GW - 32

REPORTS

YEAR(S):

1993- GROUNDWATER

OCT 11, 1993

ED -

HERE IS THE GROUNDWATER DATA THAT I SPOKE TO YOU ABOUT. AS I SAID, THIS WAS CAUGHT UP IN THE TRANSITION OF THE LAST COUPLE OF MONTHS.

AS YOU WILL SEE, THERE IS NOTHING "EARTH SHAKING" HERE.

HOPE TO SEE YOU GUYS SOON.

Thanks -
Lynn Shelton

GIANT
REFINING CO.

Route 3, Box 7
Gallup, New Mexico
87301

505
722-3833

22, 1993

Ed Horst
Program Manager
Hazardous and Radioactive Materials Bureau
New Mexico Environment Department
525 Camino de Los Marques
Santa Fe, New Mexico 87502

Re: Annual Groundwater Event - April 28, 1993

Dear Mr. Horst:

Pursuant to Attachment G. "Groundwater Monitoring Plan", Part 2.G. of Giant's Part B Permit (NMD000333211), Giant Refining Company - Ciniza is notifying your office of significant statistical increase in the indicator parameters (pH) in monitor wells MW-1 and MW-2. Using the tolerance interval method, three shallow monitor wells, SMW-3, SMW-4, and SMW-6, exceeded the tolerance limit for chromium, when compared to Background Data. All three SMW wells (SMW-3, 4, 6) showed a decrease in chromium levels for this sampling event. Additionally, a duplicate sample of SMW-4, labeled SMW-4D, did not exceed the tolerance limit.

As this situation is much like previous sampling events and has been addressed before (see attached letter) Giant requests that the "Compliance Monitoring Program" referenced in Attachment G.,3. not be implemented at this time pending modification of Giant's permit.

All relevant data concerning the spring sampling event is attached for your information.

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

Sincerely,

Lynn Shelton

Lynn Shelton
Environmental Assistant
Giant Refining Company - Ciniza

TLS:sp

GIANT
REFINING CO.

Route 3, Box 7
Gallup, New Mexico
87301

505
722-3833

June 22, 1993

Ed Horst
Program Manager
Hazardous and Radioactive Materials Bureau
New Mexico Environment Department
525 Camino de Los Marques
Santa Fe, New Mexico 87502

Re: Annual Groundwater Event - April 28, 1993

Dear Mr. Horst:

Pursuant to Attachment G. "Groundwater Monitoring Plan", Part 2.G. of Giant's Part B Permit (NMD000333211), Giant Refining Company - Ciniza is notifying your office of significant statistical increase in the indicator parameters (pH) in monitor wells MW-1 and MW-2. Using the tolerance interval method, three shallow monitor wells, SMW-3, SMW-4, and SMW-6, exceeded the tolerance limit for chromium, when compared to Background Data. All three SMW wells (SMW-3, 4, 6) showed a decrease in chromium levels for this sampling event. Additionally, a duplicate sample of SMW-4, labeled SMW-4D, did not exceed the tolerance limit.

As this situation is much like previous sampling events and has been addressed before (see attached letter) Giant requests that the "Compliance Monitoring Program" referenced in Attachment G.,3. not be implemented at this time pending modification of Giant's permit.

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

Sincerely,

Lynn Shelton
Environmental Assistant
Giant Refining Company - Ciniza

TLS:sp

cc: Zeke Sherman, Environmental Manager
Giant Refining Company

Kim Bullerdick, Corporate Counsel
Giant Industries Arizona, Inc.

Roger Anderson, NMOCD
Santa Fe, New Mexico

Denny Foust, NMOCD
Aztec, New Mexico

TLS

GIANT
INDUSTRIES, INC.

January 22, 1992

Route 3, Box 7
Gallup, New Mexico
87301

Mr. Edward Horst
RCRA Program Manager
Hazardous and Radioactive Bureau
New Mexico Environment Department
1190 St. Francis Drive
Santa Fe, New Mexico 87502

RE: Notice of Noncompliance, NMD 000333211

Dear Mr. Horst:

This is a written follow up notification concerning a noncompliance with Giant Refining Company's Hazardous Waste Facility Permit. On January 13th, I contacted Mr. Steve Alexander of your staff to inform him of a potential noncompliance with certain reporting provisions of the groundwater monitoring sections of Giant's RCRA permit. Mr. Alexander asked that I formally report these circumstances in a letter to the Bureau. The following is Giant's discussion and recommendations concerning the noncompliance.

On January 13th, 1993, Giant Refining Company completed and reviewed its Annual Groundwater Report for 1992. The submission of this report is one of the permit groundwater monitoring program requirements (Attachment G, Section 2 (L)).

During this internal review it was determined that certain requirements of the detection monitoring program had unintentionally been left undone.

In Attachment G, Part 2, there are requirements to perform statistical analysis on detection monitoring data for the point of compliance and early detection monitoring wells. The analysis and certain notifications to the Director are to be performed within specified time frames (45 days for the statistical analysis, 7 days to notify the Director of a significant change).

The statistical analysis for the point of compliance wells were performed within the specified time frame for both the Spring and Fall, 1992, monitoring events. The notifications to the Director of statistically significant changes for these monitoring events were not made as required. The statistical analysis and notifications concerning the early detection monitoring wells have also not been performed as required. This oversight was due to the confusing circumstances surrounding the groundwater monitoring program in the permit.

There are at least two occasions in the recent past where indicator parameters have given false-positive indications of a statistically significant change. The refinery responded by initiating the required assessment program. The result on each occasion was that the Bureau and Giant determined that there had been no impact to groundwater and that the statistical analysis had, indeed, given false-positives.

This led Giant and the Bureau to decide that the Permit's groundwater detection program needed to be modified so as to minimize false-positives. Giant and the Bureau discussed this much last April when we met to work out several pending permit modifications and an outstanding issue of possible beneath the treatment zone contamination.

At that meeting, Giant agreed in principle to modify the groundwater detection monitoring program. Giant wanted to adopt an alternative statistical test that would minimize false-positives. The Bureau wanted to replace the statistical methods and indicator parameters with a list of GC/MS purgeable organics (i.e. Appendix IX) and Maximum Concentration Limits (MCL'S).

Giant and the Bureau went into that meeting thinking that we would, in the very near future, modify various parts of the permit including the groundwater detection program. And in modifying the groundwater detection program, we would eliminate a very costly and time consuming problem for both the Bureau and Giant. What actually resulted from the meeting was a joint decision to first resolve the issue of possible beneath the treatment zone contamination.

In taking this course, we would determine if the land treatment unit was going to remain in operation. If not, all of the planned modifications to the permit would not be necessary.

We concluded the meeting thinking that we would know the fate of the treatment unit in the near future and that there would be several imminent changes to the RCRA permit. These circumstances led us to deemphasize the current statistical method which was about to be replaced by a new method. It was not until our internal review of the 1992 Annual Groundwater Report that we realized that the required statistical analysis and notification had not been done.

We are attaching part of the required statistical analysis. It will indicate some statistically significant changes which we think are false-positives. We will forward the rest of the statistics as soon as they are completed. We will initiate the assessment program as the permit requires us to if the Bureau agrees that this is what should be done.

What we would prefer to do is to commence the permit modifications so that we can effectively and finally resolve this issue.

Respectfully yours,

Zeke Sherman
Environmental Manager
Ciniza Refinery
Giant Industries, Inc.

cc: Mr. John Stokes
Mr. Kim Bullerdick
Mr. Lynn Shelton

GIANT REFINING COMPANY - CINIZA

ANNUAL GROUNDWATER MEASUREMENT - 1993

Well No.	Date	Depth to Water	Casing Elevation	Groundwater Elevation
MW-1	04-28-93	5.00	6878.52	6873.52
MW-2	04-28-93	8.22	6880.84	6872.62
MW-4	04-28-93	5.97	6882.54	6876.57
MW-5	04-28-93	11.81	6883.32	6871.51
OW-11	04-28-93	18.01	6923.89	6905.88
SMW-3	04-28-93	38.32	6884.56	6846.24
SMW-4	04-28-93	31.24	6880.08	6848.84
SMW-5	04-28-93	31.00	6878.02	6847.02
SMW-6	04-28-93	31.81	6880.71	6848.90
OW-1	04-28-93	0.0	6868.0	6868.00
OW-2	04-28-93	28.64	6871.0	6842.36
OW-3	04-28-93	31.15	6876.0	6844.85

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	t(m)=	5.841
Variance S(m)2	0.003366	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

Lynn 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::** 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

Lynn 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::** 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	8.44	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	t(m)=	5.841
Variance S(m)2	0.127166	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

Lynn 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::** 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	8.82	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

Mean value X(m)	8.8275	t(m)=	5.841
Variance S(m)2	0.0141	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

Lynn 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–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	t(m)=	4.541
Variance S(m)2	5700	W(m)=	1425

t(*)=	4.068200
t(c)=	4.422282

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

J 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

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

t(*)=	3.589308
t(c)=	4.470134

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

Lynn 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–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

Mean value X(m)	1210	t(m)=	4.541
Variance S(m)2	22933.33	W(m)=	5733.333

t(*)=	2.960827
t(c)=	4.510070

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

Lynn 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–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	t(m)=	4.541
Variance S(m)2	5133.333	W(m)=	1283.333

t(*)=	4.070286
t(c)=	4.410062

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

Lynn Shelton

Signature

TOLERANCE INTERVAL

1993

LEAD

SMW-3

MEAN=	0.0016	SD=	0.0017

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

SMW-4

MEAN=	0.0018	SD=	0.0016

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

SMW-5

MEAN=	0.0015	SD=	0.0017

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

SMW-6

MEAN=	0.0015	SD=	0.0017

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

* 1/2 of Reporting Limit.

CHROME

SMW-3 MEAN= 0.003 SD= 0.004

DATE	RESULT		TOL LIMIT	UNITS	
4-92	0.012	*	0.011	ppm	Exceeds the tolerance limit by 9.1%

SMW-4 MEAN= 0.0044 SD= 0.0039

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.

SMW-5 MEAN= 0.0032 SD= 0.0038

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

SMW-6 MEAN= 0.0035 SD= 0.0059

DATE	RESULT		TOL LIMIT	UNITS	
4-93	0.02	*	0.015	ppm	Exceeds the tolerance limit by 33.3%

* 1/2 of reporting limit.

pH

SMW –3

MEAN =	7.86	SD =	0.1517

DATE	RESULT	TOL LIMIT	UNITS	
4–93	7.9	8.163	ppm	Does not exceed the tolerance limit.

SMW –4

MEAN =	8.309	SD =	0.1649

DATE	RESULT	TOL LIMIT	UNITS	
4–93	8.2	8.639	ppm	Does not exceed the tolerance limit.

SMW –5

MEAN =	8.425	SD =	0.3405

DATE	RESULT	TOL LIMIT	UNITS	
4–93	8.5	9.106	ppm	Does not exceed the tolerance limit.

SMW –6

MEAN =	8.075	SD =	0.2908

DATE	RESULT	TOL LIMIT	UNITS	
4–93	8.2	8.657	ppm	Does not exceed the tolerance limit.

EC

SMW-3

MEAN =	3226.13	SD =	352.15

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

SMW-4

MEAN =	1225	SD =	107.98

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

SMW-5

MEAN =	1134.3	SD =	85.72

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

SMW-6

MEAN =	1527.5	SD =	226.63

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

TEMPERATURE

SMW –3 MEAN = 55 SD = 2.619

DATE	RESULT	TOL LIMIT	UNITS	
4–93	56.75	60.240	ppm	Does not exceed the tolerance limit.

SMW –4 MEAN = 55.5 SD = 2.988

DATE	RESULT	TOL LIMIT	UNITS	
4–93	56.75	61.476	ppm	Does not exceed the tolerance limit.

SMW –5 MEAN = 54.786 SD = 2.852

DATE	RESULT	TOL LIMIT	UNITS	
4–93	56.5	60.490	ppm	Does not exceed the tolerance limit.

SMW –6 MEAN = 54.929 SD = 3.469

DATE	RESULT	TOL LIMIT	UNITS	
4–92	55.5	61.870	ppm	Does not exceed the tolerance limit.

WATER LEVEL

SMW –3

MEAN =	6850.84	SD =	2.08

DATE	RESULT	TOL LIMIT	UNITS	
4–93	6846.24	6855.000	ppm	Does not exceed the tolerance limit.

SMW –4

MEAN =	6848.63	SD =	1.52

DATE	RESULT	TOL LIMIT	UNITS	
4–93	6851.67	6851.866	ppm	Does not exceed the tolerance limit.

SMW –5

MEAN =	6847.23	SD =	1.26

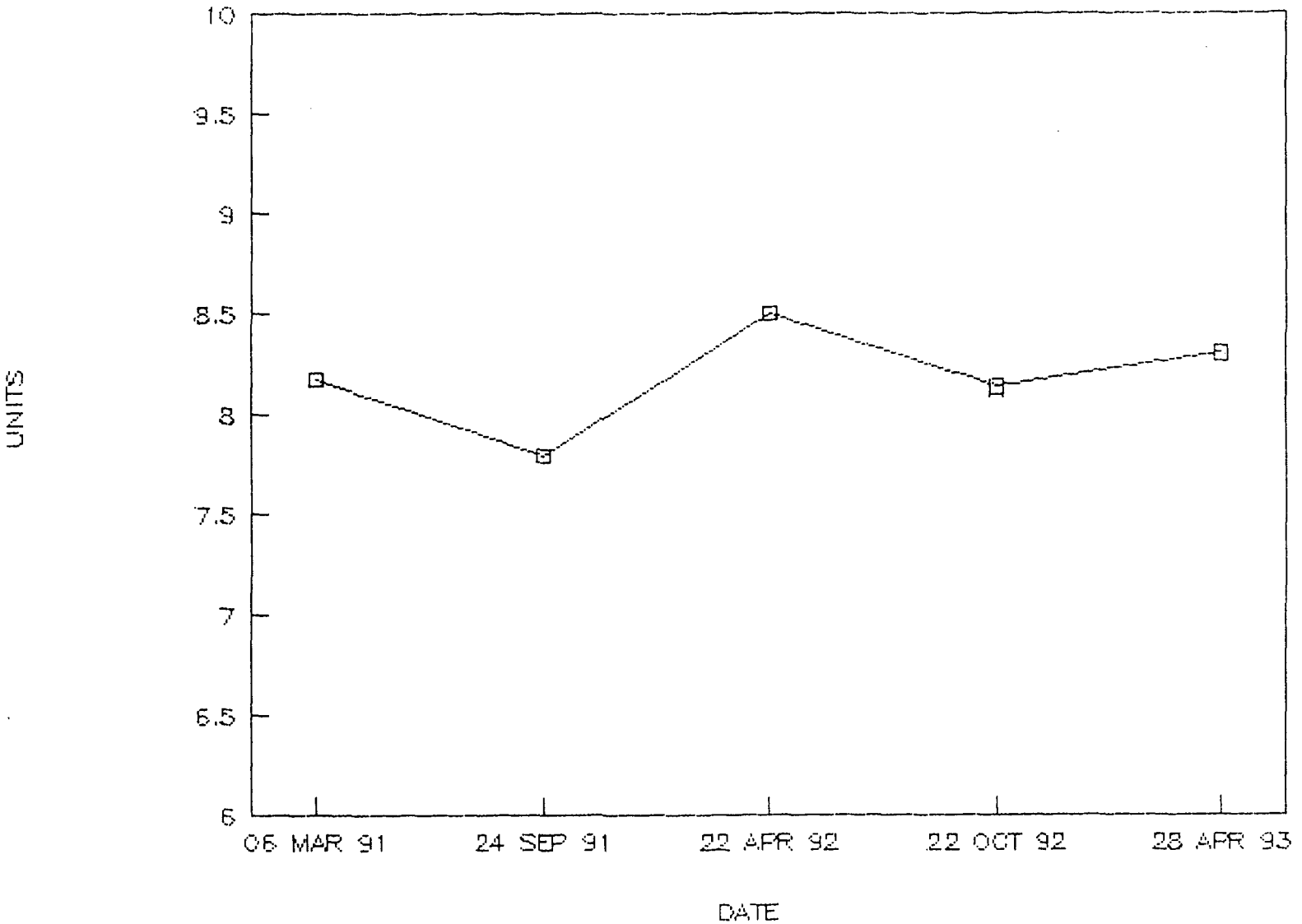
DATE	RESULT	TOL LIMIT	UNITS	
4–93	6847.89	6850.410	ppm	Does not exceed the tolerance limit.

SMW –6

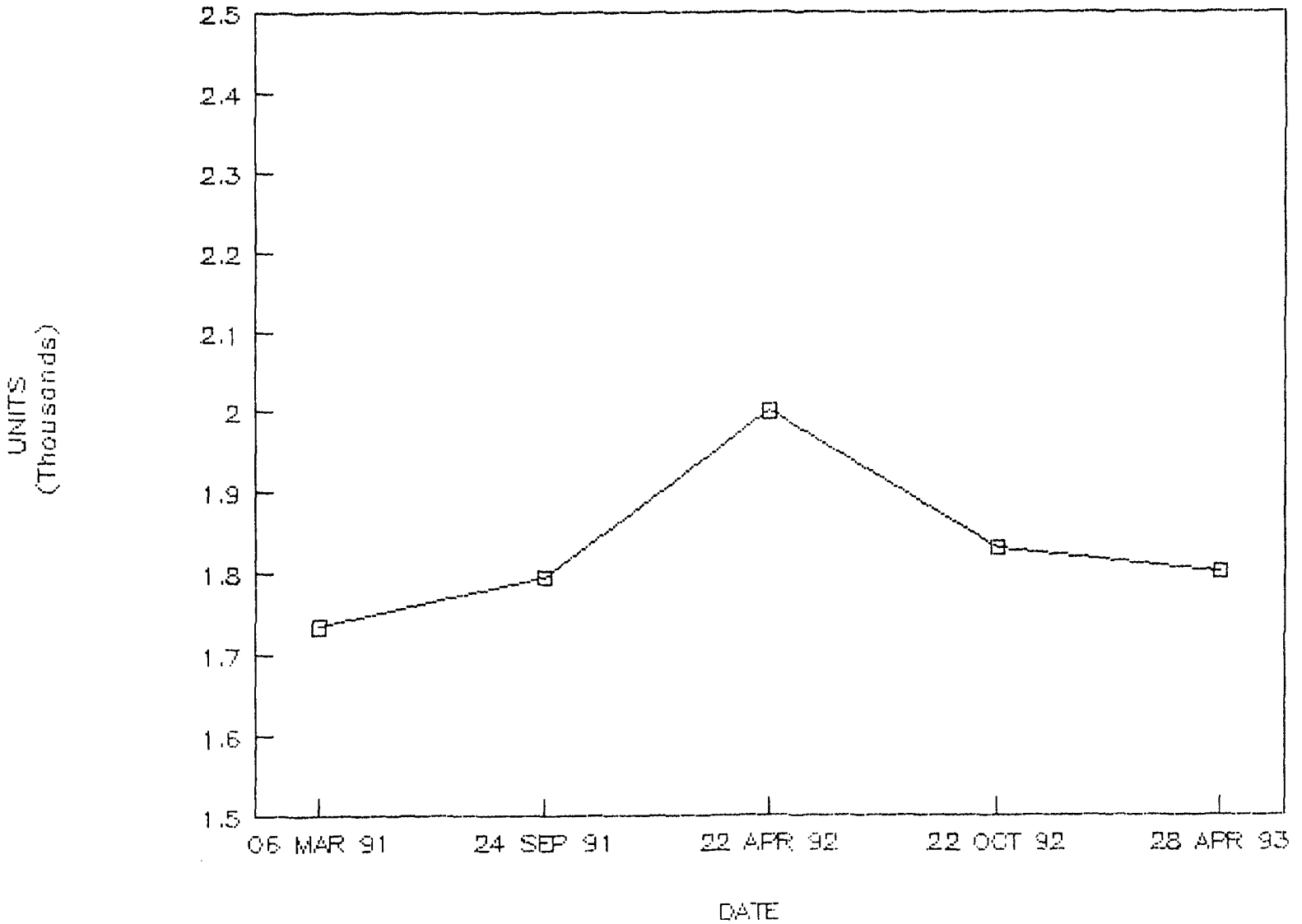
MEAN =	6856.64	SD =	5.03

DATE	RESULT	TOL LIMIT	UNITS	
4–93	6858.91	6866.700	ppm	Does not exceed the tolerance limit.

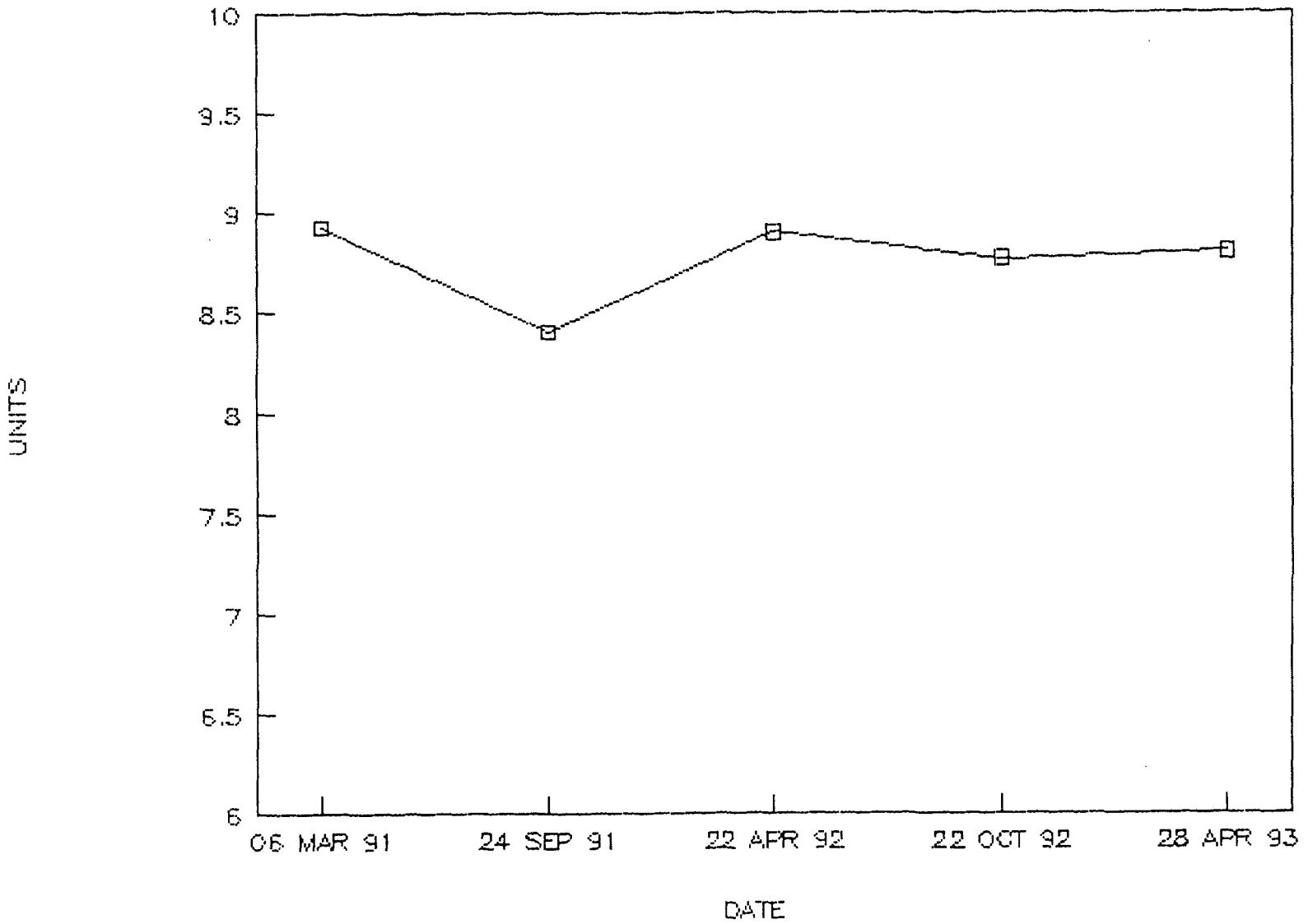
OW-11 pH


10
9.5
9
8.5
8
7.5
7
6.5
6
UNITS
06 MAR 91
24 SEP 91
22 APR 92
22 OCT 92
28 APR 93
DATE

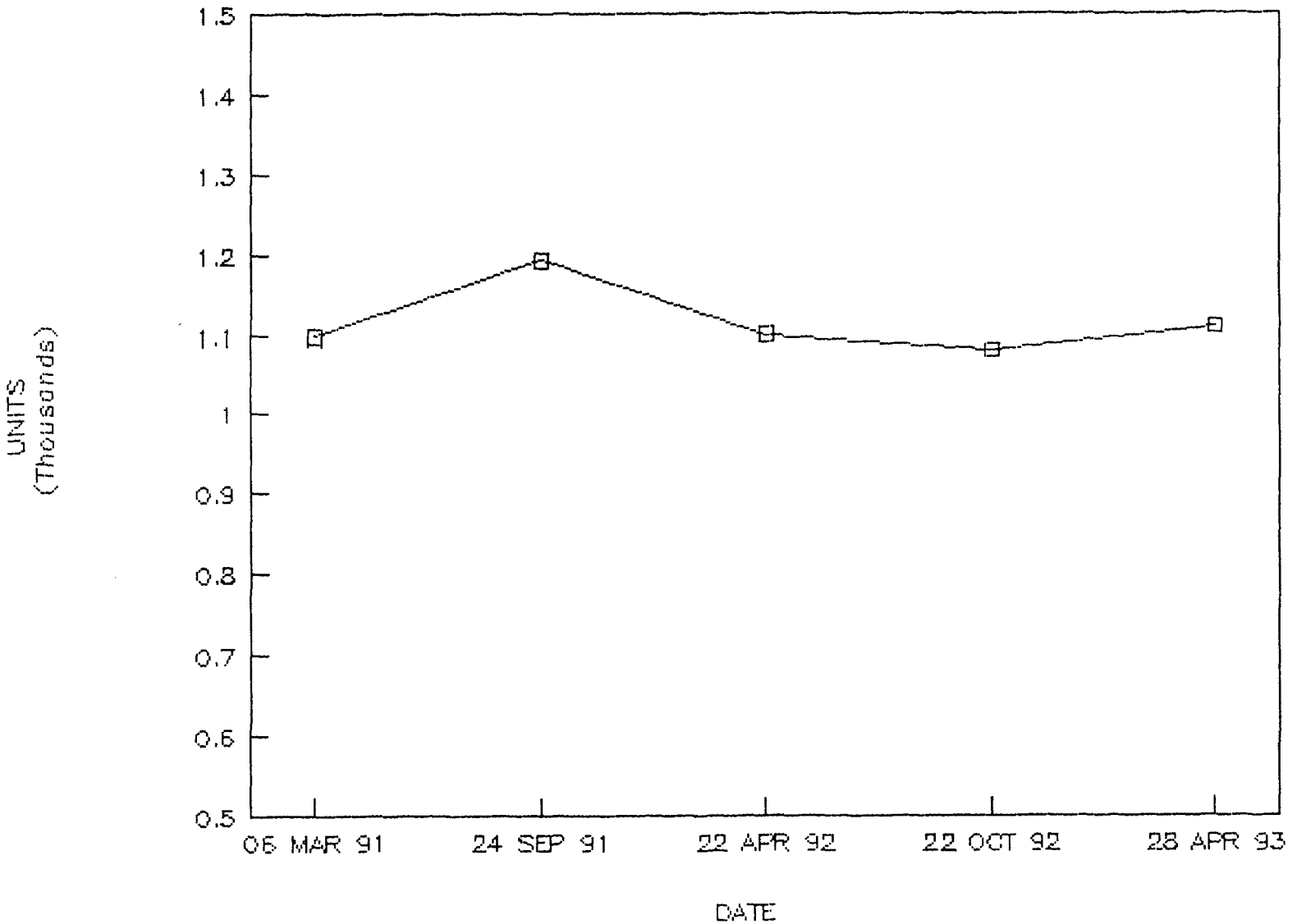
OW-11 EC


2.5
2.4
2.3
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
UNITS
(Thousands)
06 MAR 91
24 SEP 91
22 APR 92
22 OCT 92
28 APR 93
DATE

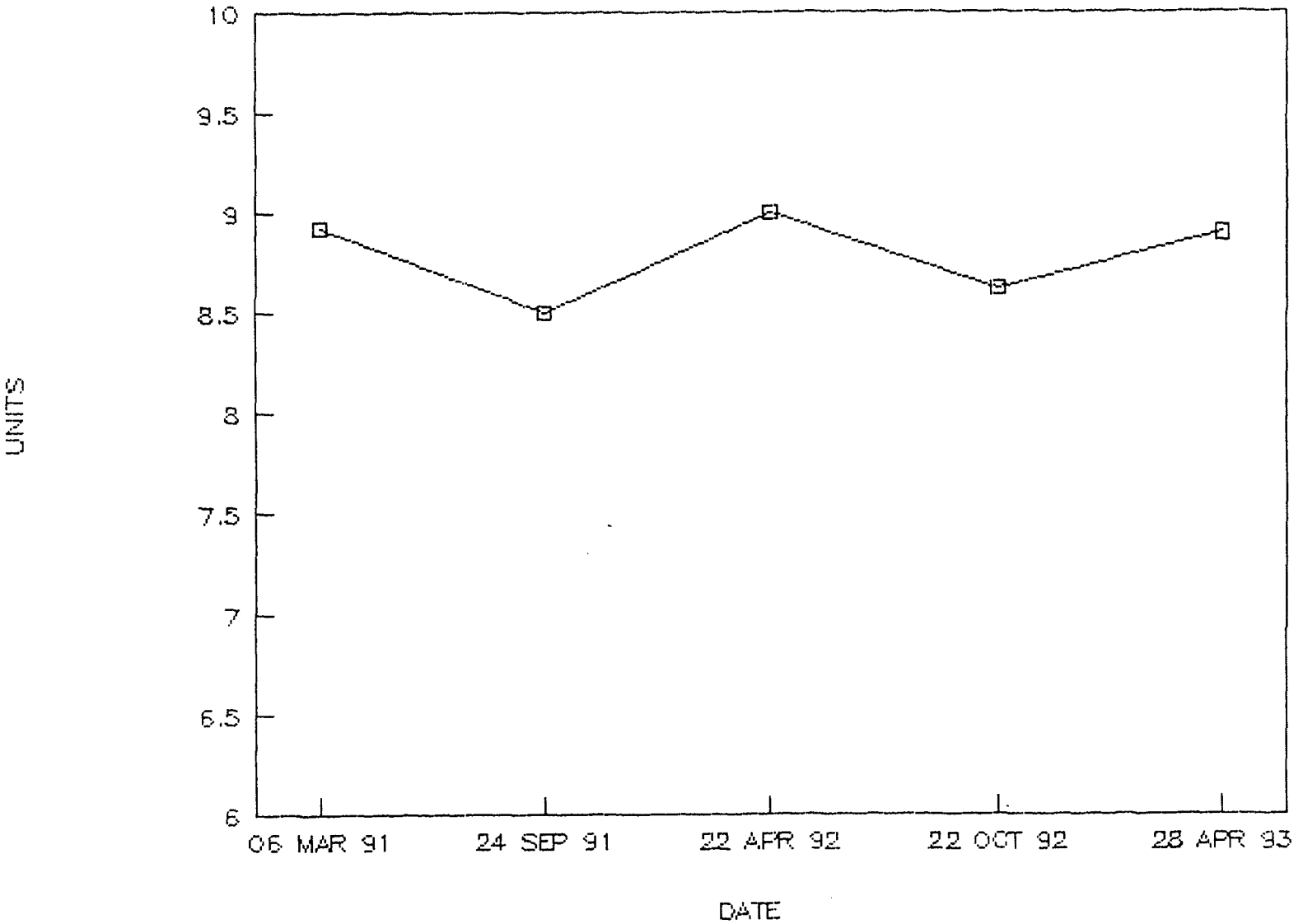
MW-1 pH


10
9.5
9
8.5
8
7.5
7
6.5
6
UNITS
06 MAR 91
24 SEP 91
22 APR 92
22 OCT 92
28 APR 93
DATE

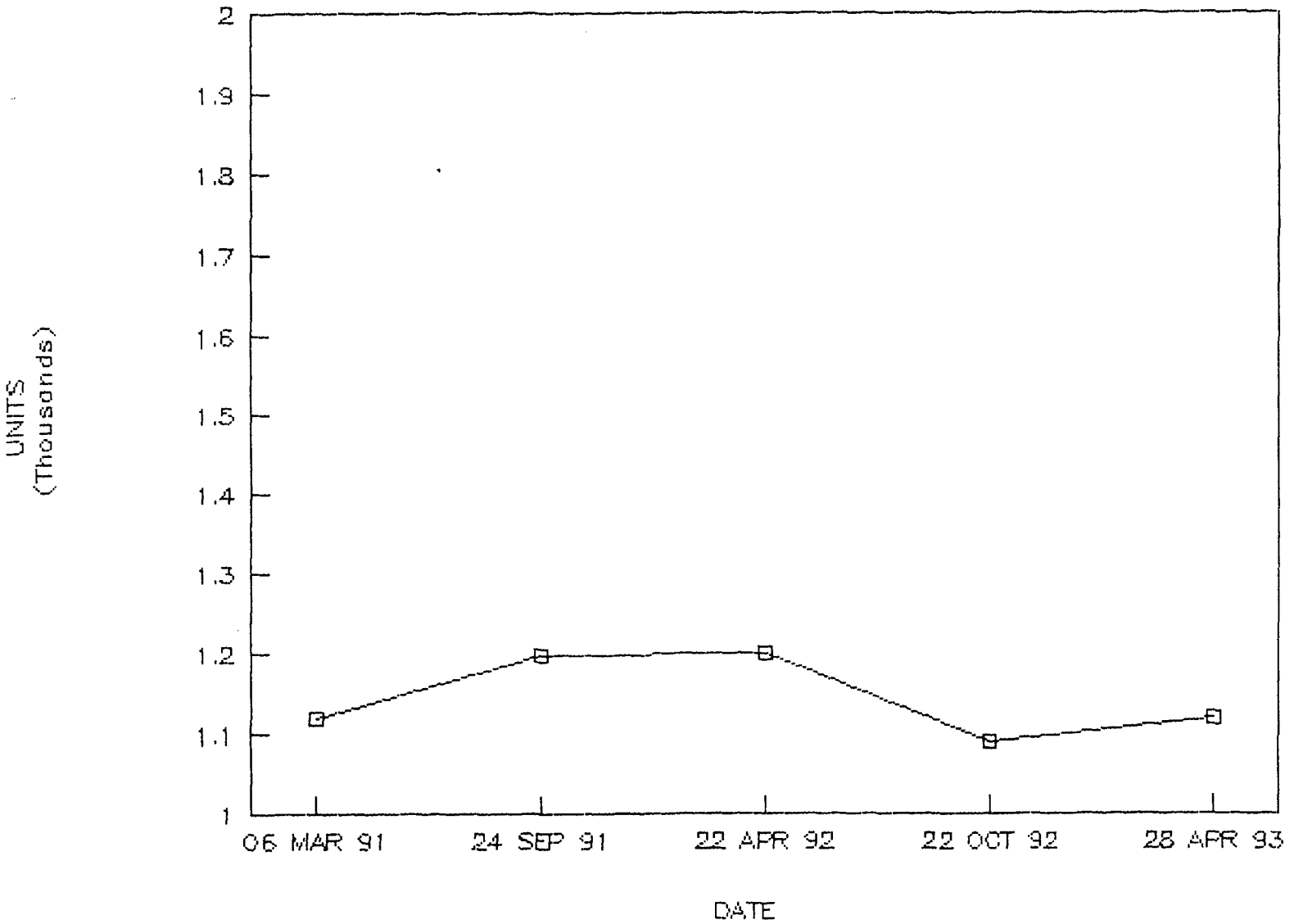
MW-1 EC


1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
UNITS
(Thousands)
06 MAR 91
24 SEP 91
22 APR 92
22 OCT 92
28 APR 93
DATE

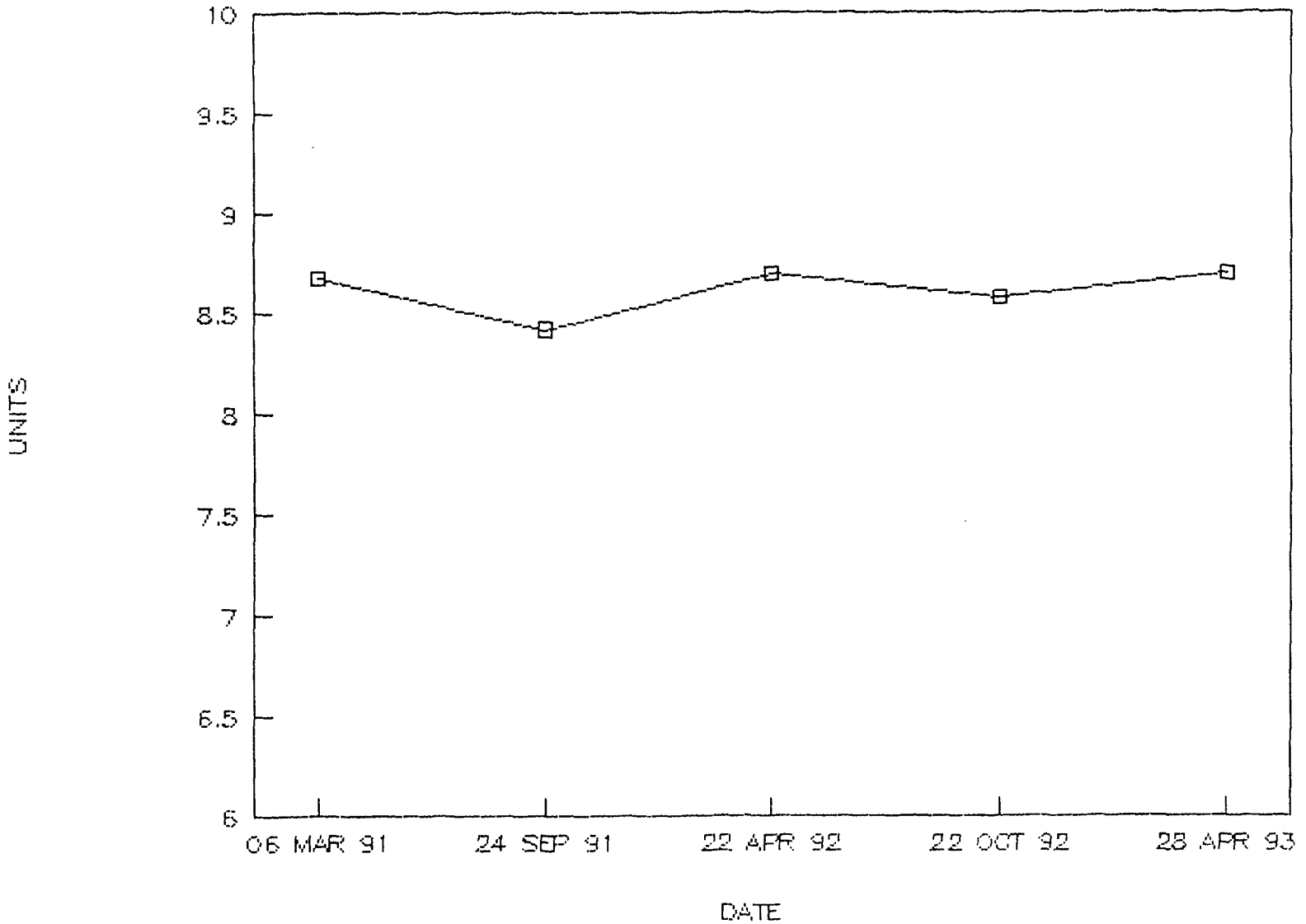
MW-2 pH


10
9.5
9
8.5
8
7.5
7
6.5
6
UNITS
06 MAR 91
24 SEP 91
22 APR 92
22 OCT 92
28 APR 93
DATE

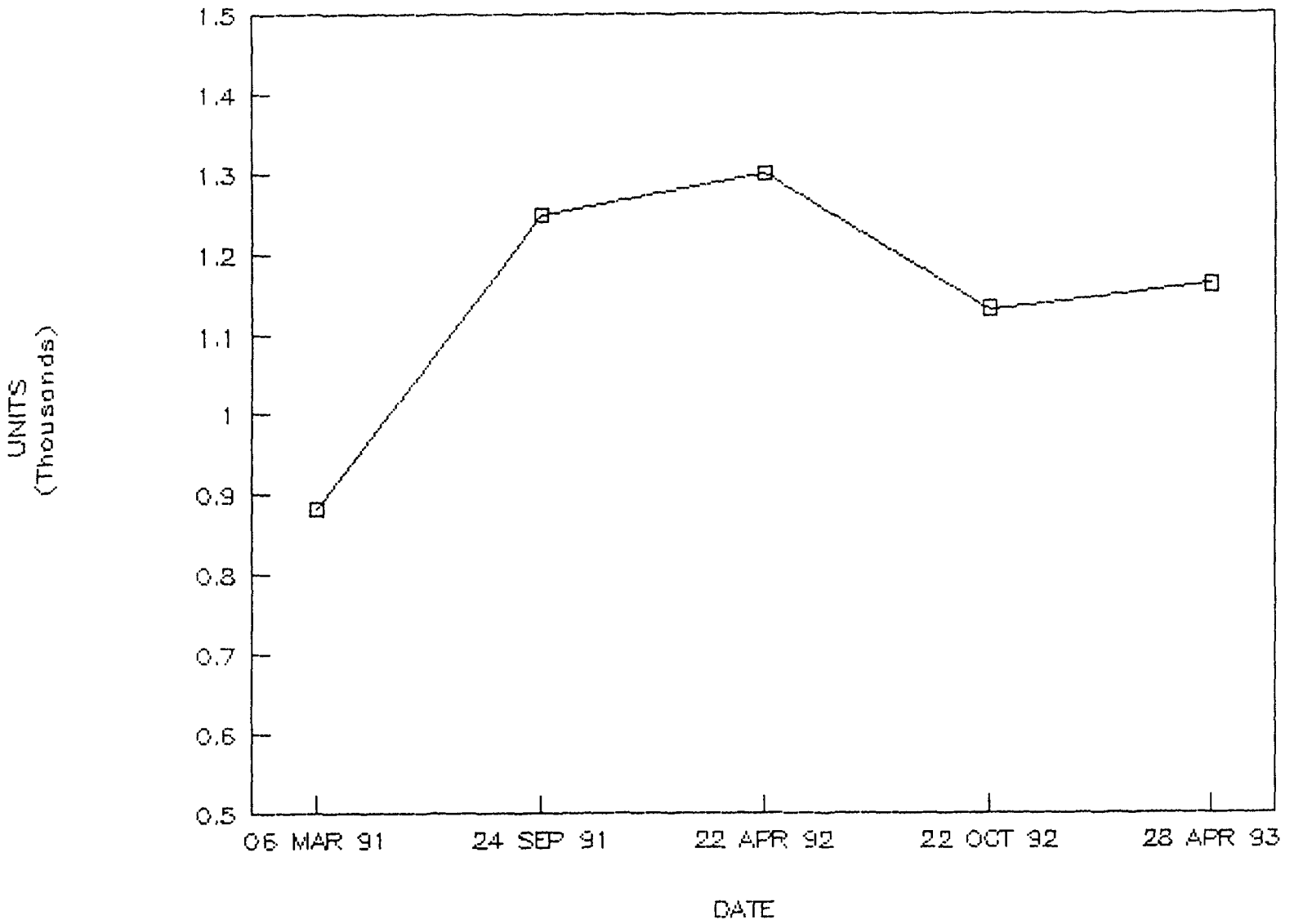
MW-2 EC


2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
UNITS
(Thousands)
06 MAR 91
24 SEP 91
22 APR 92
22 OCT 92
28 APR 93
DATE

MW-4 pH


10
9.5
9
8.5
8
7.5
7
6.5
6
UNITS
06 MAR 91
24 SEP 91
22 APR 92
22 OCT 92
28 APR 93
DATE

MW-4 EC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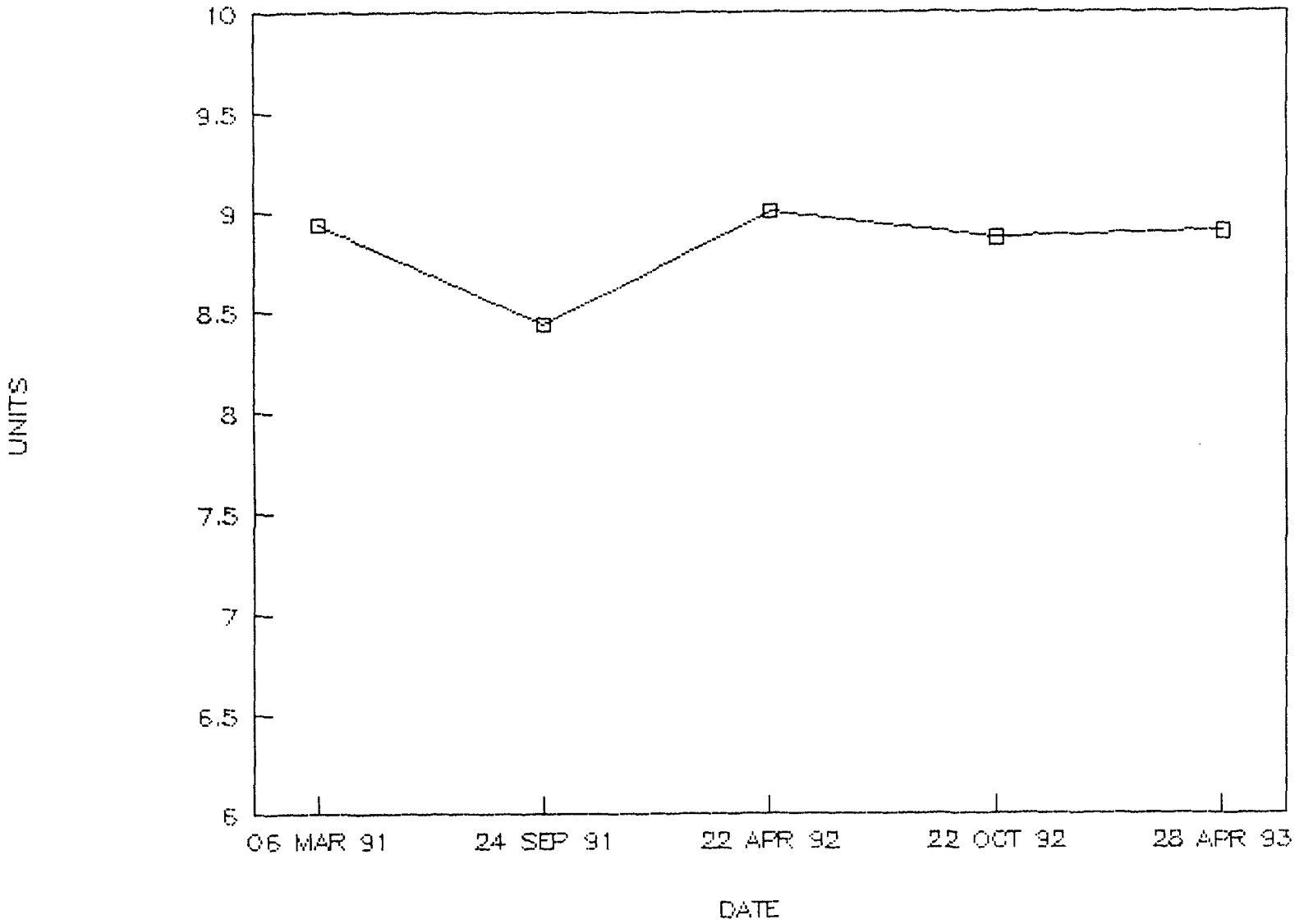
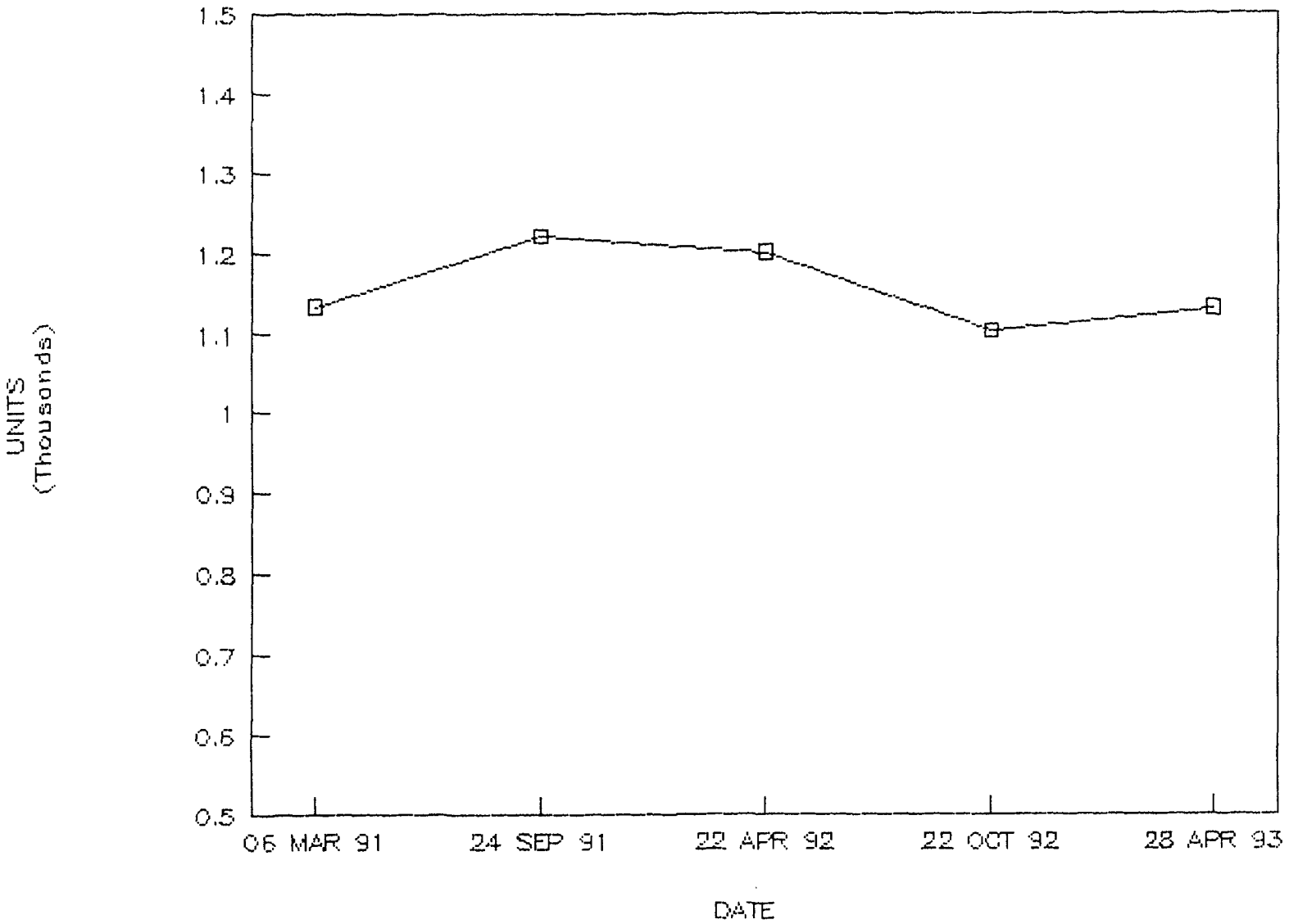
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
UNITS
(Thousands)
06 MAR 91
24 SEP 91
22 APR 92
22 OCT 92
28 APR 93
DATE

MW-5 pH


10
9.5
9
8.5
8
7.5
7
6.5
6
UNITS
06 MAR 91
24 SEP 91
22 APR 92
22 OCT 92
28 APR 93
DATE

MW-5 EC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1.4
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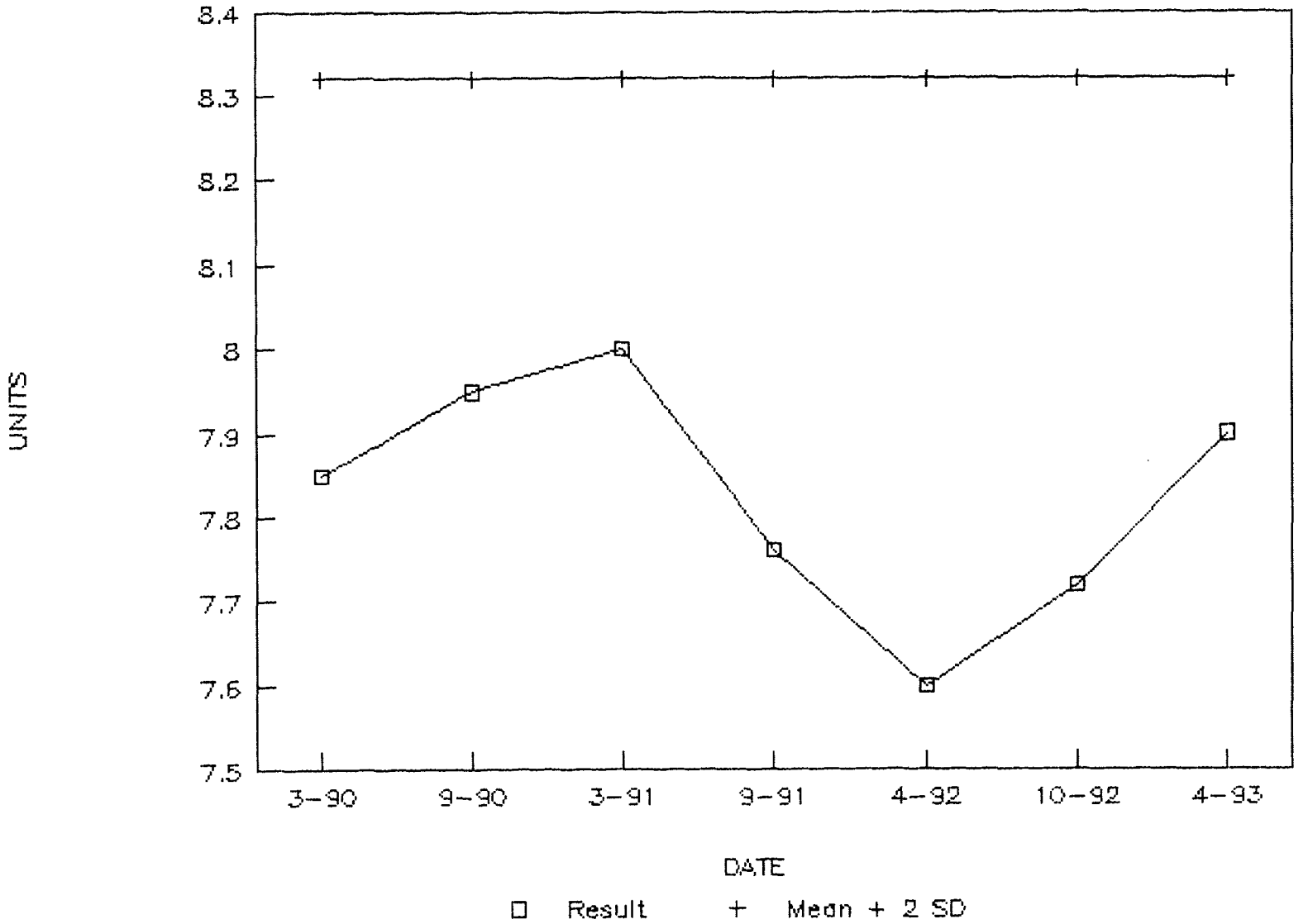
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
UNITS
(Thousands)
06 MAR 91
24 SEP 91
22 APR 92
22 OCT 92
28 APR 93
DATE

SMW-3 pH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8.3
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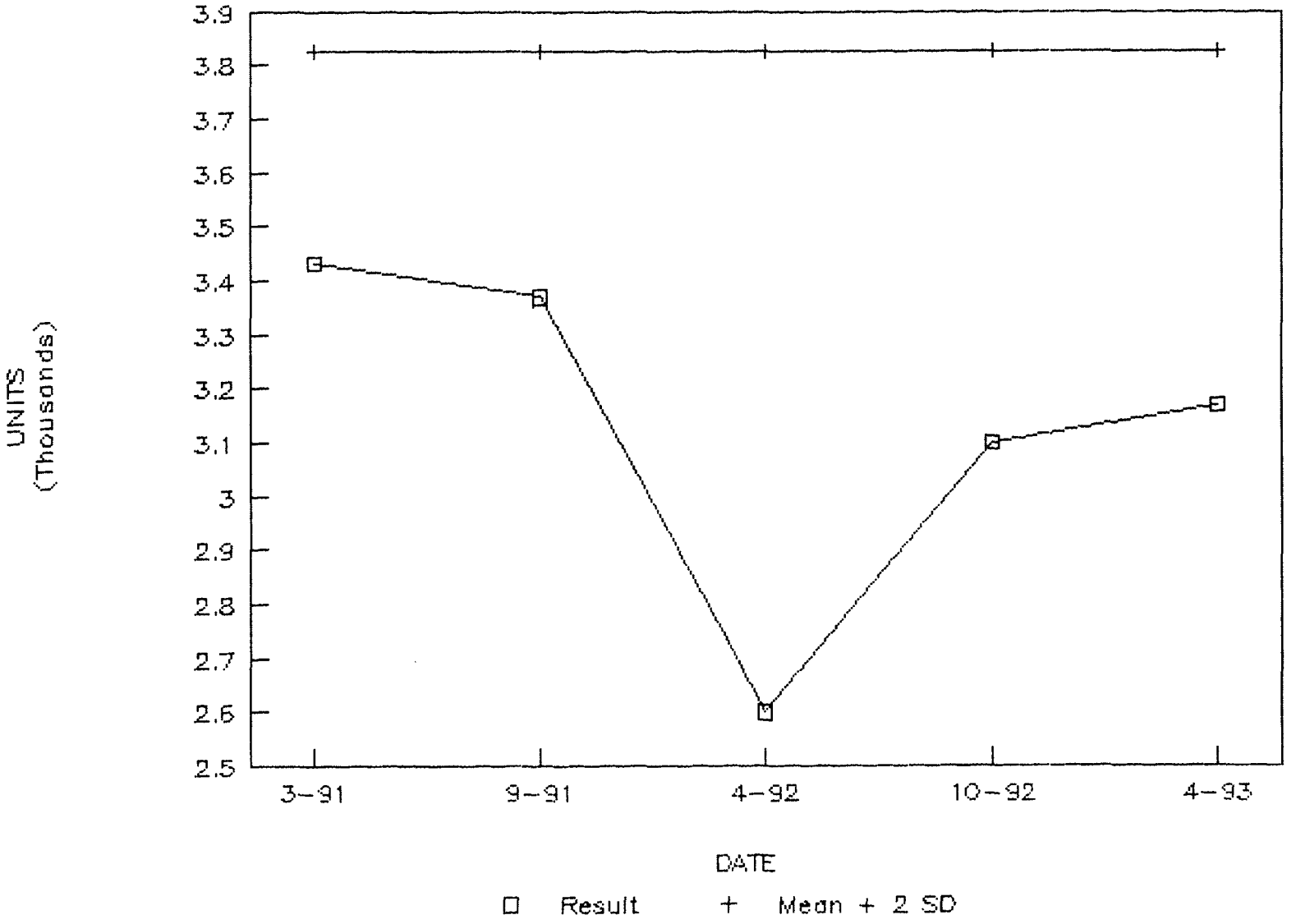
8
7.9
7.8
7.7
7.6
7.5
UNITS
3-90
9-90
3-91
9-91
4-92
10-92
4-93
DATE
Result
Mean + 2 SD

SMW-3 EC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3.8
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3.6
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3.2
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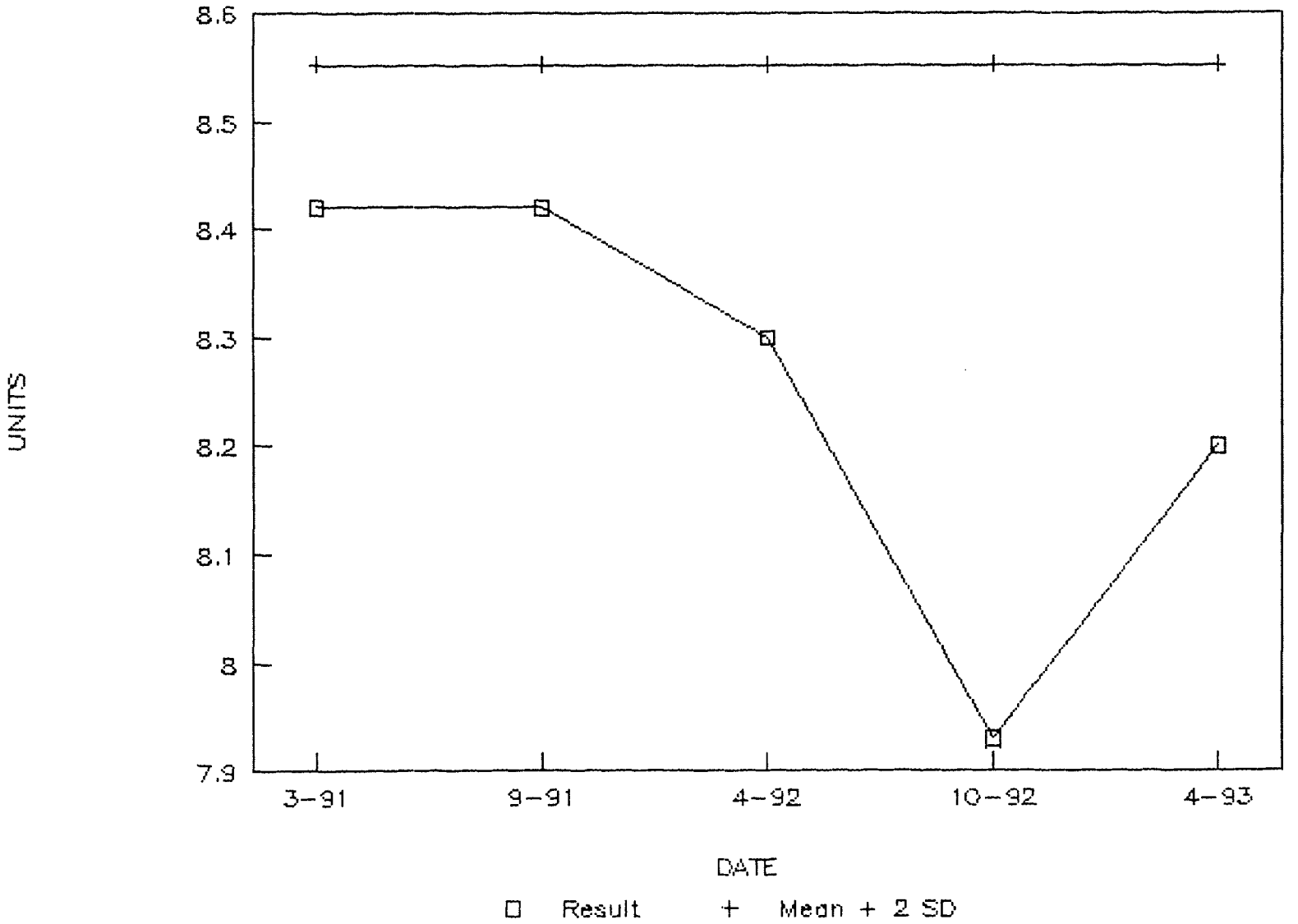
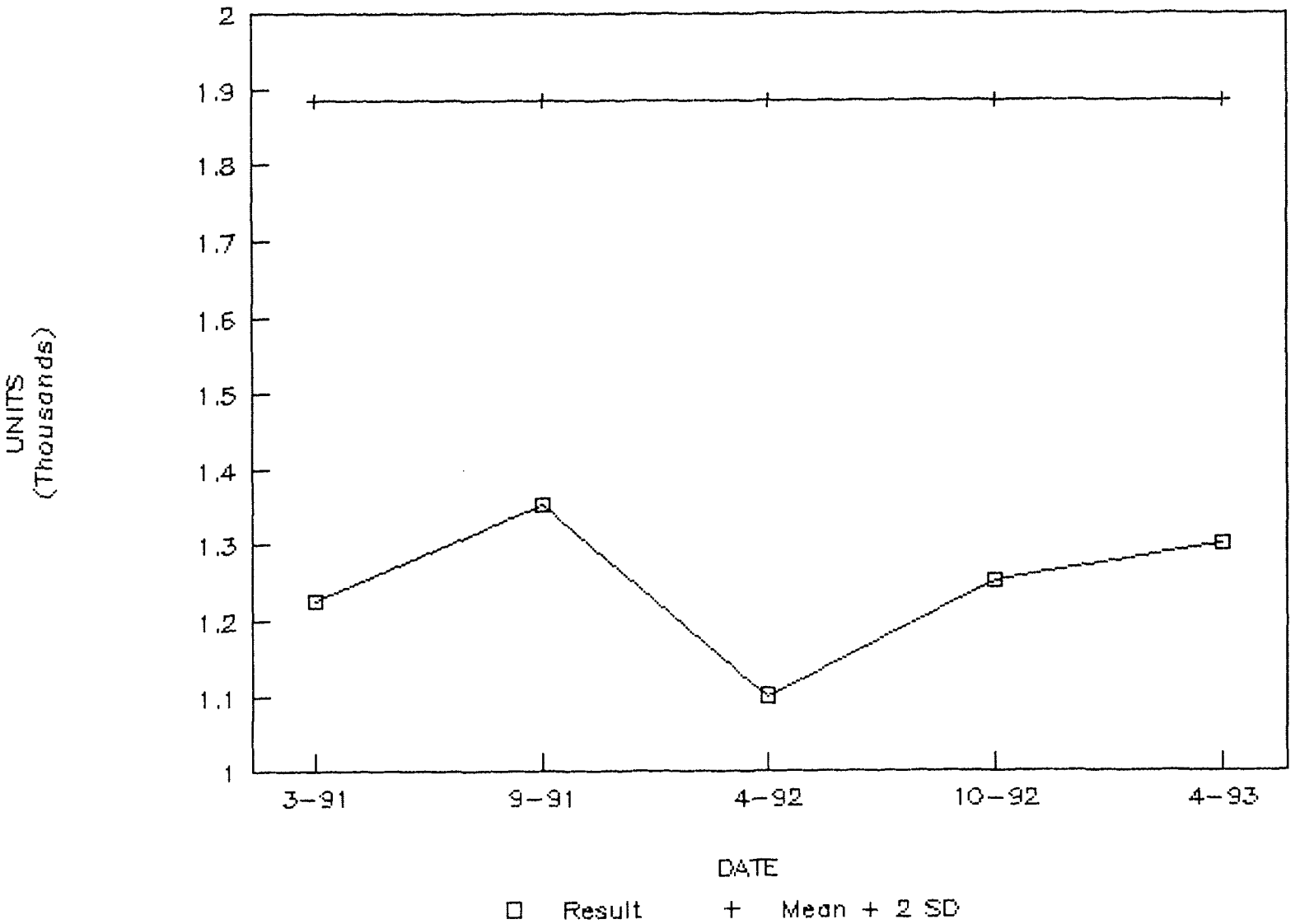
3
2.9
2.8
2.7
2.6
2.5
UNITS
(Thousands)
3-91
9-91
4-92
10-92
4-93
DATE
Result
Mean + 2 SD

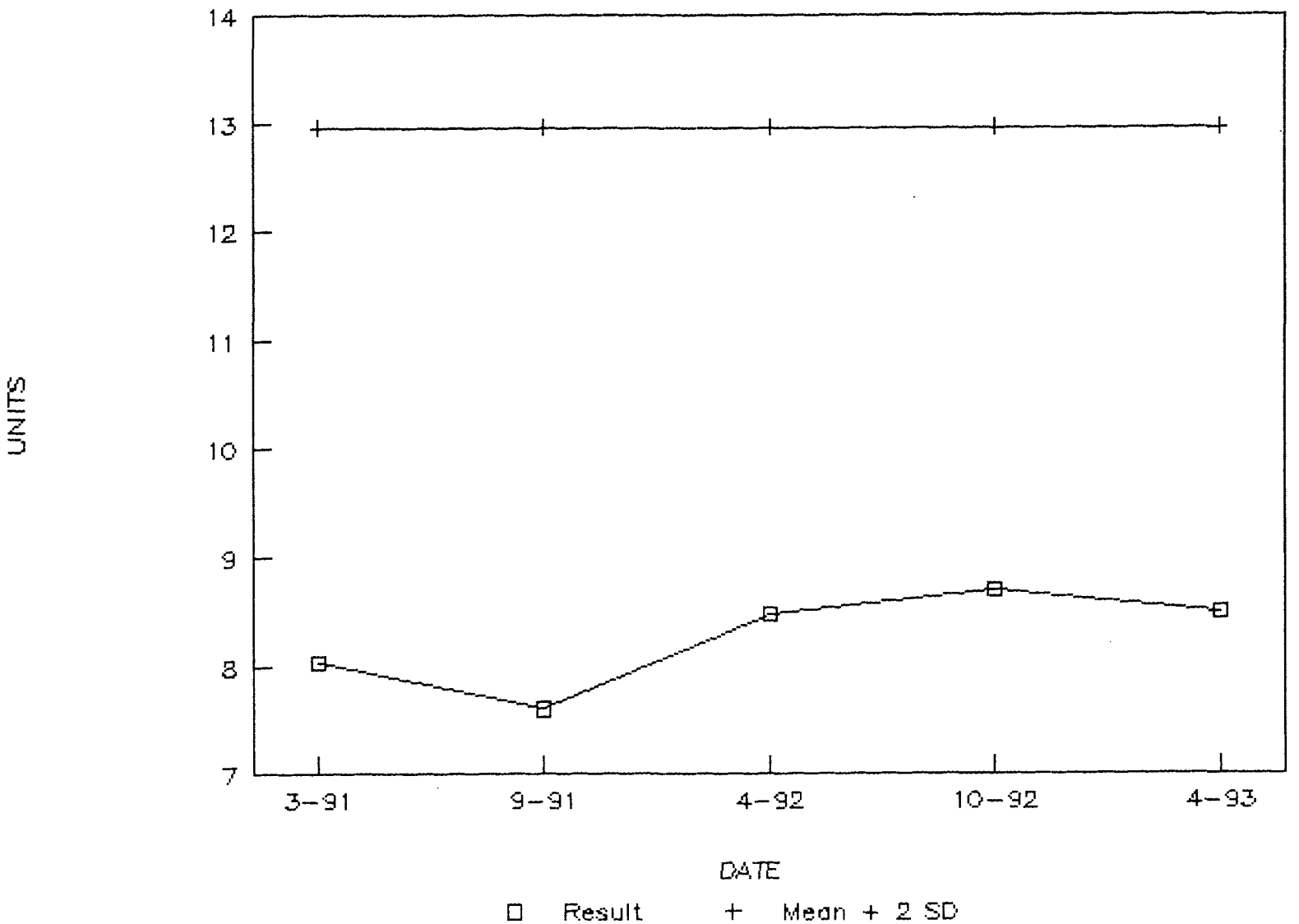
SMW-4 pH


8.6
8.5
8.4
8.3
8.2
8.1
8
7.9
UNITS
3-91
9-91
4-92
10-92
4-93
DATE
Result
Mean + 2 SD

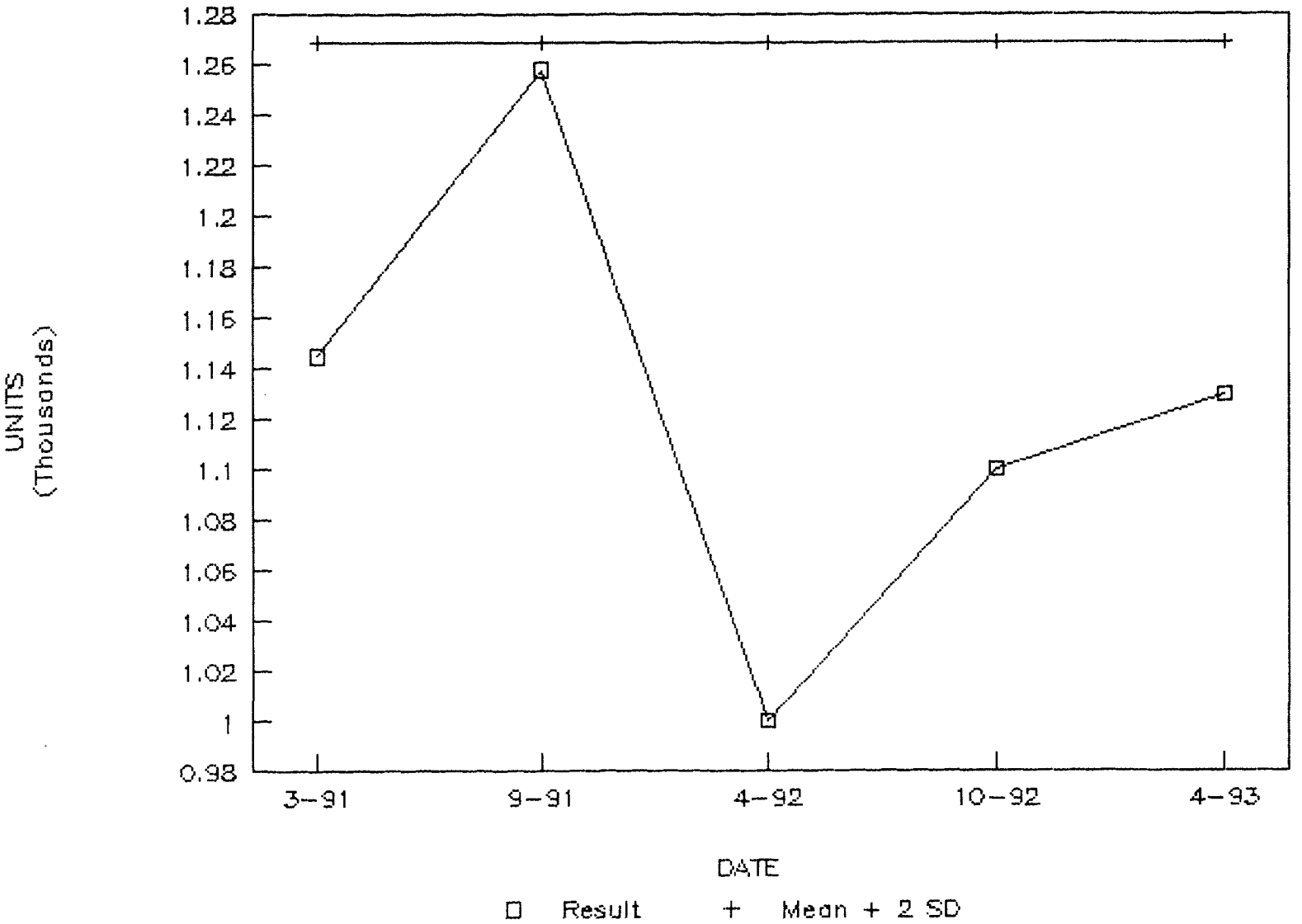
SMW-4 EC


2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
UNITS
(Thousands)
3-91
9-91
4-92
10-92
4-93
DATE
Result
Mean + 2 SD

SMW-5 pH


14
13
12
11
10
9
8
7
UNITS
3-91
9-91
4-92
10-92
4-93
DATE
Result
Mean + 2 SD

SMW-5 EC


1.28
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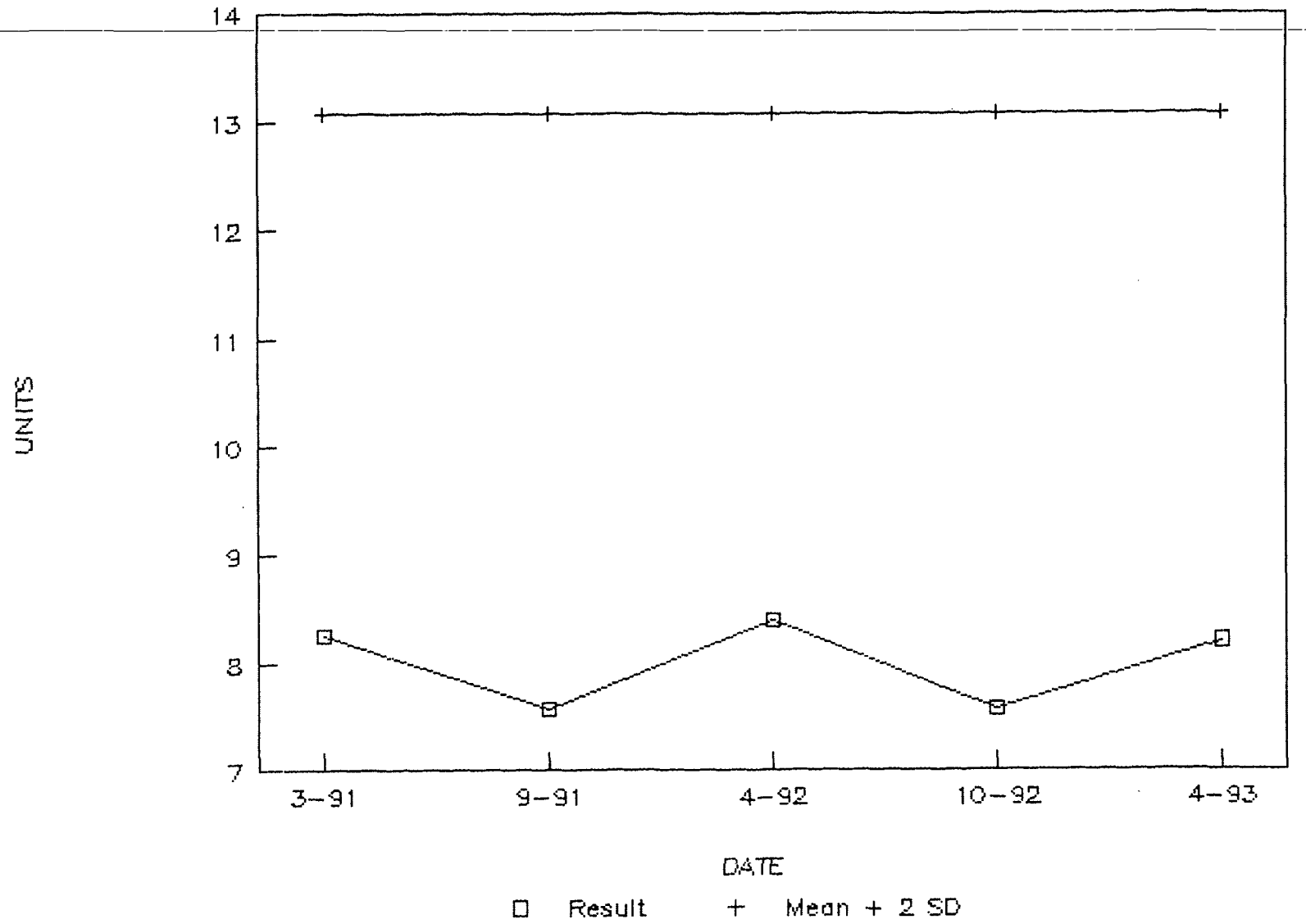
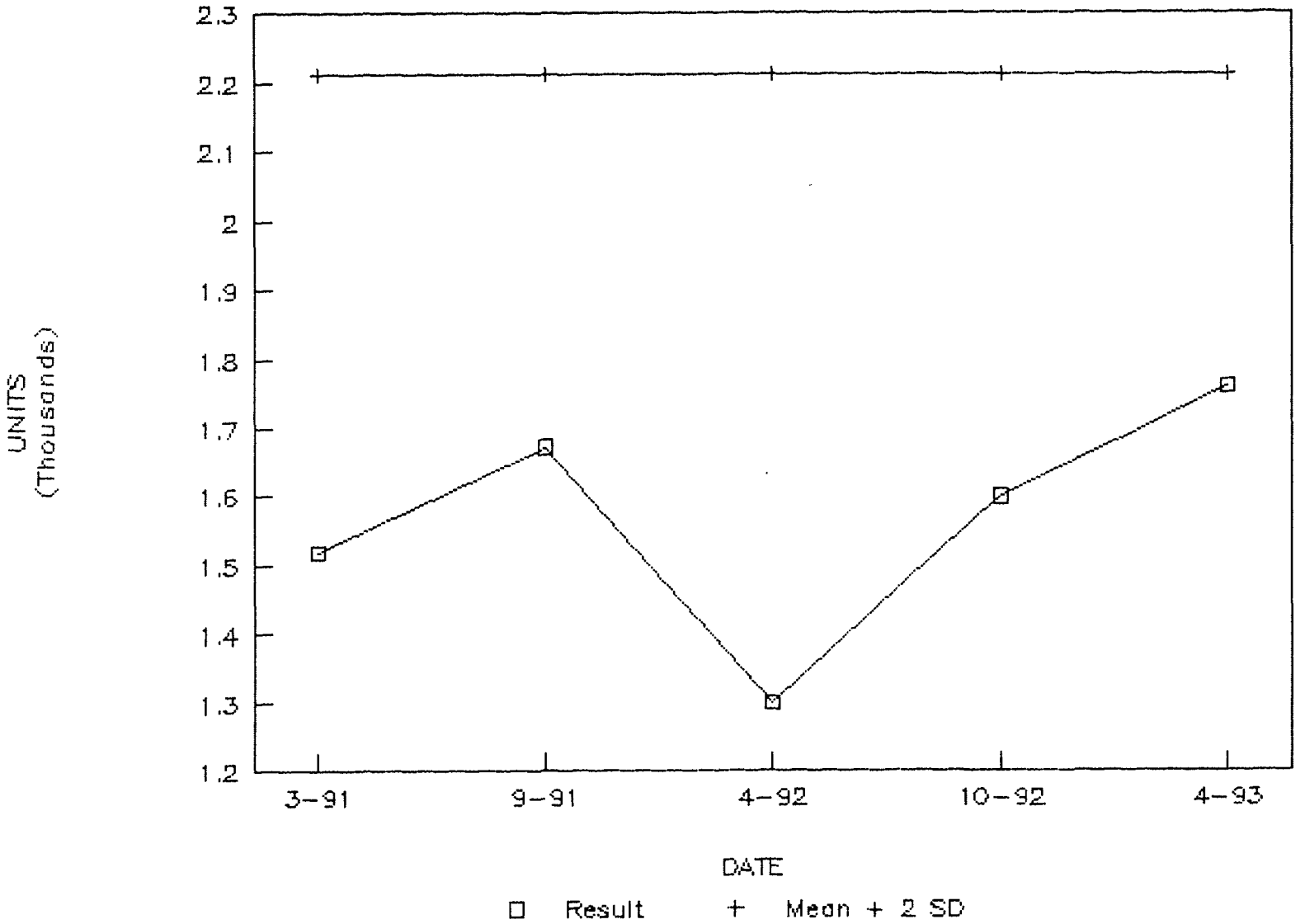
1.24
1.22
1.2
1.18
1.16
1.14
1.12
1.1
1.08
1.06
1.04
1.02
1
0.98
UNITS
(Thousands)
3-91
9-91
4-92
10-92
4-93
DATE
Result
Mean + 2 SD

SMW-6 pH


14
13
12
11
10
9
8
7
UNITS
3-91
9-91
4-92
10-92
4-93
DATE
Result
Mean + 2 SD

SMW-6 EC


2.3
2.2
2.1
2
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
UNITS
(Thousands)
3-91
9-91
4-92
10-92
4-93
DATE
Result
Mean + 2 SD

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.
PROJECT # : (NONE)
PROJECT NAME : ANNUAL GROUNDWATER

DATE RECEIVED : 04/29/93
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.
PROJECT # : (NONE)
PROJECT NAME : ANNUAL GROUNDWATER

DATE RECEIVED : 04/29/93
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) ATI I.D.: 304451
PROJECT NAME: ANNUAL GROUNDWATER

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) ATI I.D.: 304451
PROJECT NAME: ANNUAL GROUNDWATER

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.
PROJECT # : (NONE)
PROJECT NAME : ANNUAL GROUNDWATER

DATE RECEIVED : 04/29/93
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.
PROJECT # : (NONE)
PROJECT NAME : ANNUAL GROUNDWATER

DATE RECEIVED : 04/29/93
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 ATI I.D.: 304451
PROJECT # : (NONE)
PROJECT NAME: ANNUAL GROUNDWATER

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)	ATI I.D.	: 304451
BLANK I.D.	: 050393	DATE EXTRACTED	: NA
CLIENT	: GIANT REFINING	DATE ANALYZED	: 05/03/93
PROJECT #	: (NONE)	DILUTION FACTOR:	1
PROJECT NAME:	ANNUAL GROUNDWATER		

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)	ATI I.D.	: 304451
MSMSD #	: 30444511	DATE EXTRACTED	: NA
CLIENT	: GIANT REFINING	DATE ANALYZED	: 05/03/93
		SAMPLE MATRIX	: AQUEOUS
PROJECT #	: (NONE)	REF. I.D.	: 30444511
PROJECT NAME	: ANNUAL GROUNDWATER	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.	DATE SAMPLED	: 04/28/93
PROJECT #	: (NONE)	DATE RECEIVED	: 04/29/93
PROJECT NAME	: ANNUAL GROUNDWATER	DATE EXTRACTED	: N/A
CLIENT I.D.	: OW-11	DATE ANALYZED	: 05/06/93
SAMPLE MATRIX	: AQUEOUS	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.	DATE SAMPLED	: 04/28/93
PROJECT #	: (NONE)	DATE RECEIVED	: 04/29/93
PROJECT NAME	: ANNUAL GROUNDWATER	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW-1	DATE ANALYZED	: 05/06/93
SAMPLE MATRIX	: AQUEOUS	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.	DATE SAMPLED	: 04/28/93
PROJECT #	: (NONE)	DATE RECEIVED	: 04/29/93
PROJECT NAME	: ANNUAL GROUNDWATER	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW-2	DATE ANALYZED	: 05/06/93
SAMPLE MATRIX	: AQUEOUS	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 (%)	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.	DATE SAMPLED	: 04/28/93
PROJECT #	: (NONE)	DATE RECEIVED	: 04/29/93
PROJECT NAME	: ANNUAL GROUNDWATER	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW-4	DATE ANALYZED	: 05/06/93
SAMPLE MATRIX	: AQUEOUS	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.	DATE SAMPLED	: 04/28/93
PROJECT #	: (NONE)	DATE RECEIVED	: 04/29/93
PROJECT NAME	: ANNUAL GROUNDWATER	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW-5	DATE ANALYZED	: 05/06/93
SAMPLE MATRIX	: AQUEOUS	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 (%)	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.	DATE SAMPLED	: 04/05/93
PROJECT #	: (NONE)	DATE RECEIVED	: 04/29/93
PROJECT NAME	: ANNUAL GROUNDWATER	DATE EXTRACTED	: N/A
CLIENT I.D.	: TRIP BLANK	DATE ANALYZED	: 05/06/93
SAMPLE MATRIX	: AQUEOUS	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-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 (%)	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.	ATI I.D.	: 304451
PROJECT #	: (NONE)	DATE EXTRACTED	: 05/06/93
PROJECT NAME	: ANNUAL GROUNDWATER	DATE ANALYZED	: 05/06/93
CLIENT I.D.	: REAGENT BLANK	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-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 (%)	99
BROMOFLUOROBENZENE (%)	99
TOLUENE-D8 (%)	97

Analytical Technologies, Inc.

GCMS - RESULTS

REAGENT BLANK

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	ATI I.D.	: 304451
PROJECT #	: (NONE)	DATE EXTRACTED	: 05/06/93
PROJECT NAME	: ANNUAL GROUNDWATER	DATE ANALYZED	: 05/06/93
CLIENT I.D.	: REAGENT BLANK	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-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 (%)	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 RESULT	CONC. SPIKED	SPIKED SAMPLE	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
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 RESULT	CONC. SPIKED	SPIKED SAMPLE	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
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

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

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

Analytical Technologies, Inc., Albuquerque, NM

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CHAIN OF CUSTODY

DATE: 4-28-93 PAGE 1 OF 1

ATI LAB I.D. 304451

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

PROJECT MANAGER: Lynn Shelton

COMPANY: GIANT

ADDRESS: I-40 EXIT 39
JAMESTOWN, NM

PHONE: - 722 0227 - 87347

FAX:

BILL TO: SAME

COMPANY:

ADDRESS:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	BTXE/MTBE (8020)	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	DISSOLVED METALS **	DISSOLVED METALS +	The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)		NUMBER OF CONTAINERS
OW-11	4-28	8:52	H2O	01					X	X				X					X		X						X					13
MW-1		9:36		02					X	X				X					X		X						X					13
MW-2		9:54		03					X	X				X					X		X						X					13
MW-4		10:12		04					X	X				X					X		X						X					13
MW-5		10:40		05					X	X				X					X		X						X					13
OW-1		10:05		06				X	X																		X					4
OW-2		10:27		07				X	X																		X					4
OW-3		10:54		08				X	X																		X					4
TRIP BLANK	4/5		H2O	09																												

PROJECT INFORMATION

PROJ. NO.:

PROJ. NAME: ANNUAL GROUNDWATER

P.O. NO.: 997-9009-14

SHIPPED VIA: FED EX

SAMPLE RECEIPT

NO. CONTAINERS: 9

CUSTODY SEALS: Y / N / NA

RECEIVED INTACT: Y

RECEIVED COLD: Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

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

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

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Lynn Shelton Time: 3:20	Signature: Time:	Signature: Time:
Printed Name: LYNN SHELTON Date: 4-28-93	Printed Name: Date:	Printed Name: Date:
Company: GIANT Phone: 722-0227	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: (LAB) 3.
Signature: Time:	Signature: Time:	Signature: Time: 10:30
Printed Name: Date:	Printed Name: Date:	Printed Name: Date: 4/29/93
Company:	Company:	Analytical Technologies, Inc.

Analytical**Technologies,**Inc. Albuquerque, NM

Chain of Custody

DATE 4/29/93 PAGE 1 OF 1

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**
ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87106

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	General chemistry	632/632 MOD	619/619 MOD	610/8310	Phenolics (420.1)	8240 (TCLP 1311) ZHE	Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GCMS (624/8240)	Tentatively Identified See List	NACE	ASBESTOS	DISSOLVED metals per attached list	~~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
304451-01	4/28		AQ	1					X	X				X			X	X			X								9
02				2					X	X				X			X	X			X								9
03				3					X	X				X			X	X			X								9
04				4					X	X				X			X	X			X								9
05				5					X	X				X			X	X			X								8
06				6																									2
07				7					X												X								2
08				8					X												X								2
09	4/5			9													X												1

PROJECT INFORMATION	
PROJECT NUMBER:	304451
PROJECT NAME:	GIANT
QC LEVEL:	~~STD.~~ IV
QC REQUIRED:	~~MS~~ MSD BLANK
TAT:	~~STANDARD~~ RUSH!

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	51
CHAIN OF CUSTODY SEALS	Y
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	304451

DUE DATE: 13may93 WO 4404
RUSH SURCHARGE: —
CLIENT DISCOUNT: — %

Dell Foote

SAMPLES SENT TO:	
SAN DIEGO	
FT. COLLINS	
RENTON	
PENSACOLA	
PHOENIX	X
BARRINGER	
FIBERQUANT	

RELINQUISHED BY: 1.
Signature: [signature] Time: 16:15
Printed Name: [illegible] Date: 4/29/93
Analytical Technologies, Inc. Albuquerque
RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:
RECEIVED BY: (LAB) 2.
Signature: R. Tubesewski Time: 1125
Printed Name: R. Tubesewski Date: 4/30/93
Company: ATI - Phx

Analytical**Technologies,**Inc. Albuquerque, NM

Chain of Custody

DATE 4/29/93 PAGE 1 OF 1

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**
ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87106

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	NUMBER OF CONTAINERS
30445 1-01	4-28		AQ	01	X	X	3
-02	"		"	02	X	X	4
-03	"		"	03	X	X	4
04	"		"	04	X	X	4
05	"		"	05	X	X	4

TOX ↓

PROJECT INFORMATION	SAMPLE RECEIPT
PROJECT NUMBER: 30445 1	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
TAT: STANDARD RUSH!	LAB NUMBER

DUE DATE: 13 MAY 93 WORK 403
RUSH SURCHARGE:
CLIENT DISCOUNT: ____ %

SAMPLES SENT TO:
- SAN DIEGO X
- FT. COLLINS
- RENTON
- PENSACOLA
- PHOENIX
- BARRINGER
- FIBERQUANT

RELINQUISHED BY: 1.
Signature: [signature] Time: 1800
Printed Name: L Kraland Date 4/29/93
Analytical Technologies, Inc. Albuquerque

RECEIVED BY: (LAB) 1.
Signature: [signature] Time: 1230
Printed Name: S Flanders Date: 4/30/93
Company: ATI-SD

RELINQUISHED BY: 2.
Signature: [signature] Time: 9:30
Printed Name: S Flanders Date 4/30/93
Company: ATI-SD

RECEIVED BY: (LAB) 2.
Signature: Time:
Printed Name: Date:
Company: Fed-EX

Chris Mi 5-2-93 1350 ATI F/C

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 - 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. **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

Gregory R. Jordan
Laboratory Manager

GJ:td

Enclosure

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.
PROJECT # : (NONE)
PROJECT NAME : ANNUAL GRDWTR

DATE RECEIVED : 04/30/93
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.
PROJECT # : (NONE)
PROJECT NAME : ANNUAL GRDWTR

DATE RECEIVED : 04/30/93
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.
PROJECT # : (NONE)
PROJECT NAME : ANNUAL GRDWTR

DATE RECEIVED : 04/30/93
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.	DATE SAMPLED	: 04/29/93
PROJECT #	: (NONE)	DATE RECEIVED	: 04/30/93
PROJECT NAME	: ANNUAL GRDWTR	DATE EXTRACTED	: N/A
CLIENT I.D.	: SMW-3 (TOTAL)	DATE ANALYZED	: 05/05/93
SAMPLE MATRIX	: AQUEOUS	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 (%)	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.	DATE SAMPLED	: 04/29/93
PROJECT #	: (NONE)	DATE RECEIVED	: 04/30/93
PROJECT NAME	: ANNUAL GRDWTR	DATE EXTRACTED	: N/A
CLIENT I.D.	: SMW-4 (TOTAL)	DATE ANALYZED	: 05/05/93
SAMPLE MATRIX	: AQUEOUS	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 (%)	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.	DATE SAMPLED	: 04/29/93
PROJECT #	: (NONE)	DATE RECEIVED	: 04/30/93
PROJECT NAME	: ANNUAL GRDWTR	DATE EXTRACTED	: N/A
CLIENT I.D.	: SMW-5 (TOTAL)	DATE ANALYZED	: 05/05/93
SAMPLE MATRIX	: AQUEOUS	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 (%)	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.	DATE SAMPLED	: 04/29/93
PROJECT #	: (NONE)	DATE RECEIVED	: 04/30/93
PROJECT NAME	: ANNUAL GRDWTR	DATE EXTRACTED	: N/A
CLIENT I.D.	: SMW-6 (TOTAL)	DATE ANALYZED	: 05/06/93
SAMPLE MATRIX	: AQUEOUS	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 (%)	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.	DATE SAMPLED	: 04/29/93
PROJECT #	: (NONE)	DATE RECEIVED	: 04/30/93
PROJECT NAME	: ANNUAL GRDWTR	DATE EXTRACTED	: N/A
CLIENT I.D.	: SMW-4D (TOTAL)	DATE ANALYZED	: 05/06/93
SAMPLE MATRIX	: AQUEOUS	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 (%)	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	

Analytical Technologies, Inc.

GCMS - RESULTS

REAGENT BLANK

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	ATI I.D.	: 304455
PROJECT #	: (NONE)	DATE EXTRACTED	: 05/05/93
PROJECT NAME	: ANNUAL GRDWTR	DATE ANALYZED	: 05/05/93
CLIENT I.D.	: REAGENT BLANK	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-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 (%)	99
BROMOFLUOROBENZENE (%)	100
TOLUENE-D8 (%)	100

Analytical Technologies, Inc.

GCMS - RESULTS

REAGENT BLANK

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	ATI I.D.	: 304455
PROJECT #	: (NONE)	DATE EXTRACTED	: 05/06/93
PROJECT NAME	: ANNUAL GRDWTR	DATE ANALYZED	: 05/06/93
CLIENT I.D.	: REAGENT BLANK	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-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 (%)	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 RESULT	CONC. SPIKED	SPIKED SAMPLE	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
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 RESULT	CONC. SPIKED	SPIKED SAMPLE	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
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

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

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

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

CHAIN OF CUSTODY

DATE: 4-29-93 PAGE 1 OF 1

ATI LAB I.D. 3044455

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

PROJECT MANAGER:

COMPANY: GIANT
ADDRESS: 140 EXIT 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	09/08
SMW-4D		1:25	W	09/10

ANALYSIS REQUEST

	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE/MTBE (MOD 8015/8020)	~~BTXE/MTBE (8020)~~ *	General Chemistry *	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	SDWA Volatiles (502.1/503.1), 502.2 Reg. & Unreg.	Cr + Pb (NOT FILTERED)	Ca, Mg, K, Na (NOT FILTERED)	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)	TOX	TOC	SDWA Primary Standards - Arizona	SDWA Secondary Standards - Arizona	SDWA Primary Standards - Federal	SDWA Secondary Standards - Federal			The 13 Priority Pollutant Metals	RCRA Metals by Total Digestion	RCRA Metals by TCLP (1311)	NUMBER OF CONTAINERS
SMW-3				*	X			X	X	X				X		X	X									8 10
SMW-4					X			X	X	X				X		X	X									10
SMW-5					X			X	X	X				X		X	X									8
SMW-6					X			X	X	X				X		X	X									8
SMW-4D					X			X	X	X				X		X	X									7

PROJECT INFORMATION

PROJ. NO.:
PROJ. NAME: ANNUAL GRDWTR
P.O. NO.: 997 9009 14
SHIPPED VIA: FED EX

SAMPLE RECEIPT

NO. CONTAINERS: 43
CUSTODY SEALS: (Y) / N / NA
RECEIVED INTACT: Y
RECEIVED COLD: Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH PROJECTS

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

Comments:
* SEE ATTACHED LIST OF PARAMETERS

SAMPLED & RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Lynn Shelton Time: 3:30	Signature: Time:	Signature: Time:
Printed Name: LYNN SHELTON Date: 4-29-93	Printed Name: Date:	Printed Name: Date:
Company: GIANT Phone: 722 0227	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY:(LAB) 3.
Signature: Time:	Signature: Time:	Signature: Time: 0955
Printed Name: Date:	Printed Name: Date:	Printed Name: Date: 4/30/93
Company:	Company:	Analytical Technologies, Inc.

Analytical**Technologies,**Inc. Albuquerque, NM

Chain of Custody

DATE 4/30/93 PAGE 2 OF 2

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**
ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87106

Dissolved metals: Ca, Mg, K, Na

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Dissolved Metals - see list	632/632 MOD	619/619 MOD	610/8310			8240 (TCLP 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)	NUMBER OF CONTAINERS
304455-10	4/29	1325	AQ	10						X																						1

PROJECT INFORMATION

PROJECT NUMBER: 304455
PROJECT NAME: GRC
~~QC LEVEL~~: STD. IV
~~QC REQUIRED~~: MS MSD BLANK
TAT: STANDARD RUSH!

DUE DATE: 5/14/93
RUSH SURCHARGE: —
CLIENT DISCOUNT: % see att-quote

W.O. H2K405

SAMPLE RECEIPT

TOTAL NUMBER OF CONTAINERS	1
CHAIN OF CUSTODY SEALS	N
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	

SAMPLES SENT TO:

SAN DIEGO	
FT. COLLINS	
RENTON	
PENSACOLA	
PHOENIX	X
BARRINGER	
FIBERQUANT	

RELINQUISHED BY: 1.
Signature: Lorri Dettre Time: 1800
Printed Name: Lorri Dettre Date: 4/30/93
Analytical Technologies, Inc. Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:

RECEIVED BY: (LAB) 2.
Signature: R. Tubesingwski Time: 1005
Printed Name: R. Tubesingwski Date: 5/3/93
Company: ATI-Phx

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 - ATI • Pink - ORIGINATOR

Analytical Technologies, Inc. Albuquerque, NM

Chain of Custody

DATE 4/30/93 PAGE 1 OF 1

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**

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

CLIENT PROJECT MANAGER:

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	NUMBER OF CONTAINERS
304455-1	4/29	1245	AQ	01	X	X	3
-3		1310		02	X	X	3
-5		1340		03	X	X	3
-7		1355		04	X	X	3
-9		1325		05	X	X	2

TOX ↓

ORGANIC LEAD; SULFIDE; SURFACTANTS (MBAS); 632/632 MOD; 619/619 MOD; 610/8310; 8240 (TCLP 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 - O2, CO2, METHANE; AIR/Diesel/Gasoline/BTXE/ (MOD 8015/8020)

PROJECT INFORMATION	
PROJECT NUMBER:	304455
PROJECT NAME:	GRC
QC LEVEL:	(STD) IV
QC ~~REQUIRED~~:	MS MSD BLANK
TAT:	(STANDARD) RUSH!

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	18
CHAIN OF CUSTODY SEALS	N
INTACT?	NA
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	93-04-228

DUE DATE: 5/14/93

RUSH SURCHARGE:

CLIENT DISCOUNT: ____ % See quote

W.O. # LK406

SAMPLES SENT TO:
- SAN DIEGO (HD) X
- FT. COLLINS X
- RENTON
- PENSACOLA
- PHOENIX
- BARRINGER
- FIBERQUANT

RELINQUISHED BY: 1.
Signature: Terri Dettre Time: 1800
Printed Name: Terri Dettre Date: 4/30/93
Analytical Technologies, Inc.
Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company: Fed-Ex

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company: Fed-Ex

RECEIVED BY: (LAB) 2.
Signature: Chris Miller Time: 1340
Printed Name: Chris Miller Date: 5-2
Company: ATI

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 - ATI • Pink - ORIGINATOR

Analytical**Technologies,**Inc. Albuquerque, NM

Chain of Custody

DATE 4/30/93 PAGE 1 OF 2

NETWORK PROJECT MANAGER: BETH PROFFITT

COMPANY: **Analytical Technologies, Inc.**
ADDRESS: 2709-D Pan American Freeway, NE
Albuquerque, NM 87106

General Chem: pH, Cond, TDS, Alk, Cl, F
Total metals: Cr, Pb
Dissolved metals: Ca, Mg, K, Na

CLIENT PROJECT MANAGER:

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TOX	TOC	ORGANIC LEAD	SULFIDE	SURFACTANTS (MBAS)	Gen. Chem - (att. list)	632/632 MOD	619/619 MOD	610/8310	Total Metals (please see att. list)	Dissolved Metals	8240 (TCLP 1311) ZHE		Diesel/Gasoline/BTXE/MTBE/ (MOD 8015/8020)	Volatile Organics GC/MS (624/8240) 8, BeX		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	FQ	1						X				X					X													4
-2		4		2											X																	1
-3		1310		3						X				X					X													4
-4		11		4											X																	1
-5		1340		5						X				X					X													4
-6		11		6											X																	1
-7		1355		7						X				X					X													4
-8		11		8											X																	1
-9		1325		9						X				X					X													4

PROJECT INFORMATION	
PROJECT NUMBER:	304455
PROJECT NAME:	GRC
QC LEVEL:	STD. IV
QC REQUIRED:	MS MSD BLANK
TAT:	STANDARD RUSH!

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	24
CHAIN OF CUSTODY SEALS	N
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	304455

DUE DATE: 5/14/93
RUSH SURCHARGE:
CLIENT DISCOUNT: % see att. quote

W.O.# LK405

TC-Fed-X 5/1/93 1200

SAMPLES SENT TO:	
SAN DIEGO	
FT. COLLINS	
RENTON	
PENSACOLA	
PHOENIX	X
BARRINGER	
FIBERQUANT	

RELINQUISHED BY: 1.
Signature: Time: 1800
Printed Name: Date: 4/30/93
Perri Dettre
Analytical Technologies, Inc.
Albuquerque

RECEIVED BY: (LAB) 1.
Signature: Time:
Printed Name: Date:
Company:

RELINQUISHED BY: 2.
Signature: Time:
Printed Name: Date
Company:

RECEIVED BY: (LAB) 2.
Signature: Time: 1005
R. Tubeszewski
Printed Name: Date: 5/3/93
R. Tubeszewski
Company:
ATI-Phx