

GW - 32

REPORTS

YEAR(S):

1993 - SEMI-ANNUAL

GW REPORT

OIL CONSERVATION DIVISION
RECEIVED

GIANT
REFINING CO.

'94 JAN 14 AM 8 35

Route 3, Box 7
Gallup, New Mexico
87301

505
722-3833

January 5, 1994

Benito Garcia
Director
Hazardous and Radioactive Materials Bureau
New Mexico Environment Department
525 Camino De Los Marquez
Santa Fe, New Mexico 87502

1993

Re: Semi-Annual Groundwater Reporting
Permit No. NMD000333211-2

Dear Mr. Garcia:

Pursuant to Attachment G: Groundwater Monitoring Plan, 2.G. and H. of the indicated permit, Giant Refining Company - Ciniza submits the attached analytical and statistical data from the semi-annual groundwater sampling event.

If you require additional data or information, please contact me at (505) 722-0227.

Sincerely,



Lynn Shelton
Senior Environmental Coordinator
Ciniza Refinery

TLS:sp

cc w/ attachments:

David Pavlich
Health Safety Environmental Manager

Roger Anderson
Environmental Bureau Chief
Oil Conservation Division

cc w/o attachments:

Kim Bullerdick
Corporate Counsel
Giant Industries Arizona, Inc.

**SEMI-ANNUAL GROUNDWATER
ANALYTICAL AND STATISTICAL
DATA**

**GIANT REFINING COMPANY
CINIZA REFINERY**

JANUARY 5, 1994

PREPARED BY:

**LYNN SHELTON
SENIOR ENVIRONMENTAL COORDINATOR**

- I. MONITOR WELL STATISTICS
- II. MONITOR WELL GRAPHS
- III. EARLY DETECTION WELL STATISTICS
- IV. TABULATED ANALYTICAL DATA
- V. ORIGINAL ANALYTICAL DATA

MONITOR WELL STATISTICS

**Calculation Sheet for Semi-Annual Evaluation
of Indicator Parameters**

Print Your Name: Lynn Shelton Telephone 722-0227

Facility Name: GIANT CINIZA EPA ID #: NMD000333211-2

Date: Fall, 1993 Parameter: : pH

Well Number: MW-1 Up or Downgradient: : DOWN

Please list the values calculated for the background parameters
on the Background Indicator Parameter Calculation Sheet:

X(b)=	8.51	S(b)2=	0.015	t(b)=	2.947
W(b)=	0.000937	n(b)=	16		

Please list the current values for this monitoring well.

	Value	(Value - X(m)) ²
1	9.05	0.081225
2	9	0.055225
3	9.08	0.099225
4	9.08	0.099225

Total 1	36.21	Total 2	0.3349
---------	-------	---------	--------

Mean value X(m)	9.0525
Variance S(m)2	0.111633

t(m)=	5.841
W(m)=	0.027908

t(*)=	3.194171
-------	----------

t(c)=	5.746943
-------	----------

If t(*) absolute is less than t(c)
there has not been an increase
in the value

Signature

**Calculation Sheet for Semi-Annual Evaluation
of Indicator Parameters**

Print Your Name: Lynn Shelton Telephone 722-0227
 Facility Name: GIANT CINIZA EPA ID #: NMD000333211-2
 Date: Fall, 1993 Parameter: pH
 Well Number: MW-2 Up or Downgradient: : DOWN

Please list the values calculated for the background parameters
on the Background Indicator Parameter Calculation Sheet:

X(b)=	8.51	S(b)2=	0.015	t(b)=	2.947
W(b)=	0.000937	n(b)=	16		

Please list the current values for this monitoring well.

	Value	(Value - X(m)) ²
1	9.09	0.105625
2	9.08	0.099225
3	9.1	0.112225
4	9.07	0.093025

Total 1	36.34	Total 2	0.4101
---------	-------	---------	--------

Mean value X(m)	9.085	t(m)=	5.841
Variance S(m)2	0.1367	W(m)=	0.034175

t(*)=	3.068576
-------	----------

t(c)=	5.763730
-------	----------

If t(*) absolute is less than t(c)
there has not been an increase
in the value

Signature

**Calculation Sheet for Semi-Annual Evaluation
of Indicator Parameters**

Print Your Name: Lynn Shelton Telephone 722-0227

Facility Name: GIANT CINIZA EPA ID #: NMD000333211-2

Date: Fall, 1993 Parameter: pH

Well Number: MW-4 Up or Downgradient: UP

Please list the values calculated for the background parameters
on the Background Indicator Parameter Calculation Sheet:

X(b)=	8.51	S(b) ² =	0.015	t(b)=	2.947
W(b)=	0.000937	n(b)=	16		

Please list the current values for this monitoring well.

	Value	(Value - X(m)) ²
1	8.82	0.003025
2	8.83	0.004225
3	8.8	0.001225
4	8.8	0.001225

Total 1	35.25	Total 2	0.0097
---------	-------	---------	--------

Mean value X(m)	8.8125
Variance S(m) ²	0.003233

t(m)=	5.841
W(m)=	0.000808

t(*)=	7.239756
-------	----------

t(c)=	4.286942
-------	----------

If t(*) absolute is less than t(c)
there has not been an increase
in the value

Signature

**Calculation Sheet for Semi-Annual Evaluation
of Indicator Parameters**

Print Your Name: Lynn Shelton Telephone 722-0227
 Facility Name: GIANT CINIZA EPA ID #: NMD000333211-2
 Date: Fall, 1993 Parameter: : pH
 Well Number: MW-5 Up or Downgradient: : DOWN

Please list the values calculated for the background parameters
on the Background Indicator Parameter Calculation Sheet:

X(b)=	8.51	S(b)2=	0.015	t(b)=	2.947
W(b)=	0.000937	n(b)=	16		

Please list the current values for this monitoring well.

	Value	(Value - X(m))2
1	8.96	0.038025
2	8.96	0.038025
3	9	0.055225
4	8.97	0.042025

Total 1	35.89	Total 2	0.1733
---------	-------	---------	--------

Mean value X(m)	8.9725
Variance S(m)2	0.057766

t(m)=	5.841
W(m)=	0.014441

t(*)=	3.729454
-------	----------

t(c)=	5.664584
-------	----------

If t(*) absolute is less than t(c)
there has not been an increase
in the value

Signature

**Calculation Sheet for Semi-Annual Evaluation
of Indicator Parameters**

Print Your Name: Lynn Shelton Telephone 722-0227

Facility Name: GIANT CINIZA EPA ID #: NMD000333211-2

Date: Fall 1993 Parameter: : SPEC. COND.

Well Number: MW-1 Up or Downgradient: : DOWN

Please list the values calculated for the background parameters
on the Background Indicator Parameter Calculation Sheet:

X(b)=	984	S(b)2=	1487	t(b)=	2.602
W(b)=	92.9375	n(b)=	16		

Please list the current values for this monitoring well.

	Value	(Value - X(m)) ²
1	1090	100
2	1080	0
3	1080	0
4	1085	25

Total 1	4335	Total 2	125
---------	------	---------	-----

Mean value X(m)	1083.75
Variance S(m)2	41.66666

t(m)=	4.541
W(m)=	10.41666

t(*)=	9.811805
-------	----------

t(c)=	2.797424
-------	----------

If t(*) absolute is less than t(c)
there has not been an increase
in the value

Signature

**Calculation Sheet for Semi-Annual Evaluation
of Indicator Parameters**

Print Your Name: Lynn Shelton Telephone 722-0227
 Facility Name: GIANT CINIZA EPA ID #: NMD000333211-2
 Date: Fall 1993 Parameter: : SPEC. COND.
 Well Number: MW-2 Up or Downgradient: : DOWN

Please list the values calculated for the background parameters
on the Background Indicator Parameter Calculation Sheet:

X(b)=	984	S(b)2=	1487	t(b)=	2.602
W(b)=	92.9375	n(b)=	16		

Please list the current values for this monitoring well.

	Value	(Value - X(m))2
1	1100	400
2	1110	900
3	1090	100
4	1090	100

Total 1	4390	Total 2	1500
---------	------	---------	------

Mean value X(m)	1097.5	t(m)=	4.541
Variance S(m)2	500	W(m)=	125

t(*)=	7.688292
-------	----------

t(c)=	3.714130
-------	----------

If t(*) absolute is less than t(c)
there has not been an increase
in the value

Signature

**Calculation Sheet for Semi-Annual Evaluation
of Indicator Parameters**

Print Your Name: Lynn Shelton Telephone 722-0227

Facility Name: GIANT CINIZA EPA ID #: NMD000333211-2

Date: Fall 1993 Parameter: : SPEC. COND.

Well Number: MW-4 Up or Downgradient: UP

Please list the values calculated for the background parameters
on the Background Indicator Parameter Calculation Sheet:

X(b)=	984	S(b)2=	1487	t(b)=	2.602
W(b)=	92.9375	n(b)=	16		

Please list the current values for this monitoring well.

	Value	(Value - X(m))2
1	1140	3600
2	1130	2500
3	1130	2500
4	1150	4900

Total 1	4550	Total 2	13500
---------	------	---------	-------

Mean value X(m)	1137.5	t(m)=	4.541
Variance S(m)2	4500	W(m)=	1125

t(*)=	4.398411
-------	----------

t(c)=	4.393040
-------	----------

If t(*) absolute is less than t(c)
there has not been an increase
in the value

Signature

**Calculation Sheet for Semi-Annual Evaluation
of Indicator Parameters**

Print Your Name: Lynn Shelton Telephone 722-0227
 Facility Name: GIANT CINIZA EPA ID #: NMD000333211-2
 Date: Fall 1993 Parameter: : SPEC. COND.
 Well Number: MW-5 Up or Downgradient: : DOWN

Please list the values calculated for the background parameters
on the Background Indicator Parameter Calculation Sheet:

X(b)=	984	S(b)2=	1487	t(b)=	2.602
W(b)=	92.9375	n(b)=	16		

Please list the current values for this monitoring well.

	Value	(Value - X(m))2
1	1110	900
2	1130	2500
3	1120	1600
4	1130	2500
Total 1	4490	Total 2 7500

Mean value X(m)	1122.5	t(m)=	4.541
Variance S(m)2	2500	W(m)=	625

t(*)= 5.168999

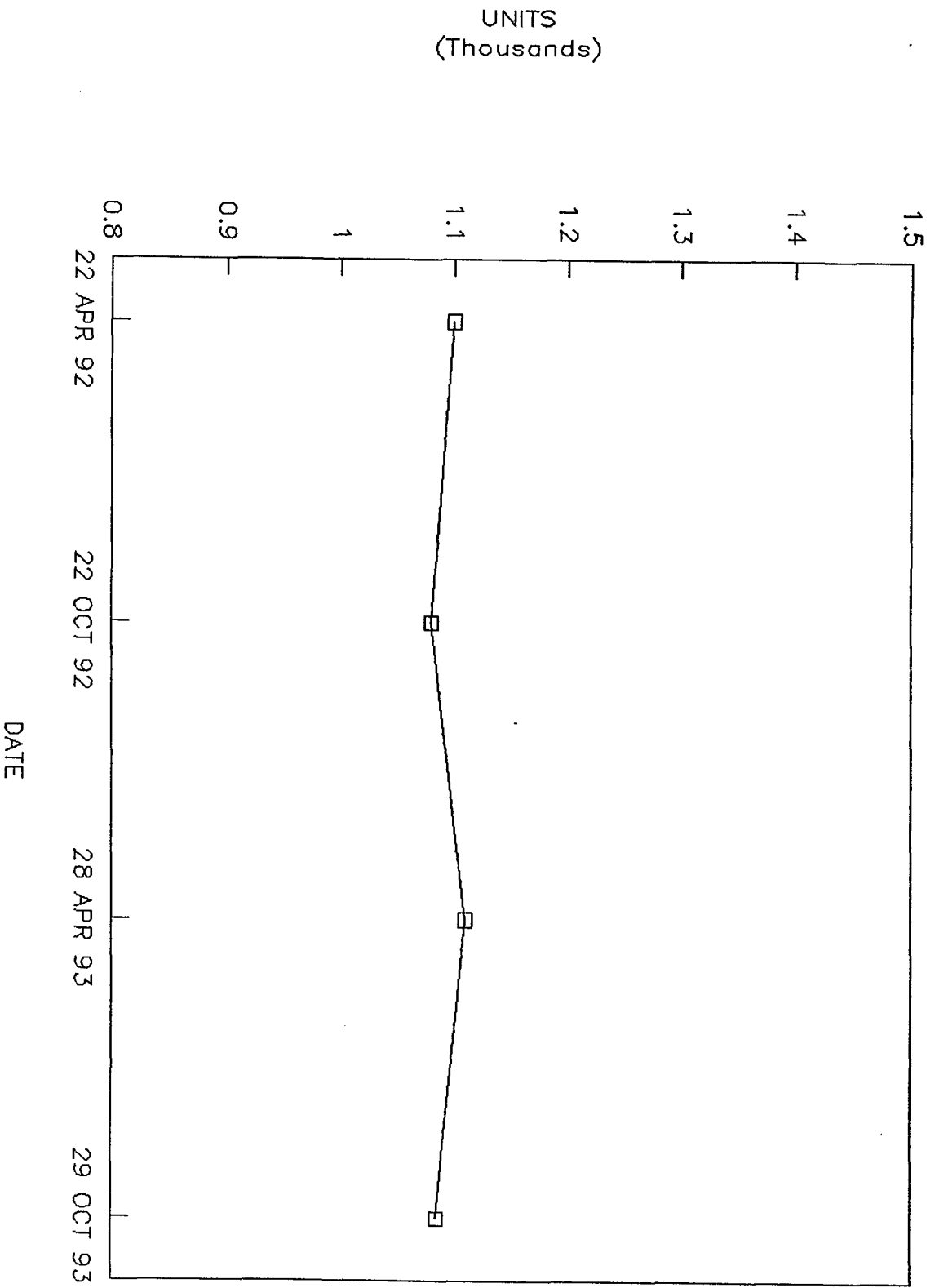
t(c)= 4.289995

If t(*) absolute is less than t(c)
there has not been an increase
in the value

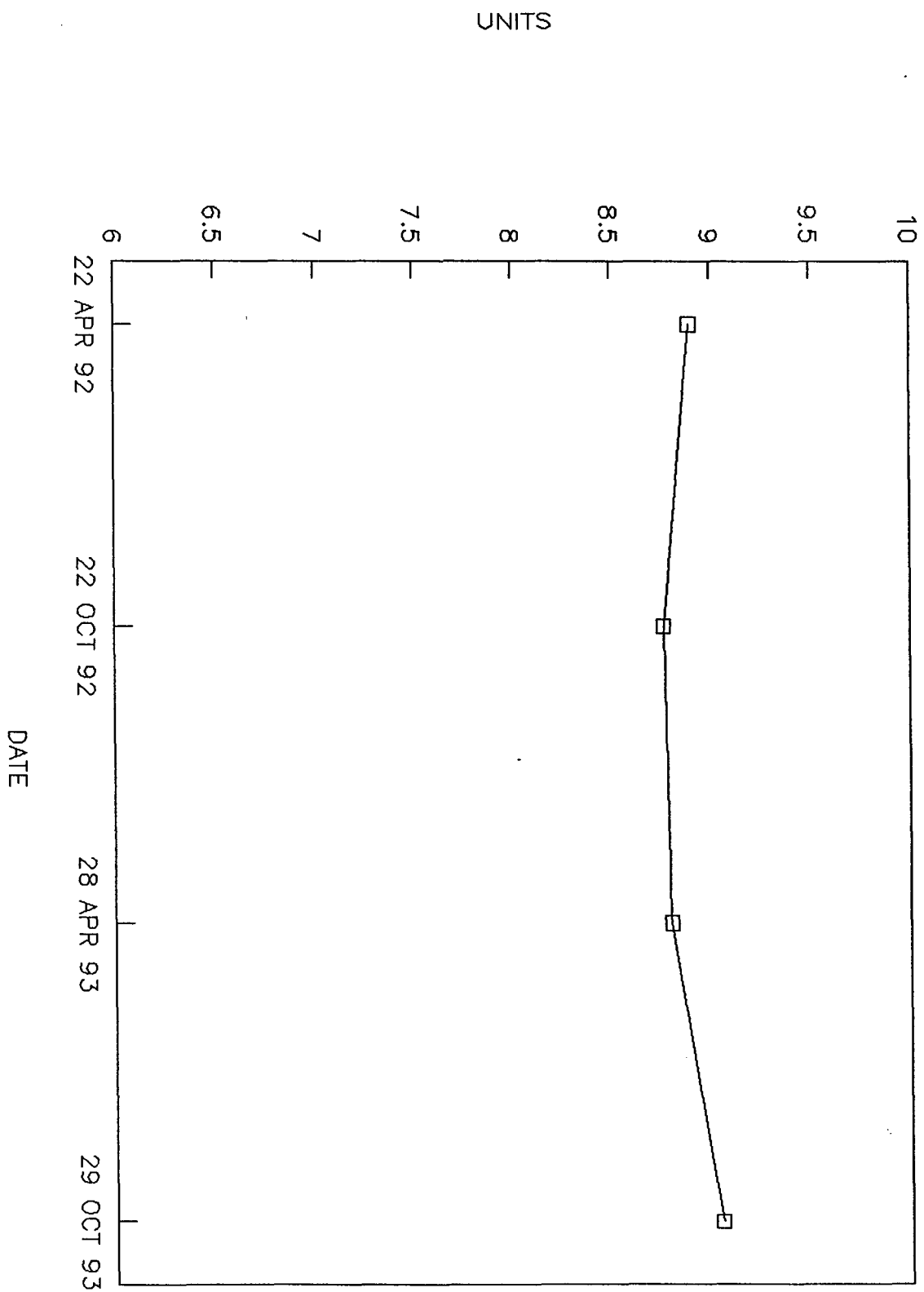
Signature

MONITOR WELL GRAPHS

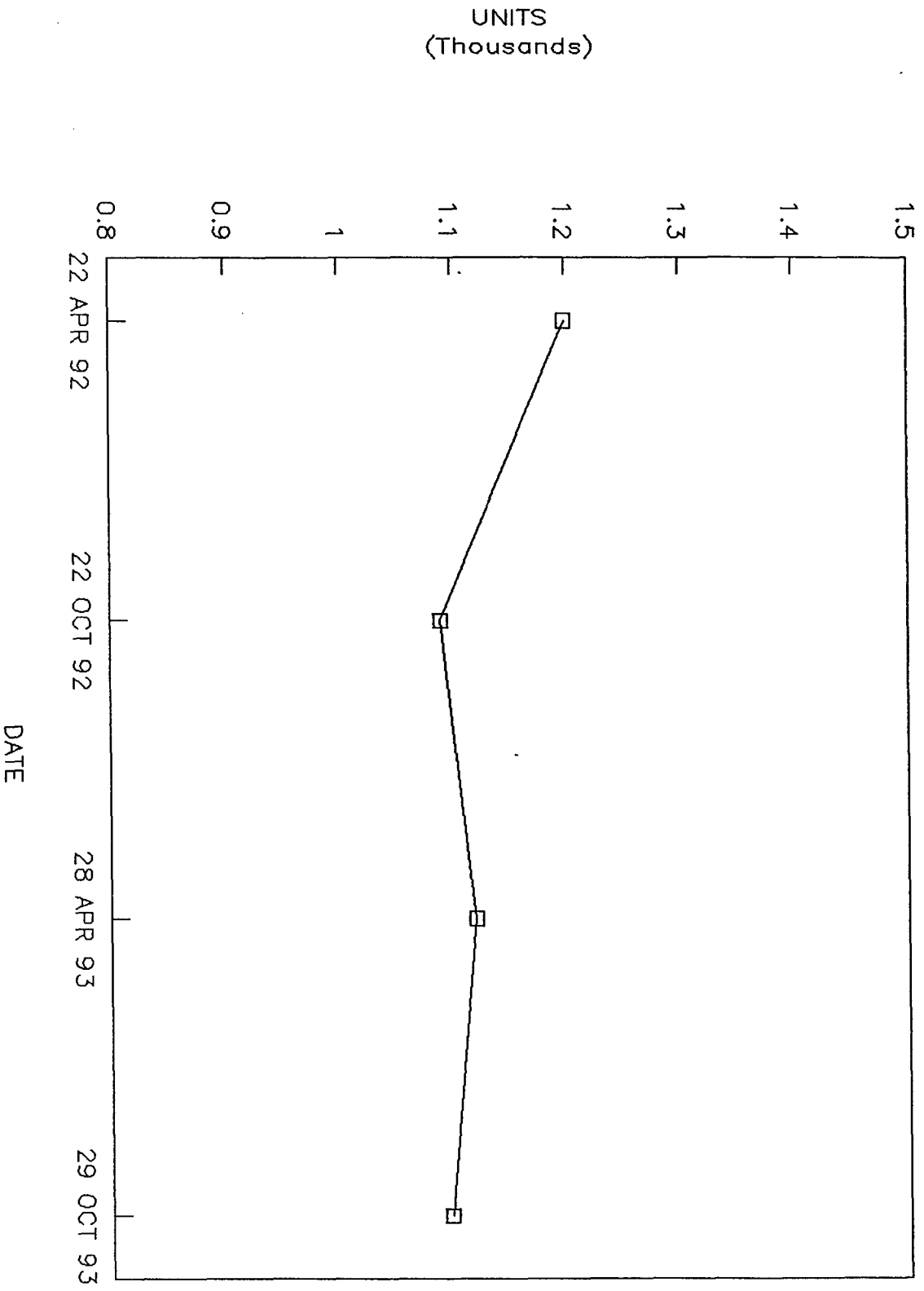
MW-1 EC



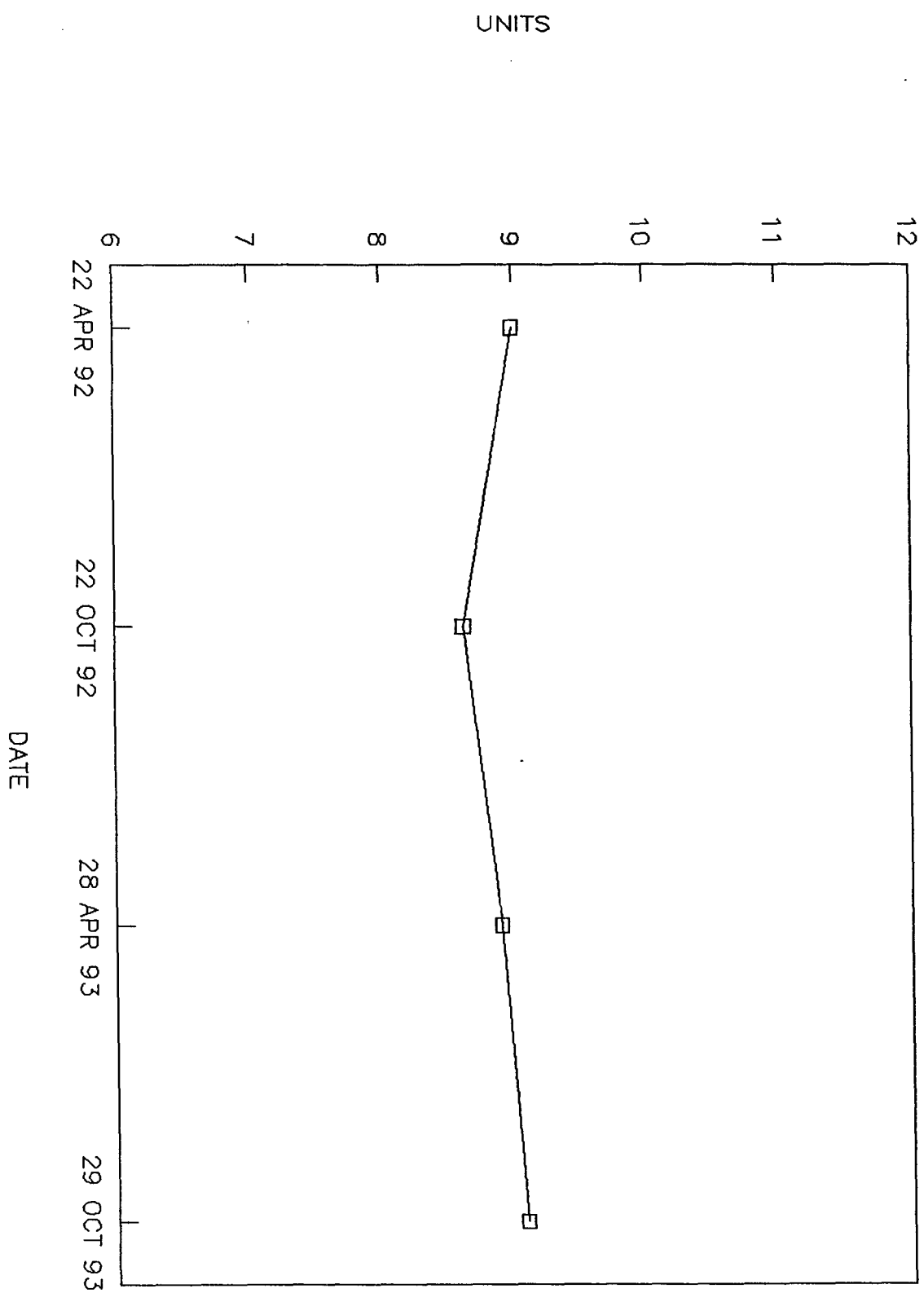
MW-1 pH



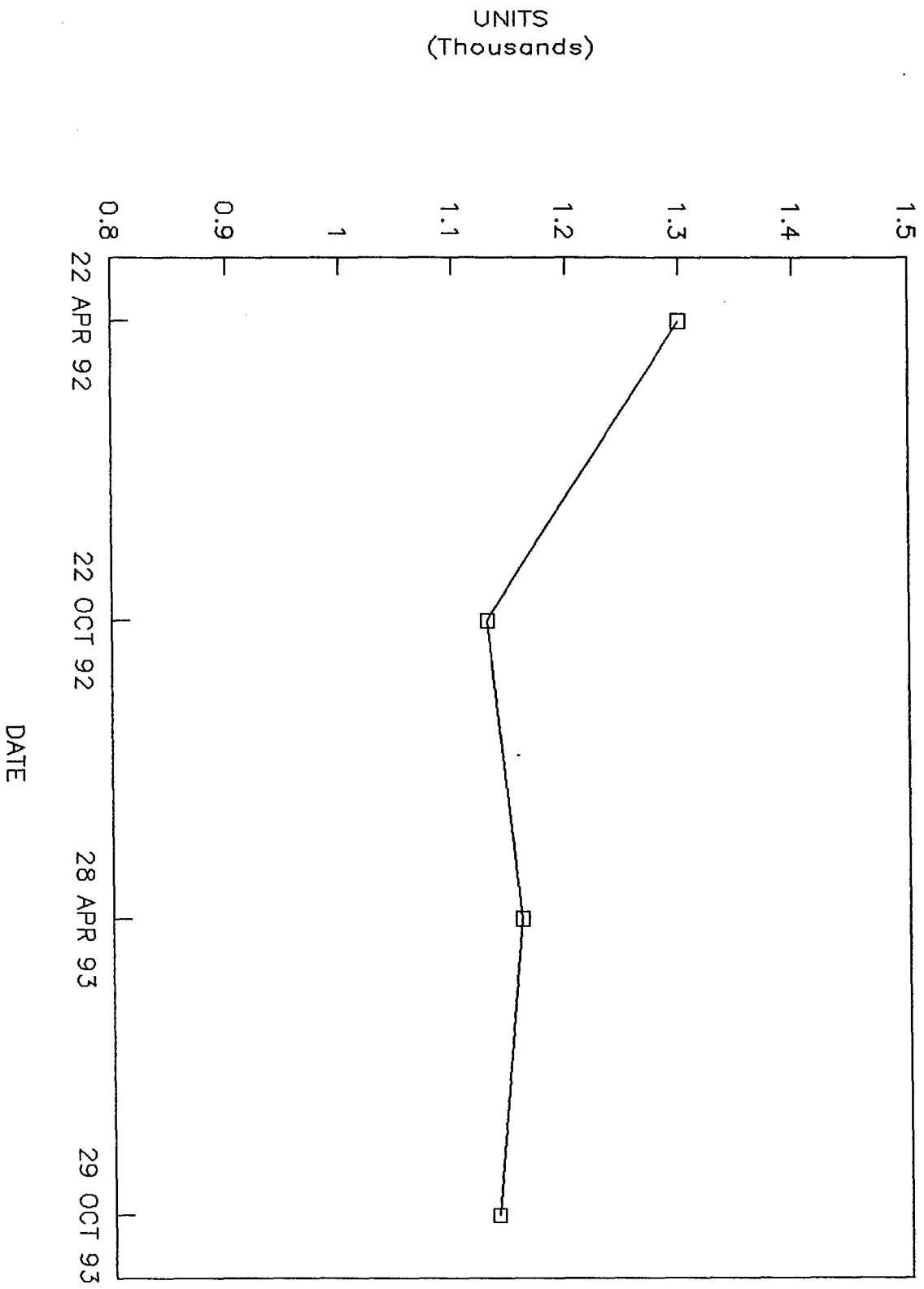
MW-2 EC



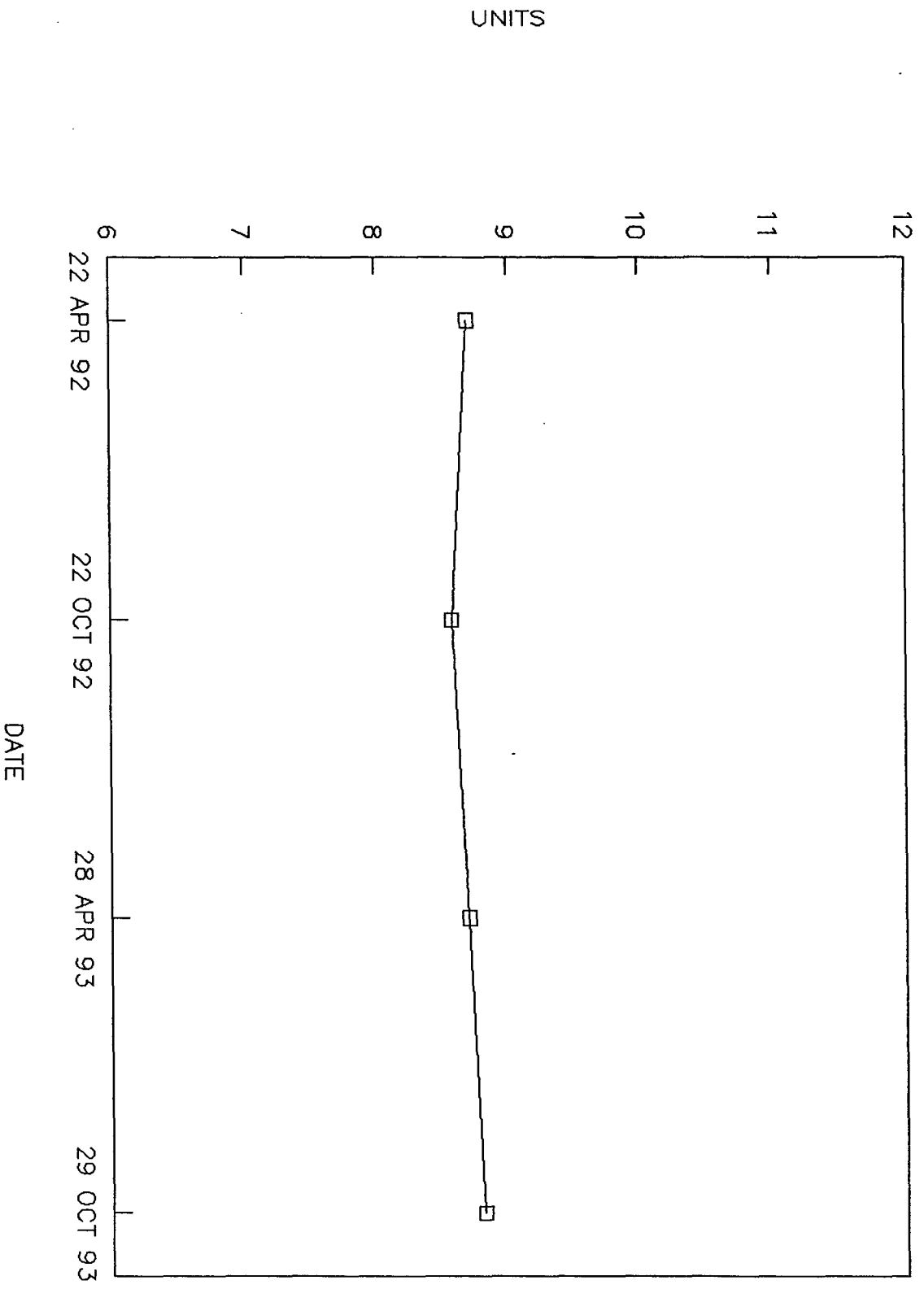
MW-2 pH



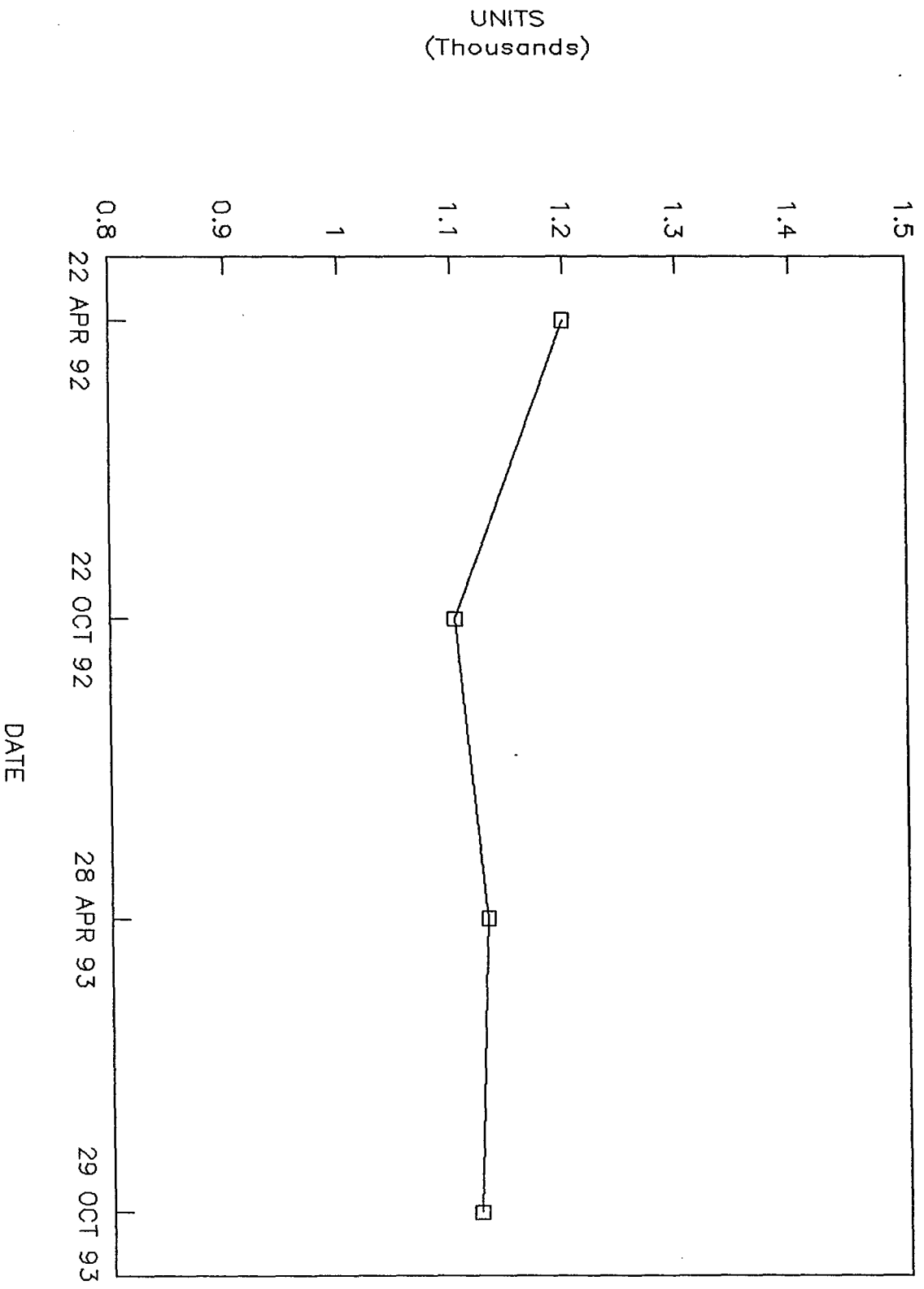
MW-4 EC



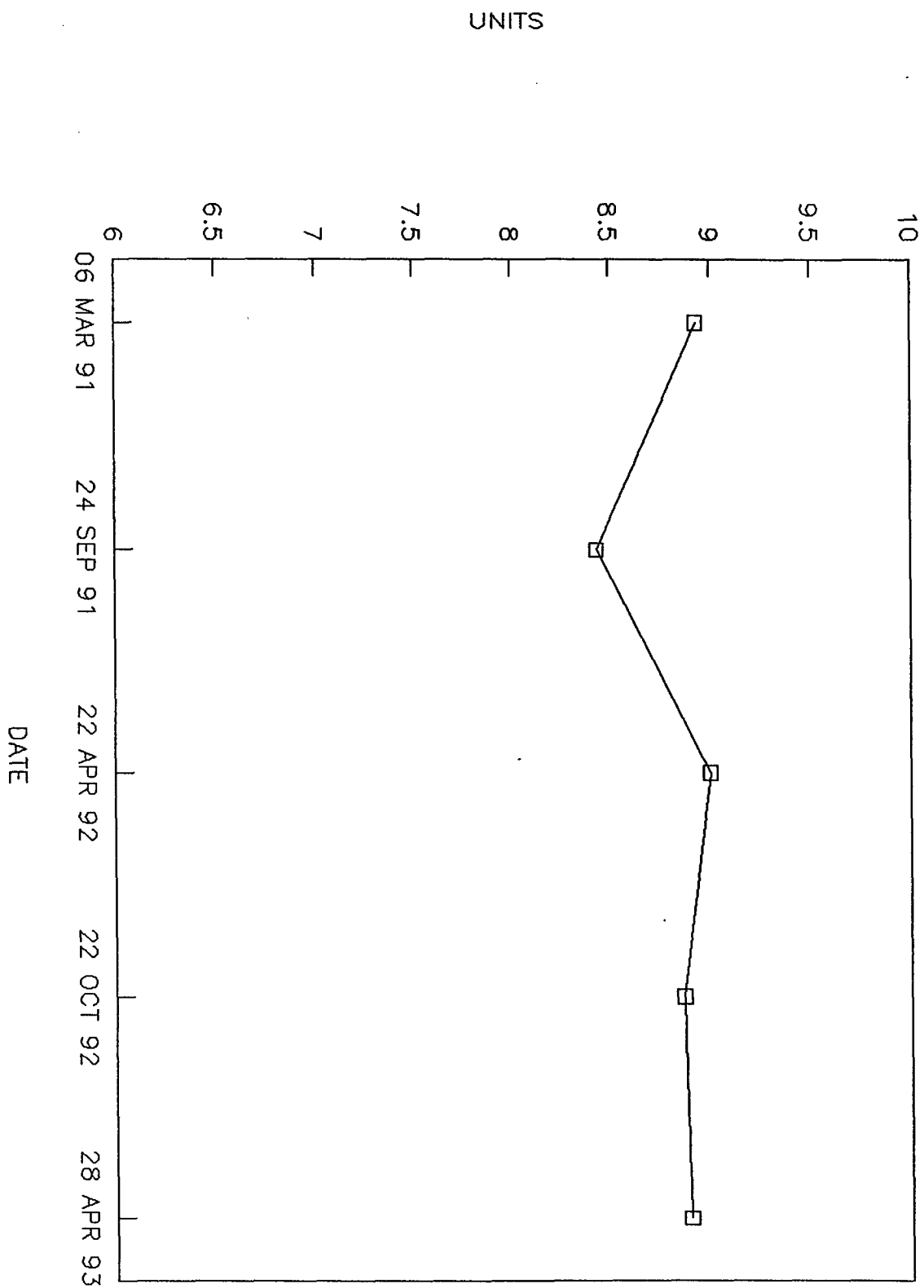
MW-4 pH



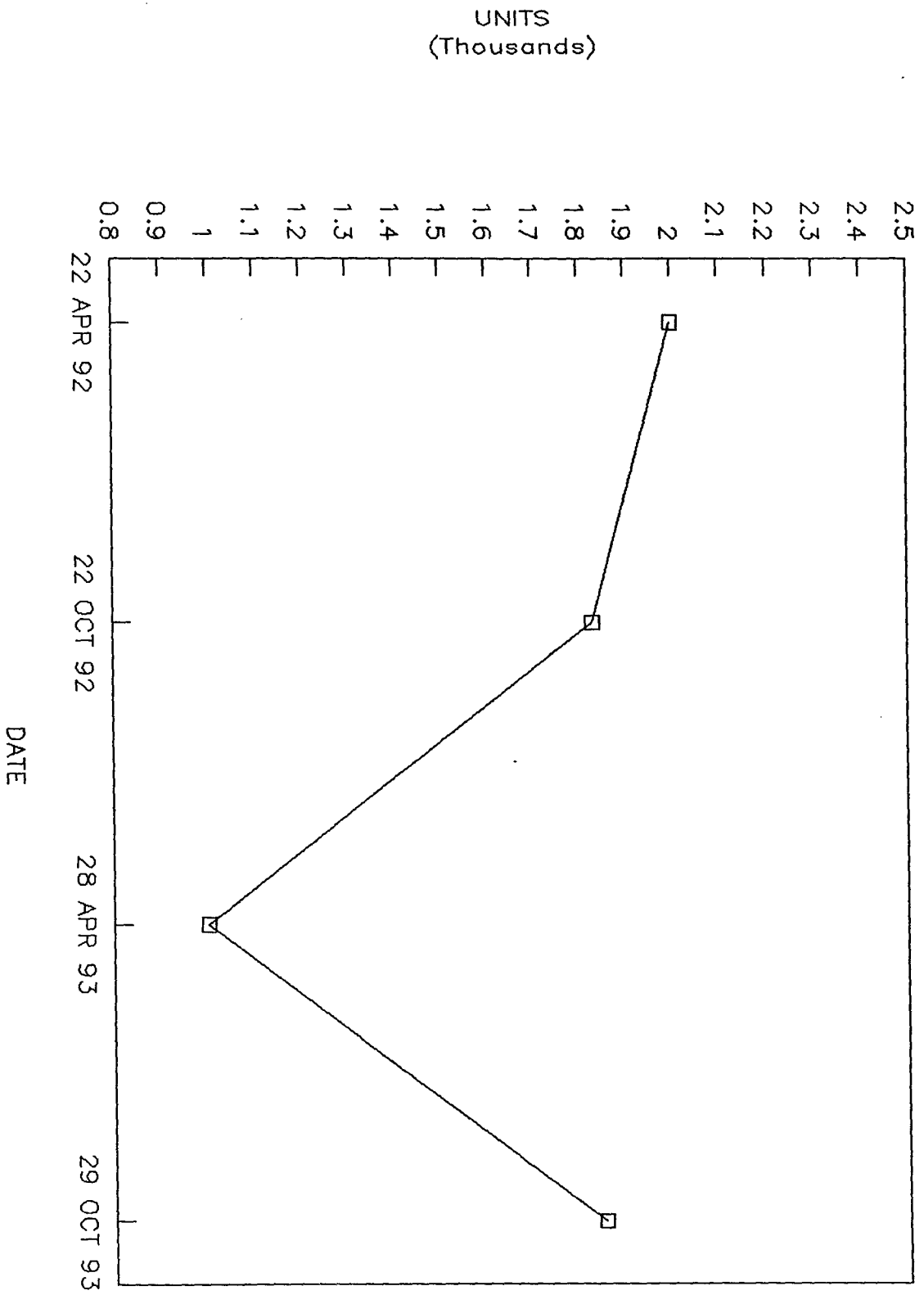
MW-5 EC



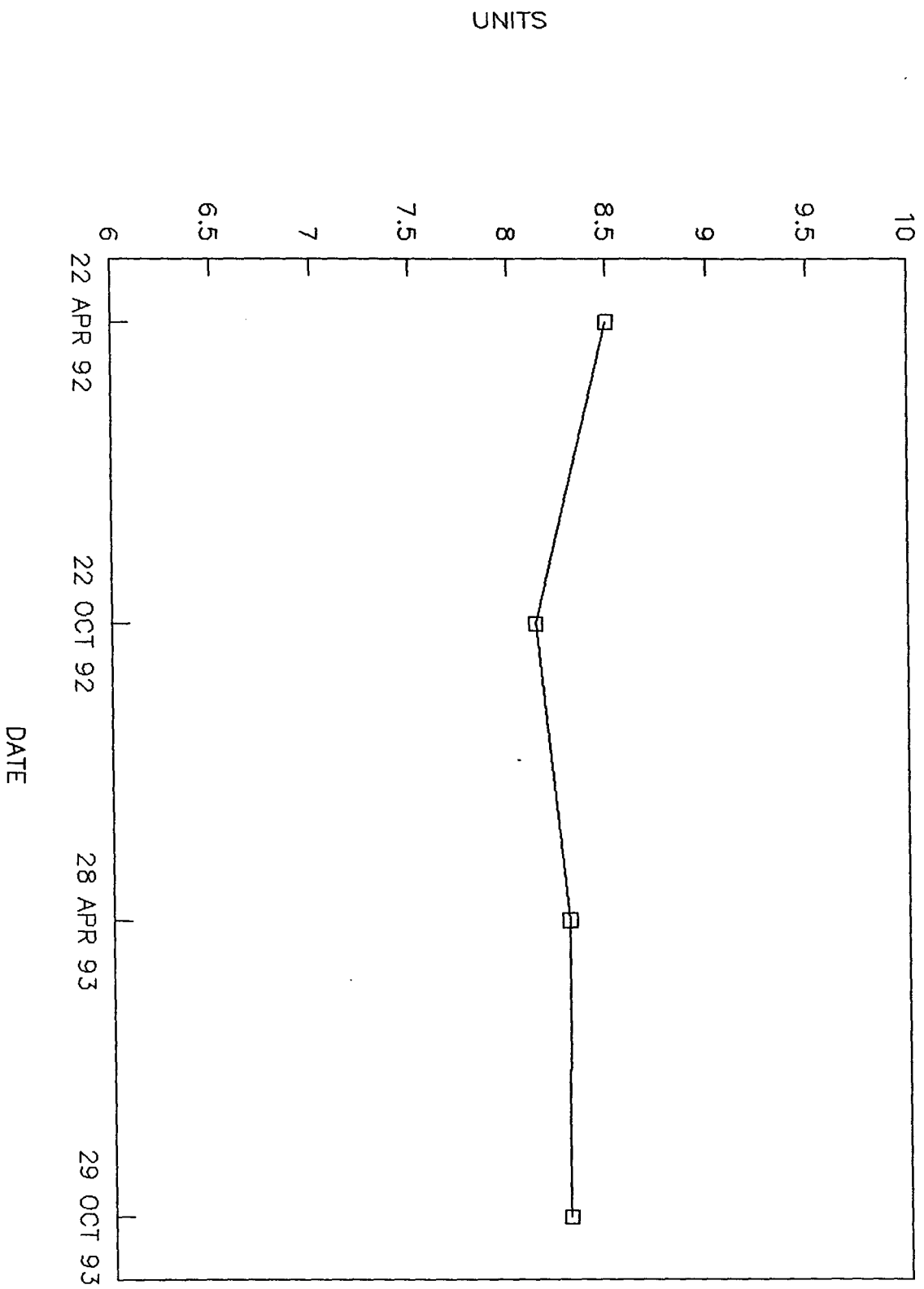
MW-5 pH



OW-11 EC



OW-11 pH



EARLY DETECTION WELL STATISTICS

TOLERANCE INTERVAL

1993

LEAD

SMW-3	4-93	MEAN-	0.0016	SD	0.0017
	11-93	MEAN-	0.0017	SD	0.0017

DATE	RESULT		TOL LIMIT	UNITS	
4-93	0.0025	*	0.005	ppm	Does not exceed the tolerance limit.
11-93	0.0025	*	0.005	ppm	Does not exceed the tolerance limit.

SMW-4	4-93	MEAN-	0.0018	SD	0.0016
	11-93	MEAN-	0.0018	SD	0.0015

DATE	RESULT		TOL LIMIT	UNITS	
4-93	0.0025	*	0.005	ppm	Does not exceed the tolerance limit.
11-93	0.0025	*	0.005	ppm	Does not exceed the tolerance limit.

SMW-5	4-93	MEAN-	0.0015	SD	0.0017
	11-93	MEAN-	0.002	SD	0.0016

DATE	RESULT		TOL LIMIT	UNITS	
4-93	0.0025	*	0.005	ppm	Does not exceed the tolerance limit.
11-93	0.0025	*	0.005	ppm	Does not exceed the tolerance limit.

SMW-6	4-93	MEAN-	0.0015	SD	0.0017
	11-93	MEAN-	0.002	SD	0.0016

DATE	RESULT		TOL LIMIT	UNITS	
4-93	0.0025	*	0.005	ppm	Does not exceed the tolerance limit.
11-93	0.0025	*	0.005	ppm	Does not exceed the tolerance limit.

* 1/2 of Reporting Limit.

TOLERANCE INTERVAL

CHROME

SMW-3	4-93	MEAN-	0.003	SD	0.004
	11-93	MEAN-	0.0036	SD	0.0038

DATE	RESULT	TOL LIMIT	UNITS	
4-93	0.012	0.011	ppm	Exceeds the tolerance limit by 9.1%.
11-93	0.005	0.011	ppm	Exceeds the tolerance limit by 9.1%.

SMW-4	4-93	MEAN-	0.0044	SD	0.0039
	11-93	MEAN-	0.005	SD	0.0037

DATE	RESULT	TOL LIMIT	UNITS	
4-93	0.014	0.012	ppm	Exceeds the tolerance limit by 16.7%.
4-93	D .011	0.012	ppm	Does not exceed the tolerance limit.
11-93	0.005	0.012	ppm	Does not exceed the tolerance limit.

SMW-5	4-93	MEAN-	0.0032	SD	0.0038
	11-93	MEAN-	0.0034	SD	0.0036

DATE	RESULT	TOL LIMIT	UNITS	
4-93	0.012	0.018	ppm	Does not exceed the tolerance limit.
11-93	0.005	0.012	ppm	Does not exceed the tolerance limit.

SMW-6	4-93	MEAN-	0.0035	SD	0.0059
	11-93	MEAN-	0.004	SD	0.0057

DATE	RESULT	TOL LIMIT	UNITS	
4-93	0.02	0.015	ppm	Exceeds the tolerance limit by 33.3%.
11-93	0.005	0.015	ppm	Does not exceed the tolerance limit.

* 1/2 of reporting limit.

TOLERANCE INTERVAL

pH

SMW-3	4-93	MEAN-	7.86	SD	0.1517
	11-93	MEAN-	7.84	SD	0.1524

DATE	RESULT	TOL LIMIT	UNITS	
4-93	7.9	8.163	---	Does not exceed the tolerance limit.
11-93	7.69	8.145	---	Does not exceed the tolerance limit.

SMW-4	4-93	MEAN-	8.309	SD	0.1649
	11-93	MEAN-	8.330	SD	0.1665

DATE	RESULT	TOL LIMIT	UNITS	
4-93	8.2	8.639	---	Does not exceed the tolerance limit.
11-93	8.5	8.663	---	Does not exceed the tolerance limit.

SMW-5	4-93	MEAN-	8.425	SD	0.3405
	11-93	MEAN-	8.450	SD	0.3372

DATE	RESULT	TOL LIMIT	UNITS	
4-93	8.5	9.106	---	Does not exceed the tolerance limit.
11-93	8.74	9.124	---	Does not exceed the tolerance limit.

SMW-6	4-93	MEAN-	8.075	SD	0.2908
	11-93	MEAN-	8.080	SD	0.2773

DATE	RESULT	TOL LIMIT	UNITS	
4-93	8.2	8.657	---	Does not exceed the tolerance limit.
11-93	8.09	8.635	---	Does not exceed the tolerance limit.

TOLERANCE INTERVAL

EC

SMW-3	4-93	MEAN-	3226.13	SD	352.15
	11-93	MEAN-	3225.72	SD	332.0105

DATE	RESULT	TOL LIMIT	UNITS	
4-93	3170	3930.430	---	Does not exceed the tolerance limit.
11-93	3222.5	3889.740	---	Does not exceed the tolerance limit.

SMW-4	4-93	MEAN-	1225	SD	107.98
	11-93	MEAN-	1229.090	SD	103.7604

DATE	RESULT	TOL LIMIT	UNITS	
4-93	1300	1440.960	---	Does not exceed the tolerance limit.
11-93	1270	1436.612	---	Does not exceed the tolerance limit.

SMW-5	4-93	MEAN-	1134.3	SD	85.72
	11-93	MEAN-	1135.270	SD	81.7859

DATE	RESULT	TOL LIMIT	UNITS	
4-93	1130	1305.740	---	Does not exceed the tolerance limit.
11-93	1145	1298.842	---	Does not exceed the tolerance limit.

SMW-6	4-93	MEAN-	1527.5	SD	226.63
	11-93	MEAN-	1540.230	SD	219.8022

DATE	RESULT	TOL LIMIT	UNITS	
4-93	1300	1980.760	---	Does not exceed the tolerance limit.
11-93	1667.5	1979.830	---	Does not exceed the tolerance limit.

TOLERANCE INTERVAL

TEMPERATURE

SMW-3	4-93	MEAN-	55	SD	2.619
	11-93	MEAN-	55.16	SD	2.4841

DATE	RESULT	TOL LIMIT	UNITS	
4-93	56.75	60.240	degrees	Does not exceed the tolerance limit.
11-93	56.25	60.128	degrees	Does not exceed the tolerance limit.

SMW-4	4-93	MEAN-	55.5	SD	2.988
	11-93	MEAN-	55.560	SD	2.8

DATE	RESULT	TOL LIMIT	UNITS	
4-93	56.75	61.476	degrees	Does not exceed the tolerance limit.
11-93	56	61.160	degrees	Does not exceed the tolerance limit.

SMW-5	4-93	MEAN-	54.786	SD	2.852
	11-93	MEAN-	55.000	SD	2.7272

DATE	RESULT	TOL LIMIT	UNITS	
4-93	56.5	60.490	degrees	Does not exceed the tolerance limit.
11-93	56.5	60.454	degrees	Does not exceed the tolerance limit.

SMW-6	4-93	MEAN-	54.929	SD	3.469
	11-93	MEAN-	55.030	SD	3.2559

TOLERANCE INTERVAL

WATER LEVEL

SMW-3

4-93	MEAN-	6850.84	SD	2.08
11-93	MEAN-	6851.04	SD	2.0128

DATE	RESULT	TOL LIMIT	UNITS	
4-93	6846.24	6855.000	feet	Does not exceed the tolerance limit.
11-93	6852.43	6855.066	feet	Does not exceed the tolerance limit.

SMW-4

4-93	MEAN-	6848.63	SD	1.52
11-93	MEAN-	6848.670	SD	1.4261

DATE	RESULT	TOL LIMIT	UNITS	
4-93	6851.67	6851.866	feet	Does not exceed the tolerance limit.
11-93	6848.99	6851.522	feet	Does not exceed the tolerance limit.

SMW-5

4-93	MEAN-	6847.23	SD	1.26
11-93	MEAN-	6847.200	SD	1.1817

DATE	RESULT	TOL LIMIT	UNITS	
4-93	6847.02	6849.75	feet	Does not exceed the tolerance limit.
11-93	6846.98	6849.563	feet	Does not exceed the tolerance limit.

SMW-6

4-93	MEAN-	6856.64	SD	5.03
11-93	MEAN-	6853.190	SD	5.1092

DATE	RESULT	TOL LIMIT	UNITS	
4-93	6848.9	6866.7	feet	Does not exceed the tolerance limit.
11-93	6849.01	6863.408	feet	Does not exceed the tolerance limit.

TOLERANCE INTERVAL

1993

LEAD

SMW-3	4-93	MEAN-	0.0016	SD	0.0017
	11-93	MEAN-	0.0017	SD	0.0017

DATE	RESULT		TOL LIMIT	UNITS	
4-93	0.0025	*	0.005	ppm	Does not exceed the tolerance limit.
11-93	0.0025	*	0.005	ppm	Does not exceed the tolerance limit.

SMW-4	4-93	MEAN-	0.0018	SD	0.0016
	11-93	MEAN-	0.0018	SD	0.0015

DATE	RESULT		TOL LIMIT	UNITS	
4-93	0.0025	*	0.005	ppm	Does not exceed the tolerance limit.
11-93	0.0025	*	0.005	ppm	Does not exceed the tolerance limit.

SMW-5	4-93	MEAN-	0.0015	SD	0.0017
	11-93	MEAN-	0.002	SD	0.0016

DATE	RESULT		TOL LIMIT	UNITS	
4-93	0.0025	*	0.005	ppm	Does not exceed the tolerance limit.
11-93	0.0025	*	0.005	ppm	Does not exceed the tolerance limit.

SMW-6	4-93	MEAN-	0.0015	SD	0.0017
	11-93	MEAN-	0.002	SD	0.0016

DATE	RESULT		TOL LIMIT	UNITS	
4-93	0.0025	*	0.005	ppm	Does not exceed the tolerance limit.
11-93	0.0025	*	0.005	ppm	Does not exceed the tolerance limit.

* 1/2 of Reporting Limit.

TOLERANCE INTERVAL

CHROME

SMW-3	4-93	MEAN-	0.003	SD	0.004
	11-93	MEAN-	0.0036	SD	0.0038

DATE	RESULT		TOL LIMIT	UNITS	
4-93	0.012		0.011	ppm	Exceeds the tolerance limit by 9.1%.
11-93	0.005	*	0.011	ppm	Exceeds the tolerance limit by 9.1%.

SMW-4	4-93	MEAN-	0.0044	SD	0.0039
	11-93	MEAN-	0.005	SD	0.0037

DATE	RESULT		TOL LIMIT	UNITS	
4-93	0.014		0.012	ppm	Exceeds the tolerance limit by 16.7%.
4-93	D .011		0.012	ppm	Does not exceed the tolerance limit.
11-93	0.005	*	0.012	ppm	Does not exceed the tolerance limit.

SMW-5	4-93	MEAN-	0.0032	SD	0.0038
	11-93	MEAN-	0.0034	SD	0.0036

DATE	RESULT		TOL LIMIT	UNITS	
4-93	0.012		0.018	ppm	Does not exceed the tolerance limit.
11-93	0.005	*	0.012	ppm	Does not exceed the tolerance limit.

SMW-6	4-93	MEAN-	0.0035	SD	0.0059
	11-93	MEAN-	0.004	SD	0.0057

DATE	RESULT		TOL LIMIT	UNITS	
4-93	0.02		0.015	ppm	Exceeds the tolerance limit by 33.3%.
11-93	0.005	*	0.015	ppm	Does not exceed the tolerance limit.

* 1/2 of reporting limit.

TOLERANCE INTERVAL

pH

SMW-3	4-93	MEAN-	7.86	SD	0.1517
	11-93	MEAN-	7.84	SD	0.1524

DATE	RESULT	TOL LIMIT	UNITS	
4-93	7.9	8.163	---	Does not exceed the tolerance limit.
11-93	7.69	8.145	---	Does not exceed the tolerance limit.

SMW-4	4-93	MEAN-	8.309	SD	0.1649
	11-93	MEAN-	8.330	SD	0.1665

DATE	RESULT	TOL LIMIT	UNITS	
4-93	8.2	8.639	---	Does not exceed the tolerance limit.
11-93	8.5	8.663	---	Does not exceed the tolerance limit.

SMW-5	4-93	MEAN-	8.425	SD	0.3405
	11-93	MEAN-	8.450	SD	0.3372

DATE	RESULT	TOL LIMIT	UNITS	
4-93	8.5	9.106	---	Does not exceed the tolerance limit.
11-93	8.74	9.124	---	Does not exceed the tolerance limit.

SMW-6	4-93	MEAN-	8.075	SD	0.2908
	11-93	MEAN-	8.080	SD	0.2773

DATE	RESULT	TOL LIMIT	UNITS	
4-93	8.2	8.657	---	Does not exceed the tolerance limit.
11-93	8.09	8.635	---	Does not exceed the tolerance limit.

TOLERANCE INTERVAL

EC

SMW-3	4-93	MEAN-	3226.13	SD	352.15
	11-93	MEAN-	3225.72	SD	332.0105

DATE	RESULT	TOL LIMIT	UNITS	
4-93	3170	3930.430	----	Does not exceed the tolerance limit.
11-93	3222.5	3889.740	----	Does not exceed the tolerance limit.

SMW-4	4-93	MEAN-	1225	SD	107.98
	11-93	MEAN-	1229.090	SD	103.7604

DATE	RESULT	TOL LIMIT	UNITS	
4-93	1300	1440.960	----	Does not exceed the tolerance limit.
11-93	1270	1436.612	----	Does not exceed the tolerance limit.

SMW-5	4-93	MEAN-	1134.3	SD	85.72
	11-93	MEAN-	1135.270	SD	81.7859

DATE	RESULT	TOL LIMIT	UNITS	
4-93	1130	1305.740	---	Does not exceed the tolerance limit.
11-93	1145	1298.842	---	Does not exceed the tolerance limit.

SMW-6	4-93	MEAN-	1527.5	SD	226.63
	11-93	MEAN-	1540.230	SD	219.8022

DATE	RESULT	TOL LIMIT	UNITS	
4-93	1300	1980.760	---	Does not exceed the tolerance limit.
11-93	1667.5	1979.830	---	Does not exceed the tolerance limit.

TOLERANCE INTERVAL

TEMPERATURE

SMW-3

4-93	MEAN-	55	SD	2.619
11-93	MEAN-	55.16	SD	2.4841

DATE	RESULT	TOL LIMIT	UNITS	
4-93	56.75	60.240	degrees	Does not exceed the tolerance limit.
11-93	56.25	60.128	degrees	Does not exceed the tolerance limit.

SMW-4

4-93	MEAN-	55.5	SD	2.988
11-93	MEAN-	55.560	SD	2.8

DATE	RESULT	TOL LIMIT	UNITS	
4-93	56.75	61.476	degrees	Does not exceed the tolerance limit.
11-93	56	61.160	degrees	Does not exceed the tolerance limit.

SMW-5

4-93	MEAN-	54.786	SD	2.852
11-93	MEAN-	55.000	SD	2.7272

DATE	RESULT	TOL LIMIT	UNITS	
4-93	56.5	60.490	degrees	Does not exceed the tolerance limit.
11-93	56.5	60.454	degrees	Does not exceed the tolerance limit.

SMW-6

4-93	MEAN-	54.929	SD	3.469
11-93	MEAN-	55.030	SD	3.2559

TOLERANCE INTERVAL

WATER LEVEL

SMW-3	4-93	MEAN-	6850.84	SD	2.08
	11-93	MEAN-	6851.04	SD	2.0128

DATE	RESULT	TOL LIMIT	UNITS	
4-93	6846.24	6855.000	feet	Does not exceed the tolerance limit.
11-93	6852.43	6855.066	feet	Does not exceed the tolerance limit.

SMW-4	4-93	MEAN-	6848.63	SD	1.52
	11-93	MEAN-	6848.670	SD	1.4261

DATE	RESULT	TOL LIMIT	UNITS	
4-93	6851.67	6851.866	feet	Does not exceed the tolerance limit.
11-93	6848.99	6851.522	feet	Does not exceed the tolerance limit.

SMW-5	4-93	MEAN-	6847.23	SD	1.26
	11-93	MEAN-	6847.200	SD	1.1817

DATE	RESULT	TOL LIMIT	UNITS	
4-93	6847.02	6849.75	feet	Does not exceed the tolerance limit.
11-93	6846.98	6849.563	feet	Does not exceed the tolerance limit.

SMW-6	4-93	MEAN-	6856.64	SD	5.03
	11-93	MEAN-	6853.190	SD	5.1092

DATE	RESULT	TOL LIMIT	UNITS	
4-93	6848.9	6866.7	feet	Does not exceed the tolerance limit.
11-93	6849.01	6863.408	feet	Does not exceed the tolerance limit.

TABULATED ANALYTICAL DATA

OW-1 Giant Refining Gallup, New Mexico

**Volatile Organics
Method 8240**

Parameter	28 APR 93 Result	4 JUN 93 Result*	14 JUL 93 Result**	29 OCT 93 Result	Units
Benzene	ND	0.9	ND	ND	ug/L
Toluene	2.3	1.9	1.4	ND	ug/L
Ethylbenzene	ND	ND	ND	ND	ug/L
Xylenes (total)	ND	1.6	0.6	ND	ug/L

* Resampled OW-1 on June 4, 1993 to verify toluene.

** Resampled OW-1 on July 14, 1993 to verify BTEX.

OW-11

Giant Refining Gallup, New Mexico

Volatile Organics
Method 8240

Parameter	22 APR 92 Result	22 OCT 92 Result	28 APR 93 Result	29 OCT 93 Result	Units
1,1-Dichloroethene	ND	ND	ND	ND	ug/L
2-Butanone	ND	---	ND	ND	ug/L
1,1,1-Trichloroethane	ND	ND	ND	ND	ug/L
Benzene	ND	ND	ND	ND	ug/L
Tetrachloroethene	ND	ND	ND	ND	ug/L
Toluene	ND	ND	ND	ND	ug/L
Ethylbenzene	ND	ND	ND	ND	ug/L
Xylenes (total)	ND	ND	ND	ND	ug/L
Acetone		6.2 J	ND	ND	ug/L
Carbon Disulfide		16	ND	ND	ug/L
Chloromethane	ND	ND	ND	ND	ug/L
Bromomethane	ND	ND	ND	ND	ug/L
Vinyl Chloride	ND	ND	ND	ND	ug/L
Chloroethane	ND	ND	ND	ND	ug/L
Methylene Chloride	ND	ND	ND	ND	ug/L
Carbon Disulfide	ND	ND	ND	ND	ug/L
1,1-Dichloroethane	ND	ND	ND	ND	ug/L
1,2-Dichloroethene (Total)	ND	ND	ND	ND	ug/L
Chloroform	ND	ND	ND	ND	ug/L
1,2-Dichloroethane	ND	ND	ND	ND	ug/L
Carbon Tetrachloride	ND	ND	ND	ND	ug/L
Vinyl Acetate	ND	ND	ND	ND	ug/L
Bromodichloromethane	ND	ND	ND	ND	ug/L
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ug/L
1,2-Dichloropropane	ND	ND	ND	ND	ug/L
Trans-1,3-Dichloropropene	ND	ND	ND	ND	ug/L
Trichloroethene	ND	ND	ND	ND	ug/L
Dibromochloromethane	ND	---	ND	ND	ug/L
1,1,2-Trichloroethane	ND	ND	ND	ND	ug/L
Cis-1,3-Dichloropropene	ND	ND	ND	ND	ug/L
2-Chloroethylvinylether	ND	ND	ND	ND	ug/L
Bromoform	ND	ND	ND	ND	ug/L
2-Hexanone (MBK)	ND	ND	ND	ND	ug/L
4-Methyl-2-Pentanone (MIBK)	ND	ND	ND	ND	ug/L
Chlorobenzene	ND	ND	ND	ND	ug/L
Styrene	ND	ND	ND	ND	ug/L

OW-11 Giant Refining Gallup, New Mexico

Metals
Total Metals

Parameter	22 APR 92 Result	22 OCT 92 Result	28 APR 93 Result	29 OCT 93 Result	Units
Chromium	ND	0.010	ND	ND	mg/L
Lead	ND	ND	ND	ND	mg/L
Mercury	ND	---	ND	---	mg/L

OW-11 Giant Refining Gallup, New Mexico

General Inorganics

Parameter	22 APR 92 Result	22 OCT 92 Result	28 APR 93 Result	29 OCT 93 Result	Units
Alkalinity, Bicarb. as CaCO3 at pH 4.5	450	----	485	----	mg/L
Alkalinity, Carb. as CaCO3 at pH 8.3	ND	----	ND	----	mg/L
Chloride	160	----	160	----	mg/L
pH	8.5	8.12	8.3	8.26	units
pH	----	8.12	----	8.31	units
pH	----	8.11	----	8.32	units
pH	----	8.2	----	8.3	units
	8.5	8.1375		8.2975	
Phenolics	ND	ND	ND	ND	mg/L
Sulfate	410	----	200	----	mg/L
Specific Conductance at 25 deg.C	2000	1820	1800	1840	mhos/c
Specific Conductance at 25 deg.C	----	1840	----	1870	mhos/c
Specific Conductance at 25 deg.C	----	1840	----	1820	mhos/c
Specific Conductance at 25 deg.C	----	1820	----	1880	mhos/c
	2000	1830		1852.5	
Total Organic Carbon	10	6.80	4	3	mg/L
Total Organic Carbon	----	6.20	----	3	mg/L
Total Organic Carbon	----	----	----	----	mg/L
Total Organic Carbon	----	----	----	----	mg/L
Total Organic Halogen as Cl	170	0.021	30	200	ug/L
Total Organic Halogen as Cl	----	0.023	----	200	ug/L
Total Organic Halogen as Cl	----	----	----	----	ug/L
Total Organic Halogen as Cl	----	----	----	----	ug/L
Total Dissolved Solids	----	----	1100	----	mg/L
Water Elevation	6904.56	6905.01	6905.79	6905.62	ft

MW-1 GIANT REFINING GALLUP, NEW MEXICO

Volatile Organics Method 8240

Parameter	23 APR 92 Result	22 OCT 92 Result	29 APR 93 Result	29 OCT 93 Result	Units
Chloromethane	ND	ND	ND	ND	ug/L
Bromomethane	ND	ND	ND	ND	ug/L
Vinyl chloride	ND	ND	ND	ND	ug/L
Chloroethane	ND	ND	ND	ND	ug/L
Methylene chloride	ND	ND	ND	ND	ug/L
Acetone	ND	4.1 J	ND	ND	ug/L
Carbon disulfide	ND	36	ND	ND	ug/L
1,1-Dichloroethene	ND	ND	ND	ND	ug/L
1,1-Dichloroethane	ND	ND	ND	ND	ug/L
1,2-Dichloroethene (cis/trans)	ND	ND	ND	ND	ug/L
Chloroform	ND	ND	ND	ND	ug/L
1,2-Dichloroethane	ND	ND	ND	ND	ug/L
2-Butanone	ND	----	ND	ND	ug/L
1,1,1-Trichloroethane	ND	ND	ND	ND	ug/L
Carbon tetrachloride	ND	ND	ND	ND	ug/L
Vinyl acetate	ND	ND	ND	ND	ug/L
Bromodichloromethane	ND	ND	ND	ND	ug/L
trans-1,3-Dichloropropene	ND	ND	ND	ND	ug/L
Trichloroethene	ND	ND	ND	ND	ug/L
Chlorodibromomethane	ND	ND	ND	ND	ug/L
1,1,2-Trichloroethane	ND	ND	ND	ND	ug/L
Benzene	ND	ND	ND	ND	ug/L
cis-1,3-Dichloropropene	ND	ND	ND	ND	ug/L
2-Chloroethyl vinyl ether	ND	ND	ND	ND	ug/L
Bromoform	ND	ND	ND	ND	ug/L
4-Methyl-2-pentanone	ND	----	ND	ND	ug/L
2-Hexanone	ND	ND	ND	ND	ug/L
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ug/L
Tetrachloroethene	ND	ND	ND	ND	ug/L
Toluene	ND	ND	ND	ND	ug/L
Chlorobenzene	ND	ND	ND	ND	ug/L
Ethylbenzene	ND	ND	ND	ND	ug/L
Stryene	ND	ND	ND	ND	ug/L
Xylenes (total)	ND	ND	ND	ND	ug/L
1,1,2 Trichloro-1,2,2- trifluoroethane	ND	----	----	----	ug/L
1,2-Dibromoethane (EDB)	----	----	----	----	ug/L
1,2-Dichlorobenzene	ND	----	----	----	ug/L
1,3-Dichlorobenzene	ND	----	----	----	ug/L

MW-1

Giant Refining Gallup, New Mexico

Metals
Total Metals

Parameter	23 APR 92 Result	22 OCT 92 Result	28 APR 93 Result	29 OCT 93 Result	Units
Chromium	ND	0.025	ND	ND	mg/L
Lead	0.084	0.004	ND	.036	mg/L
Mercury	ND	---	ND	---	mg/L

MW-1

Giant Refining Gallup, New Mexico

General Inorganics

Parameter	23 APR 92 Result	22 OCT 92 Result	28 APR 93 Result	29 OCT 93 Result	Units
Alkalinity, Bicarb. as CaCO ₃ at pH 4.5	270	---	322	---	mg/L
Alkalinity, Carb. as CaCO ₃ at pH 8.3	80	---	26	---	mg/L
Chloride	56	---	49	---	mg/L
pH	8.9	8.76	8.8	9.05	units
pH		8.78	---	9	units
pH		8.78	---	9.08	units
pH		8.74	---	9.08	units
	8.9	8.765	8.8	9.0525	
Phenolics	0.02	---	ND	ND	mg/L
Sulfate	160	---	150	---	mg/L
Specific Conductance at 25 deg.C	1100	1070	1110	1090	mhos/c
Specific Conductance at 25 deg.C		1090	---	1080	mhos/c
Specific Conductance at 25 deg.C		1070	---	1080	mhos/c
Specific Conductance at 25 deg.C		1090	---	1090	mhos/c
	1100	1080	1110	1085	
Total Organic Carbon	15	1.5	ND	ND	mg/L
Total Organic Carbon		3.0	---	ND	mg/L
Total Organic Carbon		---	---	---	mg/L
Total Organic Carbon		---	---	---	mg/L
Total Organic Halogen as Cl	ND	0.015	ND	ND	ug/L
Total Organic Halogen as Cl		0.020	---	ND	ug/L
Total Organic Halogen as Cl		---	---	---	ug/L
Total Organic Halogen as Cl		---	---	---	ug/L
Total Dissolved Solids	1400	---	690	---	mg/L
Water Elevation	6871.35	6872.82	6873.52	6864.61	ft

MW-2

Giant Refining Gallup, New Mexico

Volatile Organics
Method 8240

Parameter	23 APR 92 Result	22 OCT 92 Result	28 APR 93 Result	29 OCT 93 Result	Units
Chloromethane	ND	ND	ND	ND	ug/L
Bromomethane	ND	ND	ND	ND	ug/L
Vinyl chloride	ND	ND	ND	ND	ug/L
Chloroethane	ND	ND	ND	ND	ug/L
Methylene chloride	ND	ND	ND	ND	ug/L
Acetone	ND	4.3 J	ND	ND	ug/L
Carbon disulfide	ND	17	ND	ND	ug/L
1,1-Dichloroethene	ND	ND	ND	ND	ug/L
1,1-Dichloroethane	ND	ND	ND	ND	ug/L
1,2-Dichloroethene (cis/trans)	ND	ND	ND	ND	ug/L
Chloroform	ND	ND	ND	ND	ug/L
1,2-Dichloroethane	ND	ND	ND	ND	ug/L
2-Butanone	ND	---	ND	ND	ug/L
1,1,1-Trichloroethane	ND	ND	ND	ND	ug/L
Carbon tetrachloride	ND	ND	ND	ND	ug/L
Vinyl acetate	ND	ND	ND	ND	ug/L
Bromodichloromethane	ND	ND	ND	ND	ug/L
trans-1,3-Dichloropropene	ND	ND	ND	ND	ug/L
Trichloroethene	ND	ND	ND	ND	ug/L
Chlorodibromomethane	ND	ND	ND	ND	ug/L
1,1,2-Trichloroethane	ND	ND	ND	ND	ug/L
Benzene	ND	ND	ND	ND	ug/L
cis-1,3-Dichloropropene	ND	ND	ND	ND	ug/L
2-Chloroethyl vinyl ether	ND	ND	ND	ND	ug/L
Bromoform	ND	ND	ND	ND	ug/L
4-Methyl-2-pentanone	ND	---	ND	ND	ug/L
2-Hexanone	ND	ND	ND	ND	ug/L
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ug/L
Tetrachloroethene	ND	ND	ND	ND	ug/L
Toluene	ND	ND	ND	ND	ug/L
Chlorobenzene	ND	ND	ND	ND	ug/L
Ethylbenzene	ND	ND	ND	ND	ug/L
Stryene	ND	ND	ND	ND	ug/L
Xylenes (total)	ND	ND	ND	ND	ug/L

MW-2

Giant Refining Gallup, New Mexico

Metals
Total Metals

Parameter	23 APR 92 Result	22 OCT 92 Result	28 APR 93 Result	29 OCT 93 Result	Units
Chromium	ND	0.012	ND	ND	mg/L
Lead	ND	ND	ND	.003	mg/L
Mercury	ND	---	ND	---	mg/L

MW-2

Giant Refining Gallup, New Mexico

General Inorganics

Parameter	23 APR 92 Result	22 OCT 92 Result	28 APR 93 Result	29 OCT 93 Result	Units
Alkalinity, Bicarb. as CaCO3 at pH 4.5	250	----	303	----	mg/L
Alkalinity, Carb. as CaCO3 at pH 8.3	100	----	33	----	mg/L
Chloride	64	----	57	----	mg/L
pH	9.0	8.67	8.9	9.09	units
pH		8.61		9.08	units
pH		8.6		9.1	units
pH		8.61		9.07	units
	9	8.6225	8.9	9.085	
Phenolics	ND	----	ND	----	mg/L
Sulfate	170	----	160	----	mg/L
Specific Conductance at 25 deg.C	1200	1050	1120	1100	mhos/c
Specific Conductance at 25 deg.C		1130		1110	mhos/c
Specific Conductance at 25 deg.C		1100		1090	mhos/c
Specific Conductance at 25 deg.C		1080		1090	mhos/c
	1200	1090	1120	1097.5	
Total Organic Carbon	ND	1.60	1	ND	mg/L
Total Organic Carbon		ND		ND	mg/L
Total Organic Carbon		----		----	mg/L
Total Organic Carbon		----		----	mg/L
Total Organic Halogen as Cl	ND	ND	ND	ND	ug/L
Total Organic Halogen as Cl		ND		ND	ug/L
Total Organic Halogen as Cl		----		----	ug/L
Total Organic Halogen as Cl		----		----	ug/L
Total Dissolved Solids	1200	----	680	----	mg/L
Water Elevation	6872.88	6872.05	6872.62	6872.65	ft

MW-4

Giant Refining Gallup, New Mexico

Volatile Organics
Method 8240

Parameter	23 APR 92 Result	22 OCT 92 Result	28 APR 93 Result	29 OCT 93 Result	Units
Chloromethane	ND	ND	ND	ND	ug/L
Bromomethane	ND	ND	ND	ND	ug/L
Vinyl chloride	ND	ND	ND	ND	ug/L
Chloroethane	ND	ND	ND	ND	ug/L
Methylene chloride	ND	ND	ND	ND	ug/L
Acetone	ND	4.7 J	ND	ND	ug/L
Carbon disulfide	ND	2.8	ND	ND	ug/L
1,1-Dichloroethene	ND	ND	ND	ND	ug/L
1,1-Dichloroethane	ND	ND	ND	ND	ug/L
1,2-Dichloroethene (cis/trans)	ND	ND	ND	ND	ug/L
Chloroform	ND	ND	ND	ND	ug/L
1,2-Dichloroethane	ND	ND	ND	ND	ug/L
2-Butanone	ND	---	ND	ND	ug/L
1,1,1-Trichloroethane	ND	ND	ND	ND	ug/L
Carbon tetrachloride	ND	ND	ND	ND	ug/L
Vinyl acetate	ND	ND	ND	ND	ug/L
Bromodichloromethane	ND	ND	ND	ND	ug/L
trans-1,3-Dichloropropene	ND	ND	ND	ND	ug/L
Trichloroethene	ND	ND	ND	ND	ug/L
Chlorodibromomethane	ND	ND	ND	ND	ug/L
1,1,2-Trichloroethane	ND	ND	ND	ND	ug/L
Benzene	ND	ND	ND	ND	ug/L
cis-1,3-Dichloropropene	ND	ND	ND	ND	ug/L
2-Chloroethyl vinyl ether	ND	ND	ND	ND	ug/L
Bromoform	ND	ND	ND	ND	ug/L
4-Methyl-2-pentanone	ND	---	ND	ND	ug/L
2-Hexanone	ND	ND	ND	ND	ug/L
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ug/L
Tetrachloroethene	ND	ND	ND	ND	ug/L
Toluene	ND	ND	ND	ND	ug/L
Chlorobenzene	ND	ND	ND	ND	ug/L
Ethylbenzene	ND	ND	ND	ND	ug/L
Styrene	ND	ND	ND	ND	ug/L
Xylenes (total)	ND	ND	ND	ND	ug/L

MW-4

Giant Refining Gallup, New Mexico

Metals
Total Metals

Parameter	23 APR 92 Result	22 OCT 92 Result	28 APR 93 Result	29 OCT 93 Result	Units
Chromium	ND	0.032	ND	ND	mg/L
Lead	ND	0.008	ND	ND	mg/L
Mercury	ND	---	ND	---	mg/L

MW-4

Giant Refining Gallup, New Mexico

General Inorganics

Parameter	22 APR 92 Result	22 OCT 92 Result	28 APR 93 Result	29 OCT 93 Result	Units
Alkalinity, Bicarb. as CaCO3 at pH 4.5	390	---	426	---	mg/L
Alkalinity, Carb. as CaCO3 at pH 8.3	60	---	26	---	mg/L
Chloride	19	---	18	---	mg/L
pH	8.7	8.6	8.7	8.82	units
pH		8.58	---	8.83	units
pH		8.57	---	8.8	units
pH		8.57	---	8.8	units
	8.7	8.58	8.7	8.8125	
Phenolics	ND	ND	ND	ND	mg/L
Sulfate	150	---	140	---	mg/L
Specific Conductance at 25 deg.C	1300	1130	1160	1140	umhos/c
Specific Conductance at 25 deg.C		1130	---	1130	umhos/c
Specific Conductance at 25 deg.C		1130	---	1130	umhos/c
Specific Conductance at 25 deg.C		1130	---	1150	umhos/c
	1300	1130	1160	1137.5	
Total Organic Carbon	12	3.00	1	ND	mg/L
Total Organic Carbon		ND	---	ND	mg/L
Total Organic Carbon		---	---	---	mg/L
Total Organic Carbon		---	---	---	mg/L
Total Organic Halogen as Cl	230	0.028	ND	ND	ug/L
Total Organic Halogen as Cl		0.013	---	ND	ug/L
Total Organic Halogen as Cl		---	---	---	ug/L
Total Organic Halogen as Cl		---	---	---	ug/L
Total Dissolved Solids	1700	---	730	---	mg/L
Water Elevation	6876.28	6875.15	6876.57	6877.10	ft

MW-5

Giant Refining Gallup, NM

Volatile Organics
Method 8240

Parameter	22 APR 92 Result	22 OCT 92 Result	28 APR 93 Result	29 OCT 93 Result	Units
Chloromethane	ND	ND	ND	ND	ug/L
Bromomethane	ND	ND	ND	ND	ug/L
Vinyl chloride	ND	ND	ND	ND	ug/L
Chloroethane	ND	ND	ND	ND	ug/L
Methylene chloride	ND	ND	ND	ND	ug/L
Acetone	ND	5.4 J	ND	ND	ug/L
Carbon disulfide	ND	4.3 J	ND	ND	ug/L
1,1-Dichloroethene	ND	ND	ND	ND	ug/L
1,1-Dichloroethane	ND	ND	ND	ND	ug/L
1,2-Dichloroethene (cis/trans)	ND	ND	ND	ND	ug/L
Chloroform	ND	ND	ND	ND	ug/L
1,2-Dichloroethane	ND	ND	ND	ND	ug/L
2-Butanone	ND	---	ND	ND	ug/L
1,1,1-Trichloroethane	ND	ND	ND	ND	ug/L
Carbon tetrachloride	ND	ND	ND	ND	ug/L
Vinyl acetate	ND	ND	ND	ND	ug/L
Bromodichloromethane	ND	ND	ND	ND	ug/L
trans-1,3-Dichloropropene	ND	ND	ND	ND	ug/L
Trichloroethene	ND	ND	ND	ND	ug/L
Chlorodibromomethane	ND	ND	ND	ND	ug/L
1,1,2-Trichloroethane	ND	ND	ND	ND	ug/L
Benzene	ND	ND	ND	ND	ug/L
cis-1,3-Dichloropropene	ND	ND	ND	ND	ug/L
2-Chloroethyl vinyl ether	ND	ND	ND	ND	ug/L
Bromoform	ND	ND	ND	ND	ug/L
4-Methyl-2-pentanone	ND	---	ND	ND	ug/L
2-Hexanone	ND	ND	ND	ND	ug/L
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ug/L
Tetrachloroethene	ND	ND	ND	ND	ug/L
Toluene	ND	ND	ND	ND	ug/L
Chlorobenzene	ND	ND	ND	ND	ug/L
Ethylbenzene	ND	ND	ND	ND	ug/L
Stryene	ND	ND	ND	ND	ug/L
Xylenes (total)	ND	ND	ND	ND	ug/L

MW-5

Giant Refining Gallup, New Mexico

Metals
Total Metals

Parameter	23 APR 92 Result	22 OCT 92 Result	28 APR 93 Result	29 OCT 93 Result	Units
Chromium	ND	ND	ND	ND	mg/L
Lead	ND	0.003	ND	.002	mg/L
Mercury	ND	---	ND	---	mg/L

MW-5

Giant Refining Gallup, New Mexico

General Inorganics

Parameter	23 APR 92 Result	22 OCT 92 Result	28 APR 93 Result	29 OCT 93 Result	Units
Alkalinity, Bicarb. as CaCO ₃ at pH 4.5	310	---	295	---	mg/L
Alkalinity, Carb. as CaCO ₃ at pH 8.3	100	---	29	---	mg/L
Chloride	74	---	66	---	mg/L
pH	9.0	8.86	8.9	8.96	units
pH		8.86	---	8.96	units
pH		8.88	---	9	units
pH		8.87	---	8.97	units
	9	8.8675	8.9	8.9725	
Phenolics	ND	---	ND	---	mg/L
Sulfate	170	---	160	---	mg/L
Specific Conductance at 25 deg.C	1200	1170	1130	1110	mhos/c
Specific Conductance at 25 deg.C		1000	---	1130	mhos/c
Specific Conductance at 25 deg.C		1130	---	1120	mhos/c
Specific Conductance at 25 deg.C		1110	---	1130	mhos/c
	1200	1102.5	1130	1122.5	
Total Organic Carbon	21	5.20	1	ND	mg/L
Total Organic Carbon		5.30	---	ND	mg/L
Total Organic Carbon		---	---	---	mg/L
Total Organic Carbon		---	---	---	mg/L
Total Organic Halogen as Cl	64	0.010	50	ND	ug/L
Total Organic Halogen as Cl		0.025	---	ND	ug/L
Total Organic Halogen as Cl		---	---	---	ug/L
Total Organic Halogen as Cl		---	---	---	ug/L
Total Dissolved Solids	1300	---	700	---	mg/L
Water Elevation	6873.68	6871.61	6871.51	6873.53	ft

ORIGINAL ANALYTICAL DATA



Analytical **Technologies**, Inc.

2709-D Pan American Freeway, NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. 312300

December 20, 1993

Giant Refining Company
Route 3, Box 7
Gallup, NM 87301

Project Name/Number: SEMI-ANNUAL (NONE)

Attention: Lynn Shelton

On 12/01/93, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

Sample 31130004 A and B bottle contained a large headspace. Less than half of the bottle contained sample.

EPA Method 150.1 was performed by Analytical Technologies, Inc., Albuquerque, NM.

Total Organic Carbon and Total Organic Halide analyses were performed by Analytical Technologies, Inc., 225 Commerce Drive, Fort Collins, CO.

All other analyses were performed by Analytical Technologies, Inc., 9830 S. 51st Street, Suite B-113, Phoenix, AZ.

If you have any questions or comments, please do not hesitate to contact us at (505) 344-3777.

Letitia Krakowski, Ph.D.
Project Manager

H. Mitchell Rubenstein, Ph.D.
Laboratory Manager

MR:jd

Enclosure



Analytical Technologies, Inc.

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME : SEMI-ANNUAL

DATE RECEIVED : 12/01/93

REPORT DATE : 12/20/93

ATI I.D. : 312300

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	SMW-3	AQUEOUS	11/30/93
02	SMW-4	AQUEOUS	11/30/93
03	SMW-5	AQUEOUS	11/30/93
04	SMW-6	AQUEOUS	11/30/93

----- TOTALS -----

MATRIX	# SAMPLES
AQUEOUS	4

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.



Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME: SEMI-ANNUAL

ATI I.D. : 312300
DATE RECEIVED: 12/01/93
DATE ANALYZED: 12/02/93

PARAMETER	UNITS	1A	1B	1C	1D
PH (150.1)	UNITS	7.66	7.68	7.71	7.72



Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME: SEMI-ANNUAL

ATI I.D. : 312300
DATE RECEIVED: 12/01/93
DATE ANALYZED: 12/02/93

PARAMETER	UNITS	2A	2B	2C	2D
PH (150.1)	UNITS	8.52	8.48	8.48	8.52



Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME: SEMI-ANNUAL

ATI I.D. : 312300
DATE RECEIVED: 12/01/93
DATE ANALYZED: 12/02/93

PARAMETER	UNITS	3A	3B	3C	3D
PH (150.1)	UNITS	8.74	8.71	8.76	8.76



Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME: SEMI-ANNUAL

ATI I.D. : 312300
DATE RECEIVED: 12/01/93
DATE ANALYZED: 12/02/93

PARAMETER	UNITS	4A	4B	4C	4D
PH (150.1)	UNITS	8.14	8.15	8.05	8.00



Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME: SEMI-ANNUAL

ATI I.D.: 312300

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD
PH (150.1)	UNITS	31230001A	7.66	7.75	1.17

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$



Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : GIANT REFINING CO.

PROJECT # : (NONE)

ATI I.D.: 312300

PROJECT NAME: SEMI-ANNUAL

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD
PH (150.1)	UNITS	31230003A	8.74	8.80	0.68

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$



Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 312300

CLIENT : GIANT REFINING CO.

DATE RECEIVED : 12/01/93

PROJECT # : (NONE)

PROJECT NAME : SEMI-ANNUAL

REPORT DATE : 12/20/93

PARAMETER	UNITS	01	02	03	04
SPECIFIC CONDUCTANCE	UMHO/CM	3220	1260	1140	1670
REP 2	UMHO/CM	3250	1270	1140	1650
REP 3	UMHO/CM	3190	1280	1150	1680
REP 4	UMHO/CM	3230	1270	1150	1670



Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME : SEMI-ANNUAL

ATI I.D. : 312300

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
SPECIFIC CONDUCTANCE	- UMHO/CM	31230001	3220	3250	0.9	NA	NA	NA

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$



Analytical Technologies, Inc.

TOTAL ORGANIC HALIDE
Modified Method 9020 TOX

Lab Name: Analytical Technologies, Inc.

Date Collected: 11/30/93

Client Name: ATI-NM

Date Extracted: 12/14/93

Client Project ID: GRC -- 312300

Date Analyzed: 12/14/93

Lab Workorder Number: 93-12-012

Sample Matrix: Water

Sample ID	Lab Sample ID	Sample Volume (mL)	TOX Conc. (ug/L)	TOX AVG	RPD
Reagent Blank	WRB93-12-012	100	< 20		
312300-1	93-12-012-01	100	30		
	93-12-012-01DUP	100	30	30	0
312300-2	93-12-012-02	100	< 20		
	93-12-012-02DUP	100	< 20	< 20	N/A
312300-3	93-12-012-03	100	< 20		
	93-12-012-03DUP	100	< 20	< 20	N/A
312300-4	93-12-012-04	100	20		
	93-12-012-04DUP	100	20	20	0



Analytical Technologies, Inc.

TOTAL ORGANIC CARBON

Method 415.2

Lab Name: Analytical Technologies, Inc.

Date Collected: 11/30/93

Client Name: ATI-NM

Date Analyzed: 12/10/93

Client Project ID: GRC -- 312300

Sample Matrix: Water

Lab Workorder Number: 93-12-012

Sample ID	Lab Sample ID	Volume Injected (mL)	TOC Conc. (mg/L)	TOC AVG	RPD
Reagent Blank	RB 93-12-012	1	< 1.0	< 1.0	N/A
	312300-1 93-12-012-01	1	2		
312300-2	93-12-012-01DUP	1	2	2	0
	93-12-012-02	1	< 1.0		
312300-3	93-12-012-02DUP	1	< 1.0	< 1.0	N/A
	93-12-012-03	1	< 1.0		
312300-4	93-12-012-03DUP	1	< 1.0	< 1.0	N/A
	93-12-012-04	1	< 1.0		
	93-12-012-04DUP	1	< 1.0	< 1.0	N/A



Analytical Technologies, Inc.

METALS RESULTS

ATI I.D. : 312300

CLIENT : GIANT REFINING CO.

DATE RECEIVED : 12/01/93

PROJECT # : (NONE)

PROJECT NAME : SEMI-ANNUAL

REPORT DATE : 12/20/93

PARAMETER	UNITS	01	02	03	04
CHROMIUM (EPA 200.7/6010)	MG/L	<0.010	<0.010	<0.010	<0.010
LEAD (EPA 239.2/7421)	MG/L	<0.002	<0.002	<0.002	<0.002



Analytical Technologies, Inc.

METALS - QUALITY CONTROL

CLIENT : GIANT REFINING CO.

PROJECT # : (NONE)

PROJECT NAME : SEMI-ANNUAL

ATI I.D. : 312300

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CHROMIUM	MG/L	31252703	<0.010	<0.010	NA	0.986	1.00	99
LEAD	MG/L	31230001	<0.002	<0.002	NA	0.048	0.050	96

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$



Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 31230001

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME : SEMI-ANNUAL
CLIENT I.D. : SMW-3
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 11/30/93
DATE RECEIVED : 12/01/93
DATE EXTRACTED : N/A
DATE ANALYZED : 12/08/93
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
-----------	---------

CHLOROMETHANE	<10
BROMOMETHANE	<10
VINYL CHLORIDE	<1
CHLOROETHANE	<1
METHYLENE CHLORIDE	<5
ACETONE	<10
CARBON DISULFIDE	<1
1,1-DICHLOROETHENE	<1
1,1-DICHLOROETHANE	<1
1,2-DICHLOROETHENE (TOTAL)	<1
CHLOROFORM	<1
1,2-DICHLOROETHANE	<1
2-BUTANONE (MEK)	<10
1,1,1-TRICHLOROETHANE	<1
CARBON TETRACHLORIDE	<1
VINYL ACETATE	<10
BROMODICHLOROMETHANE	<1
1,1,2,2-TETRACHLOROETHANE	<1
1,2-DICHLOROPROPANE	<1
TRANS-1,3-DICHLOROPROPENE	<1
TRICHLOROETHENE	<1
DIBROMOCHLOROMETHANE	<1
1,1,2-TRICHLOROETHANE	<1
BENZENE	<1
CIS-1,3-DICHLOROPROPENE	<1
2-CHLOROETHYL VINYLETHYR	<10
BROMOFORM	<5
2-HEXANONE (MBK)	<10
4-METHYL-2-PENTANONE (MIBK)	<10
TETRACHLOROETHENE	<1
TOLUENE	<1
CHLOROBENZENE	<1
ETHYLBENZENE	<1
STYRENE	<1
TOTAL XYLENES	<1

SURROGATE PERCENT RECOVERIES

1,2-DICHLOROETHANE-D4 (%)	100
BROMOFLUOROBENZENE (%)	100
TOLUENE-D8 (%)	101



Analytical **Technologies, Inc.**

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 31230001

COMPOUNDS

RESULTS

NO ADDITIONAL COMPOUNDS



Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 31230002

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME : SEMI-ANNUAL
CLIENT I.D. : SMW-4
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 11/30/93
DATE RECEIVED : 12/01/93
DATE EXTRACTED : N/A
DATE ANALYZED : 12/08/93
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
-----------	---------

CHLOROMETHANE	<10
BROMOMETHANE	<10
VINYL CHLORIDE	<1
CHLOROETHANE	<1
METHYLENE CHLORIDE	<5
ACETONE	<10
CARBON DISULFIDE	<1
1,1-DICHLOROETHENE	<1
1,1-DICHLOROETHANE	<1
1,2-DICHLOROETHENE (TOTAL)	<1
CHLOROFORM	<1
1,2-DICHLOROETHANE	<1
2-BUTANONE (MEK)	<10
1,1,1-TRICHLOROETHANE	<1
CARBON TETRACHLORIDE	<1
VINYL ACETATE	<10
BROMODICHLOROMETHANE	<1
1,1,2,2-TETRACHLOROETHANE	<1
1,2-DICHLOROPROPANE	<1
TRANS-1,3-DICHLOROPROPENE	<1
TRICHLOROETHENE	<1
DIBROMOCHLOROMETHANE	<1
1,1,2-TRICHLOROETHANE	<1
BENZENE	<1
CIS-1,3-DICHLOROPROPENE	<1
2-CHLOROETHYL VINYLETHER	<10
BROMOFORM	<5
2-HEXANONE (MBK)	<10
4-METHYL-2-PENTANONE (MIBK)	<10
TETRACHLOROETHENE	<1
TOLUENE	<1
CHLOROBENZENE	<1
ETHYLBENZENE	<1
STYRENE	<1
TOTAL XYLENES	<1

SURROGATE PERCENT RECOVERIES

1,2-DICHLOROETHANE-D4 (%)	101
BROMOFLUOROBENZENE (%)	99
TOLUENE-D8 (%)	101



Analytical **Technologies**, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 31230002

COMPOUNDS

RESULTS

NO ADDITIONAL COMPOUNDS



Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 31230003

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME : SEMI-ANNUAL
CLIENT I.D. : SMW-5
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 11/30/93
DATE RECEIVED : 12/01/93
DATE EXTRACTED : N/A
DATE ANALYZED : 12/08/93
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
-----------	---------

CHLOROMETHANE	<10
BROMOMETHANE	<10
VINYL CHLORIDE	<1
CHLOROETHANE	<1
METHYLENE CHLORIDE	<5
ACETONE	<10
CARBON DISULFIDE	<1
1,1-DICHLOROETHENE	<1
1,1-DICHLOROETHANE	<1
1,2-DICHLOROETHENE (TOTAL)	<1
CHLOROFORM	<1
1,2-DICHLOROETHANE	<1
2-BUTANONE (MEK)	<10
1,1,1-TRICHLOROETHANE	<1
CARBON TETRACHLORIDE	<1
VINYL ACETATE	<10
BROMODICHLOROMETHANE	<1
1,1,2,2-TETRACHLOROETHANE	<1
1,2-DICHLOROPROPANE	<1
TRANS-1,3-DICHLOROPROPENE	<1
TRICHLOROETHENE	<1
DIBROMOCHLOROMETHANE	<1
1,1,2-TRICHLOROETHANE	<1
BENZENE	<1
CIS-1,3-DICHLOROPROPENE	<1
2-CHLOROETHYL VINYLETHYR	<10
BROMOFORM	<5
2-HEXANONE (MBK)	<10
4-METHYL-2-PENTANONE (MIBK)	<10
TETRACHLOROETHENE	<1
TOLUENE	<1
CHLOROBENZENE	<1
ETHYLBENZENE	<1
STYRENE	<1
TOTAL XYLENES	<1

SURROGATE PERCENT RECOVERIES

1,2-DICHLOROETHANE-D4 (%)	101
BROMOFLUOROBENZENE (%)	99
TOLUENE-D8 (%)	101



Analytical **Technologies**, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 31230003

COMPOUNDS

RESULTS

NO ADDITIONAL COMPOUNDS



Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 31230004

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME : SEMI-ANNUAL
CLIENT I.D. : SMW-6
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 11/30/93
DATE RECEIVED : 12/01/93
DATE EXTRACTED : N/A
DATE ANALYZED : 12/08/93
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS RESULTS

CHLOROMETHANE	<10
BROMOMETHANE	<10
VINYL CHLORIDE	<1
CHLOROETHANE	<1
METHYLENE CHLORIDE	<5
ACETONE	<10
CARBON DISULFIDE	<1
1,1-DICHLOROETHENE	<1
1,1-DICHLOROETHANE	<1
1,2-DICHLOROETHENE (TOTAL)	<1
CHLOROFORM	<1
1,2-DICHLOROETHANE	<1
2-BUTANONE (MEK)	<10
1,1,1-TRICHLOROETHANE	<1
CARBON TETRACHLORIDE	<1
VINYL ACETATE	<10
BROMODICHLOROMETHANE	<1
1,1,2,2-TETRACHLOROETHANE	<1
1,2-DICHLOROPROPANE	<1
TRANS-1,3-DICHLOROPROPENE	<1
TRICHLOROETHENE	<1
DIBROMOCHLOROMETHANE	<1
1,1,2-TRICHLOROETHANE	<1
BENZENE	<1
CIS-1,3-DICHLOROPROPENE	<1
2-CHLOROETHYL VINYLETHER	<10
BROMOFORM	<5
2-HEXANONE (MBK)	<10
4-METHYL-2-PENTANONE (MIBK)	<10
TETRACHLOROETHENE	<1
TOLUENE	<1
CHLOROBENZENE	<1
ETHYLBENZENE	<1
STYRENE	<1
TOTAL XYLENES	<1

SURROGATE PERCENT RECOVERIES

1,2-DICHLOROETHANE-D4 (%)	100
BROMOFLUOROBENZENE (%)	100
TOLUENE-D8 (%)	101



Analytical **Technologies**, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 31230004

COMPOUNDS

RESULTS

NO ADDITIONAL COMPOUNDS



Analytical Technologies, Inc.

GCMS - RESULTS

REAGENT BLANK

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME : SEMI-ANNUAL
CLIENT I.D. : REAGENT BLANK

ATI I.D. : 312300
DATE EXTRACTED : 12/08/93
DATE ANALYZED : 12/08/93
UNITS : UG/L
DILUTION FACTOR : N/A

COMPOUNDS	RESULTS
-----------	---------

CHLOROMETHANE	<10
BROMOMETHANE	<10
VINYL CHLORIDE	<1
CHLOROETHANE	<1
METHYLENE CHLORIDE	<5
ACETONE	<10
CARBON DISULFIDE	<1
1,1-DICHLOROETHENE	<1
1,1-DICHLOROETHANE	<1
1,2-DICHLOROETHENE (TOTAL)	<1
CHLOROFORM	<1
1,2-DICHLOROETHANE	<1
2-BUTANONE (MEK)	<10
1,1,1-TRICHLOROETHANE	<1
CARBON TETRACHLORIDE	<1
VINYL ACETATE	<10
BROMODICHLOROMETHANE	<1
1,1,2,2-TETRACHLOROETHANE	<1
1,2-DICHLOROPROPANE	<1
TRANS-1,3-DICHLOROPROPENE	<1
TRICHLOROETHENE	<1
DIBROMOCHLOROMETHANE	<1
1,1,2-TRICHLOROETHANE	<1
BENZENE	<1
CIS-1,3-DICHLOROPROPENE	<1
2-CHLOROETHYL VINYLETHER	<10
BROMOFORM	<5
2-HEXANONE (MBK)	<10
4-METHYL-2-PENTANONE (MIBK)	<10
TETRACHLOROETHENE	<1
TOLUENE	<1
CHLOROBENZENE	<1
ETHYLBENZENE	<1
STYRENE	<1
TOTAL XYLENES	<1

SURROGATE PERCENT RECOVERIES

1,2-DICHLOROETHANE-D4 (%)	101
BROMOFLUOROBENZENE (%)	100
TOLUENE-D8 (%)	101



Analytical Technologies, Inc.

QUALITY CONTROL DATA

ATI I.D. : 312300

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO.

PROJECT # : (NONE)

PROJECT NAME : SEMI-ANNUAL

REF I.D. : 31230004

DATE ANALYZED : 12/08/93

SAMPLE MATRIX : AQUEOUS

UNITS : UG/L

COMPOUNDS	SAMPLE CONC.		SPIKED SAMPLE	DUP.		RPD
	RESULT	SPIKED		% SPIKED REC.	% REC.	
1,1-DICHLOROETHENE	<1	50	53	106	53	0
TRICHLOROETHENE	<1	50	51	102	48	6
CHLOROBENZENE	<1	50	51	102	50	2
TOLUENE	<1	50	51	102	49	4
BENZENE	<1	50	51	102	51	0

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Spiked Sample Result} - \text{Duplicate Spike Sample Result})}{\text{Average of Spiked Sample}} \times 100$$

PROJECT MANAGER:

COMPANY: GIANT REFINING CO.
ADDRESS: 140 EXIT 39
JAMESTOWN, NM
PHONE: (505) 722 0227
FAX: (505) 722 0210
BILL TO: GIANT
COMPANY: RT3 Box 7
ADDRESS: GALLUP, NM 87301

SAMPLE ID	DATE	TIME	MATRIX	LAB ID
SMW-3	11-30	1:20	H2O	01
SMW-4	11-30	1:50	H2O	02
SMW-5	11-30	2:20	H2O	03
SMW-6	11-30	2:50	H2O	04

ANALYSIS REQUEST

Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	BTXE/MTBE (8020)	PH, CONDUCTIVITY **	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1, 502.2 Reg. & Unreg. TCE, TOX ***	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240) *	Polynuclear Aromatics (610/8310)	SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal	The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)	NUMBER OF CONTAINERS
				X							X									
			X								X									
			X								X									
			X								X									
			X								X									

PROJECT INFORMATION

PROJ. NO.:	NO. CONTAINERS	CUSTODY SEALS	RECEIVED INTACT	RECEIVED COLD
SEM1 - ANNUAL	44	Y/N/NA	Y	0
P.O. NO.:	997 9023 94			
SHIPPED VIA:	FED EX			

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK ☒ 2 WEEK

Comments:
* SEE ATTACHED LIST
** 4 REPLICATES
*** 2 REPLICATES
12.30 - blue ice
0 - C.O.C. seal intact on outside under no ice or blue ice

SAMPLE RECEIPT

Signature:	Time:	Signature:	Time:
Signature:	Time:	Signature:	Time:
Printed Name:	Date:	Printed Name:	Date:
LYNN SHELTON	11-30-93		
Company:	Phone:	Company:	Phone:
GIANT	722-0227		

SAMPLED & RELINQUISHED BY: 1. RELINQUISHED BY: 2. RELINQUISHED BY: 3.

Signature:	Time:	Signature:	Time:
Signature:	Time:	Signature:	Time:
Printed Name:	Date:	Printed Name:	Date:
Company:	Phone:	Company:	Phone:

RECEIVED BY: 1. RECEIVED BY: 2. RECEIVED BY: 3.

Signature:	Time:	Signature:	Time:
Signature:	Time:	Signature:	Time:
Printed Name:	Date:	Printed Name:	Date:
Company:	Phone:	Company:	Phone:

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: Analytical Technologies, Inc.
ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

SAMPLE ID	DATE	TIME	MATRIX	LAB ID
210300-1	11/30/93	1320	RO	011
-2		1350		02
-3		1420		03
-4		1450		04

NUMBER OF CONTAINERS		I I I I	
AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)			
AIR - O ₂ , CO ₂ , METHANE			
RADIUM 226/228			
GROSS ALPHA/BETA			
FECAL COLIFORM			
TOTAL COLIFORM			
BOD			
ASBESTOS			
NACE			
Volatile Organics GC/MS (624/8240)			
Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)			
8240 (TCLP 1311) ZHE			
610/8310			
619/619 MOD			
632/632 MOD			
TOX, TOX	X	X	X
SURFACTANTS (MBAS)			
SULFIDE			
ORGANIC LEAD			
TOC			
TOX			

PROJECT INFORMATION	SAMPLE RECEIPT
PROJECT NUMBER: 312300	TOTAL NUMBER OF CONTAINERS
PROJECT NAME: GRC	CHAIN OF CUSTODY SEALS
QC LEVEL: STD IV	INTACT?
QC REQUIRED: MS MSD BLANK	RECEIVED GOOD COND. COLD
TAT: STANDARD RUSHI	LAB NUMBER

DUE DATE: 12/15/93
RUSH SURCHARGE: _____
CLIENT DISCOUNT: _____ %
W.O. # 147912
please run each
sample in duplicate.

SAMPLES SENT TO:		RELINQUISHED BY:		1.	
SAN DIEGO		Signature:	<i>[Signature]</i>	Time:	1:30
FT. COLLINS		Printed Name:	<i>[Signature]</i>	Date:	12/1/93
RENTON		Analytical Technologies, Inc.			
PENSACOLA		Albuquerque			
PHOENIX		RECEIVED BY: (LAB)		1.	
BARRINGER		Signature:		Time:	
FIBERQUANT		Printed Name:		Date:	
		Company:	<i>Albuquerque</i>		

RELINQUISHED BY: 2	Time:		
Signature:			
Printed Name:	Date		
Company:			
RECEIVED BY: (LAB) 2	Time:		
Signature:			
Printed Name:	Date:		
Company:			

Chain of Custody

ANALYSIS REQUEST

ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87107

CLIENT PROJECT MANAGER:

[illegible]

NUMBER OF CONTAINERS		DATE	
AIR - 02, CO2, METHANE			
AIR/Diesel/Gasoline/BTEX/ (MOD 8015/8020)			
GROSS ALPHA/BETA			
RADIUM 226/228			
FECAL COLIFORM			
TOTAL COLIFORM			
BOD			
ASBESTOS			
NACE			
Volatile Organics GC/MS (624/8240)			
Diesel/Gasoline/BTEX/MTBE/ (MOD 8015/8020)			
8240 (TCLP 1311) ZHE			
EC*			
610/8310			
619/619 MOD			
632/632 MOD			
SURFACTANTS (MBAS)			
SULFIDE			
ORGANIC LEAD			
TOC			
TOX			

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJECT NUMBER:	312300	TOTAL NUMBER OF CONTAINERS	20
PROJECT NAME:	GRC	CHAIN OF CUSTODY SEALS	N/A
QC LEVEL:	(STD) IV	INTACT?	Y
QC REQUIRED:	MS MSD BLANK	RECEIVED GOOD COND./COLD	Y
TEST: STANDARD	RUSH!	LAB NUMBER	312300

DUE DATE: 12/15/93
RUSH SURCHARGE: _____
CLIENT DISCOUNT: _____ %
W.D. # 42793
* please run 4 EC (24/307)
analyses on each sample.

SAMPLES SENT TO:	RELINQUISHED BY: 1.	RELINQUISHED BY: 2.
SAN DIEGO	Signature: [Signature] Date: 1/7/92	Signature: Time:
FT. COLLINS	Printed Name: [Signature] Date: 1/7/92	Printed Name: Date
RENTON	[Signature]	
PENSACOLA	Analytical Technologies, Inc. Albuquerque	Company:
PHOENIX	RECEIVED BY: (LAB) 1.	RECEIVED BY: (LAB) 2.
BARRINGER	Signature: Time:	Signature: Time:
FIBERQUANT	[Signature]	[Signature] 914
(16)	Date:	Date
	Printed Name:	Printed Name: Link-Eshelman 12/2/93
	Company:	Company: A-T-I



Analytical**Technologies**, Inc.

2709-D Pan American Freeway, NE Albuquerque, NM 87107
Phone (505) 344-3777 FAX (505) 344-4413

ATI I.D. 311307

December 2, 1993

Giant Refining Company
Route 3, Box 7
Gallup, NM 87301

Project Name/Number: SEMI-A. GDWTR

Attention: Lynn Shelton

On 11/02/93, Analytical Technologies, Inc., (ADHS License No. AZ0015), received a request to analyze **aqueous** samples. The samples were analyzed with EPA methodology or equivalent methods. The results of these analyses and the quality control data, which follow each set of analyses, are enclosed.

Two bottle were received for each sample for electrical conductivity analysis. At the client's request, both bottles were analyzed. The results were as follows:

<u>Sample</u>	<u>EC; Bottle #1 (UMHOS/cm)</u>	<u>EC; Bottle #2 (UMHOS/cm)</u>
OW-11	1840/1870	1820/1880
MW-1	1090/1080	1080/1090
MW-2	1100/1110	1090/1090
MW-4	1140/1130	1130/1150
MW-5	1110/1130	1120/1130

EPA Method 150.1 and 8020 analyses were performed by Analytical Technologies, Inc., Albuquerque, NM.

Total Organic Carbon and Total Organic Halide analyses were performed by Analytical Technologies, Inc., 225 Commerce Drive, Fort Collins, CO.

All other analyses were performed by Analytical Technologies, Inc., 9830 S. 51st Street, Suite B-113, Phoenix, AZ.



Analytical Technologies, Inc.

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME: SEMI-A. GDWTR

DATE RECEIVED: 11/02/93

REPORT DATE : 12/02/93

ATI I.D.: 311307

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	OW-11	AQUEOUS	10/29/93
02	MW-1	AQUEOUS	10/29/93
03	MW-2	AQUEOUS	10/29/93
04	MW-4	AQUEOUS	10/29/93
05	MW-5	AQUEOUS	10/29/93
06	OW-1	AQUEOUS	10/29/93

-----TOTALS-----

MATRIX	# SAMPLES
-----	-----
AQUEOUS	6

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of this report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.



Analytical Technologies, Inc.

Giant Refining Company
December 2, 1993
Page Two

If you have any questions or comments, please do not hesitate to
contact us at (505) 344-3777.

Letitia Krakowski
Project Manager

LAK:jd

Enclosure



Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME: SEMI-A. GDWTR

ATI I.D. : 311307
DATE RECEIVED: 11/02/93
DATE ANALYZED: 11/04/93

PARAMETER	UNITS	1A	1B	1C	1D
PH (150.1)	UNITS	8.26	8.31	8.32	8.30



Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME: SEMI-A. GDWTR

ATI I.D. : 311307
DATE RECEIVED: 11/02/93
DATE ANALYZED: 11/04/93

PARAMETER	UNITS	2A	2B	2C	2D
PH (150.1)	UNITS	9.05	9.00	9.08	9.08



Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME: SEMI-A. GDWTR

ATI I.D. : 311307
DATE RECEIVED: 11/02/93
DATE ANALYZED: 11/04/93

PARAMETER	UNITS	3A	3B	3C	3D
PH (150.1)	UNITS	9.09	9.08	9.10	9.07



Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME: SEMI-A. GDWTR

ATI I.D. : 311307
DATE RECEIVED: 11/02/93
DATE ANALYZED: 11/04/93

PARAMETER	UNITS	4A	4B	4C	4D
PH (150.1)	UNITS	8.82	8.83	8.80	8.80



Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME: SEMI-A. GDWTR

ATI I.D. : 311307
DATE RECEIVED: 11/02/93
DATE ANALYZED: 11/04/93

PARAMETER	UNITS	5A	5B	5C	5D
PH (150.1)	UNITS	8.96	8.96	9.00	8.97



Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : GIANT REFINING CO.

PROJECT # : (NONE)

ATI I.D.: 311307

PROJECT NAME: SEMI-A. GDWTR

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD
PH (150.1)	UNITS	31130704	8.82	8.80	0.2

RPD (Relative Percent Difference) =
$$\frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$



Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : GIANT REFINING CO.

PROJECT # : (NONE)

ATI I.D.: 311307

PROJECT NAME: SEMI-A. GDWTR

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD
PH (150.1)	UNITS	31130705	8.96	9.00	0.4

RPD (Relative Percent Difference) =
$$\frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$



Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : GIANT REFINING CO.

PROJECT # : (NONE)

ATI I.D.: 311307

PROJECT NAME: SEMI-A. GDWTR

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD
PH (150.1)	UNITS	31130701	8.32	8.26	0.7

RPD (Relative Percent Difference) =
$$\frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$



Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 311307

CLIENT : GIANT REFINING CO.

DATE RECEIVED : 11/02/93

PROJECT # : (NONE)

PROJECT NAME : SEMI-A.GDWTR

REPORT DATE : 12/02/93

PARAMETER	UNITS	01	02	03	04	05
CONDUCTIVITY, (UMHOS/CM)		1840	1090	1100	1140	1110
PHENOLICS, TOTAL (EPA 420.1)	MG/L	<0.005	<0.005	-	<0.005	-



Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME : SEMI-A.GDWTR

ATI I.D. : 311307

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CONDUCTIVITY(UMHOS/CM)		31151801	990	1000	1	NA	NA	NA
PHENOLICS, TOTAL	MG/L	31149914	<0.005	<0.005	NA	0.024	0.025	96
PHENOLICS, TOTAL	MG/L	31149915	<0.005	<0.005	NA	0.026	0.025	104

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$



Analytical Technologies, Inc.

TOTAL ORGANIC CARBON

Method 415.2

Lab Name: Analytical Technologies, Inc.

Date Collected: 10/29/93

Client Name: ATI-NM

Date Analyzed: 11/08/93

Client Project ID: GRC -- 311307

Sample Matrix: Water

Lab Workorder Number: 93-11-016

Sample ID	Lab Sample ID	Volume Injected (mL)	TOC Conc. (mg/L)	TOC AVG	RPD
Reagent Blank	RB 93-11-016	1	< 1.0	< 1.0	N/A
311307-1	93-11-016-01	1	3		
	93-11-016-01DUP	1	3	3	0
311307-2	93-11-016-02	1	< 1.0		
	93-11-016-02DUP	1	< 1.0	< 1.0	N/A
311307-3	93-11-016-03	1	< 1.0		
	93-11-016-03DUP	1	< 1.0	< 1.0	N/A
311307-4	93-11-016-04	1	< 1.0		
	93-11-016-04DUP	1	< 1.0	< 1.0	N/A
311307-5	93-11-016-05	1	< 1.0		
	93-11-016-05DUP	1	< 1.0	< 1.0	N/A

TOTAL ORGANIC HALIDE
Modified Method 9020 TOX

Lab Name: Analytical Technologies, Inc.

Date Collected: 10/29/93

Client Name: ATI-NM

Date Extracted: 11/05/93

Client Project ID: GRC -- 311307

Date Analyzed: 11/05/93

Lab Workorder Number: 93-11-016

Sample Matrix: Water

Sample ID	Lab Sample ID	Sample Volume (mL)	TOX Conc. (ug/L)
Reagent Blank	WRB93-11-016	100	< 20
311307-1	93-11-016-01	100	200
	93-11-016-01DUP	100	200
311307-2	93-11-016-02	100	< 20
	93-11-016-02DUP	100	< 20
311307-3	93-11-016-03	100	< 20
	93-11-016-03DUP	100	< 20
311307-4	93-11-016-04	100	< 20
	93-11-016-04DUP	100	< 20
311307-5	93-11-016-05	100	< 20
	93-11-016-05DUP	100	< 20



Analytical Technologies, Inc.

METALS RESULTS

ATI I.D. : 311307

CLIENT : GIANT REFINING CO.

DATE RECEIVED : 11/02/93

PROJECT # : (NONE)

PROJECT NAME : SEMI-A.GDWTR

REPORT DATE : 12/02/93

PARAMETER	UNITS	01	02	03	04	05
CHROMIUM (EPA 200.7/6010)	MG/L	<0.010	<0.010	<0.010	<0.010	<0.010
LEAD (EPA 239.2/7421)	MG/L	<0.002	0.036	0.003	<0.002	0.002



Analytical Technologies, Inc.

METALS - QUALITY CONTROL

CLIENT : GIANT REFINING CO.

PROJECT # : (NONE)

PROJECT NAME : SEMI-A.GDWTR

ATI I.D. : 311307

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE CONC	SPIKE CONC	% REC
CHROMIUM	MG/L	31155503	<0.010	<0.010	NA	1.04	1.00	104
LEAD	MG/L	31159801	0.002	0.002	NA	0.048	0.050	92

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)
CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME: SEMI-A. GDWTR

ATI I.D.: 311307

SAMPLE I.D. #	CLIENT	I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
06	OW-1		AQUEOUS	10/29/93	NA	11/04/93	1

PARAMETER	UNITS	06
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
METHYL-t-BUTYL ETHER	UG/L	<2.5
BROMOFLUOROBENZENE (%)		103



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST : BTEX, MTBE (EPA 8020)
BLANK I.D. : 110493
CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME: SEMI-A. GDWTR

ATI I.D. : 311307
DATE EXTRACTED : NA
DATE ANALYZED : 11/04/93
DILUTION FACTOR: 1

PARAMETER	UNITS	
BENZENE	UG/L	<0.5
TOLUENE	UG/L	<0.5
ETHYLBENZENE	UG/L	<0.5
TOTAL XYLENES	UG/L	<0.5
METHYL-t-BUTYL ETHER	UG/L	<2.5
BROMOFLUOROBENZENE (%)		103



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST : BTEX, MTBE (EPA 8020)
MSMSD # : 31130706
CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME: SEMI-A. GDWTR

ATI I.D. : 311307
DATE EXTRACTED: NA
DATE ANALYZED : 11/04/93
SAMPLE MATRIX : AQUEOUS
REF. I.D. : 31130706
UNITS : UG/L

PARAMETERS	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	11	110	10	100	10
TOLUENE	<0.5	10	11	110	9.9	99	11
ETHYL BENZENE	<0.5	10	11	110	10	100	10
TOTAL XYLENES	<0.5	30	33	110	30	100	10
METHYL-t-BUTYL ETHER	<2.5	20	20	100	20	100	0

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$



Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 31130701

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME : SEMI-A.GDWTR
CLIENT I.D. : OW-11
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 10/29/93
DATE RECEIVED : 11/02/93
DATE EXTRACTED : N/A
DATE ANALYZED : 11/10/93
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
CHLOROMETHANE	<10
BROMOMETHANE	<10
VINYL CHLORIDE	<1
CHLOROETHANE	<1
METHYLENE CHLORIDE	<5
ACETONE	<10
CARBON DISULFIDE	<1
1,1-DICHLOROETHENE	<1
1,1-DICHLOROETHANE	<1
1,2-DICHLOROETHENE (TOTAL)	<1
CHLOROFORM	<1
1,2-DICHLOROETHANE	<1
2-BUTANONE (MEK)	<10
1,1,1-TRICHLOROETHANE	<1
CARBON TETRACHLORIDE	<1
VINYL ACETATE	<10
BROMODICHLOROMETHANE	<1
1,1,2,2-TETRACHLOROETHANE	<1
1,2-DICHLOROPROPANE	<1
TRANS-1,3-DICHLOROPROPENE	<1
TRICHLOROETHENE	<1
DIBROMOCHLOROMETHANE	<1
1,1,2-TRICHLOROETHANE	<1
BENZENE	<1
CIS-1,3-DICHLOROPROPENE	<1
2-CHLOROETHYL VINYLETHYR	<10
BROMOFORM	<5
2-HEXANONE (MBK)	<10
4-METHYL-2-PENTANONE (MIBK)	<10
TETRACHLOROETHENE	<1
TOLUENE	<1
CHLOROBENZENE	<1
ETHYLBENZENE	<1
STYRENE	<1
TOTAL XYLENES	<1

SURROGATE PERCENT RECOVERIES

1,2-DICHLOROETHANE-D4 (%)	105
BROMOFLUOROBENZENE (%)	99
TOLUENE-D8 (%)	101



Analytical Technologies, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 31130701

COMPOUNDS

RESULTS

NO ADDITIONAL COMPOUNDS



Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 31130702

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME : SEMI-A.GDWTR
CLIENT I.D. : MW-1
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 10/29/93
DATE RECEIVED : 11/02/93
DATE EXTRACTED : N/A
DATE ANALYZED : 11/10/93
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
-----------	---------

CHLOROMETHANE	<10
BROMOMETHANE	<10
VINYL CHLORIDE	<1
CHLOROETHANE	<1
METHYLENE CHLORIDE	<5
ACETONE	<10
CARBON DISULFIDE	<1
1,1-DICHLOROETHENE	<1
1,1-DICHLOROETHANE	<1
1,2-DICHLOROETHENE (TOTAL)	<1
CHLOROFORM	<1
1,2-DICHLOROETHANE	<1
2-BUTANONE (MEK)	<10
1,1,1-TRICHLOROETHANE	<1
CARBON TETRACHLORIDE	<1
VINYL ACETATE	<10
BROMODICHLOROMETHANE	<1
1,1,2,2-TETRACHLOROETHANE	<1
1,2-DICHLOROPROPANE	<1
TRANS-1,3-DICHLOROPROPENE	<1
TRICHLOROETHENE	<1
DIBROMOCHLOROMETHANE	<1
1,1,2-TRICHLOROETHANE	<1
BENZENE	<1
CIS-1,3-DICHLOROPROPENE	<1
2-CHLOROETHYL VINYLETHYR	<10
BROMOFORM	<5
2-HEXANONE (MBK)	<10
4-METHYL-2-PENTANONE (MIBK)	<10
TETRACHLOROETHENE	<1
TOLUENE	<1
CHLOROBENZENE	<1
ETHYLBENZENE	<1
STYRENE	<1
TOTAL XYLENES	<1

SURROGATE PERCENT RECOVERIES

1,2-DICHLOROETHANE-D4 (%)	101
BROMOFLUOROBENZENE (%)	98
TOLUENE-D8 (%)	97



Analytical **Technologies**, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 31130702

COMPOUNDS

RESULTS

NO ADDITIONAL COMPOUNDS



Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 31130703

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME : SEMI-A.GDWTR
CLIENT I.D. : MW-2
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 10/29/93
DATE RECEIVED : 11/02/93
DATE EXTRACTED : N/A
DATE ANALYZED : 11/10/93
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
-----------	---------

CHLOROMETHANE	<10
BROMOMETHANE	<10
VINYL CHLORIDE	<1
CHLOROETHANE	<1
METHYLENE CHLORIDE	<5
ACETONE	<10
CARBON DISULFIDE	<1
1,1-DICHLOROETHENE	<1
1,1-DICHLOROETHANE	<1
1,2-DICHLOROETHENE (TOTAL)	<1
CHLOROFORM	<1
1,2-DICHLOROETHANE	<1
2-BUTANONE (MEK)	<10
1,1,1-TRICHLOROETHANE	<1
CARBON TETRACHLORIDE	<1
VINYL ACETATE	<10
BROMODICHLOROMETHANE	<1
1,1,2,2-TETRACHLOROETHANE	<1
1,2-DICHLOROPROPANE	<1
TRANS-1,3-DICHLOROPROPENE	<1
TRICHLOROETHENE	<1
DIBROMOCHLOROMETHANE	<1
1,1,2-TRICHLOROETHANE	<1
BENZENE	<1
CIS-1,3-DICHLOROPROPENE	<1
2-CHLOROETHYL VINYLETHER	<10
BROMOFORM	<5
2-HEXANONE (MBK)	<10
4-METHYL-2-PENTANONE (MIBK)	<10
TETRACHLOROETHENE	<1
TOLUENE	<1
CHLOROBENZENE	<1
ETHYLBENZENE	<1
STYRENE	<1
TOTAL XYLENES	<1

SURROGATE PERCENT RECOVERIES

1,2-DICHLOROETHANE-D4 (%)	111
BROMOFLUOROBENZENE (%)	99
TOLUENE-D8 (%)	110



Analytical**Technologies**, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 31130703

COMPOUNDS

RESULTS

NO ADDITIONAL COMPOUNDS



Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 31130704

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME : SEMI-A.GDWTR
CLIENT I.D. : MW-4
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 10/29/93
DATE RECEIVED : 11/02/93
DATE EXTRACTED : N/A
DATE ANALYZED : 11/10/93
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS RESULTS

CHLOROMETHANE	<10
BROMOMETHANE	<10
VINYL CHLORIDE	<1
CHLOROETHANE	<1
METHYLENE CHLORIDE	<5
ACETONE	<10
CARBON DISULFIDE	<1
1,1-DICHLOROETHENE	<1
1,1-DICHLOROETHANE	<1
1,2-DICHLOROETHENE (TOTAL)	<1
CHLOROFORM	<1
1,2-DICHLOROETHANE	<1
2-BUTANONE (MEK)	<10
1,1,1-TRICHLOROETHANE	<1
CARBON TETRACHLORIDE	<1
VINYL ACETATE	<10
BROMODICHLOROMETHANE	<1
1,1,2,2-TETRACHLOROETHANE	<1
1,2-DICHLOROPROPANE	<1
TRANS-1,3-DICHLOROPROPENE	<1
TRICHLOROETHENE	<1
DIBROMOCHLOROMETHANE	<1
1,1,2-TRICHLOROETHANE	<1
BENZENE	<1
CIS-1,3-DICHLOROPROPENE	<1
2-CHLOROETHYL VINYLETHER	<10
BROMOFORM	<5
2-HEXANONE (MBK)	<10
4-METHYL-2-PENTANONE (MIBK)	<10
TETRACHLOROETHENE	<1
TOLUENE	<1
CHLOROBENZENE	<1
ETHYLBENZENE	<1
STYRENE	<1
TOTAL XYLENES	<1

SURROGATE PERCENT RECOVERIES

1,2-DICHLOROETHANE-D4 (%)	107
BROMOFLUOROBENZENE (%)	100
TOLUENE-D8 (%)	99



Analytical Technologies, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 31130704

COMPOUNDS

RESULTS

NO ADDITIONAL COMPOUNDS



GCMS - RESULTS

ATI I.D. : 31130705

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME : SEMI-A.GDWTR
CLIENT I.D. : MW-5
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 10/29/93
DATE RECEIVED : 11/02/93
DATE EXTRACTED : N/A
DATE ANALYZED : 11/10/93
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS RESULTS

CHLOROMETHANE	<10
BROMOMETHANE	<10
VINYL CHLORIDE	<1
CHLOROETHANE	<1
METHYLENE CHLORIDE	<5
ACETONE	<10
CARBON DISULFIDE	<1
1,1-DICHLOROETHENE	<1
1,1-DICHLOROETHANE	<1
1,2-DICHLOROETHENE (TOTAL)	<1
CHLOROFORM	<1
1,2-DICHLOROETHANE	<1
2-BUTANONE (MEK)	<10
1,1,1-TRICHLOROETHANE	<1
CARBON TETRACHLORIDE	<1
VINYL ACETATE	<10
BROMODICHLOROMETHANE	<1
1,1,2,2-TETRACHLOROETHANE	<1
1,2-DICHLOROPROPANE	<1
TRANS-1,3-DICHLOROPROPENE	<1
TRICHLOROETHENE	<1
DIBROMOCHLOROMETHANE	<1
1,1,2-TRICHLOROETHANE	<1
BENZENE	<1
CIS-1,3-DICHLOROPROPENE	<1
2-CHLOROETHYL VINYLETHER	<10
BROMOFORM	<5
2-HEXANONE (MBK)	<10
4-METHYL-2-PENTANONE (MIBK)	<10
TETRACHLOROETHENE	<1
TOLUENE	<1
CHLOROBENZENE	<1
ETHYLBENZENE	<1
STYRENE	<1
TOTAL XYLENES	<1

SURROGATE PERCENT RECOVERIES

1,2-DICHLOROETHANE-D4 (%)	110
BROMOFLUOROBENZENE (%)	99
TOLUENE-D8 (%)	100



Analytical **Technologies**, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 31130705

COMPOUNDS

RESULTS

NO ADDITIONAL COMPOUNDS



Analytical Technologies, Inc.

GCMS - RESULTS

REAGENT BLANK

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO.

PROJECT # : (NONE)

PROJECT NAME : SEMI-A.GDWTR

CLIENT I.D. : REAGENT BLANK

ATI I.D. : 311307

DATE EXTRACTED : 11/10/93

DATE ANALYZED : 11/10/93

UNITS : UG/L

DILUTION FACTOR : N/A

COMPOUNDS	RESULTS
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CHLOROMETHANE	<10
BROMOMETHANE	<10
VINYL CHLORIDE	<1
CHLOROETHANE	<1
METHYLENE CHLORIDE	<5
ACETONE	<10
CARBON DISULFIDE	<1
1,1-DICHLOROETHENE	<1
1,1-DICHLOROETHANE	<1
1,2-DICHLOROETHENE (TOTAL)	<1
CHLOROFORM	<1
1,2-DICHLOROETHANE	<1
2-BUTANONE (MEK)	<10
1,1,1-TRICHLOROETHANE	<1
CARBON TETRACHLORIDE	<1
VINYL ACETATE	<10
BROMODICHLOROMETHANE	<1
1,1,2,2-TETRACHLOROETHANE	<1
1,2-DICHLOROPROPANE	<1
TRANS-1,3-DICHLOROPROPENE	<1
TRICHLOROETHENE	<1
DIBROMOCHLOROMETHANE	<1
1,1,2-TRICHLOROETHANE	<1
BENZENE	<1
CIS-1,3-DICHLOROPROPENE	<1
2-CHLOROETHYL VINYLETHER	<10
BROMOFORM	<5
2-HEXANONE (MBK)	<10
4-METHYL-2-PENTANONE (MIBK)	<10
TETRACHLOROETHENE	<1
TOLUENE	<1
CHLOROBENZENE	<1
ETHYLBENZENE	<1
STYRENE	<1
TOTAL XYLENES	<1

SURROGATE PERCENT RECOVERIES

1,2-DICHLOROETHANE-D4 (%)	105
BROMOFLUOROBENZENE (%)	100
TOLUENE-D8 (%)	98



Analytical Technologies, Inc.

QUALITY CONTROL DATA

ATI I.D. : 311307

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME : SEMI-A.GDWTR
REF I.D. : 31149911

DATE ANALYZED : 11/10/93
SAMPLE MATRIX : AQUEOUS
UNITS : UG/L

COMPOUNDS	SAMPLE CONC.		SPIKED	% SPIKED	DUP.		RPD
	RESULT	SPIKED			SAMPLE	REC.	
1,1-DICHLOROETHENE	<1	50	47	94	49	98	4
TRICHLOROETHENE	<1	50	44	88	43	86	2
CHLOROBENZENE	<1	50	49	98	47	94	4
TOLUENE	<1	50	47	94	47	94	0
BENZENE	<1	50	44	88	45	90	2

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Spiked Sample Result} - \text{Duplicate Spike Sample Result})}{\text{Average of Spiked Sample}} \times 100$$



Analytical Technologies, Inc., Albuquerque, NM
San Diego • Phoenix • Seattle • Pensacola • Ft. Collins • Portland • Albuquerque

CHAIN OF CUSTODY

DATE: 11-1-93 PAGE 1 OF 1

ATILAB I.D. 311307

PROJECT MANAGER:

COMPANY: GIANT REFINING CO
ADDRESS: 140 EXIT 39
JAMESTOWN, NM 87347
PHONE: (505) 722-0227
FAX: (505) 722-0210
BILL TO: SAME
COMPANY: R+3 BOX 7
ADDRESS: GALLUP, NM 87301

PLEASE FILL THIS FORM IN COMPLETELY. SHADED AREAS ARE FOR LAB USE ONLY.

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	BTXE/MTBE (8020)	TOC, TOX (2 REFS)	PH, EC (4 REFS)	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.	CR, PB (DISSOLVED)	PHENOLICS	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240) *	Polynuclear Aromatics (610/8310)	SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal	The 13 Priority Pollutant Metals	HCRA Metals by Total Digestion	HCRA Metals by TCLP (1311)	NUMBER OF CONTAINERS
OW-11	10-29	1:55	H2O	1					X	X	X	X	X	X	X	X	X	X	X	X								13
MW-1	10-29	11:45		2					X	X	X	X	X	X	X	X	X	X	X	X								13
MW-2	10-29	10:15		3					X	X	X	X	X	X	X	X	X	X	X	X								11
MW-4	10-29	2:55		4					X	X	X	X	X	X	X	X	X	X	X	X								13
MW-5	10-29	3:26		5					X	X	X	X	X	X	X	X	X	X	X	X								11
OW-1	10-29	5:15		6				X																				2

PROJECT INFORMATION

PROJ. NO.:
PROJ. NAME: SEMI-ANNUAL G.D. DATE CUSTODY SEALS Y/N (NA)
P.O. NO.: 997 9023 94
SHIPPED VIA: FEDEX

SAMPLE RECEIPT

NO. CONTAINERS: 63
CUSTODY SEALS: Y/N (NA)
RECEIVED INTACT: YES
RECEIVED COLD: Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK

Comments:

* SEE ATTACHED LIST
** ONE container for TOX, OW-11 had broken lid. one container for total phenolics for MW-1 was broken; one of the two vials for both MW-5 and OW-1 were broken.
C.O.C. Seals were intact on outside container.

SAMPLED & RELINQUISHED BY: 1. RELINQUISHED BY: 2. RELINQUISHED BY: 3.

Signature: [Signature] Time: [Time]
Printed Name: LYNN SHELTON 11-1-93 Date: [Date]
Company: GIANT Time: [Time]
Phone: 722-0227 Company: [Company]

RECEIVED BY: 1. RECEIVED BY: 2. RECEIVED BY: (LAB) 3.

Signature: [Signature] Time: [Time]
Printed Name: [Name] Date: [Date]
Company: [Company]
Signature: [Signature] Time: [Time]
Printed Name: [Name] Date: [Date]
Company: [Company]
Signature: [Signature] Time: [Time]
Printed Name: [Name] Date: [Date]
Company: [Company]



Analytical Technologies, Inc. Albuquerque, NM

Chain of Custody

DATE 11/2/93 PAGE 1 OF 1

NETWORK PROJECT MANAGER: BETH PROFFITT				ANALYSIS REQUEST											
COMPANY: Analytical Technologies, Inc. ADDRESS: 2709-D Pan American Freeway, NE Albuquerque, NM 87107				8240 (TCCLP 1311) ZHE											
				Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)											
CLIENT PROJECT MANAGER: <u>AD for ER</u>				Volatiles Organics GC/MS (624/8240)											
				NAME											
				ASBESTOS											
				BOD											
				TOTAL COLIFORM											
				FECAL COLIFORM											
				GROSS ALPHA/BETA											
				RADIUM 226/228											
				AIR - O ₂ , CO ₂ , METHANE											
				AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)											
				NUMBER OF CONTAINERS											
PROJECT INFORMATION				SAMPLE RECEIPT											
				TOTAL NUMBER OF CONTAINERS <u>20</u>											
PROJECT NUMBER: <u>311207</u>				CHAIN OF CUSTODY SEALS											
				INTACT? <u>N/A</u>											
PROJECT NAME: <u>GRC</u>				RECEIVED GOOD COND. COLO											
				LAB NUMBER <u>93-11-016</u>											
QC-LEVEL: <u>STD: IV</u>				LAB NUMBER <u>93-11-016</u>											
QC REQUIRED: <u>MS MSD BLANK</u>															
TAT: <u>STANDARD</u>															
DUE DATE: <u>11/16/93</u>				DUE DATE: <u>11/16/93</u>											
				RUSH SURCHARGE: <u>511307</u>											
CLIENT DISCOUNT: <u>5%</u>				CLIENT DISCOUNT: <u>5%</u>											
				CLIENT DISCOUNT: <u>5%</u>											

ANALYSIS REQUEST

SAMPLES SENT TO:	RELINQUISHED BY: 1.	RELINQUISHED BY: 2.
SAN DIEGO	Signature: <u>[Signature]</u> Time: <u>1:15</u>	Signature: <u>[Signature]</u> Time: <u>1:15</u>
FT. COLLINS	Printed Name: <u>[Name]</u> Date: <u>11/2/93</u>	Printed Name: <u>[Name]</u> Date: <u>11/2/93</u>
RENTON	Signature: <u>[Signature]</u> Time: <u>11:20</u>	Signature: <u>[Signature]</u> Time: <u>11:20</u>
PENSACOLA	Printed Name: <u>[Name]</u> Date: <u>11/2/93</u>	Printed Name: <u>[Name]</u> Date: <u>11/2/93</u>
PHOENIX	Analytical Technologies, Inc.	Analytical Technologies, Inc.
BARRINGER	Albuquerque	Albuquerque
FIBERGLASS	Signature: <u>[Signature]</u> Time: <u>11:20</u>	Signature: <u>[Signature]</u> Time: <u>11:20</u>
	Printed Name: <u>[Name]</u> Date: <u>11/2/93</u>	Printed Name: <u>[Name]</u> Date: <u>11/2/93</u>
	Company: <u>[Company]</u>	Company: <u>[Company]</u>

