34	Filter #	=
HL-I	8/15/41			1		Metals / Particul	utus	ELEN	1	1	V	N		899526	
SHL-2	11			1	1		2	DWE		1	V			899526	1
HL-3	h			1	1			DWN			V			8995263	3
SHL-4	8/164			1	1			ELEN		1	1	VV	80	899 5265	
HL-7	8/24/2			1	1			DWE		1	V	V		899 5270	
HL-8	7/24/4			1	1			DWS		1	1	V		8995271	
此中	8/24/4				1			BLAN	4	11	V	11		8995272	BLAN
CSB-01	8/18/1				1			BOOE	100N	t	1	V		899.5268	
CSB-02	8/2441				1			800E	400N	1	V	1	1	8995269	
				1											
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ecology and environment, inc.
368 PLEASANTVIEW DRIVE, LANCASTER, NEW YORK 14086, TEL. 716/684-8060 International Specialists in the Environment

X1-08-196

CHAIN-OF-CUST

ma	the	v K	11		1	hour	June -	Krit	h Dav
STATION DATE TIME			TYPE	MPLE YPE		SAMPLE INFORMATION		STATI	
NUMBER	DAIL	338-3	TIME ON THE EXPECTED COMPOUNDS (Concentration)*				ation)*		
SHL-1	8/15/91				V	170	tals / Particula	itus	ELE
SHL-2	u				V		, , , , ,		DWE
HL-3	4				V				DMV
HL-4	8/16/1				V				ELE
	8/24/91				V	,			DWE
	8/24/9				V	/			DW:
sth-9	8/24/9				<b>V</b>				BLAN
SB-01	8/18/91				V				800E
CSB-02	8/2491		-		V				800E
Belingyish	ed By: (S	ignature)		1		ime: 91°   420	Received By: (Signature)	Relinquished By	: (Signature)

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

^{*}See CONCENTRATION RANGE on back of form.



## ANALYTICAL SERVICES

## CERTIFICATE OF ANALYSIS

Date: October 7, 1991

Ecology & Environment 368 Pleasantview Drive Lancaster, NY 14086

Attn: Mr. Tom Ferrera

Job Number 41072

This is the Certificate of Analysis for the following samples:

Client Project ID:

Ecology & Environment

Date Received:

August 28, 1991

Work Order:

X1-08-195

Number of Sample Type:

13 Air

### I. Introduction

Thirteen canister samples arrived at ITAS Cincinnati on August 28, 1991. The samples were labeled as follows:

Canister # SHL-1 Canister # SHL-6 Canister # SHL-11
Canister # SHL-2 Canister # SHL-7 Canister # CSB-1
Canister # SHL-3 Canister # SHL-8 Canister # CSB-2
Canister # SHL-4 Canister # SHL-9
Canister # SHL-5 Canister # SHL-10

### II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. The data will include sample identification information, the analytical results, and the appropriate detection limits.

The analysis requested was Volatile Organics by Gas Chromatography/Mass Spectrometry EPA Method 1014.

The analyses were performed at Air Toxics, LTD. under ITAS Subcontract.

Reviewed and Approved by:

Lauri Rotella Project Manager

108195

Client: Ecology and Environment

Work Order: X

10819501

X1-08-195

## IT ANALYTICAL SERVICES CINCINNATI, OH

### III. Quality Control

Immediately following the analytical data for the samples can be found the QA/QC information that pertains to these samples. The purpose of this information is to demonstrate that the data enclosed is scientifically valid and defensible. This QA/QC data is used to assess the laboratory's performance during the analysis of the samples it accompanies. All quantitations were performed within the calibrated range of the analytical instrument.

### IV. Comments

As part of routine Internal Quality Control, a method spike was analyzed with these samples. The recovery for Benzyl Chloride (59%) on this analysis was below internal acceptance limits (70-130).

Ecology and Environment

Work Order: X1-08-195

10819502

IT ANALYTICAL SERVICES CINCINNATI, OH

# Analyte Concentration, PPBV

Client Sample ID		Canister #	
Ish Cample No.		SHL-1 01	
Lab Sample No		01	
Date analayzed:		9/20/91	Detection
Dilution Factor:	1.0		Limit
Toluene		1.7	1
Benzene		ND	1
1,2-Dichloroethane		ND	1
Total Xylenes		ND	1
Carbon Tetrachloride		ND	1
Chloroethane		ND	1
Chloroform		ND	1
Chloromethane		ND	1
trans-1, 2-Dichloroethe	ene	ND	1
cis-1,2-Dichloroethene	9	ND	1
Dichloromethane		ND	1
Tetrachloroethene		ND	1
1,1,1-Trichloroethane		ND	1
Trichloroethene		ND	1
Vinyl Chloride		ND	1
1,1-Dichloroethene		ND	1
3-Chloropropene		ND	1
1,1,2-Trichlorotriflu	oroethane	ND	1
1,1-Dichloroethane		ND	1
1,1,2-Trichloroethane		ND	1
Chlorobenzene		ND	1
1,2-Dichloropropane		ND	1
cis-1,3-Dichloroproper	ne	ND	1
trans-1, 3-Dichloropro	pene	ND	1
Ethyl Benzene		ND	1
1,1,2,2-Tetrachloroetl	hane	ND	1
Benzyl Chloride		ND	1
1,3-Dichlorobenzene		ND	1
1,4-Dichlorobenzene		ND	1
1,2-Dichlorobenzene		ND	1
Carbon Disulfide		ND	1
Styrene		ND	1
1,3-Butadiene		ND	1
Hexachlorobutadiene		ND	1
n-Pentane		ND	1
n-Octane		ND	1
Cumene		ND	1
1,2,4-Trichlorobenzene	9	ND	1
Dichlorodifluoromethan	ne	ND	1 .

Ecology and Environment

Work Order: X1-08-195

10819503

IT ANALYTICAL SERVICES CINCINNATI, OH

# Analyte Concentration, PPBV

Client Sample ID	Canister # SHL-2	
Lab Sample No	02	
Date analayzed: Dilution Factor: 2.2	9/20/91	Detection Limit
Dilution factor: 2.2		Limit
Toluene	4.9	3
Benzene	ND	3
	ND ND	3
1,2-Dichloroethane		3
Total Xylenes Carbon Tetrachloride	ND ND	
Chloroethane	ND ND	3
Chloroform	ND	3
Chloromethane	ND	3
		3
trans-1,2-Dichloroethene	ND	3
cis-1,2-Dichloroethene Dichloromethane	ND	3
	ND	
Tetrachloroethene	ND	3
1,1,1-Trichloroethane	ND	3
Trichloroethene	ND	3
Vinyl Chloride	ND	3
1,1-Dichloroethene	ND	3
3-Chloropropene	ND	3
1,1,2-Trichlorotrifluoroethane	ND	3 3
1,1-Dichloroethane	ND	
1,1,2-Trichloroethane	ND	3
Chlorobenzene	ND	3
1,2-Dichloropropane	ND	3
cis-1,3-Dichloropropene	ND	3
trans-1,3-Dichloropropene	ND	3
Ethyl Benzene	. ND	3
1,1,2,2-Tetrachloroethane	ND	3
Benzyl Chloride	ND	3
1,3-Dichloropenzene	ND	3
1,4-Dichlorobenzene	ND	3
1,2-Dichlorobenzene	ND	3
Carbon Disulfide	ND	3
Styrene	ND	3
1,3-Butadiene	ND	3
Hexachlorobutadiene	ND	3
n-Pentane	ND	3
n-Octane	ND	3
Cumene	ND	3
1,2,4-Trichlorobenzene	ND	3 .
Dichlorodifluoromethane	ND	3 .

Ecology and Environment

Work Order: X1-08-195

10819504

IT ANALYTICAL SERVICES CINCINNATI, OH

# Analyte Concentration, PPBV

Client Sample ID	Canister # SHL-3	
Lab Sample No	03	
Date analayzed:	9/20/91	Detection
Dilution Factor: 1.0	24,74,246,2470	Limit
Toluene	1.3	1
Benzene	ND	1
1,2-Dichloroethane	ND	1
Total Xylenes	ND	1
Carbon Tetrachloride	ND	1
Chloroethane	ND	1
Chloroform	ND	1
Chloromethane	ND	1
trans-1,2-Dichloroethene	ND	1
cis-1,2-Dichloroethene	ND	1
Dichloromethane	ND	1
Tetrachloroethene	ND	1
1,1,1-Trichloroethane	ND	1
Trichloroethene	ND	1
Vinyl Chloride	ND	1
1,1-Dichloroethene	ND	1
3-Chloropropene	ND	1
1,1,2-Trichlorotrifluoroethane	ND	1
1,1-Dichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Chlorobenzene	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1
trans-1,3-Dichloropropene	ND	1
Ethyl Benzene	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Benzyl Chloride	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
1.2-Dichlorobenzene	ND	1
Carbon Disulfide	ND	1
Styrene	ND	1
1,3-Butadiene	ND	1
Hexachlorobutadiene	ND	1
n-Pentane	ND	1
n-Octane	ND	1
Cumene	ND	1
1,2,4-Trichlorobenzene	ND	1
Dichlorodifluoromethane	1.1	i .
	1825	

Ecology and Environment

Work Order: X1-08-195

10819505

IT ANALYTICAL SERVICES CINCINNATI, OH

# Analyte Concentration, PPBV

Client Sample ID	Canister #	
College State College Annual College C	SHL-4	
Lab Sample No	04	
Date analayzed:	9/20/91	Detection
Dilution Factor: 1.0		Limit
	**********	
Toluene	1.1	1
Benzene	ND	1
1,2-Dichloroethane	ND	1
Total Xylenes	ND	1
Carbon Tetrachloride	ND	1
Chloroethane	ND	1
Chloroform	ND _	1
Chloromethane	ND	1
trans-1,2-Dichloroethene	ND	1
cis-1,2-Dichloroethene	ND	1
Dichloromethane	ND	1
Tetrachloroethene	ND	1
1,1,1-Trichloroethane	ND	1
Trichloroethene	ND	1
Vinyl Chloride	ND	1
1,1-Dichloroethene	ND	1
3-Chloropropene	ND	1
1,1,2-Trichlorotrifluoroethane	ND	1
1,1-Dichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Chlorobenzene	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1
trans-1,3-Dichloropropene	ND	1
Ethyl Benzene	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Benzyl Chloride	ND	1
1,3-Dichlorobenzene	ND 🕏	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1
Carbon Disulfide	ND	1
Styrene	ND	1
1,3-Butadiene	ND	1
Hexachlorobutadiene	ND	1
n-Pentane	ND	1
n-Octane	ND	1
Cumene	ND	1
1,2,4-Trichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1 .

Ecology and Environment Client:

Work Order: X1-08-195

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10819507

IT ANALYTICAL SERVICES CINCINNATI, OH

# Analyte Concentration, PPBV

Client Sample ID	Canister # SHL-5	
Lab Sample No	05	
Day Sample No	7	
Date analayzed:	9/21/91	Detection
Dilution Factor: 1.0		Limit
CHANGE LANGUAGE		
Toluene	1.4	1
Benzene	ND	1
1,2-Dichloroethane	ND	1
Total Xylenes	ND	1
Carbon Tetrachloride	ND	1
Chloroethane	ND	1
Chloroform	ND	1
Chloromethane	ND	1
trans-1,2-Dichloroethene	ND	1
cis-1,2-Dichloroethene	ND	1
Dichloromethane	ND	1
Tetrachloroethene	ND	1
1,1,1-Trichloroethane	ND	1
Trichloroethene	ND	1
Vinyl Chloride	ND	1
1,1-Dichloroethene	ND	1
3-Chloropropene	ND	1
1,1,2-Trichlorotrifluoroethan	ne ND	1
1,1-Dichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Chlorobenzene	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1
trans-1,3-Dichloropropene	ND	1
Ethyl Benzene	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Benzyl Chloride	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1
Carbon Disulfide	ND	1
Styrene	ND	1
1,3-Butadiene	ND	1
Hexachlorobutadiene	ND	1
n-Pentane	ND	1
n-Octane	ND	1
Cumene	ND	1
1,2,4-Trichlorobenzene	ND	1
Dichlorodifluoromethane	1.1	1 .

Ecology and Environment

Work Order: X1-08-195

10819506

IT ANALYTICAL SERVICES CINCINNATI, OH

# Analyte Concentration, PPBV

Client Sample ID	Canister #	
-2.4.28.30.20	SHL-6	
Lab Sample No	06	
Date analayzed:	9/21/91	Detection
Dilution Factor: 1.0		Limit
Market State		
Toluene	1.4	1
Benzene	ND	1
1,2-Dichloroethane	ND	1
Total Xylenes	ND	1
Carbon Tetrachloride	ND	1
Chloroethane	ND	1
Chloroform	ND	1
Chloromethane	ND	1
trans-1,2-Dichloroethene	ND	1
cis-1,2-Dichloroethene	ND	1
Dichloromethane	ND	1
Tetrachloroethene	ND	1
1,1,1-Trichloroethane	ND	1
Trichloroethene	ND	1
Vinyl Chloride	ND	1
1,1-Dichloroethene	ND	1
3-Chloropropene	ND	1
1,1,2-Trichlorotrifluoroethane	ND	1
1,1-Dichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Chlorobenzene	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1
trans-1,3-Dichloropropene	ND	1
Ethyl Benzene	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Benzyl Chloride	ND	1
1,3-Dichlorobenzene	- ND	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1
Carbon Disulfide	ND	1
Styrene	ND	1
1,3-Butadiene	ND	1
Hexachlorobutadiene	ND	1
n-Pentane	ND	1
n-Octane	ND	1
Cumene	ND	ī
1,2,4-Trichlorobenzene	ND	1
Dichlorodifluoromethane	ND	ī.

Ecology and Environment

Work Order: X1-08-195

10819508

IT ANALYTICAL SERVICES CINCINNATI, OH

# Analyte Concentration, PPBV

Client Sample ID		Canister # SHL-7	
Lab Sample No		07	
Date analayzed:		9/21/91	Detection
Dilution Factor:	1.0		Limit
255000000000000000000000000000000000000			
Toluene		ND	1
Benzene		ND	1
1,2-Dichloroethane		ND	1
Total Xylenes		ND	1
Carbon Tetrachloride		ND	1
Chloroethane		ND	1
Chloroform		ND	1
Chloromethane		ND	ī
trans-1,2-Dichloroether	ne	ND	ī
cis-1,2-Dichloroethene		ND	ī
Dichloromethane		ND	ī
Tetrachloroethene		ND	î
1,1,1-Trichloroethane		ND	1
Trichloroethene		ND	1
Vinyl Chloride		ND	1
1,1-Dichloroethene		ND ND	1
3-Chloropropene			1
- BOND - BOND - BOND - BOND		ND	
1,1,2-Trichlorotrifluor	coetnane	ND	1
1,1-Dichloroethane		ND	1
1,1,2-Trichloroethane		ND	1
Chlorobenzene		ND	1
1,2-Dichloropropane		ND	1
cis-1,3-Dichloropropene		ND	1
trans-1,3-Dichloroprope	ene	ND	1
Ethyl Benzene		ND	1
1,1,2,2-Tetrachloroetha	ine	ND	1
Benzyl Chloride		ND	1
1,3-Dichlorobenzene		ND	1
1,4-Dichlorobenzene		ND	1
1,2-Dichlorobenzene		ND	1
Carbon Disulfide		ND	1
Styrene		ND	1
1,3-Butadiene		ND	1
Hexachlorobutadiene		ND	1
n-Pentane		ND	1
n-Octane		ND	1
Cumene		ND	1
1,2,4-Trichlorobenzene		ND	1
Dichlorodifluoromethane	10	ND	1 .

Ecology and Environment

Work Order: X1-08-195

10819509

IT ANALYTICAL SERVICES CINCINNATI, OH

# Analyte Concentration, PPBV

Client Sample ID	Canister # SHL-8	
Lab Sample No	08	
Date analayzed:	9/21/91	Detection
Dilution Factor: 1.0	2622622	Limit
	**********	
Toluene	1.3	1
Benzene	ND	1
1,2-Dichloroethane	ND	1
Total Xylenes	ND	1
Carbon Tetrachloride	ND	1
Chloroethane	ND	1
Chloroform	ND	1 _
Chloromethane	ND	1
trans-1,2-Dichloroethene	ND	1
cis-1,2-Dichloroethene	ND	1
Dichloromethane	ND	1
Tetrachloroethene	ND	1
1,1,1-Trichloroethane	ND	1
Trichloroethene	ND	1
Vinyl Chloride	ND	1
1,1-Dichloroethene	ND	1
3-Chloropropene	ND	1
1,1,2-Trichlorotrifluoroethane	ND	1
1,1-Dichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Chlorobenzene	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1
trans-1,3-Dichloropropene	ND	1
Ethyl Benzene	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Benzyl Chloride	ND	1
1,3-bichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1
Carbon Disulfide	ND	1
Styrene	ND	1
1,3-Butadiene	ND	1
Hexachlorobutadiene	ND	1
n-Pentane	ND	1
n-Octane	ND	1
Cumene	ND	1
1,2,4-Trichlorobenzene	ND	1 .
Dichlorodifluoromethane	1.4	1

Client: Ecology and Environment

Work Order: X1-08-195

10819510

IT ANALYTICAL SERVICES CINCINNATI, OH

# Analyte Concentration, PPBV

Client Sample ID		Canister #	
-1-1-6-2-3-2-3-3-3-3-3-3-3-3-3-3-3-3-3-3-3-3		SHL-9	
Lab Sample No		09	
Date analayzed:		9/21/91	Detection
Dilution Factor:	1.0	200 624 6 50	Limit
Toluene		1.3	1
Benzene		ND	1
1,2-Dichloroethane		ND	1
Total Xylenes		ND	1
Carbon Tetrachloride		ND	1
Chloroethane		ND	1
Chloroform		ND	1
Chloromethane		ND	1
trans-1,2-Dichloroethen	ie	ND	1
cis-1,2-Dichloroethene		ND	1
Dichloromethane		ND	1
Tetrachloroethene		ND	1
1,1,1-Trichloroethane		ND	1
Trichloroethene		ND	1
Vinyl Chloride		ND	1
1,1-Dichloroethene		ND	1
3-Chloropropene		ND	1
1,1,2-Trichlorotrifluor	oethane	ND	1
1,1-Dichloroethane		ND	1
1,1,2-Trichloroethane		ND	1
Chlorobenzene		ND	1
1,2-Dichloropropane		ND	1
cis-1,3-Dichloropropene		ND	1
trans-1,3-Dichloroprope	ne	ND	1
Ethyl Benzene		ND	1
1,1,2,2-Tetrachloroetha	ne	ND	1
Benzyl Chloride		ND	1
1,3-Dichlorobenzene		ND	1
1,4-Dichlorobenzene		ND	1
1,2-Dichlorobenzene		ND	1
Carbon Disulfide		ND	1
Styrene		ND	1
1,3-Butadiene		ND	1
Hexachlorobutadiene		ND	1
n-Pentane		ND	1
n-Octane		ND	1
Cumene		ND	1
1,2,4-Trichlorobenzene		ND	1
Dichlorodifluoromethane		1.2	1 .

Client: Ecology and Environment

Work Order: X1-08-195

10819511

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IT ANALYTICAL SERVICES CINCINNATI, OH

# Analyte Concentration, PPBV

Client Sample ID	Canister # SHL-10	
Lab Sample No	10	
Lab bampie no	10	
Date analayzed:	9/21/91	Detection
Dilution Factor: 1.0	3,000	Limit
Toluene	4.5	1
Benzene	ND	1
1,2-Dichloroethane	ND	1
Total Xylenes	1.3	1
Carbon Tetrachloride	ND	1
Chloroethane	ND	1
Chloroform	ND	1
Chloromethane	ND	1
trans-1,2-Dichloroethene	ND	1
cis-1,2-Dichloroethene	ND	1
Dichloromethane	ND	1
Tetrachloroethene	ND	1
1,1,1-Trichloroethane	ND	1
Trichloroethene	ND	1
Vinyl Chloride	ND	1
1,1-Dichloroethene	ND	1
3-Chloropropene	ND	1
1,1,2-Trichlorotrifluoroethane	ND	1
1,1-Dichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Chlorobenzene	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1
trans-1,3-Dichloropropene	ND	1
Ethyl Benzene	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Benzyl Chloride	ND	1
1,3-Dichlorobenzene	ND	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1
Carbon Disulfide	ND	ī
Styrene	ND	1
1,3-Butadiene	ND	1
Hexachlorobutadiene	ND	1
n-Pentane	ND	1
n-Octane	ND	1
Cumene	ND	î
1,2,4-Trichlorobenzene	ND	ī
Dichlorodifluoromethane	1.1	i .

Client: Ecology and Environment

Work Order: X1-08-195

10819512

# IT ANALYTICAL SERVICES CINCINNATI, OH

# Analyte Concentration, PPBV

Client Sample ID		Canister # SHL-11	
Lab Sample No		11	
Date analayzed:		9/21/91	Detection
Dilution Factor:	1.0	2/24/32	Limit
Dilucion rector.	1.0		DIMIC ,
Toluene		ND	1
Benzene		ND	1
1,2-Dichloroethane		ND	î
Total Xylenes		ND	ī
Carbon Tetrachloride		ND	i
Chloroethane	•	ND	ī
Chloroform		ND	1
Chloromethane		ND	i
trans-1,2-Dichloroet	hene	ND	1
cis-1,2-Dichloroethe		ND	î
Dichloromethane	72.54	ND	ī
Tetrachloroethene		ND	î
1,1,1-Trichloroethan		ND	ī
Trichloroethene		ND	ī
Vinyl Chloride		ND	î
1,1-Dichloroethene		ND	ī
3-Chloropropene		ND	î
1,1,2-Trichlorotrifl	uoroethane	ND	î
1,1-Dichloroethane		ND	1
1,1,2-Trichloroethan		ND	1
Chlorobenzene	3	ND	ī
1,2-Dichloropropane		ND	i
cis-1,3-Dichloroprop	ene	ND	ī
trans-1,3-Dichloropr		ND	1
Ethyl Benzene	opene	ND	i
1,1,2,2-Tetrachloroe	thane	ND	i
Benzyl Chloride		ND	i
1,3-Dichlorobenzene		מא	ī
1,4-Dichlorobenzene		ND	î
1,2-Dichlorobenzene		ND	1
Carbon Disulfide		ND ND	1
Styrene		ND	î
1,3-Butadiene		ND	1
Hexachlorobutadiene		ND	i
n-Pentane		ND	ī
n-Octane		ND	i
Cumene		ND ND	
1,2,4-Trichlorobenze	ne.	ND ND	1
Dichlorodifluorometh		ND ND	1
PICHIOLOGILITACIONECH	ane	MD	1

Ecology and Environment Client:

Work Order: X1-08-195

10819513

IT ANALYTICAL SERVICES CINCINNATI, OH

# Analyte Concentration, PPBV

Client Sample ID	Canister #	
	CSB-1	
Lab Sample No	12	
Date analayzed:	9/21/91	Detection
Dilution Factor: 1.0		Limit
Toluene	1.3	1
Benzene	ND	1
1,2-Dichloroethane	ND	1
Total Xylenes	3.1	1
Carbon Tetrachloride	ND	1
Chloroethane	ND	1
Chloroform	ND	1
Chloromethane	ND	1
trans-1,2-Dichloroethene	ND	1
cis-1,2-Dichloroethene	ND	1
Dichloromethane	ND	1
Tetrachloroethene	ND	1
1,1,1-Trichloroethane	ND	1
Trichloroethene	ND	1
Vinyl Chloride	ND	1
1,1-Dichloroethene	ND	1
3-Chloropropene	ND	1
1,1,2-Trichlorotrifluoroethane	ND	1
1,1-Dichloroethane	ND	1
1,1,2-Trichloroethane	ND	1
Chlorobenzene	ND	1
1,2-Dichloropropane	ND	1
cis-1,3-Dichloropropene	ND	1
trans-1,3-Dichloropropene	ND	1
Ethyl Benzene	ND	1
1,1,2,2-Tetrachloroethane	ND	1
Benzyl Chloride	ND	1
1,3-Dichlorobenzene	ND -	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1
Carbon Disulfide	ND	1
Styrene	ND	1
1,3-Butadiene	ND	1
Hexachlorobutadiene	ND	1
n-Pentane	ND	1
n-Octane	ND	1
Cumene	ND	1
1,2,4-Trichlorobenzene	ND	1
Dichlorodifluoromethane	ND	1 .

Client: Ecology and Environment Work Order: X1-08-195

10819514

IT ANALYTICAL SERVICES CINCINNATI, OH

# Analyte Concentration, PPBV

Date analayzed: 9/21/91   Detection   Dilution Factor: 1.0   Detection Factor: 1.0	Client Sample ID	Canister # CSB-2	
Dilution Factor: 1,0   Limit	Lab Sample No	13	
Toluene	Date analayzed:	9/21/91	Detection
Benzene	Dilution Factor: 1.0		Limit
Benzene			
1,2-Dichloroethane	Toluene	ND	1
Total Xylenes	Benzene	ND	1
Carbon Tetrachloride	1,2-Dichloroethane	ND	1
Chlorocthane Chloroform Chloromethane ND Chloromethane ND Chloromethane ND Cis-1,2-Dichlorocthene ND Dichloromethane ND Itarans-1,2-Dichlorocthene ND Intertachlorocthene ND Itartachlorocthene ND Itartachlorocthane ND Ita	Total Xylenes	ND	1
Chloroform Chloromethane Chloromethane Cris-1,2-Dichloroethene Cris-1,2-Dichloroethene Cris-1,2-Dichloroethene Dichloromethane ND Dichloromethane ND Dichloromethane ND Dichloroethene ND Dichloropropene ND Dichloropropene ND Dichloroethane ND Dichloroethane ND Dichloropropene ND Dichlorobenzene ND Dichlo	Carbon Tetrachloride	ND	1
Chloromethane	Chloroethane	ND	1
trans-1,2-Dichloroethene	Chloroform	ND	1
cis-1,2-Dichloroethene         ND         1           Dichloromethane         ND         1           Tetrachloroethene         ND         1           1,1,1-Trichloroethane         ND         1           Trichloroethene         ND         1           Vinyl Chloride         ND         1           1,1-Dichloroethene         ND         1           3-Chloropropene         ND         1           1,1,2-Trichloroethane         ND         1           1,1,2-Trichloroethane         ND         1           Chlorobenzene         ND         1           Chlorobenzene         ND         1           1,2-Dichloropropane         ND         1           cis-1,3-Dichloropropene         ND         1           trans-1,3-Dichloropropene         ND         1           Ethyl Benzene         ND         1           1,1,2,2-Tetrachloroethane         ND         1           1,3-Dichlorobenzene         ND         1           1,4-Dichlorobenzene         ND         1           1,4-Dichlorobenzene         ND         1           2carbon Disulfide         ND         1           Styrene         ND <t< td=""><td>Chloromethane</td><td>ND</td><td>1</td></t<>	Chloromethane	ND	1
Dichloromethane	trans-1,2-Dichloroethene	ND	1
Tetrachloroethene	cis-1,2-Dichloroethene	ND	1
1,1,1-Trichloroethane	Dichloromethane	ND	1
Trichloroethene	Tetrachloroethene	ND	1
Trichloroethene	1,1,1-Trichloroethane	ND	1
1,1-Dichloroethene       ND       1         3-Chloropropene       ND       1         1,1,2-Trichlorotrifluoroethane       ND       1         1,1-Dichloroethane       ND       1         1,1,2-Trichloroethane       ND       1         Chlorobenzene       ND       1         1,2-Dichloropropane       ND       1         cis-1,3-Dichloropropene       ND       1         trans-1,3-Dichloropropene       ND       1         Ethyl Benzene       ND       1         1,1,2,2-Tetrachloroethane       ND       1         Benzyl Chloride       ND       1         1,3-Dichlorobenzene       ND       1         1,4-Dichlorobenzene       ND       1         1,2-Dichlorobenzene       ND       1         Carbon Disulfide       ND       1         Styrene       ND       1         1,3-Butadiene       ND       1         Hexachlorobutadiene       ND       1         n-Pentane       ND       1         n-Ctane       ND       1         Cumene       ND       1         1,2,4-Trichlorobenzene       ND       1		ND	
1,1-Dichloroethene       ND       1         3-Chloropropene       ND       1         1,1,2-Trichlorotrifluoroethane       ND       1         1,1-Dichloroethane       ND       1         1,1,2-Trichloroethane       ND       1         Chlorobenzene       ND       1         1,2-Dichloropropane       ND       1         cis-1,3-Dichloropropene       ND       1         trans-1,3-Dichloropropene       ND       1         Ethyl Benzene       ND       1         1,1,2,2-Tetrachloroethane       ND       1         Benzyl Chloride       ND       1         1,3-Dichlorobenzene       ND       1         1,4-Dichlorobenzene       ND       1         1,2-Dichlorobenzene       ND       1         Carbon Disulfide       ND       1         Styrene       ND       1         1,3-Butadiene       ND       1         Hexachlorobutadiene       ND       1         n-Pentane       ND       1         n-Ctane       ND       1         Cumene       ND       1         1,2,4-Trichlorobenzene       ND       1	Vinyl Chloride	ND	
1,1,2-Trichlorotrifluoroethane       ND       1         1,1-Dichloroethane       ND       1         1,1,2-Trichloroethane       ND       1         Chlorobenzene       ND       1         1,2-Dichloropropane       ND       1         cis-1,3-Dichloropropene       ND       1         trans-1,3-Dichloropropene       ND       1         Ethyl Benzene       ND       1         1,1,2,2-Tetrachloroethane       ND       1         Benzyl Chloride       ND       1         1,3-Dichlorobenzene       ND       1         1,4-Dichlorobenzene       ND       1         1,2-Dichlorobenzene       ND       1         Carbon Disulfide       ND       1         Styrene       ND       1         1,3-Butadiene       ND       1         Hexachlorobutadiene       ND       1         n-Pentane       ND       1         n-Octane       ND       1         Cumene       ND       1         1,2,4-Trichlorobenzene       ND       1		ND	1
1,1,2-Trichlorotrifluoroethane       ND       1         1,1-Dichloroethane       ND       1         1,1,2-Trichloroethane       ND       1         Chlorobenzene       ND       1         1,2-Dichloropropane       ND       1         cis-1,3-Dichloropropene       ND       1         trans-1,3-Dichloropropene       ND       1         Ethyl Benzene       ND       1         1,1,2,2-Tetrachloroethane       ND       1         Benzyl Chloride       ND       1         1,3-Dichlorobenzene       ND       1         1,4-Dichlorobenzene       ND       1         1,2-Dichlorobenzene       ND       1         Carbon Disulfide       ND       1         Styrene       ND       1         1,3-Butadiene       ND       1         Hexachlorobutadiene       ND       1         n-Pentane       ND       1         n-Octane       ND       1         Cumene       ND       1         1,2,4-Trichlorobenzene       ND       1	3-Chloropropene	ND	1
1,1-Dichloroethane       ND       1         1,1,2-Trichloroethane       ND       1         Chlorobenzene       ND       1         1,2-Dichloropropane       ND       1         cis-1,3-Dichloropropene       ND       1         trans-1,3-Dichloropropene       ND       1         Ethyl Benzene       ND       1         1,1,2,2-Tetrachloroethane       ND       1         Benzyl Chloride       ND       1         1,3-Dichlorobenzene       ND       1         1,4-Dichlorobenzene       ND       1         1,2-Dichlorobenzene       ND       1         Carbon Disulfide       ND       1         Styrene       ND       1         1,3-Butadiene       ND       1         Hexachlorobutadiene       ND       1         n-Pentane       ND       1         n-Octane       ND       1         Cumene       ND       1         1,2,4-Trichlorobenzene       ND       1		ND	1
1,1,2-Trichloroethane       ND       1         Chlorobenzene       ND       1         1,2-Dichloropropane       ND       1         cis-1,3-Dichloropropene       ND       1         trans-1,3-Dichloropropene       ND       1         Ethyl Benzene       ND       1         1,1,2,2-Tetrachloroethane       ND       1         Benzyl Chloride       ND       1         1,3-Dichlorobenzene       ND       1         1,4-Dichlorobenzene       ND       1         1,2-Dichlorobenzene       ND       1         Carbon Disulfide       ND       1         Styrene       ND       1         1,3-Butadiene       ND       1         Hexachlorobutadiene       ND       1         n-Pentane       ND       1         n-Octane       ND       1         Cumene       ND       1         1,2,4-Trichlorobenzene       ND       1		ND	1
Chlorobenzene       ND       1         1,2-Dichloropropane       ND       1         cis-1,3-Dichloropropene       ND       1         trans-1,3-Dichloropropene       ND       1         Ethyl Benzene       ND       1         1,1,2,2-Tetrachloroethane       ND       1         Benzyl Chloride       ND       1         1,3-Dichlorobenzene       ND       1         1,4-Dichlorobenzene       ND       1         1,2-Dichlorobenzene       ND       1         Carbon Disulfide       ND       1         Styrene       ND       1         1,3-Butadiene       ND       1         Hexachlorobutadiene       ND       1         n-Pentane       ND       1         n-Octane       ND       1         Cumene       ND       1         1,2,4-Trichlorobenzene       ND       1		ND	
1,2-Dichloropropane       ND       1         cis-1,3-Dichloropropene       ND       1         trans-1,3-Dichloropropene       ND       1         Ethyl Benzene       ND       1         1,1,2,2-Tetrachloroethane       ND       1         Benzyl Chloride       ND       1         1,3-Dichlorobenzene       ND       1         1,4-Dichlorobenzene       ND       1         Carbon Disulfide       ND       1         Styrene       ND       1         1,3-Butadiene       ND       1         Hexachlorobutadiene       ND       1         n-Pentane       ND       1         n-Octane       ND       1         Cumene       ND       1         1,2,4-Trichlorobenzene       ND       1			
cis-1,3-Dichloropropene       ND       1         trans-1,3-Dichloropropene       ND       1         Ethyl Benzene       ND       1         1,1,2,2-Tetrachloroethane       ND       1         Benzyl Chloride       ND       1         1,3-Dichlorobenzene       ND       1         1,4-Dichlorobenzene       ND       1         Carbon Disulfide       ND       1         Styrene       ND       1         1,3-Butadiene       ND       1         Hexachlorobutadiene       ND       1         n-Pentane       ND       1         n-Octane       ND       1         Cumene       ND       1         1,2,4-Trichlorobenzene       ND       1	1,2-Dichloropropane	ND	
trans-1,3-Dichloropropene       ND       1         Ethyl Benzene       ND       1         1,1,2,2-Tetrachloroethane       ND       1         Benzyl Chloride       ND       1         1,3-Dichlorobenzene       ND       1         1,4-Dichlorobenzene       ND       1         1,2-Dichlorobenzene       ND       1         Carbon Disulfide       ND       1         Styrene       ND       1         1,3-Butadiene       ND       1         Hexachlorobutadiene       ND       1         n-Pentane       ND       1         n-Octane       ND       1         Cumene       ND       1         1,2,4-Trichlorobenzene       ND       1		ND	
Ethyl Benzene       ND       1         1,1,2,2-Tetrachloroethane       ND       1         Benzyl Chloride       ND       1         1,3-Dichlorobenzene       ND       1         1,4-Dichlorobenzene       ND       1         Carbon Disulfide       ND       1         Styrene       ND       1         1,3-Butadiene       ND       1         Hexachlorobutadiene       ND       1         n-Pentane       ND       1         n-Octane       ND       1         Cumene       ND       1         1,2,4-Trichlorobenzene       ND       1	** Out a Table 1 of The State of State of State of Table of Table 1 of Table		
1,1,2,2-Tetrachloroethane       ND       1         Benzyl Chloride       ND       1         1,3-Dichlorobenzene       ND       1         1,4-Dichlorobenzene       ND       1         1,2-Dichlorobenzene       ND       1         Carbon Disulfide       ND       1         Styrene       ND       1         1,3-Butadiene       ND       1         Hexachlorobutadiene       ND       1         n-Pentane       ND       1         n-Octane       ND       1         Cumene       ND       1         1,2,4-Trichlorobenzene       ND       1			
Benzyl Chloride       ND       1         1,3-Dichlorobenzene       ND       1         1,4-Dichlorobenzene       ND       1         1,2-Dichlorobenzene       ND       1         Carbon Disulfide       ND       1         Styrene       ND       1         1,3-Butadiene       ND       1         Hexachlorobutadiene       ND       1         n-Pentane       ND       1         n-Octane       ND       1         Cumene       ND       1         1,2,4-Trichlorobenzene       ND       1			
1,3-Dichlorobenzene       ND       1         1,4-Dichlorobenzene       ND       1         1,2-Dichlorobenzene       ND       1         Carbon Disulfide       ND       1         Styrene       ND       1         1,3-Butadiene       ND       1         Hexachlorobutadiene       ND       1         n-Pentane       ND       1         n-Octane       ND       1         Cumene       ND       1         1,2,4-Trichlorobenzene       ND       1			
1,4-Dichlorobenzene       ND       1         1,2-Dichlorobenzene       ND       1         Carbon Disulfide       ND       1         Styrene       ND       1         1,3-Butadiene       ND       1         Hexachlorobutadiene       ND       1         n-Pentane       ND       1         n-Octane       ND       1         Cumene       ND       1         1,2,4-Trichlorobenzene       ND       1	- 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
1,2-Dichlorobenzene       ND       1         Carbon Disulfide       ND       1         Styrene       ND       1         1,3-Butadiene       ND       1         Hexachlorobutadiene       ND       1         n-Pentane       ND       1         n-Octane       ND       1         Cumene       ND       1         1,2,4-Trichlorobenzene       ND       1			
Carbon Disulfide         ND         1           Styrene         ND         1           1,3-Butadiene         ND         1           Hexachlorobutadiene         ND         1           n-Pentane         ND         1           n-Octane         ND         1           Cumene         ND         1           1,2,4-Trichlorobenzene         ND         1			
Styrene       ND       1         1,3-Butadiene       ND       1         Hexachlorobutadiene       ND       1         n-Pentane       ND       1         n-Octane       ND       1         Cumene       ND       1         1,2,4-Trichlorobenzene       ND       1			
1,3-Butadiene       ND       1         Hexachlorobutadiene       ND       1         n-Pentane       ND       1         n-Octane       ND       1         Cumene       ND       1         1,2,4-Trichlorobenzene       ND       1			
Hexachlorobutadiene         ND         1           n-Pentane         ND         1           n-Octane         ND         1           Cumene         ND         1           1,2,4-Trichlorobenzene         ND         1			
n-Pentane         ND         1           n-Octane         ND         1           Cumene         ND         1           1,2,4-Trichlorobenzene         ND         1			
n-Octane ND 1 Cumene ND 1 1,2,4-Trichlorobenzene ND 1			
Cumene ND 1 1,2,4-Trichlorobenzene ND 1			
1,2,4-Trichlorobenzene ND 1			
30 No. 10 No. 10 No. 20 No.			
	Dichlorodifluoromethane	1.1	1 .

Ecology and Environment

10819518

Work Order: X1-08-195

IT ANALYTICAL SERVICES CINCINNATI, OH

# Analyte Concentration, PPBV

Client Sample ID Method Blank

Lab Sample No

Date analayzed: Dilution Factor:	1.0	9/20/91	Detection Limit
Toluene		ND	1
Benzene		ND	1
1,2-Dichloroethane		ND	1
Total Xylenes		ND	1
Carbon Tetrachloride		ND	1
Chloroethane	7	ND	1
Chlorofor		ND	1
Chloromethane		ND	1
trans-1,2-Dichloroet	hene	ND	1
cis-1,2-Dichloroethe	ne	ND	1
Dichloromethane		ND	1
Tetrachloroethene		ND	1
1,1,1-Trichloroethan	е	ND	1
Trichloroethene		ND	1
Vinyl Chloride		ND	1
1,1-Dichloroethene		ND	1
3-Chloropropene		ND	1
1,1,2-Trichlorotrifle	uoroethane	ND	1
1,1-Dichloroethane		ND	1
1,1,2-Trichloroethane	2	ND	1
Chlorobenzene		ND	1
1,2-Dichloropropane		ND	1
cis-1,3-Dichloroprope	ene	ND	1
trans-1,3-Dichloropro		ND	1
Ethyl Benzene	441.4	ND	1
1,1,2,2-Tetrachloroet	thane	ND	1
Benzyl Chloride		ND	1
1,3-Dichiorobenzene		N.	1
1,4-Dichlorobenzene		ND	1
1,2-Dichlorobenzene		ND	1
Carbon Disulfide		ND	1
Styrene		ND	1
1,3-Butadiene		ND	1
Hexachlorobutadiene		ND	1
n-Pentane		ND	1
n-Octane		ND	ī
Cumene		ND	1
1,2,4-Trichlorobenzer	ne	ND	1
Dichlorodifluorometha		ND	1 7

Ecology and Environment

Work Order: X1-08-195

10819516

IT ANALYTICAL SERVICES CINCINNATI, OH

## Analyte Concentration, PPBV

Client Sample ID Method Blank Lab Sample No 9/21/91 Detection Date analayzed: Dilution Factor: 1.0 Limit 1 Toluene ND Benzene ND ND 1 1,2-Dichloroethane Total Xylenes ND 1 Carbon Tetrachloride ND 1 ND Chloroethane 1 Chloroform ND 1 ND 1 Chloromethane trans-1,2-Dichloroethene ND 1 cis-1,2-Dichloroethene ND 1 Dichloromethane 1 ND Tetrachloroethene 1 ND 1,1,1-Trichloroethane ND 1 Trichloroethene ND 1 1 Vinyl Chloride ND ND 1 1,1-Dichloroethene ND 1 3-Chloropropene ND 1 1,1,2-Trichlorotrifluoroethane 1,1-Dichloroethane ND 1 1,1,2-Trichloroethane ND 1 ND 1 Chlorobenzene ND 1 1,2-Dichloropropane 1 cis-1,3-Dichloropropene ND trans-1,3-Dichloropropene ND 1 ND 1 Ethyl Benzene ND 1 1,1,2,2-Tetrachloroethane Benzyl Chloride ND 1 1 1,3-Dichlorobenzene ND 1,4-Dichlorobenzene ND 1 1,2-Dichlorobenzene ND 1 ND 1 Carbon Disulfide Styrene ND 1 ND 1,3-Butadiene 1 ND 1 Hexachlorobutadiene n-Pentane ND 1 n-Octane ND 1 ND 1 Cumene

ND = Not detected at or below the reported detection limit

1,2,4-Trichlorobenzene

Dichlorodifluoromethane

ND ND

10819518

IT ANALYTICAL SERVICES CINCINNATI, OH

# Quality Assurance Data

# Surrogate Recovery, Percent

Client Sample ID	Lab No.	Octofluoro- toluene	4-Bromofluoro- benzene	1,2-Dichloro- benzene-d4
Canister # SHL-1	01	90	102	89
Canister # SHL-2	02	85	114	96
Canister # SHL-3	03	90	111	84
Canister # SHL-4	04	86	113	88
Canister # SHL-5	05	91	107	91
Canister # SHL-6	06	89	104	89
Canister # SHL-7	07	87	115	97
Canister # SHL-8	08	90	104	93
Canister # SHL-9	09	92	102	90
Canister # SHL-10	10	90	105	91
Canister # SHL-11	11	101	90	79
Canister # CSB-1	12	88	101	84
Canister # CSB-2	13	91	102	88
Method Blank	9/20/91	107	94	85
Method Blank	9/21/91	108	92	83

Work Order: X1-08-195

10819550

IT ANALYTICAL SERVICES CINCINNATI, OH

# Client Sample ID

# Method Spike

# Lab Sample No

Dilution Factor:   1.0	Date analyzed:		9/21/91		Detection
Toluene 94 1 Benzene 100 1 1,2-Dichloroethane 95 1 Total Xylenes 101 1 Carbon Tetrachloride 97 1 Chloroethane 103 1 Chloroethane 103 1 Chloroethane 106 1 Cran-1,2-Dichloroethene 106 1 Cran-1,2-Dichloroethene 105 1 Cran-1,2-Dichloroethene 105 1 Cran-1,2-Dichloroethene 105 1 Cran-1,2-Dichloroethane 104 1 Cran-1,2-Trichloroethane 104 1 Cran-1,1-Trichloroethane 104 1 Cran-1,1-Trichloroethane 104 1 Cran-1,1-Dichloroethane 105 1 Cran-1,1-Dichloroethane 109 1 Cran-1,1-Dichloroethane 109 1 Chloropropene 100 1 Chlorobenzene 100 1 Chlorobenzene 100 1 Chlorobenzene 100 1 Chlorobenzene 100 1 Chloroethane 100 1 Chloroethane 100 1 Chlorobenzene 100 1 Chlorobenzene 100 1 Chlorobenzene 100 1 Chloroethane 100 1 Chlorobenzene 100 1 Chlorobenzene 100 1 Cran-1,3-Dichloropropene 82 1 Cran-1,3-Dichloropropene 95 1 Cran-1,1-Dichlorobenzene 94 1 Cran-1,1-Dichlorobenzene 95 1 Carbon Disulfide 83 1 Carbon Disulfide 83 1 Carbon Disulfide 83 1 Carbon Disulfide 89 1 Carbon Disulfide 89 1 Carbon Disulfide 89 1 Carbon Disulfide 89 1 Carbon Disulfide 88 1 Cumene 88 1		1.0			Limit
Benzene   100					
1,2-Dichloroethane	Toluene		94		1
Total Xylenes Carbon Tetrachloride Carbon Tetrachloride Chloroethane 103 1 Chloroft 199 1 Chloromethane 106 1 Chloromethane 106 1 Crans-1,2-Dichloroethene 105 1 Cis-1,2-Dichloroethene 105 1 Cis-1,2-Dichloroethene 105 1 Cithoromethane 104 1 Cithoromethane 105 1 Cithoromethane 106 1 Cithoromethane 107 Cithoroethene 108 1 Cithoroethene 109 1 Cithoroethene 100 1 Cithoropropene 100 1 Cithoropropene 100 1 Cithoroethane 100 1 Cithorobenzene 100 1 Cithorobenzene 101 1 Cithoropropene 102 1 Cithoropropane 101 1 Cithoropropane 102 1 Cithoropropane 102 1 Cithoropropane 103 1 Cithoropropane 104 1 Cithoropropane 105 1 Cithoropropane 106 1 Cithoropropane 107 1 Cithoropropane 108 1 Cithoropropane 109 1 Cithoropropane 100 1 Cithoropropane 101 1 Cithoropropane 102 1 Cithoropropane 103 1 Cithoropropane 104 1 Cithoropropane 105 1 Cithoropropane 106 1 Cithoropropane 107 1 Cithoropropane 108 1 Cithoropropane 109 1 Cithoropropane 100 1 Cithoropropane 101 1 Cithoropropane 102 1 Cithoropropane 103 1 Cithoropropane 104 1 Cithoropropane 105 1 Cithoropropane 106 1 Cithoropropane 107 1 Cithoropropane 108 1 Cithoropropane 109 1 Cithoropropane 100 1 Cithoropropane 100 1 Cithoropropane 100 1 Cithoropropane 101 1 Cithoropropane 102 1 Cithoropropane 103 1 Cithoropropane 104 1 Cithoropropane 105 1 Cithoropropane 106 1 Cithoropropane 107 1 Cithoropropane 108 1 Cithoropropane 109 1 Cithoropropane 100 1 Cithoropropane 100 1 Cithoropropane 101 1 Cithoropropane 102 1 Cithoropropane 103 1 Cithoropropane 104 1 Cithoropropane 105 1 Cithoropropane 106 1 Cithoropropane 107 1 Cithoropropane 108 1 Cithoropropane 109 1 Cithoropropane 100 1 Cithor	Benzene		100		1
Carbon Tetrachloride 97 1 Chloroethane 103 1 Chloroethane 103 1 Chloromethane 106 1 Chloromethane 106 1 Chloromethane 106 1 Crans-1,2-Dichloroethene 97 1 Dichloromethane 98 1 Dichloromethane 98 1 Tetrachloroethene 105 1 Tetrachloroethene 105 1 Thirtichloroethane 104 1 Trichloroethene 101 1 Trichloroethene 103 1 Tetrachloroethene 105 1 Tetrachloroethane 109 1 Tetrachloroethane 109 1 Tetrachloroethane 100 1 Tetrachloroethane 100 1 Tetrachloroethane 101 1 Tetrachloroethane 102 1 Tetrachloroethane 101 1 Tetrachloroethane 101 1 Tetrachloroethane 101 1 Tetrachloroethane 102 1 Tetrachloroethane 102 1 Tetrachloroethane 102 1 Tetrachloroethane 102 1 Tetrachloroethane 103 1 Tetrachloroethane 104 1 Tetrachloroethane 105 1 Tetra	1,2-Dichloroethane		95		1
Carbon Tetrachloride 97 1 Chloroethane 103 1 Chloroethane 103 1 Chloromethane 106 1 Chloromethane 106 1 Chloromethane 106 1 Crans-1,2-Dichloroethene 97 1 Dichloromethane 98 1 Dichloromethane 98 1 Tetrachloroethene 105 1 Tetrachloroethene 105 1 Thirtichloroethane 104 1 Trichloroethene 101 1 Trichloroethene 103 1 Tetrachloroethene 105 1 Tetrachloroethane 109 1 Tetrachloroethane 109 1 Tetrachloroethane 100 1 Tetrachloroethane 100 1 Tetrachloroethane 101 1 Tetrachloroethane 102 1 Tetrachloroethane 101 1 Tetrachloroethane 101 1 Tetrachloroethane 101 1 Tetrachloroethane 102 1 Tetrachloroethane 102 1 Tetrachloroethane 102 1 Tetrachloroethane 102 1 Tetrachloroethane 103 1 Tetrachloroethane 104 1 Tetrachloroethane 105 1 Tetra	Total Xylenes		101		1
Chloromethane	Carbon Tetrachloride		97		1
Chloromethane 106 1 trans-1,2-Dichloroethene 97 1 Dichloromethane 98 1 Tetrachloroethene 98 1 Tetrachloroethene 105 1 1,1,1-Trichloroethane 104 1 Trichloroethene 111 1 Trichloroethene 111 1 Trichloroethene 111 1 Trichloroethene 103 1 1,1-Dichloroethene 105 1 3-Chloropropene 92 1 1,1,2-Trichloroethane 109 1 1,1,2-Trichloroethane 109 1 1,1,2-Trichloroethane 100 1 1,1,2-Trichloroethane 100 1 1,1,2-Trichloropropene 102 1 1,1,2-Trichloropropene 101 1 cis-1,3-Dichloropropene 82 1 trans-1,3-Dichloropropene 95 1 Ethyl Benzene 102 1 1,1,2,2-Tetrachloroethane 94 1 Benzyl Chloride 99 1 1,3-Dichlorobenzene 95 1 1,4-Dichlorobenzene 95 1 1,4-Dichlorobenzene 95 1 1,4-Dichlorobenzene 95 1 1,3-Butadiene 99 1 1,3-Butadiene 89 1 1,3-Butadiene 89 1 1-Pentane 86 1 1-Pentane 86 1 1-Cumene 86 1 1,2,4-Trichlorobenzene 88 1 1,2-Trichlorobenzene 86 1 1,2,4-Trichlorobenzene 88 1 1,2-Trichlorobenzene 88 1 1,2-Trichlorobenzene 88 1 1,2-Trichlorobenzene 88 1 1,2-Trichlorobenzene 89 1 1,3-Butadiene 89 1 1,3-Butadiene 89 1 1,3-Butadiene 89 1 1,3-Pentane 86 1 1,2,4-Trichlorobenzene 86 1 1,2,4-Trichlorobenzene 86 1 1,2,4-Trichlorobenzene 86 1	Chloroethane		103		1
trans-1,2-Dichloroethene 97 1 Dichloromethane 98 1 Tetrachloroethene 98 1 1,1,1-Trichloroethene 105 1 1,1,1-Trichloroethene 104 1 Trichloroethene 111 1 Vinyl Chloride 103 1 1,1-Dichloroethene 92 1 1,1,2-Trichlorotrifluoroethane 109 1 1,1,2-Trichlorotrifluoroethane 109 1 1,1,2-Trichlorotrifluoroethane 109 1 1,1,2-Trichloroethane 100 1 1,1,2-Trichloroethane 103 1 Chlorobenzene 102 1 1,2-Dichloropropane 101 1 1,2-Dichloropropane 101 1 1,2-Dichloropropane 101 1 1,2-Dichloropropene 95 1 Ethyl Benzene 102 1 1,1,2,2-Tetrachloroethane 94 1 Benzyl Chloride 94 1 Benzyl Chloride 99 1 1,3-Dichlorobenzene 93 1 1,4-Dichlorobenzene 93 1 1,4-Dichlorobenzene 93 1 1,3-Butadiene 93 1 1,3-Butadiene 83 1 Styrene 93 1 1,3-Butadiene 86 1 1-Pentane 86 1 1-Pentane 86 1 1-Cumene 88 1 1-Cumene 86 1 1,2,4-Trichlorobenzene 88 1 1,2,4-Trichlorobenzene 88 1 1,2,4-Trichlorobenzene 88 1	Chlore for the		99		1
cis-1,2-Dichloroethene       97       1         Dichloromethane       98       1         Tetrachloroethene       105       1         1,1,1-Trichloroethane       104       1         Trichloroethene       103       1         1,1-Dichloroethene       103       1         3-Chloropropene       92       1         1,1,2-Trichloroethane       100       1         1,1,2-Trichloroethane       100       1         1,1,2-Trichloroethane       103       1         Chlorobenzene       102       1         1,2-Dichloropropane       101       1         cis-1,3-Dichloropropene       82       1         trans-1,3-Dichloropropene       95       1         Ethyl Benzene       102       1         1,1,2,2-Tetrachloroethane       94       1         Benzyl Chloride       59       0         1,3-Dichlorobenzene       93       1         1,4-Dichlorobenzene       93       1         Carbon Disulfide       83       1         Styrene       93       1         1,3-Butadiene       104       1         Hexachlorobutadiene       89       1	Chloromethane		106		1
Dichloromethane   98	trans-1,2-Dichloroeth	nene	ns		1
Tetrachloroethene	cis-1,2-Dichloroether	ie .	97		1
1,1,1-Trichloroethane       104       1         Trichloroethene       111       1         Vinyl Chloride       103       1         1,1-Dichloroethene       105       1         3-Chloropropene       92       1         1,1,2-Trichlorotrifluoroethane       109       1         1,1-Dichloroethane       100       1         1,1-2-Trichloroethane       103       1         Chlorobenzene       102       1         1,2-Dichloropropane       101       1         cis-1,3-Dichloropropene       82       1         trans-1,3-Dichloropropene       95       1         Ethyl Benzene       102       1         1,1,2,2-Tetrachloroethane       94       1         Benzyl Chloride       59 Q       1         1,3-Dichlorobenzene       93       1         1,2-Dichlorobenzene       95       1         Carbon Disulfide       83       1         Styrene       93       1         1,3-Butadiene       104       1         Hexachlorobutadiene       86       1         n-Pentane       86       1         n-Cotane       86       1         <	Dichloromethane		98		1
Trichloroethene       111       1         Vinyl Chloride       103       1         1,1-Dichloroethene       105       1         3-Chloropropene       92       1         1,1,2-Trichlorotrifluoroethane       109       1         1,1-Dichloroethane       100       1         1,1,2-Trichloroethane       103       1         Chlorobenzene       102       1         1,2-Dichloropropane       101       1         cis-1,3-Dichloropropene       95       1         Ethyl Benzene       102       1         1,1,2,2-Tetrachloroethane       94       1         Benzyl Chloride       59 Q       1         1,4-Dichlorobenzene       93       1         1,2-Dichlorobenzene       95       1         1,2-Dichlorobenzene       95       1         2-Dichlorobenzene       95       1         3-Ducthorobenzene       95       1         4-Dichlorobenzene       95       1         5-yene       93       1         1,3-Butadiene       80       1         Hexachlorobutadiene       86       1         n-Octane       86       1         1	Tetrachloroethene		105		1
Vinyl Chloride       103       1         1,1-Dichloroethene       105       1         3-Chloropropene       92       1         1,1,2-Trichlorotrifluoroethane       109       1         1,1-Dichloroethane       100       1         1,1,2-Trichloroethane       103       1         Chlorobenzene       102       1         1,2-Dichloropropane       101       1         cis-1,3-Dichloropropene       95       1         Ethyl Benzene       102       1         1,1,2,2-Tetrachloroethane       94       1         Benzyl Chloride       59 Q       1         1,	1,1,1-Trichloroethane		104		1
1,1-Dichloroethene 105 1 3-Chloropropene 92 1 1,1,2-Trichlorotrifluoroethane 109 1 1,1-Dichloroethane 100 1 1,1,2-Trichloroethane 100 1 1,1,2-Trichloroethane 100 1 1,1,2-Dichloropropene 102 1 1,2-Dichloropropane 101 1 cis-1,3-Dichloropropene 82 1 trans-1,3-Dichloropropene 95 1 Ethyl Benzene 102 1 1,1,2,2-Tetrachloroethane 94 1 Benzyl Chloride 59 Q 1 1,3-Dichlorobenzene 93 1 1,4-Dichlorobenzene 93 1 1,2-Dichlorobenzene 95 1 1,2-Dichlorobenzene 95 1 1,3-Butadiene 97 1 1,3-Butadiene 88 1 1,3-Butadiene 89 1 1,3-Butadiene 89 1 1,0-Octane 86 1 1,0-Octane 88 1 Cumene 86 1 1,2,4-Trichlorobenzene 86 1	Trichloroethene		111		1
3-Chloropropene   92	Vinyl Chloride		103		1
1,1,2-Trichlorotrifluoroethane       109       1         1,1-Dichloroethane       100       1         1,1,2-Trichloroethane       103       1         Chlorobenzene       102       1         1,2-Dichloropropane       101       1         cis-1,3-Dichloropropene       82       1         trans-1,3-Dichloropropene       95       1         Ethyl Benzene       102       1         1,1,2,2-Tetrachloroethane       94       1         Benzyl Chloride       59 Q       1         1,3-Dichlorobenzene       93       1         1,4-Dichlorobenzene       93       1         1,2-Dichlorobenzene       95       1         Carbon Disulfide       83       1         Styrene       93       1         1,3-Butadiene       104       1         Hexachlorobutadiene       89       1         n-Pentane       86       1         n-Octane       88       1         Cumene       86       1         1,2,4-Trichlorobenzene       85       1	1,1-Dichloroethene		105		1
1,1-Dichloroethane 100 1 1,1,2-Trichloroethane 103 1 Chlorobenzene 102 1 1,2-Dichloropropane 101 1 cis-1,3-Dichloropropene 82 1 trans-1,3-Dichloropropene 95 1 Ethyl Benzene 102 1 1,1,2,2-Tetrachloroethane 94 1 Benzyl Chloride 59 Q 1 1,3-Dichlorobenzene 93 1 1,2-Dichlorobenzene 93 1 1,2-Dichlorobenzene 95 1 1,3-Dichlorobenzene 95 1 1,4-Dichlorobenzene 95 1 1,3-Butadiene 95 1 1,3-Butadiene 99 1 1,3-Butadiene 89 1 1,3-Butadiene 89 1 1,0-Octane 88 1 Cumene 86 1 1,2,4-Trichlorobenzene 86 1 1,2,4-Trichlorobenzene 86 1	3-Chloropropene		92		1
1,1,2-Trichloroethane       103       1         Chlorobenzene       102       1         1,2-Dichloropropane       101       1         cis-1,3-Dichloropropene       82       1         trans-1,3-Dichloropropene       95       1         Ethyl Benzene       102       1         1,1,2,2-Tetrachloroethane       94       1         Benzyl Chloride       59 Q       1         1,3-Dichlorobenzene       93       1         1,4-Dichlorobenzene       93       1         Carbon Disulfide       83       1         Styrene       93       1         1,3-Butadiene       93       1         Hexachlorobutadiene       89       1         n-Pentane       86       1         n-Octane       88       1         Cumene       86       1         1,2,4-Trichlorobenzene       85       1	1,1,2-Trichlorotriflu	oroethane	109		1
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1,2-Dichlorobenzene       95       1         Carbon Disulfide       83       1         Styrene       93       1         1,3-Butadiene       104       1         Hexachlorobutadiene       89       1         n-Pentane       86       1         n-Octane       88       1         Cumene       86       1         1,2,4-Trichlorobenzene       85       1	1, 3-Dichiolopenzene		9.	4	1 -
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Styrene       93       1         1,3-Butadiene       104       1         Hexachlorobutadiene       89       1         n-Pentane       86       1         n-Octane       88       1         Cumene       86       1         1,2,4-Trichlorobenzene       85       1	1,2-Dichlorobenzene	× .	95		1
1,3-Butadiene       104       1         Hexachlorobutadiene       89       1         n-Pentane       86       1         n-Octane       88       1         Cumene       86       1         1,2,4-Trichlorobenzene       85       1	Carbon Disulfide		83		1
Hexachlorobutadiene       89       1         n-Pentane       86       1         n-Octane       88       1         Cumene       86       1         1,2,4-Trichlorobenzene       85       1	Styrene		93		1
n-Pentane       86       1         n-Octane       88       1         Cumene       86       1         1,2,4-Trichlorobenzene       85       1	1,3-Butadiene		104		1
n-Octane       88       1         Cumene       86       1         1,2,4-Trichlorobenzene       85       1	Hexachlorobutadiene		89		1
Cumene 86 1 1,2,4-Trichlorobenzene 85 1	n-Pentane		86		1
1,2,4-Trichlorobenzene 85	n-Octane		88		1
	Cumene		86		1
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# Q = Outside internal acceptance limits

RI Report: Section No.:

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June 1992

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Date:

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## APPENDIX H

EM-31 AND MAGNETOMETER SURVEYS AT COLD SPRING BROOK LANDFILL

# EM-31 AND MAGNETOMETER SURVEY AT COLD SPRING BROOK LANDFILL FORT DEVENS AYER, MASSACHUSETTS

Delivery Order 0001 ELIN A004 November 1991

Prepared for:

Commander

United States Army Toxic and Hazardous Materials Agency Aberdeen Proving Ground, MD 21010-5400

Prepared by:
Ecology and Environment, Inc.
Arlington, VA 22209

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## 1. INTRODUCTION

Ecology and Environment, Inc. (E & E) prepared this report on the geophysical investigation conducted at Cold Spring Brook Landfill at Fort Devens in Ayer, Massachusetts, under contract to the United States Army Toxic and Hazardous Materials Agency (USATHAMA).

The geophysical survey, conducted from June 3 to June 6, 1991, consisted of an EM-31 (electromagnetic terrain conductivity) survey and magnetometry survey. This report documents the results of both surveys. The objectives of this report are described in Section 2, while the methods used in conducting the surveys are described in Section 3. Interpretation of the data obtained from the survey area is provided in Section 4, and E & E's conclusions and recommendations are summarized in Section 5. For the geophysical survey performed at this site, field data are provided in Appendix A and contour maps in Appendix B.

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2. OBJECTIVES

E & E designed the geophysical survey program at Cold Spring Brook Landfill to achieve several general goals. The main objectives of the proposed geophysical surveys at this RI site were:

- o To delineate the actual boundaries of the landfill. Although the northern boundary of the landfill is defined by the southern edge of Cold Spring Brook Pond and the base of the very obvious break in slope of the fill material onto the wetland, the landfill's southern, eastern, and western boundaries were not known.
- o To optimize and provide cost effective surface and/or subsurface sampling locations in and around the landfill.
- To identify subsurface site conditions with regard to buried, conductive wastes.
- o To delineate (if possible) the groundwater contamination plume.

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#### 3. SURVEY METHODOLOGY

To meet the main objective of the geophysical survey, which is to delineate landfill boundaries at Cold Spring Brook, E & E designed and implemented a grid survey. Where possible, E & E maintained the grid traverse lines perpendicular to the expected landfill boundaries.

The grid survey was established and extended behind the area reported to contain the Cold Spring Brook Landfill (see Figure 3-1). The x- and y-axes of the survey grid were generally oriented in a east to west and north to south direction, respectively. Patton Road runs generally east to west in this area, and was, therefore, used as reference. Two east to west oriented traverse lines (Y=260 and Y=280) are actually located directly on Patton Road. Survey grid coordinate (0,-80) is located in the southwest corner of the contour map. Semi-permanent stakes or painted areas mark the starting and ending points of the traverse lines.

E & E surveyed an area of 600 feet by 950 feet, which remained the same for both the EM-31 survey and the magnetometer survey, although the station spacing varies. Terrain conductivity and magnetic field were measured along traverse lines 50 feet apart, at 20- and 10-foot intervals. The 10-foot data interval is the recommended spacing used for the magnetic survey. At each station, both vertical and horizontal dipole readings in a north to south orientation were recorded. The exploration depths of the EM-31 in the vertical and horizontal dipole modes are 18 feet and 9 feet, respectively. These depths are considered adequate to delineate buried waste materials that may be encountered during the investigation at Cold Spring Brook Landfill. To minimize interferences created by surface magnetic objects, the magnetometer was mounted on a 6-foot staff so that, in effect, measurements were made 6 feet above ground surface.

To ensure proper functioning and calibration of instruments used in the field, E & E performed a series of checks recommended by the manufacturer prior to starting the geophysical survey. As part of quality assurance and quality control (QA/QC), an EM-31 calibration line was established approximately 500 feet west of the survey grid in an undisturbed clean area. Reported readings, both before and after the EM-31 survey, were taken at calibration or background line to confirm repeatability and proper calibration of the EM-31 conductivity meter. The background readings were taken at Stations 1, 2, 3, and 4, from west to east, in both the vertical and horizontal dipole modes.

EM-31 background data are reported on Table 3-1.

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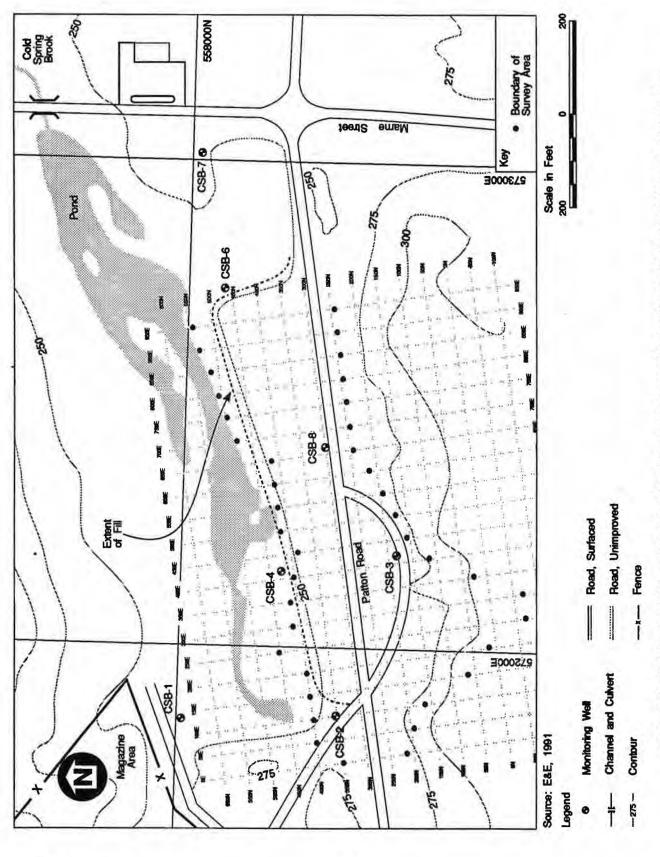


Figure 3-1 COLD SPRING BROOK LANDFILL, GEOPHYSICAL INVESTIGATION TRAVERSE LINE MAP

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TABLE 3-1
EM-31 Background Data

Background Station No.	Vertical Dipole (millimhos/meter)	Horizontal Dip (millimhos/met	
1	3.4	3.0	
2	3.8	3.2	Background taken
3	3.6	3.2	before EM-31
4	3.6	3.2	survey
1	3.3	3.0	
2	3.8	3.2	Background taken
3	3.6	3.3	after EM-31
4	3.6	3.2	survey

The negligible change in background readings ensures proper functioning of the EM-31 throughout the survey. This consistency will allow the amount of diurnal variation (natural change in the earth's field magnetics), which would occur during the daily survey, to be accurately measured. Also, as part of magnetic QA/QC, a diurnal station was set up at station 250N/350E. A series of five readings were taken at the diurnal station before, during, and after the magnetic survey.

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#### INSTRUMENTATION

The terrain conductivity survey was conducted using an EM-31 conductivity meter. The EM-31 conductivity meter, manufactured by Geonic Ltd., is a portable, one-person unit that has two coils separated by a fiber pole.

The instrument is calibrated by the manufacturer to provide a direct reading of subsurface conductivity in millimhos per meter (mmhos./m). Data can be recorded in a field notebook or data sheet or in a data logger. EM-31 data at Fort Devens were recorded in an Omni data logger Model 516GE-64-A. The data logger is connected to the EM-31 conductivity meter through a cable and carried by the person conducting the survey. Prior to starting the survey, the EM-31 conductivity meter was calibrated and checked as recommended by the manufacturer and the appropriate survey parameters were set in an Omni data logger. The use of the data logger in this survey reduced the chance of potential mistakes or errors that may occur in handwritten readings, and expedited completion of the survey.

Magnetic surveying at Cold Spring Brook Landfill was accomplished through the use of a Proton Precession Magnetometer (a portable model G-856 magnetometer manufactured by EG&G Geometrics). The mode in which the magnetometer was used had a sensitivity capable of measuring the absolute value of the earth's magnetic field to within 0.1 gamma. This instrument is battery operated, and has a digital LED display and an electronic memory capable of storing more than 1,000 readings. The memory was transferred electronically to a computer for data processing.

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#### 5. DATA REDUCTION AND INTERPRETATION METHODOLOGY

Data collected infield for both EM-31 conductivity and magnetic field measurements were subject to data reduction. Steps used in data reduction and interpretation of terrain conductivity and total magnetic field data are described below.

# Terrain Conductivity Data:

- o Terrain conductivity data recorded infield through the data logger were transferred to a computer. A hard copy of data is produced.
- o The recorded data are checked for correctness.
- o Conductivity values for both horizontal and vertical dipoles are plotted and contoured on maps along each traverse line.
- o The terrain conductivity contour maps are examined for elevated and/or lowered conductivity values (anomalies) that could not be attributed to known, naturally existing or manmade subsurface conditions or cultural features.

# Magnetic data:

- o Magnetic data recorded into the memory of the magnetometer were electronically transferred into a computer. A hard copy of the data is produced.
- o Data from traverse lines were plotted by computer as magnetic field profile lines, with the magnetic field as the y-axis and the distance in feet as the x-axis. Data were also plotted by computer to produce the magnetic field contour map.
- Anomalies that represented magnetic objects were identified on profiles and the contour map.
- o Anomalies caused by surficial objects (such as pipe racks, steel, or iron materials) were identified by reference to the site map and field notes taken during the survey.
- o Areas where the magnetic field had been disturbed by buried ferro-magnetic objects were identified.
- o Magnetic anomalies were correlated with the terrain conductivity anomalies for further confirmation of identified buried conductive wastes.

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#### SURVEY RESULTS

### 6.1 TERRAIN CONDUCTIVITY (EM-31) SURVEY RESULTS

The EM-31 survey was intended to define the landfill boundaries and to identify possible buried conductive wastes. The results of the EM-31 survey are presented in the following sections.

## 6.1.1 Landfill Boundaries

The northern and eastern boundaries of the landfill were marked by the edges of the Cold Spring Brook Pond and the base of the very obvious break in slope of the fill material onto the wetland. The southern and western boundaries of the landfill were identified through EM-31 traverse lines 1 through 20 (see Figure 3-1). Figures 6-1 and 6-2 indicate that the southern and western boundaries of the landfill are defined by the transitional zone between and anomalous area identified north of Patton Road and an apparent undisturbed area, identified south of Patton Road. The transitional zone, or southern boundary of the landfill, is marked by a conductivity contour line of 6 or 7 mmhos./m, which coincides also with the location of Patton Road.

The western boundary of the landfill is marked by the conductivity contour line 6 or 7 mmhos./m, which runs north to south along line Nos. 3 and 4 (see Figures 6-1 and 6-2).

The consistency of the finding on landfill boundaries by both vertical and horizontal dipoles indicate that the waste materials may be buried 20 feet or more below ground surface.

A small undisturbed zone was identified on lines 15 (700E) and 16 (750E) north of Patton Road. This zone may be the access road to the landfill with minimum or no buried waste.

# 6.1.2 Landfill Grid Survey

In addition to the identification of the landfill boundaries at Cold Spring Brook, the geophysical survey conducted systematically over the entire landfill grid defined areas of potential buried waste that may warrant further investigation.

Examination of terrain conductivity contour maps (see Figures 6-1 and 6-2) indicated the following:

o Figure 6-1: This figure shows two areas of elevated conductivity identified by conductivity values, higher than 12 mmhos./m. An anomaly was identified in the northern section of traverse lines 7, 8, and 9. This anomaly is indicative of buried construction debris with small amounts of iron or steel materials. The second anomaly was identified on traverse lines 11, 12, and 13, between 320 and 400 north coordinates. This

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Legend:

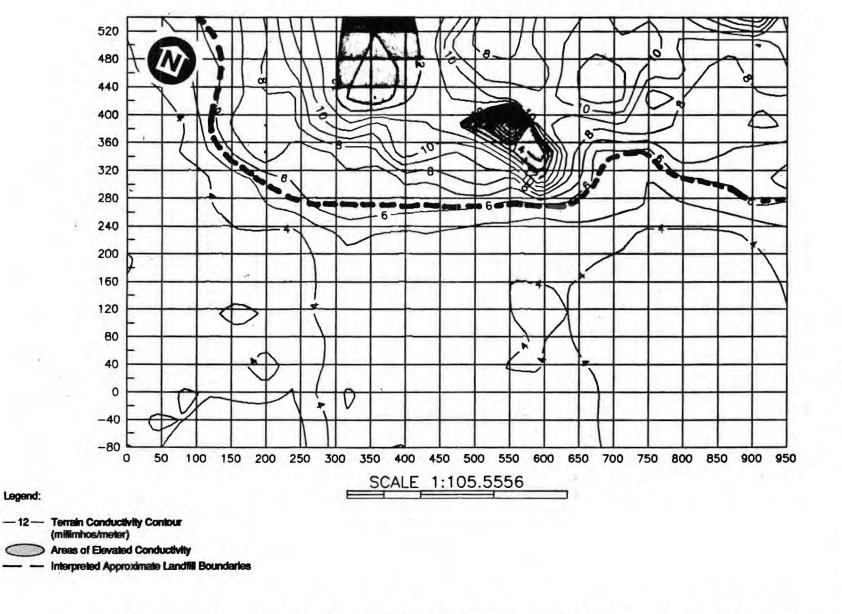
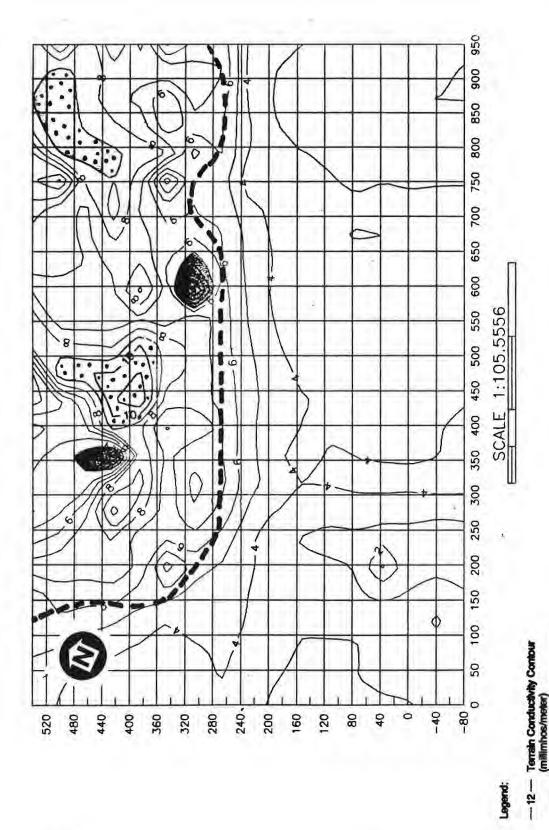


Figure 6-1 COLD SPRING BROOK LANDFILL, GEOPHYSICAL INVESTIGATION EM-31, HORIZONTAL DIPOLE, TERRAIN CONDUCTIVITY CONTOUR MAP

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Geophysical Su Section No.: Revision No.: Date:

Devens 6 0 0 er 1991



COLD SPRING BROOK LANDFILL, GEOPHYSICAL INVESTIGATION EM-31, VERITCAL DIPOLE, TERRAIN CONDUCTIVITY CONTOUR MAP Figure 6-2

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Interpreted Approximate Landilli Boundaries

Areas of Elevated Conductivity Areas of Lowered Conductivity

anomaly indicates near surface or shallow buried conductive wastes, possibly including buried metallic pipes and rebars.

o Figure 6-2: This figure shows two areas of elevated conductivity. One area of elevated conductivity was identified on traverse lines 9, 10, and 11. This anomaly is indicative of buried wastes at depths greater than 10 feet. A second area of elevated conductivity was detected on traverse lines 17, 18, and 19. The relatively low intensity of this anomaly is indicative of buried construction debris with few ferro-magnetic constituents.

Two lowered conductivity anomalies were also detected. These anomalies may be associated with negative readings that may be indicative of buried concrete and/or steel pipes.

#### 6.2 MAGNETIC SURVEY RESULTS

## 6.2.1 Landfill Boundaries

Similar to the EM-31 contour maps, the magnetic contour map (see Figure 6-3) indicated a high intensity magnetic zone, north of Paton Road, contrasting with a zone free of magnetic anomalies, south of Paton Road. The southern and western boundaries of the landfill are interpreted as a linear transitional area between the identified magnetic zone and the zone free of anomaly.

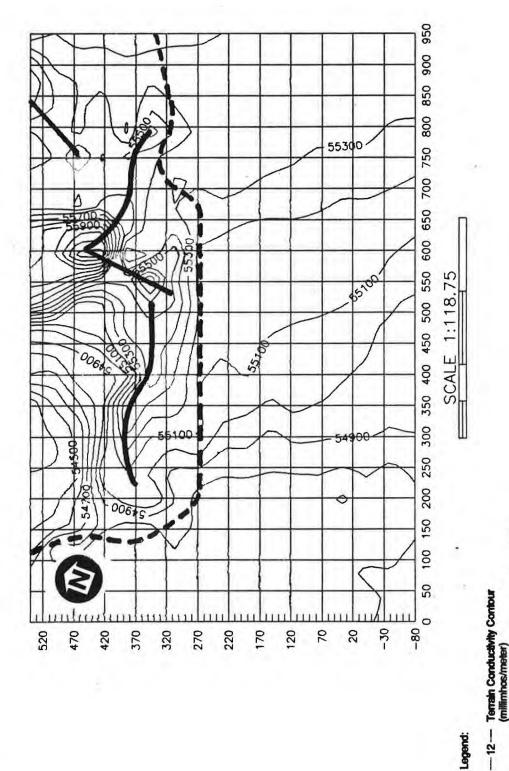
The results of the magnetic survey with regard to the landfill boundaries are in perfect correlation with the findings of the EM-31 survey described above.

#### 6.2.2 Landfill Grid Survey

The total magnetic field map (see Figure 6-3), similar to the EM-31 contour maps, indicates the presence of trends of magnetic anomalies that are described as follows:

- o An east to west trend of magnetic field was identified on traverse lines 5 through 11 at 350 and 370 north coordinates. This may be indicative of possible trenching at the landfill. It should be noted that this trend of magnetic anomaly is also identified on the terrain conductivity contour maps, and may indicate a buried depth of greater than 10 feet.
- o A north to northeast trend of magnetic field with high intensity and elevated gradient was identified on traverse lines 12 and 13. This trend of magnetic field may be indicative of a significant amount of buried ferro-magnetic materials. Field observation in this area revealed the possibility of buried construction debris along north to northeast trenches.

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Interpreted Approximate Landfill Boundaries

Trend of Magnetic Anomaly

o Two minor trends of magnetic field were identified on traverse lines 14 through 18. These trends indicate the possibility of small portions of isolated, buried waste.

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#### 7. CONCLUSIONS AND RECOMMENDATIONS

Based on the interpretation of the data discussed in Section 4, the locations of the existing monitoring wells are appropriate, and the locations chosen for the surface water/sediment samples are suitable for detecting any possible contaminant migration downgradient of the Cold Spring Brook Landfill. See Figure 3-1 for existing monitoring well locations, surface water/sediment sample locations, and for the approximate boundaries of the landfill.

Due to the high electromagnetic conductivity and magnetic readings obtained directly in the fill area, along with the visual sightings of partially buried drums and metal debris, any future drilling should be performed outside the known fill area.

#### 7.1 CONCLUSIONS

A combined geophysical technique, including terrain conductivity (EM-31) and magnetic surveys, was conducted at Cold Spring Brook Landfill as part of the RI. The principal conclusions of these surveys are:

- o Southern and western boundaries of the landfill were identified through both EM-31 and magnetic survey data. The identified landfill boundaries coincide with a conductivity contour line of 6 or 7 mmhos./m.
- o The area south of Patton Road is free of any EM-31 and/or magnetic anomalies, therefore, no landfilling seemed to occur in this area.
- o The area north of Patton Road, in contrast with the area south of the road, indicated presence of several zones of buried wastes including buried construction debris, concrete, and metal pipes.

### 7.2 RECOMMENDATIONS

Based on the results of the geophysical surveys conducted at Cold Spring Brook, E & E recommends the following:

- o To confirm the findings of the geophysical survey with regard to the boundaries of the landfill, 5 to 10 test pits should be excavated along the identified boundaries.
- o To confirm the nature and extent of identified buried waste, test pits and/or borings should be conducted in anomalous zones detected by the EM-31 and magnetic surveys.
- o The findings of geophysical anomalies should be correlated with the results of all media sampling conducted at this site. This will be performed as part of the RI report.

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# APPENDIX A

EM-31 AND MAGNETOMETER SURVEY DATA COLD SPRING BROOK LANDFILL

Geophysical Survey: Fort Devens
Section No.: A
Revision No.: 0
Date: August 1991

TERRAIN CONDUCTIVITY DATA EM-31, "VERTICAL DIPOLE" COLD SPRING BROOK LANDFILL FORT DEVENS, MASSACHUSETTS

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91

PROJECT NUMBER: UC2000

LINE NUMBER: 0 INSTRUMENT: EM-31

Station No.	Conductivity (Vertical Dipole)	Remarks
200.00	2.92	
220.00	3.26	
240.00	3.24	
260.00	3.56	
280.00	3.82	
300.00	3.36	
320.00	3.44	
340.00	3.54	

PROJECT NUMBER: UC2000

LINE NUMBER: 50 E

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91 INSTRUMENT: EM-31

Station No.	Conductivity (Vertical Dipole)	Remarks
180.00	2.98	
200.00	3.14	
220.00	3.64	
240.00	3.62	
260.00	4.22	
280.00	4.06	
300.00	3.52	
320.00	3.34	
340.00	3.56	
360.00	3.66	
380.00	3.58	
400.00	3.40	

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91

PROJECT NUMBER: UC2000 LINE NUMBER: 100 E

Station No.	Conductivity (Vertical Dipole)	Remarks
160.00		
160.00	2.98	
180.00	3.36	
200.00	3.28	
220.00	3.62	
240.00	4.24	
260.00	4.24	
280.00	4.28	
300.00	4.08	
320.00	4.00	
340.00	4.40	
360.00	1.60	
380.00	4.54	
400.00	4.58	

PROJECT NUMBER: UC2000

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass LINE NUMBER: 150 E

INSTRUMENT: EM-31 DATE: 6-6-91

Station No.	Conductivity (Vertical Dipole)	Remarks
40.00	3.16	
60.00	2.86	
80.00	3.20	
100.00	3.00	
120.00	3.52	
140.00	3.04	
160.00	3.38	
180.00	3.34	
200.00	3.62	
220.00	3.76	
240.00	4.20	
260.00	4.44	
280.00	4.96	
300.00	4.98	
320.00	4.14	
340.00	5.46	
360.00	5.74	
380.00	5.02	

PROJECT NUMBER: UC2000

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91 LINE NUMBER: 200 E

Station No.	Conductivity (Vertical Dipole)	Remarks
0.00	2.86	
20.00	2.82	
40.00	0.38	
60.00	2.86	
80.00	2.96	
100.00	3.12	
120.00	3.18	
140.00	3.00	
160.00	3.32	
180.00	3.02	
200.00	3.38	
220.00	4.06	
240.00	4.50	
260.00	4.76	
280.00	5.14	
300.00	5.60	
320.00	5.10	
340.00	3.76	
360.00	3.38	
380.00	6.56	
400.00	7.64	

PROJECT NUMBER: UC2000

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass LINE NUMBER: 250 E

DATE: 6-6-91

Station No.	Conductivity (Vertical Dipole)	Remarks
-80.00	2.66	37555
-60.00	1.64	
-40.00	2.56	
-20.00	2.32	
0.00	2.50	
20.00	2.64	
40.00	2.50	
60.00	2.64	
80.00	2.74	
100.00	2.54	
120.00	2.60	
140.00	2.08	
160.00	3.40	
180.00	3.42	
200.00	3.46	
220.00	3.96	
240.00	4.54	
260.00	5.50	
280.00	6.42	
300.00	7.16	
320.00	7.00	
340.00	7.02	
360.00	6.80	
380.00	4.74	
400.00	9.50	
420.00	8.58	
440.00	7.46	

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass

DATE: 6-6-91

PROJECT NUMBER: UC2000

LINE NUMBER: 300 E INSTRUMENT: EM-31

-80.00	3
-60.00       4.04         -40.00       4.36         -20.00       4.20         0.00       4.18         20.00       4.46         40.00       4.32         60.00       4.52         80.00       4.24         100.00       4.36         140.00       4.18         160.00       4.76         180.00       4.04         200.00       5.10         240.00       5.68         260.00       7.04	
-40.00       4.36         -20.00       4.18         20.00       4.46         40.00       4.32         60.00       4.52         80.00       4.24         100.00       4.36         120.00       4.36         140.00       4.18         160.00       4.76         180.00       4.04         200.00       5.10         240.00       5.68         260.00       7.04	
0.00       4.18         20.00       4.46         40.00       4.32         60.00       4.52         80.00       4.24         100.00       4.06         120.00       4.36         140.00       4.18         160.00       4.76         180.00       4.04         200.00       5.10         240.00       5.68         260.00       7.04	
20.00       4.46         40.00       4.32         60.00       4.52         80.00       4.24         100.00       4.06         120.00       4.36         140.00       4.18         160.00       4.76         180.00       4.04         200.00       5.10         240.00       5.68         260.00       7.04	
40.00       4.32         60.00       4.52         80.00       4.24         100.00       4.06         120.00       4.36         140.00       4.18         160.00       4.76         180.00       4.04         200.00       4.84         220.00       5.10         240.00       5.68         260.00       7.04	
60.00       4.52         80.00       4.24         100.00       4.06         120.00       4.36         140.00       4.18         160.00       4.76         180.00       4.04         200.00       4.84         220.00       5.10         240.00       5.68         260.00       7.04	
80.00       4.24         100.00       4.06         120.00       4.36         140.00       4.18         160.00       4.76         180.00       4.04         200.00       4.84         220.00       5.10         240.00       5.68         260.00       7.04	
100.00       4.06         120.00       4.36         140.00       4.18         160.00       4.76         180.00       4.04         200.00       4.84         220.00       5.10         240.00       5.68         260.00       7.04	
120.00       4.36         140.00       4.18         160.00       4.76         180.00       4.04         200.00       4.84         220.00       5.10         240.00       5.68         260.00       7.04	
140.00       4.18         160.00       4.76         180.00       4.04         200.00       4.84         220.00       5.10         240.00       5.68         260.00       7.04	
160.00       4.76         180.00       4.04         200.00       4.84         220.00       5.10         240.00       5.68         260.00       7.04	
180.00       4.04         200.00       4.84         220.00       5.10         240.00       5.68         260.00       7.04	
200.00       4.84         220.00       5.10         240.00       5.68         260.00       7.04	
220.00 5.10 240.00 5.68 260.00 7.04	
240.00 5.68 260.00 7.04	
260.00 7.04	
280.00 8.00	
300.00 8.74	
320.00 8.42	
340.00 6.86	
360.00 4.42	
380.00 9.08	
400.00 12.16	
420.00 11.62	

PROJECT NUMBER: UC2000 LINE NUMBER: 350 E

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass

DATE: 6-6-91

Station No.	Conductivity (Vertical Dipole)	Remarks
20.00	3.84	
40.00	4.00	
60.00	3.90	
80.00	4.08	
100.00	4.04	
120.00	4.50	
140.00	0.86	
160.00	4.50	
180.00	4.04	
200.00	4.90	
220.00	4.56	
240.00	5.88	
260.00	6.84	
280.00	7.46	
300.00	8.08	
320.00	7.18	
340.00	6.30	
360.00	8.16	
380.00	7.38	
400.00	11.66	
420.00	-1.24	

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass

PROJECT NUMBER: UC2000

LINE NUMBER: 400 E

DATE: 6-6-91

Station No.	Conductivity (Vertical Dipole)	Remarks
100.00	3.70	
120.00	3.72	
140.00	4.22	
160.00	3.96	
180.00	4.08	
200.00	4.54	
220.00	5.08	
240.00	5.54	
260.00	6.80	
280.00	7.50	
300.00	7.12	
320.00	5.40	
340.00	3.34	
360.00	11.30	
380.00	6.24	
400.00	13.02	

PROJECT NUMBER: UC2000

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91 LINE NUMBER: 450 E INSTRUMENT: EM-31

Station No.	Conductivity (Vertical Dipole)	Remarks
140.00	4.03	
	4.02	
160.00	4.16	
180.00	4.52	
200.00	4.86	
220.00	4.80	
240.00	5.64	
260.00	6.64	
280.00	7.26	
300.00	7.16	
320.00	8.42	
340.00	6.70	
360.00	9.24	
380.00	13.12	

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91

PROJECT NUMBER: UC2000

LINE NUMBER: 500 E INSTRUMENT: EM-31

Station No.	Conductivity (Vertical Dipole)	Remarks
160.00	3.32	
180.00	4.10	
200.00	4.44	
220.00	5.18	
240.00	5.22	
260.00	6.34	
280.00	7.08	
300.00	5.30	
320.00	10.48	
340.00	9.20	
360.00	7.52	
380.00	13.84	
400.00	6.00	
420.00	8.78	

PROJECT NUMBER: UC2000

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91 LINE NUMBER: 550 E

Station No.	Conductivity (Vertical Dipole)	Remarks
180.00	3.64	
200.00	4.22	
220.00	4.90	
240.00	5.10	
260.00	5.84	
280.00	7.58	
300.00	8.06	
320.00	8.48	
340.00	5.06	
360.00	9.56	
380.00	4.54	
400.00	12.60	
420.00	6.16	

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91

PROJECT NUMBER: UC2000

LINE NUMBER: 600 E INSTRUMENT: EM-31

Station No.	Conductivity (Vertical Dipole)	Remarks
200.00	3.86	
220.00	4.42	
240.00	5.32	
260.00	5.80	
280.00	6.42	
300.00	5.18	
320.00	-8.68	
340.00	6.16	
360.00	8.36	
380.00	10.22	
400.00	6.72	
420.00	7.08	

PROJECT NUMBER: UC2000

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass LINE NUMBER: 650 E

DATE: 6-6-91 INSTRUMENT: EM-31

Station No.	Conductivity (Vertical Dipole)	Remarks
240.00	4.90	
260.00	6.02	
280.00	6.50	
300.00	6.10	
320.00	6.24	
340.00	5.96	
360.00	7.24	
380.00	7.94	
400.00	6.70	

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91

PROJECT NUMBER: UC2000

LINE NUMBER: 700 E INSTRUMENT: EM-31

Station No.	Conductivity (Vertical Dipole)	Remarks
240.00	4.72	
260.00	5.58	
280.00	6.40	
300.00	6.42	
320.00	5.64	
340.00	6.04	
360.00	6.82	
380.00	4.68	
400.00	10.52	
420.00	9.72	
440.00	9.22	
460.00	5.68	
480.00	6.52	
500.00	8.76	

PROJECT NUMBER: UC2000

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass LINE NUMBER: 750 E

DATE: 6-6-91 INSTRUMENT: EM-31

	Conductivity	
Station No.	(Vertical Dipole)	Remarks
240.00	3.58	
260.00	4.92	
280.00	6.30	
300.00	5.84	
320.00	6.30	
340.00	0.52	
360.00	6.46	
380.00	7.38	
400.00	7.70	
420.00	8.90	
440.00	9.24	
460.00	7.92	
480.00	9.88	
500.00	3.56	

PROJECT NUMBER: UC2000

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91 LINE NUMBER: 800 E

Station No.	Conductivity (Vertical Dipole)	Remarks
240.00	4.38	
260.00	5.72	
280.00	6.92	
300.00	3.68	
320.00	6.18	
340.00	6.42	
360.00	12.84	
380.00	8.64	
400.00	7.78	
420.00	9.28	
440.00	9.96	
460.00	9.18	
480.00	10.38	
500.00	10.24	
520.00	6.66	

PROJECT NUMBER: UC2000

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91 LINE NUMBER: 850 E

Station No.	Conductivity (Vertical Dipole)	Remarks
240.00	4.12	
260.00	5.38	
280.00	7.54	
300.00	7.10	
320.00	7.00	
340.00	4.46	
360.00	0.52	
380.00	7.68	
400.00	7.14	
420.00	7.70	
440.00	7.46	
460.00	8.10	
480.00	9.46	
500.00	9.40	
520.00	10.74	

PROJECT NUMBER: UC2000

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass LINE NUMBER: 900 E

DATE: 6-6-91 INSTRUMENT: EM-31

Station No.	Conductivity (Vertical Dipole)	Remarks
240.00	4.10	
260.00	5.94	
280.00	8.58	
300.00	8.48	
320.00	6.44	
340.00	7.96	
360.00	8.88	
380.00	9.04	
400.00	3.18	
420.00	8.28	
440.00	8.18	
460.00	8.54	
480.00	9.36	
500.00	10.06	
520.00	9.72	
540.00	7.80	

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass

DATE: 6-6-91

PROJECT NUMBER: UC2000

LINE NUMBER: 950 E

Station No.	Conductivity (Vertical Dipole)	Remarks
240.00	4.20	
260.00	5.98	
280.00	7.46	
300.00	6.70	
320.00	5.72	
340.00	3.32	
360.00	8.22	
380.00	8.12	
400.00	8.48	
420.00	5.60	
440.00	8.30	
460.00	9.26	
480.00	6.44	
500.00	5.78	
520.00	9.76	
540.00	8.86	

Geophysical Survey: Fort Devens
Section No.: A
Revision No.: 0
Date: August 1991

TERRAIN CONDUCTIVITY DATA EM-31, "HORIZONTAL DIPOLE" COLD SPRING BROOK LANDFILL FORT DEVENS, MASSACHUSETTS

recycled paper

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91

PROJECT NUMBER: UC2000

LINE NUMBER: 0 E INSTRUMENT: EM-31

Conductivity (Horizontal Dipole)	Remarks
2.84	
3.44	
3.24	
4.06	
3.54	
3.84	
3.34	
3.98	
	(Horizontal Dipole)  2.84 3.44 3.24 4.06 3.54 3.84 3.34

PROJECT NUMBER: UC2000

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91 LINE NUMBER: 50 E INSTRUMENT: EM-31

Station No.	Conductivity (Horizontal Dipole)	Remarks
180.00	3.58	
200.00	3.40	
220.00	3.92	
240.00	3.38	
260.00	3.82	
280.00	3.76	
300.00	3.42	
320.00	3.36	
340.00	3.30	
360.00	3.76	
380.00	3.36	
400.00	3.50	

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass

DATE: 6-6-91

PROJECT NUMBER: UC2000

LINE NUMBER: 100 E INSTRUMENT: EM-31

Station No.	Conductivity (Horizontal Dipole)	Remarks
160.00	3.58	
180.00	3.60	
200.00	3.76	
220.00	3.12	
240.00	4.08	
260.00	4.00	
280.00	3.24	
300.00	3.52	
320.00	4.00	
340.00	3.98	
360.00	5.22	
380.00	4.06	
400.00	4.72	

PROJECT NUMBER: UC2000

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91 LINE NUMBER: 150 E

Station No.	Conductivity (Horizontal Dipole)	Remarks
40.00	3.24	
60.00	3.14	
80.00	3.44	
100.00	3.18	
120.00	2.36	
140.00	3.26	
160.00	3.60	
180.00	3.24	
200.00	3.82	
220.00	3.86	
240.00	3.90	
260.00	4.38	
280.00	4.56	
300.00	4.38	
320.00	4.92	
340.00	5.36	
360.00	7.20	
380.00	7.58	

PROJECT NUMBER: UC2000

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass LINE NUMBER: 200 E

DATE: 6-6-91 INSTRUMENT: EM-31

Station No.	Conductivity (Horizontal Dipole)	Remarks
0.00	3.18	
20.00	3.16	
40.00	5.44	
60.00	2.36	
80.00	3.66	
100.00	3.28	
120.00	3.02	
140.00	3.54	
160.00	3.48	
180.00	3.78	
200.00	3.88	
220.00	3.86	
240.00	3.94	
260.00	4.88	
280.00	5.06	
300.00	5.54	
320.00	5.10	
340.00	7.62	
360.00	9.12	
380.00	6.76	
400.00	7.54	

CLIENT: U.S. Army/USATHAMA PROJECT NUMBER: UC2000

LOCATION: Fort Devens, Mass
DATE: 6-6-91
LINE NUMBER: 250 E
INSTRUMENT: EM-31

Conductivity Station No. (Horizontal Dipole) Remarks _____ -80.00 2.72 -60.00 1.22 -40.00 3.28 -20.00 2.68 0.00 3.20 3.20 20.00 40.00 2.78 60.00 2.58 80.00 3.14 100.00 3.28 3.76 120.00 140.00 3.38 160.00 3.54 180.00 3.16 200.00 3.62 220.00 3.20 240.00 4.06 260.00 5.26 280.00 5.74 300.00 5.80 320.00 6.96 340.00 6.20 5.72 360.00 380.00 7.44 400.00 9.14 420.00 7.46

8.94

440.00

PROJECT NUMBER: UC2000

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91 LINE NUMBER: 300 E INSTRUMENT: EM-31

Station No.	Conductivity	Remarks
Station No.	(Horizontal Dipole)	Remarks
-80.00	4.48	
-60.00	5.26	
-40.00	4.34	
-20.00	4.54	
0.00	5.50	
20.00	4.66	
40.00	4.72	
60.00	5.16	
80.00	4.32	
100.00	4.74	
120.00	4.56	
140.00	4.78	
160.00	4.56	
180.00	4.62	
200.00	4.92	
220.00	5.14	
240.00	5.62	
260.00	6.50	
280.00	7.42	
300.00	7.04	
320.00	7.08	
340.00	7.30	
360.00	7.38	
380.00	9.78	
400.00	14.52	
420.00	12.02	

PROJECT NUMBER: UC2000 LINE NUMBER: 350 E

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91

Station No.	Conductivity (Horizontal Dipole)	Remarks
20.00	4.70	
40.00	4.12	
60.00	3.68	
80.00	4.38	
100.00	4.34	
120.00	5.10	
140.00	5.12	
160.00	4.38	
180.00	4.60	
200.00	4.34	
220.00	4.80	
240.00	5.28	
260.00	6.14	
280.00	7.02	
300.00	6.06	
320.00	6.24	
340.00	6.34	
360.00	9.78	
380.00	8.92	
400.00	10.72	
420.00	14.38	

PROJECT NUMBER: UC2000

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass LINE NUMBER: 400 E

DATE: 6-6-91 INSTRUMENT: EM-31

St	ation No.	Conductivity (Horizontal Dipole)	Remarks
	100.00	4.40	
	120.00	4.92	
	140.00	4.80	
	160.00	4.00	
	180.00	4.40	
	200.00	5.20	
	220.00	4.66	
	240.00	5.14	
	260.00	6.12	
	280.00	6.84	
	300.00	7.32	
	320.00	7.02	
	340.00	10.82	
	360.00	11.20	
	380.00	10.62	
	400.00	11.24	

PROJECT NUMBER: UC2000

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91 LINE NUMBER: 450 E

Station No.	Conductivity (Horizontal Dipole)	Remarks
140.00	4 20	
	4.20	
160.00	4.22	
180.00	4.20	
200.00	4.74	
220.00	5.22	
240.00	4.84	
260.00	5.76	
280.00	6.72	
300.00	7.08	
320.00	7.08	
340.00	8.68	
360.00	10.74	
380.00	10.84	

PROJECT NUMBER: UC2000

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass LINE NUMBER: 500 E

DATE: 6-6-91 INSTRUMENT: EM-31

Station No.	Conductivity (Horizontal Dipole)	Remarks
160.00	4.28	
180.00	4.46	
200.00	4.56	
220.00	3.68	
240.00	4.96	
260.00	5.98	
280.00	6.52	
300.00	8.12	
320.00	10.28	
340.00	7.94	
360.00	8.70	
380.00	13.70	
400.00	14.34	
420.00	9.94	

PROJECT NUMBER: UC2000

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91 LINE NUMBER: 550 E INSTRUMENT: EM-31

Station No.	Conductivity (Horizontal Dipole)	Remarks
180.00	3.92	
200.00	4.22	
220.00	4.16	
240.00	5.02	
260.00	5.30	
280.00	6.06	
300.00	6.58	
320.00	8.46	
340.00	11.38	
360.00	15.22	
380.00	24.92	
400.00	10.52	
420.00	9 98	

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91

PROJECT NUMBER: UC2000

LINE NUMBER: 600 E INSTRUMENT: EM-31

Station No.	Conductivity (Horizontal Dipole)	Remarks
200.00	4.14	
220.00	4.48	
240.00	4.50	
260.00	4.88	
280.00	6.46	
300.00	8.78	
320.00	19.06	
340.00	16.72	
360.00	11.10	
380.00	8.76	
400.00	8.20	
420.00	9.26	

PROJECT NUMBER: UC2000 LINE NUMBER: 650 E CLIENT: U.S. Army/USATHAMA

LOCATION: Fort Devens, Mass DATE: 6-6-91 INSTRUMENT: EM-31

Station No.	Conductivity (Horizontal Dipole)	Remarks
240.00	4.78	
260.00	5.42	
280.00	5.74	
300.00	5.94	
320.00	5.62	
340.00	6.14	
360.00	5.76	
380.00	7.06	
400.00	9.94	

PROJECT NUMBER: UC2000

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass LINE NUMBER: 700 E

DATE: 6-6-91 INSTRUMENT: EM-31

Station No.	Conductivity (Horizontal Dipole)	Remarks
240.00	4.44	
260.00	5.20	
280.00	5.62	
300.00	5.50	
320.00	5.82	
340.00	5.62	
360.00	6.28	
380.00	9.22	
400.00	9.62	
420.00	10.86	
440.00	15.60	
460.00	10.64	
480.00	11.92	
500.00	9.58	

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91 PROJECT NUMBER: UC2000 LINE NUMBER: 750 E

Station No.	Conductivity (Horizontal Dipole)	Remarks
240.00	3.84	
260.00	4.64	
280.00	5.28	
300.00	4.56	
320.00	5.62	
340.00	4.72	
360.00	7.44	
380.00	9.00	
400.00	8.82	
420.00	7.42	
440.00	7.52	
460.00	9.48	
480.00	9.64	
500.00	11.06	

PROJECT NUMBER: UC2000

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91 LINE NUMBER: 800 E

Station No.	Conductivity (Horizontal Dipole)	Remarks
240.00	4.04	
260.00	4.38	
280.00	5.28	
300.00	6.14	
320.00	5.66	
340.00	6.16	
360.00	11.56	
380.00	7.22	
400.00	7.86	
420.00	7.82	
440.00	9.08	
460.00	9.68	
480.00	8.34	
500.00	8.70	
520.00	8.64	

PROJECT NUMBER: UC2000

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91 LINE NUMBER: 850 E

Station No.	Conductivity (Horizontal Dipole)	Remarks
240.00	3.90	
260.00	4.42	
	1, T.	
280.00	6.16	
300.00	6.22	
320.00	5.94	
340.00	7.10	
360.00	7.38	
380.00	6.92	
400.00	8.54	
420.00	6.58	
440.00	7.54	
460.00	7.16	
480.00	7.42	
500.00	8.00	
520.00	10.28	

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91

PROJECT NUMBER: UC2000

LINE NUMBER: 900 E INSTRUMENT: EM-31

Station No.	Conductivity (Horizontal Dipole)	Remarks
240.00	4.20	
260.00	5.86	
280.00	6.32	
300.00	6.20	
320.00	6.16	
340.00	6.16	
360.00	7.28	
380.00	8.36	
400.00	8.24	
420.00	7.90	
440.00	7.92	
460.00	8.60	
480.00	8.14	
500.00	7.74	
520.00	7.84	
540.00	16.40	

PROJECT NUMBER: UC2000

CLIENT: U.S. Army/USATHAMA LOCATION: Fort Devens, Mass DATE: 6-6-91 LINE NUMBER: 950 E

Station No.	Conductivity (Horizontal Dipole)	Remarks
240.00	5.00	
260.00	4.94	
280.00	6.48	
300.00	7.12	
320.00	8.86	
340.00	6.18	
360.00	6.70	
380.00	8.32	
400.00	6.72	
420.00	7.86	
440.00	8.02	
460.00	8.90	
480.00	8.82	
500.00	9.72	
520.00	9.74	
540.00	8.14	

Geophysical Survey: Fort Devens
Section No.:
Revision No.:
Date:

August 1991

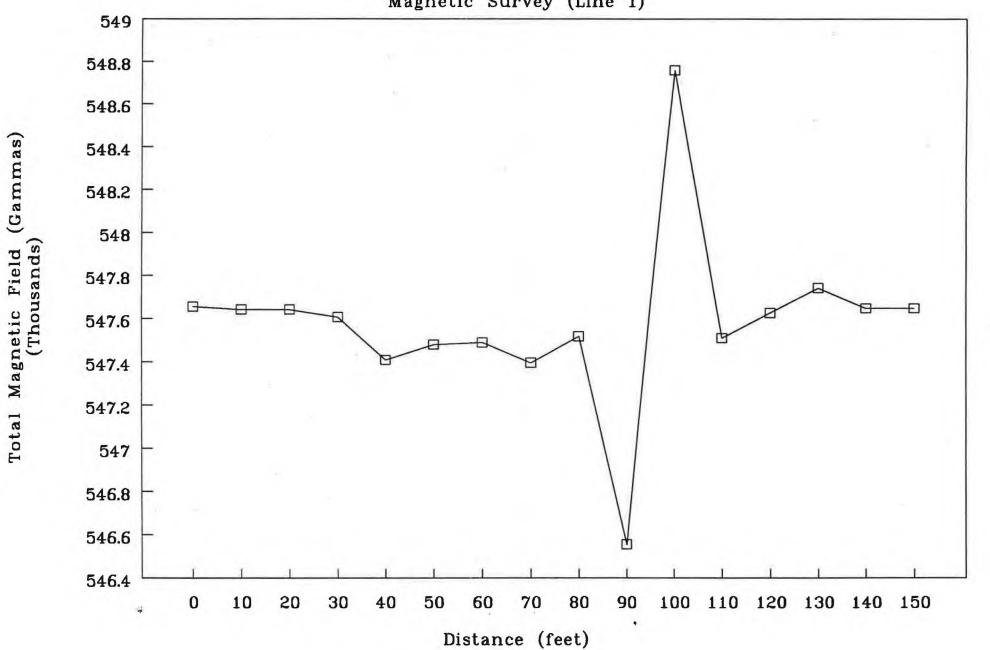
#### APPENDIX B

MAGNETIC SURVEY DATA

## FORT DEVENS MAGNETIC SURVEY DATA

LINE	#	SITE #	FEET	TIME	GAMMAS
003/	1	0	0	10:44:40	54765.6
003/	1	1	10	10:46:10	54764.1
003/	1	2	20	10:46:39	54764.1
003/	1	3	30	10:47:46	54760.5
003/	1	4	40	10:48:12	54740.8
003/	1	5	50	10:48:28	54748.0
003/	1	6	60	10:48:46	54749.0
003/	1	7	70	10:49:22	54739.6
003/	1	8	80	10:49:41	54751.8
003/	1	9	90	10:50:03	54655.5
003/	1	10	100	10:50:26	54875.9
003/	1	11	110	10:51:30	54750.9
003/	1	12	120	10:52:00	54762.5
003/	1	13	130	10:52:20	54774.2
003/	1	14	140	10:52:46	54764.7
003/	1	15	150	10:53:20	54764.7

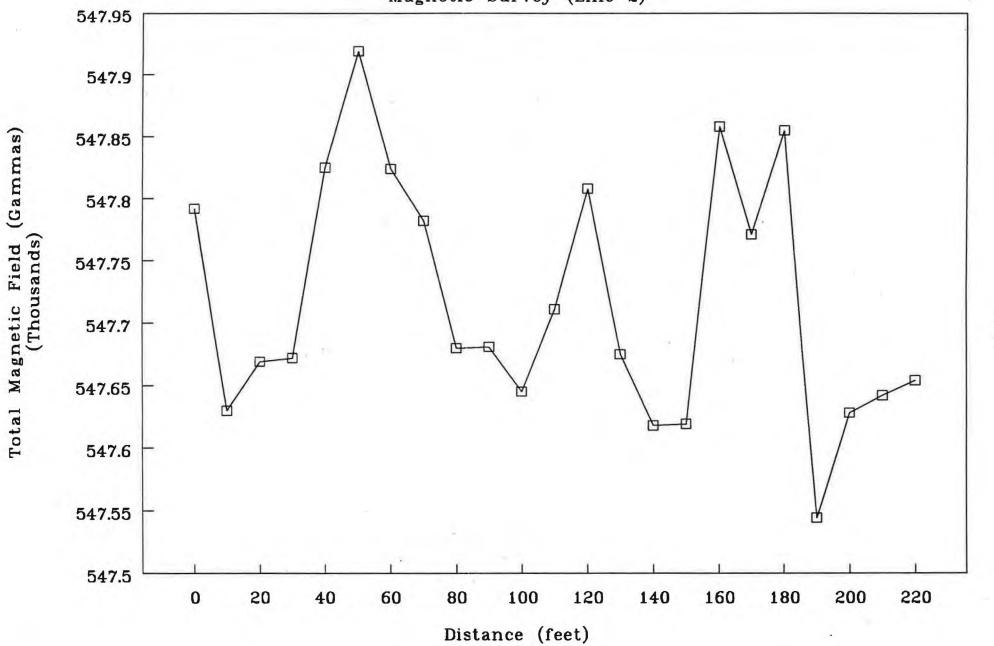
Fort Devens
Magnetic Survey (Line 1)



## FORT DEVENS MAGNETIC SURVEY DATA

LINE	#	SITE #	FEET	TIME	GAMMAS
003/	2	16	0	10:56:31	54779.2
003/	2	17	10	10:57:16	54763.0
003/	2	18	20	10:57:39	54766.9
003/	2	19	30	10:58:08	54767.2
003/	2	20	40	10:58:30	54782.5
003/	2	21	50	10:58:52	54791.9
003/	2	22	60	10:59:13	54782.4
003/	2	23	70	10:59:58	54778.2
003/	2	24	80	11:00:14	54768.0
003/	2	25	90	11:00:51	54768.1
003/	2	26	100	11:01:07	54764.5
003/	2	27	110	11:01:25	54771.1
003/	2	28	120	11:01:44	54780.8
003/	2	29	130	11:02:05	54767.5
003/	2	30	140	11:02:23	54761.8
003/	2	31	150	11:02:42	54761.9
003/	2	32	160	11:03:00	54785.8
003/	2	33	170	11:03:20	54777.1
003/	2	34	180	11:03:47	54785.5
003/	2	35	190	11:04:07	54754.4
003/	2	36	200	11:04:25	54762.8
003/	2	37	210	11:04:47	54764.2
003/	2	38	220	11:05:06	54765.4

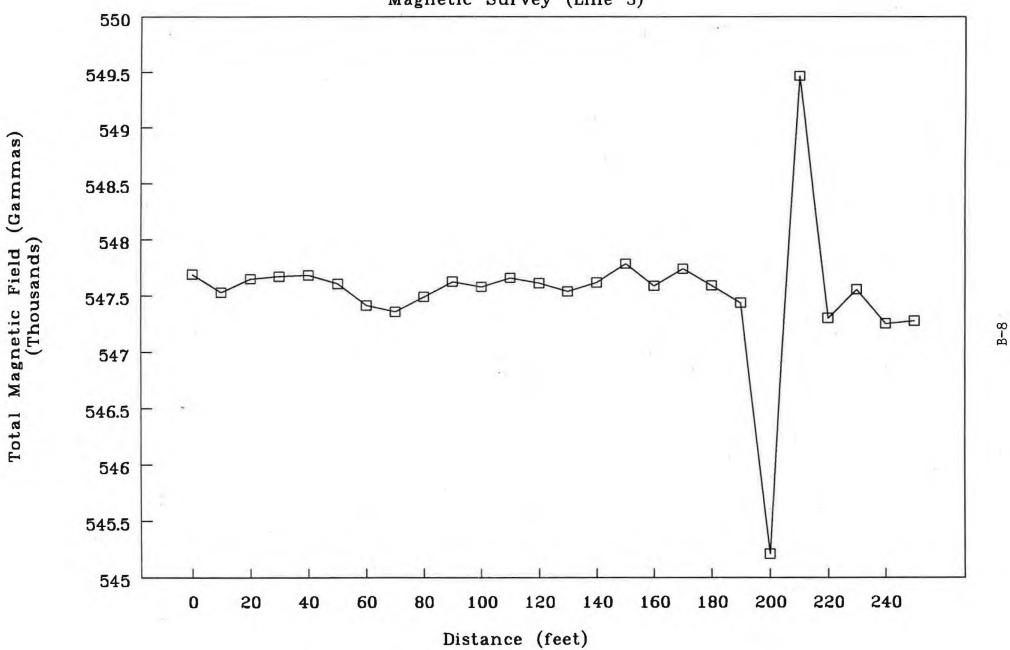
Fort Devens
Magnetic Survey (Line 2)



# FORT DEVENS MAGNETIC SURVEY DATA

LINE	#	SITE #	FEET	TIME	GAMMAS
003/	3	39	0	11:08:59	54768.9
003/	3	40	10	11:09:50	54753.0
003/	3	41	20	11:10:10	54764.9
003/		42	30	11:10:28	54767.1
003/	3	43	40	11:11:12	54768.2
003/	3	44	50	11:11:37	54760.5
003/	3	45	60	11:12:19	54741.3
003/	3	46	70	11:12:40	54735.6
003/	3	47	80	11:13:05	54748.9
003/	3	48	90	11:13:34	54762.5
003/	3	49	100	11:13:53	54757.9
003/	3	50	110	11:14:10	54765.8
003/	3	51	120	11:14:35	54761.1
003/	3	52	130	11:15:14	54753.8
003/	3	53	140	11:15:30	54761.8
003/	3	54	150	11:16:05	54778.4
003/	3	55	160	11:16:35	54758.7
003/	3	56	170	11:16:56	54773.8
003/	3	57	180	11:17:16	54759.0
003/	3	58	190	11:17:32	54743.6
003/	3	59	200	11:17:48	54521.0
003/	3	60	210	11:18:08	54946.8
003/	3	61	220	11:18:31	54730.0
003/	3	62	230	11:18:49	54755.4
003/	3	63	240	11:19:07	54724.9
003/	3	64	250	11:19:25	54727.5

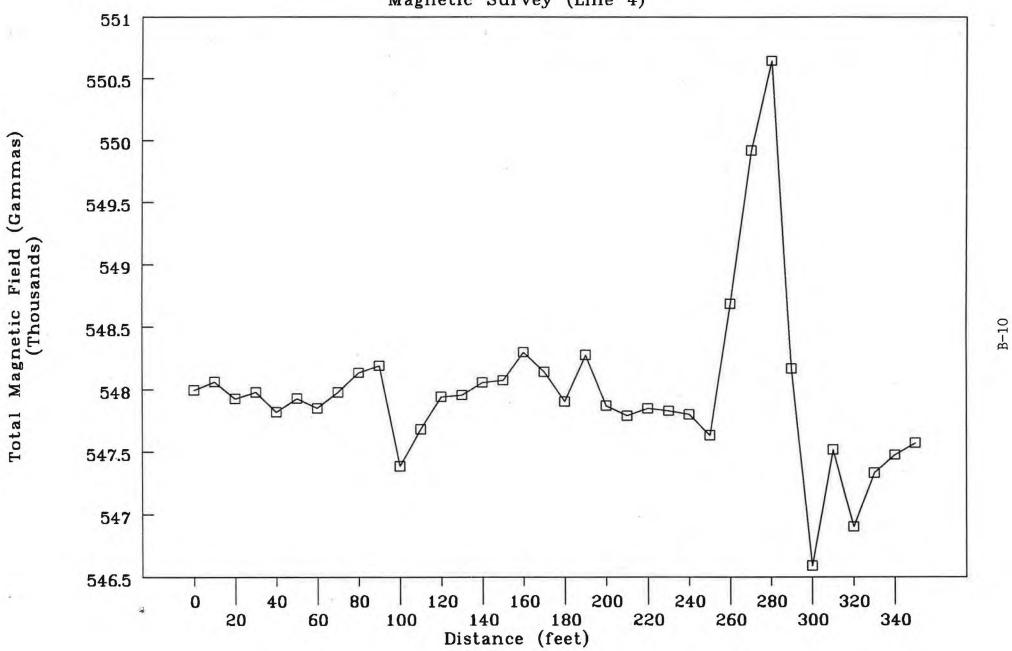
Fort Devens
Magnetic Survey (Line 3)



## FORT DEVENS MAGNETIC SURVEY DATA

LINE	#	SITE #	FEET	TIME	GAMMAS
003/	4	65	0	11:21:46	54799.4
003/	4	66	10	11:22:25	54806.1
003/	4	67	20	11:22:53	54792.6
003/	4	68	30	11:23:08	54797.7
003/	4	69	40	11:23:24	54781.9
003/	4	70	50	11:23:39	54792.9
003/	4	71	60	11:24:01	54785.1
003/	4	72	70	11:24:18	54797.8
003/	4	73	80	11:24:33	54813.6
003/	4	74	90	11:24:48	54819.2
003/	4	75	100	11:25:04	54738.6
003/	4	76	110	11:25:19	54768.1
003/	4	77	120	11:25:33	54794.0
003/	4	78	130	11:25:49	54795.6
003/	4	79	140	11:26:05	54805.7
003/	4	80	150	11:26:21	54807.3
003/	4	81	160	11:26:38	54829.9
003/	4	82	170	11:26:53	54814.3
003/	4	83	180	11:27:10	54790.4
003/	4	84	190	11:27:25	54827.8
003/	4	85	200	11:27:44	54786.9
003/	4	86	210	11:28:24	54778.9
003/	4	87	220	11:28:39	54784.7
003/	4	88	230	11:28:54	54782.8
003/	4	89	240	11:29:10	54779.9
003/	4	90	250	11:29:51	54763.2
003/	4	91	260	11:30:20	54868.3
003/	4.	92	270	11:30:39	54992.0
003/	4	93	280	11:31:01	55064.7
003/	4	94	290	11:31:18	54816.6
003/	4	95	300	11:31:36	54659.0
003/	4	96	310	11:31:54	54751.7
003/	4	97	320	11:32:24	54690.1
003/	4	98	330	11:32:44	54733.1
003/	4	99	340	11:34:18	54747.5
003/	4	100	350	11:36:45	54757.0

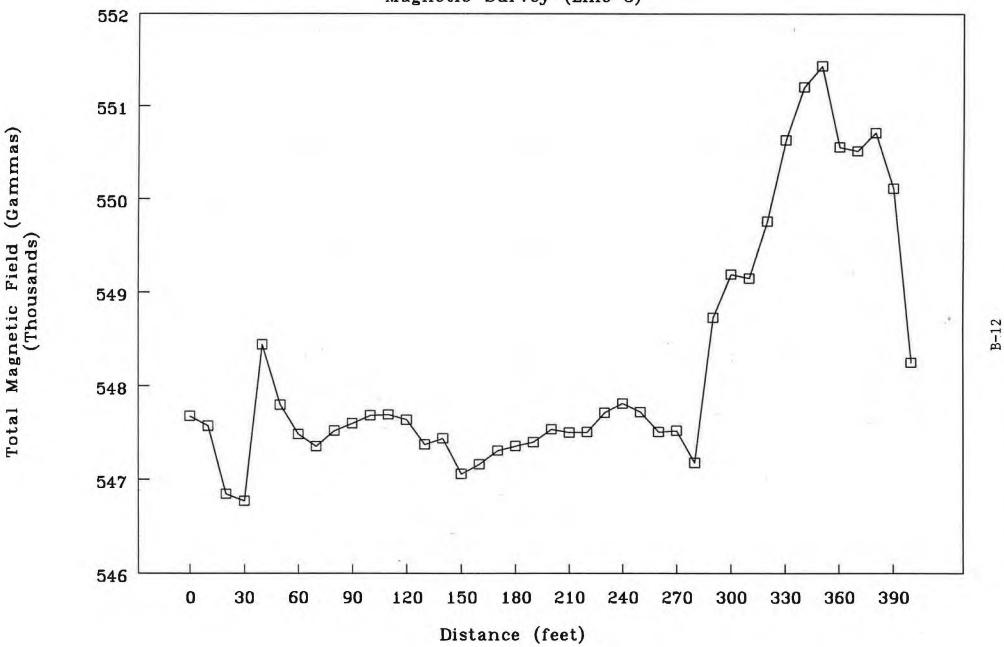
Fort Devens
Magnetic Survey (Line 4)



## FORT DEVENS MAGNETIC SURVEY DATA

LINE # SITE # FEET TIME GAMMAS  003/ 5 101 0 11:37:25 54767.8  003/ 5 102 10 11:37:41 54757.1  003/ 5 103 20 11:38:16 54684.0  003/ 5 104 30 11:38:38 54677.0  003/ 5 105 40 11:39:20 54844.1  003/ 5 106 50 11:39:21 54779.0  003/ 5 107 60 11:39:21 54778.0  003/ 5 109 80 11:40:14 54752.0  003/ 5 109 80 11:40:32 54769.8  003/ 5 110 90 11:40:32 54769.8  003/ 5 111 100 11:41:08 54768.3  003/ 5 112 110 11:41:44 54769.8  003/ 5 113 120 11:42:06 54763.8  003/ 5 114 130 11:42:23 54737.3  003/ 5 115 140 11:42:46 54737.3  003/ 5 116 150 11:43:01 54766.0  003/ 5 117 160 11:43:01 54766.0  003/ 5 118 170 11:43:48 54766.0  003/ 5 119 180 11:43:48 54735.6  003/ 5 120 190 11:44:49 54750.1  003/ 5 121 200 11:44:49 54750.1  003/ 5 123 220 11:45:06 54750.1  003/ 5 124 230 11:45:35 54761.2  003/ 5 128 270 11:45:35 54761.2  003/ 5 129 280 11:45:50 54771.2  003/ 5 131 300 11:45:35 54761.2  003/ 5 128 270 11:46:34 54752.0  003/ 5 130 290 11:47:59 54918.8  003/ 5 131 300 11:48:15 549718.8  003/ 5 131 300 11:48:15 549718.8  003/ 5 131 300 11:48:15 549718.8  003/ 5 133 320 11:48:48 55063.4  003/ 5 130 290 11:48:15 549718.8  003/ 5 131 300 11:48:15 549718.8  003/ 5 133 320 11:48:48 55063.4  003/ 5 134 330 11:48:48 55063.4  003/ 5 137 360 11:49:22 55143.5  003/ 5 139 380 11:50:12 55071.3  003/ 5 139 380 11:50:12 55071.3						
003/ 5         102         10         11:37:41         54757.1           003/ 5         103         20         11:38:16         54844.6           003/ 5         104         30         11:38:38         54677.0           003/ 5         105         40         11:39:00         54844.1           003/ 5         106         50         11:39:21         54779.9           003/ 5         108         70         11:39:59         5478.4           003/ 5         109         80         11:40:14         54752.0           003/ 5         110         90         11:40:32         54759.8           003/ 5         111         100         11:41:08         54768.3           003/ 5         112         110         11:41:44         54769.2           003/ 5         113         120         11:42:06         54763.8           003/ 5         113         120         11:42:06         54763.8           003/ 5         113         120         11:42:06         54763.8           003/ 5         115         140         11:42:06         54763.8           003/ 5         115         140         11:43:01         54706.0	LINE	#	SITE #	FEET	TIME	GAMMAS
003/ 5         102         10         11:37:41         54757.1           003/ 5         103         20         11:38:16         54684.6           003/ 5         104         30         11:38:38         54677.0           003/ 5         105         40         11:39:00         54844.1           003/ 5         106         50         11:39:21         54779.9           003/ 5         107         60         11:39:59         54735.4           003/ 5         109         80         11:40:14         54752.0           003/ 5         110         90         11:40:14         54759.8           003/ 5         110         90         11:41:08         54769.3           003/ 5         111         100         11:41:08         54768.3           003/ 5         112         110         11:42:06         54768.8           003/ 5         113         120         11:42:23         54737.3           003/ 5         114         130         11:42:23         54737.3           003/ 5         115         140         11:42:46         54743.7           003/ 5         115         140         11:43:31         54766.2	003/	5	101	0	11:37:25	54767.8
003/5         103         20         11:38:16         54684.6           003/5         104         30         11:38:38         54677.0           003/5         105         40         11:39:20         54844.1           003/5         106         50         11:39:21         54779.9           003/5         107         60         11:39:44         54748.3           003/5         109         80         11:40:14         54752.0           003/5         110         90         11:40:32         54759.8           003/5         111         100         11:41:08         54769.2           003/5         111         100         11:41:08         54769.2           003/5         113         120         11:42:06         54763.8           003/5         113         120         11:42:06         54763.8           003/5         114         130         11:42:23         54773.3           003/5         114         130         11:42:36         54743.7           003/5         115         140         11:42:36         54743.7           003/5         117         160         11:43:31         54706.0           003/5	003/		102	10	11:37:41	54757.1
003/5         105         40         11:39:00         54844.1           003/5         106         50         11:39:21         54778.3           003/5         108         70         11:39:59         54748.3           003/5         109         80         11:40:14         54752.0           003/5         110         90         11:40:32         54759.8           003/5         111         100         11:41:08         54768.3           003/5         112         110         11:41:08         54768.3           003/5         113         120         11:42:06         54763.8           003/5         114         130         11:42:06         54763.8           003/5         115         140         11:42:06         54763.8           003/5         115         140         11:42:06         54763.8           003/5         116         150         11:43:01         54763.8           003/5         116         150         11:43:01         54766.3           003/5         117         160         11:43:01         54766.3           003/5         118         170         11:43:01         54766.0           003	003/		103	20	11:38:16	54684.6
003/5         106         50         11:39:21         54779.9           003/5         107         60         11:39:44         54748.3           003/5         108         70         11:39:59         54735.4           003/5         109         80         11:40:14         54752.0           003/5         110         90         11:40:32         54759.8           003/5         111         100         11:41:08         54769.2           003/5         113         120         11:42:06         54769.2           003/5         113         120         11:42:06         54763.8           003/5         114         130         11:42:23         54737.3           003/5         115         140         11:42:23         54737.3           003/5         116         150         11:43:01         54760.0           003/5         116         150         11:43:17         54716.0           003/5         118         170         11:43:17         54716.0           003/5         120         190         11:44:31         54750.6           003/5         120         190         11:44:31         54750.6           003	003/	5	104	30	11:38:38	54677.0
003/5         106         50         11:39:21         54779.9           003/5         107         60         11:39:44         54748.3           003/5         108         70         11:39:59         54735.4           003/5         109         80         11:40:14         54752.0           003/5         110         90         11:40:32         54759.8           003/5         111         100         11:41:08         54769.2           003/5         113         120         11:42:06         54769.2           003/5         113         120         11:42:06         54763.8           003/5         114         130         11:42:23         54737.3           003/5         115         140         11:42:23         54737.3           003/5         116         150         11:43:01         54760.0           003/5         116         150         11:43:17         54716.0           003/5         118         170         11:43:17         54716.0           003/5         120         190         11:44:31         54750.6           003/5         120         190         11:44:31         54750.6           003	003/		105	40	11:39:00	54844.1
003/5         107         60         11:39:44         54748.3           003/5         108         70         11:39:59         54735.4           003/5         109         80         11:40:14         54752.0           003/5         110         90         11:40:32         54759.8           003/5         111         100         11:41:08         54768.3           003/5         112         110         11:41:44         54769.8           003/5         113         120         11:42:06         54763.8           003/5         114         130         11:42:23         54737.3           003/5         115         140         11:42:24         54763.8           003/5         116         150         11:43:01         54706.0           003/5         117         160         11:43:17         54716.0           003/5         118         170         11:43:33         54730.6           003/5         119         180         11:43:48         54735.6           003/5         120         190         11:44:31         54753.5           003/5         121         200         11:44:31         54753.5           00			106	50	11:39:21	54779.9
003/5         108         70         11:39:59         54735.4           003/5         109         80         11:40:14         54752.0           003/5         110         90         11:40:32         54759.8           003/5         111         100         11:41:08         54768.3           003/5         112         110         11:41:44         54769.2           003/5         113         120         11:42:06         54763.8           003/5         114         130         11:42:23         54737.3           003/5         115         140         11:42:23         54737.3           003/5         116         150         11:43:01         54706.0           003/5         117         160         11:43:17         54716.0           003/5         118         170         11:43:33         54730.6           003/5         119         180         11:43:48         54735.5           003/5         120         190         11:44:02         54740.0           003/5         121         200         11:44:02         54750.1           003/5         122         210         11:44:49         54750.1           0			107	60	11:39:44	54748.3
003/5         109         80         11:40:14         54752.0           003/5         110         90         11:40:32         54759.8           003/5         111         100         11:41:08         54768.3           003/5         112         110         11:41:44         54769.2           003/5         113         120         11:42:06         54763.8           003/5         114         130         11:42:23         54737.3           003/5         115         140         11:42:23         54737.3           003/5         116         150         11:42:01         54766.0           003/5         116         150         11:42:01         54766.0           003/5         117         160         11:43:01         54766.0           003/5         118         170         11:43:01         54766.0           003/5         119         180         11:43:17         54716.0           003/5         119         180         11:43:17         54716.0           003/5         120         190         11:44:33         54735.6           003/5         121         200         11:44:02         54740.0	003/		108	70	11:39:59	54735.4
003/5         110         90         11:40:32         54759.8           003/5         111         100         11:41:08         54768.3           003/5         112         110         11:41:08         54768.3           003/5         113         120         11:42:06         54763.8           003/5         114         130         11:42:23         54737.3           003/5         115         140         11:42:46         54743.7           003/5         116         150         11:43:01         54706.0           003/5         117         160         11:43:17         54716.0           003/5         118         170         11:43:33         54730.6           003/5         119         180         11:43:48         54735.6           003/5         120         190         11:44:02         54740.0           003/5         121         200         11:44:02         54740.0           003/5         122         210         11:44:49         54750.1           003/5         123         220         11:45:06         54750.5           003/5         124         230         11:45:20         54771.2 <td< td=""><td>003/</td><td></td><td>109</td><td>80</td><td>11:40:14</td><td>54752.0</td></td<>	003/		109	80	11:40:14	54752.0
003/ 5         111         100         11:41:08         54768.3           003/ 5         112         110         11:41:44         54769.2           003/ 5         113         120         11:42:06         54763.8           003/ 5         114         130         11:42:23         54737.3           003/ 5         115         140         11:42:46         54743.7           003/ 5         116         150         11:43:01         54706.0           003/ 5         117         160         11:43:17         54716.0           003/ 5         118         170         11:43:33         54730.6           003/ 5         119         180         11:43:48         54735.6           003/ 5         120         190         11:44:02         54740.0           003/ 5         121         200         11:44:49         54750.5           003/ 5         122         210         11:44:49         54750.5           003/ 5         123         220         11:45:06         54750.5           003/ 5         124         230         11:45:06         54750.5           003/ 5         125         240         11:45:35         54781.1	003/		110	90	11:40:32	54759.8
003/5         112         110         11:41:44         54769.2           003/5         113         120         11:42:06         54763.8           003/5         114         130         11:42:23         54737.3           003/5         115         140         11:42:246         54743.7           003/5         116         150         11:43:01         54706.0           003/5         117         160         11:43:17         54716.0           003/5         118         170         11:43:33         54730.6           003/5         119         180         11:43:48         54735.6           003/5         120         190         11:44:02         54740.0           003/5         121         200         11:44:31         54753.5           003/5         122         210         11:44:49         54750.1           003/5         123         220         11:45:06         54750.5           003/5         124         230         11:45:06         54750.5           003/5         125         240         11:45:20         54771.2           003/5         127         260         11:45:51         54771.9           <	003/		111	100	11:41:08	54768.3
003/5         113         120         11:42:06         54763.8           003/5         114         130         11:42:23         54737.3           003/5         115         140         11:42:23         54737.3           003/5         116         150         11:43:01         54706.0           003/5         117         160         11:43:17         54716.0           003/5         118         170         11:43:33         54730.6           003/5         119         180         11:43:48         54735.6           003/5         120         190         11:44:02         54740.0           003/5         121         200         11:44:31         54753.5           003/5         122         210         11:44:31         54750.5           003/5         123         220         11:44:31         54750.1           003/5         123         220         11:45:06         54750.5           003/5         124         230         11:45:35         54781.1           003/5         125         240         11:45:35         54781.1           003/5         127         260         11:46:34         54752.0 <t< td=""><td>003/</td><td></td><td>112</td><td>110</td><td>11:41:44</td><td>54769.2</td></t<>	003/		112	110	11:41:44	54769.2
003/5         114         130         11:42:23         54737.3           003/5         115         140         11:42:46         54743.7           003/5         116         150         11:43:01         54706.0           003/5         117         160         11:43:17         54716.0           003/5         118         170         11:43:17         54716.0           003/5         119         180         11:43:48         54730.6           003/5         120         190         11:44:02         54740.0           003/5         121         200         11:44:02         54750.1           003/5         122         210         11:44:49         54750.1           003/5         123         220         11:45:06         54750.5           003/5         123         220         11:45:06         54750.5           003/5         124         230         11:45:35         54781.1           003/5         125         240         11:45:35         54781.1           003/5         126         250         11:45:51         54771.2           003/5         128         270         11:46:34         54752.0 <t< td=""><td></td><td></td><td>113</td><td>120</td><td>11:42:06</td><td>54763.8</td></t<>			113	120	11:42:06	54763.8
003/5         115         140         11:42:46         54743.7           003/5         116         150         11:43:01         54706.0           003/5         117         160         11:43:17         54716.0           003/5         118         170         11:43:17         54716.0           003/5         119         180         11:43:48         54730.6           003/5         120         190         11:44:02         54740.0           003/5         121         200         11:44:02         54740.0           003/5         122         210         11:44:49         54750.1           003/5         123         220         11:45:06         54750.5           003/5         124         230         11:45:20         54771.2           003/5         124         230         11:45:20         54771.2           003/5         125         240         11:45:51         54771.2           003/5         126         250         11:45:51         54771.9           003/5         127         260         11:46:20         54750.8           003/5         128         270         11:46:34         54752.0 <t< td=""><td>003/</td><td></td><td>114</td><td>130</td><td>11:42:23</td><td>54737.3</td></t<>	003/		114	130	11:42:23	54737.3
003/5         116         150         11:43:01         54706.0           003/5         117         160         11:43:17         54716.0           003/5         118         170         11:43:33         54730.6           003/5         119         180         11:43:48         54735.6           003/5         120         190         11:44:02         54740.0           003/5         121         200         11:44:31         54753.5           003/5         122         210         11:44:31         54750.5           003/5         123         220         11:45:06         54750.5           003/5         124         230         11:45:20         54771.2           003/5         125         240         11:45:35         54781.1           003/5         127         260         11:46:20         54750.8           003/5         127         260         11:46:34         54752.0           003/5         129         280         11:46:57         54717.6           003/5         130         290         11:47:30         54872.6           003/5         131         300         11:48:34         54976.3 <t< td=""><td></td><td></td><td>115</td><td>140</td><td>11:42:46</td><td>54743.7</td></t<>			115	140	11:42:46	54743.7
003/5         117         160         11:43:17         54716.0           003/5         118         170         11:43:33         54730.6           003/5         119         180         11:43:48         54735.6           003/5         120         190         11:44:02         54740.0           003/5         121         200         11:44:31         54753.5           003/5         122         210         11:44:49         54750.1           003/5         123         220         11:45:06         54750.5           003/5         124         230         11:45:20         54771.2           003/5         125         240         11:45:35         54781.1           003/5         126         250         11:45:51         54771.9           003/5         127         260         11:46:20         54750.8           003/5         128         270         11:46:34         54752.0           003/5         130         290         11:47:30         54872.6           003/5         131         300         11:47:59         54918.8           003/5         133         320         11:48:34         54976.3 <t< td=""><td></td><td></td><td></td><td>150</td><td>11:43:01</td><td>54706.0</td></t<>				150	11:43:01	54706.0
003/       5       118       170       11:43:33       54730.6         003/       5       119       180       11:43:48       54735.6         003/       5       120       190       11:44:02       54740.0         003/       5       121       200       11:44:31       54753.5         003/       5       122       210       11:44:49       54750.5         003/       5       123       220       11:45:06       54750.5         003/       5       124       230       11:45:20       54771.2         003/       5       125       240       11:45:35       54781.1         003/       5       126       250       11:45:51       54771.9         003/       5       127       260       11:46:20       54750.8         003/       5       128       270       11:46:34       54752.0         003/       5       129       280       11:46:37       54717.6         003/       5       130       290       11:47:30       54872.6         003/       5       131       300       11:47:59       54918.8         003/       5       133<				160	11:43:17	54716.0
003/5         119         180         11:43:48         54735.6           003/5         120         190         11:44:02         54740.0           003/5         121         200         11:44:31         54753.5           003/5         122         210         11:44:49         54750.1           003/5         123         220         11:45:06         54750.5           003/5         124         230         11:45:20         54771.2           003/5         125         240         11:45:35         54781.1           003/5         126         250         11:45:51         54771.9           003/5         127         260         11:46:20         54750.8           003/5         128         270         11:46:34         54752.0           003/5         129         280         11:46:34         54752.0           003/5         130         290         11:47:30         54872.6           003/5         131         300         11:47:59         54918.8           003/5         132         310         11:48:15         54914.8           003/5         133         320         11:48:34         54976.3 <t< td=""><td>10 to 10 to 10 to 17 to 10 to</td><td></td><td></td><td></td><td>11:43:33</td><td>54730.6</td></t<>	10 to 10 to 10 to 17 to 10 to				11:43:33	54730.6
003/       5       120       190       11:44:02       54740.0         003/       5       121       200       11:44:31       54753.5         003/       5       122       210       11:44:49       54750.1         003/       5       123       220       11:45:06       54750.5         003/       5       124       230       11:45:20       54771.2         003/       5       125       240       11:45:35       54781.1         003/       5       126       250       11:45:51       54771.9         003/       5       127       260       11:46:20       54750.8         003/       5       128       270       11:46:34       54752.0         003/       5       129       280       11:46:57       54717.6         003/       5       130       290       11:47:30       54872.6         003/       5       131       300       11:47:59       54918.8         003/       5       132       310       11:48:15       54914.8         003/       5       133       320       11:48:34       54976.3         003/       5       134<				180	11:43:48	54735.6
003/       5       121       200       11:44:31       54753.5         003/       5       122       210       11:44:49       54750.1         003/       5       123       220       11:45:06       54750.5         003/       5       124       230       11:45:20       54771.2         003/       5       125       240       11:45:35       54781.1         003/       5       126       250       11:45:51       54771.9         003/       5       127       260       11:46:20       54750.8         003/       5       128       270       11:46:34       54752.0         003/       5       129       280       11:46:57       54717.6         003/       5       130       290       11:47:30       54872.6         003/       5       131       300       11:47:59       54918.8         003/       5       132       310       11:48:15       54914.8         003/       5       133       320       11:48:34       54976.3         003/       5       134       330       11:48:48       55063.4         003/       5       135<			120	190	11:44:02	54740.0
003/ 5         122         210         11:44:49         54750.1           003/ 5         123         220         11:45:06         54750.5           003/ 5         124         230         11:45:20         54771.2           003/ 5         125         240         11:45:35         54781.1           003/ 5         126         250         11:45:51         54771.9           003/ 5         127         260         11:46:20         54750.8           003/ 5         128         270         11:46:34         54752.0           003/ 5         129         280         11:46:57         54717.6           003/ 5         130         290         11:47:30         54872.6           003/ 5         131         300         11:47:59         54918.8           003/ 5         132         310         11:48:15         54914.8           003/ 5         133         320         11:48:34         54976.3           003/ 5         134         330         11:48:48         55063.4           003/ 5         135         340         11:49:22         55143.5           003/ 5         136         350         11:49:41         55055.9			121	200	11:44:31	54753.5
003/ 5         124         230         11:45:20         54771.2           003/ 5         125         240         11:45:35         54781.1           003/ 5         126         250         11:45:51         54771.9           003/ 5         127         260         11:46:20         54750.8           003/ 5         128         270         11:46:34         54752.0           003/ 5         129         280         11:46:57         54717.6           003/ 5         130         290         11:47:30         54872.6           003/ 5         131         300         11:47:59         54918.8           003/ 5         132         310         11:48:15         54914.8           003/ 5         133         320         11:48:34         54976.3           003/ 5         134         330         11:48:34         54976.3           003/ 5         135         340         11:49:05         55120.7           003/ 5         136         350         11:49:22         55143.5           003/ 5         138         370         11:49:41         55055.9           003/ 5         139         380         11:50:12         55071.3	003/	5	122	210	11:44:49	54750.1
003/         5         125         240         11:45:35         54781.1           003/         5         126         250         11:45:51         54771.9           003/         5         127         260         11:46:20         54750.8           003/         5         128         270         11:46:34         54752.0           003/         5         129         280         11:46:57         54717.6           003/         5         130         290         11:47:30         54872.6           003/         5         131         300         11:47:59         54918.8           003/         5         132         310         11:48:15         54914.8           003/         5         133         320         11:48:34         54976.3           003/         5         134         330         11:48:34         54976.3           003/         5         135         340         11:49:05         55120.7           003/         5         136         350         11:49:22         55143.5           003/         5         138         370         11:49:41         55055.9           003/         5				220	11:45:06	54750.5
003/       5       125       240       11:45:35       54781.1         003/       5       126       250       11:45:51       54771.9         003/       5       127       260       11:46:20       54750.8         003/       5       128       270       11:46:34       54752.0         003/       5       129       280       11:46:57       54717.6         003/       5       130       290       11:47:30       54872.6         003/       5       131       300       11:47:59       54918.8         003/       5       132       310       11:48:15       54914.8         003/       5       133       320       11:48:34       54976.3         003/       5       134       330       11:48:34       54976.3         003/       5       135       340       11:49:05       55120.7         003/       5       136       350       11:49:22       55143.5         003/       5       137       360       11:49:41       55055.9         003/       5       139       380       11:50:12       55071.3         003/       5       140<				230	11:45:20	54771.2
003/ 5       126       250       11:45:51       54771.9         003/ 5       127       260       11:46:20       54750.8         003/ 5       128       270       11:46:34       54752.0         003/ 5       129       280       11:46:57       54717.6         003/ 5       130       290       11:47:30       54872.6         003/ 5       131       300       11:47:59       54918.8         003/ 5       132       310       11:48:15       54914.8         003/ 5       133       320       11:48:34       54976.3         003/ 5       134       330       11:48:48       55063.4         003/ 5       135       340       11:49:05       55120.7         003/ 5       136       350       11:49:22       55143.5         003/ 5       138       370       11:49:41       55055.9         003/ 5       139       380       11:50:12       55071.3         003/ 5       140       390       11:50:28       55011.6			125	240	11:45:35	54781.1
003/ 5       127       260       11:46:20       54750.8         003/ 5       128       270       11:46:34       54752.0         003/ 5       129       280       11:46:57       54717.6         003/ 5       130       290       11:47:30       54872.6         003/ 5       131       300       11:47:59       54918.8         003/ 5       132       310       11:48:15       54914.8         003/ 5       133       320       11:48:34       54976.3         003/ 5       134       330       11:48:48       55063.4         003/ 5       135       340       11:49:05       55120.7         003/ 5       136       350       11:49:22       55143.5         003/ 5       137       360       11:49:41       55055.9         003/ 5       138       370       11:49:56       55051.5         003/ 5       139       380       11:50:12       55071.3         003/ 5       140       390       11:50:28       55011.6				250	11:45:51	54771.9
003/ 5       128       270       11:46:34       54752.0         003/ 5       129       280       11:46:57       54717.6         003/ 5       130       290       11:47:30       54872.6         003/ 5       131       300       11:47:59       54918.8         003/ 5       132       310       11:48:15       54914.8         003/ 5       133       320       11:48:34       54976.3         003/ 5       134       330       11:48:48       55063.4         003/ 5       135       340       11:49:05       55120.7         003/ 5       136       350       11:49:22       55143.5         003/ 5       137       360       11:49:41       55055.9         003/ 5       138       370       11:49:56       55051.5         003/ 5       139       380       11:50:12       55071.3         003/ 5       140       390       11:50:28       55011.6		5	127	260	11:46:20	54750.8
003/ 5       130       290       11:47:30       54872.6         003/ 5       131       300       11:47:59       54918.8         003/ 5       132       310       11:48:15       54914.8         003/ 5       133       320       11:48:34       54976.3         003/ 5       134       330       11:48:48       55063.4         003/ 5       135       340       11:49:05       55120.7         003/ 5       136       350       11:49:22       55143.5         003/ 5       137       360       11:49:41       55055.9         003/ 5       138       370       11:49:56       55051.5         003/ 5       139       380       11:50:12       55071.3         003/ 5       140       390       11:50:28       55011.6				270	11:46:34	54752.0
003/ 5       131       300       11:47:59       54918.8         003/ 5       132       310       11:48:15       54914.8         003/ 5       133       320       11:48:34       54976.3         003/ 5       134       330       11:48:48       55063.4         003/ 5       135       340       11:49:05       55120.7         003/ 5       136       350       11:49:22       55143.5         003/ 5       137       360       11:49:41       55055.9         003/ 5       138       370       11:49:56       55051.5         003/ 5       139       380       11:50:12       55071.3         003/ 5       140       390       11:50:28       55011.6	003/	5	129	280	11:46:57	54717.6
003/ 5       131       300       11:47:59       54918.8         003/ 5       132       310       11:48:15       54914.8         003/ 5       133       320       11:48:34       54976.3         003/ 5       134       330       11:48:48       55063.4         003/ 5       135       340       11:49:05       55120.7         003/ 5       136       350       11:49:22       55143.5         003/ 5       137       360       11:49:41       55055.9         003/ 5       138       370       11:49:56       55051.5         003/ 5       139       380       11:50:12       55071.3         003/ 5       140       390       11:50:28       55011.6		5	130	290	11:47:30	54872.6
003/ 5     132     310     11:48:15     54914.8       003/ 5     133     320     11:48:34     54976.3       003/ 5     134     330     11:48:48     55063.4       003/ 5     135     340     11:49:05     55120.7       003/ 5     136     350     11:49:22     55143.5       003/ 5     137     360     11:49:41     55055.9       003/ 5     138     370     11:49:56     55051.5       003/ 5     139     380     11:50:12     55071.3       003/ 5     140     390     11:50:28     55011.6				300	11:47:59	54918.8
003/ 5       133       320       11:48:34       54976.3         003/ 5       134       330       11:48:48       55063.4         003/ 5       135       340       11:49:05       55120.7         003/ 5       136       350       11:49:22       55143.5         003/ 5       137       360       11:49:41       55055.9         003/ 5       138       370       11:49:56       55051.5         003/ 5       139       380       11:50:12       55071.3         003/ 5       140       390       11:50:28       55011.6				310	11:48:15	54914.8
003/ 5       134       330       11:48:48       55063.4         003/ 5       135       340       11:49:05       55120.7         003/ 5       136       350       11:49:22       55143.5         003/ 5       137       360       11:49:41       55055.9         003/ 5       138       370       11:49:56       55051.5         003/ 5       139       380       11:50:12       55071.3         003/ 5       140       390       11:50:28       55011.6				320	11:48:34	54976.3
003/ 5     135     340     11:49:05     55120.7       003/ 5     136     350     11:49:22     55143.5       003/ 5     137     360     11:49:41     55055.9       003/ 5     138     370     11:49:56     55051.5       003/ 5     139     380     11:50:12     55071.3       003/ 5     140     390     11:50:28     55011.6					11:48:48	55063.4
003/     5     136     350     11:49:22     55143.5       003/     5     137     360     11:49:41     55055.9       003/     5     138     370     11:49:56     55051.5       003/     5     139     380     11:50:12     55071.3       003/     5     140     390     11:50:28     55011.6					11:49:05	55120.7
003/ 5     137     360     11:49:41     55055.9       003/ 5     138     370     11:49:56     55051.5       003/ 5     139     380     11:50:12     55071.3       003/ 5     140     390     11:50:28     55011.6					11:49:22	
003/ 5     138     370     11:49:56     55051.5       003/ 5     139     380     11:50:12     55071.3       003/ 5     140     390     11:50:28     55011.6					11:49:41	55055.9
003/ 5     139     380     11:50:12     55071.3       003/ 5     140     390     11:50:28     55011.6						
003/ 5 140 390 11:50:28 55011.6					11:50:12	
그 가장 가장 그 경기 가장 그 사람들이 가장						
003/ 5 141 400 11.55.45 54624.6	003/	5	141	400	11:53:49	54824.8

Fort Devens
Magnetic Survey (Line 5)



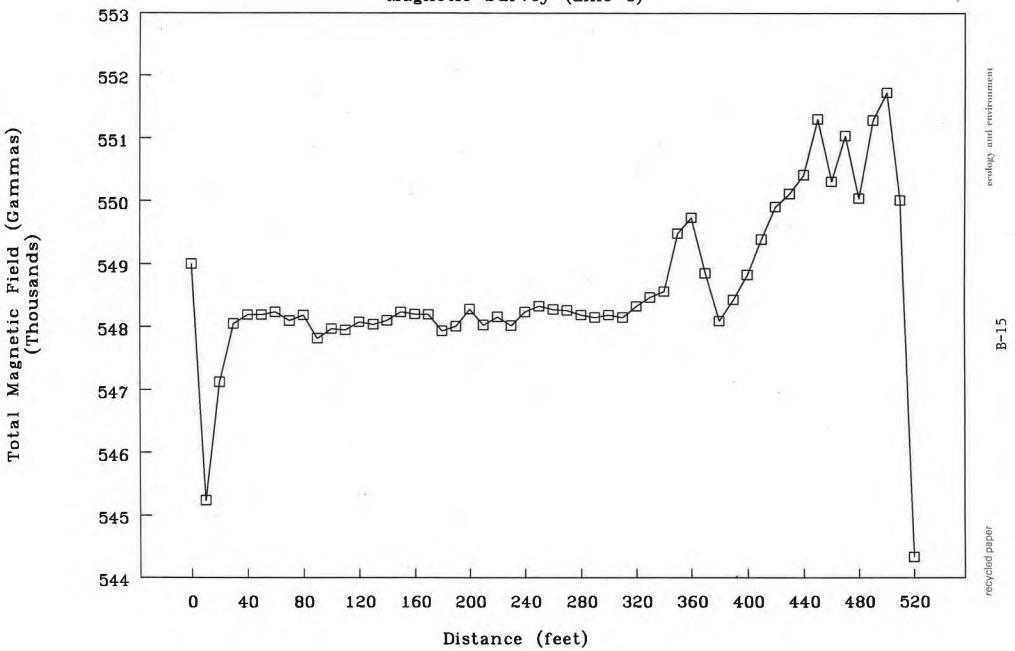
## FORT DEVENS MAGNETIC SURVEY DATA

LINE	#	SITE #	FEET	TIME	GAMMAS
003/	6	142	o	11:54:21	54900.0
003/	6	143	10	11:54:44	54524.1
003/	6	144	20	11:55:05	54712.5
003/	6	145	30	11:55:25	54805.0
003/	6	146	40	11:55:53	54818.9
003/	6	147	50	11:56:10	54819.1
003/	6	148	60	11:56:29	54823.3
003/	6	149	70	11:56:51	54809.8
003/	6	150	80	11:57:28	54818.7
003/	6	151	90	11:58:26	54781.8
003/	6	152	100	11:58:45	54797.3
003/	6	153	110	11:59:17	54795.3
003/	6	154	120	11:59:33	54807.8
003/	6	155	130	11:59:51	54803.9
003/	6	156	140	12:00:05	54810.4
003/	6	157	150	12:00:21	54823.4
003/	6	158	160	12:00:36	54820.0
003/	6	159	170	12:00:52	54819.5
003/	6	160	180	12:01:07	54793.6
003/	6	161	190	12:01:21	54800.9
003/	6	162	200	12:01:36	54827.8
003/	6	163	210	12:01:51	54802.7
003/	6	164	220	12:02:10	54815.5
003/	6	165	230	12:02:27	54802.2
003/	6	166	240	12:02:42	54823.7
003/	6	167	250	12:03:08	54832.7
003/	6	168	260	12:03:24	54827.6
003/	6	169	270	12:03:38	54825.8
003/	6	170	280	12:03:55	54818.4
003/	6	171	290	12:04:09	54814.9
003/	6	172	300	12:04:23	54818.5
003/	6	173	310	12:04:37	54814.9
003/	6	174	320	12:04:50	54832.5
003/	6	175	330	12:07:24	54846.7
003/	6	176	340	12:07:40	54856.1
003/	6	177	350	12:07:56	54948.2
003/	6	178	360	12:08:12	54973.1
003/	6	179	370	12:09:04	54884.8
003/	6	180	380	12:09:22	54809.0
003/	6	181	390	12:09:39	54842.5
003/	6	182	400	12:09:55	54882.5

# FORT DEVENS MAGNETIC SURVEY DATA

LINE	#	SITE #	FEET	TIME	GAMMAS
003/	6	183	410	12:10:11	54938.6
003/	6	184	420	12:10:27	54990.1
003/	6	185	430	12:10:42	55011.5
003/	6	186	440	12:10:58	55040.8
003/	6	187	450	12:11:14	55129.8
003/	6	188	460	12:11:31	55030.2
003/	6	189	470	12:11:48	55103.4
003/	6	190	480	12:12:12	55004.0
003/	6	191	490	12:12:31	55128.5
003/	6	192	500	12:12:45	55172.7
003/	6	193	510	12:13:00	55001.0
003/	6	194	520	12:13:21	54434.0

Fort Devens
Magnetic Survey (Line 6)

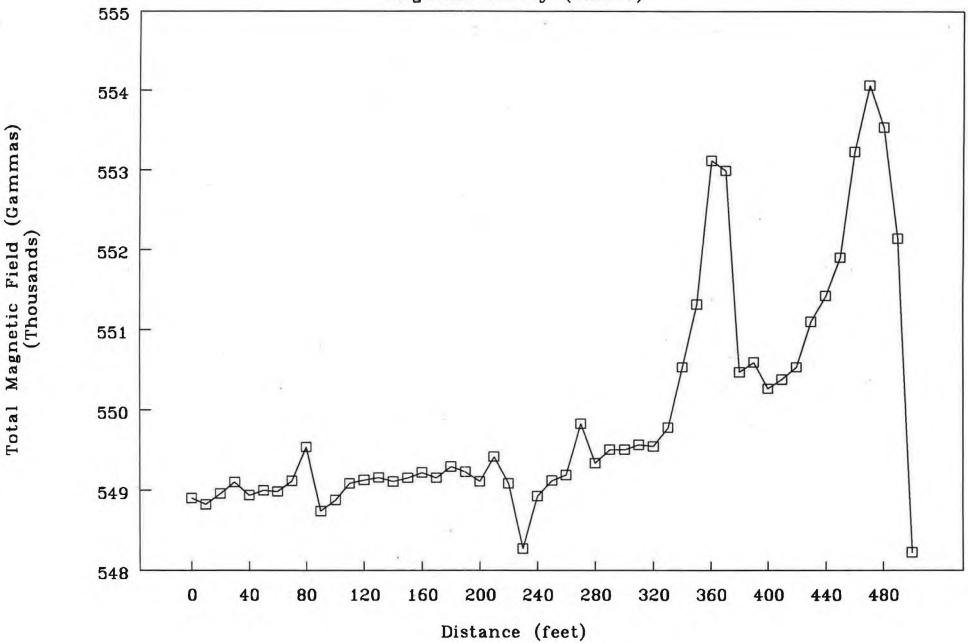


# FORT DEVENS MAGNETIC SURVEY DATA

LINE	#	SITE #	FEET	TIME	GAMMAS
003/	7	195	0	13:22:56	54890.5
003/	7	196	10	13:23:52	54882.6
003/	- 7	197	20	13:24:11	54895.8
003/	7	198	30	13:24:32	54910.3
003/	7	199	40	13:24:51	54893.9
003/	7	200	50	13:25:07	54899.9
003/	7	201	60	13:25:21	54898.6
003/	7	202	70	13:25:38	54912.0
003/	7	203	80	13:25:52	54953.7
003/	7	204	90	13:26:06	54874.1
003/	7	205	100	13:26:41	54887.6
003/	7	206	110	13:26:59	54908.6
003/	7	207	120	13:27:14	54912.8
003/	7	208	130	13:27:29	54916.1
003/	7	209	140	13:27:43	54910.9
003/	7	210	150	13:27:56	54915.5
003/	7	211	160	13:28:10	54922.2
003/	7	212	170	13:28:26	54915.7
003/	7	213	180	13:28:40	54929.3
003/	7	214	190	13:28:54	54922.8
003/	7	215	200	13:29:08	54911.2
003/	7	216	210	13:29:25	54941.7
003/	7	217	220	13:30:06	54908.9
003/	7	218	230	13:30:22	54827.5
003/	7	219	240	13:30:46	54892.6
003/	7	220	250	13:31:00	54912.1
003/	7	221	260	13:31:14	54919.0
003/	7	222	270	13:31:28	54982.8
003/	7	223	280	13:31:41	54933.5
003/	7	224	290	13:32:08	54950.5
003/	7	225	300	13:32:22	54950.2
003/	7	226	310	13:32:36	54956.4
003/	7	227	320	13:32:50	54954.4
003/	7	228	330	13:33:04	54978.0
003/	7	229	340	13:33:31	55053.1
003/	7	230	350	13:34:02	55131.4
003/	7	231	360	13:34:17	55311.9
003/	7	232	370	13:34:35	55299.1
003/	7	233	380	13:34:53	55046.9
003/	7	234	390	13:35:15	55059.1
003/	7	235	400	13:35:29	55026.2

## FORT DEVENS MAGNETIC SURVEY DATA

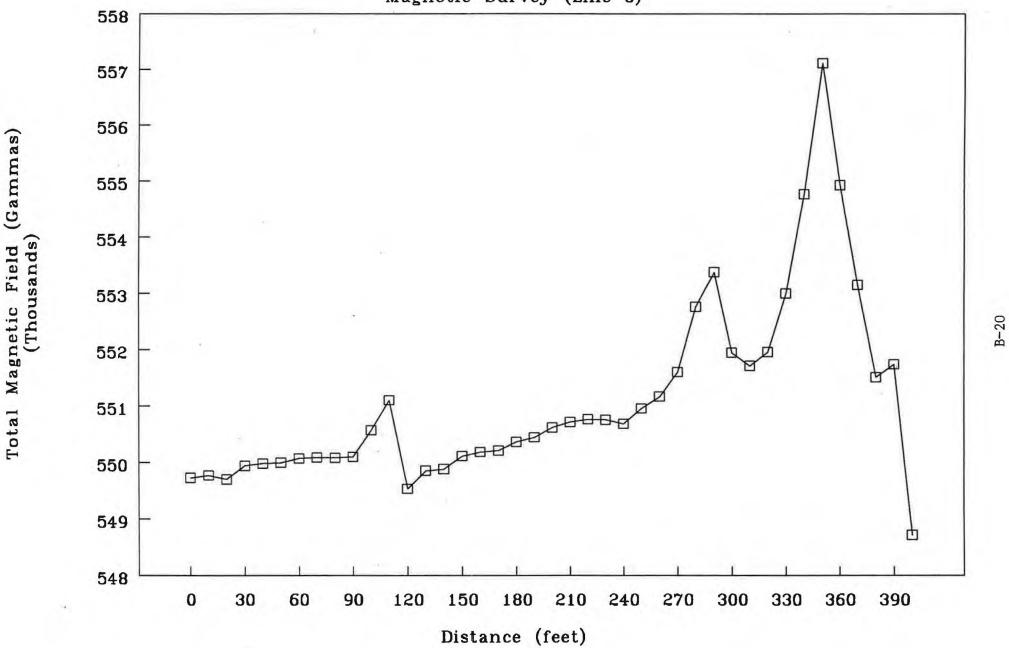
LINE	#	SITE #	FEET	TIME	GAMMAS
003/	7	236	410	13:35:46	55037.9
003/	7	237	420	13:36:00	55053.1
003/	7	238	430	13:36:20	55109.8
003/	7	239	440	13:36:37	55141.8
003/	7	240	450	13:36:53	55190.0
003/	7	241	460	13:37:07	55322.9
003/	7	242	470	13:37:23	55406.6
003/	7	243	480	13:37:42	55353.4
003/	7	244	490	13:37:59	55214.3
003/	7	245	500	13:38:29	54822.4



## FORT DEVENS MAGNETIC SURVEY DATA

LINE	#	SITE #	FEET	TIME	GAMMAS
003/	8	246	0	13:43:21	54972.8
003/	8	247	10	13:44:01	54977.2
003/	8	248	20	13:44:15	54970.3
003/	8	249	30	13:44:31	54993.8
003/	8	250	40	13:44:45	54997.9
003/	8	251	50	13:44:59	54999.7
003/	8	252	60	13:45:14	55006.9
003/	8	253	70	13:45:28	55008.6
003/	8	254	80	13:45:44	55008.3
003/	8	255	90	13:45:59	55009.9
003/	8	256	100	13:46:13	55057.1
003/	8	257	110	13:46:29	55110.5
003/	8	258	120	13:46:46	54953.3
003/	8	259	130	13:47:02	54985.3
003/	8	260	140	13:47:17	54988.1
003/	8	261	150	13:47:32	55011.5
003/	8	262	160	13:47:46	55018.5
003/	8	263	170	13:47:59	55021.3
003/	8	264	180	13:48:13	55036.6
003/	8	265	190	13:48:27	55044.7
003/	8	266	200	13:48:41	55061.8
003/	8	267	210	13:48:55	55071.6
003/	8	268	220	13:49:08	55076.6
003/	8	269	230	13:49:23	55075.3
003/	8	270	240	13:49:37	55068.4
003/	8	271	250	13:49:52	55095.5
003/	8	272	260	13:50:05	55116.9
003/	8	273	270	13:50:20	55160.3
003/	8	274	280	13:50:35	55275.6
003/	8	275	290	13:50:50	55337.5
003/	8	276	300	13:51:05	55194.8
003/	8	277	310	13:51:18	55171.1
003/	8	278	320	13:51:32	55195.4
003/	8	279	330	13:51:46	55299.4
003/	8	280	340	13:52:01	55477.2
003/	8	281	350	13:52:16	55711.8
003/	8	282	360	13:52:31	55492.9
003/	8	283	370	13:52:47	55314.8
003/	8	284	380	13:53:03	55151.1
003/	8	285	390	13:53:18	55174.1
003/	8	286	400	13:53:33	54871.1

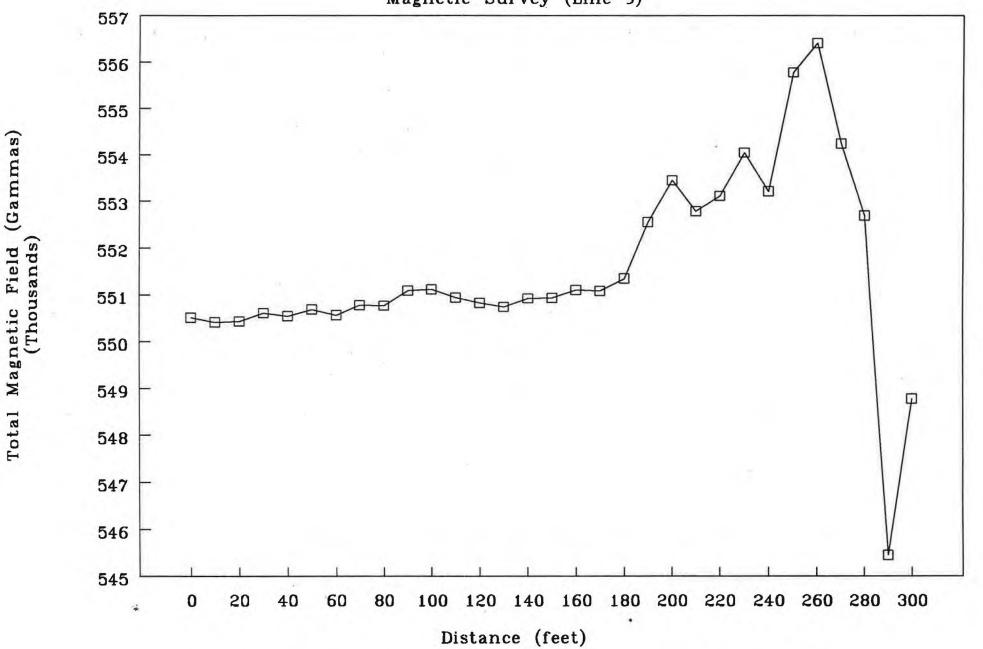
Fort Devens
Magnetic Survey (Line 8)



### FORT DEVENS MAGNETIC SURVEY DATA

LINE	#	SITE #	FEET	TIME	GAMMAS
003/	9	287	0	13:55:50	55051.3
003/	9	288	10	13:56:14	55041.2
003/	9	289	20	13:56:27	55043.0
003/	9	290	30	13:56:44	55061.1
003/	9	291	40	13:56:58	55054.1
003/	9	292	50	13:57:13	55068.6
003/	9	293	60	13:57:26	55056.5
003/	9	294	70	13:57:48	55077.7
003/	9	295	80	13:58:04	55076.5
003/	9	296	90	13:58:18	55109.3
003/	9	297	100	13:58:32	55111.6
003/	9	298	110	13:58:47	55093.8
003/	9	299	120	13:59:00	55082.4
003/	9	300	130	13:59:13	55074.0
003/	9	301	140	13:59:26	55092.1
003/	9	302	150	13:59:39	55093.5
003/	9	303	160	14:00:00	55110.5
003/	9	304	170	14:00:14	55108.6
003/	9	305	180	14:00:43	55134.4
003/	9	306	190	14:01:00	55255.8
003/	9	307	200	14:01:13	55345.2
003/	9	308	210	14:01:29	55278.3
003/	9	309	220	14:01:42	55310.9
003/	9	310	230	14:01:57	55404.6
003/	9	311	240	14:02:10	55321.0
003/	9	312	250	14:02:25	55578.1
003/	9	313	260	14:02:39	55641.0
003/	9	314	270	14:02:54	55424.1
003/	9	315	280	14:03:07	55269.4
003/	9	316	290	14:03:28	54544.9
003/	9	317	300	14:03:45	54877.5

Fort Devens
Magnetic Survey (Line 9)

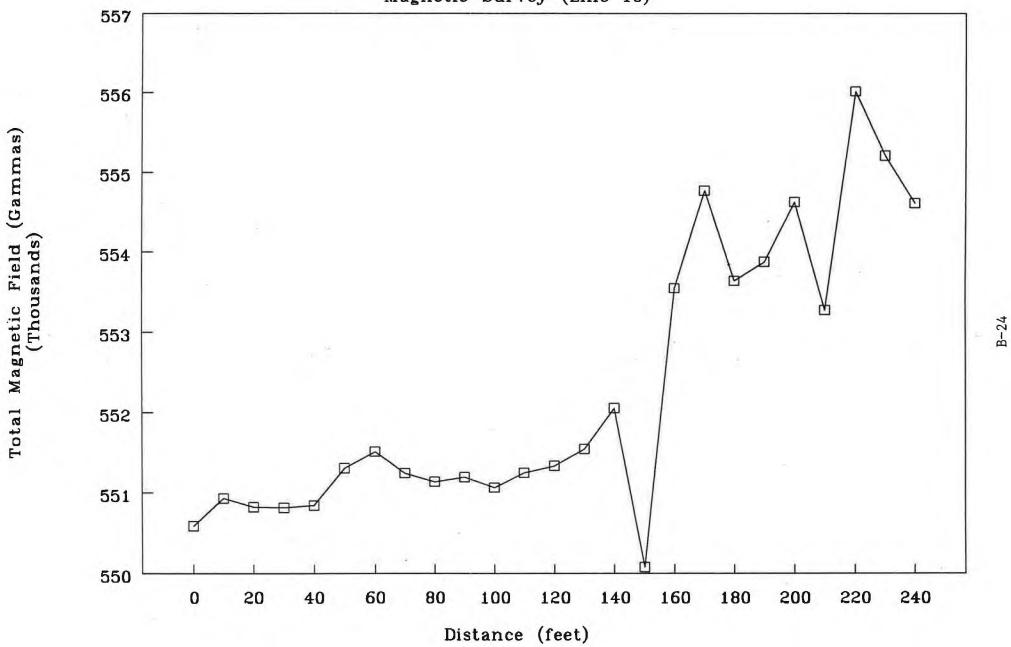


B-22

## FORT DEVENS MAGNETIC SURVEY DATA

LINE	#	SITE	# FEET	TIME	GAMMAS
003/	10	318	0	14:05:46	55058.8
003/	10	319	10	14:06:32	55093.3
003/	10	320	20	14:06:50	55082.4
003/		321	30	14:07:14	55081.5
003/		322	40	14:08:09	55084.3
003/		323	50	14:08:28	55130.7
003/		324	60	14:08:41	55151.1
003/		325	70	14:08:55	55124.6
003/		326	80	14:09:09	55113.8
003/		327	90	14:09:23	55119.4
003/		328	100	14:09:36	55106.3
003/		329	110	14:09:50	55124.9
003/		330	120	14:12:27	55133.3
003/	10	331	130	14:13:15	55154.7
003/	10	332	140	14:13:28	55205.5
003/		333	150	14:13:42	55008.0
003/		334	160	14:13:58	55354.7
003/	10	335	170	14:14:13	55477.0
003/	10	336	180	14:14:27	55363.8
003/		337	190	14:14:44	55387.5
003/		338	200	14:14:58	55462.5
003/		339	210	14:15:13	55327.0
003/		340	220	14:15:27	55601.7
003/	10	341	230	14:15:41	55521.0
003/		342	240	14:15:57	55461.2
2000					

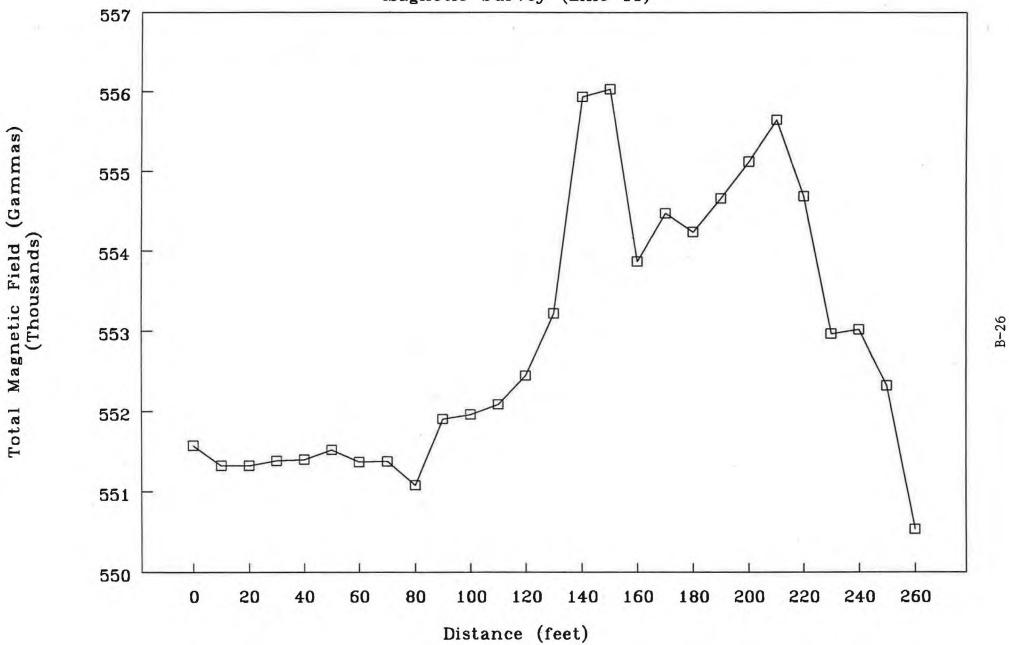
Fort Devens
Magnetic Survey (Line 10)



## FORT DEVENS MAGNETIC SURVEY DATA

LINE	#	SITE #	FEET	TIME	GAMMAS
003/	11	343	0	14:31:10	55157.7
003/		344	10	14:31:30	55132.3
003/		345	20	14:31:44	55132.5
003/	11	346	30	14:32:03	55138.4
003/	11	347	40	14:32:19	55140.1
003/	11	348	50	14:32:37	55152.3
003/	11	349	60	14:32:51	55137.2
003/	11	350	70	14:33:05	55137.9
003/	11	351	80	14:33:18	55108.1
003/	11	352	90	14:33:46	55190.5
	11	353	100	14:34:02	55196.3
003/	11	354	110	14:34:51	55208.9
003/	11	355	120	14:35:26	55244.8
003/	11	356	130	14:35:47	55321.8
003/	11	357	140	14:36:01	55593.4
003/	11	358	150	14:36:16	55603.1
003/		359	160	14:36:29	55386.6
003/	11	360	170	14:36:43	55447.5
003/	11	361	180	14:36:56	55423.6
003/	11	362	190	14:37:13	55466.1
003/	11	363	200	14:37:28	55512.3
003/	11	364	210	14:37:44	55564.4
003/	11	365	220	14:38:02	55468.7
003/	11	366	230	14:38:16	55296.6
003/	11	367	240	14:38:30	55302.0
003/	11	368	250	14:38:44	55232.0
003/	11	369	260	14:39:01	55053.6

Fort Devens
Magnetic Survey (Line 11)



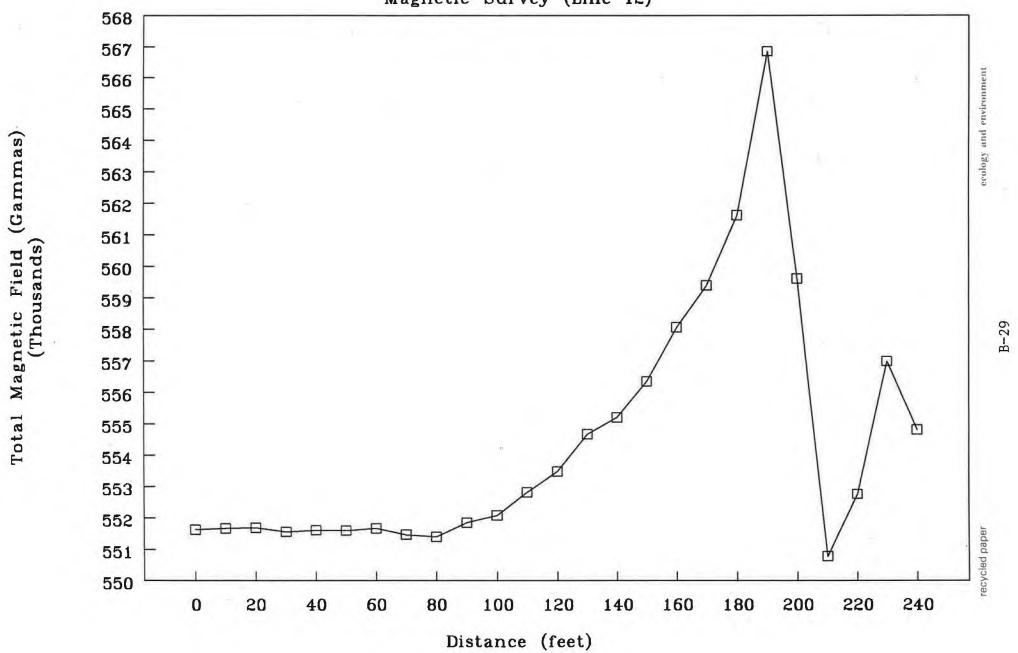
## FORT DEVENS MAGNETIC SURVEY DATA

LINE	#	SITE #	FEET	TIME	GAMMAS
003/	12	370	o	14:42:06	55163.2
003/		371	10	14:42:30	55166.3
003/		372	20	14:42:45	55169.1
003/		373	30	14:42:59	55155.8
003/		374	40	14:43:13	55160.8
003/		375	50	14:43:27	55159.6
003/		376	60	14:43:40	55167.1
003/		377	70	14:44:08	55147.4
003/		378	80	14:44:25	55139.9
003/		379	90	14:44:39	55185.4
003/		380	100	14:45:09	55208.7
003/		381	110	14:45:27	55201.2
003/		382	120	14:45:40	55348.9
003/		383	130	14:45:56	55467.2
003/		384	140	14:46:11	55520.8
003/		385	150	14:46:41	55635.5
003/		386	160	14:47:06	55806.2
003/		387	170	14:47:21	55939.4
003/		388	180	14:47:35	56162.0
003/		389	190	14:47:53	56685.2
003/		390	200	14:48:12	55961.2
003/		391	210	14:48:31	55078.5
003/		392	220	14:48:47	55276.3
003/		393	230	14:49:04	55699.5
003/		394	240	14:49:18	55481.4
13.00					

# FORT DEVENS MAGNETIC SURVEY DATA

003/ 12       370       0       14:42:06       5516         003/ 12       371       10       14:42:30       5516         003/ 12       372       20       14:42:45       5516         003/ 12       373       30       14:42:59       5515         003/ 12       374       40       14:43:13       5516         003/ 12       375       50       14:43:27       5515         003/ 12       376       60       14:43:40       5516         003/ 12       377       70       14:44:08       5514         003/ 12       378       80       14:44:25       5513         003/ 12       379       90       14:44:39       5518         003/ 12       380       100       14:45:09       5520         003/ 12       381       110       14:45:27       5528         003/ 12       382       120       14:45:40       5534         003/ 12       383       130       14:45:56       5546	AS
003/12     372     20     14:42:45     5516       003/12     373     30     14:42:59     5515       003/12     374     40     14:43:13     5516       003/12     375     50     14:43:27     5515       003/12     376     60     14:43:40     5516       003/12     377     70     14:44:08     5514       003/12     378     80     14:44:25     5513       003/12     379     90     14:44:39     5518       003/12     380     100     14:45:09     5520       003/12     381     110     14:45:27     5528       003/12     382     120     14:45:40     5534	3.2
003/12       373       30       14:42:59       5515         003/12       374       40       14:43:13       5516         003/12       375       50       14:43:27       5515         003/12       376       60       14:43:40       5516         003/12       377       70       14:44:08       5514         003/12       378       80       14:44:25       5513         003/12       379       90       14:44:39       5518         003/12       380       100       14:45:09       5520         003/12       381       110       14:45:27       5528         003/12       382       120       14:45:40       5534	6.3
003/ 12     374     40     14:43:13     5516       003/ 12     375     50     14:43:27     5515       003/ 12     376     60     14:43:40     5516       003/ 12     377     70     14:44:08     5514       003/ 12     378     80     14:44:25     5513       003/ 12     379     90     14:44:39     5518       003/ 12     380     100     14:45:09     5520       003/ 12     381     110     14:45:27     5528       003/ 12     382     120     14:45:40     5534	9.1
003/12     375     50     14:43:27     5515       003/12     376     60     14:43:40     5516       003/12     377     70     14:44:08     5514       003/12     378     80     14:44:25     5513       003/12     379     90     14:44:39     5518       003/12     380     100     14:45:09     5520       003/12     381     110     14:45:27     5528       003/12     382     120     14:45:40     5534	5.8
003/ 12     376     60     14:43:40     5516       003/ 12     377     70     14:44:08     5514       003/ 12     378     80     14:44:25     5513       003/ 12     379     90     14:44:39     5518       003/ 12     380     100     14:45:09     5520       003/ 12     381     110     14:45:27     5528       003/ 12     382     120     14:45:40     5534	0.8
003/12     377     70     14:44:08     5514       003/12     378     80     14:44:25     5513       003/12     379     90     14:44:39     5518       003/12     380     100     14:45:09     5520       003/12     381     110     14:45:27     5528       003/12     382     120     14:45:40     5534	9.6
003/ 12     378     80     14:44:25     5513       003/ 12     379     90     14:44:39     5518       003/ 12     380     100     14:45:09     5520       003/ 12     381     110     14:45:27     5528       003/ 12     382     120     14:45:40     5534	7.1
003/12     379     90     14:44:39     5518       003/12     380     100     14:45:09     5520       003/12     381     110     14:45:27     5528       003/12     382     120     14:45:40     5534	7.4
003/ 12     380     100     14:45:09     5520       003/ 12     381     110     14:45:27     5528       003/ 12     382     120     14:45:40     5534	9.9
003/ 12     381     110     14:45:27     5528       003/ 12     382     120     14:45:40     5534	5.4
003/ 12 382 120 14:45:40 5534	8.7
	2.2
003/ 12 383 130 14:45:56 5546	8.9
	7.2
003/ 12 384 140 14:46:11 5552	0.8
003/ 12 385 150 14:46:41 5563	5.5
003/ 12 386 160 14:47:06 5580	6.2
003/ 12 387 170 14:47:21 5593	9.4
003/ 12 388 180 14:47:35 5616	2.0
003/ 12 389 190 14:47:53 5668	5.2
003/ 12 390 200 14:48:12 5596	1.2
003/ 12 391 210 14:48:31 5507	8.5
003/ 12 392 220 14:48:47 5527	6.3
003/ 12 393 230 14:49:04 5569	9.5
003/ 12 394 240 14:49:18 5548	1.4

Fort Devens
Magnetic Survey (Line 12)



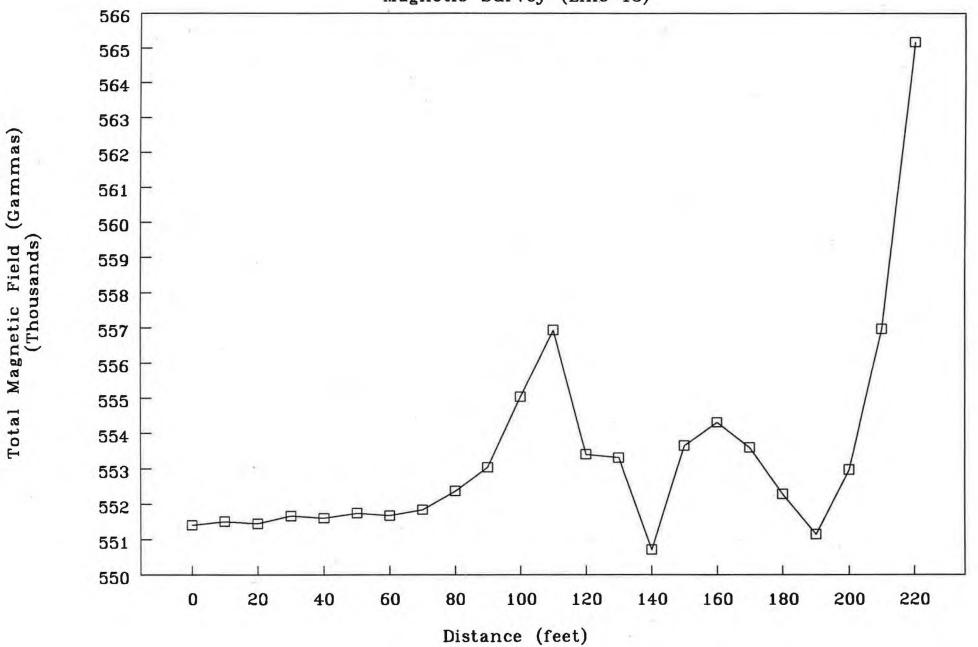
## FORT DEVENS MAGNETIC SURVEY DATA

LINE	#	SITE #	FEET	TIME	GAMMAS
003/	13	395	0	14:55:21	55141.2
003/		396	10	14:55:45	55151.6
003/		397	20	14:55:58	55145.5
003/	13	398	30	14:56:36	55167.0
003/	13	399	40	14:56:50	55161.3
003/	13	400	50	14:57:04	55174.9
003/		401	60	14:57:51	55168.1
	13	402	70	14:58:16	55184.6
003/		403	80	14:58:43	55237.7
003/		404	90	14:59:06	55304.1
003/		405	100	14:59:19	55504.3
003/		406	110	14:59:36	55693.8
003/	13	407	120	14:59:54	55340.6
003/	13	408	130	15:00:08	55331.2
003/	13	409	140	15:00:22	55071.3
003/	13	410	150	15:00:38	55365.3
003/	13	411			

# FORT DEVENS MAGNETIC SURVEY DATA

LINE	#	SITE #	FEET	TIME	GAMMAS
003/	13	395	0	14:55:21	55141.2
003/		396	10	14:55:45	55151.6
003/	13	397	20	14:55:58	55145.5
003/		398	30	14:56:36	55167.0
003/		399	40	14:56:50	55161.3
003/		400	50	14:57:04	55174.9
003/		401	60	14:57:51	55168.1
003/	1.00	402	70	14:58:16	55184.6
003/		403	80	14:58:43	55237.7
003/		404	90	14:59:06	55304.1
003/		405	100	14:59:19	55504.3
003/		406	110	14:59:36	55693.8
003/		407	120	14:59:54	55340.6
003/		408	130	15:00:08	55331.2
003/		409	140	15:00:22	55071.3
003/		410	150	15:00:38	55365.3
003/		411	160	15:00:52	55431.1
003/		412	170	15:01:15	55359.6
003/		413	180	15:01:29	55228.7
003/		414	190	15:01:45	55114.7
003/		415	200	15:01:59	55297.1
003/		416	210	15:02:15	55696.3
003/		417	220	15:02:30	56518.0

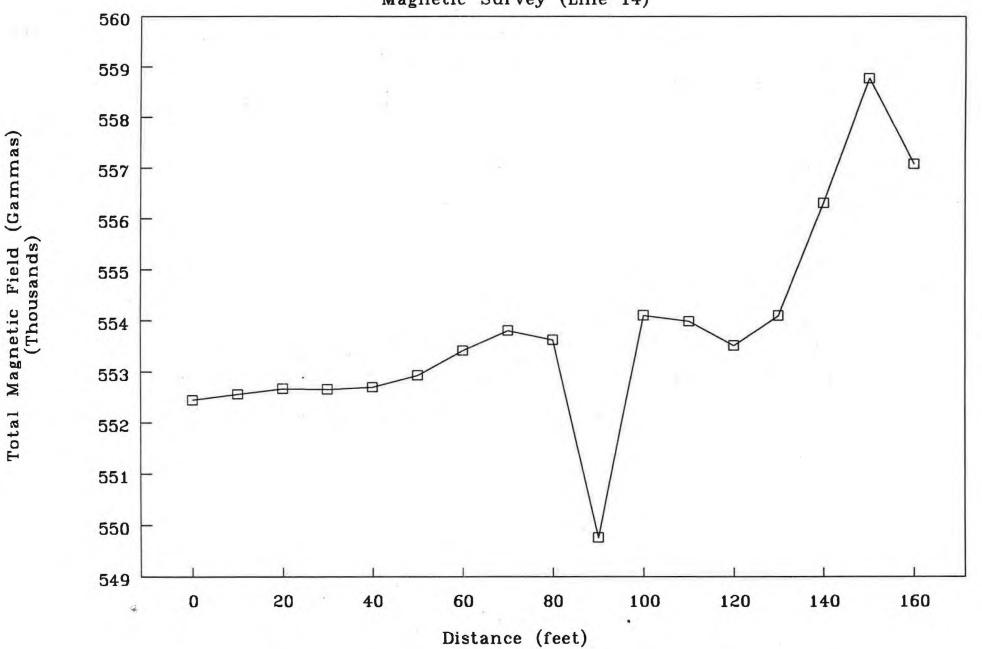
Fort Devens
Magnetic Survey (Line 13)



# FORT DEVENS MAGNETIC SURVEY DATA

LINE	#	SITE #	FEET	TIME	GAMMAS
003/	14	418	0	15:04:35	55244.9
003/		419	10	15:05:00	55256.5
003/		420	20	15:05:17	55267.0
003/		421	30	15:05:35	55266.1
003/		422	40	15:05:54	55270.3
003/		423	50	15:06:09	55293.2
003/		424	60	15:06:24	55342.0
003/		425	70	15:06:44	55380.6
003/		426	80	15:06:59	55362.8
003/		427	90	15:07:32	54976.5
003/		428	100	15:07:46	55410.3
003/		429	110	15:08:05	55398.9
003/	14	430	120	15:08:18	55351.3
003/	14	431	130	15:08:37	55409.5
003/	14	432	140	15:08:51	55631.3
003/	14	433	150	15:09:09	55877.9
003/	14	434	160	15:09:26	55708.6

For Devens
Magnetic Survey (Line 14)

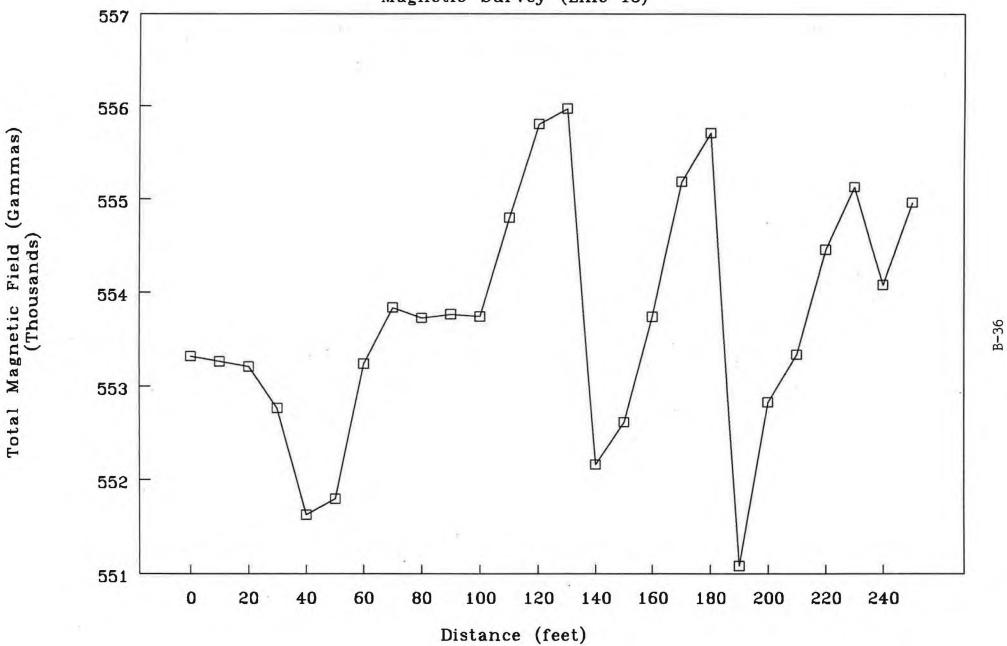


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# FORT DEVENS MAGNETIC SURVEY DATA

LINE	#	SITE #	FEET		TIME	GAMMAS
003/	15	435	0		15:12:22	55331.9
003/	15	436	10		15:12:58	55326.4
003/	15	437	20		15:13:30	55321.0
003/	15	438	30		15:13:49	55276.4
003/	15	439	40	6	15:14:12	55162.9
003/	15	440	50		15:14:27	55179.6
003/	15	441	60		15:14:43	55323.8
003/	15	442	70		15:14:59	55383.6
003/		443	80		15:15:16	55372.6
003/	15	444	90		15:15:30	55376.4
003/	15	445	100		15:15:45	55374.3
003/	15	446	110		15:15:58	55480.2
003/	15	447	120		15:16:13	55581.1
003/	15	448	130		15:16:27	55597.5
003/	15	449	140		15:16:44	55216.0
003/	15	450	150		15:16:59	55261.3
003/	15	451	160		15:17:20	55373.8
003/	15	452	170		15:17:34	55519.1
003/	15	453	180		15:17:51	55571.3
003/	15	454	190		15:18:07	55108.6
003/	15	455	200		15:18:22	55282.7
003/	15	456	210		15:18:36	55333.6
003/	15	457	220		15:18:58	55445.7
003/	15	458	230		15:19:14	55513.5
003/		459	240		15:19:29	55407.9
003/	15	460	250		15:19:45	55496.8

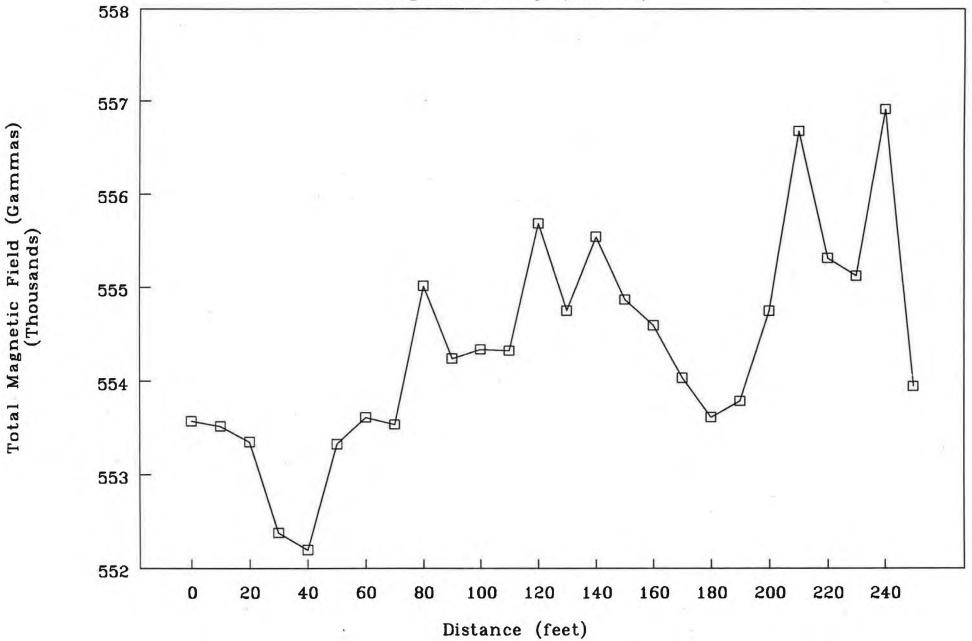
Fort Devens
Magnetic Survey (Line 15)



# FORT DEVENS MAGNETIC SURVEY DATA

LINE #	SITE #	FEET	TIME	GAMMAS
003/ 16	461	0	15:27:20	55357.1
003/ 16	462	10	15:27:41	55351.7
003/ 16	463	20	15:28:02	55335.1
003/ 16	464	30	15:28:27	55237.8
003/ 16	465	40	15:28:43	55219.6
003/ 16	466	50	15:28:57	55332.8
003/ 16		60	15:29:15	55361.2
003/ 16	468	70	15:29:32	55353.7
003/ 16		80	15:29:57	55501.3
003/ 16		90	15:30:12	55423.7
003/ 16		100	15:30:29	55433.6
003/ 16		110	15:30:43	55432.3
003/ 16		120	15:30:56	55568.7
003/ 16		130	15:31:10	55474.9
003/ 16		140	15:31:24	55554.4
003/ 16		150	15:31:39	55486.6
003/ 16		160	15:31:54	55459.3
003/ 16		170	15:32:09	55403.3
003/ 16		180	15:32:23	55361.2
003/ 16		190	15:32:37	55378.5
003/ 16		200	15:32:53	55474.4
003/ 16		210	15:33:08	55667.7
003/ 16		220	15:33:25	55531.0
003/ 16		230	15:33:40	55512.1
003/ 16		240	15:33:55	55691.3
003/ 16		250	15:34:11	55394.2

Fort Devens
Magnetic Survey (Line 16)

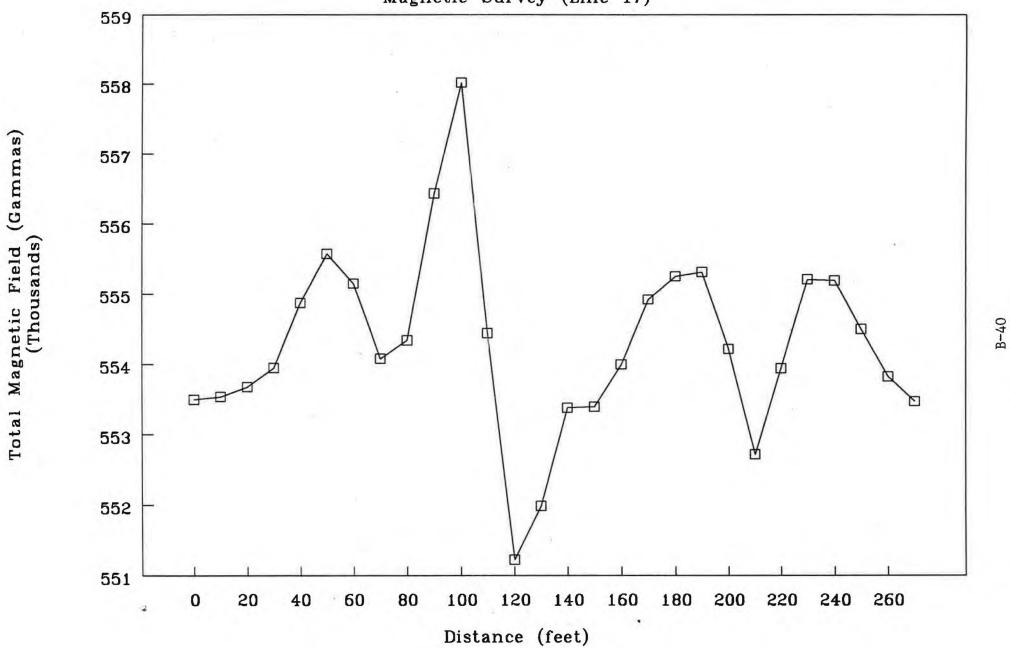


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## FORT DEVENS MAGNETIC SURVEY DATA

LINE	#	SITE #	FEET	TIME		GAMMAS
003/	17	487	0	15:36:05		55350.1
	17	488	10	15:36:30		55353.9
003/	17	489	20	15:36:49		55367.8
003/	17	490	30	15:37:12		55394.6
003/	17	491	40	15:37:39		55486.8
003/		492	50	15:37:55		55557.2
003/	17	493	60	15:38:14		55514.7
003/	17	494	70	15:38:27		55408.0
	17	495	80	15:38:43		55433.8
003/	17	496	90	15:38:57		55643.4
003/	17	497	100	15:39:13		55802.2
003/	17	498	110	15:39:30		55444.0
003/	17	499	120	15:39:45		55122.7
003/	17	500	130	15:39:59		55198.9
003/	17	501	140	15:40:14		55338.2
003/	17	502	150	15:40:29		55339.4
003/	17	503	160	15:40:44		55399.5
003/	17	504	170	15:41:19		55491.8
003/	17	505	180	15:41:36		55524.9
003/	17	506	190	15:41:51		55531.0
003/	17	507	200	15:42:08		55421.2
003/	17	508	210	15:42:23		55271.9
003/	17	509	220	15:42:40		55393.8
003/	17	510	230	15:42:53		55520.4
003/	17	511	240	15:43:11		55518.8
003/	17	512	250	15:43:27		55449.0
003/	17	513	260	15:43:43		55382.2
003/	17,	514	270	15:43:59	547	55346.8

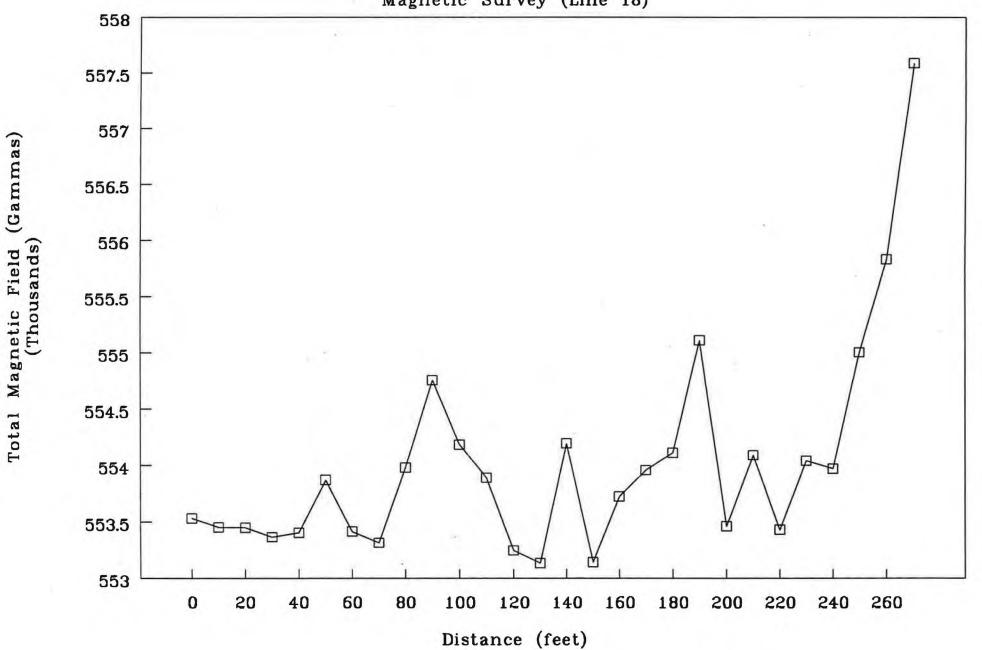
Fort Devens
Magnetic Survey (Line 17)



## FORT DEVENS MAGNETIC SURVEY DATA

LINE	#	SITE #	FEET	TIME	GAMMAS
003/	18	515	O	15:45:54	55353.3
003/	18	516	10	15:46:15	55345.3
003/	18	517	20	15:46:29	55345.2
003/	18	518	30	15:46:46	55336.6
003/	18	519	40	15:47:10	55340.6
003/	18	520	50	15:47:27	55387.3
003/	18	521	60	15:47:42	55341.5
003/	18	522	70	15:48:00	55331.4
003/	18	523	80	15:48:24	55398.1
003/	18	524	90	15:48:42	55475.9
003/	18	525	100	15:48:58	55418.6
003/	18	526	110	15:49:12	55389.1
003/	18	527	120	15:49:30	55324.8
003/	18	528	130	15:49:44	55313.7
003/	18	529	140	15:50:00	55419.6
003/	18	530	150	15:50:14	55314.4
003/	18	531	160	15:50:29	55372.6
003/	18	532	170	15:50:47	55395.7
003/	18	533	180	15:51:01	55411.2
003/	18	534	190	15:51:15	55511.0
003/	18	535	200	15:51:30	55346.3
003/	18	536	210	15:52:26	55409.1
003/	18	537	220	15:52:41	55342.8
003/	18	538	230	15:53:11	55404.1
003/	18	539	240	15:53:30	55397.0
003/	18	540	250	15:53:47	55500.2
003/	18	541	260	15:54:02	55583.2
003/	18	542	270	15:54:17	55759.1
	-28E	7.7			

Fort Devens
Magnetic Survey (Line 18)

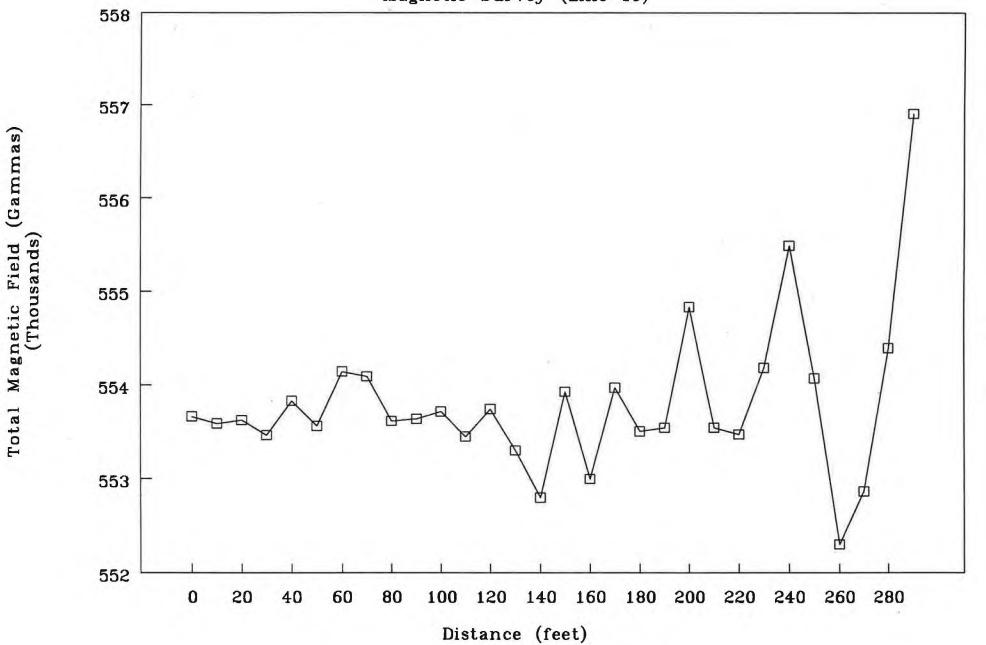


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## FORT DEVENS MAGNETIC SURVEY DATA

LINE	#	SITE #	FEET	TIME	GAMMAS
003/	19	543	O	15:57:06	55366.5
003/	19	544	10	15:57:25	55358.8
003/	19	545	20	15:57:43	55362.4
003/	19	546	30	15:57:58	55346.3
003/	19	547	40	15:58:28	55383.1
003/	19	548	50	15:58:44	55356.1
003/	19	549	60	15:59:01	55414.5
003/	19	550	70	15:59:17	55409.0
003/	19	551	80	15:59:38	55361.5
003/	19	552	90	15:59:55	55363.6
003/	19	553	100	16:00:10	55371.6
003/	19	554	110	16:00:36	55344.9
003/	19	555	120	16:00:51	55374.1
003/	19	556	130	16:01:15	55330.0
003/	19	557	140	16:01:37	55279.9
003/	19	558	150	16:01:56	55392.9
003/	19	559	160	16:02:12	55299.7
003/	19	560	170	16:02:25	55397.0
003/	19	561	180	16:02:40	55350.2
003/	19	562	190	16:02:55	55354.3
003/	19	563	200	16:03:11	55482.9
003/	19	564	210	16:03:24	55354.4
003/	19	565	220	16:03:39	55347.0
003/	19	566	230	16:03:56	55418.2
003/	19	567	240	16:04:13	55548.7
003/	19	568	250	16:04:28	55407.0
003/	19	569	260	16:04:47	55230.0
003/	19	570	270	16:05:04	55286.4
003/	19	571	280	16:05:22	55439.2
003/	19	572	290	16:05:39	55691.0
40-7124					

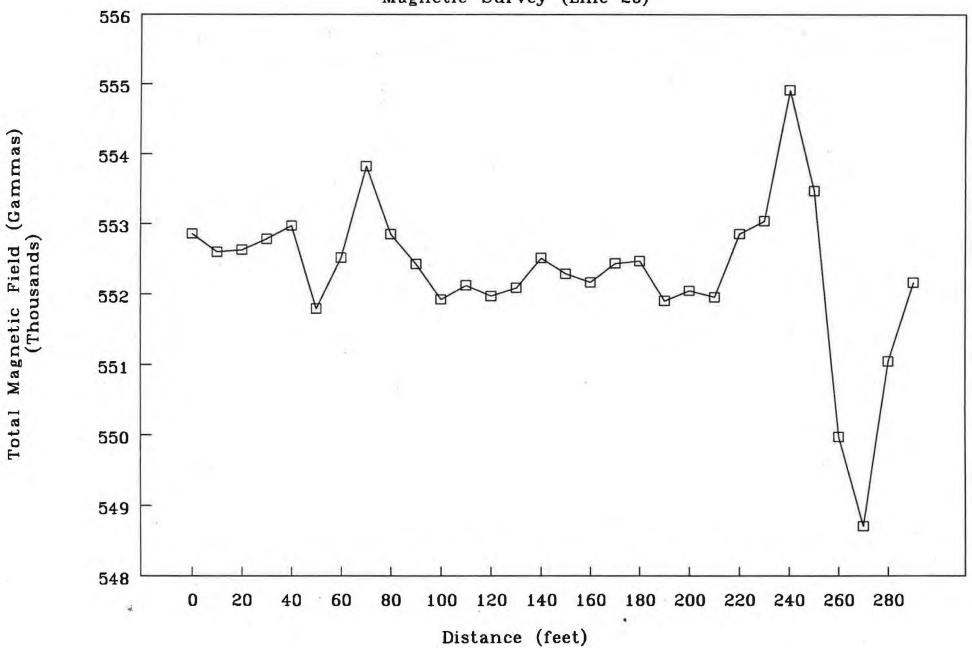
Fort Devens
Magnetic Survey (Line 19)



# FORT DEVENS MAGNETIC SURVEY DATA

LINE	#	SITE #	FEET	TIME	GAMMAS
003/	20	573	0	16:08:42	55285.9
003/	20	574	10	16:09:17	55260.1
003/		575	20	16:09:30	55263.2
003/	20	576	30	16:09:45	55278.9
003/		577	40	16:09:59	55297.4
003/		578	50	16:10:20	55179.0
003/		579	60	16:10:39	55251.6
003/		580	70	16:10:55	55382.8
003/		581	80	16:11:10	55285.4
003/		582	90	16:11:25	55242.5
003/		583	100	16:11:38	55192.0
003/		584	110	16:11:52	55212.0
003/		585	120	16:12:11	55196.9
003/		586	130	16:12:23	55208.9
003/		587	140	16:12:38	55251.2
003/		588	150	16:12:54	55228.6
003/		589	160	16:13:08	55216.6
003/		590	170	16:13:21	55243.3
003/		591	180	16:13:37	55247.0
003/	20	592	190	16:13:51	55190.2
003/		593	200	16:14:08	55204.2
003/		594	210	16:14:23	55195.2
003/	20	595	220	16:14:37	55285.7
003/	20	596	230	16:14:52	55304.1
003/	20	597	240	16:15:06	55491.1
003/		598	250	16:15:19	55346.8
003/	20	599	260	16:15:39	54996.8
003/	20.	600	270	16:15:57	54870.6
003/		601	280	16:16:17	55104.3
003/		602	290	16:16:39	55216.3
2321					

Fort Devens
Magnetic Survey (Line 20)



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#### APPENDIX I

WATER QUALITY AND GENERAL ANALYTICAL PARAMETERS

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Well Boring		TOC
SHL-17		519.000
SHL-18		240.000
SHL-19		290.000
SHL-20	<	420.000
SHL-21		120.000
SHL-23		490.000
SHL-25		590.000
	4	RC424

TOC = Total Organic Carbon

Source: USATHAMA IRDMIS Level 3/ E & E, 1992

#### INSTALLATION RESTORATION PROGRAM

#### CHEMICAL SUMMARY REPORT FOR SHEPLEY'S HILL LANDFILL

SURFACE WATER - FILE TYPE: CSW

STUDY AREA: 5

SITE TYPE: POND

UNITS: UGL

				-		SITES				
Test	Parameter	SW-SHL-01	SW-SHL-02	SW-SHL-03	SW-SHL-04	SW-SHL-05	SW-SHL-06	SW-SHL-07	SW-SHL-08	SW-SHL-09
ALK	ALKALINITY**	25.000	24.600	25.000	27.400	28.000	29.000	27.600	24.400	24.400
ANIONS	CHLORIDE	39000.000	42000.000	42000.000	44000.000	44000.000	45000.000	43000.000	49000.000	45000.000
	NITRATE	< 24.300	143.000	40.100	< 24.300	< 24.300	< 24.300	38.700	< 24.300	< 24.300
	SULFATE	5660.000	5440.000	5510.000	5340.000	5370.000	5300.000	5120.000	5030.000	3980.000
HARD	TOTAL HARDNESS**	34.900	34.900	35.300	34.900	36.100	36.100	32.800	35.300	36.100
TSS	TOTAL SUSPENDED SOLIDS**	4.400	2.000	2.400	2.400	1.600	2.000	1.200	0.400	2.400
TKN	TOTAL KJELDAHL NITROGEN	472.000	526.000	474.000	537.000	530.000	556.000	507.000	614.000	472.000
P4	TOTAL PHOSPHORUS	< 28.300	< 28.300	< 28.300	36.300	< 28.300	< 28.300	< 28.300	< 28.300	< 28.300

**Result reported in mg/l

Source: USATHAMA IRDMIS Level 3/E & E, 1992

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Table I-2 (cont.)

INSTALLATION RESTORATION PROGRAM
CHEMICAL SUMMARY REPORT FOR SHEPLEY'S HILL LANDFILL

SURFACE WATER - FILE TYPE: CSW

STUDY AREA: 5

SITE TYPE: POND

UNITS: UGL

			+			SITES	
Test	Parameter	SW-SHL-1	SW-SHL-11	+ sw-shl-12	SW-SHL-13	SW-SHL-14	SW-SHL-15
ALK	ALKALINITY**	26.00	27.200	24.000	26.000	32.400	33.000
ANIONS	CHLORIDE	43000.000	46000.000	43000.000	66000.000	44000.000	43000.000
	NITRATE	< 24.30	< 24.300	< 24.300	< 24.300	33.300	28.700
	SULFATE	4960.000	5210.000	11000.000	5380.000	4990.000	5200.000
HARD	TOTAL HARDNESS**	37.80	36.100	30.300	35.700	36.500	38.200
TSS	TOTAL SUSPENDED SOLIDS**	0.80	2.000	2.000	5.200	1.600	2.800
TKN	TOTAL KJELDAHL NITROGEN	428.00	507.000	539.000	1110.000	532.000	556.000
P4	TOTAL PHOSPHORUS	< 28.30	< 28.300	< 28.300	55.700	< 28.300	< 28.300

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Source: USATHAMA IRDMIS Level 3/E & E, 1992

⁺ Volatiles for SW-SHL-11 were lost in a laboratory accident

^{**}Result reported in mg/l

#### Table I-3

#### INSTALLATION RESTORATION PROGRAM

CHEMICAL SUMMARY REPORT FOR COLD SPRING BROOK SURFACE WATER - FILE TYPE: CSW STUDY AREA: 40 SITE TYPE: POND UNITS: UGL

		SITES								
Test	Parameter	SW-CSB-01	SW-CSB-02	SW-CSB-03	SW-CSB-04	SW-CSB-05	SW-CSB-06	SW-CSB-07	SW-CSB-08	SW-CSB-09
ALK	ALKALINITY**	55.200	71.200	68.600	72.400	62.400	58.600	61.400	60.200	61.600
ANIONS	CHLORIDE	17000.000	17000.000	18000.000	19000.000	19000.000	20000.000	20000.000	20000.000	20000.000
	NITRATE	70.300	96.200	99.600	85.400	33.400	24.300	28.800	34.300	49.200
	SULFATE	13000.000	11000.000	12000.000	6010.000	5170.000	5290.000	5190.000	5190.000	5540.000
HARD	TOTAL HARDNESS**	68.500	84.800	85.200	80.200	71.000	56.500	59.000	71.000	69.000
TSS	TOTAL SUSPENDED SOLIDS**	6.000	6.400	3.600	3.600	1.200	4.000	2.800	7.200	3.200
TKN	TOTAL KJELDAHL NITROGEN	810.000	570.000	583.000	514.000	476.000	526.000	463.000	411.000	415.000
P4	TOTAL PHOSPHORUS	34.200	36.300	47.100	47.100	< 28.300	47.100	< 28.300	< 28.300	⟨ 28.300₩

** Result reported in mg/L

Source: USATHAMA IRDMIS Level 3/E & E, 1992

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Table I-3 (cont.)

INSTALLATION RESTORATION PROGRAM
CHEMICAL SUMMARY REPORT FOR - COLD SPRING BROOK
SURFACE WATER - FILE TYPE: CSW
STUDY AREA: 40 SITE TYPE: POND UNITS: UGI

	SITES						
Test	Parameter	SW-CSB-10					
ALK	ALKALINITY**	58.800					
ANIONS	CHLORIDE	20000.000					
	NITRATE	64.900					
	SULFATE	5580.000					
HARD	TOTAL HARDNESS**	57.300					
TSS	TOTAL SUSPENDED SOLIDS**	14.800					
TKN	TOTAL KJELDAHL NITROGEN	470.000					
P4	TOTAL PHOSPHORUS	< 28.300					
		RC424					

^{**} Result reported in mg/L

Source: USATHAMA IRDMIS Level 3/E & E, 1992

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rt: Fort Devens
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Table I-4
WATER QUALITY PARAMETERS
FIELD MEASUREMENTS
PLOW SHOP POND
AOC 5

Site ID	DO mg/l	Temperature (°F)	рН	Conductivity (µmhos/cm)
u.c. 6367.27		100 0	(2.22	
SW-SHL-01	8.06	82.4	6.88	228
SW-SHL-02	9.70	80.1	6.85	208
SW-SHL-03	8.61	91.1	7.44	241
SW-SHL-04	8.90	94.0	8.36	256
SW-SHL-05	7.06	78.0	6.75	203
SW-SHL-06	8.68	82.7	7.10	213
SW-SHL-07	8.96	95.1	7.83	233
SW-SHL-08	8.85	83.5	7.19	210
SW-SHL-09	8.07	89.3	6.06	212
SW-SHL-10	7.76	76.0	7.97	194
SW-SHL-11	8.15	75.5	7.55	191
SW-SHL-12	5.15	76.1	6.25	199
SW-SHL-13	8.66	75.1	6.90	190
SW-SHL-14	6.6	80.6	6.1	220
SW-SHL-15	6.1	77.3	6.6	177

RC424

Source: E & E, August 1991

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^{*} Dissolved oxygen (DO) measured in 1 liter polyethylene bottles

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Table I-5

WATER QUALITY PARAMETERS
FIELD MEASUREMENTS
COLD SPRING BROOK
AOC 40

Site ID	mg/l	Temperature (°F)	рн	Conductivity (µmhos/cm)
SW-CSB-01	5.02	81.4	6 <ph<7< td=""><td>246</td></ph<7<>	246
SW-CSB-02	5.12	73.6	6 <ph<7< td=""><td>237</td></ph<7<>	237
SW-CSB-03	4.05	72.3	6 <ph<7< td=""><td>239</td></ph<7<>	239
SW-CSB-04	4.22	69.0	6 <ph<7< td=""><td>240</td></ph<7<>	240
SW-CSB-05	5.35	68.3	6	213
SW-CSB-06	4.05	74.4	6 <ph<7< td=""><td>248</td></ph<7<>	248
SW-CSB-07	5.7	66.6	6 < pH < 7	234
SW-CSB-08	5.22	78.0	6 <ph<7< td=""><td>255</td></ph<7<>	255
SW-CSB-09	2.94	68.0	6 <ph<7< td=""><td>224</td></ph<7<>	224
SW-CSB-10	5.12	68.6	6 <ph<7< td=""><td>243</td></ph<7<>	243

RC424

Source: E & E, August 1991

^{*} Dissolved oxygen (DO) measured in 1 liter polyethylene bottles

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Table I-6 SOLID CONTENT FOR SEDIMENTS

			Comparison
	Percent	Percent	to % Solid
Sample	Moisture	Solid	Criteria
SE-CSB-01	72.2	27.8	<30
SE-CSB-02	86.2	13.8	<30
SE-CSB-03	43.7	56.3	>30
SE-CSB-04	62.5	37.5	>30
SE-CSB-05	31.6	68.4	>30
SE-CSB-06	64.4	35.6	>30
SE-CSB-07	72.1	27.9	<30
SE-CSB-08	64.0	36.0	>30
SE-CSB-09	82.6	17.4	<30
SE-CSB-10	24.6	75.4	>30
SE-SHL-01	55.1	44.9	>30
SE-SHL-02	92.9	7.1	<30
SE-SHL-03	81.1	18.9	<30
SE-SHL-04	84.2	15.8	<30
SE-SHL-05	74.2	25.8	<30
SE-SHL-06	84.3	15.7	<30
SE-SHL-07	51.6	48.4	>30
SE-SHL-08	91.6	8.4	<30
SE-SHL-09	91.5	8.5	<30
SE-SHL-10	91.8	8.2	<30
SE-SHL-11	90.4	9.6	<30
SE-SHL-12	74.7	25.3	<30
SE-SHL-13	92.4	7.6	<30
SE-SHL-14	32.0	68.0	>30
SE-SHL-15	16.2	83.8	>30

RC424

Source: E & E 1992

RI Report: Fort Devens Section No.: Appendix J

Revision No.:

1 Date: June 1992

APPENDIX J

#### FACILITY-WIDE WATER LEVEL MEASUREMENTS BY PERIOD

Under the RI program, Ecology and Environment, Inc., was tasked to take three rounds of groundwater level measurements at 83 monitoring wells at Fort Devens. Of these 83 wells identified by installation personnel, 79 wells were both accessible and functional. The three rounds of groundwater level measurements are presented in this Appendix.

RC424

recycled paper

J-1

				CO	LLECTED 30	AUGUST 1991				
דים אמת אניאים		Time	Well	Ground	Inner	Outer	Water		Ground	
-	Well	Msmnt	Depth	Surface	Riser	Riser	Leve1	Depth	Water	<b>*</b>
	Name	Taken	(*)	Elev.	Elev.	Elev.	(*)	BGS	Elevation	Comments
	SHL-1	0818	6.3	271.00	272.44	273.16	6.30			Well dry
	SHL-3	8080	32.5	247.42	247.71	248.50	30.04	28.96	218.46	Measured from outer steel casing
	SHL-4	0804	11.4	226.73	228.71	228.76	10.92	8.94	217.79	Measured from Outer Steel Cabing
	SHL-5	0745	12.2	217.81	218.53	218.77	3.90	3.18	214.63	
	SHL-6	0835	56.0	252.58	253.82	254.17	27.48	26.24	226.34	
	SHL-7	0830	20.7	235.59	237.13	238.14	17.79	15.24	220.35	Measured from outer steel casing
	SHL-8S	0750	54.0	220.04	221.85	222.04	7.64	5.83	214.21	measured from outer steel casing
	SHL-8D	0751	71.0	220.04	221.66	222.04	7.44	5.82	214.22	
	SHL-9	0741	24.6	221.83	222.86	223.29	9.00	7.97	213.86	
	SHL-10	0810	34.1	247.44	248.80	249.48	30.68	29.32	218.12	
	SHL-11	0801	26.4	234.86	236.34	236.83	18.86	17.38	217.48	
	SHL-12	0824	26.9	248.28	249.51	249.91	22.30	21.07	227.21	
	SHL-13	0752	19.0	220.01	221.58	222.18	7.07	5.50	214.51	
	SHL-15	0858	24.5	259.03	260.75	261.04	18.70	16.98	242.05	
	SHL-17	0822	16.3	232.77	234.57	234.91	7.50	5.70		
	SHL-18	0813	26.4	236.59	238.39	238.64	18.88	17.08	227.07	
	SHL-19	0806	30.3	239.45	241.34	241.62	22.76	20.87	219.51	
	SHL-20	0800	48.3	235.55	236.84	236.90	19.24	17.95	218.58	
	SHL-21	0756	52.4	257.93	259.75	259.94	45.24		217.60	
	SHL-22	0739	>100.0	219.58	220.49	221.25	6.66	43.42	214.51	
	SHL-23	0737	33.2	240.37	242.14	242.35		5.75	213.83	
	SHL-24	0833	>100.0	237.68	239.60		27.40	25.63	214.74	
	SHL-25	0855	31.2	257.10	258.87	239.76	15.60	13.68	224.00	
			31.2	237.10	250.07	259.10	24.76	22.99	234.11	
	Staffing Guage									
	SG-SHL-1			-		-	700			
	CSB-1	1221	12.3	247.69	250.11	250.39	7.72	5.30	242.39	
	CSB-2	1219	50.3	258.38	260.07	260.28	18.18	16.49	241.89	
	CSB-3	1213	31.7	265.32	267.48	267.47	25.34	23.18	242.14	
	CSB-4	1215	6.8	244.44	247.54	247.69	5.03	1.93	242.51	
	CSB-6	1208	5.3	242.67	246.39	246.64	4.38	0.66	242.01	
	CSB-7	1205	21.9	255.50	257.83	257.81	15.94	13.61	241.89	
	CSB-8	1211	22.6	258.52	260.77	260.82	18.26	16.01	242.51	
	Staffing Guage									
	SG-CSB-1	-		-						
						200		-	-	
	POL-1	0906	27.2	257.78	259.77	259.85	19.01	17.02	240.76	
	POL-2	0904	29.3	258.65	259.42	260.79	28.78	26.64		PROTECTION COMPANY TO THE PROTECT OF
	POL-3	0901	30.8	260.18	261.94	262.30			232.01	Measured from outer steel casing
		0501	30.0	200.10	201.94	202.30	25.14	23.38	236.80	

^{(*) =} Measured from PVC inner well riser unless otherwise noted

ROUND 1: INSTALLATION-WIDE GROUNDWATER LEVEL MEASUREMENTS COLLECTED 30 AUGUST 1991

3.00	Time	Well	Ground	Inner	Outer	Water		Ground	
Well	Msmnt	Depth	Surface	Riser	Riser	Level	Depth	Water	
Name	Taken	(*)	Elev.	Elev.	Elev.	(*)	BGS -	Elevation	Comments
B202-1	0840	33.7	252.98	254.43	254.75	27.35	25.90	227.08	
B202-2	0837	38.4	256.71	258.37	258.53	31.12	29.46	227.25	
B202-3		37.5	256.46	258.32	258.56	30.43	28.57	227.89	
EOD-1	0809	-	348.16	349.89	350.13	19.31	17.58	330.58	Measured 20 September 1991
EOD-2	0816	تبيد	348.18	349.93	350.17	25.37	23.62	324.56	Measured 20 September 1991
EOD-3	0820		341.84	343.67	343.92	27.29	25.46	316.38	Measured 20 September 1991
EOD-4	0822		350.40	352.12	352.30	31.65	29.93	320.47	Measured 20 September 1991
2680W-1	1043	13.4	334.49	334.44	334.49	8.44	8.49	326.00	
2680W-2		7.6		332.44	332.53	7.60	9.35	520.00	Well dry
2680W-3	1038	13.7		332.04	332.19	9.78	9.93	322.26	well div
WWTMW-01	1025	8.3	215.61	217.71	218.29	6.12	4.02	211.59	
WWTMW-01A	0957	15.2		220.88	220.91	13.66	12.15	207.22	
WWTMW-02	1000	20.7	222.57	225.73	225.88	17.52	14.36	208.21	
WWTMW-02A	1004	20.7	223.40	225.47	225.63	18.64			
WWTMW-03	1007	13.0	214.22	216.79	217.09		16.57 7.87	206.83	
WWTMW-04	1010	12.8	215.23			10.44		206.35	
WWIMW-06	1015	17.7		217.79	218.19	10.22	7.66	207.57	
WWTMW-07	1019	28.3	231.99 240.60	234.54	234.91	15.14	12.59	219.40	
WWINW-08	1023	10.3	217.09	243.08	243.17	25.72	23.24	217.36	
WWTMW-09	0954	8.2		212.29	219.75	8.00	5.66	211.43	
WWTMW-10	0952	10.8	212.06		212.72	5.72	3.28	206.57	
WWTMW-11	0949	11.0		214.74	215.14	8.34	5.66	206.40	
WWTMW-12	0945	16.6	211.58 217.87	214.57	214.71	8.08	5.09	206.49	
WWTMW-13	0943	15.2		221.49	221.51	13.96	10.34	207.53	
WWTMW-14	1520	10.8	216.95 216.74	220.10 219.14	220.08 219.57	12.02 8.50	8.87 6.10	208.08	
nn11111 13	1320	20.0	210.74	217.14	219.57	0.50	6.10	210.64	
AAFES-1D	1110	24.5	296.27	298.73	298.84	21.92	19.46	276.81	
AAFES-2	1125	28.7	300.65	302.71	302.79	21.22	19.16	281.49	
AAFES-3	1128	31.2		308.53	308.72	25.44	25.63	283.09	
AAFES-4	1130	29.2		310.00	310.19	23.94	24.13	286.06	(Altabelació
AAFES-5	1132	27.2	301.06	300.82	301.06	27.20		01.757	Well dry
AAFES-6	1134	25.5	297.64	300.00	300.06	23.18	20.82	276.82	
AAFES-7	1136	13.0	256.96	259.42	259.49	7.56	5.10	251.86	
GE-01	1050	19.8	334.78	336.89	336.86	16.86	14.75	320.03	
GE-03	1052	24.3	337.08	339.64	339.67	12.50	9.94	327.14	
UST-01	1056	24.3	346.87	347.68	348.89	16.26	14.24	332.63	Measured from outer steel casin
UST-02	1054	27.0	347.54	349.51	349.85	18.49	16.52	331.02	
3602W-01	0910	14.2	356.46	356,19	356.46	9.22	9.49	346.97	Measured 3 September 1991
3602W-02	0900	14.5	356.91	356.58	356.91	10.42	10.75	346.16	Measured 3 September 1991
3602W-03	1102	14.3	357.18	356.82	357.18	10.72	11.08	346.10	And the state of t
3602W-04	1100	10.1	355.65	355.40	355.65	7.53	7.78	347.87	

^{(*) =} Measured from PVC inner well riser unless otherwise noted

ROUND 1: INSTALLATION-WIDE GROUNDWATER LEVEL MEASUREMENTS COLLECTED 30 AUGUST 1991

Well Name	Time Msmnt Taken	Well Depth (*)	Ground Surface Elev.	Inner Riser Elev.	Outer Riser Elev.	Water Level (*)	Depth BGS	Ground Water Elevation	Comments
3622W-01	1109	16.8	364.33	364.11	364.33	12.20	12.42	351.91	
3622W-02	1110	13.6	362.92	362.66	362.92	11.48	11.74	351.18	
3622W-03	1112	13.9	362.72	362.50	362.72	11.38	11.60	351.12	
3622W-04	1106	13.5	363.84	363.57	363.84	6.21	6.48	357.36	
EA-04	1230	29.1	253.12	252.89	253.12	23.00	23.23	229.89	
EA-05	0930	29.1	250.04	249.89	250.04	20.59	20.74	229.30	Measured 3 September 1991

^{(*) =} Measured from PVC inner well riser unless otherwise noted

Page 3 of 3

ROUND 2: INSTALLATION-WIDE GROUNDWATER LEVEL MEASUREMENTS COLLECTED 12 DECEMBER 1991

Page 1 of 3

	Time	Well	Ground	Inner	Outer	Water		Ground	
Well	Msmnt	Depth	Surface	Riser	Riser	Level	Depth	Water	
Name	Taken	(*)	Elev.	Elev.	Elev.	(*)	BGS	Elevation	Comments
SHL-1	0932	8.88	271.00	272.44	273.16	2.84	0.68	270.32	Measured from outer steel casing
SHL-3	0746	34.14	247.42	247.71	248.50	30.16	29.08	218.34	Measured from outer steel casing
SHL-4	0808	13.82	226.73	228.71	228.76	10.61	8.63	218.10	
SHL-5	0858	13.60	217.81	218.53	218.77	2.51	1.79	216.02	
SHL-6	0715	57.66	252.58	253.82	254.17	27.70	26.46	226.12	
SHL-7	0730	23.70	235.59	237.13	238.14	17.92	15.37	220.22	Measured from outer steel casing
SHL-85	0844	56.03	220.04	221.85	222.04	7.07	5.26	214.78	modeling area outer accor cauling
SHL-8D	0855	72.94	220.04	221.66	222.04	6.77	5.15	214.89	
SHL-9	0912	26.09	221.83	222.86	223.29	8.03	7.00	214.83	
SHL-10	0756	36.18	247.44	248.80	249.48	30.68	29.32	218.12	
SHL-11	0820	28.11	234.86	236.34	236.83	18.53	17.05	217.81	
SHL-12	0942	28.57	248.28	249.51	249.91	22.25	21.02	227.26	
SHL-13	0835	19.52	220.01	221.58	222.18	6.46	4.89	215.12	
SHL-15	0936	26.47	259.03	260.75	261.04	18.16	16.44	242.59	
SHL-17	0950	18.52	232.77	234.57	234.91	7.46	5.66	227.11	
SHL-18	0738	28.49	236.59	238.39	238.64	18.92	17.12	219.47	
SHL-19	0803	32.50	239.45	241.34	241.62	22.56	20.67	218.78	
SHL-20	0815	50.52	235.55	236.84	236.90	18.92	17.63	217.92	
SHL-21	0828	54.25	257.93	259.75	259.94	44.48	42.66	215.27	
SHL-22	0909	>100.00	219.58	220.49	221.25	5.77	4.86	214.72	
SHL-23	0920	35.26	240.37	242.14	242.35	25.88	24.11	216.26	
SHL-24	0725	>100.00	237.68	239.60	239.76	15.79	13.87	223.81	
SHL-25	1008	36.14	257.10	258.87	259.10	24.56	22.79	234.31	
Staffing Guag									
SG-SHL-1								1	
CSB-1	1109	15.22	247.69	250.11	250 20			010.02	
CSB-2	1102	25.05	258.38	260.07	250.39	7.14	4.72	242.97	
CSB-3	1056	32.03	265.32	267.48	260.28	17.67	15.98	242.40	
CSB-4	1116	10.30	244.44		267.47	24.81	22.65	242.67	
CSB-6	1030	9.53		247.54	247.69	9.07	5.97	238.47	40.55 and 40.00
CSB-7	1045	24.45	242.67	246.39	246.64	3.39	-0.33	243.00	Well hasp broke
CSB-8	1050	25.30	255.50 258.52	257.83 260.77	257.81 260.82	13.70 17.52	11.37 15.27	244.13 243.25	
								2.15.15	
Staffing Guag	9								
SG-CSB-1							777	-	
POL-1	1120	20.15	257 70	250 25		2000	1000		
	1138	29.16	257.78	259.77	259.85	18.99	17.00	240.78	
POL-2	1129	31.74	258.65	259.42	260.79	28.70	26.56	232.09	Measured from outer steel casing
POL-3	1134	31.71	260.18	261.94	262.30	25.52	23.76	236.42	

^{(*) =} Measured from PVC inner well riser unless otherwise noted

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> Fort Devens Appendix J 1

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				CO	BBSCIED IZ	DECEMBER 19	31			
×		Time	Well	Ground	Inner	Outer	Water		Ground	
0	Well	Msmnt	Depth	Surface	Riser	Riser	Level	Depth	Water	
RC4B4yDRIAFDer	Name	Taken	(*)	Elev.	Elev.	Elev.	(*)	BGS	Elevation	Comments
Yd.	B202-1	1143	35.38	252.98	254.43	254.75	27.42	25.97	227.01	
붉	B202-2	1149	40.31	256.71	258.37	258,53	31.28	29.62	227.09	
AH	B202-3	0705	39.56	256.46	258.32	258.56	30.58	28.72	227.74	
	EOD-1	0927	26.74	348.16	349.89	250		12.00		and the second of the second of the second
-	EOD-2	0914	26.60			350.13	18.18	16.45	331.71	Measured 13 December 1991
	EOD-3	0938	30.22	348.18	349.93	350.17	25.30	23.55	324.63	Measured 13 December 1991
	EOD-4	0942	36.10	341.84	343.67	343.92	23.60	21.77	320.07	Measured 13 December 1991
	EUD-4	0942	36.10	350.40	352.12	352.30	31.14	29.42	320.98	Measured 13 December 1991
	2680W-1	1349	13.06	334.49	334.44	334.49	8.03	8.08	326.41	
	2680W-2	1352	7.86	332.53	332.44	332.53	7.86			Well dry
	2680W-3	1343	13.72	332.19	332.04	332.19	9.37	9.52	322.67	Inner casing damaged
	WWTMW-01	0847	25.34	215.61	217.71	218.29	7.01	4.91	210.70	
	WWTMW-01A	8080	34.43	219.37	220.88	220.91	14.35	12.84	206.53	
	WWTMW-02	0931	35.08	222.57	225.73	225.88	19.82	16.66	205.91	
	WWTMW-02A	0926	32.68	223.40	225.47	225.63	19.88	17.81	205.59	
	WWTMW-03	0918	23.58	214.22	216.79	217.09	11.87	9.30	204.92	
	WWTMW-04	0910	24.10	215.23	217.79	218.19	11.56	9.00	206.23	
	WWTMW-06	0900	22.43	231.99	234.54	234.91	13.48	10.93	221.06	
	WWTMW-07	1332	36.45	240.60	243.08	243.17	24.51	22.03	218.57	
	WWTMW-08	0816	21.77	217.09	219.43	219.75	9.17	6.83	210.26	
4	WWTMW-09	0825	21.65	209.85	212.29	212.72	7.08	4.64	205.21	
-7	WWTMW-10	0801	23.15	212.06	214.74	215.14	9.56	6.88	205.21	
7	WWTMW-11	0753	55.58	211.58	214.57	214.71	9.79	6.80	204.78	
	WWTMW-12	1432	60.82	217.87	221.49	221.51	15.95	12.33	205.54	
	WWTMW-13	1412	25.56	216.95	220.10	220.08	14.50	11.35	205.60	
	WWTMW-14	1423	22.04	216.74	219.14	219.57	10.29	7.89	208.85	
	AAFES-1D	1043	31.39	296.27	298.73	298.84	21.10	18.64		
	AAFES-2	1027	33.46	300.65	302.71	302.79	25.41		277.63	
	AAFES-3	0956	22.58	308.72	308.53	308.72		23.35	277.30	
	AAFES-4			310.19	310.00	310.19	22.51 26.86	22.70	286.02	Textile of the later
	AAFES-5	1031	29.22	301.06	300.82	301.06		24.12	275.04	Under construction debris
2	AAFES-6	1038	26.95	297.64	300.00	300.06	23.88		276.94	
	AAFES-7	1049	15.61	256.96	259.42	259.49	8.04	19.33 5.58	278.31 251.38	
4			22.52	451.51	356 01					
	GE-01	1357	22.09	334.78	336.89	336.86	13.95	11.84	322.94	
2	GE-03	1402	27.08	337.08	339.64	339.67	11.68	9.12	327.96	
3	UST-01	1409	26.55	346.87	347.68	348.89	15.91	13.89	332.98	Measured from outer steel casing
	UST-02	1406	28.98	347.54	349.51	349.85	17.89	15.92	331.62	
	3602W-01	-		356.46	356.19	356.46			-	Area under piles of plowed snow
	3602W-02	1438	14.23	356.91	356.58	356.91	8.94	9.27	347.64	The second secon
	3602W-03	1427	14.19	357.18	356.82	357.18	9.80	10.16	347.02	
	3602W-04	1423	10.79	355.65	355.40	355.65	5.98	6.23	349.42	

^{(*) =} Measured from PVC inner well riser unless otherwise noted

ROUND 2: INSTALLATION-WIDE GROUNDWATER LEVEL MEASUREMENTS COLLECTED 12 DECEMBER 1991

RC424	Well Name	Time Msmnt Taken	Well Depth (*)	Ground Surface Elev.	Inner Riser Elev.	Outer Riser Elev.	Water Level (*)	Depth BGS	Ground Water Elevation	Comments
DR	3622W-01	1446	16.76	364.33	364.11	364.33	10.46	10.68	353.65	
\$	3622W-02	1450	13.60	362.92	362.66	362.92	8.79	9.05	353.87	
F	3622W-03	1454	13.96	362.72	362.50	362.72	9.36	9.58	353.14	
Н	3622W-04	1456	13.28	363.84	363.57	363.84	5.59	5.86	357.98	
	EA-04	444		253.12	252.89	253.12			1,440	Under construction debris
	EA-05		-	250.04	249.89	250.04				Under construction debris

^{(*) =} Measured from PVC inner well riser unless otherwise noted

> Fort Devens Appendix J 1

June 1992

ROUND 3: INSTALLATION-WIDE GROUNDWATER LEVEL MEASUREMENTS COLLECTED 18 AND 19 MARCH 1992

Well Ground Inner			
Depth Surface Riser	Outer Water Riser Level	Ground Depth Water	*
(*) Elev. Elev.	Elev. (*)	BGS Elevation	Comments
271.00 272.44	273.16	-	Well obstructed below ground surface
33.66 247.42 247.71	248.50 30.37	29.29 218.13	Measured from outer steel casing
13.50 226.73 228.71	228.76 10.95	8.97 217.76	
13.06 217.81 218.53	218.77 3.73	3.01 214.80	Well hasp broken - cannot be locked
57.43 252.58 253.82	254.17 28.33	27.09 225.49	
23.24 235.59 237.13	238.14 18.53	15.98 219.61	Measured from outer steel casing
55.77 220.04 221.85	222.04 7.68	5.87 214.17	measured from outer steel casing
72.70 220.04 221.66	222.04 7.53	5.91 214.13	
25.82 221.83 222.86	223.29 9.05	8.02 213.81	
35.75 247.44 248.80	249.48 31.02	29.66 217.78	
27.89 234.86 236.34	236.83 18.79	17.31 217.55	
28.11 248.28 249.51	249.91 23.05	21.82 226.46	
20.36 220.01 221.58	222.18 7.07	5.50 214.51	
26.19 259.03 260.75	261.04 18.31	16.59 242.44	
15.15 232.77 234.57	234.91 8.22	6.42 226.35	
28.20 236.59 238.39	238.64 19.48	17.68 218.91	
32.22 239.45 241.34	241.62 23.16	21.27 218.18	
50.27 235.55 236.84	236.90 19.20	17.91 217.64	
54.00 257.93 259.75	259.94 45.33	43.51 214.42	
>100.00 219.58 220.49	221.25 7.05	6.14 213.44	
34.95 240.37 242.14	242.35 27.61	25.84 214.53	
>100.00 237.68 239.60	239.76 16.45	14.53 223.15	
35.84 257.10 258.87	259.10 25.36	23.59 233.51	
	1.82	216.78	
14.94 247.69 250.11	250.39 7.20	4.78 242.91	
51.81 258.38 260.07	260.28 17.56		
31.55 265.32 267.48	267.47 24.76		
10.01 244.44 247.54		22.60 242.72 1.00 243.44	
8.99 242.67 246.39			Charles and the state of the st
24.05 255.50 257.83		-0.15 242.82	Well hasp broken - cannot be locked
24.99 258.52 260.77	257.81 14.11 260.82 17.54	11.78 243.72 15.29 243.23	
	Association of the second		
	2.21	- 242.76	
		2,21,7	
28.88 257.78 259.77	259.85 19.01	17.02 240.76	
29.51 258.65 259.42	260.79 29.11		Measured from outer steel casing
31.41 260.18 261.94	262.30 26.00	24.24 235.94	mondated from outer steer custing
29.51 258.65	259.42	259.42 260.79 29.11	259.42 260.79 29.11 26.97 231.68

				CO	Precien to	AND 19 MARC	n 1992			
R		Time	Well	Ground	Inner	Outer	Water		Ground	
4	Well	Msmnt	Depth	Surface	Riser	Riser	Level	Depth	Water	
RC424	Name	Taken	(*)	Elev.	Elev.	Elev.	(*)	BGS -	Elevation	Comments
DRAFT	B202-1	0829	35.10	252.98	254.43	254.75	28.14	26.69	226.29	
72	B202-2	0837	40.07	256.71	258.37					
T	B202-3					258.53	31.92	30.26	226.45	Confermit that the Confermit All III
+3	B202-3			256.46	258.32	258.56				Access to well denied
	EOD-1	0853	26.50	348.16	349.89	350.13	19.60	17.87	330.29	
	EOD-2	0847	26.38	348.18	349.93	350.17	25.36	23.61	324.57	
	EOD-3	0840	29.88	341.84	343.67	343.92	27.28	25.45	316.39	
	EOD-4	0824	35.69	350.40	352.12	352.30	31.12	29.40	321.00	
	2680W-1	1734	12.80	334.49	334.44	334.49	8.87	8.92	325.57	
	2680W-2	1742	7.56	332.53	332.44	332.53	7.56		323.57	Well dry
	2680W-3	1739	13.44	332.19	332.04	332.19	9.82	9.97	322.22	HATT GTÅ
	WWTMW-01	1426	25.01	215.61	217.71	218.29	7.42	5.32	210.29	
	WWTMW-01A	1435	34.20	219.37	220.88	220.91	15.37	13.86	205.51	
	WWTMW-02	1357	34.82	222.57	225.73	225.88	20.97	17.81	204.76	
	WWTMW-02A	1401	32.56	223.40	225.47	225.63	20.96	18.89	204.51	
	WWTMW-03	1406	23.45	214.22	216.79	217.09	13.12	10.55	203.67	
	WWTMW-04	1412	24.86	215.23	217.79	218.19	12.79	10.23	205.00	
	WWTMW-06	1456	22.17	231.99	234.54	234.91	13.43	10.88	221.11	
	WWTMW-07	1501	36.09	240.60	243.08	243.17	25.45	22.97	217.63	
	WWTMW-08	1442	21.42	217.09	219.43	219.75	9.84	7.50	209.59	
ے	WWTMW-09	1345	21.39	209.85	212.29	212.72	8.35	5.91	203.94	
٦	WWTMW-10	1338	22.94	212.06	214.74	215.14	10.94	8.26	203.80	
10	WWTMW-11	1332	55.44	211.58	214.57	214.71	11.11	8.12	203.46	
_	WWTMW-12	1547	60.56	217.87	221.49	221.51	16.91	13.29	204.58	
	WWTMW-13	1527	25.24	216.95	220.10	220.08	15.53	12.38	204.57	
	WWTMW-14	1536	21.75	216.74	219.14	219.57	10.26	7.86	208.88	
	AAFES-1D	1459		224 27		221 10	40.40	30.00	322 05	
	AAFES-2		31.12	296.27	298.73	298.84	21.71	19.25	277.02	
	AAFES-3	1455	33.15	300.65	302.71	302.79	26.35	24.29	276.36	
	AAFES-4	1432	25.33	308.72	308.53	308.72	23.84	24.03	284.69	The second control of
	AAFES-5	1440	26.86	310.19	310.00	310.19	26.86			Well dry
	AAFES-6	1447	29.69	301.06	300.82	301.06	24.74	24.98	276.08	
	AAFES-7	1508	26.69	297.64	300.00	300.06	22.51	20.15	277.49	140 ppm HNu reading
	AAFES-/	1514	15.36	256.96	259.42	259.49	9.12	6.66	250.30	
	GE-01	1748	22.87	334.78	336.89	336.86	16.12	14.01	320.77	
	GE-03	1751	26.80	337.08	339.64	339.67	12.61	10.05	327.03	
	UST-01	1758	26.32	346.87	347.68	348.89	16.55	14.53	332.34	Measured from outer steel casing
	UST-02	1754	28.92	347.54	349.51	349.85	18.73	16.76	330.78	entra de la companya
	3602W-01			356.46	356.19	356.46	_			Area under 10" of sand
	3602W-02	1538	13.95	356.91	356.58	356.91	9.01	9.34	347.57	wied mudel in or saud
	3602W-03	1532	13.90	357.18	356.82	357.18	9.40	9.76	347.42	
	3602W-04	1525	10.48	355.65	355.40	355.65	6.81	7.06	348.59	
	A 6 242 N C 212	2542	203.5			355.05	0.01	7.00	340.39	

^{(*) =} Measured from PVC inner well riser unless otherwise noted

ROUND 3: INSTALLATION-WIDE GROUNDWATER LEVEL MEASUREMENTS COLLECTED 18 AND 19 MARCH 1992

Well	Time Msmnt	Well Depth	Ground Surface	Inner Riser	Outer Riser	Water Level	Depth	Ground Water	
Name	Taken	(*)	Elev.	Elev.	Elev.	(*)	BGS	Elevation	Comments
3622W-01	1551	16.47	364.33	364.11	364.33	13.70	13.92	350.41	
3622W-02	1555	13.32	362.92	362.66	362.92	11.28	11.54	351.38	
3622W-03	1601	13.69	362.72	362.50	362.72	11.34	11.56	351.16	
3622W-04	1605	13.05	363.84	363.57	363.84	6.75	7.02	356.82	
EA-04	1415	28.85	253.12	252.89	253.12	23.74	23.97	229.15	
EA-05			250.04	249.89	250.04				Unable to open well cap

^{(*) =} Measured from PVC inner well riser unless otherwise noted

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