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#92

155881

CLARKCO LANDFILL COMPANY, LLC

HYDROGEOLOGIC REPORT

SOLID WASTE PERMIT TO INSTALL APPLICATION
3100 SNYDER-DOMER ROAD
GERMAN TOWNSHIP – CLARK COUNTY, OHIO
CEC PROJECT NO. 200216

VOLUME 5 OF 7

SEPTEMBER 2000

Eagon & Associates, Inc.
100 Old Wilson Bridge Road
Suite 320
Worthington, Ohio 43085
614-888-5760 (Phone)
614-888-5763 (Fax)

CLARKCO PTI APPLICATION

VOLUME III	HYDROGEOLOGIC REPORT
VOLUME IV	HYDROGEOLOGIC REPORT - LOGS
VOLUME V	HYDROGEOLOGIC REPORT - TESTING RESULTS
VOLUME VI	SUPPLEMENTAL REPORTS
VOLUME VII	GROUND WATER MONITORING REPORT

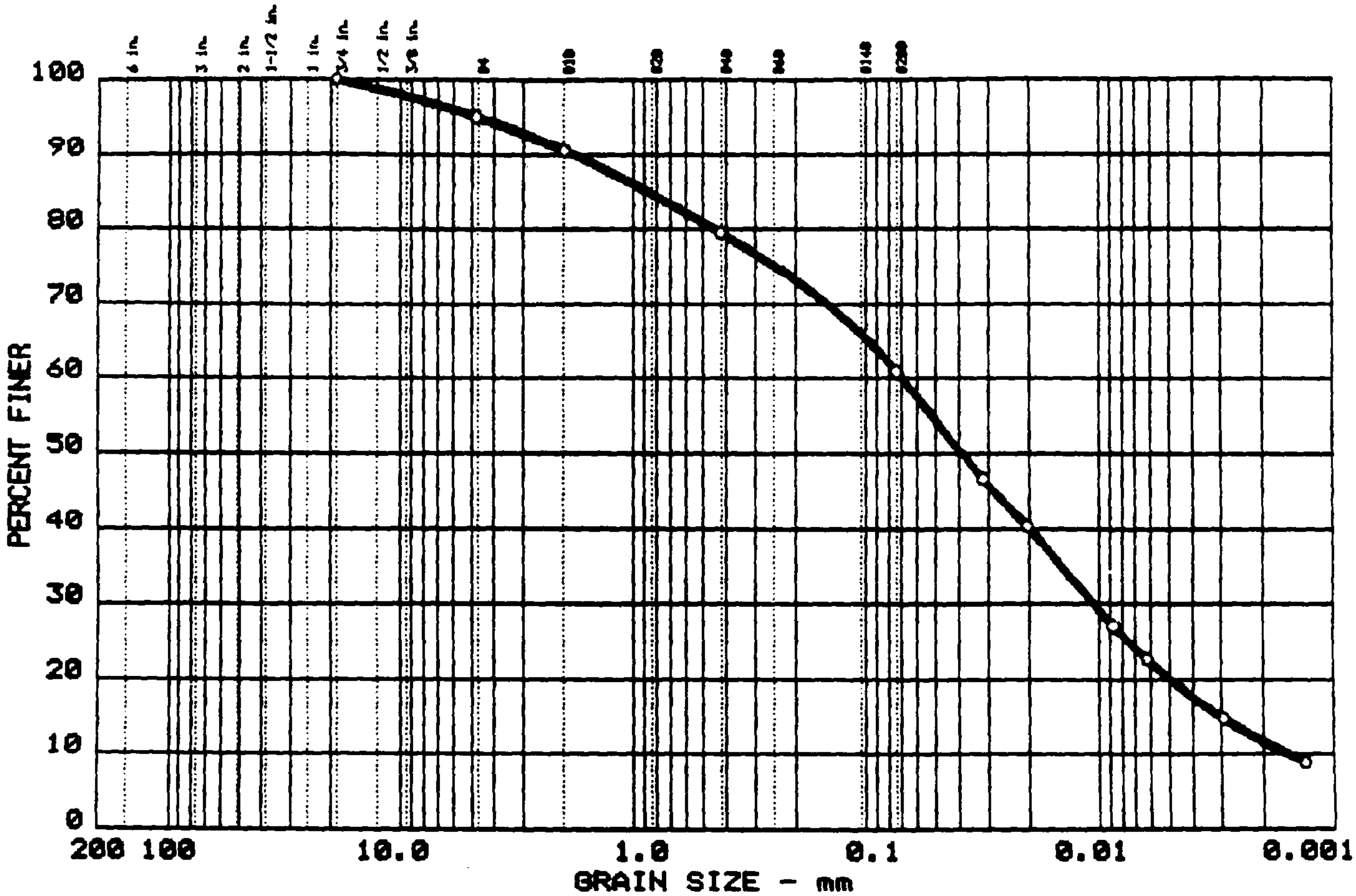
VOLUME V

HYDROGEOLOGIC REPORT - TESTING RESULTS

APPENDIX D.

GEOTECHNICAL TESTING RESULTS

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	5.0	Coarse Sand: 4.5	40.9	20.0
			Medium Sand: 11.0		
			Fine Sand: 18.6		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	22	9	0.86		0.04	0.011	0.0030	0.0015	1.05	44.7

MATERIAL DESCRIPTION	USCS	AASHTO
○ Silty Clay	CL	A-4(2.4)

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-2, Sample 1B, Depth 23-25'

Date: 2/26/91

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEO. SERVICES

Remarks:

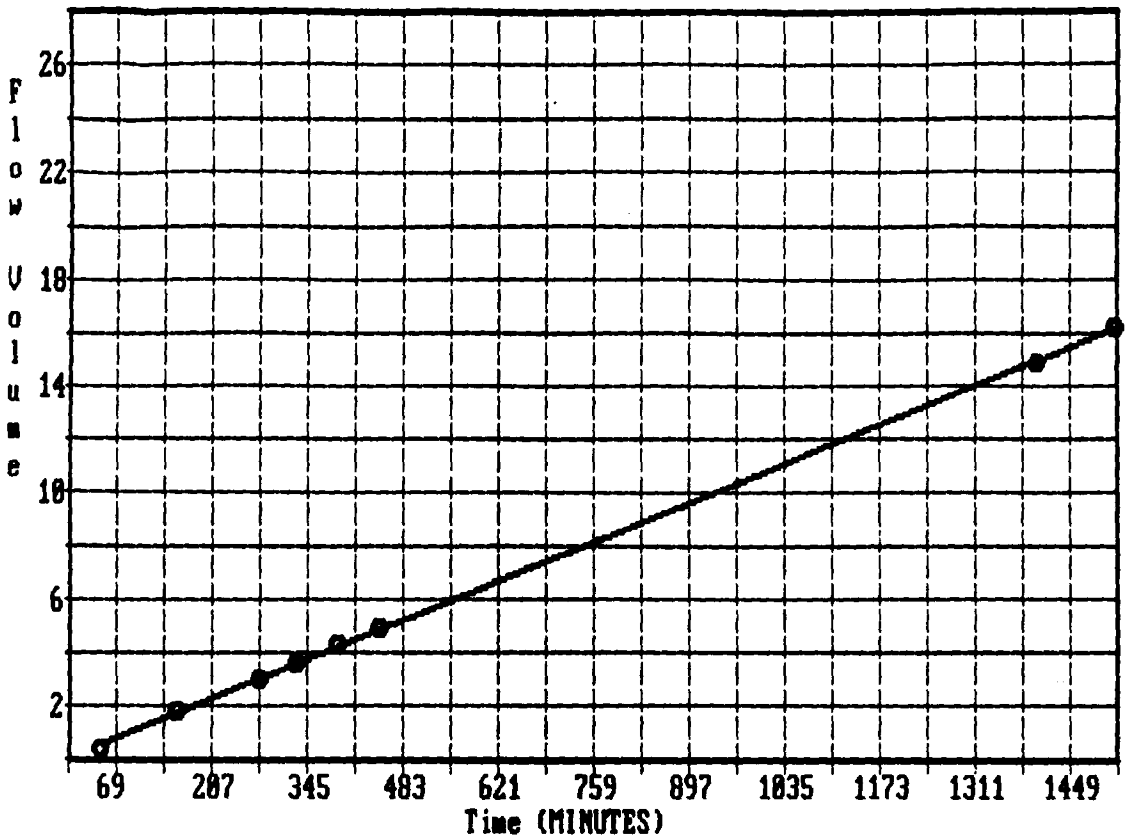
Client:

Eagon & Associates, Inc.

Moisture Content: 10.6%

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
90-2	23-25'	Silty Clay		22	9	10.6

Flow (cc)	Length (cm)	Head Loss (cm)
16.2	5.743	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
41.803	90840	131.46

K = (Q L / H A T)

= 3.034E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	02/25/91	08:01	0.6
2		08:46	1.8
3		10:38	2.3
4		12:37	3.6
5		13:31	4.2
6		14:29	4.8
7		15:30	5.5
8	02/26/91	07:21	15.5
9		09:15	16.7

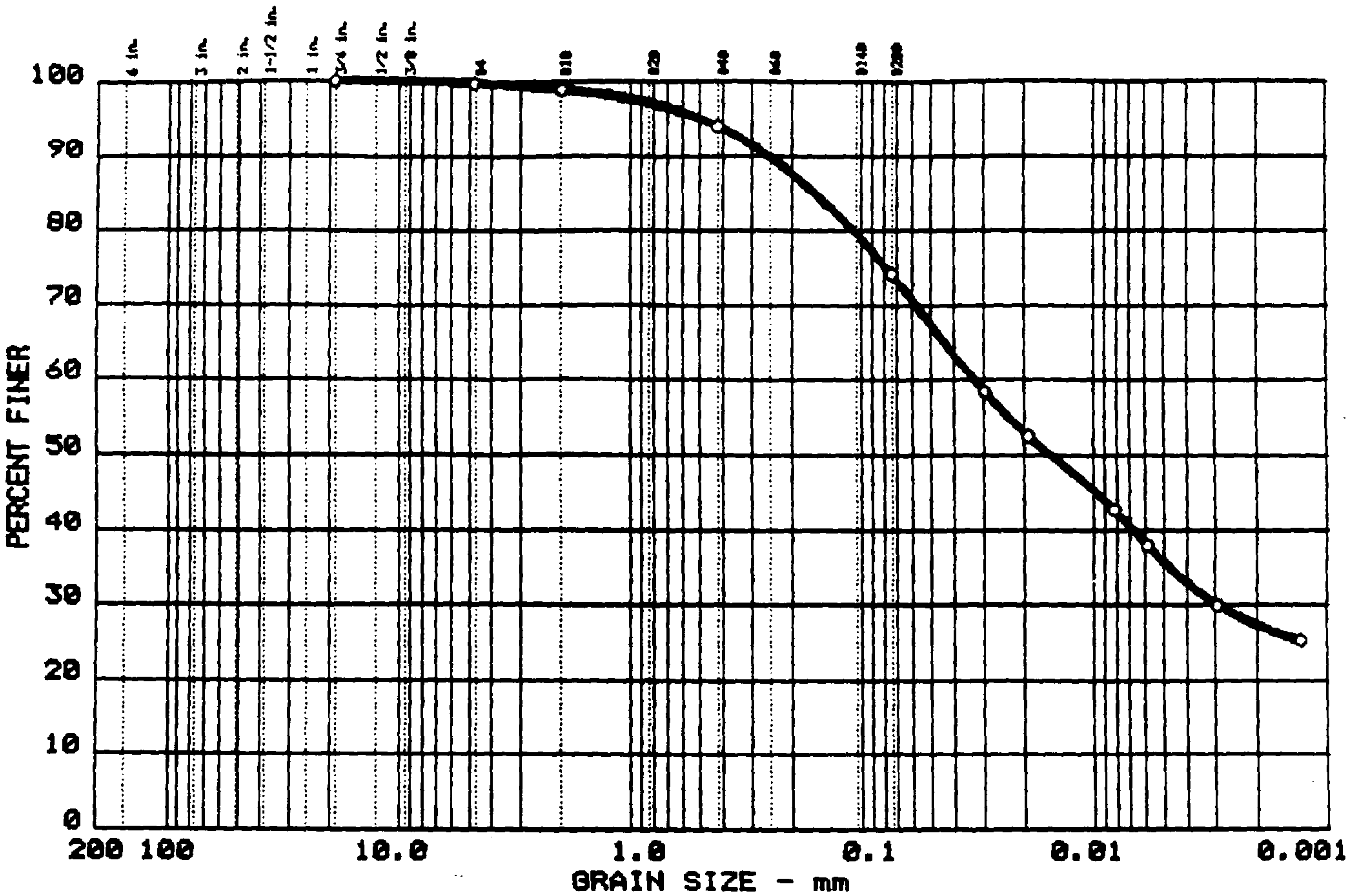
Sample : Shelby Tube

Remarks : Sample 1B

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91036

Mason - de Verteuil
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	0.2	Coarse Sand: 0.9	38.5	35.6
			Medium Sand: 4.9		
			Fine Sand: 19.8		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	34	24	0.16		0.02	0.003				

MATERIAL DESCRIPTION	USCS	AASHTO
○ Silty Clay	CL	A-6(14.9)

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-2, Sample WX-1, 69.7-70.7'

Date: 3/7/91

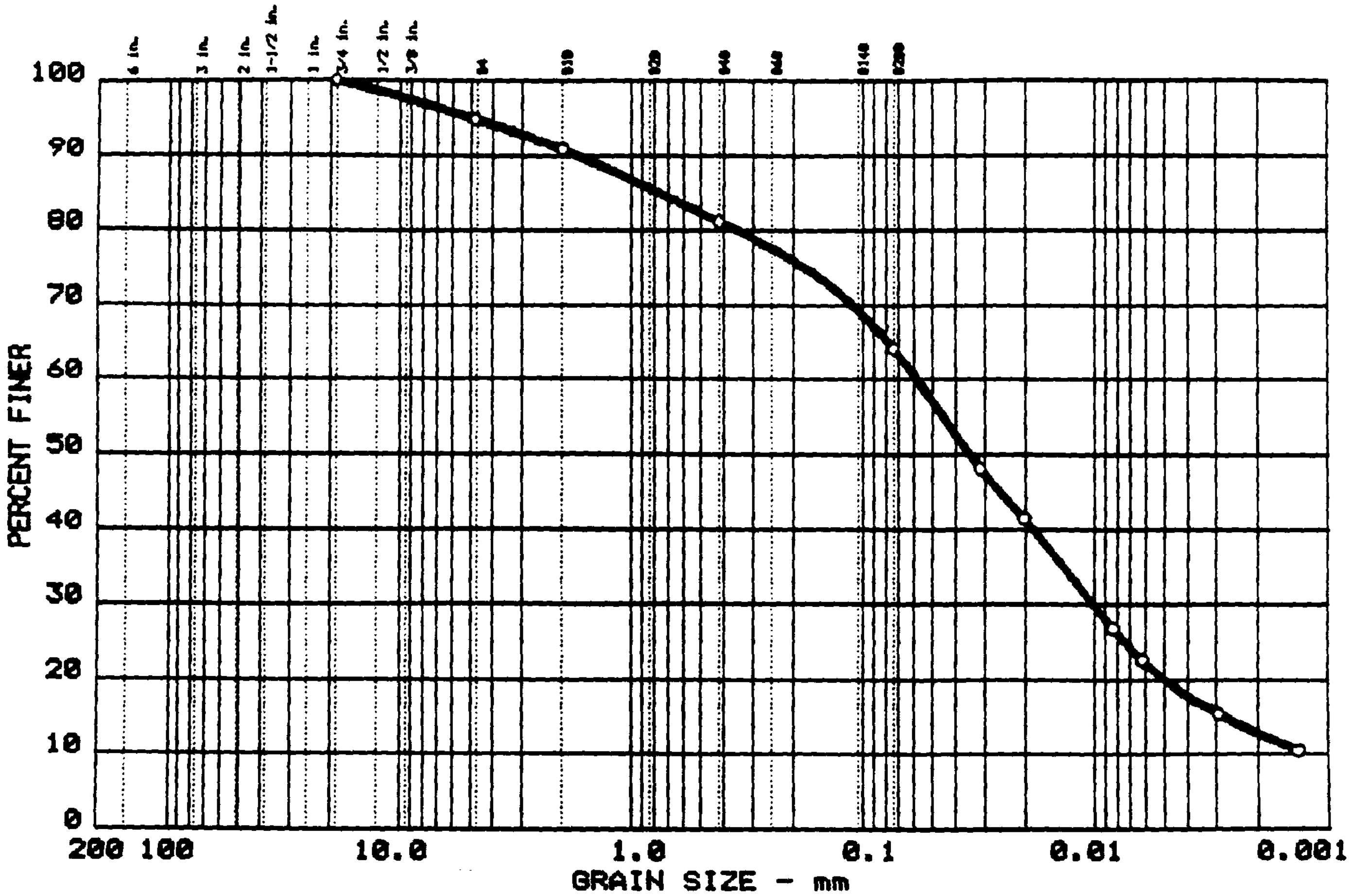
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 19.1%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND		% SILT	% CLAY
o	0.0	5.1	Coarse Sand:	4.1	44.1	20.0
			Medium Sand:	9.6		
			Fine Sand:	17.1		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
o	21	8	0.76		0.03	0.010	0.0028			

MATERIAL DESCRIPTION	USCS	AASHTO
o Silty Clay	CL	A-4(2.1)

Project No.: 91036
Project: Clark Co. Landfill
o Location: Boring 90-4, Sample 1B, Depth 23-25'

Date: 2/26/91

Remarks:

Client:

Eagon & Associates, Inc.

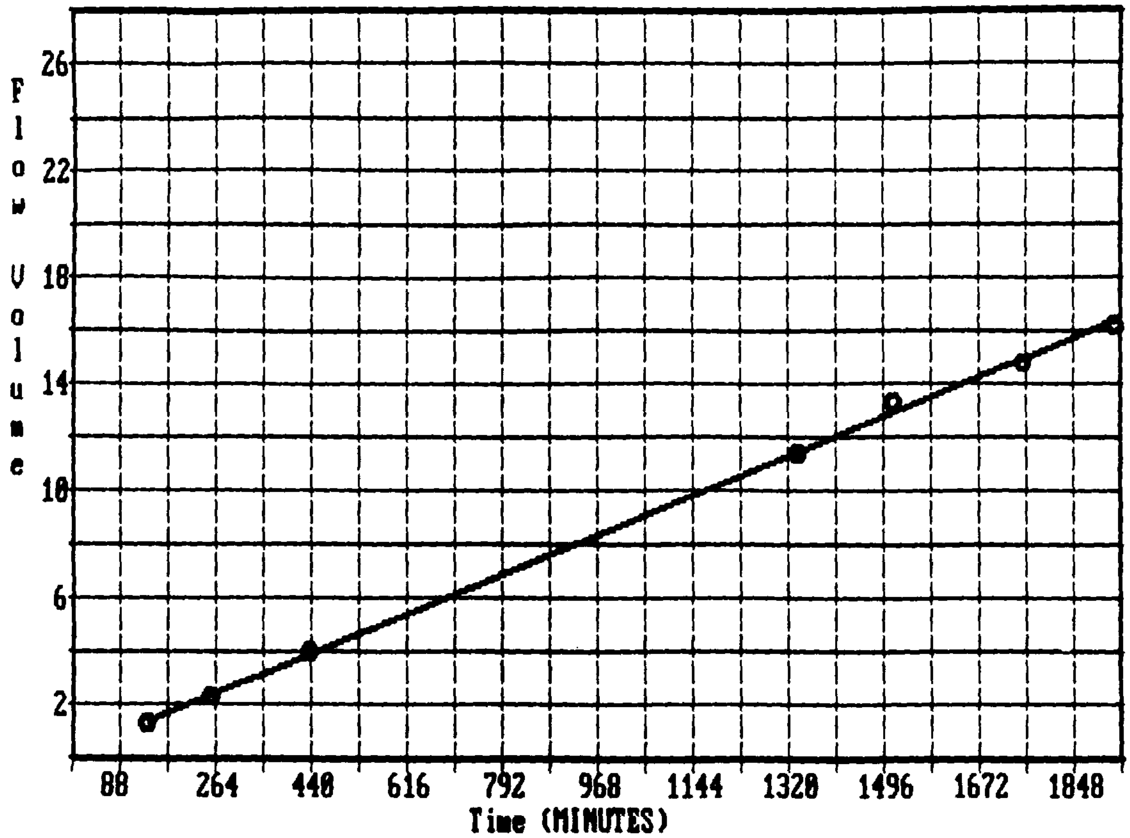
Moisture Content: 11.3%

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEO. SERVICES

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
90-2	69.7-70.7'	Silty Clay		34	24	19.1

Flow (cc)	Length (cm)	Head Loss (cm)
16.2	5.920	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
39.961	115440	100.06

K = (Q L / H A T)

= 2.586E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	03/11/91	08:49	0.6
2		11:07	1.9
3		13:04	2.9
4		16:06	4.6
5	03/12/91	07:07	12.0
6		10:04	13.9
7		14:02	15.4
8		16:53	16.8

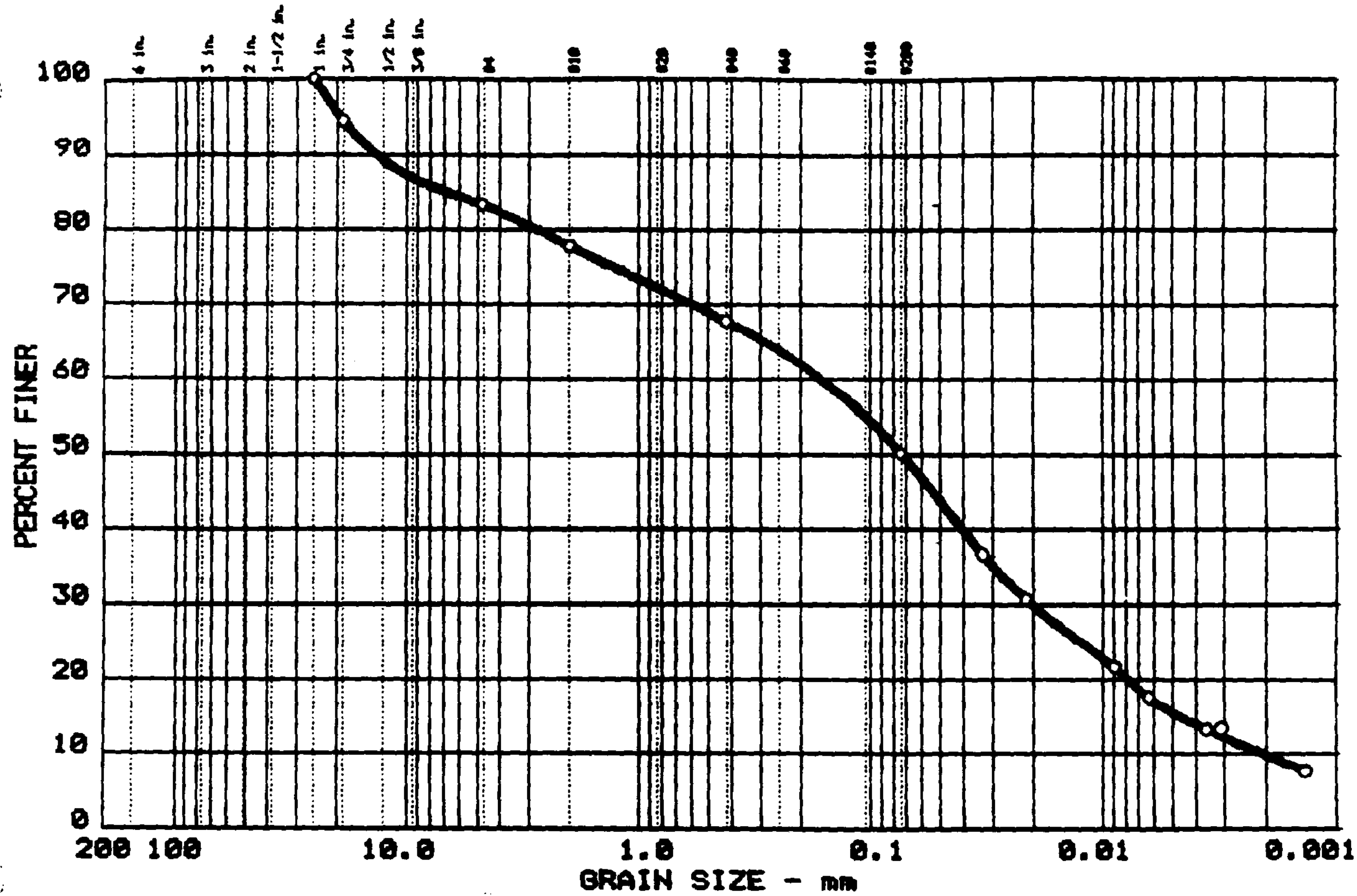
Sample : Waxed Sample

Remarks : Sample WX-1

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91036

Mason - de Verteuil
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND		% SILT	% CLAY
○	0.0	16.6	Coarse Sand:	5.6	34.7	15.5
			Medium Sand:	10.1		
			Fine Sand:	17.5		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	21	9	6.68	0.16	0.07	0.020	0.0047	0.0020	1.23	79.4

MATERIAL DESCRIPTION	USCS	AASHTO
○ Silty clay	CL	A-4

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-3, Sample WX-3, 71.8'-73'

Date: 3/27/91

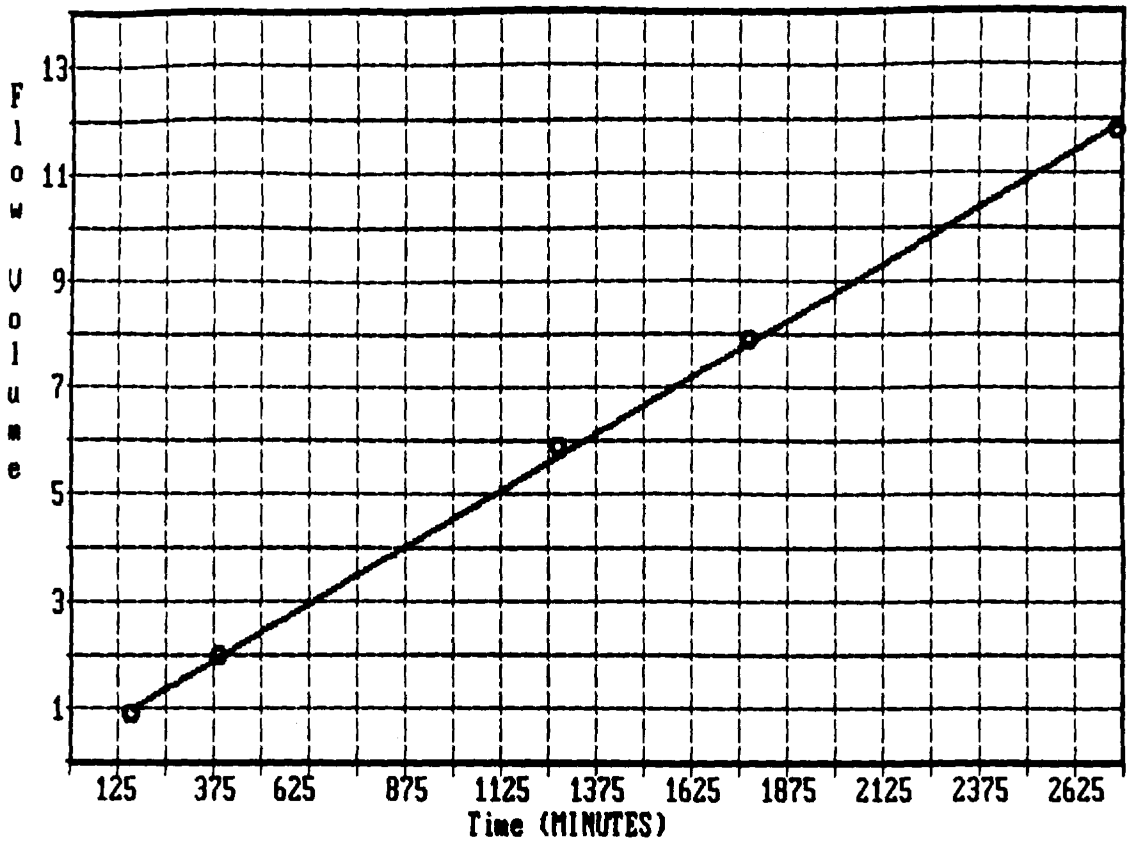
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 9.3%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
90-3	71.8-73.8'	Silty Clay		21	9	9.3

Flow (cc)	Length (cm)	Head Loss (cm)
11.8	6.990	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
39.592	163920	134.10

K = (Q L / H A T)

= 1.579E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	04/02/91	09:53	0.2
2		12:31	1.1
3		16:19	2.2
4	04/03/91	07:10	6.1
5		15:28	8.1
6	04/04/91	07:25	12.0

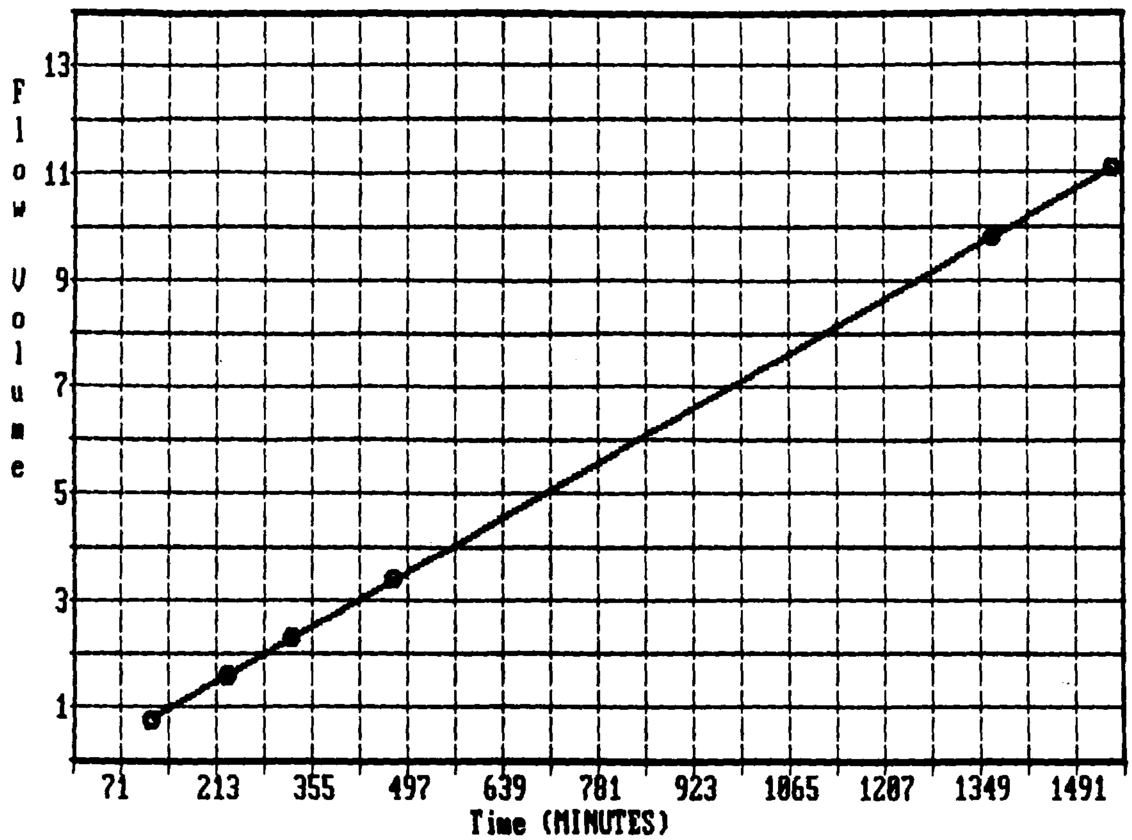
Sample : Waxed Sample

Remarks : Sample WX-3

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91036

Mason - de Verteuil
Geotechnical Services

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
90-4	23-25'	Silty Clay		21	8	11.3

Flow (cc)	Length (cm)	Head Loss (cm)
11.1	6.071	805.00
Area (cm^2)	Time (sec.)	Dry Density (pcf)
41.629	92700	130.02

K = (Q L / H A T)

= 2.169E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	02/26/91	08:20	0.8
2		10:17	1.5
3		12:10	2.4
4		13:45	3.1
5		16:15	4.2
6	02/27/91	07:09	10.6
7		10:05	11.9

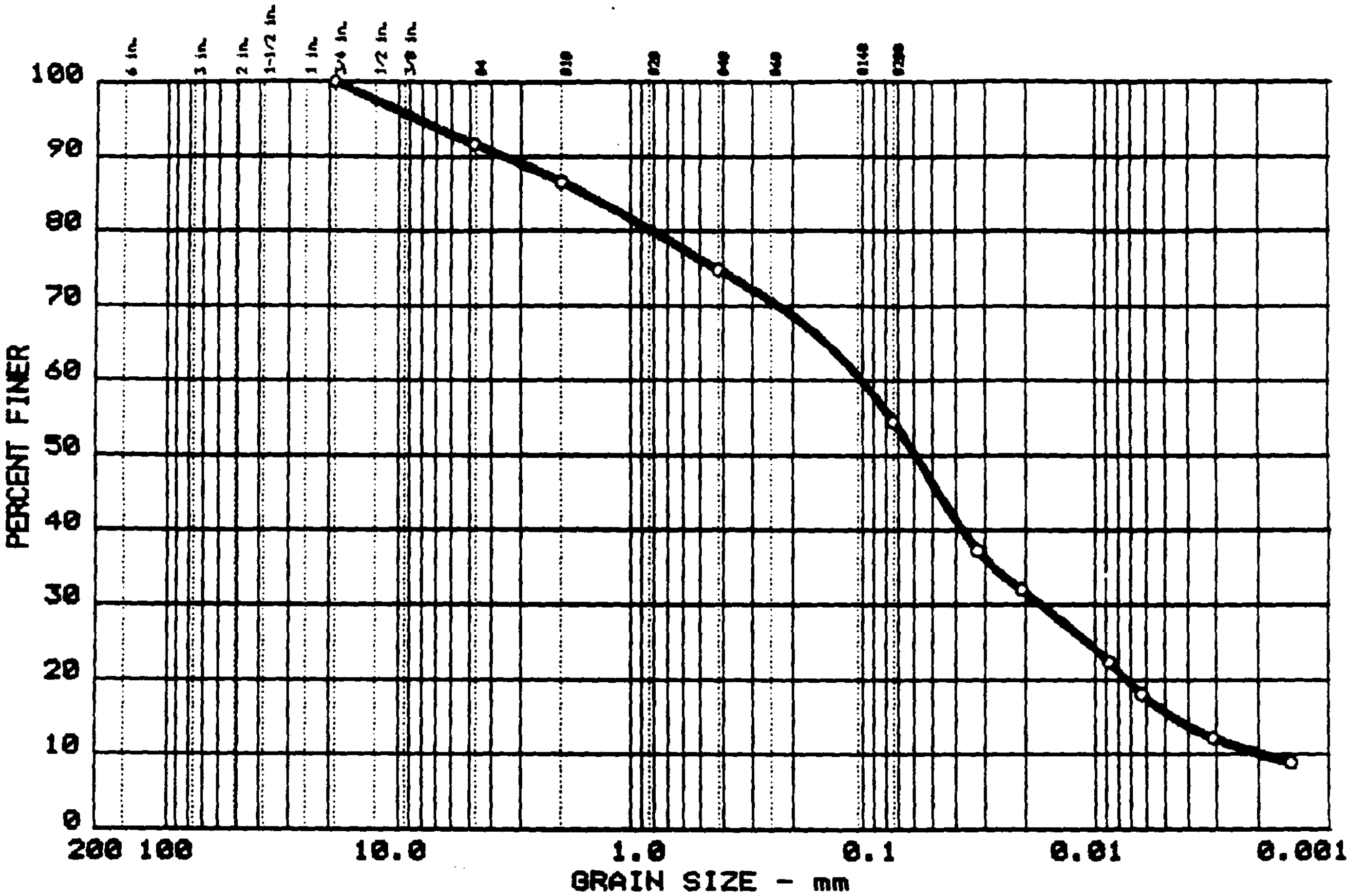
Sample : Shelby Tube

Remarks : Sample 1B

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91036

Mason - de Verteuil
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	8.3	Coarse Sand: 5.1	38.9	15.6
			Medium Sand: 11.7		
			Fine Sand: 20.4		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	18	6	1.58	0.10	0.06	0.017	0.0047	0.0019	1.50	51.9

MATERIAL DESCRIPTION	USCS	AASHTO
○ Clayey Silt	CL-ML	A-4

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-4, Sample WX-1, Depth 65-66'

Date: 3-8-91

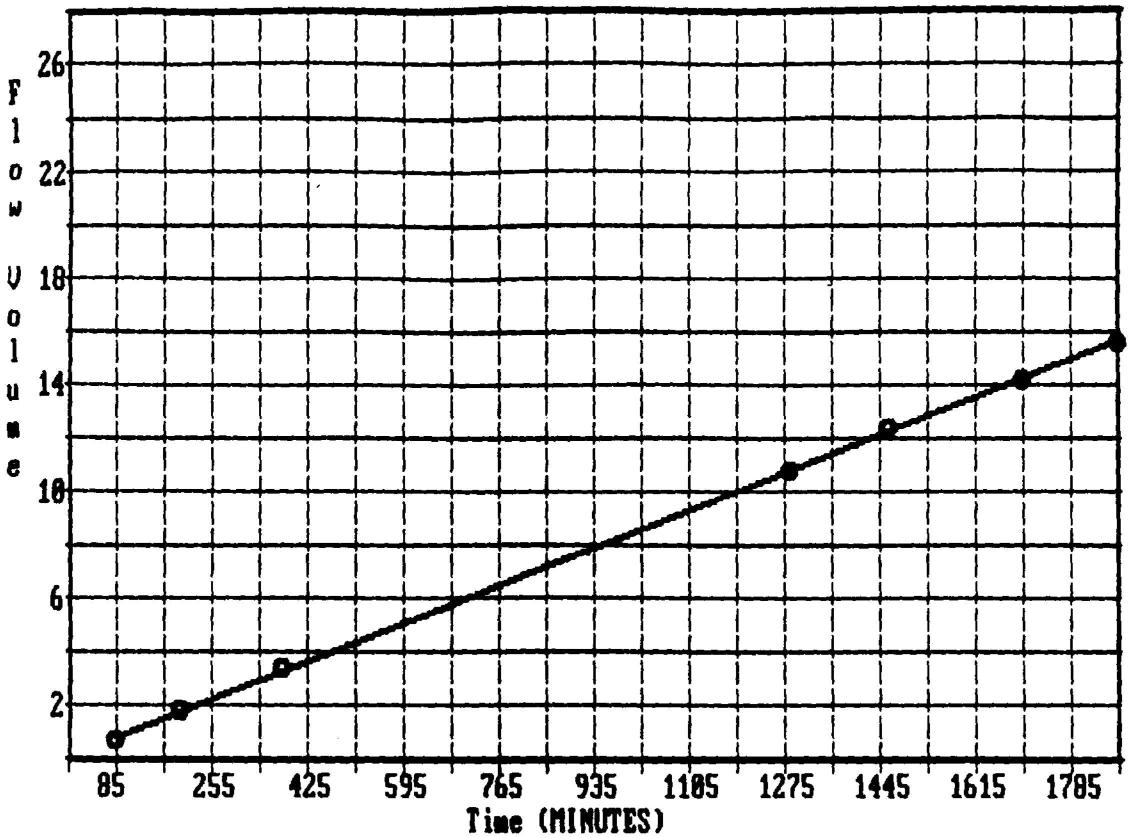
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 10.3%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
90-4	65-66'	Clayey Silt		18	6	10.3

Flow (cc)	Length (cm)	Head Loss (cm)
15.6	6.411	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
40.189	112020	131.04

K = (Q L / H A T)

= 2.760E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	03/11/91	09:46	1.7
2		11:07	2.4
3		13:03	3.5
4		16:06	5.1
5	03/12/91	07:10	12.5
6		10:04	14.1
7		14:03	15.9
8		16:53	17.3

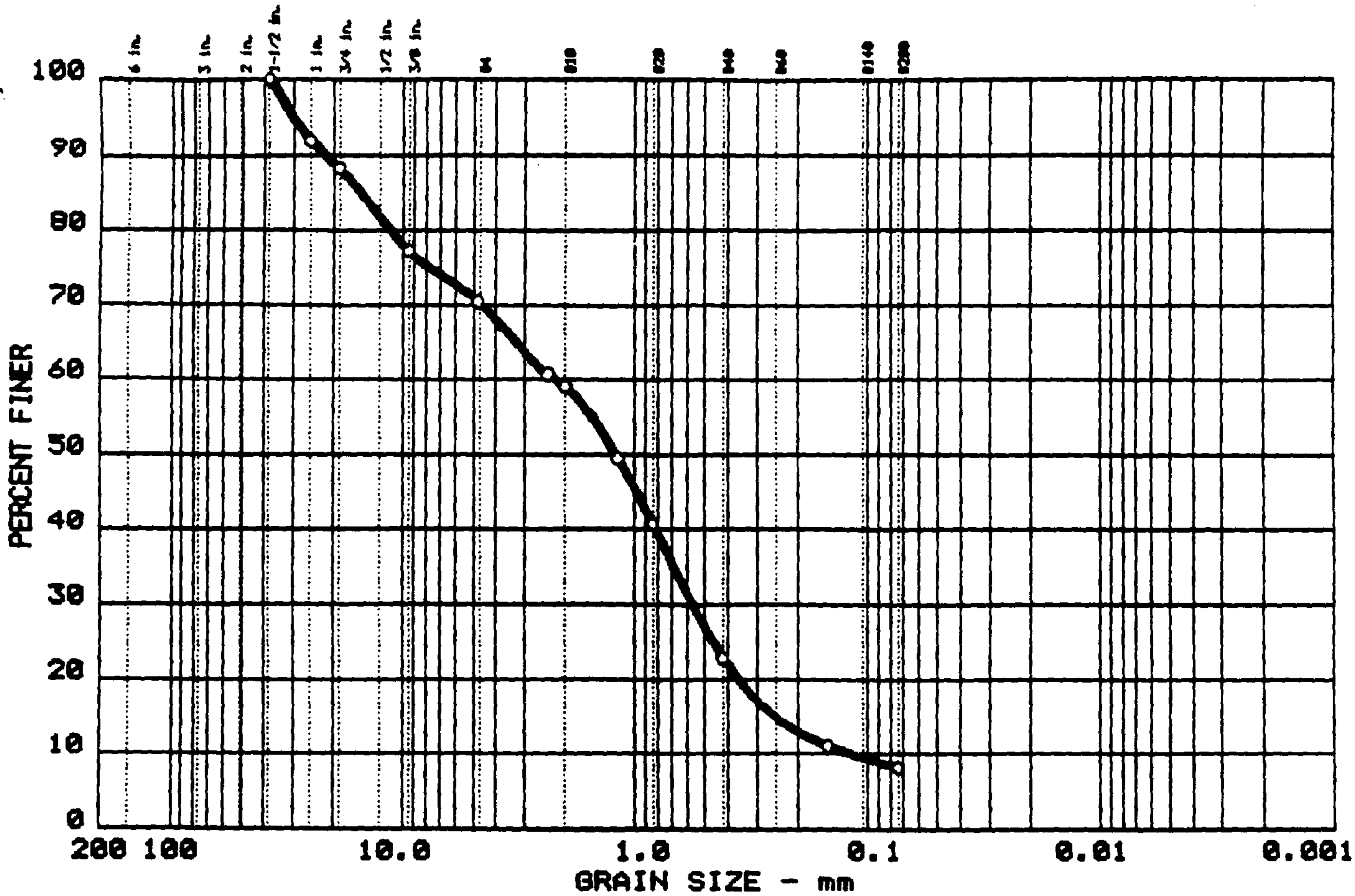
Sample : Waxed Sample

Remarks : Sample WX-1

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91036

Mason - de Verteuil
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND		% SILT	% CLAY
○	0.0	29.5	Coarse Sand	11.3	8.3	
			Medium Sand	36.4		
			Fine Sand	14.5		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	15.31	2.19	1.21	0.568	0.2506	0.1172	1.26	18.7

MATERIAL DESCRIPTION	USCS	AASHTO
○ Well Graded Sand with Silt and Gravel	SW-SM	A-1-b

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring90-6D,Sample20,Depth55.8-56.35'

Date: 4-1-91

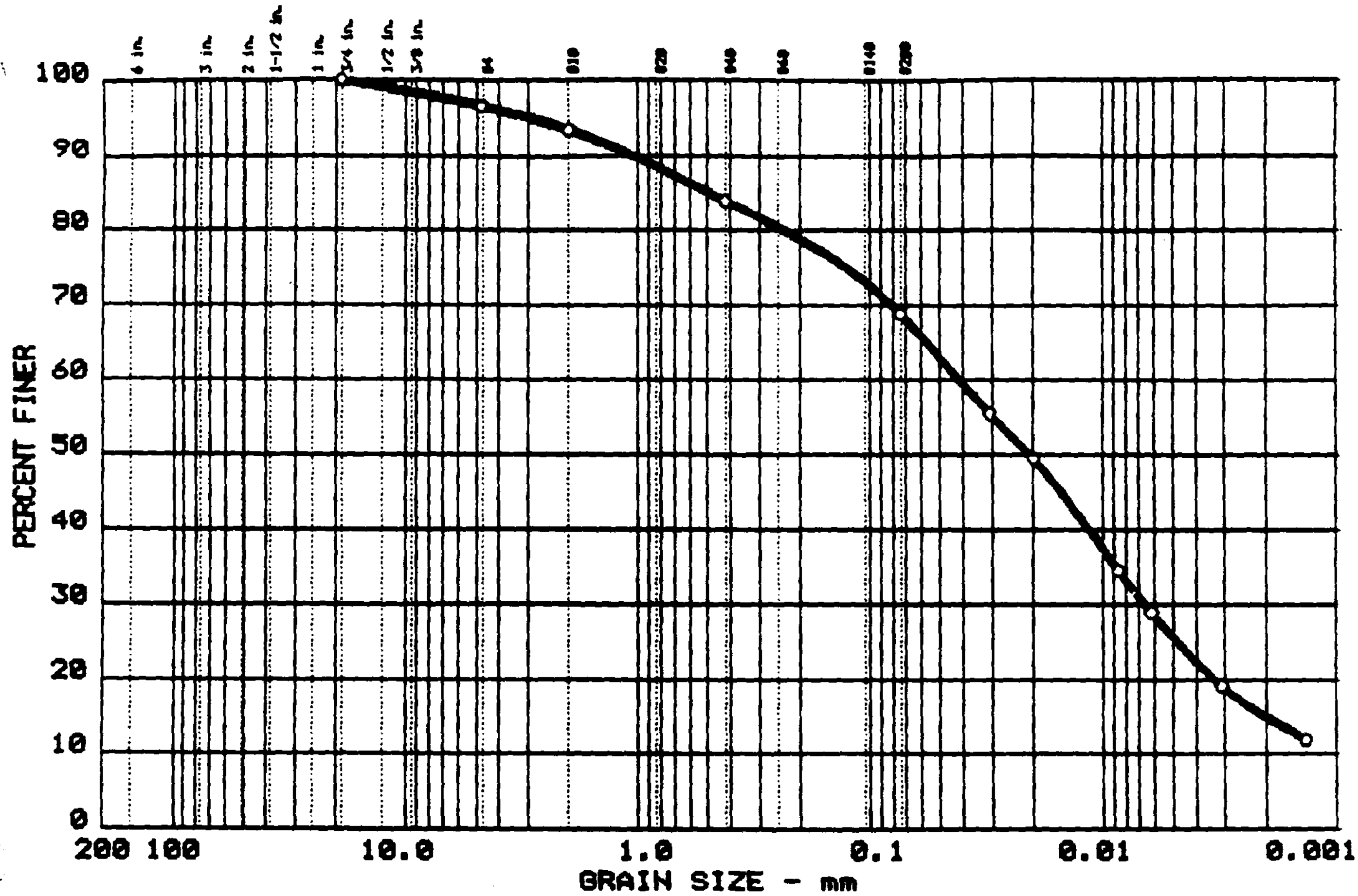
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 11.5%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	3.4	Coarse Sand: 3.1	43.3	25.5
			Medium Sand: 9.6		
			Fine Sand: 15.1		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	20	8	0.49		0.02	0.007	0.0020			

MATERIAL DESCRIPTION	USCS	AASHTO
○ Silty clay	CL	A-4

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-4, Sample WX-2, 76' - 77'

Date: 3/27/91

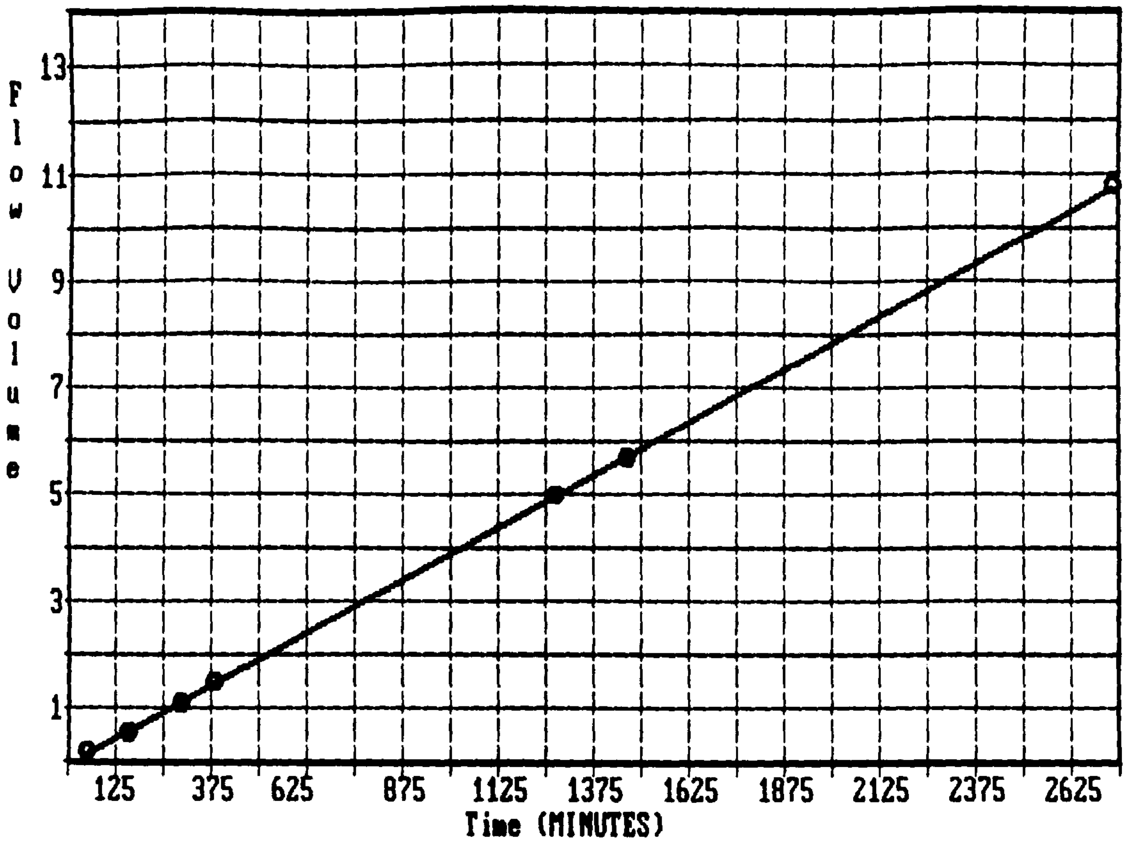
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 12.9%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
90-4	76.0-77.0'	Silty Clay		20	8	12.9

Flow (cc)	Length (cm)	Head Loss (cm)
10.8	6.203	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
39.507	163920	120.37

K = (Q L / H A T)

= 1.285E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	04/02/91	09:53	1.0
2		10:44	1.2
3		12:31	1.5
4		14:47	2.1
5		16:18	2.5
6	04/03/91	07:10	6.0
7		10:14	6.7
8	04/04/91	07:25	11.8

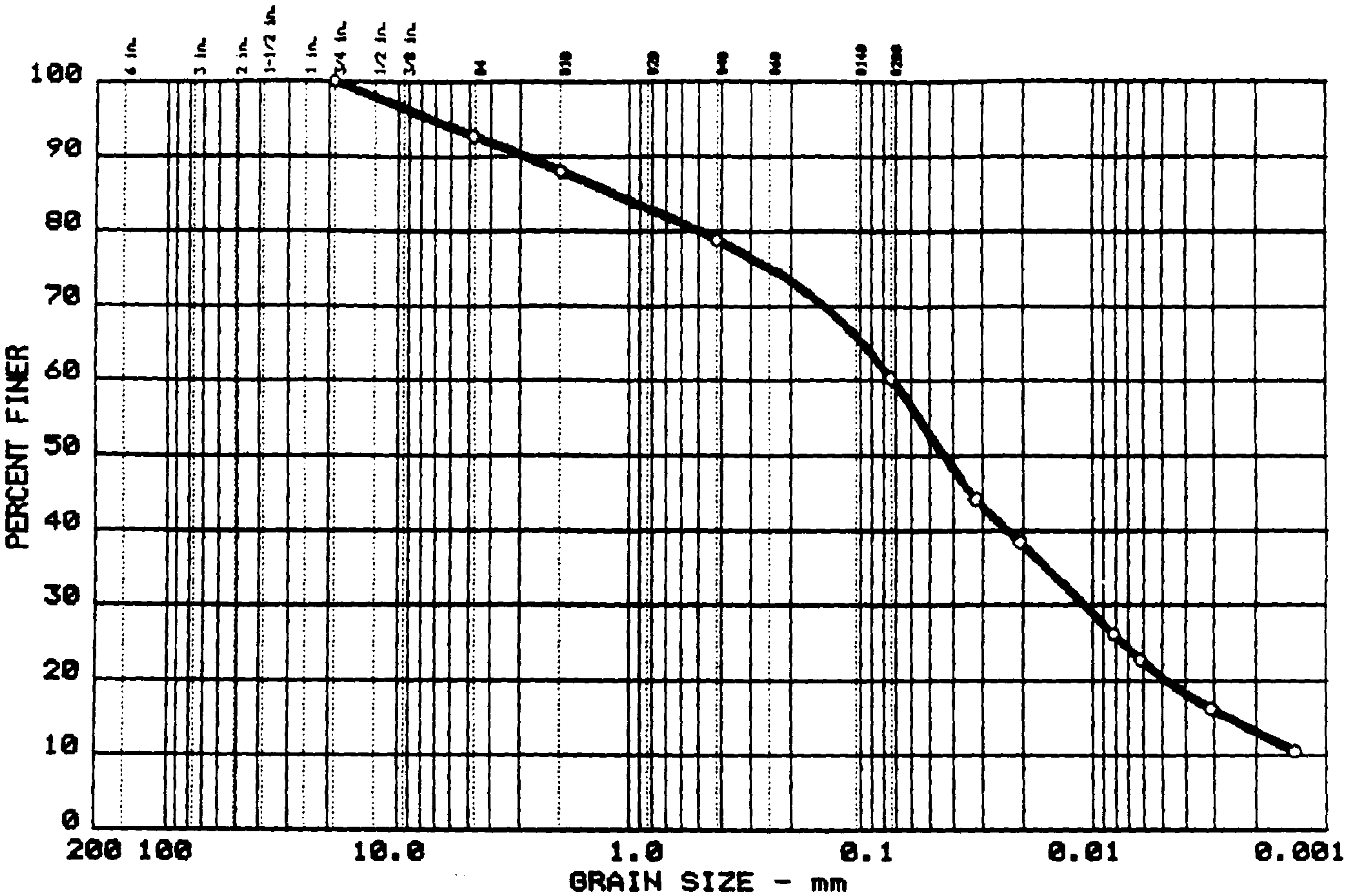
Sample : Waxed Sample

Remarks : Sample WX-2

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91036

Mason - de Verteuil
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	7.3	Coarse Sand: 4.8	40.0	20.3
			Medium Sand: 9.2		
			Fine Sand: 18.4		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	21	9	1.16		0.04	0.011	0.0026			

MATERIAL DESCRIPTION	USCS	AASHTO
○ Silty Clay	CL	A-4(2.2)

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-5, S-1B, Depth 18.5-20.5'

Date: 2/26/91

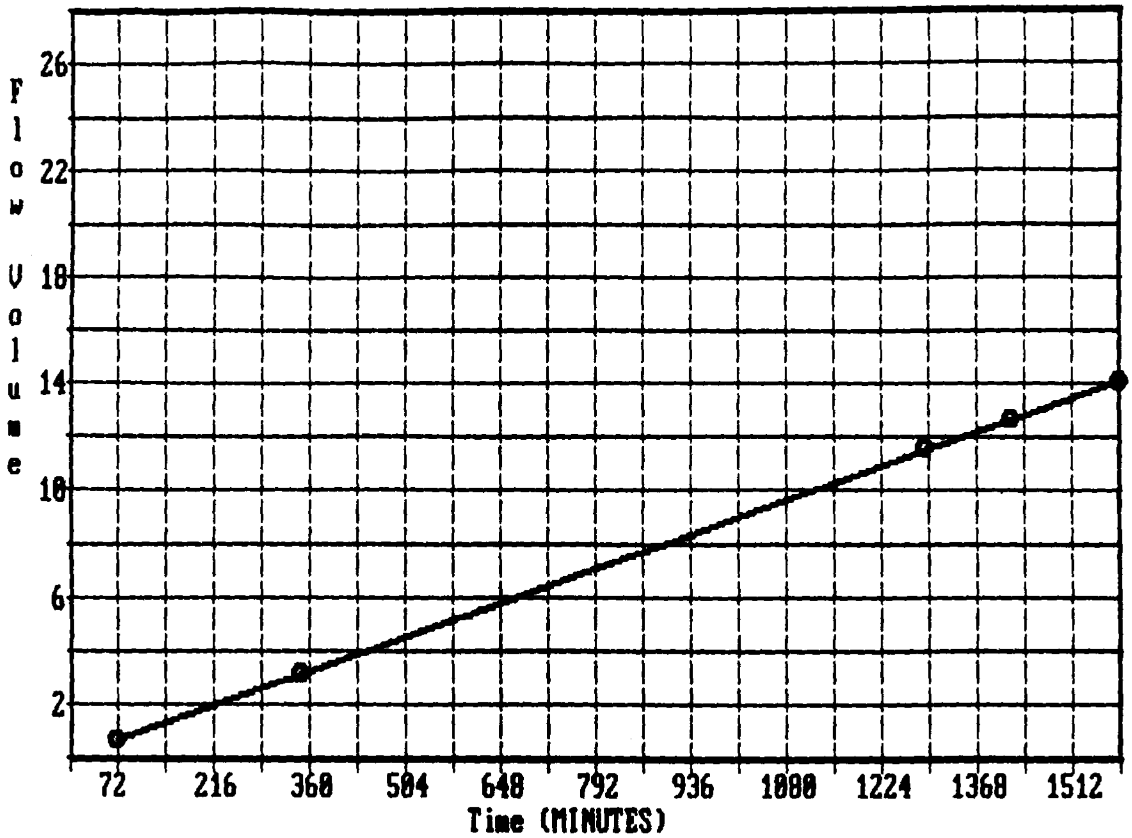
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 11.6%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
90-5	18.5-20.5'	Silty Clay		21	9	11.6

Flow (cc)	Length (cm)	Head Loss (cm)
14.1	5.019	805.00
Area (cm^2)	Time (sec.)	Dry Density (pcf)
40.848	94860	133.86

K = (Q L / H A T)

= 2.269E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	03/01/91	09:57	2.1
2		11:06	2.8
3		15:42	5.3
4	03/02/91	07:27	13.7
5		09:36	14.8
6		12:18	16.2

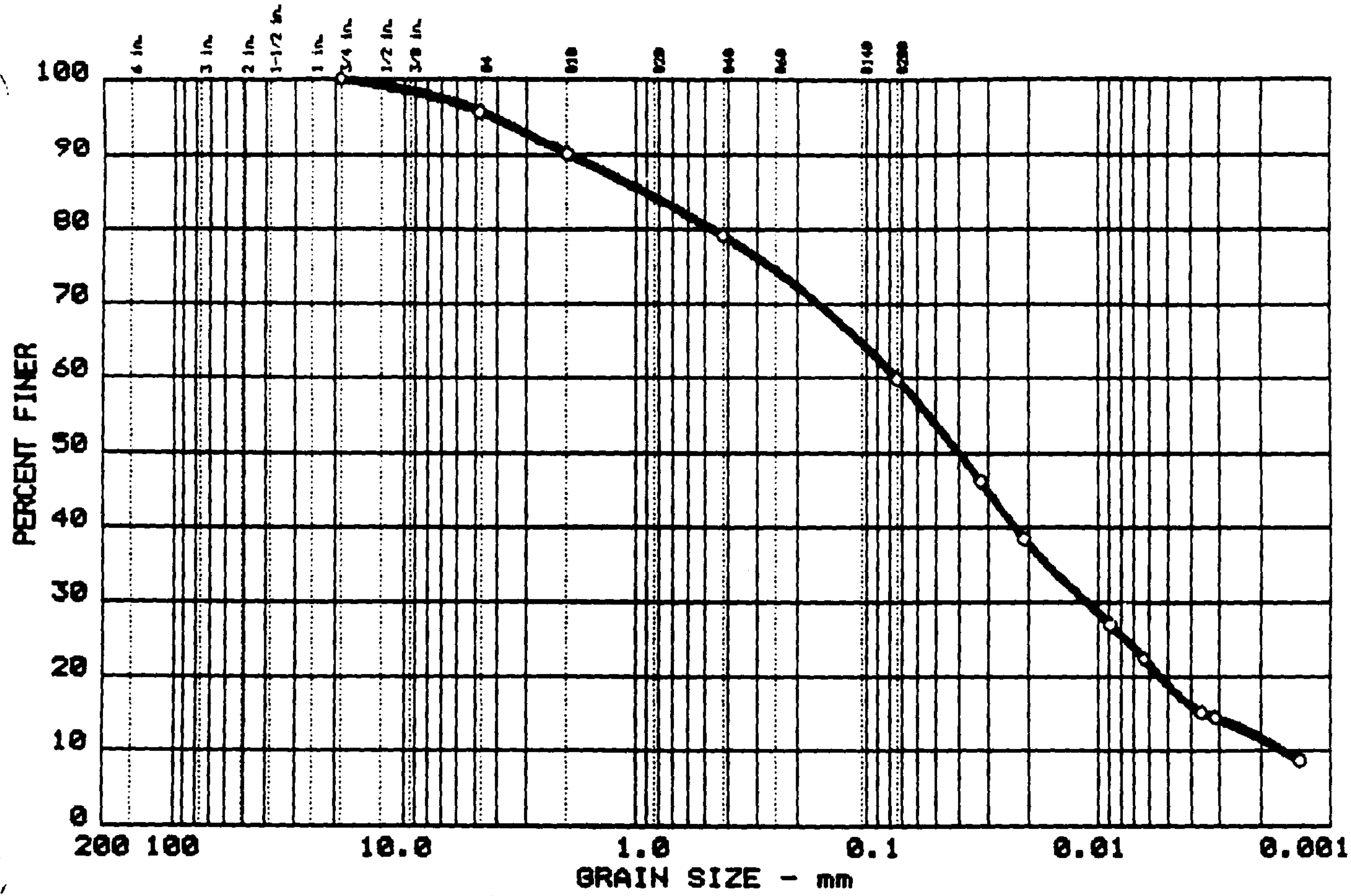
Sample : Shelby Tube

Remarks : Sample 1B

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91036

Mason - de Verteuil
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	4.3	Coarse Sand: 5.5	41.1	18.8
			Medium Sand: 11.0		
			Fine Sand: 19.3		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	23	10	0.92	0.07	0.04	0.011	0.0035	0.0016	1.04	46.2

MATERIAL DESCRIPTION	USCS	AASHTO
○ Silty Clay	CL	A-4

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-5, Sample WX-2, 79.5'-80.5'

Date: 3/29/91

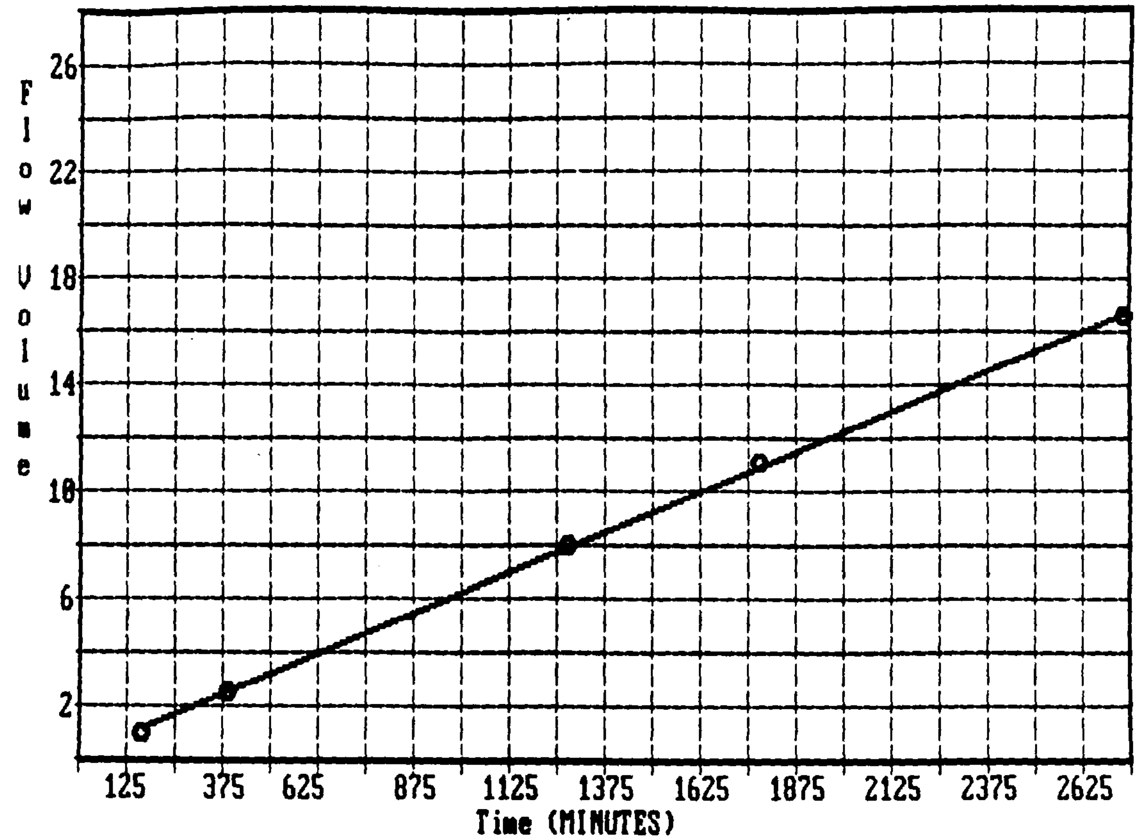
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 11.4%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
90-5	79.5-80.5'	Silty Clay		23	10	11.4

Flow (cc)	Length (cm)	Head Loss (cm)
16.6	6.114	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
38.635	164040	132.10

K = (Q L / H A T)

= 1.995E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	04/02/91	09:51	2.0
2		12:32	3.0
3		16:18	4.5
4	04/03/91	07:09	9.9
5		15:29	13.0
6	04/04/91	07:25	18.6

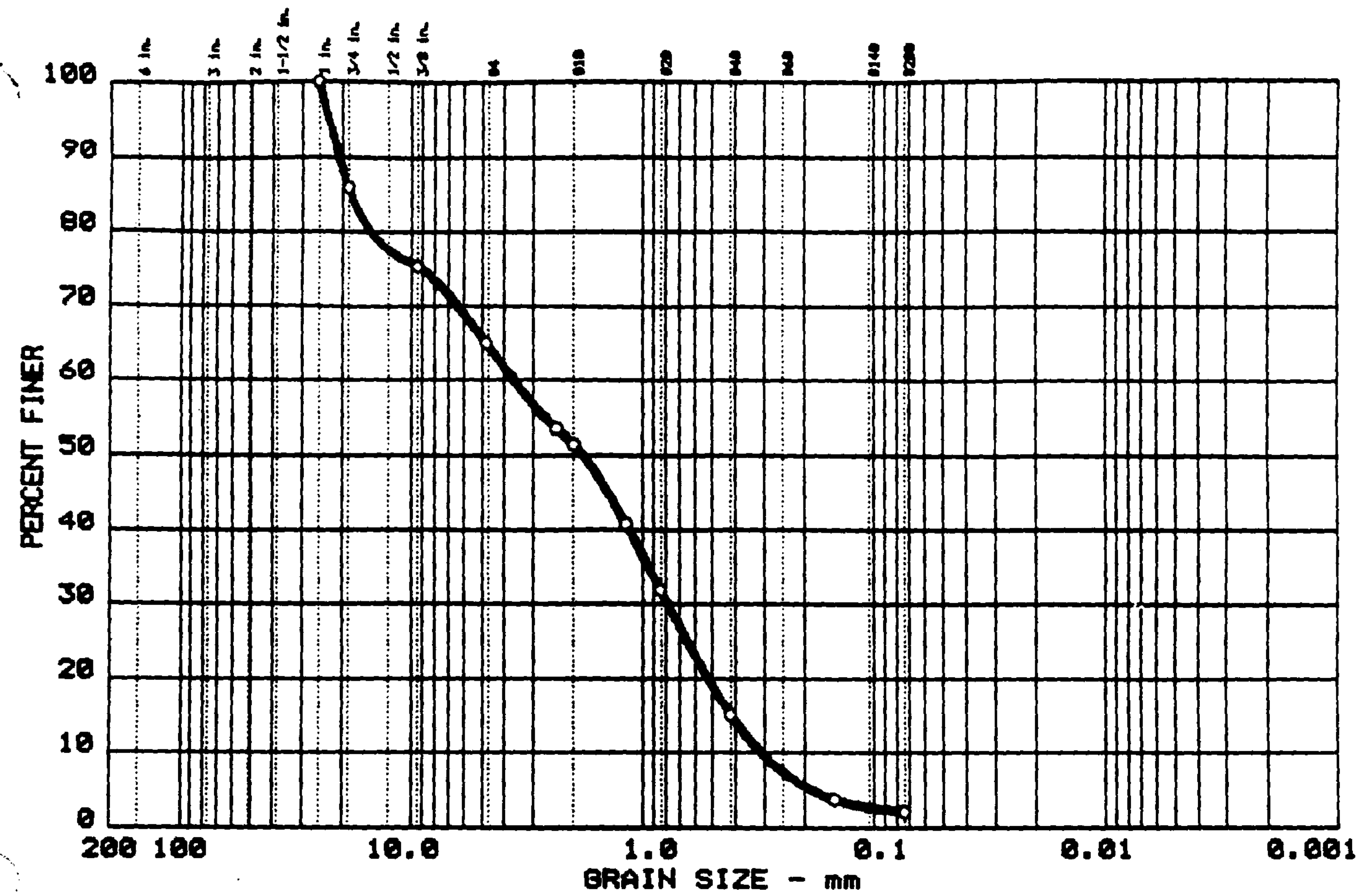
Sample : Waxed Sample

Remarks : Sample WX-2

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91036

Mason - de Verteuil
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND		% SILT	% CLAY
○	0.0	35.1	Coarse Sand	13.4	2.1	
			Medium Sand	36.4		
			Fine Sand	13.0		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			18.51	3.61	1.81	0.781	0.4145	0.3073	0.55	11.7

MATERIAL DESCRIPTION	USCS	AASHTO
○ Poorly Graded Sand with Gravel	SP	A-1-b

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-6D, Sample35, Depth 93.9-94.5'

Date: 4-1-91

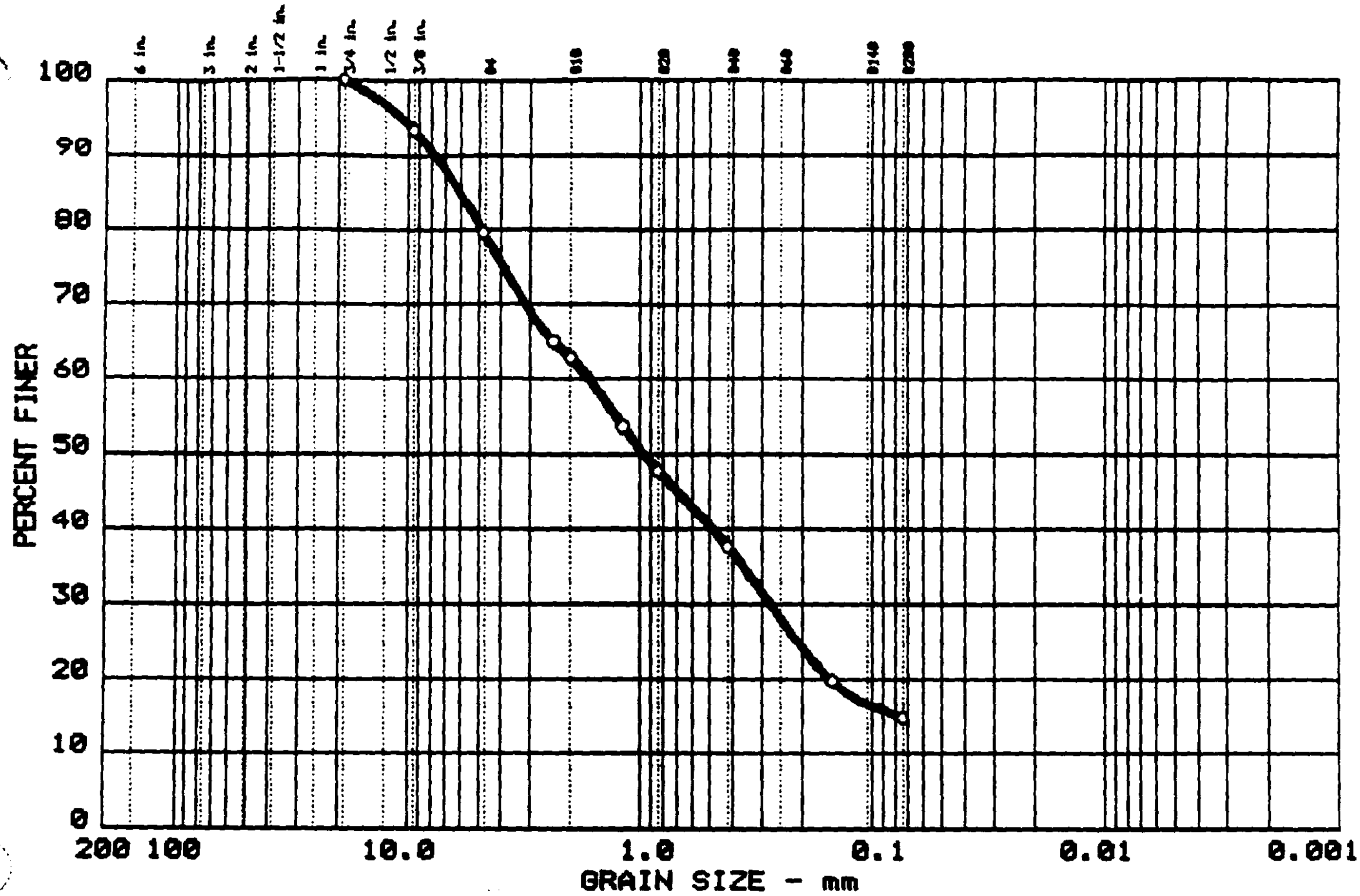
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 9.1%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	20.4	Coarse Sand 16.8	14.7	
			Medium Sand 25.2		
			Fine Sand 22.9		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	6.01	1.66	0.96	0.275	0.0774			

MATERIAL DESCRIPTION	USCS	AASHTO
○ Silty Sand with Gravel	SM	A-1-b

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-6W, Sample 3W, Depth 11-12'

Date: 4-1-91

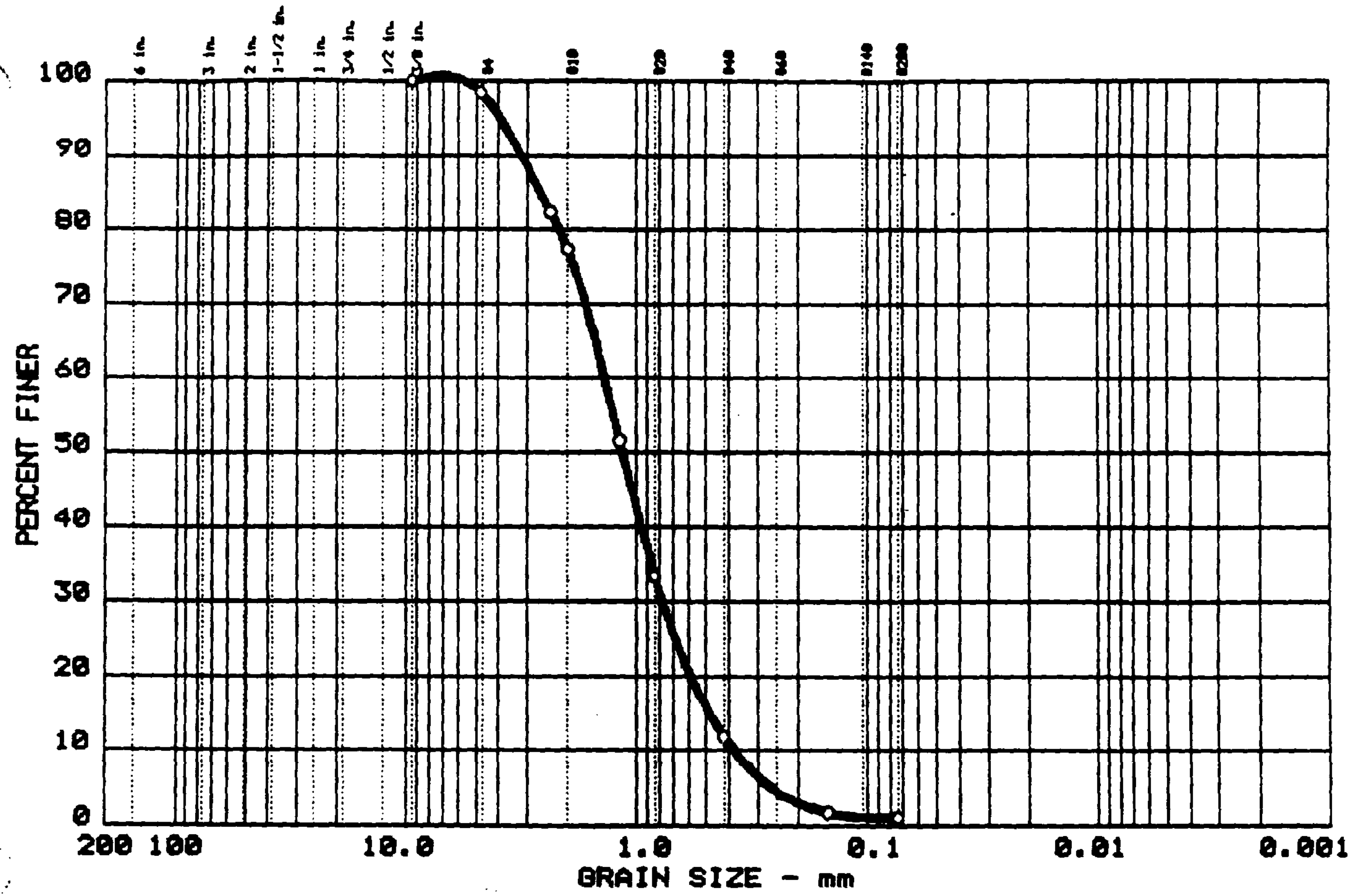
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 12.0%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	1.6	Coarse Sand 21.0	1.0	
			Medium Sand 65.6		
			Fine Sand 10.8		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			2.63	1.38	1.16	0.776	0.4842	0.3802	1.15	3.6

MATERIAL DESCRIPTION	USCS	AASHTO
○ Poorly Graded Sand	SP	A-1-b

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-6X, Sample 12, Depth 34-34.5'

Date: 4-1-91

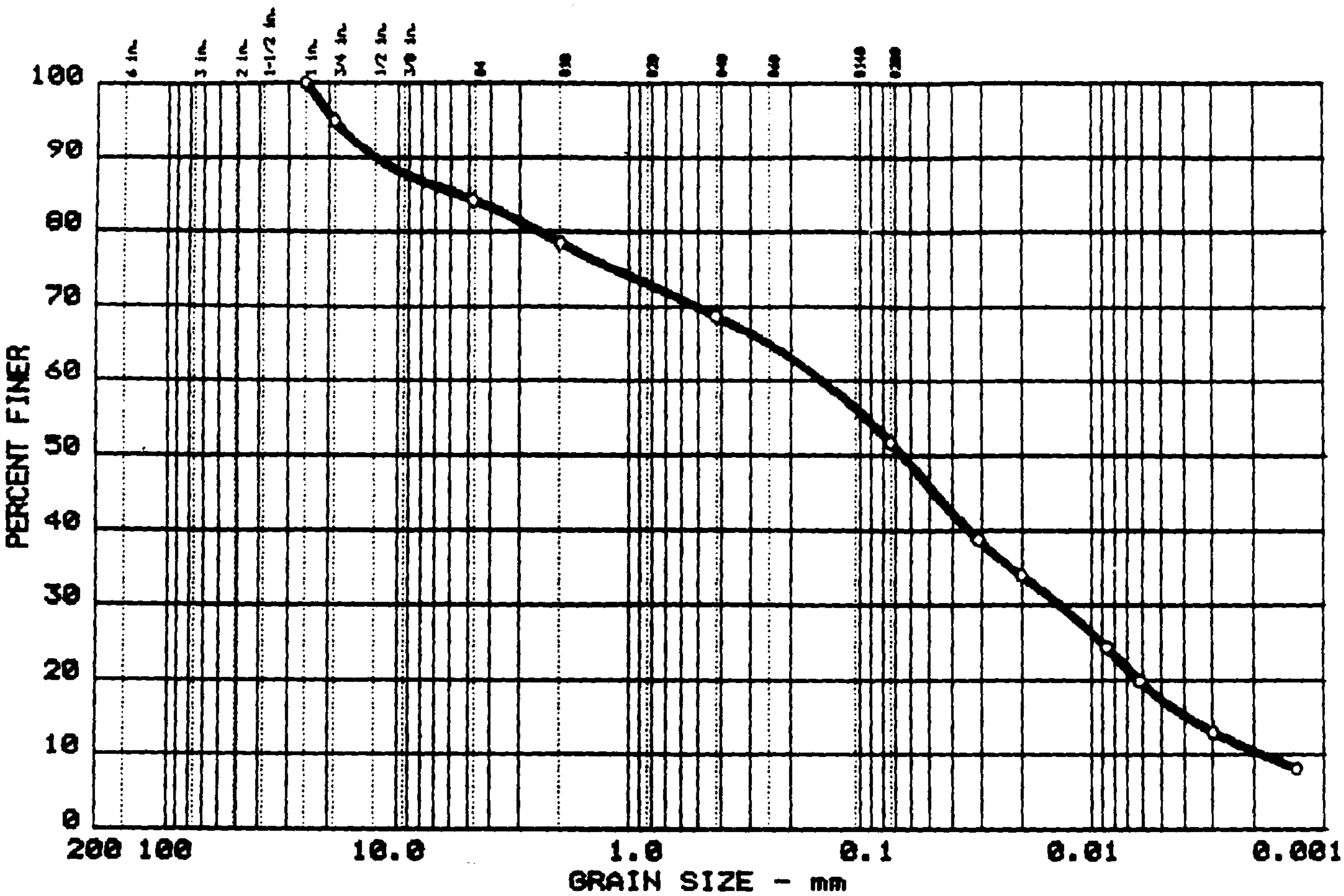
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 14.6%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	15.7	Coarse Sand: 5.8	34.4	17.3
			Medium Sand: 9.8		
			Fine Sand: 17.0		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	21	8	5.31	0.14	0.07	0.014	0.0039	0.0018	0.71	79.4

MATERIAL DESCRIPTION	USCS	AASHTO
○ Silty Clay	CL	A-4(1.0)

Project No.: 91036
Project: Clark Co. Landfill
○ Location: BORING 90-6X, S-1B, DEPTH 35.5-37.5

Date: 3/15/91

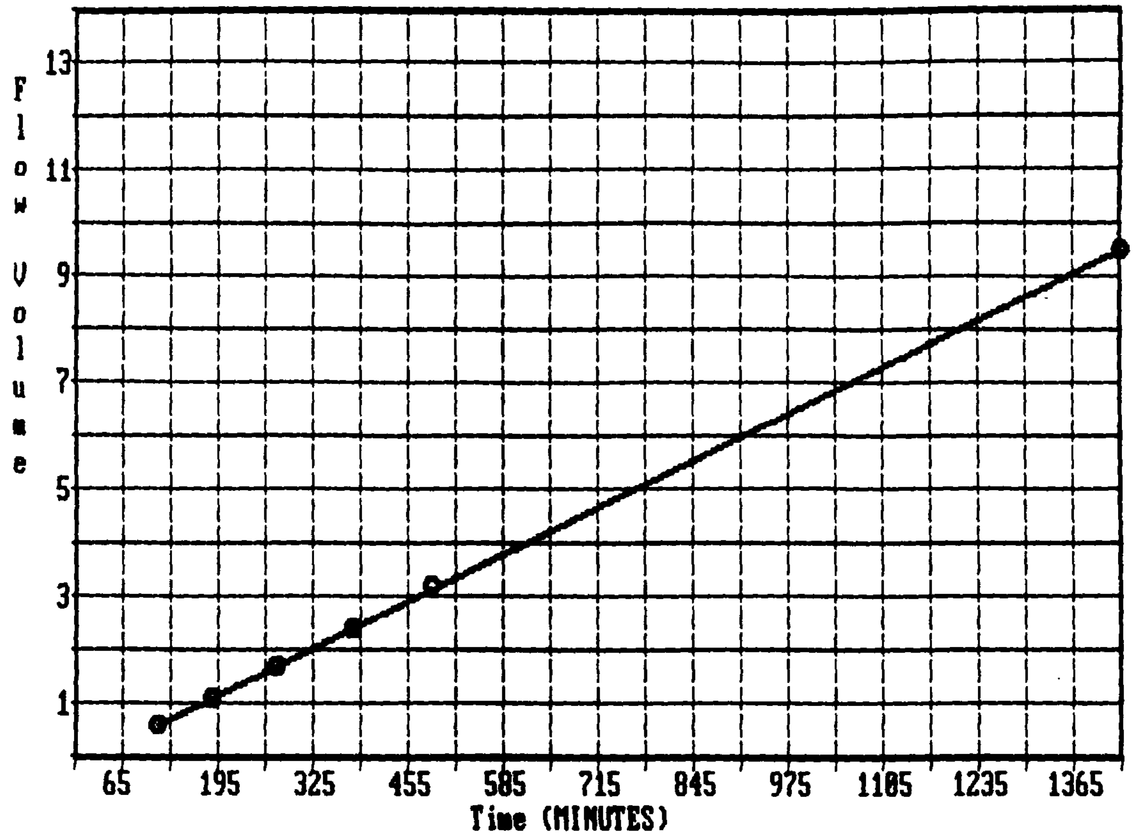
GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 10.3%

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
90-6X	35.5-37.5'	Silty Clay		21	8	10.3

Flow (cc)	Length (cm)	Head Loss (cm)
9.5	6.756	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
41.397	85740	133.60

K = (Q L / H A T)

= 2.246E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	03/18/91	08:10	1.9
2		10:10	2.5
3		11:24	3.0
4		12:53	3.6
5		14:30	4.3
6		16:25	5.1
7	03/19/91	08:07	11.4

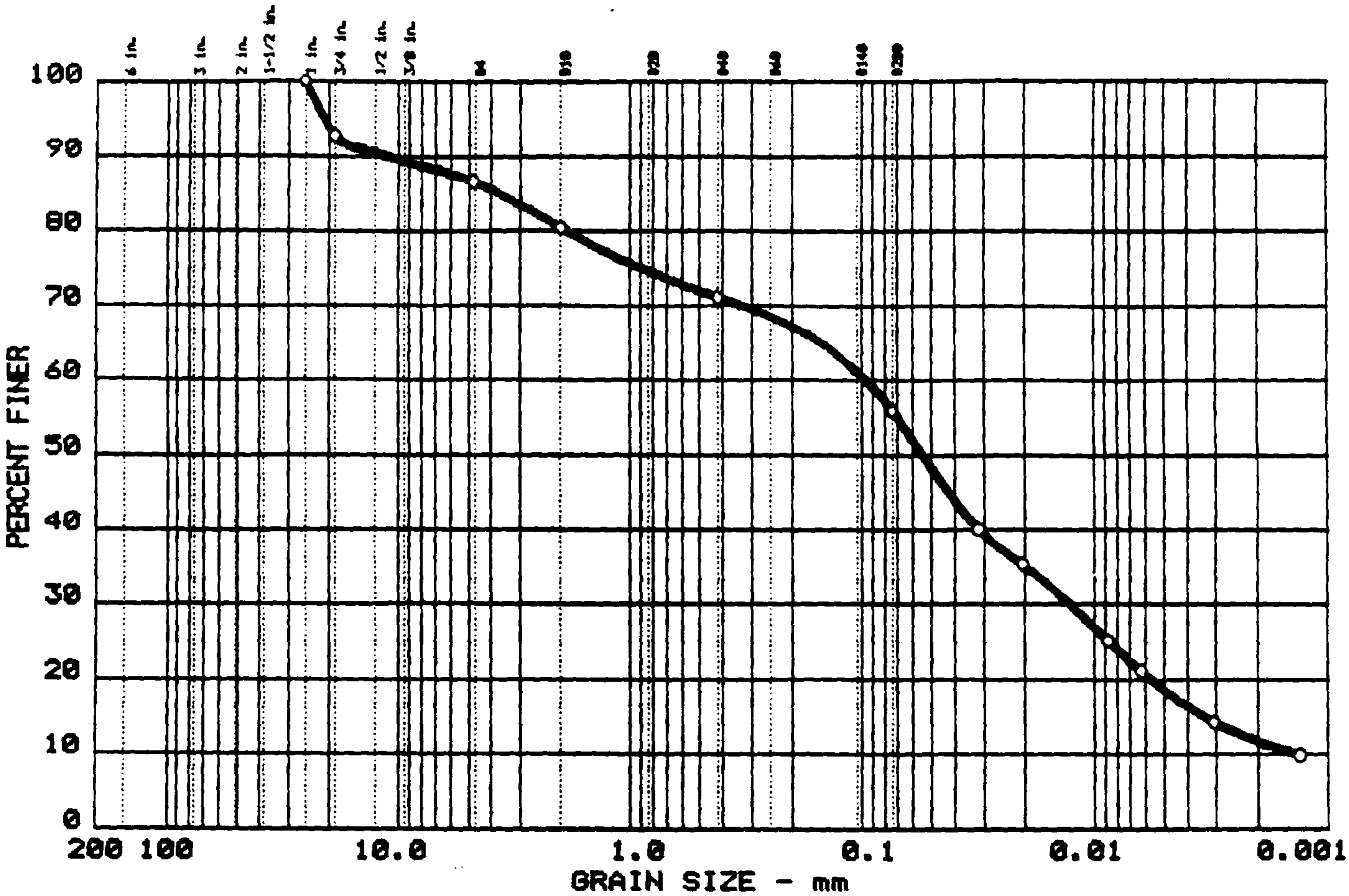
Sample : Shelby Tube

Remarks : Sample 1B

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91036

Mason - de Verteuil
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	13.3	Coarse Sand: 6.3	37.3	18.6
			Medium Sand: 9.3		
			Fine Sand: 15.2		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	21	8	3.63	0.10	0.05	0.013	0.0034	0.0013	1.27	71.6

MATERIAL DESCRIPTION	USCS	AASHTO
○ Silty Clay	CL	A-4(1.4)

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-6Y, Sample 2B, Depth 21-23'

Date: 2/26/91

Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 11.6%

GRAIN SIZE DISTRIBUTION TEST REPORT
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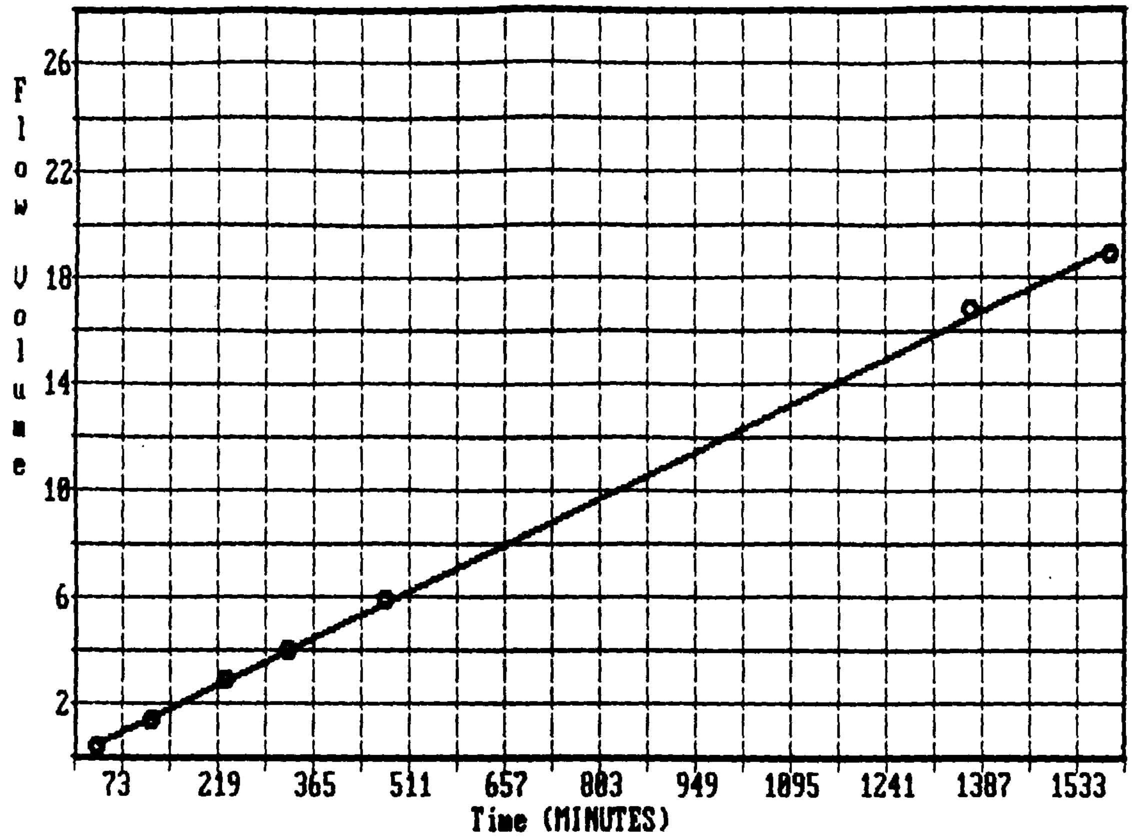
Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
90-6Y	21-23'	Silty Clay		21	8	11.6

Flow (cc)	Length (cm)	Head Loss (cm)
18.9	5.174	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
41.716	95100	131.71

K = (Q L / H A T)

= 3.062E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	02/26/91	08:19	0.2
2		08:54	0.6
3		10:16	1.6
4		12:11	3.1
5		13:45	4.2
6		16:14	6.1
7	02/27/91	07:10	17.0
8		10:44	19.1

Sample : Shelby Tube

Remarks : Sample 2B

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91036

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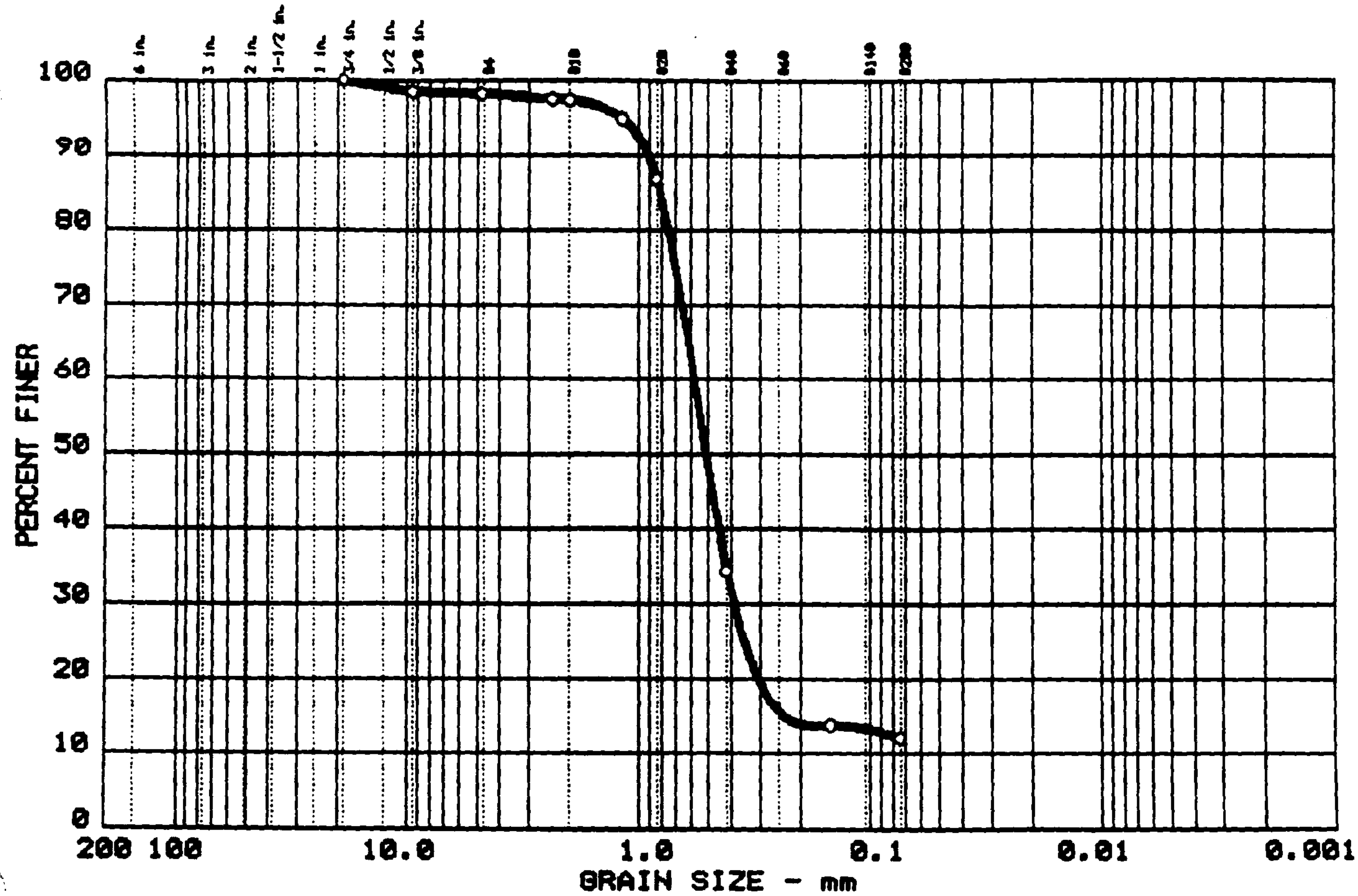
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
o	0.0	1.8	Coarse Sand 0.8	12.1	
			Medium Sand 63.0		
			Fine Sand 22.3		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
o		NP	0.81	0.58	0.51	0.390	0.2377			

MATERIAL DESCRIPTION	USCS	AASHTO
o Silty Sand	SM	A-1-b

Project No.: 91036
Project: Clark Co. Landfill
o Location: Boring 90-7D, Sample 29, Depth 90-90.5

Date: 4-1-91

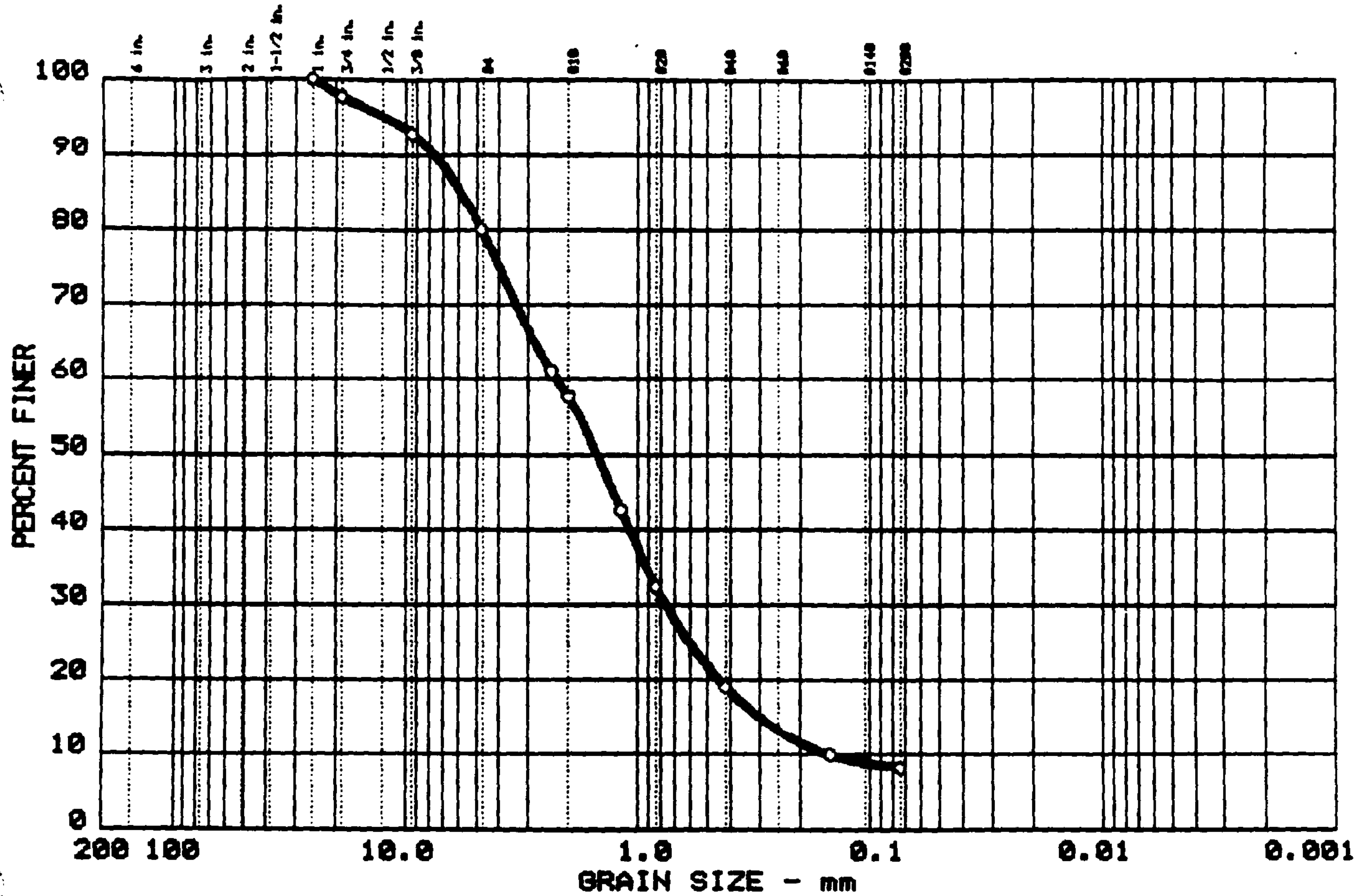
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 17.2%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	19.9	Coarse Sand 22.4	8.2	
			Medium Sand 38.7		
			Fine Sand 10.8		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	5.81	2.24	1.49	0.758	0.3016	0.1495	1.72	15.0

MATERIAL DESCRIPTION	USCS	AASHTO
○ Well Graded Sand with Gravel	SW-SM	A-1-b

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-72, Sample 22, Depth8.0-9.6

Date: 4-1-91

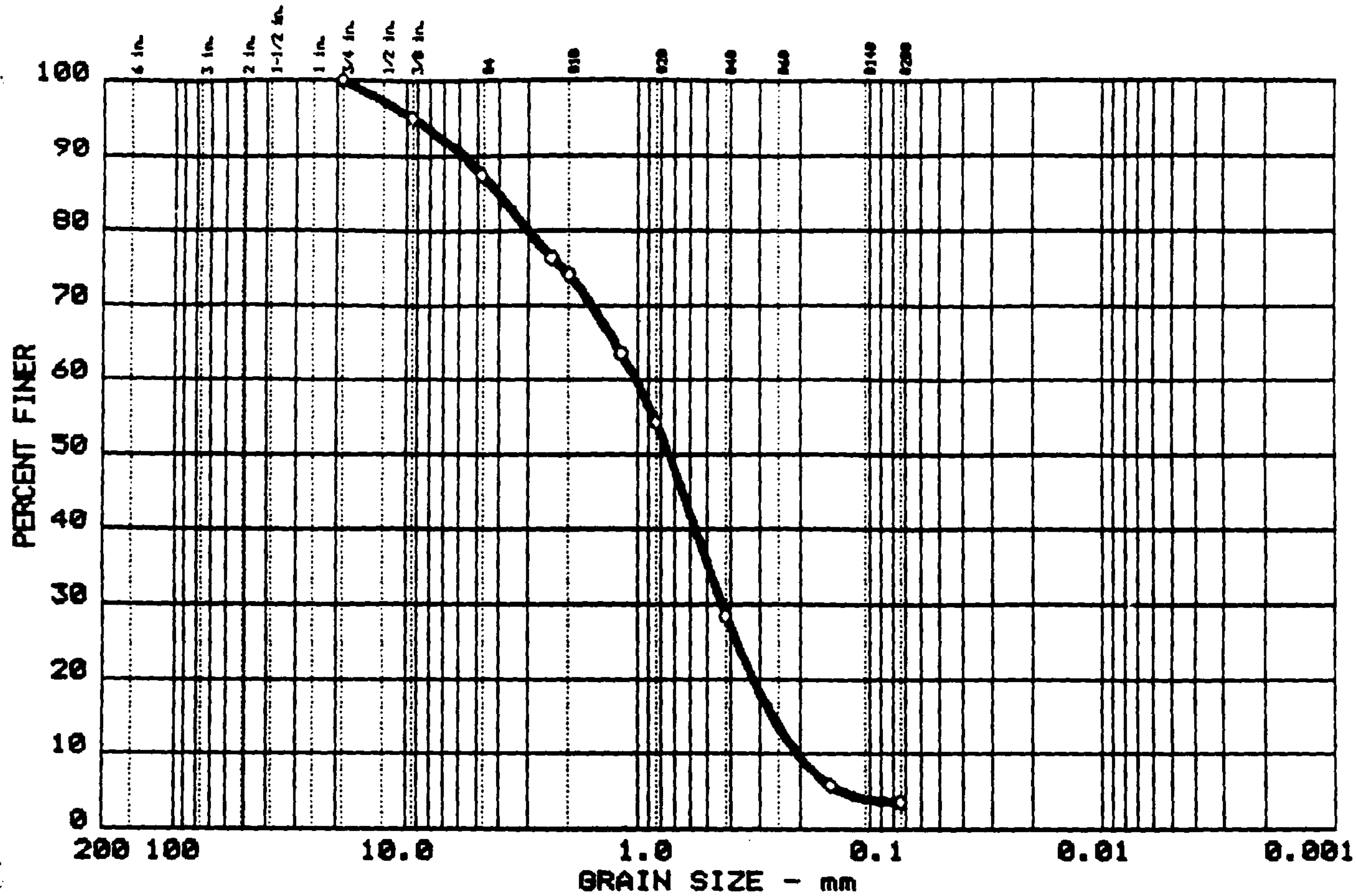
GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 11.6%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	12.5	Coarse Sand 13.5	3.6	
			Medium Sand 45.5		
			Fine Sand 24.9		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			4.03	1.02	0.74	0.438	0.2636	0.2046	0.91	5.0

MATERIAL DESCRIPTION	USCS	AASHTO
○ Poorly Graded Sand	SP	A-1-b

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-8D, Sample 9, Depth 27-27.5'

Date: 4-1-91

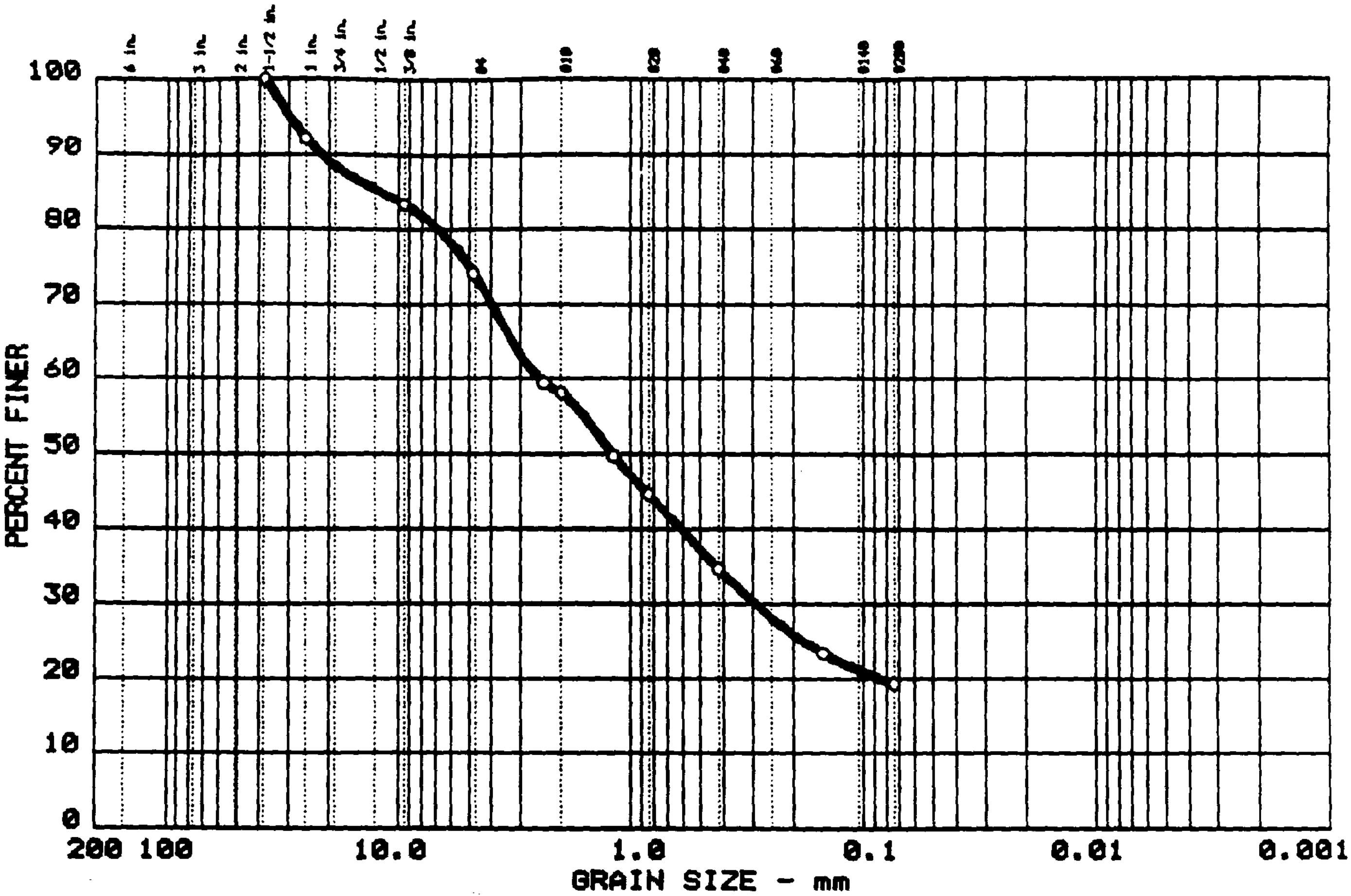
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 15.0%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	25.9	Coarse Sand 15.9	19.3	
			Medium Sand 23.4		
			Fine Sand 15.5		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	11.89	2.48	1.20	0.288				

MATERIAL DESCRIPTION	USCS	AASHTO
○ Silty Sand with Gravel	SM	A-1-b

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-8D, Sample 24, Depth 79-79.8

Date: 4-1-91

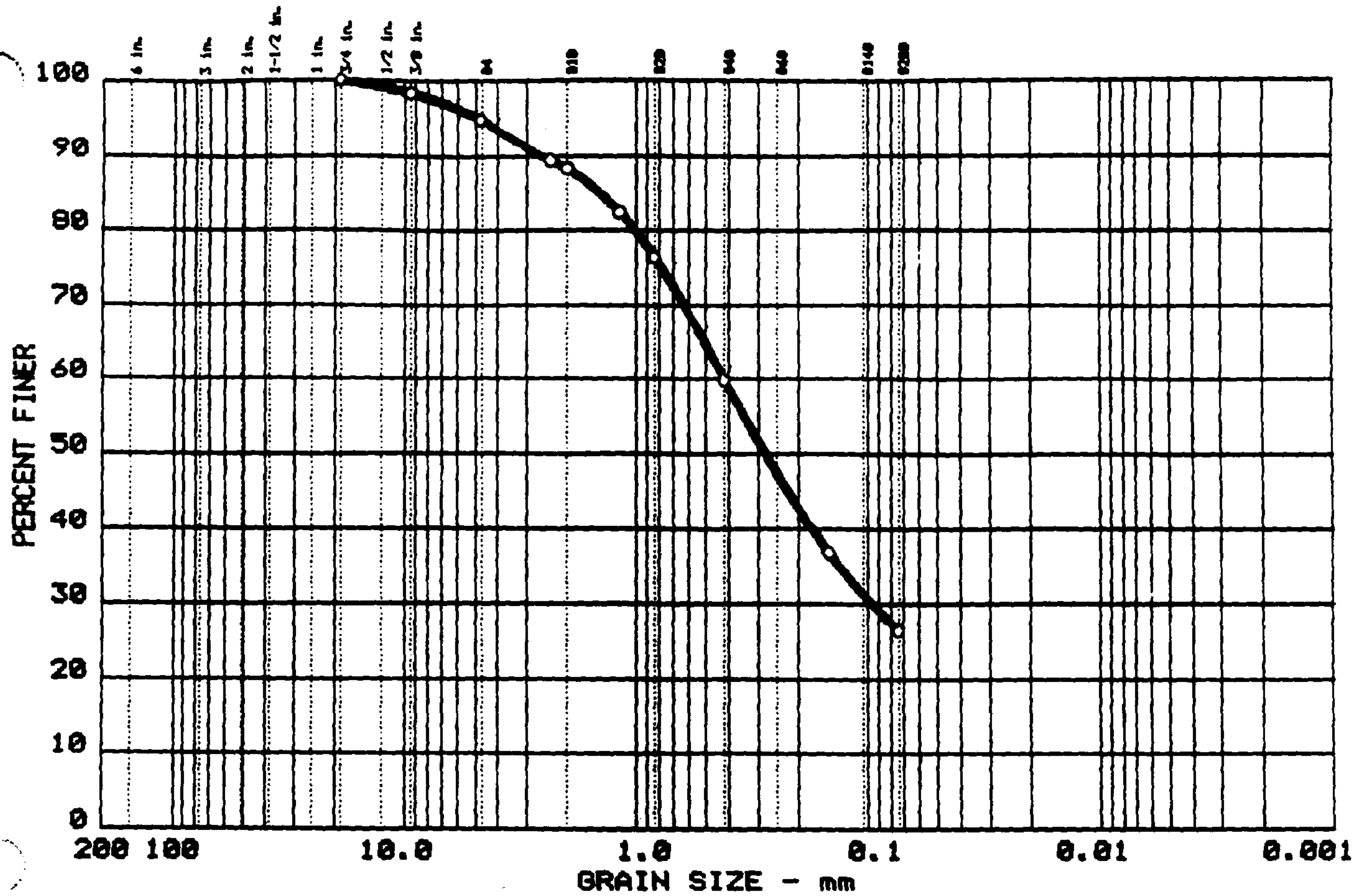
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 7.6%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	5.1	Coarse Sand 6.6	26.6	
			Medium Sand 28.4		
			Fine Sand 33.3		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	1.43	0.42	0.28	0.095				

MATERIAL DESCRIPTION	USCS	AASHTO
○ Silty Sand	SM	A-2-4

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-9D, Sample 16, Depth 62-63'

Date: 4-2-91

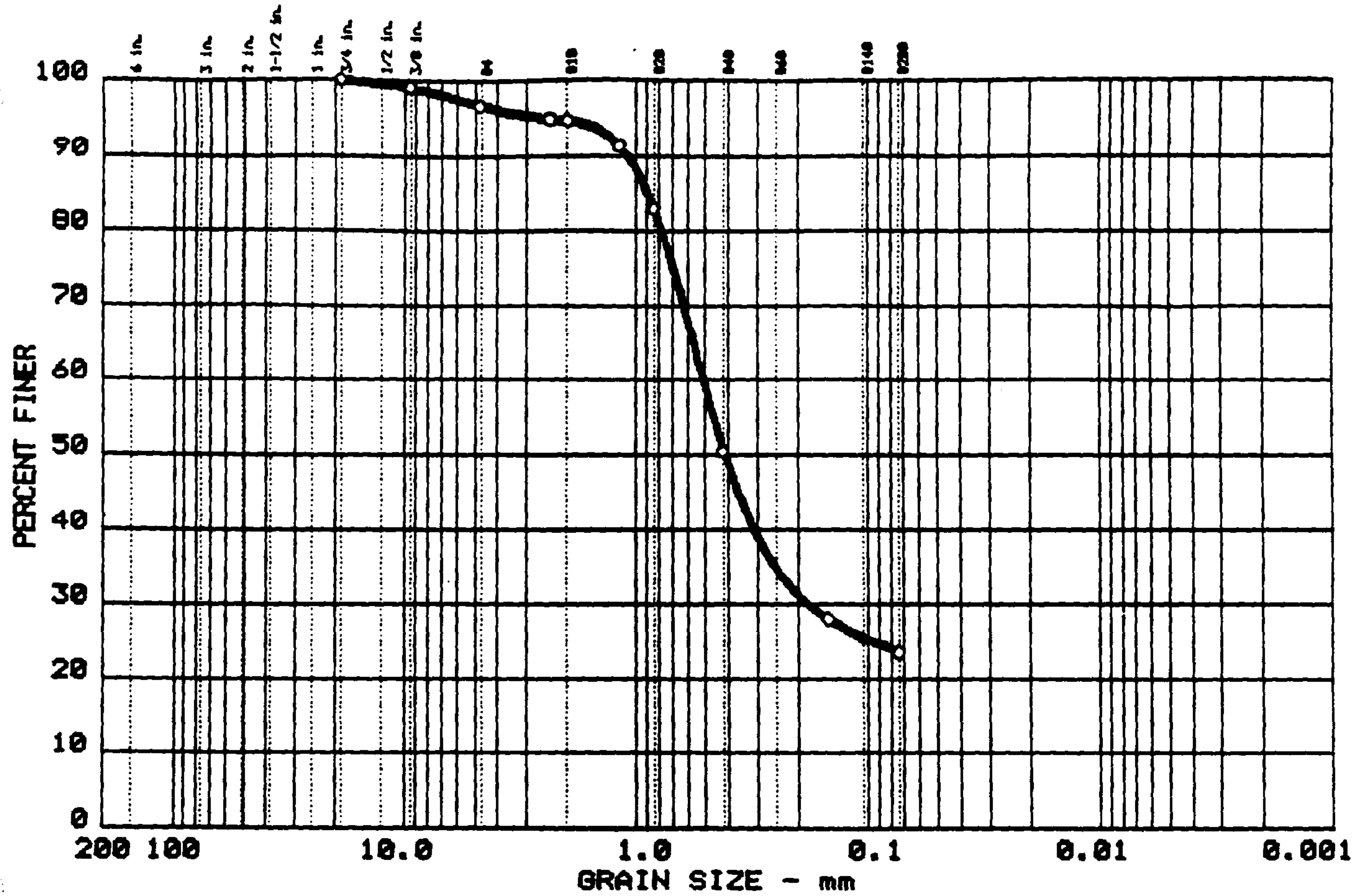
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 15.1%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	3.3	Coarse Sand 2.0	23.5	
			Medium Sand 44.2		
			Fine Sand 27.0		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	0.89	0.51	0.42	0.181				

MATERIAL DESCRIPTION	USCS	AASHTO
○ Silty Sand	SM	A-1-b

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-9D, Sample 28, Depth93.5-95

Date: 4-1-91

GRAIN SIZE DISTRIBUTION TEST REPORT

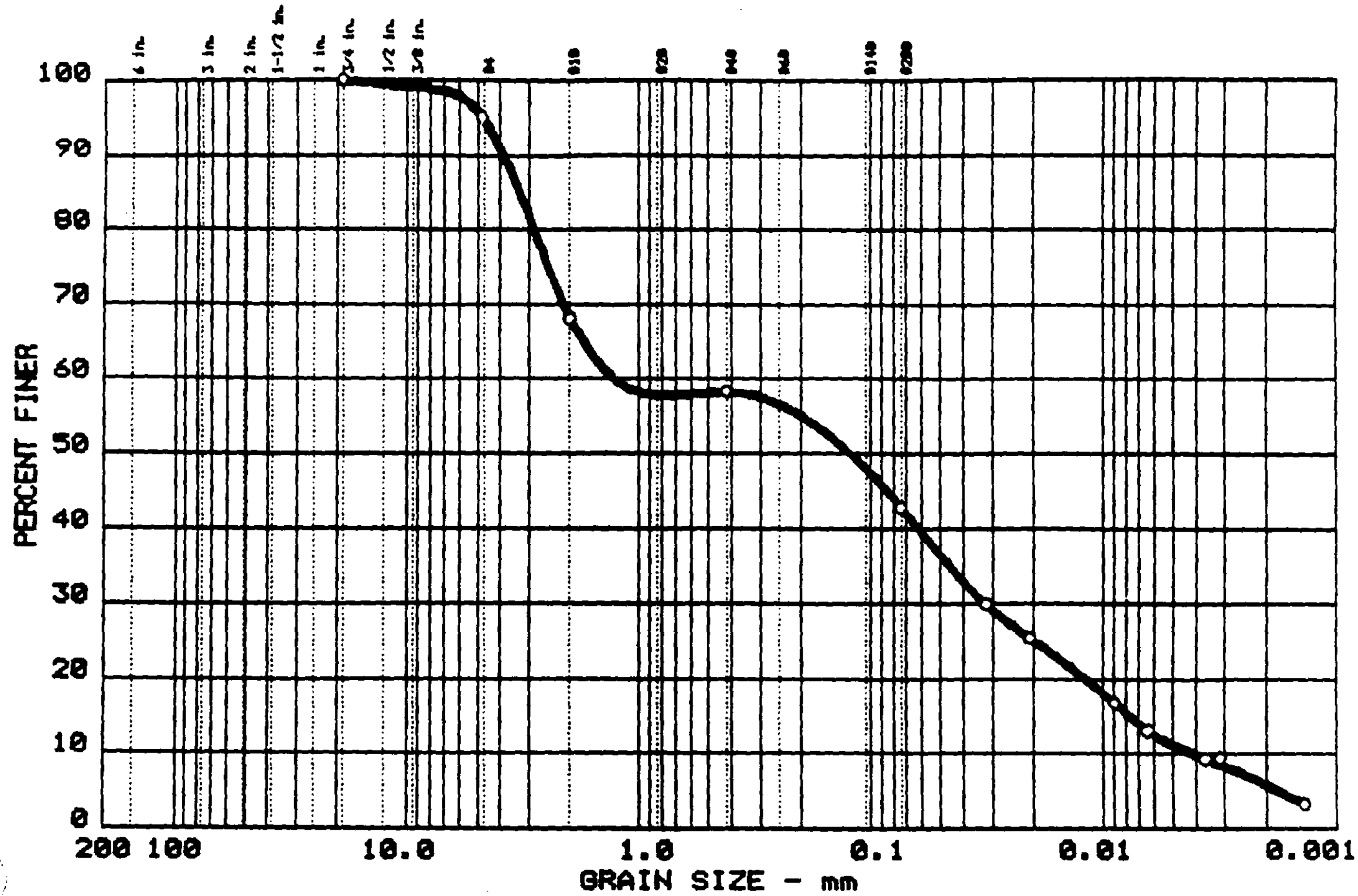
MASON - de VERTEUIL GEO. SERVICES

Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 17.0%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND		% SILT	% CLAY
○	0.0	4.8	Coarse Sand:	27.1	31.7	11.2
			Medium Sand:	9.8		
			Fine Sand:	15.4		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	19	7	3.31	1.27	0.12	0.032	0.0076	0.0040	0.20	316.2

MATERIAL DESCRIPTION	USCS	AASHTO
○ Silty, clayey sand	SC-SM	A-4

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 91-9Y, Sample WX-2,53.5'-54.5'

Date: 3/29/91

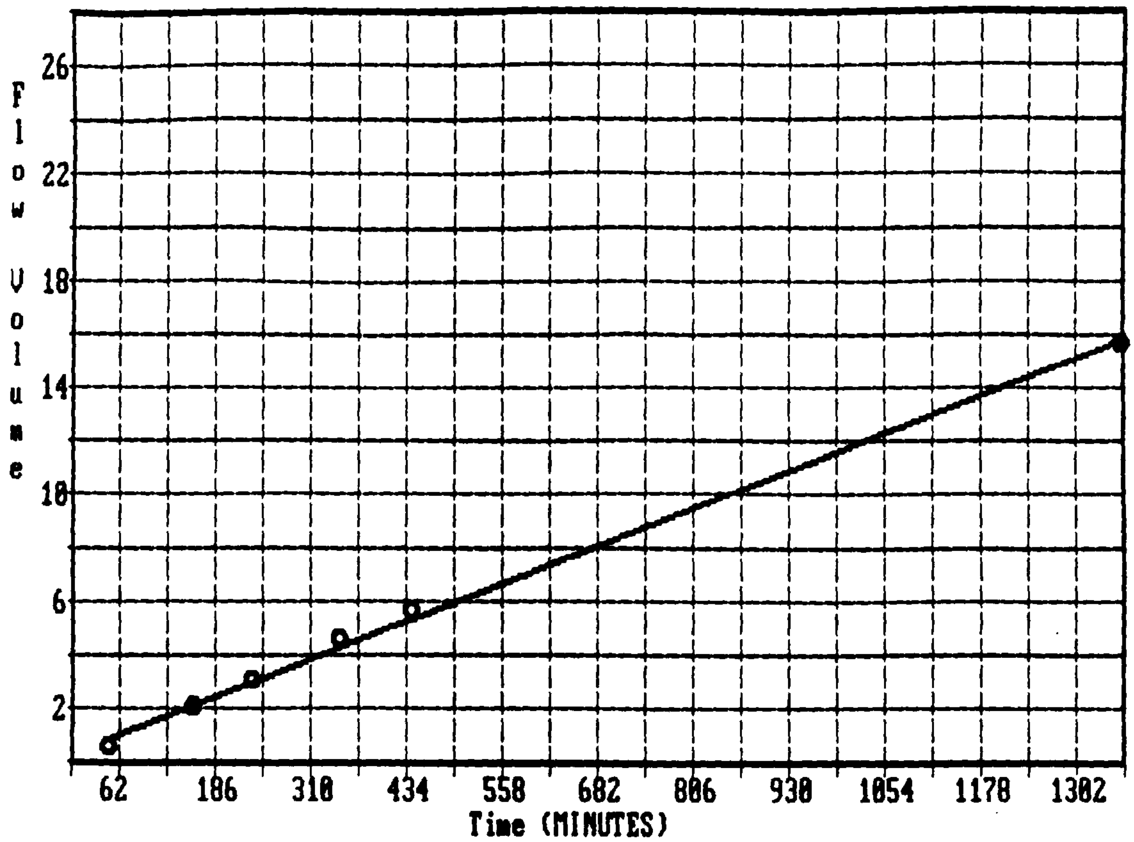
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 7.8%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
91-9Y	53.5-54.5'	Clayey Sand		19	7	7.8

Flow (cc)	Length (cm)	Head Loss (cm)
15.7	6.299	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
39.677	81600	139.09

K = (Q L / H A T)

= 3.795E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	03/28/91	08:28	0.5
2		09:16	1.1
3		11:05	2.6
4		12:22	3.6
5		14:16	5.1
6		15:49	6.2
7	03/29/91	07:08	16.2

Sample : Waxed Sample

Remarks : Sample WX-2

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91036

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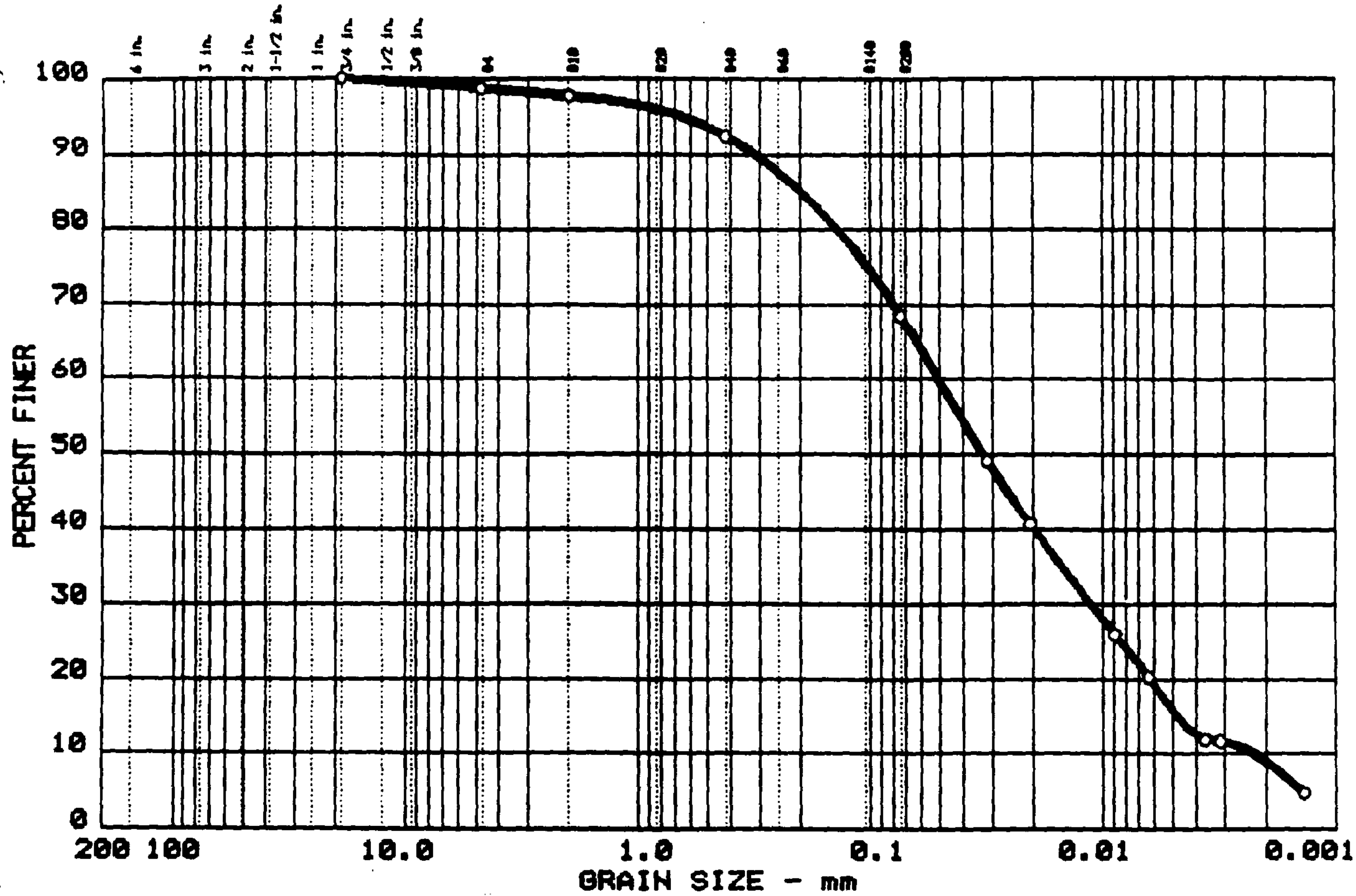
GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	1.2	Coarse Sand: 1.0	52.8	15.6
			Medium Sand: 5.3		
			Fine Sand: 24.1		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	NP	NP	0.19		0.03	0.011	0.0048	0.0022	1.12	22.9

MATERIAL DESCRIPTION	USCS	AASHTO
○ Sandy silt	ML	A-4

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 91-9Y, Sample WX-3,66'-67'

Date: 3/29/91

GRAIN SIZE DISTRIBUTION TEST REPORT

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Remarks:

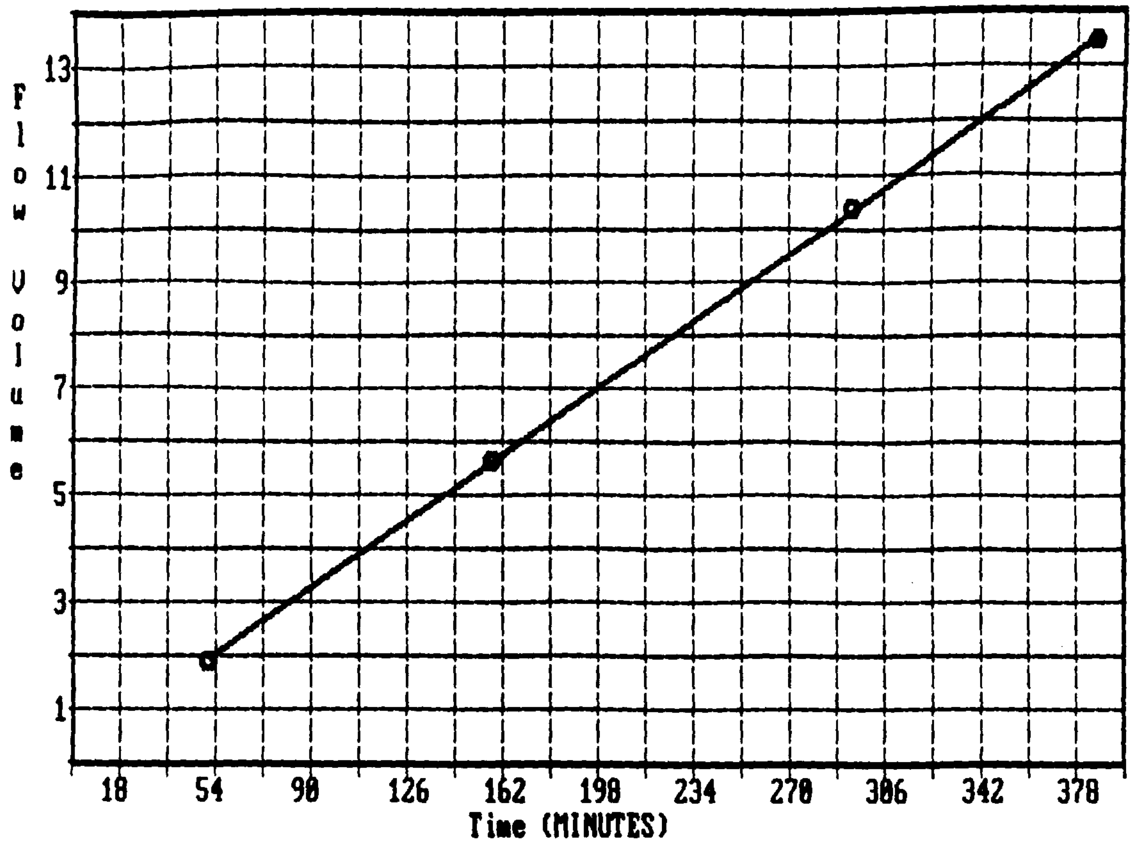
Client:

Eagon & Associates, Inc.

Moisture Content: 13.7%

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
91-9Y	66-67'	Sandy Silt				13.7

Flow (cc)	Length (cm)	Head Loss (cm)
13.5	6.149	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
39.990	23100	124.52

K = (Q L / H A T)

= 1.112E-07 cm / sec

NUM.	DATE	TIME	VOLUME
1	04/02/91	09:53	0.4
2		10:44	2.3
3		12:31	6.1
4		14:47	10.8
5		16:10	13.9

Sample : Waxed Sample

Remarks : Sample WX-3

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91036

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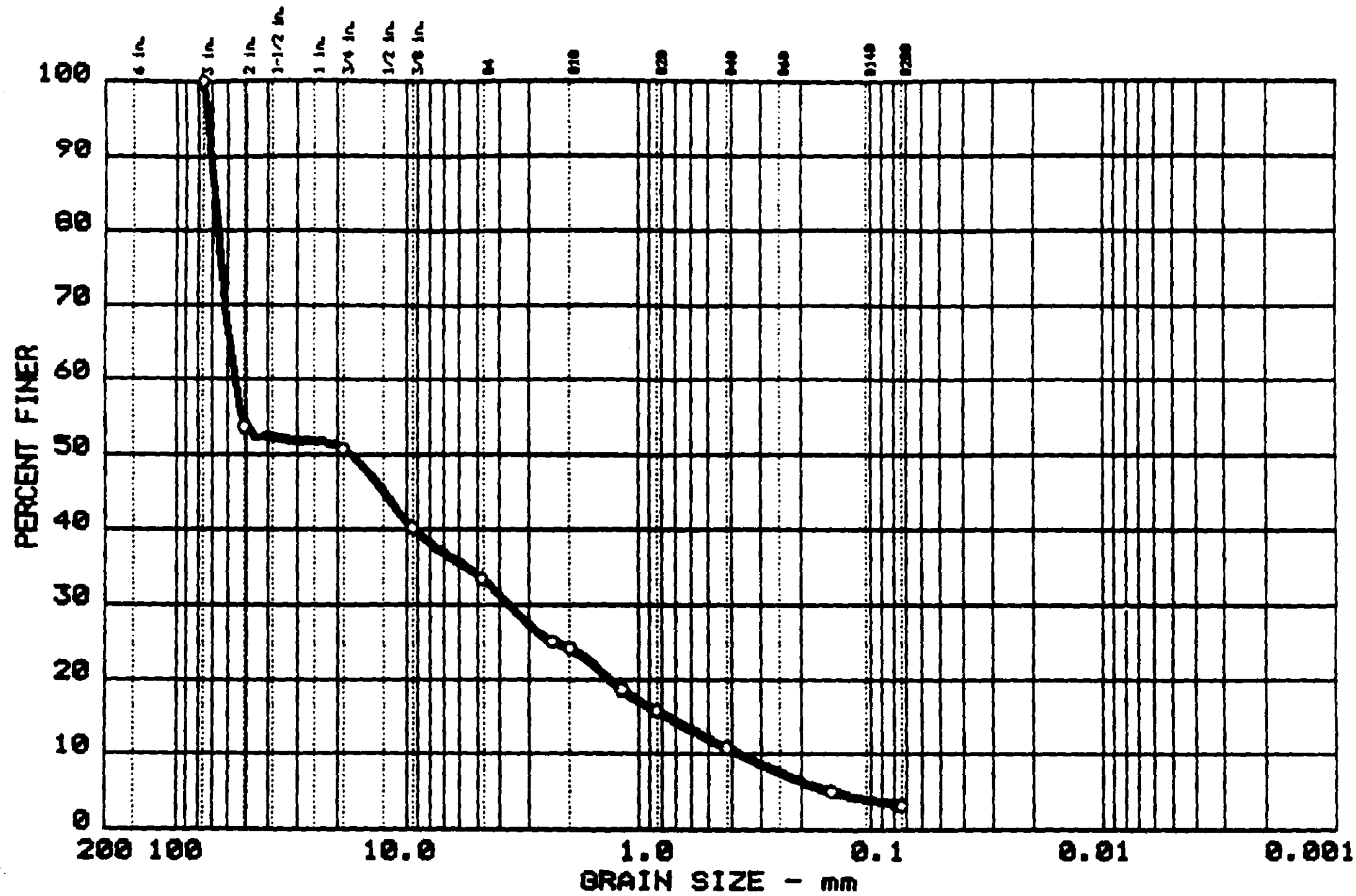
GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND		% SILT	% CLAY
o	0.0	66.5	Coarse Sand	9.4	3.1	
			Medium Sand	13.3		
			Fine Sand	7.7		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
o			68.94	56.04	17.52	3.618	0.7647	0.3703	0.63	151.4

MATERIAL DESCRIPTION	USCS	AASHTO
o Well Graded Gravel with Sand	GP	A-1-a

Project No.: 91036
Project: Clark Co. Landfill
o Location: Boring 90-10D, Sample29, Depth94.5-95.1'

Date: 4-1-91

GRAIN SIZE DISTRIBUTION TEST REPORT

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Remarks:

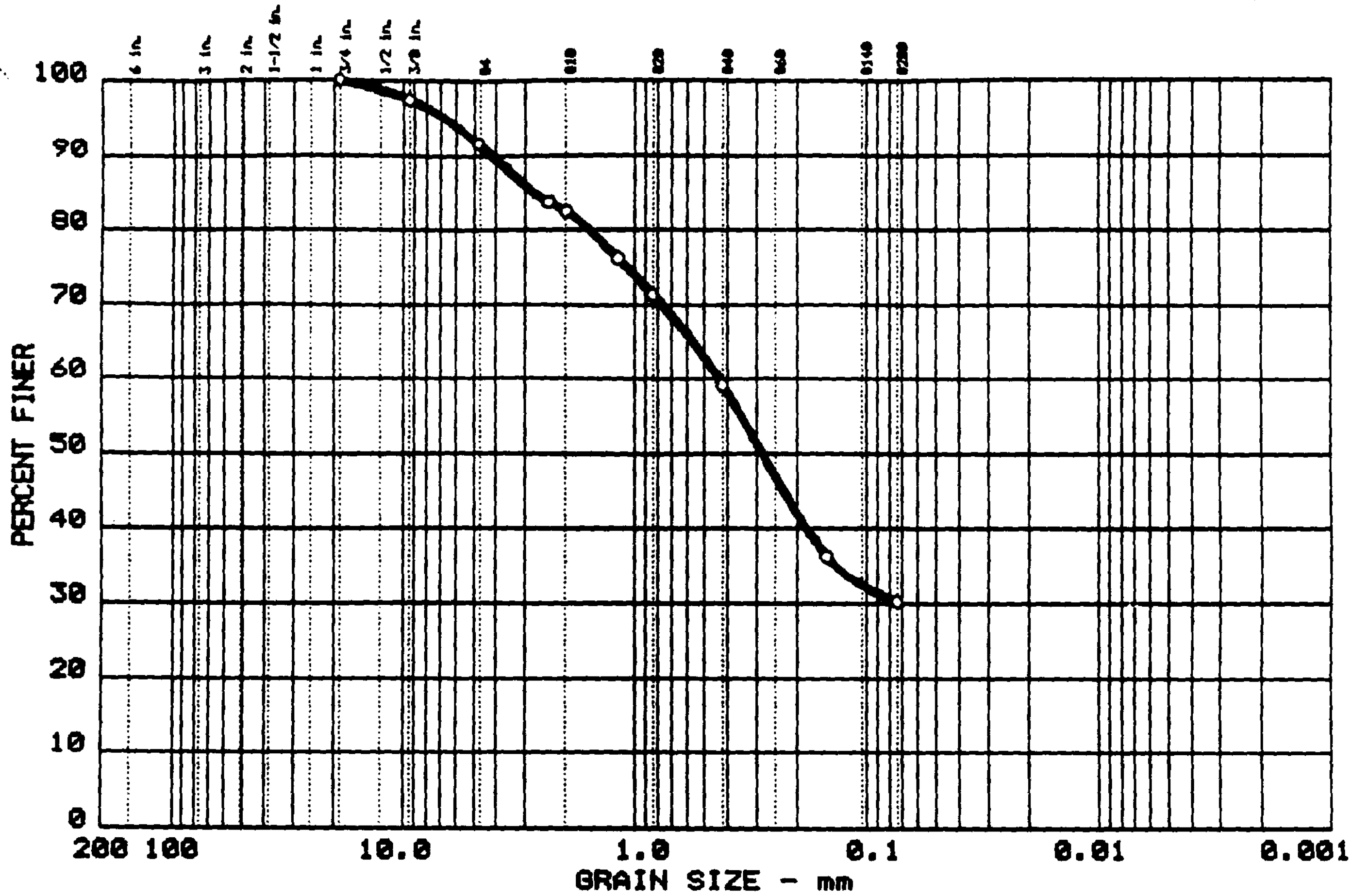
Client:

Eagon & Associates, Inc.

Moisture Content: 1.8%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	8.3	Coarse Sand 9.2	30.3	
			Medium Sand 23.3		
			Fine Sand 28.9		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	2.72	0.44	0.28					

MATERIAL DESCRIPTION	USCS	AASHTO
○ Silty Sand	SM	A-2-4

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring90-10D,Sample3,Depth119.0-120.0

Date: 4-1-91

Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 13.2%

GRAIN SIZE DISTRIBUTION TEST REPORT
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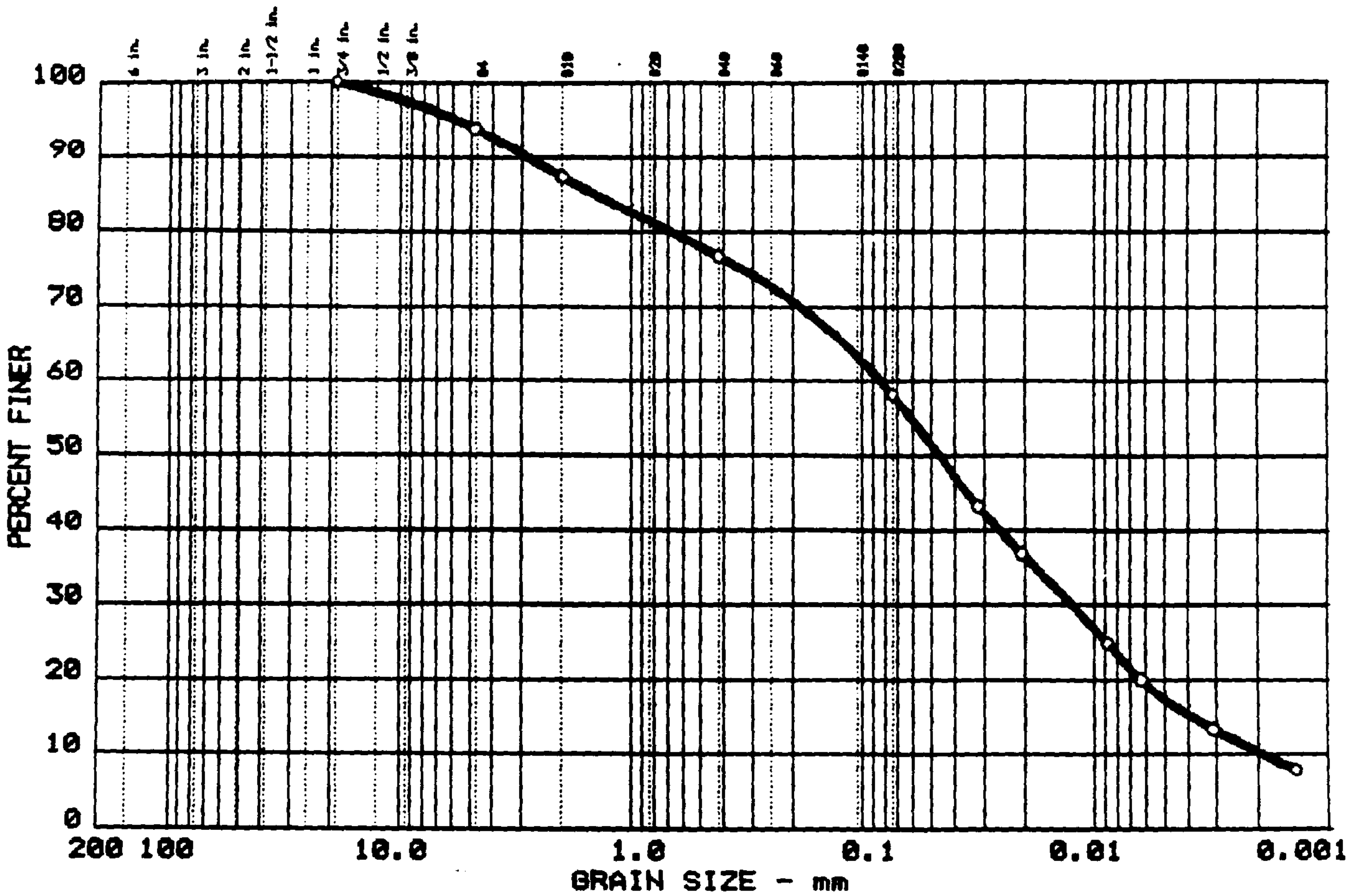
Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	6.2	Coarse Sand: 6.4	40.9	17.3
			Medium Sand: 10.6		
			Fine Sand: 18.6		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	20	7	1.41	0.08	0.05	0.012	0.0038	0.0019	1.00	43.7

MATERIAL DESCRIPTION	USCS	AASHTO
○ Clayey Silt	CL-ML	A-4(1.0)

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-10X, Sample WX-1, 24.0-25.0'

Date: 3/7/91

Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 12.3%

GRAIN SIZE DISTRIBUTION TEST REPORT
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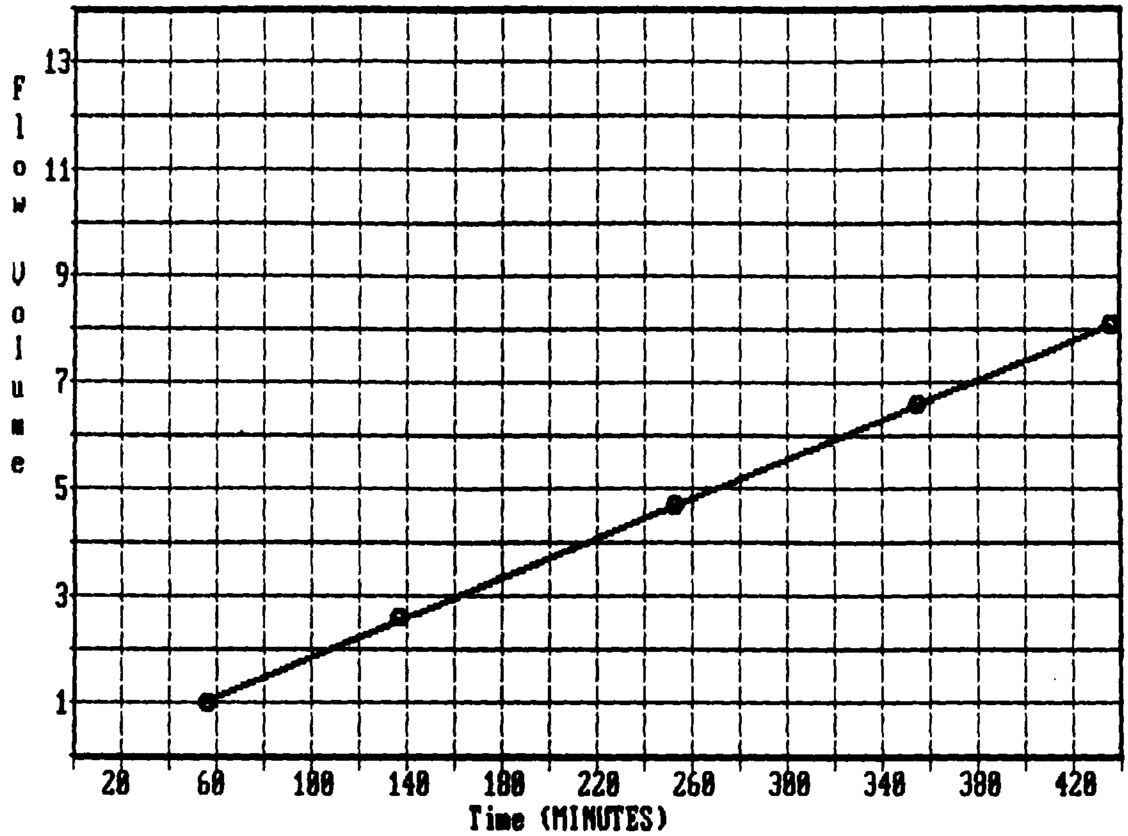
Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
90-10X	24-25'	Clayey Silt		20	7	12.3

Flow (cc)	Length (cm)	Head Loss (cm)
8.1	6.111	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
37.139	26160	127.65

K = (Q L / H A T)

= 6.329E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	03/11/91	08:50	0.5
2		09:46	1.5
3		11:07	3.1
4		13:03	5.2
5		14:45	7.1
6		16:06	8.6

Sample : Waxed Sample

Remarks : Sample WX-1

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91036

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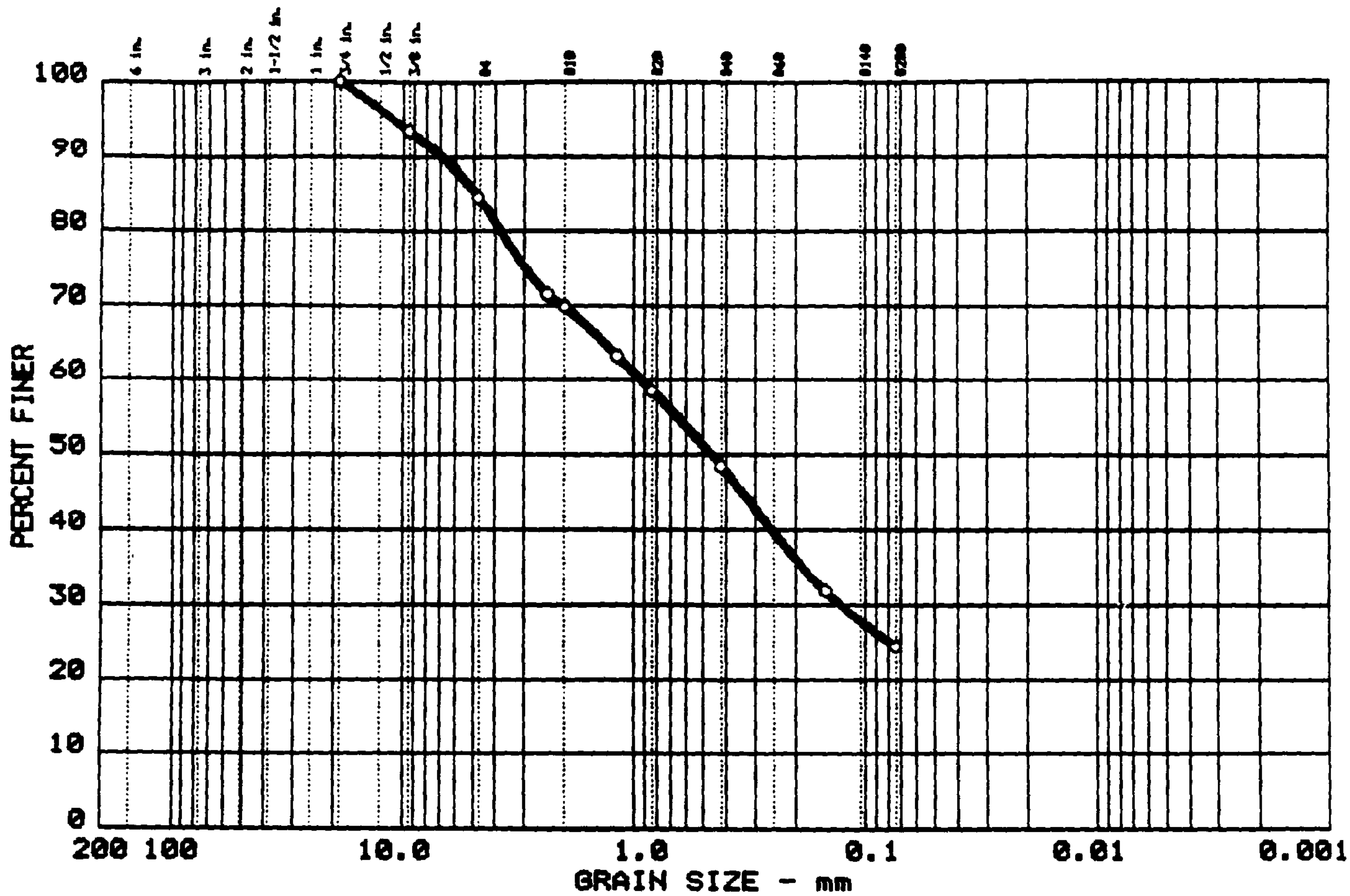
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	15.5	Coarse Sand 14.7	24.4	
			Medium Sand 21.5		
			Fine Sand 23.9		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○		NP	4.84	0.93	0.46	0.127				

MATERIAL DESCRIPTION	USCS	AASHTO
○ Silty Sand	SM	A-1-b

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring90-10X,Sample15,Depth48.4-49.05'

Date: 4-1-91

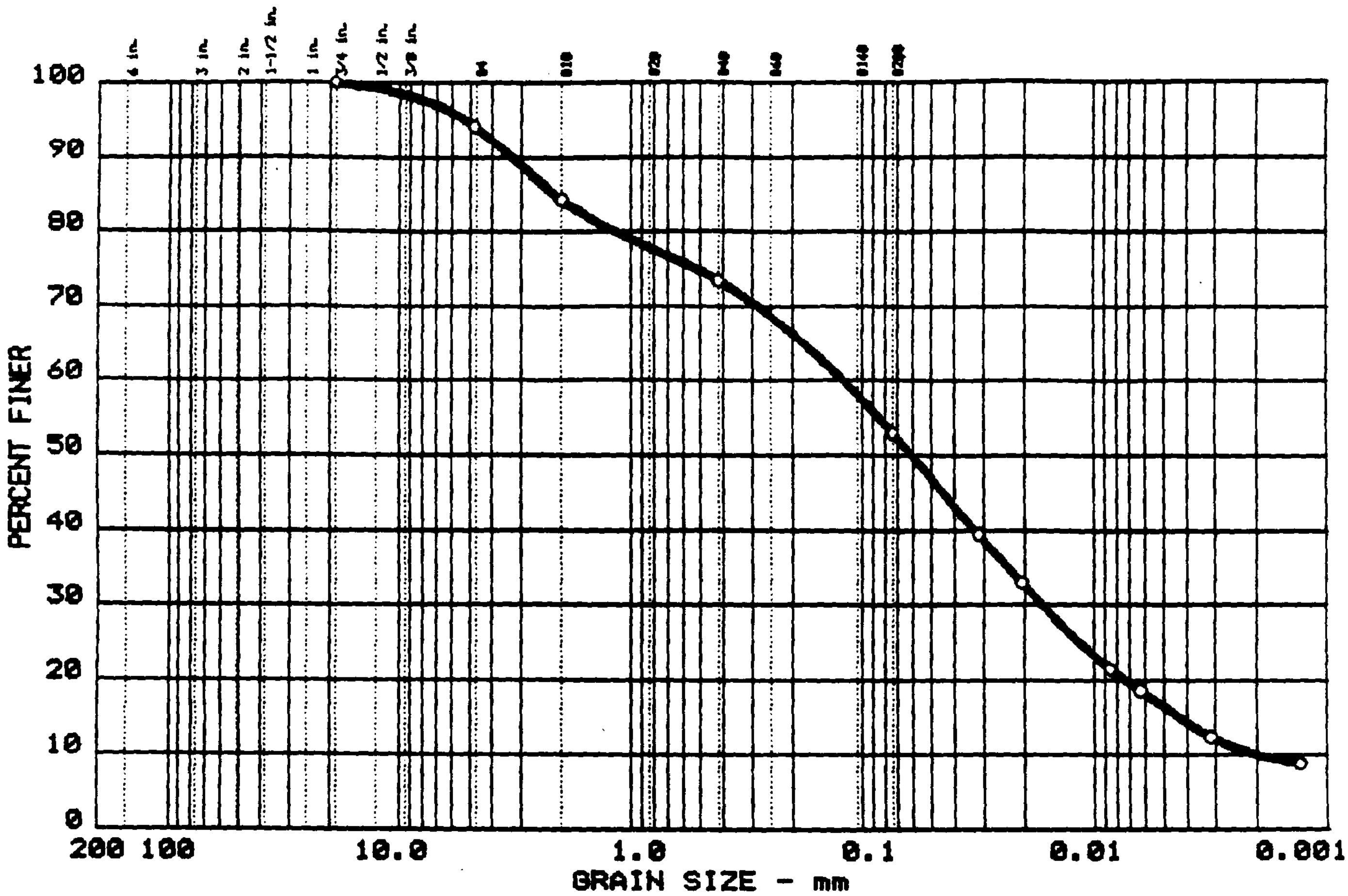
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 10.9%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	5.9	Coarse Sand: 9.8	36.6	16.4
			Medium Sand: 10.9		
			Fine Sand: 20.4		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	18	6	2.11	0.12	0.06	0.017	0.0043	0.0019	1.20	61.7

MATERIAL DESCRIPTION	USCS	AASHTO
○ Clayey Silt	CL-ML	A-4(0.1)

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-10Y, S-2B, Depth 14.0-15.4'

Date: 3/15/91

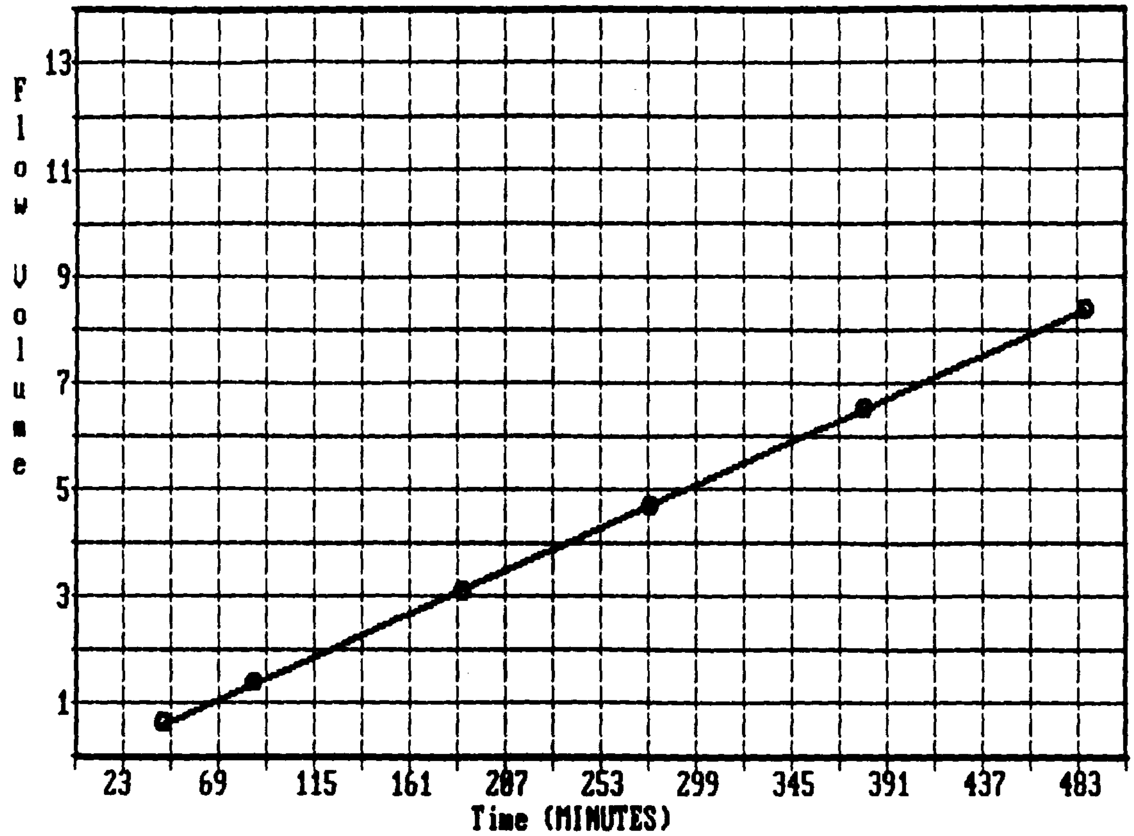
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 9.9%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
90-10Y	14.0-15.4'	Clayey Silt		18	6	10.0

Flow (cc)	Length (cm)	Head Loss (cm)
8.4	7.247	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
40.906	29220	136.99

K = (Q L / H A T)

= 6.326E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	03/18/91	08:18	0.7
2		09:00	1.4
3		09:44	2.1
4		11:24	3.8
5		12:55	5.4
6		14:38	7.3
7		16:25	9.1

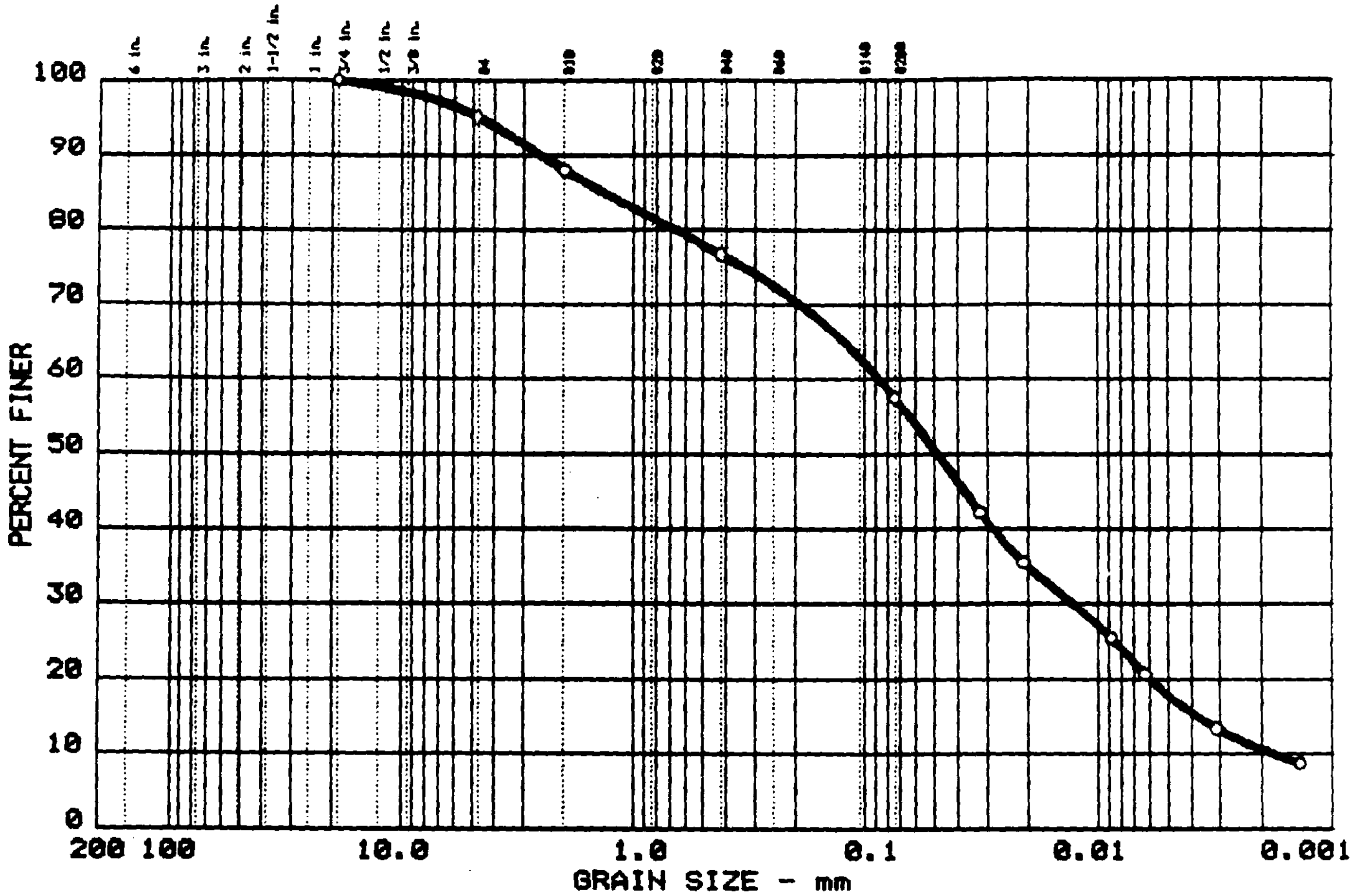
Sample : Shelby Tube

Remarks : Sample 2B

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91036

Mason - de Verteuil
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
o	0.0	4.9	Coarse Sand: 7.0	39.8	17.7
			Medium Sand: 11.4		
			Fine Sand: 19.2		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
o	21	8	1.35	0.09	0.05	0.013	0.0038	0.0017	1.08	49.6

MATERIAL DESCRIPTION	USCS	AASHTO
o Silty Clay	CL	A-4(1.6)

Project No.: 91036
Project: Clark Co. Landfill
o Location: Boring 90-11, Sample WX-1, 67-68'

Date: 3/7/91

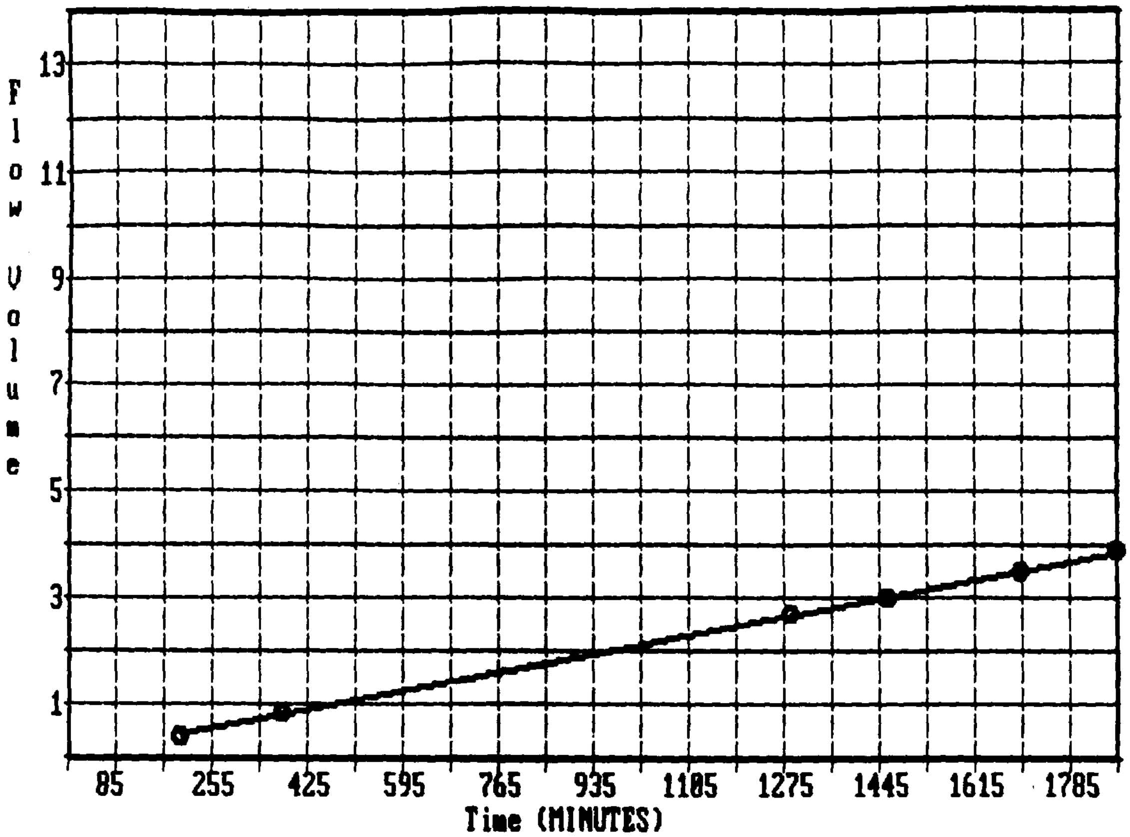
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 8.7%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
90-11	67-68'	Silty Clay		21	8	8.7

Flow (cc)	Length (cm)	Head Loss (cm)
3.9	6.558	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
39.564	112020	136.52

K = (Q L / H A T)

= 7.169E-09 cm / sec

NUM.	DATE	TIME	VOLUME
1	03/11/91	09:46	0.6
2		13:03	1.0
3		16:07	1.5
4	03/12/91	07:11	3.3
5		10:04	3.6
6		14:03	4.1
7		16:53	4.5

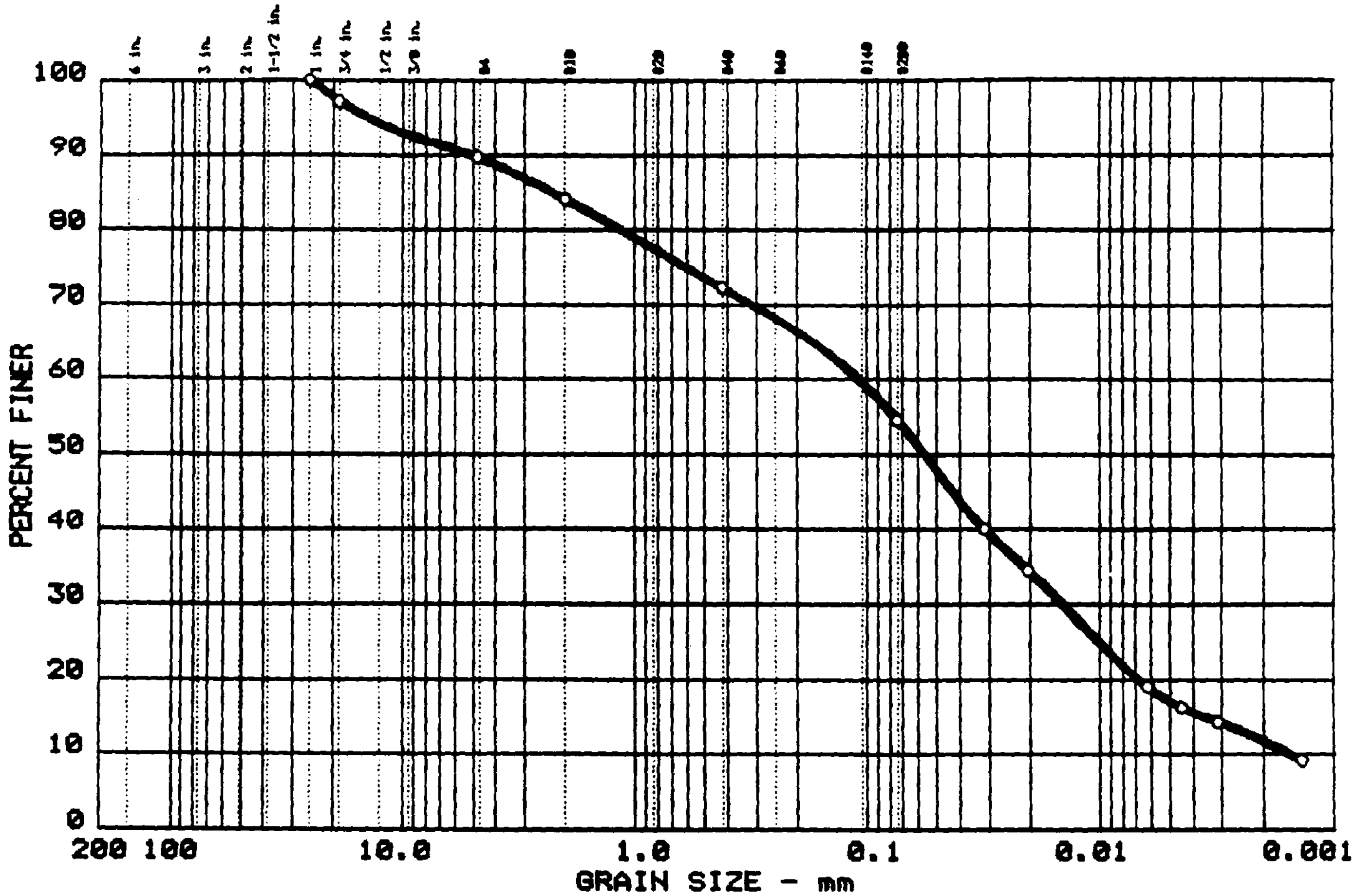
Sample : Waxed Sample

Remarks : Sample WX-1

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91036

Mason - de Verteuil
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	10.3	Coarse Sand: 5.5	37.6	17.0
			Medium Sand: 12.0		
			Fine Sand: 17.6		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	21	9	2.21	0.11	0.06	0.014	0.0035	0.0015	1.29	70.8

MATERIAL DESCRIPTION	USCS	AASHTO
○ Silty Clay	CL	A-4(1.7)

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-11, Sample WX-2, 91.2-92.1'

Date: 3/7/91

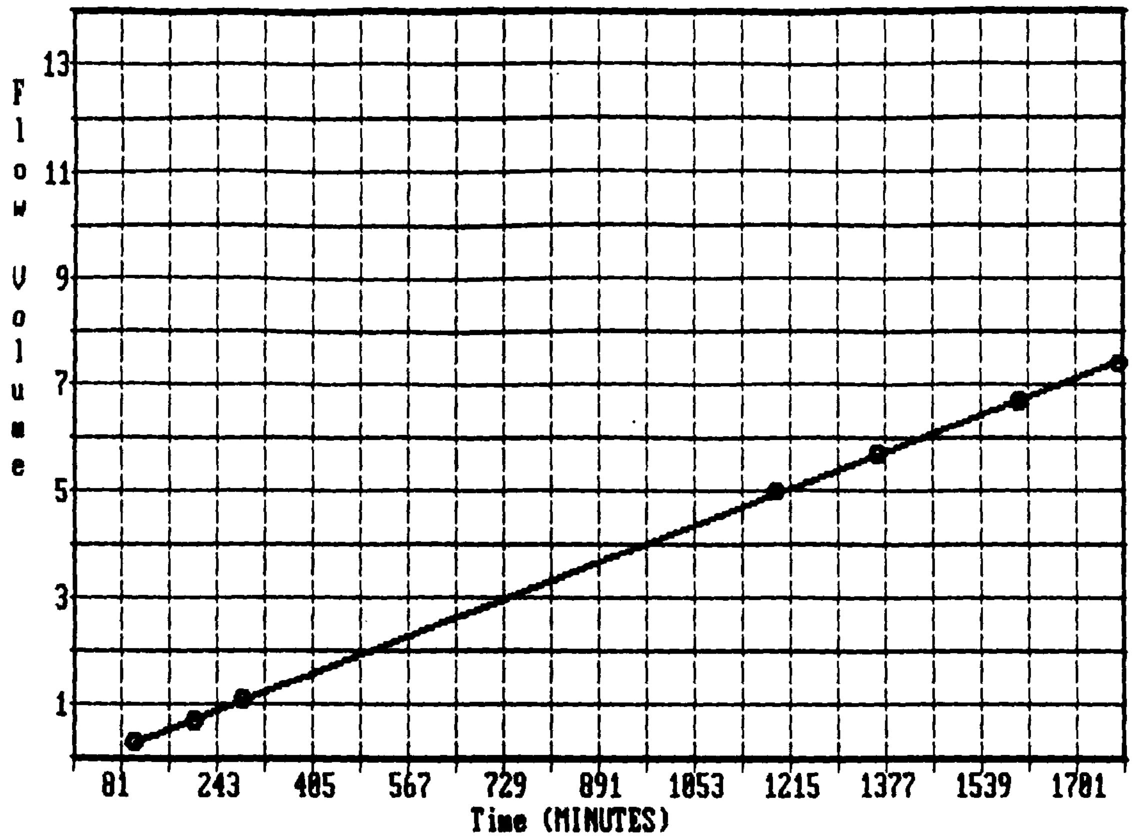
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 10.3%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
90-11	91.2-92.1'	Silty Clay		21	9	10.3

Flow (cc)	Length (cm)	Head Loss (cm)
7.4	7.054	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
40.161	106440	127.63

K = (Q L / H A T)

= 1.517E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	03/11/91	11:20	0.6
2		13:02	0.9
3		14:44	1.3
4		16:07	1.7
5	03/12/91	07:12	5.6
6		10:03	6.3
7		14:04	7.3
8		16:54	8.0

Sample : Waxed Sample

Remarks : Sample WX-2

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91036

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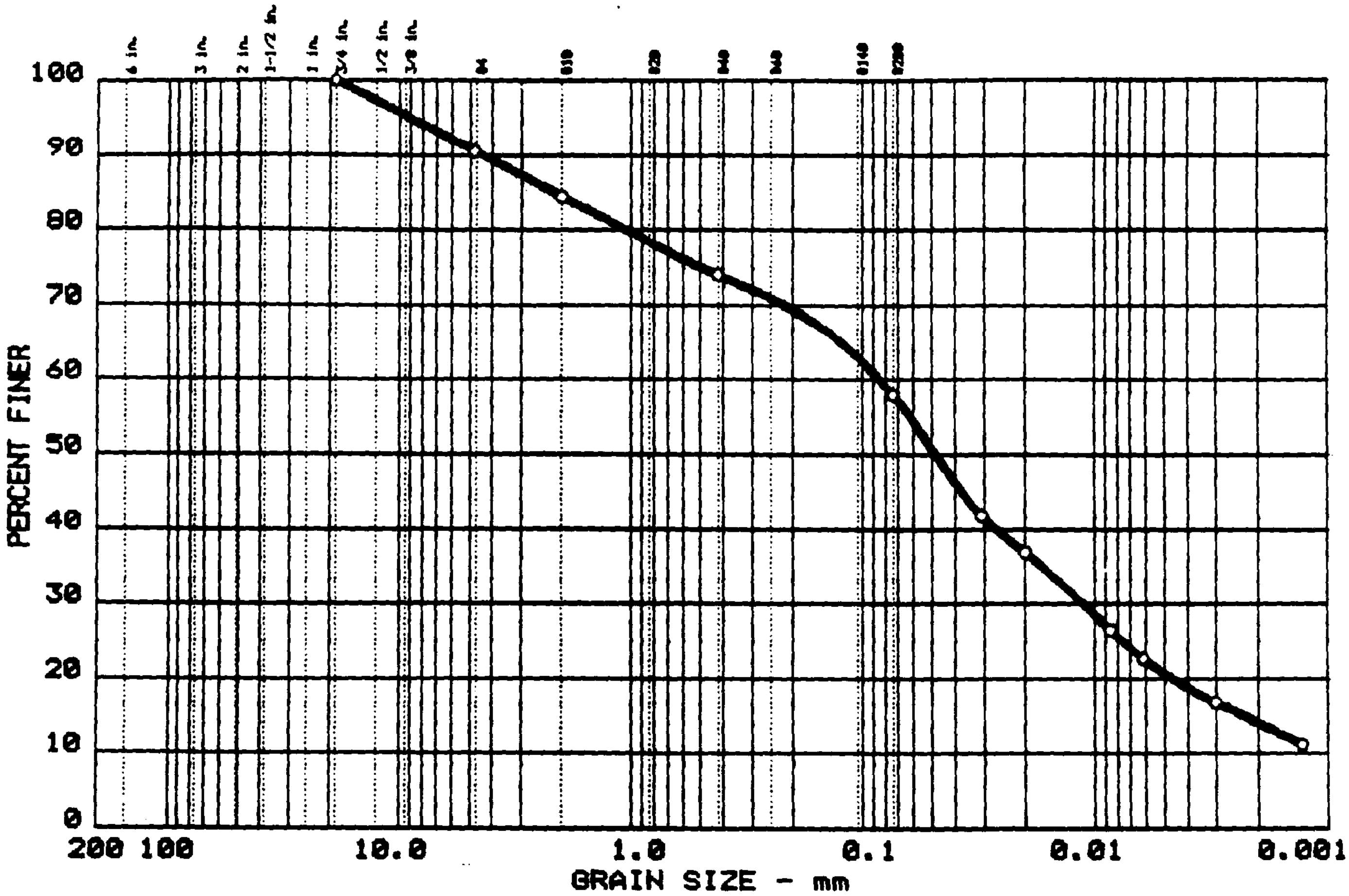
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	9.4	Coarse Sand: 6.1	37.4	20.6
			Medium Sand: 10.6		
			Fine Sand: 15.9		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	22	9	2.11	0.08	0.05	0.011	0.0023			

MATERIAL DESCRIPTION	USCS	AASHTO
○ Silty Clay	CL	A-4(2.1)

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-12, S-1B, Depth 83.0-84.3'

Date: 2/26/91

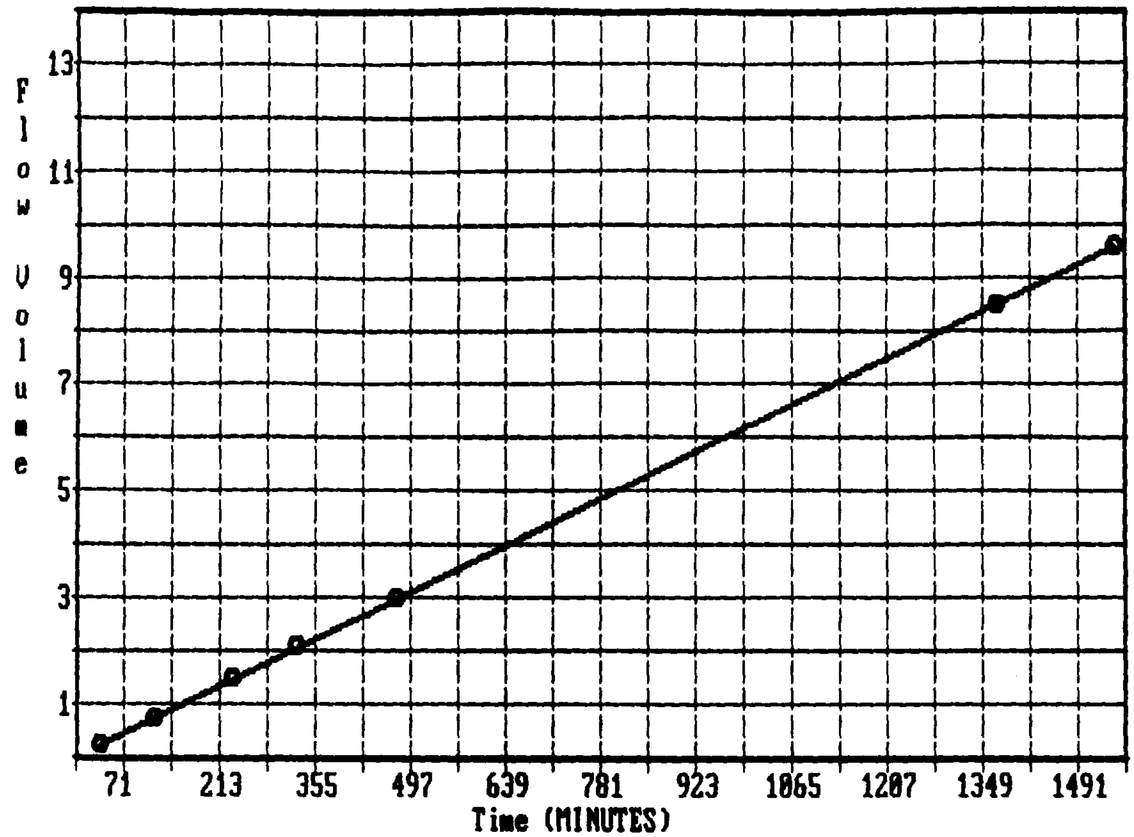
GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 9.8%

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
90-12	83.0-84.3'	Silty Clay		22	9	9.8

Flow (cc)	Length (cm)	Head Loss (cm)
9.6	6.177	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
41.397	92700	133.31

K = (Q L / H A T)

= 1.920E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	02/26/91	08:19	0.6
2		08:54	0.9
3		10:16	1.4
4		12:11	2.1
5		13:45	2.7
6		16:14	3.6
7	02/27/91	07:10	9.1
8		10:04	10.2

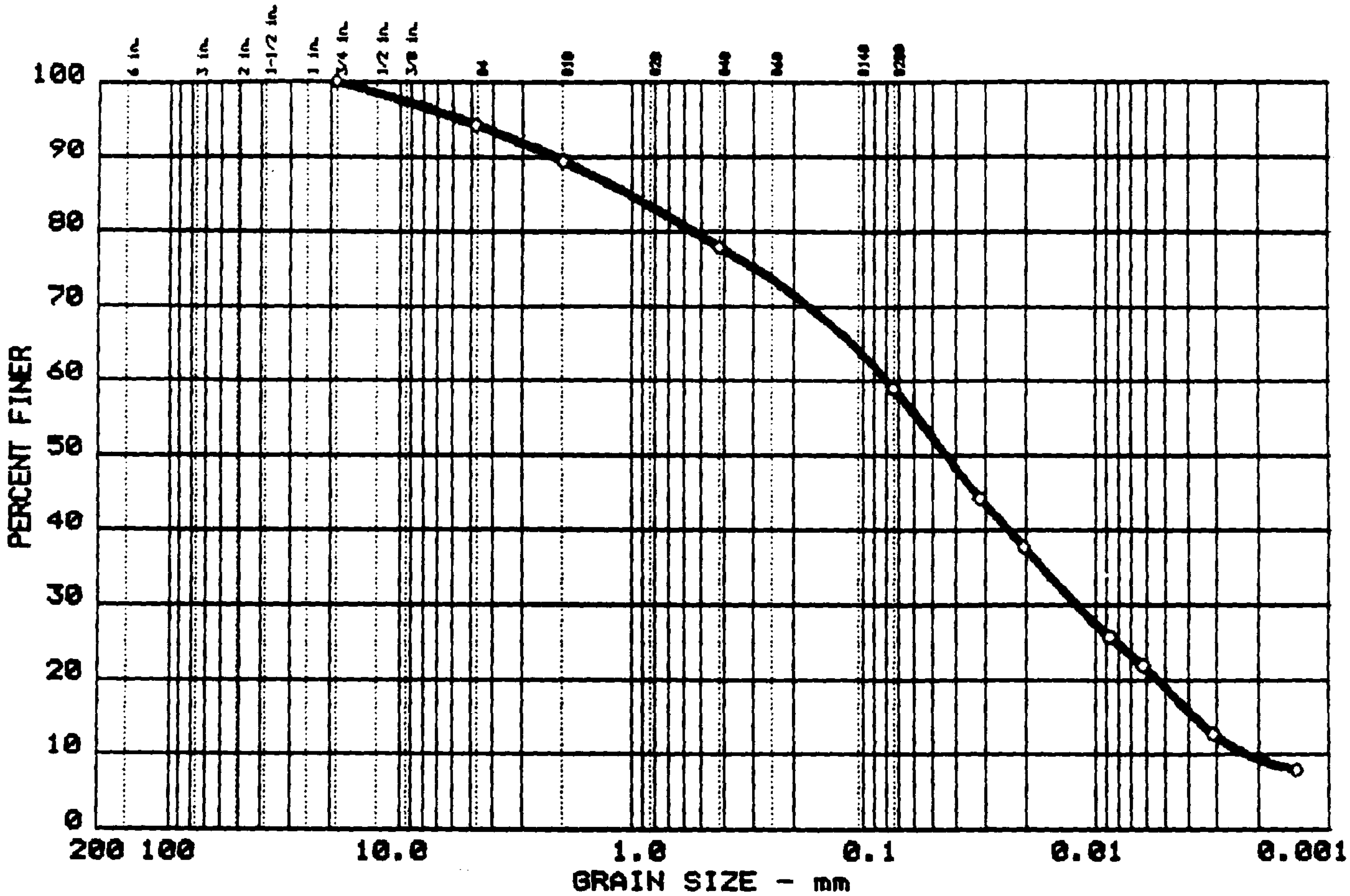
Sample : Shelby Tube

Remarks : Sample 1B

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91036

Mason - de Verteuil
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	5.6	Coarse Sand: 4.9	40.1	19.0
			Medium Sand: 11.5		
			Fine Sand: 18.9		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	21	8	1.04	0.08	0.04	0.012	0.0038	0.0022	0.85	35.5

MATERIAL DESCRIPTION	USCS	AASHTO
○ Silty Clay	CL	A-4(1.6)

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-13, Sample WX-1, 39-40'

Date: 3/7/91

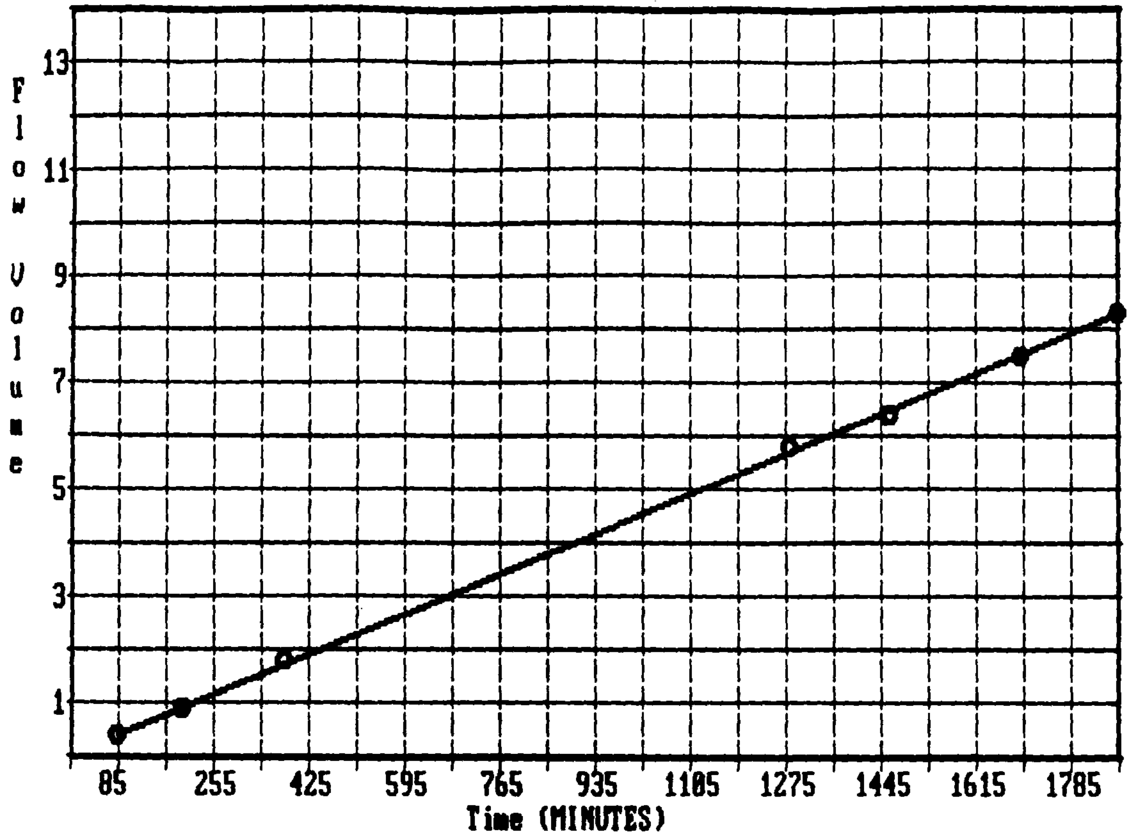
GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 9.2%

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
90-13	39-40'	Silty Clay		21	8	9.2

Flow (cc)	Length (cm)	Head Loss (cm)
8.3	6.477	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
30.747	111960	134.24

K = (Q L / H A T)

= 1.539E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	03/11/91	09:46	0.8
2		11:07	1.2
3		13:04	1.7
4		16:06	2.6
5	03/12/91	07:07	6.6
6		10:06	7.2
7		14:01	8.3
8		16:52	9.1

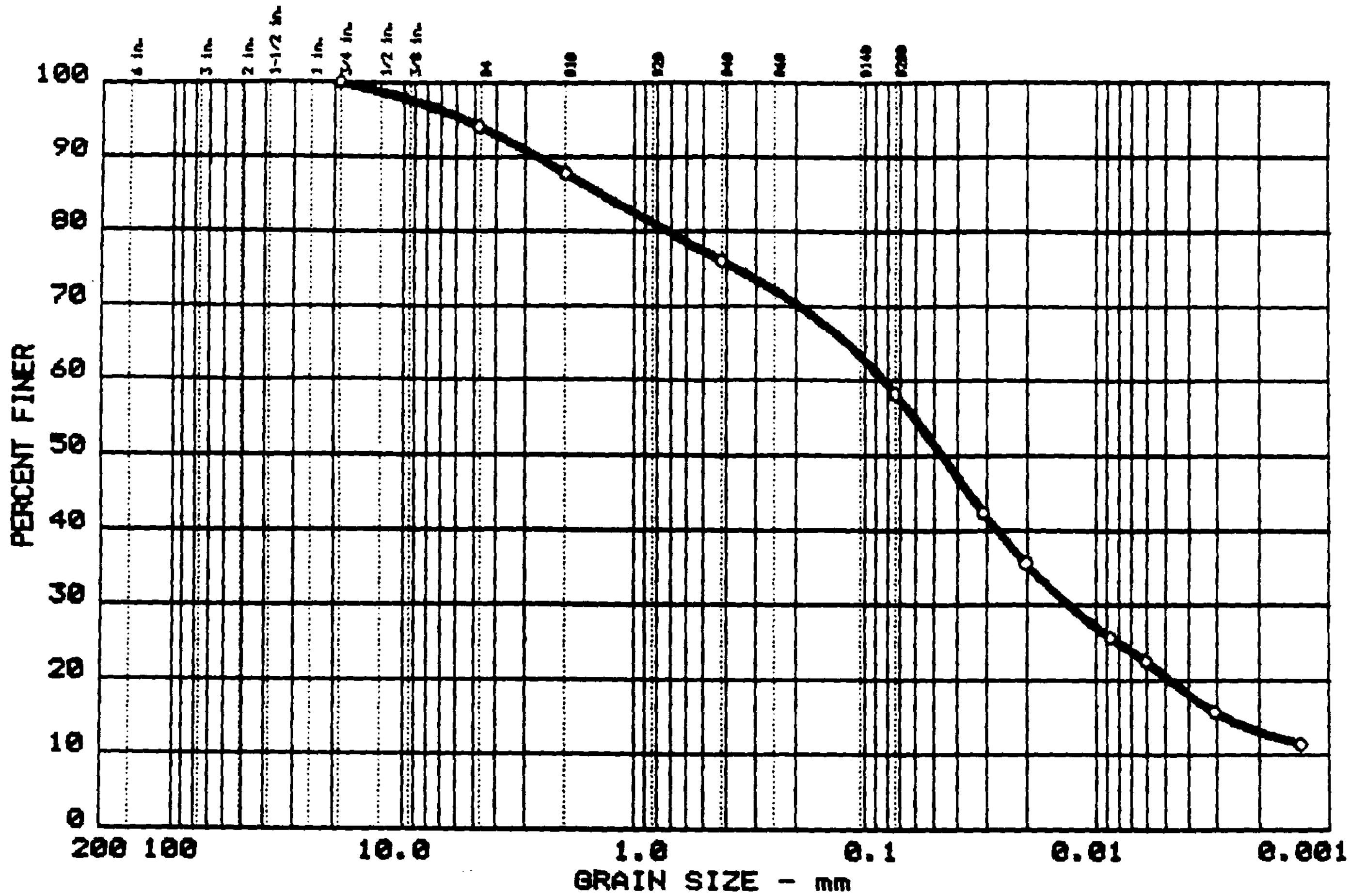
Sample : Waxed Sample

Remarks : Sample WX-1

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91036

Mason - de Verteuil
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	5.8	Coarse Sand: 6.5	37.9	20.4
			Medium Sand: 11.6		
			Fine Sand: 17.8		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	21	9	1.40	0.08	0.05	0.013	0.0028			

MATERIAL DESCRIPTION	USCS	AASHTO
○ Silty Clay	CL	A-4(2.0)

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-13, Sample 1B, Depth 78-80'

Date: 2/26/91

GRAIN SIZE DISTRIBUTION TEST REPORT

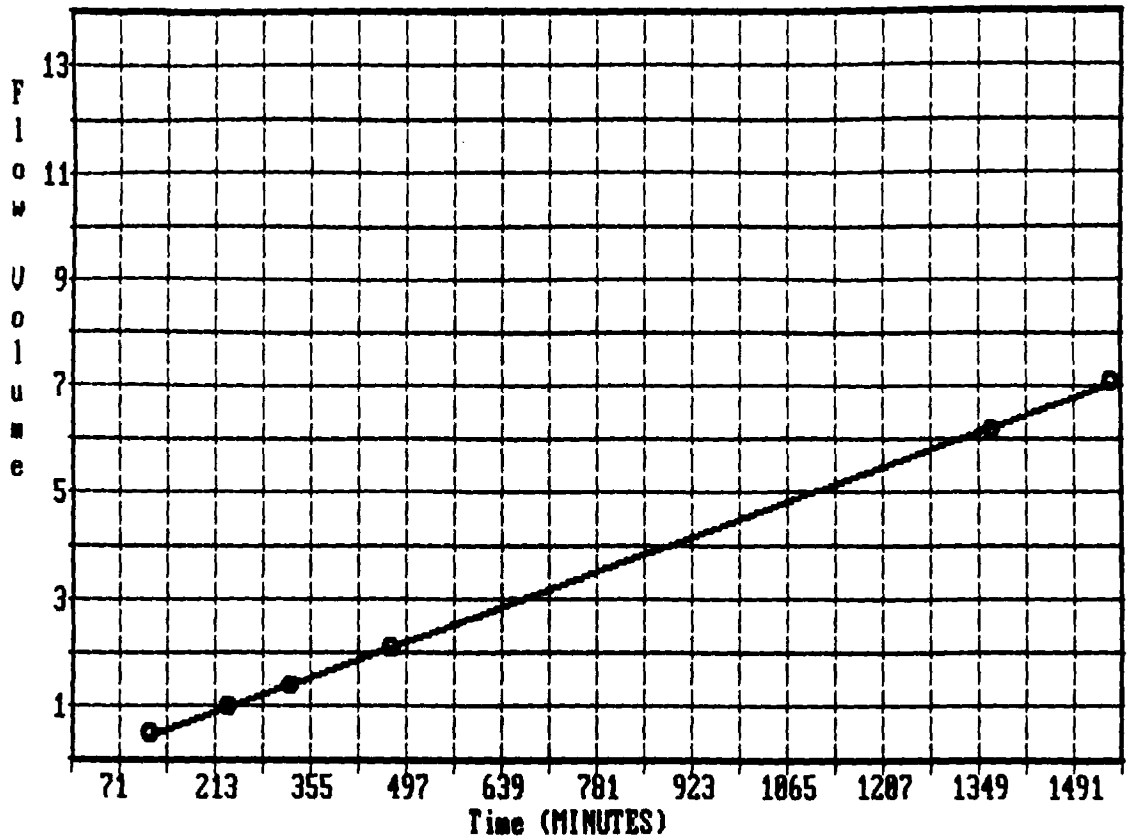
MASON - de VERTEUIL GEO. SERVICES

Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 11.2%

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
90-13	78-80'	Silty Clay		21	9	11.2

Flow (cc)	Length (cm)	Head Loss (cm)
7.1	6.269	805.00
Area (cm^2)	Time (sec.)	Dry Density (pcf)
41.832	92700	131.69

K = (Q L / H A T)

= 1.426E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	02/26/91	08:20	0.3
2		10:17	0.8
3		12:11	1.3
4		13:45	1.7
5		16:14	2.4
6	02/27/91	07:09	6.5
7		10:05	7.4

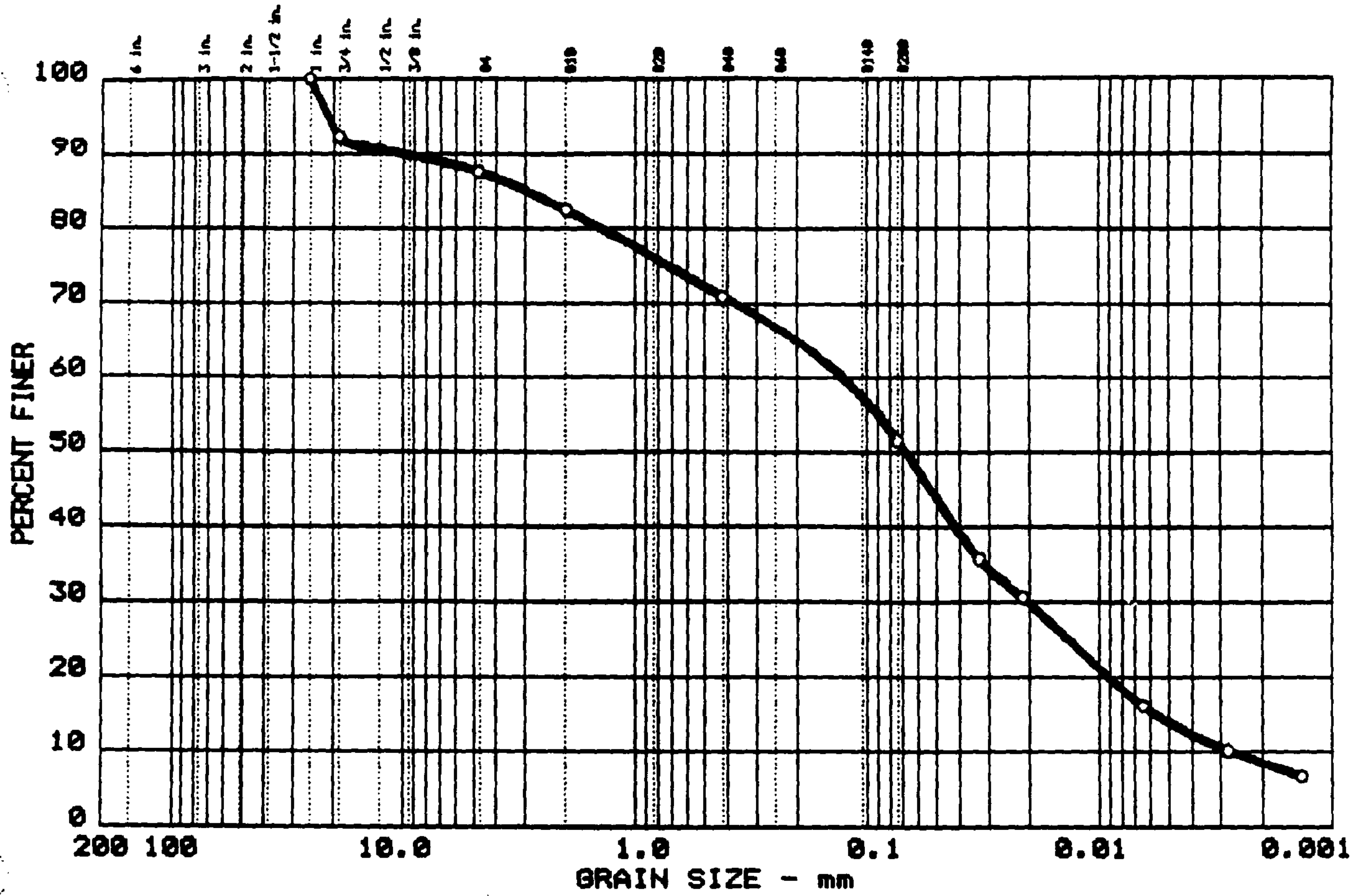
Sample : Shelby Tube

Remarks : Sample 1B

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91036

Mason - de Verteuil
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
o	0.0	12.4	Coarse Sand: 5.1	37.7	13.9
			Medium Sand: 11.6		
			Fine Sand: 19.3		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
o	23	9	2.88	0.13	0.07	0.020	0.0057	0.0027	1.20	46.8

MATERIAL DESCRIPTION	USCS	AASHTO
o Silty Clay	CL	A-4

Project No.: 91036
Project: Clark Co. Landfill
o Location: Boring 90-14, Sample 3B, Depth 48.0-48.7'

Date: 4-1-91

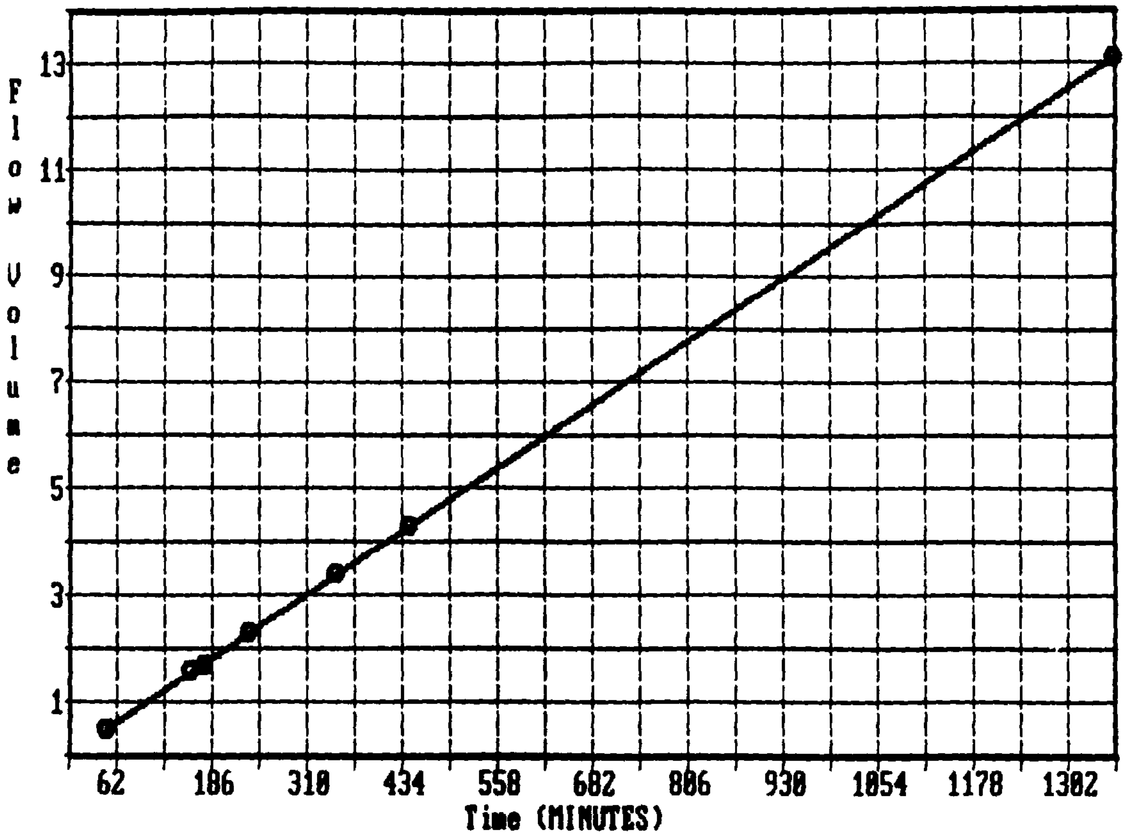
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 11.2%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
90-14	48.0-48.7'	Silty Clay		23	9	11.2

Flow (cc)	Length (cm)	Head Loss (cm)
13.1	6.380	805.00
Area (cm^2)	Time (sec.)	Dry Density (pcf)
41.100	81540	131.51

K = (Q L / H A T)

= 3.098E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	03/28/91	08:20	0.4
2		09:16	0.9
3		11:06	2.0
4		11:23	2.1
5		12:22	2.7
6		14:16	3.8
7		15:50	4.7
8	03/29/91	07:07	13.5

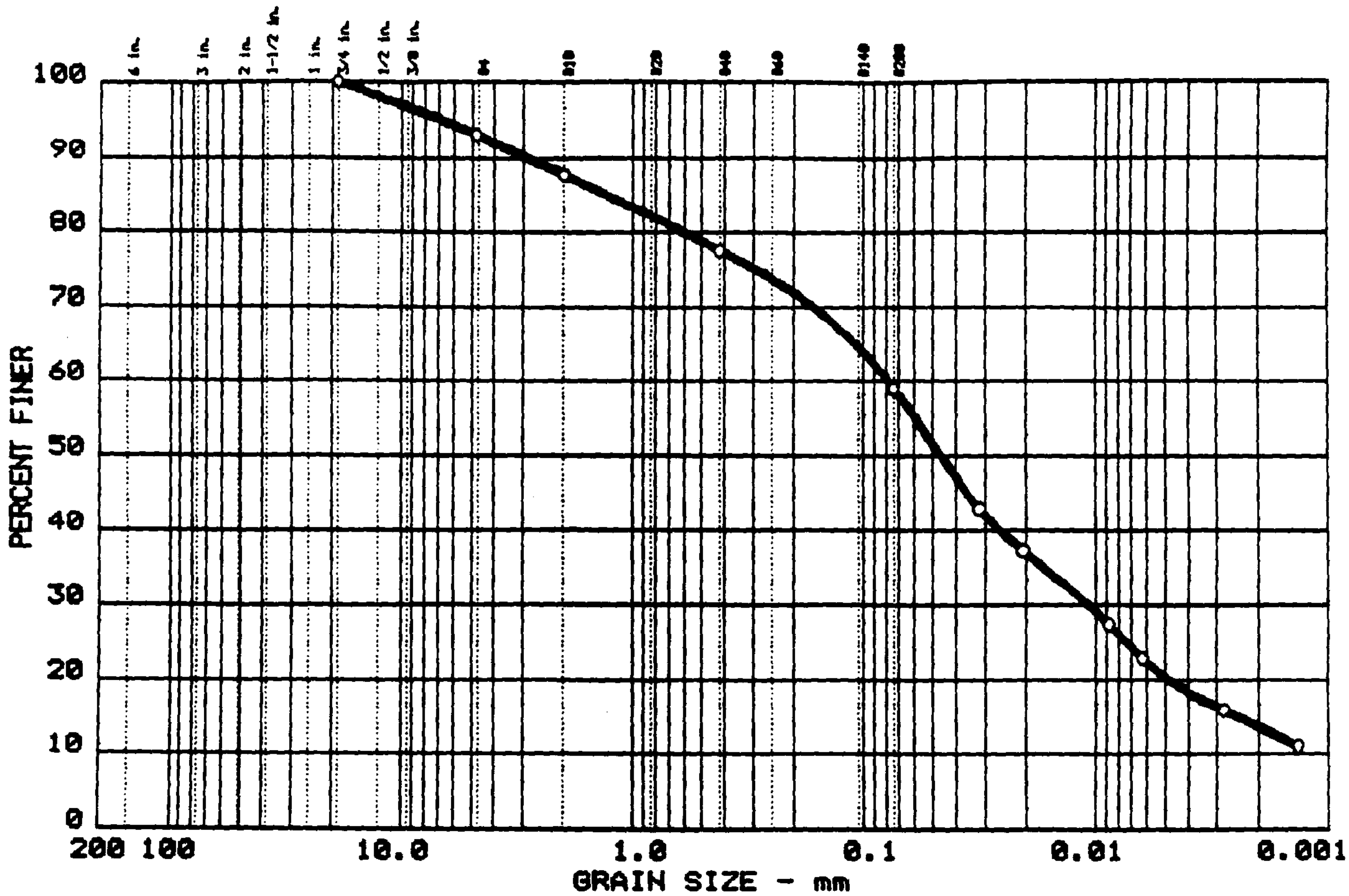
Sample : Shelby Tube

Remarks : Sample 3B

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91036

Mason - de Verteuil
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND		% SILT	% CLAY
○	0.0	6.9	Coarse Sand:	5.4	38.7	20.4
			Medium Sand:	10.1		
			Fine Sand:	18.6		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	21	9	1.30	0.08	0.05	0.011	0.0025			

MATERIAL DESCRIPTION	USCS	AASHTO
○ Silty clay	CL	A-4

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-15, Sample S-1P, 13'-14'

Date: 4/3/91

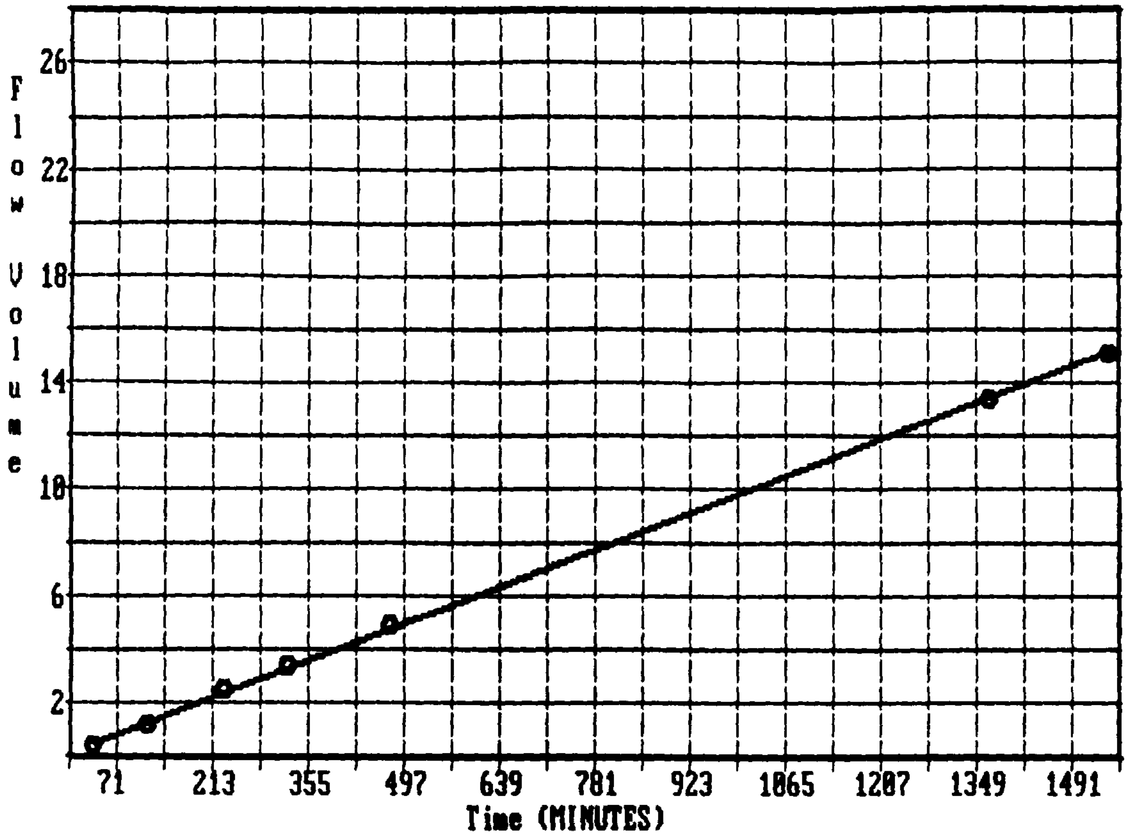
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 9.0%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
90-15	13-14'	Silty Clay		21	9	9.0

Flow (cc)	Length (cm)	Head Loss (cm)
15.1	5.697	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
41.832	92700	133.83

K = (Q L / H A T)

= 2.765E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	02/26/91	08:20	0.0
2		08:55	1.1
3		10:17	2.0
4		12:10	3.2
5		13:45	4.2
6		16:15	5.7
7	02/27/91	07:09	14.2
8		10:05	15.9

Sample : Shelby Tube

Remarks : Sample 1P

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91036

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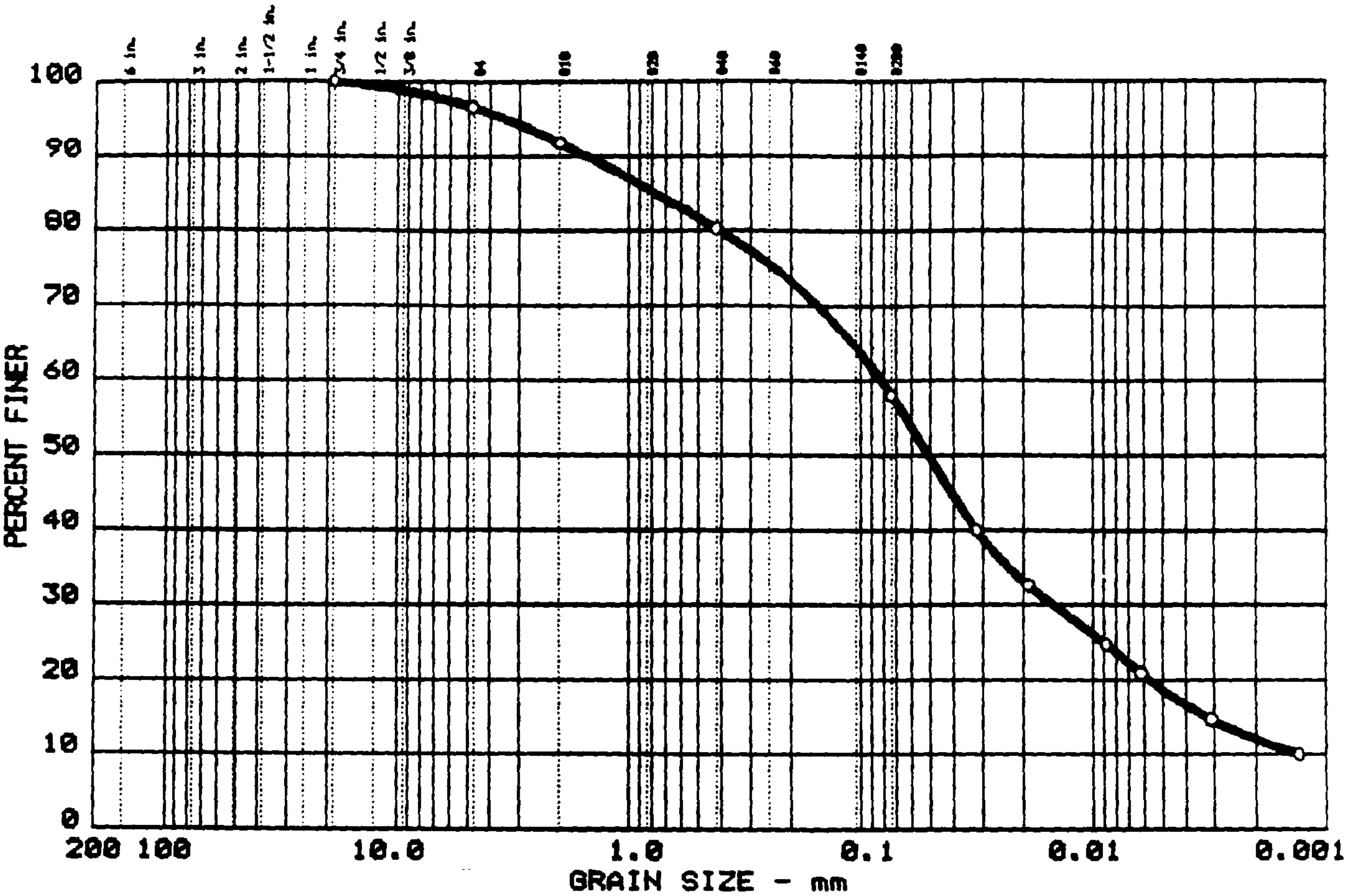
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	%+75mm	% GRAVEL	% SAND		% SILT	% CLAY
○	0.0	3.4	Coarse Sand:	4.8	39.4	18.7
			Medium Sand:	11.5		
			Fine Sand:	22.2		

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○	20	8	0.76	0.08	0.05	0.015	0.0033			

MATERIAL DESCRIPTION	USCS	AASHTO
○ Silty Clay	CL	A-4(1.4)

Project No.: 91036
Project: Clark Co. Landfill
○ Location: Boring 90-15, S-2B, Depth 23.0-24.5'

Date: 2/26/91

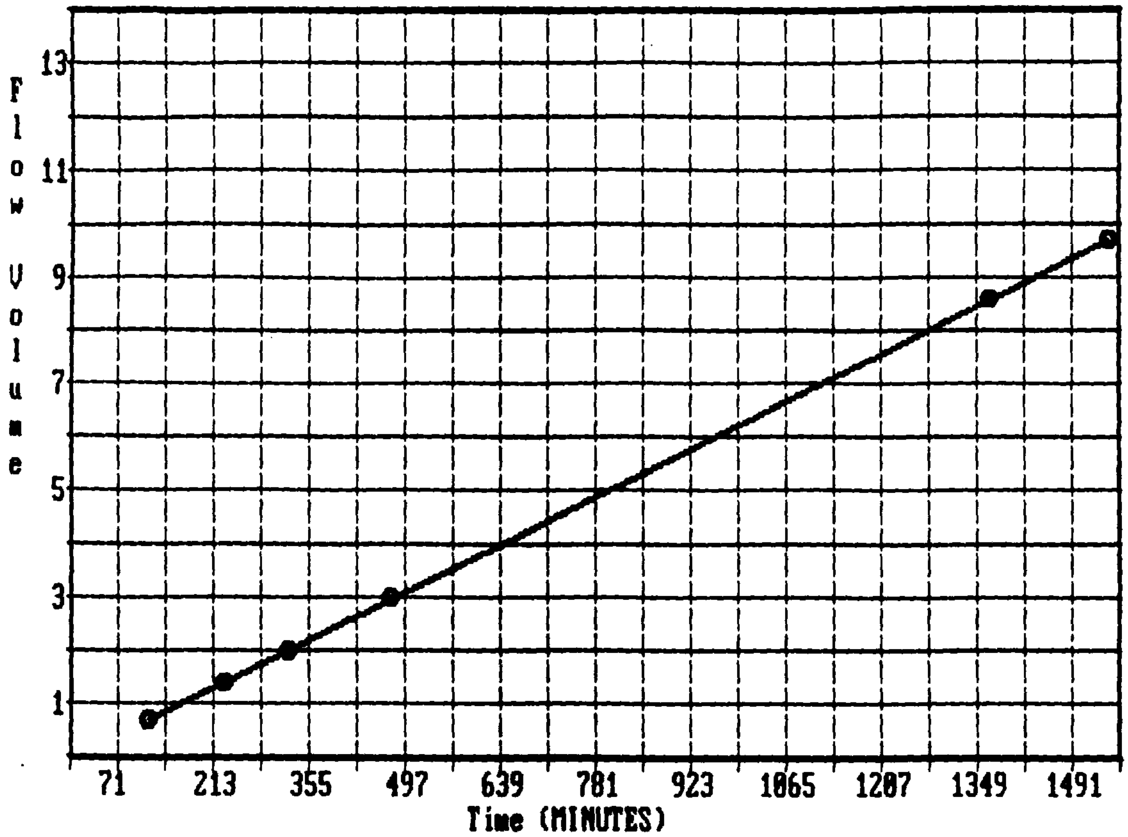
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 11.0%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEO. SERVICES

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
90-15	23-24.5'	Silty Clay		20	8	11.0

Flow (cc)	Length (cm)	Head Loss (cm)
9.7	5.796	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
41.629	92700	131.83

K = (Q L / H A T)

= 1.810E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	02/26/91	08:20	0.7
2		10:17	1.4
3		12:10	2.1
4		13:45	2.7
5		16:15	3.7
6	02/27/91	07:09	9.3
7		10:05	10.4

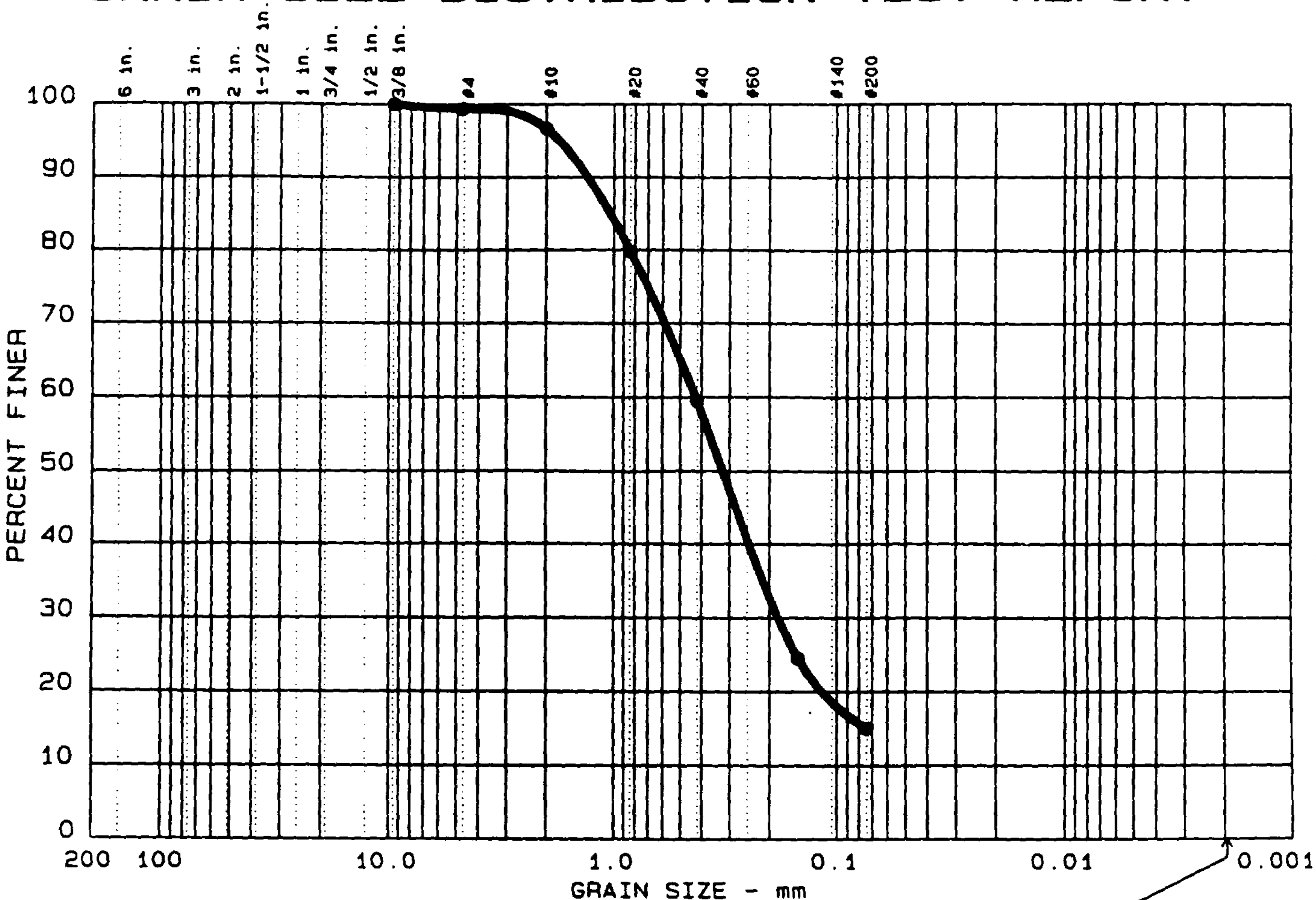
Sample : Shelby Tube

Remarks : Sample 2B

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91036

Mason - de Verteuil
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND COARSE	% SAND MEDIUM	% SAND FINE	% SILT	% CLAY
●	0.0	0.6	2.7	37.2	44.5	15.0	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●		NP	1.04	0.43	0.32	0.183				

MATERIAL DESCRIPTION	USCS	AASHTO
● Silty Sand	SM	A-2-4 (0.0)

Project No.: 91237
Project: Clark Co. Landfill
● Location: Boring C91-1, S-11, Depth 36.0-36.5'

Date: 09/30/91

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEOTECHNICAL SERVICES

Remarks:

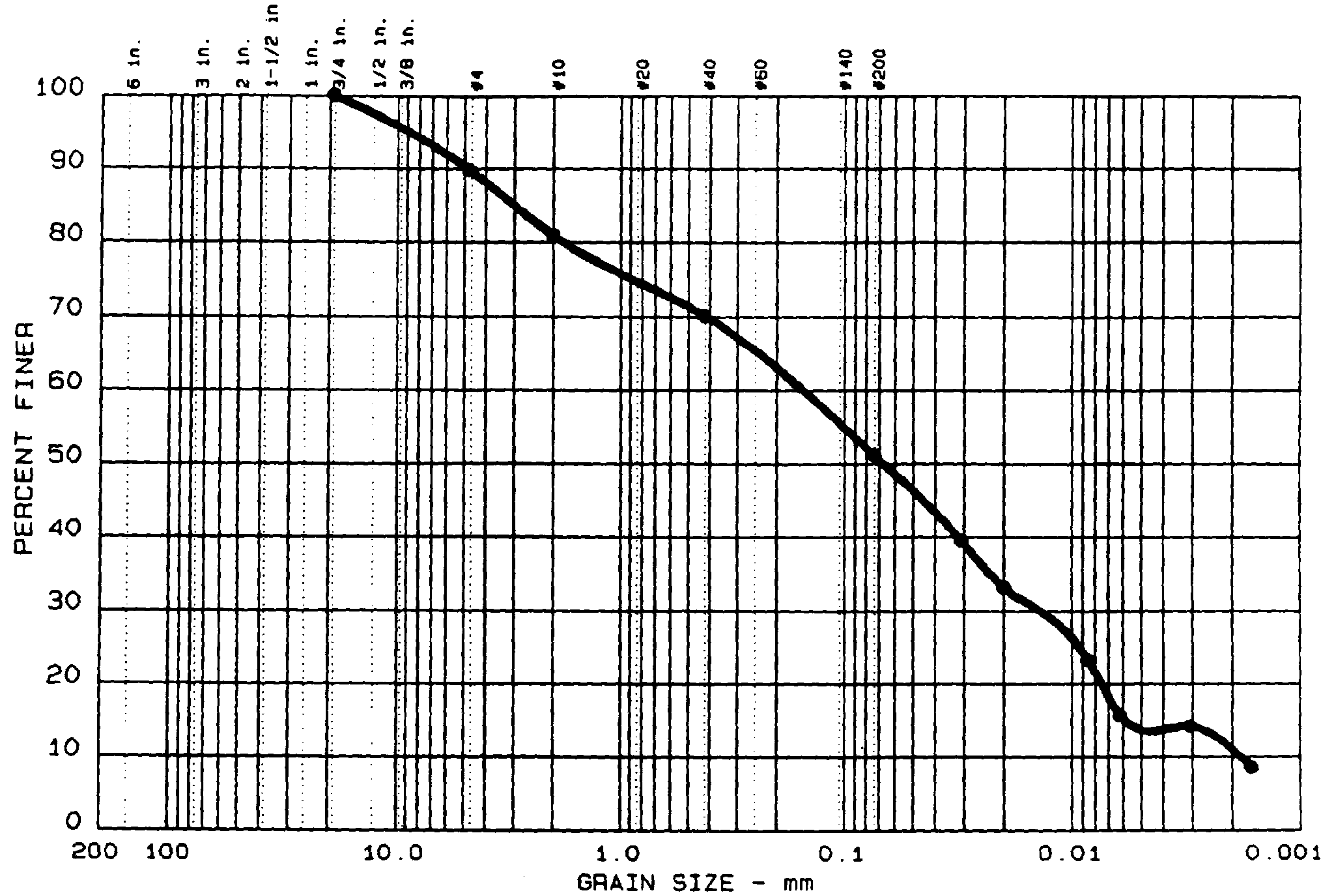
Client:

Eagon & Associates, Inc.

Moisture Content: 13.2%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND			% SILT	% CLAY
			COARSE	MEDIUM	FINE		
●	0.0	10.1	9.0	10.7	19.0	37.6	13.6

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	22	9	2.99	0.15	0.07	0.014	0.0059	0.0018	0.69	83.2

MATERIAL DESCRIPTION	USCS	AASHTO
● Silty Clay	CL	A-4(1.4)

Project No.: 91237
Project: Clark Co. Landfill
● Location: Boring C91-1, WS-2, Depth 50.5-52.0'

Date: 10/2/91

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEOTECHNICAL SERVICES

Remarks:

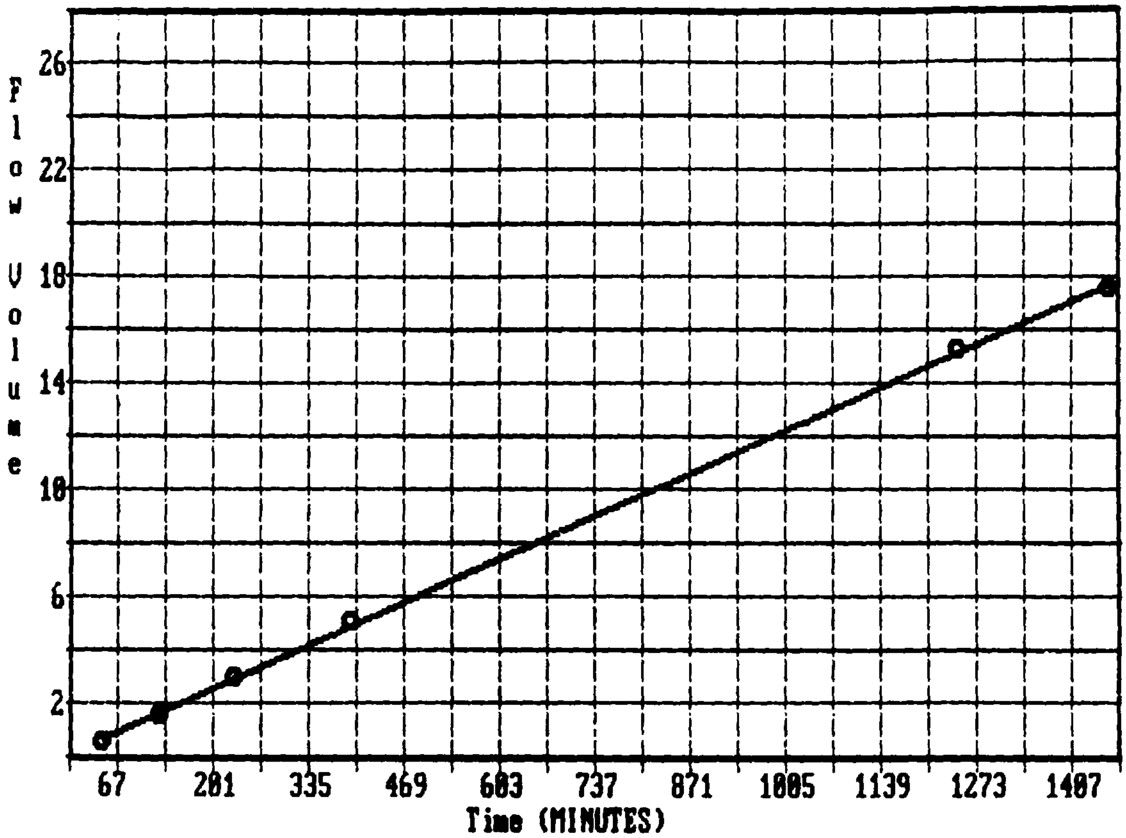
Client:

Eagon & Associates, Inc.

Moisture Content: 9.5%

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
C91-1	50.5-52.0'	Silty Clay		22	9	9.5

Flow (cc)	Length (cm)	Head Loss (cm)
17.6	6.462	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
37.967	87480	129.78

K = (Q L / H A T)

= 4.254E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	10/08/91	10:18	2.3
2		11:03	2.9
3		12:22	3.9
4		14:08	5.3
5		16:50	7.4
6	10/09/91	07:05	17.6
7		10:36	19.9

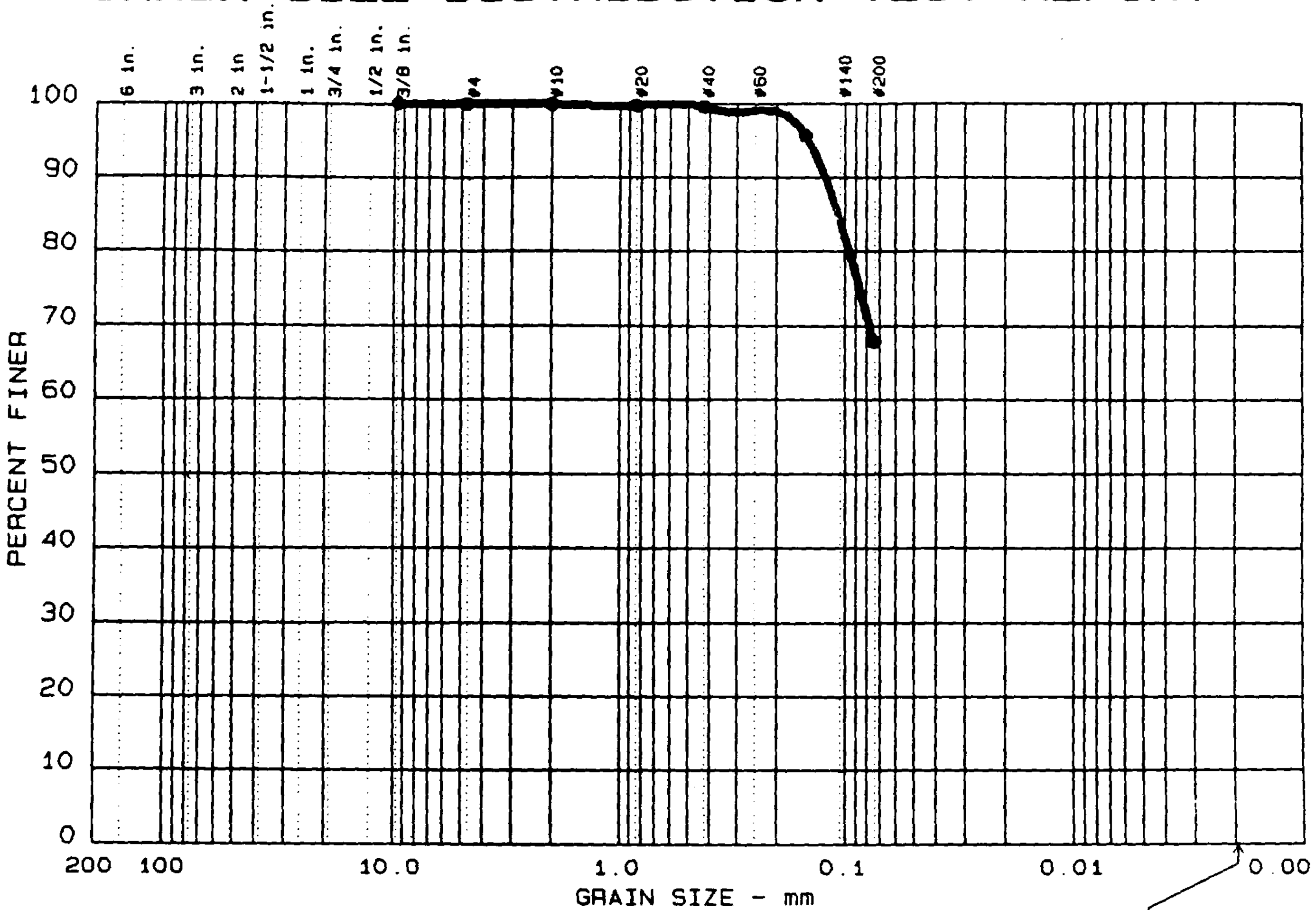
Sample : Waxed Sample WS-2

Remarks :

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91237

Mason - de Verteuil
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND COARSE	% SAND MEDIUM	% SAND FINE	% SILT	% CLAY
●	0.0	0.1	0.1	0.4	31.6	67.8	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●		NP	0.11							

MATERIAL DESCRIPTION	USCS	AASHTO
● Sandy Silt	ML	A-4 (0.0)

Project No.: 91237
Project: Clark Co. Landfill
● Location: Boring C91-1, S-23, Depth 73.0-73.5'

Date: 09/30/91

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEOTECHNICAL SERVICES

Remarks:

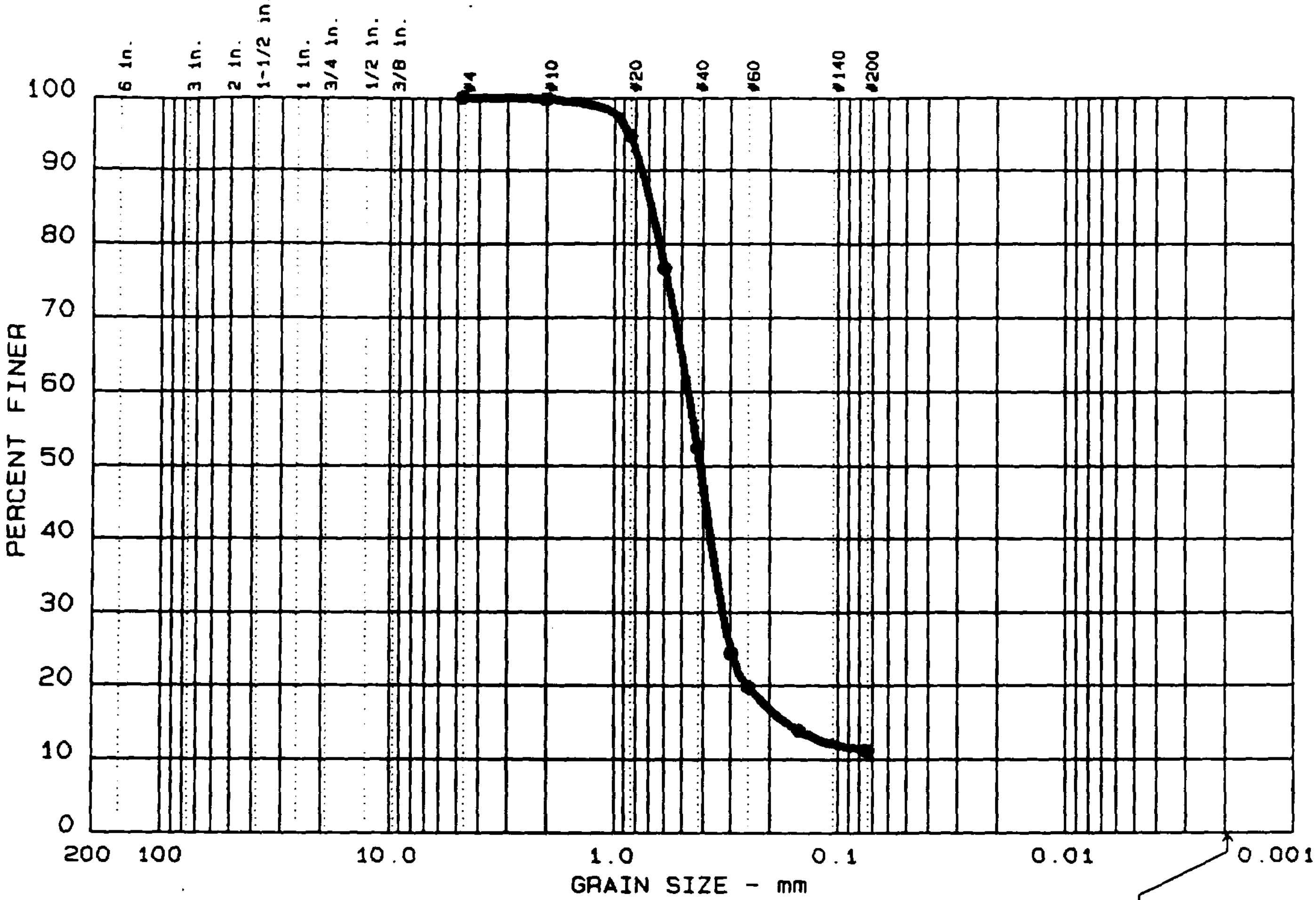
Client:

Eagon & Associates, Inc.

Moisture Content: 20.9%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND COARSE	% SAND MEDIUM	% SAND FINE	% SILT	% CLAY
●	0.0	0.0	0.2	47.4	41.2	11.2	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●		NP	0.68	0.46	0.41	0.325	0.1688			

MATERIAL DESCRIPTION	USCS	AASHTO
● Poorly graded Silty Sand	SP-SM	A-2-4 (0.4)

Project No.: 91237
Project: Clark Co. Landfill
● Location: Boring C91-2, S-28, Depth 109.5-110.0

Date: 10/2/91

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEOTECHNICAL SERVICES

Remarks:

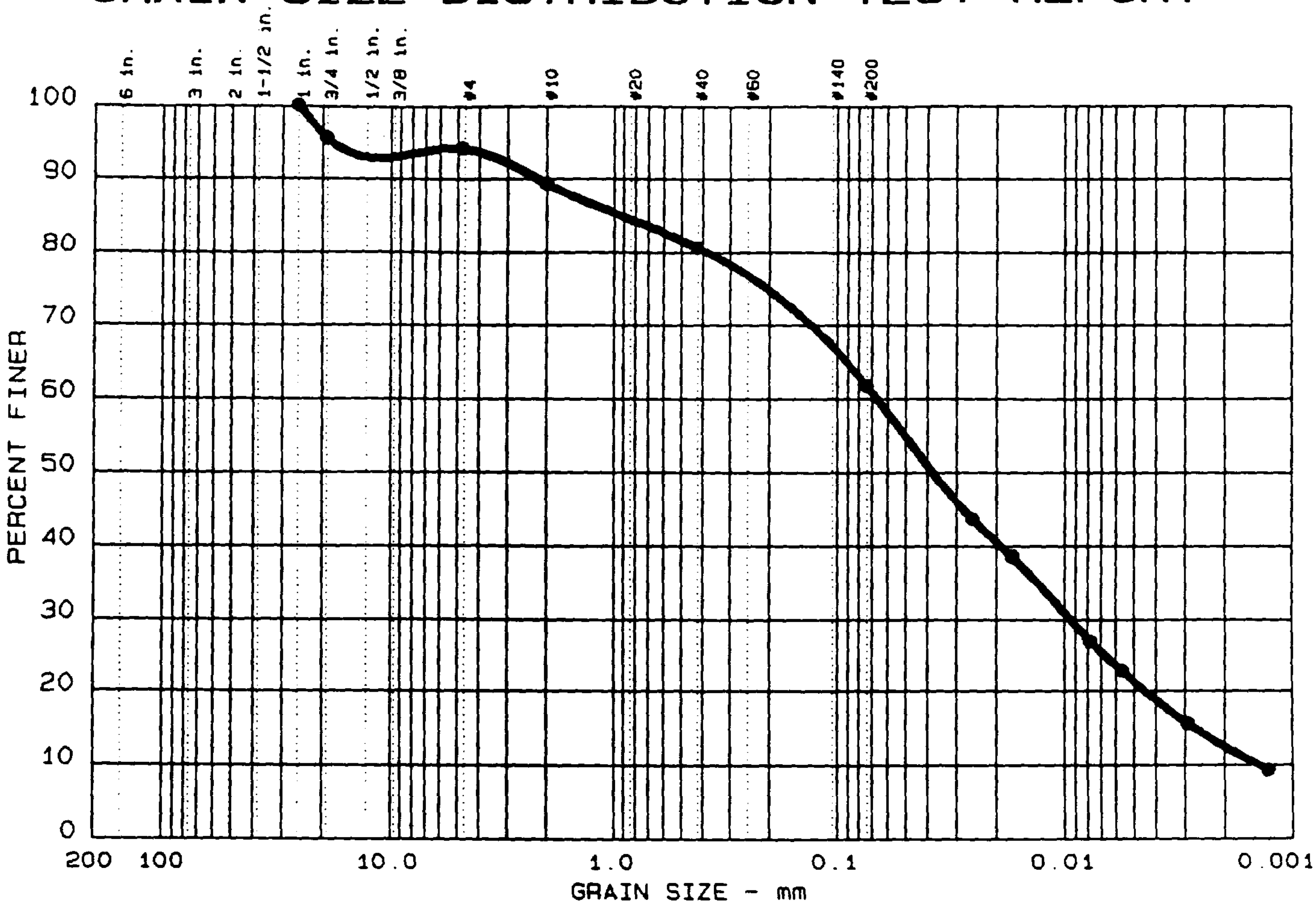
Client:

Eagon & Associates, Inc.

Moisture Content: 19.8%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND COARSE	% SAND MEDIUM	% SAND FINE	% SILT	% CLAY
●	0.0	5.8	4.9	8.6	18.9	40.5	21.3

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	20	8	0.89		0.04	0.009	0.0027	0.0014	0.97	47.3

MATERIAL DESCRIPTION	USCS	AASHTO
● Silty Clay	CL	A-4(1.8)

Project No.: 91237
Project: Clark Co. Landfill
● Location: Boring C91-3, WS-1, Depth 48.3-49.5'

Date: 9/23/91

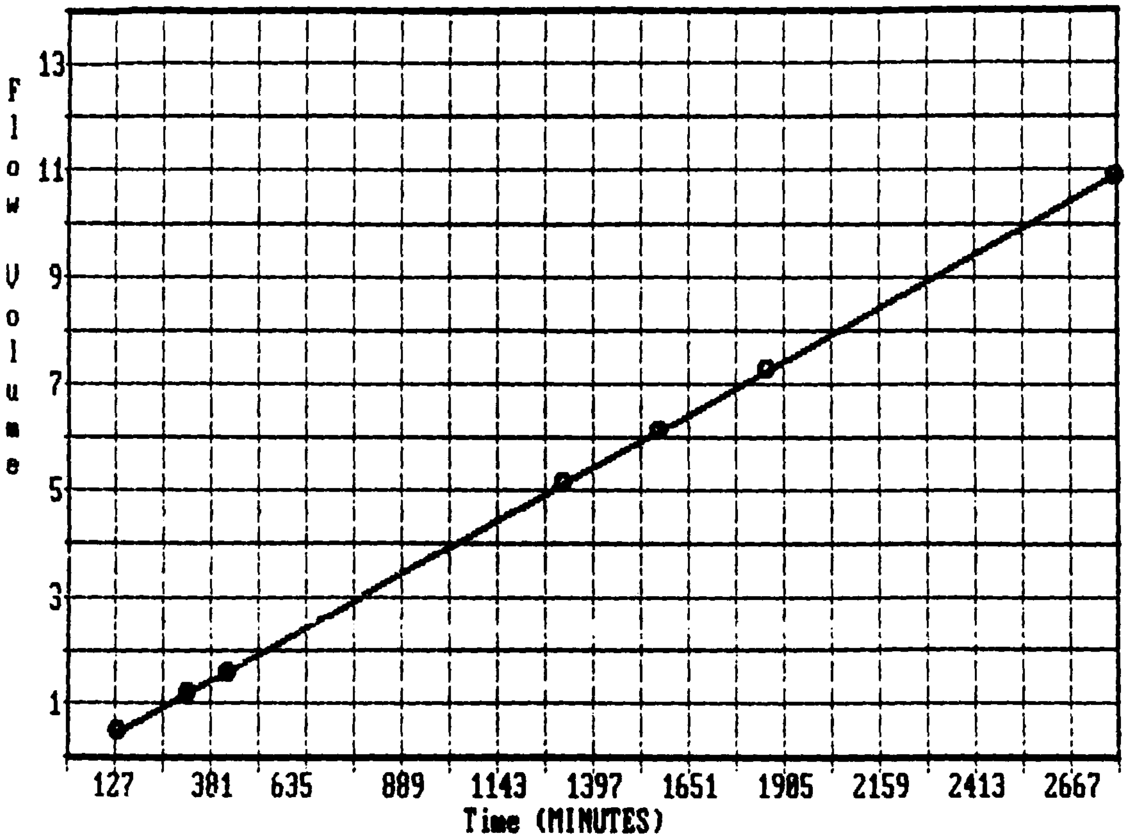
Remarks:
Client:
Eagon & Associates, Inc.

Moisture Content: 11.0%

GRAIN SIZE DISTRIBUTION TEST REPORT
MASON - de VERTEUIL GEOTECHNICAL SERVICES

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
C91-3	48.3-49.5'	Silty Clay		20	8	11.0

Flow (cc)	Length (cm)	Head Loss (cm)
10.9	6.393	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
30.747	167160	129.43

K = (Q L / H A T)

= 1.337E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	10/01/91	09:07	0.7
2		11:10	1.2
3		14:26	1.9
4		16:12	2.3
5	10/02/91	07:05	5.8
6		11:10	6.8
7		16:06	8.0
8	10/03/91	07:33	11.6

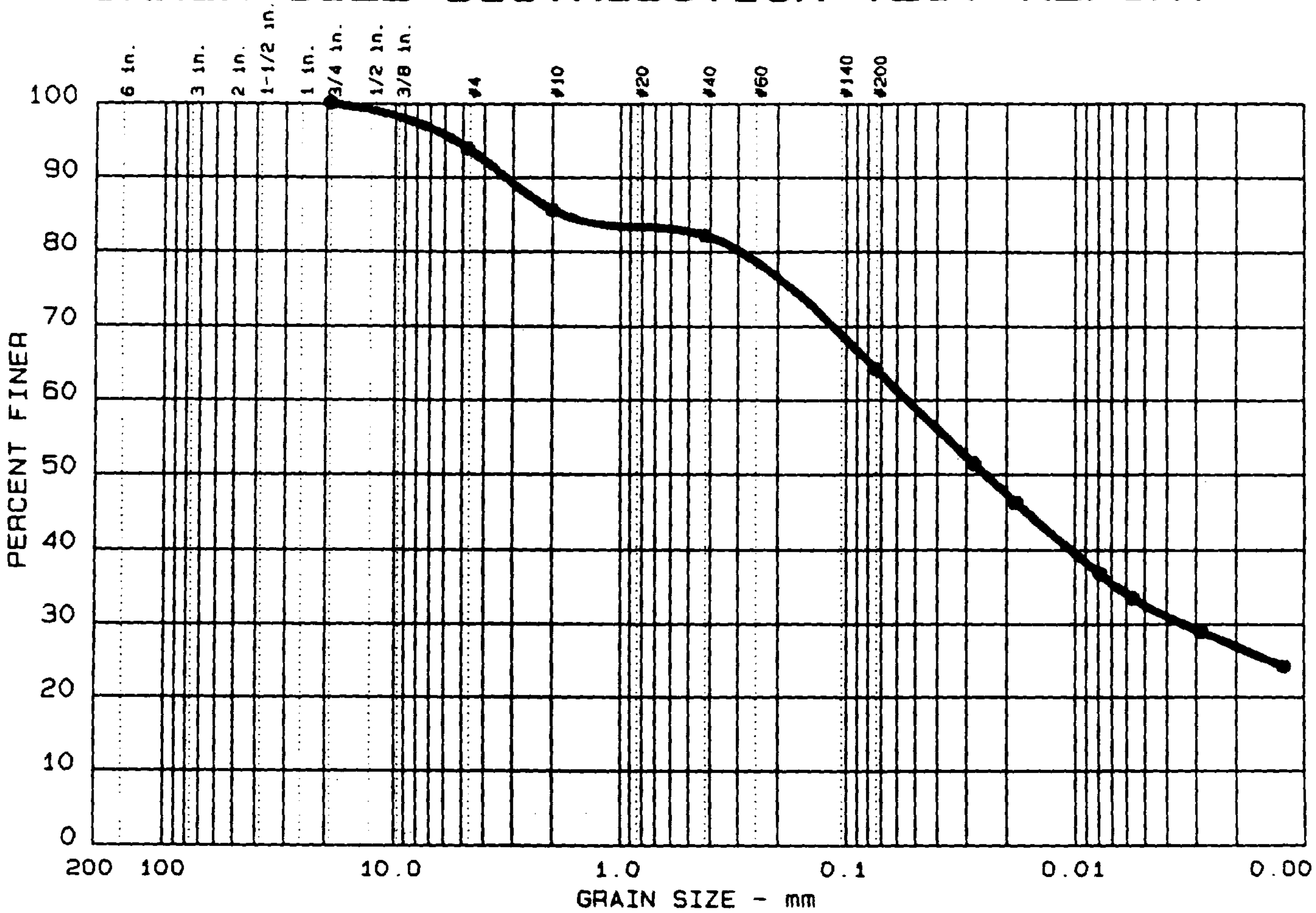
Sample : Waxed Sample WS-1

Remarks :

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91237

Mason - de Verteuil
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND COARSE	% SAND MEDIUM	% SAND FINE	% SILT	% CLAY
●	0.0	6.0	8.4	3.4	18.0	31.7	32.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	36	23	1.78		0.02	0.003				

MATERIAL DESCRIPTION	USCS	AASHTO
● Silty Clay	CL	A-6(11.6)

Project No.: 91237
Project: Clark Co. Landfill
● Location: Boring C91-3, WS-3, Depth 83.1-84.2'

Date: 09/23/91

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEOTECHNICAL SERVICES

Remarks:

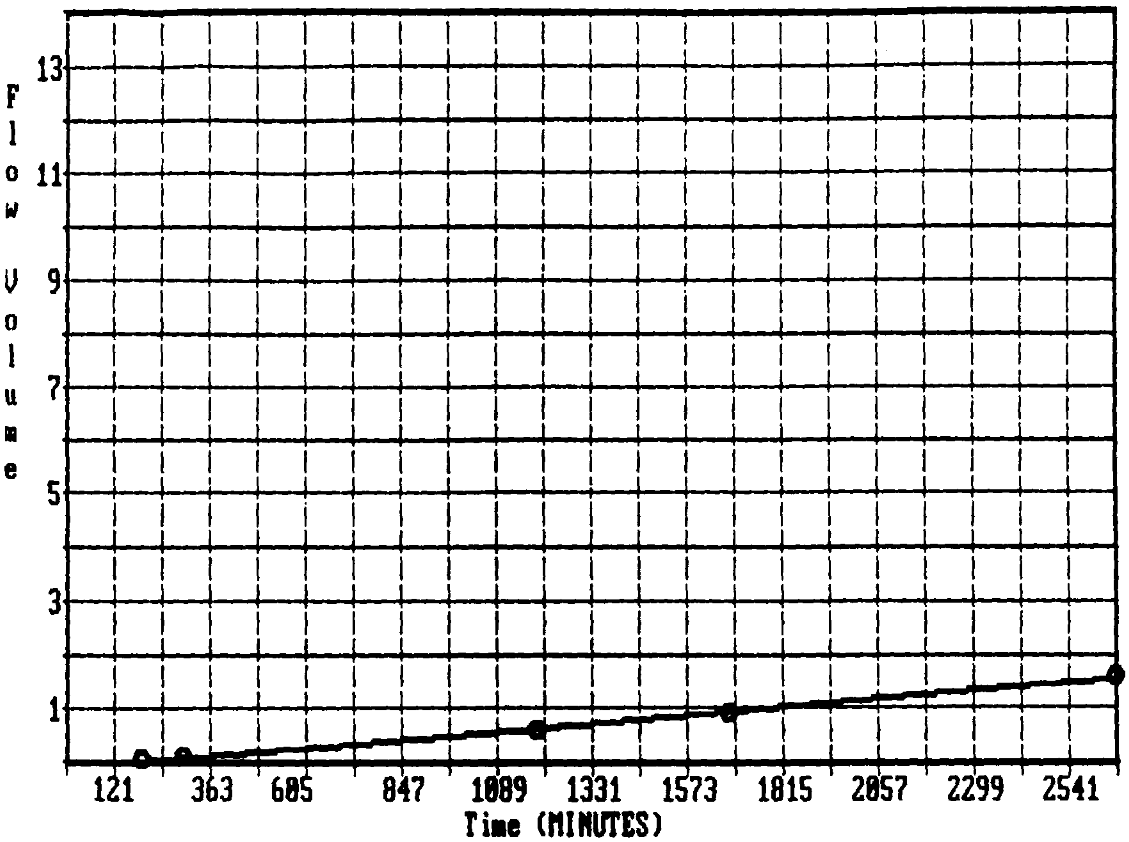
Client:

Eagon & Associates, Inc.

Moisture Content: 14.2%

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
C91-3	83.1-84.2'	Silty Clay		36	23	14.2

Flow (cc)	Length (cm)	Head Loss (cm)
1.6	5.461	805.00
Area (cm^2)	Time (sec.)	Dry Density (pcf)
37.497	159360	116.25

K = (Q L / H A T)

= 1.016E-09 cm / sec

NUM.	DATE	TIME	VOLUME
1	10/01/91	11:17	0.4
2		14:26	0.4
3		16:12	0.5
4	10/02/91	07:05	1.0
5		15:15	1.3
6	10/03/91	07:33	2.0

Sample : Waxed Sample WS-3

Remarks :

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91237

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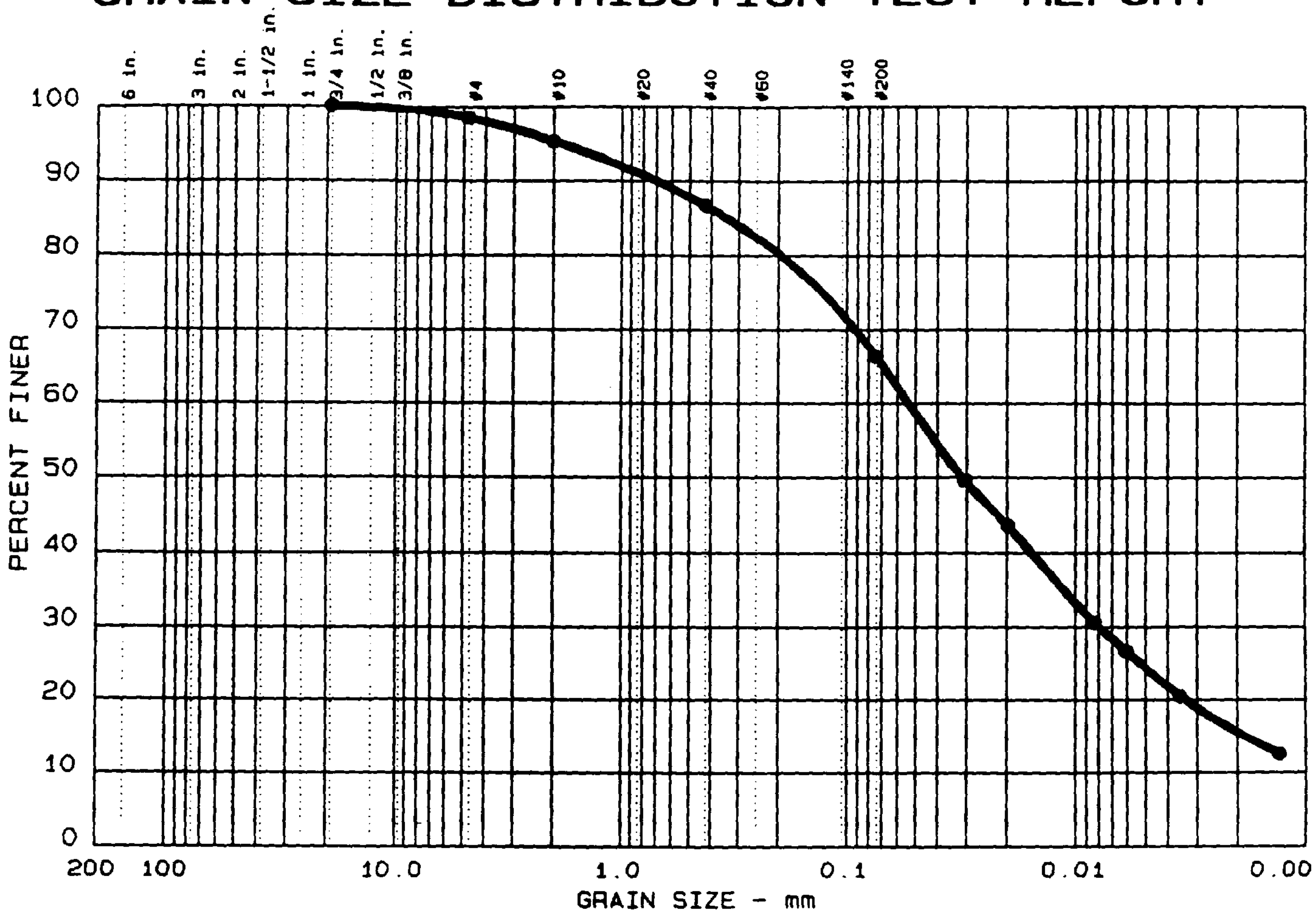
GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND			% SILT	% CLAY
			COARSE	MEDIUM	FINE		
●	0.0	1.5	3.2	8.6	20.3	42.0	24.4

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	23	11	0.33		0.03	0.008	0.0018			

MATERIAL DESCRIPTION	USCS	AASHTO
● Silty Clay	CL	A-6 (4.1)

Project No.: 91237
Project: Clark Co. Landfill
● Location: Boring C91-4, WS-1, Depth 36.5-37.5'

Date: 9/23/91

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEOTECHNICAL SERVICES

Remarks:

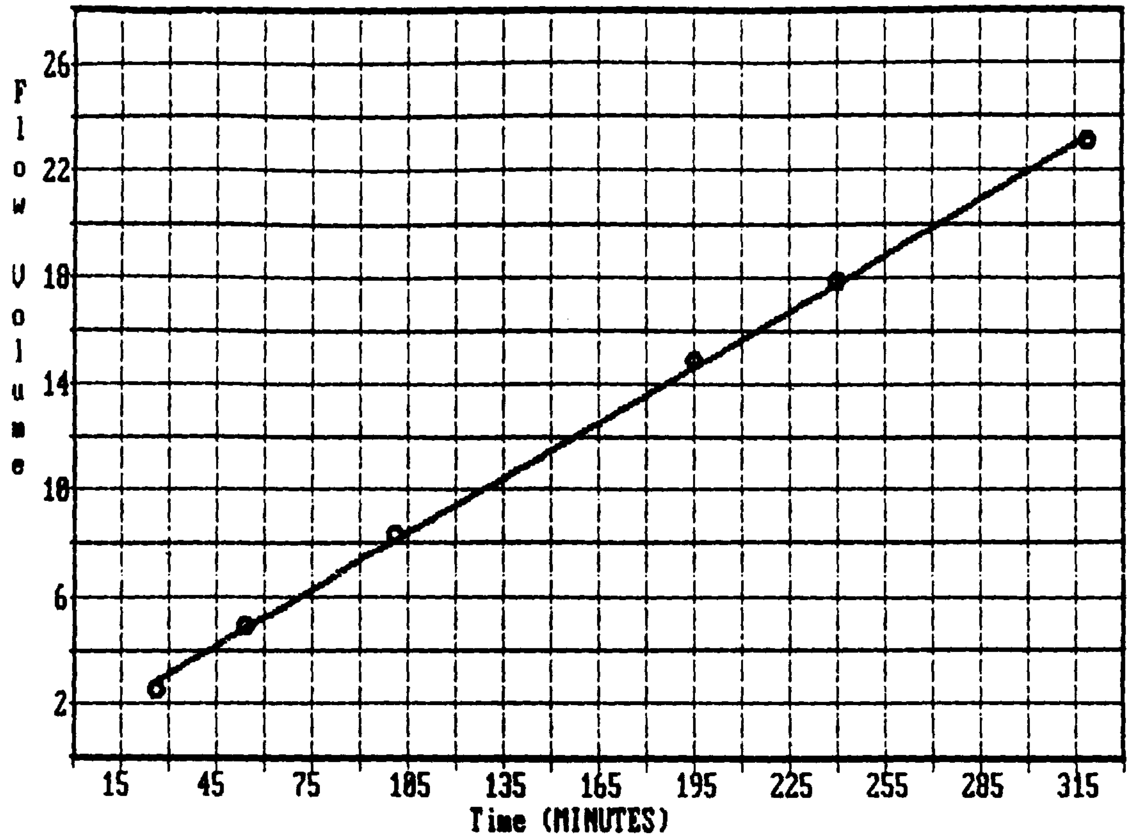
Client:

Eagon & Associates, Inc.

Moisture Content: 11.3%

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
C91-4	36.5-37.5'	Silty Clay		23	11	11.3

Flow (cc)	Length (cm)	Head Loss (cm)
23.1	6.259	454.00
Area (cm^2)	Time (sec.)	Dry Density (pcf)
37.359	19140	127.60

K = (Q L / H A T)

= 4.453E-07 cm / sec

NUM.	DATE	TIME	VOLUME
1	09/30/91	09:07	0.3
2		09:33	2.8
3		10:01	5.2
4		10:48	8.6
5		12:22	15.2
6		13:07	18.2
7		14:26	23.4

Sample : Waxed sample

Remarks :

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91237

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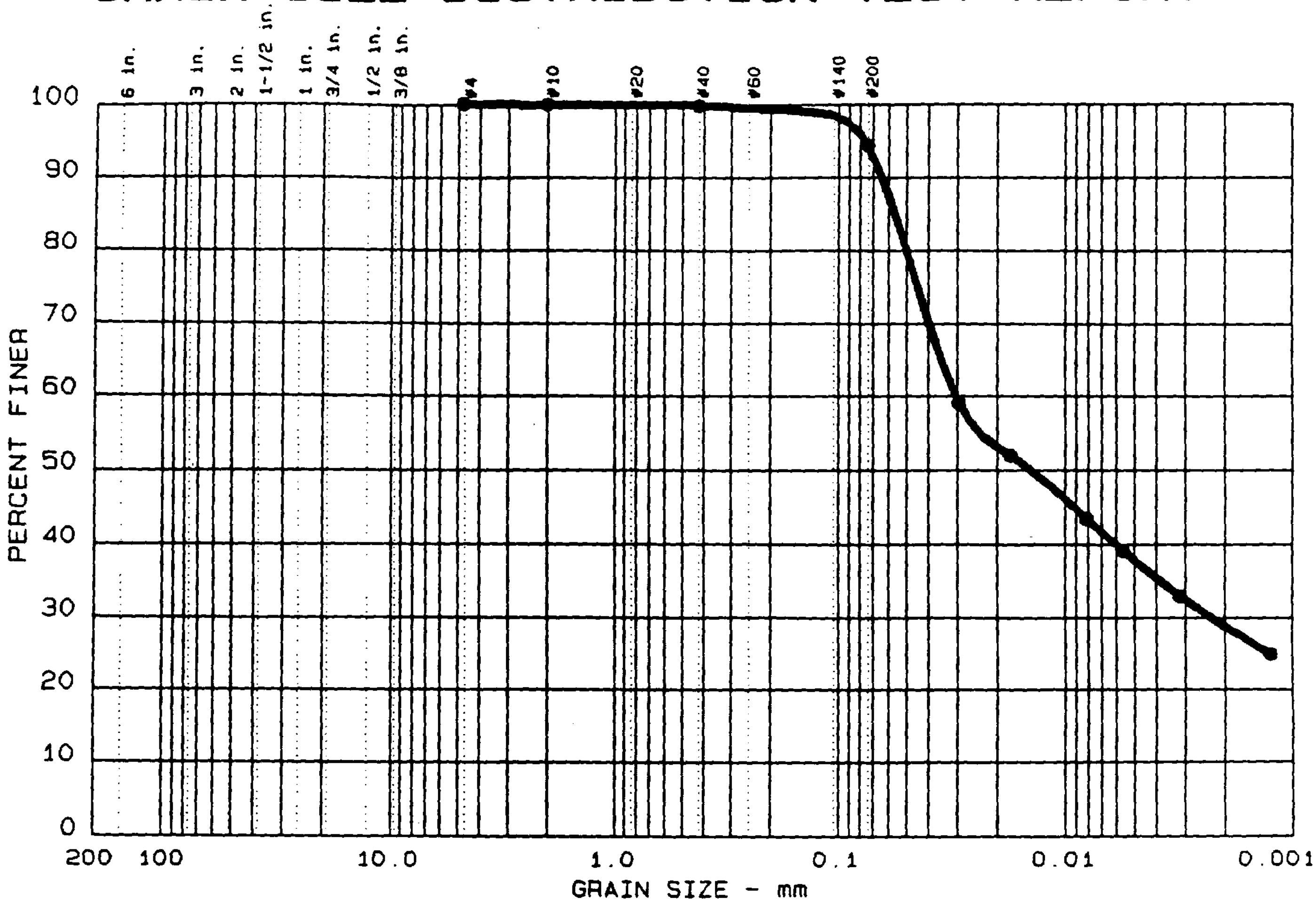
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND COARSE	% SAND MEDIUM	% SAND FINE	% SILT	% CLAY
●	0.0	0.0	0.2	0.1	5.3	56.6	37.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	35	17			0.01	0.002				

MATERIAL DESCRIPTION	USCS	AASHTO
● Silty Clay	CL	A-6(15.9)

Project No.: 91237
Project: Clark Co. Landfill
● Location: Boring C91-4, WS-2, Depth 56.5-57.5'

Date: 9/23/91

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEOTECHNICAL SERVICES

Remarks:

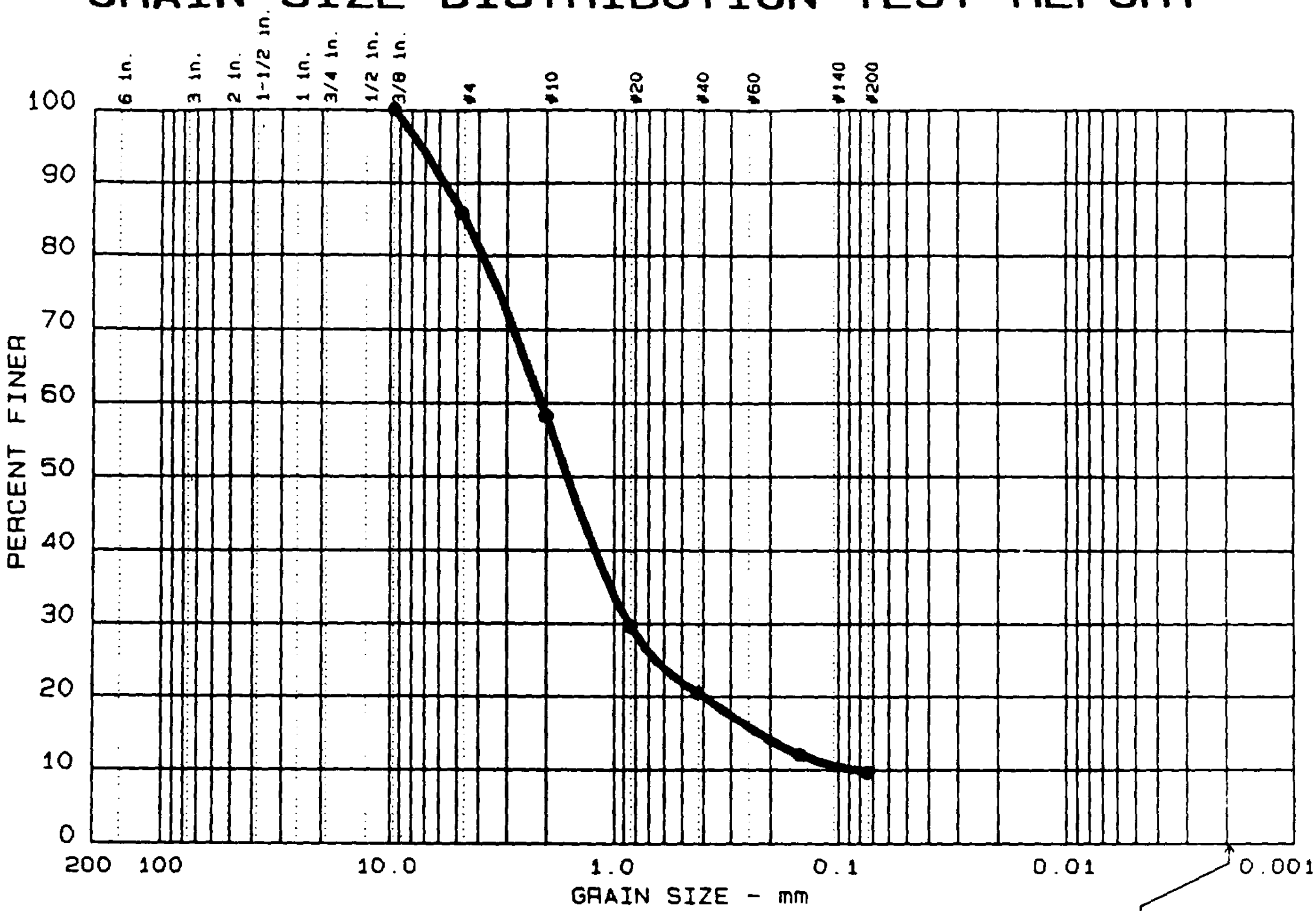
Client:

Eagon & Associates, Inc.

Moisture Content: 22.8%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND COARSE	% SAND MEDIUM	% SAND FINE	% SILT	% CLAY
●	0.0	14.1	27.7	37.6	10.8	9.7	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●		NP	4.57	2.10	1.61	0.852	0.2241	0.0833	4.15	25.2

MATERIAL DESCRIPTION	USCS	AASHTO
● Poorly graded silty Sand with gravel	SP-SM	A-1-b

Project No.: 91237
Project: Clark Co. Landfill
● Location: Boring C91-4X, S-4X, Depth 33.7-34.4'

Date: 09/30/91

Remarks:
Client:
Eagon & Associates, Inc.

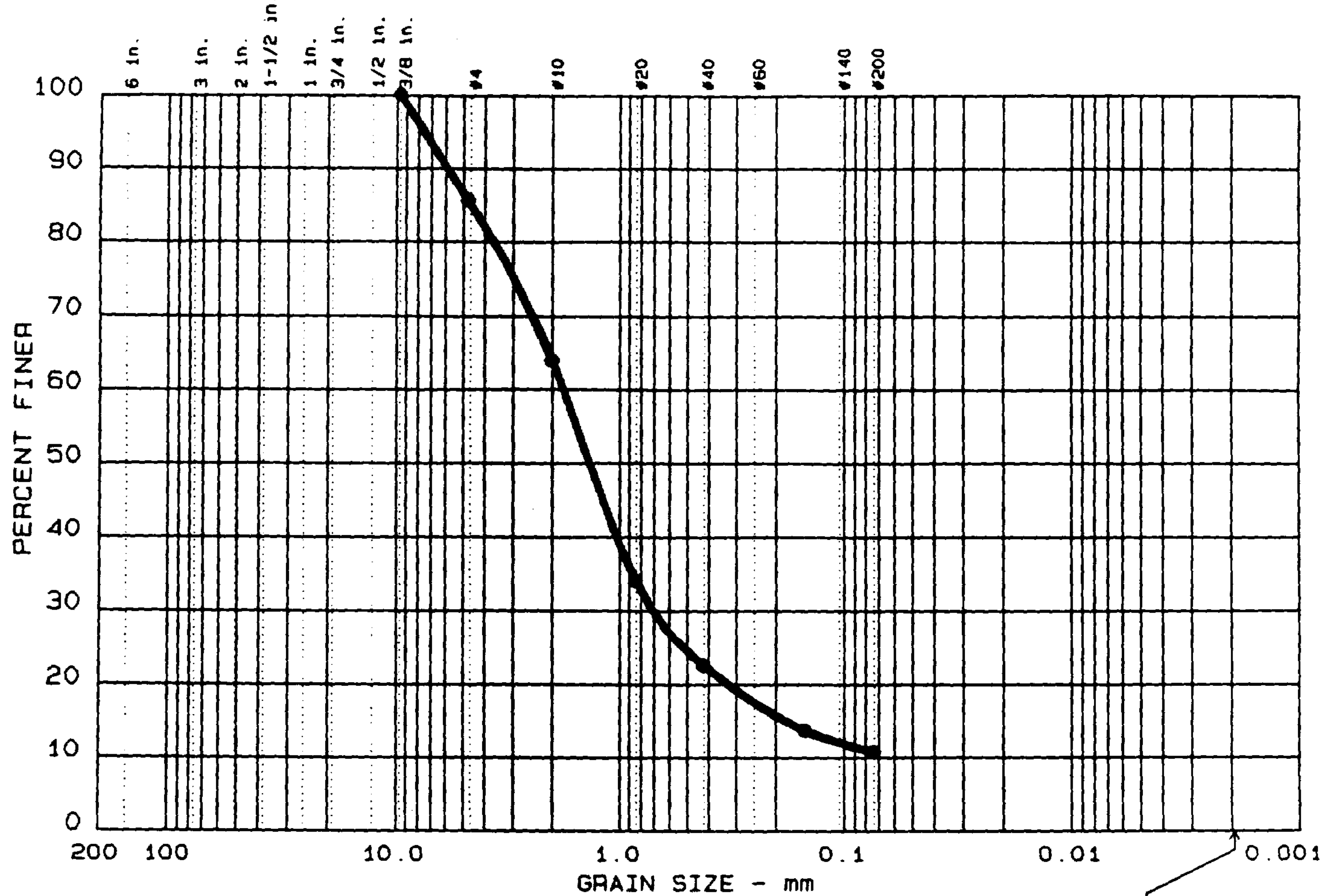
Moisture Content: 10.9%

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEOTECHNICAL SERVICES

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND COARSE	% SAND MEDIUM	% SAND FINE	% SILT	% CLAY
●	0.0	14.3	21.7	41.3	11.9	10.8	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●		NP	4.57	1.78	1.36	0.705	0.1791			

MATERIAL DESCRIPTION	USCS	AASHTO
● Poorly graded silty Sand	SP-SM	A-1-b

Project No.: 91237
Project: Clark Co. Landfill
● Location: Boring C91-4Z, S-2Z, Depth 17.0-17.8'

Date: 09/30/91

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEOTECHNICAL SERVICES

Remarks:

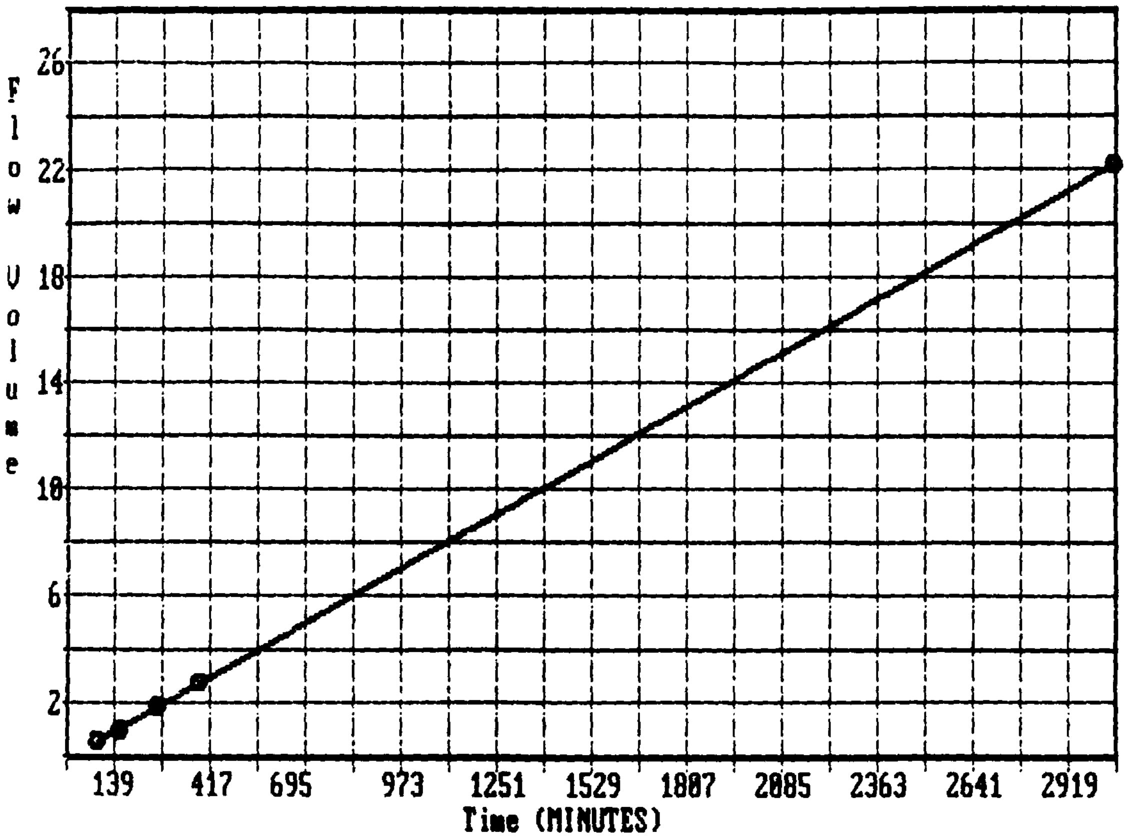
Client:

Eagon & Associates, Inc.

Moisture Content: 11.5%

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
C91-4	56.5-57.5'	Silty Clay		35	17	22.8

Flow (cc)	Length (cm)	Head Loss (cm)
22.2	6.454	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
37.995	182820	105.94

K = (Q L / H A T)

= 2.562E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	10/11/91	09:51	0.7
2		11:20	1.3
3		12:22	1.7
4		14:17	2.6
5		16:14	3.5
6	10/13/91	12:38	22.9

Sample : Waxed Sample WS-2

Remarks :

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91237

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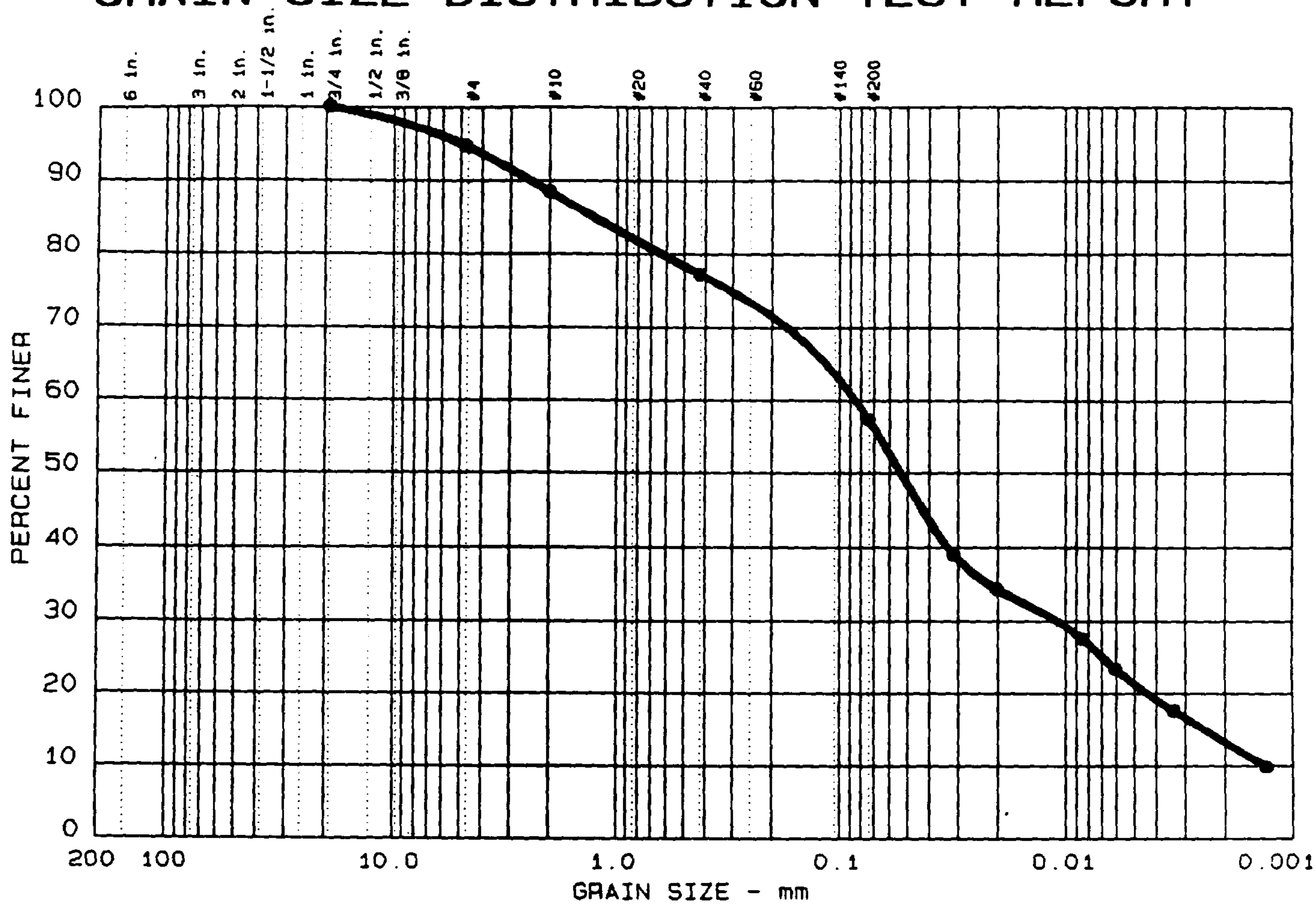
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND COARSE	% SAND MEDIUM	% SAND FINE	% SILT	% CLAY
●	0.0	5.3	6.2	11.3	19.9	36.1	21.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	24	11	1.24	0.08	0.05	0.011	0.0024	0.0013	1.08	63.8

MATERIAL DESCRIPTION	USCS	AASHTO
● Silty Clay	CL	A-6(3.1)

Project No.: 91237
Project: Clark Co. Landfill
● Location: Boring C91-5D, WS-1, Depth 28.2-29.7'

Date: 09/23/91

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEOTECHNICAL SERVICES

Remarks:

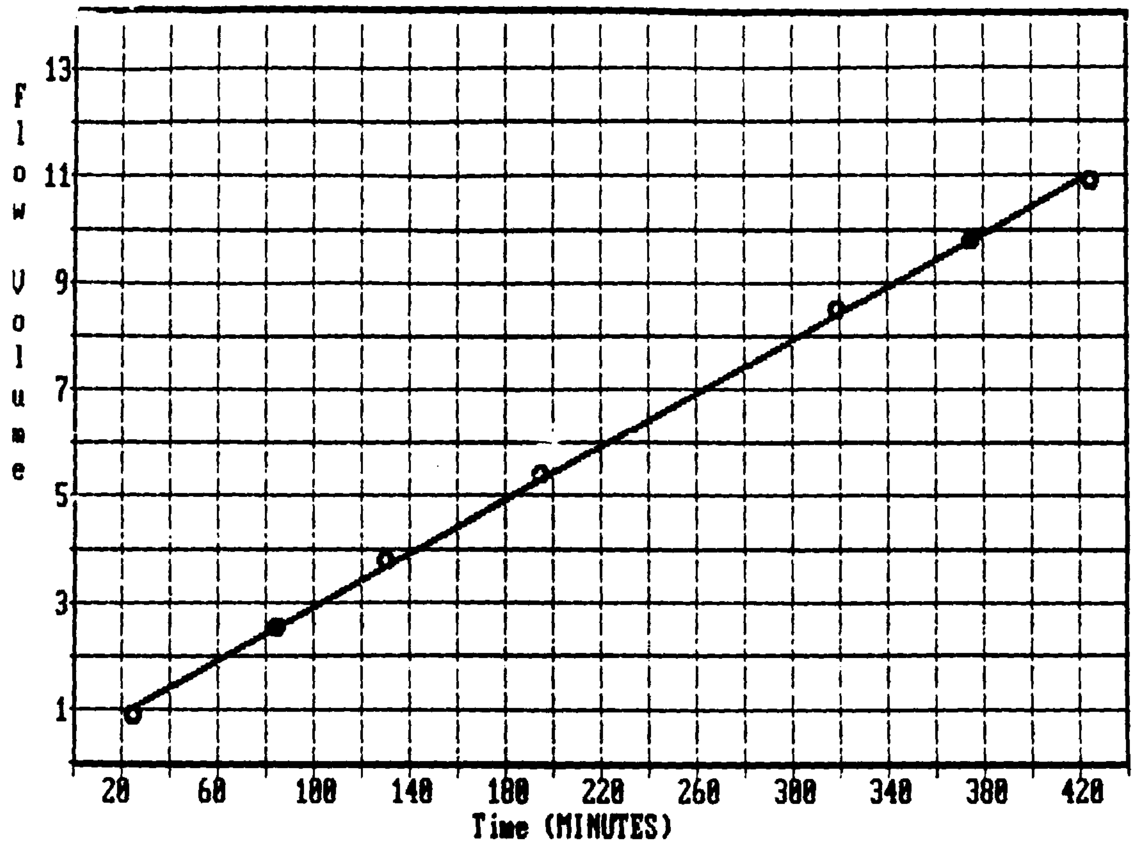
Client:

Eagon & Associates, Inc.

Moisture Content: 10.0%

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
C91-5D	28.2-29.7'	Silty Clay		24	11	10.0

Flow (cc)	Length (cm)	Head Loss (cm)
10.9	5.855	454.00
Area (cm^2)	Time (sec.)	Dry Density (pcf)
39.197	25500	126.91

K = (Q L / H A T)

= 1.406E-07 cm / sec

NUM.	DATE	TIME	VOLUME
1	09/30/91	09:07	0.7
2		09:32	1.6
3		10:32	3.3
4		11:17	4.5
5		12:22	6.1
6		14:26	9.2
7		15:22	10.5
8		16:12	11.6

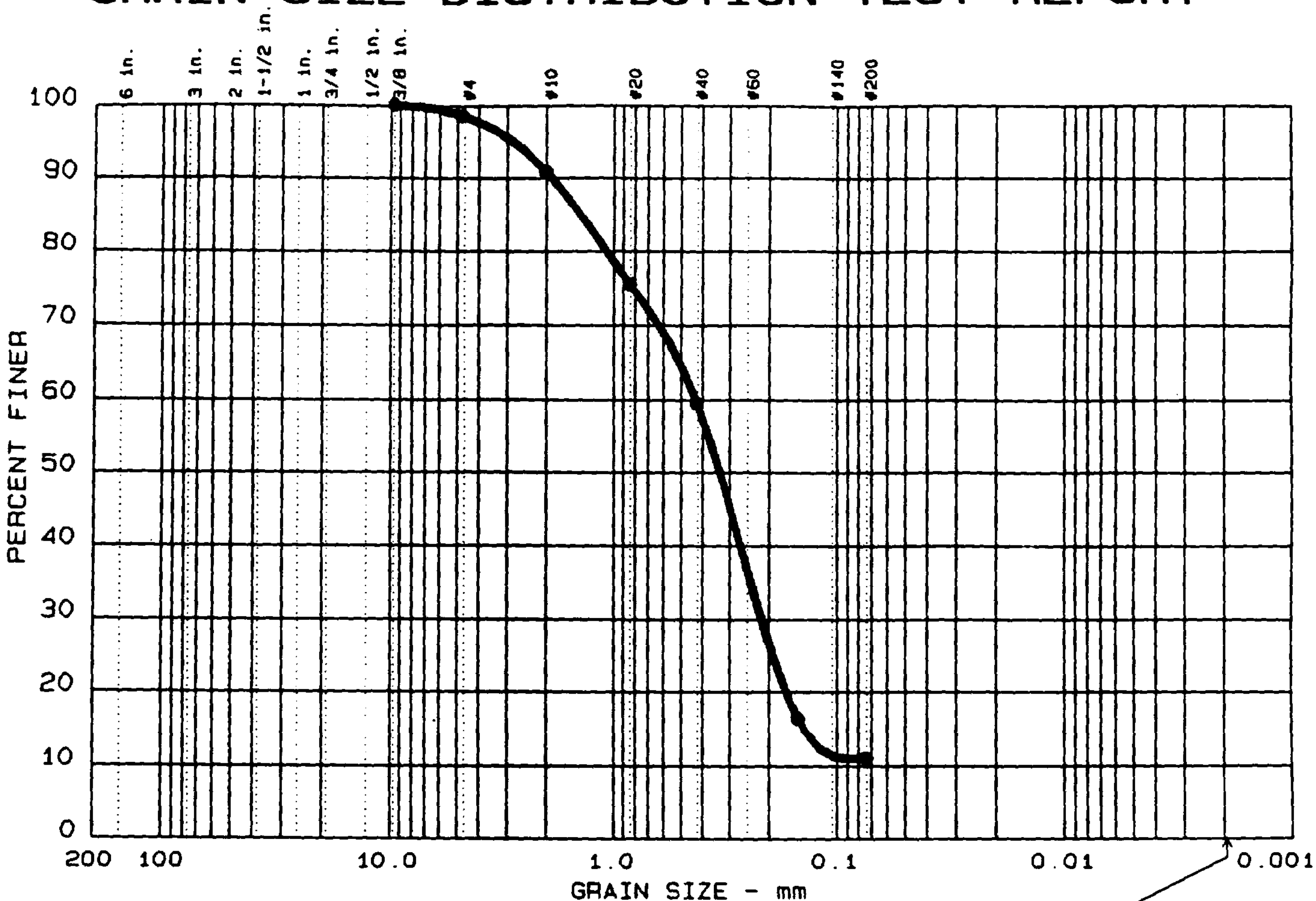
Sample : Waxed Sample WS-1

Remarks :

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91237

Mason - de Verteuil
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND COARSE	% SAND MEDIUM	% SAND FINE	% SILT	% CLAY
●	0.0	1.4	7.7	31.3	48.4	11.1	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●		NP	1.40	0.43	0.33	0.216	0.1396			

MATERIAL DESCRIPTION	USCS	AASHTO
● Poorly graded silty Sand	SP-SM	A-2-4(0.4)

Project No.: 91237
Project: Clark Co. Landfill
● Location: Boring C91-5D, S-26, Depth 79.0-80.5'

Date: 09/30/91

Remarks:

Client:

Eagon & Associates, Inc.

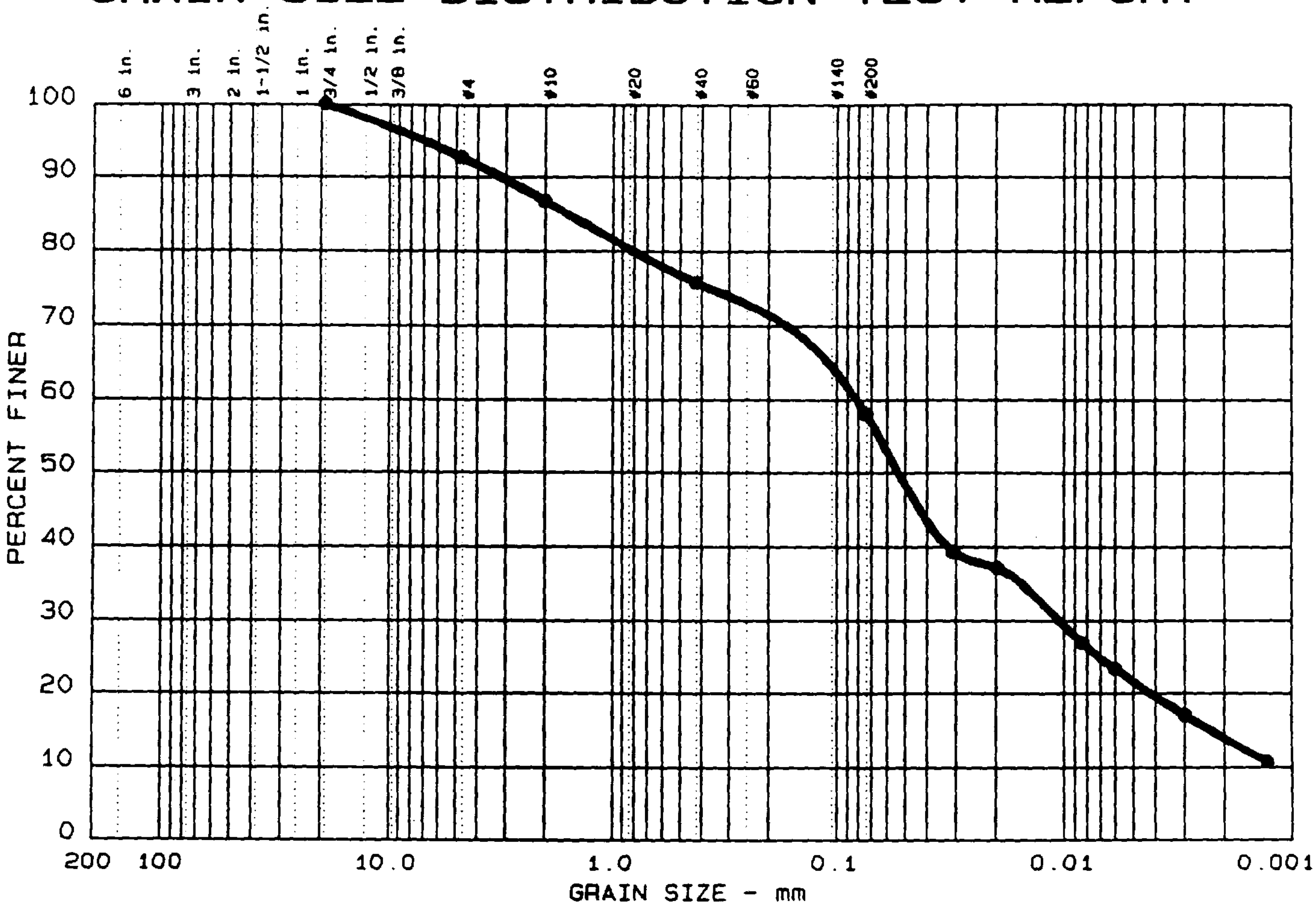
Moisture Content: 13.4%

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEOTECHNICAL SERVICES

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND COARSE	% SAND MEDIUM	% SAND FINE	% SILT	% CLAY
●	0.0	7.2	6.0	11.0	17.8	36.4	21.7

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	25	9	1.57	0.08	0.05	0.011	0.0023			

MATERIAL DESCRIPTION	USCS	AASHTO
● Silty Clay	CL	A-4 (2.4)

Project No.: 91237
Project: Clark Co. Landfill
● Location: Boring C91-6, ST-1, Depth 20.0-22.2'

Date: 9/14/91

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEOTECHNICAL SERVICES

Remarks:

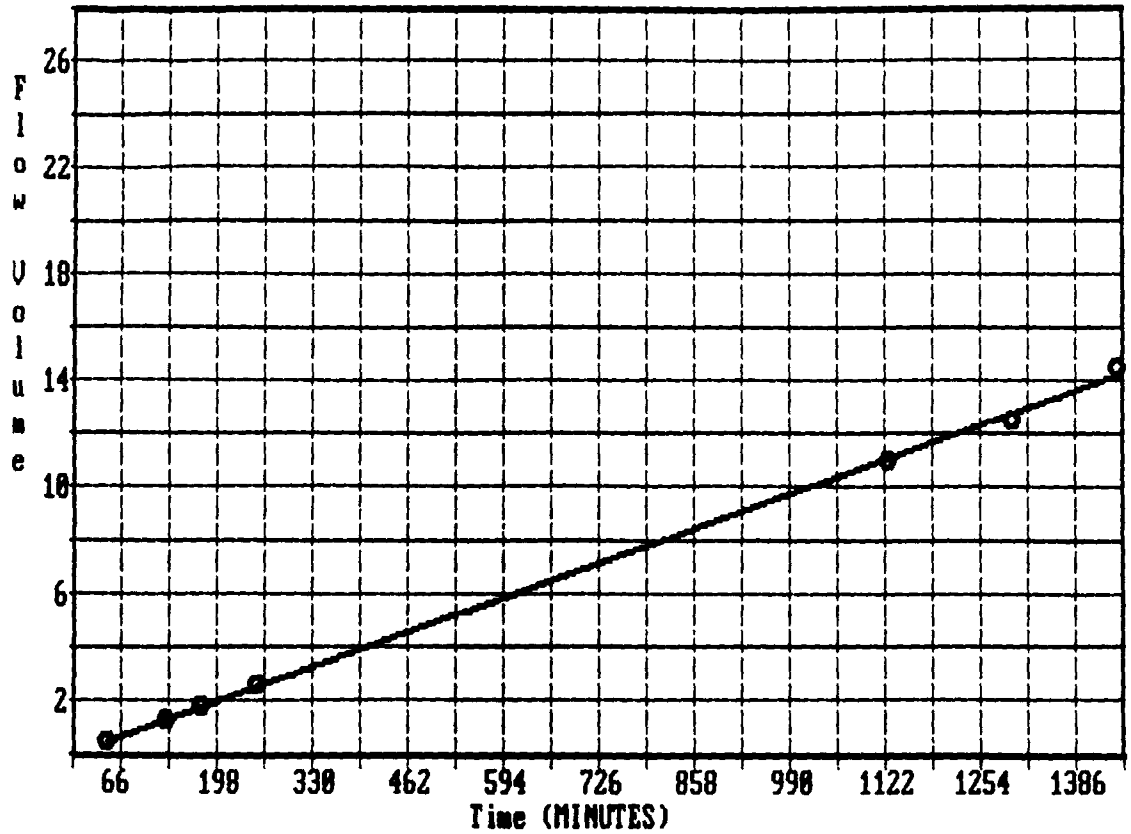
Client:

Eagon & Associates, Inc.

Moisture Content: 14.1%

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
C91-6	20.0-22.2'	Silty Clay		25	9	14.1

Flow (cc)	Length (cm)	Head Loss (cm)
14.5	6.510	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
41.223	86580	123.71

K = (Q L / H A T)

= 3.285E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	09/16/91	12:23	1.1
2		13:09	1.6
3		14:30	2.4
4		15:20	2.9
5		16:35	3.7
6	09/17/91	07:10	12.1
7		10:00	13.6
8		12:26	15.6

Sample : Shelby Tube

Remarks :

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91237

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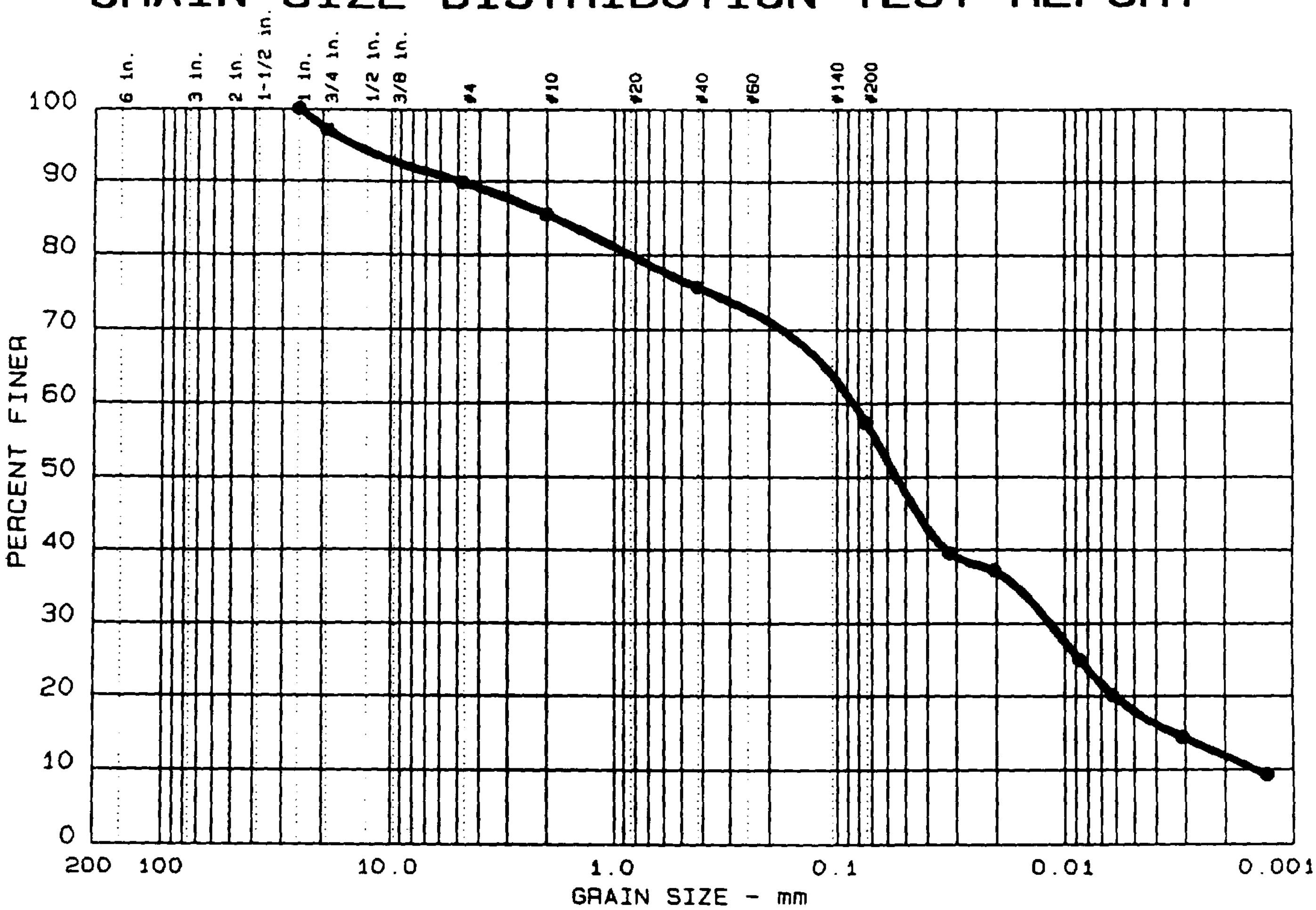
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND COARSE	% SAND MEDIUM	% SAND FINE	% SILT	% CLAY
●	0.0	10.1	4.4	9.8	18.4	39.4	17.9

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	21	10	1.84	0.08	0.05	0.012	0.0033	0.0015	1.10	57.5

MATERIAL DESCRIPTION	USCS	AASHTO
● Silty Clay	CL	A-4(2.3)

Project No.: 91237
Project: Clark Co. Landfill
● Location: Boring C91-7, ST-1, Depth 15.5' - 17.3'

Date: 9/14/91

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEOTECHNICAL SERVICES

Remarks:

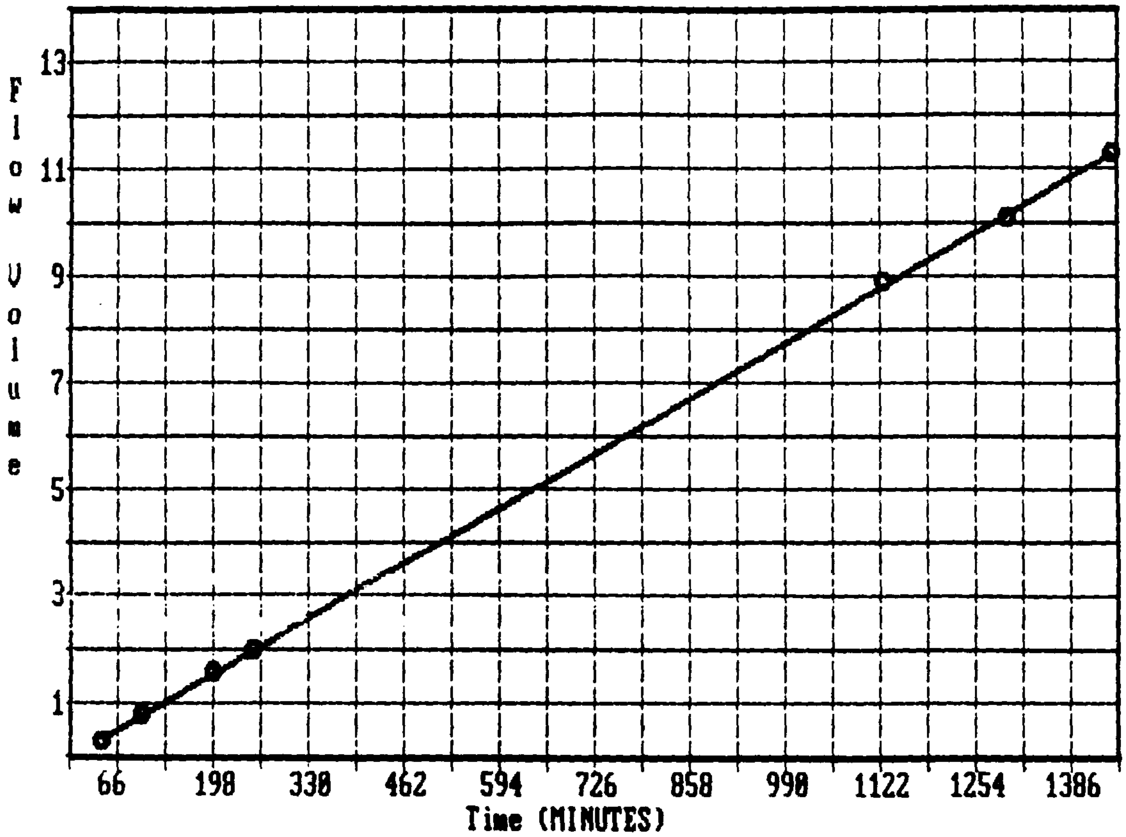
Client:

Eagon & Associates, Inc.

Moisture Content: 10.0%

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
C91-7	15.5-17.3'	Silty Clay		21	10	10.0

Flow (cc)	Length (cm)	Head Loss (cm)
11.3	6.027	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
41.021	86580	134.33

K = (Q L / H A T)

= 2.302E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	09/16/91	12:23	1.4
2		13:08	1.7
3		14:03	2.2
4		15:42	3.0
5		16:35	3.4
6	09/17/91	07:10	10.3
7		10:00	11.5
8		12:26	12.7

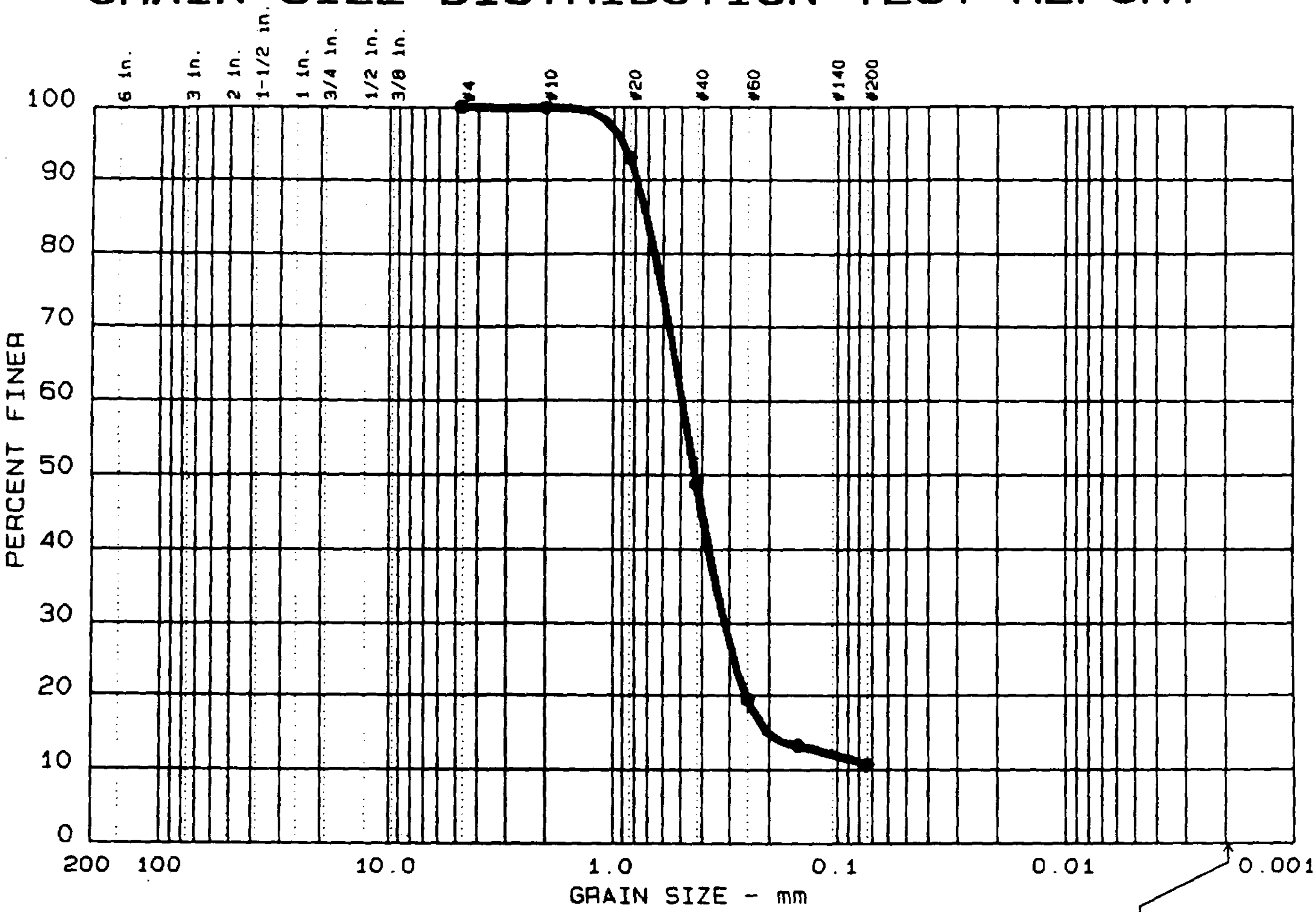
Sample : Shelby Tube

Remarks :

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91237

Mason - de Verteuil
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND COARSE	% SAND MEDIUM	% SAND FINE	% SILT	% CLAY
●	0.0	0.0	0.2	51.1	38.0	10.7	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●		NP	0.71	0.49	0.43	0.316	0.2037			

MATERIAL DESCRIPTION	USCS	AASHTO
● Poorly graded Silty Sand	SP-SM	A-1-b

Project No.: 91237
Project: Clark Co. Landfill
● Location: Boring C91-7, S-26, Depth 88.0-88.5'

Date: 10/2/91

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEOTECHNICAL SERVICES

Remarks:

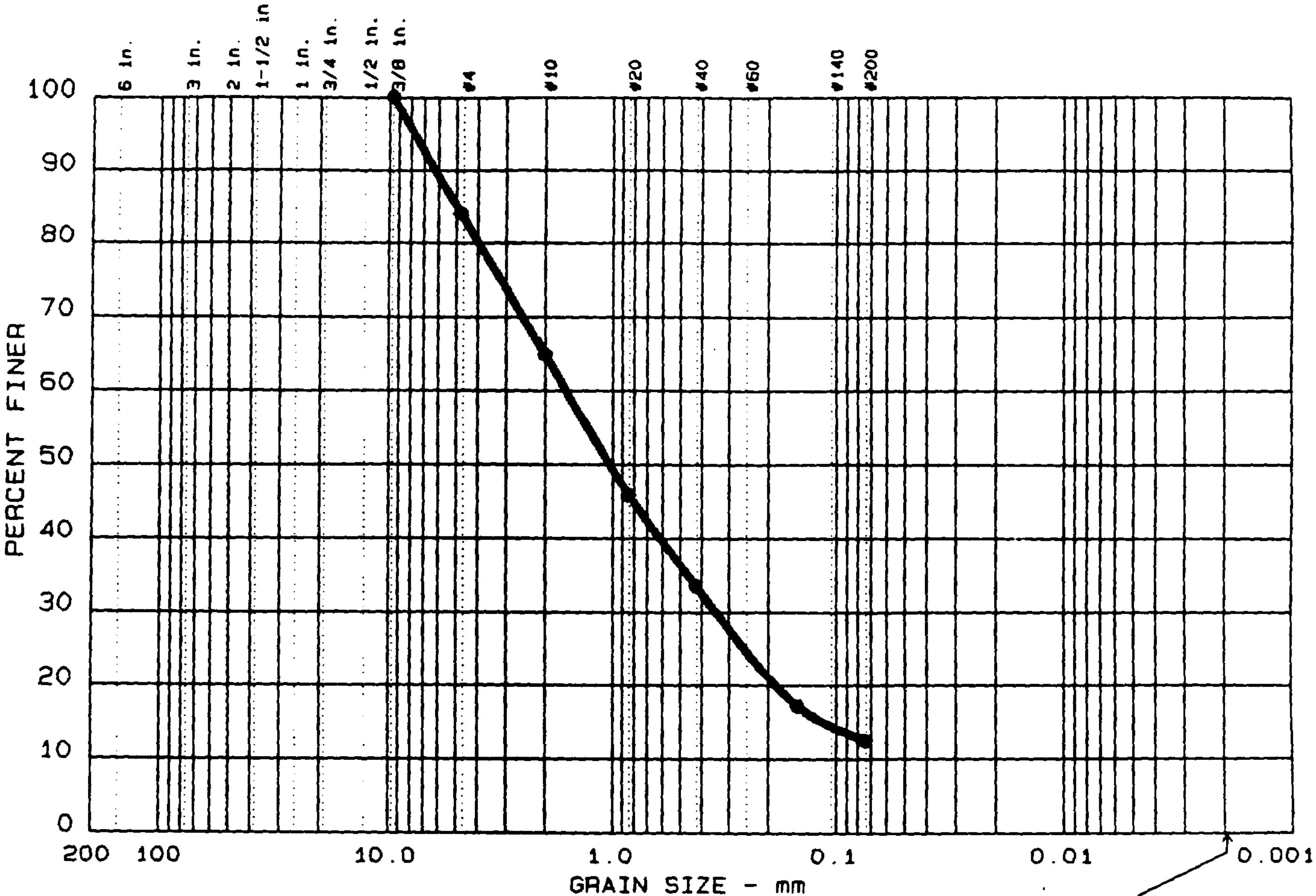
Client:

Eagon & Associates, Inc.

Moisture Content: 17.1%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND			% SILT	% CLAY
			COARSE	MEDIUM	FINE		
●	0.0	15.9	19.1	31.5	21.0	12.5	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●		NP	4.95	1.60	1.02	0.343	0.1135			

MATERIAL DESCRIPTION	USCS	AASHTO
● Silty Sand with gravel	SM	A-1-b

Project No.: 91237
Project: Clark Co. Landfill
● Location: Boring C91-8D, S-15, Depth 42.7-44.1'

Date: 09/30/91

Remarks:

Client:

Eagon & Associates, Inc.

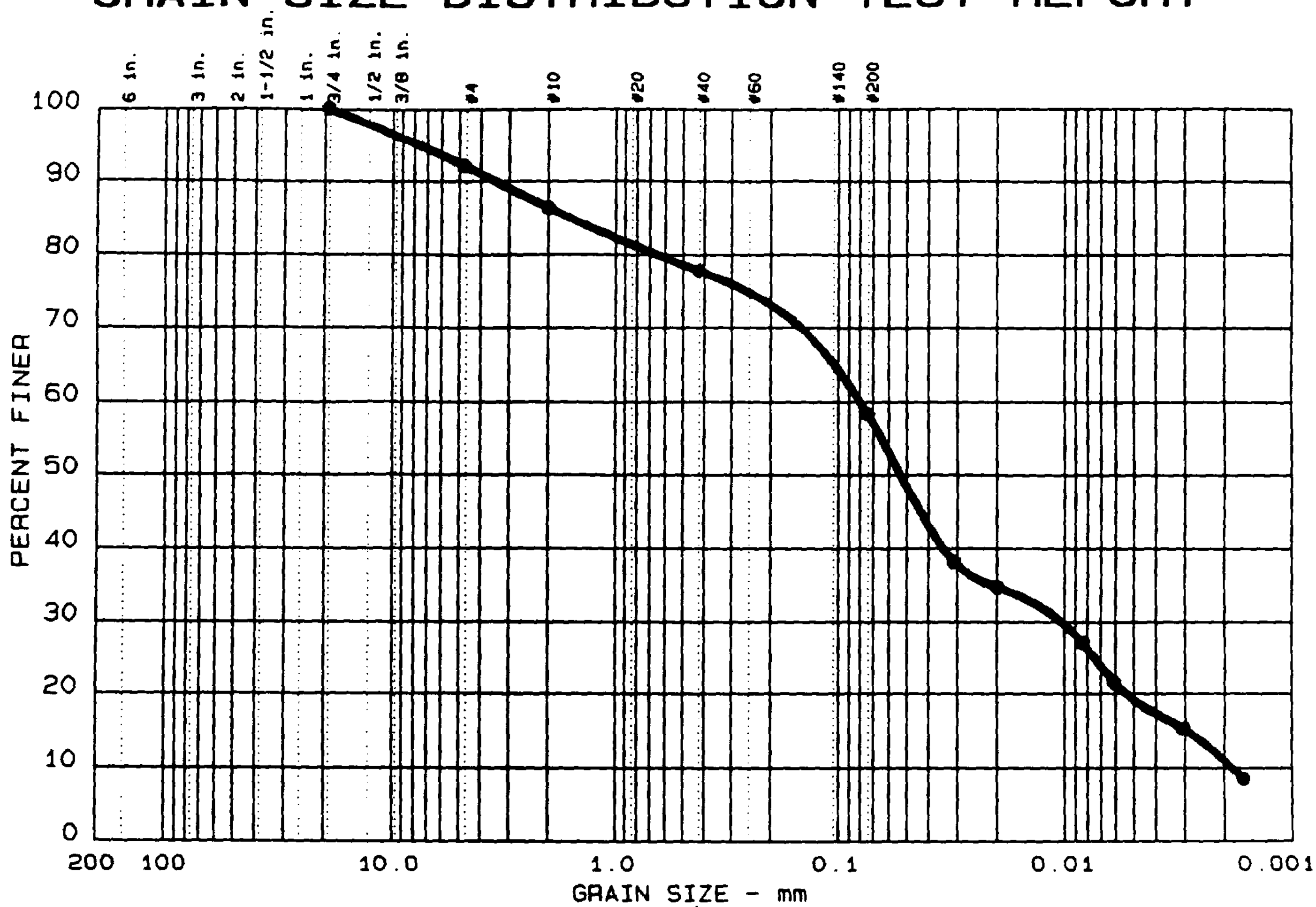
Moisture Content: 8.0%

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEOTECHNICAL SERVICES

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND COARSE	% SAND MEDIUM	% SAND FINE	% SILT	% CLAY
●	0.0	7.8	5.8	8.6	19.4	39.2	19.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	22	9	1.58	0.08	0.05	0.010	0.0029	0.0018	0.72	43.7

MATERIAL DESCRIPTION	USCS	AASHTO
● Silty Clay	CL	A-4(2.1)

Project No.: 91237
Project: Clark Co. Landfill
● Location: Boring C91-8D, WS-1, Depth 56.7-58.1'

Date: 10/2/91

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEOTECHNICAL SERVICES

Remarks:

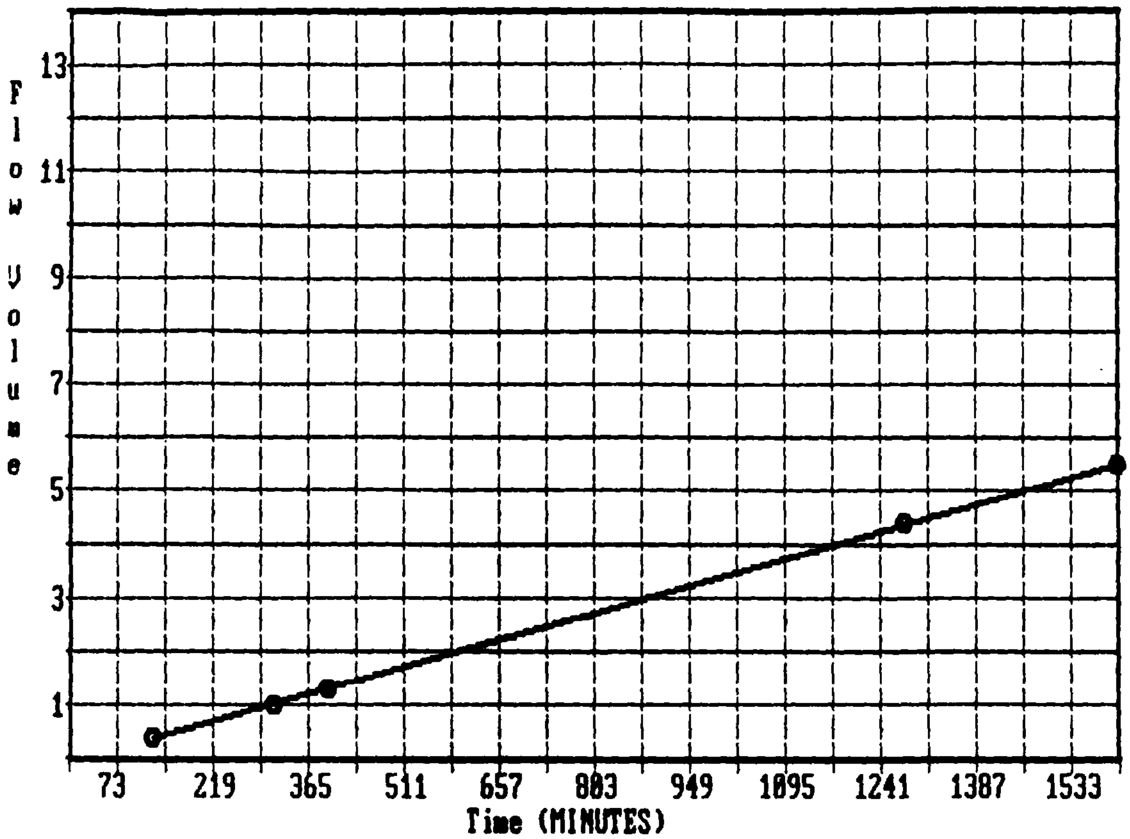
Client:

Eagon & Associates, Inc.

Moisture Content: 9.9%

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
C91-8D	56.7-58.1'	Silty Clay		22	9	9.9

Flow (cc)	Length (cm)	Head Loss (cm)
5.5	6.632	805.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
39.905	96180	133.83

K = (Q L / H A T)

= 1.181E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	10/08/91	10:17	0.3
2		12:23	0.7
3		15:20	1.3
4		16:50	1.6
5	10/09/91	07:35	4.7
6		13:00	5.8

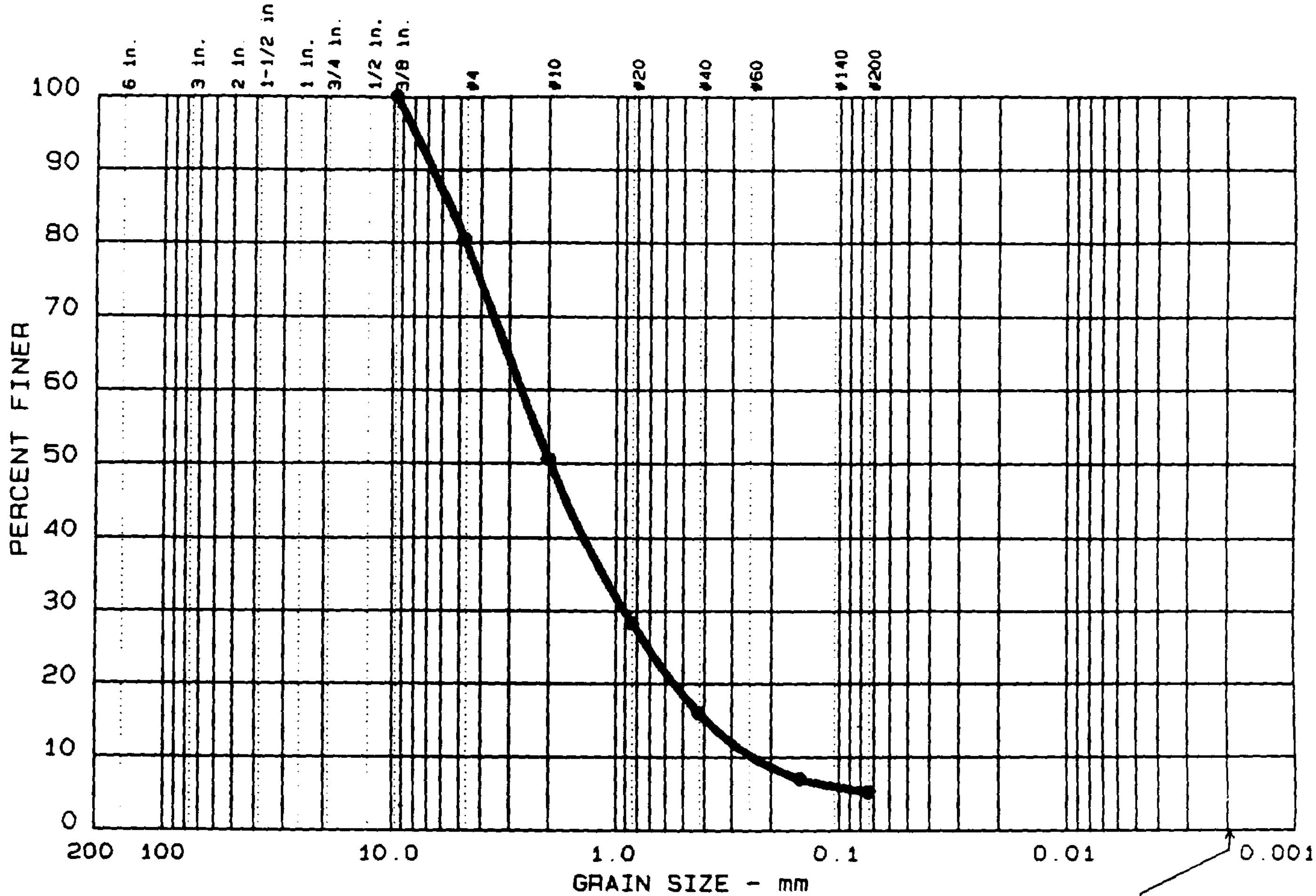
Sample : Waxed Sample WS-1

Remarks :

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91237

Mason - de Verteuil
Geotechnical Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND COARSE	% SAND MEDIUM	% SAND FINE	% SILT	% CLAY
●	0.0	19.5	29.9	34.5	10.8	5.3	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●		NP	5.50	2.65	1.96	0.907	0.3868	0.2413	1.29	11.0

MATERIAL DESCRIPTION	USCS	AASHTO
● Well graded silty Sand with gravel	SW-SM	A-1-b

Project No.: 91237
Project: Clark Co. Landfill
● Location: Boring C91-8D,S-34, Depth 113.0' - 114.0'

Date: 09/30/91

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEOTECHNICAL SERVICES

Remarks:

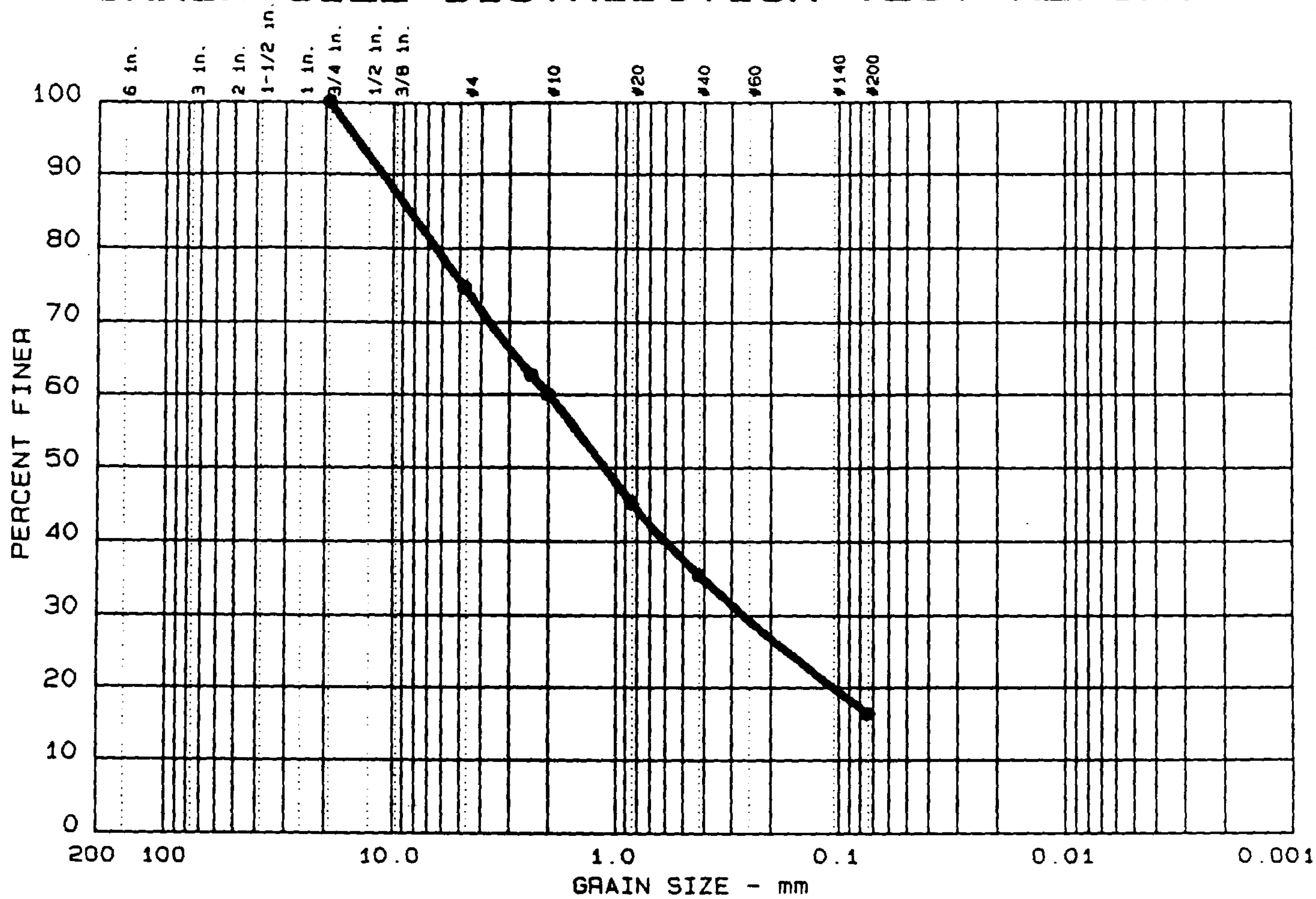
Client:

Eagon & Associates, Inc.

Moisture Content: 9.6%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND COARSE	% SAND MEDIUM	% SAND FINE	% SILT	% CLAY
●	0.0	25.3	14.7	24.6	18.9	16.4	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●		NP	8.32	2.00	1.11	0.266				

MATERIAL DESCRIPTION	USCS	AASHTO
● Silty Sand with gravel	SM	A-1-b

Project No.: 91237
Project: Clark Co. Landfill
● Location: Boring C91-8Y, S-2Y, Depth 23.0-24.6'

Date: 9/14/91

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEOTECHNICAL SERVICES

Remarks:

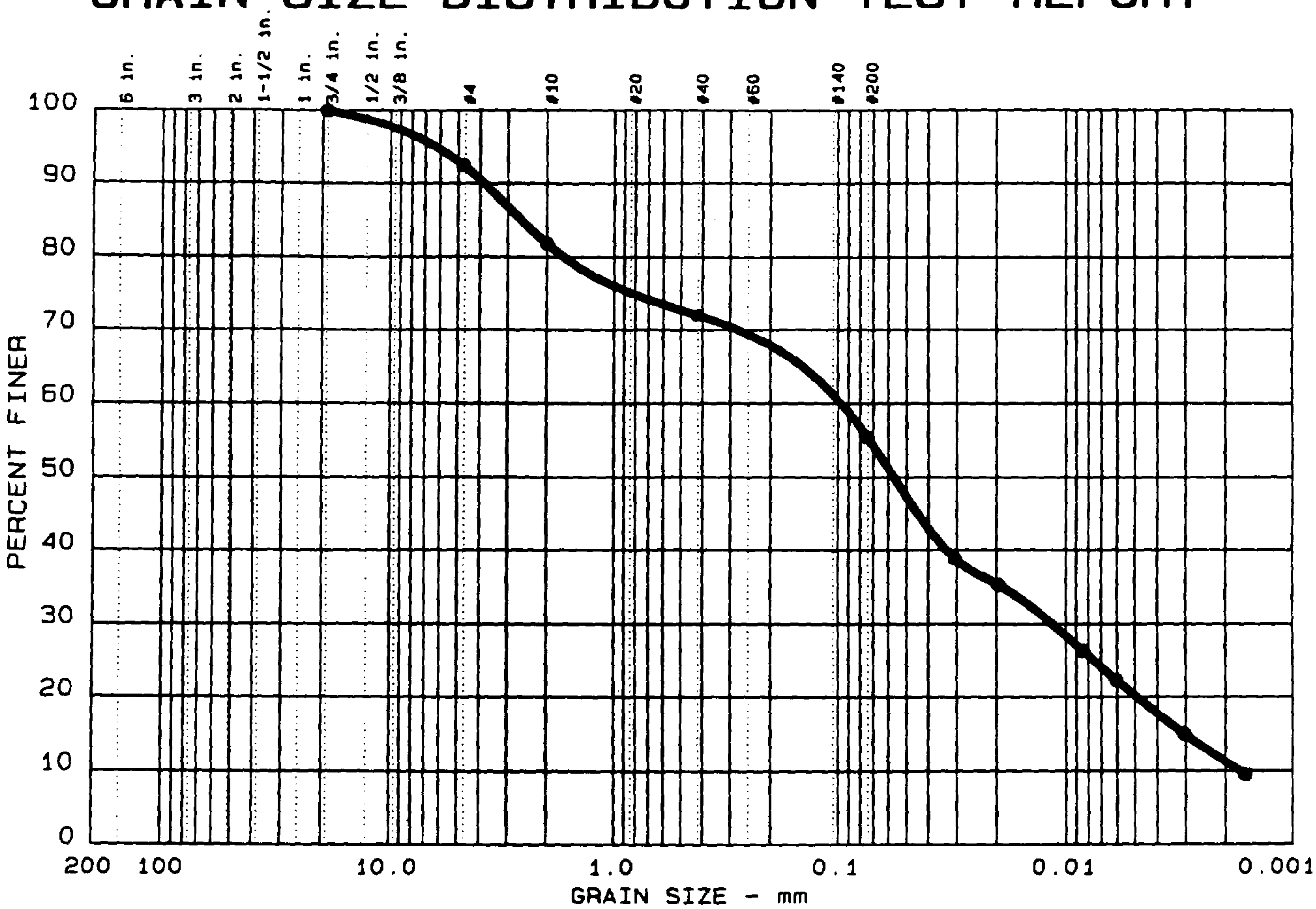
Client:

Eagon & Associates, Inc.

Moisture Content: 8.6%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND COARSE	% SAND MEDIUM	% SAND FINE	% SILT	% CLAY
●	0.0	7.5	10.8	9.7	16.6	35.3	20.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	23	10	2.60	0.10	0.06	0.011	0.0031	0.0017	0.79	56.9

MATERIAL DESCRIPTION	USCS	AASHTO
● Silty Clay	CL	A-4 (2.3)

Project No.: 91237

Project: Clark Co. Landfill

● Location: Boring C91-9, WS-1, Depth 50.5' - 51.7'

Date: 10/2/91

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEOTECHNICAL SERVICES

Remarks:

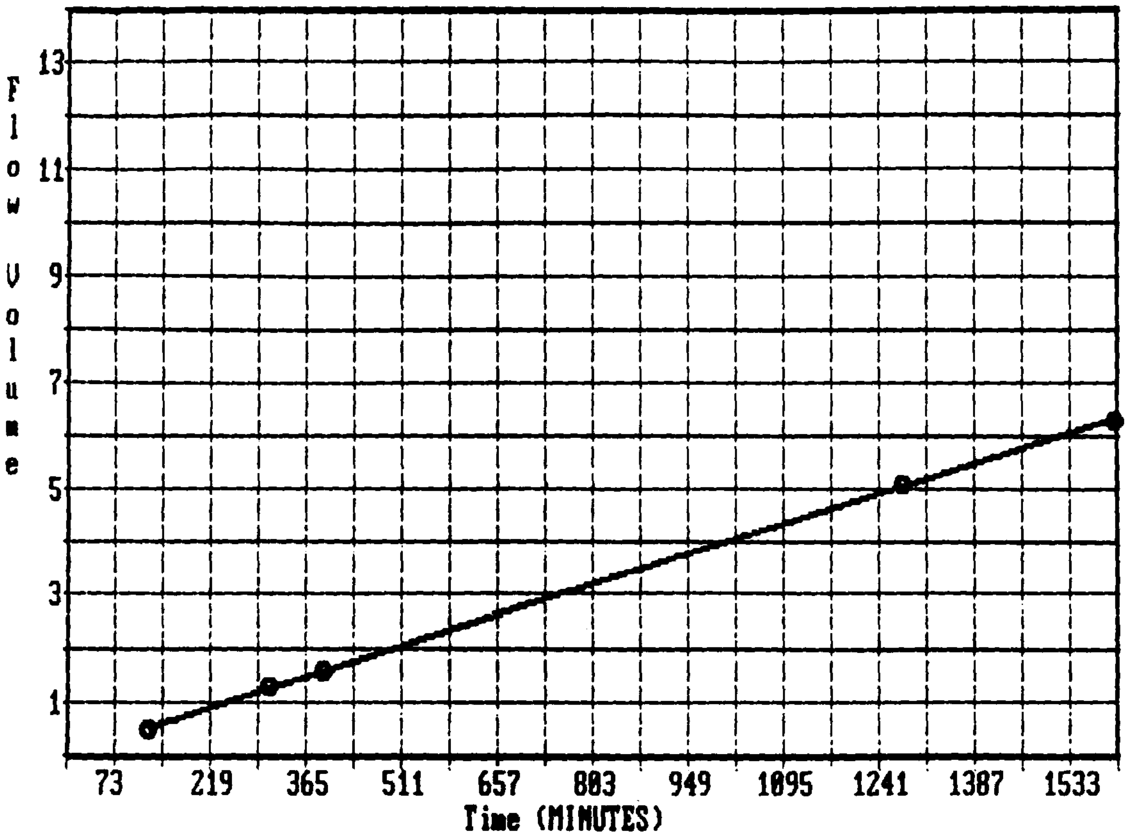
Client:

Eagon & Associates, Inc.

Moisture Content: 8.0%

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
C91-9	50.5-51.7'	Silty Clay		23	10	8.0

Flow (cc)	Length (cm)	Head Loss (cm)
6.3	5.651	805.00
Area (cm^2)	Time (sec.)	Dry Density (pcf)
30.523	96120	131.06

K = (Q L / H A T)

= 1.194E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	10/08/91	10:18	0.8
2		12:23	1.3
3		15:20	2.1
4		16:50	2.4
5	10/09/91	07:35	5.9
6		13:00	7.1

Sample : Waxed Sample WS-1

Remarks :

Client : Eagon & Associates
Project : Clark Co. Landfill
Job No. : 91237

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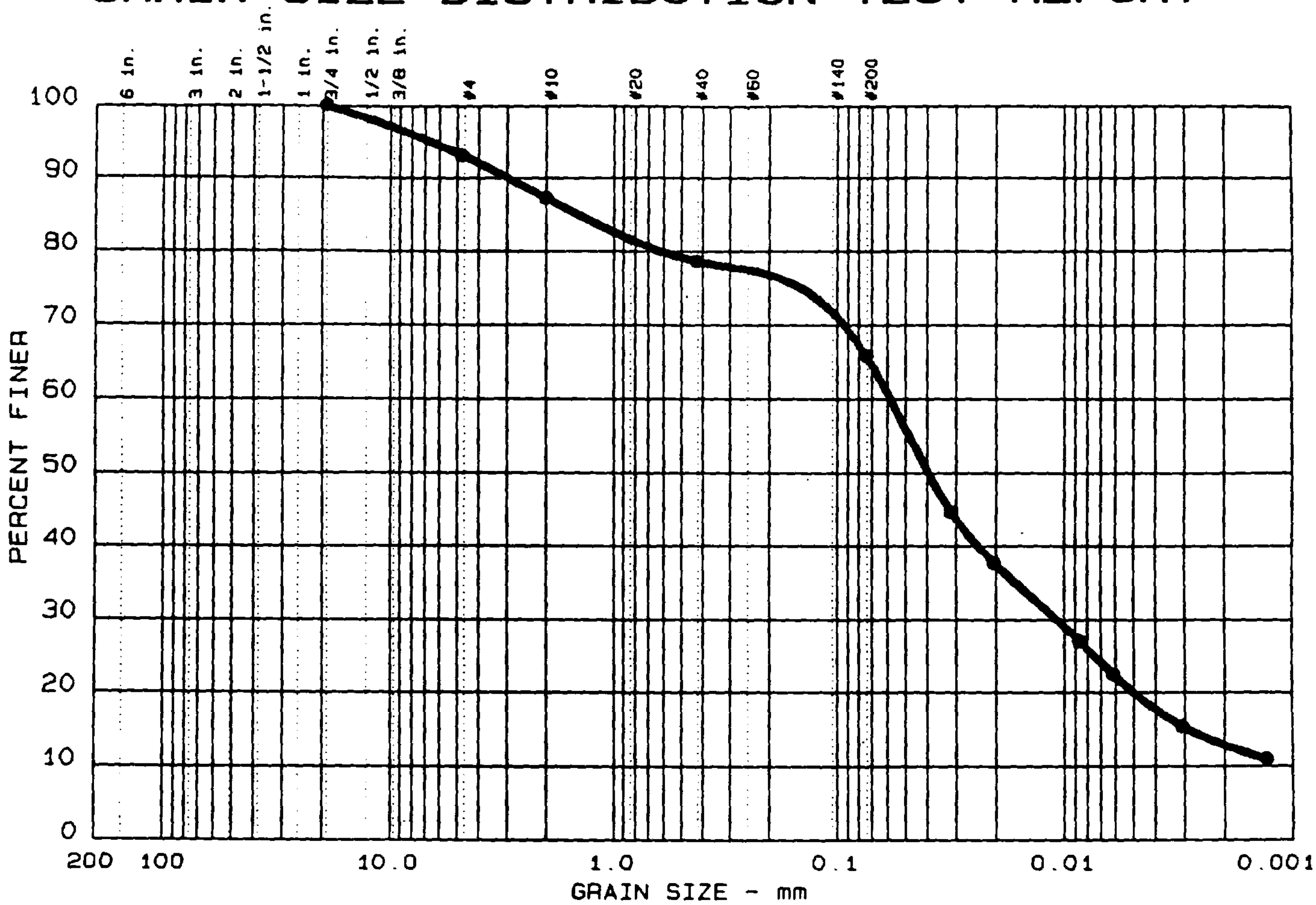
GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND COARSE	% SAND MEDIUM	% SAND FINE	% SILT	% CLAY
●	0.0	6.8	5.9	8.6	12.7	45.8	20.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●	23	8	1.41		0.04	0.011	0.0029			

MATERIAL DESCRIPTION	USCS	AASHTO
● Silty Clay	CL	A-4 (2.5)

Project No.: 91237
Project: Clark Co. Landfill
● Location: Boring C91-9, S-38, Depth 112.0-112.5

Date: 9/14/91

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEOTECHNICAL SERVICES

Remarks:

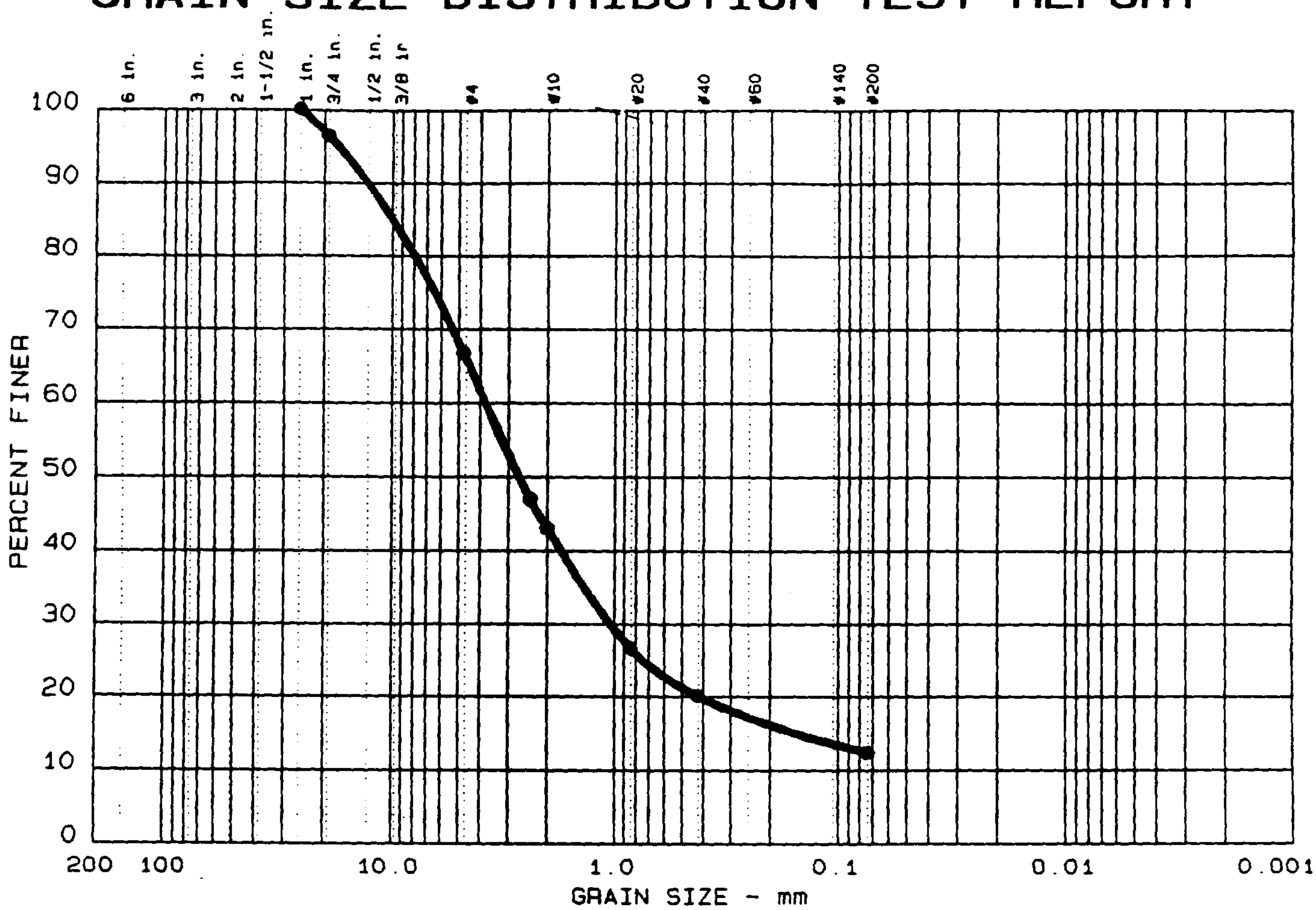
Client:

Eagon & Associates, Inc.

Moisture Content: 9.2%

Figure No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND COARSE	% SAND MEDIUM	% SAND FINE	% SILT	% CLAY
●	0.0	33.2	23.8	22.9	7.7	12.4	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●		NP	9.77	3.79	2.68	1.044	0.1474			

MATERIAL DESCRIPTION	USCS	AASHTO
● Silty Sand with gravel	SM	A-1-a

Project No.: 91237
Project: Clark Co. Landfill
● Location: Boring C91-9, S-41, 122.0' - 123.0'

Date: 9/14/91

GRAIN SIZE DISTRIBUTION TEST REPORT

MASON - de VERTEUIL GEOTECHNICAL SERVICES

Remarks:

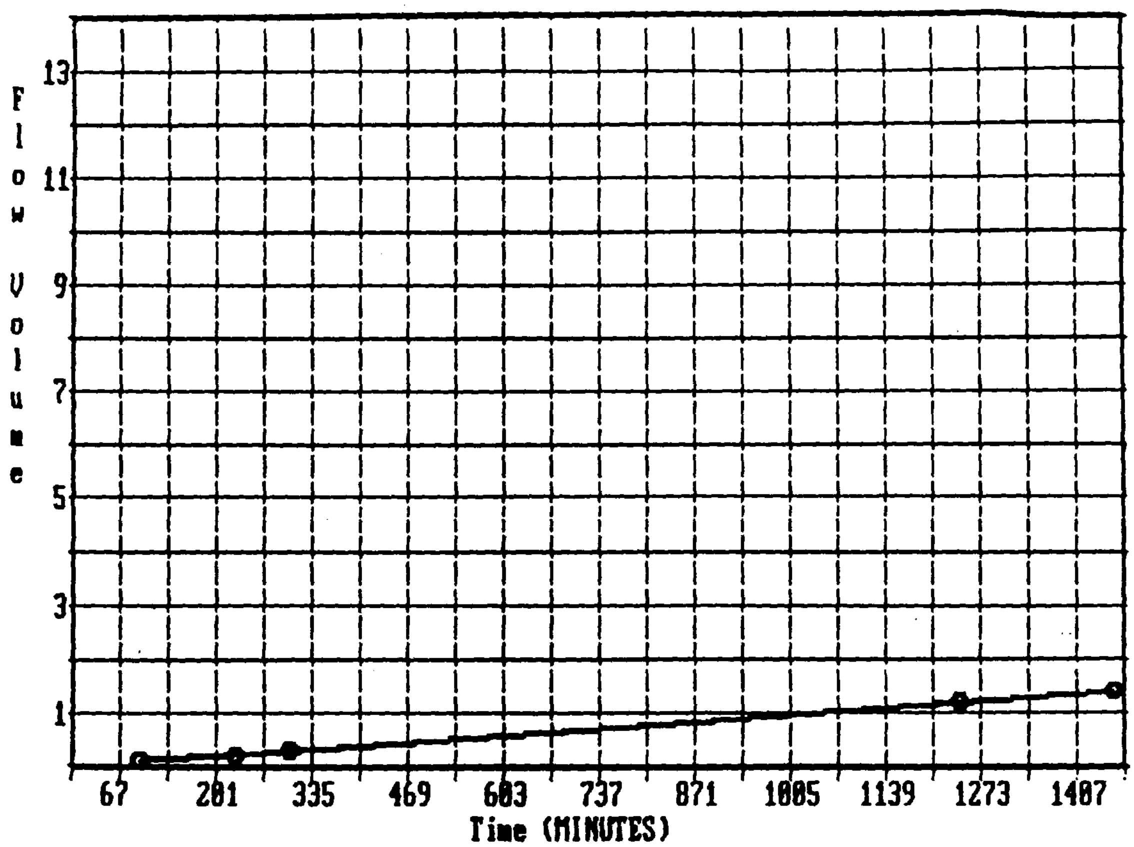
Client:

Eagon & Associates, Inc.

Moisture Content: 9.5%

Figure No.

PERMEABILITY TEST REPORT



Boring	Depth	Classification	SP.G.	LL	PI	Mois.(%)
C91-4	45.0-46.9'					9.0

Flow (cc)	Length (cm)	Head Loss (cm)
1.4	7.153	313.00
Area (cm^2)	**Time (sec.)**	**Dry Density (pcf)**
9.354	87400	133.64

K = (Q L / H A T)

= 3.910E-08 cm / sec

NUM.	DATE	TIME	VOLUME
1	11/08/93	10:42	0.8
2		12:15	0.9
3		14:30	1.0
4		15:45	1.1
5	11/09/93	07:25	2.0
6		11:00	2.2

Sample : Split spoon sample

Remarks :

Client : Eagon & Associates
Project :
Job No. : 93241

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GEOTECHNICAL SERVICES

A DLZ Company

GEOTECHNICAL • ENVIRONMENTAL • MATERIALS TESTING • DRILLING

December 29, 1994

Mr. Al Razem
Eagon and Associates, Inc.
100 Old Wilson Bridge Rd.
Suite 320
Worthington, Ohio 43085

Re: Specific Gravity Tests
Clark Co. Landfill
MV Job No. 94250

Dear Mr. Razem:

Below is a listing of the specific gravity results for the three samples from Clark Co. An invoice is also enclosed.

The following samples were tested.

Boring	Sample	Depth(ft)	Specific Gravity
90-5	25	74.5-75.0	2.80
90-11	28	92.5-93.0	2.81
90-14	14	50.5-51.0	2.80

We would like to thank you for letting us be of service to you. If you should have any questions, please feel free to call.

Sincerely,

MASON - de VERTEUIL GEOTECHNICAL SERVICES

Douglas W. Reese
Asst. Laboratory Supervisor

Copies: 1-Mr. Razem
1-File

6121 Huntley Road · Columbus, Ohio 43229-1003 · (614) 888-0576 · FAX (614) 888-6415
With Offices in Cleveland, Ohio · Lansing, Michigan · Indianapolis, Indiana

APPENDIX E.

1990 PUMPING TEST RESULTS
UPPERMOST AQUIFER
(8-INCH WELLS)

APPENDIX E

INTERPRETATION OF THE BOREHOLE GEOPHYSICAL LOGS

As table 4-1 shows, production wells PW-1, PW-2, and PW-3 were drilled, installed, and pump-tested prior to the drilling of any of the Phase I Clarkco borings. These wells were drilled to bedrock and screened in what was judged to be the best part of the uppermost aquifer for the sole purpose of determining whether or not a yield of 100 gallons per minute was obtainable. Gamma ray logs were run in the open borehole to aid in selecting the interval to be screened. The production wells were not drilled for stratigraphic characterization and the fact that the driller's logs of these wells do not coincide with the interpretation of the gamma ray logs illustrates two potential pitfalls: (1) the danger of using driller's logs for detailed stratigraphic interpretation, especially over borehole intervals that are not the drilling target; and (2) the danger of placing too much confidence in the interpretation of borehole geophysical logs, particularly when inferences are made about physical properties that are not measured by the logging tool. If the gathering of detailed stratigraphic data at the production well drill sites was considered to be vitally important at the time, these boreholes would have been continuously -sampled using a hollow-stem auger rig. Neither the driller's logs nor the gamma ray logs are considered to be as useful as detailed geologic descriptions from continuously-sampled boreholes. For this reason, no attempt was made to give equal weight or undue credibility to these data by including them on the cross-sections. Data that was more useful for stratigraphic characterization was available from nearby borings.

The gamma ray logs of the production wells are included in this appendix for the sake of thoroughness rather than because they are considered particularly useful. An interpretation of the gamma ray logs was not included in the 1992 hydrogeologic report partly because two gamma ray logs of the same boring did not appear to yield reproducible results, but mostly because the stratigraphic interpretation was based on detailed descriptions of continuous samples of the actual material. Indirect data requires much more interpretation and are known to produce ambiguous or incorrect results, particularly if invalid assumptions are applied.

If detailed soil-boring logs for the production wells were available, there would be no need to interpret and discuss, or even run, borehole geophysical logs on these holes. Because these wells were drilled in a conventional manner using a mud rotary rig, the gamma ray logs provide <u>some</u> useful information, and a short discussion of the gamma ray log interpretation for each well is appropriate.

The upper part of the gamma ray log of PW-1 indicates several relatively less radioactive zones that are interpreted to contain less clay and are considered to be relatively clean sand or sand and gravel beds. The best example is the interval from 19.5 to 23.0 feet in depth. Each of the interpreted clastic beds can be correlated with one of the sand mapping units at the Clarkco site, which is not to say that individual beds are continuous between boreholes or that they are hydraulically connected. Correlation of the beds simply means that they occur at similar elevations.

According to the driller's log of PW-1, the top of the aquifer is at 94.5 feet (~elevation 1015). The gamma ray log indicates this contact to be at 91.0 feet. Although the well screen is set from 97.0 to 122.0 feet, the screen pack extends to 87.0 feet, so that all of the "cleanest" formation is available to the well screen. A dirtier and interbedded zone that probably is mostly sand also is indicated from 77.0 to 84.5 feet. The water level in PW-1 indicates that this zone either is not hydraulically connected with the aquifer, or it is dry. The log of boring 89-2 suggests that the latter case is the more likely. In boring 89-2, sand at this elevation was contiguous with the aquifer, and the upper part of the sand was unsaturated. The overlying sand became wet at about the same elevation represented by the range in water levels recorded in PW-1.

Also open to the 25-foot screen section are sand or sand and gravel beds at depths of 117.0 to 119.0 and 120.5 to 122.5 feet that appear to be dirtier than the beds immediately above. The gamma ray log also indicates that the cleanest part of a dirty clastic sequence below the aquifer screened in PW-1 is from 136.5 to 147.0 feet. The top of the aquifer screened in PW-1, whether it is at 94.5 feet (driller log) or 91.0 feet (gamma ray log) correlates with the top of the stratified drift sequence contact over most of the Clarkco site (cross-sections A-A′ through L-L′).

The dirtier zone in PW-1 from 136.5 to 147.0 feet on the gamma ray log also is considered to be part of the aquifer system. It occurs at a slightly higher elevation than the much-cleaner zone that is screened in the lower part of the uppermost aquifer in PW-3 and, therefore, is correlated with part of the stratified drift sequence that overlies it.

The only gamma ray log run on PW-2 was recorded going into the borehole rather than coming out (as was the case with the logs of PW-1 and PW-3). For this reason, ground level (or zero depth) is shown at the bottom of the page rather than the top. Relatively few clastic beds (sand or sand and gravel) are indicated in the upper 85 feet of this borehole. The cleanest of these appears to be a bed from 3.0 to 5.5 feet in depth. Another is from 50.0 to 52.0 feet. The driller logs sand and gravel from 112.5 to 117.5 feet in PW-2. The entire overlying interval from 12.5 to 112.5 was characterized by the driller as "gray till with sand seams". The gamma ray log of PW-2 indicates cleaner formation (with dirtier or cohesive interbeds) from about 90 to 127.5 feet (elevation 981.3 - 943.8). A ten-foot screen was placed from 107.0 to 117.0 feet in this boring across the interval judged by the driller to be most productive. The screen pack extends from 98.0 feet to 123.0 feet, however, making available to the well screen all but about 3½ feet of the overlying formation that is indicated by the gamma ray log to be fairly clean. Whether or not they are acknowledged on the driller's log, nearly all of the best parts (as indicated on the gamma ray log) of the potentially productive formation at PW-2 are available to the well screen. It is very unlikely that the inclusion of cleaner beds indicated on the gamma ray log from 125.0 to 128.5 feet would make this well a 100 gpm producer.

Although comparisons of the gamma ray log of PW-2 to those of PW-1 and PW-3 shows no apparent features that explain the substantially lower well yield of PW-2, it must be remembered that gamma ray logs respond primarily to clay content and do not measure grain size, sorting, or permeability, and cannot distinguish between a dry and a wet sand.

Based on the driller's log of PW-2, the aquifer in this well was considered to be confined. Based on the gamma ray log, it is just barely confined (unlike the situation at PW-1 and PW-3). The gamma ray log of PW-2 also confirms the fact that the uppermost aquifer system thins and pinches out in this direction. No sand is indicated on the gamma ray log at or near elevation 1010 (59.0 feet), the approximate elevation where the top of the uppermost aquifer is encountered in most of the Clarkco borings. The observation that the uppermost aquifer thins to the east also is based on the boring logs of 90-15 and 89-5 which show cohesive materials at the elevations where both the top and saturated parts of the uppermost aquifer system typically are found.

PW-2 is incapable of yielding 100 gpm because transmissivity is considerably less at this location. Clearly there are other parts of the Clarkco site where this is also the case.

PW-3 is the well for which two gamma ray logs are available that do not show good reproducibility. The log reproduced in the 1992 hydrogeologic report was run coming out of the borehole and it was selected for inclusion only because the ground surface is shown at the top of the page (which is the more customary presentation). On this run, the zero radioactivity setting is questionable. The other log run was made going into the borehole so that the ground surface is at the bottom of the page, (as is the case with the log of PW-2). Panel settings i.e., the count rate (sensitivity), time constant, and/or gain clearly are different on the two runs, but only one log header is available and it is not clear to which log it corresponds. After taking into account differences in log appearance resulting from different panel settings, there still appears to be less correspondence between the two logging runs than that which would inspire confidence in the log interpretation. The additional gamma ray log run on PW-3 also is included in this appendix.

The gamma ray log of PW-3 shows some cleaner zones in the upper 35 feet of the borehole that might be interpreted as clastics. The cleanest of these is from about 2.0 - 3.0 and 5.5 to 7.0 feet in depth. Based on the logs of nearby soil borings, the zone from about 21.0 to 33.5 feet probably is a cohesive unit with slightly less clay that includes thin clastic interbeds from 21.0 to 22.0 and from 23.0 to 24.5 feet. A fairly-thick clean zone also is indicated from about 57.0 to 78.0 feet (elevation 1018.2 - 997.2). This zone is correlated to the sand and silty sand sequence logged in nearby boring 92-29DB from 52.8 to 74.0 feet. From 77.0 to 102.5 feet in boring 92-29DB, only massive till was present and sample recovery was complete. Boring 92-29DB was drilled specifically to characterize stratigraphy near PW-3 in conjunction with the installation of observation wells for the 72-hour pump test of PW-3. Wells 92-28X and 92-29X were installed, and borings 92-29 and 92-29DB drilled, within 100 feet of PW-3. The sand sequence from 52.8 to 74.0 feet in 92-29DB (elevation 1020.4 to 999.2) is the unsaturated part of the uppermost aquifer system. It is separated from the saturated and confined part of the uppermost aquifer by till that is present at least to 102.5 feet in depth (elevation 970.7). Interpretation of the gamma ray log of PW-3 suggests a thin clastic bed from 107.0 to 108.0 feet with a thicker sequence from 113.0 to about 140.5 feet that probably includes cohesive interbeds. The well screen in PW-3 was installed from 120.0 to 130.0 feet, and the screen pack was placed from 115 to 138 feet.

1990 PUMPING TEST RESULTS

Analysis of the pumping-test data provides for some additional insights and conclusions relative to the hydrogeologic framework of the Clarkco site. A short discussion of the data and its interpretation at each test site follows.

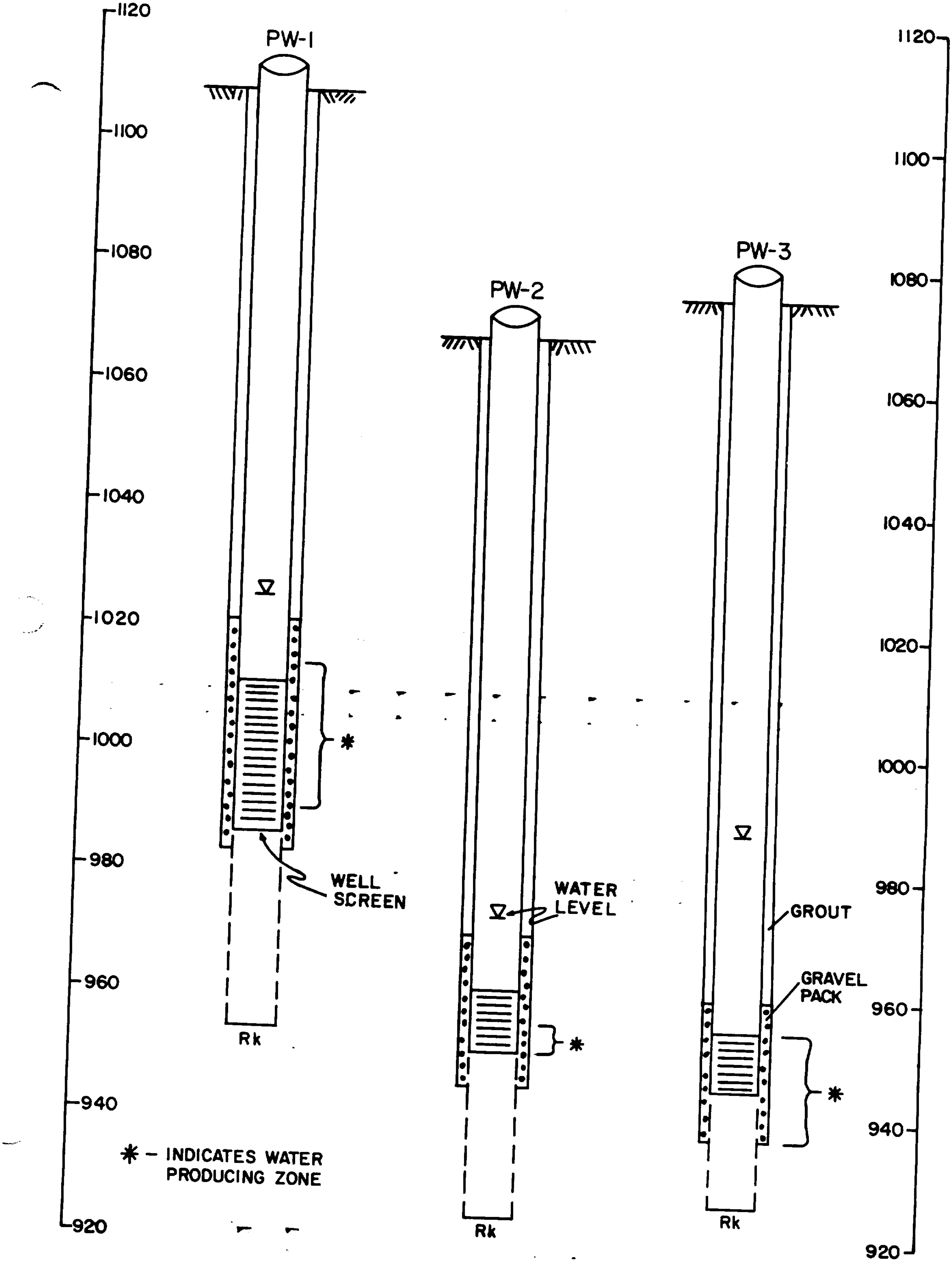
Well PW-1. The time-drawdown data plotted on the semi-log graph suggest that recharge was occurring during the 24-hour pumping test, as shown by the extremely flat slope of all but the early-time test data, i.e. less than 20 minutes. Analysis of the slope of the early-time data yields a transmissivity which is consistent with permeability values determined by various means at the site. If the later-time data were used to determine transmissivity, unrealistically high values for hydraulic conductivity would result. Therefore, it is concluded that the flattened slope of the time-drawdown data is the result of delayed yield from storage or some form of leakage between stratified zones at this location.

A likely source of leakage or delayed yield is from materials overlying the producing formation. This is consistent with the geologic interpretation of this part of the site based on test borings. In soil boring 89-2, located about 600 feet south of PW-1 (Plate 4), a thick, partly-saturated sand and gravel zone immediately overlies the water-bearing zone developed in PW-1. The elevation at which this zone became saturated in boring 89-2 closely matches the water level in PW-1. The upper sand and gravel zone identified in boring 89-2 is interpreted to be a lenticular deposit (having a north-south orientation) that passes immediately to the west of PW-1. Pumping test data are not sufficient to quantify leakage or slow drainage from materials in the area.

Well PW-2. The hydraulic conductivity of 184 gpd/ft^2 determined for this well is based on the relationship between transmissivity and specific capacity. The specific capacity of PW-2 was calculated from data obtained during the step-test for this well. A longer, more extensive pumping test was not performed on PW-2 because it was not possible to stress the aquifer at a pumping rate of 100 gpm. The PW-2 aquifer characteristics reported in Table 5-4 are consistent with the geologic interpretation based on borehole data. As seen on cross sections A-A' (Plate 11) the uppermost aquifer probably pinches out to the northeast.

Well PW-3. The time-drawdown data from the 24-hour pumping test on PW-3 indicates the presence of a negative boundary condition somewhere in that part of the site. The semi-log plot exhibits a steepening of the slope of the time-drawdown data beyond about 220 minutes. The transmissivity derived from the early-time data is believed to accurately represent the hydraulic characteristics of the aquifer. The resulting value for hydraulic conductivity seems realistic based on the aquifer materials encountered and compared to the results of the other tests. The presence of a negative boundary is consistent with the geologic interpret 'ion of the site based on test-boring data. The sand and gravel aquifer becomes much thinner and appears to pinch out to the south.

The results of the pumping tests demonstrate that the hydrogeologic characteristics of the uppermost aquifer beneath the study area vary considerably from place to place with respect to thickness, permeability, and potential yield. Beneath parts of the property, the sand and gravel aquifer is capable of yielding 100 gpm to individual wells; whereas in other areas of the site, yields of this magnitude are not possible. In the northwestern part of the Clarkco property, in the vicinity of PW-1, more than 1000 feet from the proposed limit of waste, the aquifer is most prolific. It is also quite productive in the area of PW-3. The uppermost aquifer thins and becomes finer-grained to the east, resulting in much lower productivity in the vicinity of PW-2. The uppermost aquifer also thins and becomes finer-grained to the south as seen by the log of boring 92-23. Wells which penetrated the full thickness of the uppermost aquifer were drilled south and southeast of the proposed landfill footprint at 92-20D and 92-21D. Although laterally-equivalent sand zones were encountered in these borings, neither of these locations is thought to have the potential for development of a 100 gpm well based on comparison of the aquifer materials encountered with those at the other locations.



PW-1
PW-2
PW-3
1120
1100
1080
1060
1040
1020
1000
980
960
940
920
WELL SCREEN
WATER LEVEL
GROUT
GRAVEL PACK
Rk
* - INDICATES WATER PRODUCING ZONE

WELL LOG AND DRILLING REPORT

704765

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1939 Fountain Square Drive
Columbus, Ohio 43224
(614) 265-6739

TYPE OR USE PEN
SELF-TRANSCRIBING
PRESS HARD!

Permit Number EPA PW-1
TEST WELL

COUNTY CLARK TOWNSHIP GERMAN SECTION/LOT NO. 17 (CIRCLE ONE)

OWNER/BUILDER (CIRCLE ONE OR BOTH) INDUSTRIAL WASTE DISPOSAL PROPERTY ADDRESS (ADDRESS OF WELL LOCATION) WILLOWDALE RD.

LOCATION OF PROPERTY 4000 FT. NORTH OF SNYDER-DOMER RD., 1850 FT. EAST OF WILLOWDALE

CONSTRUCTION DETAILS

CASING
Diameter 8 in. Length 100 ft. Wall Thickness SDR 21 in.
Type: ☐ Steel ☐ Galv. ☒ PVC ☐ Other
Joints: ☐ Threaded ☐ Welded ☒ Solvent ☐ Other

SCREEN
Type (wire wrapped, louvered, etc.) MACHINE SLOT Material PVC
Length 25 ft. Diameter 8 in.
Set between 97 ft. and 122 ft. Slot .040

☒ Rotary ☐ Cable ☐ Augered ☐ Driven ☐ Dug ☐ Other
Date of completion MARCH 9, 1990

GROUT
Material BENSEAL/EZ MUD Volume used 280 GALLONS
Method of installation 1" TREMIE TUBE
Depth: placed from 87 ft. to SURFACE ft.

GRAVEL PACK
Material #4 PARRY Volume used 2000#
Method of installation
Depth: placed from 125 ft. to 87 ft.

Pitless Device ☐ Adapter ☐ Preassembled unit
Use of Well TEST WELL

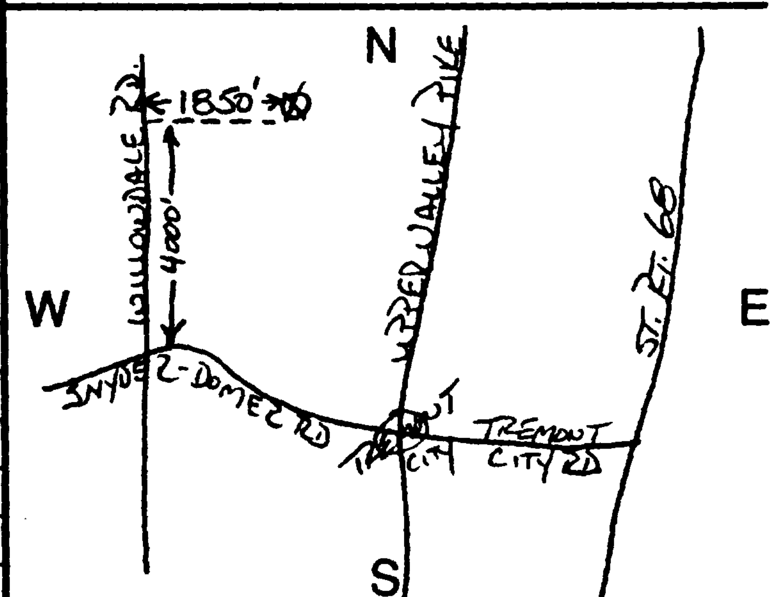
TEST PUMP
Type of pump SUBMERSIBLE Capacity 135 gpm
Pump set at 97 ft.
Pump installed by HAGER & SPROWLS

WELL TEST
Bailing ☐ or Pumping ☒
Test rate 100 gpm Duration of test 24 hrs.
Drawdown 2.08 ft.
Measured from: ☐ top of casing ☒ ground level ☐ Other
Static Level (depth to water) 82.8 ft. Date: 3-21 & 3-22-90
Quality (clear, cloudy, taste, odor) CLEAR
(Attach a copy of the pumping test record, per 1521.05, ORC)

WELL LOG*
INDICATE DEPTH(S) AT WHICH WATER IS ENCOUNTERED.
Show color, texture, hardness, and formation: sandstone, shale, limestone, gravel, clay, sand, etc.

	From	To
BROWN CLAY	0 ft.	5 ft.
YELLOW BROWN CLAY	5	11
GRAY CLAY & GRAVEL	11	67
SAND & GRAVEL	67	68.5
GRAY CLAY & GRAVEL	68.5	94.5
SAND & GRAVEL	94.5	118
SAND WITH CLAY	118	126
CLAY, SAND, & GRAVEL	126	154
LIMESTONE	154	155

SKETCH SHOWING LOCATION
Show distances well lies from numbered state highways, street intersections, county roads, etc.



* Additional space is needed to complete well log, use next consecutively numbered form

DNR 7802.88

DRILLING FIRM SPROWLS DRILLING COMPANY
ADDRESS P.O. BOX 107
CITY, STATE, ZIP SUNBURY, OHIO 43074

SIGNED Gary Sprowls
DATE MARCH 26, 1990
ODH REGISTRATION NUMBER 1731

Completion of this form is required by 1521.05, Ohio Revised Code - file within 30 days after completion of drilling.

ORIGINAL COPY - ODNR, DIVISION OF WATER, 1939 FOUNTAIN SQ. DRIVE, COLS., OHIO 43224

Blue - Customer's Copy Pink - Driller's Copy Green - Local Health Dept. Copy

REYNOLDS, INC.
GEOPHYSICAL WELL SURVEY

Electric	Caliper
16" Normal	Fluid Resistivity
64" Normal	Fluid Velocity
Single Point	Gamma Ray
S.P.	Temperature

Client Eagan + Assoc. Date 3-8-90

Well No. Production Well PW-1 Project No. ____

Location: State ____ County ____

____ 1/4 ____ 1/4 ____ 1/4 Sec. ____ T. ____ ☐ N ■ S R ____ ■ E ☐ W

Logged by J. Cunningham Observer ____

Driller ____ Date Drilled ____

Surface Elevation: ____ ft. ■ Estimated ☐ Measured Above MSL

T.D. Logged 154 ft T.D. Driller ____

Hole Dia. ____

Casing Dia. ____

Finish: ■ Open Hole ☐ Screen ☐ Gravel ☐ Other

Water Level: Flowing ft. ____

LOG SCALES

Electric Log

SP ____ millivolts/inch

Res. ____ ohm-meters/inch

Res. ____ ohms/inch

Fluid Resistivity

____ ohm meters/inch

@ ____ °D

G[illegible]a Ray Log

1K Counts/sec/inch

Time Constant 5 sec.

Logging speed 15 FPM

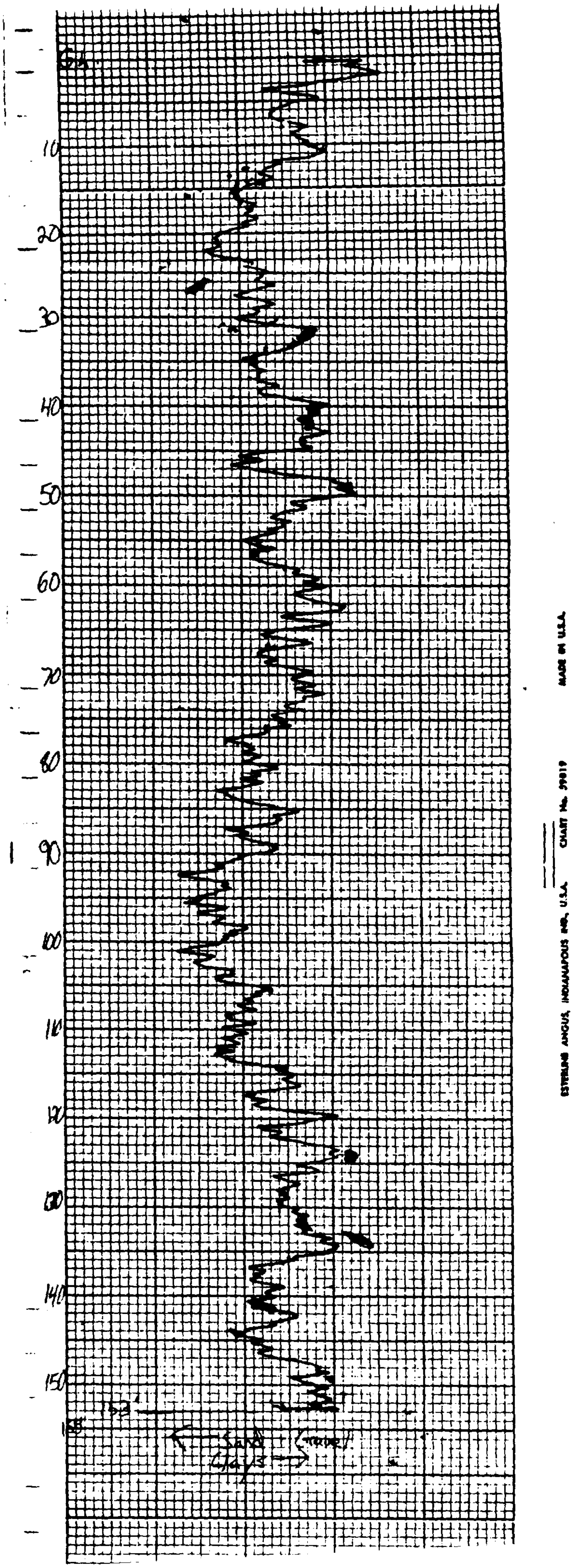
Gain 10

Fluid Velocity

____ Counts/min/inch

____ FPM (Continuous)

Q= ____ gpm



WELL LOG AND DRILLING REPORT

711141

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1939 Fountain Square Drive
Columbus, Ohio 43224
(614) 265-6739

TYPE OR USE PEN
SELF-TRANSCRIBING
PRESS HARD!

Permit Number PW-2
TEST WELL

COUNTY CLARK TOWNSHIP GERMAN SECTION/LOT NO. 17 (CIRCLE ONE)

OWNER/BUILDER (CIRCLE ONE OR BOTH) DANIS INDUSTRIES PROPERTY ADDRESS SNYDER-DOMER RD. (ADDRESS OF WELL LOCATION)

LOCATION OF PROPERTY NORTHEAST CORNER OF PROPERTY

CONSTRUCTION DETAILS

CASING
Diameter 8 in. Length 109 ft. Wall Thickness SDR 21 in.
Type: ☐ Steel ☐ Galv. ☒ PVC ☐ Other
Joints: ☐ Threaded ☐ Welded ☒ Solvent ☐ Other

SCREEN
Type (wire wrapped, louvered, etc.) MACHINE SLOT Material PVC
Length 10 ft. Diameter 8 in.
Set between 107 ft. and 117 ft. Slot .040
☒ Rotary ☐ Cable ☐ Augered ☐ Driven ☐ Dug ☐ Other
Date of completion JUNE 7, 1990

GROUT
Material BENSEAL/HOLLA GROUT Volume used 320 GALLONS
Method of installation 1" TREMIE TUBE
Depth: placed from 98 ft. to SURFACE ft.

GRAVEL PACK
Material #4 PARRY Volume used 1400 #
Method of installation
Depth: placed from 123 ft. to 98 ft.
Pitless Device ☐ Adapter ☐ Preassembled unit
Use of Well TEST WELL

PUMP
Type of pump SUBMERSIBLE Capacity 135 gpm
Pump set at 107 ft.
Pump installed by HAGER & SPROWLS

WELL TEST
Bailing ☐ or Pumping ☒ 412
Test rate ~50 gpm Duration of test 1.5 hrs.
Drawdown 10 ft.
Measured from: ☐ top of casing ☒ ground level ☐ Other
Static Level (depth to water) 95 ft. Date: 6-7-90
Quality (clear, cloudy, taste, odor) CLEAR
(Attach a copy of the pumping test record, per 1521.05, ORC)

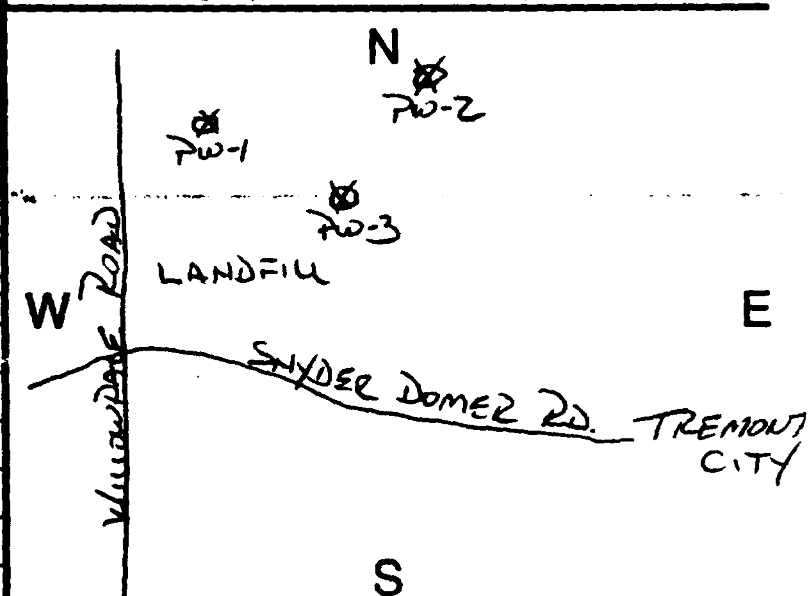
WELL LOG*

INDICATE DEPTH(S) AT WHICH WATER IS ENCOUNTERED.

Show color, texture, hardness, and formation: sandstone, shale, limestone, gravel, clay, sand, etc.	From	To
BROWN SILTY CLAY & GRAVEL	0 ft.	6 ft.
FINE-COARSE BROWN SAND	6	12.5
GRAY TILL W/SAND SEAMS	12.5	112.5
SAND & GRAVEL	112.5	117.5
GRAY TILL W/ BOULDERS	117.5	123
GRAY TILL	123	131
COARSE SAND	131	134
GRAY TILL	134	143
SAND, GRAVEL, & CLAY	143	144.5
LT. GRAY LIMESTONE	144.5	145

SKETCH SHOWING LOCATION

Show distances well lies from numbered state highways, street intersections, county roads, etc.



* If additional space is needed to complete well log, use next consecutively numbered form

DNR 7802.88

DRILLING FIRM SPROWLS DRILLING COMPANY SIGNED Gary Sprowls
ADDRESS P.O. BOX 107 DATE JUNE 12, 1990
CITY, STATE, ZIP SUNBURY, OHIO 43074 ODH REGISTRATION NUMBER 1731

Completion of this form is required by 1521.05, Ohio Revised Code - file within 30 days after completion of drilling.

ORIGINAL COPY - ODNR, DIVISION OF WATER, 1939 FOUNTAIN SQ. DRIVE, COLS., OHIO 43224

REYNOLDS, INC.

GEOPHYSICAL WELL SURVEY

Electric	
16" Normal	Caliper
64" Normal	Fluid Resistivity
Single Point	Fluid Velocity
S.P.	Gamma Ray
	Temperature

Client: Eagan + Assoc. Date: 6/7/90

Well No. PW2 Project No. ______

Location: State ______ County ______

____ 1/4 ____ 1/4 ____ 1/4 Sec. ____ T. ____ ☐ N ■ S R ____ ■ E ☐ W

Logged by: Jeff Cunningham Observer: ______

Driller: Sprowles Drilling Date Drilled: 6/6/90

Surface Elevation: ______ ft. ■ Estimated ☐ Measured Above MSL

T.D. Logged: 134.5 T.D. Driller: 144 ft.

Hole Dia. 8 in

Casing Dia. ______

Finish: ■ Open Hole ☐ Screen ☐ Gravel ☐ Other

Water Level: Flowing ft. ______

LOG SCALES

Electric Log

SP ______ millivolts/inch

Res. ______ ohm-meters/inch

Res. ______ ohms/inch @ ______ °D

Fluid Resistivity

______ ohm meters/inch

Gamma Ray Log

1K Counts/sec/inch

Time Constant 5 sec.

Logging speed 15 FPM

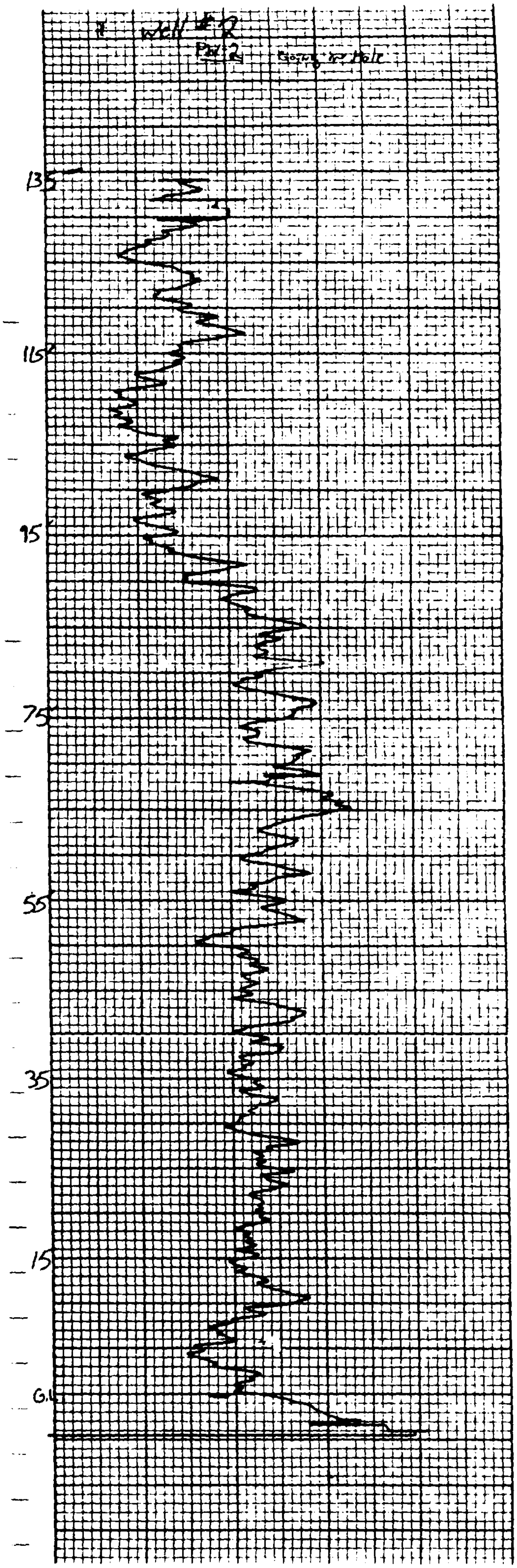
Gain 10

Fluid Velocity

______ Counts/min/inch

______ FPM (Continuous)

Q= ______ gpm



WELL LOG AND DRILLING REPORT

711142

State of Ohio
DEPARTMENT OF NATURAL RESOURCES
Division of Water
1939 Fountain Square Drive
Columbus, Ohio 43224
(614) 265-6739

TYPE OR USE PEN
SELF-TRANSCRIBING
PRESS HARD!

Permit Number PW-3
TEST WELL

COUNTY CLARK TOWNSHIP GERMAN SECTION/LOT NO. 17 (CIRCLE ONE)

OWNER/BUILDER (CIRCLE ONE OR BOTH) DANIS INDUSTRIES PROPERTY ADDRESS SNYDER DOMER RD (ADDRESS OF WELL LOCATION)

LOCATION OF PROPERTY EAST OF LANDFILL

CONSTRUCTION DETAILS

CASING
Diameter 8 in. Length 130 ft. Wall Thickness SDR 21 in.
Type: ☐ Steel ☐ Galv. ☒ PVC ☐ Other
Joints: ☐ Threaded ☐ Welded ☒ Solvent ☐ Other

SCREEN
Type (wire wrapped, louvered, etc.) MACHINE SLOT Material PVC
Length 10 ft. Diameter 8 in.
Set between 120 ft. and 130 ft. Slot .040
☒ Rotary ☐ Cable ☐ Augered ☐ Driven ☐ Dug ☐ Other
Date of completion JUNE 8, 1990

GROUT
Material BENSEAL/AQUA GEL Volume used 400 GALLONS
Method of installation 1" TREMIE TUBE
Depth: placed from 115 ft. to SURFACE ft.

GRAVEL PACK
Material #4 PARRY Volume used 1200 #
Method of installation
Depth: placed from 138 ft. to 115 ft.
Pitless Device ☐ Adapter ☐ Preassembled unit
Use of Well TEST WELL

PUMP

Type of pump SUBMERSIBLE Capacity 135 gpm
Pump set at 120 ft.
Pump installed by SPROULS DRILLING COMPANY

WELL TEST

Bailing ☐ or Pumping ☒
Test rate 100 gpm Duration of test 24 hrs.
Drawdown 4 ft.
Measured from: ☐ top of casing ☒ ground level ☐ Other
Static Level (depth to water) 88 ft. Date: 6-8-90
Quality (clear, cloudy, taste, odor) CLEAR
(Attach a copy of the pumping test record, per 1521.05, ORC)

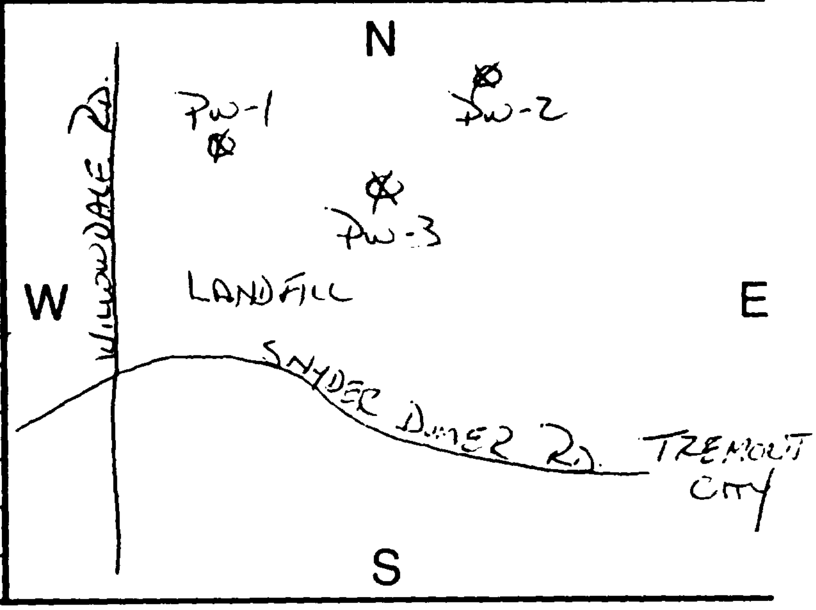
WELL LOG*

AND DEPTH(S) AT WHICH WATER IS ENCOUNTERED.

Show color, texture, hardness, and formation: sandstone, shale, limestone, gravel, clay, sand, etc.	From	To
BROWN TILL	0 ft.	9 ft.
BROWN SAND	9	14.5
GRAY TILL	14.5	44
BROWN SILTY CLAY	44	78
GRAY TILL	78	120
SAND & GRAVEL	120	127
GRAY CLAY & GRAVEL	127	130
GRAVEL W/CLAY	130	138
GRAY TILL	138	149
MED. GRAY LIMESTONE	149	149.5

SKETCH SHOWING LOCATION

Show distances well lies from numbered state highways, street intersections, county roads, etc.



* If additional space is needed to complete well log, use next consecutively numbered form

DNR 7802.88

DRILLING FIRM SPROULS DRILLING COMPANY
ADDRESS P.O. BOX 107
CITY, STATE, ZIP SUNBURY, OHIO 43074

SIGNED GARY SPRO[illegible]
DATE JUNE 12, 1990
ODH REGISTRATION NUMBER 1731

Completion of this form is required by 1521.05, Ohio Revised Code - file within 30 days after completion of drilling.

ORIGINAL COPY - ODNR, DIVISION OF WATER, 1939 FOUNTAIN SQ. DRIVE, COLS., OHIO 43224

Blue - Customer's Copy Pink - Driller's Copy Green - Local Health Dept Copy

REYNOLDS, INC.
GEOPHYSICAL WELL SURVEY

Electric	Caliper
16" Normal	Fluid Resistivity
64" Normal	Fluid Velocity
Single Point	Gamma Ray
S.P.	Temperature

Client Eagon & Associates Date 7/8/90
Well No. PW 3 Project No. ____

Location: State Ohio County Clark
____1/4 ____1/4 ____1/4 Sec. ____ T. ____ ☐N ■S R ____ ■E ☐W
Logged by L. Simpson Observer D. Sugar

Driller Sprowls Date Drilled 7/8/90
Surface Elevation: ____ ft. ■ Estimated ☐ Measured Above MSL
T.D. Logged 143.6' T.D. Driller 149'
Hole Dia. 8"
Casing Dia. N/A
Finish: ☒ Open Hole ☐ Screen ☐ Gravel ☐ Other
Water Level: Flowing ft. ____

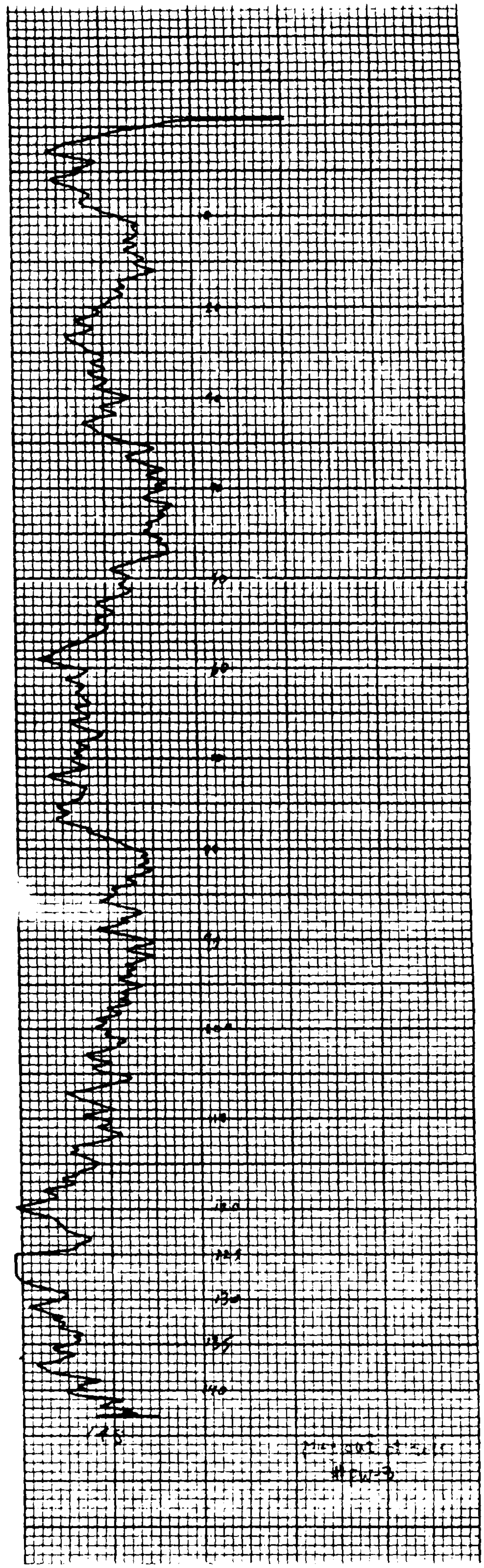
LOG SCALES

Electric Log
SP ____ millivolts/inch
Res. ____ ohm-meters/inch
Res. ____ ohms/inch @ °D

Fluid Resistivity
____ ohm meters/inch

Gamma Ray Log
5 Counts/sec/inch
Time Constant 1K sec.
Logging speed 15 FPM
6pm 10

Fluid Velocity
____ Counts/min/inch
____ FPM (Continuous)
Q= ____ gpm



REYNOLDS, INC.
GEOPHYSICAL WELL SURVEY

Electric	Caliper
16" Normal	Fluid Resistivity
64" Normal	Fluid Velocity
Single Point	Gamma Ray
S.P.	Temperature

Client Eagon & Associates Date 7/8/90
Well No. P W 3 Project No. ______

Location: State Ohio County Clark
____1/4 ____1/4 ____1/4 Sec. ____ T. ____ ☐N ■S R ____ ■E ☐W
Logged by L. Simpson Observer D. Sugar

Driller Sprowls Date Drilled 7/8/96
Surface Elevation: ______ ft. ■ Estimated ☐ Measured Above MSL
T.D. Logged 143.6' T.D. Driller 149'
Hole Dia. 8"
Casing Dia. N/A
Finish: ☒ Open Hole ☐ Screen ☐ Gravel ☐ Other
Water Level: Flowing ft. ______

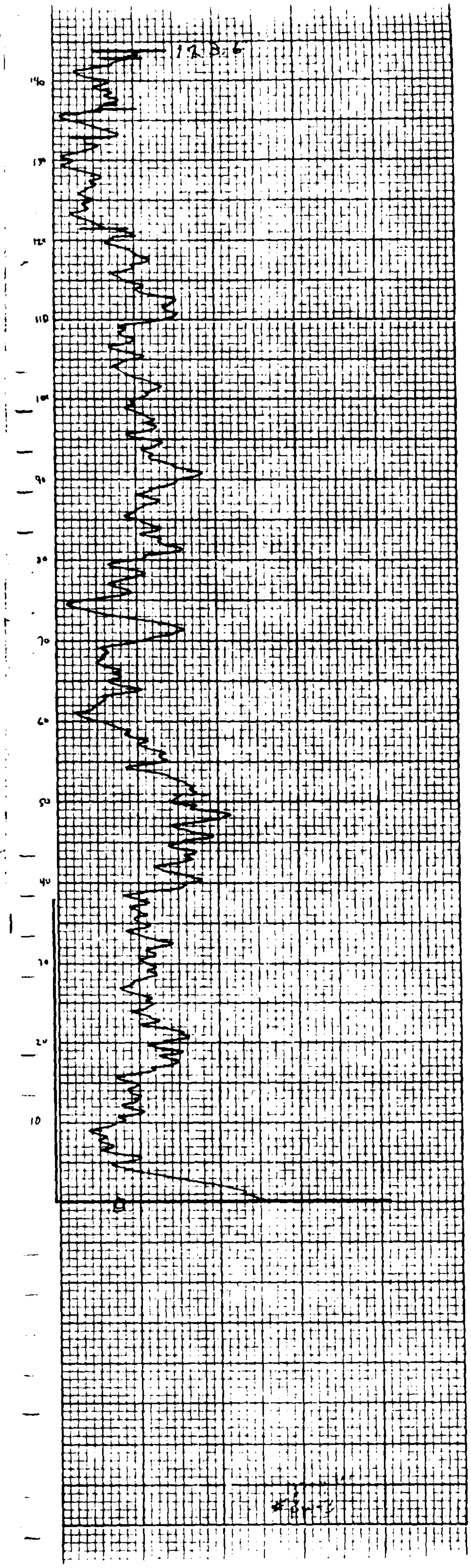
LOG SCALES

Electric Log
SP ______ millivolts/inch
Res. ______ ohm-meters/inch
Res. ______ ohms/inch @ °D

Fluid Resistivity
______ ohm meters/inch

Gamma Ray Log
5 Counts/sec/inch
Time Constant 1 K sec.
Logging speed 15 FPM
6pm 10

Fluid Velocity
______ Counts/min/inch
______ FPM (Continuous)
Q= ______ gpm

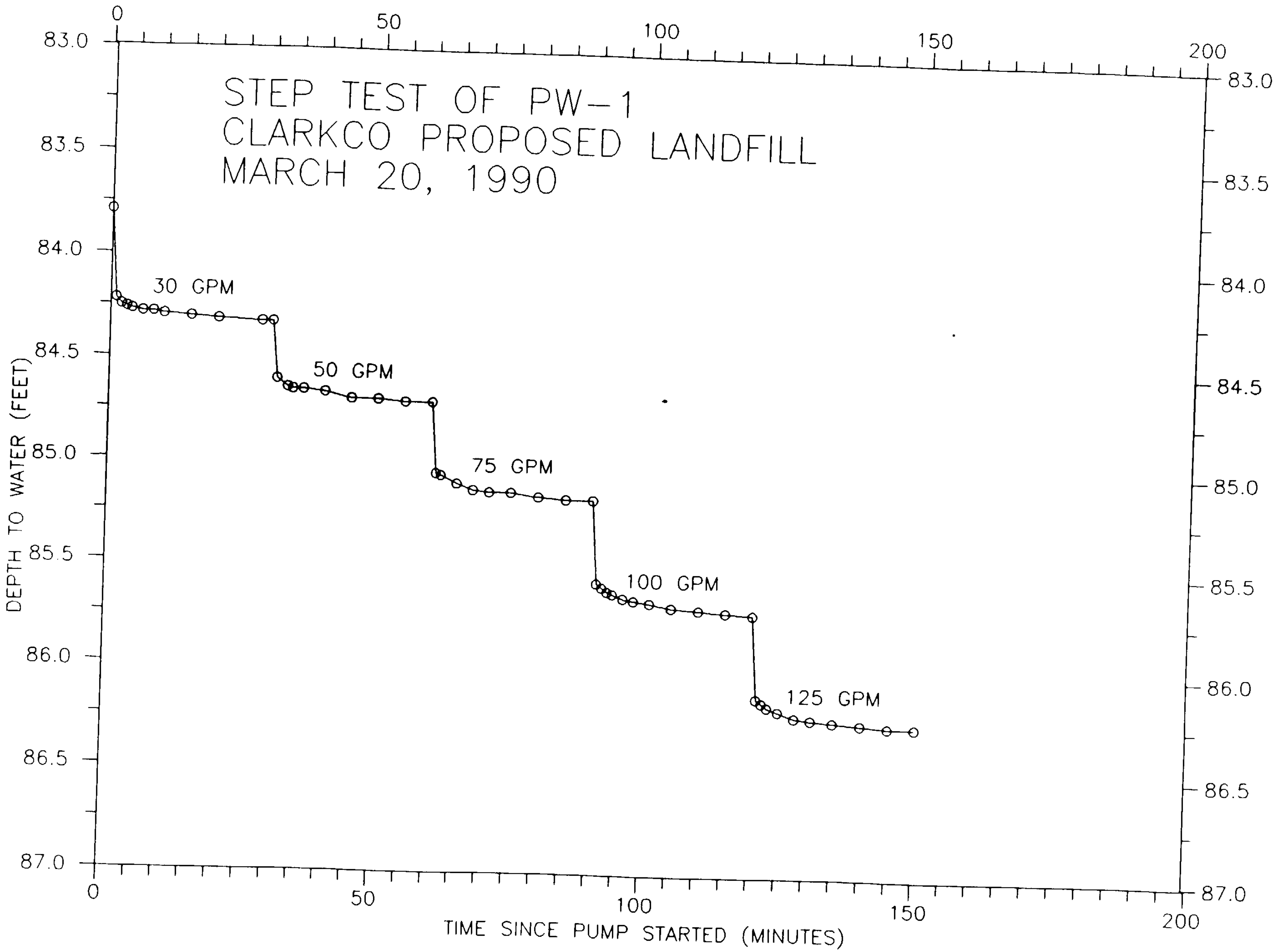


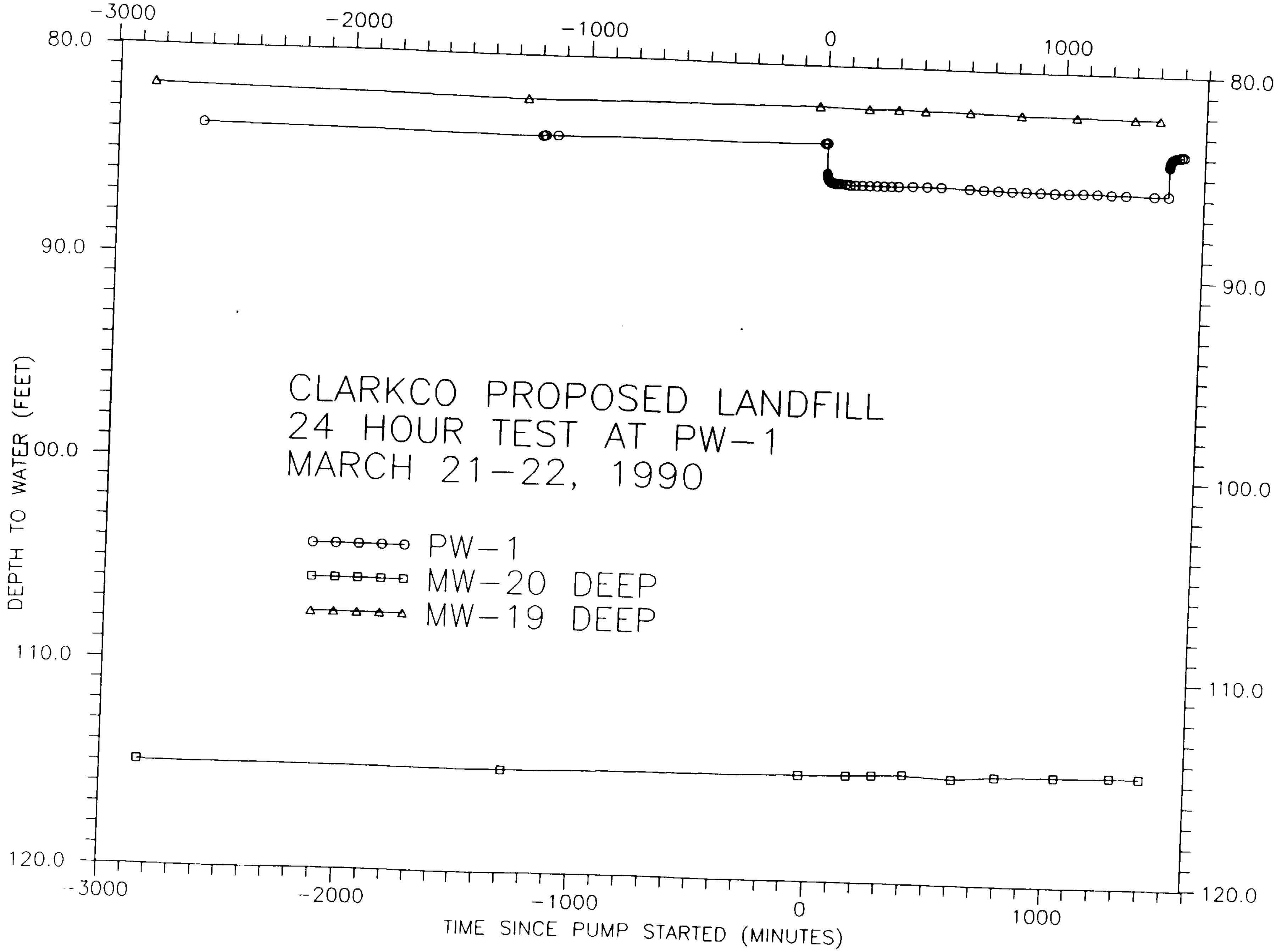
1990 PUMPING TEST RESULTS

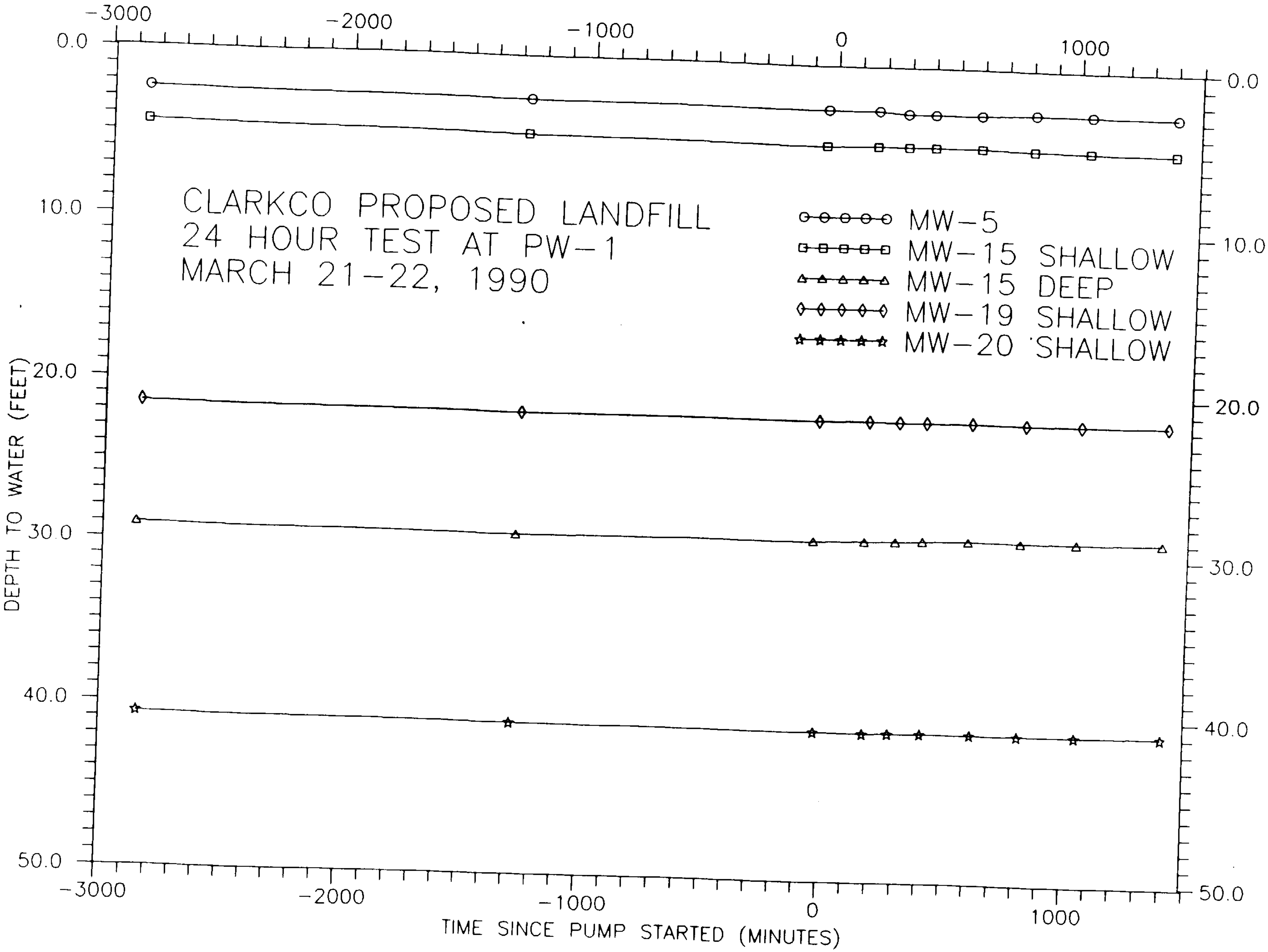
Graphs	Comments
Pumping Test on PW-1	
PW-1 Step Test Graph	Five steps at 25 gpm increments up to capacity of test pump.
Hydrographs for wells PW-1, TBF-19D, & TBF-20D	Only PW-1 shows any obvious drawdown.
Hydrographs for wells 5, 15S, 15D, 19S & 20S at Closed Barrel Fill	None of these hydrographs show any evidence of drawdown.
Semi-log graph of time drawdown data for PW-1	Shows evidence of delayed yield from storage or leakage from stratified zones.
Semi-log graphs of time-drawdown data for TBF-19D	Drawdown is based on difference in water levels during the test from the water level before the test with no correction for trend. Results are somewhat questionable.
Pumping Test on PW-2	
PW-2 Step Test Graph	Pump broke suction at 50 gpm. Drawdown at 25 gpm was 10.67 feet giving a specific capacity of 2.3 gpm/ft. Approximating the T based on Driscoll (1986) gives 4600 gpd/ft. The driller reported 5 feet of sand and gravel, but the gamma ray log suggests that the productive formation may be thicker. The average hydraulic conductivity for the 25 feet of material exposed to the sand pack is 184 gpd/ft^2.
Pumping Test on PW-3	
PW-3 Step Test Graph	Five steps at 25 gpm increments up to capacity of test pump.
Hydrographs for wells PW-1, TBF-19D, TBF-20D PW-2 and PW-3	PW-3 shows obvious drawdown as does TBF-20D. The lower water levels after shutdown are probably due to interference from supply well, based on later experiences.
Semi-log graph of time-drawdown data for PW-3	Shows evidence of boundary conditions or delayed yield from storage. Based on later analysis of the 72-hour test the early slope is thought to be affected by delayed yield and the later slope is more representative of actual transmissivity.

1990 PUMPING TEST RESULTS

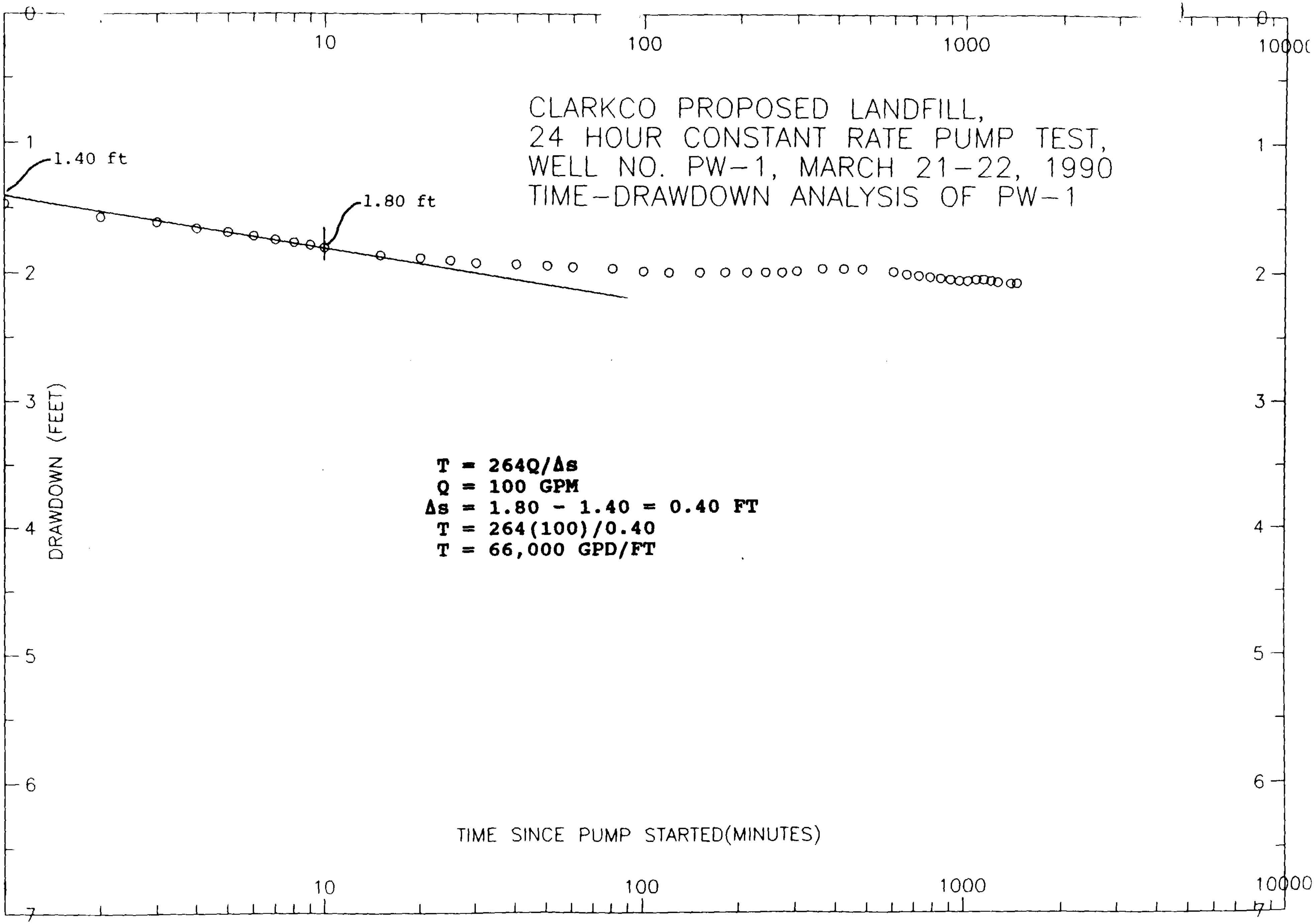
Graphs	Comments
Semi-log graph of time-drawdown data for TBF-20D	Some lag time is suggested as well responds to pumping, but slope probably represents aquifer characteristics.
Hydrographs for wells TBF-19S and TBF-20S at Closed Barrel Fill	No evidence of drawdown due to pumping PW-3.

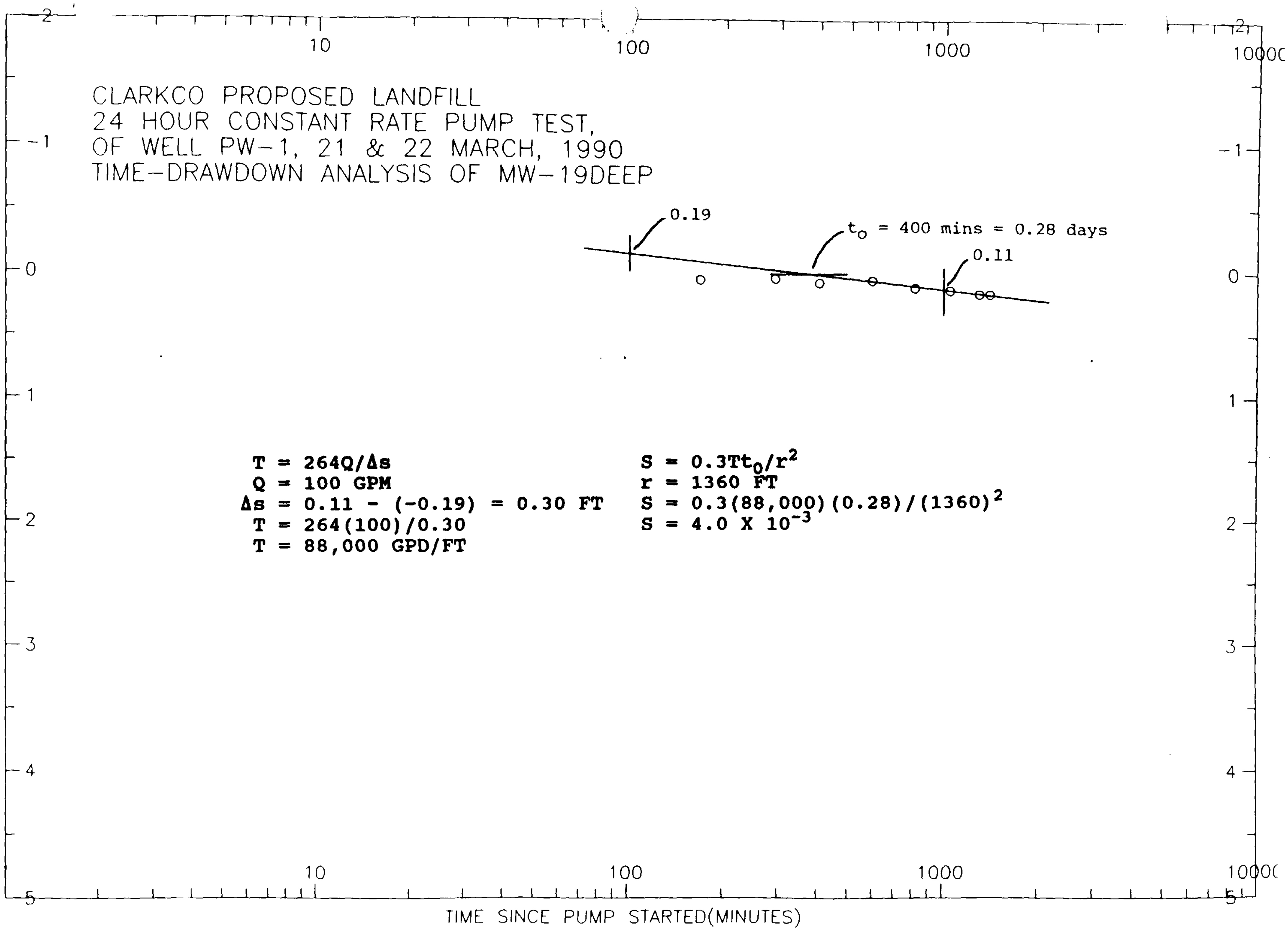

STEP TEST OF PW-1
CLARKCO PROPOSED LANDFILL
MARCH 20, 1990
30 GPM
50 GPM
75 GPM
100 GPM
125 GPM
DEPTH TO WATER (FEET)
TIME SINCE PUMP STARTED (MINUTES)
0
50
100
150
200
83.0
83.5
84.0
84.5
85.0
85.5
86.0
86.5
87.0


CLARKCO PROPOSED LANDFILL
24 HOUR TEST AT PW-1
MARCH 21-22, 1990
PW-1
MW-20 DEEP
MW-19 DEEP
DEPTH TO WATER (FEET)
TIME SINCE PUMP STARTED (MINUTES)
-3000
-2000
-1000
0
1000
80.0
90.0
100.0
110.0
120.0



CLARKCO PROPOSED LANDFILL
24 HOUR TEST AT PW-1
MARCH 21-22, 1990
MW-5
MW-15 SHALLOW
MW-15 DEEP
MW-19 SHALLOW
MW-20 SHALLOW
DEPTH TO WATER (FEET)
TIME SINCE PUMP STARTED (MINUTES)
-3000
-2000
-1000
0
1000
0.0
10.0
20.0
30.0
40.0
50.0


CLARKCO PROPOSED LANDFILL,
24 HOUR CONSTANT RATE PUMP TEST,
WELL NO. PW-1, MARCH 21-22, 1990
TIME-DRAWDOWN ANALYSIS OF PW-1
1.40 ft
1.80 ft
T = 264Q/Δs
Q = 100 GPM
Δs = 1.80 - 1.40 = 0.40 FT
T = 264(100)/0.40
T = 66,000 GPD/FT
DRAWDOWN (FEET)
TIME SINCE PUMP STARTED(MINUTES)
10
100
1000
10000
0
1
2
3
4
5
6
7



CLARKCO PROPOSED LANDFILL
24 HOUR CONSTANT RATE PUMP TEST,
OF WELL PW-1, 21 & 22 MARCH, 1990
TIME-DRAWDOWN ANALYSIS OF MW-19DEEP
0.19
t_o = 400 mins = 0.28 days
0.11
T = 264Q/Δs
Q = 100 GPM
Δs = 0.11 - (-0.19) = 0.30 FT
T = 264(100)/0.30
T = 88,000 GPD/FT
S = $0.3Tt_0/r^2$
r = 1360 FT
S = $0.3(88,000)(0.28)/(1360)^2$
S = 4.0×10^{-3}
10
100
1000
10000
-2
-1
0
1
2
3
4
5
TIME SINCE PUMP STARTED(MINUTES)

CLARKCO PROPOSED LANDFILL
STEP TEST OF PW-1
MARCH 20, 1990

ELAPSED TIME (MINUTES)	DEPTH TO WATER (FEET)	PUMPING RATE
0	83.79	30 GPM
1	84.22	
2	84.25	
3	84.26	
4	84.27	
6	84.28	
8	84.28	
10	84.29	
15	84.3	
20	84.31	
28	84.32	
30	84.32	
31	84.6	50 GPM
33	84.64	
34	84.65	
36	84.65	
40	84.66	
45	84.69	
50	84.69	
55	84.7	
60	84.7	
61	85.05	75 GPM
62	85.06	
65	85.1	
68	85.13	
71	85.14	
75	85.14	
80	85.16	
85	85.17	
90	85.17	
91	85.58	100 GPM
92	85.6	
93	85.62	
94	85.63	
96	85.65	
98	85.66	
101	85.67	
105	85.69	
110	85.7	
115	85.71	
120	85.72	
121	86.13	125 GPM
122	86.15	
123	86.17	
125	86.19	
128	86.22	
131	86.23	
135	86.24	
140	86.25	
145	86.26	
150	86.26	

CLARKCO PROPOSED LANDFILL
24 HOUR PUMPING TEST OF PW-1
OBSERVATIONS IN PW-1
MARCH 21 & 22, 1990

ELAPSED TIME (MINUTES)	DEPTH TO WATER (FEET)	DRAWDOWN (FEET)
-2640	83.68	
-1200	83.83	
-1191	83.8	
-1188	83.8	
-1137	83.79	
-12	83.71	
-3	83.7	
0	83.7	0
1	85.17	1.47
2	85.27	1.57
3	85.31	1.61
4	85.36	1.66
5	85.39	1.69
6	85.42	1.72
7	85.45	1.75
8	85.47	1.77
9	85.49	1.79
10	85.51	1.81
15	85.57	1.87
20	85.59	1.89
25	85.61	1.91
30	85.63	1.93
40	85.64	1.94
50	85.65	1.95
60	85.66	1.96
80	85.67	1.97
100	85.69	1.99
120	85.7	2
150	85.7	2
180	85.7	2
210	85.7	2
240	85.7	2
270	85.7	2
300	85.69	1.99
360	85.67	1.97
420	85.67	1.97
480	85.67	1.97
600	85.69	1.99
660	85.71	2.01
720	85.72	2.02
780	85.73	2.03
840	85.74	2.04
900	85.75	2.05
960	85.76	2.06
1020	85.76	2.06
1080	85.75	2.05
1140	85.75	2.05
1200	85.76	2.06
1260	85.77	2.07
1380	85.78	2.08
1440	85.78	2.08
1440.5	84.35	0.65
1441	84.31	0.61
1442	84.25	0.55
1443	84.19	0.49
1444	84.15	0.45
1445	84.11	0.41
1446	84.08	0.38
1447	84.06	0.36
1450	84	0.3
1452	83.97	0.27
1454	83.95	0.25
1457	83.93	0.23
1460	83.91	0.21
1465	83.89	0.19
1480	83.85	0.15
1490	83.84	0.14
1500	83.83	0.13

CLARKCO PROPOSED LANDFILL

24 HOUR PUMPING TEST OF PW-1

OBSERVATIONS IN MW-5

MARCH 21 & 22, 1990

ELAPSED TIME (MINUTES)	DEPTH TO WATER (FEET)
-2857	2.38
-1272	2.56
-44	2.61
163	2.61
281	2.75
392	2.77
581	2.75
805	2.62
1037	2.62
1391	2.65

CLARKCO PROPOSED LANDFILL

24 HOUR PUMPING TEST OF PW-1

OBSERVATIONS IN MW-15 SHALLOW

MARCH 21 & 22, 1990

ELAPSED TIME (MINUTES)	DEPTH TO WATER (FEET)
-2859	4.4
-1277	4.67
-48	4.8
161	4.77
286	4.77
396	4.76
586	4.77
802	4.82
1034	4.83
1388	4.87

CLARKCO PROPOSED LANDFILL

24 HOUR PUMPING TEST OF PW-1

OBSERVATIONS IN MW-15 DEEP

MARCH 21 & 22, 1990

ELAPSED TIME (MINUTES)	DEPTH TO WATER (FEET)
-2862	29.03
-1278	29.25
-50	29.14
159	29.11
284	29.08
394	29.02
584	28.97
800	28.97
1033	28.93
1386	28.88

CLARKCO PROPOSED LANDFILL

24 HOUR PUMPING TEST OF PW-1

OBSERVATIONS IN MW-19 SHALLOW

MARCH 21 & 22, 1990

ELAPSED TIME (MINUTES)	DEPTH TO WATER (FEET)
-2853	21.5
-1269	21.68
-39	21.69
166	21.66
288	21.67
399	21.67
588	21.64
810	21.66
1040	21.63
1396	21.58

CLARKCO PROPOSED LANDFILL

24 HOUR PUMPING TEST OF PW-1

OBSERVATIONS IN MW-19 DEEP

MARCH 21 & 22, 1990

ELAPSED TIME (MINUTES)	DEPTH TO WATER (FEET)	DRAWDOWN (FEET)
-2850	81.82	
-1267	82.07	
-40	81.91	
167	81.97	0.06
290	81.96	0.05
401	81.99	0.08
590	81.97	0.06
808	82.03	0.12
1042	82.05	0.14
1288	82.08	0.17
1393	82.08	0.17

CLARKCO PROPOSED LANDFILL

24 HOUR PUMPING TEST OF PW-1

OBSERVATIONS IN MW-20 SHALLOW

MARCH 21 & 22, 1990

ELAPSED TIME (MINUTES)	DEPTH TO WATER (FEET)
-2845	40.68
-1283	40.83
-27	40.91
173	40.94
276	40.91
408	40.9
614	40.9
810	40.89
1048	40.88
1400	40.86

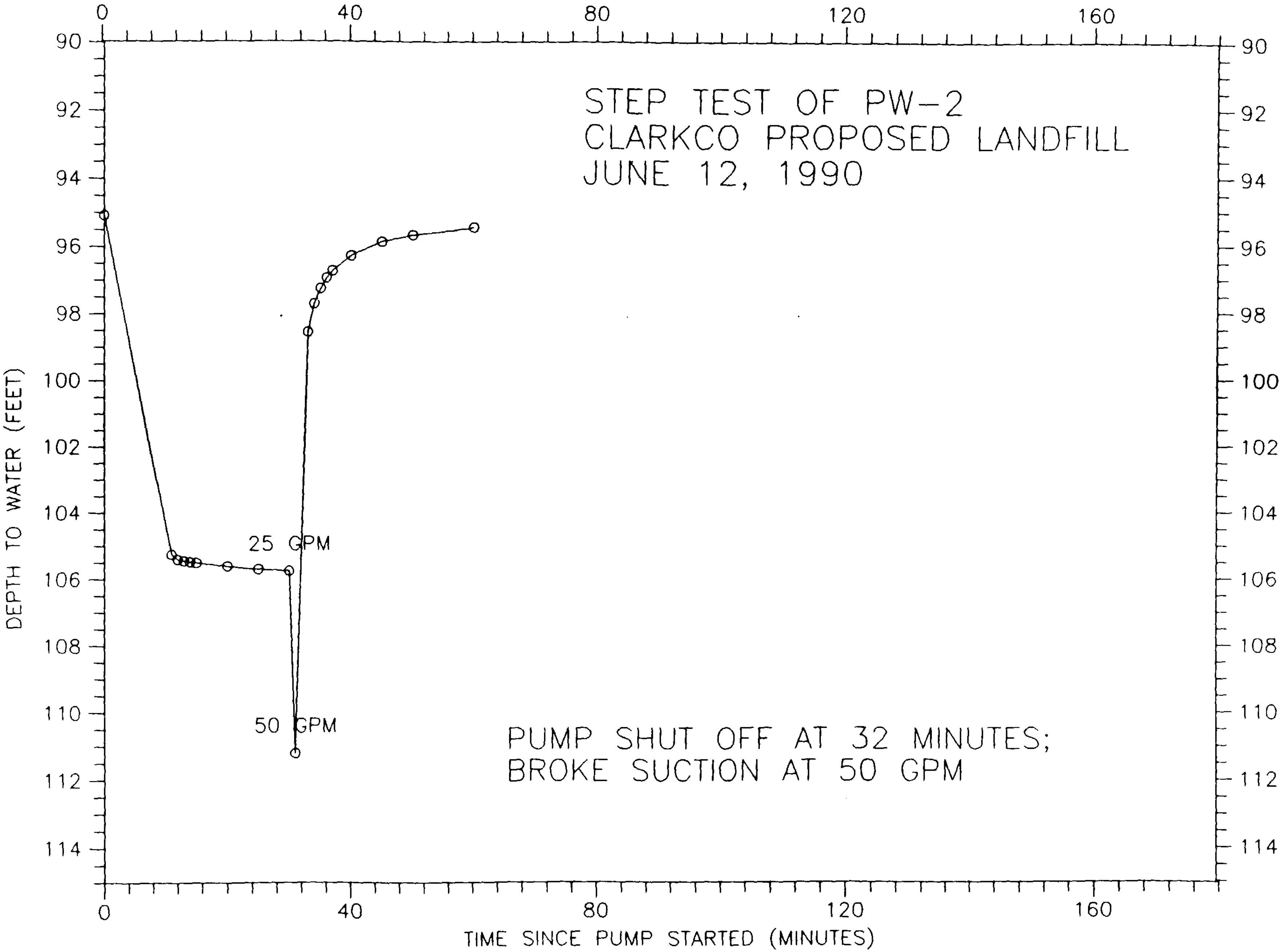
CLARKCO PROPOSED LANDFILL

24 HOUR PUMPING TEST OF PW-1

OBSERVATIONS IN MW-20 DEEP

MARCH 21 & 22, 1990

ELAPSED TIME (MINUTES)	DEPTH TO WATER (FEET)
-2841	114.94
-1285	115
-30	114.84
170	114.8
278	114.76
406	114.7
612	114.82
795	114.67
1046	114.62
1281	114.59
1403	114.6

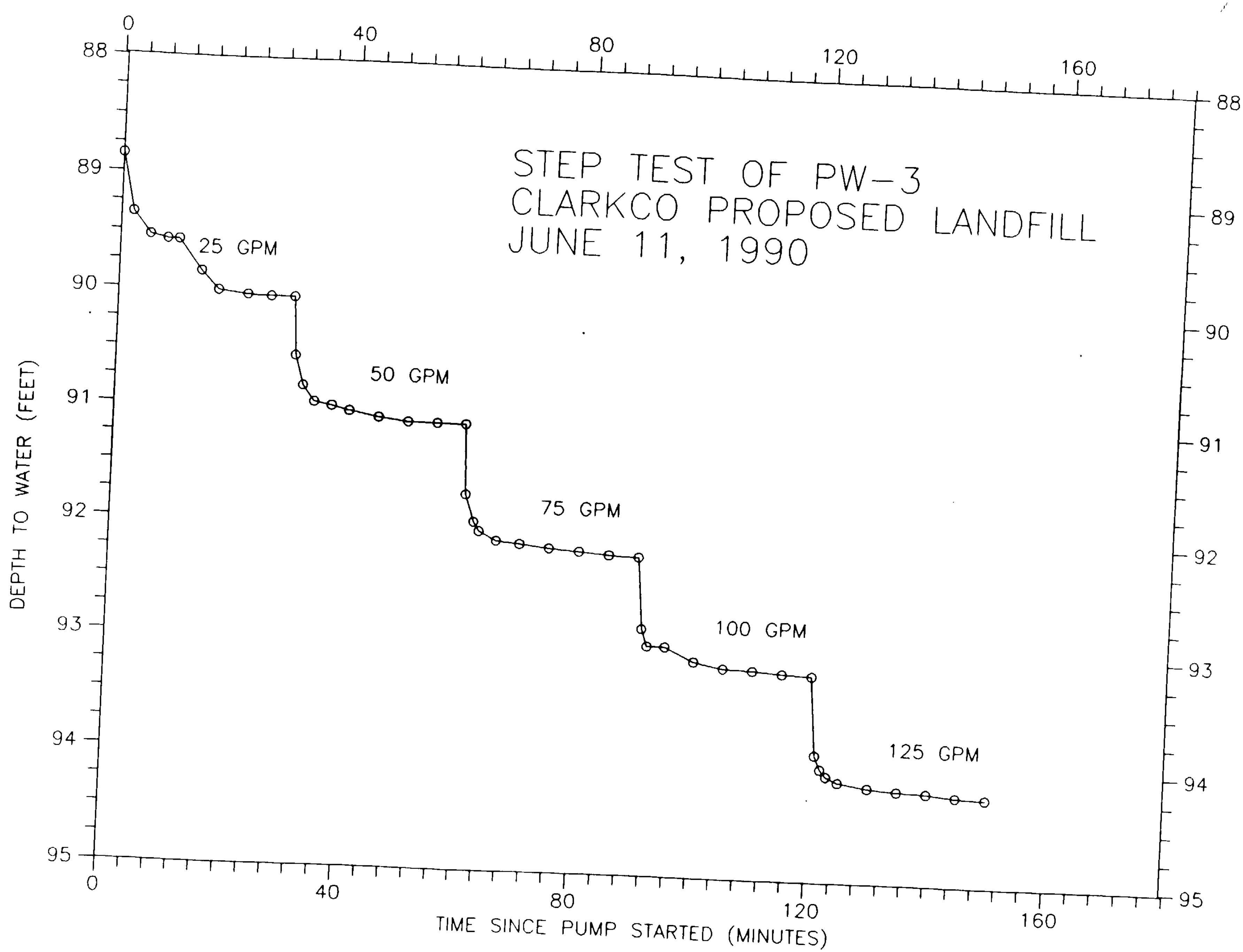

STEP TEST OF PW-2
CLARKCO PROPOSED LANDFILL
JUNE 12, 1990
25 GPM
50 GPM
PUMP SHUT OFF AT 32 MINUTES;
BROKE SUCTION AT 50 GPM
DEPTH TO WATER (FEET)
TIME SINCE PUMP STARTED (MINUTES)
0
40
80
120
160
90
92
94
96
98
100
102
104
106
108
110
112
114

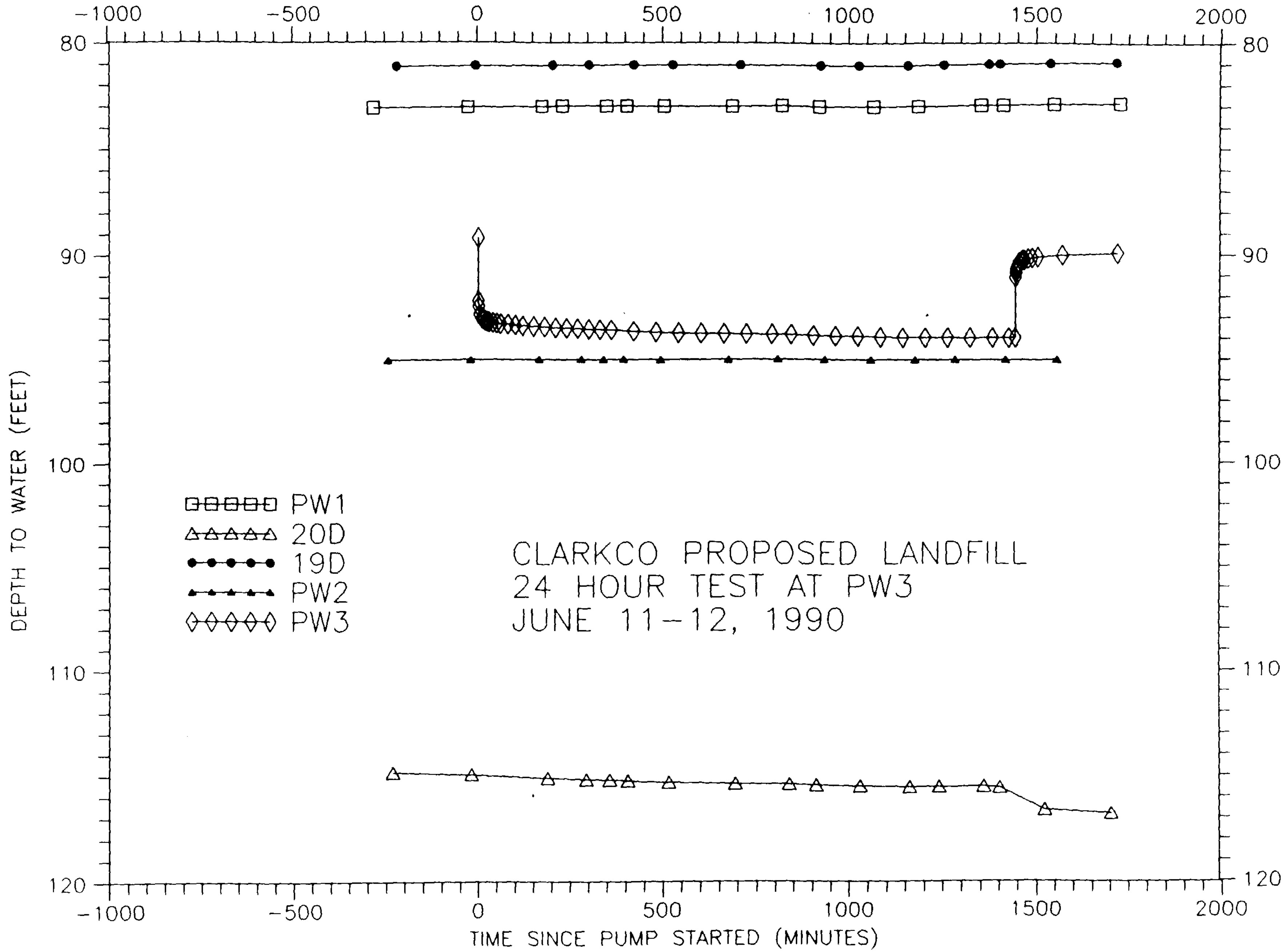
CLARKCO PROPOSED LANDFILL

STEP TEST OF PW-2

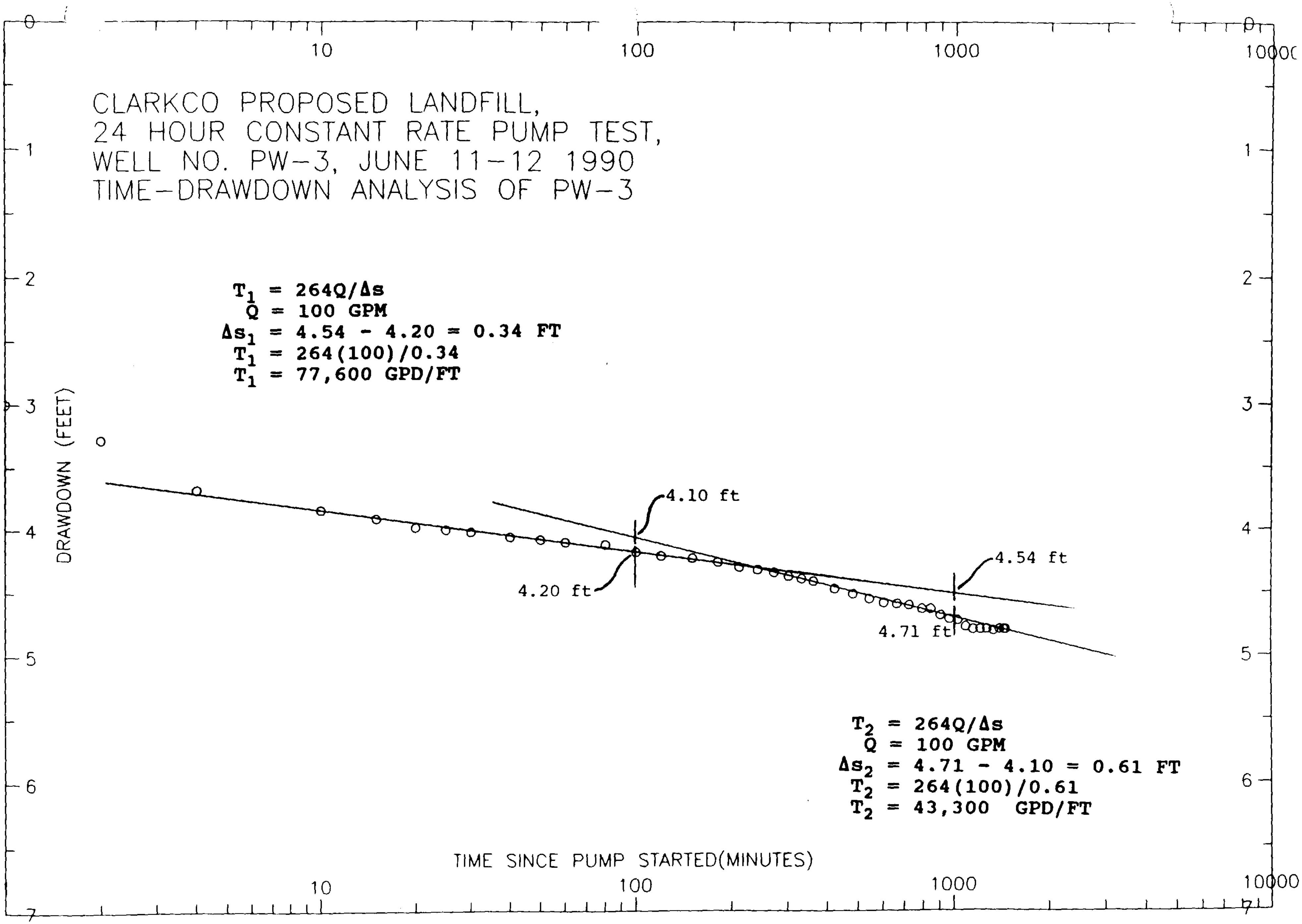
JUNE 12, 1990

ELAPSED TIME (MINUTES)	DEPTH TO WATER (FEET)	PUMPING RATE	
0	95.08	25 GPM	
11	105.25		
12	105.4		
13	105.45		
14	105.47		
15	105.5		
20	105.6		
25	105.69		
30	105.75		
31	111.2	50 GPM	BROKE SUCTION
33	98.55		
34	97.7		
35	97.25		
36	96.93		
37	96.72		
40	96.27		
45	95.86		
50	95.65		
60	95.43		

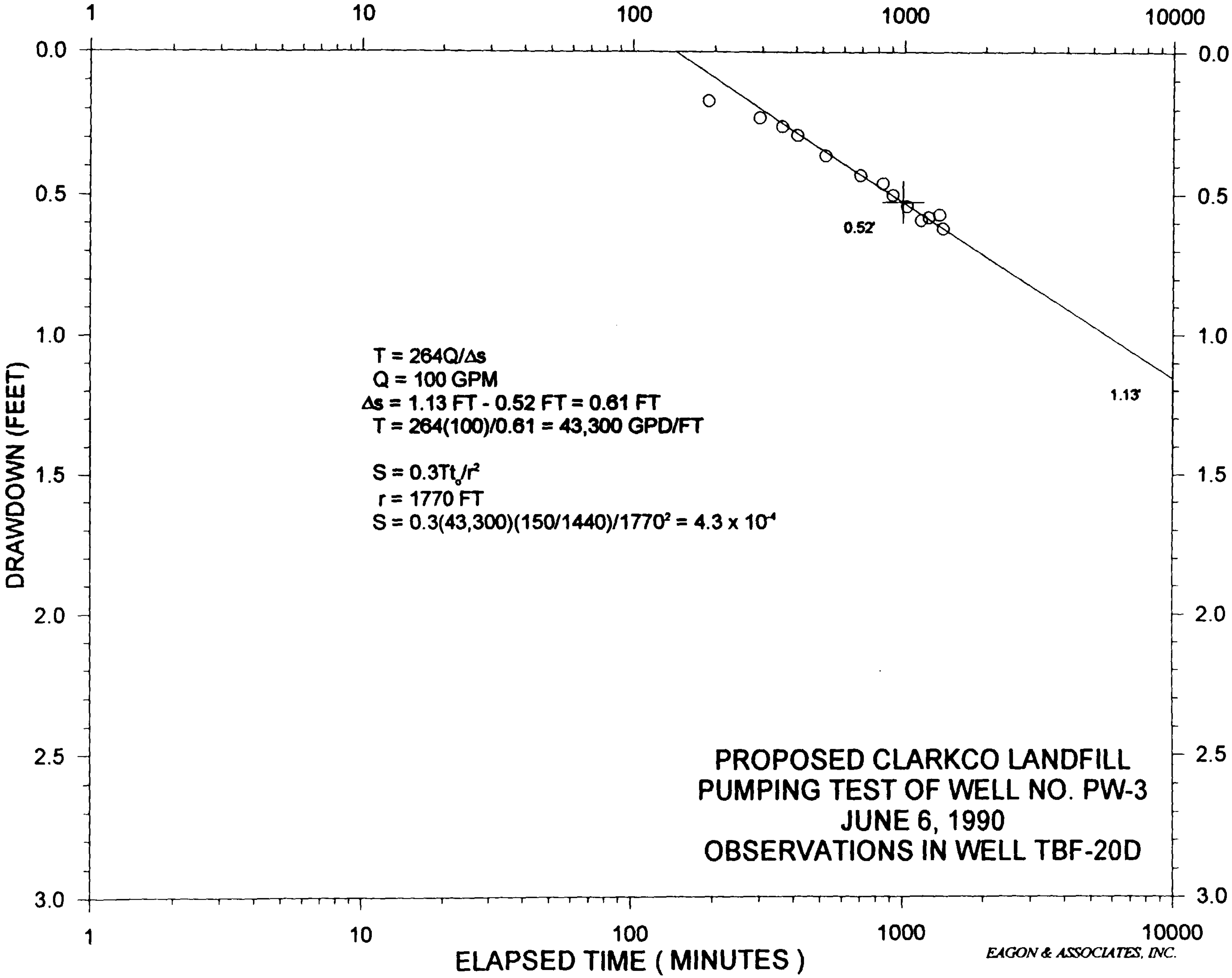

STEP TEST OF PW-3
CLARKCO PROPOSED LANDFILL
JUNE 11, 1990
25 GPM
50 GPM
75 GPM
100 GPM
125 GPM
DEPTH TO WATER (FEET)
TIME SINCE PUMP STARTED (MINUTES)
0
40
80
120
160
88
89
90
91
92
93
94
95



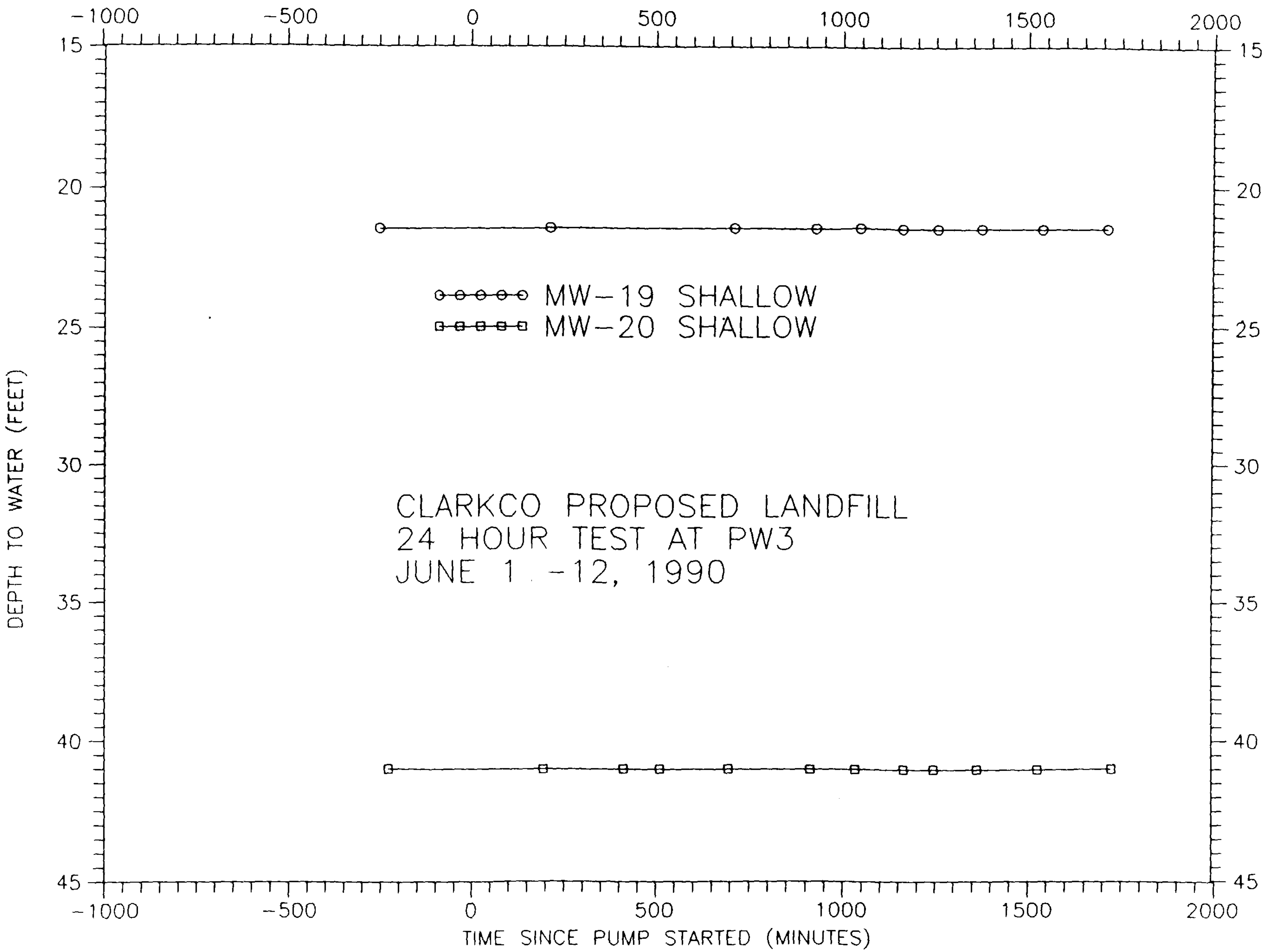
PW1
20D
19D
PW2
PW3
CLARKCO PROPOSED LANDFILL
24 HOUR TEST AT PW3
JUNE 11-12, 1990
DEPTH TO WATER (FEET)
TIME SINCE PUMP STARTED (MINUTES)



CLARKCO PROPOSED LANDFILL,
24 HOUR CONSTANT RATE PUMP TEST,
WELL NO. PW-3, JUNE 11-12 1990
TIME-DRAWDOWN ANALYSIS OF PW-3
$T_1 = 264Q/\Delta s$
$Q = 100$ GPM
$\Delta s_1 = 4.54 - 4.20 = 0.34$ FT
$T_1 = 264(100)/0.34$
$T_1 = 77{,}600$ GPD/FT
4.10 ft
4.20 ft
4.54 ft
4.71 ft
$T_2 = 264Q/\Delta s$
$Q = 100$ GPM
$\Delta s_2 = 4.71 - 4.10 = 0.61$ FT
$T_2 = 264(100)/0.61$
$T_2 = 43{,}300$ GPD/FT
DRAWDOWN (FEET)
TIME SINCE PUMP STARTED(MINUTES)
10
100
1000
10000
0
1
2
3
4
5
6
7



1
10
100
1000
10000
0.0
0.5
1.0
1.5
2.0
2.5
3.0
DRAWDOWN (FEET)
0.52'
1.13'
T = 264Q/Δs
Q = 100 GPM
Δs = 1.13 FT - 0.52 FT = 0.61 FT
T = 264(100)/0.61 = 43,300 GPD/FT
S = 0.3Tt₀/r²
r = 1770 FT
S = 0.3(43,300)(150/1440)/1770² = 4.3 x 10⁻⁴
PROPOSED CLARKCO LANDFILL
PUMPING TEST OF WELL NO. PW-3
JUNE 6, 1990
OBSERVATIONS IN WELL TBF-20D
ELAPSED TIME (MINUTES)
EAGON & ASSOCIATES, INC.



-1000
-500
0
500
1000
1500
2000
15
20
25
30
35
40
45
DEPTH TO WATER (FEET)
MW-19 SHALLOW
MW-20 SHALLOW
CLARKCO PROPOSED LANDFILL
24 HOUR TEST AT PW3
JUNE 1 -12, 1990
TIME SINCE PUMP STARTED (MINUTES)

CLARKCO PROPOSED LANDFILL
STEP TEST OF PW-3
JUNE 11, 1990

ELAPSED TIME (MINUTES)	DEPTH TO WATER (FEET)	PUMPING RATE
0	88.85	25 GPM
2	89.35	
5	89.54	
8	89.57	
10	89.57	
14	89.84	
17	90	
22	90.03	
26	90.04	
30	90.04	
30.5	90.55	50 GPM
32	90.81	
34	90.95	
37	90.98	
40	91.02	
45	91.07	
50	91.1	
55	91.1	
60	91.1	
60.5	91.72	75 GPM
62	91.96	
63	92.04	
66	92.12	
70	92.14	
75	92.17	
80	92.19	
85	92.21	
90	92.22	
91	92.85	100 GPM
92	93	
95	93	
100	93.12	
105	93.17	
110	93.18	
115	93.2	
120	93.21	
121	93.9	125 GPM
122	94.02	
123	94.08	
125	94.13	
130	94.17	
135	94.19	
140	94.2	
145	94.22	
150	94.23	

CLARKCO PROPOSED LANDFILL
24 HOUR PUMPING TEST OF PW-3
OBSERVATIONS IN PW-3
JUNE 11 & 12, 1990

ELAPSED TIME (MINUTES)	DEPTH TO WATER (FEET)	DRAWDOWN (FEET)
0	89.18	0
1	92.18	3
2	92.46	3.28
4	92.86	3.68
10	93.02	3.84
15	93.09	3.91
20	93.16	3.98
25	93.18	4
30	93.2	4.02
40	93.24	4.06
50	93.26	4.08
60	93.28	4.1
80	93.3	4.12
100	93.36	4.18
120	93.39	4.21
150	93.41	4.23
180	93.44	4.26
210	93.48	4.3
240	93.5	4.32
270	93.52	4.34
300	93.55	4.37
330	93.57	4.39
360	93.59	4.41
420	93.65	4.47
480	93.69	4.51
540	93.73	4.55
600	93.76	4.58
660	93.77	4.59
720	93.78	4.6
790	93.81	4.63
840	93.81	4.63
900	93.86	4.68
960	93.89	4.71
1020	93.9	4.72
1080	93.95	4.77
1140	93.97	4.79
1200	93.97	4.79
1260	93.97	4.79
1320	93.98	4.8
1380	93.97	4.79
1423	93.97	4.79
1440	93.97	4.79
1441	91.07	1.89
1442	90.85	1.67
1443	90.7	1.52
1444	90.61	1.43
1445	90.55	1.37
1447	90.47	1.29
1450	90.37	1.19
1455	90.31	1.13
1460	90.25	1.07
1465	90.23	1.05
1475	90.18	1
1485	90.14	0.96
1500	90.1	0.92
1566	90	0.82
1716	89.88	0.7

CLARKCO PROPOSED LANDFILL

24 HOUR PUMPING TEST OF PW-3

OBSERVATIONS IN PW-1

JUNE 11 & 12, 1990

ELAPSED TIME (MINUTES)	DEPTH TO WATER (FEET)
-285	83.05
-29	83.01
171	82.97
227	82.95
345	82.95
400	82.95
500	82.96
681	82.96
815	82.92
915	82.96
1062	82.96
1181	82.95
1348	82.9
1407	82.89
1542	82.85
1721	82.8

CLARKCO PROPOSED LANDFILL

24 HOUR PUMPING TEST OF PW-3

OBSERVATIONS IN PW-2

JUNE 11 & 12, 1990

ELAPSED TIME (MINUTES)	DEPTH TO WATER (FEET)
-244	95.04
-20	95.02
166	95
280	95
340	95
393	95
493	95.01
673	95.01
805	95
930	95.02
1055	95.04
1173	95.04
1281	95.03
1415	95.03
1552	95.01

CLARKCO PROPOSED LANDFILL

24 HOUR PUMPING TEST OF PW-3

OBSERVATIONS IN MW-19 SHALLOW

JUNE 11 & 12, 1990

ELAPSED TIME (MINUTES)	DEPTH TO WATER (FEET)
-255	21.43
208	21.42
706	21.42
923	21.43
1042	21.41
1156	21.43
1251	21.43
1370	21.43
1534	21.44
1708	21.43

CLARKCO PROPOSED LANDFILL
24 HOUR PUMPING TEST OF PW-3
OBSERVATIONS IN MW-19 DEEP
JUNE 11 & 12, 1990

ELAPSED TIME (MINUTES)	DEPTH TO WATER (FEET)
-223	81.11
-9	81.06
200	81.03
298	81.02
418	81.01
522	81.02
703	81.02
919	81.01
1022	81.02
1152	81.03
1248	80.99
1368	80.96
1397	80.95
1531	80.92
1711	80.86

CLARKCO PROPOSED LANDFILL

24 HOUR PUMPING TEST OF PW-3

OBSERVATIONS IN MW-20 SHALLOW

JUNE 11 & 12, 1990

ELAPSED TIME (MINUTES)	DEPTH TO WATER (FEET)
-228	40.98
195	41
412	40.99
511	40.99
695	40.99
913	41
1032	41
1164	41.01
1245	41.01
1363	41.01
1525	41
1724	40.98

CLARKCO PROPOSED LANDFILL

24 HOUR PUMPING TEST OF PW-3

OBSERVATIONS IN MW-20 DEEP

JUNE 11 & 12, 1990

ELAPSED TIME (MINUTES)	DEPTH TO WATER (FEET)
-231	114.84
-17	114.94
190	115.11
295	115.17
358	115.2
407	115.23
516	115.3
693	115.37
838	115.4
911	115.44
1030	115.48
1160	115.53
1240	115.52
1358	115.51
1401	115.56
1522	116.61
1702	116.77

APPENDIX F.

72-HOUR PUMPING TEST ON UPPERMOST AQUIFER

72-HOUR PUMPING TEST

The primary purpose of the pumping test of 72 hours duration performed on well PW-3 from 10:30 am on October 6 to 10:30 am on October 9, 1992, was to determine the hydraulic interconnection, or lack thereof, between the uppermost aquifer and the saturated zones within the glacial till confining bed above it. A secondary objective of the pumping test was to evaluate the hydraulic characteristics of the uppermost aquifer. A step test was conducted on PW-3 three days prior to the 72-hour test to determine the characteristics of the well and to determine the most appropriate pumping rate for the long test. The maximum capacity of the pump was found to be about 220 gallons per minute (gpm), so a test rate of 197 gpm was used for the 72-hour test to insure that a constant rate could be maintained as total-discharge-head increased as water-levels in the well declined with time.

In all, 53 wells at the Clarkco and Tremont sites were used as observation wells during the test. Hydrographs plotted from water levels measured in these wells are presented in this Appendix. These wells are listed in Table F-1 which also identifies the zone in which they are screened, and lists the distance from PW-3 and the method and frequency of water-level measurement during the test. In order to establish the background trend in water levels, these wells were measured daily for three days prior to, and four days after, the test. Figure F-1 is a graphic summary of the observation wells used for data collection, showing the vertical relationship of screened intervals and water levels.

Test Data

The observation wells can be characterized in several categories. First, there are wells developed in sand zones within the till. Then there are wells which are screened in the uppermost aquifer or the other saturated beds in the stratified drift which are laterally equivalent to it. The approximate base of the Wisconsinan Till protective layer as shown on Plate 23 and generalized on

Figure 5-21 serves to separate these two groups; in reality the base of till ranges from elevation 1020 to 1000.

The most important wells for test purposes are the intra-till sand wells located within 700 feet of well PW-3. These are the wells in which a response to pumping in the uppermost aquifer would be detected if a vertical interconnection were to exist. Each of these wells was equipped with a transducer in order to obtain a continuous record of water-level fluctuations. The only exceptions were the two shallower wells at a 3-well cluster (C91-4X, C91-4Y and C91-4Z). Here a continuous record was obtained in the deepest well and periodic measurements were made routinely in the others.

The next important category of observation wells includes those developed within the uppermost aquifer and located within 2500 feet of PW-3. This includes BF-19D and 20D at the Closed Barrel Fill, and the "supply well" at the Tremont Landfill. The purpose of data collection in these wells was to determine the shape of the cone of depression within the uppermost aquifer in order to identify directional differences in transmissivity, boundary conditions, and areas more distant from the pumping well where the magnitude of drawdown in the aquifer might be more likely to cause evidence of a vertical connection due to greater head differential. Uppermost aquifer wells within about 1000 feet of PW-3 also were used to collect early drawdown data for computation of aquifer characteristics. Transducers were installed in wells 92-22D and 22DD and manual water-level measurements were taken frequently in wells C91-5D, C92-5DD,C91-2D, and 92-21D for the first four hours of the test. Some early measurements also were taken at TBF-19D, TBF-20D and 92-23D. These wells subsequently were measured on a 4-hour schedule for the remainder of the test. The data collection schedule is listed on Table F-1.

The rest of the wells screened in the 1035 and 1050 sands that are located within a radius of 2000 feet from PW-3 were measured on a 4-hour schedule during the test. The purpose of including these wells in the network was to insure that all available wells developed in intra-till sands, where even a remote possibility of a vertical interconnection existed, were observed during this test. Four wells developed in the 1070 and 1077 sands also were included because they were located at clusters where deeper wells were being measured routinely. It was a fairly simple matter to include them in the schedule.

Wells at the south end of the Tremont Landfill were selected for measurement to determine whether or not any lateral hydraulic interconnection exists between the uppermost aquifer at the Clarkco site and the stratified drift at the landfill where ground-water assessment studies have been performed. Transducers were installed in wells A89-3D and A91-7D, which are typical of the two hydrogeologic environments present at the southern end of the Tremont Landfill (Eagon 1992a). Water-level measurements were also taken on a 4-hour schedule in M-3 and A91-9S, and daily at well M-4.

Finally, several wells at the north end of the Clarkco property were measured for background purposes. Daily measurements were taken in wells PW-1, 90-6D and 92-27DD which are screened in the uppermost aquifer. A strip chart recorder was installed and operated to obtain a continuous record of water levels in PW-2 and a transducer was installed in well 92-15X.

A continuous record of barometric fluctuations was obtained using a recording barometer with a strip chart recorder, so that water level fluctuations could be corrected for barometric affects. The stage of Chapman Creek also was measured routinely during and after the pumping test in order to relate river stage to ground-water level changes.

Hydrographs for all of the observation wells monitored during the pumping test are grouped by category, as described above, in this Appendix. Each group of hydrographs is preceded by a header sheet which explains the logic of the grouping, lists the wells included, and summarizes unique characteristics of the data. Figure F-2 is the hydrograph for the pumping well (PW-3) for the data collection period before, during, and after the test. All hydrographs are plotted to the same scale for both time and water-level elevation to facilitate comparison. Figure F-2 shows the hydrographs for the two closest well pairs screened in the uppermost aquifer, namely C91-5D and 5DD, and 92-

22D and 22DD. Figure F-4 shows the hydrographs for the two closest intra-well sand wells which are 92-28X and 92-29X, located at distances from PW-3 of 100 and 75 feet, respectively.

Trends and Data Correction

Figure F-4 includes a plot of the barometric pressure for the data collection period, converted to feet of water and plotted on an inverted vertical axis so that rising pressure matches declining ground-water levels. The plots of barometric and water-level fluctuations of wells 92-28X and 92-29X are almost identical. Based on Figure F-4, it appears that the only water-level changes in these two wells during the pumping test were the result of barometric affects. Conversely, hydrographs of wells in the uppermost aquifer (Figure F-3) clearly show drawdown as a result of pumping in PW-3. Some barometric affect is also apparent, causing minor variations in water levels that vary in amount depending on the barometric efficiency of each well.

A review of the hydrographs for intra-till sand wells within 700 feet of PW-3 indicate that there was no drawdown produced in these wells during the 72-hour test period. In order to validate this conclusion the hydrographs were corrected for barometric-induced fluctuations by calculating the barometric efficiency unique to each well and adding or subtracting the appropriate change values using the beginning of the test as the time reference point. Figure F-5 is an example of the manner in which the barometric efficiency was determined.

Corrected hydrographs are included in for wells 92-28X, 92-29X, C91-4X, C91-4Z and 91-26X. All of these plots show a straight line, with absolutely no indication of response to pumping (drawdown) during the test. Most wells show some declining trend during the data collection period, in varying amounts. Well 92-28X declined about 0 4 foot whereas well 92-29X was essentially flat. Water levels in wells C91-4Z and 92-26X declined at about the same rate, about 0.7 foot over the 10 day period. This slight decline is to be expected considering the season and the lack of substantial precipitation during that period of time. Clearly the declining trend is natural. It was not necessary to correct the hydrographs for wells 92-31Y and 92-33Y because there was no barometric affect, probably because the water levels in these wells were within the sand pack zone (see Figure F-1). The hydrograph of well 92-31X also was essentially featureless and required no correction. Clearly, there was no drawdown in any of these wells.

A declining trend for the data collection period also is apparent in wells developed in the uppermost aquifer, the hydrographs of which are grouped together. As seen from the hydrographs of PW-3 and the C91-5 and 92-22 well pairs, the decline is about 0.6 to 0.7 foot for the 10-day period. The decline is slightly less in well 92-23D which has a low barometric efficiency. This well hydrograph requires no correction to conclude that drawdown was not produced.

Wells C91-2D, C91-8D, 90-9DD, 90-14D, 92-14DD and 92-21D all have hydrographs which are quite similar. Even though these wells (with the exception of 92-21D) are developed in what has been considered to be the unconfined portion of the uppermost aquifer, the water level fluctuations were not affected by the pumping of PW-3, but appear to be affected by barometric changes to varying degrees. This is probably due to stratification in the aquifer and the fact that some have water levels above the top of the sand pack (see Figure F-1). The hydrographs for wells C91-2D and 90-9DD were corrected for barometric affects and show a slight declining trend with no evidence of drawdown.

Well TBF-20D and the supply well both clearly show drawdown as a result of pumping PW-3. However, it was not possible to keep the supply well shut down during the test and its on-off cycling is obvious in the hydrographs for both wells. Clearly, TBF-20D is affected by pumping of the supply well, and both wells are affected by PW-3. The data is too erratic to determine trends, but it is possible to compute an approximation of the drawdown as a result of pumping. Drawdown at the supply well and TBF-20D as a result of pumping PW-3 at the end of the test is estimated to be about 0.70 and 0.65 foot, respectively. Drawdown at TBF-20D as a result of short-term pumping at the supply well is about 1.1 feet. The supply well itself draws down about 3 feet when the pump cycles.

The hydrograph for well TBF-19D exhibits the same characteristics as other hydrographs of wells in the uppermost aquifer which are unaffected by pumping, however, it appears to be even more responsive to barometric changes. This is consistent with the log of this well which clearly indicates confined conditions at this location. Hydrographs of PW-1, 90-6D, 90-10D, 90-13D and 92-27DD are all quite similar and show the same general trends as those which were corrected. In view of their distance from PW-3, and the fact that corrected hydrographs for closer wells showed no drawdown, it is concluded that these wells were beyond the radius of influence of pumping at PW-3.

Wells PW-2 and 92-20D show very minor affects of barometric fluctuations and both hydrographs exhibit a slight declining trend. PW-2 was considered to be a background well as it is farthest away (over 3000 feet from PW-3). Clearly there is no drawdown indicated by these hydrographs.

The next series of hydrographs grouped together are those for intra-till sand wells located more than 1000 feet from PW-3. All of these wells are located to the north of PW-3 and all are in the area where the lower till is underlain by a fairly thick unsaturated zone. The only exceptions are the shallow aquifer wells monitored at the Closed Barrel Fill, namely TBF-17, 19S and 20S where the uppermost aquifer is confined. A hydraulic response to pumping was not expected in any of these wells due to their distance from the pumping well and the underlying unsaturated zone. Nevertheless, they were monitored to insure that the data collection and test analysis was as comprehensive as possible.

Hydrographs of wells C92-1X, 92-4X, 92-14X, and 92-19X developed in the 1035 sand all have the same characteristic plots as the barometric record, with slight variations in magnitude of change due to varying barometric efficiency. As with intra-till wells closer to PW-3, no change due to pumping was detected. Well 91-9Y is the deepest of the group and appears to be the most responsive to barometric changes.

The hydrographs of 1050 sand wells show similar patterns of barometric fluctuation, although more subdued. The abrupt change in water level on October 8 shown on the hydrograph of well C91-8X looks like a data collection anomaly because the observed trend before and after the change matches the other hydrographs. However, the change was real as confirmed by careful verification by on-site personnel at the time. The change is thought to be related to the physical conditions in the borehole and sand pack. Perhaps a small airpocket in a void was released. In any event, the change cannot be attributed to pumping at PW-3. This well is 1440 feet away, and more distant vertically and horizontally than many wells showing no response. Even if some hydraulic connection were possible, any response would be gradual and not an abrupt event. This curious change is absolutely unrelated to the pumping test.

The background well in the 1050 sand (92-15X), in which a transducer was installed, has a low barometric efficiency and the hydrograph shows a fairly level trend. The water level is at or just below the top of the sand pack (see Figure F-1). This hydrograph is similar to the other intra-till wells with low barometric efficiency, i.e. like the wells developed in the 1070 and 1077 sands. All three intra-till sand wells at the Closed Barrel (TBF-17, 19S, and 20S) have hydrographs that show low barometric efficiency and the characteristic background trend. As with the closer intra-till sand wells, there is no indication of response to pumping in any of the intra-till sand wells located beyond 1000 feet from PW-3.

The five wells located at the south end of the Tremont Landfill that were monitored during the 72-hour pumping test (A89-3D, A91-7D, A91-9S, M-3, and M-4) showed absolutely no response to the pumping. The hydrographs are essentially featureless, showing little or no change resulting from barometric fluctuation and no deviation during the pumping period. The hydrographs for Chapman Creek shows essentially the same level trend as these wells which are located in close proximity to it.

Evaluation of Vertical Interconnection

As described in the preceding detailed discussion of hydrographs and background trends in ground-water levels, there was absolutely no evidence of drawdown in any of the intra-till sand wells during the pumping test. Figure 5-15 shows a general trace of the limit of the area where confined conditions exist in the uppermost aquifer. In the unconfined area north of this line there is no physical mechanism for a hydraulic response to be transmitted vertically. Moreover, there was no drawdown in the uppermost aquifer in that area, as will be discussed in the next section. Within the confined area, very careful analysis of the water-level data collected during the test revealed no vertical interconnection between the uppermost aquifer and intra-till sands within the confining bed above the aquifer.

None of the observation wells located at the Tremont Landfill to the southwest of PW-3 were affected by pumping, which in the case of the confined saturated zones, indicates that there is no lateral interconnection. Wells A91-9S and M-3, for instance, are developed in what are considered to be local sand lenses within material which is mostly till. Therefore, it was considered unlikely that a lateral interconnection with these wells existed and the test results confirm this conclusion. Wells A91-7D, A89-3D, and M-4, however, are developed in effectively unconfined saturated zones which may be horizontally equivalent to the uppermost aquifer at the Clarkco site or, more likely, to a discrete aquifer located further to the west. In either case, a response to pumping at PW-3 would not be expected, and none was observed. This is consistent with data presented in the Tremont Landfill assessment report (Eagon, 1992a), which describes a flow system that discharges locally to Chapman Creek.

Well 92-23D, located south of PW-3 along Snyder Domer Road, showed no evidence of drawdown during the test, which confirms the conclusion that the uppermost aquifer at the Clarkco site pinches out to the south. There also was no drawdown observed at well 92-21D located only 1025 feet to the southeast of PW-3. The water-level elevation in this well is consistent with other wells developed in the uppermost aquifer and it is screened at about the same elevation as the screen and gravel-pack interval of PW-3. However, there is no evidence of a lateral interconnection in the pumping test results, which leads to the conclusion that 92-21D is screened in a saturated zone which is hydraulically isolated from the uppermost aquifer. This serves to illustrate the variable nature of the stratified drift, particularly to the south and southeast of the proposed landfill footprint.

Well 92-20D is screened in a deeper zone than the other observation wells in the uppermost aquifer, as shown by the significantly lower water level (see Figure F-1). The lack of observed drawdown during the pumping test confirms this conclusion. Whether or not there was any hydraulic response in the shallower saturated zones at well 92-20D that are closer in elevation to the aquifer at PW-3 cannot be determined, because only the deep zone is screened at 92-20D. However, considering that no drawdown was observed at wells C91-2D, 92-14D, and 92-14DD also located to the northeast of PW-3, it seems doubtful that the hydraulic response would have been transmitted through the unsaturated portion of the uppermost aquifer to this location, which is even farther away.

The cone of depression delineated in Figure 5-16 shows the extent of the area in the uppermost aquifer affected by the pumping of PW-3. Time-drawdown graphs presented in Appendix I indicate that the wells in which drawdown was observed responded in a manner that can be characterized as nonleaky artesian conditions. In other words, all of the water pumped came from storage in the aquifer, rather than some source of recharge such as confining-bed leakage or streambed infiltration. There does appear to be delayed yield from storage as seen from log-log plot of the time-drawdown data from well C92-5DD. This is believed to be due to an imperfect interconnection between zones within the aquifer due to stratification. Evidence supporting the poor connection is the smaller drawdowns observed in the shallower wells at these locations, i.e. C91-5D and 92-22D. The delayed response shown by the semi-log graph of the drawdown in well 92-22D is further evidence of this (see hydrograph).

Negative boundary conditions are indicated by the semi-log plots of drawdown in PW-3 and the affected observation wells. This is consistent with the shape of the cone of influence delineated on Figure 5-16, and the apparent lack of a lateral interconnection in certain directions from PW-3.

Calculation of Aquifer Characteristics

Aquifer characteristics that were calculated from the pumping-test data from various wells are summarized in Table 5-4. Well TBF-20D and the supply well could not be used for time-drawdown computations due to the erratic nature of the data caused by intermittent pumping at the supply well. Calculated values for transmissivity (T) which are considered to be valid are in the range of 41,800 to 51,100 gpd/ft. Assuming that the average thickness of the aquifer within the cone of depression observed is about 30 feet, the average hydraulic conductivity for the uppermost aquifer based on the pumping test results is 1556 gpd/ft^2 or 7.3×10^{-2} cm/sec. This compares favorably with values determined from slug tests on wells developed in the upper portion of the uppermost aquifer shown on Table 5-4.

The storativity (S) values determined from the pumping-test data are in the typical artesian range of 1×10^{-4}. This is consistent with confined conditions in the aquifer which exist at PW-3. However, the distance-drawdown graph plotted from test data indicates that a storativity value of this order of magnitude would cause a very extensive cone of depression. The transmissivity value determined from the slope of the distance-drawdown graph seems consistent with drawdowns observed, and T values derived, from time-drawdown methods. However, the extent of the cone defined by the distance-drawdown plot is much greater than was actually observed. A value of 1.4×10^{-3} derived from distance-drawdown computations is high for confined conditions and it seems obvious that the actual S must be higher yet to reconcile the observed results with the aquifer characteristics derived. The conclusion to be derived from this analysis is that the cone of depression developed within the confined or partially-confined part of the aquifer to the south, and spread to the unconfined part to the north. Much of the water pumped from storage apparently came from the unconfined part of the aquifer where the storativity may be as high as 0.2. This is the most likely explanation for the limited size of the cone of depression observed, and the apparent lack of drawdown experienced in the deep wells to the north of PW-3 where water-table conditions prevail. Again, these results demonstrate the variable nature of the uppermost aquifer and other units of which the stratified drift is comprised. The true or average value for S cannot be determined from the test data, but it seems obvious that it varies with local conditions and becomes larger to the north where there is a transition from confined to unconfined conditions.

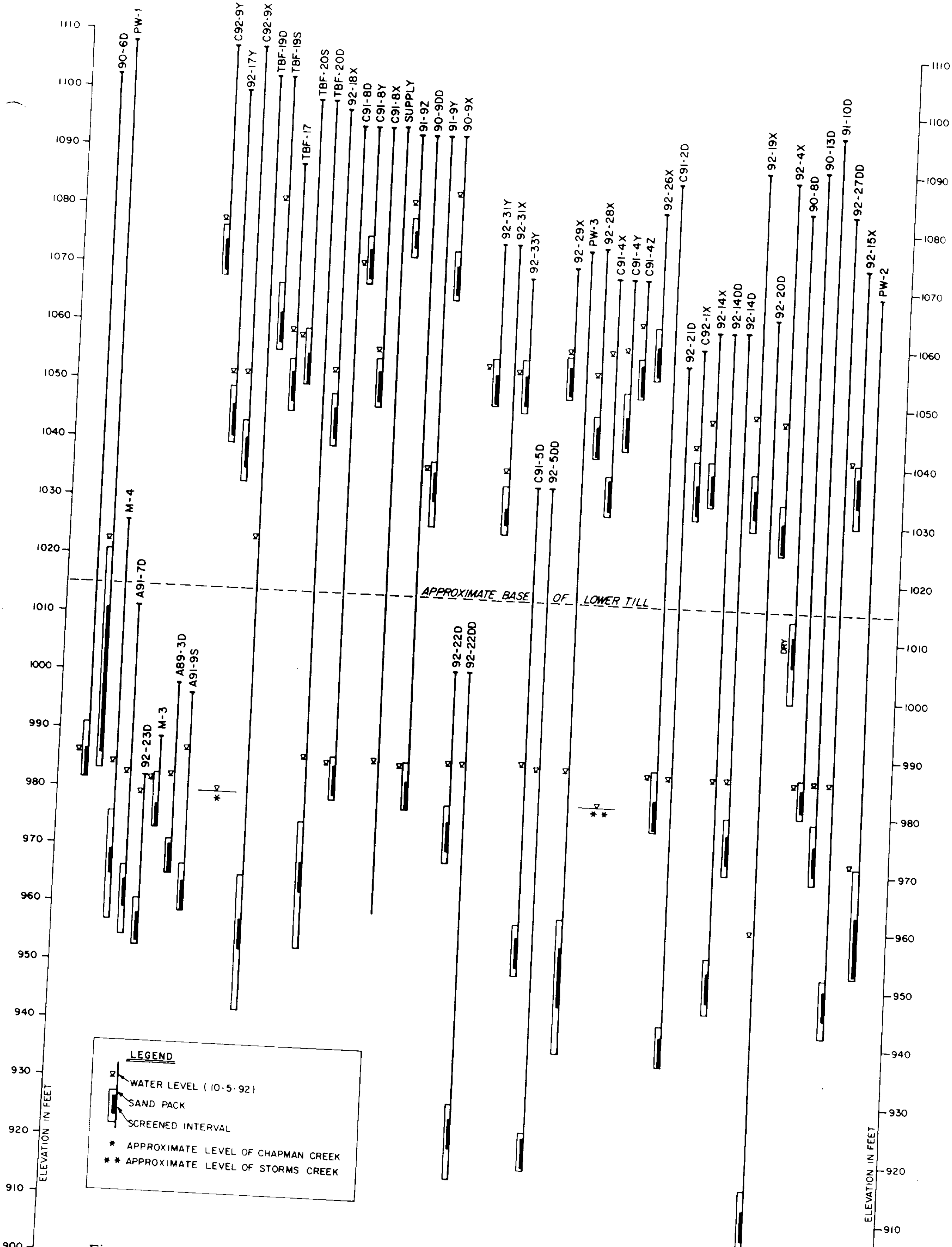


Figure F-1. Graphic Summary of Observation Wells Used for 72-Hour Pumping Test

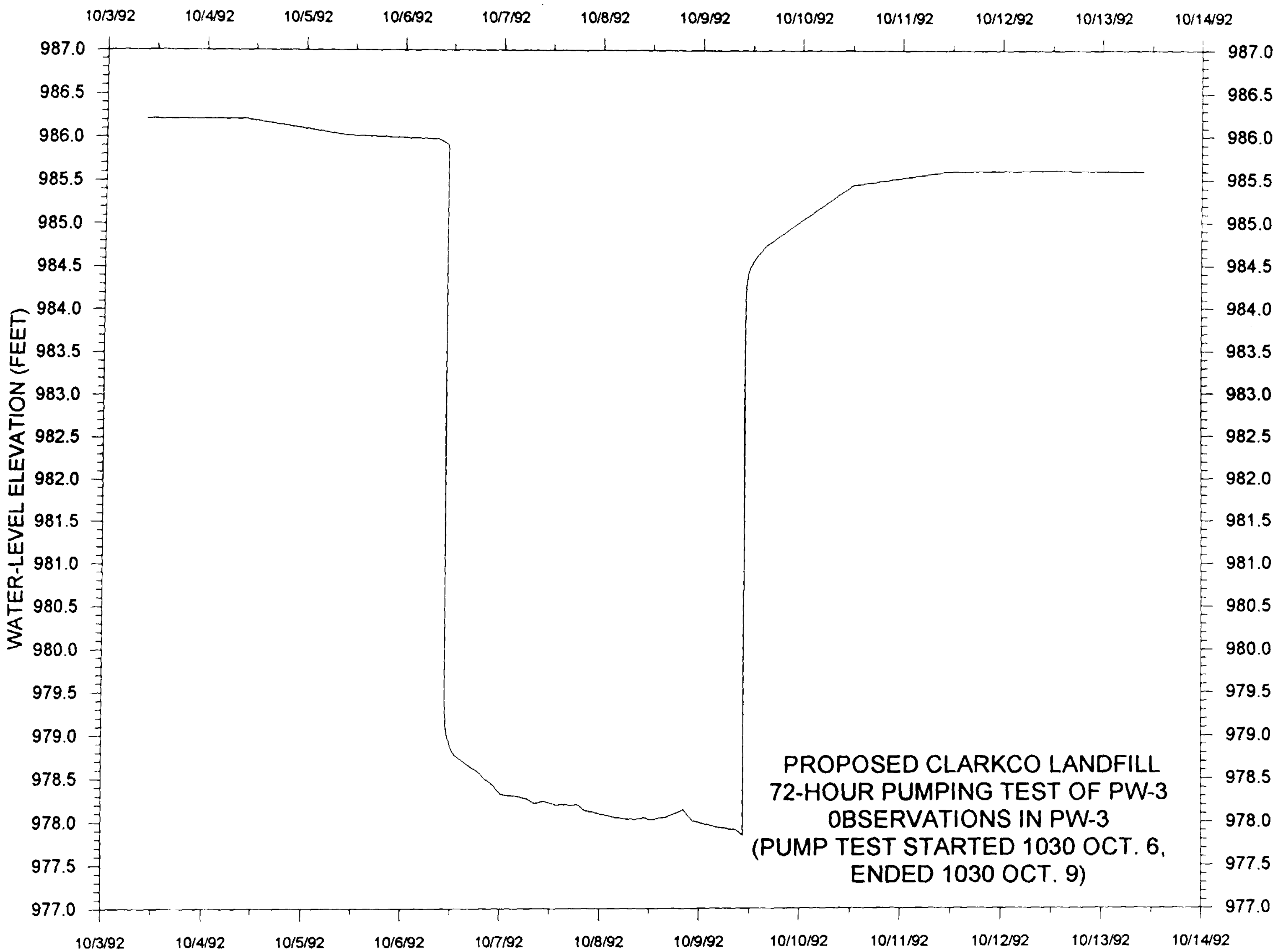


Figure F-2. Pumping Test Hydrograph for Well PW-3

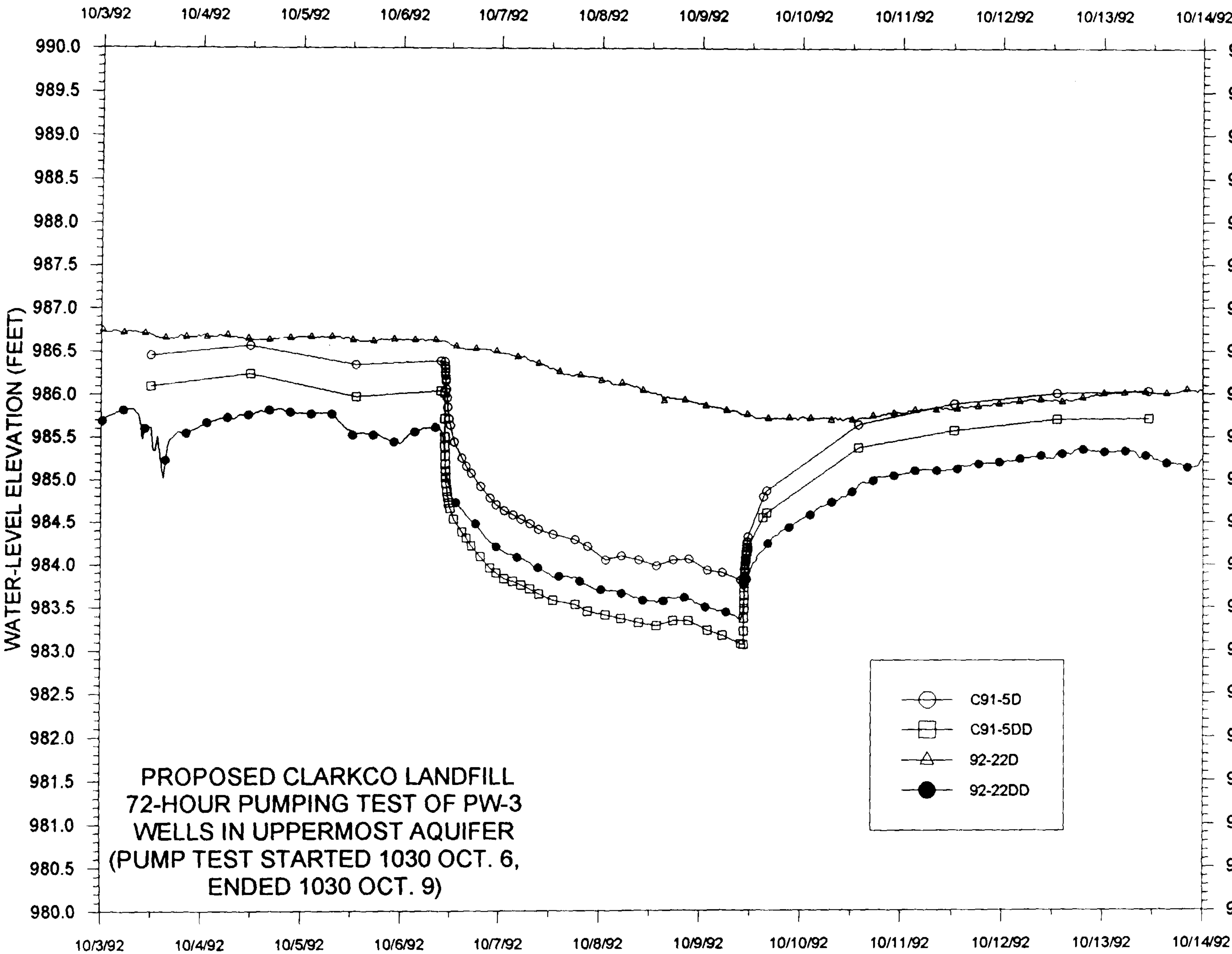


Figure F-3. Pumping Test Hydrographs for the Closest Observation Wells in the Uppermost Aquifer

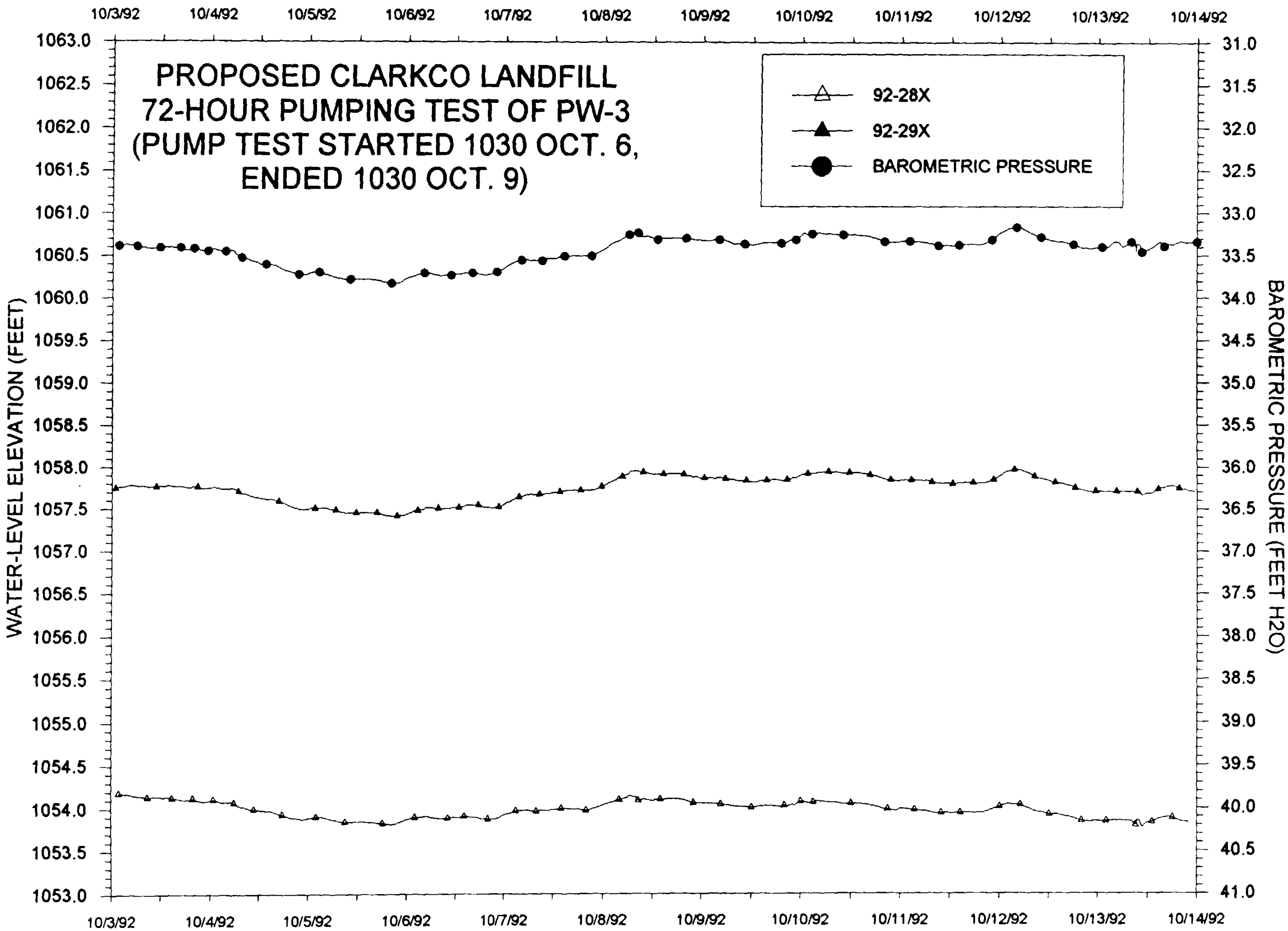


Figure F-4. Pumping Test Hydrographs for the Closest Observation Wells in the Intra-Till Sand Zones

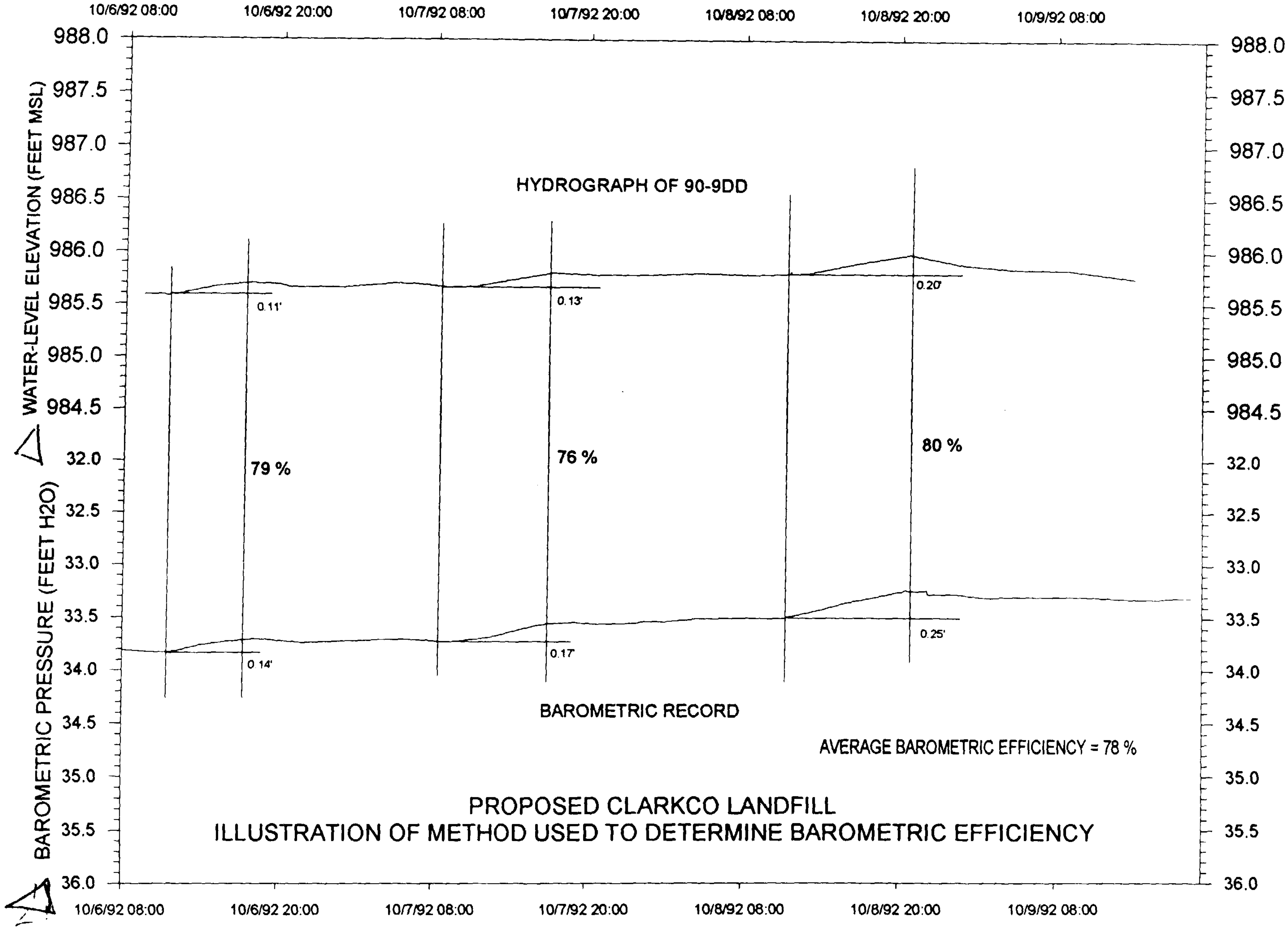


Figure F-5. Illustration of Method Used to Determine Barometric Efficiency

TABLE F-1
OBSERVATION WELLS USED DURING 72-HOUR PUMPING TEST
PROPOSED CLARKCO LANDFILL

Well No.	Distance from PW-3 (feet)	Zone Screened	Water Level Measurement Method	Measurement Frequency	Remarks
92-28X	100	1050 Sand	H	C	
92-29X	75	1050 Sand	H	C	
C91-4X	440	1035 Sand	T	C	
C91-4Y	440	1050 Sand	E	B	
C91-4Z	440	1050 Sand	E	B	
92-5DD	510	UMA	E	A	
C91-5D	550	UMA	E	A	
92-33Y	595	1050 Sand	T	C	
91-31X	640	1035 Sand	H	C	
92-31Y	645	1050 Sand	H	C	
92-26X	690	1060 Sand	T	C	
C91-2D	900	UMA	E	A	
92-21D	1025	UMA		A	
92-22D	1105	UMA	T	C	
92-22DD	1120	UMA	T	C	
90-9X	1125	1070 Sand	E	4	
91-9Y	1125	1035 Sand	E	B	
90-9DD	1135	UMA	E	A	
91-9Z	1135	1077 Sand	E	4	
Supply Well	1140		E	A	Pumped intermittently during test.
C92-1X	1310	1035 Sand	E	B	
92-14X	1400	1035 Sand	E	B	
92-14DD	1400	UMA	E	B	
90-14D	1410	UMA	E	B	
C91-8X	1440	1050 Sand	E	B	
C91-8Y	1450	1077 Sand	E	4	
C91-8D	1450	UMA	E	A	
92-18X	1580	1050 Sand	E	B	
92-19X	1620	1035 Sand	E	B	
92-20D	1710	SD	E	A	
TBF-20D	1770	UMA	E	B	Affected by supply well
TBF-20S	1780	1050 Sand	E	B	
92-4X	1780	1035 Sand	E	B	

UMA = Uppermost Aquifer
SD = Stratified Drift

H = Hermit Transducer with Data Logger
T = Telog Transducer
E = Hand Measurement with Electric Tape
S = Stevens Strip Chart Recorder

A = Intermittent measurements during 1st 2 hours, then following schedule B.

B = Measurements every 2 hours for 24 hours, then at least every 4 hours for remainder of test.

C = Continuous monitoring with pressure transducer.

4 = Measurements every 4 hours.

TABLE F-1 (cont'd)
OBSERVATION WELLS USED DURING 72-HOUR PUMPING TEST
PROPOSED CLARKCO LANDFILL

Well No.	Distance from PW-3 (feet)	Zone Screened	Water Level Measurement Method	Measurement Frequency	Remarks
TBF-17	1790	1050 Sand	E	B	
TBF-19S	1850	1050 Sand	E	B	
TBF-19D	1850	UMA	E	B	
C92-9X	1970	1050 Sand	E	B	
92-17Y	1980	1050 Sand	E	B	
C92-9Y	2000	1077 Sand	E	4	
A91-9S	1980	SD	E	B	
A89-3D	2030	SD	T	4	
M-3	2030	SD	E	4	
92-23D	2150	SD	E	A	
A91-7D	2180	UMA	T	C	
90-8D	2125	UMA	E	4	
90-13D	2100	UMA	E	Daily	
90-10D	2280	UMA	E	Daily	
M-4	2550	UMA	E	Daily	
PW-1	2890	UMA	E	Daily	
92-27DD	2710	UMA	E	Daily	Background well
90-6D	2820	UMA	E	Daily	Background well
92-15X	3025	1050 Sand	T	C	Background well
PW-2	3170	SD	S	C	Background well
Chapman Creek			E	4	

UMA = Uppermost Aquifer
SD = Stratified Drift

H = Hermit Transducer with Data Logger
T = Telog Transducer
E = Hand Measurement with Electric Tape
S = Stevens Strip Chart Recorder

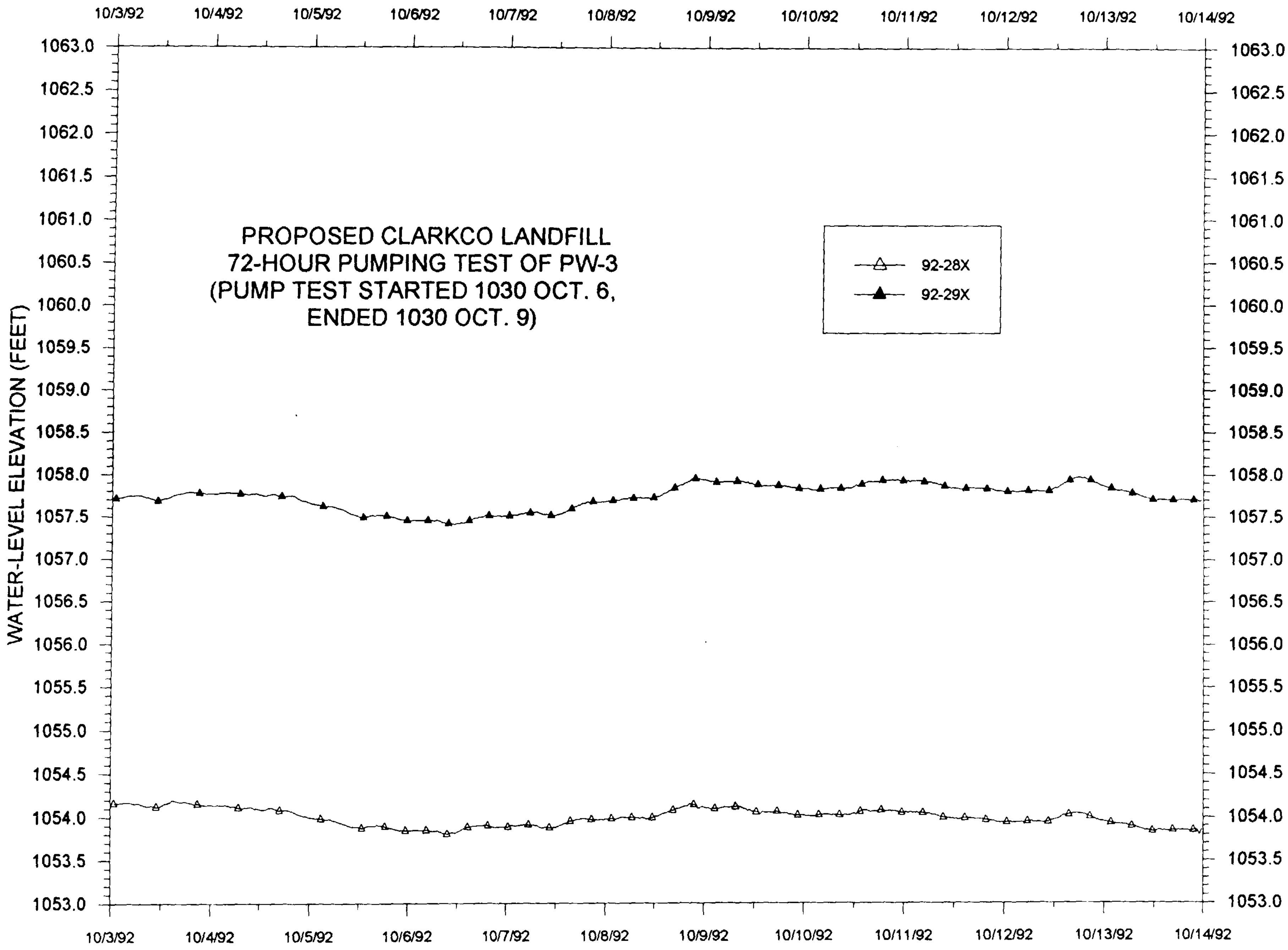
A = Intermittent measurements during 1st 2 hours, then following schedule B.

B = Measurements every 2 hours for 24 hours, then at least every 4 hours for remainder of test.

C = Continuous monitoring with pressure transducer.

4 = Measurements every 4 hours.

HYDROGRAPHS FOR INTRA-TILL SAND WELLS LOCATED WITHIN 700 FEET OF PUMPING TEST WELL PW-3. ARRANGED IN ORDER OF DISTANCE FROM PW-3.	
Hydrographs	Comments
92-28X & 92-29X.	Well 92-28X demonstrates greater barometric efficiency than 92-29X.
Barometric Record.	Converted to feet of water.
92-28X.	Hydrograph corrected for barometric effects demonstrates slight declining trend with no evidence of drawdown.
92-29X.	Hydrograph corrected for barometric effects shows water levels with essentially no trend or evidence of drawdown.
C91-4X, C91-4Y & C91-4Z.	All wells at one cluster location.
C91-4Z.	Hydrograph corrected for barometric effects demonstrates declining trend with no evidence of drawdown. Shallower well hydrographs were not corrected because they are essentially identical to deepest well.
92-31Y-92-33Y.	Hydrographs are essentially flat. No barometric effects in the data and there is no evidence of drawdown.
C92-31X.	Same as above.
92-26X.	Hydrograph shows declining trend with barometric effects.
92-26X.	Corrected hydrograph still shows declining trend, but no evidence of drawdown.


PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)
92-28X
92-29X
WATER-LEVEL ELEVATION (FEET)
1063.0
1062.5
1062.0
1061.5
1061.0
1060.5
1060.0
1059.5
1059.0
1058.5
1058.0
1057.5
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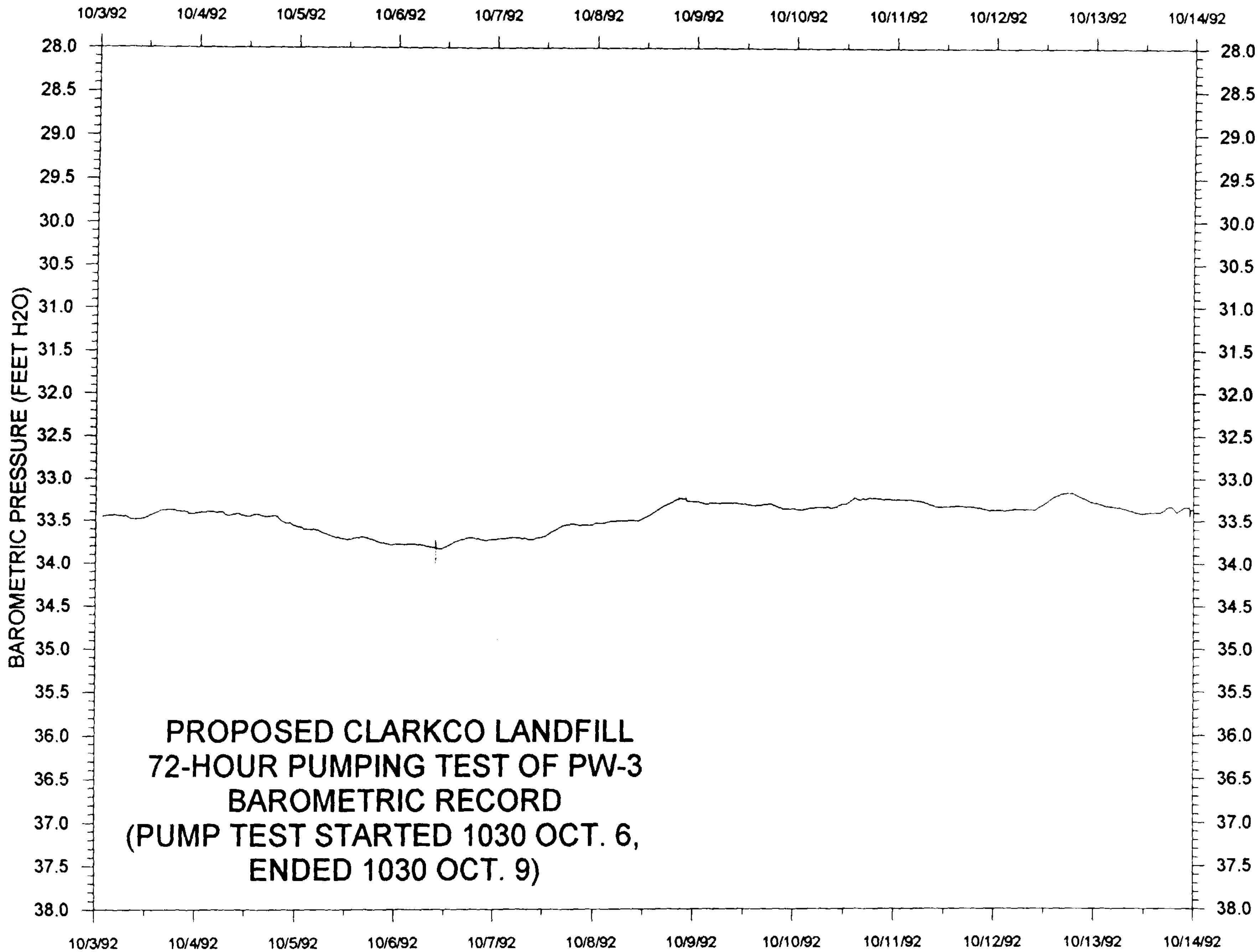
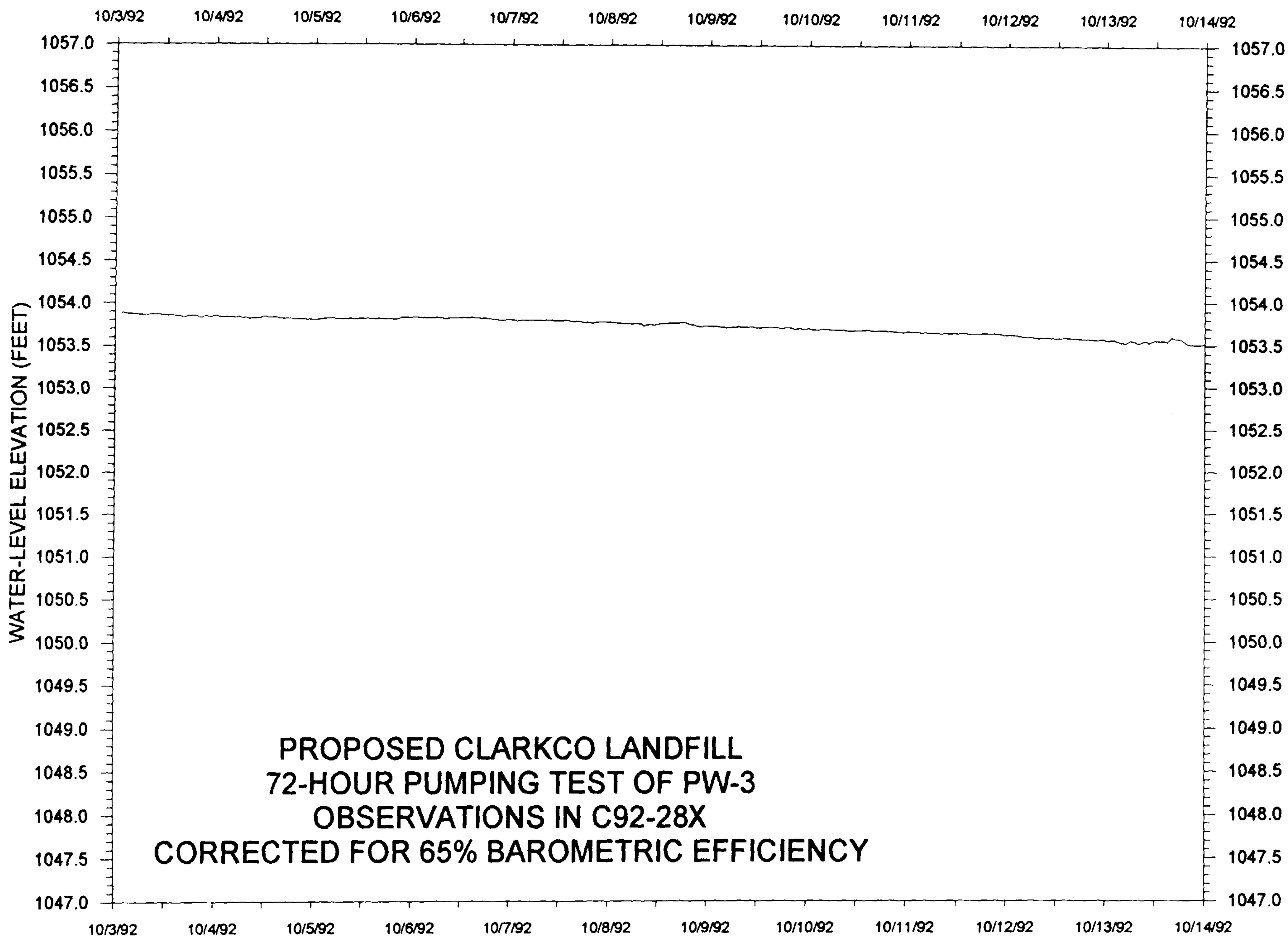
10/14/92



10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92
BAROMETRIC PRESSURE (FEET H2O)
28.0
28.5
29.0
29.5
30.0
30.5
31.0
31.5
32.0
32.5
33.0
33.5
34.0
34.5
35.0
35.5
36.0
36.5
37.0
37.5
38.0
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
BAROMETRIC RECORD
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)



10/3/92
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10/6/92
10/7/92
10/8/92
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10/10/92
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10/12/92
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1057.0
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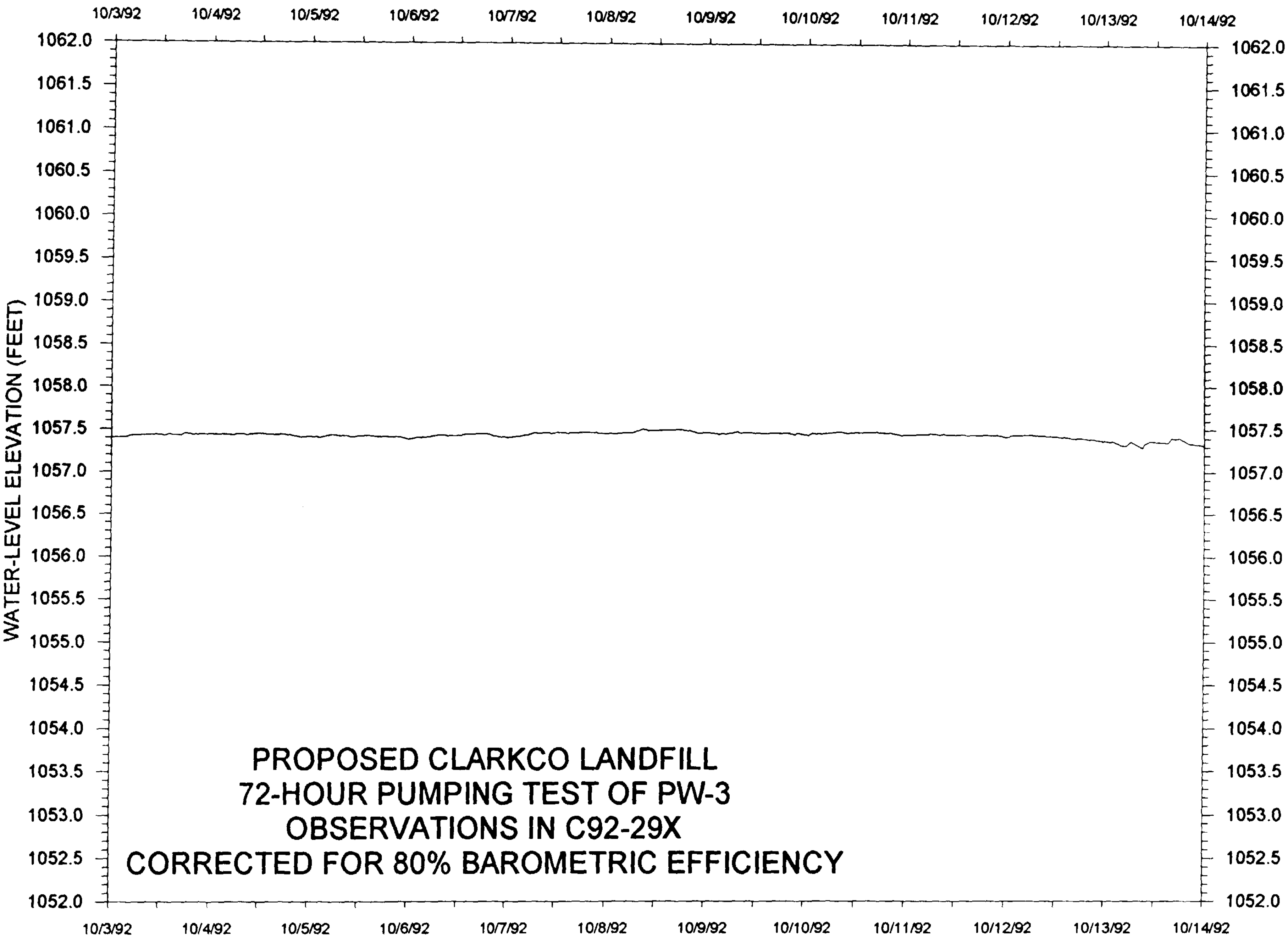
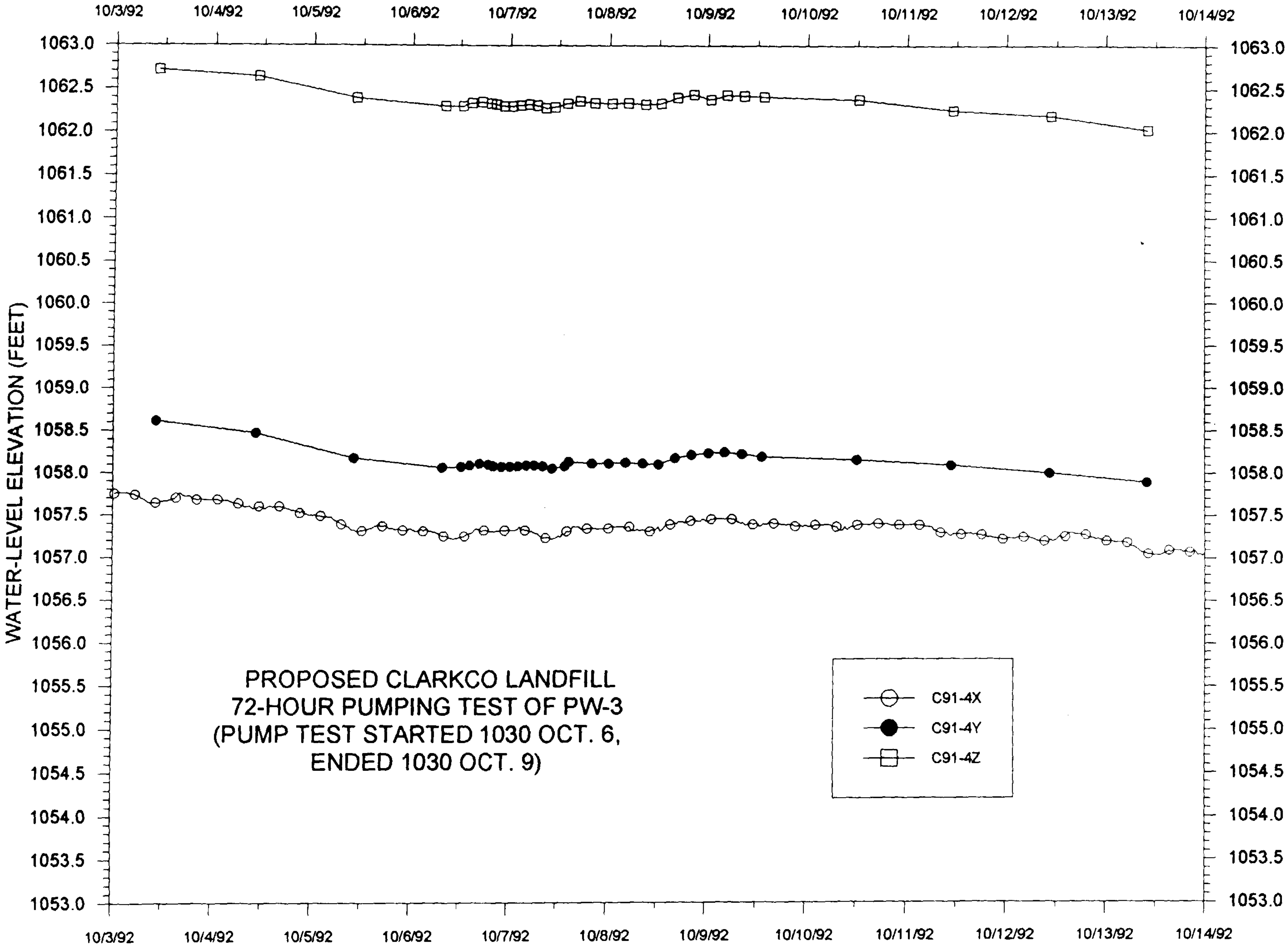
1053.5
1053.0
1052.5
1052.0
1051.5
1051.0
1050.5
1050.0
1049.5
1049.0
1048.5
1048.0
1047.5
1047.0
WATER-LEVEL ELEVATION (FEET)
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
OBSERVATIONS IN C92-28X
CORRECTED FOR 65% BAROMETRIC EFFICIENCY



10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92
1062.0
1061.5
1061.0
1060.5
1060.0
1059.5
1059.0
1058.5
1058.0
1057.5
1057.0
1056.5
1056.0
1055.5
1055.0
1054.5
1054.0
1053.5
1053.0
1052.5
1052.0
WATER-LEVEL ELEVATION (FEET)
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
OBSERVATIONS IN C92-29X
CORRECTED FOR 80% BAROMETRIC EFFICIENCY



PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)
WATER-LEVEL ELEVATION (FEET)
C91-4X
C91-4Y
C91-4Z
10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92
1063.0
1062.5
1062.0
1061.5
1061.0
1060.5
1060.0
1059.5
1059.0
1058.5
1058.0
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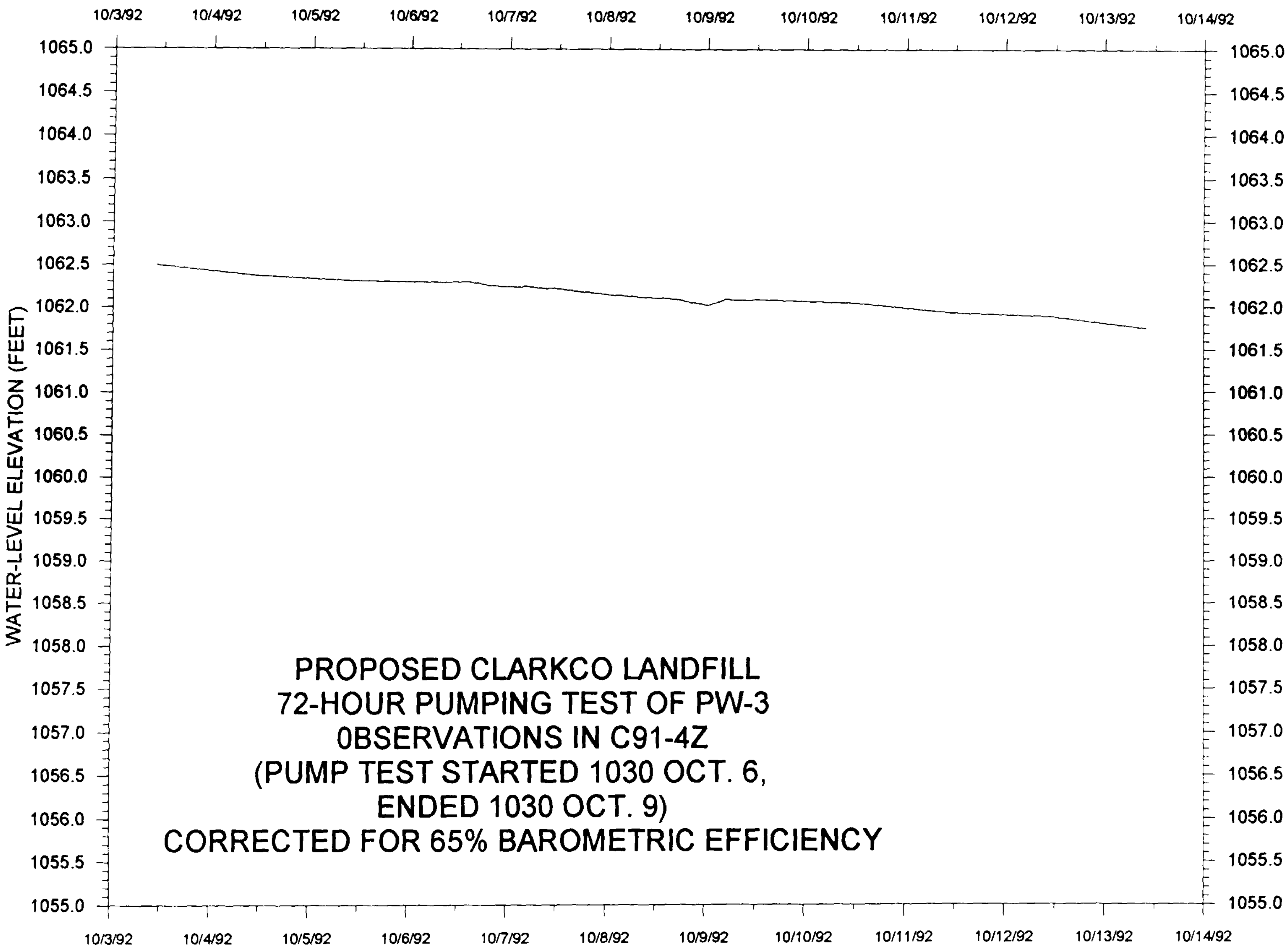
1053.5
1053.0


PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
0BSERVATIONS IN C91-4Z
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)
CORRECTED FOR 65% BAROMETRIC EFFICIENCY
WATER-LEVEL ELEVATION (FEET)
10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92
1065.0
1064.5
1064.0
1063.5
1063.0
1062.5
1062.0
1061.5
1061.0
1060.5
1060.0
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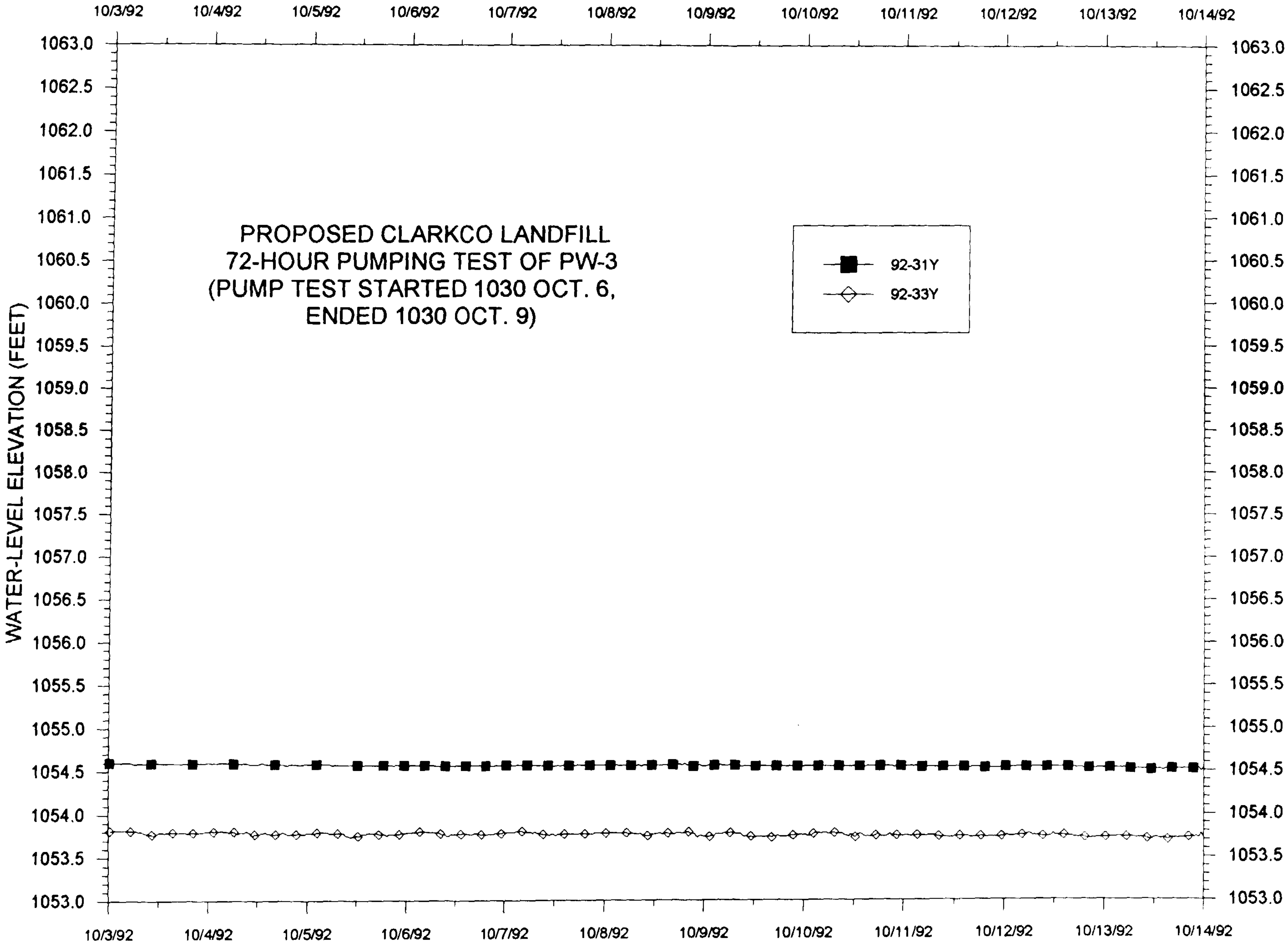
1055.5
1055.0


PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)
92-31Y
92-33Y
WATER-LEVEL ELEVATION (FEET)
1063.0
1062.5
1062.0
1061.5
1061.0
1060.5
1060.0
1059.5
1059.0
1058.5
1058.0
1057.5
1057.0
1056.5
1056.0
1055.5
1055.0
1054.5
1054.0
1053.5
1053.0
10/3/92
10/4/92
10/5/92
10/6/92
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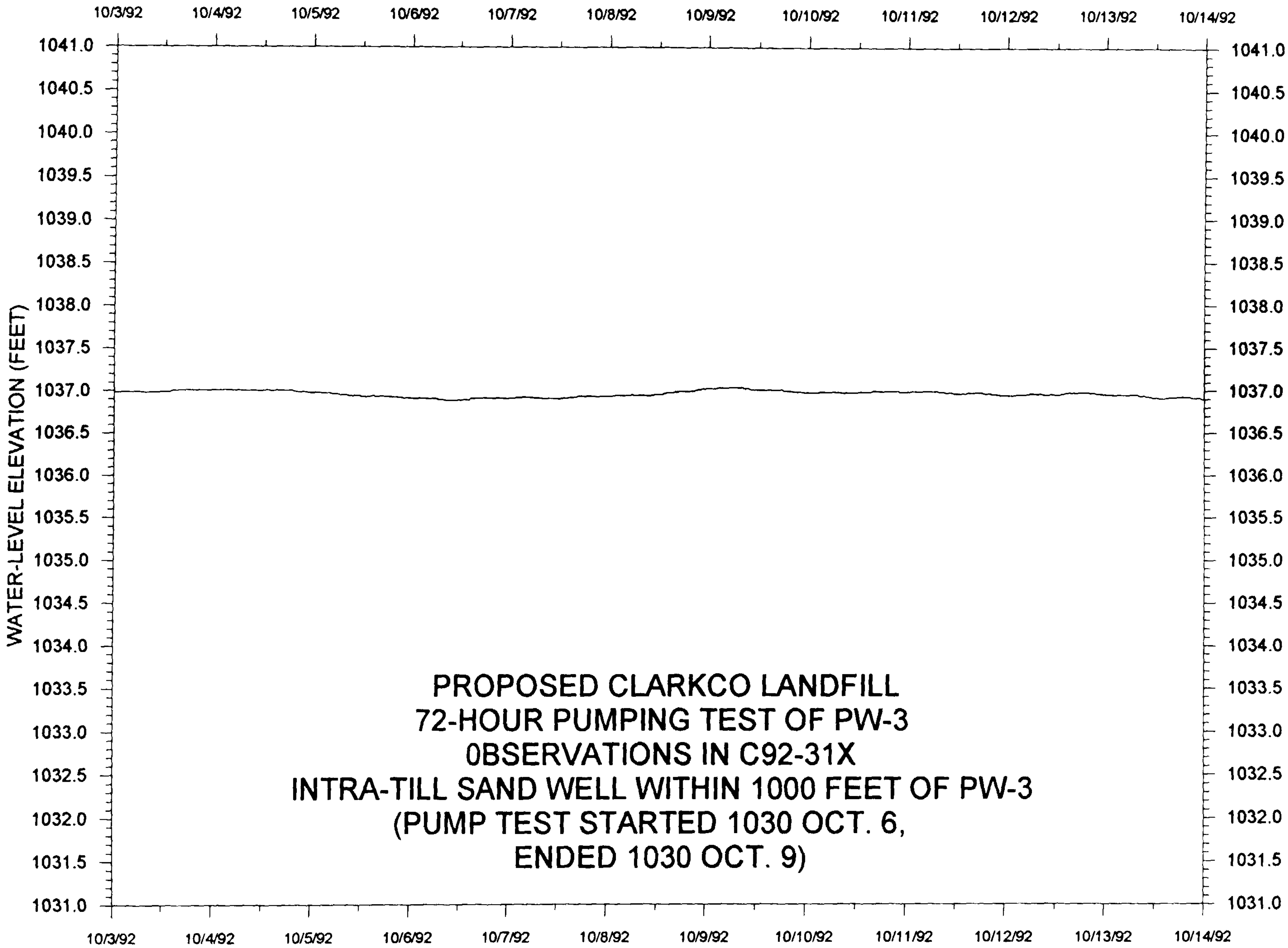
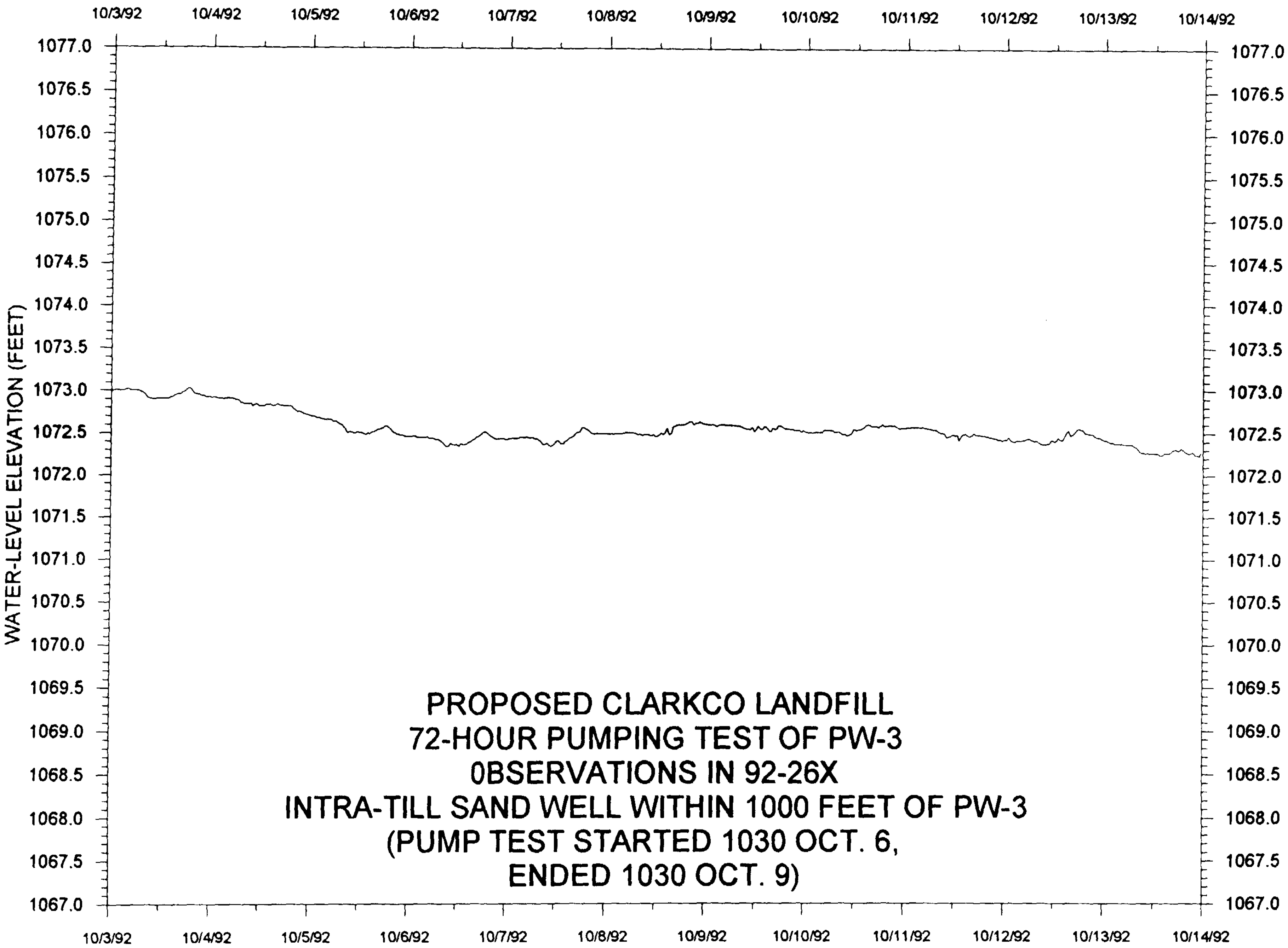
10/13/92
10/14/92


10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92
1041.0
1040.5
1040.0
1039.5
1039.0
1038.5
1038.0
1037.5
1037.0
1036.5
1036.0
1035.5
1035.0
1034.5
1034.0
1033.5
1033.0
1032.5
1032.0
1031.5
1031.0
WATER-LEVEL ELEVATION (FEET)
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
0BSERVATIONS IN C92-31X
INTRA-TILL SAND WELL WITHIN 1000 FEET OF PW-3
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)


PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
0BSERVATIONS IN 92-26X
INTRA-TILL SAND WELL WITHIN 1000 FEET OF PW-3
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)
WATER-LEVEL ELEVATION (FEET)
1077.0
1076.5
1076.0
1075.5
1075.0
1074.5
1074.0
1073.5
1073.0
1072.5
1072.0
1071.5
1071.0
1070.5
1070.0
1069.5
1069.0
1068.5
1068.0
1067.5
1067.0
10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
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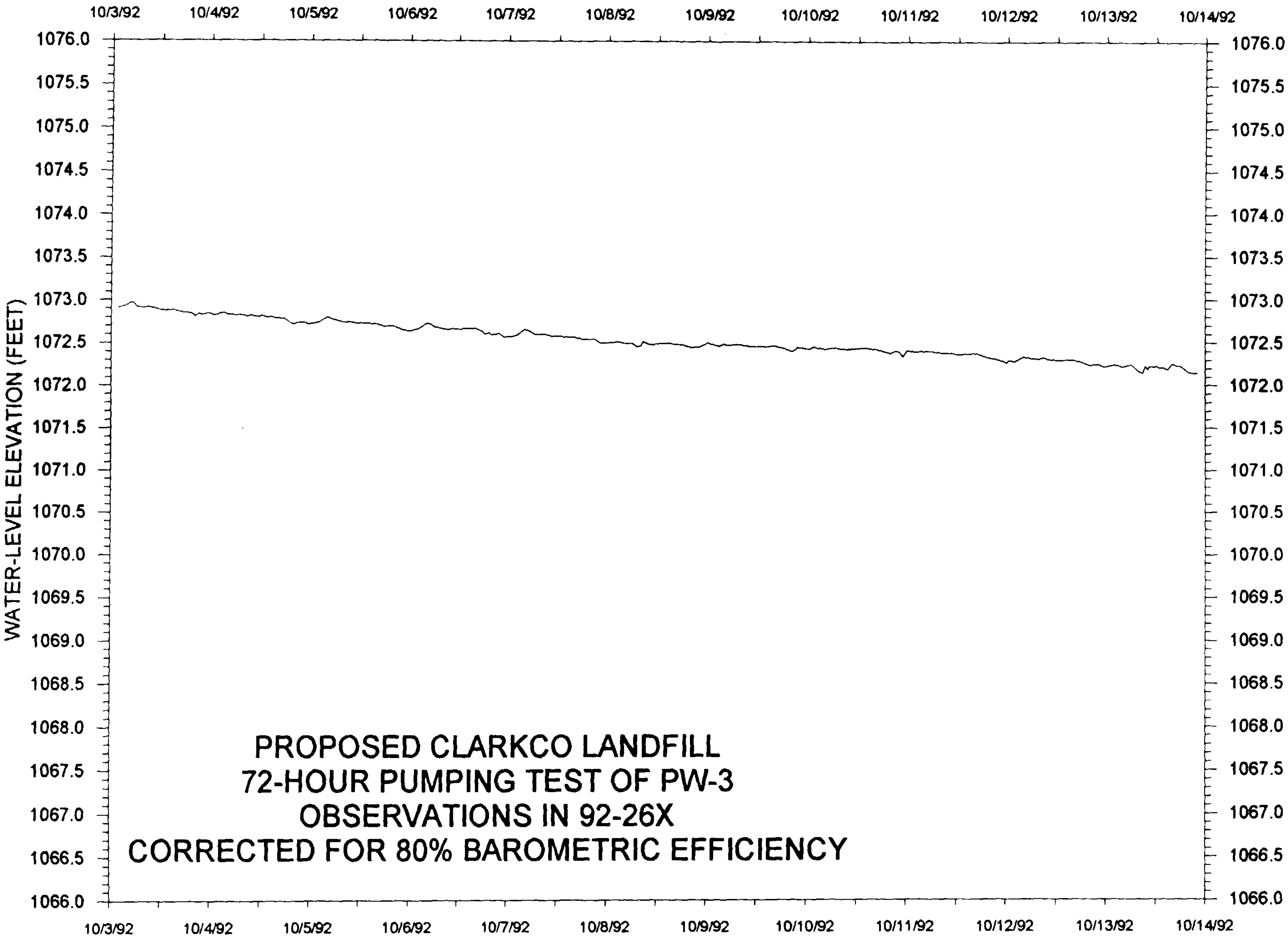
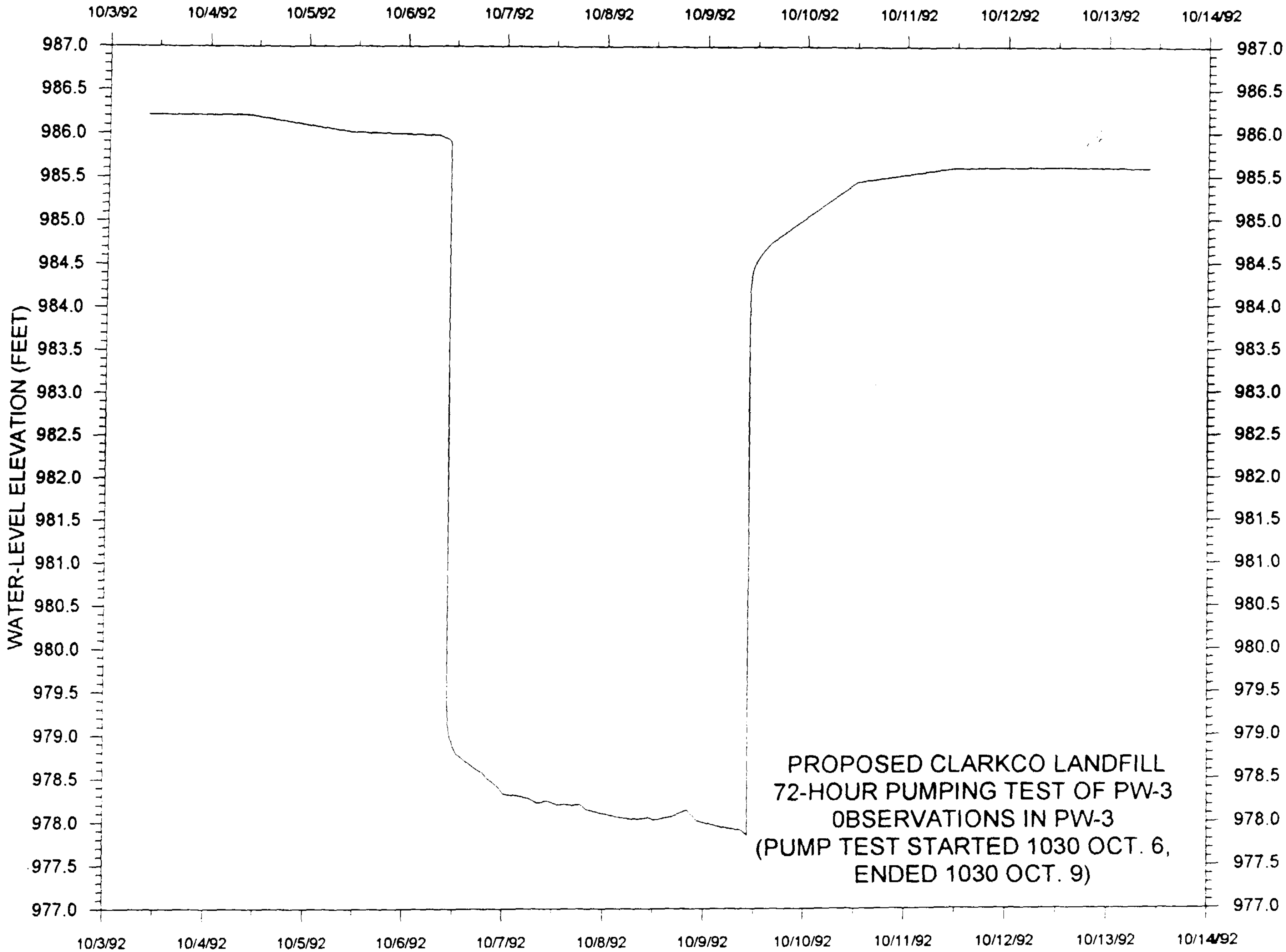
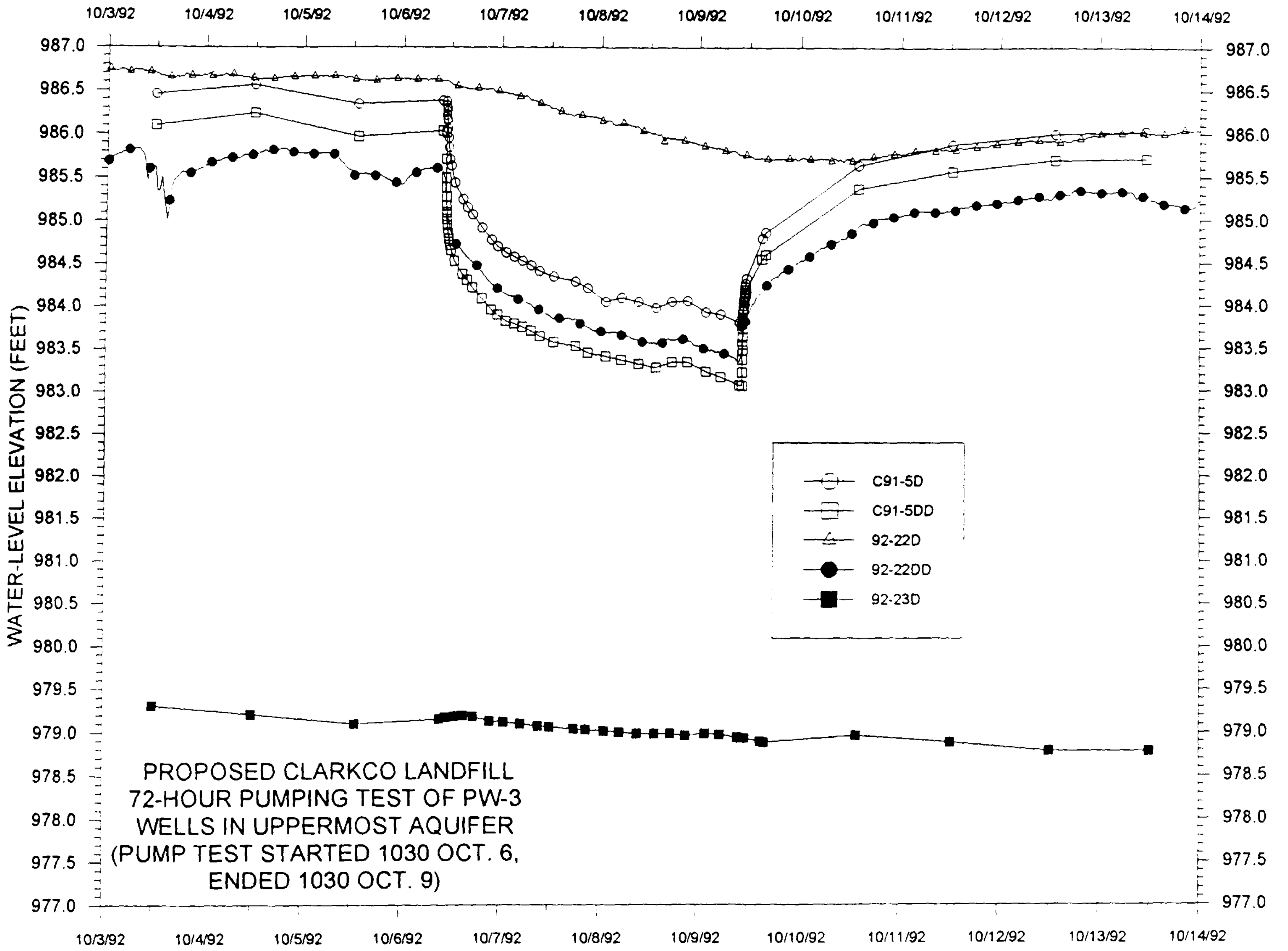
10/12/92
10/13/92
10/14/92

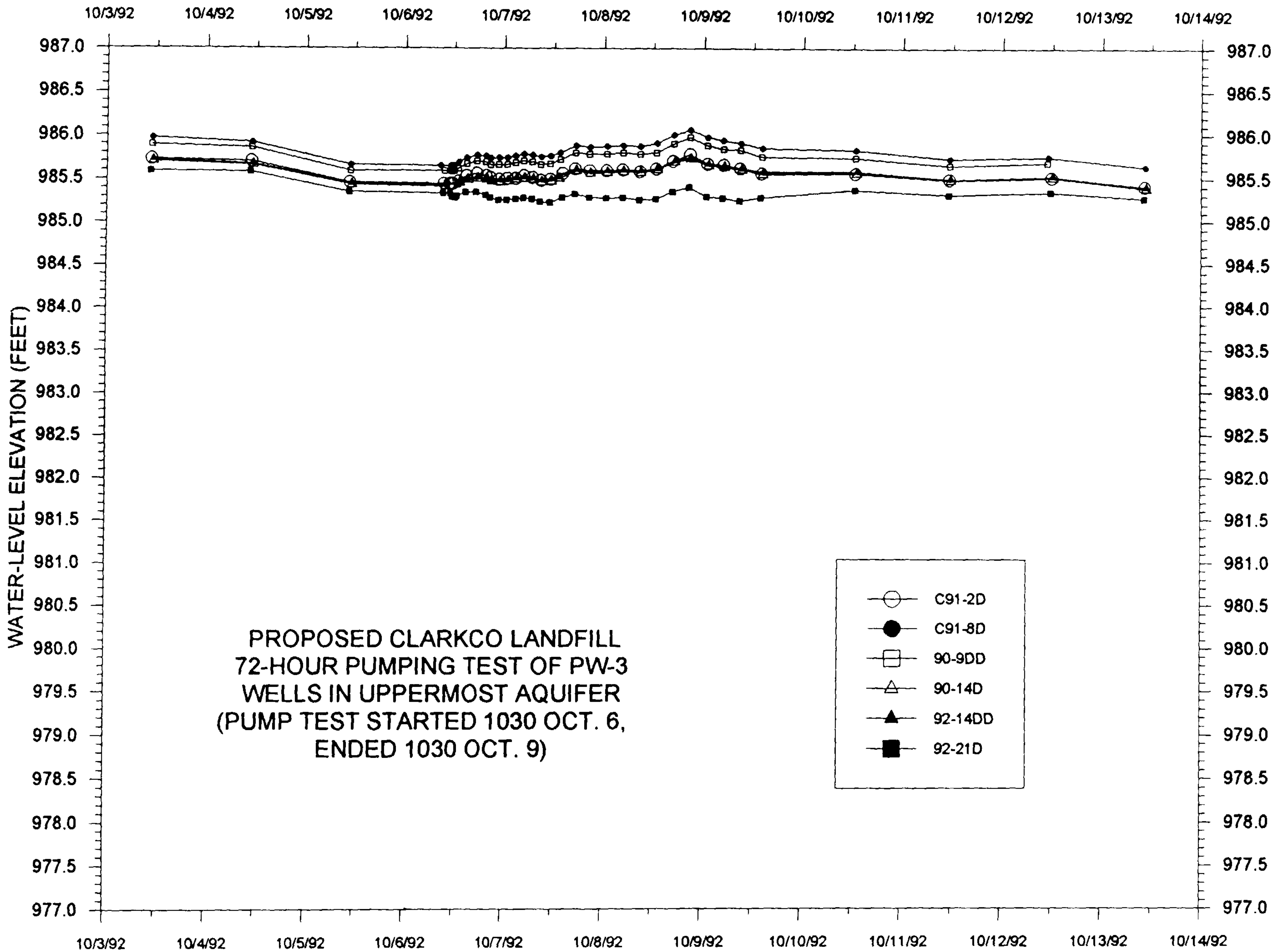


10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92
1076.0
1075.5
1075.0
1074.5
1074.0
1073.5
1073.0
1072.5
1072.0
1071.5
1071.0
1070.5
1070.0
1069.5
1069.0
1068.5
1068.0
1067.5
1067.0
1066.5
1066.0
WATER-LEVEL ELEVATION (FEET)
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
OBSERVATIONS IN 92-26X
CORRECTED FOR 80% BAROMETRIC EFFICIENCY

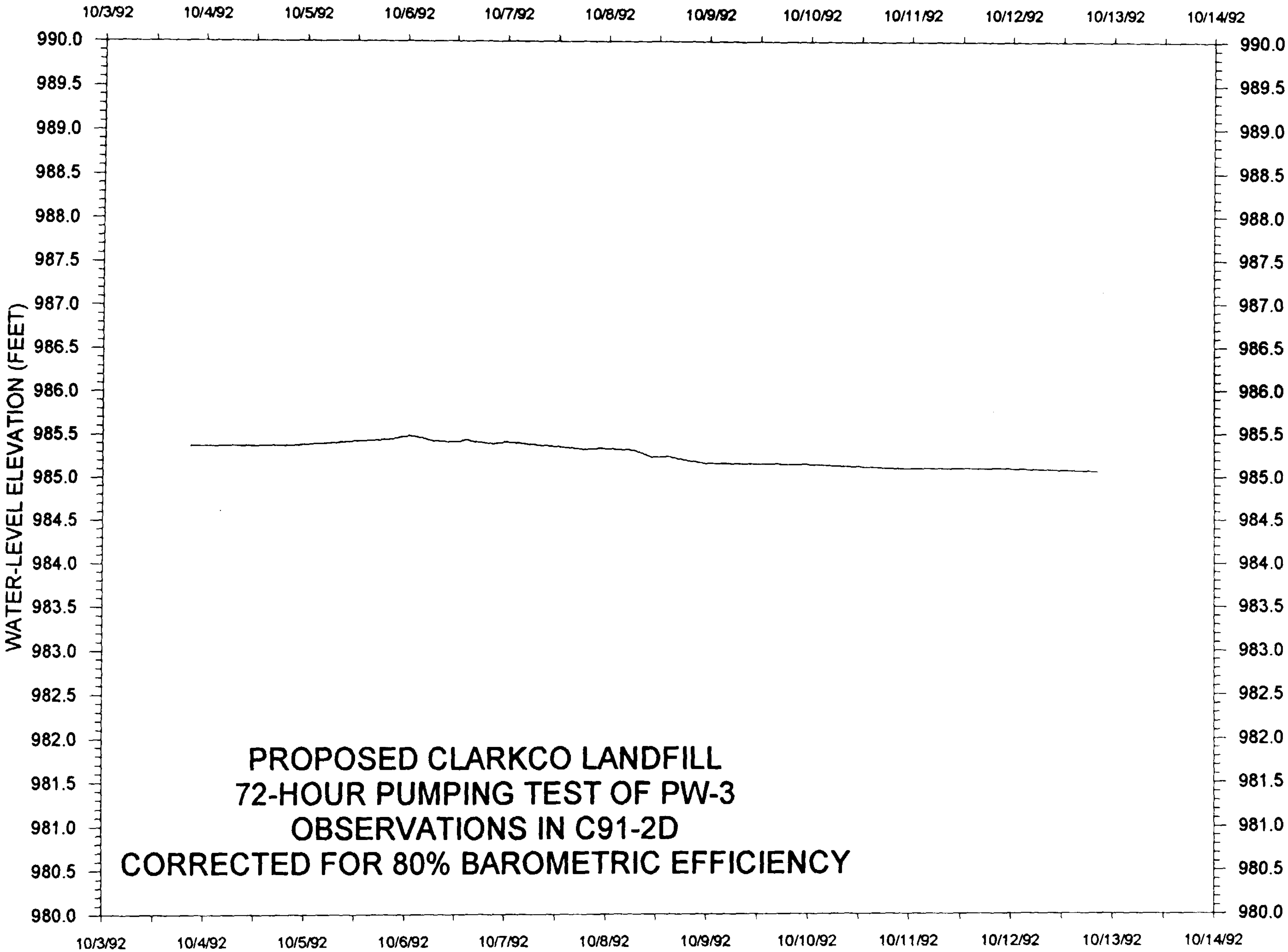
HYDROGRAPHS FOR WELLS SCREENED IN THE UPPERMOST AQUIFER SYSTEM. GENERALLY ARRANGED BY DISTANCE FROM PW-3.	
Hydrographs	Comments
PW-3.	Pumping well. Natural trend shown by projecting between the end point measurements for the data collection period.
C91-5D, 92-5DD, 92-22D, 92-22DD & 92-23D.	Wells located south of PW-3. All clearly show drawdown except 92-23D, which only shows the natural declining trend. Trends are projected across test and recovery period for other wells.
C91-2D, C91-8D, 90-9DD, 90-14D, 92-14DD & 92-21D.	All wells fluctuate in essentially the same manner.
C91-2D.	Hydrograph corrected for barometric effects. Correction does not completely flatten the line, but there is clearly no evidence of drawdown.
90-9DD.	Same as above.
TBF-20D & Supply Well.	Hydrographs mostly show drawdown and recovery resulting from use of the supply well, but drawdown from PW-3 also is evident when comparing water levels with the supply well either on or off for the 72 hour test period and before or after.
TBF-19D & PW-1.	Hydrograph for PW-1 very similar to next set of graphs which all represent background conditions.
90-6D, 90-10D, 90-13D, 90-27DD.	Wells located from 2100 to more than 2800 feet to the north of PW-3. All hydrographs show some background trends.
PW-2.	Well screened in deep, isolated sand zone. This plus the distance away were rationale to use for background record. However, lack of barometric response makes the hydrograph dissimilar to many of other deep wells. Only shows declining trend.
90-20D.	Well screened in deep, isolated sand zone much closer to PW-3. Hydrograph is essentially the same as for PW-2.

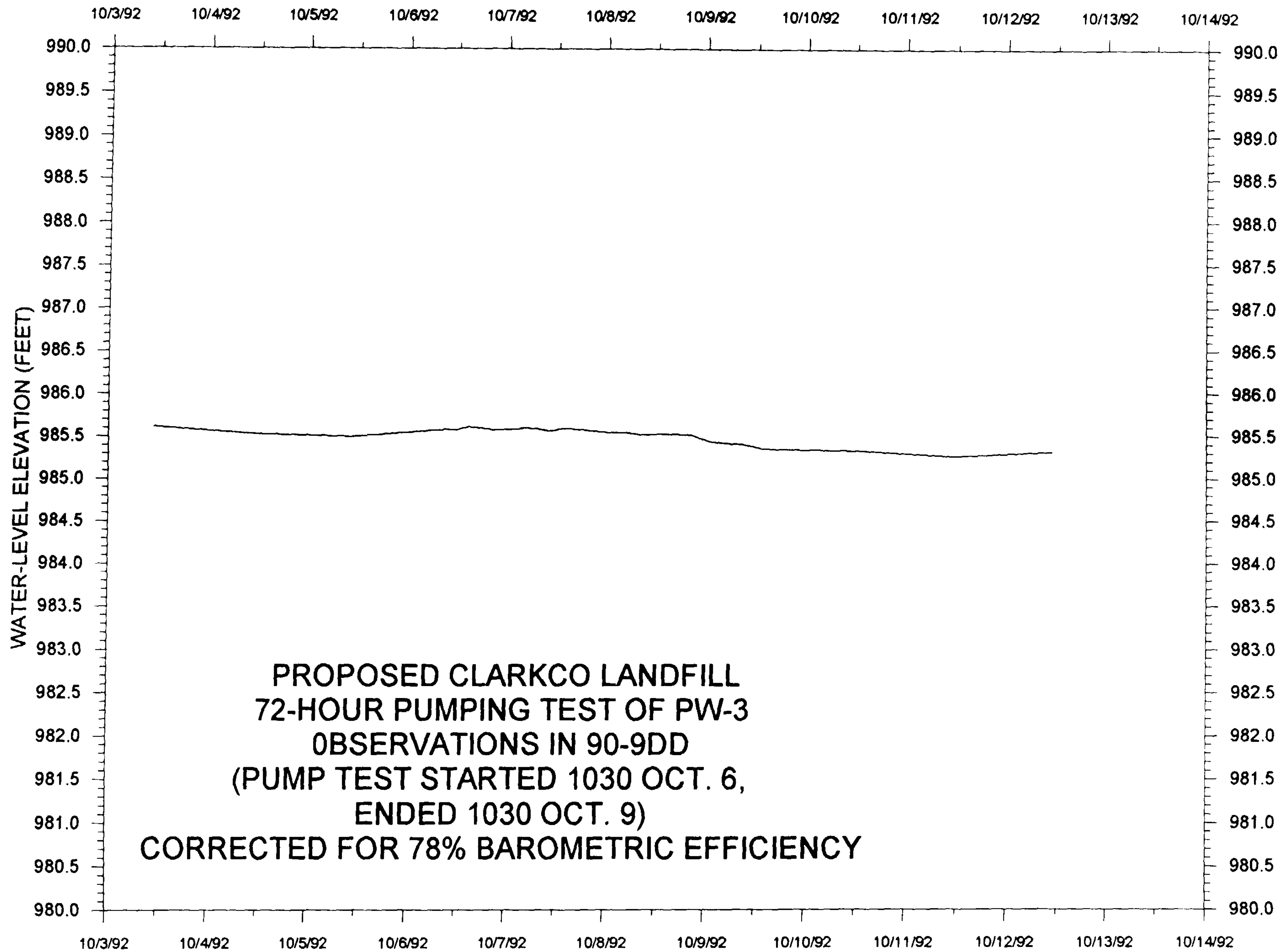

WATER-LEVEL ELEVATION (FEET)
987.0
986.5
986.0
985.5
985.0
984.5
984.0
983.5
983.0
982.5
982.0
981.5
981.0
980.5
980.0
979.5
979.0
978.5
978.0
977.5
977.0
10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
0BSERVATIONS IN PW-3
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)

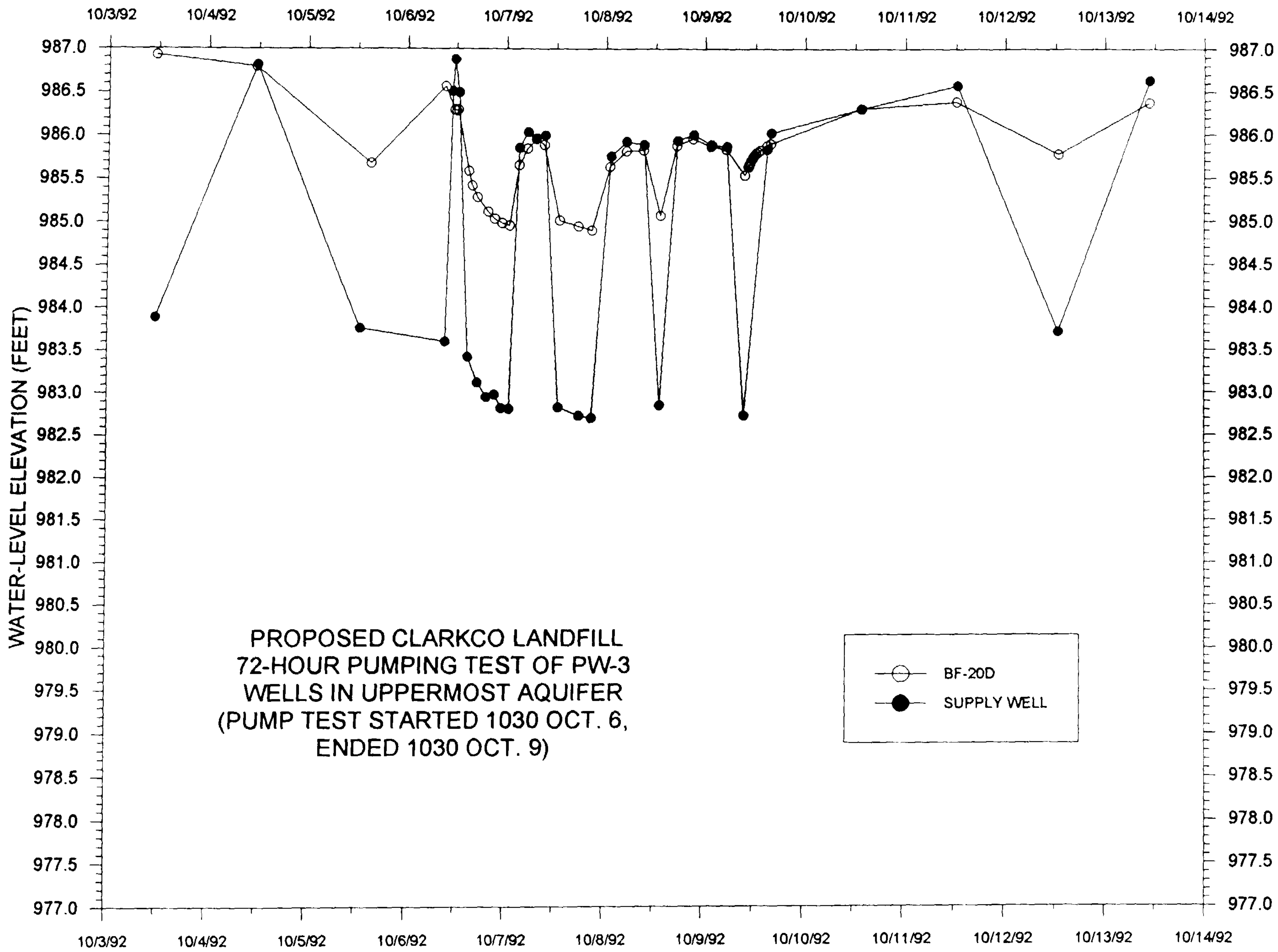

10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92
987.0
986.5
986.0
985.5
985.0
984.5
984.0
983.5
983.0
982.5
982.0
981.5
981.0
980.5
980.0
979.5
979.0
978.5
978.0
977.5
977.0
WATER-LEVEL ELEVATION (FEET)
C91-5D
C91-5DD
92-22D
92-22DD
92-23D
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
WELLS IN UPPERMOST AQUIFER
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)



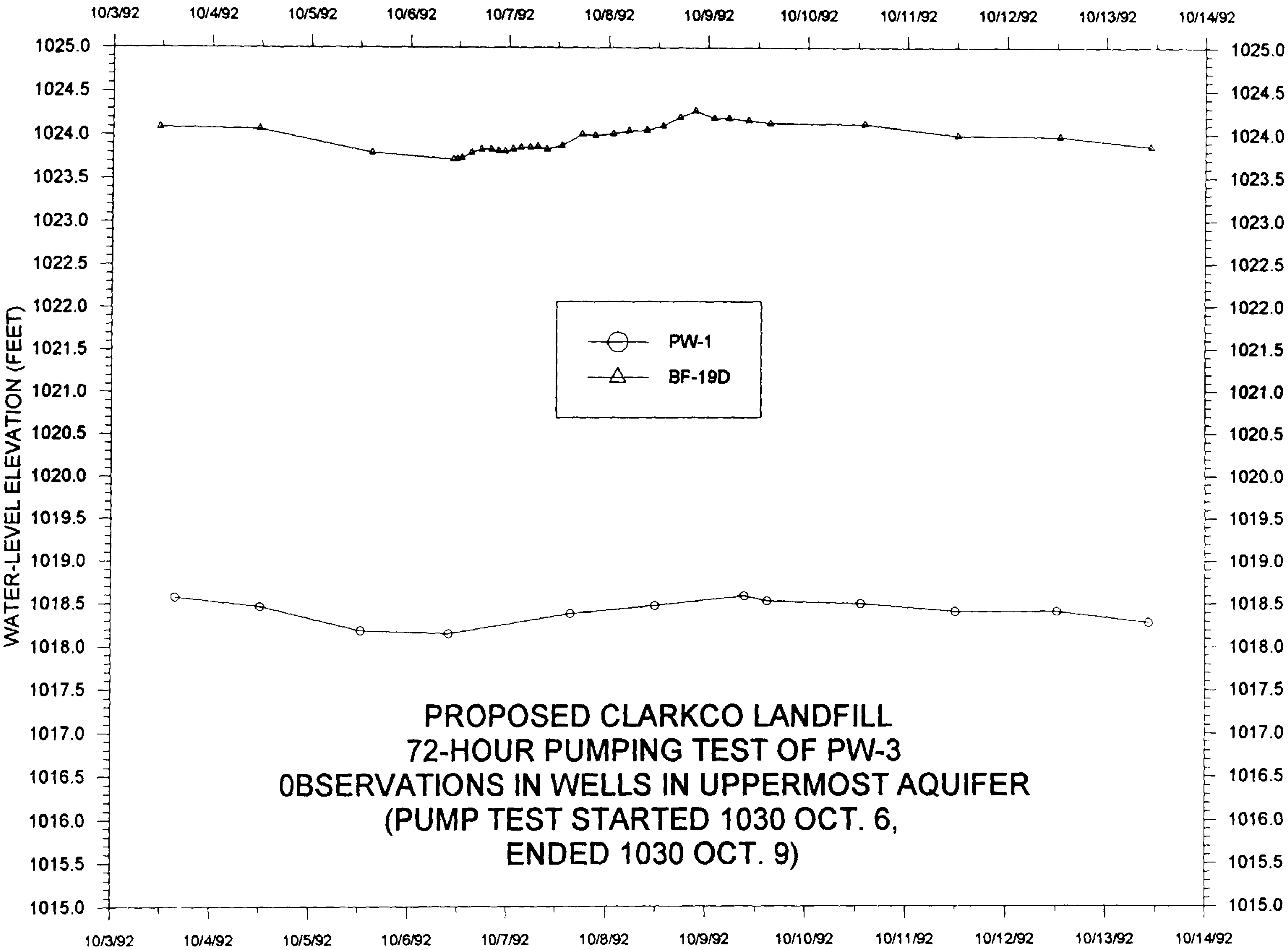
10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92
WATER-LEVEL ELEVATION (FEET)
987.0
986.5
986.0
985.5
985.0
984.5
984.0
983.5
983.0
982.5
982.0
981.5
981.0
980.5
980.0
979.5
979.0
978.5
978.0
977.5
977.0
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
WELLS IN UPPERMOST AQUIFER
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)
C91-2D
C91-8D
90-9DD
90-14D
92-14DD
92-21D

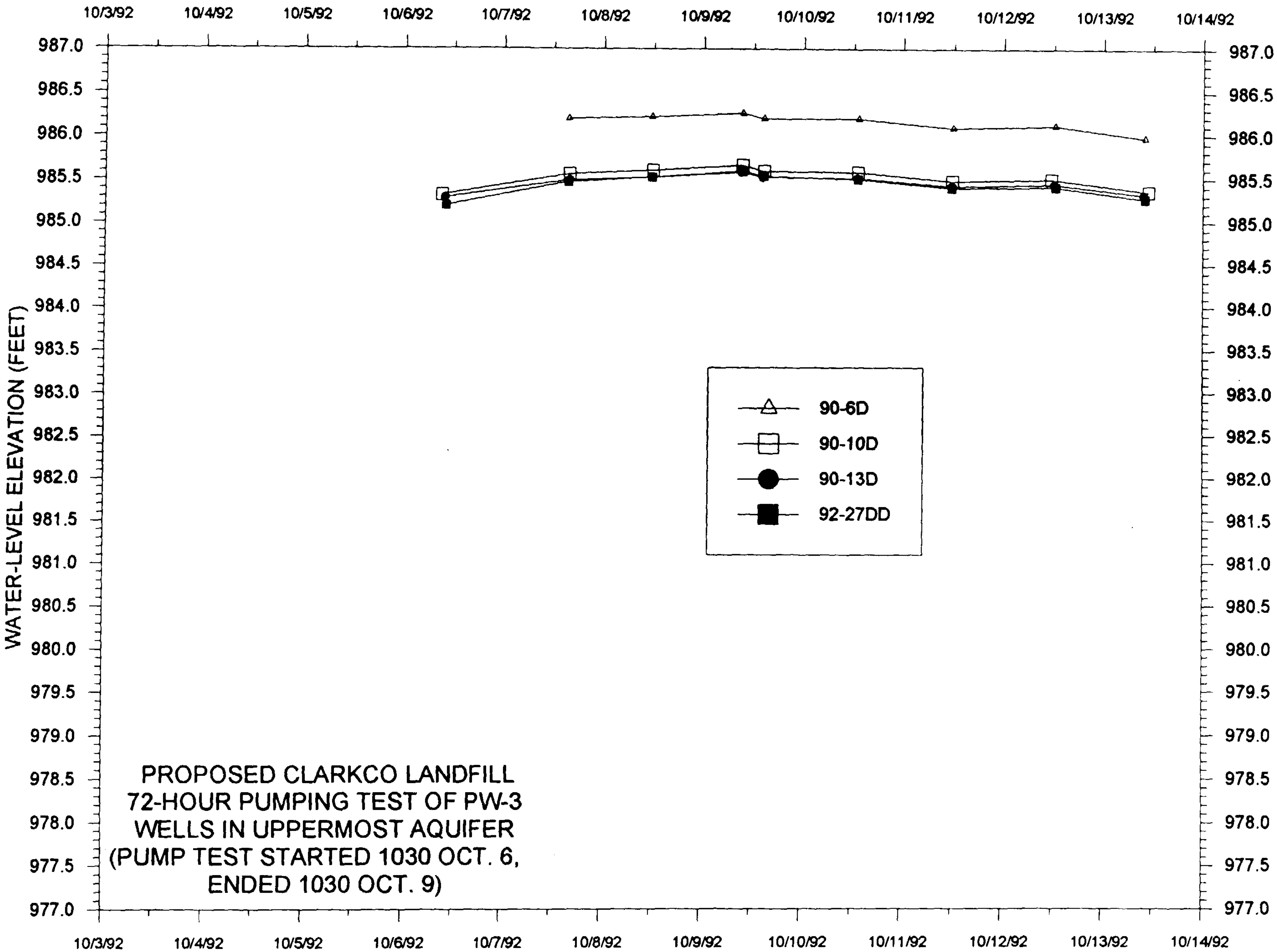

10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92
990.0
989.5
989.0
988.5
988.0
987.5
987.0
986.5
986.0
985.5
985.0
984.5
984.0
983.5
983.0
982.5
982.0
981.5
981.0
980.5
980.0
WATER-LEVEL ELEVATION (FEET)
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
OBSERVATIONS IN C91-2D
CORRECTED FOR 80% BAROMETRIC EFFICIENCY


WATER-LEVEL ELEVATION (FEET)
990.0
989.5
989.0
988.5
988.0
987.5
987.0
986.5
986.0
985.5
985.0
984.5
984.0
983.5
983.0
982.5
982.0
981.5
981.0
980.5
980.0
10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
0BSERVATIONS IN 90-9DD
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)
CORRECTED FOR 78% BAROMETRIC EFFICIENCY

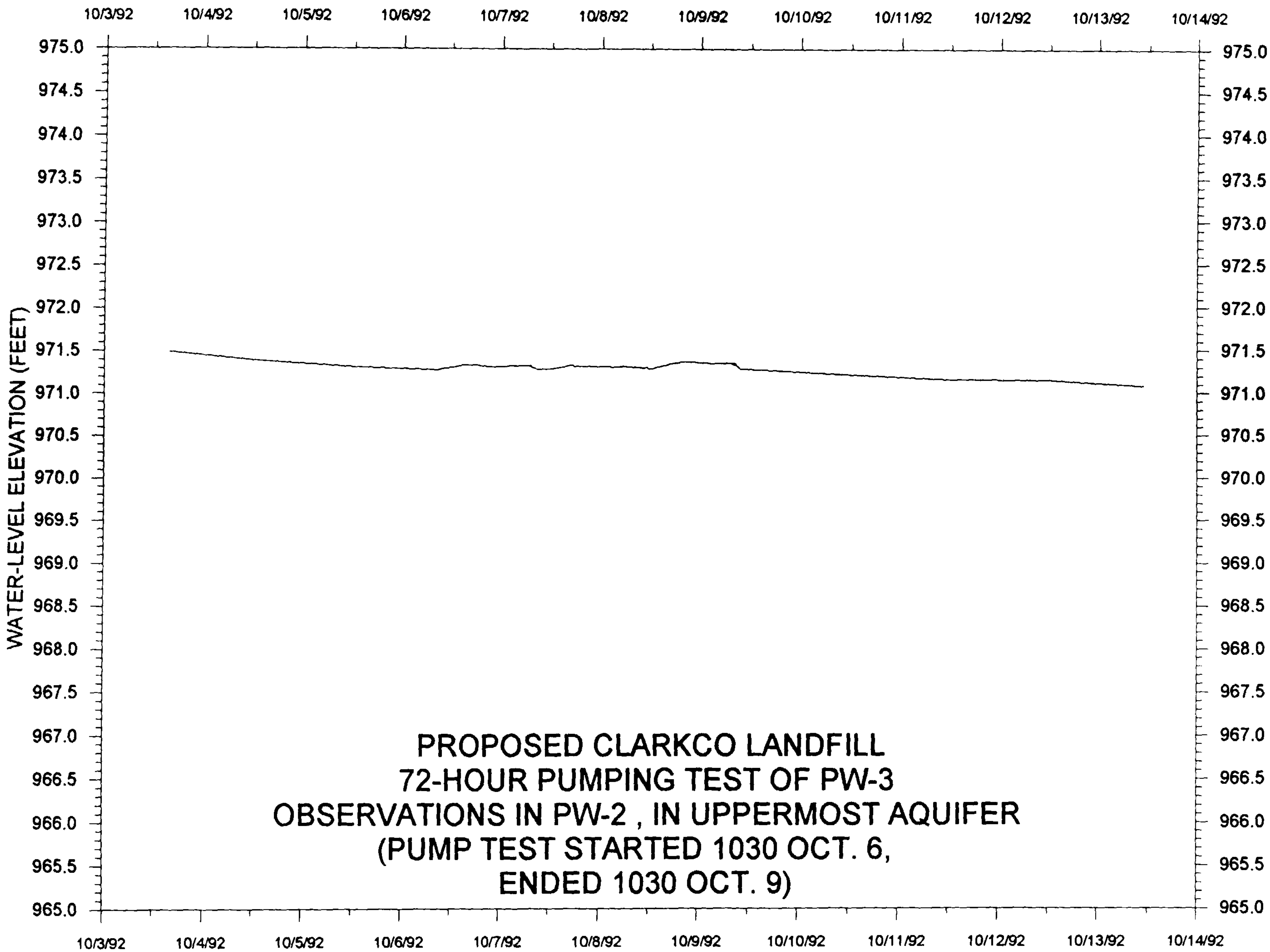


10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92
WATER-LEVEL ELEVATION (FEET)
987.0
986.5
986.0
985.5
985.0
984.5
984.0
983.5
983.0
982.5
982.0
981.5
981.0
980.5
980.0
979.5
979.0
978.5
978.0
977.5
977.0
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
WELLS IN UPPERMOST AQUIFER
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)
BF-20D
SUPPLY WELL

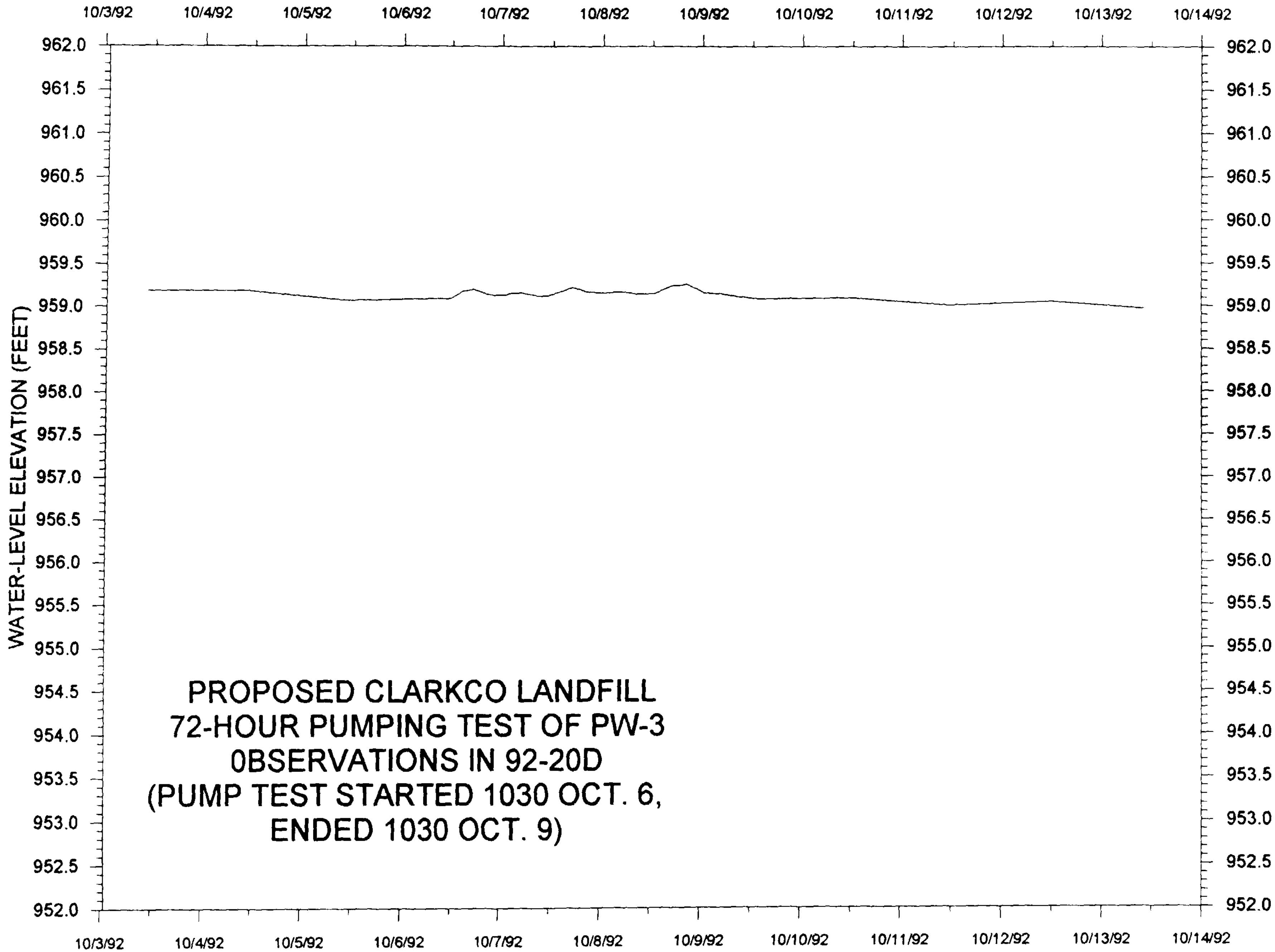

10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92
1025.0
1024.5
1024.0
1023.5
1023.0
1022.5
1022.0
1021.5
1021.0
1020.5
1020.0
1019.5
1019.0
1018.5
1018.0
1017.5
1017.0
1016.5
1016.0
1015.5
1015.0
WATER-LEVEL ELEVATION (FEET)
PW-1
BF-19D
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
0BSERVATIONS IN WELLS IN UPPERMOST AQUIFER
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)



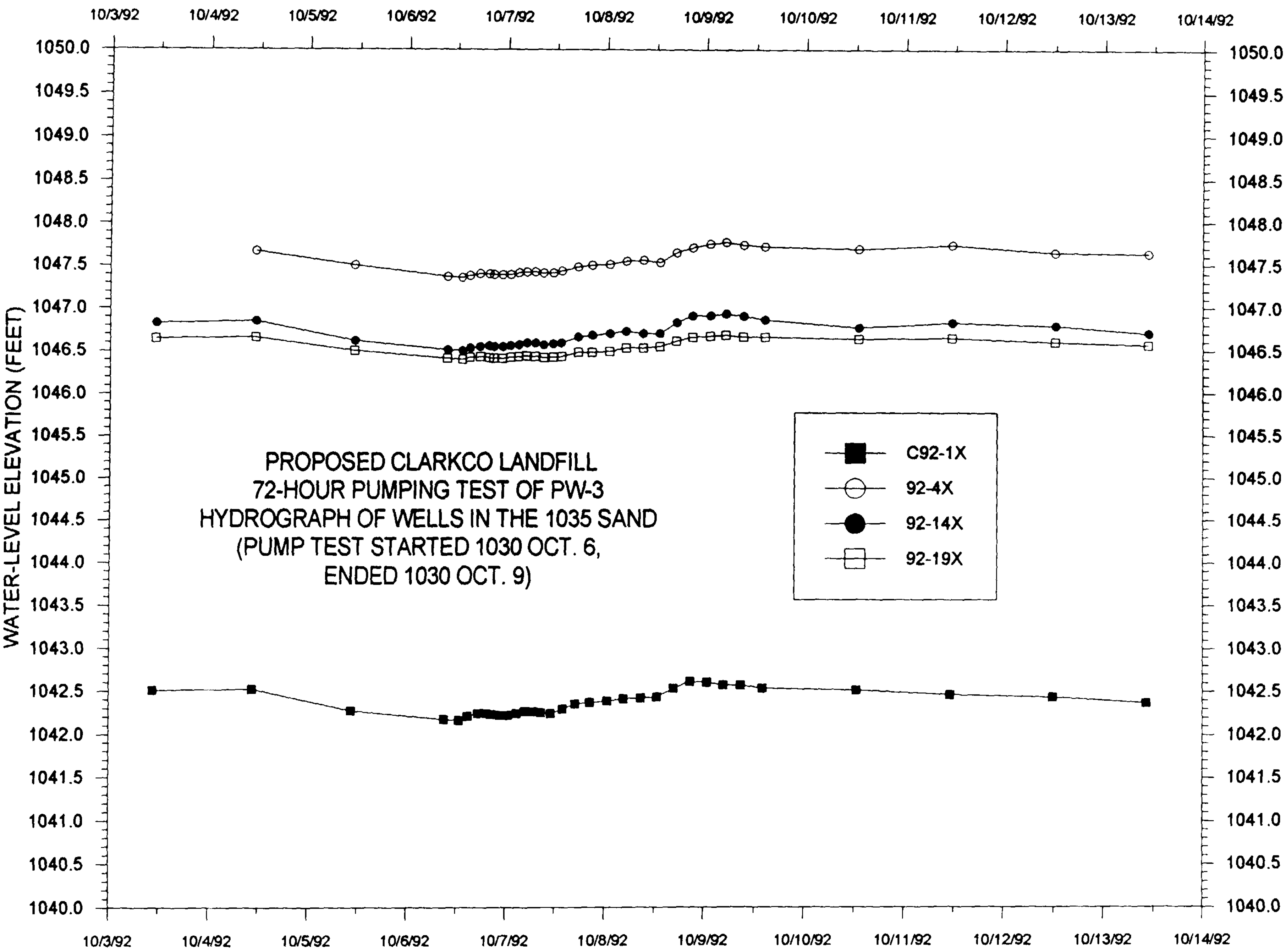
10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92
987.0
986.5
986.0
985.5
985.0
984.5
984.0
983.5
983.0
982.5
982.0
981.5
981.0
980.5
980.0
979.5
979.0
978.5
978.0
977.5
977.0
WATER-LEVEL ELEVATION (FEET)
90-6D
90-10D
90-13D
92-27DD
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
WELLS IN UPPERMOST AQUIFER
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)



10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92
WATER-LEVEL ELEVATION (FEET)
975.0
974.5
974.0
973.5
973.0
972.5
972.0
971.5
971.0
970.5
970.0
969.5
969.0
968.5
968.0
967.5
967.0
966.5
966.0
965.5
965.0
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
OBSERVATIONS IN PW-2 , IN UPPERMOST AQUIFER
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)


PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
0BSERVATIONS IN 92-20D
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)
WATER-LEVEL ELEVATION (FEET)
10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92

HYDROGRAPHS FOR INTRA-TILL SAND WELLS LOCATED MORE THAN 1000 FEET FROM PW-3. NONE HAVE BEEN CORRECTED FOR BAROMETRIC CHANGE BECAUSE THE HYDROGRAPHS ARE TYPICAL OF THOSE ALREADY CORRECTED AND SHOWING NO EVIDENCE OF DRAWDOWN.	
Hydrographs	Comments
C92-1X, 92-4X, 92-14X & 92-19X.	All hydrographs show typical barometric trends. All screened in 1035 Sand.
91-9Y.	Deepest intra-till well in this group. Most responsive to barometric change but shows no drawdown. 1035 Sand.
C91-8X, C92-9X, 92-17Y & 92-18X.	All show barometric effects except C92-9X. All screened in 1050 Sand.
92-15X.	Background well in 1050 Sand shows essentially a level trend.
C91-8Y.	Level trend no barometric effects. 1070 Sand.
91-9Z, 90-9X & C92-9Y.	Slight barometric effects. 1077 Sand.
TBF-17 & TBF-20S.	Located at Closed Barrel Fill where uppermost aquifer is confined. Slight barometric effects with essentially level trend. 1050 Sand.
TBF-19S.	Same as above. 1060 Sand.



PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
HYDROGRAPH OF WELLS IN THE 1035 SAND
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)
C92-1X
92-4X
92-14X
92-19X
WATER-LEVEL ELEVATION (FEET)
1050.0
1049.5
1049.0
1048.5
1048.0
1047.5
1047.0
1046.5
1046.0
1045.5
1045.0
1044.5
1044.0
1043.5
1043.0
1042.5
1042.0
1041.5
1041.0
1040.5
1040.0
10/3/92
10/4/92
10/5/92
10/6/92
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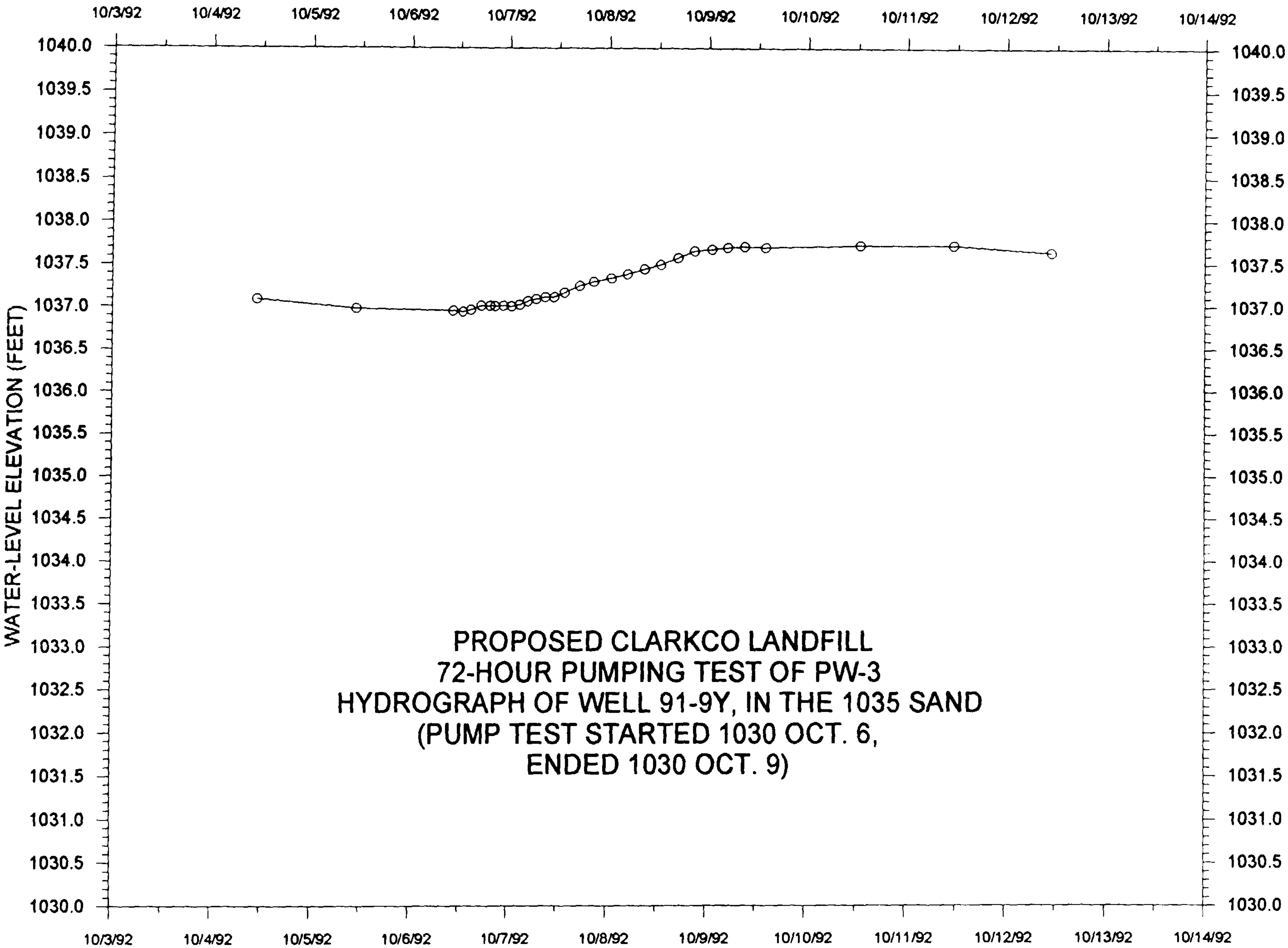
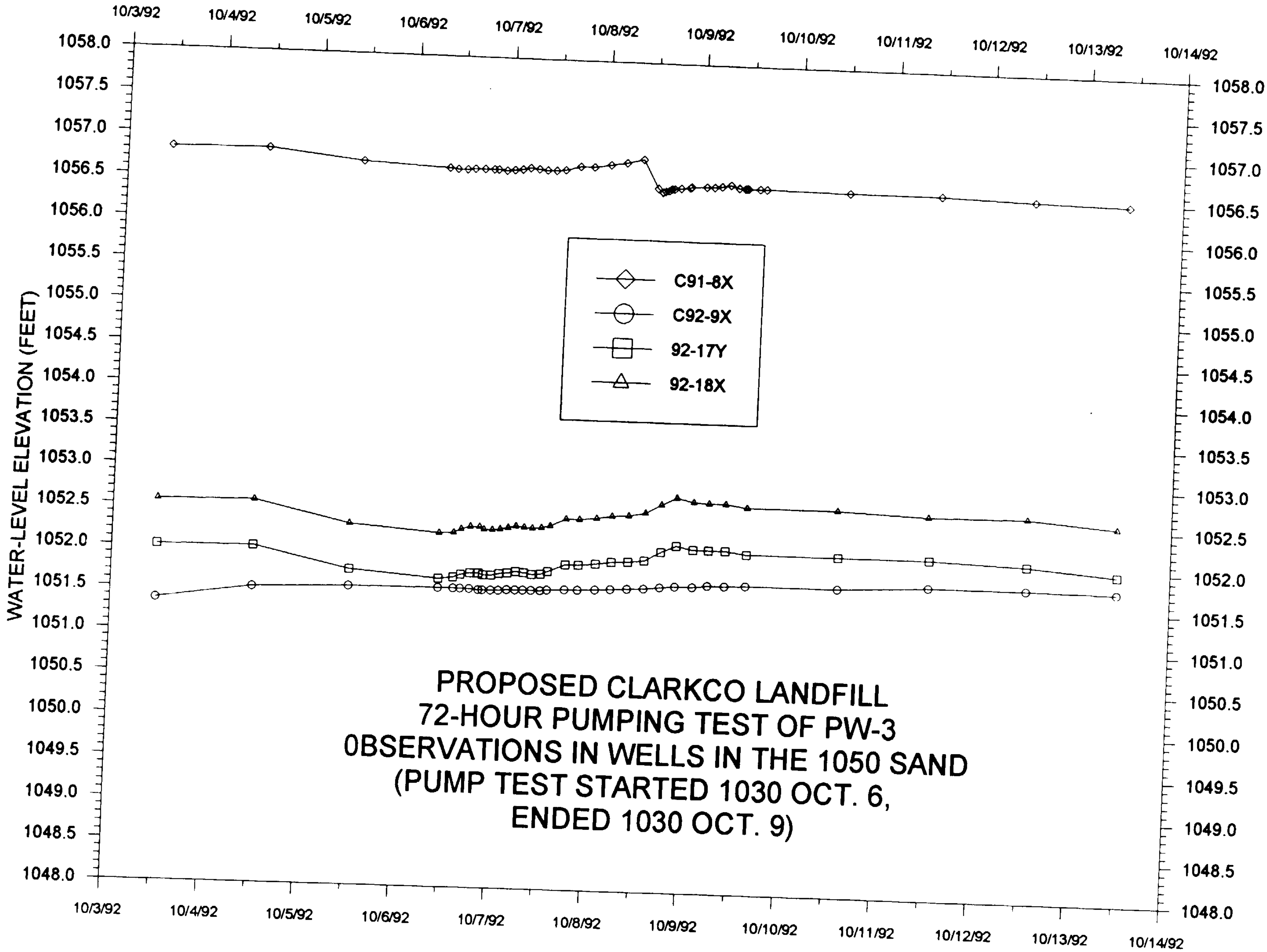
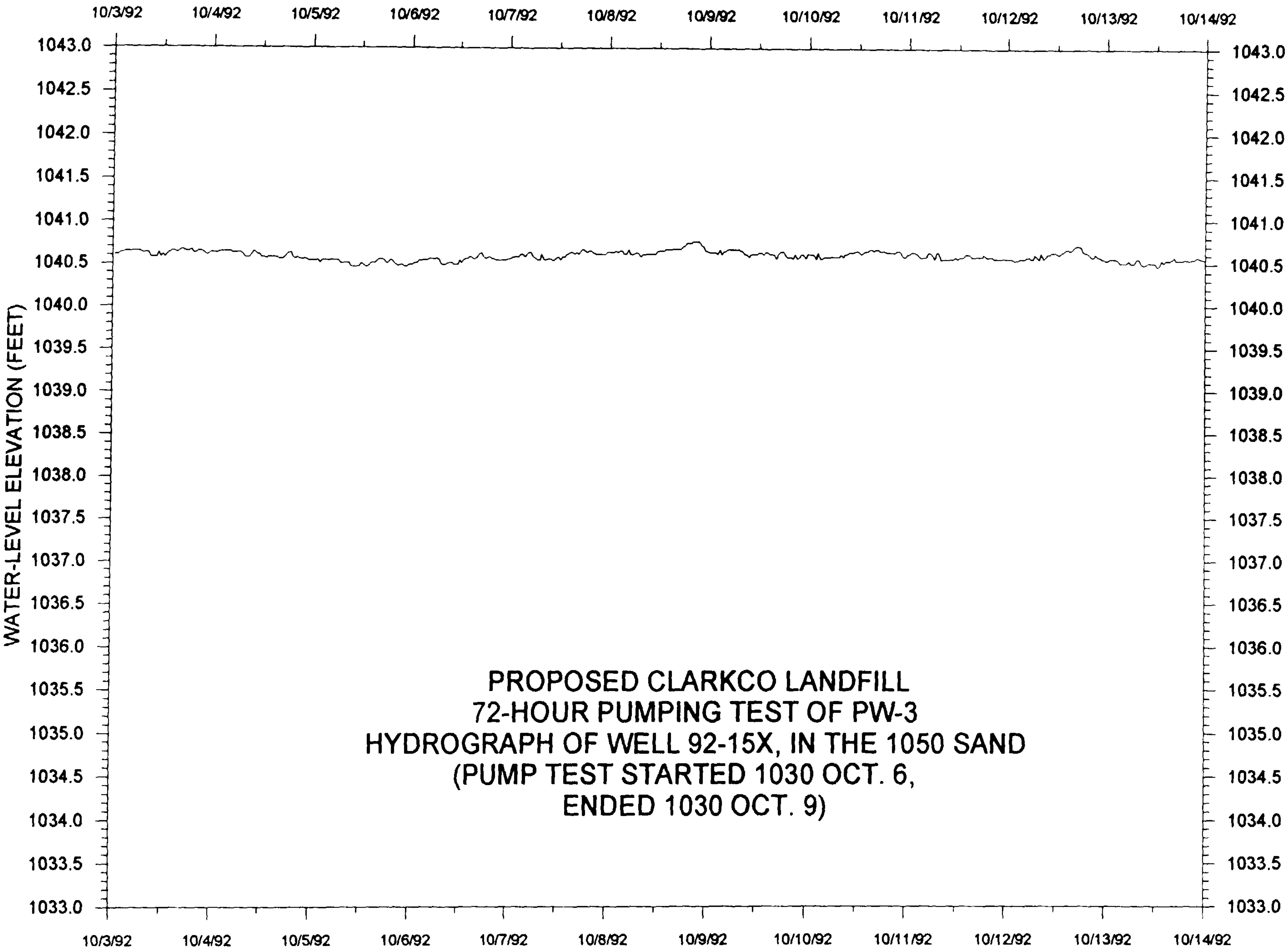
10/13/92
10/14/92

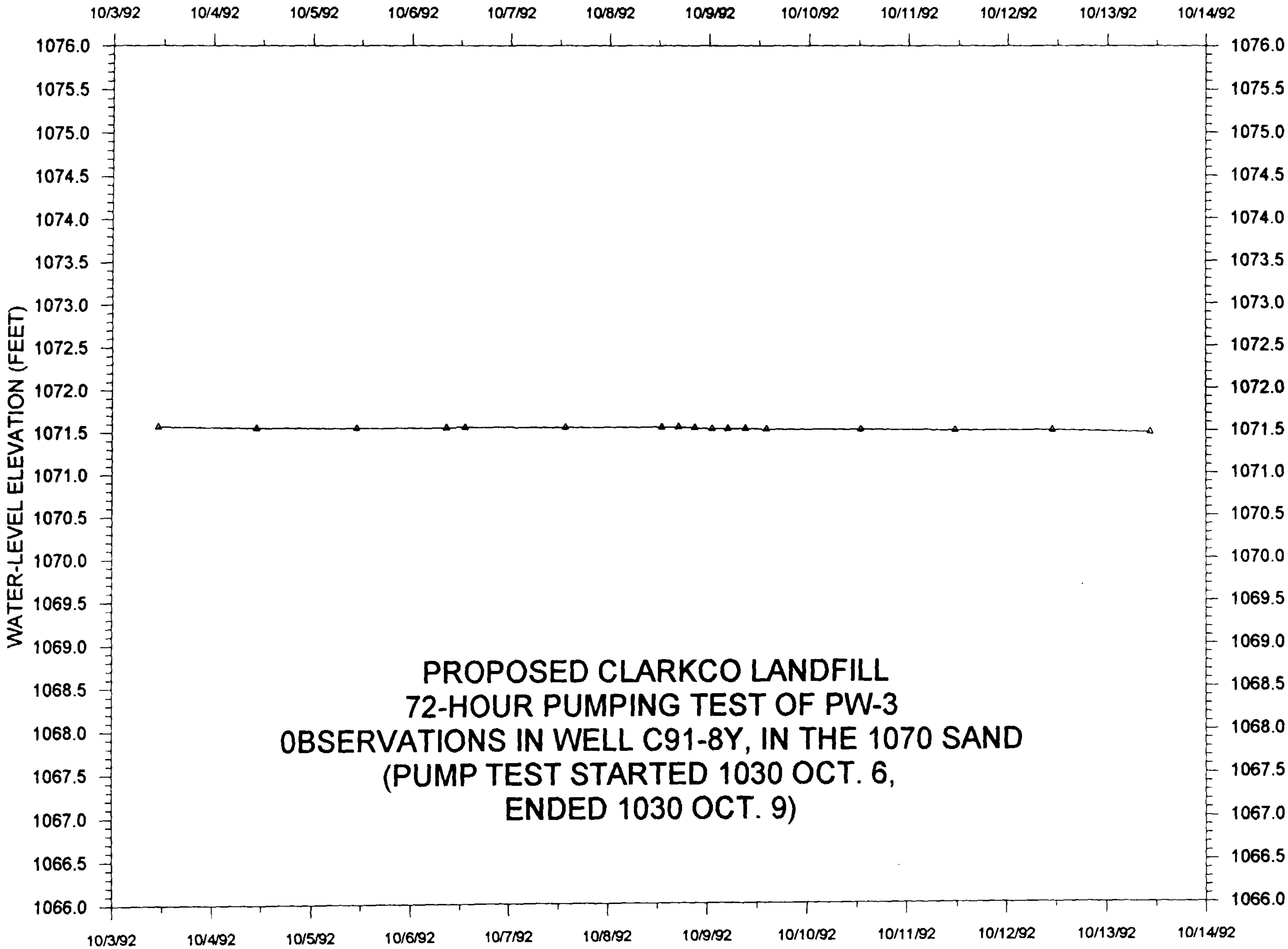

10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92
1040.0
1039.5
1039.0
1038.5
1038.0
1037.5
1037.0
1036.5
1036.0
1035.5
1035.0
1034.5
1034.0
1033.5
1033.0
1032.5
1032.0
1031.5
1031.0
1030.5
1030.0
WATER-LEVEL ELEVATION (FEET)
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
HYDROGRAPH OF WELL 91-9Y, IN THE 1035 SAND
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)



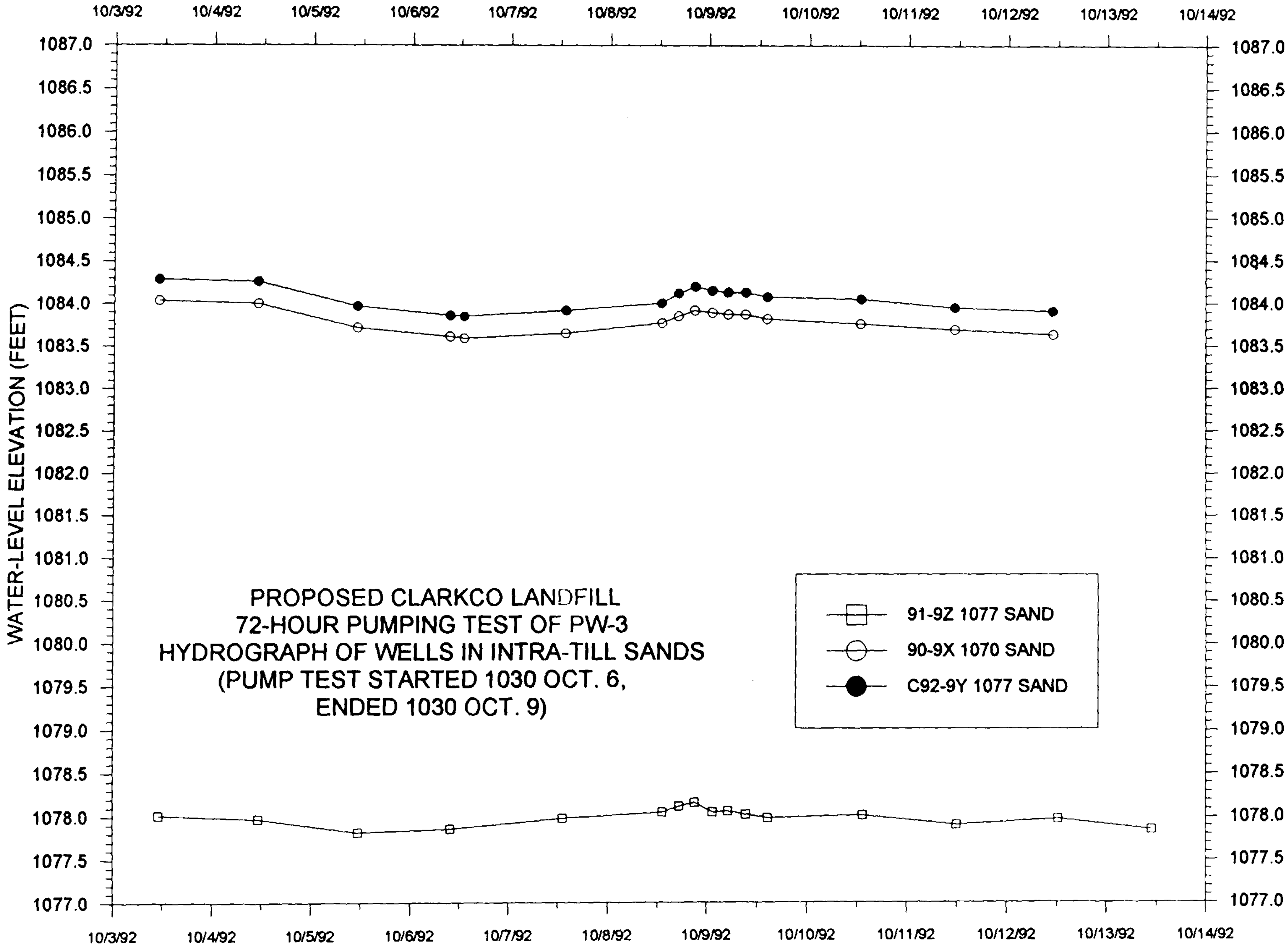
WATER-LEVEL ELEVATION (FEET)
C91-8X
C92-9X
92-17Y
92-18X
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
0BSERVATIONS IN WELLS IN THE 1050 SAND
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)



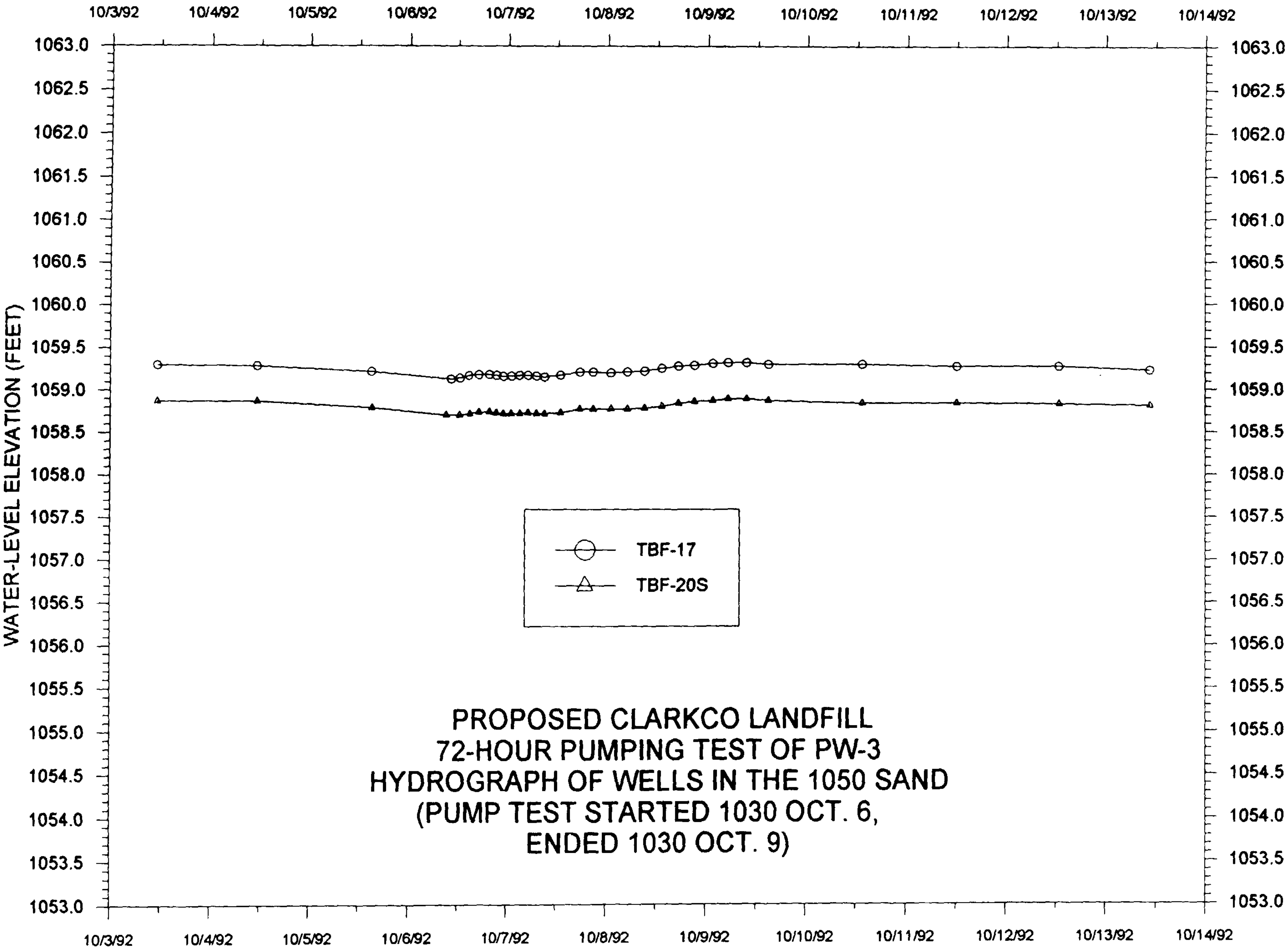
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
HYDROGRAPH OF WELL 92-15X, IN THE 1050 SAND
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)
WATER-LEVEL ELEVATION (FEET)
10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92
1043.0
1042.5
1042.0
1041.5
1041.0
1040.5
1040.0
1039.5
1039.0
1038.5
1038.0
1037.5
1037.0
1036.5
1036.0
1035.5
1035.0
1034.5
1034.0
1033.5
1033.0



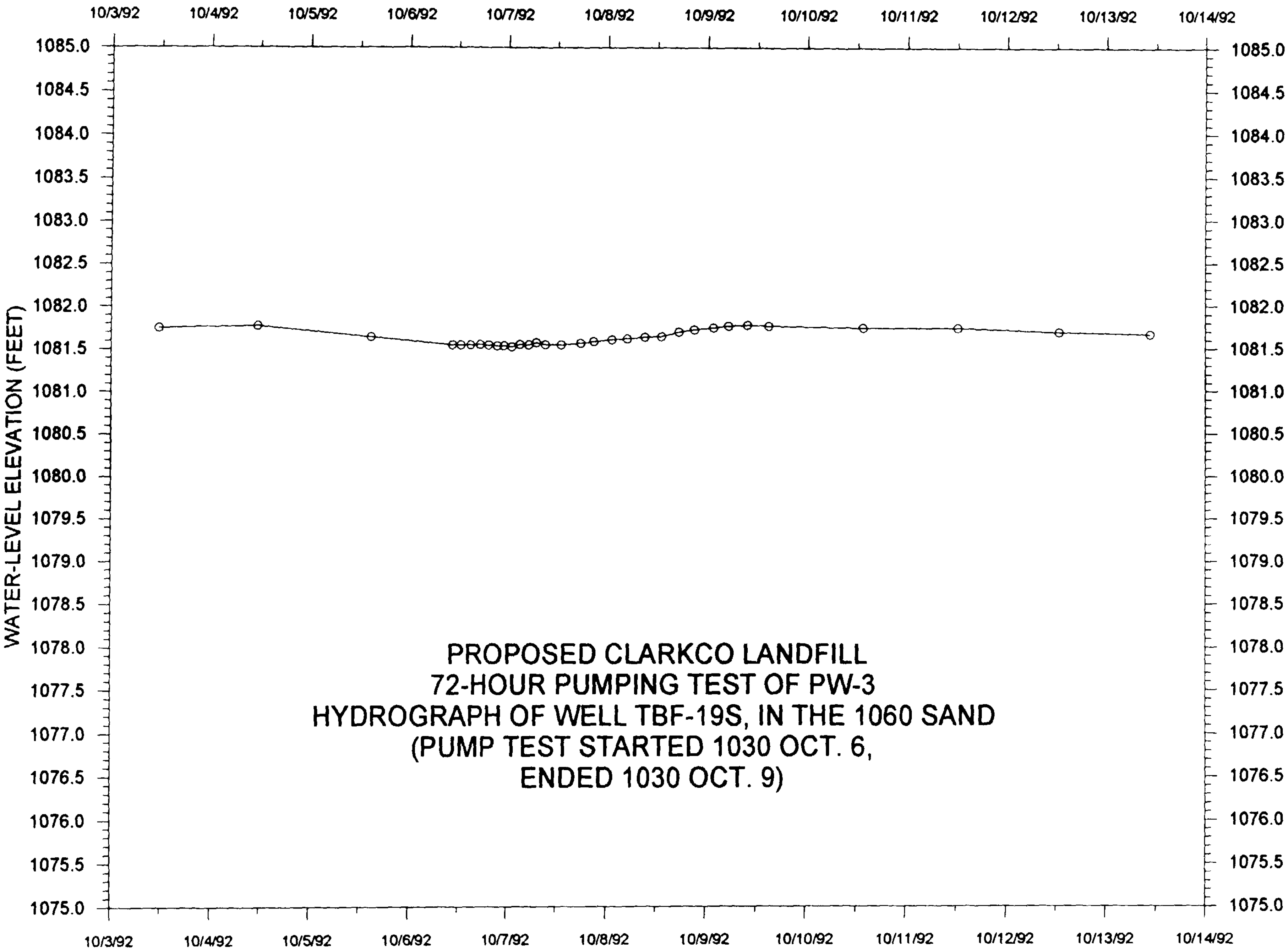
10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92
1076.0
1075.5
1075.0
1074.5
1074.0
1073.5
1073.0
1072.5
1072.0
1071.5
1071.0
1070.5
1070.0
1069.5
1069.0
1068.5
1068.0
1067.5
1067.0
1066.5
1066.0
WATER-LEVEL ELEVATION (FEET)
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
0BSERVATIONS IN WELL C91-8Y, IN THE 1070 SAND
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)



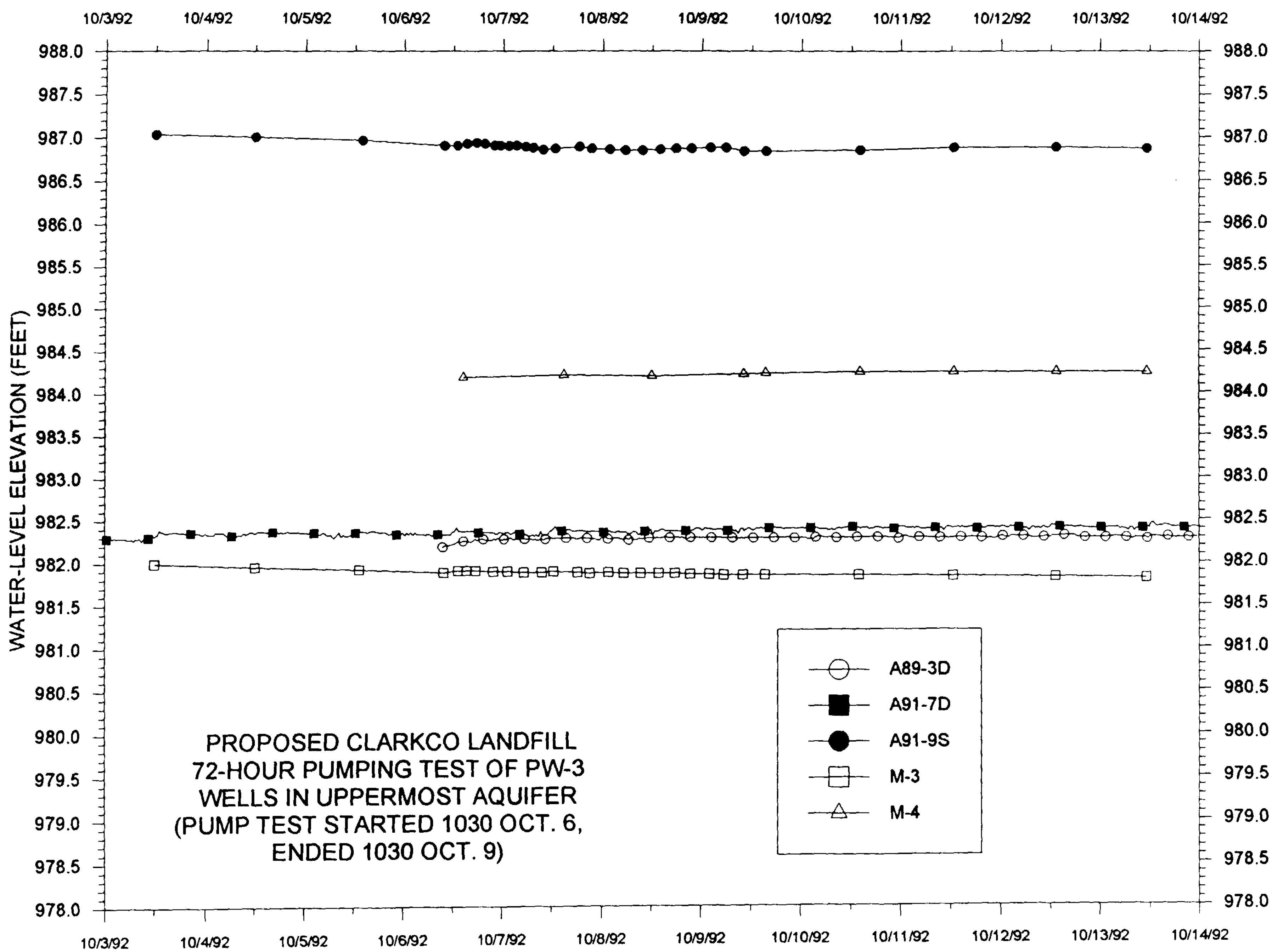
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
HYDROGRAPH OF WELLS IN INTRA-TILL SANDS
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)
91-9Z 1077 SAND
90-9X 1070 SAND
C92-9Y 1077 SAND
WATER-LEVEL ELEVATION (FEET)
1087.0
1086.5
1086.0
1085.5
1085.0
1084.5
1084.0
1083.5
1083.0
1082.5
1082.0
1081.5
1081.0
1080.5
1080.0
1079.5
1079.0
1078.5
1078.0
1077.5
1077.0
10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92



10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92
1063.0
1062.5
1062.0
1061.5
1061.0
1060.5
1060.0
1059.5
1059.0
1058.5
1058.0
1057.5
1057.0
1056.5
1056.0
1055.5
1055.0
1054.5
1054.0
1053.5
1053.0
WATER-LEVEL ELEVATION (FEET)
TBF-17
TBF-20S
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
HYDROGRAPH OF WELLS IN THE 1050 SAND
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)


10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92
1085.0
1084.5
1084.0
1083.5
1083.0
1082.5
1082.0
1081.5
1081.0
1080.5
1080.0
1079.5
1079.0
1078.5
1078.0
1077.5
1077.0
1076.5
1076.0
1075.5
1075.0
WATER-LEVEL ELEVATION (FEET)
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
HYDROGRAPH OF WELL TBF-19S, IN THE 1060 SAND
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)

HYDROGRAPHS FOR WELLS LOCATED AT SOUTH END OF THE TREMONT LANDFILL SITE.	
Hydrographs	Comments
A89-3D, A91-7D, A91-9S, M-3 & M-4.	All hydrographs are essentially featureless with level trend. No evidence of drawdown.
Chapman Creek.	Stage of creek is as flat as above ground-water levels.


WATER-LEVEL ELEVATION (FEET)
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
WELLS IN UPPERMOST AQUIFER
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)
A89-3D
A91-7D
A91-9S
M-3
M-4
10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92
978.0
978.5
979.0
979.5
980.0
980.5
981.0
981.5
982.0
982.5
983.0
983.5
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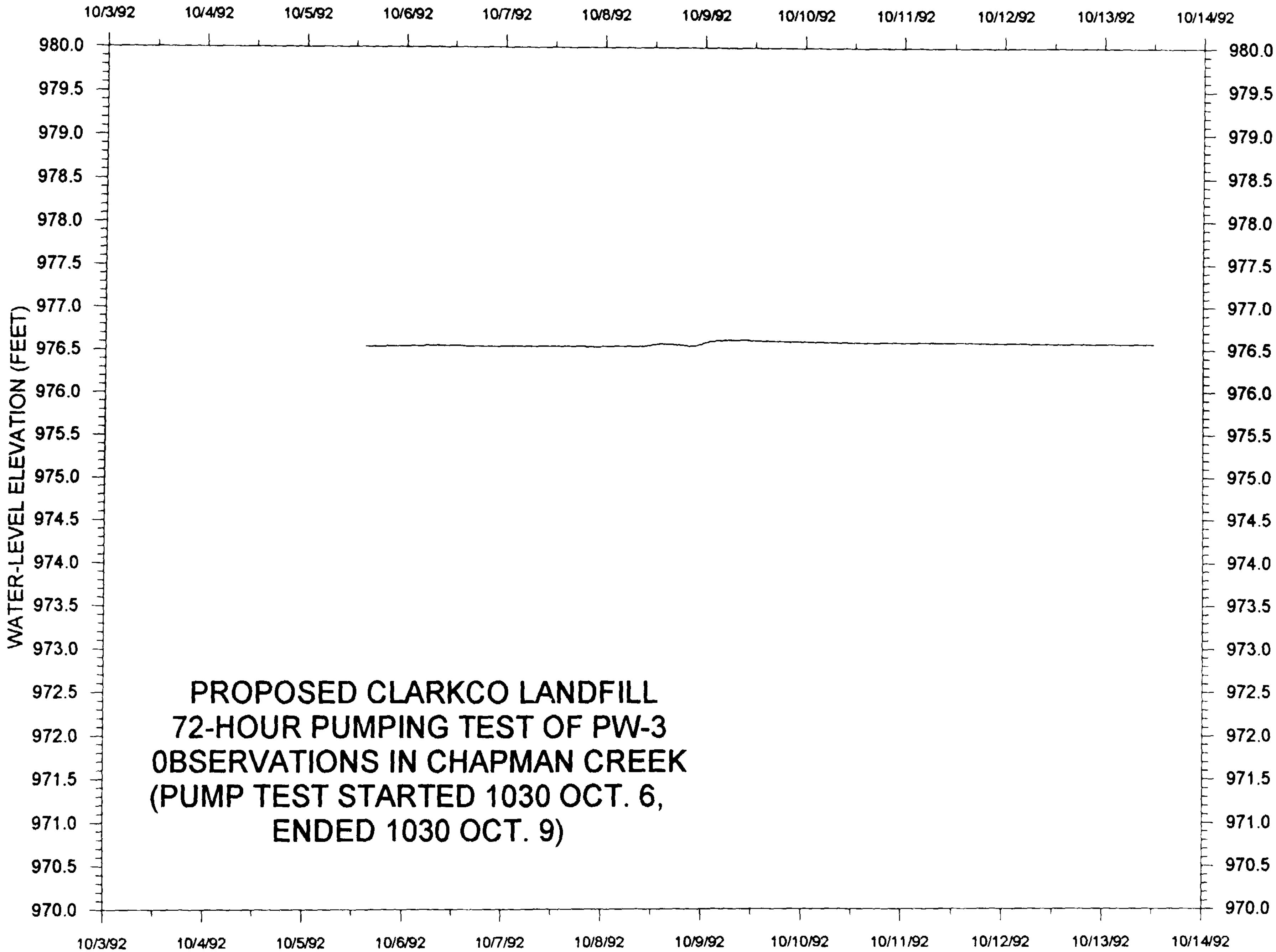
984.5
985.0
985.5
986.0
986.5
987.0
987.5
988.0

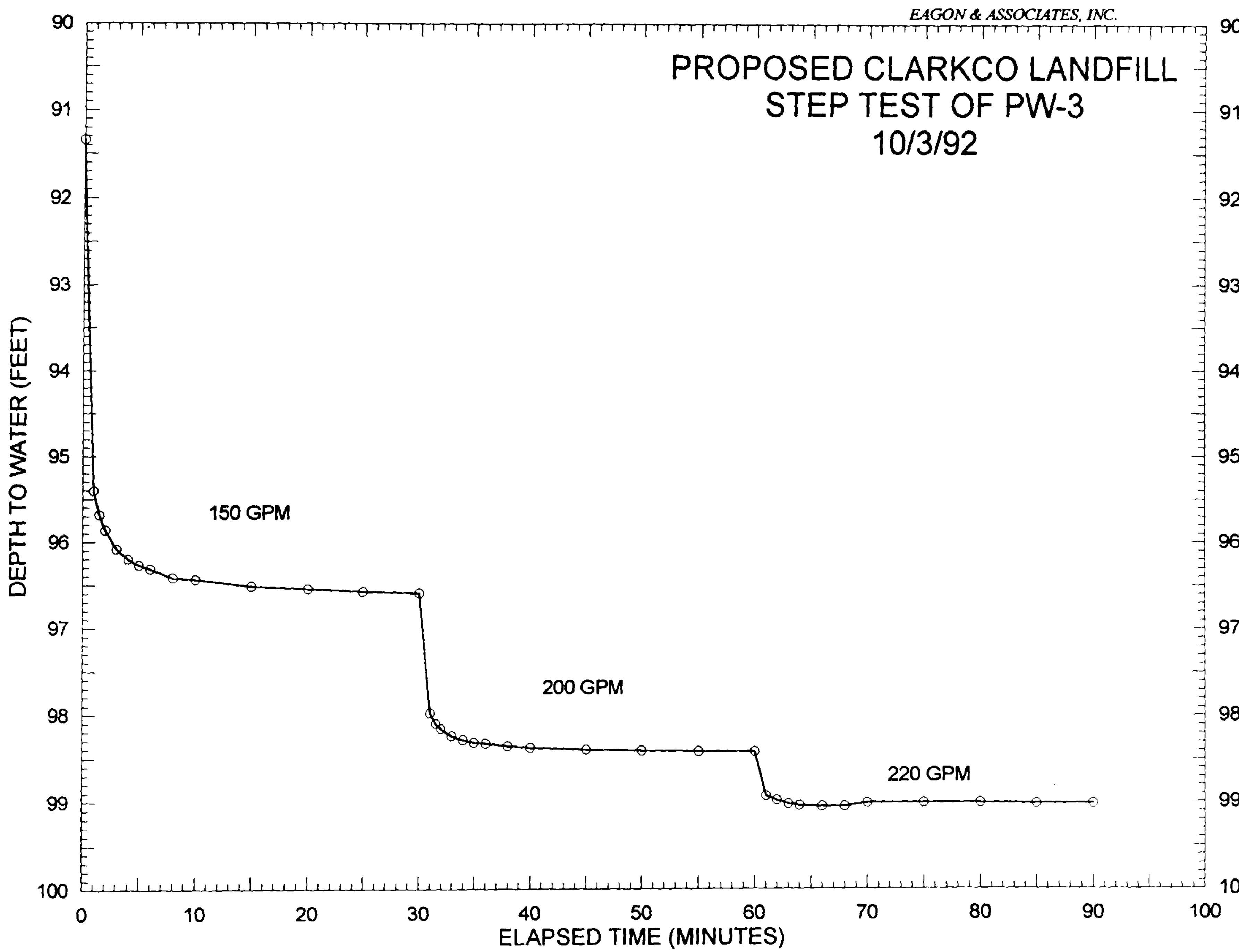


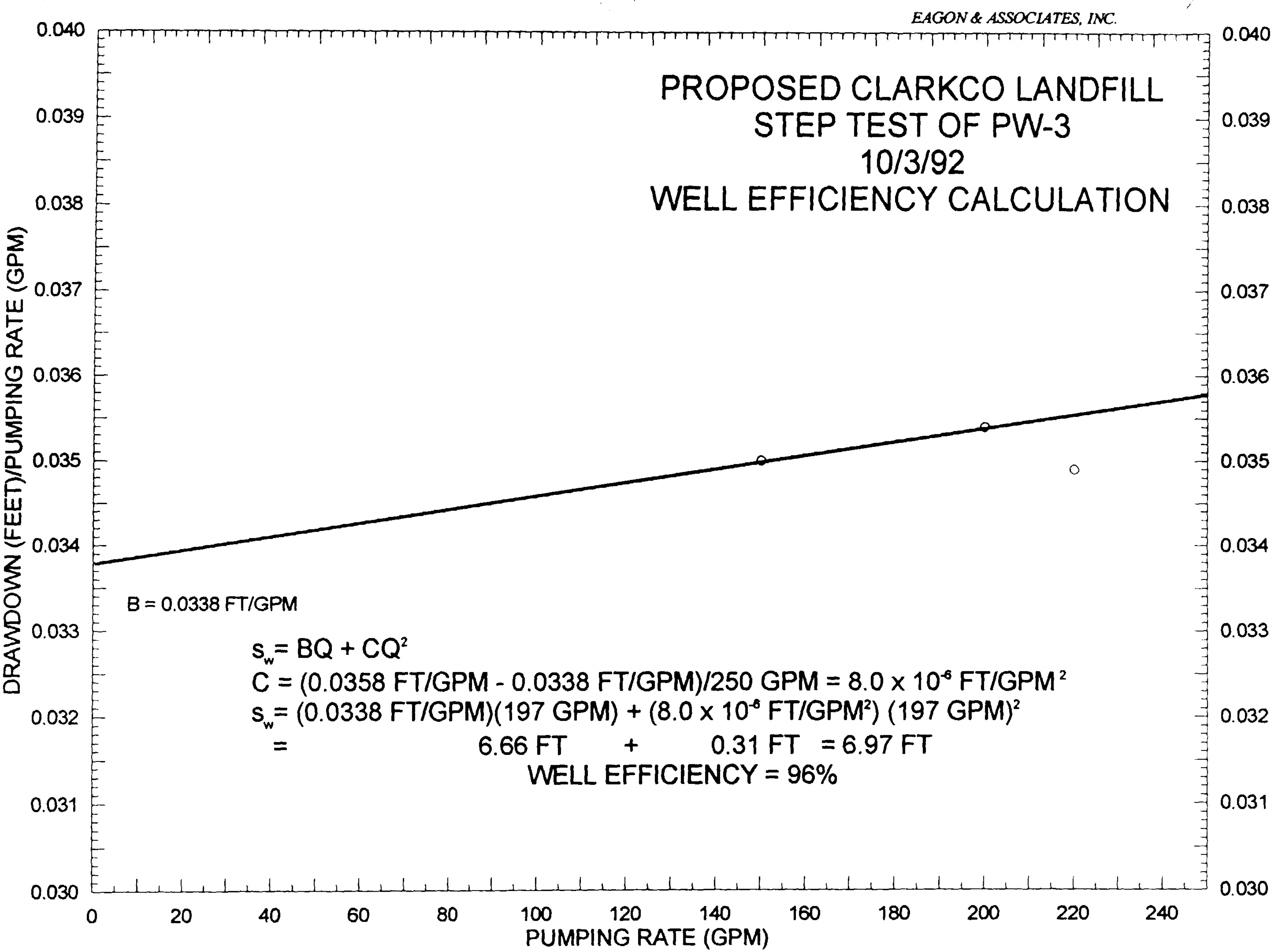
10/3/92
10/4/92
10/5/92
10/6/92
10/7/92
10/8/92
10/9/92
10/10/92
10/11/92
10/12/92
10/13/92
10/14/92
WATER-LEVEL ELEVATION (FEET)
980.0
979.5
979.0
978.5
978.0
977.5
977.0
976.5
976.0
975.5
975.0
974.5
974.0
973.5
973.0
972.5
972.0
971.5
971.0
970.5
970.0
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
0BSERVATIONS IN CHAPMAN CREEK
(PUMP TEST STARTED 1030 OCT. 6,
ENDED 1030 OCT. 9)

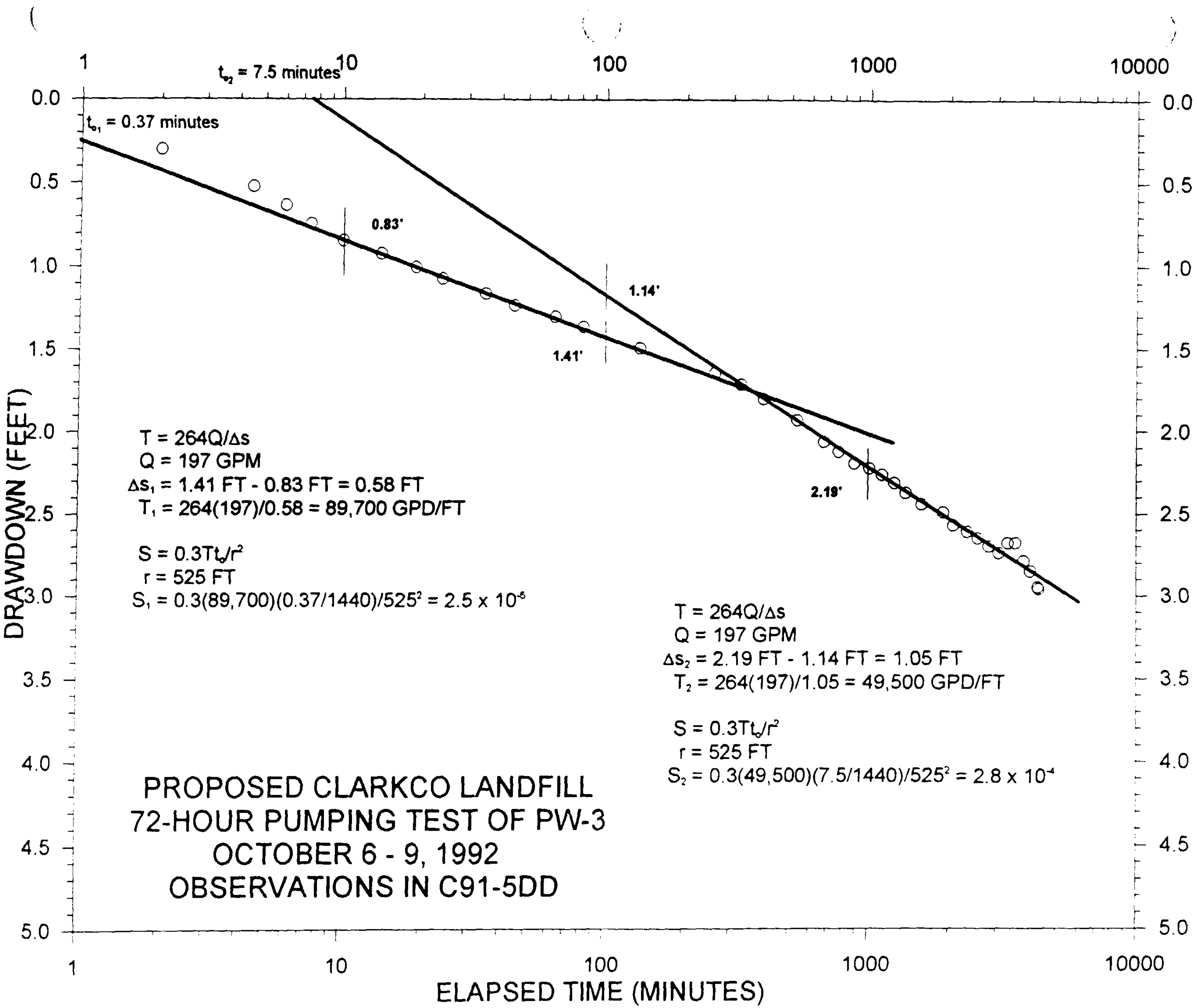
GRAPHS SHOWING THE PLOTS OF DRAWDOWN DATA FROM THE 72-HOUR PUMPING TEST AND COMPUTATION OF AQUIFER CHARACTERISTICS — Page 1 of 2	
Hydrographs	Comments
PW-3 Step-test graph.	The primary purpose of this step test was to determine pump capability. A step test was performed previously in 1990, up to a rate of 125 gpm. Increments of 50 gpm were used anticipating a final rate of 250 gpm; however, the pump would only deliver 220 gpm.
PW-3 Well-loss computation	There was very little well loss (head loss due to turbulent flow), indicating that the well is adequately developed and highly efficient (96%). The well-loss constant (C) is quite low, being 8.0×10^{-6} ft/gpm^2 or 1.6 sec^2/ft^2. A C value of from 1-5 sec^2/ft^2 is considered normal for a properly developed well (Walton, 1962).
C92-5DD.	The break in slope after about 300 minutes indicates a negative boundary. However, T and S derived from the second slope seem more realistic.
C91-5D semi-log graph.	The break in slope after about 300 minutes indicates a negative boundary. However, the T derived from the second slope seems more realistic, but the S is almost 10^{-3} which seems a bit high for fully confined conditions. Comparing the early data (< 10 minutes) for both wells in the cluster suggests leakage (slow drainage) between the two zones screened. The shallower well (5D) is slow to respond and the transition to the first slope becomes steeper, whereas in the deeper well (5DD) the first slope drawn is flatter than the early data. In other words, the rate of drawdown increases in 5D as flow between the two zones is established and drawdown in 5DD slows slightly as the lower zone adjusts to leakage from above. This is due to stratification within the aquifer. The drawdown data from 5D was corrected for barometric effects, but the corrected data gave essentially the same results. Therefore, time-drawdown data was used without barometric correction.
C92-5DD log-log graph.	Type curve analysis based on delayed yield from storage was applied to these data. This is not a totally valid application of the analytical technique, because it assumes water-table conditions. The same data cannot be used for computation of both a boundary condition and a delayed yield; it is one or the other. However, T and S values from both the early and late data seem reasonable. It seems evident that some type of leakage or delayed yield is occurring in the aquifer system. In reality, the system is probably responding to boundary conditions as well.

GRAPHS SHOWING THE PLOTS OF DRAWDOWN DATA FROM THE 72-HOUR PUMPING TEST AND COMPUTATION OF AQUIFER CHARACTERISTICS

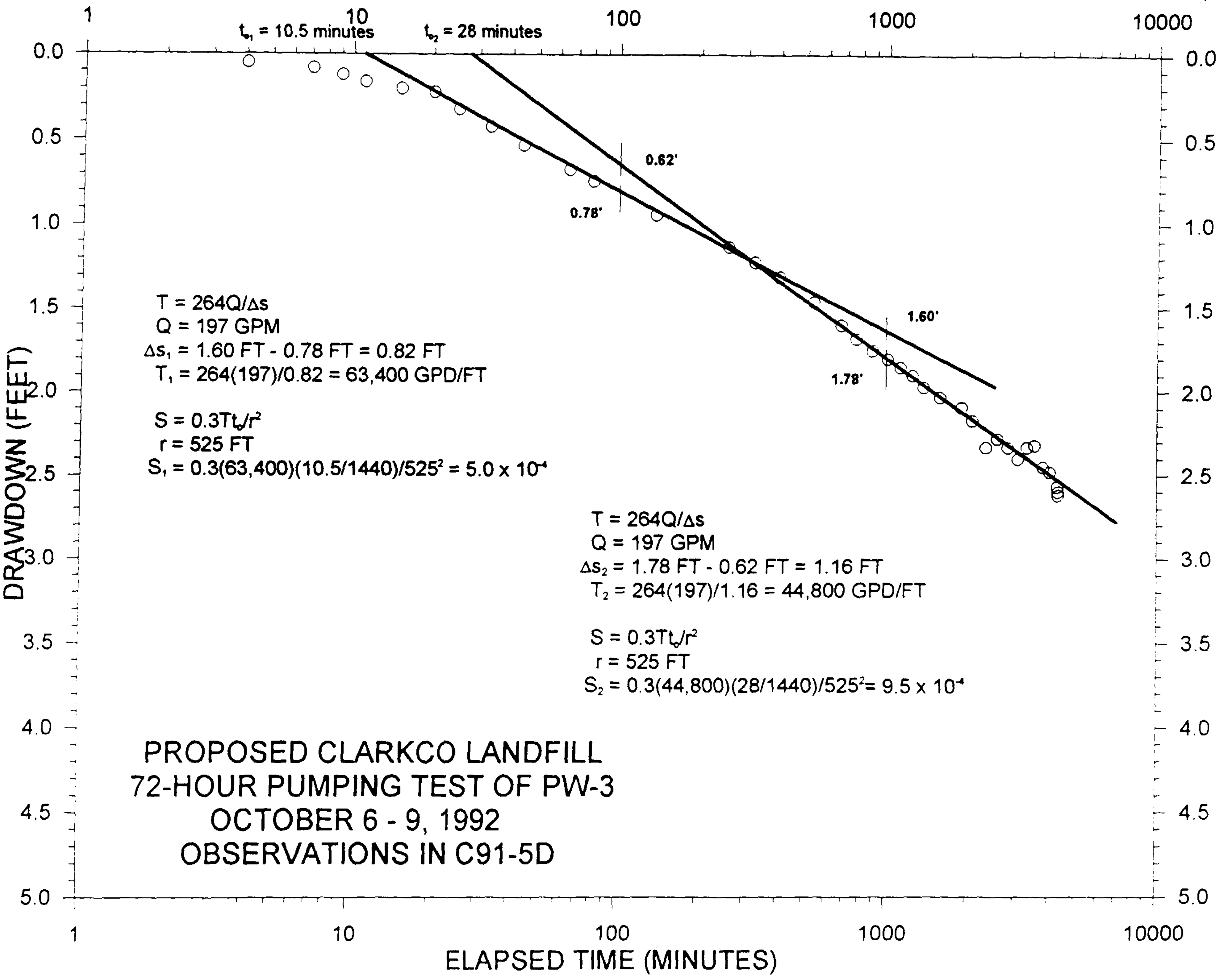
Hydrographs	Comments
C91-5D log-log graph.	This plot fits the nonleaky artesian type curve fairly well. The resulting computations for T and S seem reasonable. This indicates that the shallow portion of the aquifer is not responding to any confining bed leakage.
92-22DD semi-log graph.	The break in slope after about 300 minutes indicates a negative boundary. However, the T and S derived from the second slope seem more realistic.
92-22D semi-log graph.	The delayed response of this well is quite evident. It appears to be in transition throughout the test period. The total drawdown in this well is substantially less than that in the deeper well (22DD). The poor interconnection between zones due to stratification is more pronounced at this location than at the 5D-5DD location farther north. This is consistent with the conclusions of more stratification and aquifer pinch-out to the south.
PW-3 semi-log graph.	A slight boundary condition is indicated by the break in slope. However, the T derived from both slopes seems unrealistically high. The most likely explanation is that the system is already under the influence of delayed yield from storage. The early data (<5 minutes) quickly flattens out to the first slope. The unconfined portion of the aquifer is probably providing much of the water from storage and this results in flattening the response to pumping like a recharge boundary.
Distance-drawdown graph.	Aquifer characteristics (T and S) derived from these computations seem realistic. The data points that fit the line are C92-5DD, 92-22DD and PW-3. Wells C91-5D and 92-22D fall above the line due to an imperfect connection with the aquifer system as already described. The computed drawdown for TBF-20D and the supply well are somewhat dubious, because of the pumping interference. These drawdowns also plot above the distance-drawdown graph. This may be due to directional differences in transmissivity in the aquifer. In addition, the lack of any observed drawdown in other directions (see Figure 5-26) demonstrates that the cone of depression does not reach out as indicated on the distance-drawdown graph. Again, this is believed to be due to the amount of water supplied from storage in the unconfined portion of the aquifer to the north.


EAGON & ASSOCIATES, INC.
PROPOSED CLARKCO LANDFILL
STEP TEST OF PW-3
10/3/92
150 GPM
200 GPM
220 GPM
DEPTH TO WATER (FEET)
ELAPSED TIME (MINUTES)
90
91
92
93
94
95
96
97
98
99
100
0
10
20
30
40
50
60
70
80
90
100

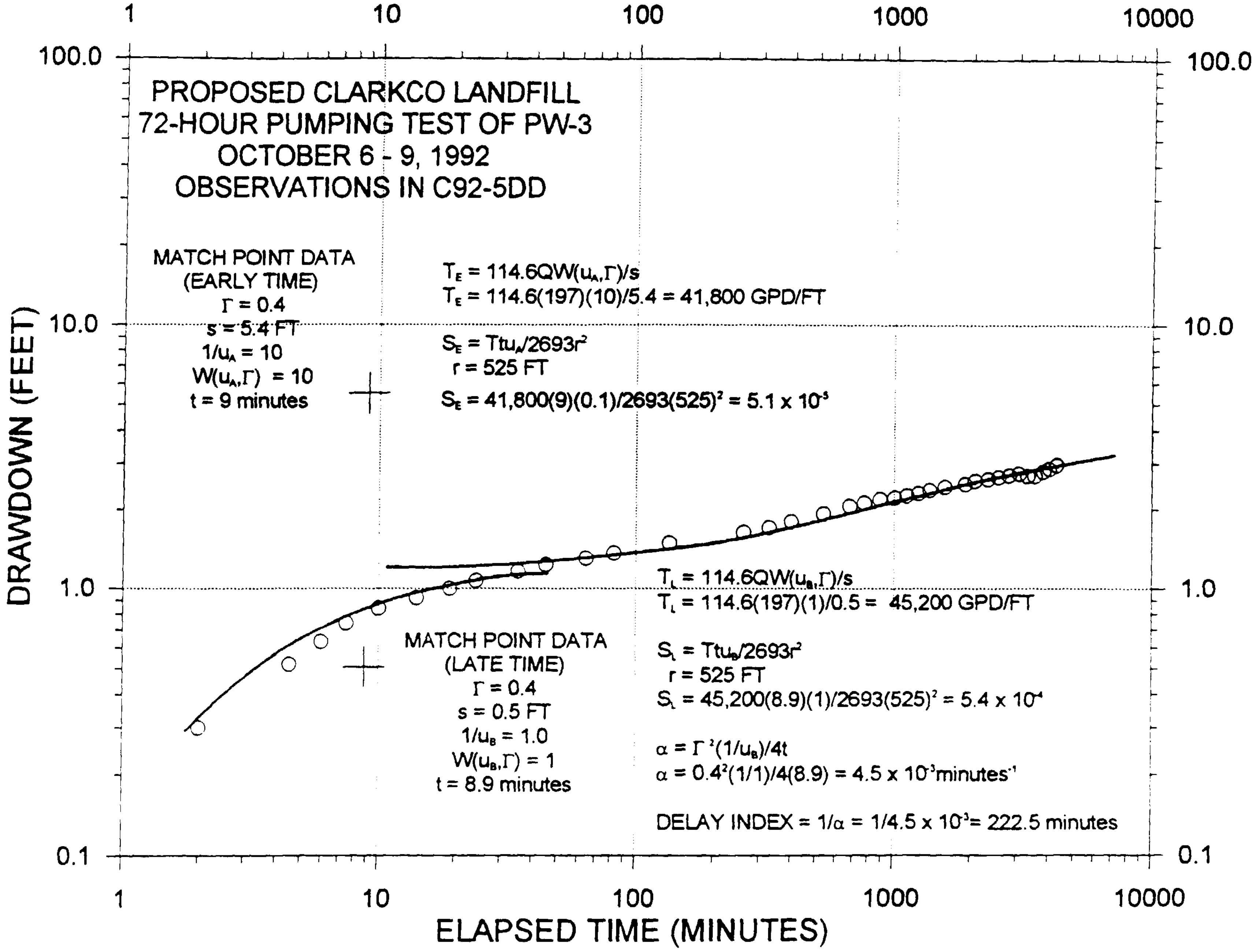

EAGON & ASSOCIATES, INC.
PROPOSED CLARKCO LANDFILL
STEP TEST OF PW-3
10/3/92
WELL EFFICIENCY CALCULATION
B = 0.0338 FT/GPM
$s_w = BQ + CQ^2$
C = (0.0358 FT/GPM - 0.0338 FT/GPM)/250 GPM = 8.0 x 10^{-6} FT/GPM^2
s_w = (0.0338 FT/GPM)(197 GPM) + (8.0 x 10^{-6} FT/GPM^2) (197 GPM)^2
= 6.66 FT + 0.31 FT = 6.97 FT
WELL EFFICIENCY = 96%
DRAWDOWN (FEET)/PUMPING RATE (GPM)
PUMPING RATE (GPM)
0.030
0.031
0.032
0.033
0.034
0.035
0.036
0.037
0.038
0.039
0.040
0
20
40
60
80
100
120
140
160
180
200
220
240

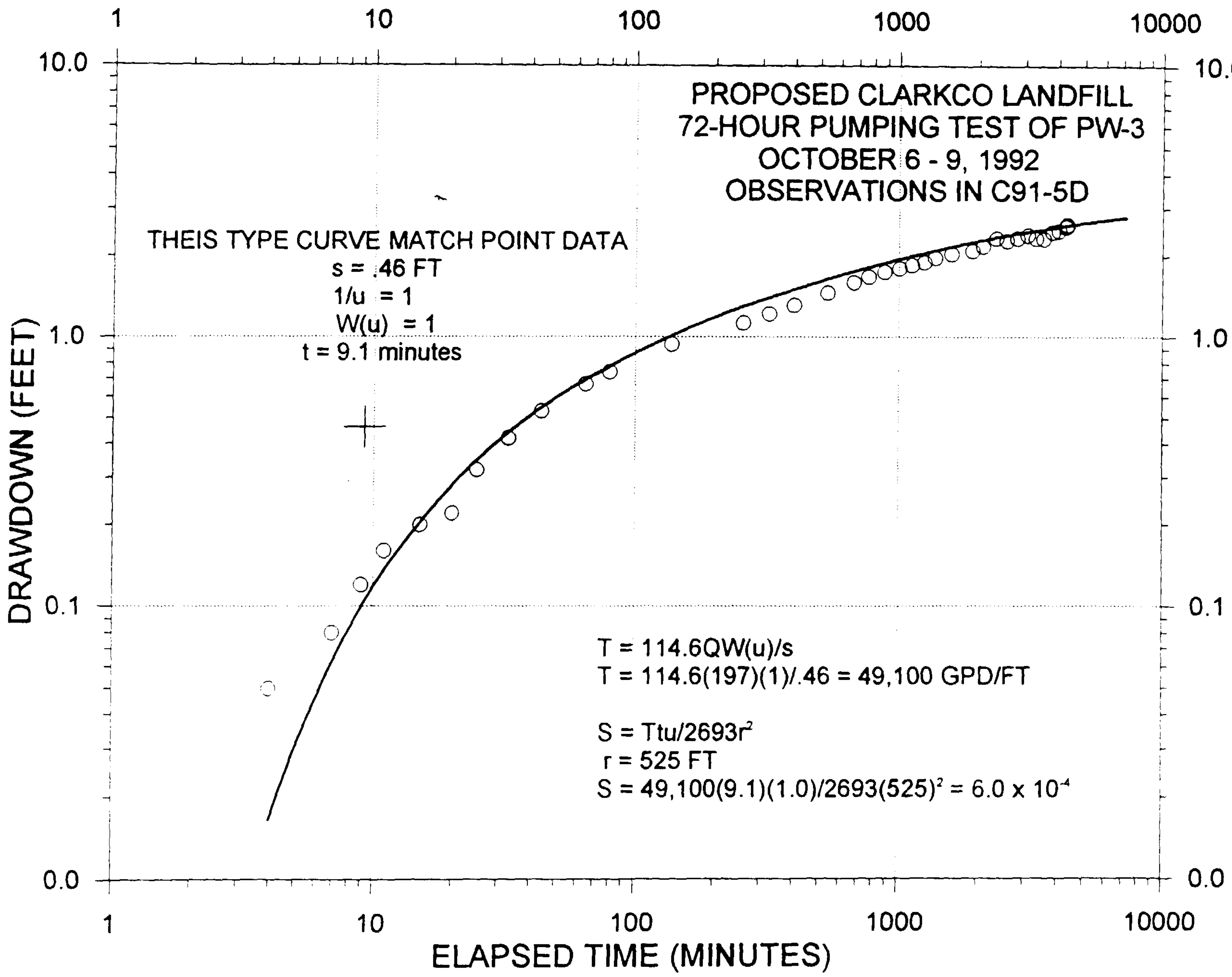


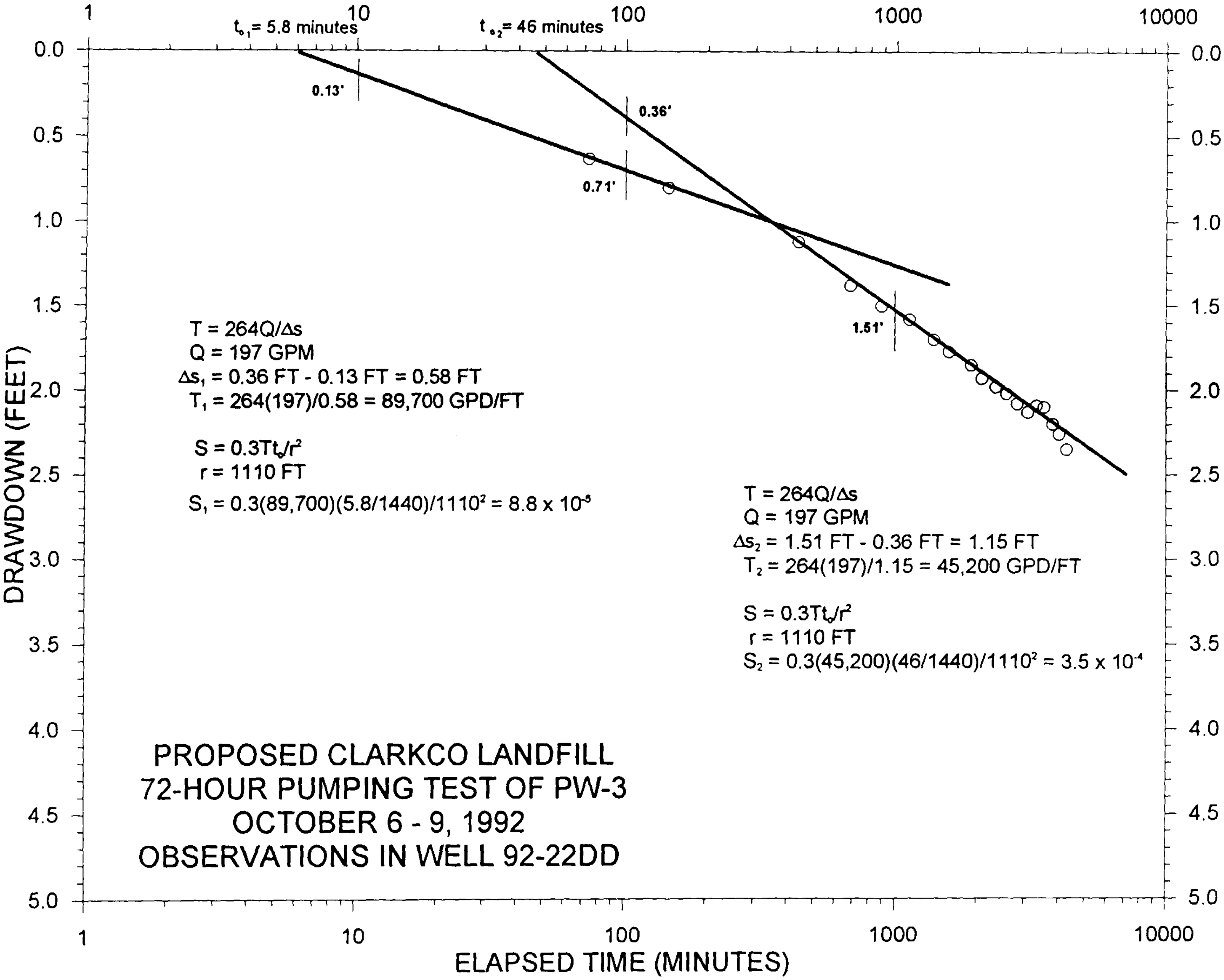
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
OCTOBER 6 - 9, 1992
OBSERVATIONS IN C91-5DD
DRAWDOWN (FEET)
ELAPSED TIME (MINUTES)
t_{o_2} = 7.5 minutes
t_{o_1} = 0.37 minutes
0.83'
1.14'
1.41'
2.19'
T = 264Q/Δs
Q = 197 GPM
Δs_1 = 1.41 FT - 0.83 FT = 0.58 FT
T_1 = 264(197)/0.58 = 89,700 GPD/FT
S = $0.3Tt_o/r^2$
r = 525 FT
$S_1 = 0.3(89{,}700)(0.37/1440)/525^2 = 2.5 \times 10^{-5}$
T = 264Q/Δs
Q = 197 GPM
Δs_2 = 2.19 FT - 1.14 FT = 1.05 FT
T_2 = 264(197)/1.05 = 49,500 GPD/FT
S = $0.3Tt_o/r^2$
r = 525 FT
$S_2 = 0.3(49{,}500)(7.5/1440)/525^2 = 2.8 \times 10^{-4}$



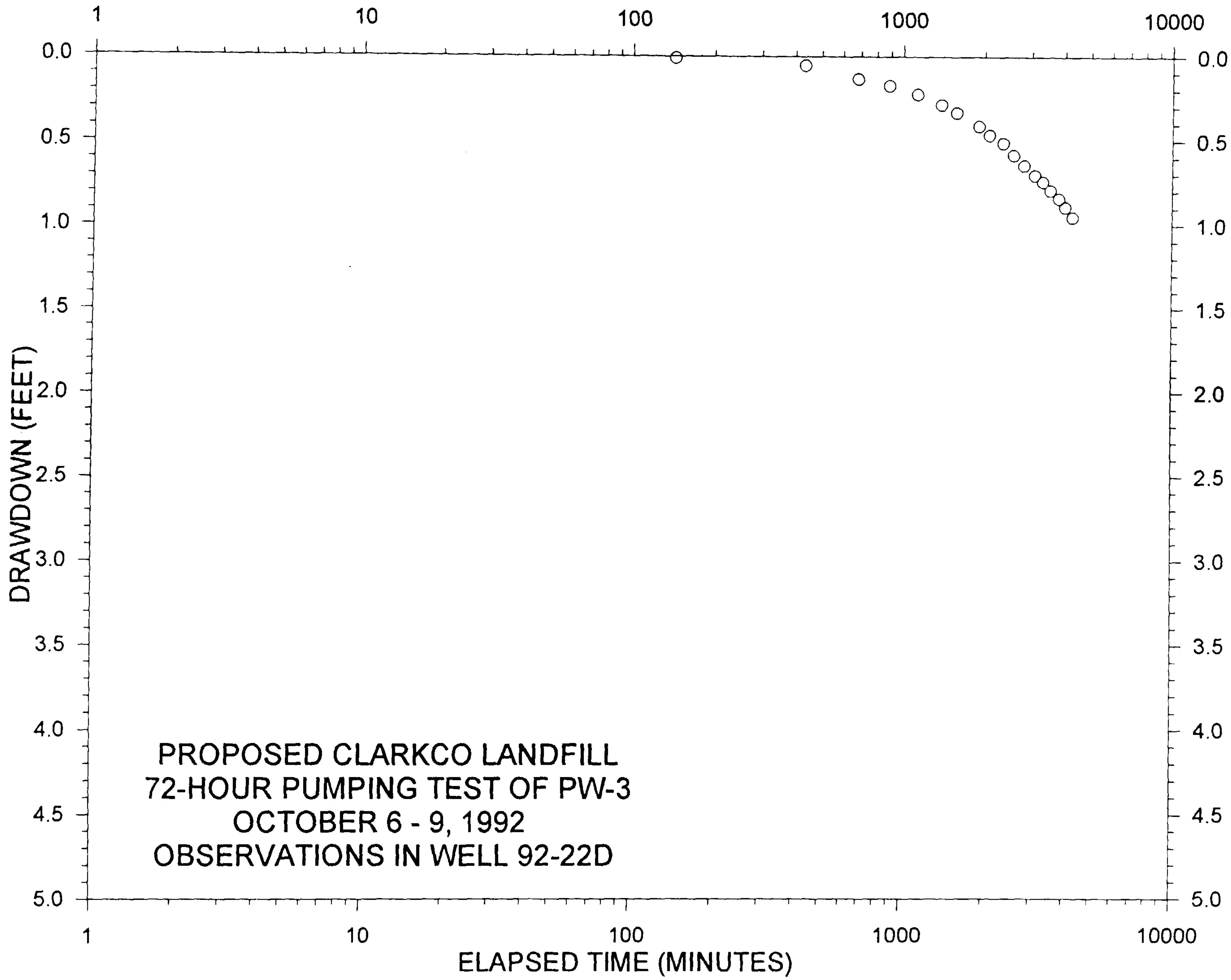
t_{o1} = 10.5 minutes
t_{o2} = 28 minutes
0.62'
0.78'
1.60'
1.78'
T = 264Q/Δs
Q = 197 GPM
Δs_1 = 1.60 FT - 0.78 FT = 0.82 FT
T_1 = 264(197)/0.82 = 63,400 GPD/FT
S = $0.3Tt_o/r^2$
r = 525 FT
S_1 = $0.3(63,400)(10.5/1440)/525^2 = 5.0 \times 10^{-4}$
T = 264Q/Δs
Q = 197 GPM
Δs_2 = 1.78 FT - 0.62 FT = 1.16 FT
T_2 = 264(197)/1.16 = 44,800 GPD/FT
S = $0.3Tt_o/r^2$
r = 525 FT
S_2 = $0.3(44,800)(28/1440)/525^2 = 9.5 \times 10^{-4}$
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
OCTOBER 6 - 9, 1992
OBSERVATIONS IN C91-5D
DRAWDOWN (FEET)
ELAPSED TIME (MINUTES)


PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
OCTOBER 6 - 9, 1992
OBSERVATIONS IN C92-5DD
MATCH POINT DATA
(EARLY TIME)
$\Gamma = 0.4$
s = 5.4 FT
$1/u_A = 10$
$W(u_A,\Gamma) = 10$
t = 9 minutes
$T_E = 114.6QW(u_A,\Gamma)/s$
$T_E = 114.6(197)(10)/5.4 = 41,800$ GPD/FT
$S_E = Ttu_A/2693r^2$
r = 525 FT
$S_E = 41,800(9)(0.1)/2693(525)^2 = 5.1 \times 10^{-5}$
MATCH POINT DATA
(LATE TIME)
$\Gamma = 0.4$
s = 0.5 FT
$1/u_B = 1.0$
$W(u_B,\Gamma) = 1$
t = 8.9 minutes
$T_L = 114.6QW(u_B,\Gamma)/s$
$T_L = 114.6(197)(1)/0.5 = 45,200$ GPD/FT
$S_L = Ttu_B/2693r^2$
r = 525 FT
$S_L = 45,200(8.9)(1)/2693(525)^2 = 5.4 \times 10^{-4}$
$\alpha = \Gamma^2(1/u_B)/4t$
$\alpha = 0.4^2(1/1)/4(8.9) = 4.5 \times 10^{-3}$ minutes^{-1}
DELAY INDEX = $1/\alpha = 1/4.5 \times 10^{-3} = 222.5$ minutes
DRAWDOWN (FEET)
ELAPSED TIME (MINUTES)
100.0
10.0
1.0
0.1
1
10
100
1000
10000

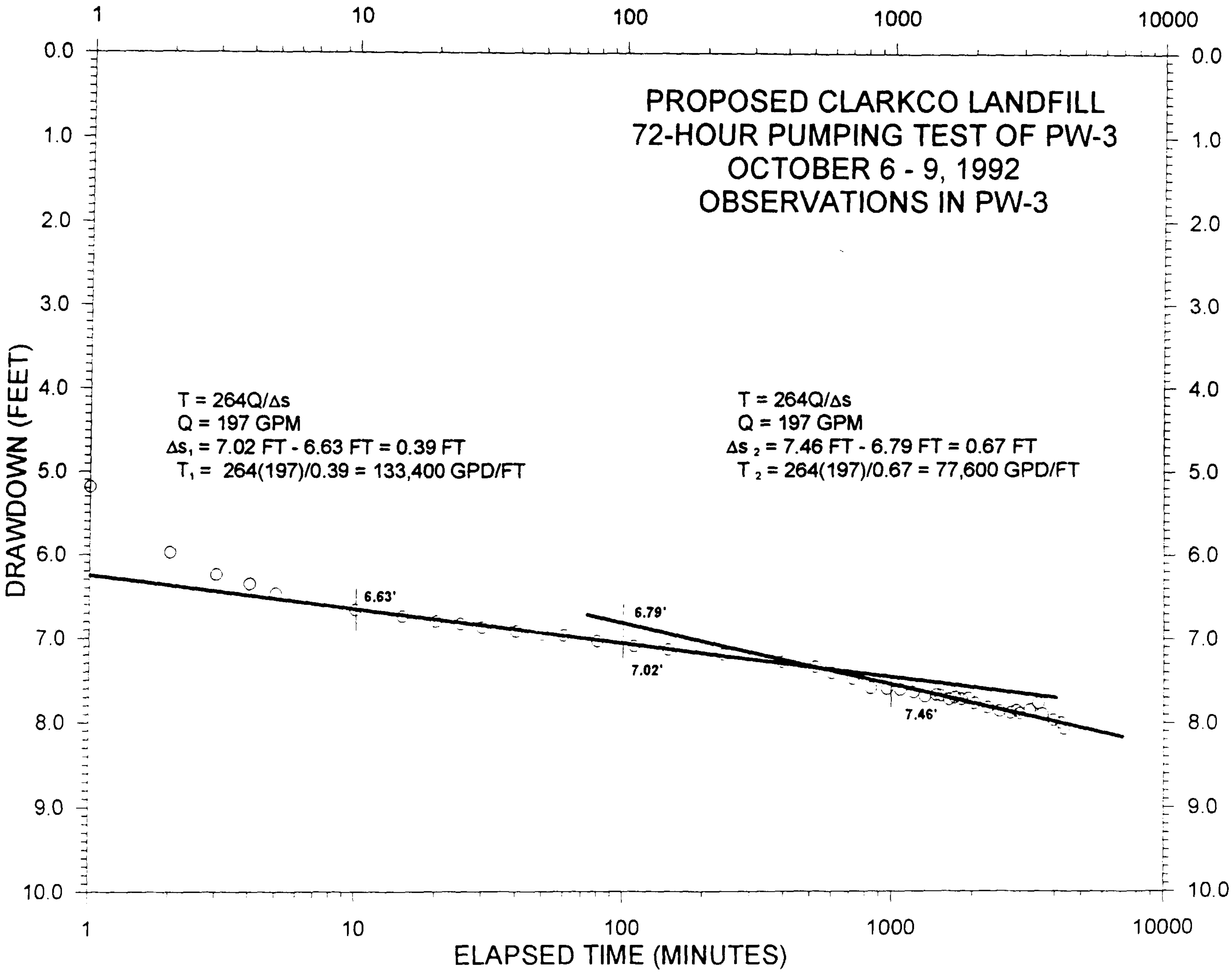

PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
OCTOBER 6 - 9, 1992
OBSERVATIONS IN C91-5D
THEIS TYPE CURVE MATCH POINT DATA
s = .46 FT
1/u = 1
W(u) = 1
t = 9.1 minutes
T = 114.6QW(u)/s
T = 114.6(197)(1)/.46 = 49,100 GPD/FT
S = Ttu/2693r²
r = 525 FT
S = 49,100(9.1)(1.0)/2693(525)² = 6.0 x 10⁻⁴
DRAWDOWN (FEET)
ELAPSED TIME (MINUTES)
1
10
100
1000
10000
10.0
1.0
0.1
0.0



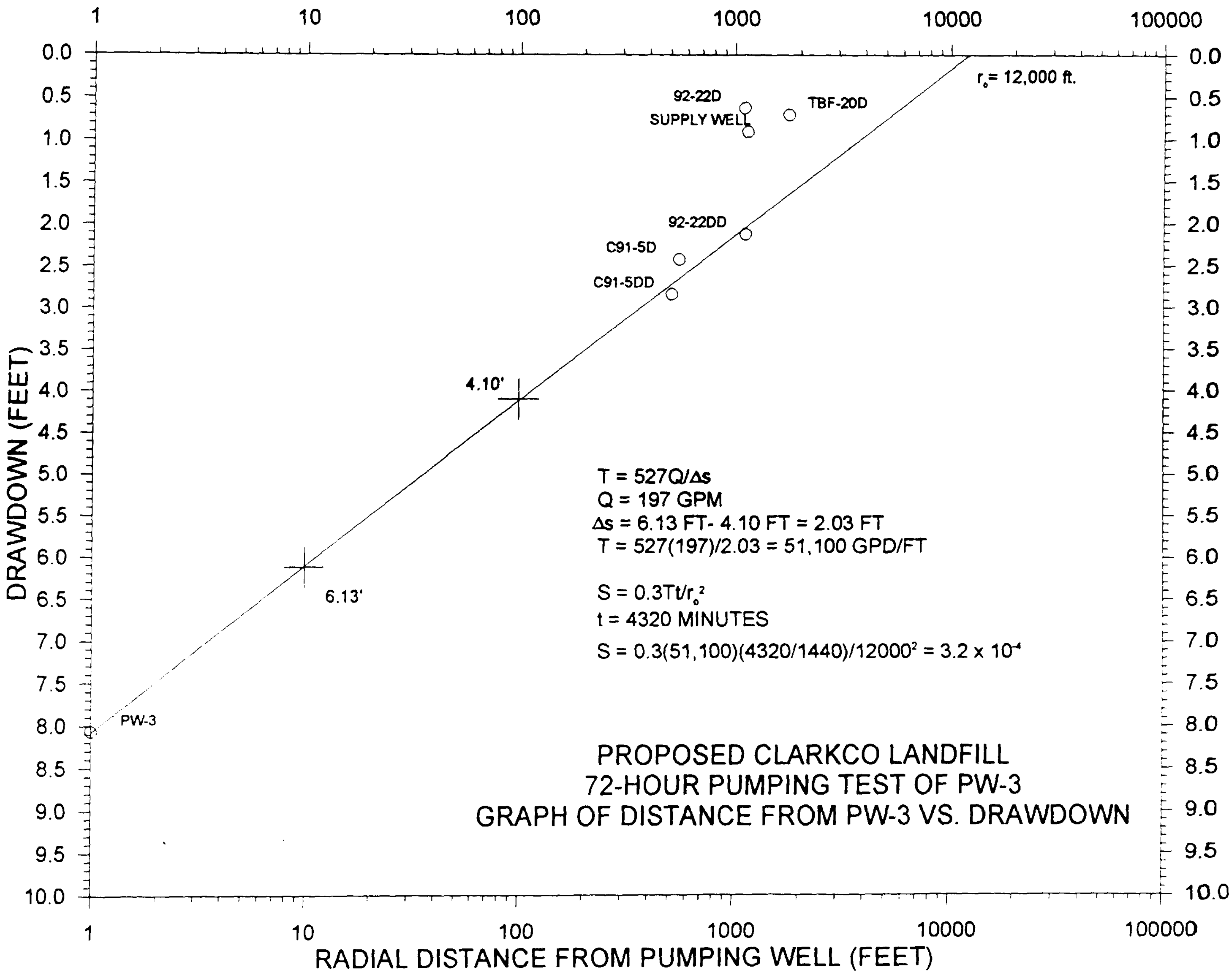
t_{o1} = 5.8 minutes
t_{o2} = 46 minutes
0.13'
0.36'
0.71'
1.51'
T = 264Q/Δs
Q = 197 GPM
Δs_1 = 0.36 FT - 0.13 FT = 0.58 FT
T_1 = 264(197)/0.58 = 89,700 GPD/FT
S = $0.3Tt_o/r^2$
r = 1110 FT
$S_1 = 0.3(89{,}700)(5.8/1440)/1110^2 = 8.8 \times 10^{-5}$
T = 264Q/Δs
Q = 197 GPM
Δs_2 = 1.51 FT - 0.36 FT = 1.15 FT
T_2 = 264(197)/1.15 = 45,200 GPD/FT
S = $0.3Tt_o/r^2$
r = 1110 FT
$S_2 = 0.3(45{,}200)(46/1440)/1110^2 = 3.5 \times 10^{-4}$
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
OCTOBER 6 - 9, 1992
OBSERVATIONS IN WELL 92-22DD
DRAWDOWN (FEET)
ELAPSED TIME (MINUTES)



1
10
100
1000
10000
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
DRAWDOWN (FEET)
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
OCTOBER 6 - 9, 1992
OBSERVATIONS IN WELL 92-22D
ELAPSED TIME (MINUTES)



PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
OCTOBER 6 - 9, 1992
OBSERVATIONS IN PW-3
T = 264Q/Δs
Q = 197 GPM
Δs₁ = 7.02 FT - 6.63 FT = 0.39 FT
T₁ = 264(197)/0.39 = 133,400 GPD/FT
T = 264Q/Δs
Q = 197 GPM
Δs₂ = 7.46 FT - 6.79 FT = 0.67 FT
T₂ = 264(197)/0.67 = 77,600 GPD/FT
6.63'
6.79'
7.02'
7.46'
DRAWDOWN (FEET)
ELAPSED TIME (MINUTES)

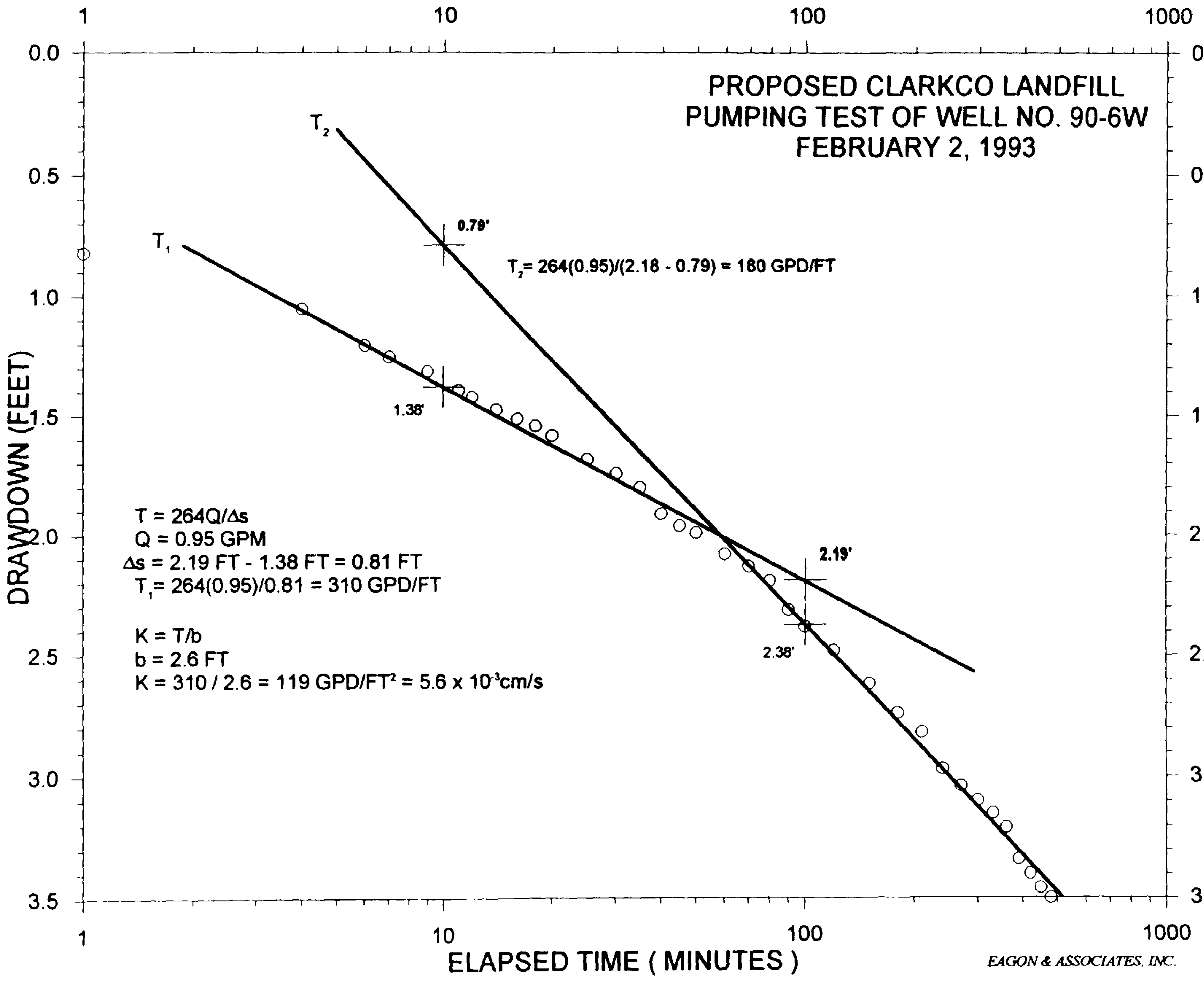


1
10
100
1000
10000
100000
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
9.5
10.0
DRAWDOWN (FEET)
r_o= 12,000 ft.
92-22D
SUPPLY WELL
TBF-20D
92-22DD
C91-5D
C91-5DD
4.10'
6.13'
PW-3
T = 527Q/Δs
Q = 197 GPM
Δs = 6.13 FT- 4.10 FT = 2.03 FT
T = 527(197)/2.03 = 51,100 GPD/FT
S = 0.3Tt/r_o^2
t = 4320 MINUTES
S = 0.3(51,100)(4320/1440)/12000^2 = 3.2 x 10^{-4}
PROPOSED CLARKCO LANDFILL
72-HOUR PUMPING TEST OF PW-3
GRAPH OF DISTANCE FROM PW-3 VS. DRAWDOWN
RADIAL DISTANCE FROM PUMPING WELL (FEET)

APPENDIX G.

SLUG TESTS AND PUMPING TESTS ON SIGNIFICANT SATURATED ZONES

TESTS PERFORMED 1991-1993 **Graphs of test data and computations in this appendix are arranged in the order that they are presented in Table 5-1. Where both a slug test and a pumping test were performed, the slug test is presented first.**	
1092 Sand	90-6W, 92-24Z
1077 Sand	90-10Y, 90-6Y, 91-9Z
1070 Sand	90-6X, 90-9X, C91-8Y, 92-26X
1060 Sand	90-7Z, 90-8X
1050 Sand	90-6Z, 90-10X, C91-4Y, C91-4Z, C91-8X, 92-11X, 92-18X, 92-24Y, 92-29X
1035 Sand	90-7Y, 91-9Y, C91-4X, 92-14X, 92-15X, 92-16X, 92-19X, 92-4X, C92-1X
Uppermost Aquifer	C91-2D, C91-5D, C91-8D (slug tests performed in 1991)
TESTS PERFORMED 2000 **Slug tests were performed on wells utilized for low-volume, long-duration pumping tests, after development or redevelopment and before start of pumping tests. Data added to Table 5-1.**	
1050 Sand	00-4Y, 00-9G
1035 Sand	92-4X, 92-4Z


PROPOSED CLARKCO LANDFILL
PUMPING TEST OF WELL NO. 90-6W
FEBRUARY 2, 1993
T2
T1
0.79'
T2= 264(0.95)/(2.18 - 0.79) = 180 GPD/FT
1.38'
2.19'
2.38'
T = 264Q/Δs
Q = 0.95 GPM
Δs = 2.19 FT - 1.38 FT = 0.81 FT
T1= 264(0.95)/0.81 = 310 GPD/FT
K = T/b
b = 2.6 FT
K = 310 / 2.6 = 119 GPD/FT² = 5.6 x 10⁻³cm/s
DRAWDOWN (FEET)
ELAPSED TIME (MINUTES)
1
10
100
1000
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
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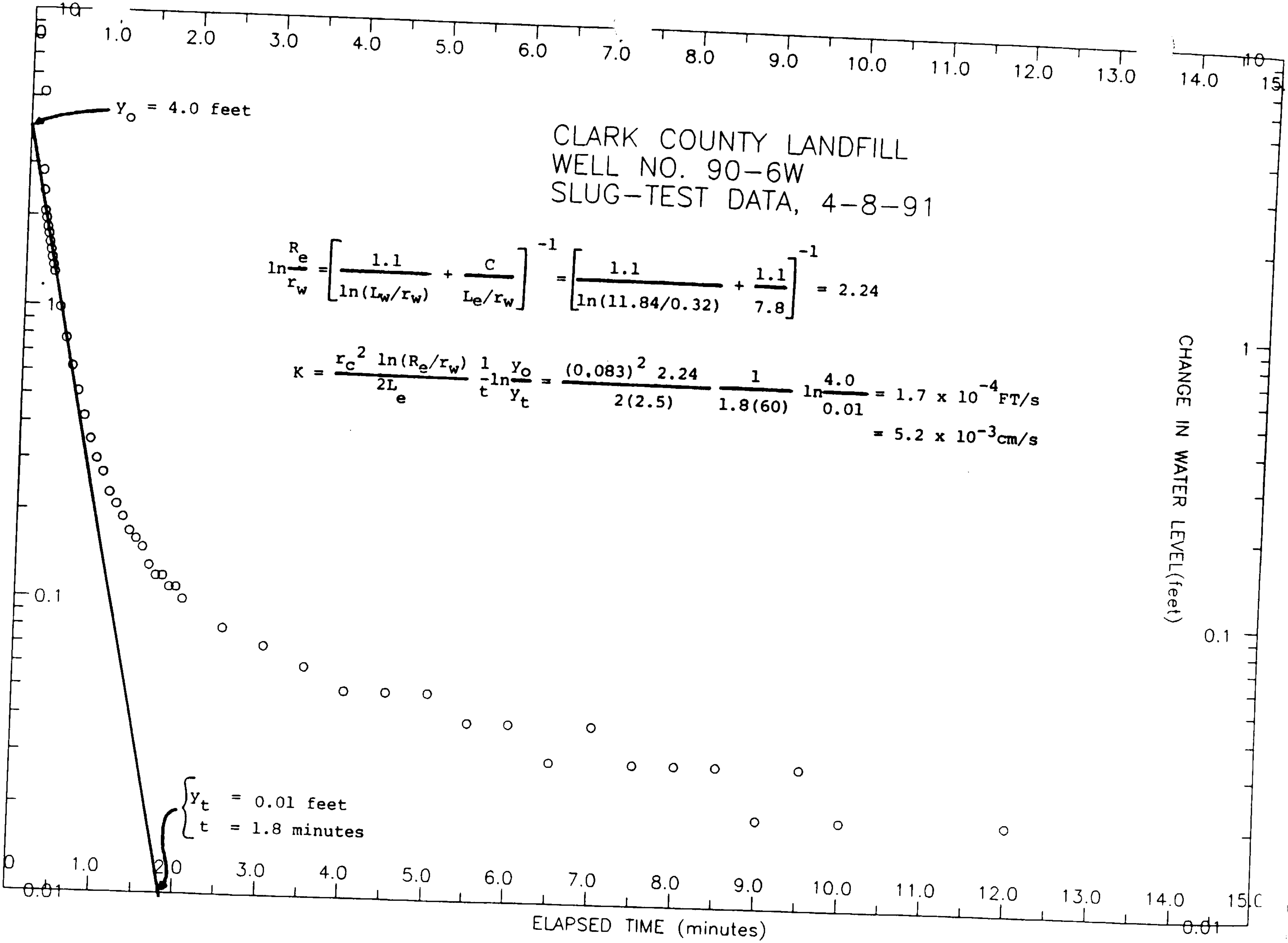
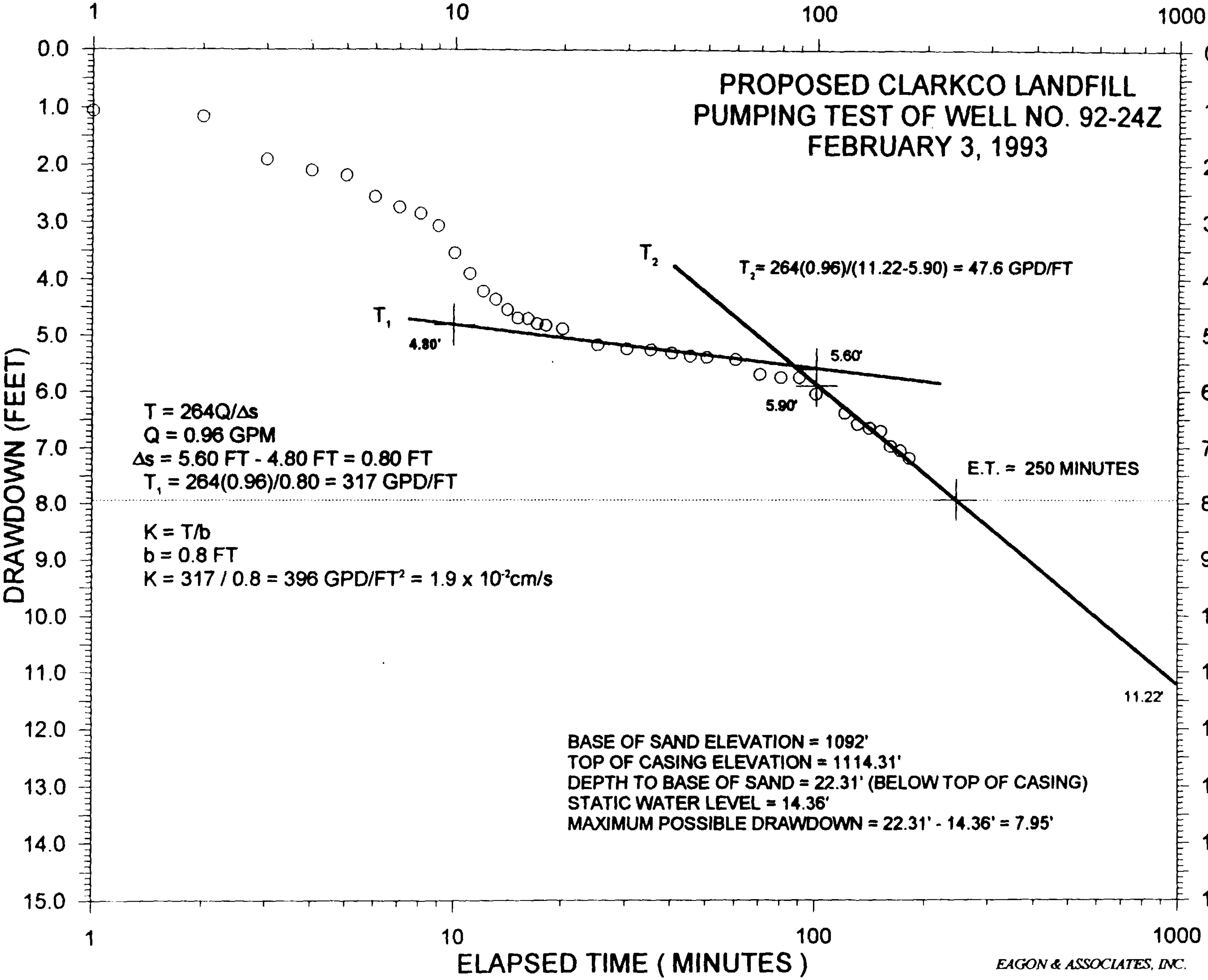
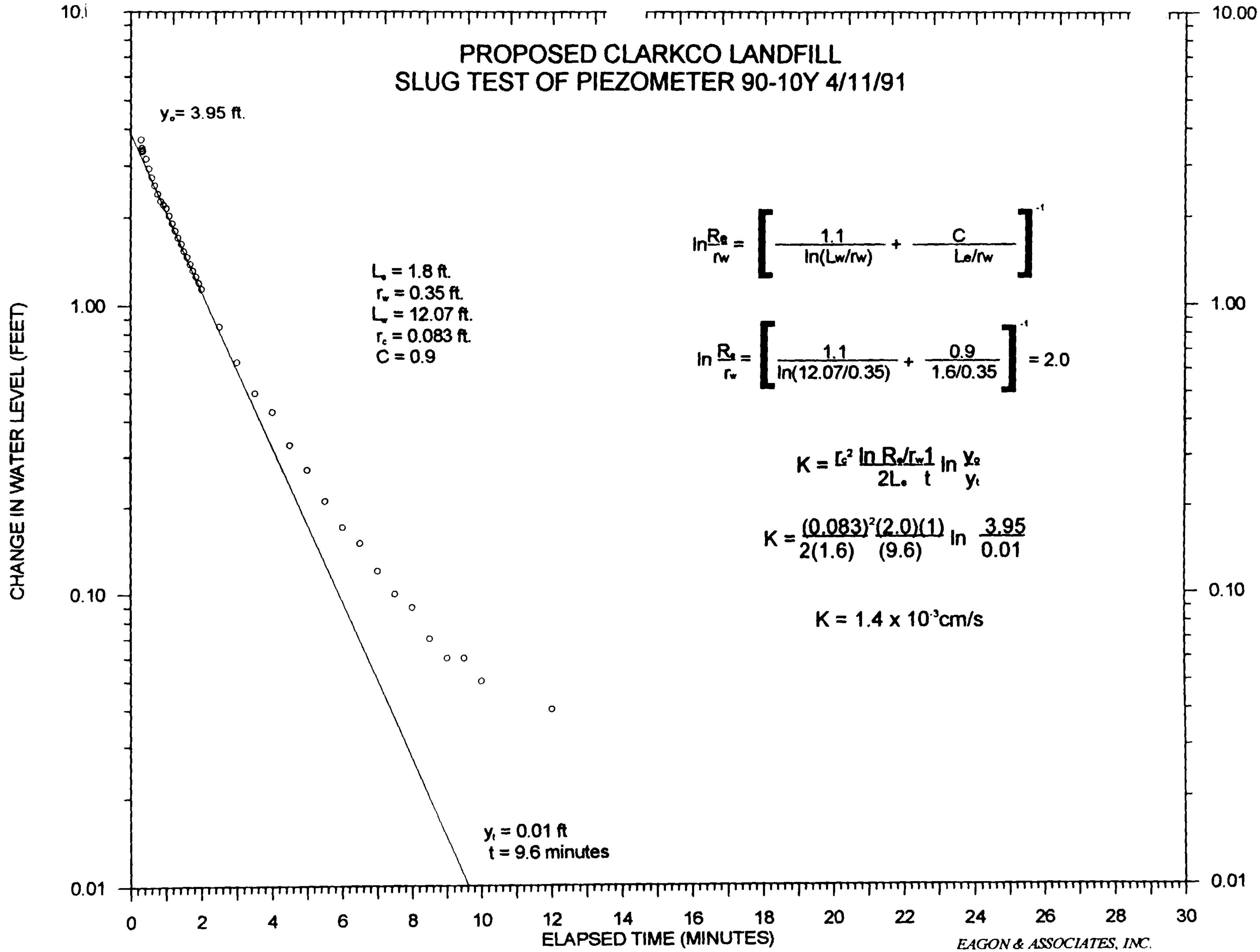

CLARK COUNTY LANDFILL
WELL NO. 90-6W
SLUG-TEST DATA, 4-8-91
Y_o = 4.0 feet
$\ln\frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{L_e/r_w}\right]^{-1} = \left[\frac{1.1}{\ln(11.84/0.32)} + \frac{1.1}{7.8}\right]^{-1} = 2.24$
$K = \frac{r_c^2 \ln(R_e/r_w)}{2L_e} \frac{1}{t} \ln\frac{Y_o}{Y_t} = \frac{(0.083)^2\ 2.24}{2(2.5)} \frac{1}{1.8(60)} \ln\frac{4.0}{0.01} = 1.7 \times 10^{-4}$ FT/s
$= 5.2 \times 10^{-3}$ cm/s
Y_t = 0.01 feet
t = 1.8 minutes
ELAPSED TIME (minutes)
CHANGE IN WATER LEVEL (feet)
0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
10
1
0.1
0.01


PROPOSED CLARKCO LANDFILL
PUMPING TEST OF WELL NO. 92-24Z
FEBRUARY 3, 1993
T_2= 264(0.96)/(11.22-5.90) = 47.6 GPD/FT
T_2
T_1
4.80'
5.60'
5.90'
E.T. = 250 MINUTES
11.22'
T = 264Q/Δs
Q = 0.96 GPM
Δs = 5.60 FT - 4.80 FT = 0.80 FT
T_1 = 264(0.96)/0.80 = 317 GPD/FT
K = T/b
b = 0.8 FT
K = 317 / 0.8 = 396 GPD/FT² = 1.9 x 10⁻²cm/s
BASE OF SAND ELEVATION = 1092'
TOP OF CASING ELEVATION = 1114.31'
DEPTH TO BASE OF SAND = 22.31' (BELOW TOP OF CASING)
STATIC WATER LEVEL = 14.36'
MAXIMUM POSSIBLE DRAWDOWN = 22.31' - 14.36' = 7.95'
DRAWDOWN (FEET)
ELAPSED TIME (MINUTES)
EAGON & ASSOCIATES, INC.


PROPOSED CLARKCO LANDFILL
SLUG TEST OF PIEZOMETER 90-10Y 4/11/91
y₀ = 3.95 ft.
Le = 1.8 ft.
rw = 0.35 ft.
Lw = 12.07 ft.
rc = 0.083 ft.
C = 0.9
ln Re/rw = [1.1 / ln(Lw/rw) + C / Le/rw]^-1
ln Re/rw = [1.1 / ln(12.07/0.35) + 0.9 / 1.6/0.35]^-1 = 2.0
K = rc² ln Re/rw 1 / 2Le t ln y0/yt
K = (0.083)²(2.0)(1) / 2(1.6) (9.6) ln 3.95/0.01
K = 1.4 x 10⁻³ cm/s
yt = 0.01 ft
t = 9.6 minutes
CHANGE IN WATER LEVEL (FEET)
ELAPSED TIME (MINUTES)
10.00
1.00
0.10
0.01
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
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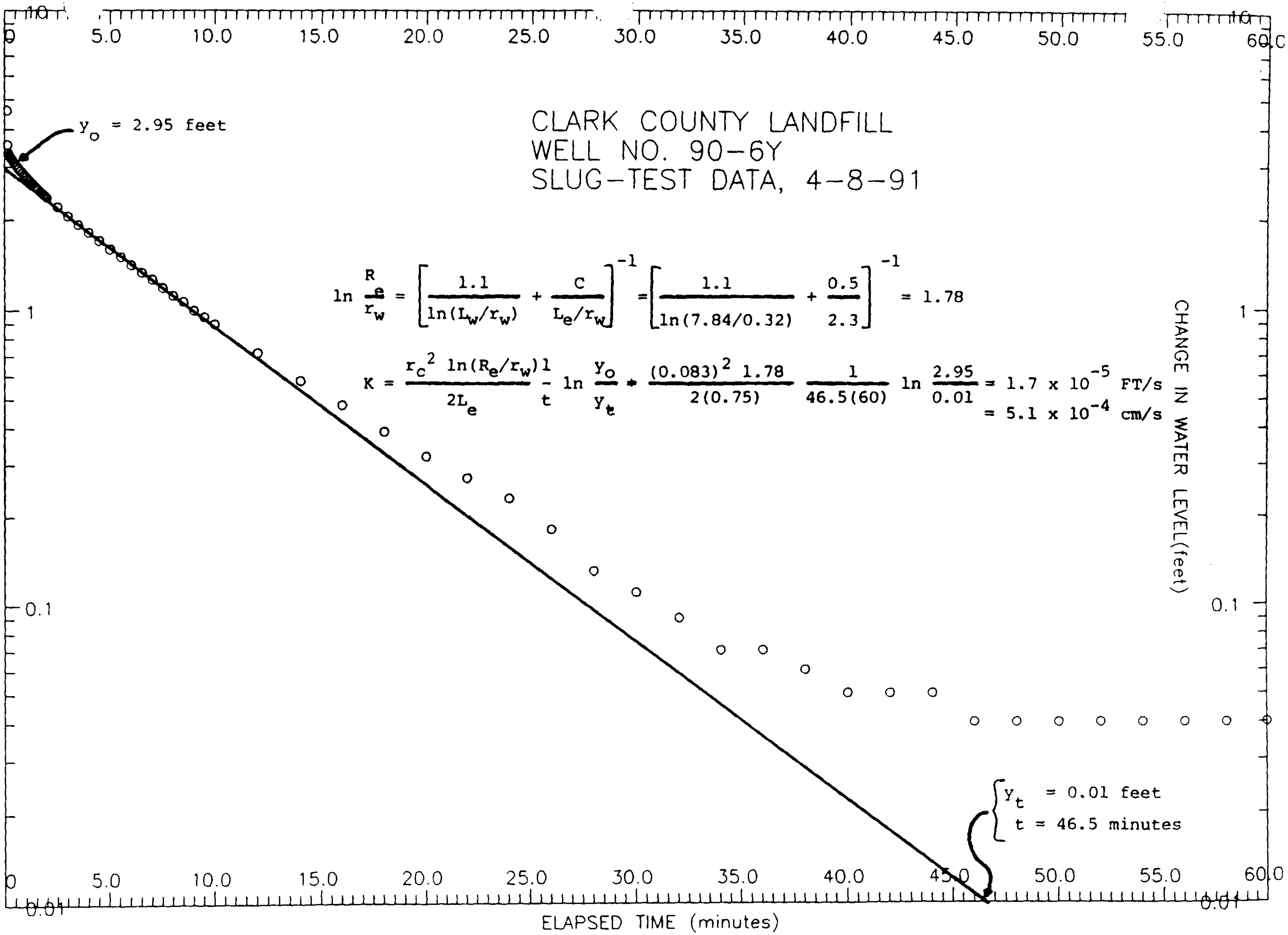
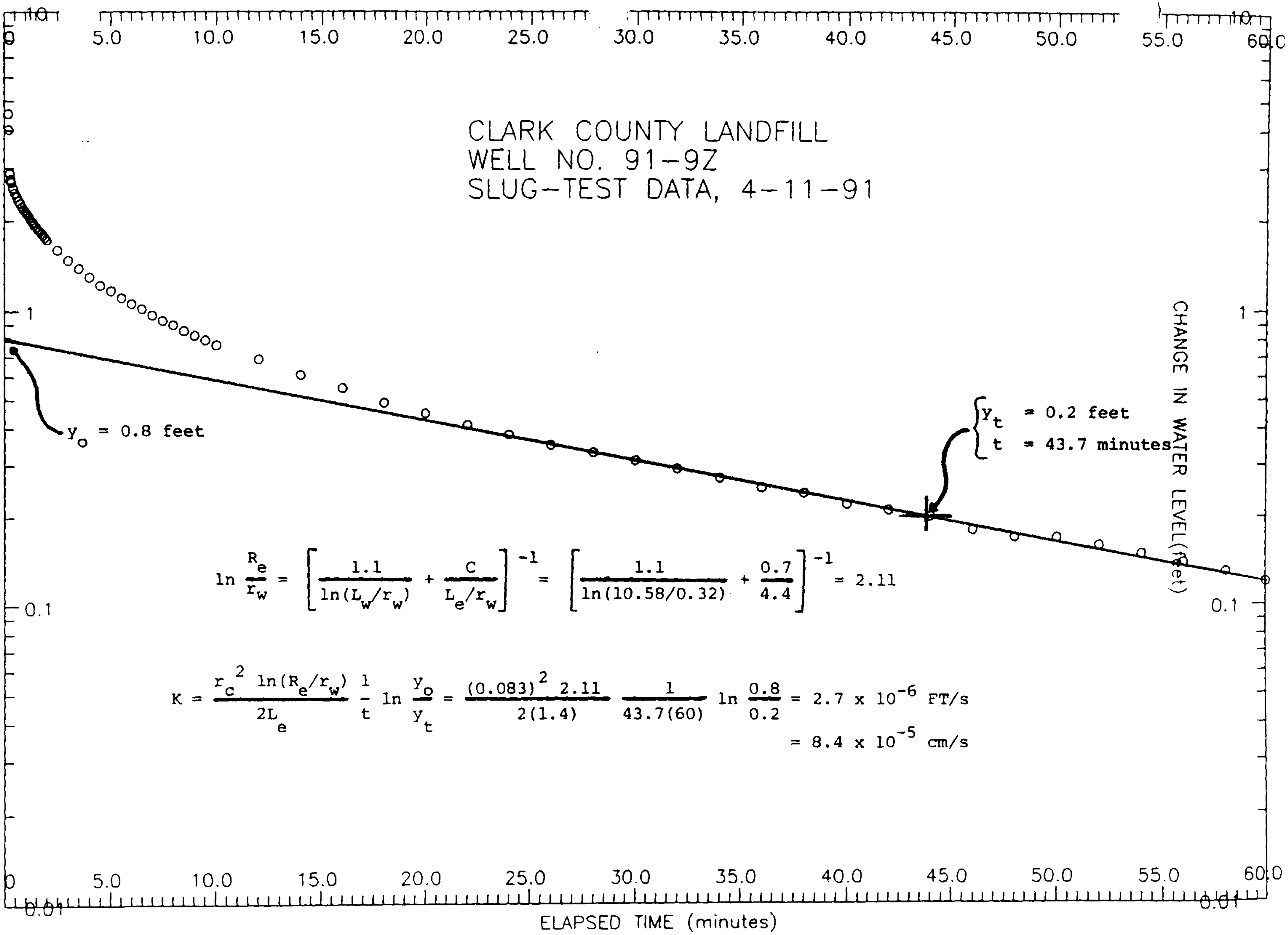
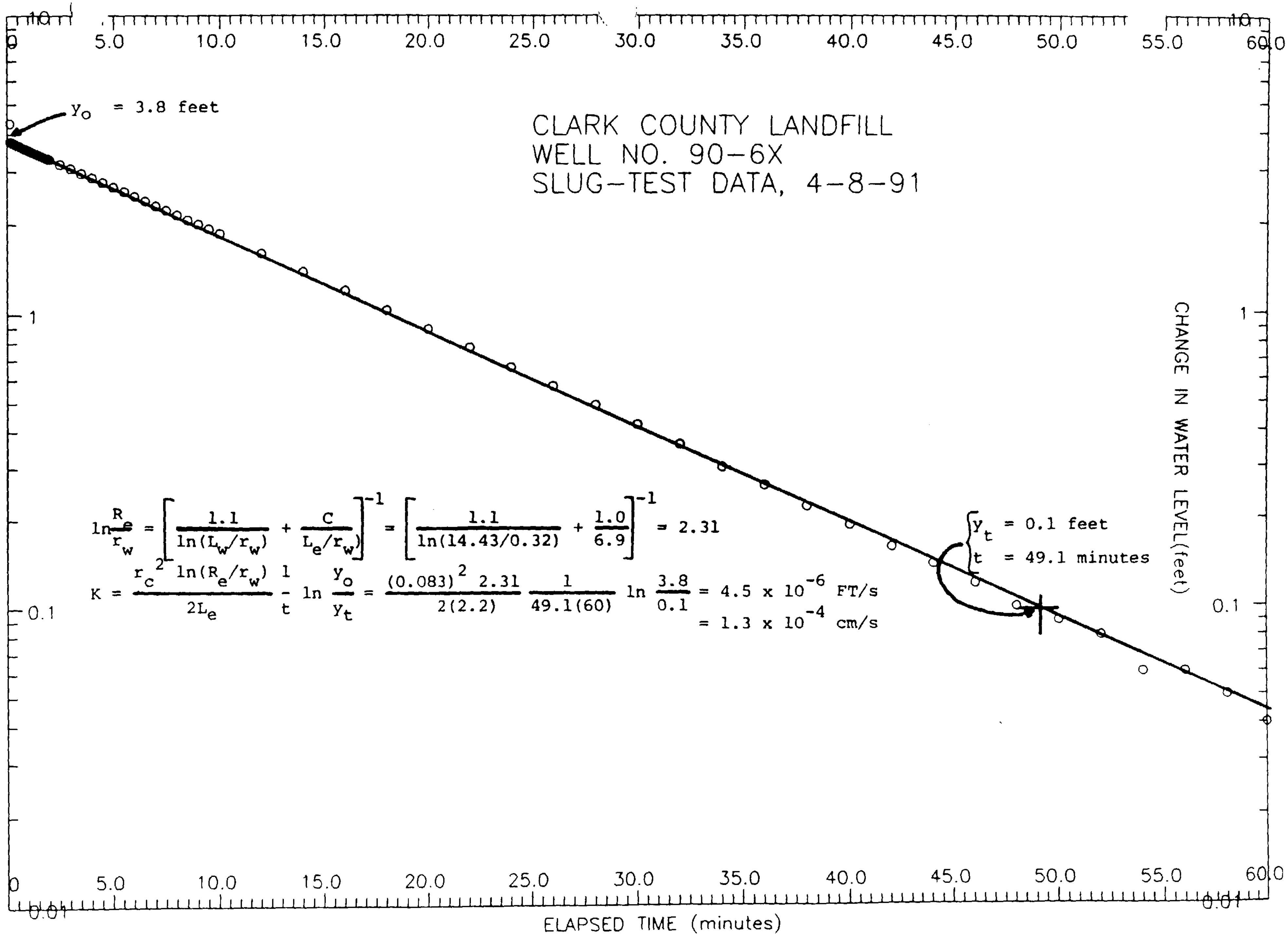
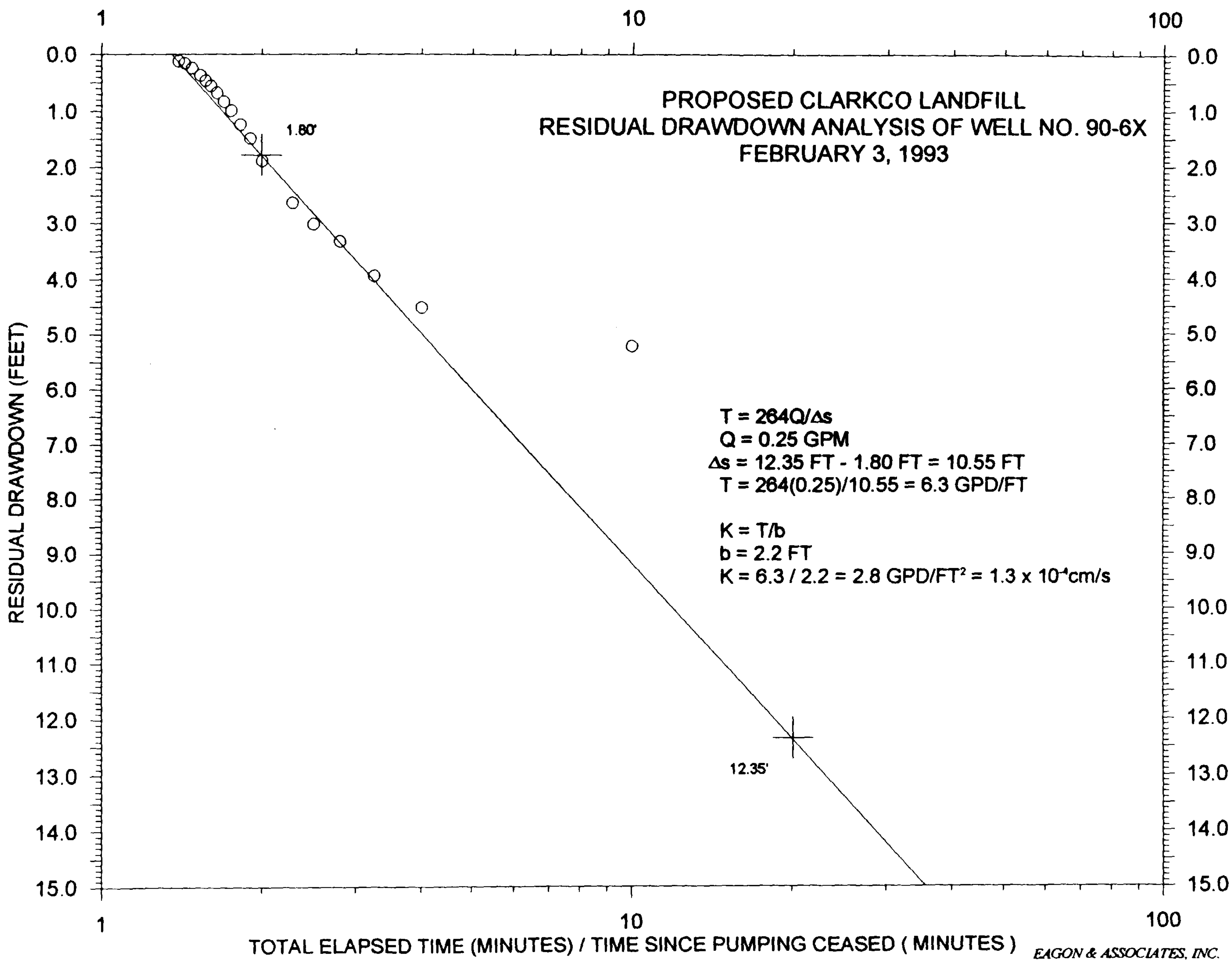

CLARK COUNTY LANDFILL
WELL NO. 90-6Y
SLUG-TEST DATA, 4-8-91
y_o = 2.95 feet
$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{L_e/r_w}\right]^{-1} = \left[\frac{1.1}{\ln(7.84/0.32)} + \frac{0.5}{2.3}\right]^{-1} = 1.78$
$K = \frac{r_c^2 \ln(R_e/r_w)}{2L_e} \frac{1}{t} \ln \frac{y_o}{y_t} = \frac{(0.083)^2\ 1.78}{2(0.75)} \frac{1}{46.5(60)} \ln \frac{2.95}{0.01} = 1.7 \times 10^{-5}$ FT/s
$= 5.1 \times 10^{-4}$ cm/s
y_t = 0.01 feet
t = 46.5 minutes
ELAPSED TIME (minutes)
CHANGE IN WATER LEVEL(feet)
0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
45.0
50.0
55.0
60.0
10
1
0.1
0.01



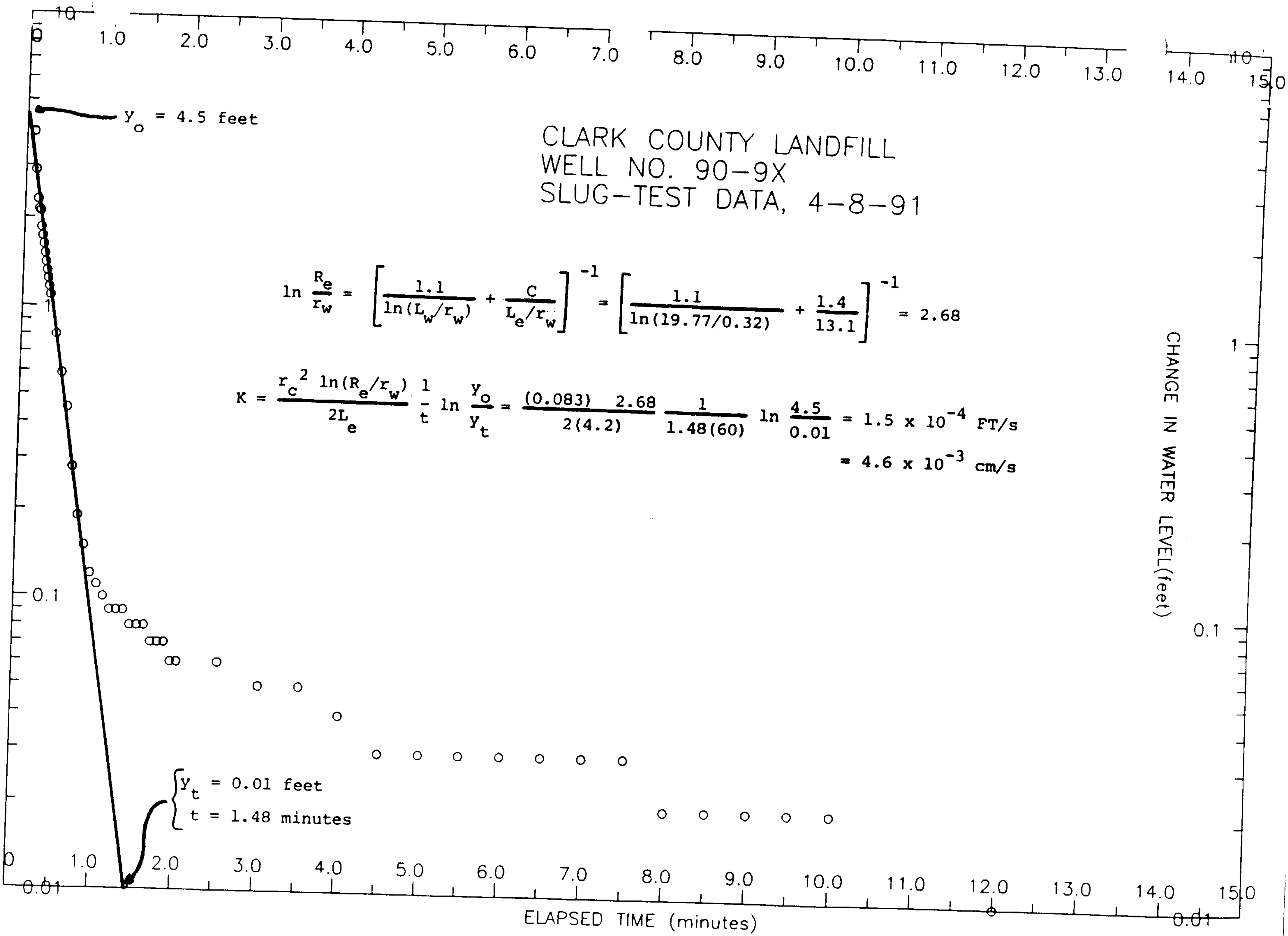
CLARK COUNTY LANDFILL
WELL NO. 91-9Z
SLUG-TEST DATA, 4-11-91
0
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
45.0
50.0
55.0
60.0
10
1
0.1
0.01
y_o = 0.8 feet
y_t = 0.2 feet
t = 43.7 minutes
$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{L_e/r_w}\right]^{-1} = \left[\frac{1.1}{\ln(10.58/0.32)} + \frac{0.7}{4.4}\right]^{-1} = 2.11$
$K = \frac{r_c^2 \ln(R_e/r_w)}{2L_e} \frac{1}{t} \ln \frac{y_o}{y_t} = \frac{(0.083)^2\ 2.11}{2(1.4)} \frac{1}{43.7(60)} \ln \frac{0.8}{0.2} = 2.7 \times 10^{-6}$ FT/s
$= 8.4 \times 10^{-5}$ cm/s
CHANGE IN WATER LEVEL(feet)
ELAPSED TIME (minutes)



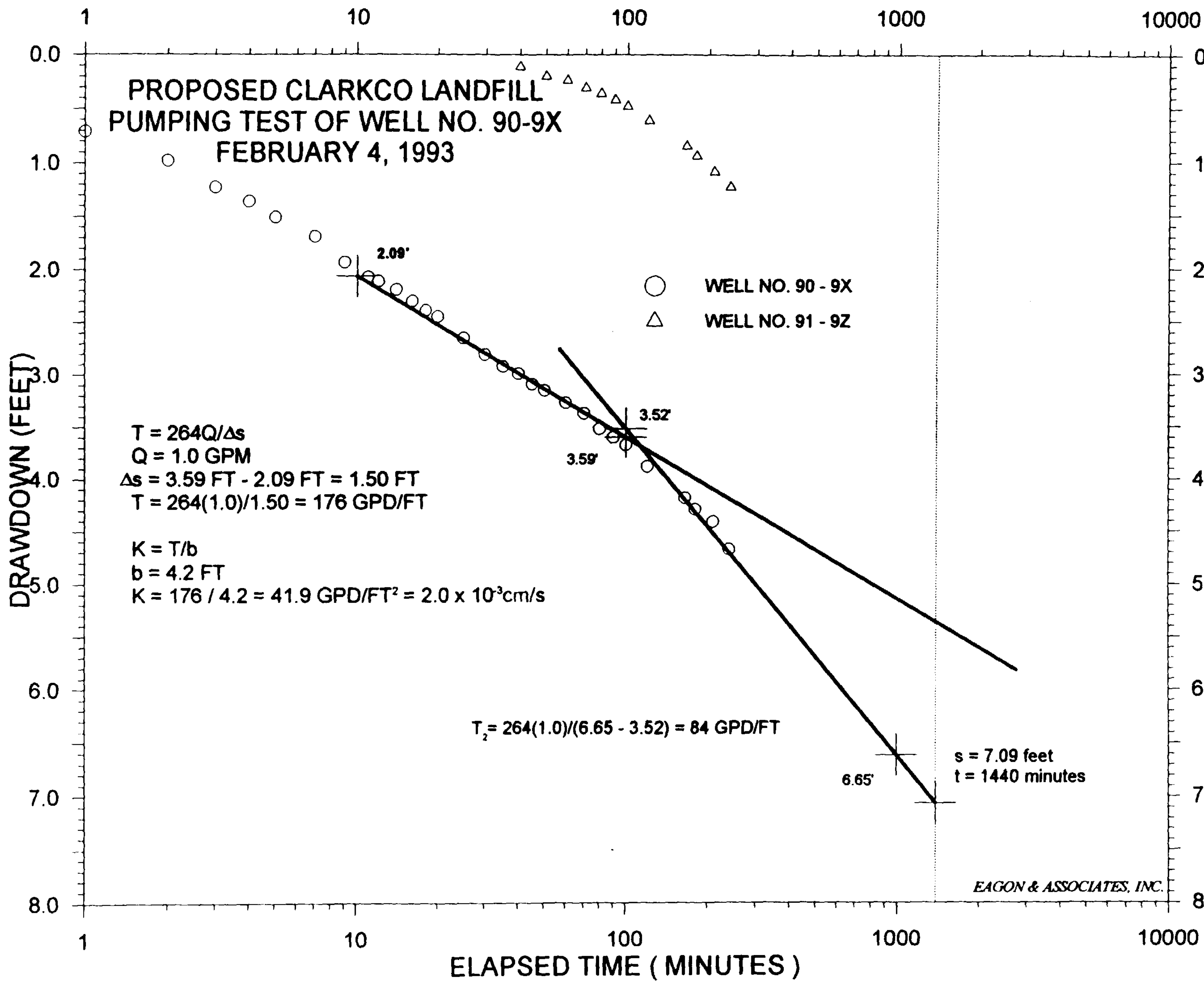
CLARK COUNTY LANDFILL
WELL NO. 90-6X
SLUG-TEST DATA, 4-8-91
y_o = 3.8 feet
y_t = 0.1 feet
t = 49.1 minutes
$\ln\frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{L_e/r_w}\right]^{-1} = \left[\frac{1.1}{\ln(14.43/0.32)} + \frac{1.0}{6.9}\right]^{-1} = 2.31$
$K = \frac{r_c^2 \ln(R_e/r_w)}{2L_e}\,\frac{1}{t}\,\ln\frac{y_o}{y_t} = \frac{(0.083)^2\ 2.31}{2(2.2)}\,\frac{1}{49.1(60)}\,\ln\frac{3.8}{0.1} = 4.5 \times 10^{-6}$ FT/s
$= 1.3 \times 10^{-4}$ cm/s
CHANGE IN WATER LEVEL(feet)
ELAPSED TIME (minutes)

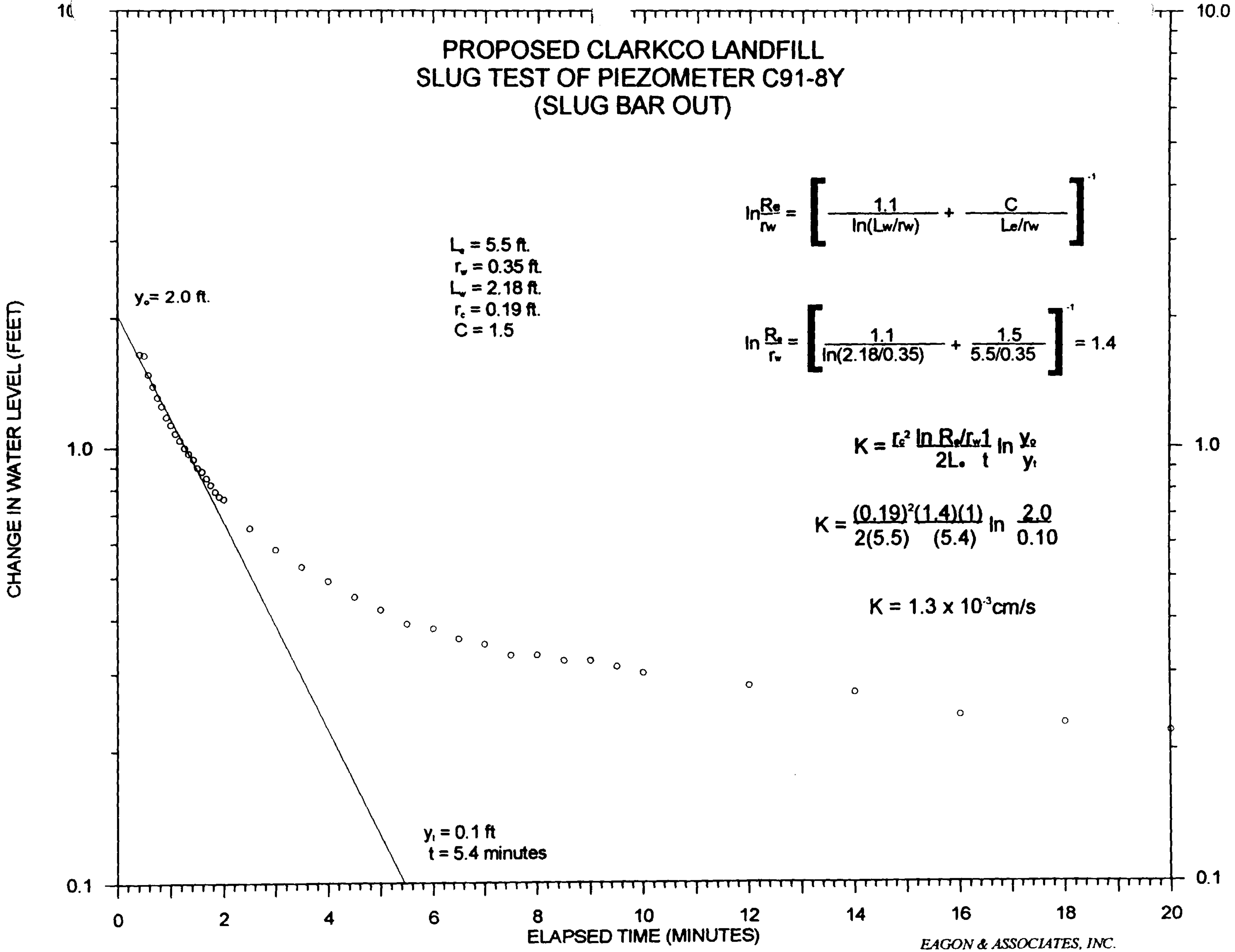


PROPOSED CLARKCO LANDFILL
RESIDUAL DRAWDOWN ANALYSIS OF WELL NO. 90-6X
FEBRUARY 3, 1993
1.80'
12.35'
T = 264Q/Δs
Q = 0.25 GPM
Δs = 12.35 FT - 1.80 FT = 10.55 FT
T = 264(0.25)/10.55 = 6.3 GPD/FT
K = T/b
b = 2.2 FT
K = 6.3 / 2.2 = 2.8 GPD/FT² = 1.3 x 10⁻⁴cm/s
RESIDUAL DRAWDOWN (FEET)
TOTAL ELAPSED TIME (MINUTES) / TIME SINCE PUMPING CEASED (MINUTES)
EAGON & ASSOCIATES, INC.



CLARK COUNTY LANDFILL
WELL NO. 90-9X
SLUG-TEST DATA, 4-8-91
y_o = 4.5 feet
$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{L_e/r_w}\right]^{-1} = \left[\frac{1.1}{\ln(19.77/0.32)} + \frac{1.4}{13.1}\right]^{-1} = 2.68$
$K = \frac{r_c^2 \ln(R_e/r_w)}{2L_e} \frac{1}{t} \ln \frac{y_o}{y_t} = \frac{(0.083)\ 2.68}{2(4.2)} \frac{1}{1.48(60)} \ln \frac{4.5}{0.01} = 1.5 \times 10^{-4}$ FT/s
$= 4.6 \times 10^{-3}$ cm/s
y_t = 0.01 feet
t = 1.48 minutes
CHANGE IN WATER LEVEL (feet)
ELAPSED TIME (minutes)


PROPOSED CLARKCO LANDFILL
PUMPING TEST OF WELL NO. 90-9X
FEBRUARY 4, 1993
WELL NO. 90 - 9X
WELL NO. 91 - 9Z
T = 264Q/Δs
Q = 1.0 GPM
Δs = 3.59 FT - 2.09 FT = 1.50 FT
T = 264(1.0)/1.50 = 176 GPD/FT
K = T/b
b = 4.2 FT
K = 176 / 4.2 = 41.9 GPD/FT² = 2.0 x 10⁻³cm/s
T₂ = 264(1.0)/(6.65 - 3.52) = 84 GPD/FT
s = 7.09 feet
t = 1440 minutes
2.09'
3.52'
3.59'
6.65'
DRAWDOWN (FEET)
ELAPSED TIME (MINUTES)
EAGON & ASSOCIATES, INC.



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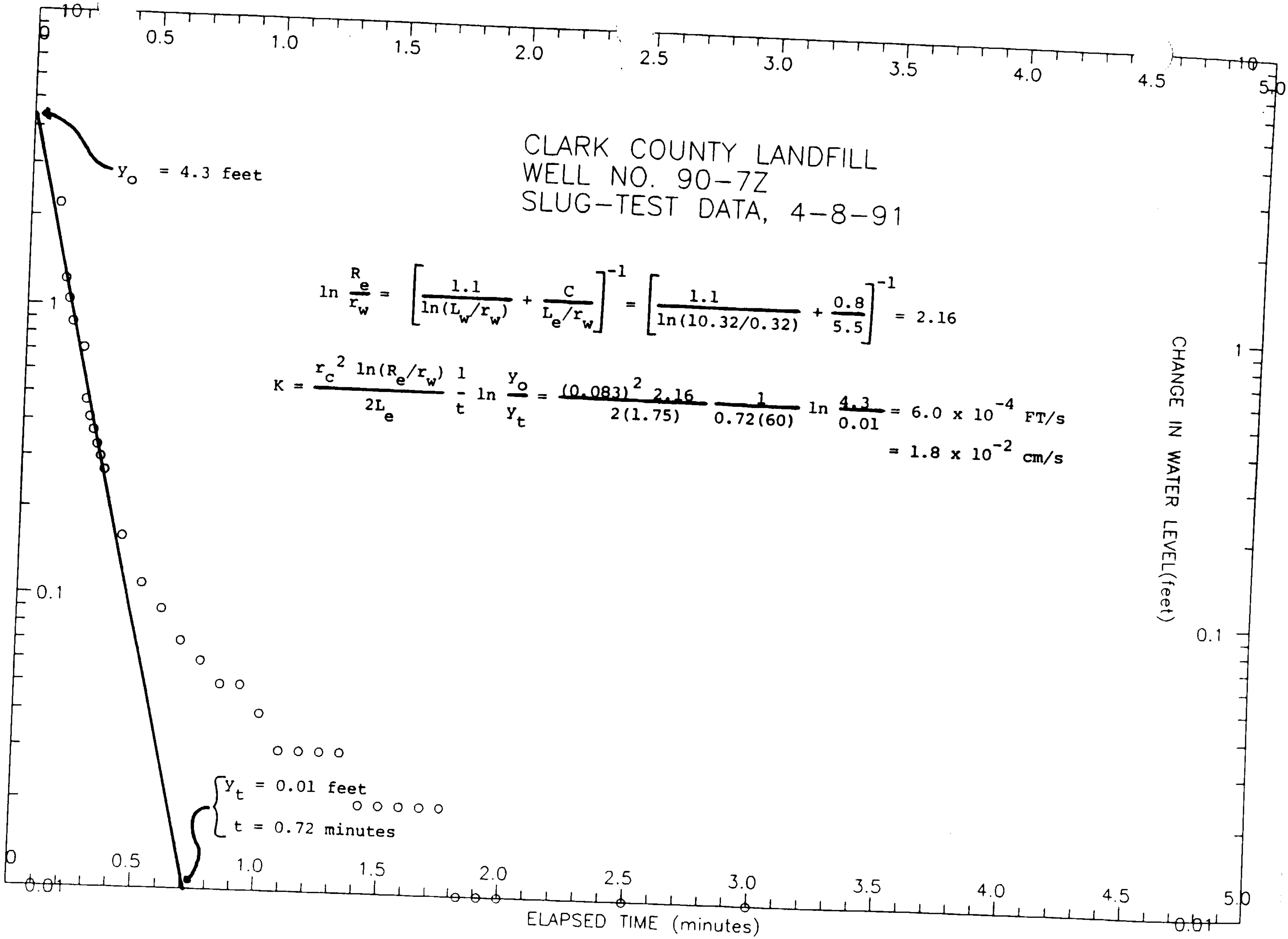
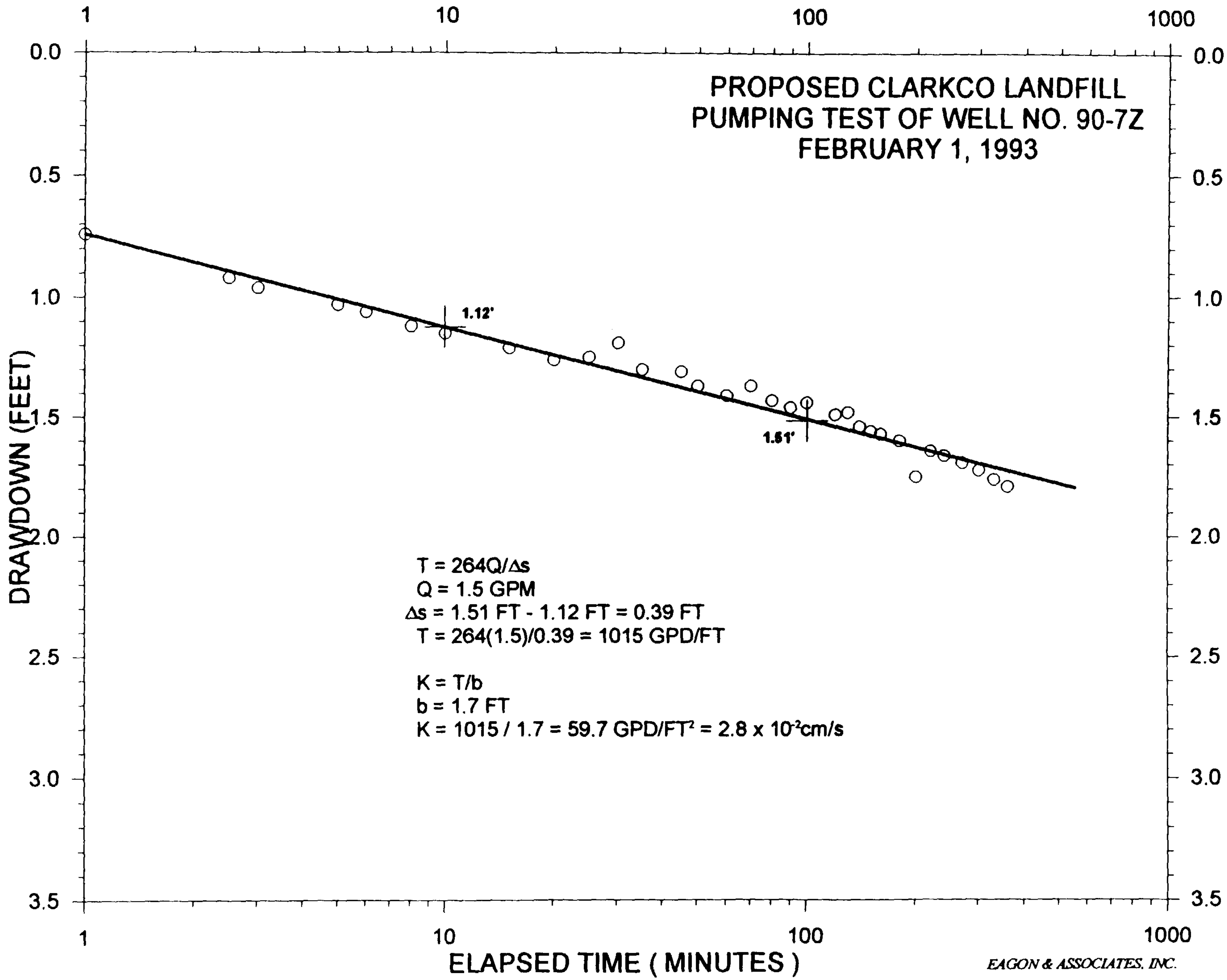
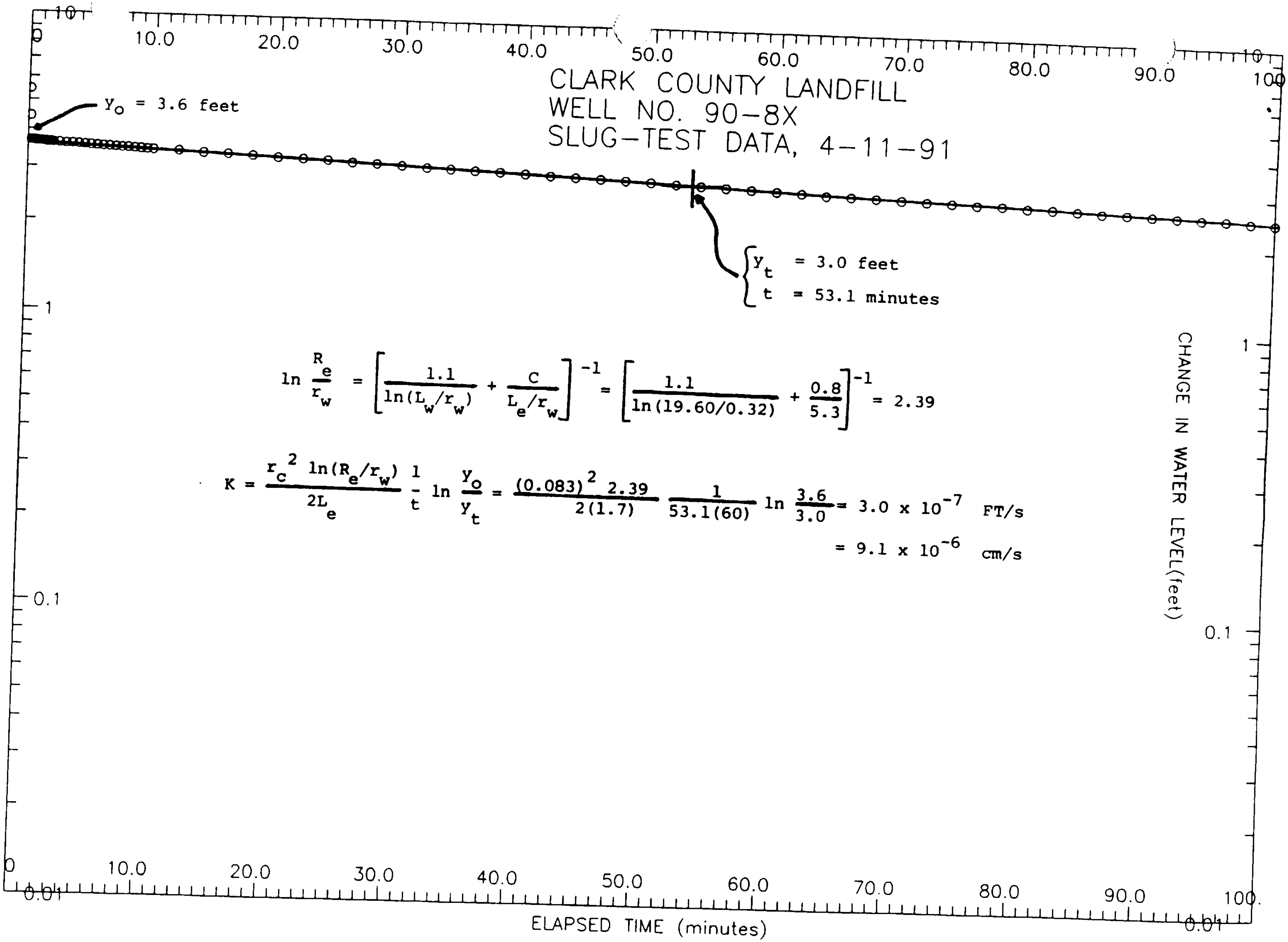


CLARK COUNTY LANDFILL
WELL NO. 90-7Z
SLUG-TEST DATA, 4-8-91
y_o = 4.3 feet
$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{L_e/r_w}\right]^{-1} = \left[\frac{1.1}{\ln(10.32/0.32)} + \frac{0.8}{5.5}\right]^{-1} = 2.16$
$K = \frac{r_c^2 \ln(R_e/r_w)}{2L_e} \frac{1}{t} \ln \frac{y_o}{y_t} = \frac{(0.083)^2\ 2.16}{2(1.75)} \frac{1}{0.72(60)} \ln \frac{4.3}{0.01} = 6.0 \times 10^{-4}$ FT/s
$= 1.8 \times 10^{-2}$ cm/s
y_t = 0.01 feet
t = 0.72 minutes
CHANGE IN WATER LEVEL(feet)
ELAPSED TIME (minutes)
10
1
0.1
0.01
0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0


PROPOSED CLARKCO LANDFILL
PUMPING TEST OF WELL NO. 90-7Z
FEBRUARY 1, 1993
1.12'
1.51'
T = 264Q/Δs
Q = 1.5 GPM
Δs = 1.51 FT - 1.12 FT = 0.39 FT
T = 264(1.5)/0.39 = 1015 GPD/FT
K = T/b
b = 1.7 FT
K = 1015 / 1.7 = 59.7 GPD/FT² = 2.8 x 10⁻²cm/s
DRAWDOWN (FEET)
ELAPSED TIME (MINUTES)
EAGON & ASSOCIATES, INC.



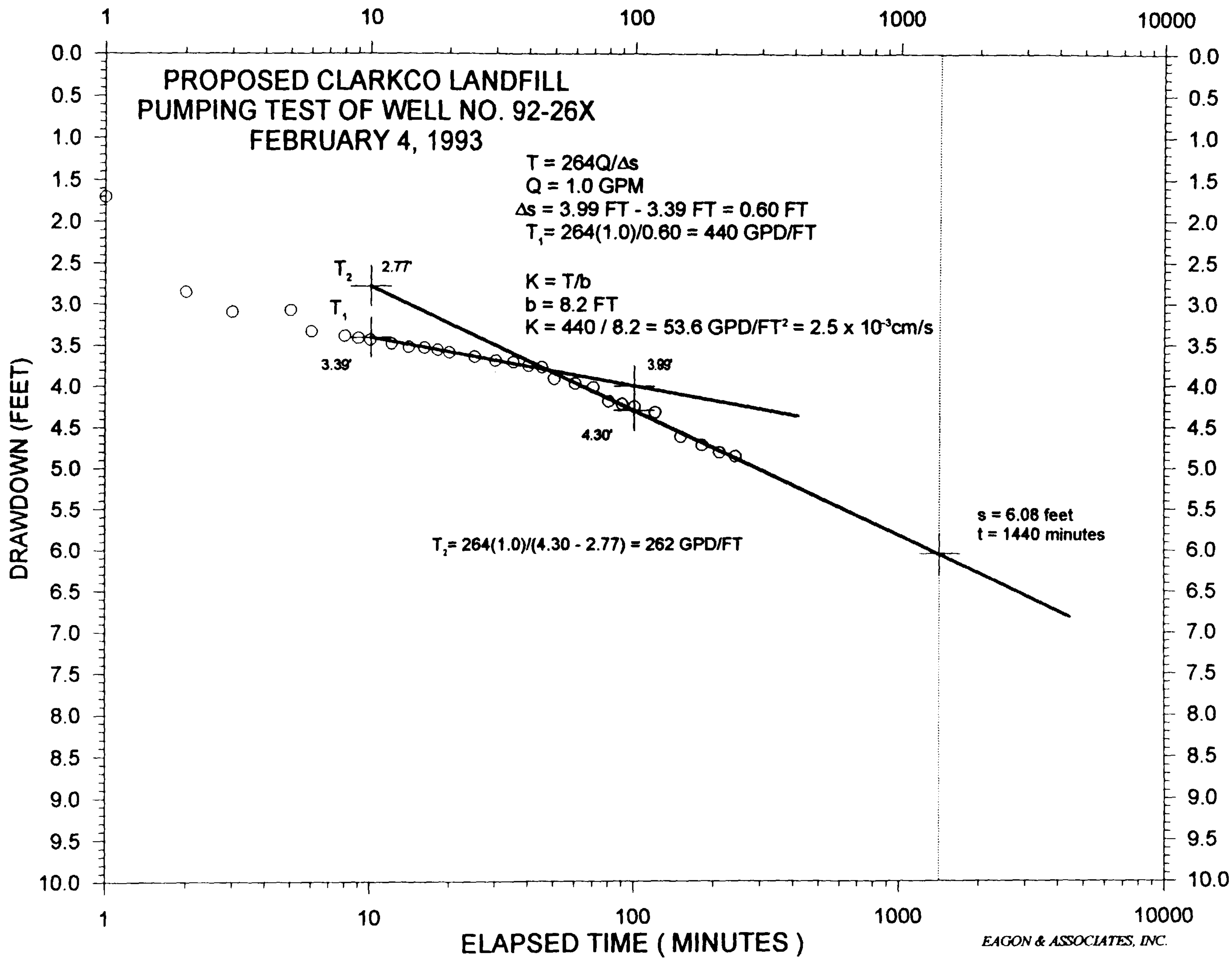
$$y_o = 3.6 \text{ feet}$$

$$y_t = 3.0 \text{ feet}, \quad t = 53.1 \text{ minutes}$$

$$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{L_e/r_w}\right]^{-1} = \left[\frac{1.1}{\ln(19.60/0.32)} + \frac{0.8}{5.3}\right]^{-1} = 2.39$$

$$K = \frac{r_c^2 \ln(R_e/r_w)}{2L_e} \frac{1}{t} \ln \frac{y_o}{y_t} = \frac{(0.083)^2 \; 2.39}{2(1.7)} \frac{1}{53.1(60)} \ln \frac{3.6}{3.0} = 3.0 \times 10^{-7} \text{ FT/s}$$

$$= 9.1 \times 10^{-6} \text{ cm/s}$$


PROPOSED CLARKCO LANDFILL
PUMPING TEST OF WELL NO. 92-26X
FEBRUARY 4, 1993
T = 264Q/Δs
Q = 1.0 GPM
Δs = 3.99 FT - 3.39 FT = 0.60 FT
T_1= 264(1.0)/0.60 = 440 GPD/FT
K = T/b
b = 8.2 FT
K = 440 / 8.2 = 53.6 GPD/FT² = 2.5 x 10⁻³cm/s
T_2
T_1
2.77'
3.39'
3.99'
4.30'
s = 6.08 feet
t = 1440 minutes
T_2= 264(1.0)/(4.30 - 2.77) = 262 GPD/FT
DRAWDOWN (FEET)
ELAPSED TIME (MINUTES)
1
10
100
1000
10000
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
8.5
9.0
9.5
10.0
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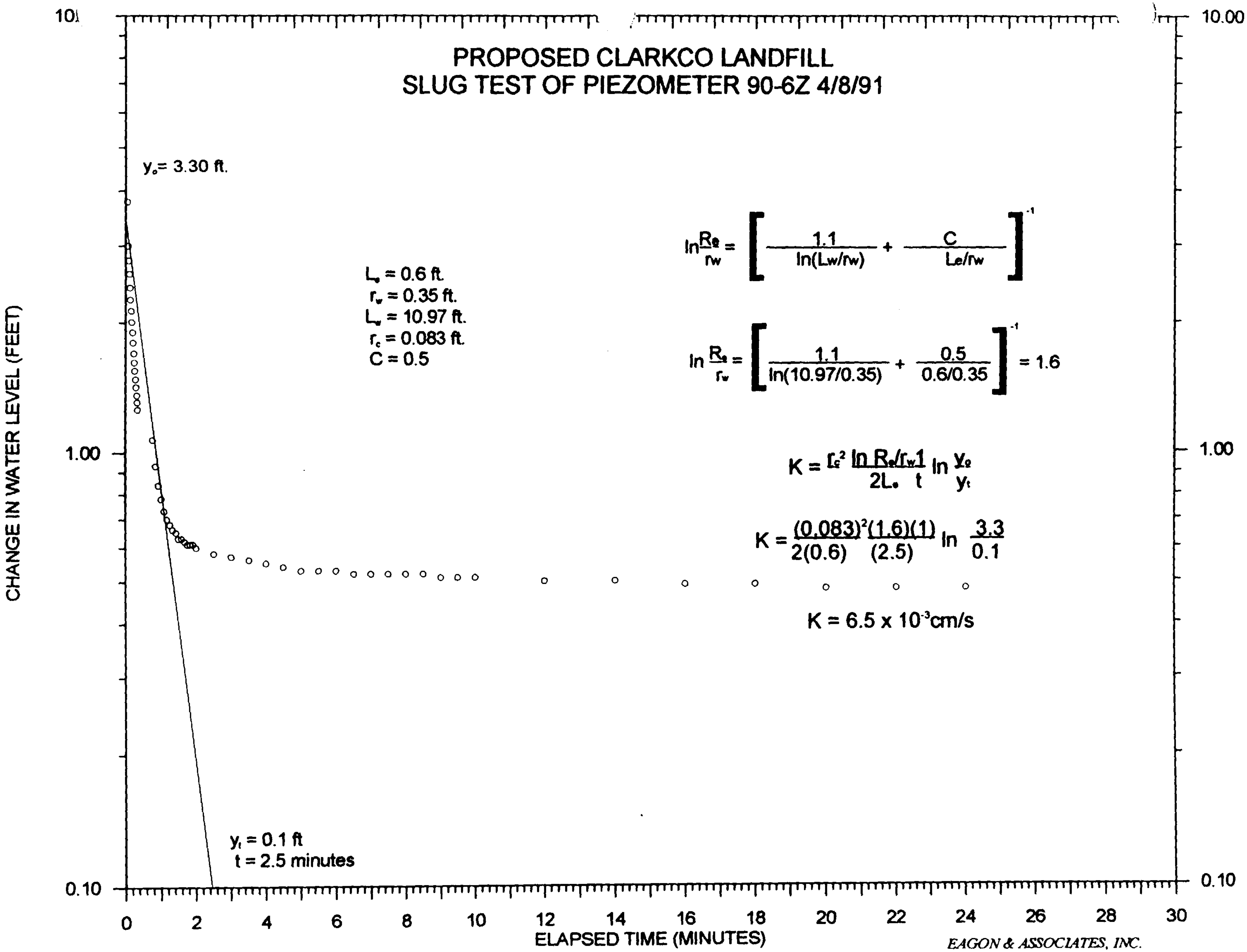
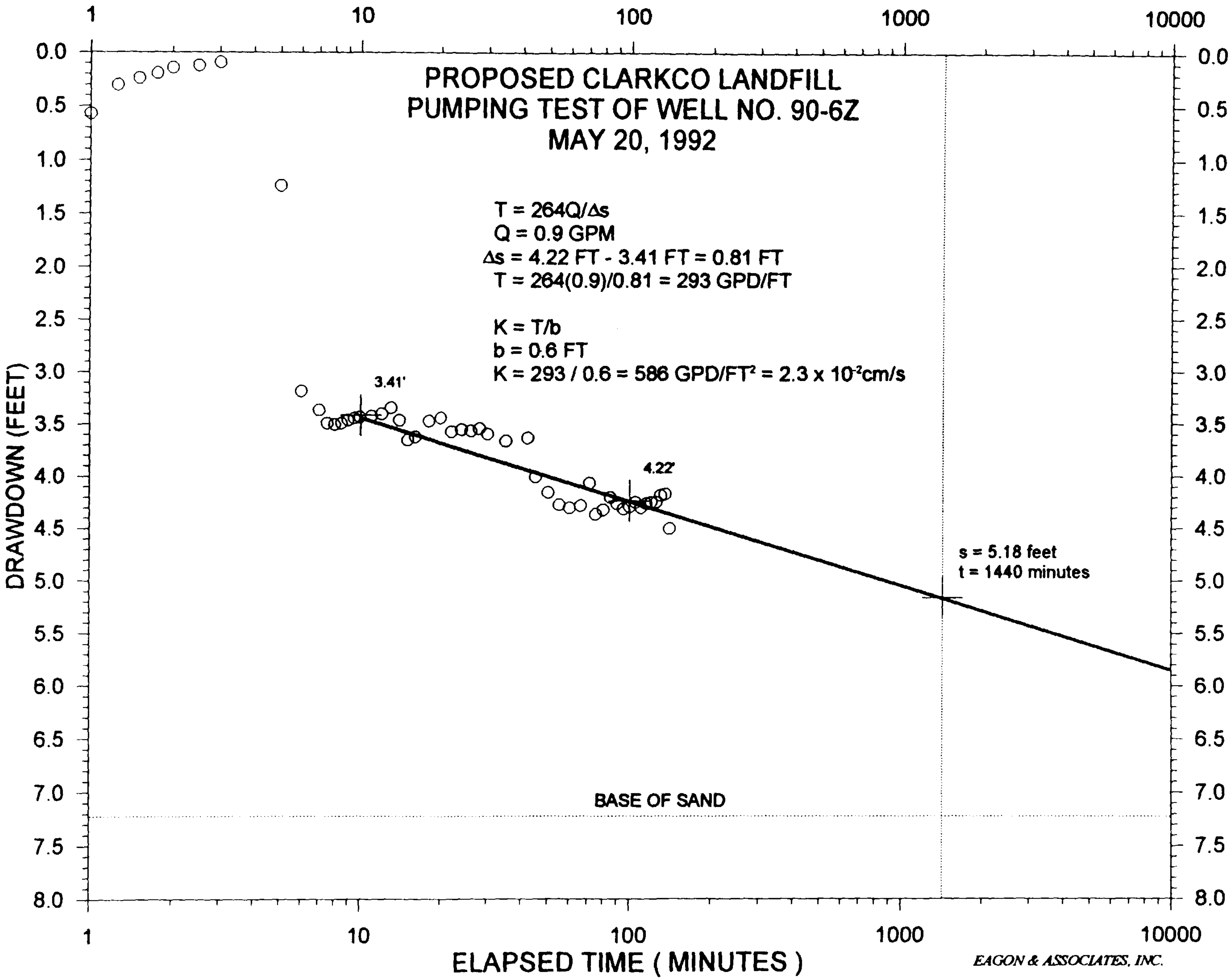
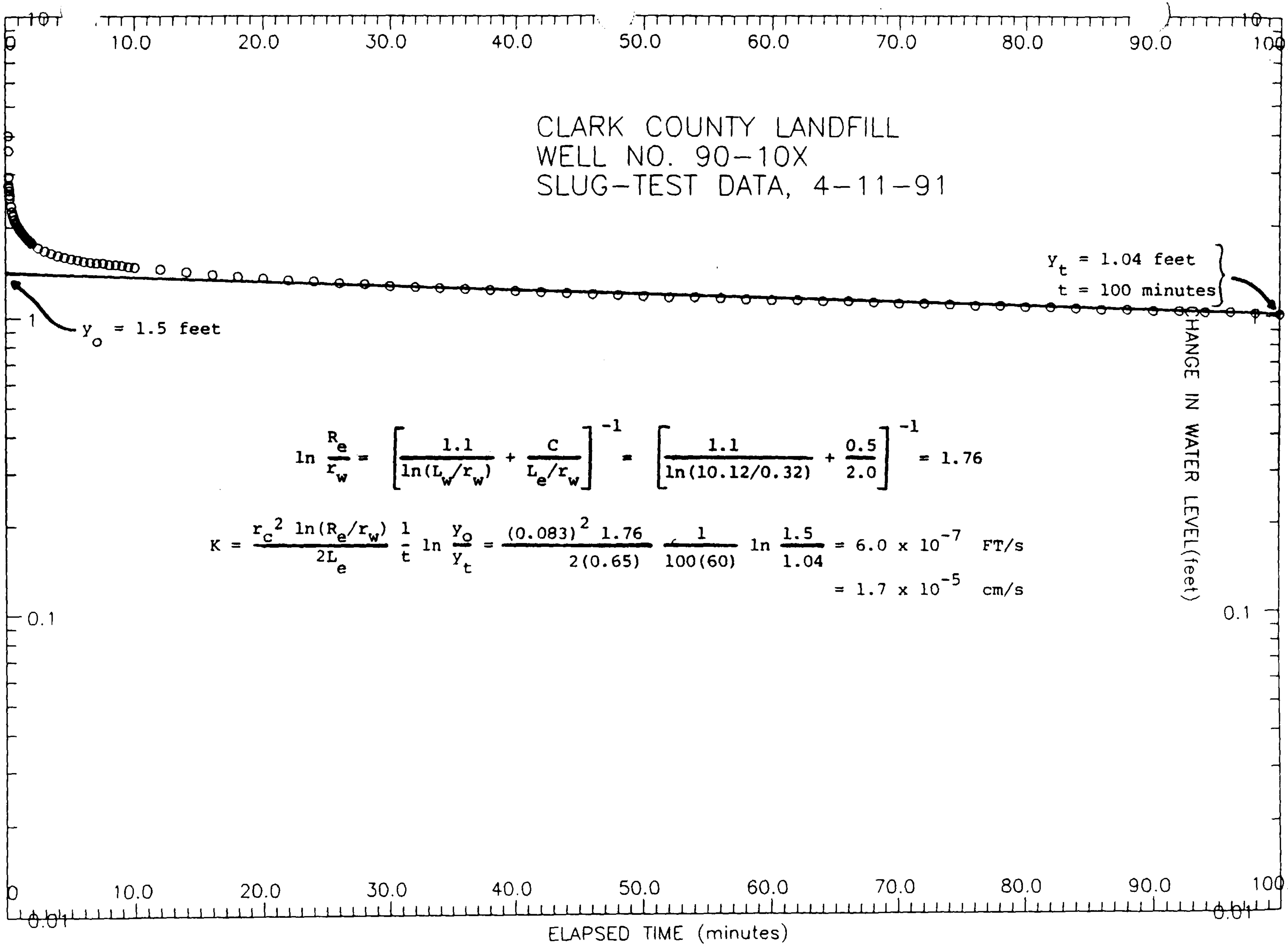
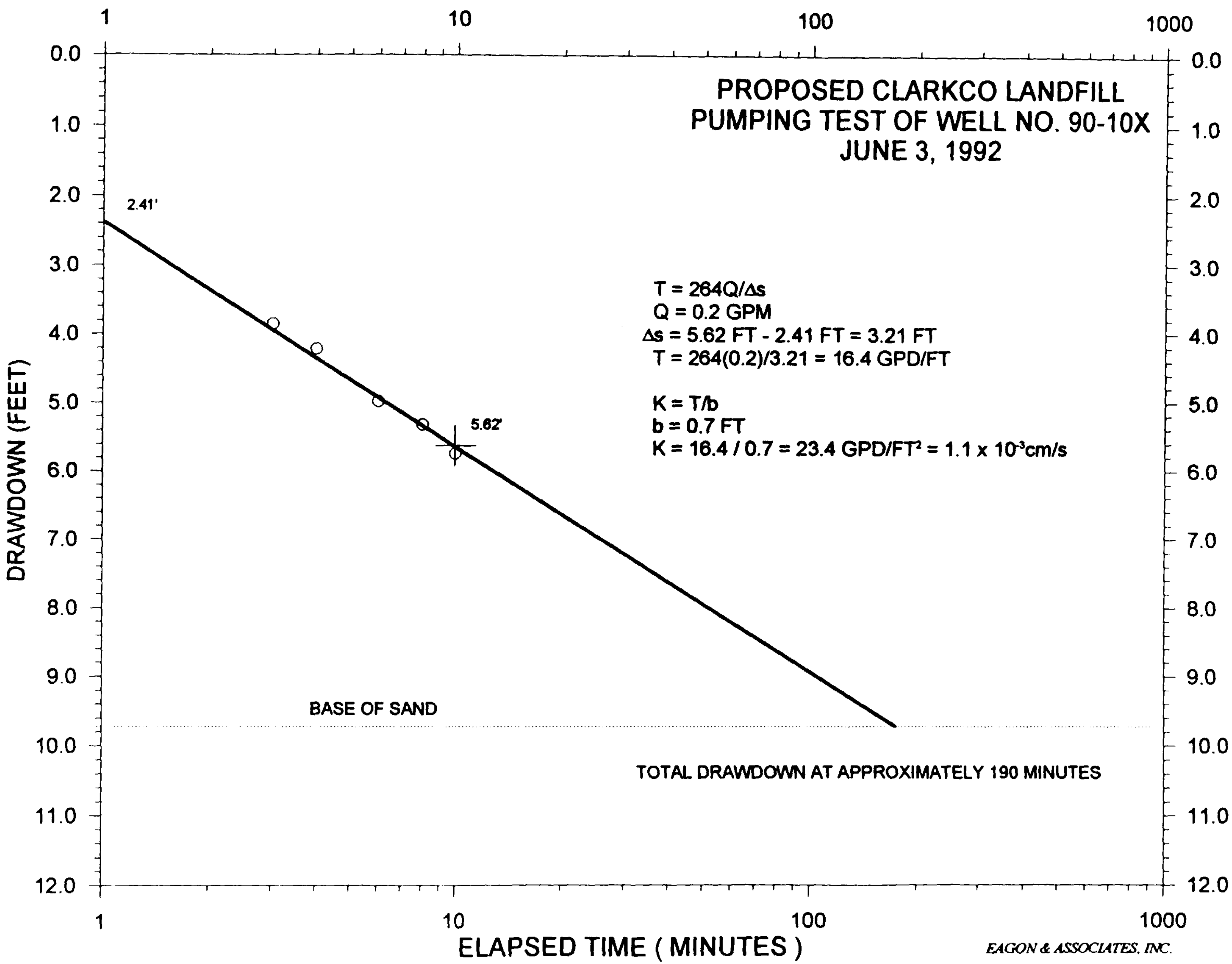


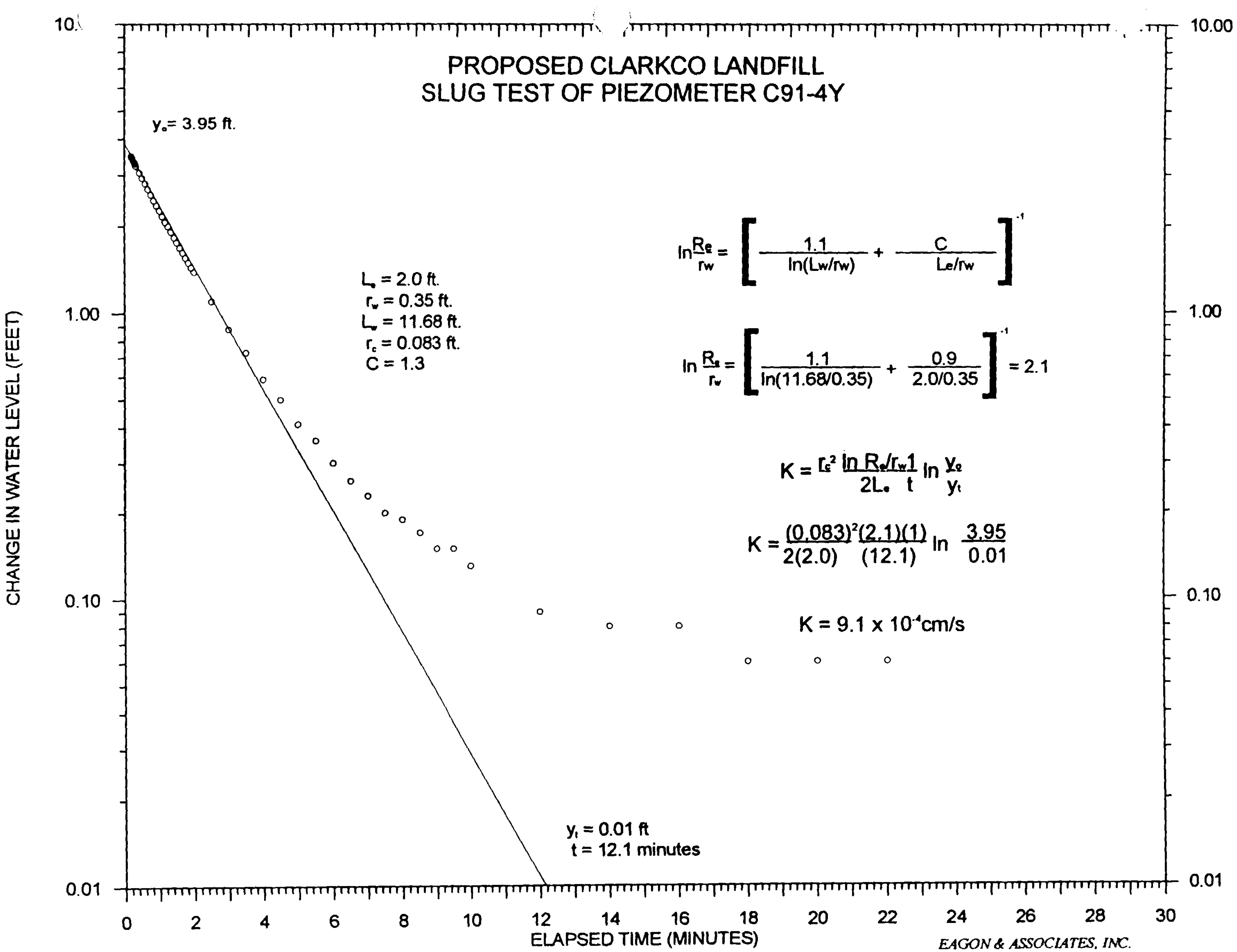
PROPOSED CLARKCO LANDFILL
SLUG TEST OF PIEZOMETER 90-6Z 4/8/91
y_o = 3.30 ft.
L_e = 0.6 ft.
r_w = 0.35 ft.
L_w = 10.97 ft.
r_c = 0.083 ft.
C = 0.5
$\ln\frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{L_e/r_w}\right]^{-1}$
$\ln\frac{R_e}{r_w} = \left[\frac{1.1}{\ln(10.97/0.35)} + \frac{0.5}{0.6/0.35}\right]^{-1} = 1.6$
$K = \frac{r_c^2 \ln R_e/r_w}{2L_e} \frac{1}{t} \ln\frac{y_o}{y_t}$
$K = \frac{(0.083)^2(1.6)}{2(0.6)} \frac{(1)}{(2.5)} \ln\frac{3.3}{0.1}$
$K = 6.5 \times 10^{-3}$ cm/s
y_t = 0.1 ft
t = 2.5 minutes
CHANGE IN WATER LEVEL (FEET)
ELAPSED TIME (MINUTES)
10
1.00
0.10
10.00
1.00
0.10
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
EAGON & ASSOCIATES, INC.

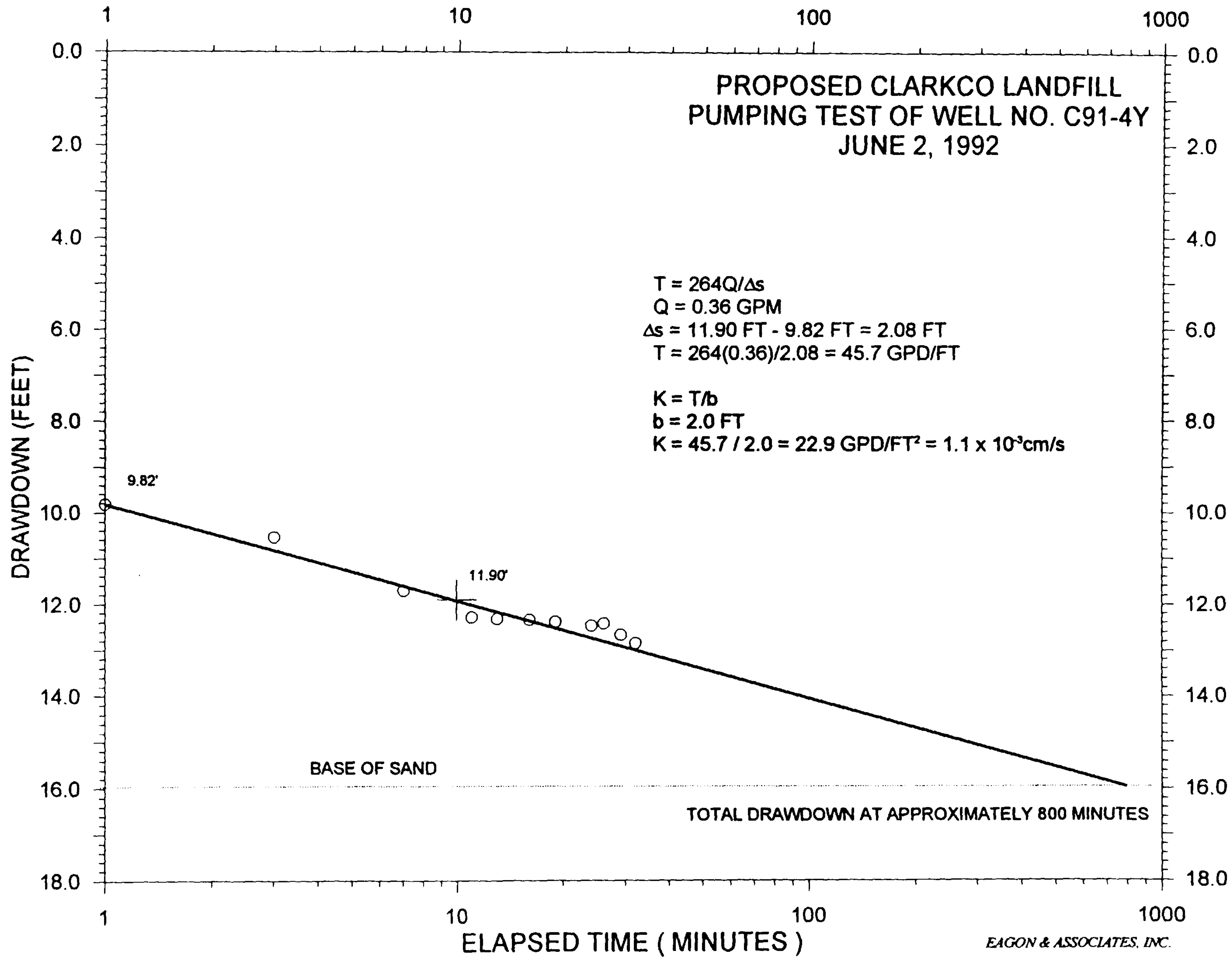


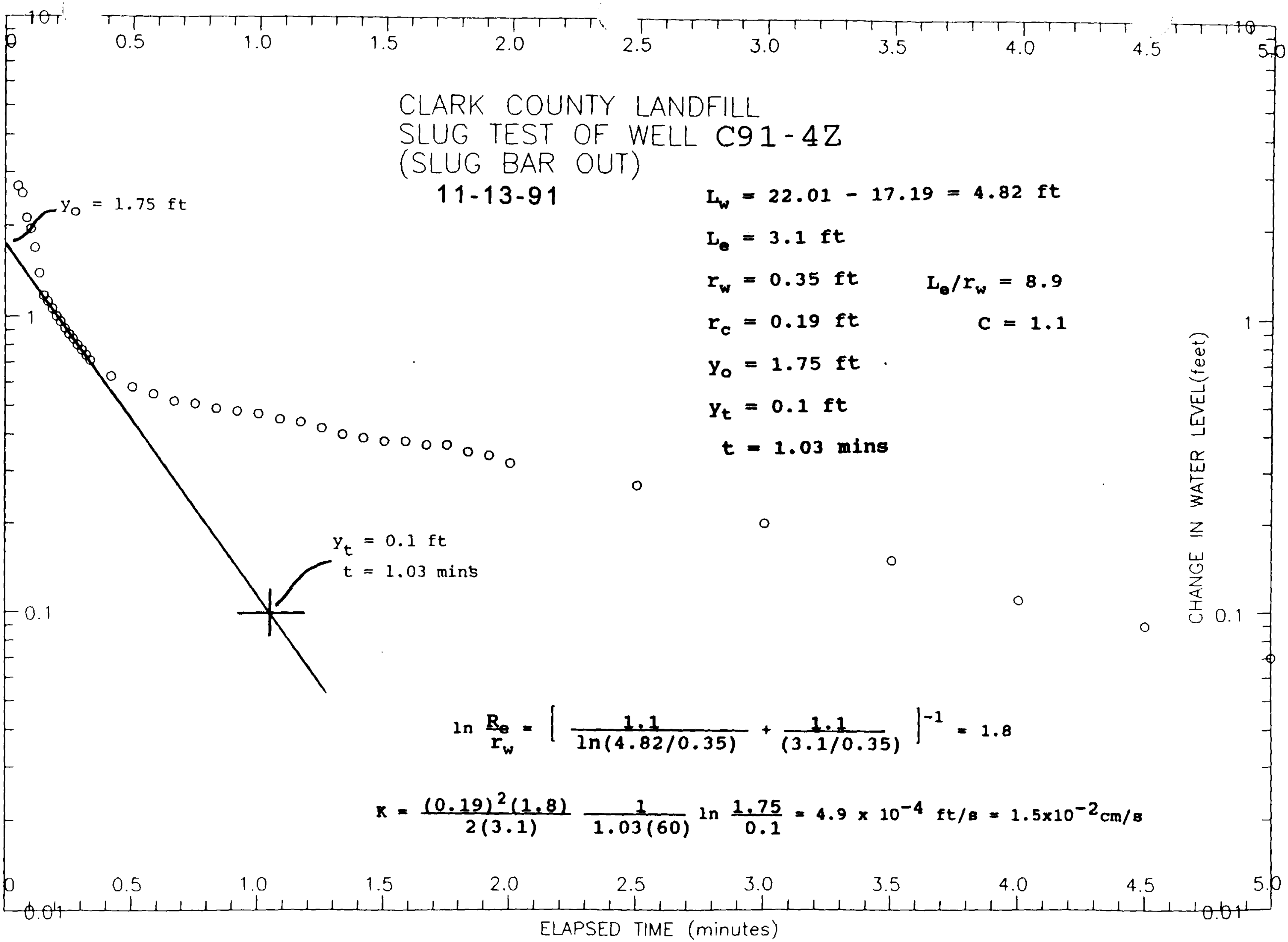
PROPOSED CLARKCO LANDFILL
PUMPING TEST OF WELL NO. 90-6Z
MAY 20, 1992
T = 264Q/Δs
Q = 0.9 GPM
Δs = 4.22 FT - 3.41 FT = 0.81 FT
T = 264(0.9)/0.81 = 293 GPD/FT
K = T/b
b = 0.6 FT
K = 293 / 0.6 = 586 GPD/FT² = 2.3 x 10⁻²cm/s
3.41'
4.22'
s = 5.18 feet
t = 1440 minutes
BASE OF SAND
DRAWDOWN (FEET)
ELAPSED TIME (MINUTES)
1
10
100
1000
10000
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
EAGON & ASSOCIATES, INC.


CLARK COUNTY LANDFILL
WELL NO. 90-10X
SLUG-TEST DATA, 4-11-91
y_t = 1.04 feet
t = 100 minutes
y_o = 1.5 feet
$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{L_e/r_w}\right]^{-1} = \left[\frac{1.1}{\ln(10.12/0.32)} + \frac{0.5}{2.0}\right]^{-1} = 1.76$
$K = \frac{r_c^2 \ln(R_e/r_w)}{2L_e} \frac{1}{t} \ln \frac{y_o}{y_t} = \frac{(0.083)^2\ 1.76}{2(0.65)} \frac{1}{100(60)} \ln \frac{1.5}{1.04} = 6.0 \times 10^{-7}$ FT/s
$= 1.7 \times 10^{-5}$ cm/s
CHANGE IN WATER LEVEL(feet)
ELAPSED TIME (minutes)
0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
80.0
90.0
100.
10
1
0.1
0.01

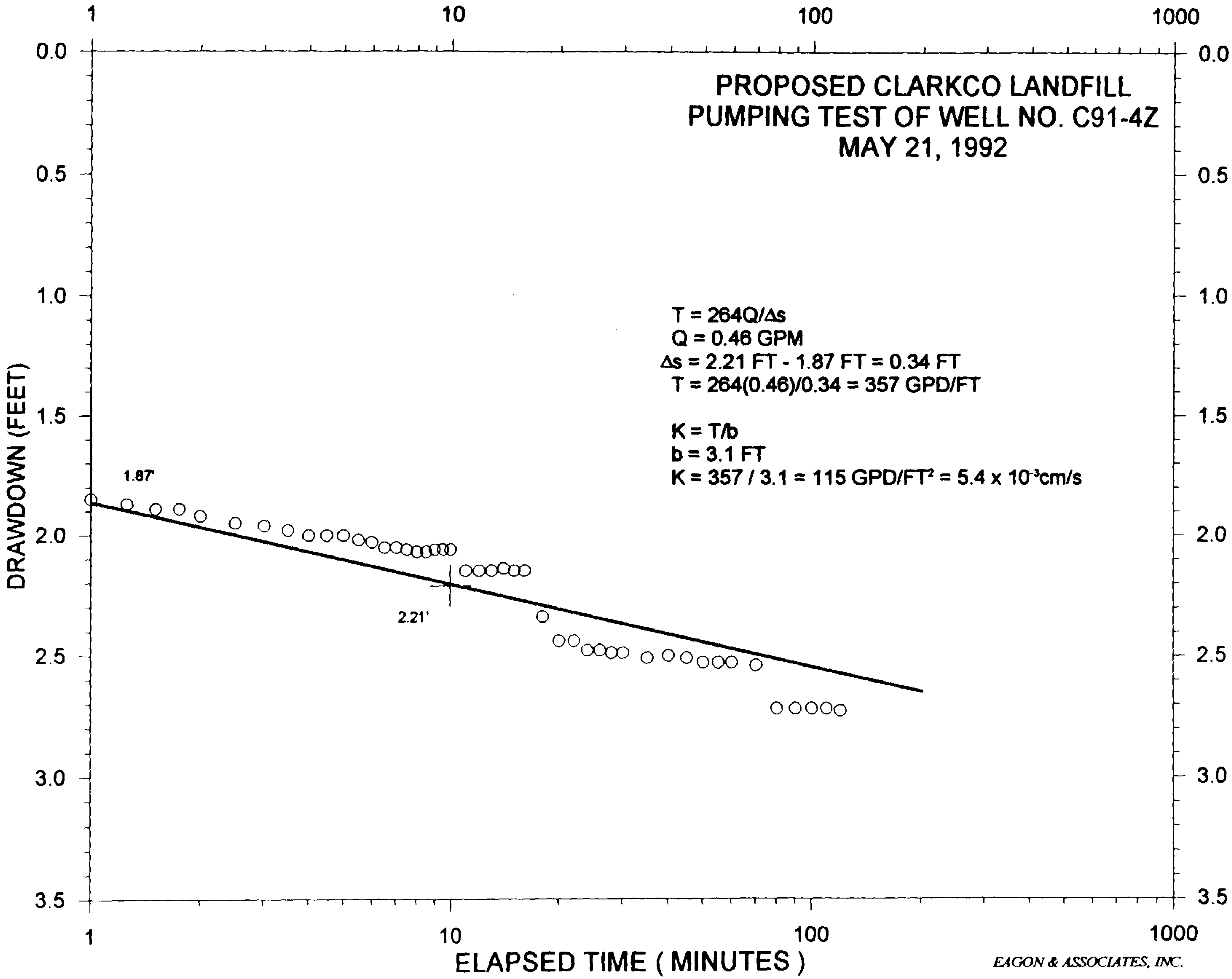

PROPOSED CLARKCO LANDFILL
PUMPING TEST OF WELL NO. 90-10X
JUNE 3, 1992
T = 264Q/Δs
Q = 0.2 GPM
Δs = 5.62 FT - 2.41 FT = 3.21 FT
T = 264(0.2)/3.21 = 16.4 GPD/FT
K = T/b
b = 0.7 FT
K = 16.4 / 0.7 = 23.4 GPD/FT² = 1.1 x 10⁻³cm/s
2.41'
5.62'
BASE OF SAND
TOTAL DRAWDOWN AT APPROXIMATELY 190 MINUTES
DRAWDOWN (FEET)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
1
10
100
1000
ELAPSED TIME (MINUTES)
EAGON & ASSOCIATES, INC.


PROPOSED CLARKCO LANDFILL
SLUG TEST OF PIEZOMETER C91-4Y
yo = 3.95 ft.
Le = 2.0 ft.
rw = 0.35 ft.
Lw = 11.68 ft.
rc = 0.083 ft.
C = 1.3
ln Re/rw = [1.1/ln(Lw/rw) + C/Le/rw]^-1
ln Re/rw = [1.1/ln(11.68/0.35) + 0.9/2.0/0.35]^-1 = 2.1
K = rc² ln Re/rw 1/2Le t ln yo/yt
K = (0.083)²(2.1)(1)/2(2.0)(12.1) ln 3.95/0.01
K = 9.1 x 10^-4 cm/s
yt = 0.01 ft
t = 12.1 minutes
CHANGE IN WATER LEVEL (FEET)
ELAPSED TIME (MINUTES)
10.00
1.00
0.10
0.01
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
EAGON & ASSOCIATES, INC.

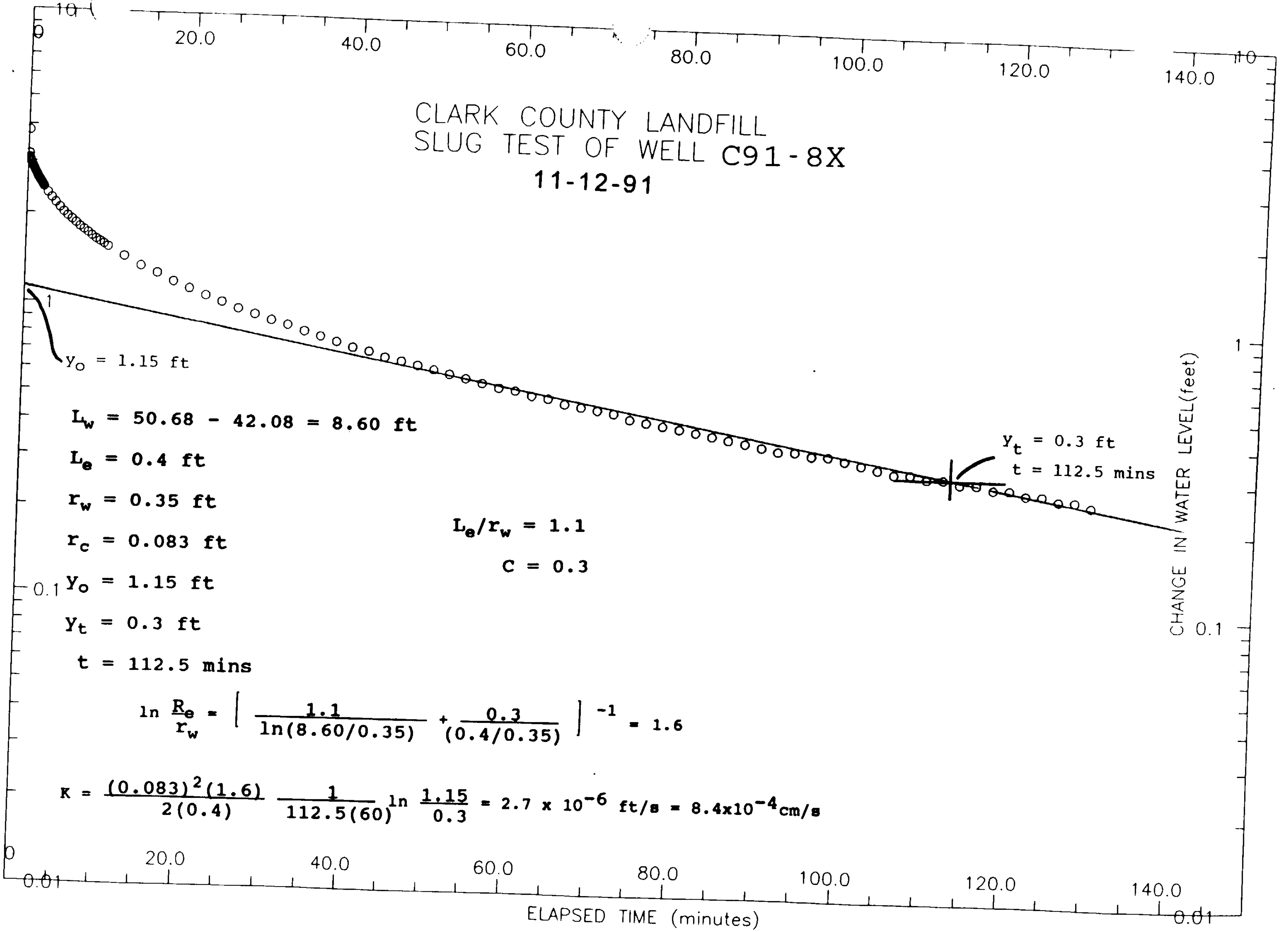

PROPOSED CLARKCO LANDFILL
PUMPING TEST OF WELL NO. C91-4Y
JUNE 2, 1992
T = 264Q/Δs
Q = 0.36 GPM
Δs = 11.90 FT - 9.82 FT = 2.08 FT
T = 264(0.36)/2.08 = 45.7 GPD/FT
K = T/b
b = 2.0 FT
K = 45.7 / 2.0 = 22.9 GPD/FT² = 1.1 x 10⁻³cm/s
9.82'
11.90'
BASE OF SAND
TOTAL DRAWDOWN AT APPROXIMATELY 800 MINUTES
DRAWDOWN (FEET)
ELAPSED TIME (MINUTES)
1
10
100
1000
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
EAGON & ASSOCIATES, INC.



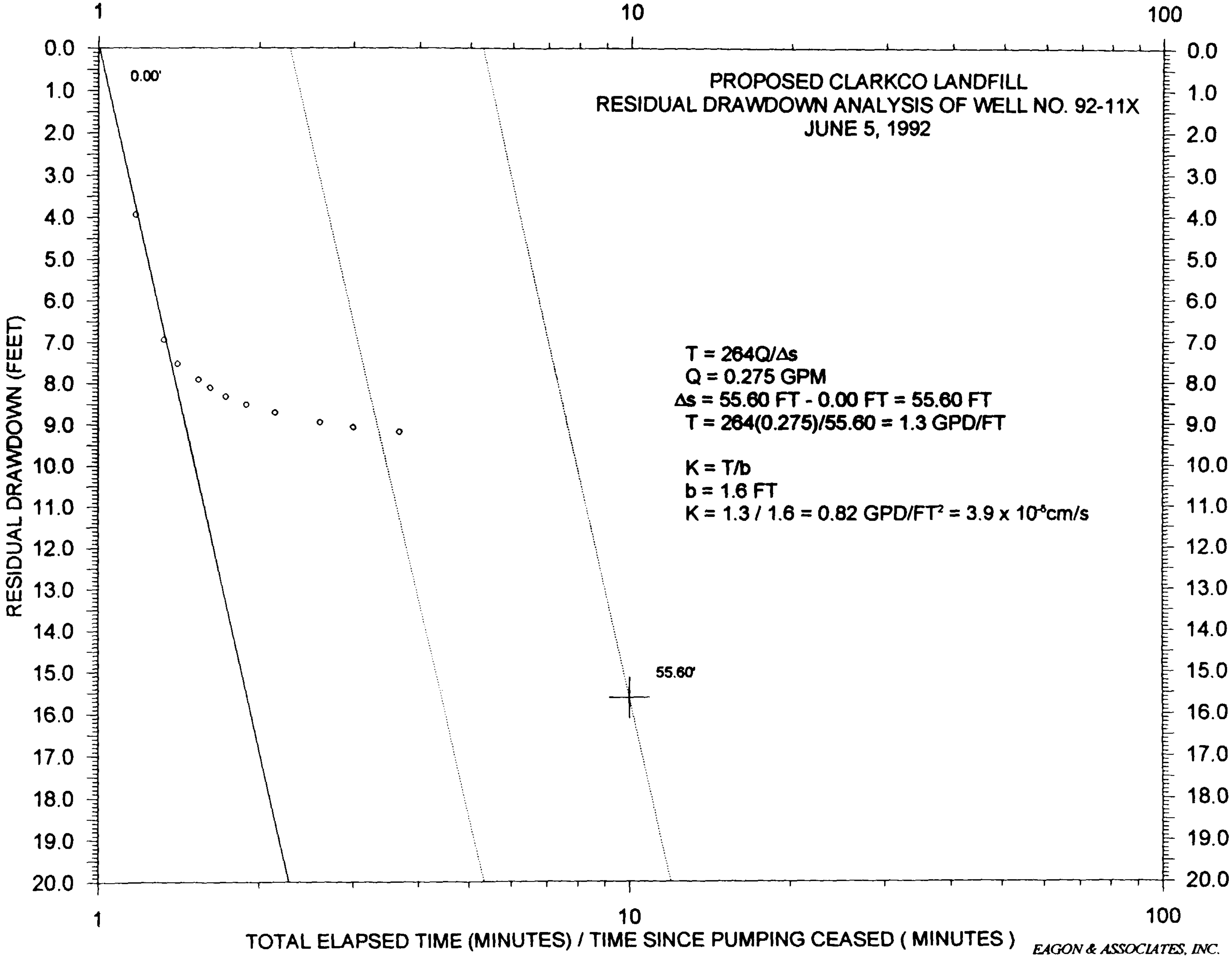
CLARK COUNTY LANDFILL
SLUG TEST OF WELL C91-4Z
(SLUG BAR OUT)
11-13-91
L_w = 22.01 - 17.19 = 4.82 ft
L_e = 3.1 ft
r_w = 0.35 ft
L_e/r_w = 8.9
r_c = 0.19 ft
C = 1.1
y_o = 1.75 ft
y_t = 0.1 ft
t = 1.03 mins
y_o = 1.75 ft
y_t = 0.1 ft
t = 1.03 mins
$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(4.82/0.35)} + \frac{1.1}{(3.1/0.35)} \right]^{-1} = 1.8$
$K = \frac{(0.19)^2(1.8)}{2(3.1)} \frac{1}{1.03(60)} \ln \frac{1.75}{0.1} = 4.9 \times 10^{-4}$ ft/s = 1.5×10^{-2} cm/s
ELAPSED TIME (minutes)
CHANGE IN WATER LEVEL (feet)
0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0
10 1 0.1 0.01

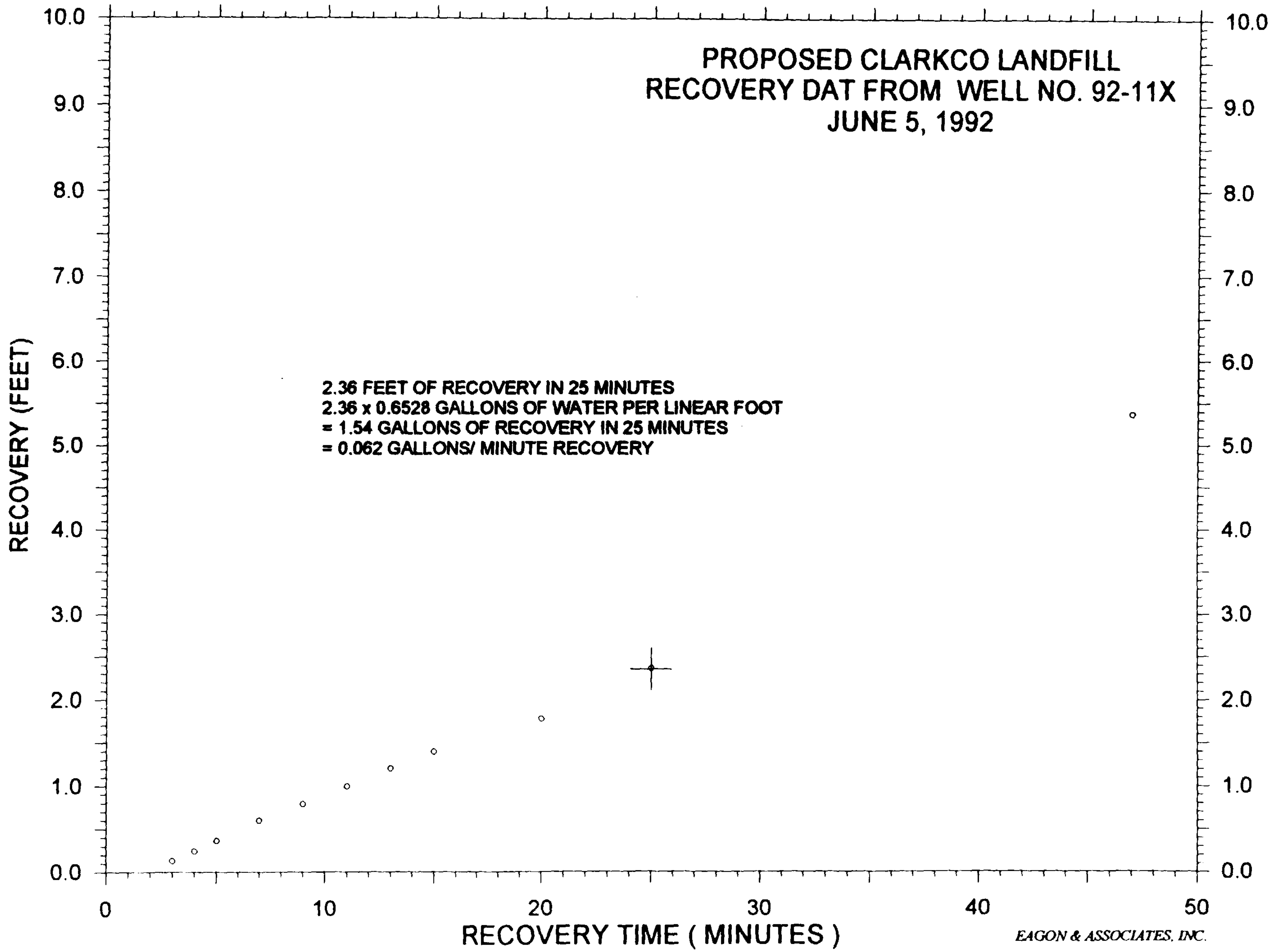


PROPOSED CLARKCO LANDFILL
PUMPING TEST OF WELL NO. C91-4Z
MAY 21, 1992
T = 264Q/Δs
Q = 0.46 GPM
Δs = 2.21 FT - 1.87 FT = 0.34 FT
T = 264(0.46)/0.34 = 357 GPD/FT
K = T/b
b = 3.1 FT
K = 357 / 3.1 = 115 GPD/FT² = 5.4 x 10⁻³cm/s
1.87'
2.21'
DRAWDOWN (FEET)
ELAPSED TIME (MINUTES)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
1
10
100
1000
EAGON & ASSOCIATES, INC.

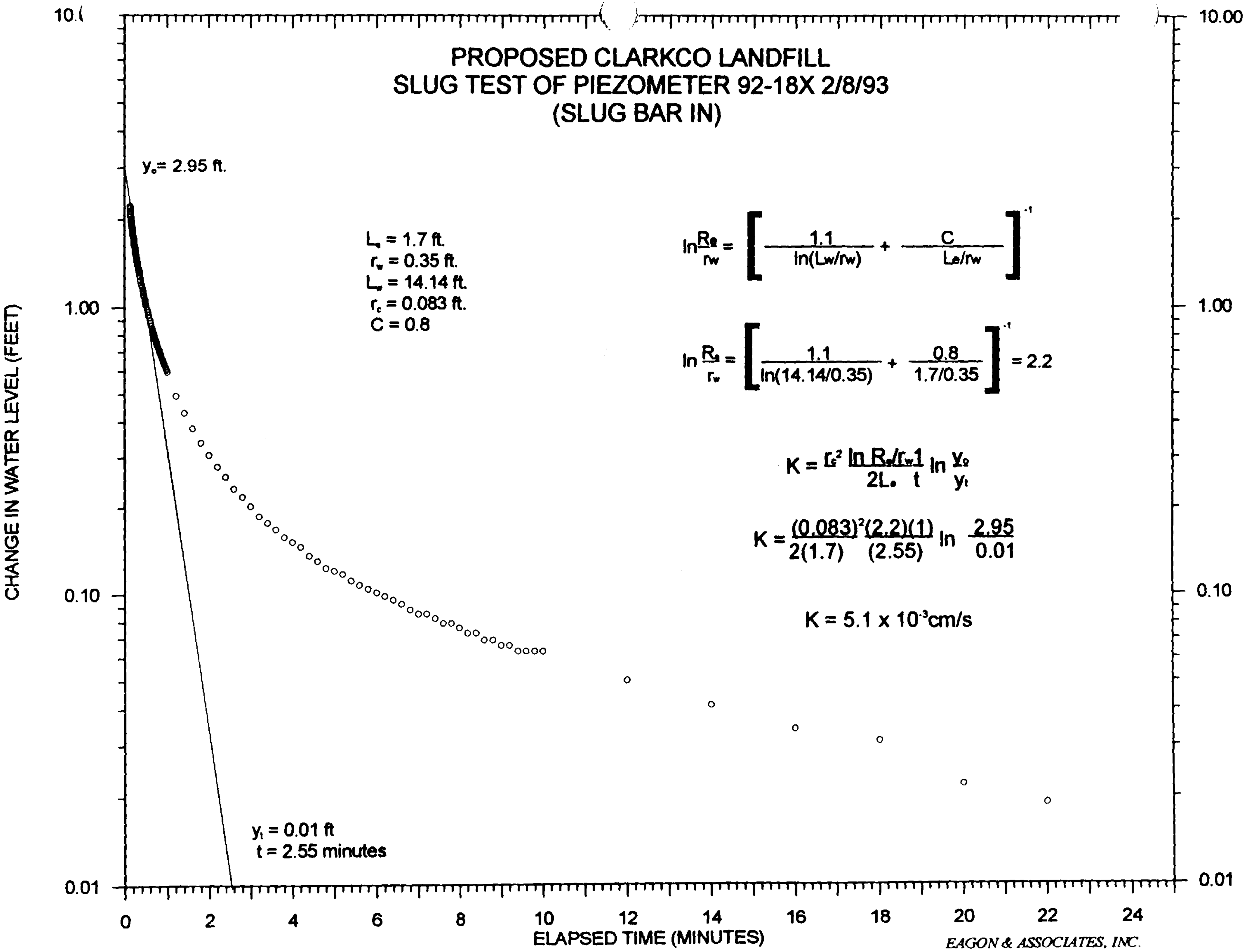


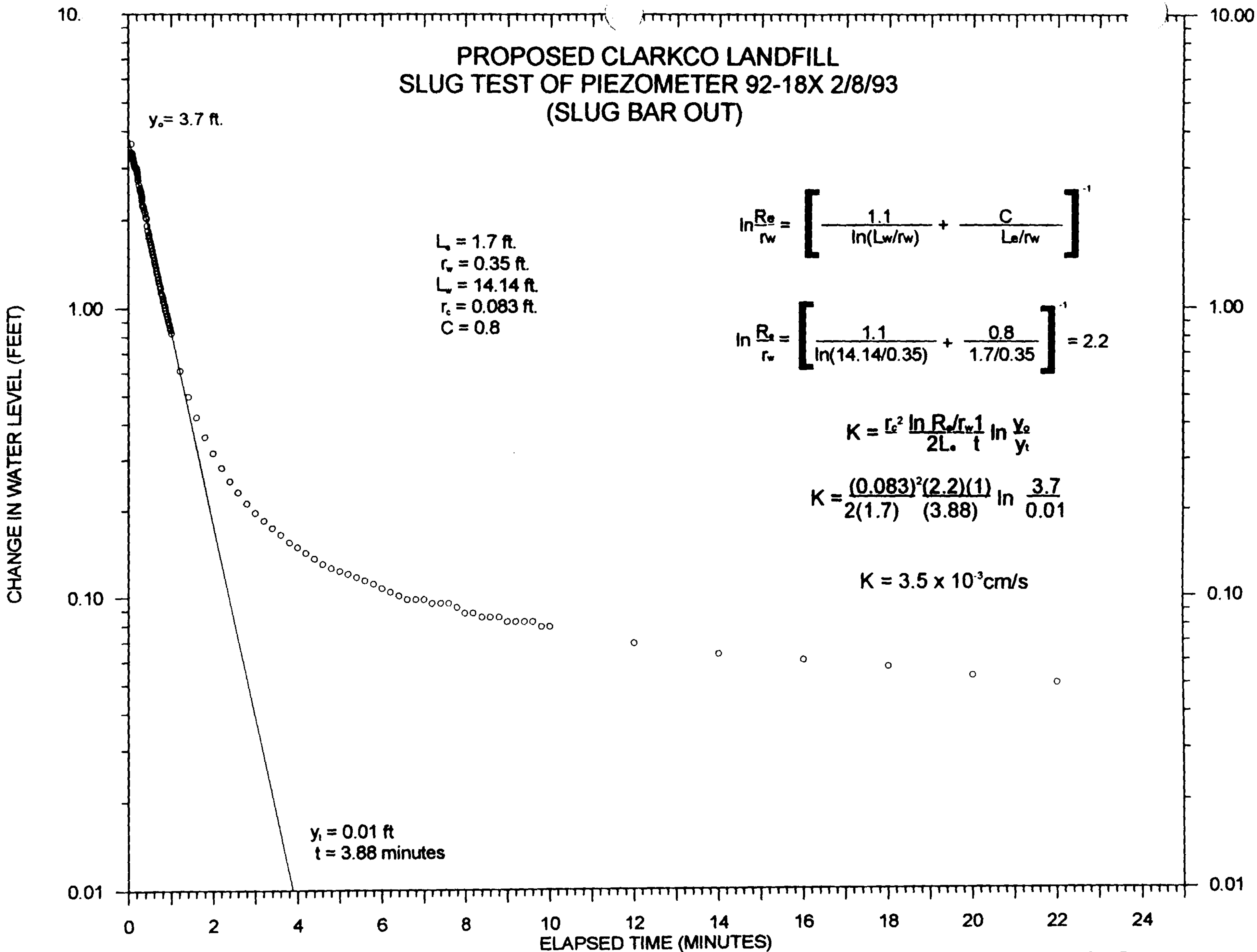
CLARK COUNTY LANDFILL
SLUG TEST OF WELL C91-8X
11-12-91
y_o = 1.15 ft
L_w = 50.68 - 42.08 = 8.60 ft
L_e = 0.4 ft
r_w = 0.35 ft
r_c = 0.083 ft
y_o = 1.15 ft
y_t = 0.3 ft
t = 112.5 mins
L_e/r_w = 1.1
C = 0.3
y_t = 0.3 ft
t = 112.5 mins
$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(8.60/0.35)} + \frac{0.3}{(0.4/0.35)} \right]^{-1} = 1.6$
$K = \frac{(0.083)^2(1.6)}{2(0.4)} \frac{1}{112.5(60)} \ln \frac{1.15}{0.3} = 2.7 \times 10^{-6}$ ft/s $= 8.4 \times 10^{-4}$ cm/s
0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
10
1
0.1
0.01
CHANGE IN WATER LEVEL(feet)
ELAPSED TIME (minutes)


PROPOSED CLARKCO LANDFILL
RESIDUAL DRAWDOWN ANALYSIS OF WELL NO. 92-11X
JUNE 5, 1992
T = 264Q/Δs
Q = 0.275 GPM
Δs = 55.60 FT - 0.00 FT = 55.60 FT
T = 264(0.275)/55.60 = 1.3 GPD/FT
K = T/b
b = 1.6 FT
K = 1.3 / 1.6 = 0.82 GPD/FT² = 3.9 x 10⁻⁵cm/s
0.00'
55.60'
RESIDUAL DRAWDOWN (FEET)
TOTAL ELAPSED TIME (MINUTES) / TIME SINCE PUMPING CEASED (MINUTES)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0
1
10
100
EAGON & ASSOCIATES, INC.

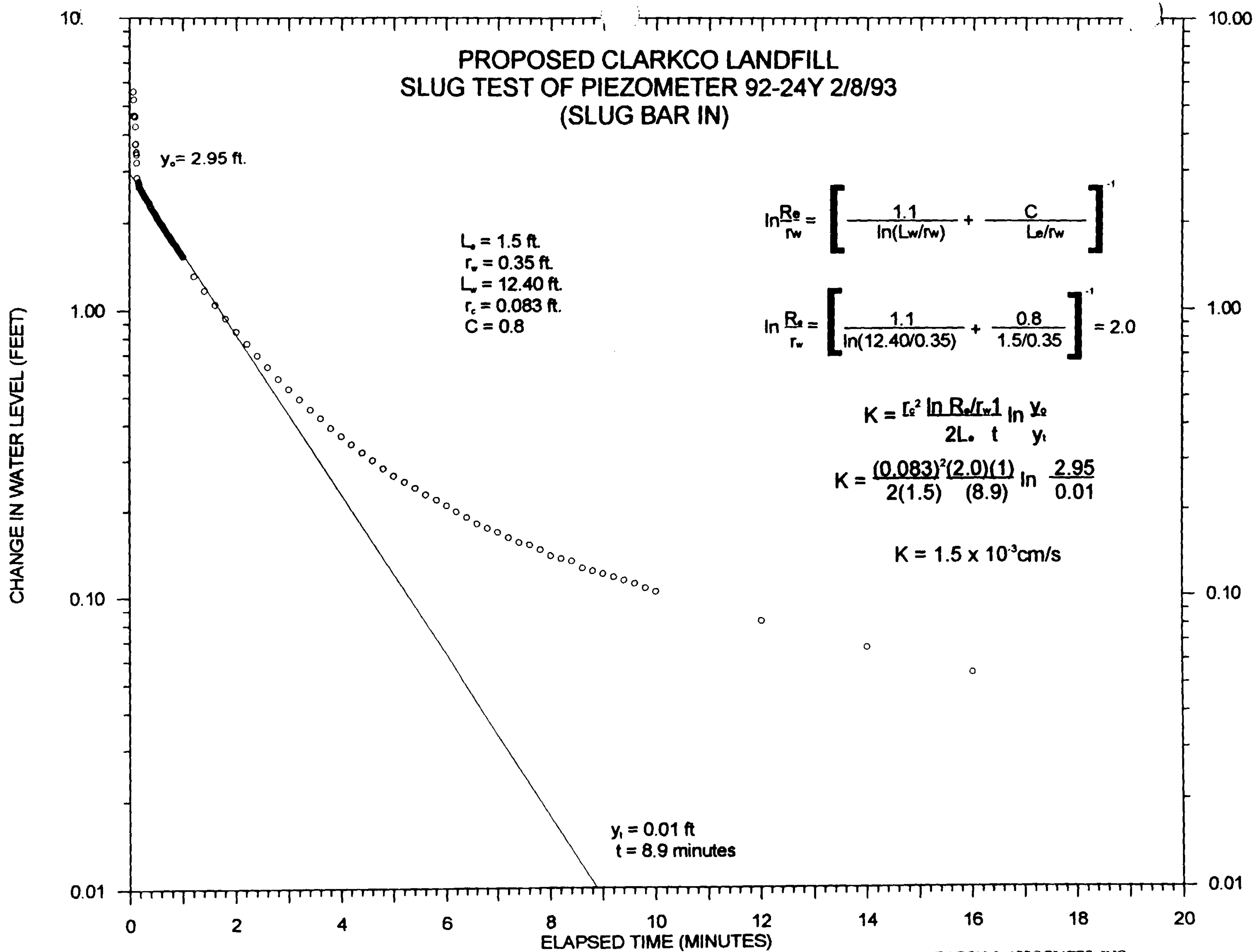


PROPOSED CLARKCO LANDFILL
RECOVERY DAT FROM WELL NO. 92-11X
JUNE 5, 1992
2.36 FEET OF RECOVERY IN 25 MINUTES
2.36 x 0.6528 GALLONS OF WATER PER LINEAR FOOT
= 1.54 GALLONS OF RECOVERY IN 25 MINUTES
= 0.062 GALLONS/ MINUTE RECOVERY
RECOVERY (FEET)
RECOVERY TIME (MINUTES)
0
10
20
30
40
50
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
EAGON & ASSOCIATES, INC.

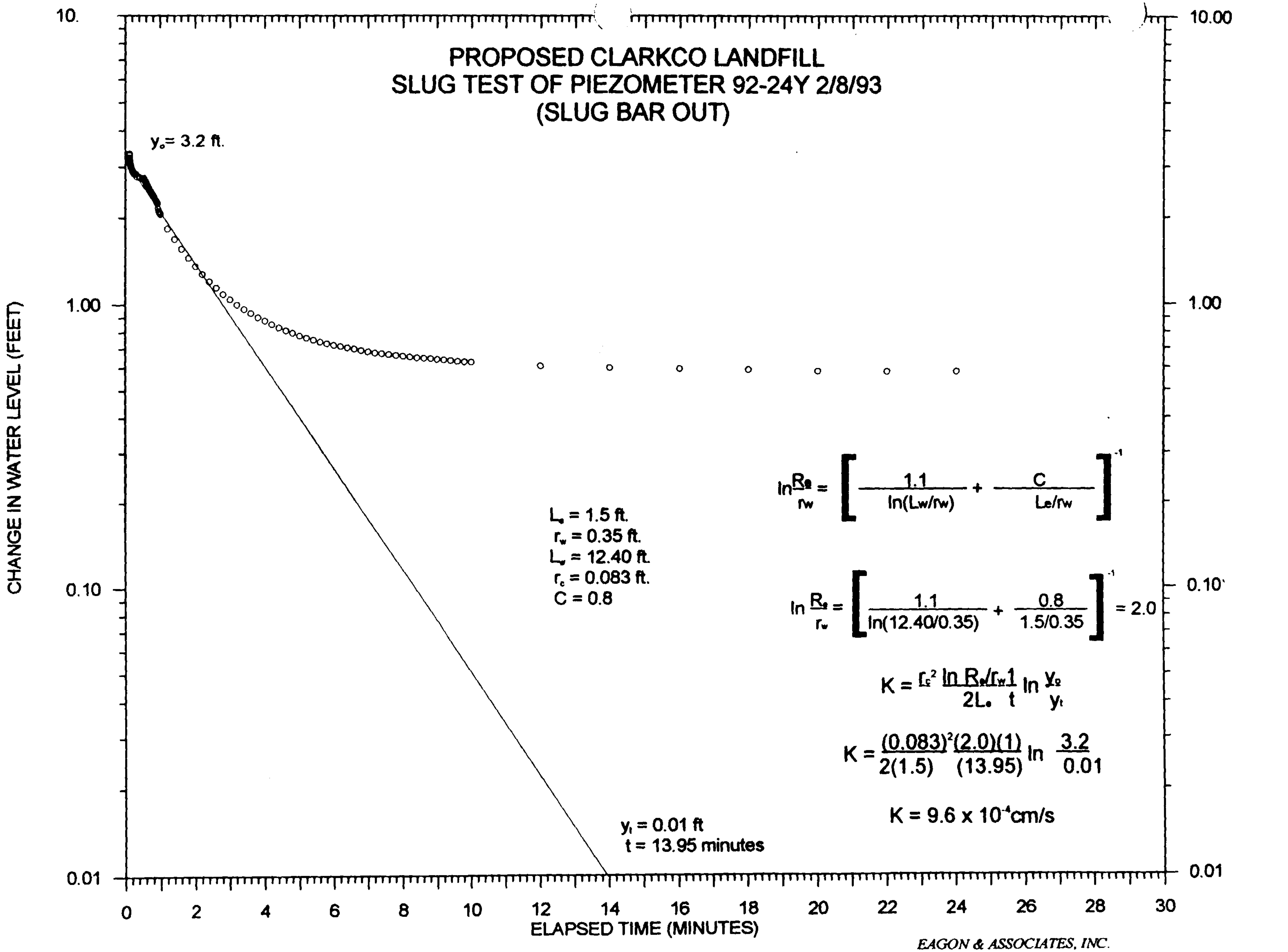

PROPOSED CLARKCO LANDFILL
SLUG TEST OF PIEZOMETER 92-18X 2/8/93
(SLUG BAR IN)
y_o = 2.95 ft.
L_e = 1.7 ft.
r_w = 0.35 ft.
L_w = 14.14 ft.
r_c = 0.083 ft.
C = 0.8
$\ln\frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{L_e/r_w}\right]^{-1}$
$\ln\frac{R_e}{r_w} = \left[\frac{1.1}{\ln(14.14/0.35)} + \frac{0.8}{1.7/0.35}\right]^{-1} = 2.2$
$K = \frac{r_c^2 \ln R_e/r_w}{2L_e}\frac{1}{t}\ln\frac{y_o}{y_t}$
$K = \frac{(0.083)^2(2.2)}{2(1.7)}\frac{(1)}{(2.55)}\ln\frac{2.95}{0.01}$
$K = 5.1 \times 10^{-3}$ cm/s
y_t = 0.01 ft
t = 2.55 minutes
CHANGE IN WATER LEVEL (FEET)
ELAPSED TIME (MINUTES)
10.00
1.00
0.10
0.01
0
2
4
6
8
10
12
14
16
18
20
22
24
EAGON & ASSOCIATES, INC.

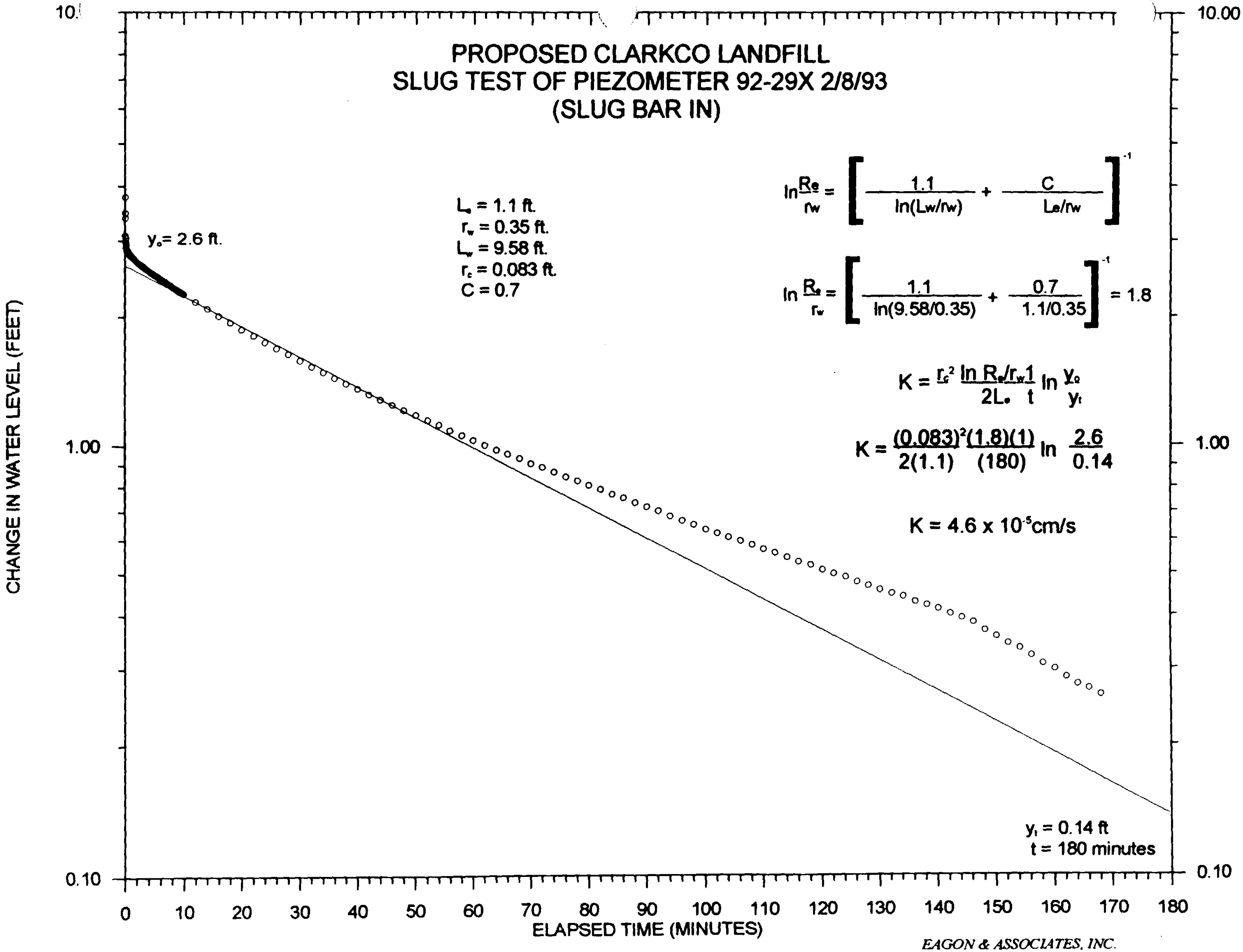


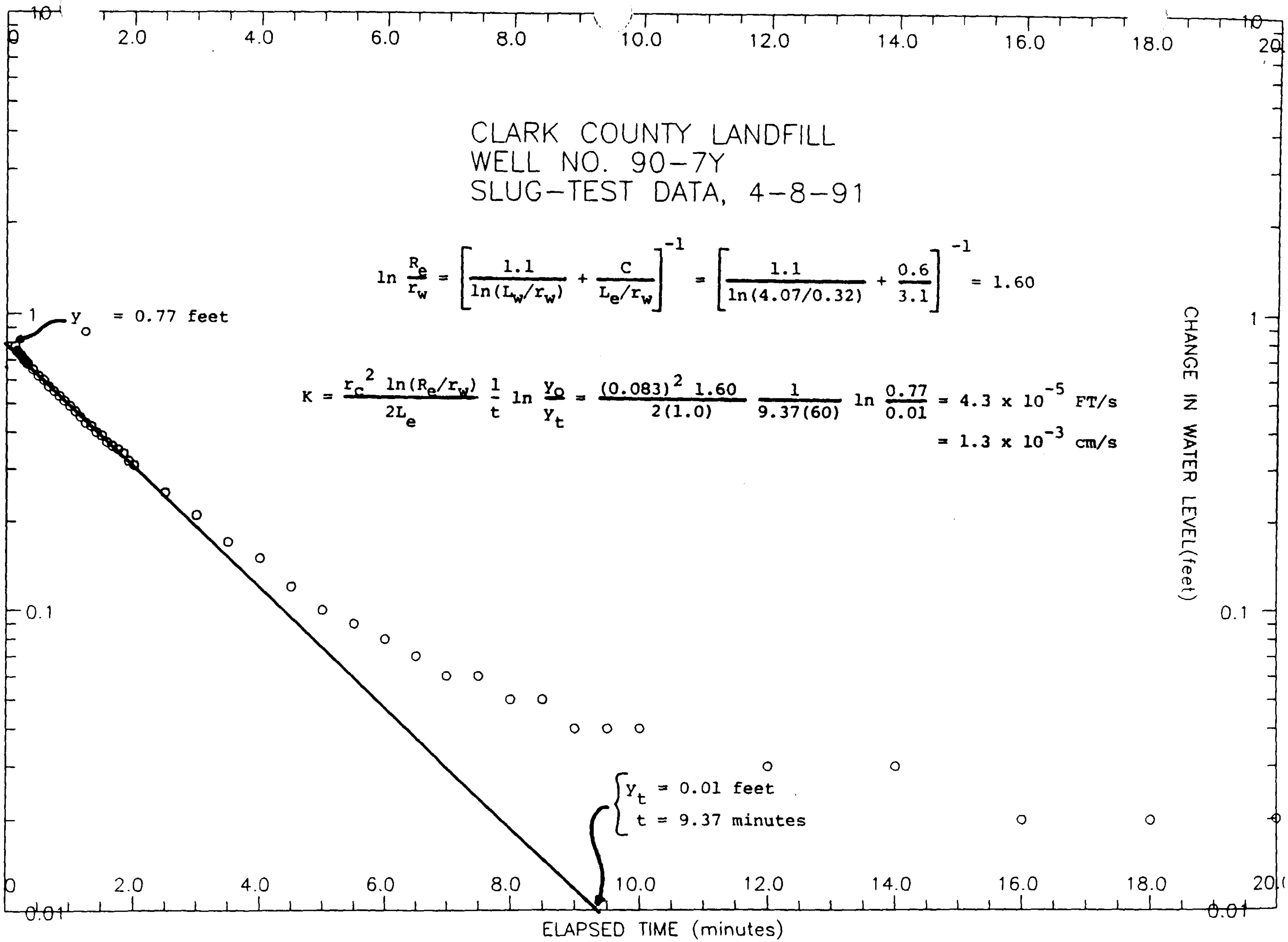
EAGON & ASSOCIATES, INC.

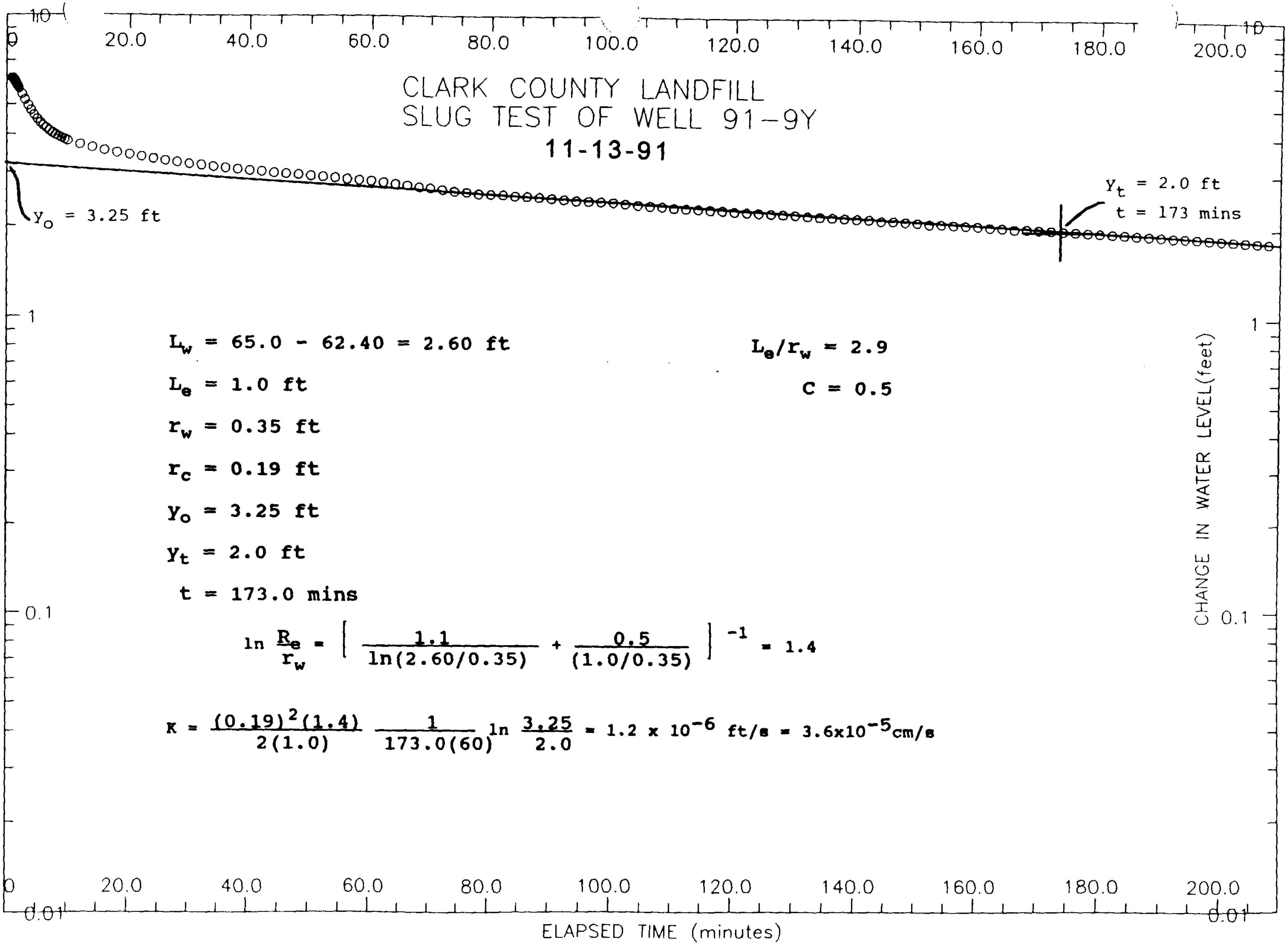


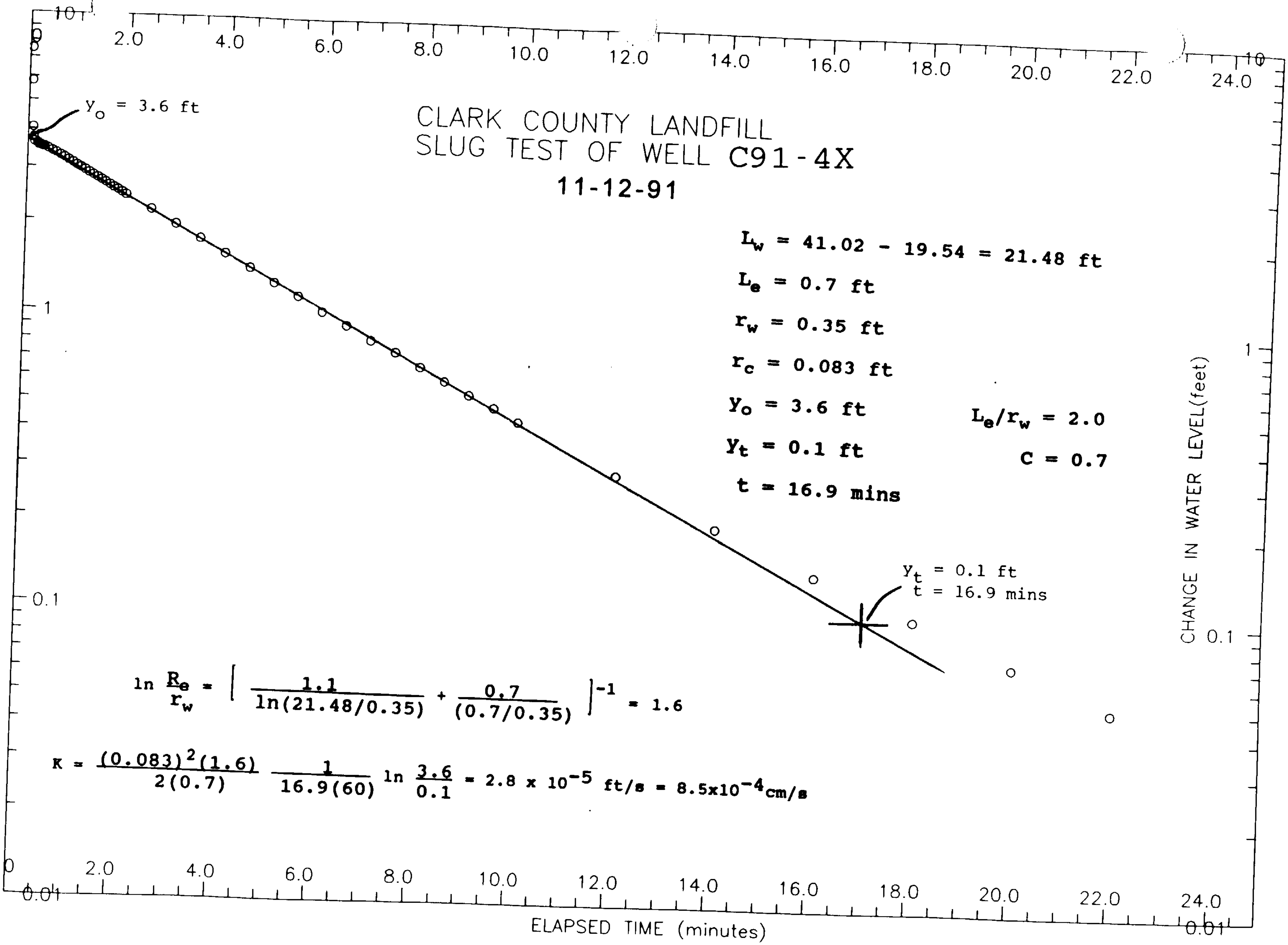
EAGON & ASSOCIATES, INC.

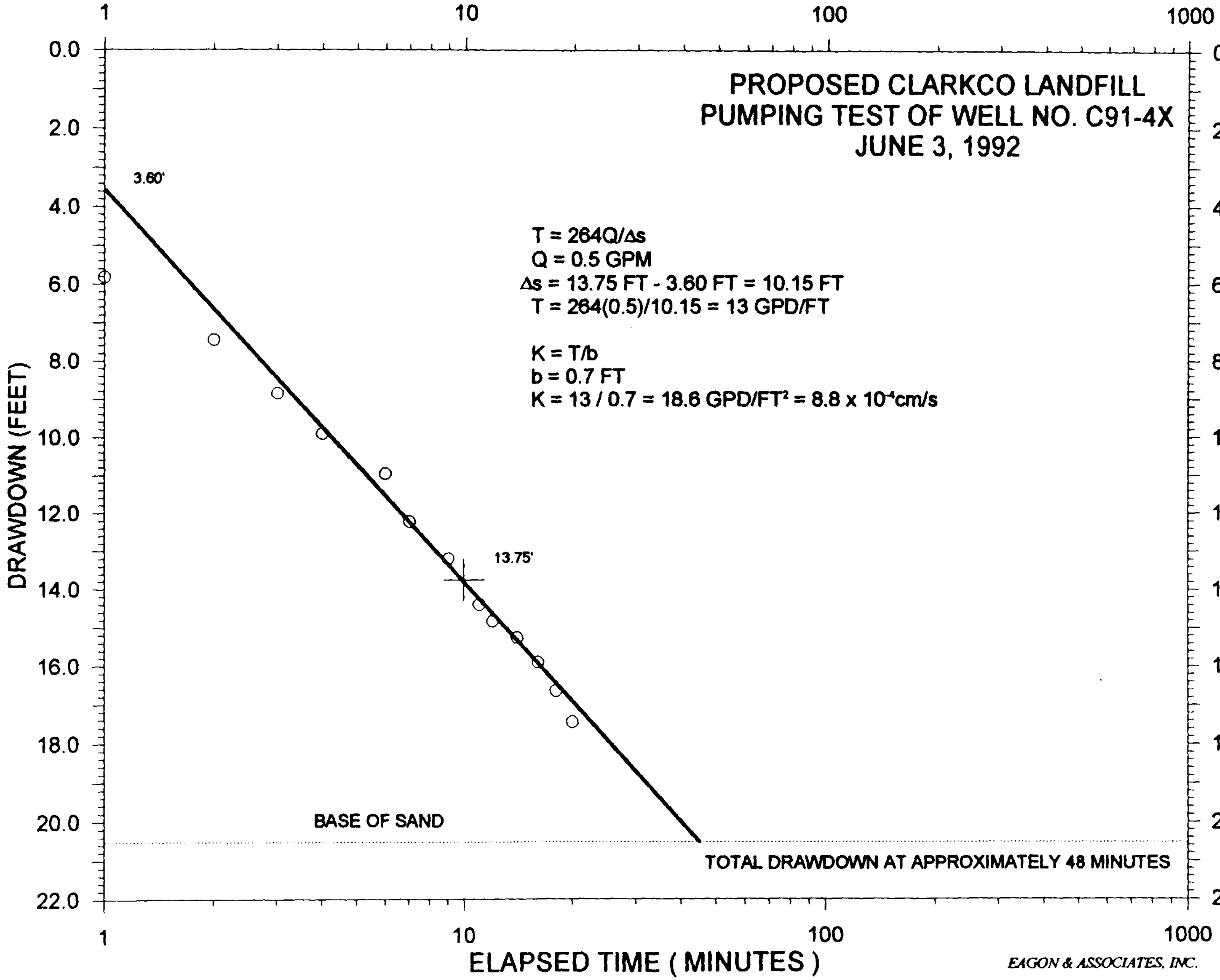

PROPOSED CLARKCO LANDFILL
SLUG TEST OF PIEZOMETER 92-24Y 2/8/93
(SLUG BAR OUT)
y_o = 3.2 ft.
L_e = 1.5 ft.
r_w = 0.35 ft.
L_w = 12.40 ft.
r_c = 0.083 ft.
C = 0.8
$\ln\frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{L_e/r_w}\right]^{-1}$
$\ln\frac{R_e}{r_w} = \left[\frac{1.1}{\ln(12.40/0.35)} + \frac{0.8}{1.5/0.35}\right]^{-1} = 2.0$
$K = \frac{r_c^2}{2L_e}\frac{\ln R_e/r_w\ 1}{t}\ln\frac{y_o}{y_t}$
$K = \frac{(0.083)^2}{2(1.5)}\frac{(2.0)(1)}{(13.95)}\ln\frac{3.2}{0.01}$
$K = 9.6 \times 10^{-4}$ cm/s
y_t = 0.01 ft
t = 13.95 minutes
CHANGE IN WATER LEVEL (FEET)
ELAPSED TIME (MINUTES)
10.
1.00
0.10
0.01
10.00
1.00
0.10
0.01
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
EAGON & ASSOCIATES, INC.


PROPOSED CLARKCO LANDFILL
SLUG TEST OF PIEZOMETER 92-29X 2/8/93
(SLUG BAR IN)
y_o = 2.6 ft.
L_e = 1.1 ft.
r_w = 0.35 ft.
L_w = 9.58 ft.
r_c = 0.083 ft.
C = 0.7
$\ln\frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{L_e/r_w}\right]^{-1}$
$\ln\frac{R_e}{r_w} = \left[\frac{1.1}{\ln(9.58/0.35)} + \frac{0.7}{1.1/0.35}\right]^{-1} = 1.8$
$K = \frac{r_c^2 \ln R_e/r_w}{2L_e}\frac{1}{t}\ln\frac{y_o}{y_t}$
$K = \frac{(0.083)^2(1.8)}{2(1.1)}\frac{(1)}{(180)}\ln\frac{2.6}{0.14}$
$K = 4.6 \times 10^{-5}$ cm/s
y_t = 0.14 ft
t = 180 minutes
CHANGE IN WATER LEVEL (FEET)
ELAPSED TIME (MINUTES)
10.00
1.00
0.10
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
EAGON & ASSOCIATES, INC.

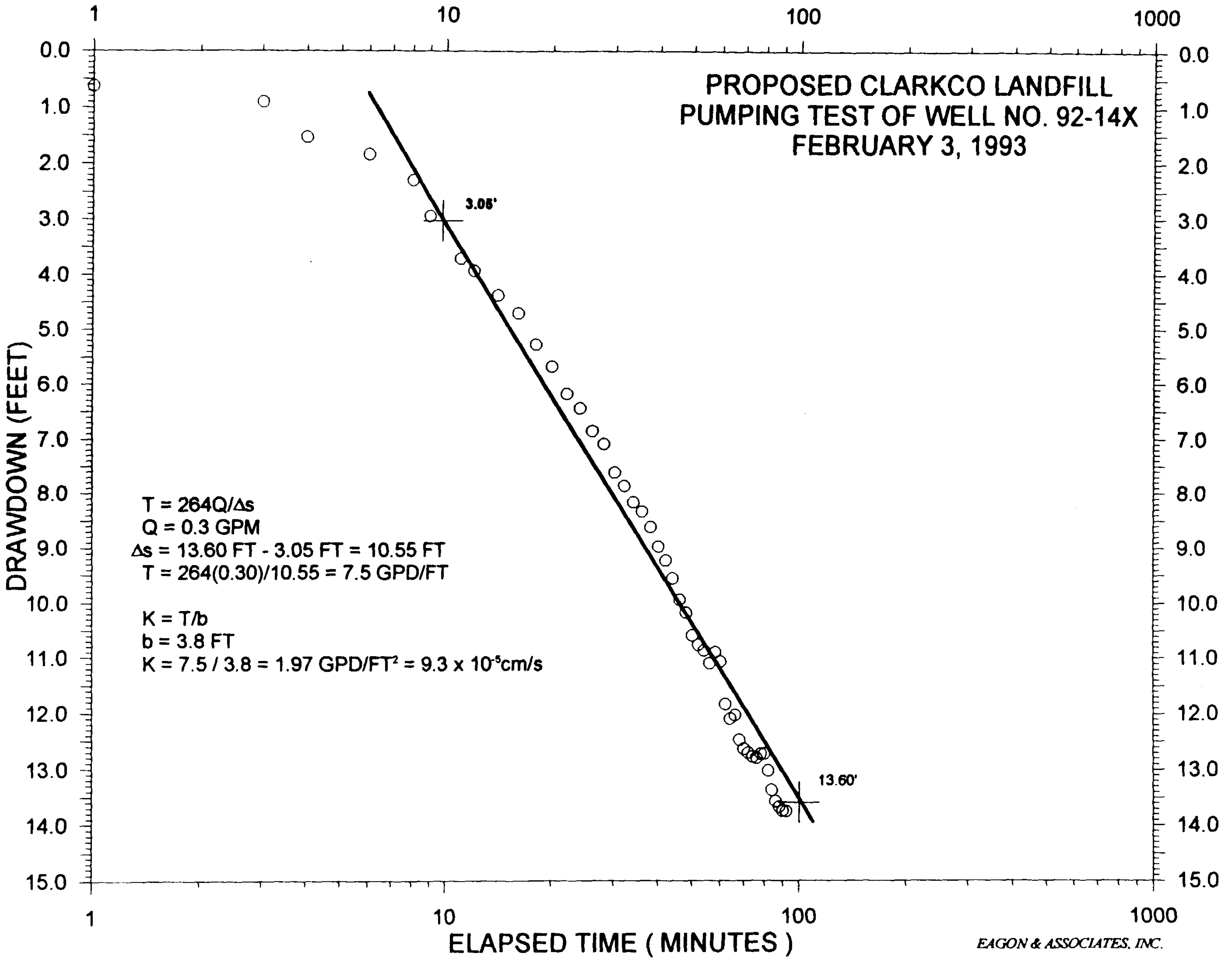

CLARK COUNTY LANDFILL
WELL NO. 90-7Y
SLUG-TEST DATA, 4-8-91
ln Re/rw = [1.1/ln(Lw/rw) + C/(Le/rw)]^-1 = [1.1/ln(4.07/0.32) + 0.6/3.1]^-1 = 1.60
K = rc^2 ln(Re/rw)/2Le 1/t ln yo/yt = (0.083)^2 1.60/2(1.0) 1/9.37(60) ln 0.77/0.01 = 4.3 x 10^-5 FT/s
= 1.3 x 10^-3 cm/s
yo = 0.77 feet
yt = 0.01 feet
t = 9.37 minutes
0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20
1
0.1
0.01
10
ELAPSED TIME (minutes)
CHANGE IN WATER LEVEL(feet)

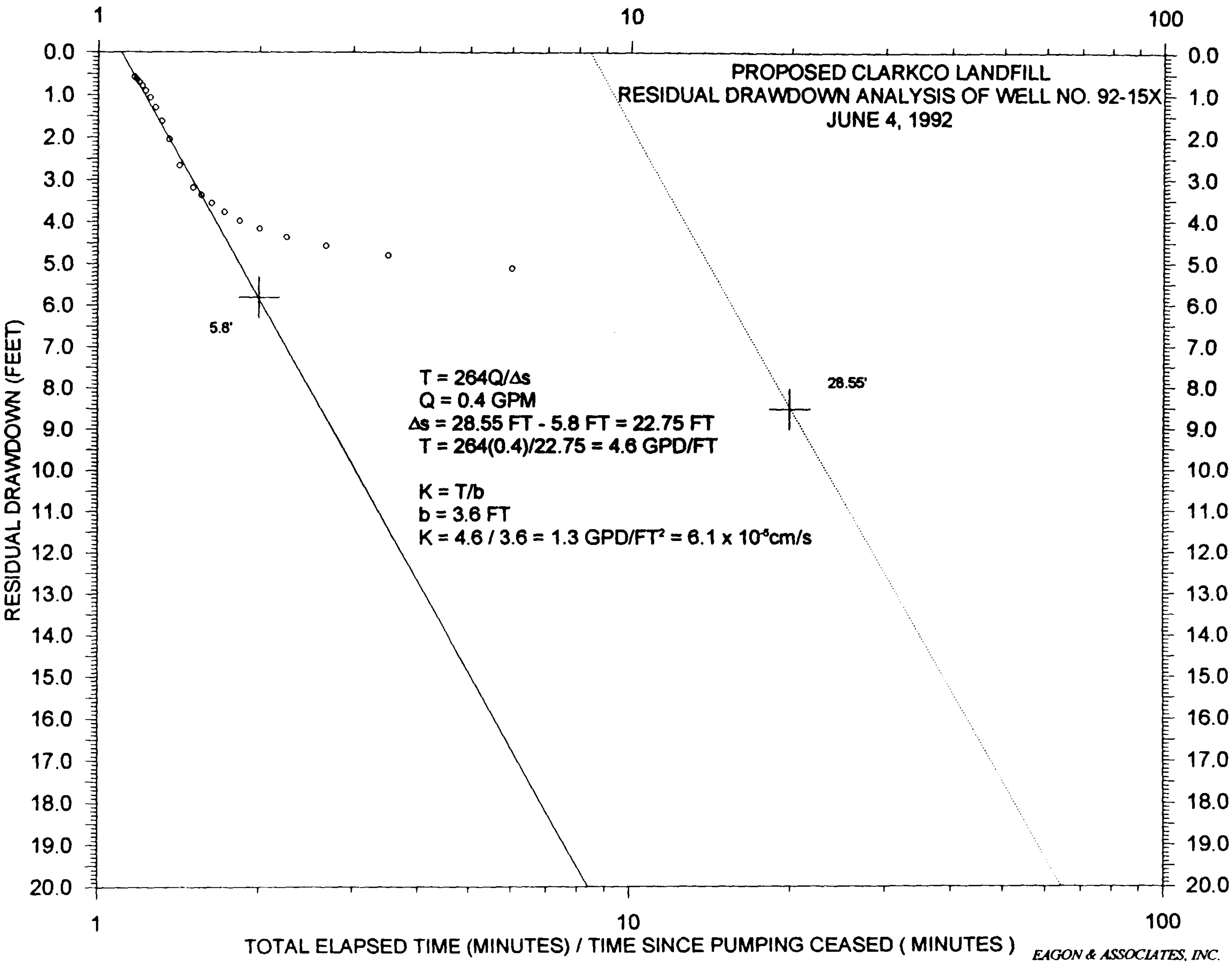

CLARK COUNTY LANDFILL
SLUG TEST OF WELL 91-9Y
11-13-91
y_o = 3.25 ft
y_t = 2.0 ft
t = 173 mins
L_w = 65.0 - 62.40 = 2.60 ft
L_e = 1.0 ft
r_w = 0.35 ft
r_c = 0.19 ft
y_o = 3.25 ft
y_t = 2.0 ft
t = 173.0 mins
L_e/r_w = 2.9
C = 0.5
ln R_e/r_w = [1.1 / ln(2.60/0.35) + 0.5 / (1.0/0.35)]^-1 = 1.4
K = (0.19)^2(1.4) / 2(1.0) · 1 / 173.0(60) · ln 3.25/2.0 = 1.2 x 10^-6 ft/s = 3.6x10^-5 cm/s
CHANGE IN WATER LEVEL (feet)
ELAPSED TIME (minutes)
0
20.0
40.0
60.0
80.0
100.0
120.0
140.0
160.0
180.0
200.0
10
1
0.1
0.01


CLARK COUNTY LANDFILL
SLUG TEST OF WELL C91-4X
11-12-91
y_o = 3.6 ft
L_w = 41.02 - 19.54 = 21.48 ft
L_e = 0.7 ft
r_w = 0.35 ft
r_c = 0.083 ft
y_o = 3.6 ft
y_t = 0.1 ft
t = 16.9 mins
L_e/r_w = 2.0
C = 0.7
y_t = 0.1 ft
t = 16.9 mins
$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(21.48/0.35)} + \frac{0.7}{(0.7/0.35)} \right]^{-1} = 1.6$
$K = \frac{(0.083)^2(1.6)}{2(0.7)} \frac{1}{16.9(60)} \ln \frac{3.6}{0.1} = 2.8 \times 10^{-5}$ ft/s = 8.5×10^{-4} cm/s
CHANGE IN WATER LEVEL (feet)
ELAPSED TIME (minutes)
10
1
0.1
0.01
0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0



PROPOSED CLARKCO LANDFILL
PUMPING TEST OF WELL NO. C91-4X
JUNE 3, 1992
T = 264Q/Δs
Q = 0.5 GPM
Δs = 13.75 FT - 3.60 FT = 10.15 FT
T = 264(0.5)/10.15 = 13 GPD/FT
K = T/b
b = 0.7 FT
K = 13 / 0.7 = 18.6 GPD/FT² = 8.8 x 10⁻⁴cm/s
3.60'
13.75'
BASE OF SAND
TOTAL DRAWDOWN AT APPROXIMATELY 48 MINUTES
DRAWDOWN (FEET)
ELAPSED TIME (MINUTES)
EAGON & ASSOCIATES, INC.


PROPOSED CLARKCO LANDFILL
PUMPING TEST OF WELL NO. 92-14X
FEBRUARY 3, 1993
3.05'
13.60'
T = 264Q/Δs
Q = 0.3 GPM
Δs = 13.60 FT - 3.05 FT = 10.55 FT
T = 264(0.30)/10.55 = 7.5 GPD/FT
K = T/b
b = 3.8 FT
K = 7.5 / 3.8 = 1.97 GPD/FT² = 9.3 x 10⁻⁵cm/s
DRAWDOWN (FEET)
ELAPSED TIME (MINUTES)
EAGON & ASSOCIATES, INC.



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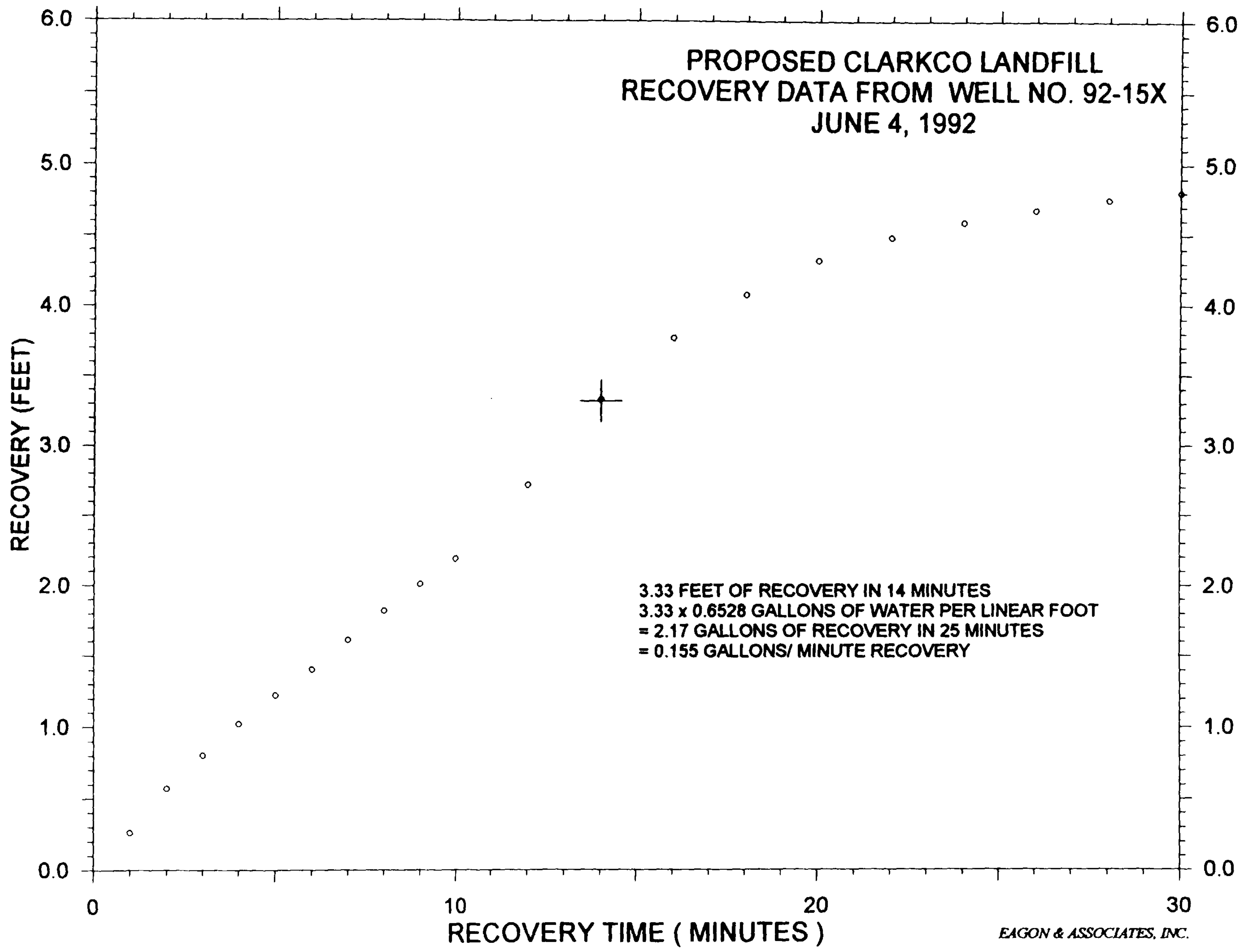
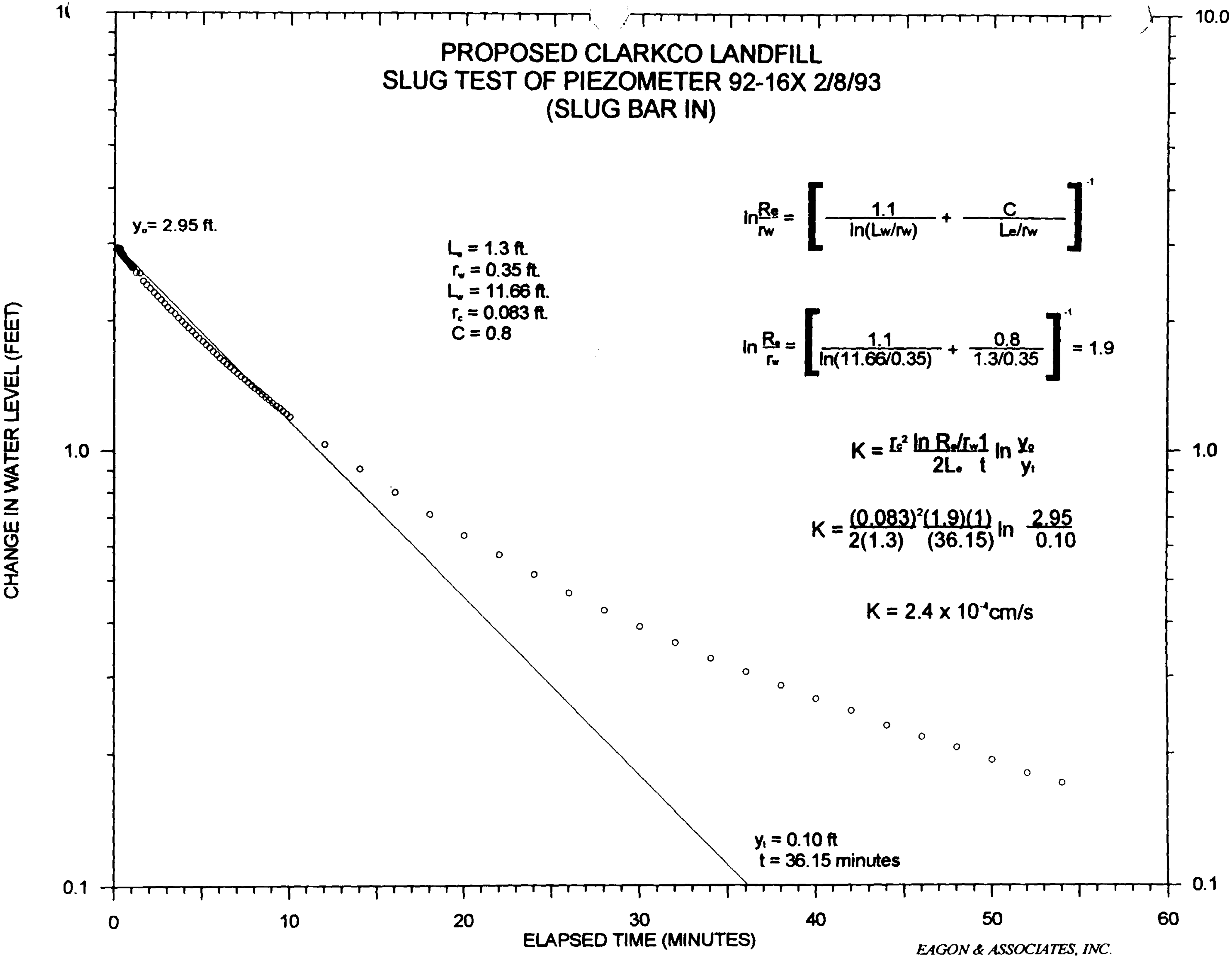
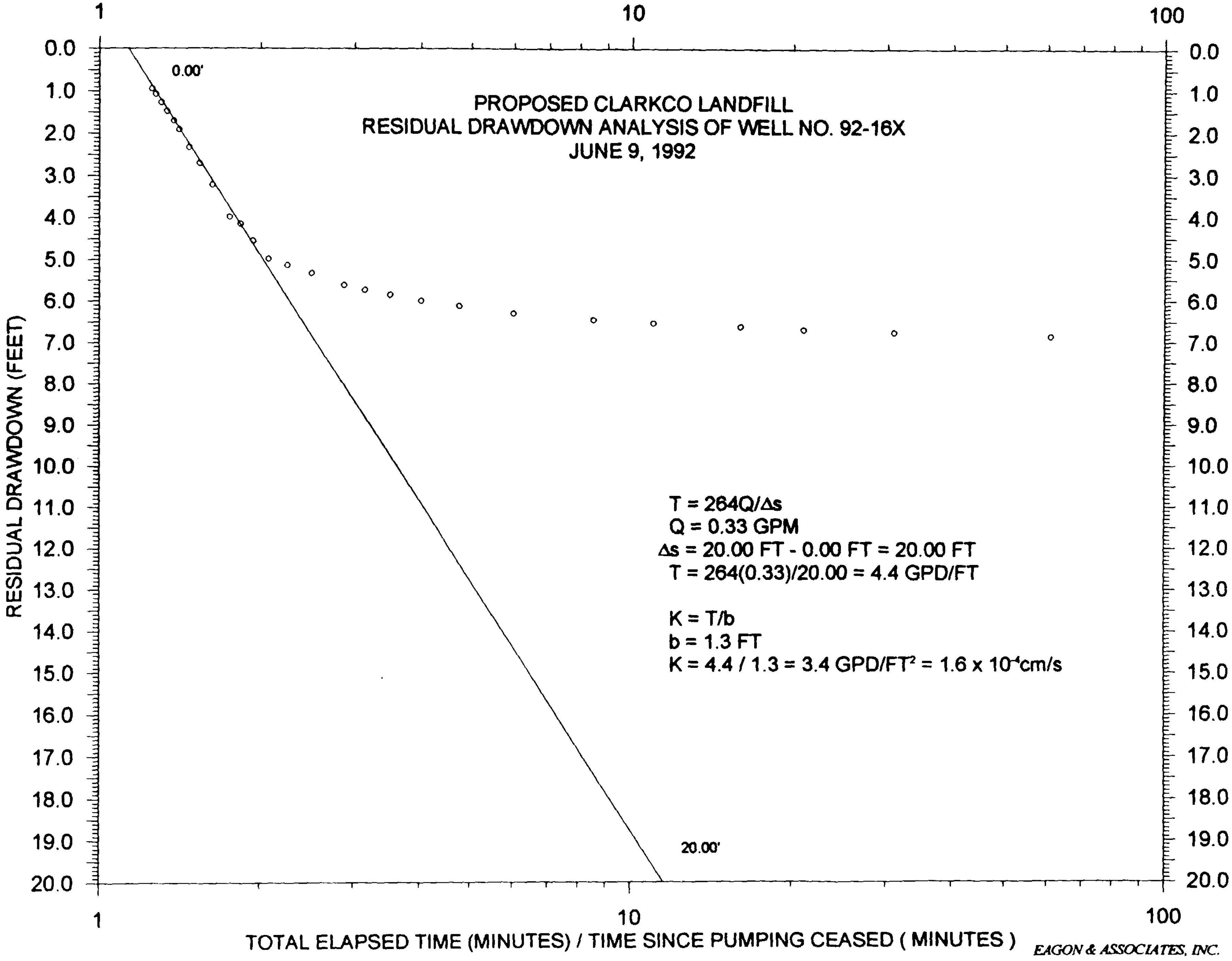
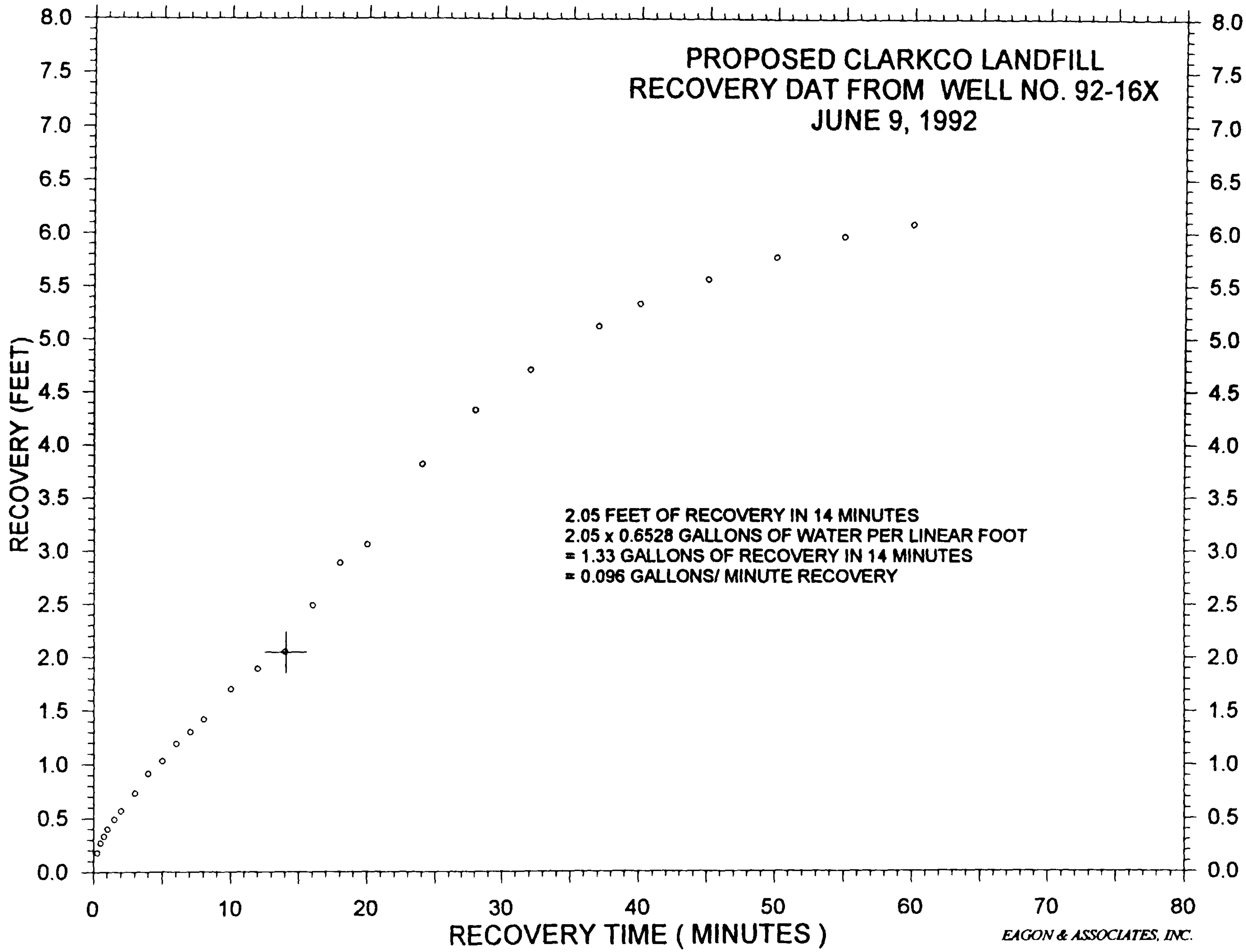

PROPOSED CLARKCO LANDFILL
RECOVERY DATA FROM WELL NO. 92-15X
JUNE 4, 1992
3.33 FEET OF RECOVERY IN 14 MINUTES
3.33 x 0.6528 GALLONS OF WATER PER LINEAR FOOT
= 2.17 GALLONS OF RECOVERY IN 25 MINUTES
= 0.155 GALLONS/ MINUTE RECOVERY
RECOVERY (FEET)
RECOVERY TIME (MINUTES)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
0
10
20
30
EAGON & ASSOCIATES, INC.

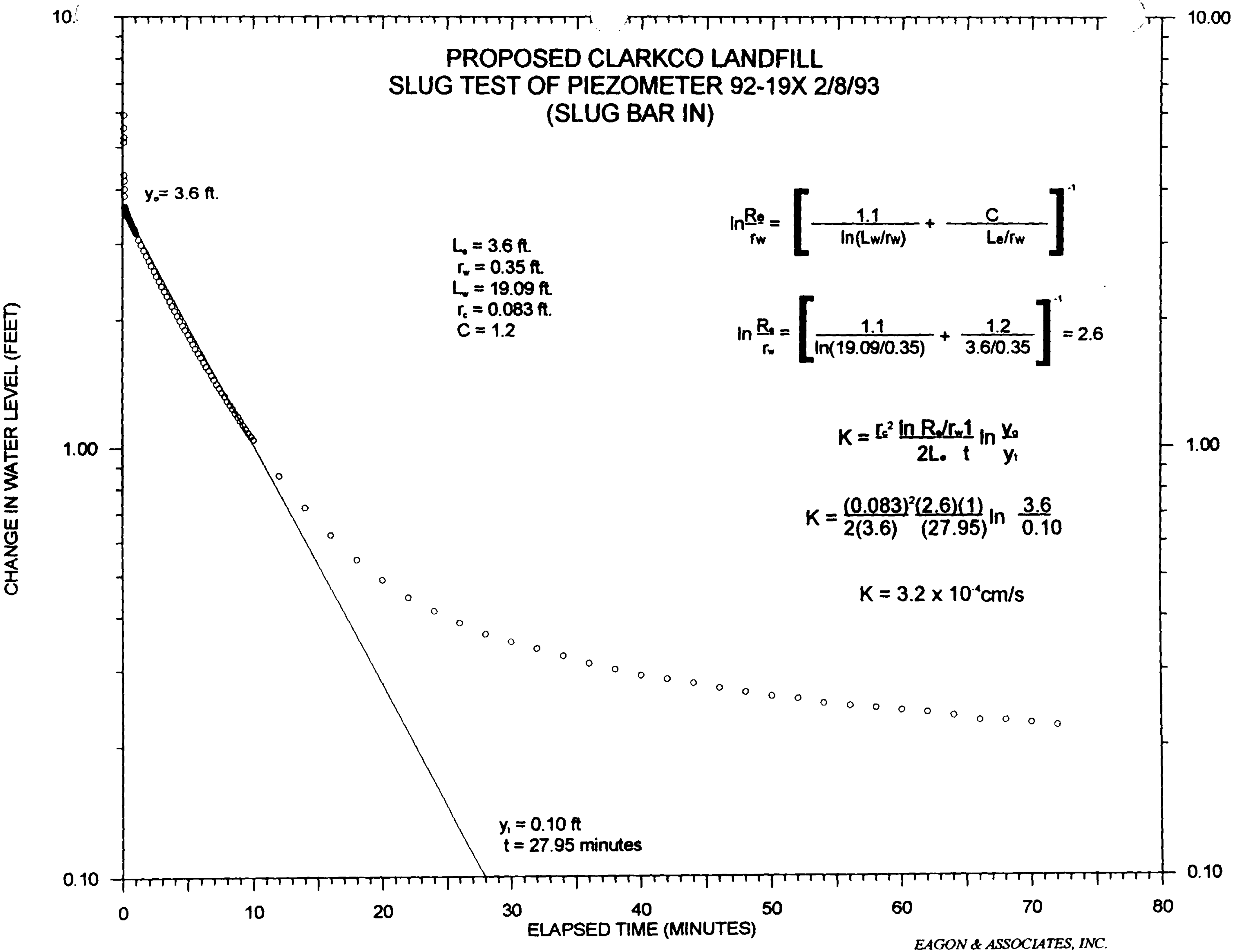


EAGON & ASSOCIATES, INC.

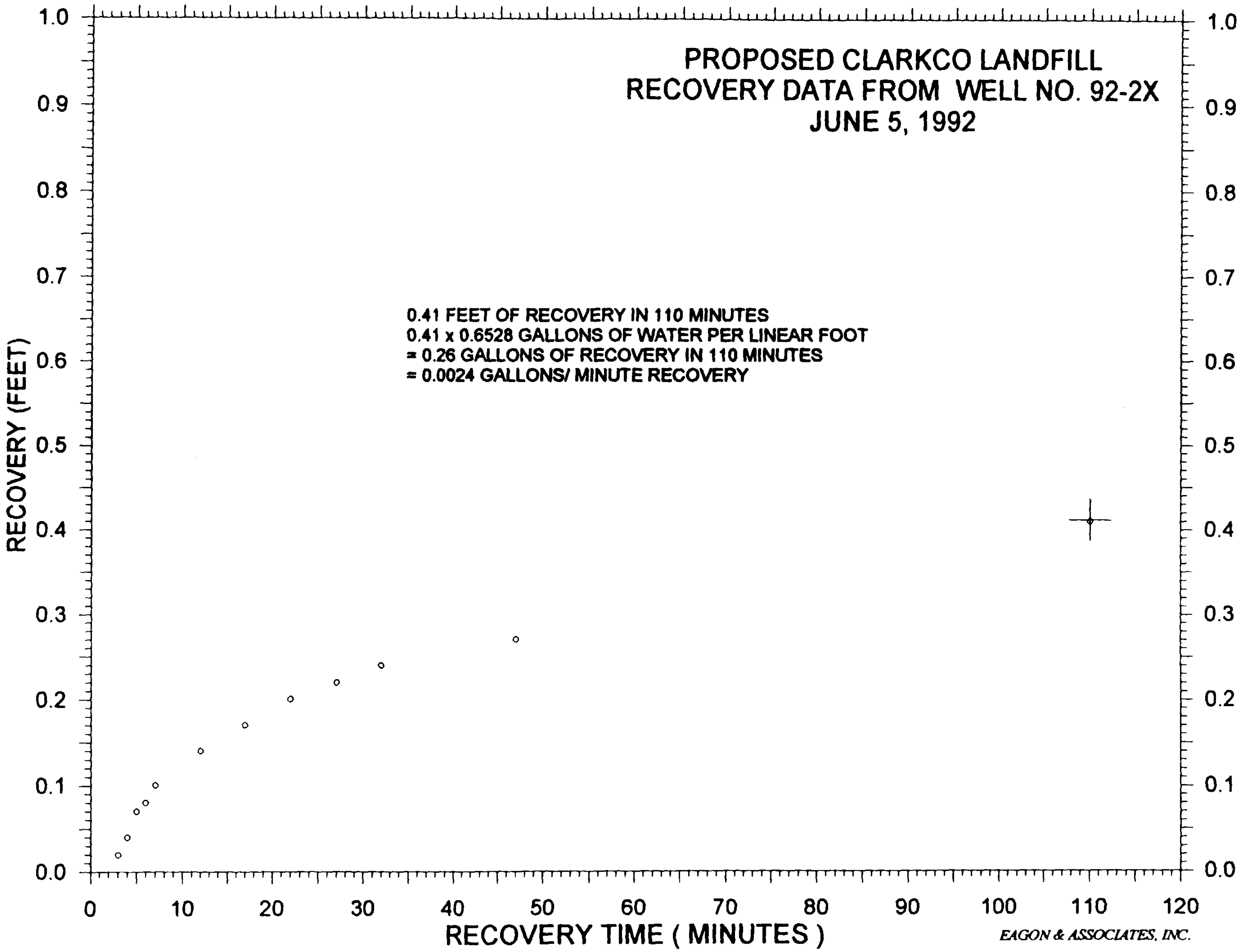

PROPOSED CLARKCO LANDFILL
RESIDUAL DRAWDOWN ANALYSIS OF WELL NO. 92-16X
JUNE 9, 1992
0.00'
20.00'
T = 264Q/Δs
Q = 0.33 GPM
Δs = 20.00 FT - 0.00 FT = 20.00 FT
T = 264(0.33)/20.00 = 4.4 GPD/FT
K = T/b
b = 1.3 FT
K = 4.4 / 1.3 = 3.4 GPD/FT² = 1.6 x 10⁻⁴cm/s
RESIDUAL DRAWDOWN (FEET)
TOTAL ELAPSED TIME (MINUTES) / TIME SINCE PUMPING CEASED (MINUTES)
1
10
100
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
16.0
17.0
18.0
19.0
20.0
EAGON & ASSOCIATES, INC.

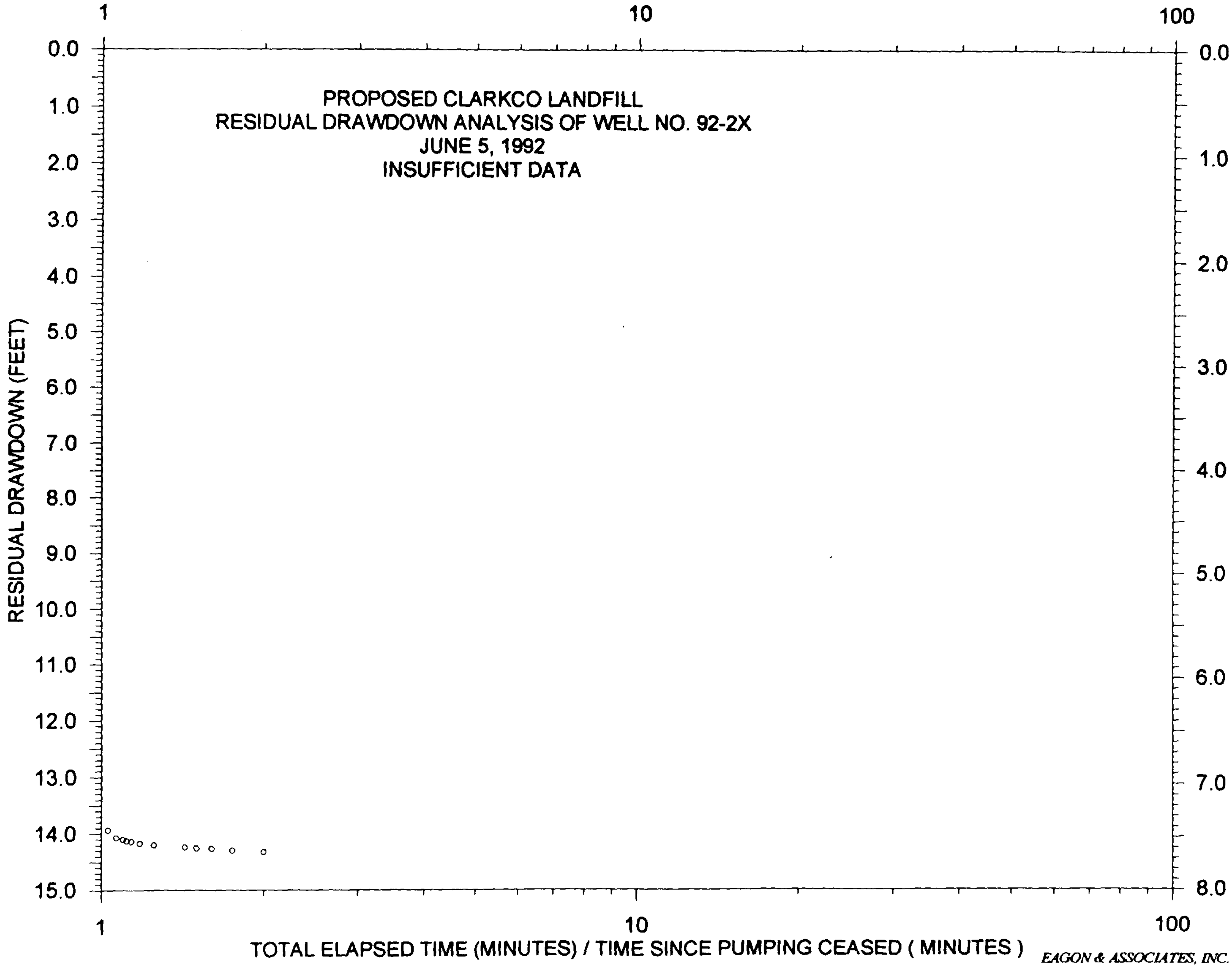


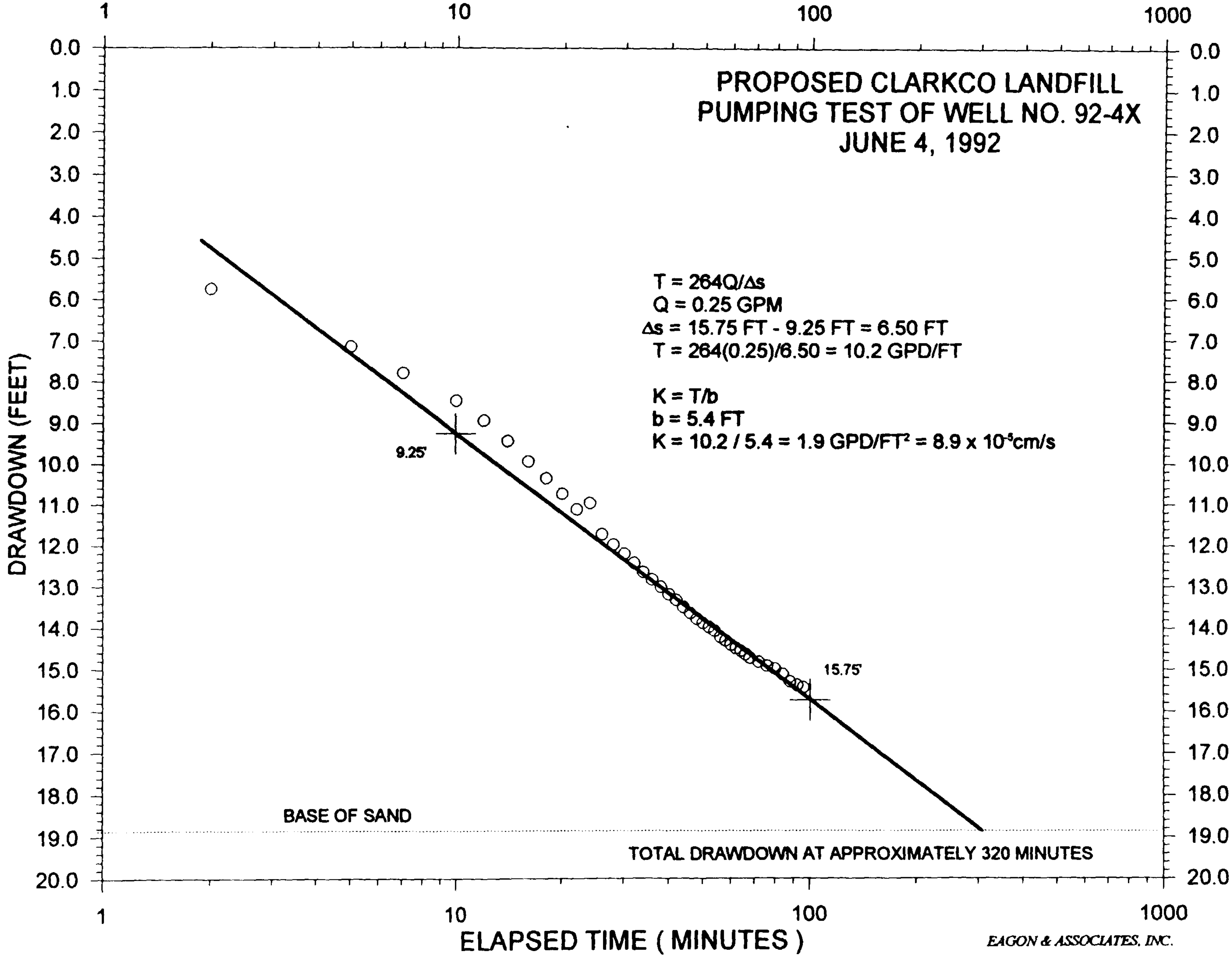
PROPOSED CLARKCO LANDFILL
RECOVERY DAT FROM WELL NO. 92-16X
JUNE 9, 1992
2.05 FEET OF RECOVERY IN 14 MINUTES
2.05 x 0.6528 GALLONS OF WATER PER LINEAR FOOT
= 1.33 GALLONS OF RECOVERY IN 14 MINUTES
= 0.096 GALLONS/ MINUTE RECOVERY
RECOVERY (FEET)
RECOVERY TIME (MINUTES)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
0
10
20
30
40
50
60
70
80
EAGON & ASSOCIATES, INC.

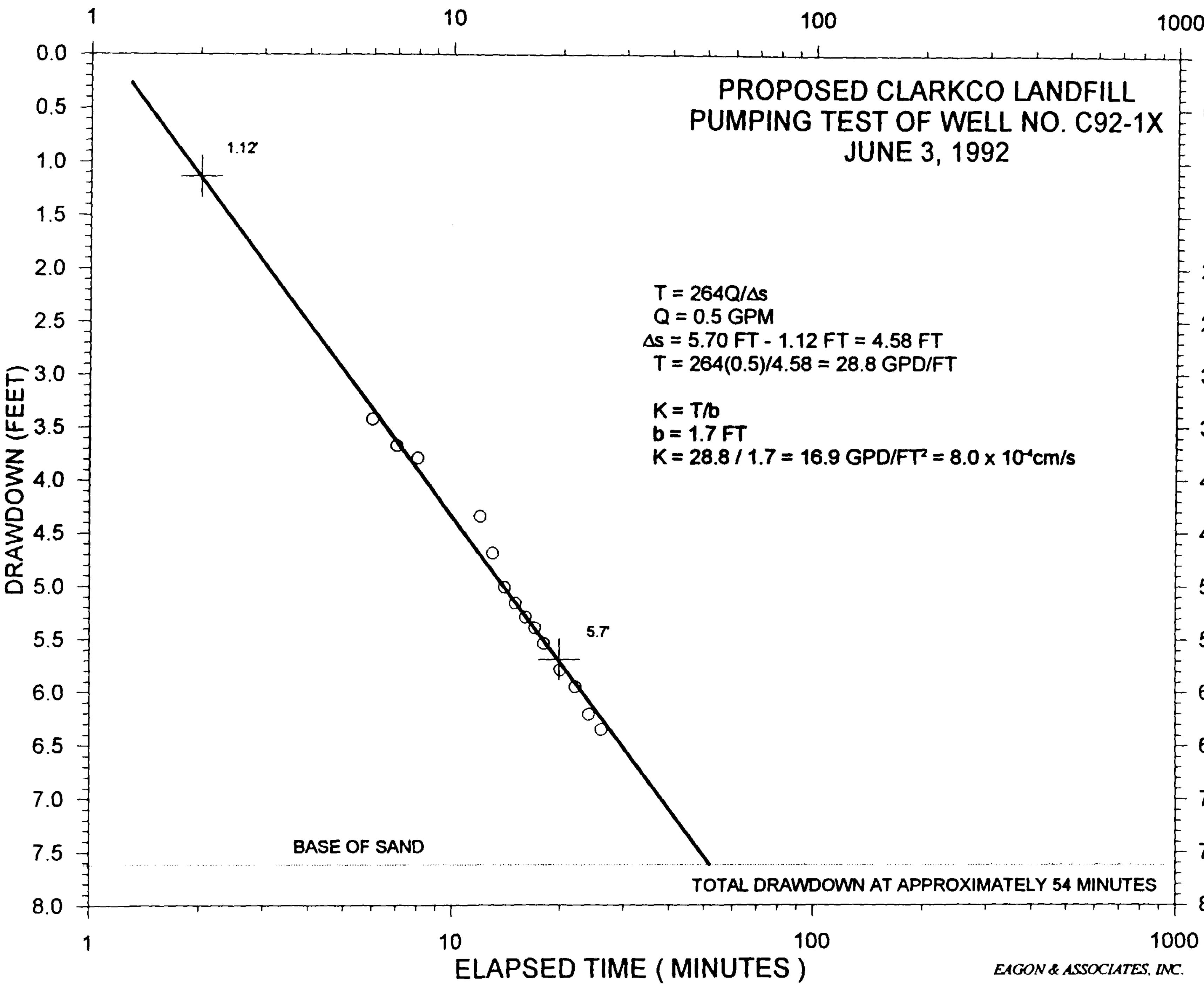


PROPOSED CLARKCO LANDFILL
SLUG TEST OF PIEZOMETER 92-19X 2/8/93
(SLUG BAR IN)
y_o = 3.6 ft.
L_e = 3.6 ft.
r_w = 0.35 ft.
L_w = 19.09 ft.
r_c = 0.083 ft.
C = 1.2
$\ln\frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{L_e/r_w}\right]^{-1}$
$\ln\frac{R_e}{r_w} = \left[\frac{1.1}{\ln(19.09/0.35)} + \frac{1.2}{3.6/0.35}\right]^{-1} = 2.6$
$K = \frac{r_c^2 \ln R_e/r_w 1}{2L_e \; t} \ln\frac{y_o}{y_t}$
$K = \frac{(0.083)^2(2.6)(1)}{2(3.6)\;(27.95)} \ln\frac{3.6}{0.10}$
$K = 3.2 \times 10^{-4}$ cm/s
y_t = 0.10 ft
t = 27.95 minutes
CHANGE IN WATER LEVEL (FEET)
ELAPSED TIME (MINUTES)
10.00
1.00
0.10
0
10
20
30
40
50
60
70
80
EAGON & ASSOCIATES, INC.

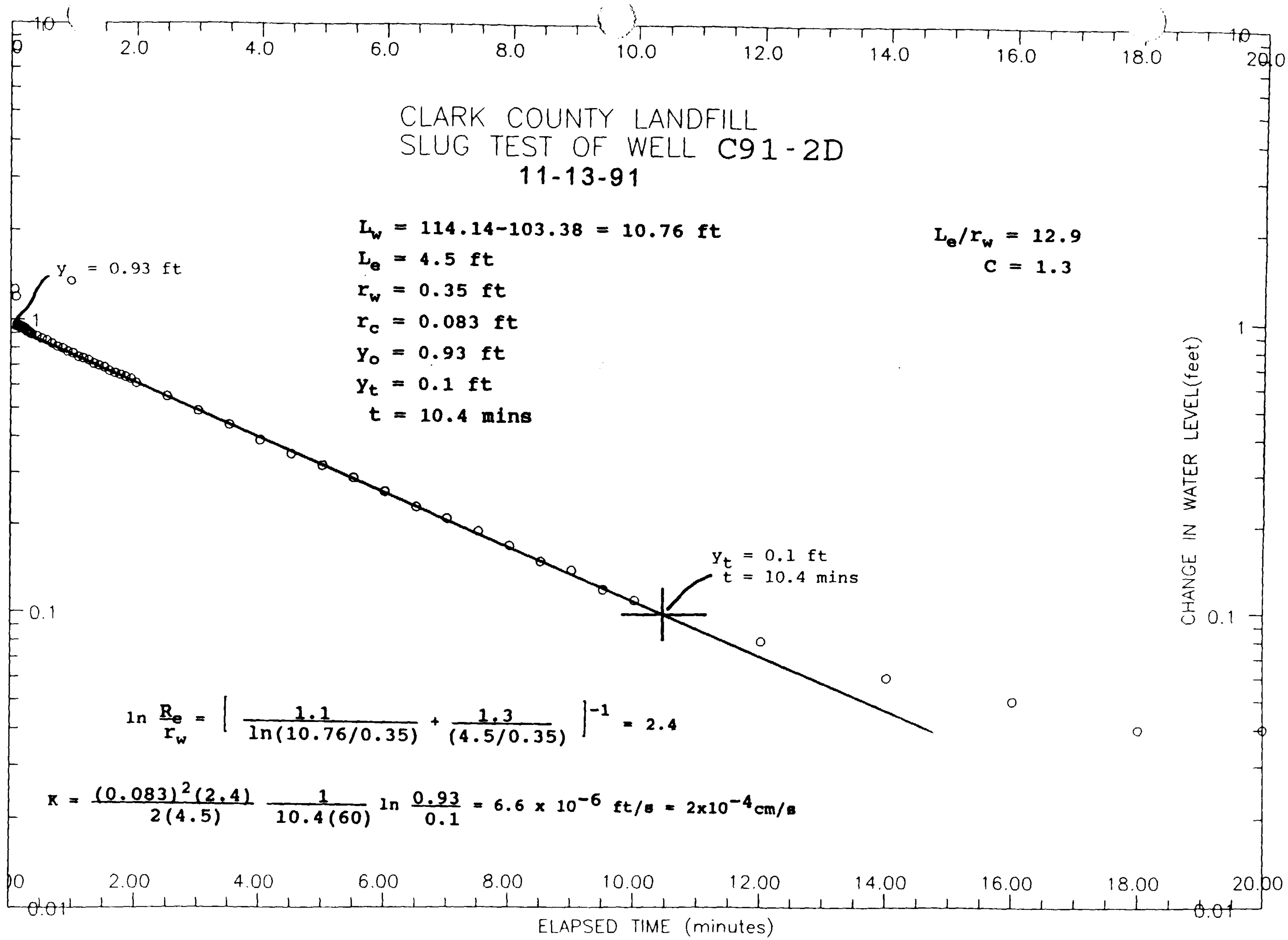

PROPOSED CLARKCO LANDFILL
RECOVERY DATA FROM WELL NO. 92-2X
JUNE 5, 1992
0.41 FEET OF RECOVERY IN 110 MINUTES
0.41 x 0.6528 GALLONS OF WATER PER LINEAR FOOT
= 0.26 GALLONS OF RECOVERY IN 110 MINUTES
= 0.0024 GALLONS/ MINUTE RECOVERY
RECOVERY (FEET)
RECOVERY TIME (MINUTES)
EAGON & ASSOCIATES, INC.

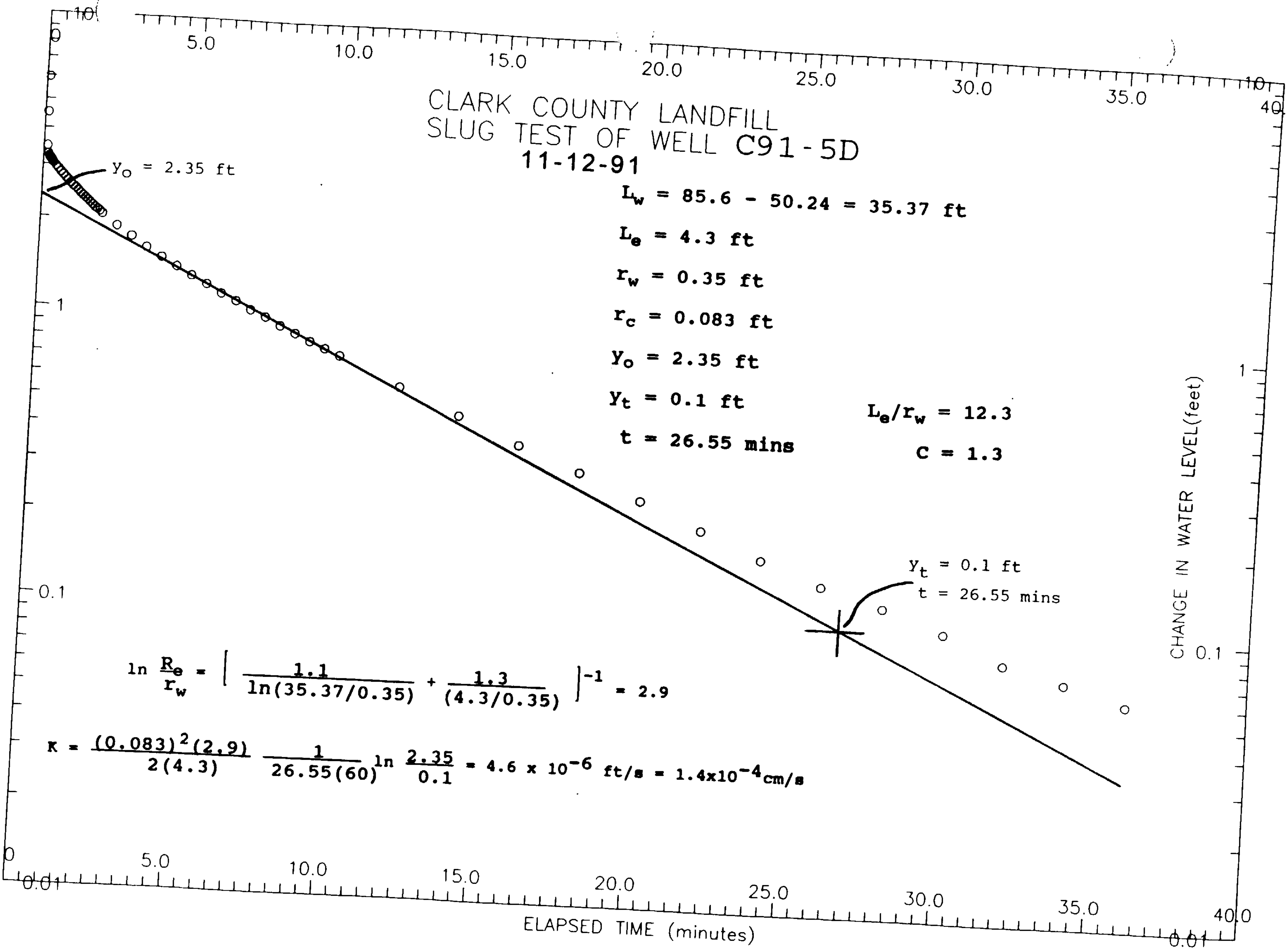

PROPOSED CLARKCO LANDFILL
RESIDUAL DRAWDOWN ANALYSIS OF WELL NO. 92-2X
JUNE 5, 1992
INSUFFICIENT DATA
RESIDUAL DRAWDOWN (FEET)
0.0
1.0
2.0
3.0
4.0
5.0
6.0
7.0
8.0
9.0
10.0
11.0
12.0
13.0
14.0
15.0
1
10
100
TOTAL ELAPSED TIME (MINUTES) / TIME SINCE PUMPING CEASED (MINUTES)
EAGON & ASSOCIATES, INC.

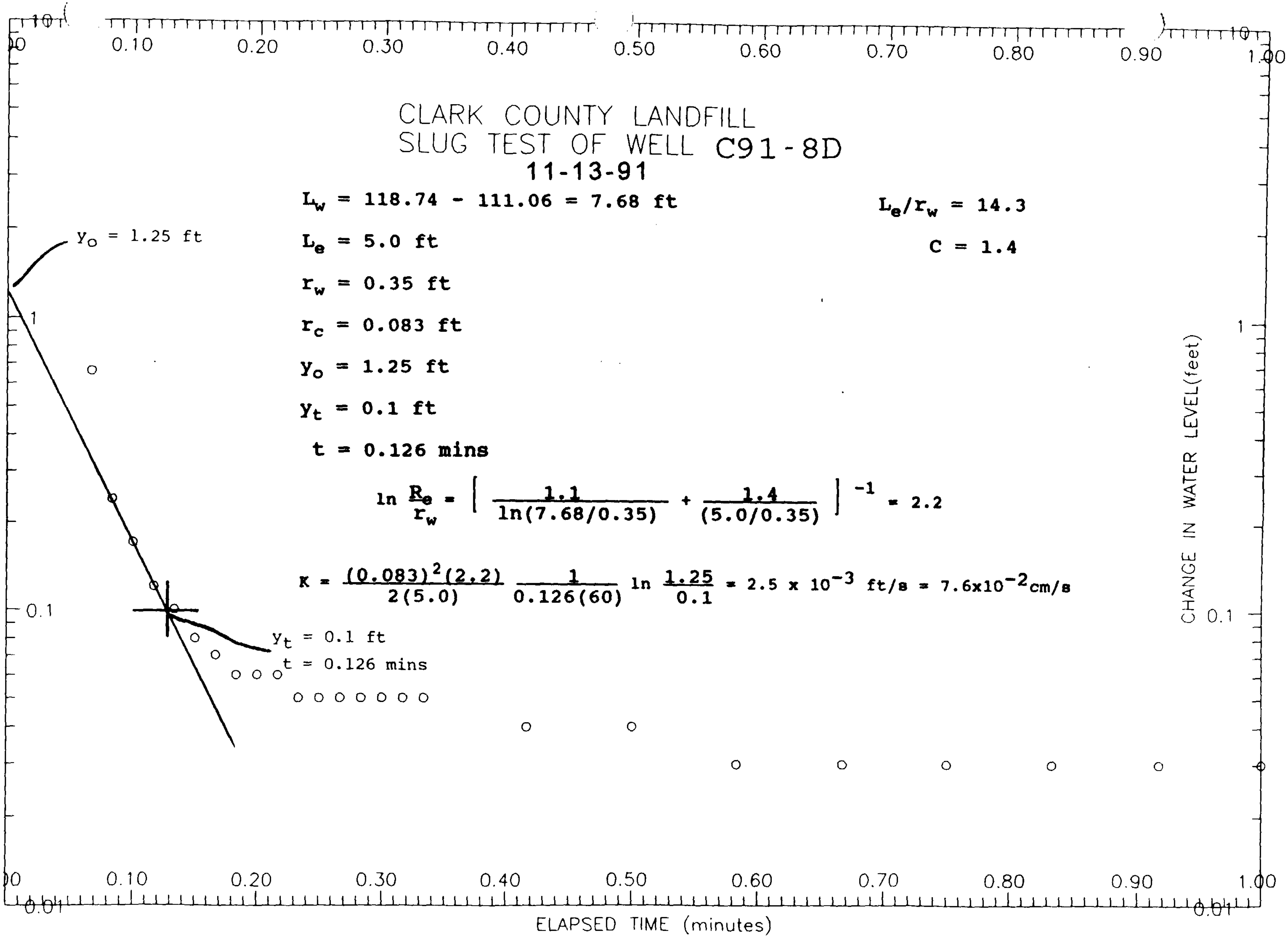

PROPOSED CLARKCO LANDFILL
PUMPING TEST OF WELL NO. 92-4X
JUNE 4, 1992
T = 264Q/Δs
Q = 0.25 GPM
Δs = 15.75 FT - 9.25 FT = 6.50 FT
T = 264(0.25)/6.50 = 10.2 GPD/FT
K = T/b
b = 5.4 FT
K = 10.2 / 5.4 = 1.9 GPD/FT² = 8.9 x 10⁻⁵cm/s
9.25'
15.75'
BASE OF SAND
TOTAL DRAWDOWN AT APPROXIMATELY 320 MINUTES
DRAWDOWN (FEET)
ELAPSED TIME (MINUTES)
EAGON & ASSOCIATES, INC.



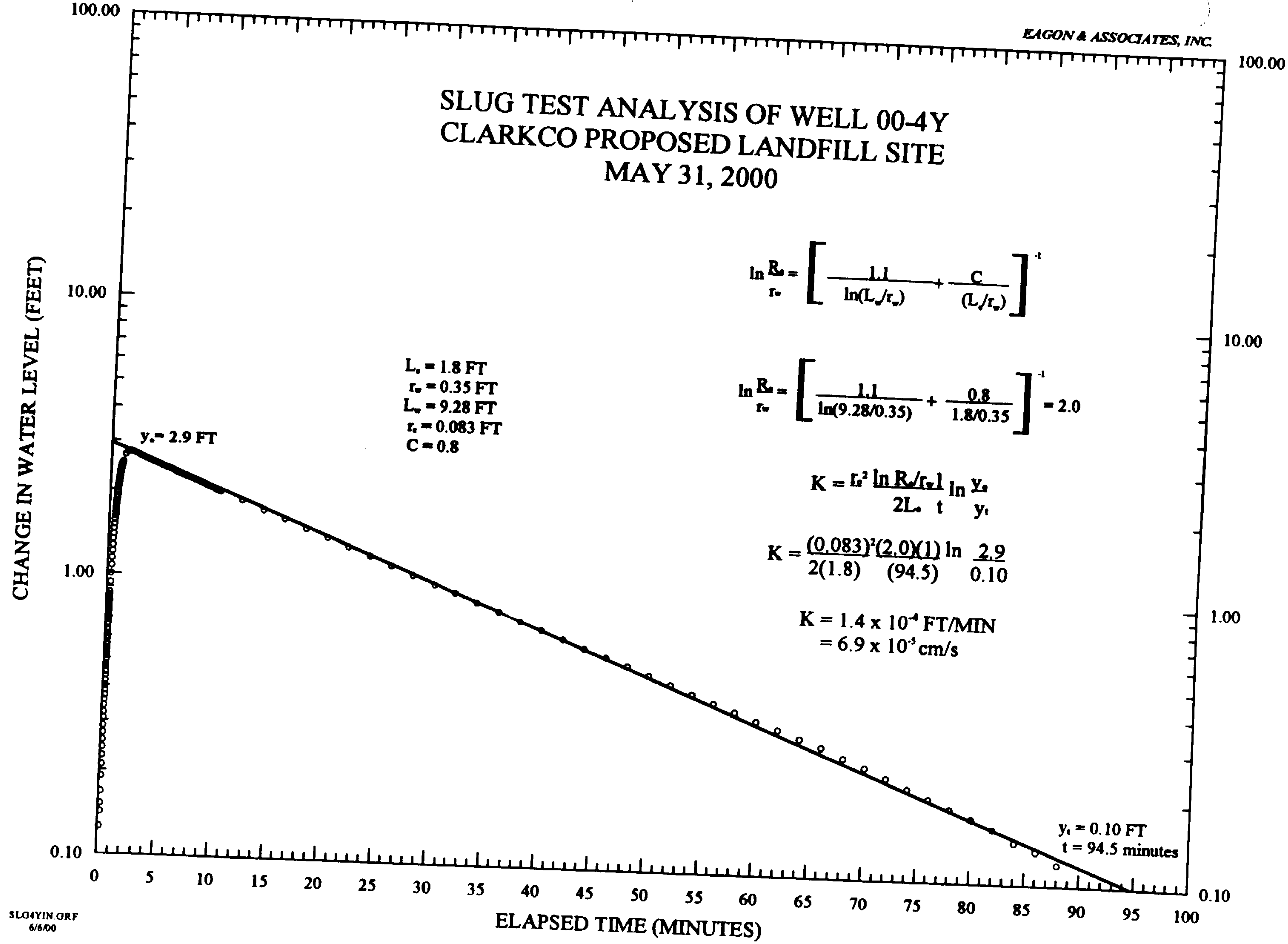
PROPOSED CLARKCO LANDFILL
PUMPING TEST OF WELL NO. C92-1X
JUNE 3, 1992
T = 264Q/Δs
Q = 0.5 GPM
Δs = 5.70 FT - 1.12 FT = 4.58 FT
T = 264(0.5)/4.58 = 28.8 GPD/FT
K = T/b
b = 1.7 FT
K = 28.8 / 1.7 = 16.9 GPD/FT² = 8.0 x 10⁻⁴cm/s
1.12'
5.7'
BASE OF SAND
TOTAL DRAWDOWN AT APPROXIMATELY 54 MINUTES
DRAWDOWN (FEET)
ELAPSED TIME (MINUTES)
1
10
100
1000
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
EAGON & ASSOCIATES, INC.

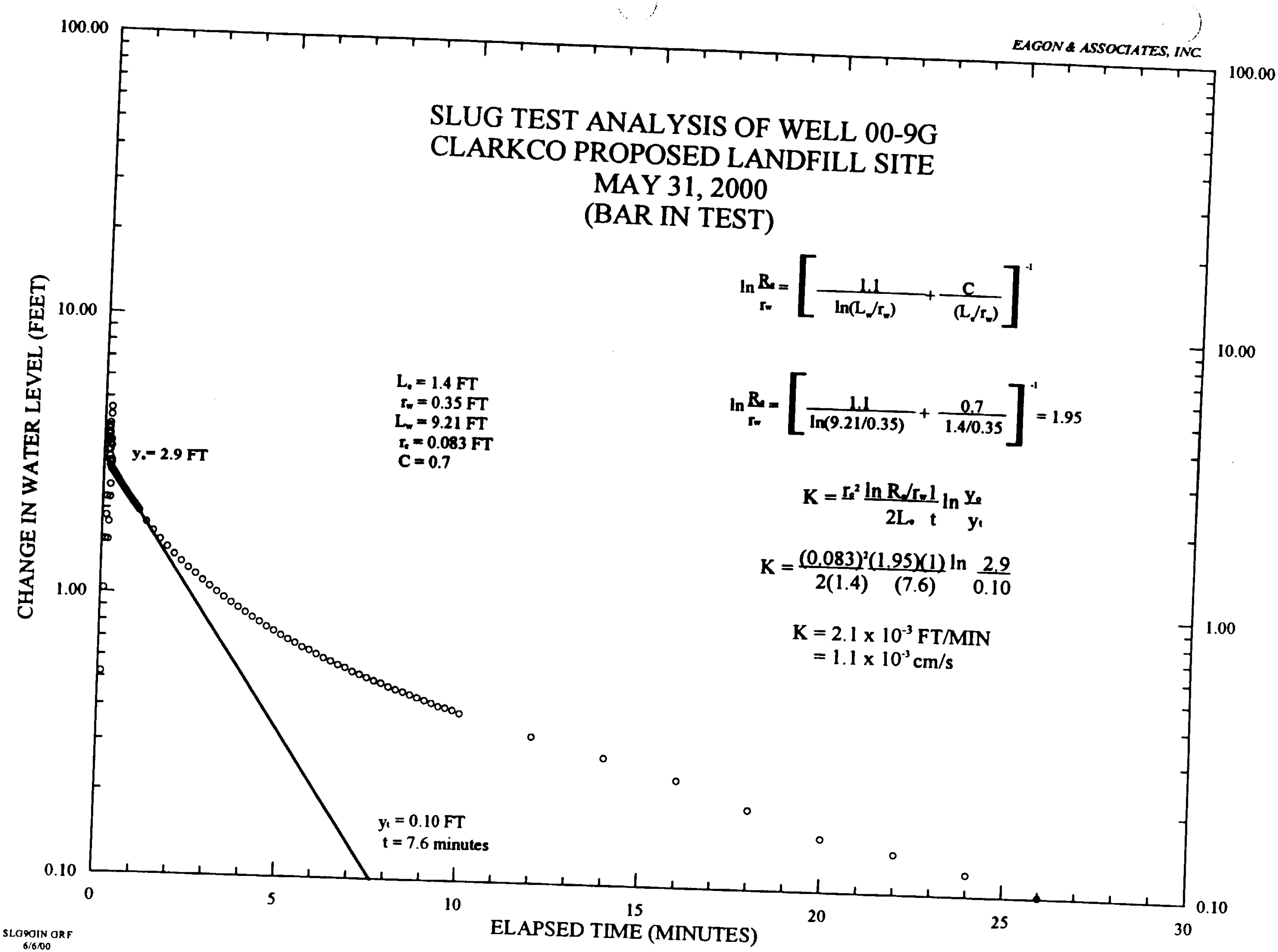

CLARK COUNTY LANDFILL
SLUG TEST OF WELL C91-2D
11-13-91
Lw = 114.14-103.38 = 10.76 ft
Le = 4.5 ft
rw = 0.35 ft
rc = 0.083 ft
yo = 0.93 ft
yt = 0.1 ft
t = 10.4 mins
Le/rw = 12.9
C = 1.3
yo = 0.93 ft
yt = 0.1 ft
t = 10.4 mins
ln Re/rw = [1.1/ln(10.76/0.35) + 1.3/(4.5/0.35)]^-1 = 2.4
K = (0.083)^2(2.4)/2(4.5) 1/10.4(60) ln 0.93/0.1 = 6.6 x 10^-6 ft/s = 2x10^-4 cm/s
CHANGE IN WATER LEVEL(feet)
ELAPSED TIME (minutes)
0.1
1
0.01
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00


CLARK COUNTY LANDFILL
SLUG TEST OF WELL C91-5D
11-12-91
y_o = 2.35 ft
L_w = 85.6 - 50.24 = 35.37 ft
L_e = 4.3 ft
r_w = 0.35 ft
r_c = 0.083 ft
y_o = 2.35 ft
y_t = 0.1 ft
t = 26.55 mins
L_e/r_w = 12.3
C = 1.3
y_t = 0.1 ft
t = 26.55 mins
$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(35.37/0.35)} + \frac{1.3}{(4.3/0.35)} \right]^{-1} = 2.9$
$K = \frac{(0.083)^2(2.9)}{2(4.3)} \frac{1}{26.55(60)} \ln \frac{2.35}{0.1} = 4.6 \times 10^{-6}$ ft/s $= 1.4 \times 10^{-4}$ cm/s
10
1
0.1
0.01
5.0
10.0
15.0
20.0
25.0
30.0
35.0
40.0
ELAPSED TIME (minutes)
CHANGE IN WATER LEVEL(feet)

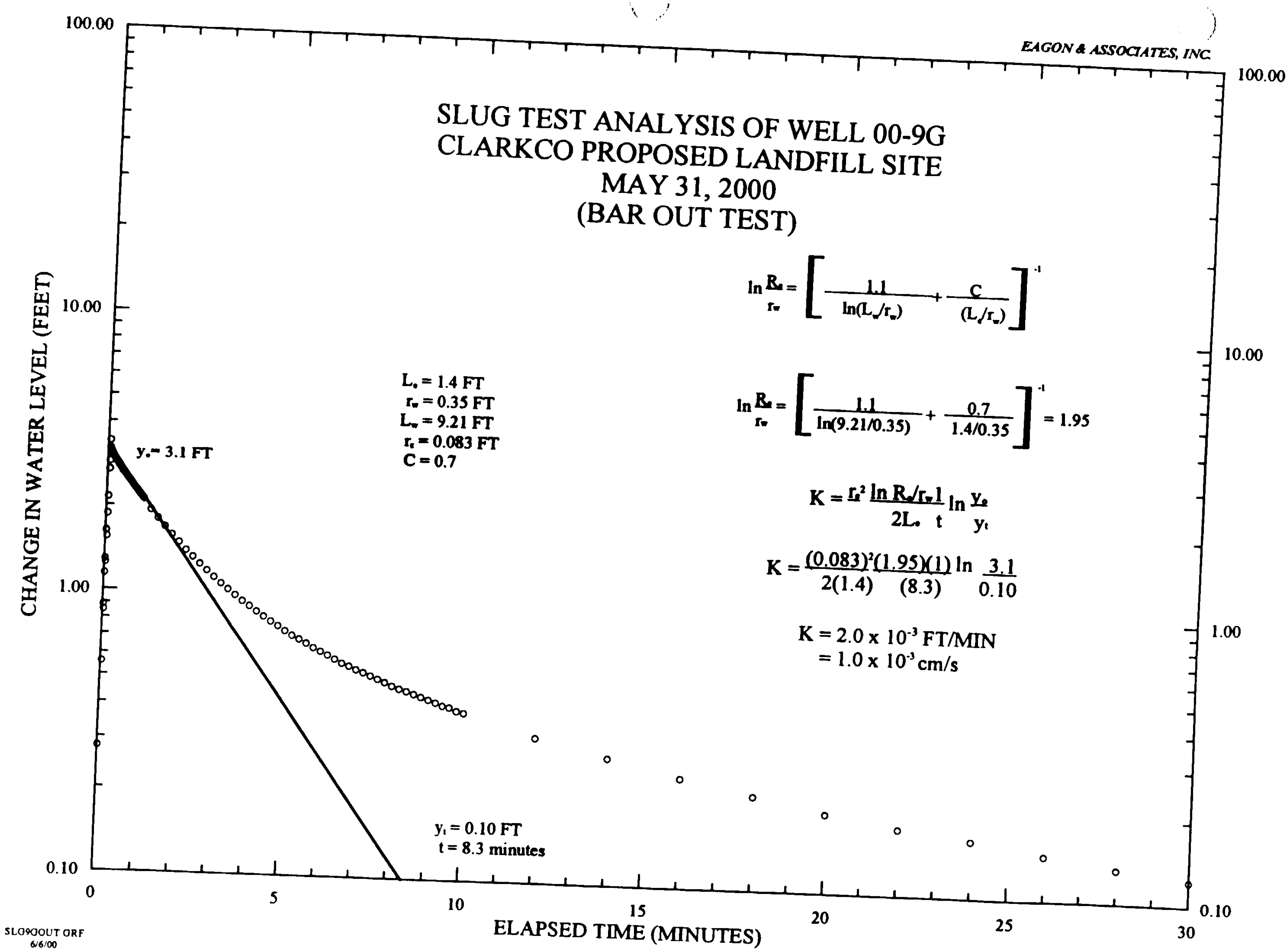


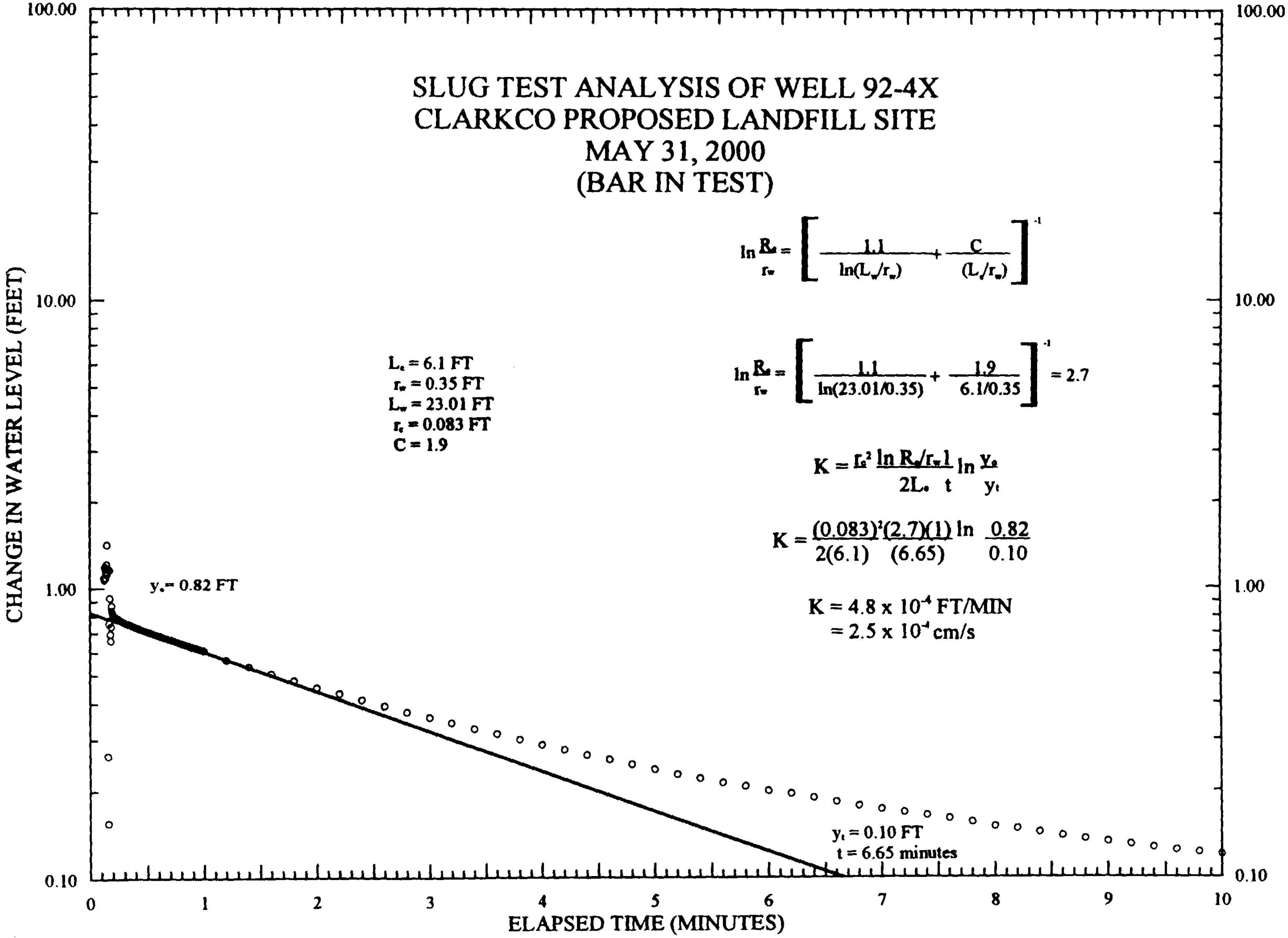
CLARK COUNTY LANDFILL
SLUG TEST OF WELL C91-8D
11-13-91
L_w = 118.74 - 111.06 = 7.68 ft
L_e = 5.0 ft
r_w = 0.35 ft
r_c = 0.083 ft
y_o = 1.25 ft
y_t = 0.1 ft
t = 0.126 mins
L_e/r_w = 14.3
C = 1.4
$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(7.68/0.35)} + \frac{1.4}{(5.0/0.35)} \right]^{-1} = 2.2$
$K = \frac{(0.083)^2(2.2)}{2(5.0)} \frac{1}{0.126(60)} \ln \frac{1.25}{0.1} = 2.5 \times 10^{-3}$ ft/s $= 7.6\times10^{-2}$ cm/s
y_o = 1.25 ft
y_t = 0.1 ft
t = 0.126 mins
0.10
0.20
0.30
0.40
0.50
0.60
0.70
0.80
0.90
1.00
10
1
0.1
0.01
CHANGE IN WATER LEVEL(feet)
ELAPSED TIME (minutes)


EAGON & ASSOCIATES, INC.
SLUG TEST ANALYSIS OF WELL 00-4Y
CLARKCO PROPOSED LANDFILL SITE
MAY 31, 2000
$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{(L_e/r_w)} \right]^{-1}$
$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(9.28/0.35)} + \frac{0.8}{1.8/0.35} \right]^{-1} = 2.0$
$K = r_c^2 \frac{\ln R_e/r_w}{2L_e} \frac{1}{t} \ln \frac{y_o}{y_t}$
$K = \frac{(0.083)^2(2.0)}{2(1.8)} \frac{(1)}{(94.5)} \ln \frac{2.9}{0.10}$
$K = 1.4 \times 10^{-4}$ FT/MIN
$= 6.9 \times 10^{-5}$ cm/s
$L_e = 1.8$ FT
$r_w = 0.35$ FT
$L_w = 9.28$ FT
$r_c = 0.083$ FT
$C = 0.8$
$y_o = 2.9$ FT
$y_t = 0.10$ FT
t = 94.5 minutes
CHANGE IN WATER LEVEL (FEET)
100.00
10.00
1.00
0.10
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
ELAPSED TIME (MINUTES)
SLG4YIN.GRF
6/6/00

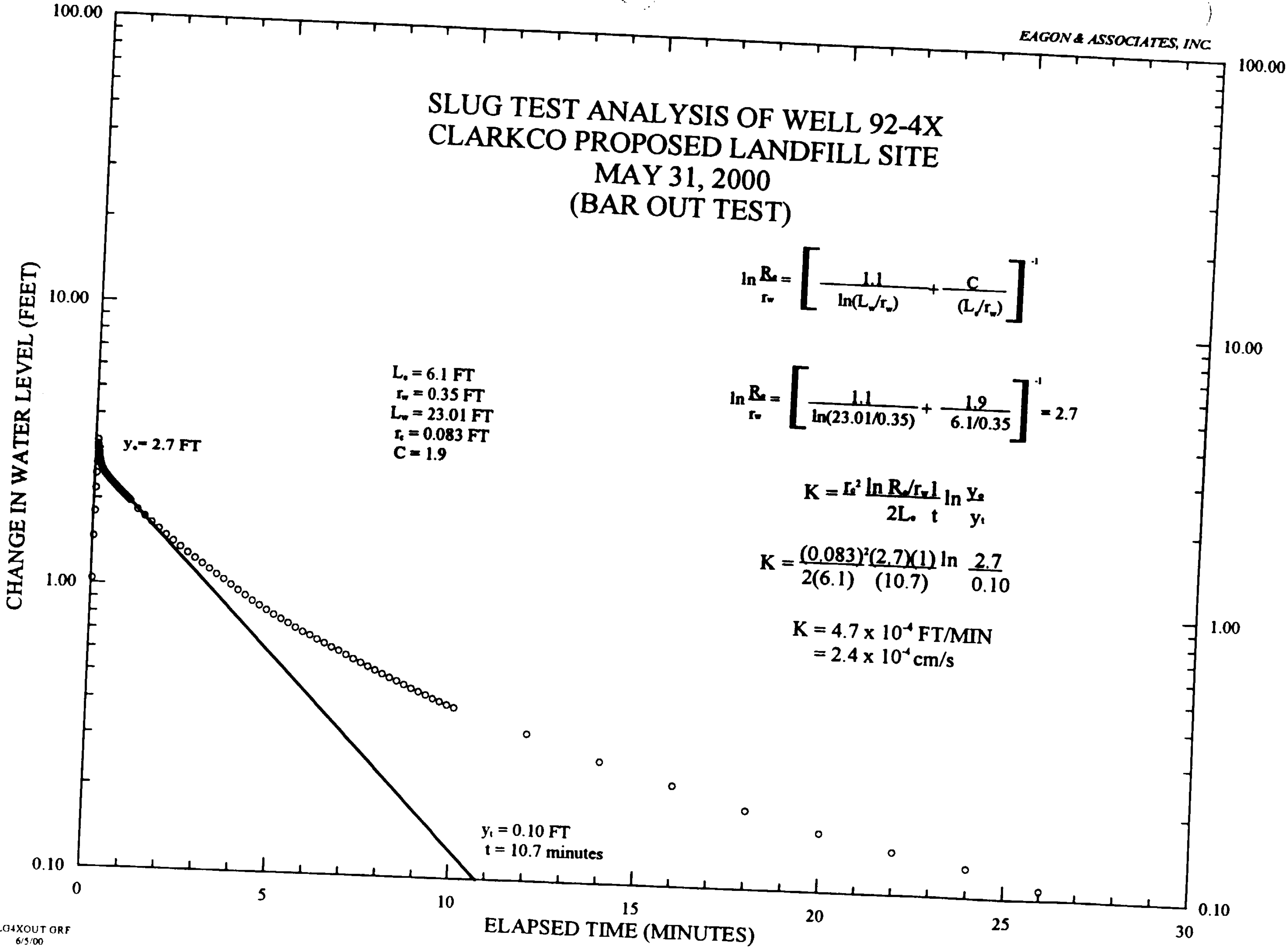


EAGON & ASSOCIATES, INC.
SLUG TEST ANALYSIS OF WELL 00-9G
CLARKCO PROPOSED LANDFILL SITE
MAY 31, 2000
(BAR IN TEST)
$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{(L_e/r_w)} \right]^{-1}$
$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(9.21/0.35)} + \frac{0.7}{1.4/0.35} \right]^{-1} = 1.95$
$L_e = 1.4$ FT
$r_w = 0.35$ FT
$L_w = 9.21$ FT
$r_c = 0.083$ FT
$C = 0.7$
$y_o = 2.9$ FT
$K = \frac{r_c^2 \ln R_e/r_w}{2L_e} \frac{1}{t} \ln \frac{y_o}{y_t}$
$K = \frac{(0.083)^2 (1.95)}{2(1.4)} \frac{(1)}{(7.6)} \ln \frac{2.9}{0.10}$
$K = 2.1 \times 10^{-3}$ FT/MIN
$= 1.1 \times 10^{-3}$ cm/s
$y_t = 0.10$ FT
$t = 7.6$ minutes
CHANGE IN WATER LEVEL (FEET)
100.00
10.00
1.00
0.10
ELAPSED TIME (MINUTES)
0
5
10
15
20
25
30
SLG9GIN GRF
6/6/00

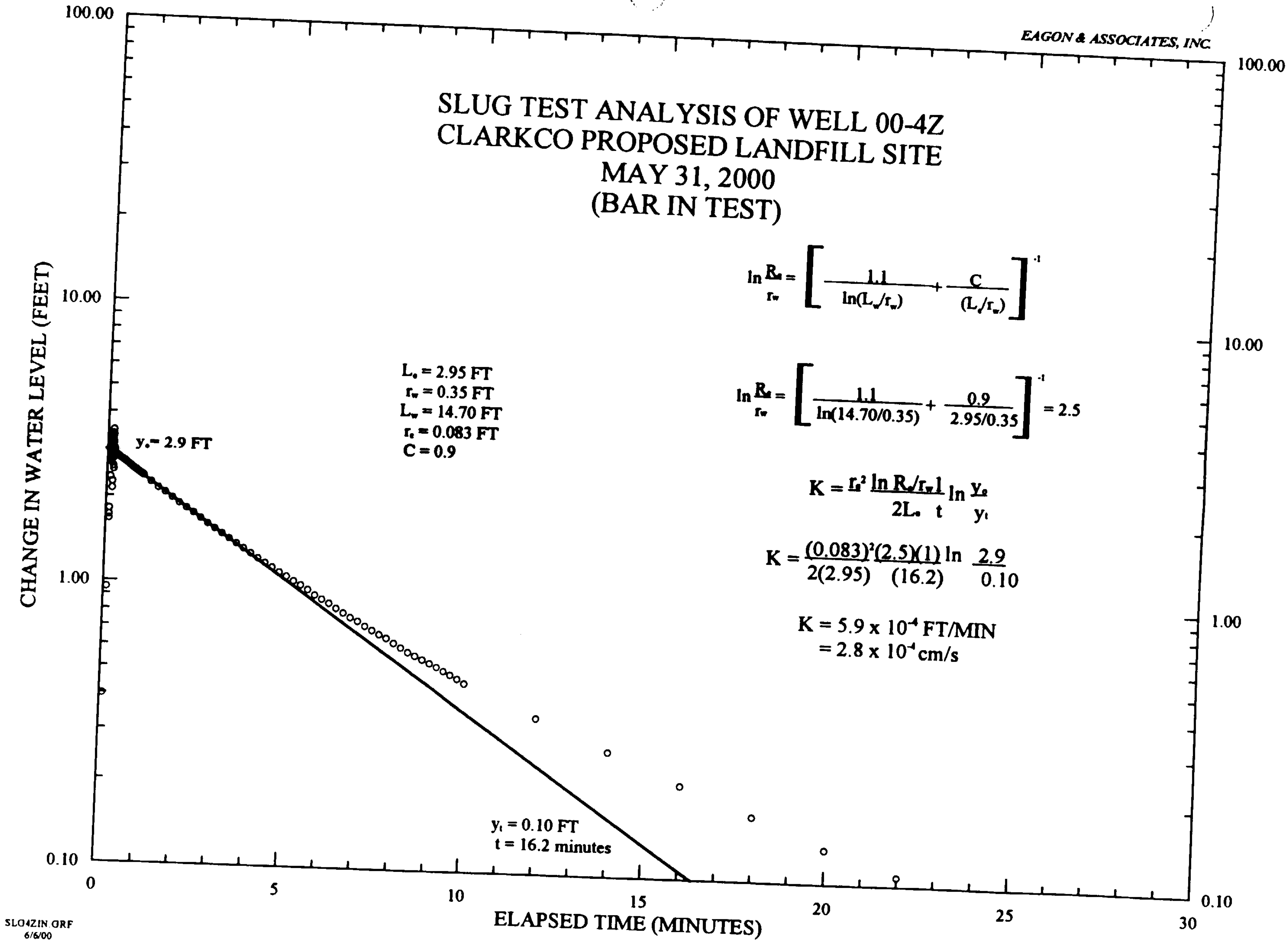

EAGON & ASSOCIATES, INC.
SLUG TEST ANALYSIS OF WELL 00-9G
CLARKCO PROPOSED LANDFILL SITE
MAY 31, 2000
(BAR OUT TEST)
$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{(L_e/r_w)} \right]^{-1}$
$L_e = 1.4$ FT
$r_w = 0.35$ FT
$L_w = 9.21$ FT
$r_c = 0.083$ FT
$C = 0.7$
$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(9.21/0.35)} + \frac{0.7}{1.4/0.35} \right]^{-1} = 1.95$
$y_o = 3.1$ FT
$K = \frac{r_c^2 \ln R_e/r_w}{2L_e} \frac{1}{t} \ln \frac{y_o}{y_t}$
$K = \frac{(0.083)^2(1.95)}{2(1.4)} \frac{(1)}{(8.3)} \ln \frac{3.1}{0.10}$
$K = 2.0 \times 10^{-3}$ FT/MIN
$= 1.0 \times 10^{-3}$ cm/s
$y_t = 0.10$ FT
$t = 8.3$ minutes
CHANGE IN WATER LEVEL (FEET)
100.00
10.00
1.00
0.10
0
5
10
15
20
25
30
ELAPSED TIME (MINUTES)
SLO9GOUT GRF
6/6/00

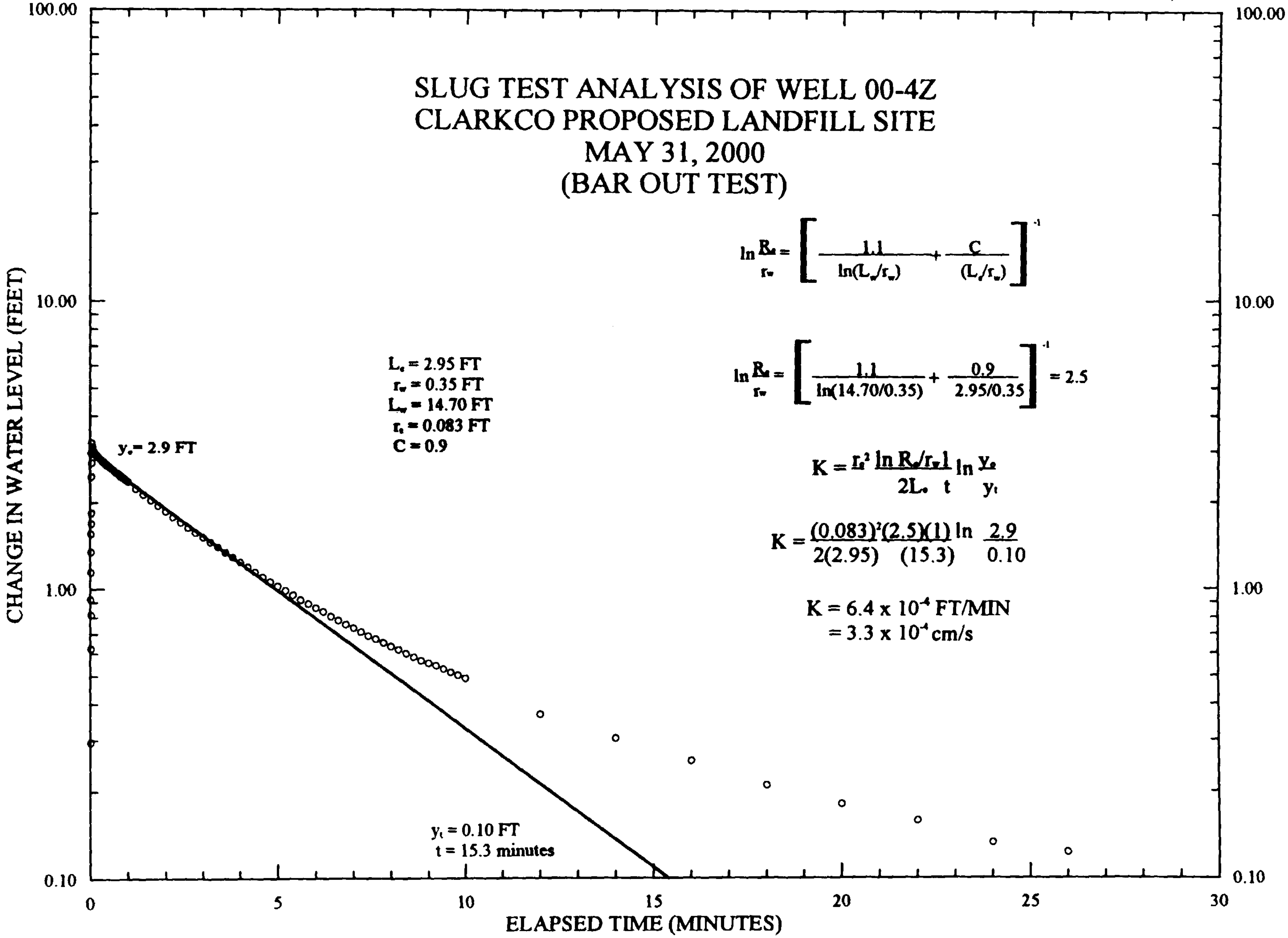


SLO4XIN.GRF
6/5/00



SLG4XOUT ORF
6/5/00


EAGON & ASSOCIATES, INC.
SLUG TEST ANALYSIS OF WELL 00-4Z
CLARKCO PROPOSED LANDFILL SITE
MAY 31, 2000
(BAR IN TEST)
$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{(L_e/r_w)} \right]^{-1}$
$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(14.70/0.35)} + \frac{0.9}{2.95/0.35} \right]^{-1} = 2.5$
$K = \frac{r_c^2 \ln R_e/r_w}{2L_e} \frac{1}{t} \ln \frac{y_o}{y_t}$
$K = \frac{(0.083)^2 (2.5)}{2(2.95)} \frac{(1)}{(16.2)} \ln \frac{2.9}{0.10}$
$K = 5.9 \times 10^{-4}$ FT/MIN
$= 2.8 \times 10^{-4}$ cm/s
$L_e = 2.95$ FT
$r_w = 0.35$ FT
$L_w = 14.70$ FT
$r_c = 0.083$ FT
$C = 0.9$
$y_o = 2.9$ FT
$y_t = 0.10$ FT
t = 16.2 minutes
CHANGE IN WATER LEVEL (FEET)
100.00
10.00
1.00
0.10
ELAPSED TIME (MINUTES)
0
5
10
15
20
25
30
SLO4ZIN.GRF
6/6/00

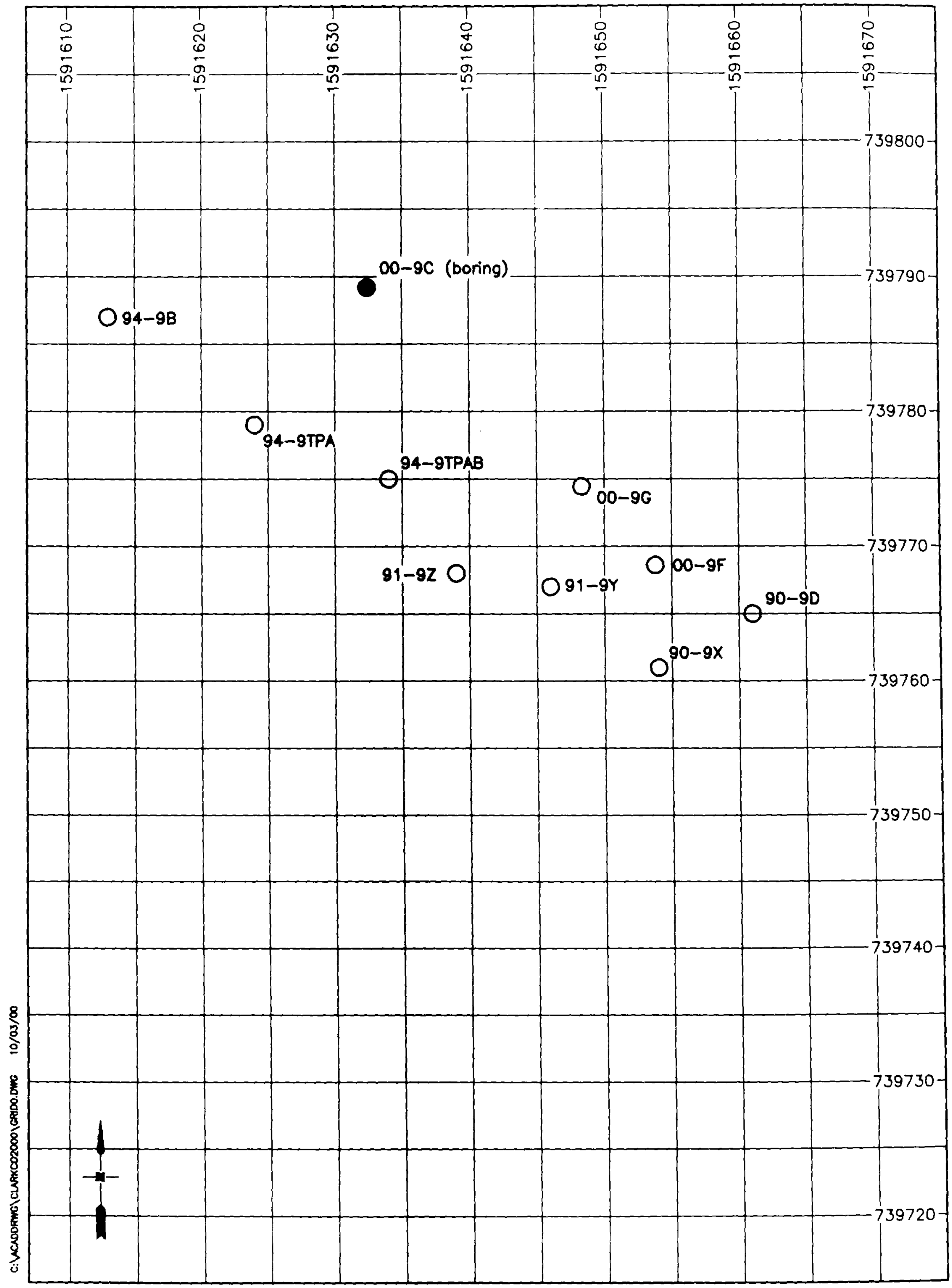

SLUG TEST ANALYSIS OF WELL 00-4Z
CLARKCO PROPOSED LANDFILL SITE
MAY 31, 2000
(BAR OUT TEST)
$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{(L_e/r_w)} \right]^{-1}$
$\ln \frac{R_e}{r_w} = \left[\frac{1.1}{\ln(14.70/0.35)} + \frac{0.9}{2.95/0.35} \right]^{-1} = 2.5$
$K = \frac{r_c^2 \ln R_e/r_w}{2L_e} \frac{1}{t} \ln \frac{y_o}{y_t}$
$K = \frac{(0.083)^2(2.5)}{2(2.95)} \frac{(1)}{(15.3)} \ln \frac{2.9}{0.10}$
$K = 6.4 \times 10^{-4}$ FT/MIN
$= 3.3 \times 10^{-4}$ cm/s
$L_e = 2.95$ FT
$r_w = 0.35$ FT
$L_w = 14.70$ FT
$r_c = 0.083$ FT
$C = 0.9$
$y_o = 2.9$ FT
$y_t = 0.10$ FT
t = 15.3 minutes
CHANGE IN WATER LEVEL (FEET)
ELAPSED TIME (MINUTES)
100.00
10.00
1.00
0.10
0
5
10
15
20
25
30

APPENDIX H.

LOW VOLUME LONG DURATION PUMPING TESTS

PUMPING TEST ANALYSIS

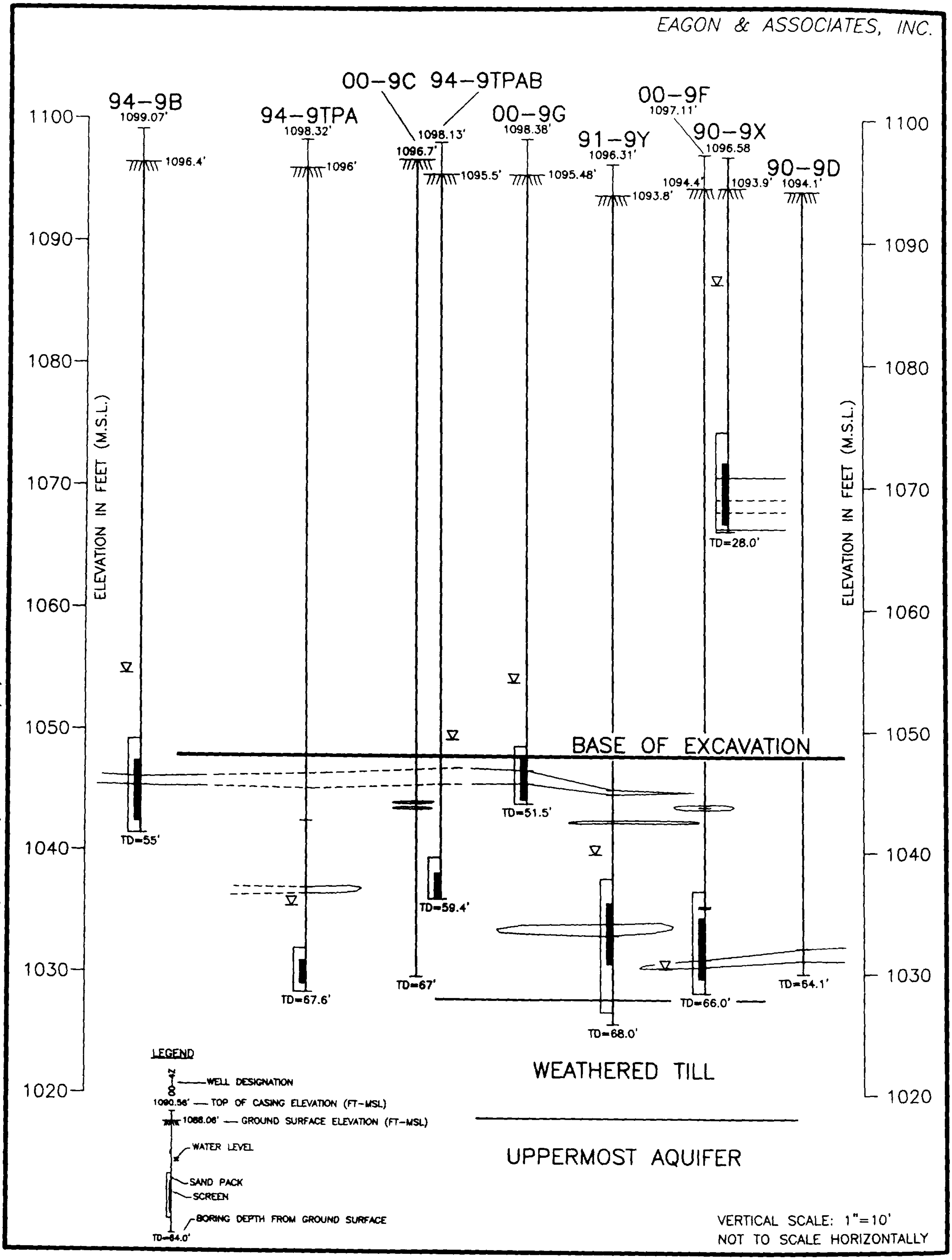
Clarkco Well 92-4X Pumping Test
June 26-July 21, 2000



SCALE: 1"=10'

WELL LOCATIONS AT THE 91-9Y WELL CLUSTER
(COORDINATE GRID IN FEET)

C:\ACADDRWG\CLARKCO2000\CLSTICK1.DWG 10/02/00

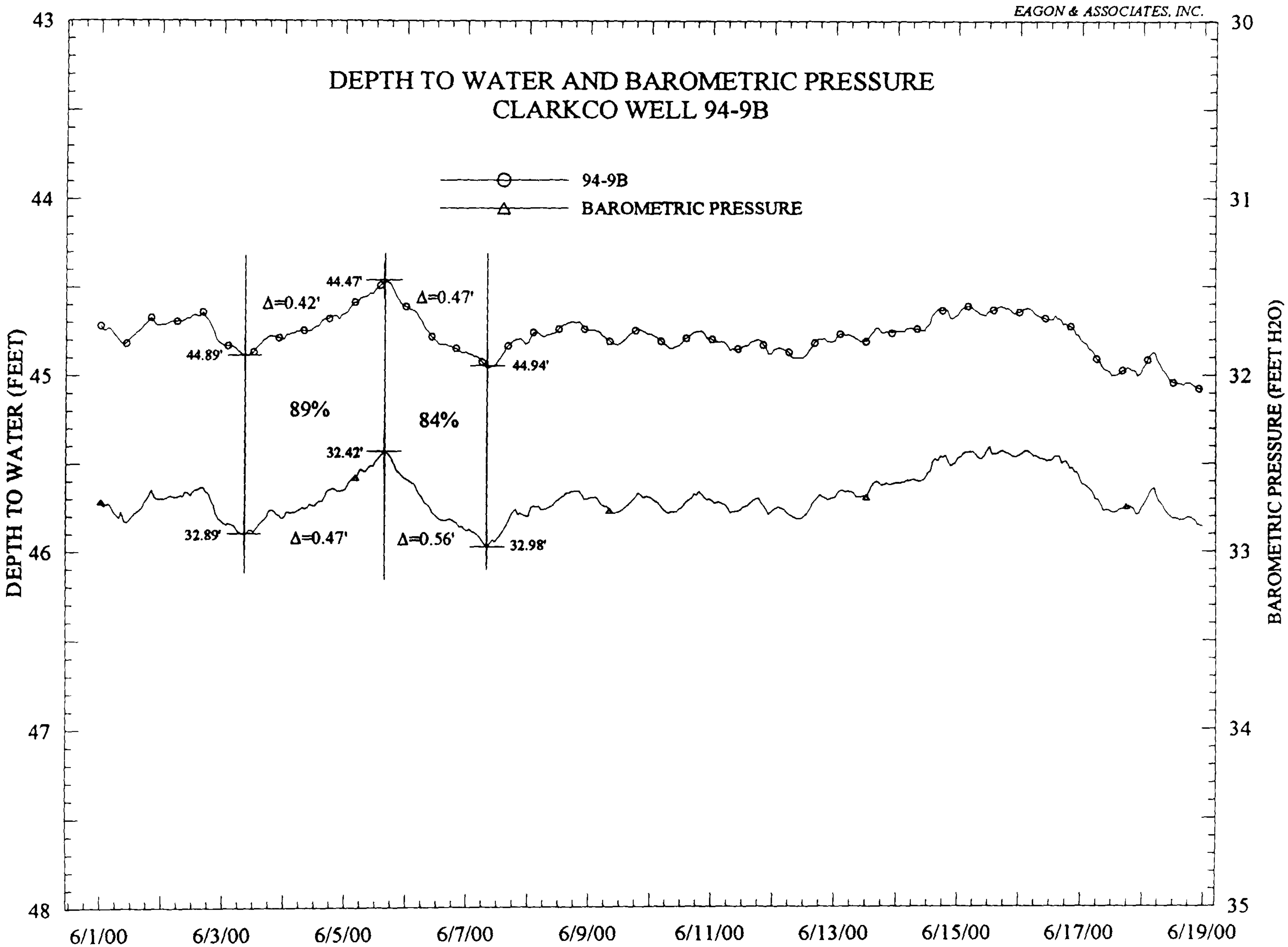


WELL CONFIGURATION AT 91-9Y WELL CLUSTER

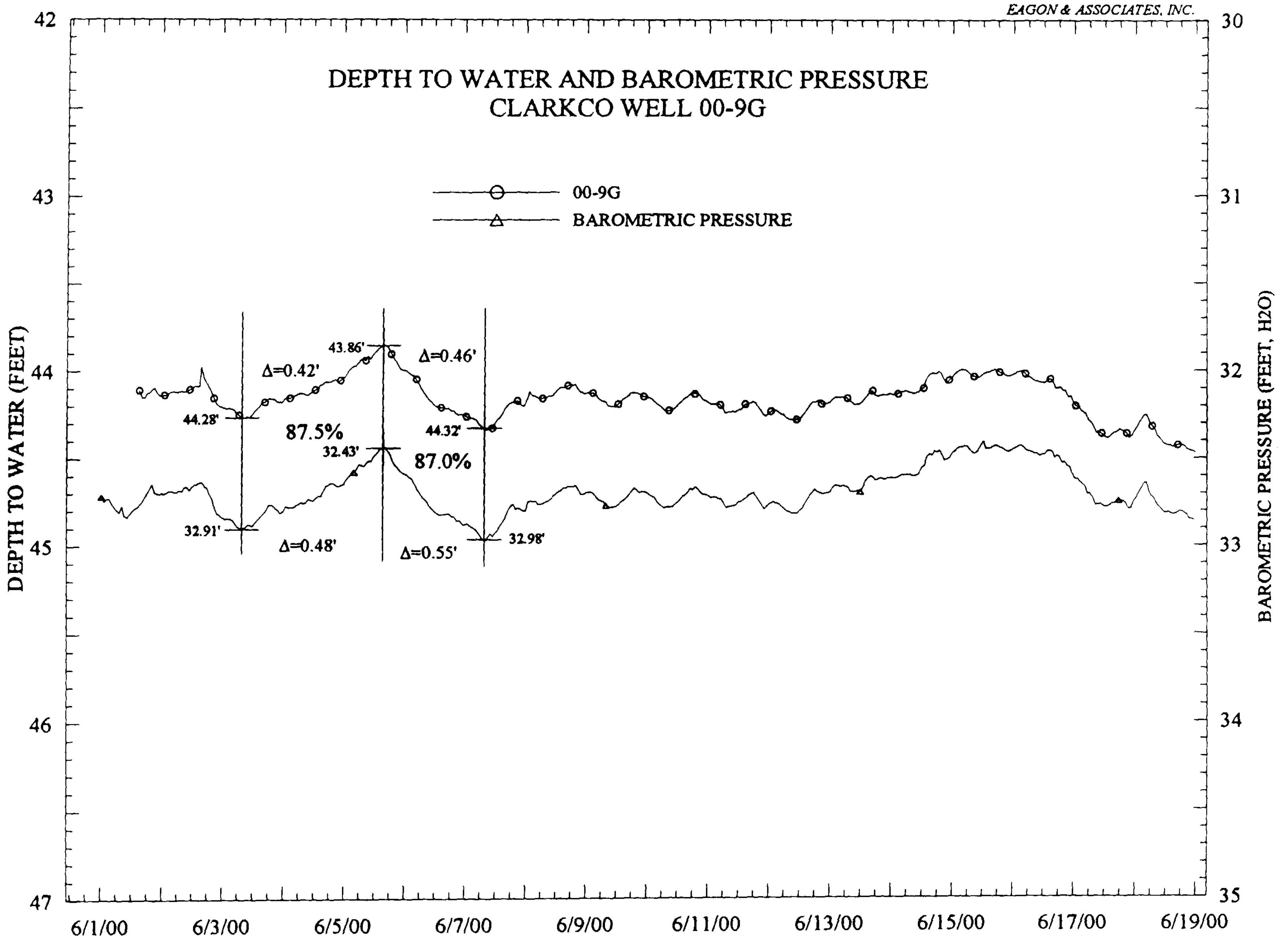
PUMPING RATE DATA
PUMPING TEST ON WELL 00-9G
PROPOSED CLARKCO LANDFILL

Month/Day/Time	Daily[1] Elapsed Time (min)	Total Elapsed Time (min)	Refill & Discharge Cycles Per Minute	Volume Per Cycle (ml)	Volume[2] Per Cycle (gal)	Pumping[3] Rate (gpm)	Volume[4] Pumped (gal)	Volume in Tank	Pumping[5] Rate (gpm)
6 / 19 / 1503	0		4	103.5	0.0270	0.109			
6 / 20 / 1415	1392	1392	4	94	0.0248	0.099	137	140	0.101
6 / 21 / 1120	1265	2657	4	93	0.0246	0.098	124	125	0.099
6 / 22 / 1055	1415	4072	4	90	0.0238	0.095	134	140	0.099
6 / 23 / 1100	1445	5517	4	87	0.0230	0.092	133	140	0.097
6 / 24 / 1035	1415	6932	4.286	87	0.0230	0.099	139	165	0.117
6 / 25 / 1230	1555	8487	4.286	80	0.0212	0.091	141	150	0.096
6 / 26 / 1430	1560	10,047	4.286	78	0.0206	0.088	138	190	0.122
6 / 27 / 0955	1165	11,212	4.286	75	0.0198	0.085	99	130	0.112
6 / 28 / 1235	1280	12,492	4.286	73	0.0193	0.083	106	135	0.105
6 / 29 / 1220	1425	13,917	4.286	75	0.0198	0.085	121	125	0.088
6 / 30 / 1120	1380	15,297	4.286	74	0.0195	0.084	116	120	0.087
7 / 1 / 1010	1370	16,667	4.286	71	0.0187	0.080	110	150	0.109
7 / 2 / 1335	1645	18,312	4.286	71	0.0187	0.080	132	150	0.091
7 / 3 / 1120	1305	19,617	4.286	72	0.019	0.081	106	140	0.107
7 / 4 / 1130	1450	21,067	4.286	78	0.021	0.088	130	90	0.090
7 / 5 / 1350	1580	22,647	4.286	72	0.019	0.081	128	155	0.081
				Average Volume Pumped (gal)			124.6	140	
				Average Pumping Rate (gpm)			0.087	0.097	

[1] Total time in minutes between pump checks and tank emptying.
[2] Conversion from milliliters to gallons (x 0.000264).
[3] Pumping rate based on calculations of pumping cycles.
[4] Volume pumped based on calculations of pumping cycles.
[5] Daily pumping rate based on daily volume pumped.



Clarkco/9BvsBPs.Grf
9/27/00



Clarkco/9GvsBPa.Grf
7/6/00

CORRECTED DRAWDOWN DATA - WELL 94-9B
PUMPING TEST ON WELL 00-9G
PROPOSED CLARKCO LANDFILL

Date/Time	Elapsed Time (min.)	Depth to Water (ft.)	Water Level Trend	Drawdown (ft.)	Barometric Change (ft.)	Barometric Efficiency Correction 87%	Corrected Drawdown (ft.)
6-19-00 / 1404	0	45.20	45.20	--			
	1	45.21	45.20	.01			
	6	45.26	45.20	.06			
	11	45.31	45.20	.11			
	16	45.35	45.20	.15			
	21	45.38	45.20	.18			
	26	45.41	45.20	.21			
	31	45.43	45.20	.23			
	36	45.45	45.20	.25			
	41	45.47	45.20	.27			
	46	45.48	45.20	.28			
	51	45.49	45.20	.29			
	61	45.51	45.20	.31	+.01	+.01	.32
	71	45.52	45.20	.32	+.01		.33
	81	45.53	45.20	.33	+.01		.34
	91	45.54	45.20	.34	+.01		.35
	101	45.54	45.20	.34	+.02	+.02	.36
	121	45.56	45.20	.36	+.02		.38
	141	45.58	45.20	.38	+.03	+.03	.41
	161	45.59	45.20	.39	+.03		.42
	181	45.60	45.20	.40	+.04	.03	.43
	201	45.61	45.20	.41	+.05	.04	.45
	251	45.63	45.20	.43	+.06	.05	.48
	301	45.67	45.20	.47	+.06	.05	.52
	351	45.70	45.20	.50	+.06	.05	.55
	451	45.77	45.20	.57	+.03	.03	.60
	551	45.83	45.20	.63	0	.03	.66
	651	45.85	45.20	.65	+.02	.02	.67
	751	45.87	45.20	.67	+.05	.04	.71
	851	45.90	45.20	.70	+.07	.06	.76
	951	45.93	45.21	.72	+.08	.07	.79
	1051	45.97	45.21	.76	+.10	.09	.85
	1151	46.00	45.21	.79	+.12	.10	.89
	1251	46.01	45.21	.80	+.13	.11	.91

CORRECTED DRAWDOWN DATA - WELL 94-9B
PUMPING TEST ON WELL 00-9G
PROPOSED CLARKCO LANDFILL

Date/Time	Elapsed Time (min.)	Depth to Water (ft.)	Water Level Trend	Drawdown (ft.)	Barometric Change (ft.)	Barometric Efficiency Correction 87%	Corrected Drawdown (ft.)
	1351	46.03	45.22	.81	+.15	.13	.94
	1436	46.00	45.22	.78	+.25	.22	1.00
	1675	46.00	45.22	.78	+.30	.26	1.04
	2035	46.04	45.22	.82	+.34	.30	1.12
	2395	46.04	45.23	.81	+.42	.37	1.18
	2755	46.15	45.23	.92	+.38	.33	1.25
	3115	46.17	45.23	.94	+.43	.37	1.31
	3475	46.30	45.24	1.06	+.38	.33	1.39
	4195	46.40	45.25	1.15	+.37	.32	1.47
	4915	46.57	45.26	1.31	+.26	.23	1.54
	5635	46.72	45.27	1.45	+.18	.16	1.61
	6355	46.74	45.28	1.46	+.24	.21	1.67
	7075	46.78	45.28	1.50	+.25	.22	1.72
	7795	46.70	45.29	1.41	+.40	.35	1.76
	8515	46.84	45.30	1.54	+.28	.24	1.78
	9235	46.91	45.30	1.61	+.21	.18	1.79
	9955	46.89	45.31	1.58	+.30	.26	1.84
	10,675	46.96	45.31	1.65	+.24	.21	1.86
	11,395	47.04	45.32	1.72	+.14	.12	1.84
	12,115	47.05	45.33	1.72	+.13	.11	1.83
	12,835	47.01	45.34	1.67	+.20	.17	1.84
	13,555	46.96	45.35	1.61	+.27	.23	1.84
	14,275	46.98	45.36	1.62	+.30	.26	1.88
	14,995	47.03	45.37	1.66	+.22	.19	1.85
	15,715	47.10	45.38	1.72	+.16	.14	1.86
	16,435	47.13	45.39	1.74	+.14	.12	1.86
	17,155	47.17	45.40	1.77	+.10	.09	1.86
	17,875	47.12	45.40	1.72	+.17	.15	1.87
	18,595	47.12	45.41	1.71	+.23	.20	1.91
	19,315	47.08	45.42	1.66	+.25	.22	1.88

CORRECTED DRAWDOWN DATA - WELL 00-9G
PUMPING TEST ON WELL 00-9G
PROPOSED CLARKCO LANDFILL

Date/Time	Elapsed Time (min.)	Depth to Water (ft.)	Water Level Trend	Drawdown (ft.)	Barometric Change (ft.)	Barometric Efficiency Correction 87%	Corrected Drawdown (ft.)
6-19-00 / 1503	0	44.54	44.54	--			
	4	45.79	44.54	1.25			1.25
	9	46.20	44.54	1.66			1.66
	14	46.45	44.54	1.91			1.91
	19	46.60	44.54	2.06			2.06
	24	46.71	44.54	2.17			2.17
	29	46.78	44.54	2.24			2.24
	34	46.84	44.54	2.30			2.30
	39	46.87	44.54	2.33			2.33
	44	46.90	44.54	2.36	+.01	.01	2.37
	49	46.91	44.54	2.37	+.01	.01	2.38
	59	46.96	44.54	2.42	+.01	.01	2.43
	69	46.98	44.54	2.44	+.01	.01	2.45
	79	47.00	44.54	2.46	+.02	.02	2.48
	89	47.02	44.54	2.48	+.02	.02	2.50
	99	47.03	44.54	2.49	+.02	.02	2.51
	119	47.05	44.54	2.51	+.03	.03	2.54
	139	47.07	44.54	2.53	+.03	.03	2.56
	159	47.12	44.54	2.58	+.03	.03	2.61
	179	47.13	44.54	2.59	+.04	.03	2.62
	199	47.15	44.54	2.61	+.04	.03	2.64
	249	47.20	44.54	2.66	+.04	.03	2.69
	299	47.25	44.54	2.71	+.04	.03	2.74
	349	47.30	44.54	2.76	+.04	.03	2.79
	449	47.41	44.54	2.87	+.01	.01	2.88
	549	47.49	44.54	2.95	+.01	.01	2.96
	649	47.53	44.54	2.99	+.03	.03	3.02
	749	47.58	44.54	3.04	+.04	.03	3.07
	849	47.65	44.54	3.11	+.07	.06	3.17
	949	47.70	44.54	3.16	+.08	.07	3.23
	1,099	47.79	44.54	3.25	+.09	.08	3.33
	1,199	47.85		3.31	+.10	.09	3.40
	1,299	47.89		3.35	+.13	.11	3.46

CORRECTED DRAWDOWN DATA - WELL 00-9G
PUMPING TEST ON WELL 00-9G
PROPOSED CLARKCO LANDFILL

Date/Time	Elapsed Time (min.)	Depth to Water (ft.)	Water Level Trend	Drawdown (ft.)	Barometric Change (ft.)	Barometric Efficiency Correction 87%	Corrected Drawdown (ft.)
	1,616	47.95	44.55	3.40	+.27	.23	3.63
	1,976	48.04	44.56	3.48	+.30	.26	3.74
	2,336	48.07	44.56	3.51	+.40	.35	3.86
	2,696	48.41	44.56	3.85	+.37	.32	4.17
	3,056	48.48	44.57	3.91	+.40	.35	4.26
	3,416	48.61	44.57	4.04	+.36	.31	4.35
	4,136	48.55	44.58	3.97	+.36	.31	4.28
	4,856	48.70	44.59	4.11	+.24	.21	4.32
	5,576	48.90	44.60	4.30	+.16	.14	4.44
	6,296	48.96	44.60	4.36	+.22	.19	4.55
	7,016	49.03	44.61	4.42	+.24	.21	4.63
	7,736	49.04	44.62	4.42	+.40	.35	4.77
	8,456	49.16	44.63	4.53	+.25	.22	4.75
	9,176	49.27	44.64	4.63	+19	.17	4.80
	9,896	49.25	44.65	4.60	+.28	.24	4.84
	10,616	49.37	44.66	4.71	+.22	.19	4.90
	11,336	49.40	44.67	4.73	+.12	.10	4.83
	12,056	49.45	44.68	4.77	+.10	.09	4.86
	12,776	49.42	44.69	4.73	+.18	.16	4.89
	13,496	49.38	44.70	4.68	+.24	.21	4.89
	14,216	49.40	44.70	4.70	+.27	.23	4.93
	14,936	49.44	44.71	4.73	+.20	.17	4.90
	15,656	49.48	44.72	4.76	+.13	.11	4.87
	16,376	49.58	44.73	4.85	+.11	.10	4.95
	17,096	49.54	44.74	4.80	+.08	.07	4.87
	17,816	49.57	44.75	4.82	+.15	.13	4.95
	18,536	49.52	44.76	4.76	+.20	.17	4.93
	19,256	49.55	44.77	4.78	+.24	.21	4.99
	19,976	49.60	44.78	4.82	+.20	.17	4.99

PUMPING TEST ANALYSIS

Clarkco Well 00-9G Pumping Test
June 19-July 5, 2000

1.0 Introduction

This document provides additional supporting information regarding the analyses of data from the pumping test performed at 92-4x between June 26 and July 21, 2000. It provides brief summaries of the basis for analysis methods, the procedures used to perform the analyses. Additionally, printouts of the Mathcad calculations are provided at the end of this document.

2.0 Data

Pumping Rates

On July 26, 2000 at 12:20 P.M., pumping began at 92-4x was pumped at a nominal rate of 0.2 gallons per minute (gpm). The pump operated without interruption until it was shut off on July 7 at 2:10 P.M. Actual pumping rates varied slightly throughout the test and the time-averaged rate was 0.217 gpm. The measured rates are provided in the attached Table.

Water Levels

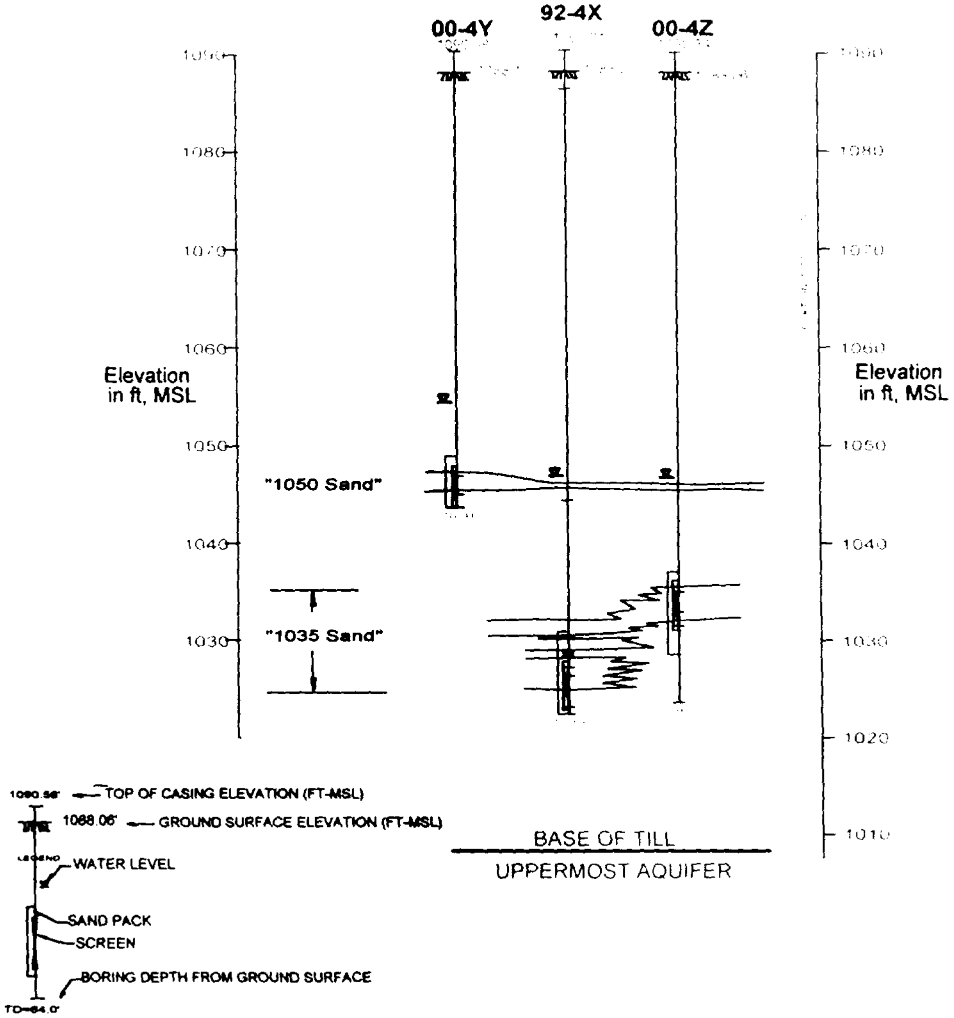
Water levels in 92-4x and in two monitoring wells, 00-4y and 00-4z, were monitored beginning June 1 using pressure transducers and automatic data loggers to measure and record the water level elevations on approximately an hourly basis. Just prior to the test, the data loggers were set to measure water levels every 5 minutes. Water level monitoring continued after the pump was shut off until July 21. The locations of the three wells relative to each other and hydrogeologic units are illustrated on the figure presented on the following page.

Barometric Pressures

Barometric pressures were recorded hourly beginning in March through July 21. Barometric pressure readings were used to estimate ambient water-level elevations for computing drawdowns

3.0 Drawdown Computation

For the case of a pumping test, the drawdown in a well is the change in ground-water levels caused by pumping with respect to ambient water levels, or water levels that would exist in the absence of pumping. Drawdown is computed by subtracting the measured water levels during the test from the ambient water levels. For short duration tests, the ambient level can often be assumed to be constant and equal to the water level prior to the test. However, 92-4x was pumped for a relative long duration during which ambient water levels varied. Therefore, ambient ground-water levels had to be estimated for the test period for each well. Calculations performed to estimate ambient water-level elevations and drawdown are attached to this appendix.



Well Configuration for 92-4X Pumping Test

Two environmental influences were identified as the sources for most of the ambient ground-water level fluctuations that occurred during the test. Foremost was the seasonally high rate of evapotranspiration that caused water levels to gradually fall with time during the test period. Secondly, atmospheric pressure changes caused changes in water levels in the wells.

The seasonal water-level changes were modeled assuming a linear decline over time. For each well the rate of the water-level change was estimated from the slope of a line fit to the water levels measured 7 days prior to pumping and between 7 and 14 days after the pump was shut off. Water levels in the 92-4x and 00-4z, which were completed in the "1035 sand", were estimated to decline at a rate of 0.022 ft/day during the test. Water levels in well 00-4y and "1050 sand" were estimated to fall slightly faster at a rate of 0.029 ft/day. For all wells, water levels prior to the test fell at nearly the same rate as water levels following the test recovery period indicating that a linear model was reasonable.

Atmospheric pressure influences were estimated from barometric pressure and water-level measurements. Following procedures given in Todd (1980) barometric efficiencies were computed for each well by plotting the time derivatives of water levels as a function of the time derivatives of the barometric pressures. The barometric efficiency was set equal to the slope of a line fit to the data. The barometric efficiency was determined to be 0.4 for the "1035 sand" wells and 0.6 for 00-4y.

Because barometric efficiency is not time dependent, the barometric efficiency analysis considered only those water levels and barometric pressures measured between June 1 and June 7 prior to the start of the first test at 92-4x. Corrections were made to the water-level elevations by summing the changes in barometric pressure from a reference point in time and multiplying the sum by the barometric efficiency. This is expressed in equation form as follows:

$$z_{corr_i} = z_i - E_B \sum_{j=1}^{i} \Delta p a_i \qquad \text{(H-1)}$$

In Equation (H-1), z_{corr_i} and z_i are the corrected and measured water-level elevations at time index i, E_B is the barometric efficiency and $\Delta p a_i$ are the measured barometric pressures.

4.0 Curve Matching

Analytical Methods

The analytical methods used to analyze responses to 92-4x pumping are based upon the following radial form of the ground water flow equation

$$\frac{\partial^2 s}{\partial r^2} + \frac{1}{r}\frac{\partial s}{\partial r} - \frac{W}{T} = \frac{S}{T}\frac{\partial s}{\partial t} \qquad \text{(H-2)}$$

or on some variation of it. The variables in Equation (H-2) are defined as follows:

- s is the drawdown (ft)
- r is the radial distance from the pumped well (ft)
- T, S are the transmissivity(gpd/ft) and storage coefficient (dimensionless) of the pumped zone; and
- W is the source term, which for this analysis represents inflow from aquitards.

The analytical methods used incorporate solutions to Equation (H-2) for a given set of assumptions that allow drawdown to be computed explicitly as a function of the other parameters. For example, the analytical solution developed by Hantush and Jacob (1956) assumes that ground-water flow through the aquitard can be described by Darcy's law. Then the source term, W can be rewritten in terms of leaky aquifer parameters

$$W = s\frac{K'}{b'} \qquad \text{(H-3)}$$

where K' and b' are the hydraulic conductivity (ft/day or cm/sec) and thickness of the aquitards (ft). The drawdown is assumed to be zero in an aquifer overlying the aquitards and so s/b' becomes the hydraulic gradient.

Ground-water level responses to pumping at 92-4x were analyzed using the Hantush-Jacob analytical solution as well as a solution developed by Neumann and Witherspoon (1969). Calculations used to match plots of these solutions to the data and to compute hydraulic parameters are provided as an attachment to this appendix.

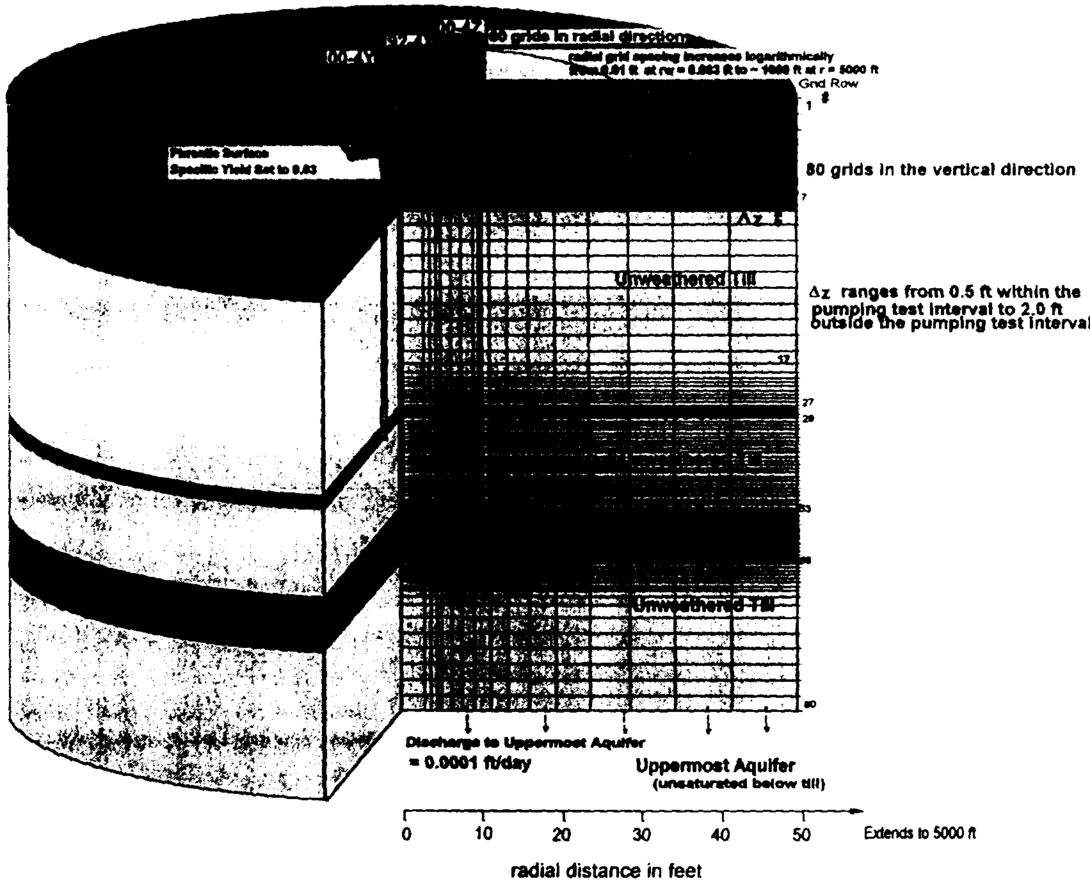
Finite Difference Analysis

An implicit finite difference approach was used for this analysis to solve the following axisymmetrical form of the ground water flow equation:

$$\frac{\partial}{\partial r}\left(T \cdot r\frac{\partial s}{\partial r}\right) + \frac{\partial}{\partial z}\left(K_{zz}\frac{\partial s}{\partial z}\right) - W = S\frac{\partial s}{\partial t} \qquad \text{(H-4)}$$

The finite-difference calculations were performed using a computer program written in Fortran by Mr. Steven Larson, currently at S. S. Papadopulos and Associates, Inc. in Bethesda, Maryland. The version used herein has been modified at Eagon and Associates. An axisymmetrical finite-difference grid was constructed around 92-4x based upon simplified interpretation of the "1035 sand" "1050 sand" and unweathered and weathered till geometries. The grid and interpreted hydrogeology are illustrated in the following figure.

Unlike most analytical methods, the finite-difference method permits aquifer properties to be varied throughout the grid. This permitted the lateral extent of the "1035 sand" to be varied by setting its hydraulic conductivity equal to that of the unweathered till beyond a specified radius. Additionally the hydraulic conductivity of the weathered till near the ground surface could be set higher than the underlying unweathered till.



Finite Difference Representation of Till Hydrogeology

In order to create type curves that would match the data after removing most of the "1035 sand" from the model, it was necessary to consider alternate sources of ground water. Without considering other sources, calculated drawdowns would rise sharply regardless of the choice of hydrogeologic parameters. By using the finite difference method, the following three alternate sources could be considered.

1. Elastic storage from the entire vertical thickness of the till. The analytical methods could at most consider storage in the "1050 sand" and "1035 sand" and the till in between these zones.

2. the drainage of pores at the phreatic surface. Note that the term water table is avoided because the entire till section, while saturated, is perched.

3. The capture of seepage from the base of the till.

Below 92-4x, ground water seeps from the till into the uppermost aquifer. According to superposition principals, any decreases in discharge from a boundary of a ground-water system caused by pumping should be considered to be a source of water when computing impacts caused by the pumping (see Reilly et. al. 1987). Accordingly, any reduction in seepage from the till that occurs as a result of pumping at 92-4x should be considered a source of water in the drawdown calculations. In the absence of pumping, an approximate unit hydraulic gradient exists through the till and so the seepage per unit area from the till approximately equals the hydraulic conductivity or about 10^{-4} ft/day. Reductions in this flow are

$$\Delta q = K \frac{(h_b - s)}{\frac{\Delta z}{2}} \qquad \text{(H-5)}$$

where Δq is the in discharge h_b and s are the hydraulic head and drawdown at the boundary, and Δz is the thickness of the lowermost finite difference cells. In the finite difference calculations, Δz was set to 2 at the base of the till, and h_b was set to 0. Therefore, the reduction in discharge can be computed as follows.

$$\Delta q = \begin{matrix} K \cdot s & \textit{for } 0 \le s \le 1 \\ K & \textit{for } \quad s > 1 \end{matrix} \qquad \text{(H-6)}$$

This is implemented as a mixed third-type and second type boundary condition in the radial flow model.

5.0 References

Hantush, M.S. and C.E. Jacob, 1955, Non-Steady Radial Flow in an Infinite Leaky Aquifer. Trans. Am. Geophys. Union, V. 37, No. 6.

Harrill, J.R., 1970, Determining Transmissivity from the Water-Level Recovery of a Step-Drawdown Test. U. S. Geol Survey, Prof. Paper 700-C, pp212-213.

Neumann, S.P. and P. A Witherspoon, 1969, Theory of Flow in a Confined Two-Aquifer System. Wat. Resour. Res. Vol 5, No. 4, pp. 803-816.

Reilly, T.E., O.L. Franke and G.D. Bennett, 1987, *The Principal of Superposition and its Application in Ground Water Hydraulics*. Techniques of Water-Resources Investigations of the United States Geological Survey, Book 3, Chapter B6. U.S. Geol Surv.

Todd, D. K. , 1980, *Groundwater Hydrology*. John Wiley and Sons, 535pp.

PUMPING RATE DATA
PUMPING TEST ON WELL 92-4X
PROPOSED CLARKCO LANDFILL

Month/Day/Time	Daily Elapsed Time[1] (min)	Total Elapsed Time (min)	Refill & Discharge Cycles Per Minute	Volume Per Cycle (mR)	Volume Per Cycle[2] (gal)	Pumping Rate[3] (gpm)	Volume in Tank (gal)	Pumping Rate[5] (gpm)
6 / 26 / 1220	0	--	1.58	453	0.119	0.188		
6 / 27 / 1030	1330	1330	1.58	463	0.122	0.193	285	0.214
6 / 28 / 1335	1625	2955	1.58	463	0.122	0.193	310	0.191
6 / 29 / 1100	1285	4240	1.58	468	0.124	0.196	255	0.198
6 / 30 / 0915	1335	5575	1.67	459	0.121	0.202	285	0.213
7 / 1 / 1040	1525	7100	1.62	461	1.22	0.197	350	0.23
7 / 2 / 1240	1560	8660	1.62	454	0.119	0.193	400	0.256
7 / 3 / 0955	1275	9935	1.62	476	0.126	0.204	295	0.231
7 / 4 / 1215	1580	11,515	1.62	465	0.123	0.199	325	0.206
7 / 5 / 1225	1450	12,965	1.62	482	0.127	0.205	310	0.213
7 / 6 / 1255	1470	14,435	1.62	475	0.125	0.203	325	0.220
7 / 7 / 1346	1491	15,926	1.62	468	0.124	0.201	330	0.220
				Average Volume Pumped			315	
				Average Pumping Rate		0.199 gpm	0.219 gpm	

[1] Total time in minutes between pump checks and tank emptying.

[2] Conversion from milliliters to gallons (x 0.000264).

[3] Pumping rate based on calculations of pumping cycles.

[4] Volume pumped based on calculations of pumping cycles.

[5] Daily pumping rate based on daily volume pumped.

CALCULATIONS

Clarkco 92-4X Pumping Test
June 26- July 21, 2000

1. Barometric Efficiency Calculation for Wells 00-4y and 00-4z
2. Ground-Water Level Drawdown Calculation
3. Hantush Jacob Leaky Aquifer Analysis of 00-4z Drawdown
4. Neumann-Witherspoon Two-Aquifer Analysis of 92-4X, 00-4y and 00-4Z Drawdown
5. Harrill Method Analysis of 92-4X Recovery Data

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Barometric Efficiency Calculation for Clarkco Wells 00-4y and 00-4z
Clarkco 92-4x Pumping Test 06/26 - 7/21, 2000

Summary

Barometric efficiencies are computed for wells 00-4y and 00-4z based on depth-to-water measurements and barometric pressure measurements collected between June 1 and June 7, 2000 This data range occurs before 92-4x was pumped and so the water level changes reflect only natural fluctuations.

Data

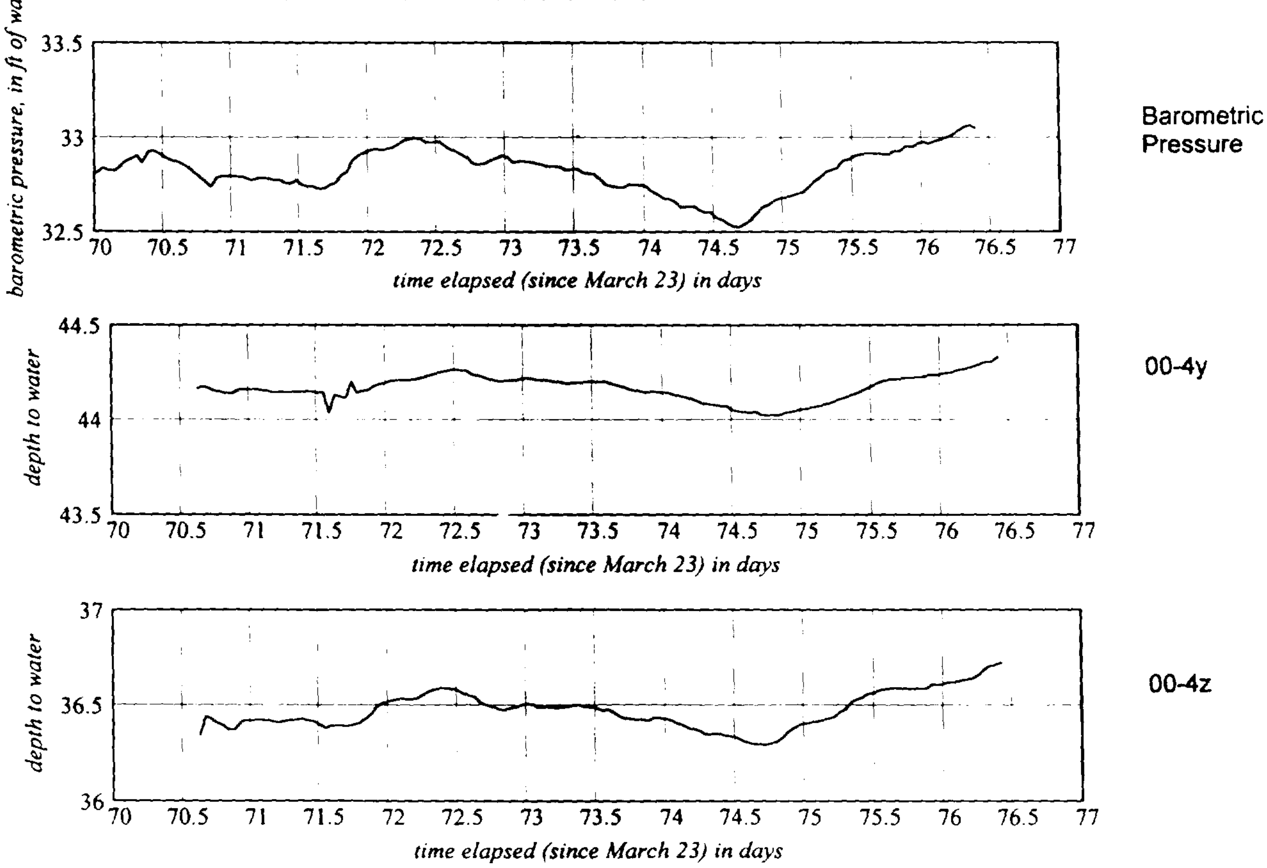
$ft\_water := 2980\ Pa$ define units not contained in Mathcad

Read Excel File

Water level and barometric pressure measurements were compiled in an excel file and attached to this document. The following mathcad statements assigns variables and units to those values.

$$\begin{pmatrix} t_a \\ p_a \\ t_w \\ z_{4y} \\ z_{4z} \end{pmatrix} := \text{Worksheet} \qquad \begin{pmatrix} t_a \\ p_a \\ t_w \\ z_{4y} \\ z_{4z} \end{pmatrix} := \begin{pmatrix} t_a\ day \\ p_a\ in\_Hg \\ t_w\ day \\ z_{4y}\ ft\_water \\ z_{4z}\ ft\_water \end{pmatrix}$$

Time Series Plots of Water Level and Barometric Pressure Values



Barometric Efficiency for 00-4z

Interpolate barometric pressure data

Interpolate barometric data so that barometric level measurments and water-level measurements coincide

$$p_{a\_interp} := interp\left(cspline\left(t_a, p_a\right), t_a + 1 \cdot hr, p_a, t_w\right)$$

Note:

Time series plots show an approximate 1 hour lag between barometric pressure changes and water-level changes in 00-4z. The 1-hour lag is therefore incorporated into the above interpolation function for 00-4z.

Compute Derivatives

Compute derivatives of barometric pressure and depth to water as a function of time

$$deriv(x,t) := \left| \begin{array}{l} n_r \leftarrow rows(x) \\ for \;\; j \in 2 .. rows(x) - 1 \\ \quad deriv_j \leftarrow \dfrac{x_{j+1} - x_{j-1}}{t_{j+1} - t_{j-1}} \\ deriv_1 \leftarrow \dfrac{x_{j+1} - x_j}{t_{j+1} - t_j} \\ deriv_{n_r} \leftarrow \dfrac{x_j - x_{j-1}}{t_j - t_{j-1}} \\ deriv \end{array} \right.$$

$$p'_a := deriv\left(p_{a\_interp}, t_w\right)$$

$$z'_{4y} := deriv\left(z_{4y}, t_w\right)$$

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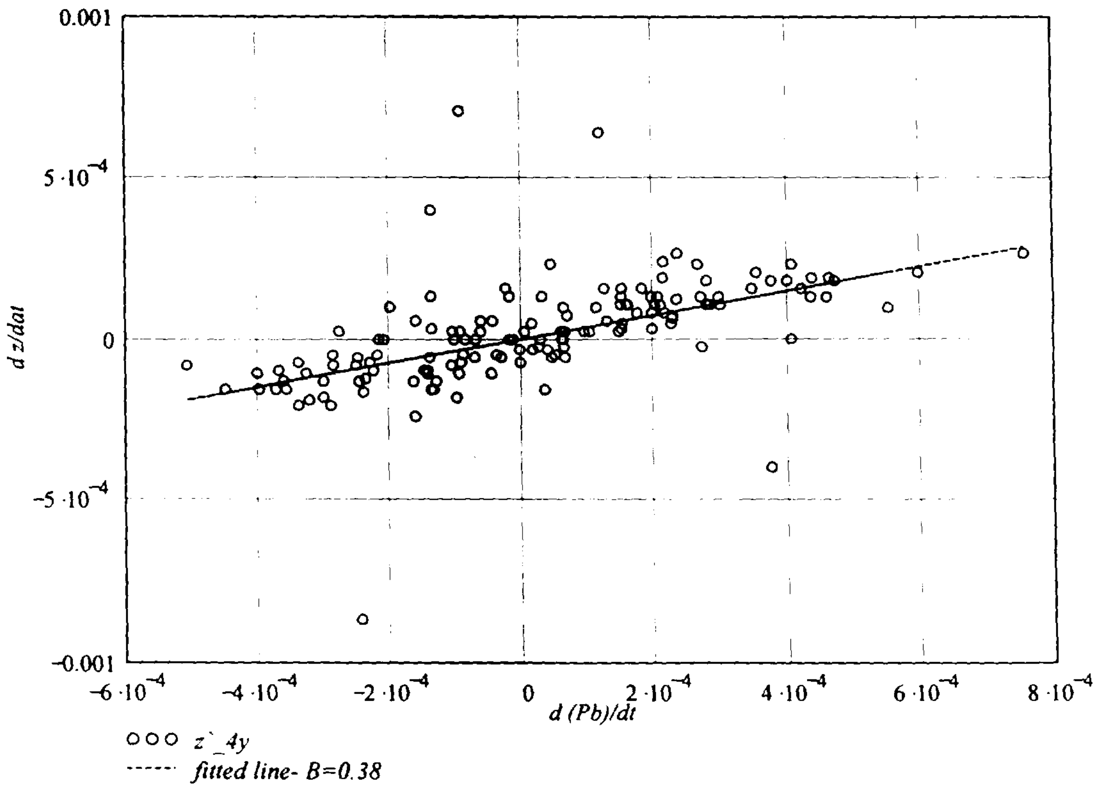
PROJECT *Clarkco*
SHEET NO *3* OF *4*
CALCULATED BY *S. Heermann* DATE *10/5/00*
FILE *barom effic mcd*
LOCATED *C:\Clarkco\MathCad Analyses\barom effic mcd*

Perform least-squares regression

$$\begin{pmatrix} A \\ B \end{pmatrix} := line\left(\frac{p'a}{\frac{ft\_water}{min}}, \frac{z'4y}{\frac{ft\_water}{min}}\right)$$

$A = 1.199 \times 10^{-5}$

$B = 0.38$ <=== **Barometric Efficiency**



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Barometric Efficiency for 00-4y

Interpolate barometric pressure data

Interpolate barometric data so that barometric level measurments and water-level measurements coincide

$$p_{a\_interp} := interp\left(cspline\left(t_a, p_a\right), t_a, p_a, t_w\right)$$

Note:

No lag was apparent between baromeric pressures and 00-4y depth-to water measurments. Therefore, no adjustment was made

$$p_{a\_interp} := interp\left(cspline\left(t_a, p_a\right), t_a, p_a, t_w\right)$$

Compute Derivatives

Compute derivatives of barometric pressure and depth to water as a function of time

$$z'_{4z} := deriv\left(z_{4z}, t_w\right)$$

$$p'_a := deriv\left(p_{a\_interp}, t_w\right)$$

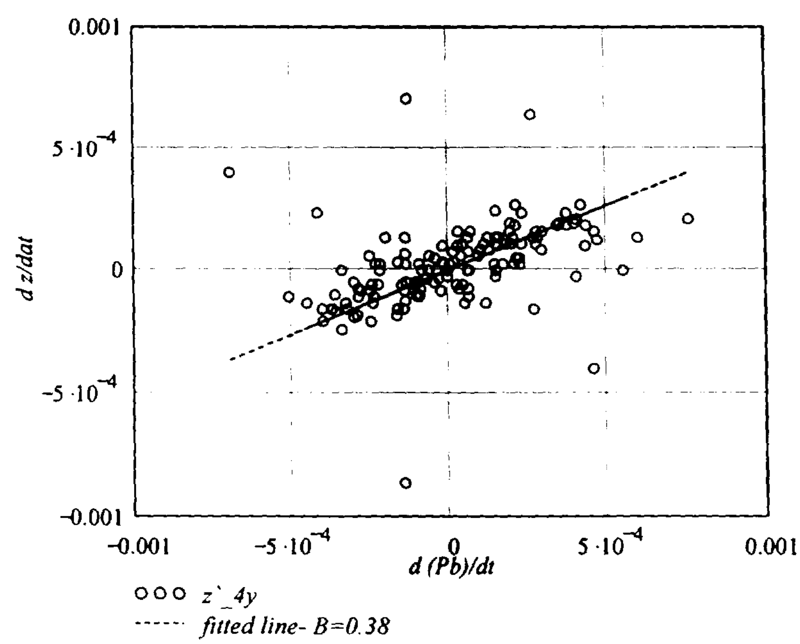
Perform least-squares regression

$$\begin{pmatrix} A \\ B \end{pmatrix} := line\left(\frac{p'_a}{\frac{ft\_water}{min}}, \frac{z'_{4z}}{\frac{ft\_water}{min}}\right)$$

$A = 3.257 \times 10^{-5}$

$B = 0.53$ statistical fit

<=== Barometric Efficiency



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Ground-Water Level Drawdown Calculation
Clarkco 92-4X Pumping Test June 26 - July 21, 20000

Overview

Ground water levels measured in wells 92-4x, 92-4y and 92-4z prior to, during and following pumping at 92-4x are analyzed to separate the response to pumping (drawdown) from fluctuations due to barometric pressure changes and to natural seasonal trends

Data

Ground Water Levels measured from June 1, 2000 through July 21, 2000 were compiled in an excel worksheet which was then attached to this calculation. These are then brought into the Mathcad worksheet using the Excel component feature and appropriat units were attached to the values.

$ft\_water := 2980\ Pa$ <==define units not contained in Mathcad

$$\begin{pmatrix} t_{4x} \\ z_{4x} \\ t_{4yz} \\ z_{4y} \\ z_{4z} \\ t_a \\ p_a \end{pmatrix} := \text{Worksheet}$$

$$\begin{pmatrix} t_{4x} \\ t_{4yz} \\ t_a \\ z_{4x} \\ z_{4y} \\ z_{4z} \\ p_a \end{pmatrix} := \begin{bmatrix} t_{4x}\ day \\ t_{4yz}\ day \\ t_a\ day \\ (1090.31 - z_{4x})\ ft\_water \\ (1090.38 - z_{4y})\ ft\_water \\ (1090.56 - z_{4z})\ ft\_water \\ p_a\ in\_Hg \end{bmatrix}$$

$n_t := rows(t_{4x})$ $n_t = 10950$

n_t = number of water-level measurements at 92-4x

$n_a := rows(t_a)$ $n_a = 2849$

n_a = number of barometric pressure readings

$t_{4'x} := submatrix(t_{4x}, 1, 100, 1, 1)$ $n_{t'} := rows(t_{4'x})$

$z_{4'x} := submatrix(z_{4x}, 1, 100, 1, 1)$

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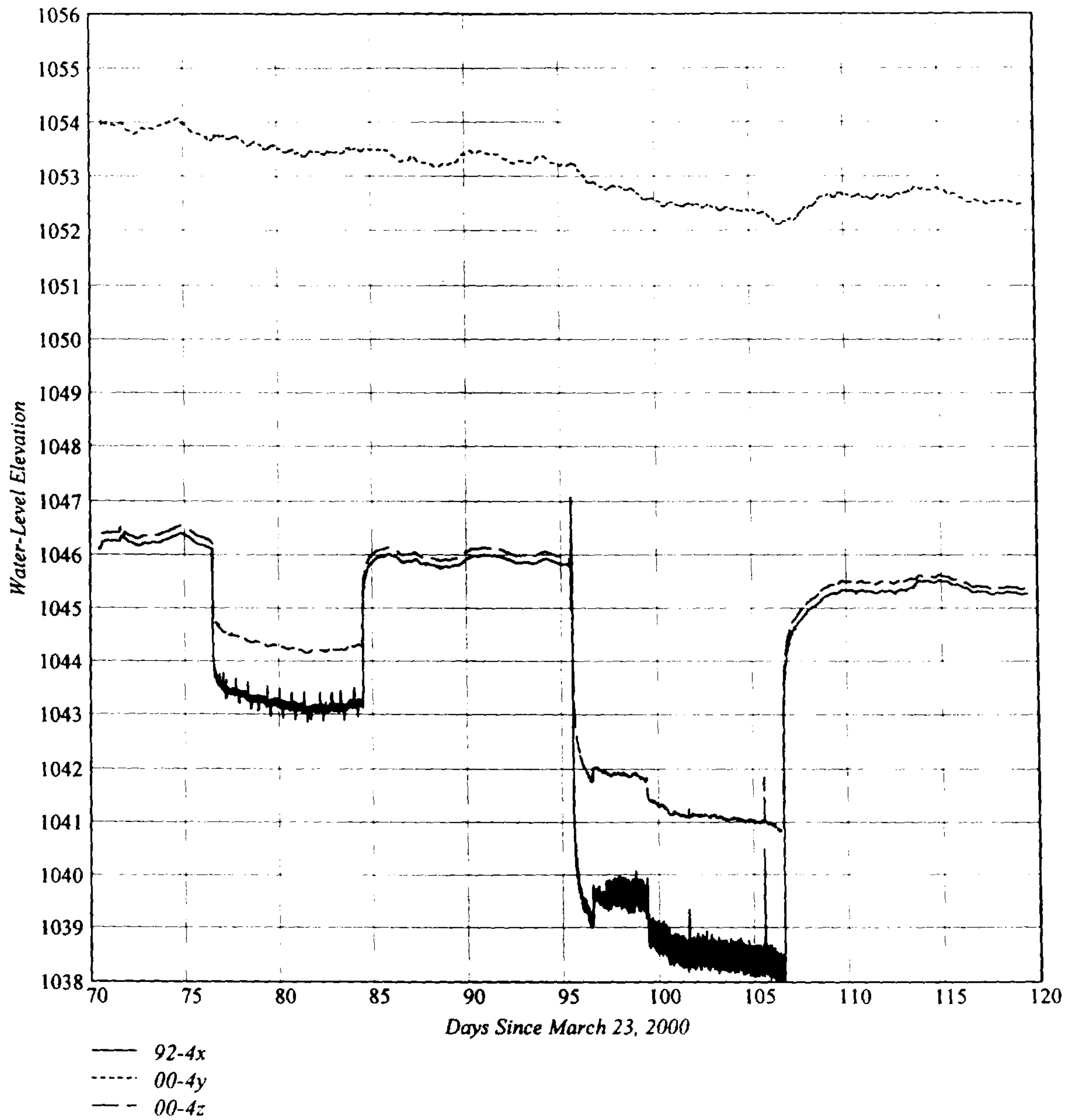
PROJECT Clarkco
SHEET NO 2 OF 8
CALCULATED BY S. Heermann DATE 10/5/00
FILE drawdown.mcd LOCATED C:\Clarkco\MathCad Analyses\drawdown.mcd

Time Series Plot of Water-Level Elevations



Calculate drawdowns for well92-4x

Interpolate barometric pressure

$p_{a\_interp} := interp(cspline(t_a, p_a), t_a, p_a, t_{4x})$ <== interpolate to create vector of barometric pressures readings coincident with water level readings

Define functions to describe ambient ground water fluctuations during test

$corr_{pa}(B, i, p) := \overrightarrow{(p - p_i)\, B}$ <== changes due to barometric pressure fluctuations; B is the baromatric efficiency

$corr_{trend}(t, c, i) := c\,(t - t_i)$ <== changes due to linear long-term water-level trend; c is the slope of trend. Intercept for line is beginning of test (June 26).

$z_{ambient}(t, z, B, c, i, z_0, p) := z_0 + corr_{trend}(t, c, i) - corr_{pa}(B, i, p)$ <== ambient ground-water elevation

constants

$i_l := 5634$ <= index for last water level measurement taken before starting test

$z_{0\_4x} := z_{4x_{i_l}}$ $z_{0\_4x} = 1045.9\, ft\_water$ <== reference water level (last water level prior to test)

$B_{4x} := .4$ **<= barometric efficiency**

- linear trend computed such that drawdowns are nearly flat at value 0 prior to and following recovery of water levels

$c_{4x} := -\frac{.022}{day}\, ft\_water$ **<== linear trend**

Compute ambient ground water level and drawdown

$z_{4x\_ambient} := z_{ambient}(t_{4x}, z_{4x}, B_{4x}, c_{4x}, i_l, z_{0\_4x}, p_{a\_interp})$ <== ambient water level elevation

$s_{4x} := \overrightarrow{(z_{4x\_ambient} - z_{4x})}$ <== drawdown --measured water level elevation minus estimated ambient water level elevation

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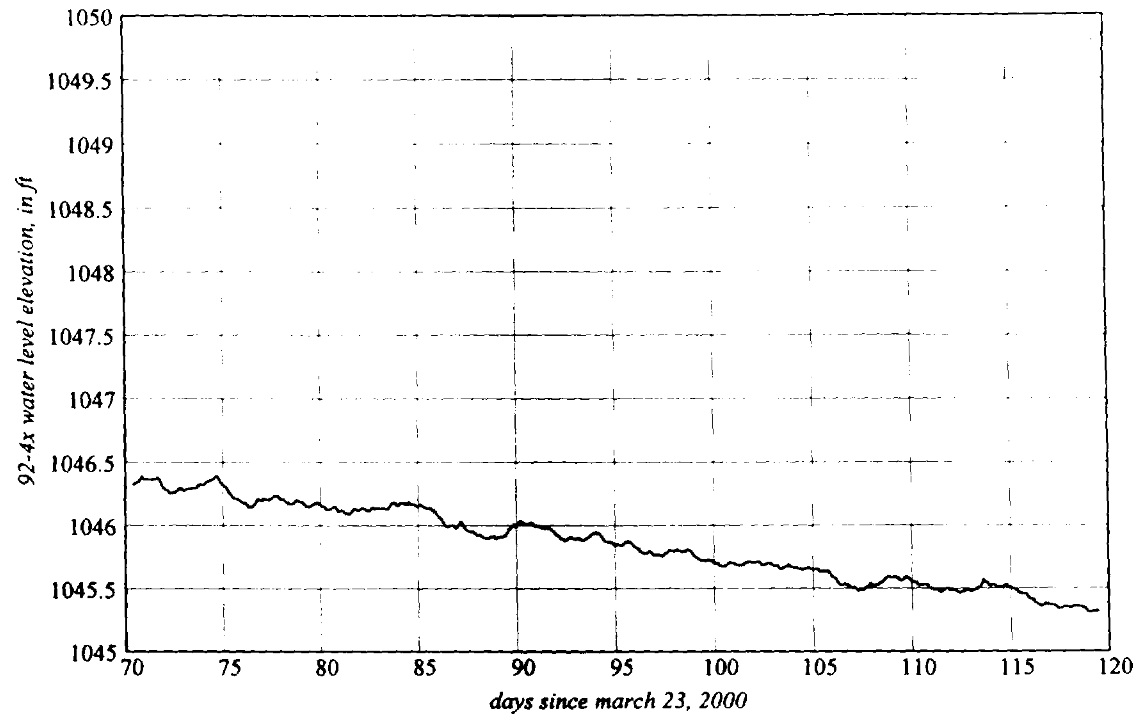
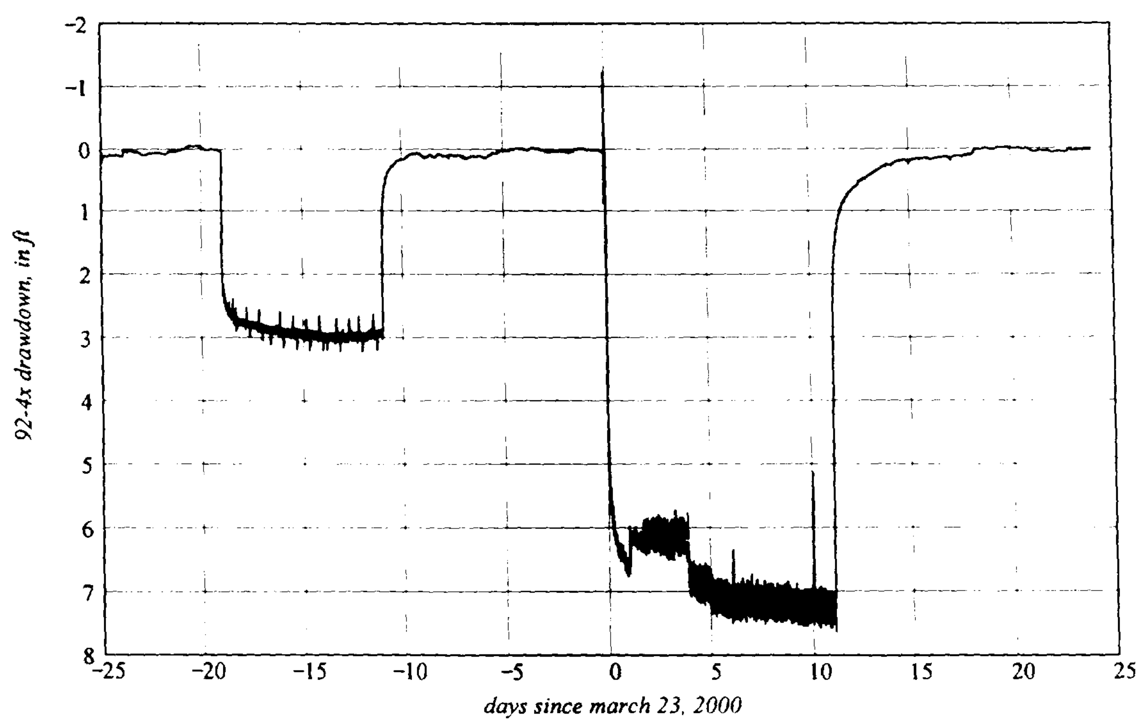
Estimated Ambient Ground Water Elevations at 92-4x



Computed Drawdown at 92-4x



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Calculate drawdowns for wells 00-4y and 00-4z

Interpolate barometric pressure

$$Pa\_interp := interp\left(cspline\left(t_a, Pa\right), t_a, Pa, t_{4yz}\right)$$

<=== interpolate to create vector of barometric pressure readings coincident with water level readings

(functions used above for 92-4x are generalized and can be reapplied here)

constants or 92-4y and 92-4z

$$i_{pump} := 2771$$

<= index for last water level measurement taken before starting test

$$z0\_4y := 1053.49\ ft\_water$$

<== reference water level (last water level prior to test)

$$z0\_4z := 1045.96\ ft\_water$$

$$B_{4y} := .6 \qquad B_{4z} := 0.4$$

<= barometric efficiency

- linear trend computed such that drawdowns are nearly flat at value 0 prior to and following recovery of water levels

$$c_{4y} := -0.029\ \frac{ft\_water}{day}$$

$$c_{4z} := -.022\ \frac{ft\_water}{day}$$

<== linear trends, 00-4y and 00-4z

$$z_{4y\_ambient} := z_{ambient}\left(t_{4yz}, z_{4y}, B_{4y}, c_{4y}, i_{pump}, z0\_4y, Pa\_interp\right)$$

$$z_{4z\_ambient} := z_{ambient}\left(t_{4yz}, z_{4z}, B_{4z}, c_{4z}, i_{pump}, z0\_4z, Pa\_interp\right)$$

$$s_{4y} := \overrightarrow{\left(z_{4y\_ambient} - z_{4y}\right)}$$

$$s_{4z} := \overrightarrow{\left(z_{4z\_ambient} - z_{4z}\right)}$$

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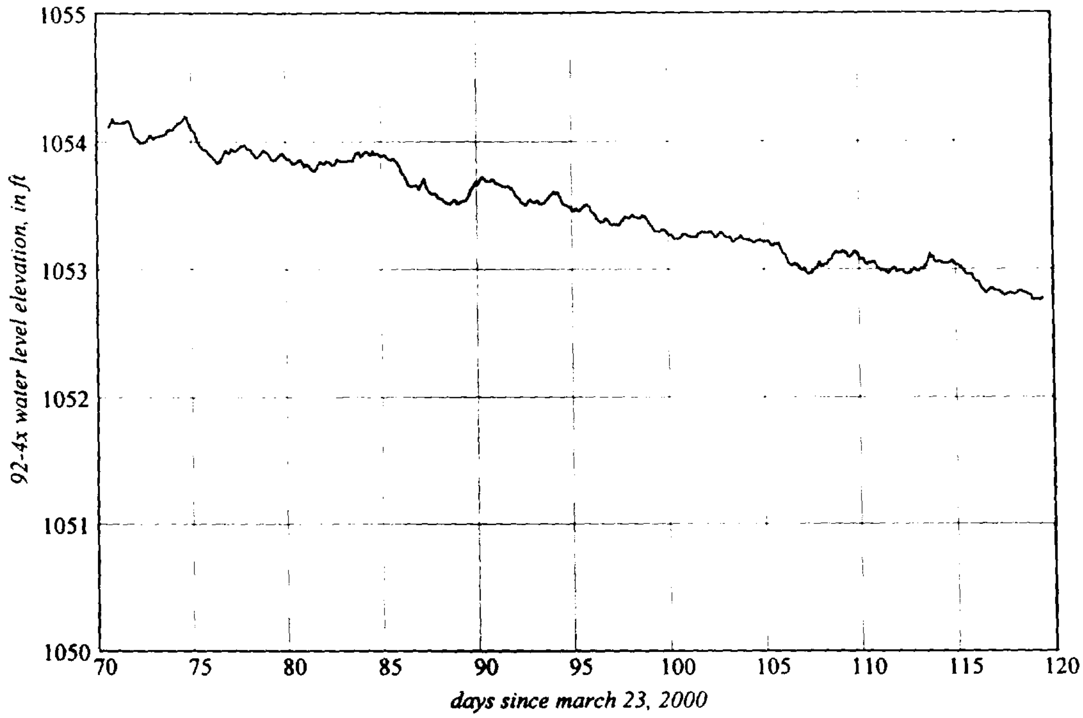
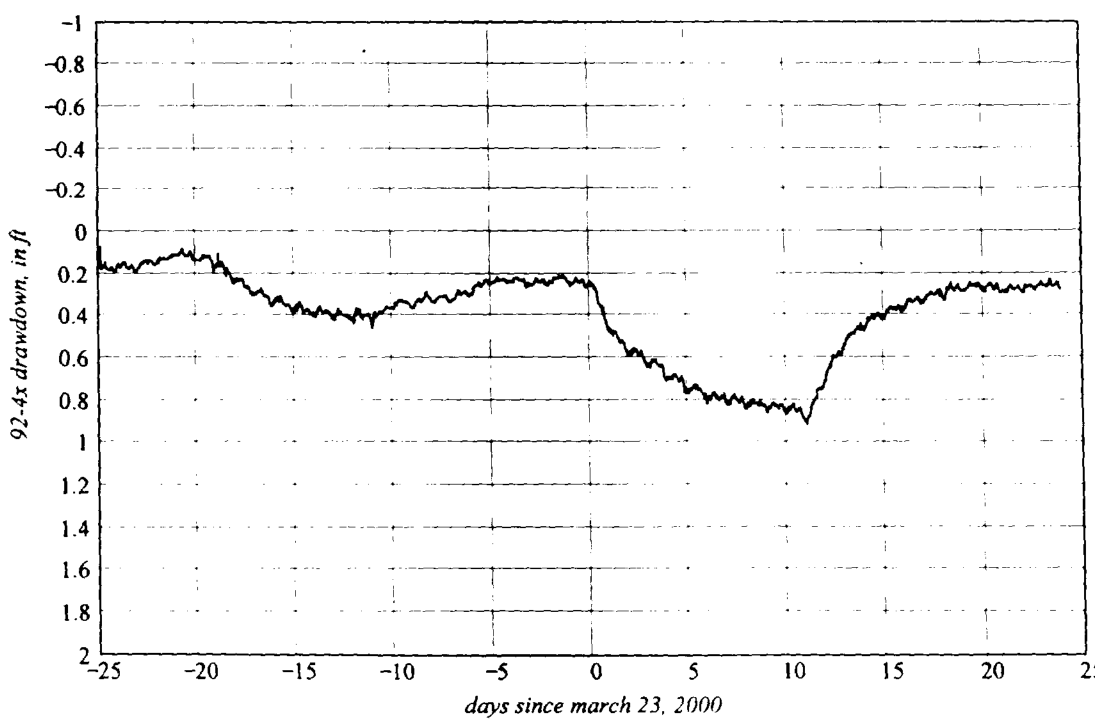
Estimated Ambient Ground Water Elevations at 92-4y



Computed Drawdown at 92-4y



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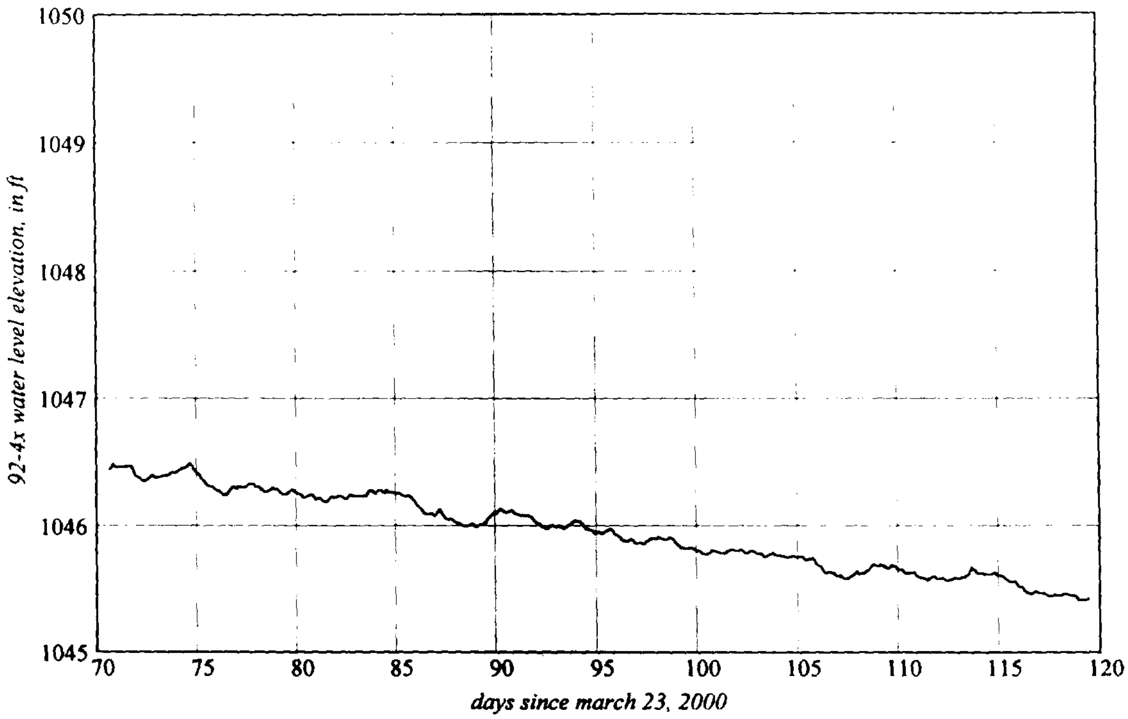
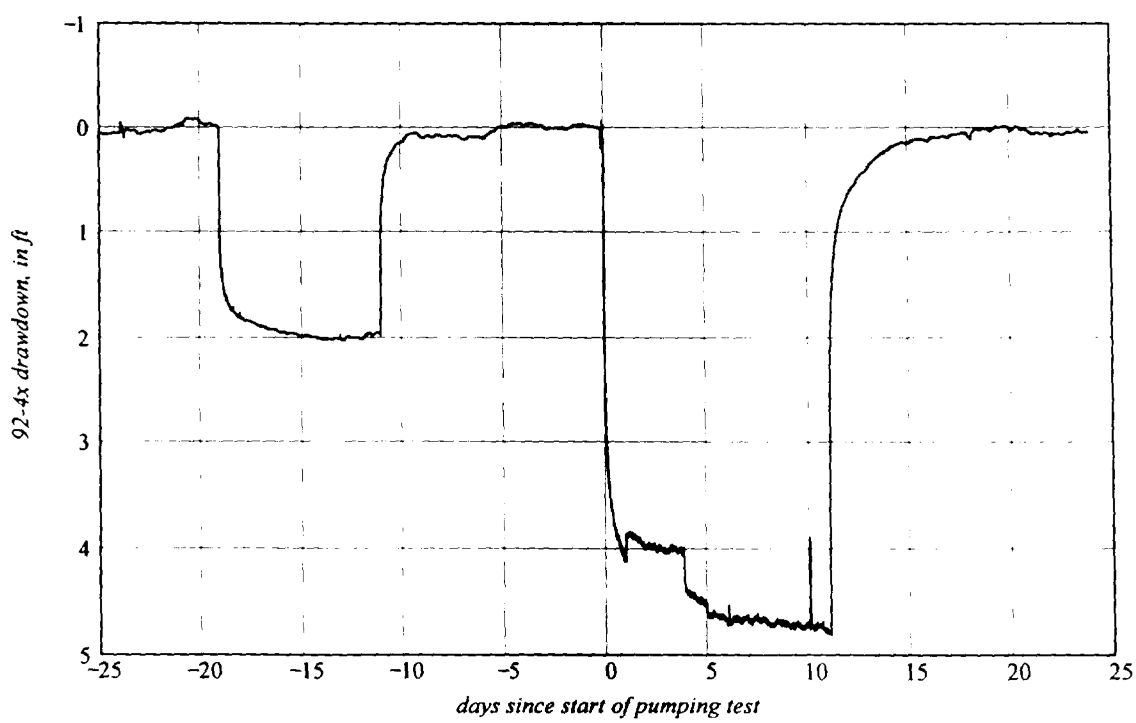
Estimated Ambient Ground Water Elevations at 92-4z



Computed Drawdown at 92-4z



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WRITE DRAWDOWNS TO EXCEL WORKSHEET

<u>92-4x</u>

$t_{pump} := 95\ day + 12\ hr + 20\ min$ <= time at start of test

$i_{pump\_4x} := 5635$ <= data index for start of test

$i_{total} := rows(t_{4x})$

$$return_{4x} := submatrix\left(augment\left(\frac{t_{4x} - t_{pump}}{min}, \frac{s_{4x}}{ft\_water}\right), i_{pump\_4x}, i_{total}, 1, 2\right)$$

<u>place 4y and 4z drawdowns in a matrix</u>

$i_{total} := rows(t_{4yz})$

$$return_{4yz} := submatrix\left(augment\left(\frac{t_{4yz} - t_{pump}}{min}, \frac{s_{4y}}{ft\_water}, \frac{s_{4z}}{ft\_water}\right), i_{pump}, i_{total}, 1, 3\right)$$

<u>Write to excel worksheet</u>

Worksheet

$(return_{4x}\ \ return_{4yz})$

Hantush-Jacob Leaky Aquifer Analysis of 00-4z Drawdown
Clarkco 92-4x Pumping Test June 26 - July 21, 2000

Overview

Drawdown data at 00-4z are analyzed using the leaky-aquifer method of Hantush and Jacob

Data

Elapsed test time and drawdowns were imported from Excel worksheet 4xyz_drawdown.xls

$$\begin{pmatrix} t_{4z} \\ s_{4z} \end{pmatrix} :=$$

Worksheet

$t_{4z} := t_{4z}\ min$

$s_{4z} := s_{4z}\ ft$

<== units are assigned to variables

Fixed Parameters

$Q := 0.217\ \frac{gal}{min}$ <== Pumping rate at 92-4x

$r := 10\ ft$ <== radial distance of 00-4z from 92-4x

$b' := 12\ ft$ <== thickness of unweathered till between 1050 and 1035 sands

Compute drawdowns using Hantush and Jacob Analytical Solution

Reference:C:\Program Files\MathSoft\Mathcad 2000 Professional\Well hydraulics\hydraulic functions.mcd

Define times for calculating drawdown

$j := 1..101$

$t_{H\_min} := 0.01\ min$

$t_{H\_max} := 20\ day$

$$t_{H_j} := exp\left[\left[ln\left(\frac{t_{H\_min}}{sec}\right) + (j-1)\ \frac{ln\left(\frac{t_{H\_max}}{t_{H\_min}}\right)}{100}\right]\right] sec$$

Define values for transmissivity, storage and leakage coefficients
Adjust until a good visual fit is obtained

$T := 50\ \frac{gal}{day\ ft}$

$S := .00003$

$\beta := .01 \qquad k' := \frac{T\ b'\ \beta^2}{r^2} \qquad k' = 2.83 \times 10^{-8}\ \frac{cm}{sec}$

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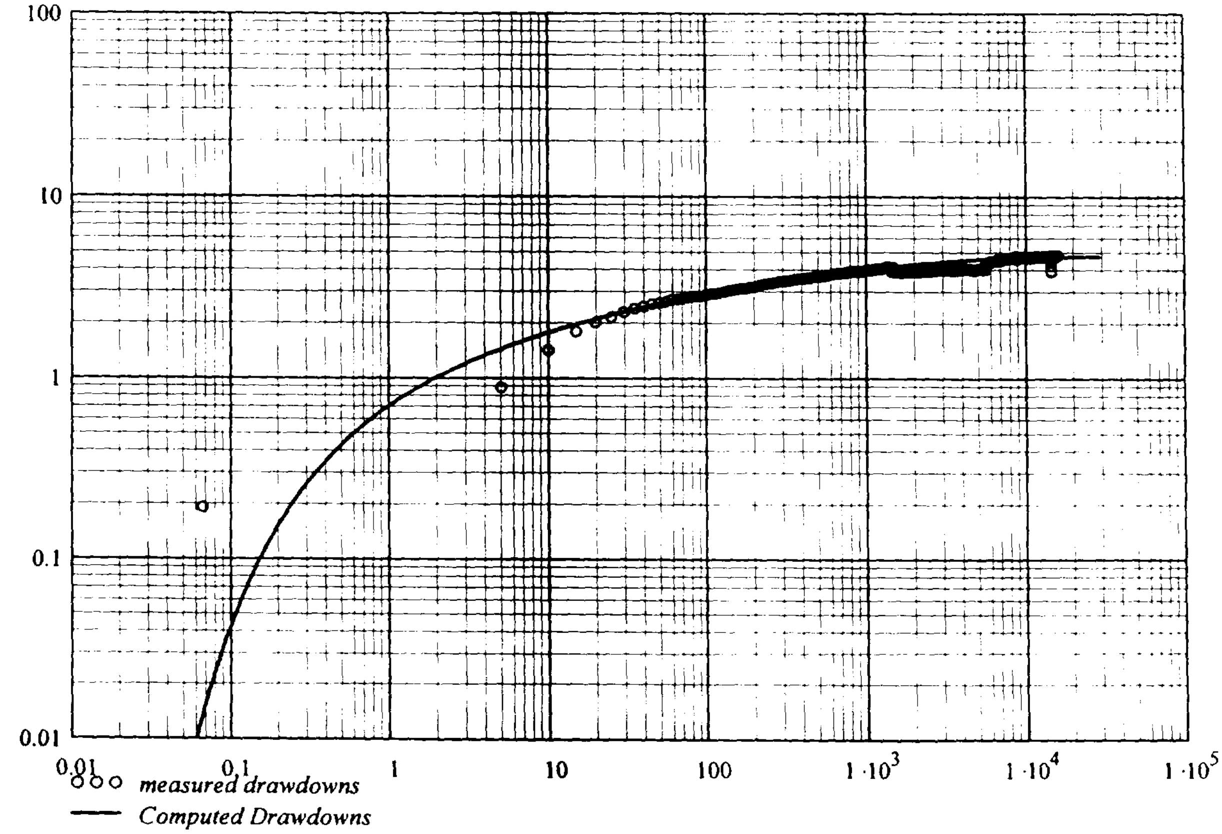
$$s_H(r,t) := \frac{Q}{4\ \pi\ T}\ H\left(\frac{r^2\ S}{4\ T\ t}, \beta\right)$$ <== Compute drawdowns

$$i := 1 .. rows(t_{4z})$$

$$s_j := s_H\left(r, t_{H_j}\right)$$



Neumann-Witherspoon Two-Aquifer Analysis of 92-4X, 92-4Y and 92-4Z Drawdown Clarkco 92-4x Pumping Test, June 26 - July 21, 2000

Overview

Drawdown data at 92-4x, 00-4y and 00-4z are analyzed using the two-aquifer method of Neumann and Witherspoon (1969)

Data

Elapsed test time and drawdowns were imported from Excel worksheet 4xyz_drawdown.xls

$$\begin{pmatrix} t_{4x} \\ s_{4x} \\ t_{4yz} \\ s_{4y} \\ s_{4z} \end{pmatrix} :=$$

Worksheet

$$\begin{pmatrix} t_{4x} \\ s_{4x} \\ t_{4yz} \\ s_{4y} \\ s_{4z} \end{pmatrix} := \begin{pmatrix} t_{4x}\,min \\ s_{4x}\,ft \\ t_{4yz}\,min \\ s_{4y}\,ft \\ s_{4z}\,ft \end{pmatrix}$$

<== assign units to variables

Fixed Parameters

$Q := 0.217\ \frac{gal}{min}$ <== Pumping rate at 92-4x

$r := 10\ ft$ <== radial distance of 00-4z from 92-4x

$b' := 12\ ft$ <== thickness of unweathered till between 1050 and 1035 sands

Compute drawdowns using Neumann and Witherspoon Analytical Solution

Define times for calculating drawdown

$n_j := 51$ <== number of calculation values

$j := 1 .. n_j$

$t_{N\_min} := 0.01\ min$ <== minimum and maximum times for calculation

$t_{N\_max} := 12\ day$

$$t_{N_j} := exp\left[\left[ln\left(\frac{t_{N\_min}}{sec}\right) + (j-1)\,\frac{ln\left(\frac{t_{N\_max}}{t_{N\_min}}\right)}{n_j - 1}\right]\right] sec$$

Adjustable Parameters

Define values for transmissivity, storage and leakage coefficients

(adjust via trial and error until a good visual fit is reached)

Parameters for 1035 Sand (Pumped Interval)

$T_1 := 50 \frac{gal}{day\ ft}$ Transmissivity

$S_1 := .00004$ Storage Coeffiient

Parameters for 1050 Sand

$T_2 := 50 \frac{gal}{day\ ft}$ Transmissivity

$S_2 := 0.00002$ Storage Coeffiient

Parameters for Unweathered Till

$K' := 5\ 10^{-8} \frac{cm}{sec}$ Hydraulic Conductivity

$S'_s := 2\ 10^{-7}\ ft^{-1}$ Storage Coefficient

Calculate Leakage Parameters

$B_{11} := \sqrt{\frac{T_1}{\left(\frac{K'}{b'}\right)}}$ $B_{11} = 752.273\,ft$

$B_{21} := \sqrt{\frac{T_2}{\left(\frac{K'}{b'}\right)}}$ $B_{21} = 752.273\,ft$

Calculate Drawdown using Neumann-Witherspoon Functions

Call Neumann Function

Reference:C:/Program Files\MathSoft\Mathcad 2000 Professional\Well hydraulics\hydraulic functions.mcd(R)

$s_1(r,t) := \frac{Q}{4\ \pi\ T_1} Neumann1(r,t)$

$s_2(r,t) := \frac{Q}{4\ \pi\ T_1} Neumann2(r,t)$

$s_{N\_4z_j} := s_1\left(10.5\ ft, t_{N_j}\right)$

$s_{N\_4y_j} := s_2\left(10\ ft, t_{N_j}\right)$

$s_{N\_4x_j} := s_1\left(0.083\ ft, t_{N_j}\right)$

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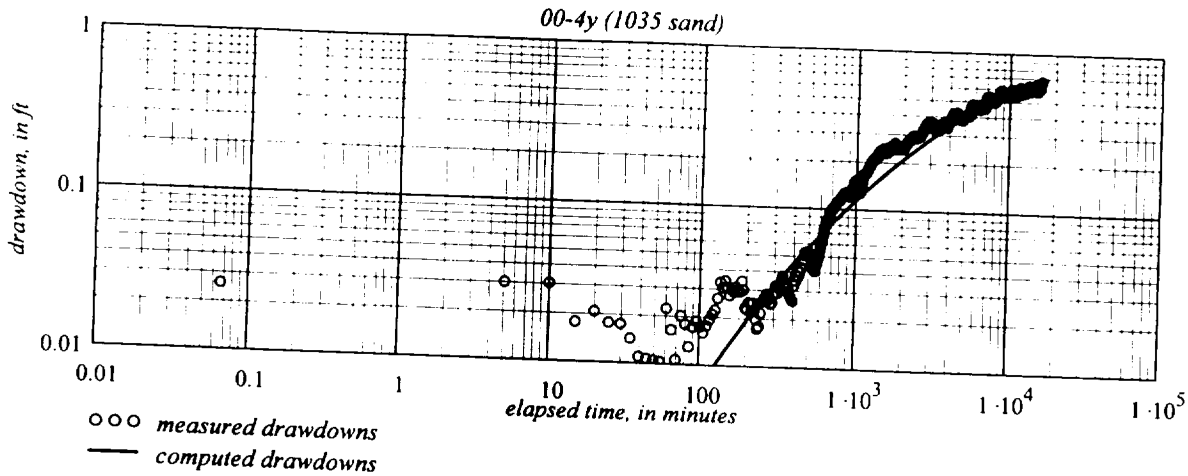
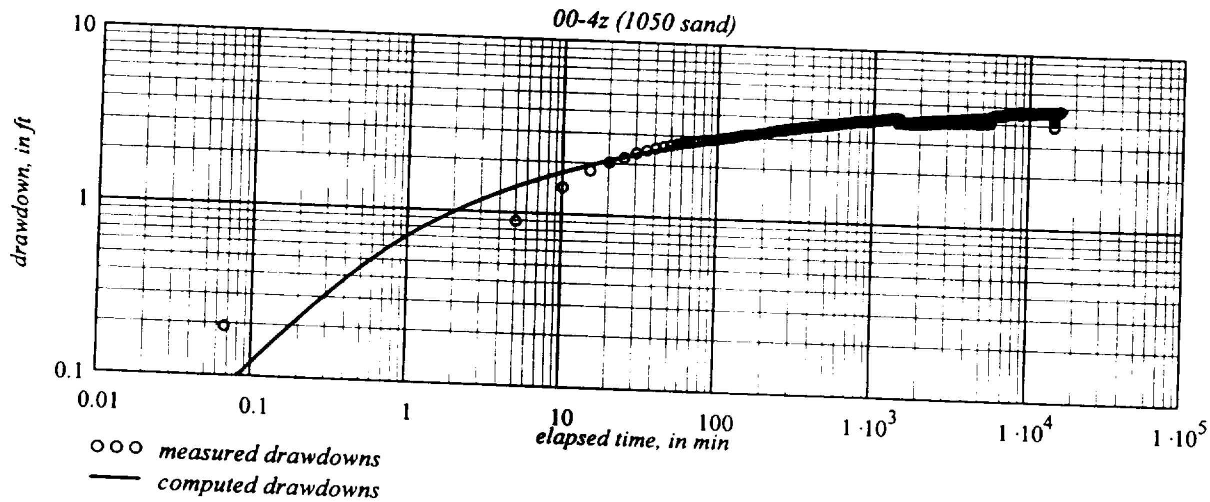
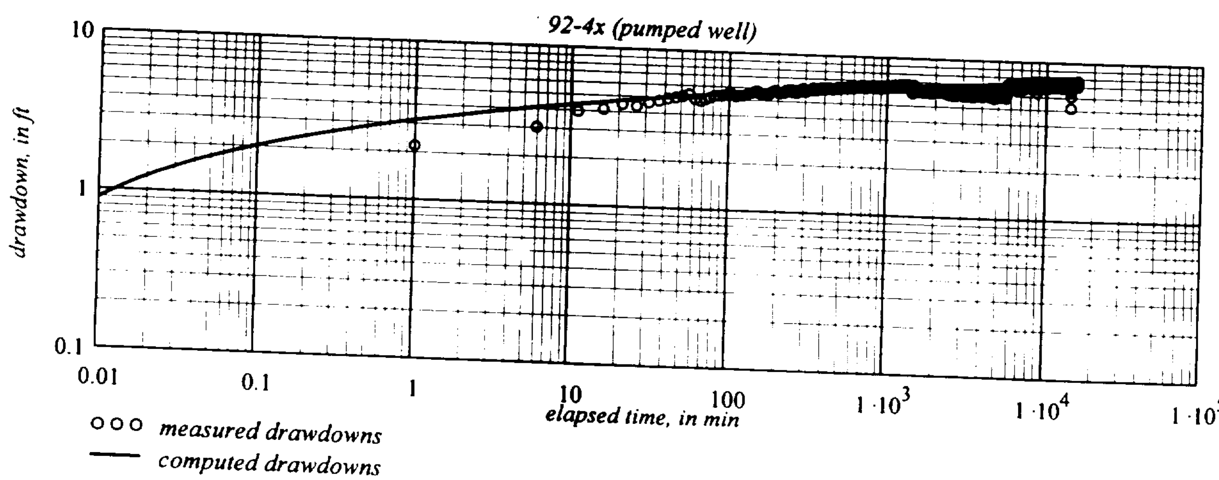
PROJECT Clarkco
SHEET NO 3 OF 3
CALCULATED BY S. Heermann DATE 10/5/00
FILE neumann 4xyz.mcd
LOCATED C:\Clarkco\MathCad Analyses\neumann_4xyz.mcd







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Analysis of 92-4x Recovery data using the Harrill Analysis Method
Clarkco 92-4x Pumping Test, June 26 - July 21, 2000

$gpm := \frac{gal}{min}$

define miscellaneous units of measure

$gpd := \frac{gal}{day}$

Read in Excel File containing corrected drawdowns (4xyz drawdown.xls) and assign values to variables

$read_{4x} :=$

C:\..\4xyz_drawdown.xls

$t_e := read_{4x}^{\langle 1 \rangle}\ min$ <== t_e is elapsed test time (from start of pumping)

$s := read_{4x}^{\langle 2 \rangle}\ ft \qquad n_s := rows(s)$ s_{4x} is the corresponding drawdown in well 4x

Miscellaneous parameters

$t_{recov} := 15950\ min$ <== time at which recovery starts

Tabulate measured pumping rates at corresponding times

$$t_{\Delta Q} := \begin{pmatrix} 0.0 \\ 1330 \\ 2955 \\ 4240 \\ 5575 \\ 7100 \\ 8660 \\ 9935 \\ 11515 \\ 12965 \end{pmatrix} min \qquad Q := \begin{pmatrix} 0.192 \\ 0.214 \\ 0.191 \\ 0.198 \\ 0.213 \\ 0.23 \\ 0.256 \\ 0.231 \\ 0.206 \\ 0.213 \end{pmatrix} gpm$$

compute change in puming rate (ΔQ)

$\Delta Q_1 := Q_1$

$n_Q := rows(Q)$

$i := 2 .. n_Q$

$\Delta Q_i := Q_i - Q_{i-1}$

$$\Delta Q = \begin{pmatrix} 0.192 \\ 0.022 \\ -0.023 \\ 0.007 \\ 0.015 \\ 0.017 \\ 0.026 \\ -0.025 \\ -0.025 \\ 0.007 \end{pmatrix} gpm$$

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Extract subset of test recovery information after recovery starts including t', t, and s'

$$i_{recov} := \left| \begin{array}{l} i \leftarrow 1 \\ \text{while } t_{e_i} < t_{recov} \\ \quad i \leftarrow i+1 \end{array} \right.$$ <== find index where recovery period starts

$$i_{recov} = 3190$$

$$t := submatrix\left(t_e, i_{recov}, n_s, 1, 1\right)$$

$$t' := \overrightarrow{\left(t - t_{recov}\right)}$$

$$s' := submatrix\left(s, i_{recov}, n_s, 1, 1\right)$$

$$n_r := n_s - i_{recov} + 1$$ <== number of recovery data

Compute Harrill time function

Compute Harrill and Jacob Drawdowns

$$i := 1 .. n_r \qquad T := 54\,\frac{gpd}{ft} \qquad Q_T := Q_{n_Q}$$

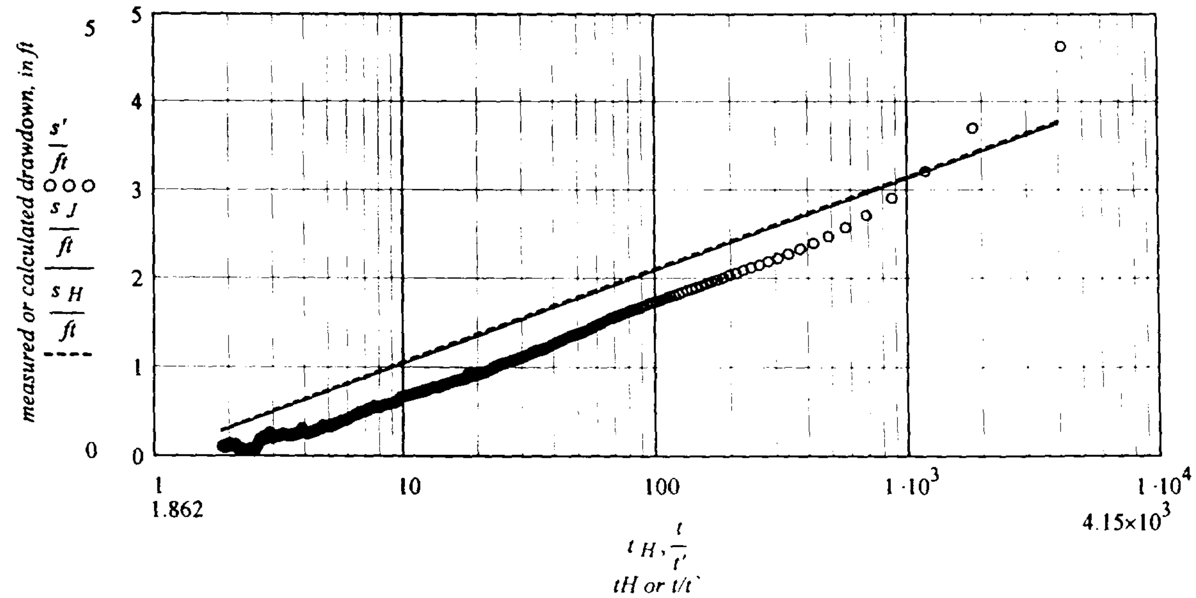
$$t_{H_i} := \frac{\displaystyle\prod_{j=1}^{10} \left(\frac{t_i - t_{\Delta Q_j}}{sec}\right)^{\frac{\Delta Q_j}{Q_T}}}{\dfrac{t'_i}{sec}}$$

Harrill Drawdown

$$s_H := \frac{Q_T}{4\,\pi\,T}\,ln\left(t_H\right)$$

Jacob Method Drawdown

$$s_J := \frac{Q_T}{4\,\pi\,T}\,ln\left(\frac{t}{t'}\right)$$

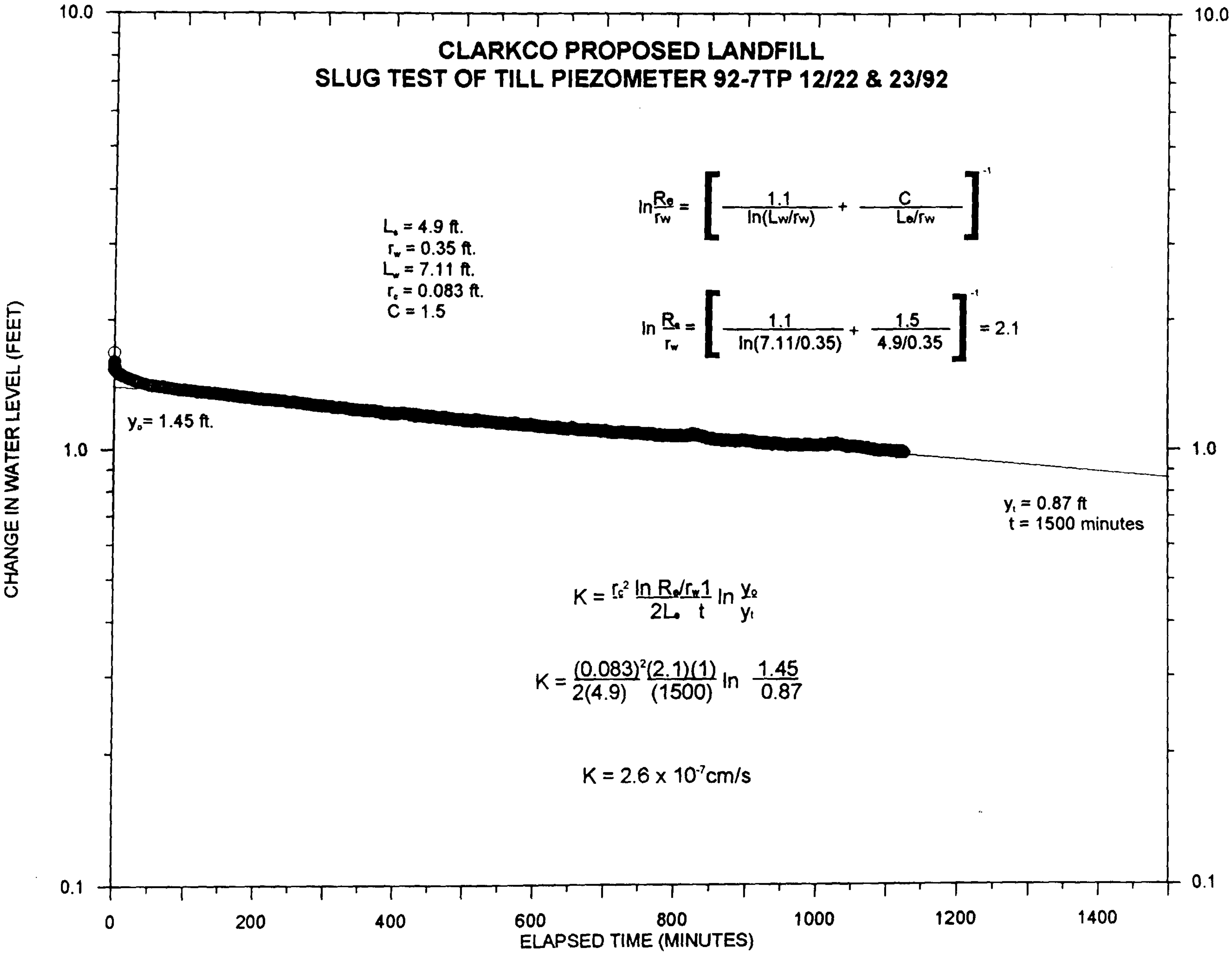


ooo *recovery drawdowns*
—— *Jacob drawdowns*
---- *Harrill Analysis Drawdowns*

APPENDIX I
SLUG TESTS ON TILL PIEZOMETERS

SLUG TESTS ON TILL WELLS	
Lower Till (Wisconsinan)	92-7TP, 92-10TP, 92-14TP, C92-8TP
Illinoian Till *	00-40TP, 00-41TPD, 00-41 TPW

Tests on Illinoian till piezometers were performed during June, July, and August 2000. Transducers and data loggers were installed in each piezometer to monitor equilibration of water levels after installation. Declining trends were observed due to water being added to hydrate the bentonite seal after installation. Hydrographs of water-level trends are provided along with the slug test graphs and calculations.



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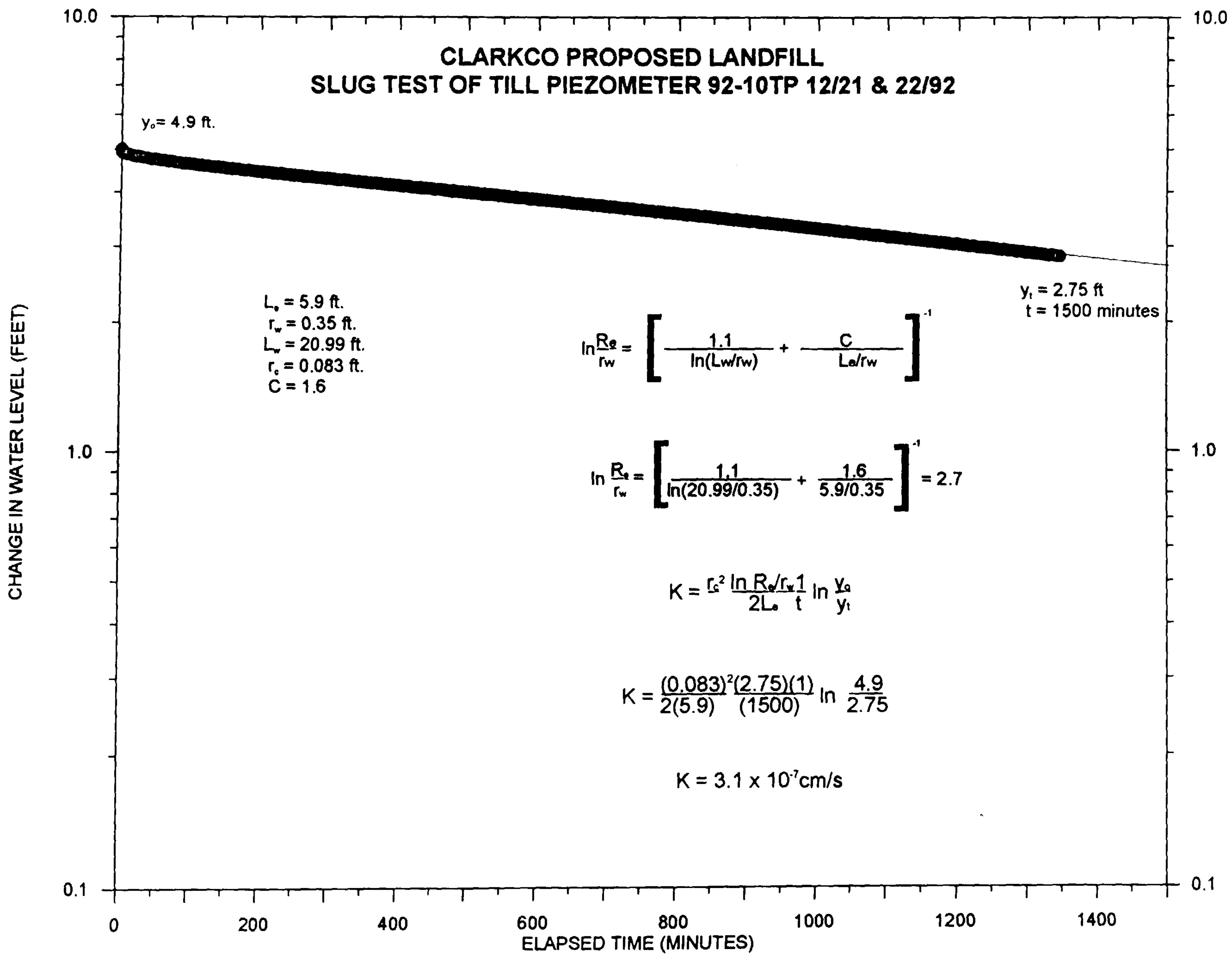

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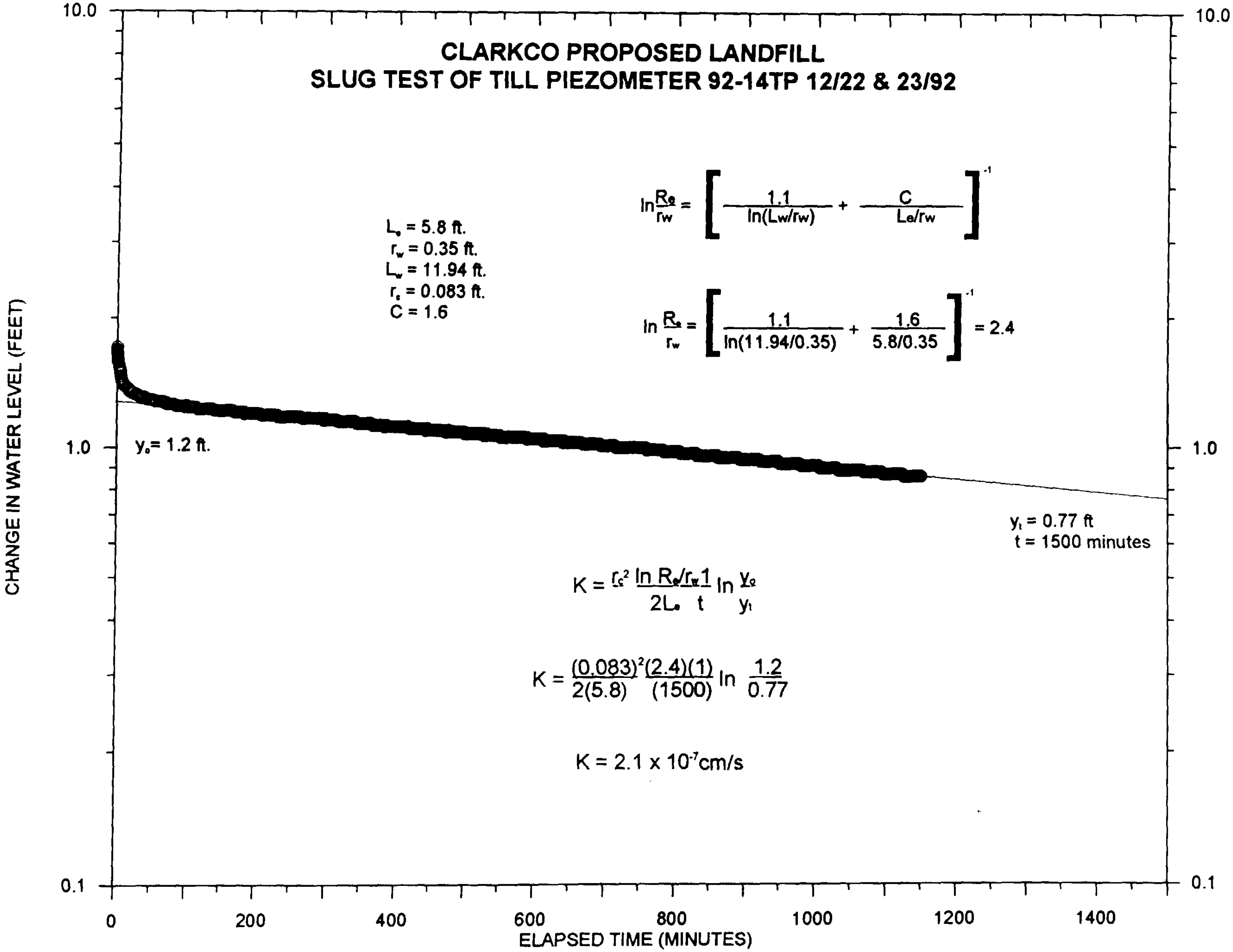

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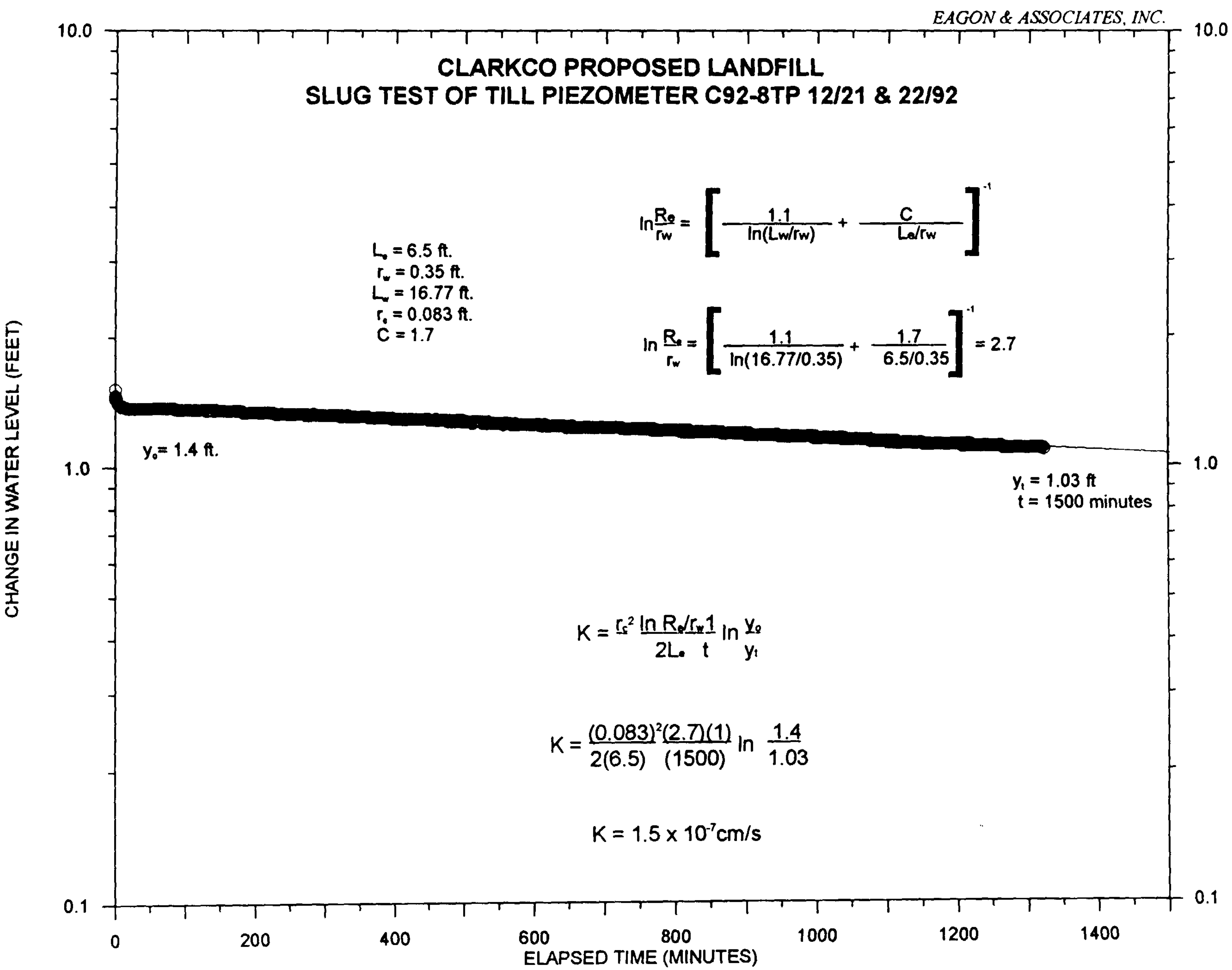

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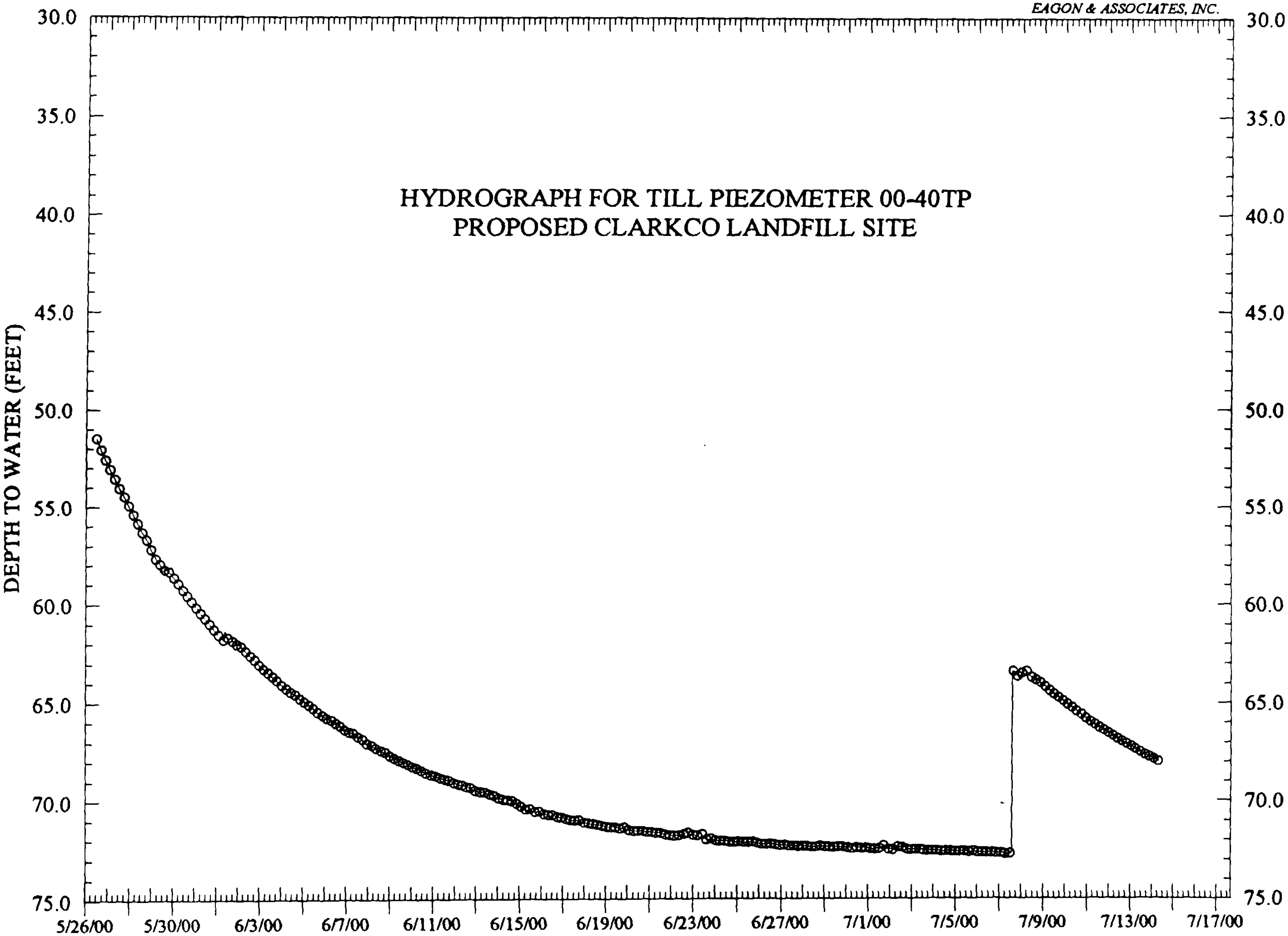
CLARKCO PROPOSED LANDFILL
SLUG TEST OF TILL PIEZOMETER C92-8TP 12/21 & 22/92
$\ln\frac{R_e}{r_w} = \left[\frac{1.1}{\ln(L_w/r_w)} + \frac{C}{L_e/r_w}\right]^{-1}$
$L_e = 6.5$ ft.
$r_w = 0.35$ ft.
$L_w = 16.77$ ft.
$r_c = 0.083$ ft.
C = 1.7
$\ln\frac{R_e}{r_w} = \left[\frac{1.1}{\ln(16.77/0.35)} + \frac{1.7}{6.5/0.35}\right]^{-1} = 2.7$
$y_o = 1.4$ ft.
$y_t = 1.03$ ft
t = 1500 minutes
$K = \frac{r_c^2}{2L_e}\frac{\ln R_e/r_w 1}{t}\ln\frac{y_o}{y_t}$
$K = \frac{(0.083)^2}{2(6.5)}\frac{(2.7)(1)}{(1500)}\ln\frac{1.4}{1.03}$
$K = 1.5 \times 10^{-7}$ cm/s
CHANGE IN WATER LEVEL (FEET)
10.0
1.0
0.1
ELAPSED TIME (MINUTES)
0
200
400
600
800
1000
1200
1400



CLARKCO/HYDTP.GRF
7/18/00

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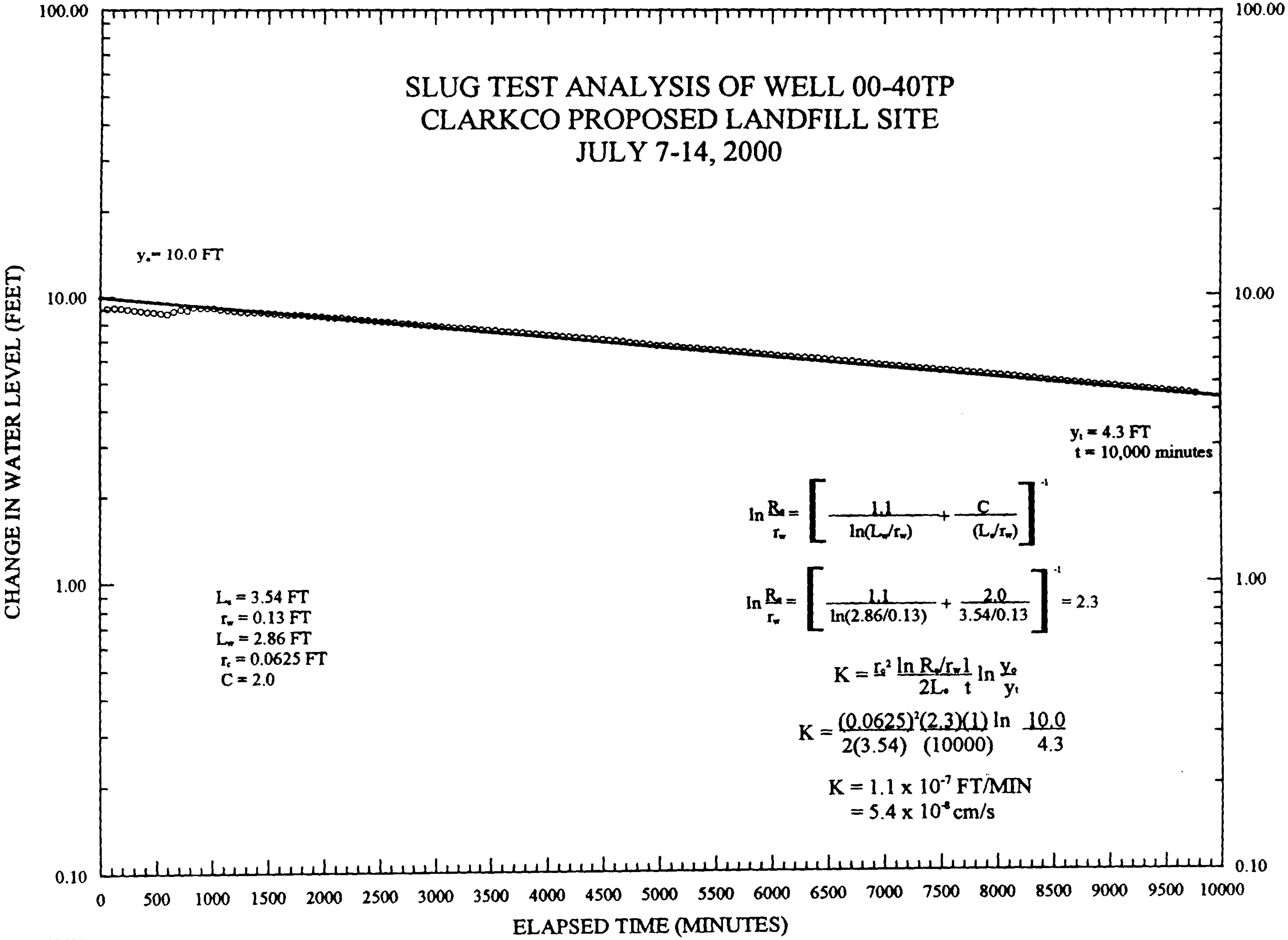
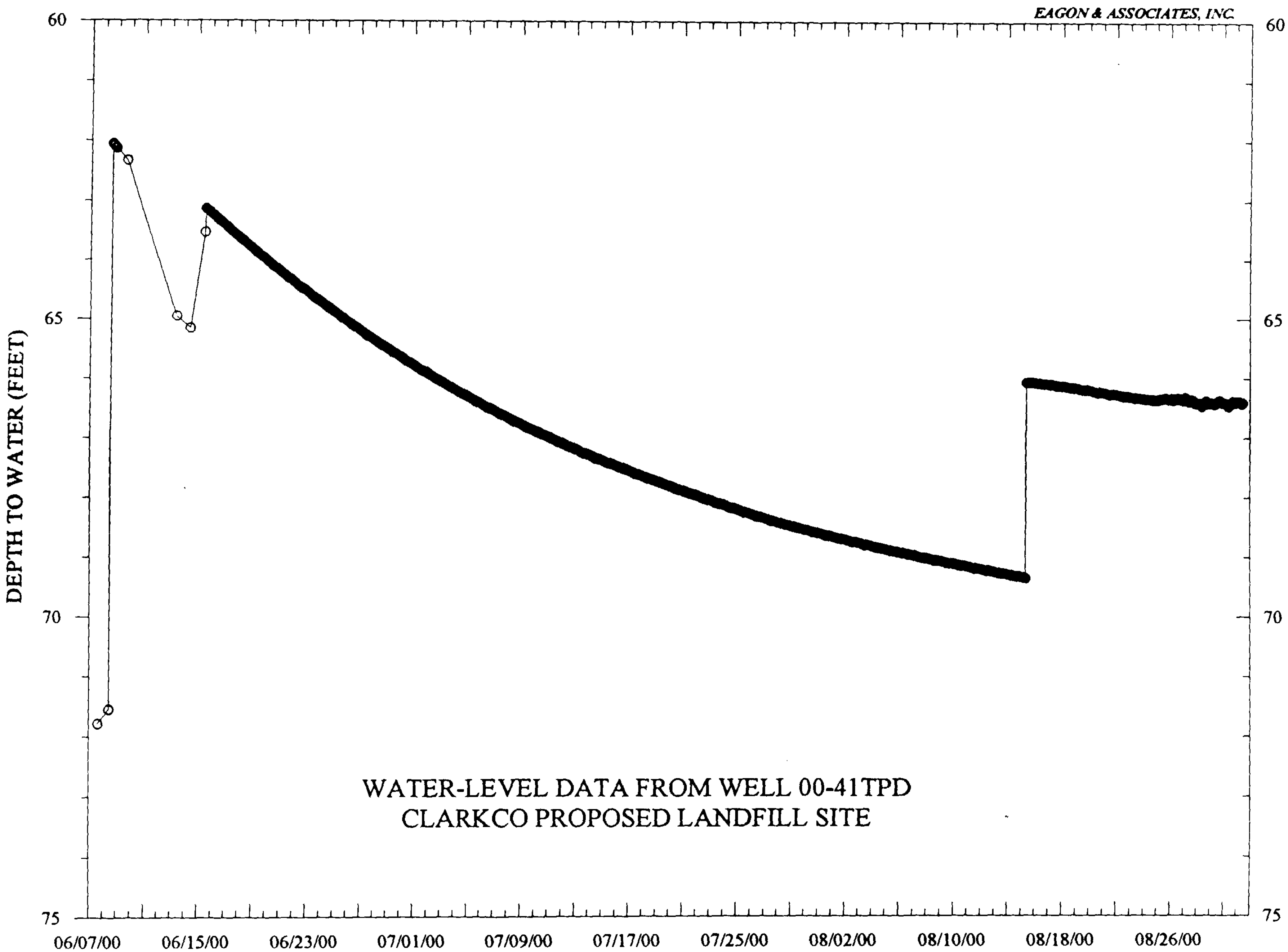


SLO40TP.GRF
7/19/00



CLARKCO/41TPD.GRF
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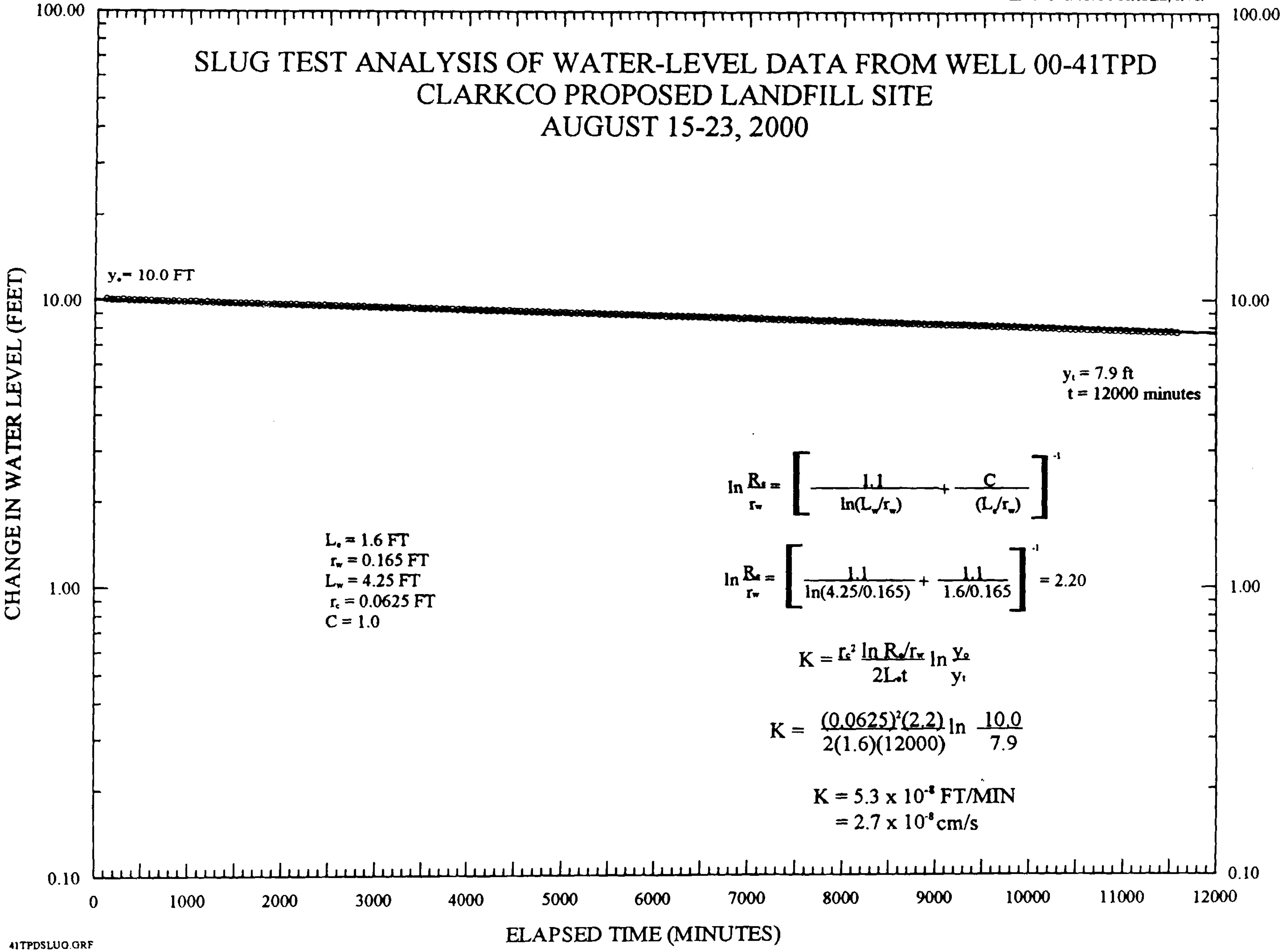

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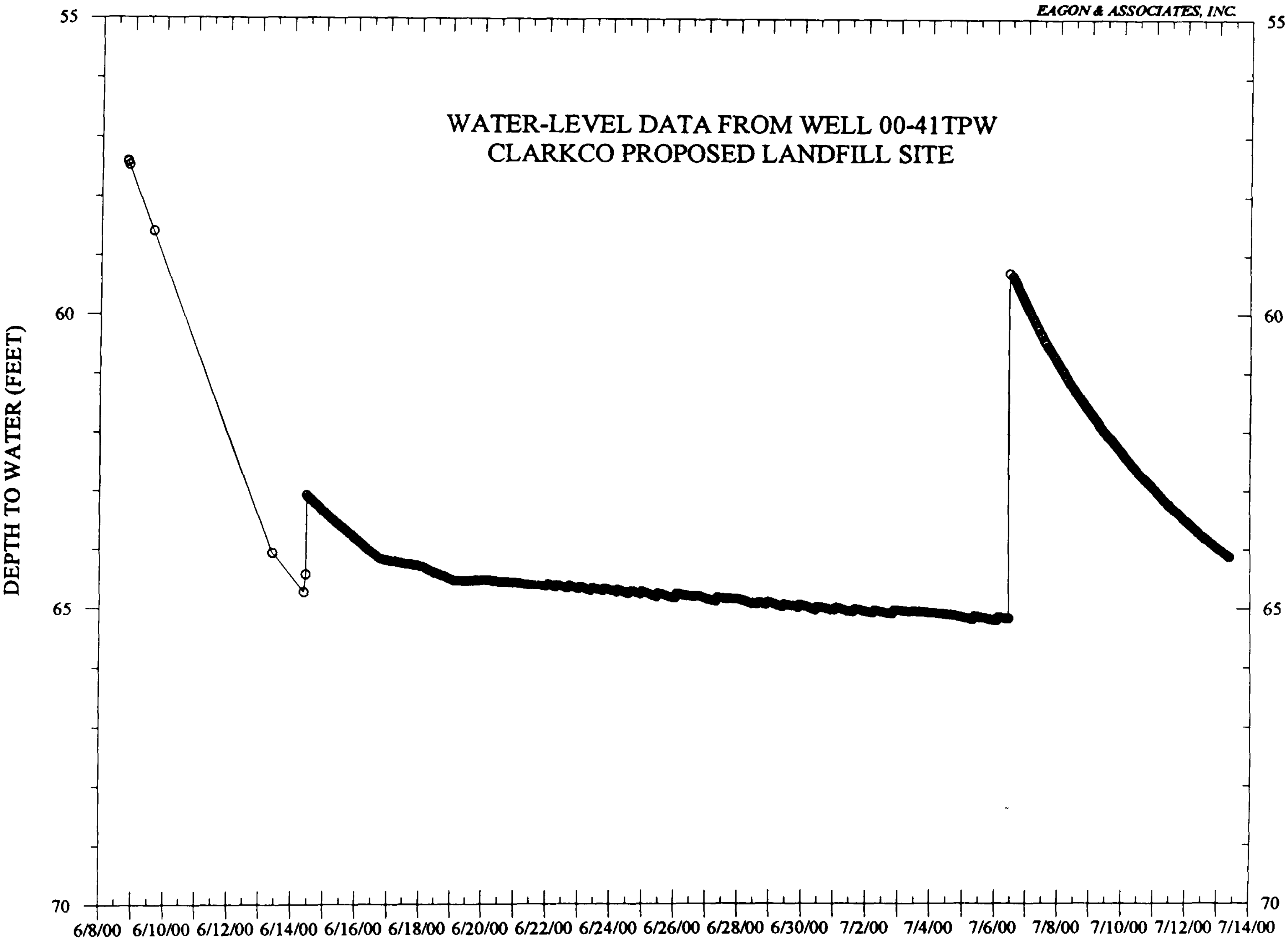

CLARKCO/41TPW.GRF
7/18/00

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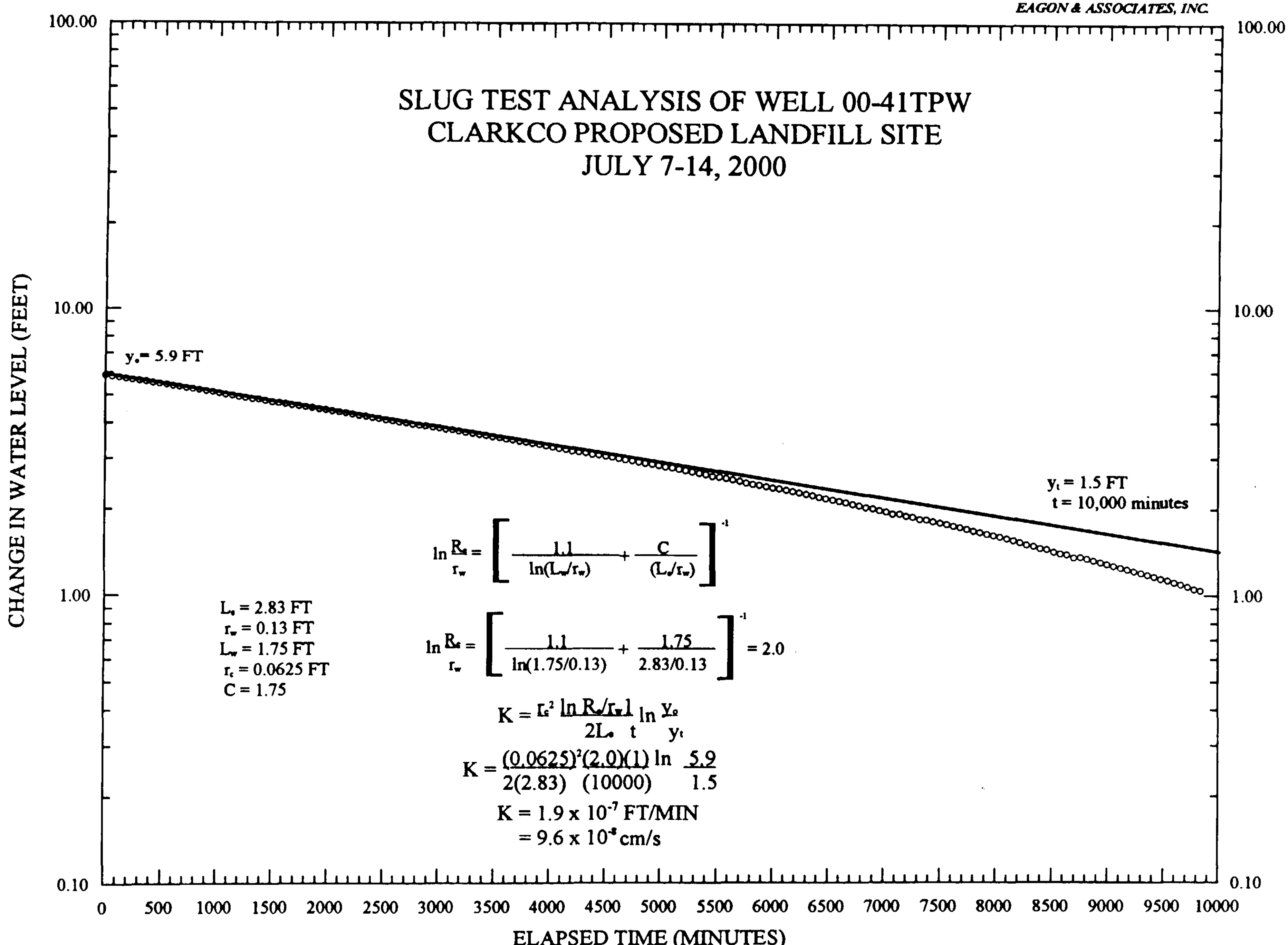

SLG41TPW.GRF
7/19/00

APPENDIX J.

WATER QUALITY TESTING RESULTS

WATER QUALITY DATA IN THIS APPENDIX IS ARRANGED IN THE FOLLOWING ORDER:	
October, 1991 Sampling	Wells 90-6D, 90-7D, 90-14D, C91-5D, C91-8D
September, 1992 Sampling	Wells C91-8X, C91-9Z, 90-10X, C91-4X, 92-9Y, 92-27DD, 90-7Z, 90-9DD, 92-24Y, 92-4X, C92-5DD, C92-9X
Analyses from 1990 Pumping Tests	Wells PW-1 and PW-3
Analysis from 72-hour Pumping Test	Well PW-3
Tritium Analyses October, 1992	Wells 90-9DD, 92-4X, 91-9Z, 92-27DD, 90-10X
Resampling February, 1993	Wells C91-5D and C92-5DD
Drilling Water Samples	Rig Tanks

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936 North Horner Blvd., Sanford, North Carolina 27330

LABORATORY ANALYSIS REPORT

DATE REC'D. 10-29-1991
DATE REP'D. 12-02-1991
P.O. # CLARK CO
LAB NO. 10-18687-91
CLIENT NO. I0107

SAMPLE LOCATION CLARK CO 90-6D
SAMPLED BY STEPHEN CHAMPE
DATE SAMPLED 10-28-1991
TIME SAMPLED 10:00

FRANK MAJCHSZAK
EAGON & ASSOCIATES INC
6877 N HIGH STE 302
WORTHINGTON OH 43085

COMMENTS:

STORET	ANALYSIS	RESULT	UNITS	DATE OF ANALYSIS
00410	ALKALINITY, TOTAL, CACO3	810	MG/L	10-31-1991
01003	ARSENIC, DISS., AS	5	UG/L	11-01-1991
01008	BARIUM, DISS., BA	430	UG/L	11-01-1991
01028	CADMIUM, DISS., CD	<1	UG/L	11-01-1991
00940	CHLORIDE, CL	10	MG/L	11-04-1991
01035	CHROMIUM, DISS., CR	<10	UG/L	11-01-1991
00917	CALCIUM, DISS., CA	76	MG/L	11-01-1991
00340	COD	76	MG/L	10-31-1991
01043	COPPER, DISS., CU	14	UG/L	11-01-1991
00720	CYANIDE, TOTAL, CN	0.016	MG/L	10-30-1991
01046	IRON, DISS, FE	<10	UG/L	11-01-1991
01052	LEAD, DISS., PB	<2.0	UG/L	11-01-1991
01056	MANGANESE, DISS., MN	100	UG/L	11-01-1991
71901	MERCURY, DISS., HG	<0.2	UG/L	10-30-1991
01068	NICKEL, DISS., NI	27	UG/L	11-01-1991
00928	MAGNESIUM, DISS., MG	36	MG/L	11-01-1991
00620	NITRATE N	<0.05	MG/L	11-13-1991
00615	NITRITE N	<0.05	MG/L	11-01-1991
00610	NITROGEN, AMMONIA, N	0.56	MG/L	10-29-1991
32730	PHENOLS, 4-AAP	<0.010	MG/L	10-30-1991
00665	PHOSPHORUS, TOTAL, P	0.19	MG/L	11-05-1991
00939	POTASSIUM, DISS., K	3.7	MG/L	11-01-1991
00515	RESIDUE, T. FLT. (DISS)	364	MG/L	11-03-1991
01148	SELENIUM, DISS., SE	<3-R	UG/L	11-01-1991
01078	SILVER, DISS., AG	<30	UG/L	11-01-1991
00930	SODIUM, DISS., NA	19	MG/L	11-01-1991
00945	SULFATE, SO4	21	MG/L	11-04-1991
00680	CARBON, TOTAL ORGANIC, C	7.7	MG/L	11-04-1991
00076	TURBIDITY, NTU	7500	NTU	10-30-1991
01093	ZINC, DISS., ZN	<5	UG/L	11-01-1991
00100	ORGANICS ANALYSIS	---	---	12-02-1991

LABORATORY CERTIFICATION # 4053

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936 North Horner Blvd., Sanford, North Carolina 27330

LABORATORY ANALYSIS REPORT

DATE REC'D. 10-29-1991 LAB NO. 10-18688-91
DATE REP'D. 12-02-1991 P.O. # CLARK CO CLIENT NO. I0107

SAMPLE LOCATION CLARK CO 90-7D DATE SAMPLED 10-28-1991
SAMPLED BY STEPHEN CHAMPE TIME SAMPLED 11:15

FRANK MAJCHSZAK
EAGON & ASSOCIATES INC
6877 N HIGH STE 302
WORTHINGTON OH 43085

COMMENTS:

STORET	ANALYSIS	RESULT	UNITS	DATE OF ANALYSIS
00410	ALKALINITY, TOTAL, CACO3	641	MG/L	10-31-1991
01003	ARSENIC, DISS., AS	4	UG/L	11-01-1991
01008	BARIUM, DISS., BA	340	UG/L	11-01-1991
01028	CADMIUM, DISS., CD	<1	UG/L	11-01-1991
00940	CHLORIDE, CL	8	MG/L	11-04-1991
01035	CHROMIUM, DISS., CR	<10	UG/L	11-01-1991
00917	CALCIUM, DISS., CA	78	MG/L	11-01-1991
00340	COD	67	MG/L	10-31-1991
01043	COPPER, DISS., CU	21	UG/L	11-01-1991
00720	CYANIDE, TOTAL, CN	<0.010	MG/L	10-30-1991
01046	IRON, DISS, FE	<10	UG/L	11-01-1991
01052	LEAD, DISS., PB	<2.0	UG/L	11-01-1991
01056	MANGANESE, DISS., MN	200	UG/L	11-01-1991
71901	MERCURY, DISS., HG	<0.2	UG/L	10-30-1991
01068	NICKEL, DISS., NI	26	UG/L	11-01-1991
00928	MAGNESIUM, DISS., MG	38	MG/L	11-01-1991
00620	NITRATE N	<0.05	MG/L	11-01-1991
00615	NITRITE N	<0.05	MG/L	11-01-1991
00610	NITROGEN, AMMONIA, N	0.35	MG/L	10-29-1991
32730	PHENOLS, 4-AAP	<0.010	MG/L	10-30-1991
00665	PHOSPHORUS, TOTAL, P	0.77	MG/L	10-31-1991
00939	POTASSIUM, DISS., K	3.2	MG/L	11-01-1991
00515	RESIDUE, T. FLT. (DISS)	330	MG/L	11-03-1991
01148	SELENIUM, DISS., SE	<3-R	UG/L	11-01-1991
01078	SILVER, DISS., AG	<30	UG/L	11-01-1991
00930	SODIUM, DISS., NA	14	MG/L	11-01-1991
00945	SULFATE, SO4	21	MG/L	11-04-1991
00680	CARBON, TOTAL ORGANIC, C	4.2	MG/L	11-04-1991
00076	TURBIDITY, NTU	7000	NTU	10-30-1991
01093	ZINC, DISS., ZN	<5	UG/L	11-01-1991
00100	ORGANICS ANALYSIS	---	---	12-02-1991

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936 North Horner Blvd., Sanford, North Carolina 27330

LABORATORY ANALYSIS REPORT

DATE REC'D. 10-29-1991
DATE REP'D. 12-02-1991 P.O. # CLARK CO
LAB NO. 10-18690-91
CLIENT NO. I0107

SAMPLE LOCATION CLARK CO 90-14D
SAMPLED BY STEPHEN CHAMPE
DATE SAMPLED 10-28-1991
TIME SAMPLED 16:00

FRANK MAJCHSZAK
EAGON & ASSOCIATES INC
6877 N HIGH STE 302
WORTHINGTON OH 43085

COMMENTS:

	ANALYSIS	RESULT	UNITS	DATE OF ANALYSIS
00410	ALKALINITY, TOTAL, CACO3	736	MG/L	10-31-1991
01003	ARSENIC, DISS., AS	23	UG/L	11-01-1991
01008	BARIUM, DISS., BA	430	UG/L	11-01-1991
01028	CADMIUM, DISS., CD	<1	UG/L	11-01-1991
00940	CHLORIDE, CL	9	MG/L	11-04-1991
01035	CHROMIUM, DISS., CR	<10	UG/L	11-01-1991
00917	CALCIUM, DISS., CA	80	MG/L	11-01-1991
00340	COD	<20	MG/L	10-31-1991
01043	COPPER, DISS., CU	10	UG/L	11-01-1991
00720	CYANIDE, TOTAL, CN	<0.010	MG/L	10-30-1991
01046	IRON, DISS, FE	310	UG/L	11-01-1991
01052	LEAD, DISS., PB	<2.0	UG/L	11-01-1991
01056	MANGANESE, DISS., MN	43	UG/L	11-01-1991
71901	MERCURY, DISS., HG	<0.2	UG/L	10-30-1991
01068	NICKEL, DISS., NI	27	UG/L	11-01-1991
00928	MAGNESIUM, DISS., MG	36	MG/L	11-01-1991
00620	NITRATE N	<0.05	MG/L	11-01-1991
00615	NITRITE N	<0.05	MG/L	11-01-1991
00610	NITROGEN, AMMONIA, N	0.27	MG/L	10-29-1991
32730	PHENOLS, 4-AAP	<0.010	MG/L	10-30-1991
00665	PHOSPHORUS, TOTAL, P	0.04	MG/L	11-04-1991
00939	POTASSIUM, DISS., K	3.1	MG/L	11-01-1991
00515	RESIDUE, T. FLT. (DISS)	226	MG/L	11-05-1991
01148	SELENIUM, DISS., SE	<3-R	UG/L	11-01-1991
01078	SILVER, DISS., AG	<30	UG/L	11-01-1991
00930	SODIUM, DISS., NA	17	MG/L	11-01-1991
00945	SULFATE, SO4	22	MG/L	11-04-1991
00680	CARBON, TOTAL ORGANIC, C	2.3	MG/L	11-04-1991
00076	TURBIDITY, NTU	7500	NTU	10-30-1991
01093	ZINC, DISS., ZN	<5	UG/L	11-01-1991
00100	ORGANICS ANALYSIS	---	---	12-02-1991

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LABORATORY ANALYSIS REPORT

DATE REC'D. 10-29-1991
DATE REP'D. 12-02-1991
P.O. # CLARK CO
LAB NO. 10-18691-91
CLIENT NO. I0107

SAMPLE LOCATION CLARK CO C91-5D
SAMPLED BY STEPHEN CHAMPE
DATE SAMPLED 10-28-1991
TIME SAMPLED 17:40

FRANK MAJCHSZAK
EAGON & ASSOCIATES INC
6877 N HIGH STE 302
WORTHINGTON OH 43085

COMMENTS:

STORET	ANALYSIS	RESULT	UNITS	DATE OF ANALYSIS
00410	ALKALINITY, TOTAL, CACO3	369	MG/L	10-31-1991
01003	ARSENIC, DISS., AS	6	UG/L	11-01-1991
01008	BARIUM, DISS., BA	310	UG/L	11-01-1991
01028	CADMIUM, DISS., CD	<1	UG/L	11-01-1991
00940	CHLORIDE, CL	10	MG/L	11-04-1991
01035	CHROMIUM, DISS., CR	<10	UG/L	11-01-1991
00917	CALCIUM, DISS., CA	90	MG/L	11-01-1991
00340	COD	<20	MG/L	10-31-1991
01043	COPPER, DISS., CU	<6	UG/L	11-01-1991
00720	CYANIDE, TOTAL, CN	<0.010	MG/L	10-30-1991
01046	IRON, DISS, FE	1800	UG/L	11-01-1991
01052	LEAD, DISS., PB	<2.0	UG/L	11-01-1991
01056	MANGANESE, DISS., MN	180	UG/L	11-01-1991
71901	MERCURY, DISS., HG	<0.2	UG/L	10-30-1991
01068	NICKEL, DISS., NI	28	UG/L	11-01-1991
00928	MAGNESIUM, DISS., MG	36	MG/L	11-01-1991
00620	NITRATE N	<0.05	MG/L	11-01-1991
00615	NITRITE N	<0.05	MG/L	11-01-1991
00610	NITROGEN, AMMONIA, N	0.19	MG/L	10-29-1991
32730	PHENOLS, 4-AAP	0.013	MG/L	11-06-1991
00665	PHOSPHORUS, TOTAL, P	0.09	MG/L	11-04-1991
00939	POTASSIUM, DISS., K	2.7	MG/L	11-01-1991
00515	RESIDUE, T. FLT. (DISS)	166	MG/L	11-05-1991
01148	SELENIUM, DISS., SE	<3-R	UG/L	11-01-1991
01078	SILVER, DISS., AG	<30	UG/L	11-01-1991
00930	SODIUM, DISS., NA	9.0	MG/L	11-01-1991
00945	SULFATE, SO4	27	MG/L	11-04-1991
00680	CARBON, TOTAL ORGANIC, C	<1.0	MG/L	11-04-1991
00076	TURBIDITY, NTU	220	NTU	10-30-1991
01093	ZINC, DISS., ZN	8	UG/L	11-01-1991
00100	ORGANICS ANALYSIS	---	---	12-02-1991

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936 North Horner Blvd., Sanford, North Carolina 27330

LABORATORY ANALYSIS REPORT

DATE REC'D. 10-29-1991
DATE REP'D. 12-02-1991
P.O. # CLARK CO
LAB NO. 10-18689-91
CLIENT NO. I0107

SAMPLE LOCATION CLARK CO C91-8D
SAMPLED BY STEPHEN CHAMPE
DATE SAMPLED 10-28-1991
TIME SAMPLED 12:55

FRANK MAJCHSZAK
EAGON & ASSOCIATES INC
6877 N HIGH STE 302
WORTHINGTON OH 43085

COMMENTS:

STORET	ANALYSIS	RESULT	UNITS	[illegible]
00410	ALKALINITY, TOTAL, CACO3	1000	MG/L	10-31-1991
01003	ARSENIC, DISS., AS	13	UG/L	11-01-1991
01008	BARIUM, DISS., BA	250	UG/L	11-01-1991
01028	CADMIUM, DISS., CD	<1	UG/L	11-01-1991
00940	CHLORIDE, CL	9	MG/L	11-04-1991
01035	CHROMIUM, DISS., CR	<10	UG/L	11-01-1991
00917	CALCIUM, DISS., CA	76	MG/L	11-01-1991
00340	COD	<20	MG/L	10-31-1991
01043	COPPER, DISS., CU	9	UG/L	11-01-1991
00720	CYANIDE, TOTAL, CN	0.012	MG/L	10-30-1991
01046	IRON, DISS, FE	26	UG/L	11-01-1991
01052	LEAD, DISS., PB	<2.0	UG/L	11-01-1991
01056	MANGANESE, DISS., MN	180	UG/L	11-01-1991
71901	MERCURY, DISS., HG	<0.2	UG/L	10-30-1991
01068	NICKEL, DISS., NI	36	UG/L	11-01-1991
00928	MAGNESIUM, DISS., MG	37	MG/L	11-01-1991
00620	NITRATE N	<0.05	MG/L	11-01-1991
00615	NITRITE N	<0.05	MG/L	11-01-1991
00610	NITROGEN, AMMONIA, N	0.23	MG/L	10-29-1991
32730	PHENOLS, 4-AAP	<0.010	MG/L	10-30-1991
00665	PHOSPHORUS, TOTAL, P	5.36	MG/L	10-31-1991
00939	POTASSIUM, DISS., K	4.3	MG/L	11-01-1991
00515	RESIDUE, T. FLT. (DISS)	342	MG/L	11-03-1991
01148	SELENIUM, DISS., SE	<3-R	UG/L	11-01-1991
01078	SILVER, DISS., AG	<30	UG/L	11-01-1991
00930	SODIUM, DISS., NA	17	MG/L	11-01-1991
00945	SULFATE, SO4	23	MG/L	11-04-1991
00680	CARBON, TOTAL ORGANIC, C	6.6	MG/L	11-04-1991
00076	TURBIDITY, NTU	13000	NTU	10-30-1991
01093	ZINC, DISS., ZN	<5	UG/L	11-01-1991
00100	ORGANICS ANALYSIS	---	---	12-02-1991

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LABORATORY ANALYSIS REPORT

DATE REC'D. 10-29-1991 LAB NO. 10-18692-91
DATE REP'D. 12-02-1991 P.O. # CLARK CO CLIENT NO. I0107

SAMPLE LOCATION TRIP BLANK DATE SAMPLED 10-28-1991
SAMPLED BY STEPHEN CHAMPE TIME SAMPLED ?

FRANK MAJCHSZAK
EAGON & ASSOCIATES INC
6877 N HIGH STE 302
WORTHINGTON OH 43085

COMMENTS:

STORET	ANALYSIS	RESULT	UNITS	DATE OF ANALYSIS
00100	ORGANICS ANALYSIS	---	---	12-02-1991

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(419) 397-2659

CLIENT:	EAGON & ASSOCIATES INC
ADDRESS:	ATTN: HERB EAGON 6877 N HIGH ST SUITE 302 WORTHINGTON ,OH 43085
PROJECT NO.:	CLARK CO
PURCHASE ORDER:	
DATE OF INITIAL RECEIPT AT LABORATORY:	10/30/91
COMMENTS:	

SAMPLE INVENTORY

ATEC NO.	CLIENT NO.	METHOD(S)
91-29279-MEL	90- ~~C91~~-6D,10-18687	APPENDIX I - SW-846;8260
91-29280-MEL	90- ~~C91~~-7D,10-18688	APPENDIX I - SW-846;8260
91-29281-MEL	C91-8D,10-18689	APPENDIX I - SW-846;8260
91-29282-MEL	90 ~~C91~~-14D,10-18690	APPENDIX I - SW-846;8260
91-29283-MEL	C91-5D,10-18691	APPENDIX I - SW-846;8260
91-29284-MEL	TRIP BLANK,10-18692	APPENDIX I - SW-846;8260
91-29285-MEL	TLFA-TANK, 10-18694	524.2, SW-846-8270

AUTHORIZED SIGNATURE: Ronald A. Kowacky

TITLE: MELMORE LABORATORY MANAGER
DATE RELEASED: NOV. 19 1991

Aqua Tech Environmental Consultants, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEC Sample No.: 91-29279-MEL
Client Description: 90 ~~C9~~1-6D, 10-18687
Date Received: 10/30/91
Date Extracted:
Date Analyzed: 10/30/91

Method: SW-846; 8260
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.:
Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	<20.0
Acrolein	<20.0
Acrylonitrile	<20.0
Benzene	< 1.0
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	<10.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	< 1.0
Ethyl Methacrylate	< 5.0
2-Hexanone	<10.0
4-Methyl-2-Pentanone	<20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Consultants, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEC Sample No.: 91-29280-MEL
Client Description: 90 ~~C9~~1-7D,10-18688
Date Received: 10/30/91
Date Extracted:
Date Analyzed: 10/30/91

Method: SW-846; 8260
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.:
Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	<20.0
Acrolein	<20.0
Acrylonitrile	<20.0
Benzene	< 1.0
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	<10.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	< 1.0
Ethyl Methacrylate	< 5.0
2-Hexanone	<10.0
4-Methyl-2-Pentanone	<20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Consultants, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEC Sample No.: 91-29282-MEL
Client Description: 70 ~~C9~~1-14D,10-18690
Date Received: 10/30/91
Date Extracted:
Date Analyzed: 10/30/91

Method: SW-846; 8260
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.:
Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	<20.0
Acrolein	<20.0
Acrylonitrile	<20.0
Benzene	< 1.0
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	<10.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	< 1.0
Ethyl Methacrylate	< 5.0
2-Hexanone	<10.0
4-Methyl-2-Pentanone	<20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Consultants, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEC Sample No.: 91-29283-MEL
Client Description: C91-5D,10-18691
Date Received: 10/30/91
Date Extracted:
Date Analyzed: 10/30/91

Method: SW-846; 8260
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.:
Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	<20.0
Acrolein	<20.0
Acrylonitrile	<20.0
Benzene	< 1.0
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	<10.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	< 1.0
Ethyl Methacrylate	< 5.0
2-Hexanone	<10.0
4-Methyl-2-Pentanone	<20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Consultants, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEC Sample No.: 91-29281-MEL
Client Description: C91-8D,10-18689
Date Received: 10/30/91
Date Extracted:
Date Analyzed: 10/30/91

Method: SW-846; 8260
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.:
Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	<20.0
Acrolein	<20.0
Acrylonitrile	<20.0
Benzene	< 1.0
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	<10.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	< 1.0
Ethyl Methacrylate	< 5.0
2-Hexanone	<10.0
4-Methyl-2-Pentanone	<20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Consultants, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEC Sample No.: 91-29284-MEL
Client Description: TRIP BLANK,10-18692
Date Received: 10/30/91
Date Extracted:
Date Analyzed: 10/30/91

Method: SW-846; 8260
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.:
Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	<20.0
Acrolein	<20.0
Acrylonitrile	<20.0
Benzene	< 1.0
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	<10.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	< 1.0
Ethyl Methacrylate	< 5.0
2-Hexanone	<10.0
4-Methyl-2-Pentanone	<20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

AQUA TECH ENVIRONMENTAL CONSULTANTS, INC.
QUALITY CONTROL DATA
FOR
LABNUMBERS 18687-91 TO 18694-91

LAB NO.	STORET	ANALYSIS	RSLT #1	RSLT #2	SPIKE	SPIKE RSLT	% R	UNITS
18689-91	00076	TURBIDITY, NTU	13000	13000				NTU
18688-91	00610	NITROGEN, AMMON	0.35	0.34	1.0	1.35	101	MG/L
18693-91	00403	PH, LAB	7.2	7.2				S.U.
18687-91	71901	MERCURY, DISS.,	<0.2	<0.2				UG/L
18688-91	71901	MERCURY, DISS.,	0.0	--	2.0	2.4	120	UG/L
18693-91	00720	CYANIDE, TOTAL,	0.011	0.010	0.167	0.193	109	MG/L
18693-91	00340	COD	<20	<20	273	274	100	MG/L
18687-91	01003	ARSENIC, DISS.,	4.9	--	45.0	53.7	108	UG/L
18687-91	01008	BARIUM, DISS.,	430	--	10000	11300	109	UG/L
18687-91	01028	CADMIUM, DISS.,	0.05	--	5.00	5.06	100	UG/L
18687-91	01035	CHROMIUM, DISS.	2.4	--	45	43.9	92	UG/L
18687-91	00917	CALCIUM, DISS.,	76	--	50	129	106	MG/L
18687-91	01043	COPPER, DISS.,	14	--	100	114.6	101	UG/L
18687-91	01046	IRON, DISS, FE	0	--	1000	1048	105	UG/L
18687-91	01052	LEAD, DISS., PB	0	--	45	52.2	116	UG/L
18687-91	01052	LEAD, DISS., PB	0	--	65	75.0	115	UG/L
18687-91	01056	MANGANESE, DISS	100	--	500	610	102	UG/L
18687-91	01068	NICKEL, DISS.,	27	--	100	126	99	UG/L
18687-91	00928	MAGNESIUM, DISS	38	--	50	91.2	106	MG/L
18687-91	00939	POTASSIUM, DISS	3.7	--	10.00	12.33	86	MG/L
18687-91	01148	SELENIUM, DISS.	0	--	45.0	22.7	50	UG/L
18687-91	01148	SELENIUM, DISS.	0	--	65.0	34.3	53	UG/L
18687-91	01078	SILVER, DISS.,	6.4	--	1000	956	95	UG/L
18687-91	00930	SODIUM, DISS.,	19	--	50	71	104	MG/L
18687-91	01093	ZINC, DISS., ZN	0	--	100	103	103	UG/L
18687-91	00928	MAGNESIUM, DISS	38	--	50	91.2	106	MG/L
18688-91	01003	ARSENIC, DISS.,	3	5				UG/L
18688-91	01008	BARIUM, DISS.,	340	330				UG/L
18688-91	01028	CADMIUM, DISS.,	<1	<1				UG/L
18688-91	01035	CHROMIUM, DISS.	<10	<10				UG/L
18688-91	00917	CALCIUM, DISS.,	78	78				MG/L
18688-91	01043	COPPER, DISS.,	21	21				UG/L
18688-91	01046	IRON, DISS, FE	<10	<10				UG/L
18688-91	01052	LEAD, DISS., PB	<2.0	<2.0				UG/L
18688-91	01056	MANGANESE, DISS	200	200				UG/L
18688-91	01068	NICKEL, DISS.,	25	27				UG/L
18688-91	00928	MAGNESIUM, DISS	38	38				MG/L
18688-91	00939	POTASSIUM, DISS	3.2	3.2				MG/L
18688-91	01148	SELENIUM, DISS.	<3-R	<3-R				UG/L
18688-91	00930	SODIUM, DISS.,	14	14				MG/L
18688-91	01093	ZINC, DISS., ZN	<5	<5				UG/L
18688-91	01078	SILVER, DISS.,	<30	<30				UG/L
18689-91	00620	NITRATE N	0.00	0.03	1.00	1.10	109	MG/L
18687-91	00615	NITRITE N	0.03	0.04	1.00	0.93	90	MG/L
18689-91	00940	CHLORIDE, CL	9	9	100	96	87	MG/L

LAB NO.	STORET	ANALYSIS	RSLT #1	RSLT #2	SPIKE	SPIKE RSLT	% R	UNITS

18689-91	00945	SULFATE, SO4	24	23	200	200	88	MG/L

Aqua Tech Environmental Consultants, Inc.

Marion Laboratory
P.O. Box 436
181 S. Main Street
Marion, Ohio 43302
614-382-5991 or 800-783-5991
FAX 614-382-1420

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845
419-397-2659 or 419-397-2222
FAX 419-397-2229

Chain of Custody Record

Client Name: EAGON & ASSOC.
Client Number: CLARK CO./TLF/TLFA

Samplers: (print) Stephen T. Change (signature) [signature]

Station Number	Station Location	Date	Time	SAMPLE TYPE: Water Comp.	Water Grab	Comp.	Grab	Number of Containers	Analysis Required
C91-6d	Clark Co	12/28/91	1000		X	[illegible]		8	For analyses and
C91-7d	" "	"	1115		X	[illegible]		8	detection limits
C91-8d	" "	"	1255		X	13689		8	see attached
C91-14d	" "	"	1600		X	13690		8	analysis request
C91-5d	" "	"	1740		X	13691		8	forms
[illegible]						13692			
PW-1	Tremont Landfill	"	1700		X	[illegible]	← OVERS ONLY	4	
TLFA-TANK	Tremont Landfill Assessment	"	1805		X	13694		8	

Relinquished by:	Received by:	DATE / TIME
(print) (signature)	(print) (signature)	
Relinquished by: (print) (signature)	Received by: (print) (signature)	DATE / TIME
Relinquished by: (print) (signature)	Received by: (print) (signature)	DATE / TIME
Relinquished by: (print) Stephen T. Change (signature) [signature]	Received by Mobile Laboratory for Field Analysis: (print) (signature)	DATE / TIME

Dispatched by:	DATE / TIME	Received for Laboratory by:	DATE / TIME
Stephen T. Change	12/29/91	(print) [illegible] (signature) [illegible]	[illegible]

Method of shipment: [illegible]

Distribution:
White - Laboratory (include with reports)
Yellow - Laboratory (file copy)
Pink - Sample custodian
Gold - Field sampling records

Form ATEC-65
Revised 2.15.90

Aqua Tech Environmental Laboratories Inc.

To: EAGON & ASSOCIATES INC
6877 NORTH HIGH STREET
SUITE 302
WORTHINGTON OH 43085

Attn: STEPHEN CHAMPA

Client # : I0107
Your Sample ID: C91-8X
Sample Matrix : LIQUID
PO #: CLARK CO

Lab # : 10-92-117897
Login Date : 09/25/92
Date Reported: 10/12/92
Date Printed : 11/04/92

COLLECTION INFORMATION
Date/Time/By: 09/23/92 09:40 CHAMPA
Location : CLARKCO

Report Approved By: Jeffrey A. Smith
Jeffrey A. Smith

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117897					
SELENIUM, Se, DISSOLVED	< 5.0	UG/L	JDR	270.2/7740	09/27/92
SILVER, DISSOLVED, Ag	< 5.0	UG/L	RLH	200.7/6010	09/27/92
MANGANESE, Mn, DISSOLVED	59	UG/L	LLL	200.7/6010	09/25/92
RESIDUE, FILTERABLE (DISSOLVED SOLIDS)	398	MG/L	MAB	160.1	09/30/92
COD, LOW LEVEL	73	MG/L	MAB	410.2/7196	09/28/92
ORGANICS ANALYSIS	ATTACHED		CMG		10/09/92
SULFATE	27.9	MG/L	SRT	300.0	09/29/92
SODIUM, Na, DISSOLVED	7.3	MG/L	LLL	200.7/6010	09/25/92
LEAD, Pb, DISSOLVED	< 2.0	UG/L	RCM	239.2/7421	09/25/92
PHENOLS, 4-AAP	0.011	MG/L	BSR	420.2/9066	09/25/92
CHLORIDE	11.2	MG/L	SRT	300.0	09/29/92
POTASSIUM, K, DISSOLVED	2.1	MG/L	LLL	200.7/6010	09/25/92
IRON, Fe, DISSOLVED	71	UG/L	LLL	200.7/6010	09/25/92
TURBIDITY	170	NTU	RKM	180.1	09/25/92
CYANIDE, TOTAL (as CN)	< 0.010	MG/L	SMO	335.3/9012	09/28/92
NITRATE + NITRITE N	< 0.05	MG/L	SMO	353.2/9200	09/29/92
ZINC, Zn, DISSOLVED	< 10	UG/L	LLL	200.7/6010	09/25/92
MAGNESIUM, Mg, DISSOLVED	39.4	MG/L	LLL	200.7/6010	09/25/92
PHOSPHORUS as P	< 0.020	MG/L	MAB	365.2	09/28/92
TOTAL ORGANIC CARBON (TOC)	2.4	MG/L	JAM	415.2/9060	09/29/92
COPPER, Cu, DISSOLVED	< 10	UG/L	LLL	200.7/6010	09/25/92
MERCURY, Hg, DISSOLVED	< 0.2	UG/L	DLQ	245.1/7470	09/27/92
NICKEL, Ni, DISSOLVED	< 20	UG/L	LLL	200.7/6010	09/25/92

181 S. MAIN ST. • P.O. BOX 436 • MARION, OH 43301-0436
PHONE 614-382-5991 • 1-800-783-5991 • FAX 614-382-1420

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117897					
ALKALINITY, TOTAL	657	MG/L	RKM	310.1	09/25/92
NITROGEN, AMMONIA (as N)	0.08	MG/L	SMO	350.1	09/25/92
CHROMIUM, Cr, DISSOLVED	< 10	UG/L	RLH	200.7/6010	09/25/92
CALCIUM, Ca, DISSOLVED	87.6	MG/L	LLL	200.7/6010	09/25/92
BARIUM, Ba, DISSOLVED	251	UG/L	LLL	200.7/6010	09/25/92
CADMIUM, Cd, DISSOLVED	< 1.0	UG/L	DKS	213.2/7131	09/27/92
ARSENIC, As, DISSOLVED	< 3.0	UG/L	RCM	206.2/7060	09/25/92

Aqua Tech Environmental Laboratories Inc.

To: EAGON & ASSOCIATES INC
6877 NORTH HIGH STREET
SUITE 302
WORTHINGTON OH 43085

Attn: STEPHEN CHAMPA

Client # : I0107
Your Sample ID: 91-9Z
Sample Matrix : LIQUID
PO #: CLARK CO

Lab # : 10-92-117898
Login Date : 09/25/92
Date Reported: 10/12/92
Date Printed : 11/04/92

COLLECTION INFORMATION

Date/Time/By: 09/23/92 10:45 CHAMPA
Location : CLARKCO

Report Approved By: Jeffrey A. Smith

Jeffrey A. Smith

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117898					
ZINC, Zn, DISSOLVED	< 10	UG/L	LLL	200.7/6010	09/25/92
SODIUM, Na, DISSOLVED	18.0	MG/L	LLL	200.7/6010	09/25/92
ALKALINITY, TOTAL	331	MG/L	RKM	310.1	09/25/92
SILVER, DISSOLVED, Ag	< 5.0	UG/L	RLH	200.7/6010	09/27/92
ARSENIC, As, DISSOLVED	5.5	UG/L	RCM	206.2/7060	09/25/92
CYANIDE, TOTAL (as CN)	< 0.010	MG/L	SMO	335.3/9012	09/28/92
ORGANICS ANALYSIS	ATTACHED		CMG		10/09/92
POTASSIUM, K, DISSOLVED	1.6	MG/L	LLL	200.7/6010	09/25/92
CHROMIUM, Cr, DISSOLVED	< 10	UG/L	RLH	200.7/6010	09/25/92
CALCIUM, Ca, DISSOLVED	85.8	MG/L	LLL	200.7/6010	09/25/92
TOTAL ORGANIC CARBON (TOC)	1.9	MG/L	JAM	415.2/9060	09/29/92
RESIDUE, FILTERABLE (DISSOLVED SOLIDS)	430	MG/L	MAB	160.1	09/30/92
COD, LOW LEVEL	17	MG/L	MAB	410.2/7196	09/28/92
NICKEL, Ni, DISSOLVED	< 20	UG/L	LLL	200.7/6010	09/25/92
NITROGEN, AMMONIA (as N)	0.07	MG/L	SMO	350.1	09/25/92
PHOSPHORUS as P	0.291	MG/L	MAB	365.2	09/28/92
CHLORIDE	20.1	MG/L	SRT	300.0	09/29/92
SULFATE	53.8	MG/L	SRT	300.0	09/29/92
CADMIUM, Cd, DISSOLVED	< 1.0	UG/L	DKS	213.2/7131	09/27/92
TURBIDITY	17	NTU	RKM	180.1	09/25/92
SELENIUM, Se, DISSOLVED	< 5.0	UG/L	JDR	270.2/7740	09/27/92
NITRATE + NITRITE N	< 0.05	MG/L	SMO	353.2/9200	09/29/92
PHENOLS, 4-AAP	< 0.010	MG/L	BSR	420.2/9066	09/25/92

181 S. MAIN ST. • P.O. BOX 436 • MARION, OH 43301-0436
PHONE 614-382-5991 • 1-800-783-5991 • FAX 614-382-1420

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117898					
MERCURY, Hg, DISSOLVED	< 0.2	UG/L	DLQ	245.1/7470	09/27/92
IRON, Fe, DISSOLVED	330	UG/L	LLL	200.7/6010	09/25/92
BARIUM, Ba, DISSOLVED	89	UG/L	LLL	200.7/6010	09/25/92
COPPER, Cu, DISSOLVED	< 10	UG/L	LLL	200.7/6010	09/25/92
MANGANESE, Mn, DISSOLVED	115	UG/L	LLL	200.7/6010	09/25/92
MAGNESIUM, Mg, DISSOLVED	37.6	MG/L	LLL	200.7/6010	09/25/92
LEAD, Pb, DISSOLVED	< 2.0	UG/L	RCM	239.2/7421	09/25/92

Aqua Tech Environmental Laboratories Inc.

To: EAGON & ASSOCIATES INC
6877 NORTH HIGH STREET
SUITE 302
WORTHINGTON OH 43085

Attn: STEPHEN CHAMPA

Client #	: I0107	Lab #	: 10-92-117899
Your Sample ID:	90-10X	Login Date	: 09/25/92
Sample Matrix	: LIQUID	Date Reported:	10/12/92
PO #:	CLARK CO	Date Printed	: 11/04/92

COLLECTION INFORMATION

Date/Time/By: 09/23/92 11:10 CHAMPA

Location : CLARKCO

Report Approved By: Jeffrey A. Smith

Jeffrey A. Smith

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117899					
ORGANICS ANALYSIS	ATTACHED		CMG		10/09/92
TURBIDITY	680	NTU	RKM	180.1	09/25/92
NITRATE + NITRITE N	0.07	MG/L	SMO	353.2/9200	09/29/92
ZINC, Zn, DISSOLVED	< 10	UG/L	LLL	200.7/6010	09/25/92
SODIUM, Na, DISSOLVED	24.0	MG/L	LLL	200.7/6010	09/25/92
TOTAL ORGANIC CARBON (TOC)	2.2	MG/L	JAM	415.2/9060	09/29/92
IRON, Fe, DISSOLVED	48	UG/L	LLL	200.7/6010	09/25/92
COD, HIGH LEVEL	571	MG/L	BSR	410.2/7196	09/28/92
SULFATE	31.8	MG/L	SRT	300.0	09/29/92
ALKALINITY, TOTAL	1440	MG/L	RKM	310.1	09/25/92
CHLORIDE	9.46	MG/L	SRT	300.0	09/29/92
CALCIUM, Ca, DISSOLVED	103	MG/L	LLL	200.7/6010	09/25/92
SILVER, DISSOLVED, Ag	< 5.0	UG/L	RLH	200.7/6010	09/27/92
BARIUM, Ba, DISSOLVED	445	UG/L	LLL	200.7/6010	09/25/92
CADMIUM, Cd, DISSOLVED	< 1.0	UG/L	DKS	213.2/7131	09/27/92
MAGNESIUM, Mg, DISSOLVED	44.7	MG/L	LLL	200.7/6010	09/25/92
ARSENIC, As, DISSOLVED	13	UG/L	RCM	206.2/7060	09/25/92
PHENOLS, 4-AAP	0.017	MG/L	BSR	420.2/9066	09/25/92
SELENIUM, Se, DISSOLVED	< 5.0	UG/L	JDR	270.2/7740	09/27/92
CYANIDE, TOTAL (as CN)	< 0.010	MG/L	SMO	335.3/9012	09/28/92
NITROGEN, AMMONIA (as N)	0.30	MG/L	SMO	350.1	09/25/92
COPPER, Cu, DISSOLVED	< 10	UG/L	LLL	200.7/6010	09/25/92
PHOSPHORUS as P	2.94	MG/L	BSR	365.2	10/01/92
RESIDUE, FILTERABLE	493	MG/L	MAB	160.1	09/30/92

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Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
(DISSOLVED SOLIDS)					
10-92-117899					
LEAD, Pb, DISSOLVED	< 2.0	UG/L	RCM	239.2/7421	09/25/92
MERCURY, Hg, DISSOLVED	0.2	UG/L	DKJ	245.1/7470	10/02/92
POTASSIUM, K, DISSOLVED	2.9	MG/L	LLL	200.7/6010	09/25/92
MANGANESE, Mn, DISSOLVED	156	UG/L	LLL	200.7/6010	09/25/92
CHROMIUM, Cr, DISSOLVED	< 10	UG/L	RLH	200.7/6010	09/25/92
NICKEL, Ni, DISSOLVED	< 20	UG/L	LLL	200.7/6010	09/25/92

Aqua Tech Environmental Laboratories Inc.

To: EAGON & ASSOCIATES INC
6877 NORTH HIGH STREET
SUITE 302
WORTHINGTON OH 43085

Attn: FRANK MAJCHSZAK

Client # : I0107
Your Sample ID: 90-10X FILT (10-117899)
Sample Matrix : LIQUID
PO #: CLARKCO

Lab # : 10-92-119529
Login Date : 10/15/92
Date Reported: 11/03/92
Date Printed : 11/03/92

COLLECTION INFORMATION
Date/Time/By: 09/23/92 11:10 CHAMPA
Location :

Report Approved By: Jeffrey A. Smith
Jeffrey A. Smith

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis	Run Number
10-92-119529						
COD, DISS	79	MG/L	JRA	410.4/7196	10/27/92	10000562

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Aqua Tech Environmental Laboratories Inc.

To: EAGON & ASSOCIATES INC
6877 NORTH HIGH STREET
SUITE 302
WORTHINGTON OH 43085

Attn: STEPHEN CHAMPA

Client # : I0107
Your Sample ID: C91-4X
Sample Matrix : LIQUID
PO #: CLARK CO

Lab # : 10-92-117900
Login Date : 09/25/92
Date Reported: 10/12/92
Date Printed : 11/04/92

COLLECTION INFORMATION
Date/Time/By: 09/23/92 13:25 CHAMPA
Location : CLARKCO

Report Approved By: Jeffrey A. Smith
Jeffrey A. Smith

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117900					
COD, LOW LEVEL	< 8	MG/L	MAB	410.2/7196	09/28/92
SULFATE	48.9	MG/L	SRT	300.0	09/29/92
CALCIUM, Ca, DISSOLVED	97.4	MG/L	LLL	200.7/6010	09/25/92
ORGANICS ANALYSIS	ATTACHED		CMG		10/09/92
NITRATE + NITRITE N	< 0.05	MG/L	SMO	353.2/9200	09/29/92
MANGANESE, Mn, DISSOLVED	127	UG/L	LLL	200.7/6010	09/25/92
PHENOLS, 4-AAP	0.011	MG/L	BSR	420.2/9066	09/25/92
CADMIUM, Cd, DISSOLVED	< 1.0	UG/L	DKS	213.2/7131	09/27/92
CHROMIUM, Cr, DISSOLVED	< 10	UG/L	RLH	200.7/6010	09/25/92
NITROGEN, AMMONIA (as N)	< 0.05	MG/L	SMO	350.1	09/25/92
IRON, Fe, DISSOLVED	230	UG/L	LLL	200.7/6010	09/25/92
CYANIDE, TOTAL (as CN)	< 0.010	MG/L	SMO	335.3/9012	09/28/92
RESIDUE, FILTERABLE (DISSOLVED SOLIDS)	424	MG/L	MAB	160.1	09/30/92
ZINC, Zn, DISSOLVED	10	UG/L	LLL	200.7/6010	09/25/92
MERCURY, Hg, DISSOLVED	< 0.2	UG/L	DLO	245.1/7470	09/27/92
TOTAL ORGANIC CARBON (TOC)	< 1.0	MG/L	JAR	415.2/9060	09/29/92
TURBIDITY	56	NTU	RKM	180.1	09/25/92
COPPER, Cu, DISSOLVED	< 10	UG/L	LLL	200.7/6010	09/25/92
MAGNESIUM, Mg, DISSOLVED	37.9	MG/L	LLL	200.7/6010	09/25/92
PHOSPHORUS as P	0.105	MG/L	MAB	365.2	09/28/92
CHLORIDE	16.7	MG/L	SRT	300.0	09/29/9.
SODIUM, Na, DISSOLVED	7.9	MG/L	LLL	200.7/6010	09/25/92
ALKALINITY, TOTAL	339	MG/L	RKM	310.1	09/25/92

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Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117900					
LEAD, Pb, DISSOLVED	< 2.0	UG/L	RCM	239.2/7421	09/25/92
BARIUM, Ba, DISSOLVED	189	UG/L	LLL	200.7/6010	09/25/92
ARSENIC, As, DISSOLVED	< 3.0	UG/L	RCM	206.2/7060	09/25/92
POTASSIUM, K, DISSOLVED	1.3	MG/L	LLL	200.7/6010	09/25/92
SILVER, DISSOLVED, Ag	< 5.0	UG/L	RLH	200.7/6010	09/27/92
NICKEL, Ni, DISSOLVED	< 20	UG/L	LLL	200.7/6010	09/25/92
SELENIUM, Se, DISSOLVED	< 5.0	UG/L	JDR	270.2/7740	09/27/92

Aqua Tech Environmental Laboratories Inc.

To: EAGON & ASSOCIATES INC
6877 NORTH HIGH STREET
SUITE 302
WORTHINGTON OH 43085

Attn: STEPHEN CHAMPA

Client # : I0107
Your Sample ID: C92-9Y
Sample Matrix : LIQUID
PO #: CLARK CO

Lab # : 10-92-117901
Login Date : 09/25/92
Date Reported: 10/12/92
Date Printed : 11/04/92

COLLECTION INFORMATION
Date/Time/By: 09/23/92 14:00 CHAMPA
Location : CLARKCO

Report Approved By: Jeffrey A. Smith
Jeffrey A. Smith

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117901					
CYANIDE, TOTAL (as CN)	< 0.010	MG/L	SMO	335.3/9012	09/28/92
IRON, Fe, DISSOLVED	1300	UG/L	LLL	200.7/6010	09/25/92
ALKALINITY, TOTAL	343	MG/L	RKM	310.1	09/25/92
COPPER, Cu, DISSOLVED	< 10	UG/L	LLL	200.7/6010	09/25/92
TURBIDITY	370	NTU	RKM	180.1	09/25/92
SILVER, DISSOLVED, Ag	< 5.0	UG/L	RLH	200.7/6010	09/27/92
CHROMIUM, Cr, DISSOLVED	< 10	UG/L	RLH	200.7/6010	09/25/92
NITROGEN, AMMONIA (as N)	0.10	MG/L	SMO	350.1	09/25/92
SULFATE	30.8	MG/L	SRT	300.0	09/29/92
PHOSPHORUS as P	0.421	MG/L	MAB	365.2	09/28/92
ORGANICS ANALYSIS	ATTACHED		CMG		10/09/92
MAGNESIUM, Mg, DISSOLVED	37.1	MG/L	LLL	200.7/6010	09/25/92
PHENOLS, 4-AAP	0.011	MG/L	BSR	420.2/9066	09/25/92
MERCURY, Hg, DISSOLVED	< 0.2	UG/L	DLQ	245.1/7470	09/27/92
NITRATE + NITRITE N	< 0.05	MG/L	SMO	353.2/9200	09/29/92
TOTAL ORGANIC CARBON (TOC)	1.6	MG/L	[illegible]	415.2/9060	09/29/92
SELENIUM, Se, DISSOLVED	< 5.0	UG/L	JLP	270.2/7740	09/27/92
BARIUM, Ba, DISSOLVED	291	UG/L	LLL	200.7/6010	09/25/92
ARSENIC, As, DISSOLVED	16	UG/L	RCM	206.2/7060	09/25/92
POTASSIUM, K, DISSOLVED	1.4	MG/L	LLL	200.7/6010	09/25/92
MANGANESE, Mn, DISSOLVED	89	UG/L	LLL	200.7/6010	09/25/92
COD, LOW LEVEL	17	MG/L	MAB	410.2/7196	09/28/92
RESIDUE, FILTERABLE (DISSOLVED SOLIDS)	355	MG/L	MAB	160.1	09/30/92

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Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117901					
CHLORIDE	14.4	MG/L	SRT	300.0	09/29/92
LEAD, Pb, DISSOLVED	< 2.0	UG/L	RCM	239.2/7421	09/25/92
CALCIUM, Ca, DISSOLVED	85.4	MG/L	LLL	200.7/6010	09/25/92
NICKEL, Ni, DISSOLVED	< 20	UG/L	LLL	200.7/6010	09/25/92
ZINC, Zn, DISSOLVED	16	UG/L	LLL	200.7/6010	09/25/92
CADMIUM, Cd, DISSOLVED	< 1.0	UG/L	RCM	213.2/7131	09/28/92
SODIUM, Na, DISSOLVED	4.7	MG/L	LLL	200.7/6010	09/25/92

Aqua Tech Environmental Laboratories Inc.

To: EAGON & ASSOCIATES INC
6877 NORTH HIGH STREET
SUITE 302
WORTHINGTON OH 43085

Attn: STEPHEN CHAMPA

Client # : I0107
Your Sample ID: C92-9Y DUP
Sample Matrix : LIQUID
PO #: CLARK CO

Lab # : 10-92-117902
Login Date : 09/25/92
Date Reported: 10/12/92
Date Printed : 11/04/92

COLLECTION INFORMATION

Date/Time/By: 09/23/92 14:10 CHAMPA
Location : CLARKCO

Report Approved By: Jeffrey A. Smith

Jeffrey A. Smith

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117902					
IRON, Fe, DISSOLVED	1300	UG/L	LLL	200.7/6010	09/25/92
RESIDUE, FILTERABLE (DISSOLVED SOLIDS)	378	MG/L	MAB	160.1	09/30/92
PHOSPHORUS as P	0.522	MG/L	MAB	365.2	09/28/92
NITROGEN, AMMONIA (as N)	0.09	MG/L	SMO	350.1	09/25/92
SELENIUM, Se, DISSOLVED	< 5.0	UG/L	JDR	270.2/7740	09/27/92
CADMIUM, Cd, DISSOLVED	< 1.0	UG/L	RCM	213.2/7131	09/28/92
NICKEL, Ni, DISSOLVED	< 20	UG/L	LLL	200.7/6010	09/25/92
COD, LOW LEVEL	22	MG/L	MAB	410.2/7196	09/28/92
TURBIDITY	510	NTU	RKM	180.1	09/25/92
BARIUM, Ba, DISSOLVED	298	UG/L	LLL	200.7/6010	09/25/92
PHENOLS, 4-AAP	< 0.010	MG/L	BSR	420.2/9066	09/25/92
TOTAL ORGANIC CARBON (TOC)	1.5	MG/L	JAM	415.2/9060	09/29/92
MANGANESE, Mn, DISSOLVED	85	UG/L	LLL	200.7/6010	09/25/92
ORGANICS ANALYSIS	ATTACHED		CMG		10/09/92
SULFATE	31.6	MG/L	SRT	300.0	09/29/92
MAGNESIUM, Mg, DISSOLVED	37.7	MG/L	LLL	200.7/6010	09/25/92
NITRATE + NITRITE N	< 0.05	MG/L	SMO	353.2/9200	09/29/92
CALCIUM, Ca, DISSOLVED	87.1	MG/L	LLL	200.7/6010	09/25/92
CHROMIUM, Cr, DISSOLVED	< 10	UG/L	RLH	200.7/6010	09/25/92
POTASSIUM, K, DISSOLVED	1.4	MG/L	LLL	200.7/6010	09/25/92
CYANIDE, TOTAL (as CN)	< 0.010	MG/L	SMO	335.3/9012	09/28/92
ARSENIC, As, DISSOLVED	14	UG/L	RCM	206.2/7060	09/25/92
CHLORIDE	14.4	MG/L	SRT	300.0	09/29/92

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Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117902					
LEAD, Pb, DISSOLVED	< 2.0	UG/L	RCM	239.2/7421	09/25/92
ALKALINITY, TOTAL	339	MG/L	RKM	310.1	09/25/92
MERCURY, Hg, DISSOLVED	< 0.2	UG/L	DLQ	245.1/7470	09/27/92
ZINC, Zn, DISSOLVED	12	UG/L	LLL	200.7/6010	09/25/92
SODIUM, Na, DISSOLVED	4.7	MG/L	LLL	200.7/6010	09/25/92
COPPER, Cu, DISSOLVED	< 10	UG/L	LLL	200.7/6010	09/25/92
SILVER, DISSOLVED, Ag	< 5.0	UG/L	RLH	200.7/6010	09/27/92

Aqua Tech Environmental Laboratories Inc.

To: EAGON & ASSOCIATES INC
6877 NORTH HIGH STREET
SUITE 302
WORTHINGTON OH 43085

Attn: STEPHEN CHAMPA

Client # : I0107
Your Sample ID: 92-27DD
Sample Matrix : LIQUID
PO #: CLARK CO

Lab # : 10-92-117904
Login Date : 09/25/92
Date Reported: 10/12/92
Date Printed : 11/04/92

COLLECTION INFORMATION
Date/Time/By: 09/23/92 15:45 CHAMPA
Location : CLARKCO

Report Approved By: Jeffrey A. Smith

Jeffrey A. Smith

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117904					
TURBIDITY	1700	NTU	RKM	180.1	09/25/92
TOTAL ORGANIC CARBON (TOC)	2.0	MG/L	JAM	415.2/9060	09/29/92
POTASSIUM, K, DISSOLVED	2.6	MG/L	LLL	200.7/6010	09/25/92
PHOSPHORUS as P	0.888	MG/L	MAB	365.2	09/28/92
IRON, Fe, DISSOLVED	941	UG/L	LLL	200.7/6010	09/25/92
NICKEL, Ni, DISSOLVED	< 20	UG/L	LLL	200.7/6010	09/25/92
ORGANICS ANALYSIS	ATTACHED		CMG		10/09/92
COPPER, Cu, DISSOLVED	< 10	UG/L	LLL	200.7/6010	09/25/92
SULFATE	15.3	MG/L	SRT	300.0	09/29/92
NITROGEN, AMMONIA (as N)	0.42	MG/L	SMO	350.1	09/25/92
CADMIUM, Cd, DISSOLVED	< 1.0	UG/L	RCM	213.2/7131	09/28/92
CHROMIUM, Cr, DISSOLVED	< 10	UG/L	RLH	200.7/6010	09/25/92
SODIUM, Na, DISSOLVED	16.5	MG/L	LLL	200.7/6010	09/25/92
BARIUM, Ba, DISSOLVED	415	UG/L	LLL	200.7/6010	09/25/92
SELENIUM, Se, DISSOLVED	< 5.0	UG/L	JDR	270.2/7740	09/27/92
CALCIUM, Ca, DISSOLVED	75.0	MG/L	LLL	200.7/6010	09/25/92
RESIDUE, FILTERABLE (DISSOLVED SOLIDS)	[illegible]	[illegible]	[illegible]	160.1	09/30/92
CYANIDE, TOTAL (as CN)	< 0.010	MG/L	SMO	335.3/9012	09/28/92
ALKALINITY, TOTAL	614	MG/L	RKM	310.1	09/25/92
SILVER, DISSOLVED, Ag	< 5.0	UG/L	RLH	200.7/6010	09/27/92
ARSENIC, As, DISSOLVED	7.2	UG/L	RCM	206.2/7060	09/25/9.
MAGNESIUM, Mg, DISSOLVED	39.9	MG/L	LLL	200.7/6010	09/25/92
PHENOLS, 4-AAP	0.022	MG/L	BSR	420.2/9066	09/25/92

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Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117904					
MANGANESE, Mn, DISSOLVED	44	UG/L	LLL	200.7/6010	09/25/92
LEAD, Pb, DISSOLVED	< 2.0	UG/L	RCM	239.2/7421	09/25/92
ZINC, Zn, DISSOLVED	15	UG/L	LLL	200.7/6010	09/25/92
MERCURY, Hg, DISSOLVED	< 0.2	UG/L	DLQ	245.1/7470	09/27/92
NITRATE + NITRITE N	< 0.05	MG/L	SMO	353.2/9200	09/29/92
COD, LOW LEVEL	73	MG/L	MAB	410.2/7196	09/28/92
CHLORIDE	10.6	MG/L	SRT	300.0	09/29/92

Aqua Tech Environmental Laboratories Inc.

To: EAGON & ASSOCIATES INC
6877 NORTH HIGH STREET
SUITE 302
WORTHINGTON OH 43085

Attn: FRANK MAJCHSZAK

Client #	: I0107	Lab #	: 10-92-119530
Your Sample ID:	92-27DD FILT (10-117904)	Login Date	: 10/15/92
Sample Matrix	: LIQUID	Date Reported:	11/03/92
PO #:	CLARKCO	Date Printed	: 11/03/92

COLLECTION INFORMATION

Date/Time/By: 09/23/92 15:45 CHAMPA

Location :

Report Approved By: Jeffrey A. Smith

Jeffrey A. Smith

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis	Run Number
10-92-119530						
COD, DISS	< 20	MG/L	SRT	410.4/7196	10/29/92	10000590

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Aqua Tech Environmental Laboratories Inc.

To: EAGON & ASSOCIATES INC
6877 NORTH HIGH STREET
SUITE 302
WORTHINGTON OH 43085

Attn: STEPHEN CHAMPA

Client # : I0107
Your Sample ID: 90-7Z
Sample Matrix : LIQUID
PO #: CLARK CO

Lab # : 10-92-117905
Login Date : 09/25/92
Date Reported: 10/12/92
Date Printed : 11/04/92

COLLECTION INFORMATION
Date/Time/By: 09/23/92 16:05 CHAMPA
Location : CLARKCO

Report Approved By: Jeffrey A. Smith
Jeffrey A. Smith

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117905					
BARIUM, Ba, DISSOLVED	42	UG/L	LLL	200.7/6010	09/25/92
CADMIUM, Cd, DISSOLVED	< 1.0	UG/L	RCM	213.2/7131	09/28/92
SILVER, DISSOLVED, Ag	< 5.0	UG/L	RLH	200.7/6010	09/27/92
TURBIDITY	3700	NTU	RKM	180.1	09/25/92
ARSENIC, As, DISSOLVED	< 3.0	UG/L	RCM	206.2/7060	09/25/92
MAGNESIUM, Mg, DISSOLVED	32.4	MG/L	LLL	200.7/6010	09/25/92
SULFATE	28.7	MG/L	SRT	300.0	09/29/92
ZINC, Zn, DISSOLVED	< 10	UG/L	LLL	200.7/6010	09/25/92
SELENIUM, Se, DISSOLVED	< 5.0	UG/L	JDR	270.2/7740	09/27/92
CHROMIUM, Cr, DISSOLVED	< 10	UG/L	RLH	200.7/6010	09/25/92
LEAD, Pb, DISSOLVED	< 2.0	UG/L	RCM	239.2/7421	09/25/92
TOTAL ORGANIC CARBON (TOC)	1.8	MG/L	JAM	415.2/9060	09/29/92
PHOSPHORUS as P	1.74	MG/L	MAB	365.2	09/28/92
ORGANICS ANALYSIS	ATTACHED		CMG		10/09/92
IRON, Fe, DISSOLVED	< 20	UG/L	LLL	200.7/6010	09/25/92
SODIUM, Na, DISSOLVED	2.1	MG/L	LLL	200.7/6010	09/25/92
CALCIUM, Ca, DISSOLVED	37.4	MG/L	LLL	200.7/6010	09/25/92
CHLORIDE	8.59	MG/L	SRT	300.0	09/29/92
COPPER, Cu, DISSOLVED	< 10	UG/L	LLL	200.7/6010	09/25/92
RESIDUE, FILTERABLE (DISSOLVED SOLIDS)	355	MG/L	MAB	160.1	09/30/92
PHENOLS, 4-AAP	0.156	MG/L	BSR	420.2/9066	09/25/92
MANGANESE, Mn, DISSOLVED	2[illegible]	UG/L	LLL	200.7/6010	09/25/92
NICKEL, Ni, DISSOLVED	< 20	UG/L	LLL	200.7/6010	09/25/92

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Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117905					
POTASSIUM, K, DISSOLVED	< 1.0	MG/L	LLL	200.7/6010	09/25/92
MERCURY, Hg, DISSOLVED	< 0.2	UG/L	DLQ	245.1/7470	09/27/92
ALKALINITY, TOTAL	808	MG/L	RKM	310.1	09/25/92
NITRATE + NITRITE N	0.05	MG/L	SMO	353.2/9200	09/29/92
NITROGEN, AMMONIA (as N)	0.42	MG/L	SMO	350.1	09/25/92
CYANIDE, TOTAL (as CN)	< 0.010	MG/L	SMO	335.3/9012	09/28/92
COD, HIGH LEVEL	227	MG/L	BSR	410.2/7196	09/28/92

Aqua Tech Environmental Laboratories Inc.

To: EAGON & ASSOCIATES INC
6877 NORTH HIGH STREET
SUITE 302
WORTHINGTON OH 43085

Attn: FRANK MAJCHSZAK

Client # : I0107
Your Sample ID: 90-72 FILT (10-117905)
Sample Matrix : LIQUID
PO #: CLARKCO

Lab # : 10-92-119527
Login Date : 10/15/92
Date Reported: 11/03/92
Date Printed : 11/03/92

COLLECTION INFORMATION
Date/Time/By: 09/23/92 16:05 CHAMPA
Location :

Report Approved By: Jeffrey A. Smith
Jeffrey A. Smith

Analysis	Result	Units	Analyst	APHA Method #'s	Date of Analysis	Run Number
10-92-119527						
COD, DISS	21	MG/L	JRA	410.4/5220	10/27/92	10000562
PHENOLS, DISS	< 0.010	MG/L	BSR	420.2/9066	10/26/92	10000191

181 S. MAIN ST. • P.O. BOX 436 • MARION, OH 43301-0436
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Aqua Tech Environmental Laboratories Inc.

To: EAGON & ASSOCIATES INC
6877 NORTH HIGH STREET
SUITE 302
WORTHINGTON OH 43085

Attn: STEPHEN CHAMPA

Client # : I0107
Your Sample ID: 90-95D
Sample Matrix : LIQUID
PO #: CLARK CO

Lab # : 10-92-117906
Login Date : 09/25/92
Date Reported: 10/12/92
Date Printed : 11/04/92

COLLECTION INFORMATION

Date/Time/By: 09/23/92 16:50 CHAMPA
Location : CLARKCO

Report Approved By: Jeffrey A. Smith

Jeffrey A. Smith

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117906					
IRON, Fe, DISSOLVED	418	UG/L	LLL	200.7/6010	09/25/92
SELENIUM, Se, DISSOLVED	< 5.0	UG/L	JDR	270.2/7740	09/27/92
LEAD, Pb, DISSOLVED	< 2.0	UG/L	RCM	239.2/7421	09/25/92
COPPER, Cu, DISSOLVED	< 10	UG/L	LLL	200.7/6010	09/25/92
MANGANESE, Mn, DISSOLVED	108	UG/L	LLL	200.7/6010	09/25/92
CALCIUM, Ca, DISSOLVED	80.7	MG/L	LLL	200.7/6010	09/25/92
COD, LOW LEVEL	56	MG/L	MAB	410.2/7196	09/28/92
POTASSIUM, K, DISSOLVED	1.8	MG/L	LLL	200.7/6010	09/25/92
ALKALINITY, TOTAL	478	MG/L	RKM	310.1	09/25/92
BARIUM, Ba, DISSOLVED	408	UG/L	LLL	200.7/6010	09/25/92
SILVER, DISSOLVED, Ag	< 5.0	UG/L	RLH	200.7/6010	09/27/92
NICKEL, Ni, DISSOLVED	< 20	UG/L	LLL	200.7/6010	09/25/92
NITROGEN, AMMONIA (as N)	0.35	MG/L	SMO	350.1	09/25/92
ORGANICS ANALYSIS	ATTACHED		CMG		10/09/92
CHROMIUM, Cr, DISSOLVED	< 10	UG/L	RLH	200.7/6010	09/25/92
CYANIDE, TOTAL (as CN)	< 0.010	MG/L	SMO	335.3/9012	09/28/92
NITRATE + NITRITE N	< 0.05	MG/L	SMO	353.2/9200	09/29/92
MERCURY, Hg, DISSOLVED	< 0.2	UG/L	DLQ	245.1/7470	09/27/92
CADMIUM, Cd, DISSOLVED	< 1.0	UG/L	RCM	213.2/7131	09/28/92
MAGNESIUM, Mg, DISSOLVED	35.1	MG/L	LLL	200.7/6010	09/25/92
ZINC, Zn, DISSOLVED	12	UG/L	LLL	200.7/6010	09/25/92
CHLORIDE	8.66	MG/L	SRT	300.0	09/29/92
TOTAL ORGANIC CARBON (TOC)	2.0	MG/L	JAM	415.2/9060	09/29/92
ARSENIC, As, DISSOLVED	8.7	UG/L	RCM	206.2/7060	09/25/92

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Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117906					
PHOSPHORUS as P	0.779	MG/L	MAB	365.2	09/28/92
SODIUM, Na, DISSOLVED	13.9	MG/L	LLL	200.7/6010	09/25/92
PHENOLS, 4-AAP	0.063	MG/L	BSR	420.2/9066	09/25/92
TURBIDITY	1400	NTU	RKM	180.1	09/25/92
SULFATE	15.2	MG/L	SRT	300.0	09/29/92
RESIDUE, FILTERABLE (DISSOLVED SOLIDS)	403	MG/L	MAB	160.1	09/30/92

Aqua Tech Environmental Laboratories Inc.

To: EAGON & ASSOCIATES INC
6877 NORTH HIGH STREET
SUITE 302
WORTHINGTON OH 43085

Attn: FRANK MAJCHSZAK

Client # : I0107
Your Sample ID: 90-9DD FILTERED(10-11790)
Sample Matrix : LIQUID
PO #: CLARKCO

Lab # : 10-92-119528
Login Date : 10/15/92
Date Reported: 11/03/92
Date Printed : 11/03/92

COLLECTION INFORMATION

Date/Time/By: 09/23/92 16:50 CHAMPA
Location :

Report Approved By: Jeffrey A. Smith

Jeffrey A. Smith

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis	Run Number
10-92-119528						
COD, DISS	33	MG/L	JRA	410.4/7196	10/27/92	1000055?
PHENOLS, DISS	< 0.010	MG/L	BSR	420.2/9066	10/26/92	1000049?

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Aqua Tech Environmental Laboratories Inc.

To: EAGON & ASSOCIATES INC
6877 NORTH HIGH STREET
SUITE 302
WORTHINGTON OH 43085

Attn: STEPHEN CHAMPA

Client # : I0107
Your Sample ID: 92-24Y
Sample Matrix : LIQUID
PO #: CLARK CO

Lab # : 10-92-117907
Login Date : 09/25/92
Date Reported: 10/12/92
Date Printed : 11/04/92

COLLECTION INFORMATION
Date/Time/By: 09/24/92 09:40 CHAMPA
Location : CLARKCO

Report Approved By: Jeffrey A. Smith
Jeffrey A. Smith

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117907					
LEAD, Pb, DISSOLVED	< 2.0	UG/L	RCM	239.2/7421	09/25/92
IRON, Fe, DISSOLVED	1820	UG/L	LLL	200.7/6010	09/25/92
CHROMIUM, Cr, DISSOLVED	< 10	UG/L	RLH	200.7/6010	09/25/92
MAGNESIUM, Mg, DISSOLVED	40.0	MG/L	LLL	200.7/6010	09/25/92
SELENIUM, Se, DISSOLVED	< 5.0	UG/L	JDR	270.2/7740	09/27/92
SILVER, DISSOLVED, Ag	< 5.0	UG/L	RLH	200.7/6010	09/27/92
ALKALINITY, TOTAL	400	MG/L	RKM	310.1	09/25/92
NICKEL, Ni, DISSOLVED	< 20	UG/L	LLL	200.7/6010	09/25/92
PHOSPHORUS as P	0.544	MG/L	MAB	365.2	09/28/92
NITRATE + NITRITE N	< 0.05	MG/L	SMO	353.2/9200	09/29/92
CALCIUM, Ca, DISSOLVED	85.2	MG/L	LLL	200.7/6010	09/25/92
ORGANICS ANALYSIS	ATTACHED		CMG		10/09/92
COD, LOW LEVEL	28	MG/L	MAB	410.2/7196	09/28/92
MANGANESE, Mn, DISSOLVED	34	UG/L	LLL	200.7/6010	09/25/92
MERCURY, Hg, DISSOLVED	< 0.2	UG/L	DLQ	245.1/7470	09/27/92
RESIDUE, FILTERABLE (DISSOLVED SOLIDS)	390	MG/L	MAB	160.1	09/30/92
CHLORIDE	14.4	MG/L	SRT	300.0	09/29/92
SODIUM, Na, DISSOLVED	8.9	MG/L	LLL	200.7/6010	09/25/92
CADMIUM, Cd, DISSOLVED	< 1.0	UG/L	RCM	213.2/7131	09/28/92
PHENOLS, 4-AAP	< 0.010	MG/L	BSR	420.2/9066	09/25/92
POTASSIUM, K, DISSOLVED	1.5	MG/L	LLL	200.7/6010	09/25/92
COPPER, Cu, DISSOLVED	< 10	UG/L	LLL	200.7/6010	09/25/92
CYANIDE, TOTAL (as CN)	< 0.010	MG/L	SMO	335.3/9012	09/28/92

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Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117907					
TOTAL ORGANIC CARBON (TOC)	2.1	MG/L	JAM	415.2/9060	09/30/92
NITROGEN, AMMONIA (as N)	0.21	MG/L	SMO	350.1	09/25/92
SULFATE	21.8	MG/L	SRT	300.0	09/29/92
BARIUM, Ba, DISSOLVED	523	UG/L	LLL	200.7/6010	09/25/92
ZINC, Zn, DISSOLVED	10	UG/L	LLL	200.7/6010	09/25/92
ARSENIC, As, DISSOLVED	11	UG/L	RCM	206.2/7060	09/25/92
TURBIDITY	380	NTU	RKM	180.1	09/25/92

Aqua Tech Environmental Laboratories Inc.

To: [illegible] & ASSOCIATES INC
[illegible] 7 [illegible] HIGH STREET
SUITE 302
WORTHINGTON OH 43085

Attn: STEPHEN CHAMPA

Client # : 10107
Your Sample ID: 92-4X
Sample Matrix : LIQUID
PO # : CLARK CO

Lab # : 10-92-117908
Login Date : 09/25/92
Date Reported: 10/12/92
Date Printed : 11/04/92

COLLECTION INFORMATION
Date/Time/By: 09/24/92 10:25 CHAMPA
Location : CLARK Co

Report Approved By: Jeffrey A. Smith

Jeffrey A. Smith

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
[illegible]					
[illegible], DISSOLVED	2.3	[illegible]	LLL	[illegible].7/[illegible]010	09/25/[illegible]
[illegible], DISSOLVED	< 20	[illegible]	[illegible]	200.7/[illegible]010	09/25/[illegible]
[illegible]	< 0.2	[illegible]	[illegible]	[illegible]	09/27/[illegible]
[illegible]	3300	[illegible]	[illegible]	[illegible]	09/25/[illegible]
[illegible], DISSOLVED	< 5.0	[illegible]	JDR	270.2/7740	09/27/9[illegible]
[illegible] + NITRATE N	< 0.05	[illegible]	[illegible]	353.2/[illegible]	09/29/[illegible]
[illegible], DISSOLVED	59	[illegible]	LLL	200.7/[illegible]	09/25/[illegible]
[illegible]	< 0.010	[illegible]	BSR	420.2/[illegible]	09/2[illegible]
[illegible]	26[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible], DISSOLVED	[illegible]0.1	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	< 10	[illegible]	[illegible]	[illegible].7/[illegible]010	09/2[illegible]
[illegible], AMMONIA [illegible]	0.25	[illegible]	[illegible]	350.1	09/2[illegible]
[illegible]	< 5.0	[illegible]	[illegible]	[illegible].7/[illegible]10	09/27[illegible]
[illegible]	< 2[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	39[illegible]	[illegible]	[illegible]	160.[illegible]	[illegible]
[illegible]					
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	< 0.010	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	8.[illegible]	[illegible]	[illegible]	[illegible]	09/[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible].7/[illegible]010	0[illegible]
[illegible]	[illegible]		[illegible]		10/0[illegible]
[illegible]	[illegible]		[illegible]	[illegible]	0[illegible]
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]

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Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117908					
SULFATE	20.9	MG/L	SRT	300.0	09/29/92
CALCIUM, Ca, DISSOLVED	81.9	MG/L	LLL	200.7/6010	09/25/92
PHOSPHORUS as P	1.73	MG/L	MAB	365.2	09/28/92
CADMIUM, Cd, DISSOLVED	< 1.0	UG/L	RCM	213.2/7131	09/28/92
ALKALINITY, TOTAL	759	MG/L	RKM	310.1	09/25/92
COPPER, Cu, DISSOLVED	< 10	UG/L	LLL	200.7/6010	09/25/92
CHROMIUM, Cr, DISSOLVED	< 10	UG/L	RLH	200.7/6010	09/25/92

Aqua Tech Environmental Laboratories Inc.

To: EAGON & ASSOCIATES INC
6877 NORTH HIGH STREET
SUITE 302
WORTHINGTON OH 43085

Attn: FRANK MAJCHSZAK

Client # : I0107
Your Sample ID: 92-4X FILTERED(10-117908)
Sample Matrix : LIQUID
PO #: CLARKCO

Lab # : 10-92-119531
Login Date : 10/15/92
Date Reported: 11/03/92
Date Printed : 11/03/92

COLLECTION INFORMATION

Date/Time/By: 09/24/92 10:25 CHAMPA
Location :

Report Approved By: Jeffrey A. Smith
Jeffrey A. Smith

Analysis	Result	Units	Analyst	EPA Method No	Date of Analysis	Run Number
10-92-119531						
COD, DISS	< 20	MG/L	SRT	410.4/7196	10/29/92	10000590

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Aqua Tech Environmental Laboratories Inc.

To: EAGON & ASSOCIATES INC
6877 NORTH HIGH STREET
SUITE 302
WORTHINGTON OH 43085

Attn: STEPHEN CHAMPA

Client # : I0107
Your Sample ID: C92-5DD
Sample Matrix : LIQUID
PO #: CLARK CO

Lab # : 10-92-117909
Login Date : 09/25/92
Date Reported: 10/12/92
Date Printed : 11/04/92

COLLECTION INFORMATION

Date/Time/By: 09/24/92 12:10 CHAMPA
Location : CLARKCO

Report Approved By: Jeffrey A. Smith

Jeffrey A. Smith

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117909					
COD, LOW LEVEL	22	MG/L	MAB	410.2/7196	09/28/92
SELENIUM, Se, DISSOLVED	< 5.0	UG/L	JDR	270.2/7740	09/27/92
CADMIUM, Cd, DISSOLVED	< 1.0	UG/L	RCM	213.2/7131	09/28/92
SILVER, DISSOLVED, Ag	< 5.0	UG/L	RLH	200.7/6010	09/27/92
POTASSIUM, K, DISSOLVED	1.9	MG/L	LLL	200.7/6010	09/25/92
NICKEL, Ni, DISSOLVED	< 20	UG/L	LLL	200.7/6010	09/25/92
SULFATE	30	MG/L	SRT	300.0	09/29/92
SODIUM, Na, DISSOLVED	5.2	MG/L	LLL	200.7/6010	09/25/92
MERCURY, Hg, DISSOLVED	< 0.2	UG/L	DLQ	245.1/7470	09/27/92
RESIDUE, FILTERABLE (DISSOLVED SOLIDS)	373	MG/L	MAB	160.1	09/30/92
CYANIDE, TOTAL (as CN)	< 0.010	MG/L	SMO	335.3/9012	09/28/92
NITRATE + NITRITE N	< 0.05	MG/L	SMO	353.2/9200	09/29/92
ZINC, Zn, DISSOLVED	30	UG/L	LLL	200.7/6010	09/25/92
ORGANICS ANALYSIS	ATTACHED		CMC		10/09/92
ALKALINITY, TOTAL	359	MG/L	RKM	310.1	09/25/92
CHLORIDE	10.4	MG/L	SRT	300.0	09/29/92
MANGANESE, Mn, DISSOLVED	90	UG/L	LLL	200.7/6010	09/25/92
TURBIDITY	170	NTU	RKM	180.1	09/25/92
ARSENIC, As, DISSOLVED	4.3	UG/L	RCM	206.2/7060	09/25/92
BARIUM, Ba, DISSOLVED	268	UG/L	LLL	200.7/6010	09/25/92
TOTAL ORGANIC CARBON (TOC)	1.5	MG/L	JAM	415.2/9060	09/30/9.
CALCIUM, Ca, DISSOLVED	87.3	MG/L	LLL	200.7/6010	09/25/92
PHENOLS, 4-AAP	< 0.010	MG/L	BSR	420.2/9066	09/25/92

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117909					
PHOSPHORUS as P	0.224	MG/L	MAB	365.2	09/28/92
MAGNESIUM, Mg, DISSOLVED	37.2	MG/L	LLL	200.7/6010	09/25/92
COPPER, Cu, DISSOLVED	< 10	UG/L	LLL	200.7/6010	09/25/92
NITROGEN, AMMONIA (as N)	< 0.05	MG/L	SMO	350.1	09/25/92
CHROMIUM, Cr, DISSOLVED	< 10	UG/L	RLH	200.7/6010	09/25/92
LEAD, Pb, DISSOLVED	< 2.0	UG/L	RCM	239.2/7421	09/25/92
IRON, Fe, DISSOLVED	1410	UG/L	LLL	200.7/6010	09/25/92

Aqua Tech Environmental Laboratories Inc.

To: [illegible] & ASSOCIATES INC
6[illegible]7 NORTH HIGH STREET
SUITE [illegible]02
WORTHINGTON OH 43[illegible]

Attn: STEPHEN CHAMPA

Client #	: 10107	[illegible] #	: 10-92-1[illegible]791C
Your Sample ID:	C[illegible]-9X	Login Date	: 09/25/92
Sample Matrix	: LIQUID	Date Reported:	10/12/92
P.O. #:	[illegible] CO	Date Printed	: 11/04/92

COLLECTION INFORMATION

Date/Time/By: [illegible]/24/92 12:30 CHAMPA

Location : [illegible]

Report Approved By: Jeffrey A. Smith

Jeffrey A. Smith

Analyte	Result	[illegible]	[illegible]	EPA Method No.	Date of Analysis
1[illegible]-92-1[illegible]					
[illegible]	< 0.[illegible]	[illegible]	[illegible]	353.2 [illegible]	09/29/9[illegible]
[illegible]	[illegible]		[illegible]		10/09/9[illegible]
[illegible], DISSOLVED	1[illegible]	[illegible]	[illegible]	200.7/6010	09/25/9[illegible]
[illegible]	17	[illegible]	[illegible]	410.2/[illegible]196	09/25/9[illegible]
TOTAL ORGANIC CARBON ([illegible])	[illegible]	MG/L	[illegible]	415.2/9060	09/20/9[illegible]
[illegible], DISSOLVED	503	[illegible]	[illegible]	200.7/6010	[illegible]/25/9[illegible]
LEAD, PB, DISSOLVED	< 2.0	UG/L	[illegible]	239.2/7421	09/25/92
SODIUM, NA, DISSOLVED	[illegible]5.6	[illegible]	[illegible]	200.7/6010	09/25/92
SELENIUM, SE, DISSOLVED	< 5.[illegible]	[illegible]	[illegible]	[illegible].2/[illegible]	09/27/92
[illegible]	7.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]/25/92
[illegible], DISSOLVED	[illegible]3.0	[illegible]	[illegible]	20[illegible].2/7[illegible]	09/25/9[illegible]
[illegible], DISSOLVED	[illegible]	[illegible]	[illegible]	[illegible].7/[illegible]	09/25/9[illegible]
[illegible], TOTAL	[illegible]	[illegible]	[illegible]	[illegible]	09/25/9[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117910					
MANGANESE, Mn, DISSOLVED	127	UG/L	LLL	200.7/6010	09/25/92
RESIDUE, FILTERABLE (DISSOLVED SOLIDS)	440	MG/L	MAB	160.1	09/30/92
MAGNESIUM, Mg, DISSOLVED	40.0	MG/L	LLL	200.7/6010	09/25/92
POTASSIUM, K, DISSOLVED	7.6	MG/L	LLL	200.7/6010	09/25/92
NICKEL, Ni, DISSOLVED	< 20	UG/L	LLL	200.7/6010	09/25/92
MERCURY, Hg, DISSOLVED	< 0.2	UG/L	DLQ	245.1/7470	09/27/92

Aqua Tech Environmental Laboratories Inc.

To: EAGON & ASSOCIATES INC
6877 NORTH HIGH STREET
SUITE 302
WORTHINGTON OH 43085

Attn: STEPHEN CHAMPA

Client # : I0107
Your Sample ID: FIELD BLANK
Sample Matrix : LIQUID
PO #: CLARK CO

Lab # : 10-92-117903
Login Date : 09/25/92
Date Reported: 10/12/92
Date Printed : 11/04/92

COLLECTION INFORMATION
Date/Time/By: 09/23/92 14:35 CHAMPA
Location : CLARKCO

Report Approved By: Jeffrey A. Smith
Jeffrey A. Smith

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117903					
RESIDUE, FILTERABLE (DISSOLVED SOLIDS)	5	MG/L	MAB	160.1	09/30/92
NITROGEN, AMMONIA (as N)	0.30	MG/L	SMO	350.1	09/25/92
MAGNESIUM, Mg, DISSOLVED	< 0.5	MG/L	LLL	200.7/6010	09/25/92
SULFATE	< 2.00	MG/L	SRT	300.0	09/29/92
CALCIUM, Ca, DISSOLVED	< 0.5	MG/L	LLL	200.7/6010	09/25/92
MANGANESE, Mn, DISSOLVED	< 10	UG/L	LLL	200.7/6010	09/25/92
CYANIDE, TOTAL (as CN)	< 0.010	MG/L	SMO	335.3/9012	09/28/92
ZINC, Zn, DISSOLVED	< 10	UG/L	LLL	200.7/6010	09/25/92
CADMIUM, Cd, DISSOLVED	< 1.0	UG/L	RCM	213.2/7131	09/28/92
SILVER, DISSOLVED, Ag	< 5.0	UG/L	RLH	200.7/6010	09/27/92
TURBIDITY	0.34	NTU	RKM	180.1	09/25/92
ARSENIC, As, DISSOLVED	< 3.0	UG/L	RCM	206.2/7060	09/25/92
BARIUM, Ba, DISSOLVED	< 5	UG/L	LLL	200.7/6010	09/25/92
PHOSPHORUS as P	< 0.020	MG/L	MAB	365.2	09/28/92
ALKALINITY, TOTAL	2	MG/L	RKM	310.1	09/25/92
POTASSIUM, K, DISSOLVED	< 1.0	MG/L	LLL	200.7/6010	09/25/92
SELENIUM, Se, DISSOLVED	< 5.0	UG/L	JDR	270.2/7740	09/27/92
TOTAL ORGANIC CARBON (TOC)	< 1.0	MG/L	JAM	415.2/9060	09/29/92
NICKEL, Ni, DISSOLVED	20	UG/L	LLL	200.7/6010	09/25/92
PHENOLS, 4-AAP	< 0.010	MG/L	BSR	420.2/9066	09/25/92
IRON, Fe, DISSOLVED	< 20	UG/L	LLL	200.7/6010	09/25/92
CHROMIUM, Cr, DISSOLVED	< 10	UG/L	RLH	200.7/6010	09/25/92
SODIUM, Na, DISSOLVED	< 0.4	MG/L	LLL	200.7/6010	09/25/92

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis
10-92-117903					
NITRATE + NITRITE N	< 0.05	MG/L	SMO	353.2/9200	09/29/92
MERCURY, Hg, DISSOLVED	< 0.2	UG/L	DLQ	245.1/7470	09/27/92
LEAD, Pb, DISSOLVED	< 2.0	UG/L	RCM	239.2/7421	09/25/92
COPPER, Cu, DISSOLVED	84	UG/L	LLL	200.7/6010	09/25/92
COD, LOW LEVEL	< 8	MG/L	MAB	410.2/7196	09/28/92
ORGANICS ANALYSIS	ATTACHED		CMG		10/09/92
CHLORIDE	< 2.00	MG/L	SRT	300.0	09/29/92

AQUA TECH ENVIRONMENTAL LABORATORIES, INC.

P.O. BOX 76
MELMORE, OHIO 44845
(419) 397-2659

CLIENT: EAGON & ASSOCIATES INC

ADDRESS: ATTN: STEPHEN CHAMPA
6877 N HIGH ST SUITE 302
WORTHINGTON ,OH 43085

PROJECT NO.: CLARK CO

PURCHASE ORDER: CLARK CO

DATE OF INITIAL RECEIPT AT LABORATORY: 09/25/92

COMMENTS:

SAMPLE INVENTORY

ATEL NO.	CLIENT NO.	METHOD (S)
92-14813-MEL	C91-8X,10-17897	APPENDIX I
92-14814-MEL	C91-9Z,10-17898	APPENDIX I
92-14815-MEL	P-90-10X,10-17899	APPENDIX I
92-14816-MEL	C91-4X,10-17900	APPENDIX I
92-14817-MEL	92-9Y,10-17901	APPENDIX I
92-14818-MEL	92-9Y DUP,10-17902	APPENDIX I
92-14819-MEL	FIELD BLANK,10-17903	APPENDIX I
92-14820-MEL	92-27DD,10-17904	APPENDIX I
92-14821-MEL	90-7Z,10-17905	APPENDIX I
92-14822-MEL	90-9DD,10-17906	APPENDIX I
92-14823-MEL	92-24Y,10-17907	APPENDIX I
92-14824-MEL	92-4X,10-17908	APPENDIX I
92-14825-MEL	C92-5DD,10-17909	APPENDIX I
92-14826-MEL	C92-9X,10-17910	APPENDIX I
92-14827-MEL	BLANK	APPENDIX I

AUTHORIZED SIGNATURE: Robert S. Slowacky

TITLE: MELMORE LABORATORY MANAGER
DATE RELEASED: OCT. 2 1992

Aqua Tech Environmental Laboratories, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEL Sample No.: 92-14813-MEL
Client Description: C91-8X,10-17897
Date Received: 09/25/92
Date Extracted:
Date Analyzed: 09/28/92

Method: SW-846; 8240
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.: CLARK CO
Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	< 20.0
Acrolein	< 20.0
Acrylonitrile	< 20.0
Benzene	< 1.0
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	< 10.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	< 1.0
Ethyl Methacrylate	< 5.0
2-Hexanone	< 10.0
4-Methyl-2-Pentanone	< 20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Laboratories, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEL Sample No.: 92-14814-MEL
Client Description: 91-9Z,10-17898
Date Received: 09/25/92
Date Extracted:
Date Analyzed: 09/28/92

Method: SW-846; 8240
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.: CLARK CO
Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	< 20.0
Acrolein	< 20.0
Acrylonitrile	< 20.0
Benzene	< 1.0
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	< 10.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	< 1.0
Ethyl Methacrylate	< 5.0
2-Hexanone	< 10.0
4-Methyl-2-Pentanone	< 20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Laboratories, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEL Sample No.: 92-14815-MEL
Client Description: 90-10X,10-17899
Date Received: 09/25/92
Date Extracted:
Date Analyzed: 09/28/92

Method: SW-846; 8240
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.: CLARK CO
Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	< 20.0
Acrolein	< 20.0
Acrylonitrile	< 20.0
Benzene	< 1.0
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	< 10.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	< 1.0
Ethyl Methacrylate	< 5.0
2-Hexanone	< 10.0
4-Methyl-2-Pentanone	< 20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Laboratories, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEL Sample No.: 92-14816-MEL
Client Description: C91-4X,10-17900
Date Received: 09/25/92
Date Extracted:
Date Analyzed: 09/28/92

Method: SW-846; 8240
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.: CLARK CO
Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	< 20.0
Acrolein	< 20.0
Acrylonitrile	< 20.0
Benzene	< 1.0
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	< 10.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	< 1.0
Ethyl Methacrylate	< 5.0
2-Hexanone	< 10.0
4-Methyl-2-Pentanone	< 20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Laboratories, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEL Sample No.: 92-14817-MEL
Client Description: C92-9Y,10-17901
Date Received: 09/25/92
Date Extracted:
Date Analyzed: 09/28/92

Method: SW-846; 8240
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.: CLARK CO
Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	< 20.0
Acrolein	< 20.0
Acrylonitrile	< 20.0
Benzene	< 1.0
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	< 10.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	< 1.0
Ethyl Methacrylate	< 5.0
2-Hexanone	< 10.0
4-Methyl-2-Pentanone	< 20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Laboratories, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEL Sample No.: 92-14818-MEL
Client Description: C92-9Y DUP,10-17902
Date Received: 09/25/92
Date Extracted:
Date Analyzed: 09/28/92

Method: SW-846; 8240
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.: CLARK CO
Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	< 20.0
Acrolein	< 20.0
Acrylonitrile	< 20.0
Benzene	< 1.0
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	< 10.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	< 1.0
Ethyl Methacrylate	< 5.0
2-Hexanone	< 10.0
4-Methyl-2-Pentanone	< 20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Laboratories, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEL Sample No.: 92-14819-MEL
Client Description: FIELD BLANK,10-17903
Date Received: 09/25/92
Date Extracted:
Date Analyzed: 09/28/92

Method: SW-846; 8240
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.: CLARK CO
Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	< 20.0
Acrolein	< 20.0
Acrylonitrile	< 20.0
Benzene	< 1.0
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	< 10.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	< 1.0
Ethyl Methacrylate	< 5.0
2-Hexanone	< 10.0
4-Methyl-2-Pentanone	< 20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Laboratories, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEL Sample No.: 92-14820-MEL
Client Description: 92-27DD,10-17904
Date Received: 09/25/92
Date Extracted:
Date Analyzed: 09/28/92

Method: SW-846; 8240
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.: CLARK CO
Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	< 20.0
Acrolein	< 20.0
Acrylonitrile	< 20.0
Benzene	< 1.0
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	< 10.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	< 1.0
Ethyl Methacrylate	< 5.0
2-Hexanone	< 10.0
4-Methyl-2-Pentanone	< 20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Laboratories, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEL Sample No.: 92-14821-MEL
Client Description: 90-7Z,10-17905
Date Received: 09/25/92
Date Extracted:
Date Analyzed: 09/28/92

Method: SW-846; 8240
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.: CLARK CO
Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	< 20.0
Acrolein	< 20.0
Acrylonitrile	< 20.0
Benzene	< 1.0
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	< 10.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	< 1.0
Ethyl Methacrylate	< 5.0
2-Hexanone	< 10.0
4-Methyl-2-Pentanone	< 20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Laboratories, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEL Sample No.: 92-14822-MEL
Client Description: 90-9DD,10-17906
Date Received: 09/25/92
Date Extracted:
Date Analyzed: 09/28/92

Method: SW-846; 8240
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.: CLARK CO
Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	< 20.0
Acrolein	< 20.0
Acrylonitrile	< 20.0
Benzene	< 1.0
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	< 10.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	< 1.0
Ethyl Methacrylate	< 5.0
2-Hexanone	< 10.0
4-Methyl-2-Pentanone	< 20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Laboratories, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEL Sample No.: 92-14823-MEL
Client Description: 92-24Y,10-17907
Date Received: 09/25/92
Date Extracted:
Date Analyzed: 09/28/92

Method: SW-846; 8240
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.: CLARK CO
Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	< 20.0
Acrolein	< 20.0
Acrylonitrile	< 20.0
Benzene	< 1.0
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	< 10.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	< 1.0
Ethyl Methacrylate	< 5.0
2-Hexanone	< 10.0
4-Methyl-2-Pentanone	< 20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Laboratories, Inc.

Melmore Laboratory
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Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEL Sample No.: 92-14824-MEL
Client Description: 92-4X,10-17908
Date Received: 09/25/92
Date Extracted:
Date Analyzed: 09/28/92

Method: SW-846; 8240
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.: CLARK CO
Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	< 20.0
Acrolein	< 20.0
Acrylonitrile	< 20.0
Benzene	< 1.0
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	< 10.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	< 1.0
Ethyl Methacrylate	< 5.0
2-Hexanone	< 10.0
4-Methyl-2-Pentanone	< 20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Laboratories, Inc.

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Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEL Sample No.: 92-14825-MEL
Client Description: C92-5DD,10-17909
Date Received: 09/25/92
Date Extracted:
Date Analyzed: 09/28/92

Method: SW-846; 8240
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.: CLARK CO
Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	< 20.0
Acrolein	< 20.0
Acrylonitrile	< 20.0
Benzene	1.1
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	< 10.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	2.2
Ethyl Methacrylate	< 5.0
2-Hexanone	< 10.0
4-Methyl-2-Pentanone	< 20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Laboratories, Inc.

Melmore Laboratory
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Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEL Sample No.: 92-14826-MEL
Client Description: C92-9X,10-17910
Date Received: 09/25/92
Date Extracted:
Date Analyzed: 09/28/92

Method: SW-846; 8240
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.: CLARK CO
Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	< 20.0
Acrolein	< 20.0
Acrylonitrile	< 20.0
Benzene	< 1.0
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	< 10.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	< 1.0
Ethyl Methacrylate	< 5.0
2-Hexanone	< 10.0
4-Methyl-2-Pentanone	< 20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Laboratories, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEL Sample No.: 92-14827-MEL
Client Description: BLANK
Date Received: 09/25/92
Date Extracted:
Date Analyzed: 09/28/92

Method: SW-846; 8240
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.: CLARK CO
Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	< 20.0
Acrolein	< 20.0
Acrylonitrile	< 20.0
Benzene	< 1.0
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	< 10.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	< 1.0
Ethyl Methacrylate	< 5.0
2-Hexanone	< 10.0
4-Methyl-2-Pentanone	< 20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

AQUA TECH ENVIRONMENTAL LABORATORIES, INC. - MARION LAB
- RESULTS REPORT -
(with QC data)

October 12, 1992

Lab#	Sample ID	Testid	Testname		Result	Units	%Rec	%Diff	Run #
10-92-117897	C91-8X	ALK	ALKALINITY, TOT		657	MG/L			09000543
	C91-8X	CL-IC	CHLORIDE		11.2	MG/L	82.1	0.3	09000608
	C91-8X	COD-LO	COD, LOW LEVEL		73	MG/L			09000540
	C91-8X	CN	CYANIDE, TOTAL	<	0.010	MG/L			09000577
	C91-8X	NO3	NITRATE + NITRI	<	0.05	MG/L	100.3		09000611
	C91-8X	NH3	NITROGEN, AMMON		0.08	MG/L			09000536
	C91-8X	PHEN	PHENOLS, 4-AAP		0.011	MG/L			09000544
	C91-8X	P	PHOSPHORUS as P	<	0.020	MG/L			09000539
	C91-8X	TDS	RESIDUE, FILTER		398	MG/L		0.8	09000588
	C91-8X	SO4-IC	SULFATE		27.9	MG/L			09000608
	C91-8X	TOC	TOTAL ORGANIC C		2.4	MG/L			09000582
	C91-8X	TURB	TURBIDITY		170	NTU			09000542
	C91-8X	AS-D	ARSENIC, As, DI	<	3.0	UG/L	91.1		09000546
	C91-8X	BA-D	BARIUM, Ba, DIS		251	UG/L			09000547
	C91-8X	CD-D	CADMIUM, Cd, DI	<	1.0	UG/L	85.6		09000574
	C91-8X	CA-D	CALCIUM, Ca, DI		87.6	MG/L			09000547
	C91-8X	CR-D	CHROMIUM, Cr, D	<	10	UG/L	93.3		09000554
	C91-8X	CU-D	COPPER, Cu, DIS	<	10	UG/L			09000547
	C91-8X	FE-D	IRON, Fe, DISSO		71	UG/L			09000547
	C91-8X	PB-D	LEAD, Pb, DISSO	<	2.0	UG/L	118.2		09000555
	C91-8X	MG-D	MAGNESIUM, Mg,		39.4	MG/L			09000547
	C91-8X	MN-D	MANGANESE, Mn,		59	UG/L			09000547
	C91-8X	HG-D	MERCURY, Hg, DI	<	0.2	UG/L			09000571
	C91-8X	NI-D	NICKEL, Ni, DIS	<	20	UG/L			09000547
	C91-8X	K-D	POTASSIUM, K, D		2.1	MG/L			09000547
	C91-8X	SE-D	SELENIUM, Se, D	<	5.0	UG/L	71.6		09000575
	C91-8X	AG-D	SILVER, DISSOLV	<	5.0	UG/L	101.7		09000558
	C91-8X	NA-D	SODIUM, Na, DIS		7.3	MG/L			09000547
	C91-8X	ZN-D	ZINC, Zn, DISSO	<	10	UG/L			09000547
	C91-8X	APPX	ORGANICS ANALYS		ATTACHED				
10-92-117898	C91-9Z	ALK	ALKALINITY, TOT		331	MG/L		2.5	09000543
	C91-9Z 91-9Z	CL-IC	CHLORIDE		20.1	MG/L			09000608
	C91-9Z	COD-LO	COD, LOW LEVEL		17	MG/L			09000540
	C91-9Z	CN	CYANIDE, TOTAL	<	0.010	MG/L			09000577
	C91-9Z	NO3	NITRATE + NITRI	<	0.05	MG/L			09000611
	C91-9Z	NH3	NITROGEN, AMMON		0.07	MG/L	100.9		09000536
	C91-9Z	PHEN	PHENOLS, 4-AAP	<	0.010	MG/L			09000544
	C91-9Z	P	PHOSPHORUS as P		0.291	MG/L			09000539
	C91-9Z	TDS	RESIDUE, FILTER		430	MG/L			09000588
	C91-9Z	SO4-IC	SULFATE		53.8	MG/L			09000608
	C91-9Z	TOC	TOTAL ORGANIC C		1.9	MG/L	91.6		09000582
	C91-9Z	TURB	TURBIDITY		17	NTU			09000542
	C91-9Z	AS-D	ARSENIC, As, DI		5.5	UG/L			09000546
	C91-9Z	BA-D	BARIUM, Ba, DIS		89	UG/L			09000547
	C91-9Z	CD-D	CADMIUM, Cd, DI	<	1.0	UG/L	72.4		09000574
	C91-9Z	CA-D	CALCIUM, Ca, DI		85.8	MG/L			09000547
	C91-9Z	CR-D	CHROMIUM, Cr, D	<	10	UG/L	88.4		09000554
	C91-9Z	CU-D	COPPER, Cu, DIS	<	10	UG/L			09000547
	C91-9Z	FE-D	IRON, Fe, DISSO		330	UG/L			09000547
	C91-9Z	PB-D	LEAD, Pb, DISSO	<	2.0	UG/L	111.6		09000555
	C91-9Z	MG-D	MAGNESIUM, Mg,		37.6	MG/L			09000547

AQUA TECH ENVIRONMENTAL LABORATORIES, INC. - MARION LAB
- RESULTS REPORT -
(with QC data)

October 12, 1992

Lab#	Sample ID	Testid	Testname	Result	Units	%Rec	%Diff	Run #
10-92-117898	C91-9Z	MN-D	MANGANESE, Mn,	115	UG/L			09000547
	C91-9Z	HG-D	MERCURY, Hg, DI	< 0.2	UG/L			09000571
	C91-9Z	NI-D	NICKEL, Ni, DIS	< 20	UG/L			09000547
	C91-9Z 91-9Z	K-D	POTASSIUM, K, D	1.6	MG/L			09000547
	C91-9Z	SE-D	SELENIUM, Se, D	< 5.0	UG/L	76.4		09000575
	C91-9Z	AG-D	SILVER, DISSOLV	< 5.0	UG/L	100.8		09000558
	C91-9Z	NA-D	SODIUM, Na, DIS	18.0	MG/L			09000547
	C91-9Z	ZN-D	ZINC, Zn, DISSO	< 10	UG/L			09000547
	C91-9Z	APPX	ORGANICS ANALYS	ATTACHED				
10-92-117899	P-90-10X	ALK	ALKALINITY, TOT	1440	MG/L			09000543
	P-90-10X	CL-IC	CHLORIDE	9.46	MG/L			09000608
	P-90-10X	COD-HI	COD, HIGH LEVEL	571	MG/L			09000579
	P-90-10X	CN	CYANIDE, TOTAL	< 0.010	MG/L			09000577
	P-90-10X	NO3	NITRATE + NITRI	0.07	MG/L			09000611
	P-90-10X 90-10X	NH3	NITROGEN, AMMON	0.30	MG/L			09000536
	P-90-10X	PHEN	PHENOLS, 4-AAP	0.017	MG/L			09000544
	P-90-10X	P	PHOSPHORUS as P	2.94	MG/L			10000007
	P-90-10X	TDS	RESIDUE, FILTER	493	MG/L			09000588
	P-90-10X	SO4-IC	SULFATE	31.8	MG/L			09000608
	P-90-10X	TOC	TOTAL ORGANIC C	2.2	MG/L			09000582
	P-90-10X	TURB	TURBIDITY	680	NTU		0.0	09000542
	P-90-10X	AS-D	ARSENIC, As, DI	13	UG/L	96.9		09000546
	P-90-10X	BA-D	BARIUM, Ba, DIS	445	UG/L		0.4	09000547
	P-90-10X	CD-D	CADMIUM, Cd, DI	< 1.0	UG/L	82.6		09000574
	P-90-10X	CA-D	CALCIUM, Ca, DI	103	MG/L		1.2	09000547
	P-90-10X	CR-D	CHROMIUM, Cr, D	< 10	UG/L	91.1		09000554
	P-90-10X	CU-D	COPPER, Cu, DIS	< 10	UG/L			09000547
	P-90-10X	FE-D	IRON, Fe, DISSO	48	UG/L			09000547
	P-90-10X	PB-D	LEAD, Pb, DISSO	< 2.0	UG/L	119.1		09000555
	P-90-10X	MG-D	MAGNESIUM, Mg,	44.7	MG/L		0.8	09000547
	P-90-10X	MN-D	MANGANESE, Mn,	156	UG/L		0.8	09000547
	P-90-10X	HG-D	MERCURY, Hg, DI	0.2	UG/L			10000069
	P-90-10X	NI-D	NICKEL, Ni, DIS	< 20	UG/L			09000547
	P-90-10X	K-D	POTASSIUM, K, D	2.9	MG/L			09000547
	P-90-10X	SE-D	SELENIUM, Se, D	< 5.0	UG/L	72.7		09000575
	P-90-10X	AG-D	SILVER, DISSOLV	< 5.0	UG/L	104.2		09000558
	P-90-10X	NA-D	SODIUM, Na, DIS	24.0	MG/L		0.5	09000547
	P-90-10X	ZN-D	ZINC, Zn, DISSO	< 10	UG/L			09000547
	P-90-10X	APPX	ORGANICS ANALYS	ATTACHED				
10-92-117900	C91-4X	ALK	ALKALINITY, TOT	339	MG/L			09000543
	C91-4X	CL-IC	CHLORIDE	16.7	MG/L			09000608
	C91-4X	COD-LO	COD, LOW LEVEL	< 8	MG/L			09000540
	C91-4X	CN	CYANIDE, TOTAL	< 0.010	MG/L			09000577
	C91-4X	NO3	NITRATE + NITRI	< 0.05	MG/L			09000611
	C91-4X	NH3	NITROGEN, AMMON	< 0.05	MG/L			09000536
	C91-4X	PHEN	PHENOLS, 4-AAP	0.011	MG/L			09000544
	C91-4X	P	PHOSPHORUS as P	0.105	MG/L			09000539
	C91-4X	TDS	RESIDUE, FILTER	424	MG/L			09000588
	C91-4X	SO4-IC	SULFATE	48.9	MG/L			09000608
	C91-4X	TOC	TOTAL ORGANIC C	< 1.0	MG/L			09000582

AQUA TECH ENVIRONMENTAL LABORATORIES, INC. - MARION LAB

- RESULTS REPORT -

(with QC data)

October 12, 1992

Lab#	Sample ID	Testid	Testname	Result	Units	%Rec	%Diff	Run #
10-92-117900	C91-4X	TURB	TURBIDITY	56	NTU			
	C91-4X	AS-D	ARSENIC, As, DI	< 3.0	UG/L			09000542
	C91-4X	BA-D	BARIUM, Ba, DIS	189	UG/L	90.4		09000546
	C91-4X	CD-D	CADMIUM, Cd, DI	< 1.0	UG/L	99.0		09000547
	C91-4X	CA-D	CALCIUM, Ca, DI	97.4	MG/L	74.2		09000574
	C91-4X	CR-D	CHROMIUM, Cr, D	< 10	UG/L			09000547
	C91-4X	CU-D	COPPER, Cu, DIS	< 10	UG/L	90.7		09000554
	C91-4X	FE-D	IRON, Fe, DISSO	230	UG/L	97.2		09000547
	C91-4X	PB-D	LEAD, Pb, DISSO	< 2.0	UG/L	99.4		09000547
	C91-4X	MG-D	MAGNESIUM, Mg,	37.9	MG/L	114.7		09000555
	C91-4X	MN-D	MANGANESE, Mn,	127	UG/L	81.8		09000547
	C91-4X	HG-D	MERCURY, Hg, DI	< 0.2	UG/L	98.5		09000547
	C91-4X	NI-D	NICKEL, Ni, DIS	< 20	UG/L	104.8		09000571
	C91-4X	K-D	POTASSIUM, K, D	1.3	MG/L	96.6		09000547
	C91-4X	SE-D	SELENIUM, Se, D	< 5.0	UG/L	97.0		09000547
	C91-4X	AG-D	SILVER, DISSOLV	< 5.0	UG/L	77.8		09000575
	C91-4X	NA-D	SODIUM, Na, DIS	7.9	MG/L	110.0		09000558
	C91-4X	ZN-D	ZINC, Zn, DISSO	10	UG/L	103.9		09000547
	C91-4X	APPX	ORGANICS ANALYS	ATTACHED		98.4		09000547
10-92-117901	92-94 Y	ALK	ALKALINITY, TOT	343	MG/L			
	92-94	CL-IC	CHLORIDE	14.4	MG/L			09000543
	92-94	COD-LO	COD, LOW LEVEL	17	MG/L			09000608
	C 92-9Y Y	CN	CYANIDE, TOTAL	< 0.010	MG/L			09000540
	92-94	NO3	NITRATE + NITRI	< 0.05	MG/L			09000577
	92-94 C92-9Y	NH3	NITROGEN, AMMON	0.10	MG/L			09000611
	92-94	PHEN	PHENOLS, 4-AAP	0.011	MG/L			09000536
	92-94	P	PHOSPHORUS as P	0.421	MG/L			09000544
	92-94	TDS	RESIDUE, FILTER	355	MG/L			09000539
	92-94	SO4-IC	SULFATE	30.8	MG/L			09000588
	92-94	TOC	TOTAL ORGANIC C	1.6	MG/L			09000608
	92-94	TURB	TURBIDITY	370	NTU			09000582
	92-94	AS-D	ARSENIC, As, DI	16	UG/L			09000542
	92-94	BA-D	BARIUM, Ba, DIS	291	UG/L			09000546
	92-94	CD-D	CADMIUM, Cd, DI	< 1.0	UG/L			09000547
	92-94	CA-D	CALCIUM, Ca, DI	85.4	MG/L	94.8		09000583
	92-94	CR-D	CHROMIUM, Cr, D	< 10	UG/L			09000547
	92-94	CU-D	COPPER, Cu, DIS	< 10	UG/L	89.3		09000554
	92-94	FE-D	IRON, Fe, DISSO	1300	UG/L			09000547
	92-94	PB-D	LEAD, Pb, DISSO	< 2.0	UG/L			09000547
	92-94	MG-D	MAGNESIUM, Mg,	37.1	MG/L	119.3		09000555
	92-94	MN-D	MANGANESE, Mn,	89	UG/L			09000547
	92-94	HG-D	MERCURY, Hg, DI	< 0.2	UG/L			09000547
	92-94	NI-D	NICKEL, Ni, DIS	< 20	UG/L			09000571
	92-94	K-D	POTASSIUM, K, D	1.4	MG/L			09000547
	92-94	SE-D	SELENIUM, Se, D	< 5.0	UG/L			09000547
	92-94	AG-D	SILVER, DISSOLV	< 5.0	UG/L	69.3		09000575
	92-94	NA-D	SODIUM, Na, DIS	4.7	MG/L	106.3		09000558
	92-94	ZN-D	ZINC, Zn, DISSO	16	UG/L			09000547
	92-94	APPX	ORGANICS ANALYS	ATTACHED				09000547
10-92-117902	92-94 DUP [illegible]	ALK	ALKALINITY, TOT	339	MG/L			09000543

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C92-9Y DUPLICATE

Lab#	Sample ID	Testid	Testname		Result	Units	%Rec	%Diff	Run #
10-92-117902	92-94 DUP	CL-IC	CHLORIDE		14.4	MG/L			09000608
	92-94 DUP	COD-LO	COD, LOW LEVEL		22	MG/L	192.5		09000540
	92-94 DUP	CN	CYANIDE, TOTAL	<	0.010	MG/L	104.8		09000577
	92-94 DUP	NO3	NITRATE + NITRI	<	0.05	MG/L			09000611
	92-94 DUP	NH3	NITROGEN, AMMON		0.09	MG/L			09000536
	92-94 DUP	PHEN	PHENOLS, 4-AAP	<	0.010	MG/L	94.6		09000544
	92-94 DUP	P	PHOSPHORUS as P		0.522	MG/L			09000539
	92-94 DUP	TDS	RESIDUE, FILTER		378	MG/L			09000588
	92-94 DUP	SO4-IC	SULFATE		31.6	MG/L			09000608
	92-94 DUP	TOC	TOTAL ORGANIC C		1.5	MG/L			09000582
	92-94 DUP	TURB	TURBIDITY		510	NTU			09000542
	92-94 DUP	AS-D	ARSENIC, As, DI		14	UG/L	91.1		09000546
	92-94 DUP	BA-D	BARIUM, Ba, DIS		298	UG/L			09000547
	92-94 DUP	CD-D	CADMIUM, Cd, DI	<	1.0	UG/L	87.6		09000583
	92-94 DUP	CA-D	CALCIUM, Ca, DI		87.1	MG/L			09000547
	92-94 DUP	CR-D	CHROMIUM, Cr, D	<	10	UG/L	94.7		09000554
	92-94 DUP	CU-D	COPPER, Cu, DIS	<	10	UG/L			09000547
	92-94 DUP	FE-D	IRON, Fe, DISSO		1300	UG/L			09000547
	92-94 DUP	PB-D	LEAD, Pb, DISSO	<	2.0	UG/L	120.4		09000555
	92-94 DUP	MG-D	MAGNESIUM, Mg,		37.7	MG/L			09000547
	92-94 DUP	MN-D	MANGANESE, Mn,		85	UG/L			09000547
	92-94 DUP	HG-D	MERCURY, Hg, DI	<	0.2	UG/L			09000571
	92-94 DUP	NI-D	NICKEL, Ni, DIS	<	20	UG/L			09000547
	92-94 DUP	K-D	POTASSIUM, K, D		1.4	MG/L			09000547
	92-94 DUP	SE-D	SELENIUM, Se, D	<	5.0	UG/L	79.8		09000575
	92-94 DUP	AG-D	SILVER, DISSOLV	<	5.0	UG/L	101.7		09000558
	92-94 DUP	NA-D	SODIUM, Na, DIS		4.7	MG/L			09000547
	92-94 DUP	ZN-D	ZINC, Zn, DISSO		12	UG/L			09000547
	92-94 DUP	APPX	ORGANICS ANALYS		ATTACHED				
10-92-117903	FIELD BLANK	ALK	ALKALINITY, TOT		2	MG/L			09000543
	FIELD BLANK	CL-IC	CHLORIDE	<	2.00	MG/L			09000608
	FIELD BLANK	COD-LO	COD, LOW LEVEL	<	8	MG/L			09000540
	FIELD BLANK	CN	CYANIDE, TOTAL	<	0.010	MG/L			09000577
	FIELD BLANK	NO3	NITRATE + NITRI	<	0.05	MG/L			09000611
	FIELD BLANK	NH3	NITROGEN, AMMON		0.30	MG/L			09000536
	FIELD BLANK	PHEN	PHENOLS, 4-AAP	<	0.010	MG/L			09000544
	FIELD BLANK	P	PHOSPHORUS as P	<	0.020	MG/L			09000539
	FIELD BLANK	TDS	RESIDUE, FILTER		5	MG/L			09000588
	FIELD BLANK	SO4-IC	SULFATE	<	2.00	MG/L			09000608
	FIELD BLANK	TOC	TOTAL ORGANIC C	<	1.0	MG/L			09000582
	FIELD BLANK	TURB	TURBIDITY		0.34	NTU			09000542
	FIELD BLANK	AS-D	ARSENIC, As, DI	<	3.0	UG/L	103.3		09000546
	FIELD BLANK	BA-D	BARIUM, Ba, DIS	<	5	UG/L			09000547
	FIELD BLANK	CD-D	CADMIUM, Cd, DI	<	1.0	UG/L	95.2		09000583
	FIELD BLANK	CA-D	CALCIUM, Ca, DI	<	0.5	MG/L			09000547
	FIELD BLANK	CR-D	CHROMIUM, Cr, D	<	10	UG/L	93.3		09000554
	FIELD BLANK	CU-D	COPPER, Cu, DIS		84	UG/L			09000547
	FIELD BLANK	FE-D	IRON, Fe, DISSO	<	20	UG/L			09000547
	FIELD BLANK	PB-D	LEAD, Pb, DISSO	<	2.0	UG/L	118.0		09000555
	FIELD BLANK	MG-D	MAGNESIUM, Mg,	<	0.5	MG/L			09000547
	FIELD BLANK	MN-D	MANGANESE, Mn,	<	10	UG/L			09000547

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Lab#	Sample ID	Testid	Testname	Result	Units	%Rec	%Diff	Run #
10-92-117903	FIELD BLANK	HG-D	MERCURY, Hg, DI	< 0.2	UG/L			09000571
	FIELD BLANK	NI-D	NICKEL, Ni, DIS	20	UG/L			09000547
	FIELD BLANK	K-D	POTASSIUM, K, D	< 1.0	MG/L			09000547
	FIELD BLANK	SE-D	SELENIUM, Se, D	< 5.0	UG/L	105.6		09000575
	FIELD BLANK	AG-D	SILVER, DISSOLV	< 5.0	UG/L	112.5		09000558
	FIELD BLANK	NA-D	SODIUM, Na, DIS	< 0.4	MG/L			09000547
	FIELD BLANK	ZN-D	ZINC, Zn, DISSO	< 10	UG/L			09000547
	FIELD BLANK	APPX	ORGANICS ANALYS	ATTACHED				
10-92-117904	92-27DD	ALK	ALKALINITY, TOT	614	MG/L			09000543
	92-27DD	CL-IC	CHLORIDE	10.6	MG/L			09000608
	92-27DD	COD-LO	COD, LOW LEVEL	73	MG/L			09000540
	92-27DD	CN	CYANIDE, TOTAL	< 0.010	MG/L			09000577
	92-27DD	NO3	NITRATE + NITRI	< 0.05	MG/L			09000611
	92-27DD	NH3	NITROGEN, AMMON	0.42	MG/L			09000536
	92-27DD	PHEN	PHENOLS, 4-AAP	0.022	MG/L			09000544
	92-27DD	P	PHOSPHORUS as P	0.888	MG/L	113.8	3.2	09000539
	92-27DD	TDS	RESIDUE, FILTER	385	MG/L			09000588
	92-27DD	SO4-IC	SULFATE	15.3	MG/L			09000608
	92-27DD	TOC	TOTAL ORGANIC C	2.0	MG/L			09000582
	92-27DD	TURB	TURBIDITY	1700	NTU			09000542
	92-27DD	AS-D	ARSENIC, As, DI	7.2	UG/L	95.5		09000546
	92-27DD	BA-D	BARIUM, Ba, DIS	415	UG/L			09000547
	92-27DD	CD-D	CADMIUM, Cd, DI	< 1.0	UG/L	94.8		09000583
	92-27DD	CA-D	CALCIUM, Ca, DI	75.0	MG/L			09000547
	92-27DD	CR-D	CHROMIUM, Cr, D	< 10	UG/L	90.9		09000554
	92-27DD	CU-D	COPPER, Cu, DIS	< 10	UG/L			09000547
	92-27DD	FE-D	IRON, Fe, DISSO	941	UG/L			09000547
	92-27DD	PB-D	LEAD, Pb, DISSO	< 2.0	UG/L	127.3		09000555
	92-27DD	MG-D	MAGNESIUM, Mg,	39.9	MG/L			09000547
	92-27DD	MN-D	MANGANESE, Mn,	44	UG/L			09000547
	92-27DD	HG-D	MERCURY, Hg, DI	< 0.2	UG/L			09000571
	92-27DD	NI-D	NICKEL, Ni, DIS	< 20	UG/L			09000547
	92-27DD	K-D	POTASSIUM, K, D	2.6	MG/L			09000547
	92-27DD	SE-D	SELENIUM, Se, D	< 5.0	UG/L	79.3		09000575
	92-27DD	AG-D	SILVER, DISSOLV	< 5.0	UG/L	101.3		09000558
	92-27DD	NA-D	SODIUM, Na, DIS	16.5	MG/L			09000547
	92-27DD	ZN-D	ZINC, Zn, DISSO	15	UG/L			09000547
	92-27DD	APPX	ORGANICS ANALYS	ATTACHED				
10-92-117905	90-7Z	ALK	ALKALINITY, TOT	808	MG/L			09000543
	90-7Z	CL-IC	CHLORIDE	8.59	MG/L			09000608
	90-7Z	COD-HI	COD, HIGH LEVEL	227	MG/L			09000579
	90-7Z	CN	CYANIDE, TOTAL	< 0.010	MG/L			09000577
	90-7Z	NO3	NITRATE + NITRI	0.05	MG/L			09000611
	90-7Z	NH3	NITROGEN, AMMON	0.42	MG/L			09000536
	90-7Z	PHEN	PHENOLS, 4-AAP	0.156	MG/L			09000544
	90-7Z	P	PHOSPHORUS as P	1.74	MG/L			09000539
	90-7Z	TDS	RESIDUE, FILTER	353	MG/L			09000588
	90-7Z	SO4-IC	SULFATE	28.7	MG/L			09000608
	90-7Z	TOC	TOTAL ORGANIC C	1.8	MG/L			09000582
	90-7Z	TURB	TURBIDITY	3700	NTU			09000542

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Lab#	Sample ID	Testid	Testname	Result	Units	%Rec	%Diff	Run #
10-92-117905	90-7Z	AS-D	ARSENIC, As, DI	< 3.0	UG/L	92.2		09000546
	90-7Z	BA-D	BARIUM, Ba, DIS	42	UG/L			09000547
	90-7Z	CD-D	CADMIUM, Cd, DI	< 1.0	UG/L	94.4		09000583
	90-7Z	CA-D	CALCIUM, Ca, DI	87.4	MG/L			09000547
	90-7Z	CR-D	CHROMIUM, Cr, D	< 10	UG/L	92.4		09000554
	90-7Z	CU-D	COPPER, Cu, DIS	< 10	UG/L			09000547
	90-7Z	FE-D	IRON, Fe, DISSO	< 20	UG/L			09000547
	90-7Z	PB-D	LEAD, Pb, DISSO	< 2.0	UG/L	118.7		09000555
	90-7Z	MG-D	MAGNESIUM, Mg,	32.4	MG/L			09000547
	90-7Z	MN-D	MANGANESE, Mn,	29	UG/L			09000547
	90-7Z	HG-D	MERCURY, Hg, DI	< 0.2	UG/L			09000571
	90-7Z	NI-D	NICKEL, Ni, DIS	< 20	UG/L			09000547
	90-7Z	K-D	POTASSIUM, K, D	< 1.0	MG/L			09000547
	90-7Z	SE-D	SELENIUM, Se, D	< 5.0	UG/L	74.2		09000575
	90-7Z	AG-D	SILVER, DISSOLV	< 5.0	UG/L	102.1		09000558
	90-7Z	NA-D	SODIUM, Na, DIS	2.1	MG/L			09000547
	90-7Z	ZN-D	ZINC, Zn, DISSO	< 10	UG/L			09000547
	90-7Z	APPX	ORGANICS ANALYS	ATTACHED				
10-92-117906	90-9DD	ALK	ALKALINITY, TOT	478	MG/L			09000543
	90-9DD	CL-IC	CHLORIDE	8.66	MG/L			09000608
	90-9DD	COD-LO	COD, LOW LEVEL	56	MG/L			09000540
	90-9DD	CN	CYANIDE, TOTAL	< 0.010	MG/L			09000577
	90-9DD	NO3	NITRATE + NITRI	< 0.05	MG/L			09000611
	90-9DD	NH3	NITROGEN, AMMON	0.35	MG/L			09000536
	90-9DD	PHEN	PHENOLS, 4-AAP	0.063	MG/L			09000544
	90-9DD	P	PHOSPHORUS as P	0.779	MG/L			09000539
	90-9DD	TDS	RESIDUE, FILTER	403	MG/L			09000588
	90-9DD	SO4-IC	SULFATE	15.2	MG/L			09000608
	90-9DD	TOC	TOTAL ORGANIC C	2.0	MG/L			09000582
	90-9DD	TURB	TURBIDITY	1400	NTU			09000542
	90-9DD	AS-D	ARSENIC, As, DI	8.7	UG/L			09000546
	90-9DD	BA-D	BARIUM, Ba, DIS	408	UG/L			09000547
	90-9DD	CD-D	CADMIUM, Cd, DI	< 1.0	UG/L	94.0		09000583
	90-9DD	CA-D	CALCIUM, Ca, DI	80.7	MG/L			09000547
	90-9DD	CR-D	CHROMIUM, Cr, D	< 10	UG/L	89.1		09000554
	90-9DD	CU-D	COPPER, Cu, DIS	< 10	UG/L			09000547
	90-9DD	FE-D	IRON, Fe, DISSO	418	UG/L			09000547
	90-9DD	PB-D	LEAD, Pb, DISSO	< 2.0	UG/L	125.1		09000555
	90-9DD	MG-D	MAGNESIUM, Mg,	35.1	MG/L			09000547
	90-9DD	MN-D	MANGANESE, Mn,	108	UG/L			09000547
	90-9DD	HG-D	MERCURY, Hg, DI	< 0.2	UG/L			09000571
	90-9DD	NI-D	NICKEL, Ni, DIS	< 20	UG/L			09000547
	90-9DD	K-D	POTASSIUM, K, D	1.8	MG/L			09000547
	90-9DD	SE-D	SELENIUM, Se, D	< 5.0	UG/L	60.7		09000575
	90-9DD	AG-D	SILVER, DISSOLV	< 5.0	UG/L	100.4		09000558
	90-9DD	NA-D	SODIUM, Na, DIS	13.9	MG/L			09000547
	90-9DD	ZN-D	ZINC, Zn, DISSO	12	UG/L			09000547
	90-9DD	APPX	ORGANICS ANALYS	ATTACHED				
10-92-117907	92-24Y	ALK	ALKALINITY, TOT	400	MG/L		4.2	09000543
	92-24Y	CL-IC	CHLORIDE	14.4	MG/L	81.9	0.6	09000608

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Lab#	Sample ID	Testid	Testname		Result	Units	%Rec	%Diff	Run #
10-92-117907	92-24Y	COD-LO	COD, LOW LEVEL		28	MG/L			09000540
	92-24Y	CN	CYANIDE, TOTAL	<	0.010	MG/L			09000577
	92-24Y	NO3	NITRATE + NITRI	<	0.05	MG/L	101.5		09000611
	92-24Y	NH3	NITROGEN, AMMON		0.21	MG/L			09000536
	92-24Y	PHEN	PHENOLS, 4-AAP	<	0.010	MG/L			09000544
	92-24Y	P	PHOSPHORUS as P		0.544	MG/L			09000539
	92-24Y	TDS	RESIDUE, FILTER		390	MG/L		2.3	09000588
	92-24Y	SO4-IC	SULFATE		21.8	MG/L	87.4		09000608
	92-24Y	TOC	TOTAL ORGANIC C		2.1	MG/L			09000604
	92-24Y	TURB	TURBIDITY		380	NTU			09000542
	92-24Y	AS-D	ARSENIC, As, DI		11	UG/L			09000546
	92-24Y	BA-D	BARIUM, Ba, DIS		523	UG/L			09000547
	92-24Y	CD-D	CADMIUM, Cd, DI	<	1.0	UG/L	94.0		09000583
	92-24Y	CA-D	CALCIUM, Ca, DI		85.2	MG/L			09000547
	92-24Y	CR-D	CHROMIUM, Cr, D	<	10	UG/L	90.2		09000554
	92-24Y	CU-D	COPPER, Cu, DIS	<	10	UG/L			09000547
	92-24Y	FE-D	IRON, Fe, DISSO		1820	UG/L			09000547
	92-24Y	PB-D	LEAD, Pb, DISSO	<	2.0	UG/L	121.1		09000555
	92-24Y	MG-D	MAGNESIUM, Mg,		40.0	MG/L			09000547
	92-24Y	MN-D	MANGANESE, Mn,		34	UG/L			09000547
	92-24Y	HG-D	MERCURY, Hg, DI	<	0.2	UG/L			09000571
	92-24Y	NI-D	NICKEL, Ni, DIS	<	20	UG/L			09000547
	92-24Y	K-D	POTASSIUM, K, D		1.8	MG/L			09000547
	92-24Y	SE-D	SELENIUM, Se, D	<	5.0	UG/L	69.6		09000575
	92-24Y	AG-D	SILVER, DISSOLV	<	5.0	UG/L	95.8		09000558
	92-24Y	NA-D	SODIUM, Na, DIS		8.9	MG/L			09000547
	92-24Y	ZN-D	ZINC, Zn, DISSO		10	UG/L			09000547
	92-24Y	APPX	ORGANICS ANALYS		ATTACHED				
10-92-117908	92-4X	ALK	ALKALINITY, TOT		759	MG/L			09000543
	92-4X	CL-IC	CHLORIDE		9.68	MG/L			09000608
	92-4X	COD-HI	COD, HIGH LEVEL		269	MG/L			09000579
	92-4X	CN	CYANIDE, TOTAL	<	0.010	MG/L			09000577
	92-4X	NO3	NITRATE + NITRI	<	0.05	MG/L			09000611
	92-4X	NH3	NITROGEN, AMMON		0.25	MG/L	116.1	2.5	09000536
	92-4X	PHEN	PHENOLS, 4-AAP	<	0.010	MG/L			09000544
	92-4X	P	PHOSPHORUS as P		1.73	MG/L			09000539
	92-4X	TDS	RESIDUE, FILTER		395	MG/L			09000588
	92-4X	SO4-IC	SULFATE		20.9	MG/L			09000608
	92-4X	TOC	TOTAL ORGANIC C		3.0	MG/L			09000604
	92-4X	TURB	TURBIDITY		3300	NTU			09000542
	92-4X	AS-D	ARSENIC, As, DI		8.5	UG/L			09000546
	92-4X	BA-D	BARIUM, Ba, DIS		616	UG/L		0.3	09000547
	92-4X	CD-D	CADMIUM, Cd, DI	<	1.0	UG/L	88.4		09000583
	92-4X	CA-D	CALCIUM, Ca, DI		81.9	MG/L		0.3	09000547
	92-4X	CR-D	CHROMIUM, Cr, D	<	10	UG/L	94.4		09000554
	92-4X	CU-D	COPPER, Cu, DIS	<	10	UG/L			09000547
	92-4X	FE-D	IRON, Fe, DISSO		234	UG/L		8.3	09000547
	92-4X	PB-D	LEAD, Pb, DISSO	<	2.0	UG/L	120.7		09000555
	92-4X	MG-D	MAGNESIUM, Mg,		40.1	MG/L		0.5	09000547
	92-4X	MN-D	MANGANESE, Mn,		59	UG/L		0.5	09000547
	92-4X	HG-D	MERCURY, Hg, DI	<	0.2	UG/L			09000571

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Lab#	Sample ID	Testid	Testname	Result	Units	%Rec	%Diff	Run #
10-92-117908	92-4X	NI-D	NICKEL, Ni, DIS	< 20	UG/L			09000547
	92-4X	K-D	POTASSIUM, K, D	2.3	MG/L			09000547
	92-4X	SE-D	SELENIUM, Se, D	< 5.0	UG/L	70.9		09000575
	92-4X	AG-D	SILVER, DISSOLV	< 5.0	UG/L	106.3		09000558
	92-4X	NA-D	SODIUM, Na, DIS	8.8	MG/L		0.3	09000547
	92-4X	ZN-D	ZINC, Zn, DISSO	< 10	UG/L			09000597
	92-4X	APPX	ORGANICS ANALYS	ATTACHED				
10-92-117909	C92-5DD	ALK	ALKALINITY, TOT	359	MG/L			09000543
	C92-5DD	CL-IC	CHLORIDE	10.4	MG/L			09000608
	C92-5DD	COD-LO	COD, LOW LEVEL	22	MG/L			09000540
	C92-5DD	CN	CYANIDE, TOTAL	< 0.010	MG/L			09000577
	C92-5DD	NO3	NITRATE + NITRI	< 0.05	MG/L			09000611
	C92-5DD	NH3	NITROGEN, AMMON	< 0.05	MG/L			09000536
	C92-5DD	PHEN	PHENOLS, 4-AAP	< 0.010	MG/L			09000544
	C92-5DD	P	PHOSPHORUS as P	0.224	MG/L			09000539
	C92-5DD	TDS	RESIDUE, FILTER	373	MG/L			09000588
	C92-5DD	SO4-IC	SULFATE	30	MG/L			09000608
	C92-5DD	TOC	TOTAL ORGANIC C	1.5	MG/L	37.2		09000604
	C92-5DD	TURB	TURBIDITY	170	NTU			09000542
	C92-5DD	AS-D	ARSENIC, As, DI	4.3	UG/L	90.4		09000546
	C92-5DD	BA-D	BARIUM, Ba, DIS	268	UG/L	108.8		09000547
	C92-5DD	CD-D	CADMIUM, Cd, DI	< 1.0	UG/L	88.8		09000583
	C92-5DD	CA-D	CALCIUM, Ca, DI	87.3	MG/L			09000547
	C92-5DD	CR-D	CHROMIUM, Cr, D	< 10	UG/L	96.4		09000554
	C92-5DD	CU-D	COPPER, Cu, DIS	< 10	UG/L	106.4		09000547
	C92-5DD	FE-D	IRON, Fe, DISSO	1410	UG/L	106.2		09000547
	C92-5DD	PB-D	LEAD, Pb, DISSO	< 2.0	UG/L	119.3		09000555
	C92-5DD	MG-D	MAGNESIUM, Mg,	37.2	MG/L	91.1		09000547
	C92-5DD	MN-D	MANGANESE, Mn,	90	UG/L	108.3		09000547
	C92-5DD	HG-D	MERCURY, Hg, DI	< 0.2	UG/L	103.2		09000571
	C92-5DD	NI-D	NICKEL, Ni, DIS	< 20	UG/L	106.9		09000547
	C92-5DD	K-D	POTASSIUM, K, D	1.9	MG/L	104.0		09000547
	C92-5DD	SE-D	SELENIUM, Se, D	< 5.0	UG/L	68.0		09000575
	C92-5DD	AG-D	SILVER, DISSOLV	< 5.0	UG/L	103.8		09000558
	C92-5DD	NA-D	SODIUM, Na, DIS	5.2	MG/L	114.6		09000547
	C92-5DD	ZN-D	ZINC, Zn, DISSO	30	UG/L	107.8		09000547
	C92-5DD	APPX	ORGANICS ANALYS	ATTACHED				
10-92-117910	92-9X	ALK	ALKALINITY, TOT	429	MG/L			09000543
	92-9X C92-9X	CL-IC	CHLORIDE	10.4	MG/L	80.1	0.5	09000608
	C 92-9X	COD-LO	COD, LOW LEVEL	17	MG/L			09000540
	92-9X	CN	CYANIDE, TOTAL	< 0.010	MG/L			09000577
	92-9X	NO3	NITRATE + NITRI	< 0.05	MG/L			09000611
	92-9X	NH3	NITROGEN, AMMON	0.22	MG/L			09000536
	92-9X	PHEN	PHENOLS, 4-AAP	0.056	MG/L			09000544
	92-9X	P	PHOSPHORUS as P	0.487	MG/L			09000539
	92-9X	TDS	RESIDUE, FILTER	440	MG/L			09000588
	92-9X	SO4-IC	SULFATE	40.3	MG/L	88.3		09000608
	92-9X	TOC	TOTAL ORGANIC C	3.0	MG/L			09000604
	92-9X	TURB	TURBIDITY	760	NTU		0.0	09000542
	92-9X	AS-D	ARSENIC, As, DI	< 3.0	UG/L	91.8		09000546

AQUA TECH ENVIRONMENTAL LABORATORIES, INC. - MARION LAB

- RESULTS REPORT -

(with QC data)

October 12, 1992

Lab#	Sample ID	Testid	Testname		Result	Units	%Rec	%Diff	Run #
10-92-117910	92-9X	BA-D	BARIUM, Ba, DIS		303	UG/L			09000547
	92-9X	CD-D	CADMIUM, Cd, DI	<	1.0	UG/L	92.8		09000583
	92-9X	CA-D	CALCIUM, Ca, DI		62.4	MG/L			09000547
	92-9X	CR-D	CHROMIUM, Cr, D	<	10	UG/L	96.2		09000554
	92-9X C92-9X	CU-D	COPPER, Cu, DIS	<	10	UG/L			09000547
	92-9X	FE-D	IRON, Fe, DISSO		708	UG/L			09000547
	92-9X	PB-D	LEAD, Pb, DISSO	<	2.0	UG/L	104.9		09000555
	92-9X	MG-D	MAGNESIUM, Mg,		40.0	MG/L			09000547
	92-9X	MN-D	MANGANESE, Mn,		127	UG/L			09000547
	92-9X	HG-D	MERCURY, Hg, DI	<	0.2	UG/L			09000571
	92-9X	NI-D	NICKEL, Ni, DIS	<	20	UG/L			09000547
	92-9X	K-D	POTASSIUM, K, D		7.6	MG/L			09000547
	92-9X	SE-D	SELENIUM, Se, D	<	5.0	UG/L	73.3		09000575
	92-9X	AG-D	SILVER, DISSOLV	<	5.0	UG/L	108.3		09000558
	92-9X	NA-D	SODIUM, Na, DIS		18.6	MG/L			09000547
	92-9X	ZN-D	ZINC, Zn, DISSO	<	10	UG/L			09000547
	92-9X	APPX	ORGANICS ANALYS		ATTACHED				

Aqua Tech Environmental Consultants, Inc.

Marion Laboratory
P.O. Box 436
181 S. Main Street
Marion, Ohio 43302
614-382-5991 or 800-783-5991
FAX 614-382-1420

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845
419-397-2659 or 419-397-2222
FAX 419-397-2229

Chain of Custody Record

Client Name: Eagon & Assoc.

Client Number: I0107

Samplers: (print) Stephen J. Champe, Wesley J. Vins (signature) [signatures]

Station Number	Station Location	Date	Time	Water Comp.	Water Grab	Comp.	Grab	Number of Containers	Analysis Required
C91-8X	Clark Co	9-23-92	0940		X	117897		8	BAT groundwater parameters and Appendix I volatile organic compounds - see attached lists
C91-9Z	" "	"	1045		X	117898		8	
P-90-10X	" "	"	1110		X	117899		8	
C91-4X	" "	"	1325		X	117900		8	
92-9Y	" "	"	1400		X	117901		8	
92-9YDUP	" "	"	1410		X	117902		8	
Field Blank	" "	"	1435		X	117903		8	
92-29DD	" "	"	1545		X	117904		8	
90-7Z	" "	"	1605		X	117905		8	
90-9DD	" "	"	1650		X	117906		8	
92-24Y	" "	9-24-92	0940		X	117907		8	
92-4X	" "	"	1025		X	117908		8	
C92-5DD	" "	"	1210		X	117909		8	
C92-9X	" "	"	1230		X	117910		8	

Relinquished by:	Received by	DATE / TIME
(print) (signature)	(print) (signature)	
(print) (signature)	(print) (signature)	
(print) (signature)	(print) (signature)	
Relinquished by (print) (signature)	Received by Mobile Laboratory for Field Analysis (print) (signature)	

Dispatched by	DATE / TIME	Received for Laboratory by	DATE / TIME
Stephen J. Champe	9-24-92 pm	(print) Carol M. Swigert (signature) [signature] Carol M. Swigert	9-24-92 9/24/92 1655

Method of shipment: Hand carried to ATEL-Marion

Distribution
White - Laboratory (include with reports)
Yellow - Laboratory (file copy)
Pink - Sample custodian
Gold - Field sampling records

Form ATEC-65
Revised 2 15 90

AQUA TECH
ENVIRONMENTAL CONSULTANTS, INC.
P.O. Box 76, Melmore, Ohio 44845, 419-397-2659 or 397-2222
P.O. Box 436, 181 South Main Street, Marion, Ohio 43302, 614-382-5991

LABORATORY ANALYSIS REPORT

DATE REC'D. 03-22-1990
DATE REP'D. 03-29-1990
P.O. # TREMONT
LAB NO. 4059-90
CLIENT NO. T0107

SAMPLE LOCATION PW-1 TEST WELL START
SAMPLED BY STEPHEN J CHAMPA
DATE SAMPLED 03-21-1990
TIME SAMPLED 09:10

EAGON & ASSOCIATES INC
6877 N. HIGH
SUITE 302
WORTHINGTON OH 43085

COMMENTS:

STORET	ANALYSIS	RESULT	UNITS	DATE OF ANALYSIS
00410	ALKALINITY, TOTAL, CACO3	380	MG/L	03-27-1990
01007	BARIUM, TOTAL, BA	300	UG/L	03-28-1990
00916	CALCIUM, TOTAL, CA	87	MG/L	03-28-1990
00940	CHLORIDE, CL	10	MG/L	03-26-1990
01034	CHROMIUM, TOTAL, CR	<10	UG/L	03-28-1990
00720	CYANIDE, TOTAL, CN	<0.010	MG/L	03-28-1990
01045	IRON, TOTAL, FE	1300	UG/L	03-28-1990
00927	MAGNESIUM, TOTAL, MG	38	MG/L	03-28-1990
01055	MANGANESE, TOTAL, MN	57	UG/L	03-28-1990
00620	NITRATE N	<0.05	MG/L	03-27-1990
00515	RESIDUE, T. FLT. (DISS)	390	MG/L	03-28-1990
00929	SODIUM, TOTAL, NA	12	MG/L	03-28-1990
00945	SULFATE, SO4	<2	MG/L	03-26-1990

LABORATORY CERTIFICATION # 4053

SIGNED Peter J. Youell

COPY DISTRIBUTION: WHITE - CLIENT YELLOW - FILE

AQUA TECH
ENVIRONMENTAL CONSULTANTS, INC
P.O. Box 76, Melmore, Ohio 44845, 419-397-2659 or 397-2222
P O Box 436, 181 South Main Street, Marion, Ohio 43302, 614-382-5991

LABORATORY ANALYSIS REPORT

DATE REC'D. 03-22-1990
DATE REP'D. 03-29-1990
P.O. # TREMONT
LAB NO. 4060-90
CLIENT NO. T0107

SAMPLE LOCATION PW-1 TEST WELL END
SAMPLED BY STEPHEN J CHAMPA
DATE SAMPLED 03-22-1990
TIME SAMPLED 08:50

EAGON & ASSOCIATES INC
6877 N. HIGH
SUITE 302
WORTHINGTON OH 43085

COMMENTS:

STORET #	ANALYSIS	RESULT	UNITS	DATE OF ANALYSIS
00410	ALKALINITY, TOTAL, CACO3	374	MG/L	03-27-1990
01007	BARIUM, TOTAL, BA	290	UG/L	03-28-1990
00916	CALCIUM, TOTAL, CA	91	MG/L	03-28-1990
00940	CHLORIDE, CL	4	MG/L	03-26-1990
01034	CHROMIUM, TOTAL, CR	<10	UG/L	03-28-1990
00720	CYANIDE, TOTAL, CN	<0.010	MG/L	03-28-1990
01045	IRON, TOTAL, FE	1600	UG/L	03-28-1990
00927	MAGNESIUM, TOTAL, MG	40	MG/L	03-28-1990
01055	MANGANESE, TOTAL, MN	33	UG/L	03-28-1990
00620	NITRATE N	<0.05	MG/L	03-27-1990
00515	RESIDUE, T. FLT. (DISS)	386	MG/L	03-28-1990
00929	SODIUM, TOTAL, NA	12	MG/L	03-28-1990
00945	SULFATE, SO4	2	MG/L	03-26-1990

LABORATORY CERTIFICATION # 4053

SIGNED Peter J. Youll

COPY DISTRIBUTION: WHITE - CLIENT YELLOW - FILE

AQUA T' ENVIRONMENTAL CONSULTANT INC.
QUALITY CONTROL DATA
FOR
LABNUMBERS 4059-90 TO 4060-90

LAB NO.	STORET	ANALYSIS	RSLT #1	RSLT #2	SPIKE	SPIKE RSLT	% R	UNITS
4060-90	00916	CALCIUM, TOTAL,	18.11	--	40.00	59.58	104	MG/L
4060-90	00927	MAGNESIUM, TOTA	8.05	--	40.00	49.01	102	MG/L

AQUA TECH
ENVIRONMENTAL CONSULTANTS, INC

P.O. Box 76, Melmore, Ohio 44845, 419-397-2659 or 397-2222
P.O. Box 436, 181 South Main Street, Marion, Ohio 43302, 614-382-5991

LABORATORY ANALYSIS REPORT

DATE REC'D. 06-14-1990
DATE REP'D. 06-21-1990
P.O. # TREMONT
LAB NO. 0696-90
CLIENT NO. T0107

SAMPLE LOCATION TREMONT CITY PW 3
SAMPLED BY DAVID SUGAR
DATE SAMPLED 06-12-1990
TIME SAMPLED 14:55

EAGON & ASSOCIATES INC
6877 N HIGH ST
SUITE 302
WORTHINGTON OH 43085

COMMENTS:

STORET #	ANALYSIS	[illegible]	UNITS	[illegible]
01007	BARIUM, TOTAL, BA	240	UG/L	06-21-1990
00410	ALKALINITY, TOTAL, CACO3	333	MG/L	06-18-1990
00916	CALCIUM, TOTAL, CA	110	MG/L	06-21-1990
00940	CHLORIDE, CL	10	MG/L	06-15-1990
01034	CHROMIUM, TOTAL, CR	<30	UG/L	06-21-1990
00720	CYANIDE, TOTAL, CN	<0.010	MG/L	06-19-1990
01045	IRON, TOTAL, FE	1400	UG/L	06-21-1990
00927	MAGNESIUM, TOTAL, MG	40	MG/L	06-21-1990
01055	MANGANESE, TOTAL, MN	81	UG/L	06-21-1990
00620	NITRATE N	<0.05	MG/L	06-14-1990
00515	RESIDUE, T. FLT. (DISS)	476	MG/L	06-19-1990
00929	SODIUM, TOTAL, NA	4.1	MG/L	06-21-1990
00945	SULFATE, SO4	45	MG/L	06-18-1990

LABORATORY CERTIFICATION # 4053

SIGNED Peter J. Youll

COPY DISTRIBUTION: WHITE - CLIENT YELLOW - FILE

AQUA TECH ENVIRONMENTAL CONSULTANTS, INC.
QUALITY CONTROL DATA
FOR
LABNUMBERS 8696-90 TO 8696-90

LAB NO.	STORET	ANALYSIS	RSLT #1	RSLT #2	SPIKE	SPIKE RSLT	% R	UNITS
8696-90	00940	CHLORIDE, CL	9.7	9.4				MG/L
8696-90	00620	NITRATE N	0.04	0.04	1.00	1.07	103	MG/L

Aqua Tech Environmental Laboratories Inc.

To: EAGON & ASSOCIATES INC
[illegible]77 NORTH HIGH STREET
SUITE 302
WORTHINGTON OH 43085

Attn: STEPHEN CHAMPA

Client # : I0107
Your Sample ID: CLARK CO PW-3-3
Sample Matrix : LIQUID
PO #: CLARKCO

Lab # : 10-92-119207
Login Date : 10/12/92
Date Reported: 11/09/92
Date Printed : 11/09/92

COLLECTION INFORMATION

Date/Time/By: 10/09/92 10:00 CHAMPA
Location:

Report Approved By: Jeffrey A. Smith

Jeffrey A. Smith

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis	Run Number
10-92-119207						
SILVER, DISSOLVED, Ag	< 5.0	UG/L	DKS	200.7/6010	10/12/92	10000249
ALKALINITY, TOTAL	354	MG/L	MAB	310.1	10/13/92	1000026[illegible]
ORGANIC ANALYSIS	ATTACHED		CMG		11/02/92	
ARSENIC, As, DISSOLVED	< 3.0	UG/L	RCM	206.2/7060	10/15/92	1000033[illegible]
BARIUM, Ba, DISSOLVED	214	UG/L	KRG	200.7/6010	10/13/92	10000[illegible]
CALCIUM, Ca, DISSOLVED	90.5	MG/L	KRG	200.7/6010	10/13/92	10000[illegible]
CADMIUM, Cd, DISSOLVED	< 1.0	UG/L	DKS	213.2/7131	10/12/92	10000[illegible]
CHLORIDE	16.6	MG/L	SRT	300.0	10/20/92	1000[illegible]
CYANIDE, TOTAL (as CN)	< 0.010	MG/L	TAM	335.3/9012	10/14/92	1000[illegible]
COD, LOW LEVEL	< 8	MG/L	SRT	410.2/7196	10/23/92	1000[illegible]
CHROMIUM, Cr	< 10.0	UG/L	RLH	218.2/7191	10/14/92	10000207
COPPER, Cu, DISSOLVED	< 10	UG/L	KRG	200.7/6010	10/13/92	10000283
IRON, Fe, DISSOLVED	1280	UG/L	KRG	200.7/6010	10/13/92	10000[illegible]
MERCURY, Hg, DISSOLVED	< 0.2	UG/L	JDR	245.1/7470	10/12/92	1000[illegible]
POTASSIUM, K, DISSOLVED	1.2	MG/L	KRG	200.7/6010	10/13/92	10000[illegible]
MAGNESIUM, Mg, DISSOLVED	[illegible].3	MG/L	KRG	200.7/6010	10/13/92	10000[illegible]
MANGANESE, Mn, DISSOLVED	[illegible]	UG/L	KRG	200.7/6010	10/13/92	10000[illegible]
SODIUM, Na, DISSOLVED	4.6	MG/L	KRG	200.7/6010	10/13/92	10000283
NITROGEN, AMMONIA (as N)	< 0.05	MG/L	SRT	350.1	10/13/92	10000[illegible]
NICKEL, Ni, DISSOLVED	< 20	UG/L	KRG	200.7/6010	10/13/92	10000283
NITRATE + NITRITE N	< 0.05	MG/L	[illegible]	353.2/9200	10/11/92	10000[illegible]
PHOSPHORUS, TOTAL P	< 0.020	MG/L	[illegible]	365.2	10/15/92	1000[illegible]
LEAD, Pb, DISSOLVED	< 3.0	UG/L	[illegible]	239.2/7421	10/13/92	1000[illegible]

181 S. MAIN ST. • P.O. BOX 436 • MARION, OH 43301-0436
PHONE 614-382-5991 • 1-800-783-5991 • FAX 614-382-1420

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis	Run Number
10-92-119207						
PHENOLS, 4-AAP	< 0.010	MG/L	SMO	420.2/9066	10/12/92	10000225
SELENIUM, Se, DISSOLVED	< 5.0	UG/L	JDR	270.2/7740	10/13/92	10000286
SULFATE	34.1	MG/L	SRT	300.0	10/20/92	10000348
RESIDUE, FILTERABLE (DISSOLVED SOLIDS)	411	MG/L	MAB	160.1	10/13/92	10000243
TOTAL ORGANIC CARBON (TOC)	< 1.0	MG/L	MRH	415.2/9060	10/14/92	10000276
TURBIDITY	21	NTU	SRT	180.1	10/13/92	10000270
ZINC, Zn, DISSOLVED	< 10	UG/L	KRG	200.7/6010	10/13/92	10000283

Aqua Tech Environmental Laboratories Inc.

To: EAGON & ASSOCIATES INC
6877 NORTH HIGH STREET
SUITE 302
WORTHINGTON OH 43085

Attn: STEPHEN CHAMPA

Client #	: I0107	Lab #	: 10-92-119208
Your Sample ID:	TRIP BLANK	Login Date	: 10/12/92
Sample Matrix :	LIQUID	Date Reported:	11/09/92
PO #:	CLARKCO	Date Printed :	11/09/92

COLLECTION INFORMATION

Date/Time/By: 10/05/92 15:10 KJL
Location :

Report Approved By: Jeffrey A. Smith
Jeffrey A. Smith

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis	Run Number
10-92-119208						
SILVER, Ag	< 20	UG/L	KRG	200.7/6010	10/13/92	10000283
ALKALINITY, TOTAL	2	MG/L	MAB	310.1	10/13/92	10000263
ORGANICS ANALYSIS	ATTACHED		CMG		11/02/92	
ARSENIC, As	< 3.0	UG/L	RCM	206.2/7060	10/15/92	10000335
BARIUM, Ba	< 10	UG/L	KRG	200.7/6010	10/13/92	10000283
CALCIUM, Ca	< 0.5	MG/L	KRG	200.7/6010	10/13/92	10000283
CADMIUM, Cd	< 1.0	UG/L	DKS	213.2/7131	10/12/92	10000252
CHLORIDE	< 1.00	MG/L	SRT	300.0	10/20/92	10000349
CYANIDE, TOTAL (as CN)	< 0.010	MG/L	JAM	335.3/9012	10/14/92	10000305
COD, LOW LEVEL	< 8	MG/L	SRT	410.2/7196	10/23/92	10000467
CHROMIUM, Cr	< 20	UG/L	KRG	200.7/6010	10/13/92	10000283
COPPER, Cu	< 10	UG/L	KRG	200.7/6010	10/13/92	10000283
IRON, Fe	< 40	UG/L	KRG	200.7/6010	10/13/92	10000283
MERCURY, Hg	< 0.2	UG/L	JDR	245.1/7470	10/12/92	10000247
POTASSIUM, K	< 1.0	MG/L	KRG	200.7/6010	10/13/92	10000283
MAGNESIUM, Mg	< 0.5	MG/L	KRG	200.7/6010	10/13/92	10000283
MANGANESE, Mn	< 10	UG/L	[illegible]	200.7/6010	[illegible]	[illegible]
SODIUM, Na	< 0.4	MG/L	KRG	200.7/6010	10/13/92	10000283
NITROGEN, AMMONIA (as N)	< 0.05	MG/L	SRT	350.1	10/13/92	10000262
NICKEL, Ni	< 20	UG/L	KRG	200.7/6010	10/13/92	10000283
NITRATE + NITRITE N	< 0.05	MG/L	MRH	353.2/9200	10/11/92	1000023[illegible]
PHOSPHORUS as P	< 0.020	MG/L	MRH	365.2	10/15/92	10000337
LEAD, Pb	< 2.0	UG/L	RCM	239.2/7421	10/13/92	100002[illegible]

181 S. MAIN ST. • P.O. BOX 436 • MARION, OH 43301-0436
PHONE 614-382-5991 • 1-800-783-5991 • FAX 614-382-1420

Analysis	Result	Units	Analyst	EPA Method No.	Date of Analysis	Run Number
10-92-119208						
PHENOLS, 4-AAP	< 0.010	MG/L	SMO	420.2/9066	10/12/92	10000225
SELENIUM, Se	< 5.0	UG/L	JDR	270.2/7740	10/13/92	10000286
SULFATE	< 1.00	MG/L	SRT	300.0	10/20/92	10000348
RESIDUE, FILTERABLE (DISSOLVED SOLIDS)	< 1	MG/L	MAB	160.1	10/13/92	10000243
TOTAL ORGANIC CARBON (TOC)	1.5	MG/L	MRH	415.2/9060	11/06/92	11000097
TURBIDITY	1.30	NTU	SRT	180.1	10/13/92	10000270
ZINC, Zn	< 10	UG/L	KRG	200.7/6010	10/13/92	10000283

AQUA TECH ENVIRONMENTAL LABORATORIES, INC.

P.O. BOX 76
MELMORE, OHIO 44845
(419) 397-2659

CLIENT: EAGON & ASSOCIATES INC

ADDRESS: ATTN: STEPHEN CHAMPA
6877 N HIGH ST SUITE 302
WORTHINGTON ,OH 43085

PROJECT NO.: CLARK CO

PURCHASE ORDER: CLARK CO

DATE OF INITIAL RECEIPT AT LABORATORY: 10/12/92

COMMENTS:

SAMPLE INVENTORY

ATEL NO.	CLIENT NO.	METHOD(S)
92-16011-MEL	PW-3-3,10-19207	APPENDIX I
92-16012-MEL	BLANK,10-19208	APPENDIX I

COMMENTS:

AUTHORIZED SIGNATURE: Robert J. Slowacky

TITLE: MELMORE LABORATORY MANAGER
DATE RELEASED: OCT. 28 1992

Aqua Tech Environmental Laboratories, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEL Sample No.: 92-16011-MEL
Client Description: PW-3-3,10-19207
Date Received: 10/12/92
Date Extracted:
Date Analyzed: 10/13/92

Method: SW-846; 8240
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.: CLARK CO
Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	<20.0
Acrolein	<20.0
Acrylonitrile	<20.0
Benzene	< 1.0
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	<20.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	< 1.0
Ethyl Methacrylate	< 5.0
2-Hexanone	<10.0
4-Methyl-2-Pentanone	<20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Laboratories, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC	Method: SW-846; 8240
ATEL Sample No.: 92-16012-MEL	Sample Type: WATER
Client Description: BLANK,10-19208	Percent Solids:
Date Received: 10/12/92	Analyst: SPH
Date Extracted:	Project No.: CLARK CO
Date Analyzed: 10/13/92	Appendix I List Volatiles

Compound	Concentration ug/l (ppb)
Acetone	<20.0
Acrolein	<20.0
Acrylonitrile	<20.0
Benzene	< 1.0
Bromoform	< 1.0
Bromomethane	< 1.0
2-Butanone	<10.0
Carbon Disulfide	< 5.0
Carbon Tetrachloride	< 0.5
Chlorobenzene	< 1.0
Chloroethane	< 1.0
2-Chloroethyl Vinyl Ether	< 2.0
Chloroform	< 0.5
Chloromethane	< 1.0
Dichlorobromomethane	< 0.5
Dichlorodifluoromethane	< 1.0
1,1-Dichloroethane	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethene	< 0.5
trans-1,2-Dichloroethene	< 0.5
cis-1,3-Dichloropropene	< 0.5
trans-1,3-Dichloropropene	< 0.5
Ethyl Benzene	< 1.0
Ethyl Methacrylate	< 5.0
2-Hexanone	<10.0
4-Methyl-2-Pentanone	<20.0
Methylene Chloride	< 1.0
Styrene	< 0.5
1,1,2,2-Tetrachloroethane	< 0.5
Toluene	< 1.0
1,1,1-Trichloroethane	< 0.5
1,1,2-Trichloroethane	< 0.5
Trichloroethene	< 0.5
Trichlorofluoromethane	< 1.0
1,2,3-Trichloropropane	< 1.0
Vinyl Acetate	< 5.0
Vinyl Chloride	< 1.0
Total Xylenes	< 2.0

AQUA TECH ENVIRONMENTAL LABORATORIES, INC.

MARION LABORATORY

QUALITY CONTROL REPORT (DUPLICATE AND SPIKE ANALYSES)

November 9, 1992

LAB NUMBER	ANALYSIS	REPORTING LIMIT	RESULT	DUPLICATE RESULT	% DIFFERENCE	AMOUNT OF SPIKE	SPIKED SMPL RESULT	% RECOVERY	UNITS
10-92-119207	ALKALINITY, TOTAL	1.0000	353.8462	353.8462	0.0				MG/L
10-92-119207	NITRATE + NITRITE N	0.0500	0.0021	0.0043	< 5X RL	1.0000	1.0200	102	MG/L
10-92-119207	RESIDUE, FILTERABLE	1.0000	411.0000	419.0000	1.9				MG/L
10-92-119207	TURBIDITY	0.0500	21.0000	21.0000	0.0				NTU
10-92-119207	CADMIUM, Cd, DISSOLV	1.0000	0.1200			4.8000	3.4800	70	UG/L
10-92-119207	CHROMIUM, Cr	10.0000	1.0000			45.0000	46.9000	102	UG/L
10-92-119207	LEAD, Pb, DISSOLVED	2.0000	-0.2000			45.0000	29.5000	66	UG/L
10-92-119207	SELENIUM, Se, DISSOL	5.0000	-2.9000			45.0000	39.6000	94	UG/L
10-92-119207	SILVER, DISSOLVED, A	5.0000	0.3000			24.0000	22.7000	93	UG/L
10-92-119208	CHLORIDE	1.0000	0.0000	0.0000	< 5X RL	10.0000	9.9351	99	MG/L
10-92-119208	SULFATE	1.0000	0.0000	0.0000	< 5X RL	20.0000	20.0927	101	MG/L
10-92-119208	ARSENIC, As	3.0000	0.2300			24.0000	24.1700	100	UG/L
10-92-119208	CADMIUM, Cd	1.0000	0.1000			2.4000	2.3300	93	UG/L
10-92-119208	LEAD, Pb	2.0000	-0.2000			25.0000	20.5000	83	UG/L
10-92-119208	SELENIUM, Se	5.0000	-1.7000			45.0000	47.8000	110	UG/L

Aqua Tech Environmental Consultants, Inc.

Marion Laboratory
P.O. Box 436
181 S. Main Street
Marion, Ohio 43302
614-382-5991 or 800-783-5991
FAX 614-382-1420

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845
419-397-2659 or 419-397-2222
FAX 419-397-2229

Chain of Custody Record

Client Name: EAGON & ASSOC.

Client Number: I0107

Samplers: (print) Stephen J. Champe (signature) [signature]

Station Number	Station Location	Date	Time	Water Comp.	Water Grab	Comp	Grab	Number of Containers	Analysis Required
PW-3-1	Clark Co	10/7/92	1145		X			8	BAT Groundwater parameters including appendix I volatile organic compounds by method 8240. see attached lists
PW-3-2	" "	10/8/92	1045		X			8	
PW-3-3	" " *	10/9/92	1000		X	119207		8	* Analyze sample No. PW-3-3 only until otherwise instructed
	Trip Blank					119208		8	ANALYZE TRIP BLANK PER WES VINS cmr

Relinquished by	Received by	DATE / TIME
(print) Wesley J. Vins (signature) Wesley J. Vins	(print) (signature)	
(print) (signature)	(print) (signature)	
(print) (signature)	(print) (signature)	
(print) (signature)	Received by Mobile Laboratory for Field Analysis: (print) (signature)	

Dispatched by	DATE / TIME	Received for Laboratory by	DATE / TIME
Stephen J. Champe	10/9/92 p.m.	(print) Chris Gibson (signature) Chris Gibson	10-9-92 1:33

Method of shipment: Hand carried to Aquatech-Marion

Distribution:
White - Laboratory (include with reports)
Yellow - Laboratory (file copy)
Pink - Sample custodian
Gold - Field sampling records

Form ATEC-65
Revised 2 15 90

UNIVERSITY OF
Miami

November 25, 1992

TRITIUM LABORATORY

Data Release #92-74
Job # 437

EAGON & ASSOCIATES
TRITIUM SAMPLES

H. Gote Ostlund
Head, Tritium Laboratory

Distribution:
Herbert B. Eagon, Jr.
Eagon & Associates, Inc.
6877 N. High Street, Suite 302
Worthington, Ohio 43085

Rosenstiel School of Marine and Atmospheric Science
Tritium Laboratory
4600 Rickenbacker Causeway
Miami, Florida 33149-1098
(305) 361-4100

Revised October 9, 1992

GENERAL COMMENTS ON TRITIUM RESULTS

Tritium Scales

The tritium concentrations are expressed in TU, where 1 TU indicates a T/H ratio of 10^{-18}. The values refer to the old, internationally-adopted scale of U.S. National Bureau of Standards (NBS), which is based on their tritium water standard #4926 as measured on 1961/09/03, and age-corrected with the old half-life of 12.26 years, i.e., $\lambda = 5.65\%$ year^{-1}. In this scale, 1 TU is 7.186 dpm/kg H_2O, or 3.237 pCi/kg H_2O. TU values are calculated for date of sample collection, REFDATE in the table, as provided by the submitter. If no such date is available, date of arrival of sample at our laboratory is used. The stated errors, eTU are one standard deviation (1 sigma) including all conceivable contributions.

In the table, QUANT is quantity of sample received, and ELYS is the amount of water taken for electrolytic enrichment. DIR means direct run (no enrichment).

It has been found lately that a better value for the half-life is 12.43 years, i.e., $\lambda = 5.576\%$ year^{-1}. This will cause a change in the TU scale, which is still based on the same NBS standard (#4926) as of the same date, 1961/09/03 (Ref below) In the new scale, 1 TU(new) is 7.088 dpm/kg H_2O, 3.193 pCi/kg H_2O. To convert from the current, old, scale to the new scale at any given point in time, multiply the listed TU(old)-values by f, where

$$f = 1.0368 + (\text{year}-1990) \times 0.0008$$

i.e. for 1992 the factor is 1.0384. The formula is correct within 0.02% between 1962 and 1999.

Very low tritium values

In some cases, negative TU values are listed. Such numbers can occur because the net tritium count rate is, in principle the difference between the count rate of the sample and that of a tritium-free sample (background count or blank sample). Given a set of "unknown" samples with no tritium, the distribution of net results should become symmetrical around 0 TU. The negative values are reported as such for the benefit of allowing the user unbiased statistical treatment of sets of the data. For other applications, 0 TU should be used.

Reliability of results

Refer to Services Rendered (Tritium), Section II.8, in the Tritium Laboratory Price Schedule, Procedures and Standards, Advice on Sampling.

References

Mann, W.B., M.P. Unterweger, and B.M. Coursey, Comments on the NBS tritiated-water standards and their use, *Int. J. Appl. Radiat. Isot.*, 33, 383-386, 1982.

Taylor, C.B., and W. Roether, A uniform scale for reporting low-level tritium measurements in water, *Int. J. Appl. Radiat. Isot.*, 33, 377-382, 1982.

Client: EAGON & ASSOCIATES, INC.
Recvd : 92/10/01
Job# : 437
Final : 92/11/24

Purchase Order: CHECK
Contact: F. Majchszak, H. Eagon, Jr.
6877 High Street, Suite 302
Worthington, OH 43085 614/888-5760

Cust LABEL INFO	JOB.SX	REFDATE	QUANT	ELYS	TU	eTU
EAGON-90-9DD	437.01	920923	1000	246	1.26	0.12
EAGON-92-4X	437.02	920924	1000	250 *	0.33	0.09
EAGON-91-9Z	437.03	920923	1000	168 *	26.5	0.9
EAGON-92-27DD	437.04	920°23	1000	275	1.00	0.09
EAGON-D-90-10X	437.05	920923	1000	250 *	0.35	0.09

* Average of duplicate runs

AQUA TECH ENVIRONMENTAL LABORATORIES, INC.

P.O. BOX 76
MELMORE, OHIO 44845
(419) 397-2659

CLIENT: EAGON & ASSOCIATES INC

ADDRESS: ATTN: STEPHEN J CHAMPA
100 OLD WILSON BRIDGE RD
WORTHINGTON ,OH 43085

PROJECT NO.: CLARK CO

PURCHASE ORDER: CLARK CO

DATE OF INITIAL RECEIPT AT LABORATORY: 03/11/93

COMMENTS:

SAMPLE INVENTORY

ATEL NO.	CLIENT NO.	METHOD(S)
93-04004-MEL	C91-5D CLARK CO	SW-846; 8240
93-04005-MEL	C92-5DD PROPOSED LANDFILL	SW-846; 8240
93-04006-MEL	BLANK	SW-846; 8240

COMMENTS:

AUTHORIZED SIGNATURE: Robert S. Hlavacky

DATE RELEASED: MAR. 15 1993

Aqua Tech Environmental Laboratories, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEL Sample No.: 93-04004-MEL
Client Description: C91-5D CLARK CO
Date Received: 03/11/93
Date Extracted:
Date Analyzed: 03/11/93

Method: SW-846;8240
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.: CLARK CO

Compound	Concentration ug/l (ppb)
Benzene	< 1.0
Ethyl Benzene	< 1.0
Toluene	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Laboratories, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEL Sample No.: 93-04005-MEL
Client Description: C92-5DD PROPOSED LAN
Date Received: 03/11/93
Date Extracted:
Date Analyzed: 03/11/93

Method: SW-846;8240
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.: CLARK CO

Compound	Concentration ug/l (ppb)
Benzene	< 1.0
Ethyl Benzene	< 1.0
Toluene	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Laboratories, Inc.

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845

Telephone: (419) 397-2659

Client: EAGON & ASSOCIATES INC
ATEL Sample No.: 93-04006-MEL
Client Description: BLANK
Date Received: 03/11/93
Date Extracted:
Date Analyzed: 03/11/93

Method: SW-846;8240
Sample Type: WATER
Percent Solids:
Analyst: SPH
Project No.: CLARK CO

Compound	Concentration ug/l (ppb)
Benzene	< 1.0
Ethyl Benzene	< 1.0
Toluene	< 1.0
Total Xylenes	< 2.0

Aqua Tech Environmental Consultants, Inc.

Marion Laboratory
P.O. Box 436
181 S. Main Street
Marion, Ohio 43302
614-382-5991 or 800-783-5991
FAX 614-382-1420

Melmore Laboratory
P.O. Box 76
Melmore, Ohio 44845
419-397-2659 or 419-397-2222
FAX 419-397-2229

Chain of Custody Record

Client Name: Eagon & Assoc.
Client Number: I0107

Samplers: (print) Stephen J. Champa (signature) [signature]

Station Number	Station Location	Date	Time	Water Comp.	Water Grab	Comp.	Grab	Number of Containers	Analysis Required
C91-5D	Clarkco	3/10/93	1220		X			3	BTEX by
C92-5DD	Proposed Landfill	3/10/93	1110		X			3	method 8240
									Detection Limits:
									Benzene <1.0 ug/l
									Ethyl Benzene <1.0 ug/l
									Toluene <1.0 ug/l
									Total Xylenes <2.0 ug/l

Relinquished by	Received by	DATE / TIME
(print) (signature)	(print) (signature)	
(print) (signature)	(print) (signature)	
(print) (signature)	(print) (signature)	
(print) (signature)	Received by Mobile Laboratory for Field Analysis (print) (signature)	

Dispatched by	DATE / TIME	Received for Laboratory by	DATE / TIME
Stephen J. Champa	3/10/93 p.m.	(print) (signature) Cheryl Myers	3/11/93 17:30

Method of shipment: UPS Next Day

Distribution:
White - Laboratory (include with reports)
Yellow - Laboratory (file copy)
Pink - Sample custodian
Gold - Field sampling records

Form ATEC-65
Revised 2 15 90

AQUA TECH
ENVIRONMENTAL CONSULTANTS, INC

P.O. Box 76, Melmore, Ohio 44845, 419-397-2659 or 397-2222
P.O. Box 436, 181 South Main Street, Marion, Ohio 43302, 614-382-5991
936 North Horner Blvd., Sanford, North Carolina 27330

LABORATORY ANALYSIS REPORT

DATE REC'D.	12-26-1990	LAB NO.	10-22179-90
DATE REP'D.	01-10-1991 P.O. # TREMONT	CLIENT NO.	I0107
SAMPLE LOCATION	TREMONT RIGS B-61 (AUGUSTINE)	DATE SAMPLED	12-14-1990
SAMPLED BY	FRANK L. MAJCHSZAK	TIME SAMPLED	09:45

EAGON & ASSOCIATES INC
6877 N HIGH
SUITE 302
WORTHINGTON OH 43085

COMMENTS:

STORET	ANALYSIS	RESULTS	UNITS	DATE OF ANALYSIS
00410	ALKALINITY, TOTAL, CACO3	431	MG/L	01-02-1991
01002	ARSENIC, TOTAL, AS	9	UG/L	12-31-1990
01007	BARIUM, TOTAL, BA	260	UG/L	01-04-1991
01027	CADMIUM, TOTAL, CD	<1	UG/L	01-09-1991
00916	CALCIUM, TOTAL, CA	64	MG/L	01-04-1991
00940	CHLORIDE, CL	10	MG/L	01-02-1991
01034	CHROMIUM, TOTAL, CR	<20	UG/L	01-04-1991
00340	COD	34	MG/L	12-31-1990
00195	CONDUCTIVITY, LAB	590	UMHO	12-28-1990
01042	COPPER, TOTAL, CU	50	UG/L	01-04-1991
00720	CYANIDE, TOTAL, CN	0.038	MG/L	12-31-1990
00950	FLUORIDE, DISS, F	1.09	MG/L	12-31-1990
01045	IRON, TOTAL, FE	1100	UG/L	01-04-1991
01051	LEAD, TOTAL, PB	<2.0	UG/L	12-31-1990
00927	MAGNESIUM, TOTAL, MG	28	MG/L	01-04-1991
01055	MANGANESE, TOTAL, MN	15	UG/L	01-04-1991
71900	MERCURY, TOTAL, HG	0.2	UG/L	12-28-1990
01067	NICKEL, TOTAL, NI	<30	UG/L	01-04-1991
00620	NITRATE N	<0.05	MG/L	01-02-1991
00615	NITRITE N	<0.05	MG/L	12-28-1990
00610	NITROGEN, AMMONIA, N	<0.05	MG/L	01-04-1991
32730	PHENOLS, 4-AAP	0.028	MG/L	01-03-1991
00665	PHOSPHORUS, TOTAL, P	<0.04	MG/L	01-03-1991
00403	PH, LAB	7.5	S.U.	12-31-1990
00937	POTASSIUM, TOTAL, K	2.3	MG/L	01-04-1991
00515	RESIDUE, T. FLT. (DISS)	344	MG/L	01-02-1991
01147	SELENIUM, TOTAL, SE	<3	UG/L	12-31-1990
01077	SILVER, TOTAL, AG	<10	UG/L	01-04-1991
00929	SODIUM, TOTAL, NA	13	MG/L	01-04-1991
00945	SULFATE, SO4	10	MG/L	01-03-1991
00680	CARBON, TOTAL ORGANIC, C	11	MG/L	01-04-1991
00076	TURBIDITY, NTU	5.5	NTU	12-28-1990

LABORATORY CERTIFICATION # 4053

SIGNED Jeffrey A. Smith

COPY DISTRIBUTION: WHITE - CLIENT YELLOW - FILE

AQUA TECH
ENVIRONMENTAL CONSULTANTS, INC

ENVIRONMENTAL CONSULTANTS INC P.O. Box 76, Melmore, Ohio 44845, 419-397-2659 or 397-2222
P.O. Box 436, 181 South Main Street, Marion, Ohio 43302, 614-382-5991
936 North Horner Blvd., Sanford, North Carolina 27330

LABORATORY ANALYSIS REPORT

DATE REC'D.
DATE REP'D.
P.O. #
LAB NO.
CLIENT NO.

SAMPLE LOCATION
SAMPLED BY
DATE SAMPLED
TIME SAMPLED

COMMENTS:

[illegible]	ANALYSIS	RESULT	UNITS	DATE OF ANAL[illegible]
	CONTINUED REPORT 10-22179-90			
01092	ZINC, TOTAL, ZN	20	UG/L	01-04-1991

LABORATORY CERTIFICATION # 4053

SIGNED [signature]

COPY DISTRIBUTION: WHITE - CLIENT YELLOW - FILE

AQUA TECH ENVIRONMENTAL CONSULTANTS INC.
RESULT SHEET

Customer Name: Eagon & Associates Project No.: Tremont Rigs
Volatile Organic Compounds (VOC's)
51 & 8 List by Method 524.2
Date Received: 12/27/90

Atec Sample No.	20628
Client Identification	B-61
Date Collected	12/14/90
Time Collected	09:45
Collector	Frank Majchszak
Analyst	REB
Date Analyzed	12/27/90

Regulated VOC's:

Benzene	< 0.5
Carbon Tetrachloride	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethylene	< 0.5
1,1,1-Trichloroethane	< 0.5
Trichloroethylene	< 0.5
Vinyl Chloride	< 0.5
p-Dichlorobenzene	< 1.0

Unregulated VOC's:

		1,3-Dichloropropane	< 1.0
Bromoform	< 1.0	Styrene	< 1.0
Monochlorobenzene	< 1.0	Chloromethane	< 1.0
Dibromochloromethane	< 0.5	Bromomethane	< 1.0
Chloroethane	< 1.0	Bromochloromethane	< 0.5
Chloroform	< 0.5	1,2,3-Trichloropropane	< 2.0
Bromodichloromethane	< 0.5	1,2,3-Trichlorobenzene	< 3.0
Dichlorodifluoromethane	< 1.0	n-Propylbenzene	< 1.0
1,1-Dichloroethane	< 0.5	1,1,1,2-Tetrachloroethane	< 0.5
1,2-Dichloropropane	< 0.5	Tetrachloroethylene	< 0.5
Ethyl Benzene	< 1.0	1,3-Dichloropropene	< 1.0
1,1,2,2-Tetrachloroethane	< 1.0	2,2-Dichloropropane	< 1.0
Toluene	< 0.5	1,2,4-Trimethylbenzene	< 2.0
trans-1,2-Dichloroethylene	< 0.5	n-Butylbenzene	< 1.0
1,1,2-Trichloroethane	< 0.5	Naphthalene	< 2.0
Trichlorofluoromethane	< 1.0	Hexachlorobutadiene	< 2.0
m-Dichlorobenzene	< 1.0	o-Chlorotoluene	< 1.0
Dichloromethane	< 1.0	p-Chlorotoluene	< 1.0
cis-1,2-Dichloroethylene	< 0.5	1,3,5-Trimethylbenzene	< 2.0
o-Dichlorobenzene	< 1.0	p-Isopropyltoluene	< 1.0
1,2,4-Trichlorobenzene	< 3.0	1,1-Dichloropropene	< 1.0
Dibromomethane	< 1.0	iso-Propylbenzene	< 1.0
1,2-Dibromoethane (EDB)	< 0.1	tert-Butylbenzene	< 2.0
1,2-Dibromo-3-Chloropropane	< 0.1	sec-Butylbenzene	< 2.0
p-Xylene	< 1.0	Bromobenzene	< 1.0
o-Xylene	< 1.0	m-Xylene	< 1.0

All results are reported as ug/l (PPB).

AQUA TECH
ENVIRONMENTAL CONSULTANTS INC

P.O. Box 76, Melmore, Ohio 44845, 419-397-2659 or 397-2222
P.O. Box 436, 181 South Main Street, Marion, Ohio 43302, 614-382-5991
936 North Horner Blvd., Sanford, North Carolina 27330

LABORATORY ANALYSIS REPORT

DATE REC'D. 12-26-1990
DATE REP'D. 01-08-1991 P.O. # TREMONT
LAB NO. 10-22180-90
CLIENT NO. I0107

SAMPLE LOCATION TREMONT RIGS IR (SPROWLS)
SAMPLED BY FRANK L MAJCHSZAK
DATE SAMPLED 12-14-1990
TIME SAMPLED 17:45

EAGON & ASSOCIATES INC
6877 N HIGH
SUITE 302
WORTHINGTON OH 43085

COMMENTS:

STORET	ANALYSIS	RESULT	UNITS	DATE OF ANALYSIS
00410	ALKALINITY, TOTAL, CACO3	466	MG/L	01-02-1991
01002	ARSENIC, TOTAL, AS	13	UG/L	01-03-1991
01007	BARIUM, TOTAL, BA	490	UG/L	01-03-1991
01027	CADMIUM, TOTAL, CD	<1	UG/L	01-03-1991
00916	CALCIUM, TOTAL, CA	93	MG/L	01-03-1991
00940	CHLORIDE, CL	19	MG/L	01-02-1991
01034	CHROMIUM, TOTAL, CR	<10	UG/L	01-03-1991
00340	COD	<20	MG/L	12-31-1990
00195	CONDUCTIVITY, LAB	630	UMHO	12-28-1990
01042	COPPER, TOTAL, CU	<10	UG/L	01-03-1991
00720	CYANIDE, TOTAL, CN	0.013	MG/L	12-31-1990
00950	FLUORIDE, DISS, F	1.12	MG/L	12-31-1990
01045	IRON, TOTAL, FE	770	UG/L	01-03-1991
01051	LEAD, TOTAL, PB	<4.0	UG/L	01-03-1991
00927	MAGNESIUM, TOTAL, MG	40	MG/L	01-03-1991
01055	MANGANESE, TOTAL, MN	43	UG/L	01-03-1991
71900	MERCURY, TOTAL, HG	0.2	UG/L	12-28-1990
01067	NICKEL, TOTAL, NI	<30	UG/L	01-03-1991
00620	NITRATE N	<0.05	MG/L	01-02-1991
00615	NITRITE N	<0.05	MG/L	12-28-1990
00610	NITROGEN, AMMONIA, N	0.23	MG/L	01-04-1991
32730	PHENOLS, 4-AAP	<0.010	MG/L	01-03-1991
00665	PHOSPHORUS, TOTAL, P	<0.04	MG/L	01-03-1991
00403	PH, LAB	7.8	S.U.	12-31-1990
00937	POTASSIUM, TOTAL, K	2.5	MG/L	01-03-1991
00515	RESIDUE, T. FLT. (DISS)	368	MG/L	01-02-1991
01147	SELENIUM, TOTAL, SE	<5	UG/L	01-03-1991
01077	SILVER, TOTAL, AG	<10	UG/L	01-03-1991
00929	SODIUM, TOTAL, NA	13	MG/L	01-03-1991
00945	SULFATE, SO4	10	MG/L	01-03-1991
00680	CARBON, TOTAL ORGANIC, C	0.7	MG/L	01-04-1991
00076	TURBIDITY, NTU	0.77	NTU	12-28-1990

LABORATORY CERTIFICATION # 4053

SIGNED [illegible signature]

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AQUA TECH
ENVIRONMENTAL CONSULTANTS INC
P.O. Box 76, Melmore, Ohio 44845, 419-397-2659 or 397-2222
P.O. Box 436, 181 South Main Street, Marion, Ohio 43302, 614-382-5991
936 North Horner Blvd., Sanford, North Carolina 27330

LABORATORY ANALYSIS REPORT

DATE REC'D.
DATE REP'D.
P.O. #
LAB NO.
CLIENT NO.

SAMPLE LOCATION
SAMPLED BY
DATE SAMPLED
TIME SAMPLED

COMMENTS:

STORET	ANALYSIS	RESULT	UNITS	DATE OF ANALYSIS
	CONTINUED REPORT 10-22180-90			
01092	ZINC, TOTAL, ZN	<10	UG/L	01-03-1991

LABORATORY CERTIFICATION # 4053

SIGNED

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AQUA TECH ENVIRONMENTAL CONSULTANTS INC.
RESULT SHEET

Customer Name: Eagon & Associates Project No.: Tremont Rigs
Volatile Organic Compounds (VOC's)
51 & 8 List by Method 524.2
Date Received: 12/27/90

Atec Sample No.	20629
Client Identification	IR
Date Collected	12/14/90
Time Collected	17:45
Collector	Frank Majchszak
Analyst	REB
Date Analyzed	12/27/90

Regulated VOC's:

Benzene	< 0.5
Carbon Tetrachloride	< 0.5
1,2-Dichloroethane	< 0.5
1,1-Dichloroethylene	< 0.5
1,1,1-Trichloroethane	< 0.5
Trichloroethylene	< 0.5
Vinyl Chloride	< 0.5
p-Dichlorobenzene	< 1.0

Unregulated VOC's:

		1,3-Dichloropropane	< 1.0
Bromoform	< 1.0	Styrene	< 1.0
Monochlorobenzene	< 1.0	Chloromethane	< 1.0
Dibromochloromethane	< 0.5	Bromomethane	< 1.0
Chloroethane	< 1.0	Bromochloromethane	< 0.5
Chloroform	< 0.5	1,2,3-Trichloropropane	< 2.0
Bromodichloromethane	< 0.5	1,2,3-Trichlorobenzene	< 3.0
Dichlorodifluoromethane	< 1.0	n-Propylbenzene	< 1.0
1,1-Dichloroethane	< 0.5	1,1,1,2-Tetrachloroethane	< 0.5
1,2-Dichloropropane	< 0.5	Tetrachloroethylene	< 0.5
Ethyl Benzene	< 1.0	1,3-Dichloropropene	< 1.0
1,1,2,2-Tetrachloroethane	< 1.0	2,2-Dichloropropane	< 1.0
Toluene	< 0.5	1,2,4-Trimethylbenzene	< 2.0
trans-1,2-Dichloroethylene	< 0.5	n-Butylbenzene	< 1.0
1,1,2-Trichloroethane	< 0.5	Naphthalene	< 2.0
Trichlorofluoromethane	< 1.0	Hexachlorobutadiene	< 2.0
m-Dichlorobenzene	< 1.0	o-Chlorotoluene	< 1.0
Dichloromethane	< 1.0	p-Chlorotoluene	< 1.0
cis-1,2-Dichloroethylene	< 0.5	1,3,5-Trimethylbenzene	< 2.0
o-Dichlorobenzene	< 1.0	p-Isopropyltoluene	< 1.0
1,2,4-Trichlorobenzene	< 3.0	1,1-Dichloropropene	< 1.0
Dibromomethane	< 1.0	iso-Propylbenzene	< 1.0
1,2-Dibromoethane (EDB)	< 0.1	tert-Butylbenzene	< 2.0
1,2-Dibromo-3-Chloropropane	< 0.1	sec-Butylbenzene	< 2.0
p-Xylene	< 1.0	Bromobenzene	< 1.0
o-Xylene	< 1.0	m-Xylene	< 1.0

All results are reported as ug/l (PPB).

AQUA TECH ENVIRONMENTAL CONSULTANTS, INC.
QUALITY CONTROL DATA
FOR
LABNUMBERS 22179-90 TO 22180-90

LAB NO.	STORET	ANALYSIS	RSLT #1	RSLT #2	SPIKE	SPIKE RSLT	% R	UNITS
22180-90	01002	ARSENIC, TOTAL,	0.0133	0.0130				MG/L
22180-90	00916	CALCIUM, TOTAL,	9.32	--	20.00	30.48	106	MG/L
22180-90	00927	MAGNESIUM, TOTA	4.00	--	20.00	25.79	109	MG/L
22180-90	00937	POTASSIUM, TOTA	2.49	--	10.00	12.14	97	MG/L
22180-90	01077	SILVER, TOTAL,	0	--	1000	930	93	UG/L
22180-90	00929	SODIUM, TOTAL,	13.47	--	20.00	33.11	98	MG/L
22179-90	01077	SILVER, TOTAL,	0.00	--	1000	955	96	UG/L