



THE MEMPHIS DEPOT TENNESSEE

ADMINISTRATIVE RECORD COVER SHEET

AR File Number 889
Part II of III

Attachments

Attachment A

Table A-1
Venting Well and Monitoring Point Construction Details
Rev 0 SVE Treatment Study Memphis Depot, Darzi Field

Identification	ID	Related to Main Installation (MI) or Dunn Field (DF)	Onsite or Offsite	Northing	Eastings	Boring Type	Ground Elevation	Length of Screen	Depth to Top of Screen	Depth to Bottom of Screen	Elevation of Top of Screen	Elevation of Bottom of Screen	Depth of Boring (ft bgs)	Elevation of Bottom of Boring (ft)
VW-1	SBLCA SB2 (VW-1)	DF	On	280996.43	802153.34	SB/VW	301.20	15.00	9.00	24.00	292.20	277.20	93.0	208.2
VW-2	SBLCA SB2 (VW-2)	DF	On	280996.43	802153.34	SB/VW	301.20	40.00	32.00	72.00	289.20	229.20		
MP-1	SBLCA SB1 (MP-1)	DF	On	280925.92	802202.04	SB/MP	299.80	0.50	21.50	22.00	278.30	278.80	90.0	209.8
									34.50	35.00	265.30	265.80		
									57.50	58.00	242.30	242.80		
MP-2	SBLCA SB3 (MP-2)	DF	On	281010.26	802098.19	SB/MP	301.00	0.50	70.00	70.50	229.80	230.30		
									21.50	22.00	279.50	280.00	88.0	213.0
									34.50	35.00	266.50	267.00		
									57.50	58.00	243.50	244.00		
MP-3	SBLCA SB5 (MP-3)	DF	On	281029.52	802175.45	SB/MP	301.20	0.50	10.50	11.00	290.70	291.20	90.0	211.2
									26.50	27.00	274.70	275.20		
									48.50	49.00	252.70	253.20		
MP-4	SBLCA SB8 (MP-4)	DF	On	280957.77	802115.90	SB/MP	300.80	0.50	67.00	67.50	234.20	234.70		
									18.50	19.00	312.30	312.80	87.0	213.8
									47.5	48.0	253.3	253.8		
									57.5	58	243.3	243.8		
MP-5	MP-5	DF	On	?	?	SB/MP	300.80	1.0	69.5	70	231.3	231.8		
									9.50	10.50	291.30	290.30	21.0	279.8
									19.5	20.5	281.30	280.30		
MP-6	MP-6	DF	On	?	?	SB/MP	300.80	1.0	9.50	10.50	291.30	290.30	72.0	228.8
									19.5	20.5	281.30	280.30		
									49.5	50.5	251.30	250.30		
MP-7	MP-7	DF	On	?	?	SB/MP	300.80	1.0	69.5	70.5	231.30	230.30		
									4.50	5.50	296.30	295.30	87.0	213.8
									14.5	15.5	286.30	285.30		
									39.5	40.5	261.30	260.30		
MP-8	MP-8	DF	On	?	?	SB/MP	300.80	1.0	59.5	60.5	241.30	240.30		
									14.50	15.50	286.30	285.30	52.0	246.8
									49.5	50.5	251.3	250.30		

VW= Venting Well
MP= Monitoring Point
SB= Soil Boring
ft bgs = feet below ground surface



PROJECT NUMBER 160492.TS.04	WELL NUMBER MP-5	SHEET 1 OF 1
MONITORING POINT COMPLETION DIAGRAM		

PROJECT : Dunn Field Monitoring Point Installation

LOCATION : Memphis, Tennessee

DRILLING CONTRACTOR : Tri-State Drilling Services

DRILLING METHOD AND EQUIPMENT USED

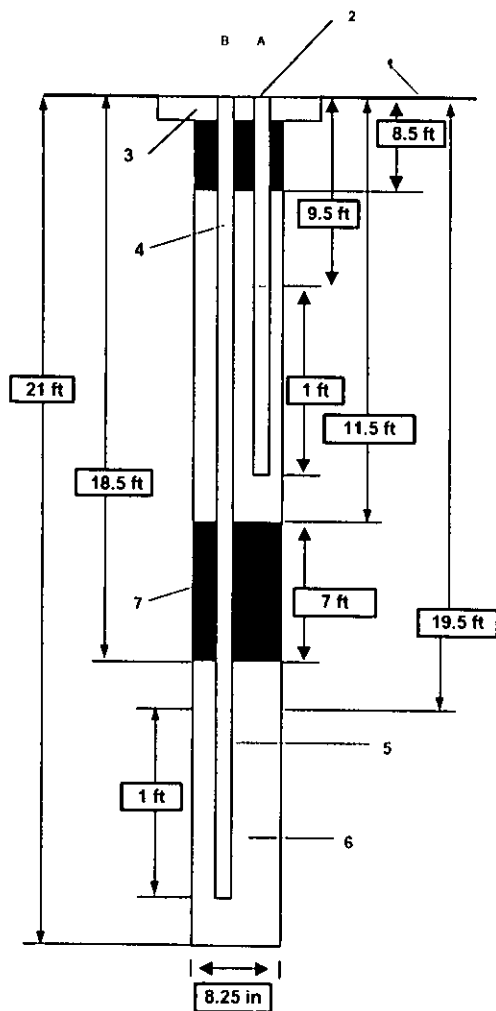
Hollow Stem Auger 4.25 inch ID

WATER LEVELS : None

START : 11/12/01

END : 11/12/01

LOGGER : Bryan Burkinstock



1- Ground elevation at well	None	feet MSL
2- Top of casing elevation	None	feet MSL
3- a) concrete pad dimensions	3ft x 3 ft	
4- Diameter/type of well casing	0.5-inch PVC	
5- Type/slot size of screen	0.010 slot PVC	
6- Type screen filter	#2 filter sand	
a) Quantity used	bags	
7- Type of seal	Bentonite Chips	
a) Quantity used	bags	

Notes

Monitoring Point A:

Screen length = 1 feet
 Depth to top of screen 9.5 ft bgs
 Depth to bottom of screen 10.5 ft bgs

Monitoring Point B:

Screen length = 1 feet
 Depth to top of screen 19.5 ft bgs
 Depth to bottom of screen 20.5 ft bgs

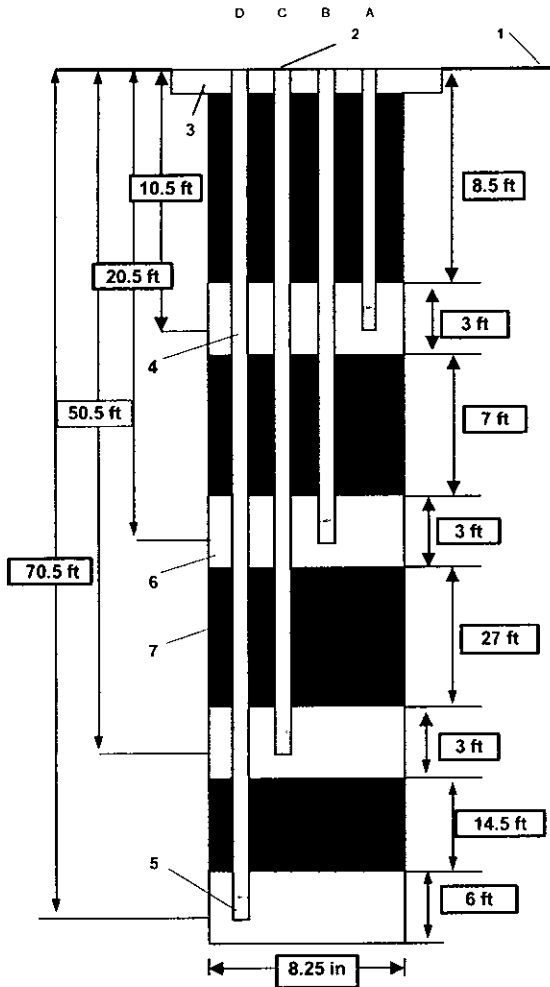
NOTE: Diagram is not to scale

889 451



PROJECT NUMBER 160492.TS.04	WELL NUMBER MP-6	SHEET 1 OF 1
MONITORING POINT COMPLETION DIAGRAM		

PROJECT	Dunn Field Monitoring Point Installation	LOCATION	Memphis, Tennessee
DRILLING CONTRACTOR	Tri-State Drilling Services		
DRILLING METHOD AND EQUIPMENT USED	Hollow Stem Auger 4 25 inch ID		
WATER LEVELS	None	START	11/12/01
		END	11/12/01
		LOGGER	Bryan Burkinstock



NOTE. Diagram is not to scale

1- Ground elevation at well	None	feet MSL
2- Top of casing elevation	None	feet MSL
3- a) concrete pad dimensions	3 ft x 3 ft	
4- Diameter/type of well casing	0.5-inch PVC	
5- Type/slot size of screen	0.010 slot PVC	
6- Type screen filter	#2 filter sand	
a) Quantity used	bags	
7- Type of seal	Bentonite Chips	
a) Quantity used	bags	

Notes

Monitoring Point A

Screen length = 1 feet
Depth to top of screen: 9.5 ft bgs
Depth to bottom of screen: 10.5 ft bgs

Monitoring Point B

Screen length = 1 feet
Depth to top of screen: 19.5 ft bgs
Depth to bottom of screen: 20.5 ft bgs

Monitoring Point C

Screen length = 1 feet
Depth to top of screen: 49.5 ft bgs
Depth to bottom of screen: 50.5 ft bgs

Monitoring Point D

Screen length = 1 feet
Depth to top of screen: 69.5 ft bgs
Depth to bottom of screen: 70.5 ft bgs



PROJECT NUMBER 160492.TS.04	WELL NUMBER MP-7	SHEET 1 OF 1
MONITORING POINT COMPLETION DIAGRAM		

PROJECT : Dunn Field Monitoring Point Installation

LOCATION : Memphis, Tennessee

DRILLING CONTRACTOR : Tri-State Drilling Services

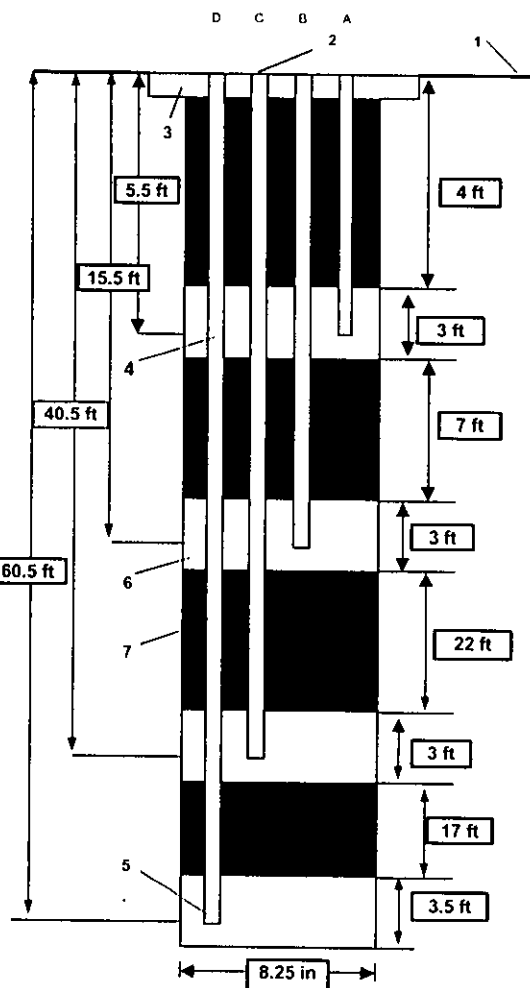
DRILLING METHOD AND EQUIPMENT USED : Hollow Stem Auger 4 25 inch ID

WATER LEVELS : None

START 11/13/01

END : 11/13/01

LOGGER : Bryan Burkingstock



NOTE: Diagram is not to scale

1- Ground elevation at well	None feet MSL
2- Top of casing elevation	None feet MSL
3- a) concrete pad dimensions	3 ft x 3 ft
4- Diameter/type of well casing	0.5-inch PVC
5- Type/slot size of screen	0.010 slot PVC
6- Type screen filter	#2 filter sand
a) Quantity used	bags
7- Type of seal	Bentonite Chips
a) Quantity used	bags

Notes

Monitoring Point A

Screen length = 1 foot
 Depth to top of screen 4.5 ft bgs
 Depth to bottom of screen 5.5 ft bgs

Monitoring Point B

Screen length = 1 foot
 Depth to top of screen 14.5 ft bgs
 Depth to bottom of screen 15.5 ft bgs

Monitoring Point C

Screen length = 1 foot
 Depth to top of screen 39.5 ft bgs
 Depth to bottom of screen 40.5 ft bgs

Monitoring Point D

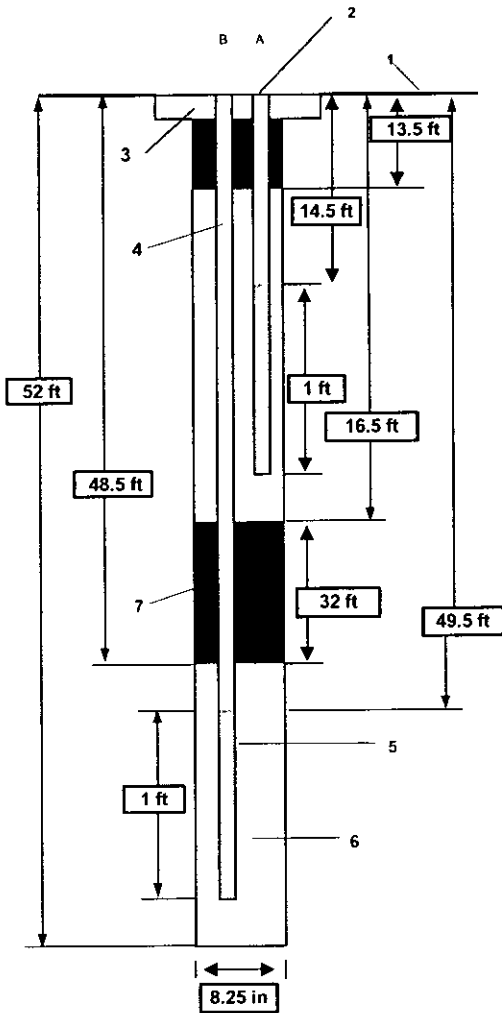
Screen length = 1 foot
 Depth to top of screen 59.5 ft bgs
 Depth to bottom of screen 60.5 ft bgs

889 453



PROJECT NUMBER 160492.TS.04	WELL NUMBER MP-8	SHEET 1 OF 1
MONITORING POINT COMPLETION DIAGRAM		

PROJECT	Dunn Field Monitoring Point Installation	LOCATION	Memphis, Tennessee
DRILLING CONTRACTOR	Tri-State Drilling Services		
DRILLING METHOD AND EQUIPMENT USED	Hollow Stem Auger 4 25 inch ID		
WATER LEVELS	None	START : 11/13/01	END 11/13/01
		LOGGER	Bryan Burkinstock



NOTE: Diagram is not to scale

1- Ground elevation at well	None	feet MSL
2- Top of casing elevation	None	feet MSL
3- a) concrete pad dimensions	3ft x 3 ft	
4- Diameter/type of well casing	0 5-inch PVC	
5- Type/slot size of screen	0 010 slot PVC	
6- Type screen filter	#2 filter sand	
a) Quantity used	bags	
7- Type of seal	Bentonite Chips	
a) Quantity used	bags	

Notes:

Monitoring Point A:

Screen length = 1 feet
 Depth to top of screen: 14 5 ft bgs
 Depth to bottom of screen: 15 5 ft bgs

Monitoring Point B:

Screen length = 1 feet
 Depth to top of screen: 49 5 ft bgs
 Depth to bottom of screen: 50 5 ft bgs

Attachment B

A Jacobs Company

TO: CH2M HillDATE: 4/25/02

ATTN: David Nelson

JOB NO. DO #10 - Mobile PRAC

PROJECT: SVE Pilot Study at Dunn Field

THE FOLLOWING IS TRANSMITTED

- ☒ Herewith
☐ Under Separate Cover
☐ For Your Use or Distribution
☐ For Review and Comments
☐ For Correction and Resubmittal

QUANTITY 1

DESCRIPTION

Law-Gibb Geotechnical Test Results.

THIS TRANSMITTAL IS PER

- ☒ Federal Express
☐ Your Letter
☐ Your Telegram
☐ Your Telephone Request

REMARKS: Enclosed is a hard copy of the geotechnical analytical results from the soil samples collected during the installation of the additional monitoring points needed as part of the SVE Pilot Study. I am happy to hear the results are acceptable even though there was a substantial delay in obtaining them.

JACOBS ENGINEERING GROUP INC.

BY: Margel W. Jansen

c:

889 456



LAW

RESOURCES CREATING SOLUTIONS

April 10, 2002

Jacobs Engineering Group Inc.
13723 Riverport Drive
Maryland Heights, MO 83043

Attention: Mr. Virgil Jansen

Subject: Transmittal of Test Results: Memphis Depot
Geotechnical Testing Services
Law Engineering & Environmental Services Job Number 50160-2-0113

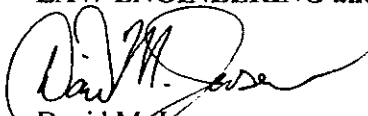
Dear Mr. Jansen:

Law Engineering and Environmental Services, Inc. has completed the assigned laboratory tests for the samples you had delivered to our office. We are transmitting to you the tabular summary for the samples tested. These are the final results, thus, we have enclosed two copies of the following test results for your distribution:

Hydraulic Conductivity (ASTM D 5084) (including unit weight)
Organic Content (ASTM 2974-87(95))
Specific Gravity (ASTM D 854-92)

If you have any questions pertaining to these test results or require additional information, please do not hesitate to call us at (404) 817-0257.

Sincerely,
LAW ENGINEERING and ENVIRONMENTAL SERVICES, INC.



David M. Jensen
Project Professional II



ORGANIC CONTENT

(ASTM D2974-87) (1995)

Project No. 50160-2-0113Tested By JMTest Date 3/28/02Project Name Memphis DepotReviewed By BenReview Date 4/9/02

Boring No.	MP-5	MP-5	MP-6	MP-6
Sample No.	Ud	Ud	Ud	Ud
Sample Depth	4-6 Ft.	14-16 Ft.	9-11 Ft.	49-51 Ft.
A) Tare No.	R-14	R-33	V-69	R-6
B) Tare Weight, grams	16.03	16.44	16.42	16.76
C) Wet Soil + Tare, grams	129.7	152.5	146.98	143.88
D) Dry Soil + Tare, grams	105.52	128.64	122.11	138.37
E) Weight of Dry Soil, grams [D - B]	89.49	112.2	105.69	121.61
F) Weight of Moisture, grams [C - D]	24.18	23.86	24.87	5.51
G) Moisture Content, % $[F * 100 / E]$ (based on over-dried weight)	27.02	21.27	23.53	4.53
H) Tare No.	E-3	E-8	E-2	L-1
I) Weight of Tare, grams	107.65	100.45	103.49	99.8
J) Weight of Over-Dried Soil + Tare, grams	165.46	137.74	161.09	174.51
K) Weight of Oven- Dried Soil, grams [J - I]	57.81	37.29	57.6	74.71
L) Weight of Ignited Soil + Tare, grams	164.9	137.47	160.72	174.43
M) Ash, grams [L - I]	57.25	37.02	57.23	74.63
N) Ash Content, % $[M * 100 / K]$	99.03	99.28	99.36	99.89
O) Organic Matter, % $[100 - N]$	0.97	0.72	0.64	0.11

889 458



ORGANIC CONTENT

(ASTM D2974-87) (1995)

Project No. 50160-2-0113

Tested By JM

Test Date 3/28/02

Project Name Memphis Depot

Reviewed By BCS

Review Date 4/9/02

Boring No.	MP-6	MP-7	MP-7	MP-7
Sample No.	Ud	Ud	Ud	Ud
Sample Depth	65-67 Ft.	19-21 Ft.	39-41 Ft.	59-61 Ft.
A) Tare No.	R-63	V-9	R-55	R-64
B) Tare Weight, grams	15.99	15.32	31.8	15.96
C) Wet Soil + Tare, grams	109.9	71.94	148.61	118.03
D) Dry Soil + Tare, grams	103.52	59.14	134.24	115.44
E) Weight of Dry Soil, grams [D - B]	87.53	43.82	102.44	99.48
F) Weight of Moisture, grams [C - D]	6.38	12.8	14.37	2.59
G) Moisture Content, % [F * 100 / E]	7.29	29.21	14.03	2.60
(based on over-dried weight)				
H) Tare No.	L-3	E-7	L-2	E-3
I) Weight of Tare, grams	99.41	102.78	99.68	107.66
J) Weight of Over-Dried Soil + Tare, grams	166.12	146.5	166.59	182.47
K) Weight of Oven- Dried Soil, grams [J - I]	66.71	43.72	66.91	74.81
L) Weight of Ignited Soil + Tare, grams	166.07	146.23	166.37	182.44
M) Ash, grams [L - I]	66.66	43.45	66.69	74.78
N) Ash Content, % [M * 100 / K]	99.93	99.38	99.67	99.96
O) Organic Matter, % [100 - N]	0.07	0.62	0.33	0.04



(ASTM D854 - 92)

Project No. 50160-2-0113

Project Name	Memphis Depot

Tested By WFL

Test Date 1/25-3/27/2002

Reviewed By

Review Date 4/9/02

[illegible]

WF - Water and Flask

WFS - Water, Flask and Soil

CWF - Calibration Water and Flask

DS - Deaired Sample

**HYDRAULIC CONDUCTIVITY**

Project No. *50160-2-0113*
Project Name *Memphis Depot*
Boring No. *MP-5*
Sample No. *Ud*
Sample Depth *14-16'*
Sample Description *Tan, sandy silt*

Tested By *DMJ*
Test Date *01/17/02*
Reviewed By *[Signature]*
Review Date *4/9/02*

ASTM D5084 - Falling Head

Sample Type:	<i>Ud</i>
Sample Orientation:	<i>Vertical</i>
Initial Water Content, %:	<i>22.2</i>
Wet Unit Weight, pcf:	<i>127.2</i>
Dry Unit Weight, pcf:	<i>104.1</i>
Compaction, %:	<i>N/A</i>
Hydraulic Conductivity, cm/sec. @20 °C	<i>6.0E-06</i>

PERMEABILITY TEST - FALLING HEAD (ASTM D5084 - 90)



Project Number 50160-2-0113
 Project Name Memphis Depot
 Boring No. MP-5
 Sample No. Ud
 Sample Depth 14-16'
 Sample Description Tan, sandy silt

Tested By DMJ
 Test Date 01/17/02
 Reviewed By *BM*
 Review Date 4/9/02

Sample Data

Length, in	Diameter, in		Pan No.	
	Location 1	Location 2	Dry Soil+Pan, grams	K-49
Location 1	3.962	2.869	749.89	
Location 2	3.960	2.870	49.76	
Location 3	3.962	2.872		
Average	3.961	2.870	Moisture Content, %	22.2
		855.59	Wet Unit Weight, pcf	127.2
		0.00	Dry Unit Weight, pcf	104.1

Chamber Pressure, psi 50
 Back Pressure, psi 40
 Confining Pressure, psi 10

Date Start	Date Finish	Time Start	Time Finish	Time (sec)	Division Start	Division Finish	H ₀ (cm)	H _r (cm)	k cm/sec	Temp (°C)	k cm/sec at 20 °C
				1515	0.0	5.0	128.38	123.38	6.3E-06	22	6.0E-06
				3120	0.0	10.0	128.38	118.38	6.3E-06	22	6.0E-06
				6660	0.0	20.0	128.38	108.38	6.1E-06	22	5.9E-06

No. of Trials	Sample Type	Max. Density (pcf)	Compaction %	Sample Orientation
3	Ud		N/A	Vertical

Avg. k at 20 °C 6.0E-06 cm/sec

a = area of burette in cm²
 L = length of sample in cm
 A = area of sample in cm²
 H₀ = initial head in cm
 H_r = final head in cm
 t = time in seconds
 a = 1.00 cm²
 A = 41.75 cm²
 L = 10.06 cm



HYDRAULIC CONDUCTIVITY

Project No. **50160-2-0113**
Project Name **Memphis Depot**
Boring No. **MP-5**
Sample No. **Ud**
Sample Depth **14-16'**
Sample Description **Tan, sandy silt**

Tested By **DMJ**
Test Date **01/17/02**
Reviewed By **RLH**
Review Date **4/9/02**

ASTM D5084 - Falling Head

Sample Type:	<i>Ud</i>
Sample Orientation:	<i>Horizontal</i>
Initial Water Content, %:	<i>23.3</i>
Wet Unit Weight, pcf:	<i>120.0</i>
Dry Unit Weight, pcf:	<i>97.3</i>
Compaction, %:	<i>N/A</i>
Hydraulic Conductivity, cm/sec. @20 °C	<i>5.2E-06</i>

PERMEABILITY TEST - FALLING HEAD (ASTM D5084 - 90)

Project Number 50160-2-0113

Project Name Memphis Depot

Boring No. MP-5

Sample No. Ud

Sample Depth 14-16'

Sample Description Tan, sandy silt

Tested By DMJ

Test Date 01/17/02

Reviewed By *OK*

Review Date 4/9/02

LAWGIBB GROUP

Sample Data

Length, in	Diameter, in		Pan No.	X-30
Location 1	1.411	Location 1	2.910	Dry Soil+Pan, grams
Location 2	1.411	Location 2	2.780	Pan Weight, grams
Location 3	1.411	Location 3	2.815	
Average	1.411	Average	2.835	Moisture Content, %
		Wet Soil + Tare, grams	280.53	Wet Unit Weight, pcf
		Tare Weight, grams	0.00	Dry Unit Weight, pcf
				23.3
				120.0
				97.3

Chamber Pressure, psi 25

Back Pressure, psi 15

Confining Pressure, psi 10

Date	Date	Time	Time	Time	Division	H ₀	H _f	k	Temp	k
Start	Finish	Start	Finish	(sec)	Start	(cm)	(cm)	cm/sec	(°C)	cm/sec
				700	0.0	126.22	121.22	5.1E-06	22	4.9E-06
				1573	0.0	126.22	116.22	4.6E-06	22	4.4E-06
				2242	0.0	126.22	106.22	6.8E-06	22	6.5E-06

Avg. k at 20 °C 5.2E-06 cm/sec

No. of Trials	Sample	Max. Density	Compaction	Sample
	Type	(pcf)	%	Orientation
3	Ud		N/A	Horizontal

a = area of burette in cm²

L = length of sample in cm

A = area of sample in cm²

H₀ = initial head in cm

H_f = final head in cm

t = time in seconds

a = 1.00 cm²

A = 40.73 cm²

L = 3.58 cm

889 463



HYDRAULIC CONDUCTIVITY

Project No. *50160-2-0113*
Project Name *Memphis Depot*
Boring No. *MP-5*
Sample No. *Ud*
Sample Depth *4-6'*
Sample Description *Tan, sandy silt*

Tested By *DMJ*
Test Date *01/16/02*
Reviewed By *Pen*
Review Date *4/9/02*

ASTM D5084 - Falling Head

Sample Type:	<i>Ud</i>
Sample Orientation:	<i>Horizontal</i>
Initial Water Content, %:	<i>28.2</i>
Wet Unit Weight, pcf:	<i>103.8</i>
Dry Unit Weight, pcf:	<i>81.0</i>
Compaction, %:	<i>N/A</i>
Hydraulic Conductivity, cm/sec. @20 °C	<i>1.1E-05</i>

PERMEABILITY TEST - FALLING HEAD (ASTM D5084 - 90)



Project Number 50160-2-0113
 Project Name Memphis Depot
 Boring No. MP-5
 Sample No. Ud
 Sample Depth 4-6'
 Sample Description Tan, sandy silt

Tested By DMJ
 Test Date 01/16/02
 Reviewed By *DMJ*
 Review Date 4/9/02

Sample Data

Length, in	Diameter, in	Pan No.	N-8
Location 1	Location 1	2.810	228.72
Location 2	Location 2	2.750	48.80
Location 3	Location 3	2.772	
Average	Average	2.777	28.2
	Wet Soil + Tare, grams	230.57	103.8
	Tare Weight, grams	0.00	81.0

Chamber Pressure, psi 25
 Back Pressure, psi 15
 Confining Pressure, psi 10

Date	Date	Time	Time	Time	Division	H ₀	H _f	k	Temp	k
Start	Finish	Start	Finish	(sec)	Start	(cm)	(cm)	cm/sec	(°C)	cm/sec
				304	0.0	126.22	121.22	1.2E-05	22	1.2E-05
				630	0.0	126.22	116.22	1.2E-05	22	1.1E-05
				966	0.0	126.22	111.22	1.2E-05	22	1.1E-05

No. of Trials	Sample Type	Max. Density (pcf)	Compaction %	Sample Orientation
3	Ud		N/A	Horizontal

Avg. k at 20 °C 1.1E-05 cm/sec

a = area of burette in cm²
 L = length of sample in cm
 A = area of sample in cm²

H₀ = initial head in cm
 H_f = final head in cm
 t = time in seconds

a = 1.00 cm²
 A = 39.09 cm²
 L = 3.55 cm

**HYDRAULIC CONDUCTIVITY**

Project No. **50160-2-0113**
Project Name **Memphis Depot**
Boring No. **MP-5**
Sample No. **Ud**
Sample Depth **4-6'**
Sample Description **Tan, sandy silt**

Tested By **DMJ**
Test Date **01/17/02**
Reviewed By **BEH**
Review Date **4/8/02**

ASTM D5084 - Falling Head

Sample Type:	<i>Ud</i>
Sample Orientation:	<i>Vertical</i>
Initial Water Content, %:	<i>28.8</i>
Wet Unit Weight, pcf:	<i>114.0</i>
Dry Unit Weight, pcf:	<i>88.5</i>
Compaction, %:	<i>N/A</i>
Hydraulic Conductivity, cm/sec. @20 °C	<i>2.9E-06</i>

PERMEABILITY TEST - FALLING HEAD (ASTM D5084 - 90)

LAWGIBB
GROUP

Project Number 50160-2-0113
Project Name Memphis Depot
Boring No. MP-5
Sample No. Ud
Sample Depth 4-6'
Sample Description Tan, sandy silt

Tested By DMJ
Test Date 01/17/02
Reviewed By BAH
Review Date 4/9/02

Sample Data

Length, in	Diameter, in	Pan No.	AB-20
Location 1 3.932	Location 1 2.860	Dry Soil+Pan, grams	671.25
Location 2 3.931	Location 2 2.829	Pan Weight, grams	89.94
Location 3 3.931	Location 3 2.851		
Average 3.931	Average 2.847	Moisture Content, %	28.8
	Wet Soil + Tare, grams	Wet Unit Weight, pcf	114.0
	Tare Weight, grams	Dry Unit Weight, pcf	88.5

Chamber Pressure, psi 50
Back Pressure, psi 40
Confining Pressure, psi 10

Date Start	Date Finish	Time Start	Time Finish	Time (sec)	Division Start	Division Finish	H ₀ (cm)	H _f (cm)	k cm/sec	Temp (°C)	k cm/sec at 20 °C
				1260	0.0	2.0	128.38	126.38	3.0E-06	22	2.9E-06
				1894	0.0	3.0	128.38	125.38	3.0E-06	22	2.9E-06
				6557	0.0	10.0	128.38	118.38	3.0E-06	22	2.9E-06

No. of Trials	Sample Type	Max. Density (pcf)	Compaction %	Sample Orientation
3	Ud		N/A	Vertical

Avg. k at 20 °C 2.9E-06 cm/sec

a = area of burette in cm²
L = length of sample in cm
A = area of sample in cm²

H₀ = initial head in cm
H_f = final head in cm
t = time in seconds

a = 1.00 cm²
A = 41.06 cm²
L = 9.99 cm



HYDRAULIC CONDUCTIVITY

Project No. **50160-2-0113**
Project Name **Memphis Depot**
Boring No. **MP-6**
Sample No. **Ud**
Sample Depth **49-51'**
Sample Description **Brown sand**

Tested By **DMJ**
Test Date **03/23/02**
Reviewed By **JEH**
Review Date **4/9/02**

ASTM D5084 - Falling Head

Sample Type:	<i>Ud</i>
Sample Orientation:	<i>Horizontal</i>
Initial Water Content, %:	<i>6.1</i>
Wet Unit Weight, pcf:	<i>81.4</i>
Dry Unit Weight, pcf:	<i>76.7</i>
Compaction, %:	<i>N/A</i>
Hydraulic Conductivity, cm/sec. @20 °C	<i>4.5E-04</i>

LAWGIBB
GROUP

Tested By DMJ

Test Date 03/23/02

Reviewed By BH

Review Date 4/9/02

1

Brown sand

Sample Data

Sample Data					
Length, in		Diameter, in		Pan No.	J-5
Location 1	2.338	Location 1	2.680	Dry Soil+Pan, grams	488.10
Location 2	2.337	Location 2	2.680	Pan Weight, grams	222.59
Location3	2.338	Location 3	2.679		
Average	2.338	Average	2.680	Moisture Content, %	6.1
		Wet Soil + Tare, grams	281.70	Wet Unit Weight, pcf	81.4
		Tare Weight, grams	0.00	Dry Unit Weight, pcf	76.7

Chamber Pressure, psi 44

Back Pressure, psi	34

Confining Pressure, psi 10

Date Start	Date Finish	Time Start	Time Finish	Time (sec)	Division Start	Division Finish	H ₀ (cm)	H _f (cm)	k cm/sec	Temp (°C)	k cm/sec at 20 °C
				13	0.0	5.0	123.43	118.43	5.2E-04	22	5.0E-04
				30	0.0	10.0	123.43	113.43	4.6E-04	22	4.4E-04
				68	0.0	20.0	123.43	103.43	4.2E-04	22	4.1E-04
				13	0.0	5.0	123.43	118.43	5.2E-04	22	5.0E-04
				29	0.0	10.0	123.43	113.43	4.8E-04	22	4.5E-04
				67	0.0	20.0	123.43	103.43	4.3E-04	22	4.1E-04

Avg. k at 20 °C 4.5E-04 cm/sec

No. of Trials	Sample Type	Max. Density (pcf)	Compaction %	Sample Orientation
6	Ud		N/A	Horizontal

a = area of burette in cm^2

 H_0 = initial head in cm

L = length of sample in cm

 H_f = final head in cm

A = area of sample in cm^2

t = time in seconds

$$a = 1.00 \text{ cm}^2$$
$$A = \frac{36.38 \text{ cm}^2}{\text{cm}^2}$$
$$L = \frac{5.94 \text{ cm}}{}$$

**HYDRAULIC CONDUCTIVITY**

Project No. **50160-2-0113**
Project Name **Memphis Depot**
Boring No. **MP-6**
Sample No. **Ud**
Sample Depth **49-51'**
Sample Description **Brown sand**

Tested By **DMJ**
Test Date **03/23/02**
Reviewed By *RLB*
Review Date **4/9/02**

ASTM D5084 - Falling Head

Sample Type:	<i>Ud</i>
Sample Orientation:	<i>Vertical</i>
Initial Water Content, %:	<i>4.7</i>
Wet Unit Weight, pcf:	<i>86.2</i>
Dry Unit Weight, pcf:	<i>82.4</i>
Compaction, %:	<i>N/A</i>
Hydraulic Conductivity, cm/sec. @20 °C	5.9E-04

PERMEABILITY TEST - FALLING HEAD (ASTM D5084 - 90)

Project Number 50160-2-0113
 Project Name Memphis Depot
 Boring No. MP-6
 Sample No. Ud
 Sample Depth 49-51'
 Sample Description Brown sand

Tested By DMJ
 Test Date 03/23/02
 Reviewed By *RL*
 Review Date 4/9/02

LAWGIBB
GROUP

Sample Data

Length, in	Diameter, in	Pan No.	N-11
Location 1 3.053	Location 1 2.787	Dry Soil+Pan, grams	451.39
Location 2 3.051	Location 2 2.786	Pan Weight, grams	49.04
Location 3 3.050	Location 3 2.787		
Average 3.051	Average 2.787	Moisture Content, %	4.7
	Wet Soil + Tare, grams	421.20	Wet Unit Weight, pcf 86.2
	Tare Weight, grams	0.00	Dry Unit Weight, pcf 82.4

Chamber Pressure, psi 60
 Back Pressure, psi 50
 Confining Pressure, psi 10

Date Start	Date Finish	Time Start	Time Finish	Time (sec)	Division Start	Division Finish	H ₀ (cm)	H _r (cm)	k cm/sec	Temp (°C)	k cm/sec at 20 °C
				12	0.0	5.0	123.04	118.04	6.8E-04	22	6.5E-04
				25	0.0	10.0	123.04	113.04	6.7E-04	22	6.4E-04
				53	0.0	20.0	123.04	103.04	6.6E-04	22	6.3E-04
				14	0.0	5.0	123.04	118.04	5.8E-04	22	5.6E-04
				30	0.0	10.0	123.04	113.04	5.6E-04	22	5.3E-04
				64	0.0	20.0	123.04	103.04	5.5E-04	22	5.2E-04

No. of Trials	Sample Type	Max. Density (pcf)	Compaction %	Sample Orientation
6	Ud		N/A	Vertical

Avg. k at 20 °C 5.9E-04 cm/sec

a = area of burette in cm²
 L = length of sample in cm
 A = area of sample in cm²

H₀ = initial head in cm
 H_r = final head in cm
 t = time in seconds

a = 1.00 cm²
 A = 39.35 cm²
 L = 7.75 cm

**HYDRAULIC CONDUCTIVITY**

Project No. **50160-2-0113**
Project Name **Memphis Depot**
Boring No. **MP-6**
Sample No. **Ud**
Sample Depth **65-67'**
Sample Description **Orange sand**

Tested By **DMJ**
Test Date **03/26/02**
Reviewed By *Ben*
Review Date **4/9/02**

ASTM D5084 - Falling Head

Sample Type:	<i>Ud</i>
Sample Orientation:	<i>Horizontal</i>
Initial Water Content, %:	<i>8.8</i>
Wet Unit Weight, pcf:	<i>100.2</i>
Dry Unit Weight, pcf:	<i>92.1</i>
Compaction, %:	<i>N/A</i>
Hydraulic Conductivity, cm/sec. @20 °C	7.1E-04

PERMEABILITY TEST - FALLING HEAD (ASTM D5084 - 90)

LAWGIBB
GROUP

Project Number 50160-2-0113
Project Name Memphis Depot
Boring No. MP-6
Sample No. Ud
Sample Depth 65-67"
Sample Description Orange sand

Tested By DMJ
Test Date 03/26/02
Reviewed By *GBH*
Review Date 4/9/02

Sample Data

Length, in	Diameter, in		Pan No.	
	Location 1	Location 2	Dry Soil+Pan, grams	LS-68
Location 1	2.188	2.880	433.03	
Location 2	2.186	2.879	88.88	
Location 3	2.185	2.880		
Average	2.186	2.880		
			Moisture Content, %	8.8
			Wet Soil + Tare, grams	374.50
			Tare Weight, grams	0.00
			Wet Unit Weight, pcf	100.2
			Dry Unit Weight, pcf	92.1

Chamber Pressure, psi 55
Back Pressure, psi 45
Confining Pressure, psi 10

Date Start	Date Finish	Time Start	Time Finish	Time (sec)	Division Start	Division Finish	H ₀ (cm)	H _r (cm)	k cm/sec	Temp (°C)	k cm/sec at 20 °C
				7	0.0	5.0	116.44	111.442	8.3E-04	22	7.9E-04
				15	0.0	10.0	116.44	106.442	7.9E-04	22	7.6E-04
				31	0.0	20.0	116.44	96.442	8.0E-04	22	7.7E-04
				9	0.0	5.0	116.44	111.442	6.4E-04	22	6.2E-04
				17	0.0	10.0	116.44	106.442	7.0E-04	22	6.7E-04
				35	0.0	20.0	116.44	96.442	7.1E-04	22	6.8E-04

No. of Trials	Sample Type	Sample Ud	Max. Density (pcf)	Compaction %	Sample Orientation
6				N/A	Horizontal

Avg. k at 20 °C 7.1E-04 cm/sec

a = area of burette in cm²
L = length of sample in cm
A = area of sample in cm²

H₀ = initial head in cm
H_r = final head in cm
t = time in seconds

a = 1.00 cm²
A = 42.02 cm²
L = 5.55 cm

**HYDRAULIC CONDUCTIVITY**

Project No. **50160-2-0113**
Project Name **Memphis Depot**
Boring No. **MP-6**
Sample No. **Ud**
Sample Depth **65-67'**
Sample Description **Orange sand**

Tested By **DMJ**
Test Date **03/26/02**
Reviewed By **BM**
Review Date **4/9/02**

ASTM D5084 - Falling Head

Sample Type:	<i>Ud</i>
Sample Orientation:	<i>Vertical</i>
Initial Water Content, %:	<i>7.3</i>
Wet Unit Weight, pcf:	<i>96.9</i>
Dry Unit Weight, pcf:	<i>90.3</i>
Compaction, %:	<i>N/A</i>
Hydraulic Conductivity, cm/sec. @20 °C	<i>1.7E-03</i>

PERMEABILITY TEST - FALLING HEAD (ASTM D5084 - 90)

LAWGIBB
GROUP

Project Number 50160-2-0113
Project Name Memphis Depot
Boring No. MP-6
Sample No. Ud
Sample Depth 65-67'
Sample Description Orange sand

Tested By DMJ
Test Date 03/26/02
Reviewed By *BLU*
Review Date 9/9/02

Sample Data

Length, in	Diameter, in	Pan No.	LS-40
Location 1	Location 1	2.885	Dry Soil+Pan, grams
Location 2	Location 2	2.883	Pan Weight, grams
Location 3	Location 3	2.882	
Average	Average	2.883	Moisture Content, %
	Wet Soil + Tare, grams	782.00	Wet Unit Weight, pcf
	Tare Weight, grams	0.00	Dry Unit Weight, pcf
			90.3

Chamber Pressure, psi 55
Back Pressure, psi 45
Confining Pressure, psi 10

Date Start	Date Finish	Time Start	Time Finish	Time (sec)	Division Start	Division Finish	H ₀ (cm)	H _r (cm)	k cm/sec	Temp (°C)	k cm/sec at 20 °C
				7	0.0	5.0	116.44	111.442	1.8E-03	22	1.7E-03
				14	0.0	10.0	116.44	106.442	1.8E-03	22	1.7E-03
				30	0.0	20.0	116.44	96.442	1.8E-03	22	1.7E-03
				7	0.0	5.0	116.44	111.442	1.8E-03	22	1.7E-03
				14	0.0	10.0	116.44	106.442	1.8E-03	22	1.7E-03
				29	0.0	20.0	116.44	96.442	1.8E-03	22	1.8E-03

No. of Trials	Sample Type	Max. Density (pcf)	Compaction %	Sample Orientation
6	Ud		N/A	Vertical

Avg. k at 20 °C 1.7E-03 cm/sec

a = area of burette in cm²
L = length of sample in cm
A = area of sample in cm²

H₀ = initial head in cm
H_r = final head in cm
t = time in seconds

a = 1.00 cm²
A = 42.13 cm²
L = 11.97 cm

**HYDRAULIC CONDUCTIVITY**

Project No. **50160-2-0113**
Project Name **Memphis Depot**
Boring No. **MP-6**
Sample No. **Ud**
Sample Depth **9-11'**
Sample Description **Red-brown sandy silt**

Tested By **DMJ**
Test Date **03/22/02**
Reviewed By **BEH**
Review Date **4/9/02**

ASTM D5084 - Falling Head

Sample Type:	<i>Ud</i>
Sample Orientation:	<i>Horizontal</i>
Initial Water Content, %:	<i>24.1</i>
Wet Unit Weight, pcf:	<i>116.6</i>
Dry Unit Weight, pcf:	<i>93.9</i>
Compaction, %:	<i>N/A</i>
Hydraulic Conductivity, cm/sec. @20 °C	<i>9.4E-07</i>

PERMEABILITY TEST - FALLING HEAD (ASTM D5084 - 90)



Project Number 50160-2-0113
 Project Name Memphis Depot
 Boring No. MP-6
 Sample No. Ud
 Sample Depth 9-11'
 Sample Description Red-brown sandy silt

Tested By DMJ
 Test Date 03/22/02
 Reviewed By *BLH*
 Review Date 4/9/02

Sample Data

Length, in	Diameter, in	Pan No.	B-7
Location 1 2.357	Location 1 2.810	Dry Soil+Pan, grams	579.61
Location 2 2.356	Location 2 2.809	Pan Weight, grams	219.79
Location 3 2.356	Location 3 2.807		
Average 2.356	Average 2.809	Moisture Content, %	24.1
	Wet Soil + Tare, grams	Wet Unit Weight, pcf	116.6
	Tare Weight, grams	Dry Unit Weight, pcf	93.9

Chamber Pressure, psi 44
 Back Pressure, psi 34
 Confining Pressure, psi 10

Date Start	Date Finish	Time Start	Time Finish	Time (sec)	Division Start	Division Finish	H ₀ (cm)	H _f (cm)	k cm/sec	Temp (°C)	k cm/sec at 20 °C
				3300	0.0	3.0	123.04	120.04	1.1E-06	22	1.1E-06
				6300	0.0	5.0	123.04	118.04	9.9E-07	22	9.4E-07
				10800	0.0	8.0	123.04	115.04	9.3E-07	22	8.9E-07
				12480	0.0	9.0	123.04	114.04	9.1E-07	22	8.7E-07

No. of Trials	Sample Type	Max. Density (pcf)	Compaction %	Sample Orientation
4	Ud		N/A	Horizontal

Avg. k at 20 °C 9.4E-07 cm/sec

a = area of burette in cm²
 L = length of sample in cm
 A = area of sample in cm²

H₀ = initial head in cm
 H_f = final head in cm
 t = time in seconds

a = 1.00 cm²
 A = 39.97 cm²
 L = 5.99 cm



HYDRAULIC CONDUCTIVITY

Project No. **50160-2-0113**
Project Name **Memphis Depot**
Boring No. **MP-6**
Sample No. **Ud**
Sample Depth **9-11'**
Sample Description **Red-brown sandy silt**

Tested By **DMJ**
Test Date **03/26/02**
Reviewed By **GR**
Review Date **4/9/02**

ASTM D5084 - Falling Head

Sample Type:	<i>Ud</i>
Sample Orientation:	<i>Vertical</i>
Initial Water Content, %:	<i>24.0</i>
Wet Unit Weight, pcf:	<i>119.5</i>
Dry Unit Weight, pcf:	<i>96.3</i>
Compaction, %:	<i>N/A</i>
Hydraulic Conductivity, cm/sec. @20 °C	<i>1.6E-05</i>

PERMEABILITY TEST - FALLING HEAD (ASTM D5084 - 90)



Project Number 50160-2-0113
 Project Name Memphis Depot
 Boring No. MP-6
 Sample No. Ud
 Sample Depth 9.11'
 Sample Description Red-brown sandy silt

Tested By DMJ
 Test Date 03/26/02
 Reviewed By *gbl*
 Review Date 4/9/02

Sample Data

Length, in	Diameter, in	Pan No.	T-19
Location 1 4.721	Location 1 2.845	Dry Soil+Pan, grams	810.72
Location 2 4.720	Location 2 2.848	Pan Weight, grams	50.58
Location 3 4.720	Location 3 2.850		
Average 4.720	Average 2.848	Moisture Content, %	24.0
	Wet Soil + Tare, grams	Wet Unit Weight, pcf	119.5
	Tare Weight, grams	Dry Unit Weight, pcf	96.3

Chamber Pressure, psi 61
 Back Pressure, psi 51
 Confining Pressure, psi 10

Date Start	Date Finish	Time Start	Time Finish	Time (sec)	Division Start	Division Finish	H ₀ (cm)	H _f (cm)	k cm/sec	Temp (°C)	k cm/sec at 20 °C
				277	0.0	2.0	125.33	123.332	1.7E-05	22	1.6E-05
				599	0.0	4.0	125.33	121.332	1.6E-05	22	1.5E-05
				918	0.0	6.0	125.33	119.332	1.6E-05	22	1.5E-05
				253	0.0	2.0	125.33	123.332	1.9E-05	22	1.8E-05
				594	0.0	4.0	125.33	121.332	1.6E-05	22	1.5E-05
				920	0.0	6.0	125.33	119.332	1.6E-05	22	1.5E-05

No. of Trials	Sample Type	Max. Density (pcf)	Compaction %	Sample Orientation
6	Ud		N/A	Vertical

Avg. k at 20 °C 1.6E-05 cm/sec

a = area of burette in cm²
 L = length of sample in cm
 A = area of sample in cm²
 H₀ = initial head in cm
 H_f = final head in cm
 t = time in seconds

**HYDRAULIC CONDUCTIVITY**

Project No. **50160-2-0113**
Project Name **Memphis Depot**
Boring No. **MP-7**
Sample No. **Ud**
Sample Depth **19-21'**
Sample Description **Red-brown, silty sand**

Tested By **DMJ**
Test Date **03/26/02**
Reviewed By **BLH**
Review Date **4/9/02**

ASTM D5084 - Falling Head

Sample Type:	<i>Ud</i>
Sample Orientation:	<i>Horizontal</i>
Initial Water Content, %:	<i>31.9</i>
Wet Unit Weight, pcf:	<i>101.4</i>
Dry Unit Weight, pcf:	<i>76.9</i>
Compaction, %:	<i>N/A</i>
Hydraulic Conductivity, cm/sec. @20 °C	<i>1.4E-06</i>

PERMEABILITY TEST - FALLING HEAD (ASTM D5084 - 90)

LAWGIBB GROUP

Project Number 50160-2-0113
 Project Name Memphis Depot
 Boring No. MP-7
 Sample No. Ud
 Sample Depth 19-21'
 Sample Description Red-brown, silty sand

Tested By DMJ
 Test Date 03/26/02
 Reviewed By *CRK*
 Review Date 9/9/02

Sample Data

Length, in		Diameter, in		Pan No.		LS-58
Location 1	2.035	Location 1	2.874	Dry Soil+Pan, grams		353.62
Location 2	2.035	Location 2	2.872	Pan Weight, grams		87.55
Location 3	2.035	Location 3	2.870			
Average	2.035	Average	2.872	Moisture Content, %		31.9
		Wet Soil + Tare, grams	350.94	Wet Unit Weight, pcf		101.4
		Tare Weight, grams	0.00	Dry Unit Weight, pcf		76.9

Chamber Pressure, psi 60
 Back Pressure, psi 50
 Confining Pressure, psi 10

Date Start	Date Finish	Time Start	Time Finish	Time (sec)	Division Start	Division Finish	H ₀ (cm)	H _f (cm)	k cm/sec	Temp (°C)	k cm/sec at 20 °C
				2087	0.0	3.0	120.44	117.44	1.5E-06	22	1.4E-06
				4367	0.0	6.0	120.44	114.44	1.4E-06	22	1.4E-06
				6540	0.0	9.0	120.44	111.44	1.5E-06	22	1.4E-06

No. of Trials	Sample Type	Max. Density (pcf)	Compaction %	Sample Orientation
3	Ud		N/A	Horizontal

Avg. k at 20 °C 1.4E-06 cm/sec

a = area of burette in cm²
 L = length of sample in cm
 A = area of sample in cm²

H₀ = initial head in cm
 H_f = final head in cm
 t = time in seconds

a = 1.00 cm²
 A = 41.80 cm²
 L = 5.17 cm

889 481

**HYDRAULIC CONDUCTIVITY**

Project No. **50160-2-0113**
Project Name **Memphis Depot**
Boring No. **MP-7**
Sample No. **Ud**
Sample Depth **19-21'**
Sample Description **Red-brown silty sand**

Tested By **DMJ**
Test Date **03/23/02**
Reviewed By *DMJ*
Review Date **4/9/02**

ASTM D5084 - Falling Head

Sample Type:	<i>Ud</i>
Sample Orientation:	<i>Vertical</i>
Initial Water Content, %:	<i>29.7</i>
Wet Unit Weight, pcf:	<i>118.4</i>
Dry Unit Weight, pcf:	<i>91.3</i>
Compaction, %:	<i>N/A</i>
Hydraulic Conductivity, cm/sec. @20 °C	<i>1.5E-05</i>

PERMEABILITY TEST - FALLING HEAD (ASTM D5084 - 90)



Project Number 50160-2-0113
 Project Name Memphis Depot
 Boring No. MP-7
 Sample No. Ud
 Sample Depth 19-21'
 Sample Description Red-brown silty sand

Tested By DMJ
 Test Date 03/23/02
 Reviewed By *GR*
 Review Date 4/9/02

Sample Data

Length, in	Diameter, in	Pan No.	S-23
Location 1 4.703	Location 1 2.850	Dry Soil+Pan, grams	763.66
Location 2 4.704	Location 2 2.848	Pan Weight, grams	45.00
Location 3 4.704	Location 3 2.850		
Average 4.704	Average 2.849	Moisture Content, %	29.7
	Wet Soil + Tare, grams	Wet Unit Weight, pcf	118.4
	Tare Weight, grams	Dry Unit Weight, pcf	91.3

Chamber Pressure, psi 60
 Back Pressure, psi 50
 Confining Pressure, psi 10

Date	Date	Time	Time	Time	Division	H ₀	H _r	k	Temp	k
Start	Finish	Start	Finish	(sec)	Start	(cm)	(cm)	cm/sec	(°C)	cm/sec
				150	0.0	123.04	122.04	1.6E-05	22	1.5E-05
				315	0.0	123.04	121.04	1.5E-05	22	1.4E-05
				650	0.0	123.04	119.04	1.5E-05	22	1.4E-05
				300	0.0	123.04	121.04	1.6E-05	22	1.5E-05
				780	0.0	123.04	118.04	1.5E-05	22	1.5E-05

No. of Trials	Sample	Max. Density	Compaction	Sample
S	Type	(pcf)	%	Orientation
	Ud		N/A	Vertical

Avg. k at 20 °C 1.5E-05 cm/sec

a = area of burette in cm²
 L = length of sample in cm
 A = area of sample in cm²

H₀ = initial head in cm
 H_r = final head in cm
 t = time in seconds

a = 1.00 cm²
 A = 41.14 cm²
 L = 11.95 cm



HYDRAULIC CONDUCTIVITY

Project No. *50160-2-0113*
Project Name *Memphis Depot*
Boring No. *MP-7*
Sample No. *Ud*
Sample Depth *39-41'*
Sample Description *Red-brown, silty sand*

Tested By *DMJ*
Test Date *03/25/02*
Reviewed By *BC*
Review Date *4/9/02*

ASTM D5084 - Falling Head

Sample Type:	<i>Ud</i>
Sample Orientation:	<i>Horizontal</i>
Initial Water Content, %:	<i>14.4</i>
Wet Unit Weight, pcf:	<i>113.4</i>
Dry Unit Weight, pcf:	<i>99.1</i>
Compaction, %:	<i>N/A</i>
Hydraulic Conductivity, cm/sec. @20 °C	<i>9.7E-05</i>

PERMEABILITY TEST - FALLING HEAD (ASTM D5084 - 90)



Project Number 50160-2-0113
 Project Name Memphis Depot
 Boring No. MP-7
 Sample No. Ud
 Sample Depth 39-41'
 Sample Description Red-brown, silty sand

Tested By DMJ
 Test Date 03/25/02
 Reviewed By *DMJ*
 Review Date 9/9/02

Sample Data

Length, in	Diameter, in	Pan No.	AL-11
Location 1	Location 1	Dry Soil+Pan, grams	533.82
Location 2	Location 2	Pan Weight, grams	181.55
Location 3	Location 3		
Average	Average	Moisture Content, %	14.4
	Wet Soil + Tare, grams	Wet Unit Weight, pcf	113.4
	Tare Weight, grams	Dry Unit Weight, pcf	99.1

Chamber Pressure, psi 60
 Back Pressure, psi 50
 Confining Pressure, psi 10

Date Start	Date Finish	Time Start	Time Finish	Time (sec)	Division Start	Division Finish	H ₀ (cm)	H _f (cm)	k cm/sec	Temp (°C)	k cm/sec at 20 °C
				83	0.0	10.0	127.11	117.11	1.3E-04	22	1.2E-04
				224	0.0	20.0	127.11	107.11	1.0E-04	22	9.6E-05
				40	0.0	5.0	127.11	122.11	1.3E-04	22	1.3E-04
				109	0.0	10.0	127.11	117.11	9.9E-05	22	9.4E-05
				295	0.0	20.0	127.11	107.11	7.6E-05	22	7.3E-05
				57	0.0	5.0	125.84	120.84	9.3E-05	22	8.9E-05
				141	0.0	10.0	125.84	115.84	7.7E-05	22	7.4E-05

No. of Trials	Sample Type	Max. Density (pcf)	Compaction %	Sample Orientation
7	Ud		N/A	Horizontal

Avg. k at 20 °C 9.7E-05 cm/sec

a = area of burette in cm²
 L = length of sample in cm
 A = area of sample in cm²

H₀ = initial head in cm
 H_f = final head in cm
 t = time in seconds

a = 1.00 cm²
 A = 41.10 cm²
 L = 5.40 cm

**HYDRAULIC CONDUCTIVITY**

Project No. *50160-2-0113*
Project Name *Memphis Depot*
Boring No. *MP-7*
Sample No. *Ud*
Sample Depth *39-41'*
Sample Description *Red-brown, silty sand*

Tested By *DMJ*
Test Date *03/26/02*
Reviewed By *BCU*
Review Date *4/9/02*

ASTM D5084 - Falling Head

Sample Type:	<i>Ud</i>
Sample Orientation:	<i>Vertical</i>
Initial Water Content, %:	<i>12.8</i>
Wet Unit Weight, pcf:	<i>119.2</i>
Dry Unit Weight, pcf:	<i>105.8</i>
Compaction, %:	<i>N/A</i>
Hydraulic Conductivity, cm/sec. @20 °C	<i>3.3E-04</i>

PERMEABILITY TEST - FALLING HEAD (ASTM D5084 - 90)

LAWGIBB
GROUP

Project Number 50160-2-0113
 Project Name Memphis Depot
 Boring No. MP-7
 Sample No. Ud
 Sample Depth 39.41'
 Sample Description Red-brown, silty sand

Tested By DMJ
 Test Date 03/26/02
 Reviewed By *GL*
 Review Date 4/9/02

Sample Data

Length, in	Diameter, in	Pan No.	J-1
Location 1 4.685	Location 1 2.821	Dry Soil+Pan, grams	1038.85
Location 2 4.686	Location 2 2.820	Pan Weight, grams	226.30
Location 3 4.685	Location 3 2.820		
Average 4.685	Average 2.820	Moisture Content, %	12.8
	Wet Soil + Tare, grams	Wet Unit Weight, pcf	119.2
	Tare Weight, grams	Dry Unit Weight, pcf	105.8

Chamber Pressure, psi 64
 Back Pressure, psi 54
 Confining Pressure, psi 10

Date Start	Date Finish	Time Start	Time Finish	Time (sec)	Division Start	Division Finish	H ₀ (cm)	H _r (cm)	k cm/sec	Temp (°C)	k cm/sec at 20 °C
				34	0.0	5.0	118.22	113.22	3.8E-04	22	3.6E-04
				76	0.0	10.0	118.22	108.22	3.4E-04	22	3.3E-04
				169	0.0	20.0	118.22	98.22	3.2E-04	22	3.1E-04
				36	0.0	5.0	118.22	113.22	3.5E-04	22	3.4E-04
				79	0.0	10.0	118.22	108.22	3.3E-04	22	3.2E-04
				174	0.0	20.0	118.22	98.22	3.1E-04	22	3.0E-04

No. of Trials	Sample Type	Sample Ud	Max. Density (pcf)	Compaction %	Sample Orientation
6				N/A	Vertical

Avg. k at 20 °C 3.3E-04 cm/sec

a = area of burette in cm²
 L = length of sample in cm
 A = area of sample in cm²

H₀ = initial head in cm
 H_r = final head in cm
 t = time in seconds

a = 1.00 cm²
 A = 40.30 cm²
 L = 11.90 cm

889 487



HYDRAULIC CONDUCTIVITY

Project No. **50160-2-0113**
Project Name **Memphis Depot**
Boring No. **MP-7**
Sample No. **Ud**
Sample Depth **59-61'**
Sample Description **Orange sand**

Tested By **DMJ**
Test Date **03/25/02**
Reviewed By **BLK**
Review Date **4/9/02**

ASTM D5084 - Falling Head

Sample Type:	<i>Ud</i>
Sample Orientation:	<i>Horizontal</i>
Initial Water Content, %:	<i>6.1</i>
Wet Unit Weight, pcf:	<i>96.2</i>
Dry Unit Weight, pcf:	<i>90.7</i>
Compaction, %:	<i>N/A</i>
Hydraulic Conductivity, cm/sec. @20 °C	<i>2.8E-04</i>

PERMEABILITY TEST - FALLING HEAD (ASTM D5084 - 90)



Project Number 50160-2-0113
 Project Name Memphis Depot
 Boring No. MP-7
 Sample No. Ud
 Sample Depth 59-61'
 Sample Description Orange sand

Tested By DMJ
 Test Date 03/25/02
 Reviewed By *gla*
 Review Date 4/9/02

Sample Data

Length, in	Diameter, in	Pan No.	LS-49
Location 1 1.701	Location 1	2.873 Dry Soil+Pan, grams	350.29
Location 2 1.700	Location 2	2.872 Pan Weight, grams	87.94
Location 3 1.700	Location 3	2.873	
Average 1.700	Average	2.873 Moisture Content, %	6.1
	Wet Soil + Tare, grams	278.25 Wet Unit Weight, pcf	96.2
	Tare Weight, grams	0.00 Dry Unit Weight, pcf	90.7

Chamber Pressure, psi 60
 Back Pressure, psi 50
 Confining Pressure, psi 10

Date Start	Date Finish	Time Start	Time Finish	Time (sec)	Division Start	Division Finish	H ₀ (cm)	H _r (cm)	k cm/sec	Temp (°C)	k cm/sec at 20 °C
				14	0.0	5.0	127.11	122.11	3.0E-04	22	2.8E-04
				32	0.0	10.0	127.11	117.11	2.6E-04	22	2.5E-04
				66	0.0	20.0	127.11	107.11	2.7E-04	22	2.6E-04
				12	0.0	5.0	127.11	122.11	3.5E-04	22	3.3E-04
				28	0.0	10.0	127.11	117.11	3.0E-04	22	2.9E-04
				67	0.0	20.0	127.11	107.11	2.6E-04	22	2.5E-04

No. of Trials	Sample Type	Max. Density (pcf)	Compaction %	Sample Orientation
6	Ud		N/A	Horizontal

Avg. k at 20 °C 2.8E-04 cm/sec

a = area of burette in cm²
 L = length of sample in cm
 A = area of sample in cm²
 H₀ = initial head in cm
 H_r = final head in cm
 t = time in seconds

889 489

**HYDRAULIC CONDUCTIVITY**

Project No. **50160-2-0113**
Project Name **Memphis Depot**
Boring No. **MP-7**
Sample No. **Ud**
Sample Depth **59-61'**
Sample Description **Orange sand**

Tested By **DMJ**
Test Date **03/26/02**
Reviewed By **[Signature]**
Review Date **4/9/02**

ASTM D5084 - Falling Head

Sample Type:	<i>Ud</i>
Sample Orientation:	<i>Vertical</i>
Initial Water Content, %:	<i>4.5</i>
Wet Unit Weight, pcf:	<i>99.5</i>
Dry Unit Weight, pcf:	<i>95.2</i>
Compaction, %:	<i>N/A</i>
Hydraulic Conductivity, cm/sec. @20 °C	<i>2.0E-03</i>

PERMEABILITY TEST - FALLING HEAD (ASTM D5084 - 90)



Project Number 50160-2-0113
 Project Name Memphis Depot
 Boring No. MP-7
 Sample No. Ud
 Sample Depth 59-61'
 Sample Description Orange sand
 Tested By DMJ
 Test Date 03/26/02
 Reviewed By BLK
 Review Date 4/9/02

Sample Data

Length, in		Diameter, in		Pan No.	
Location 1	4.716	Location 1	2.885	Dry Soil+Pan, grams	LS-69
Location 2	4.715	Location 2	2.885	Pan Weight, grams	858.99
Location 3	4.717	Location 3	2.885		88.84
Average	4.716	Average	2.885	Moisture Content, %	4.5
		Wet Soil + Tare, grams	805.10	Wet Unit Weight, pcf	99.5
		Tare Weight, grams	0.00	Dry Unit Weight, pcf	95.2

Chamber Pressure, psi 64
 Back Pressure, psi 54
 Confining Pressure, psi 10

Date	Date	Time	Time	Time	Division	Division	H ₀	H _r	k	Temp	k
Start	Finish	Start	Finish	(sec)	Start	Finish	(cm)	(cm)	cm/sec	(°C)	cm/sec
				5	0.0	5.0	118.22	113.22	2.5E-03	22	2.3E-03
				11	0.0	10.0	118.22	108.22	2.3E-03	22	2.2E-03
				24	0.0	20.0	118.22	98.22	2.2E-03	22	2.1E-03
				7	0.0	5.0	118.22	113.22	1.8E-03	22	1.7E-03
				13	0.0	10.0	118.22	108.22	1.9E-03	22	1.8E-03
				29	0.0	20.0	118.22	98.22	1.8E-03	22	1.7E-03

No. of Trials	Sample	Max. Density	Compaction	Sample
	Type	(pcf)	%	Orientation
6	Ud		N/A	Vertical

Avg. k at 20 °C 2.0E-03 cm/sec

a = area of burette in cm²
 L = length of sample in cm
 A = area of sample in cm²

H₀ = initial head in cm
 H_r = final head in cm
 t = time in seconds

a = 1.00 cm²
 A = 42.17 cm²
 L = 11.98 cm

Attachment C

Memphis Depot
Dunn Field SVE TS Field Data- Test 1 - VW-1 (December, 2001)

Date	Actual Time	Elapsed Time (hrs)	Vapor Flow Rate		Groundwater Flow	Vacuum																																
			Liquid Ring Pump (acfm)	Calculated Air SCFM		Flow Totalizer (gal)	Liquid Ring Pump (in-Hg)	Knock out Tank (in-Hg)	MP-1 22' Wellhead (in-H ₂ O)	MP-1 35' Wellhead (in-H ₂ O)	MP-1 58' Wellhead (in-H ₂ O)	MP-1 71' Wellhead (in-H ₂ O)	MP-2 22' Wellhead (in-H ₂ O)	MP-2 35' Wellhead (in-H ₂ O)	MP-2 58' Wellhead (in-H ₂ O)	MP-2 71' Wellhead (in-H ₂ O)	MP-3 11' Wellhead (in-H ₂ O)	MP-3 27' Wellhead (in-H ₂ O)	MP-3 49' Wellhead (in-H ₂ O)	MP-3 68' Wellhead (in-H ₂ O)	MP-4 19' Wellhead (in-H ₂ O)	MP-4 48' Wellhead (in-H ₂ O)	MP-4 58' Wellhead (in-H ₂ O)	MP-4 70' Wellhead (in-H ₂ O)	MP-5 11' Wellhead (in-H ₂ O)	MP-5 21' Wellhead (in-H ₂ O)	MP-6 11' Wellhead (in-H ₂ O)	MP-6 21' Wellhead (in-H ₂ O)	MP-6 51' Wellhead (in-H ₂ O)	MP-6 72' Wellhead (in-H ₂ O)	MP-7 6' Wellhead (in-H ₂ O)	MP-7 16' Wellhead (in-H ₂ O)	MP-7 41' Wellhead (in-H ₂ O)	MP-7 52' Wellhead (in-H ₂ O)	MP-8 16' Wellhead (in-H ₂ O)	MP-8 52' Wellhead (in-H ₂ O)		
12/18/2001	14:32:00	0:00:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/18/2001	14:32:15	00:00:15					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/18/2001	14:32:30	00:00:30					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/18/2001	14:32:45	00:00:45					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/18/2001	14:33:00	00:01:00					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12/18/2001	14:33:15	00:01:15	27.5	1.6-4.0		26.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/18/2001	14:33:30	00:01:30					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/18/2001	14:33:45	00:01:45					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/18/2001	14:34:00	00:02:00					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/18/2001	14:35:00	00:03:00					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/18/2001	14:36:00	00:04:00					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/18/2001	14:37:00	00:05:00	27.5	2.4-4.9		26.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/18/2001	14:38:00	00:06:00					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/18/2001	14:39:00	00:07:00					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/18/2001	14:40:00	00:08:00					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/18/2001	14:41:00	00:09:00					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/18/2001	14:42:00	00:10:00				27.5	26.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/18/2001	14:47:00	00:15:00	27.5	3.2-5.7		26.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/18/2001	14:52:00	00:20:00	27.5	4.0-5.5		26.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/18/2001	14:57:00	00:25:00	27.5	4.0-7.3		26.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/18/2001	15:02:00	00:30:00					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/18/2001	15:17:00	00:45:00	27	4.9-9.8		26	0	0	0	0	0	0	0	0.035	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/18/2001	15:32:00	01:00:00	27	6.8-9.8		26	0	0	0	0	0	0	0	0.16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/18/2001	15:47:00	1:15:00					0	0	0	0	0	0	0	0.21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/18/2001	16:02:00	1:30:00	27	7.8-9.8		26	0	0	0	0	0	0	0	0.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12/18/2001	16:17:00	1:45:00	27	7.8-9.8		26	0	0	0	0	0	0	0	0.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0								

Memphis Depot
Dunn Field SVE TS Field Data- Test 1 - VW-1 (December, 2001)

Date	Actual Time	Elapsed Time (hrs)	Vapor Flow Rate		Groundwater Flow	Vacuum																																
			Liquid Ring Pump (acfm)	Calculated Air SCFM		Flow Totalizer (gal)	Liquid Ring Pump (in-Hg)	Knock out Tank (in-Hg)	MP-1 22' Wellhead (in-H ₂ O)	MP-1 35' Wellhead (in-H ₂ O)	MP-1 58' Wellhead (in-H ₂ O)	MP-1 71' Wellhead (in-H ₂ O)	MP-2 22' Wellhead (in-H ₂ O)	MP-2 35' Wellhead (in-H ₂ O)	MP-2 58' Wellhead (in-H ₂ O)	MP-2 71' Wellhead (in-H ₂ O)	MP-3 11' Wellhead (in-H ₂ O)	MP-3 27' Wellhead (in-H ₂ O)	MP-3 49' Wellhead (in-H ₂ O)	MP-3 68' Wellhead (in-H ₂ O)	MP-4 19' Wellhead (in-H ₂ O)	MP-4 48' Wellhead (in-H ₂ O)	MP-4 58' Wellhead (in-H ₂ O)	MP-4 70' Wellhead (in-H ₂ O)	MP-5 11' Wellhead (in-H ₂ O)	MP-5 21' Wellhead (in-H ₂ O)	MP-6 11' Wellhead (in-H ₂ O)	MP-6 21' Wellhead (in-H ₂ O)	MP-6 51' Wellhead (in-H ₂ O)	MP-6 72' Wellhead (in-H ₂ O)	MP-7 6' Wellhead (in-H ₂ O)	MP-7 16' Wellhead (in-H ₂ O)	MP-7 41' Wellhead (in-H ₂ O)	MP-7 62' Wellhead (in-H ₂ O)	MP-8 16' Wellhead (in-H ₂ O)	MP-8 52' Wellhead (in-H ₂ O)		
12/19/2001	1:30:00	11:00:00	150	19.7		26	25	0	0	0	0	0	0	0	0.90	0.09	0	0	0.40	0	0	0	0	0	0.11	0.15	0	0	1.2	1.8	0	0	0	0	0	0	0	0
12/19/2001	2:30:00	12:00:00	150	19.7		26	24.5	0	0	0	0	0	0	0	0.90	0.12	0	0	0.40	0	0	0	0	0	0.12	0.14	0	0	1.3	1.9	0	0	0	0	0	0	0	0
12/19/2001	3:30:00	13:00:00	150	19.7		26	24.5	0	0	0	0	0	0	0	1.0	0	0	0.28	0	0	0	0	0	0.07	0.10	0	0	1.2	1.8	0	0	0	0	0	0	0	0	
12/19/2001	4:30:00	14:00:00	150-160	19.7-21.0		26	24.5	0	0	0	0	0	0	0	1.0	0	0	0.22	0	0	0	0	0	0.05	0.10	0	0	1.1	1.8	0	0	0	0	0	0	0	0	
12/19/2001	5:30:00	15:00:00	140	18.3		26	24	0	0	0	0	0	0	0	1.0	0	0	0.32	0	0	0	0	0	0.06	0.14	0	0	1.2	1.9	0	0	0	0	0	0	0	0	
12/19/2001	6:30:00	16:00:00	140	18.3		26	24	0	0	0	0	0	0	0	0.90	0.20	0	0.41	0	0	0	0	0	0.08	0.16	0	0	1.2	1.9	0	0	0	0	0	0	0	0	
12/19/2001	7:30:00	17:00:00	140-150	18.5-19.7		26	24	0	0	0	0.14	0	0	0	1.0	0.38	0	0.59	0	0	0	0	0	0.10	0.18	0	0	1.5	2.0	0	0	0	0	0	0	0	0	
12/19/2001	8:30:00	18:00:00	150-170	19.7-22.3		26	24	0	0.09	0.11	0.11	0.16	0.20	0.58	0.21	1.0	0.79	0.20	0.81	0.16	0.17	0.17	6.4	4.6	0.14	0.21	0.20	1.9	2.0	0.25	0.23	0	0.23	0	0.07	0.07		
12/19/2001	9:30:00	19:00:00	160-170	21.0-22.3	720	26	24	0	0.50	0.62	0.62	0.30	0.40	0.62	0.70	0.60	0.78	0.50	0.80	0.94	0.62	0.60	6.2	4.2	0.16	0.22	0.72	0.80	1.8	2.2	0.50	0.50	0.12	0.68	0.12	0.68		
12/19/2001	10:30:00	20:00:00	170	22.3		26	24	0	0.96	0.50	0.86	1.3	1.0	0.96	0.72	1.4	1.0	1.0	0.92	1.0	0.92	0.92	6.2	4.2	0.16	0.22	1.0	1.0	0.90	2.2	1.0	0.90	0.15	0.83	0.15	0.83		
12/19/2001	11:30:00	21:00:00	170-180	22.3-23.6		26	24	0.09	0.98	1.0	0.98	1.2	1.0	0.96	0.88	1.4	1.0	0.98	1.0	0.92	0.90	0.92	6.2	2.4	0.13	0.15	0.94	1.0	1.6	2.2	1.0	0.90	0.17	0.88	0.17	0.88		
12/19/2001	12:30:00	22:00:00	180-190	23.6-24.9		26	24	0.10	1.0	1.1	1.0	1.2	1.0	0.98	0.94	1.4	1.1	1.0	0.99	1.0	0.98	0.98	6.2	3.0	0.13	0.16	1.0	1.0	1.8	2.2	0.90	0.80	0.12	1.0	0.12	1.0		
12/19/2001	13:30:00	23:00:00	180-200	23.6-26.2		26	24	0.15	1.1	1.0	1.1	1.4	1.0	1.0	1.0	1.5	1.1	1.1	1.0	0.90	1.1	1.1	1.0	6.5	3.1	0.10	0.14	1.0	1.0	1.7	2.3	1.0	1.0	0.05	1.1	0.05	1.1	
12/19/2001	14:30:00	24:00	180-200	23.6-26.2		26	24	0.23	1.4	1.4	1.3	1.1	1.2	1.0	1.0	1.5	1.1	1.1	1.2	1.0	1.2	1.3	1.0	6.5	3.2	0.09	0.17	1.1	1.1	1.9	2.4	1.1	1.2	0.09	1.2	0.09	1.2	
12/19/2001	15:30:00	25:00	180-200	23.6-26.2		26	24	0.51	1.5	1.6	1.6	1.2	1.5	1.4	1.4	1.0	0.80	1.4	1.5	0.89	1.5	1.5	1.3	6.5	3.9	0.15	0.19	1.4	1.9	2.2	1.3	1.3	0.20	1.5	0.20	1.5		
12/19/2001	16:30:00	26:00	180-200	23.6-26.2		26	24	0.62	1.6	1.6	1.6	1.5	1.5	1.3	1.5	1.2	1.4	1.6	1.6	0.94	1.6	1.3	1.5	6.5	4.0	0.17	0.18	1.5	1.5	2.2	1.5	1.5	0.22	1.5	0.22	1.5		
12/19/2001	17:30:00	27:00	180-190	23.6-24.9		26	24	0.71	1.8	1.7	1.7	1.4	1.0	1.4	1.4	1.4	1.0	1.5	0.98	1.4	1.3	1.6	6.4	4.0	0.16	0.15	1.4	1.5	1.8	2.1	1.4	1.5	0.26	1.5	0.26	1.5		
12/19/2001	18:30:00	28:00	170-180	22.3-23.6		26	24	0.26	1.8	1.9	1.8	1.5	1.0	1.5	1.5	1.2	1.4	1.6	1.6	1.0	1.4	1.6	1.7	6.3	4.0	0.16	0.14	1.4	1.5	1.9	2.2	1.4	1.5	0.25	1.7	0.25	1.7	
12/19/2001	19:30:00	29:00	180-190	23.6-24.9		26	24	0.40	2.0	2.0	2.0	1.6	1.0	1.8	1.9	1.5	1.4	1.8	1.9	1.1	1.9	1.8	1.9	6.4	4.1	0.18	0.15	1.8	1.1	2.3	1.7	1.7	0.30	1.9	0.30	1.9		
12/19/2001	20:30:00	30:00	180-190	23.6-24.9		26	24	0.48	1.9	2.0	2.0	1.5	1.7	1.8	1.8	1.4	1.4	1.5	1.8	1.0	1.8	1.6	1.7	6.4	4.0	0.17	0.14	1.7	1.7	1.8	2.0	1.5	1.5	0.27	1.9	0.27	1.9	
12/19/2001	21:30:00	31:00	190-200	24.9-26.2		26	24	0.52	1.8	2.0	2.0	1.6	1.2	1.5	1.7	1.5	1.4	1.5	1.6	0.80	1.5	1.8	1.7	6.4	4.0	0.17	0.13	1.7	1.8	1.8	2.0	1.5	1.6	0.26	1.8	0.26	1.8	
12/19/2001	22:30:00	32:00	190-200	24.9-26.2		26	24	0.69	2.0	2.0	2.0	1.6	1.2	1.8	1.7	1.5	1.5	1.6	1.9	1.0	1.8	1.9	6.4	4.0	0.18	0.15	2.0	2.0	1.8	2.0	1.8	1.8	0.29	1.9	0.29	1.9		
12/19/2001	23:30:00	33:00	190-200	24.9-26.2		26	24.5	0.																														

Memphis Depot
Dunn Field SVE TS Field Data- Test 1 - VW-1 (December, 2001)

Date	Actual Time	Elapsed Time (hrs)	Vapor Flow Rate		Groundwater Flow	Vacuum																													
			Liquid Ring Pump (acfm)	Calculated Air SCFM		Flow Totalizer (gal)	Liquid Ring Pump (in-Hg)	Knock out Tank (in-Hg)	MP-1 22' Wellhead (in-H ₂ O)	MP-1 35' Wellhead (in-H ₂ O)	MP-1 58' Wellhead (in-H ₂ O)	MP-1 71' Wellhead (in-H ₂ O)	MP-2 22' Wellhead (in-H ₂ O)	MP-2 35' Wellhead (in-H ₂ O)	MP-2 58' Wellhead (in-H ₂ O)	MP-2 71' Wellhead (in-H ₂ O)	MP-3 11' Wellhead (in-H ₂ O)	MP-3 27' Wellhead (in-H ₂ O)	MP-3 49' Wellhead (in-H ₂ O)	MP-3 68' Wellhead (in-H ₂ O)	MP-4 19' Wellhead (in-H ₂ O)	MP-4 48' Wellhead (in-H ₂ O)	MP-4 58' Wellhead (in-H ₂ O)	MP-4 70' Wellhead (in-H ₂ O)	MP-5 11' Wellhead (in-H ₂ O)	MP-5 21' Wellhead (in-H ₂ O)	MP-6 11' Wellhead (in-H ₂ O)	MP-6 21' Wellhead (in-H ₂ O)	MP-6 51' Wellhead (in-H ₂ O)	MP-6 72' Wellhead (in-H ₂ O)	MP-7 6' Wellhead (in-H ₂ O)	MP-7 16' Wellhead (in-H ₂ O)	MP-7 41' Wellhead (in-H ₂ O)	MP-7 62' Wellhead (in-H ₂ O)	MP-8 16' Wellhead (in-H ₂ O)
12/20/2001	18 30:00	52 00	220-230	32.5-34.0	1240	25.5	0.06	0.60	0.59	0.58	0.77	0.56	0.51	0.49	1.1	0.80	0.50	0.52	0.60	0.53	0.51	0.52	0.51	7.3	1.7	0.08	0.09	0.55	0.50	1.3	1.7	0.58	0.58	0.01	0.50
12/20/2001	19 30 00	53 00	220-230	32.5-34.0		25.5	0.08	0.55	0.58	0.55	0.72	0.55	0.50	0.47	1.0	0.79	0.50	0.52	0.49	0.51	0.49	0.51	0.51	7.3	1.8	0.07	0.07	0.52	0.50	1.3	1.7	0.56	0.55	0.01	0.48
12/20/2001	20 30 00	54:00	220-240	32.5-35.5		25.5	0.11	0.54	0.53	0.53	0.70	0.50	0.47	0.44	1.0	0.74	0.45	0.46	0.59	0.48	0.45	0.48	7.4	1.7	0.08	0.08	0.49	0.46	1.3	1.6	0.52	0.50	0	0.46	
12/20/2001	21:30 00	55:00	220-240	32.5-35.5		25.5	0.11	0.51	0.52	0.50	0.69	0.50	0.45	0.42	1.0	0.74	0.42	0.44	0.55	0.46	0.42	0.41	7.4	1.8	0.08	0.06	0.46	0.44	1.3	1.5	0.51	0.50	0	0.44	
12/20/2001	22 30:00	56 00	230	34.0		25.5	0.10	0.42	0.40	0.40	0.58	0.36	0.32	0.32	1.0	0.68	0.31	0.30	0.50	0.35	0.30	0.28	7.4	1.6	0.07	0.04	0.36	0.32	1.1	1.5	0.40	0.38	0	0.33	
12/20/2001	23 30 00	57 00	220-240	32.5-35.5		25.5	0.13	0.32	0.31	0.32	0.51	0.51	0.28	0.26	1.0	0.65	0.25	0.24	0.50	0.50	0.24	0.24	7.4	1.5	0.06	0.05	0.30	0.27	1.1	1.5	0.33	0.30	0	0.28	
12/21/2001	0 30:00	58:00	230-240	34 0-35.5		25.5	0.12	0.25	0.22	0.26	0.45	0.23	0.20	0.18	0.90	0.58	0.18	0.16	0.46	0.22	0.16	0.20	7.4	1.5	0.06	0.04	0.40	0.19	1.1	1.3	0.25	0.23	0	0.20	
12/21/2001	1 30:00	59 00	220-230	32.5-34.0		25.5	0.22	0.43	0.40	0.43	0.18	0.42	0.38	0.36	1.0	0.73	0.35	0.34	0.59	0.38	0.35	0.33	7.4	1.5	0.08	0.09	0.40	0.37	1.2	1.6	0.44	0.40	0	0.36	
12/21/2001	2 30 00	60 00	220-230	32.5-34.0		25.5	0.18	0.41	0.39	0.37	0.06	0.32	0.33	0.31	1.1	0.66	0.31	0.28	0.50	0.38	0.28	0.30	7.3	1.3	0.06	0.06	0.30	0.33	1.2	1.4	0.40	0.36	0	0.30	
12/21/2001	3:30 00	61:00	230	34.0		25.5	0.21	0.42	0.34	0.38	0.54	0.26	0.28	0.28	1.0	0.64	0.28	0.28	0.50	0.32	0.32	0.26	7.3	1.2	0.06	0.05	0.27	0.30	1.2	1.6	0.35	0.32	0	0.28	
12/21/2001	4 30:00	62:00	230-240	34.0-35.5		25.5	0.21	0.31	0.28	0.38	0.49	0.24	0.20	0.21	1.0	0.58	0.20	0.18	0.48	0.24	0.23	0.19	7.4	1.0	0.05	0.03	0.21	0.19	1.2	1.3	0.29	0.34	0	0.20	
12/21/2001	5 30 00	63 00	230-240	34 0-35.5		25.5	0.23	0.31	0.31	0.30	0.48	0.28	0.25	0.24	1.0	0.68	0.30	0.30	0.50	0.24	0.30	0.28	7.6	1.2	0.07	0.07	0.32	0.30	1.3	1.4	0.32	0.30	0	0.30	
12/21/2001	6 30 00	64 00	230-240	34 0-35.5		25.5	0.25	0.40	0.40	0.40	0.55	0.40	0.38	0.38	1.0	0.70	0.36	0.34	0.58	0.38	0.40	0.34	7.6	1.2	0.07	0.06	0.38	0.35	1.4	1.6	0.42	0.40	0	0.32	
12/21/2001	7:30 00	65 00	230-240	34 0-35.5		25.5	0.05	0.51	0.48	0.50	0.60	0.42	0.41	0.42	1.0	0.75	0.44	0.42	0.60	0.42	0.43	0.40	7.4	1.0	0.07	0.07	0.47	0.42	1.1	1.3	0.48	0.46	0	0.43	
12/21/2001	8 30 00	66:00	230-240	34.0-35.5		25.5	0.06	0.68	0.62	0.64	0.72	0.62	0.55	0.59	1.0	0.85	0.62	0.58	0.60	0.57	0.56	0.54	7.5	0.90	0.05	0.07	0.58	0.60	1.2	1.5	0.65	0.62	0	0.60	
12/21/2001	9 30 00	67 00	230-240	34.0-35.5		25.5	0.04	0.82	0.76	0.80	0.80	0.78	0.67	0.70	1.0	0.84	0.72	0.68	0.64	0.66	0.65	0.68	7.6	0.80	0.03	0.07	0.72	0.70	1.1	1.7	0.74	0.72	0	0.72	
12/21/2001	10 30:00	68 00	230-240	34 0-35.5		25.5	0.06	0.62	0.58	0.62	0.72	0.52	0.45	0.46	0.73	1.0	0.46	0.47	0.50	0.50	0.52	0.50	7.5	0.50	0	0.03	0.49	0.46	1.0	1.5	0.53	0.51	0	0.48	
12/21/2001	11:30 00	69 00	230	34.0		25.5	0.16	0.08	0.60	0	0.16	0	0	0	0.88	0.40	0	0	0.30	0	0	0	7.5	0	0	0	0	0	0.80	0	0	0	0	0	
12/21/2001	12 30 00	70 00	240	35.5		25.5	0.11	0	0	0	0	0	0	0	0.88	0.20	0	0	0.25	0	0	0	7.2	0	0	0	0	0	0.80	0	0	0	0	0	
12/21/2001	13 30 00	71 00	240	35.5		25.5	0.01	0	0	0	0	0	0	0	0.92	0.16	0	0	0.25	0	0	0	7.5	0	0	0	0	0	0.98	0.04	0	0	0	0	
12/21/2001	14 30:00	72 00	240	35.5	1450	25.5	0.10	0	0	0	0	0	0	0	0.94	0.22	0	0	0.34	0	0	0	7.6	0	0	0	0	0	1.0	0.015	0	0	0	0	

Memphis Depot
Dunn Field SVE TS Field Data - Test 2 - VW-2 (January 2002)

Date	Current Time	Air Flow Rate		Elapsed Time (Before)	Vacuum Data																															
		ACFM	Calculated SCFM		Vacuum @ Pump (in-Hg)	MP-1 22" Wellhead (in-H₂O)	MP-1 35" Wellhead (in-H₂O)	MP-1 58" Wellhead (in-H₂O)	MP-1 71" Wellhead (in-H₂O)	MP-2 22" Wellhead (in-H₂O)	MP-2 35" Wellhead (in-H₂O)	MP-2 58" Wellhead (in-H₂O)	MP-2 71" Wellhead (in-H₂O)	MP-3 11" Wellhead (in-H₂O)	MP-3 27" Wellhead (in-H₂O)	MP-3 49" Wellhead (in-H₂O)	MP-3 68" Wellhead (in-H₂O)	MP-4 19" Wellhead (in-H₂O)	MP-4 48" Wellhead (in-H₂O)	MP-4 58" Wellhead (in-H₂O)	MP-4 70" Wellhead (in-H₂O)	MP-5 11" Wellhead (in-H₂O)	MP-5 21" Wellhead (in-H₂O)	MP-6 11" Wellhead (in-H₂O)	MP-6 21" Wellhead (in-H₂O)	MP-6 51" Wellhead (in-H₂O)	MP-6 72" Wellhead (in-H₂O)	MP-7 6" Wellhead (in-H₂O)	MP-7 16" Wellhead (in-H₂O)	MP-7 41" Wellhead (in-H₂O)	MP-7 62" Wellhead (in-H₂O)	MP-8 16" Wellhead (in-H₂O)	MP-8 52" Wellhead (in-H₂O)			
01/07/2002	14:00:00	270	249	2.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
01/07/2002	14:00:15	270	249	2.3	0	0.5	0.8	0.7	0.41	0.40	0.30	0.50	0.10	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0	0.02	0	0.72	1.4	0	0	0.70	0.01	0.03	0.09		
01/07/2002	14:00:30	270	249	2.3	0	0.9	1.0	0.9	0.54	0.60	0.70	0.60	0.10	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0	0.05	0	1.4	1.6	0	0	0.70	0.01	0.03	0.09		
01/07/2002	14:00:45	270	249	2.3	0	0.9	1.0	0.9	0.54	0.60	0.70	0.60	0.10	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0	0.02	0	1.5	1.5	0	0	0.82	0.01	0.03	0.09		
01/07/2002	14:01:00	270	249	2.3	0	0.9	1.0	0.9	0.54	0.60	0.70	0.60	0.12	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0	0.02	0	1.5	1.5	0	0	0.92	0.01	0.03	0.09		
01/07/2002	14:01:15	270	249	2.3	0	0.9	1.0	0.9	0.54	0.60	0.70	0.80	0.10	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0	0.02	0	1.6	1.7	0	0	1.2	0.01	0.03	0.09		
01/07/2002	14:01:30	270	249	2.3	0	0.9	1.0	0.9	0.56	0.60	0.80	0.80	0.10	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0	0.02	0	1.7	1.8	0	0	1.3	0.01	0.03	0.09		
01/07/2002	14:01:45	270	249	2.3	0	0.9	1.0	0.9	0.56	0.60	0.80	0.80	0.10	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0	0.02	0	1.7	1.8	0	0	1.3	0.02	0.03	0.09		
01/07/2002	14:02:00	270	249	2.3	0	0.9	1.0	0.9	0.56	0.80	1.0	1.0	0.10	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0	0.02	0	1.7	1.8	0	0	1.4	0.02	0.03	0.09		
01/07/2002	14:03:00	270	249	2.3	0	0.9	1.0	0.9	0.56	0.80	1.0	1.0	0.10	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0	0.02	0	1.8	1.8	0	0	1.6	0.02	0.03	0.09		
01/07/2002	14:04:00	270	249	2.3	0	0.9	1.0	0.9	0.56	0.80	1.0	1.0	0.10	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0	0.03	0	1.9	1.9	0	0	1.6	0.02	0.03	0.09		
01/07/2002	14:05:00	270	249	2.3	0	0.9	1.0	0.9	0.56	0.80	1.0	1.0	0.12	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0	0.04	0	2.0	1.9	0	0	1.6	0.02	0.03	0.09		
01/07/2002	14:06:00	270	249	2.3	0	0.9	1.0	0.9	0.58	0.80	1.0	1.0	0.12	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0	0.03	0	2.0	2.0	0	0	1.7	0.02	0.03	0.09		
01/07/2002	14:07:00	270	249	2.3	0	0.9	1.0	0.9	0.58	0.80	1.0	1.0	0.12	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0	0.03	0	2.0	2.0	0	0	1.7	0.02	0.03	0.09		
01/07/2002	14:08:00	270	249	2.3	0	0.9	1.0	0.9	0.58	1.0	1.2	1.2	0.12	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0	0.03	0	2.0	2.1	0	0	1.8	0.03	0.03	0.08		
01/07/2002	14:09:00	270	249	2.3	0	0.9	1.0	0.9	0.58	1.0	1.2	1.2	0.12	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0	0.03	0	2.0	2.0	0	0	1.9	0.03	0.03	0.08		
01/07/2002	14:10:00	270	249	2.3	0	0.9	1.2	1.0	0.58	1.0	1.2	1.2	0.12	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0	0.03	0	2.0	2.0	0	0	2.0	0.01	0.03	0.04		
01/07/2002	14:15:00	270	249	2.3	0	1.2	1.2	1.2	0.64	1.2	1.4	1.4	0.12	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0	0.03	0	2.1	2.1	0	0	2.0	0.02	0.45	0.03		
01/07/2002	14:20:00	270	249	2.3	0	1.2	1.2	1.2	0.64	1.2	1.4	1.4	0.10	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0	0.03	0	2.1	2.2	0	0	2.0	0.02	0.06	0.04		
01/07/2002	14:25:00	270	249	2.3	0	1.2	1.2	1.2	0.62	1.4	1.4	1.4	0.10	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0	0.02	0	2.0	2.1	0	0	2.3	0.02	0.06	0.03		
01/07/2002	14:30:00	270	249	2.3	0	1.2	1.3	1.3	0.80	1.4	1.6	1.6	0.14	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0	0.03	0	2.1	2.2	0	0	2.2	0.02	0.06	0.03		
01/07/2002	14:45:00	270	249	2.3	0	1.2	1.5	1.5	0.90	1.6	1.8	1.6	0.20	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0	0.04	0	2.5	2.6	0	0	2.4	0.02	0.09	0.03		
01/07/2002	15:00:00	270	249	2.3	0	1.2	1.6	1.6	1.0	1.8	1.8	1.8	0.22	0	0	0	0.01	0	0.01	0.02	0.01	0.02	0	0	0.04	0	2.5	2.8	0	0	2.5	0.01	0.11	0.03		
01/07/2002	15:05:00	220	210	1.3	0	1.6	1.6	1.6	1.0	1.4	1.4	1.2	0.22	0	0	0	0.01	0	0.01	0.01	0	0	0	0	0.05	0	1.9</									

Memphis Depot
Dunn Field SVE TS Field Data - Test 2 - VW-2 (January 2002)

Date	Current Time	Elapsed Time	Air Flow Rate		Vacuum Data																													
			ACFM	Calculated SCFM	Vacuum @ Pump (in-Hg)	MP-1 22' Wellhead (in-H ₂ O)	MP-1 35' Wellhead (in-H ₂ O)	MP-1 58' Wellhead (in-H ₂ O)	MP-1 71' Wellhead (in-H ₂ O)	MP-2 22' Wellhead (in-H ₂ O)	MP-2 35' Wellhead (in-H ₂ O)	MP-2 58' Wellhead (in-H ₂ O)	MP-2 71' Wellhead (in-H ₂ O)	MP-3 11' Wellhead (in-H ₂ O)	MP-3 27' Wellhead (in-H ₂ O)	MP-3 49' Wellhead (in-H ₂ O)	MP-3 68' Wellhead (in-H ₂ O)	MP-4 19' Wellhead (in-H ₂ O)	MP-4 48' Wellhead (in-H ₂ O)	MP-4 58' Wellhead (in-H ₂ O)	MP-4 70' Wellhead (in-H ₂ O)	MP-5 11' Wellhead (in-H ₂ O)	MP-5 21' Wellhead (in-H ₂ O)	MP-6 11' Wellhead (in-H ₂ O)	MP-6 21' Wellhead (in-H ₂ O)	MP-6 51' Wellhead (in-H ₂ O)	MP-6 72' Wellhead (in-H ₂ O)	MP-7 6' Wellhead (in-H ₂ O)	MP-7 16' Wellhead (in-H ₂ O)	MP-7 41' Wellhead (in-H ₂ O)	MP-7 62' Wellhead (in-H ₂ O)	MP-8 16' Wellhead (in-H ₂ O)	MP-8 52' Wellhead (in-H ₂ O)	
01/08/2002	0 00 00	10:00:00	275	253	2.3	0	1.8	1.6	1.6	1.2	1.8	1.8	1.8	0.07	0	0	0	0	0	0	0.01	0.01	0	0	0.03	0.02	2.4	2.6	0	0	2.4	0	0.20	0.02
01/08/2002	1 00 00	11:00:00	275	253	2.3	0	1.6	1.6	1.4	1.2	1.5	1.6	1.5	0.05	0	0	0	0	0	0	0.01	0	0	0	0.02	0	2.2	2.2	0	0	2.2	0	0.13	0.02
01/08/2002	2 00 00	12:00:00	275	253	2.3	0	1.2	1.3	1.1	1.0	1.3	1.4	1.3	0.08	0	0	0	0	0	0	0	0	0	0.02	0	2.0	2.2	0	0	2.1	0	0.09	0.02	
01/08/2002	3 00 00	13:00:00	275	253	2.3	0	1.1	1.2	1.2	1.1	1.1	1.5	1.3	0.10	0	0	0	0	0	0	0.02	0	0	0	0	2.1	2.0	0	0	2.2	0	0.13	0.02	
01/08/2002	4 00 00	14:00:00	275	253	2.3	0	1.4	1.4	1.4	1.2	1.3	1.4	1.4	0.11	0	0	0	0	0	0	0	0.01	0	0.03	0	2.2	2.2	0	0	2.1	0	0.14	0.02	
01/08/2002	5 00 00	15:00:00	275	253	2.3	0	1.2	1.2	1.2	1.1	1.4	1.5	1.4	0.09	0	0	0	0	0	0.01	0.01	0	0.04	0.01	2.1	2.1	0	0	2.1	0	0.15	0.01		
01/08/2002	6 00 00	16:00:00	275	253	2.3	0	1.3	1.3	1.3	1.0	1.5	1.5	1.5	0.09	0	0	0	0	0	0.01	0	0	0	0	2.1	2.1	0	0	2.1	0	0.13	0.01		
01/08/2002	7 00 00	17:00:00	275	253	2.3	0	1.1	1.3	1.2	1.1	1.4	1.4	1.4	0	0	0.01	0	0	0.01	0.01	0	0.02	0	2.1	2.1	0	0	2.1	0	0.11	0.01			
01/08/2002	8 00 00	18:00:00	275	253	2.3	0	1.2	1.3	1.3	1.1	1.2	1.4	1.5	0.10	0	0	0	0	0	0.01	0.01	0	0.02	0	2.0	2.0	0	0	2.0	0.01	0.09	0.01		
01/08/2002	9 00 00	19 00:00	275	253	2.3	0	1.2	1.3	1.3	1.0	1.5	1.4	1.2	0.10	0	0.01	0.01	0.01	0	0.01	0.01	0	0.04	0	2.0	2.1	0	0	2.0	0.01	0.05	0.02		
01/08/2002	10 00:00	20:00:00	275	253	2.3	0	1.1	1.2	1.0	1.0	1.3	1.3	1.2	0.10	0	0.01	0.01	0.01	0	0.02	0.01	0	0.01	0	2.0	2.0	0	0	2.0	0.01	0	0.02		
01/08/2002	11 00:00	21:00:00	275	253	2.3	0	1.0	1.0	1.0	1.0	1.1	1.1	1.0	0	0	0.01	0.01	0	0	0.01	0.01	0	0	0	1.7	1.7	0	0	2.0	0.01	0	0.01		
01/08/2002	12 00 00	22:00 00	275	253	2.3	0	0.50	0.56	0.54	0.48	0.92	1.1	1.0	0	0	0	0	0	0	0	0.015	0	0.03	0	1.5	1.5	0	0	1.5	0	0	0.01		
01/08/2002	13 00:00	23 00 00	275	253	2.3	0	0.22	0.23	0.23	0.80	0.62	0.60	0.23	0	0	0.01	0.01	0	0	0.01	0.01	0	0	0	1.1	1.1	0	0	1.1	0.01	0	0.01		
01/08/2002	14:00:00	24 00	275	254	2.2	0	0.19	0.20	0.20	0.22	0.62	0.60	0.22	0	0	0.01	0.01	0	0	0	0	0	0	0	1.1	1.1	0	0	1.1	0.01	0	0.01		
01/08/2002	15 00:00	25:00	275	254	2.2	0	0.18	0.22	0.20	0.32	0.66	0.60	0.70	0	0	0.01	0.01	0	0	0.01	0.01	0	0	0	1.2	1.2	0	0	1.2	0	0	0.02		
01/08/2002	16 00 00	26 00	275	254	2.2	0	0.32	0.36	0.36	0.40	0.78	0.76	0.74	0	0	0.01	0	0	0	0.01	0.01	0	0.01	0	1.3	1.4	0	0	1.2	0	0	0.02		
01/08/2002	17 00 00	27 00	275	255	2.1	0	0.43	0.50	0.48	0.55	0.92	0.90	0.89	0.03	0	0.01	0	0	0	0	0	0	0	1.5	1.5	0	0	1.5	0	0	0.02			
01/08/2002	18 00:00	28 00	275	255	2.1	0	0.64	0.68	0.68	0.69	1.1	1.1	1.0	0.03	0	0.01	0	0	0	0.01	0.01	0	0.01	0	1.5	1.6	0	0	1.6	0	0	0.02		
01/08/2002	19:00:00	29 00	275	255	2.1	0	0.72	0.79	0.78	0.76	0.90	1.0	1.0	0.03	0	0	0	0	0	0	0	0	0	1.5	1.8	0	0	1.6	0	0	0.02			
01/08/2002	20 00 00	30 00	275	255	2.1	0	0.65	0.79	0.75	0.67	0.90	1.0	0.90	0.03	0	0	0	0	0	0	0	0	0	1.5	1.7	0	0	1.6	0	0	0.02			
01/08/2002	21 00 00	31 00	275	255	2.1	0	0.60	0.64	0.62	0.59	0.90	0.90	0.90	0.01	0	0	0	0	0	0	0	0	0	1.5	1.5	0	0	1.5	0	0	0.02			
01/08/2002	22 00 00	32 00	275	255	2.1	0	0.62	0.67	0.66	0.58	1.0	0.90	0.90	0.03	0	0	0	0	0	0	0	0	0	1.5	1.6	0	0	1.6	0	0	0.02			
01/08/2002	23 00:00	33 00	275	255	2.1	0	0.60	0.64	0.64	0.68	0.90	0.90	0.90	0.04	0	0	0	0	0	0	0	0	0	1.5	1.6	0	0	1.6	0	0	0.02			
01/09/2002	0 00 00	34 00	275	255	2.1	0	0.48	0.51	0.50	0.50	0.82	0.90	0.88	0	0	0	0	0	0	0	0	0	0	1.4	1.5	0	0	1.5	0	0	0.02			
01/09/2002	1 00 00	35:00	275	255	2.1	0	0.46	0.50	0.49	0.52	0.90	0.92	0.85	0	0	0	0	0	0	0	0	0	0	1.5	1.3	0	0	1.4	0	0	0.02			
01/09/2002	2 00:00	36:00	275	255	2.1	0	0.53	0.58	0.56	0.59	0.92	0.96	0.93	0	0	0	0.04	0	0</															

Memphis Depot
Dunn Field SVE TS Field Data - Test 2 - VW-2 (January 2002)

Date	Current Time	Elapsed Time	Air Flow Rate		Vacuum Data																														
			ACFM	Calculated SCFM	Vacuum @ Pump (in-Hg)	MP-1 22' Wellhead (in-H ₂ O)	MP-1 35' Wellhead (in-H ₂ O)	MP-1 58' Wellhead (in-H ₂ O)	MP-1 71' Wellhead (in-H ₂ O)	MP-2 22' Wellhead (in-H ₂ O)	MP-2 35' Wellhead (in-H ₂ O)	MP-2 58' Wellhead (in-H ₂ O)	MP-2 71' Wellhead (in-H ₂ O)	MP-3 11' Wellhead (in-H ₂ O)	MP-3 27' Wellhead (in-H ₂ O)	MP-3 49' Wellhead (in-H ₂ O)	MP-3 68' Wellhead (in-H ₂ O)	MP-4 19' Wellhead (in-H ₂ O)	MP-4 48' Wellhead (in-H ₂ O)	MP-4 58' Wellhead (in-H ₂ O)	MP-4 70' Wellhead (in-H ₂ O)	MP-5 11' Wellhead (in-H ₂ O)	MP-5 21' Wellhead (in-H ₂ O)	MP-6 11' Wellhead (in-H ₂ O)	MP-6 21' Wellhead (in-H ₂ O)	MP-6 51' Wellhead (in-H ₂ O)	MP-6 72' Wellhead (in-H ₂ O)	MP-7 6' Wellhead (in-H ₂ O)	MP-7 16' Wellhead (in-H ₂ O)	MP-7 41' Wellhead (in-H ₂ O)	MP-7 62' Wellhead (in-H ₂ O)	MP-8 16' Wellhead (in-H ₂ O)	MP-8 52' Wellhead (in-H ₂ O)		
01/10/2002	0:00:00	58:00	275	255	2.1	0	1.0	1.0	1.0	1.0	1.2	1.2	1.2	0	0	0.01	0.01	0	0.01	0.02	0.02	0.01	0	0	0.01	1.9	1.8	0	0	2.0	0	0	0	0.02	
01/10/2002	1:00:00	59:00	275	255	2.1	+0.01	0.90	0.88	0.88	1.0	1.2	1.2	1.2	0	0	0.01	0.01	0	0.01	0.01	0.01	0	0	0.02	0.01	1.8	1.8	0	0	1.9	0	0	0	0.03	
01/10/2002	2:00:00	60:00	275	253	2.3	0	0.92	0.98	1.0	1.0	1.2	1.2	1.2	0	0	0.01	0.01	0	0.01	0.01	0.01	0	0	0.01	0.01	1.8	1.8	0	0	1.9	0	0	0	0.01	
01/10/2002	3:00:00	61:00	275	253	2.3	0	0.81	0.96	0.90	0.90	1.1	1.1	1.1	0	0	0.01	0	0	0.01	0.01	0.01	0	0	0.03	0.01	1.8	1.8	0	0	1.9	0	0	0	0.02	
01/10/2002	4:00:00	62:00	275	253	2.3	0	0.89	0.90	0.92	1.0	1.1	1.2	1.2	0.08	0	0.01	0	0	0.02	0.02	0.01	0	0	0.03	0.02	1.9	1.9	0	0	2.0	0	0	0	0.02	
01/10/2002	5:00:00	63:00	275	253	2.3	0	1.0	1.0	1.0	1.1	1.2	1.2	1.2	0.11	0	0.01	0	0	0.01	0.01	0	0	0.02	0.04	2.0	2.0	0	0	2.0	0	0	0.01	0.03		
01/10/2002	6:00:00	64:00	275	253	2.3	0	1.2	1.2	1.0	1.2	1.3	1.4	1.4	0.11	0	0.01	0	0	0.01	0.01	0.01	0	0	0.02	0.04	2.0	2.0	0	0	2.1	0	0	0.01	0.03	
01/10/2002	7:00:00	65:00	275	253	2.3	0	1.1	1.1	1.2	1.2	1.8	1.5	1.5	0.12	0	0.01	0.01	0	0.01	0.02	0.01	0	0	0.03	0.03	2.1	2.1	0	0	2.1	0	0	0.01	0.03	
01/10/2002	8:00:00	66:00	275	253	2.3	0	1.3	1.3	1.3	1.3	1.7	1.7	1.5	0.13	0	0.01	0.01	0	0.01	0.01	0.01	0	0	0.03	0.04	2.2	2.2	0	0	2.3	0	0	0.02	0.03	
01/10/2002	9:00:00	67:00	275	253	2.3	0	1.3	1.3	1.4	1.4	1.7	1.7	1.5	0.16	0	0.01	0.01	0	0.01	0.01	0.01	0	0	0.04	0.04	2.3	2.3	0	0	2.3	0	0.02	0.02	0.03	
01/10/2002	10:00:00	68:00	275	253	2.3	0	1.3	1.3	1.4	1.5	1.6	1.8	1.5	0.15	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0.05	0.04	2.3	2.3	0	0	2.3	0	0.02	0.02	0.03	
01/10/2002	11:00:00	69:00	275	253	2.3	0	1.3	1.4	1.1	1.2	1.3	1.5	1.3	0	0	0.01	0.01	0	0.01	0.02	0.01	0	0	0	+0.05	2.0	2.1	0	0	2.0	0	0	0	0.03	
01/10/2002	12:00:00	70:00	275	254	2.2	0	0.90	0.90	1.0	1.0	1.2	1.2	1.1	0	0	0.01	0.01	0	0.01	0.01	0.01	0	0	0.02	+0.11	1.9	1.9	0	0	1.9	0	0	+0.02	0.03	
01/10/2002	13:00:00	71:00	275	254	2.2	0	0.60	0.70	0.80	0.80	1.0	1.0	1.0	0	0	0.01	0.01	0	0.01	0.02	0.01	0.01	0	0	0.04	0	1.8	1.8	0	0	1.7	0.01	0	0	0.03
01/10/2002	14:00:00	72:00	275	254	2.2	0	0.70	0.65	0.63	0.70	0.90	1.0	0.90	0	0	0.01	0.01	0	0.01	0.02	0.01	0.01	0	0	0.04	0	1.6	1.6	0	0	1.7	0.01	+0.03	0.03	0.03
01/10/2002	15:00:00	73:00	275	254	2.2	0	0.70	0.67	0.66	0.68	1.1	1.0	1.0	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0.03	0.03	1.6	1.5	0	0	1.7	0.01	+0.03	0.03	0.03	
01/10/2002	16:00:00	74:00	275	254	2.2	0	0.90	0.87	0.86	0.88	1.1	1.2	1.2	0	0	0.01	0.01	0	0.01	0.01	0.01	0	0	0.04	0.06	1.8	1.8	0	0	1.9	0.01	0	0	0.03	
01/10/2002	17:00:00	75:00	275	254	2.2	0	0.96	0.95	0.92	0.90	1.1	1.3	1.2	0	0	0.01	0.01	0	0.01	0.01	0.01	0	0	0.03	0.04	1.9	1.9	0	0	2.0	0.01	0	0	0.03	
01/10/2002	18:00:00	76:00	275	254	2.2	0	1.0	1.2	1.2	1.1	1.4	1.5	1.5	0	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0	0.04	0.07	2.1	2.0	0	0	2.2	0.01	0.03	0.03	0.03
01/10/2002	19:00:00	77:00	275	254	2.2	0	1.1	1.2	1.3	1.2	1.5	1.6	1.5	0	0	0.01	0.01	0	0.01	0.01	0.01	0	0	0.04	0.06	2.1	2.1	0	0	2.1	0.01	0.03	0.03	0.03	
01/10/2002	20:00:00	78:00	275	253	2.3	0.25	1.8	1.9	1.8	1.9	2.0	2.0	2.0	0.25	0	0.01	0.01	0	0.01	0.02	0.02	0.02	0	0.07	0.17	2.7	2.5	0.01	0	2.8	0.01	0.07	0.03	0.03	
01/10/2002	21:00:00	79:00	275	253	2.3	1.1	2.0	2.0	2.0	2.0	2.2	2.3	2.2	0.15	0	0.01	0.01	0	0.01	0.02	0.01	0.02	0	0.02	0.13	2.8	2.9	0	0	3.0	0.01	0.09	0.03	0.03	
01/10/2002	22:00:00	80:00	275	253	2.3	1.5	2.2	2.3	2.2	2.0	2.4	2.4	2.3	0.20	0	0.01	0.01	0	0.01	0.02	0.02	0.02	0	0.05	0.13	3.0	3.0	0	0	3.1	0.01	0.09	0.03	0.03	
01/10/2002	23:00:00	81:00	275	253	2.3	1.8	2.2	2.3	2.2	2.1	2.4	2.4	2.3	0.19	0	0.01	0.01	0	0.01	0.02	0.02	0.02	0	0.04	0.09	3.1	3.1	0	0	3.2	0.01	0.08	0.03	0.03	
01/11/2002	0:00:00	82:00	275	252	2.4	1.9	2.2	2.3	2.2	2.0	2.4	2.4	2.3	0.20	0	0.01	0.01	0	0.01	0.02	0.02	0.02	0	0.06	0.07	3.1	3.1	0	0	3.2	0.01	0.06	0.03	0.03	
01/11/2002	1:00:00	83:00	275	253	2.3	2.1	2.3	2.3	2.3	2.1	2.5	2.5	2.4	0.18	0	0	0.01	0	0.01	0.02	0.02	0.02	0	0.06	0.07	3.2	3.2	0	0	3.3	0	0.06	0.03	0.03	
01/11/2002	2:00:00	84:00	275	253	2.3	2.3	2.4	2.4	2.4	2.2	2.5	2.6	2.5	0.24	0.01	0.01	0	0	0.01	0.01	0.02	0.02	0	0.06	0.11	3.3	3.3	0	0	3.5	0	0.07	0.03	0.03	
01/11/2002	3:00:00	8																																	

Memphis Depot - Test 1

Dunn Field SVE TS Recording Sheet for before test and after test

After Test12/21/01

Before Test: 12/17/01

Recorder: Jacobs

		VW-1 Wellhead	VW-2 Wellhead	MP-1-22' Wellhead	MP-1-35' Wellhead	MP-1-58' Wellhead	MP-1-71' Wellhead	MP-2-22' Wellhead	MP-2-35' Wellhead	MP-2-58' Wellhead	MP-2-71' Wellhead	MP-3-11' Wellhead	MP-3-27' Wellhead	MP-3-49' Wellhead	MP-3-58' Wellhead	MP-4-19' Wellhead	MP-4-48' Wellhead	MP-4-58' Wellhead	MP-4-70' Wellhead
		Before Test	After Test	Before Test	After Test	Before Test	After Test	Before Test	After Test	Before Test	After Test	Before Test	After Test	Before Test	After Test	Before Test	After Test	Before Test	After Test
Screening with an FID for VOCs Tedlar bag w/ pump (ppm)	Before Test	787	68	NS	745	662	434	43	204	690	1326	242	991	418	542	155	3159	2919	2302
	After Test	2495	63	254	117	1055	260	87	585	2210	1020	40	621	739	650	147	3840	2320	4916
Air Sampling for O ₂ (%)	Before Test			20.0	13.1	13.2	20.5	19.9	20.3	12.7	14.2	17.8	20.3	14.6	14.4	19.3	12.3	12.4	12.6
	After Test			21.9	22.0	15.1	17.1	22.7	22.7	16.3	17.3	21.9	22.8	16.5	16.3	21.5	14.2	15.0	14.5
Air Sampling for CO ₂ (%)	Before Test			0.5	8.0	7.7	0.1	0.6	0.4	0.7	6.7	2.1	0.5	6.1	6.4	0.6	8.9	8.7	8.6
	After Test			0.5	0.3	7.0	4.5	0.0	0.0	6.2	4.9	2.1	0.0	5.7	5.8	0.3	8.0	7.0	7.7
Air Sampling for CH ₄ (%)	Before Test			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	After Test			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1

		MP-5-11' Wellhead	MP-5-21' Wellhead	MP-6-11' Wellhead	MP-6-21' Wellhead	MP-6-51' Wellhead	MP-6-72' Wellhead	MP-7-6' Wellhead	MP-7-16' Wellhead	MP-7-41' Wellhead	MP-7-62' Wellhead	MP-8-16' Wellhead	MP-8-52' Wellhead
		Before Test	After Test	Before Test	After Test	Before Test	After Test	Before Test	After Test	Before Test	After Test	Before Test	After Test
Screening with an FID for VOCs Tedlar bag w/ pump (ppm)	Before Test	NS	NS	NS	NS	5771	4475	181	135	188	3959	NS	1154
	After Test	62	211	49	473	8592	5530	19700	20	32	4830	NS	133
Air Sampling for O ₂ (%)	Before Test	19.9	20.2	16.2	18.9	13.5	12.7	12.4	13.3	2.3	12.6	19.9	15.0
	After Test	22.7	22.7	22.8	22.8	15.0	15.0	21.3	22.3	5.8	14.1	22.5	22.8
Air Sampling for CO ₂ (%)	Before Test	1.0	0.4	2.5	0.9	5.6	7.9	0.0	0.0	14.6	7.9	0.2	5.0
	After Test	0.0	0.0	0.1	0.1	7.7	7.4	1.3	0.0	15.0	7.2	0.2	0.1
Air Sampling for CH ₄ (%)	Before Test	0.1	0.1	0.0	0.0	0.2	1.4	4.0	0.5	0.0	0.1	0.2	0.2
	After Test	0.0	0.2	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.2	0.6	0.2

Note:

NS -- Not Sampled, air could not be pumped and sampled from location due to presence of water

Memphis Depot - Test 2
Dunn Field SVE TS Recording Sheet (January 2002)

Before Test: 1/7/2002

After Test: 1/11/2002

Recorder: Jacobs

		VW-1 Wellhead	VW-2 Wellhead	MP-1-22' Wellhead	MP-1-35' Wellhead	MP-1-58' Wellhead	MP-1-71' Wellhead	MP-2-22' Wellhead	MP-2-35' Wellhead	MP-2-58' Wellhead	MP-2-71' Wellhead	MP-3-11' Wellhead	MP-3-27' Wellhead	MP-3-49' Wellhead	MP-3-68' Wellhead	MP-4-19' Wellhead	MP-4-48' Wellhead	MP-4-58' Wellhead	MP-4-70' Wellhead
		Before Test	After Test	Before Test	After Test	Before Test	After Test	Before Test	After Test	Before Test	After Test	Before Test	After Test	Before Test	After Test	Before Test	After Test	Before Test	After Test
Screening with an FID for VOCs Tedlar bag w/ pump (ppm)	Before Test	110	112	43.7	41.4	37.5	26.2	7206	50.4	413	559	165	1003	27.7	758	351	63.2	66.8	41.3
	After Test	32.4	33.5	17.1	46.1	288	305	189	23.6	432	221	3.1	29.6	8.7	2.1	4.6	6.9	5.1	16.3
Air Sampling for O ₂ (%)	Before Test	15.5	20.5	8.0	17.8	14.0	13.4	8.6	20.5	17.0	15.3	19.1	15.6	20.6	14.5	20.7	20.8	20.8	20.8
	After Test	18.2	20.9	15.4	21.9	21.8	19.1	6.9	21.9	20.7	21.0	21.1	21.9	21.9	19.8	21.0	22.1	21.1	21.5
Air Sampling for CO ₂ (%)	Before Test	1.3	0	3.8	1.9	6.1	6.2	7.8	0.1	3.2	5.2	1.7	5.3	0.3	5.7	0.1	0	0	0
	After Test	1.0	0	1.8	0	0.1	1.2	10.3	0.2	0.1	0.1	1.7	0	0	0.5	0	0	0	0.4
Air Sampling for CH ₄ (%)	Before Test	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	After Test	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

		MP-5-11' Wellhead	MP-5-21' Wellhead	MP-6-11' Wellhead	MP-6-21' Wellhead	MP-6-51' Wellhead	MP-6-72' Wellhead	MP-7-6' Wellhead	MP-7-16' Wellhead	MP-7-41' Wellhead	MP-7-62' Wellhead	MP-8-16' Wellhead	MP-8-52' Wellhead
		Before Test	After Test	Before Test	After Test	Before Test	After Test	Before Test	After Test	Before Test	After Test	Before Test	After Test
Screening with an FID for VOCs Tedlar bag w/ pump (ppm)	Before Test	191	468	495	2506	263	2630	2862	79	309	2268	7.5	6.8
	After Test	481	3.3	56.3	1.9	3035	3395	1153	39.7	156	130	5.6	8.8
Air Sampling for O ₂ (%)	Before Test	16.0	20.4	8.3	20.1	20.4	13.5	0	1.9	3.3	10.3	20.4	17.0
	After Test	21.9	21.8	8.8	21.4	21.9	22.1	11.4	0.8	15.4	20.7	21.8	20.0
Air Sampling for CO ₂ (%)	Before Test	2.3	1.0	6.0	0.8	0.2	7.0	12.2	13.2	14.1	6.7	0.3	1.9
	After Test	0	0.6	6.6	0.7	0	0.1	3.2	18.5	7.8	1.5	0.1	0.5
Air Sampling for CH ₄ (%)	Before Test	0	0	0	0	0	0.2	5.8	0.2	0.2	0.2	0.2	0
	After Test	0	0.1	0.1	0.1	0	0.1	0.6	0	0	0	0.3	0.1

Attachment D

TO-14A/TO-15 GC/MS Volatiles Report

Sample: Philip 209131 Jacobs Dunnfield SVE

Autosampler: 3

Dil. Fact: 9.3

Misc: 500mL; 12/18/01 VW-1 Test/VW-1 Wellhead

GC/MS #1

Method: 1702 1832

File: PCHEM\1\1702\

1475132.D

Reporting

Compound	CAS #	R.T.	Q ion	Area	ppbv	Limits ppbv	IS/Surr. Recovery
Chlorobenzene-d5 (IS)		12.46	117	5998874	50.0		100%
Dichlorodifluoromethane (12)	75-71-8	2.13	85	3922	ND	4.7	
Chloromethane	74-87-3	2.77	50	2228	ND	4.7	
1,2- Cl- 1,1,2,2-F ethane (114)	76-14-2	0.00	85	0	ND	4.7	
Vinyl chloride	75-01-4	3.10	62	966817	263.4	4.7	
Bromomethane	74-83-9	0.00	94	0	ND	4.7	
Chloroethane	75-00-3	4.23	64	5040	ND	4.7	
Trichlorofluoromethane (11)	75-69-4	4.54	101	2680	ND	4.7	
1,1-Dichloroethene	75-35-4	5.40	61	375713	32.5	4.7	
1,1,2- Cl 1,2,2- F ethane (113)	76-13-1	0.00	151	0	ND	4.7	
Methylene Chloride	75-09-2	6.23	84	15985	ND	4.7	
MTBE (TO-15 only)	1634-04-4	6.66	73	2392	ND	4.7	
1,1-dichloroethane	75-34-3	7.17	63	5701	ND	4.7	
cis-1,2-Dichloroethene	156-59-2	7.76	61	14446832	874.0	4.7	
Chloroform	67-66-3	8.06	83	1481616	62.5	4.7	
1,1,1-Trichloroethane	71-55-6	8.27	97	8657	ND	4.7	
1,2-Dichloroethane	107-06-2	8.84	62	291241	14.1	4.7	
Carbon tetrachloride	56-23-5	8.20	117	15109	ND	4.7	
Benzene	71-43-2	8.65	78	776995	21.0	4.7	
Trichloroethene	79-01-6	9.33	130	60148322	3169.6	4.7	
1,2-dichloropropane	78-87-5	9.76	63	6228	ND	4.7	
cis-1,3-dichloropropene	542-75-6	10.53	75	10928	ND	4.7	
Toluene	108-88-3	10.79	91	1312542	19.6	4.7	
trans-1,3-dichloropropene	10061-02-6	11.17	75	633	ND	4.7	
1,1,2-Trichloroethane	79-00-5	11.41	97	2357431	114.8	4.7	
Tetrachloroethene	127-18-4	11.20	166	34278871	1195.7	4.7	
1,2-Dibromoethane	106-93-4	11.87	107	23432	ND	4.7	
Chlorobenzene	108-90-7	12.47	112	191675	ND	4.7	
Ethyl benzene	100-41-4	12.51	91	4966444	64.4	4.7	
m,p-Xylene	1330-20-7	12.51	91	4966444	45.6	4.7	
o-Xylene	95-47-6	13.40	91	2260274	34.9	4.7	
Styrene	100-42-5	13.31	104	118120	ND	4.7	
1,1,2,2-Tetrachloroethane	79-34-5	14.14	83	1.24E+08	2391.3	4.7	
Bromofluorobenzene (SS)		13.92	95	1152120	26.1		52%
1,3,5-Trimethylbenzene	108-67-8	14.47	105	4858693	65.3	4.7	
1,2,4-Trimethylbenzene	95-63-6	14.87	105	12000497	160.4	4.7	
1,3-Dichlorobenzene	541-73-1	15.27	146	126082	ND	4.7	
1,4-Dichlorobenzene	106-46-7	15.38	146	213585	ND	4.7	
1,2-Dichlorobenzene	95-50-1	15.94	146	140480	ND	4.7	
1,2,4-Trichlorobenzene	120-82-1	17.94	180	236468	8.4	4.7	
Hexachlorobutadiene	87-68-3	17.92	225	3880373	109.4	4.7	

Note than benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data:

NIST Traceable Standard Cylinder: Spectra Gases L69236, 1ppmv

108_20R.D

108_10B.D

108_30I.D

Date Printed:

1/30/02 3:44 PM

ND = Not Detected at the Reporting Limits.

SS = Surrogate Standard; IS = Internal Standard 50 ng each.

Col:RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; direct interface; -20C to 210 @ 12C/m; 35-300 amu full scan

Nutech: -5C Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15_lci.

TO15crt4.crt

TO-14A/TO-15 GC/MS Volatiles Report

Sample: Philip/Jacobs Dunfield SVE 12/18/01

Misc: 500mL; VW-1 Test/Carbon canister sys; 0066

Autosampler: 3

Dil. Fact: 1.7

Method: 10801 18 32

File: CHEM1\10801\

1475133.D

30201_01.D

GC/MS

Compound	CAS #	R.T.	Q Ion	Area	ppbv	Reporting Limits ppbv	IS/Surr. Recovery
Chlorobenzene-d5 (IS)		12.42	117	1267684	50.0		
Dichlorodifluoromethane (12)	75-71-8	0.00	85	0	ND	0.8	100%
Chloromethane	74-87-3	2.70	50	1316	ND	0.8	
1,2- Cl- 1,1,2,2-F ethane (114)	76-14-2	0.00	85	0	ND	0.8	
Vinyl chloride	75-01-4	0.00	62	0	ND	0.8	
Bromomethane	74-83-9	0.00	94	0	ND	0.8	
Chloroethane	75-00-3	0.00	64	0	ND	0.8	
Trichlorofluoromethane (11)	75-69-4	0.00	101	0	ND	0.8	
1,1-Dichloroethene	75-35-4	5.40	61	2607	ND	0.8	
1,1,2- Cl 1,2,2- F ethane (113)	76-13-1	0.00	151	0	ND	0.8	
Methylene Chloride	75-09-2	6.25	84	16387	1.7	0.8	
MTBE (TO-15 only)	1634-04-4	7.31	73	568	ND	0.8	
1,1-dichloroethane	75-34-3	7.15	63	1609	ND	0.8	
cis-1,2-Dichloroethene	156-59-2	7.74	61	784798	40.5	0.8	
Chloroform	67-66-3	8.04	83	14870	ND	0.8	
1,1,1-Trichloroethane	71-55-6	8.25	97	9338	ND	0.8	
1,2-Dichloroethane	107-06-2	8.82	62	5069	ND	0.8	
Carbon tetrachloride	56-23-5	0.00	117	0	ND	0.8	
Benzene	71-43-2	8.63	78	68187	1.6	0.8	
Trichloroethene	79-01-6	9.24	130	13045245	585.8	0.8	
1,2-dichloropropane	78-87-5	0.00	63	0	ND	0.8	
cis-1,3-dichloropropene	542-75-6	0.00	75	0	ND	0.8	
Toluene	108-88-3	10.75	91	151731	1.9	0.8	
trans-1,3-dichloropropene	10061-02-6	10.98	75	7366	ND	0.8	
1,1,2-Trichloroethane	79-00-5	11.36	97	91591	3.8	0.8	
Tetrachloroethene	127-18-4	11.19	166	4974366	147.8	0.8	
1,2-Dibromoethane	106-93-4	0.00	107	0	ND	0.8	
Chlorobenzene	108-90-7	12.44	112	11741	ND	0.8	
Ethyl benzene	100-41-4	12.48	91	105413	1.2	0.8	
m,p-Xylene	1330-20-7	12.65	91	380307	3.0	0.8	
o-Xylene	95-47-6	13.19	91	194509	2.6	0.8	
Styrene	100-42-5	13.22	104	24236	ND	0.8	
1,1,2,2-Tetrachloroethane	79-34-5	14.15	83	28688501	473.3	0.8	
Bromofluorobenzene (SS)		13.88	95	673310	72.3		145%
1,3,5-Trimethylbenzene	108-67-8	14.34	105	229626	2.6	0.8	
1,2,4-Trimethylbenzene	95-63-6	14.81	105	476407	5.4	0.8	
1,3-Dichlorobenzene	541-73-1	15.22	146	4915	ND	0.8	
1,4-Dichlorobenzene	106-46-7	15.33	146	24039	ND	0.8	
1,2-Dichlorobenzene	95-50-1	15.89	146	6356	ND	0.8	
1,2,4-Trichlorobenzene	120-82-1	17.92	180	9890	ND	0.8	
Hexachlorobutadiene	87-68-3	17.89	225	1366684	32.8	0.8	

Note than benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data:

NIST Traceable Standard Cylinder: Spectra Gases L69236, 1ppmv

108_20R.D

108_10B.D

108_30I.D

Date Printed:

1/31/02 2:32 PM

ND = Not Detected at the Reporting Limits.

SS = Surrogate Standard; IS = Internal Standard 50 ng each.

Col:RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; direct interface; -20C to 210 @ 12C/m; 35-300 amu full scan

Nutech: -5C Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15_lci.

TO15crt4.crt

TO-14A/TO-15 GC/MS Volatiles Report

Sample: Philip 209131 Jacobs Dunnfield SVE

Autosampler: 4

Dil. Fact: 1.0

Misc: 500mL; 12/18/01 VW-1 Test/ equipment blank

GC/MS #1

Method: 1702 18.3 File: PCHEM\1\1702\ 1475134.D

Reporting

Compound	CAS #	R.T.	Q ion	Area	ppbv	Limits ppbv	IS/Surr. Recovery
Chlorobenzene-d5 (IS)		12.42	117	3778304	50.0		100%
Dichlorodifluoromethane (12)	75-71-8	0.00	85	0	ND	0.5	
Chloromethane	74-87-3	2.91	50	1383	ND	0.5	
1,2- Cl- 1,1,2,2-F ethane (114)	76-14-2	0.00	85	0	ND	0.5	
Vinyl chloride	75-01-4	0.00	62	0	ND	0.5	
Bromomethane	74-83-9	0.00	94	0	ND	0.5	
Chloroethane	75-00-3	0.00	64	0	ND	0.5	
Trichlorofluoromethane (11)	75-69-4	0.00	101	0	ND	0.5	
1,1-Dichloroethene	75-35-4	0.00	61	0	ND	0.5	
1,1,2- Cl 1,2,2- F ethane (113)	76-13-1	0.00	151	0	ND	0.5	
Methylene Chloride	75-09-2	6.25	84	16800	ND	0.5	
MTBE (TO-15 only)	1634-04-4	0.00	73	0	ND	0.5	
1,1-dichloroethane	75-34-3	0.00	63	0	ND	0.5	
cis-1,2-Dichloroethene	156-59-2	7.76	61	26300	ND	0.5	
Chloroform	67-66-3	8.06	83	6943	ND	0.5	
1,1,1-Trichloroethane	71-55-6	0.00	97	0	ND	0.5	
1,2-Dichloroethane	107-06-2	8.84	62	3142	ND	0.5	
Carbon tetrachloride	56-23-5	0.00	117	0	ND	0.5	
Benzene	71-43-2	8.63	78	11534	ND	0.5	
Trichloroethene	79-01-6	9.24	130	1617527	14.5	0.5	
1,2-dichloropropane	78-87-5	0.00	63	0	ND	0.5	
cis-1,3-dichloropropene	542-75-6	10.51	75	1807	ND	0.5	
Toluene	108-88-3	10.77	91	29887	ND	0.5	
trans-1,3-dichloropropene	10061-02-6	11.21	75	1868	ND	0.5	
1,1,2-Trichloroethane	79-00-5	11.38	97	1994	ND	0.5	
Tetrachloroethene	127-18-4	11.19	166	329037	2.0	0.5	
1,2-Dibromoethane	106-93-4	11.85	107	1692	ND	0.5	
Chlorobenzene	108-90-7	12.46	112	5375	ND	0.5	
Ethyl benzene	100-41-4	12.48	91	15160	ND	0.5	
m,p-Xylene	1330-20-7	12.65	91	38262	ND	0.5	
o-Xylene	95-47-6	13.17	91	9879	ND	0.5	
Styrene	100-42-5	13.23	104	6040	ND	0.5	
1,1,2,2-Tetrachloroethane	79-34-5	14.13	83	5241444	17.3	0.5	
Bromofluorobenzene (SS)		13.89	95	1373002	49.5		99%
1,3,5-Trimethylbenzene	108-67-8	14.30	105	19031	ND	0.5	
1,2,4-Trimethylbenzene	95-63-6	14.81	105	31808	ND	0.5	
1,3-Dichlorobenzene	541-73-1	15.23	146	14235	ND	0.5	
1,4-Dichlorobenzene	106-46-7	15.35	146	18715	ND	0.5	
1,2-Dichlorobenzene	95-50-1	15.90	146	15582	ND	0.5	
1,2,4-Trichlorobenzene	120-82-1	17.94	180	25286	ND	0.5	
Hexachlorobutadiene	87-68-3	17.92	225	47773	ND	0.5	

Note that benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data:

NIST Traceable Standard Cylinder: Spectra Gases L69236, 1ppmv

108_20R.D

108_10B.D

108_30I.D

Date Printed:

1/31/02 2:33 PM

ND = Not Detected at the Reporting Limits.

SS = Surrogate Standard; IS = Internal Standard 50 ng each.

Col: RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; direct interface; -20C to 210 @ 12C/m; 35-300 amu full scan

Nutech: -5C Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15_lci.

TO15crt4.crt

TO-14A/TO-15 GC/MS Volatiles Report

Sample: Philip 209131 Jacobs Dunnfield SVE Autosampler: 5 Dil. Fact: 1.1
 Misc: 500mL; 12/19/01 VW-1 Test/ carbon canister GC/MS
 Method: 1702 File: \CHEM\1\1702\ 1475135.D Reporting Limits IS/Surr.
 100% Recovery

Compound	CAS #	R.T.	Q ion	Area	ppbv	ppbv	IS/Surr. Recovery
Chlorobenzene-d5 (IS)		12.43	117	3754044	50.0		100%
Dichlorodifluoromethane (12)	75-71-8	2.13	85	6106	ND	0.6	
Chloromethane	74-87-3	2.79	50	2783	ND	0.6	
1,2- Cl- 1,1,2,2-F ethane (114)	76-14-2	0.00	85	0	ND	0.6	
Vinyl chloride	75-01-4	3.07	62	2532	ND	0.6	
Bromomethane	74-83-9	0.00	94	0	ND	0.6	
Chloroethane	75-00-3	0.00	64	0	ND	0.6	
Trichlorofluoromethane (11)	75-69-4	4.57	101	2873	ND	0.6	
1,1-Dichloroethene	75-35-4	5.40	61	2467	ND	0.6	
1,1,2- Cl 1,2,2- F ethane (113)	76-13-1	0.00	151	0	ND	0.6	
Methylene Chloride	75-09-2	6.24	84	13318	ND	0.6	
MTBE (TO-15 only)	1634-04-4	7.31	73	3308	ND	0.6	
1,1-dichloroethane	75-34-3	0.00	63	0	ND	0.6	
cis-1,2-Dichloroethene	156-59-2	7.75	61	1419850	16.2	0.6	
Chloroform	67-66-3	8.06	83	18373	ND	0.6	
1,1,1-Trichloroethane	71-55-6	8.25	97	18343	ND	0.6	
1,2-Dichloroethane	107-06-2	8.84	62	10992	ND	0.6	
Carbon tetrachloride	56-23-5	8.18	117	2057	ND	0.6	
Benzene	71-43-2	8.64	78	65449	ND	0.6	
Trichloroethene	79-01-6	9.25	130	10439939	103.6	0.6	
1,2-dichloropropane	78-87-5	0.00	63	0	ND	0.6	
cis-1,3-dichloropropene	542-75-6	10.50	75	1788	ND	0.6	
Toluene	108-88-3	10.76	91	317908	0.9	0.6	
trans-1,3-dichloropropene	10061-02-6	10.98	75	364765	3.9	0.6	
1,1,2-Trichloroethane	79-00-5	11.38	97	72149	0.7	0.6	
Tetrachloroethene	127-18-4	11.19	166	4964178	32.6	0.6	
1,2-Dibromoethane	106-93-4	11.84	107	1825	ND	0.6	
Chlorobenzene	108-90-7	12.45	112	11976	ND	0.6	
Ethyl benzene	100-41-4	12.48	91	147374	ND	0.6	
m,p-Xylene	1330-20-7	12.65	91	528827	0.9	0.6	
o-Xylene	95-47-6	13.18	91	251259	0.7	0.6	
Styrene	100-42-5	13.23	104	62350	ND	0.6	
1,1,2,2-Tetrachloroethane	79-34-5	14.15	83	34064206	124.2	0.6	
Bromofluorobenzene (SS)		13.89	95	1359487	49.3		99%
1,3,5-Trimethylbenzene	108-67-8	14.34	105	273409	0.7	0.6	
1,2,4-Trimethylbenzene	95-63-6	14.81	105	689153	1.7	0.6	
1,3-Dichlorobenzene	541-73-1	15.23	146	13808	ND	0.6	
1,4-Dichlorobenzene	106-46-7	15.35	146	46494	ND	0.6	
1,2-Dichlorobenzene	95-50-1	15.91	146	16068	ND	0.6	
1,2,4-Trichlorobenzene	120-82-1	17.94	180	26493	ND	0.6	
Hexachlorobutadiene	87-68-3	17.91	225	821468	4.4	0.6	

Note than benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data: NIST Traceable Standard Cylinder: Spectra Gases L69236, 1ppmv
 108_20R.D 108_10B.D 108_30I.D

Date Printed: 1/31/02 2:33 PM

ND = Not Detected at the Reporting Limits.

SS = Surrogate Standard; IS = Internal Standard 50 ng each.

Col:RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; direct interface; -20C to 210 @ 12C/m; 35-300 amu full scan
 Nutech: -5C Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15_lci. TO15crt4.crt

TO-14A/TO-15 GC/MS Volatiles Report

Sample: Philip 209131 Jacobs Dunnfield SVE

Misc: 500mL; 12/19/01 VW-1 Test/Wellhead

Method: 1702

File: CHEM\1\1702\

1475136.D

Autosampler: 6

Dil. Fact: 12.0

GC/MS #1

Reporting

Limits

IS/Surr.

Recovery

Compound	CAS #	R.T.	Q ion	Area	ppbv	ppbv	
Chlorobenzene-d5 (IS)		12.43	117	4447590	50.0		100%
Dichlorodifluoromethane (12)	75-71-8	2.11	85	5667	ND	6.0	
Chloromethane	74-87-3	2.76	50	699	ND	6.0	
1,2- Cl- 1,1,2,2-F ethane (114)	76-14-2	0.00	85	0	ND	6.0	
Vinyl chloride	75-01-4	3.07	62	186519	88.1	6.0	
Bromomethane	74-83-9	0.00	94	0	ND	6.0	
Chloroethane	75-00-3	0.00	64	0	ND	6.0	
Trichlorofluoromethane (11)	75-69-4	4.57	101	2662	ND	6.0	
1,1-Dichloroethene	75-35-4	5.40	61	58430	8.8	6.0	
1,1,2- Cl 1,2,2- F ethane (113)	76-13-1	0.00	151	0	ND	6.0	
Methylene Chloride	75-09-2	6.24	84	22448	ND	6.0	
MTBE (TO-15 only)	1634-04-4	6.67	73	3012	ND	6.0	
1,1-dichloroethane	75-34-3	7.17	63	1247	ND	6.0	
cis-1,2-Dichloroethene	156-59-2	7.75	61	4956277	520.2	6.0	
Chloroform	67-66-3	8.06	83	325813	23.8	6.0	
1,1,1-Trichloroethane	71-55-6	8.25	97	5119	ND	6.0	
1,2-Dichloroethane	107-06-2	8.84	62	139689	11.7	6.0	
Carbon tetrachloride	56-23-5	8.18	117	3258	ND	6.0	
Benzene	71-43-2	8.64	78	89191	ND	6.0	
Trichloroethene	79-01-6	9.26	130	14376156	1314.2	6.0	
1,2-dichloropropane	78-87-5	9.78	63	4151	ND	6.0	
cis-1,3-dichloropropene	542-75-6	10.51	75	1158	ND	6.0	
Toluene	108-88-3	10.76	91	416951	10.8	6.0	
trans-1,3-dichloropropene	10061-02-6	10.98	75	15920	ND	6.0	
1,1,2-Trichloroethane	79-00-5	11.38	97	187005	15.8	6.0	
Tetrachloroethene	127-18-4	11.19	166	13545596	819.6	6.0	
1,2-Dibromoethane	106-93-4	11.85	107	1787	ND	6.0	
Chlorobenzene	108-90-7	12.45	112	14367	ND	6.0	
Ethyl benzene	100-41-4	12.48	91	141186	ND	6.0	
m,p-Xylene	1330-20-7	12.65	91	405763	6.5	6.0	
o-Xylene	95-47-6	13.18	91	185088	ND	6.0	
Styrene	100-42-5	13.23	104	30199	ND	6.0	
1,1,2,2-Tetrachloroethane	79-34-5	14.15	83	27926332	937.9	6.0	
Bromofluorobenzene (SS)		13.89	95	1595878	48.8		98%
1,3,5-Trimethylbenzene	108-67-8	14.32	105	183040	ND	6.0	
1,2,4-Trimethylbenzene	95-63-6	14.81	105	348616	8.1	6.0	
1,3-Dichlorobenzene	541-73-1	15.35	146	63071	ND	6.0	
1,4-Dichlorobenzene	106-46-7	15.35	146	63071	ND	6.0	
1,2-Dichlorobenzene	95-50-1	15.91	146	10743	ND	6.0	
1,2,4-Trichlorobenzene	120-82-1	17.94	180	17286	ND	6.0	
Hexachlorobutadiene	87-68-3	17.91	225	355338	17.4	6.0	

Note than benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data:

NIST Traceable Standard Cylinder: Spectra Gases L69236, 1ppmv

108_20R.D

108_10B.D

108_30I.D

Date Printed:

1/31/02 2:33 PM

ND = Not Detected at the Reporting Limits.

SS = Surrogate Standard; IS = Internal Standard 50 ng each.

Col: RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; direct interface; -20C to 210 @ 12C/m; 35-300 amu full scan

Nutech: -5C Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15_lci.

TO15crt4.crt

889 507
TO-14A/TO-15 GC/MS Volatiles Report

Sample: Philip 209131 Jacobs Dunnfield SVE

Autosampler: 7

Dil. Fact: 3.4

Misc: 500mL; 12/18/01 VW-1 Test/equil baseline

GC/MS

Method: 1702

File: P\CHEM\1\1702\

1475137.D

Reporting

Limits

IS/Surr.

Compound	CAS #	R.T.	Q ion	Area	ppbv	ppbv	Recovery
Chlorobenzene-d5 (IS)		12.44	117	6449414	50.0		100%
Dichlorodifluoromethane (12)	75-71-8	2.11	85	15661	ND	1.7	
Chloromethane	74-87-3	2.77	50	9770	ND	1.7	
1,2- Cl- 1,1,2,2-F ethane (114)	76-14-2	2.53	85	1148	ND	1.7	
Vinyl chloride	75-01-4	3.09	62	3116674	284.4	1.7	
Bromomethane	74-83-9	0.00	94	0	ND	1.7	
Chloroethane	75-00-3	4.23	64	32981	4.4	1.7	
Trichlorofluoromethane (11)	75-69-4	4.55	101	8953	ND	1.7	
1,1-Dichloroethene	75-35-4	5.40	61	2984962	86.4	1.7	
1,1,2- Cl 1,2,2- F ethane (113)	76-13-1	0.00	151	0	ND	1.7	
Methylene Chloride	75-09-2	6.23	84	53707	2.2	1.7	
MTBE (TO-15 only)	1634-04-4	6.79	73	3342	ND	1.7	
1,1-dichloroethane	75-34-3	7.17	63	10001	ND	1.7	
cis-1,2-Dichloroethene	156-59-2	7.75	61	12910303	261.6	1.7	
Chloroform	67-66-3	8.06	83	1356935	19.2	1.7	
1,1,1-Trichloroethane	71-55-6	8.27	97	4372	ND	1.7	
1,2-Dichloroethane	107-06-2	8.84	62	472980	7.7	1.7	
Carbon tetrachloride	56-23-5	8.18	117	86247	1.8	1.7	
Benzene	71-43-2	8.63	78	252836	2.3	1.7	
Trichloroethene	79-01-6	9.26	130	14175812	250.2	1.7	
1,2-dichloropropane	78-87-5	9.76	63	3289	ND	1.7	
cis-1,3-dichloropropene	542-75-6	10.84	75	2838	ND	1.7	
Toluene	108-88-3	10.77	91	1183826	5.9	1.7	
trans-1,3-dichloropropene	10061-02-6	11.09	75	15318	ND	1.7	
1,1,2-Trichloroethane	79-00-5	11.40	97	1029013	16.8	1.7	
Tetrachloroethene	127-18-4	11.19	166	22516499	263.1	1.7	
1,2-Dibromoethane	106-93-4	11.87	107	2865	ND	1.7	
Chlorobenzene	108-90-7	12.46	112	168183	ND	1.7	
Ethyl benzene	100-41-4	12.50	91	680922	3.0	1.7	
m,p-Xylene	1330-20-7	12.67	91	2042468	6.3	1.7	
o-Xylene	95-47-6	13.19	91	1294328	6.7	1.7	
Styrene	100-42-5	13.24	104	30786	ND	1.7	
1,1,2,2-Tetrachloroethane	79-34-5	14.13	83	28375453	184.0	1.7	
Bromofluorobenzene (SS)		13.89	95	2487902	52.5		105%
1,3,5-Trimethylbenzene	108-67-8	14.32	105	46747	ND	1.7	
1,2,4-Trimethylbenzene	95-63-6	14.81	105	137824	ND	1.7	
1,3-Dichlorobenzene	541-73-1	15.23	146	35332	ND	1.7	
1,4-Dichlorobenzene	106-46-7	15.35	146	57381	ND	1.7	
1,2-Dichlorobenzene	95-50-1	15.90	146	12792	ND	1.7	
1,2,4-Trichlorobenzene	120-82-1	17.94	180	28262	ND	1.7	
Hexachlorobutadiene	87-68-3	17.92	225	14246209	134.6	1.7	

Note than benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data:

NIST Traceable Standard Cylinder: Spectra Gases L69236, 1ppmv

108_20R.D

108_10B.D

108_30I.D

Date Printed:

1/31/02 2:34 PM

ND = Not Detected at the Reporting Limits.

SS = Surrogate Standard; IS = Internal Standard 50 ng each.

Col:RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; direct interface; -20C to 210 @ 12C/m; 35-300 amu full scan

Nutech: -5C Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15_lci.

TO15crt4.crt

TO-14A/TO-15 GC/MS Volatiles Report

Sample: Philip 209131 Jacobs Dunnfield SVE

Autosampler: 8

Dil. Fact: 1.7

Misc: 500mL; 12/18/01 VW-2 Test/equl baseline

GC/MS #1

Method: 1702

File: P:\CHEM\1\1702\

1475138.D

Reporting

Limits

IS/Surr.

ppbv

Recovery

Compound	CAS #	R.T.	Q ion	Area	ppbv	ppbv	IS/Surr. Recovery
Chlorobenzene-d5 (IS)		12.43	117	3803729	50.0		100%
Dichlorodifluoromethane (12)	75-71-8	2.13	85	24177	1.4	0.8	
Chloromethane	74-87-3	2.71	50	9784	0.9	0.8	
1,2- Cl- 1,1,2,2-F ethane (114)	76-14-2	2.64	85	1795	ND	0.8	
Vinyl chloride	75-01-4	3.07	62	1160	ND	0.8	
Bromomethane	74-83-9	0.00	94	0	ND	0.8	
Chloroethane	75-00-3	0.00	64	0	ND	0.8	
Trichlorofluoromethane (11)	75-69-4	4.57	101	15311	ND	0.8	
1,1-Dichloroethene	75-35-4	5.40	61	3234	ND	0.8	
1,1,2- Cl 1,2,2- F ethane (113)	76-13-1	5.56	151	1875	ND	0.8	
Methylene Chloride	75-09-2	6.24	84	15185	ND	0.8	
MTBE (TO-15 only)	1634-04-4	6.41	73	1262	ND	0.8	
1,1-dichloroethane	75-34-3	0.00	63	0	ND	0.8	
cis-1,2-Dichloroethene	156-59-2	7.75	61	224082	3.8	0.8	
Chloroform	67-66-3	8.06	83	16285	ND	0.8	
1,1,1-Trichloroethane	71-55-6	8.25	97	7507	ND	0.8	
1,2-Dichloroethane	107-06-2	8.83	62	6789	ND	0.8	
Carbon tetrachloride	56-23-5	8.19	117	9546	ND	0.8	
Benzene	71-43-2	8.64	78	1186721	9.1	0.8	
Trichloroethene	79-01-6	9.25	130	8214917	122.9	0.8	
1,2-dichloropropane	78-87-5	10.06	63	1782	ND	0.8	
cis-1,3-dichloropropene	542-75-6	10.76	75	22322	ND	0.8	
Toluene	108-88-3	10.76	91	2585515	11.0	0.8	
trans-1,3-dichloropropene	10061-02-6	11.21	75	1183	ND	0.8	
1,1,2-Trichloroethane	79-00-5	11.37	97	11655	ND	0.8	
Tetrachloroethene	127-18-4	11.18	166	2011836	19.9	0.8	
1,2-Dibromoethane	106-93-4	0.00	107	0	ND	0.8	
Chlorobenzene	108-90-7	12.45	112	3166	ND	0.8	
Ethyl benzene	100-41-4	12.48	91	193609	ND	0.8	
m,p-Xylene	1330-20-7	12.66	91	418484	1.1	0.8	
o-Xylene	95-47-6	13.16	91	232994	1.0	0.8	
Styrene	100-42-5	13.23	104	30068	ND	0.8	
1,1,2,2-Tetrachloroethane	79-34-5	14.13	83	20784000	114.3	0.8	
Bromofluorobenzene (SS)		13.89	95	1423317	50.9		102%
1,3,5-Trimethylbenzene	108-67-8	14.31	105	44662	ND	0.8	
1,2,4-Trimethylbenzene	95-63-6	14.79	105	165858	ND	0.8	
1,3-Dichlorobenzene	541-73-1	15.33	146	24664	ND	0.8	
1,4-Dichlorobenzene	106-46-7	15.33	146	24664	ND	0.8	
1,2-Dichlorobenzene	95-50-1	15.89	146	4204	ND	0.8	
1,2,4-Trichlorobenzene	120-82-1	17.94	180	7667	ND	0.8	
Hexachlorobutadiene	87-68-3	17.91	225	862023	6.9	0.8	

Note than benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data:

NIST Traceable Standard Cylinder: Spectra Gases L69236, 1ppmv

108_20R.D

108_10B.D

108_30I.D

Date Printed:

1/31/02 2:34 PM

ND = Not Detected at the Reporting Limits.

SS = Surrogate Standard; IS = Internal Standard 50 ng each.

Col: RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; direct interface; -20C to 210 @ 12C/m; 35-300 amu full scan

Nutech: -5C Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15_lci.

TO15crt4.crt

889 509

TO-14A/TO-15 GC/MS Volatiles Report

Sample: Philip 209131 Jacobs Dunnfield SVE

Autosampler: 9

Dil. Fact: 2.2

Misc: 500mL; 12/18/01 VW-1 Test/pumped baseline

GC/MS

Method: 1702

File: \\CHEM\1\1702\

1475139.D

Reporting

Compound	CAS #	R.T.	Q ion	Area	ppbv	Limits ppbv	IS/Surr. Recovery
Chlorobenzene-d5 (IS)		12.44	117	6213878	50.0		100%
Dichlorodifluoromethane (12)	75-71-8	2.14	85	18834	ND	1.1	
Chloromethane	74-87-3	2.77	50	14851	1.1	1.1	
1,2- Cl- 1,1,2,2-F ethane (114)	76-14-2	2.33	85	1345	ND	1.1	
Vinyl chloride	75-01-4	3.12	62	3569758	222.4	1.1	
Bromomethane	74-83-9	0.00	94	0	ND	1.1	
Chloroethane	75-00-3	4.27	64	27345	2.5	1.1	
Trichlorofluoromethane (11)	75-69-4	4.56	101	11326	ND	1.1	
1,1-Dichloroethene	75-35-4	5.41	61	1429211	28.2	1.1	
1,1,2- Cl 1,2,2- F ethane (113)	76-13-1	0.00	151	0	ND	1.1	
Methylene Chloride	75-09-2	6.25	84	28413	ND	1.1	
MTBE (TO-15 only)	1634-04-4	6.72	73	546	ND	1.1	
1,1-dichloroethane	75-34-3	7.17	63	26163	ND	1.1	
cis-1,2-Dichloroethene	156-59-2	7.76	61	13879494	192.0	1.1	
Chloroform	67-66-3	8.07	83	1376113	13.3	1.1	
1,1,1-Trichloroethane	71-55-6	8.28	97	19191	ND	1.1	
1,2-Dichloroethane	107-06-2	8.87	62	883257	9.8	1.1	
Carbon tetrachloride	56-23-5	8.21	117	92254	1.3	1.1	
Benzene	71-43-2	8.68	78	366261	2.3	1.1	
Trichloroethene	79-01-6	9.26	130	14235081	171.5	1.1	
1,2-dichloropropane	78-87-5	9.74	63	2828	ND	1.1	
cis-1,3-dichloropropene	542-75-6	10.54	75	5959	ND	1.1	
Toluene	108-88-3	10.77	91	2587047	8.9	1.1	
trans-1,3-dichloropropene	10061-02-6	11.26	75	1442	ND	1.1	
1,1,2-Trichloroethane	79-00-5	11.40	97	2491709	27.7	1.1	
Tetrachloroethene	127-18-4	11.19	166	26644782	212.5	1.1	
1,2-Dibromoethane	106-93-4	11.83	107	5343	ND	1.1	
Chlorobenzene	108-90-7	12.46	112	208980	ND	1.1	
Ethyl benzene	100-41-4	12.49	91	3727300	11.1	1.1	
m,p-Xylene	1330-20-7	12.67	91	11933153	25.0	1.1	
o-Xylene	95-47-6	13.24	91	7401044	26.2	1.1	
Styrene	100-42-5	13.24	104	324176	1.7	1.1	
1,1,2,2-Tetrachloroethane	79-34-5	14.13	83	21471260	95.1	1.1	
Bromofluorobenzene (SS)		13.90	95	2547997	55.8		112%
1,3,5-Trimethylbenzene	108-67-8	14.37	105	588332	1.8	1.1	
1,2,4-Trimethylbenzene	95-63-6	14.82	105	1771865	5.4	1.1	
1,3-Dichlorobenzene	541-73-1	15.24	146	22569	ND	1.1	
1,4-Dichlorobenzene	106-46-7	15.35	146	127678	ND	1.1	
1,2-Dichlorobenzene	95-50-1	15.90	146	12824	ND	1.1	
1,2,4-Trichlorobenzene	120-82-1	17.94	180	20038	ND	1.1	
Hexachlorobutadiene	87-68-3	17.90	225	5120282	33.0	1.1	

Note than benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data:

NIST Traceable Standard Cylinder: Spectra Gases L69236, 1ppmv

108_20R.D

108_10B.D

108_30I.D

Date Printed:

1/31/02 2:34 PM

ND = Not Detected at the Reporting Limits.

SS = Surrogate Standard; IS = Internal Standard 50 ng each.

Col: RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; direct interface; -20C to 210 @ 12C/m; 35-300 amu full scan

Nutech: -5C Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15_lci.

TO15crt4.crt

TO-14A/TO-15 GC/MS Volatiles Report

Sample: Philip 209131 Jacobs Dunnfield SVE

Autosampler: 10

Dil. Fact: 400.0

Misc: 2.5mL; 12/18/01 VW-2 Pumped baseline

GC/MS #1

Method: 1702

File: 2CHEM1\1702\

1475140.D

Reporting

Limits

IS/Surr.

Recovery

Compound	CAS #	R.T.	Q ion	Area	ppbv	ppbv	
Chlorobenzene-d5 (IS)		12.41	117	3017983	50.0		
Dichlorodifluoromethane (12)	75-71-8	0.00	85	0	ND	200.0	100%
Chloromethane	74-87-3	0.00	50	0	ND	200.0	
1,2- Cl- 1,1,2,2-F ethane (114)	76-14-2	0.00	85	0	ND	200.0	
Vinyl chloride	75-01-4	3.00	62	51642	1198.8	200.0	
Bromomethane	74-83-9	0.00	94	0	ND	200.0	
Chloroethane	75-00-3	0.00	64	0	ND	200.0	
Trichlorofluoromethane (11)	75-69-4	0.00	101	0	ND	200.0	
1,1-Dichloroethene	75-35-4	5.37	61	15558	ND	200.0	
1,1,2- Cl 1,2,2- F ethane (113)	76-13-1	0.00	151	0	ND	200.0	
Methylene Chloride	75-09-2	6.22	84	1818	ND	200.0	
MTBE (TO-15 only)	1634-04-4	0.00	73	0	ND	200.0	
1,1-dichloroethane	75-34-3	0.00	63	0	ND	200.0	
cis-1,2-Dichloroethene	156-59-2	7.73	61	2267293	11688.9	200.0	
Chloroform	67-66-3	8.04	83	95453	342.9	200.0	
1,1,1-Trichloroethane	71-55-6	0.00	97	0	ND	200.0	
1,2-Dichloroethane	107-06-2	8.81	62	7707	ND	200.0	
Carbon tetrachloride	56-23-5	8.17	117	14319	ND	200.0	
Benzene	71-43-2	8.62	78	7136	ND	200.0	
Trichloroethene	79-01-6	9.26	130	17980026	80742.2	200.0	
1,2-dichloropropane	78-87-5	9.75	63	1558	ND	200.0	
cis-1,3-dichloropropene	542-75-6	0.00	75	0	ND	200.0	
Toluene	108-88-3	10.74	91	9167	ND	200.0	
trans-1,3-dichloropropene	10061-02-6	0.00	75	0	ND	200.0	
1,1,2-Trichloroethane	79-00-5	11.37	97	56243	233.3	200.0	
Tetrachloroethene	127-18-4	11.18	166	5721084	17005.5	200.0	
1,2-Dibromoethane	106-93-4	0.00	107	0	ND	200.0	
Chlorobenzene	108-90-7	12.43	112	3396	ND	200.0	
Ethyl benzene	100-41-4	12.46	91	3793	ND	200.0	
m,p-Xylene	1330-20-7	12.64	91	9665	ND	200.0	
o-Xylene	95-47-6	13.14	91	6660	ND	200.0	
Styrene	100-42-5	0.00	104	0	ND	200.0	
1,1,2,2-Tetrachloroethane	79-34-5	14.13	83	23071485	38064.7	200.0	
Bromofluorobenzene (SS)		13.87	95	993979	44.8		90%
1,3,5-Trimethylbenzene	108-67-8	14.31	105	1305	ND	200.0	
1,2,4-Trimethylbenzene	95-63-6	14.79	105	4466	ND	200.0	
1,3-Dichlorobenzene	541-73-1	0.00	146	0	ND	200.0	
1,4-Dichlorobenzene	106-46-7	0.00	146	0	ND	200.0	
1,2-Dichlorobenzene	95-50-1	0.00	146	0	ND	200.0	
1,2,4-Trichlorobenzene	120-82-1	0.00	180	0	ND	200.0	
Hexachlorobutadiene	87-68-3	17.89	225	67124	ND	200.0	

Note that benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data:

NIST Traceable Standard Cylinder: Spectra Gases L69236, 1ppmv

108_20R.D

108_10B.D

108_30I.D

Date Printed:

1/31/02 2:34 PM

ND = Not Detected at the Reporting Limits.

SS = Surrogate Standard; IS = Internal Standard 50 ng each.

Col: RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; direct interface; -20C to 210 @ 12C/m; 35-300 amu full scan

Nutech: -5C Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15_lci.

TO15crt4.crt

889 511

TO-14A/TO-15 GC/MS Volatiles Report

Sample: Philip 209247 Jacobs Dunnfield SVE

Autosampler: 9

Dil. Fact: 200.0

Misc: 2.5mL; 1/7/02 VW-2 Equipment blank

GC/MS

Method: 1702

18.30

File: \CHEM\1\1702\

1475789.D

Reporting

Compound	CAS #	R.T.	Q ion	Area	ppbv	Limits ppbv	IS/Surr. Recovery
Chlorobenzene-d5 (IS)		12.43	117	2763757	50.0		100%
Dichlorodifluoromethane (12)	75-71-8	0.00	85	0	ND	100.0	
Chloromethane	74-87-3	0.00	50	0	ND	100.0	
1,2- Cl- 1,1,2,2-F ethane (114)	76-14-2	0.00	85	0	ND	100.0	
Vinyl chloride	75-01-4	0.00	62	0	ND	100.0	
Bromomethane	74-83-9	0.00	94	0	ND	100.0	
Chloroethane	75-00-3	0.00	64	0	ND	100.0	
Trichlorofluoromethane (11)	75-69-4	0.00	101	0	ND	100.0	
1,1-Dichloroethene	75-35-4	0.00	61	0	ND	100.0	
1,1,2- Cl 1,2,2- F ethane (113)	76-13-1	0.00	151	0	ND	100.0	
Methylene Chloride	75-09-2	6.23	84	2388	ND	100.0	
MTBE (TO-15 only)	1634-04-4	0.00	73	0	ND	100.0	
1,1-dichloroethane	75-34-3	0.00	63	0	ND	100.0	
cis-1,2-Dichloroethene	156-59-2	7.75	61	3554	ND	100.0	
Chloroform	67-66-3	8.06	83	3550	ND	100.0	
1,1,1-Trichloroethane	71-55-6	0.00	97	0	ND	100.0	
1,2-Dichloroethane	107-06-2	0.00	62	0	ND	100.0	
Carbon tetrachloride	56-23-5	0.00	117	0	ND	100.0	
Benzene	71-43-2	0.00	78	0	ND	100.0	
Trichloroethene	79-01-6	9.24	130	12600	ND	100.0	
1,2-dichloropropane	78-87-5	0.00	63	0	ND	100.0	
cis-1,3-dichloropropene	542-75-6	0.00	75	0	ND	100.0	
Toluene	108-88-3	10.77	91	1219	ND	100.0	
trans-1,3-dichloropropene	10061-02-6	0.00	75	0	ND	100.0	
1,1,2-Trichloroethane	79-00-5	0.00	97	0	ND	100.0	
Tetrachloroethene	127-18-4	11.19	166	144467	234.5	100.0	
1,2-Dibromoethane	106-93-4	0.00	107	0	ND	100.0	
Chlorobenzene	108-90-7	0.00	112	0	ND	100.0	
Ethyl benzene	100-41-4	12.43	91	7859	ND	100.0	
m,p-Xylene	1330-20-7	12.43	91	7859	ND	100.0	
o-Xylene	95-47-6	0.00	91	0	ND	100.0	
Styrene	100-42-5	0.00	104	0	ND	100.0	
1,1,2,2-Tetrachloroethane	79-34-5	14.13	83	64040	ND	100.0	
Bromofluorobenzene (SS)		13.89	95	975548	48.0		96%
1,3,5-Trimethylbenzene	108-67-8	13.89	105	1772	ND	100.0	
1,2,4-Trimethylbenzene	95-63-6	0.00	105	0	ND	100.0	
1,3-Dichlorobenzene	541-73-1	0.00	146	0	ND	100.0	
1,4-Dichlorobenzene	106-46-7	0.00	146	0	ND	100.0	
1,2-Dichlorobenzene	95-50-1	0.00	146	0	ND	100.0	
1,2,4-Trichlorobenzene	120-82-1	0.00	180	0	ND	100.0	
Hexachlorobutadiene	87-68-3	0.00	225	0	ND	100.0	

Note than benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data:

NIST Traceable Standard Cylinder: Spectra Gases L69236, 1ppmv

108_20R.D

108_10B.D

108_30I.D

Date Printed:

1/31/02 2:43 PM

ND = Not Detected at the Reporting Limits.

SS = Surrogate Standard; IS = Internal Standard 50 ng each.

Col: RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; direct interface; -20C to 210 @ 12C/m; 35-300 amu full scan

Nutech: -5C Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15_lci.

TO15crt4.crt

TO-14A/TO-15 GC/MS Volatiles Report

Sample: Philip 209247 Jacobs Dunnfield SVE

Autosampler: 13

Dil. Fact: 200.0

Misc: 2.5mL; 1/8/02 VW-2 Wellhead

GC/MS #1

Method: 1702 2.00

File: P:\CHEM\1\1702\

1475790.D

Reporting

Limits

IS/Surr.

Compound	CAS #	R.T.	Q Ion	Area	ppbv	ppbv	Recovery
Chlorobenzene-d5 (IS)		12.43	117	3442876	50.0		100%
Dichlorodifluoromethane (12)	75-71-8	0.00	85	0	ND	100.0	
Chloromethane	74-87-3	2.72	50	607	ND	100.0	
1,2- Cl- 1,1,2,2-F ethane (114)	76-14-2	0.00	85	0	ND	100.0	
Vinyl chloride	75-01-4	3.07	62	224053	2279.6	100.0	
Bromomethane	74-83-9	0.00	94	0	ND	100.0	
Chloroethane	75-00-3	0.00	64	0	ND	100.0	
Trichlorofluoromethane (11)	75-69-4	0.00	101	0	ND	100.0	
1,1-Dichloroethene	75-35-4	5.40	61	76981	248.5	100.0	
1,1,2- Cl 1,2,2- F ethane (113)	76-13-1	0.00	151	0	ND	100.0	
Methylene Chloride	75-09-2	6.24	84	5141	ND	100.0	
MTBE (TO-15 only)	1634-04-4	0.00	73	0	ND	100.0	
1,1-dichloroethane	75-34-3	0.00	63	0	ND	100.0	
cis-1,2-Dichloroethene	156-59-2	7.75	61	12187884	27539.8	100.0	
Chloroform	67-66-3	8.06	83	490585	772.4	100.0	
1,1,1-Trichloroethane	71-55-6	0.00	97	0	ND	100.0	
1,2-Dichloroethane	107-06-2	8.85	62	29132	ND	100.0	
Carbon tetrachloride	56-23-5	8.18	117	153725	363.2	100.0	
Benzene	71-43-2	8.64	78	14172	ND	100.0	
Trichloroethene	79-01-6	9.32	130	35815949	70494.0	100.0	
1,2-dichloropropane	78-87-5	9.79	63	10311	ND	100.0	
cis-1,3-dichloropropene	542-75-6	0.00	75	0	ND	100.0	
Toluene	108-88-3	10.78	91	62195	ND	100.0	
trans-1,3-dichloropropene	10061-02-6	11.45	75	2387	ND	100.0	
1,1,2-Trichloroethane	79-00-5	11.39	97	297810	541.5	100.0	
Tetrachloroethene	127-18-4	11.19	166	7718806	10056.0	100.0	
1,2-Dibromoethane	106-93-4	0.00	107	0	ND	100.0	
Chlorobenzene	108-90-7	12.45	112	7618	ND	100.0	
Ethyl benzene	100-41-4	12.48	91	40355	ND	100.0	
m,p-Xylene	1330-20-7	12.66	91	82598	ND	100.0	
o-Xylene	95-47-6	13.18	91	36807	ND	100.0	
Styrene	100-42-5	13.25	104	3011	ND	100.0	
1,1,2,2-Tetrachloroethane	79-34-5	14.13	83	18242346	13191.5	100.0	
Bromofluorobenzene (SS)		13.89	95	1276584	50.5		101%
1,3,5-Trimethylbenzene	108-67-8	14.32	105	4454	ND	100.0	
1,2,4-Trimethylbenzene	95-63-6	14.81	105	11714	ND	100.0	
1,3-Dichlorobenzene	541-73-1	15.35	146	4965	ND	100.0	
1,4-Dichlorobenzene	106-46-7	15.35	146	4965	ND	100.0	
1,2-Dichlorobenzene	95-50-1	0.00	146	0	ND	100.0	
1,2,4-Trichlorobenzene	120-82-1	0.00	180	0	ND	100.0	
Hexachlorobutadiene	87-68-3	17.91	225	37576	ND	100.0	

Note than benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data:

NIST Traceable Standard Cylinder: Spectra Gases L69236, 1ppmv

108_20R.D

108_10B.D

108_30I.D

Date Printed:

1/31/02 2:43 PM

ND = Not Detected at the Reporting Limits.

SS = Surrogate Standard; IS = Internal Standard 50 ng each.

Col:RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; direct interface; -20C to 210 @ 12C/m; 35-300 amu full scan

Nutech: -5C Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15_lci.

TO15crt4.crt

TO-14A/TO-15 GC/MS Volatiles Report

Sample: Philip 209247 Jacobs Dunnfield SVE

Autosampler: 14

Dil. Fact: 267.0

Misc: 2.5mL; 1/8/02 VW-2 Source B

GC/MS

Method: 1702 2 co dup File: 3CHEM1\1702\ 1475791.D

Compound	CAS #	R.T.	Q ion	Area	ppbv	Reporting Limits ppbv	IS/Surr. Recovery
Chlorobenzene-d5 (IS)		12.43	117	3526427	50.0		100%
Dichlorodifluoromethane (12)	75-71-8	0.00	85	0	ND	133.5	
Chloromethane	74-87-3	2.70	50	557	ND	133.5	
1,2- Cl- 1,1,2,2-F ethane (114)	76-14-2	0.00	85	0	ND	133.5	
Vinyl chloride	75-01-4	3.07	62	260024	3448.1	133.5	
Bromomethane	74-83-9	0.00	94	0	ND	133.5	
Chloroethane	75-00-3	3.92	64	570	ND	133.5	
Trichlorofluoromethane (11)	75-69-4	0.00	101	0	ND	133.5	
1,1-Dichloroethene	75-35-4	5.40	61	71861	302.4	133.5	
1,1,2- Cl 1,2,2- F ethane (113)	76-13-1	0.00	151	0	ND	133.5	
Methylene Chloride	75-09-2	6.24	84	5222	ND	133.5	
MTBE (TO-15 only)	1634-04-4	0.00	73	0	ND	133.5	
1,1-dichloroethane	75-34-3	0.00	63	0	ND	133.5	
cis-1,2-Dichloroethene	156-59-2	7.75	61	12083957	35588.5	133.5	
Chloroform	67-66-3	8.06	83	483656	992.5	133.5	
1,1,1-Trichloroethane	71-55-6	7.92	97	1132	ND	133.5	
1,2-Dichloroethane	107-06-2	8.84	62	33741	ND	133.5	
Carbon tetrachloride	56-23-5	8.18	117	152115	468.4	133.5	
Benzene	71-43-2	8.64	78	13200	ND	133.5	
Trichloroethene	79-01-6	9.31	130	34365292	88158.4	133.5	
1,2-dichloropropane	78-87-5	9.78	63	10015	ND	133.5	
cis-1,3-dichloropropene	542-75-6	0.00	75	0	ND	133.5	
Toluene	108-88-3	10.78	91	37091	ND	133.5	
trans-1,3-dichloropropene	10061-02-6	11.44	75	2278	ND	133.5	
1,1,2-Trichloroethane	79-00-5	11.38	97	260207	616.7	133.5	
Tetrachloroethene	127-18-4	11.19	166	7460368	12667.9	133.5	
1,2-Dibromoethane	106-93-4	0.00	107	0	ND	133.5	
Chlorobenzene	108-90-7	12.46	112	7031	ND	133.5	
Ethyl benzene	100-41-4	12.48	91	21884	ND	133.5	
m,p-Xylene	1330-20-7	12.65	91	56761	ND	133.5	
o-Xylene	95-47-6	13.18	91	26448	ND	133.5	
Styrene	100-42-5	0.00	104	0	ND	133.5	
1,1,2,2-Tetrachloroethane	79-34-5	14.13	83	23174812	21842.2	133.5	
Bromofluorobenzene (SS)		13.89	95	1308003	50.5		101%
1,3,5-Trimethylbenzene	108-67-8	14.22	105	11155	ND	133.5	
1,2,4-Trimethylbenzene	95-63-6	14.81	105	7253	ND	133.5	
1,3-Dichlorobenzene	541-73-1	15.35	146	3139	ND	133.5	
1,4-Dichlorobenzene	106-46-7	15.35	146	3139	ND	133.5	
1,2-Dichlorobenzene	95-50-1	0.00	146	0	ND	133.5	
1,2,4-Trichlorobenzene	120-82-1	0.00	180	0	ND	133.5	
Hexachlorobutadiene	87-68-3	17.91	225	14125	ND	133.5	

Note than benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data:

NIST Traceable Standard Cylinder: Spectra Gases L69236, 1ppmv

108_20R.D

108_10B.D

108_30I.D

Date Printed:

1/31/02 2:43 PM

ND = Not Detected at the Reporting Limits.

SS = Surrogate Standard; IS = Internal Standard 50 ng each.

Col: RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; direct interface; -20C to 210 @ 12C/m; 35-300 amu full scan

Nutech: -5C Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15_lci.

TO15crt4.crt

TO-14/TO-15 GC/MS Volatiles Report

Sample: Philip 209247 Jacobs Dunnfield SVE

Autosampler: 15

Dil. Fact: 294.0

Misc: 2.5mL; 1/7/02 VW-2 Wellhead

GC/MS #1

Method: 1702

18:30

File: PCHEM\1\1702\

1475792.D

Reporting

Limits

IS/Surr.

ppbv

Recovery

Compound

CAS #

R.T.

Q ion

Area

ppbv

Chlorobenzene-d5 (IS)

12.44

117

3718826

50.0

Dichlorodifluoromethane (12)

75-71-8

0.00

85

0

ND

Chloromethane

74-87-3

2.73

50

844

ND

1,2- Cl- 1,1,2,2-F ethane (114)

76-14-2

0.00

85

0

ND

Vinyl chloride

75-01-4

3.07

62

539057

7463.9

Bromomethane

74-83-9

0.00

94

0

ND

Chloroethane

75-00-3

4.06

64

725

ND

Trichlorofluoromethane (11)

75-69-4

0.00

101

0

ND

1,1-Dichloroethene

75-35-4

5.41

61

99603

437.6

1,1,2- Cl 1,2,2- F ethane (113)

76-13-1

0.00

151

0

ND

Methylene Chloride

75-09-2

6.25

84

4808

ND

MTBE (TO-15 only)

1634-04-4

0.00

73

0

ND

1,1-dichloroethane

75-34-3

0.00

63

0

ND

cis-1,2-Dichloroethene

156-59-2

7.76

61

15497302

47656.5

Chloroform

67-66-3

8.06

83

749218

1605.3

1,1,1-Trichloroethane

71-55-6

8.21

97

743

ND

1,2-Dichloroethane

107-06-2

8.84

62

43625

ND

Carbon tetrachloride

56-23-5

8.20

117

198254

637.5

Benzene

71-43-2

8.65

78

16206

ND

Trichloroethene

79-01-6

9.33

130

32480800

87003.2

1,2-dichloropropane

78-87-5

9.81

63

15768

ND

cis-1,3-dichloropropene

542-75-6

0.00

75

0

ND

Toluene

108-88-3

10.77

91

39478

ND

trans-1,3-dichloropropene

10061-02-6

11.45

75

3752

ND

1,1,2-Trichloroethane

79-00-5

11.38

97

356260

881.6

Tetrachloroethene

127-18-4

11.21

166

10050785

17820.1

1,2-Dibromoethane

106-93-4

0.00

107

0

ND

Chlorobenzene

108-90-7

12.46

112

11538

ND

Ethyl benzene

100-41-4

12.49

91

22809

ND

m,p-Xylene

1330-20-7

12.67

91

50968

ND

o-Xylene

95-47-6

13.17

91

24942

ND

Styrene

100-42-5

0.00

104

0

ND

1,1,2,2-Tetrachloroethane

79-34-5

14.13

83

27460450

27024.2

Bromofluorobenzene (SS)

13.90

95

1401120

51.3

1,3,5-Trimethylbenzene

108-67-8

14.23

105

12278

ND

1,2,4-Trimethylbenzene

95-63-6

14.81

105

9431

ND

1,3-Dichlorobenzene

541-73-1

15.35

146

3359

ND

1,4-Dichlorobenzene

106-46-7

15.35

146

3359

ND

1,2-Dichlorobenzene

95-50-1

0.00

146

0

ND

1,2,4-Trichlorobenzene

120-82-1

0.00

180

0

ND

Hexachlorobutadiene

87-68-3

17.90

225

32645

ND

Note than benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data:

NIST Traceable Standard Cylinder: Spectra Gases L69236, 1ppmv

108_20R.D

108_10B.D

108_30I.D

Date Printed:

1/31/02 2:44 PM

ND = Not Detected at the Reporting Limits.

SS = Surrogate Standard; IS = Internal Standard 50 ng each.

Col: RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; direct interface; -20C to 210 @ 12C/m; 35-300 amu full scan

Nutech: -5C Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15_lci.

TO15crt4.crt

889 515

Jan 15 02 08:43a

PSC Analytical Services

6109219667

p.1

page 1 of 2

14JAN02_1713_03_M1261_RFR



INDUSTRIAL HYGIENE

- EPA/NVLAP 101282-0
- AIHA ACCREDITATION NO. 100439
- NC DENR 599

ENVIRONMENTAL TESTING

- NY DOH 10903
- PA DER 06-353
- NJ DEP 77678
- CT DPH PH-0238

ANALYTICAL REPORT

Client: Jacobs Engineering
Report to: Kraig Smith
Jacobs Engineering
13723 Riverport Dr.
Maryland Heights MO 63043

Project: 209146
Received: 24-DEC-01
Reported: 14-JAN-02

PURCHASE ORDER: C5X61110

Project Description: Memphis Depot SVE

<u>RESULT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>DATE</u>	<u>ANALYST</u>

VW-1 Test/Carbon Canister Unit (804)

Lab Sample: 1475316
sampled: 21-DEC-01 14:30

See Attached Report

VW-1 Test/Source B (02316)

Lab Sample: 1475317
sampled: 21-DEC-01 14:30

See Attached Report

VW-1 Test/Ambient Background (11208)

Lab Sample: 1475318
sampled: 20-DEC-01 15:00

See Attached Report

VW-1 Test/Well Head (12830)

Lab Sample: 1475319
sampled: 21-DEC-01 14:30

See Attached Report

VW-1 Test/Carbon Canister West (19301)

Lab Sample: 1475320
sampled: 20-DEC-01 02:30

See Attached Report

Jan 15 02 08:43a

PSC Analytical Services

6109218667

p. 2

page 2 of 2

14JAN02_1713_D3_N1261_RFR



ANALYTICAL SERVICES
 Client: Jacobs Engineering
 Project: 209146

INDUSTRIAL HYGIENE

- EPA/NVLAP 101262-0
- AIHA ACCREDITATION NO. 100439
- NC DENR 599

ENVIRONMENTAL TESTING

- NY DOH 10903
- PA DER 06-353
- NJ DEP 77678
- CT DPH PH-0238

RESULTUNITSMETHODDATEANALYST**VW-1 Test/Well Head (93047)**

Lab Sample: 1475321
 sampled: 20-DEC-01 02:35

See Attached Report

VW-1 Test/Source B (12155)

Lab Sample: 1475322
 sampled: 20-DEC-01 02:36

See Attached Report

< Indicates less than the limit of quantitation.

889 517

Jan 15 02 08:43a PSC Analytical Services 6109219667
01/11/2002 16:06 9195100141 RTP LABS

PAGE 04

P. 3

Research Triangle Park Labs, Inc.

TO-14A/TO-15 GC/MS Volatiles Report

Sample: Philp 209148 Jacobs Dunnfield SVE
Mlac: 500mL; 12/21/01 VW-1 Test carbon canister
Method: 1702 File: 2CHEM111702 1475318.D
Autosampler: 3 Dil. Fact: 1.0 GC/MS #1

Compound	CAS #	R.T.	Q Ion	Area	ppbv	Reporting Limits ppbv	IS/Surr. Recovery
Chlorobenzene-d5 (15)		12.43	117	3555891	50.0	ND	100%
Dichlorodifluoromethane (12)	75-71-8	2.13	85	1338	ND	0.5	
Chloromethane	74-87-3	2.72	50	6541	ND	0.5	
1,2-Cl-1,1,2,2-F ethane (114)	76-14-2	0.00	85	0	ND	0.5	
Vinyl chloride	75-01-4	3.08	62	14330	0.7	0.5	
Bromomethane	74-83-9	0.00	84	0	ND	0.5	
Chloroethane	75-00-3	0.00	04	0	ND	0.5	
Trichlorofluoromethane (11)	75-89-4	0.00	101	0	ND	0.5	
1,1-Dichloroethene	75-35-4	5.40	61	32515	0.5	0.5	
1,1,2-Cl 1,2,2- F ethane (113)	78-13-1	0.00	151	0	ND	0.5	
Methylene Chloride	75-09-2	6.24	84	20804	ND	0.5	
MTBE (TO-15 only)	1034-04-4	7.30	73	581	ND	0.5	
1,1-dichloroethene	75-34-3	7.18	63	2150	NO	0.5	
cis-1,2-Dichloroethene	158-59-2	7.75	81	2357577	25.8	0.5	
Chloroform	67-66-3	8.08	83	20341	ND	0.5	
1,1,1-Trichloroethane	71-65-6	8.25	97	10178	ND	0.5	
1,2-Dichloroethane	107-08-2	8.83	62	5883	ND	0.5	
Carbon tetrachloride	58-23-5	8.25	117	1266	ND	0.5	
Benzene	71-43-2	8.64	78	54115	ND	0.5	
Trichloroethene	79-01-6	9.26	130	13564163	130.2	0.5	
1,2-dichloropropane	78-87-5	0.00	63	0	ND	0.5	
cis-1,3-dichloropropane	542-75-8	10.76	75	5214	ND	0.5	
Toluene	108-88-3	10.76	91	578535	1.6	0.5	
trans-1,3-dichloropropane	10061-02-6	11.23	75	1832	ND	0.5	
1,1,2-Trichloroethane	79-00-5	11.39	97	175011	1.5	0.5	
Tetrachloroethene	127-18-4	11.18	188	11267905	71.1	0.5	
1,2-Dibromoethane	106-93-4	0.00	107	0	ND	0.5	
Chlorobenzene	108-90-7	12.45	112	25360	ND	0.5	
Ethyl benzene	100-41-4	12.48	91	141335	ND	0.5	
m,o-Xylene	1330-20-7	12.89	91	238828	ND	0.5	
o-Xylene	95-47-6	13.18	91	100944	ND	0.5	
Styrene	100-42-5	13.23	104	18021	ND	0.5	
1,1,2,2-Tetrachloroethane	78-34-5	14.17	83	33818858	117.7	0.5	
Bromofluorobenzene (SS)		13.89	95	1277439	48.9		98%
1,3,5-Trimethylbenzene	108-67-6	14.32	105	84888	ND	0.5	
1,2,4-Trimethylbenzene	95-63-6	14.81	105	174745	ND	0.5	
1,3-Dichlorobenzene	541-73-1	15.25	148	18204	ND	0.5	
1,4-Dichlorobenzene	106-46-7	15.35	146	29540	ND	0.5	
1,2-Dichlorobenzene	95-50-1	15.91	146	15427	ND	0.5	
1,2,4-Trichlorobenzene	120-82-1	17.94	180	15664	ND	0.5	
Hexachlorobutadiene	87-68-3	17.91	225	615002	3.1	0.5	

Note that benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data: NIST Traceable Standard Cylinder: Spectra Gases L69236, 1ppmv
108_20R.D 108_10B.D 108_30L.D

Date Printed: 1/8/02 9:58 AM

ND = Not Detected at the Reporting Limits. SS = Surrogate Standard; IS = Internal Standard 50 ng each.
Col: RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; direct interface: -20C to 210 @ 12C/m; 35-300 amu full scan
Nutech: -5C Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15 Ici TO15cr14.crl

Jan 15 02 08:43a PSC Analytical Services 6109219667

01/11/2002 16:05 9195188141

RTP LABS

PAGE 05

P.4

Research Triangle Park Labs, Inc.

TO-14A/TO-15 GC/MS Volatiles Report

Sample: Philip 209148 Jacobs Dunnfield SVS

Misc: 2.5mL; 12/21/01 VW-1 Source B

Method: 1702

File: PCHEM1117021

1475317.D

Autosampler: 14

DB. Fact: 294.0

GC/MS #1

Compound	CAS #	R.T.	Q Ion	Area	Peak	Reporting Limits	IS/Surr. Recovery
Chlorobenzene-d5 (19)		12.43	117	1076716	50.0		100%
Dichlorodifluoromethane (12)	75-71-6	0.00	85	0	ND	147.0	
Chloromethane	74-87-3	0.00	50	0	ND	147.0	
1,2- Cl- 1,1,2,2-F ethane (114)	76-14-2	0.00	85	0	ND	147.0	
Vinyl chloride	75-01-4	3.05	62	6757	178.0	147.0	
Bromomethane	74-83-9	0.00	94	0	ND	147.0	
Chloroethane	75-00-3	0.00	84	0	ND	147.0	
Trichlorofluoromethane (11)	75-69-4	0.00	101	0	ND	147.0	
1,1-Dichloroethane	75-35-4	5.40	81	8437	ND	147.0	
1,1,2- Cl 1,2,2- F ethane (113)	76-13-1	0.00	151	0	ND	147.0	
Methylene Chloride	75-09-2	0.00	84	0	ND	147.0	
MTBE (TO-15 only)	1834-04-4	0.00	73	0	ND	147.0	
1,1-dichloroethane	75-34-3	0.00	83	0	ND	147.0	
cis-1,2-Dichloroethane	156-59-2	7.75	81	462430	2875.3	147.0	
Chloroform	67-66-3	8.04	83	33281	ND	147.0	
1,1,1-Trichloroethane	71-55-8	0.00	97	0	ND	147.0	
1,2-Dichloroethane	107-06-2	8.83	62	2370	ND	147.0	
Carbon tetrachloride	56-23-6	0.00	117	0	ND	147.0	
Benzene	71-43-2	8.64	78	3925	ND	147.0	
Trichloroethane	79-01-8	9.24	130	10233942	51571.9	147.0	
1,2-dichloropropene	78-87-5	0.00	83	0	ND	147.0	
cis-1,3-dichloropropene	542-75-6	0.00	75	0	ND	147.0	
Toluene	108-88-3	10.76	81	7567	ND	147.0	
trans-1,3-dichloropropene	10061-02-6	0.00	75	0	ND	147.0	
1,1,2-Trichloroethane	78-00-5	11.37	97	12383	ND	147.0	
Tetrachloroethane	127-18-4	11.18	188	3447519	11499.5	147.0	
1,2-Dibromoethane	106-93-4	0.00	107	0	ND	147.0	
Chlorobenzene	108-90-7	0.00	112	0	ND	147.0	
Ethyl benzene	100-41-4	12.48	91	4380	ND	147.0	
m,p-Xylene	1330-20-7	12.94	91	8534	ND	147.0	
o-Xylene	95-47-8	13.18	91	3508	ND	147.0	
Styrene	100-42-5	0.00	104	0	ND	147.0	
1,1,2,2-Tetrachloroethane	79-34-5	14.13	83	10675708	19765.3	147.0	
Bromofluorobenzene (SS)		13.89	95	597300	41.1		82%
1,3,5-Trimethylbenzene	108-67-8	14.18	105	4918	ND	147.0	
1,2,4-Trimethylbenzene	95-63-6	0.00	105	0	ND	147.0	
1,3-Dichlorobenzene	541-73-1	0.00	146	0	ND	147.0	
1,4-Dichlorobenzene	106-46-7	0.00	146	0	ND	147.0	
1,2-Dichlorobenzene	95-50-1	0.00	146	0	ND	147.0	
1,2,4-Trichlorobenzene	120-82-1	0.00	180	0	ND	147.0	
Hexachlorobutadiene	87-68-3	17.69	225	10523	ND	147.0	

Note that benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data:

NIST Traceable Standard Cylinder: Spectra Gases L69236, 1ppmv

108_20R.D

108_109.D

108_301.D

Date Printed:

1/9/02 8:08 AM

ND = Not Detected at the Reporting Limits.

SS = Surrogate Standard; IS = Internal Standard 50 ng each.

Col: RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; Direct Interface; -20C to 210 @ 12C/m; 35-300 amu full scan

Nutech: -5C Tenax/Anasorb 747 Trap; desorb @ 180C, TO14/15_i

TO15art4.crl

Research Triangle Park Labs, Inc.

TO-14/TO-15 GC/MS Volatiles Report

Sample: Phis 209148 Jacobs Dunnfield SVE
 Misc: 500mL; 12/20/01 VW-1 Test Ambient bkgrd
 Method: 1702 File: PCHEM\111702\ 1475318.D
 Autosampler: 12 Dil. Fact: 1.7
 GC/MS #1

Compound	CAS #	R.T.	Q Ion	Area	ppbv	Reporting Limits ppbv	IS/Surr. Recovery
Chlorobenzene-d5 (IS)		12.42	117	2222381	50.0		
Dichlorodifluoromethane (12)	75-71-8	2.11	85	7638	ND	0.8	
Chloromethane	74-87-3	2.75	50	1585	ND	0.8	
1,2-Cl 1,1,2,2-F ethane (114)	78-14-2	0.00	85	0	ND	0.8	
Vinyl chloride	75-01-4	0.00	82	0	ND	0.8	
Bromomethane	74-83-9	0.00	84	0	ND	0.8	
Chloroethane	75-00-3	0.00	84	0	ND	0.8	
Trichlorofluoromethane (11)	75-69-4	4.64	101	8854	ND	0.8	
1,1-Dichloroethene	75-35-4	0.00	61	0	ND	0.8	
1,1,2-Cl 1,2,2- F ethane (113)	78-13-1	0.00	151	0	ND	0.8	
Methylene Chloride	75-09-2	6.23	84	11328	ND	0.8	
MTBE (TO-15 only)	1634-04-4	0.00	73	0	ND	0.8	
1,1-dichloroethane	75-34-3	0.00	63	0	ND	0.8	
cis-1,2-Dichloroethene	156-59-2	7.74	61	32815	1.0	0.8	
Chloroform	67-68-3	8.06	83	3870	ND	0.8	
1,1,1-Trichloroethane	71-55-6	8.25	97	2507	ND	0.8	
1,2-Dichloroethane	107-06-2	8.82	82	7058	ND	0.8	
Carbon tetrachloride	58-23-5	8.18	117	6509	ND	0.8	
Benzene	71-43-2	8.63	78	21874	ND	0.8	
Trichloroethene	79-01-8	9.24	130	2146817	56.0	0.8	
1,2-dichloropropane	78-87-5	0.00	63	0	ND	0.8	
cis-1,3-dichloropropene	542-75-8	0.00	75	0	ND	0.8	
Toluene	108-88-3	10.75	91	68762	ND	0.8	
trans-1,3-dichloropropene	10061-02-6	10.98	75	2409	ND	0.8	
1,1,2-Trichloroethane	79-00-5	11.19	97	584	ND	0.8	
Tetrachloroethane	127-18-4	11.17	166	394472	6.7	0.8	
1,2-Dibromoethane	106-93-4	0.00	107	0	ND	0.8	
Chlorobenzene	106-90-7	0.00	112	0	ND	0.8	
Ethyl benzene	100-41-4	12.47	81	11943	ND	0.8	
m,p-Xylene	1330-20-7	12.85	91	33352	ND	0.8	
o-Xylene	95-47-8	13.15	91	12251	ND	0.8	
Styrene	100-42-5	0.00	104	0	ND	0.8	
1,1,2,2-Tetrachloroethane	79-34-5	14.11	83	3032550	28.5	0.8	
Bromofluorobenzene (SS)		13.88	86	704923	43.2		88%
1,3,5-Trimethylbenzene	106-67-8	14.30	105	4382	ND	0.8	
1,2,4-Trimethylbenzene	95-63-6	14.79	105	13507	ND	0.8	
1,3-Dichlorobenzene	541-73-1	15.33	148	1827	ND	0.8	
1,4-Dichlorobenzene	106-48-7	15.33	148	1827	ND	0.8	
1,2-Dichlorobenzene	95-50-1	0.00	148	0	ND	0.8	
1,2,4-Trichlorobenzene	120-82-1	0.00	180	0	ND	0.8	
Hexachlorobutadiene	87-68-3	17.88	225	13801	ND	0.8	

Note that benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data: NIST Traceable Standard Cylinder: Spectra Gases L69236, 1ppmv
 108_20R.D 108_108.D 108_301.D

Date Printed: 1/8/02 4:38 PM

ND = Not Detected at the Reporting Limits. SS = Surrogate Standard, IS = Internal Standard 50 ng each.
 Col: RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; direct interface; -20C to 210 @ 12C/m; 35-300 amu full scan
 Nutach: -5C Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15_id TO15crt4.crt

Jan 15 02 08:44a

PSC Analytical Services

6109219667

P.6

01/11/2002 16:06

9195180141

RTP LABS

PAGE 07

Research Triangle Park Labs, Inc.

TO-14A/TO-15 GC/MS Volatiles Report

Sample: Philo 209148 Jacobs Dunnfield SVE

Misc: 2.5mL; 12/21/01 VW-1 Wellhead

Method: 1702

File: PCHEM1117021

1475319.D

Autosampler: 13

Dil. Fact: 336.0

GC/MS #1

Compound	CAS #	R.T.	Q Ion	Area	ppbv	Reporting Limits ppbv	IS/Surr. Recovery
Chlorobenzene-d5 (IS)		12.41	117	2880354	50.0		
Dichlorodifluoromethane (12)	75-71-6	0.00	85	0	ND	168.0	100%
Chloromethane	74-87-3	0.00	50	0	ND	168.0	
1,2-Cl-1,1,2,2-F ethane (114)	78-14-2	0.00	85	0	ND	168.0	
Vinyl chloride	75-01-4	3.01	62	20864	458.1	168.0	
Bromomethane	74-83-9	0.00	84	0	ND	168.0	
Chloroethane	75-00-3	0.00	64	0	ND	168.0	
Trichlorofluoromethane (11)	75-80-4	0.00	101	0	ND	168.0	
1,1-Dichloroethene	75-35-4	5.38	81	10299	ND	168.0	
1,1,2-Cl 1,2,2- F ethane (113)	76-13-1	0.00	151	0	ND	168.0	
Methylene Chloride	75-09-2	6.23	84	1957	ND	168.0	
MTBE (TO-15 only)	1834-04-4	0.00	73	0	ND	168.0	
1,1-dichloroethane	75-34-3	0.00	63	0	ND	168.0	
cis-1,2-Dichloroethane	156-59-2	7.74	61	882176	3228.8	168.0	
Chloroform	67-66-3	8.04	63	45482	ND	168.0	
1,1,1-Trichloroethane	71-55-6	0.00	97	0	ND	168.0	
1,2-Dichloroethane	107-06-2	8.82	62	2903	ND	168.0	
Carbon tetrachloride	56-23-5	0.00	117	0	ND	168.0	
Benzene	71-43-2	8.81	78	8107	ND	168.0	
Trichloroethene	79-01-8	9.24	130	11049323	46929.9	168.0	
1,2-dichloropropane	78-87-5	0.00	83	0	ND	168.0	
cis-1,3-dichloropropene	542-75-8	0.00	76	0	ND	168.0	
Toluene	108-88-3	10.74	91	7313	ND	168.0	
trans-1,3-dichloropropene	10061-02-6	0.00	76	0	ND	168.0	
1,1,2-Trichloroethane	78-00-5	11.36	97	12525	ND	168.0	
Tetrachloroethene	127-18-4	11.17	166	3978352	11187.4	168.0	
1,2-Dibromomethane	106-63-4	0.00	107	0	ND	168.0	
Chlorobenzene	108-90-7	12.44	112	2148	ND	168.0	
Ethyl benzene	100-41-4	12.48	91	4397	ND	168.0	
m,p-Xylene	1330-20-7	12.63	91	7475	ND	168.0	
o-Xylene	95-47-6	13.15	91	3751	ND	168.0	
Styrene	100-42-6	0.00	104	0	ND	168.0	
1,1,2,2-Tetrachloroethane	78-34-5	14.11	83	12495070	19502.7	168.0	
Bromofluorobenzene (SS)		13.87	95	872880	44.3		89%
1,3,5-Trimethylbenzene	108-87-8	14.16	105	4467	ND	168.0	
1,2,4-Trimethylbenzene	95-63-8	14.79	105	3524	ND	168.0	
1,3-Dichlorobenzene	541-73-1	0.00	146	0	ND	168.0	
1,4-Dichlorobenzene	106-48-7	0.00	146	0	ND	168.0	
1,2-Dichlorobenzene	95-50-1	0.00	146	0	ND	168.0	
1,2,4-Trichlorobenzene	120-82-1	0.00	186	0	ND	168.0	
Hexachlorobutadiene	87-68-3	17.90	225	25222	ND	168.0	

Note that benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data:

NIST Traceable Standard Cylinder: Spectra Gases L69238, 1ppmv

108_20R.D

108_10B.D

108_30I.D

Data Printed:

1/8/02 6:43 PM

ND = Not Detected at the Reporting Limits.

SS = Surrogate Standard; IS = Internal Standard 50 ng each.

Col: RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; direct interface; -20C to 210 @ 12C/m; 35-300 amu full scan

Nutech; -SC Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15_id.

TO15ert4.cri

Jan 15 02 08:44a

PSC Analytical Services

6109219667

P.7

01/11/2002 16:06 9195100141

RTP LABS

PAGE 08

Research Triangle Park Labs, Inc.

TO-14A/TO-15 GC/MS Volatiles Report

Sample: Philip 209148 Jacobs Dunnfield SVE
 Misc: 2.5mL; 12/20/01 VVY-1 Carbon canister unit
 Method: 1702 File: >CHEM\111702\ 1475320.D
 Autosampler: 11 DM. Fact: 338.0
 GC/MS #1

Compound	CAS #	R.T.	Q len	Area	ppbv	Reporting Limits ppbv	IS/Surr. Recovery
Chlorobenzene-d5 (IS)		12.42	117	2806870	50.0		
Dichlorodifluoromethane (12)	75-71-6	0.00	85	0	ND	168.0	100%
Chloromethane	74-87-3	0.00	50	0	ND	168.0	
1,2-Cl-1,1,2,2-F ethane (114)	78-14-2	0.00	85	0	ND	168.0	
Vinyl chloride	75-01-4	3.07	62	14920	312.8	168.0	
Bromomethane	74-83-8	0.00	94	0	ND	168.0	
Chloroethane	75-00-3	0.00	84	0	ND	168.0	
Trichlorofluoromethane (11)	75-09-4	0.00	101	0	ND	168.0	
1,1-Dichloroethane	75-35-4	5.38	81	10004	ND	168.0	
1,1,2-Cl 1,2,2-F ethane (113)	78-13-1	0.00	151	0	ND	168.0	
Methylene Chloride	75-09-2	6.21	84	1961	ND	168.0	
MTBE (TO-15 only)	1634-04-4	0.00	73	0	ND	168.0	
1,1-dichloroethane	75-34-3	0.00	63	0	ND	168.0	
cis-1,2-Dichloroethane	156-59-2	7.74	61	580781	2611.4	168.0	
Chloroform	67-68-3	8.04	83	40563	ND	168.0	
1,1,1-Trichloroethane	71-55-8	0.00	97	0	ND	168.0	
1,2-Dichloroethane	107-08-2	8.82	62	2287	ND	168.0	
Carbon tetrachloride	58-23-5	0.00	117	0	ND	168.0	
Benzene	71-43-2	8.81	78	8704	ND	168.0	
Trichloroethene	78-01-9	9.24	130	10675210	43300.4	168.0	
1,2-dichloropropane	78-87-5	0.00	63	0	ND	168.0	
cis-1,3-dichloropropane	642-75-6	0.00	75	0	ND	168.0	
Toluene	108-88-3	10.75	91	7411	ND	168.0	
trans-1,3-dichloropropane	10061-02-8	0.00	75	0	ND	168.0	
1,1,2-Trichloroethane	78-00-5	11.38	97	11707	ND	168.0	
Tetrachloroethane	127-18-4	11.17	168	3502722	9404.2	168.0	
1,2-Dibromomethane	106-93-4	0.00	107	0	ND	168.0	
Chlorobenzene	106-90-7	12.44	112	1547	ND	168.0	
Ethyl benzene	100-41-4	12.48	91	2863	ND	168.0	
m,p-Xylene	1330-20-7	12.83	91	8282	ND	168.0	
o-Xylene	95-47-6	13.15	91	3140	ND	168.0	
Styrene	100-42-5	0.00	104	0	ND	168.0	
1,1,2,2-Tetrachloroethane	78-34-5	14.11	83	9585758	14284.9	168.0	
Bromofluorobenzene (SS)		13.87	95	904118	43.8		88%
1,3,5-Trimethylbenzene	108-67-8	14.18	105	2990	ND	168.0	
1,2,4-Trimethylbenzene	95-63-6	14.68	105	1301	ND	168.0	
1,3-Dichlorobenzene	541-73-1	0.00	146	0	ND	168.0	
1,4-Dichlorobenzene	106-46-7	0.00	146	0	ND	168.0	
1,2-Dichlorobenzene	95-50-1	0.00	146	0	ND	168.0	
1,2,4-Trichlorobenzene	120-82-1	0.00	180	0	ND	168.0	
Hexachlorobutadiene	87-88-3	17.80	225	7166	ND	168.0	

Note that benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data: NIST Traceable Standard Cylinder: Spectra Gases L89236, 1ppmv
 108_20R.D 108_108.D 108_301.D

Date Printed: 1/8/02 5:52 PM

ND = Not Detected at the Reporting Limits.

SS = Surrogate Standard; IS = Internal Standard 50 ng each.

Col: RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; direct interface; -20C to 210 @ 12C/min; 35-300 amu full scan
 Nutech: -5C Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15_jcl. TO15crt4.crt

Jan 15 02 08:44a PSC Analytical Services

6109219667

01/11/2002 15:06 9195100141

RTP LABS

PAGE 09

P. 8

Research Triangle Park Labs, Inc.

TO-14/TO-15 GC/MS Volatiles Report

Sample: Philp 200146 Jacobs Dunnfield SVE
 Misc: 2.5mL; 12/20/01 VW-1 Wellhead
 Method: 1702
 Autosampler: 15
 File: PCHEM1\1702\ 1475321.D
 Dil Fact: 200.0
 GC/MS #1

Compound	CAS #	R.T.	Q Ion	Area	ppbv	Reporting Limits ppbv	IS/Surr. Recovery
Chlorobenzene-d5 (IS)		12.41	117	2888164	50.0	ND	100%
Dichlorodifluoromethane (12)	75-71-8	0.00	85	0	ND	100.0	
Chloromethane	74-87-3	2.88	50	1196	ND	100.0	
1,2-Di-1,1,2,2-F ethane (114)	76-14-2	0.00	85	0	ND	100.0	
Vinyl chloride	75-01-4	3.02	62	26172	317.4	100.0	
Bromomethane	74-83-9	0.00	94	0	ND	100.0	
Chloroethane	75-00-3	0.00	54	0	ND	100.0	
Trichlorofluoromethane (11)	75-89-4	0.00	101	0	ND	100.0	
1,1-Dichloroethane	75-35-4	5.38	61	14057	ND	100.0	
1,1,2-Di-1,2,2-F ethane (113)	76-13-1	0.00	161	0	ND	100.0	
Methylene Chloride	75-09-2	8.22	84	1734	ND	100.0	
MTBE (TO-15 only)	1834-06-4	0.00	73	0	ND	100.0	
1,1-dichloroethane	75-34-3	0.00	63	0	ND	100.0	
cis-1,2-Dichloroethene	158-59-2	7.73	61	804175	2495.5	100.0	
Chloroform	67-88-3	8.05	83	81334	115.1	100.0	
1,1,1-Trichloroethane	71-55-6	0.00	97	0	ND	100.0	
1,2-Dichloroethane	107-06-2	8.83	82	4177	ND	100.0	
Carbon tetrachloride	56-23-5	0.00	117	0	ND	100.0	
Benzene	71-43-2	8.62	78	9324	ND	100.0	
Trichloroethene	78-01-8	9.25	130	13479319	31625.9	100.0	
1,2-dichloropropane	78-87-5	0.00	83	0	ND	100.0	
cis-1,3-dichloropropene	542-75-8	0.00	76	0	ND	100.0	
Toluene	108-88-3	10.78	91	9987	ND	100.0	
trans-1,3-dichloropropene	10581-02-6	0.00	75	0	ND	100.0	
1,1,2-Trichloroethane	79-00-5	11.37	97	18133	ND	100.0	
Tetrachloroethene	127-18-4	11.18	168	5348481	8306.3	100.0	
1,2-Dibromoethane	106-93-4	0.00	107	0	ND	100.0	
Chlorobenzene	108-90-7	12.43	112	2897	ND	100.0	
Ethyl benzene	100-41-4	12.48	91	4731	ND	100.0	
m,p-Xylene	1330-20-7	12.84	91	9747	ND	100.0	
o-Xylene	95-47-8	13.16	91	5081	ND	100.0	
Styrene	100-42-5	0.00	104	0	ND	100.0	
1,1,2,2-Tetrachloroethane	79-34-5	14.12	83	14483253	12484.7	100.0	
Bromofluorobenzene (SS)		13.87	95	936836	44.1		88%
1,3,5-Trimethylbenzene	108-67-8	14.17	105	4603	ND	100.0	
1,2,4-Trimethylbenzene	95-83-6	14.79	105	3777	ND	100.0	
1,3-Dichlorobenzene	541-73-1	0.00	146	0	ND	100.0	
1,4-Dichlorobenzene	106-46-7	0.00	146	0	ND	100.0	
1,2-Dichlorobenzene	95-50-1	0.00	146	0	ND	100.0	
1,2,4-Trichlorobenzene	120-82-1	0.00	180	0	ND	100.0	
Hexachlorobutadiene	87-68-3	17.89	225	12546	ND	100.0	

Note that benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data: NIST Traceable Standard Cylinder: Spectra Gases L69238, 1ppmv
 108_20R.D 108_108.D 106_301.D

Date Printed: 1/9/02 7:54 AM

ND = Not Detected at the Reporting Limits.

SS = Surrogate Standard; IS = Internal Standard 50 ng each.

Col: RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film 8/N 214582; direct interface; -20C to 210 @ 12C/m; 35-300 amu full scan
 Nutech: -5C Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15_id1
 TO16c14.crt

01/11/2002 16:06 9195100141

RTP LABS

PAGE 10

Research Triangle Park Labs, Inc.

TO-14A/TO-15 GC/MS Volatiles Report

Sample: Philp 209146 Jacobs Dunnfield SVE Autosampler: 10 Dil. Fact.: 200.0
 Misc: 2.5mL; 12/20/01 VW-1 Source B GC/MS #1
 Method: 1702 File: PCHEM1\1702\ 1475322.D Reporting Limits: ppbv ppbv IS/Surr. Recovery

Compound	CAS #	R.T.	Q Ion	Area	ppbv	Reporting Limits	IS/Surr. Recovery
Chlorobenzene-d5 (IS)		12.41	117	2898984	50.0		100%
Dichlorodifluoromethane (12)	75-71-8	0.00	85	0	ND	100.0	
Chloromethane	74-87-3	0.00	50	0	ND	100.0	
1,2-Cl-1,1,2,2-F ethane (114)	78-14-2	0.00	85	0	ND	100.0	
Vinyl chloride	75-01-4	2.98	82	12924	158.2	100.0	
Bromomethane	74-83-9	0.00	94	0	ND	100.0	
Chloroethane	75-00-3	0.00	64	0	ND	100.0	
Trichlorofluoromethane (11)	75-69-4	0.00	101	0	ND	100.0	
1,1-Dichloroethane	75-35-4	5.37	61	14874	ND	100.0	
1,1,2-Cl 1,2,2- F ethane (113)	76-13-1	0.00	151	0	ND	100.0	
Methylene Chloride	75-09-2	6.20	84	2005	ND	100.0	
MTBE (TO-15 only)	1834-04-4	0.00	73	0	ND	100.0	
1,1-dichloroethane	75-34-3	0.00	83	0	ND	100.0	
cis-1,2-Dichloroethane	158-59-2	7.73	61	897878	2409.0	100.0	
Chloroform	67-68-3	8.04	83	59232	110.6	100.0	
1,1,1-Trichloroethane	71-55-6	0.00	97	0	ND	100.0	
1,2-Dichloroethane	107-08-2	8.83	62	3812	ND	100.0	
Carbon tetrachloride	56-23-5	0.00	117	0	ND	100.0	
Benzene	71-43-2	8.82	78	8079	ND	100.0	
Trichloroethane	79-01-8	9.24	130	13720688	32072.3	100.0	
1,2-dichloropropane	78-87-5	0.00	63	0	ND	100.0	
cis-1,3-dichloropropene	542-75-8	0.00	75	0	ND	100.0	
Toluene	108-88-3	10.74	91	8721	ND	100.0	
trans-1,3-dichloropropene	10091-02-0	0.00	75	0	ND	100.0	
1,1,2-Trichloroethane	79-00-5	11.37	97	22078	ND	100.0	
Tetrachloroethane	127-18-4	11.18	166	5706084	8828.6	100.0	
1,2-Dibromochloroethane	108-93-4	0.00	107	0	ND	100.0	
Chlorobenzene	108-90-7	12.43	112	3547	ND	100.0	
Ethyl benzene	100-41-4	12.45	91	5802	ND	100.0	
m,p-Xylene	1330-20-7	12.84	91	13516	ND	100.0	
o-Xylene	95-47-8	13.14	91	8511	ND	100.0	
Styrene	100-42-5	0.00	104	0	ND	100.0	
1,1,2,2-Tetrachloroethane	79-34-5	14.11	83	17215619	14784.7	100.0	
Bromofluorobenzene (SS)		13.87	85	951402	44.7		89%
1,3,5-Trimethylbenzene	108-67-8	14.29	106	4094	ND	100.0	
1,2,4-Trimethylbenzene	95-63-6	14.79	105	8082	ND	100.0	
1,3-Dichlorobenzene	541-73-1	0.00	148	0	ND	100.0	
1,4-Dichlorobenzene	106-46-7	0.00	146	0	ND	100.0	
1,2-Dichlorobenzene	95-50-1	0.00	146	0	ND	100.0	
1,2,4-Trichlorobenzene	120-82-1	0.00	180	0	ND	100.0	
Hexachlorobutadiene	87-88-3	17.89	225	68380	ND	100.0	

Note that benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data: NIST Traceable Standard Cylinder: Spectra Gases L89236, 7ppmv
 108_20R.D 108_10B.D 108_30I.D

Date Printed: 1/9/02 7:56 AM

ND = Not Detected at the Reporting Limits. SS = Surrogate Standard; IS = Internal Standard 50 ng each
 Col: RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; direct interface; -20C to 210 @ 12C/m; 35-300 amu full scan
 Nutech: -5C Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15_id TO15crt4.ort

Research Triangle Park Laboratories, Inc
8109 Ebenezer Church Road
Raleigh, North Carolina 27612-7307
Phone: 919-510-0228 Fax: 919-510-0141
Web Site: www.rtp-labs.com

Chain of Custody Record

ISO 17025 Compliant for Testing Labs

209146



Client (Billing): JACBS ENGINEERING		Send Report To Attention: KRATIG SMITH		Phone Number: 615-301-6437	Fax Number: 615-833-8328	Date: 12/21/01
Address: 3354 Perimeter Hill Dr.		City: Nashville		State: TN Zip Code: 37211		Page: 1 of 2
Contract/Purchase Order No.: CS25110		Project Name: Memphis Dept SVE		RTP Labs Proj. Tracking No.: 306-01		
Comments:		Date Sampled		Time		
Sample ID No. & Description		Date Sampled		Time		
1 VW-1 Test/Carbon Counter Unit		12/21/01		1730		
2 VW-1 Test/Source B		12/21/01		1730		
3 VW-1 Test/Ambient Background		12/20/01		1500		
4 VW-1 Test/Well Head		12/21/01		1730		
5						
6						
7						
8						
9						
10						
Matrix		Air		Source		
Liquid/Solid		Compliance Test		Preservatives		
# of Containers		1		X		809
1		1		X		02316
2		1		X		11308
3		1		X		12830
4						
5						
6						
7						
8						
9						
10						
Turn Around Time Requested (for Report: Business Days):		Rush Multipliers (X):		Data Pack Size: ☒ Full ☐ (1.1x surchar)		QC Requirements:
☐ 1 day (X) ☐ 2 days (X) ☐ 3 days (X) ☐ 5 days (1.5x) ☐ 10 days (1.1x) ☒ 15 days		☐ 1 day (X) ☐ 2 days (X) ☐ 3 days (X) ☐ 5 days (1.5x) ☐ 10 days (1.1x) ☒ 15 days		Electronic Data Transfer: ☐ (1.1x surchar)		Screen ☐ Standard ☒ EPA Level IV ☐ Level IV (requires approved OAPP)
Relinquished By: Kay Smith		Date: 12-21-01		Time: 12:30		Received By: Alton Glen
Relinquished By:		Date:		Time:		Received By:

SVERDRUP NASHVLL

011/012

889 524

Research Triangle Park Laboratories, Inc.
8109 Ebenezer Church Road.
Raleigh, North Carolina 27612-7307
Phone: 919-510-0228 Fax: 919-510-0141
Web Site: www.rtp-labs.com

Chain of Custody Record

ISO 17025 Compliant for Testing Labs

Box 1

209146

RTP Labs

889 525

Client (Billing):		JACOBS ENGINEERING		Send Report To Attention:		KEAGLE SMITH		Phone Number		615-205-6437		Fax Number		615-205-6338		Date:		12-21-01			
Address:		3354 Perimeter Hill Dr.		Ste 310		City:		Nashville,		State:		TN		Zip Code:		37211		RTP Labs Proj. Tracking No.:			
Contract/Purchase Order No.:		CSX57110		Project Name:		Memphis data SVE		Requested Analytes:				Plate:		21-21-01		RTP Labs Sample ID:		306-01-			
Comments:		Sample ID No. & Description		Date Sampled		Time		Matrix		Air		Liquid/Solid		Compliance Test		Preservatives		# of Containers			
		1 VW-1 Test/Carbon Canister Unit		12/20/01		0230		X		X		X		X		X		X			
		2 VW-1 Test/Well Head		12/20/01		0215		X		X		X		X		X		X			
		3 VW-1 Test/Source B		12/20/01		0236		X		X		X		X		X		X			
		4																			
		5																			
		6																			
		7																			
		8																			
		9																			
		10																			
Turn Around Time Requested for Report: Business Days: *Rush Multipliers (Xs)		☐ 1 day/4x ☐ 2 days/3x ☐ 3 days/2x ☐ 5 days/1.5x ☐ 10 days/1.1x		☒ 15 days		Date:		12-21-01		Time:		17:00		Date:		12-21-01		Time:		10:30	
Relinquished By:		Kearney		Date:		12-21-01		Time:		17:00		Date:		12-21-01		Time:		10:30		Date:	
Relinquished By:		Kearney		Date:		12-21-01		Time:		17:00		Date:		12-21-01		Time:		10:30		Date:	

Jan 24 02 08:31a

PSC Analytical Services

6109219667

Jan 24 02 08:31a

PSC Analytical Services

6109219667

p. 1



ANALYTICAL SERVICES

page 1 of 2

23JAN02_1628_13_N1261_R.R

INDUSTRIAL HYGIENE

ENVIRONMENTAL TESTING

• EPA/NVLAP 101262-0

• AIHA ACCREDITATION NO. 100439

• NC DENR 599

• NY DOH/NELAC 10903

• PA DEP 06-353

• NJ DEP 77020

• CT DPH PH-0238

ANALYTICAL REPORT

Client: Jacobs Engineering

Report to: Kraig Smith
Jacobs Engineering
3354 Perimeter Hill Dr.
Suite 310
Nashville TN 37211Project: 209278
Received: 11-JAN-02
Reported: 23-JAN-02

Project Description: SVE Pilot Study / TO-14

RESULTUNITSCONCENTRATION UNITSMETHODSVE Test/VW-2/Source B

Air Volume:

Lab Sample: 1475889

sampled: 09-JAN-02

See Attached Report

SVE Test/VW-2/Wellhead

Air Volume:

Lab Sample: 1475890

sampled: 09-JAN-02

See Attached Report

SVE Test/VW-2/Wellhead

Air Volume:

Lab Sample: 1475891

sampled: 10-JAN-02

See Attached Report

889 527

Jan 24 02 08:31a
81/22/2002 16:32PSC Analytical Services
9195100141

6109219667

RTP LABS INC

P. 3

PAGE 04

Research Triangle Park Labs, Inc.

TO-14A/TO-15 GC/MS Volatiles Report

Sample: Philip 208278 Jacobs VW-2 1/9/02 Source B
Misc: 2.5mL
Method: 1702

File: PCHEM1(1702)

1475889.D

Autosampler: 9

DIL Fact: 338.0

GC/MS #1

Compound	CAS #	R.T.	Q Ion	Area	Detby	Reporting Limits	IS/Surr. Recovery
Chlorobenzene-d5 (IS)		12.41	117	3547198	50.0		
Dichlorodifluoromethane (12)	75-71-8	0.00	85	0	ND	168.0	100%
Chloromethane	74-87-3	2.72	50	718	ND	168.0	
1,2-Cl-1,1,2,2-F ethane (114)	78-14-2	0.00	85	0	ND	168.0	
Vinyl chloride	75-01-4	3.05	82	92420	1533.2	168.0	
Bromomethane	74-83-9	3.87	94	2010	ND	168.0	
Chloroethane	75-00-3	0.00	84	0	ND	168.0	
Trichlorofluoromethane (11)	75-89-4	0.00	101	0	ND	168.0	
1,1-Dichloroethane	75-35-4	5.37	61	39873	209.8	168.0	
1,1,2-Cl 1,2,2-F ethane (113)	78-13-1	0.00	151	0	ND	168.0	
Methylene Chloride	75-09-2	6.22	84	3753	ND	168.0	
MTBE (TO-15 only)	1034-04-4	0.00	73	0	ND	168.0	
1,1-dichloroethane	75-34-3	0.00	63	0	ND	168.0	
cis-1,2-Dichloroethane	156-59-2	7.73	81	11411583	42045.9	168.0	
Chloroform	67-68-3	8.03	83	489740	1257.3	168.0	
1,1,1-Trichloroethane	71-55-8	0.00	97	0	ND	168.0	
1,2-Dichloroethane	107-08-2	8.81	62	34745	ND	168.0	
Carbon tetrachloride	56-23-5	8.17	117	223484	881.1	168.0	
Benzene	71-43-2	8.62	78	13003	ND	168.0	
Trichloroethene	79-01-6	9.30	130	34523231	110796.1	168.0	
1,2-dichloropropane	78-87-5	9.77	63	10428	ND	168.0	
cis-1,3-dichloropropane	542-75-6	0.00	75	0	ND	168.0	
Toluene	108-88-3	10.74	91	9256	ND	168.0	
trans-1,3-dichloropropane	10061-02-8	0.00	75	0	ND	168.0	
1,1,2-Trichloroethane	79-00-5	11.35	97	341361	1012.1	168.0	
Tetrachloroethene	127-18-4	11.18	188	8909787	14878.7	168.0	
1,2-Dibromoethane	108-93-4	0.00	107	0	ND	168.0	
Chlorobenzene	108-90-7	12.43	112	7110	ND	168.0	
Ethyl benzene	100-41-4	12.46	91	7260	ND	168.0	
m,p-Xylene	1330-20-7	12.84	81	18837	ND	168.0	
o-Xylene	95-47-6	13.16	91	20095	ND	168.0	
Styrene	100-42-5	0.00	104	0	ND	168.0	
1,1,2,2-Tetrachloroethane	79-34-5	0.00	83	0	ND	168.0	
Bromofluorobenzene (SS)		13.87	95	1347810	51.7		103%
1,3,5-Trimethylbenzene	108-67-8	14.31	105	3234	ND	168.0	
1,2,4-Trimethylbenzene	95-63-8	14.70	105	5944	ND	168.0	
1,3-Dichlorobenzene	541-73-1	15.32	146	5019	ND	168.0	
1,4-Dichlorobenzene	106-46-7	15.32	148	5019	ND	168.0	
1,2-Dichlorobenzene	95-50-1	0.00	149	0	ND	168.0	
1,2,4-Trichlorobenzene	120-82-1	17.92	180	1904	ND	168.0	
Hexachlorobutadiene	87-88-3	17.89	225	83322	ND	168.0	

Note that benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data:

108_20R.D

108_10B.D

108_30LD

NIST Traceable Standard Cylinder: Spectra Gases L89238, 1ppmv

Date Printed:

1/15/02 3:59 PM

ND = Not Detected at the Reporting Limits.

SS = Surrogate Standard; IS = Internal Standard 50 ng each.

Col: RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; direct interface; -20C to 210 @ 12C/m; 35-300 amu full scan

Nutech: -5C Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15_101

TO15sort4.crt

Jan 24 02 08:31a
01/22/2002 15:32PSC Analytical Services
9195100141

6109219667

RTP LABS INC

P. 4

PAGE 85

Research Triangle Park Labs, Inc.

TO-14A/TO-15 GC/MS Volatiles Report

Sample: Philip 208278 Jacobs VW-2 1/9/02 Walhead
Misc: 2.5mL
Method: 1702

Autosampler: 10

DIL Fact: 336.0

File: PCHEM1117021

1475890.D

GC/MS #1

Compound	CAS #	R.T.	Q Ion	Area	ppbv	Reporting Limits ppbv	Is/Int. Recovery
Chlorobenzene-d5 (IS)		12.41	117	3585321	50.0	ND	100%
Dichlorodifluoromethane (12)	75-71-8	0.00	85	0	ND	168.0	
Chloromethane	74-87-3	2.88	50	1343	ND	168.0	
1,2-Di-1,1,2,2-F ethane (114)	78-14-2	0.00	85	0	ND	168.0	
Vinyl chloride	75-01-4	3.01	82	140543	2319.8	168.0	
Bromomethane	74-83-8	0.00	94	0	ND	168.0	
Chloroethane	75-00-3	0.00	64	0	ND	168.0	
Trichlorofluoromethane (11)	75-69-4	0.00	101	0	ND	168.0	
1,1-Dichloroethene	75-35-4	5.38	81	39149	205.0	168.0	
1,1,2-Cl 1,2,2-F ethane (113)	78-13-1	0.00	151	0	ND	168.0	
Methylene Chloride	75-09-2	6.21	84	4566	ND	168.0	
MTBE (TO-15 only)	1834-04-4	0.00	73	0	ND	168.0	
1,1-dichloroethane	75-34-3	0.00	63	0	ND	168.0	
cis-1,2-Dichloroethane	158-59-2	7.73	81	11178409	40977.4	168.0	
Chloroform	67-68-3	8.04	83	470940	1202.9	168.0	
1,1,1-Trichloroethane	71-55-6	8.09	97	576	ND	168.0	
1,2-Dichloroethane	107-08-2	8.81	82	33217	ND	168.0	
Carbon tetrachloride	56-23-5	8.18	117	223145	655.3	168.0	
Benzene	71-43-2	8.81	78	14560	ND	168.0	
Trichloroethene	79-01-0	8.29	130	34030547	108881.8	168.0	
1,2-dichloropropene	78-87-5	8.78	63	10480	ND	168.0	
cis-1,3-dichloropropene	542-75-8	0.00	75	0	ND	168.0	
Toluene	108-88-3	10.75	91	10872	ND	168.0	
trans-1,3-dichloropropene	10061-02-6	11.41	75	2824	ND	168.0	
1,1,2-Trichloroethane	79-00-5	11.35	97	352381	1039.4	168.0	
Tetrachloroethane	127-18-4	11.17	166	7585728	16032.7	168.0	
1,2-Dibromoethane	106-93-4	0.00	107	0	ND	168.0	
Chlorobenzene	108-90-7	12.42	112	8590	ND	168.0	
Ethyl benzene	100-41-4	12.48	91	5798	ND	168.0	
m,p-Xylene	1330-20-7	12.63	91	13617	ND	168.0	
o-Xylene	95-47-6	13.15	91	18252	ND	168.0	
Styrene	100-42-5	0.00	104	0	ND	168.0	
1,1,2,2-Tetrachloroethane	79-34-5	14.11	83	19013581	22305.3	168.0	
Bromofluorobenzene (88)		13.87	95	1328887	50.7	101%	
1,3,5-Trimethylbenzene	108-87-8	14.30	105	1382	ND	168.0	
1,2,4-Trimethylbenzene	85-83-6	14.79	105	4891	ND	168.0	
1,3-Dichlorobenzene	541-73-1	15.24	148	3442	ND	168.0	
1,4-Dichlorobenzene	106-46-7	15.33	148	14057	ND	168.0	
1,2-Dichlorobenzene	95-50-1	15.42	148	547	ND	168.0	
1,2,4-Trichlorobenzene	120-82-1	0.00	180	0	ND	168.0	
Hexachlorocyclopentadiene	87-86-3	17.88	225	65432	ND	168.0	

Note that benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data:

NIST Traceable Standard Cylinder, Spectra Gases L69236, 1ppmv

108_20R.D

108_108.D

108_30I.D

Date Printed:

1/18/02 7:03 PM

ND = Not Detected at the Reporting Limits.

SS = Surrogate Standard, IS = Internal Standard 50 ng each.

Col: RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214562; direct interface; -20C to 210 @ 12C/min; 35-300 amu full scan
Nutech; -5C Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15_idi
TO15cm4.ort

889 529

Jan 24 02 08:31a
01/22/2002 15:32PSC Analytical Services
9195100141

6109219667

RTP LABS INC

P. 5

PAGE 06

Research Triangle Park Labs, Inc.

TO-14A/TO-15 GC/MS Volatiles Report

Sample: Philp 200278 Jacobs VW-2 1/10/02 Wellhead
Misc: 2.5mL
Method: 1702

Autosampler: 11

DL Fact: 398.0

GC/MS #1

File: PCHEM1117021

1475891.D

Compound	CAS #	R.T.	Q Ion	Area	Pptv	Reporting Limits ppbv	IS/Surr. Recovery
Chlorobenzene-d5 (IS)		12.41	117	3571185	50.0		
Dichlorodifluoromethane (12)	75-71-8	0.00	85	0	ND	188.0	100%
Chloromethane	74-87-3	2.74	50	537	ND	168.0	
1,2- Cl- 1,1,2,2-F ethane (114)	78-14-2	0.00	65	0	ND	168.0	
Vinyl chloride	75-01-4	3.01	82	38543	602.2	168.0	
Bromomethane	74-83-9	0.00	94	0	ND	168.0	
Chloroethane	75-00-3	0.00	84	0	ND	168.0	
Trichlorofluoromethane (11)	75-68-4	0.00	101	0	ND	168.0	
1,1-Dichloroethane	75-35-4	5.38	61	27781	ND	168.0	
1,1,2- Cl 1,2,2- F ethane (113)	78-13-1	0.00	151	0	ND	168.0	
Methylene Chloride	75-09-2	6.21	84	4256	ND	168.0	
MTBE (TO-15 only)	1634-04-4	0.00	73	0	ND	168.0	
1,1-dichloroethane	75-34-3	0.00	83	0	ND	168.0	
cis-1,2-Dichloroethane	156-39-2	7.73	61	8809732	31509.5	168.0	
Chloroform	87-66-3	8.04	83	393283	1002.9	168.0	
1,1,1-Trichloroethane	71-43-8	7.78	97	1785	ND	168.0	
1,2-Dichloroethane	107-05-2	8.81	62	25278	ND	168.0	
Carbon tetrachloride	56-23-5	8.18	117	247394	948.7	168.0	
Benzene	71-43-2	8.61	78	14686	ND	168.0	
Trichloroethene	79-01-8	8.28	130	27668908	88841.1	168.0	
1,2-dichloropropane	78-87-5	9.75	63	7454	ND	168.0	
cis-1,3-dichloropropene	542-75-6	0.00	75	0	ND	168.0	
Toluene	100-68-3	10.75	91	7148	ND	168.0	
trans-1,3-dichloropropene	10061-02-6	0.00	75	0	ND	168.0	
1,1,2-Trichloroethane	79-00-5	11.35	97	295365	859.8	168.0	
Tetrachloroethane	127-18-4	11.17	186	6061212	12789.5	168.0	
1,2-Dibromoethane	106-83-4	0.00	107	0	ND	168.0	
Chlorobenzene	108-90-7	12.42	112	5639	ND	168.0	
Ethyl benzene	100-41-4	12.48	91	4171	ND	168.0	
m,p-Xylene	1330-20-7	12.63	91	6482	ND	168.0	
o-Xylene	95-47-6	13.15	91	5977	ND	168.0	
Styrene	100-42-5	0.00	104	0	ND	168.0	
1,1,2,2-Tetrachloroethane	79-34-5	14.15	83	39737061	46540.0	168.0	
Bromofluorobenzene (SS)		13.87	95	1240615	47.3		95%
1,3,5-Trimethylbenzene	108-67-8	14.22	105	3474	ND	168.0	
1,2,4-Trimethylbenzene	95-83-6	14.79	105	2800	ND	168.0	
1,3-Dichlorobenzene	541-73-1	15.22	146	3541	ND	168.0	
1,4-Dichlorobenzene	106-46-7	15.31	148	9891	ND	168.0	
1,2-Dichlorobenzene	95-50-1	0.00	145	0	ND	168.0	
1,2,4-Trichlorobenzene	120-82-1	0.00	180	0	ND	168.0	
Hexachlorobutadiene	87-88-3	17.89	225	66876	ND	168.0	

Note that benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data:

NIST Traceable Standard Cylinder: Spectra Gases L69236, 1ppmv

108_20R.D

108_10B.D

108_30L.D

Date Printed:

1/16/02 7:03 PM

ND = Not Detected at the Reporting Limits.

SS = Surrogate Standard; IS = Internal Standard 50 ng each.

Col: RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; direct interface: -20C to 210 @ 12C/m; 35-300 amu full scan

Nutech: -5C Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/16.Jd

TO15crt4.crt

Jan 24 02 08:31a
01/24/2002 16:32PSC Analytical Services
9195100141

6109219667

RTP LABS INC

p.6

PAGE 07

Research Triangle Park Labs, Inc.

TO-14A/TO-15 GC/MS Volatiles Report

Sample: Philp 209278/Jacobs VW-2 1/10/02 Ambient Air
Misc: 500ml
Method: 1702

Autosampler: 8

Dil. Fact: 1.7

File: >CHEM1\17021

1475892.D

GC/MS #1

Compound	CAS #	R.T.	Q Ion	Area	ppbv	Reporting Limits ppbv	IS/Surr. Recovery
Chlorobenzene-d5 (IS)		12.41	117	3308884	50.0		100%
Dichlorodifluoromethane (12)	75-71-8	2.11	85	10885	1.1	0.8	
Chloromethane	74-87-3	2.77	50	5278	ND	0.8	
1,2-Di-1,1,2,2-F ethane (114)	78-14-2	2.23	85	1109	ND	0.8	
Vinyl chloride	75-01-4	0.00	62	0	ND	0.8	
Bromomethane	74-83-9	0.00	94	0	ND	0.8	
Chloroethane	75-00-3	0.00	84	0	ND	0.8	
Trichlorofluoromethane (11)	75-69-4	4.53	101	12098	ND	0.8	
1,1-Dichloroethane	75-35-4	5.52	61	10549	ND	0.8	
1,1,2-Di-1,2,2-F ethane (113)	78-13-1	5.53	151	1250	ND	0.8	
Methylene Chloride	75-09-2	6.23	84	13712	ND	0.8	
MTBE (TO-15 only)	1634-04-4	6.40	73	6977	ND	0.8	
1,1-dichloroethane	75-34-3	0.00	83	0	ND	0.8	
cis-1,2-Dichloroethane	158-59-2	7.73	61	3588	ND	0.8	
Chloroform	67-68-3	8.04	83	4838	ND	0.8	
1,1,1-Trichloroethane	71-55-6	8.23	97	4488	ND	0.8	
1,2-Dichloroethane	107-06-2	8.82	82	1397	ND	0.8	
Carbon tetrachloride	56-23-5	8.16	117	10952	ND	0.8	
Benzene	71-43-2	8.61	78	54327	ND	0.8	
Trichloroethane	79-01-6	9.22	130	154193	2.7	0.8	
1,2-dichloropropane	78-67-5	0.00	83	0	ND	0.8	
cis-1,3-dichloropropene	542-75-6	0.00	75	0	ND	0.8	
Toluene	108-88-3	10.74	91	128205	ND	0.8	
trans-1,3-dichloropropene	10081-02-8	10.96	75	26824	ND	0.8	
1,1,2-Trichloroethane	79-00-5	11.38	97	1755	ND	0.8	
Tetrachloroethane	127-18-4	11.17	188	20603	ND	0.8	
1,2-Dibromoethane	108-93-4	0.00	107	0	ND	0.8	
Chlorobenzene	108-90-7	12.42	112	12824	ND	0.8	
Ethyl benzene	100-41-4	12.48	91	31574	ND	0.8	
m,p-Xylene	1330-20-7	12.63	91	73408	ND	0.8	
o-Xylene	95-47-8	13.14	91	28947	ND	0.8	
Styrene	100-42-5	13.21	104	20005	ND	0.8	
1,1,2,2-Tetrachloroethane	78-34-5	14.11	83	411195	2.6	0.8	
Bromodifluorobenzene (SS)		13.87	95	1118651	48.0		82%
1,3,5-Trimethylbenzene	108-87-8	14.28	105	7584	ND	0.8	
1,2,4-Trimethylbenzene	95-83-6	14.78	105	25280	ND	0.8	
1,3-Dichlorobenzene	541-73-1	15.21	146	2522	ND	0.8	
1,4-Dichlorobenzene	106-46-7	15.31	146	4539	ND	0.8	
1,2-Dichlorobenzene	95-60-1	15.87	146	2760	ND	0.8	
1,2,4-Trichlorobenzene	120-82-1	17.82	180	4812	ND	0.8	
Hexachlorobutadiene	87-86-3	0.00	225	0	ND	0.8	

Note that benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data:

NIST Traceable Standard Cylinder: Spectra Gases L69236, 1ppmv

108_20R.D

108_10B.D

108_30I.D

Date Printed:

1/18/02 3:43 PM

ND = Not Detected at the Reporting Limits.

SS = Surrogate Standard, IS = Internal Standard 50 ng each.

Col: RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; direct interface; -20C to 210 @ 12C/min; 35-300 amu full scan

Nutech: -SC Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15_1.c1

TO15cr1.c1

889 531

Jan 24 02 08:32a

PSC Analytical Services

6109219667

P.7



page 1 of 1

23JAN02_1622_13_M1261_R.R

INDUSTRIAL HYGIENE

ENVIRONMENTAL TESTING

• EPA/NVLAP 101262-0
• AIHA ACCREDITATION NO. 100438
• NC DENR 599

• NY DOH/NELAC 10903
• PA DEP 08-353

• NJ DEP 77020
• CT DPH PH-0238

ANALYTICAL REPORT

Client: Jacobs Engineering

Report to: Kraig Smith
Jacobs Engineering
3354 Perimeter Hill Dr.
Suite 310
Nashville TN 37211

Project: 209313
Received: 14-JAN-02
Reported: 23-JAN-02

PURCHASE ORDER: C5X51110

Project Description: SVE Pilot Study / TO-15 Analysis

Sampled: 11-JAN-02 14:10

VW-Z/Wellhead 04316

Lab Sample: 1476062

See Attached Report

RESULT

UNITS

CONCENTRATION

UNITS

METHOD

Final sample concentrations calculated from sample areas supplied on chain of custody.
< Indicates less than the limit of quantitation.

Jan 24 02 08:32a
01/24/2002 16:32PSC Analytical Services
9195100141

6109219667

RTP LABS INC

P.8

PAGE 11

Research Triangle Park Labs, Inc.

TO-14A/TO-15 GC/MS Volatiles Report

Sample: Philip 209313 Jacobs VW-2 1/11/02 Wellhead
Misc: 2.5mL
Method: 1702

File: PCHEM111702 1476062.D

Autosampler: 12

Off. Fact: 936.0

GC/MS #1

Compound	CAS #	R.T.	Q Ion	Area	ppbv	Reporting Limits ppbv	IS/Surr. Recovery
Chlorobenzene-d3 (IS)		12.41	117	3369672	50.0		
Dichlorodifluoromethane (12)	75-71-8	0.00	85	0	ND	168.0	100%
Chloromethane	74-87-3	0.00	50	0	ND	168.0	
1,2-Cl-1,1,2,2-F ethane (114)	78-14-2	0.00	85	0	ND	168.0	
Vinyl chloride	75-01-4	3.05	82	31851	552.8	168.0	
Bromomethane	74-83-9	0.00	94	0	ND	168.0	
Chloroethane	75-00-3	0.00	84	0	ND	168.0	
Trichlorofluoromethane (11)	75-69-4	0.00	101	0	ND	168.0	
1,1-Dichloroethane	75-35-4	5.36	81	21814	ND	168.0	
1,1,2-Cl1,2,2-F ethane (113)	78-13-1	0.00	151	0	ND	168.0	
Methylene Chloride	75-09-2	8.22	84	3549	ND	168.0	
MTBE (TO-15 only)	1834-04-4	0.00	73	0	ND	168.0	
1,1-dichloroethane	75-34-3	0.00	83	0	ND	168.0	
cis-1,2-Dichloroethane	158-59-2	7.73	81	7820475	30332.8	168.0	
Chloroform	67-66-3	8.03	83	382031	1032.5	168.0	
1,1,1-Trichloroethane	71-55-6	8.03	87	1086	ND	168.0	
1,2-Dichloroethane	107-06-2	8.81	82	25907	ND	168.0	
Carbon tetrachloride	56-23-5	9.16	117	267888	1088.5	168.0	
Benzene	71-43-2	8.82	78	12577	ND	168.0	
Trichloroethene	79-01-6	9.28	130	25593534	88466.7	168.0	
1,2-dichloropropane	78-87-5	9.75	83	8041	ND	168.0	
cis-1,3-dichloropropene	542-75-8	0.00	75	0	ND	168.0	
Toluene	108-88-3	10.74	81	8805	ND	168.0	
trans-1,3-dichloropropane	10061-03-6	11.40	75	589	ND	168.0	
1,1,2-Trichloroethane	79-00-5	11.35	87	265594	828.9	168.0	
Tetrachloroethene	127-18-4	11.17	168	5379254	12029.3	168.0	
1,2-Dibromoethane	106-93-4	0.00	107	0	ND	168.0	
Chlorobenzene	108-90-7	12.43	112	6283	ND	168.0	
Ethyl benzene	100-41-4	12.48	91	2177	ND	168.0	
m,p-Xylene	1330-20-7	12.83	91	3380	ND	168.0	
o-Xylene	85-47-6	13.16	91	8122	ND	168.0	
Styrene	100-42-5	0.00	104	0	ND	168.0	
1,1,2,2-Tetrachloroethane	79-34-5	0.00	83	0	ND	168.0	
Bromofluorobenzene (SS)		13.87	95	1232009	49.8		100%
1,3,5-Trimethylbenzene	108-87-8	14.22	105	1818	ND	168.0	
1,2,4-Trimethylbenzene	95-83-6	14.79	105	2788	ND	168.0	
1,3-Dichlorobenzene	541-73-1	15.21	148	3151	ND	168.0	
1,4-Dichlorobenzene	106-46-7	15.31	148	20849	ND	168.0	
1,2-Dichlorobenzene	95-50-1	0.00	146	0	ND	168.0	
1,2,4-Trichlorobenzene	120-82-1	0.00	180	0	ND	168.0	
Hexachlorobutadiene	87-68-3	17.87	225	49351	ND	168.0	

Note that benzyl chloride has been removed from the target list due to instability in the standards.

Calibration Data:

NIST Traceable Standard Cylinder, Spectra Gases L88236, 1ppmv

108_20R.D

108_10B.D

108_30LD

Data Printed

1/15/02 7:17 PM

ND = Not Detected at the Reporting Limits.

SS = Surrogate Standard; IS = Internal Standard 50 ng each.

Col: RTX-VMS Fused Silica; 30m x 0.25mm, 1.4u film S/N 214582; direct interface; -20C to 210 @ 12C/m; 35-300 amu full scan

Nutech: -5C Tenax/Anasorb 747 Trap; desorb @ 180C; TO14/15_lo

TO15or14.crl

Vapor VOCs Analytical Results for Test 1 (VW-1)

Dunn Field - Memphis Depot (December 2001)

Venting Well ID	SUMMA Canister Sampling Locations	Parameter ID	Date & Time Collected	Analytical Results (ppbv)	Reporting Limits (ppbv)	IS/Surr. Recovery
VW-1	After Carbon Canister	Chlorobenzene	12/18/2001 18:32	50.0		100%
VW-1	After Carbon Canister	Dichlorodifluoromethane	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	Chloromethane	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	1,2-DI - 1,1,2,2-F ethane	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	Vinyl chloride	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	Bromomethane	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	Chloroethane	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	Trichlorofluoromethane	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	1,1-Dichloroethene	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	1,1,2-DI - 1,2,2-F ethane	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	Methylene Chloride	12/18/2001 18:32	1.7	0.8	
VW-1	After Carbon Canister	MTBE	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	1,1-dichloroethane	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	cis-1,2-Dichloroethene	12/18/2001 18:32	40.5	0.8	
VW-1	After Carbon Canister	Chloroform	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	1,1,1-Trichloroethane	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	1,2-Dichloroethane	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	Carbon tetrachloride	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	Benzene	12/18/2001 18:32	1.6	0.8	
VW-1	After Carbon Canister	Trichloroethene	12/18/2001 18:32	585.8	0.8	
VW-1	After Carbon Canister	1,2-Dichloropropane	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	cis-1,3-Dichloropropene	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	Toluene	12/18/2001 18:32	1.9	0.8	
VW-1	After Carbon Canister	trans-1,3-dichloropropene	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	1,1,2-Trichloroethane	12/18/2001 18:32	3.8	0.8	
VW-1	After Carbon Canister	Tetrachloroethene	12/18/2001 18:32	147.8	0.8	
VW-1	After Carbon Canister	1,2-Dibromoethane	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	Chlorobenzene	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	Ethylbenzene	12/18/2001 18:32	1.2	0.8	
VW-1	After Carbon Canister	m,p-Xylene	12/18/2001 18:32	3.0	0.8	
VW-1	After Carbon Canister	o-Xylene	12/18/2001 18:32	2.6	0.8	
VW-1	After Carbon Canister	Styrene	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	1,1,2,2-Tetrachloroethane	12/18/2001 18:32	473.3	0.8	
VW-1	After Carbon Canister	Bromofluorobenzene	12/18/2001 18:32	72.3		145%
VW-1	After Carbon Canister	1,3,5-Trimethylbenzene	12/18/2001 18:32	2.6	0.8	
VW-1	After Carbon Canister	1,2,4-Trimethylbenzene	12/18/2001 18:32	5.4	0.8	
VW-1	After Carbon Canister	1,3-Dichlorobenzene	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	1,4-Dichlorobenzene	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	1,2-Dichlorobenzene	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	1,2,4-Trichlorobenzene	12/18/2001 18:32	ND	0.8	
VW-1	After Carbon Canister	Hexachlorobutadiene	12/18/2001 18:32	32.8	0.8	
VW-1	After Liquid Ring Pump	Chlorobenzene	12/18/2001 18:32	50.0		100%
VW-1	After Liquid Ring Pump	Dichlorodifluoromethane	12/18/2001 18:32	ND	4.7	

Venting Well ID	SUMMA Canister Sampling Locations	Parameter ID	Date & Time Collected	Analytical Results (ppbv)	Reporting Limits (ppbv)	IS/Surr. Recovery
VW-1	After Liquid Ring Pump	Chloromethane	12/18/2001 18:32	ND	4.7	
VW-1	After Liquid Ring Pump	1,2-Cl - 1,1,2,2-F ethane	12/18/2001 18:32	ND	4.7	
VW-1	After Liquid Ring Pump	Vinyl chloride	12/18/2001 18:32	263.4	4.7	
VW-1	After Liquid Ring Pump	Bromomethane	12/18/2001 18:32	ND	4.7	
VW-1	After Liquid Ring Pump	Chloroethane	12/18/2001 18:32	ND	4.7	
VW-1	After Liquid Ring Pump	Trichlorofluoromethane	12/18/2001 18:32	ND	4.7	
VW-1	After Liquid Ring Pump	1,1-Dichloroethene	12/18/2001 18:32	32.5	4.7	
VW-1	After Liquid Ring Pump	1,1,2-Cl - 1,2,2-F ethane	12/18/2001 18:32	ND	4.7	
VW-1	After Liquid Ring Pump	Methylene Chloride	12/18/2001 18:32	ND	4.7	
VW-1	After Liquid Ring Pump	MTBE	12/18/2001 18:32	ND	4.7	
VW-1	After Liquid Ring Pump	1,1-dichloroethane	12/18/2001 18:32	ND	4.7	
VW-1	After Liquid Ring Pump	cis-1,2-Dichloroethene	12/18/2001 18:32	847.0	4.7	
VW-1	After Liquid Ring Pump	Chloroform	12/18/2001 18:32	62.5	4.7	
VW-1	After Liquid Ring Pump	1,1,1-Trichloroethane	12/18/2001 18:32	ND	4.7	
VW-1	After Liquid Ring Pump	1,2-Dichloroethane	12/18/2001 18:32	14.1	4.7	
VW-1	After Liquid Ring Pump	Carbon tetrachloride	12/18/2001 18:32	ND	4.7	
VW-1	After Liquid Ring Pump	Benzene	12/18/2001 18:32	21.0	4.7	
VW-1	After Liquid Ring Pump	Trichloroethene	12/18/2001 18:32	3169.6	4.7	
VW-1	After Liquid Ring Pump	1,2-Dichloropropane	12/18/2001 18:32	ND	4.7	
VW-1	After Liquid Ring Pump	cis-1,3-Dichloropropene	12/18/2001 18:32	ND	4.7	
VW-1	After Liquid Ring Pump	Toluene	12/18/2001 18:32	19.6	4.7	
VW-1	After Liquid Ring Pump	trans-1,3-dichloropropene	12/18/2001 18:32	ND	4.7	
VW-1	After Liquid Ring Pump	1,1,2-Trichloroethane	12/18/2001 18:32	114.8	4.7	
VW-1	After Liquid Ring Pump	Tetrachloroethene	12/18/2001 18:32	1195.7	4.7	
VW-1	After Liquid Ring Pump	1,2-Dibromoethane	12/18/2001 18:32	ND	4.7	
VW-1	After Liquid Ring Pump	Chlorobenzene	12/18/2001 18:32	ND	4.7	
VW-1	After Liquid Ring Pump	Ethylbenzene	12/18/2001 18:32	64.4	4.7	
VW-1	After Liquid Ring Pump	m,p-Xylene	12/18/2001 18:32	45.6	4.7	
VW-1	After Liquid Ring Pump	o-Xylene	12/18/2001 18:32	34.9	4.7	
VW-1	After Liquid Ring Pump	Styrene	12/18/2001 18:32	ND	4.7	
VW-1	After Liquid Ring Pump	1,1,2,2-Tetrachloroethane	12/18/2001 18:32	2391.3	4.7	
VW-1	After Liquid Ring Pump	Bromofluorobenzene	12/18/2001 18:32	26.1		52%
VW-1	After Liquid Ring Pump	1,3,5-Trimethylbenzene	12/18/2001 18:32	65.3	4.7	
VW-1	After Liquid Ring Pump	1,2,4-Trimethylbenzene	12/18/2001 18:32	160.4	4.7	
VW-1	After Liquid Ring Pump	1,3-Dichlorobenzene	12/18/2001 18:32	ND	4.7	
VW-1	After Liquid Ring Pump	1,4-Dichlorobenzene	12/18/2001 18:32	ND	4.7	
VW-1	After Liquid Ring Pump	1,2-Dichlorobenzene	12/18/2001 18:32	ND	4.7	
VW-1	After Liquid Ring Pump	1,2,4-Trichlorobenzene	12/18/2001 18:32	8.4	4.7	
VW-1	After Liquid Ring Pump	Hexachlorobutadiene	12/18/2001 18:32	109.4	4.7	
VW-1	Equipment blank	Chlorobenzene	12/18/2001 18:32	50.0		100%
VW-1	Equipment blank	Dichlorodifluoromethane	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	Chloromethane	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	1,2-Cl - 1,1,2,2-F ethane	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	Vinyl chloride	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	Bromomethane	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	Chloroethane	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	Trichlorofluoromethane	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	1,1-Dichloroethene	12/18/2001 18:32	ND	0.5	

Venting Well ID	SUMMA Canister Sampling Locations	Parameter ID	Date & Time Collected	Analytical Results (ppbv)	Reporting Limits (ppbv)	IS/Surr. Recovery
VW-1	Equipment blank	1,1,2-Cl - 1,2,2-F ethane	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	Methylene Chloride	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	MTBE	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	1,1-dichloroethane	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	cis-1,2-Dichloroethene	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	Chloroform	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	1,1,1-Trichloroethane	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	1,2-Dichloroethane	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	Carbon tetrachloride	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	Benzene	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	Trichloroethene	12/18/2001 18:32	14.5	0.5	
VW-1	Equipment blank	1,2-Dichloropropane	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	cis-1,3-Dichloropropene	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	Toluene	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	trans-1,3-dichloropropene	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	1,1,2-Trichloroethane	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	Tetrachloroethene	12/18/2001 18:32	2.0	0.5	
VW-1	Equipment blank	1,2-Dibromoethane	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	Chlorobenzene	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	Ethylbenzene	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	m,p-Xylene	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	o-Xylene	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	Styrene	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	1,1,2,2-Tetrachloroethane	12/18/2001 18:32	17.3	0.5	
VW-1	Equipment blank	Bromofluorobenzene	12/18/2001 18:32	49.5		99%
VW-1	Equipment blank	1,3,5-Trimethylbenzene	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	1,2,4-Trimethylbenzene	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	1,3-Dichlorobenzene	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	1,4-Dichlorobenzene	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	1,2-Dichlorobenzene	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	1,2,4-Trichlorobenzene	12/18/2001 18:32	ND	0.5	
VW-1	Equipment blank	Hexachlorobutadiene	12/18/2001 18:32	ND	0.5	
VW-1	After Carbon Canister	Chlorobenzene	12/19/2001 2:32	50.0		100%
VW-1	After Carbon Canister	Dichlorodifluoromethane	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	Chloromethane	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	1,2-Cl - 1,1,2,2-F ethane	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	Vinyl chloride	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	Bromomethane	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	Chloroethane	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	Trichlorofluoromethane	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	1,1-Dichloroethene	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	1,1,2-Cl - 1,2,2-F ethane	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	Methylene Chloride	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	MTBE	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	1,1-dichloroethane	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	cis-1,2-Dichloroethene	12/19/2001 2:32	16.2	0.6	
VW-1	After Carbon Canister	Chloroform	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	1,1,1-Trichloroethane	12/19/2001 2:32	ND	0.6	

Venting Well ID	SUMMA Canister Sampling Locations	Parameter ID	Date & Time Collected	Analytical Results (ppbv)	Reporting Limits (ppbv)	IS/Surr. Recovery
VW-1	After Carbon Canister	1,2-Dichloroethane	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	Carbon tetrachloride	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	Benzene	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	Trichloroethene	12/19/2001 2:32	103.6	0.6	
VW-1	After Carbon Canister	1,2-Dichloropropane	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	cis-1,3-Dichloropropene	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	Toluene	12/19/2001 2:32	0.9	0.6	
VW-1	After Carbon Canister	trans-1,3-dichloropropene	12/19/2001 2:32	3.9	0.6	
VW-1	After Carbon Canister	1,1,2-Trichloroethane	12/19/2001 2:32	0.7	0.6	
VW-1	After Carbon Canister	Tetrachloroethene	12/19/2001 2:32	32.6	0.6	
VW-1	After Carbon Canister	1,2-Dibromoethane	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	Chlorobenzene	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	Ethylbenzene	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	m,p-Xylene	12/19/2001 2:32	0.9	0.6	
VW-1	After Carbon Canister	o-Xylene	12/19/2001 2:32	0.7	0.6	
VW-1	After Carbon Canister	Styrene	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	1,1,2,2-Tetrachloroethane	12/19/2001 2:32	124.2	0.6	
VW-1	After Carbon Canister	Bromofluorobenzene	12/19/2001 2:32	49.3		99%
VW-1	After Carbon Canister	1,3,5-Trimethylbenzene	12/19/2001 2:32	0.7	0.6	
VW-1	After Carbon Canister	1,2,4-Trimethylbenzene	12/19/2001 2:32	1.7	0.6	
VW-1	After Carbon Canister	1,3-Dichlorobenzene	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	1,4-Dichlorobenzene	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	1,2-Dichlorobenzene	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	1,2,4-Trichlorobenzene	12/19/2001 2:32	ND	0.6	
VW-1	After Carbon Canister	Hexachlorobutadiene	12/19/2001 2:32	4.4	0.6	
VW-1	After Liquid Ring Pump	Chlorobenzene	12/19/2001 2:32	50.0		100%
VW-1	After Liquid Ring Pump	Dichlorodifluoromethane	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	Chloromethane	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	1,2-Cl - 1,1,2,2-F ethane	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	Vinyl chloride	12/19/2001 2:32	88.1	6.0	
VW-1	After Liquid Ring Pump	Bromomethane	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	Chloroethane	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	Trichlorofluoromethane	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	1,1-Dichloroethene	12/19/2001 2:32	8.8	6.0	
VW-1	After Liquid Ring Pump	1,1,2-Cl - 1,2,2-F ethane	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	Methylene Chloride	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	MTBE	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	1,1-dichloroethane	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	cis-1,2-Dichloroethene	12/19/2001 2:32	520.2	6.0	
VW-1	After Liquid Ring Pump	Chloroform	12/19/2001 2:32	23.8	6.0	
VW-1	After Liquid Ring Pump	1,1,1-Trichloroethane	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	1,2-Dichloroethane	12/19/2001 2:32	11.7	6.0	
VW-1	After Liquid Ring Pump	Carbon tetrachloride	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	Benzene	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	Trichloroethene	12/19/2001 2:32	1314.2	6.0	
VW-1	After Liquid Ring Pump	1,2-Dichloropropane	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	cis-1,3-Dichloropropene	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	Toluene	12/19/2001 2:32	10.8	6.0	

Venting Well ID	SUMMA Canister Sampling Locations	Parameter ID	Date & Time Collected	Analytical Results (ppbv)	Reporting Limits (ppbv)	IS/Surr. Recovery
VW-1	After Liquid Ring Pump	trans-1,3-dichloropropene	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	1,1,2-Trichloroethane	12/19/2001 2:32	15.8	6.0	
VW-1	After Liquid Ring Pump	Tetrachloroethene	12/19/2001 2:32	819.6	6.0	
VW-1	After Liquid Ring Pump	1,2-Dibromoethane	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	Chlorobenzene	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	Ethylbenzene	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	m,p-Xylene	12/19/2001 2:32	6.5	6.0	
VW-1	After Liquid Ring Pump	o-Xylene	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	Styrene	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	1,1,2,2-Tetrachloroethane	12/19/2001 2:32	937.9	6.0	
VW-1	After Liquid Ring Pump	Bromofluorobenzene	12/19/2001 2:32	48.8		98%
VW-1	After Liquid Ring Pump	1,3,5-Trimethylbenzene	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	1,2,4-Trimethylbenzene	12/19/2001 2:32	8.1	6.0	
VW-1	After Liquid Ring Pump	1,3-Dichlorobenzene	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	1,4-Dichlorobenzene	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	1,2-Dichlorobenzene	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	1,2,4-Trichlorobenzene	12/19/2001 2:32	ND	6.0	
VW-1	After Liquid Ring Pump	Hexachlorobutadiene	12/19/2001 2:32	17.4	6.0	
VW-1	After Carbon Canister	Chlorobenzene	12/20/2001 2:30	50.0	NA	100%
VW-1	After Carbon Canister	Dichlorodifluoromethane	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	Chloromethane	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	1,2-Di - 1,1,2,2-F ethane	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	Vinyl chloride	12/20/2001 2:30	312.8	168.0	
VW-1	After Carbon Canister	Bromomethane	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	Chloroethane	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	Trichlorofluoromethane	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	1,1-Dichloroethene	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	1,1,2-Di - 1,2,2-F ethane	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	Methylene Chloride	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	MTBE	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	1,1-dichloroethane	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	cis-1,2-Dichloroethene	12/20/2001 2:30	2611.4	168.0	
VW-1	After Carbon Canister	Chloroform	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	1,1,1-Trichloroethane	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	1,2-Dichloroethane	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	Carbon tetrachloride	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	Benzene	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	Trichloroethene	12/20/2001 2:30	43300.4	168.0	
VW-1	After Carbon Canister	1,2-Dichloropropane	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	cis-1,3-Dichloropropene	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	Toluene	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	trans-1,3-dichloropropene	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	1,1,2-Trichloroethane	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	Tetrachloroethene	12/20/2001 2:30	9404.2	168.0	
VW-1	After Carbon Canister	1,2-Dibromoethane	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	Chlorobenzene	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	Ethylbenzene	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	m,p-Xylene	12/20/2001 2:30	ND	168.0	

Venting Well ID	SUMMA Canister Sampling Locations	Parameter ID	Date & Time Collected	Analytical Results (ppbv)	Reporting Limits (ppbv)	IS/Surr. Recovery
VW-1	After Carbon Canister	o-Xylene	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	Styrene	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	1,1,2,2-Tetrachloroethane	12/20/2001 2:30	14284.9	168.0	
VW-1	After Carbon Canister	Bromofluorobenzene	12/20/2001 2:30	43.8	NA	88%
VW-1	After Carbon Canister	1,3,5-Trimethylbenzene	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	1,2,4-Trimethylbenzene	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	1,3-Dichlorobenzene	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	1,4-Dichlorobenzene	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	1,2-Dichlorobenzene	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	1,2,4-Trichlorobenzene	12/20/2001 2:30	ND	168.0	
VW-1	After Carbon Canister	Hexachlorobutadiene	12/20/2001 2:30	ND	168.0	
VW-1	After Liquid Ring Pump	Chlorobenzene	12/20/2001 2:35	50.0	NA	100%
VW-1	After Liquid Ring Pump	Dichlorodifluoromethane	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	Chloromethane	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	1,2-Cl - 1,1,2,2-F ethane	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	Vinyl chloride	12/20/2001 2:35	317.4	100.0	
VW-1	After Liquid Ring Pump	Bromomethane	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	Chloroethane	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	Trichlorofluoromethane	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	1,1-Dichloroethene	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	1,1,2-Cl - 1,2,2-F ethane	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	Methylene Chloride	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	MTBE	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	1,1-dichloroethane	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	cis-1,2-Dichloroethene	12/20/2001 2:35	2435.5	100.0	
VW-1	After Liquid Ring Pump	Chloroform	12/20/2001 2:35	115.1	100.0	
VW-1	After Liquid Ring Pump	1,1,1-Trichloroethane	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	1,2-Dichloroethane	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	Carbon tetrachloride	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	Benzene	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	Trichloroethene	12/20/2001 2:35	31625.9	100.0	
VW-1	After Liquid Ring Pump	1,2-Dichloropropane	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	cis-1,3-Dichloroproene	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	Toluene	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	trans-1,3-dichloropropene	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	1,1,2-Trichloroethane	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	Tetrachloroethene	12/20/2001 2:35	8306.3	100.0	
VW-1	After Liquid Ring Pump	1,2-Dibromoethane	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	Chlorobenzene	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	Ethylbenzene	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	m,p-Xylene	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	o-Xylene	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	Styrene	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	1,1,2,2-Tetrachloroethane	12/20/2001 2:35	12484.7	100.0	
VW-1	After Liquid Ring Pump	Bromofluorobenzene	12/20/2001 2:35	44.1	NA	86%
VW-1	After Liquid Ring Pump	1,3,5-Trimethylbenzene	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	1,2,4-Trimethylbenzene	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	1,3-Dichlorobenzene	12/20/2001 2:35	ND	100.0	

Venting Well ID	SUMMA Canister Sampling Locations	Parameter ID	Date & Time Collected	Analytical Results (ppbv)	Reporting Limits (ppbv)	IS/Surr. Recovery
VW-1	After Liquid Ring Pump	1,4-Dichlorobenzene	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	1,2-Dichlorobenzene	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	1,2,4-Trichlorobenzene	12/20/2001 2:35	ND	100.0	
VW-1	After Liquid Ring Pump	Hexachlorobutadiene	12/20/2001 2:35	ND	100.0	
VW-1	Duplicate after Pump	Chlorobenzene	12/20/2001 2:36	50.0	NA	100%
VW-1	Duplicate after Pump	Dichlorodifluoromethane	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	Chloromethane	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	1,2-Cl - 1,1,2,2-F ethane	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	Vinyl chloride	12/20/2001 2:36	156.2	100.0	
VW-1	Duplicate after Pump	Bromomethane	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	Chloroethane	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	Trichlorofluoromethane	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	1,1-Dichloroethene	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	1,1,2-Cl - 1,2,2-F ethane	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	Methylene Chloride	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	MTBE	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	1,1-dichloroethane	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	cis-1,2-Dichloroethene	12/20/2001 2:36	2409.0	100.0	
VW-1	Duplicate after Pump	Chloroform	12/20/2001 2:36	110.8	100.0	
VW-1	Duplicate after Pump	1,1,1-Trichloroethane	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	1,2-Dichloroethane	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	Carbon tetrachloride	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	Benzene	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	Trichloroethene	12/20/2001 2:36	32072.3	100.0	
VW-1	Duplicate after Pump	1,2-Dichloropropane	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	cis-1,3-Dichloropropene	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	Toluene	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	trans-1,3-dichloropropene	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	1,1,2-Trichloroethane	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	Tetrachloroethene	12/20/2001 2:36	8828.6	100.0	
VW-1	Duplicate after Pump	1,2-Dibromoethane	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	Chlorobenzene	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	Ethylbenzene	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	m,p-Xylene	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	o-Xylene	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	Styrene	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	1,1,2,2-Tetrachloroethane	12/20/2001 2:36	14784.7	100.0	
VW-1	Duplicate after Pump	Bromofluorobenzene	12/20/2001 2:36	44.7	NA	89%
VW-1	Duplicate after Pump	1,3,5-Trimethylbenzene	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	1,2,4-Trimethylbenzene	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	1,3-Dichlorobenzene	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	1,4-Dichlorobenzene	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	1,2-Dichlorobenzene	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	1,2,4-Trichlorobenzene	12/20/2001 2:36	ND	100.0	
VW-1	Duplicate after Pump	Hexachlorobutadiene	12/20/2001 2:36	ND	100.0	
VW-1	Ambient Background	Chlorobenzene	12/20/2001 15:00	50.0	NA	100%
VW-1	Ambient Background	Dichlorodifluoromethane	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	Chloromethane	12/20/2001 15:00	ND	0.8	

Venting Well ID	SUMMA Canister Sampling Locations	Parameter ID	Date & Time Collected	Analytical Results (ppbv)	Reporting Limits (ppbv)	IS/Surr. Recovery
VW-1	Ambient Background	1,2-Cl - 1,1,2,2-F ethane	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	Vinyl chloride	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	Bromomethane	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	Chloroethane	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	Trichlorofluoromethane	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	1,1-Dichloroethene	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	1,1,2-Cl - 1,2,2-F ethane	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	Methylene Chloride	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	MTBE	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	1,1-dichloroethane	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	cis-1,2-Dichloroethene	12/20/2001 15:00	1.0	0.8	
VW-1	Ambient Background	Chloroform	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	1,1,1-Trichloroethane	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	1,2-Dichloroethane	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	Carbon tetrachloride	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	Benzene	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	Trichloroethene	12/20/2001 15:00	56.0	0.8	
VW-1	Ambient Background	1,2-Dichloropropane	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	cis-1,3-Dichloropropene	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	Toluene	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	trans-1,3-dichloropropene	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	1,1,2-Trichloroethane	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	Tetrachloroethene	12/20/2001 15:00	6.7	0.8	
VW-1	Ambient Background	1,2-Dibromoethane	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	Chlorobenzene	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	Ethylbenzene	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	m,p-Xylene	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	o-Xylene	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	Styrene	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	1,1,2,2-Tetrachloroethane	12/20/2001 15:00	28.5	0.8	
VW-1	Ambient Background	Bromofluorobenzene	12/20/2001 15:00	43.2	NA	86%
VW-1	Ambient Background	1,3,5-Trimethylbenzene	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	1,2,4-Trimethylbenzene	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	1,3-Dichlorobenzene	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	1,4-Dichlorobenzene	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	1,2-Dichlorobenzene	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	1,2,4-Trichlorobenzene	12/20/2001 15:00	ND	0.8	
VW-1	Ambient Background	Hexachlorobutadiene	12/20/2001 15:00	ND	0.8	
VW-1	After Carbon Canister	Chlorobenzene	12/21/2001 14:30	50.0	NA	100%
VW-1	After Carbon Canister	Dichlorodifluoromethane	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	Chloromethane	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	1,2-Cl - 1,1,2,2-F ethane	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	Vinyl chloride	12/21/2001 14:30	0.7	0.5	
VW-1	After Carbon Canister	Bromomethane	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	Chloroethane	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	Trichlorofluoromethane	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	1,1-Dichloroethene	12/21/2001 14:30	0.5	0.5	
VW-1	After Carbon Canister	1,1,2-Cl - 1,2,2-F ethane	12/21/2001 14:30	ND	0.5	

Venting Well ID	SUMMA Canister Sampling Locations	Parameter ID	Date & Time Collected	Analytical Results (ppbv)	Reporting Limits (ppbv)	IS/Surr. Recovery
VW-1	After Carbon Canister	Methylene Chloride	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	MTBE	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	1,1-dichloroethane	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	cis-1,2-Dichloroethene	12/21/2001 14:30	25.8	0.5	
VW-1	After Carbon Canister	Chloroform	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	1,1,1-Trichloroethane	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	1,2-Dichloroethane	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	Carbon tetrachloride	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	Benzene	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	Trichloroethene	12/21/2001 14:30	130.2	0.5	
VW-1	After Carbon Canister	1,2-Dichloropropane	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	cis-1,3-Dichloropropene	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	Toluene	12/21/2001 14:30	1.6	0.5	
VW-1	After Carbon Canister	trans-1,3-dichloropropene	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	1,1,2-Trichloroethane	12/21/2001 14:30	1.5	0.5	
VW-1	After Carbon Canister	Tetrachloroethene	12/21/2001 14:30	71.1	0.5	
VW-1	After Carbon Canister	1,2-Dibromoethane	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	Chlorobenzene	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	Ethylbenzene	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	m,p-Xylene	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	o-Xylene	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	Styrene	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	1,1,2,2-Tetrachloroethane	12/21/2001 14:30	117.7	0.5	
VW-1	After Carbon Canister	Bromofluorobenzene	12/21/2001 14:30	48.9	NA	98%
VW-1	After Carbon Canister	1,3,5-Trimethylbenzene	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	1,2,4-Trimethylbenzene	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	1,3-Dichlorobenzene	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	1,4-Dichlorobenzene	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	1,2-Dichlorobenzene	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	1,2,4-Trichlorobenzene	12/21/2001 14:30	ND	0.5	
VW-1	After Carbon Canister	Hexachlorobutadiene	12/21/2001 14:30	3.1	0.5	
VW-1	After Liquid Ring Pump	Chlorobenzene	12/21/2001 14:30	50.0	NA	100%
VW-1	After Liquid Ring Pump	Dichlorodifluoromethane	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	Chloromethane	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	1,2-Cl - 1,1,2,2-F ethane	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	Vinyl chloride	12/21/2001 14:30	458.1	168.0	
VW-1	After Liquid Ring Pump	Bromomethane	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	Chloroethane	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	Trichlorofluoromethane	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	1,1-Dichloroethene	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	1,1,2-Cl - 1,2,2-F ethane	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	Methylene Chloride	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	MTBE	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	1,1-dichloroethane	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	cis-1,2-Dichloroethene	12/21/2001 14:30	3228.8	168.0	
VW-1	After Liquid Ring Pump	Chloroform	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	1,1,1-Trichloroethane	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	1,2-Dichloroethane	12/21/2001 14:30	ND	168.0	

Venting Well ID	SUMMA Canister Sampling Locations	Parameter ID	Date & Time Collected	Analytical Results (ppbv)	Reporting Limits (ppbv)	IS/Surr. Recovery
VW-1	After Liquid Ring Pump	Carbon tetrachloride	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	Benzene	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	Trichloroethene	12/21/2001 14:30	46929.9	168.0	
VW-1	After Liquid Ring Pump	1,2-Dichloropropane	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	cis-1,3-Dichloropropene	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	Toluene	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	trans-1,3-dichloropropene	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	1,1,2-Trichloroethane	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	Tetrachloroethene	12/21/2001 14:30	11167.4	168.0	
VW-1	After Liquid Ring Pump	1,2-Dibromoethane	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	Chlorobenzene	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	Ethylbenzene	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	m,p-Xylene	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	o-Xylene	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	Styrene	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	1,1,2,2-Tetrachloroethane	12/21/2001 14:30	19502.7	168.0	
VW-1	After Liquid Ring Pump	Bromofluorobenzene	12/21/2001 14:30	44.3	NA	89%
VW-1	After Liquid Ring Pump	1,3,5-Trimethylbenzene	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	1,2,4-Trimethylbenzene	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	1,3-Dichlorobenzene	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	1,4-Dichlorobenzene	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	1,2-Dichlorobenzene	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	1,2,4-Trichlorobenzene	12/21/2001 14:30	ND	168.0	
VW-1	After Liquid Ring Pump	Hexachlorobutadiene	12/21/2001 14:30	ND	168.0	
VW-1	Duplicate after Pump	Chlorobenzene	12/21/2001 14:30	50.0	NA	100%
VW-1	Duplicate after Pump	Dichlorodifluoromethane	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	Chloromethane	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	1,2-Cl - 1,1,2,2-F ethane	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	Vinyl chloride	12/21/2001 14:30	176.0	147	
VW-1	Duplicate after Pump	Bromomethane	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	Chloroethane	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	Trichlorofluoromethane	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	1,1-Dichloroethene	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	1,1,2-Cl - 1,2,2-F ethane	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	Methylene Chloride	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	MTBE	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	1,1-dichloroethane	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	cis-1,2-Dichloroethene	12/21/2001 14:30	2675.3	147	
VW-1	Duplicate after Pump	Chloroform	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	1,1,1-Trichloroethane	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	1,2-Dichloroethane	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	Carbon tetrachloride	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	Benzene	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	Trichloroethene	12/21/2001 14:30	51571.9	147	
VW-1	Duplicate after Pump	1,2-Dichloropropane	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	cis-1,3-Dichloropropene	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	Toluene	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	trans-1,3-dichloropropene	12/21/2001 14:30	ND	147	

Venting Well ID	SUMMA Canister Sampling Locations	Parameter ID	Date & Time Collected	Analytical Results (ppbv)	Reporting Limits (ppbv)	IS/Surr. Recovery
VW-1	Duplicate after Pump	1,1,2-Trichloroethane	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	Tetrachloroethene	12/21/2001 14:30	11499.5	147	
VW-1	Duplicate after Pump	1,2-Dibromoethane	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	Chlorobenzene	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	Ethylbenzene	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	m,p-Xylene	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	o-Xylene	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	Styrene	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	1,1,2,2-Tetrachloroethane	12/21/2001 14:30	19785.3	147	
VW-1	Duplicate after Pump	Bromofluorobenzene	12/21/2001 14:30	41.1	NA	82%
VW-1	Duplicate after Pump	1,3,5-Trimethylbenzene	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	1,2,4-Trimethylbenzene	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	1,3-Dichlorobenzene	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	1,4-Dichlorobenzene	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	1,2-Dichlorobenzene	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	1,2,4-Trichlorobenzene	12/21/2001 14:30	ND	147	
VW-1	Duplicate after Pump	Hexachlorobutadiene	12/21/2001 14:30	ND	147	

Note:

ND = Not Detected at the Reporting Limits

NA = Not Applicable

Benzyl chloride has been removed from the target list due to instability in the standards

SS = Surrogate Standard

IS = Internal Standard 50 ng each

Benzyl chloride has been removed from the target list due to instability in the standards

Vapor VOCs Analytical Results for Test 2 (VW-2)

Dunn Field - Memphis Depot (January 2002)

Venting Well ID	SUMMA Canister Sampling Locations	Parameter ID	Date & Time Collected	Analytical Results (ppbv)	Reporting Limits (ppbv)	IS/Surr. Recovery
VW-2	Exhausting Pipe	Chlorobenzene	01/09/2002 2:00	50.0	NA	100%
VW-2	Exhausting Pipe	Dichlorodifluoromethane	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	Chloromethane	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	1,2-Cl - 1,1,2,2-F ethane	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	Vinyl chloride	01/09/2002 2:00	2319.8	168.0	
VW-2	Exhausting Pipe	Bromomethane	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	Chloroethane	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	Trichlorofluoromethane	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	1,1-Dichloroethene	01/09/2002 2:00	205.0	168.0	
VW-2	Exhausting Pipe	1,1,2-Cl - 1,2,2-F ethane	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	Methylene Chloride	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	MTBE	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	1,1-dichloroethane	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	cis-1,2-Dichloroethene	01/09/2002 2:00	40977.4	168.0	
VW-2	Exhausting Pipe	Chloroform	01/09/2002 2:00	1202.9	168.0	
VW-2	Exhausting Pipe	1,1,1-Trichloroethane	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	1,2-Dichloroethane	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	Carbon tetrachloride	01/09/2002 2:00	855.3	168.0	
VW-2	Exhausting Pipe	Benzene	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	Trichloroethene	01/09/2002 2:00	108661.8	168.0	
VW-2	Exhausting Pipe	1,2-Dichloropropane	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	cis-1,3-Dichloropropene	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	Toluene	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	trans-1,3-dichloropropene	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	1,1,2-Trichloroethane	01/09/2002 2:00	1039.4	168.0	
VW-2	Exhausting Pipe	Tetrachloroethene	01/09/2002 2:00	16032.7	168.0	
VW-2	Exhausting Pipe	1,2-Dibromoethane	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	Chlorobenzene	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	Ethylbenzene	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	m,p-Xylene	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	o-Xylene	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	Styrene	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	1,1,2,2-Tetrachloroethane	01/09/2002 2:00	22305.3	168.0	
VW-2	Exhausting Pipe	Bromofluorobenzene	01/09/2002 2:00	50.7	NA	101%
VW-2	Exhausting Pipe	1,3,5-Trimethylbenzene	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	1,2,4-Trimethylbenzene	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	1,3-Dichlorobenzene	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	1,4-Dichlorobenzene	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	1,2-Dichlorobenzene	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	1,2,4-Trichlorobenzene	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	Hexachlorobutadiene	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	Chlorobenzene	01/09/2002 2:00	50.0	NA	100%
VW-3	Duplicate Exhausting	Dichlorodifluoromethane	01/09/2002 2:00	ND	168.0	

Venting Well ID	SUMMA Canister Sampling Locations	Parameter ID	Date & Time Collected	Analytical Results (ppbv)	Reporting Limits (ppbv)	IS/Surr. Recovery
VW-2	Duplicate Exhausting	Chloromethane	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	1,2-Cl - 1,1,2,2-F ethane	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	Vinyl chloride	01/09/2002 2:00	1533.2	168.0	
VW-2	Duplicate Exhausting	Bromomethane	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	Chloroethane	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	Trichlorofluoromethane	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	1,1-Dichloroethene	01/09/2002 2:00	209.9	168.0	
VW-2	Duplicate Exhausting	1,1,2-Cl - 1,2,2-F ethane	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	Methylene Chloride	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	MTBE	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	1,1-dichloroethane	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	cis-1,2-Dichloroethene	01/09/2002 2:00	42045.9	168.0	
VW-2	Duplicate Exhausting	Chloroform	01/09/2002 2:00	1257.3	168.0	
VW-2	Duplicate Exhausting	1,1,1-Trichloroethane	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	1,2-Dichloroethane	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	Carbon tetrachloride	01/09/2002 2:00	861.1	168.0	
VW-2	Duplicate Exhausting	Benzene	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	Trichloroethene	01/09/2002 2:00	110798.1	168.0	
VW-2	Duplicate Exhausting	1,2-Dichloropropane	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	cis-1,3-Dichloroproene	01/09/2002 2:00	ND	168.0	
VW-3	Duplicate Exhausting	Toluene	01/09/2002 2:00	ND	168.0	
VW-4	Duplicate Exhausting	trans-1,3-dichloropropene	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	1,1,2-Trichloroethane	01/09/2002 2:00	1012.1	168.0	
VW-2	Duplicate Exhausting	Tetrachloroethene	01/09/2002 2:00	14878.7	168.0	
VW-2	Duplicate Exhausting	1,2-Dibromoethane	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	Chlorobenzene	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	Ethylbenzene	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	m,p-Xylene	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	o-Xylene	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	Styrene	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	1,1,2,2-Tetrachloroethane	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	Bromofluorobenzene	01/09/2002 2:00	51.7	NA	103%
VW-2	Duplicate Exhausting	1,3,5-Trimethylbenzene	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	1,2,4-Trimethylbenzene	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	1,3-Dichlorobenzene	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	1,4-Dichlorobenzene	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	1,2-Dichlorobenzene	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	1,2,4-Trichlorobenzene	01/09/2002 2:00	ND	168.0	
VW-2	Duplicate Exhausting	Hexachlorobutadiene	01/09/2002 2:00	ND	168.0	
VW-2	Exhausting Pipe	Chlorobenzene	01/10/2002 14:00	50.0	NA	100%
VW-2	Exhausting Pipe	Dichlorodifluoromethane	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	Chloromethane	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	1,2-Cl - 1,1,2,2-F ethane	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	Vinyl chloride	01/10/2002 14:00	602.2	168.0	
VW-2	Exhausting Pipe	Bromomethane	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	Chloroethane	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	Trichlorofluoromethane	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	1,1-Dichloroethene	01/10/2002 14:00	ND	168.0	

Venting Well ID	SUMMA Canister Sampling Locations	Parameter ID	Date & Time Collected	Analytical Results (ppbv)	Reporting Limits (ppbv)	IS/Surr. Recovery
VW-2	Exhausting Pipe	1,1,2-Cl - 1,2,2-F ethane	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	Methylene Chloride	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	MTBE	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	1,1-dichloroethane	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	cis-1,2-Dichloroethene	01/10/2002 14:00	31509.5	168.0	
VW-2	Exhausting Pipe	Chloroform	01/10/2002 14:00	1002.9	168.0	
VW-2	Exhausting Pipe	1,1,1-Trichloroethane	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	1,2-Dichloroethane	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	Carbon tetrachloride	01/10/2002 14:00	946.7	168.0	
VW-2	Exhausting Pipe	Benzene	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	Trichloroethene	01/10/2002 14:00	88841.1	168.0	
VW-2	Exhausting Pipe	1,2-Dichloropropane	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	cis-1,3-Dichloropropene	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	Toluene	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	trans-1,3-dichloropropene	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	1,1,2-Trichloroethane	01/10/2002 14:00	869.8	168.0	
VW-2	Exhausting Pipe	Tetrachloroethene	01/10/2002 14:00	12789.5	168.0	
VW-2	Exhausting Pipe	1,2-Dibromoethane	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	Chlorobenzene	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	Ethylbenzene	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	m,p-Xylene	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	o-Xylene	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	Styrene	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	1,1,2,2-Tetrachloroethane	01/10/2002 14:00	46540.0	168.0	
VW-2	Exhausting Pipe	Bromofluorobenzene	01/10/2002 14:00	47.3	NA	95%
VW-2	Exhausting Pipe	1,3,5-Trimethylbenzene	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	1,2,4-Trimethylbenzene	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	1,3-Dichlorobenzene	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	1,4-Dichlorobenzene	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	1,2-Dichlorobenzene	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	1,2,4-Trichlorobenzene	01/10/2002 14:00	ND	168.0	
VW-2	Exhausting Pipe	Hexachlorobutadiene	01/10/2002 14:00	ND	168.0	
VW-2	Ambient Air	Chlorobenzene	01/10/2002 14:00	50.0	NA	100%
VW-2	Ambient Air	Dichlorodifluoromethane	01/10/2002 14:00	1.1	0.8	
VW-2	Ambient Air	Chloromethane	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	1,2-Cl - 1,1,2,2-F ethane	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	Vinyl chloride	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	Bromomethane	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	Chloroethane	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	Trichlorofluoromethane	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	1,1-Dichloroethene	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	1,1,2-Cl - 1,2,2-F ethane	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	Methylene Chloride	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	MTBE	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	1,1-dichloroethane	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	cis-1,2-Dichloroethene	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	Chloroform	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	1,1,1-Trichloroethane	01/10/2002 14:00	ND	0.8	

Venting Well ID	SUMMA Canister Sampling Locations	Parameter ID	Date & Time Collected	Analytical Results (ppbv)	Reporting Limits (ppbv)	IS/Surr. Recovery
VW-2	Ambient Air	1,2-Dichloroethane	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	Carbon tetrachloride	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	Benzene	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	Trichloroethene	01/10/2002 14:00	2.7	0.8	
VW-2	Ambient Air	1,2-Dichloropropane	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	cis-1,3-Dichloropropene	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	Toluene	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	trans-1,3-dichloropropene	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	1,1,2-Trichloroethane	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	Tetrachloroethene	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	1,2-Dibromoethane	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	Chlorobenzene	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	Ethylbenzene	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	m,p-Xylene	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	o-Xylene	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	Styrene	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	1,1,2,2-Tetrachloroethane	01/10/2002 14:00	2.6	0.8	
VW-2	Ambient Air	Bromofluorobenzene	01/10/2002 14:00	46.0	NA	92%
VW-2	Ambient Air	1,3,5-Trimethylbenzene	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	1,2,4-Trimethylbenzene	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	1,3-Dichlorobenzene	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	1,4-Dichlorobenzene	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	1,2-Dichlorobenzene	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	1,2,4-Trichlorobenzene	01/10/2002 14:00	ND	0.8	
VW-2	Ambient Air	Hexachlorobutadiene	01/10/2002 14:00	ND	0.8	
VW-2	Exhausting Pipe	Chlorobenzene	01/11/2002 14:10	50.0	NA	100%
VW-2	Exhausting Pipe	Dichlorodifluoromethane	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	Chloromethane	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	1,2-Cl - 1,1,2,2-F ethane	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	Vinyl chloride	01/11/2002 14:10	552.8	168.0	
VW-2	Exhausting Pipe	Bromomethane	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	Chloroethane	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	Trichlorofluoromethane	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	1,1-Dichloroethene	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	1,1,2-Cl - 1,2,2-F ethane	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	Methylene Chloride	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	MTBE	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	1,1-dichloroethane	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	cis-1,2-Dichloroethene	01/11/2002 14:10	30332.8	168.0	
VW-2	Exhausting Pipe	Chloroform	01/11/2002 14:10	1032.5	168.0	
VW-2	Exhausting Pipe	1,1,1-Trichloroethane	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	1,2-Dichloroethane	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	Carbon tetrachloride	01/11/2002 14:10	1086.5	168.0	
VW-2	Exhausting Pipe	Benzene	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	Trichloroethene	01/11/2002 14:10	86466.7	168.0	
VW-2	Exhausting Pipe	1,2-Dichloropropane	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	cis-1,3-Dichloropropene	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	Toluene	01/11/2002 14:10	ND	168.0	

Venting Well ID	SUMMA Canister Sampling Locations	Parameter ID	Date & Time Collected	Analytical Results (ppbv)	Reporting Limits (ppbv)	IS/Surr. Recovery
VW-2	Exhausting Pipe	trans-1,3-dichloropropene	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	1,1,2-Trichloroethane	01/11/2002 14:10	828.9	168.0	
VW-2	Exhausting Pipe	Tetrachloroethene	01/11/2002 14:10	12029.3	168.0	
VW-2	Exhausting Pipe	1,2-Dibromoethane	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	Chlorobenzene	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	Ethylbenzene	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	m,p-Xylene	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	o-Xylene	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	Styrene	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	1,1,2,2-Tetrachloroethane	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	Bromofluorobenzene	01/11/2002 14:10	49.8	NA	100%
VW-2	Exhausting Pipe	1,3,5-Trimethylbenzene	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	1,2,4-Trimethylbenzene	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	1,3-Dichlorobenzene	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	1,4-Dichlorobenzene	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	1,2-Dichlorobenzene	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	1,2,4-Trichlorobenzene	01/11/2002 14:10	ND	168.0	
VW-2	Exhausting Pipe	Hexachlorobutadiene	01/11/2002 14:10	ND	168.0	
VW-2	Equipment blank	Chlorobenzene	01/07/2002 18:30	50.0		100%
VW-2	Equipment blank	Dichlorodifluoromethane	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	Chloromethane	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	1,2-Cl - 1,1,2,2-F ethane	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	Vinyl chloride	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	Bromomethane	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	Chloroethane	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	Trichlorofluoromethane	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	1,1-Dichloroethene	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	1,1,2-Cl - 1,2,2-F ethane	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	Methylene Chloride	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	MTBE	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	1,1-dichloroethane	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	cis-1,2-Dichloroethene	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	Chloroform	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	1,1,1-Trichloroethane	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	1,2-Dichloroethane	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	Carbon tetrachloride	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	Benzene	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	Trichloroethene	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	1,2-Dichloropropane	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	cis-1,3-Dichloropropene	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	Toluene	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	trans-1,3-dichloropropene	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	1,1,2-Trichloroethane	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	Tetrachloroethene	01/07/2002 18:30	234.5	100.0	
VW-2	Equipment blank	1,2-Dibromoethane	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	Chlorobenzene	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	Ethylbenzene	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	m,p-Xylene	01/07/2002 18:30	ND	100.0	

Venting Well ID	SUMMA Canister Sampling Locations	Parameter ID	Date & Time Collected	Analytical Results (ppbv)	Reporting Limits (ppbv)	IS/Surr. Recovery
VW-2	Equipment blank	o-Xylene	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	Styrene	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	1,1,2,2-Tetrachloroethane	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	Bromofluorobenzene	01/07/2002 18:30	48.0		96%
VW-2	Equipment blank	1,3,5-Trimethylbenzene	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	1,2,4-Trimethylbenzene	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	1,3-Dichlorobenzene	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	1,4-Dichlorobenzene	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	1,2-Dichlorobenzene	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	1,2,4-Trichlorobenzene	01/07/2002 18:30	ND	100.0	
VW-2	Equipment blank	Hexachlorobutadiene	01/07/2002 18:30	ND	100.0	
VW-2	Exhausting Pipe	Chlorobenzene	01/08/2002 2:00	50.0		100%
VW-2	Exhausting Pipe	Dichlorodifluoromethane	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	Chloromethane	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	1,2-Cl - 1,1,2,2-F ethane	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	Vinyl chloride	01/08/2002 2:00	2279.6	100.0	
VW-2	Exhausting Pipe	Bromomethane	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	Chloroethane	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	Trichlorofluoromethane	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	1,1-Dichloroethene	01/08/2002 2:00	248.5	100.0	
VW-2	Exhausting Pipe	1,1,2-Cl - 1,2,2-F ethane	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	Methylene Chloride	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	MTBE	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	1,1-dichloroethane	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	cis-1,2-Dichloroethene	01/08/2002 2:00	27539.8	100.0	
VW-2	Exhausting Pipe	Chloroform	01/08/2002 2:00	772.4	100.0	
VW-2	Exhausting Pipe	1,1,1-Trichloroethane	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	1,2-Dichloroethane	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	Carbon tetrachloride	01/08/2002 2:00	363.2	100.0	
VW-2	Exhausting Pipe	Benzene	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	Trichloroethene	01/08/2002 2:00	70494.0	100.0	
VW-2	Exhausting Pipe	1,2-Dichloropropane	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	cis-1,3-Dichloropropene	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	Toluene	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	trans-1,3-dichloropropene	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	1,1,2-Trichloroethane	01/08/2002 2:00	541.5	100.0	
VW-2	Exhausting Pipe	Tetrachloroethene	01/08/2002 2:00	10056.0	100.0	
VW-2	Exhausting Pipe	1,2-Dibromoethane	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	Chlorobenzene	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	Ethylbenzene	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	m,p-Xylene	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	o-Xylene	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	Styrene	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	1,1,2,2-Tetrachloroethane	01/08/2002 2:00	13191.5	100.0	
VW-2	Exhausting Pipe	Bromofluorobenzene	01/08/2002 2:00	50.5		101%
VW-2	Exhausting Pipe	1,3,5-Trimethylbenzene	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	1,2,4-Trimethylbenzene	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	1,3-Dichlorobenzene	01/08/2002 2:00	ND	100.0	

Venting Well ID	SUMMA Canister Sampling Locations	Parameter ID	Date & Time Collected	Analytical Results (ppbv)	Reporting Limits (ppbv)	IS/Surr. Recovery
VW-2	Exhausting Pipe	1,4-Dichlorobenzene	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	1,2-Dichlorobenzene	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	1,2,4-Trichlorobenzene	01/08/2002 2:00	ND	100.0	
VW-2	Exhausting Pipe	Hexachlorobutadiene	01/08/2002 2:00	ND	100.0	
VW-2	Duplicate Exhausting	Chlorobenzene	01/08/2002 2:00	50.0		100%
VW-2	Duplicate Exhausting	Dichlorodifluoromethane	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	Chloromethane	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	1,2-Cl - 1,1,2,2-F ethane	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	Vinyl chloride	01/08/2002 2:00	3448.1	133.5	
VW-2	Duplicate Exhausting	Bromomethane	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	Chloroethane	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	Trichlorofluoromethane	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	1,1-Dichloroethene	01/08/2002 2:00	302.4	133.5	
VW-2	Duplicate Exhausting	1,1,2-Cl - 1,2,2-F ethane	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	Methylene Chloride	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	MTBE	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	1,1-dichloroethane	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	cis-1,2-Dichloroethene	01/08/2002 2:00	35588.5	133.5	
VW-2	Duplicate Exhausting	Chloroform	01/08/2002 2:00	992.5	133.5	
VW-2	Duplicate Exhausting	1,1,1-Trichloroethane	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	1,2-Dichloroethane	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	Carbon tetrachloride	01/08/2002 2:00	468.4	133.5	
VW-2	Duplicate Exhausting	Benzene	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	Trichloroethene	01/08/2002 2:00	88158.4	133.5	
VW-2	Duplicate Exhausting	1,2-Dichloropropane	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	cis-1,3-Dichloropropene	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	Toluene	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	trans-1,3-dichloropropene	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	1,1,2-Trichloroethane	01/08/2002 2:00	616.7	133.5	
VW-2	Duplicate Exhausting	Tetrachloroethene	01/08/2002 2:00	12667.9	133.5	
VW-2	Duplicate Exhausting	1,2-Dibromoethane	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	Chlorobenzene	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	Ethylbenzene	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	m,p-Xylene	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	o-Xylene	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	Styrene	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	1,1,2,2-Tetrachloroethane	01/08/2002 2:00	21842.2	133.5	
VW-2	Duplicate Exhausting	Bromofluorobenzene	01/08/2002 2:00	50.5		101%
VW-2	Duplicate Exhausting	1,3,5-Trimethylbenzene	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	1,2,4-Trimethylbenzene	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	1,3-Dichlorobenzene	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	1,4-Dichlorobenzene	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	1,2-Dichlorobenzene	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	1,2,4-Trichlorobenzene	01/08/2002 2:00	ND	133.5	
VW-2	Duplicate Exhausting	Hexachlorobutadiene	01/08/2002 2:00	ND	133.5	
VW-2	Exhausting Pipe	Chlorobenzene	01/07/2002 18:30	50.0		100%
VW-2	Exhausting Pipe	Dichlorodifluoromethane	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	Chloromethane	01/07/2002 18:30	ND	147.0	

Venting Well ID	SUMMA Canister Sampling Locations	Parameter ID	Date & Time Collected	Analytical Results (ppbv)	Reporting Limits (ppbv)	IS/Surr. Recovery
VW-2	Exhausting Pipe	1,2-CI - 1,1,2,2-F ethane	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	Vinyl chloride	01/07/2002 18:30	7463.9	147.0	
VW-2	Exhausting Pipe	Bromomethane	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	Chloroethane	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	Trichlorofluoromethane	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	1,1-Dichloroethene	01/07/2002 18:30	437.6	147.0	
VW-2	Exhausting Pipe	1,1,2-CI - 1,2,2-F ethane	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	Methylene Chloride	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	MTBE	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	1,1-dichloroethane	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	cis-1,2-Dichloroethene	01/07/2002 18:30	47656.5	147.0	
VW-2	Exhausting Pipe	Chloroform	01/07/2002 18:30	1605.3	147.0	
VW-2	Exhausting Pipe	1,1,1-Trichloroethane	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	1,2-Dichloroethane	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	Carbon tetrachloride	01/07/2002 18:30	637.5	147.0	
VW-2	Exhausting Pipe	Benzene	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	Trichloroethene	01/07/2002 18:30	87003.2	147.0	
VW-2	Exhausting Pipe	1,2-Dichloropropane	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	cis-1,3-Dichloropropene	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	Toluene	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	trans-1,3-dichloropropene	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	1,1,2-Trichloroethane	01/07/2002 18:30	881.6	147.0	
VW-2	Exhausting Pipe	Tetrachloroethene	01/07/2002 18:30	17820.1	147.0	
VW-2	Exhausting Pipe	1,2-Dibromoethane	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	Chlorobenzene	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	Ethylbenzene	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	m,p-Xylene	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	o-Xylene	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	Styrene	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	1,1,2,2-Tetrachloroethane	01/07/2002 18:30	27024.2	147.0	
VW-2	Exhausting Pipe	Bromofluorobenzene	01/07/2002 18:30	51.3		103%
VW-2	Exhausting Pipe	1,3,5-Trimethylbenzene	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	1,2,4-Trimethylbenzene	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	1,3-Dichlorobenzene	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	1,4-Dichlorobenzene	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	1,2-Dichlorobenzene	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	1,2,4-Trichlorobenzene	01/07/2002 18:30	ND	147.0	
VW-2	Exhausting Pipe	Hexachlorobutadiene	01/07/2002 18:30	ND	147.0	

Note.

ND = Not Detected at the Reporting Limits

NA = Not Applicable

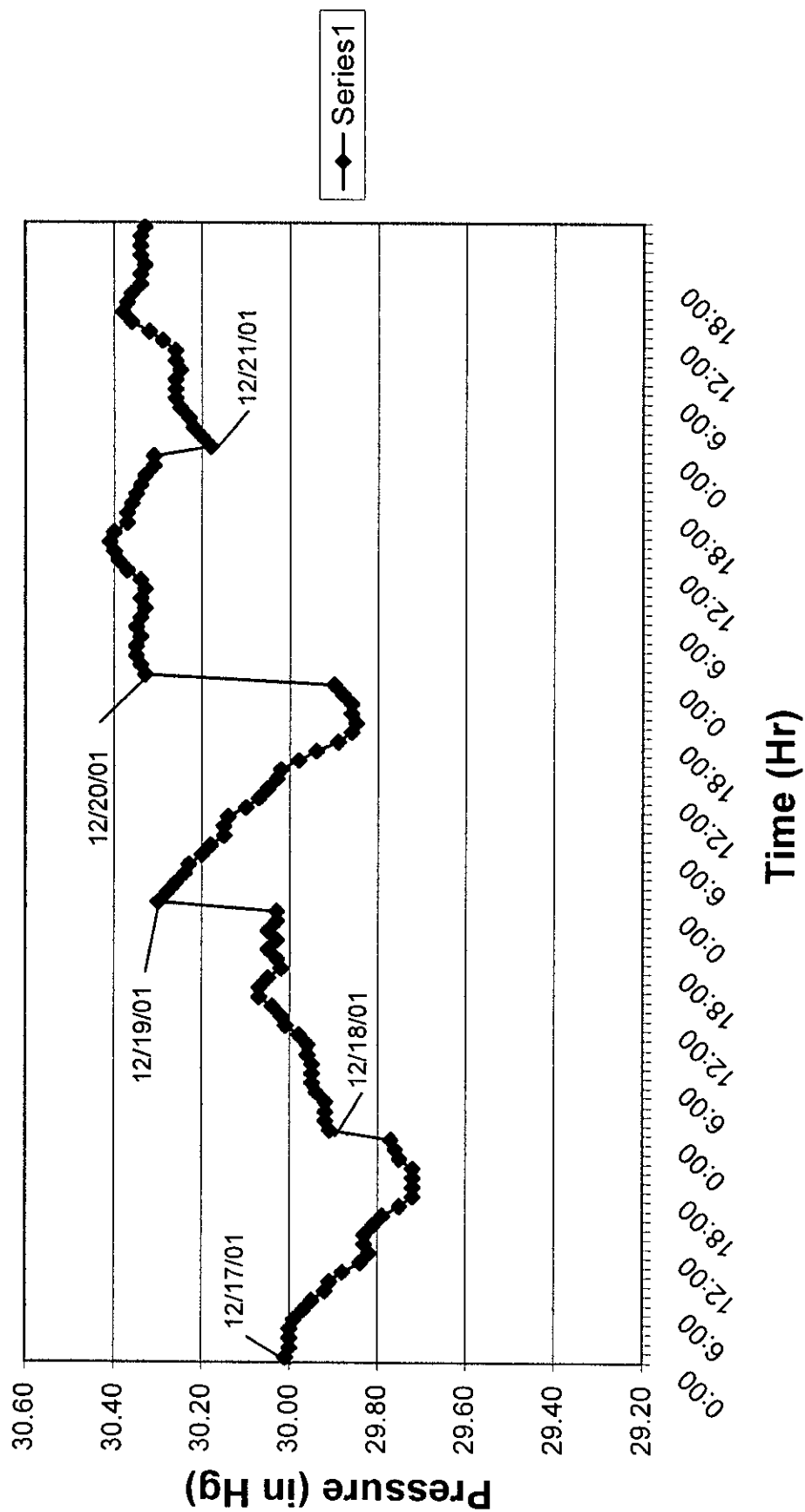
SS = Surrogate Standard

IS = Internal Standard 50 ng each

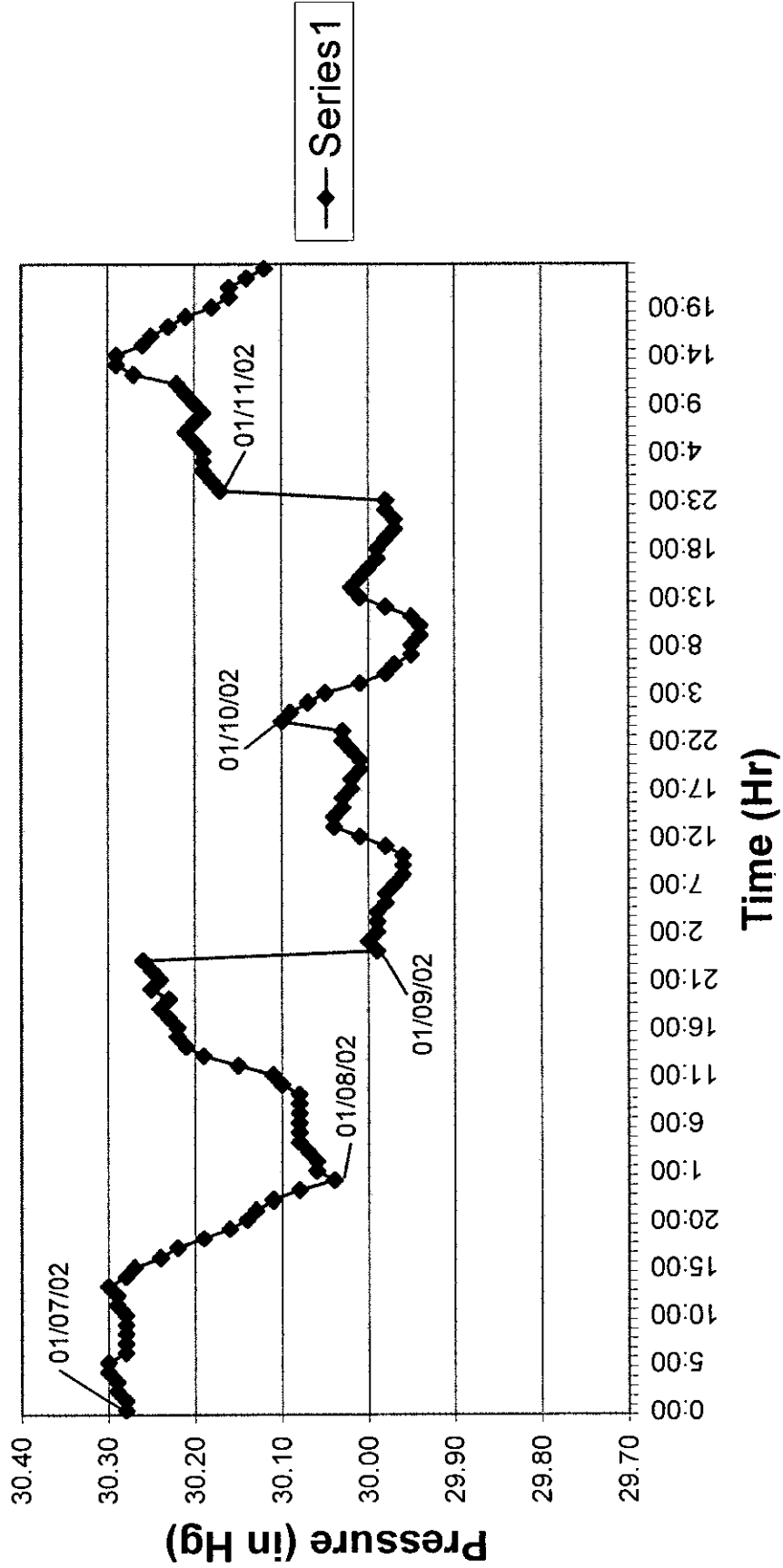
Benzyl chloride has been removed from the target list due to instability in the standards

Attachment E

Barometric Pressure Measurements - SVE Test 1

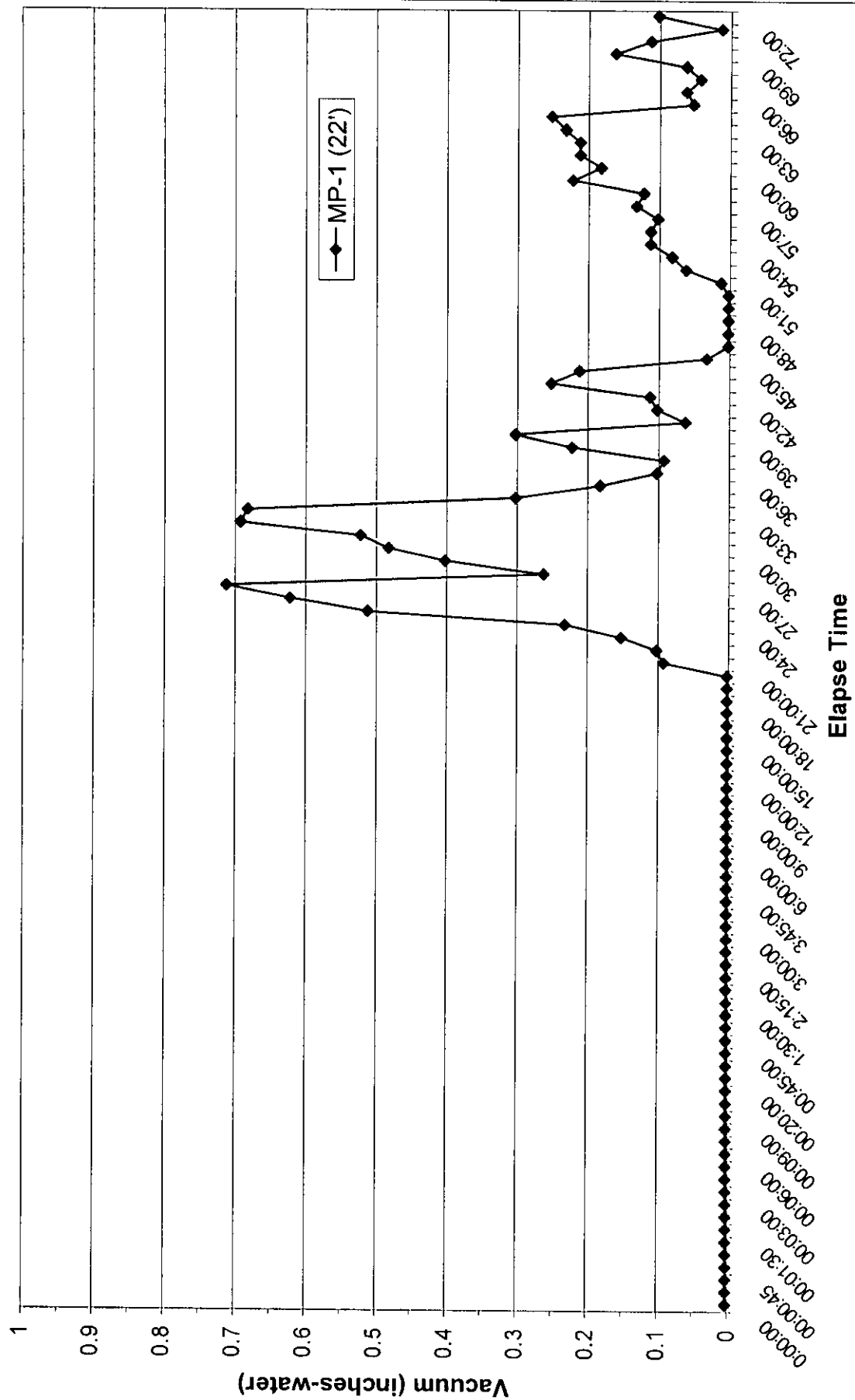


Barometric Pressure Readings - SVE Test 2

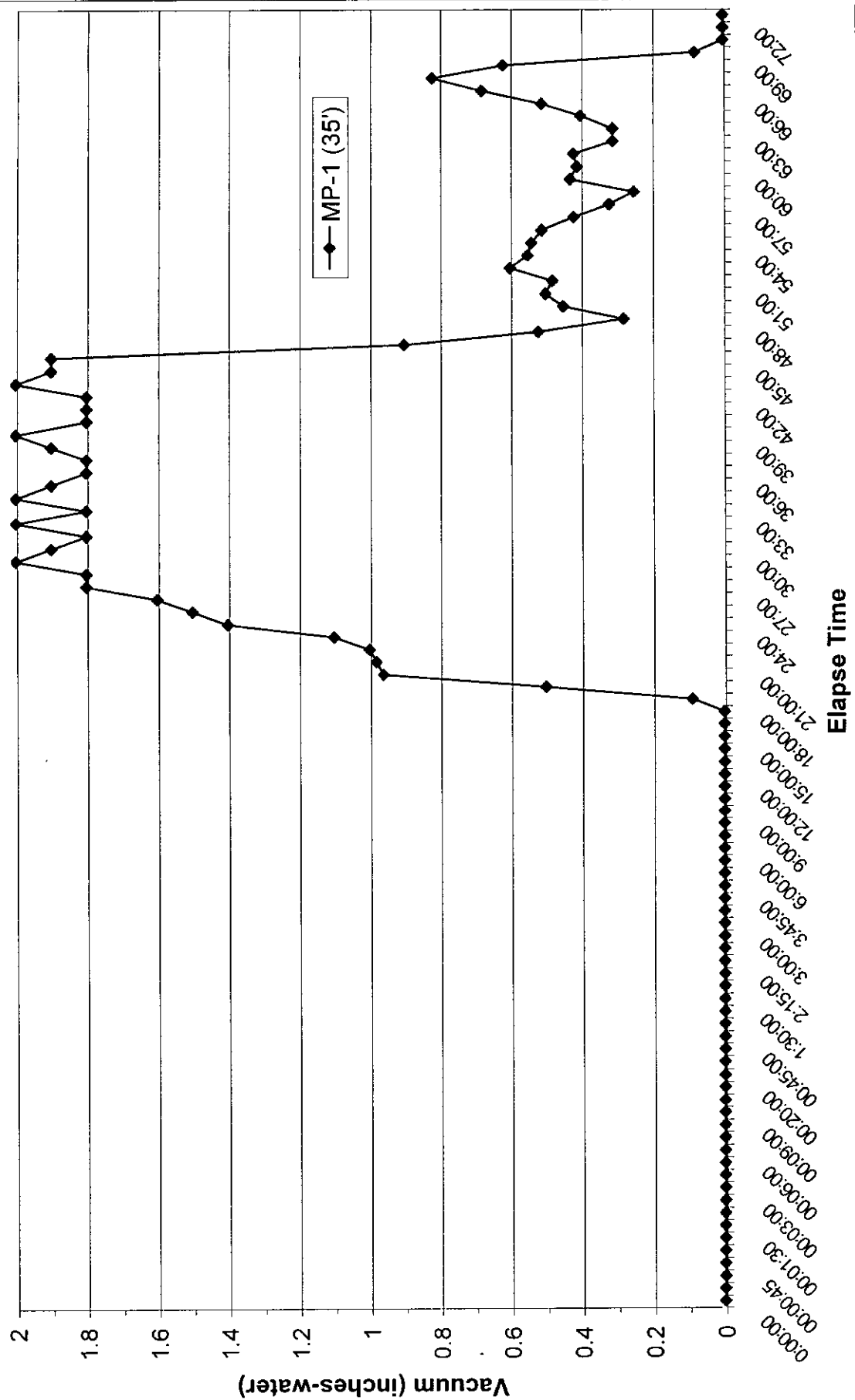


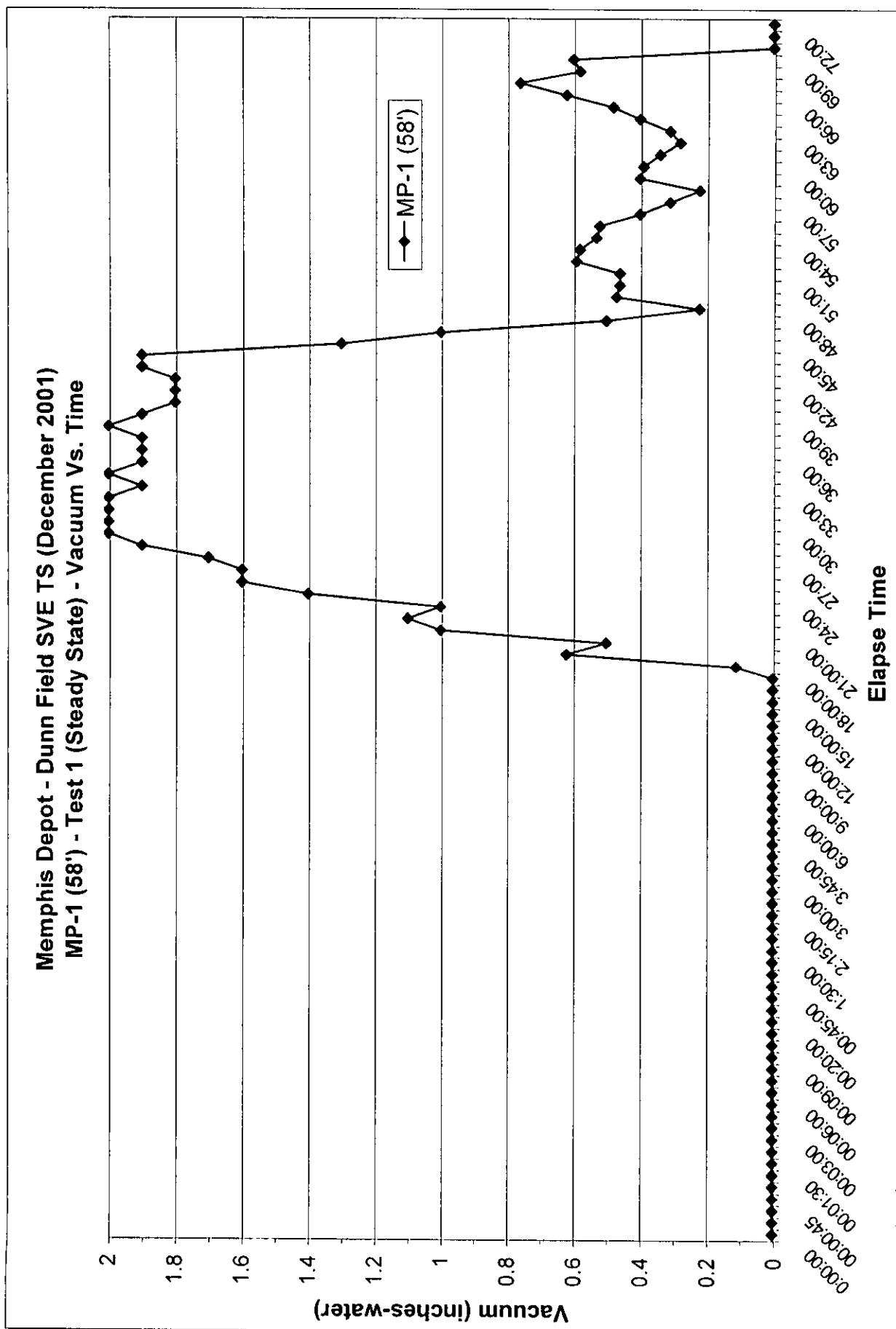
Attachment F

Memphis Depot - Dunn Field SVE TS (December 2001)
MP-1 (22') - Test 1 (Steady State) - Vacuum Vs. Time

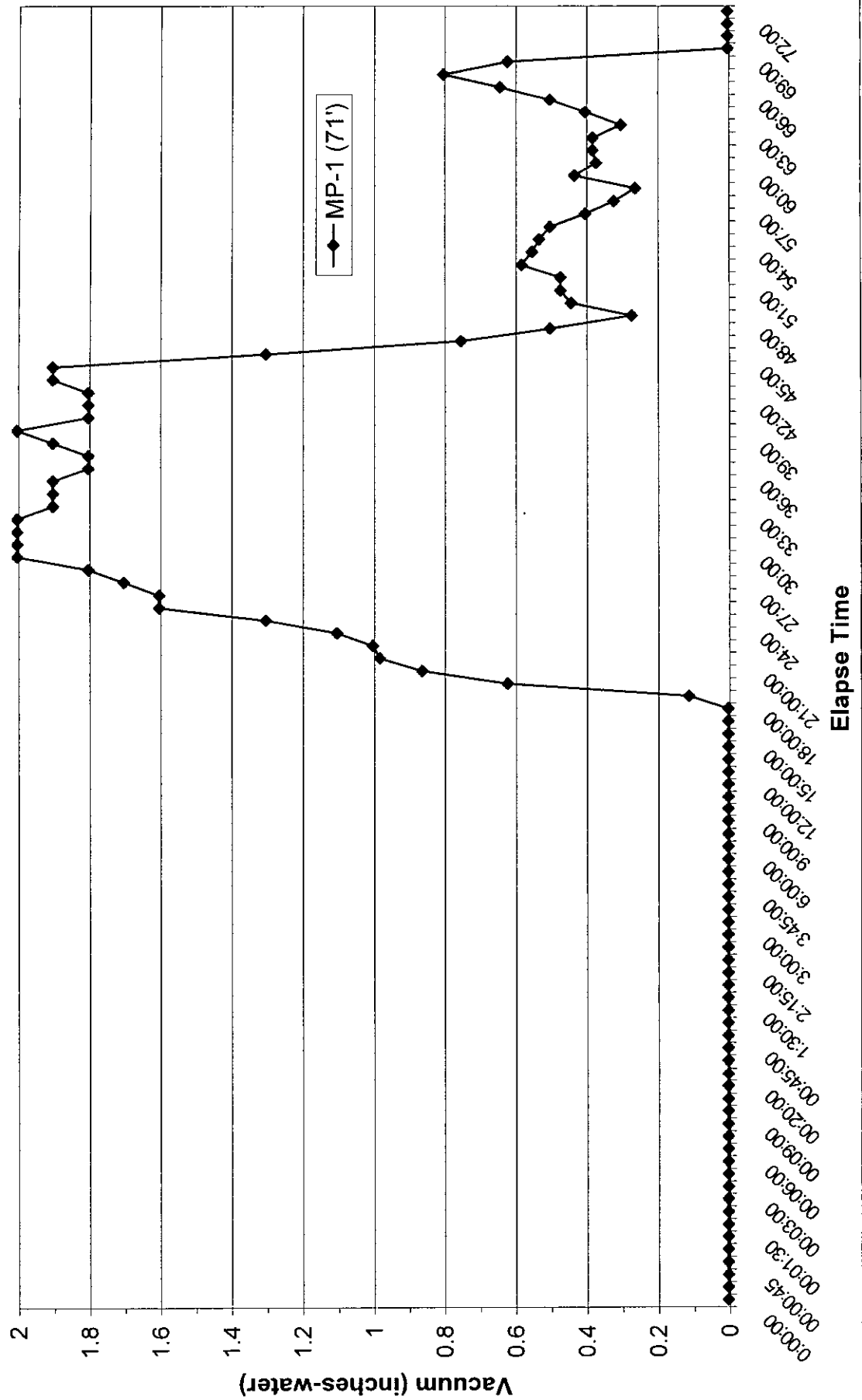


Memphis Depot - Dunn Field SVE TS (December 2001)
MP-1 (35') - Test 1 (Steady State) - Vacuum Vs. Time

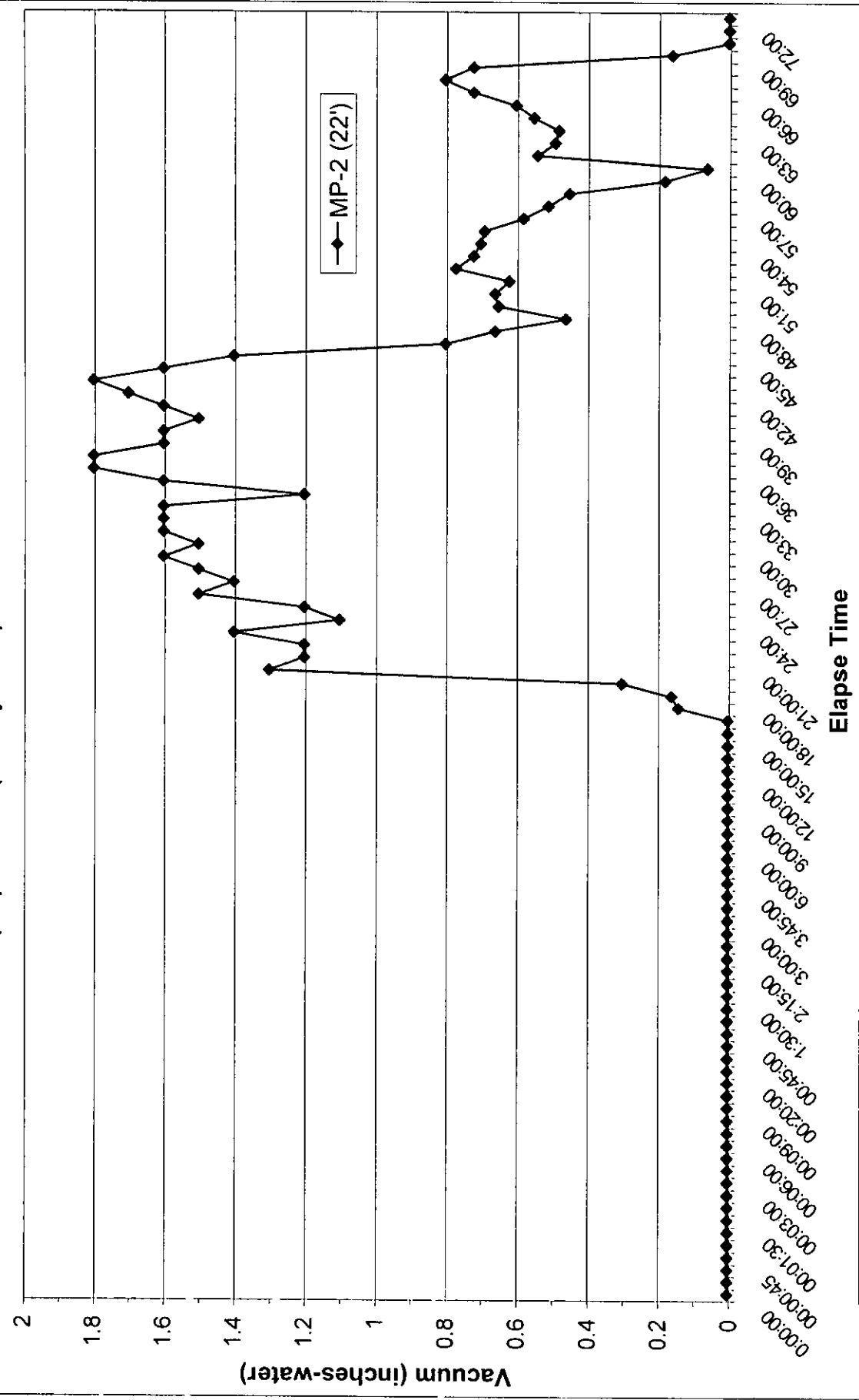




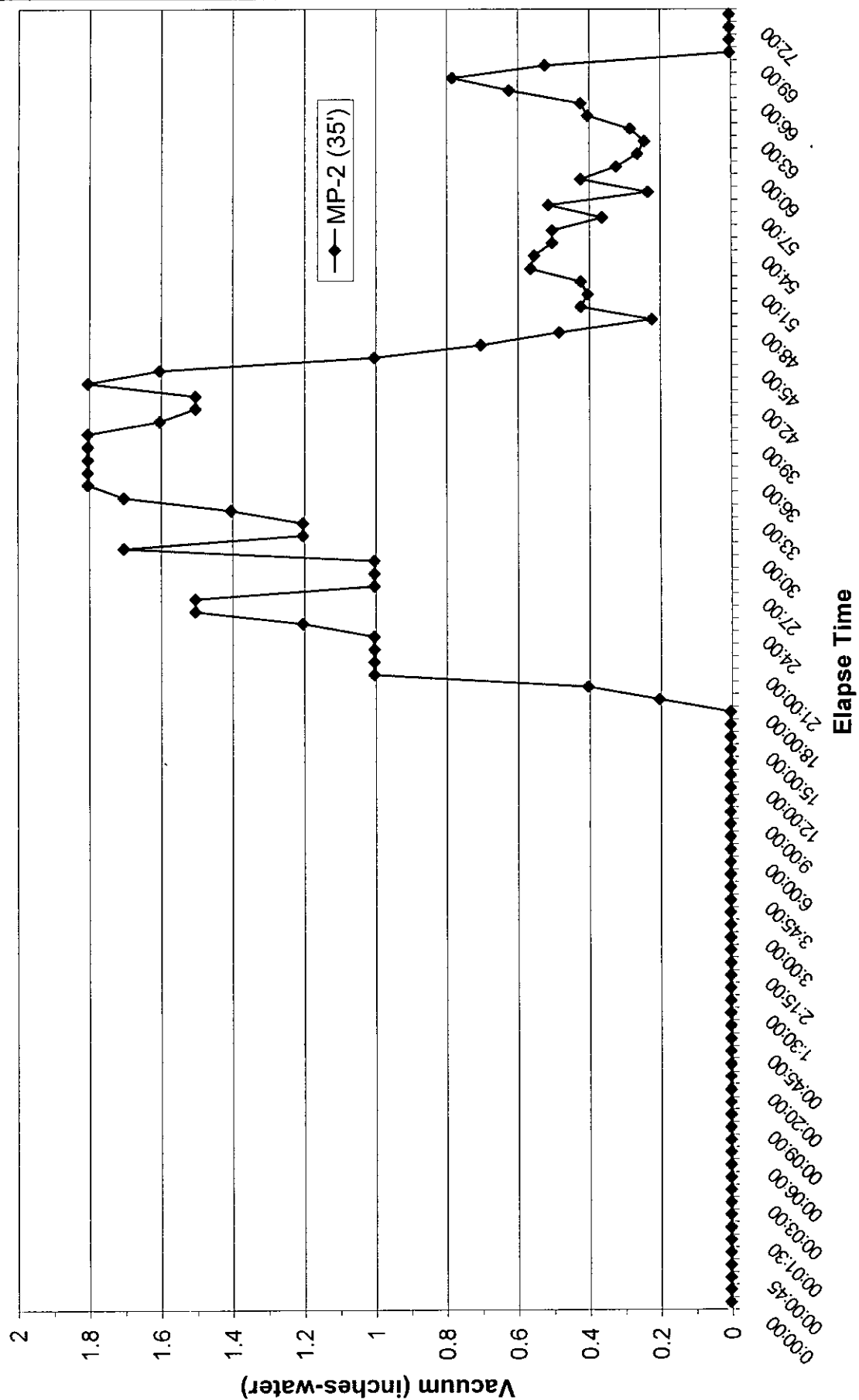
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-1 (71') - Test 1 (Steady State) - Vacuum Vs. Time



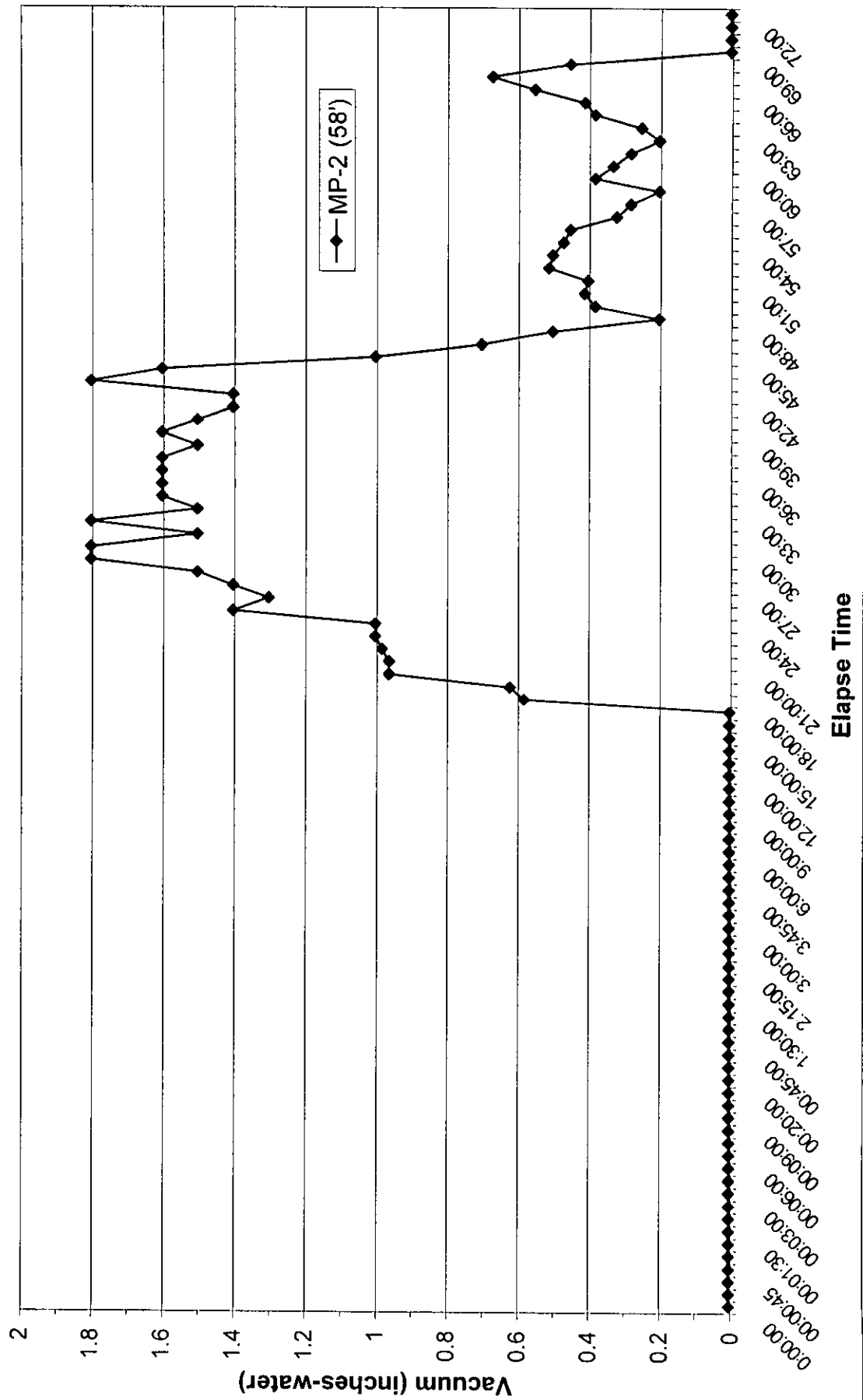
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-2 (22') - Test 1 (Steady State) - Vacuum Vs. Time



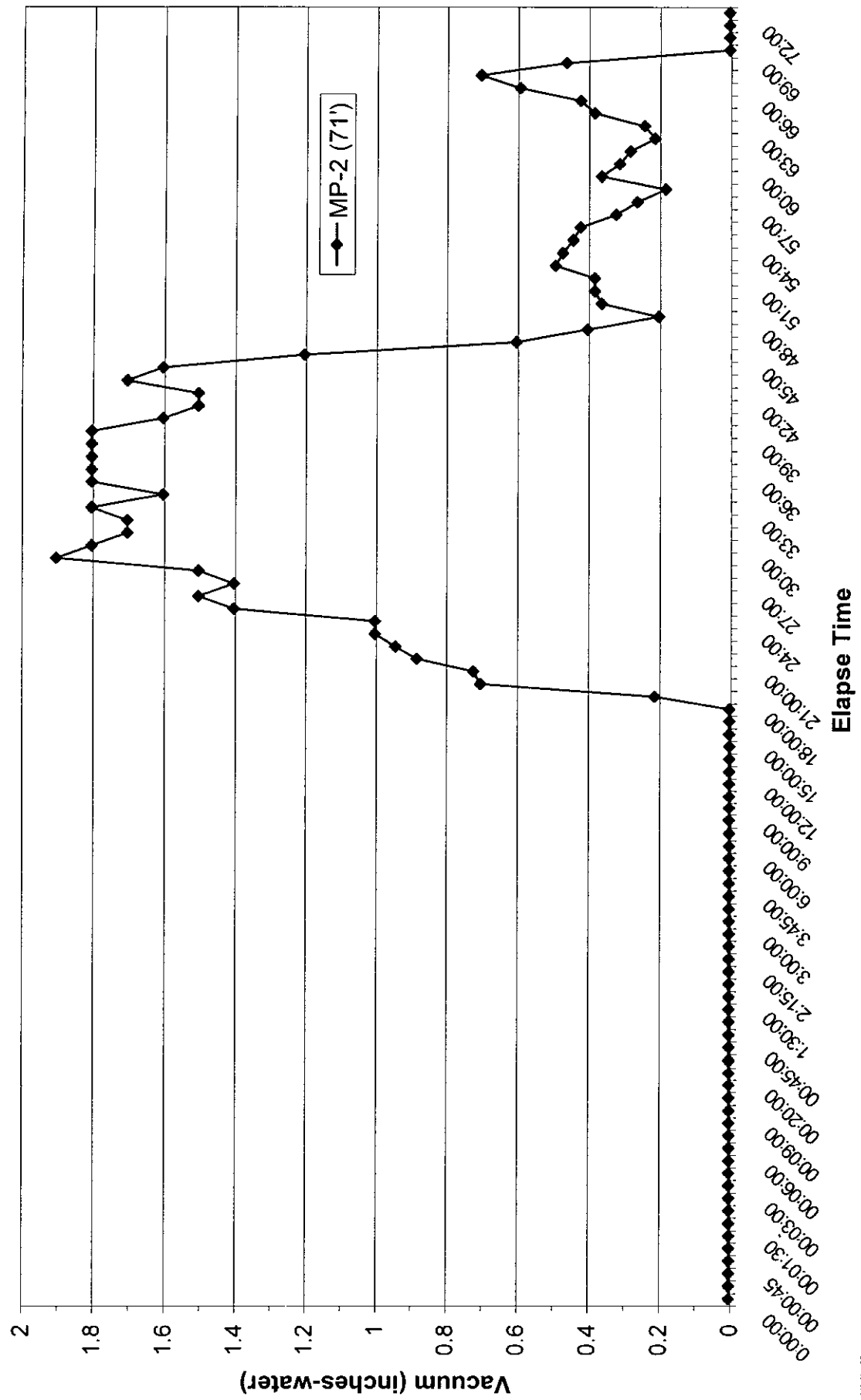
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-2 (35') - Test 1 (Steady State) - Vacuum Vs. Time



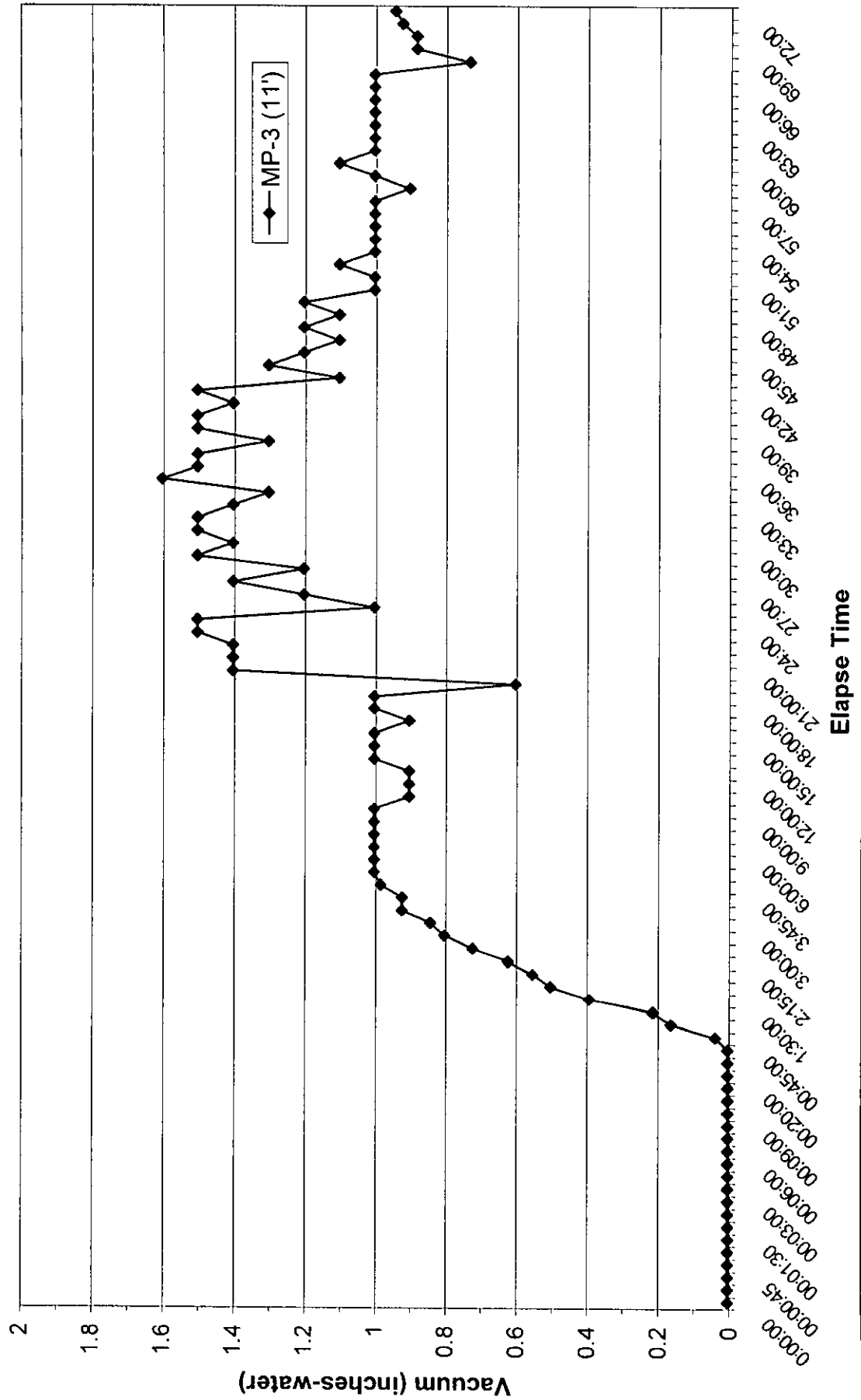
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-2 (58') - Test 1 (Steady State) - Vacuum Vs. Time



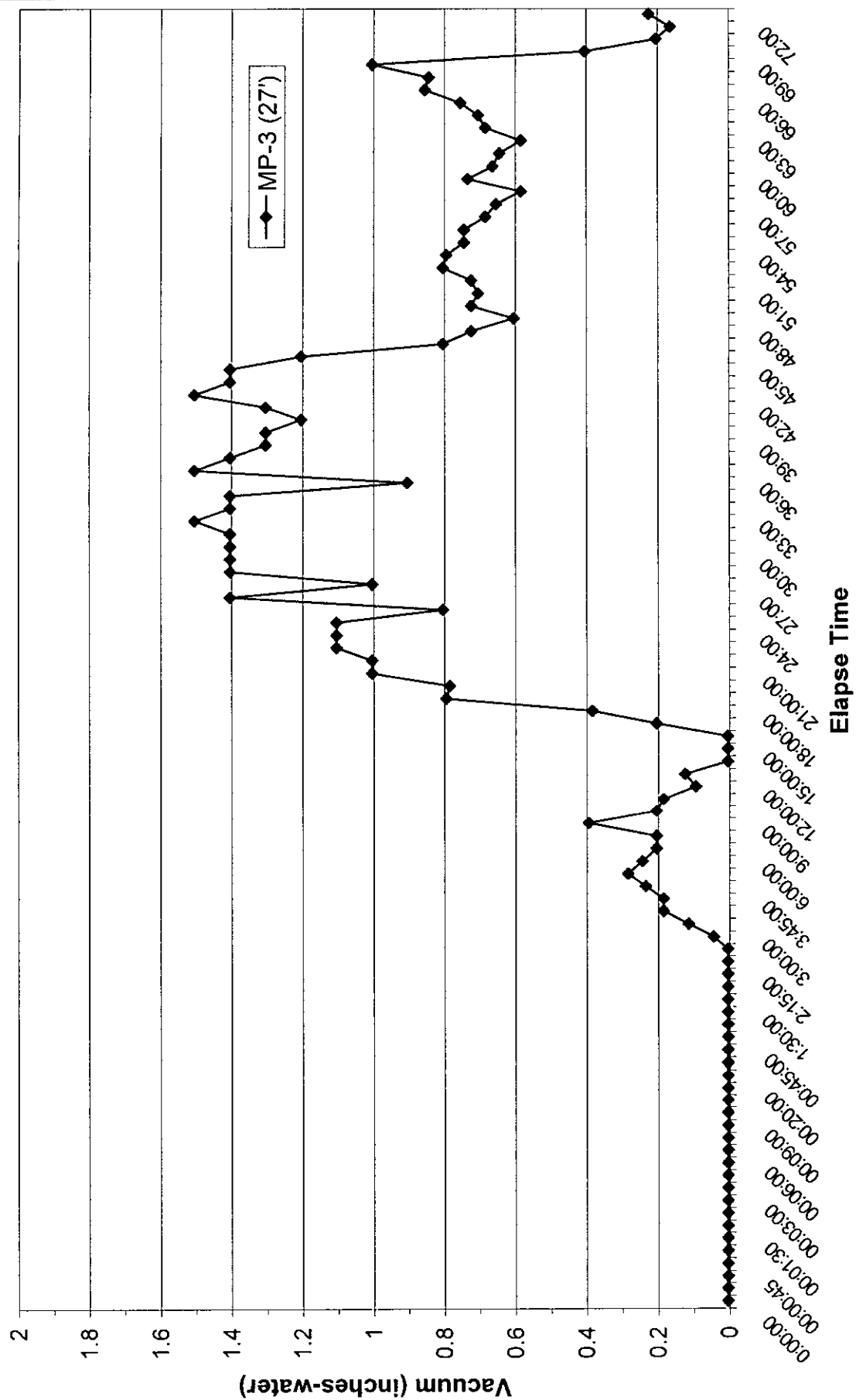
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-2 (71') - Test 1 (Steady State) - Vacuum Vs. Time



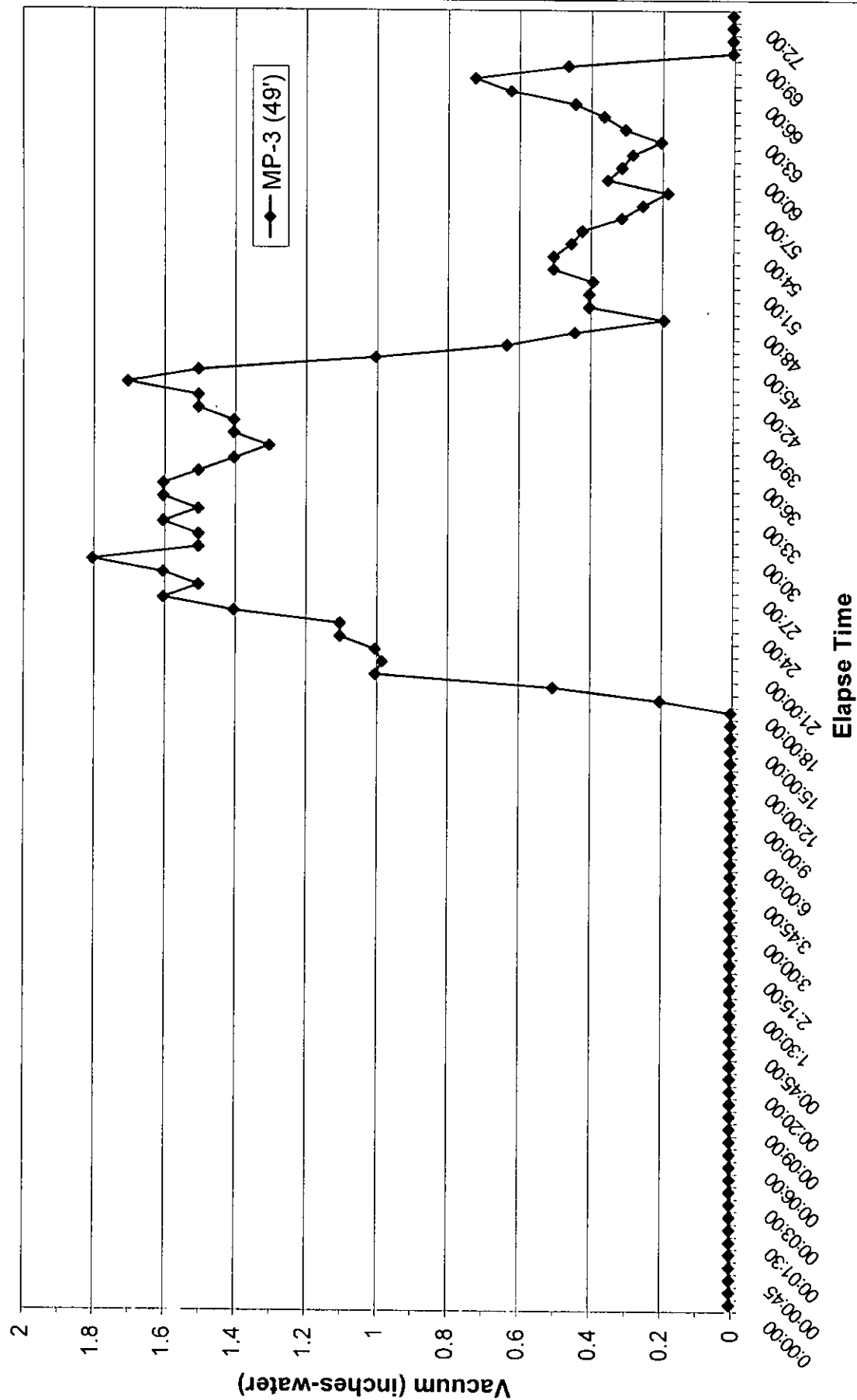
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-3 (11') - Test 1 (Steady State) - Vacuum Vs. Time



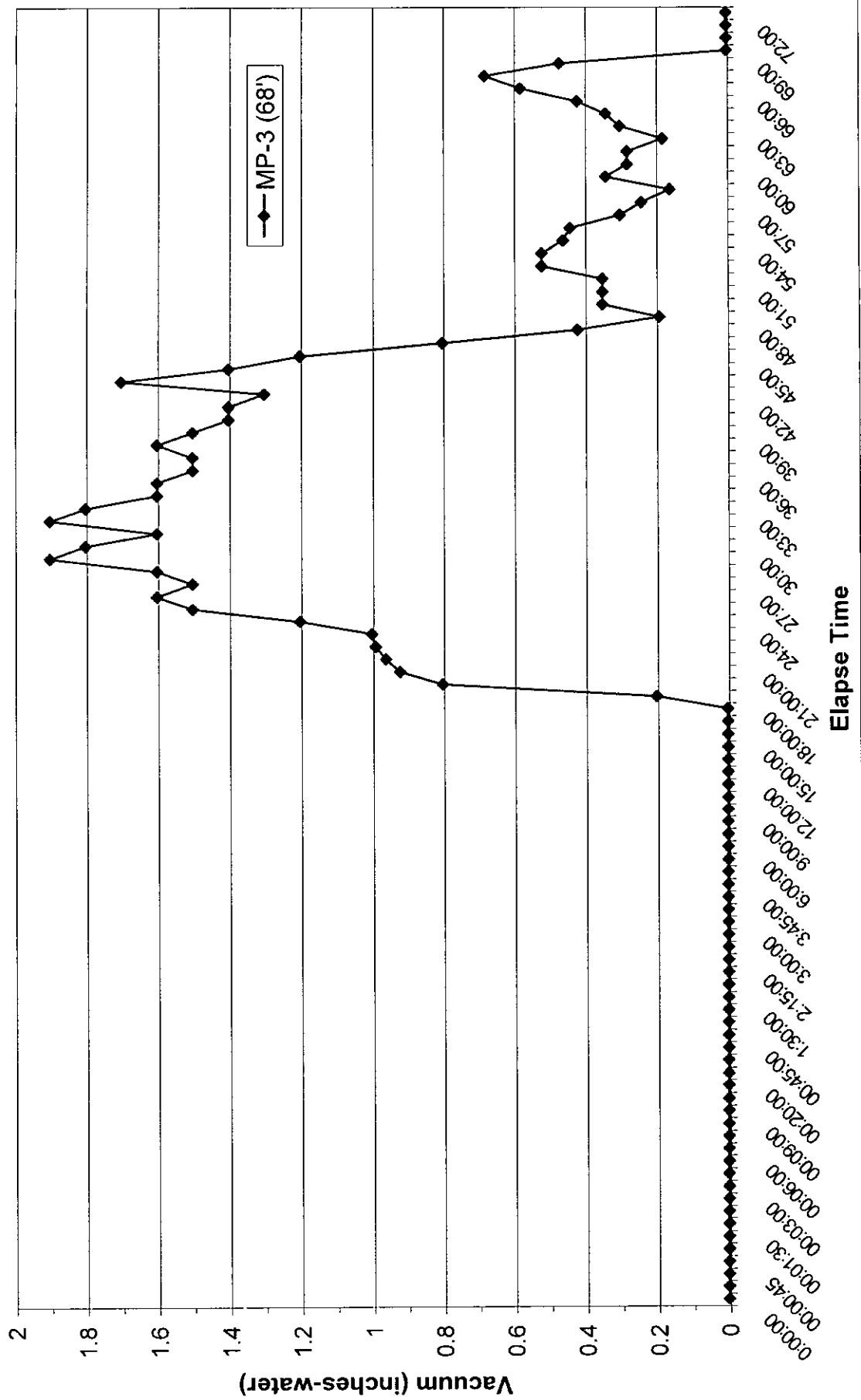
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-3 (27") - Test 1 (Steady State) - Vacuum Vs. Time



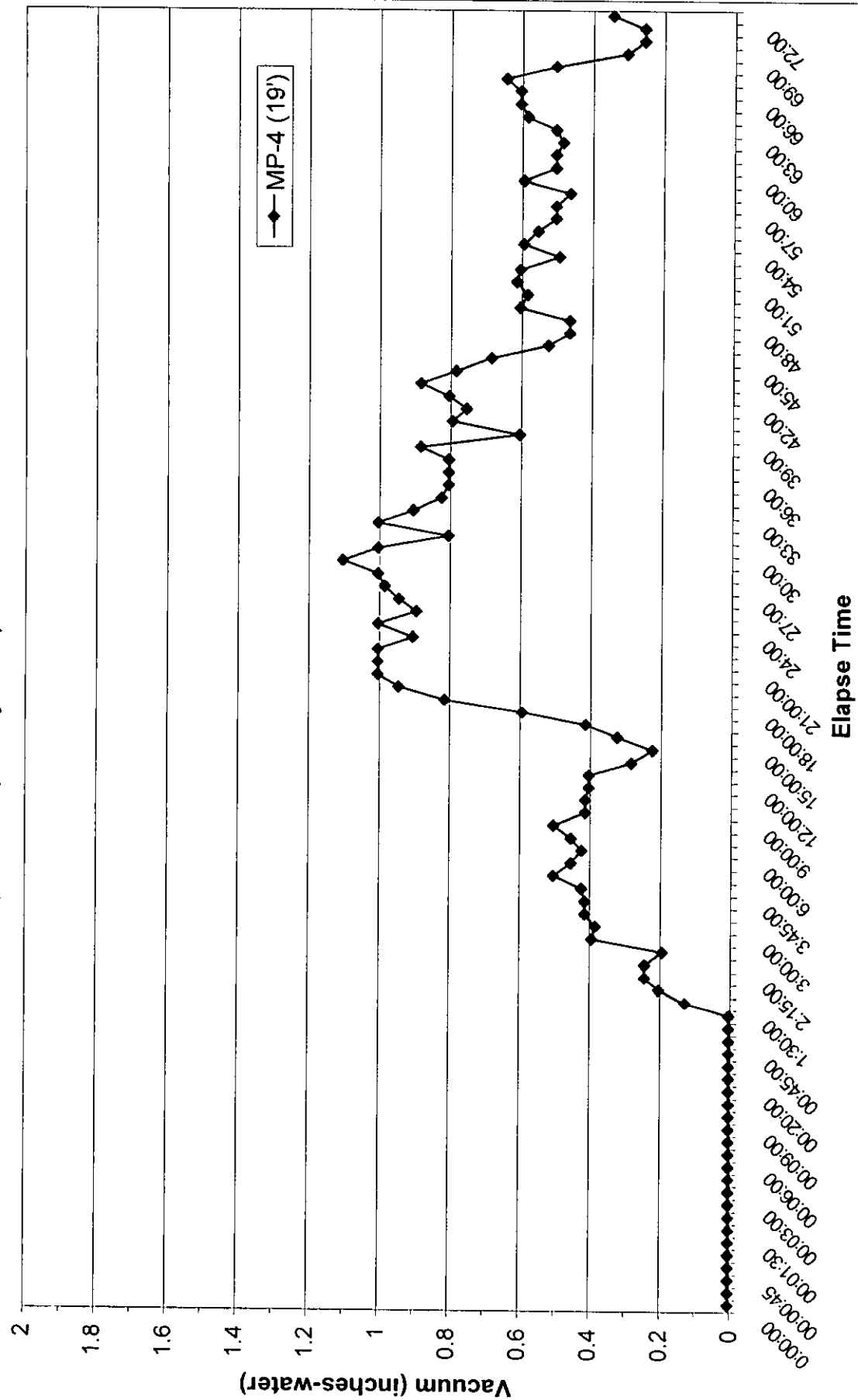
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-3 (49') - Test 1 (Steady State) - Vacuum Vs. Time



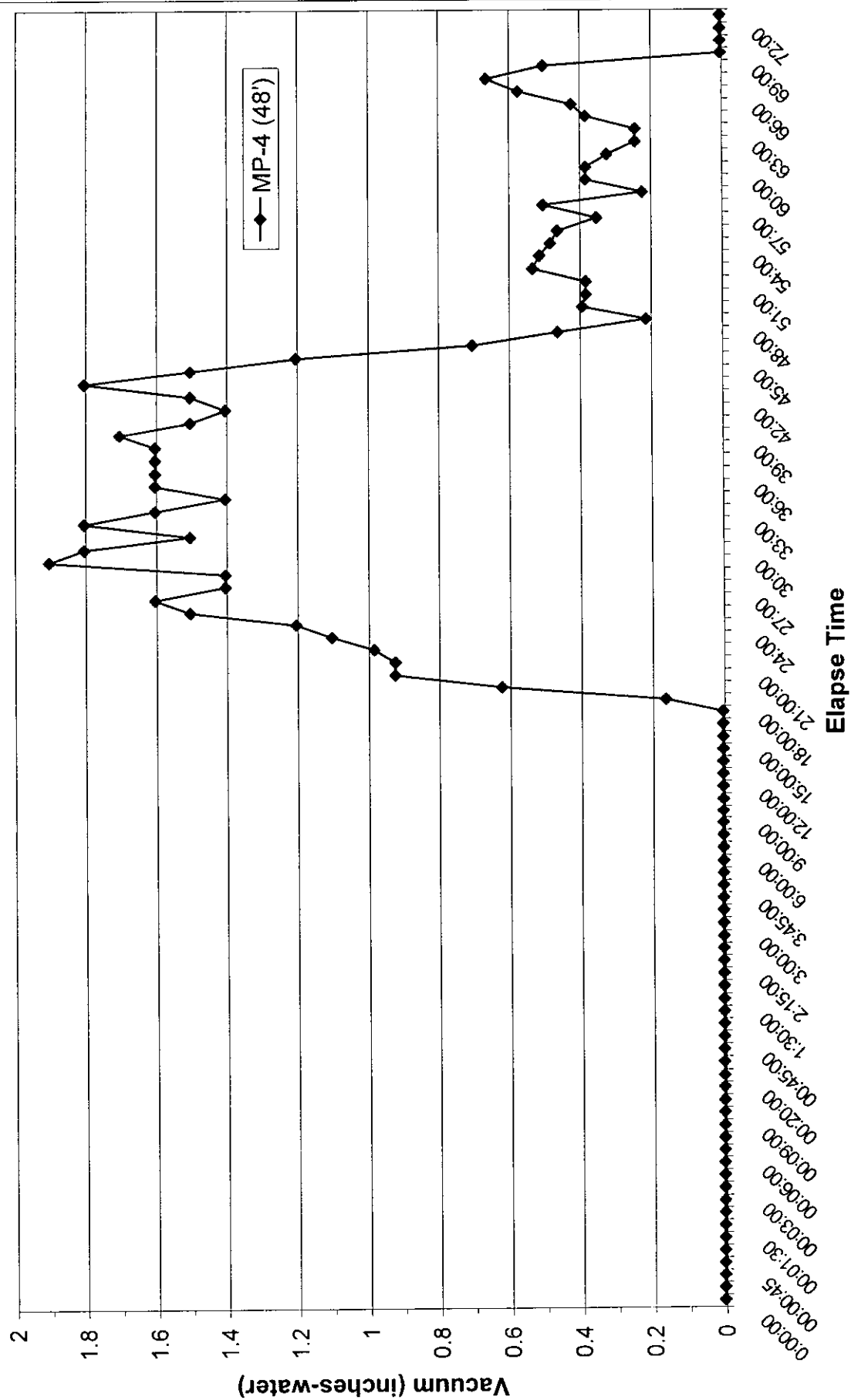
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-3 (68') - Test 1 (Steady State) - Vacuum Vs. Time



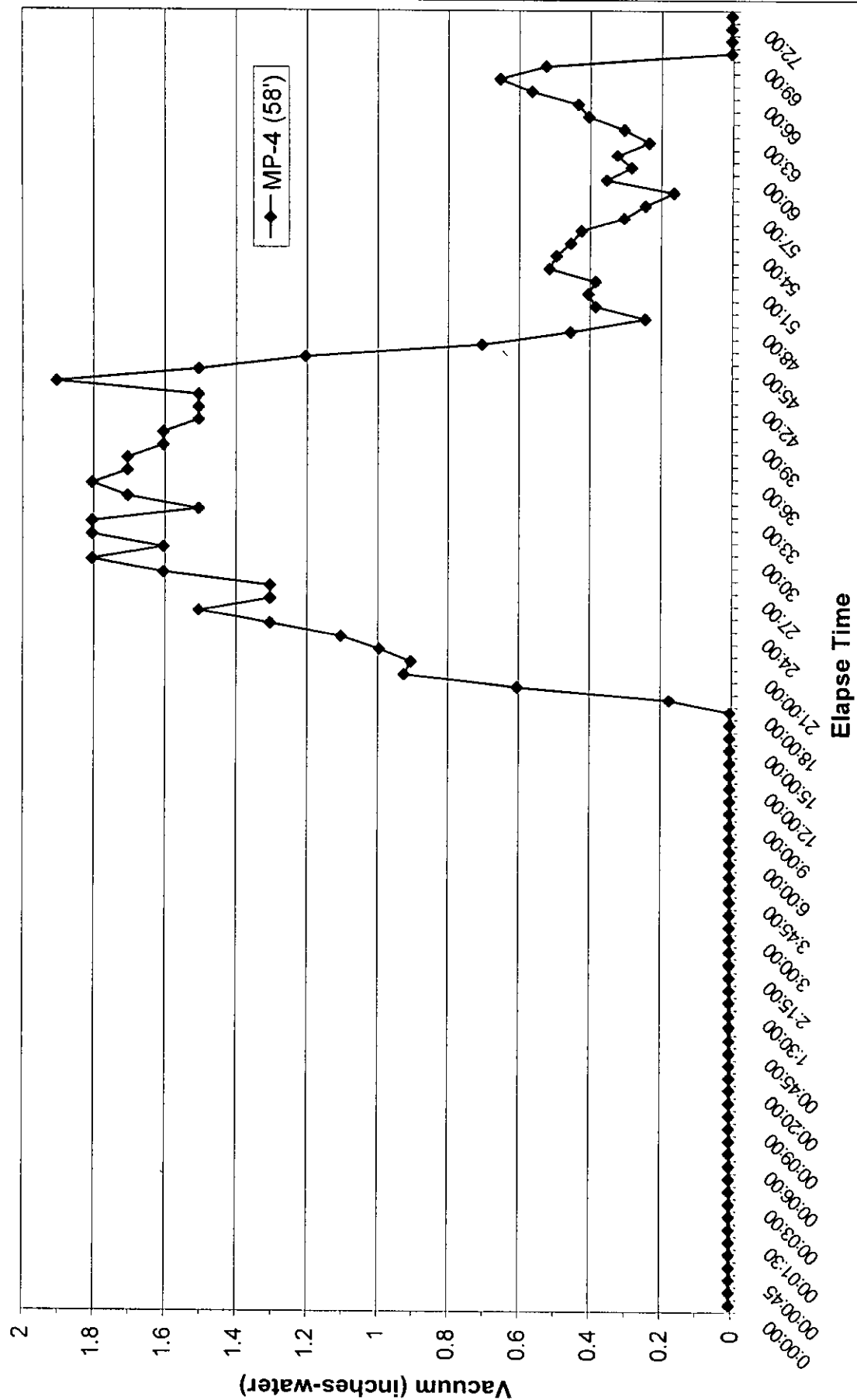
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-4 (19') - Test 1 (Steady State) - Vacuum Vs. Time



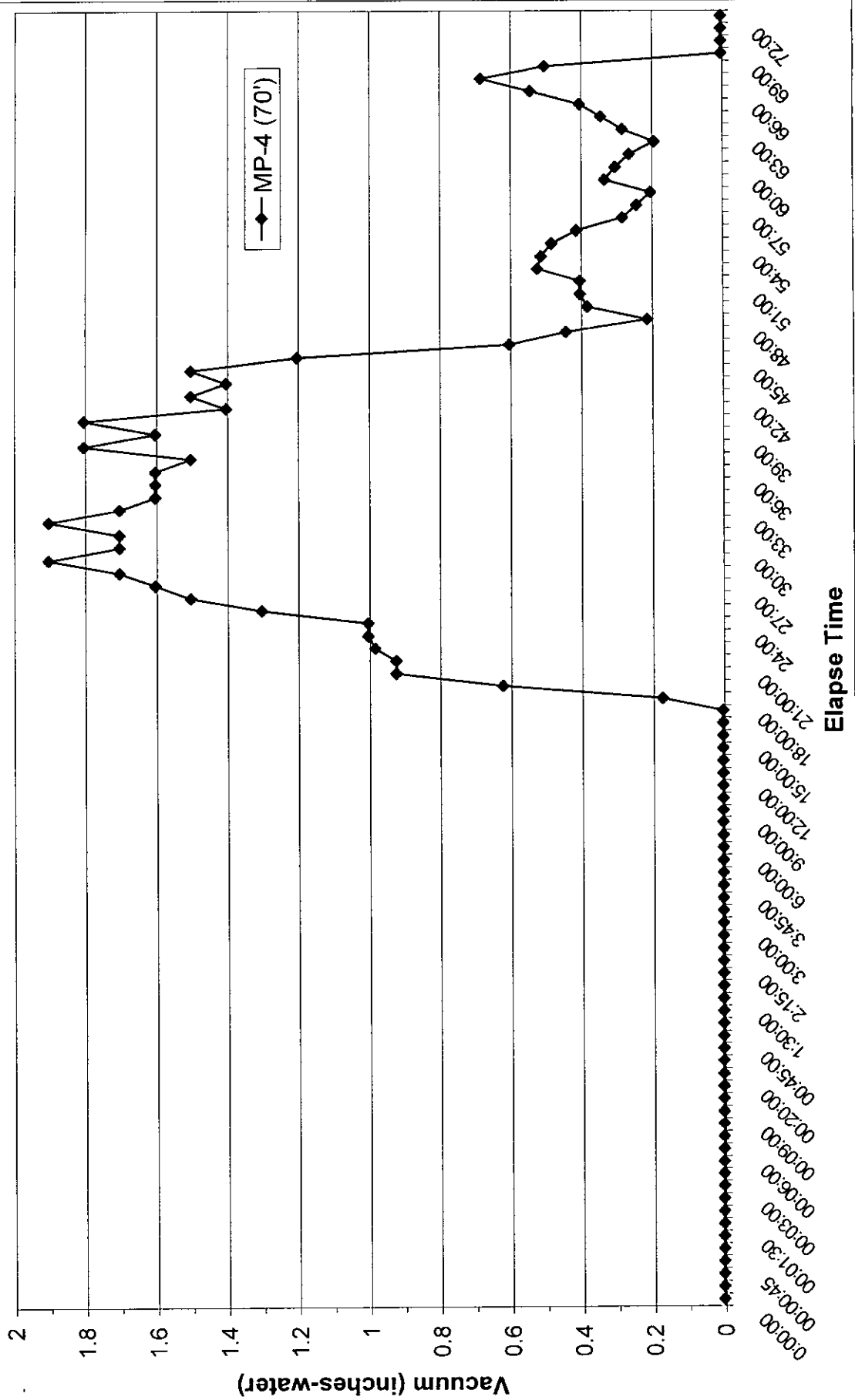
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-4 (48') - Test 1 (Steady State) - Vacuum Vs. Time



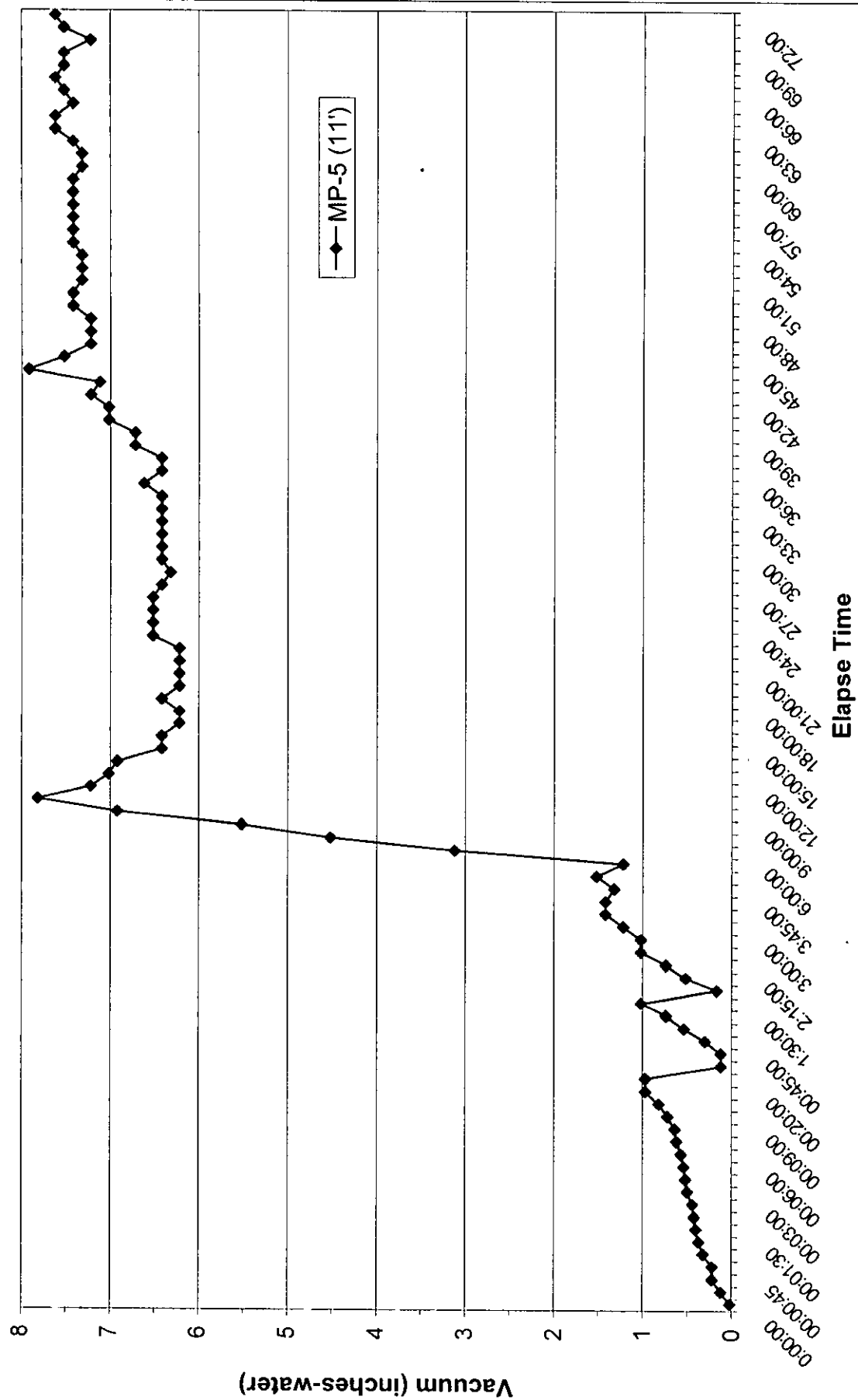
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-4 (58') - Test 1 (Steady State) - Vacuum Vs. Time



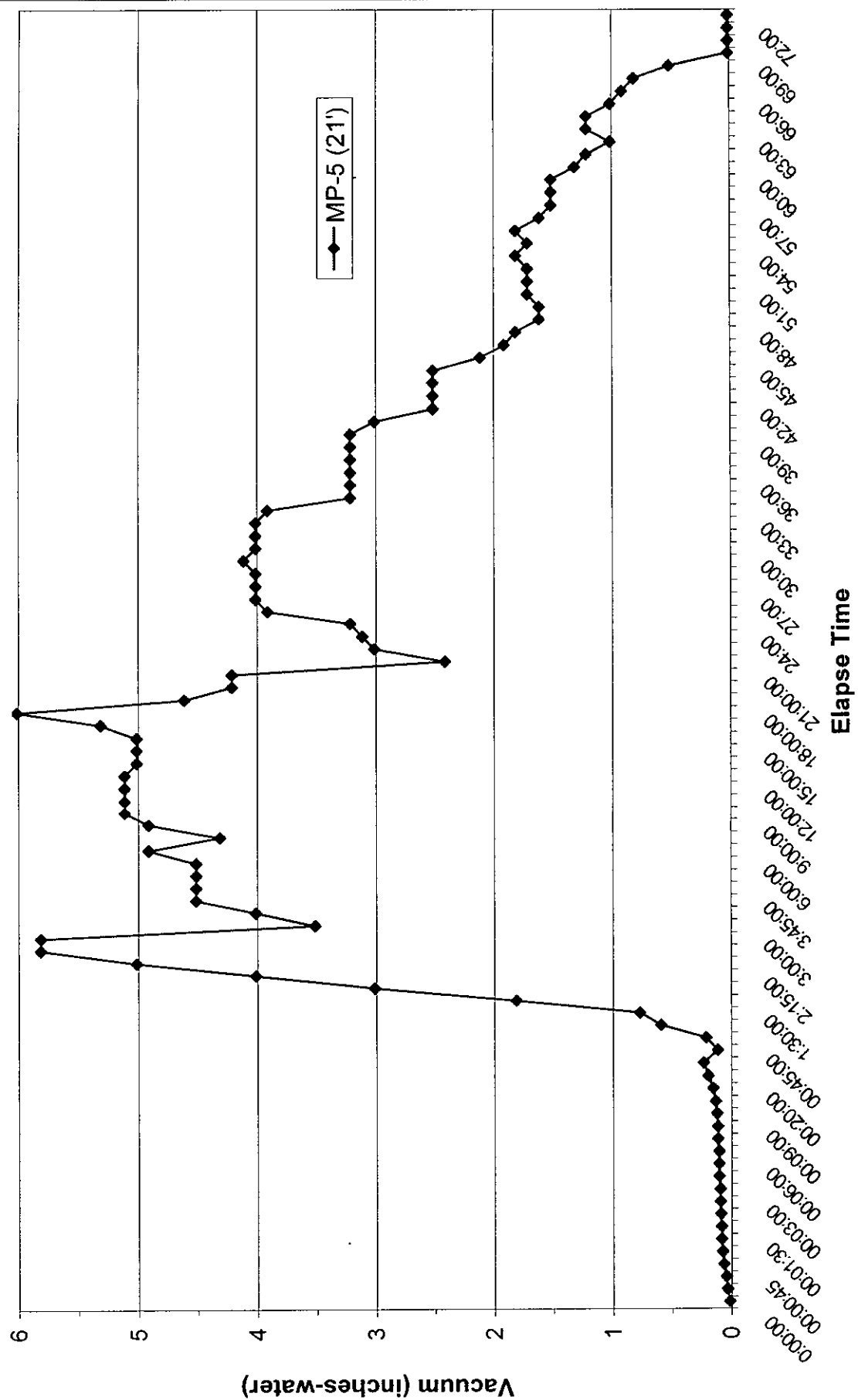
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-4 (70') - Test 1 (Steady State) - Vacuum Vs. Time



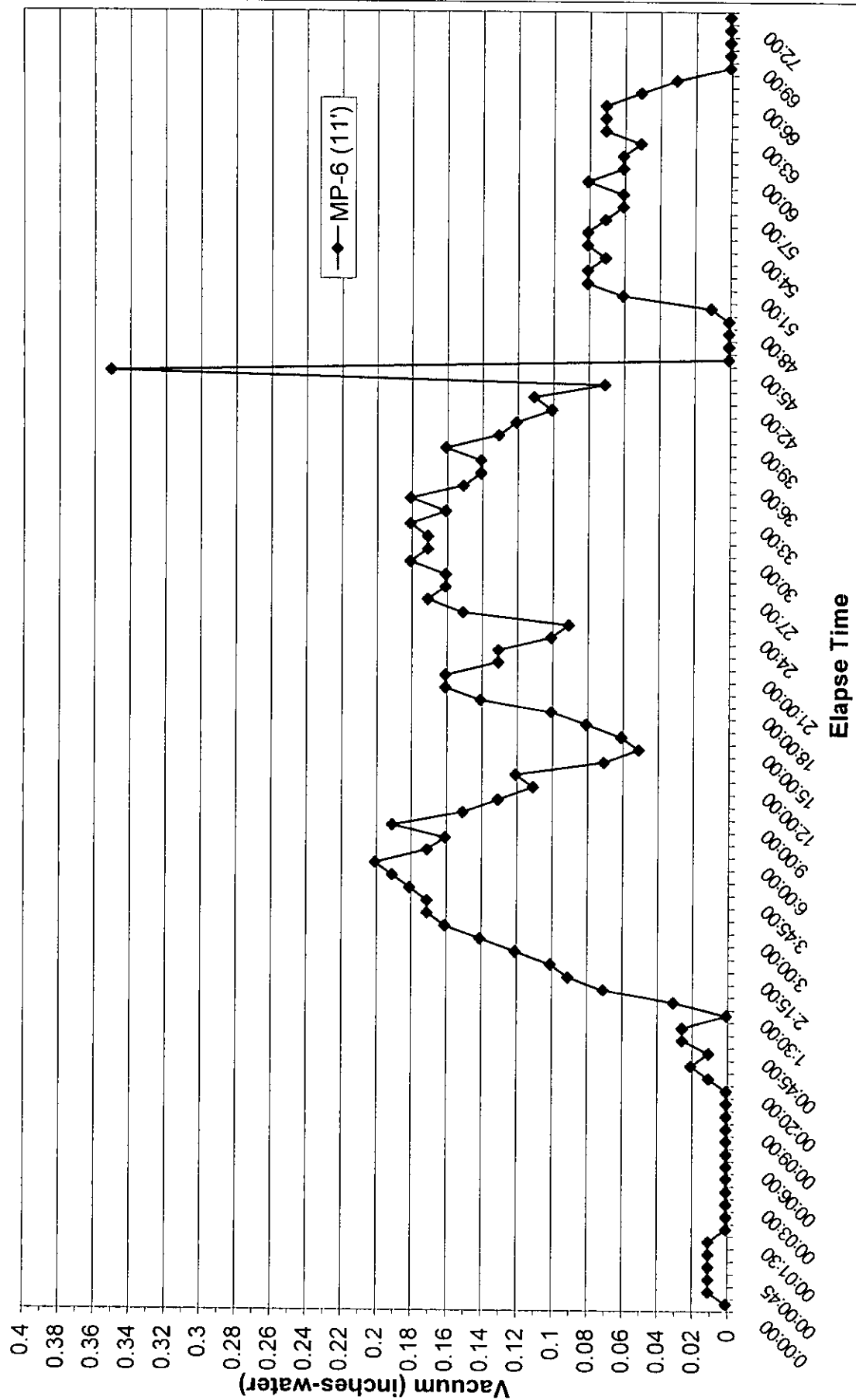
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-5 (11') - Test 1 (Steady State) - Vacuum Vs. Time



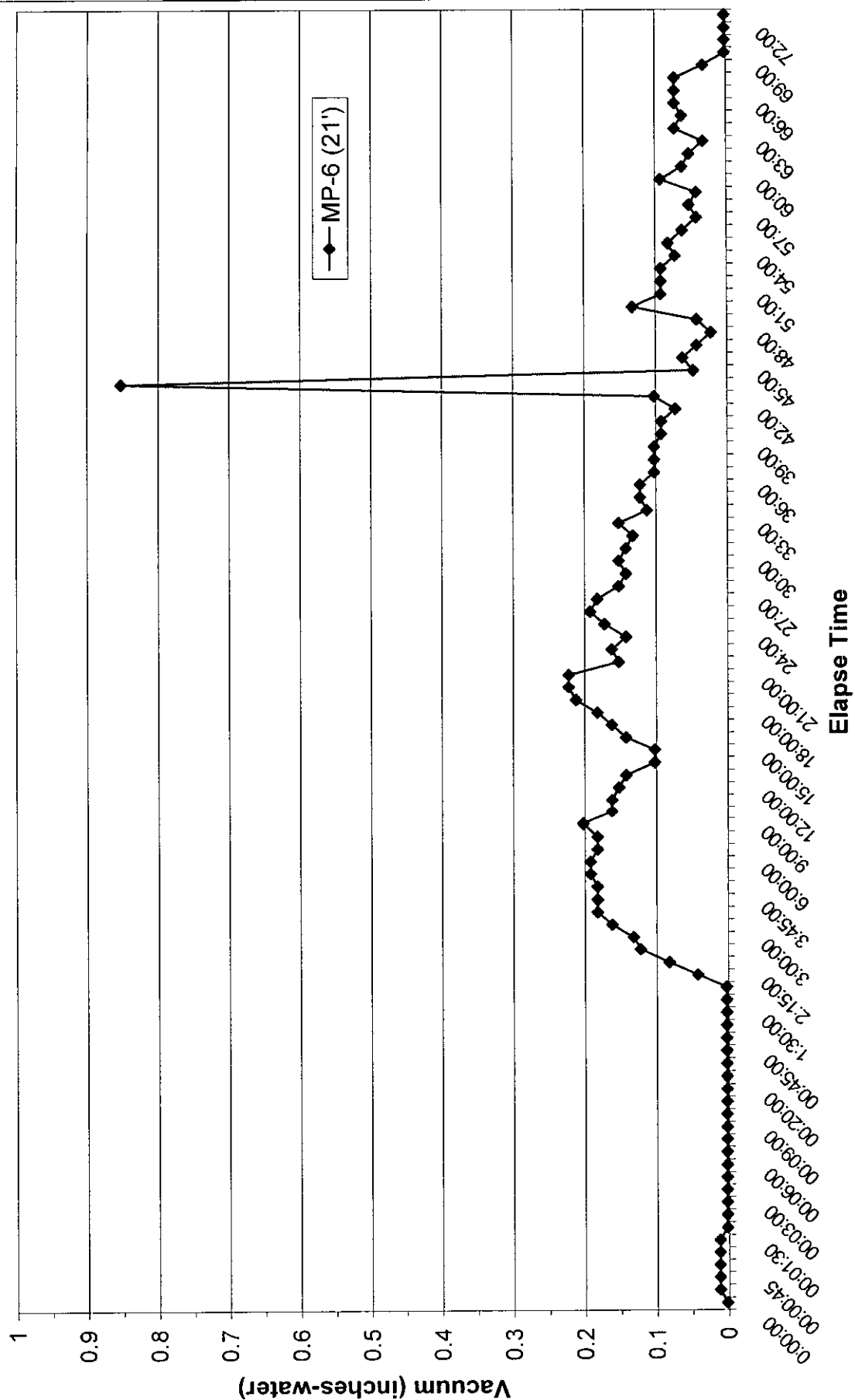
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-5 (21') - Test 1 (Steady State) - Vacuum Vs. Time



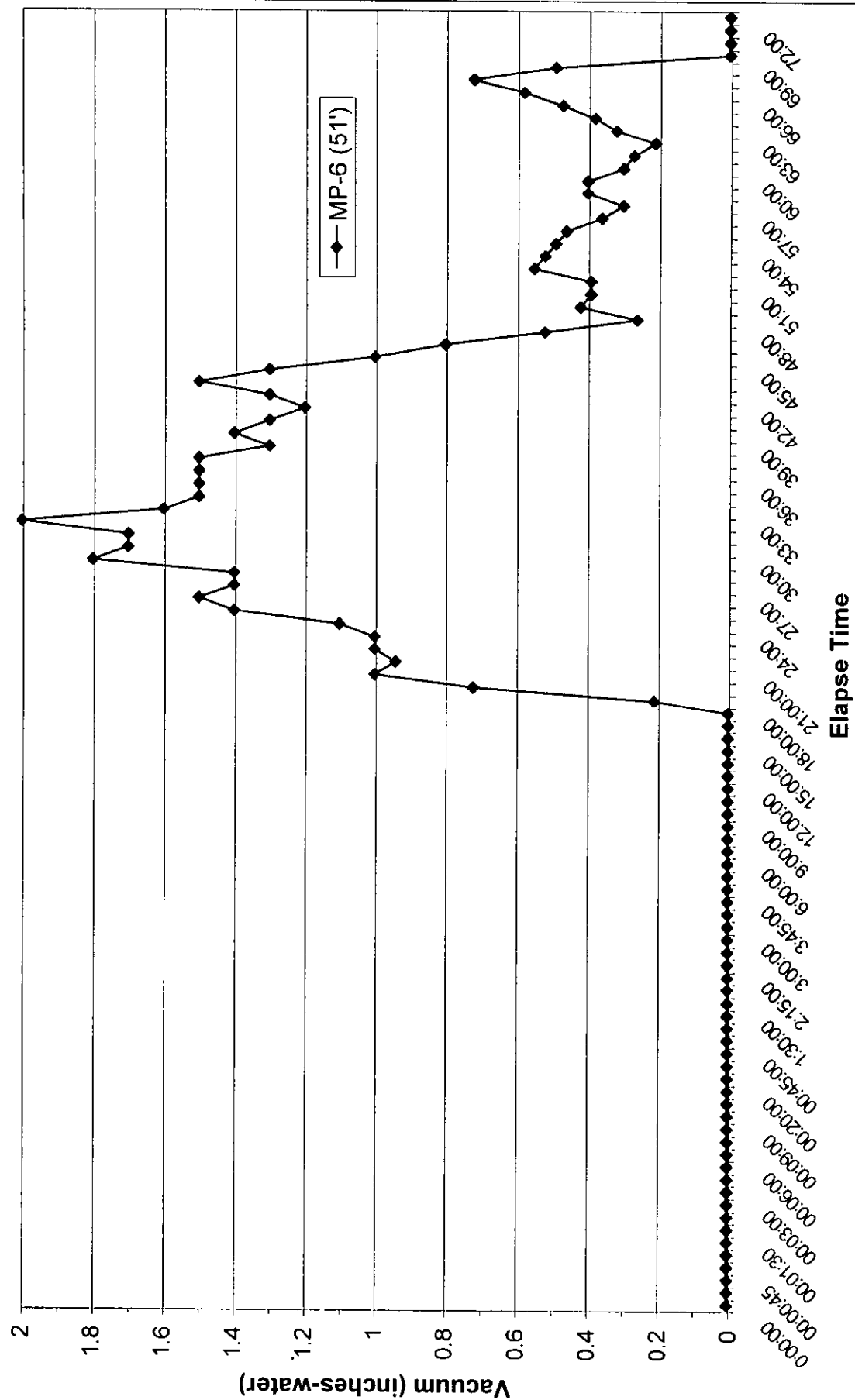
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-6 (11') - Test 1 (Steady State) - Vacuum Vs. Time



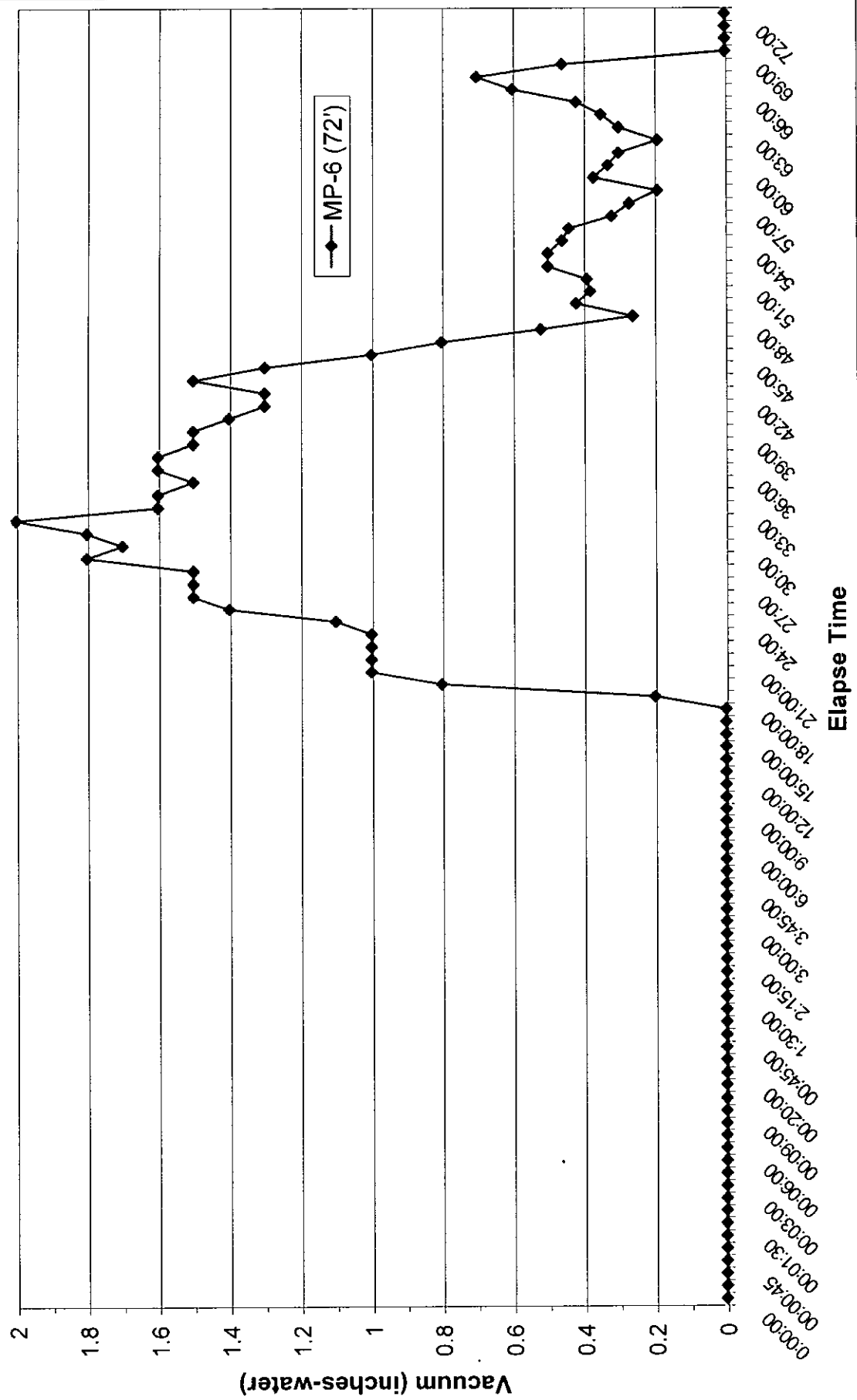
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-6 (21') - Test 1 (Steady State) - Vacuum Vs. Time



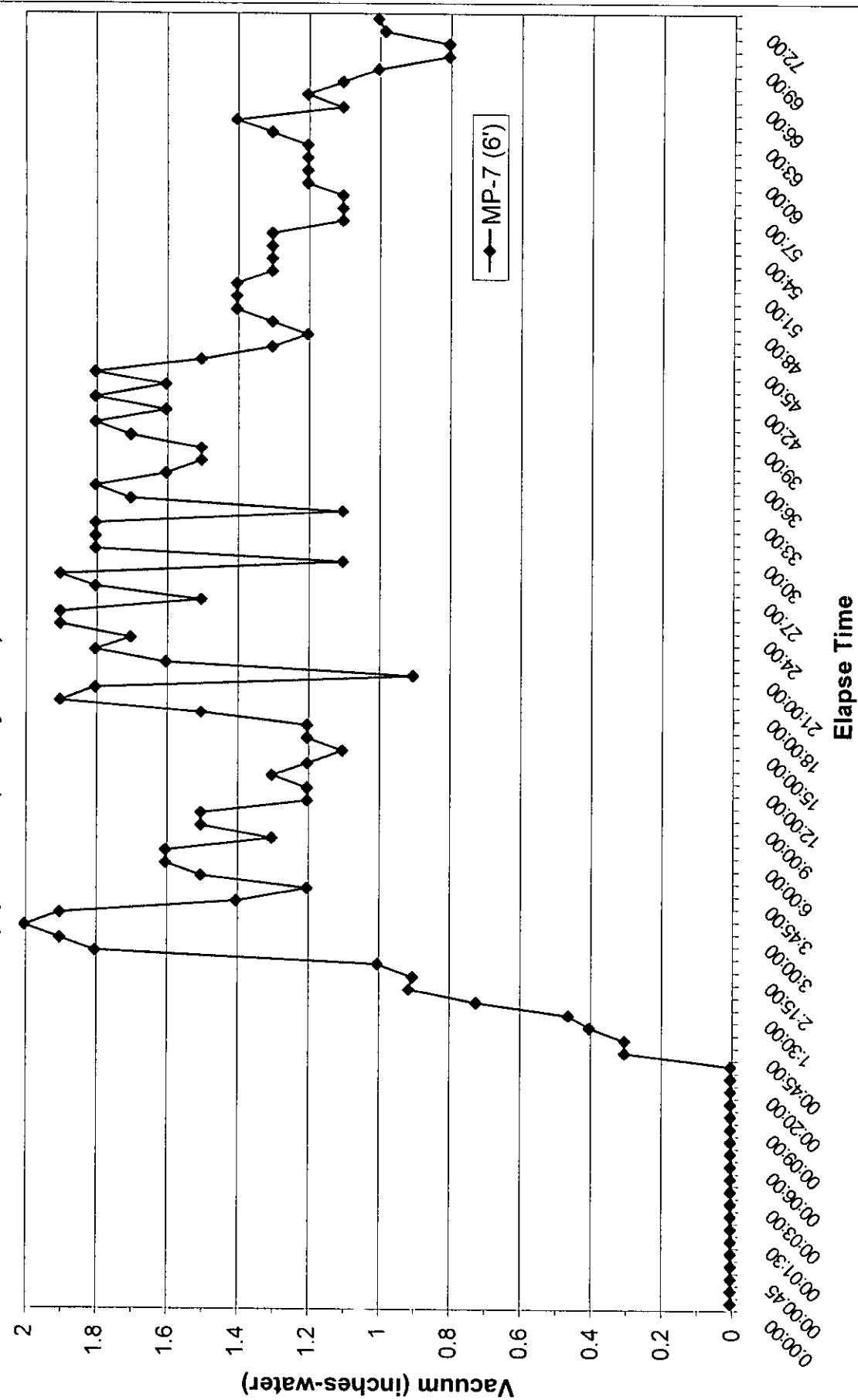
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-6 (51') - Test 1 (Steady State) - Vacuum Vs. Time



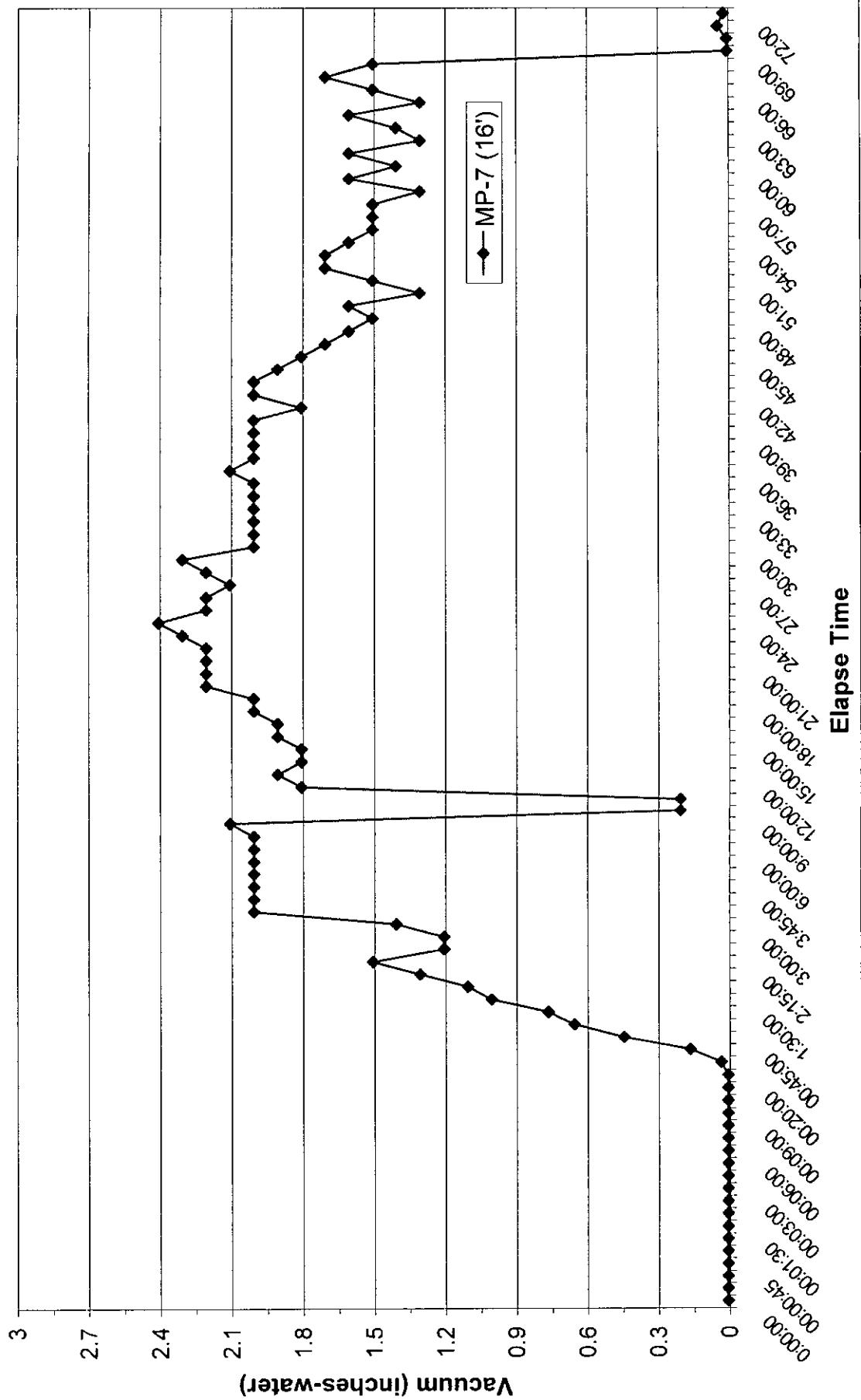
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-6 (72') - Test 1 (Steady State) - Vacuum Vs. Time



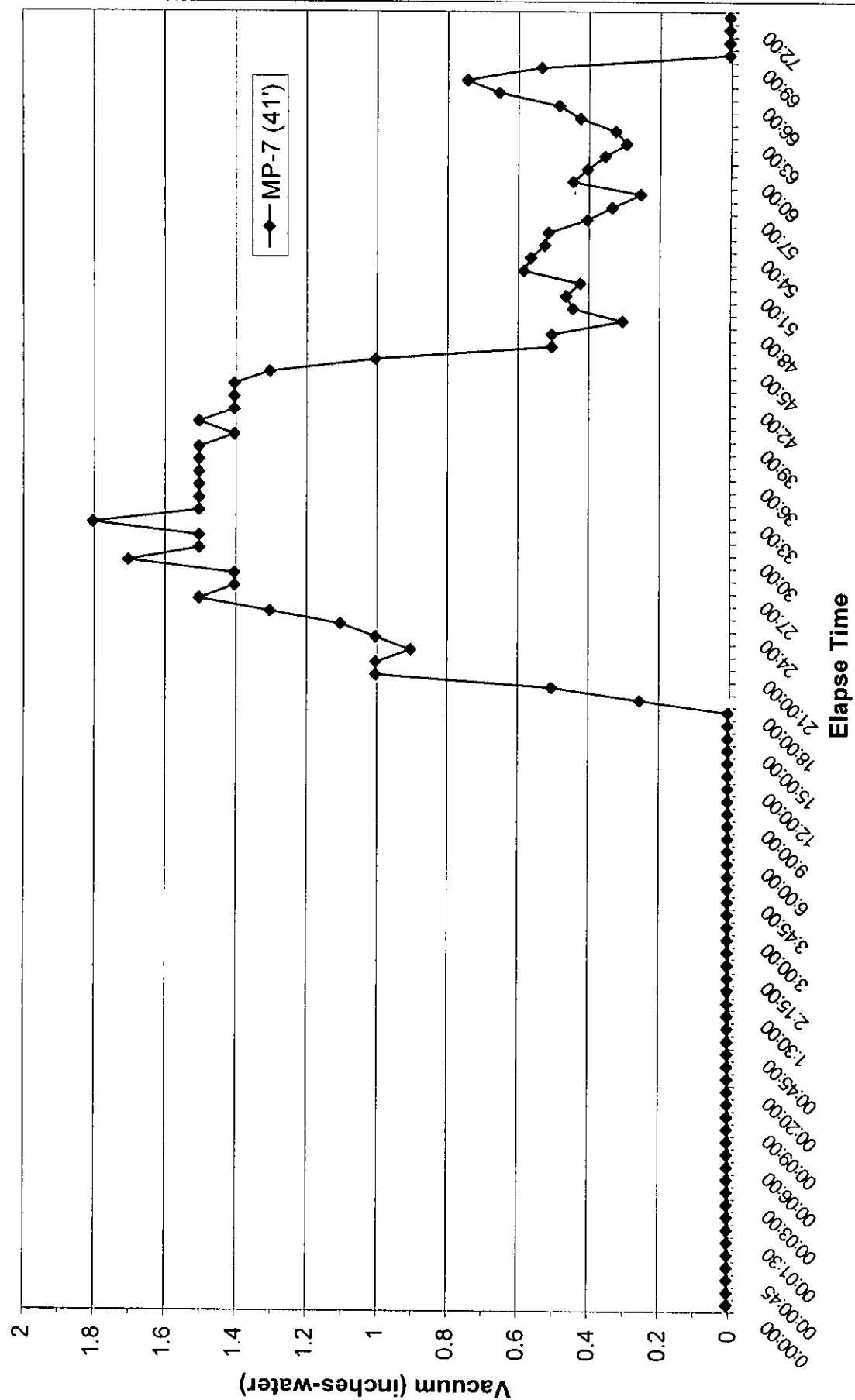
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-7 (6') - Test 1 (Steady State) - Vacuum Vs. Time



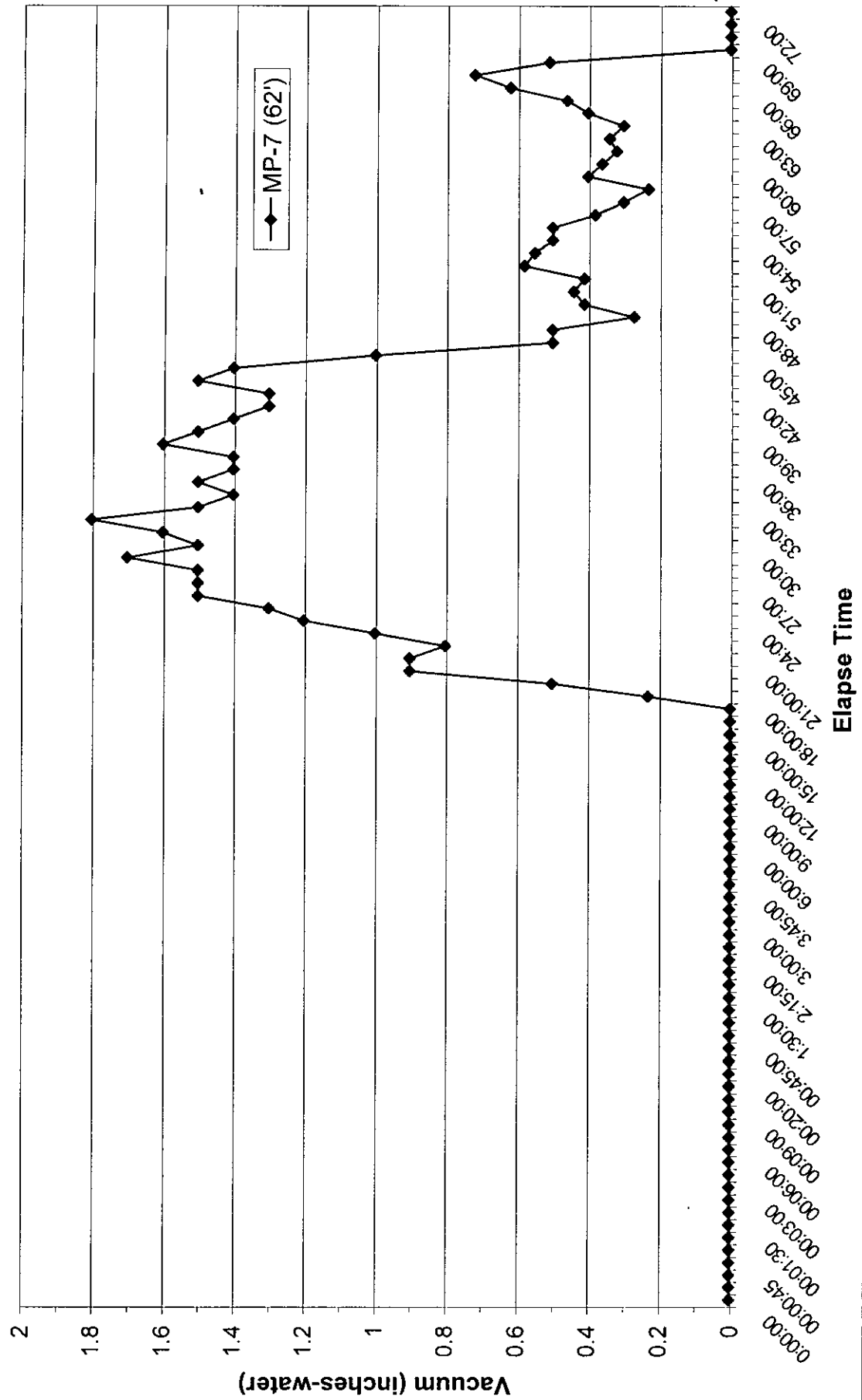
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-7 (16') - Test 1 (Steady State) - Vacuum Vs. Time



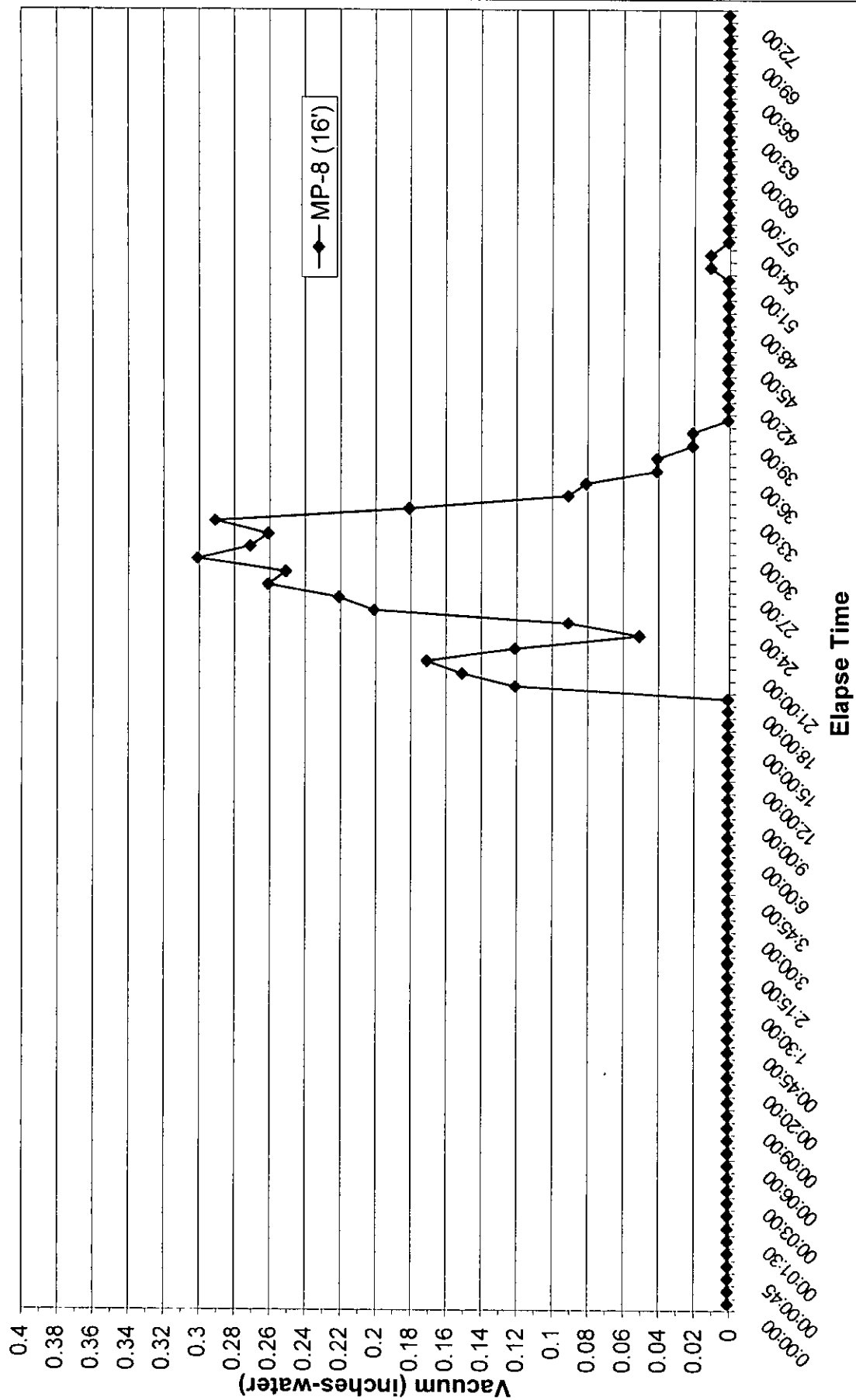
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-7 (41') - Test 1 (Steady State) - Vacuum Vs. Time



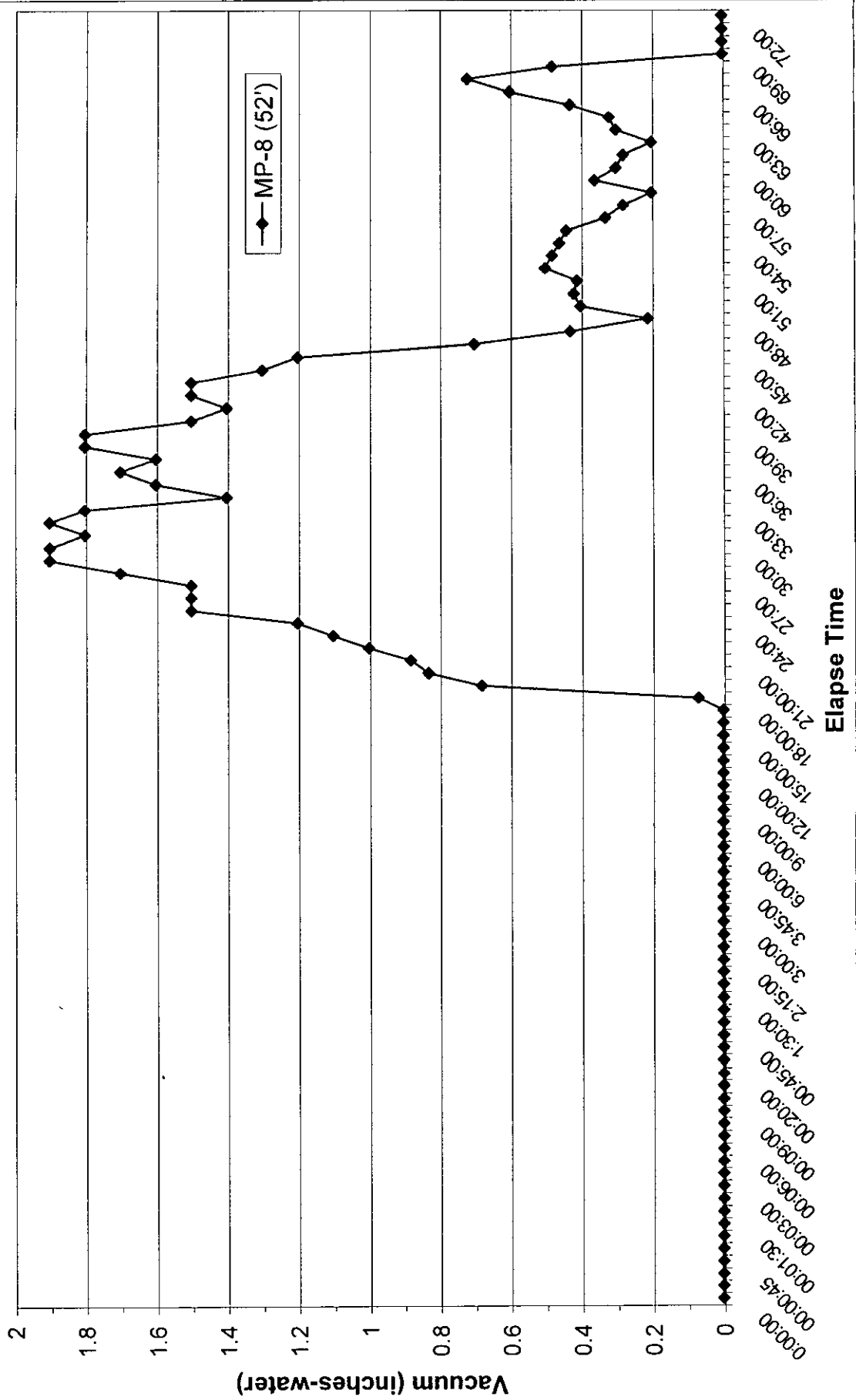
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-7 (62') - Test 1 (Steady State) - Vacuum Vs. Time



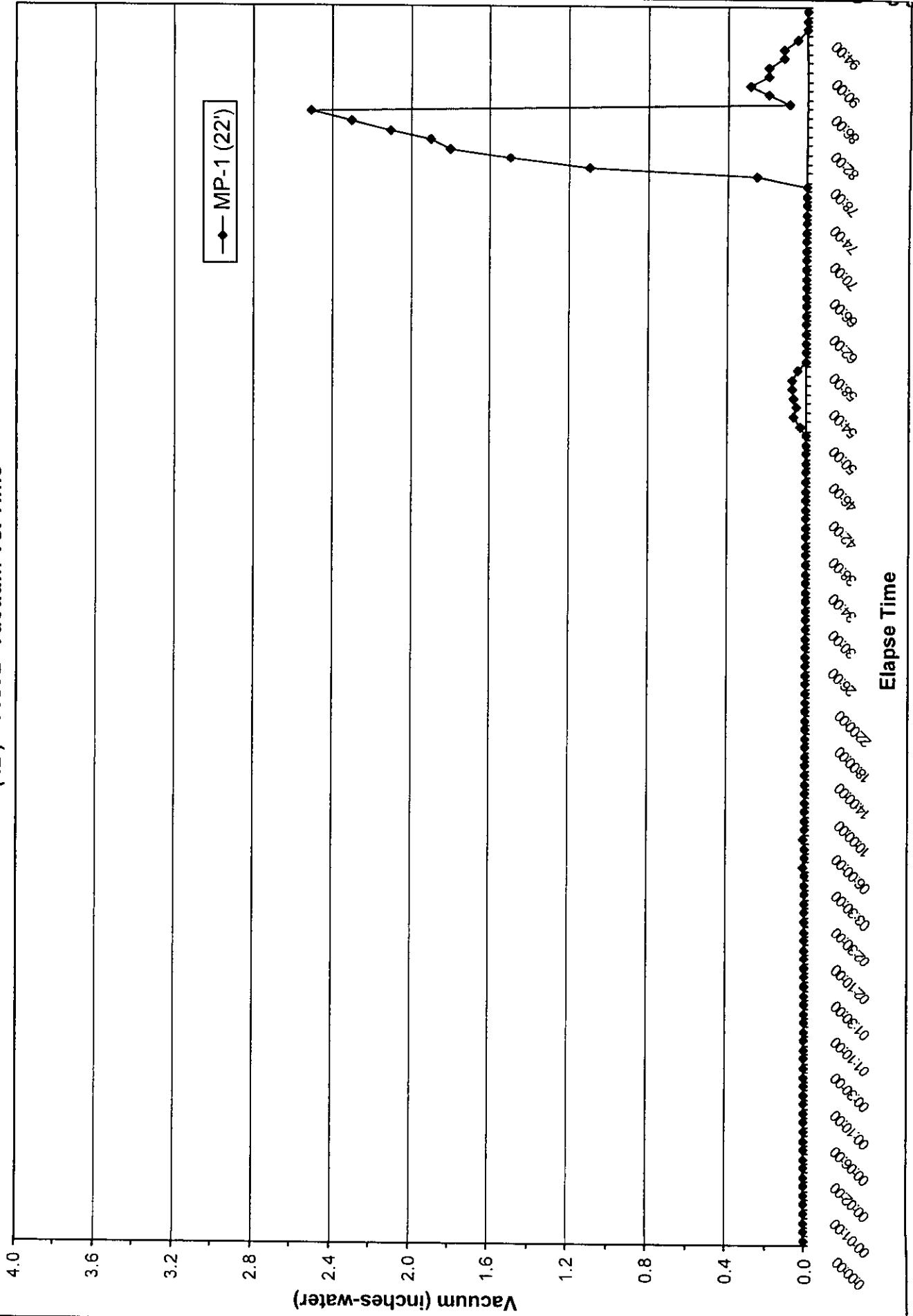
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-8 (16') - Test 1 (Steady State) - Vacuum Vs. Time



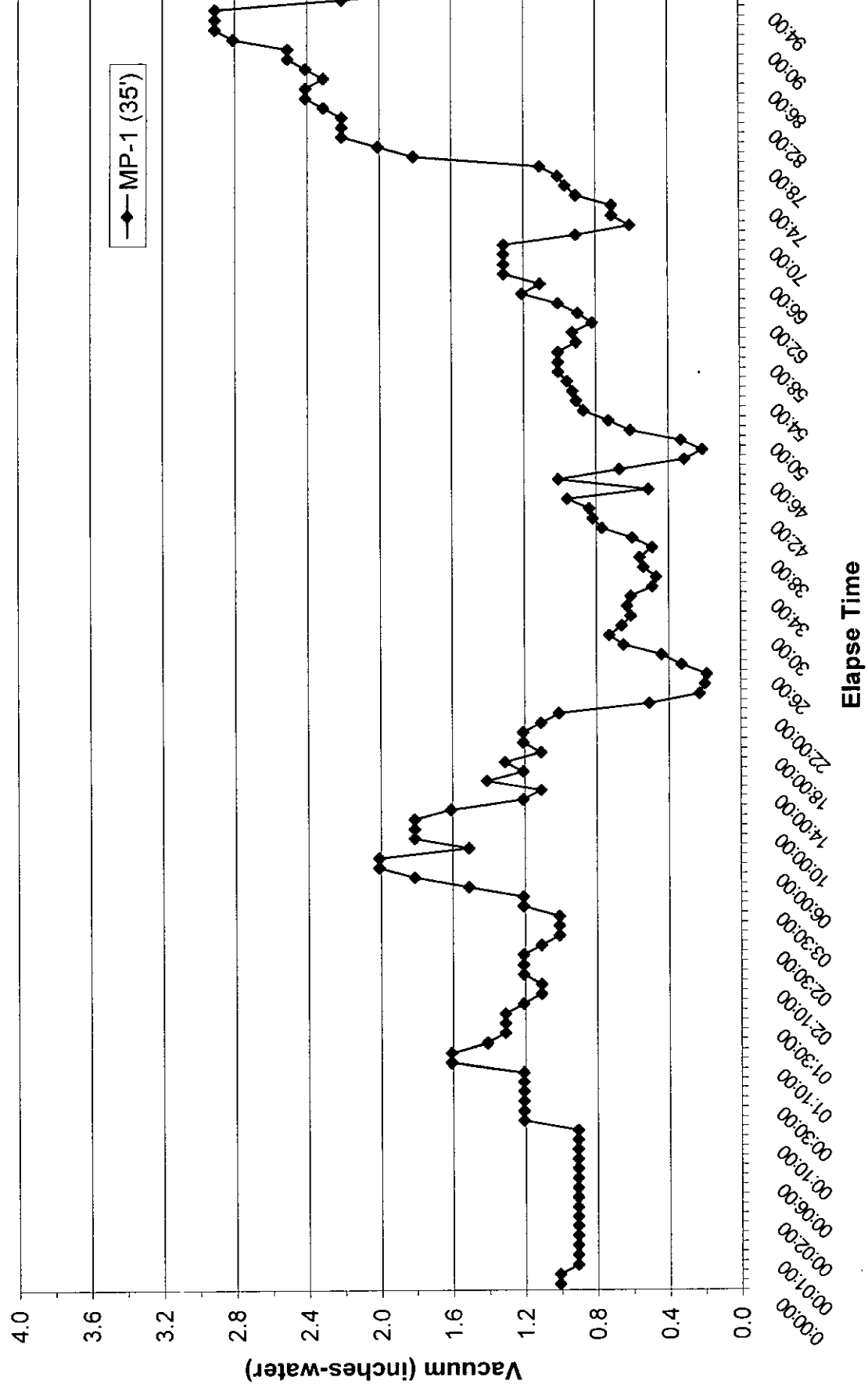
Memphis Depot - Dunn Field SVE TS (December 2001)
MP-8 (52') - Test 1 (Steady State) - Vacuum Vs. Time



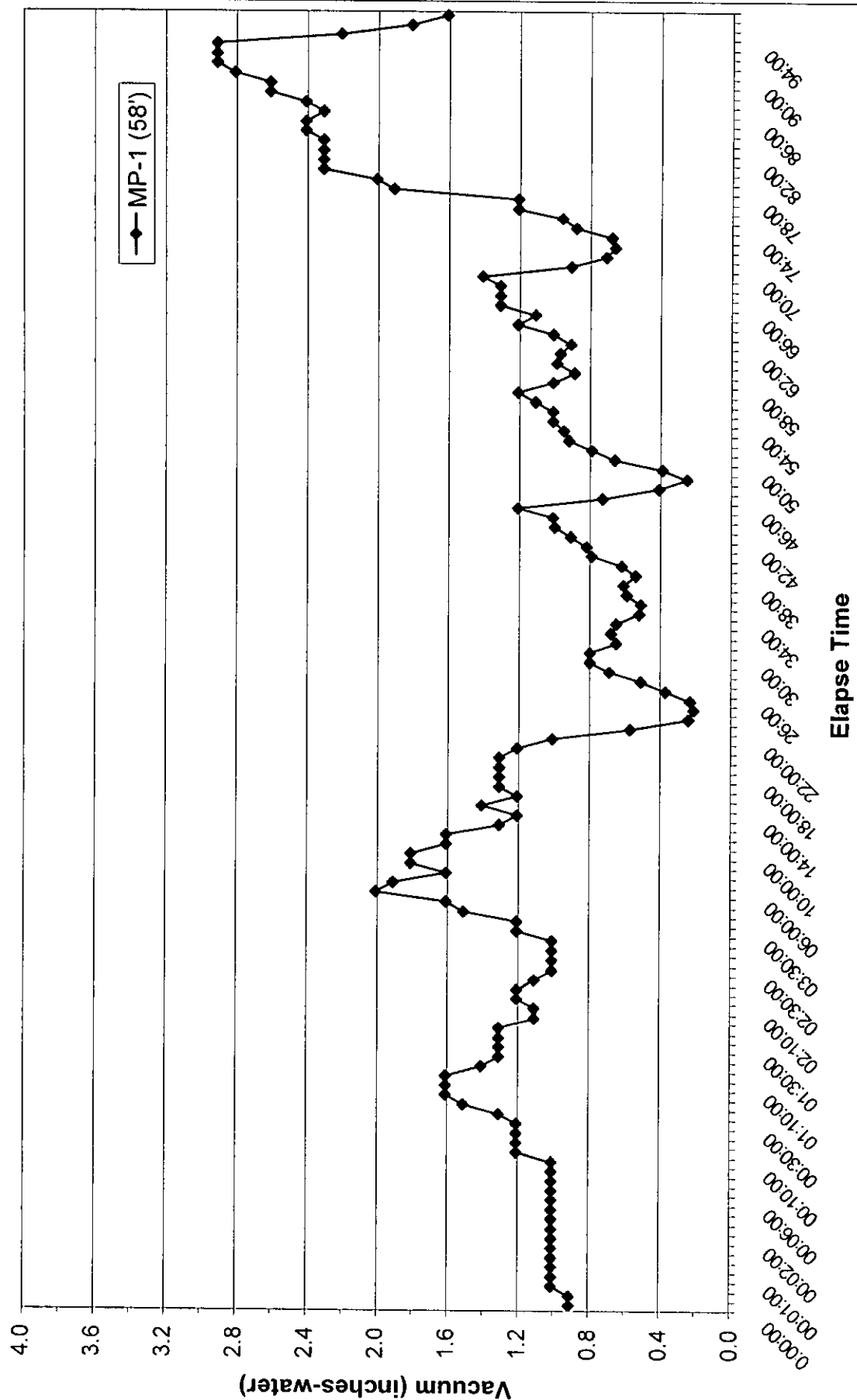
Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-1 (22') - Test 2- Vacuum Vs. Time



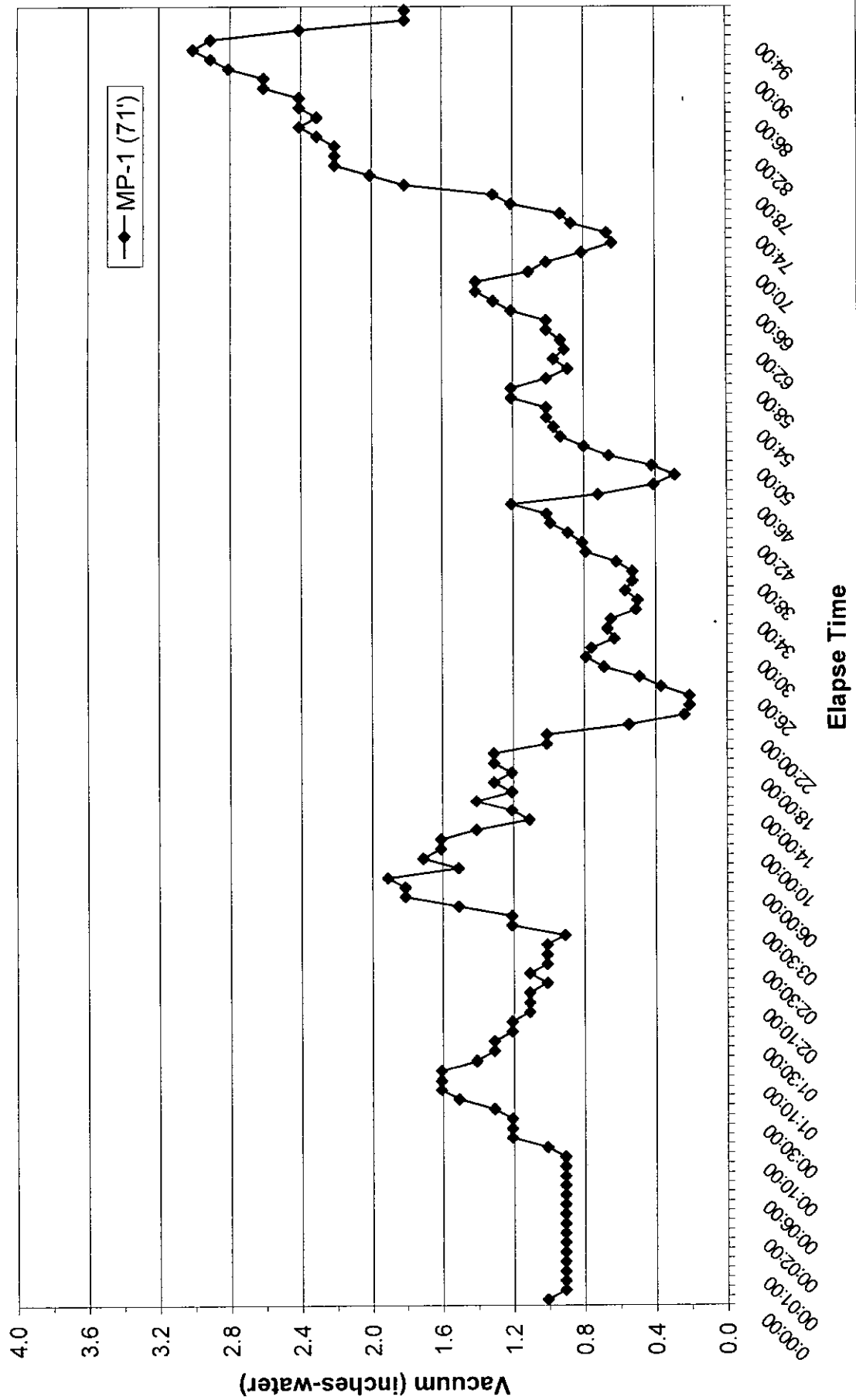
Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-1 (35') - Test 2- Vacuum Vs. Time



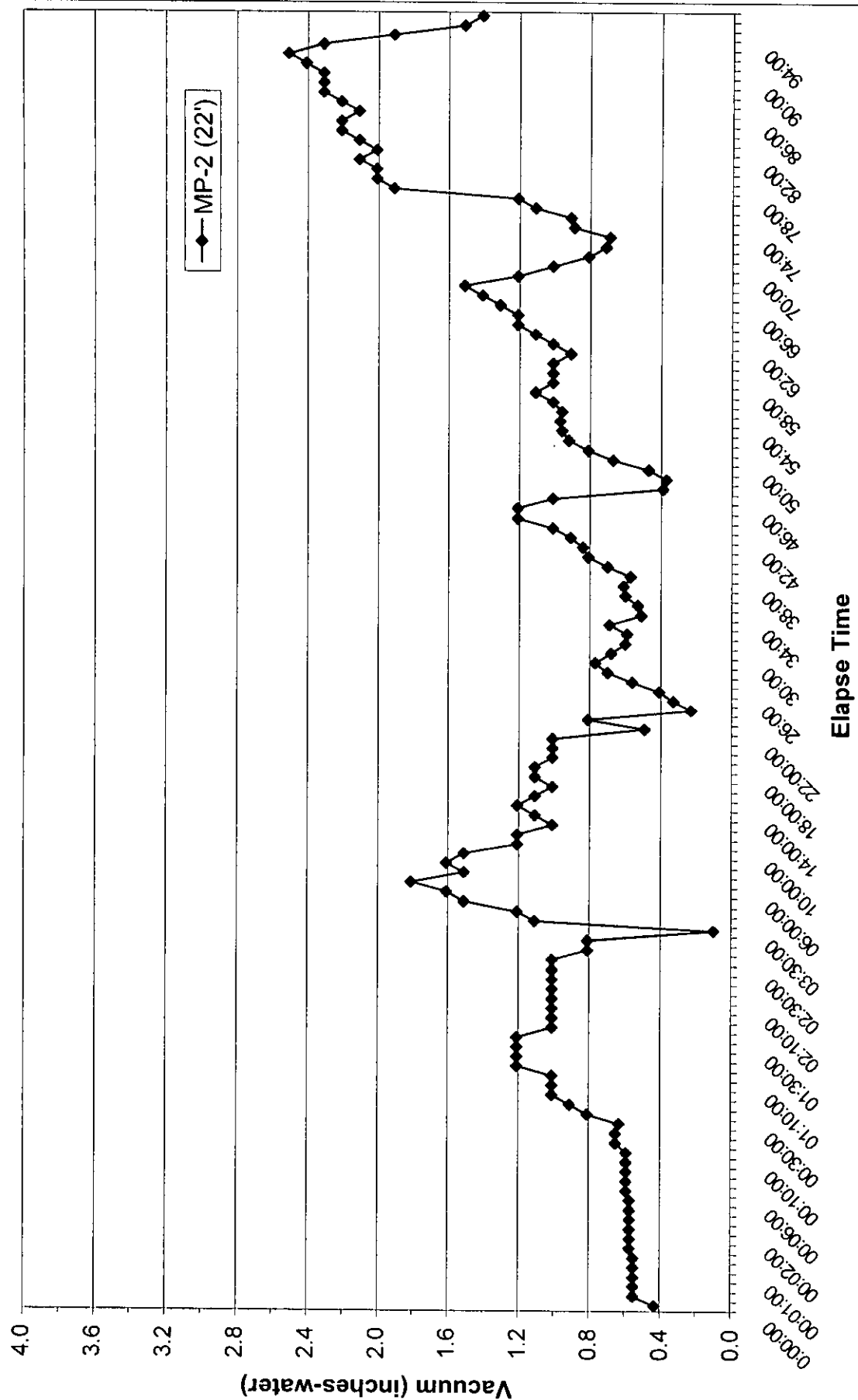
Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-1 (58') - Test 2- Vacuum Vs. Time



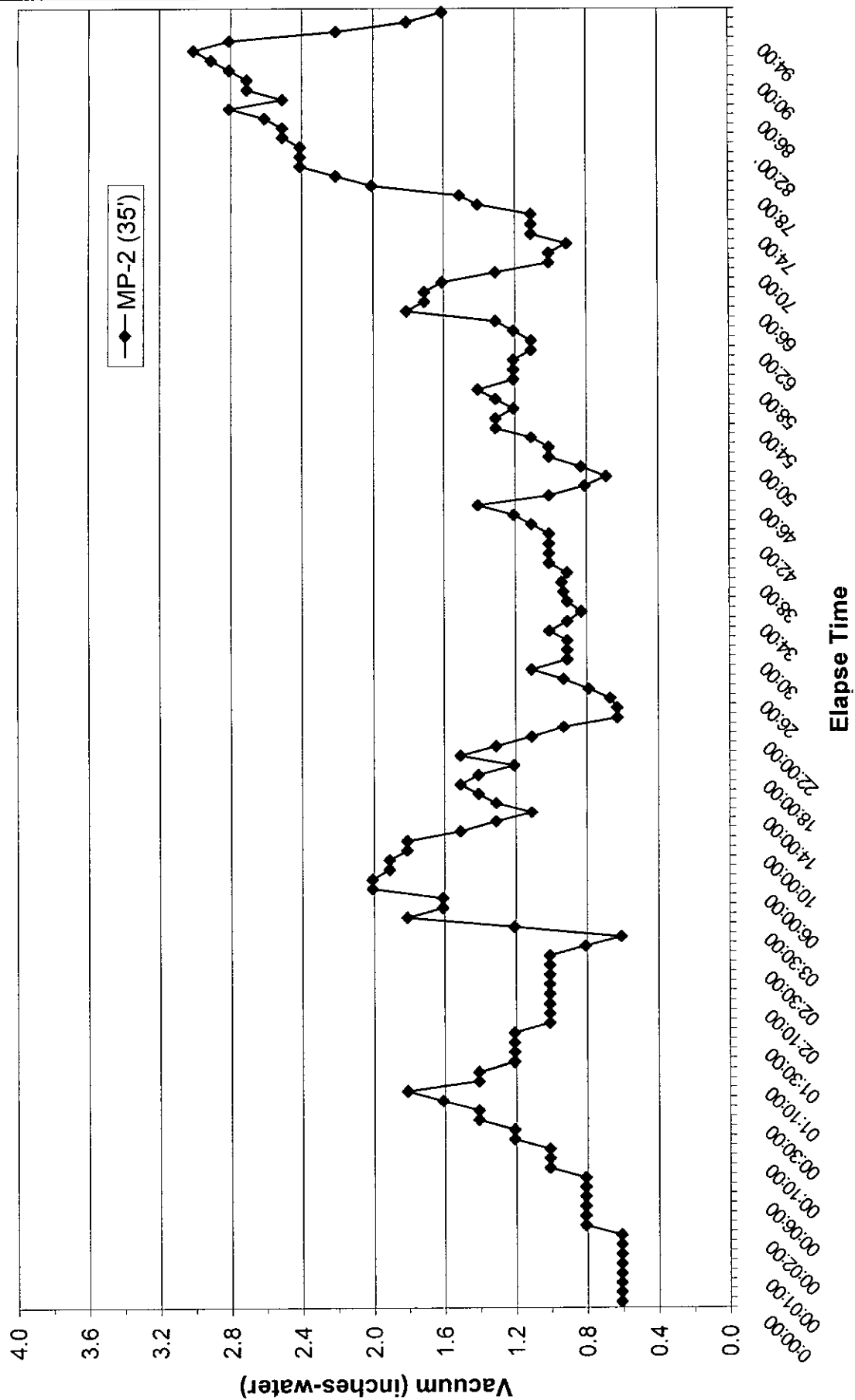
Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-1 (71') - Test 2- Vacuum Vs. Time



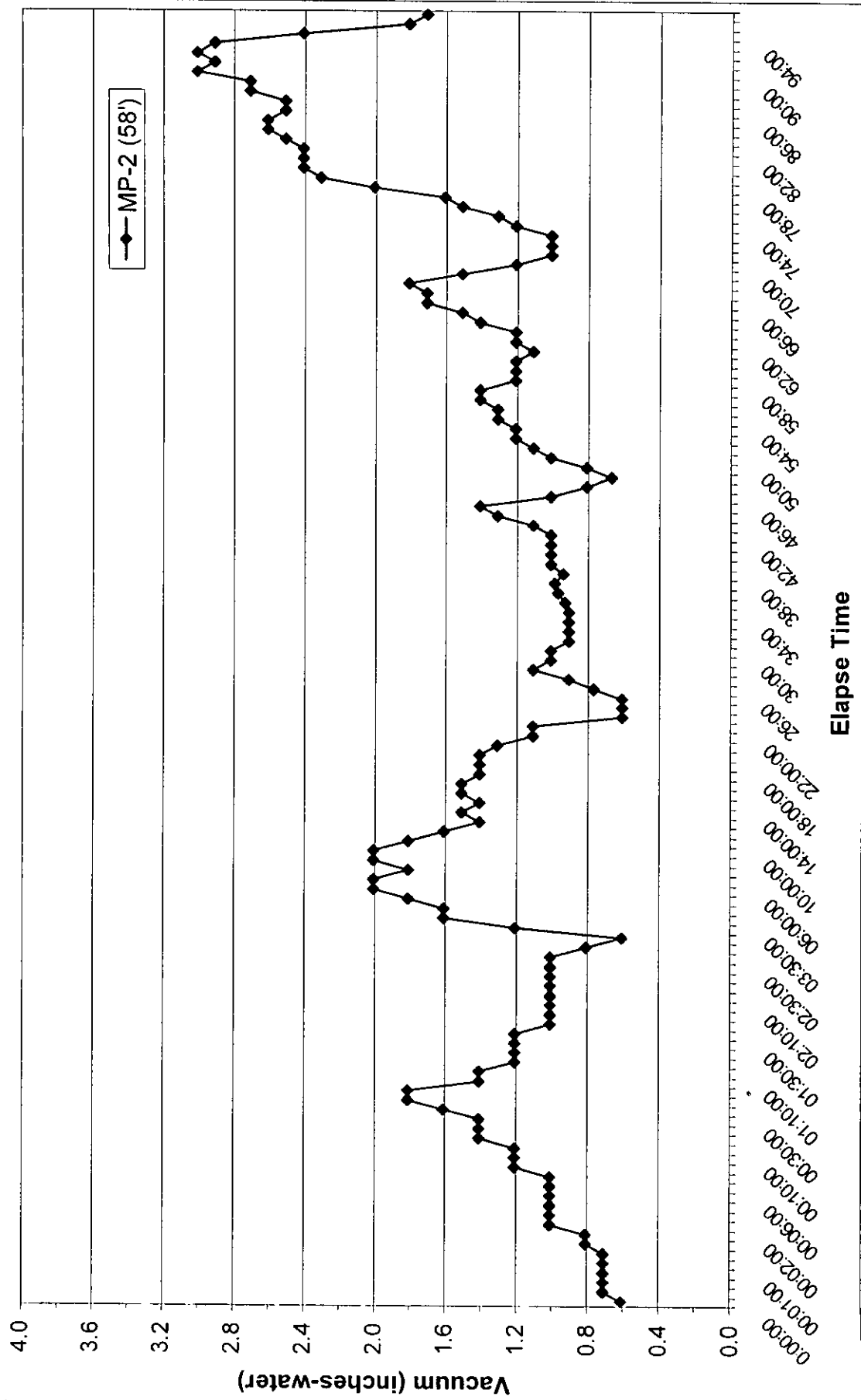
Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-2 (22') - Test 2- Vacuum Vs. Time



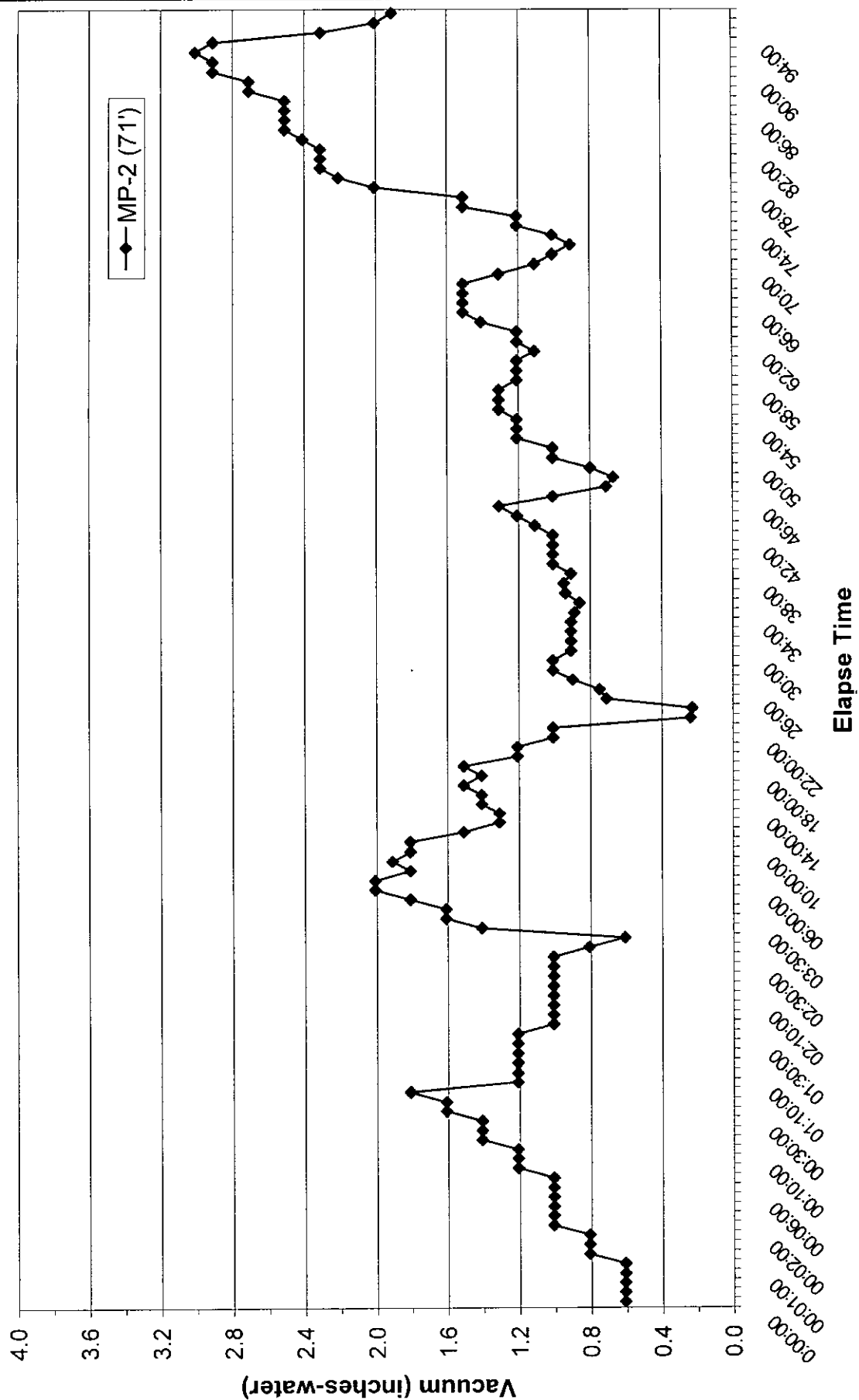
Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-2 (35') - Test 2- Vacuum Vs. Time



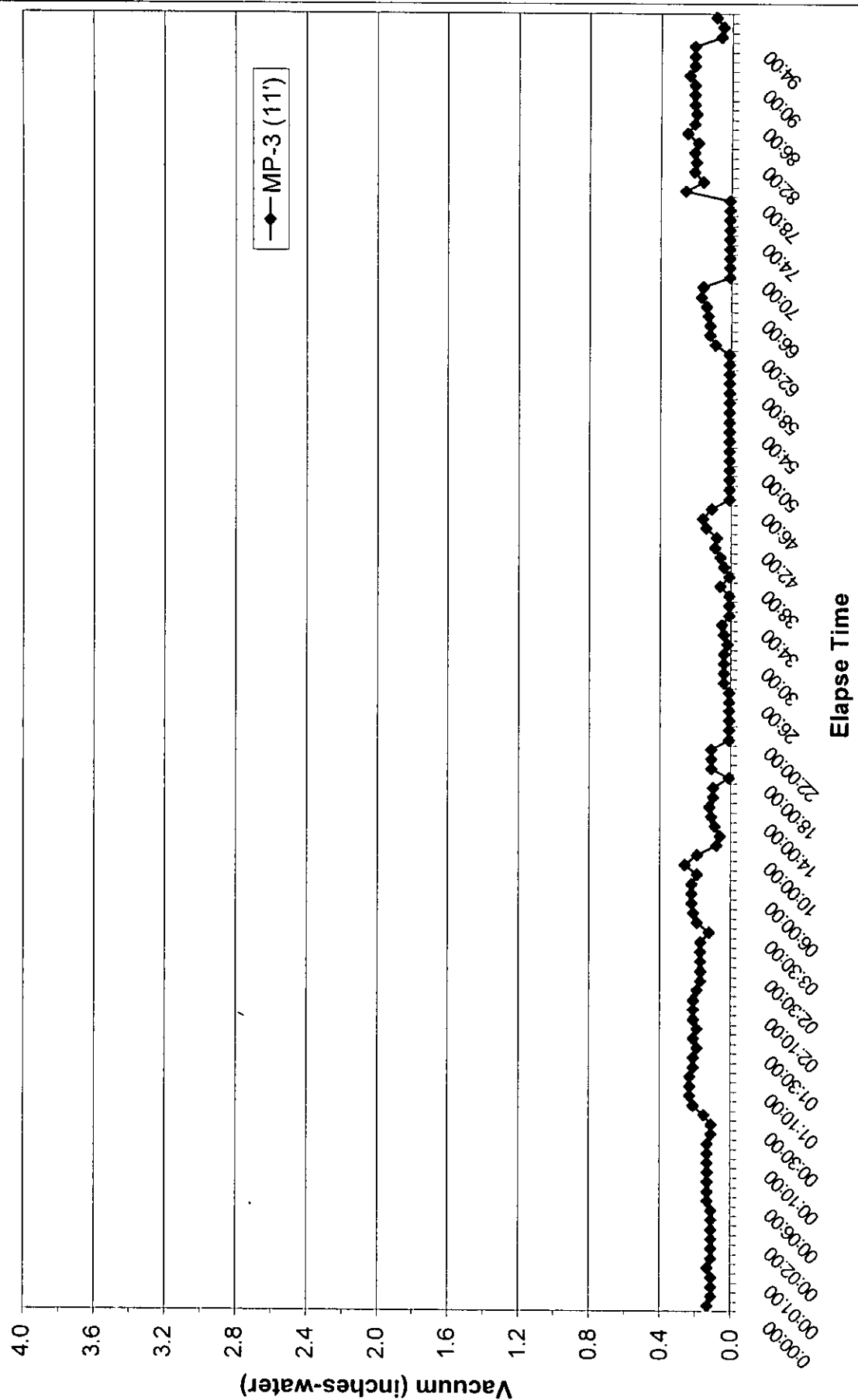
Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-2 (58') - Test 2- Vacuum Vs. Time



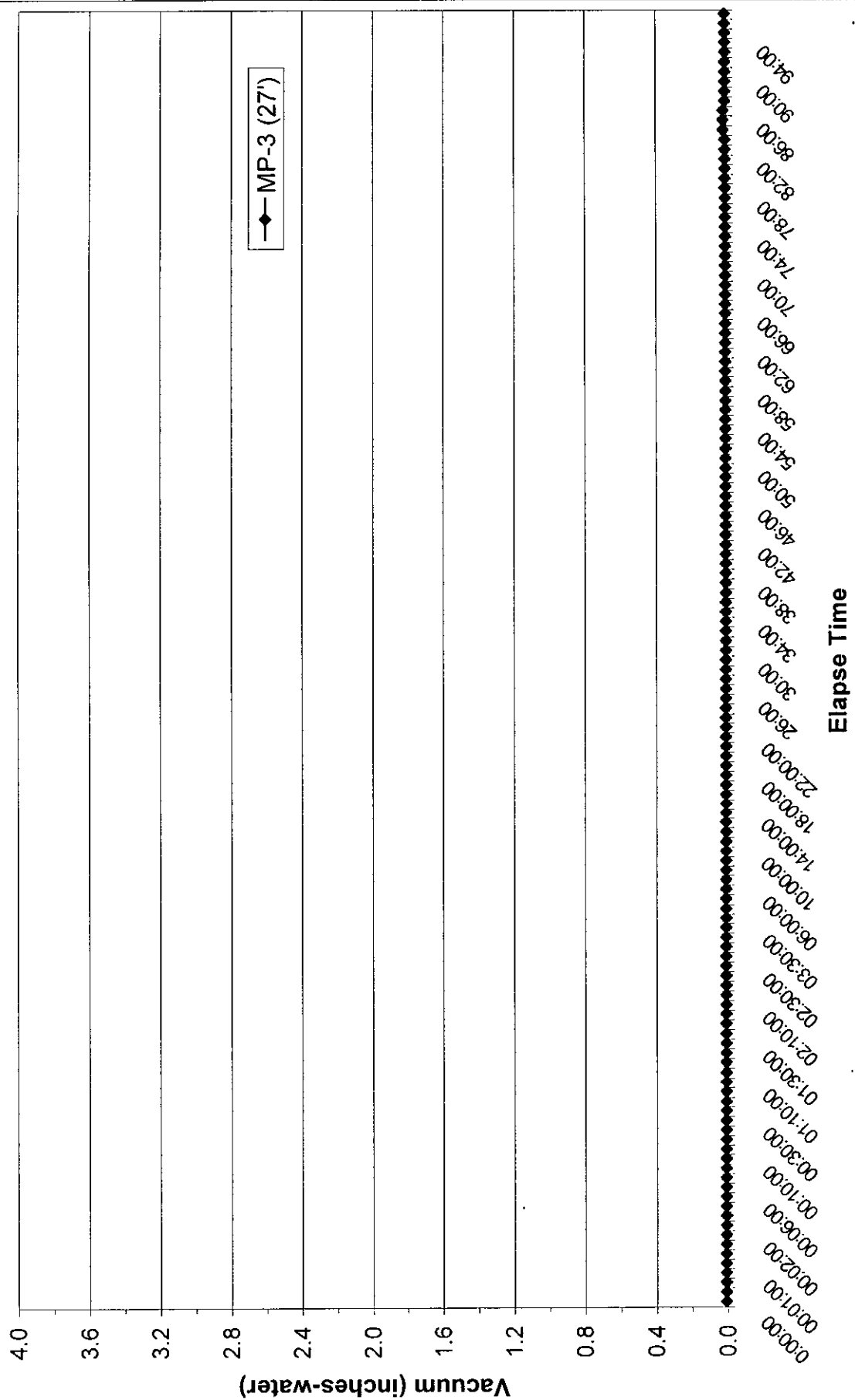
Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-2 (71') - Test 2- Vacuum Vs. Time



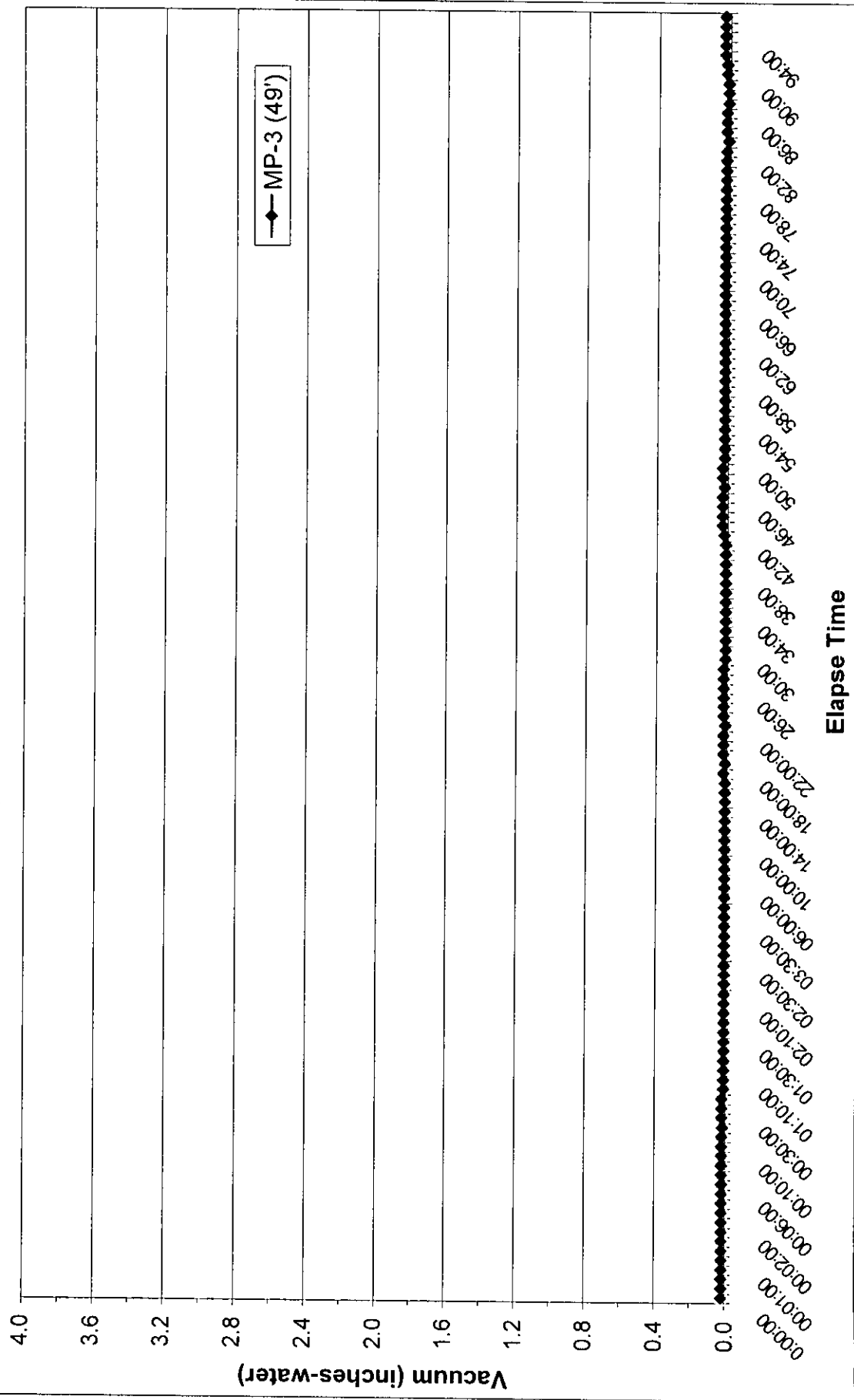
Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-3 (11') - Test 2- Vacuum Vs. Time



Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
 MP-3 (27') - Test 2- Vacuum Vs. Time

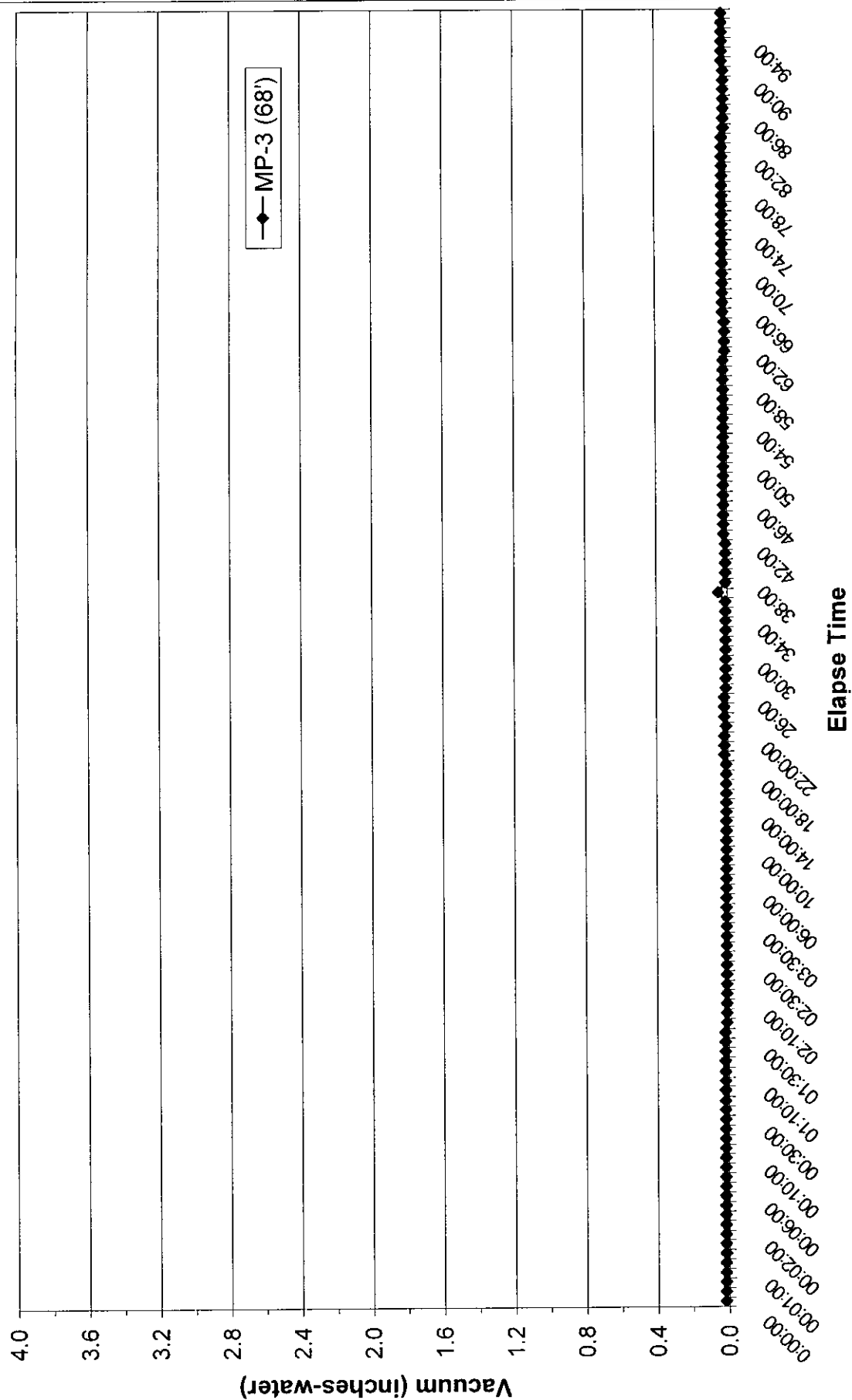


Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-3 (49') - Test 2- Vacuum Vs. Time

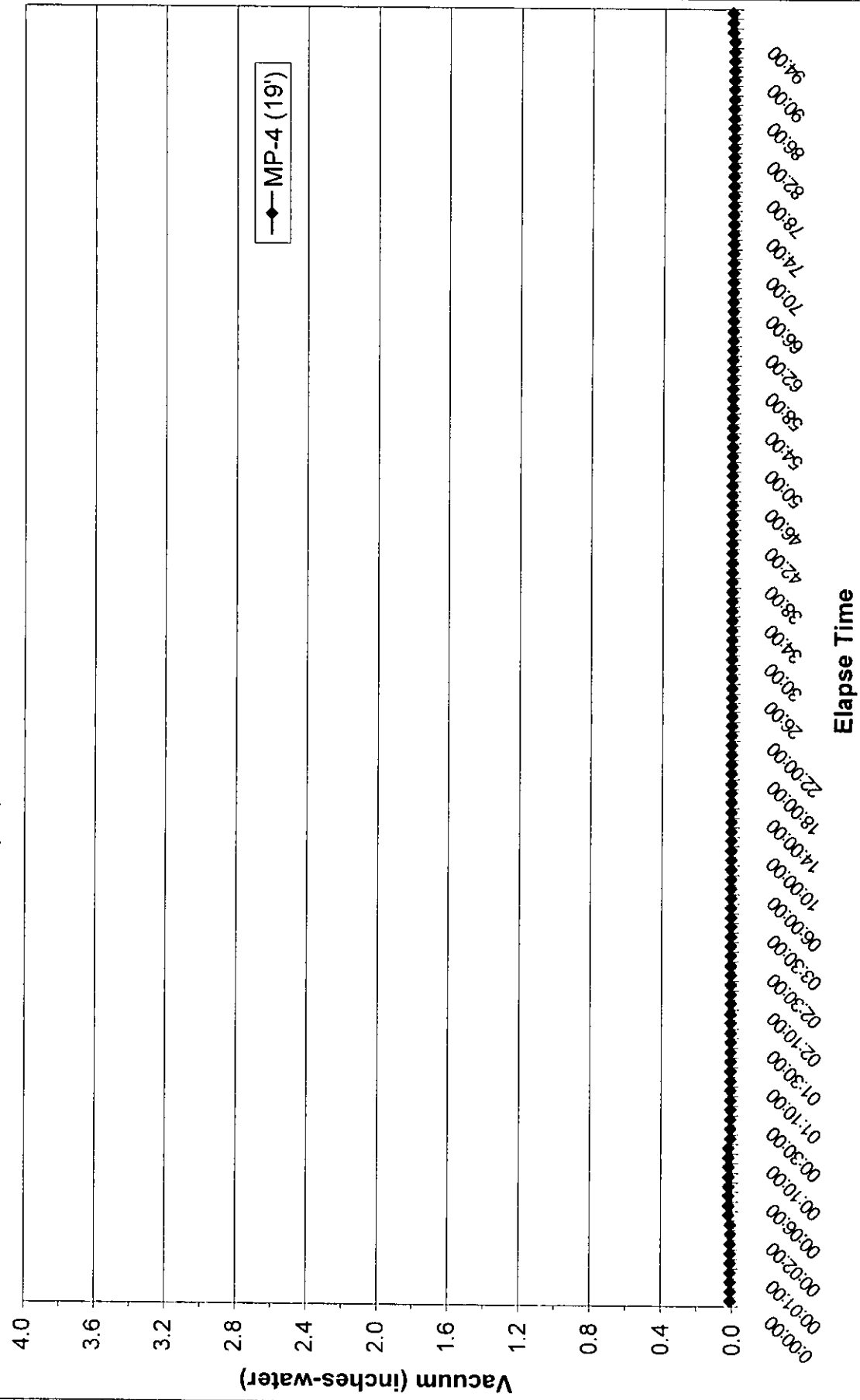


Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)

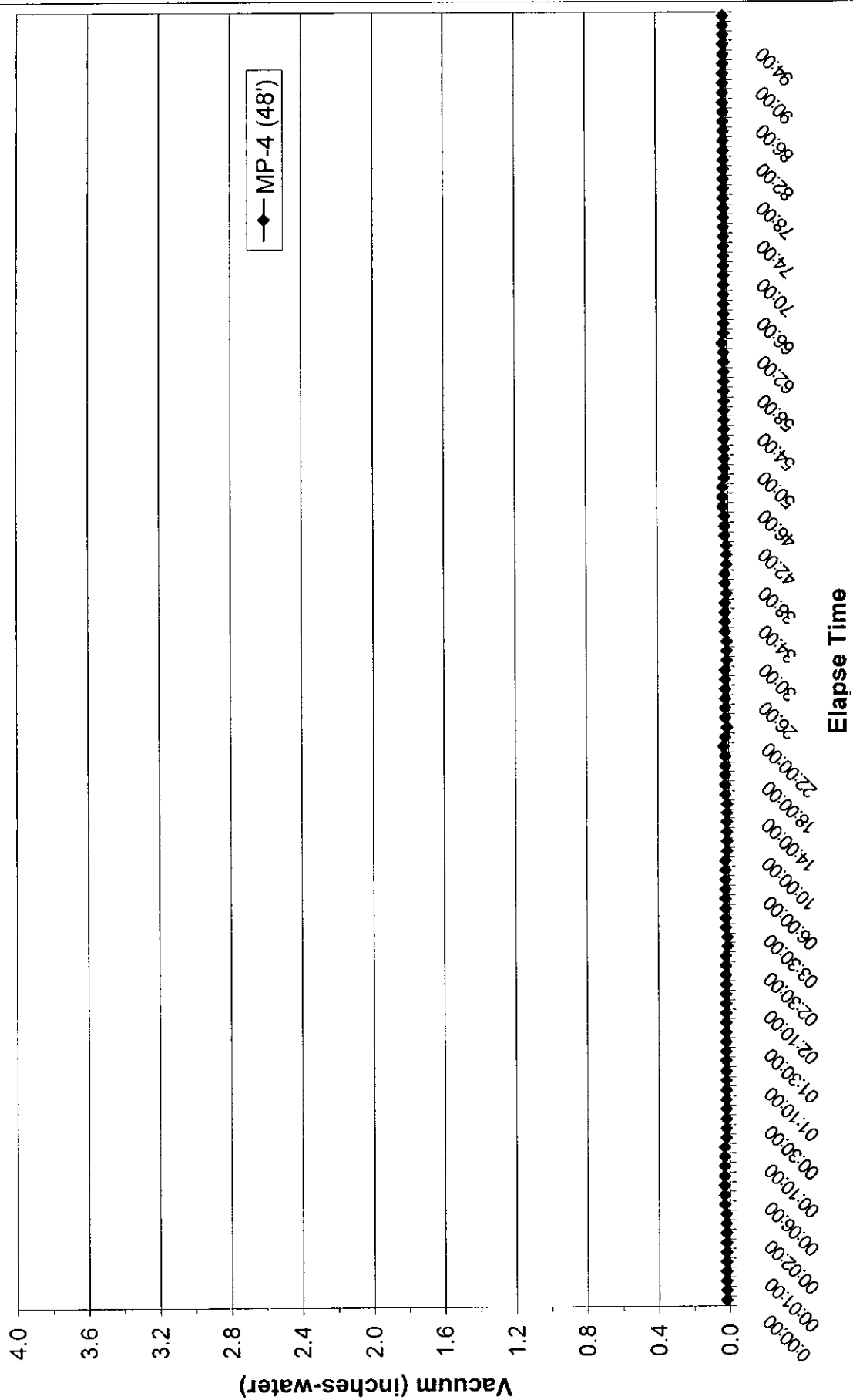
MP-3 (68') - Test 2- Vacuum Vs. Time



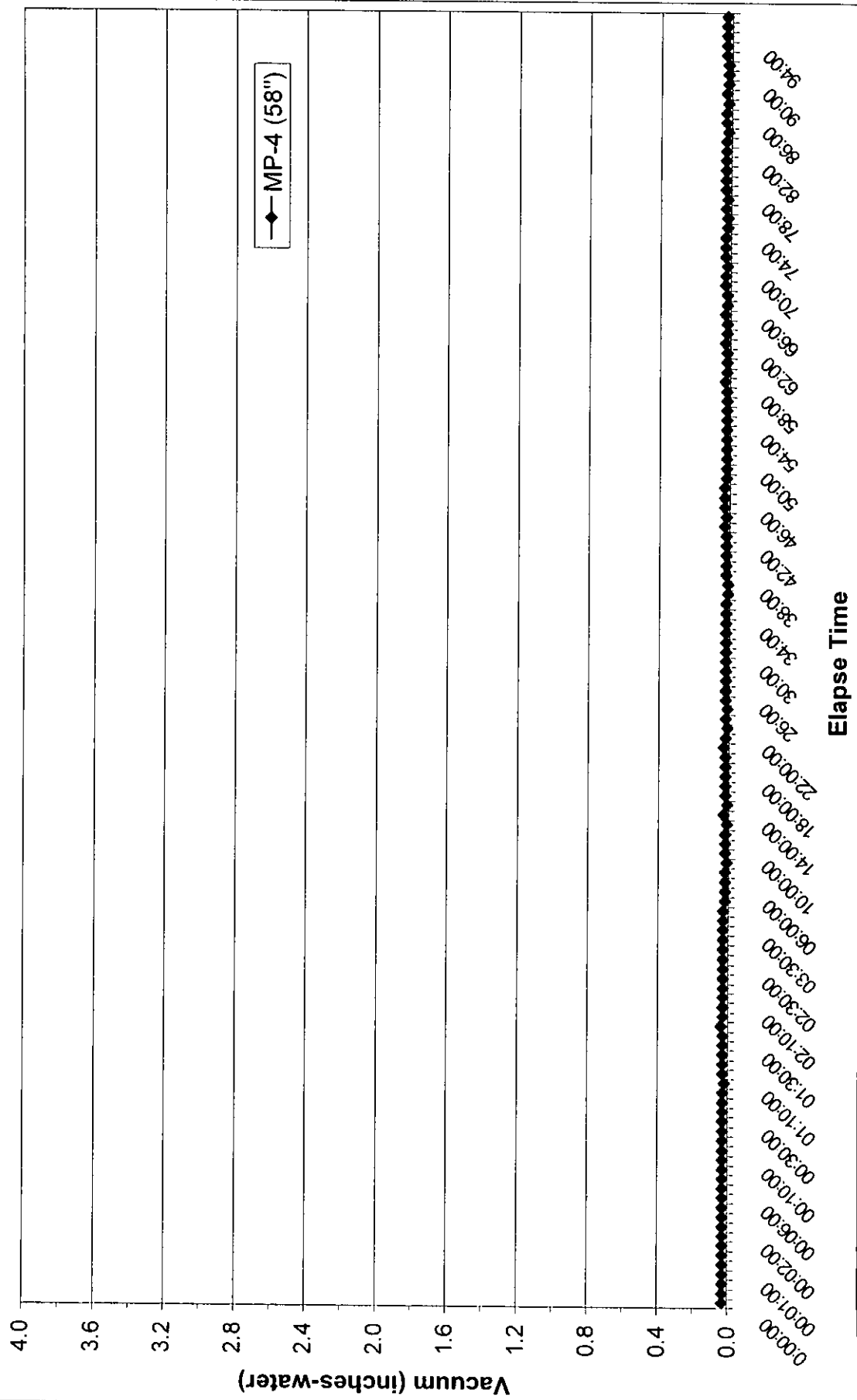
Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-4 (19') - Test 2- Vacuum Vs. Time



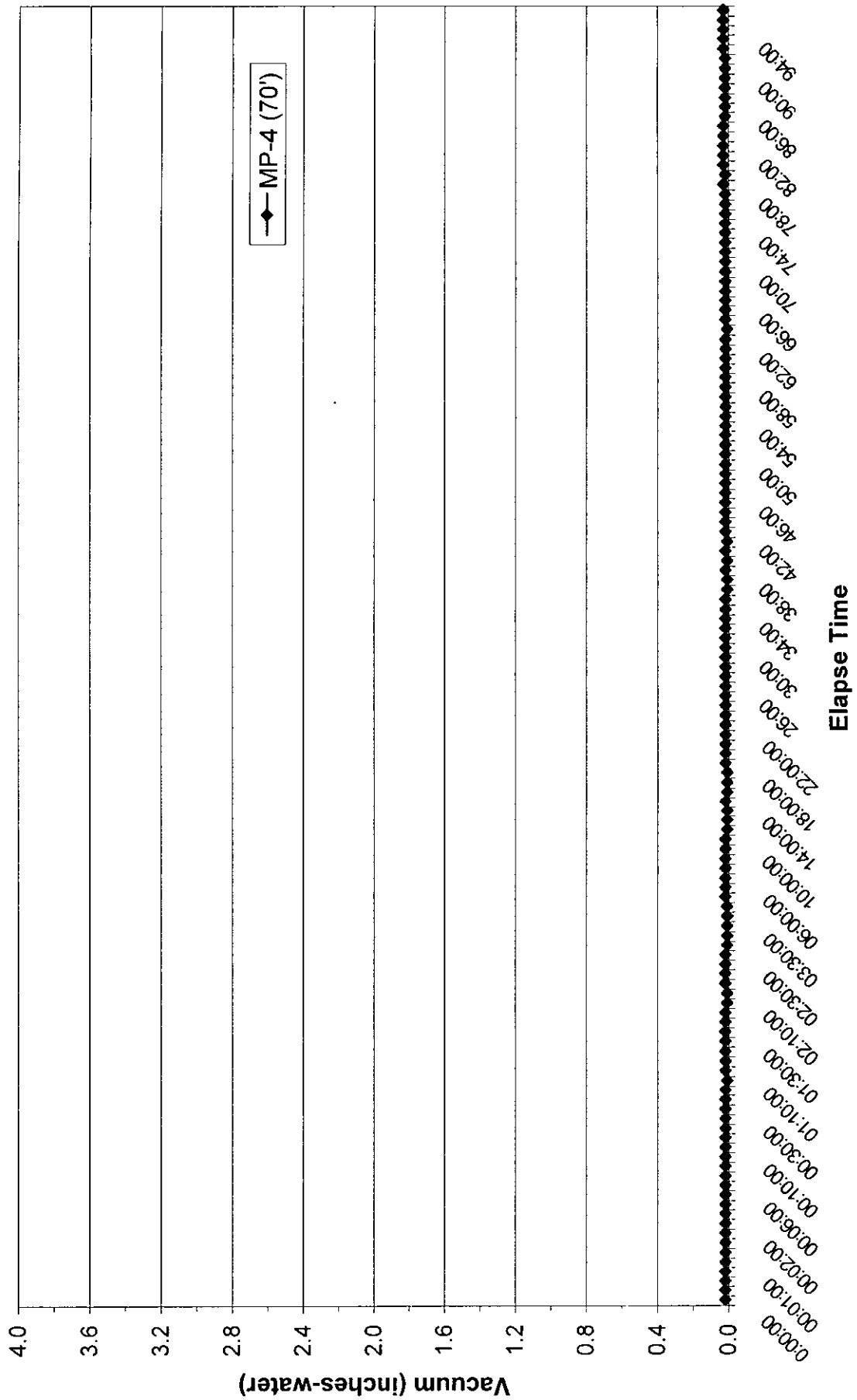
Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-4 (48') - Test 2- Vacuum Vs. Time



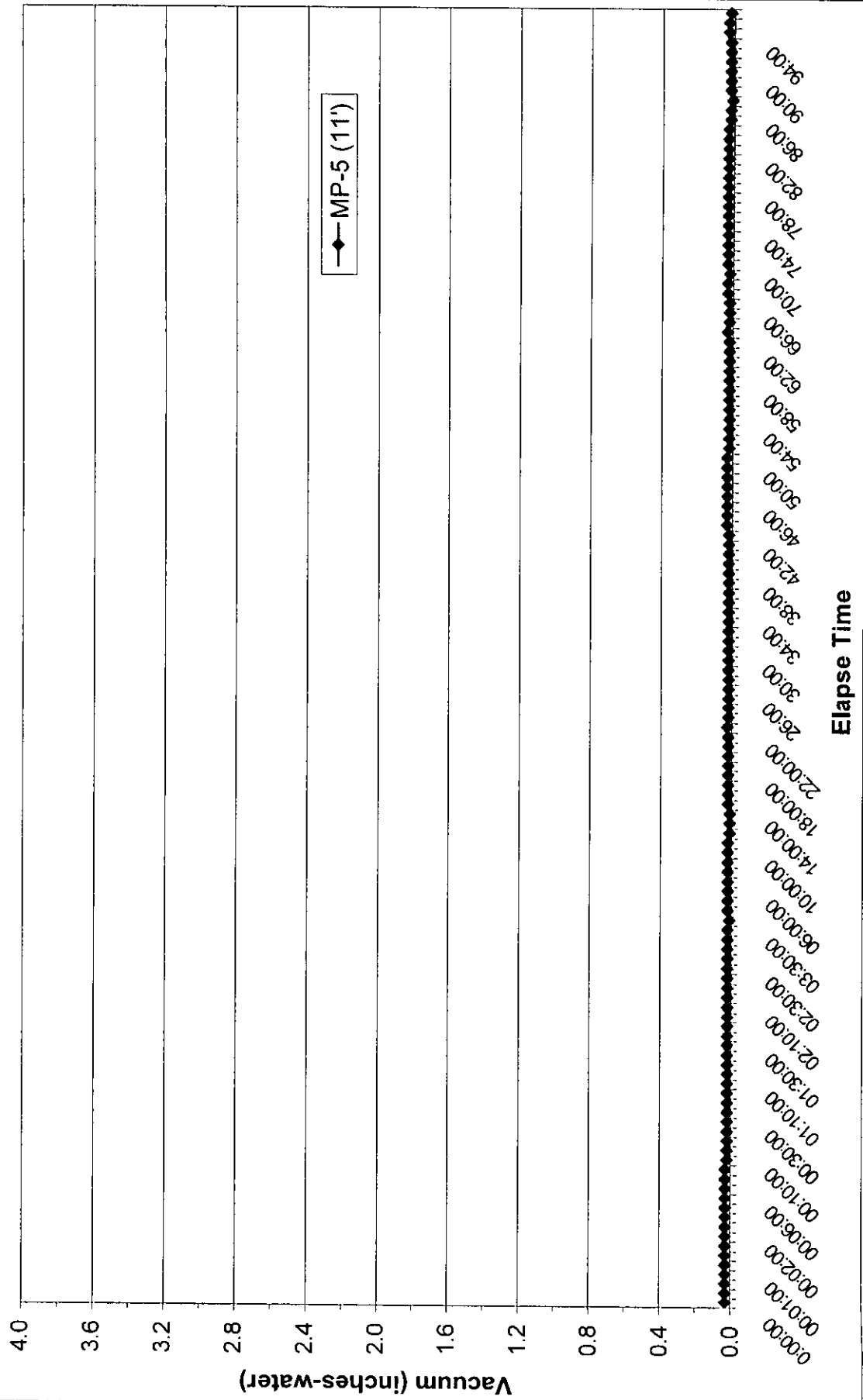
Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-4 (58') - Test 2- Vacuum Vs. Time



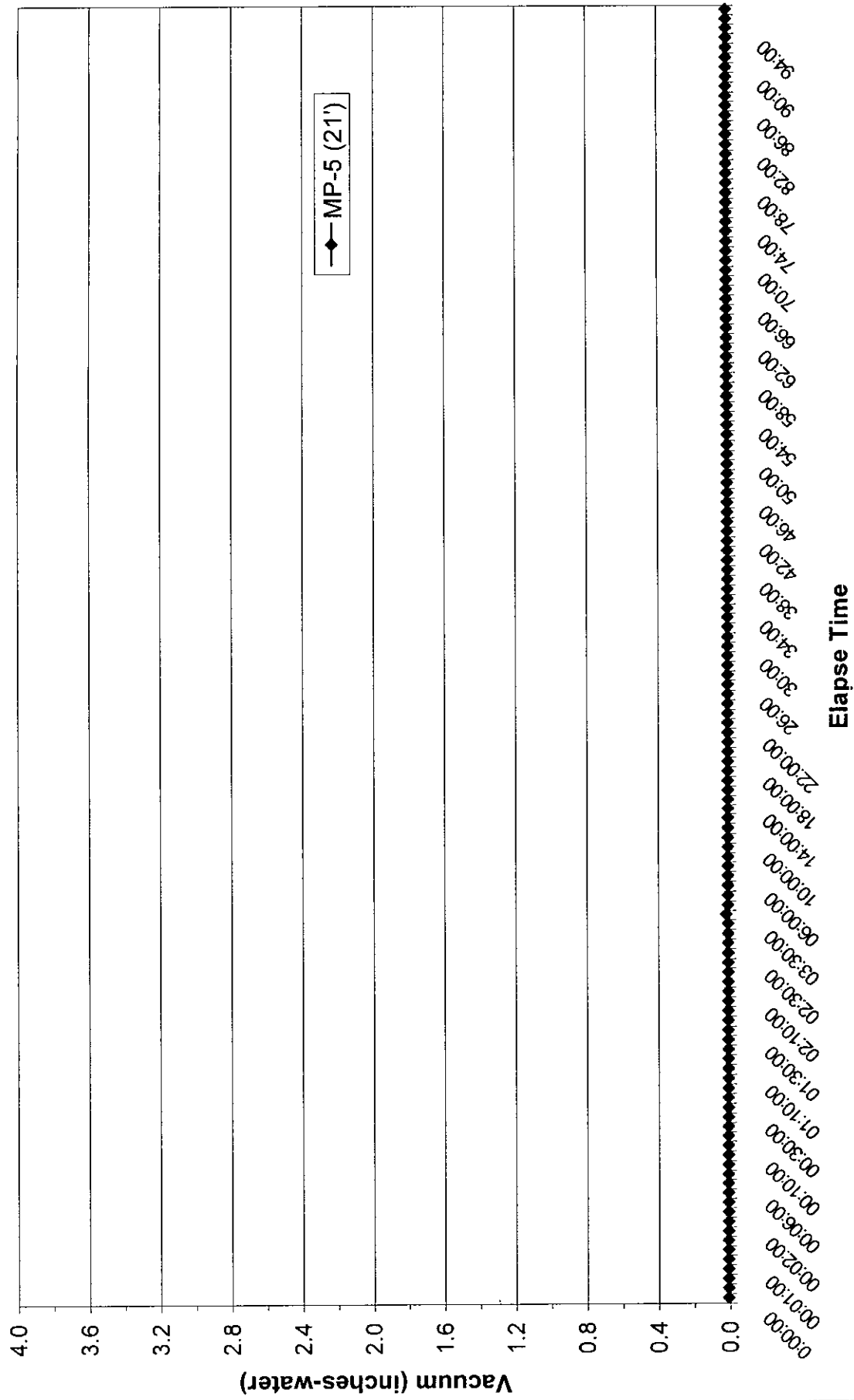
Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-4 (70') - Test 2- Vacuum Vs. Time



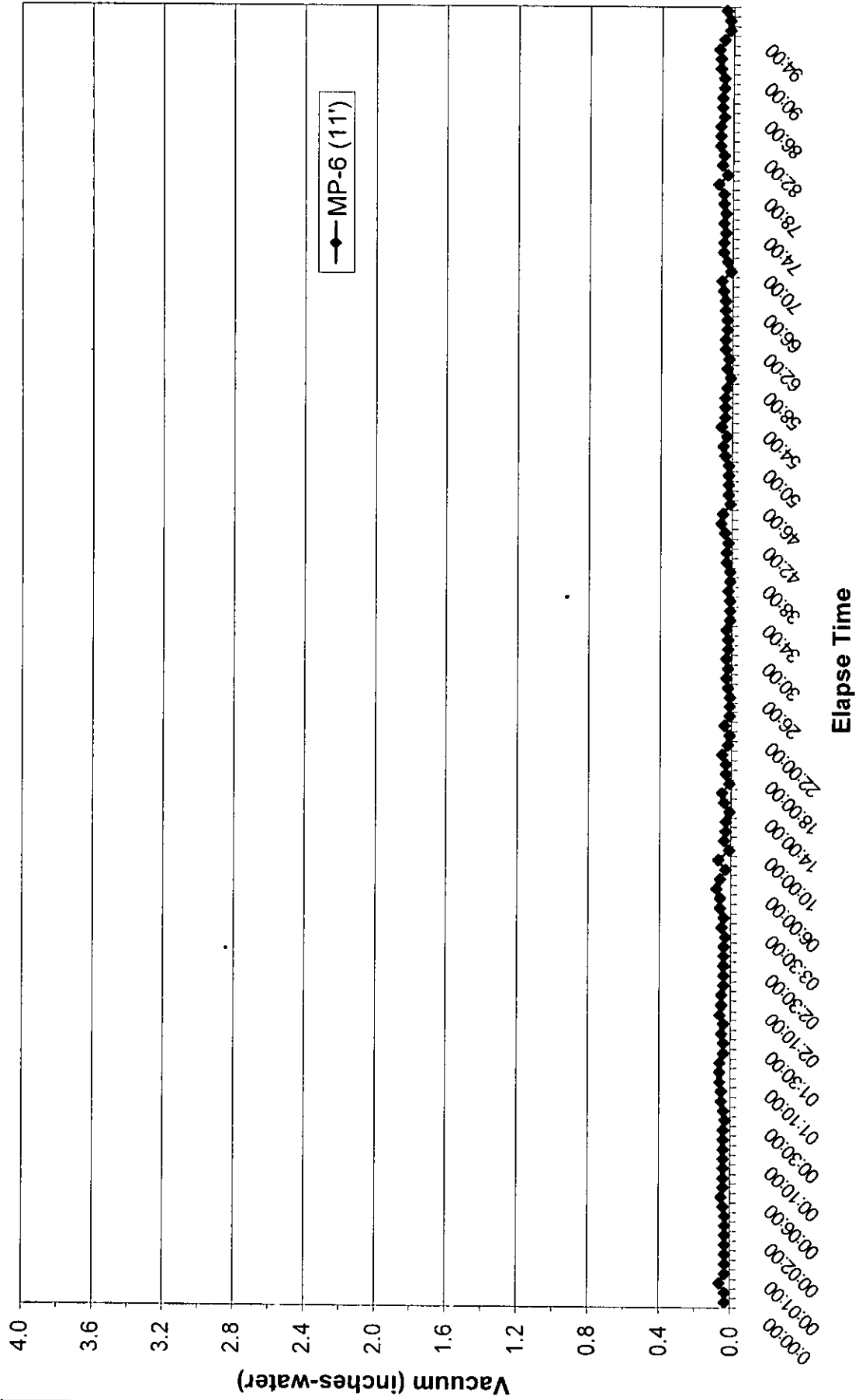
Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-5 (11') - Test 2- Vacuum Vs. Time



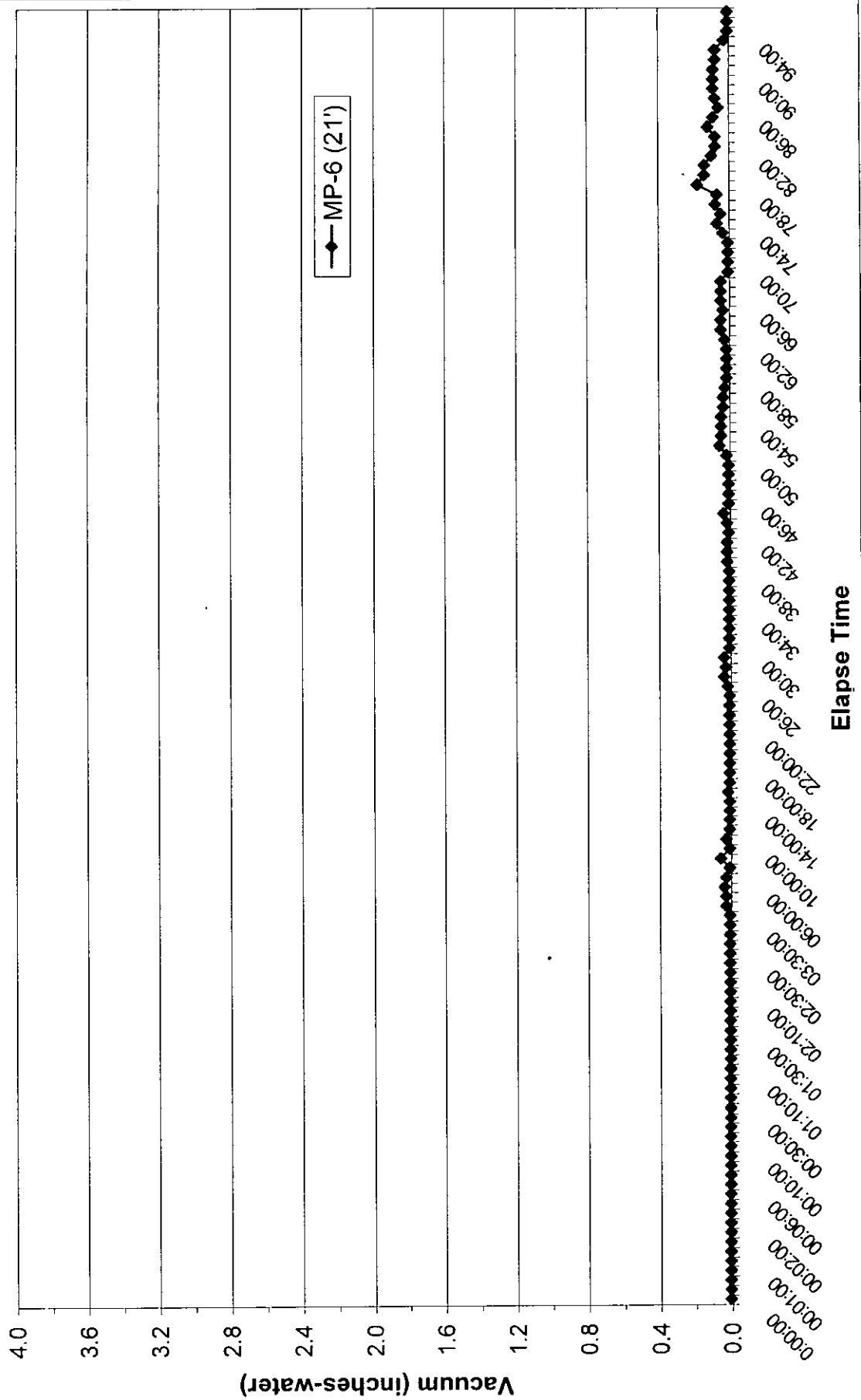
Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-5 (21') - Test 2- Vacuum Vs. Time



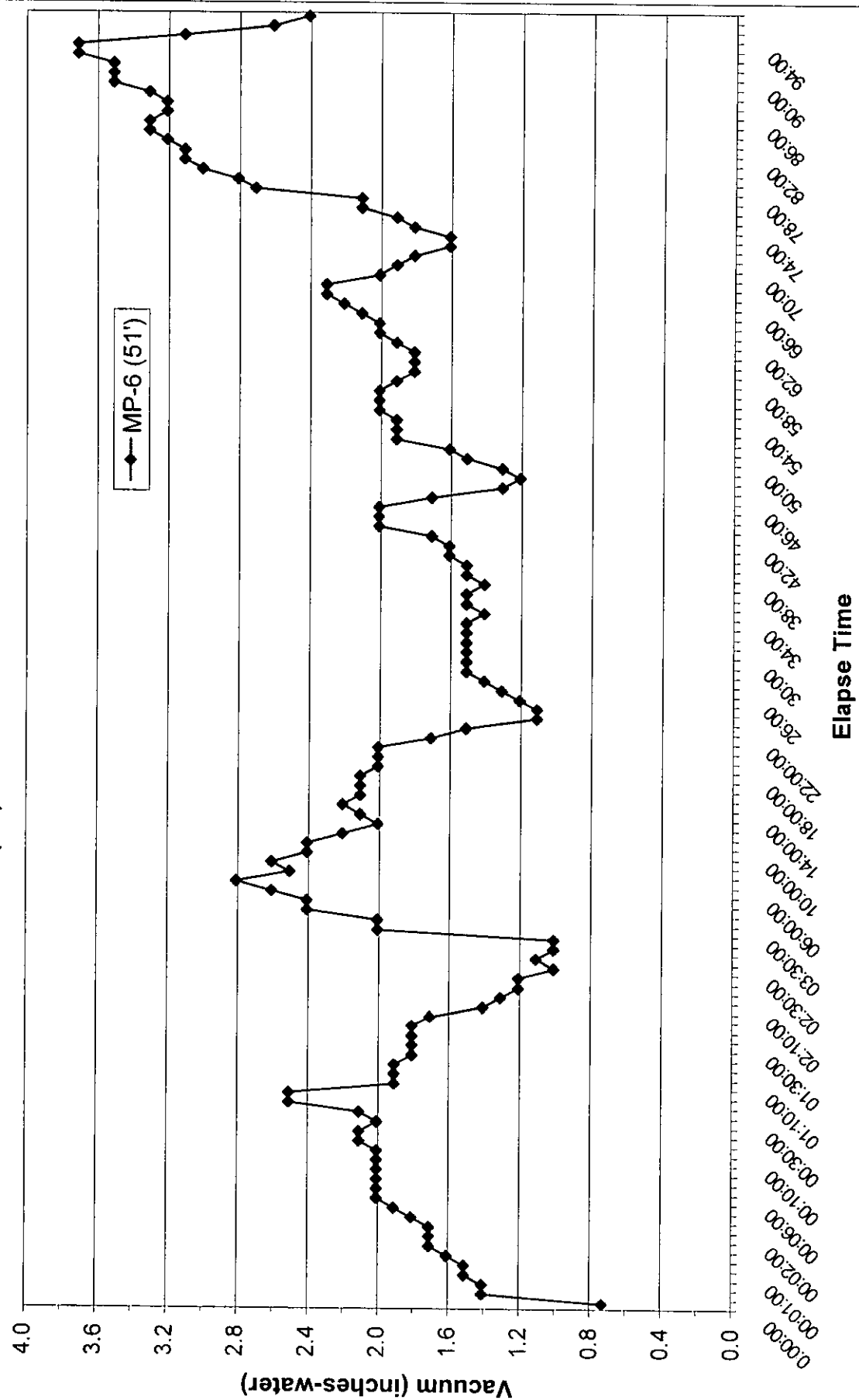
Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-6 (11') - Test 2- Vacuum Vs. Time



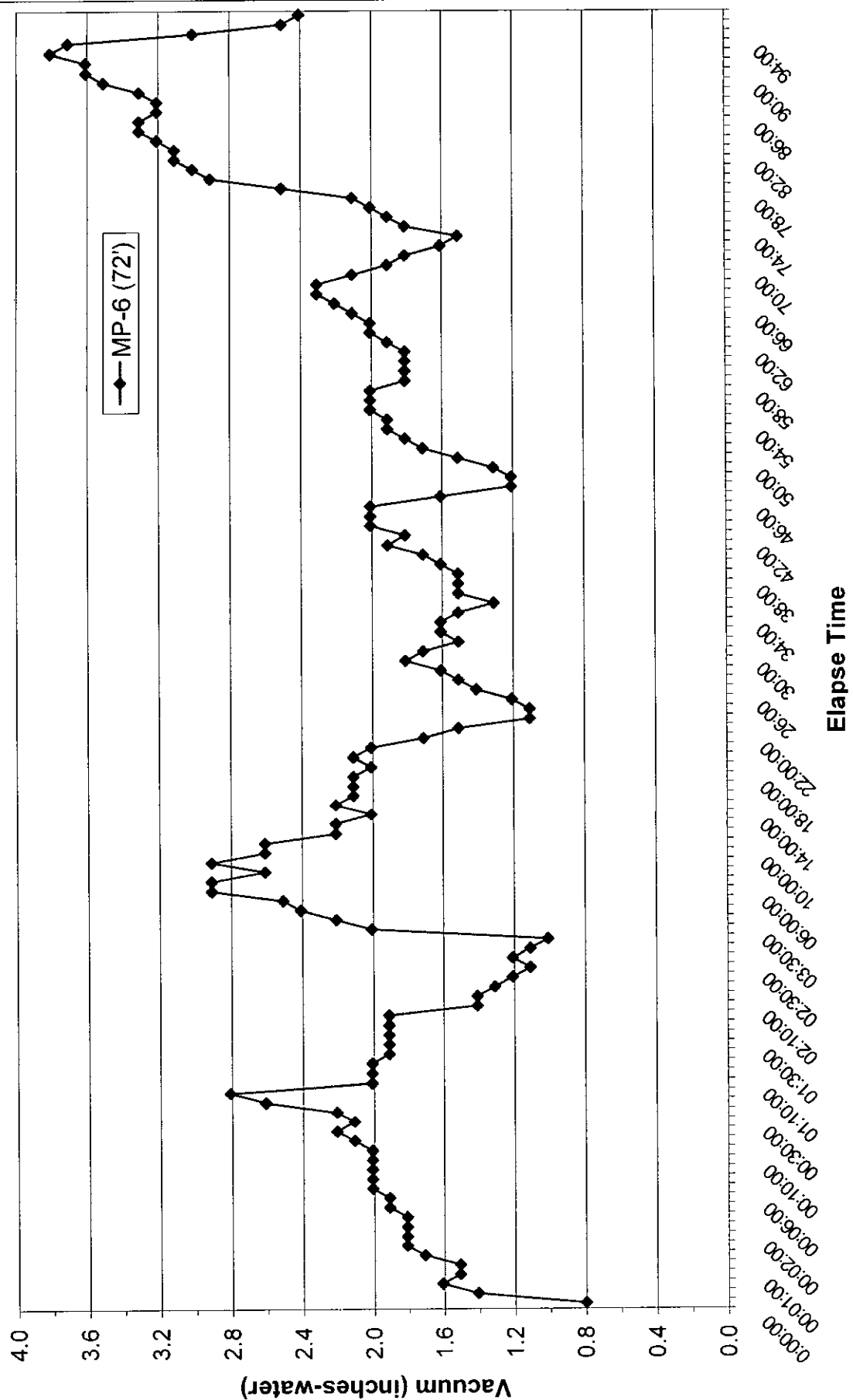
Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-6 (21') - Test 2- Vacuum Vs. Time



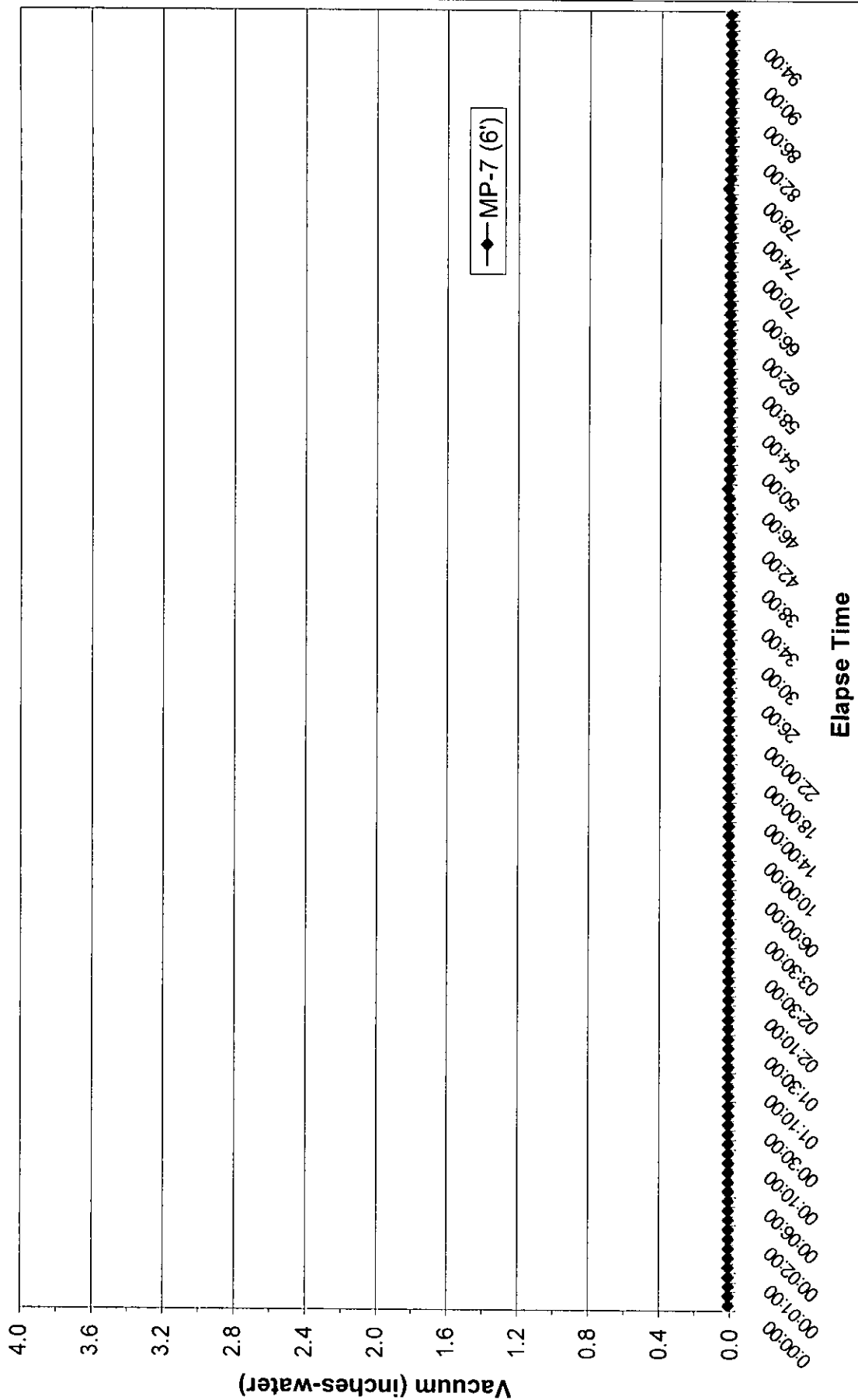
Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-6 (51') - Test 2- Vacuum Vs. Time



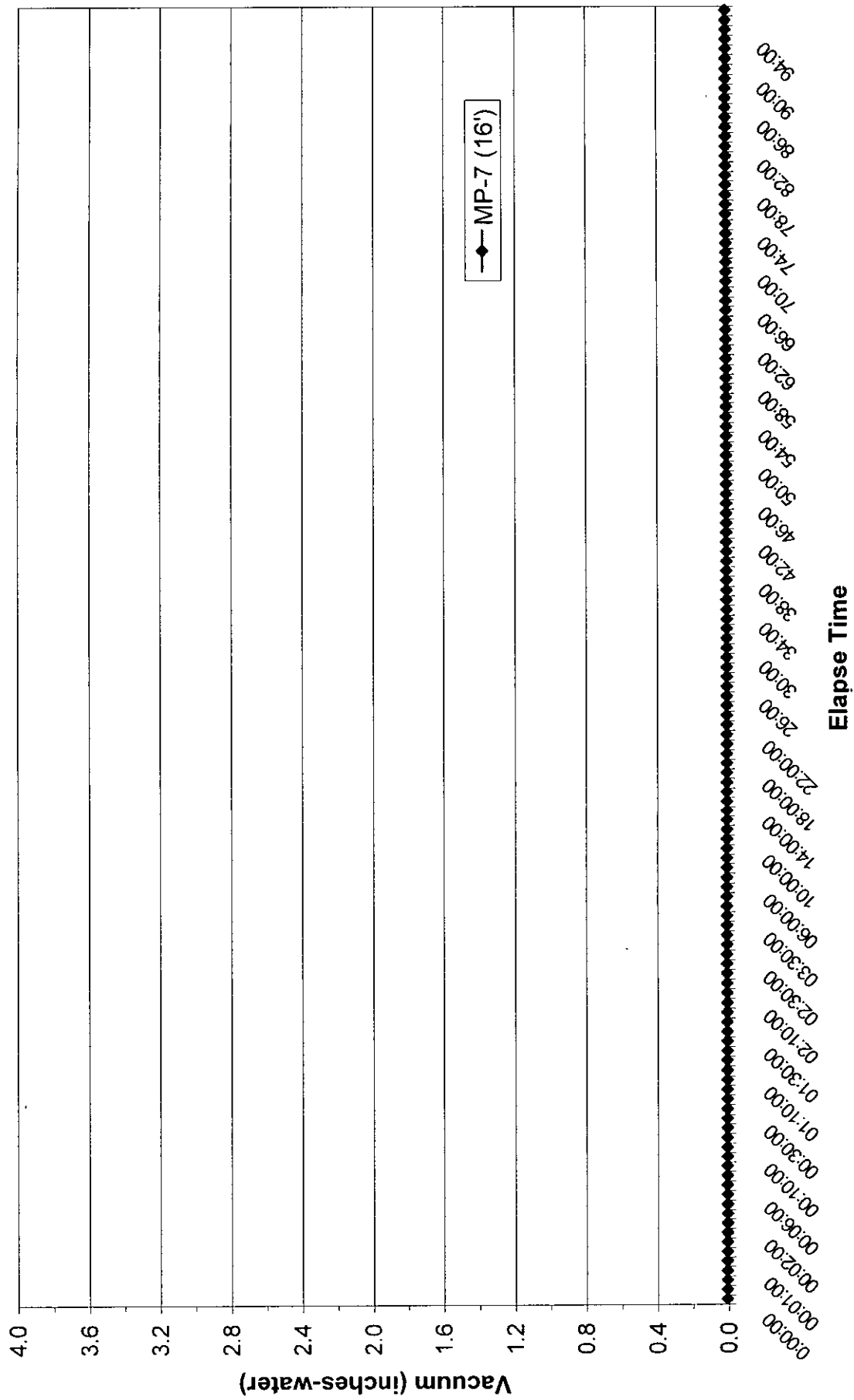
Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-6 (72') - Test 2- Vacuum Vs. Time



Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-7 (6') - Test 2- Vacuum Vs. Time

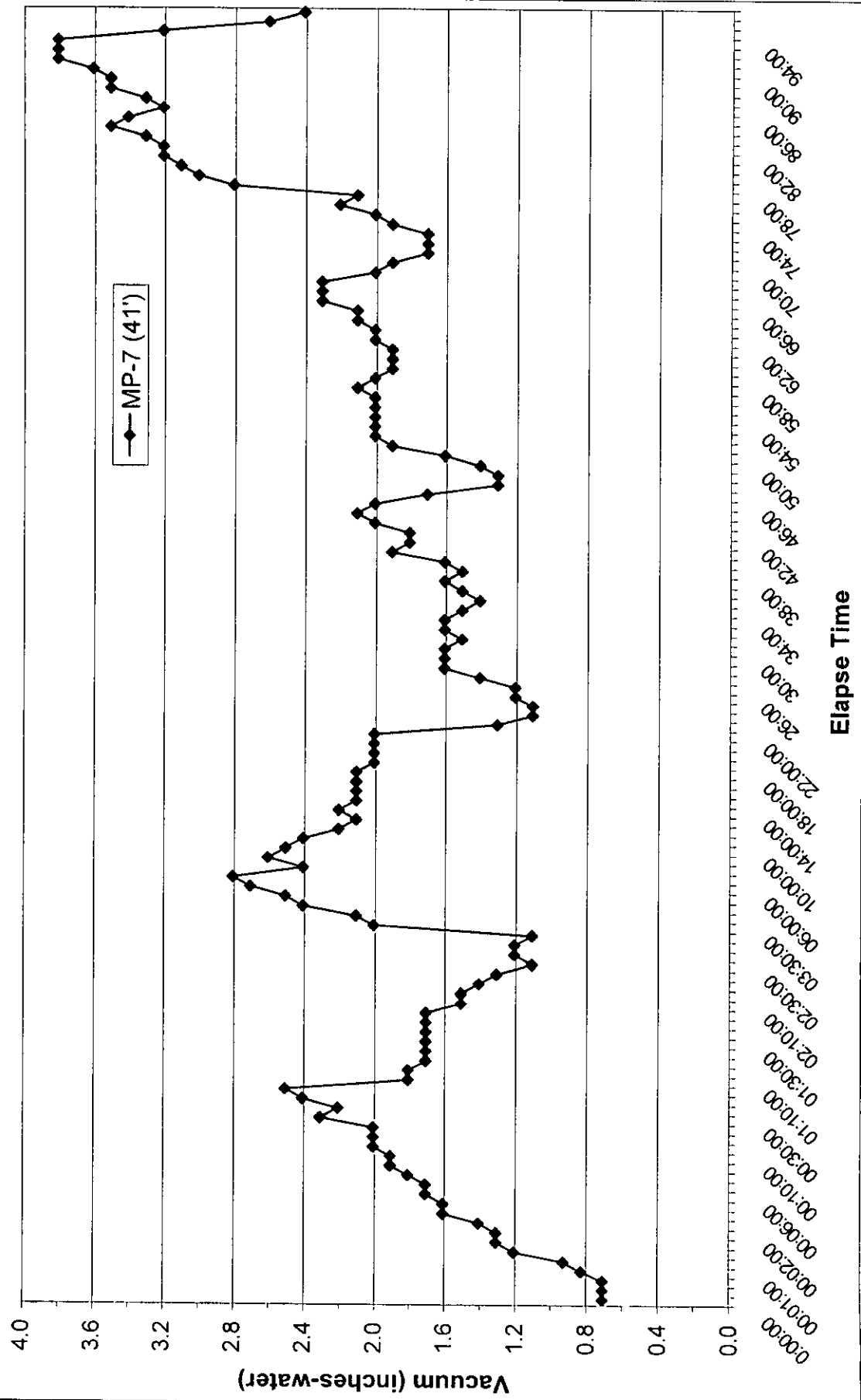


Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-7 (16") - Test 2- Vacuum Vs. Time

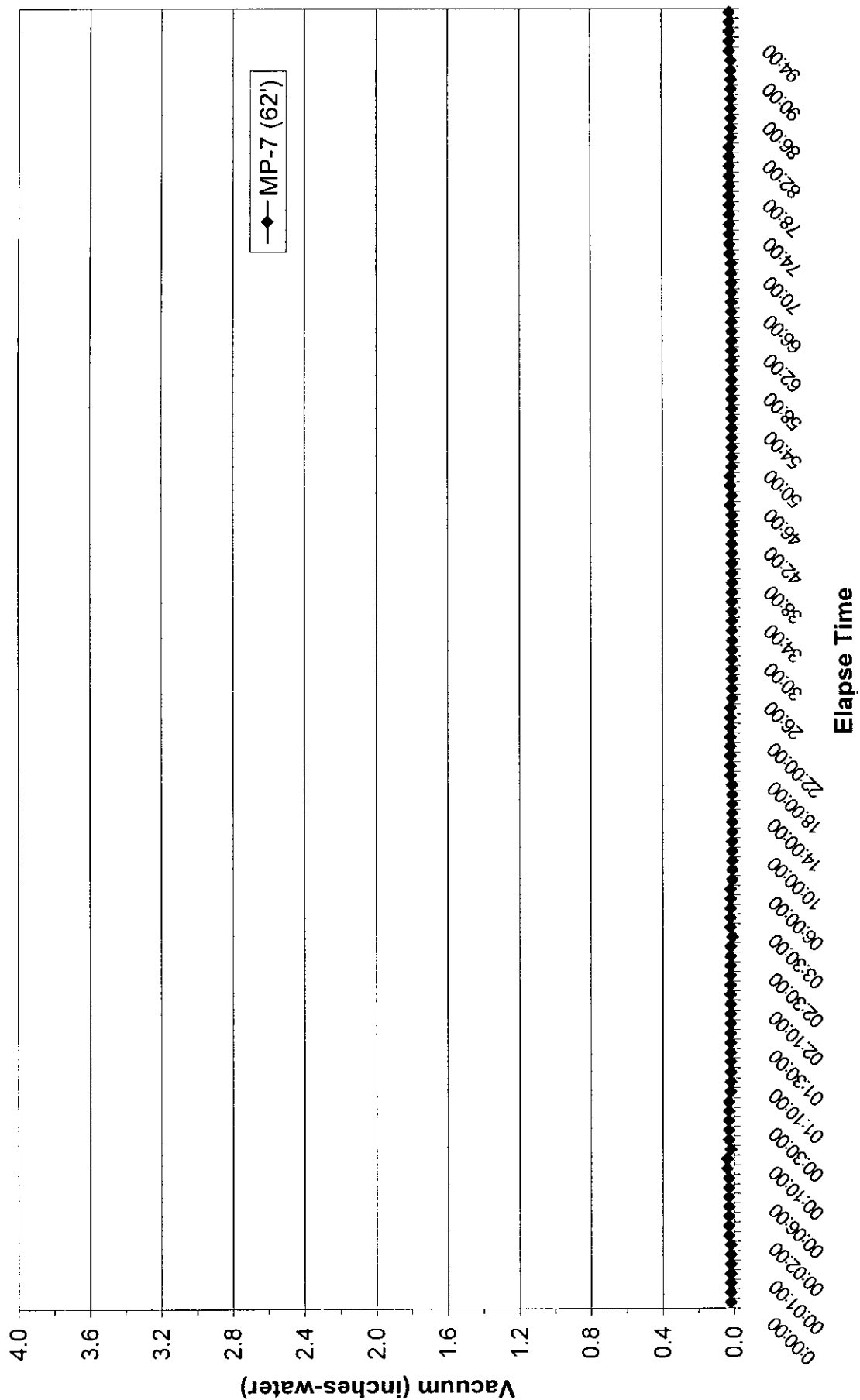


889 607

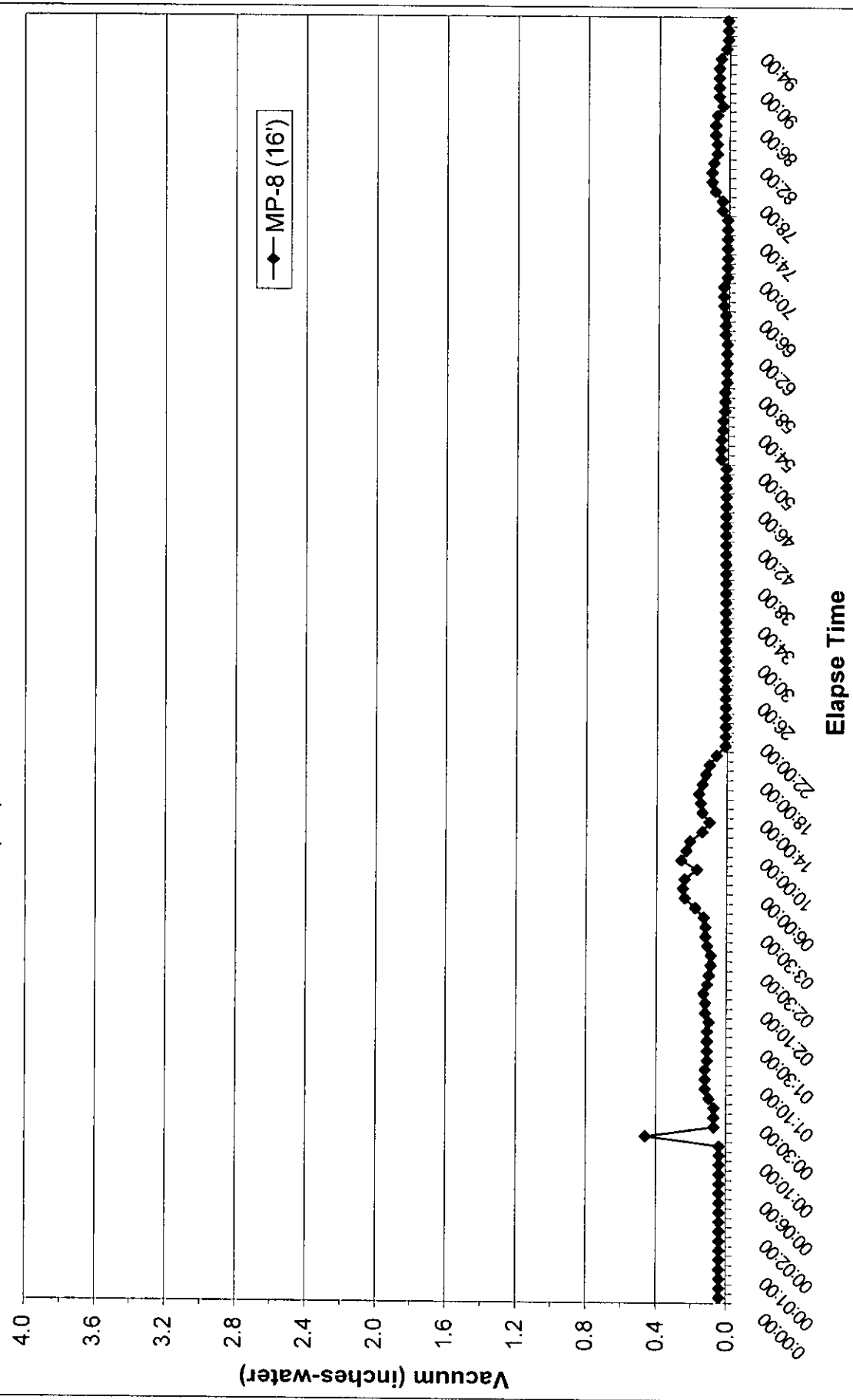
Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
 MP-7 (41') - Test 2- Vacuum Vs. Time



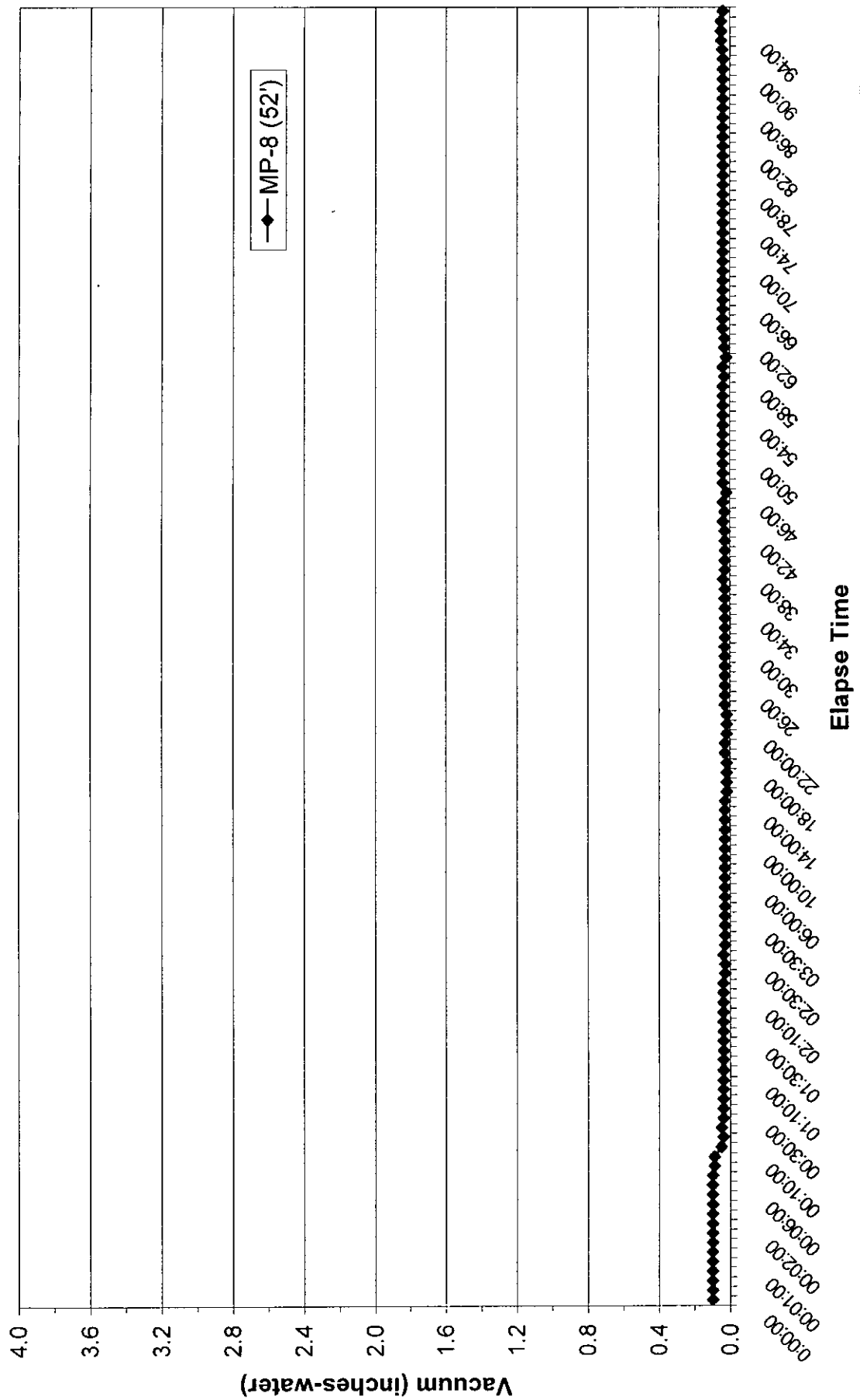
Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-7 (62') - Test 2- Vacuum Vs. Time



Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-8 (16') - Test 2- Vacuum Vs. Time

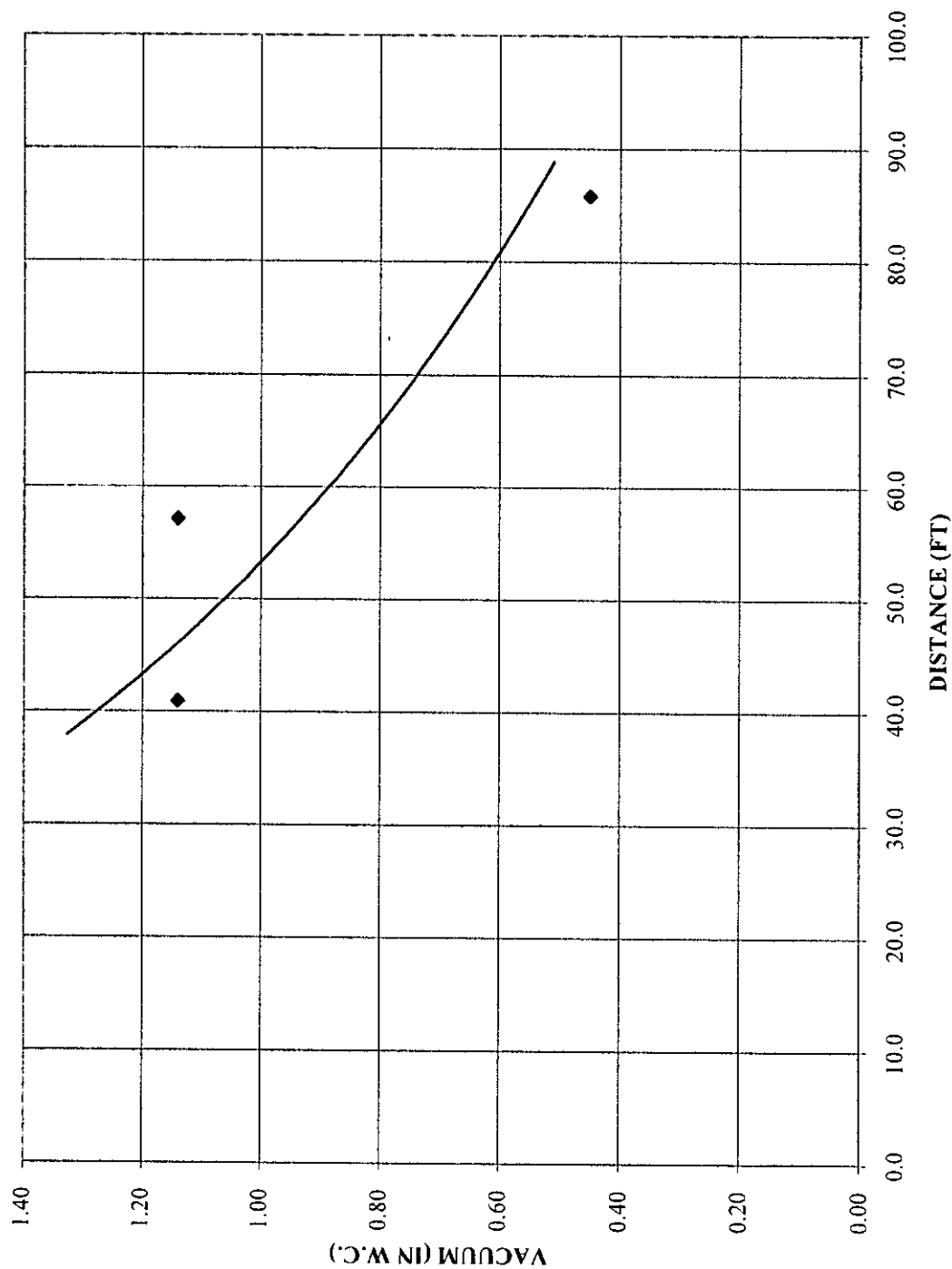


Memphis Depot - Dunn Field SVE TS (VW-2, January 2002)
MP-8 (52') - Test 2- Vacuum Vs. Time

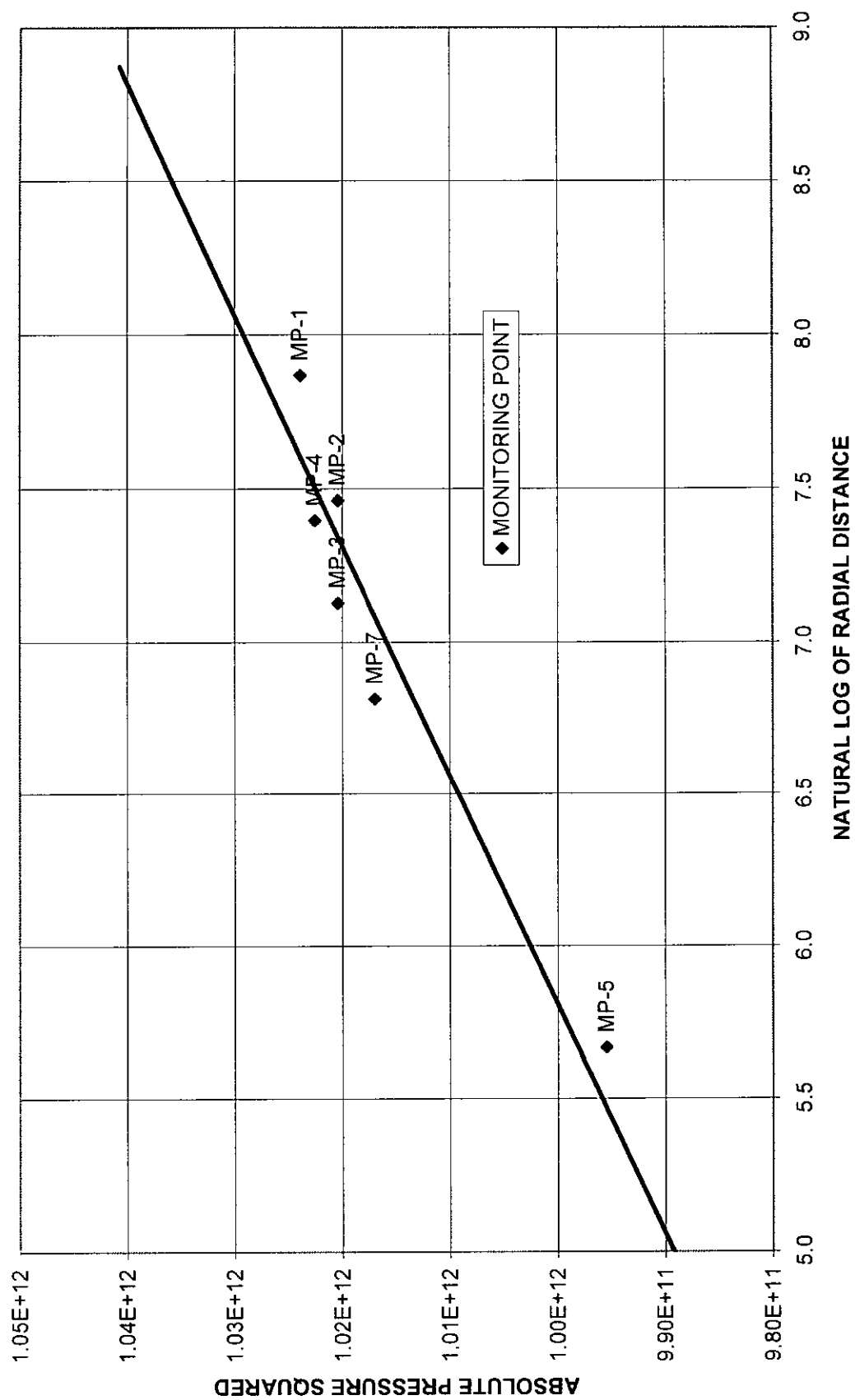


Attachment G

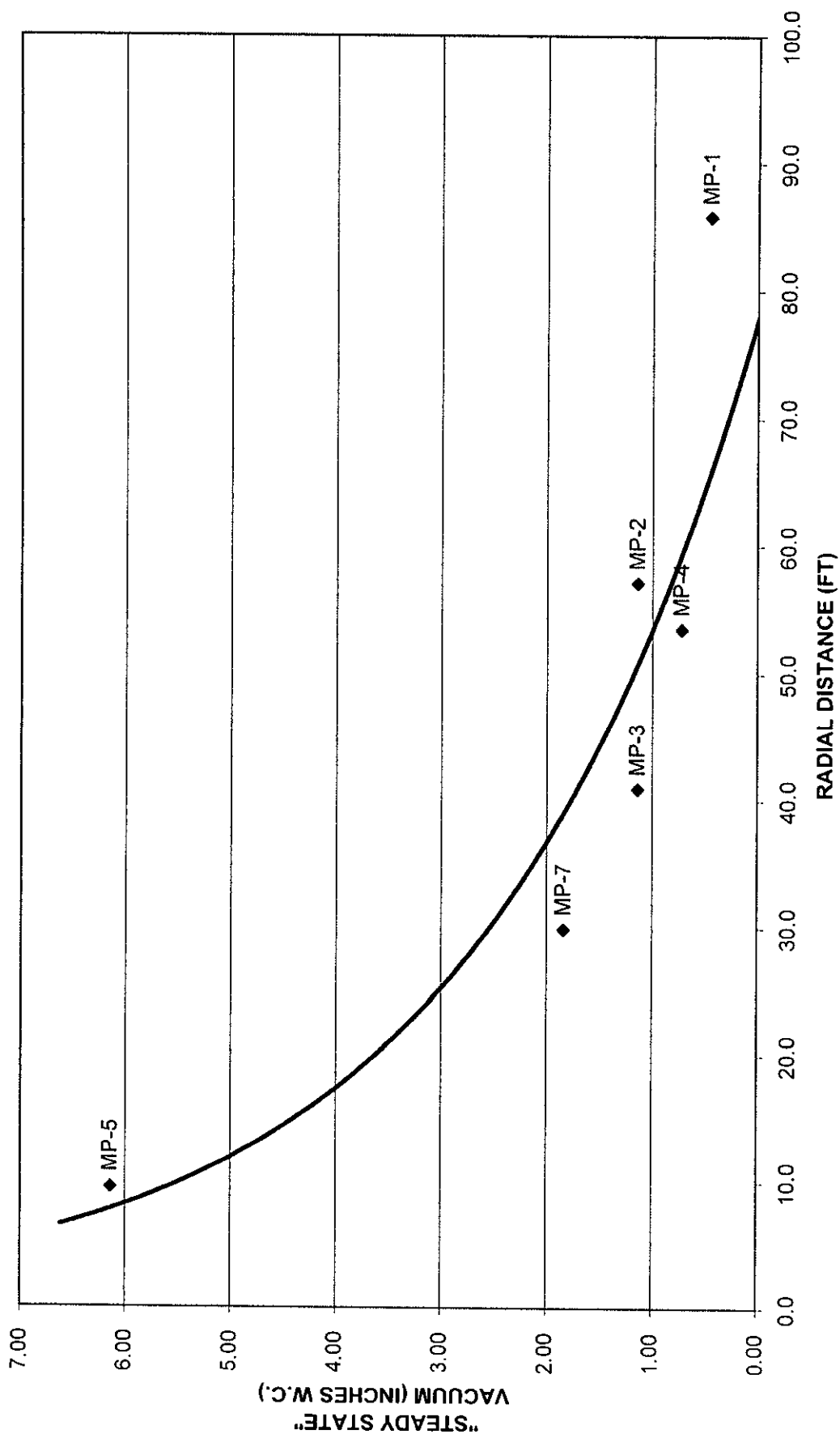
TEST 1 - SVE PILOT TEST LINEAR DATA PLOT



TEST 1 - REGRESSION SOLUTION PLOT



TEST 1 - LINEAR DATA PLOT



889 616

SOIL VAPOR EXTRACTION PILOT TEST DATA "STEADY STATE" SOLUTION - TEST 1

Location Memphis Depot, Dunn Field

Client U S Army Engineering and Support Center, Huntsville

Test Date December 18-21, 2001

Vapor Extraction Well: VW-1

Monitoring Point	Radial Distance (r) [ft]	Radial Distance (r) [cm]	ln(r)	Steady-State Vacuum [in H2O]	Absolute Pressure (P) [g/cm s^2]	P^2	Regrssn P^2
MP-1	85.8	2615.18	7.87	0.45	1011880.85	1.02E+12	1.03E+12
MP-2	57.1	1740.41	7.46	1.14	1010164.82	1.02E+12	1.02E+12
MP-3	40.9	1246.63	7.13	1.14	1010164.82	1.02E+12	1.02E+12
MP-4	53.5	1630.68	7.40	0.72	1011209.36	1.02E+12	1.02E+12
MP-5	9.5	289.56	5.67	6.14	997729.82	9.95E+11	9.98E+11
MP-7	29.9	911.35	6.81	1.84	1008423.92	1.02E+12	1.01E+12

$$P(r) = P_w \left[1 + \frac{1}{P_w^2} (P_w^2 - P_{atm}^2) \ln(r/R_w) / \ln(R_w/R_i) \right]^{1/2}$$

$$P(r) = \text{absolute pressure at radius } r$$

$$r = \text{radial distance from extraction well}$$

$$P_w = \text{absolute pressure at the extraction well}$$

$$= P_{atm} - \text{vacuum}$$

$$P_{atm} = \text{absolute ambient atmospheric pressure}$$

$$R_w = \text{radius of extraction well}$$

$$R_i = \text{radius of influence of extraction well}$$

$$P(r)^2 = \frac{(P_w^2 - P_{atm}^2) \ln(r)}{\ln(R_w/R_i)} - \frac{\ln(R_w)(P_w^2 - P_{atm}^2)}{\ln(R_w/R_i)} + P_w^2$$

$$P(r)^2 = m \cdot \ln(r) + b$$

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.96
R Square	0.92
Adjusted R Square	0.90
Standard Error	3.34E+09
Observations	6.00

ANOVA

	df	SS	MS	F	Significance F
Regression	1.00	5.20E+20	5.20E+20	46.62	0.00
Residual	4.00	4.46E+19	1.12E+19		
Total	5.00	5.65E+20			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	9.23E+11	1.38E+10	66.68	0.00	8.84E+11	9.61E+11	8.84E+11	9.61E+11
X Variable 1	1.33E+10	1.95E+09	6.83	0.00	7.91E+09	1.87E+10	7.91E+09	1.87E+10

$$R_i = 1629.2 \text{ cm}$$

$$R_i = 53.5 \text{ ft}$$

SOIL VAPOR EXTRACTION PILOT TEST DATA "STEADY STATE" SOLUTION - TEST 1

Location: Memphis Depot, Dunn Field

Client: U S Army Engineering and Support Center, Huntsville

Test Date: December 18-21, 2001

Vapor Extraction Well VW-1

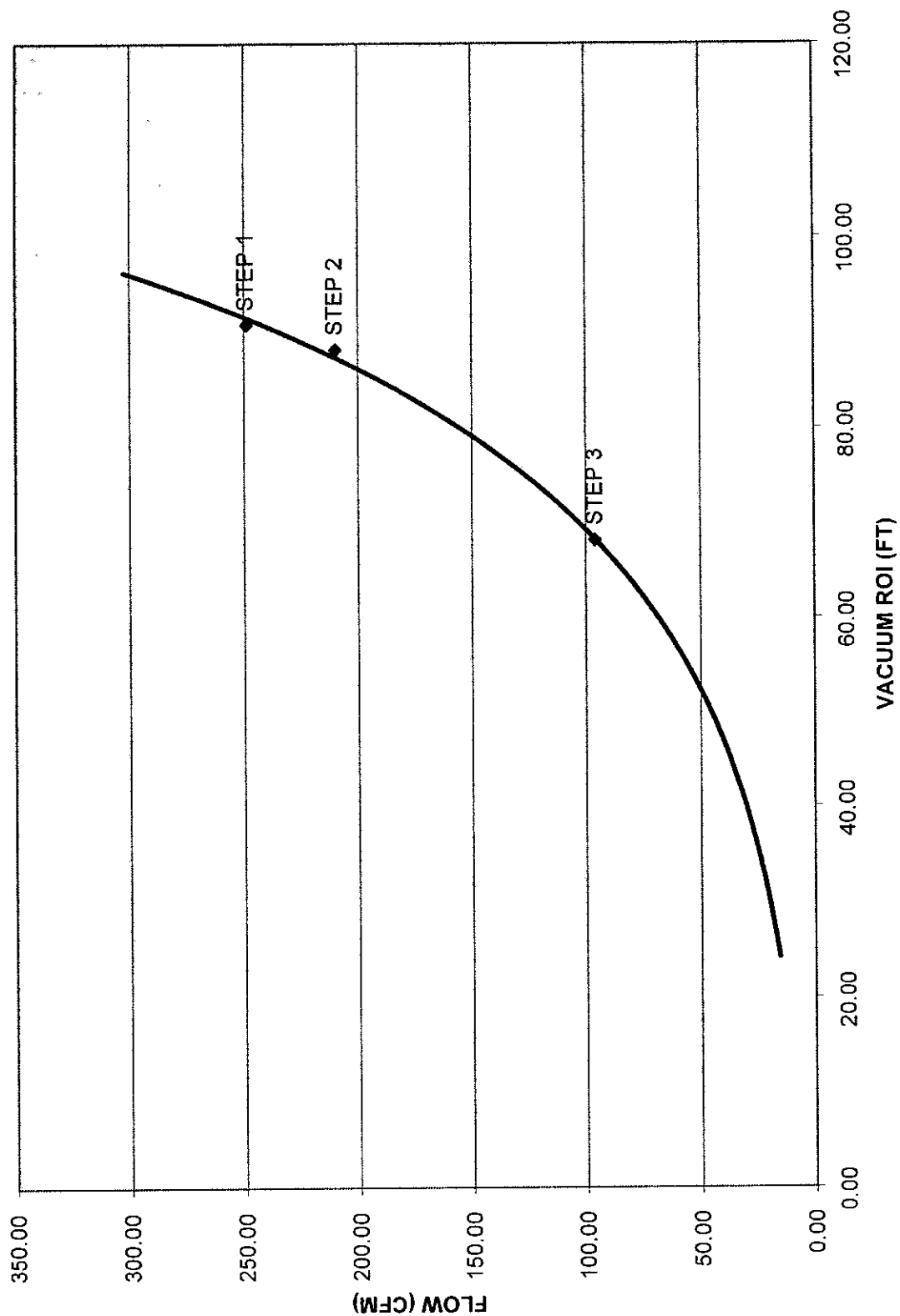
$$Q = \frac{H \cdot P_i \cdot (k/u) \cdot P_w \cdot [1 - (P_{atm}/P_w)^2]}{\ln(R_w/R_i)} \quad 2)$$

Q = volumetric vapor flow rate from well
 H = well screen thickness
 P_i = 3.142
 k = soil permeability to air flow
 u = viscosity of extracted vapor
 P_w = absolute pressure at the extraction well
 = P_{atm} - vacuum
 P_{atm} = absolute ambient atmospheric pressure
 R_w = radius of extraction well
 R_i = radius of influence of extraction well

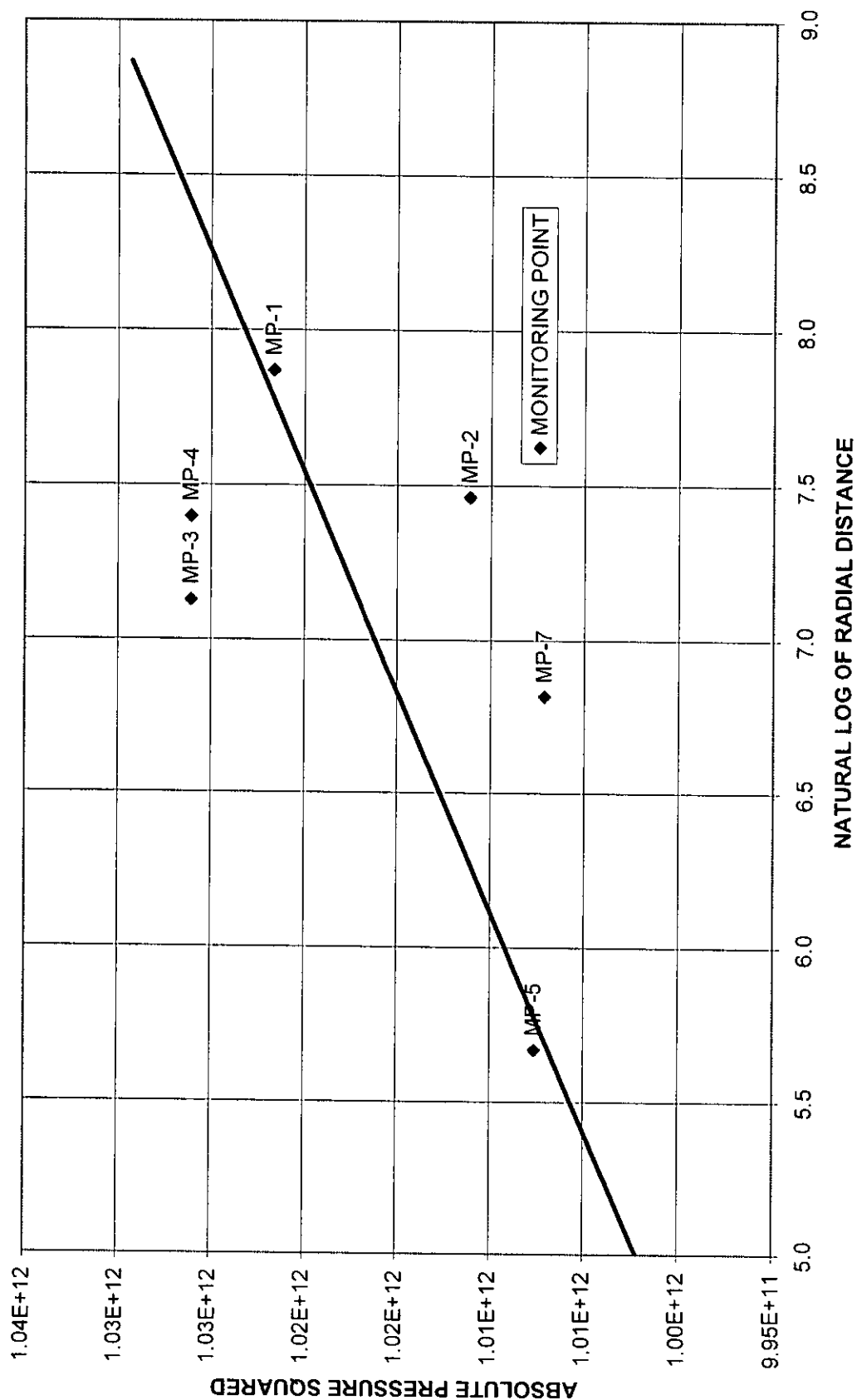
$$k = \frac{Q \cdot u \cdot \ln(R_w/R_i)}{H \cdot P_i \cdot P_w \cdot [1 - (P_{atm}/P_w)^2]}$$

H	=	457.2 [cm]
u	=	0.000180 [cm/gs]
Q	=	11443.6 [cm ³ /s]
P _w	=	251480.6 [g/cm s ²]
P _{atm}	=	1013000.0 [g/cm s ²]
R _w	=	2.54 [cm]
R _i	=	1629.2 [cm]
k	=	2.42E-09 [cm ²]
k	=	0.2 [darcy]

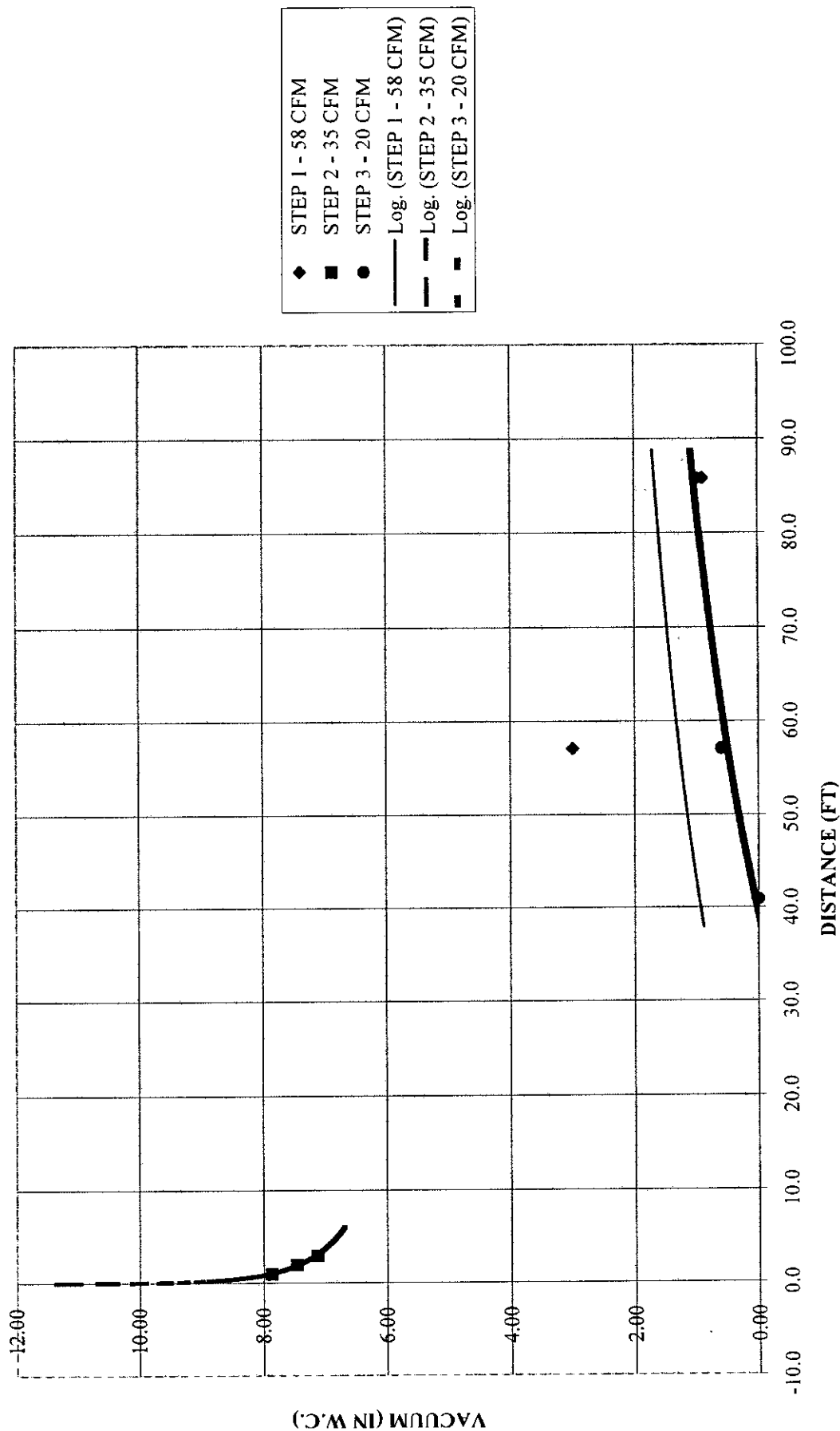
TEST 2 - VACUUM ROI VS. FLOW



TEST 2 - REGRESSION SOLUTION PLOT



TEST 2 - SVE PILOT TEST LINEAR DATA PLOT



SOIL VAPOR EXTRACTION PILOT TEST DATA "STEADY STATE" SOLUTION - TEST 2

Location Memphis Depot, Dunn Field

Client U S Army Engineering and Support Center, Huntsville

Test Date January 7-11, 2002

Vapor Extraction Well: VW-2

Monitoring Point	Radial Distance (r) [ft]	Radial Distance (r) [cm]	ln(r)	Steady-State Vacuum [in H2O]	Absolute Pressure (P) [g/cm s^2]	P^2	Regrssn P^2
MP-1	85.8	2615.18	7.87	0.90	1010761.70	1.02E+12	1.02E+12
MP-2	57.1	1740.41	7.46	3.00	1005539.00	1.01E+12	1.02E+12
MP-3	40.9	1246.63	7.13	0.02	1012950.26	1.03E+12	1.02E+12
MP-4	53.5	1630.68	7.40	0.02	1012950.26	1.03E+12	1.02E+12
MP-6	9.5	289.56	5.67	3.70	1003798.10	1.01E+12	1.01E+12
MP-7	29.9	911.35	6.81	3.80	1003549.40	1.01E+12	1.01E+12

$$P(r) = P_w \left[1 + \frac{(P_w^2 - P_{atm}^2) \ln(r/R_w) / \ln(R_w/R_i)}{P_w^2} \right]^{1/2}$$

P(r) = absolute pressure at radius r

r = radial distance from extraction well

P_w = absolute pressure at the extraction well

P_{atm} = absolute ambient atmospheric pressure

R_w = radius of extraction well

R_i = radius of influence of extraction well

$$P(r)^2 = \frac{(P_w^2 - P_{atm}^2) \ln(r)}{\ln(R_w/R_i)} - \frac{\ln(R_w)(P_w^2 - P_{atm}^2)}{\ln(R_w/R_i)} + P_w^2$$

$$P(r)^2 = m * \ln(r) + b$$

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.60
R Square	0.35
Adjusted R Square	0.19
Standard Error	8.09E+09
Observations	6.00

ANOVA

	df	SS	MS	F	Significance F
Regression	1.00	1.44E+20	1.44E+20	2.20	0.21
Residual	4.00	2.62E+20	6.54E+19		
Total	5.00	4.06E+20			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	9.67E+11	3.35E+10	28.87	0.00	8.74E+11	1.06E+12	8.74E+11	1.06E+12
X Variable 1	7.01E+09	4.73E+09	1.48	0.21	-6.11E+09	2.01E+10	-6.11E+09	2.01E+10

R_i = 3173.3 cm
 R_i = 104.1 ft

SOIL VAPOR EXTRACTION PILOT TEST DATA "STEADY STATE" SOLUTION - TEST 2

Location Memphis Depot, Dunn Field

Client U.S. Army Engineering and Support Center, Huntsville

Test Date: January 7-11, 2002

Vapor Extraction Well: VW-2

$$Q = \frac{H \cdot P_i \cdot (k/u) \cdot P_w \cdot [1 - (P_{atm}/P_w)^2]}{\ln(R_w/R_i)} \quad 2)$$

Q = volumetric vapor flow rate from well
 H = well screen thickness
 P_i = 3.142
 k = soil permeability to air flow
 u = viscosity of extracted vapor
 P_w = absolute pressure at the extraction well
 = P_{atm} - vacuum
 P_{atm} = absolute ambient atmospheric pressure
 R_w = radius of extraction well
 R_i = radius of influence of extraction well

$$k = \frac{Q \cdot u \cdot \ln(R_w/R_i)}{H \cdot P_i \cdot P_w \cdot [1 - (P_{atm}/P_w)^2]}$$

H = 1219.2 [cm]
 u = 0.000180 [cm/g·s]
 Q = 118918.8 [cm³/s]
 P_w = 931675.1 [g/cm·s²]
 P_{atm} = 1013000.0 [g/cm·s²]
 R_w = 2.54 [cm]
 R_i = 3173.3 [cm]

k = 2.35E-07 [cm²]
 k = 23.8 [darcy]

SOIL VAPOR EXTRACTION PILOT TEST DATA "STEP TEST" - STEP 1

Location Memphis Depot, Dunn Field

Client U.S. Army Engineering and Support Center, Huntsville

Test Date January 7, 2002

Vapor Extraction Well: VW-2

Monitoring Point	Radial Distance (r) [ft]	Radial Distance (r) [cm]	ln(r)	Steady-State Vacuum [in H2O]	Absolute Pressure (P) [g/cm s^2]	P^2	Regrssn P^2
MP-1	85.8	2615.18	7.87	1.60	1009020.80	1.02E+12	1.02E+12
MP-2	57.1	1740.41	7.46	1.80	1008523.40	1.02E+12	1.02E+12
MP-3	40.9	1246.63	7.13	0.01	1012975.13	1.03E+12	1.02E+12
MP-4	53.5	1630.68	7.40	0.02	1012950.26	1.03E+12	1.02E+12
MP-6	9.5	289.56	5.67	2.50	1006782.50	1.01E+12	1.01E+12
MP-7	29.9	911.35	6.81	2.50	1006782.50	1.01E+12	1.02E+12

$$P(r) = P_w \left[1 + \frac{1}{P_w^2} (P_w^2 - P_{atm}^2) \ln(r/R_w) / \ln(R_w/R_i) \right]^{1/2}$$

P(r) = absolute pressure at radius r

r = radial distance from extraction well

Pw = absolute pressure at the extraction well

= Patm - vacuum

Patm = absolute ambient atmospheric pressure

Rw = radius of extraction well

Ri = radius of influence of extraction well

$$P(r)^2 = \frac{(P_w^2 - P_{atm}^2) \ln(r)}{\ln(R_w/R_i)} - \frac{\ln(R_w/R_i) (P_w^2 - P_{atm}^2)}{\ln(R_w/R_i)} + P_w^2$$

$$P(r)^2 = m \cdot \ln(r) + b$$

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.47
R Square	0.22
Adjusted R Square	0.02
Standard Error	5.64E+09
Observations	6.00

ANOVA

	df	SS	MS	F	Significance F
Regression	1.00	3.57E+19	3.57E+19	1.12	0.35
Residual	4.00	1.27E+20	3.18E+19		
Total	5.00	1.63E+20			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	9.94E+11	2.34E+10	42.56	0.00	9.30E+11	1.06E+12	9.30E+11	1.06E+12
X Variable 1	3.49E+09	3.30E+09	1.06	0.35	-5.66E+09	1.26E+10	-5.66E+09	1.26E+10

Ri = 2768.9 cm
Ri = 90.8 ft

889 624

SOIL VAPOR EXTRACTION PILOT TEST DATA "STEP TEST" - STEP 2

Location Memphis Depot, Dunn Field

Client U S Army Engineering and Support Center, Huntsville

Test Date January 7, 2002

Vapor Extraction Well VW-2

Monitoring Point	Radial Distance (r) [ft]	Radial Distance (r) [cm]	ln(r)	Steady-State Vacuum [in H2O]	Absolute Pressure (P) [g/cm s^2]	P^2	Regrssn P^2
MP-1	85.8	2615.18	7.87	1.10	1010264.30	1.02E+12	1.02E+12
MP-2	57.1	1740.41	7.46	1.00	1010513.00	1.02E+12	1.02E+12
MP-3	40.9	1246.63	7.13	0.00	1013000.00	1.03E+12	1.02E+12
MP-4	53.5	1630.68	7.40	0.02	1012950.26	1.03E+12	1.02E+12
MP-6	9.5	289.56	5.67	1.70	1008772.10	1.02E+12	1.02E+12
MP-7	29.9	911.35	6.81	1.70	1008772.10	1.02E+12	1.02E+12

$$P(r) = P_w \left[1 + \frac{1}{P_w^2} (P_w^2 - P_{atm}^2) \ln(r/R_w) / \ln(R_w/R_i) \right]^{1/2}$$

P(r) = absolute pressure at radius r

r = radial distance from extraction well

Pw = absolute pressure at the extraction well

= Patm - vacuum

Patm = absolute ambient atmospheric pressure

Rw = radius of extraction well

Ri = radius of influence of extraction well

$$P(r)^2 = \frac{(P_w^2 - P_{atm}^2) \ln(r)}{\ln(R_w/R_i)} - \frac{\ln(R_w)(P_w^2 - P_{atm}^2)}{\ln(R_w/R_i)} + P_w^2$$

$$P(r)^2 = m * \ln(r) + b$$

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.50
R Square	0.25
Adjusted R Square	0.06
Standard Error	3.71E+09
Observations	6.00

ANOVA

	df	SS	MS	F	Significance F
Regression	1.00	1.85E+19	1.85E+19	1.34	0.31
Residual	4.00	5.52E+19	1.38E+19		
Total	5.00	7.36E+19			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	1.00E+12	1.54E+10	65.27	0.00	9.61E+11	1.05E+12	9.61E+11	1.05E+12
X Variable 1	2.51E+09	2.17E+09	1.16	0.31	-3.51E+09	8.53E+09	-3.51E+09	8.53E+09

Ri = 2688.2 cm

Ri = 88.2 ft

SOIL VAPOR EXTRACTION PILOT TEST DATA "STEP TEST" - STEP 3

Location: Memphis Depot, Dunn Field

Client: U S Army Engineering and Support Center, Huntsville

Test Date: January 7, 2002

Vapor Extraction Well: VW-2

Monitoring Point	Radial Distance (r) [ft]	Radial Distance (r) [cm]	ln(r)	Steady-State Vacuum [in H2O]	Absolute Pressure (P) [g/cm s^2]	P^2	Regrssn P^2
MP-1	85.8	2615.18	7.87	1.00	1010513.00	1.02E+12	1.02E+12
MP-2	57.1	1740.41	7.46	0.60	1011507.80	1.02E+12	1.02E+12
MP-3	40.9	1246.63	7.13	0.00	1013000.00	1.03E+12	1.02E+12
MP-4	53.5	1630.68	7.40	0.01	1012975.13	1.03E+12	1.02E+12
MP-6	9.5	289.56	5.67	1.00	1010513.00	1.02E+12	1.02E+12
MP-7	29.9	911.35	6.81	1.10	1010264.30	1.02E+12	1.02E+12

$$P(r) = P_w \left[1 + \frac{(P_w^2 - P_{atm}^2) \ln(r/R_w) \ln(R_w/R_i)}{P_w^2} \right]^{1/2}$$

P(r) = absolute pressure at radius r

r = radial distance from extraction well

P_w = absolute pressure at the extraction well

= P_{atm} - vacuum

P_{atm} = absolute ambient atmospheric pressure

R_w = radius of extraction well

R_i = radius of influence of extraction well

$$P(r)^2 = \frac{(P_w^2 - P_{atm}^2) \ln(r)}{\ln(R_w/R_i)} - \frac{\ln(R_w/R_i) (P_w^2 - P_{atm}^2)}{\ln(R_w/R_i)} + P_w^2$$

$$P(r)^2 = m \cdot \ln(r) + b$$

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.31
R Square	0.09
Adjusted R Square	-0.13
Standard Error	2.70E+09
Observations	6.00

ANOVA

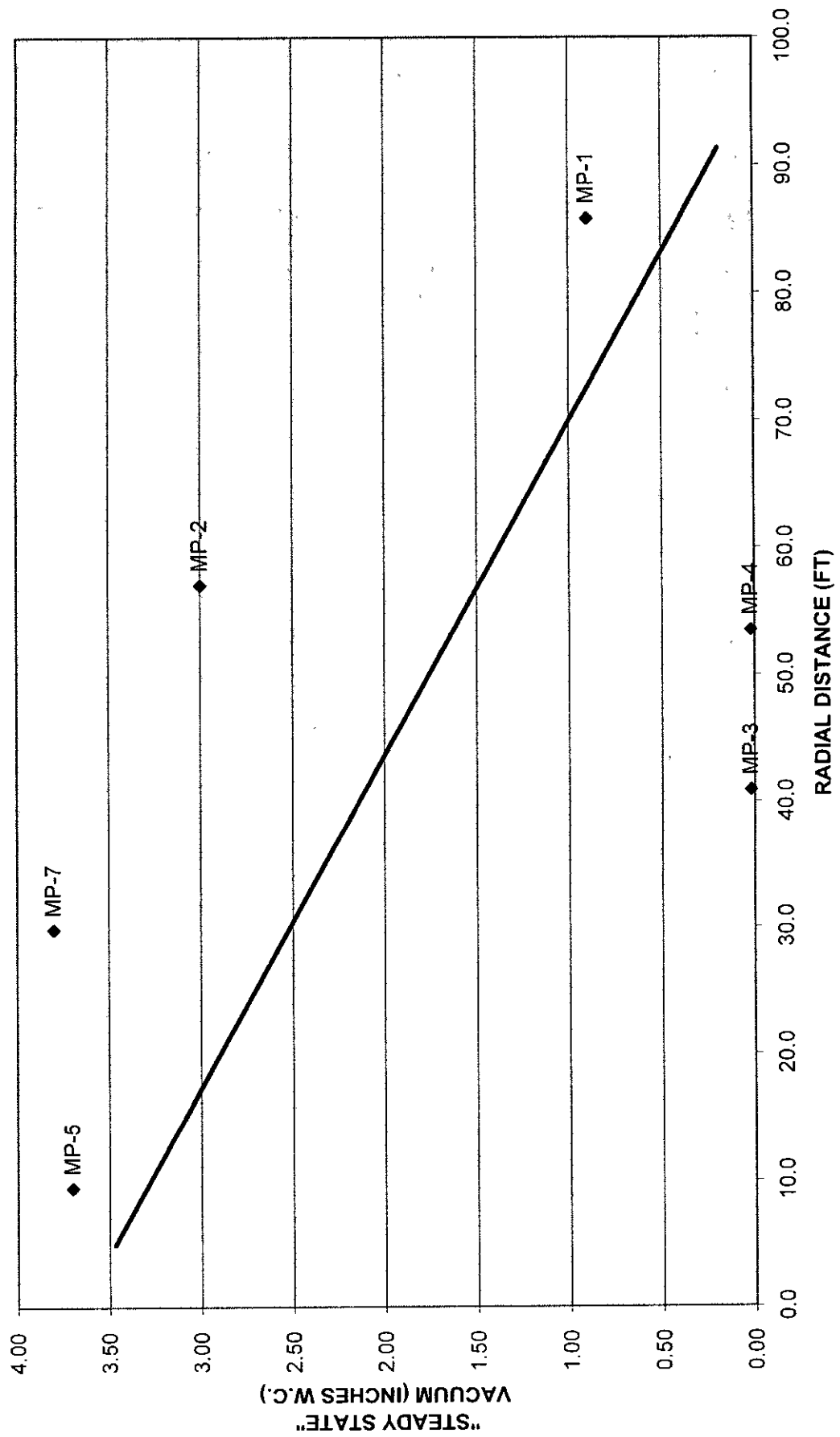
	df	SS	MS	F	Significance F
Regression	1.00	3.06E+18	3.06E+18	0.42	0.55
Residual	4.00	2.93E+19	7.31E+18		
Total	5.00	3.23E+19			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	1.02E+12	1.12E+10	90.68	0.00	9.85E+11	1.05E+12	9.85E+11	1.05E+12
X Variable 1	1.02E+09	1.58E+09	0.65	0.55	-3.37E+09	5.41E+09	-3.37E+09	5.41E+09

R_i = 2076.4 cm

R_i = 68.1 ft

TEST 2 - LINEAR DATA PLOT



Attachment H



ENVIRONMENTAL TESTING & CONSULTING, INC.
2924 Walnut Grove Road • Memphis, TN 38111 • (901) 327-2750 • FAX (901) 327-6334

889 628

Founded 1972

January 15, 2002

Mr. Kraig Smith
Sverdrup/Jacobs Eng.
3354 Perimeter Hill Drive,
Suite 310
Nashville, TN 37211

SVERDRUP

JAN 17 2002

RECEIVED

Ref: Analytical Testing
ETC Order # 0201135
Project Description Dunn Field
Project Number C5X51108

The above referenced project has been analyzed per your instructions. The analyses were performed in our laboratory in accordance with Standard Methods, The Solid Waste Manual SW-846, EPA Methods for Chemical Analysis of Water and Wastes and/or 40 CFR part 136.

The analytical data has been validated using standard quality control measures performed as required by the analytical method. Quality Assurance, instrumentation maintenance and calibration were performed in accordance with guidelines established by the USEPA.

The results are shown on the attached analysis sheet(s).

Please do not hesitate to contact our office if you have any questions.

Sincerely,

Connie Bradberry

Connie Bradberry
Laboratory Project Manager

rt
Attachment

SVE_MHDDMTR

Certifications

Tennessee #TN02027
Arkansas #40730
Kentucky #90047
North Carolina #415
South Carolina #84002002

Mississippi
Oklahoma #9311
Virginia #00106
Washington #C248
US Army Corps of Engineers

USDA #S-46279

Environmental Testing & Consulting, Inc.
Data Qualifiers for Organic Reporting

Within the attached report, some analytical data may be reported as "Qualified Data" as indicated by a "Data Qualifier" next to the result. This table summarizes the possible "Data Qualifiers" that may be associated with this report. These qualifiers do not apply for TIC reports.

Q	Surrogate Recovery Outside QC Limits
J	Estimated Value. Presence of the compound was confirmed but less than the reported detection limit.
E	Concentration exceeds the established method calibration range but is within the working range of the instrument.
B	Analyte detected in the associated Method Blank.
U	Reported result was unconfirmed. Refer to Case Narrative.
C	Result reported from GC/MS confirmation analysis.
M	Result reported represents a minimum value. Refer to Case Narrative.
NC	Result reported from Primary Column. Result did not confirm.
*	QC Data (percent recovery/RPD for a particular analyte was outside QC Limits)

ENVIRONMENTAL TESTING & CONSULTING, INC.
2924 Walnut Grove Road - Memphis, TN 38111 - (901)327-2750
ANALYTICAL SUMMARY/CROSS REFERENCE TABLE

889 630

Client Name Sverdrup/Jacobs Eng.
e ID Dunn Field

ETC Order #0201135
C5X51108

<u>ETC</u> <u>Sample ID</u>	<u>Field</u> <u>ID</u>	<u>Matrix</u>	<u>Method</u>	<u>Method Description</u>
020113501	Carbon-1	SOLID	1311	TCLP Extraction ZHE
020113501	Carbon-1	SOLID	8260B	TCLP Volatile Organics

Environmental Testing & Consulting, Inc.

Login
Chain-of-Custody



CHAIN OF CUSTODY RECORD

Environmental Testing & Consulting, Inc.
2924 Walnut Grove Rd.
Memphis, TN 38111
(901)327-2750 FAX (901)327-6334

ETC Work Order :

020135

[illegible]

*Distribution : Original and Yellow accompany samples to the laboratory. Pink copy for Field Crew.
Original copy returned with results. Yellow copy for ETC, Inc. files.

889 633

Environmental Testing & Consulting, Inc.
Cooler Receipt Form

Date Received 1/8/02
Date/Time Checked In 1/8/02-14:55
Carrier/Bill# Hand-Delivered

LIMS# 0201-135
Project Dunn Field
By Rebekah Barger

1. Custody Seals?/Location-	No
2. Samples are non-radioactive?	Yes
3. Chain of Custody in plastic?	No
4. Temperature at receipt (ok = 4 ± 2 °C) <4°C	OK
5. Ice & Packing- bags, ice	Yes
6. Chain of Custody filled out properly?	Yes
7. All containers in separate bags?	No
8. Sample containers intact?	Yes
9. Label(s) complete and in good condition?	Yes
10. Label(s) agree with Chain of Custody?	Yes
11. Correct containers used?	Yes
12. Sufficient sample?	Yes
13. VOA vials bubble-free (H ₂ O) or no head space (soil)?	Yes
14. Preservation OK? TM pH____; TRPH pH____; TOC pH____; TOX pH____; CN pH____; N/P pH____; Other pH____	Yes

Comments _____

*Validated Date and Time of Sample Receipt (VDTSR)

000005

Environmental Testing & Consulting, Inc.

Sample Reports

ENVIRONMENTAL TESTING & CONSULTING, INC.

2924 Walnut Grove Road - Memphis, TN 38111 - (901)327-2750

889 635

Client Name

Sverdrup/Jacobs Eng.
Memphis Depot, Dunn Field
3354 Perimeter Hill Drive,
Suite 310
Nashville, TN 37211

Site ID **Dunn Field**

FID #

Date Arrived **01/08/02**

ETC Order Number **0201135**

ETC Lab ID **0201135-01**

Field ID : **Carbon-1**

Matrix : **SOLID**

Sample Date : **01/08/02**

TEST	RESULT	UNITS	DETECTION LIMIT	DATE ANALYZED	DATE EXTRACTED BY	METHOD
TCLP Extraction ZHE	Leachate	mg/L				
TCLP Volatile Organics				01/09/02	01/08/02	TL 1311 LS 8260B 5030B
QC Batch	V401091					
Dilution Factor	10					
Benzene	ND	mg/L	0.010			
Carbon Tetrachloride	ND	mg/L	0.010			
Chlorobenzene	ND	mg/L	0.010			
Chloroform	ND	mg/L	0.010			
1,4-Dichlorobenzene	ND	mg/L	0.010			
1,2-Dichloroethane	ND	mg/L	0.010			
1,1-Dichloroethene	ND	mg/L	0.010			
2-Butanone (MEK)	ND	mg/L	1.00			
Tetrachloroethene	ND	mg/L	0.010			
Trichloroethene	ND	mg/L	0.010			
vinyl Chloride	ND	mg/L	0.010			
Surrogate Standard	% Recovery		QC Limits			
S1 - Dibromofluoromethane	85		84	115		
S2 - Toluene-d8	87		69	133		
S3 - 4-Bromofluorobenzene	83		80	111		
S4 - 1,2-Dichloroethane-d4	78		58	131		

Environmental Testing & Consulting, Inc.

**Quality Control Reports
Level III
GC/MS Volatiles**

889 637

ENVIRONMENTAL TESTING AND CONSULTING, INC.
CASE NARRATIVE
GC/MS VOLATILE COMPOUNDS - TCLP

Client Name Sverdrup/Jacobs Eng.
Project Name Dunn Field
ETC Order # 0201-135

HOLDING TIMES

TCLP Extraction All samples extracted within 14 days.
Sample Analysis All VOC extracts analyzed within 14 days.

METHOD

Preparation: SW-846 1311
Analysis: SW-846 8260B

QUALITY CONTROL

QC Batch Form 4 Summary
V401091 V401091LB

System Monitoring Compounds FORM 2

Surrogate recoveries within QC limits.*

*Surrogate Dibromofluoromethane was flagged for low recovery in samples V401091LB, V401091LCS and 0201-135-01MS/MSD. Surrogate Bromofluorobenzene was flagged for low recovery in sample 0201-135-01MSD.

Method Blank FORM 4

V401091LB

Target analytes were not detected in the method blank.

Laboratory Control Sample FORM 3

V401091LCS

All acceptance criteria met.

Matrix Spike / Matrix Spike Dup FORM 3

Batch V401091

0201-135-01

RPD

All analytes within QC limits.

Carbon-1

Spike Recovery

All analytes within QC limits.

Refer to Laboratory Control Sample(s) for system verification.

CALIBRATION

BFB Daily 12-Hour Tune

All criteria met. FORM 5

Initial Calibration

All criteria met. FORM 6

Calibration Verification

All criteria met. FORM 7

Volatile Internal Standard Area and RT FORM 8

Daily Check Standard(s) Internal Standard Areas and Retention Times within QC limits

SAMPLE ANALYSIS

Instrumentation

HP 5890 Series II GC, 5971MSD

Dilutions Required

No dilutions required.


Project Manager

000009

FORM 2
WATER VOA-GCMS SYSTEM MONITORING COMPOUND RECOVERY

889 638

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0201135

	CLIENT SAMPLE NO.	SMC1 (DFM) #	SMC2 (TOL) #	SMC3 (BFB) #	OTHER (DCE) #	TOT OUT
	=====	=====	=====	=====	=====	=====
01	V401091LB	81*	83	82	73	1
02	020113501	85	87	83	78	0
03	V401091LCS	84*	90	86	75	1
04	020113501MS	78*	80	81	70	1
05	020113501MSD	76*	79	78*	69	2
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

QC LIMITS

SMC1 (DFM) = Dibromofluoromethane (84-115)
 SMC2 (TOL) = Toluene-d8 (69-133)
 SMC3 (BFB) = Bromofluorobenzene (80-111)
 OTHER (DCE) = 1,2-Dichloroethane-d4 (58-131)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D System Monitoring Compound diluted out

FORM 4
VOA-GCMS METHOD BLANK SUMMARY

889 639

CLIENT SAMPLE NO.

V401091LB

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0201135

Lab File ID: 0402005T

Lab Prep Batch: V401091

Date Analyzed: 01/09/02

Time Analyzed: 1231

GC Column:

ID: 2 (mm)

Heated Purge: (Y/N) Y

Instrument ID: VOC4

Lab Sample ID: 1LB

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	020113501	020113501	0601007	1333
02	V401091LCS	1LCS	1701018TLCS	1923
03	020113501MS	MS	1901020	2025
04	020113501MSD	MSD	2001021	2056
05				
06				
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS:

889 640 VOA-GCMS ORGANICS ANALYSIS DATA SHEET

FORM 1

CLIENT SAMPLE NO.

Lab Name: ETC, INC.

Contract:

V401091LB

Lab Code:

Case No.:

SAS No.:

SDG No.: 0201135

Matrix: (soil/water) WATER

Lab Prep Batch: V401091

Sample wt/vol: 10.00 (g/mL) ML

Lab File ID: 0402005T

Level: (low/med) LOW

Date Received: _____

% Moisture: not dec. _____

Date Analyzed: 01/09/02

GC Column: ID: 2.00 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Q

71-43-2-----Benzene	1.00	U
78-93-3-----2-Butanone	20.00	U
56-23-5-----Carbon Tetrachloride	1.00	U
108-90-7-----Chlorobenzene	1.00	U
67-66-3-----Chloroform	1.00	U
106-46-7-----1,4-Dichlorobenzene	1.00	U
107-06-2-----1,2-Dichloroethane	1.00	U
75-35-4-----1,1-Dichloroethene	1.00	U
127-18-4-----Tetrachloroethene	1.00	U
79-01-6-----Trichloroethene	1.00	U
75-01-4-----Vinyl Chloride	1.00	U

FORM 1
VOA-GCMS ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

889 641
CLIENT SAMPLE NO.

V401091LB

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0201135

Matrix: (soil/water) WATER

Lab Sample ID: 1LB

Sample wt/vol: 10.00 (g/mL) ML

Lab File ID: 0402005T

Level: (low/med) LOW

Date Received: _____

% Moisture: not dec. _____

Date Analyzed: 01/09/02

GC Column: ID: 2.00 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

Lab Name: ETC, INC.

Lab Prep Batch: V401091

Lab Code:

Case No.:

SAS No.:

SDG No.: 0201135

Matrix Spike - Sample No.: V401091LCS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
=====	=====	=====	=====	=====	=====
Benzene	100.0		95.45	95	72-124
2-Butanone	100.0		92.91	93	55-151
Carbon Tetrachloride	100.0		88.39	88	64-123
Chlorobenzene	100.0		84.41	84	77-112
Chloroform	100.0		82.46	82	70-115
1,4-Dichlorobenzene	100.0		92.66	93	78-116
1,2-Dichloroethane	100.0		79.54	80	62-124
1,1-Dichloroethene	100.0		79.24	79	69-121
Tetrachloroethene	100.0		87.94	88	77-115
Trichloroethene	100.0		89.68	90	75-113
Vinyl Chloride	100.0		70.80	71	65-134

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 0 outside limits

Spike Recovery: 0 out of 11 outside limits

COMMENTS:

FORM 3
WATER VOA-GCMS MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

889 643

Lab Name: ETC, INC.

Lab Prep Batch: V401091

Lab Code:

Case No.:

SAS No.:

SDG No.: 0201135

Matrix Spike - Sample No.: 020113501

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC. LIMITS REC.
=====	=====	=====	=====	=====	=====
Benzene	100.0	0.000	108.6	109	72-124
2-Butanone	100.0	0.000	84.04	84	55-151
Carbon Tetrachloride	100.0	0.000	95.09	95	64-123
Chlorobenzene	100.0	0.000	90.55	90	77-112
Chloroform	100.0	0.000	83.01	83	70-115
1,4-Dichlorobenzene	100.0	0.000	95.84	96	78-116
1,2-Dichloroethane	100.0	0.000	77.05	77	62-124
1,1-Dichloroethene	100.0	0.000	79.43	79	69-121
Tetrachloroethene	100.0	0.000	86.14	86	77-115
Trichloroethene	100.0	0.000	94.58	94	75-113
Vinyl Chloride	100.0	0.000	66.49	66	65-134

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
=====	=====	=====	=====	=====	=====
Benzene	100.0	111.3	111	2	20 72-124
2-Butanone	100.0	85.07	85	1	20 55-151
Carbon Tetrachloride	100.0	94.62	95	0	20 64-123
Chlorobenzene	100.0	92.73	93	3	20 77-112
Chloroform	100.0	83.32	83	0	20 70-115
1,4-Dichlorobenzene	100.0	98.79	99	3	20 78-116
1,2-Dichloroethane	100.0	77.59	78	1	20 62-124
1,1-Dichloroethene	100.0	79.10	79	0	20 69-121
Tetrachloroethene	100.0	88.04	88	2	20 77-115
Trichloroethene	100.0	100.1	100	6	20 75-113
Vinyl Chloride	100.0	66.11	66	0	20 65-134

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 11 outside limits

Spike Recovery: 0 out of 22 outside limits

COMMENTS:

Environmental Testing & Consulting, Inc.

**Quality Control Reports
Level IV
GC/MS Volatiles**

ENVIRONMENTAL TESTING & CONSULTING, INC
GC/MS VOC Method 8260B Sequence Check List (SW-846)

Sequence ID: V401091 Matrix: H₂O HBN: _____
 Date: 1-10-02 Analyst: SS
 Applicable ETC Order Nos. for this sequence: 0201-135-1 0201-055-1-4
 Super: Circle

Validated

1. BFB Daily 12-Hour Tune Meets Criteria. No analyses begins until criteria are met. (SOP)
2. Initial Calibration Verification Criteria - Method: V401091, 8260M
 - a. SPCC - Mean RF ≥ 0.10 (≥ 0.30 for Chlorobenzene / 1122-Tetrachloroethene)
 - b. CCC - RSD of RF for CCCs and Target Analytes MUST BE $\leq 30\%$
 - c. RSD of analytes $\leq 15\%$ may use Average RF for quantitation
 - d. Analytes w/RSD $> 15\%$ use Linear Regression - correlation coefficient ≥ 0.99

3. Calibration Verification - Each 12-Hour Shift

- a. SPCC - Mean RF ≥ 0.10 (≥ 0.30 for Chlorobenzene / 1122-Tetrachloroethene)
- b. CCC - % Difference for Average RF Calibration - $\leq 20\%$
- c. CCC - % Drift for Linear Regression Calibration - $\leq 20\%$
- d. % Difference/% Drift for all other Target Analytes - $\leq 30\%$

- e. Internal Standards - Retention Times within ± 30 seconds from Mid-Point ICAL STD
- f. Internal Standards - Areas within (-50% to +100%) from Mid-Point ICAL STD

4. Method Blanks included in this sequence :

Analyze daily or for each analytical batch (20 samples): _____

List compounds identified in Method Blank w/concentration. _____

Flag final result "B, Detected in Blank" _____

5. Matrix Spike/Matrix Spike Duplicates included in this sequence :

Analyze daily or for each matrix (ms/msd per 20 samples of same matrix)

List MS/MSD(s) performed with any failures :

0201-13501ms, msd

6. Laboratory Control Samples included in this sequence

Must contain all Target Analytes.

7. Surrogate Recoveries within QC Limits

8. All positive compounds within calibration range

Narrative/Notes :

FORM 5
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

889 646

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0201135

Lab File ID: 0101001

BFB Injection Date: 01/09/02

Instrument ID: VOC4

BFB Injection Time: 1028

GC Column:

ID: 2.00 (mm)

Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	17.1
75	30.0 - 60.0% of mass 95	46.1
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.8
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	Greater than 50.0% of mass 95	65.0
175	5.0 - 9.0% of mass 174	5.3 (8.2)1
176	95.0 - 101.0% of mass 174	62.5 (96.1)1
177	5.0 - 9.0% of mass 176	4.4 (7.0)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	DSC100PPB		0201002	01/09/02	1046
02	020113501	020113501	0601007	01/09/02	1333
03	020113501MS	MS	1901020	01/09/02	2025
04	020113501MSD	MSD	2001021	01/09/02	2056
05					
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

FORM 7
VOA-GCMS CONTINUING CALIBRATION CHECK

889 647

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0201135

Instrument ID: VOC4

Calibration Date: 01/09/02 Time: 1046

Lab File ID: 0201002

Init. Calib. Date(s): 01/04/02 01/04/02

Heated Purge: (Y/N) Y

Init. Calib. Times: 1614 2127

GC Column:

ID: 2.00 (mm)

COMPOUND	SAMPLE AMOUNT	CAL100 AMOUNT	CURVE	%D	MAX %d
=====	=====	=====	=====	=====	=====
Acetone	96.29	100.0	AVRG	3.7	30.0
Acetonitrile	1149	1000	AVRG	14.9	30.0
Acrolein	37.02	100.0	AVRG	63.0	30.0
Acrylonitrile	105.5	100.0	AVRG	5.5	30.0
Allyl chloride	91.44	100.0	AVRG	8.6	30.0
Benzene	100.2	100.0	AVRG	0.2	30.0
Bromobenzene	90.48	100.0	AVRG	9.5	30.0
Bromochloromethane	99.16	100.0	AVRG	0.8	30.0
Bromodichloromethane	87.55	100.0	AVRG	12.4	30.0
Bromoform	87.76	100.0	AVRG	12.2	30.0
2-Butanone	97.72	100.0	AVRG	2.3	30.0
Bromomethane	107.6	100.0	AVRG	7.6	30.0
n-Butylbenzene	103.1	100.0	AVRG	3.1	30.0
sec-Butylbenzene	82.34	100.0	AVRG	17.7	30.0
tert-Butylbenzene	81.23	100.0	AVRG	18.8	30.0
Carbon Disulfide	90.81	100.0	AVRG	9.2	30.0
Carbon Tetrachloride	89.31	100.0	AVRG	10.7	30.0
Chlorobenzene	86.08	100.0	AVRG	13.9	30.0
Chlorodibromomethane	95.60	100.0	AVRG	4.4	30.0
Chloroethane	90.41	100.0	AVRG	9.6	30.0
2-Chloroethyl vinyl ether	94.73	100.0	AVRG	5.3	30.0
Chloroform	83.28	100.0	AVRG	16.7	20.0
Chloromethane	84.59	100.0	AVRG	15.4	30.0
Chloroprene	82.53	100.0	AVRG	17.5	30.0
2-Chlorotoluene	78.72	100.0	AVRG	21.3	30.0
4-Chlorotoluene	80.64	100.0	AVRG	19.4	30.0
1,2-Dibromo-3-chloropropane	96.12	100.0	AVRG	3.9	30.0
1,2-Dibromoethane	102.2	100.0	AVRG	2.2	30.0
Dibromomethane	82.84	100.0	AVRG	17.2	30.0
1,2-Dichlorobenzene	106.6	100.0	AVRG	6.6	30.0
1,3-Dichlorobenzene	109.3	100.0	AVRG	9.3	30.0
1,4-Dichlorobenzene	101.9	100.0	AVRG	1.9	30.0
cis-1,4-Dichloro-2-butene	91.17	100.0	AVRG	8.8	30.0
trans-1,4-Dichloro-2-butene	107.6	100.0	AVRG	7.6	30.0
Dichlorodifluoromethane	76.73	100.0	AVRG	23.3	30.0
1,1-Dichloroethane	87.50	100.0	AVRG	12.5	30.0
1,2-Dichloroethane	84.53	100.0	AVRG	15.5	30.0

889 648^{VOA}-GCMS CONTINUING CALIBRATION CHECK

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0201135

Instrument ID: VOC4

Calibration Date: 01/09/02 Time: 1046

Lab File ID: 0201002

Init. Calib. Date(s): 01/04/02 01/04/02

Heated Purge: (Y/N) Y

Init. Calib. Times: 1614 2127

GC Column:

ID: 2.00 (mm)

COMPOUND	SAMPLE AMOUNT	CAL100 AMOUNT	CURVE	%D	MAX %d
1,1-Dichloroethene	89.71	100.0	AVRG	10.3	20.0
cis-1,2-Dichloroethene	95.84	100.0	AVRG	4.2	30.0
trans-1,2-Dichloroethene	97.53	100.0	AVRG	2.5	30.0
1,2-Dichloropropane	91.05	100.0	AVRG	9.0	20.0
1,3-Dichloropropane	98.32	100.0	AVRG	1.7	30.0
2,2-Dichloropropane	90.23	100.0	AVRG	9.8	30.0
1,1-Dichloropropene	95.35	100.0	AVRG	4.6	30.0
cis-1,3-Dichloropropene	95.71	100.0	AVRG	4.3	30.0
trans-1,3-Dichloropropene	94.17	100.0	AVRG	5.8	30.0
Di isopropyl ether	94.43	100.0	AVRG	5.6	30.0
1,4-Dioxane	2336	2000	AVRG	16.8	30.0
Ethyl Acetate	104.4	100.0	AVRG	4.4	30.0
Ethylbenzene	85.15	100.0	AVRG	14.8	20.0
Ethyl methacrylate	197.5	200.0	AVRG	1.2	30.0
Furan	131.2	153.0	AVRG	14.2	30.0
Hexachlorobutadiene	105.5	100.0	AVRG	5.5	30.0
Hexane	106.2	117.0	AVRG	9.2	30.0
2-Hexanone	107.5	100.0	AVRG	7.5	30.0
Iodomethane	81.96	100.0	AVRG	18.0	30.0
Isobutyl Alcohol	2373	2000	AVRG	18.6	30.0
Isopropylbenzene	89.19	100.0	AVRG	10.8	30.0
4-Isopropyltoluene	76.42	100.0	AVRG	23.6	30.0
Methacrylonitrile	956.0	1000	AVRG	4.4	30.0
Methylene Chloride	101.2	100.0	LINR	1.2	30.0
Methyl methacrylate	193.0	200.0	AVRG	3.5	30.0
4-Methyl-2-Pentanone	103.2	100.0	AVRG	3.2	30.0
Methyl-tertbutyl-Ether	90.79	100.0	AVRG	9.2	30.0
Naphthalene	121.8	100.0	AVRG	21.8	30.0
Propionitrile	1022	1000	AVRG	2.2	30.0
n-Propyl Acetate	151.7	151.0	AVRG	0.5	30.0
n-Propylbenzene	87.36	100.0	AVRG	12.6	30.0
Styrene	92.16	100.0	AVRG	7.8	30.0
1,1,1,2-Tetrachloroethane	80.88	100.0	AVRG	19.1	30.0
1,1,2,2-Tetrachloroethane	121.5	100.0	AVRG	21.5	30.0
Tetrachloroethene	101.3	100.0	AVRG	1.3	30.0
Tetrahydrofuran	108.3	91.50	AVRG	18.4	30.0
1,2,3-Trichlorobenzene	120.4	100.0	AVRG	20.4	30.0

FORM 7
VOA-GCMS CONTINUING CALIBRATION CHECK

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0201135

Instrument ID: VOC4

Calibration Date: 01/09/02 Time: 1046

Lab File ID: 0201002

Init. Calib. Date(s): 01/04/02 01/04/02

Heated Purge: (Y/N) Y

Init. Calib. Times: 1614 2127

GC Column:

ID: 2.00 (mm)

COMPOUND	SAMPLE AMOUNT	CAL100 AMOUNT	CURVE	%D	MAX %d
=====	=====	=====	=====	=====	=====
Toluene	94.56	100.0	AVRG	5.4	20.0
1,1,1-Trichloroethane	89.52	100.0	AVRG	10.5	30.0
1,1,2-Trichloroethane	100.5	100.0	AVRG	0.5	30.0
1,1,2-trichloro-1,2,2-triflu	94.63	100.0	AVRG	5.4	30.0
Trichloroethene	100.2	100.0	AVRG	0.2	30.0
Trichlorofluoromethane	73.63	100.0	AVRG	26.4	30.0
1,2,3-Trichloropropane	90.30	100.0	AVRG	9.7	30.0
1,2,4-Trimethylbenzene	79.07	100.0	AVRG	20.9	30.0
1,2,4-Trichlorobenzene	121.5	100.0	AVRG	21.5	30.0
1,3,5-Trimethylbenzene	81.60	100.0	AVRG	18.4	30.0
Vinyl Acetate	101.9	100.0	AVRG	1.9	30.0
Vinyl Chloride	83.00	100.0	AVRG	17.0	20.0
Xylene-mp	175.3	200.0	AVRG	12.4	30.0
Xylene-o	88.27	100.0	AVRG	11.7	30.0
=====	=====	=====	=====	=====	=====
Dibromofluoromethane	39.87	50.00	AVRG	20.3	30.0
Toluene-d8	46.44	50.00	AVRG	7.1	30.0
Bromofluorobenzene	39.71	50.00	AVRG	20.6	30.0
1,2-Dichloroethane-d4	37.16	50.00	AVRG	25.7	30.0

889 650

FORM 8

VOA-GCMS INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0201135

Lab File ID (Standard): 0201002

Date Analyzed: 01/09/02

Instrument ID: VOC4

Time Analyzed: 1046

GC Column:

ID: 2.00 (mm)

Heated Purge: (Y/N) Y

	IS1 AREA #	RT #	IS2 (DFB) AREA #	RT #	IS3 (CBZ) AREA #	RT #
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	846271	6.92	1277286	7.50	1378510	9.70
UPPER LIMIT	1692542	7.42	2554572	8.00	2757020	10.20
LOWER LIMIT	423136	6.42	638643	7.00	689255	9.20
=====	=====	=====	=====	=====	=====	=====
CLIENT SAMPLE NO.						
=====	=====	=====	=====	=====	=====	=====
01 020113501	813385	6.92	1275447	7.51	1074916	9.71
02 020113501MS	883916	6.92	1435681	7.51	1176896	9.71
03 020113501MSD	917663	6.92	1475407	7.51	1196338	9.71
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 = Pentafluorobenzene
 IS2 (DFB) = 1,4-Difluorobenzene
 IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = + 0.50 minutes of internal standard RT
 RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
 * Values outside of QC limits.

FORM 8
VOA-GCMS INTERNAL STANDARD AREA AND RT SUMMARY

889 651

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0201135

Lab File ID (Standard): 0201002

Date Analyzed: 01/09/02

Instrument ID: VOC4

Time Analyzed: 1046

GC Column:

ID: 2.00 (mm)

Heated Purge: (Y/N) Y

	IS4 (DCB)					
	AREA #	RT #	AREA #	RT #	AREA #	RT #
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	327534	11.52				
UPPER LIMIT	655068	12.02				
LOWER LIMIT	163767	11.02				
=====	=====	=====	=====	=====	=====	=====
CLIENT						
SAMPLE NO.						
=====	=====	=====	=====	=====	=====	=====
01 020113501	267966	11.53				
02 020113501MS	303392	11.53				
03 020113501MSD	283146	11.53				
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS4 (DCB) = 1,4-Dichlorobenzene-d4

AREA UPPER LIMIT = +100% of internal standard area

AREA LOWER LIMIT = - 50% of internal standard area

RT UPPER LIMIT = + 0.50 minutes of internal standard RT

RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.

* Values outside of QC limits.

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-JAN-2002 16:14
 End Cal Date : 04-JAN-2002 21:27
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCBDC\DD\chem\voc4.i\V401041.B\V401041.8260.m
 Cal Date : 07-Jan-2002 09:30 lisa

Calibration File Names:

Level 1: \\ETCBDC\DD\chem\voc4.i\V401041.B\0301005.D
 Level 2: \\ETCBDC\DD\chem\voc4.i\V401041.B\0401006.D
 Level 3: \\ETCBDC\DD\chem\voc4.i\V401041.B\0601008.D
 Level 4: \\ETCBDC\DD\chem\voc4.i\V401041.B\0701009.D
 Level 5: \\ETCBDC\DD\chem\voc4.i\V401041.B\0801010.D
 Level 6: \\ETCBDC\DD\chem\voc4.i\V401041.B\0901011.D
 Level 7: \\ETCBDC\DD\chem\voc4.i\V401041.B\1001012.D
 Level 8: \\ETCBDC\DD\chem\voc4.i\V401041.B\1101013.D
 Level 9: \\ETCBDC\DD\chem\voc4.i\V401041.B\1201014.D
 Level 10: \\ETCBDC\DD\chem\voc4.i\V401041.B\1301015.D

Compound	0.500000		1.0000		5.0000		20.0000		50.0000		100.0000		Curve		Coefficients		%RSD	
	Level 1	Level 2	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10	Level 1	Level 2	m1	m2	or R ²	
1 Dichlorodifluoromethane	0.64464	0.73605	0.84463	0.86253	0.88129	0.80100	0.80100	0.80100	0.80100	0.80100	0.80100	0.80100	AVRG	0.71916			13.94235	
	0.68037	0.65786	0.59036	0.59291	0.59291	0.59291	0.59291	0.59291	0.59291	0.59291	0.59291	0.59291	AVRG	0.71916			13.94235	

Lisa Savage
 1-8-02
 ML/1/01/02

QC REVIEWED 1-8-02
 889 652

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-JAN-2002 16:14
 End Cal Date : 04-JAN-2002 21:27
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETC\BDC\DD\chem\voc4.i\V401041.B\V401041.8260.m
 Cal Date : 07-Jan-2002 09:30 lisa

Compound	0.500000 Level 1	1.0000 Level 2	5.0000 Level 3	20.0000 Level 4	50.0000 Level 5	100.0000 Level 6	Curve	b	Coefficients ml	m2	MSD or R^2
2 Chloromethane	0.52202 0.39634	0.39411 0.38824	0.54041 ++++	0.47289 ++++	0.50453	0.44151	AVRG		0.45750		13.39704
3 Vinyl Chloride	++++ 0.45186	0.57262 0.44769	0.48281 ++++	0.54979 ++++	0.63108	0.51883	AVRG		0.52210		12.90094
4 Bromomethane	0.36242 0.34529	0.33421 0.35097	0.40954 0.32675	0.35692 0.34268	0.42887	0.38840	AVRG		0.36460		9.22244
5 Chloroethane	0.27728 0.26303	0.33919 0.26399	0.30204 0.23875	0.29727 0.24285	0.35974	0.30609	AVRG		0.28902		13.71688
6 Acrolein	++++ 0.02675	++++ 0.02979	++++ 0.02821	0.03521 0.03079	0.03263	0.03228	AVRG		0.03081		9.28264

889 653

000025

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-JAN-2002 16:14
 End Cal Date : 04-JAN-2002 21:27
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V401041.B\V401041.8260.m
 Cal Date : 07-Jan-2002 09:30 lisa

Compound	0.5000000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients m1	m2	\$RSD or R^2
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
7 Trichlorofluoromethane	0.95330	1.06944	1.08397	1.08993	1.21458	0.99319	AVRG		0.98739		14.42477
	0.85757	0.86086	0.76369	++++							
8 Acetonitrile	++++	++++	0.03265	0.03033	0.03196	0.02988	AVRG		0.02864		11.04328
	0.02369	0.02691	0.02532	0.02838							
9 Acetone	++++	++++	++++	0.16627	0.17899	0.15836	AVRG		0.15343		10.47737
	0.13098	0.15021	0.14025	0.14895							
10 Furan	++++	1.27041	1.20232	1.18393	1.25854	1.11153	AVRG		1.09661		12.68620
	0.98490	1.00867	0.92480	0.92442							
11 1,1-Dichloroethene	0.49598	0.60376	0.53716	0.50486	0.54657	0.48411	AVRG		0.48555		13.42620
	0.42660	0.43826	0.41065	0.40756							

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-JAN-2002 16:14
 End Cal Date : 04-JAN-2002 21:27
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V401041.B\V401041.8260.m
 Cal Date : 07-Jan-2002 09:30 lisa

Compound	0.500000 Level 1	1.0000 Level 2	5.0000 Level 3	20.0000 Level 4	50.0000 Level 5	100.0000 Level 6	Curve	b	Coefficients ml	m2	\$RSD or R^2
12 Acrylonitrile	++++ 0.10575	++++ 0.12161	++++ 0.11425	0.13855 0.12587	0.13194	0.12994	AVRG		0.12399		9.00101
13 Iodomethane	++++ 0.65199	0.73248 0.67254	0.79261 0.62133	0.78665 0.60411	0.84651	0.74725	AVRG		0.71727		11.72641
14 Methylene Chloride	40172 859996	43445 1148871	73795 1258780	179584 1467972	404256	776066	LINR	-0.18014	0.48601		0.99220
15 1,1,2-trichloro-1,2,2-trifluo	0.47632 0.53911	0.49377 0.53070	0.52405 0.51363	0.51266 0.51917	0.53229	0.52094	AVRG		0.51626		3.65197
16 Allyl chloride	0.79161 0.69806	0.92437 0.72017	0.83369 0.68220	0.83003 0.67745	0.88173	0.78694	AVRG		0.78263		11.03014

889 655

000027

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-JAN-2002 16:14
 End Cal Date : 04-JAN-2002 21:27
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETC\DD\chem\voc4.i\V401041.B\V401041.8260.m
 Cal Date : 07-Jan-2002 09:30 lisa

Compound	0.500000 Level 1	1.0000 Level 2	5.0000 Level 3	20.0000 Level 4	50.0000 Level 5	100.0000 Level 6	Curve	b	Coefficients m1	m2	%RSD or R^2
17 Carbon Disulfide	3.35704 3.02286	3.87392 3.02736	3.61149 2.82323	3.39298 2.83551	3.70142	3.35149	AVRG		3.29973		11.04896
18 trans-1,2-Dichloroethene	0.51720 0.52431	0.59945 0.54680	0.54575 0.52393	0.54617 0.51719	0.58964	0.57143	AVRG		0.54819		5.43140
19 Methyl-tertbutyl-Ether	1.56383 1.33729	1.56180 1.42231	1.55698 1.39353	1.47227 1.43234	1.46460	1.45037	AVRG		1.46553		5.19508
20 Propionitrile	0.05388 0.03619	0.04865 0.04200	0.04894 0.03832	0.04796 0.04398	0.04632	0.04624	AVRG		0.04525		11.68130
21 1,1-Dichloroethane	1.00797 0.93803	1.04581 0.97842	1.09429 0.93952	1.09894 0.92149	1.17344	1.06431	AVRG		1.02622		8.10819

889 656

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-JAN-2002 16:14
 End Cal Date : 04-JAN-2002 21:27
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V401041.B\V401041.8260.m
 Cal Date : 07-Jan-2002 09:30 lisa

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients	m1	m2	RSD or R ²
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6						
22 Vinyl Acetate	0.88459	0.95897	0.91342	0.97079	0.97348	0.98828	AVRG			0.97803		6.83678
23 Chloroprene	1.11706	1.10422	1.10659	1.07922	1.10117	1.05419	AVRG			1.06189		4.83605
24 2-Butanone	0.05322	0.06018	0.05641	0.06024	0.06147	0.06187	AVRG			0.06092		8.75973
25 Hexane	0.85884	0.83458	0.82111	0.81570	0.85076	0.83752	AVRG			0.82643		2.87025
26 Di isopropyl ether	1.72261	1.83618	1.74130	1.71736	1.71822	1.77838	AVRG			1.77600		2.92220

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-JAN-2002 16:14
 End Cal Date : 04-JAN-2002 21:27
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V401041.B\V401041.8260.m
 Cal Date : 07-Jan-2002 09:30 lisa

Compound	0.500000 Level 1	1.0000 Level 2	5.0000 Level 3	20.0000 Level 4	50.0000 Level 5	100.0000 Level 6	Curve	b	Coefficients ml	m2	%RSD or R^2
27 Methacrylonitrile	0.33198 0.22664	0.30965 0.25926	0.29484 0.24631	0.27767 0.26870	0.26046	0.26259	AVRG		0.27381		11.32180
28 cis-1,2-Dichloroethene	0.57890 0.53816	0.68209 0.57652	0.60865 0.55739	0.60304 0.55252	0.63790	0.60197	AVRG		0.59371		7.26839
29 Ethyl Acetate	++++ 0.36685	++++ 0.41122	0.49359 0.39573	0.43467 0.43586	0.40667	0.42828	AVRG		0.42161		8.78343
30 Bromochloromethane	0.21714 0.20771	0.26220 0.22990	0.25311 0.22223	0.24672 0.22719	0.24766	0.24133	AVRG		0.23552		7.37663
31 Chloroform	1.44667 1.14211	1.38240 1.18803	1.28753 1.14781	1.25329 1.10820	1.31083	1.27006	AVRG		1.25369		8.72252

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-JAN-2002 16:14
 End Cal Date : 04-JAN-2002 21:27
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V401041.B\V401041.8260.m
 Cal Date : 07-Jan-2002 09:30 lisa

Compound	0.500000 Level 1	1.0000 Level 2	5.0000 Level 3	20.0000 Level 4	50.0000 Level 5	100.0000 Level 6	Curve	b	Coefficients ml	m2	SRSD or R^2
32 Isobutyl Alcohol	0.01260	0.01518	0.01423	0.01722	0.01639	0.01625	AVRG		0.01602		13.33758
33 2,2-Dichloropropane	1.11146	1.13781	1.06860	1.03185	1.03811	1.01077	AVRG		1.04093		4.89415
35 Tetrahydrofuran	0.13551	0.15299	0.14488	0.15385	0.15957	0.16074	AVRG		0.15373		9.05235
38 1,2-Dichloroethane	0.89836	1.01489	0.94160	0.93711	0.90067	0.97694	AVRG		0.90415		7.09445
39 1,1,1-Trichloroethane	1.07605	1.14852	1.20571	1.19358	1.15196	1.20426	AVRG		1.17146		4.24132

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-JAN-2002 16:14
 End Cal Date : 04-JAN-2002 21:27
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETC\BDC\DD\chem\voc4.i\V401041.B\V401041.8260.m
 Cal Date : 07-Jan-2002 09:30 lisa

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients ml	m2	RSR or R^2
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
40 1,1-Dichloropropene	0.9444	0.98256	0.94313	0.94403	0.94360	0.95924	AVRG		0.96026		2.24778
	0.94200	0.99609	0.99149	0.95606							
41 Carbon Tetrachloride	0.85423	0.99118	0.97529	1.00749	0.99264	1.02468	AVRG		0.99841		5.62850
	1.03870	1.04539	1.04657	1.00797							
42 Benzene	2.49422	2.25750	2.12928	2.07795	2.24608	2.18626	AVRG		2.25489		5.39382
	2.17823	2.28546	2.35739	2.33649							
44 Dibromomethane	0.26891	0.28673	0.29257	0.27176	0.25891	0.25651	AVRG		0.25479		10.11250
	0.21836	0.23720	0.22798	0.22901							
45 2,2-Dichloropropane	++++	0.54915	0.44417	0.37946	0.37661	0.39581	AVRG		0.41463		13.30511
	0.36877	0.40418	0.40862	0.40488							

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-JAN-2002 16:14
 End Cal Date : 04-JAN-2002 21:27
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V401041.B\V401041.8260.m
 Cal Date : 07-Jan-2002 09:30 lisa

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients ml	m2	RSD or R^2
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
46 Trichloroethene	0.31489	0.36660	0.36553	0.36007	0.34495	0.36563	AVRG		0.36135		5.72550
	0.35236	0.37178	0.38824	0.38245							
47 Bromodichloromethane	0.67628	0.69502	0.76378	0.73321	0.69155	0.73073	AVRG		0.71400		4.18932
	0.66818	0.72356	0.73040	0.72733							
48 n-Propyl Acetate	++++	0.81220	0.83251	0.77170	0.69307	0.75533	AVRG				
	0.61934	0.71264	0.69263	0.75480					0.73825		8.95395
49 Methyl methacrylate	0.27605	0.26873	0.28756	0.26955	0.24088	0.26282	AVRG				
	0.21916	0.24786	0.24144	0.25709					0.25711		7.82418
50 1,4-Dioxane	++++	++++	0.00207	0.00220	0.00239	0.00239	AVRG				
	0.00169	0.00219	0.00210	0.00236					0.00217		10.79875

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-JAN-2002 16:14
 End Cal Date : 04-JAN-2002 21:27
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDDC\DD\chem\voc4.i\V401041.B\V401041.8260.m
 Cal Date : 07-Jan-2002 09:30 lisa

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients ml	m2	\$RSD or R^2
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
51 2-Chloroethyl vinyl ether	0.40493	0.39898	0.4424	0.38187	0.37682	0.39453	AVRG		0.39793		5.34615
	0.36568	0.40321	0.40665	0.40235							
52 cis-1,3-Dichloropropene	0.75500	0.75078	0.82879	0.79950	0.76328	0.81756	AVRG		0.79041		4.35995
	0.73951	0.80539	0.82360	0.82071							
53 4-Methyl-2-Pentanone	+++++	+++++	0.41199	0.38377	0.33910	0.36880	AVRG		0.35453		9.67552
	0.30229	0.34443	0.32651	0.35935							
54 trans-1,3-Dichloropropene	0.70937	0.74985	0.82277	0.80628	0.75783	0.82484	AVRG		0.77719		5.15089
	0.72432	0.79655	0.78816	0.79194							
55 1,1,2-Trichloroethane	0.24470	0.29273	0.30294	0.28870	0.26597	0.29858	AVRG		0.28307		6.94042
	0.25830	0.29165	0.28898	0.29812							

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-JAN-2002 16:14
 End Cal Date : 04-JAN-2002 21:27
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V401041.B\V401041.8260.m
 Cal Date : 07-Jan-2002 09:30 lisa

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients m1	m2	SRSD or R^2
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
57 Ethyl methacrylate	0.25628	0.29423	0.33026	0.31548	0.28924	0.30495	AVRG		0.28733		8.69941
	0.25223	0.28024	0.26869	0.28165							
58 Toluene	1.25067	1.25627	1.16786	1.13372	1.11508	1.12344	AVRG		1.12579		7.41257
	0.98461	1.06517	1.09480	1.06631							
59 1,3-Dichloropropane	0.64223	0.66274	0.70759	0.70545	0.65640	0.72209	AVRG		0.68268		4.82550
	0.62720	0.70634	0.68786	0.70888							
60 2-Hexanone	++++	++++	0.27063	0.27959	0.25400	0.27396	AVRG		0.24811		10.45386
	0.20889	0.23989	0.21974	0.23822							
61 Chlorodibromomethane	0.44995	0.48345	0.51065	0.50193	0.49233	0.54464	AVRG		0.50314		5.86493
	0.46997	0.53078	0.52311	0.52460							

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-JAN-2002 16:14
 End Cal Date : 04-JAN-2002 21:27
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETC\BDC\DD\chem\voc4.i\V401041.B\V401041.8260.m
 Cal Date : 07-Jan-2002 09:30 lisa

Compound	0.500000 Level 1	1.0000 Level 2	5.0000 Level 3	20.0000 Level 4	50.0000 Level 5	100.0000 Level 6	Curve	b	Coefficients ml	m2	%RSD or R^2
62 1,2-Dibromoethane	0.37227	0.38600	0.41954	0.41572	0.38676	0.42899	AVRG		0.39449		5.57527
63 Tetrachloroethene	0.35774	0.40018	0.38627	0.39145			AVRG				
	0.30278	0.34746	0.34441	0.34024	0.33749	0.34875	AVRG		0.33478		4.51860
	0.31438	0.33743	0.34496	0.32994			AVRG				
64 1,1,1,2-Tetrachloroethane	0.51197	0.47162	0.46101	0.45588	0.45691	0.48472	AVRG				
	0.49981	0.52170	0.53792	0.53326			AVRG		0.49348		6.44174
66 Chlorobenzene	1.26639	1.25757	1.15024	1.11749	1.18480	1.13247	AVRG				
	1.06669	1.14012	1.17752	1.16481			AVRG		1.16581		5.21056
67 Ethylbenzene	2.36101	2.52253	2.39424	2.33547	2.50862	2.38337	AVRG				
	2.22441	2.31121	2.37033	2.26092			AVRG		2.36721		4.00740

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-JAN-2002 16:14
 End Cal Date : 04-JAN-2002 21:27
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V401041.B\V401041.8260.m
 Cal Date : 07-Jan-2002 09:30 lisa

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients ml	m2	MSD or R ²
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
68 Xylene-mp	0.69973	0.75203	0.66763	0.67660	0.72959	0.70335	AVRG		0.69873		4.44285
	0.65304	0.69092	0.71572	++++							
69 Bromoform	0.30866	0.30528	0.32270	0.32788	0.33041	0.34769	AVRG		0.32030		4.43800
	0.31021	0.32441	0.30544	++++							
70 trans-1,4-Dichloro-2-butene	0.12161	0.13521	0.15074	0.15807	0.16516	0.16884	AVRG		0.14466		10.71748
	0.13716	0.14065	0.12980	0.13935							
71 Styrene	1.13453	1.11910	1.06431	1.07832	1.19130	1.09533	AVRG		1.08011		5.28829
	0.99360	1.03918	1.04900	1.03643							
72 Xylene-o	0.64667	0.69676	0.62543	0.62909	0.68590	0.63675	AVRG		0.63254		5.74101
	0.58086	0.59867	0.61480	0.61052							

889 665

000037

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-JAN-2002 16:14
 End Cal Date : 04-JAN-2002 21:27
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCBDC\DD\chem\voc4.i\V401041.B\V401041.8260.m
 Cal Date : 07-Jan-2002 09:30 lisa

Compound	0.500000 Level 1	1.0000 Level 2	5.0000 Level 3	20.0000 Level 4	50.0000 Level 5	100.0000 Level 6	Curve	b	Coefficients ml	m2	%RSD or R^2
73 1,1,2,2-Tetrachloroethane	1.54460 1.25874	1.42046 1.24230	1.43875 1.03991	1.34532 1.05296	1.23280	1.44779	AVRG		1.30236		12.94114
74 cis-1,4-Dichloro-2-butene	++++ 0.11886	0.13074 0.11954	0.15504 0.11391	0.15499 0.12257	0.16538	0.15790	AVRG		0.13766		14.75727
75 1,2,3-Trichloropropane	++++ 0.11501	0.14196 0.11551	0.14419 0.10687	0.14183 0.11248	0.14207	0.14423	AVRG		0.12935		12.53998
76 Isopropylbenzene	1.85624 1.83510	2.14976 1.84460	1.99296 1.84888	2.04291 1.79939	2.24735	2.03921	AVRG		1.96564		7.77714
78 Bromobenzene	0.38054 0.34564	0.42371 0.35125	0.40925 0.35309	0.41268 0.35179	0.44549	0.39983	AVRG		0.38733		9.23182

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-JAN-2002 16:14
 End Cal Date : 04-JAN-2002 21:27
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETC\BDC\DD\chem\voc4.i\V401041.B\V401041.8260.m
 Cal Date : 07-Jan-2002 09:30 lisa

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients m1	m2	%RSD or R ²
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
79 n-Propylbenzene	120.0000	150.0000	170.0000	200.0000							
	Level 7	Level 8	Level 9	Level 10							
	2.34388	2.42195	2.25126	2.33252	2.63319	2.32672					
	2.05606	2.05763	2.14564	2.11725			AVRG		2.26861		8.01536
80 2-Chlorotoluene	1.68075	1.54201	1.53867	1.45738	1.68319	1.55858					
	1.23511	1.24829	1.29623	1.27721			AVRG		1.45174		12.06552
81 4-Chlorotoluene	1.72219	1.62478	1.61522	1.65395	1.81777	1.46066					
	1.36837	1.38610	1.46791	1.40825			AVRG		1.55252		9.99245
82 1,3,5-Trimethylbenzene	1.47319	1.51459	1.45660	1.48528	1.63138	1.42852					
	1.26116	1.27928	1.40332	1.38751			AVRG		1.43208		7.61508
83 1,2,4-Trimethylbenzene	1.63396	1.49410	1.44842	1.45191	1.60250	1.38586					
	1.23323	1.28264	1.41342	1.41189			AVRG		1.43579		8.65337

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-JAN-2002 16:14
 End Cal Date : 04-JAN-2002 21:27
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V401041.B\V401041.8260.m
 Cal Date : 07-Jan-2002 09:30 lisa

Compound	0.500000 Level 1	1.0000 Level 2	5.0000 Level 3	20.0000 Level 4	50.0000 Level 5	100.0000 Level 6	Curve	b	Coefficients m1	m2	%RSD or R^2
85 tert-Butylbenzene	1.28265 0.98960	1.25150 1.00758	1.21517 1.12234	1.25092 1.13854	1.38257	1.17847	AVRG		1.18193		10.32140
86 sec-Butylbenzene	1.87369 1.49900	1.83653 1.57467	1.76438 1.80255	1.86655 1.80408	2.12653	1.75458	AVRG		1.79025		9.52315
87 4-Isopropyltoluene	1.36979 1.14596	1.41888 1.24298	1.30093 1.44344	1.38523 1.37733	1.54474	1.26340	AVRG		1.34927		8.44185
89 1,3-Dichlorobenzene	2.19989 1.67750	2.03763 1.75224	1.87202 1.78727	1.84275 1.69593	1.88513	1.77389	AVRG		1.85243		8.66950
90 1,4-Dichlorobenzene	2.14979 1.67802	2.11049 2.00933	1.84650 2.06690	1.81034 1.74093	1.84668	1.76380	AVRG		1.90228		8.81955

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-JAN-2002 16:14
 End Cal Date : 04-JAN-2002 21:27
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V401041.B\V401041.8260.m
 Cal Date : 07-Jan-2002 09:30 lisa

Compound	0.5000000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients ml	m2	%RSD or R^2
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
91 1,2-Dichlorobenzene	1.71574	1.61401	1.52739	1.53514	1.56212	1.49545	AVRG		1.56065		4.58290
	1.46841	1.58147	1.59857	1.50821							
92 n-Butylbenzene	4.75997	4.58118	4.38107	4.41902	4.53399	4.20401	AVRG		4.44178		5.13069
	4.40073	4.59939	4.57859	3.95985							
93 1,2-Dibromo-3-chloropropane	++++	++++	0.22696	0.21046	0.20438	0.20190	AVRG		0.21318		10.55551
	0.23460	0.25087	0.19022	0.18605							
94 1,2,4-Trichlorobenzene	1.31167	1.11679	0.98410	0.93017	0.86282	1.00082	AVRG		1.01405		13.24670
	1.11452	0.99735	0.89210	0.93016							
95 Naphthalene	++++	2.02799	1.75891	1.65133	1.52249	1.87980	AVRG		1.78957		8.40310
	1.90443	1.79783	1.70698	1.85638							

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-JAN-2002 16:14
 End Cal Date : 04-JAN-2002 21:27
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V401041.B\V401041.8260.m
 Cal Date : 07-Jan-2002 09:30 lisa

Compound	0.500000 Level 1	1.0000 Level 2	5.0000 Level 3	20.0000 Level 4	50.0000 Level 5	100.0000 Level 6	Curve	b	Coefficients ml	m2	RRSD or R^2
96 Hexachlorobutadiene	0.71233 0.93759	0.68817 0.81136	0.59845 0.60840	0.70091 0.63010	0.66050	0.69456	AVRG		0.71424		13.36302
97 1,2,3-Trichlorobenzene	1.04144 0.92304	0.97627 0.83102	0.82275 0.81068	0.79806 0.84054	0.73875	0.89793	AVRG		0.86805		10.50087
34 Dibromofluoromethane	0.62174 0.59661	0.66707 0.61491	0.63070 0.57628	0.61798 0.58493	0.64800	0.62887	AVRG		0.61871		4.47457
37 1,2-Dichloroethane-d4	0.75623 0.72807	0.85245 0.73600	0.77603 0.69084	0.74218 0.69355	0.74421	0.79843	AVRG		0.75180		6.42267
56 Toluene-d8	1.43569 1.47850	1.61083 1.55237	1.59969 1.45063	1.50323 1.51931	1.57781	1.56405	AVRG		1.52921		4.01972

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 04-JAN-2002 16:14
 End Cal Date : 04-JAN-2002 21:27
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCBDC\DD\chem\voc4.i\V401041.B\V401041.8260.m
 Cal Date : 07-Jan-2002 09:30 lisa

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients ml	m2	%RSD or R^2
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
	120.0000	150.0000	170.0000	200.0000							
	Level 7	Level 8	Level 9	Level 10							
\$ 77 Bromofluorobenzene	0.60036	0.61605	0.60108	0.56567	0.66149	0.57521					
	0.55060	0.53028	0.48225	0.50952		AVRG		0.56925			9.39288

Curve	Formula	Units
Averaged	Amt = Rsp/ml	Response
Linear	Amt = b * Rsp/ml	Response

889 672

FORM 3
WATER VOA-GCMS LAB CONTROL SAMPLE

Lab Name: ETC, INC.

Lab Prep Batch: V401031

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix Spike - Sample No.: V401031LCS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
Isobutyl Alcohol	2000		1620	81	60-134
Isopropylbenzene	100.0		93.79	94	74-125
4-Isopropyltoluene	100.0		88.99	89	72-127
Methacrylonitrile	1000		779.0	78	70-125
Methylene Chloride	100.0		84.58	84	76-115
Methyl methacrylate	200.0		147.0	74	57-147
4-Methyl-2-Pentanone	100.0		73.20	73	42-144
Methyl-tertbutyl-Ether	100.0		85.05	85	62-122
Naphthalene	100.0		98.36	98	53-124
Propionitrile	1000		751.3	75	58-139
n-Propyl Acetate	100.0		120.2	120	88-170
n-Propylbenzene	100.0		94.74	95	75-125
Styrene	100.0		94.38	94	77-117
1,1,1,2-Tetrachloroetha	100.0		89.12	89	79-113
1,1,2,2-Tetrachloroetha	100.0		86.82	87	67-126
Tetrachloroethene	100.0		93.68	94	77-115
Tetrahydrofuran	100.0		80.47	80	76-181
1,2,3-Trichlorobenzene	100.0		105.3	105	62-132
Toluene	100.0		85.55	86	77-115
1,1,1-Trichloroethane	100.0		88.50	88	63-122
1,1,2-Trichloroethane	100.0		81.46	81	69-117
1,1,2-trichloro-1,2,2-t	100.0		104.8	105	70-130
Trichloroethene	100.0		90.70	91	75-113
Trichlorofluoromethane	100.0		72.51	72	55-130
1,2,3-Trichloropropane	100.0		78.87	79	62-130
1,2,4-Trimethylbenzene	100.0		85.88	86	69-126
1,2,4-Trichlorobenzene	100.0		110.4	110	68-132
1,3,5-Trimethylbenzene	100.0		87.74	88	69-128

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

COMMENTS:



ENVIRONMENTAL TESTING & CONSULTING, INC.
2924 Walnut Grove Road • Memphis, TN 38111 • (901) 327-2750 • FAX (901) 327-6334

889 673

Founded 1972

January 14, 2002

Mr. Kraig Smith
Sverdrup/Jacobs Eng.
3354 Perimeter Hill Drive,
Suite 310
Nashville, TN 37211

Ref: Analytical Testing
ETC Order # 0112602
Project Description Memphis Depot
Project Number C5X51106

The above referenced project has been analyzed per your instructions. The analyses were performed in our laboratory in accordance with Standard Methods, The Solid Waste Manual SW-846, EPA Methods for Chemical Analysis of Water and Wastes and/or 40 CFR part 136.

The analytical data has been validated using standard quality control measures performed as required by the analytical method. Quality Assurance, instrumentation maintenance and calibration were performed in accordance with guidelines established by the USEPA.

The results are shown on the attached analysis sheet(s).

Please do not hesitate to contact our office if you have any questions.

Sincerely,

Connie Bradberry

Connie Bradberry
Laboratory Project Manager

rt
Attachment

SVE_MHDDMT6

Certifications

Tennessee #TN02027
Arkansas #40730
Kentucky #90047
North Carolina #415
South Carolina #84002002

Mississippi
Oklahoma #9311
Virginia #00106
Washington #C248
US Army Corps of Engineers

USDA #S-46279

Environmental Testing & Consulting, Inc.
Data Qualifiers for Organic Reporting

Within the attached report, some analytical data may be reported as "Qualified Data" as indicated by a "Data Qualifier" next to the result. This table summarizes the possible "Data Qualifiers" that may be associated with this report. These qualifiers do not apply for TIC reports.

Q	Surrogate Recovery Outside QC Limits
J	Estimated Value. Presence of the compound was confirmed but less than the reported detection limit.
E	Concentration exceeds the established method calibration range but is within the working range of the instrument.
B	Analyte detected in the associated Method Blank.
U	Reported result was unconfirmed. Refer to Case Narrative.
C	Result reported from GC/MS confirmation analysis.
M	Result reported represents a minimum value. Refer to Case Narrative.
NC	Result reported from Primary Column. Result did not confirm.
*	QC Data (percent recovery/RPD for a particular analyte was outside QC Limits)

ENVIRONMENTAL TESTING & CONSULTING, INC.
 2924 Walnut Grove Road - Memphis, TN 38111 - (901)327-2750
ANALYTICAL SUMMARY/CROSS REFERENCE TABLE

889 675

Client Name **Sverdrup/Jacobs Eng.**
 Site ID **Memphis Depot**

ETC Order #0112602
 C5X51106

ETC Sample ID	Field ID	Matrix	Method	Method Description
011260201	VW-1	AQUEOUS	150.1	pH
011260201	VW-1	AQUEOUS	160.2	Total Suspended Solids
011260201	VW-1	AQUEOUS	245.1	Mercury Dig. Batch/Diss.
011260201	VW-1	AQUEOUS	200.7	Silver
011260201	VW-1	AQUEOUS	200.7	Silver - Dissolved
011260201	VW-1	AQUEOUS	200.7	Arsenic
011260201	VW-1	AQUEOUS	200.7	Arsenic - Dissolved
011260201	VW-1	AQUEOUS	200.7	Barium
011260201	VW-1	AQUEOUS	200.7	Barium - Dissolved
011260201	VW-1	AQUEOUS	200.7	Cadmium
011260201	VW-1	AQUEOUS	200.7	Cadmium - Dissolved
011260201	VW-1	AQUEOUS	200.7	Chromium
011260201	VW-1	AQUEOUS	200.7	Chromium - Dissolved
011260201	VW-1	AQUEOUS	200.7	Iron
011260201	VW-1	AQUEOUS	200.7	Iron - Dissolved
011260201	VW-1	AQUEOUS	245.1	Mercury
011260201	VW-1	AQUEOUS	245.1	Mercury - Dissolved
011260201	VW-1	AQUEOUS	200.7	Manganese
011260201	VW-1	AQUEOUS	200.7	Manganese - Dissolved
011260201	VW-1	AQUEOUS	200.7	Lead
011260201	VW-1	AQUEOUS	200.7	Lead - Dissolved
011260201	VW-1	AQUEOUS	200.7	Selenium
011260201	VW-1	AQUEOUS	200.7	Selenium - Dissolved
011260201	VW-1	AQUEOUS	8260B	GC/MS Volatile Organics
011260202	EFF-12-21	AQUEOUS	8260B	GC/MS Volatile Organics
011260202	EFF-12-21	AQUEOUS	8270C	GC/MS Base/Neutral & Acid

889 676

Environmental Testing & Consulting, Inc.

Login
Chain-of-Custody

000003



Environmental Testing & Consulting, Inc.
2924 Walnut Grove Rd.
Memphis, TN 38111
(901)327-2750 FAX (901)327-6334

ETC Work Order :

(901)327-2750 **FAX (901)327-6334**

[illegible][illegible]

Distribution : Original and Yellow accompany samples to the laboratory. Pink copy for Field Crew. Original copy returned with results. Yellow copy for ETC, Inc. files.

889 678

Environmental Testing & Consulting, Inc.
Cooler Receipt Form

Date Received 12/21/01
Date/Time Checked In 12/21/01-10:45
Carrier/Bill# Hand-Delivered

LIMS# 0112-602
Project Memphis Depot
By Rebekah Barger

1. Custody Seals?/Location-	No
2. Samples are non-radioactive?	Yes
3. Chain of Custody in plastic?	Yes
4. Temperature at receipt (ok = 4 ± 2 °C) <40C	OK
5. Ice & Packing-bags, ice, bubble wrap	Yes
6. Chain of Custody filled out properly?	Yes
7. All containers in separate bags?	No
8. Sample containers intact?	Yes
9. Label(s) complete and in good condition?	Yes
10. Label(s) agree with Chain of Custody?	Yes
11. Correct containers used?	Yes
12. Sufficient sample?	Yes
13. VOA vials bubble-free (H ₂ O) or no head space (soil)?	Yes
14. Preservation OK? TM pH____; TRPH pH____; TOC pH____; TOX pH____; CN pH____; N/P pH____; Other pH____	Yes

Comments _____

*Validated Date and Time of Sample Receipt (VDTSR)

900005

889 679

Environmental Testing & Consulting, Inc.

Sample Reports

000006

ENVIRONMENTAL TESTING & CONSULTING, INC.
2924 Walnut Grove Road - Memphis, TN 38111 - (901)327-2750

889 630

Client Name

Sverdrup/Jacobs Eng.
Memphis Depot, Dunn Field
3354 Perimeter Hill Drive,
Suite 310
Nashville, TN 37211

Site ID Memphis Depot

Date Arrived 12/21/01

ETC Order Number 0112602

ETC Lab ID : 0112602-01

Field ID : VW-1

Matrix : AQUEOUS

Sample Date : 12/21/01

TEST	RESULT	UNITS	DETECTION LIMIT	DATE ANALYZED	BY	METHOD	QC BATCH
pH	6.5	SU		12/21/01	RB	150.1	1330
Total Suspended Solids	177	mg/L	2	12/26/01	JM	160.2	T2122611

889 681

ENVIRONMENTAL TESTING & CONSULTING, INC.

2924 Walnut Grove Road - Memphis, TN 38111 - (901)327-2750

Client Name **Sverdrup/Jacobs Eng.**
Memphis Depot, Dunn Field
3354 Perimeter Hill Drive,
Suite 310
Nashville, TN 37211

Site ID **Memphis Depot**Date Arrived **12/21/01**ETC Order Number **0112602**ETC Lab ID : **0112602-01**Field ID : **VW-1**Matrix : **AQUEOUS**Sample Date : **12/21/01**

TEST	RESULT	UNITS	DETECTION LIMIT	DATE ANALYZED	DATE PREPARED	BY	METHOD
Mercury Digestion Batch	V9-AQ-26				01/02/02	JF	245.1
Metals Dig. Batch/Diss.	V29-AQ-29				12/28/01	NR	3030K
Silver	ND	mg/L	0.0005	01/03/02	12/28/01	SH	200.7
Silver - Dissolved	ND	mg/L	0.0005	01/03/02	12/28/01	SH	200.7
Arsenic	0.003	mg/L	0.002	01/03/02	12/28/01	SH	200.7
Arsenic - Dissolved	ND	mg/L	0.002	01/03/02	12/28/01	SH	200.7
Barium	0.124	mg/L	0.001	01/03/02	12/28/01	SH	200.7
Barium - Dissolved	0.065	mg/L	0.001	01/03/02	12/28/01	SH	200.7
Cadmium	ND	mg/L	0.0003	01/03/02	12/28/01	SH	200.7
Cadmium - Dissolved	ND	mg/L	0.0003	01/03/02	12/28/01	SH	200.7
Chromium	0.014	mg/L	0.002	01/03/02	12/28/01	SH	200.7
Chromium - Dissolved	ND	mg/L	0.002	01/03/02	12/28/01	SH	200.7
Iron	11.1	mg/L	0.035	01/03/02	12/28/01	SH	200.7
Iron - Dissolved	ND	mg/L	0.035	01/03/02	12/28/01	SH	200.7
Mercury	ND	mg/L	0.0002	01/03/02	01/02/02	JF	245.1
Mercury - Dissolved	ND	mg/L	0.0002	01/03/02	01/02/02	JF	245.1
Manganese	2.39	mg/L	0.002	01/03/02	12/28/01	SH	200.7
Manganese - Dissolved	2.12	mg/L	0.001	01/03/02	12/28/01	SH	200.7
Lead	0.049	mg/L	0.002	01/03/02	12/28/01	SH	200.7
Lead - Dissolved	ND	mg/L	0.002	01/03/02	12/28/01	SH	200.7
Selenium	ND	mg/L	0.002	01/03/02	12/28/01	SH	200.7
Selenium - Dissolved	ND	mg/L	0.002	01/03/02	12/28/01	SH	200.7

ENVIRONMENTAL TESTING & CONSULTING, INC.

2924 Walnut Grove Road - Memphis, TN 38111 - (901)327-2750

889 682

Client Name **Sverdrup/Jacobs Eng.**
Memphis Depot, Dunn Field
3354 Perimeter Hill Drive,
Suite 310
Nashville, TN 37211

Site ID **Memphis Depot**

FID #

Date Arrived **12/21/01**
 ETC Order Number **0112602**

ETC Lab ID **0112602-01**
 Field ID **VW-1**

Matrix : **AQUEOUS**
 Sample Date : **12/21/01**

TEST	RESULT	UNITS	DETECTION LIMIT	DATE ANALYZED	DATE EXTRACTED BY	METHOD
GC/MS Volatile Organics				12/21/01	LS	8260B 5030B
QC Batch	V412211					
Dilution Factor	1					
Acetone	ND	ug/L	20.0			
Benzene	ND	ug/L	1.00			
Bromodichloromethane	ND	ug/L	1.00			
Bromoform	ND	ug/L	1.00			
Bromomethane	ND	ug/L	1.00			
2-Butanone (MEK)	57.3	ug/L	20.0			
Carbon Disulfide	0.64J	ug/L	1.00			
Carbon Tetrachloride	ND	ug/L	1.00			
Chlorobenzene	ND	ug/L	1.00			
Chlorodibromomethane	ND	ug/L	1.00			
Chloroethane	ND	ug/L	1.00			
Chloroform	1.36	ug/L	1.00			
Bromomethane	ND	ug/L	1.00			
1,1-Dichloroethane	ND	ug/L	1.00			
1,2-Dichloroethane	0.48J	ug/L	1.00			
1,1-Dichloroethene	ND	ug/L	1.00			
trans-1,2-Dichloroethene	7.91	ug/L	1.00			
1,2-Dichloropropane	ND	ug/L	1.00			
cis-1,3-Dichloropropene	ND	ug/L	1.00			
trans-1,3-Dichloropropene	ND	ug/L	1.00			
Ethylbenzene	ND	ug/L	1.00			
2-Hexanone (MBK)	ND	ug/L	5.00			
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.00			
Methylene Chloride	ND	ug/L	5.00			
Styrene	ND	ug/L	1.00			
1,1,2,2-Tetrachloroethane	311E	ug/L	1.00			
Tetrachloroethene	25.6	ug/L	1.00			
Toluene	ND	ug/L	2.00			
1,1,1-Trichloroethane	ND	ug/L	1.00			
1,1,2-Trichloroethane	3.20	ug/L	1.00			
Trichloroethene	606E	ug/L	1.00			
Vinyl Acetate	ND	ug/L	20.0			
Vinyl Chloride	ND	ug/L	1.00			
Xylenes-m,p	ND	ug/L	1.00			
Xylenes-o	ND	ug/L	1.00			
cis-1,2-Dichloroethene	26.0	ug/L	1.00			

Surrogate Standard	% Recovery	QC Limits	
S1 - Dibromofluoromethane	99	84	115
S2 - Toluene-d8	86	69	133
S3 - 4-Bromofluorobenzene	91	80	111
S4 - 1,2-Dichloroethane-d4	125	58	131


 Data Validator _____ ND - Not Detected

Q - Recovery Outside QC Limits

000009

889 683

FORM 1
VOA-GCMS ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

011260201

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix: (soil/water) WATER

Lab Sample ID: 011260201

Sample wt/vol: 10.00 (g/mL) ML

Lab File ID: 0701008

Level: (low/med) LOW

Date Received: _____

% Moisture: not dec. _____

Date Analyzed: 12/21/01

GC Column: ID: 2.00 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

FORM I VOA-GCMS-TIC

000010

ENVIRONMENTAL TESTING & CONSULTING, INC.
2924 Walnut Grove Road - Memphis, TN 38111 - (901)327-2750

889 684

Client Name **Sverdrup/Jacobs Eng.**
Memphis Depot, Dunn Field
3354 Perimeter Hill Drive,
Suite 310
Nashville, TN 37211

Site ID **Memphis Depot**

FID #

Date Arrived **12/21/01**
ETC Order Number **0112602**

ETC Lab ID **0112602-01**
Field ID : **VW-1-DIL1**

Matrix : **AQUEOUS**
Sample Date : **12/21/01**

TEST	RESULT	UNITS	DETECTION LIMIT	DATE ANALYZED	DATE EXTRACTED BY	METHOD
GC/MS Volatile Organics						
				01/03/02	LS	8260B 5030B
QC Batch	V401031					
Dilution Factor	50					
1,1,2,2-Tetrachloroethane	16,400E	ug/L	50.0			
Trichloroethene	788	ug/L	50.0			
Surrogate Standard						
	% Recovery		QC Limits			
S1 - Dibromofluoromethane	104		84	115		
S2 - Toluene-d8	93		69	133		
S3 - 4-Bromofluorobenzene	102		80	111		
S4 - 1,2-Dichloroethane-d4	104		58	131		

889 685 ENVIRONMENTAL TESTING & CONSULTING, INC.

2924 Walnut Grove Road - Memphis, TN 38111 - (901)327-2750

Client Name **Sverdrup/Jacobs Eng.**
Memphis Depot, Dunn Field
3354 Perimeter Hill Drive,
Suite 310
Nashville, TN 37211

Site ID **Memphis Depot**

FID #

Date Arrived **12/21/01**

ETC Order Number **0112602**

ETC Lab ID **0112602-01**

Field ID : **VW-1-DIL2**

Matrix : **AQUEOUS**

Sample Date : **12/21/01**

TEST	RESULT	UNITS	DETECTION LIMIT	DATE ANALYZED	DATE EXTRACTED BY	METHOD
GC/MS Volatile Organics				01/03/02	LS	8260B 5030B
QC Batch	V401031					
Dilution Factor	1000					
1,1,2,2-Tetrachloroethane	18,000	ug/L	1000			
<u>Surrogate Standard</u>	<u>% Recovery</u>					
S1 - Dibromofluoromethane	104		84	115		
S2 - Toluene-d8	103		69	133		
S3 - 4-Bromofluorobenzene	101		80	111		
S4 - 1,2-Dichloroethane-d4	104		58	131		

CB
Data Validator

ND - Not Detected

Q - Recovery Outside QC Limits

000012

ENVIRONMENTAL TESTING & CONSULTING, INC.

2924 Walnut Grove Road - Memphis, TN 38111 - (901)327-2750

889 686

Client Name **Sverdrup/Jacobs Eng.**
Memphis Depot, Dunn Field
3354 Perimeter Hill Drive,
Suite 310
Nashville, TN 37211

Site ID **Memphis Depot**
 FID #

Date Arrived **12/21/01**
 ETC Order Number **0112602**

ETC Lab ID **0112602-02**
 Field ID : **EFF-12-21**

Matrix : **AQUEOUS**
 Sample Date : **12/21/01**

TEST	RESULT	UNITS	DETECTION LIMIT	DATE ANALYZED	DATE EXTRACTED BY	METHOD
GC/MS Volatile Organics				01/03/02	LS	8260B 5030B
QC Batch	V401031					
Dilution Factor	1					
Acetone	ND	ug/L	20.0			
Benzene	ND	ug/L	1.00			
Bromodichloromethane	ND	ug/L	1.00			
Bromoform	ND	ug/L	1.00			
Bromomethane	ND	ug/L	1.00			
2-Butanone (MEK)	ND	ug/L	20.0			
Carbon Disulfide	ND	ug/L	1.00			
Carbon Tetrachloride	6.11	ug/L	1.00			
Chlorobenzene	ND	ug/L	1.00			
Chlorodibromomethane	ND	ug/L	1.00			
Chloroethane	ND	ug/L	1.00			
Chloroform	52.1	ug/L	1.00			
Bromomethane	ND	ug/L	1.00			
1,1-Dichloroethane	0.53J	ug/L	1.00			
1,2-Dichloroethane	ND	ug/L	1.00			
1,1-Dichloroethene	16.4	ug/L	1.00			
trans-1,2-Dichloroethene	13.2	ug/L	1.00			
1,2-Dichloropropane	ND	ug/L	1.00			
cis-1,3-Dichloropropene	ND	ug/L	1.00			
trans-1,3-Dichloropropene	ND	ug/L	1.00			
Ethylbenzene	ND	ug/L	1.00			
2-Hexanone (MBK)	ND	ug/L	5.00			
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.00			
Methylene Chloride	ND	ug/L	10.0			
Styrene	ND	ug/L	1.00			
1,1,2,2-Tetrachloroethane	174	ug/L	1.00			
Tetrachloroethene	21.6	ug/L	1.00			
Toluene	ND	ug/L	2.00			
1,1,1-Trichloroethane	0.65J	ug/L	1.00			
1,1,2-Trichloroethane	1.32	ug/L	1.00			
Trichloroethene	173	ug/L	1.00			
Vinyl Acetate	ND	ug/L	20.0			
Vinyl Chloride	ND	ug/L	1.00			
Xylenes-m,p	ND	ug/L	1.00			
Xylenes-o	ND	ug/L	1.00			
cis-1,2-Dichloroethene	53.6	ug/L	1.00			

Surrogate Standard	% Recovery	QC Limits	
S1 - Dibromofluoromethane	107	84	115
S2 - Toluene-d8	94	69	133
S3 - 4-Bromofluorobenzene	102	80	111
S4 - 1,2-Dichloroethane-d4	118	58	131

CB
 Data Validator ND - Not Detected

Q - Recovery Outside QC Limits

000013

FORM 1
VOA-GCMS ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

889 687

011260202

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix: (soil/water) WATER

Lab Sample ID: 011260202

Sample wt/vol: 10.00 (g/mL) ML

Lab File ID: 0901011

Level: (low/med) LOW

Date Received: _____

% Moisture: not dec. _____

Date Analyzed: 01/03/02

GC Column: ID: 2.00 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

ENVIRONMENTAL TESTING & CONSULTING, INC. 889 688

2924 Walnut Grove Road - Memphis, TN 38111 - (901)327-2750

Client Name **Sverdrup/Jacobs Eng.**
Memphis Depot, Dunn Field
3354 Perimeter Hill Drive,
Suite 310
Nashville, TN 37211

Site ID **Memphis Depot**
 FID #

Date Arrived **12/21/01**
 ETC Order Number **0112602**

ETC Lab ID **0112602-02**
 Field ID : **EFF-12-21**

Matrix : **AQUEOUS**
 Sample Date : **12/21/01**

TEST	RESULT	UNITS	DETECTION LIMIT	DATE ANALYZED	DATE EXTRACTED BY	METHOD
GC/MS Base/Neutral & Acid				01/03/02	12/27/01	EM 8270C 3510C
QC Batch	P07012					
Dilution Factor	1					
Acenaphthene	ND	ug/L	2.00			
Acenaphthylene	ND	ug/L	2.00			
Anthracene	ND	ug/L	2.00			
Benzo(a)anthracene	ND	ug/L	2.00			
Benzo(b)fluoranthene	ND	ug/L	2.00			
Benzo(k)fluoranthene	ND	ug/L	2.00			
Benzo(g,h,i)perylene	ND	ug/L	2.00			
Benzo(a)pyrene	ND	ug/L	2.00			
Benzoic Acid	ND	ug/L	50.0			
Benzyol Alcohol	ND	ug/L	10.0			
Bis(2-chloroethoxy)methane	ND	ug/L	5.00			
Bis(2-chloroethyl)ether	ND	ug/L	5.00			
Bis(2-chloroisopropyl)ether	ND	ug/L	5.00			
Bis(2-ethylhexyl)phthalate	ND	ug/L	10.0			
4-Bromophenyl phenyl ether	ND	ug/L	5.00			
Butyl benzyl phthalate	ND	ug/L	5.00			
4-Chloroaniline	ND	ug/L	5.00			
2-Chloronaphthalene	ND	ug/L	5.00			
4-Chloro-3-methylphenol	ND	ug/L	5.00			
2-Chlorophenol	ND	ug/L	5.00			
4-Chlorophenyl phenyl ether	ND	ug/L	5.00			
Chrysene	ND	ug/L	2.00			
Dibenzo(a,h)anthracene	ND	ug/L	2.00			
Dibenzofuran	ND	ug/L	5.00			
Di-n-butyl phthalate	ND	ug/L	5.00			
3,3'-Dichlorobenzidine	ND	ug/L	10.0			
2,4-Dichlorophenol	ND	ug/L	5.00			
Diethyl phthalate	ND	ug/L	5.00			
2,4-Dimethylphenol	ND	ug/L	5.00			
Dimethyl phthalate	ND	ug/L	5.00			
4,6-Dinitro-2-methylphenol	ND	ug/L	10.0			
2,4-Dinitrophenol	ND	ug/L	50.0			
2,4-Dinitrotoluene	ND	ug/L	5.00			
2,6-Dinitrotoluene	ND	ug/L	5.00			
Di-n-octyl phthalate	ND	ug/L	5.00			
Fluoranthene	ND	ug/L	2.00			
Fluorene	ND	ug/L	2.00			
Hexachlorobenzene	ND	ug/L	5.00			
Hexachlorobutadiene	ND	ug/L	5.00			
Hexachlorocyclopentadiene	ND	ug/L	5.00			
Hexachloroethane	ND	ug/L	5.00			
Indeno(1,2,3-cd)pyrene	ND	ug/L	2.00			
Benzo(a)anthracene	ND	ug/L	5.00			
2-Methylphenol (o-cresol)	ND	ug/L	5.00			
4-Methylphenol (p-cresol)	ND	ug/L	5.00			
Naphthalene	ND	ug/L	2.00			

CS
 Data Validator

ND - Not Detected

Q - Recovery Outside QC Limits

000015

889 689

ENVIRONMENTAL TESTING & CONSULTING, INC.

2924 Walnut Grove Road - Memphis, TN 38111 - (901)327-2750

Client Name

Sverdrup/Jacobs Eng.
Memphis Depot, Dunn Field
3354 Perimeter Hill Drive,
Suite 310
Nashville, TN 37211

Site ID Memphis Depot

FID #

Date Arrived 12/21/01

ETC Order Number 0112602

ETC Lab ID 0112602-02

Field ID : EFF-12-21

Matrix : AQUEOUS

Sample Date : 12/21/01

TEST	RESULT	UNITS	DETECTION LIMIT	DATE ANALYZED	DATE EXTRACTED BY	METHOD
GC/MS Base/Neutral & Acid						
				01/03/02		
Nitrobenzene	ND	ug/L	5.00		12/27/01	EM 8270C
2-Nitroaniline	ND	ug/L	5.00			3510C
3-Nitroaniline	ND	ug/L	10.0			
4-Nitroaniline	ND	ug/L	5.00			
2-Nitrophenol	ND	ug/L	5.00			
4-Nitrophenol	ND	ug/L	5.00			
N-Nitrosodiphenylamine	ND	ug/L	5.00			
N-Nitrosodipropylamine	ND	ug/L	5.00			
Pentachlorophenol	ND	ug/L	10.0			
Phenanthrene	ND	ug/L	2.00			
Phenol	ND	ug/L	5.00			
Pyrene	ND	ug/L	2.00			
2,4,5-Trichlorophenol	ND	ug/L	5.00			
2,4,6-Trichlorophenol	ND	ug/L	5.00			

Surrogate Standard	% Recovery	QC Limits	
S1 - Nitrobenzene-d5	51	29	110
S2 - 2-Fluorobiphenyl	51	38	107
S3 - 4-Terphenyl-d14	53	33	122
S4 - Phenol-d6	23	7	58
S5 - 2,4,6-Tribromophenol	54	16	138
S6 - 2-Fluorophenol	33	8	88

Data Validator

ND - Not Detected

Q - Recovery Outside QC Limits

000016

FORM 1
BNA-GCMS ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

889 630
CLIENT SAMPLE NO.

011260202

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix: (soil/water) WATER

Lab Sample ID: 011260202

Sample wt/vol: 1000 (g/mL) ML

Lab File ID: 0601008

Level: (low/med) LOW

Date Received: _____

% Moisture: _____ decanted: (Y/N) _____

Date Extracted: _____

Concentrated Extract Volume: 1 (mL)

Date Analyzed: 01/03/02

Injection Volume: 1.0 (uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

Number TICs found: 9

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	3.72	0.820	J
2. 127-18-4	TETRACHLOROETHYLENE	3.79	3.30	NJ
3. 79-34-5	ETHANE, 1,1,2,2-TETRACHLORO-	4.45	39.58	NJ
4. 565-75-3	PENTANE, 2,3,4-TRIMETHYL-	4.57	1.06	NJ
5. 542-85-8	ETHANE, ISOTHIOCYANATO-	4.80	3.27	NJ
6.	UNKNOWN	5.50	1.07	J
7. 398-23-2	1,1'-BIPHENYL, 4,4'-DIFLUORO	6.12	1.64	NJ
8. 57-10-3	HEXADECANOIC ACID	7.50	0.932	NJ
9. 314-40-9	BROMACIL	7.58	2.39	NJ
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

FORM I BNA-GCMS-TIC

900017

Environmental Testing & Consulting, Inc.

**Quality Control Reports
Level III
Inorganics**

ENVIRONMENTAL TESTING AND CONSULTING, INC.
CASE NARRATIVE
INORGANICS - AQUEOUS

889 692

Client Name Sverdrup/Jacobs Engineering
Project Name Memphis Depot
ETC Order# 0112-602

HOLDING TIMES

Sample Analysis

All samples analyzed within Method Specified Holding Times.

QUALITY CONTROL

QC Batch

T2122611

TSS

Duplicates

RPD

All analytes within QC limits



Project Manager

000019

889 693

DUPLICATE
INORGANICS

Lab Name: Environmental Testing and Consulting, Inc.

Analyte	QC Sample No.	QC Batch	SAMPLE Result	DUP Result	Units	% RPD	#	QC Limits		Method
TSS	01112-611-0 DUP	T2122611	344	308	mg/L	11		0	20	160.2

ND - Not Detected

Column to be used to flag recovery values with an asterisk

* Values outside of QC limits

Reviewed by.



INORG DUP 0112-602.iqc

900020

889 694

Environmental Testing & Consulting, Inc.

**Quality Control Reports
Level III
Metals (ICP/GFAA/CV)**

000021

ENVIRONMENTAL TESTING AND CONSULTING, INC.
CASE NARRATIVE
METALS - AQUEOUS

889 695

Client Name Sverdrup/Jacobs Engineering
Project Name Memphis Depot
ETC Order# 0112-602

PRESERVATION

All aqueous samples preserved to pH < 2.

HOLDING TIMES

QC Batch(s) for this order	ICP Metals	V29-AQ-29
	Mercury	V9-AQ-26

Sample Preparation/Analysis	All samples digested/ analyzed within holding time.
Mercury Preparation/Analysis	All samples analyzed within 28 days of collection.

METHOD

Preparation: SM3030K/7470A
Analysis: EPA 200.7/7470A

CALIBRATION

Initial Calibration	All criteria met.
Continuing Calibration	All criteria met.

SAMPLE ANALYSIS

Instrumentation	Thermo Jarrell Ash Enviro-I ICP CETAC M-6000A Mercury Analyzer
Dilutions Required	No dilutions required.

QUALITY CONTROL

0112-602.MQCBLANK

Method Blank

V29-AQ-29BLK	ICP Metals

V9-AQ-26BLK	Mercury

No target analytes detected in the method blank

0112-602.MQCLCS

Laboratory Control Sample(s)

V29-AQ-29LCS	ICP Metals

V9-AQ-26LCS	Mercury

All acceptance criteria met.

0112-602.MQCMSMSD

Matrix Spike / Matrix Spike Dup - ICP Metals

0112-602-01	RPD	All analytes within QC limits.
VW-1	Spike Recovery	All analytes within QC limits.*

*Iron was flagged for low recovery in the MS. MSD recovery was within QC limits. Refer to Laboratory Control Sample(s) for system verification.

Matrix Spike / Matrix Spike Dup - Hg

0112-602-01	RPD	All analytes within QC limits.
VW-1	Spike Recovery	All analytes within QC limits.

Refer to Laboratory Control Sample(s) for system verification.

CB
Project Manager

889 696

FORM 3A
WATER METHOD BLANK
METALS

Lab Name: Environmental Testing and Consulting, Inc

Laboratory ID ICP/GFAA Metals
Laboratory ID MercuryV29-AQ-29 BLK
V9-AQ-26 BLKQC Batch
V29-AQ-29
V9-AQ-26

Date Sample Prepared

12/28/01 ICP/GFAA Metals
1/2/02 Mercury

Metals	Concentration mg/L	Detection Limit mg/L	Date Analyzed	Method
Silver	ND	0.0005	1/3/02	200.7
Arsenic	ND	0.002	1/3/02	200.7
Barium	ND	0.0005	1/3/02	200.7
Cadmium	ND	0.0003	1/3/02	200.7
Chromium	ND	0.002	1/3/02	200.7
Iron	ND	0.035	1/3/02	200.7
Manganese	ND	0.0005	1/3/02	200.7
Lead	ND	0.002	1/3/02	200.7
Selenium	ND	0.002	1/3/02	200.7
Mercury	ND	0.0002	1/3/02	245.1

ND - Not Detected

Reviewed by 

0112-602.mqc BLANK

000023

889 697

FORM 7
WATER LABORATORY CONTROL SAMPLE
METALS

Lab Name: Environmental Testing and Consulting, Inc

Laboratory Control ID

ICP/GFAA Metals V29-AQ-29 LCS
Mercury V9-AQ-26 LCS

QC Batch
V29-AQ-29
V9-AQ-26

Date Prepared

ICP/GFAA Metals 12/28/01
Mercury 1/2/02

Metals	Spike Added mg/L	Found mg/L	% R	#	QC Limits	
Silver	0.2500	0.2488	100		80	120
Arsenic	0.100	0.114	114		80	120
Barium	2.500	2.645	106		80	120
Cadmium	0.0200	0.0210	105		80	120
Chromium	0.500	0.544	109		80	120
Iron	2.50	2.78	111		80	120
Manganese	0.2500	0.2798	112		80	120
Lead	0.100	0.109	109		80	120
Selenium	0.100	0.106	106		80	120
Mercury	0.0050	0.0055	110		85	115

Column to be used to flag recovery values with an asterisk
* Values outside of QC limits

Reviewed by 

0112-602.mqc LCS

000024

889 698

FORM 6
WATER MATRIX SPIKE / MATRIX SPIKE DUPLICATE
METALS

Lab Name: Environmental Testing and Consulting, Inc

Laboratory ID MS ICP/GFAA Metals
Laboratory ID MS Mercury

0112-602-01

0112-602-01

QC Batch

V29-AQ-29

V9-AQ-26

Date Sample Prepared

12/28/01

1/2/02

ICP/GFAA Metals

Mercury

Metals	SPIKE Added mg/L	SAMPLE Conc mg/L	MS Conc mg/L	RPD < 20% #	MS % Rec #	QC Limits	
Silver	0.2500	ND	0.2495	2	100	75	125
Arsenic	0.100	0.003	0.116	0	113	75	125
Barium	2.500	0.1235	2.799	2	107	75	125
Cadmium	0.0200	ND	0.0208	2	104	75	125
Chromium	0.500	0.014	0.554	2	108	75	125
Iron	2.50	11.1	12.4	5	52 *	75	125
Manganese	0.2500	2.393	2.648	0	102	75	125
Lead	0.100	0.049	0.157	1	108	75	125
Selenium	0.100	ND	0.106	0	106	75	125
Mercury	0.0050	ND	0.0053	0	106	80	120

ND - Not Detected

Column to be used to flag recovery values with an asterisk

* Values outside of QC limits

Reviewed by h

0112-602.mqc MSMSD

000025

FORM 6
WATER MATRIX SPIKE / MATRIX SPIKE DUPLICATE
METALS

889 699

Lab Name: Environmental Testing and Consulting, Inc

Laboratory ID MS ICP/GFAA Metals
Laboratory ID MS Mercury

0112-602-01
0112-602-01

QC Batch
V29-AQ-29
V9-AQ-26

Date Sample Prepared

12/28/01
1/2/02

ICP/GFAA Metals
Mercury

Metals	SPIKE Added mg/L	SAMPLE Conc mg/L	MSD Conc mg/L		MSD % Rec	#	QC Limits	
Silver	0.2500	ND	0.2448		98		75	125
Arsenic	0.100	0.003	0.116		113		75	125
Barium	2.500	0.1235	2.735		104		75	125
Cadmium	0.0200	ND	0.0203		102		75	125
Chromium	0.500	0.014	0.545		106		75	125
Iron	2.50	11.1	13.1		80		75	125
Manganese	0.2500	2.393	2.640		99		75	125
Lead	0.100	0.049	0.155		106		75	125
Selenium	0.100	ND	0.106		106		75	125
Mercury	0.0050	ND	0.0053		106		80	120

ND - Not Detected

Column to be used to flag recovery values with an asterisk

* Values outside of QC limits

Reviewed by h

0112-602.mqc MSMSD

000026

889 700

Environmental Testing & Consulting, Inc.

**Quality Control Reports
Level III
GC/MS Volatiles**

000027

ENVIRONMENTAL TESTING AND CONSULTING, INC.

889 701

CASE NARRATIVE -

GC/MS VOLATILE COMPOUNDS - AQUEOUS

Client Name Sverdrup/Jacobs Engineering
Project Name Memphis Depot
ETC Order# 0112-602

SAMPLE PRESERVATION (Verified at time of analysis)

All aqueous samples preserved to pH < 2 and maintained at 4 degrees C until analysis.

METHOD

Preparation: SW-846 5030B
Analysis: SW-846 8260B

HOLDING TIMES

Sample Analysis All samples analyzed within 14 days of collection.

QUALITY CONTROL

QC Batch Form 4 Summary
V412211 V412211LB
V401031 V401031LB

System Monitoring Compounds FORM 2
Surrogate recoveries within QC limits.

Method Blank FORM 4

V412211LB
V401031LB

Target analytes were not detected in the method blanks, except as listed below:
Methylene Chloride was identified in method blank V412211LB at 4.60J ug/L. Per ETC, Inc. policy, sample concentrations less than 10 times the method blank value are flagged with "B - Detected in blank" and should be attributed to lab contamination.

Laboratory Control Sample FORM 3

V412211LCS/V412212LCS
V401031LCS

All target analyte acceptance criteria met.
1,1,1,2-Tetrachloroethane was flagged for low recovery in V412211LCS. The LCS was re-analyzed for this analyte. Recovery was within QC limits.

Matrix Spike / Matrix Spike Dup. FORM 3

Batch V412211

0112-623-02

RPD

Spike Recovery

All analytes within QC limits.

All analytes within QC limits.

The MS/MSD was performed on a sample not directly associated with this project. Batch QC provided for information only. Refer to Laboratory Control Sample(s) for system verification.

Batch V401031

0112-623-01

RPD

Spike Recovery

All analytes within QC limits.

All analytes within QC limits.*

*Multiple analytes were flagged for high recoveries in the MS/MSD. The MS/MSD was performed on a sample not directly associated with this project. Batch QC provided for information only. Refer to Laboratory Control Sample(s) for system verification.

000028

889 702

ENVIRONMENTAL TESTING AND CONSULTING, INC.

CASE NARRATIVE -

GC/MS VOLATILE COMPOUNDS - AQUEOUS

Client Name Sverdrup/Jacobs Engineering
Project Name Memphis Depot
ETC Order# 0112-602

CALIBRATION

BFB Daily 12-Hour Tune All criteria met. FORM 5
Initial Calibration All criteria met. FORM 6
Calibration Verification All criteria met. FORM 7 Responses >30% do not affect the data.

Sequence V401031

Calibration Verification (CV): Date 01/03/02 Time: 0857

Multiple analytes were flagged as outside QC limits in this CV. Project samples were analyzed in this sequence to bring specific target analytes within calibration range. The analytes with responses >30% difference did not affect the data. Samples in this sequence are listed on Form 5 (Instrument Performance Check). The CV passed SPCC/CCC evaluation criteria. The CV is valid per SW-846 method 8000A/8260B.

Volatile Internal Standard Area and RT FORM 8

Calibration Verification standard(s) Internal Standard Areas and Retention Times within QC limits.

SAMPLE ANALYSIS

Instrumentation HP 5890 Series II GC, 5971MSD
Dilutions Required Dilutions were performed, as indicated on the result forms, to bring target analytes within calibration range.

CS

Project Manager

000029

FORM 2
WATER VOA-GCMS SYSTEM MONITORING COMPOUND RECOVERY

889 703

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

	CLIENT SAMPLE NO.	SMC1 (DFM) #	SMC2 (TOL) #	SMC3 (BFB) #	OTHER (DCE) #	TOT OUT
01	V412211LCS	94	88	90	108	0
02	V412212LCS	94	91	80	114	0
03	V412211LB	97	95	89	113	0
04	011260201	99	86	91	125	0
05	V401031LCS	92	95	92	91	0
06	V401031LB	97	103	94	91	0
07	011260201	104	93	102	104	0
08	011260201	104	103	101	104	0
09	011260202	107	94	102	118	0
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

QC LIMITS

SMC1 (DFM) = Dibromofluoromethane (84-115)
 SMC2 (TOL) = Toluene-d8 (69-133)
 SMC3 (BFB) = Bromofluorobenzene (80-111)
 OTHER (DCE) = 1,2-Dichloroethane-d4 (58-131)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D System Monitoring Compound diluted out

889 704

FORM 4
VOA-GCMS METHOD BLANK SUMMARY

CLIENT SAMPLE NO.

Lab Name: ETC, INC.

Contract:

V412211LE

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Lab File ID: 0402005

Lab Prep Batch: V412211

Date Analyzed: 12/21/01

Time Analyzed: 1645

GC Column:

ID: 2 (mm)

Heated Purge: (Y/N) Y

Instrument ID: VOC4

Lab Sample ID: V412211LB

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	V412211LCS	1LCS	0201002LCS	1417
02	V412212LCS	2LCS	0202003LCS	1452
03	011260201	011260201	0701008	1818
04	011262302	011262302	1101012	2022
05	011262302MS	MS	2001021	0059
06	011262302MSD	MSD	2101022	0130
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS:

FORM 1
VOA-GCMS ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO. 889.705

Lab Name: ETC, INC.

Contract:

V412211LB

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix: (soil/water) WATER

Lab Prep Batch: V412211

Sample wt/vol: 10.00 (g/mL) ML

Lab File ID: 0402005

Level: (low/med) LOW

Date Received: _____

% Moisture: not dec. _____

Date Analyzed: 12/21/01

GC Column: ID: 2.00 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Q

67-64-1-----	Acetone	20.00	U
75-05-8-----	Acetonitrile	20.00	U
107-02-8-----	Acrolein	20.00	U
107-13-1-----	Acrylonitrile	20.00	U
107-05-1-----	Allyl chloride	20.00	U
71-43-2-----	Benzene	1.00	U
108-86-1-----	Bromobenzene	1.00	U
74-97-5-----	Bromochloromethane	1.00	U
75-27-4-----	Bromodichloromethane	1.00	U
75-25-2-----	Bromoform	1.00	U
78-93-3-----	2-Butanone	1.00	U
74-83-9-----	Bromomethane	20.00	U
104-51-8-----	n-Butylbenzene	1.00	U
135-98-8-----	sec-Butylbenzene	1.00	U
98-06-6-----	tert-Butylbenzene	1.00	U
75-15-0-----	Carbon Disulfide	1.00	U
56-23-5-----	Carbon Tetrachloride	1.00	U
108-90-7-----	Chlorobenzene	1.00	U
124-48-1-----	Chlorodibromomethane	1.00	U
75-00-3-----	Chloroethane	1.00	U
110-75-8-----	2-Chloroethyl vinyl ether	1.00	U
67-66-3-----	Chloroform	20.00	U
74-87-3-----	Chloromethane	1.00	U
126-99-8-----	Chloroprene	1.00	U
95-49-8-----	2-Chlorotoluene	1.00	U
106-43-4-----	4-Chlorotoluene	1.00	U
96-12-8-----	1,2-Dibromo-3-chloropropane	1.00	U
106-93-4-----	1,2-Dibromoethane	1.00	U
74-95-3-----	Dibromomethane	1.00	U
95-50-1-----	1,2-Dichlorobenzene	1.00	U
541-73-1-----	1,3-Dichlorobenzene	1.00	U
106-46-7-----	1,4-Dichlorobenzene	1.00	U
1476-11-5-----	cis-1,4-Dichloro-2-butene	1.00	U

889 706

FORM 1
VOA-GCMS ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

Lab Name: ETC, INC.

Contract:

V412211LB

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix: (soil/water) WATER

Lab Prep Batch: V412211

Sample wt/vol: 10.00 (g/mL) ML

Lab File ID: 0402005

Level: (low/med) LOW

Date Received: _____

% Moisture: not dec. _____

Date Analyzed: 12/21/01

GC Column: ID: 2.00 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Q

110-57-6-----	trans-1,4-Dichloro-2-butene	1.00	U
75-71-8-----	Dichlorodifluoromethane	1.00	U
75-34-3-----	1,1-Dichloroethane	1.00	U
107-06-2-----	1,2-Dichloroethane	1.00	U
75-35-4-----	1,1-Dichloroethene	1.00	U
156-59-2-----	cis-1,2-Dichloroethene	1.00	U
156-60-5-----	trans-1,2-Dichloroethene	1.00	U
78-87-5-----	1,2-Dichloropropane	1.00	U
142-28-9-----	1,3-Dichloropropane	1.00	U
594-20-7-----	2,2-Dichloropropane	1.00	U
563-58-6-----	1,1-Dichloropropene	1.00	U
10061-01-5-----	cis-1,3-Dichloropropene	1.00	U
10061-02-6-----	trans-1,3-Dichloropropene	1.00	U
108-20-3-----	Di isopropyl ether	1.00	U
123-91-1-----	1,4-Dioxane	100.0	U
141-78-6-----	Ethyl Acetate	5.00	U
100-41-4-----	Ethylbenzene	1.00	U
97-63-2-----	Ethyl methacrylate	1.00	U
110-00-9-----	Furan	1.00	U
87-68-3-----	Hexachlorobutadiene	1.00	U
110-54-3-----	Hexane	1.00	U
591-78-6-----	2-Hexanone	5.00	U
74-88-4-----	Iodomethane	1.00	U
78-83-1-----	Isobutyl Alcohol	100.0	U
98-82-8-----	Isopropylbenzene	1.00	U
99-87-6-----	4-Isopropyltoluene	1.00	U
126-98-7-----	Methacrylonitrile	10.00	U
75-09-2-----	Methylene Chloride	4.60	J
80-62-6-----	Methyl methacrylate	1.00	U
108-10-1-----	4-Methyl-2-Pentanone	5.00	U
1634-04-4-----	Methyl-tertbutyl-Ether	1.00	U
91-20-3-----	Naphthalene	1.00	U
107-12-0-----	Propionitrile	10.00	U

FORM I VOA-GCMS

000033

FORM 1
VOA-GCMS ORGANICS ANALYSIS DATA SHEET

889 707
CLIENT SAMPLE NO.

Lab Name: ETC, INC.

Contract:

V412211LB

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix: (soil/water) WATER

Lab Prep Batch: V412211

Sample wt/vol: 10.00 (g/mL) ML

Lab File ID: 0402005

Level: (low/med) LOW

Date Received: _____

% Moisture: not dec. _____

Date Analyzed: 12/21/01

GC Column: ID: 2.00 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Q

109-60-4-----	n-Propyl Acetate	1.00	U
103-65-1-----	n-Propylbenzene	1.00	U
100-42-5-----	Styrene	1.00	U
630-20-6-----	1,1,1,2-Tetrachloroethane	1.00	U
79-34-5-----	1,1,2,2-Tetrachloroethane	1.00	U
127-18-4-----	Tetrachloroethene	1.00	U
109-99-9-----	Tetrahydrofuran	1.00	U
87-61-6-----	1,2,3-Trichlorobenzene	1.00	U
108-88-3-----	Toluene	1.00	U
71-55-6-----	1,1,1-Trichloroethane	1.00	U
79-00-5-----	1,1,2-Trichloroethane	1.00	U
76-13-1-----	1,1,2-trichloro-1,2,2-triflu	1.00	U
79-01-6-----	Trichloroethene	1.00	U
75-69-4-----	Trichlorofluoromethane	1.00	U
96-18-4-----	1,2,3-Trichloropropane	1.00	U
95-63-6-----	1,2,4-Trimethylbenzene	1.00	U
120-82-1-----	1,2,4-Trichlorobenzene	1.00	U
108-67-8-----	1,3,5-Trimethylbenzene	1.00	U
108-05-4-----	Vinyl Acetate	20.00	U
75-01-4-----	Vinyl Chloride	1.00	U
108-38-3-----	Xylene-mp	1.00	U
95-47-6-----	Xylene-o	1.00	U

FORM 1
VOA-GCMS ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT SAMPLE NO.

889 708

V412211LE

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix: (soil/water) WATER

Lab Sample ID: V412211LB

Sample wt/vol: 10.00 (g/mL) ML

Lab File ID: 0402005

Level: (low/med) LOW

Date Received: _____

% Moisture: not dec. _____

Date Analyzed: 12/21/01

GC Column: ID: 2.00 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	2
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

FORM 3
WATER VOA-GCMS LAB CONTROL SAMPLE

889 709

Lab Name: ETC, INC.

Lab Prep Batch: V412211

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix Spike - Sample No.: V412211LCS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
=====	=====	=====	=====	=====	=====
Acetone	100.0		106.9	107	59-151
Acetonitrile	1000		1028	103	57-143
Acrolein	100.0		94.20	94	59-134
Acrylonitrile	100.0		99.07	99	60-146
Allyl chloride	100.0		87.62	88	74-120
Benzene	100.0		98.31	98	72-124
Bromobenzene	100.0		102.8	103	77-120
Bromochloromethane	100.0		97.16	97	74-120
Bromodichloromethane	100.0		93.54	94	68-119
Bromoform	100.0		105.1	105	66-136
2-Butanone	100.0		103.4	103	55-151
Bromomethane	100.0		86.79	87	40-134
n-Butylbenzene	100.0		94.38	94	69-129
sec-Butylbenzene	100.0		81.13	81	72-127
tert-Butylbenzene	100.0		103.5	104	73-126
Carbon Disulfide	100.0		102.0	102	60-133
Carbon Tetrachloride	100.0		98.14	98	64-123
Chlorobenzene	100.0		92.98	93	77-112
Chlorodibromomethane	100.0		92.18	92	72-118
Chloroethane	100.0		104.3	104	64-142
2-Chloroethyl vinyl eth	100.0		84.83	85	22-165
Chloroform	100.0		94.34	94	70-115
Chloromethane	100.0		100.1	100	58-139
Chloroprene	100.0		93.58	94	73-118
2-Chlorotoluene	100.0		109.8	110	65-132
4-Chlorotoluene	100.0		107.2	107	67-127
1,2-Dibromo-3-chloropro	100.0		89.22	89	56-134
1,2-Dibromoethane	100.0		90.92	91	74-118

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

COMMENTS:

FORM 3
WATER VOA-GCMS LAB CONTROL SAMPLE

889 710

Lab Name: ETC, INC.

Lab Prep Batch: V412211

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix Spike - Sample No.: V412211LCS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
Dibromomethane	100.0		91.00	91	75-114
1,2-Dichlorobenzene	100.0		91.93	92	80-113
1,3-Dichlorobenzene	100.0		94.14	94	77-119
1,4-Dichlorobenzene	100.0		89.46	89	78-116
cis-1,4-Dichloro-2-bute	100.0		114.2	114	70-130
trans-1,4-Dichloro-2-bu	100.0		109.6	110	62-138
Dichlorodifluoromethane	100.0		101.1	101	48-145
1,1-Dichloroethane	100.0		91.57	92	76-118
1,2-Dichloroethane	100.0		100.5	100	62-124
1,1-Dichloroethene	100.0		86.25	86	69-121
cis-1,2-Dichloroethene	100.0		88.86	89	76-114
trans-1,2-Dichloroethen	100.0		85.04	85	72-121
1,2-Dichloropropane	100.0		96.34	96	64-133
1,3-Dichloropropane	100.0		88.94	89	68-128
2,2-Dichloropropane	100.0		102.0	102	67-132
1,1-Dichloropropene	100.0		100.4	100	76-117
cis-1,3-Dichloropropene	100.0		92.53	92	77-120
trans-1,3-Dichloroprope	100.0		101.8	102	73-124
Di isopropyl ether	100.0		96.44	96	62-160
1,4-Dioxane	2000		2110	106	56-131
Ethyl Acetate	100.0		100.9	101	52-151
Ethylbenzene	100.0		96.57	96	77-111
Ethyl methacrylate	200.0		166.4	83	57-140
Furan	100.0		150.1	150*	52-124
Hexachlorobutadiene	100.0		90.86	91	69-137
Hexane	100.0		103.6	104	70-130
2-Hexanone	100.0		86.26	86	53-144
Iodomethane	100.0		131.0	131	51-153

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

COMMENTS:

FORM 3
WATER VOA-GCMS LAB CONTROL SAMPLE

889 711

Lab Name: ETC, INC.

Lab Prep Batch: V412211

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix Spike - Sample No.: V412211LCS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
Isobutyl Alcohol	2000		1840	92	60-134
Isopropylbenzene	100.0		100.1	100	74-125
4-Isopropyltoluene	100.0		106.7	107	72-127
Methacrylonitrile	1000		979.2	98	70-125
Methylene Chloride	100.0		100.4	100	76-115
Methyl methacrylate	200.0		185.4	93	57-147
4-Methyl-2-Pentanone	100.0		92.82	93	42-144
Methyl-tertbutyl-Ether	100.0		103.8	104	62-122
Naphthalene	100.0		95.77	96	53-124
Propionitrile	1000		1026	103	58-139
n-Propyl Acetate	100.0		158.3	158	88-170
n-Propylbenzene	100.0		107.3	107	75-125
Styrene	100.0		99.10	99	77-117
1,1,1,2-Tetrachloroetha	100.0		74.52	74*	79-113
1,1,2,2-Tetrachloroetha	100.0		84.27	84	67-126
Tetrachloroethene	100.0		83.52	84	77-115
Tetrahydrofuran	100.0		87.40	87	76-181
1,2,3-Trichlorobenzene	100.0		98.34	98	62-132
Toluene	100.0		78.03	78	77-115
1,1,1-Trichloroethane	100.0		91.06	91	63-122
1,1,2-Trichloroethane	100.0		86.47	86	69-117
1,1,2-trichloro-1,2,2-t	100.0		91.22	91	70-130
Trichloroethene	100.0		82.95	83	75-113
Trichlorofluoromethane	100.0		102.5	102	55-130
1,2,3-Trichloropropane	100.0		103.2	103	62-130
1,2,4-Trimethylbenzene	100.0		105.1	105	69-126
1,2,4-Trichlorobenzene	100.0		99.34	99	68-132
1,3,5-Trimethylbenzene	100.0		105.0	105	69-128

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

COMMENTS:

FORM 3
WATER VOA-GCMS LAB CONTROL SAMPLE

889 712

Lab Name: ETC, INC.

Lab Prep Batch: V412211

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix Spike - Sample No.: V412211LCS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
Vinyl Acetate	100.0		90.40	90	28-146
Vinyl Chloride	100.0		104.6	105	65-134
Xylene-mp	200.0		187.7	94	77-115
Xylene-o	100.0		94.80	95	77-115

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 0 outside limits

Spike Recovery: 2 out of 88 outside limits

COMMENTS:

FORM 3
WATER VOA-GCMS LAB CONTROL SAMPLE

889 713

Lab Name: ETC, INC.

Lab Prep Batch: V412211

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix Spike - Sample No.: V412212LCS

COMPOUND =====	SPIKE ADDED (ug/L) =====	SAMPLE CONCENTRATION (ug/L) =====	LCS CONCENTRATION (ug/L) =====	LCS % REC # =====	QC. LIMITS REC. =====
1,1,1,2-Tetrachloroetha	100.0		79.10	79	79-113

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 0 outside limits

Spike Recovery: 0 out of 1 outside limits

COMMENTS:

FORM III VOA-GCMS

000040

889 714 FORM 3
WATER VOA-GCMS MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: ETC, INC.

Lab Prep Batch: V412211

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix Spike - Sample No.: 011262302

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC. LIMITS REC.
Benzene	100.0	0.000	121.1	121	72-124
Chlorobenzene	100.0	0.000	100.3	100	77-112
1,1-Dichloroethene	100.0	0.000	95.99	96	69-121
Toluene	100.0	0.000	92.12	92	77-115
Trichloroethene	100.0	0.000	93.20	93	75-113

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	REC.
Benzene	100.0	104.4	104	15	20	72-124
Chlorobenzene	100.0	102.7	103	3	20	77-112
1,1-Dichloroethene	100.0	99.48	99	3	20	69-121
Toluene	100.0	90.81	91	1	20	77-115
Trichloroethene	100.0	94.96	95	2	20	75-113

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits

Spike Recovery: 0 out of 10 outside limits

COMMENTS:

FORM 4
VOA-GCMS METHOD BLANK SUMMARY

889 715 CLIENT SAMPLE NO.

Lab Name: ETC, INC.

Contract:

V401031LB

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Lab File ID: 0303005

Lab Prep Batch: V401031

Date Analyzed: 01/03/02

Time Analyzed: 1103

GC Column: ID: 2 (mm)

Heated Purge: (Y/N) Y

Instrument ID: VOC4

Lab Sample ID: 1LB

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	V401031LCS	1LCS	0201002LCS	0857
02	011262301	011262301	0501007	1210
03	011260201	011260201	0701009	1313
04	011260201	011260201	0801010	1345
05	011260202	011260202	0901011	1416
06	011262301MS	MS	1801020	1859
07	011262301MSD	MSD	1901021	1930
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS:

FORM 1
VOA-GCMS ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

889 716

Lab Name: ETC, INC.

Contract:

V401031LE

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix: (soil/water) WATER

Lab Prep Batch: V401031

Sample wt/vol: 10.00 (g/mL) ML

Lab File ID: 0303005

Level: (low/med) LOW

Date Received: _____

% Moisture: not dec. _____

Date Analyzed: 01/03/02

GC Column: ID: 2.00 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Q

67-64-1-----	Acetone	20.00	U
75-05-8-----	Acetonitrile	20.00	U
107-02-8-----	Acrolein	20.00	U
107-13-1-----	Acrylonitrile	20.00	U
107-05-1-----	Allyl chloride	1.00	U
71-43-2-----	Benzene	1.00	U
108-86-1-----	Bromobenzene	1.00	U
74-97-5-----	Bromochloromethane	1.00	U
75-27-4-----	Bromodichloromethane	1.00	U
75-25-2-----	Bromoform	1.00	U
78-93-3-----	2-Butanone	20.00	U
74-83-9-----	Bromomethane	1.00	U
104-51-8-----	n-Butylbenzene	1.00	U
135-98-8-----	sec-Butylbenzene	1.00	U
98-06-6-----	tert-Butylbenzene	1.00	U
75-15-0-----	Carbon Disulfide	1.00	U
56-23-5-----	Carbon Tetrachloride	1.00	U
108-90-7-----	Chlorobenzene	1.00	U
124-48-1-----	Chlorodibromomethane	1.00	U
75-00-3-----	Chloroethane	1.00	U
110-75-8-----	2-Chloroethyl vinyl ether	20.00	U
67-66-3-----	Chloroform	1.00	U
74-87-3-----	Chloromethane	1.00	U
126-99-8-----	Chloroprene	1.00	U
95-49-8-----	2-Chlorotoluene	1.00	U
106-43-4-----	4-Chlorotoluene	1.00	U
96-12-8-----	1,2-Dibromo-3-chloropropane	1.00	U
106-93-4-----	1,2-Dibromoethane	1.00	U
74-95-3-----	Dibromomethane	1.00	U
95-50-1-----	1,2-Dichlorobenzene	1.00	U
541-73-1-----	1,3-Dichlorobenzene	1.00	U
106-46-7-----	1,4-Dichlorobenzene	1.00	U
1476-11-5-----	cis-1,4-Dichloro-2-butene	1.00	U

FORM I VOA-GCMS

000043

FORM 1
VOA-GCMS ORGANICS ANALYSIS DATA SHEET

889 717 CLIENT SAMPLE NO.

Lab Name: ETC, INC.

Contract:

V401031LB

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix: (soil/water) WATER

Lab Prep Batch: V401031

Sample wt/vol: 10.00 (g/mL) ML

Lab File ID: 0303005

Level: (low/med) LOW

Date Received: _____

% Moisture: not dec. _____

Date Analyzed: 01/03/02

GC Column: ID: 2.00 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Q

110-57-6	trans-1,4-Dichloro-2-butene	1.00	U
75-71-8	Dichlorodifluoromethane	1.00	U
75-34-3	1,1-Dichloroethane	1.00	U
107-06-2	1,2-Dichloroethane	1.00	U
75-35-4	1,1-Dichloroethene	1.00	U
156-59-2	cis-1,2-Dichloroethene	1.00	U
156-60-5	trans-1,2-Dichloroethene	1.00	U
78-87-5	1,2-Dichloropropane	1.00	U
142-28-9	1,3-Dichloropropane	1.00	U
594-20-7	2,2-Dichloropropane	1.00	U
563-58-6	1,1-Dichloropropene	1.00	U
10061-01-5	cis-1,3-Dichloropropene	1.00	U
10061-02-6	trans-1,3-Dichloropropene	1.00	U
108-20-3	Di isopropyl ether	5.00	U
123-91-1	1,4-Dioxane	100.0	U
141-78-6	Ethyl Acetate	5.00	U
100-41-4	Ethylbenzene	1.00	U
97-63-2	Ethyl methacrylate	1.00	U
110-00-9	Furan	1.00	U
87-68-3	Hexachlorobutadiene	1.00	U
110-54-3	Hexane	1.00	U
591-78-6	2-Hexanone	5.00	U
74-88-4	Iodomethane	1.00	U
78-83-1	Isobutyl Alcohol	100.0	U
98-82-8	Isopropylbenzene	1.00	U
99-87-6	4-Isopropyltoluene	1.00	U
126-98-7	Methacrylonitrile	10.00	U
75-09-2	Methylene Chloride	5.00	U
80-62-6	Methyl methacrylate	1.00	U
108-10-1	4-Methyl-2-Pentanone	5.00	U
1634-04-4	Methyl-tertbutyl-Ether	5.00	U
91-20-3	Naphthalene	1.00	U
107-12-0	Propionitrile	10.00	U

FORM I VOA-GCMS

000044

889 718 VOA-GCMS ORGANICS ANALYSIS DATA SHEET

FORM 1

CLIENT SAMPLE NO.

Lab Name: ETC, INC.

Contract:

V401031LB

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix: (soil/water) WATER

Lab Prep Batch: V401031

Sample wt/vol: 10.00 (g/mL) ML

Lab File ID: 0303005

Level: (low/med) LOW

Date Received: _____

% Moisture: not dec. _____

Date Analyzed: 01/03/02

GC Column: ID: 2.00 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Q

109-60-4-----	n-Propyl Acetate	1.00	U
103-65-1-----	n-Propylbenzene	1.00	U
100-42-5-----	Styrene	1.00	U
630-20-6-----	1,1,1,2-Tetrachloroethane	1.00	U
79-34-5-----	1,1,2,2-Tetrachloroethane	1.00	U
127-18-4-----	Tetrachloroethene	1.00	U
109-99-9-----	Tetrahydrofuran	1.00	U
87-61-6-----	1,2,3-Trichlorobenzene	1.00	U
108-88-3-----	Toluene	1.00	U
71-55-6-----	1,1,1-Trichloroethane	1.00	U
79-00-5-----	1,1,2-Trichloroethane	1.00	U
76-13-1-----	1,1,2-trichloro-1,2,2-triflu	1.00	U
79-01-6-----	Trichloroethene	1.00	U
75-69-4-----	Trichlorofluoromethane	1.00	U
96-18-4-----	1,2,3-Trichloropropane	1.00	U
95-63-6-----	1,2,4-Trimethylbenzene	1.00	U
120-82-1-----	1,2,4-Trichlorobenzene	1.00	U
108-67-8-----	1,3,5-Trimethylbenzene	1.00	U
108-05-4-----	Vinyl Acetate	20.00	U
75-01-4-----	Vinyl Chloride	1.00	U
108-38-3-----	Xylene-mp	1.00	U
95-47-6-----	Xylene-o	1.00	U

FORM I VOA-GCMS

000045

FORM 1
VOA-GCMS ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

889 719
CLIENT SAMPLE NO.

V401031LB

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix: (soil/water) WATER

Lab Sample ID: 1LB

Sample wt/vol: 10.00 (g/mL) ML

Lab File ID: 0303005

Level: (low/med) LOW

Date Received: _____

% Moisture: not dec. _____

Date Analyzed: 01/03/02

GC Column: ID: 2.00 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

Number TICs found: 0

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

889.720

FORM 3
WATER VOA-GCMS LAB CONTROL SAMPLE

Lab Name: ETC, INC.

Lab Prep Batch: V401031

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix Spike - Sample No.: V401031LCS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
=====	=====	=====	=====	=====	=====
Acetone	100.0		68.26	68	59-151
Acetonitrile	1000		746.2	75	57-143
Acrolein	100.0		99.73	100	59-134
Acrylonitrile	100.0		74.25	74	60-146
Allyl chloride	100.0		82.43	82	74-120
Benzene	100.0		99.31	99	72-124
Bromobenzene	100.0		87.62	88	77-120
Bromochloromethane	100.0		80.56	80	74-120
Bromodichloromethane	100.0		81.82	82	68-119
Bromoform	100.0		79.04	79	66-136
2-Butanone	100.0		79.18	79	55-151
Bromomethane	100.0		78.92	79	40-134
n-Butylbenzene	100.0		99.63	100	69-129
sec-Butylbenzene	100.0		109.0	109	72-127
tert-Butylbenzene	100.0		88.23	88	73-126
Carbon Disulfide	100.0		89.65	90	60-133
Carbon Tetrachloride	100.0		87.92	88	64-123
Chlorobenzene	100.0		91.89	92	77-112
Chlorodibromomethane	100.0		76.86	77	72-118
Chloroethane	100.0		82.94	83	64-142
2-Chloroethyl vinyl eth	100.0		88.49	88	22-165
Chloroform	100.0		83.76	84	70-115
Chloromethane	100.0		81.67	82	58-139
Chloroprene	100.0		88.78	89	73-118
2-Chlorotoluene	100.0		94.57	94	65-132
4-Chlorotoluene	100.0		88.32	88	67-127
1,2-Dibromo-3-chloropro	100.0		74.02	74	55-134
1,2-Dibromoethane	100.0		74.92	75	74-118

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

COMMENTS:

FORM 3
WATER VOA-GCMS LAB CONTROL SAMPLE

889 721

Lab Name: ETC, INC.

Lab Prep Batch: V401031

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix Spike - Sample No.: V401031LCS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
=====	=====	=====	=====	=====	=====
Dibromomethane	100.0		82.00	82	75-114
1,2-Dichlorobenzene	100.0		99.20	99	80-113
1,3-Dichlorobenzene	100.0		102.3	102	77-119
1,4-Dichlorobenzene	100.0		97.49	97	78-116
cis-1,4-Dichloro-2-bute	100.0		74.72	75	70-130
trans-1,4-Dichloro-2-bu	100.0		88.53	88	62-138
Dichlorodifluoromethane	100.0		59.17	59	48-145
1,1-Dichloroethane	100.0		84.13	84	76-118
1,2-Dichloroethane	100.0		76.34	76	62-124
1,1-Dichloroethene	100.0		87.14	87	69-121
cis-1,2-Dichloroethene	100.0		87.33	87	76-114
trans-1,2-Dichloroethen	100.0		92.86	93	72-121
1,2-Dichloropropane	100.0		87.29	87	64-133
1,3-Dichloropropane	100.0		80.58	80	68-128
2,2-Dichloropropane	100.0		92.94	93	67-132
1,1-Dichloropropene	100.0		99.78	100	76-117
cis-1,3-Dichloropropene	100.0		87.39	87	77-120
trans-1,3-Dichloroprope	100.0		82.77	83	73-124
Di isopropyl ether	100.0		96.43	96	62-160
1,4-Dioxane	2000		1524	76	56-131
Ethyl Acetate	100.0		78.55	78	52-151
Ethylbenzene	100.0		93.51	94	77-111
Ethyl methacrylate	200.0		134.6	67	57-140
Furan	100.0		119.7	120	52-124
Hexachlorobutadiene	100.0		102.5	102	69-137
Hexane	100.0		113.5	114	70-130
2-Hexanone	100.0		67.19	67	53-144
Iodomethane	100.0		88.86	89	51-153

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

COMMENTS:

VOA-GCMS CONTINUING CALIBRATION CHECK

889 722

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Instrument ID: VOC4

Calibration Date: 01/03/02 Time: 0857

Lab File ID: 0201002

Init. Calib. Date(s): 12/27/01 12/27/01

Heated Purge: (Y/N) Y

Init. Calib. Times: 1552 2105

GC Column: ID: 2.00 (mm)

COMPOUND	SAMPLE AMOUNT	CAL100 AMOUNT	CURVE	%D	MAX %d
=====	=====	=====	=====	=====	=====
Acetone	68.26	100.0	LINR	31.7	30.0
Acetonitrile	746.2	1000	LINR	25.4	30.0
Acrolein	99.73	100.0	AVRG	0.3	30.0
Acrylonitrile	74.25	100.0	LINR	25.8	30.0
Allyl chloride	82.43	100.0	AVRG	17.6	30.0
Benzene	99.31	100.0	AVRG	0.7	30.0
Bromobenzene	87.62	100.0	AVRG	12.4	30.0
Bromochloromethane	80.56	100.0	AVRG	19.4	30.0
Bromodichloromethane	81.82	100.0	AVRG	18.2	30.0
Bromoform	79.04	100.0	AVRG	21.0	30.0
2-Butanone	79.18	100.0	AVRG	20.8	30.0
Bromomethane	78.92	100.0	AVRG	21.1	30.0
n-Butylbenzene	99.63	100.0	AVRG	0.4	30.0
sec-Butylbenzene	109.0	100.0	AVRG	9.0	30.0
tert-Butylbenzene	88.23	100.0	AVRG	11.8	30.0
Carbon Disulfide	89.65	100.0	AVRG	10.4	30.0
Carbon Tetrachloride	87.92	100.0	AVRG	12.1	30.0
Chlorobenzene	91.89	100.0	AVRG	8.1	30.0
Chlorodibromomethane	76.86	100.0	AVRG	23.1	30.0
Chloroethane	82.94	100.0	AVRG	17.1	30.0
2-Chloroethyl vinyl ether	88.49	100.0	AVRG	11.5	30.0
Chloroform	83.76	100.0	AVRG	16.2	20.0
Chloromethane	81.67	100.0	AVRG	18.3	30.0
Chloroprene	88.78	100.0	AVRG	11.2	30.0
2-Chlorotoluene	94.57	100.0	AVRG	5.4	30.0
4-Chlorotoluene	88.32	100.0	AVRG	11.7	30.0
1,2-Dibromo-3-chloropropane	74.02	100.0	AVRG	26.0	30.0
1,2-Dibromoethane	74.92	100.0	AVRG	25.1	30.0
Dibromomethane	82.00	100.0	LINR	18.0	30.0
1,2-Dichlorobenzene	99.20	100.0	AVRG	0.8	30.0
1,3-Dichlorobenzene	102.3	100.0	AVRG	2.3	30.0
1,4-Dichlorobenzene	97.49	100.0	AVRG	2.5	30.0
cis-1,4-Dichloro-2-butene	74.72	100.0	AVRG	25.3	30.0
trans-1,4-Dichloro-2-butene	88.53	100.0	AVRG	11.5	30.0
Dichlorodifluoromethane	59.17	100.0	AVRG	40.8	30.0
1,1-Dichloroethane	84.13	100.0	AVRG	15.9	30.0
1,2-Dichloroethane	76.34	100.0	AVRG	23.7	30.0

FORM 7
VOA-GCMS CONTINUING CALIBRATION CHECK

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Instrument ID: VOC4

Calibration Date: 01/03/02 Time: 0857

Lab File ID: 0201002

Init. Calib. Date(s): 12/27/01 12/27/01

Heated Purge: (Y/N) Y

Init. Calib. Times: 1552 2105

GC Column: ID: 2.00 (mm)

COMPOUND	SAMPLE AMOUNT	CAL100 AMOUNT	CURVE	%D	MAX %d
=====	=====	=====	=====	=====	=====
1,1-Dichloroethene	87.14	100.0	AVRG	12.9	20.0
cis-1,2-Dichloroethene	87.33	100.0	AVRG	12.7	30.0
trans-1,2-Dichloroethene	92.86	100.0	AVRG	7.1	30.0
1,2-Dichloropropane	87.29	100.0	LINR	12.7	20.0
1,3-Dichloropropane	80.58	100.0	AVRG	19.4	30.0
2,2-Dichloropropane	92.94	100.0	AVRG	7.1	30.0
1,1-Dichloropropene	99.78	100.0	AVRG	0.2	30.0
cis-1,3-Dichloropropene	87.39	100.0	AVRG	12.6	30.0
trans-1,3-Dichloropropene	82.77	100.0	AVRG	17.2	30.0
Di isopropyl ether	96.43	100.0	AVRG	3.6	30.0
1,4-Dioxane	1524	2000	AVRG	23.8	30.0
Ethyl Acetate	78.55	100.0	AVRG	21.4	30.0
Ethylbenzene	93.51	100.0	AVRG	6.5	20.0
Ethyl methacrylate	134.6	200.0	AVRG	32.7	30.0
Furan	119.7	153.0	AVRG	21.8	30.0
Hexachlorobutadiene	102.5	100.0	AVRG	2.5	30.0
Hexane	113.5	117.0	AVRG	3.0	30.0
2-Hexanone	67.19	100.0	AVRG	32.8	30.0
Iodomethane	88.86	100.0	AVRG	11.1	30.0
Isobutyl Alcohol	1620	2000	LINR	19.0	30.0
Isopropylbenzene	93.79	100.0	AVRG	6.2	30.0
4-Isopropyltoluene	88.99	100.0	AVRG	11.0	30.0
Methacrylonitrile	779.0	1000	AVRG	22.1	30.0
Methylene Chloride	84.58	100.0	LINR	15.4	30.0
Methyl methacrylate	147.0	200.0	AVRG	26.5	30.0
4-Methyl-2-Pentanone	73.20	100.0	AVRG	26.8	30.0
Methyl-tertbutyl-Ether	85.05	100.0	AVRG	15.0	30.0
Naphthalene	98.36	100.0	AVRG	1.6	30.0
Propionitrile	751.3	1000	LINR	24.9	30.0
n-Propyl Acetate	120.2	151.0	LINR	20.4	30.0
n-Propylbenzene	94.74	100.0	AVRG	5.3	30.0
Styrene	94.38	100.0	AVRG	5.6	30.0
1,1,1,2-Tetrachloroethane	89.12	100.0	AVRG	10.9	30.0
1,1,2,2-Tetrachloroethane	86.82	100.0	AVRG	13.2	30.0
Tetrachloroethene	93.68	100.0	AVRG	6.3	30.0
Tetrahydrofuran	80.47	91.50	LINR	12.0	30.0
1,2,3-Trichlorobenzene	105.3	100.0	AVRG	5.3	30.0

889 724

FORM 7
VOA-GCMS CONTINUING CALIBRATION CHECK

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Instrument ID: VOC4

Calibration Date: 01/03/02 Time: 0857

Lab File ID: 0201002

Init. Calib. Date(s): 12/27/01 12/27/01

Heated Purge: (Y/N) Y

Init. Calib. Times: 1552 2105

GC Column:

ID: 2.00 (mm)

COMPOUND	SAMPLE AMOUNT	CAL100 AMOUNT	CURVE	%D	MAX %d
Toluene	85.55	100.0	AVRG	14.4	20.0
1,1,1-Trichloroethane	88.50	100.0	AVRG	11.5	30.0
1,1,2-Trichloroethane	81.46	100.0	AVRG	18.5	30.0
1,1,2-trichloro-1,2,2-triflu	104.8	100.0	AVRG	4.8	30.0
Trichloroethene	90.70	100.0	AVRG	9.3	30.0
Trichlorofluoromethane	72.51	100.0	AVRG	27.5	30.0
1,2,3-Trichloropropane	78.87	100.0	AVRG	21.1	30.0
1,2,4-Trimethylbenzene	85.88	100.0	AVRG	14.1	30.0
1,2,4-Trichlorobenzene	110.4	100.0	AVRG	10.4	30.0
1,3,5-Trimethylbenzene	87.74	100.0	AVRG	12.3	30.0
Vinyl Acetate	89.20	100.0	AVRG	10.8	30.0
Vinyl Chloride	85.52	100.0	AVRG	14.5	20.0
Xylene-mp	187.7	200.0	AVRG	6.2	30.0
Xylene-o	93.92	100.0	AVRG	6.1	30.0
Dibromofluoromethane	37.60	40.90	AVRG	8.1	30.0
Toluene-d8	38.54	50.00	AVRG	22.9	30.0
Bromofluorobenzene	37.54	40.80	AVRG	8.0	30.0
1,2-Dichloroethane-d4	33.45	50.00	AVRG	33.1	30.0

FORM 8
VOA-GCMS INTERNAL STANDARD AREA AND RT SUMMARY

889 725

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Lab File ID (Standard): 0201002

Date Analyzed: 01/03/02

Instrument ID: VOC4

Time Analyzed: 0857

GC Column:

ID: 2.00 (mm)

Heated Purge: (Y/N) Y

	IS1 AREA #	RT #	IS2 (DFB) AREA #	RT #	IS3 (CBZ) AREA #	RT #
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	941533	6.90	1456749	7.49	1019112	9.69
UPPER LIMIT	1883066	7.40	2913498	7.99	2038224	10.19
LOWER LIMIT	470767	6.40	728375	6.99	509556	9.19
=====	=====	=====	=====	=====	=====	=====
CLIENT SAMPLE NO.						
=====	=====	=====	=====	=====	=====	=====
01 V401031LB	645571	6.90	921653	7.49	598556	9.69
02 011262301	583467	6.90	861331	7.49	499642*	9.69
03 011260201	569990	6.90	921637	7.49	553380	9.69
04 011260201	547406	6.90	822530	7.49	548967	9.69
05 011260202	509177	6.90	825611	7.49	516643	9.69
06 011262301MS	542363	6.90	893343	7.49	701406	9.69
07 011262301MSD	597075	6.90	953969	7.49	751542	9.69
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 = Pentafluorobenzene
IS2 (DFB) = 1,4-Difluorobenzene
IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

889 726

FORM 8
VOA-GCMS INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Lab File ID (Standard): 0201002

Date Analyzed: 01/03/02

Instrument ID: VOC4

Time Analyzed: 0857

GC Column:

ID: 2.00 (mm)

Heated Purge: (Y/N) Y

	IS4 (DCB)					
	AREA #	RT #	AREA #	RT #	AREA #	RT #
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	297425	11.51				
UPPER LIMIT	594850	12.01				
LOWER LIMIT	148713	11.01				
=====	=====	=====	=====	=====	=====	=====
CLIENT						
SAMPLE NO.						
=====	=====	=====	=====	=====	=====	=====
01 V401031LB	175543	11.51				
02 011262301	158839	11.52				
03 011260201	164634	11.52				
04 011260201	166798	11.52				
05 011260202	166351	11.52				
06 011262301MS	183368	11.51				
07 011262301MSD	187816	11.51				
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS4 (DCB) = 1,4-Dichlorobenzene-d4

AREA UPPER LIMIT = +100% of internal standard area

AREA LOWER LIMIT = - 50% of internal standard area

RT UPPER LIMIT = + 0.50 minutes of internal standard RT

RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.

* Values outside of QC limits.

Report Date : 25-Oct-2001 09:01

Page 1

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 24-OCT-2001 14:33
 End Cal Date : 24-OCT-2001 19:46
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCBDC\DD\chem\voc4.i\V410242.B\V410242.8260.m
 Cal Date : 25-Oct-2001 08:59 lisa

Calibration File Names:

Level 1: \\ETCBDC\DD\chem\voc4.i\V410242.B\0301004.D
 Level 2: \\ETCBDC\DD\chem\voc4.i\V410242.B\0401005.D
 Level 3: \\ETCBDC\DD\chem\voc4.i\V410242.B\0601007.D
 Level 4: \\ETCBDC\DD\chem\voc4.i\V410242.B\0701008.D
 Level 5: \\ETCBDC\DD\chem\voc4.i\V410242.B\0801009.D
 Level 6: \\ETCBDC\DD\chem\voc4.i\V410242.B\0901010.D
 Level 7: \\ETCBDC\DD\chem\voc4.i\V410242.B\1001011.D
 Level 8: \\ETCBDC\DD\chem\voc4.i\V410242.B\1101012.D
 Level 9: \\ETCBDC\DD\chem\voc4.i\V410242.B\1201013.D
 Level 10: \\ETCBDC\DD\chem\voc4.i\V410242.B\1301014.D

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients ml	m2	%RSD or R^2
1 Dichlorodifluoromethane	0.97213	0.95013	0.94312	1.01738	1.00663	1.04224	AVRG		0.96365		7.04360
	1.04297	0.92814	0.82458	0.90314							

000095

Sam Savage
 10-26-01
 10/26/01
 10/26/01

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 24-OCT-2001 14:33
 End Cal Date : 24-OCT-2001 19:46
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V410242.B\V410242.8260.m
 Cal Date : 25-Oct-2001 08:59 lisa

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients m1	m2	%RSD or R^2
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
2 Chloromethane	0.70152	0.57801	0.61302	0.52598	0.53065	0.59540	AVRG		0.56497		11.67925
	0.58984	0.52870	0.45990	0.52673							
3 Vinyl Chloride	0.41504	0.55814	0.61838	0.56120	0.54778	0.57876	AVRG		0.54096		10.62800
	0.59121	0.53043	0.49026	0.51833							
4 Bromomethane	0.50805	0.52688	0.48448	0.47790	0.45649	0.49288	AVRG		0.48615		4.43967
	0.47705	0.48754	0.45601	0.49421							
5 Chloroethane	0.25529	0.25532	0.35699	0.31411	0.31534	0.32438	AVRG		0.30399		10.54341
	0.32833	0.30304	0.28265	0.30450							
6 Acrolein	+++++	+++++	+++++	0.03677	0.03069	0.02911	AVRG		0.03424		14.32308
	0.04131	0.03332	+++++	+++++							

000096

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 24-OCT-2001 14:33
 End Cal Date : 24-OCT-2001 19:46
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETC\BDC\DD\chem\voc4.i\V410242.B\V410242.8260.m
 Cal Date : 25-Oct-2001 08:59 lisa

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients ml	m2	RSD or R ²
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
7 Trichlorofluoromethane	1.16026	1.21300	1.34269	1.31597	1.18371	1.18760	AVRG		1.16499		10.58693
	1.21715	1.05716	0.96331	1.00903							
8 Acetonitrile	++++	0.02489	0.03313	0.03355	0.02717	0.02730	AVRG		0.02891		12.30411
	0.02743	++++	++++	++++							
9 Acetone	++++	++++	0.03122	0.03297	0.02880	0.02763	AVRG		0.02811		10.62012
	0.02789	0.02716	0.02337	0.02588							
10 Furan	++++	1.05748	1.16309	1.15498	1.02991	1.06795	AVRG		1.02918		10.35521
	1.08312	0.90945	0.85766	0.93897							
11 1,1-Dichloroethene	0.51648	0.52424	0.57495	0.55918	0.49645	0.50924	AVRG		0.51338		7.79658
	0.54784	0.48238	0.44463	0.47838							

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 24-OCT-2001 14:33
 End Cal Date : 24-OCT-2001 19:46
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V410242.B\V410242.8260.m
 Cal Date : 25-Oct-2001 08:59 lisa

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients ml	m2	%RSD or R^2
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
12 Acrylonitrile	0.09954	0.09308	0.08292	0.09200	0.09761	0.09877	AVRG		0.09630		8.66909
13 Iodomethane	0.65621	0.54686	0.53122	0.52399	0.58014	0.61396	AVRG		0.55461		10.59563
14 Methylene Chloride	12388	18829	44395	138765	302315	620602	LINR	-0.01891	0.49236		0.99613
15 1,1,2-trichloro-1,2,2-trifluoroethane	0.63380	0.69759	0.69775	0.69300	0.63335	0.63219	AVRG		0.54642		7.17477
16 Allyl chloride	0.91424	0.79900	0.89847	0.84670	0.78047	0.79042	AVRG		0.79549		9.78522

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 24-OCT-2001 14:33
 End Cal Date : 24-OCT-2001 19:46
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V410242.B\V410242.8260.m
 Cal Date : 25-Oct-2001 08:59 lisa

Compound	0.500000		1.0000		5.0000		20.0000		50.0000		100.0000		Curve	b	Coefficients		m2	%RSD or R^2
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10	Level 11	Level 12			m1			
	120.0000	150.0000	170.0000	200.0000														
	Level 7	Level 8	Level 9	Level 10														
17 Carbon Disulfide	1.58809	1.72791	1.79773	1.68785	1.53451	1.60071							AVRG		1.60183			7.57827
	1.65238	1.52032	1.37206	1.53677														
18 trans-1,2-Dichloroethene	0.62495	0.59923	0.60078	0.60037	0.57486	0.57152							AVRG		0.57540			5.84241
	0.58546	0.53954	0.52134	0.53596														
19 Methyl-tertbutyl-Ether	1.46529	1.37018	1.50544	1.52302	1.46321	1.44905												
	1.37186	1.33334	1.28365	1.28546									AVRG		1.40505			6.25164
20 Propionitrile	0.03267	0.03871	0.04101	0.04451	0.03763	0.03741												
	0.03421	0.03406	0.03258	0.03265									AVRG		0.03654			11.08086
21 1,1-Dichloroethane	1.01540	0.98146	1.07218	1.07143	1.02274	1.01481												
	1.00212	0.92096	0.90182	0.89500									AVRG		0.98979			6.52198

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 24-OCT-2001 14:33
 End Cal Date : 24-OCT-2001 19:46
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETC\BDC\DD\chem\voc4.i\V410242.B\V410242.8260.m
 Cal Date : 25-Oct-2001 08:59 lisa

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients m1	m2	%RSD or R^2
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
22 Vinyl Acetate	120.0000 Level 7	150.0000 Level 8	170.0000 Level 9	200.0000 Level 10							
	++++ 0.77464	++++ 0.77773	++++ 0.73976	0.91967 0.74507	0.83279	0.83793	AVRG		0.80394		7.95038
23 Chloroprene	1.13848 1.08550	1.11913 0.96022	1.19023 0.92231	1.20699 0.86828	1.09447	1.07124	AVRG		1.06568		10.63170
24 2-Butanone	++++ 0.04320	++++ 0.04153	0.04829 0.03935	0.05271 0.03766	0.04683	0.04482	AVRG		0.04430		11.15286
25 Hexane	++++ 0.74050	++++ 0.65795	0.82532 0.61355	0.86931 0.58994	0.73317	0.71114	AVRG		0.71761		13.54231
26 Di isopropyl ether	++++ 1.50754	1.70469 1.41871	1.66235 1.40402	1.74529 1.32184	1.58561	1.55028	AVRG		1.54448		9.38520

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 24-OCT-2001 14:33
 End Cal Date : 24-OCT-2001 19:46
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDDC\DD\chem\voc4.i\V410242.B\V410242.8260.m
 Cal Date : 25-Oct-2001 08:59 lisa

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients	m1	m2	%RSD or R^2
Level 1	Level 2	Level 3	Level 4	Level 5	Level 6							
120.0000	150.0000	170.0000	200.0000									
Level 7	Level 8	Level 9	Level 10									
0.13099	0.13215	0.13417	0.14533	0.12259	0.11468		AVRG			0.11909		13.76472
0.10945	0.10489	0.09973	0.09597									
0.61891	0.62373	0.59315	0.61558	0.58087	0.57887		AVRG			0.57875		6.72712
0.59543	0.53426	0.52811	0.51862									
0.33852	0.31951	0.30671	0.31191	0.35214	0.35736		AVRG			0.34355		9.02520
0.26260	0.24562	0.26758	0.25728	0.24984	0.24783		AVRG			0.24426		6.90469
0.23987	0.22434	0.21920	0.22442									
1.40516	1.34461	1.24725	1.27029	1.22669	1.20626		AVRG			1.21487		9.22697
1.20723	1.10822	1.07769	1.05530									

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 24-OCT-2001 14:33
 End Cal Date : 24-OCT-2001 19:46
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETC\BDC\DD\chem\voc4.i\V410242.B\V410242.8260.m
 Cal Date : 25-Oct-2001 08:59 lisa

Compound	0.5000000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients m1	m2	SRSD or R^2
32 Isobutyl Alcohol	Level 1 0.01329	Level 2 0.01329	Level 3 0.01648 0.01229	Level 4 0.01804 0.01231	Level 5 0.01497	Level 6 0.01476	AVRG		0.01443		14 17654
33 2,2-Dichloropropane	Level 7 1.07298	Level 8 1.16393 0.95887	Level 9 1.13915 0.90207	Level 10 1.13707 0.88359	Level 11 1.06218	Level 12 1.06665	AVRG		1.04294		9 99286
35 Tetrahydrofuran	Level 13 0.14714	Level 14 0.14481	Level 15 0.13437 0.13290	Level 16 0.17794 0.13867	Level 17 0.15677	Level 18 0.15526	AVRG		0.14848		9.97711
38 1,2-Dichloroethane	Level 19 0.76306 0.75840	Level 20 0.78654 0.71945	Level 21 0.81471 0.67702	Level 22 0.86924 0.66261	Level 23 0.80172	Level 24 0.81714	AVRG		0.76699		8.49138
39 1,1,1-Trichloroethane	Level 25 1.26536 1.29351	Level 26 1.29468 1.18332	Level 27 1.33745 1.12111	Level 28 1.37830 1.10889	Level 29 1.30042	Level 30 1.31740	AVRG		1.26004		7.25825

INITIAL CALIBRATION DATA

```

Start Cal Date      : 24-OCT-2001 14:33
End Cal Date       : 24-OCT-2001 19:46
Quant Method       : ISTD
Target Version     : 4.00
Integrator        : HP RTE
Method file       : \\ETCBDC\DD\chem\voc4.i\V410242.B\V410242.8260.m
Cal Date          : 25-Oct-2001 08:59 lisa

```

Compound	Coefficients										b	Curve	m1	m2	RSD or R^2
	0.500000 Level 1	1.0000 Level 2	5.0000 Level 3	20.0000 Level 4	50.0000 Level 5	100.0000 Level 6									
40 1,1-Dichloropropene	0.94782	0.90775	0.93531	0.95761	0.88903	0.91848							0.88480		7.39962
	0.90292	0.82121	0.79693	0.77087			AVRG								
41 Carbon Tetrachloride	0.98421	1.07996	1.09740	1.15293	1.14189	1.11366									
	1.09892	1.04175	1.03131	0.93397			AVRG						1.06460		6.72265
42 Benzene	2.08294	2.17245	2.17085	2.14551	2.34859	2.03843									
	1.94892	1.83684	2.09078	1.74782			AVRG						2.05831		8.52387
44 Dibromomethane	0.23977	0.23651	0.23816	0.25395	0.22710	0.21335									
	0.20689	0.20179	0.19453	0.18755			AVRG						0.21997		10.09505
45 1,2-Dichloropropane	6379	10500	36231	168357	393306	626886									
	719627	1088203	1239578	1240658			LI NR						-0.10644	0.27757	0.99229

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 24-OCT-2001 14:33
 End Cal Date : 24-OCT-2001 19:46
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V410242.B\V410242.8260.m
 Cal Date : 25-Oct-2001 08:59 lisa

Compound	0.500000	1.0000	Level 1	Level 2	5.0000	Level 3	20.0000	Level 4	50.0000	Level 5	100.0000	Level 6	Curve	b	Coefficients m1	m2	RSD or R^2
46 Trichloroethene	0.41359	0.41107	0.39005	0.41920	0.37123	0.36541	AVRG								0.37521		8.82993
47 Bromodichloromethane	0.54006	0.51100	0.50137	0.49164	AVRG										0.55680		8.57914
48 n-Propyl Acetate	1586182	16632	81492	437143	968262	1455441	LINR								0.45810		0.99078
49 Methyl methacrylate	0.21829	0.19108	0.18981	0.22751	0.18947	0.16621	AVRG								0.18467		13.91905
50 1,4-Dioxane	0.00194	0.00207	0.00189	0.00186	0.00220	0.00215	AVRG								0.00215		14.38932

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 24-OCT-2001 14:33
 End Cal Date : 24-OCT-2001 19:46
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V410242.B\V410242.8260.m
 Cal Date : 25-Oct-2001 08:59 lisa

Compound	0.500000 Level 1	1.0000 Level 2	5.0000 Level 3	20.0000 Level 4	50.0000 Level 5	100.0000 Level 6	Curve	b	Coefficients ml	m2	RSR or R^2
51 2-Chloroethyl vinyl ether	0.37993 0.29488	0.40223 0.29704	0.35477 0.28766	0.40641 ++++	0.35154	0.30366	AVRG		0.34201		13.92065
52 cis-1,3-Dichloropropene	0.60379 0.59206	0.64653 0.50691	0.56319 0.49563	0.62128 0.47426	0.56206	0.59882	AVRG		0.56645		10.12549
53 4-Methyl-2-Pentanone	++++ 0.26698	++++ 0.24374	0.23995 0.23300	0.31555 0.21473	0.26530	0.28205	AVRG		0.25766		12.31646
54 trans-1,3-Dichloropropene	0.53306 0.53568	0.55093 0.46008	0.52073 0.44789	0.56825 0.48467	0.50571	0.54475	AVRG		0.51558		7.72118
55 1,1,2-Trichloroethane	0.25715 0.23516	0.26562 0.20463	0.25436 0.19627	0.25250 0.21729	0.22240	0.24025	AVRG		0.23456		10.07904

889 737

000105

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 24-OCT-2001 14:33
 End Cal Date : 24-OCT-2001 19:46
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V410242.B\V410242.8260.m
 Cal Date : 25-Oct-2001 08:59 lisa

Compound	0 500000	1.0000	5 0000	20 0000	50.0000	100.0000	Coefficients	%RSD
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	m1	or R^2
							m2	
57 Ethyl methacrylate	0.23549	0.24511	0.23353	0.22751	0.19157	0.20450	0.21299	12.38532
	0.19698	0.16925	++++	++++				
58 Toluene	++++	1.13442	1.02096	0.97034	0.84582	0.89935	0.92943	13.74312
	0.89786	0.73726	++++	++++				
59 1,3-Dichloropropane	0.51136	0.54491	0.54212	0.53286	0.47559	0.50272	0.48867	9.85225
	0.49645	0.42291	0.41352	0.44426				
60 2-Hexanone	++++	++++	0.10885	0.11477	0.09743	0.10672	0.10018	9.48776
	0.10133	0.09150	0.08678	0.09400				
61 Chlorodibromomethane	0.38260	0.44295	0.42570	0.42460	0.38442	0.42338	0.39913	7.89985
	0.41542	0.35595	0.35164	0.38464				

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 24-OCT-2001 14:33
 End Cal Date : 24-OCT-2001 19:46
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V410242.B\V410242.8260.m
 Cal Date : 25-Oct-2001 08:59 lisa

Compound	0.500000 Level 1	1.0000 Level 2	5.0000 Level 3	20.0000 Level 4	50.0000 Level 5	100.0000 Level 6	Curve	b	Coefficients m1	m2	%RSD or R ²
62 1,1,2-Dibromoethane	0.26653 0.28951	0.28216 0.25375	0.30433 0.24326	0.30809 0.27001	0.26944	0.29566	AVRG		0.27827		7.69154
63 Tetrachloroethene	0.32834 0.30436	0.32924 0.25277	0.31407 0.24974	0.31393 0.27577	0.27151	0.29834	AVRG		0.29381		10.04748
64 1,1,1,2-Tetrachloroethane	0.39561 0.38140	0.40149 0.38373	0.41996 0.37664	0.43811 0.35365	0.39994	0.39473	AVRG		0.39453		5.91706
66 Chlorobenzene	1.08631 0.86366	1.02090 0.86455	1.01229 0.85425	1.02035 0.79867	0.91309	0.86783	AVRG		0.93024		10.36095
67 Ethylbenzene	2.15167 1.86540	2.20368 1.81985	2.15854 1.79431	2.12345 1.68491	1.89612	1.87310	AVRG		1.95710		9.41421

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 24-OCT-2001 14:33
 End Cal Date : 24-OCT-2001 19:46
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V410242.B\V410242.8260.m
 Cal Date : 25-Oct-2001 08:59 Lisa

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients	m1	m2	%RSD or R^2
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6						
68 Xylene-mp	0.59841	0.68061	0.67498	0.64185	0.54562	0.54810	AVRG			0.58071		14.44875
	0.52147	0.51573	0.50571	0.47465								
69 Bromoform	0.20006	0.23056	0.24295	0.26063	0.23556	0.23267	AVRG			0.22857		7.49939
	0.22158	0.23163	0.22214	0.20789								
70 trans-1,4-Dichloro-2-butene	0.11456	0.10290	0.12906	0.13876	0.12198	0.11976	AVRG			0.11675		9.78409
	0.11198	0.11655	0.11093	0.10098								
71 Styrene	1.04862	1.07015	1.00769	1.02922	0.90267	0.92324	AVRG			0.94305		9.38864
	0.88879	0.87926	0.86827	0.81258								
72 Xylene-o	0.59357	0.63998	0.63686	0.60711	0.52354	0.52053	AVRG			0.54302		12.92937
	0.49288	0.48964	0.47802	0.44805								

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 24-OCT-2001 14:33
 End Cal Date : 24-OCT-2001 19:46
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V410242.B\V410242.8260.m
 Cal Date : 25-Oct-2001 08:59 lisa

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients ml	m2	RSD or R ²
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
73 1,1,2,2-Tetrachloroethane	0.91813	0.89035	0.91607	0.99578	0.95775	0.95428	AVRG		0.86863		9.19563
	0.82291	0.79800	0.76756	0.76549							
74 cis-1,4-Dichloro-2-butene	0.09223	0.11046	0.11496	0.12262	0.10968	0.10695	AVRG		0.10494		9.73515
	0.09953	0.10306	0.09600	0.08693							
75 1,2,3-Trichloropropane	++++	0.10919	0.10641	0.11582	0.09968	0.09490	AVRG		0.09701		12.07833
	0.08855	0.09241	0.08572	0.08040							
76 Isopropylbenzene	1.87944	1.79679	1.81359	1.80981	1.60585	1.66882	AVRG		1.67834		8.28326
	1.60728	1.57853	1.57465	1.44859							
78 Bromobenzene	0.40113	0.38551	0.39572	0.39583	0.35093	0.35329	AVRG		0.36006		8.91376
	0.33729	0.33625	0.33510	0.30958							

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 24-OCT-2001 14:33
 End Cal Date : 24-OCT-2001 19:46
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V410242.B\V410242.8260.m
 Cal Date : 25-Oct-2001 08:59 lisa

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients	m2	%RSD or R ²
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
	120.0000	150.0000	170.0000	200.0000							
	Level 7	Level 8	Level 9	Level 10							
79 n-Propylbenzene	2.32607	2.34673	2.33469	2.32867	2.01747	2.17805	AVRG		2.15425		8.02711
	2.07046	2.06029	2.01956	1.86048							
80 2-Chlorotoluene	1.54838	1.47921	1.39167	1.36433	1.27001	1.26612	AVRG		1.29776		11.23164
	1.20209	1.19203	1.18233	1.08142							
81 4-Chlorotoluene	1.75556	1.47249	1.60908	1.51940	1.32021	1.42120	AVRG		1.42082		12.00598
	1.28953	1.32981	1.29487	1.19608							
82 1,3,5-Trimethylbenzene	1.44013	1.44535	1.46019	1.43590	1.22452	1.30045	AVRG		1.30938		9.59902
	1.24583	1.23353	1.18899	1.11892							
83 1,2,4-Trimethylbenzene	1.44774	1.40562	1.47855	1.44169	1.22952	1.28360	AVRG		1.30512		9.87751
	1.23691	1.23798	1.18760	1.10202							

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 24-OCT-2001 14:33
 End Cal Date : 24-OCT-2001 19:46
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V410242.B\V410242.8260.m
 Cal Date : 25-Oct-2001 08:59 lisa

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients m1	m2	RSD or R^2
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
85 tert-Butylbenzene	1.19807	1.21315	1.19561	1.21673	1.03967	1.10777	AVRG		1.11272		7.93640
	1.08352	1.06752	1.03877	0.96642							
86 sec-Butylbenzene	1.87212	1.86483	1.88979	1.86617	1.60615	1.71002	AVRG		1.71520		8.71165
	1.65042	1.63597	1.59299	1.46354							
87 4-Isopropyltoluene	1.41196	1.43297	1.42166	1.38530	1.20060	1.25639	AVRG		1.27843		9.75204
	1.22112	1.20505	1.16767	1.08155							
89 1,3-Dichlorobenzene	1.87171	1.81694	1.66127	1.76811	1.72043	1.73848	AVRG		1.73733		3.91181
	1.75579	1.68055	1.67691	1.68313							
90 1,4-Dichlorobenzene	1.87269	1.76330	1.66127	1.70794	1.59897	1.65210	AVRG		1.64972		6.61410
	1.57405	1.61957	1.52048	1.52686							

889 743

000111

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 24-OCT-2001 14:33
 End Cal Date : 24-OCT-2001 19:46
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\voc4.i\V410242.B\V410242.8260.m
 Cal Date : 25-Oct-2001 08:59 lisa

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients	m2	SRSD or R ²
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
91 1,2-Dichlorobenzene	1.52509	1.53316	1.49159	1.54576	1.44885	1.51042	AVRG		1.48333		3.32446
	1.50813	1.42484	1.40876	1.43671							
92 n-Butylbenzene	3.81309	3.85474	3.91226	4.04234	3.79198	3.96621	AVRG		3.85915		3.37108
	4.04727	3.76185	3.66229	3.73877							
93 1,2-Dibromo-3-chloropropane	0.20851	0.16211	0.16679	0.18100	0.16450	0.16306	AVRG		0.16611		10.43754
	0.15521	0.15884	0.15015	0.15091							
94 1,2,4-Trichlorobenzene	0.90420	0.86693	0.85270	0.82901	0.74162	0.79170	AVRG		0.82180		5.45952
	0.80746	0.81427	0.79715	0.81293							
95 Naphthalene	1.90618	1.73975	1.65414	1.70272	1.45301	1.58625	AVRG		1.54604		7.36512
	1.60575	1.65427	1.55601	1.60229							

FORM 3
WATER VOA-GCMS LAB CONTROL SAMPLE

889 745

Lab Name: ETC, INC.

Lab Prep Batch: V401031

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix Spike - Sample No.: V401031LCS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
Vinyl Acetate	100.0		89.20	89	28-146
Vinyl Chloride	100.0		85.52	86	65-134
Xylene-mp	200.0		187.7	94	77-115
Xylene-o	100.0		93.92	94	77-115

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 0 outside limits

Spike Recovery: 0 out of 88 outside limits

COMMENTS:

FORM 3
WATER VOA-GCMS MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

889 746

Lab Name: ETC, INC.

Lab Prep Batch: V401031

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix Spike - Sample No.: 011262301

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC. LIMITS REC.
=====	=====	=====	=====	=====	=====
Benzene	100.0	0.000	150.2	150*	72-124
Chlorobenzene	100.0	0.000	116.8	117*	77-112
1,1-Dichloroethene	100.0	0.000	115.4	115	69-121
Toluene	100.0	0.000	122.7	123*	77-115
Trichloroethene	100.0	0.000	134.4	134*	75-113

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	REC.
=====	=====	=====	=====	=====	=====	=====
Benzene	100.0	128.3	128*	16	20	72-124
Chlorobenzene	100.0	115.2	115*	2	20	77-112
1,1-Dichloroethene	100.0	115.6	116	1	20	69-121
Toluene	100.0	117.7	118*	4	20	77-115
Trichloroethene	100.0	114.2	114*	16	20	75-113

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits

Spike Recovery: 8 out of 10 outside limits

COMMENTS:

Environmental Testing & Consulting, Inc.

**Quality Control Reports
Level III
GC/MS Semi-Volatiles**

889 748

ENVIRONMENTAL TESTING AND CONSULTING, INC.
CASE NARRATIVE -
GC/MS SEMI-VOLATILE COMPOUNDS - AQUEOUS

Client Name Sverdrup/Jacobs Engineering
Project Name Memphis Depot
ETC Order# 0112-602

SAMPLE PRESERVATION

All aqueous samples maintained at 4 degrees C until extraction.

HOLDING TIMES

Sample Extraction All aqueous samples extracted within 7 days.

METHOD

Preparation: SW-846 3510C
Analysis: SW-846 8270C

QUALITY CONTROL

QC Batch Form 4 Summary
P07012 P07012LB

System Monitoring Compounds FORM 2
Surrogate recoveries within QC limits.

Method Blank FORM 4
P07012LB

Target analytes were not detected in the method blank.

Laboratory Control Sample FORM 3
P07012LCS/LCSD

All target analyte acceptance criteria met, except as listed below.
Benzidine was flagged for low recoveries in the LCS/LCSD. 2,4-Dimethylphenol was flagged for low recovery in the LCSD.

RPDs for multiple analytes were flagged as outside QC limits due to lower recoveries in the LCSD.

Matrix Spike / Matrix Spike Dup FORM 3
Batch P07012

Due to the limited amount of sample available, no MS/MSD was extracted/analyzed. Refer to Laboratory Control Sample(s) for system verification.

CALIBRATION

DFTPP Daily 12-Hour Tune	All criteria met. FORM 5
Initial Calibration	All criteria met. FORM 6
Calibration Verification	All criteria met. FORM 7 Responses >30% do not affect the data.

Semi-Volatile Internal Standard Area and RT FORM 8

Calibration Verification standard(s) Internal Standard Areas and Retention Times within QC limits.

SAMPLE ANALYSIS

Instrumentation	HP 5890 Series II GC, 5971MSD/HP 6890 GC, 5973MSD
Dilutions Required	No dilutions required.

1
Project Manager

000053

FORM 2
WATER BNA-GCMS SURROGATE RECOVERY

889-749

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

	CLIENT SAMPLE NO.	S1 (NBZ) #	S2 (FBP) #	S3 (TPH) #	S4 (PHL) #	S5 (TBP) #	S6 (2FP) #	S7 #	S8 #	TOT OUT
01	P07012LB	54	51	70	23	55	34			0
02	P07012LCS	65	67	82	25	76	36			0
03	P07012LCSD	71	69	80	28	71	40			0
04	011260202	51	51	53	23	54	33			0
05										
06										
07										
08										
09										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

QC LIMITS

S1 (NBZ) = Nitrobenzene-d5 (29-110)
 S2 (FBP) = 2-Fluorobiphenyl (38-107)
 S3 (TPH) = Terphenyl-d14 (33-122)
 S4 (PHL) = Phenol-d6 (7- 58)
 S5 (TBP) = 2,4,6-Tribromophenol (16-138)
 S6 (2FP) = 2-Fluorophenol (8- 88)

Column to be used to flag recovery values
 * Values outside of contract required QC limits
 D Surrogate diluted out

FORM 4
BNA-GCMS METHOD BLANK SUMMARY

889 750

CLIENT SAMPLE NO.

Lab Name: ETC, INC.

Contract:

P07012LB

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Lab File ID: 0301005

Lab Prep Batch: P07012

Instrument ID: BNA1

Lab Sample ID: P07012LB

Matrix: (soil/water) WATER

Date Analyzed: 01/03/02

Level: (low/med) LOW

Time Analyzed: 1715

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
	=====	=====	=====	=====
01	P07012LCS	P07012LCS	0401006	01/03/02
02	P07012LCSD	P07012LCSD	0501007	01/03/02
03	011260202	011260202	0601008	01/03/02
04				
05				
06				
07				
08				
09				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

COMMENTS:

889 751

FORM 1
BNA-GCMS ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

P07012LB

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix: (soil/water) WATER

Lab Prep Batch: P07012

Sample wt/vol: 1000 (g/mL) ML

Lab File ID: 0301005

Level: (low/med) LOW

Date Received: _____

% Moisture: _____ decanted: (Y/N) _____

Date Extracted: _____

Concentrated Extract Volume: 1 (mL)

Date Analyzed: 01/03/02

Injection Volume: 1.0 (uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
83-32-9	Acenaphthene	2.00	U
208-96-8	Acenaphthylene	2.00	U
98-86-2	Acetophenone	5.00	U
62-53-3	Aniline	5.00	U
120-12-7	Anthracene	2.00	U
92-87-5	Benzidine	20.00	U
56-55-3	Benz (a) Anthracene	2.00	U
205-99-2	Benzo (b) fluoranthene	2.00	U
207-08-9	Benzo (k) fluoranthene	2.00	U
191-24-2	Benzo (ghi) perylene	2.00	U
50-32-8	Benzo (a) pyrene	2.00	U
65-85-0	Benzoic acid	50.00	U
100-51-6	Benzyl alcohol	5.00	U
111-91-1	Bis (2-chloroethoxy) methane	5.00	U
111-44-4	Bis (2-chloroethyl) ether	5.00	U
108-60-1	Bis (2-chloroisopropyl) ether	5.00	U
117-81-7	Bis (2-ethylhexyl) phthalate	5.00	U
101-55-3	4-Bromophenyl phenyl ether	5.00	U
85-68-7	Butyl benzyl phthalate	5.00	U
86-74-8	Carbazole	2.00	U
106-47-8	4-Chloroaniline	5.00	U
510-15-6	Chlorobenzilate	5.00	U
59-50-7	4-Chloro-3-methylphenol	5.00	U
91-58-7	2-Chloronaphthalene	2.00	U
95-57-8	2-Chlorophenol	5.00	U
7005-72-3	4-Chlorophenyl phenyl ether	5.00	U
218-01-9	Chrysene	2.00	U
53-70-3	Dibenz (a, h) anthracene	2.00	U
132-64-9	Dibenzofuran	5.00	U
84-74-2	Di-n-butyl phthalate	5.00	U
95-50-1	1,2-Dichlorobenzene	5.00	U
541-73-1	1,3-Dichlorobenzene	5.00	U
106-46-7	1,4-Dichlorobenzene	5.00	U

FORM I BNA-GCMS

900056

FORM 1
BNA-GCMS ORGANICS ANALYSIS DATA SHEET

889 752

CLIENT SAMPLE NO.

Lab Name: ETC, INC.

Contract:

P07012LB

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix: (soil/water) WATER

Lab Prep Batch: P07012

Sample wt/vol: 1000 (g/mL) ML

Lab File ID: 0301005

Level: (low/med) LOW

Date Received: _____

% Moisture: _____ decanted: (Y/N) _____

Date Extracted: _____

Concentrated Extract Volume: 1 (mL)

Date Analyzed: 01/03/02

Injection Volume: 1.0 (uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Q

91-94-1-----	3,3'-Dichlorobenzidine	10.00	U
120-83-2-----	2,4-Dichlorophenol	5.00	U
87-65-0-----	2,6-Dichlorophenol	5.00	U
84-66-2-----	Diethyl phthalate	5.00	U
119-93-7-----	3,3-Dimethylbenzidine	10.00	U
105-67-9-----	2,4-Dimethyphenol	5.00	U
131-11-3-----	Dimethyl phthalate	5.00	U
534-52-1-----	4,6-Dinitro-2-methylphenol	10.00	U
51-28-5-----	2,4-Dinitrophenol	20.00	U
121-14-2-----	2,4-Dinitrotoluene	5.00	U
606-20-2-----	2,6-Dinitrotoluene	5.00	U
122-39-4-----	N-NitrsdiphyAm/Diphenylamin	5.00	U
117-84-0-----	Di-n-octyl phthalate	5.00	U
62-50-0-----	Ethyl methanesulfonate	5.00	U
206-44-0-----	Fluoranthene	2.00	U
86-73-7-----	Fluorene	2.00	U
118-74-1-----	Hexachlorobenzene	5.00	U
87-68-3-----	Hexachlorobutadiene	5.00	U
77-47-4-----	Hexachlorocyclopentadiene	5.00	U
67-72-1-----	Hexachloroethane	5.00	U
193-39-5-----	Indeno(1,2,3-cd)pyrene	2.00	U
78-59-1-----	Isophorone	5.00	U
66-27-3-----	Methyl methanesulfonate	5.00	U
91-57-6-----	2-Methylnaphthalene	2.00	U
95-48-7-----	2-Methylphenol	5.00	U
108-39-4-----	3&4-Methylphenol	5.00	U
91-20-3-----	Naphthalene	2.00	U
88-74-4-----	2-Nitroaniline	10.00	U
99-09-2-----	3-Nitroaniline	10.00	U
100-01-6-----	4-Nitroaniline	10.00	U
98-95-3-----	Nitrobenzene	5.00	U
88-75-5-----	2-Nitrophenol	10.00	U
100-02-7-----	4-Nitrophenol	5.00	U

FORM I BNA-GCMS

889 753

FORM 1
BNA-GCMS ORGANICS ANALYSIS DATA SHEET

CLIENT SAMPLE NO.

P07012LB

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix: (soil/water) WATER

Lab Prep Batch: P07012

Sample wt/vol: 1000 (g/mL) ML

Lab File ID: 0301005

Level: (low/med) LOW

Date Received: _____

% Moisture: _____ decanted: (Y/N) _____

Date Extracted:

Concentrated Extract Volume: 1 (mL)

Date Analyzed: 01/03/02

Injection Volume: 1.0 (uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.

COMPOUND

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/L

Q

924-16-3-----	N-Nitrosodibutylamine	5.00	U
55-18-5-----	N-Nitrosodiethylamine	5.00	U
62-75-9-----	N-Nitrosodimethylamine	5.00	U
621-64-7-----	N-Nitrosodi-n-propylamine	5.00	U
82-68-8-----	Pentachloronitrobenzene	10.00	U
87-86-5-----	Pentachlorophenol	10.00	U
62-44-2-----	Phenacetin	5.00	U
85-01-8-----	Phenanthrene	2.00	U
108-95-2-----	Phenol	5.00	U
129-00-0-----	Pyrene	2.00	U
110-86-1-----	Pyridine	5.00	U
95-94-3-----	1,2,4,5-Tetrachlorobenzene	5.00	U
58-90-2-----	2,3,4,6-Tetrachlorophenol	5.00	U
120-82-1-----	1,2,4-Trichlorobenzene	5.00	U
95-95-4-----	2,4,5-Trichlorophenol	5.00	U
88-06-2-----	2,4,6-Trichlorophenol	5.00	U
103-33-3-----	1,2-Dphnylhydrzine/Azobenzen	5.00	U

FORM I BNA-GCMS

900058

FORM 1
BNA-GCMS ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

889 754
CLIENT SAMPLE NO.

P07012LB

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix: (soil/water) WATER

Lab Sample ID: P07012LB

Sample wt/vol: 1000 (g/mL) ML

Lab File ID: 0301005

Level: (low/med) LOW

Date Received: _____

% Moisture: _____ decanted: (Y/N) _____

Date Extracted: _____

Concentrated Extract Volume: 1 (mL)

Date Analyzed: 01/03/02

Injection Volume: 1.0 (uL)

Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

Number TICs found: 3

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN	3.73	1.21	J
2. 584-94-1	HEXANE, 2,3-DIMETHYL-	4.57	1.13	NJ
3. 102-82-9	TRIBUTYLAMINE	5.50	0.901	NJ
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

FORM 3
WATER BNA-GCMS LAB CONTROL SAMPLE

889 755

Lab Name: ETC, INC.

Lab Prep Batch: P07012

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix Spike - Sample No.: P07012LCS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
=====	=====	=====	=====	=====	=====
Acenaphthene	50.00		37.03	74	38-117
Acenaphthylene	50.00		39.46	79	37-114
Acetophenone	50.00		34.48	69	32-108
Aniline	50.00		29.44	59	16-133
Anthracene	50.00		37.54	75	34-128
Benzidine	50.00		7.31	15*	22-176
Benz(a)Anthracene	50.00		39.98	80	35-127
Benzo(b)fluoranthene	50.00		41.12	82	35-131
Benzo(k)fluoranthene	50.00		40.29	80	32-132
Benzo(ghi)perylene	50.00		37.62	75	25-123
Benzo(a)pyrene	50.00		39.57	79	34-131
Benzoic acid	50.00		17.77	36	11- 58
Benzyl alcohol	50.00		28.56	57	20-109
Bis(2-chloroethoxy)meth	50.00		35.24	70	20-126
Bis(2-chloroethyl)ether	50.00		31.67	63	16-122
Bis(2-chloroisopropyl)e	50.00		35.02	70	28-108
Bis(2-ethylhexyl)phthal	50.00		39.23	78	21-162
4-Bromophenyl phenyl et	50.00		37.02	74	31-124
Butyl benzyl phthalate	50.00		38.87	78	33-142
Carbazole	50.00		44.00	88	20-147
4-Chloroaniline	50.00		36.70	73	24-127
Chlorobenzilate	50.00		36.36	73	35-118
4-Chloro-3-methylphenol	50.00		37.84	76	35-117
2-Chloronaphthalene	50.00		39.08	78	29-137
2-Chlorophenol	50.00		28.72	57	27-102
4-Chlorophenyl phenyl e	50.00		36.89	74	39-110
Chrysene	50.00		41.19	82	30-124
Dibenz(a,h)anthracene	50.00		40.66	81	27-124

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

COMMENTS:

889 756

FORM 3
WATER BNA-GCMS LAB CONTROL SAMPLE

Lab Name: ETC, INC.

Lab Prep Batch: P07012

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix Spike - Sample No.: P07012LCS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
Dibenzofuran	50.00		37.09	74	40-108
Di-n-butyl phthalate	50.00		33.32	67	19-158
1,2-Dichlorobenzene	50.00		28.34	57	26-100
1,3-Dichlorobenzene	50.00		26.48	53	21-102
1,4-Dichlorobenzene	50.00		27.52	55	24- 99
3,3'-Dichlorobenzidine	50.00		57.64	115	6-192
2,4-Dichlorophenol	50.00		34.41	69	32-110
2,6-Dichlorophenol	50.00		36.02	72	31-112
Diethyl phthalate	50.00		37.48	75	36-130
3,3-Dimethylbenzidine	50.00		3.32	7	6-192
2,4-Dimethyphenol	50.00		26.59	53	34-105
Dimethyl phthalate	50.00		37.58	75	34-123
4,6-Dinitro-2-methylphe	50.00		34.06	68	27-128
2,4-Dinitrophenol	50.00		29.03	58	10-132
2,4-Dinitrotoluene	50.00		35.37	71	24-147
2,6-Dinitrotoluene	50.00		36.13	72	36-125
N-NitrsdiphylAm/Dipheny	100.0		78.99	79	35-116
Di-n-octyl phthalate	50.00		38.60	77	29-136
Ethyl methanesulfonate	50.00		31.47	63	20-121
Fluoranthene	50.00		34.00	68	28-127
Fluorene	50.00		37.51	75	41-116
Hexachlorobenzene	50.00		35.33	71	18-136
Hexachlorobutadiene	50.00		28.58	57	22-109
Hexachlorocyclopentadie	50.00		22.23	44	10-102
Hexachloroethane	50.00		24.68	49	16-107
Indeno (1,2,3-cd) pyrene	50.00		40.40	81	22-126
Isophorone	50.00		35.16	70	31-116
Methyl methanesulfonate	50.00		22.25	44	15- 82

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

COMMENTS:

889 757

FORM 3
WATER BNA-GCMS LAB CONTROL SAMPLE

Lab Name: ETC, INC.

Lab Prep Batch: P07012

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix Spike - Sample No.: P07012LCS

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	LCS CONCENTRATION (ug/L)	LCS % REC #	QC. LIMITS REC.
=====	=====	=====	=====	=====	=====
2-Methylnaphthalene	50.00		34.49	69	34-108
2-Methylphenol	50.00		27.50	55	22- 97
3&4-Methylphenol	50.00		26.02	52	21- 96
Naphthalene	50.00		32.48	65	33-108
2-Nitroaniline	50.00		37.92	76	32-127
3-Nitroaniline	50.00		46.45	93	23-142
4-Nitroaniline	50.00		34.02	68	23-139
Nitrobenzene	50.00		33.22	66	27-117
2-Nitrophenol	50.00		32.55	65	25-114
4-Nitrophenol	50.00		13.54	27	1- 76
N-Nitrosodibutylamine	50.00		38.10	76	31-126
N-Nitrosodiethylamine	50.00		29.41	59	28-107
N-Nitrosodimethylamine	50.00		19.60	39	14- 84
N-Nitrosodi-n-propylami	50.00		36.17	72	29-114
Pentachloronitrobenzene	50.00		38.28	76	34-135
Pentachlorophenol	50.00		36.52	73	17-142
Phenacetin	50.00		37.07	74	29-141
Phenanthrene	50.00		36.84	74	40-120
Phenol	50.00		12.95	26	11- 55
Pyrene	50.00		34.96	70	20-154
Pyridine	50.00		12.76	26	10- 71
1,2,4,5-Tetrachlorobenz	50.00		32.97	66	28-110
2,3,4,6-Tetrachlorophen	50.00		39.50	79	28-118
1,2,4-Trichlorobenzene	50.00		28.78	58	23-106
2,4,5-Trichlorophenol	50.00		38.20	76	26-118
2,4,6-Trichlorophenol	50.00		37.39	75	26-115
1,2-Dphnylhydrzine/Azob	50.00		42.40	85	45-135

Column to be used to flag recovery and RPD values with an asterisk
 * Values outside of QC limits

COMMENTS:

FORM 3
WATER BNA-GCMS LAB CONTROL SAMPLE

Lab Name: ETC, INC.

Lab Prep Batch: P07012

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix Spike - Sample No.: P07012LCS

COMPOUND	SPIKE ADDED (ug/L)	LCSD CONCENTRATION (ug/L)	LCSD % REC #	% RPD #	QC LIMITS	
					RPD	REC.
Acenaphthene	50.00	28.69	57	26*	20	38-117
Acenaphthylene	50.00	30.18	60	27*	20	37-114
Acetophenone	50.00	35.50	71	3	20	32-108
Aniline	50.00	27.90	56	5	20	16-133
Anthracene	50.00	29.56	59	24*	20	34-128
Benzidine	50.00	6.32	13*	14	20	22-176
Benz(a)Anthracene	50.00	38.82	78	2	20	36-127
Benzo(b)fluoranthene	50.00	43.31	87	6	20	36-131
Benzo(k)fluoranthene	50.00	45.51	91	13	20	32-132
Benzo(ghi)perylene	50.00	35.00	70	7	20	26-123
Benzo(a)pyrene	50.00	42.82	86	8	20	34-131
Benzoic acid	50.00	16.88	34	6	20	11- 58
Benzyl alcohol	50.00	33.21	66	15	20	20-109
Bis(2-chloroethoxy)meth	50.00	36.83	74	6	20	20-126
Bis(2-chloroethyl)ether	50.00	37.01	74	16	20	16-122
Bis(2-chloroisopropyl)e	50.00	40.96	82	16	20	28-108
Bis(2-ethylhexyl)phthal	50.00	39.58	79	1	20	21-162
4-Bromophenyl phenyl et	50.00	26.51	53	33*	20	31-124
Butyl benzyl phthalate	50.00	39.35	79	1	20	33-142
Carbazole	50.00	52.94	106	18	20	20-147
4-Chloroaniline	50.00	35.58	71	3	20	24-127
Chlorobenzilate	50.00	40.82	82	12	20	35-118
4-Chloro-3-methylphenol	50.00	36.02	72	5	20	35-117
2-Chloronaphthalene	50.00	30.72	61	24*	20	29-137
2-Chlorophenol	50.00	33.38	67	16	20	27-102
4-Chlorophenyl phenyl e	50.00	28.76	58	24*	20	39-110
Chrysene	50.00	38.90	78	5	20	30-124
Dibenz(a,h)anthracene	50.00	39.05	78	4	20	27-124

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

COMMENTS:

889 759

FORM 3
WATER BNA-GCMS LAB CONTROL SAMPLE

Lab Name: ETC, INC.

Lab Prep Batch: P07012

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix Spike - Sample No.: P07012LCS

COMPOUND	SPIKE ADDED (ug/L)	LCSD CONCENTRATION (ug/L)	LCSD % REC #	% RPD #	QC LIMITS	
					RPD	REC.
Dibenzofuran	50.00	28.57	57	26*	20	40-108
Di-n-butyl phthalate	50.00	31.27	62	8	20	19-158
1,2-Dichlorobenzene	50.00	32.62	65	13	20	26-100
1,3-Dichlorobenzene	50.00	30.51	61	14	20	21-102
1,4-Dichlorobenzene	50.00	31.80	64	15	20	24- 99
3,3'-Dichlorobenzidine	50.00	43.61	87	28*	20	6-192
2,4-Dichlorophenol	50.00	34.51	69	0	20	32-110
2,6-Dichlorophenol	50.00	35.49	71	1	20	31-112
Diethyl phthalate	50.00	30.76	62	19	20	36-130
3,3-Dimethylbenzidine	50.00	3.47	7	0	20	6-192
2,4-Dimethylphenol	50.00	5.46	11*	131*	20	34-105
Dimethyl phthalate	50.00	29.55	59	24*	20	34-123
4,6-Dinitro-2-methylphe	50.00	27.11	54	23*	20	27-128
2,4-Dinitrophenol	50.00	24.05	48	19	20	10-132
2,4-Dinitrotoluene	50.00	29.89	60	17	20	24-147
2,6-Dinitrotoluene	50.00	30.54	61	16	20	36-125
N-NitrsdiphyAm/Dipheny	100.0	85.16	85	7	20	35-116
Di-n-octyl phthalate	50.00	44.51	89	14	20	29-136
Ethyl methanesulfonate	50.00	36.80	74	16	20	20-121
Fluoranthene	50.00	32.84	66	3	20	23-127
Fluorene	50.00	29.96	60	22*	20	41-116
Hexachlorobenzene	50.00	26.76	54	27*	20	13-136
Hexachlorobutadiene	50.00	29.76	60	5	20	22-109
Hexachlorocyclopentadie	50.00	15.06	30	38*	20	10-102
Hexachloroethane	50.00	27.48	55	12	20	15-107
Indeno(1,2,3-cd)pyrene	50.00	39.01	78	4	20	22-126
Isophorone	50.00	36.09	72	3	20	31-116
Methyl methanesulfonate	50.00	26.24	52	17	20	15- 82

Column to be used to flag recovery and RPD values with an asterisk
 * Values outside of QC limits

COMMENTS:

FORM 3
WATER BNA-GCMS LAB CONTROL SAMPLE

Lab Name: ETC, INC.

Lab Prep Batch: P07012

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Matrix Spike - Sample No.: P07012LCS

COMPOUND	SPIKE ADDED (ug/L)	LCSD CONCENTRATION (ug/L)	LCSD % REC #	% RPD #	QC LIMITS	
					RPD	REC.
2-Methylnaphthalene	50.00	35.17	70	1	20	34-108
2-Methylphenol	50.00	25.48	51	8	20	22- 97
3&4-Methylphenol	50.00	22.84	46	12	20	21- 96
Naphthalene	50.00	33.68	67	3	20	33-108
2-Nitroaniline	50.00	28.43	57	28*	20	32-127
3-Nitroaniline	50.00	33.08	66	34*	20	28-142
4-Nitroaniline	50.00	30.14	60	12	20	23-139
Nitrobenzene	50.00	34.45	69	4	20	27-117
2-Nitrophenol	50.00	33.91	68	4	20	25-114
4-Nitrophenol	50.00	11.48	23	16	20	1- 76
N-Nitrosodibutylamine	50.00	38.57	77	1	20	31-126
N-Nitrosodiethylamine	50.00	35.82	72	20	20	28-107
N-Nitrosodimethylamine	50.00	22.89	46	16	20	14- 84
N-Nitrosodi-n-propylami	50.00	40.13	80	10	20	29-114
Pentachloronitrobenzene	50.00	46.38	93	20	20	34-135
Pentachlorophenol	50.00	29.06	58	23*	20	17-142
Phenacetin	50.00	51.30	103	33*	20	29-141
Phenanthrene	50.00	29.34	59	22*	20	40-120
Phenol	50.00	14.72	29	11	20	11- 55
Pyrene	50.00	44.92	90	25*	20	20-154
Pyridine	50.00	7.14	14	60*	20	10- 71
1,2,4,5-Tetrachlorobenz	50.00	25.10	50	28*	20	28-110
2,3,4,6-Tetrachlorophen	50.00	30.33	61	26*	20	28-118
1,2,4-Trichlorobenzene	50.00	30.00	60	3	20	23-106
2,4,5-Trichlorophenol	50.00	28.34	57	28*	20	26-118
2,4,6-Trichlorophenol	50.00	26.32	53	34*	20	26-115
1,2-Dphnylhydrazine/Azob	50.00	43.34	87	2	20	45-135

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits

RPD: 25 out of 83 outside limits
Spike Recovery: 3 out of 166 outside limits

COMMENTS:

Environmental Testing & Consulting, Inc.

**Quality Control Reports
Level IV
Metals (ICP/GFAA/CV)**

Analyst : SH
Supervisor: JF

9140

1. Instrument Profile Intensity Check (Manganese)
2. Initial Calibration
 - a. Initial Calibration Blank (STD1-Blank)
 - b. Initial Calibration Standard 1 (C1) 3 Exposures at less than 3% RSD
 - c. Initial Calibration Standard 2 (C2) 3 Exposures at less than 3% RSD
 - d. Initial Calibration Standard 3 (C3) 3 Exposures at less than 3% RSD
 - e. Initial Calibration Standard 4 (C4) 3 Exposures at less than 3% RSD
 - f. Standardization Report

- ### 3. Initial Calibration Readback (+/- 5% Difference Check Table)

5% Difference Check Table			Failures
a. Initial Calibration Standard 1 (C1)		✓	
b. Initial Calibration Standard 2 (C2)		✓	
c. Initial Calibration Standard 3 (C3)		✓	
d. Initial Calibration Standard 4 (C4)		✓	

- #### 4. Initial Calibration Verification

e. Initial Calibration Blank (ICB) – All elements below MDL/MQL	✓	
f. Initial Calibration Verification (ICV1) – (5%)	✓	OK AT 10%
g. Low Level Check (LLC1) – (20%)	✓	Ca, V
h. Low Level Check (LLC2) – (20%)	✓	Ca
i. Interelement Correction Standard – Initial (ICSAB) – (20%)	✓	
j. Interelement Correction Standard – Final (ICSAB) – (20%)	✓	

Comments

Applicable ETC Order Nos. for this sequence:

V29AQ29	0112621			
V1550521	622			
0201001	597			
0112602	543			
0201026	V29AQ28			
027	0112623			
0112564	543			
552	4196			
538	4160			
571	V.550001			
584	0112545			
586				

Table Name: PLASMA1 Autosampler Type: TYPE TJA
 Sample Positions: 42/192 QC Positions: 19/19 # Sets: 1
 Rinse Station location is rack -1, pos. -1.

--- Racks ---

Rack #	Type	Usage	#Pos Left	Analyses/Pos
1	Aux. (L) Rack	STD/QC/BLANK	19	10
2	Sample (16mm)	Samples	0	1
3	Sample (16mm)	Samples	0	1
4	Sample (16mm)	Samples	0	1
5	Sample (16mm)	Samples	0	1
			42	1

--- Sample Sets ---

Set#	Type	Prepare?	Description	Method	#Pos	Rack#	StartPos
1	Normal	No	010302	ICPT	150	2	1

--- Preparation Info ---

Set#	Uptake	Uptake#2	Final	Dil.Factor

No Samples Prepared.

Rack #1

Pos	Row	Col	Sample Name	Set #	#Used	Type
(1...19	Not	Used)				

Rack #2

Pos	Row	Col	Sample Name	Set #	#Used	Type
1	1	1	V29AQ29 SB	1	-NA-	Sample
2	1	2	V15SO54 SB	1	-NA-	Sample
3	1	3	V29AQ29 LC	1	-NA-	Sample
4	1	4	V15SO54 LC	1	-NA-	Sample
5	1	5	020100101	1	-NA-	Sample
6	1	6	020100103	1	-NA-	Sample
7	1	7	011260201 D	1	-NA-	Sample
8	1	8	011260201	1	-NA-	Sample
9	1	9	011260201 MS	1	-NA-	Sample
10	1	10	011260201 MSD	1	-NA-	Sample
11	1	11	CCB1	1	-NA-	Sample
12	1	12	CCV1	1	-NA-	Sample
13	2	1	11260201 5	1	-NA-	Sample
14	2	2	11260201 D	1	-NA-	Sample
15	2	3	20102601	1	-NA-	Sample
16	2	4	20102701	1	-NA-	Sample
17	2	5	CCB2	1	-NA-	Sample
18	2	6	CCV2	1	-NA-	Sample
19	2	7	11256402 10	1	-NA-	Sample
20	2	8	11256406 10	1	-NA-	Sample
21	2	9	11256408 10	1	-NA-	Sample

Rack #2

Row	Col	Sample Name	Set #	#Used	Type
22	2	10 11255201 PDS	1	-NA-	Sample
23	2	11 11253802 PDS	1	-NA-	Sample
24	2	12 11257101	1	-NA-	Sample
25	3	1 11258404	1	-NA-	Sample
26	3	2 11258406	1	-NA-	Sample
27	3	3 11258609	1	-NA-	Sample
28	3	4 11258609 5	1	-NA-	Sample
29	3	5 CCB3	1	-NA-	Sample
30	3	6 CCV3	1	-NA-	Sample
31	3	7 11258603 5	1	-NA-	Sample
32	3	8 11258613 PDS	1	-NA-	Sample
33	3	9 11258613 DT	1	-NA-	Sample
34	3	10 11255101 MSD	1	-NA-	Sample
35	3	11 11258614	1	-NA-	Sample
36	3	12 11258614 MS	1	-NA-	Sample
37	4	1 11258614 MSD	1	-NA-	Sample
38	4	2 11262101	1	-NA-	Sample
39	4	3 11262101 D	1	-NA-	Sample
40	4	4 11262101 MS	1	-NA-	Sample
41	4	5 CCB4	1	-NA-	Sample
42	4	6 CCV4	1	-NA-	Sample
43	4	7 11262201	1	-NA-	Sample
44	4	8 11262202	1	-NA-	Sample
45	4	9 11262203	1	-NA-	Sample
46	4	10 11262204	1	-NA-	Sample
47	4	11 11262205	1	-NA-	Sample
48	4	12 11262206	1	-NA-	Sample

Rack #3

Pos	Row	Col	Sample Name	Set #	#Used	Type
1	1	1	11262207	1	-NA-	Sample
2	1	2	11262208	1	-NA-	Sample
3	1	3	11262208 MS	1	-NA-	Sample
4	1	4	11262208 MSD	1	-NA-	Sample
5	1	5	CCB5	1	-NA-	Sample
6	1	6	CCV5	1	-NA-	Sample
7	1	7	11259701	1	-NA-	Sample
8	1	8	11259702	1	-NA-	Sample
9	1	9	11254303	1	-NA-	Sample
10	1	10	11254304	1	-NA-	Sample
11	1	11	V29AQ28 SB	1	-NA-	Sample
12	1	12	V29AQ28 LC	1	-NA-	Sample
13	2	1	11262301	1	-NA-	Sample
14	2	2	11262302	1	-NA-	Sample
15	2	3	11254302	1	-NA-	Sample
16	2	4	11254305	1	-NA-	Sample
17	2	5	CCB6	1	-NA-	Sample
18	2	6	CCV6	1	-NA-	Sample
19	2	7	11254306	1	-NA-	Sample
20	2	8	11249601	1	-NA-	Sample
21	2	9	11246001	1	-NA-	Sample

889 765

AutoSampler Report Table: PLASMA1

01/05/02 09:03:56 AM

page 3

Rack #3

Pos	Row	Col	Sample Name	Set #	#Used	Type
22	2	10	11246001 MS	1	-NA-	Sample
23	2	11	11246001 MSD	1	-NA-	Sample
24	2	12	V15S061 SB	1	-NA-	Sample
25	3	1	V15S061 LC	1	-NA-	Sample
26	3	2	11254502	1	-NA-	Sample
27	3	3	11254504	1	-NA-	Sample
28	3	4	11254506	1	-NA-	Sample
29	3	5	CCB7	1	-NA-	Sample
30	3	6	CCV7	1	-NA-	Sample
31	3	7	11254509	1	-NA-	Sample
32	3	8	11254511	1	-NA-	Sample
33	3	9	11254513	1	-NA-	Sample
34	3	10	11254515	1	-NA-	Sample
35	3	11	11254518	1	-NA-	Sample
36	3	12	11254520	1	-NA-	Sample
37	4	1	11254522	1	-NA-	Sample
38	4	2	CCB8	1	-NA-	Sample
39	4	3	CCV8	1	-NA-	Sample
40	4	4	ICSA	1	-NA-	Sample
41	4	5	ICSAB	1	-NA-	Sample
42	4	6	(empty)	1	-NA-	-NA-
43	4	7	(empty)	1	-NA-	-NA-
44	4	8	(empty)	1	-NA-	-NA-
45	4	9	(empty)	1	-NA-	-NA-
46	4	10	(empty)	1	-NA-	-NA-
47	4	11	(empty)	1	-NA-	-NA-
48	4	12	(empty)	1	-NA-	-NA-

Rack #4

Pos	Row	Col	Sample Name	Set #	#Used	Type
1	1	1	(empty)	1	-NA-	-NA-
2	1	2	(empty)	1	-NA-	-NA-
3	1	3	(empty)	1	-NA-	-NA-
4	1	4	(empty)	1	-NA-	-NA-
5	1	5	(empty)	1	-NA-	-NA-
6	1	6	(empty)	1	-NA-	-NA-
7	1	7	(empty)	1	-NA-	-NA-
8	1	8	(empty)	1	-NA-	-NA-
9	1	9	(empty)	1	-NA-	-NA-
10	1	10	(empty)	1	-NA-	-NA-
11	1	11	(empty)	1	-NA-	-NA-
12	1	12	(empty)	1	-NA-	-NA-
13	2	1	(empty)	1	-NA-	-NA-
14	2	2	(empty)	1	-NA-	-NA-
15	2	3	(empty)	1	-NA-	-NA-
16	2	4	(empty)	1	-NA-	-NA-
17	2	5	(empty)	1	-NA-	-NA-
18	2	6	(empty)	1	-NA-	-NA-
19	2	7	(empty)	1	-NA-	-NA-
20	2	8	(empty)	1	-NA-	-NA-
21	2	9	(empty)	1	-NA-	-NA-

000070

FORM 2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION
ICP METALS

Lab Name Environmental Testing and Consulting, Inc

Date/Time of Sequence 01/03/02 0918 Instrument ICPT

Initial Calibration Source C1 M6-28-10 C2 M6-29-01 C3 M6-32-09 C4 M6-33-03

Continuing Calibration Source ICV/CCV M6-32-16

Analyte	Initial Calibration Verification			Continuing CCV1			Continuing CCV2			Found			Flag
	True	Found	%Diff(1)	True	Found	%Diff(1)	Found	%Diff(1)	Flag	Found	%Diff(1)	Flag	
Silver	100	98.1	2	100	99	1	100	0	<5	100	0	<5	
Arsenic	500	522	4	500	528	6	538	8	<10	538	8	<10	
Barium	1000	990	1	1000	1000	0	1020	2	<5	1020	2	<5	
Cadmium	100	98.6	1	100	99.7	0	102	2	<5	102	2	<5	
Chromium	200	204	2	200	206	3	210	5	<5	210	5	<10	
Iron	1000	1040	4	1000	1050	5	1070	7	<5	1070	7	<10	
Manganese	100	105	5	100	106	6	108	8	<10	108	8	<10	
Lead	500	515	3	500	523	5	532	6	<10	532	6	<10	
Selenium	500	497	1	500	503	1	511	2	<5	511	2	<5	

(1) Percent difference from true value. ICP Method 6010B - 10% ICP Method 200.7 - 5%

000071

889 766

FORM 3
INITIAL AND CONTINUING CALIBRATION BLANKS
ICP METALS

Lab Name: Environmental Testing and Consulting, Inc. Date/Time of Sequence: 01/03/02 0918 Instrument: ICPT

Analyte	Initial Calibration Blank ug/L	CCB1	CCB2	Continuing Calibration Blank ug/L									
Silver	ND	ND	ND										
Arsenic	ND	ND	ND										
Barium	ND	ND	ND										
Cadmium	ND	ND	ND										
Chromium	ND	ND	ND										
Iron	ND	ND	ND										
Manganese	ND	ND	ND										
Lead	ND	ND	ND										
Selenium	ND	ND	ND										

000072

FORM 4
INTERFERENCE CHECK SAMPLE
ICP METALS

Lab Name Environmental Testing and Consulting, Inc

Date/Time of Sequence 01/03/02 0918 Instrument ICPT

Concentration Units: ug/L

Analyte	True Sol AB	Initial Found		Final Found	
		Sol AB	%REC	Sol AB	%REC
Silver	200	211	106	206	103
Aluminum	250000	251000	100	246000	98
Arsenic	200	204	102	201	101
Barium	200	209	105	204	102
Calcium	250000	252000	101	244000	98
Cadmium	200	195	98	193	97
Chromium	200	197	99	194	97
Iron	100000	101000	101	99000	99
Magnesium	250000	254000	102	246000	98
Manganese	200	205	103	200	100
Lead	200	202	101	196	98
Selenium	200	202	101	197	99

Analyte	True Sol A	Initial Found		Final Found	
		Sol A	%REC	Sol A	%REC
Silver	0	ND	0	ND	0
Aluminum	250000	251000	100	248000	99
Arsenic	0	ND	0	ND	0
Barium	0	ND	0	ND	0
Calcium	250000	254000	102	247000	99
Cadmium	0	ND	0	ND	0
Chromium	0	ND	0	ND	0
Iron	100000	101000	101	99900	100
Magnesium	250000	254000	102	247000	99
Manganese	0	ND	0	ND	0
Lead	0	ND	0	ND	0
Selenium	0	ND	0	ND	0

%R - Recovery should be within 20%.

ENVIRONMENTAL TESTING & CONSULTING, INC

Mercury Sequence Check List

Sequence ID: 120103000203.DBDate/Time: 1/3/02 0949Analyst: JFSupervisor: A

Instrument ID: CETAC M-6000A

1. General Maintenance Check

- a. Lamp Warm-up ☒
- b. Pump Winding ☒
- c. Check GLS ☒
- d. Nafion Dryer ☒

Action Taken

2. Sequence Check List

Initial Calibration

- a. Initial Calibration Blank (STD1-Blank)
- b. Initial Calibration Standard 1 0 20 ug/L
- c. Initial Calibration Standard 2 1 0 ug/L
- d. Initial Calibration Standard 3 2 0 ug/L
- e. Initial Calibration Standard 4 5 0 ug/L
- f. Initial Calibration Standard 5 10 0 ug/L

3. Regression coefficient (minimum = 0.995)

4. Initial Calibration Blank (ICB) - All elements below MQL

Water = 0.20 ug/L Soil = 0.02 mg/Kg

5. Initial Calibration Verification (ICV) - 2nd Source SRN: M-6-33-21

Concentration 5.0 ug/L +/- 10%

Found: 5.34 %Difference: 7

6. Continuing Calibration Blank (CCB) - All elements below MQL indicate by ✓

Metal	CCB1	CCB2	CCB3	CCB4	CCB5	CCB6	CCB7	CCB8	CCB9	CCB10	CCB11	CCB12	CCB13	CCB14	CCB15
Hg	✓	✓	✓	F	✓										

7. Continuing Calibration Verification (CCV) - Range EPA 90-110% SW-846 80-120%

All elements within QC limits indicate by ✓ (Concentration same as ICV) SRN: M-6-33-21

Metal	CCV1	CCV2	CCV3	CCV4	CCV5	CCV6	CCV7	CCV8	CCV9	CCV10	CCV11	CCV12	CCV13	CCV14	CCV15
Hg	✓	✓	✓	F	✓										

Applicable ETC Order Nos. for this sequence:

SBLC V09A026112551112692201001112602112659BLK D15.5112701112622112691112690112660

Thursday, January 03, 2002

Tube	Rack ID	Sample ID	Weight	Volume	Sample
1		ICB	1	1	Unknov
2		ICV	1	1	Unknov
3		V09AQ26 SB	1	1	Unknov
4		V09AQ26 LC	1	1	Unknov
5		11260201B	1	1	Unknov
6		11260201C	1	1	Unknov
7		11260201C MS	1	1	Unknov
8		11260201C MSD	1	1	Unknov
9		11262201	1	1	Unknov
10		11262202	1	1	Unknov
11		11262203	1	1	Unknov
12		11262204	1	1	Unknov
13		CCB1	1	1	Unknov
14		CCV1	1	1	Unknov
15		11262205	1	1	Unknov
16		11262206	1	1	Unknov
17		11262207	1	1	Unknov
18		11262208	1	1	Unknov
19		11255101	1	1	Unknov
20		11265904	1	1	Unknov
21		11265904 MS	1	1	Unknov
22		11265904 MSD	1	1	Unknov
23		11265902	1	1	Unknov
24		11265903	1	1	Unknov
25		CCR2	1	1	Unknov
26		CCV2	1	1	Unknov
27		11265901	1	1	Unknov
28		11269101	1	1	Unknov
29		11269102	1	1	Unknov
30		11269201	1	1	Unknov
31		BLK DISS	1	1	Unknov
32		11269002	1	1	Unknov
33		11269002 MS	1	1	Unknov
34		11269002 MSD	1	1	Unknov
35		V09AQ27 SB	1	1	Unknov
36		V09AQ27 LC	1	1	Unknov
37		CCB3	1	1	Unknov
38		CCV3	1	1	Unknov
39		20100101	1	1	Unknov
40		20100103	1	1	Unknov
41		20100103 MS	1	1	Unknov
42		20100103 MSD	1	1	Unknov
43		11270101	1	1	Unknov
44		11270102	1	1	Unknov
45		11270103	1	1	Unknov
46		11270104	1	1	Unknov

889 771

Thursday, January 03, 2002

Tube	Rack ID	Sample ID	Weight	Volume	Sample
48		11270106	1	1	Un
49		CCB4	1	1	Unknov
50		CCV4	1	1	Unknov
51		11266001	1	1	Unknov
52		11266002	1	1	Unknov
53		11260201C PDS	1	1	Unknov
54		20100103 PDS	1	1	Unknov
55		CCB5	1	1	Unknov
56		CCV5	1	1	Unknov

000076

FORM 2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION
MERCURY

Lab Name Environmental Testing and Consulting, Inc

Date/Time of Sequence 01/03/02 0949 Instrument M6000

Initial Calibration Source C1 M6-33-20

Continuing Calibration Source ICV/CCV M6-33-21

Analyte	Initial Calibration Verification				Continuing CCV1				Continuing CCV2				Continuing CCV3			
	True	Found	%Diff(1)	Flag	True	Found	%Diff(1)	Flag	Found	%Diff(1)	Flag	Found	%Diff(1)	Flag		
Mercury	5.00	5.34	6.8	<10	5.00	5.31	6.2	<10	5.35	7.0	<10	5.35	7.0	<10		

000077

889 772

FORM 3
INITIAL AND CONTINUING CALIBRATION BLANKS
ICP METALS

Lab Name Environmental Testing and Consulting, Inc

Date/Time of Sequence 01/03/02 0949 Instrument M6000

889 773

Analyte	MDL ug/L	Initial Cal Blank (ICB) ug/L	CCB1	CCB2	CCB3	Continuing Calibration Blank ug/L									
Mercury	0.06	ND	ND	ND	ND										

000078

Environmental Testing & Consulting, Inc.

**Quality Control Reports
Level IV
GC/MS Volatiles**

ENVIRONMENTAL TESTING & CONSULTING, INC

GC/MS VOC Method 8260B Sequence Check List (SW-846)

Sequence ID: V412211 Matrix: _____ HBN: _____
 Date: 12/20/01
 Applicable ETC Order Nos. for this sequence: _____ Analyst (1)
0112-496 0112-623 0112-512 (2) 521 Super (11)
0112-602 -495 -477 510

Validated

1. BFB Daily 12-Hour Tune Meets Criteria. No analyses begins until criteria are met. (SOP) ✓
2. Initial Calibration Verification Criteria - Method : V410242-8260.M
 - a. SPCC - Mean RF ≥ 0.10 (≥ 0.30 for Chlorobenzene / 1122-Tetrachloroethene) ✓
 - b. CCC - RSD of RF for CCCs and Target Analytes MUST BE $\leq 30\%$ ✓
 - c. RSD of analytes $\leq 15\%$ may use Average RF for quantitation ✓
 - d. Analytes w/RSD $> 15\%$ use Linear Regression - correlation coefficient ≥ 0.99 ✓
3. Calibration Verification - Each 12-Hour Shift
 - a. SPCC - Mean RF ≥ 0.10 (≥ 0.30 for Chlorobenzene / 1122-Tetrachloroethene) ✓
 - b. CCC - % Difference for Average RF Calibration - $\leq 20\%$ ✓
 - c. CCC - % Drift for Linear Regression Calibration - $\leq 20\%$ ✓
 - d. % Difference/% Drift for all other Target Analytes - $\leq 30\%$ ✓
Indemethane @31.0
 - e. Internal Standards - Retention Times within ± 30 seconds from Mid-Point ICAL STD ✓
 - f. Internal Standards - Areas within (-50% to +100%) from Mid-Point ICAL STD ✓
4. Method Blanks included in this sequence :

Analyze daily or for each analytical batch (20 samples): _____ ✓
 List compounds identified in Method Blank w/concentration. _____
 Flag final result "B-Detected in Blank"
V41221125 MECL2 (P) 4.60ug/L
5. Matrix Spike/Matrix Spike Duplicates included in this sequence :

Analyze daily or for each matrix (ms/msd per 20 samples of same matrix) ✓
 List MS/MSD(s) performed with any failures :
0112-623-2
6. Laboratory Control Samples included in this sequence :

Must contain all Target Analytes. ✓
V41221125
7. Surrogate Recoveries within QC Limits ✓
8. All positive compounds within calibration range ✓

Narrative/Notes :

889 776

FORM 5

VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Lab File ID: 0101001

BFB Injection Date: 12/21/01

Instrument ID: VOC4

BFB Injection Time: 1403

GC Column:

ID: 2.00 (mm)

Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	17.6
75	30.0 - 60.0% of mass 95	46.3
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	6.9
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	Greater than 50.0% of mass 95	65.4
175	5.0 - 9.0% of mass 174	4.8 (7.4)1
176	95.0 - 101.0% of mass 174	65.2 (99.7)1
177	5.0 - 9.0% of mass 176	4.3 (6.7)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	V412211LCS	1LCS	0201002LCS	12/21/01	1417
02	DSC100PPB		0201002	12/21/01	1417
03	V412212LCS	2LCS	0202003LCS	12/21/01	1452
04	DSC100PPB		0202003	12/21/01	1452
05	V412211LB	V412211LB	0402005	12/21/01	1645
06	011260201	011260201	0701008	12/21/01	1818
07	011262302	011262302	1101012	12/21/01	2022
08	011262302MS	MS	2001021	12/22/01	0059
09	011262302MSD	MSD	2101022	12/22/01	0130
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

FORM 7
VOA-GCMS CONTINUING CALIBRATION CHECK

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Instrument ID: VOC4

Calibration Date: 12/21/01 Time: 1417

Lab File ID: 0201002

Init. Calib. Date(s): 10/24/01 10/24/01

Heated Purge: (Y/N) Y

Init. Calib. Times: 1433 1946

GC Column:

ID: 2.00 (mm)

COMPOUND	SAMPLE AMOUNT	CAL100 AMOUNT	CURVE	%D	MAX %d
Acetone	106.9	100.0	AVRG	6.9	30.0
Acetonitrile	1028	1000	AVRG	2.8	30.0
Acrolein	94.20	100.0	AVRG	5.8	30.0
Acrylonitrile	99.07	100.0	AVRG	0.9	30.0
Allyl chloride	87.62	100.0	AVRG	12.4	30.0
Benzene	98.31	100.0	AVRG	1.7	30.0
Bromobenzene	102.8	100.0	AVRG	2.8	30.0
Bromochloromethane	97.16	100.0	AVRG	2.8	30.0
Bromodichloromethane	93.54	100.0	AVRG	6.5	30.0
Bromoform	105.1	100.0	AVRG	5.1	30.0
2-Butanone	103.4	100.0	AVRG	3.4	30.0
Bromomethane	86.79	100.0	AVRG	13.2	30.0
n-Butylbenzene	94.38	100.0	AVRG	5.6	30.0
sec-Butylbenzene	81.13	100.0	AVRG	18.9	30.0
tert-Butylbenzene	103.5	100.0	AVRG	3.5	30.0
Carbon Disulfide	102.0	100.0	AVRG	2.0	30.0
Carbon Tetrachloride	98.14	100.0	AVRG	1.9	30.0
Chlorobenzene	92.98	100.0	AVRG	7.0	30.0
Chlorodibromomethane	92.18	100.0	AVRG	7.8	30.0
Chloroethane	104.3	100.0	AVRG	4.3	30.0
2-Chloroethyl vinyl ether	84.83	100.0	AVRG	15.2	30.0
Chloroform	94.34	100.0	AVRG	5.7	20.0
Chloromethane	100.1	100.0	AVRG	0.1	30.0
Chloroprene	93.58	100.0	AVRG	6.4	30.0
2-Chlorotoluene	109.8	100.0	AVRG	9.8	30.0
4-Chlorotoluene	107.2	100.0	AVRG	7.2	30.0
1,2-Dibromo-3-chloropropane	89.22	100.0	AVRG	10.8	30.0
1,2-Dibromoethane	90.92	100.0	AVRG	9.1	30.0
Dibromomethane	91.00	100.0	AVRG	9.0	30.0
1,2-Dichlorobenzene	91.93	100.0	AVRG	8.1	30.0
1,3-Dichlorobenzene	94.14	100.0	AVRG	5.9	30.0
1,4-Dichlorobenzene	89.46	100.0	AVRG	10.5	30.0
cis-1,4-Dichloro-2-butene	114.2	100.0	AVRG	14.2	30.0
trans-1,4-Dichloro-2-butene	109.6	100.0	AVRG	9.6	30.0
Dichlorodifluoromethane	101.1	100.0	AVRG	1.1	30.0
1,1-Dichloroethane	91.57	100.0	AVRG	8.4	30.0
1,2-Dichloroethane	100.5	100.0	AVRG	0.5	30.0

889 778

FORM 7

VOA-GCMS CONTINUING CALIBRATION CHECK

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Instrument ID: VOC4

Calibration Date: 12/21/01 Time: 1417

Lab File ID: 0201002

Init. Calib. Date(s): 10/24/01 10/24/01

Heated Purge: (Y/N) Y

Init. Calib. Times: 1433 1946

GC Column:

ID: 2.00 (mm)

COMPOUND	SAMPLE AMOUNT	CAL100 AMOUNT	CURVE	%D	MAX %d
1,1-Dichloroethene	86.25	100.0	AVRG	13.8	20.0
cis-1,2-Dichloroethene	88.86	100.0	AVRG	11.1	30.0
trans-1,2-Dichloroethene	85.04	100.0	AVRG	15.0	30.0
1,2-Dichloropropane	96.34	100.0	LINR	3.7	20.0
1,3-Dichloropropane	88.94	100.0	AVRG	11.1	30.0
2,2-Dichloropropane	102.0	100.0	AVRG	2.0	30.0
1,1-Dichloropropene	100.4	100.0	AVRG	0.4	30.0
cis-1,3-Dichloropropene	92.53	100.0	AVRG	7.5	30.0
trans-1,3-Dichloropropene	101.8	100.0	AVRG	1.8	30.0
Di isopropyl ether	96.44	100.0	AVRG	3.6	30.0
1,4-Dioxane	2110	2000	AVRG	5.5	30.0
Ethyl Acetate	100.9	100.0	AVRG	0.9	30.0
Ethylbenzene	96.57	100.0	AVRG	3.4	20.0
Ethyl methacrylate	166.4	200.0	AVRG	16.8	30.0
Furan	150.1	153.0	AVRG	1.9	30.0
Hexachlorobutadiene	90.86	100.0	AVRG	9.1	30.0
Hexane	103.6	117.0	AVRG	11.4	30.0
2-Hexanone	86.26	100.0	AVRG	13.7	30.0
Iodomethane	131.0	100.0	AVRG	31.0	30.0
Isobutyl Alcohol	1840	2000	AVRG	8.0	30.0
Isopropylbenzene	100.1	100.0	AVRG	0.1	30.0
4-Isopropyltoluene	106.7	100.0	AVRG	6.7	30.0
Methacrylonitrile	979.2	1000	AVRG	2.1	30.0
Methylene Chloride	100.4	100.0	LINR	0.4	30.0
Methyl methacrylate	185.4	200.0	AVRG	7.3	30.0
4-Methyl-2-Pentanone	92.82	100.0	AVRG	7.2	30.0
Methyl-tertbutyl-Ether	103.8	100.0	AVRG	3.8	30.0
Naphthalene	95.77	100.0	AVRG	4.2	30.0
Propionitrile	1026	1000	AVRG	2.6	30.0
n-Propyl Acetate	158.3	151.0	LINR	4.8	30.0
n-Propylbenzene	107.3	100.0	AVRG	7.3	30.0
Styrene	99.10	100.0	AVRG	0.9	30.0
1,1,1,2-Tetrachloroethane	98.49	100.0	AVRG	1.5	30.0
1,1,2,2-Tetrachloroethane	84.27	100.0	AVRG	15.7	30.0
Tetrachloroethene	83.52	100.0	AVRG	16.5	30.0
Tetrahydrofuran	87.40	91.50	AVRG	4.5	30.0
1,2,3-Trichlorobenzene	98.34	100.0	AVRG	1.7	30.0

FORM 7
VOA-GCMS CONTINUING CALIBRATION CHECK

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Instrument ID: VOC4

Calibration Date: 12/21/01 Time: 1417

Lab File ID: 0201002

Init. Calib. Date(s): 10/24/01 10/24/01

Heated Purge: (Y/N) Y

Init. Calib. Times: 1433 1946

GC Column:

ID: 2.00 (mm)

COMPOUND	SAMPLE AMOUNT	CAL100 AMOUNT	CURVE	%D	MAX %d
=====	=====	=====	=====	=====	=====
Toluene	78.03	100.0	AVRG	22.0	20.0
1,1,1-Trichloroethane	91.06	100.0	AVRG	8.9	30.0
1,1,2-Trichloroethane	86.47	100.0	AVRG	13.5	30.0
1,1,2-trichloro-1,2,2-triflu	91.22	100.0	AVRG	8.8	30.0
Trichloroethene	82.95	100.0	AVRG	17.0	30.0
Trichlorofluoromethane	102.5	100.0	AVRG	2.5	30.0
1,2,3-Trichloropropane	103.2	100.0	AVRG	3.2	30.0
1,2,4-Trimethylbenzene	105.1	100.0	AVRG	5.1	30.0
1,2,4-Trichlorobenzene	99.34	100.0	AVRG	0.7	30.0
1,3,5-Trimethylbenzene	105.0	100.0	AVRG	5.0	30.0
Vinyl Acetate	90.40	100.0	AVRG	9.6	30.0
Vinyl Chloride	104.6	100.0	AVRG	4.6	20.0
Xylene-mp	187.7	200.0	AVRG	6.2	30.0
Xylene-o	94.80	100.0	AVRG	5.2	30.0
=====	=====	=====	=====	=====	=====
Dibromofluoromethane	50.17	50.00	AVRG	0.3	30.0
Toluene-d8	47.23	50.00	AVRG	5.5	30.0
Bromofluorobenzene	55.68	50.00	AVRG	11.4	30.0
1,2-Dichloroethane-d4	52.05	50.00	AVRG	4.1	30.0

889 730 VOA-GCMS CONTINUING CALIBRATION CHECK

FORM 7

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Instrument ID: VOC4

Calibration Date: 12/21/01 Time: 1452

Lab File ID: 0202003

Init. Calib. Date(s): 10/24/01 10/24/01

Heated Purge: (Y/N) Y

Init. Calib. Times: 1433 1946

GC Column:

ID: 2.00 (mm)

COMPOUND	RRF	RRF100	MIN RRF	%D	MAX %D
Toluene	0.929	0.891		4.1	20.0
Dibromofluoromethane	0.653	0.654		0.2	30.0
Toluene-d8	1.306	1.281		1.9	30.0
Bromofluorobenzene	0.536	0.533		0.6	30.0
1,2-Dichloroethane-d4	0.690	0.761		10.3	30.0

FORM VII VOA-GCMS

000085

FORM 8
VOA-GCMS INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Lab File ID (Standard): 0202003

Date Analyzed: 12/21/01

Instrument ID: VOC4

Time Analyzed: 1452

GC Column:

ID: 2.00 (mm)

Heated Purge: (Y/N) Y

	IS1 AREA #	RT #	IS2 (DFB) AREA #	RT #	IS3 (CBZ) AREA #	RT #
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	1150845	6.92	1896752	7.51	1912092	9.71
UPPER LIMIT	2301690	7.42	3793504	8.01	3824184	10.21
LOWER LIMIT	575423	6.42	948376	7.01	956046	9.21
=====	=====	=====	=====	=====	=====	=====
CLIENT SAMPLE NO.						
=====	=====	=====	=====	=====	=====	=====
01 V412211LB	1082051	6.92	1653425	7.52	1492564	9.72
02 011260201	986876	6.92	1699657	7.52	1360729	9.71
03 011262302	939724	6.92	1613041	7.52	1285255	9.71
04 011262302MS	1021364	6.92	1826158	7.52	1683678	9.71
05 011262302MSD	1112557	6.92	1908306	7.52	1734938	9.72
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 = Pentafluorobenzene
 IS2 (DFB) = 1,4-Difluorobenzene
 IS3 (CBZ) = Chlorobenzene-d5

AREA UPPER LIMIT = +100% of internal standard area
 AREA LOWER LIMIT = - 50% of internal standard area
 RT UPPER LIMIT = + 0.50 minutes of internal standard RT
 RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
 * Values outside of QC limits.

889 782

FORM 8
VOA-GCMS INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Lab File ID (Standard): 0202003

Date Analyzed: 12/21/01

Instrument ID: VOC4

Time Analyzed: 1452

GC Column:

ID: 2.00 (mm)

Heated Purge: (Y/N) Y

	IS4 (DCB)					
	AREA #	RT #	AREA #	RT #	AREA #	RT #
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	715184	11.53				
UPPER LIMIT	1430368	12.03				
LOWER LIMIT	357592	11.03				
=====	=====	=====	=====	=====	=====	=====
CLIENT						
SAMPLE NO.						
=====	=====	=====	=====	=====	=====	=====
01 V412211LB	634402	11.53				
02 011260201	583986	11.54				
03 011262302	550098	11.54				
04 011262302MS	658638	11.54				
05 011262302MSD	651137	11.54				
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS4 (DCB) = 1,4-Dichlorobenzene-d4

AREA UPPER LIMIT = +100% of internal standard area

AREA LOWER LIMIT = - 50% of internal standard area

RT UPPER LIMIT = + 0.50 minutes of internal standard RT

RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.

* Values outside of QC limits.

ENVIRONMENTAL TESTING & CONSULTING, INC
GC/MS VOC Method 8260B Sequence Check List (SW-846)

Sequence ID: V401031 Matrix: H₂O HBN: _____
 Date: 1-4-02 Analyst: [Signature]
 Applicable ETC Order Nos. for this sequence:
0112-623-1-3 0112-602-1-2 Super: [Signature]
0112-659-1-4 0201-037-1-3

Validated

1. BFB Daily 12-Hour Tune Meets Criteria. No analyses begins until criteria are met. (SOP) ☒
2. Initial Calibration Verification Criteria - Method: V412271.8260m
 - a. SPCC - Mean RF ≥ 0.10 (≥ 0.30 for Chlorobenzene / 1122-Tetrachloroethene) ☒
 - b. CCC - RSD of RF for CCCs and Target Analytes MUST BE $\leq 30\%$ ☒
 - c. RSD of analytes $\leq 15\%$ may use Average RF for quantitation ☒
 - d. Analytes w/RSD $> 15\%$ use Linear Regression - correlation coefficient ≥ 0.99 ☒

3. Calibration Verification - Each 12-Hour Shift

- a. SPCC - Mean RF ≥ 0.10 (≥ 0.30 for Chlorobenzene / 1122-Tetrachloroethene) ☒
- b. CCC - % Difference for Average RF Calibration - $\leq 20\%$ ☒
- c. CCC - % Drift for Linear Regression Calibration - $\leq 20\%$ ☒
- d. % Difference/% Drift for all other Target Analytes - $\leq 30\%$
Acetone, DCEM, Ethyl Meth, 2-Hexanone ☒
- e. Internal Standards - Retention Times within ± 30 seconds from Mid-Point ICAL STD ☒
- f. Internal Standards - Areas within (-50% to +100%) from Mid-Point ICAL STD ☒

4. Method Blanks included in this sequence :

Analyze daily or for each analytical batch (20 samples): _____
 List compounds identified in Method Blank w/concentration. _____
 Flag final result "B-Detected in Blank" ☒

Meth 2 BDL

5. Matrix Spike/Matrix Spike Duplicates included in this sequence :

Analyze daily or for each matrix (ms/msd per 20 samples of same matrix) ☒
 List MS/MSD(s) performed with any failures : _____

* 8 out of 10 recoveries exceed limits

6. Laboratory Control Samples included in this sequence :

Must contain all Target Analytes. 0/88 ☒

7. Surrogate Recoveries within QC Limits ☒

8. All positive compounds within calibration range ☒

Narrative/Notes : _____

889 784 FORM 5
VOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
BROMOFLUOROBENZENE (BFB)

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Lab File ID: 0101001

BFB Injection Date: 01/03/02

Instrument ID: VOC4

BFB Injection Time: 0835

GC Column:

ID: 2.00 (mm)

Heated Purge: (Y/N) N

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0 - 40.0% of mass 95	18.8
75	30.0 - 60.0% of mass 95	48.1
95	Base Peak, 100% relative abundance	100.0
96	5.0 - 9.0% of mass 95	7.0
173	Less than 2.0% of mass 174	0.0 (0.0)1
174	Greater than 50.0% of mass 95	57.6
175	5.0 - 9.0% of mass 174	5.0 (8.7)1
176	95.0 - 101.0% of mass 174	57.4 (99.6)1
177	5.0 - 9.0% of mass 176	3.7 (6.5)2

1-Value is % mass 174 2-Value is % mass 176

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	V401031LCS	1LCS	0201002LCS	01/03/02	0857
02	DSC100PPB		0201002	01/03/02	0857
03	V401031LB	1LB	0303005	01/03/02	1103
04	011262301	011262301	0501007	01/03/02	1210
05	011260201	011260201	0701009	01/03/02	1313
06	011260201	011260201	0801010	01/03/02	1345
07	011260202	011260202	0901011	01/03/02	1416
08	011262301MS	MS	1801020	01/03/02	1859
09	011262301MSD	MSD	1901021	01/03/02	1930
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

INITIAL CALIBRATION DATA

```

Start Cal Date      : 29-DEC-2001 09:23
End Cal Date       : 29-DEC-2001 12:17
Quant Method       : ISTD
Target Version     : 4.00
Integrator        : HP RTE
Method file       : \\ETCBDC\DD\chem\bna1.i\B1122901.B\B1122901.M
Cal Date          : 30-Dec-2001 07:39 erica

```

Compound	2.0000 Level 1	5.0000 Level 2	10.0000 Level 3	20.0000 Level 4	50.0000 Level 5	80.0000 Level 6	Curve	b	Coefficients m1	m2	SRSD or R ²
76 Fluoranthene	57560 2180271	160874 2692179	315419 ++++	570921	1343258	1559018	LINR	-0.07693	0.68541		0.99578
77 Benzidine	++++ ++++	33143 ++++	65727 ++++	81503	163777	202973	LINR	-0.16215	0.20632		0.99203
78 Pyrene	55165 2132260	160345 ++++	309864 ++++	550797	1316706	1517381	LINR	-0.05349	0.69737		0.99798
80 Chlorobenzilate	0.35034 0.45019	0.36127 0.47233	0.43132 0.48521	0.46800	0.47062	0.46298	AVERG				11 31379
81 3,3-Dimethylbenzidine	++++ 503373	++++ 673094	59880 ++++	74605	204168	260538	QUAD	-0.08896	4.38243	-1.54802	0.99646

$$* \% RSD = 16.6$$

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 29-DEC-2001 09:23
 End Cal Date : 29-DEC-2001 12:17
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\bnal.i\B1122901.B\B1122901.M
 Cal Date : 30-Dec-2001 07:39 erica

Compound	2.0000 Level 1	5.0000 Level 2	10.0000 Level 3	20.0000 Level 4	50.0000 Level 5	80.0000 Level 6	Curve	b	Coefficients ml	m2	%RSD or R ²
82 Butyl benzyl phthalate	0.51366 0.68134	0.55601 0.68814	0.64541 0.67193	0.66998	0.65395	0.67365	AVRG		0.63934		9.62833
83 Benz(a)Anthracene	1.19601 1.11576	1.06953 1.12187	1.11969 1.07025	1.05791	1.06009	1.09113	AVRG		1.10025		4.01198
85 3,3'-Dichlorobenzidine	0.21108 0.23001	0.21349 0.24272	0.26296 0.27172	0.24915	0.18053	0.18397	AVRG		0.22729		14.32917
86 Chrysene	1.13830 1.06144	1.00673 1.04783	1.05767 0.98465	0.99820	0.99434	1.01749	AVRG		1.03407		4.67406
87 Bis(2-ethylhexyl)phthalate	++++ 0.87194	0.61333 0.88515	0.76926 0.87573	0.76832	0.81233	0.85431	AVRG		0.80630		11.26392

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 29-DEC-2001 09:23
 End Cal Date : 29-DEC-2001 12:17
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\bna1.i\B1122901.B\B1122901.M
 Cal Date : 30-Dec-2001 07:39 erica

Compound	2.0000 Level 1	5.0000 Level 2	10.0000 Level 3	20.0000 Level 4	50.0000 Level 5	80.0000 Level 6	Curve	b	Coefficients m1	m2	%RSD or R ²
88 Di-n-octyl phthalate <i>ccc</i>	++++ 1686684	54287 2020444	122636 3006537	217853	786101	1015991	QUAD	0.12598	0.80634	-0.00100	0.99781
89 Benzo(b)fluoranthene	1.16578 1.18401	1.06994 1.34654	1.20588 ++++	1.14980	1.15548	1.16893	AVRG		1.18079		6.58866
90 Benzo(k)fluoranthene	1.13549 1.21892	1.03874 1.30674	1.16146 ++++	1.18146	1.12186	1.20276	AVRG		1.17093		6.70120
91 Benzo(a)pyrene <i>ccc</i>	0.81166 1.04154	0.77129 1.09694	0.92529 ++++	0.90540	0.96492	1.01602	AVRG		0.94163		11.88456
93 Indeno(1,2,3-cd)pyrene	0.79263 1.03537	0.71478 0.91011	0.72775 ++++	0.75673	0.90865	0.91972	AVRG		0.84572		13.50767

* %RSD = 25.0

889 787

900160

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 29-DEC-2001 09:23
 End Cal Date : 29-DEC-2001 12:17
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\bna1.i\B1122901.B\B1122901.M
 Cal Date : 30-Dec-2001 07:39 erica

Compound	2.0000 Level 1	5.0000 Level 2	10.0000 Level 3	20.0000 Level 4	50.0000 Level 5	80.0000 Level 6	Curve	b	Coefficients m1	m2	%RSD or R^2
94 Dibenz(a,h)anthracene	0.63206 0.83452	0.59255 0.73742	0.59084 ++++	0.59901	0.73378	0.73546	AVRG		0.68195		13.29749
95 Benzo(ghi)perylene	0.68168 0.80287	0.62070 0.69411	0.61183 0.67777	0.61076	0.72526	0.71720	AVRG		0.68246		9.21500
4 2-Fluorophenol	1.41442 1.39592	1.28454 1.37609	1.43117 1.31964	1.38787	1.36493	1.38229	AVRG		1.37298		3.32560
7 Phenol-d6	1.84923 1.73413	1.67028 1.71261	1.83320 1.62752	1.77994	1.78400	1.71912	AVRG		1.74556		4.18058
23 Nitrobenzene-d5	0.52926 0.42938	0.47176 0.43052	0.49599 0.38657	0.45959	0.46664	0.43213	AVRG		0.45576		9.20780

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 29-DEC-2001 09:23
 End Cal Date : 29-DEC-2001 12:17
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETC\BDC\DD\chem\bnal.i\B1122901.B\B1122901.M
 Cal Date : 30-Dec-2001 07:39 erica

Compound	2.0000 Level 1	5.0000 Level 2	10.0000 Level 3	20.0000 Level 4	50.0000 Level 5	80.0000 Level 6	Curve	b	Coefficients ml	m2	%RSD or R ²
44 2-Fluorobiphenyl	100.0000	120.0000	160.0000								
	Level 7	Level 8	Level 9								
	1.47427	1.26262	1.38537	1.24358	1.26132	1.17394					
	1.12250	1.06281	++++				AVRG		1.24830		10.74816
65 2,4,6-Tribromophenol	3934	12607	28816	67949	198007	285393					
	395423	555840	764291				QUAD	0.08507	7.62342	-0.93256	0.99764
79 Terphenyl-d14	++++	1.11657	1.23388	1.30089	1.25577	1.17387					
	1.10858	1.21073	1.10840				AVRG		1.18858		6.19093

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 29-DEC-2001 09:23
 End Cal Date : 29-DEC-2001 12:17
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\bnal.i\B1122901.B\B1122901.M
 Cal Date : 30-Dec-2001 07:39 Erica

Curve	Formula	Units
Averaged	Amt = Rsp/ml	Response
Linear	Amt = b + Rsp/ml	Response
Quad	Amt = b + m1*Rsp + m2*Rsp^2	Response

000163

889 790

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 24-OCT-2001 14:33
 End Cal Date : 24-OCT-2001 19:46
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETC\BDC\DD\chem\voc4.i\V410242.B\V410242.8260.m
 Cal Date : 25-Oct-2001 08:59 lisa

Compound	0.500000 Level 1	1.0000 Level 2	5.0000 Level 3	20.0000 Level 4	50.0000 Level 5	100.0000 Level 6	Curve	b	Coefficients m1	m2	%RSD or R^2
96 Hexachlorobutadiene	0.58251 0.61329	0.56548 0.61227	0.59938 0.58522	0.60727 0.62309	0.55408	0.58054	AVRG		0.59231		3.78629
97 1,2,3-Trichlorobenzene	0.78149 0.71464	0.69318 0.70617	0.72054 0.68692	0.70894 0.70062	0.62372	0.67216	AVRG		0.70084		5.66740
34 Dibromofluoromethane	0.60801 0.67110	0.64401 0.63742	0.66936 ++++	0.67275 ++++	0.65981	0.66477	AVRG		0.65328		3.41252
37 1,2-Dichloroethane-d4	0.63834 0.66160	0.69243 0.65064	0.70400 ++++	0.73776 ++++	0.69380	0.71780	AVRG		0.68955		4.76496
56 Toluene-d8	1.29319 1.41136	1.36271 1.19201	1.35633 ++++	1.31140 ++++	1.17059	1.34760	AVRG		1.30565		6.47972

889 791

000113

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 24-OCT-2001 14:33
 End Cal Date : 24-OCT-2001 19:46
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDDC\DD\chem\voc4.i\V410242.B\V410242.8260.m
 Cal Date : 25-Oct-2001 08:59 Lisa

Compound	0.5000000	1.0000	5.0000	20.0000	50.0000	100.0000	Coefficients	%RSD or R ²
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	b	m2
	120.0000	150.0000	170.0000	200.0000				
	Level 7	Level 8	Level 9	Level 10				
\$ 77 Bromofluorobenzene	0.53274	0.57475	0.56855	0.56015	0.49657	0.52419		
	0.51436	0.51673	++++	++++		AVRG	0.53602	5.32130

Curve	Formula	Units
Averaged	Ant = Rsp/ml	Response
Linear	Ant = b + Rsp/ml	Response

Report Date : 28-Dec-2001 08:55

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 27-DEC-2001 15:52
End Cal Date : 27-DEC-2001 21:05
Quant Method : ISTD
Target Version : 4.00
Integrator : HP RTE
Method file : \\ETC\BDC\CHEM\voc4.i\V412271.B\V412271.8260.m
Cal Date : 28-Dec-2001 08:45 mike

Calibration File Names:

Level 1: M:\voc4.i\V412271.B\0301003.D
Level 2: M:\voc4.i\V412271.B\0402005.D
Level 3: M:\voc4.i\V412271.B\0501006.D
Level 4: M:\voc4.i\V412271.B\0601007.D
Level 5: M:\voc4.i\V412271.B\0701008.D
Level 6: M:\voc4.i\V412271.B\0801009.D
Level 7: M:\voc4.i\V412271.B\0901010.D
Level 8: M:\voc4.i\V412271.B\1001011.D
Level 9: M:\voc4.i\V412271.B\1101012.D
Level 10: M:\voc4.i\V412271.B\1201013.D

Compound	0.500000		1.0000		5.0000		20.0000		50.0000		100.0000		Curve		Coefficients		m2	%RSD or R^2
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10	Level 11	Level 12	b	m1				
1 Dichlorodifluoromethane	120.0000	150.0000	170.0000	200.0000														
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10	Level 11	Level 12						
	2.00376	1.75176	1.43626	2.26754	2.11641	2.29171												
	2.03902	2.12873	2.08120	2.04195									AVRG		2.01583			12.52367

M. J. J. 1/4/02
Page 1

1/4/02 12/28/01

QC REVIEWED 1-4-02

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 27-DEC-2001 15:52
 End Cal Date : 27-DEC-2001 21:05
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETC\BDC\CHEM\VOIC4.i\412271.B\412271.8260.m
 Cal Date : 28-Dec-2001 08:45 mike

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients ml	m2	%RSD or R ²
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
2 Chloromethane SPC	0.40266 0.43731	0.20561 0.24208	0.22832 0.25727	0.24089 0.21471	0.24363	0.26463	AVRG		0.23466		8.60122
3 Vinyl Chloride CCC	0.40235 0.33948	0.34792 0.36277	0.41282 0.46166	0.42263 0.42840	0.50068	0.47286	AVRG		0.43802		8.14938
4 Bromomethane	0.40235 0.33948	0.34792 0.36277	0.26632 0.36793	0.33876 0.35056	0.35489	0.36183	AVRG		0.34928		9.83862
5 Chloroethane	0.31514 0.26135	0.26843 0.27158	0.27135 0.27263	0.31063 0.25673	0.30807	0.28241	AVRG		0.28183		7.62473
6 Acrolein	0.03299	0.03565	0.04387	0.04387	0.03872	0.03553	AVRG		0.03735		11.16710

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 27-DEC-2001 15:52
 End Cal Date : 27-DEC-2001 21:05
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETC\BDC\CHEM\VOIC4.i\412271.B\412271.8260.m
 Cal Date : 28-Dec-2001 08:45 mike

Compound	0.500000 Level 1	1.0000 Level 2	5.0000 Level 3	20.0000 Level 4	50.0000 Level 5	100.0000 Level 6	Curve	b	Coefficients m1	m2	RSD or R ²
7 Trichlorofluoromethane	1.07616 1.06897	1.23779 1.08958	170.0000 1.05961	1.19710 1.02494	1.24212	1.12523	AVRG		1.13649		6.80952
8 Acetonitrile	390427 47646	5147 496680	18819 530715	86540 74102	175096	353395	LINR	-0.64615	0.02754		0.99555
9 Acetone	47646	59198	63314	74102	23135	41566	LINR	-0.22854	0.03083		0.99643
10 Furan	1.10525	1.22619	1.23139	1.23135	1.24904	1.16952	AVRG		1.17894		4.92311
11 1,1-Dichloroethene	0.49968 0.41684	0.56429 0.43099	0.49556 0.44284	0.46557 0.41104	0.47874	0.44415	AVRG		0.46497		10.01055

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 27-DEC-2001 15:52
 End Cal Date : 27-DEC-2001 21:05
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\CHEM\voc4.i\V412271.B\V412271.8260.m
 Cal Date : 28-Dec-2001 08:45 mike

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients ml	m2	%RSD or R ²
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
12 Acrylonitrile	++++ 170283	++++ 217231	++++ 233107	41579 266396	78178	150832	LINR	-0.24678	0.11109		0.99569
13 Iodomethane	++++ 0.70804	0.64492 0.72983	0.73698 0.74195	0.82077 0.67882	0.81621	0.75531	AVRG		0.73698		7.79534
14 Methylene Chloride	27855 747135	26663 930568	54744 1050294	162345 1185277	344589	643926	LINR	-0.10234	0.51229		0.99839
15 1,1,2-trichloro-1,2,2-trifluoroethane	0.50750 0.63857	0.60898 0.71907	0.64171 0.63994	0.64942 0.66058	0.65747	0.66365	AVRG		0.63869		8.43727
16 Allyl chloride	1.13502 0.74762	0.90468 0.76236	0.83255 0.77676	0.83872 0.74071	0.84580	0.78784	AVRG		0.83721		13.92795

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 27-DEC-2001 15:52
 End Cal Date : 27-DEC-2001 21:05
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETC\BDC\CHEM\VOIC4.i\412271.B\412271.8260.m
 Cal Date : 28-Dec-2001 08:45 mike

Compound	0.5000000 Level 1	1.0000 Level 2	5.0000 Level 3	20.0000 Level 4	50.0000 Level 5	100.0000 Level 6	Curve	b	Coefficients m1 m2	%RSD or R ²
17 Carbon Disulfide	2.20075 1.67343	2.11981 1.74302	1.88277 1.78882	1.79523 1.64446	1.88022	1.76730	AVRG		1.84958	9.80937
18 trans-1,2-Dichloroethane	0.78555 0.53183	0.56842 0.55531	0.58340 0.56421	0.56514 0.53547	0.57398	0.55601	AVRG		0.58193	12.59538
19 Methyl-tertbutyl-Ether	2.28245 1.84270	2.14903 1.99114	1.91481 1.81489	2.18307 1.85944	1.89551	1.89007	AVRG		1.98231	8.26316
20 Propionitrile	*** 575968	7211 737225	27311 797201	137571 921408	266196	513005	AVRG			
21 1,1-Dichloroethane	1.19219 1.04834	1.18461 1.06176	1.13140 1.08656	1.15217 1.04185	1.16733	1.08115	AVRG	-0.91430	0.03996	0.99639
57C							AVRG		1.11474	5.15971

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 27-DEC-2001 15:52
 End Cal Date : 27-DEC-2001 21:05
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETC\BDC\CHEM\VOIC4.i\V412271.B\V412271.8260.m
 Cal Date : 28-Dec-2001 08:45 mike

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coeficients	m1	m2	SRSD
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6						or R^2
22 Vinyl Acetate	++++ 0.91139	++++ 1.01019	++++ 0.91999	1.16663 0.89843	0.97483	0.98209	AVRG			0.98051		9.37813
23 Chloroprene	1.61125 1.33408	1.52289 1.40442	1.39968 1.29806	1.36119 1.31349	1.38175	1.37581	AVRG			1.40026		6.91551
24 2-Butanone	++++ 0.06394	++++ 0.06471	0.06663 0.06189	0.08200 0.06231	0.06564	0.06760	AVRG			0.06696		9.58733
25 Hexane	++++ 0.85678	++++ 0.93909	1.10112 0.88404	0.90278 0.87087	0.87897	0.91777	AVRG			0.91893		8.51400
26 Di isopropyl ether	++++ 2.08048	1.95993 2.26011	2.00300 2.13949	2.14124 2.19542	2.01859	2.14966	AVRG			2.10532		4.63708

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 27-DEC-2001 15:52
 End Cal Date : 27-DEC-2001 21:05
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETC\BDC\CHEM\voc4.i\V412271.B\V412271.8260.m
 Cal Date : 28-Dec-2001 08:45 mike

Compound	0.500000 Level 1	1.0000 Level 2	5.0000 Level 3	20.0000 Level 4	50.0000 Level 5	100.0000 Level 6	Curve	b	Coefficients m1	m2	SRSD or R ²
27 Methacrylonitrile	0.23359 0.17923	0.20729 0.19266	0.19319 0.18063	0.23455 0.18429	0.18650	0.19015	AVRG		0.19822		10.32909
28 cis-1,2-Dichloroethene	0.80976 0.56775	0.67778 0.58331	0.60731 0.58879	0.61834 0.56928	0.62234	0.58371	AVRG		0.62284		11.77140
29 Ethyl Acetate	++++ 0.46331	++++ 0.49626	0.50993 0.46410	0.62095 0.46647	0.48469	0.49652	AVRG		0.50028		10.34440
30 Bromochloromethane	0.31836 0.23560	0.28607 0.24426	0.25394 0.25160	0.26470 0.23783	0.25678	0.25194	AVRG		0.26011		9.61114
31 Chloroform	1.51683 1.36319	1.55203 1.40411	1.45438 1.42271	1.49866 1.36895	1.48146	1.42394	AVRG		1.44863		4.35791
CCC											

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 27-DEC-2001 15:52
 End Cal Date : 27-DEC-2001 21:05
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETC\BDC\CHEM\voc4.i\V412271.B\V412271.8260.m
 Cal Date : 28-Dec-2001 08:45 mike

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	ml	m2	%RSD or R ²
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
32 Isobutyl Alcohol	++++ 442144	++++ 575911	23413 594159	114011 706564	198506	391740	LINR	-2 89225	0.01500		0.99460
33 2,2-Dichloropropane	++++ 1.32965	1.31032 1.44527	1.37887 1.34149	1.35423 1.37835	1.34669	1.36457	AVRG		1.36105		2.83580
35 Tetrahydrofuran	++++ 203372	5143 258329	10920 265848	53330 314893	94602	184885	LINR	-0 12229	0.14874		0.99121
38 1,2-Dichloroethane	1.24921 1.12710	1.11515 1.19742	1.14250 1.13528	1.28192 1.09181	1.16162	1.18904	AVRG		1.16910		5.17177
39 1,1,1-Trichloroethane	1.39344 1.44942	1.40195 1.59038	1.41249 1.49227	1.40532 1.50028	1.45289	1.46608	AVRG		1.45645		4.14376

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 27-DEC-2001 15:52
 End Cal Date : 27-DEC-2001 21:05
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\CHEM\VOIC4.i\412271.B\412271.8260.m
 Cal Date : 28-Dec-2001 08:45 mike

Compound	0.500000 Level 1	1.0000 Level 2	5.0000 Level 3	20.0000 Level 4	50.0000 Level 5	100.0000 Level 6	Curve	b	Coefficients ml	m2	%RSD or R ²
40 1,1-Dichloropropene	0.78539 1.09737	1.03347 1.18493	1.07014 1.11054	1.01623 1.12931	1.07606	1.11313	AVRG		1.06166		10.20042
41 Carbon Tetrachloride	0.97561 1.27938	1.22994 1.38559	1.24340 1.30473	1.22156 1.30940	1.28722	1.30552	AVRG		1.25425		8.67767
42 Benzene	2.59514 2.46750	2.41203 2.69339	2.32159 2.56099	2.35914 2.62630	2.34827	2.56440	AVRG		2.49487		5.23450
44 Dibromomethane	++ 0.24944	0.35476 0.24879	0.28376 0.25399	0.29758 0.24263	0.28363	0.25799	AVRG		0.27473		12.95917
45 1,2-Dichloropropane	7297 905115	10623 1224880	38583 1311472	160933 1603968	348147	745024	LNIR	0.03178	0.44088		0.99802

2 1/2 % RSD = 22.6%

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 27-DEC-2001 15:52
 End Cal Date : 27-DEC-2001 21:05
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\CHEM\VOIC4.i\V412271.B\V412271.8260.m
 Cal Date : 28-Dec-2001 08:45 mike

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients ml	m2	%RSD or R^2
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
46 Trichloroethene	0.31903	0.38151	0.35613	0.34915	0.39549	0.38900	AVRG		0.38475		9.08655
	0.38826	0.41872	0.42159	0.42865							
47 Bromodichloromethane	0.89451	0.88106	0.72884	0.77406	0.83371	0.78902	AVRG		0.80972		6.31116
	0.76285	0.80018	0.81291	0.82013							
48 n-Propyl Acetate	++++	0.90777	0.72879	0.91186	0.77493	0.73763	AVRG				
	0.70481	0.72162	0.71432	++++					0.77522		11.04799
49 Methyl methacrylate	0.35778	0.29772	0.27226	0.31192	0.27570	0.26298	AVRG				
	0.25066	0.25562	0.25442	++++					0.28212		12.41890
50 1,4-Dioxane	++++	++++	0.00213	0.00250	0.00212	0.00211	AVRG				
	0.00163	0.00185	0.00189	0.00195					0.00202		12.64790

889 802

Environmental Testing and Consulting, Inc. .

INITIAL CALIBRATION DATA

Start Cal Date : 27-DEC-2001 15:52
 End Cal Date : 27-DEC-2001 21:05
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\CHEM\VOIC4.i\V412271.B\V412271.8260.m
 Cal Date : 28-Dec-2001 08:45 mike

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients	m1	m2	%RSD or R^2
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6						
	120.0000	150.0000	170.0000	200.0000								
	Level 7	Level 8	Level 9	Level 10								
51 2-Chloroethyl vinyl ether	0.46318	0.43032	0.40711	0.42489	0.41518	0.41236	AVRG			0.42719		4.31357
	0.40927	0.43683	0.43654	++++								
52 cis-1,3-Dichloropropene	0.75249	0.74362	0.74201	0.78224	0.78754	0.77192	AVRG			0.77319		2.98331
	0.75908	0.78684	0.79784	0.80827								
53 4-Methyl-2-Pentanone	++++	++++	0.35179	0.44895	0.37317	0.35072	AVRG					
	0.32949	0.32616	0.33053	0.31022						0.35263		12.32745
54 trans-1,3-Dichloropropene	0.75208	0.74356	0.74225	0.78172	0.78818	0.77345	AVRG					
	0.76036	0.78785	0.79909	0.80336						0.77379		3.02569
55 1,1,2-Trichloroethane	0.30300	0.31762	0.26816	0.29007	0.27612	0.27746	AVRG					
	0.26685	0.27587	0.27465	++++						0.28331		6.02039

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 27-DEC-2001 15:52
 End Cal Date : 27-DEC-2001 21:05
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\CHEM\voc4.i\V412271.B\V412271.8260.m
 Cal Date : 28-Dec-2001 08:45 mike

Compound	0.5000000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients	m2	%RSD or R^2
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6			m1		
57 Ethyl methacrylate	0.38603	0.34188	0.28251	0.33050	0.30630	0.28499	AVRG		0.30734		13.98490
	0.26435	0.26213	++++	++++							
58 Toluene	++++	1.00271	0.90493	0.86658	1.03453	0.93028	AVRG		0.93560		6.47019
	0.91111	0.89894	++++	++++							
59 1,3-Dichloropropane	0.63725	0.66591	0.64153	0.70454	0.68861	0.69573	AVRG		0.67074		3.43633
	0.66089	0.67439	0.68632	0.65219							
60 2-Hexanone	++++	++++	0.25720	0.31068	0.26247	0.24661	AVRG		0.24773		13.59865
	0.22576	0.21712	0.21428	++++							
61 Chlorodibromomethane	0.50203	0.52890	0.49010	0.55313	0.55746	0.54251	AVRG		0.53091		4.17921
	0.52747	0.53373	0.55274	0.52101							

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 27-DEC-2001 15:52
 End Cal Date : 27-DEC-2001 21:05
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\CHEM\VOIC4.i\V412271.B\V412271.8260.m
 Cal Date : 28-Dec-2001 08:45 mike

Compound	0.500000		1.0000		5.0000		20.0000		50.0000		100.0000		Curve	b	Coefficients		m2	RSD or R^2
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10	Level 11	Level 12			m1			
62 1,2-Dibromoethane	0.39552	0.39549	0.37537	0.41794	0.40879	0.39651	0.36790	0.36305	0.37583	0.33774	0.30341	0.29013	AVRG		0.38341			6.24688
63 Tetrachloroethene	0.19233	0.30325	0.29176	0.27120	0.32742	0.30341	0.29696	0.29140	0.32329	0.30032			AVRG					13.05700
64 1,1,1,2-Tetrachloroethane	0.54182	0.54335	0.50230	0.52155	0.53592	0.55279	0.54182	0.54883	0.65558	0.66874			AVRG		0.57010			8.64504
66 Chlorobenzene C6H5Cl	1.05890	1.25566	1.17428	0.99248	1.12050	1.05930	1.01007	0.99428	1.25318	1.21050			AVRG		1.11291			9.39281
67 Ethylbenzene C6H5C2H5	1.74969	2.56861	2.40716	2.01587	2.42833	2.21968	2.13414	2.05254	2.60446	2.47433			AVRG		2.26548			12.22237

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 27-DEC-2001 15:52
 End Cal Date : 27-DEC-2001 21:05
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\CHEM\VOIC4.i\412271.B\412271.8260.m
 Cal Date : 28-Dec-2001 08:45 mike

Compound	0.500000 Level 1	1.0000 Level 2	5.0000 Level 3	20.0000 Level 4	50.0000 Level 5	100.0000 Level 6	Curve	b	Coefficients ml	m2	RSR or R^2
68 Xylene-mp	0.60360 0.61722	0.75785 0.60609	0.67340 0.77839	0.57146 0.76653	0.68730	0.63820	AVRG		0.67000		11.24574
69 Bromoform	0.36943 0.34227	0.39607 0.31779	0.40389 0.36001	0.41165 0.33920	0.38148	0.38077	AVRG		0.37025		8.22824
70 trans-1,4-Dichloro-2-butene	0.14592 0.14273	0.18709 0.13051	0.17407 0.14621	0.19092 0.14369	0.17478	0.16392	AVRG		0.15998		13.08430
71 Styrene	0.81036 0.91973	1.08909 0.89650	1.04173 1.12063	0.93641 1.10483	1.10626	1.00111	AVRG		1.00266		10.70061
72 Xylene-o	0.50144 0.54040	0.65308 0.52615	0.62579 0.66203	0.52625 0.64818	0.64102	0.58383	AVRG		0.59082		10.54171

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 27-DEC-2001 15:52
 End Cal Date : 27-DEC-2001 21:05
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETC\BDC\CHEM\VOIC4.i\412271.B\412271.8260.m
 Cal Date : 28-Dec-2001 08:45 mike

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients m1	m2	%RSD or R^2
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
73 1,1,2,2-Tetrachloroethane	1.19127	1.59624	1.45185	1.50788	1.37539	1.48269	AVRG		1.39626	✓	14.47894
74 cis-1,4-Dichloro-2-butene	0.19928	0.17842	0.16247	0.20635	0.19155	0.16723	AVRG		0.17067		13.66062
75 1,2,3-Trichloropropane	0.12334	0.1355	0.12811	0.13230	0.15925	0.14515	AVRG		0.14358		14.69421
76 Isopropylbenzene	1.40794	2.18439	2.02261	1.74912	2.14397	1.88593	AVRG		1.88690		13.11885
78 Bromobenzene	0.32428	0.43247	0.40880	0.35072	0.41262	0.35664	AVRG		0.36885		11.53478

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 27-DEC-2001 15:52
 End Cal Date : 27-DEC-2001 21:05
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\CHEM\voc4.i\V412271.B\V412271.8260.m
 Cal Date : 28-Dec-2001 08:45 mike

Compound	0.5000000 Level 1	1.0000 Level 2	5.0000 Level 3	20.0000 Level 4	50.0000 Level 5	100.0000 Level 6	Curve	b	Coefficients m1	m2	%RSD or R ²
79 n-Propylbenzene	1.68468 1.89285	2.43331 1.89925	2.29228 2.35420	1.97552 2.41005	2.44480	2.08750	AVRG		2.14744		12.76753
80 2-Chlorotoluene	1.12855 1.19329	1.51080 1.20341	1.44798 1.50704	1.34804 1.52246	1.51636	1.31280	AVRG		1.36907		11.16736
81 4-Chlorotoluene	1.34676 1.38036	1.84424 1.38381	1.54293 1.74914	1.31050 1.75012	1.69607	1.40002	AVRG		1.54039		13.06099
82 1,3,5-Trimethylbenzene	1.15463 1.28356	1.68178 1.31779	1.52745 1.65089	1.33067 1.64547	1.61711	1.35826	AVRG		1.45676		12.96070
83 1,2,4-Trimethylbenzene	1.15463 1.28329	1.68163 1.31728	1.52672 1.65089	1.33046 1.64335	1.61316	1.35653	AVRG		1.45580		12.93714

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 27-DEC-2001 15:52
 End Cal Date : 27-DEC-2001 21:05
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\CHEM\voc4.i\V412271.B\V412271.8260.m
 Cal Date : 28-Dec-2001 08:45 mike

Compound	0.500000 Level 1	1.0000 Level 2	5.0000 Level 3	20.0000 Level 4	50.0000 Level 5	100.0000 Level 6	Curve	b	Coefficients m1	m2	%RSD or R ²
85 tert-Butylbenzene	0.88345 0.97760	1.32118 1.02536	1.25739 1.28607	1.10068 1.29245	1.32638	1.06914	AVRG		1.15397		14.02882
86 sec-Butylbenzene	1.28241 1.27939	1.63858 1.34463	1.55179 1.63575	1.32320 1.64168	1.57622	1.31680	AVRG		1.45905		11.06080
87 4-Isopropyltoluene	1.02553 1.24821	1.48552 1.33876	1.39683 1.50581	1.23142 1.55013	1.48781	1.20241	AVRG		1.34724		12.50420
89 1,3-Dichlorobenzene	1.58074 1.70187	1.82761 1.70692	1.82239 1.78911	1.66664 1.69926	1.83163	1.78147	AVRG		1.74076		4.76556
90 1,4-Dichlorobenzene	1.57767 1.77132	1.80135 1.78304	1.70133 1.84000	1.64271 1.79476	1.81991	2.01347	AVRG		1.77456		6.67126

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 27-DEC-2001 15:52
 End Cal Date : 27-DEC-2001 21:05
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETC\BDC\CHEM\VOIC4.i\V412271.B\V412271.8260.m
 Cal Date : 28-Dec-2001 08:45 mike

Compound	0.500000 Level 1	1.0000 Level 2	5.0000 Level 3	20.0000 Level 4	50.0000 Level 5	100.0000 Level 6	Curve	b	Coefficients m1 m2	%RSD or R^2
91 1,2-Dichlorobenzene	1.23750 1.52947	1.47416 1.49325	1.48686 1.46298	1.39324 1.45396	1.54128	1.50371	AVRG		1.45764	6.02103
92 n-Butylbenzene	3.58801 4.72781	4.66035 4.47856	4.51314 4.17029	4.16597 4.17003	4.71826	4.48822	AVRG		4.36806	8.05022
93 1,2-Dibromo-3-chloropropane	++++ 0.30954	0.31440 0.22941	0.25562 0.21761	0.28938 ++++	0.23961	0.25904	AVRG		0.26433	13.78662
94 1,2,4-Trichlorobenzene	0.87541 0.98720	1.14315 0.87113	0.98734 1.00133	0.95564 0.94941	0.90561	1.03492	AVRG		0.97111	8.35577
95 Naphthalene	++++ 1.81938	2.12450 1.65011	1.84039 1.77183	1.89714 1.77037	1.58628	1.87569	AVRG		1.81508	8.49599

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 27-DEC-2001 15:52
 End Cal Date : 27-DEC-2001 21:05
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\CHEM\voc4.i\V412271.B\V412271.8260.m
 Cal Date : 28-Dec-2001 08:45 mike

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients m1	m2	TRSD or R^2
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6					
96 Hexachlorobutadiene	0.67157	0.76412	0.78837	0.72793	0.73388	0.87648	AVRG		0.77755		9.34253
	0.87078	0.69055	0.84673	0.80509							
97 1,2,3-Trichlorobenzene	0.80133	1.02377	0.83089	0.86284	0.77550	0.89551	AVRG				
	0.87515	0.79183	0.85755	0.84983					0.85642		8.19909
\$ 34 Dibromofluoromethane	0.80510	0.77296	0.79000	0.74821	0.75013	0.74329	AVRG				
	0.71352	0.71483	0.71420	0.70336					0.74556		4.69742
\$ 37 1,2-Dichloroethane-d4	1.05576	1.01901	1.03513	1.08782	0.99974	1.01257	AVRG				
	0.98882	1.03578	0.97850	0.95156					1.01647		3.89081
\$ 56 Toluene-d8	1.54328	1.64415	1.47182	1.35252	1.61240	1.50338	AVRG				
	1.46015	1.36120	1.51921	1.43087					1.48990		6.43868

889 811

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 27-DEC-2001 15:52
 End Cal Date : 27-DEC-2001 21:05
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\CHEM\voc4.i\V412271.B\V412271.8260.m
 Cal Date : 28-Dec-2001 08:45 mike

Compound	0.500000	1.0000	5.0000	20.0000	50.0000	100.0000	Curve	b	Coefficients	m2	RSD or R^2
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6			m1		
120.0000	150.0000	170.0000	200.0000								
Level 7	Level 8	Level 9	Level 10								
\$ 77 Bromofluorobenzene	0.66422	0.76562	0.70296	0.59667	0.71372	0.63301					
	0.58695	0.53297	0.66750	0.68387		AVRG		0.65475			10.49105

Curve	Formula	Units
Averaged	Ant = Rsp/ml	Response
Linear	Ant = b + Rsp/ml	Response

889 812

Environmental Testing & Consulting, Inc.

**Quality Control Reports
Level IV
GC/MS Semi-Volatiles**

ENVIRONMENTAL TESTING & CONSULTING, INC
GC/MS BNA Sequence Check List (SW-846)

889 814

Sequence ID B1010301
Date 1/4/02

System ID BNA 1
Analyst ESM

Applicable ETC Order Nos. for this sequence:

0112600 0112638
0112602 0112623

Validated

1. DFTPP Daily 12-Hour Tune Meets Criteria. No analysis begins until criteria are met. (SOP) ✓

2. Degradation/Peak Tailing Check (may be combined with DFTPP Tune): ✓

a. DDT to DDE/DDD $\leq 20\%$ Benzidine/PCP - Normal Response with no visible peak tailing. ✓

2. Initial Calibration Verification Criteria - Method : B1122901.M

a. SPCC - Mean RF ≥ 0.050 ✓

b. CCC - RSD of RF for CCCs and Target Analytes MUST BE $\leq 30\%$ ✓

c. RSD of analytes $\leq 15\%$ may use Average RF for quantitation ✓

d. Analytes w/RSD $> 15\%$ use Linear Regression - correlation coefficient ≥ 0.99 ✓

3. Calibration Verification - Each 12-Hour Shift

a. SPCC - RF ≥ 0.050 ✓

b. CCC - % Difference for Average RF Calibration - $\leq 20\%$ ✓

c. CCC - % Drift for Linear Regression Calibration - $\leq 20\%$ ✓

d. % Difference/% Drift for all other Target Analytes - $\leq 30\%$ ✓

Benzidine, 3,3 Dimethylbenzidine, Nitrobenzene, 4 Nitroaniline all high response

e. Internal Standards - Retention Times within ± 30 seconds from Mid-Point ICAL STD ✓

f. Internal Standards - Areas within $(-50\% \text{ to } +100\%)$ from Mid-Point ICAL STD ✓

3. Method Blanks included in this sequence :

Analyze for each analytical batch (20 samples): ✓

List compounds identified in Method Blank w/concentration.

Flag final result "B-Detected in Blank"

107012LB - 014

4. Matrix Spike/Matrix Spike Duplicates included in this sequence :

Analyze for each analytical batch (20 samples) . List MS/MSD(s) performed with any failures : NA

5. Laboratory Control Samples included in this sequence :

Must contain all Target Analytes.

107012 LCS/LCSD $\rightarrow$ 20 of 166 spike recoveries outside limits
26 of 83 RPD's

6. Surrogate Recoveries within QC Limits ✓

7. All positive compounds within calibration range ✓

ative/Notes :

889 815

DFTPP TUNE/TAILING FACTOR/DEGRADATION SUMMARY RESULTS

DFTPP Ion Abundance/Ratio Criteria Chart

Ion	Abundance Criteria	Base Peak	Other	Test
198	Base Peak, 100% relative abundance	100.00		PASS
51	30 - 60% of mass 198	51.39		PASS
68	Less than 2% of mass 69	0.00	(0.00)	PASS
69	Mass 69 relative abundance	58.23		PASS
70	Less than 2% of mass 69	0.31	(0.52)	PASS
127	40 - 60% of mass 198	55.79		PASS
197	0 - 1% of mass 198	0.00		PASS
199	5 - 9% of mass 198	7.06		PASS
275	10 - 30% of mass 198	27.41		PASS
365	Greater than 1% of mass 198	3.50		PASS
441	Present, but less than mass 443	12.39	(78.76)	PASS
442	Greater than 40% of mass 198	78.30		PASS
443	17 - 23% of mass 442	15.73	(20.09)	PASS

TAILING ANALYSIS SUMMARY

Compound	Tail Factor	Max Allowed	Test
Pentachlorophenol	0.6489362	5.000	PASS
Benzidine	1.1582915	3.000	PASS

DDT DEGRADATION BREAKDOWN ANALYSIS SUMMARY

Compound	Response	%Breakdown	Max Allowed	Test
4,4-DDT	633398			N/A
4,4-DDE	0	0.0	15.0	PASS
4,4-DDD	26453	4.0	15.0	PASS
4,4-DDD + DDE	26453	4.0	15.0	PASS

Tuning Sample, //ETCBDC/DD/chem/bnal.i/B1010301.B/0101001.D/0101001.D, *** PASSED **

000137

FORM 5
SEMIVOLATILE ORGANIC INSTRUMENT PERFORMANCE CHECK
DECAFLUOROTRIPHENYLPHOSPHINE (DFTPP)

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Lab File ID: 0101001

DFTPP Injection Date: 01/03/02

Instrument ID: BNA1

DFTPP Injection Time: 1530

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
51	30.0 - 60.0% of mass 198	51.4
68	Less than 2.0% of mass 69	0.0 (0.0)1
69	Mass 69 relative abundance	58.2
70	Less than 2.0% of mass 69	0.3 (0.5)1
127	40.0 - 60.0% of mass 198	55.8
197	Less than 1.0% of mass 198	0.0
198	Base Peak, 100% relative abundance	100.0
199	5.0 to 9.0% of mass 198	7.1
275	10.0 - 30.0% of mass 198	27.4
365	Greater than 1.0% of mass 198	3.50
441	Present, but less than mass 443	12.4
442	Greater than 40.0% of mass 198	78.3
443	17.0 - 23.0% of mass 442	15.7 (20.1)2

1-Value is % mass 69

2-Value is % mass 442

THIS CHECK APPLIES TO THE FOLLOWING SAMPLES, MS, MSD, BLANKS, AND STANDARDS:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED	TIME ANALYZED
01	8270 CV1		0202004	01/03/02	1653
02	P07012LB	P07012LB	0301005	01/03/02	1715
03	P07012LCS	P07012LCS	0401006	01/03/02	1737
04	P07012LCSD	P07012LCSD	0501007	01/03/02	1758
05	011260202	011260202	0601008	01/03/02	1820
06					
07					
08					
09					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

889 817

FORM 7

BNA-GCMS CONTINUING CALIBRATION CHECK

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Instrument ID: BNA1

Calibration Date: 01/03/02 Time: 1653

Lab File ID: 0202004

Init. Calib. Date(s): 12/29/01 12/29/01

Init. Calib. Times: 0923 1217

GC Column: DB-5MS ID: 0.25 (mm)

COMPOUND	SAMPLE AMOUNT	CAL50 AMOUNT	CURVE	%D	MAX %d
=====	=====	=====	=====	=====	=====
Acenaphthene	51.27	50.00	AVRG	2.5	20.0
Acenaphthylene	53.27	50.00	AVRG	6.5	30.0
Acetophenone	54.14	50.00	AVRG	8.3	30.0
Aniline	57.24	50.00	AVRG	14.5	30.0
Anthracene	51.73	50.00	AVRG	3.5	30.0
Benzidine	94.02	50.00	LINR	88.0	35.0
Benz(a)Anthracene	50.93	50.00	AVRG	1.9	30.0
Benzo(b)fluoranthene	53.12	50.00	AVRG	6.2	30.0
Benzo(k)fluoranthene	54.45	50.00	AVRG	8.9	30.0
Benzo(ghi)perylene	48.92	50.00	AVRG	2.2	30.0
Benzo(a)pyrene	55.99	50.00	AVRG	12.0	20.0
Benzoic acid	48.46	50.00	LINR	3.1	35.0
Benzyl alcohol	55.05	50.00	AVRG	10.1	30.0
Bis(2-chloroethoxy)methane	53.67	50.00	AVRG	7.3	30.0
Bis(2-chloroethyl)ether	54.97	50.00	AVRG	9.9	30.0
Bis(2-chloroisopropyl)ether	55.98	50.00	AVRG	12.0	30.0
Bis(2-ethylhexyl)phthalate	48.54	50.00	AVRG	2.9	30.0
4-Bromophenyl phenyl ether	55.45	50.00	AVRG	10.9	30.0
Butyl benzyl phthalate	48.86	50.00	AVRG	2.3	30.0
Carbazole	59.31	50.00	LINR	18.6	30.0
4-Chloroaniline	51.57	50.00	AVRG	3.1	30.0
Chlorobenzilate	44.92	50.00	AVRG	10.2	35.0
4-Chloro-3-methylphenol	52.95	50.00	AVRG	5.9	20.0
2-Chloronaphthalene	53.25	50.00	AVRG	6.5	30.0
2-Chlorophenol	53.98	50.00	AVRG	8.0	30.0
4-Chlorophenyl phenyl ether	49.73	50.00	AVRG	0.5	30.0
Chrysene	51.22	50.00	AVRG	2.4	30.0
Dibenz(a,h)anthracene	52.63	50.00	AVRG	5.3	30.0
Dibenzofuran	50.90	50.00	AVRG	1.8	30.0
Di-n-butyl phthalate	45.94	50.00	AVRG	8.1	30.0
1,2-Dichlorobenzene	53.80	50.00	AVRG	7.6	30.0
1,3-Dichlorobenzene	52.61	50.00	AVRG	5.2	30.0
1,4-Dichlorobenzene	53.16	50.00	AVRG	6.3	20.0
3,3'-Dichlorobenzidine	62.74	50.00	AVRG	25.5	30.0
2,4-Dichlorophenol	53.38	50.00	AVRG	6.8	20.0
2,6-Dichlorophenol	55.09	50.00	AVRG	10.2	30.0
Diethyl phthalate	49.08	50.00	2ORDR	1.8	30.0

FORM 7
BNA-GCMS CONTINUING CALIBRATION CHECK

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Instrument ID: BNA1

Calibration Date: 01/03/02 Time: 1653

Lab File ID: 0202004

Init. Calib. Date(s): 12/29/01 12/29/01

Init. Calib. Times: 0923 1217

GC Column: DB-5MS ID: 0.25 (mm)

COMPOUND	SAMPLE AMOUNT	CAL50 AMOUNT	CURVE	%D	MAX %d
=====	=====	=====	=====	=====	=====
3,3-Dimethylbenzidine	80.45	50.00	2ORDR	60.9	35.0 <-
2,4-Dimethyphenol	54.92	50.00	AVRG	9.8	30.0
Dimethyl phthalate	48.59	50.00	AVRG	2.8	30.0
4,6-Dinitro-2-methylphenol	48.02	50.00	LINR	4.0	30.0
2,4-Dinitrophenol	47.42	50.00	2ORDR	5.2	30.0
2,4-Dinitrotoluene	43.66	50.00	AVRG	12.7	30.0
2,6-Dinitrotoluene	44.13	50.00	AVRG	11.7	30.0
N-NitrsdiphyAm/Diphenylamin	57.83	50.00	AVRG	15.7	20.0
Di-n-octyl phthalate	50.78	50.00	2ORDR	1.6	20.0
Ethyl methanesulfonate	52.36	50.00	AVRG	4.7	30.0
Fluoranthene	51.39	50.00	LINR	2.8	20.0
Fluorene	50.04	50.00	AVRG	0.1	30.0
Hexachlorobenzene	54.82	50.00	AVRG	9.6	30.0
Hexachlorobutadiene	52.07	50.00	AVRG	4.1	20.0
Hexachlorocyclopentadiene	49.53	50.00	AVRG	0.9	30.0
Hexachloroethane	52.69	50.00	AVRG	5.4	30.0
Indeno (1,2,3-cd) pyrene	51.85	50.00	AVRG	3.7	30.0
Isophorone	54.00	50.00	AVRG	8.0	30.0
Methyl methanesulfonate	52.50	50.00	AVRG	5.0	30.0
2-Methylnaphthalene	52.54	50.00	AVRG	5.1	30.0
2-Methylphenol	56.08	50.00	AVRG	12.2	30.0
3&4-Methylphenol	55.00	50.00	AVRG	10.0	30.0
Naphthalene	57.99	50.00	2ORDR	16.0	30.0
2-Nitroaniline	50.24	50.00	AVRG	0.5	30.0
3-Nitroaniline	43.56	50.00	2ORDR	12.9	30.0
4-Nitroaniline	30.43	50.00	AVRG	39.1	30.0 <-
Nitrobenzene	52.64	50.00	AVRG	5.3	30.0
2-Nitrophenol	52.02	50.00	AVRG	4.0	20.0
4-Nitrophenol	42.65	50.00	AVRG	14.7	30.0
N-Nitrosodibutylamine	53.89	50.00	AVRG	7.8	30.0
N-Nitrosodiethylamine	53.70	50.00	AVRG	7.4	30.0
N-Nitrosodimethylamine	53.58	50.00	AVRG	7.2	30.0
N-Nitrosodi-n-propylamine	53.84	50.00	AVRG	7.7	30.0
Pentachloronitrobenzene	53.59	50.00	AVRG	7.2	30.0
Pentachlorophenol	47.27	50.00	LINR	5.5	20.0
Phenacetin	47.47	50.00	AVRG	5.1	35.0
Phenanthrene	51.32	50.00	AVRG	2.6	30.0

889 819 BNA-GCMS CONTINUING CALIBRATION CHECK

FORM 7

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Instrument ID: BNA1

Calibration Date: 01/03/02 Time: 1653

Lab File ID: 0202004

Init. Calib. Date(s): 12/29/01 12/29/01

Init. Calib. Times: 0923 1217

GC Column: DB-5MS ID: 0.25 (mm)

COMPOUND	SAMPLE AMOUNT	CAL50 AMOUNT	CURVE	%D	MAX %d
Phenol	54.84	50.00	AVRG	9.7	20.0
Pyrene	50.32	50.00	LINR	0.6	30.0
Pyridine	56.01	50.00	AVRG	12.0	30.0
1,2,4,5-Tetrachlorobenzene	56.29	50.00	AVRG	12.6	30.0
2,3,4,6-Tetrachlorophenol	54.74	50.00	AVRG	9.5	30.0
1,2,4-Trichlorobenzene	51.94	50.00	AVRG	3.9	30.0
2,4,5-Trichlorophenol	53.68	50.00	AVRG	7.4	30.0
2,4,6-Trichlorophenol	54.10	50.00	AVRG	8.2	20.0
1,2-Dphnylhydrazine/Azobenzen	59.99	50.00	AVRG	20.0	30.0
Nitrobenzene-d5	51.58	50.00	AVRG	3.2	30.0
2-Fluorobiphenyl	52.64	50.00	AVRG	5.3	30.0
Terphenyl-d14	41.71	50.00	AVRG	16.6	30.0
Phenol-d6	54.49	50.00	AVRG	9.0	30.0
2,4,6-Tribromophenol	48.67	50.00	2ORDR	2.7	30.0
2-Fluorophenol	54.03	50.00	AVRG	8.1	30.0

FORM 8
BNA-GCMS INTERNAL STANDARD AREA AND RT SUMMARY

889 820

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Lab File ID (Standard): 0202004

Date Analyzed: 01/03/02

Instrument ID: BNA1

Time Analyzed: 1653

	IS1 (DCB) AREA #	RT #	IS2 (NPT) AREA #	RT #	IS3 (ANT) AREA #	RT #
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	346727	4.92	1416790	5.62	711030	6.54
UPPER LIMIT	693454	5.42	2833580	6.12	1422060	7.04
LOWER LIMIT	173364	4.42	708395	5.12	355515	6.04
=====	=====	=====	=====	=====	=====	=====
CLIENT SAMPLE NO.						
=====	=====	=====	=====	=====	=====	=====
01 P07012LB	376748	4.92	1469844	5.62	766544	6.54
02 P07012LCS	371537	4.92	1501251	5.62	799930	6.54
03 P07012LCSD	343126	4.92	1424814	5.62	775332	6.54
04 011260202	380079	4.92	1498039	5.61	800695	6.54
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS1 (DCB) = 1,4-Dichlorobenzene-d4
IS2 (NPT) = Naphthalene-d8
IS3 (ANT) = Acenaphthene-d10

AREA UPPER LIMIT = +100% of internal standard area
AREA LOWER LIMIT = - 50% of internal standard area
RT UPPER LIMIT = + 0.50 minutes of internal standard RT
RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.
* Values outside of QC limits.

BNA-GCMS INTERNAL STANDARD AREA AND RT SUMMARY

Lab Name: ETC, INC.

Contract:

Lab Code:

Case No.:

SAS No.:

SDG No.: 0112602

Lab File ID (Standard): 0202004

Date Analyzed: 01/03/02

Instrument ID: BNA1

Time Analyzed: 1653

	IS4 (PHN) AREA #	RT #	IS5 (CRY) AREA #	RT #	IS6 (PRY) AREA #	RT #
=====	=====	=====	=====	=====	=====	=====
12 HOUR STD	893683	7.34	429908	9.22	314353	11.32
UPPER LIMIT	1787366	7.84	859816	9.72	628706	11.82
LOWER LIMIT	446842	6.84	214954	8.72	157177	10.82
=====	=====	=====	=====	=====	=====	=====
CLIENT SAMPLE NO.						
=====	=====	=====	=====	=====	=====	=====
01 P07012LB	1153015	7.33	568860	9.22	422035	11.32
02 P07012LCS	1052824	7.34	423850	9.22	305307	11.32
03 P07012LCSD	1240652	7.33	676327	9.22	467140	11.32
04 011260202	1318309	7.33	1146153*	9.22	879786*	11.32
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						

IS4 (PHN) = Phenanthrene-d10

IS5 (CRY) = Chrysene-d12

IS6 (PRY) = Perylene-d12

AREA UPPER LIMIT = +100% of internal standard area

AREA LOWER LIMIT = - 50% of internal standard area

RT UPPER LIMIT = + 0.50 minutes of internal standard RT

RT LOWER LIMIT = - 0.50 minutes of internal standard RT

Column used to flag internal standard area values with an asterisk.

* Values outside of QC limits.

Report Date : 30-Dec-2001 07:49

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 29-DEC-2001 09:23
End Cal Date : 29-DEC-2001 12:17
Quant Method : ISTD
Target Version : 4.00
Integrator : HP RTE
Method file : \\ETCBDC\DD\chem\bnal.i\B1122901.B\B1122901.M
Cal Date : 30-Dec-2001 07:39 erica

Calibration File Names:

level 1: \\ETCBDC\DD\chem\bnal.i\B1122901.B\0301004.D
level 2: \\ETCBDC\DD\chem\bnal.i\B1122901.B\0401005.D
level 3: \\ETCBDC\DD\chem\bnal.i\B1122901.B\0501006.D
level 4: \\ETCBDC\DD\chem\bnal.i\B1122901.B\0601007.D
level 5: \\ETCBDC\DD\chem\bnal.i\B1122901.B\0701008.D
level 6: \\ETCBDC\DD\chem\bnal.i\B1122901.B\0801009.D
level 7: \\ETCBDC\DD\chem\bnal.i\B1122901.B\0901010.D
level 8: \\ETCBDC\DD\chem\bnal.i\B1122901.B\1001011.D
level 9: \\ETCBDC\DD\chem\bnal.i\B1122901.B\1101012.D

Compound	2.0000		5.0000		10.0000		20.0000		50.0000		80.0000		Curve		Coefficients		b		m1		m2		tRSD		or R^2	
	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10	Level 11	Level 12	Level 13	Level 14	Level 15	Level 16	Level 17	Level 18	Level 19	Level 20	Level 21	Level 22	Level 23	Level 24	Level 25	Level 26
1 N-Nitrosodimethylamine	1.04884	0.93712	1.03457	1.00166	1.02904	1.02163	1.03766	1.05563	1.01488	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163
	1.03766	1.05563	1.01488	1.00166	1.02904	1.02163	1.03766	1.05563	1.01488	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163	1.02163

889 822

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 29-DEC-2001 09:23
 End Cal Date : 29-DEC-2001 12:17
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\bnal.i\B1122901.B\B1122901.M
 Cal Date : 30-Dec-2001 07:39 erica

Compound	2.0000 Level 1	5.0000 Level 2	10.0000 Level 3	20.0000 Level 4	50.0000 Level 5	80.0000 Level 6	Curve	b	Coefficients ml	m2	RSD or R ²
2 Pyridine	100.0000 Level 7	120.0000 Level 8	160.0000 Level 9								
	++++	1.43280	1.72363	1.65532	1.76527	1.68137					
	1.69294	1.75408	1.61437				AVRG		1.66497		6.38243
3 Methyl methanesulfonate	1.04235	0.92294	0.97342	0.93460	0.95507	0.91024					
	0.89537	0.86474	0.84805				AVRG		0.92631		6.43696
5 N-Nitrosodiethylamine	0.70157	0.64117	0.69052	0.68019	0.69401	0.69838					
	0.69613	0.69405	0.69228				AVRG		0.68759		2.67559
6 Ethyl methanesulfonate	1.35135	1.18432	1.28599	1.22674	1.26063	1.22301					
	1.21156	1.17809	1.18516				AVRG		1.23410		4.60519
8 Phenol <i>ccc</i>	2.00719	1.80142	1.93396	1.84809	1.87267	1.79157					
	1.74344	1.70229	1.62486				AVRG		1.81394		6.47057

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 29-DEC-2001 09:23
 End Cal Date : 29-DEC-2001 12:17
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\bna1.i\B1122901.B\B1122901.M
 Cal Date : 30-Dec-2001 07:39 erica

Compound	2.0000 Level 1	5.0000 Level 2	10.0000 Level 3	20.0000 Level 4	50.0000 Level 5	80.0000 Level 6	Curve	b	Coefficients m1	m2	%RSD or R ²
9 Aniline	100.0000 Level 7	120.0000 Level 8	160.0000 Level 9								
	0.89399	0.78565	0.87063	0.81094	0.85821	0.78543					
	0.77746	0.80010	0.75319				AVRG		0.81507		5.88484
10 Bis (2-chloroethyl) ether	1.42424	1.25116	1.32704	1.24316	1.19152	1.13644					
	1.12145	1.12037	1.02691				AVRG		1.20470		10.05076
11 2-Chlorophenol	1.39601	1.30045	1.41809	1.35297	1.40772	1.36910					
	1.36153	1.34933	1.34017				AVRG		1.36615		2.68892
12 1,3-Dichlorobenzene	1.70742	1.51783	1.60018	1.48482	1.47102	1.43137					
	1.43187	1.42023	1.29452				AVRG		1.48436		7.90640
14 1,4-Dichlorobenzene	1.80844	1.54944	1.65176	1.51573	1.49167	1.45818					
CCC	1.42334	1.42585	1.30099				AVRG		1.51393		9.68273

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 29-DEC-2001 09:23
 End Cal Date : 29-DEC-2001 12:17
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\bnal.i\B1122901.B\B1122901.M
 Cal Date : 30-Dec-2001 07:39 erica

Compound	2.0000 Level 1	5.0000 Level 2	10.0000 Level 3	20.0000 Level 4	50.0000 Level 5	80.0000 Level 6	Curve	b	Coefficients ml	m2	%RSD or R ²
15 Benzyl alcohol	0.84064 0.94389	0.78894 0.98926	0.89018 0.94588	0.89138	0.97853	0.93965	AVRG		0.91204		7.19630
16 1,2-Dichlorobenzene	1.59567 1.27472	1.43727 1.24664	1.51230 ++++	1.42184	1.39616	1.32228	AVRG		1.40086		8.44769
17 2-Methylphenol	1.22098 1.11133	1.15090 1.06411	1.19314 0.95048	1.16486	1.21476	1.15328	AVRG		1.13598		7.51071
18 Bis(2-chloroisopropyl) ether	2.41978 1.82823	2.08314 1.80768	2.16380 ++++	2.00510	1.96433	1.85531	AVRG		2.01592		10 21189
19 3,4-Methylphenol	1.29043 1.34404	1.22313 1.33131	1.34310 1.31450	1.30235	1.40962	1.37485	AVRG		1.32592		4.00533

889 825

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 29-DEC-2001 09:23
 End Cal Date : 29-DEC-2001 12:17
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDDC\DD\chem\bnal.i\B1122901.B\B1122901.M
 Cal Date : 30-Dec-2001 07:39 erica

Compound	2.0000 Level 1	5.0000 Level 2	10.0000 Level 3	20.0000 Level 4	50.0000 Level 5	80.0000 Level 6	Curve	b	Coefficients ml	m2	RSD or R^2
20 Acetophenone	100.0000 Level 7	120.0000 Level 8	160.0000 Level 9								
	0.54981	0.49946	0.52929	0.49192	0.49351	0.47441					
	0.46648	0.44830	0.39916				AVRG		0.48359		9.14445
21 N-Nitrosodi-n-propylamine SPCL	0.30459	0.27732	0.30513	0.27898	0.27778	0.27564					
	0.27514	0.27014	0.23320				AVRG		0.27755		7.56393
22 Hexachloroethane	0.15336	0.16578	0.18154	0.16608	0.16167	0.16045					
	0.16149	0.15773	0.14180				AVRG		0.16555		8.83758
24 Nitrobenzene	0.50372	0.45587	0.47882	0.43615	0.42792	0.40623					
	0.40449	0.39892	0.34988				AVRG		0.42911		10.78159
25 Isophorone	0.72671	0.68767	0.75532	0.71231	0.69226	0.66542					
	0.67694	0.66139	0.59741				AVRG		0.68616		6.54943

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 29-DEC-2001 09:23
 End Cal Date : 29-DEC-2001 12:17
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\bna1.i\B1122901.B\B1122901.M
 Cal Date : 30-Dec-2001 07:39 erica

Compound	2.0000 Level 1	5.0000 Level 2	10.0000 Level 3	20.0000 Level 4	50.0000 Level 5	80.0000 Level 6	Curve	b	Coefficients ml	m2	%RSD or R ²
26 2-Nitrophenol <i>ccc</i>	100.0000 Level 7	120.0000 Level 8	160.0000 Level 9								
	0.17503 0.19688	0.17395 0.19378	0.19168 0.18588	0.19807	0.19084	0.19467	AVRG		0.18898		4.73772
27 2,4-Dimethylphenol	0.36335 0.35139	0.32821 0.33698	0.36590 0.31524	0.34212	0.36280	0.35156	AVRG		0.34640		4.99670
28 B.s(2-chloroethoxy)methane	0.49403 0.40717	0.43305 0.39512	0.46437 0.35577	0.43086	0.42598	0.40812	AVRG		0.42383		9.39735
29 Benzoic acid	++++ 1194182	14454 1371658	50244 2005506	144724	526754	965494	LINR	0.15137	0.29894		0.99888
30 2,4-Dichlorophenol <i>ccc</i>	0.23448 0.26469	0.23402 0.26357	0.25669 0.24654	0.24651	0.26077	0.26834	AVRG		0.25273		5.09097

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 29-DEC-2001 09:23
 End Cal Date : 29-DEC-2001 12:17
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\bnal.i\B1122901.B\B1122901.M
 Cal Date : 30-Dec-2001 07:39 erica

Compound	2.0000 Level 1	5.0000 Level 2	10.0000 Level 3	20.0000 Level 4	50.0000 Level 5	80.0000 Level 6	Curve	b	Coefficients ml	m2	%RSD or R ²
31 1,2,4-Trichlorobenzene	0.33718 0.29879	0.30132 0.29048	0.31490 0.26455	0.29308	0.29564	0.29511	AVRG		0.29801		6.51572
33 Naphthalene	89650 3281729	220501 ++++	419481 ++++	842154	1973906	2894103	QUAD	0.03106	0.62124	0.34194	0.99892
34 4-Chloroaniline	0.53810 0.42280	0.51524 0.40879	0.54594 ++++	0.49563	0.49899	0.44028	AVRG		0.48322		10.89651
35 2,6-Dichlorophenol	0.25497 0.25081	0.23499 0.23893	0.25655 0.21296	0.25010	0.25775	0.25053	AVRG		0.24529		5.85233
36 Hexachlorobutadiene <i>ccc</i>	0.17964 0.16419	0.15766 0.16091	0.16557 0.14253	0.15701	0.16093	0.16233	AVRG		0.16120		5.99914

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 29-DEC-2001 09:23
 End Cal Date : 29-DEC-2001 12:17
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDDC\DD\chem\bnal.i\B1122901.B\B1122901.M
 Cal Date : 30-Dec-2001 07:39 erica

Compound	2.0000 Level 1	5.0000 Level 2	10.0000 Level 3	20.0000 Level 4	50.0000 Level 5	80.0000 Level 6	Curve	b	Coefficients ml	m2	%RSD or R^2
37 N-Nitrosodibutylamine	0.25214 0.25798	0.24384 0.25625	0.27090 0.24135	0.26072	0.26706	0.25452	AVRG		0.25608		3.78105
38 4-Chloro-3-methylphenol CCl	0.27489 0.30012	0.26942 0.29674	0.29961 0.27798	0.29540	0.31222	0.29750	AVRG		0.29154		4.84159
39 2-Methylnaphthalene	0.74927 0.58368	0.66329 0.56821	0.71020 ++++	0.67054	0.66785	0.59177	AVRG		0.65060		9.87106
40 Hexachlorocyclopentadiene SPC	0.21832 0.27379	0.22081 0.25944	0.23490 0.25233	0.23726	0.25578	0.28690	AVRG		0.24884		9.30494
41 1,2,4,5-Tetrachlorobenzene	0.53599 0.51402	0.49378 0.48653	0.52200 0.46505	0.48346	0.50704	0.52969	AVRG		0.50417		4.68589

889 829

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 29-DEC-2001 09:23
 End Cal Date : 29-DEC-2001 12:17
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETC\BDC\DD\chem\bnal.i\B1122901.B\B1122901.M
 Cal Date : 30-Dec-2001 07:39 erica

Compound	2.0000 Level 1	5.0000 Level 2	10.0000 Level 3	20.0000 Level 4	50.0000 Level 5	80.0000 Level 6	Curve	b	Coefficients ml	m2	TRSD or R^2
42 2,4,6-Trichlorophenol <i>ccc</i>	0.28768 0.36871	0.28640 0.35842	0.33659 0.35445	0.32272	0.35332	0.37002					
43 2,4,5-Trichlorophenol	0.30782 0.38863	0.31360 0.38581	0.35899 ++++	0.34343	0.38230	0.38661	AVRG		0.33760		9.55169
45 2-Chloronaphthalene	1.21608 1.01888	1.10443 0.98427	1.19520 ++++	1.10791	1.09396	1.06170	AVRG		0.35840		9.32675
46 2-Nitroaniline	++++ 0.36819	0.34598 0.40365	0.40339 0.39128	0.39306	0.41293	0.35817	AVRG		1.09780		7.22657
47 Dimethyl phthalate	1.36985 1.06580	1.22283 1.09044	1.33941 ++++	1.23800	1.20336	1.06974	AVRG		0.38458		6.28858
							AVRG		1.19993		9.82260

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 29-DEC-2001 09:23
 End Cal Date : 29-DEC-2001 12:17
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCBDC\DD\chem\bna1.i\B1122901.B\B1122901.M
 Cal Date : 30-Dec-2001 07:39 erica

Compound	2.0000 Level 1	5.0000 Level 2	10.0000 Level 3	20.0000 Level 4	50.0000 Level 5	80.0000 Level 6	Curve	b	Coefficients m1	m2	%RSD or R ²
48 2,6-Dinitrotoluene	++++ 0.15243	++++ 0.16904	0.20660 ++++	0.19009	0.18591	0.14532	AVRG		0.17490		13.46124
49 Acenaphthylene	1.69609 1.32663	1.55646 1.27253	1.69896 ++++	1.56630	1.49894	1.37528	AVRG		1.49890		10.78603
50 3-Nitroaniline	8229 543347	24327 793139	53924 ++++	111983	218557	372343	QUAD	-0.10013	5.98532	-2.80429	0.99571
52 Acenaphthene CCL	1.27094 0.95799	1.10877 0.92318	1.19092 ++++	1.08445	1.05220	0.97181	AVRG		1.07003		11.21308
53 2,4-Dinitrophenol SPCL	++++ 308755	14340 402256	32312 530311	72265	193546	236053	QUAD	-0.07037	7.34498	-0.96727	0.99125

* $RF = 0.154$

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 29-DEC-2001 09:23
 End Cal Date : 29-DEC-2001 12:17
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETC\BDC\DD\chem\bnal.i\B1122901.B\B1122901.M
 Cal Date : 30-Dec-2001 07:39 erica

Compound	2.0000 Level 1	5.0000 Level 2	10.0000 Level 3	20.0000 Level 4	50.0000 Level 5	80.0000 Level 6	Curve	b	Coefficients ml	m2	%RSD or R ²
54 4-Nitrophenol <i>SPCL</i>	100.0000 Level 7	120.0000 Level 8	160.0000 Level 9								
	++++ 0.18833	0.16766 0.21335	0.21551 0.22398	0.21715	0.23653	0.17886	AVRG		0.20517		11.70546
55 Dibenzofuran	1.69016 1.28632	1.49716 1.28118	1.66071 ++++	1.54207	1.53559	1.31761	AVRG		1.47635		11.08186
56 2,4-Dinitrotoluene	++++ 0.30723	0.31470 0.34970	0.37098 0.34999	0.34184	0.35132	0.28599	AVRG		0.33397		8.48796
57 2,3,4,6-Tetrachlorophenol	0.18958 0.24468	0.21033 0.24241	0.25521 0.22356	0.25648	0.28376	0.24846	AVRG		0.23939		11.63547
58 Diethyl phthalate	47606 2019296	126560 2419116	258262 2762912	539294	1297889	1654469	QUAD	0.02042	0.59505	0.20610	0.99608

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 29-DEC-2001 09:23
 End Cal Date : 29-DEC-2001 12:17
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\bnal.i\B1122901.B\B1122901.M
 Cal Date : 30-Dec-2001 07:39 erica

Compound	2.0000 Level 1	5.0000 Level 2	10.0000 Level 3	20.0000 Level 4	50.0000 Level 5	80.0000 Level 6	Curve	b	Coefficients ml	m2	%RSD or R ²
59 Fluorene	100.0000 Level 7	120.0000 Level 8	160.0000 Level 9								
	1 35747	1.21264	1.32510	1 23247	1.20985	1.04582	AVRG		1.17595		11.65705
	1.01658	1.00766	++++								
60 4-Chlorophenyl phenyl ether	0.61946	0.54083	0.60236	0.56766	0.59045	0.54480	AVRG		0.56663		5.66934
	0.54390	0.56788	0.52236								
61 4-Nitroaniline	0.29500	0.33282	0.40178	0.34399	0 27432	++++	AVRG		0.32958		14.92661
	++++	++++	++++								
62 4,6-Dinitro-2-methylphenol	++++	13468	32603	73585	218665	266900					
	363368	444941	++++				LINR	0.02265	0.11894		0.99337
63 N-Nitrosdiphenylamine	0.52767	0.47854	0.51073	0.48944	0.50223	0.55036	AVRG				
	0.53485	0.50832	0.44502						0.50524		6.28014
ccc											

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 29-DEC-2001 09:23
 End Cal Date : 29-DEC-2001 12:17
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETC\BDC\DD\chem\bnal.i\B1122901.B\B1122901.M
 Cal Date : 30-Dec-2001 07:39 erica

Compound	2.0000 Level 1	5.0000 Level 2	10.0000 Level 3	20.0000 Level 4	50.0000 Level 5	80.0000 Level 6	Curve	b	Coefficients m1	m2	RSD or R ²
64 1,2-Diphenylhydrazine/Azobenzene	1.08326	0.97774	1.04007	0.97693	0.94297	1.02556	AVRG		0.97458		8.24345
	0.92820	0.82189	++++								
66 Phenacetin	0.21878	0.26844	0.32831	0.30147	0.31126	0.28227	AVRG		0.28728		10.73828
	0.28779	0.29296	0.29426								
67 4-Bromophenyl phenyl ether	0.20844	0.18876	0.20204	0.19772	0.21190	0.23772	AVRG		0.21348		8.40941
	0.23692	0.23241	0.20543								
68 Hexachlorobenzene	0.24408	0.21190	0.22761	0.21791	0.23686	0.26006	AVRG		0.23779		7.50802
	0.25793	0.25612	0.22766								
69 Pentachlorophenol <i>ccc</i>	++++	13332	32265	77784	242837	303727	LINE	0.05832	0.14202		0.99748
	425310	572174	765997								

* 70RSD = 19.1

889 834

Environmental Testing and Consulting, Inc.

INITIAL CALIBRATION DATA

Start Cal Date : 29-DEC-2001 09:23
 End Cal Date : 29-DEC-2001 12:17
 Quant Method : ISTD
 Target Version : 4.00
 Integrator : HP RTE
 Method file : \\ETCDBC\DD\chem\bnal.i\B1122901.B\B1122901.M
 Cal Date : 30-Dec-2001 07:39 erica

Compound	2.0000 Level 1	5.0000 Level 2	10.0000 Level 3	20.0000 Level 4	50.0000 Level 5	80.0000 Level 6	Curve	b	Coefficients m1	m2	%RSD or R ²
70 Pentachloronitrobenzene	0.08183 0.08139	0.07956 0.07782	0.09042 0.07026	0.08317	0.08483	0.08329	AVRG		0.08140		6.73465
72 Phenanthrene	1.20967 0.89258	1.04885 0.81349	1.13383 ++++	1.01594	0.96868	0.94290	AVRG		1.00324		12.77563
73 Anthracene	1.07508 0.86726	0.97889 0.79504	1.05256 ++++	0.98344	0.93863	0.89787	AVRG		0.94860		9.90563
74 Carbazole	48159 1659683	137071 2303540	282271 ++++	546099	1191542	1196678	LINR	-0.11260	0.54979		0.99291
75 Di-n-butyl phthalate	1.16079 0.87484	1.13999 ++++	1.25184 ++++	1.08524	0.99000	0.90114	AVRG		1.05769		13.28025

Attachment I

TABLE I-1

HELP Model Input Parameters Dunn Field, Memphis Depot

Weather Data

1. Evapotranspiration

Location:	Memphis, Tennessee
Evaporative Zone Depth:	18 inches
Maximum leaf area index:	3.5

2. Precipitation

Default Precipitation:	Memphis, Tennessee

3. Temperature

Default Temperature:	Memphis, Tennessee

4. Solar Radiation Data

Default Radiation:	Memphis, Tennessee

Soil and Design Data

1. Dunn Field Area:

13	Acres

2. Percent of landfill area where runoff is possible:

95%

3. Method of initialization of moisture storage:

No

4. Layer Data

Layer Type	Layer Thickness (inches)	Soil Texture Number
1	18	8
1	342	8
1	270	2
1	270	2

5. Runoff Curve

Slope:	50%	
Slope Length:	1000	feet
Soil Texture:	8	
Vegetation:	4	

TABLE I-2

**HELP Model Output Parameters
Dunn Field, Memphis Depot**

	Inches	Std. Deviations	Cu. Feet	Percent
Precipitation	54.52	7.39	2572799	100
Runoff	0.318	0.253	14991	0.58
Evapotranspiration	35.22	2.26	1662194	64.6
Percolation/Leakage thru layer 4	7.50	7.69	353713	13.75
Change in water storage	11.48	12.29	541902	21

TABLE I-3
Dilution Attenuation Factor (DAF) Parameters
Dunn Field FS

Parameter	Units	Value	Reference
Hydraulic Conductivity	(m/yr)	2460	Fluvial aquifer, Final Groundwater Characterization Data Report (CH2M HILL, 1997a)
Hydraulic Gradient	(m/m)	0.0124	Remedial Investigation Report for Dunn Field (CH2M HILL, 2002)
Aquifer Thickness	(m)	4.6	Remedial Investigation Report for Dunn Field (CH2M HILL, 2002)
Source Length	(m)	143	Based on Subsurface Soil VOCs Figures included in RI Report (CH2M HILL 2002); Direction of groundwater flow is assumed to be east to west.
Infiltration Rate	(m/yr)	0.1904	HELP model output (see Table I-2)
Mixing Zone Thickness	(m)	4.6	Calculated using Equation 12 from SSL Guidance (EPA, 1996)
DAF		6.1	

TABLE I-4
Target Soil Concentrations
Dunn Field FS

Compound	DAF	Groundwater Criteria ^{a, b} (mg/L)	Target Soil Leachate Concentration ^c (mg/L)	Target Total Soil Concentration ^c (mg/kg)
Carbon Tetrachloride	6.1	0.0050	0.0305	0.0476
Chloroform	6.1	0.0790	0.4819	0.2267
Dichloroethane, 1,2-	6.1	0.0050	0.0305	0.0091
Dichloroethene, 1,1	6.1	0.0070	0.0427	0.0312
Dichloroethene, cis-1,2-	6.1	0.0700	0.4270	0.1890
Dichloroethene, 1,2-trans-	6.1	0.1000	0.6100	0.3608
Methylene chloride	6.1	0.0050	0.0305	0.0081
Tetrachloroethane, 1,1,1,2,2-	6.1	0.0005	0.0031	0.0025
Tetrachloroethene	6.1	0.0050	0.0305	0.0415
Trichloroethane, 1,1,1,2-	6.1	0.0050	0.0305	0.0161
Trichloroethene	6.1	0.0050	0.0305	0.0424
Vinyl chloride	6.1	0.0020	0.0122	0.0055

^a MCL for all parameters except 1,1,2,2-Tetrachloroethane, in which the laboratory reporting limit was used.

^b MCL used for Chloroform is a proportion of the Total Trihalomethanes(TTHM) MCL of 0.08 mg/L. TTHM is the sum of chloroform, Bromodichloromethane (BDCM), Dibromochloromethane (DBCM) and bromoform. Based on Dunn Field Groundwater concentrations, chloroform, makes up 99% of TTHM concentrations. Therefore, the MCL for TTHM was multiplied by 99% to determine the MCL for chloroform.

^c Target soil concentrations are assumed to be at the depth of the water table interface.

Target Soil Leachate Concentration = DAF * Groundwater Criteria

Target Total Soil Concentration = (Target Leachate Concentration * RL) / Bulk Density

Where, RL = (Bulk Density * Distribution Coefficient) + Water Content + (Air-filled Porosity * Henry's Law Constant)

TABLE I-5: Loess & Fluvial Deposits Model
Input Parameters for EMSOFT Model Runs
Dunn Field FS

Parameter	Description	Unit	Carbon		Dichloroethane, 1,2-		Dichloroethene, 1,2-		Methylene chloride		Trichloroethane, 1,1,2-		Vinyl Chloride		Reference
			Tetrachloride	Chloroform	1,2-	1,1	cis-1,2-	trans-	1,1,2-	1,1,2-	1,1,2-	Chloride			
General															
Time	Time period for averaging and printing flux and soil concentration results	days	2805	2805	2805	2805	2805	2805	2805	2805	2805	2805	2805	2805	Assume time for contaminated soil water to reach water table from bottom of fluvial deposit contamination HELP model output = 19.04 in/year
J	Porewater flux/infiltration rate	cm/day	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	0.052	
D _{wv}	Binary diffusion coefficient of water vapor in air	m ² /day	2	2	2	2	2	2	2	2	2	2	2	2	Reference 1
ρ _{wv}	Water vapor density	g/m ³	23	23	23	23	23	23	23	23	23	23	23	23	Reference 5; Assume 25°C
ρ _{wl}	Liquid water density	g/m ³	1.E+06	1.E+06	1.E+06	1.E+06	1.E+06	1.E+06	1.E+06	1.E+06	1.E+06	1.E+06	1.E+06	1.E+06	Reference 4; Appendix 14; Assume 25°C
RH	Relative humidity	dimensionless	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Assume Mean value (0<RH<1)
E	Evaporation rate	in/day	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	HELP model output = 35.2 in/year
N	Number of contaminant layers per model	dimensionless	1	1	1	1	1	1	1	1	1	1	1	1	Assume 1 Layer due to lack of site specific data
Loess-Specific Model Parameters															
D1	Depth for averaging soil concentration results	cm	914	914	914	914	914	914	914	914	914	914	914	914	Assume Approximate Thickness of Loess at Dunn Field =30 ft; Reference 6
D2	Depth for printing soil concentration results	cm	914	914	914	914	914	914	914	914	914	914	914	914	Same as D1
foc	Fraction organic carbon	dimensionless	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	0.007	Based on Geotechnical Analyses above 30 ft depth; Attachment B
φ	Soil porosity	dimensionless	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	Based on Geotechnical Analyses above 30 ft depth; Attachment B
θ	Water content	dimensionless	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	Based on Geotechnical Analyses above 30 ft depth; Attachment B
α	Volumetric air content; (α = φ - θ)	dimensionless	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	Based on Geotechnical Analyses above 30 ft depth; Attachment B
ρ _b	dry soil bulk density	g/cm ³	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	Based on Geotechnical Analyses above 30 ft depth; Attachment B
h	Boundary layer thickness; ρ _{wv} (1-RH)/(2E * ρ _{wl})	cm	4.71E-01	4.71E-01	4.71E-01	4.71E-01	4.71E-01	4.71E-01	4.71E-01	4.71E-01	4.71E-01	4.71E-01	4.71E-01	4.71E-01	Reference 2
Thickness of Clean Overburden	Depth from top of ground surface to soil contamination	cm	60.96	60.96	60.96	60.96	60.96	60.96	60.96	60.96	60.96	60.96	60.96	60.96	Assume 2 feet, based on historical vertical soil data (SBLCA and SBLER)
Layer 1 Thickness	Thickness of contaminated layer	cm	853	853	853	853	853	853	853	853	853	853	853	853	Assume 28 feet; Average Loess Thickness - Clean Overburden
Fluvial Sand-Specific Model Parameters															
D1	Depth for averaging soil concentration results	cm	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396	Depth to the water table is approximately 75.8 ft (SBLCA). D1 = distance between bottom of loess and water table = 75.8 ft - 30 ft = 45.8 ft
D2	Depth for printing soil concentration results	cm	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396	1396	Same as D1
foc	Fraction organic carbon	dimensionless	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	Based on Geotechnical Analyses below 30 ft depth; Attachment B
φ	Soil porosity	dimensionless	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	Based on Geotechnical Analyses below 30 ft depth; Attachment B
θ	Water content	dimensionless	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	Based on Geotechnical Analyses below 30 ft depth; Attachment B
α	Volumetric air content; (α = φ - θ)	dimensionless	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.37	Based on Geotechnical Analyses below 30 ft depth; Attachment B
ρ _b	dry soil bulk density	g/cm ³	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	Based on Geotechnical Analyses below 30 ft depth; Attachment B
h	Boundary layer thickness; ρ _{wv} (1-RH)/(2E * ρ _{wl})	cm	0	0	0	0	0	0	0	0	0	0	0	0	Not exposed to atmosphere.
Thickness of Clean Overburden	Depth from top of ground surface to soil contamination	cm	0	0	0	0	0	0	0	0	0	0	0	0	No clean layer between the Loess and the fluvial deposits.
Layer 1 Thickness	Thickness of contaminated layer	cm	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	Assume depth of contamination is 71 feet based on historical vertical soil data (SBLCA and SBLER). Thickness = 71 ft (depth of fluvial contamination) - 30 ft (depth of loess) = 41 ft
Chemical Specific															
K _{oc}	Soil organic carbon-water partition coefficient	mL/g	174	39.8	58.9	52.5	11.7	93.3	155	50.1	166	18.6	Reference 2, Attachment C		
K _H	Henry's law constant	dimensionless	1.25	0.15	1.07	0.385	0.0898	0.0141	0.754	0.0374	0.422	1.11	Reference 2, Attachment C		
D _g	Air diffusion coefficient	cm ² /day	6739.2	8985.6	7776	6108.48	8726.4	6134.4	6220.8	6739.2	6825.6	9158.4	Reference 2, Attachment C		
D _i	Aqueous diffusion coefficient	cm ² /day	0.760	0.864	0.899	1.028	1.011	0.883	0.708	0.760	0.786	0.106	Reference 2, Attachment C		
t _{1/2}	Half-life	days	999,999	999,999	999,999	999,999	999,999	999,999	999,999	999,999	999,999	999,999	Assume no degradation		
C _{L (2-01)}	Target soil leachate concentration	mg/L	3.05E-02	4.82E-01	4.27E-02	6.10E-01	3.05E-02	3.05E-02	3.05E-02	3.05E-02	3.05E-02	1.22E-02	MCL, RBC, or Reporting Limit * DAF		
C _{T (2-01)}	Target Total soil concentration at water table interface; (C _{T, soil} = C _L R _i /ρ _b)	mg/kg	4.76E-02	2.27E-01	3.12E-02	3.61E-01	8.10E-03	2.52E-03	4.15E-02	1.61E-02	4.24E-02	5.53E-03	Reference 1		
R _i	Partitioning Factor; ρ _b K _{oc} + θ + αK _{ow}	dimensionless	2.278	0.687	1.066	0.864	0.388	1.206	1.985	0.770	2.031	0.662	Reference 1		
R _o	Partitioning Factor; ρ _b K _{oc} /K _{oc} + θK _{oc} + α	dimensionless	1.823	4.578	0.996	2.243	4.316	85.556	2.632	20.575	4.813	0.596	Reference 1		
			2.330E-02	1.529E-01	1.908E-02	2.262E-01	7.272E-03	1.358E-03	2.047E-02	1.020E-02	2.047E-02	4.208E-03			

REFERENCES

1. Jury, W. A., W. F. Spencer, and W. J. Farmer. 1983. Behavior Assessment Model for Trace Organics in Soil. I. Model Description. J. Environ. Qual. Vol. 12, no. 4, pp. 558-564.
2. USEPA. Soil Screening Level Guidance. User's Guide. 1996. Office of Solid Waste and Emergency Response, Washington D.C. EPA540/R-96/018.
3. USEPA. 1997. EMSOFT User's Guide. Office of Research and Development, Washington D.C. Report No. NCEA-W-0073.
4. Felter, C.W. 1994. Applied Hydrogeology. New Jersey: Prentice Hall, Inc.
5. <http://hyperphysics.phy-astr.gsu.edu/hbase/kinetic/watvap.html>
6. CH2M HILL. 2002. Remedial Investigation Report for Dunn Field. Prepared for the U.S. Army Corps of Engineering and Support Center, Huntsville.

TABLE I-6
Summary of EMSOFT Output
Dunn Field FS

Parameter	Protective Groundwater Criteria ^a (mg/L)	Target Soil Leachate Concentration ^b (mg/L)	Disposal Area Concentrations (mg/kg)			Generic SSL Calculated from EPA Guidance ^{c,e}		EMSOFT Calculated SSL		Protective Soil Vapor Concentration ^d	
			Max.	Mean	Detects						
Carbon Tetrachloride	0.0050	0.0305	6.8	0.52	16/155	0.04759	0.01636	0.2150	0.1086	28.14	14.22
Chloroform	0.0790	0.4819	14	0.94	37/154	0.22668	0.06032	0.9170	0.4860	61.57	32.63
Dichloroethane, 1,2-	0.0050	0.0305	0.046	0.016	5/155	0.00911	0.00229	0.0329	0.0189	1.12	0.64
Dichloroethene, 1,1	0.0070	0.0427	0.06	0.014	8/155	0.03118	0.01605	0.1500	0.0764	57.00	29.03
Dichloroethene, cis-1,2-	0.0700	0.4270	0.132	0.013	40/49	0.18899	0.05344	0.7550	0.4040	73.86	39.52
Dichloroethene, 1,2-trans-	0.1000	0.6100	0.044	0.0054	22/49	0.36080	0.12018	1.5200	0.7910	256.53	133.50
Methylene chloride	0.0050	0.0305	0.039	0.0071	20/155	0.00810	0.00250	0.0305	0.0169	5.14	2.85
Tetrachloroethane, 1,1,2,2-	0.0005	0.0031	160	6.18	56/155	0.00252	0.00044	0.0112	0.0066	0.03	0.55
Tetrachloroethene	0.0050	0.0305	4.4	0.16	56/155	0.04147	0.01197	0.1806	0.0920	15.18	0.99
Trichloroethane, 1,1,2-	0.0050	0.0305	2.2	0.18	25/155	0.01608	0.00327	0.0627	0.0355	0.84	2.03
Trichloroethene	0.0050	0.0305	460	7.89	92/155	0.04243	0.00976	0.1820	0.0932	10.56	2.06
Vinyl chloride	0.0020	0.0122	7.0	0.64	15/155	0.00553	0.00422	0.0294	0.0150	28.94	14.77

^a Protective groundwater criteria assumed to be MCL for all compounds except 1,1,2,2-Tetrachloroethane, in which the laboratory reporting limit was used. The MCL for Chloroform is 99% of the MCL for Total Trihalomethanes, which is 0.08 mg/L, based on Dunn Field groundwater concentration.

^b Target Soil Leachate Concentration = protective groundwater criteria times a DAF of 6.1

^c SSL Calculated from Equation 10 in SSL Guidance (EPA, 1996)

^d Soil Vapor concentration is in equilibrium with EMSOFT calculated SSL.

^e Does not account for thickness of layers or that Loess exists on top of fluvial deposits.

SSL = Soil Screening Level

MCL = Maximum Contaminant Level

DAF = Dilution Attenuation Factor

TECHNICAL MEMORANDUM

CH2MHILL

Phase II Evaluation of Soil Vapor Extraction Treatability Study, Dunn Field, Memphis Depot (Rev. 0)

PREPARED FOR: U.S. Army Engineering and Support Center, Huntsville

PREPARED BY: CH2M HILL

COPIES: Defense Distribution Center (Memphis)
U.S. Environmental Protection Agency (USEPA), Region 4
Tennessee Department of Environment and Conservation (TDEC)

DATE: August 24, 2004

PROJECT NUMBER: 177556.RD.03

Introduction

Phase II of the Memphis Depot Dunn Field soil vapor extraction (SVE) treatability study was conducted in August 2004 to assess the impact of various engineered amendments on vapor recovery from the loess deposits (see Figure 1 for location of SVE treatability study area). These amendments were intended to improve the distribution and magnitude of flow near the vapor recovery well. As presented in the *Phase II SVE and Pneumatic Fracturing Pilot Study Work Plan, Dunn Field, Memphis Depot* (CH2M HILL, 2004), Phase II activities included the (1) installation of a polyethylene liner to mitigate atmospheric leakage, (2) installation and fracturing of two boreholes in the loess deposits, and (3) injection of a proppant into the fractures of one borehole to sustain the fractures. Both borings were completed as SVE wells.

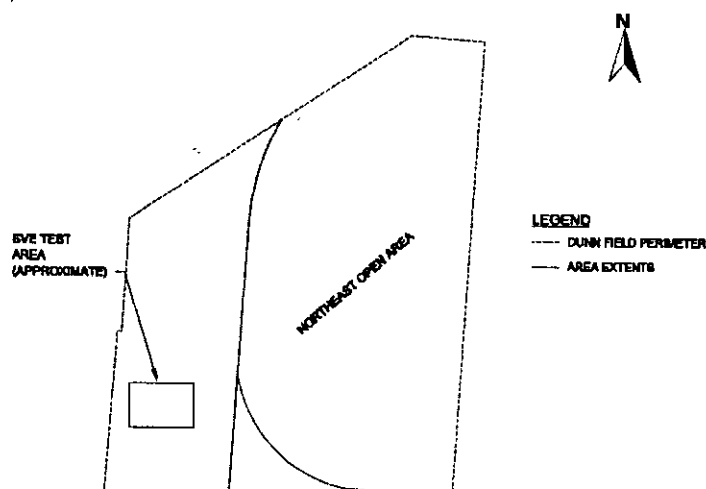


Figure 1 Location of SVE Treatability Study

Description of Test Wells and Fracturing/Proppant Injection Methodology

Pneumatic fracturing was completed in two, 4-inch diameter, open boreholes designated VW-3 and VW-4P (Figure 2). Each fracturing event was isolated with pneumatic packers to target 3-foot vertical intervals.

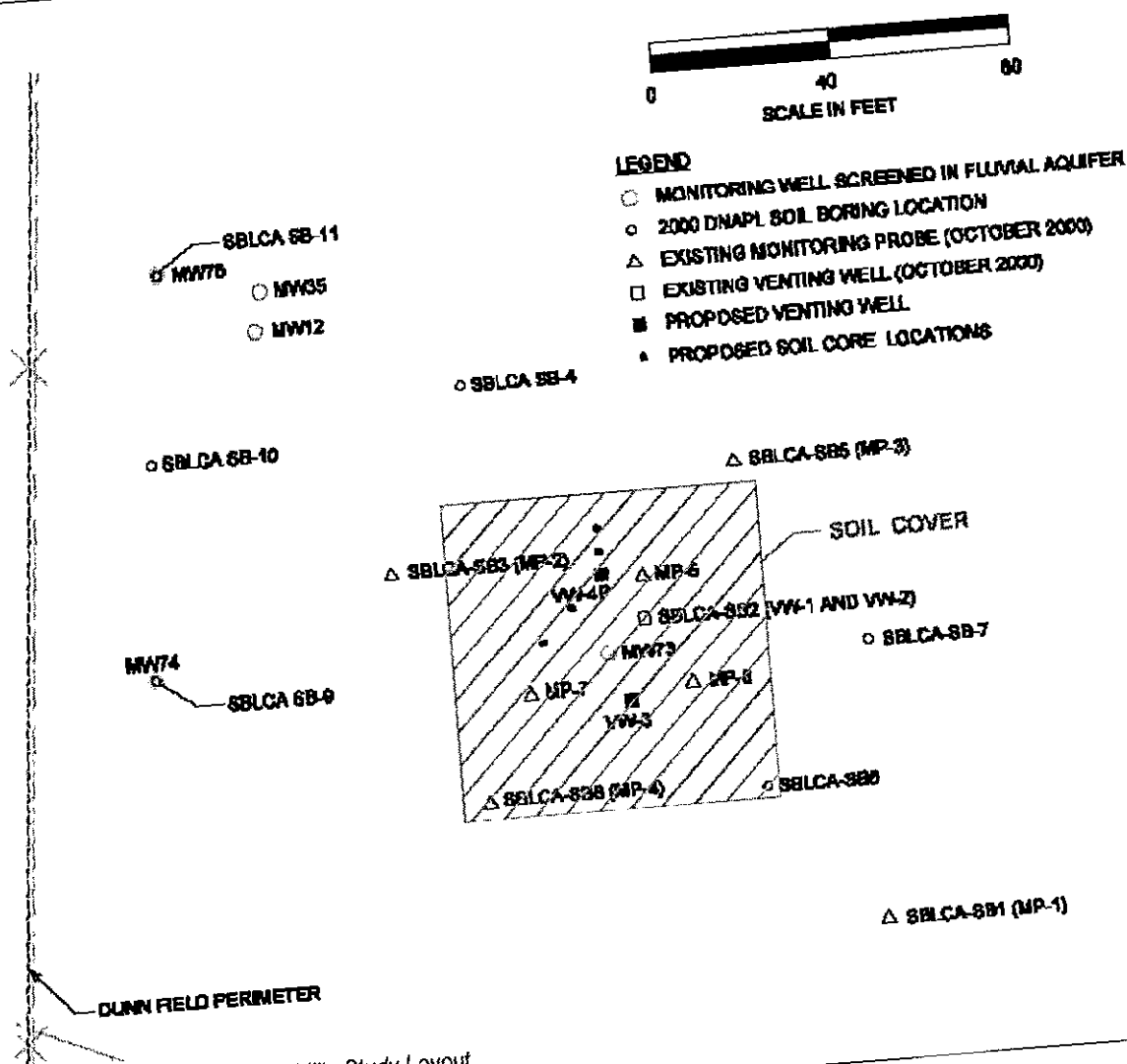


Figure 2 Phase II SVE Treatability Study Layout

VW-3

Fracture intervals were centered at 25, 22, and 19 feet below ground surface (bgs) in the VW-3 boring. Pneumatic fracturing was initiated and propagated using high-flow nitrogen gas (500 to 1,000 cubic feet per minute [cfm]). Attempts to fracture at depths of 16 feet or less resulted in immediate surface discharge (daylighting) of gas and groundwater near the borehole. Daylighting is indicative of vertical fracture propagation and/or fluidization of the formation near the point of injection; it causes the packers to lose their seal against the formation.

VW-4P

Fracture intervals were centered at 25, 22, 19, 16, and 13 feet bgs in the VW-4P boring. As with VW-3, pneumatic fracturing was initiated and propagated using high-flow nitrogen gas. Immediately following pneumatic fracturing, approximately 300 to 400 pounds of ceramic proppant was mixed with 150-175 gallons of water and delivered to each 3-foot fracture interval using nitrogen gas to dilate the fractures and transport the proppant/water mixture. Water was mixed with the proppant so that conventional pumping equipment

could be used and to provide a lubricant for the proppant¹. After the proppant/water mixture was injected, the down-hole tooling was purged (cleaned) using a 15- to 20-second burst of pure nitrogen gas. Daylighting of gas and water was observed at various radial distances outside the boundary of the polyethylene cover. Though the shallower injection intervals resulted in daylighting closer to the boring, none was observed within 10 feet of VW-4P. Mounding under the cover was also observed.

After fracturing, 2-inch diameter schedule 40 polyvinyl chloride (PVC) recovery wells with 0.010-inch slot screen were completed in VW-3 and VW-4P. The well installations were modified due to soil collapse in each of the boreholes. A rotasonic drill rig was required to complete the installation of VW-3. VW-4 was installed 1 foot shallower than intended (24 vs. 25 ft bgs). Furthermore, the filter pack could only be installed from 10 to 22 feet bgs in VW-4P. Well characteristics are summarized below.

Recovery Well	Depth (ft bgs)	Screen Interval (ft bgs)	Filter Pack Interval (ft bgs)
VW-3	24	10 – 24	10 – 22
VW-4P	27	17 – 25	17 – 25

Findings

Based on SVE vacuum and flow monitoring data, partial or complete fracture collapse occurred in both test borings (propped and non-propped). Fracture "healing" occurred when vacuum was applied to the near-saturated loess soils. Vapor extraction flow rates remained low (≤ 50 standard cubic feet per minute [scfm]) with high applied vacuum (24-26 inches mercury). The maximum (uncorrected) vacuum pressures measured in surrounding monitoring points during the SVE tests at VW-3 and VW-4P are summarized below.

VW-3 Vacuum Test

Monitor Probe	MP-1	MP-2	MP-3	MP-4	MP-5	MP-6	MP-7	VW-1
Radial Distance (ft)	(101')	(45')	(32')	(57')	(12')	(36')	(30')	(15')
Maximum Loess Vacuum (inches water column [w.c.])	0.1	0.42	0.65	0.13	7	0.65	0.9	5

VW-4P Vacuum Test

Monitor Probe	MP-1	MP-2	MP-3	MP-4	MP-5	MP-6	MP-7	VW-1
Radial Distance (ft)	(78')	(55')	(61')	(32')	(32')	(24')	(16')	(21')
Maximum Loess Vacuum (in w.c.)	0.17	0.24	0.1	0.4	0.26	0.35	1.7	0.5

Short-term pressure tests were conducted at VW-3 and VW-4P on August 10 and August 11 to evaluate whether propped and non-propped fractures would respond differently to the application of positive pressure.

The first positive pressure test in the propped well produced a flow rate of 170 scfm at 30.5 inches of mercury (Hg) (15 pounds per square inch [psi]) measured at the wellhead. Flow

¹ Bridging of the materials down-hole and/or within the fractures was a concern.

was sustained at this rate for approximately 10 minutes before the pump was deactivated². Operation of the pump for a subsequent 10-minute period produced similar results. Daylighting was not observed. The maximum (uncorrected) pressures measured in surrounding monitoring points during the pressure tests at VW-4P are summarized below.

VW-4P Pressure Test								
Monitor Probe	MP-1	MP-2	MP-3	MP-4	MP-5	MP-6	MP-7	VW-1
Radial Distance (ft)	(78')	(55')	(61')	(32')	(32')	(24')	(16')	(21')
Maximum Loess Vacuum (in w.c.)	N/A	0.4	0.3	0.4	>30	1.7	8.5	>30

The positive pressure test in the non-propped well/boring (VW-3) produced an initial flow rate of 55 scfm at 50.9 inches of Hg measured at the wellhead. However, this flow rate could not be sustained for more than a few minutes before the injection manifold burst off the well. Test data indicate that closure of the pneumatic fractures occurred almost immediately after the apertures were created. No pressure readings could be recorded.

Discussion

Fracture Closure

Overall, the vacuum response at surrounding monitoring probes during the SVE tests at VW-3 and VW-4P was less than the response observed during an earlier test performed at (non-fractured) recovery well VW-1. The pressure application to VW-3 resulted in strong resistance to flow, as though no fracturing had occurred. Although unusual, rapid fracture closure can occur under certain conditions. According to USEPA document 542-R-97-007, entitled *Analysis of Selected Enhancements for Soil Vapor Extraction* (USEPA, 1997):

"The strength of the geologic formation plays an important role in determining whether fractures will stay open naturally or whether they should be filled, or propped, with a granular material, such as sand (Murdoch and others 1991; USEPA 1994; Schuring and others 1995). In general, the strength of fine-grained soil decreases with increasing water content or decreasing consolidation. Therefore, fractures may stay open in dry soils but may close when the soil becomes saturated. The stress driving closure of a fracture is the stress that the geologic formation applies (for a horizontal fracture, the unit weight of the geologic formation times the depth), plus the amount of suction applied to the fracture during vapor extraction. Fractures may be propped naturally when soil or rock is strong relative to the closure stress. However, if strength decreases, depth increases, or suction increases past a critical value, fractures should be propped with granular materials."

Proppant Injection and Impact

Based on field observations, proppant was distributed up to 42 feet from the injection boring, where proppant and water daylighting was observed. However, the distribution of proppant near the borehole appears to have been compromised by blow-out³, which was

² An interlock switch on the liquid ring pump, which was set-up to operate in vacuum mode only, automatically deactivated the unit. Experiments with the positive displacement (PD) rotary lobe blower (mobilized to the site with the liquid ring unit) resulted in shut-down within 15 seconds, because the blower "dead-headed" and tripped the thermal overload. PD blowers can only generate about 10 psi, which was not sufficient to generate flow in either VW-3 or VW-4P.

³ Displacement of injected materials from the immediate vicinity of the borehole, during high gas flow injection, also observed during the ZVI pilot test.

likely caused by the 15- to 20-second gas purging cycle used to clean down-hole tooling after each injection event. The apparent pneumatic disconnect between the borehole and the propped fractures essentially nullified the benefit of the proppant enhancement during the vacuum pressure test. The application of low positive pressure⁴ (approximately 10 psi⁵) appeared to re-open the fractures near the borehole and reconnect them to proppant-filled fractures at some distance from the borehole. An increase in bulk permeability is indicated by the 170-scfm flow rate.

Despite less than satisfactory vacuum data, propped fractures in the loess appear to be viable based on the positive pressure test results. The flow rate recorded during short-term positive pressure testing at the propped well was more than triple the flow rate recorded during previous vacuum tests at similar net pressure. Response in surrounding monitoring probes screened in the loess during the pressure test was immediate, as opposed to the slow and gradual increase observed during the previous vacuum tests conducted over 24 to 48 hours. The magnitude of response was also considerably higher. These results indicate greatly improved pneumatic communication with the formation after proppant injection.

Conclusion

For SVE application in a low-permeability formation, flow distribution and magnitude are directly proportional to removal efficiency (*Vapor Extraction of Volatile Organic Compounds From Clay Soil: A Long Term Pilot Study*, Gibson et al., Groundwater, Vol 31, No. 4, June 1993). Accordingly, maximizing the number of flow pathways through the low-permeability matrix of the loess is essential for timely closure of the site. In the absence of viable fractures, SVE-induced flow will predominantly occur in isolated, higher-permeability zones, leaving other areas to be treated by diffusion-limited transport.

The proppant "blow-out" problem may be remedied by using hydraulic-only pumping at the conclusion of each proppant injection event to "fill in" the fractures near the well bore.

References

- Murdoch, L.C., G. Losonsky, P. Cluxton, B. Patterson, I. Klich, and B. Braswell. 1991. *Feasibility of Hydraulic Fracturing of Soil to Improve Remedial Actions. Project Summary*. USEPA/600/S2-91/012. Office of Research and Development. Cincinnati, OH.
- Schuring, J.R., P.C. Chan, and T.M. Boland. 1995. *Using Pneumatic Fracturing for In-Situ Remediation of Contaminated Sites*. Remediation. Spring. Pages 77-89.
- USEPA. 1994. *Alternative Methods for Fluid Delivery and Recovery. Manual*. USEPA/625/R94/003. Office of Research and Development. Washington, DC.
- USEPA. 1997. *Analysis of Selected Enhancements for Soil Vapor Extraction*. EPA/542/R-97/007. Office of Solid Waste and Emergency Response. September 1997.

⁴ Fracture initiation (creation) pressures in the loess ranged from 140 to 160 psi.

⁵ Note that fracture initiation pressure ranged from 140 to 160 psi.

TECHNICAL MEMORANDUM

CH2MHILL

Phase III Evaluation of Soil Vapor Extraction Treatability Study, Dunn Field, Memphis Depot (Rev. 0)

PREPARED FOR: U.S. Army Engineering and Support Center, Huntsville

PREPARED BY: CH2M HILL

COPIES: Defense Distribution Center (Memphis)
U.S. Environmental Protection Agency (USEPA), Region 4
Tennessee Department of Environment and Conservation (TDEC)

DATE: January 18, 2005

PROJECT NUMBER: 177556.RD.03

Introduction

The purpose of this Technical Memorandum (TM) is to provide a summary of field activities, logistical issues, and results from the third phase of the soil vapor extraction (SVE) treatability study conducted from January 10 through January 13, 2005. The objective of this phase was to develop a modified proppant injection procedure that would facilitate pneumatic fracture dilation under conditions of strong vacuum and partial saturation. Creation and maintenance of a viable fracture network in the loess are critical for SVE system effectiveness. Without a viable fracture network, air flow will be limited to localized areas of higher permeability.

Phase III Methodology

Two pneumatic fracture intervals were completed in the loess in three offsite boreholes installed for the *Early Implementation of Selected Remedy*. The borings, which were about 100 feet apart, were installed east of the Phase II test area. Following proppant injection (discussed below), three temporary SVE recovery wells (TRW-1, TRW-2, and TRW-3) were installed within 4-inch diameter boreholes that were advanced using rotasonic drilling methods. Monitoring wells were also installed adjacent to each temporary recovery well.

Wet Injection Method – TRW-1

The goal of the wet injection method was to fill in the larger apertures near the borehole and establish a relatively continuous seam of ceramic media extending from the borehole wall to the periphery of proppant distribution¹. Wet proppant injection was conducted as follows:

1. Completed pneumatic fracturing at the target depth interval
2. Mixed proppant and water in 500-gallon holding tank.
3. Injected the proppant and water mixture into the formation, using high-pressure, high-flow (estimated to be 850-cubic feet per minute [cfm]) nitrogen gas.

¹ That is, avoid the "blow-out" problems that may have impacted Phase II SVE effectiveness.

Two fracture intervals were completed: 21.5 to 25 and 18 to 21.5 feet below ground surface (bgs). Pneumatic packers were used to seal/straddle the fracture intervals. The fracture initiation pressures were approximately 240 pounds per square inch (psi) for the deep injection and 180 psi for the shallow injection. The shallow injection interval had a lower initiation pressure because of fracture "merging" or "overlap" due to the strong vertical component of fracture propagation in the loess. Fracture maintenance pressures ranged from 80 to 100 psi.

Various proppant mix ratios were attempted; however, unlike the double diaphragm pump used during Phase II, the progressive cavity pump proved to be highly sensitive to concentration of solids. As such, the pump "locked-up" on several occasions at mix ratios of 2:1 and 3:1 (mass ratio water:proppant); a mix ratio of 4:1 was eventually used (1,600 pounds of water and 400 pounds of proppant at each injection interval). Hydraulic injection of water and proppant with intermittent bursts of high-flow nitrogen gas was used to drive the material out into the formation.

The injection procedure concluded with a period of hydraulic pumping only to minimize proppant displacement (blow-out) around the borehole. Daylighting of water and gas at the surface was frequently observed during the process. Fluorescent green dye was also injected with the proppant slurry (tracer).

TRW-1 was constructed of 2-inch diameter schedule 40 polyvinyl chloride (PVC) with 10 feet of 0.010-slot screen from 15 to 25 feet bgs. Hydrated bentonite chips were used to seal the annular space above the screen. The boring was re-drilled before well installation because of accumulation of material in the hole after fracturing activity.

Dry Injection Method- TRW-2

Dry proppant injection was conducted as follows:

1. Completed pneumatic fracturing at the target depth interval
2. Filled a sandblaster chamber with approximately 300 pounds of proppant.
3. Injected the proppant into the formation using nitrogen gas.

The sandblaster was supplied with compressed air; low-flow nitrogen gas was used to suspend the proppant. Approximately 200 cfm of nitrogen at 100 psi or less was required to keep the sandblaster operating at less than 110 psi (the limit of the rented air compressor).

Two fracture intervals were completed: 21.5 to 25 and 18 to 21.5 feet bgs. Pneumatic packers were used to seal/straddle the fracture intervals. An attempt to fracture from 14.5 to 18 feet bgs resulted in the immediate bypassing of the upper packer due to compromised borehole integrity². The fracture initiation pressures were approximately 230 psi for the deep injection and 210 psi for the shallow injection. Fracture maintenance pressures ranged from 80 to 100 psi.

Approximately 600 pounds of proppant was delivered to the 21.5- to 25-foot interval in two injection sequences. Approximately 450 pounds of proppant was delivered to the 18- to

² Due to repeated fracturing events; packer effectiveness depends on the ability of the packer gland to bite or grip the borehole surface.

21.5-foot interval. Until the end of the second injection sequence for the shallow interval, when the upper packer was bypassed, no gas or proppant daylighting was observed and surface heave was minimal. After fracturing and proppant injection, fluorescent dye mixed with 100 gallons water was injected into each interval.

TRW-2 was constructed of 2-inch diameter schedule 40 PVC with 10 feet of 0.010-slot screen from 15 to 25 feet bgs. Hydrated bentonite chips were used to seal the annular space above the screen. As with TRW-1, the boring had to be re-drilled before well installation.

Dry Injection Method – TRW-3

A third injection location was selected to experiment with the dry injection procedure. As with TRW-2, two fracture intervals were completed: 21.5 to 25 and 18 to 21.5 feet bgs.

The formation at this location responded differently than at previous testing locations. The fracture initiation pressure was similar to those of previous efforts (approximately 200-210 psi for both the shallow and deep intervals); however, the maintenance pressure remained unusually high for the 21.5- to 25-foot interval (180 psi). The elevated maintenance pressure indicated a strong resistance to post-fracture air flow. Because the sandblaster could not achieve the maintenance pressure, proppant delivery was severely impaired. As a result, limited proppant mass was delivered to the formation and the entire drill string became clogged. Because the maintenance pressure was lower in the 18- to 21.5-foot interval (90 psi), 300 pounds of proppant was injected before the drill string was clogged. Dye was not injected at this location.

TRW-3 was constructed of 2-inch diameter schedule 40 PVC with 10 feet of 0.010-slot screen from 15 to 25 feet bgs. Hydrated bentonite chips were used to seal the annular space above the screen. As with TRW-1 and -2, the boring had to be re-drilled before well installation.

Confirmation Borings/Monitoring Wells

Two confirmation borings were advanced near each temporary recovery well at radial distances of 3 and 10 feet for TRW-1 and 10 and 20 feet for both TRW-2 and TRW-3. Though green staining of the drill string was observed 3 feet from TRW-1, neither dye nor proppant was observed in any of the confirmation borings. Temporary monitoring wells, constructed identically to the recovery wells, were installed in each confirmation boring.

Vacuum Test Results

One-hour duration vacuum tests were performed at each temporary recovery well location to evaluate the response of propped fractures to application of vacuum. Unlike the previous SVE treatability study phases, the vacuum test was conducted with a 2,500-gallon vacuum truck (oil flooded vane pump that is driven off the power take-off (PTO) instead of a liquid ring pump. Vapor flow was measured using an orifice plate type differential pressure meter. Wellhead vacuum was measured using a glycerin-filled vacuum gauge mounted on a PVC suction manifold that was attached to each recovery well with a slip connection and sealing grease. The vacuum tests were performed in reverse order: TRW-3, TRW-2, and then TRW-1.

TRW-3

The first test was performed at TRW-3. The vacuum truck was only able to generate 21 inches of mercury (Hg) vacuum, which was insufficient to withdraw water above the top of the well casing. As a result, a 1-inch suction tube was progressively lowered into the well to extract slugs of water until the well was dewatered. Depth to water prior to dewatering was 13.77 feet bgs; after dewatering it was 25.19 feet bgs. After 1 hour, the well had recovered to 20.62 feet bgs.

Vacuum was applied to the top of casing for 1 hour. Flow remained fairly constant at 100 cfm. Because the test was conducted immediately following a period of heavy rain, ponded surface water was present in the vicinity of TRW-3. Based on inspection of the confirmation borings, near-surface soils were saturated to approximately 5 feet bgs. There was no evidence of surface water leakage into the ground due to the vacuum. After 1 hour, the vacuum responses in surrounding monitoring wells were as follows:

- 10 feet from TRW-3; 2.7 inches water column (w.c.)
- 20 feet from TRW-3; 2.9 inches w.c.

Vacuum increased steadily during the 1-hour trial period. MP-1, which was closest to TRW-3, was flooded and could not be monitored.

TRW-2

The second test was conducted at TRW-2. As with TRW-3, a 1-inch suction tube was used to dewater the well prior to the start of the test. Depth to water prior to the start of the test was 11.82 feet bgs; after dewatering it was 24.56 feet bgs. After 1 hour, the well had recovered to 17.38 feet bgs.

Vacuum (21 inches Hg) was applied to the top of casing manifold for 1 hour. The air flow rate at the start of the test was 110 cfm and increased to 125 cfm after 1 hour. There was no evidence of surface water leakage into the ground due to the vacuum. After 1 hour, the vacuum responses in surrounding monitoring wells were as follows:

- 10 feet from TRW-3; 3.4 inches w.c.
- 20 feet from TRW-3; 2.5 inches w.c.

Vacuum increased steadily during the 1-hour trial period. MP-4, which was about 50 feet from TRW-2, was flooded and could not be monitored.

TRW-1

The last test was performed at TRW-1. As with TRW-2 and -3, the 1-inch suction tube was used to dewater the well prior to the start of the test; however, the well recovered quickly because of the large volume of water injected during proppant injection. Vacuum response was significantly lower than in the previous experiments, because the screen was flooded. Flow was limited to about 30 cfm. After 1 hour, the vacuum responses in surrounding monitoring wells were as follows:

- 3 feet from TRW-3; 1.3 inches w.c.
- 10 feet from TRW-3; 0.6 inches w.c.
- 26 feet from TRW-3; 0 inches w.c.

Discussion

Relative to the Phase II steady-state air flow rate observed at VW-1 (recovery well screened in non-fractured material, with a polyethylene cover), Phase III results indicate an increase of flow through the loess of approximately 50-100% (60 to 110-125 cfm). The vacuum response also increased by approximately 200-300% (0.85 to 2.5-2.9 inches w.c. at 20 feet). Phase II and Phase III wellhead vacuums were similar (21.25 and 21 inches Hg, respectively).

Wet injection of proppant appears to exacerbate daylighting of water and gas to the surface because the water partially occludes the fractures and increases leak-off. Problems (that is, pump lock-up) were also encountered with combined nitrogen gas, water, and proppant injection. Wet injection of proppant is not recommended for future use at the site.

The increase in flow and vacuum response suggests that the use of dry injection procedures improves proppant delivery, limits fracture closure, and enhances performance under vacuum. Dry injection of proppant media for full-scale implementation would likely necessitate a specially designed sandblasting chamber of larger volume that can support high flows and pressures. On a few occasions, the use of low-pressure air sandblasting equipment resulted in clogged drill strings.

During proppant injection at TRW-2, a large circular area of bubbling was observed at the surface. The radius of bubbling was measured at approximately 56 feet from TRW-2. This observation qualitatively validates the concept that pneumatic fractures in the loess have a strong vertical component and/or the vertical permeability is significant.

Performance of pneumatic fractures under positive pressure appears favorable. Pressurized air injection into pneumatic fractures (with or without proppant enhancement) should be evaluated as an alternative to high vacuum recovery from the loess. Field pressure testing could be readily performed using existing wells as a 1- or 2-day adjunct to Phase III.

TECHNICAL MEMORANDUM

CH2MHILL

Phase IV Evaluation of Soil Vapor Extraction Treatability Study, Dunn Field, Memphis Depot (Rev. 0)

PREPARED FOR: U.S. Army Engineering and Support Center, Huntsville

PREPARED BY: CH2M HILL

COPIES: Defense Distribution Center (Memphis)
U.S. Environmental Protection Agency (USEPA), Region 4
Tennessee Department of Environment and Conservation (TDEC)

DATE: March 10, 2005

PROJECT NUMBER: 177556.RD.03

Introduction

The purpose of this Technical Memorandum (TM) is to summarize the methodology and results associated with Phase IV of the soil vapor extraction (SVE) treatability study conducted on February 23, 2005.

Though previous results indicated that vacuum-induced soil vapor flow through pneumatic fractures could be enhanced by proppant injection, which reduces fracture closure under conditions of strong vacuum, there are several logistical issues associated with full-scale implementation. Previous results also indicated that positive pressure injection in the loess could be a viable alternative to SVE, assuming vapor produced by the process could be controlled/captured. Air injection was briefly, but favorably, demonstrated during Phase II (August 2004).

Methodology

The objective of Phase IV was to evaluate air injection as a viable alternative to SVE. Air injection was tested in all three subsurface environments associated with past SVE field efforts at the site:

1. Loess deposits without fracturing (Phase I)
2. Loess deposits with fracturing (Phase II)
3. Loess deposits with proppant-amended fractures (Phases II and III).

Six existing SVE wells associated with previous phases of work were pressure-tested. Temporary wells from Phase III are labeled "TRW" or "TMW." Except as noted, each injection test lasted approximately 30 minutes, which was long enough to achieve approximate steady-state conditions based on pressure monitoring data. Positive pressure displaces groundwater from the well casing and rapidly establishes air flow "channels" in the formation (analogous to air sparging). Based on previous field tests, vacuum-enhanced groundwater recovery in the loess is characterized by slow dewatering over a period of several days or more.

Phase IV Injection Well Location	Phase of SVE Testing	Screen Depth (ft bgs)	Fractured	Proppant Injection Method
VW-1*	Phase I (December 2001)	9-24	No	None
VW-3*	Phase II (August 2004)	17-25	Yes	None
VW-4P*	Phase II (August 2004)	10-24	Yes	Wet
TRW-1	Phase III (January, 2005)	15-25	Yes	Wet
TRW-2	Phase III (January, 2005)	15-25	Yes	Dry
TRW-3	Phase III (January 2005)	15-25	Yes	Dry

* VW-1, VW-3, and VW-4P are positioned within the area overlain by a polyethylene liner; other wells are not covered

The pressure response was monitored using a digital manometer in probes and/or wells located within a 50-foot radius of each injection well. Baseline pressure measurements were collected before the test events; all baseline readings were zero.

Compressed air was applied to the selected wells using an industrial air compressor, rated for 185 cubic feet per minute (cfm) at 120 pounds per square inch (psi). The air compressor was connected to each well using 3/4-inch diameter rubber hose secured to the well casing using a rubber Fernco fitting and hose clamps. The air velocity into the well was measured using a thermal anemometer, installed within a 10-foot section of 2-inch diameter polyvinyl chloride (PVC) pipe, between sections of 3/4-inch hose. To avoid overpressurizing the wells, the compressor was never operated above idle speed, which produced a flow of approximately 50 cfm at 15 psi (~95 standard cfm [scfm]).

Results

Pressure responses from the air injection testing are summarized below.

Phase IV Injection Well Location	Injection Pressure [psi] (Initial/Steady State)	Flow (cfm)	Monitoring Point Pressure Response MP (Depth/Distance) = Pressure Response (inches w.c.)
Previous SVE Wells			
VW-1	20/18	39	MP-2 (22, 56) = 0, MP-2 (35, 56) = 0 MP-3 (11, 40) = 0.5, MP-3 (27, 40) = 0.2 MP-4 (19, 54) = 0 MP-5 (10, 11) = 1.7, MP-5 (20, 11) = 1.4 MP-6 (11, 21) = 0.7, MP-6 (27, 21) = 0.3 MP-7 (6, 30) = 0.1, MP-7 (16, 30) = 0.3 VW-4P = 1.1 VW-3 = 1.8
VW-4P	13/12	52	MP-2 (22, 35) = 6.6, MP-2 (35, 35) = 0 MP-3 (11, 36) = 2.2, MP-3 (27, 36) = 2.2 MP-4 (19, 57) = 1.4 MP-5 (10, 12) = 14.6, MP-5 (20, 12) = 1.3 MP-6 (11, 36) = 3.7, MP-6 (27, 36) = -2.2 MP-7 (6, 30) = 6.1, MP-7 (16, 30) = 6.7 VW-1 (9-24, 15) = 6.8 VW-3 (17-24, 21) = 4.3

Phase IV Injection Well Location	Injection Pressure [psi] (Initial/Steady State)	Flow (cfm)	Monitoring Point Pressure Response
			MP (Depth/Distance) = Pressure Response (inches w.c.)
VW-3	15/14	48	MP-2 (22, 53) = 0, MP-2 (35, 53) = 0 MP-3 (11, 60) = 0.8, MP-3 (27, 60) = 2.6 MP-4 (19, 33) = 0.9 MP-5 (10, 27) = 2.8, MP-5 (20, 27) = 1.8 MP-6 (11, 22) = 1.1, MP-6 (27, 22) = 0 MP-7 (6, 16) = 2.8, MP-7 (16, 16) = 3.3 VW-1 (9-24, 21) = 2.3 VW-4P (10-24, 21) = 3.7
TRW-1	14.5/14	47	TMW-1-10: (15-25, 10) = 15.1 TMW-1-20: (15-25, 20) = 7.1
TRW-2	14.5/13.5	46	TMW-2-10: (15-25, 10) = 15.4 TMW-1-20: (15-25, 20) = 6.8
TRW-3	14.5/14	44	TMW-3-10: (15-25, 10) = 19.6 TMW-3-20: (15-25, 20) = 7.9

Previous Temporary Monitoring Wells

TMW-2-10*	20/18	36	TRW-2: (15-25, 10) = 2.0 TMW-2-20: (15-25, 30) = -2.9
TMW-1-10*	21/19	35	TRW-1: (15-25, 10) = 1.7 TMW-1-20: (15-25, 30) = 0

Note: VW-1 is located close to VW-3 and VW-4P and may have "connected" with secondary fractures during the pressure application.

* Test stopped prematurely (after about 5 minutes) because of grout blow-out

Shading indicates wells that were not fractured.

The effect of flow modulation can be evaluated by comparing Phase II and Phase IV results. During the short Phase II pressure test, 170 cfm of air at 15 psi (~345 scfm) was injected into VW-4P. The pressure response in surrounding probes/wells ranged from 36 inches water column (w.c.) at a radial distance of 11 feet to 8.5 inches w.c. at a distance of 30 feet. In comparison, during Phase IV, 52 cfm at 12 psi (~96 scfm) was injected into VW-4P. The pressure response ranged from 14 inches w.c. at a radial distance of 12 feet, to 6 inches w.c. at 30 feet. These results, coupled with other Phase IV observations, indicate that increasing the air injection flow rate increases the radial distance of air flow propagation. However, this also results in increased vertical short-circuiting immediately around the injection well.

Relative to Phase III, the significantly greater response at surrounding probes/wells indicated improved fracture flow and communication with the formation under pressurized conditions. Key comparisons between Phase III and IV are summarized below.

Parameter	Phase III	Phase IV
Motive	Vacuum	Injection
Wellhead pressure	21 inches (10.3 psi)	28.5 inches Hg (14 psi)
Observations at 10 feet	0.6 to 3.4 inches water	15.1 to 19.6 inches water
Observations at 20 feet	2.5 to 2.9 inches water	6.8 to 7.9 inches water

Discussion

The Phase IV results suggest that pneumatic fracture performance in the loess deposits is enhanced by air injection. As evidence, during all air injection testing, once fracture dilation pressure is exceeded (estimated to be 10 psi), resistance to air flow is minimal. Phase IV (96 scfm) and Phase II (345 scfm) only differed by 3 psi. Moreover, Phase II data indicate that increasing vacuum appears to have the opposite effect: fractures are constricted and flow is significantly reduced. Potential air injection advantages and disadvantages are summarized below.

Air Injection Advantages

- Fracture performance and air flow distribution in the subsurface are improved; fracture dilation maintained.
- Groundwater pumping, and the associated increased capital and operations costs, is significantly reduced or eliminated. Water collection is limited to condensate management only.
- Void space available for air flow is increased, as a result of groundwater displacement¹ from the fractures.

Air Injection Disadvantages

- Dewatering is slower, particularly during early operation. However, if surface water infiltration is limited, air injection will enhance dewatering over time (that is, groundwater will be removed from the subsurface by evaporation).
- Added design complexity. A three-layer design, including SVE above and below the loess, is required to capture fugitive vapor. However, low-vacuum and relatively low-cost blowers can be used to extract vapor from both the upper and lower SVE units. Additional conveyance piping, manifolding, and horizontal well installation are required.
- Fugitive vapor migration will result if the integrity of the required liner/cover system is compromised.

The benefits of proppant injection were less obvious; subtle differences in applied pressure may have been a function of site heterogeneity. Because only one non-propped well was tested, relative performance was difficult to assess. Wellhead injection pressure and flow at non-propped wells were similar to those at propped wells. Theoretically, fracture flow is significantly enhanced in open fractures, which are devoid of water, proppant, or other materials. For this reason, proppant use at Dunn Field is not recommended, unless the potential exists for future application of SVE and/or groundwater recovery. Fracture collapse during air injection is not expected to occur during intermittent (pulsed) air injection, provided surface water infiltration is limited (low-permeability soil cover).

¹ The term "displacement" in this context refers to localized displacement of water from air channels, rather than displacement of bulk groundwater from the treatment area.

Details concerning remedy implementation will be documented in the Remedial Design. Based on overall results from the various field tests, performed from 2001 to 2005, air injection in pneumatic fractures is the recommended option for loess remediation.

Layout 20 Version 1 1 well at 100 cfm

889 858

Air Budget Layout 20 Version 1

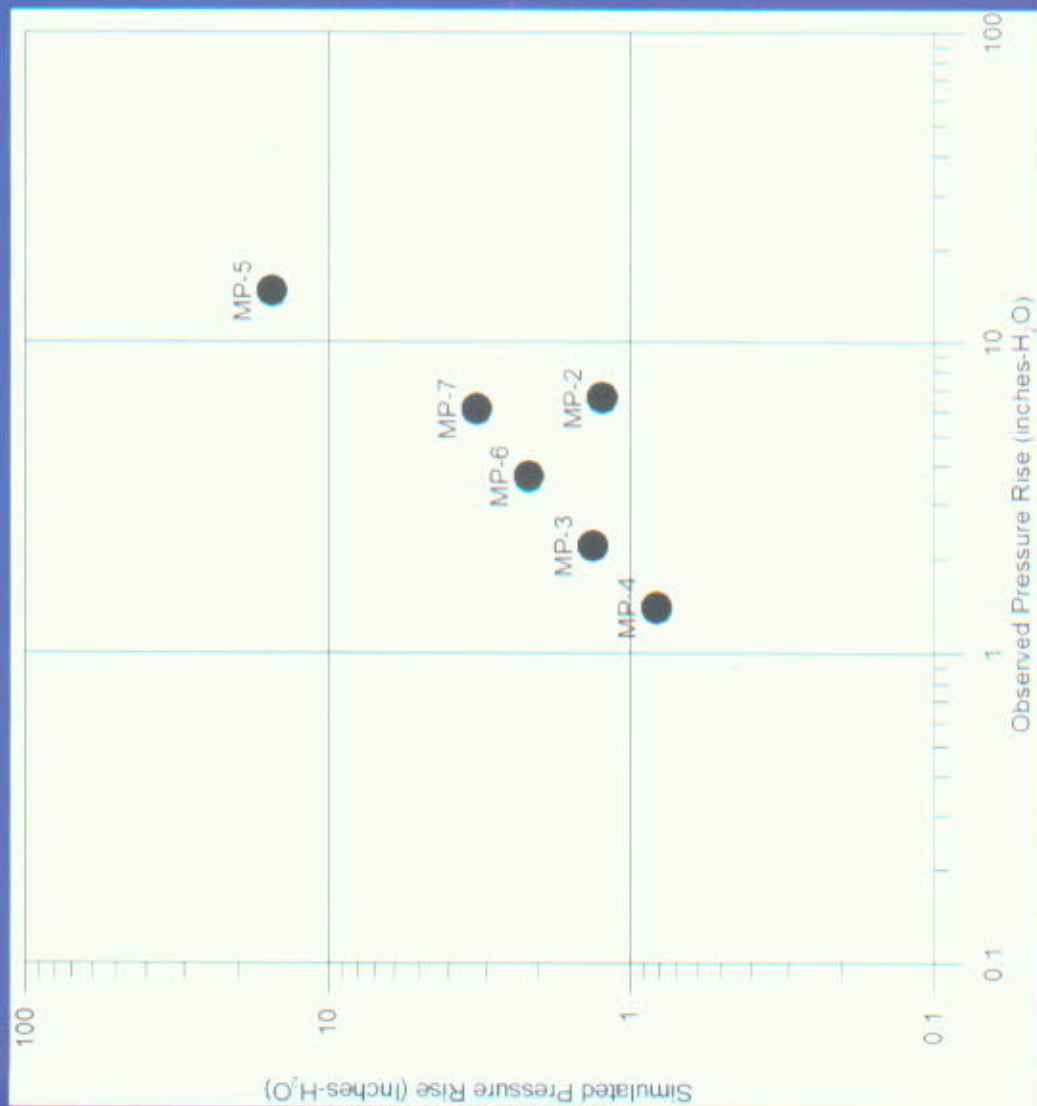
total flow into passive wells	0 cfm
flow per passive well	0 cfm
total flow into fluvial well	100 cfm
flow per fluvial well	100 cfm

Vadose Zone Properties

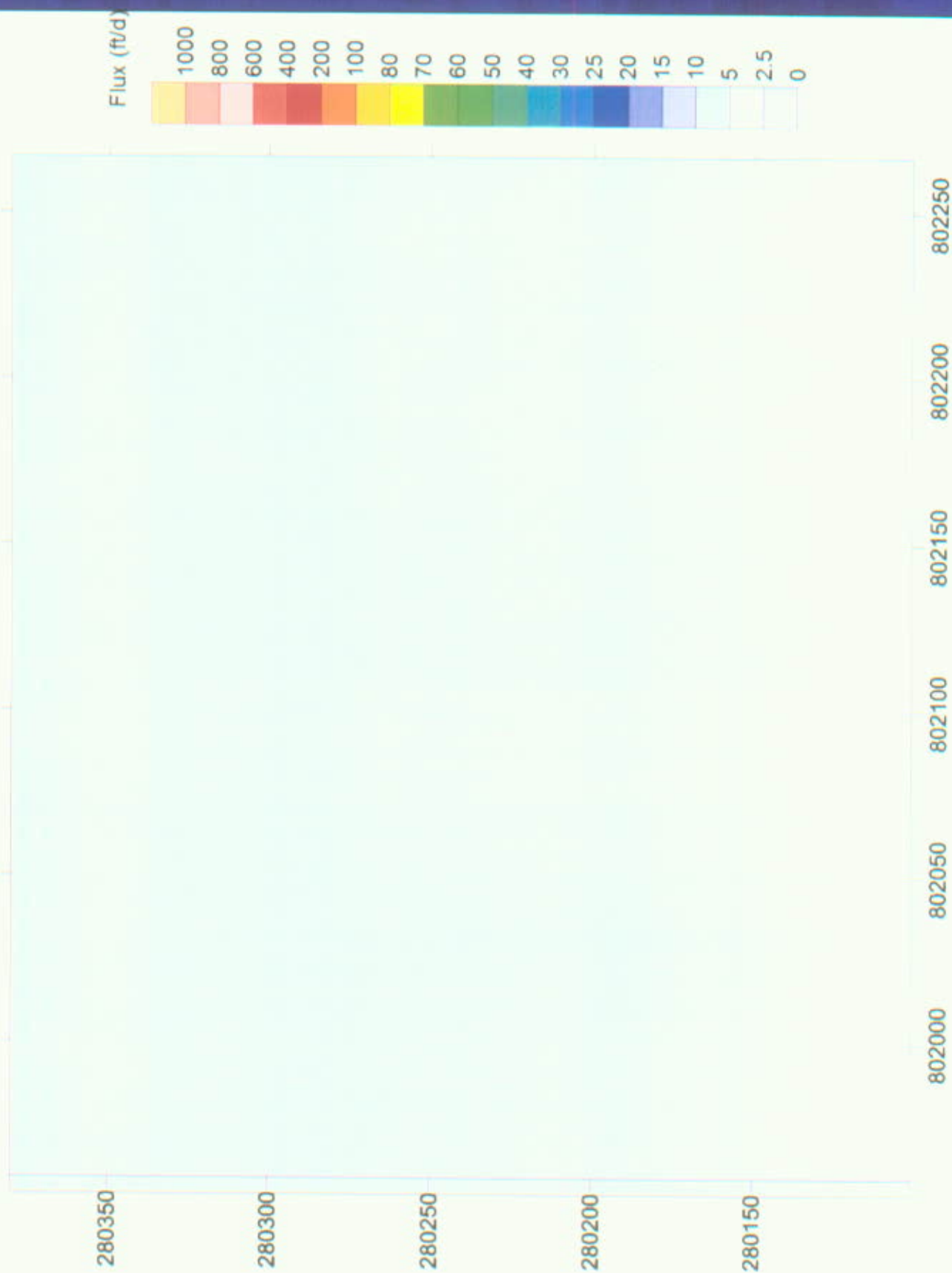
- **K loess = 0.34 ft/d**
- **Kh/Kv loess = 0.53**
- **K fluvial = 16.55 ft/d**
- **Kh/Kv fluvial = 50**

Comparison of Observed and Simulated Pressure Response - Feb 2005 Test at VW4P

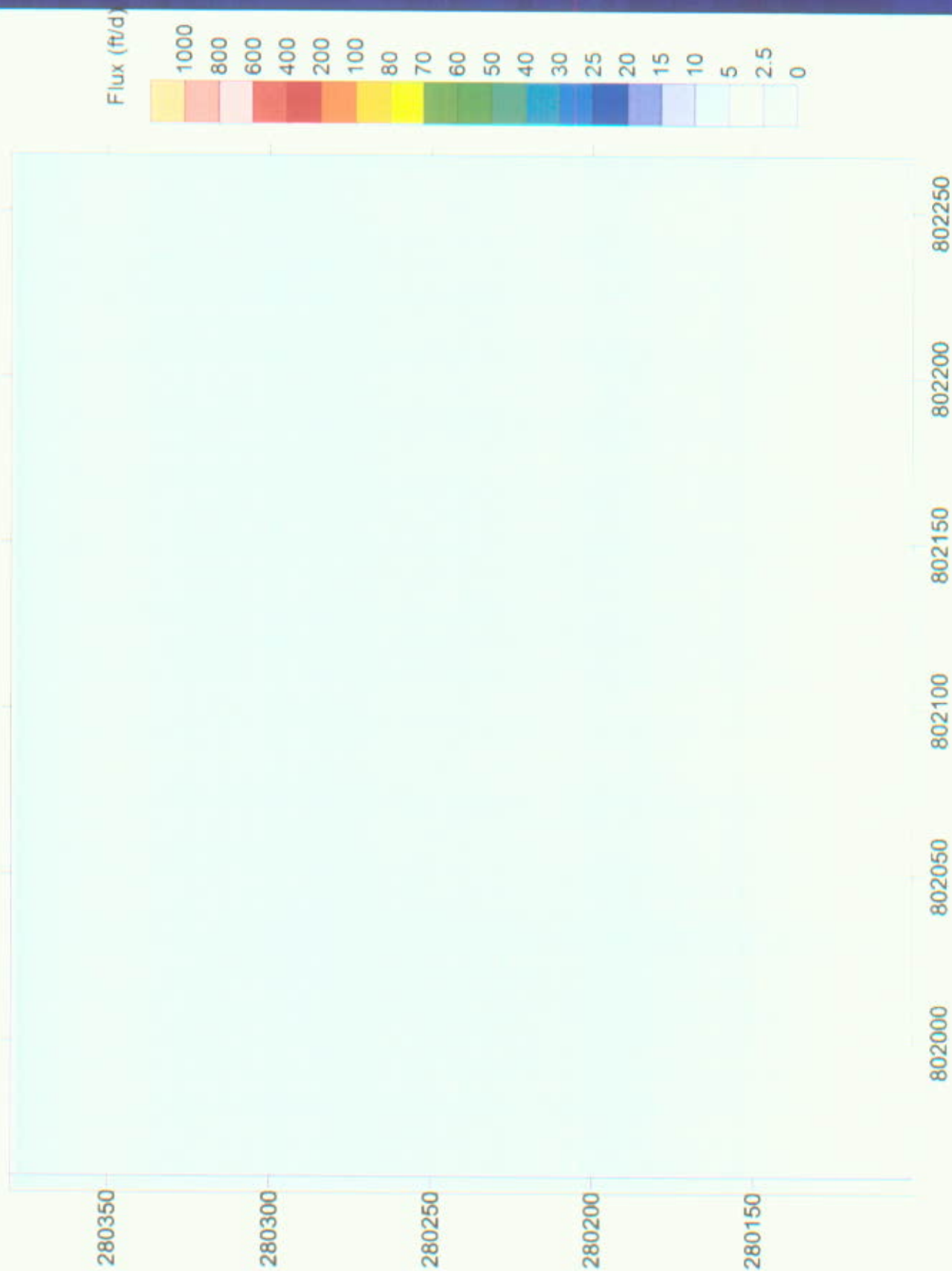
Vadose Zone Properties
K loess = 0.34 ft/d
Kh/Kv loess = 0.53
K fluvial = 16.55 ft/d
Kh/Kv fluvial = 50



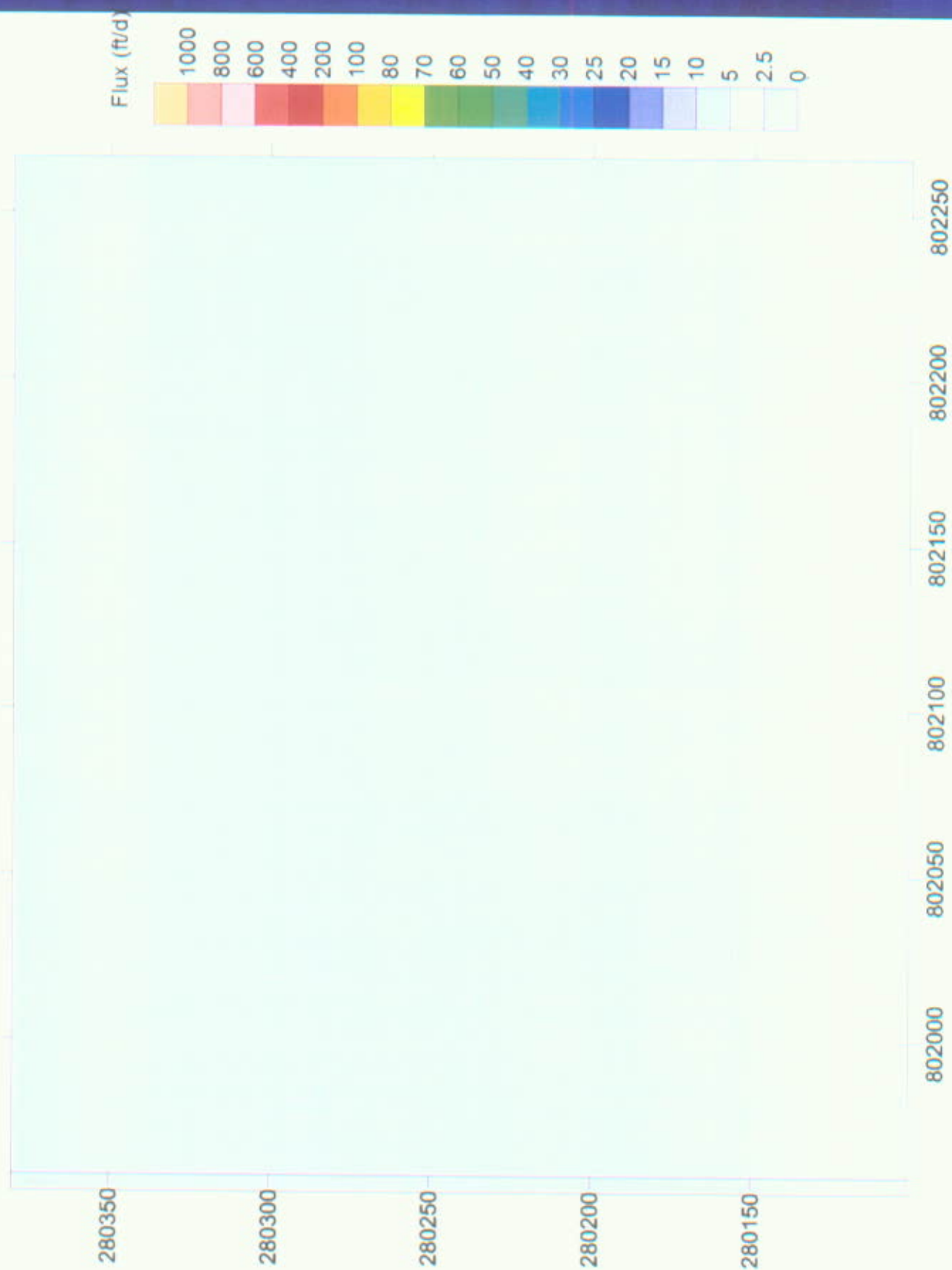
Layout 20 Version 1 - Flux at 0.5 ft depth



Layout 20 Version 1 - Flux at 2 ft depth

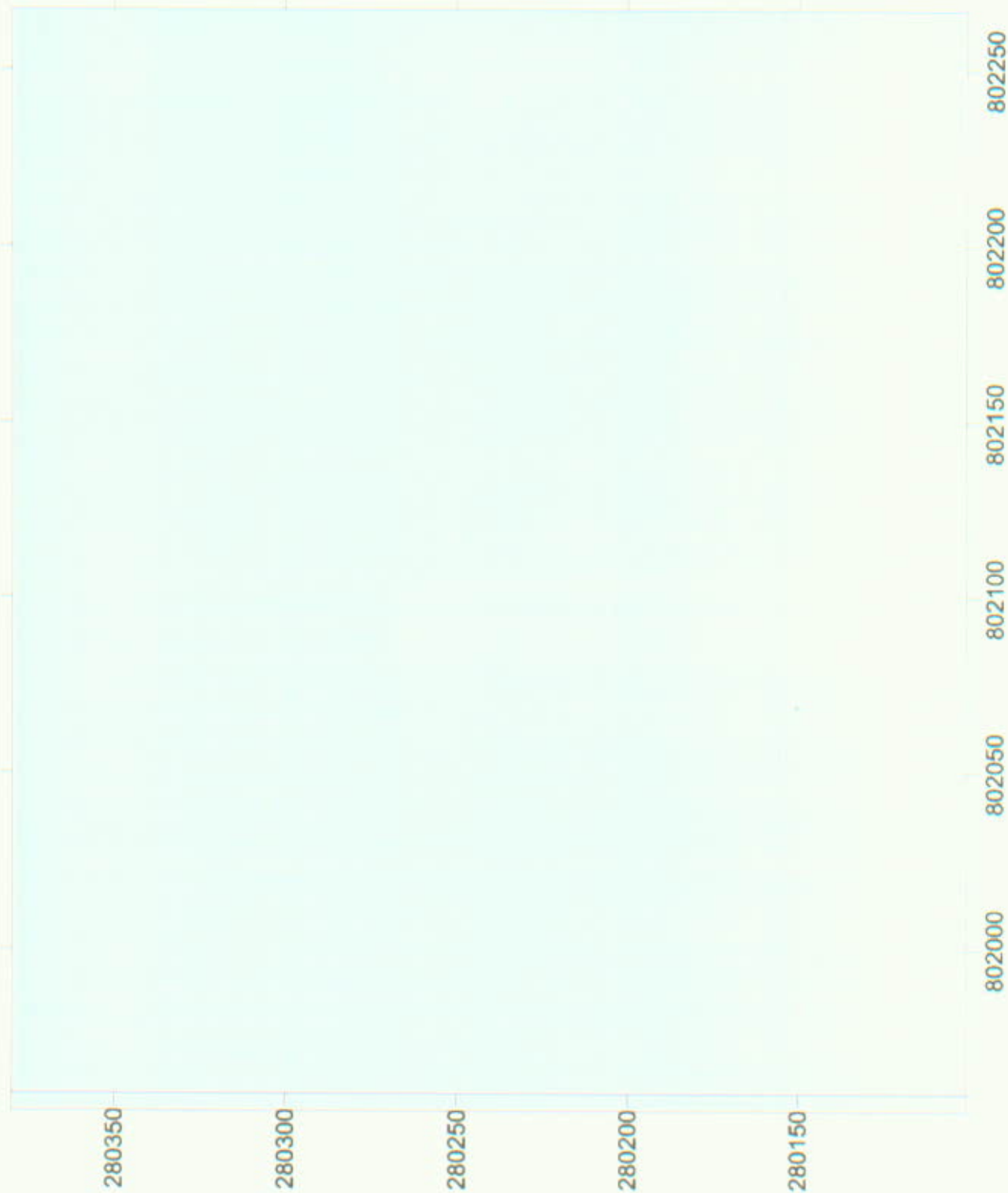
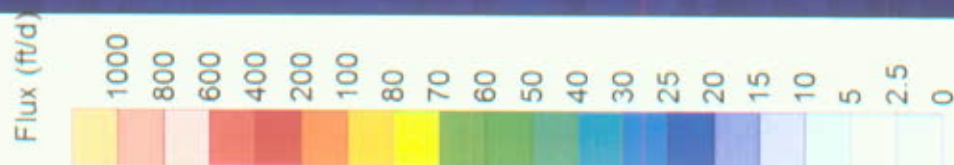


Layout 20 Version 1 - Flux at 4.5 ft depth

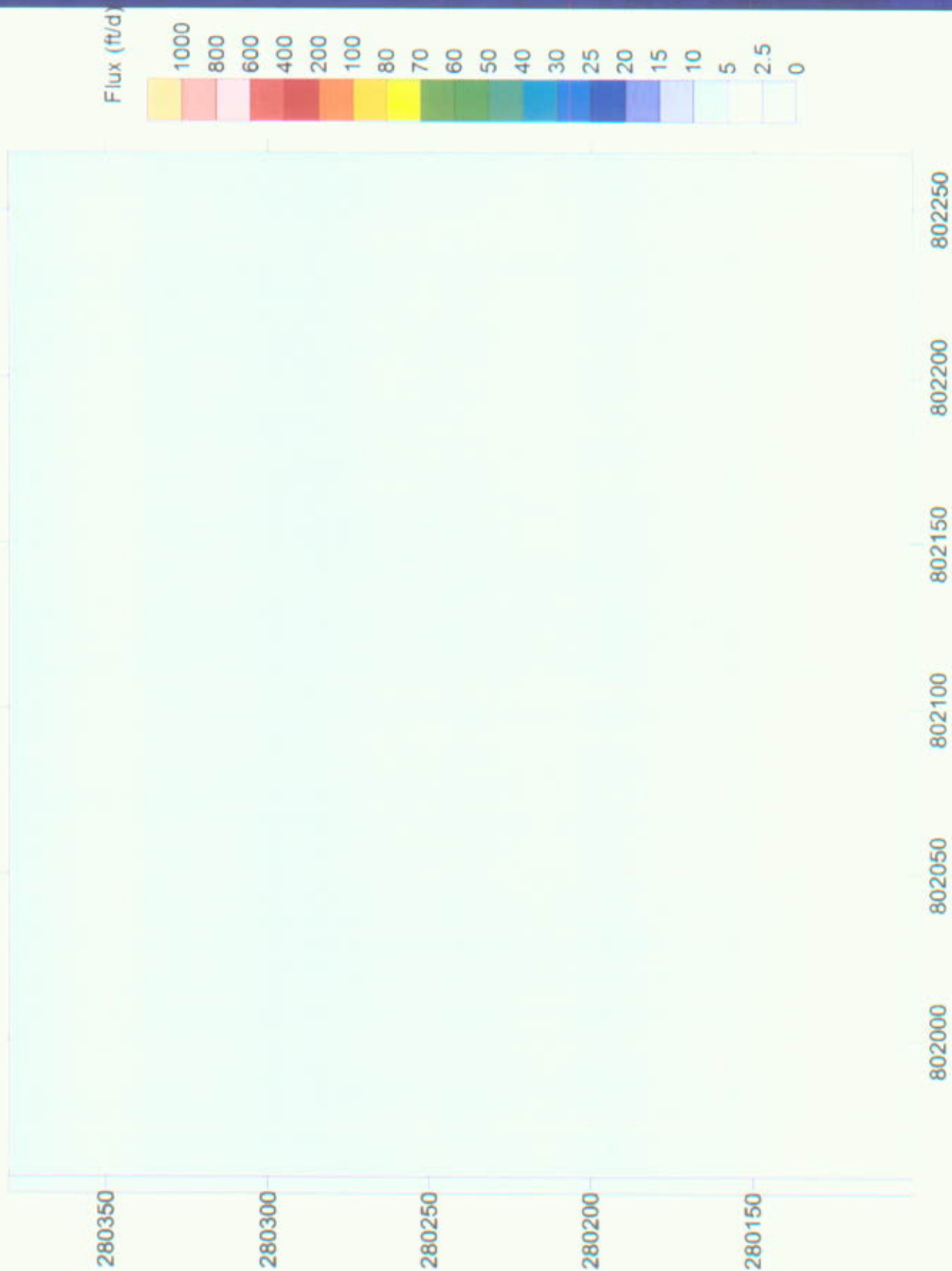


Layout 20 Version 1 - Flux at 8 ft depth

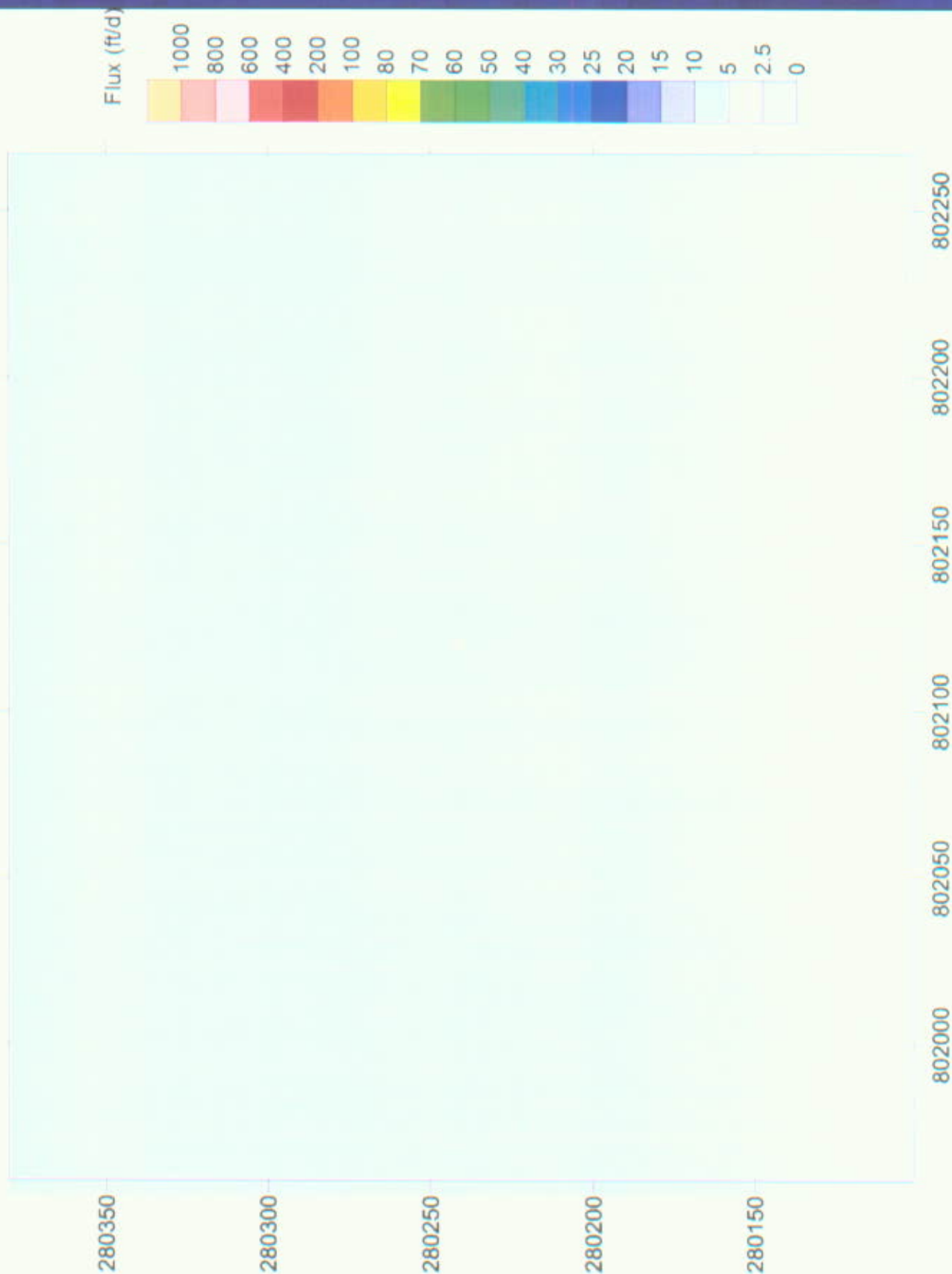
889 865



Layout 20 Version 1 - Flux at 12.5 ft depth



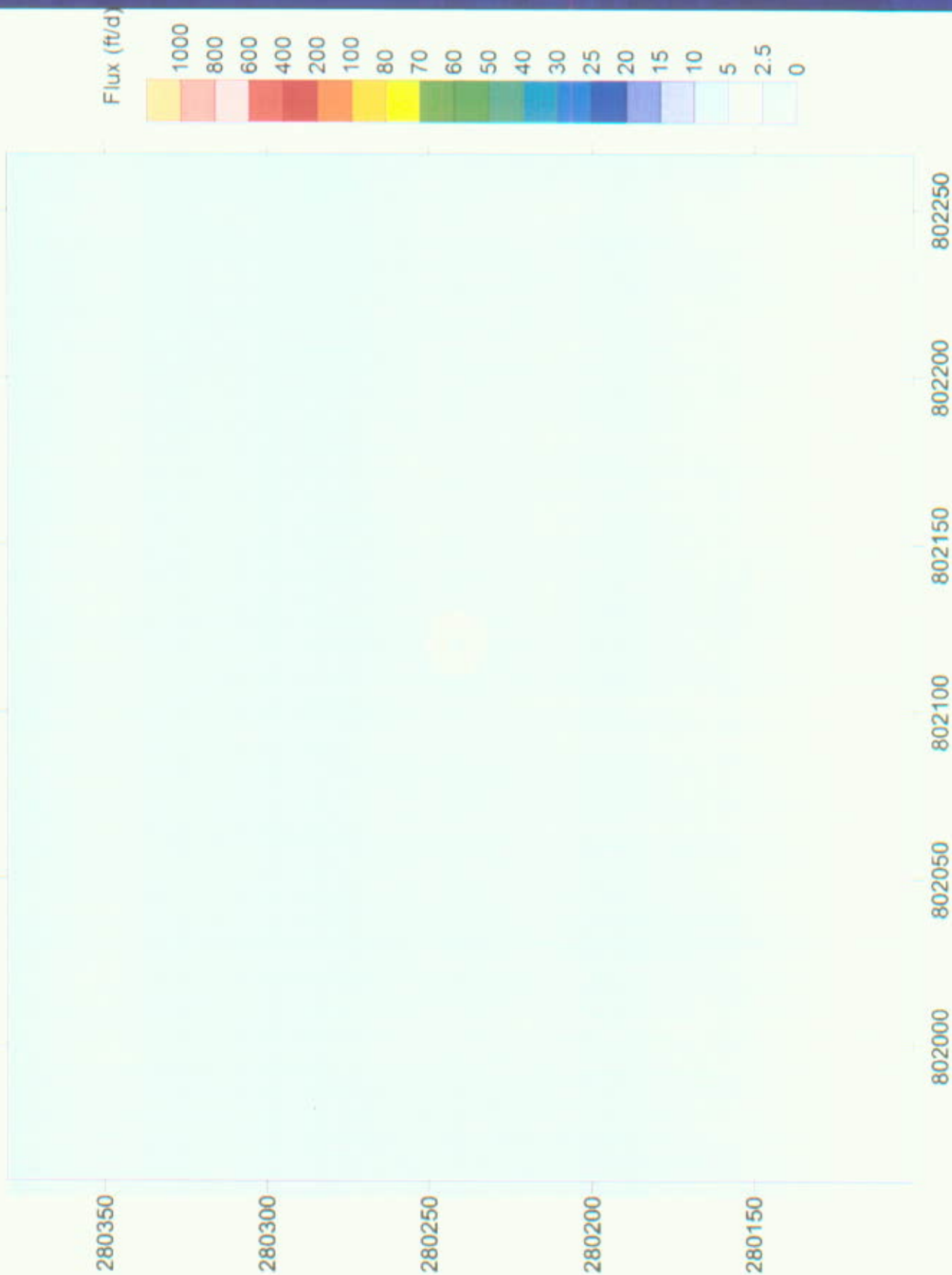
Layout 20 Version 1 - Flux at 17.5 ft depth



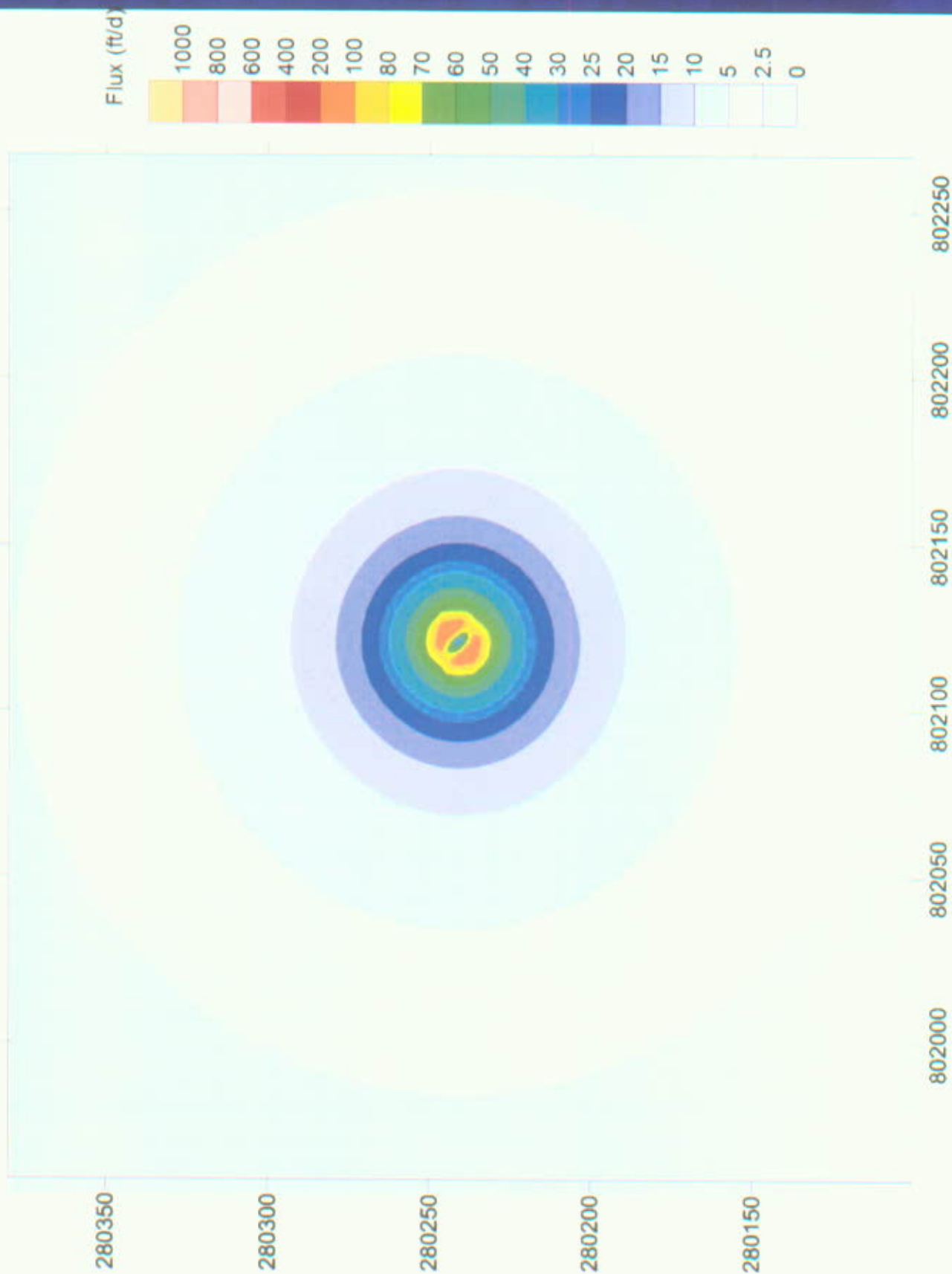
Layout 20 Version 1 - Flux at 22.5 ft depth



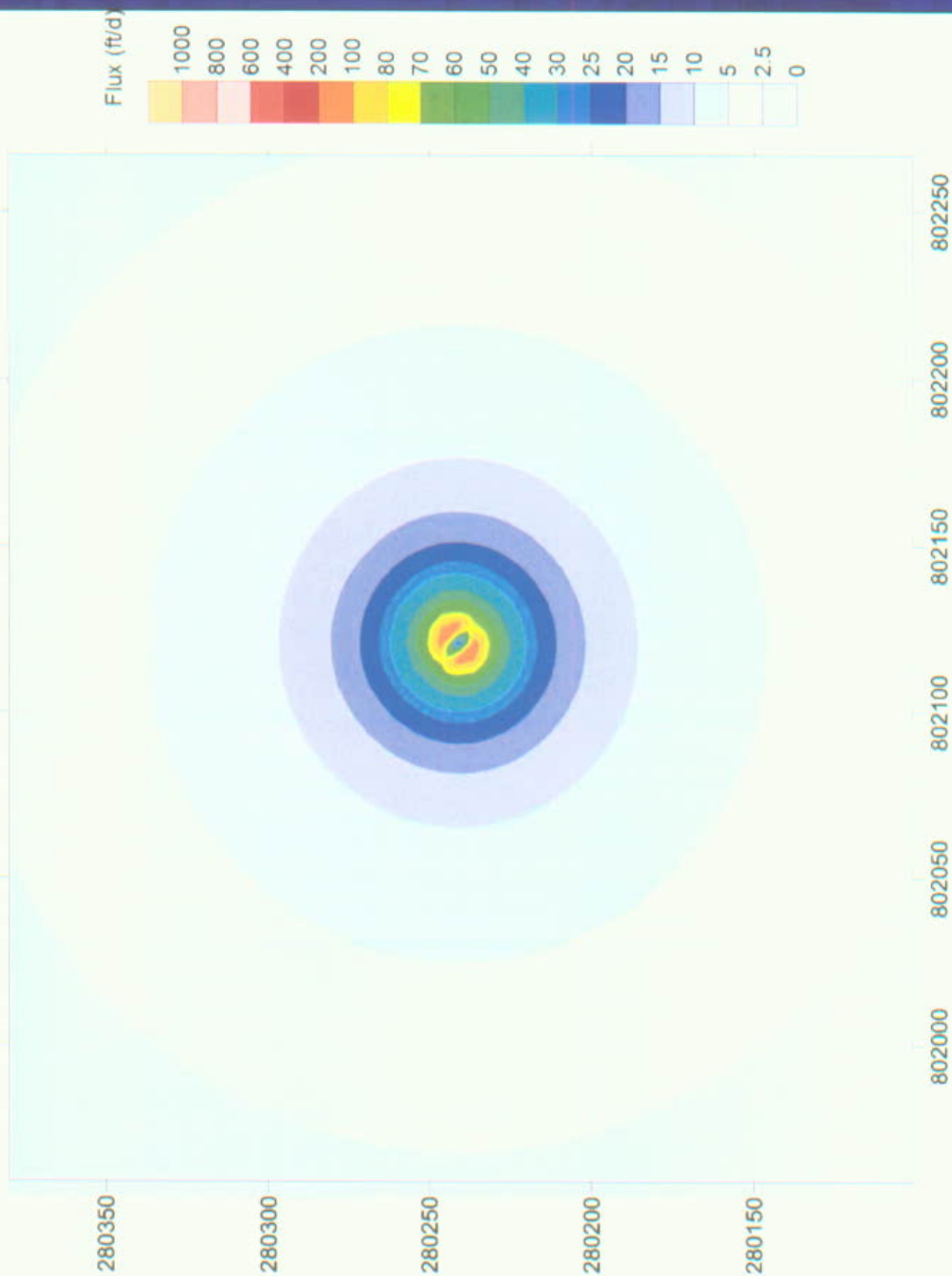
Layout 20 Version 1 - Flux at 27 ft depth



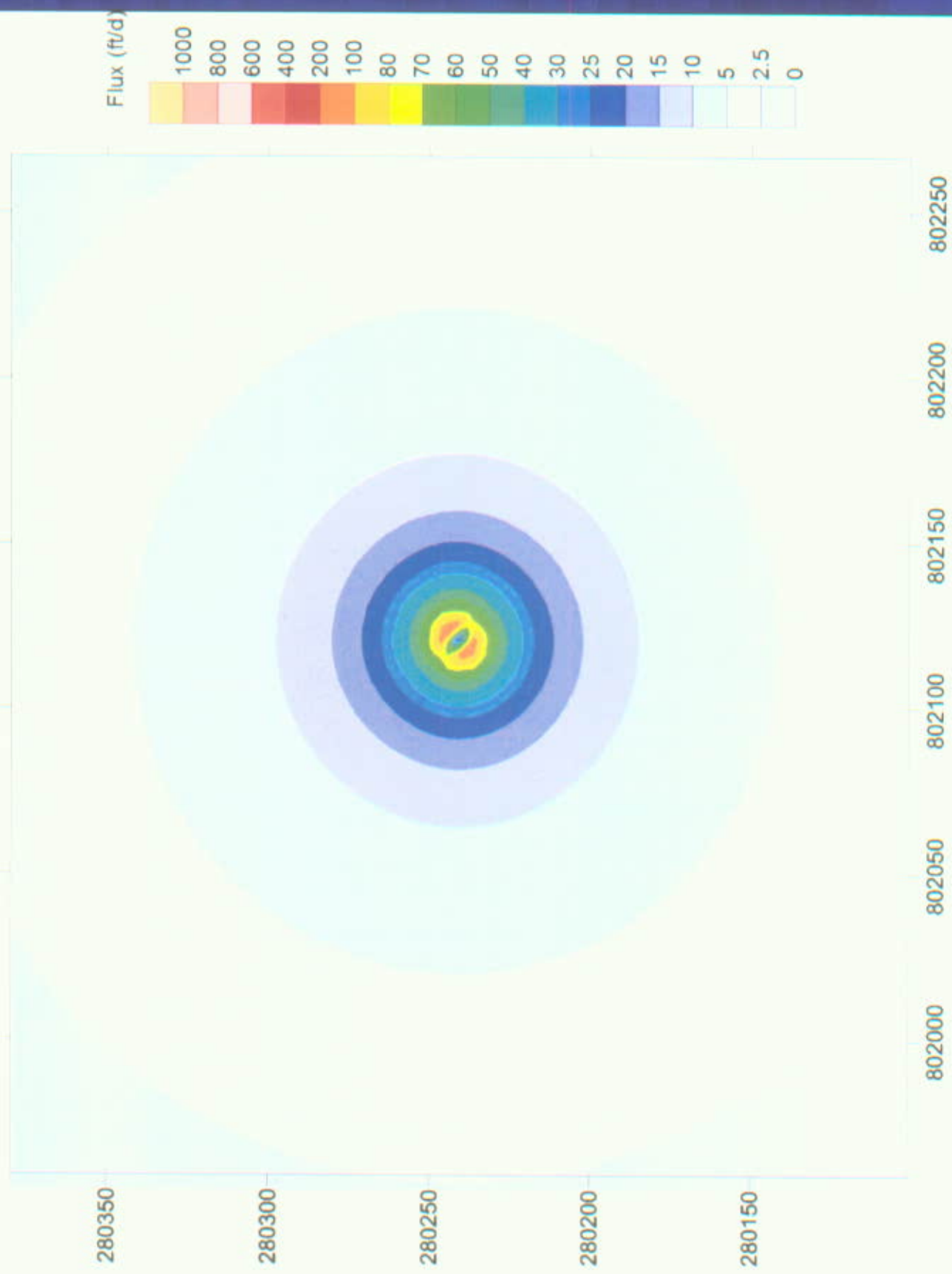
Layout 20 Version 1 - Flux at 31.5 ft depth



Layout 20 Version 1 - Flux at 36.5 ft depth



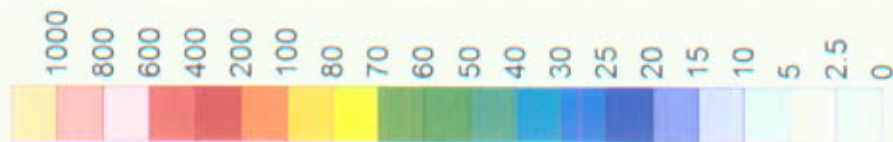
Layout 20 Version 1 - Flux at 41.5 ft depth



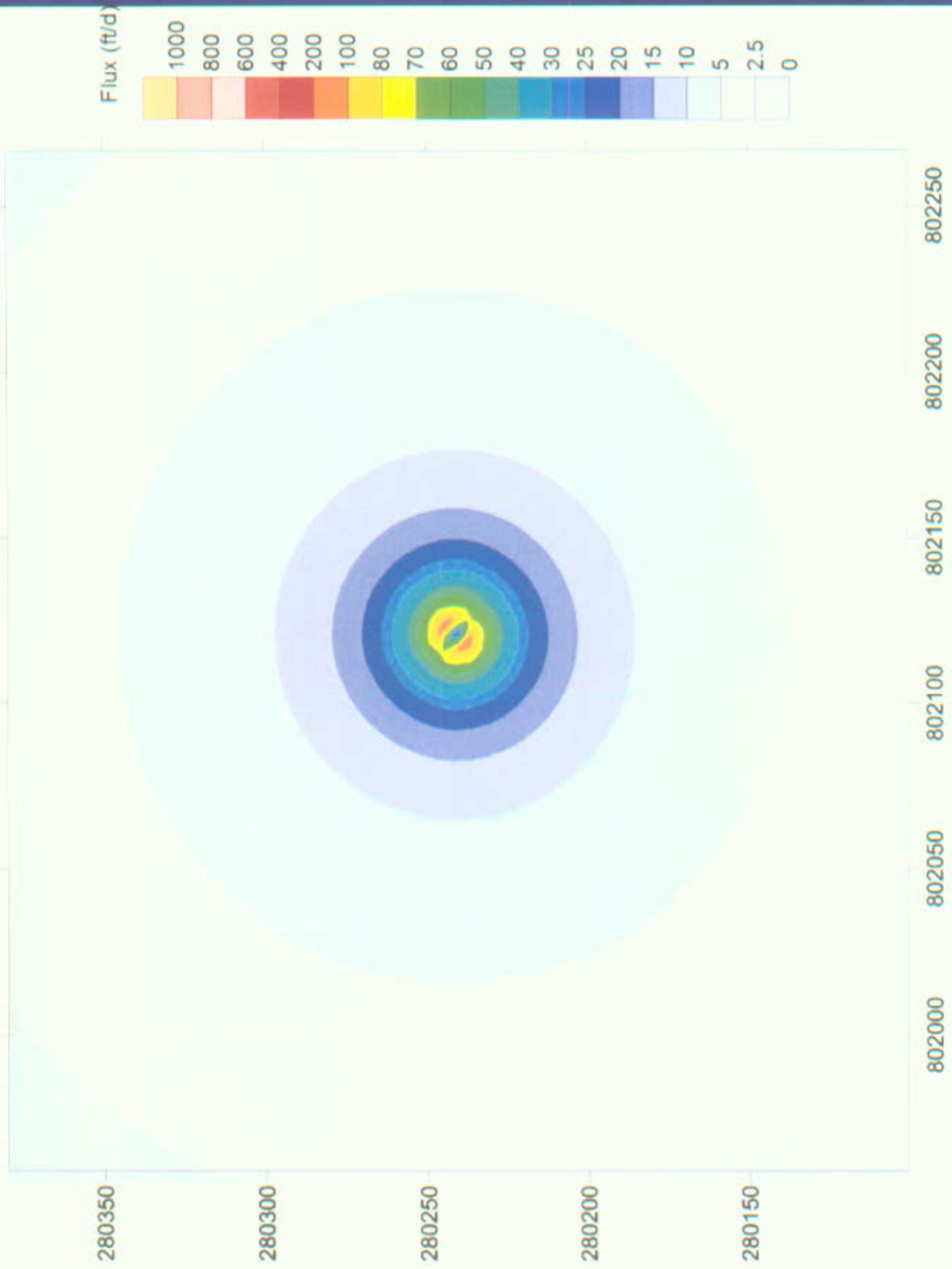
889 873

Layout 20 Version 1 - Flux at 46.5 ft depth

Flux (ft/d)

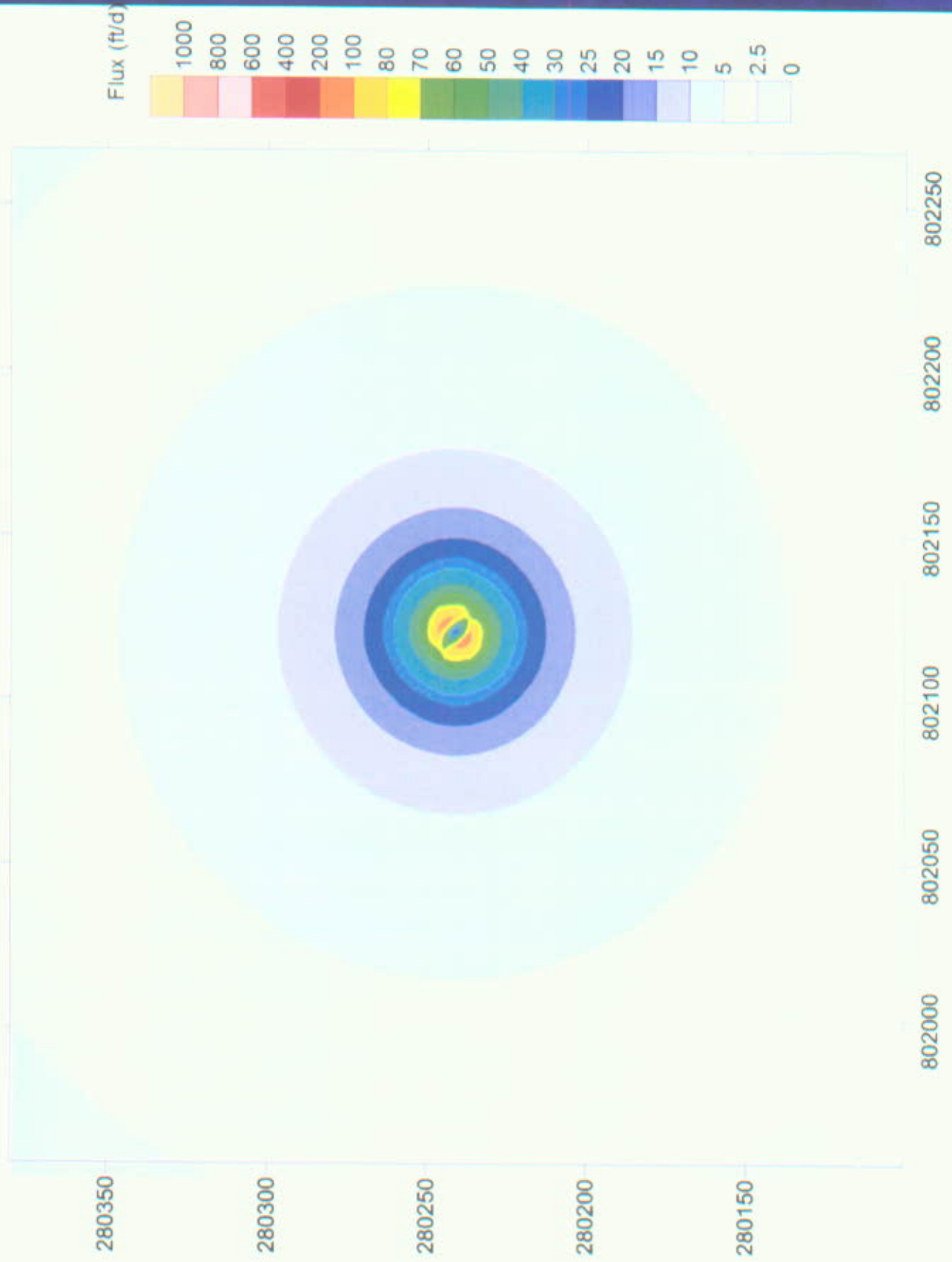


Layout 20 Version 1 - Flux at 51.5 ft depth

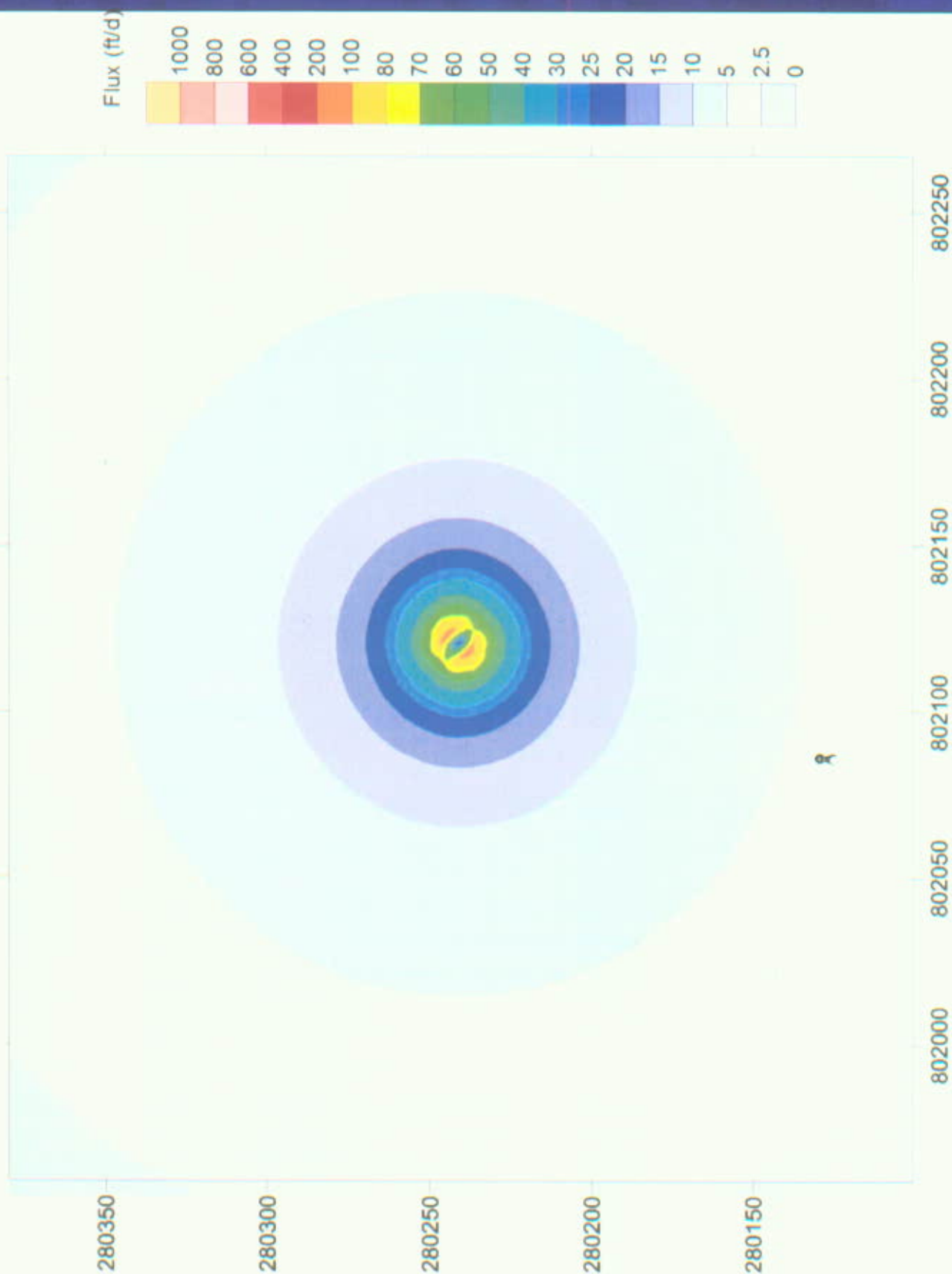


889 875

Layout 20 Version 1 - Flux at 57 ft depth

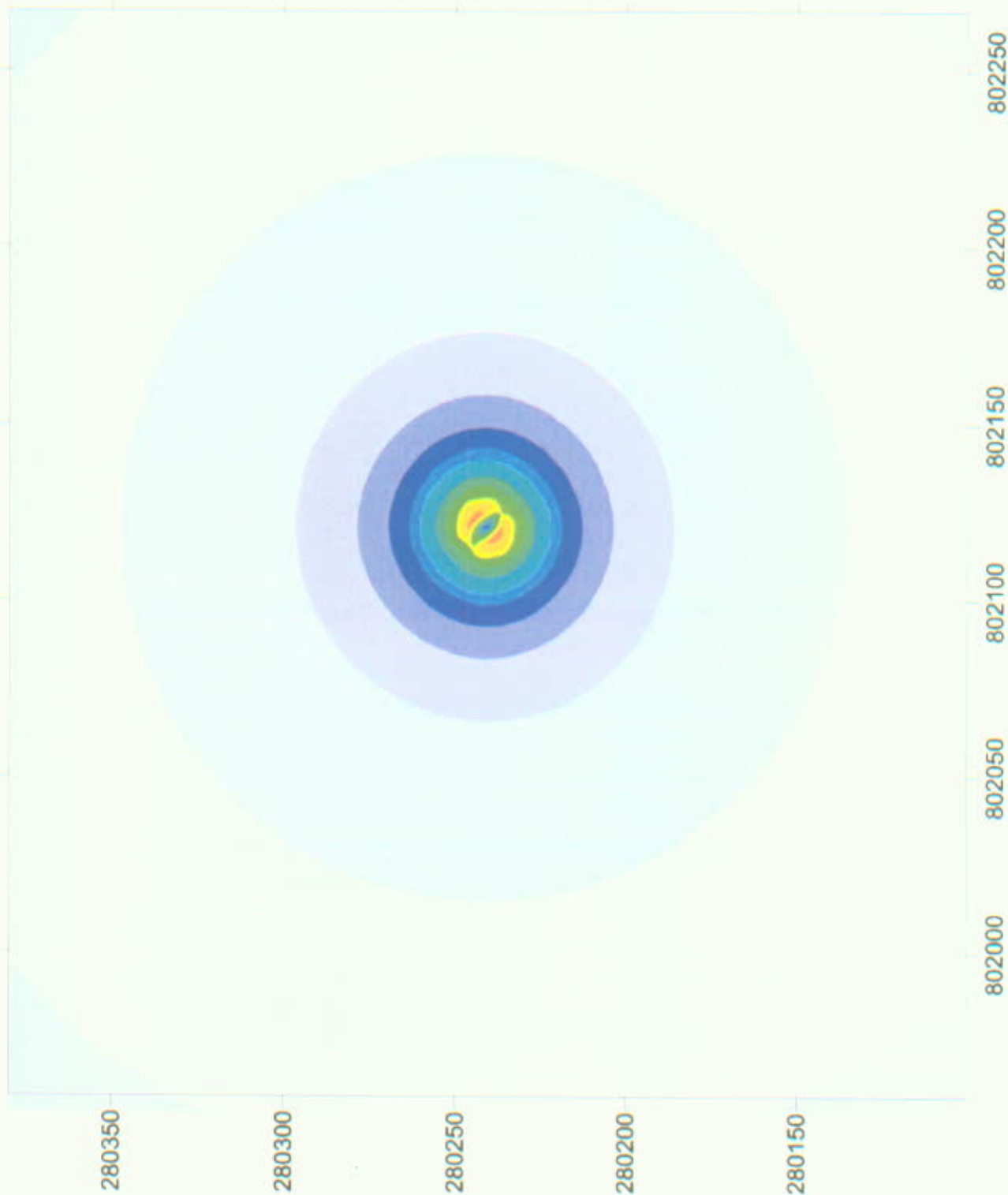


Layout 20 Version 1 - Flux at 62.5 ft depth

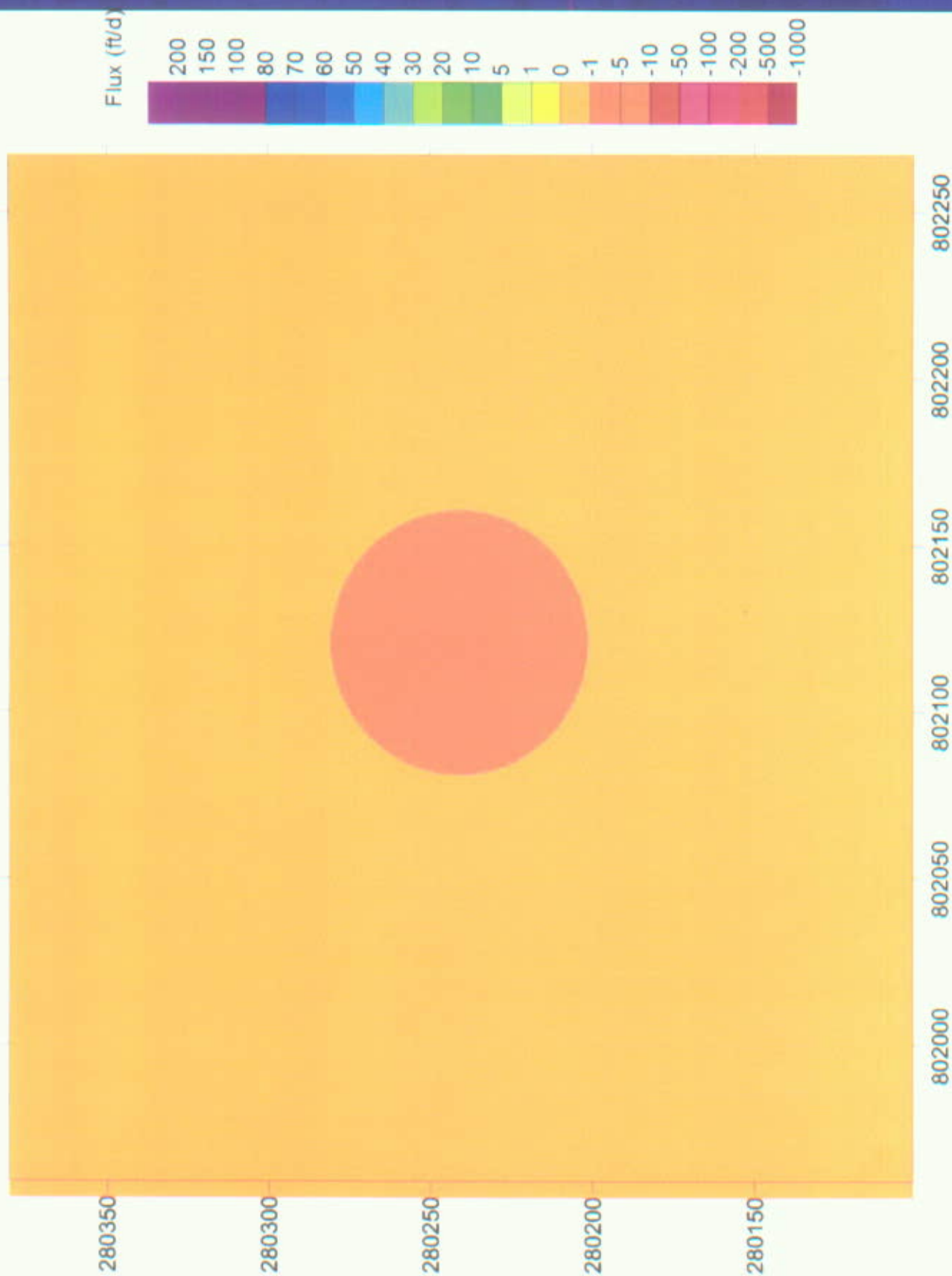


889 877

Flux (ft/d)



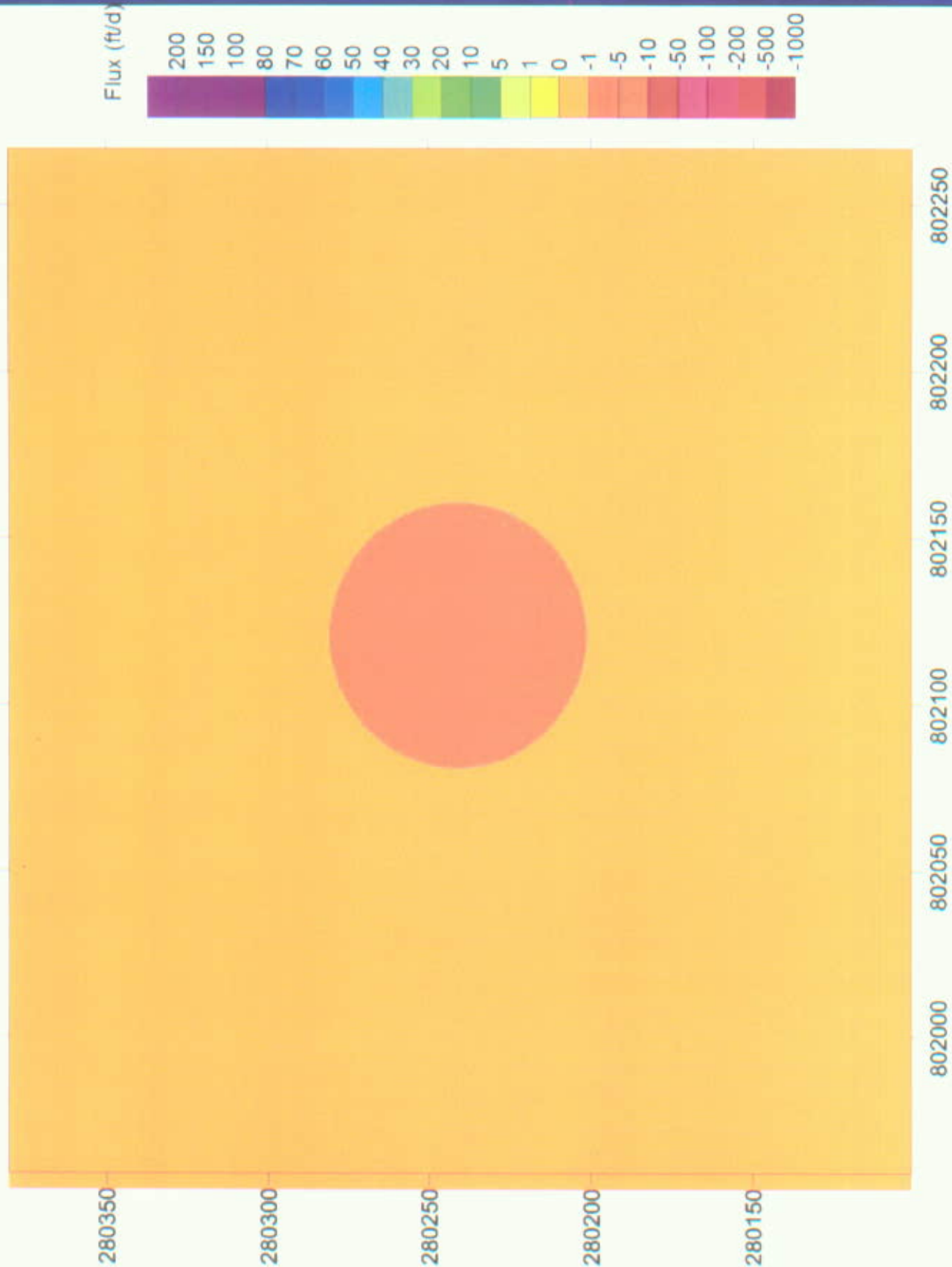
Layout 20 Version 1 -Vertical Flux at 0.5 ft depth (positive upwards)



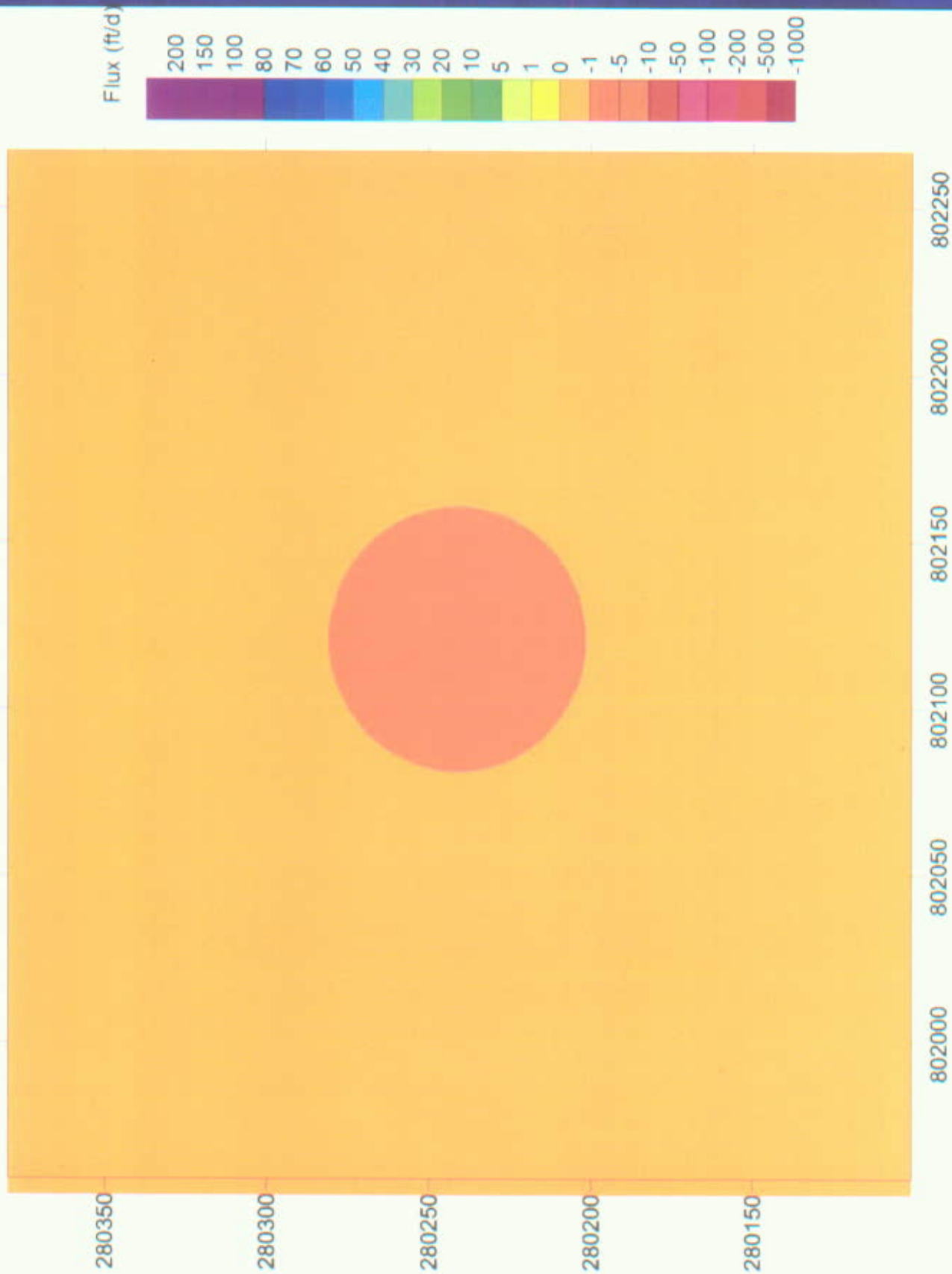
Layout 20 Version 1 -Vertical Flux at 2 ft depth (positive upwards)



Layout 20 Version 1 - Vertical Flux at 4.5 ft depth (positive upwards)



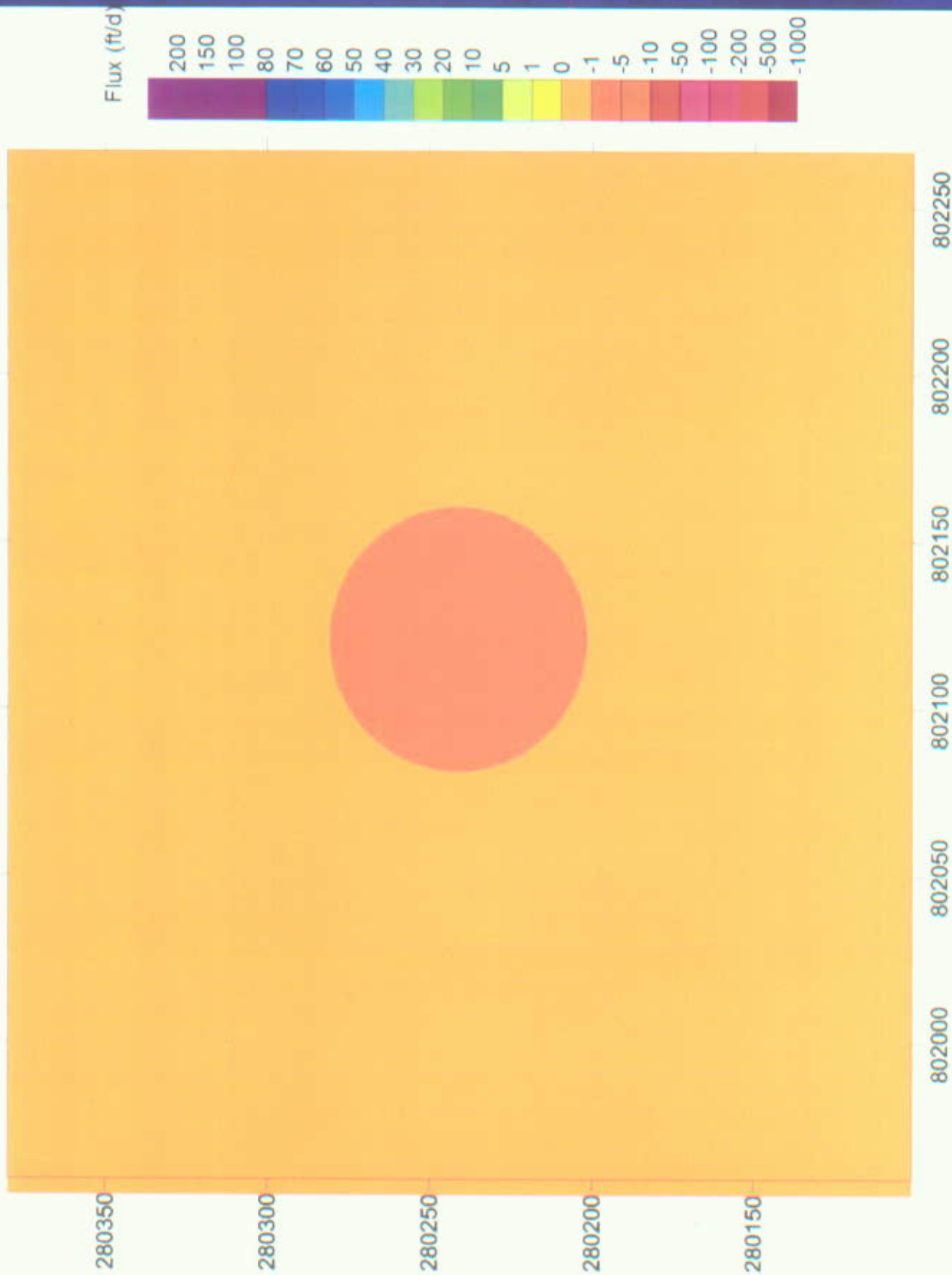
Layout 20 Version 1 -Vertical Flux at 8 ft depth (positive upwards)



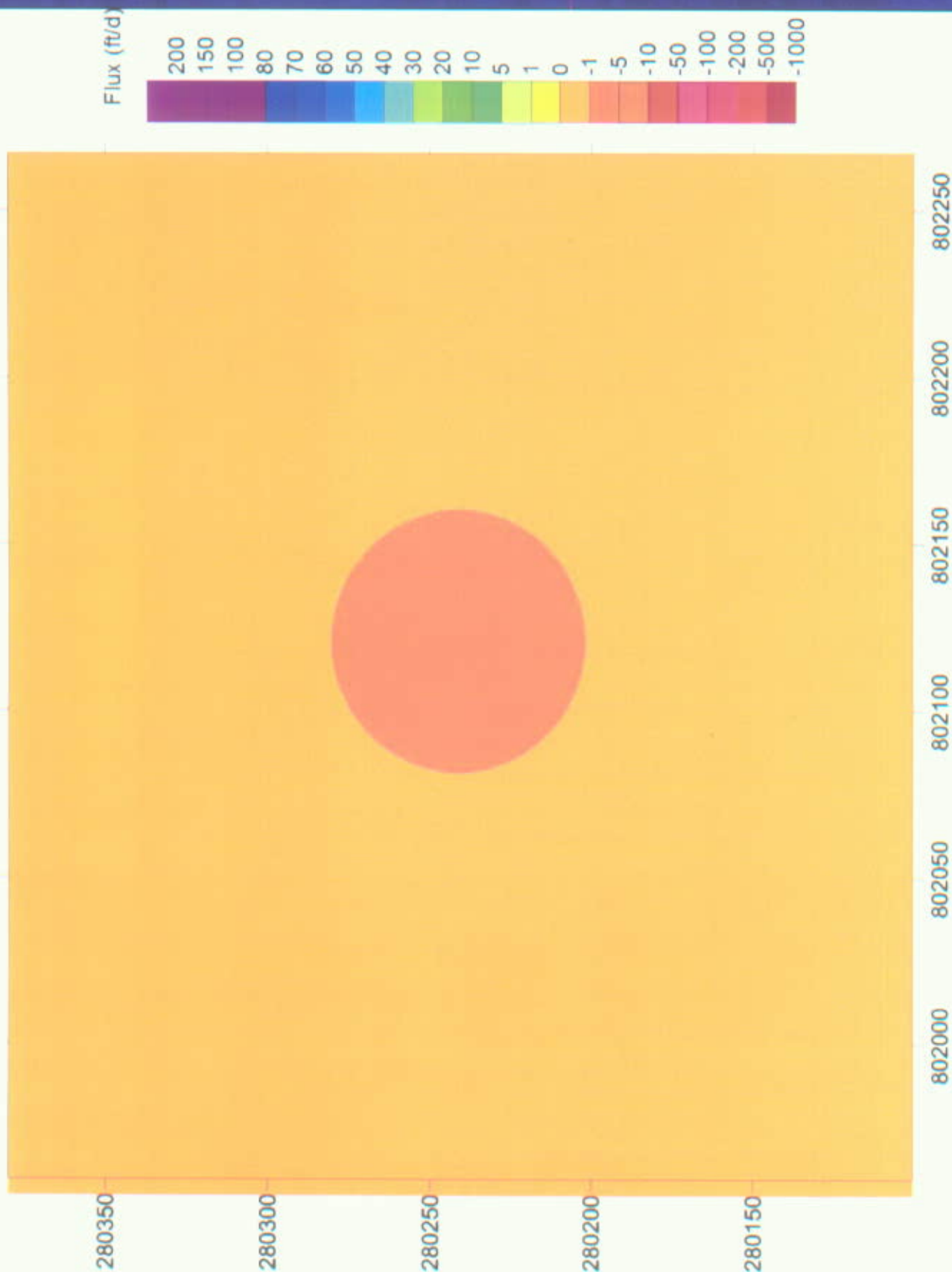
Layout 20 Version 1 -Vertical Flux at 12.5 ft depth (positive upwards)



Layout 20 Version 1 -Vertical Flux at 17.5 ft depth (positive upwards)



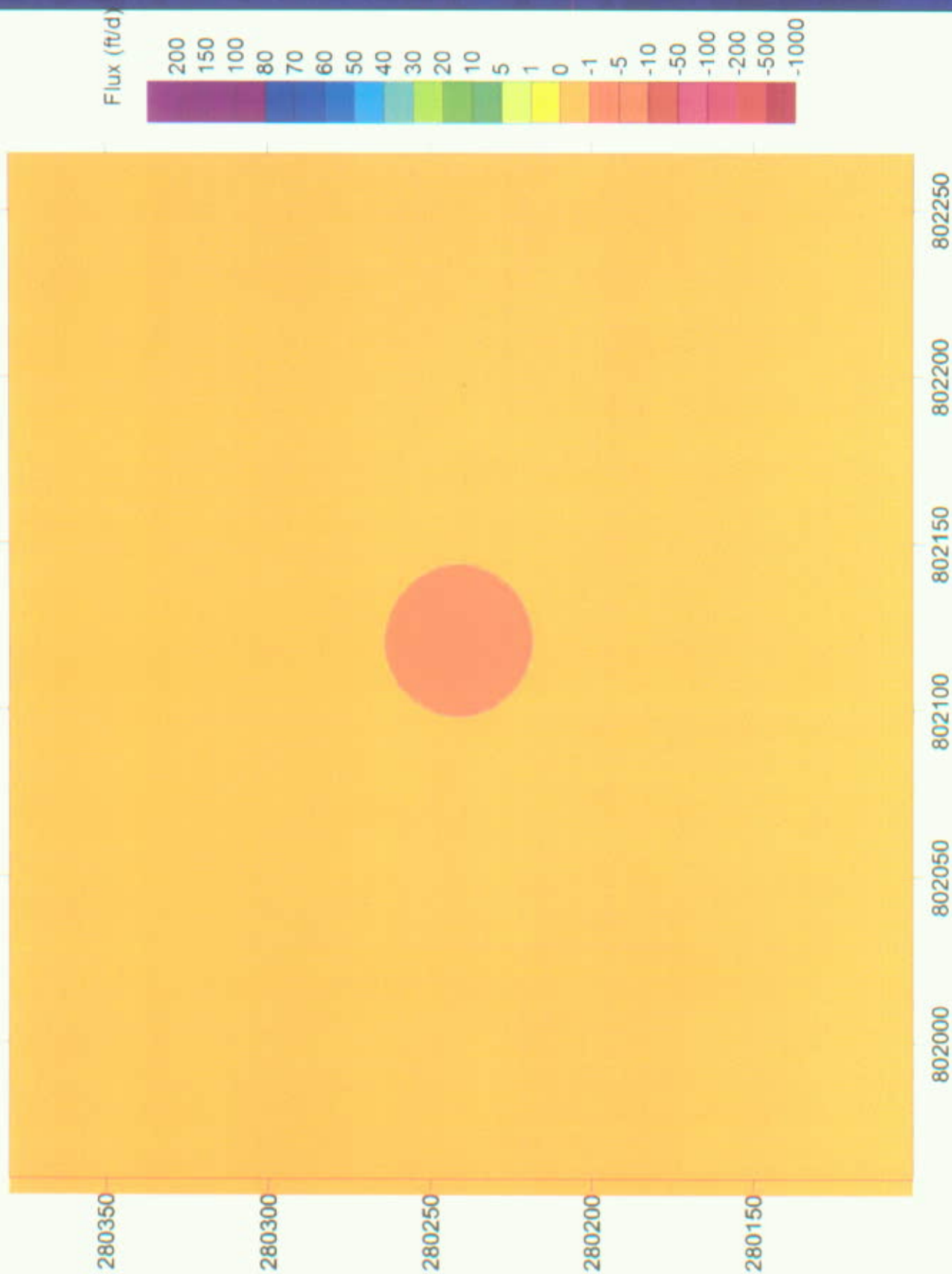
Layout 20 Version 1 -Vertical Flux at 22.5 ft depth (positive upwards)



Layout 20 Version 1 -Vertical Flux at 27 ft depth (positive upwards)



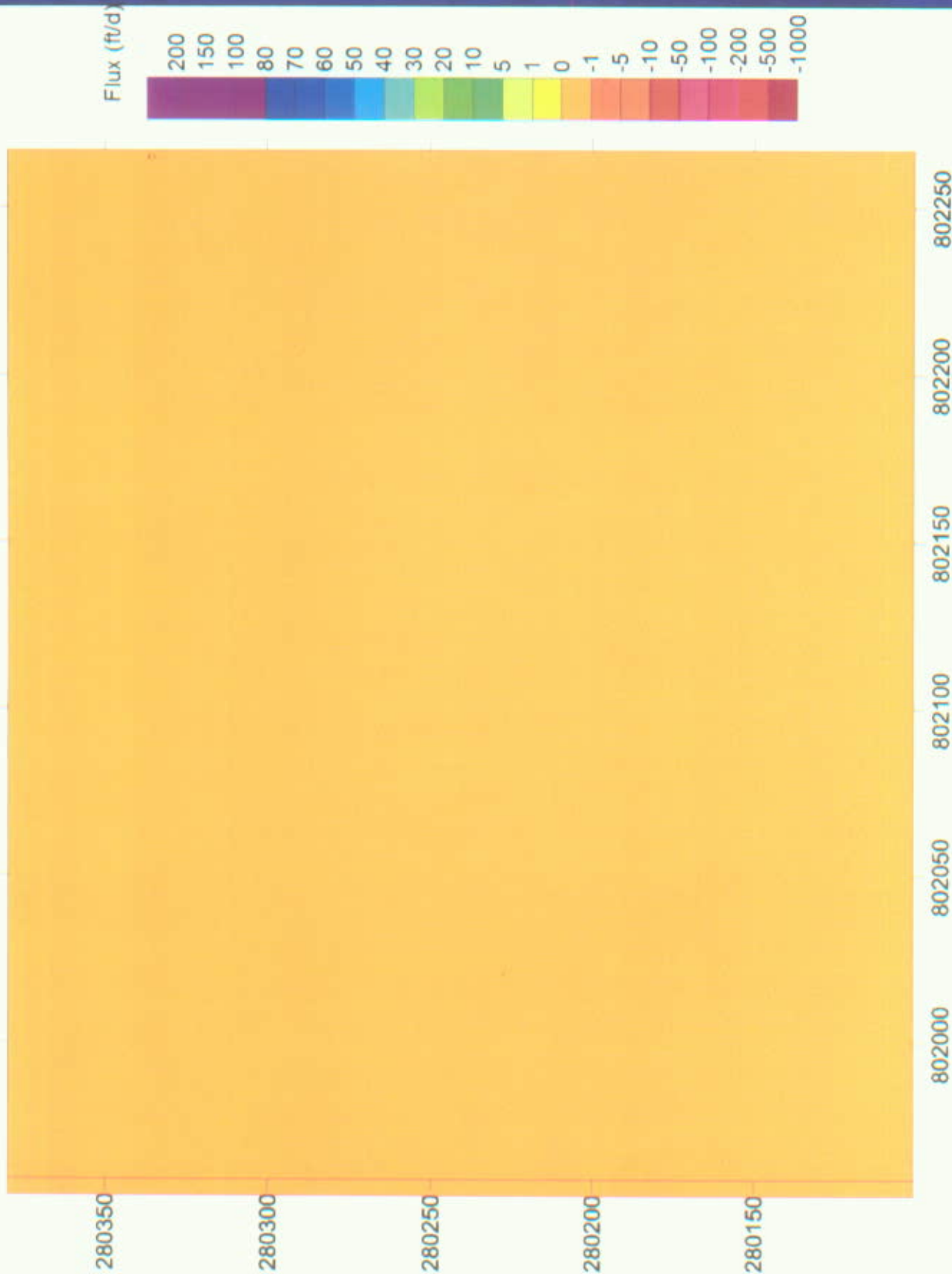
Layout 20 Version 1 - Vertical Flux at 31.5 ft depth (positive upwards)



Layout 20 Version 1 -Vertical Flux at 36.5 ft depth (positive upwards)



Layout 20 Version 1 -Vertical Flux at 41.5 ft depth (positive upwards)



Layout 20 Version 1 -Vertical Flux at 46.5 ft depth (positive upwards)



Layout 20 Version 1 -Vertical Flux at 51.5 ft depth (positive upwards)



Layout 20 Version 1 -Vertical Flux at 57 ft depth (positive upwards)



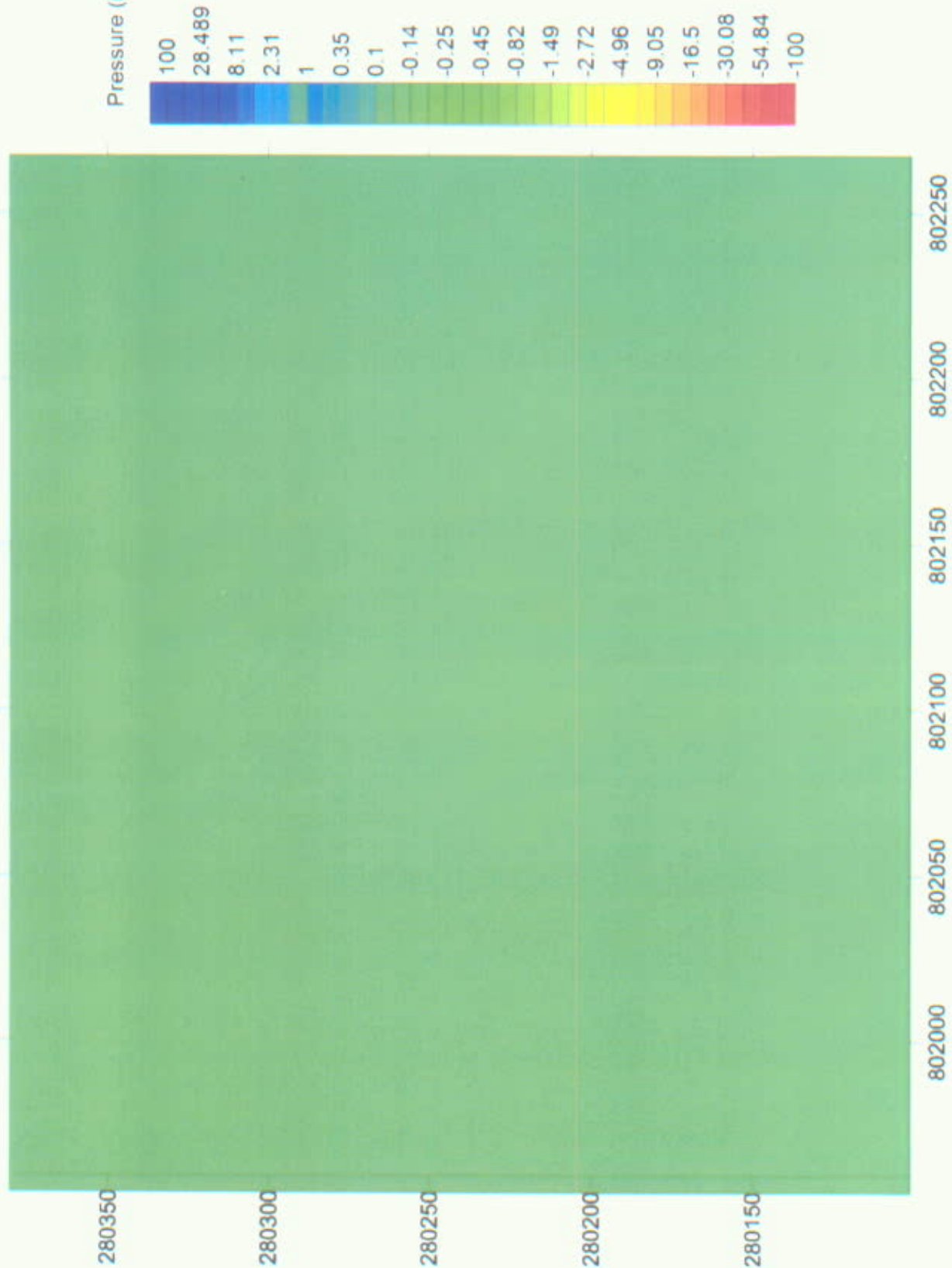
Layout 20 Version 1 - Vertical Flux at 62.5 ft depth (positive upwards)



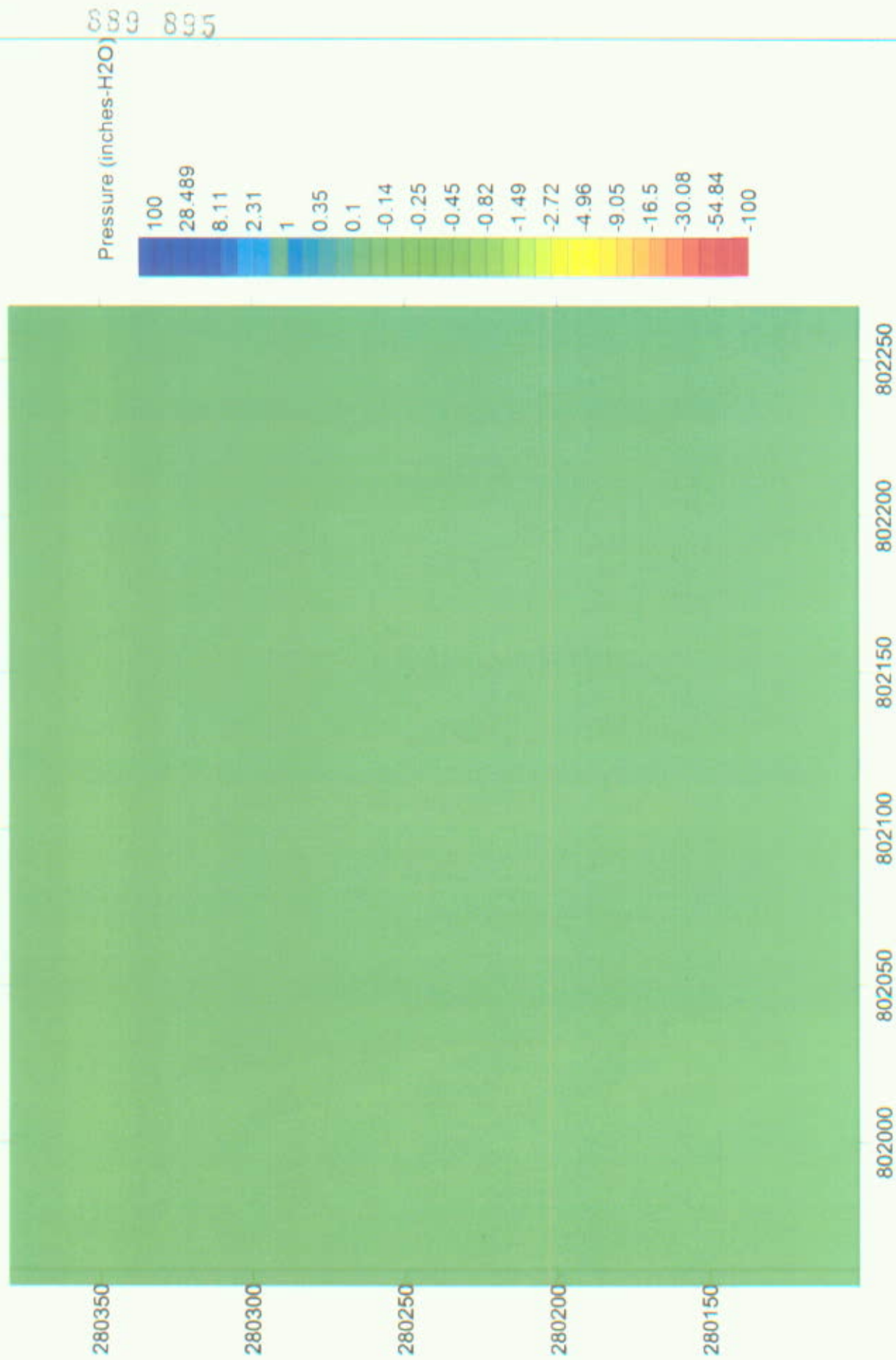
Layout 20 Version 1 -Vertical Flux at 67.5 ft depth (positive upwards)



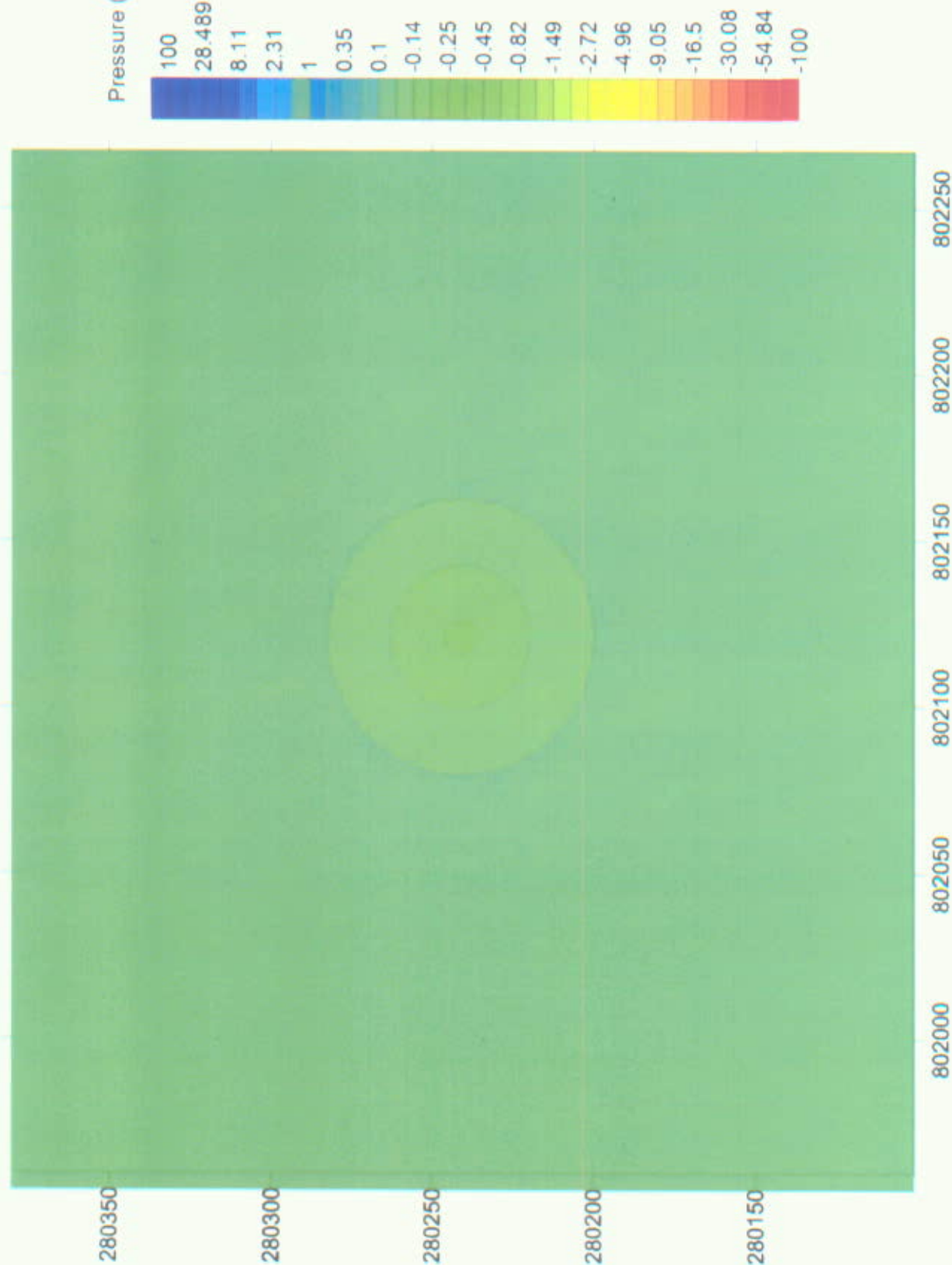
Layout 20 Version 1 - Pressure at 0.5 ft depth



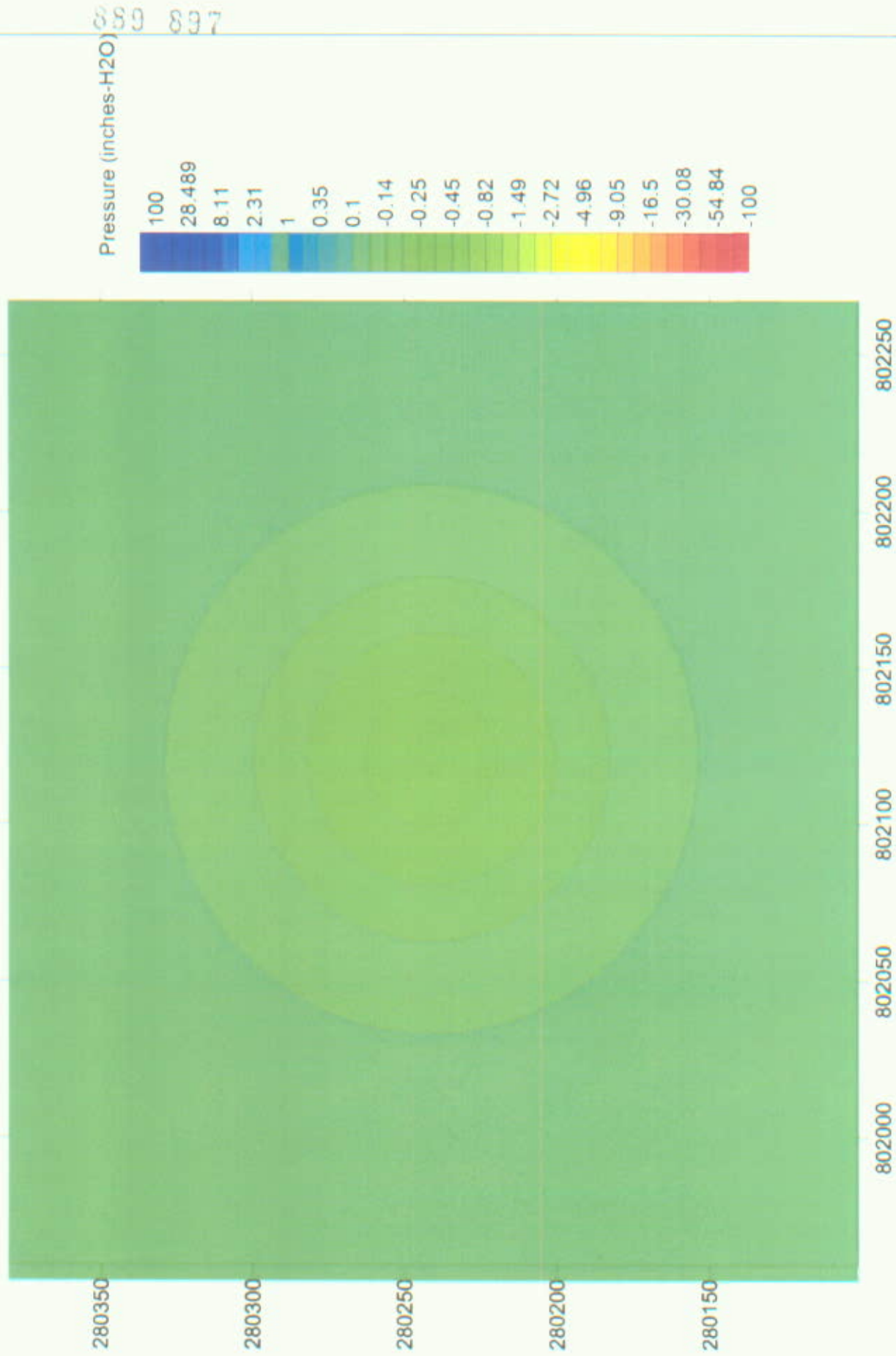
Layout 20 Version 1 - Pressure at 2 ft depth



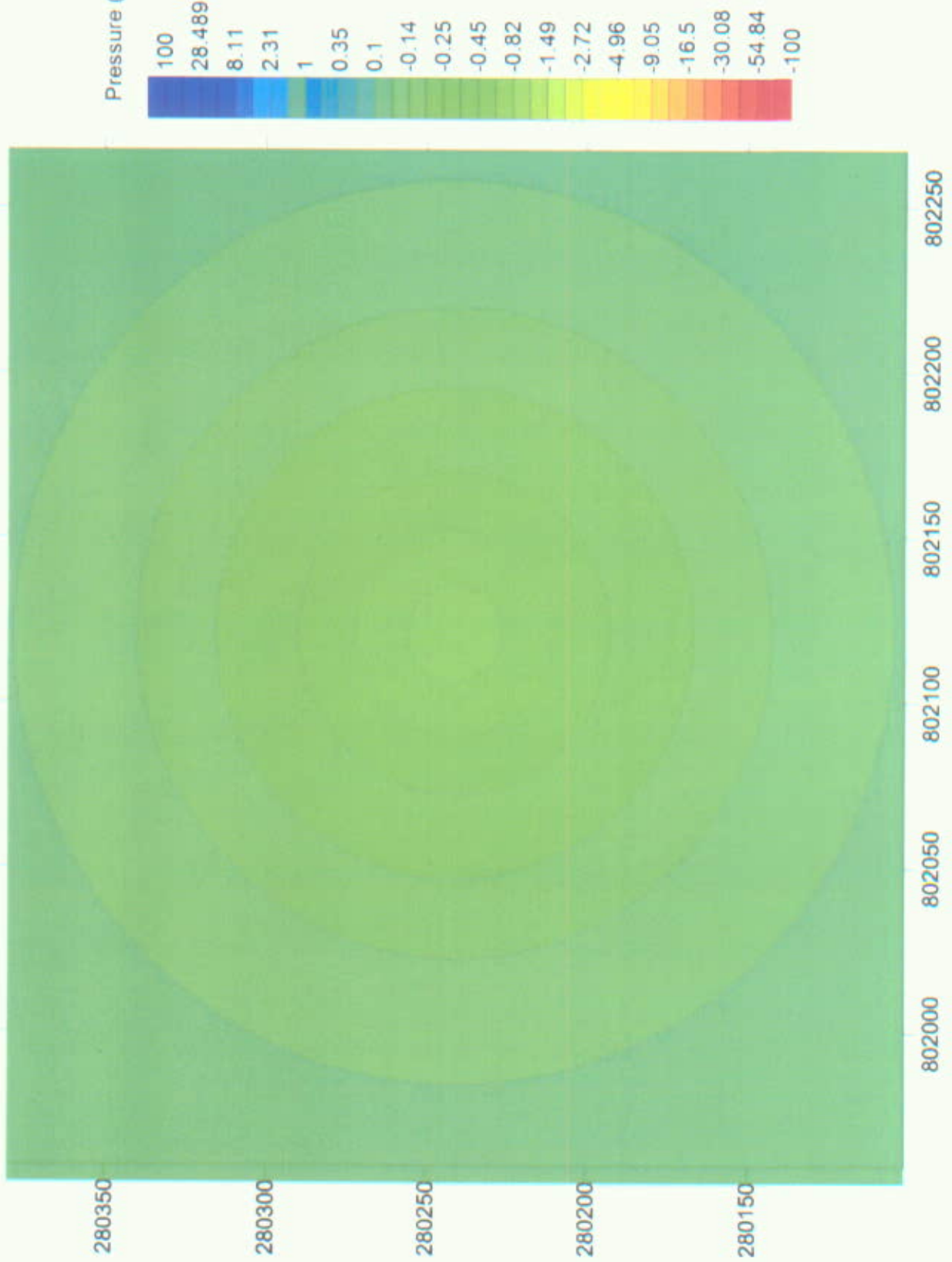
Layout 20 Version 1 - Pressure at 4.5 ft depth



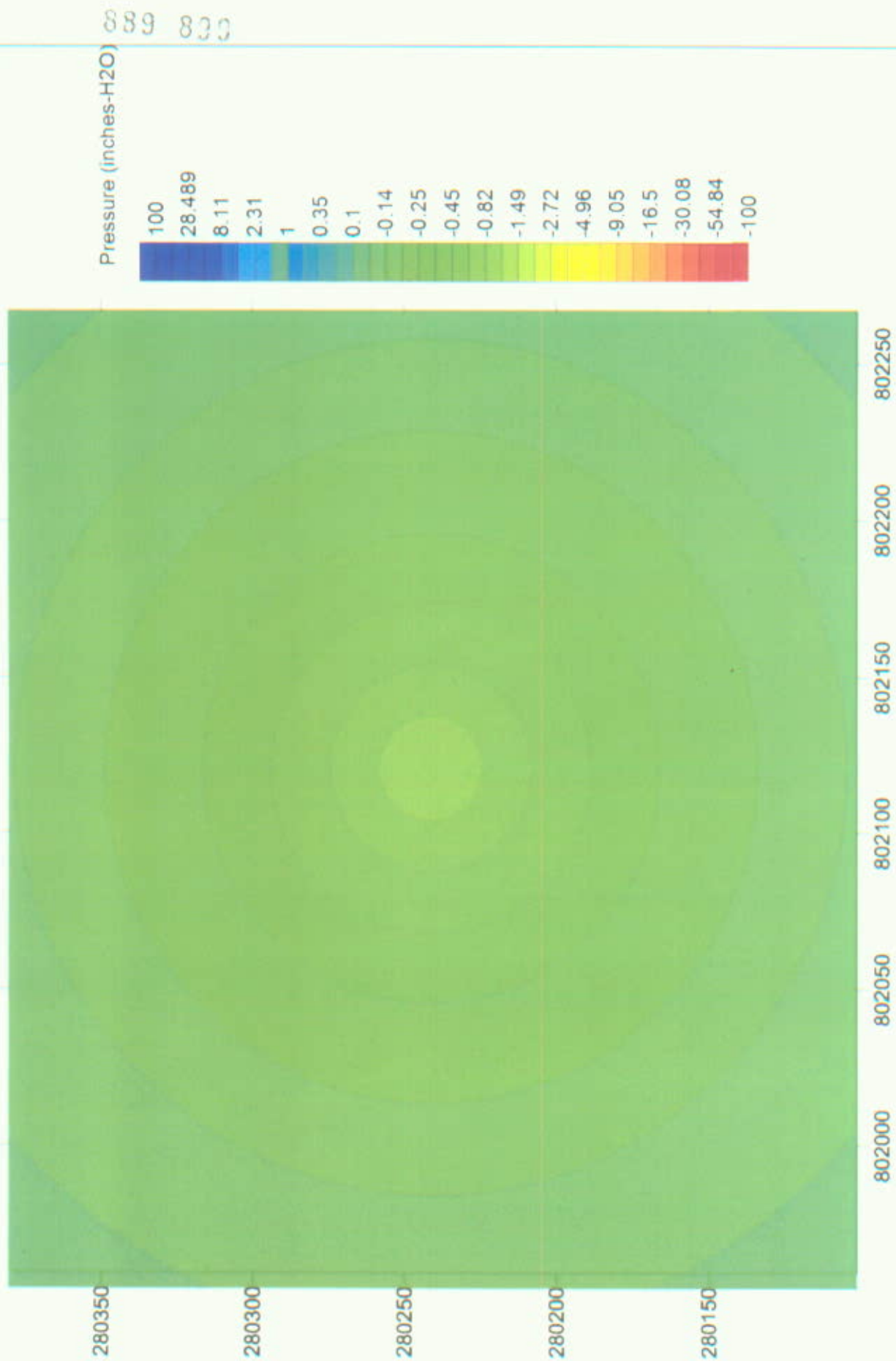
Layout 20 Version 1 - Pressure at 8 ft depth



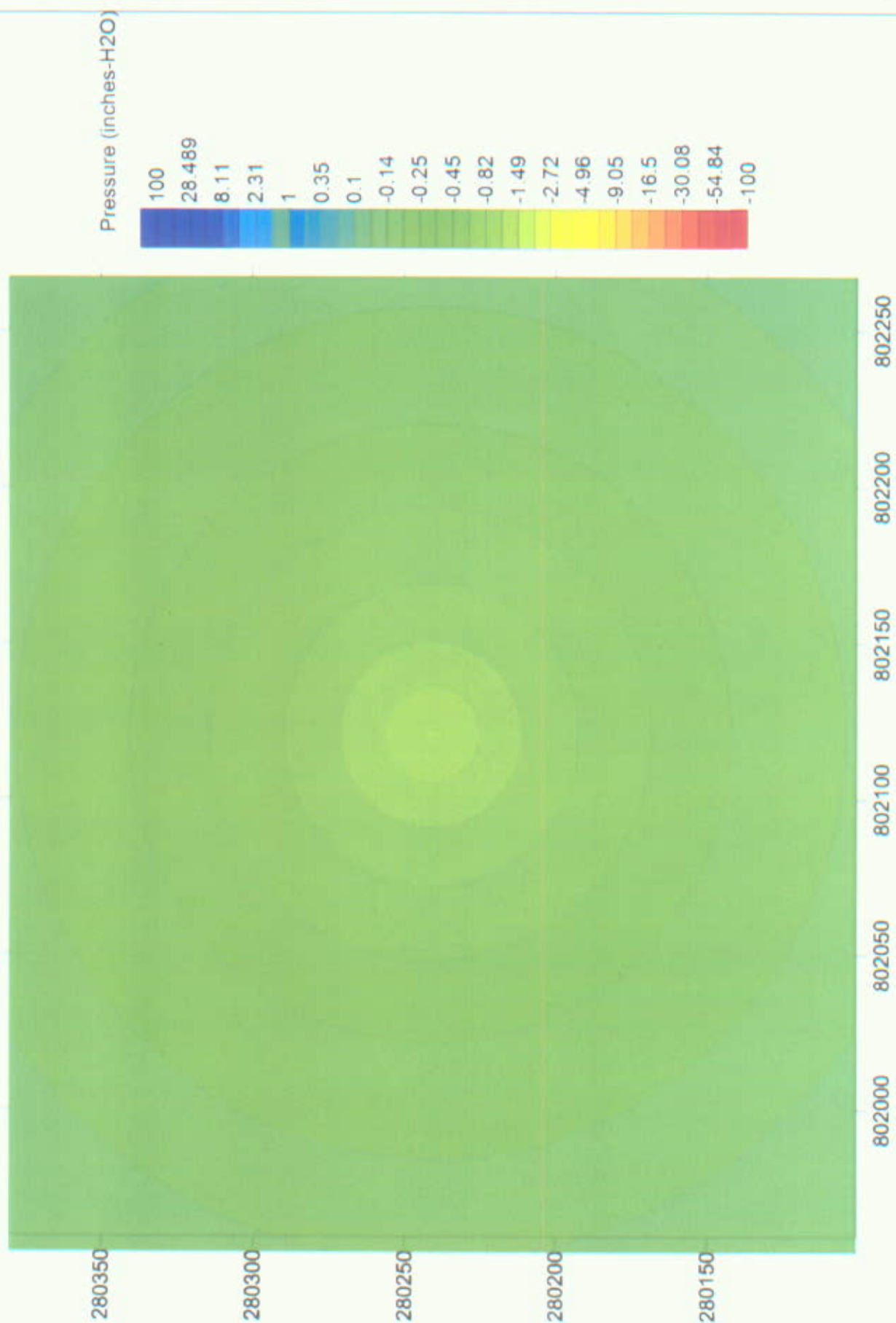
Layout 20 Version 1 - Pressure at 12.5 ft depth



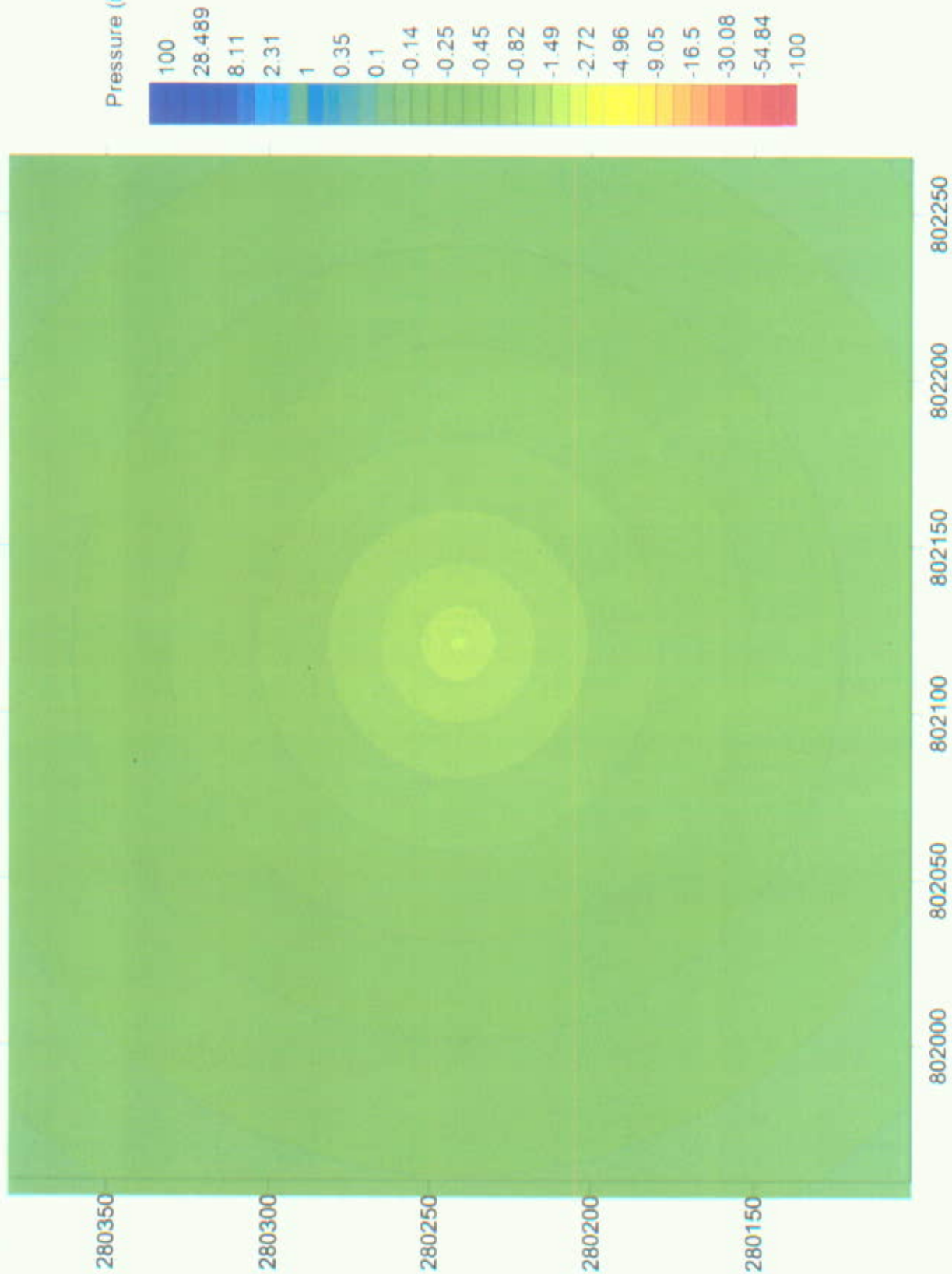
Layout 20 Version 1 - Pressure at 17.5 ft depth



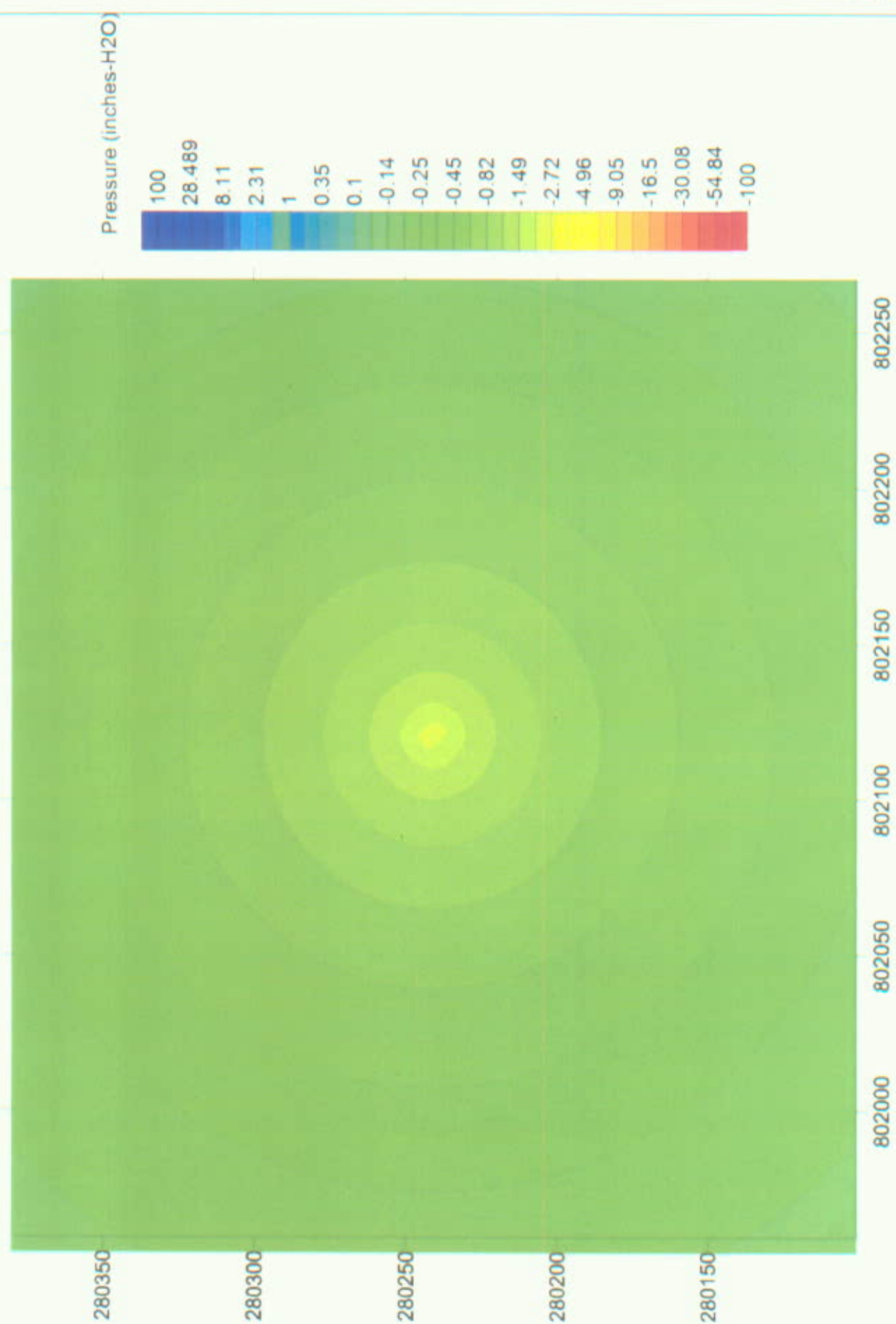
Layout 20 Version 1 - Pressure at 22.5 ft depth



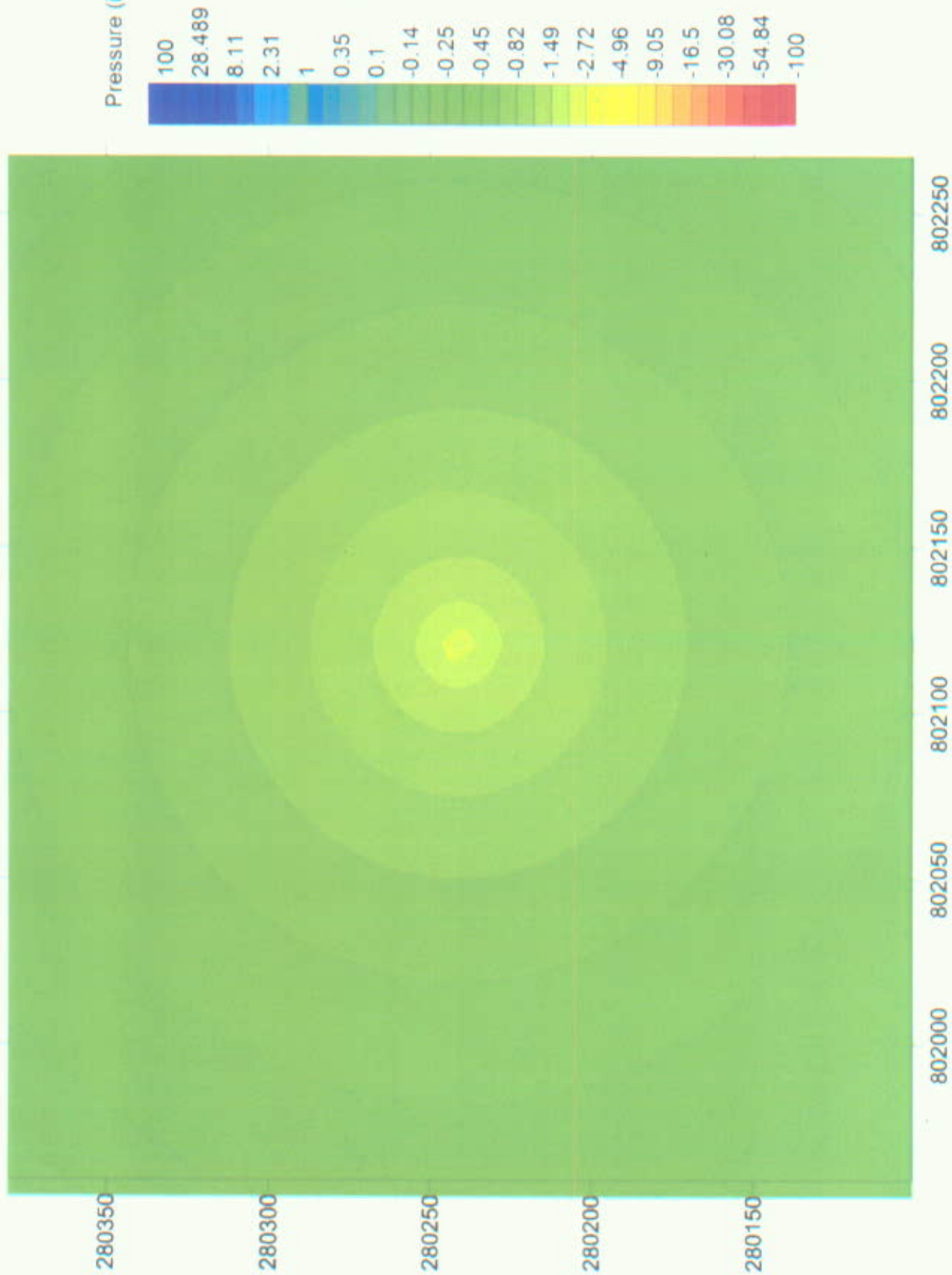
Layout 20 Version 1 - Pressure at 27 ft depth



Layout 20 Version 1 - Pressure at 31.5 ft depth

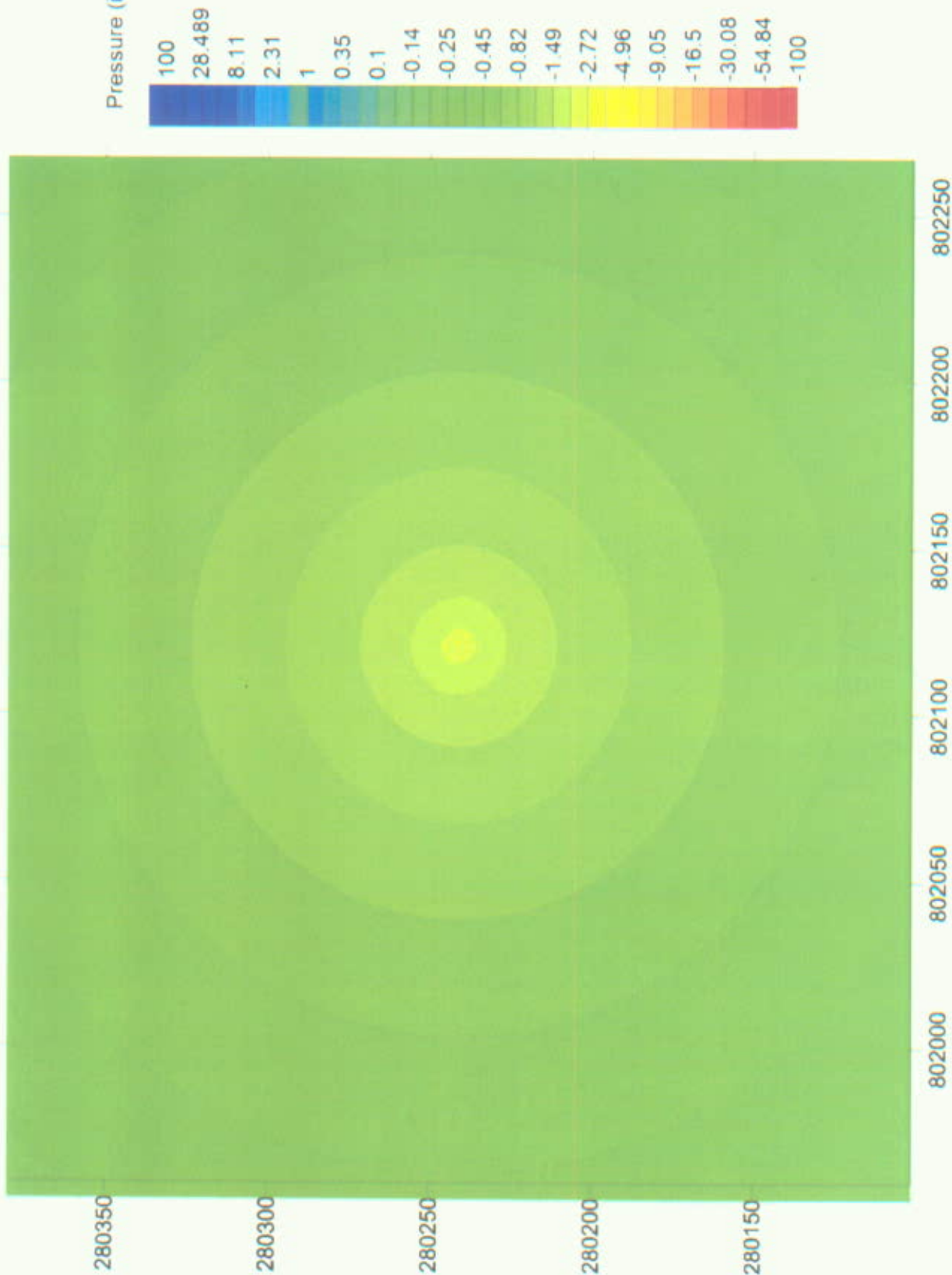


Layout 20 Version 1 - Pressure at 36.5 ft depth

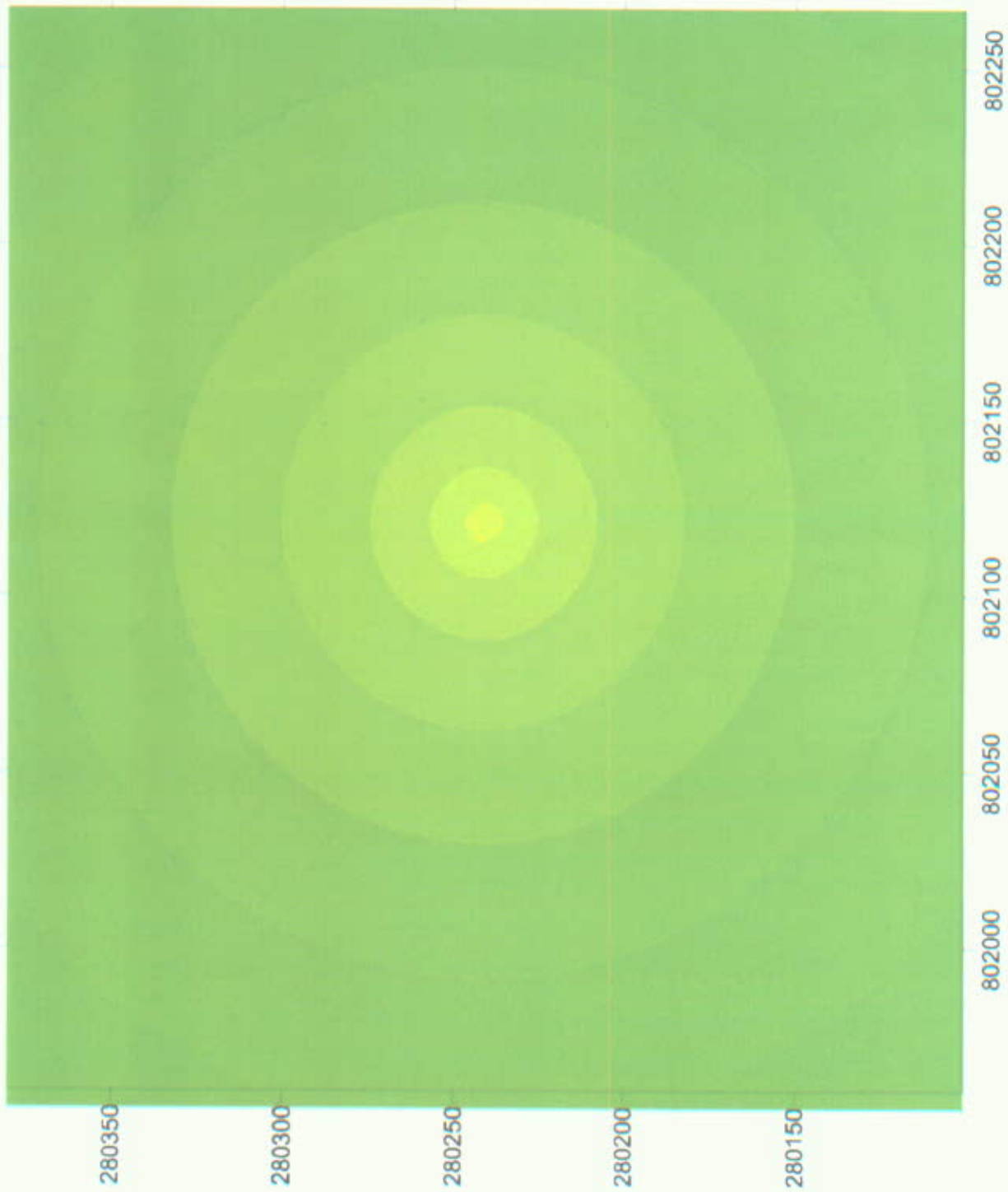


889 903

Layout 20 Version 1 - Pressure at 41.5 ft depth

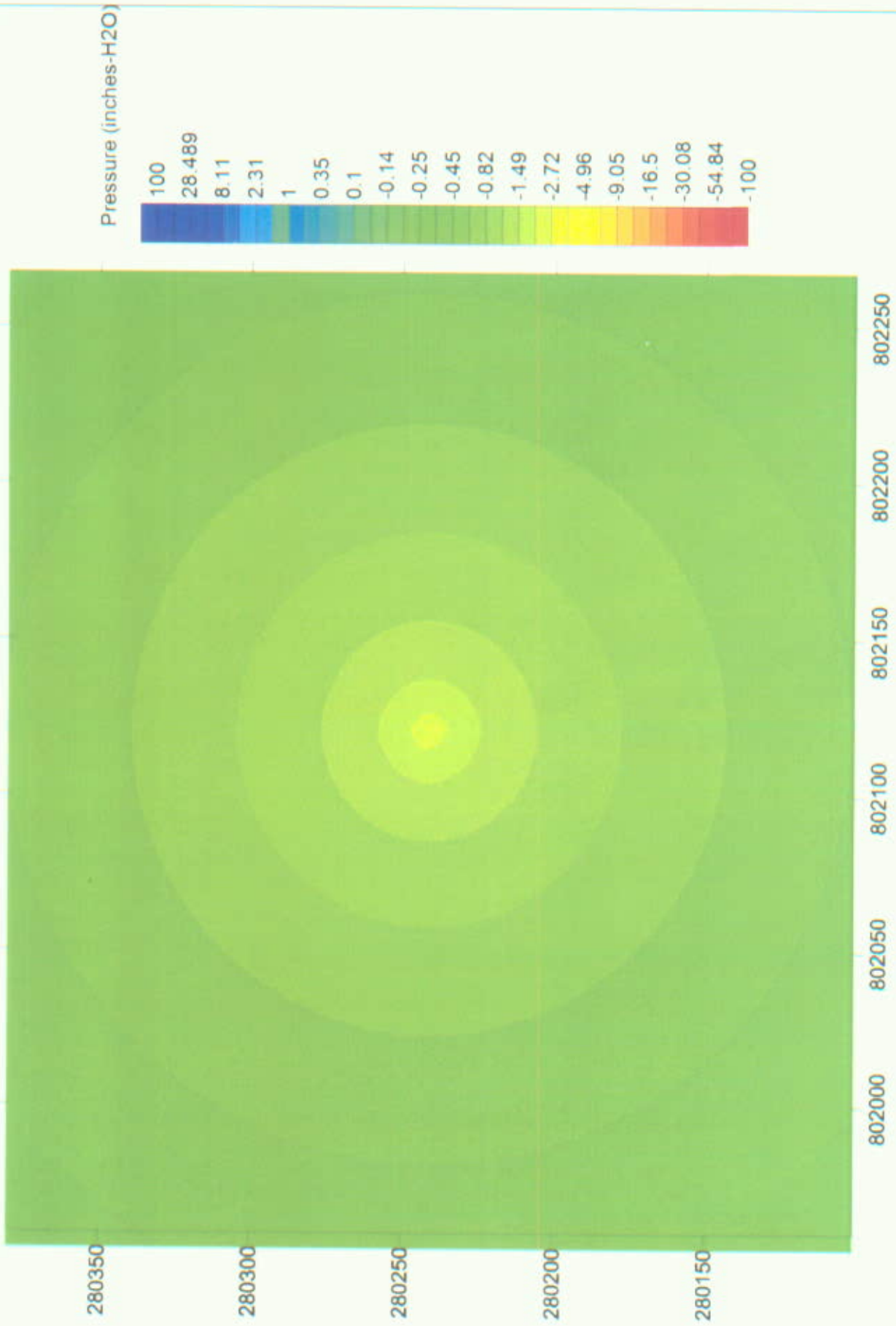


Layout 20 Version 1 - Pressure at 46.5 ft depth

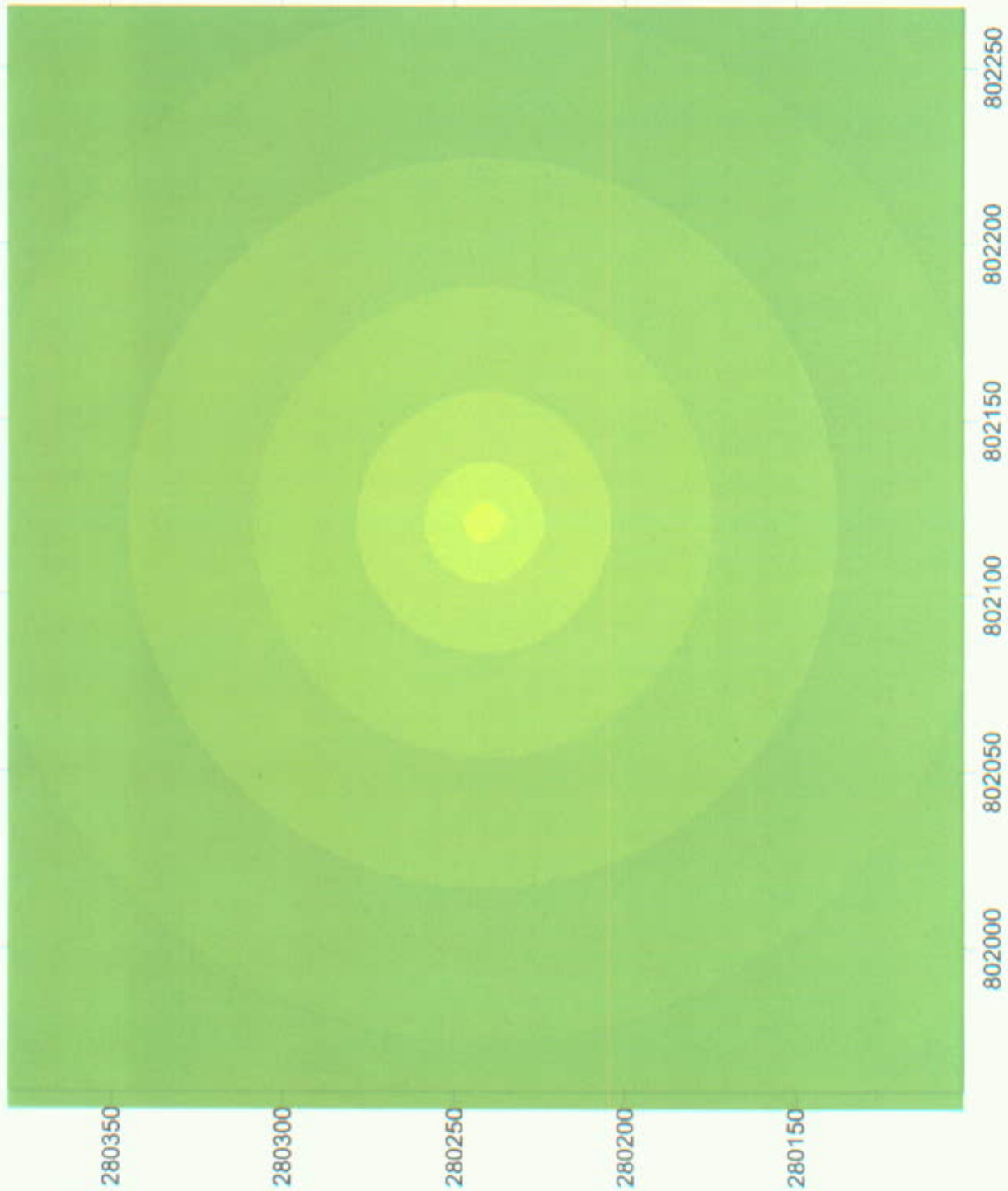


889 905

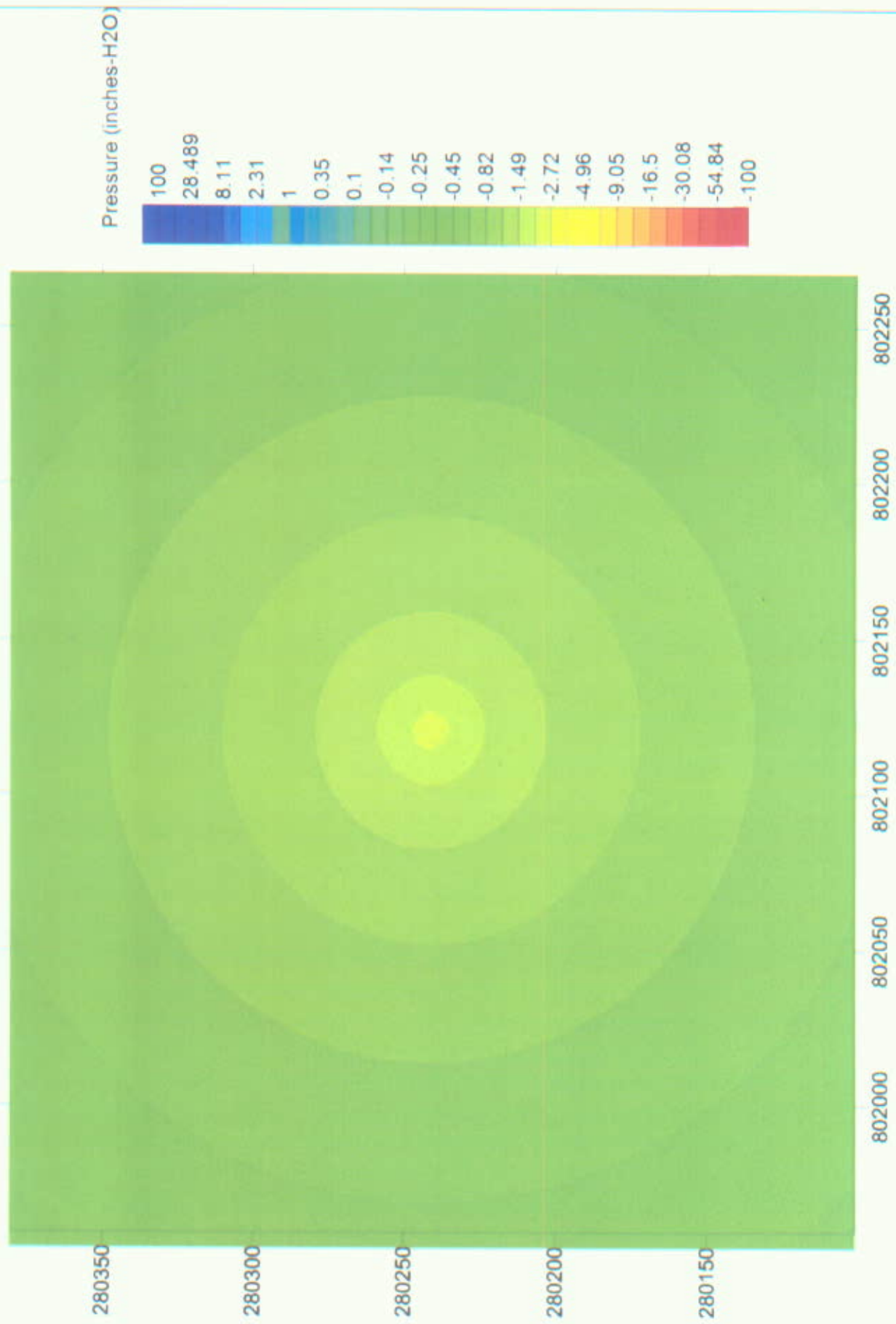
Layout 20 Version 1 - Pressure at 51.5 ft depth



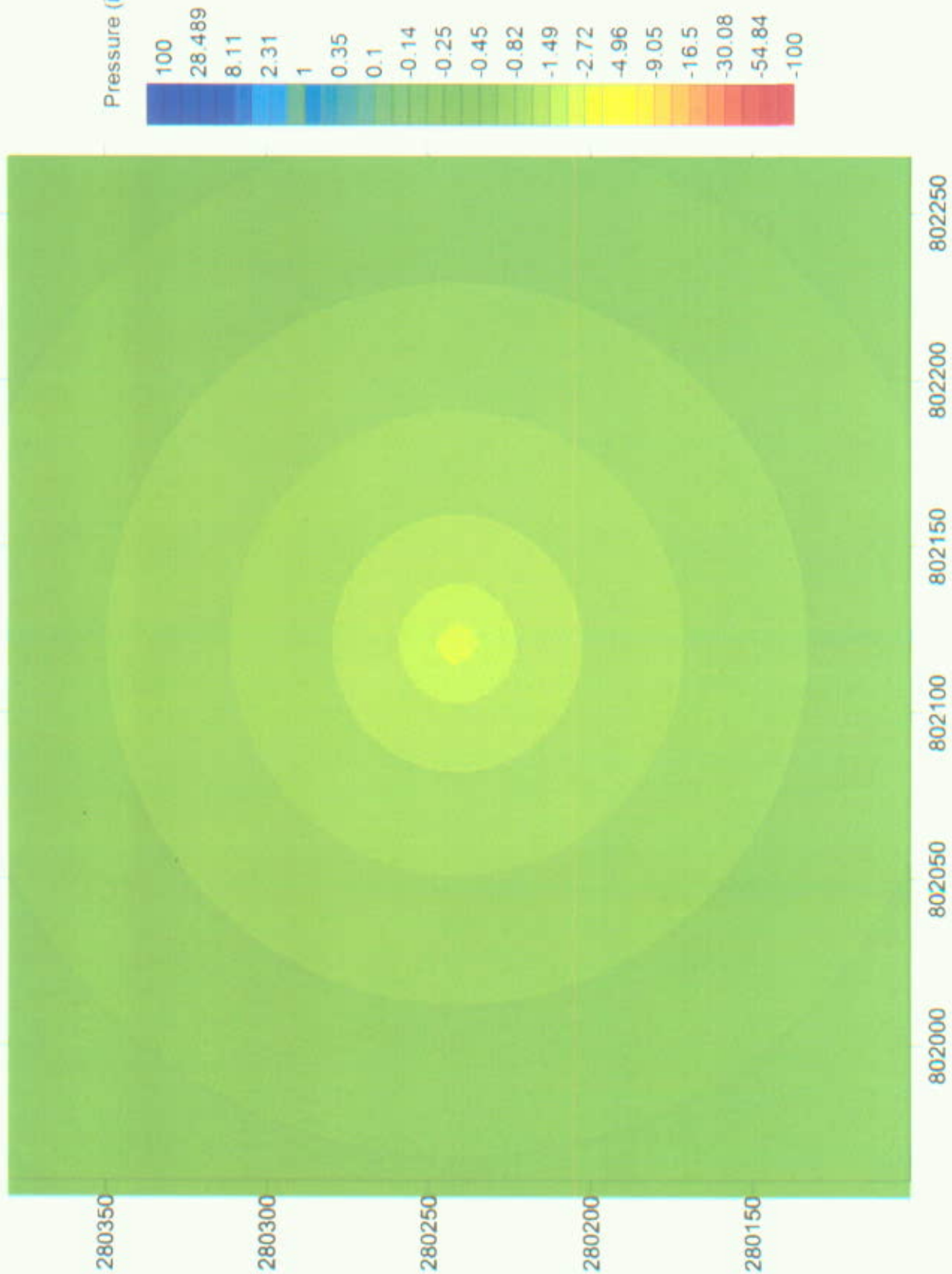
Layout 20 Version 1 - Pressure at 57 ft depth



Layout 20 Version 1 - Pressure at 62.5 ft depth

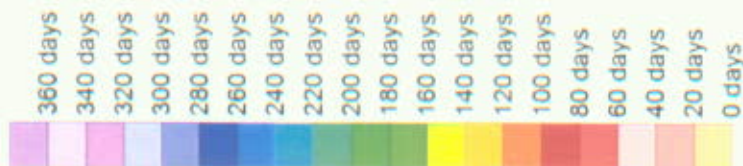
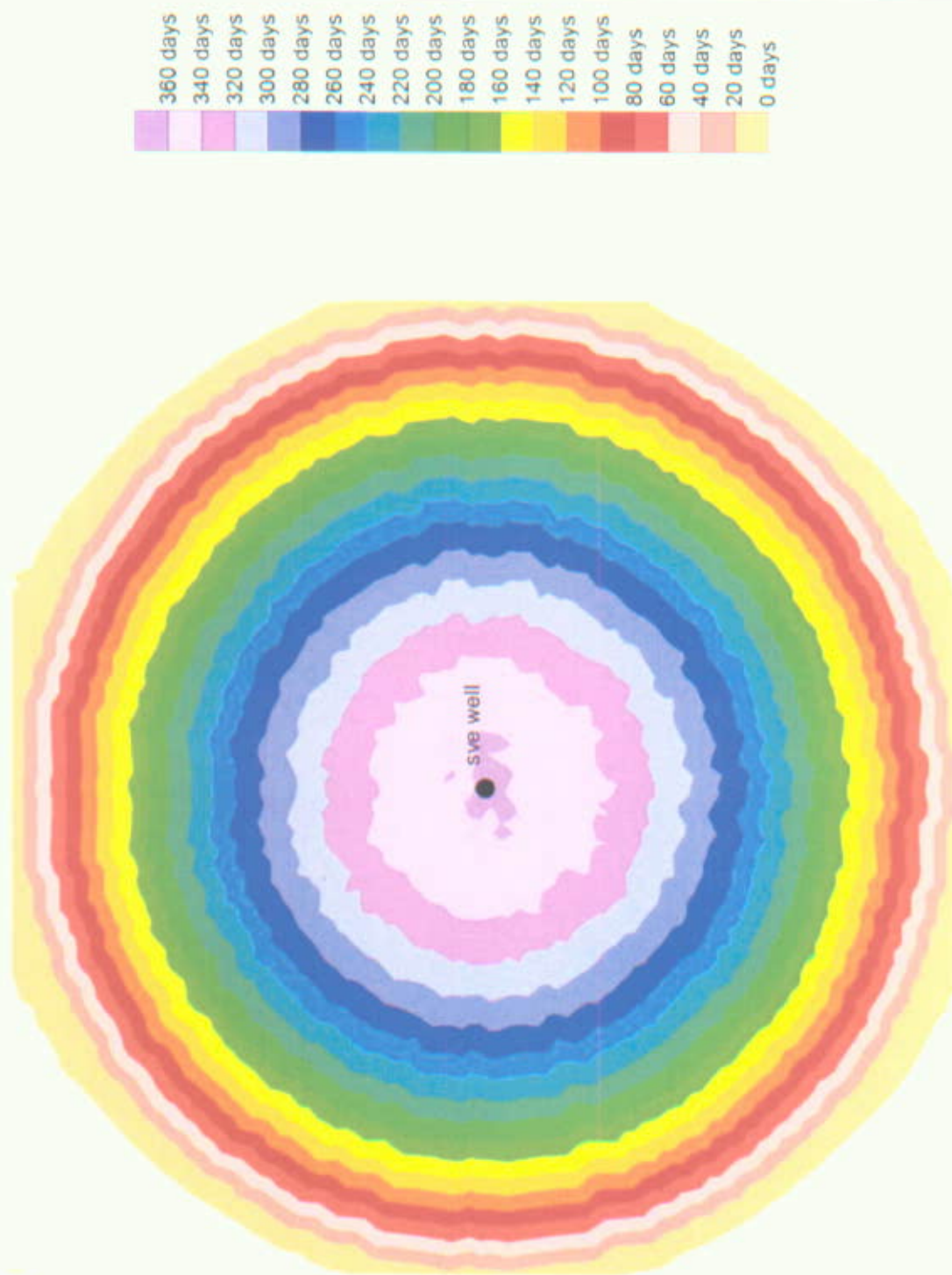


Layout 20 Version 1 - Pressure at 67.5 ft depth

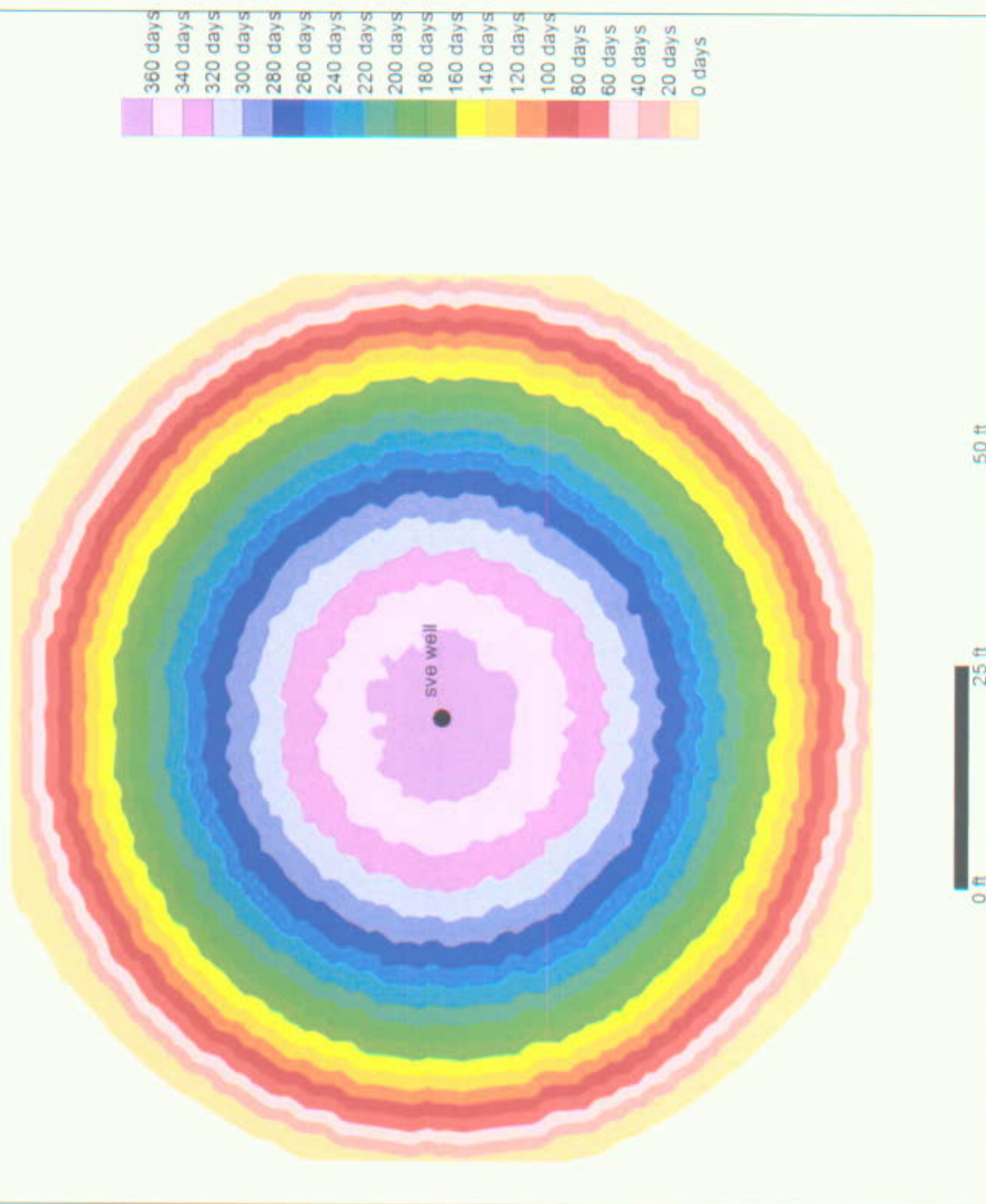


889 909

Time to flush 1000 pore volumes of clean air at depth of 46.5 feet
 Single SVE well pumping 100 cfm



Time to flush 1000 pore volumes of clean air at depth of 68 feet
Single SVE well pumping 100 cfm



TECHNICAL MEMORANDUM

CH2MHILL

Numerical Modeling of Dunn Field Source Areas Fluvial Soil Vapor Extraction System Well Screen

PREPARED FOR: U.S. Army Corps of Engineers - Huntsville Center

PREPARED BY: CH2M HILL

DATE: March 30, 2007

PROJECT NUMBER: 177556.RD.03

COPIES: Defense Logistics Agency (DLA)
U.S. Environmental Protection Agency (EPA)
Tennessee Department of Environment and Conservation (TDEC)
Air Force Center for Environmental Excellence (AFCEE)
engineering-environmental Management, Inc. (e2M)
Mitretek Systems

This technical memorandum (TM) summarizes the results of air flow distribution modeling performed on the fluvial soil vapor extraction (SVE) wells. The SVE well design described in the *Dunn Field Source Areas Final Remedial Design, Rev. 3* (CH2M HILL, 2007) and the *Dunn Field Source Areas Fluvial Soil Vapor Extraction Remedial Action Work Plan (RAWP)* (engineering-environmental Management [e2M], 2007) specifies 2-inch diameter stainless steel wells with 20 to 30 feet of 0.010-inch continuous-slot 316 stainless steel screen, depending on the thickness of the fluvial vadose zones. The SVE well screens will extend from just above boring termination to approximately 5 feet below the loess/fluvial interface.

Because relatively uniform flow and pressure distribution across the fluvial SVE wells is critical to overall performance, CH2M HILL re-visited the SVE well screen design following a review of the RAWP. The open area of the 0.010-inch slot polyvinyl chloride (PVC) SVE well screens that were specified in the Intermediate Source Areas Remedial Design (SARD) (CH2M HILL, 2006a) was between 2 and 4 percent of the total screen length. This open area was selected based on the results of Phase I of the SVE treatability study (CH2M HILL, 2003) to preclude significant differential pressure across the screen and result in relatively even extraction rates across the entire well screen.

The SVE well screens and casings were subsequently changed from PVC to stainless steel in the Pre-Final and Final SARD (CH2M HILL, 2006b and 2007) to facilitate concurrent operation of the fluvial SVE system and loess thermal-enhanced SVE system. The subsurface temperatures (100°C or higher) generated by the thermal-enhanced SVE system would likely damage the PVC or CPVC¹ wells.

Depending on the vendor and wire thickness, the 0.010-inch continuous-slot stainless steel screen specified in the Final SARD features an open area ranging from 10 to 14 percent. At the

¹ The maximum service temperature for CPVC is (93°C).

design flow rate of approximately 100 standard cubic feet per minute (scfm), the open area is expected to result in development of a significant pressure gradient, with associated non-uniform flow along the screened section. As such, a numerical model was used to predict the open area of uniformly-slotted pipe necessary to achieve less than 5 percent differential pressure across the screened section. As summarized below, input parameters for the model included SVE system design elements specified in the SARD and RAWP, and characteristics of the fluvial sands.

- Blower inlet pressure: 4 inches of mercury (Hg)
- Extraction air flow rate per SVE well: 110 scfm (slightly higher than the flow rate specified in the Final SARD, to be conservative)
- Inner diameter of the pipes:
 - 2.067 inches for the SVE well
 - 3.65 inches for the high-density polyethylene (HDPE) conveyance piping
- Outer diameter of the pipes:
 - 2.375 inches for the SVE well
 - 4.467 inches for the HDPE conveyance piping
- Pipe roughness factor:
 - 0.0006 for the SVE well
 - 0.00006 for the HDPE conveyance piping
- Formation intrinsic permeability (k): 1,800 milliDarcy
 - The formation k was calculated using Appendix D of the *Soil Vapor Extraction and Bioventing Engineering Manual Guidelines* (USACE, 2002) and the average vertical hydraulic permeability (K_v) in the fluvial sands (9×10^{-4} cm/s), which was converted to the horizontal hydraulic permeability (K_h) using a multiplier (20-30 times the K_v based on professional experience). As summarized in the adjacent table, the average fluvial sands K_v was based on falling head permeability testing (ASTM D5084-90) conducted on four samples collected by Jacobs Engineering and analyzed by the LawGibb Group in 2002.
- Target zone thickness: 30 feet
- Length of the header pipe (including the well riser and surface piping): 350 to 923 feet
- Elevation of the inlet of the header pipe: 0 feet
- Elevation of the outlet of the header pipe (beginning of the screen interval): 25 to 30 feet
- Changes in elevation of the screened section: 30 feet (vertical)
- Viscosity of the extracted fluid: 0.0000121 pound_{mass} per foot per second (lb_m/ft-sec)
- Initial temperature of the extracted air: 80°F
- Orifice coefficient for the screen slots: 0.128
- Estimated time to reach equilibrium flow in the vadose zone: 20 minutes

Sample Depth	K (cm/s)
39-41 ft bgs	3.3×10^{-4}
49-51 ft bgs	5.9×10^{-4}
59-61 ft bgs	2.0×10^{-3}
65-67 ft bgs	1.7×10^{-3}
Geometric Mean	9.0×10^{-4}

The objective of the modeling effort was to optimize flow and pressure across the screen, with less than 5 percent variance in flow and pressure across the 30 foot section. First, the frictional head losses were calculated for the header pipe and each element of the screened section. Then Bernoulli's equation was used to solve for total head in terms of fluid pressure

and velocity; the well screen slots constitute orifices through which flow occurs. Based on the input parameters and objective summarized above, the model prescribes an optimal open area of approximately 7 percent.

Flow and pressure distribution, along with mass flux across the screen, is presented in the plots in Attachment A for a screen with a 7 percent open area and an extraction rate of 110 standard cubic feet per minute (scfm). To demonstrate effectiveness at the range of conveyance piping lengths, plots were generated for two lengths: 350 and 923 feet. The plots show relatively consistent vacuum pressures and vapor extraction rates along the length of the well screen for both conveyance pipe lengths.

RAWP Implications

Two-inch diameter continuous-slot 304 stainless steel well screens with an open area of 7 percent are recommended for the fluvial sands SVE system. Although either the 0.005-inch, 90 wire (6.7 percent open area) or 0.006-inch, 90 wire (7.9 percent open area) continuous-slot well screens would be acceptable, **CH2M HILL recommends use of the 0.006-inch, 90 wire continuous-slot well screen, which will allow higher SVE flow rates with a lower pressure drop.**

As a final modification to the Final SARD, to allow for higher extraction flows rates at each SVE well (if warranted), the conveyance piping will increase from 3-inch, which was specified in the Final SARD, to 4-inch HDPE.

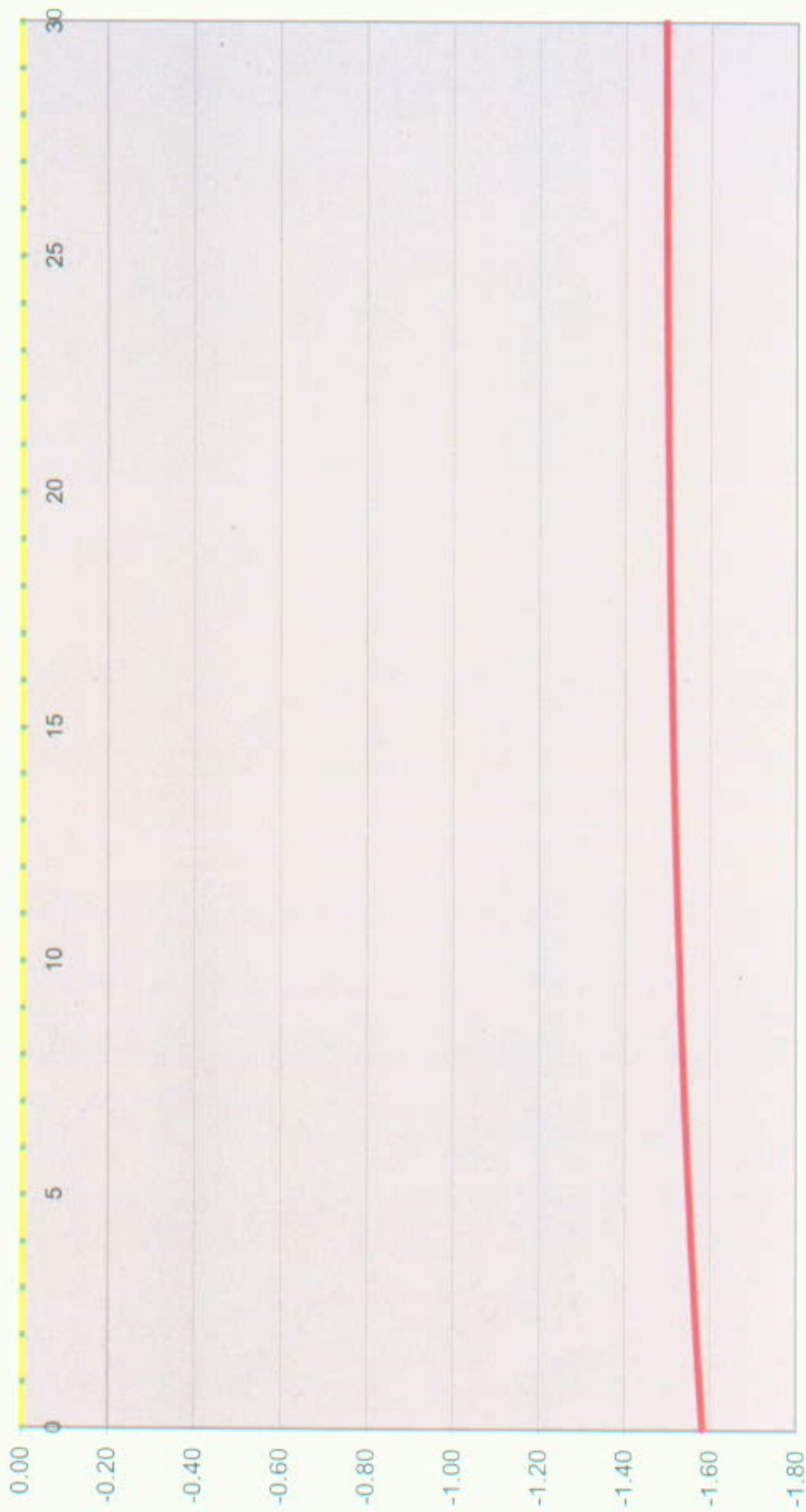
References

- CH2M HILL. 2003. *Evaluation of Soil Vapor Extraction Treatability Study, Dunn Field, Memphis Depot (Rev. 2)*. May.
- CH2M HILL. 2006a. *Memphis Depot, Dunn Field Source Areas Intermediate Remedial Design. Rev. 1*. Prepared for the U.S. Army Engineering and Support Center, Huntsville, Alabama. April.
- CH2M HILL. 2006b. *Memphis Depot, Dunn Field Source Areas Pre-Final Remedial Design. Rev. 2*. Prepared for the U.S. Army Engineering and Support Center, Huntsville, Alabama. September.
- CH2M HILL. 2007. *Memphis Depot, Dunn Field Source Areas Final Remedial Design, Rev. 3*. Prepared for the U.S. Army Engineering and Support Center, Huntsville, Alabama. January.
- e2M. 2007. *Dunn Field Source Areas Fluvial Soil Vapor Extraction Remedial Action Work Plan, Rev. 0*. Defense Depot Memphis, Tennessee. January.
- USACE. 2002. *Soil Vapor Extraction and Bioventing Engineering Manual Guidelines (EM 1110-11-4001)*. June 3, 2002.

Attachment A

Model Output

2" SVE Well with 350' Conveyance
Pressure Along the Screen (psig)



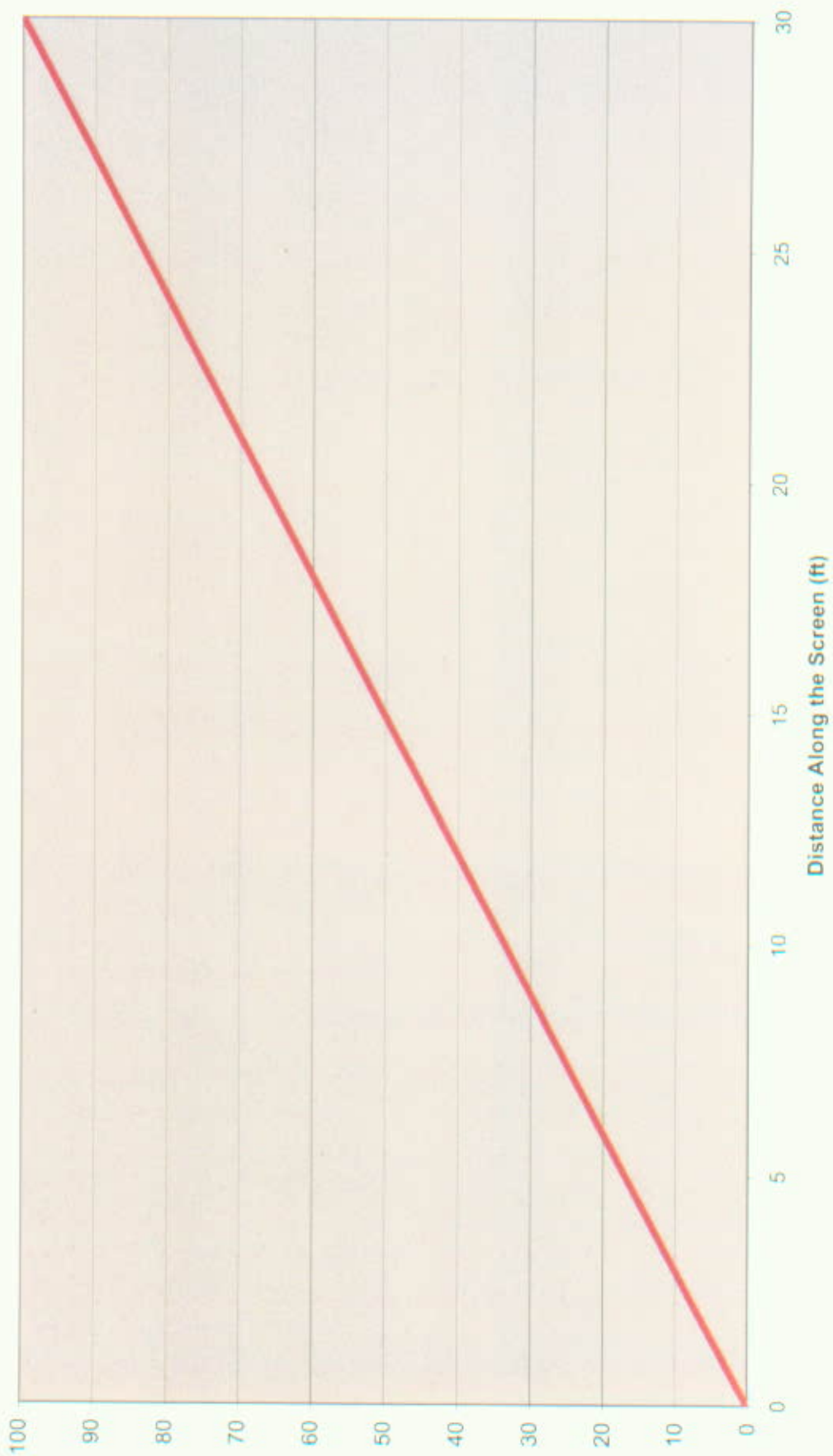
Distance Along the Screen (ft)

2" SVE Well with 350' Conveyance
Extraction Rate (SCFM / foot of screen)

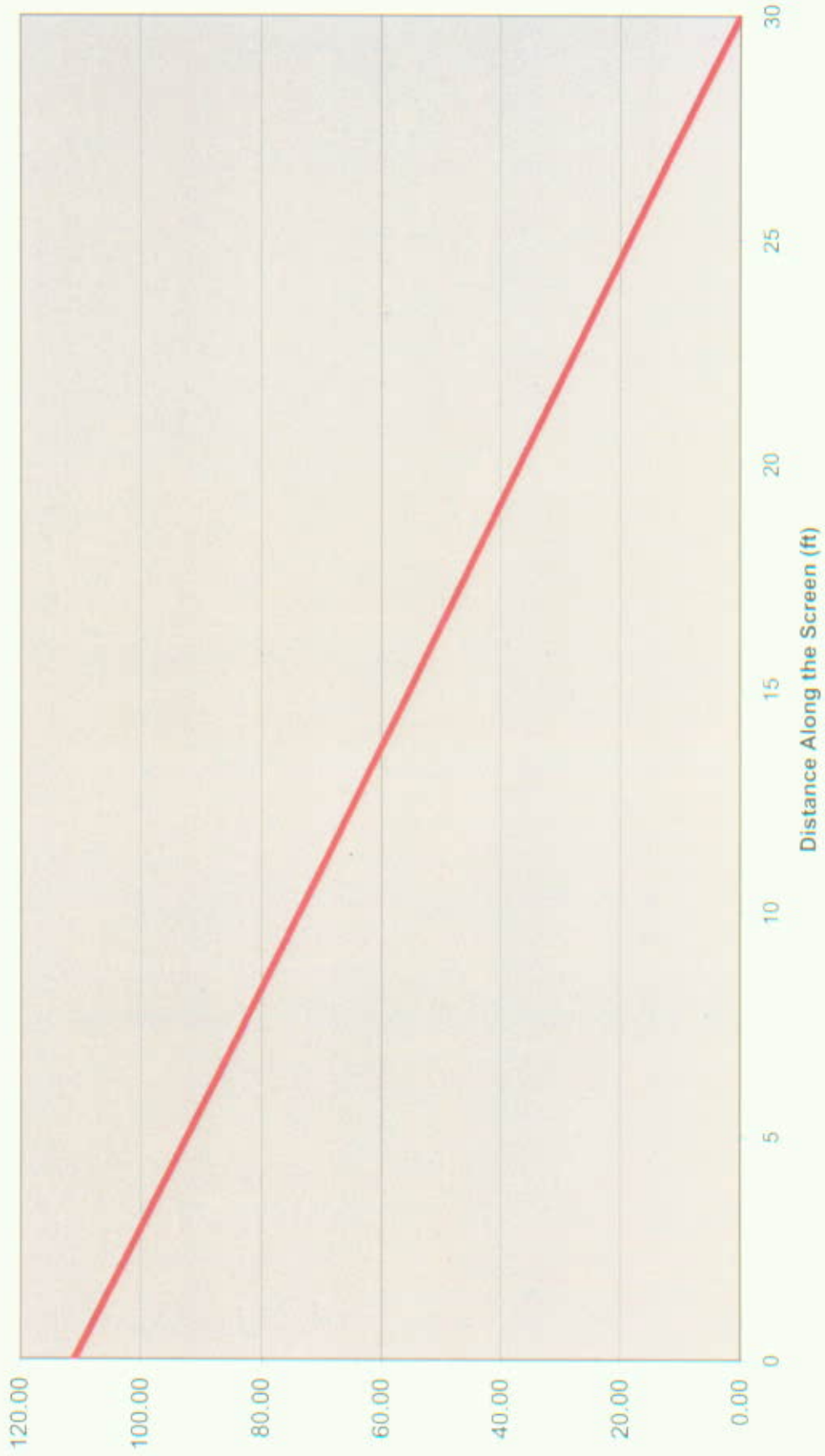


889 917

2" SVE Well with 350' Conveyance
Cumulative Extraction Rate (% of total)



2" SVE Well with 350' Conveyance
Flow Through Pipe (SCFM)

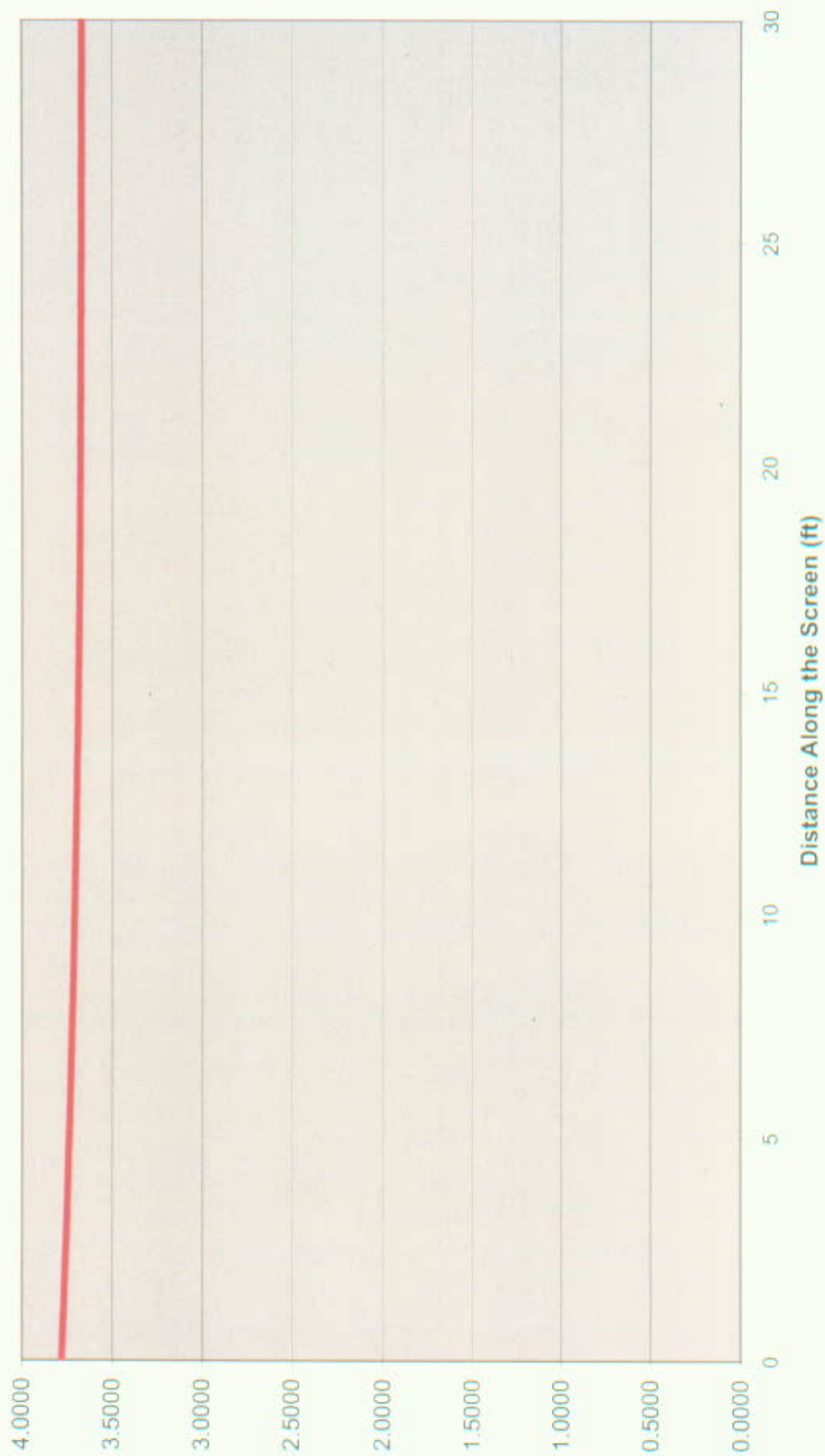


2" SVE Well with 923' Conveyance
Pressure Along the Screen (psig)

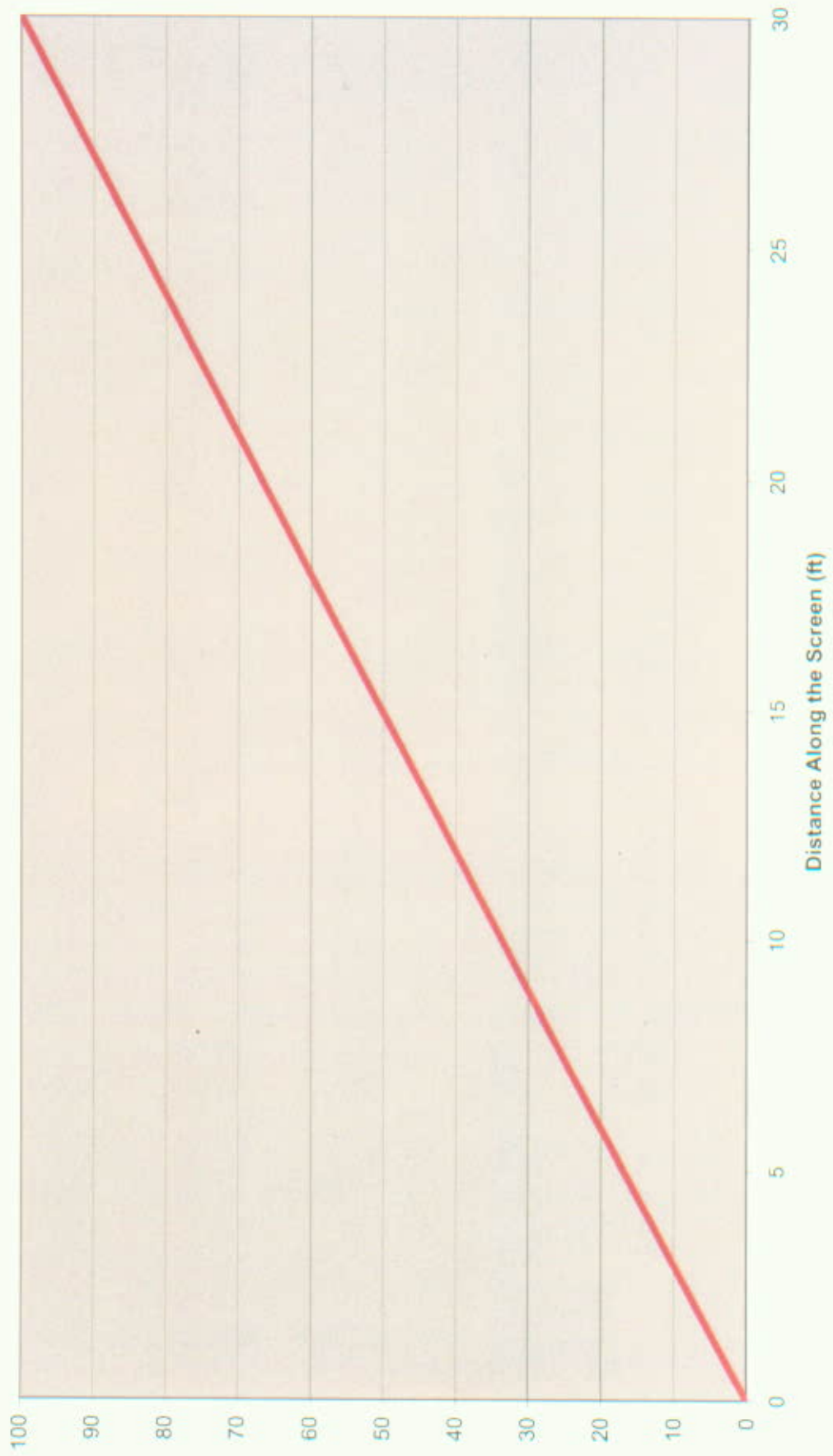


Distance Along the Screen (ft)

2" SVE Well with 923' Conveyance
Extraction Rate (SCFM / foot of screen)

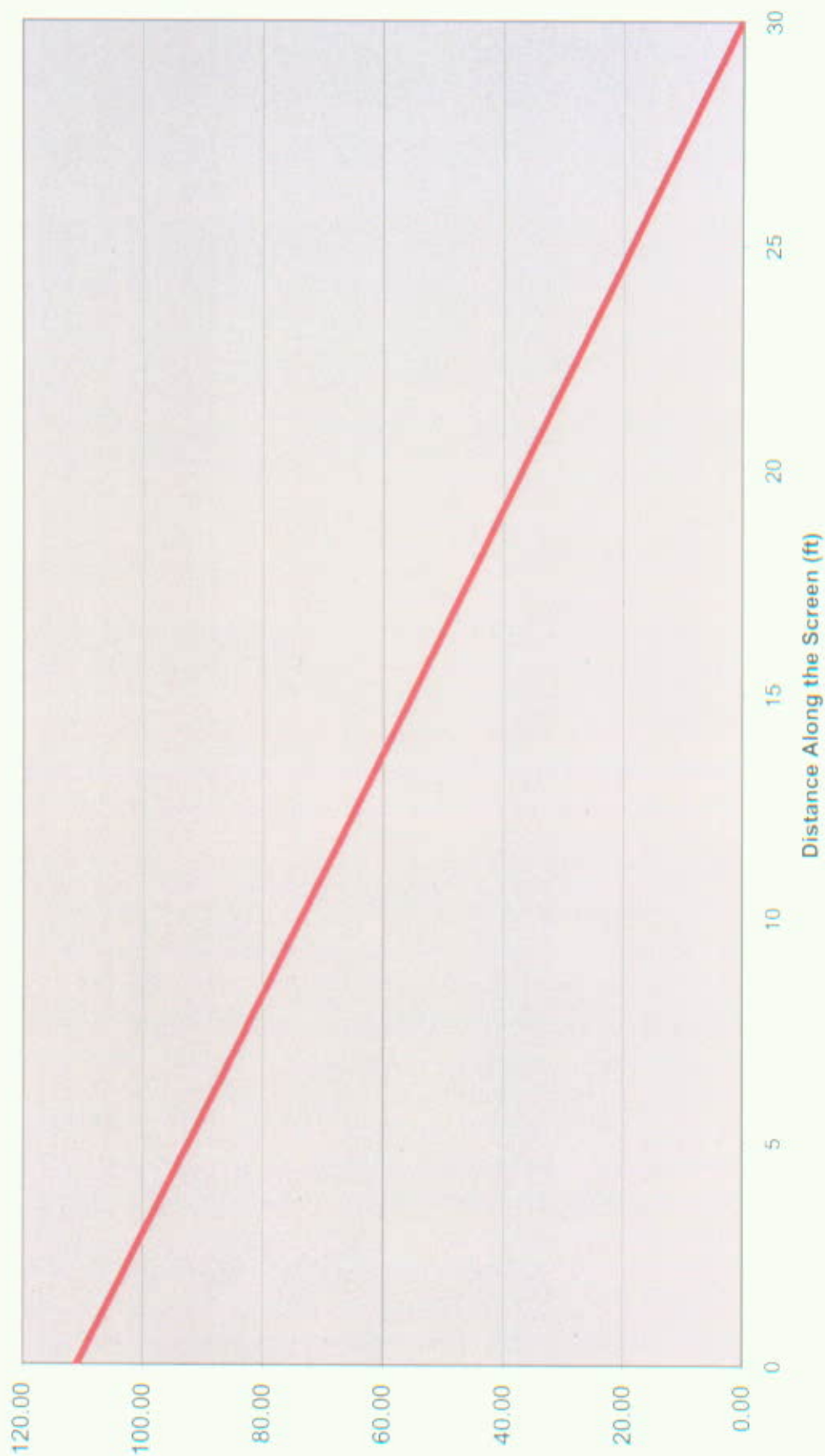


2" SVE Well with 923' Conveyance
Cumulative Extraction Rate (% of total)



889 923

2" SVE Well with 923" Conveyance
Flow Through Pipe (SCFM)



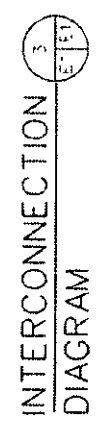
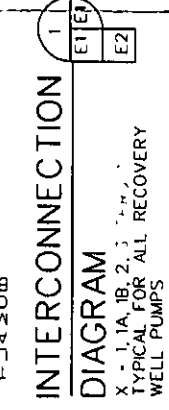
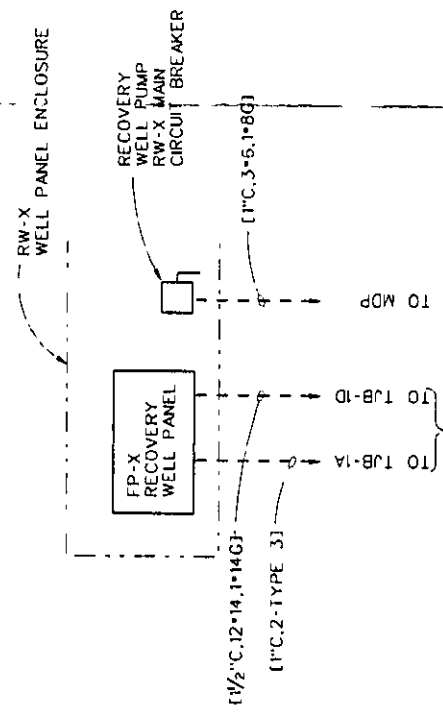
APPENDIX C

Performance Standards Verification Plan

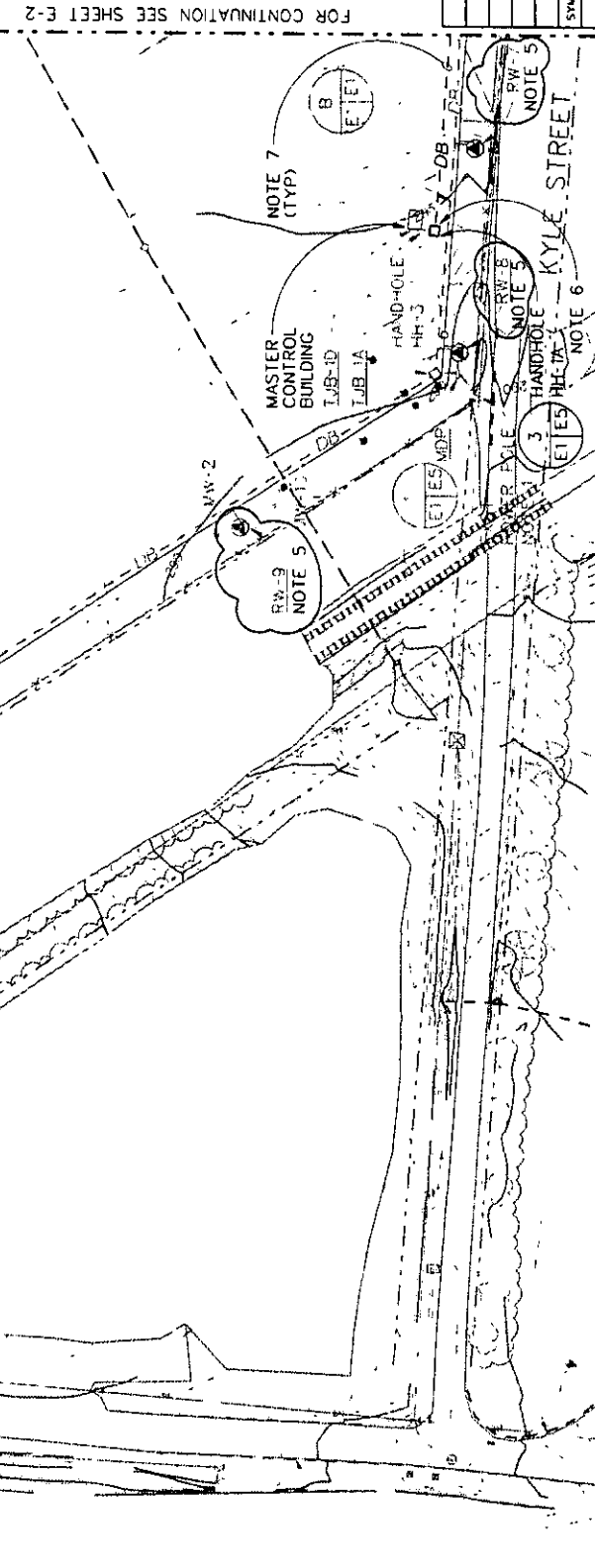


EXISTING CIRCUITS IN CONDUIT
TRINCH SECTION

EXISTING CIRCUITS IN CONDUIT
TRENCH SECTION



- NOTES:
1. CONTRACTOR TO SEPARATE ALL INSTRUMENTATION WIRING IN HANDHOLES FROM POWER WIRING BY USING PERMANENT BARRIERS OR SECURELY FASTENING INSTRUMENTATION WIRING TO RACKS, INSULATORS, OR OTHER NEC APPROVED SUPPORTS
 2. SCREENED PORTIONS OF THE DRAWINGS REPRESENT EXISTING INSTALLATION
 3. FOR STANDARD DETAILS, REFER TO SHEET E-5
 4. FOR ELECTRICAL LEGEND, REFER TO SHEET G-5
 5. REPLACE EXISTING PUMP AND MOTOR WITH NEW PUMP AND MOTOR PER SHEET E-3. PROVIDE MATERIAL AND LABOR TO MAKE NEW MOTOR FUNCTIONAL.
 6. TO TJB-1A, TJB-1B AND MDP.
 7. UNDERGROUND CONDUITS TO BE PVC ALL OTHERS TO BE RGS CONDUITS.
 8. WELLS RW-10, 11, 12 AND 13 ARE FUTURE WELLS

[illegible]

U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS MOBILE, ALABAMA	U.S. ARMY CORPS OF ENGINEERS MONTICELLO, ALABAMA	UPDATED GROUNDWATER INTERIM REMEDIAL ACTION	
ELECTRICAL SITE PLAN - NORTH		DEFENSE DEPOT	MEMPHIS TENNESSEE
SCALE: 1"=60'-0"	SIZE D	FILE NO.	SHEET E-1
FILE: 49p2e01.dgn		11 OF 18	

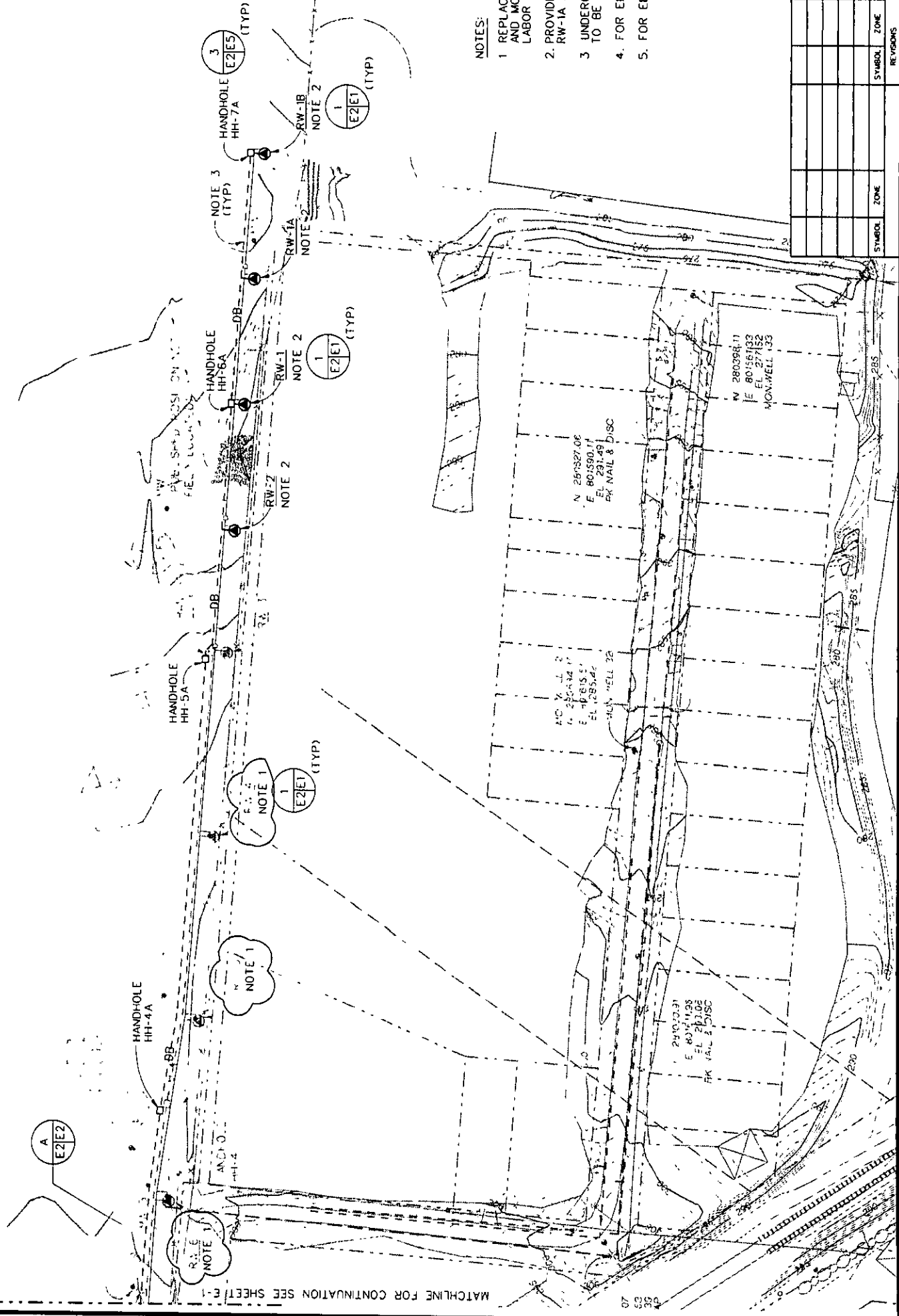
4 SETS [1" C, 2 1/2" TYPE 3] FROM FOUR RECOVERY WELLS
4 SETS [1 1/2" C, 12" 14, 1" 14 C] FROM FOUR RECOVERY WELLS
4 SETS [1" C, 3" 6, 1" 8 C] FROM FOUR RECOVERY WELLS

THIS SECTION DETAIL IS PROVIDED AS AN AID IN IDENTIFYING THE TOTAL NUMBER OF CIRCUITS IN THIS PORTION OF THE CONDUIT TRENCH.

REFER TO DRAWING E-1 FOR INTERCONNECTION DIAGRAMS
FOR COMPLETE DESCRIPTION OF CIRCUITS LISTED ABOVE.

CONTRACTOR MAY COMBINE LIKE CIRCUITS IN LARGER CONDUITS BETWEEN HANDHOLES, TO REDUCE TOTAL NUMBER OF CONDUIT RUNS. CONDUIT FILL SHALL CONFORM TO NATIONAL ELECTRICAL CODE. DO NOT COMBINE MORE THAN THREE POWER CIRCUITS IN ONE CONDUIT.

CIRCUITS IN CONDUIT TRENCH SECTION



NOTES:

- 1 REPLACE EXISTING PUMP AND MOTOR WITH NEW PUMP AND MOTOR PER SHEET E-3. PROVIDE MATERIAL AND LABOR TO MAKE NEW MOTOR FUNCTIONAL.
2. PROVIDE NEW CONDUITS AND WIRING FOR RW-2, RW-1, RW-1A AND RW-1B
- 3 UNDERGROUND CONDUITS TO BE PVC. ALL OTHERS TO BE RGS CONDUITS.
4. FOR ELECTRICAL DETAILS, REFER TO SHEET E-5
5. FOR ELECTRICAL LEGEND, REFER TO SHEET G-5

		ATLANTA, GEORGIA		U. S. ARMY ENGINEER DISTRICT OFFICE, MOBILE, ALABAMA		U. S. ARMY CORPS OF ENGINEERS MOBILE, ALABAMA	
DESIGN		DRAWING		FINAL CHECK		UPDATED GROUNDWATER INTERIM REMEDIAL ACTION	
MAKE	CHRG	DR	CRD	VT	RD	RB	ELECTRICAL SITE PLAN - SOUTH
VT	LH	RD	VT	VT	RB	RB	DEFENSE DEPOT
VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING 0 1" IF NO ONE INCH ON THIS SHEET, ADJUST SCALED ACCORDINGLY							MEMPHIS TENNESSEE
DATE: JANUARY 2000							SCALE: 1"=60'-0"
SIZE							SHEET
INVITATION NO							E-2
FILE NO							12 OF 15

DESIGN		DRAWING		FINAL CHECK	
MADE	CHK'D	DR	CHK'D		
VT	LH	RD	VT	RB	

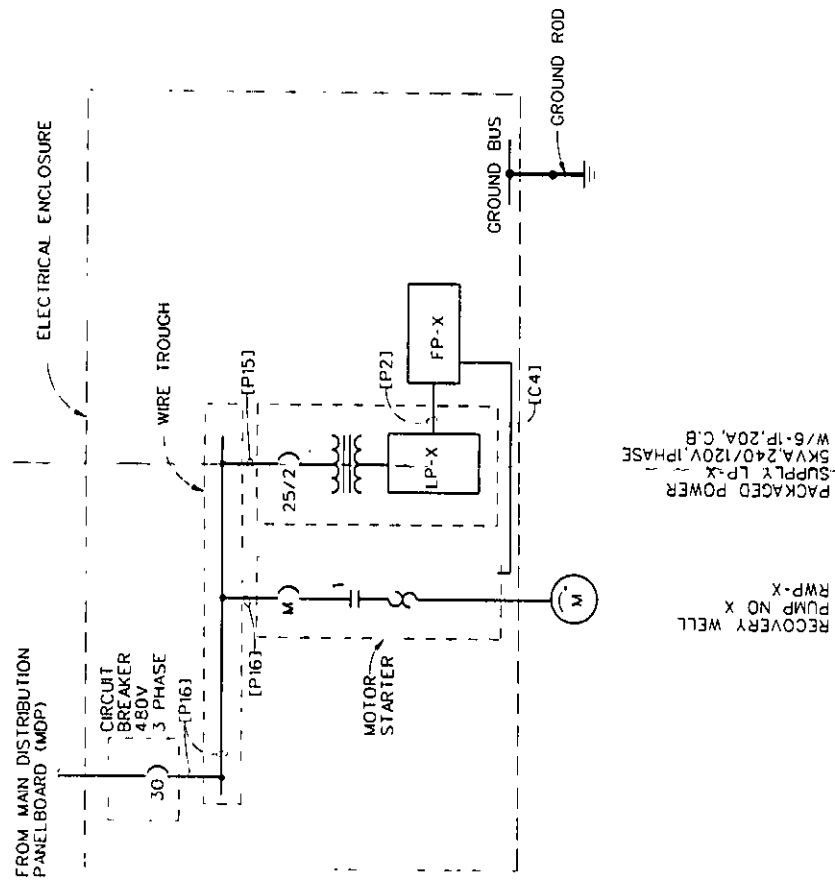
VERIFY SCALE

BAR IS ONE INCH ON DRAWING. DRAWING SCALE IS _____ 1"

IF ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

DATE: JANUARY 2000

[illegible]



MAIN DISTRIBUTION PANELBOARD - ONE LINE DIAGRAM

TYPICAL RECOVERY WELL - ONE LINE DIAGRAM

TABLE 1 - RECOVERY WELL			
RECOVERY WELL PUMP #	MOTOR HORSEPOWER	FIELD PANEL NO.	
	EXISTING	NEW	
RWP-1	-	1/2	FP-1
RWP-1A	-	1/2	FP-1A
RWP-1B	-	1/2	FP-1B
RWP-2	-	1/2	FP-2
RWP-3	1/2	-	FP-3
RWP-4	5	1/3*	FP-4
RWP-5	3/4	1/2	FP-5
RWP-6	5	3/4*	FP-6
RWP-7	2	1/2 *	FP-7
RWP-8	5	1	FP-8
RWP-9	5	1	FP-9

*ALTERNATIVE A: 1/2 HP FOR RW-4,
1/2 HP FOR RW-6, AND 1/2 HP FOR RW-7

SEE NOTE 4

CIRCUIT CALLOUTS:

[C4] = $[\frac{3}{4}^{\circ}\text{C}, 4^{\circ}\text{14}, 1^{\circ}\text{14G}]$

$[\eta] = [\eta]_{\text{C}}^{3/4} \cdot 2 \cdot 12 \cdot 1 \cdot 126]$

[P15] - [$\frac{3}{4}$ "C, 2•10, 1•10G]

[P16] - [$\frac{3}{4}$ "C. 3•10. 1•10G]

- NOTES:
1. REFER TO ELECTRICAL SITE PLANS, (SHEETS E1 AND E2) FOR EXTERNAL CIRCUITS FROM MDP AND TYPICAL RECOVERY WELL PLAN (SHEET E-4) FOR RECOVERY WELL CIRCUITS.
 2. MDP SHALL BE LABELED AS SUITABLE FOR SERVICE ENHANCE
 3. REPLACE EXISTING PUMP MOTOR WITH NEW PUMP MOTOR PER TABLE 1. PROVIDE MCP AND OVERLOADS SUITABLE FOR NEW MOTOR.
 4. NOT PART OF THIS CONTRACT
 5. SCREENED PORTIONS OF THIS DRAWING REPRESENT EXISTING INSTALLATION.
 6. FOR ELECTRICAL LEGEND REFER TO SHEET G-5.

[illegible]

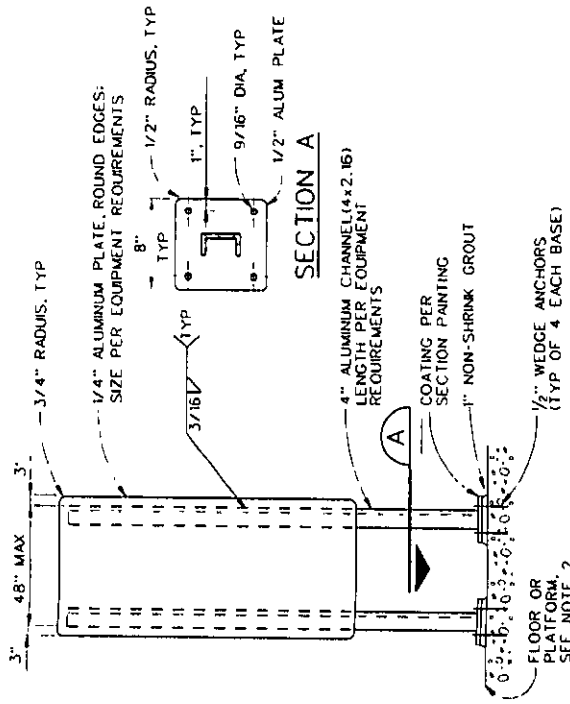
U.S. ARMY ENGINEER BATTALION CORPS OF ENGINEERS MOBILE, ALABAMA	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE, ALABAMA

UPDATED GROUNDWATER INTERIM REMEDIAL ACTION
ELECTRICAL ONE-LINE DIAGRAM

DEFENSE DEPOT MEMPHIS TENNESSEE

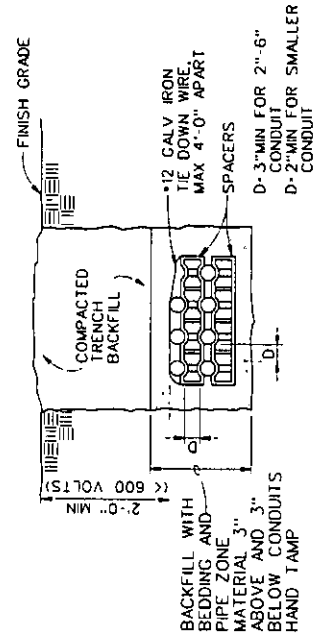
SIZE	INVITATION NO	FILE NO	SHEET
D			E-3

SCALE: NONE FILE: 451023a03 drawings



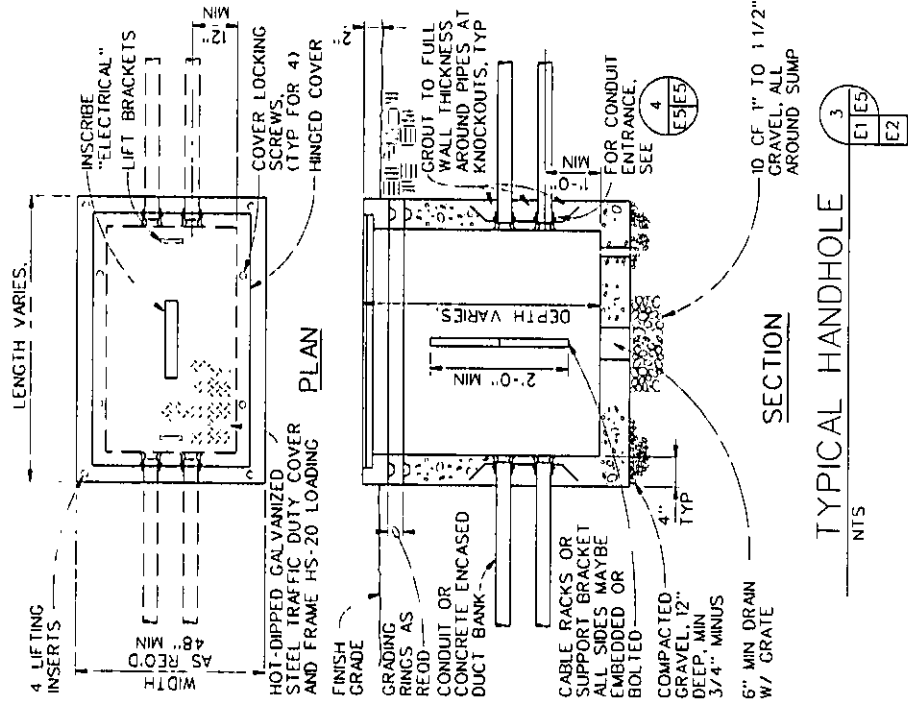
- NOTES:**
1. USE STAINLESS STEEL MOUNTING HARDWARE USE WASHER AND SPLIT LOCKWASHER UNDER ALL NUTS
 2. FOR YARD LOCATIONS PROVIDE A 6 INCH THICK CONCRETE PAD AT GRADE WITH *4 BAR @ 12" OC EACH WAY. CENTERED THE PAD SHALL BE 12 INCHES LONGER THAN THE MOUNTING PLATE BY ONE HALF THE HEIGHT OF THE MOUNTING PLATE ABOVE FINISHED GRADE. MINIMUM WIDTH 24 INCHES.

ELECTRICAL EQUIPMENT
SUPPORT
NTS

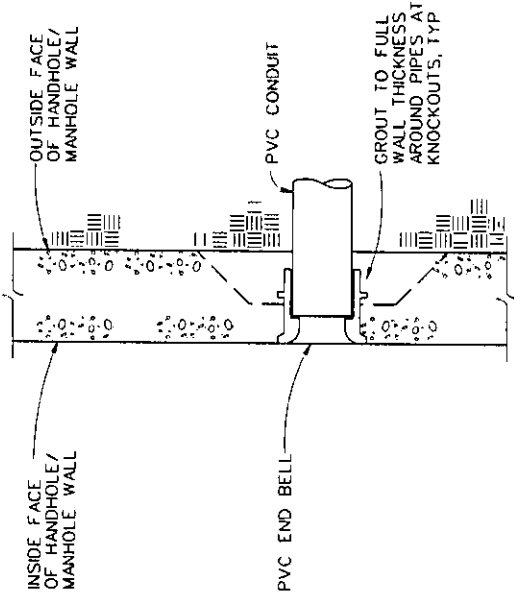


- NOTES:**
1. USE FOR INSTALLATION OF DIRECT BURIAL CONDUIT BANKS OF MORE THAN ONE LAYER OF CONDUITS (MORE THAN THREE CONDUITS).
 2. DO NOT USE THE SAME TRENCH AS THE TRENCH FOR MECHANICAL PIPING.

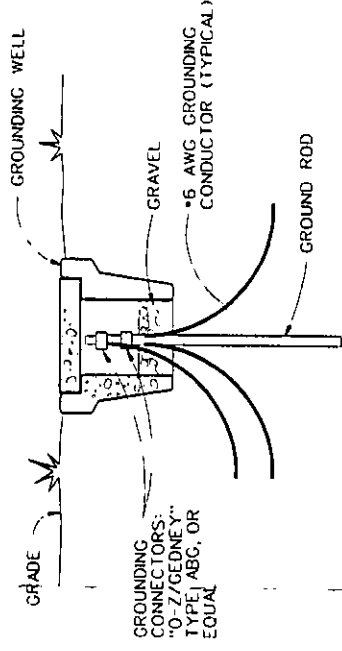
TRENCH AND CONDUIT PLACEMENT



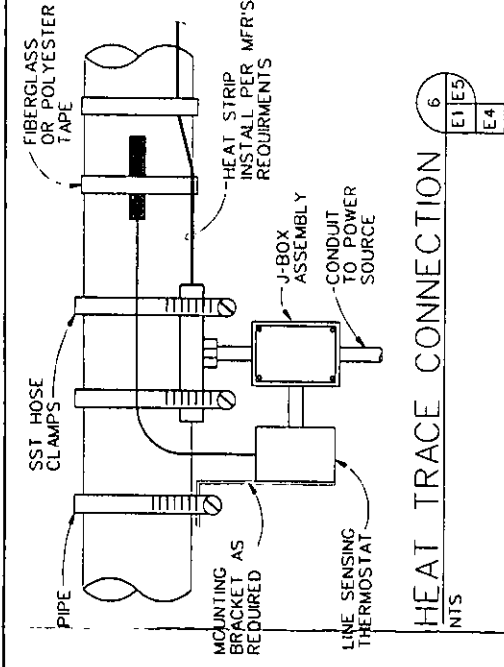
NTS
TYPICAL HANDHOLE



CONDUIT HANDHOLE/MANHOLE
ENTRANCE
NTS



GROUND TEST WELL



HEAT TRACE CONNECTION

DESIGN	DRAWING	
MADE	DWD	DR
VT	LH	RD
		VT

VERIFY SCALE
 BAR IS ONE INCH ON
 ORIGINAL DRAWING.

0 2 4 6 8 10

IF NOT ONE INCH ON
 THIS SHEET, ADJUST
 SCALES ACCORDINGLY

[illegible]

U.S. ARMY ENGINEER DISTRICT CORPORAL MOBILE, ALABAMA	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE, ALABAMA

UPDATED GROUNDWATER INTERIM REMEDIAL ACTION

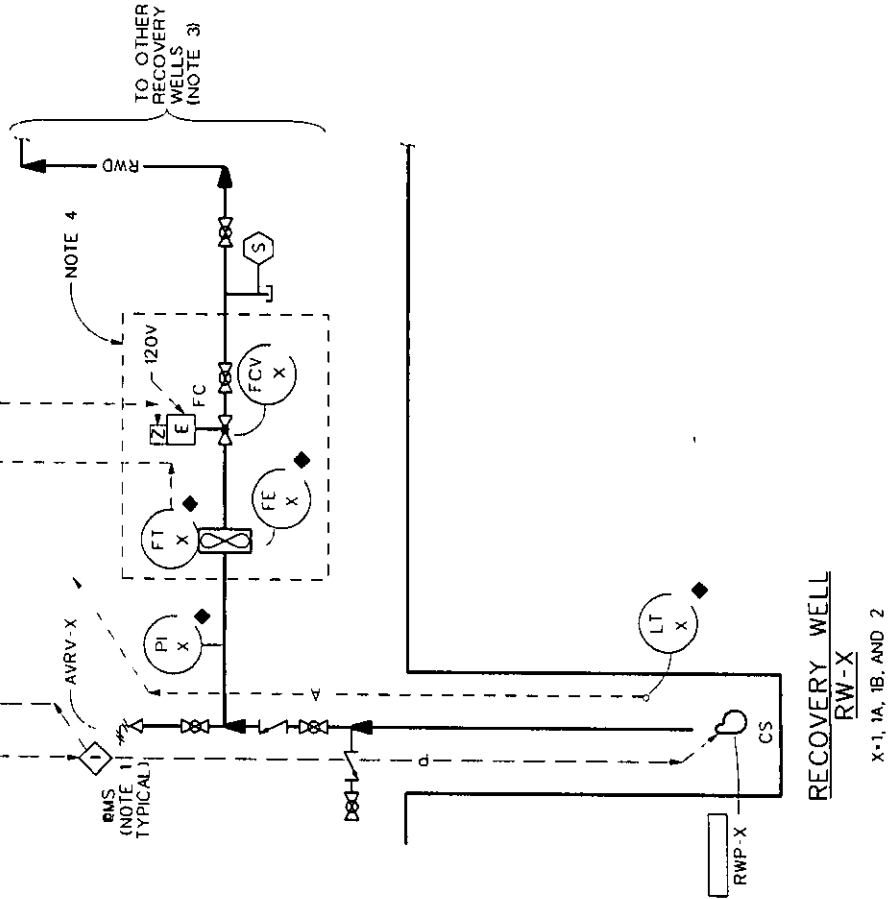
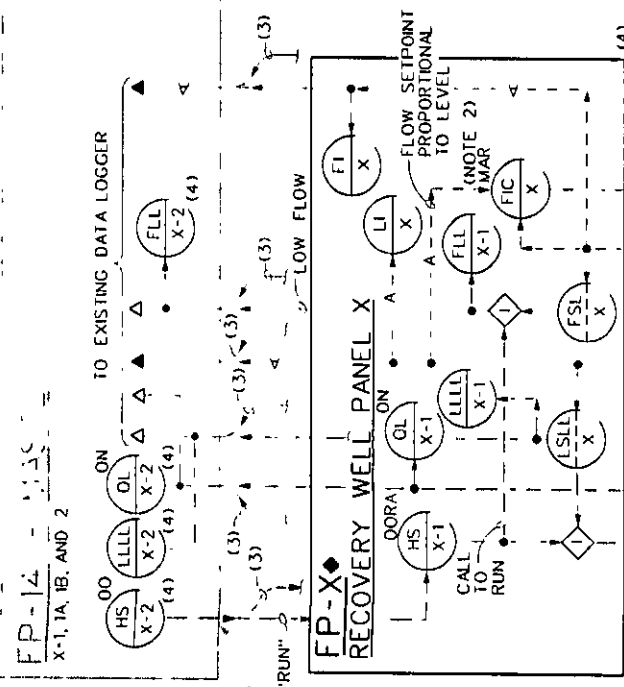
STANDARD DETAILS

DEFENSE DEPOT

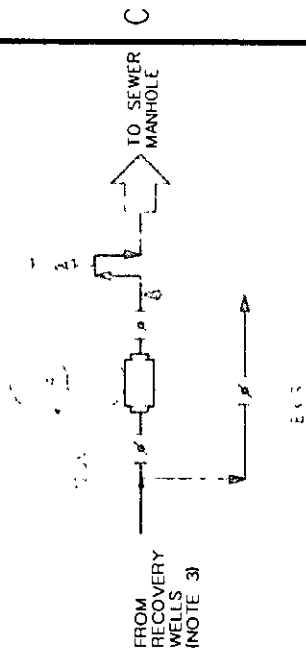
MEMPHIS TENNESSEE

SIZE	INVITATION NO.	FILE NO	SHEET
D			E-5

SCALE:	NONE	FILE: 419p2e05.dgn	SHEET	15 OF 18



RECOVERY WELL NUMBER	RECOVERY WELL INSTRUMENTATION					RECOVERY PANEL OPERATOR INTERFACE							MASTER CONTROL PANEL OPERATOR INTERFACES					
	RECOVERY WELL PUMP	WELL LEVEL TRANSMITTER	DISCHARGE FLOW TRANSMITTER	DISCHARGE FLOW CONTROL VALVE	RECOVERY PUMP PRESSURE	RECOVERY WELL PANEL	SELECTOR SWITCH (OOR)	ON STATUS LIGHT	RECOVERY WELL LEVEL INDICATOR	DISCHARGE FLOW RATE INDICATOR	LOW LOW RECOVERY WELL ALARM LIGHT	LOW DISCHARGE FLOW ALARM LIGHT	SELECTOR SWITCH (OO)	ON STATUS LIGHT	LOW DISCHARGE FLOW ALARM LIGHT	LOW LOW RECOVERY WELL LEVEL ALARM LIGHT		
RW-1	RWP-1	LT-1	FT-1	FCV-1	PI-1	FP-1	HS-1-1	OL-1-1	LI-1	FI-1	LU-1-1	FL-1-1	HS-1-2	OL-1-2	FL-1-2	LL-1-2		
RW-1A	RWP-1A	LT-1A	FT-1A	FCV-1A	PI-1A	FP-1A	HS-1A-1	OL-1A-1	LI-1A	FI-1A	LU-1A-1	FL-1A-1	HS-1A-2	OL-1A-2	FL-1A-2	LL-1A-2		
RW-1B	RWP-1B	LT-1B	FT-1B	FCV-1B	PI-1B	FP-1B	HS-1B-1	OL-1B-1	LI-1B	FI-1B	LU-1B-1	FL-1B-1	HS-1B-2	OL-1B-2	FL-1B-2	LL-1B-2		
RW-2	RWP-2	LT-2	FT-2	FCV-2	PI-2	FP-2	HS-2-1	OL-2-1	LI-2	FI-2	LU-2-1	FL-2-1	HS-2-2	OL-2-2	FL-2-2	LL-2-2		



TO EXISTING DATA LOGGER

CH2M HILL
ATLANTA, GEORGIA

DESIGN		DRAWING		FINAL CHECK		U.S. ARMY ENGINEER DISTRICT CHICKASAW MOBILE, ALABAMA		U.S. ARMY ENGINEER DISTRICT CHICKASAW MOBILE, ALABAMA	
MADE	CHRD	DR	CHRD						
AB	TI	LF	AB	RB					

VERIFY SCALE

BAR IS ONE INCH ON ORIGINAL DRAWING

0 1

IF NOT ONE INCH ON ORIGINAL DRAWING, SCALE IS ACCURACLY

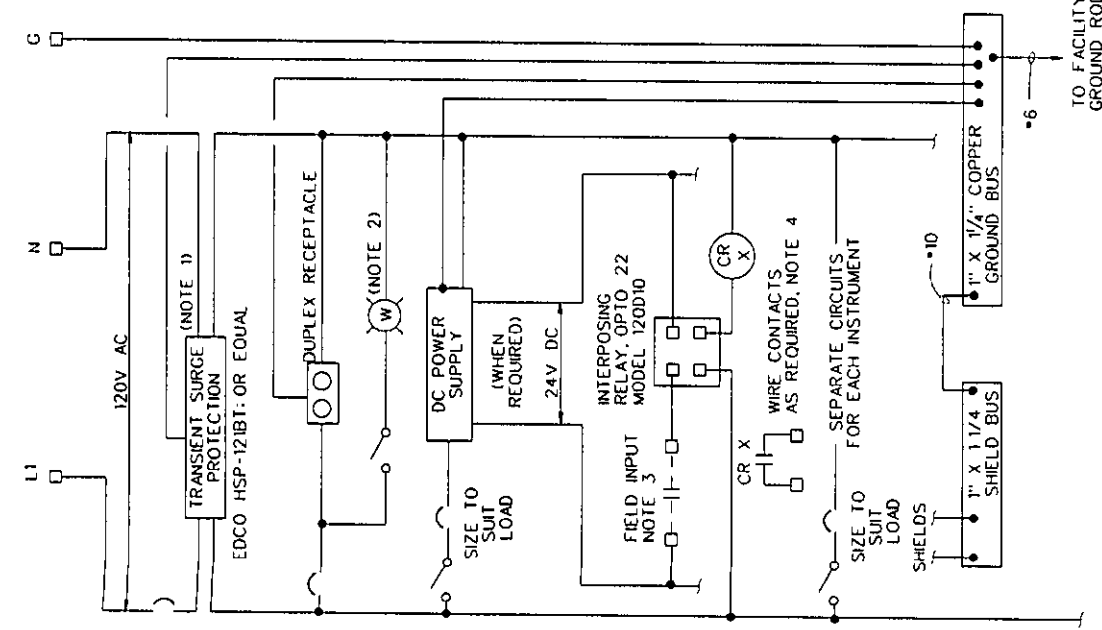
DATE		JANUARY 2000		SCALE:		NONE		FILE: 49102101.dgn		SHEET		16 OF 18	

NOTES

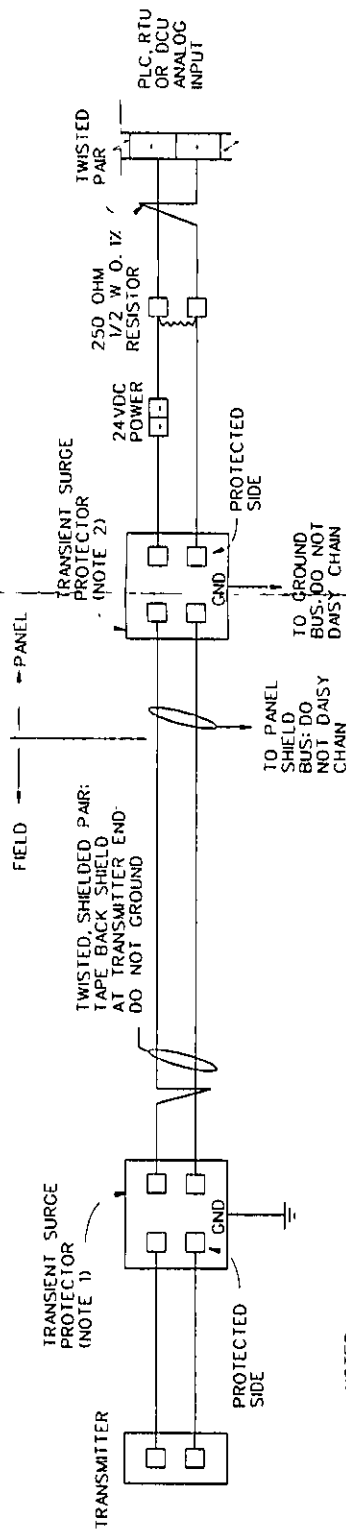
1. MS - MOTOR STARTER
2. WAR MANUAL/AUTO/REMOTE IN MANUAL MODE, OPERATOR SETS THE VALVE POSITION. IN AUTO MODE, THE VALVE MODULATES TO MAINTAIN THE FLOW SETPOINT. IN REMOTE MODE, THE FLOW SETPOINT IS VARIABLE AND PROPORTIONAL TO LEVEL
3. REFER TO DWGS C-1 THRU C-3 FOR LOCATION OF WELL AND PHYSICAL LAYOUT OF INTERCONNECTING PIPING
4. REPLACE FE/FT AT RW-4, 6, 7, 8 AND 9. REPLACE FCV AT RW-4, 5, 6 AND 7. REUSE THE EXISTING ACTUATORS FOR FCV.

X-1, 1A, 1B, AND 2

491p2:01 dgm 18-JAN-2000 10:12:22

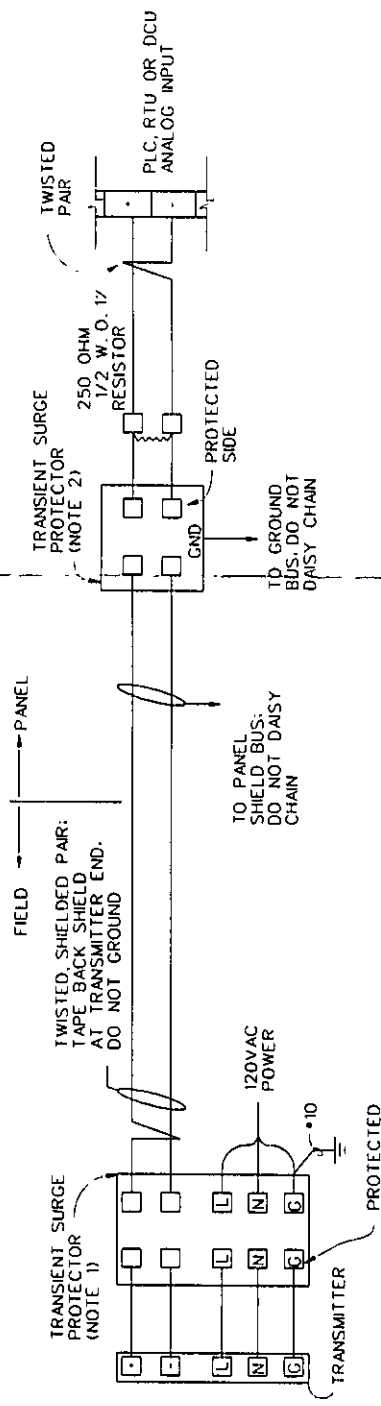


- NOTES:
1. IF LOAD EXCEEDS 15 AMPS PROVIDE ADDITIONAL PARALLEL CIRCUITS WITH TRANSIENT SURGE PROTECTION AS SHOWN.
 2. PROVIDE APPROPRIATE LIGHTING PACKAGE FOR PANEL SIZE
HOFFMAN BULLETIN A-LTDB1, OR EQUAL
 3. PROVIDE OPTO 22 SOLID STATE RELAYS.
 4. PROVIDE DRY CONTACTS TO DATA LOGGER DIGITAL INPUT CHANNELS. POWER DIGITAL INPUTS FROM 5 V SOURCE ON DATA LOGGER.



NOTES:	CHAIN	CHAIN
1. EDCO MODEL SS64-036-2; OR EQUAL. SEE SECTION 13401, ELECTRICAL TRANSIENT PROTECTION FOR SPECIFICATIONS.		
2. EDCO MODEL PC-642-036; OR EQUAL. SEE SECTION 13401, ELECTRICAL TRANSIENT PROTECTION FOR SPECIFICATIONS.		

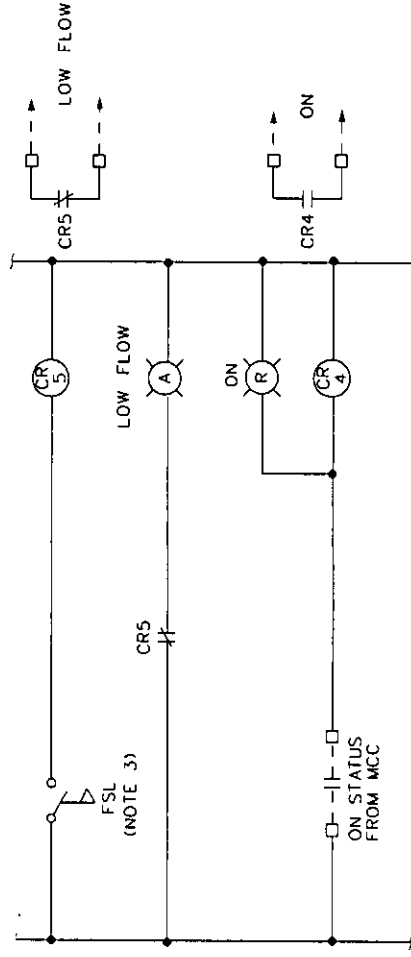
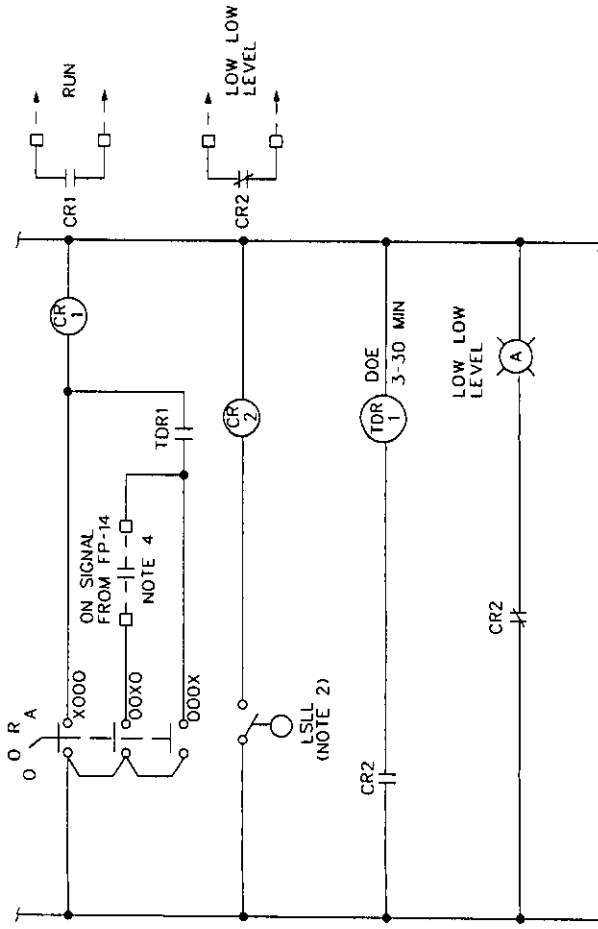
2-WIRE TRANSMITTER



- NOTES:**
- 1 EDCO MODEL SLAC, OR EQUAL, SEE SECTION 13401, ELECTRICAL TRANSIENT PROTECTION FOR SPECIFICATIONS.
 2. REQUIRED WHEN SIGNAL PAIR TRAVELS OUTSIDE A BUILDING. EDCO MODEL PC-642-036; OR EQUAL. SEE SECTION 13401, ELECTRICAL TRANSIENT PROTECTION FOR SPECIFICATIONS

4-WIRE TRANSMITTER

FOR PANELS WITHOUT MOTOR STARTERS



- NOTES:**
1. ELEMENTARY SHOWS DISCRETE PANEL LOGIC. SEE LOOP DESCRIPTIONS FOR REMAINING CONTROL FUNCTIONS.
 2. OPENS ON FALLING LEVEL. SEE INSTRUMENT LIST FOR SETPOINT.
 3. OPENS ON FALLING FLOW. SEE INSTRUMENT LIST FOR SETPOINT.
 4. PROVIDE OPTO 22 SOLID STATE RELAYS. SEE TYPICAL PANEL POWER DISTRIBUTION WIRING.

TYPICAL OUTDOOR TRANSMITTERS

PARTIAL ELEMENTARY FOR RECOVERY
WELL PANELS FP-X (X=1, 1A, 1B, AND 2)
(NOTE 1)

[illegible]

DESIGN		DRAWING		PANEL CHECK		U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS MOBILE, ALABAMA		U.S. ARMY CORPS OF ENGINEERS Huntsville, Alabama	
WAGE	CHG	DR	CHD						
RD	TI	RD	AB	RB					

VERIFY SCALE

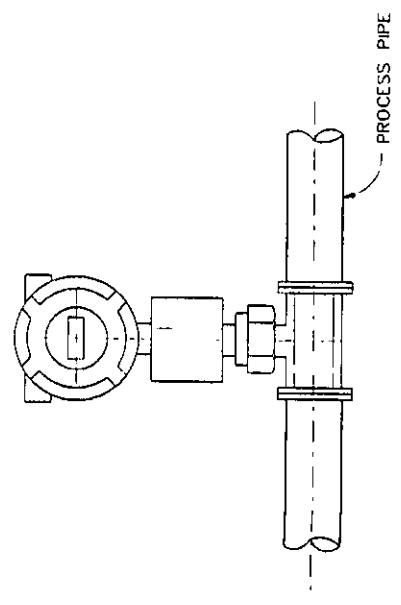
SCALE IS CORRECT ON
GENERAL DRAWING

0 1"

IF NOT ONE INCH ON
THIS SHEET, PROBABLY
SCALES ACCORDINGLY

CONTROL AND PANEL DIAGRAMS DEFENSE DEPOT				MEMPHIS TENNESSEE	
SIZE	INVENTION NO	FILE NO	SIZE		
D			SHEET	1-2	
SCALE	NONE	FILE	4-9-2002-don		SHEET 17 OF 18

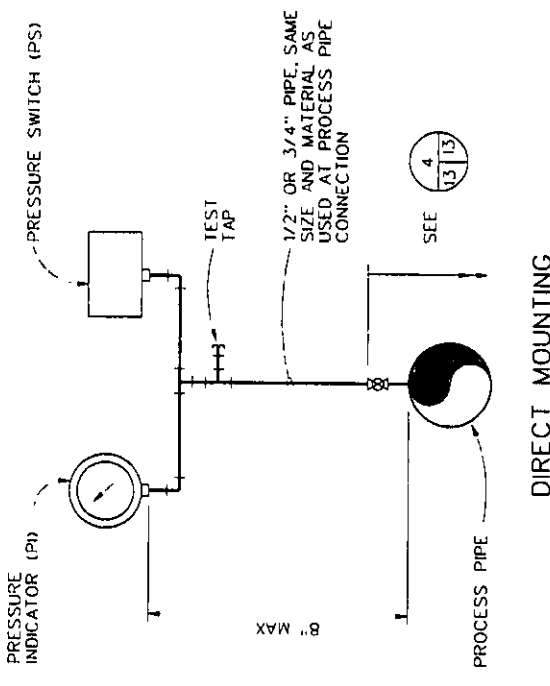
DATE
JANUARY 2000



NOTE:
1 PROVIDE APPROPRIATE END CONNECTION FOR METER SIZE.

TURBINE FLOWMETER TRANSMITTER INSTALLATION (1) M1/13

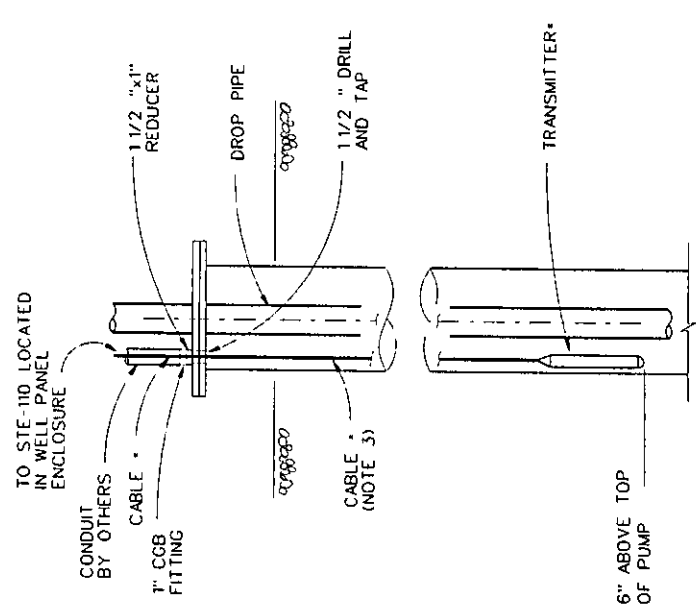
NTS



NOTE:
INDICATOR AND SWITCH INSTALLATION SHOWN FOR SINGLE INSTRUMENT INSTALLATIONS. MOUNT DEVICE DIRECTLY ABOVE TEST TAP.

PRESSURE SWITCH & INDICATOR INSTALLATION (3) M1/13

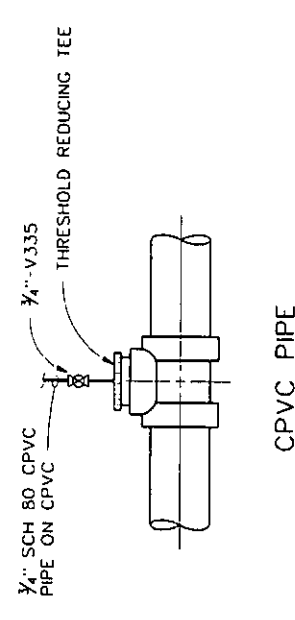
NTS



NOTES:
1. SET PROBE 6" ABOVE UPPER THREADED CONNECTION OF PUMP.
2. COMPONENTS DESIGNATED BY * ARE SUPPLIED BY INSTRUMENT MANUFACTURER.
3. CLAMP CABLE TO PUMP COLUMN EVERY 10 FEET.

WELL LEVEL PROBE INSTALLATION (2) M1/13

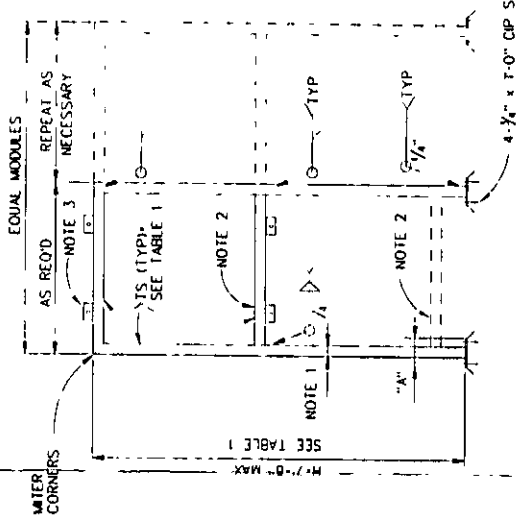
NTS



NOTES:
1. THIS IS A STANDARD DETAIL, NOT ALL OF THE CONNECTION TYPES MAY BE USED.
2. FOR LIQUID, STEAM OR VAPOR SERVICE INSTALL PROCESS TAP HORIZONTALLY INTO THE SIDE OF THE PIPE.
3. FOR AIR OR GAS SERVICE, INSTALL PROCESS TAP VERTICALLY INTO THE TOP OF THE PIPE.

PRESSURE CONNECTION INSTALLATION (4) 13/13

NTS



NOTES:
1 TOTAL WEIGHT OF PANEL(S) SHALL NOT EXCEED 750 LB IN EACH MODULE.
2 FOR PANELS WITH "H" GREATER THAN 4'-0" ONE HORIZONTAL MEMBER MUST BE LOCATED WITHIN THE MIDDLE THIRD OF THE FRAME HEIGHT. PROVIDE ADD'L MEMBERS AS NECESSARY FOR PANEL MOUNTING.
3 PROVIDE 1 2/16" x 2 1/4" x 1/4" 0'-3" WELD ALL AROUND TO IS-TYP AT EACH PANEL MOUNT.
4 GRIND ALL WELDS AND SHARP CORNERS SMOOTH.
5 THIS DETAIL APPLIES TO NON-FREE STANDING ELECTRICAL EQUIPMENT OVER 25 LB WHICH IS NOT MOUNTED ON A FREE STANDING FRAME OR IS NOT WALL MOUNTED.
6 PANEL OR INSTRUMENT FRONT FACES NORTH, UNLESS OTHERWISE NOTED.

PANEL MOUNTING RACK (7) E4/13

NTS

TABLE 1

HEIGHT "H"	TS (MIN SIZE)	ALUMINUM FRAME			BASE PLATE	
		(IN)			(IN)	
5'-0" MAX	TS 3 x 3 x 188	8	1	1	A	1
7'-6" MAX	TS 4 x 4 x 188	9	1	1	1/2	1/2

CRM HILL
ATLANTA, GEORGIA

U.S. ARMY
ENGINEER DISTRICT
CORPS OF ENGINEERS
DANVILLE, ALABAMA

U.S. ARMY
CORPS OF ENGINEERS
MEMPHIS, ALABAMA

UPDATED GROUNDWATER INTERIM REMEDIAL ACTION

INSTRUMENTATION DETAILS

DEFENSE DEPOT MEMPHIS TENNESSEE

SIZE INITIATION NO FILE NO SHEET 1-3

SCALE: NONE FILE 49b203.00p SHEET 18 OF 18

DATE JANUARY 2000

DESIGN DRAWING OR CHECKED RD TT RD AB RB

FINAL CHECK

VERIFY SCALE
BASE ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON ORIGINAL DRAWING, SCALE ACCORDINGLY

DETAIL 5 NOT USED

DETAIL 6 NOT USED

ATTACHMENT B

Photographs from Memphis Depot Dunn Field Five-Year Review

Memphis Depot, Dunn Field: Five-Year Review



Date/View: 19-Apr-2002/South

Comment: View of the control building and recovery wells RW-07 and RW-06 in the background.



Date/View: 19-Apr-2002/Northeast

Comment: View of the NW boundary of Dunn Field with recovery well RW-08 in the foreground and RW-09 in the background.

Memphis Depot, Dunn Field: Five-Year Review



Date/View: 19-Apr-2002/West

Comment: View of the NW corner of Dunn Field and the control building, RW-07, -08 and -09



Date/View: 19-Apr-2002/Southwest

Comment: View of the W boundary of Dunn Field with RW-07, -06, -05, -04 and -03 in the background

Memphis Depot, Dunn Field: Five-Year Review



Date/View: 19-Apr-2002/West

Comment: View of the NW corner of Dunn Field and the main power distribution to Dunn Field



Date/View: 19-Apr-2002/North

Comment: View along the W boundary of Dunn Field with RW-01A (in the foreground), -02, -03, -04, -05, -06 and -07 (in the far background)

Memphis Depot, Dunn Field: Five-Year Review



Date/View: 19-Apr-2002/southwest

Comment: View of the W boundary of Dunn Field and RW-06, -05 and -04 (in the background)



Date/View: 19-Apr-2002/West

Comment: View beneath the powerline corridor on Dunn Field with RW-04 (beneath the powerlines) and RW-05 (north of RW-04)

Memphis Depot, Dunn Field: Five-Year Review



Date/View: 19-Apr-2002/North

Comment: View along the W boundary of Dunn Field and RW-01 and -01A (in the background)



Date/View: 19-Apr-2002/South

Comment: View of the southern portion of the west half of Dunn Field

Memphis Depot, Dunn Field: Five-Year Review



Date/View: 16-Sep-2002/Northwest

Comment: View along the N boundary of Dunn Field with the total effluent meter/by-pass station (in the background)

Memphis Depot, Dunn Field: Five-Year Review



Date/View: 16-Sep-2002/West

Comment: View of an older monitoring well (MW-36 in the foreground) and a newer monitoring well (MW-84 in the background)

Memphis Depot, Dunn Field: Five-Year Review



Date/View: 16-Sep-2002/West

Comment: View of the exterior of a wellhead assembly - control panel (right) and wellhead enclosure (left)



Date/View: 16-Sep-2002/West

Comment: View of the interior of a wellhead enclosure

Memphis Depot, Dunn Field: Five-Year Review



Date/View: 16-Sep-2002/North-northwest

Comment: View of the southern portion of the west half of Dunn Field - former stockpile area



Date/View: 16-Sep-2002/South

Comment: View of the southern portion of the west half of Dunn Field

Memphis Depot, Dunn Field: Five-Year Review



Date/View: 16-Sep-2002/Northwest

Comment: View of the northern portion of the west half of Dunn Field - Northeast Open Area

Memphis Depot, Dunn Field: Five-Year Review



Date/View: 17-Sep-2002/South

Comment: Status of MW-2, which requires locking capability and new well cap.



Memphis Depot, Dunn Field: Five-Year Review

Date/View: 17-Sep-2002/South

Comment: Status of MW-36 and MW-84 (foreground), MW-84 requires new concrete pad and flush mount manhole.



Memphis Depot, Dunn Field: Five-Year Review

Date/View: 17-Sep-2002/South

Comment: Status of MW-57, which requires new bolts in manhole to ensure integrity.

FINAL PAGE

PART II

ADMINISTRATIVE RECORD

PART II

FINAL PAGE