

GW - 32

REPORTS

YEAR(S):

1993 GW



CONSERVATION DIVISION
RECEIVED

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Route 3, Box 7
Gallup, New Mexico
87301

505
722-3833

June 29, 1994

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

Re: 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 enclosed analytical and statistical data from the annual groundwater sampling event.

Please note that acetone was detected in well #SMW-6 at a level of eleven parts per billion. Although an insignificant concentration, Giant will resample the well on or before July 8, 1994 for the list of volatile organic compounds. This situation was reported verbally to Coby Muckelroy, of your staff, on June 24, 1994.

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

Sincerely,

Lynn Shelton
Senior Environmental Coordinator
Giant Refining Company

TLS:sp

cc: Roger Anderson, OCD
David Pavlich, HS&E Manager, Giant Refining Company
Kim Bullerdick, Corporate Counsel, Giant Industries Arizona, Inc.

TLS\BG0629

ANNUAL GROUNDWATER REPORT

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February 14, 1994

Prepared By:

Lynn Shelton
Senior Environmental Coordinator
Giant Refining Company
Ciniza

MONITORING WELL IDENTIFICATION REPORT

ENVIRONMENTAL IMPROVEMENT DIVISION
HAZARDOUS WASTE SECTION
1190 ST. FRANCIS DRIVE/HAROLD RUNNELS BLDG.
SANTA FE, NEW MEXICO 87503

FACILITY NAME Giant Refining Company - Ciniza
EPA I.D. NUMBER NMD000333211-2
COUNTY McKinley
WELL NUMBER MW-1
WELL LOCATION (LONGITUDE) 108° 25' 36"
WELL LOCATION (LATITUDE) 35° 29' 08"
NEW MEXICO STATE PLANE (X) 320, 903.76
(Y) 1,636,112.13
AQUIFER NAME Sonsela
AQUIFER CONFINED X UNCONFINED _____
WELL INSTALLATION DATE 10-14-81
DRILLING METHOD Cable
INNER CASING DIAMETER 5.0"
BOREHOLE DIAMETER 10.0"
CASING MATERIAL PVC
METHOD OF DEVELOPMENT Compr
ELEV BOTTOM OF BOREHOLE 6745.80
ELEV BOTTOM OF WELL CASING 6745.80
ELEV BOTTOM OF SCREENED INT 6750.80
ELEVATION OF SCREENED INT 6760.80
SURVEYED ELEV OF CASING TOP 6878.52

DATE OF REPORT 2-14-94

SIGNATURE Lynn Shelton

NAME (TYPED) Lynn Shelton

MONITORING WELL IDENTIFICATION REPORT

ENVIRONMENTAL IMPROVEMENT DIVISION
HAZARDOUS WASTE SECTION
1190 ST. FRANCIS DRIVE/HAROLD RUNNELS BLDG.
SANTA FE, NEW MEXICO 87503

FACILITY NAME Giant Refining Company - Ciniza
EPA I.D. NUMBER NMD000333211-2
COUNTY McKinley
WELL NUMBER MW-2
WELL LOCATION (LONGITUDE) 108° 26' 00"
WELL LOCATION (LATITUDE) 35° 29' 43"
NEW MEXICO STATE PLANE (X) 321,035.35
(Y) 1,636,184.06
AQUIFER NAME Sonsela
AQUIFER CONFINED X UNCONFINED _____
WELL INSTALLATION DATE 10-15-81
DRILLING METHOD Cable
INNER CASING DIAMETER 5.0"
BOREHOLE DIAMETER 10.0"
CASING MATERIAL PVC
METHOD OF DEVELOPMENT Compr
ELEV BOTTOM OF BOREHOLE 6741.90
ELEV BOTTOM OF WELL CASING 6741.90
ELEV BOTTOM OF SCREENED INT 6747.90
ELEVATION OF SCREENED INT 6757.90
SURVEYED ELEV OF CASING TOP 6880.84

DATE OF REPORT 2-14-94

SIGNATURE Lynn Shelton

NAME (TYPED) Lynn Shelton

MONITORING WELL IDENTIFICATION REPORT

ENVIRONMENTAL IMPROVEMENT DIVISION
HAZARDOUS WASTE SECTION
1190 ST. FRANCIS DRIVE/HAROLD RUNNELS BLDG.
SANTA FE, NEW MEXICO 87503

FACILITY NAME Giant Refining Company - Ciniza
EPA I.D. NUMBER NMD000333211-2
COUNTY McKinley
WELL NUMBER MW-4
WELL LOCATION (LONGITUDE) 108° 26' 54"
WELL LOCATION (LATITUDE) 35° 29' 30"
NEW MEXICO STATE PLANE (X) 321,602.07
(Y) 1,635,066.25
AQUIFER NAME Sonsela
AQUIFER CONFINED X UNCONFINED _____
WELL INSTALLATION DATE 10-16-81
DRILLING METHOD Cable
INNER CASING DIAMETER 5.0"
BOREHOLE DIAMETER 10.0"
CASING MATERIAL PVC
METHOD OF DEVELOPMENT Compr
ELEV BOTTOM OF BOREHOLE 6761.60
ELEV BOTTOM OF WELL CASING 6761.60
ELEV BOTTOM OF SCREENED INT 6761.60
ELEVATION OF SCREENED INT 6781.60
SURVEYED ELEV OF CASING TOP 6882.54

DATE OF REPORT 2-14-94

SIGNATURE Lynn Shelton

NAME (TYPED) Lynn Shelton

MONITORING WELL IDENTIFICATION REPORT

ENVIRONMENTAL IMPROVEMENT DIVISION
HAZARDOUS WASTE SECTION
1190 ST. FRANCIS DRIVE/HAROLD RUNNELS BLDG.
SANTA FE, NEW MEXICO 87503

FACILITY NAME Giant Refining Company - Ciniza
EPA I.D. NUMBER NMD000333211-2
COUNTY McKinley
WELL NUMBER MW-5
WELL LOCATION (LONGITUDE) 108° 25' 57"
WELL LOCATION (LATITUDE) 35° 29' 43"
NEW MEXICO STATE PLANE (X) 321,233.03
(Y) 1,636,212.58
AQUIFER NAME Sonsela
AQUIFER CONFINED X UNCONFINED _____
WELL INSTALLATION DATE 7-29-86
DRILLING METHOD HLWAG & AIRRT
INNER CASING DIAMETER 4.0"
BOREHOLE DIAMETER 10.0"
CASING MATERIAL PVC
METHOD OF DEVELOPMENT Compr
ELEV BOTTOM OF BOREHOLE 6746.80
ELEV BOTTOM OF WELL CASING 6753.30
ELEV BOTTOM OF SCREENED INT 6758.30
ELEVATION OF SCREENED INT 6768.80
SURVEYED ELEV OF CASING TOP 6883.32

DATE OF REPORT 2-14-94

SIGNATURE Lynn Shelton

NAME (TYPED) Lynn Shelton

MONITORING WELL IDENTIFICATION REPORT

ENVIRONMENTAL IMPROVEMENT DIVISION
HAZARDOUS WASTE SECTION
1190 ST. FRANCIS DRIVE/HAROLD RUNNELS BLDG.
SANTA FE, NEW MEXICO 87503

FACILITY NAME Giant Refining Company - Ciniza
EPA I.D. NUMBER NMD000333211-2
COUNTY McKinley
WELL NUMBER OW-11
WELL LOCATION (LONGITUDE) 108° 25' 36"
WELL LOCATION (LATITUDE) 35° 29' 08"
NEW MEXICO STATE PLANE (X) 323,167,68
(Y) 1,632,185.21
AQUIFER NAME Sonsela
AQUIFER CONFINED X UNCONFINED _____
WELL INSTALLATION DATE 12-30-80
DRILLING METHOD Cable
INNER CASING DIAMETER 4.0"
BOREHOLE DIAMETER 8.0"
CASING MATERIAL PVC
METHOD OF DEVELOPMENT Compr
ELEV BOTTOM OF BOREHOLE 6773.
ELEV BOTTOM OF WELL CASING 6773.
ELEV BOTTOM OF SCREENED INT 6858.
ELEVATION OF SCREENED INT 6880.
SURVEYED ELEV OF CASING TOP 6923.89

DATE OF REPORT 2-14-94

SIGNATURE

Lynn Shelton

NAME (TYPED) Lynn Shelton

MONITORING WELL IDENTIFICATION REPORT

ENVIRONMENTAL IMPROVEMENT DIVISION
HAZARDOUS WASTE SECTION
1190 ST. FRANCIS DRIVE/HAROLD RUNNELS BLDG.
SANTA FE, NEW MEXICO 87503

FACILITY NAME Giant Refining Company - Ciniza
EPA I.D. NUMBER NMD000333211-2
COUNTY McKinley
WELL NUMBER SMW-1
WELL LOCATION (LONGITUDE) _____
WELL LOCATION (LATITUDE) _____
NEW MEXICO STATE PLANE (X) 321,501.32
(Y) 1,635,501.43
AQUIFER NAME Ciniza Sand
AQUIFER CONFINED X UNCONFINED _____
WELL INSTALLATION DATE 10-4-85
DRILLING METHOD HWLAG
INNER CASING DIAMETER 2.0"
BOREHOLE DIAMETER 6.5"
CASING MATERIAL SS304
METHOD OF DEVELOPMENT Compr
ELEV BOTTOM OF BOREHOLE 6832.73
ELEV BOTTOM OF WELL CASING 6834.23
ELEV BOTTOM OF SCREENED INT 6837.23
ELEVATION OF SCREENED INT 6857.23
SURVEYED ELEV OF CASING TOP 6883.29

DATE OF REPORT 2-14-94

SIGNATURE

Lynn Shelton

NAME (TYPED) Lynn Shelton

MONITORING WELL IDENTIFICATION REPORT

ENVIRONMENTAL IMPROVEMENT DIVISION
HAZARDOUS WASTE SECTION
1190 ST. FRANCIS DRIVE/HAROLD RUNNELS BLDG.
SANTA FE, NEW MEXICO 87503

FACILITY NAME Giant Refining Company - Ciniza

EPA I.D. NUMBER NMD000333211-2

COUNTY McKinley

WELL NUMBER SMW-2

WELL LOCATION (LONGITUDE) _____

WELL LOCATION (LATITUDE) _____

NEW MEXICO STATE PLANE (X) 321,542.80

(Y) 1,635,592.65

AQUIFER NAME Ciniza Sand

AQUIFER CONFINED X UNCONFINED _____

WELL INSTALLATION DATE 9-26-85

DRILLING METHOD HLWAG

INNER CASING DIAMETER 2.0"

BOREHOLE DIAMETER 6.5"

CASING MATERIAL SS304

METHOD OF DEVELOPMENT Compr

ELEV BOTTOM OF BOREHOLE 6826.73

ELEV BOTTOM OF WELL CASING 6827.13

ELEV BOTTOM OF SCREENED INT 6830.13

ELEVATION OF SCREENED INT 6850.13

SURVEYED ELEV OF CASING TOP 6884.44

DATE OF REPORT 2-14-94

SIGNATURE Lynn Shelton

NAME (TYPED) Lynn Shelton

MONITORING WELL IDENTIFICATION REPORT

ENVIRONMENTAL IMPROVEMENT DIVISION
HAZARDOUS WASTE SECTION
1190 ST. FRANCIS DRIVE/HAROLD RUNNELS BLDG.
SANTA FE, NEW MEXICO 87503

FACILITY NAME Giant Refining Company - Ciniza

EPA I.D. NUMBER NMD000333211-2

COUNTY McKinley

WELL NUMBER SMW-3

WELL LOCATION (LONGITUDE) 108° 25' 56"

WELL LOCATION (LATITUDE) 35° 29' 40"

NEW MEXICO STATE PLANE (X) 321,397.90

(Y) 1,635,948.75

AQUIFER NAME Ciniza Sand

AQUIFER CONFINED X UNCONFINED

WELL INSTALLATION DATE 10-1-85

DRILLING METHOD HLWAG

INNER CASING DIAMETER 2.0"

BOREHOLE DIAMETER 6.5"

CASING MATERIAL SS304

METHOD OF DEVELOPMENT Compr

ELEV BOTTOM OF BOREHOLE 6836.15

ELEV BOTTOM OF WELL CASING 6838.65

ELEV BOTTOM OF SCREENED INT 6841.65

ELEVATION OF SCREENED INT 6861.65

SURVEYED ELEV OF CASING TOP 6884.56

DATE OF REPORT 2-14-94

SIGNATURE Lynn Shelton

NAME (TYPED) Lynn Shelton

MONITORING WELL IDENTIFICATION REPORT

ENVIRONMENTAL IMPROVEMENT DIVISION
HAZARDOUS WASTE SECTION
1190 ST. FRANCIS DRIVE/HAROLD RUNNELS BLDG.
SANTA FE, NEW MEXICO 87503

FACILITY NAME Giant Refining Company - Ciniza
EPA I.D. NUMBER NMD000333211-2
COUNTY McKinley
WELL NUMBER SMW-4
WELL LOCATION (LONGITUDE) 108° 26' 01"
WELL LOCATION (LATITUDE) 35° 29' 44"
NEW MEXICO STATE PLANE (X) 320,974.85
(Y) 1,636,153.54
AQUIFER NAME Ciniza Sand
AQUIFER CONFINED X UNCONFINED
WELL INSTALLATION DATE 9-25-85
DRILLING METHOD HLWAG
INNER CASING DIAMETER 2.0"
BOREHOLE DIAMETER 6.5"
CASING MATERIAL SS304
METHOD OF DEVELOPMENT Compr
ELEV BOTTOM OF BOREHOLE 6806.74
ELEV BOTTOM OF WELL CASING 6807.84
ELEV BOTTOM OF SCREENED INT 6810.84
ELEVATION OF SCREENED INT 6830.84
SURVEYED ELEV OF CASING TOP 6877.74

DATE OF REPORT 2-14-94

SIGNATURE

Lynn Shelton

NAME (TYPED) Lynn Shelton

MONITORING WELL IDENTIFICATION REPORT

ENVIRONMENTAL IMPROVEMENT DIVISION
HAZARDOUS WASTE SECTION
1190 ST. FRANCIS DRIVE/HAROLD RUNNELS BLDG.
SANTA FE, NEW MEXICO 87503

FACILITY NAME Giant Refining Company - Ciniza
EPA I.D. NUMBER NMD000333211-2
COUNTY McKinley
WELL NUMBER SMW-5
WELL LOCATION (LONGITUDE) 108° 26' 03"
WELL LOCATION (LATITUDE) 35° 29' 41"
NEW MEXICO STATE PLANE (X) 320,778.61
(Y) 1,636,054.28
AQUIFER NAME Ciniza Sand
AQUIFER CONFINED X UNCONFINED _____
WELL INSTALLATION DATE 9-25-85
DRILLING METHOD HLWAG
INNER CASING DIAMETER 2.0"
BOREHOLE DIAMETER 6.5"
CASING MATERIAL SS304
METHOD OF DEVELOPMENT Compr
ELEV BOTTOM OF BOREHOLE 6800.68
ELEV BOTTOM OF WELL CASING 6801.78
ELEV BOTTOM OF SCREENED INT 6804.78
ELEVATION OF SCREENED INT 6824.78
SURVEYED ELEV OF CASING TOP 6878.02

DATE OF REPORT 2-14-94

SIGNATURE Lynn Shelton

NAME (TYPED) Lynn Shelton

MONITORING WELL IDENTIFICATION REPORT

ENVIRONMENTAL IMPROVEMENT DIVISION
HAZARDOUS WASTE SECTION
1190 ST. FRANCIS DRIVE/HAROLD RUNNELS BLDG.
SANTA FE, NEW MEXICO 87503

FACILITY NAME Giant Refining Company - Ciniza

EPA I.D. NUMBER NMD000333211-2

COUNTY McKinley

WELL NUMBER SMW-6

WELL LOCATION (LONGITUDE) 108° 26' 02"

WELL LOCATION (LATITUDE) 35° 29' 38"

NEW MEXICO STATE PLANE (X) 320,839.52

(Y) 1,635,867.66

AQUIFER NAME Ciniza Sand

AQUIFER CONFINED X UNCONFINED

WELL INSTALLATION DATE 10-3-85

DRILLING METHOD HLWAG

INNER CASING DIAMETER 2.0"

BOREHOLE DIAMETER 6.5"

CASING MATERIAL SS304

METHOD OF DEVELOPMENT Compr

ELEV BOTTOM OF BOREHOLE 6806.35

ELEV BOTTOM OF WELL CASING 6807.55

ELEV BOTTOM OF SCREENED INT 6810.55

ELEVATION OF SCREENED INT 6830.55

SURVEYED ELEV OF CASING TOP 6880.71

DATE OF REPORT 2-14-94 SIGNATURE Lynn Shelton

NAME (TYPED) Lynn Shelton

Calculation Sheet for Semi-Annual Evaluation of Indicator Parameters

Print Your Name: Lynn Shelton Telephone: (505) 722-0227
 Facility Name: GIANT CINIZA EPA ID #: NMD000333211-2
 Date: Spring, 93 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	8.84	0.005625
2	8.81	0.002025
3	8.8	0.001225
4	8.8	0.001225

Total 1	35.25	Total 2	0.0101
---------	-------	---------	--------

Mean value X(m)	8.8125
Variance S(m) ²	0.003366

t(m)=	5.841
W(m)=	0.000841

t(*)= 7.171616

t(c)= 4.316058

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: (505) 722-0227
 Facility Name: GIANT CINIZA EPA ID #: NMD000333211-2
 Date: Spring, 93 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	8.79	0.000625
2	8.8	0.001225
3	8.83	0.004225
4	8.8	0.001225

Total 1	35.22	Total 2	0.0073
---------	-------	---------	--------

Mean value X(m)	8.805	t(m)=	5.841
Variance S(m)2	0.002433	W(m)=	0.000608

t(*)= 7.503099

t(c)= 4.085878

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: (505) 722-0227

Facility Name: GIANT CINIZA

EPA ID #: NMD000333211-2

Date: Spring, 93

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	$(\text{Value} - X(m))^2$
1	8.44	0.105625
2	8.42	0.119025
3	8.49	0.075625
4	8.48	0.081225

Total 1	33.83	Total 2	0.3815
---------	-------	---------	--------

Mean value $X(m)$	8.4575
Variance $S(m)^2$	0.127166

$t(m) =$	5.841
$W(m) =$	0.031791

$t(*) = -0.29019$

$t(c) = 5.758103$

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 (505) 722-0227

Facility Name: GIANT CINIZA

EPA ID #: NMD000333211-2

Date: Spring, 93

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	$(\text{Value} - X(m))^2$
1	8.82	0.003025
2	8.72	0.002025
3	8.82	0.003025
4	8.95	0.034225

Total 1	35.31	Total 2	0.0423
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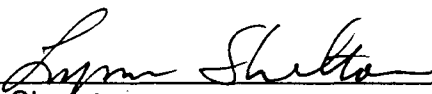
Mean value $X(m)$	8.8275
Variance $S(m)^2$	0.0141

$t(m) =$	5.841
$W(m) =$	0.003525

$t(*) =$ 4.752855

$t(c) =$ 5.233016

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: (505) 722-0227
 Facility Name: GIANT CINIZA EPA ID #: NMD000333211-2
 Date: Spring 93 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	1110	900
2	1160	6400
3	1150	4900
4	1150	4900
Total 1	4570	Total 2 17100

Mean value X(m)	1142.5
Variance S(m) ²	5700

t(m)=	4.541
W(m)=	1425

t(*)= 4.068200

If t(*) is negative there has not
been an increase in the value

t(c)= 4.422282

L. Shelton
Signature

Calculation Sheet for Semi-Annual Evaluation of Indicator Parameters

Print Your Name: Lynn Shelton

Telephone: (505) 722-0227

Facility Name: GIANT CINIZA

EPA ID #: NMD000333211-2

Date: Spring 93

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	1150	4900
2	1160	6400
3	1180	10000
4	1170	8100

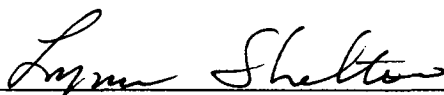
Total 1	4660	Total 2	29400
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Mean value X(m)	1165	t(m)=	4.541
Variance S(m)2	9800	W(m)=	2450

t(*)= 3.589308

If t(*) is negative there has not
been an increase in the value

t(c)= 4.470134


Signature

Calculation Sheet for Semi-Annual Evaluation of Indicator Parameters

Print Your Name: Lynn Shelton

Telephone: (505) 722-0227

Facility Name: GIANT CINIZA

EPA ID #: NMD000333211-2

Date: Spring 93

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	1240	25600
2	1200	14400
3	1200	14400
4	1200	14400

Total 1	4840	Total 2	68800
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Mean value X(m)	1210
Variance S(m)2	22933.33

t(m)=	4.541
W(m)=	5733.333

t(*)= 2.960827

If t(*) is negative there has not
been an increase in the value

t(c)= 4.510070


Signature

Calculation Sheet for Semi-Annual Evaluation of Indicator Parameters

Print Your Name: Lynn Shelton Telephone: (505) 722-0227
 Facility Name: GIANT CINIZA EPA ID #: NMD000333211-2
 Date: Spring 93 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	1090	100
2	1140	3600
3	1140	3600
4	1170	8100

Total 1	4540	Total 2	15400
---------	------	---------	-------

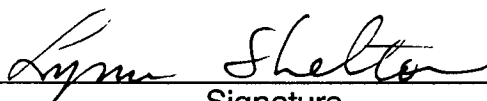
Mean value X(m)	1135
Variance S(m)2	5133.333

t(m)=	4.541
W(m)=	1283.333

t(*)= 4.070286

If t(*) is negative there has not
been an increase in the value

t(c)= 4.410062


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-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	t(m)=	5.841
Variance S(m) ²	0.111633	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	t(m)=	5.841
Variance S(m) ²	0.003233	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	t(m)=	5.841
Variance S(m) ²	0.057766	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	t(m)=	4.541
Variance S(m) ²	41.66666	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	$(\text{Value} - X(m))^2$
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

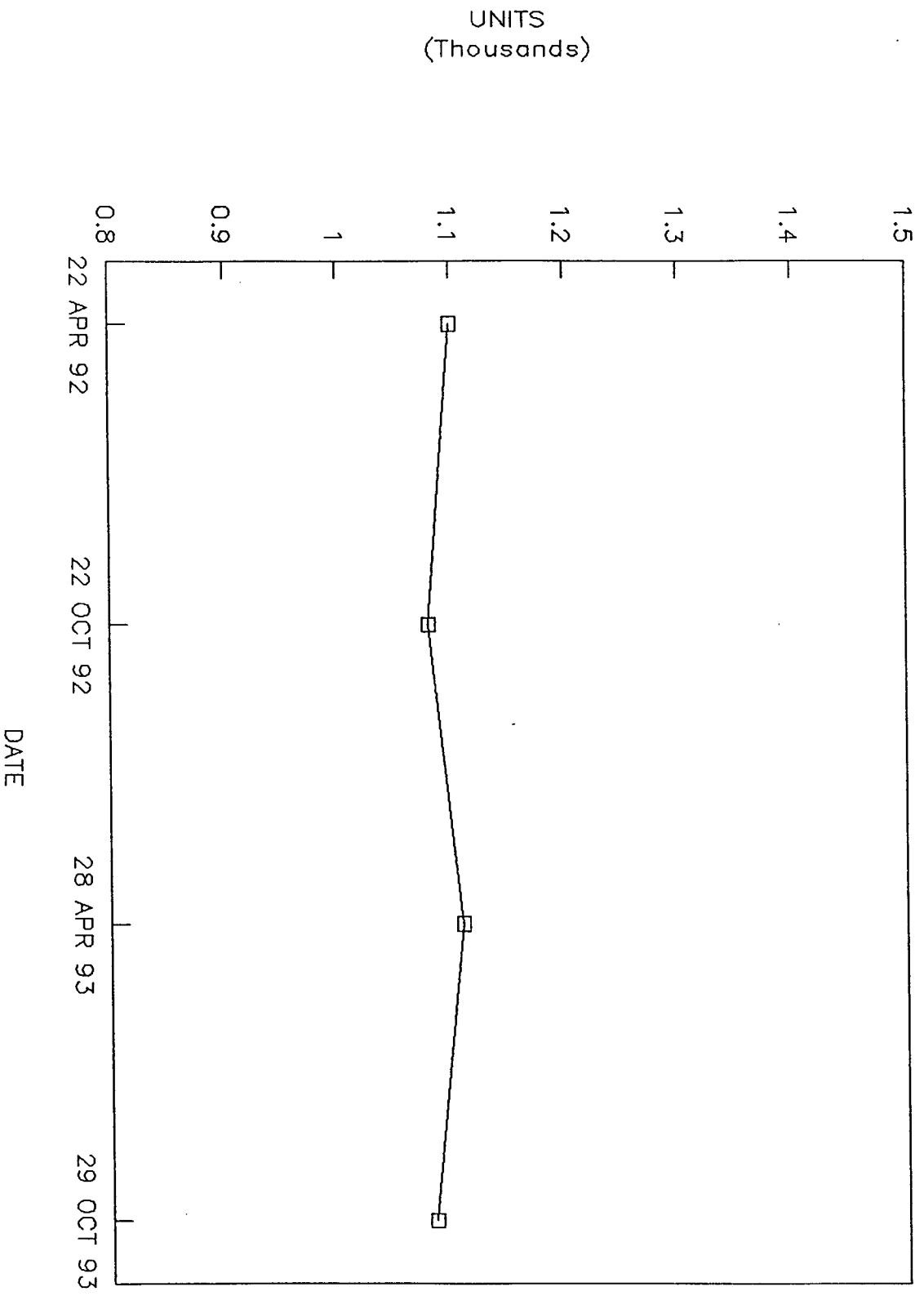
t(*)=	5.168999
-------	----------

t(c)=	4.289995
-------	----------

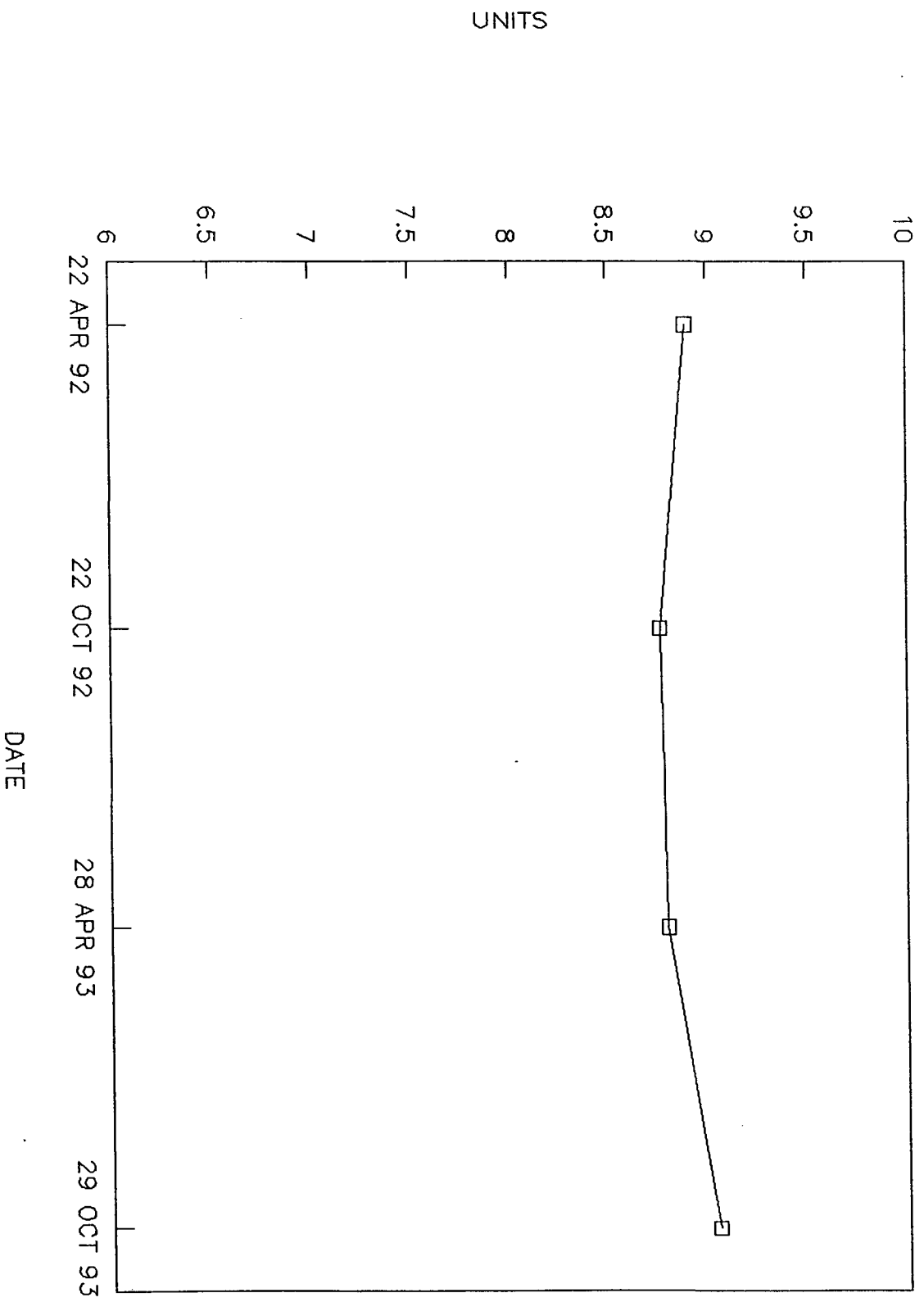
If t(*) absolute is less than t(c)
there has not been an increase
in the value

Signature

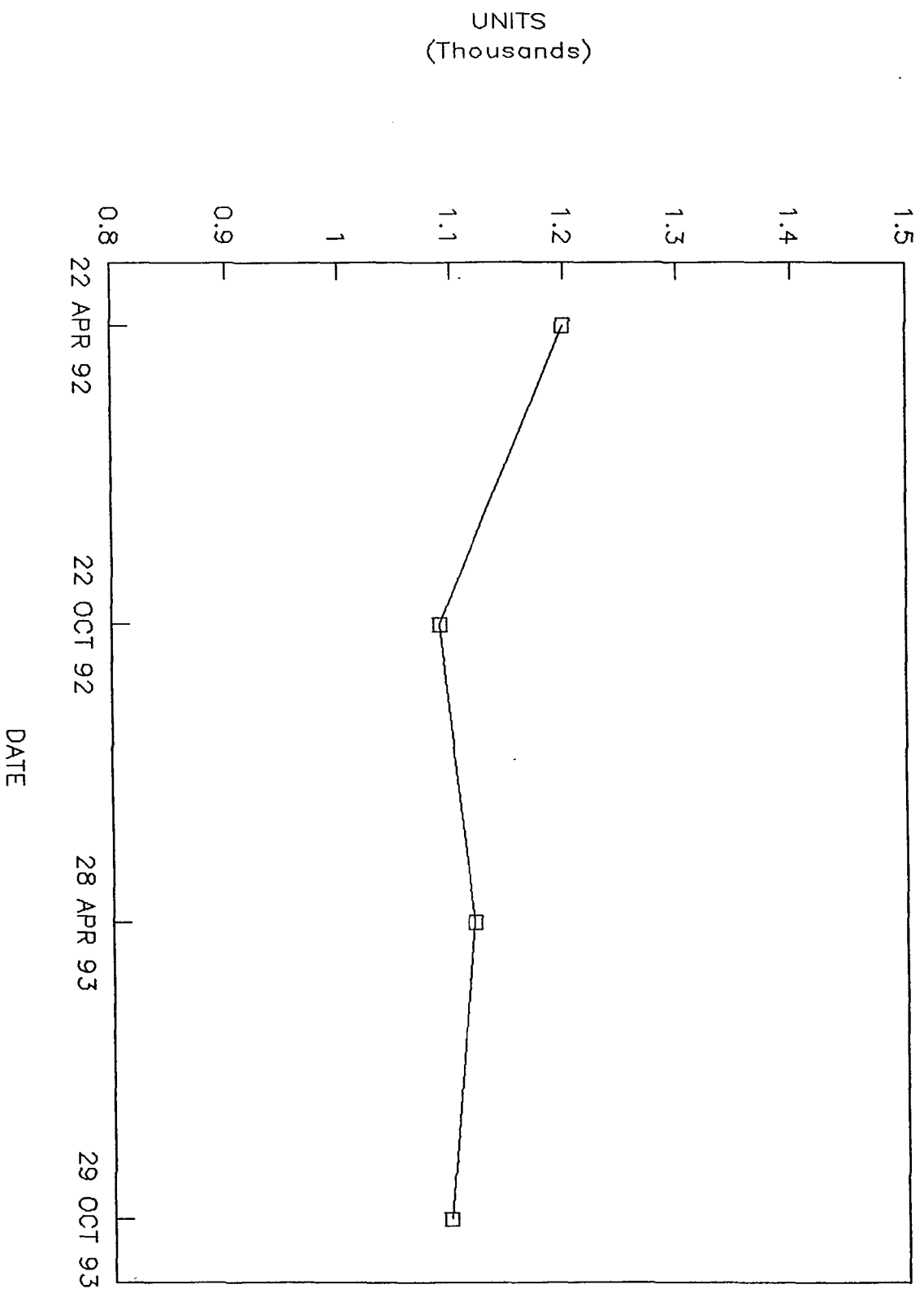
MW-1 EC



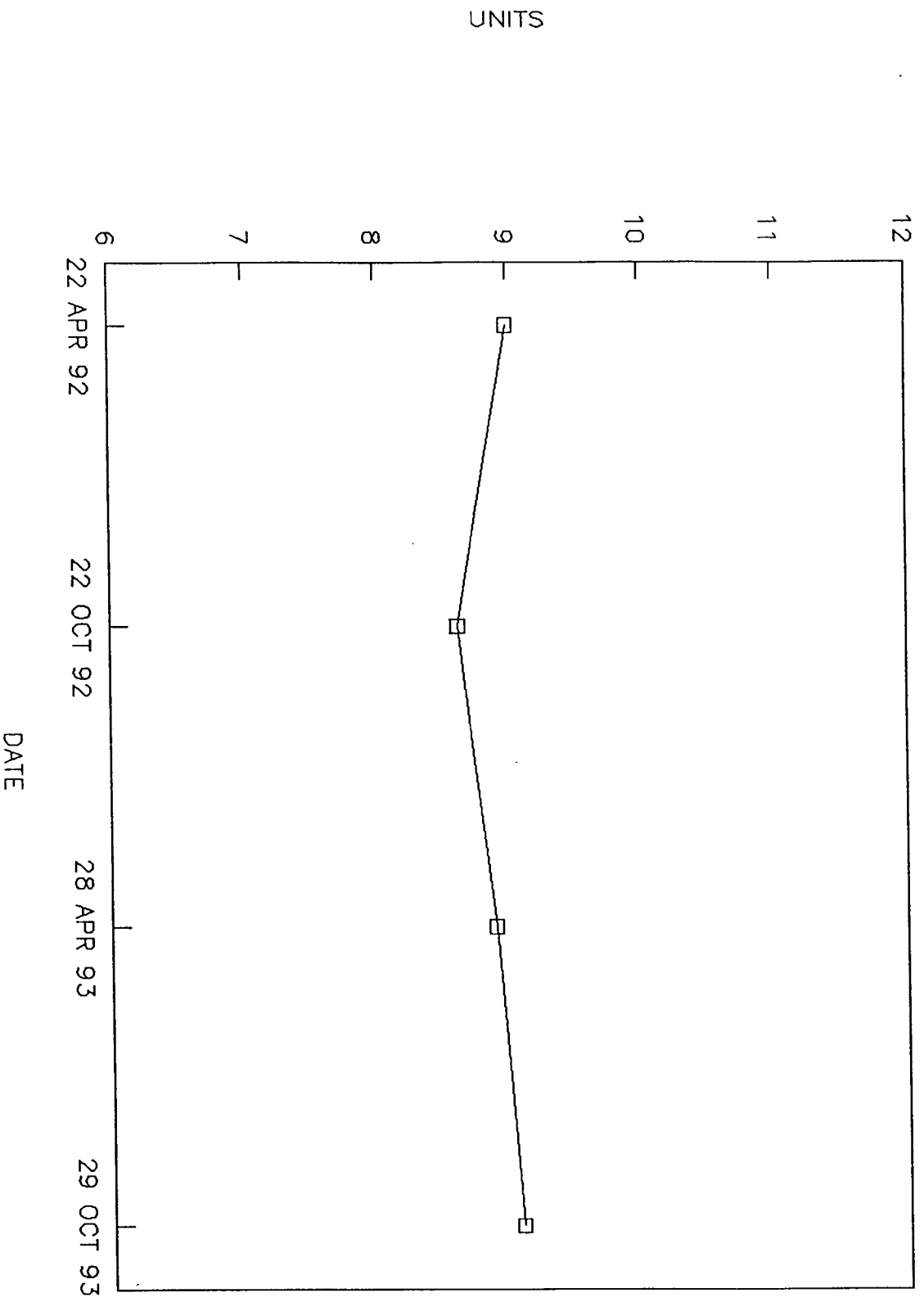
MW-1 pH



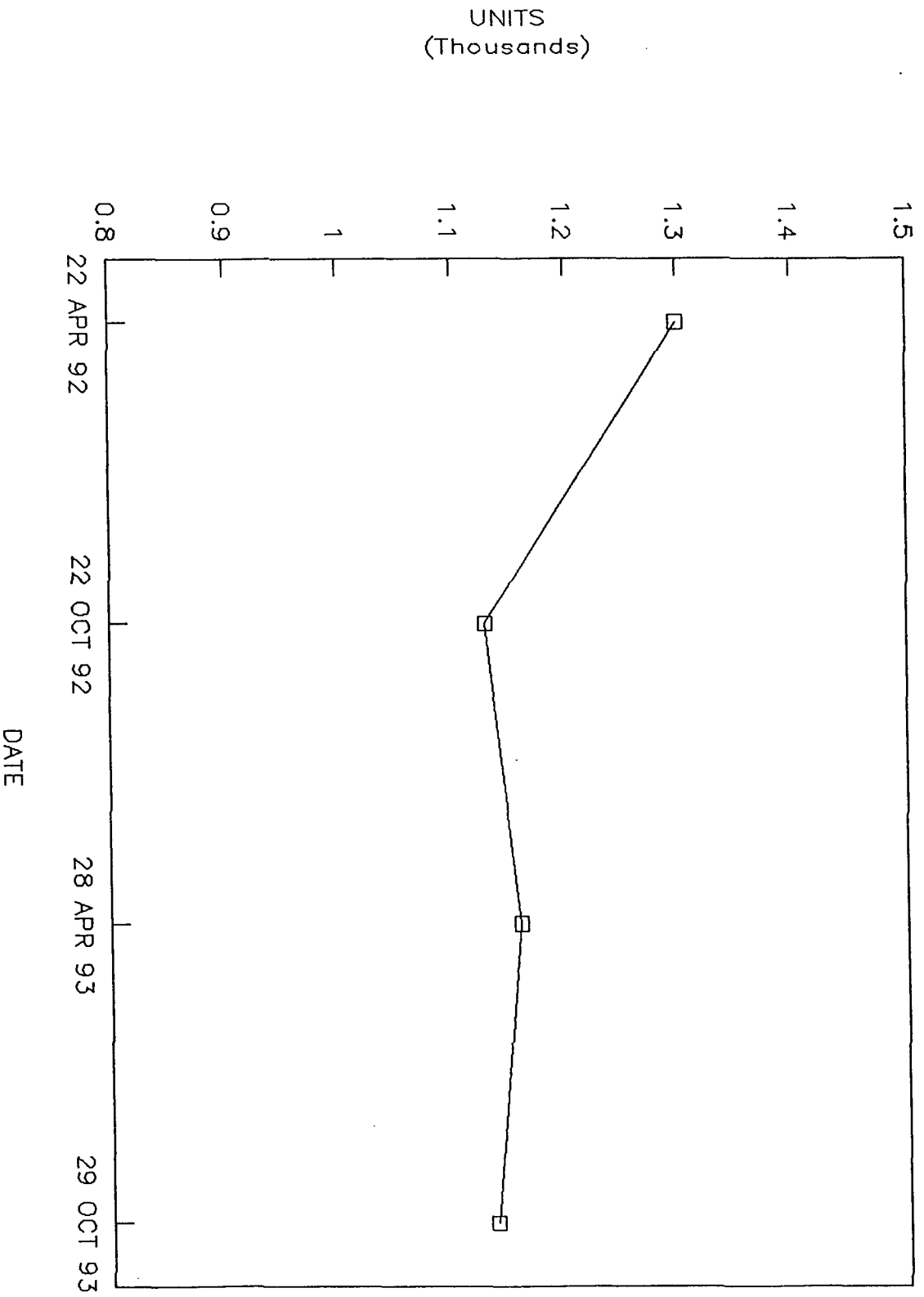
MW-2 EC



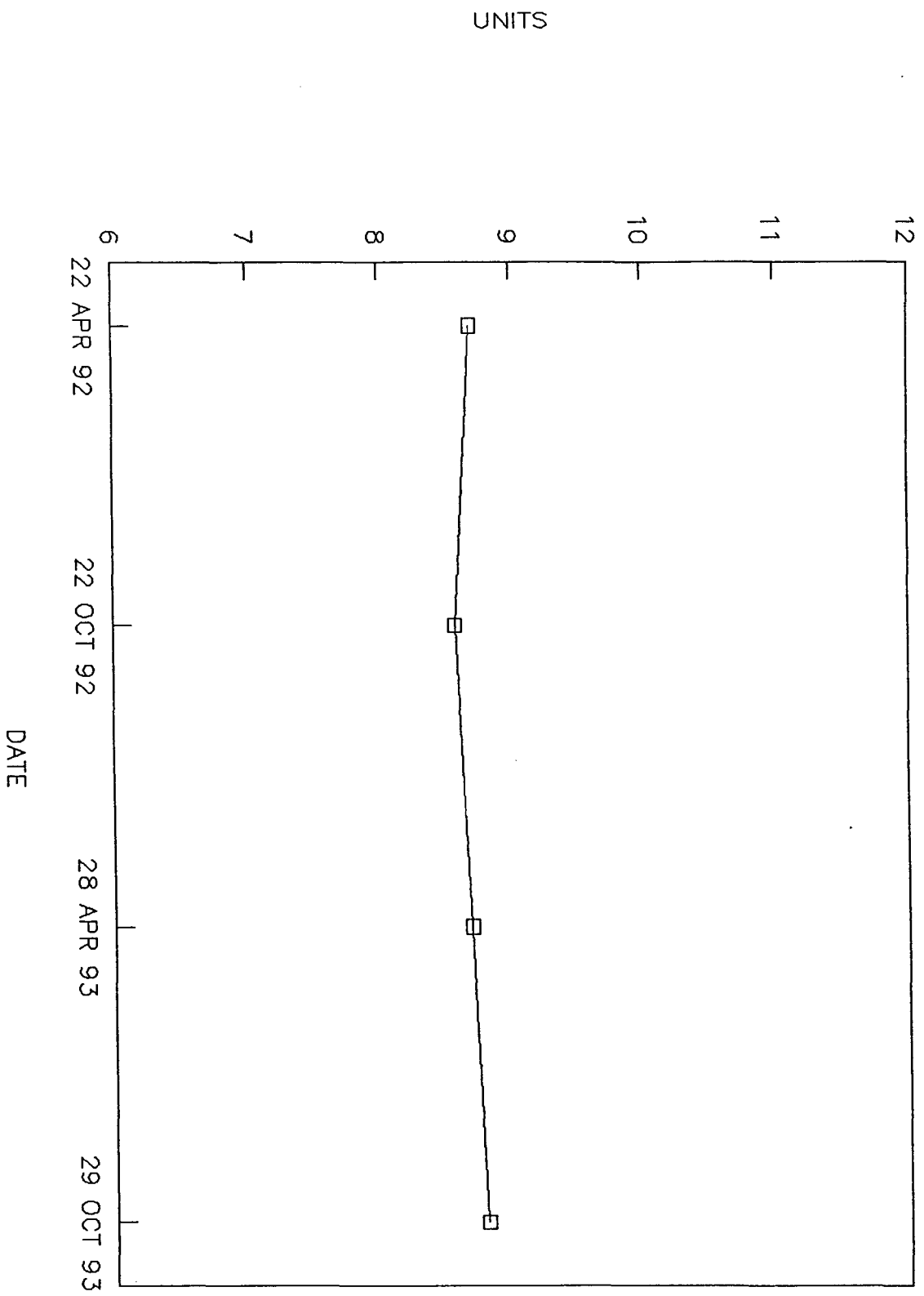
MW-2 pH



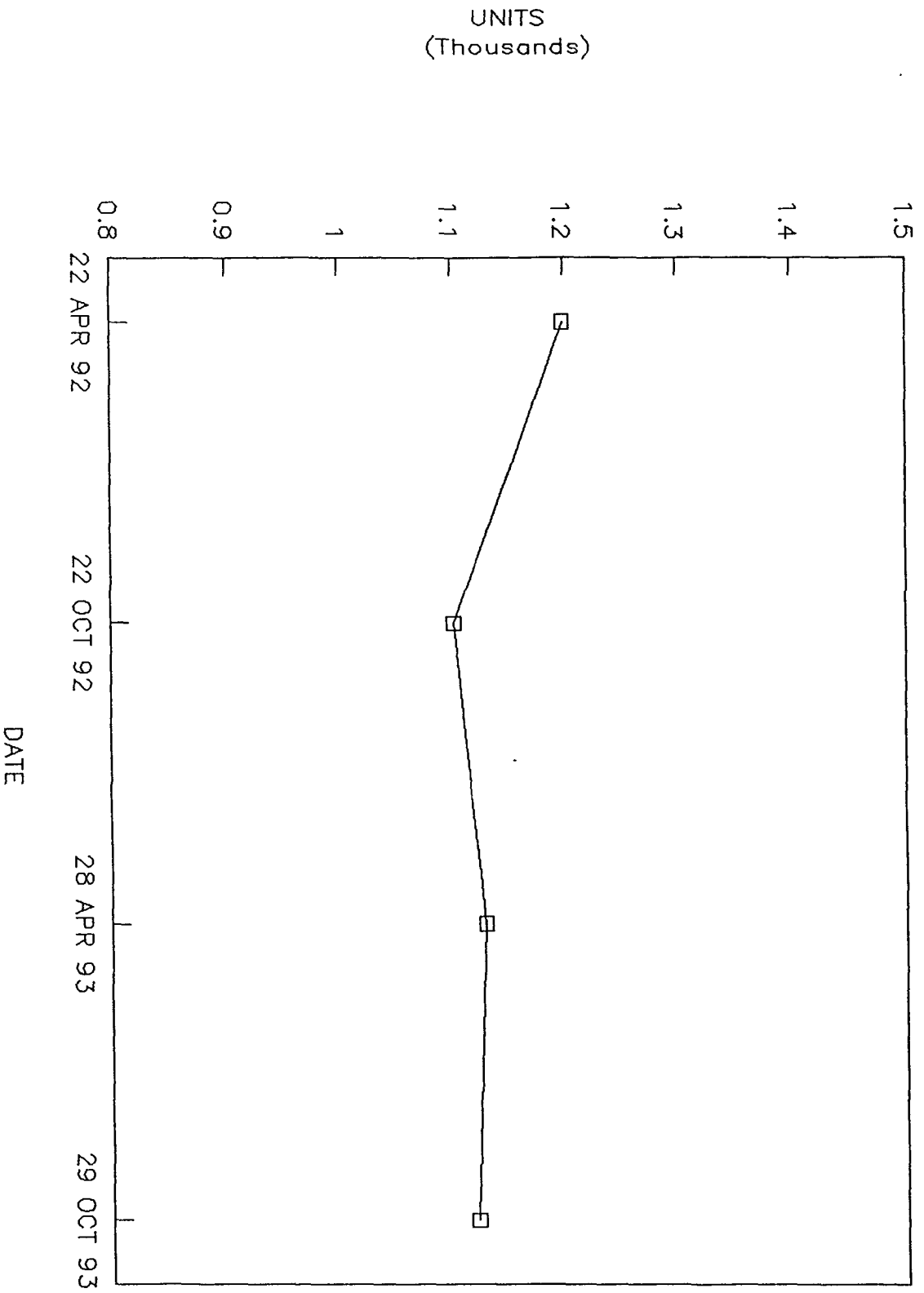
MW-4 EC



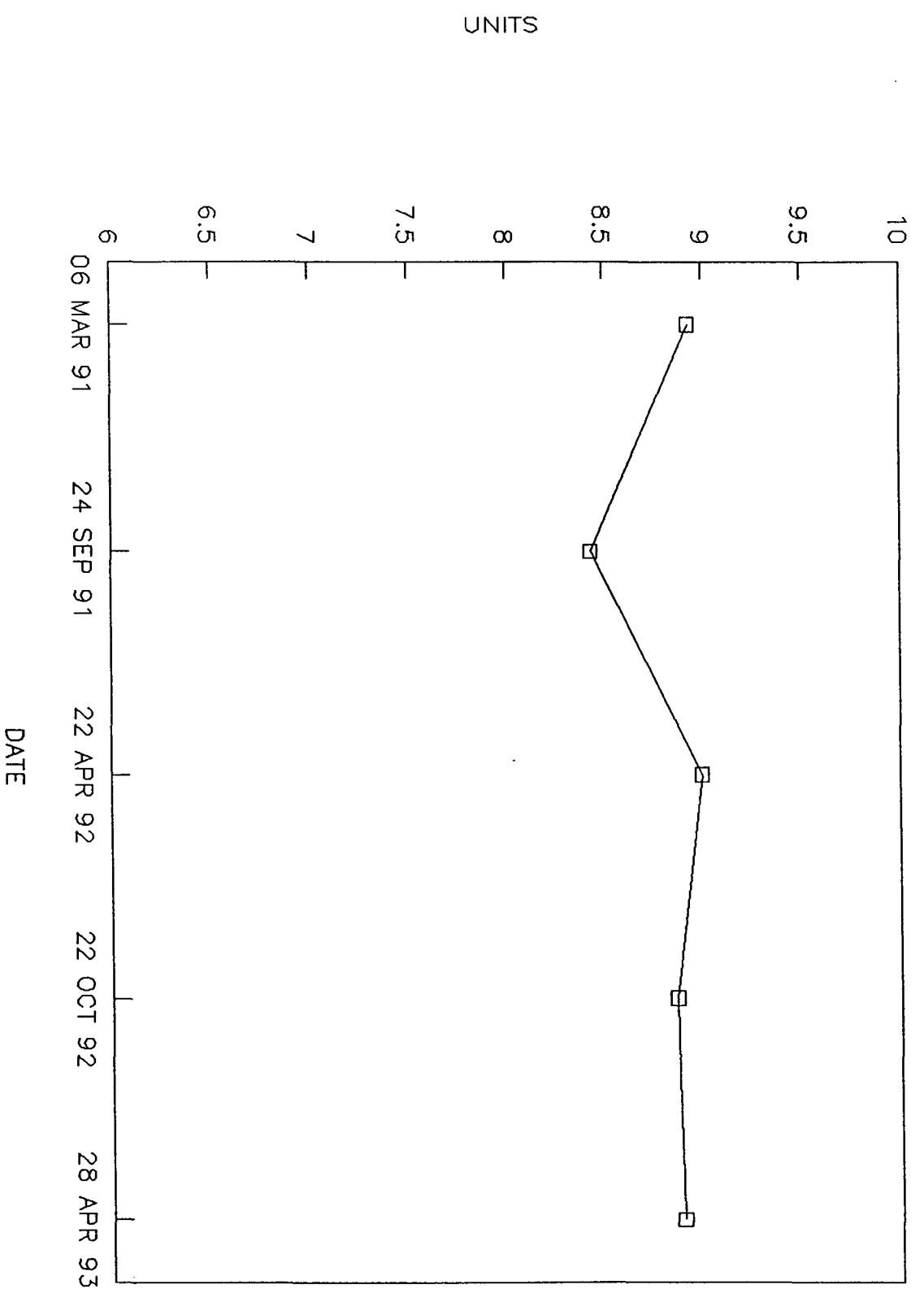
MW-4 pH



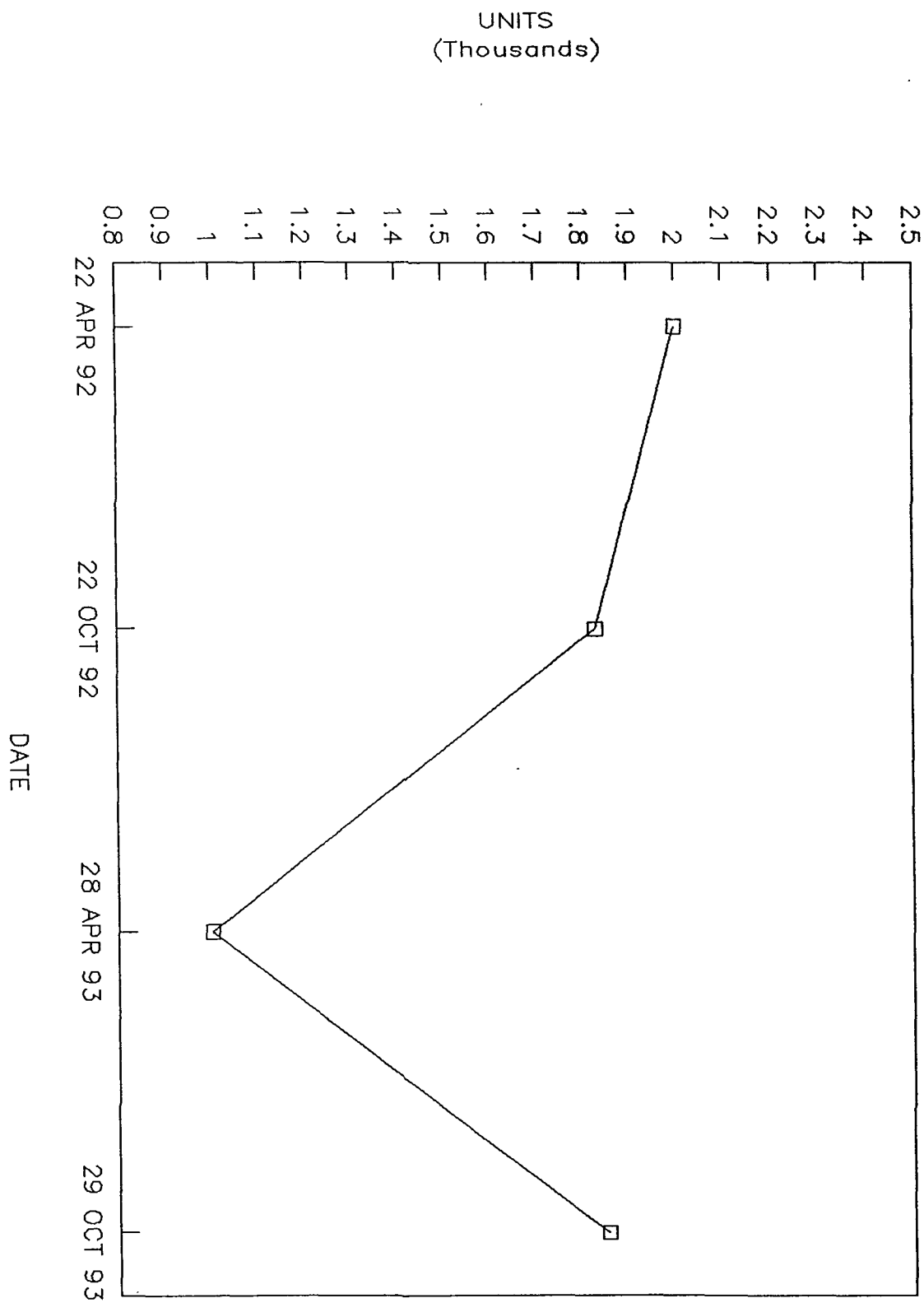
MW-5 EC



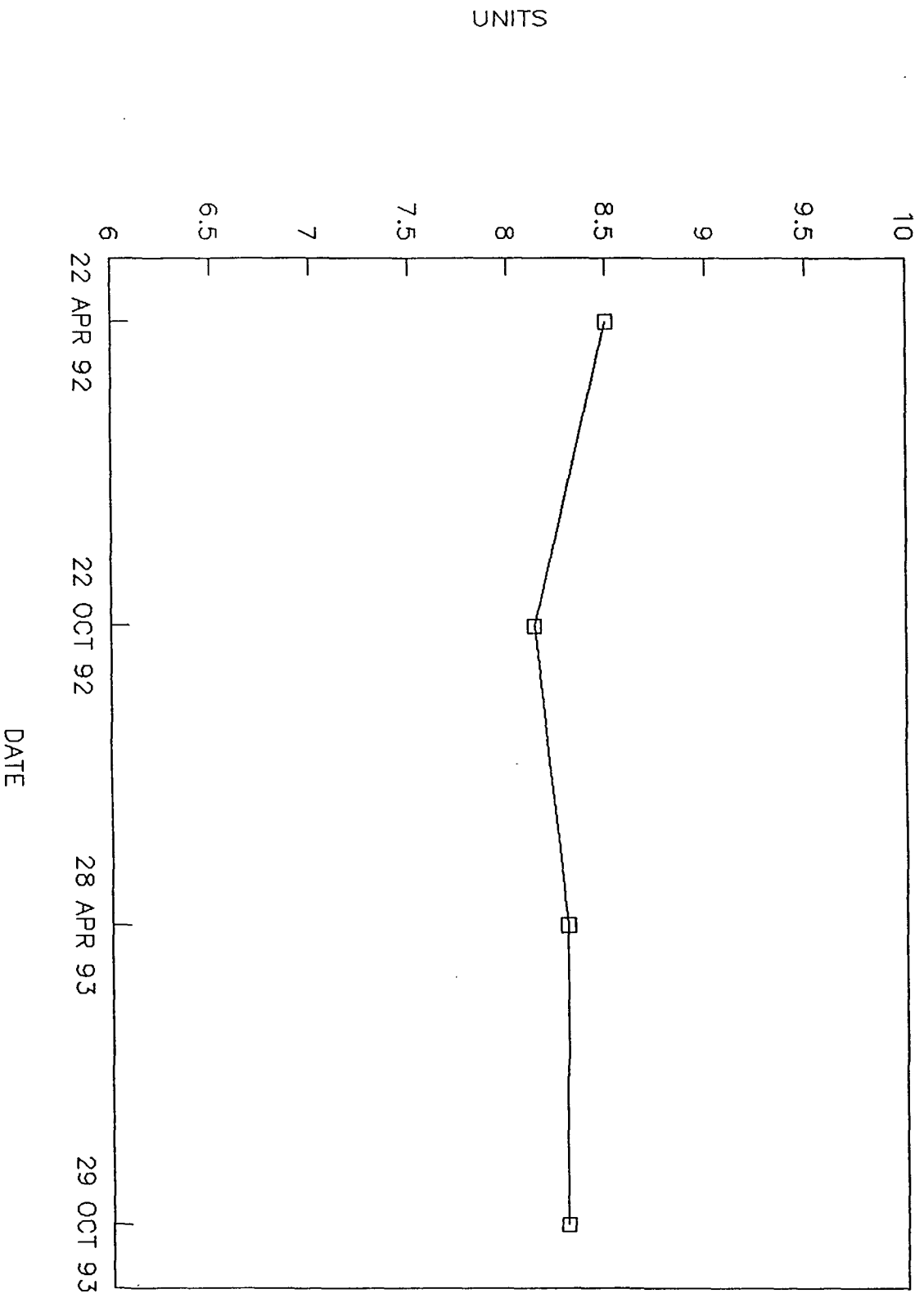
MW-5 pH



OW-11 EC



OW-11 pH



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.

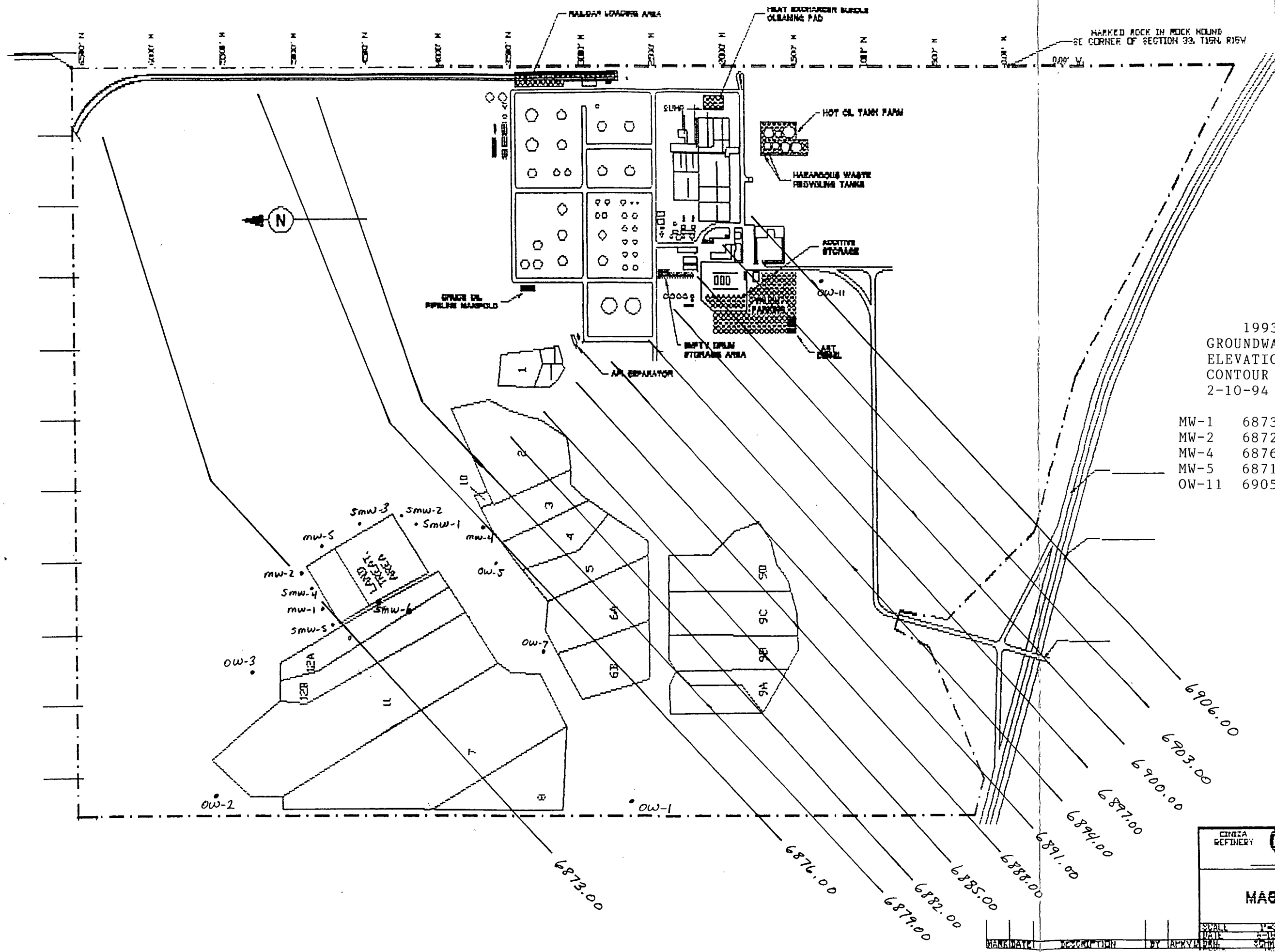
SMW-6	4-93	MEAN-	6856.64	SD	5.03
	11-93	MEAN-	6853.190	SD	5.1092

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.

GIANT REFINING CO.-CINIZA

ANNUAL GROUNDWATER MEASUREMENT

Well No.	Date	Casing Elevation	Depth to Water	Groundwater Elevation
MW-1	04-28-93	6878.52	5.00	6873.52
	10-29-93		13.91	6864.61
MW-2	04-28-93	6880.84	8.22	6872.62
	10-29-93		8.19	6872.65
MW-4	04-28-93	6882.54	5.97	6876.57
	10-29-93		5.44	6877.10
MW-5	04-28-93	6883.32	11.81	6871.51
	10-29-93		9.79	6873.53
OW-11	04-28-93	6923.89	18.01	6905.88
	10-29-93		18.27	6905.62
SMW-3	04-28-93	6884.56	38.82	6845.74
	11-29-93		32.13	6852.43
SMW-4	04-28-93	6880.08	31.24	6848.84
	11-29-93		31.09	6848.99
SMW-5	04-28-93	6878.02	31.00	6847.02
	11-29-93		31.04	6846.98
SMW-6	04-28-93	6880.71	31.81	6848.90
	11-29-93		31.61	6849.10
OW-1	04-28-93	6868.00	0.00	6868.00
			0.00	6868.00
OW-2	04-28-93	6871.00	28.64	6842.36
OW-3	04-28-93	6876.00	31.15	6844.85



1993
GROUNDWATER
ELEVATION
CONTOUR MAP
2-10-94 TLS

MW-1	6873.52
MW-2	6872.62
MW-4	6876.57
MW-5	6871.51
OW-11	6905.88

Cimza
REFINERY

GIANT
REFINING CO.

GALLUP
NEW MEXICO

MASTER PLAN

SCALE	1"=200'	DATE	10/2/94
BY	JAPY/ML	CHECKED	ML
APPROVED		DATE	10/2/94

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

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 CaCO ₃ at pH 4.5	250	----	303	----	mg/L
Alkalinity, Carb. as CaCO ₃ 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

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 CaCO ₃ at pH 4.5	390	---	426	---	mg/L
Alkalinity, Carb. as CaCO ₃ 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

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
Styrene	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



Analytical **Technologies**, Inc.

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

ATI I.D. 304451

May 20, 1993

Giant Refining
Route 3, Box 7
Gallup, NM 87301

Project Name/Number: ANNUAL GROUNDWATER

Attention: Lynn Shelton

On 04/29/93, Analytical Technologies, Inc. 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.

EPA Method 8020 analyses were performed by ATI, Albuquerque.

Total Organic Carbon and Total Organic Halides analyses were performed by ATI, Fort Collins.

All other analyses were performed by ATI, Phoenix.

J indicates the value is estimated and below the reporting limit. Methylene Chlorite was detected by EPA Method 8240 in the Trip Blank. It was not detected in any of the client's samples.

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

Letitia Krakowski
Assistant Project Manager

Gregory R. Jordan
Laboratory Manager

GJ:td

Enclosure



Analytical Technologies, Inc.

CLIENT : GIANT REFINING CO.

DATE RECEIVED : 04/29/93

PROJECT # : (NONE)

PROJECT NAME : ANNUAL GROUNDWATER

REPORT DATE : 05/20/93

ATI I.D. : 304451

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	OW-11	AQUEOUS	04/28/93
02	MW-1	AQUEOUS	04/28/93
03	MW-2	AQUEOUS	04/28/93
04	MW-4	AQUEOUS	04/28/93
05	MW-5	AQUEOUS	04/28/93
06	OW-1	AQUEOUS	04/28/93
07	OW-2	AQUEOUS	04/28/93
08	OW-3	AQUEOUS	04/28/93
09	TRIP BLANK	AQUEOUS	04/05/93

----- TOTALS -----

MATRIX	# SAMPLES
-----	-----
AQUEOUS	9

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

ATI I.D. : 304451

CLIENT : GIANT REFINING CO.

DATE RECEIVED : 04/29/93

PROJECT # : (NONE)

PROJECT NAME : ANNUAL GROUNDWATER

REPORT DATE : 05/20/93

PARAMETER	UNITS	01	02	03	04	05
CARBONATE (CACO3)	MG/L	<1	26	33	26	29
BICARBONATE (CACO3)	MG/L	485	322	303	426	295
HYDROXIDE (CACO3)	MG/L	<1	<1	<1	<1	<1
TOTAL ALKALINITY (AS CACO3)	MG/L	485	348	336	452	324
CHLORIDE (EPA 325.2)	MG/L	160	49	57	18	66
CONDUCTIVITY, (UMHOS/CM)		1800	1110	1120	1160	1130
PH (EPA 150.1)	UNITS	8.3	8.8	8.9	8.7	8.9
PHENOLICS, TOTAL (EPA 420.1)	MG/L	<0.005	<0.005	<0.005	<0.005	<0.005
SULFATE (EPA 375.2)	MG/L	200	150	160	140	160
T. DISSOLVED SOLIDS (160.1)	MG/L	1100	690	680	730	700



Analytical **Technologies**, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 304451

CLIENT : GIANT REFINING CO.

DATE RECEIVED : 04/29/93

PROJECT # : (NONE)

PROJECT NAME : ANNUAL GROUNDWATER

REPORT DATE : 05/20/93

PARAMETER	UNITS	06	07	08
CARBONATE (CACO3)	MG/L	22	<1	<1
BICARBONATE (CACO3)	MG/L	387	662	660
HYDROXIDE (CACO3)	MG/L	<1	<1	<1
TOTAL ALKALINITY (AS CACO3)	MG/L	409	662	660
CHLORIDE (EPA 325.2)	MG/L	41	42	41
CONDUCTIVITY, (UMHOS/CM)		1260	1220	1260
PH (EPA 150.1)	UNITS	8.7	8.1	8.2
SULFATE (EPA 375.2)	MG/L	210	19	16
T. DISSOLVED SOLIDS (160.1)	MG/L	870	1100	840



Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

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

ATI I.D. : 304451

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CARBONATE	MG/L	30401101	<1	<1	NA	NA	NA	NA
BICARBONATE	MG/L		212	210	0.9	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		212	210	0.9	NA	NA	NA
CARBONATE	MG/L	30445105	29	29	0	NA	NA	NA
BICARBONATE	MG/L		295	297	0.7	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		324	326	0.6	NA	NA	NA
CHLORIDE	MG/L	30445104	18	18	0	44	25	104
CONDUCTIVITY(UMHOS/CM)		30403301	1260	1270	0.8	NA	NA	NA
PH	UNITS	30401101	7.7	7.7	0	NA	NA	NA
PH	UNITS	30445105	8.9	8.9	0	NA	NA	NA
PHENOLICS, TOTAL	MG/L	30549904	<0.005	<0.005	NA	0.025	0.025	100
SULFATE	MG/L	30549909	38	38	0	76	38	100
SULFATE	MG/L	30549905	190	180	5	410	200	110
TOTAL DISSOLVED SOLIDS	MG/L	30444401	390	390	0	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.

GENERAL CHEMISTRY RESULTS

CLIENT : GIANT REFINING
PROJECT # : (NONE)
PROJECT NAME: ANNUAL GROUNDWATER

ATI I.D. : 304451
DATE RECEIVED: 04/29/93
REPORT DATE : 05/20/93

PARAMETER	UNITS	01	02	03	04	05
TOTAL ORGANIC CARBON	MG/L	4	<1.0	1	1	1



Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : GIANT REFINING
PROJECT # : (NONE)
PROJECT NAME: ANNUAL GROUNDWATER

ATI I.D.: 304451

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC.	% REC
TOTAL ORGANIC CARBON	MG/L	30445101	4	4	0	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.

GENERAL CHEMISTRY RESULTS

CLIENT : GIANT REFINING
PROJECT # : (NONE)
PROJECT NAME: ANNUAL GROUNDWATER

ATI I.D. : 304451
DATE RECEIVED: 04/29/93
REPORT DATE : 05/20/93

PARAMETER	UNITS	01	02	03	04	05
TOTAL ORGANIC HALIDES	MG/L	30	<20	<20	<20	50



Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : GIANT REFINING
PROJECT # : (NONE)
PROJECT NAME: ANNUAL GROUNDWATER

ATI I.D.: 304451

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC.	% REC
TOTAL ORGANIC HALIDES	MG/L	30445102	<20	NA	NA	400	400	100

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

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



Analytical Technologies, Inc.

METALS RESULTS

ATI I.D. : 304451

CLIENT : GIANT REFINING CO.

DATE RECEIVED : 04/29/93

PROJECT # : (NONE)

PROJECT NAME : ANNUAL GROUNDWATER

REPORT DATE : 05/20/93

PARAMETER	UNITS	01	02	03	04	05
SILVER (EPA 200.7/6010)	MG/L	<0.010	<0.010	<0.010	<0.010	<0.010
ARSENIC (200.7/6010)	MG/L	<0.1	<0.1	<0.1	<0.1	<0.1
BARIUM (EPA 200.7/6010)	MG/L	<0.010	<0.010	0.015	0.016	0.015
CALCIUM (EPA 200.7/6010)	MG/L	4.8	1.1	0.9	1.5	1.4
CADMIUM (200.7/6010)	MG/L	<0.005	<0.005	<0.005	<0.005	<0.005
CHROMIUM (EPA 200.7/6010)	MG/L	<0.010	<0.010	<0.010	<0.010	<0.010
MERCURY (EPA 245.1/7470)	MG/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
POTASSIUM (EPA 200.7/6010)	MG/L	1.1	<1.0	<1.0	<1.0	1.5
MAGNESIUM (EPA 200.7/6010)	MG/L	0.6	0.2	0.1	0.3	0.2
MANGANESE (EPA 200.7/6010)	MG/L	<0.010	<0.010	<0.010	<0.010	<0.010
SODIUM (EPA 200.7/6010)	MG/L	421	260	275	295	279
LEAD (200.7/6010)	MG/L	<0.10	<0.10	<0.10	<0.10	<0.10
SELENIUM (200.7/6010)	MG/L	<0.1	<0.1	<0.1	<0.1	<0.1



Analytical **Technologies**, Inc.

METALS RESULTS

ATI I.D. : 304451

CLIENT : GIANT REFINING CO.

DATE RECEIVED : 04/29/93

PROJECT # : (NONE)

PROJECT NAME : ANNUAL GROUNDWATER

REPORT DATE : 05/20/93

PARAMETER	UNITS	06	07	08
CALCIUM (EPA 200.7/6010)	MG/L	3.6	8.7	9.5
POTASSIUM (EPA 200.7/6010)	MG/L	2.1	<1.0	<1.0
MAGNESIUM (EPA 200.7/6010)	MG/L	4.5	3.7	3.6
SODIUM (EPA 200.7/6010)	MG/L	326	336	340



Analytical Technologies, Inc.

METALS - QUALITY CONTROL

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

ATI I.D. : 304451

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
SILVER	MG/L	30445105	<0.010	<0.010	NA	1.02	1.00	102
ARSENIC (ICAP)	MG/L	30445105	<0.1	<0.1	NA	1.0	1.0	100
BARIUM	MG/L	30445105	0.015	0.015	0	1.04	1.00	102
CALCIUM	MG/L	30445103	0.9	0.9	0	48.7	50.0	96
CALCIUM	MG/L	30496402	67.0	69.2	3	117	50.0	100
CADMIUM	MG/L	30445105	<0.005	<0.005	NA	0.996	1.00	100
CHROMIUM	MG/L	30445105	<0.010	<0.010	NA	0.982	1.00	98
MERCURY	MG/L	30550701	<0.0002	<0.0002	NA	0.0049	0.0050	98
POTASSIUM	MG/L	30445103	<1.0	<1.0	NA	48.2	50.0	96
MAGNESIUM	MG/L	30445103	0.1	0.1	0	23.4	25.0	93
MANGANESE	MG/L	30445105	<0.010	<0.010	NA	1.02	1.00	102
SODIUM	MG/L	30445103	275	277	0.7	364	100	89
LEAD	MG/L	30445105	<0.10	<0.10	NA	1.01	1.00	101
SELENIUM (ICAP)	MG/L	30445105	<0.1	<0.1	NA	1.1	1.00	110

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

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



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

TEST : BTEX, MTBE (EPA 8020)
CLIENT : GIANT REFINING
PROJECT # : (NONE)
PROJECT NAME: ANNUAL GROUNDWATER

ATI I.D.: 304451

SAMPLE I.D. #	CLIENT I.D.	MATRIX	DATE SAMPLED	DATE EXTRACTED	DATE ANALYZED	DIL. FACTOR
06	OW-1	AQUEOUS	04/28/93	NA	05/03/93	1
07	OW-2	AQUEOUS	04/28/93	NA	05/03/93	1
08	OW-3	AQUEOUS	04/28/93	NA	05/03/93	1

PARAMETER	UNITS	06	07	08
BENZENE	UG/L	<0.5	<0.5	<0.5
TOLUENE	UG/L	2.3	<0.5	<0.5
ETHYLBENZENE	UG/L	<0.5	<0.5	<0.5
TOTAL XYLENES	UG/L	<0.5	<0.5	<0.5
METHYL-t-BUTYL ETHER	UG/L	<2.5	<2.5	<2.5
BROMOFLUOROBENZENE (%)		95	91	92



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY RESULTS

REAGENT BLANK

TEST : BTEX, MTBE (EPA 8020)
BLANK I.D. : 050393
CLIENT : GIANT REFINING
PROJECT # : (NONE)
PROJECT NAME: ANNUAL GROUNDWATER

ATI I.D. : 304451
DATE EXTRACTED : NA
DATE ANALYZED : 05/03/93
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 (%)		91



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - QUALITY CONTROL

MSMSD

TEST : BTEX, MTBE (EPA 8020)
MSMSD # : 30444511
CLIENT : GIANT REFINING
PROJECT # : (NONE)
PROJECT NAME: ANNUAL GROUNDWATER

ATI I.D. : 304451
DATE EXTRACTED: NA
DATE ANALYZED : 05/03/93
SAMPLE MATRIX : AQUEOUS
REF. I.D. : 30444511
UNITS : UG/L

PARAMETERS	SAMPLE RESULT	CONC SPIKE	SPIKED SAMPLE	% REC	DUP SPIKE	DUP % REC	RPD
BENZENE	<0.5	10	9.8	98	9.7	97	1
TOLUENE	<0.5	10	10	100	10	100	0
ETHYL BENZENE	<0.5	10	10	100	10	100	0
TOTAL XYLENES	<0.5	30	30	100	30	100	0
METHYL-t-BUTYL ETHER	<2.5	20	22	110	21	105	5



Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 30445101

TEST : VOLATILE ORGANICS (EPA 8240)

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

DATE SAMPLED : 04/28/93
DATE RECEIVED : 04/29/93
DATE EXTRACTED : N/A
DATE ANALYZED : 05/06/93
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-CHLOROETHYLVINYLETHER	<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 (%)	90
BROMOFLUOROBENZENE (%)	100
TOLUENE-D8 (%)	98



Analytical **Technologies**, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 30445101

COMPOUNDS

RESULTS

NO ADDITIONAL COMPOUNDS



Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 30445102

TEST : VOLATILE ORGANICS (EPA 8240)

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

DATE SAMPLED : 04/28/93
DATE RECEIVED : 04/29/93
DATE EXTRACTED : N/A
DATE ANALYZED : 05/06/93
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-CHLOROETHYLVINYLETHER	<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 (%)	97
TOLUENE-D8 (%)	96



Analytical **Technologies, Inc.** ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 30445102

COMPOUNDS

RESULTS

NO ADDITIONAL COMPOUNDS



Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 30445103

TEST : VOLATILE ORGANICS (EPA 8240)

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

DATE SAMPLED : 04/28/93
DATE RECEIVED : 04/29/93
DATE EXTRACTED : N/A
DATE ANALYZED : 05/06/93
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 (%)	98



Analytical **Technologies**, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 30445103

COMPOUNDS

RESULTS

NO ADDITIONAL COMPOUNDS



Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 30445104

TEST : VOLATILE ORGANICS (EPA 8240)

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

DATE SAMPLED : 04/28/93
DATE RECEIVED : 04/29/93
DATE EXTRACTED : N/A
DATE ANALYZED : 05/06/93
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-CHLOROETHYLVINYLETHER	<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 (%)	97
BROMOFLUOROBENZENE (%)	95
TOLUENE-D8 (%)	95



Analytical **Technologies, Inc.**

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 30445104

COMPOUNDS

RESULTS

NO ADDITIONAL COMPOUNDS



Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 30445105

TEST : VOLATILE ORGANICS (EPA 8240)

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

DATE SAMPLED : 04/28/93
DATE RECEIVED : 04/29/93
DATE EXTRACTED : N/A
DATE ANALYZED : 05/06/93
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-CHLOROETHYLVINYLEETHER	<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 (%)	97
BROMOFLUOROBENZENE (%)	96
TOLUENE-D8 (%)	97



Analytical**Technologies, Inc.**

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 30445105

COMPOUNDS

RESULTS

NO ADDITIONAL COMPOUNDS



Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 30445109

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME : ANNUAL GROUNDWATER
CLIENT I.D. : TRIP BLANK
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/05/93
DATE RECEIVED : 04/29/93
DATE EXTRACTED : N/A
DATE ANALYZED : 05/06/93
UNITS : UG/L
DILUTION FACTOR : 1

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

CHLOROMETHANE	<10
BROMOMETHANE	<10
VINYL CHLORIDE	<1
CHLOROETHANE	<1
METHYLENE CHLORIDE	3 J
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-CHLOROETHYLVINYLEETHER	<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 (%)	99
BROMOFLUOROBENZENE (%)	97
TOLUENE-D8 (%)	97



Analytical **Technologies**, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 30445109

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 : ANNUAL GROUNDWATER
CLIENT I.D. : REAGENT BLANK

ATI I.D. : 304451
DATE EXTRACTED : 05/06/93
DATE ANALYZED : 05/06/93
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 (%)	99
BROMOFLUOROBENZENE (%)	99
TOLUENE-D8 (%)	97



Analytical Technologies, Inc.

GCMS - RESULTS

REAGENT BLANK

TEST : VOLATILE ORGANICS (EPA 8240)

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

ATI I.D. : 304451
DATE EXTRACTED : 05/06/93
DATE ANALYZED : 05/06/93
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 (%)	98
BROMOFLUOROBENZENE (%)	99
TOLUENE-D8 (%)	97



Analytical Technologies, Inc.

QUALITY CONTROL DATA

ATI I.D. : 304451

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO.

PROJECT # : (NONE)

PROJECT NAME : ANNUAL GROUNDWATER

REF I.D. : 30445101

DATE ANALYZED : 05/06/93

SAMPLE MATRIX : AQUEOUS

UNITS : UG/L

COMPOUNDS	SAMPLE CONC.		SPIKED SAMPLE	% REC.	DUP. SPIKED		RPD
	RESULT	SPIKED			SAMPLE	% REC.	
1,1-DICHLOROETHENE	<1	50	44	88	50	100	13
TRICHLOROETHENE	<1	50	45	90	48	96	6
CHLOROBENZENE	<1	50	48	96	49	98	2
TOLUENE	<1	50	50	100	53	106	6
BENZENE	<1	50	50	100	52	104	4

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

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



Analytical Technologies, Inc.

QUALITY CONTROL DATA

ATI I.D. : 304451

TEST : VOLATILE ORGANICS (EPA 8240)

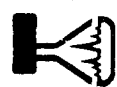
CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME : ANNUAL GROUNDWATER
REF I.D. : 30445509

DATE ANALYZED : 05/06/93
SAMPLE MATRIX : AQUEOUS
UNITS : UG/L

COMPOUNDS	SAMPLE CONC.		SPIKED SAMPLE	% REC.	DUP. SPIKED		RPD
	RESULT	SPIKED			SAMPLE	% REC.	
1,1-DICHLOROETHENE	<1	50	46	92	51	102	10
TRICHLOROETHENE	<1	50	45	90	48	96	6
CHLOROBENZENE	<1	50	46	92	48	96	4
TOLUENE	<1	50	48	96	51	102	6
BENZENE	<1	50	48	96	51	102	6

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

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



PROJECT MANAGER:		Lynn Shelton	
COMPANY:	GIANT		
ADDRESS:	140 EXIT 39 JAMES TOWN, NM		
PHONE:	- 722 0227 - 87347		
FAX:			
BILL TO:	SAME		
COMPANY:			
ADDRESS:			

SAMPLE ID	DATE	MATRIX	CALIB
OW-11	4-28	Hyd	01
MW-1	9/26		02
MW-2	9/24		03
MW-4	11/12		04
MW-5	11/10		05
OW-1	11/5		06
OW-2	11/7		07
OW-3	11/4		08
TRIP BLANK	4/5		09

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.:		NO. CONTAINERS	500 17
PROJ. NAME:	ANNUAL GROUNDWATER	CUSTODY SEALS	(Y) N / NA
P.O. NO.:	997-9009-14	RECEIVED INTACT	Y
SHIPPED VIA:	FED EX	RECEIVED COLD	Y

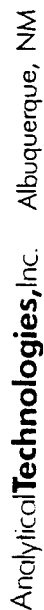
PRIORITY AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS			
(RUSH)	☐ 24hr	☐ 48hr	☒ 72hr
	☐ 1 WEEK		☒ 2 WEEK

Comments:
SEE ATTACHED LIST FOR PARAMETERS
XX DISSOLVED METALS ARE NOT FILTERED.

ANALYSIS REQUEST																							
Petroleum Hydrocarbons (418.1)	Diesel/Gasoline/BTEX/MTBE (MOD 8015/8020)	BTEX/MTBE (8020)	GENERAL CHEMISTRY *	TOC, TOX	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.	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)	TOTAL METALS *	SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal	DIS SOLVED METALS **	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	X					X	X	X	X	13
			X	X	X		X	X	X	X	X	X	X	X					X	X	X	X	13
			X	X	X		X	X	X	X	X	X	X	X					X	X	X	X	13
			X	X	X		X	X	X	X	X	X	X	X					X	X	X	X	13
			X	X	X		X	X	X	X	X	X	X	X					X	X	X	X	4
			X	X	X		X	X	X	X	X	X	X	X					X	X	X	X	4
			X	X	X		X	X	X	X	X	X	X	X					X	X	X	X	4

SAMPLED & RELINQUISHED BY: 1.		RELINQUISHED BY: 2.		RELINQUISHED BY: 3.	
Signature:	Lynn Shelton	Signature:		Signature:	
Date:	3:20	Date:		Date:	
Printed Name:	LYNN SHELTON	Printed Name:		Printed Name:	
Company:	Giant	Company:		Company:	

RECEIVED BY: 1.		RECEIVED BY: 2.		RECEIVED BY: 3.	
Signature:		Signature:		Signature:	
Date:		Date:		Date:	
Printed Name:		Printed Name:		Printed Name:	
Company:		Company:		Company:	Analytical Technologies, Inc.



Chain of Custody

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: Analytical Technologies, Inc.

ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87106

CLIENT PROJECT MANAGER:

SAMPLE ID	DATE	TIME	MATRIX	LABID
304451-01	4/28		A	01
-02	}		}	02
-03	}		}	03
04	}		}	04
05	}		}	05

[illegible]

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJECT NUMBER:	26451	TOTAL NUMBER OF CONTAINERS	
PROJECT NAME:	GIANT	CHAIN OF CUSTODY SEALS	
QC LEVEL: STD. IV		INTACT?	
QC REQUIRED: MS MSD BLANK		RECEIVED GOOD COND./COLD	
YAT: STANDARD) RUSH!		LAB NUMBER	

W00LK403

DUE DATE:

RUSH SURCHARGE:

CLIENT DISCOUNT: _____ %

SAMPLES SENT TO:	REMAINED BY: 1.	RELINQUISHED BY: 2.
SAN DIEGO	Signature: <i>[Signature]</i> Time: 1200	Signature: <i>[Signature]</i> Time: 4:30
FT. COLLINS	Printed Name: <i>[Signature]</i> Date: 4/30/93	Printed Name: <i>[Signature]</i> Date: 4/30/93
RENTON	Analytical Technologies, Inc.	Company: <i>[Signature]</i>
PENSACOLA	Albuquerque	
PHOENIX	RECEIVED BY: (LAB) 1.	RECEIVED BY: (LAB) 2.
BARRINGER	Signature: <i>[Signature]</i> Time: 1230	Signature: Time:
FIBERQUANT	Printed Name: <i>[Signature]</i> Date: 4/30/93	Printed Name: Date:
	Company: <i>[Signature]</i>	Company: <i>[Signature]</i>

Chris Miller
5-2-83
1350
ATTN
F/C



Analytical**Technologies**, Inc.

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

ATI I.D. 304455

May 20, 1993

Giant Refining Co.
Route 3, Box 7
Gallup, NM 87301

Project Name/Number: ANNUAL GRDWTR

Attention: Lynn Shelton

On 04/30/93, Analytical Technologies, Inc. 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.

Total Organic Carbon and Total Organic Halides analyses were performed by ATI, Fort Collins.

All other analyses were performed by ATI, Phoenix.

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

Letitia Krakowski
Assistant Project Manager

GJ:td

Enclosure

Gregory R. Jordan
Laboratory Manager



Analytical Technologies, Inc.

CLIENT : GIANT REFINING CO.

DATE RECEIVED : 04/30/93

PROJECT # : (NONE)

PROJECT NAME : ANNUAL GRDWTR

REPORT DATE : 05/20/93

ATI I.D. : 304455

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	SMW-3 (TOTAL)	AQUEOUS	04/29/93
02	SMW-3 (DISSOLVED)	AQUEOUS	04/29/93
03	SMW-4 (TOTAL)	AQUEOUS	04/29/93
04	SMW-4 (DISSOLVED)	AQUEOUS	04/29/93
05	SMW-5 (TOTAL)	AQUEOUS	04/29/93
06	SMW-5 (DISSOLVED)	AQUEOUS	04/29/93
07	SMW-6 (TOTAL)	AQUEOUS	04/29/93
08	SMW-6 (DISSOLVED)	AQUEOUS	04/29/93
09	SMW-4D (TOTAL)	AQUEOUS	04/29/93
10	SMW-4D (DISSOLVED)	AQUEOUS	04/29/93

----- TOTALS -----

MATRIX	# SAMPLES
-----	-----
AQUEOUS	10

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

ATI I.D. : 304455

CLIENT : GIANT REFINING CO.

DATE RECEIVED : 04/30/93

PROJECT # : (NONE)

PROJECT NAME : ANNUAL GRDWTR

REPORT DATE : 05/20/93

PARAMETER	UNITS	01	03	05	07	09
CARBONATE (CACO3)	MG/L	<1	<1	10	<1	<1
BICARBONATE (CACO3)	MG/L	630	420	335	591	426
HYDROXIDE (CACO3)	MG/L	<1	<1	<1	<1	<1
TOTAL ALKALINITY (AS CACO3)	MG/L	630	420	345	591	426
CHLORIDE (EPA 325.2)	MG/L	70	61	61	90	60
CONDUCTIVITY, (UMHOS/CM)		3170	1310	1130	1760	1300
PH (EPA 150.1)	UNITS	7.9	8.2	8.5	8.2	8.2
SULFATE (EPA 375.2)	MG/L	1000	180	140	220	180
T. DISSOLVED SOLIDS (160.1)	MG/L	2300	840	770	1100	840
TOTAL ORGANIC CARBON	MG/L	3	3	8	2	4
TOTAL ORGANIC HALIDES	MG/L	40	40	90	< 20	90



Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

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

ATI I.D. : 304455

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CARBONATE	MG/L	30445501	<1	<1	NA	NA	NA	NA
BICARBONATE	MG/L		630	629	0.2	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		630	629	0.2	NA	NA	NA
CHLORIDE	MG/L	30445509	60	59	2	163	100	103
CONDUCTIVITY (UMHOS/CM)		30445501	3170	3240	2	NA	NA	NA
PH	UNITS	30445501	7.9	8.0	1	NA	NA	NA
SULFATE	MG/L	30445501	1000	1000	0	2000	990	101
TOTAL DISSOLVED SOLIDS	MG/L	30445507	1100	1100	0	NA	NA	NA
TOTAL ORGANIC CARBON	MG/L	30445501	3	3	0	NA	NA	NA
TOTAL ORGANIC HALIDES	MG/L	930422902	< 20	NA	NA	400	400	100

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

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



Analytical Technologies, Inc.

METALS RESULTS

ATI I.D. : 304455

CLIENT : GIANT REFINING CO.

DATE RECEIVED : 04/30/93

PROJECT # : (NONE)

PROJECT NAME : ANNUAL GRDWTR

REPORT DATE : 05/20/93

PARAMETER	UNITS	01	02	03	04	05
CALCIUM (EPA 200.7/6010)	MG/L	-	43.5	-	4.2	-
CHROMIUM (EPA 200.7/6010)	MG/L	0.012	-	0.014	-	0.020
POTASSIUM (EPA 200.7/6010)	MG/L	-	<1.0	-	<1.0	-
MAGNESIUM (EPA 200.7/6010)	MG/L	-	15.6	-	1.4	-
SODIUM (EPA 200.7/6010)	MG/L	-	820	-	318	-
LEAD (200.7/6010)	MG/L	<0.10	-	<0.10	-	<0.10



Analytical Technologies, Inc.

METALS RESULTS

ATI I.D. : 304455

CLIENT : GIANT REFINING CO.

DATE RECEIVED : 04/30/93

PROJECT # : (NONE)

PROJECT NAME : ANNUAL GRDWTR

REPORT DATE : 05/20/93

PARAMETER	UNITS	06	07	08	09	10
CALCIUM (EPA 200.7/6010)	MG/L	3.4	-	9.6	-	4.6
CHROMIUM (EPA 200.7/6010)	MG/L	-	0.012	-	0.011	-
POTASSIUM (EPA 200.7/6010)	MG/L	1.3	-	<1.0	-	<1.0
MAGNESIUM (EPA 200.7/6010)	MG/L	1.5	-	3.2	-	1.5
SODIUM (EPA 200.7/6010)	MG/L	256	-	443	-	321
LEAD (200.7/6010)	MG/L	-	<0.10	-	<0.10	-



Analytical Technologies, Inc.

METALS - QUALITY CONTROL

CLIENT : GIANT REFINING CO.

PROJECT # : (NONE)

PROJECT NAME : ANNUAL GRDWTR

ATI I.D. : 304455

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CALCIUM	MG/L	30551402	16.6	16.2	2	65.1	50.0	97
CHROMIUM	MG/L	30550801	0.018	0.016	12	0.898	1.00	88
POTASSIUM	MG/L	30551402	13.8	13.6	1	62.6	50.0	98
MAGNESIUM	MG/L	30551402	6.4	6.4	0	30.8	25.0	98
SODIUM	MG/L	30551402	1060	1050	0.9	1480	500	84
LEAD	MG/L	30445105	<0.10	<0.10	NA	1.01	1.00	101

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

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



Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 30445501

TEST : VOLATILE ORGANICS (EPA 8240)

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

DATE SAMPLED : 04/29/93
DATE RECEIVED : 04/30/93
DATE EXTRACTED : N/A
DATE ANALYZED : 05/05/93
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 (%)	101
TOLUENE-D8 (%)	101



Analytical**Technologies**, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 30445501

COMPOUNDS

RESULTS

NO ADDITIONAL COMPOUNDS



Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 30445503

TEST : VOLATILE ORGANICS (EPA 8240)

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

DATE SAMPLED : 04/29/93
DATE RECEIVED : 04/30/93
DATE EXTRACTED : N/A
DATE ANALYZED : 05/05/93
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-CHLOROETHYLVINYLEETHER	<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 (%)	97
BROMOFLUOROBENZENE (%)	100
TOLUENE-D8 (%)	99



Analytical**Technologies**, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 30445503

COMPOUNDS

RESULTS

NO ADDITIONAL COMPOUNDS



Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 30445505

TEST : VOLATILE ORGANICS (EPA 8240)

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

DATE SAMPLED : 04/29/93
DATE RECEIVED : 04/30/93
DATE EXTRACTED : N/A
DATE ANALYZED : 05/05/93
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 (%)	96
BROMOFLUOROBENZENE (%)	100
TOLUENE-D8 (%)	99



Analytical**Technologies**, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 30445505

COMPOUNDS

RESULTS

NO ADDITIONAL COMPOUNDS



Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 30445507

TEST : VOLATILE ORGANICS (EPA 8240)

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

DATE SAMPLED : 04/29/93
DATE RECEIVED : 04/30/93
DATE EXTRACTED : N/A
DATE ANALYZED : 05/06/93
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 (%)	105
BROMOFLUOROBENZENE (%)	98
TOLUENE-D8 (%)	97



Analytical **Technologies**, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 30445507

COMPOUNDS

RESULTS

NO ADDITIONAL COMPOUNDS



Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 30445509

TEST : VOLATILE ORGANICS (EPA 8240)

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

DATE SAMPLED : 04/29/93
DATE RECEIVED : 04/30/93
DATE EXTRACTED : N/A
DATE ANALYZED : 05/06/93
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 (%)	102
BROMOFLUOROBENZENE (%)	96
TOLUENE-D8 (%)	97



Analytical**Technologies**, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 30445509

COMPOUNDS

RESULTS

NO ADDITIONAL COMPOUNDS



GCMS - RESULTS

REAGENT BLANK

TEST : VOLATILE ORGANICS (EPA 8240)

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

ATI I.D. : 304455
DATE EXTRACTED : 05/05/93
DATE ANALYZED : 05/05/93
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 (%)	99
BROMOFLUOROBENZENE (%)	100
TOLUENE-D8 (%)	100



Analytical Technologies, Inc.

GCMS - RESULTS

REAGENT BLANK

TEST : VOLATILE ORGANICS (EPA 8240)

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

ATI I.D. : 304455
DATE EXTRACTED : 05/06/93
DATE ANALYZED : 05/06/93
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 (%)	98
BROMOFLUOROBENZENE (%)	99
TOLUENE-D8 (%)	97



Analytical Technologies, Inc.

QUALITY CONTROL DATA

ATI I.D. : 304455

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME : ANNUAL GRDWTR
REF I.D. : 30549805

DATE ANALYZED : 05/06/93
SAMPLE MATRIX : AQUEOUS
UNITS : UG/L

COMPOUNDS	SAMPLE CONC.		SPIKED	% SPIKED	DUP.		RPD
	RESULT	SPIKED			SAMPLE	REC.	
1,1-DICHLOROETHENE	<1	50	44	88	50	100	13
TRICHLOROETHENE	<1	50	45	90	48	96	6
CHLOROBENZENE	<1	50	48	96	49	98	2
TOLUENE	<1	50	50	100	53	106	6
BENZENE	<1	50	50	100	52	104	4

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

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



Analytical Technologies, Inc.

QUALITY CONTROL DATA

ATI I.D. : 304455

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO.

PROJECT # : (NONE)

PROJECT NAME : ANNUAL G.W.

REF I.D. : 30445509

DATE ANALYZED : 05/06/93

SAMPLE MATRIX : AQUEOUS

UNITS : UG/L

COMPOUNDS	SAMPLE CONC.		SPIKED SAMPLE	% REC.	DUP. SPIKED		DUP. % REC.	RPD
	RESULT	SPIKED			SAMPLE	REC.		
1,1-DICHLOROETHENE	<1	50	46	92	51	102	10	
TRICHLOROETHENE	<1	50	45	90	48	96	6	
CHLOROBENZENE	<1	50	46	92	48	96	4	
TOLUENE	<1	50	48	96	51	102	6	
BENZENE	<1	50	48	96	51	102	6	

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

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

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

PROJECT MANAGER: _____

COMPANY: GIANT

ADDRESS: 190 ELIT 39
JAMESTOWN NM 87347

PHONE: 722 0227

FAX: _____

BILL TO: _____

COMPANY: SAME

ADDRESS: _____

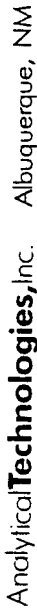
SAMPLE ID	DATE	TIME	MATRIX	LAB ID
SMW-3	4-29	12:45	W	01/08
SMW-4	{	1:10	W	03/04
SMW-5		1:40	W	05/06
SMW-6		1:55	W	07/08
SMW-4D	}	1:25	W	09/10

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJ. NO.:		NO. CONTAINERS	43
PROJ. NAME:	ANNUAL GROWTH	CUSTODY SEALS	DIN/NA
P.O. NO.:	997 9009 14	RECEIVED INTACT	Y
SHIPPED VIA:	FED EX	RECEIVED COLD	Y
PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS			
(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK		(NORMAL) ☒ 12 WEEK	

Comments: * SEE ATTACHED LIST OF PARAMETERS

[illegible]

SAMPLED & RELINQUISHED BY: 1.		RELINQUISHED BY: 2.		RELINQUISHED BY: 3.	
Signature: <i>[Signature]</i>	Time: 3:30	Signature:	Time:	Signature:	Time:
Printed Name: LYNNE SHELTON	Date: 9-29-93	Printed Name:	Date:	Printed Name:	Date:
Company: CLANT	Phone: 722 0227	Company:		Company:	
RECEIVED BY: 1.		RECEIVED BY: 2.		RECEIVED BY: (LAB) 3.	
Signature:	Time:	Signature:	Time:	Signature: <i>[Signature]</i>	Time: 0955
Printed Name:	Date:	Printed Name:	Date:	Printed Name: <i>[Signature]</i>	Date: 10/1/93
Company:		Company:		Company: Analytical Technologies, Inc.	



DATE 4/30/93 PAGE 1 OF 1

ATI Labs: San Diego (619) 458-9141 • Phoenix (602) 496-4400 • Seattle (206) 228-8335 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Albuquerque (505) 344-3777



Chain of Custody

NETWORK PROJECT MANAGER: BETH PROFFITT				ANALYSIS REQUEST																						
COMPANY: Analytical Technologies, Inc. ADDRESS: 2709-D Pan American Freeway, NE Albuquerque, NM 87106 General Chem: PH, Cond, TDS, aek, cl, F Total metals: Cu, Pb Dissolved metals: Ca, Mg, K, Na				CLIENT PROJECT MANAGER: <u>John</u>																						
SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Gen. Chem. - (att. list)	632/632 MOD	619/619 MOD	610/6310	Total Metals / see att. list	8240 (TCPLP 1311) ZHE	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (6240/1001) / 3.5x	NACE	ASBESTOS	BOD	TOTAL COLIFORM	FECAL COLIFORM	GROSS ALPHA/BETA	RADIUM 226/228	AIR - O2, CO2, METHANE	AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)	NUMBER OF CONTAINERS
304455-1	4/29	1245	FR	1						X			X				X									4
-2		"		2									X													1
-3		1310		3						X			X													4
-4		"		4						X			X													1
-5		1340		5						X			X													4
-6		"		6									X													1
-7		1355		7						X			X													4
-8		"		8									X													1
-9		1325		9						X			X													4

PROJECT INFORMATION		SAMPLE RECEIPT		RELINQUISHED BY: 1.		RELINQUISHED BY: 2.	
PROJECT NUMBER: 304455	TOTAL NUMBER OF CONTAINERS: 24	SAN DIEGO	SIGNATURE: <u>John</u>	SIGNATURE: <u>John</u>	SIGNATURE: <u>John</u>	SIGNATURE: <u>John</u>	
PROJECT NAME: GRC	CHAIN OF CUSTODY SEALS: N	FT. COLLINS	DATE: <u>4/30/93</u>	DATE: <u>4/30/93</u>	DATE: <u>4/30/93</u>	DATE: <u>4/30/93</u>	
QC LEVEL: STD. IV	INTACT? Y	RENTON	PRINTED NAME: <u>John</u>	PRINTED NAME: <u>John</u>	PRINTED NAME: <u>John</u>	PRINTED NAME: <u>John</u>	
QC REQUIRED: MS MSD BLANK	RECEIVED GOOD COND./COLD	PENSACOLA	ANALYTICAL TECHNOLOGIES, INC.	ANALYTICAL TECHNOLOGIES, INC.	ANALYTICAL TECHNOLOGIES, INC.	ANALYTICAL TECHNOLOGIES, INC.	
LAB: STANDARD	LAB NUMBER: 304455	PHOENIX	RECEIVED BY: (LAB) 1.	RECEIVED BY: (LAB) 1.	RECEIVED BY: (LAB) 1.	RECEIVED BY: (LAB) 2.	
		BARRINGER	SIGNATURE: <u>John</u>	SIGNATURE: <u>John</u>	SIGNATURE: <u>John</u>	SIGNATURE: <u>John</u>	
		FIBERQUANT	DATE: <u>4/30/93</u>	DATE: <u>4/30/93</u>	DATE: <u>4/30/93</u>	DATE: <u>4/30/93</u>	
			PRINTED NAME: <u>John</u>	PRINTED NAME: <u>John</u>	PRINTED NAME: <u>John</u>	PRINTED NAME: <u>John</u>	
			COMPANY: <u>ATI</u>	COMPANY: <u>ATI</u>	COMPANY: <u>ATI</u>	COMPANY: <u>ATI</u>	

DUE DATE: <u>5/14/93</u>	W.O. # <u>LK405</u>
RUSH SURCHARGE: <u>see att. quote</u>	
CLIENT DISCOUNT: <u>see att. quote</u>	



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)
PROJECT NAME: SEMI-A. GDWTR

ATI I.D.: 311307

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)
PROJECT NAME: SEMI-A. GDWTR

ATI I.D.: 311307

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

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



Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

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

ATI I.D.: 311307

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

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



Analytical**Technologies**, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 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

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

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 10$$



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



Analytical Technologies, Inc.

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	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

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

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 10$$



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 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 (%)	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

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-CHLOROETHYLVINYLEETHER	<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

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



Analytical Technologies, Inc.

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-CHLOROETHYLVINYLETHER	<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
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 SAMPLE	% REC.	DUP.	DUP.	RPD
	RESULT	SPIKED			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 ID: 211307

PROJECT MANAGER:

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

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	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 - Federal	SDWA Secondary Standards - Federal	The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)	NUMBER OF CONTAINERS
DW-11	10-29	1:55	H2O	1				X	X	X				X	X											13
MW-1	10-29	11:45		2				X	X	X				X	X											13
MW-2	10-29	10:15		3				X	X	X				X	X											11
MW-4	10-29	2:55		4				X	X	X				X	X											13
MW-5	10-29	3:26		5				X	X	X				X	X											11
DW-1	10-29	5:15		6			X																			2

PROJECT INFORMATION

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

SAMPLE RECEIPT

NO. CONTAINERS: 603
CUSTODY SEALS: Y/N (NA)
RECEIVED INTACT
RECEIVED COLD

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

(RUSH) ☐ 24hr ☐ 48hr ☐ 72hr ☐ 1 WEEK (NORMAL) ☒ 2 WEEK
Comments:
* SEE ATTACHED LIST
** One container for TOX, DW-11 had broken lid. one container for total phenolics for MW-1 was broken, one of the two was for both MW-5 and DW-1 were broken.
P.O.C. Seals were intact on outside container.

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

Signature: <i>[Signature]</i>	Signature:	Signature:
Printed Name: LYN SHULTON	Printed Name:	Printed Name:
Date: 11-1-93	Date:	Date:
Phone: 712-0227	Company:	Company:
Company: C.I.A.N.T.	Company:	Company:

Signature:	Signature:	Signature:
Printed Name:	Printed Name:	Printed Name:
Date:	Date:	Date:
Company:	Company:	Company:

Signature: <i>[Signature]</i>	Signature:	Signature:
Printed Name: <i>[Name]</i>	Printed Name:	Printed Name:
Date: 11/2/93	Date:	Date:
Company: Analytical Technologies, Inc.	Company:	Company:



Chain of Custody

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
311207-1	10/22/93	1355	SP	01
-2		1145		01
-3		1015		03
-4		1455		04
-5		1526		02

[illegible][illegible]

3#25



Analytical Technologies, Inc. Albuquerque, NM

Chain of Custody

DATE 11/29/93 PAGE 1 OF 1

NETWORK PROJECT MANAGER: BETH PROFFITT				ANALYSIS REQUEST																	
COMPANY: Analytical Technologies, Inc.				AIR - O ₂ , CO ₂ , METHANE																	
ADDRESS: 2709-D Pan American Freeway, NE Albuquerque, NM 87107				AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)																	
CLIENT PROJECT MANAGER:				TOTAL COLIFORM																	
				FECAL COLIFORM																	
				GROSS ALPHA/BETA																	
				RADIUM 226/228																	
				NACE																	
				ASBESTOS																	
				BOD																	
				Volatile Organics GC/MS (624/8240)																	
				Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)																	
				8240 (TCCLP 1311) ZHE																	
				8240 (TCCLP 1311) ZHE																	
				Dissolved C, Pb																	
				Total Therma (400.1)																	
				SURFACTANTS (MBAS)																	
				632/632 MOD																	
				619/619 MOD																	
				610/8310																	
				SULFIDE																	
				ORGANIC LEAD																	
				TOC																	
				TOX																	
				SURFACTANTS (MBAS)																	
				632/632 MOD																	
				619/619 MOD																	
				610/8310																	
				Dissolved C, Pb																	
				Total Therma (400.1)																	
				8240 (TCCLP 1311) ZHE																	
				8240 (TCCLP 1311) ZHE																	
				Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)																	
				Volatile Organics GC/MS (624/8240)																	
				NACE																	
				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)																	
SAMPLE ID				DATE		TIME		MATRIX		LAB ID											
311307-1				11/29/93		1355		AQ		1											
-2						1145				2											
-3						1015				3											
-4						1455				4											
-5						1526				5											

PROJECT INFORMATION		SAMPLE RECEIPT		SAMPLES SENT TO:		RELINQUISHED BY: 1.		RELINQUISHED BY: 2.	
PROJECT NUMBER: 311307	TOTAL NUMBER OF CONTAINERS 29	SAN DIEGO	Signature: [Signature]	Time: 7:15	Signature: [Signature]	Time: [Time]			
PROJECT NAME: GPC	CHAIN OF CUSTODY SEALS NA	FT. COLLINS	Printed Name: [Name]	Date: [Date]	Printed Name: [Name]	Date: [Date]			
QC-LEVEL: STD IV	INTACT? Y	RENTON	Signature: [Signature]	Date: 11/29/93	Signature: [Signature]	Date: [Date]			
QC REQUIRED: MS MSD BLANK	RECEIVED GOOD COND/COLD Y	PENSACOLA	Analytical Technologies, Inc.		Company: [Company]				
TAT: STANDARD RUSHI	LAB NUMBER 311307	PHOENIX	Albuquerque		RECEIVED BY: (LAB) 1.	RECEIVED BY: (LAB) 2.			
		BARRINGER	Signature: [Signature]	Time: [Time]	Signature: [Signature]	Time: [Time]			
		FIBERQUANT	Printed Name: [Name]	Date: [Date]	Printed Name: [Name]	Date: [Date]			
			Company: [Company]		Company: [Company]				

DUE DATE: 11/16/93
RUSH SURCHARGE: \$1,111.11
CLIENT DISCOUNT: \$1,111.11
Only one container provided for 311307-2 for total Phosporus and only one was provided for 311307-5 for 8240.

W.O. #1111148
On EC please take 2 vials of 1 um each trace per week

ATI Labs San Diego (619) 458-9141 • Phoenix (602) 496-4400 • Seattle (206) 228-3335 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Albuquerque (505) 344-3777 DISTRIBUTION: White, Canary - ATI • Pink - ORIGINATOR



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)

ATI I.D.: 312300

PROJECT NAME: SEMI-ANNUAL

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.
PROJECT # : (NONE)
PROJECT NAME : SEMI-ANNUAL

DATE RECEIVED : 12/01/93

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

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

$$\text{RPD (Relative Percent Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 10$$



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 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. : 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-CHLOROETHYLVINYLEETHER	<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 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. : 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-CHLOROETHYLVINYLEETHER	<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-CHLOROETHYLVINYLEETHER	<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.		DUP.	RPD
	RESULT	SPIKED		% SPIKED REC.	% SPIKED SAMPLE REC.		
1,1-DICHLOROETHENE	<1	50	53	106	53	106	0
TRICHLOROETHENE	<1	50	51	102	48	96	6
CHLOROBENZENE	<1	50	51	102	50	100	2
TOLUENE	<1	50	51	102	49	98	4
BENZENE	<1	50	51	102	51	102	0

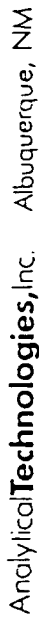
$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

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

ANALYSIS REQUEST

Signature: [Signature] Time: 0945
Printed Name: John Doe Date: 12/1/93
Analytical Technologies, Inc.

ATI Labs: San Diego (619) 458-9141 • Phoenix (602) 496-4400 • Seattle (206) 228-8335 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Albuquerque (505) 344-3777
DISTRIBUTION: White, Canary • Pink • Pink • ATi • Pink • ORIGINATOR



15-615

Albuquerque, NM

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
2102300-1	11/30/93	1320	RO	011
-2		1350		012
-3		1420		013
-4		1450		014

[illegible]

ANALYSIS REQUEST

PROJECT INFORMATION

PROJECT NUMBER: 312,300

PROJECT NAME:	GR C
CHAIN OF CUSTODY SEALS	

CG LEVEL: (STN IV	INTACT?
-------------------	---------

CC REQUIRED: <u>YES</u>	MSN BLANK	RECEIVED GOOD COND COLD
-------------------------	-----------	-------------------------

QC PERFORMED - YES	NO	DATE
TAT: STANDARD	PLUS	1
		LAB NUMBER

DUE DATE: 12/15/93 W.O.# 12192

RUSH SURCHARGE: _____
CLIENT DISCOUNT: _____ %

2017.03.03

please use each sample in duplicate.

RELINQUISHED BY:	1.	Time:
Signature: <i>[Signature]</i>	Date: <i>12/1/93</i>	
Printed Name: <i>Peter Detterre</i>		
Analytical Technologies, Inc. Albuquerque		
RECEIVED BY: (LAB)	1.	Time:
Signature: <i>[Signature]</i>		
Printed Name: <i>Chen bruce</i>		
Company: <i>[Signature]</i>		

ATI Labs: San Diego (619) 458-9141 • Phoenix (602) 496-4400 • Seattle (206) 228-8335 • Pensacola (904) 474-1001 • Portland (503) 684-0447 • Albuquerque (505) 344-3777



Analytical Technologies, Inc. Albuquerque, NM

Chain of Custody

DATE 12/1/93 PAGE 1 OF 1

NETWORK PROJECT MANAGER: BETH PROFFITT				ANALYSIS REQUEST																							
COMPANY: Analytical Technologies, Inc.				ANALYSIS REQUEST																							
ADDRESS: 2709-D Pan American Freeway, NE Albuquerque, NM 87107				ANALYSIS REQUEST																							
CLIENT PROJECT MANAGER:				ANALYSIS REQUEST																							
SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	632/632 MOD	619/619 MOD	610/8310	EC*	8240 (TCCLP 1311) ZHE	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	Volatiles Organics GCMS (624/8240)	NACE	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	
312300-1	11/30/93	1320	RO	1									X														
-2		1350		2									X														
-3		1420		3									X														
-4		1450		4									X														
SAMPLE RECEIPT																											
PROJECT INFORMATION				TOTAL NUMBER OF CONTAINERS				CHAIN OF CUSTODY SEALS				INTACT?				RECEIVED GOOD COND./COLD				LAB NUMBER				312300			
PROJECT NUMBER: 312300				20				N/A				Y				Y											
PROJECT NAME: GRC																											
QC LEVEL: (STD) IV																											
QC (REQUIRED) MS MSD BLANK																											
PAT. STANDARD RUSHI																											
DUE DATE: 12/15/93																											
RUSH SURCHARGE: _____ %																											
CLIENT DISCOUNT: _____ %																											
W.D. 444793																											
* please run 4 EC (24/1/93)																											
analyses on each sample.																											
RELINQUISHED BY: 1. Signature: <u>Peter Dotre</u> Date: <u>12/1/93</u>				RELINQUISHED BY: 2. Signature: _____ Date: _____				RECEIVED BY: (LAB) 1. Signature: <u>Link Eshelman</u> Date: <u>12/1/93</u>				RECEIVED BY: (LAB) 2. Signature: _____ Date: _____															
Printed Name: _____				Printed Name: _____				Printed Name: _____				Printed Name: _____															
Company: _____				Company: _____				Company: _____				Company: _____															

GROUNDWATER VELOCITY

SONSELA AQUIFER

The groundwater velocity in the Sonsela aquifer under the Land Treatment Unit is estimated to be .010395 ft/day (3.794 ft/yr), using the following calculation

V	=	(KI/n)
V	=	Velocity, ft/day
K	=	Horizontal Hydraulic Conductivity, 0.35 ft/day
I	=	Potentiometric Gradient, .00297 ft/day
n	=	Porosity, 10%

"I" was calculated by using the differential elevation between wells MW-2 and MW-4 in 1993.