Analytical Technologies, Inc. 9830 S. 51st Street Suite B-113 Phoenix, AZ 85044 (602) 496-4400

SMW 1-6
3-5-91

ATI I.D. 103573

April 18, 1991

LIBRARY COPY

Giant Refining Company
Route 3, P.O. Box 7
Gallup, NM 87301

Project Name/Number: None Given

Attention: Claud Rosendale

On 03/06/91, Analytical Technologies, Inc. received a request to analyze aqueous sample(s). The sample(s) 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.

TOC, TOX analyses were performed by ATI, San Diego. Additional sample for client ID SMW-3 was received on 03/07/91. Total metals results are reported under ATI ID numbers 103573-01,- 06, -11, -16, -21, -26, and -31. Dissolved metals results are reported under ATI ID number -02, -07, -12, -17, -22, and -27.

If you have any questions or comments, please do not hesitate to contact us at (602)496-4400.

Elizabeth Proffitt
Senior Project Manager

Robert V. Woods
Laboratory Manager

Lorraine Davis
QA Coordinator

RVW:clf
Enclosure

Analytical Technologies, Inc.

CLIENT : GIANT REFINING CO. DATE RECEIVED : 03/06/91
PROJECT # : (NONE)
PROJECT NAME : (NONE) REPORT DATE : 04/18/91

ATI I.D. : 103573

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	SMW-1	AQUEOUS	03/05/91
02	SMW-1	AQUEOUS	03/05/91
03	SMW-1	AQUEOUS	03/05/91
04	SMW-1	AQUEOUS	03/05/91
05	SMW-1	AQUEOUS	03/05/91
06	SMW-2	AQUEOUS	03/05/91
07	SMW-2	AQUEOUS	03/05/91
08	SMW-2	AQUEOUS	03/05/91
09	SMW-2	AQUEOUS	03/05/91
10	SMW-2	AQUEOUS	03/05/91
11	SMW-3	AQUEOUS	03/05/91
12	SMW-3	AQUEOUS	03/05/91
13	SMW-3	AQUEOUS	03/05/91
14	SMW-3	AQUEOUS	03/05/91
15	SMW-3	AQUEOUS	03/06/91
16	SMW-4	AQUEOUS	03/05/91
17	SMW-4	AQUEOUS	03/05/91
18	SMW-4	AQUEOUS	03/05/91
19	SMW-4	AQUEOUS	03/05/91
20	SMW-4	AQUEOUS	03/05/91
21	SMW-5	AQUEOUS	03/05/91
22	SMW-5	AQUEOUS	03/05/91
23	SMW-5	AQUEOUS	03/05/91
24	SMW-5	AQUEOUS	03/05/91
25	SMW-5	AQUEOUS	03/05/91
26	SMW-6	AQUEOUS	03/05/91
27	SMW-6	AQUEOUS	03/05/91
28	SMW-6	AQUEOUS	03/05/91
29	SMW-6	AQUEOUS	03/05/91
30	SMW-6	AQUEOUS	03/05/91
31	SMW EQUIP WASH	AQUEOUS	03/05/91
32	SMW EQUIP WASH	AQUEOUS	03/05/91
33	SMW EQUIP WASH	AQUEOUS	03/05/91
34	SMW EQUIP WASH	AQUEOUS	03/05/91
35	TRIP BLANK	AQUEOUS	03/05/91

----- TOTALS -----

MATRIX	# SAMPLES
AQUEOUS	35

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. : 103573

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

DATE RECEIVED : 03/06/91
REPORT DATE : 04/18/91

PARAMETER	UNITS	01	03	04	05	06
CARBONATE (CACO3)	MG/L	<1	-	-	-	<1
BICARBONATE (CACO3)	MG/L	620	-	-	-	578
HYDROXIDE (CACO3)	MG/L	<1	-	-	-	<1
TOTAL ALKALINITY (AS CACO3)	MG/L	620	-	-	-	578
CHLORIDE	MG/L	1130	-	-	-	1240
CONDUCTIVITY, (UMHOS/CM)		6320	6170	6180	6240	6940
PH	UNITS	7.52	7.69	7.54	7.55	7.65
SULFATE	MG/L	1300	-	-	-	1600
TOTAL DISSOLVED SOLIDS	MG/L	4700	-	-	-	5000
TOTAL ORGANIC CARBON	MG/L	14.0	12.8	15.8	11.4	14.3
TOTAL ORGANIC HALIDE	MG/L	0.032	0.039	0.053	0.037	0.051

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 103573

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

DATE RECEIVED : 03/06/91

REPORT DATE : 04/18/91

PARAMETER	UNITS	08	09	10	11	13
CARBONATE (CACO3)	MG/L	-	-	-	<1	-
BICARBONATE (CACO3)	MG/L	-	-	-	664	-
HYDROXIDE (CACO3)	MG/L	-	-	-	<1	-
TOTAL ALKALINITY (AS CACO3)	MG/L	-	-	-	664	-
CHLORIDE	MG/L	-	-	-	59	-
CONDUCTIVITY, (UMHOS/CM)		7030	7100	7100	3400	3410
PH	UNITS	7.68	7.69	7.66	7.94	8.09
SULFATE	MG/L	-	-	-	1200	-
TOTAL DISSOLVED SOLIDS	MG/L	-	-	-	5200	-
TOTAL ORGANIC CARBON	MG/L	11.6	15.2	10.2	3.0	5.1
TOTAL ORGANIC HALIDE	MG/L	0.061	0.051	0.037	<0.008	0.015

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 103573

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

DATE RECEIVED : 03/06/91

REPORT DATE : 04/18/91

PARAMETER	UNITS	14	15	16	18	19
CARBONATE (CACO3)	MG/L	-	-	24	-	-
BICARBONATE (CACO3)	MG/L	-	-	418	-	-
HYDROXIDE (CACO3)	MG/L	-	-	<1	-	-
TOTAL ALKALINITY (AS CACO3)	MG/L	-	-	442	-	-
CHLORIDE	MG/L	-	-	58	-	-
CONDUCTIVITY, (UMHOS/CM)		3330	3590	1210	1210	1230
PH	UNITS	8.04	7.92	8.54	8.39	8.38
SULFATE	MG/L	-	-	170	-	-
TOTAL DISSOLVED SOLIDS	MG/L	-	-	860	-	-
TOTAL ORGANIC CARBON	MG/L	2.5	3.3	2.6	2.2	1.6
TOTAL ORGANIC HALIDE	MG/L	<0.008	<0.008	<0.008	<0.008	<0.008

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 103573

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

DATE RECEIVED : 03/06/91

REPORT DATE : 04/18/91

PARAMETER	UNITS	20	21	23	24	25
CARBONATE (CACO3)	MG/L	-	20	-	-	-
BICARBONATE (CACO3)	MG/L	-	378	-	-	-
HYDROXIDE (CACO3)	MG/L	-	<1	-	-	-
TOTAL ALKALINITY (AS CACO3)	MG/L	-	398	-	-	-
CHLORIDE	MG/L	-	65	-	-	-
CONDUCTIVITY, (UMHOS/CM)		1240	1160	1150	1120	1150
PH	UNITS	8.37	8.56	8.54	8.51	8.55
SULFATE	MG/L	-	150	-	-	-
TOTAL DISSOLVED SOLIDS	MG/L	-	1500	-	-	-
TOTAL ORGANIC CARBON	MG/L	1.7	2.3	3.2	1.3	1.5
TOTAL ORGANIC HALIDE	MG/L	<0.008	<0.008	<0.008	<0.008	<0.008

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 103573

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

DATE RECEIVED : 03/06/91

REPORT DATE : 04/18/91

PARAMETER	UNITS	26	28	29	30	31
CARBONATE (CACO3)	MG/L	8	-	-	-	<1
BICARBONATE (CACO3)	MG/L	604	-	-	-	2
HYDROXIDE (CACO3)	MG/L	<1	-	-	-	<1
TOTAL ALKALINITY (AS CACO3)	MG/L	612	-	-	-	2
CHLORIDE	MG/L	82	-	-	-	<0.5
CONDUCTIVITY, (UMHOS/CM)		1520	1540	1520	1490	1.42
PH	UNITS	8.41	8.20	8.20	8.17	5.71
SULFATE	MG/L	200	-	-	-	<0.3
TOTAL DISSOLVED SOLIDS	MG/L	1100	-	-	-	10
TOTAL ORGANIC CARBON	MG/L	2.0	1.2	1.2	1.3	1.3
TOTAL ORGANIC HALIDE	MG/L	<0.008	<0.008	<0.008	<0.008	<0.008

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 103573

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

DATE RECEIVED : 03/06/91

REPORT DATE : 04/18/91

PARAMETER	UNITS	32	33	34
CONDUCTIVITY, (UMHOS/CM)		1.28	1.23	1.08
PH	UNITS	6.05	5.92	5.76
TOTAL ORGANIC CARBON	MG/L	0.9	0.6	<0.5
TOTAL ORGANIC HALIDE	MG/L	<0.008	<0.008	<0.008

Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME : (NONE) ATI I.D. : 103573

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CARBONATE	MG/L	10371505	<1	<1	NA	NA	NA	NA
BICARBONATE	MG/L		17	17	0	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		17	17	0	NA	NA	NA
CARBONATE	MG/L	10357602	<1	<1	NA	NA	NA	NA
BICARBONATE	MG/L		150	154	3	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		150	154	3	NA	NA	NA
CHLORIDE	MG/L	10357602	150	150	0	280	125	104
CONDUCTIVITY(UMHOS/CM)		10357313	3410	3410	0	NA	NA	NA
CONDUCTIVITY(UMHOS/CM)		10357326	1520	1530	0.7	NA	NA	NA
CONDUCTIVITY(UMHOS/CM)		10360203	90.7	89.5	1	NA	NA	NA
CONDUCTIVITY(UMHOS/CM)		10357334	1.08	1.10	2	NA	NA	NA
CONDUCTIVITY(UMHOS/CM)		10368901	2180	2160	0.9	NA	NA	NA
PH	UNITS	10357306	7.7	7.7	0	NA	NA	NA
PH	UNITS	10499905	8.4	8.4	0	NA	NA	NA
PH	UNITS	10357602	8.0	8.0	0	NA	NA	NA
PH	UNITS	10357333	5.9	5.9	0	NA	NA	NA
SULFATE	MG/L	10352901	170	170	0	340	170	100
SULFATE	MG/L	10357602	87	87	0	180	93	100
TOTAL DISSOLVED SOLIDS	MG/L	10357321	1500	1500	0	NA	NA	NA
TOTAL DISSOLVED SOLIDS	MG/L	10357331	10	10	0	NA	NA	NA
TOTAL ORGANIC CARBON	MG/L	10357314	2.5	3.0	18	26.2	20.0	119
TOTAL ORGANIC CARBON	MG/L	10499914	0.8	0.6	29	23.2	20.0	112
TOTAL ORGANIC CARBON	MG/L	10357328	1.2	1.2	0	22.5	20.0	107
TOTAL ORGANIC HALIDE	MG/L	10357316	<0.008	<0.008	NA	0.19	0.20	95
TOTAL ORGANIC HALIDE	MG/L	10357326	<0.008	<0.008	NA	0.19	0.20	95
TOTAL ORGANIC HALIDE	MG/L	10359806	<0.008	<0.008	NA	0.17	0.20	85

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

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

Analytical Technologies, Inc.

METALS RESULTS

ATI I.D. : 103573

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

DATE RECEIVED : 03/06/91
REPORT DATE : 04/18/91

PARAMETER	UNITS	01	02	06	07	11
CALCIUM	MG/L	-	185	-	132	-
CHROMIUM	MG/L	0.075	-	0.245	-	0.038
POTASSIUM	MG/L	-	1.9	-	<1.0	-
MAGNESIUM	MG/L	-	50.6	-	37.8	-
SODIUM	MG/L	-	1390	-	1620	-
LEAD	MG/L	0.007	-	0.010	-	0.010

Analytical Technologies, Inc.

METALS RESULTS

ATI I.D. : 103573

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

DATE RECEIVED : 03/06/91
REPORT DATE : 04/18/91

PARAMETER	UNITS	12	16	17	21	22
CALCIUM	MG/L	50.4	-	4.5	-	3.3
CHROMIUM	MG/L	-	0.032	-	0.042	-
POTASSIUM	MG/L	1.3	-	1.3	-	<1.0
MAGNESIUM	MG/L	14.7	-	1.1	-	0.8
SODIUM	MG/L	815	-	306	-	281
LEAD	MG/L	-	0.008	-	<0.002	-

Analytical Technologies, Inc.

METALS RESULTS

ATI I.D. : 103573

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

DATE RECEIVED : 03/06/91
REPORT DATE : 04/18/91

PARAMETER	UNITS	26	27	31
CALCIUM	MG/L	-	6.6	-
CHROMIUM	MG/L	0.038	-	<0.010
POTASSIUM	MG/L	-	3.6	-
MAGNESIUM	MG/L	-	1.9	-
SODIUM	MG/L	-	376	-
LEAD	MG/L	0.010	-	<0.002

Analytical Technologies, Inc.

METALS - QUALITY CONTROL

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

ATI I.D. : 103573

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CALCIUM	MG/L	10357602	80.9	80.8	0.1	133	50.0	104
CHROMIUM	MG/L	10357001	0.020	0.020	0	0.932	1.00	91
POTASSIUM	MG/L	10357602	3.6	3.5	3	56.4	50.0	106
MAGNESIUM	MG/L	10357602	48.5	48.3	0.4	74.2	25.0	103
SODIUM	MG/L	10357602	44.3	44.2	0.2	93.8	50.0	99
LEAD	MG/L	10357321	<0.002	<0.002	NA	0.039	0.050	78
LEAD	MG/L	10357331	<0.002	<0.002	NA	0.056	0.050	112

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

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

Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 10357301

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	DATE SAMPLED	: 03/05/91
PROJECT #	: (NONE)	DATE RECEIVED	: 03/06/91
PROJECT NAME	: (NONE)	DATE EXTRACTED	: N/A
CLIENT I.D.	: SMW-1	DATE ANALYZED	: 03/11/91
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)	<2
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 (%)	95
BROMOFLUOROBENZENE (%)	116
TOLUENE-D8 (%)	101

Analytical Technologies, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 10357321

COMPOUNDS	RESULTS
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 10357306

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	DATE SAMPLED	: 03/05/91
PROJECT #	: (NONE)	DATE RECEIVED	: 03/06/91
PROJECT NAME	: (NONE)	DATE EXTRACTED	: N/A
CLIENT I.D.	: SMW-2	DATE ANALYZED	: 03/11/91
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)	<2
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 (%)	116
TOLUENE-D8 (%)	93

Analytical Technologies, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 10357311

COMPOUNDS	RESULTS
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 10357311

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	DATE SAMPLED	: 03/05/91
PROJECT #	: (NONE)	DATE RECEIVED	: 03/06/91
PROJECT NAME	: (NONE)	DATE EXTRACTED	: N/A
CLIENT I.D.	: SMW-3	DATE ANALYZED	: 03/11/91
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)	<2
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 (%)	94
BROMOFLUOROBENZENE (%)	88
TOLUENE-D8 (%)	113

Analytical Technologies, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 10357316

COMPOUNDS	RESULTS
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 10357316

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	DATE SAMPLED	: 03/05/91
PROJECT #	: (NONE)	DATE RECEIVED	: 03/06/91
PROJECT NAME	: (NONE)	DATE EXTRACTED	: N/A
CLIENT I.D.	: SMW-4	DATE ANALYZED	: 03/11/91
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)	<2
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 (%)	88
BROMOFLUOROBENZENE (%)	117
TOLUENE-D8 (%)	97

Analytical Technologies, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 10357301

COMPOUNDS	RESULTS
SULFONATED HYDROCARBON C6	400
UNKNOWN DIOL	700
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 10357321

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	DATE SAMPLED	: 03/05/91
PROJECT #	: (NONE)	DATE RECEIVED	: 03/06/91
PROJECT NAME	: (NONE)	DATE EXTRACTED	: N/A
CLIENT I.D.	: SMW-5	DATE ANALYZED	: 03/11/91
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)	<2
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 (%)	88
BROMOFLUOROBENZENE (%)	117
TOLUENE-D8 (%)	103

Analytical Technologies, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 10357306

COMPOUNDS	RESULTS
SULFONATED HYDROCARBON C6	400
UNKNOWN DIOL	600
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 10357326

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	DATE SAMPLED	: 03/05/91
PROJECT #	: (NONE)	DATE RECEIVED	: 03/06/91
PROJECT NAME	: (NONE)	DATE EXTRACTED	: N/A
CLIENT I.D.	: SMW-6	DATE ANALYZED	: 03/11/91
SAMPLE MATRIX	: AQUEOUS	UNITS	: UG/L
		DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
CHLOROMETHANE	<10
BROMOMETHANE	<10
VINYL CHLORIDE	<1
CHLOROETHANE	<1
METHYLENE CHLORIDE	<5
ACETONE	15
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)	<2
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

NOTE: Acetone did not appear on ED split sample analysis

SURROGATE PERCENT RECOVERIES

1,2-DICHLOROETHANE-D4 (%)	94
BROMOFLUOROBENZENE (%)	116
TOLUENE-D8 (%)	101

Analytical Technologies, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 10357326

COMPOUNDS	RESULTS
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 10357331

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	DATE SAMPLED	: 03/05/91
PROJECT #	: (NONE)	DATE RECEIVED	: 03/06/91
PROJECT NAME	: (NONE)	DATE EXTRACTED	: N/A
CLIENT I.D.	: SMW EQUIP WASH	DATE ANALYZED	: 03/11/91
SAMPLE MATRIX	: AQUEOUS	UNITS	: UG/L
		DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
CHLOROMETHANE	<10
BROMOMETHANE	<10
VINYL CHLORIDE	<1
CHLOROETHANE	<1
METHYLENE CHLORIDE	<5
ACETONE	14
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)	<2
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 (%)	115
TOLUENE-D8 (%)	103

Analytical Technologies, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 10357331

COMPOUNDS	RESULTS
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 10357335

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	DATE SAMPLED	: 03/05/91
PROJECT #	: (NONE)	DATE RECEIVED	: 03/06/91
PROJECT NAME	: (NONE)	DATE EXTRACTED	: N/A
CLIENT I.D.	: TRIP BLANK	DATE ANALYZED	: 03/11/91
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)	<2
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 (%)	95
BROMOFLUOROBENZENE (%)	105
TOLUENE-D8 (%)	99

Analytical Technologies, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 10357335

COMPOUNDS	RESULTS
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

GCMS - RESULTS

REAGENT BLANK

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	ATI I.D.	: 103573
PROJECT #	: (NONE)	DATE EXTRACTED	: 03/11/91
PROJECT NAME	: (NONE)	DATE ANALYZED	: 03/11/91
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)	<2
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 (%)	107
TOLUENE-D8 (%)	103

Analytical Technologies, Inc.

GCMS - RESULTS

REAGENT BLANK

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO. ATI I.D : 103573

COMPOUNDS	RESULTS
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

QUALITY CONTROL DATA

ATI I.D. : 103573

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME : (NONE)
REF I.D. : 10399901

DATE ANALYZED : 03/11/91
SAMPLE MATRIX :
UNITS : UG/L

COMPOUNDS	SAMPLE RESULT	CONC. SPIKED	SPIKED SAMPLE	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
1,1-DICHLOROETHENE	<1	50	52	104	51	102	2
TRICHLOROETHENE	<1	50	53	106	47	94	12
CHLOROBENZENE	<1	50	52	104	51	102	2
TOLUENE	<1	50	56	112	56	112	0
BENZENE	<1	50	55	110	49	98	12

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

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

AnalyticalTechnologies,Inc.
Phoenix, Arizona

Chain of Custody

DATE 3-5-91 PAGE 1 OF 2

PROJECT MANAGER: Elizabeth Proffitt

COMPANY: Giant Refining Co
ADDRESS: Rt 3 Box 7
Gallup, N.M. 87301

BILL TO: Cland Rosendale
COMPANY:
ADDRESS: Same

Cland Rosendale
SAMPLERS: (Signature)

(505) 722-0217
PHONE NUMBER

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE (MOD 8015/8020)	BTXE (8020)	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	MTBE	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	TOC - 4 replicates	TOX - 4 replicates	Poll. Cond. - 4 replicates	SDWA Primary Standards	SDWA Secondary Standards	SDWA Volatiles (502.1/503.1)	TDS Alk Cl SO4	~~The 13 Priority Pollutant~~ Metals Total	The 8 EP Tox Metals ~~by EP Tox~~ Prep. (1310)	~~The 8 EP Tox Metals by Total Digestion~~	~~The 8 EP Tox Metals~~ TCLP Metals Dissolved			NUMBER OF CONTAINERS
SMW-1 250ml Amber Sulfuric	3-5	0820	Water													X													4
250ml Amber Sulfuric																	X												4
250ml plastic																		X											4
1 L. Plastic																						X							1
1 L Plastic																							X						1
1 L. Plastic																										X			1
40ml VOA															X														2

PROJECT INFORMATION	
PROJECT NO.: —	
PROJECT NAME: —	
P.O. NO.: 01413	
VIA: Fed Ex	
TAT: ☐ 24HR ☐ 48 HRS ☐ 1 WK ☐ 2 WKS	

SAMPLE RECEIPT	
TOTAL NO. OF CONTAINERS	17
CHAIN OF CUSTODY SEALS	Y
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	103513

SAMPLE DISPOSAL INSTRUCTIONS
☒ ATI Disposal ☐ Return ☐ Pickup (will call)

Comments: See attached for specific parameter detail

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Cland Rosendale Time: 2:15pm	Signature: Time:	Signature: Time:
Printed Name: C Rosendale Date 3-5-91	Printed Name: Date	Printed Name: Date
Company: Giant	Company: —	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: (LAB) 3.**
Signature: Time:	Signature: Time:	Signature: Time:
Printed Name: Date:	Printed Name: Date:	Printed Name: Date:
Company:	Company:	Analytical Technologies, Inc. 3/6/91

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AnalyticalTechnologies, Inc.
Phoenix, Arizona

Chain of Custody

DATE 3-5-91 PAGE 2 OF 7

PROJECT MANAGER: Elizabeth Proffitt

COMPANY: Giant Refining Co.
ADDRESS: Rt 3 Box 7
Gallup, NM 87301

BILL TO: Claud Rosendale
COMPANY:
ADDRESS: Same

Claud Rosendale
SAMPLERS: (Signature)

(505) 722-0217
PHONE NUMBER

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE (MOD 8015/8020)	BTXE (8020)	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	MTBE	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	TOC-4 replicates	TOX-4 replicates	all Lead - 4 replicates each	SDWA Primary Standards	SDWA Secondary Standards	SDWA Volatiles (502.1/503.1)	TDS, Alk, Cl, SO4	~~The 13 Priority Pollutant Metals~~ Total	The 8 EP Tox Metals by EP Tox Prep. (1310)	The 8 EP Tox Metals by Total Digestion	~~The 8 EP Tox Metals by TCLP~~ Dissolved	NUMBER OF CONTAINERS
SMW-2 250ml Baker Sulfuric	3-5	1930	Water													X											4
250ml Baker Sulfuric																	X										4
250ml Plastic																		X									4
1 L. Plastic																						X					1
1 L. Plastic																							X		~~X~~		1
1 L. Plastic																									X		1
40ml VOA															X												2

PROJECT INFORMATION	
PROJECT NO.: —	
PROJECT NAME: —	
P.O. NO.: 01413	
VIA: Fed Ex	
TAT: ☐ 24HR ☐ 48 HRS ☐ 1 WK ☐ 2 WKS	

SAMPLE RECEIPT	
TOTAL NO. OF CONTAINERS	17
CHAIN OF CUSTODY SEALS	Y
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	10557

SAMPLE DISPOSAL INSTRUCTIONS

☒ ATI Disposal ☐ Return ☐ Pickup (will call)

Comments: See attached for specific parameter detail.

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Claud Rosendale Time: 3:15	Signature: Time:	Signature: Time:
Printed Name: Claud Rosendale Date 3-5	Printed Name: Date	Printed Name: Date
Company: Giant	Company:	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: (LAB) 3.**
Signature: Time:	Signature: Time:	Signature: Time:
Printed Name: Date:	Printed Name: Date:	Printed Name: Date:
Company:	Company:	Analytical Technologies, Inc. 3/6/91

AnalyticalTechnologies, Inc.
Phoenix, Arizona

Chain of Custody

DATE 3-5-91 PAGE 3 OF 7

PROJECT MANAGER: Elizabeth Proffitt

COMPANY: Giant Refining Co.
ADDRESS: Rt 3 Box 7
Gallup, NM 87301

BILL TO: Carol Rosendale
COMPANY: Same
ADDRESS:

Carol Rosendale
SAMPLERS: (Signature)

(505) 722-0217
PHONE NUMBER

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE (MOD 8015/8020)	BTXE (8020)	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	MTBE	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	TOC-4 replicates	TOX-4 replicates	pH, Cond, Alkalinity each	SDWA Primary Standards	SDWA Secondary Standards	SDWA Volatiles (502.1/503.1)	TDS, Alk, Cl, SO4	The 10 Priority Pollutant Metals Total	The 8 EP Tox Metals by EP Tox Prep. (1310)	The 8 EP Tox Metals by Total Digestion	The 8 EP Tox Metals by EPA Dissolved	NUMBER OF CONTAINERS
SMW-3 250ml Amber Sulfuric	3-5-91	10:30	water													X											4
250ml Amber Sulfuric																	X										~~4~~ 4
250ml plastic																		X									~~4~~ 3
1 L Plastic																						X					1
1 L Plastic																							X				1
1 L Plastic																									X		1
40ml VOA															X												2

PROJECT INFORMATION	
PROJECT NO.: —	
PROJECT NAME: —	
P.O. NO.: 01413	
VIA: Fed Ex	
TAT: ☐ 24HR ☐ 48 HRS ☐ 1 WK ☐ 2 WKS	

SAMPLE RECEIPT	
TOTAL NO. OF CONTAINERS	15
CHAIN OF CUSTODY SEALS	N
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	103573

SAMPLE DISPOSAL INSTRUCTIONS
☒ ATI Disposal ☐ Return ☐ Pickup (will call)

Comments:
See attached for specific parameter details, TOX, pH, Cond. + Inorganics Lab

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: 2:15 Time:	Signature: Time:	Signature: Time:
Printed Name: Carol Rosendale Date 3-5-91	Printed Name: Date	Printed Name: Date
Company: Giant	Company:	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: (LAB) 3.**
Signature: Time:	Signature: Time:	Signature: Time:
Printed Name: Date:	Printed Name: Date:	Printed Name: Date:
Company:	Company:	Analytical Technologies, Inc. 3/5/91

ATI Labs: San Diego (619)458-9141 • Phoenix (602)438-1530 • Seattle (206)228-8335 • Pensacola (904)474-1001

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Phoenix, Arizona

Chain of Custody

DATE 3-5-91 PAGE 4 OF 7

PROJECT MANAGER: Elizabeth Proffitt

COMPANY: Giant Refining Co.
ADDRESS: Rt 3 Box 7
Gallup, NM 87301

BILL TO: Clay Rosendale
COMPANY:
ADDRESS: Same

SAMPLERS: (Signature) — PHONE NUMBER: (505)722-0217

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE (MOD 8015/8020)	BTXE (8020)	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	MTBE	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	SDWA Primary Standards	SDWA Secondary Standards	SDWA Volatiles (502.1/503.1)	TDS Alk Cl SO4	The 8 EP Tox Metals by Total Digestion	The 8 EP Tox Metals by TCLP (1311)	NUMBER OF CONTAINERS
SMW-4 250 ml Amber Sterile	3-5-91	11:15	Water												TOC-4 replicates							4
250 ml Amber Sterile															TOX-4 replicates							4
250 ml Plastic															all Cat-4 replicates each							4
1 L Plastic																			X			1
1 L Plastic																				X		1
1 L Plastic																					X	1
40 ml VOC															X							2

PROJECT INFORMATION	
PROJECT NO.: —	
PROJECT NAME: —	
P.O. NO.: 01413	
VIA: Fed EX	
TAT: ☐ 24HR ☐ 48 HRS ☐ 1 WK ☐ 2 WKS	

SAMPLE RECEIPT	
TOTAL NO. OF CONTAINERS	17
CHAIN OF CUSTODY SEALS	Y
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	103573

SAMPLE DISPOSAL INSTRUCTIONS
☒ ATI Disposal ☐ Return ☐ Pickup (will call)

Comments:
See attached for specific parameter detail.

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: [signature] Time: 2:15	Signature: Time:	Signature: Time:
Printed Name: Clay Rosendale Date 03-5-91	Printed Name: Date	Printed Name: Date
Company: Giant	Company:	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: (LAB) 3.**
Signature: Time:	Signature: Time:	Signature: Time:
Printed Name: Date:	Printed Name: Date:	Printed Name: Date: [signature]
Company:	Company:	Analytical Technologies, Inc. 3/6/91

ATI Labs: San Diego (619)458-9141 • Phoenix (602)438-1530 • Seattle (206)228-8335 • Pensacola (904)474-1001 DISTRIBUTION: White, Canary - ANALYTICAL TECHNOLOGIES, INC. • Pink - ORIGINATOR

AnalyticalTechnologies,Inc.
Phoenix, Arizona

Chain of Custody

DATE 3-5-91 PAGE 5 OF 7

PROJECT MANAGER: Elizabeth Proffitt

COMPANY: Giant Refining Co.
ADDRESS: Rt 3 Box 7
Gallup N.M. 87301

BILL TO: Claud Rosendale
COMPANY:
ADDRESS: Same

Claud Rosendale
SAMPLERS: (Signature)

505 722-0217
PHONE NUMBER

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE (MOD 8015/8020)	BTXE (8020)	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	MTBE	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	TAC - 4 regular 5	TEX - 4 regular 5	Pit Cond - 4 regular 5 each	SDWA Primary Standards	SDWA Secondary Standards	SDWA Volatiles (502.1/503.1)	TDS, Alk, Cl, SO4	Total Priority Pollutant Metals	The 8 EP Tox Metals by EP Tox Prep. (1310)	The 8 EP Tox Metals by Total Digestion	The 8 EP Tox Metals by TCLP	17.550 lined		NUMBER OF CONTAINERS
SMW-5 250 ml Amber Glass	3-5-91	12:45	Water													X													4
250 ml Amber Glass	/																X												4
250 ml plastic	/																	X											4
1 L Plastic	/																					X							1
1 L Plastic	/																						X						1
1 L Plastic	/																									X			1
40 ml VOA	/														X														2

PROJECT INFORMATION	
PROJECT NO.: —	
PROJECT NAME: —	
P.O. NO.: 01413	
VIA: Fed Ex	
TAT: ☐ 24HR ☐ 48 HRS ☐ 1 WK ☐ 2 WKS	

SAMPLE RECEIPT	
TOTAL NO. OF CONTAINERS	7
CHAIN OF CUSTODY SEALS	N
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	103573

SAMPLE DISPOSAL INSTRUCTIONS
☒ ATI Disposal ☐ Return ☐ Pickup (will call)

Comments: See Attached for specific parameter detail.

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Time: 2:15	Signature: Time:	Signature: Time:
Printed Name: Date 3-5-91	Printed Name: Date	Printed Name: Date
Company: Giant	Company:	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: (LAB) 3.**
Signature: Time:	Signature: Time:	Signature: Time: 1:15
Printed Name: Date:	Printed Name: Date:	Printed Name: Date: 3/6/91
Company:	Company:	Analytical Technologies, Inc.

ATI Labs: San Diego (619)458-9141 • Phoenix (602)438-1530 • Seattle (206)228-8335 • Pensacola (904)474-1001 DISTRIBUTION: White, Canary - ANALYTICAL TECHNOLOGIES, INC. • Pink - ORIGINATOR

Analytical Technologies, Inc.
Phoenix, Arizona

Chain of Custody

DATE 3-5-91 / PAGE 6 OF 7

PROJECT MANAGER: Elizabeth Proffitt

COMPANY: Giant Refining Co.
ADDRESS: Rt. 3 Box 7
Gallup, N.M. 87301

BILL TO: Claud Rosendale
COMPANY:
ADDRESS: Same

Claud Rosendale
SAMPLERS: (Signature)

(505) 722-0217
PHONE NUMBER

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE (MOD 8015/8020)	BTXE (8020)	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	MTBE	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	TOC-4 replicates	TOX-4 replicates	Alkalinity-4 replicates each	SDWA Primary Standards	SDWA Secondary Standards	SDWA Volatiles (502.1/503.1)	TDS, Alk, Cl, SO4	~~The 12 Priority Pollutant~~ Metals Jars	The 8 EP Tox Metals by EP Tox Prep. (1310)	The 8 EP Tox Metals by Total Digestion	~~The 8 EP Tox Metals by TCLP~~ Dissolved	NUMBER OF CONTAINERS
SMW-6 250ml Amber Sulfuric	3-5	1:00	Water													X											4
250ml Amber Sulfuric																	X										4
250ml Plastic																		X									4
1L Plastic																						X					1
1L Plastic																							X				1
1L Plastic																									X		1
40ml VOA															X												2

PROJECT INFORMATION	
PROJECT NO.: —	
PROJECT NAME: —	
P.O. NO.: 01413	
VIA: Fed. Ex	
TAT: ☐ 24HR ☐ 48 HRS ☐ 1 WK ☐ 2 WKS	

SAMPLE RECEIPT	
TOTAL NO. OF CONTAINERS	17
CHAIN OF CUSTODY SEALS	Y
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	103573

SAMPLE DISPOSAL INSTRUCTIONS
☒ ATI Disposal ☐ Return ☐ Pickup (will call)

Comments:
See attached for specific parameter detail.

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Time: 2:15	Signature: Time:	Signature: Time:
Printed Name: Date 3-5	Printed Name: Date	Printed Name: Date
Company: Giant	Company:	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: (LAB) 3.**
Signature: Time:	Signature: Time:	Signature: Time: 1115
Printed Name: Date:	Printed Name: Date:	Printed Name: Date:
Company:	Company:	Analytical Technologies, Inc. 3/6/91

ATI Labs: San Diego (619)458-9141 • Phoenix (602)438-1530 • Seattle (206)228-8335 • Pensacola (904)474-1001

DISTRIBUTION: White, Canary - ANALYTICAL TECHNOLOGIES, INC. • Pink - COORDINATOR

AnalyticalTechnologies,Inc.
Phoenix, Arizona

Chain of Custody

DATE 3-5-91 PAGE 2 OF 2

PROJECT MANAGER: Elizabeth Proffitt

COMPANY: Giant Refining Co.
ADDRESS: Rt 3 Box 7
Gallup N.M. 87301

BILL TO: Claud Rosendale
COMPANY:
ADDRESS: Same

Claud Rosendale
SAMPLERS: (Signature)

(505) 722-0217
PHONE NUMBER

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE (MOD 8015/8020)	BTXE (8020)	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	MTBE	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	TOC	TOX	oil and grease	SDWA Primary Standards	SDWA Secondary Standards	SDWA Volatiles (502.1/503.1)	TDS, Alk, Cl, SO4	~~The 13 Priority Pollutant Metals~~ Fe,	The 8 EP Tox Metals by EP Tox Prep. (1310)	The 8 EP Tox Metals by Total Digestion	~~The 8 EP Tox Metals by TCLP~~ Cl, SO4			NUMBER OF CONTAINERS
SAM Equipment Wash	3-5	0920	Water													X													4
																	X												4
																		X											4
																						X							1
																							X						1
																									~~X~~				~~1~~
															X														2
															X														2
TRIP BLANKS																													

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJECT NO.: —		TOTAL NO. OF CONTAINERS	15
PROJECT NAME: —		CHAIN OF CUSTODY SEALS	N
P.O. NO.: 01413		INTACT?	Y
VIA: Fed Ex.		RECEIVED GOOD COND./COLD	Y
TAT: ☐ 24HR ☐ 48 HRS ☐ 1 WK ☐ 2 WKS		LAB NUMBER	103573

SAMPLE DISPOSAL INSTRUCTIONS
☒ ATI Disposal ☐ Return ☐ Pickup (will call)

Comments: See attached for specific parameter detail.

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Time: 2:15	Signature: Time:	Signature: Time:
Printed Name: Date 3-5	Printed Name: Date	Printed Name: Date
Company: Giant	Company:	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: (LAB) 3.**
Signature: Time:	Signature: Time:	Signature: Time: 1115
Printed Name: Date:	Printed Name: Date:	Printed Name: Date:
Company:	Company:	Analytical Technologies, Inc. 3/6/91

ATI Labs: San Diego (619)458-9141 • Phoenix (602)438-1530 • Seattle (206)228-8335 • Pensacola (904)474-1001 DISTRIBUTION: White, Canary - ANALYTICAL TECHNOLOGIES, INC. Pink - ORIGINATOR

AnalyticalTechnologies,Inc.
Phoenix, Arizona

Chain of Custody

DATE 3-6 PAGE 1 OF 1

PROJECT MANAGER: Elizabeth Proffitt

COMPANY: Giant
ADDRESS: Rt 3 Box 7
Gallup

BILL TO:
COMPANY: Same
ADDRESS:

SAMPLERS: (Signature)
PHONE NUMBER ( ) -

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE (MOD 8015/8020)	BTXE (8020)	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	MTBE	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	Tox	all Cyn	TDS, Cl, SO4	SDWA Primary Standards	SDWA Secondary Standards	SDWA Volatiles (502.1/503.1)	The 13 Priority Pollutant Metals	The 8 EP Tox Metals by EP Tox Prep. (1310)	The 8 EP Tox Metals by Total Digestion	The 8 EP Tox Metals by TCLP	NUMBER OF CONTAINERS
SMW3	3-6	12:45	Water	15												X										1
				15													X									1
				11														X								1

PROJECT INFORMATION	
PROJECT NO.:	
PROJECT NAME:	
P.O. NO.:	
VIA:	
TAT: ☐ 24HR ☐ 48 HRS ☐ 1 WK ☐ 2 WKS	

SAMPLE RECEIPT	
TOTAL NO. OF CONTAINERS	3
CHAIN OF CUSTODY SEALS	Y
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	103573

SAMPLE DISPOSAL INSTRUCTIONS
☐ ATI Disposal ☐ Return ☐ Pickup (will call)

Comments:

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Time: 12:45	Signature: Time:	Signature: Time:
Printed Name: Date 3-6-91	Printed Name: Date	Printed Name: Date
Company:	Company:	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: (LAB) 3.**
Signature: Time:	Signature: Time:	Signature: Time: 10:50
Printed Name: Date:	Printed Name: Date:	Printed Name: Date: Linda Eshelman 3/7/91
Company:	Company:	Analytical Technologies, Inc.

ATI Labs: San Diego (619)458-9141 • Phoenix (602)438-1530 • Seattle (206)228-8335 • Pensacola (904)474-1001 DISTRIBUTION: White, Canary - ANALYTICAL TECHNOLOGIES, INC.• Pink - COORDINATOR

TABLE 1 - GROUNDWATER SAMPLING SCHEDULE
ANNUAL PARAMETERS (MARCH OR APRIL)

WELL #/PARAM	pH	CONDUCT	TOC*	TOX*	TDS	ALKAL. BICARB.	ALKAL. CARB.	CHLORIDE	SULFATE	PHENOL	TCL-VOL ORG(8240)	VOA-BTEX 8020	TOTAL METALS Cr	Pb	Hg	DISSOLVED METALS As	Ba	Cd	Ca	Hg	Mn	K	Se	Ag	Na
MW-1	X	X	X	X	X	X	X	X	X	X	X+		X	X	X	X	X	X	X	X	X	X	X	X	X
MW-2	X	X	X	X	X	X	X	X	X	X	X+		X	X	X	X	X	X	X	X	X	X	X	X	X
MW-4	X	X	X	X	X	X	X	X	X	X	X+		X	X	X	X	X	X	X	X	X	X	X	X	X
MW-5	X	X	X	X	X	X	X	X	X	X	X+		X	X	X	X	X	X	X	X	X	X	X	X	X
OW-11	X	X	X	X	X	X	X	X	X	X	X+		X	X	X	X	X	X	X	X	X	X	X	X	X
OW-1	X	X			X	X	X	X	X			X							X	X		X			X
OW-2	X	X			X	X	X	X	X			X							X	X		X			X
OW-3	X	X			X	X	X	X	X			X							X	X		X			X
SMW-1	X	X	X	X	X	X	X	X	X		X		X	X					X	X		X			X
SMW-2	X	X	X	X	X	X	X	X	X		X		X	X					X	X		X			X
SMW-3	X	X	X	X	X	X	X	X	X		X		X	X					X	X		X			X
SMW-4	X	X	X	X	X	X	X	X	X		X		X	X					X	X		X			X
SMW-5	X	X	X	X	X	X	X	X	X		X		X	X					X	X		X			X
SMW-6	X	X	X	X	X	X	X	X	X		X		X	X					X	X		X			X

SEMI-ANNUAL PARAMETERS (SEPT. OR OCT.)

	pH*	COND*	TOC*	TOX*	TOTAL METALS Cr	Pb	TCL-VOL ORG(8240)
MW-1	X	X	X	X	X	X	X
MW-2	X	X	X	X	X	X	X
MW-4	X	X	X	X	X	X	X
MW-5	X	X	X	X	X	X	X
OW-11	X	X	X	X	X	X	X
SMW-1	X	X	X	X	X	X	X
SMW-2	X	X	X	X	X	X	X
SMW-3	X	X	X	X	X	X	X
SMW-4	X	X	X	X	X	X	X
SMW-5	X	X	X	X	X	X	X
SMW-6	X	X	X	X	X	X	X

* 4 REPLICATES
\+ 2 REPLICATES

Waste Waters

API Effluent
1. BOD
2. COD
3. TOC
4. TDS

Aerated Lagoon Effluent
1. pH
2. BOD
3. COD
4. TOC
5. TDS
6. Sulfide (total)
7. Metals - (As, Cd, Cr, Pb, Hg, Ni, Se)
8. Oil + Grease
9. 8240 (Attached)
10. 8270 (Attached)

TABLE-4

RECOMMENDED ANALYTICAL METHODS

Parameter	Method
pH (Liquid)	221, 9040
Specific Conductance	120.1
Total Organic Carbon (TOC) 4 replicates	505, 9060
Total Organic Halogen (TOX) 4 replicates	9020
Total Dissolved Solids (TDS)	160.1
Alkalinity as Bicarbonate	310.1
Alkalinity as Carbonate	310.1
Chloride	300.0
Sulfate	300.0
Phenol	420.1, 9065
Metals	-
Arsenic	303E, 206.2,7060
Barium	303A, 200.7, 6010
Cadmium	200.7, 6010
Calcium D	200.7, 6010
Chromium T	303A, 200.7, 6010
Lead T	303A, 239.2, 7421
Magnesium D	200.7, 6010
Manganese	200.7, 6010
Mercury	245.1, 7470
Potassium D	200.7, 6010
Selenium	270.2, 7740
Silver	200.7, 6010
Sodium D	200.7, 6010
Oil & Grease	413.1, 9071
pH (Solid)	9045
Carbon	9060
Nitrogen	353.2
Phosphorus	365.3
Total Solids (Solids)	160.3
VOA (BTEX) (Liquid & Solid)	8020
Benzene	-
Toluene	-
Ethyl benzene	-
Xylene (m, o & p)	-
TCL Volatile Organics (Liquids)	8240 ~~2 replicates for MW-1, MW-4, [illegible]~~
Chloromethane	-
Bromomethane	-
Vinyl chloride	-
Chloroethane	-
Methylene chloride	-
Acetone	-
Carbon disulfide	-
1,1 - Dichloroethene	-
1,1 - Dichloroethane	-
1,2 - Dichloroethene (cis/trans)	-

	-	
Chloroform	-	
1,2-Dichloroethane	-	
2-Butanone	-	
1,1,1-Trichloroethane	-	
Carbon tetrachloride	-	
Vinyl acetate	-	
Bromodichloromethane	-	
1,2 - Dichloropropane	-	
trans-1,3-Dichloropropene	-	
Trichloroethene	-	
Chlorodibromomethane	-	
1,1,2-Trichloroethane	-	
Benzene	-	
cis-1,3-Dichloropropene	-	
2-Chloroethyl vinyl ether	-	
Bromoform	-	
4-Methyl-2-pentanone	-	
2-Hexanone	-	
1,1,2,2,-Tetrachloroethane	-	
Tetrachloroethene	-	
Toluene	-	
Chlorobenzene	-	
Ethyl benzene	-	
Styrene	-	
Xylenes (total)	-	
1,1,2 Trichloro-1,2,2-trifluorethane	-	
1,2-Dibromomethane	-	
1,2-Dichlorobenzene	-	
1,3-Dichlorobenzene	-	
1,4-Dichlorobenzene	-	
Refinery Hazardous Const. Semivolatiles (Solids)		8270
Benzo(a)pyrene	-	
Chrysene	-	
1-Methylnaphthalene	-	
Phenanthrene	-	
Pyrene	-	
o-Cresol	-	
m & p Cresol		

Analytical Technologies, Inc. 9830 S. 51st Street Suite B-113 Phoenix, AZ 85044 (602) 496-4400

MW-1, MW-4, OW-11
3-6-91

March 91 - CME
GRC's data

ATI I.D. 103598

April 18, 1991

— See June 5, 1991 analytical/statistical calculations
— HRMB data in 1991 CME

Giant Refining Company
Route 3, P.O. Box 7
Gallup, NM 87301

Project Name/Number: None Given

Attention: Claud Rosendale

On 03/07/91, Analytical Technologies, Inc. received a request to analyze aqueous sample(s). The sample(s) 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.

TOC, TOX analyses were performed by ATI, San Diego. Samples 103598-01 and -02, 103598-06 and -07, as well as 103598-11 and -12 are replicates for EPA Method 8240. Total metals results are reported under ATI ID number -01, -06, -11, and -16. Dissolved metals results are reported under ATI ID numbers -02, -07, -12, and -17.

If you have any questions or comments, please do not hesitate to contact us at (602)496-4400.

Elizabeth Proffitt
Senior Project Manager

Robert V. Woods
Laboratory Manager

Lorraine Davis
QA Coordinator

RVW:dkm
Enclosure

Analytical Technologies, Inc.

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

DATE RECEIVED : 03/07/91
REPORT DATE : 04/10/91

ATI I.D. : 103598

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	MW-1/MW-1-2	AQUEOUS	03/06/91
02	MW-1/MW-1-1	AQUEOUS	03/06/91
03	MW-1	AQUEOUS	03/06/91
04	MW-1	AQUEOUS	03/06/91
05	MW-1	AQUEOUS	03/06/91
06	MW-4/MW-4-2	AQUEOUS	03/06/91
07	MW-4/MW-4-1	AQUEOUS	03/06/91
08	MW-4	AQUEOUS	03/06/91
09	MW-4	AQUEOUS	03/06/91
10	MW-4	AQUEOUS	03/06/91
11	OW-11/OW-11-1	AQUEOUS	03/06/91
12	OW-11/OW-11-2	AQUEOUS	03/06/91
13	OW-11	AQUEOUS	03/06/91
14	OW-11	AQUEOUS	03/06/91
15	OW-11	AQUEOUS	03/06/91
16	EQUIPMENT WASH/EQUIP WASH-2	AQUEOUS	03/06/91
17	EQUIPMENT WASH	AQUEOUS	03/06/91
18	EQUIPMENT WASH	AQUEOUS	03/06/91
19	EQUIPMENT WASH	AQUEOUS	03/06/91
20	TRIP BLANK	AQUEOUS	03/06/91

----- TOTALS -----

MATRIX	# SAMPLES
AQUEOUS	20

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. : 103598

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

DATE RECEIVED : 03/07/91
REPORT DATE : 04/10/91

PARAMETER	UNITS	01	03	04	05	06
CARBONATE (CACO3)	MG/L	48	-	-	-	28
BICARBONATE (CACO3)	MG/L	304	-	-	-	428
HYDROXIDE (CACO3)	MG/L	<1	-	-	-	<1
TOTAL ALKALINITY (AS CACO3)	MG/L	352	-	-	-	456
CHLORIDE	MG/L	51	-	-	-	19
CONDUCTIVITY, (UMHOS/CM)		1080	1110	1090	1110	1150
PH	UNITS	8.92	8.92	8.94	8.94	8.65
PHENOLICS, TOTAL	MG/L	<0.02	-	-	-	<0.02
SULFATE	MG/L	160	-	-	-	150
TOTAL DISSOLVED SOLIDS	MG/L	710	-	-	-	740
TOTAL ORGANIC CARBON	MG/L	1.9	0.8	0.6	0.7	0.5
TOTAL ORGANIC HALIDE	MG/L	<0.008	<0.008	<0.008	<0.008	<0.008

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 103598

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

DATE RECEIVED : 03/07/91
REPORT DATE : 04/10/91

PARAMETER	UNITS	08	09	10	11 (MW11)	13
CARBONATE (CACO3)	MG/L	-	-	-	<1	-
BICARBONATE (CACO3)	MG/L	-	-	-	456	-
HYDROXIDE (CACO3)	MG/L	-	-	-	<1	-
TOTAL ALKALINITY (AS CACO3)	MG/L	-	-	-	456	-
CHLORIDE	MG/L	-	-	-	140	-
CONDUCTIVITY, (UMHOS/CM)		1130	1150	1100	1760	1760
PH	UNITS	8.69	8.69	8.69	8.3	8.18
PHENOLICS, TOTAL	MG/L	-	-	-	<0.02	-
SULFATE	MG/L	-	-	-	200	-
TOTAL DISSOLVED SOLIDS	MG/L	-	-	-	1100	-
TOTAL ORGANIC CARBON	MG/L	1.5	0.9	0.6	5.9	5.1
TOTAL ORGANIC HALIDE	MG/L	<0.008	<0.008	<0.008	0.013	0.015

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 103598

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

DATE RECEIVED : 03/07/91
REPORT DATE : 04/10/91

GWII

PARAMETER	UNITS	14	15	16	18	19
CARBONATE (CACO3)	MG/L	-	-	<1	-	-
BICARBONATE (CACO3)	MG/L	-	-	5	-	-
HYDROXIDE (CACO3)	MG/L	-	-	<1	-	-
TOTAL ALKALINITY (AS CACO3)	MG/L	-	-	5	-	-
CHLORIDE	MG/L	-	-	<0.5	-	-
CONDUCTIVITY, (UMHOS/CM)		1700	1720	1.49	1.63	1.51
PH	UNITS	8.14	8.07	5.66	5.92	5.65
PHENOLICS, TOTAL	MG/L	-	-	<0.02	-	-
SULFATE	MG/L	-	-	<0.3	-	-
TOTAL DISSOLVED SOLIDS	MG/L	-	-	10	-	-
TOTAL ORGANIC CARBON	MG/L	5.7	5.5	0.5	0.5	<0.5
TOTAL ORGANIC HALIDE	MG/L	0.011	0.010	<0.008	<0.008	<0.008

Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

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

ATI I.D. : 103598

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CARBONATE	MG/L	10371505	<1	<1	NA	NA	NA	NA
BICARBONATE	MG/L		17	17	0	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		17	17	0	NA	NA	NA
CARBONATE	MG/L	10357602	<1	<1	NA	NA	NA	NA
BICARBONATE	MG/L		150	154	3	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		150	154	3	NA	NA	NA
CARBONATE	MG/L	10365005	<1	<1	NA	NA	NA	NA
BICARBONATE	MG/L		2	2	0	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		2	2	0	NA	NA	NA
CHLORIDE	MG/L	10359816	<0.5	<0.5	NA	10.9	10.0	109
CONDUCTIVITY(UMHOS/CM)		10359813	1760	1750	0.6	NA	NA	NA
CONDUCTIVITY(UMHOS/CM)		10359819	1.51	1.51	0	NA	NA	NA
CONDUCTIVITY(UMHOS/CM)		10368901	2180	2160	0.9	NA	NA	NA
PH	UNITS	10359816	5.7	5.7	0	NA	NA	NA
PH	UNITS	10357602	8.0	8.0	0	NA	NA	NA
PH	UNITS	10365005	5.1	5.1	0	NA	NA	NA
PH	UNITS	10357306	7.7	7.7	0	NA	NA	NA
PH	UNITS	10499905	8.4	8.4	0	NA	NA	NA
PHENOLICS, TOTAL	MG/L	10359816	<0.02	<0.02	NA	0.26	0.25	104
SULFATE	MG/L	10358401	31	32	3	63	31	103
SULFATE	MG/L	10361901	140	140	0	270	140	93
TOTAL DISSOLVED SOLIDS	MG/L	10357602	550	570	4	NA	NA	NA
TOTAL ORGANIC CARBON	MG/L	10359803	0.8	0.6	29	23.2	20.0	112
TOTAL ORGANIC CARBON	MG/L	10359811	5.9	5.1	15	26.6	20.0	104
TOTAL ORGANIC CARBON	MG/L	10499913	0.8	0.8	0	21.7	20.0	105
TOTAL ORGANIC HALIDE	MG/L	10359806	<0.008	<0.008	NA	0.17	0.20	85
TOTAL ORGANIC HALIDE	MG/L	10366006	<0.008	<0.008	NA	0.21	0.20	105

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

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

Analytical Technologies, Inc.

METALS RESULTS

ATI I.D. : 103598

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

DATE RECEIVED : 03/07/91
REPORT DATE : 04/10/91

PARAMETER	UNITS	01	02	06	07	11
SILVER	MG/L	-	<0.010	-	0.016	-
ARSENIC	MG/L	-	<0.005	-	<0.005	-
BARIUM	MG/L	-	<0.010	-	0.019	-
CALCIUM	MG/L	-	1.9	-	2.0	-
CADMIUM	MG/L	-	<0.005	-	<0.005	-
CHROMIUM	MG/L	<0.010	-	<0.010	-	<0.010
MERCURY	MG/L	<0.0002	-	<0.0002	-	<0.0002
POTASSIUM	MG/L	-	<1.0	-	<1.0	-
MAGNESIUM	MG/L	-	0.3	-	0.3	-
MANGANESE	MG/L	-	<0.010	-	0.010	-
SODIUM	MG/L	-	267	-	292	-
LEAD	MG/L	0.010	-	0.005	-	0.003
SELENIUM	MG/L	-	<0.005	-	<0.005	-

Analytical Technologies, Inc.

METALS RESULTS

ATI I.D. : 103598

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

DATE RECEIVED : 03/07/91
REPORT DATE : 04/10/91

PARAMETER	UNITS	12	16	17
SILVER	MG/L	0.028	-	<0.010
ARSENIC	MG/L	<0.005	-	<0.005
BARIUM	MG/L	0.023	-	<0.010
CALCIUM	MG/L	5.0	-	<0.1
CADMIUM	MG/L	<0.005	-	<0.005
CHROMIUM	MG/L	-	<0.010	-
MERCURY	MG/L	-	<0.0002	-
POTASSIUM	MG/L	1.4	-	<1.0
MAGNESIUM	MG/L	0.5	-	<0.1
MANGANESE	MG/L	<0.010	-	<0.010
SODIUM	MG/L	426	-	<0.1
LEAD	MG/L	-	<0.002	-
SELENIUM	MG/L	0.036	-	<0.005

Analytical Technologies, Inc.

METALS - QUALITY CONTROL

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

ATI I.D. : 103598

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
SILVER	MG/L	10359802	<0.010	<0.010	NA	0.095	0.100	95
ARSENIC	MG/L	10357001	<0.005	<0.005	NA	0.044	0.050	88
ARSENIC	MG/L	10359906	<0.005	<0.005	NA	0.053	0.050	106
BARIUM	MG/L	10359802	<0.010	<0.010	NA	0.110	0.100	110
CALCIUM	MG/L	10358301	204	203	0.5	260	50.0	112
CADMIUM	MG/L	10360801	<0.005	<0.005	NA	0.102	0.100	102
CHROMIUM	MG/L	10359816	<0.010	<0.010	NA	0.934	1.00	93
MERCURY	MG/L	10355601	<0.0002	<0.0002	NA	0.0047	0.0050	94
POTASSIUM	MG/L	10358301	8.7	8.7	0	60.5	50.0	104
MAGNESIUM	MG/L	10358301	191	190	0.5	413	200	111
MANGANESE	MG/L	10359802	<0.010	<0.010	NA	0.111	0.100	111
SODIUM	MG/L	10358301	223	220	1	275	50.0	104
LEAD	MG/L	10359806	0.005	0.003	50	0.048	0.050	86
SELENIUM	MG/L	10359802	<0.005	<0.005	NA	0.038	0.050	76

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

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

Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 10359801

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	DATE SAMPLED	: 03/06/91
PROJECT #	: (NONE)	DATE RECEIVED	: 03/07/91
PROJECT NAME	: (NONE)	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW-1/MW-1-2	DATE ANALYZED	: 03/14/91
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)	<2
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 (%)	100
BROMOFLUOROBENZENE (%)	108
TOLUENE-D8 (%)	91

Analytical Technologies, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 10359801

COMPOUNDS	RESULTS
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 10359802

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	DATE SAMPLED	: 03/06/91
PROJECT #	: (NONE)	DATE RECEIVED	: 03/07/91
PROJECT NAME	: (NONE)	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW-1/MW-1-1	DATE ANALYZED	: 03/14/91
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)	<2
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 (%)	89
BROMOFLUOROBENZENE (%)	96
TOLUENE-D8 (%)	104

Analytical Technologies, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 10359802

COMPOUNDS	RESULTS
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 10359806

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	DATE SAMPLED	: 03/06/91
PROJECT #	: (NONE)	DATE RECEIVED	: 03/07/91
PROJECT NAME	: (NONE)	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW-4/MW-4-2	DATE ANALYZED	: 03/14/91
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)	<2
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 (%)	88
BROMOFLUOROBENZENE (%)	107
TOLUENE-D8 (%)	93

Analytical Technologies, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 10359806

COMPOUNDS	RESULTS
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 10359807

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	DATE SAMPLED	: 03/06/91
PROJECT #	: (NONE)	DATE RECEIVED	: 03/07/91
PROJECT NAME	: (NONE)	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW-4/MW-4-1	DATE ANALYZED	: 03/14/91
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)	<2
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 (%)	99
TOLUENE-D8 (%)	92

Analytical Technologies, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 10359807

COMPOUNDS	RESULTS
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 10359811

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	DATE SAMPLED	: 03/06/91
PROJECT #	: (NONE)	DATE RECEIVED	: 03/07/91
PROJECT NAME	: (NONE)	DATE EXTRACTED	: N/A
CLIENT I.D.	: OW-11/OW-11-1	DATE ANALYZED	: 03/14/91
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)	<2
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 (%)	97
TOLUENE-D8 (%)	93

Analytical Technologies, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 10359811

COMPOUNDS	RESULTS
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 10359812

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	DATE SAMPLED	: 03/06/91
PROJECT #	: (NONE)	DATE RECEIVED	: 03/07/91
PROJECT NAME	: (NONE)	DATE EXTRACTED	: N/A
CLIENT I.D.	: OW-11/OW-11-2	DATE ANALYZED	: 03/14/91
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)	<2
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 (%)	85
BROMOFLUOROBENZENE (%)	95
TOLUENE-D8 (%)	93

Analytical Technologies, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 10359812

COMPOUNDS	RESULTS
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 10359816

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	DATE SAMPLED	: 03/06/91
PROJECT #	: (NONE)	DATE RECEIVED	: 03/07/91
PROJECT NAME	: (NONE)	DATE EXTRACTED	: N/A
CLIENT I.D.	: EQUIPMENT WASH/EQUIP WASH-2	DATE ANALYZED	: 03/14/91
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)	<2
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 (%)	89
BROMOFLUOROBENZENE (%)	101
TOLUENE-D8 (%)	98

Analytical Technologies, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 10359816

COMPOUNDS	RESULTS
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 10359820

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	DATE SAMPLED	: 03/06/91
PROJECT #	: (NONE)	DATE RECEIVED	: 03/07/91
PROJECT NAME	: (NONE)	DATE EXTRACTED	: N/A
CLIENT I.D.	: TRIP BLANK	DATE ANALYZED	: 03/14/91
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)	<2
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 (%)	80
TOLUENE-D8 (%)	104

Analytical Technologies, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 10359820

COMPOUNDS	RESULTS
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

GCMS - RESULTS

REAGENT BLANK

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	ATI I.D.	: 103598
PROJECT #	: (NONE)	DATE EXTRACTED	: 03/14/91
PROJECT NAME	: (NONE)	DATE ANALYZED	: 03/14/91
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)	<2
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 (%)	93
BROMOFLUOROBENZENE (%)	105
TOLUENE-D8 (%)	100

Analytical Technologies, Inc.

GCMS - RESULTS

REAGENT BLANK

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO. ATI I.D : 103598

COMPOUNDS	RESULTS
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

QUALITY CONTROL DATA

ATI I.D. : 103598

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME : (NONE)
REF I.D. : 10399923

DATE ANALYZED : 03/14/91
SAMPLE MATRIX :
UNITS : UG/L

COMPOUNDS	SAMPLE RESULT	CONC. SPIKED	SPIKED SAMPLE	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
1,1-DICHLOROETHENE	<1	50	49	98	49	98	0
TRICHLOROETHENE	<1	50	51	102	49	98	4
CHLOROBENZENE	<1	50	51	102	50	100	2
TOLUENE	<1	50	46	92	47	94	2
BENZENE	<1	50	51	102	49	98	4

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

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

AnalyticalTechnologies, Inc.
Phoenix, Arizona

Chain of Custody

DATE _____ PAGE 1 OF 8

PROJECT MANAGER: Elizabeth Proffitt

COMPANY: Giant Refining Co.
ADDRESS: Rt 3 Box 7
Gallup NM 87301

BILL TO: Clark Rosendale
COMPANY: Same
ADDRESS:

Clark Rosendale — SAMPLERS: (Signature)
(505) 722-0217 — PHONE NUMBER

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE (MOD 8015/8020)	BTXE (8020)	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	MTBE	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	TOX - 4 replicates	TOC - 4 replicates	pH, Cond - 4 replicates each	SDWA Primary Standards	SDWA Secondary Standards	SDWA Volatiles (502.1/503.1)	TDS, Alk, Cl, SO_4	~~The 10 Priority Pollutant~~ Metals Total	The 8 EP Tox Metals by EP Tox Prep. (1310)	The 8 EP Tox Metals by Total Digestion	~~The 8 EP Tox Metals by~~ Dissolved	Phenol	NUMBER OF CONTAINERS
MW-1 250ml			Water													X												4
250ml																	X											4
250ml																		X										4
1 L.																						X						1
1 L.																							X					1
1 L.																										X		1
1 L.																											X	1
-1 (40ml)															X													2
-2 (40ml)															X													2

PROJECT INFORMATION	
PROJECT NO.: —	
PROJECT NAME: —	
P.O. NO.: 01413	
VIA: FedEx.	
TAT: ☐ 24HR ☐ 48 HRS ☐ 1 WK ☐ 2 WKS	

SAMPLE RECEIPT	
TOTAL NO. OF CONTAINERS	20
CHAIN OF CUSTODY SEALS	Y
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER 103598	

SAMPLE DISPOSAL INSTRUCTIONS
☒ ATI Disposal ☐ Return ☐ Pickup (will call)

Comments: See attached for specific parameter detail.

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Clark Rosendale Time: 12:30	Signature: Time:	Signature: Time:
Printed Name: Clark Rosendale Date	Printed Name: Date	Printed Name: Date
Company: Giant Refining	Company:	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: (LAB) 3.**
Signature: Time:	Signature: Time:	Signature: Linda Eshelman Time: 11:00
Printed Name: Date:	Printed Name: Date:	Printed Name: Linda Eshelman Date: 3/7/91
Company:	Company:	Analytical Technologies, Inc.

AnalyticalTechnologies, Inc.
Phoenix, Arizona

Chain of Custody

DATE 3-6-91 PAGE 3 OF 2

PROJECT MANAGER: Elizabeth Proffitt

COMPANY: Giant Refining Co.
ADDRESS: Rt. 3 Box 7
Gallup, NM 87301

BILL TO: Cloud Rosendale
COMPANY:
ADDRESS: Same

Cloud Rosendale — SAMPLERS: (Signature)
505/722-0217 — PHONE NUMBER

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE (MOD 8015/8020)	BTXE (8020)	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	MTBE	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	TOC-4 replicates	TOX-4 replicates	oil and grease 4 replicates	SDWA Primary Standards	SDWA Secondary Standards	SDWA Volatiles (502.1/503.1)	TDS Alk Cl-SO4	~~The 13 Priority Pollutant~~ Metals 1	The 8 EP Tox Metals by EP Tox Prep. (1310)	The 8 EP Tox Metals by Total Digestion	~~The 8 EP Tox Metals by TCLP~~	Dissolved	Phenol		NUMBER OF CONTAINERS
MW-4 250 ml			Water													X														4
250 ml																	X													4
250 ml																		X												4
1 L																						X								1
1 L																							X							1
1 L																										X				1
1 L																											X			1
40 ml															X															2
40 ml															X															2

PROJECT INFORMATION	
PROJECT NO.: —	
PROJECT NAME: —	
P.O. NO.: 01413	
VIA: Fed Ex.	
TAT: ☐ 24HR ☐ 48 HRS ☐ 1 WK ☐ 2 WKS	

SAMPLE RECEIPT	
TOTAL NO. OF CONTAINERS	20
CHAIN OF CUSTODY SEALS	Y
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	103598

SAMPLE DISPOSAL INSTRUCTIONS
☒ ATI Disposal ☐ Return ☐ Pickup (will call)

Comments: See attached for specific parameter details.

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: [signature] Time: 12:30	Signature: Time:	Signature: Time:
Printed Name: C Rosendale Date 3-6-91	Printed Name: Date	Printed Name: Date
Company: Giant Refining	Company:	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: (LAB) 3.**
Signature: Time:	Signature: Time:	Signature: [signature] Time: 1:10
Printed Name: Date:	Printed Name: Date:	Printed Name: Linda Estelman Date: 3/7/91
Company:	Company:	Analytical Technologies, Inc.

ATI Labs: San Diego (619)458-9141 • Phoenix (602)438-1530 • Seattle (206)228-8335 • Pensacola (904)474-1001 DISTRIBUTION: White, Canary - ANALYTICAL TECHNOLOGIES, INC. • Pink - COORDINATOR

AnalyticalTechnologies, Inc.
Phoenix, Arizona

Chain of Custody

DATE 3-6 PAGE 5 OF 8

PROJECT MANAGER: Elizabeth Proffitt

COMPANY: Giant Refining Co.
ADDRESS: Rt 3 Box 7
Gallup, NM 87301

BILL TO: Claud Rosendale
COMPANY:
ADDRESS: Same

Claud Rosendale — SAMPLERS: (Signature)
(505) 722-0217 — PHONE NUMBER

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE (MOD 8015/8020)	BTXE (8020)	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	MTBE	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	TOC - 4 replicates	TOX - 4 replicates	All Cond - 4 replicates each	SDWA Primary Standards	SDWA Secondary Standards	SDWA Volatiles (502.1/503.1)	TDS, Alk, Cl, SO4	~~The 13 Priority Pollutant~~ Metals Total	The 8 EP Tox Metals by EP Tox Prep. (1310)	The 8 EP Tox Metals by Total Digestion	~~The 8 EP Tox Metals by TCLP~~	Phenol	Dissolved	NUMBER OF CONTAINERS
MW-11 250 ml			Water													X													4
750 ml																	X												4
250 ml																		X											4
1 L																						X							1
1 L																							X						1
1 L																										X			1
1 L																											X		1
-1 (40 ml)															X														2
-2 40 ml															X														2

PROJECT INFORMATION	
PROJECT NO.: —	
PROJECT NAME: —	
P.O. NO.: 01413	
VIA: Fed Ex	
TAT: ☐ 24HR ☐ 48 HRS ☐ 1 WK ☐ 2 WKS	

SAMPLE RECEIPT	
TOTAL NO. OF CONTAINERS	20
CHAIN OF CUSTODY SEALS	Y
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	L03598

SAMPLE DISPOSAL INSTRUCTIONS
☒ ATI Disposal ☐ Return ☐ Pickup (will call)

Comments:
See attached for specific parameter detail

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: [signature] Time: 11:30	Signature: Time:	Signature: Time:
Printed Name: C Rosendale Date: 03-6	Printed Name: Date	Printed Name: Date
Company: Giant Refining	Company:	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: (LAB) 3.**
Signature: Time:	Signature: Time:	Signature: [signature] Time: 11:15
Printed Name: Date:	Printed Name: Date:	Printed Name: Linda Eshelman Date: 3/7/9
Company:	Company:	Analytical Technologies, Inc.

ATI Labs: San Diego (619)458-9141 • Phoenix (602)438-1530 • Seattle (206)228-8335 • Pensacola (904)474-1001 DISTRIBUTION: White, Canary - ANALYTICAL TECHNOLOGIES, INC.• Pink - GENERATOR

AnalyticalTechnologies,Inc.
Phoenix, Arizona

Chain of Custody

DATE 3-6 PAGE 6 OF 8

PROJECT MANAGER: Elizabeth Proffitt

COMPANY: Giant Refining Co.
ADDRESS: Rt 3 Box 7
Gallup NM 87301

BILL TO: Chevron Rosendale
COMPANY:
ADDRESS: Farmington

SAMPLERS: (Signature)
PHONE NUMBER: 505 722-0217

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE (MOD 8015/8020)	BTXE (8020)	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	MTBE	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	TIC: Hydrocarbons	TOX: Hydrocarbons	oil and grease	SDWA Primary Standards	SDWA Secondary Standards	SDWA Volatiles (502.1/503.1)	TDS AK CL SO4	~~The 13 Priority Pollutant Metals~~ Total	The 8 EP Tox Metals by EP Tox Prep. (1310)	The 8 EP Tox Metals by Total Digestion	~~The 8 EP Tox Metals by TCLP~~ Dissolved	phenol	NUMBER OF CONTAINERS
Equipment Wash			Water													X												4
																	X											9
																		X										4
																						X						1
																							X					1
																									X			1
																										X		1
															X													2
															[redacted]													[redacted]

PROJECT INFORMATION	
PROJECT NO.: —	
PROJECT NAME: —	
P.O. NO.: 01413	
VIA: Fed Ex	
TAT: ☐ 24HR ☐ 48 HRS ☐ 1 WK ☐ 2 WKS	

SAMPLE RECEIPT	
TOTAL NO. OF CONTAINERS	20
CHAIN OF CUSTODY SEALS	Y
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	103598

SAMPLE DISPOSAL INSTRUCTIONS
☒ ATI Disposal ☐ Return ☐ Pickup (will call)

Comments:
See attached for specific parameter detail.

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Time:	Signature: Time:	Signature: Time:
Printed Name: Date	Printed Name: Date	Printed Name: Date
Company: Giant Refining	Company:	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: (LAB) 3.**
Signature: Time:	Signature: Time:	Signature: Linda Eshelman Time: 11:00
Printed Name: Date:	Printed Name: Date:	Printed Name: Linda Eshelman Date:
Company:	Company:	Analytical Technologies, Inc.

ATI Labs: San Diego (619)458-9141 • Phoenix (602)438-1530 • Seattle (206)228-8335 • Pensacola (904) [illegible]-1001 DISTRIBUTION: White, Canary - ANALYTICAL TECHNOLOGIES, INC.• Pink - C[illegible]NATOR

AnalyticalTechnologies,Inc.
Phoenix, Arizona

Chain of Custody

DATE 3-6 PAGE 8 OF 8

PROJECT MANAGER: Elizabeth Pfaffenberger

COMPANY: Giant Refining Co.
ADDRESS: Rt 3 Box 7
Gallup N.M. 87301

BILL TO: Cloud Rosendale
COMPANY:
ADDRESS: Same

Cloud Rosendale (505) 722-0217
SAMPLERS: (Signature) PHONE NUMBER

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE (MOD 8015/8020)	BTXE (8020)	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	MTBE	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	SDWA Primary Standards	SDWA Secondary Standards	SDWA Volatiles (502.1/503.1)	The 13 Priority Pollutant Metals	The 8 EP Tox Metals by EP Tox Prep. (1310)	The 8 EP Tox Metals by Total Digestion	The 8 EP Tox Metals by TCLP	NUMBER OF CONTAINERS
Trip Blank (MW)			Water																				

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJECT NO.: —		TOTAL NO. OF CONTAINERS	2
PROJECT NAME: —		CHAIN OF CUSTODY SEALS	N
P.O. NO.: 0413		INTACT?	Y
VIA: Fed Ex		RECEIVED GOOD COND./COLD	Y
TAT: ☐ 24HR ☐ 48 HRS ☐ 1 WK ☐ 2 WKS		LAB NUMBER	103598

SAMPLE DISPOSAL INSTRUCTIONS
☒ ATI Disposal ☐ Return ☐ Pickup (will call)

Comments:

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Cloud Rosendale Time: 12:30	Signature: Time:	Signature: Time:
Printed Name: Cloud Rosendale Date 3-6	Printed Name: Date	Printed Name: Date
Company: Cloud Rosendale	Company:	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: (LAB) 3.**
Signature: Time:	Signature: Time:	Signature: Linda Eshelman Time: 1100
Printed Name: Date:	Printed Name: Date:	Printed Name: Linda Eshelman Date: 3/7/91
Company:	Company:	Analytical Technologies, Inc.

ATI Labs: Diego (619)458-9141 • Phoenix (602)438-1530 • Seattle (206)228-8335 • Pensacola (90 1001 DISTRIBUTION: White, Canary - ANALYTICAL TECHNOLOGIES, INC.• Pink - C NATOR

TABLE 1 - GROUNDWATER SAMPLING SCHEDULE
ANNUAL PARAMETERS (MARCH OR APRIL)

WELL #/PARAM	pH	CONDUCT	TOC*	TOX*	TDS	ALKAL. BICARB.	ALKAL. CARB.	CHLORIDE	SULFATE	PHENOL	TCL-VOL ORG(8240)	VOA-BTEX 8020	TOTAL METALS Cr	Pb	Hg	DISSOLVED METALS As	Ba	Cd	Ca	Mg	Mn	K	Se	Ag	Na
MW-1	X	X	X	X	X	X	X	X	X	X	X+		X	X	X	X	X	X	X	X	X	X	X	X	X
MW-2	X	X	X	X	X	X	X	X	X	X	X+		X	X	X	X	X	X	X	X	X	X	X	X	X
MW-4	X	X	X	X	X	X	X	X	X	X	X+		X	X	X	X	X	X	X	X	X	X	X	X	X
MW-5	X	X	X	X	X	X	X	X	X	X	X+		X	X	X	X	X	X	X	X	X	X	X	X	X
OW-11	X	X	X	X	X	X	X	X	X	X	X+		X	X	X	X	X	X	X	X	X	X	X	X	X
OW-1	X	X			X	X	X	X	X			X							X	X		X			X
OW-2	X	X			X	X	X	X	X			X							X	X		X			X
OW-3	X	X			X	X	X	X	X			X							X	X		X			X
SMW-1	X	X	X	X	X	X	X	X	X		X		X	X					X	X		X			X
SMW-2	X	X	X	X	X	X	X	X	X		X		X	X					X	X		X			X
SMW-3	X	X	X	X	X	X	X	X	X		X		X	X					X	X		X			X
SMW-4	X	X	X	X	X	X	X	X	X		X		X	X					X	X		X			X
SMW-5	X	X	X	X	X	X	X	X	X		X		X	X					X	X		X			X
SMW-6	X	X	X	X	X	X	X	X	X		X		X	X					X	X		X			X

SEMI-ANNUAL PARAMETERS (SEPT. OR OCT.)

	pH*	COND*	TOC*	TOX*	TOTAL METALS Cr	Pb	TCL-VOL ORG(8240)
MW-1	X	X	X	X	X	X	X
MW-2	X	X	X	X	X	X	X
MW-4	X	X	X	X	X	X	X
MW-5	X	X	X	X	X	X	X
OW-11	X	X	X	X	X	X	X
SMW-1	X	X	X	X	X	X	X
SMW-2	X	X	X	X	X	X	X
SMW-3	X	X	X	X	X	X	X
SMW-4	X	X	X	X	X	X	X
SMW-5	X	X	X	X	X	X	X
SMW-6	X	X	X	X	X	X	X

* 4 REPLICATES
\+ 2 REPLICATES

Waste Waters

API Effluent
1. BOD
2. COD
3. TOC
4. TDS

Aerated Lagoon Effluent
1. pH
2. BOD
3. COD
4. TOC
5. TDS
6. Sulfide (total)
7. Metals - (As, Cd, Cr, Pb, Hg, Ni, Se)
8. Oil + Grease
9. 8240 (Attached)
10. 8270 (Attached)

TABLE-4

RECOMMENDED ANALYTICAL METHODS

Parameter	Method
pH (Liquid)	221, 9040
Specific Conductance	120.1
Total Organic Carbon (TOC) 4 replicates	505, 9060
Total Organic Halogen (TOX) 4 replicates	9020
Total Dissolved Solids (TDS)	160.1
Alkalinity as Bicarbonate	310.1
Alkalinity as Carbonate	310.1
Chloride	300.0
Sulfate	300.0
Phenol	420.1, 9065
Metals	
Arsenic	303E, 206.2,7060
Barium	303A, 200.7, 6010
Cadmium	200.7, 6010
Calcium	200.7, 6010
Chromium T	303A, 200.7, 6010
Lead T	303A, 239.2, 7421
Magnesium	200.7, 6010
Manganese	200.7, 6010
Mercury T	245.1, 7470
Potassium	200.7, 6010
Selenium	270.2, 7740
Silver	200.7, 6010
Sodium	200.7, 6010
Oil & Grease	413.1, 9071
pH (Solid)	9045
Carbon	9060
Nitrogen	353.2
Phosphorus	365.3
Total Solids (Solids)	160.3
VOA (BTEX) (Liquid & Solid)	8020
Benzene	
Toluene	
Ethyl benzene	
Xylene (m, o & p)	
TCL Volatile Organics (Liquids)	8240 2 replicates for mw-1, mw-4, mw-11 + ow-11
Chloromethane	
Bromomethane	
Vinyl chloride	
Chloroethane	
Methylene chloride	
Acetone	
Carbon disulfide	
1,1 - Dichloroethene	
1,1 - Dichloroethane	
1,2 - Dichloroethene (cis/trans)	

Chloroform	-	
1,2-Dichloroethane	-	
2-Butanone	-	
1,1,1-Trichloroethane	-	
Carbon tetrachloride	-	
Vinyl acetate	-	
Bromodichloromethane	-	
1,2 - Dichloropropane	-	
trans-1,3-Dichloropropene	-	
Trichloroethene	-	
Chlorodibromomethane	-	
1,1,2-Trichloroethane	-	
Benzene	-	
cis-1,3-Dichloropropene	-	
2-Chloroethyl vinyl ether	-	
Bromoform	-	
4-Methyl-2-pentanone	-	
2-Hexanone	-	
1,1,2,2,-Tetrachloroethane	-	
Tetrachloroethene	-	
Toluene	-	
Chlorobenzene	-	
Ethyl benzene	-	
Styrene	-	
Xylenes (total)	-	
1,1,2 Trichloro-1,2,2-trifluorethane	-	
1,2-Dibromomethane	-	
1,2-Dichlorobenzene	-	
1,3-Dichlorobenzene	-	
1,4-Dichlorobenzene	-	
Refinery Hazardous Const. Semivolatiles (Solids)		8270
Benzo(a)pyrene	-	
Chrysene	-	
1-Methylnaphthalene	-	
Phenanthrene	-	
Pyrene	-	
o-Cresol	-	
m & p Cresol	-	

Analytical Technologies, Inc. 9830 S. 51st Street Suite B-113 Phoenix, AZ 85044 (602) 496-4400

MW 1 + MW 5
3-8-91

ATI I.D. 103660

April 18, 1991

Giant Refining
Route 3, P.O. Box 7
Gallup, NM 87301

Project Name/Number: None given

Attention: Claud Rosendale

On 03/09/91, Analytical Technologies, Inc. received a request to analyze aqueous sample(s). The sample(s) 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.

TOX, TOC analyses were performed by ATI, San Diego. Samples 103660-01 and -02 as well as samples 103660-06 and -07 are replicates for EPA Method 8240. Total metals results are reported under ATI ID numbers -01 and -06. The dissolved metals are reported under ATI ID number -02 and -07.

If you have any questions or comments, please do not hesitate to contact us at (602)496-4400.

Elizabeth Proffitt
Senior Project Manager

Robert V. Woods
Laboratory Manager

Lorraine Davis
QA Coordinator

RVW:clf
Enclosure

Analytical Technologies, Inc.

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

DATE RECEIVED : 03/09/91
REPORT DATE : 04/18/91

ATI I.D. : 103660

ATI #	CLIENT DESCRIPTION	MATRIX	DATE COLLECTED
01	MW-5/MW-5-1	AQUEOUS	03/08/91
02	MW-5/MW-5-2	AQUEOUS	03/08/91
03	MW-5	AQUEOUS	03/08/91
04	MW-5	AQUEOUS	03/08/91
05	MW-5	AQUEOUS	03/08/91
06	MW-2/MW-2-2	AQUEOUS	03/08/91
07	MW-2/MW-2-1	AQUEOUS	03/08/91
08	MW-2	AQUEOUS	03/08/91
09	MW-2	AQUEOUS	03/08/91
10	MW-2	AQUEOUS	03/08/91

----- 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. : 103660

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

DATE RECEIVED : 03/09/91
REPORT DATE : 04/18/91

PARAMETER	UNITS	01	03	04	05	06
CARBONATE (CACO3)	MG/L	32	-	-	-	48
BICARBONATE (CACO3)	MG/L	314	-	-	-	304
HYDROXIDE (CACO3)	MG/L	<1	-	-	-	<1
TOTAL ALKALINITY (AS CACO3)	MG/L	346	-	-	-	352
CHLORIDE	MG/L	67	-	-	-	59
CONDUCTIVITY, (UMHOS/CM)		1100	1160	1140	1130	1120
PH	UNITS	8.87	8.97	8.95	8.94	8.83
PHENOLICS, TOTAL	MG/L	<0.02	-	-	-	<0.02
SULFATE	MG/L	160	-	-	-	160
TOTAL DISSOLVED SOLIDS	MG/L	700	-	-	-	690
TOTAL ORGANIC CARBON	MG/L	1.0	0.8	1.6	0.7	0.8
TOTAL ORGANIC HALIDE	MG/L	<0.008	<0.008	<0.008	<0.008	<0.008

Analytical Technologies, Inc.

GENERAL CHEMISTRY RESULTS

ATI I.D. : 103660

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

DATE RECEIVED : 03/09/91

REPORT DATE : 04/18/91

PARAMETER	UNITS	08	09	10
CONDUCTIVITY, (UMHOS/CM)		1100	1130	1130
PH	UNITS	8.96	8.95	8.95
TOTAL ORGANIC CARBON	MG/L	<0.5	1.6	0.8
TOTAL ORGANIC HALIDE	MG/L	<0.008	<0.008	<0.008

Analytical Technologies, Inc.

GENERAL CHEMISTRY - QUALITY CONTROL

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

ATI I.D. : 103660

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
CARBONATE	MG/L	10368901	<1	<1	NA	NA	NA	NA
BICARBONATE	MG/L		456	456	0	NA	NA	NA
HYDROXIDE	MG/L		<1	<1	NA	NA	NA	NA
TOTAL ALKALINITY	MG/L		456	456	0	NA	NA	NA
CHLORIDE	MG/L	10366006	59	60	2	164	100	105
CONDUCTIVITY(UMHOS/CM)		10365903	1280	1290	0.7	NA	NA	NA
CONDUCTIVITY(UMHOS/CM)		10368901	2180	2160	0.9	NA	NA	NA
PH	UNITS	10368901	8.1	8.1	0	NA	NA	NA
PH	UNITS	10361702	8.8	8.8	0	NA	NA	NA
PHENOLICS, TOTAL	MG/L	10371534	<0.02	<0.02	NA	0.28	0.25	112
SULFATE	MG/L	10371505	11	11	0	20	10	90
TOTAL DISSOLVED SOLIDS	MG/L	10370001	710	710	0	NA	NA	NA
TOTAL ORGANIC CARBON	MG/L	10366006	0.8	0.8	0	21.7	20.0	105
TOTAL ORGANIC HALIDE	MG/L	10366006	<0.008	<0.008	NA	0.21	0.20	105

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

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

Analytical Technologies, Inc.

METALS RESULTS

ATI I.D. : 103660

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

DATE RECEIVED : 03/09/91
REPORT DATE : 04/18/91

PARAMETER	UNITS	01	02	06	07
SILVER	MG/L	-	<0.010	-	<0.010
ARSENIC	MG/L	-	<0.005	-	<0.005
BARIUM	MG/L	-	0.017	-	0.019
CALCIUM	MG/L	-	1.7	-	1.7
CADMIUM	MG/L	-	<0.005	-	<0.005
CHROMIUM	MG/L	<0.010	-	<0.010	-
MERCURY	MG/L	<0.0002	-	<0.0002	-
POTASSIUM	MG/L	-	<1.0	-	<1.0
MAGNESIUM	MG/L	-	0.2	-	0.2
MANGANESE	MG/L	-	<0.010	-	<0.010
SODIUM	MG/L	-	270	-	270
LEAD	MG/L	<0.002	-	<0.002	-
SELENIUM	MG/L	-	<0.005	-	<0.005

Analytical Technologies, Inc.

METALS - QUALITY CONTROL

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

ATI I.D. : 103660

PARAMETER	UNITS	ATI I.D.	SAMPLE RESULT	DUP. RESULT	RPD	SPIKED SAMPLE	SPIKE CONC	% REC
SILVER	MG/L	10366002	<0.010	<0.010	NA	0.086	0.100	86
ARSENIC	MG/L	10366007	<0.005	<0.005	NA	0.046	0.050	92
BARIUM	MG/L	10366002	0.017	0.017	0	0.119	0.100	102
CALCIUM	MG/L	10360202	12.4	12.5	0.8	68.0	50.0	111
CADMIUM	MG/L	10366002	<0.005	<0.005	NA	0.104	0.100	104
CHROMIUM	MG/L	10368101	<0.010	<0.010	NA	0.096	0.100	96
MERCURY	MG/L	10362001	<0.0002	<0.0002	NA	0.0050	0.0050	100
POTASSIUM	MG/L	10360202	1.2	1.3	8	54.9	50.0	107
MAGNESIUM	MG/L	10360202	2.4	2.4	0	29.7	25.0	109
MANGANESE	MG/L	10366002	<0.010	<0.010	NA	0.101	0.100	100
SODIUM	MG/L	10360202	3.6	3.7	3	56.1	50.0	105
LEAD	MG/L	10366006	<0.002	<0.002	NA	0.048	0.050	96
SELENIUM	MG/L	10367401	<0.005	<0.005	NA	0.033	0.050	66
SELENIUM	MG/L	10366007	<0.005	<0.005	NA	0.036	0.050	72

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

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

Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 10366001

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	DATE SAMPLED	: 03/08/91
PROJECT #	: (NONE)	DATE RECEIVED	: 03/09/91
PROJECT NAME	: (NONE)	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW-5/MW-5-1	DATE ANALYZED	: 03/20/91
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)	<2
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 (%)	80
BROMOFLUOROBENZENE (%)	96
TOLUENE-D8 (%)	97

Analytical Technologies, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 10366001

COMPOUNDS	RESULTS
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 10366002

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	DATE SAMPLED	: 03/08/91
PROJECT #	: (NONE)	DATE RECEIVED	: 03/09/91
PROJECT NAME	: (NONE)	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW-5/MW-5-2	DATE ANALYZED	: 03/20/91
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)	<2
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 (%)	86
BROMOFLUOROBENZENE (%)	87
TOLUENE-D8 (%)	106

Analytical Technologies, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 10366002

COMPOUNDS	RESULTS
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 10366006

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	DATE SAMPLED	: 03/08/91
PROJECT #	: (NONE)	DATE RECEIVED	: 03/09/91
PROJECT NAME	: (NONE)	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW-2/MW-2-2	DATE ANALYZED	: 03/20/91
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)	<2
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 (%)	90
TOLUENE-D8 (%)	103

Analytical Technologies, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 10366006

COMPOUNDS	RESULTS
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

GCMS - RESULTS

ATI I.D. : 10366007

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	DATE SAMPLED	: 03/08/91
PROJECT #	: (NONE)	DATE RECEIVED	: 03/09/91
PROJECT NAME	: (NONE)	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW-2/MW-2-1	DATE ANALYZED	: 03/20/91
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)	<2
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 (%)	89
BROMOFLUOROBENZENE (%)	83
TOLUENE-D8 (%)	104

Analytical Technologies, Inc.

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

ATI I.D. : 10366007

COMPOUNDS	RESULTS
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

GCMS - RESULTS

REAGENT BLANK

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT	: GIANT REFINING CO.	ATI I.D.	: 103660
PROJECT #	: (NONE)	DATE EXTRACTED	: 03/20/91
PROJECT NAME	: (NONE)	DATE ANALYZED	: 03/20/91
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	TR
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)	<2
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 (%)	92
BROMOFLUOROBENZENE (%)	80
TOLUENE-D8 (%)	103

TR - Compound detected at an unquantifiable trace level

Analytical Technologies, Inc.

GCMS - RESULTS

REAGENT BLANK

ADDITIONAL COMPOUNDS (SEMI-QUANTITATED)

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO. ATI I.D : 103660

COMPOUNDS	RESULTS
1,2-DIBROMOMETHANE	<2

Analytical Technologies, Inc.

QUALITY CONTROL DATA

ATI I.D. : 103660

TEST : VOLATILE ORGANICS (EPA 8240)

CLIENT : GIANT REFINING CO.
PROJECT # : (NONE)
PROJECT NAME : (NONE)
REF I.D. : 10399924

DATE ANALYZED : 03/20/91
SAMPLE MATRIX :
UNITS : UG/L

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

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

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

TR - Compound detected at an unquantifiable trace level

AnalyticalTechnologies, Inc.
Phoenix, Arizona

Chain of Custody

DATE 3-8-91 PAGE 4 OF 8

PROJECT MANAGER: Elizabeth Ann Fitzpatrick

COMPANY: Giant Refining Co
ADDRESS: Rt. 3 Box 7
Gallup, NM. 87301

BILL TO: Claud Rosendale
COMPANY:
ADDRESS: Same

Claud Rosendale — SAMPLERS: (Signature)
(505) 722-0217 — PHONE NUMBER

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE (MOD 8015/8020)	BTXE (8020)	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	MTBE	Pesticides/PCB (608/8080)	Herbicides (615/8150)	Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	TOC-4 replicates	TOX-4 replicates	all Cond-4 replicates per pack	SDWA Primary Standards	SDWA Secondary Standards	SDWA Volatiles (502.1/503.1)	TDS, Alk, Cl, SO4	The 19 Priority Pollutant Metals Total	The 8 EP Tox Metals by EP Tox Prep. (1310)	The 8 EP Tox Metals by Total Digestion	~~The 8 EP Tox Metals by TCLP~~	Dissolved Phenols		NUMBER OF CONTAINERS
MW-5 250ml			Water													X													4
250ml																	X												4
250ml																		X											4
1L																						X							1
1L																							X						1
1L																										X			1
1L																											X		1
40ml															X														2
40ml															X														2

PROJECT INFORMATION	
PROJECT NO.: —	
PROJECT NAME: —	
P.O. NO.: 01413	
VIA: Fed Ex.	
TAT: ☐ 24HR ☐ 48 HRS ☐ 1 WK ☐ 2 WKS	

SAMPLE RECEIPT	
TOTAL NO. OF CONTAINERS	20
CHAIN OF CUSTODY SEALS	N
INTACT?	Y
RECEIVED GOOD COND./COLD	Y
LAB NUMBER	103660

SAMPLE DISPOSAL INSTRUCTIONS
☒ ATI Disposal ☐ Return ☐ Pickup (will call)

Comments: See attached for specific parameter details.

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: CRosendale Time: 11:00	Signature: Time:	Signature: Time:
Printed Name: Claud Rosendale Date 3-8-91	Printed Name: Date	Printed Name: Date
Company: Giant Refining	Company:	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: (LAB) 3.**
Signature: Time:	Signature: Time:	Signature: Linda Eshelman Time: 11:00
Printed Name: Date:	Printed Name: Date:	Printed Name: Linda Eshelman Date: 3/9/91
Company:	Company:	Analytical Technologies, Inc.

ATI Labs: San Diego (619)458-9141 • Phoenix (602)438-1530 • Seattle (206)228-8335 • Pensacola (904)474-1001

DISTRIBUTION: White, Canary - ANALYTICAL TECHNOLOGIES, INC.• Pink - ORIGINATOR

AnalyticalTechnologies, Inc.
Phoenix, Arizona

Chain of Custody

DATE 3-8-91 PAGE 7 OF 8

PROJECT MANAGER: Elizabeth Proffitt

COMPANY: Giant Refining Co.
ADDRESS: Rt 3 Box 7
Gallup NM 87301

BILL TO: Claud Rosendale
COMPANY: Same
ADDRESS:

Claud Rosendale
SAMPLERS: (Signature)

(505) 722 0217
PHONE NUMBER

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	Petroleum Hydrocarbons (418.1)	(MOD 8015) Gas/Diesel	Diesel/Gasoline/BTXE (MOD 8015/8020)	BTXE (8020)	Chlorinated Hydrocarbons (601/8010)	Aromatic Hydrocarbons (602/8020)	MTBE		Pesticides/PCB (608/8080)	Herbicides (615/8150)		Base/Neutral/Acid Compounds GC/MS (625/8270)	Volatile Organics GC/MS (624/8240)	TOC - 4 replicates	TOX - 4 replicates	pH, Cond - 4 replicates each	SDWA Primary Standards	SDWA Secondary Standards	SDWA Volatiles (502.1/503.1)	IDS Alk Cl, SO4	~~The 13 Priority Pollutant~~ Metals Total	The 8 EP Tox Metals by EP Tox Prep. (1310)	The 8 EP Tox Metals by Total Digestion	~~The 8 EP Tox Metals by TCLP~~	Dissolved Chrome		NUMBER OF CONTAINERS
MW-12			Water															X													4
250 ml																			X												4
250 ml																				X											4
250 ml																								X							1
1 L																									X						1
1 L																											X				1
1 L																												X			1
1 L																													X		1
40 ml																	X														2
40 ml																	X														2

PROJECT INFORMATION		SAMPLE RECEIPT	
PROJECT NO.: —		TOTAL NO. OF CONTAINERS	20
PROJECT NAME: —		CHAIN OF CUSTODY SEALS	N
P.O. NO.: 01413		INTACT?	Y
VIA: Fed Ex		RECEIVED GOOD COND./COLD	Y
TAT: ☐ 24HR ☐ 48 HRS ☐ 1 WK ☐ 2 WKS		LAB NUMBER	103660

SAMPLE DISPOSAL INSTRUCTIONS
☒ ATI Disposal ☐ Return ☐ Pickup (will call)

Comments: See Attached for specific parameter detail

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Time: 11:00	Signature: Time:	Signature: Time:
Printed Name: Date 3-8-91	Printed Name: Date	Printed Name: Date
Company: Giant Refining	Company:	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: (LAB) 3.**
Signature: Time:	Signature: Time:	Signature: Time: 11:00
Printed Name: Date:	Printed Name: Date:	Printed Name: Date: 3/9/91
Company:	Company:	Analytical Technologies, Inc.

ATI Labs: San Diego (619)458-9141 • Phoenix (602)438-1530 • Seattle (206)228-8335 • Pensacola (904)474-1001 DISTRIBUTION: White, Canary - ANALYTICAL TECHNOLOGIES, INC.• Pink - ORIGINATOR

TABLE 1 - GROUNDWATER SAMPLING SCHEDULE
ANNUAL PARAMETERS (MARCH OR APRIL)

WELL #/PARAM	pH	CONDUCT	TOC*	TOX*	TDS	ALKAL. BICARB.	ALKAL. CARB.	CHLORIDE	SULFATE	PHENOL	TCL-VOL ORG(8240)	VOA-BTEX 8020	TOTAL METALS Cr	Pb	Hg	DISSOLVED METALS As	Ba	Cd	Ca	Mg	Mn	K	Se	Ag	Na
MW-1	X	X	X	X	X	X	X	X	X	X	X+		X	X	X	X	X	X	X	X	X	X	X	X	X
MW-2	X	X	X	X	X	X	X	X	X	X	X+		X	X	X	X	X	X	X	X	X	X	X	X	X
MW-4	X	X	X	X	X	X	X	X	X	X	X+		X	X	X	X	X	X	X	X	X	X	X	X	X
MW-5	X	X	X	X	X	X	X	X	X	X	X+		X	X	X	X	X	X	X	X	X	X	X	X	X
OW-11	X	X	X	X	X	X	X	X	X	X	X+		X	X	X	X	X	X	X	X	X	X	X	X	X
OW-1	X	X			X	X	X	X	X			X							X	X		X			X
OW-2	X	X			X	X	X	X	X			X							X	X		X			X
OW-3	X	X			X	X	X	X	X			X							X	X		X			X
SMW-1	X	X	X	X	X	X	X	X	X		X		X	X					X	X		X			X
SMW-2	X	X	X	X	X	X	X	X	X		X		X	X					X	X		X			X
SMW-3	X	X	X	X	X	X	X	X	X		X		X	X					X	X		X			X
SMW-4	X	X	X	X	X	X	X	X	X		X		X	X					X	X		X			X
SMW-5	X	X	X	X	X	X	X	X	X		X		X	X					X	X		X			X
SMW-6	X	X	X	X	X	X	X	X	X		X		X	X					X	X		X			X

SEMI-ANNUAL PARAMETERS (SEPT. OR OCT.)

	pH*	COND*	TOC*	TOX*	TOTAL METALS Cr	Pb	TCL-VOL ORG(8240)
MW-1	X	X	X	X	X	X	X
MW-2	X	X	X	X	X	X	X
MW-4	X	X	X	X	X	X	X
MW-5	X	X	X	X	X	X	X
OW-11	X	X	X	X	X	X	X
SMW-1	X	X	X	X	X	X	X
SMW-2	X	X	X	X	X	X	X
SMW-3	X	X	X	X	X	X	X
SMW-4	X	X	X	X	X	X	X
SMW-5	X	X	X	X	X	X	X
SMW-6	X	X	X	X	X	X	X

* 4 REPLICATES
\+ 2 REPLICATES

Waste Waters

API Effluent
1. BOD
2. COD
3. TOC
4. TDS

Aerated Lagoon Effluent
1. pH
2. BOD
3. COD
4. TOC
5. TDS
6. Sulfide (total)
7. Metals - (As, Cd, Cr, Pb, Hg, Ni, Se)
8. Oil + Grease
9. 8240 (Attached)
10. 8270 (Attached)

TABLE-4

RECOMMENDED ANALYTICAL METHODS

Parameter	Method
pH (Liquid)	221, 9040
Specific Conductance	120.1
Total Organic Carbon (TOC) 4 replicates	505, 9060
Total Organic Halogen (TOX) 4 replicates	9020
Total Dissolved Solids (TDS)	160.1
Alkalinity as Bicarbonate	310.1
Alkalinity as Carbonate	310.1
Chloride	300.0
Sulfate	300.0
Phenol	420.1, 9065
Metals	-
Arsenic	303E, 206.2,7060
Barium	303A, 200.7, 6010
Cadmium	200.7, 6010
Calcium	200.7, 6010
Chromium T	303A, 200.7, 6010
Lead T	303A, 239.2, 7421
Magnesium	200.7, 6010
Manganese	200.7, 6010
Mercury T	245.1, 7470
Potassium	200.7, 6010
Selenium	270.2, 7740
Silver	200.7, 6010
Sodium	200.7, 6010
Oil & Grease	413.1, 9071
pH (Solid)	9045
Carbon	9060
Nitrogen	353.2
Phosphorus	365.3
Total Solids (Solids)	160.3
VOA (BTEX) (Liquid & Solid)	8020
Benzene	-
Toluene	-
Ethyl benzene	-
Xylene (m, o & p)	-
TCL Volatile Organics (Liquids)	8240 2 replicates for MW-1, MW-4, MW-11
Chloromethane	-
Bromomethane	-
Vinyl chloride	-
Chloroethane	-
Methylene chloride	-
Acetone	-
Carbon disulfide	-
1,1 - Dichloroethene	-
1,1 - Dichloroethane	-
1,2 - Dichloroethene (cis/trans)	-

	-	
Chloroform	-	
1,2-Dichloroethane	-	
2-Butanone	-	
1,1,1-Trichloroethane	-	
Carbon tetrachloride	-	
Vinyl acetate	-	
Bromodichloromethane	-	
1,2 - Dichloropropane	-	
trans-1,3-Dichloropropene	-	
Trichloroethene	-	
Chlorodibromomethane	-	
1,1,2-Trichloroethane	-	
Benzene	-	
cis-1,3-Dichloropropene	-	
2-Chloroethyl vinyl ether	-	
Bromoform	-	
4-Methyl-2-pentanone	-	
2-Hexanone	-	
1,1,2,2,-Tetrachloroethane	-	
Tetrachloroethene	-	
Toluene	-	
Chlorobenzene	-	
Ethyl benzene	-	
Styrene	-	
Xylenes (total)	-	
1,1,2 Trichloro-1,2,2-trifluorethane	-	
1,2-Dibromomethane	-	
1,2-Dichlorobenzene	-	
1,3-Dichlorobenzene	-	
1,4-Dichlorobenzene	-	
Refinery Hazardous Const. Semivolatiles (Solids)		8270
Benzo(a)pyrene	-	
Chrysene	-	
1-Methylnaphthalene	-	
Phenanthrene	-	
Pyrene	-	
o-Cresol	-	
m & p Cresol	-	

G2E Annually deter. GW flowrate in Sonsela
(p.5)

I. Detection System: MW

Semi-annual for G-2
Annually for G-3 } Indicator parameters

- Stat. sign increase for each indicator para. over b.g. for that para. triggers assessment
  if Assessment = CMP quarterly analyze for G-3 & G-4. (Appendix IX)
  MCL as in G-3 or EPA Groundwater Cleanup Standards

  CMP continues until Director says either; 1) discontinue, or 2) CAP

II Predetection System: SMW

- Semi-annual for G-2: If sign. increase for organic or inorganic, resampled/analyzed for organic specie in G-4. ~~If detected~~ If detection of any specie in G-4 cause detection monitoring system (MW) to be sampled for analysis of any volatile or semi-volatile organic constituent

- compare analytical value against the mean + 2 sd value of the historical data for that para. at that well.

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

Print Your Name: L. Shelton Your Telephone #: (505) 722-0227

Facility Name: Giant Refining EPA ID#: NMD000333211

Date: 6-5-91 Parameter: pH

Well Number: MW-1 Up or Downgradient? (U or D): D

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

$\bar{X}_b$ = 8.51 S_b^2 = 0.015

W_b = .000937 t_b = 2.947

Please list the current values for this upgradient or downgradient monitoring well.

	Value	$(Value-X_m)^2$
1.	8.92	.0001
2.	8.92	.0001
3.	8.94	.0001
4.	8.94	.0001

Total #1: 35.72 Total #2: .0004

$\bar{X}_m$ = (Total #1)/4 = 8.93

t_m (TOC,TOX, S.C) = 4.541
t_m (pH) = 5.841

S_m^2 = (Total #2)/3 = .000133

$W_m = S_m^2/n_m$ = .00003325

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{8.93 - 8.51}{.00003325 + .000937} = \frac{.42}{.03114} = 13.487$$

$$t_o = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{.000937 \times 2.947 + .00003325 \times 5.841}{.000937 + .00003325} = 3.04$$

For pH values, treat the value for t_o as if it is positive in all cases. If t^* is greater than t_o for any of the indicator parameters, you must **immediately** resample all monitoring wells for this unit. If the t^* value for the reevaluation is still greater than t_o, the RCRA unit served by the monitoring wells is in assessment, and **you must notify EID within 7 days.**

Claud Rosendal
please sign here

statqtr.88/bas

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

Print Your Name: L. Shelton Your Telephone #: (505) 722-0227

Facility Name: Giant Refining EPA ID#: NMD000333211

Date: 6-5-91 Parameter: pH

Well Number: MW-2 Up or Downgradient? (U or D): D

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

$\bar{X}_b$ = 8.51 S_b^2 = .015

W_b = .000937 t_b = 2.947

Please list the current values for this upgradient or downgradient monitoring well.

	Value	$(Value-X_m)^2$
1.	8.83	.00846
2.	8.96	.00144
3.	8.95	.00078
4.	8.95	.00078

Total #1: 35.69 Total #2: .01146

$\bar{X}_m$ = (Total #1)/4 = 8.922

t_m (TOC,TOX, S.C) = 4.541
t_m (pH) = 5.841

S_m^2 = (Total #2)/3 = .00382

$W_m = S_m^2/n_m$ = .000955

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{8.922 - 8.51}{.000955 + .000937} = \frac{.41}{.0435} = 9.43$$

$$t_c = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{.000937 \times 2.947 + .000955 \times 5.841}{.000937 + .000955} = 4.41$$

For pH values, treat the value for t_c as if it is positive in all cases. If t^* is greater than t_c for any of the indicator parameters, you must **immediately** resample all monitoring wells for this unit. If the t^* value for the reevaluation is still greater than t_c, the RCRA unit served by the monitoring wells is in assessment, and **you must notify EID within 7 days.**

please sign here

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

Print Your Name: L. Shelton Your Telephone #: (505)722-0227

Facility Name: Giant Refining EPA ID#: NMD000333221

Date: 6-5-91 Parameter: pH

Well Number: MW-4 Up or Downgradient? (U or D): U

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

$\bar{X}_b$ = 8.51 S_b^2 = 0.15

W_b = .000937 t_b = 2.947

Please list the current values for this upgradient or downgradient monitoring well.

	Value	$(Value-X_m)^2$
1.	8.65	.0009
2.	8.69	.0001
3.	8.69	.0001
4.	8.69	.0001

Total #1: 34.72 Total #2: .0012

$\bar{X}_m$ = (Total #1)/4 = 8.68

t_m (TOC,TOX, S.C) = 4.541
t_m (pH) = 5.841

S_m^2 = (Total #2)/3 = .0013

$W_m = S_m^2/n_m$ = .000325

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{8.68 - 8.51}{.000325 + .000937} = \frac{.17}{.0356} = 4.78$$

$$t_c = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{.000937 \times 2.947 + .000325 \times 5.841}{.000937 + .000325} = 3.69$$

For pH values, treat the value for t_c as if it is positive in all cases. If t^* is greater than t_c for any of the indicator parameters, you must **immediately** resample all monitoring wells for this unit. If the t^* value for the reevaluation is still greater than t_c, the RCRA unit served by the monitoring wells is in assessment, and **you must notify EID within 7 days.**

Claud Rosendale
please sign here

statqtr.88/bas

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

Print Your Name: L. Shelton Your Telephone #: (505)722-0227

Facility Name: Giant Refining EPA ID#: NMD000333211

Date: 6-5-91 Parameter: pH

Well Number: MW-5 Up or Downgradient? (U or D): D

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

$\bar{X}_b$ = 8.51 S_b^2 = .015

W_b = .000937 t_b = 2.947

Please list the current values for this upgradient or downgradient monitoring well.

	Value	$(Value-X_m)^2$
1.	8.87	.00039
2.	8.97	.0014
3.	8.95	.00031
4.	8.94	.000056

Total #1: 35.73 Total #2: .002156

$\bar{X}_m$ = (Total #1)/4 = 8.9325

t_m (TOC,TOX, S.C) = 4.541
t_m (pH) = 5.841

S_m^2 = (Total #2)/3 = .00072

$W_m = S_m^2/n_m$ = .00018

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{8.9325 - 8.51}{.00018 + .000937} = \frac{.4225}{.0334} = 12.65$$

$$t_c = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{.000937 \times 2.947 + .00018 \times 5.841}{.000937 + .00018} = 3.41$$

For pH values, treat the value for t_c as if it is positive in all cases. If t^* is greater than t_c for any of the indicator parameters, you must **immediately** resample all monitoring wells for this unit. If the t^* value for the reevaluation is still greater than t_c, the RCRA unit served by the monitoring wells is in assessment, and **you must notify EID within 7 days.**

Chand Rosendahl
please sign here

statqtr.88/bas

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

Print Your Name: L. Shelton Your Telephone #: (505)722-0227

Facility Name: Giant Refining EPA ID#: NMD000333211

Date: 6-5-91 Parameter: COND

Well Number: MW-1 Up or Downgradient? (U or D): D

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

$\bar{X}_b$ = 984 S_b^2 = 1487

W_b = 92.9375 t_b = 2.602

Please list the current values for this upgradient or downgradient monitoring well.

	Value	$(Value-X_m)^2$
1.	1080	306.25
2.	1110	156.25
3.	1090	56.25
4.	1110	156.25

Total #1: 4390 Total #2: 675.0

$\bar{X}_m$ = (Total #1)/4 = 1097.5

t_m (TOC,TOX, S.C) = 4.541
t_m (pH) = 5.841

S_m^2 = (Total #2)/3 = 225

$W_m = S_m^2/n_m$ = 56.25

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{1097.5 - 984}{56.25 + 92.9375} = \frac{113.5}{12.214} = 9.29$$

$$t_o = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{92.9375 \times 2.602 + 56.25 \times 4.541}{92.9375 + 56.25} = 3.33$$

For pH values, treat the value for t_o as if it is positive in all cases. If t^* is greater than t_o for any of the indicator parameters, you must **immediately** resample all monitoring wells for this unit. If the t^* value for the reevaluation is still greater than t_o, the RCRA unit served by the monitoring wells is in assessment, and **you must notify EID within 7 days.**

Claud Rosendahl
please sign here

statqtr.88/bas

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

Print Your Name: L. Shelton Your Telephone #: (505)722-0227

Facility Name: Giant Refining EPA ID#: NMD000333211

Date: 6-5-91 Parameter: COND

Well Number: MW-2 Up or Downgradient? (U or D): D

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

$\bar{X}_b$ = 984 S_b^2 = 1487

W_b = 92.9375 t_b = 2.602

Please list the current values for this upgradient or downgradient monitoring well.

	Value	$(Value-X_m)^2$
1.	1120	0
2.	1100	400
3.	1130	100
4.	1130	100

Total #1: 4480 Total #2: 600

$\bar{X}_m$ = (Total #1)/4 = 1120

t_m (TOC,TOX, S.C) = 4.541
t_m (pH) = 5.841

S_m^2 = (Total #2)/3 = 200

$W_m = S_m^2/n_m$ = 50

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{1120 - 984}{50 + 92.9375} = \frac{136}{11.956} = 11.38$$

$$t_c = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{92.9375 \times 2.602 + 50 \times 4.541}{92.9375 + 50} = 3.28$$

For pH values, treat the value for t_c as if it is positive in all cases. If t^* is greater than t_c for any of the indicator parameters, you must **immediately** resample all monitoring wells for this unit. If the t^* value for the reevaluation is still greater than t_c, the RCRA unit served by the monitoring wells is in assessment, and **you must notify EID within 7 days.**

Clare Rosendahl
please sign here

statqtr.88/bas

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

Print Your Name: L. Shelton Your Telephone #: (505)722-0227

Facility Name: Giant Refining EPA ID#: NMD000333211

Date: 6-5-91 Parameter: COND

Well Number: MW-4 Up or Downgradient? (U or D): U

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

$\bar{X}_b$ = 984 S_b^2 = 1487

W_b = 92.9375 t_b = 2.602

Please list the current values for this upgradient or downgradient monitoring well.

	Value	$(Value-X_m)^2$
1.	1150	306.25
2.	1130	6.25
3.	1150	306.25
4.	1100	1056.25

Total #1: 4530 Total #2: 1675

$\bar{X}_m$ = (Total #1)/4 = 1132.5

t_m (TOC,TOX, S.C) = 4.541
t_m (pH) = 5.841

S_m^2 = (Total #2)/3 = 558.33

$W_m = S_m^2/n_m$ = 139.58

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{1132.5 - 984}{139.58 + 92.9375} = \frac{148.5}{15.249} = 9.74$$

$$t_c = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{92.9375 \times 2.602 + 139.58 \times 4.541}{92.9375 + 139.58} = 3.77$$

For pH values, treat the value for t_c as if it is positive in all cases. If t^* is greater than t_c for any of the indicator parameters, you must **immediately** resample all monitoring wells for this unit. If the t^* value for the reevaluation is still greater than t_c, the RCRA unit served by the monitoring wells is in assessment, and **you must notify EID within 7 days.**

Chand Rosenbaum
please sign here

statqtr.88/bas

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

Print Your Name: L. Shelton Your Telephone #: (505)722-0227

Facility Name: Giant Refining EPA ID#: NMD000333211

Date: 6-5-91 Parameter: COND

Well Number: MW-5 Up or Downgradient? (U or D): D

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

$\bar{X}_b$ = 984 S_b^2 = 1487

W_b = 92.9375 t_b = 2.602

Please list the current values for this upgradient or downgradient monitoring well.

	Value	$(Value-X_m)^2$
1.	1100	1056.25
2.	1160	756.25
3.	1140	56.25
4.	1130	6.25

Total #1: 4530 Total #2: 1875

$\bar{X}_m$ = (Total #1)/4 = 1132.5

t_m (TOC,TOX, S.C) = 4.541
t_m (pH) = 5.841

S_m^2 = (Total #2)/3 = 625

$W_m = S_m^2/n_m$ = 156.25

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{1132.5 - 984}{156.25 + 92.9375} = \frac{148.5}{15.79} = 9.40$$

$$t_c = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{92.9375 \times 2.602 + 156.25 \times 4.541}{92.9375 + 156.25} = 3.82$$

For pH values, treat the value for t_c as if it is positive in all cases. If t^* is greater than t_c for any of the indicator parameters, you must **immediately** resample all monitoring wells for this unit. If the t^* value for the reevaluation is still greater than t_c, the RCRA unit served by the monitoring wells is in assessment, and **you must notify EID within 7 days.**

Claud Rosenstock
please sign here

statqtr.88/bas

MW-1

TCL Volatile Organics
Method 8240

Parameter	Date: 06 MAR 91 Result*	Units	Reporting Limit
Chloromethane	<10	ug/L	10
Bromomethane	<10	ug/L	10
Vinyl chloride	<1	ug/L	10
Chloroethane	<1	ug/L	10
Methylene chloride	<5	ug/L	5.0
Acetone	<10	ug/L	10
Carbon disulfide	<1	ug/L	5.0
1,1-Dichloroethene	<1	ug/L	5.0
1,1-Dichloroethane	<1	ug/L	5.0
1,2-Dichloroethene (cis/trans)	<1	ug/L	5.0
Chloroform	<1	ug/L	5.0
1,2-Dichloroethane	<1	ug/L	5.0
2-Butanone	<2	ug/L	5.0
1,1,1-Trichloroethane	<1	ug/L	10
Carbon tetrachloride	<1	ug/L	5.0
Vinyl acetate	<10	ug/L	5.0
Bromodichloromethane	<1	ug/L	10
trans-1,3-Dichloropropene	<1	ug/L	5.0
Trichloroethene	<1	ug/L	5.0
Chlorodibromomethane	<1	ug/L	5.0
1,1,2-Trichloroethane	<1	ug/L	5.0
Benzene	<1	ug/L	5.0
cis-1,3-Dichloropropene	<1	ug/L	5.0
2-Chloroethyl vinyl ether	<10	ug/L	10
Bromoform	<5	ug/L	5.0
4-Methyl-2-pentanone	<10	ug/L	10
2-Hexanone	<10	ug/L	10
1,1,2,2-Tetrachloroethane	<1	ug/L	5.0
Tetrachoroethene	<1	ug/L	5.0
Tolukebe	<1	ug/L	5.0
Chlorobenzene	<1	ug/L	5.0
Ethylbenzene	<1	ug/L	5.0
Stryene	<1	ug/L	5.0
Xylenes (total)	<1	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	---	ug/L	10
1,2-Dibromoethane (EDB)	---	ug/L	10
1,2-Dichlorobenzene	---	ug/L	5.0
1,3-Dichlorobenzene	---	ug/L	5.0

* Data from Analytical Technologies, Inc.

MW-1

Metals
Dissolved Metals

Parameter	Date: 06 MAR 91 Result*	Units	Reporting Limit
Arsenic	<0.005	mg/L	0.0050
Barium	<0.010	mg/L	0.010
Cadmium	<0.005	mg/L	0.0050
Calcium	1.9	mg/L	0.20
Magnesium	0.3	mg/L	0.20
Manganese	<0.010	mg/L	0.010
Potassium	<1.0	mg/L	5.00
Selenium	<0.005	mg/L	0.0050
Silver	<0.010	mg/L	0.010
Sodium	267	mg/L	5.0

* Data from Analytical Technologies, Inc.

MW-1 Giant Refining

Metals
Total Metals

Date:	06 MAR 91		Reporting
Parameter	Result*	Units	Limit
Chromium	<0.010	mg/L	0.010
Lead	0.010	mg/L	0.0050
Mercury	<0.0002	mg/L	0.00020

* Data from Analytical Technologies, Inc.

MW-1 Giant Refining

General Inorganics

Parameter	Date: 06 MAR 91 Result*	Units	Reporting Limit
Alkalinity, Bicarb. as CaCO3 at pH 4.5	304	mg/L	5.0
Alkalinity, Carb. as CaCO3 at pH 8.3	48	mg/L	5.0
Chloride	51	mg/L	3.0
pH	8.92	units	--
pH	8.92	units	--
pH	8.94	units	--
pH	8.94	units	--
Phenolics	<0.02	mg/L	0.010
Sulfate	160	mg/L	5.0
Specific Conductance at 25 deg.C	1080	umhos/cm	1.0
Specific Conductance at 25 deg.C	1110	umhos/cm	1.0
Specific Conductance at 25 deg.C	1090	umhos/cm	1.0
Specific Conductance at 25 deg.C	1110	umhos/cm	1.0
Total Organic Carbon	1.9	mg/L	1.0
Total Organic Carbon	0.8	mg/L	1.0
Total Organic Carbon	0.6	mg/L	1.0
Total Organic Carbon	0.7	mg/L	1.0
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30.0
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30.0
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30.0
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30.0
Total Dissolved Solids	710	mg/L	10.0
Water Elevation	---	ft	--

* Data from Analytical Technologies, Inc.
(1) Total Organic Halide as reported by ATI.

MW-2 Giant Refining

TCL Volatile Organics
Method 8240

Parameter	Date: 06 MAR 91 Result*	Units	Reporting Limit
Chloromethane	<10	ug/L	10
Bromomethane	<10	ug/L	10
Vinyl chloride	<1	ug/L	10
Chloroethane	<1	ug/L	10
Methylene chloride	<5	ug/L	5.0
Acetone	<10	ug/L	10
Carbon disulfide	<1	ug/L	5.0
1,1-Dichloroethene	<1	ug/L	5.0
1,1-Dichloroethane	<1	ug/L	5.0
1,2-Dichloroethene (cis/trans)	<1	ug/L	5.0
Chloroform	<1	ug/L	5.0
1,2-Dichloroethane	<1	ug/L	5.0
2-Butanone	<2	ug/L	10
1,1,1-Trichloroethane	<1	ug/L	5.0
Carbon tetrachloride	<1	ug/L	5.0
Vinyl acetate	<10	ug/L	10
Bromodichloromethane	<1	ug/L	5.0
trans-1,3-Dichloropropene	<1	ug/L	5.0
Trichloroethene	<1	ug/L	5.0
Chlorodibromomethane	<1	ug/L	5.0
1,1,2-Trichloroethane	<1	ug/L	5.0
Benzene	<1	ug/L	5.0
cis-1,3-Dichloropropene	<1	ug/L	5.0
2-Chloroethyl vinyl ether	<1	ug/L	10
Bromoform	<10	ug/L	5.0
4-Methyl-2-pentanone	<5	ug/L	10
2-Hexanone	<10	ug/L	10
1,1,2,2-Tetrachloroethane	<10	ug/L	5.0
Tetrachoroethene	<1	ug/L	5.0
Tolukebe	<1	ug/L	5.0
Chlorobenzene	<1	ug/L	5.0
Ethylbenzene	<1	ug/L	5.0
Stryene	<1	ug/L	5.0
Xylenes (total)	<1	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	---	ug/L	5.0
1,2-Dibromoethane (EDB)	---	ug/L	5.0
1,2-Dichlorobenzene	---	ug/L	5.0
1,4-Dichlorobenzene	---	ug/L	5.0
1,3-Dichlorobenzene	---		

* Data from Analytical Technologies, Inc.

MW-2

Metals
Dissolved Metals

Parameter	Date: 06 MAR 91 Result*	Units	Reporting Limit
Arsenic	<0.005	mg/L	0.010
Barium	0.019	mg/L	0.010
Cadmium	<0.005	mg/L	0.0050
Calcium	1.7	mg/L	0.20
Magnesium	0.2	mg/L	0.20
Manganese	<0.010	mg/L	0.010
Potassium	<1.0	mg/L	5.00
Selenium	<0.005	mg/L	0.0050
Silver	<0.010	mg/L	0.010
Sodium	270	mg/L	5.0

* Data from Analytical Technologies, Inc.

MW-2 Giant Refining

Metals
Total Metals

Parameter	Date: 06 MAR 91 Result*	Units	Reporting Limit
Chromium	<0.010	mg/L	0.010
Lead	<0.002	mg/L	0.010
Mercury	<0.0002	mg/L	0.00020

* Data from Analytical Technologies, Inc.

MW-2 Giant Refining

General Inorganics

Parameter	Date: 06 MAR 91 Result*	Units	Reporting Limit
Alkalinity, Bicarb. as CaCO3 at pH 4.5	304	mg/L	5.0
Alkalinity, Carb. as CaCO3 at pH 8.3	32	mg/L	5.0
Chloride	59	mg/L	3.0
pH	8.83	units	--
pH	8.96	units	--
pH	8.95	units	--
pH	8.95	units	--
Phenolics	<0.02	mg/L	0.010
Sulfate	160	mg/L	5.0
Specific Conductance at 25 deg.C	1120	umhos/cm	1.0
Specific Conductance at 25 deg.C	1100	umhos/cm	1.0
Specific Conductance at 25 deg.C	1130	umhos/cm	1.0
Specific Conductance at 25 deg.C	1130	umhos/cm	1.0
Total Organic Carbon	0.8	mg/L	1.0
Total Organic Carbon	<0.5	mg/L	1.0
Total Organic Carbon	1.6	mg/L	1.0
Total Organic Carbon	0.8	mg/L	1.0
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30.0
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30.0
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30.0
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30.0
Total Dissolved Solids	690	mg/L	10.0
Water Elevation	---	ft	--

* Data from Analytical Technologies, Inc.
(1) Total Organic Halide as reported by ATI.

MW-4 Giant Refining

TCL Volatile Organics
Method 8240

Parameter	Date: 06 MAR 91 Result*	Units	Reporting Limit
Chloromethane	<10	ug/L	10
Bromomethane	<10	ug/L	10
Vinyl chloride	<1	ug/L	10
Chloroethane	<1	ug/L	10
Methylene chloride	<5	ug/L	5.0
Acetone	<10	ug/L	10
Carbon disulfide	<1	ug/L	5.0
1,1-Dichloroethene	<1	ug/L	5.0
1,1-Dichloroethane	<1	ug/L	5.0
1,2-Dichloroethene (cis/trans)	<1	ug/L	5.0
Chloroform	<1	ug/L	5.0
1,2-Dichloroethane	<1	ug/L	5.0
2-Butanone	<2	ug/L	5.0
1,1,1-Trichloroethane	<1	ug/L	10
Carbon tetrachloride	<1	ug/L	5.0
Vinyl acetate	<10	ug/L	5.0
Bromodichloromethane	<1	ug/L	10
trans-1,3-Dichloropropene	<1	ug/L	5.0
Trichloroethene	<1	ug/L	5.0
Chlorodibromomethane	<1	ug/L	5.0
1,1,2-Trichloroethane	<1	ug/L	5.0
Benzene	<1	ug/L	5.0
cis-1,3-Dichloropropene	<1	ug/L	5.0
2-Chloroethyl vinyl ether	<10	ug/L	10
Bromoform	<5	ug/L	5.0
4-Methyl-2-pentanone	<10	ug/L	10
2-Hexanone	<10	ug/L	10
1,1,2,2-Tetrachloroethane	<1	ug/L	5.0
Tetrachoroethene	<1	ug/L	5.0
Tolukebe	<1	ug/L	5.0
Chlorobenzene	<1	ug/L	5.0
Ethylbenzene	<1	ug/L	5.0
Stryene	<1	ug/L	5.0
Xylenes (total)	<1	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	---	ug/L	5.0
1,2-Dibromoethane (EDB)	---	ug/L	5.0
1,2-Dichlorobenzene	---	ug/L	5.0
1,3-Dichlorobenzene	---	ug/L	5.0

* Data from Analytical Technologies, Inc.

MW-4

Metals
Dissolved Metals

Parameter	06 MAR 91 Result*	Units	Reporting Limit
Arsenic	<0.005	mg/L	0.010
Barium	0.019	mg/L	0.010
Cadmium	<0.005	mg/L	0.0050
Calcium	2.0	mg/L	0.20
Magnesium	0.3	mg/L	0.20
Manganese	0.010	mg/L	0.010
Potassium	<1.0	mg/L	5.00
Selenium	<0.0005	mg/L	0.0050
Silver	0.016	mg/L	0.010
Sodium	292	mg/L	5.0

* Data from Analytical Technologies, Inc.

MW-4 Giant Refining

Metals
Total Metals

Parameter	06 MAR 91 Result*	Units	Reporting Limit
Chromium	<0.010	mg/L	0.010
Lead	0.010	mg/L	0.0050
Mercury	<0.0002	mg/L	0.00020

* Data from Analytical Technologies, Inc.

MW-4 Giant Refining

General Inorganics

Parameter	06 MAR 91 Result*	Units	Reporting Limit
Alkalinity, Bicarb. as CaCO3 at pH 4.5	428	mg/L	5.0
Alkalinity, Carb. as CaCO3 at pH 8.3	28	mg/L	5.0
Chloride	19	mg/L	3.0
pH	8.65	units	--
pH	8.69	units	--
pH	8.69	units	--
pH	8.69	units	--
Phenolics	0.02	mg/L	0.010
Sulfate	150	mg/L	5.0
Specific Conductance at 25 deg.C	1150	umhos/cm	1.0
Specific Conductance at 25 deg.C	1130	umhos/cm	1.0
Specific Conductance at 25 deg.C	1150	umhos/cm	1.0
Specific Conductance at 25 deg.C	1100	umhos/cm	1.0
Total Organic Carbon	0.5	mg/L	1.0
Total Organic Carbon	1.5	mg/L	1.0
Total Organic Carbon	0.9	mg/L	1.0
Total Organic Carbon	0.6	mg/L	1.0
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30.0
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30.0
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30.0
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30.0
Total Dissolved Solids	1100	mg/L	10.0
Water Elevation	---	ft	--

* Data from Analytical Technologies, Inc.
(1) Total Organic Halide as reported by ATI.

MW-5 Giant Refining Gallup, New Mexico

TCL Volatile Organics
Method 8240

Parameter	Date: 06 MAR 91 Result*	Units	Reporting Limit
Chloromethane	<10	ug/L	10
Bromomethane	<10	ug/L	10
Vinyl chloride	<1	ug/L	10
Chloroethane	<1	ug/L	10
Methylene chloride	<5	ug/L	5.0
Acetone	<10	ug/L	10
Carbon disulfide	<1	ug/L	5.0
1,1-Dichloroethene	<1	ug/L	5.0
1,1-Dichloroethane	<1	ug/L	5.0
1,2-Dichloroethene (cis/trans)	<1	ug/L	5.0
Chloroform	<1	ug/L	5.0
1,2-Dichloroethane	<1	ug/L	5.0
2-Butanone	<2	ug/L	5.0
1,1,1-Trichloroethane	<1	ug/L	10
Carbon tetrachloride	<1	ug/L	5.0
Vinyl acetate	<10	ug/L	5.0
Bromodichloromethane	<1	ug/L	10
trans-1,3-Dichloropropene	<1	ug/L	5.0
Trichloroethene	<1	ug/L	5.0
Chlorodibromomethane	<1	ug/L	5.0
1,1,2-Trichloroethane	<1	ug/L	5.0
Benzene	<1	ug/L	5.0
cis-1,3-Dichloropropene	<1	ug/L	5.0
2-Chloroethyl vinyl ether	<10	ug/L	10
Bromoform	<5	ug/L	5.0
4-Methyl-2-pentanone	<10	ug/L	10
2-Hexanone	<10	ug/L	10
1,1,2,2-Tetrachloroethane	<1	ug/L	5.0
Tetrachoroethene	<1	ug/L	5.0
Tolukebe	<1	ug/L	5.0
Chlorobenzene	<1	ug/L	5.0
Ethylbenzene	<1	ug/L	5.0
Stryene	<1	ug/L	5.0
Xylenes (total)	<1	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	---	ug/L	10
1,2-Dibromoethane (EDB)	---	ug/L	10
1,2-Dichlorobenzene	---	ug/L	5.0
1,4-Dichlorobenzene	---	ug/L	5.0

* Data from Analytical Technologies, Inc.

MW-5

Metals
Dissolved Metals

Parameter	Date: 06 MAR 91 Result*	Units	Reporting Limit
Arsenic	<0.005	mg/L	0.010
Barium	0.017	mg/L	0.010
Cadmium	<0.005	mg/L	0.0050
Calcium	1.7	mg/L	0.20
Magnesium	0.2	mg/L	0.20
Manganese	<0.010	mg/L	0.010
Potassium	<1.0	mg/L	5.00
Selenium	0.005	mg/L	0.0050
Silver	<0.010	mg/L	0.010
Sodium	270	mg/L	5.0

* Data from Analytical Technologies, Inc.

MW-5 Giant Refining

Metals
Total Metals

Parameter	06 MAR 91 Result*	Units	Reporting Limit
Chromium	<0.010	mg/L	0.010
Lead	<0.002	mg/L	0.0050
Mercury	<0.0002	mg/L	0.00020

* Data from Analytical Technologies, Inc.

MW-5 Giant Refining

General Inorganics

Parameter	Date: 06 MAR 91 Result*	Units	Reporting Limit
Alkalinity, Bicarb. as CaCO3 at pH 4.5	314	mg/L	5.0
Alkalinity, Carb. as CaCO3 at pH 8.3	32	mg/L	5.0
Chloride	67	mg/L	3.0
pH	8.87	units	--
pH	8.97	units	--
pH	8.95	units	--
pH	8.94	units	--
Phenolics	<0.02	mg/L	0.010
Sulfate	160	mg/L	5.0
Specific Conductance at 25 deg.C	1100	umhos/cm	1.0
Specific Conductance at 25 deg.C	1160	umhos/cm	1.0
Specific Conductance at 25 deg.C	1140	umhos/cm	1.0
Specific Conductance at 25 deg.C	1130	umhos/cm	1.0
Total Organic Carbon	1.0	mg/L	1.0
Total Organic Carbon	0.8	mg/L	1.0
Total Organic Carbon	1.6	mg/L	1.0
Total Organic Carbon	0.7	mg/L	1.0
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30.0
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30.0
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30.0
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30.0
Total Dissolved Solids	700	mg/L	10.0
Water Elevation	---	ft	--

* Data from Analytical Technologies, Inc.
(1) Total Organic Halide as reported by ATI.

OW-11 Giant Refining

TCL Volatile Organics
Method 8240

Parameter	06 MAR 91 Result*	Units
1,1-Dichloroethene	<1	ug/L
2-Butanone	<2	ug/L
1,1,1-Trichloroethane	<1	ug/L
Benzene	<1	ug/L
Tetrachloroethene	<1	ug/L
Toluene	<1	ug/L
Ethylbenzene	<1	ug/L
Xylenes (total)	<1	ug/L
Chloromethane	<10	ug/L
Bromomethane	<10	ug/L
Vinyl Chloride	<1	ug/L
Chloroethane	<1	ug/L
Methylene Chloride	<5	ug/L
Carbon Disulfide	<1	ug/L
1,1-Dichloroethane	<1	ug/L
1,2-Dichloroethene (Total)	<1	ug/L
Chloroform	<1	ug/L
1,2-Dichloroethane	<1	ug/L
Carbon Tetrachloride	<1	ug/L
Vinyl Acetate	<10	ug/L
Bromodichloromethane	<1	ug/L
1,1,2,2-Tetrachloroethane	<1	ug/L
1,2-Dichloropropane	<1	ug/L
Trans-1,3-Dichloropropene	<1	ug/L
Trichloroethene	<1	ug/L
Dibromochloromethane	<1	ug/L
1,1,2-Trichloroethane	<1	ug/L
Cis-1,3-Dichloropropene	<1	ug/L
2-Chloroethylvinylether	<10	ug/L
Bromoform	<5	ug/L
2-Hexanone (MBK)	<10	ug/L
4-Methyl-2-Pentanone (MIBK)	<10	ug/L
Chlorobenzene	<1	ug/L
Styrene	<1	ug/L

* Data from Analytical Technologies, Inc.

OW-11 Giant Refining

Metals
Dissolved Metals

Parameter	06 MAR 91 Result*	Units
Arsenic	<0.005	mg/L
Barium	0.023	mg/L
Cadmium	<0.005	mg/L
Calcium	5.0	mg/L
Copper	---	mg/L
Manganese	<0.010	mg/L
Nickel	---	mg/L
Selenium	0.036	mg/L
Silver	0.028	mg/L
Sodium	426	mg/L
Zinc	---	mg/L
Potassium	1.4	mg/L

* Data from Analytical Technologies, Inc.

OW-11 Giant Refining Gallup,

Metals
Total Metals

Parameter	06 MAR 91 Result*	Units
Chromium	<0.010	mg/L
Lead	0.003	mg/L
Mercury	<0.0002	mg/L

* Data from Analytical Technologies, Inc.

OW-11 Giant Refining

General Inorganics

Parameter	06 MAR 91 Result*	Units
Alkalinity, Bicarb. as CaCO3 at pH 4.5	456	mg/L
Alkalinity, Carb. as CaCO3 at pH 8.3	<1	mg/L
Chloride	140	mg/L
pH	8.30	units
pH	8.18	units
pH	8.14	units
pH	8.07	units
Phenolics	<0.02	mg/L
Sulfate	200	mg/L
Specific Conductance at 25 deg.C	1760	umhos/cm
Specific Conductance at 25 deg.C	1760	umhos/cm
Specific Conductance at 25 deg.C	1700	umhos/cm
Specific Conductance at 25 deg.C	1720	umhos/cm
Total Organic Carbon	5.9	mg/L
Total Organic Carbon	5.1	mg/L
Total Organic Carbon	5.7	mg/L
Total Organic Carbon	5.5	mg/L
Total Organic Halogen as Cl	0.013 (1)	ug/L
Total Organic Halogen as Cl	0.015 (1)	ug/L
Total Organic Halogen as Cl	0.011 (1)	ug/L
Total Organic Halogen as Cl	0.010 (1)	ug/L
Total Dissolved Solids	1100	mg/L
Water Elevation	---	ft

* Data from Analytical Technologies, Inc.
(1) Total Organic Halide as reported by ATI.

SMW-1 Giant Refining

TCL Volatile Organics
Method 8240

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Chloromethane	<10	ug/L	10
Bromomethane	<10	ug/L	10
Vinyl chloride	<1	ug/L	10
Chloroethane	<1	ug/L	10
Methylene chloride	<5	ug/L	5.0
Acetone	<10	ug/L	10
Carbon disulfide	<1	ug/L	5.0
1,1-Dichloroethene	<1	ug/L	5.0
1,1-Dichloroethane	<1	ug/L	5.0
1,2-Dichloroethene (cis/trans)	<1	ug/L	5.0
Chloroform	<1	ug/L	5.0
1,2-Dichloroethane	<1	ug/L	5.0
2-Butanone	<2	ug/L	5.0
1,1,1-Trichloroethane	<1	ug/L	10
Carbon tetrachloride	<1	ug/L	5.0
Vinyl acetate	<10	ug/L	5.0
Bromodichloromethane	<1	ug/L	10
trans-1,3-Dichloropropene	<1	ug/L	5.0
Trichloroethene	<1	ug/L	5.0
Chlorodibromomethane	<1	ug/L	5.0
1,1,2-Trichloroethane	<1	ug/L	5.0
Benzene	<1	ug/L	5.0
cis-1,3-Dichloropropene	<1	ug/L	5.0
2-Chloroethyl vinyl ether	<10	ug/L	10
Bromoform	<5	ug/L	5.0
4-Methyl-2-pentanone	<10	ug/L	10
2-Hexanone	<10	ug/L	10
1,1,2,2-Tetrachloroethane	<1	ug/L	5.0
Tetrachloroethene	<1	ug/L	5.0
Toluene	<1	ug/L	5.0
Chlorobenzene	<1	ug/L	5.0
Ethylbenzene	<1	ug/L	5.0
Stryene	<1	ug/L	5.0
Xylenes (total)	<1	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	---	ug/L	10
1,2-Dibromoethane (EDB)	---	ug/L	10
1,2-Dichlorobenzene	---	ug/L	5.0
1,4-Dichlorobenzene	---	ug/L	5.0

* Data from Analytical Technologies, Inc.

SMW-1 Giant Refining

Metals
Dissolved Metals

Parameter	Date: 05 MAR 91 Result*	Units	Reporting Limit
Calcium	185	mg/L	0.40
Magnesium	50.6	mg/L	0.40
Potassium	1.9	mg/L	10.0
Sodium	1390	mg/L	10.0

* Data from Analytical Technologies, Inc.

SMW-1 Giant Refining

Metals
Total Metals

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Chromium	0.075	mg/L	0.010
Lead	0.007	mg/L	0.0050

* Data from Analytical Technologies,

SMW-1 Giant Refining

General Inorganics

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Alkalinity, Bicarb. as CaCO3 at pH 4.5	620	mg/L	5.0
Alkalinity, Carb. as CaCO3 at pH 8.3	<1	mg/L	5.0
Chloride	1130	mg/L	3.0
pH	7.52	units	---
pH	7.69	units	---
pH	7.54	units	---
pH	7.55	units	---
Average pH		units	---
Sulfate	1300	mg/L	5.0
Specific Conductance at 25 deg.C	6320	umhos/cm	1.0
Specific Conductance at 25 deg.C	6170	umhos/cm	1.0
Specific Conductance at 25 deg.C	6180	umhos/cm	1.0
Specific Conductance at 25 deg.C	6240	umhos/cm	1.0
Average Specific Conductance at 25 deg.C		umhos/cm	1.0
Total Organic Carbon	14.0	mg/L	0.50
Total Organic Carbon	12.8	mg/L	0.50
Total Organic Carbon	15.8	mg/L	0.50
Total Organic Carbon	11.4	mg/L	0.50
Total Organic Halogen as Cl	0.032 (1)	ug/L	30
Total Organic Halogen as Cl	0.039 (1)	ug/L	30
Total Organic Halogen as Cl	0.053 (1)	ug/L	30
Total Organic Halogen as Cl	0.037 (1)	ug/L	30
Total Dissolved Solids	4700	mg/L	10
Water Elevation	---	ft	

* Data from Analytical Technologies, Inc.
(1) Total Organic Halide as reported by ATI

SMW-2 Giant Refining

TCL Volatile Organics
Method 8240

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Chloromethane	<10	ug/L	10
Bromomethane	<10	ug/L	10
Vinyl chloride	<1	ug/L	10
Chloroethane	<1	ug/L	10
Methylene chloride	<5	ug/L	5.0
Acetone	<10	ug/L	10
Carbon disulfide	<1	ug/L	5.0
1,1-Dichloroethene	<1	ug/L	5.0
1,1-Dichloroethane	<1	ug/L	5.0
1,2-Dichloroethene (cis/trans)	<1	ug/L	5.0
Chloroform	<1	ug/L	5.0
1,2-Dichloroethane	<1	ug/L	5.0
2-Butanone	<2	ug/L	5.0
1,1,1-Trichloroethane	<1	ug/L	10
Carbon tetrachloride	<1	ug/L	5.0
Vinyl acetate	<10	ug/L	5.0
Bromodichloromethane	<1	ug/L	10
trans-1,3-Dichloropropene	<1	ug/L	5.0
Trichloroethene	<1	ug/L	5.0
Chlorodibromomethane	<1	ug/L	5.0
1,1,2-Trichloroethane	<1	ug/L	5.0
Benzene	<1	ug/L	5.0
cis-1,3-Dichloropropene	<1	ug/L	5.0
2-Chloroethyl vinyl ether	<10	ug/L	10
Bromoform	<5	ug/L	5.0
4-Methyl-2-pentanone	<10	ug/L	10
2-Hexanone	<10	ug/L	10
1,1,2,2-Tetrachloroethane	<1	ug/L	5.0
Tetrachloroethene	<1	ug/L	5.0
Toluene	<1	ug/L	5.0
Chlorobenzene	<1	ug/L	5.0
Ethylbenzene	<1	ug/L	5.0
Stryene	<1	ug/L	5.0
Xylenes (total)	<1	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	---	ug/L	10
1,2-Dibromoethane (EDB)	---	ug/L	10
1,2-Dichlorobenzene	---	ug/L	5.0
1,4-Dichlorobenzene	---	ug/L	5.0

* Data from Analytical Technologies, Inc.

SMW-2 Giant Refining

Metals
Dissolved Metals

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Calcium	132	mg/L	0.40
Magnesium	37.8	mg/L	0.40
Potassium	<1.0	mg/L	10.0
Sodium	1620	mg/L	10.0

* Data from Analytical Technologies, Inc.

SMW-2 Giant Refining

Total Metals

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Chromium	0.245	mg/L	0.010
Lead	0.010	mg/L	0.0050

* Data from Analytical Technologies, Inc.

SMW-2 Giant Refining

General Inorganics

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Alkalinity, Bicarb. as CaCO3 at pH 4.5	578	mg/L	5.0
Alkalinity, Carb. as CaCO3 at pH 8.3	<1	mg/L	5.0
Chloride	1240	mg/L	3.0
pH	7.7	units	---
pH	7.65	units	---
pH	7.68	units	---
pH	7.69	units	---
Average pH	7.66	units	---
Sulfate	1600	mg/L	5.0
Specific Conductance at 25 deg.C	6940	umhos/cm	1.0
Specific Conductance at 25 deg.C	7030	umhos/cm	1.0
Specific Conductance at 25 deg.C	7100	umhos/cm	1.0
Specific Conductance at 25 deg.C	7100	umhos/cm	1.0
Average Specific Conductance at 25 deg.C		umhos/cm	1.0
Total Organic Carbon	14.3	mg/L	0.50
Total Organic Carbon	11.6	mg/L	0.50
Total Organic Carbon	15.2	mg/L	0.50
Total Organic Carbon	10.2	mg/L	0.50
Total Organic Halogen as Cl	0.051 (1)	ug/L	30
Total Organic Halogen as Cl	0.061 (1)	ug/L	30
Total Organic Halogen as Cl	0.051 (1)	ug/L	30
Total Organic Halogen as Cl	0.037 (1)	ug/L	30
Total Dissolved Solids	5000	mg/L	10
Water Elevation	---	ft	

* Data from Analytical Technologies, Inc.
(1) Total Organic Halide as reported by ATI.

SMW-3 Giant Refining

TCL Volatile Organics
Method 8240

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Chloromethane	<10	ug/L	10
Bromomethane	<10	ug/L	10
Vinyl chloride	<1	ug/L	10
Chloroethane	<1	ug/L	10
Methylene chloride	<5	ug/L	5.0
Acetone	<10	ug/L	10
Carbon disulfide	<1	ug/L	5.0
1,1-Dichloroethene	<1	ug/L	5.0
1,1-Dichloroethane	<1	ug/L	5.0
1,2-Dichloroethene (cis/trans)	<1	ug/L	5.0
Chloroform	<1	ug/L	5.0
1,2-Dichloroethane	<1	ug/L	5.0
2-Butanone	<2	ug/L	5.0
1,1,1-Trichloroethane	<1	ug/L	10
Carbon tetrachloride	<1	ug/L	5.0
Vinyl acetate	<10	ug/L	5.0
Bromodichloromethane	<1	ug/L	10
trans-1,3-Dichloropropene	<1	ug/L	5.0
Trichloroethene	<1	ug/L	5.0
Chlorodibromomethane	<1	ug/L	5.0
1,1,2-Trichloroethane	<1	ug/L	5.0
Benzene	<1	ug/L	5.0
cis-1,3-Dichloropropene	<1	ug/L	5.0
2-Chloroethyl vinyl ether	<10	ug/L	10
Bromoform	<5	ug/L	5.0
4-Methyl-2-pentanone	<10	ug/L	10
2-Hexanone	<10	ug/L	10
1,1,2,2-Tetrachloroethane	<1	ug/L	5.0
Tetrachloroethene	<1	ug/L	5.0
Toluene	<1	ug/L	5.0
Chlorobenzene	<1	ug/L	5.0
Ethylbenzene	<1	ug/L	5.0
Stryene	<1	ug/L	5.0
Xylenes (total)	<1	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	---	ug/L	10
1,2-Dibromoethane (EDB)	---	ug/L	10
1,2-Dichlorobenzene	---	ug/L	5.0
1,3-Dichlorobenzene	---	ug/L	5.0

* Data from Analytical Technologies, Inc.

SMW-3 Giant Refining

Metals
Dissolved Metals

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Calcium	50.4	mg/L	0.40
Magnesium	14.7	mg/L	0.40
Potassium	1.3	mg/L	10.0
Sodium	815	mg/L	10.0

* Data from Analytical Technologies, Inc.

SMW-3 Giant Refining

Total Metals

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Chromium	0.038	mg/L	0.010
Lead	0.010	mg/L	0.0050

* Data from Analytical Technologies, Inc.

SMW-3 Giant Refining

General Inorganics

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Alkalinity, Bicarb. as CaCO3 at pH 4.5	664	mg/L	5.0
Alkalinity, Carb. as CaCO3 at pH 8.3	<1	mg/L	5.0
Chloride	59	mg/L	3.0
pH	7.94	units	---
pH	8.09	units	---
pH	8.04	units	---
pH	7.92	units	---
Average pH	---	units	---
Sulfate	1200	mg/L	5.0
Specific Conductance at 25 deg.C	3400	umhos/cm	1.0
Specific Conductance at 25 deg.C	3410	umhos/cm	1.0
Specific Conductance at 25 deg.C	3330	umhos/cm	1.0
Specific Conductance at 25 deg.C	3590	umhos/cm	1.0
Average Specific Conductance at 25 deg.C		umhos/cm	1.0
Total Organic Carbon	3.0	mg/L	0.50
Total Organic Carbon	5.1	mg/L	0.50
Total Organic Carbon	2.5	mg/L	0.50
Total Organic Carbon	3.3	mg/L	0.50
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30
Total Organic Halogen as Cl	0.015 (1)	ug/L	30
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30
Total Dissolved Solids	5200	mg/L	10
Water Elevation	---	ft	

* Data from Analytical Technologies, Inc.
(1) Total Organic Halide as reported by ATI.

SMW-4 Giant Refining

TCL Volatile Organics
Method 8240

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Chloromethane	<10	ug/L	10
Bromomethane	<10	ug/L	10
Vinyl chloride	<1	ug/L	10
Chloroethane	<1	ug/L	10
Methylene chloride	<5	ug/L	5.0
Acetone	<10	ug/L	10
Carbon disulfide	<1	ug/L	5.0
1,1-Dichloroethene	<1	ug/L	5.0
1,1-Dichloroethane	<1	ug/L	5.0
1,2-Dichloroethene (cis/trans)	<1	ug/L	5.0
Chloroform	<1	ug/L	5.0
1,2-Dichloroethane	<1	ug/L	5.0
2-Butanone	<2	ug/L	5.0
1,1,1-Trichloroethane	<1	ug/L	10
Carbon tetrachloride	<1	ug/L	5.0
Vinyl acetate	<10	ug/L	5.0
Bromodichloromethane	<1	ug/L	10
trans-1,3-Dichloropropene	<1	ug/L	5.0
Trichloroethene	<1	ug/L	5.0
Chlorodibromomethane	<1	ug/L	5.0
1,1,2-Trichloroethane	<1	ug/L	5.0
Benzene	<1	ug/L	5.0
cis-1,3-Dichloropropene	<1	ug/L	5.0
2-Chloroethyl vinyl ether	<10	ug/L	10
Bromoform	<5	ug/L	5.0
4-Methyl-2-pentanone	<10	ug/L	10
2-Hexanone	<10	ug/L	10
1,1,2,2-Tetrachloroethane	<1	ug/L	5.0
Tetrachloroethene	<1	ug/L	5.0
Toluene	<1	ug/L	5.0
Chlorobenzene	<1	ug/L	5.0
Ethylbenzene	<1	ug/L	5.0
Stryene	<1	ug/L	5.0
Xylenes (total)	<1	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	---	ug/L	10
1,2-Dibromoethane (EDB)	---	ug/L	10
1,2-Dichlorobenzene	---	ug/L	5.0
1,4-Dichlorobenzene	---	ug/L	5.0

* Data from Analytical Technologies, Inc.

SMW-4 Giant Refinery

Dissolved Metals

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Calcium	4.5	mg/L	0.40
Magnesium	1.1	mg/L	0.40
Potassium	1.3	mg/L	10.0
Sodium	306	mg/L	10.0

* Data from Analytical Technologies, Inc.

SMW-4 Giant Refining

Total Metals

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Chromium	0.032	mg/L	0.010
Lead	0.008	mg/L	0.0050

* Data from Analytical Technologies, Inc.

SMW-4 Giant Refining

General Inorganics

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Alkalinity, Bicarb. as CaCO3 at pH 4.5	418	mg/L	5.0
Alkalinity, Carb. as CaCO3 at pH 8.3	24	mg/L	5.0
Chloride	58	mg/L	3.0
pH	8.54	units	---
pH	8.39	units	---
pH	8.38	units	---
pH	8.37	units	---
Average pH	---	units	---
Sulfate	170	mg/L	5.0
Specific Conductance at 25 deg.C	1210	umhos/cm	1.0
Specific Conductance at 25 deg.C	1210	umhos/cm	1.0
Specific Conductance at 25 deg.C	1230	umhos/cm	1.0
Specific Conductance at 25 deg.C	1240	umhos/cm	1.0
Average Specific Conductance at 25 deg.C		umhos/cm	1.0
Total Organic Carbon	2.6	mg/L	0.50
Total Organic Carbon	2.2	mg/L	0.50
Total Organic Carbon	1.6	mg/L	0.50
Total Organic Carbon	1.7	mg/L	0.50
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30
Total Dissolved Solids	860	mg/L	10
Water Elevation	---	ft	

* Data from Analytical Technologies, Inc.
(1) Total Organic Halide as reported by ATI.

SMW-5 Giant Refining

TCL Volatile Organics
Method 8240

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Chloromethane	<10	ug/L	10
Bromomethane	<10	ug/L	10
Vinyl chloride	<1	ug/L	10
Chloroethane	<1	ug/L	10
Methylene chloride	<5	ug/L	5.0
Acetone	<10	ug/L	10
Carbon disulfide	<1	ug/L	5.0
1,1-Dichloroethene	<1	ug/L	5.0
1,1-Dichloroethane	<1	ug/L	5.0
1,2-Dichloroethene	<1		
(cis/trans)	<1	ug/L	5.0
Chloroform	<1	ug/L	5.0
1,2-Dichloroethane	<1	ug/L	5.0
2-Butanone	<2	ug/L	5.0
1,1,1-Trichloroethane	<1	ug/L	10
Carbon tetrachloride	<1	ug/L	5.0
Vinyl acetate	<10	ug/L	5.0
Bromodichloromethane	<1	ug/L	10
trans-1,3-Dichloropropene	<1	ug/L	5.0
Trichloroethene	<1	ug/L	5.0
Chlorodibromomethane	<1	ug/L	5.0
1,1,2-Trichloroethane	<1	ug/L	5.0
Benzene	<1	ug/L	5.0
cis-1,3-Dichloropropene	<1	ug/L	5.0
2-Chloroethyl vinyl ether	<10	ug/L	10
Bromoform	<5	ug/L	5.0
4-Methyl-2-pentanone	<10	ug/L	10
2-Hexanone	<10	ug/L	10
1,1,2,2-Tetrachloroethane	<1	ug/L	5.0
Tetrachloroethene	<1	ug/L	5.0
Toluene	<1	ug/L	5.0
Chlorobenzene	<1	ug/L	5.0
Ethylbenzene	<1	ug/L	5.0
Stryene	<1	ug/L	5.0
Xylenes (total)	<1	ug/L	5.0
1,1,2 Trichloro-1,2,2-			
trifluoroethane	---	ug/L	10
1,2-Dibromoethane (EDB)	---	ug/L	10
1,2-Dichlorobenzene	---	ug/L	5.0
1,3-Dichlorobenzene	---	ug/L	5.0

* Data from Analytical Technologies, Inc.

SMW-5 Giant Refinery

Metals
Dissolved Metals

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Calcium	3.3	mg/L	0.40
Magnesium	0.8	mg/L	0.40
Potassium	<1.0	mg/L	10.0
Sodium	281	mg/L	10.0

* Data from Analytical Technologies, Inc.

SMW-5 Giant Refining

Metals
Total Metals

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Chromium	0.042	mg/L	0.010
Lead	<0.002	mg/L	0.0050

* Data from Analytical Technologies, Inc.

SMW-5 Giant Refining

General Inorganics

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Alkalinity, Bicarb. as CaCO3 at pH 4.5	378	mg/L	5.0
Alkalinity, Carb. as CaCO3 at pH 8.3	20	mg/L	5.0
Chloride	65	mg/L	3.0
pH	8.56	units	---
pH	8.54	units	---
pH	8.51	units	---
pH	8.55	units	---
Average pH	---	units	---
Sulfate	150	mg/L	5.0
Specific Conductance at 25 deg.C	1160	umhos/cm	1.0
Specific Conductance at 25 deg.C	1150	umhos/cm	1.0
Specific Conductance at 25 deg.C	1120	umhos/cm	1.0
Specific Conductance at 25 deg.C	1150	umhos/cm	1.0
Average Specific Conductance at 25 deg.C		umhos/cm	1.0
Total Organic Carbon	2.3	mg/L	0.50
Total Organic Carbon	3.2	mg/L	0.50
Total Organic Carbon	1.3	mg/L	0.50
Total Organic Carbon	1.5	mg/L	0.50
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30
Total Organic Halogen as Cl	<0.008 (1)	ug/L	30
Total Dissolved Solids	1500	mg/L	10
Water Elevation	---	ft	

* Data from Analytical Technologies, Inc.
(1) Total Organic Halide as reported by ATI.

SMW-6 Giant Refining

TCL Volatile Organics
Method 8240

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Chloromethane	<10	ug/L	10
Bromomethane	<10	ug/L	10
Vinyl chloride	<1	ug/L	10
Chloroethane	<1	ug/L	10
Methylene chloride	<5	ug/L	5.0
Acetone	15	ug/L	10
Carbon disulfide	<1	ug/L	5.0
1,1-Dichloroethene	<1	ug/L	5.0
1,1-Dichloroethane	<1	ug/L	5.0
1,2-Dichloroethene (cis/trans)	<1	ug/L	5.0
Chloroform	<1	ug/L	5.0
1,2-Dichloroethane	<1	ug/L	5.0
2-Butanone	<2	ug/L	5.0
1,1,1-Trichloroethane	<1	ug/L	10
Carbon tetrachloride	<1	ug/L	5.0
Vinyl acetate	<10	ug/L	5.0
Bromodichloromethane	<1	ug/L	10
trans-1,3-Dichloropropene	<1	ug/L	5.0
Trichloroethene	<1	ug/L	5.0
Chlorodibromomethane	<1	ug/L	5.0
1,1,2-Trichloroethane	<1	ug/L	5.0
Benzene	<1	ug/L	5.0
cis-1,3-Dichloropropene	<1	ug/L	5.0
2-Chloroethyl vinyl ether	<10	ug/L	10
Bromoform	<5	ug/L	5.0
4-Methyl-2-pentanone	<10	ug/L	10
2-Hexanone	<10	ug/L	10
1,1,2,2-Tetrachloroethane	<1	ug/L	5.0
Tetrachloroethene	<1	ug/L	5.0
Toluene	<1	ug/L	5.0
Chlorobenzene	<1	ug/L	5.0
Ethylbenzene	<1	ug/L	5.0
Stryene	<1	ug/L	5.0
Xylenes (total)	<1	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	---	ug/L	
1,2-Dibromoethane (EDB)	---	ug/L	
1,2-Dichlorobenzene	---	ug/L	
1,4-Dichlorobenzene	---	ug/L	

* Data from Analytical Technologies, Inc.

SMW-6 Giant Refinery

Metals
Dissolved Metals

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Calcium	6.6	mg/L	0.40
Magnesium	1.9	mg/L	0.40
Potassium	3.6	mg/L	10.0
Sodium	376	mg/L	10.0

* Data from Analytical Technologies, Inc.

SMW-6 Giant Refining

Total Metals

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Chromium	<0.010	mg/L	0.010
Lead	<0.002	mg/L	0.0050

* Data from Analytical Technologies, Inc.

SMW-6 Giant Refining

General Inorganics

Parameter	05 MAR 91 Result*	Units	Reporting Limit
Alkalinity, Bicarb. as			10
CaCO3 at pH 4.5	604	mg/L	10
Alkalinity, Carb. as			10
CaCO3 at pH 8.3	8	mg/L	10
Chloride	82	mg/L	5.0
pH	8.41	units	10
pH	8.20	units	5.0
pH	8.20	units	5.0
pH	8.17	units	5.0
Average pH	---	units	
Sulfate	200	mg/L	5.0
Specific Conductance			5.0
at 25 deg.C	1520	umhos/cm	5.0
Specific Conductance			5.0
at 25 deg.C	1540	umhos/cm	10
Specific Conductance			5.0
at 25 deg.C	1520	umhos/cm	5.0
Specific Conductance			10
at 25 deg.C	1490	umhos/cm	5.0
Average Specific			5.0
Conductance at 25 deg.C		umhos/cm	5.0
Total Organic Carbon	2.0	mg/L	5.0
Total Organic Carbon	1.2	mg/L	5.0
Total Organic Carbon	1.2	mg/L	5.0
Total Organic Carbon	1.3	mg/L	10
Total Organic			5.0
Halogen as Cl	<0.008 (1)	ug/L	10
Total Organic			10
Halogen as Cl	<0.008 (1)	ug/L	5.0
Total Organic			5.0
Halogen as Cl	<0.008 (1)	ug/L	5.0
Total Organic			5.0
Halogen as Cl	<0.008 (1)	ug/L	5.0
Total Dissolved			5.0
Solids	1100	mg/L	5.0
Water Elevation	---	ft	

* Data from Analytical Technologies, Inc.
(1) Total Organic Halide as reported by ATI.

Instructions for Completing the Background and Semi-Annual Indicator Parameter Worksheets

These calculations must be completed within 14 days of receiving raw analytical data from the lab so that your facility can "immediately obtain additional groundwater samples" and determine if your facility is in assessment. See HWMR-5, Part 6, Section 265.93(c)(2)

Background Indicator Parameter Calculation Sheet

1. This sheet provides space for two upgradient wells being used to establish the background data against which all future comparisons will be made for all downgradient as well as upgradient monitoring wells (HWMR-5, Part VI, Section 265.92(c)(2). You may use the sheet for either one or two upgradient wells during the first year's quarterly establishment of background data. If you have more than two upgradient wells, please call EID.

2. The left-hand set of columns is for one upgradient well. Indicate the well code number on the line provided above the two left-hand columns. The sixteen lines will accommodate four replicate sample values for each of four quarters.

3. The right-hand set of columns is for the second upgradient well, if there is one. If the RCRA facility has only one upgradient well, ignore the two right-hand columns.

4. As per the instructions on the sheet, enter values which the laboratory has reported as below the minimum detection limit as one-half the minimum detection limit stated on the analysis form. For example, if the minimum detection limit for TOC is listed as 0.5 ppm, and the value found for a particular sample is listed as zero, enter the value for that sample as 0.25 ppm.

5. After the final quarter's data has been recorded in the Sample Value column, total the sixteen values as Total #1. If there is a second upgradient well, total the values for that well as Total #2.

6. On page 2, find $\overline{X_b}$ by dividing the grand total (Total #1 + Total #2) by the total number of samples, n_b, to get the average value, $\overline{X_b}$.

7. For each Sample Value on page 1, subtract from it $\overline{X_b}$, square the result, and enter this value on the (Value - $\overline{X_b}$)^2 line. Total these values as Total #3 and Total #4 (if any). The variance (S_b^2) is found by dividing this grand total by n_b-1.

NOTE: You may have a statistical calculator which will compute the background data variance, S_b^2, from the raw data. If you use such a calculator, run through the example data set given at the end of these instructions using your statistical calculator and verify that the variance you compute agrees with our listed result for s^2.

8. Next calculate the background correction factor, W_b.

9. Finally, locate the t-test statistic for the background data, t_b, in the tables on page 2, which list t values at the 0.01 level of significance. The second table lists values of t_b to be used for the statistical evaluation of pH. Using the first table, for example, if you had a total of 16 sample values, t_b would be 2.602. (If you have used t-test statistic tables before, note that this one is different in that you don't have to locate the test statistic value by using a "n-1 degrees of freedom" value column. The table has been altered to allow you to select the t-value directly from the sample size number, n_b.)

10. List the four background data values on the lines provided. It is suggested that you make copies of page 3 of the completed Background Indicator Parameter Calculation Sheet, as you will be using these four data values for each semi-annual evaluation of both upgradient and downgradient wells for each indicator parameter, and we request you to submit the background data sheets with each annual report.

11. If you are using a statistical calculator to determine the variance (S_b^2) of the background data set, test your calculator against the following set of data:

1.	0.25
2.	0.43
3.	1.01
4.	0.54
5.	1.23
6.	0.25
7.	0.98
8.	0.59
9.	0.63
10.	0.25

The variance of this data set is 0.123. If your calculations resulted in the value 0.351, you have calculated S_b, not S_b^2.

Semi-Annual Evaluation of Indicator Parameters

1. We recommend you use the form provided by EID, "Calculation Sheet for Semi-Annual Evaluation of Indicator Parameters". Write in the spaces provided the facility's name and EPA ID#

plus the values for $\overline{X}_b$, S_b^2, W_b, and t_b as calculated for the background data. We recommend you make multiple copies of this sheet and retain the master copy for future inclusion in the facility's annual reports. Don't include the name of the person completing the form or his/her telephone contact number, as over time various people may be responsible for the semi-annual monitoring well data evaluations.

2. List date the samples were taken, the parameter for which the samples were evaluated, the well code number and indicate whether the well is an upgradient (U) or a downgradient (D) monitoring well.

3. Calculate the values $\overline{X}_m$ (the mean sample value for the given parameter for the monitoring well), S_m^2 (the variance for the monitoring well data), and W_m (the correction factor for the monitoring well data set). As you must always take one sample from each of four bailers, you must **always** have four data points for each parameter for each monitoring well. Consequently t_m for pH (two-tailed t-test, 0.01 level of significance) will always be 5.841, and for TOX, TOC or Specific Conductivity (one-tailed, 0.01 level of significance) will always be 4.541.

4. Calculate t^* and t_o as indicated on the form, and follow the instructions given at the bottom of the form. Note that you must evaluate semi-annually both upgradient and downgradient monitoring wells for significant differences in indicator parameters versus the background data. Before March 1 of every year you must report 1) all statistical evaluations for the indicator parameters for all downgradient wells, and 2) separately report any significant differences between any upgradient well and the background data.

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Background Semi-Annual Indicator Parameter
Statistical Calculation Sheet

Please Print Your Name: _____ Your Telephone #: _____

Facility Name: _____ EPA ID#: _____

This report data: _____ Parameter: _____

List all values found during each quarterly monitoring for all upgradient wells. If the laboratory has listed a value as less than the detection limit, enter one-half the value listed as the minimum detectable concentration. This form can be used for up to two upgradient wells. Contact The hazardous waste section if your facility has more than two upgradient wells. **Complete the calculations only after the completion of one year of background data.**

Well Number: _____ Well Number: _____

Sample Value	$(\text{Value} - \overline{X}_b)^2$	Date of Sampling
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____
4. _____	_____	_____
5. _____	_____	_____
6. _____	_____	_____
7. _____	_____	_____
8. _____	_____	_____
9. _____	_____	_____
10. _____	_____	_____
11. _____	_____	_____
12. _____	_____	_____
13. _____	_____	_____
14. _____	_____	_____
15. _____	_____	_____
16. _____	_____	_____

Total #1: _____ Total #3: _____

Well number _____ Parameter _____

	Sample Value	$(\text{Value} - \overline{X}_b)^2$	Date of Sampling
17.	_____	_____	_____
18.	_____	_____	_____
19.	_____	_____	_____
20.	_____	_____	_____
21.	_____	_____	_____
22.	_____	_____	_____
23.	_____	_____	_____
24.	_____	_____	_____
25.	_____	_____	_____
26.	_____	_____	_____
27.	_____	_____	_____
28.	_____	_____	_____
29.	_____	_____	_____
30.	_____	_____	_____
31.	_____	_____	_____
32.	_____	_____	_____

Total #2: _____ Total #4: _____

n_b = Total number of sample background samples (up to 32 for two upgradient wells, up to 16 for one).

$\overline{X}_b$ = (Total #1 + Total #2)/n_b = _____

S_b^2 = (Total #3 + Total #4)/(n_b - 1) = _____

$$W_b = \frac{S_b^2}{n_b} = _____$$

Well Number _____ Parameter _____

For TOC, TOX or specific conductance, use the following table to locate the appropriate value for t_b, found next to the number of values in your data set, n_b.

n_b	t_b	n_b	t_b	n_b	t_b	n_b	t_b
1	-----	11	2.764	21	2.528	31	2.457
2	31.821	12	2.718	22	2.518	32	2.452
3	6.965	13	2.681	23	2.508		
4	4.541	14	2.650	24	2.500		
5	3.747	15	2.624	25	2.492		
6	3.365	16	2.602	26	2.485		
7	3.143	17	2.583	27	2.479		
8	2.998	18	2.567	28	2.473		
9	2.896	19	2.552	29	2.467		
10	2.821	20	2.539	30	2.462		

For pH, use the following table to locate the value for t_b.

n_b	t_b	n_b	t_b	n_b	t_b	n_b	t_b
1	-----	11	3.169	21	2.845	31	2.750
2	63.657	12	3.106	22	2.831	32	2.745
3	9.925	13	3.055	23	2.819		
4	5.841	14	3.012	24	2.807		
5	4.604	15	2.977	25	2.797		
6	4.032	16	2.947	26	2.787		
7	3.707	17	2.921	27	2.779		
8	3.499	18	2.898	28	2.771		
9	3.355	19	2.878	29	2.763		
10	3.250	20	2.861	30	2.756		

The values for $\overline{X}_b$, S_b^2, W_b and t_b, as found above, will be used in all subsequent evaluations of monitoring wells for significant increases in the indicator parameters.

Well Number _____

Date _____ Parameter _____

Please list these four values below:

$\overline{X}_b$ = _____

S_b^2 = _____

W_b = _____

t_b = _____

_____
Your Signature

Calculation Sheet for Semi-Annual Statistical Evaluation
of Indicator Parameters for Annual Report

Print Your Name: _____ Your Telephone #: _____

Facility Name: _____ EPA ID#: _____

Date of Sampling: _____ Parameter: _____

Well Number: _____

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

$\overline{X}_b$ = _____ S_b^2 = _____

W_b = _____ t_b = _____

Please list the current values for this downgradient monitoring well.

	Value	$(\text{Value}-\overline{X}_m)^2$
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____

Total #1: _____ Total #2: _____

$\overline{X}_m$ = (Total #1)/4 = _____

t_m (TOC,TOX, S.C) = 4.541
t_m (pH) = 5.841

S_m^2 = (Total #2)/3 = _____

$W_m = S_m^2/n_m$ = _____

$$t^* = \frac{X_m - \overline{X}_b}{\sqrt{W_m + W_b}} = \frac{\quad - \quad}{\sqrt{\quad + \quad}} = ____$$

$$t_c = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{\quad \times \quad + \quad \times \quad}{\quad + \quad} =$$

For pH values, treat the value for t^* as if it is positive in all cases. If t^* is greater than t_c for any of the indicator parameters, you must **immediately** resample all monitoring wells for this unit. If the t^* value for the reevaluation is still greater than t_c, the RCRA unit served by the monitoring wells is in assessment, and **you must notify EID within 7 days.**

_____ Report Date

_____ Signature

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