GIANT
REFINING CO.

Route 3, Box 7
Gallup, New Mexico
87301

505
722-3833

January 28, 1991

Jack Elvinger
Bureau Chief
Hazardous Waste Division
New Mexico Environmental Improvement Division
Harold Runnels Building
1190 St. Francis Drive
Santa Fe, New Mexico 87504-0968

RE: Annual Ground Water Monitoring Report
Giant Refining Company
Route 3 Box 7
Gallup, New Mexico 87301
Permit No. NMD000333211-2

Dear Mr. Elvinger,

As required by the indicated permit, the annual ground water monitoring report is attached. The report is organized as follows:

Appendix A: Monitoring Well Identification Report
Appendix B: Ground Water Measurements
Appendix C: Semi-Annual Evaluation of Indicator Parameters
Appendix D: Tabulated Analytical Summary
Appendix E: Original Analytical

The statistical comparisons of specific conductance and pH data was completed for the detection wells and compared to the background data from MW-4. These were also submitted with each semi-annual report as statistical variances were noted.

If you have any questions, contact my office at (505) 722-0217.

Sincerely,

Claud Rosendale

Claud Rosendale
Environmental Manager
Ciniza Refinery

cc w/attachments: Kim Bullerdick
Corporate Counsel
Giant Industries Arizona, Inc.

LIBRARY COPY

GIANT REFINING COMPANY
CINIZA REFINERY
JANUARY 28, 1991
1990-ANNUAL GROUND WATER REPORT

GIANT
REFINING CO.

Route 3, Box 7
Gallup, New Mexico
87301

505
722-3833

January 28, 1991

Jack Elvinger
Bureau Chief
Hazardous Waste Division
New Mexico Environmental Improvement Division
Harold Runnels Building
1190 St. Francis Drive
Santa Fe, New Mexico 87504-0968

RE: Annual Ground Water Monitoring Report
Giant Refining Company
Route 3 Box 7
Gallup, New Mexico 87301
Permit No. NMD000333211-2

Dear Mr. Elvinger,

As required by the indicated permit, the annual ground water monitoring report is attached. The report is organized as follows:

Appendix A: Monitoring Well Identification Report
Appendix B: Ground Water Measurements
Appendix C: Semi-Annual Evaluation of Indicator Parameters
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The statistical comparisons of specific conductance and pH data was completed for the detection wells and compared to the background data from MW-4. These were also submitted with each semi-annual report as statistical variances were noted.

If you have any questions, contact my office at (505) 722-0217.

Sincerely,

Claud Rosendale

Claud Rosendale
Environmental Manager
Ciniza Refinery

cc w/attachments: Kim Bullerdick
Corporate Counsel
Giant Industries Arizona, Inc.

APPENDIX A

MONITORING WELL IDENTIFICATION REPORT

MONITORING WELL IDENTIFICATION REPORT

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

FACILITY NAME Giant Refining Company

EPA I.D. NUMBER NMD000333211-2

COUNTY McKinley

WELL NUMBER MW-1

WELL LOCATION (LONGITUDE) 108° 26' 02''

WELL LOCATION (LATITUDE) 35° 29' 42''

AQUIFER NAME Sonsela

AQUIFER CONFINED X UNCONFINED

WELL INSTALLATION DATE 10-14-81

DRILLING METHOD Cable

INNER CASING DIAMETER 5.0"

BOREHOLE DIAMETER 10.0"

CASING MATERIAL PVC

METHOD OF DEVELOPMENT COMPR

ELEV BOTTOM OF BOREHOLE 6745.80

ELEV BOTTOM OF WELL CASING 6745.80

ELEV BOTTOM OF SCREENED INT 6750.80

ELEVATION OF SCREENED INT 6760.80

SURVEYED ELEV OF CASING TOP 6876.20

DATE OF REPORT Jan. 28, 1991 SIGNATURE Claud C. Rosendale

NAME (TYPED) Claud C. Rosendale

b:wellid/bas

MONITORING WELL IDENTIFICATION REPORT

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

FACILITY NAME Giant Refining Company

EPA I.D. NUMBER NMD000333211-2

COUNTY McKinley

WELL NUMBER MW-2

WELL LOCATION (LONGITUDE) 108° 26' 00"

WELL LOCATION (LATITUDE) 35° 29' 43"

AQUIFER NAME Sonsela

AQUIFER CONFINED X UNCONFINED

WELL INSTALLATION DATE 10-15-81

DRILLING METHOD Cable

INNER CASING DIAMETER 5.0"

BOREHOLE DIAMETER 10.0"

CASING MATERIAL PVC

METHOD OF DEVELOPMENT COMPR

ELEV BOTTOM OF BOREHOLE 6741.90

ELEV BOTTOM OF WELL CASING 6741.90

ELEV BOTTOM OF SCREENED INT 6747.90

ELEVATION OF SCREENED INT 6757.90

SURVEYED ELEV OF CASING TOP 6878.30

DATE OF REPORT Jan. 28, 1991 SIGNATURE Claud C Rosendale

NAME (TYPED) Claud C. Rosendale

b:wellid/bas

MONITORING WELL IDENTIFICATION REPORT

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

FACILITY NAME Giant Refining Company

EPA I.D. NUMBER NMD000333211-2

COUNTY McKinley

WELL NUMBER MW-4

WELL LOCATION (LONGITUDE) 108° 26' 54"

WELL LOCATION (LATITUDE) 35° 29' 30"

AQUIFER NAME Sonsela

AQUIFER CONFINED X UNCONFINED

WELL INSTALLATION DATE 10-16-81

DRILLING METHOD Cable

INNER CASING DIAMETER 5.0"

BOREHOLE DIAMETER 10.0"

CASING MATERIAL PVC

METHOD OF DEVELOPMENT COMPR

ELEV BOTTOM OF BOREHOLE 6761.60

ELEV BOTTOM OF WELL CASING 6761.60

ELEV BOTTOM OF SCREENED INT 6761.60

ELEVATION OF SCREENED INT 6781.60

SURVEYED ELEV OF CASING TOP 6879.80

DATE OF REPORT Jan. 28, 1991 SIGNATURE Claud C. Rosendale

NAME (TYPED) Claud C. Rosendale

b:wellid/bas

MONITORING WELL IDENTIFICATION REPORT

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

FACILITY NAME Giant Refining Company

EPA I.D. NUMBER NMD000333211-2

COUNTY McKinley

WELL NUMBER MW-5

WELL LOCATION (LONGITUDE) 108° 25' 57"

WELL LOCATION (LATITUDE) 35° 29' 43"

AQUIFER NAME Sonsela

AQUIFER CONFINED X UNCONFINED

WELL INSTALLATION DATE 7-29-86

DRILLING METHOD HLWAG and AIRRT

INNER CASING DIAMETER 4.0"

BOREHOLE DIAMETER 10.0"

CASING MATERIAL PVC

METHOD OF DEVELOPMENT COMPR

ELEV BOTTOM OF BOREHOLE 6746.80

ELEV BOTTOM OF WELL CASING 6753.30

ELEV BOTTOM OF SCREENED INT 6758.30

ELEVATION OF SCREENED INT 6768.80

SURVEYED ELEV OF CASING TOP 6880.80

DATE OF REPORT Jan. 28, 1991 SIGNATURE Claud C Rosendale

NAME (TYPED) Claud C. Rosendale

b:wellid/bas

MONITORING WELL IDENTIFICATION REPORT

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

FACILITY NAME Giant Refining Company

EPA I.D. NUMBER NMD000333211-2

COUNTY McKinley

WELL NUMBER OW-11

WELL LOCATION (LONGITUDE) 108° 25' 36''

WELL LOCATION (LATITUDE) 35° 29' 08''

AQUIFER NAME Sonsela

AQUIFER CONFINED X UNCONFINED

WELL INSTALLATION DATE 12-30-80

DRILLING METHOD Cable

INNER CASING DIAMETER 4.0"

BOREHOLE DIAMETER 8.0"

CASING MATERIAL PVC

METHOD OF DEVELOPMENT COMPR

ELEV BOTTOM OF BOREHOLE 6773.

ELEV BOTTOM OF WELL CASING 6773.

ELEV BOTTOM OF SCREENED INT 6858.

ELEVATION OF SCREENED INT 6880.

SURVEYED ELEV OF CASING TOP 6923.00

DATE OF REPORT Jan. 28, 1991 SIGNATURE Claud C Rosendale

NAME (TYPED) Claud C. Rosendale

b:wellid/bas

MONITORING WELL IDENTIFICATION REPORT

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

FACILITY NAME Giant Refining Company

EPA I.D. NUMBER NMD000333211-2

COUNTY McKinley

WELL NUMBER SMW-1

WELL LOCATION (LONGITUDE) ° ' "

WELL LOCATION (LATITUDE) ° ' "

AQUIFER NAME Ciniza Sand

AQUIFER CONFINED X UNCONFINED

WELL INSTALLATION DATE 10-4-85

DRILLING METHOD HLWAG

INNER CASING DIAMETER 2.0"

BOREHOLE DIAMETER 6.5"

CASING MATERIAL SS304

METHOD OF DEVELOPMENT COMPR

ELEV BOTTOM OF BOREHOLE 6832.73

ELEV BOTTOM OF WELL CASING 6834.23

ELEV BOTTOM OF SCREENED INT 6837.23

ELEVATION OF SCREENED INT 6857.23

SURVEYED ELEV OF CASING TOP 6880.73

DATE OF REPORT Jan. 28, 1991 SIGNATURE Claud C. Rosendale

NAME (TYPED) Claud C. Rosendale

b:wellid/bas

MONITORING WELL IDENTIFICATION REPORT

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

FACILITY NAME Giant Refining Company

EPA I.D. NUMBER NMD000333211-2

COUNTY McKinley

WELL NUMBER SMW-2

WELL LOCATION (LONGITUDE) ° ' "

WELL LOCATION (LATITUDE) ° ' "

AQUIFER NAME Ciniza Sand

AQUIFER CONFINED X UNCONFINED

WELL INSTALLATION DATE 9-26-85

DRILLING METHOD HLWAG

INNER CASING DIAMETER 2.0"

BOREHOLE DIAMETER 6.5"

CASING MATERIAL SS304

METHOD OF DEVELOPMENT COMPR

ELEV BOTTOM OF BOREHOLE 6826.73

ELEV BOTTOM OF WELL CASING 6827.13

ELEV BOTTOM OF SCREENED INT 6830.13

ELEVATION OF SCREENED INT 6850.13

SURVEYED ELEV OF CASING TOP 6881.73

DATE OF REPORT Jan. 28, 1991 SIGNATURE Claud C. Rosendale

NAME (TYPED) Claud C. Rosendale

b:wellid/bas

MONITORING WELL IDENTIFICATION REPORT

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

FACILITY NAME Giant Refning Company

EPA I.D. NUMBER NMD000333211-2

COUNTY McKinley

WELL NUMBER SMW-3

WELL LOCATION (LONGITUDE) 108° 25' 56"

WELL LOCATION (LATITUDE) 35° 29' 40"

AQUIFER NAME Ciniza Sand

AQUIFER CONFINED X UNCONFINED

WELL INSTALLATION DATE 10-1-85

DRILLING METHOD HLWAG

INNER CASING DIAMETER 2.0"

BOREHOLE DIAMETER 6.5"

CASING MATERIAL SS304

METHOD OF DEVELOPMENT COMPR

ELEV BOTTOM OF BOREHOLE 6836.15

ELEV BOTTOM OF WELL CASING 6838.65

ELEV BOTTOM OF SCREENED INT 6841.65

ELEVATION OF SCREENED INT 6861.65

SURVEYED ELEV OF CASING TOP 6882.15

DATE OF REPORT Jan. 28, 1991 SIGNATURE Claud C. Rosendale

NAME (TYPED) Claud C. Rosendale

b:wellid/bas

MONITORING WELL IDENTIFICATION REPORT

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

FACILITY NAME Giant Refining Company

EPA I.D. NUMBER NMD000333211-2

COUNTY McKinley

WELL NUMBER SMW-4

WELL LOCATION (LONGITUDE) 108° 26' 01"

WELL LOCATION (LATITUDE) 35° 29' 44"

AQUIFER NAME Ciniza Sand

AQUIFER CONFINED X UNCONFINED

WELL INSTALLATION DATE 9-25-85

DRILLING METHOD HLWAG

INNER CASING DIAMETER 2.0"

BOREHOLE DIAMETER 6.5"

CASING MATERIAL SS304

METHOD OF DEVELOPMENT COMPR

ELEV BOTTOM OF BOREHOLE 6806.74

ELEV BOTTOM OF WELL CASING 6807.84

ELEV BOTTOM OF SCREENED INT 6810.84

ELEVATION OF SCREENED INT 6830.84

SURVEYED ELEV OF CASING TOP 6877.74

DATE OF REPORT Jan. 28, 1991 SIGNATURE Claud C. Rosendale

NAME (TYPED) Claud C. Rosendale

b:wellid/bas

MONITORING WELL IDENTIFICATION REPORT

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

FACILITY NAME Giant Refining Company

EPA I.D. NUMBER NMD000333211-2

COUNTY McKinley

WELL NUMBER SMW-5

WELL LOCATION (LONGITUDE) 108° 26' 03"

WELL LOCATION (LATITUDE) 35° 29' 41"

AQUIFER NAME Ciniza Sand

AQUIFER CONFINED X UNCONFINED

WELL INSTALLATION DATE 9-25-85

DRILLING METHOD HWLAG

INNER CASING DIAMETER 2.0"

BOREHOLE DIAMETER 6.5"

CASING MATERIAL SS304

METHOD OF DEVELOPMENT COMPR

ELEV BOTTOM OF BOREHOLE 6800.68

ELEV BOTTOM OF WELL CASING 6801.78

ELEV BOTTOM OF SCREENED INT 6804.78

ELEVATION OF SCREENED INT 6824.78

SURVEYED ELEV OF CASING TOP 6875.68

DATE OF REPORT Jan. 28, 1991 SIGNATURE Claud Rosendale

NAME (TYPED) Claud C. Rosendale

b:wellid/bas

MONITORING WELL IDENTIFICATION REPORT

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

FACILITY NAME Giant Refining Company

EPA I.D. NUMBER NMD000333211-2

COUNTY McKinley

WELL NUMBER SMW-6

WELL LOCATION (LONGITUDE) 108° 26' 02"

WELL LOCATION (LATITUDE) 35° 29' 38"

AQUIFER NAME Ciniza Sand

AQUIFER CONFINED X UNCONFINED

WELL INSTALLATION DATE 10-3-85

DRILLING METHOD HWLAG

INNER CASING DIAMETER 2.0"

BOREHOLE DIAMETER 6.5"

CASING MATERIAL SS304

METHOD OF DEVELOPMENT COMPR

ELEV BOTTOM OF BOREHOLE 6806.35

ELEV BOTTOM OF WELL CASING 6807.55

ELEV BOTTOM OF SCREENED INT 6810.55

ELEVATION OF SCREENED INT 6830.55

SURVEYED ELEV OF CASING TOP 6878.35

DATE OF REPORT Jan. 28, 1991 SIGNATURE Claud C. Rosendale

NAME (TYPED) Claud C. Rosendale

b:wellid/bas

APPENDIX B

GROUNDWATER MEASUREMENTS

GIANT REFINING CO.-CINIZA

ANNUAL GROUNDWATER MEASUREMENT - 1990*

Well No.	Date	Casing Elevation	Depth to Water	Groundwater Elevation
MW-1	03-27-90	6878.52	7.08	6871.44
	10-02-90		6.55	6871.97
MW-2	03-27-90	6880.84	8.32	6872.52
	10-02-90		9.75	6871.09
MW-4	03-27-90	6882.54	6.68	6875.86
	10-02-90		7.02	6875.52
MW-5	03-27-90	6883.32	10.36	6872.96
	10-02-90		12.53	6870.79
OW-11	03-28-90	6923.89	20.91	6902.98
	06-12-90		20.94	6902.95
	09-13-90		20.93	6902.96
	12-02-90		20.51	6903.38
SMW-1	03-27-90	6883.29	22.92	6860.37
	09-13-90		23.59	6859.70
SMW-2	03-27-90	6884.44	30.17	6854.27
	09-13-90		30.89	6853.55
SMW-3	03-27-90	6884.56	32.50	6852.06
	09-13-90		33.48	6851.08
SMW.4	03-27-90	6880.08	31.98	6848.10
	09-13-90		31.78	6848.30
SMW-5	03-27-90	6878.02	30.87	6847.15
	09-13-90		32.38	6845.64
SMW-6	03-27-90	6880.71	31.94	6848.77
	09-13-90		31.91	6848.80

* Corrected figures using new elevations surveyed to the New Mexico coordinate system. Those elevations were supplied to the NMED in 1991.

GIANT REFINING COMPANY

GROUND WATER MEASUREMENTS - 1990

Well No.	Date	Casing Elevation	Depth to Water	Ground Water Elevation
MW-1	03-27-90	6876.2 6878.52	7.08	~~6869.1~~2 6871.44
	10-02-90		6.55	~~6869.6~~5 6871.97
MW-2	03-27-90	6878.3 6880.94	8.32	~~6869.9~~8 6872.52
	10-02-90		~~7.02~~ 9.75	6871.28 6874.09
MW-4	03-27-90	~~6879.8~~ 6882.54	6.68	~~6873.12~~ 6875.86
	10-02-90		~~9.75~~ 7.02	~~6870.05~~ 6875.52
MW-5	03-27-90	6880.8 6883.02	10.36	~~6870.4~~4 6872.96
	10-02-90		12.53	6868.27 6870.79
OW-11	03-28-90	6923.~~0~~ 89	20.91	6902.~~09~~ 98
	06-12-90		20.94	6902.~~06~~ 95
	09-13-90		20.93	6902.~~07~~ 96
	12-02-90		20.51	~~6902.4~~9 6903.38
SMW-1	03-27-90	~~6880.7~~6883.29	22.92	6857.78 6860.37
	09-13-90		23.59	68~~57.1~~1 6859.70
SMW-2	03-27-90	~~6881.7~~6884.44	30.17	~~6851.~~53 6854.27
	09-13-90		30.89	~~6850.~~81 6853.55
SMW-3	03-27-90	~~6882.2~~6884.56	32.50	~~6849.7~~0 6852.06
	09-13-90		33.48	~~6848.72~~ 6851.08
SMW-4	03-27-90	~~6877.7~~6880.08	31.98	~~6845.7~~2 6848.10
	09-13-90		31.78	~~6845.9~~2 6848.30
SMW-5	03-27-90	~~6875.7~~6878.02	30.87	~~6844.8~~3 6847.15
	09-13-90		32.38	~~6843.~~32 6845.64
SMW-6	03-27-90	~~6878.4~~6880.71	31.94	~~6846.~~46 6848.77
	09-13-90		31.91	~~6846.49~~ 6848.80

APPENDIX C

SEMI-ANNUAL EVALUATION OF INDICATOR PARAMETERS

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

Print Your Name: Claud C. Rosendale Your Telephone #: (505) 722-3833

Facility Name: Ciniza Refinery EPA ID#: NMD000333211-2

Date: 26 NOV 90 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.	8.58	.0001
2.	8.57	.0000
3.	8.57	.0000
4.	8.56	.0001

Total #1: 34.28 Total #2: .0002

$\bar{X}_m$ = (Total #1)/4 = 8.57

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

S_m^2 = (Total #2)/3 = .0000666

$W_m = S_m^2/n_m$ = .0000166

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{8.57 - 8.51}{.0000166 + .000937} = 1.94$$

$$t_c = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{.000937 \times 2.947 + .0000166 \times 5.841}{.000937 + .0000166} = 2.997$$

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 C Rosendale
please sign here

statqtr.88/bas

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

Print Your Name: Claud C. Rosendale Your Telephone #: (505) 722-3833

Facility Name: Ciniza Refinery EPA ID#: NMD000333211-2

Date: 26 NOV 90 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 = 0.015

W_b = .000937 t_b = 2.947

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

	Value	$(Value-X_m)^2$
1.	8.62	.0000
2.	8.62	.0000
3.	8.62	.0000
4.	8.63	.0001

Total #1: 34.49 Total #2: .0001

$\bar{X}_m$ = (Total #1)/4 = 8.62

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

S_m^2 = (Total #2)/3 = .0000333

$W_m = S_m^2/n_m$ = .0000083

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{8.62 - 8.51}{.0000083 + .000937} = 3.58$$

$$t_c = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{.000937 \times 2.947 + .0000083 \times 5.841}{.000937 + .0000083} = 2.98$$

For pH values, treat the value for t_c as if it is positive in all cases. If 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 C. Rosendale
please sign here

statqtr.88/bas

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

Print Your Name: Claud C. Rosendale Your Telephone #: (505) 722-3833

Facility Name: Ciniza Refinery EPA ID#: NMD000333211-2

Date: 26 NOV 90 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 = 0.015

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.	8.42	.0001
2.	8.43	.0000
3.	8.43	.0000
4.	8.43	.0000

Total #1: 33.71 Total #2: .0001

$\bar{X}_m$ = (Total #1)/4 = 8.43

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

S_m^2 = (Total #2)/3 = .0000333

$W_m = S_m^2/n_m$ = .0000083

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{8.43 - 8.51}{.0000083 + .000937} = 2.60$$

$$t_c = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{.000937 \times 2.947 + .0000083 \times 5.841}{.0000083 + .000937} = 2.97$$

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 C Rosendale
please sign here

statqtr.88/bas

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

Print Your Name: Claud C. Rosendale Your Telephone #: (505) 722-3833

Facility Name: Ciniza Refinery EPA ID#: NMD000333211-2

Date: 26 NOV 90 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 = 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.	8.63	.0000
2.	8.63	.0000
3.	8.63	.0000
4.	8.62	.0001

Total #1: 34.51 Total #2: .0001

$\bar{X}_m$ = (Total #1)/4 = 8.63

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

S_m^2 = (Total #2)/3 = .0000333

$W_m = S_m^2/n_m$ = .0000083

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{8.63 - 8.51}{+ .000937} = 3.90$$

$$t_c = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{.000937 \times 2.947 + .0000083 \times 5.841}{.0000083 + .000937} = 2.97$$

For pH values, treat the value for t_c as if it is positive in all cases. If 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 C. Rosendale
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Calculation Sheet for Semi-Annual Evaluation
of Indicator Parameters for Annual Report

Print Your Name: Claud C. Rosendale Your Telephone #: (505) 722-3833

Facility Name: Ciniza Refinery EPA ID#: NMD000333211-2

Date: 26 NOV 90 Parameter: Specific Conductance

Well Number: MW1 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.	1180	100
2.	1170	0
3.	1170	0
4.	1160	100

Total #1: 4680 Total #2: 200

$\bar{X}_m$ = (Total #1)/4 = 1170

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

S_m^2 = (Total #2)/3 = 66.6667

$W_m = S_m^2/n_m$ = 16.6667

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{1170 - 984}{16.6667 + } = 17.77$$

$$t_c = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{92.9375 \times 2.602 + 16.6667 \times 4.541}{92.9375 + 16.6667} = 2.897$$

For pH values, treat the value for t_c as if it is positive in all cases. If 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.

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

Print Your Name: Claud C. Rosendale Your Telephone #: (505) 722-3833

Facility Name: Ciniza Refinery EPA ID#: NMD000333211-2

Date: 26 NOV 90 Parameter: Specific Conductance

Well Number: MW2 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.	1180	5
2.	1170	5
3.	1180	5
4.	1170	5

Total #1: 4700 Total #2: 20

$\bar{X}_m$ = (Total #1)/4 = 1175

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

S_m^2 = (Total #2)/3 = 6.6667

$W_m = S_m^2/n_m$ = 1.6667

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{1175 - 984}{1.6667 + 92.9375} = 19.637$$

$$t_c = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{92.9375 \times 2.602 + 1.6667 \times 2.602}{92.9375 + 1.6667} = 2.602$$

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.

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

Print Your Name: Claud C. Rosendale Your Telephone #: (505) 722-3833

Facility Name: Ciniza Refinery EPA ID#: NMD000333211-2

Date: 26 NOV 90 Parameter: Specific conductance

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 monitori well.

	Value	$(Value-X_m)^2$
1.	1170	0
2.	1180	100
3.	1160	100
4.	1170	0

Total #1: 4680 Total #2: 200

$\bar{X}_m$ = (Total #1)/4 = 1170

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

S_m^2 = (Total #2)/3 = 66.6667

$W_m = S_m^2/n_m$ = 16.6667

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{1170 - 984}{16.6667 + 92.9375} = 17.77$$

$$t_c = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{92.9375 \times 2.602 + 16.6667 \times 4.541}{16.6667 + 92.9375} = 2.897$$

For pH values, treat the value for t_c as if it is positive in all cases. I is greater than t_c for any of the indicator parameters, you must immediatel 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 monitori wells is in assessment, and you must notify EID within 7 days.

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

Print Your Name: Claud C. Rosendale Your Telephone #: (505) 722-3833

Facility Name: Ciniza Refinery EPA ID#: NMD000333211-2

Date: 26 NOV 90 Parameter: Specific Conductance

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.	1170	100
2.	1160	0
3.	1160	0
4.	1150	100

Total #1: 4640 Total #2: 200

$\bar{X}_m$ = (Total #1)/4 = 1160

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

S_m^2 = (Total #2)/3 = 66.6667

$W_m = S_m^2/n_m$ = 16.6667

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{1160 - 984}{16.6667 + 92.9375} = 16.811$$

$$t_c = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{92.9375 \times 2.602 + 16.6667 \times 4.541}{92.9375 + 16.6667} = 2.897$$

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.

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

Print Your Name: Claud Rosendale Your Telephone #: (505)722-3833 ext. 2

Facility Name: Giant Refining EPA ID#: NMD000333211

Date: 6-20-90 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 = 0.000937 t_b = 2.947

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

	Value	$(Value-X_m)^2$
1.	8.61	0.0004
2.	8.64	0.0001
3.	8.61	0.0004
4.	8.65	0.0004
Total #1:	34.51	Total #2: 0.0013

$\bar{X}_m$ = (Total #1)/4 = 8.63

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

S_m^2 = (Total #2)/3 = 0.000433

$W_m = S_m^2/n_m$ = 0.000108

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{8.63 - 8.51}{0.000108 + 0.000937} = 3.71$$

$$t_c = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{(.000937 \times 2.947) + (.000108 \times 5.841)}{.000937 + .000108} = 3.25$$

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.

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

Print Your Name: Claud Rosendale Your Telephone #: (505) 722-3833 Ext. 217

Facility Name: Giant Refining EPA ID#: NMD000333211

Date: 06-20-90 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 = 0.015

W_b = 0.000937 t_b = 2.947

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

	Value	$(Value-X_m)^2$
1.	8.63	0.0004
2.	8.60	0.0025
3.	8.72	0.0049
4.	8.64	0.0079
Total #1:	34.59	Total #2: 0.0079

$\bar{X}_m$ = (Total #1)/4 = 8.65

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

S_m^2 = (Total #2)/3 = 0.002633

$W_m = S_m^2/n_m$ = 0.000658

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{8.65 - 8.51}{.000658 + 0.000937} = 3.505$$

$$t_c = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{(.000937 \times 2.947) + (.000658 \times 5.841)}{.000937 + .000658} = 4.141$$

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.

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

Print Your Name: Claud Rosendale Your Telephone #: (505) 722-3833 ext. 217

Facility Name: Giant Refining EPA ID#: NMD000333211

Date: 06-20-90 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 = 0.015

W_b = 0.000937 t_b = 2.947

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

	Value	$(Value-X_m)^2$
1.	8.38	0.0004
2.	8.41	0.0001
3.	8.40	0
4.	8.42	0.0004
Total #1:	33.61	Total #2: 0.0009

$\bar{X}_m$ = (Total #1)/4 = 8.4025

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

S_m^2 = (Total #2)/3 = 0.0003

$W_m = S_m^2/n_m$ = 0.000075

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{8.40 - 8.51}{0.000075 + 0.000937} = -3.458$$

$$t_o = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{(.000937 \times 2.947) + (.000075 \times 5.841)}{(.000937 + .000075)} = 3.161$$

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.

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

Print Your Name: Claud Rosendale Your Telephone #: (505)722-3833 ext. 217

Facility Name: Giant Refining EPA ID#: NMD000333211

Date: 06-20-90 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 = 0.015

W_b = 0.000937 t_b = 2.947

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

	Value	$(\text{Value}-X_m)^2$
1.	8.46	0.0009
2.	8.49	0
3.	8.52	0.0009
4.	8.50	0.0001
Total #1:	33.97	Total #2: 0.0019

$\bar{X}_m$ = (Total #1)/4 = 8.4925

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

S_m^2 = (Total #2)/3 = 0.000633

$W_m = S_m^2/n_m$ = 0.000158

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{8.49 - 8.51}{.000158 + .000937} = -0.604$$

$$t_o = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{(.000937 \times 2.947) + (.000158 \times 5.841)}{.000937 + .000158} = 3.365$$

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.

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

Print Your Name: Claud Rosendale Your Telephone #: (505) 722-3833 ext. 217

Facility Name: Giant Refining EPA ID#: NMD000333211

Date: 06-20-90 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.	1120	6.25
2.	1120	6.25
3.	1110	56.25
4.	1120	6.25
Total #1:	4470	Total #2: 75.00

$\bar{X}_m$ = (Total #1)/4 = 1117.5

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

S_m^2 = (Total #2)/3 = 25

$W_m = S_m^2/n_m$ = 6.25

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{1117.5 - 984}{6.25 + 92.9375} = 13.40$$

$$t_c = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{(92.9375 \times 2.602) + (6.25 \times 4.541)}{92.9375 + 6.25} = 2.724$$

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.

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

Print Your Name: Claud Rosendale Your Telephone #: (505) 722-3833 ext. 217

Facility Name: Giant Refining EPA ID#: NMD000333211

Date: 06-20-90 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.	1030	56.25
2.	1040	6.25
3.	1030	56.25
4.	1050	156.25

Total #1: 4150 Total #2: 275

$\bar{X}_m$ = (Total #1)/4 = 1037.5

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

S_m^2 = (Total #2)/3 = 91.66

$W_m = S_m^2/n_m$ = 21.9167

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{1037.5 - 984}{21.9167 + 92.9375} = 4.99$$

$$t_c = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{(92.9375 \times 2.602) + (21.9167 \times 4.541)}{(92.9375 + 21.9167)} = 2.972$$

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.

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

Print Your Name: Claud Rosendale Your Telephone #: (505) 722-3833 ext. 217

Facility Name: Giant Refining EPA ID#: NMD000333211

Date: 06-20-90 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.	1090	156.25
2.	1110	56.25
3.	1100	6.25
4.	1110	56.25
Total #1:	4,410	Total #2: 275

$\bar{X}_m$ = (Total #1)/4 = 1,102.5

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

S_m^2 = (Total #2)/3 = 91.66

$W_m = S_m^2/n_m$ = 22.9167

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{1,102.5 - 984}{22.9167 + 92.9375} = 11.01$$

$$t_c = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{(92.9375 \times 2.602) + (22.9167 \times 4.541)}{(92.9375 + 22.9167)} = 2.985$$

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.

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

Print Your Name: Claud Rosendale Your Telephone #: (505)722-3833 ext. 217

Facility Name: Giant Refining EPA ID#: NMD000333211

Date: 06-20-90 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.	1070	6.25
2.	1060	156.25
3.	1080	56.25
4.	1080	56.25

Total #1: 4,290 Total #2: 275.0

$\bar{X}_m$ = (Total #1)/4 = 1072.5

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

S_m^2 = (Total #2)/3 = 91.67

$W_m = S_m^2/n_m$ = 22.9167

$$t^* = \frac{\bar{X}_m - \bar{X}_b}{\sqrt{W_m + W_b}} = \frac{1072.5 - 984}{22.9167+92.9375} = 8.22$$

$$t_c = \frac{W_b \times t_b + W_m \times t_m}{W_b + W_m} = \frac{(92.9375 \times 2.602) + (22.9167 \times 4.541)}{92.9375 + 22.9167} = 2.986$$

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.

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APPENDIX D

TABULATED ANALYTICAL SUMMARY

SMW-1 Giant Refining Gallup, New Mexico

TCL Volatile Organics
Method 8240

Parameter	Date: 02 APR 90 Result	13 SEP 90 Result	Units	Reporting Limit
Chloromethane	ND	ND	ug/L	10
Bromomethane	ND	ND	ug/L	10
Vinyl chloride	ND	ND	ug/L	10
Chloroethane	ND	ND	ug/L	10
Methylene chloride	ND	ND	ug/L	5.0
Acetone	ND	ND	ug/L	10
Carbon disulfide	ND	ND	ug/L	5.0
1,1-Dichloroethene	ND	ND	ug/L	5.0
1,1-Dichloroethane	ND	ND	ug/L	5.0
1,2-Dichloroethene (cis/trans)	ND	ND	ug/L	5.0
Chloroform	ND	ND	ug/L	5.0
1,2-Dichloroethane	ND	ND	ug/L	5.0
2-Butanone	ND	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ND	ug/L	10
Carbon tetrachloride	ND	ND	ug/L	5.0
Vinyl acetate	ND	ND	ug/L	5.0
Bromodichloromethane	ND	ND	ug/L	10
1,2-Dichloropropane	ND	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ND	ug/L	5.0
Trichloroethene	ND	ND	ug/L	5.0
Chlorodibromomethane	ND	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ND	ug/L	5.0
Benzene	ND	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ND	ug/L	10
Bromoform	ND	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ND	ug/L	10
2-Hexanone	ND	ND	ug/L	10
1,1,2,2-Tetrachloroethane	ND	ND	ug/L	5.0
Tetrachloroethene	ND	ND	ug/L	5.0
Toluene	ND	ND	ug/L	5.0
Chlorobenzene	ND	ND	ug/L	5.0
Ethylbenzene	ND	ND	ug/L	5.0
Stryene	ND	ND	ug/L	5.0
Xylenes (total)	ND	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ND	ug/L	10
1,2-Dibromoethane (EDB)	ND	ND	ug/L	10
1,2-Dichlorobenzene	ND	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ND	ug/L	5.0

SMW-1 Giant Refining Gallup, New Mexico

Metals
Dissolved Metals

Parameter	27 MAR 90 Result	Units	Reporting Limit
Calcium	182	mg/L	0.40
Magnesium	56.5	mg/L	0.40
Potassium	nd	mg/L	10.0
Sodium	1250	mg/L	10.0

SMW-1 Giant Refining Gallup, New Mexico

Metals
Total Metals

Parameter	Date: 27 MAR 90 Result	13 SEP 90 Result	Units	Reporting Limit
Chromium	ND	0.030	mg/L	0.010
Lead	ND	ND	mg/L	0.0050

SMW-1 Giant Refining Gallup, New Mexico

General Inorganics

Parameter	03 APR 90 Result	13 SEP 90 Result	Units	Reporting Limit
Alkalinity, Bicarb. as CaCO3 at pH 4.5	611	-----	mg/L	5.0
Alkalinity, Carb. as CaCO3 at pH 8.3	nd	-----	mg/L	5.0
Chloride	1120	-----	mg/L	30.0
pH	7.38	7.33	units	--
pH	7.42	7.34	units	--
pH	7.39	7.34	units	--
pH	7.40	7.33	units	--
Sulfate	1330	-----	mg/L	50.0
Specific Conductance at 25 deg.C	6940	5810	umhos/cm	1.0
Specific Conductance at 25 deg.C	6930	5820	umhos/cm	1.0
Specific Conductance at 25 deg.C	6950	5830	umhos/cm	1.0
Specific Conductance at 25 deg.C	6940	5810	umhos/cm	1.0
Total Organic Carbon	19.0	10.1	mg/L	1.0
Total Organic Carbon	16.0	10.2	mg/L	1.0
Total Organic Carbon	18.0	10.2	mg/L	1.0
Total Organic Carbon	21.0	10.1	mg/L	1.0
Total Organic Halogen as Cl	61.6	47.9	ug/L	30.0
Total Organic Halogen as Cl	49.2	41.5	ug/L	30.0
Total Organic Halogen as Cl	48.9	52.5	ug/L	30.0
Total Organic Halogen as Cl	46.7	50.9	ug/L	30.0
Total Dissolved Solids	4330	-----	mg/L	50.0
Water Elevation	6857.78	6857.11	ft	--

SMW-2 Giant Refining Gallup, New Mexico

TCL Volatile Organics
Method 8240

Date: Parameter	02 APR 90 Result	13 SEP 90 Result	Units	Reporting Limit
Chloromethane	ND	ND	ug/L	10
Bromomethane	ND	ND	ug/L	10
Vinyl chloride	ND	ND	ug/L	10
Chloroethane	ND	ND	ug/L	10
Methylene chloride	ND	ND	ug/L	5.0
Acetone	ND	ND	ug/L	10
Carbon disulfide	ND	ND	ug/L	5.0
1,1-Dichloroethene	ND	ND	ug/L	5.0
1,1-Dichloroethane	ND	ND	ug/L	5.0
1,2-Dichloroethene (cis/trans)	ND	ND	ug/L	5.0
Chloroform	ND	ND	ug/L	5.0
1,2-Dichloroethane	ND	ND	ug/L	5.0
2-Butanone	ND	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ND	ug/L	10
Carbon tetrachloride	ND	ND	ug/L	5.0
Vinyl acetate	ND	ND	ug/L	5.0
Bromodichloromethane	ND	ND	ug/L	10
1,2-Dichloropropane	ND	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ND	ug/L	5.0
Trichloroethene	ND	ND	ug/L	5.0
Chlorodibromomethane	ND	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ND	ug/L	5.0
Benzene	ND	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ND	ug/L	10
Bromoform	ND	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ND	ug/L	10
2-Hexanone	ND	ND	ug/L	10
1,1,2,2-Tetrachloroethane	ND	ND	ug/L	5.0
Tetrachloroethene	ND	ND	ug/L	5.0
Toluene	ND	ND	ug/L	5.0
Chlorobenzene	ND	ND	ug/L	5.0
Ethylbenzene	ND	ND	ug/L	5.0
Stryene	ND	ND	ug/L	5.0
Xylenes (total)	ND	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ND	ug/L	10
1,2-Dibromoethane (EDB)	ND	ND	ug/L	10
1,2-Dichlorobenzene	ND	ND	ug/L	5.0
1,3-Dichlorbenzene	ND	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ND	ug/L	5.0

SMW-2 Giant Refinery Gallup, New Mexico

Metals
Dissolved Metals

Parameter	27 mar 90 Result	Units	Reporting Limit
Calcium	147	mg/L	1.0
Magnesium	44.3	mg/L	1.0
Potassium	ND	mg/L	25.0
Sodium	1630	mg/L	25.0

SMW-2 Giant Refining Gallup, New Mexico

Metals
Total Metals

Parameter	27 MAR 90 Result	13 SEP 90 Result	Units	Reporting Limit
Chromium	0.19	0.19	mg/L	0.050
Lead	0.0071	0.034	mg/L	0.0050

SMW-2 Giant Refining Gallup, New Mexico

General Inorganics

Parameter	Date: 27 MAR 90 Result	13 SEP 90 Result	Units	Reporting Limit
Alkalinity, Bicarb. as CaCO3 at pH 4.5	563	-----	mg/L	5.0
Alkalinity, Carb. as CaCO3 at pH 8.3	ND	-----	mg/L	5.0
Chloride	1320	-----	mg/L	30.0
pH	7.51	7.47	units	--
pH	7.50	7.46	units	--
pH	7.50	7.46	units	--
pH	7.51	7.47	units	--
Sulfate	1590	-----	mg/L	50.0
Specific Conductance at 25 deg.C	6920	6600	umhos/cm	1.0
Specific Conductance at 25 deg.C	6920	6600	umhos/cm	1.0
Specific Conductance at 25 deg.C	6930	6610	umhos/cm	1.0
Specific Conductance at 25 deg.C	6940	6620	umhos/cm	1.0
Total Organic Carbon	12.0	8.0	mg/L	1.0
Total Organic Carbon	12.0	7.9	mg/L	1.0
Total Organic Carbon	14.0	8.3	mg/L	1.0
Total Organic Carbon	13.0	8.0	mg/L	1.0
Total Organic Halogen as Cl	45.6	ND	ug/L	30.0
Total Organic Halogen as Cl	39.7	ND	ug/L	30.0
Total Organic Halogen as Cl	37.2	ND	ug/L	30.0
Total Organic Halogen as Cl	49.0	65.7	ug/L	30.0
Total Dissolved Solids	5180	-----	mg/L	50.0
Water Elevation	6851.53	6850.81	ft	--

SMW-3 Giant Refining Gallup, New Mexico

TCL Volatile Organics
Method 8240

Parameter	27 MAR 90 Result	13 SEP 90 Result	Units	Reporting Limit
Chloromethane	ND	ND	ug/L	10
Bromomethane	ND	ND	ug/L	10
Vinyl chloride	ND	ND	ug/L	10
Chloroethane	ND	ND	ug/L	10
Methylene chloride	ND	ND	ug/L	5.0
Acetone	ND	ND	ug/L	10
Carbon disulfide	ND	ND	ug/L	5.0
1,1-Dichloroethene	ND	ND	ug/L	5.0
1,1-Dichloroethane	ND	ND	ug/L	5.0
1,2-Dichloroethene (cis/trans)	ND	ND	ug/L	5.0
Chloroform	ND	ND	ug/L	5.0
1,2-Dichloroethane	ND	ND	ug/L	5.0
2-Butanone	ND	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ND	ug/L	10
Carbon tetrachloride	ND	ND	ug/L	5.0
Vinyl acetate	ND	ND	ug/L	5.0
Bromodichloromethane	ND	ND	ug/L	10
1,2-Dichloropropane	ND	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ND	ug/L	5.0
Trichloroethene	ND	ND	ug/L	5.0
Chlorodibromomethane	ND	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ND	ug/L	5.0
Benzene	ND	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ND	ug/L	10
Bromoform	ND	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ND	ug/L	10
2-Hexanone	ND	ND	ug/L	10
1,1,2,2-Tetrachloroethane	ND	ND	ug/L	5.0
Tetrachloroethene	ND	ND	ug/L	5.0
Toluene	ND	ND	ug/L	5.0
Chlorobenzene	ND	ND	ug/L	5.0
Ethylbenzene	ND	ND	ug/L	5.0
Stryene	ND	ND	ug/L	5.0
Xylenes (total)	ND	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ND	ug/L	5.0
1,2-Dibromoethane (EDB)	ND	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ND	ug/L	5.0

SMW-3 Giant Refinery Gallup, New Mexico

Metals
Dissolved Metals

Parameter	27 MAR 90 Result	Units	Reporting Limit
Calcium	59.0	mg/L	0.40
Magnesium	16.2	mg/L	0.40
Potassium	ND	mg/L	10.0
Sodium	739	mg/L	10.0

SMW-3 Giant Refining Gallup, New Mexico

Metals
Total Metals

Parameter	27 MAR 90 Result	13 SEP 90 Result	Units
Chromium	ND	ND	mg/L
Lead	ND	ND	mg/L

SMW-3 Giant Refining Gallup, New Mexico

General Inorganics

Parameter	27 MAR 90 Result	13 SEP 90 Result	Units	Reporting Limit
Alkalinity, Bicarb. as CaCO3 at pH 4.5	681	-----	mg/L	5.0
Alkalinity, Carb. as CaCO3 at pH 8.3	ND	-----	mg/L	5.0
Chloride	49.1	-----	mg/L	30.0
pH	7.84	7.96	units	--
pH	7.86	7.94	units	--
pH	7.85	7.96	units	--
pH	7.85	7.95	units	--
Sulfate	1180	-----	mg/L	50.0
Specific Conductance at 25 dec. C	3040	3220	umhos/cm	1.0
Specific Conductance at 25 deg. C	3000	3230	umhos/cm	1.0
Specific Conductance at 25 deg. C	2980	3220	umhos/cm	1.0
Specific Conductance at 25 deg. C	2990	3220	umhos/cm	1.0
Total Organic Carbon	4.0	2.7	mg/L	1.0
Total Organic Carbon	4.0	2.8	mg/L	1.0
Total Organic Carbon	4.0	2.9	mg/L	1.0
Total Organic Carbon	4.0	2.6	mg/L	1.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Dissolved Solids	2560	-----	mg/L	50.0
Water Elevation	6849.70	6848.72	ft	-----

SMW-4 Giant Refining Gallup, New Mexico

TCL Volatile Organics
Method 8240

Date:	27 MAR 90	13 SEP 90		Reporting
Parameter	Result	Result	Units	Limit
Chloromethane	ND	ND	ug/L	10
Bromomethane	ND	ND	ug/L	10
Vinyl chloride	ND	ND	ug/L	10
Chloroethane	ND	ND	ug/L	10
Methylene chloride	ND	ND	ug/L	5.0
Acetone	ND	ND	ug/L	10
Carbon disulfide	ND	ND	ug/L	5.0
1,1-Dichloroethene	ND	ND	ug/L	5.0
1,1-Dichloroethane	ND	ND	ug/L	5.0
1,2-Dichloroethene (cis/trans)	ND	ND	ug/L	5.0
Chloroform	ND	ND	ug/L	5.0
1,2-Dichloroethane	ND	ND	ug/L	5.0
2-Butanone	ND	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ND	ug/L	10
Carbon tetrachloride	ND	ND	ug/L	5.0
Vinyl acetate	ND	ND	ug/L	5.0
Bromodichloromethane	ND	ND	ug/L	10
1,2-Dichlorobenzene	ND	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ND	ug/L	5.0
Trichloroethene	ND	ND	ug/L	5.0
Chlorodibromomethane	ND	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ND	ug/L	5.0
Benzene	ND	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ND	ug/L	10
Bromoform	ND	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ND	ug/L	10
2-Hexanone	ND	ND	ug/L	10
1,1,2,2-Tetrachloroethane	ND	ND	ug/L	5.0
Tetrachloroethene	ND	ND	ug/L	5.0
Toluene	ND	ND	ug/L	5.0
Chlorobenzene	ND	ND	ug/L	5.0
Ethylbenzene	ND	ND	ug/L	5.0
Stryene	ND	ND	ug/L	5.0
Xylenes (total)	ND	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ND	ug/L	10
1,2-Dibromoethane (EDB)	ND	ND	ug/L	10
1,2-Dichlorobenzene	ND	ND	ug/L	5.0
1,3-Dichlorobenzene				
1,4-Dichlorobenzene	ND	ND	ug/L	5.0

SMW-4 Giant Refinery Gallup, New Mexico

Dissolved Metals
Metals

Parameter	27 MAR 90 Result	Units	Reporting Limit
Calcium	4.7	mg/L	0.20
Magnesium	1.2	mg/L	0.20
Potassium	nd	mg/L	5.0
Sodium	296	mg/L	5.0

SMW-4 Giant Refining Gallup, New Mexico

Total Metals

Parameter	27 MAR 90 Result	13 SEP 90 Result	Units	Reporting Limit
Chromium	ND	0.019	mg/L	0.010
Lead	ND	0.015	mg/L	0.0050

SMW-4 Giant Refining Gallup, New Mexico

General Inorganics

Parameter	Date: 27 MAR 90 Result	13 SEP 90 Result	Units	Reporting Limit
Alkalinity, Bicarb. as CaCO3 at pH 4.5	434	-----	mg/L	5.0
Alkalinity, Carb. as CaCO3 at pH 8.3	9.4	-----	mg/L	5.0
Chloride	53.2	-----	mg/L	30.0
pH	8.10	8.39	units	--
pH	8.16	8.38	units	--
pH	8.14	8.39	units	--
pH	8.11	8.39	units	--
Sulfate	178	-----	mg/L	50.0
Specific Conductance at 25 deg.C	1220	1050	umhos/cm	1.0
Specific Conductance at 25 deg.C	1210	1050	umhos/cm	1.0
Specific Conductance at 25 deg.C	1230	1050	umhos/cm	1.0
Specific Conductance at 25 deg.C	1220	1050	umhos/cm	1.0
Total Organic Carbon	3.0	.76	mg/L	1.0
Total Organic Carbon	2.0	.82	mg/L	1.0
Total Organic Carbon	2.0	.73	mg/L	1.0
Total Organic Carbon	2.0	.75	mg/L	1.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Dissolved Solids	852	-----	mg/L	50.0
Water Elevation	6845.72	6845.92	ft	--

SMW-5 Giant Refining Gallup, New Mexico

TCL Volatile Organics
Method 8240

Parameter	27 MAR 90 Result	13 SEP 90 Result	Units	Reporting Limit
Chloromethane	ND	ND	ug/L	10
Bromomthane	ND	ND	ug/L	10
Vinyl chloride	ND	ND	ug/L	10
Chloroethane	ND	ND	ug/L	10
Methylene chloride	ND	ND	ug/L	5.0
Acetone	ND	ND	ug/L	10
Carbon disulfide	ND	ND	ug/L	5.0
1,1-Dichloroethene	ND	ND	ug/L	5.0
1,1-Dichloroethane	ND	ND	ug/L	5.0
1,2-Dichloroethene (cis/trans)	ND	ND	ug/L	5.0
Chloroform	ND	ND	ug/L	5.0
1,2-Dichloroethane	ND	ND	ug/L	5.0
2-Butanone	ND	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ND	ug/L	10
Carbon tetrachloride	ND	ND	ug/L	5.0
Vinyl acetate	ND	ND	ug/L	5.0
Bromodichloromethane	ND	ND	ug/L	10
1,2-Dichloropropane	ND	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ND	ug/L	5.0
Trichloroethene	ND	ND	ug/L	5.0
Chlorodibromomethane	ND	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ND	ug/L	5.0
Benzene	ND	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ND	ug/L	10
Bromoform	ND	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ND	ug/L	10
2-Hexanone	ND	ND	ug/L	10
1,1,2,2-Tetrachloroethane	ND	ND	ug/L	5.0
Tetrachloroethene	ND	ND	ug/L	5.0
Toluene	ND	ND	ug/L	5.0
Chlorobenzene	ND	ND	ug/L	5.0
Ethylbenzene	ND	ND	ug/L	5.0
Stryene	ND	ND	ug/L	5.0
Xylenes (total)	ND	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ND	ug/L	10
1,2-Dibromoethane (EDB)	ND	ND	ug/L	10
1,2-Dichlorobenzene	ND	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ND	ug/L	5.0

SMW-5 Giant Refinery Gallup, New Mexico

Metals
Dissolved Metals

Parameter	03 APR 90 Result	Units	Reporting Limit
Calcium	3.9	mg/L	0.20
Magnesium	0.82	mg/L	0.20
Potassium	5.6	mg/L	5.0
Sodium	254	mg/L	5.0

SMW-5 Giant Refining Gallup, New Mexico

Metals
Total Metals

Parameter	Date: 27 MAR 90 Result	13 SEP 90 Result	Units	Reporting Limit
Chromium	0.025	0.037	mg/L	0.010
Lead	0.018	0.012	mg/L	0.0050

SMW-5 Giant Refining Gallup, New Mexico

General Inorganics

Date:	27 MAR 90	13 SEP 90		Reporting
Parameter	Result	Result	Units	Limit
Alkalinity, Bicarb. as CaCO3 at pH 4.5	287	-----	mg/L	5.0
Alkalinity, Carb. as CaCO3 at pH 8.3	24.2	-----	mg/L	5.0
Chloride	55.1	-----	mg/L	3.0
pH	8.31	8.66	units	--
pH	8.38	8.65	units	--
pH	8.36	8.66	units	--
pH	8.37	8.66	units	--
Sulfate	147	-----	mg/L	5.0
Specific Conductance at 25 deg.C	1070	1000	umhos/cm	1.0
Specific Conductance at 25 deg.C	1080	1010	umhos/cm	1.0
Specific Conductance at 25 deg.C	1080	1000	umhos/cm	1.0
Specific Conductance at 25 deg.C	1070	1010	umhos/cm	1.0
Total Organic Carbon	2.0	0.77	mg/L	1.0
Total Organic Carbon	2.0	0.76	mg/L	1.0
Total Organic Carbon	2.0	0.70	mg/L	1.0
Total Organic Carbon	1.0	0.77	mg/L	1.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Dissolved Solids	769	-----	mg/L	10.0
Water Elevation	6844.83	6843.32	ft	--

SMW-6 Giant Refining Gallup, New Mexico

TCL Volatile Organics
Method 8240

Parameter	Date: 27 MAR 90 Result	13 SEP 90 Result	Units	Reporting Limit
Chloromethane	ND	ND	ug/L	10
Bromomethane	ND	ND	ug/L	10
Vinyl chloride	ND	ND	ug/L	10
Chloroethane	ND	ND	ug/L	10
Methylene chloride	ND	ND	ug/L	5.0
Acetone	ND	ND	ug/L	10
Carbon disulfide	ND	ND	ug/L	5.0
1,1-Dichloroethene	ND	ND	ug/L	5.0
1,1-Dichloroethane	ND	ND	ug/L	5.0
1,2-Dichloroethene (cis/trans)	ND	ND	ug/L	5.0
Chloroform	ND	ND	ug/L	5.0
1,2-Dichloroethane	ND	ND	ug/L	5.0
2-Butanone	ND	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ND	ug/L	10
Carbon tetrachloride	ND	ND	ug/L	5.0
Vinyl acetate	ND	ND	ug/L	5.0
Bromodichloromethane	ND	ND	ug/L	10
1,2-Dichloropropane	ND	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ND	ug/L	5.0
Trichloroethene	ND	ND	ug/L	5.0
Chlorodibromomethane	ND	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ND	ug/L	5.0
Benzene	ND	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ND	ug/L	10
Bromoform	ND	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ND	ug/L	10
2-Hexanone	ND	ND	ug/L	10
1,1,2,2-Tetrachloroethane	ND	ND	ug/L	5.0
Tetrachloroethene	ND	ND	ug/L	5.0
Toluene	ND	ND	ug/L	5.0
Chlorobenzene	ND	ND	ug/L	5.0
Ethylbenzene	ND	ND	ug/L	5.0
Stryene	ND	ND	ug/L	5.0
Xylenes (total)	ND	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ND	ug/L	10
1,2-Dibromoethane (EDB)	ND	ND	ug/L	10
1,2-Dichlorobenzene	ND	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ND	ug/L	5.0

SMW-6 Giant Refinery Gallup, New Mexico

Metals
Dissolved Metals

Parameter	27 MAR 90 Result	Units	Reporting Limit
Calcium	8.3	mg/L	0.20
Magnesium	2.5	mg/L	0.20
Potassium	ND	mg/L	5.0
Sodium	379	mg/L	5.0

SMW-6 Giant Refining Gallup, New Mexico

Metals
Total Metals

Parameter	Date: 27 MAR 90 Result	13 SEP 90 Result	Units	Reporting Limit
Chromium	0.011	.11	mg/L	0.010
Lead	ND	.026	mg/L	0.0050

SMW-6 Giant Refining Gallup, New Mexico

General Inorganics

Parameter	Date: 27 MAR 90 Result	13 SEP 90 Result	Units	Reporting Limit
Alkalinity, Bicarb. as CaCO3 at pH 4.5	572	-----	mg/L	5.0
Alkalinity, Carb. as CaCO3 at pH 8.3	ND	-----	mg/L	5.0
Chloride	77.3	-----	mg/L	3.0
pH	8.09	7.86	units	--
pH	8.10	8.86	units	--
pH	8.10	7.87	units	--
pH	8.09	7.86	units	--
Sulfate	215	-----	mg/L	5.0
Specific Conductance at 25 deg.C	1570	1390	umhos/cm	1.0
Specific Conductance at 25 deg.C	1580	1390	umhos/cm	1.0
Specific Conductance at 25 deg.C	1560	1400	umhos/cm	1.0
Specific Conductance at 25 deg.C	1570	1400	umhos/cm	1.0
Total Organic Carbon	1.0	.92	mg/L	1.0
Total Organic Carbon	2.0	.96	mg/L	1.0
Total Organic Carbon	3.0	.97	mg/L	1.0
Total Organic Carbon	2.0	.70	mg/L	1.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Dissolved Solids	1090	-----	mg/L	10.0
Water Elevation	6846.46	6846.49	ft	--

OW-11 Giant Refining Gallup, New Mexico

TCL Volatile Organics
Method 8240

Parameter	Date: 04 APR 90 Result	13 JUN 90 Result	13 SEP 90 Result	Units	Reporting Limit
1,1-Dichloroethene	ND	ND	ND	ug/L	5.0
2-Butanone	ND	ND	ND	ug/L	10
1,1,1-Trichloroethane	ND	ND	ND	ug/L	5.0
Benzene	ND	ND	ND	ug/L	5.0
Tetrachloroethene	ND	ND	ND	ug/L	5.0
Toluene	ND	ND	ND	ug/L	5.0
Ethylbenzene	ND	ND	ND	ug/L	5.0
Xylenes (total)	ND	ND	ND	ug/L	5.0

OW-11 Giant Refining Gallup, New Mexico

Refinery Hazard Constituent Semivolatiles
Method 8270

Parameter	04 APR 90 Result	13 JUN 90 Result	13 SEP 90 Result	Units	Reporting Limit
Benzo(a)anthracene	ND	ND	ND	ug/L	10
Benzo(b)fluorathene	ND	ND	ND	ug/L	10
Benzo(a)pyrene	ND	ND	ND	ug/L	10
bis(2-Ethylhexyl) phthalate	ND	ND	ND	ug/L	10
Chrysene	ND	ND	ND	ug/L	10
7,12-Dimethylbenz(a)-anthracene	ND	ND	ND	ug/L	10
Dimethyl phthalate	ND	ND	ND	ug/L	10
Fluorathene	ND	ND	ND	ug/L	10
1-Mthylnaphthalene	ND	ND	ND	ug/L	10
Naphthalene	ND	ND	ND	ug/L	10
Phenanthrene	ND	ND	ND	ug/L	10
Pyrene	ND	ND	ND	ug/L	10
o-Cresol	ND	ND	ND	ug/L	10
m & p-Cresol(s)	ND	ND	ND	ug/L	10
2,4,6-Trichlorophenol	ND	ND	ND	ug/L	10
2-Chlorophenol	ND	ND	ND	ug/L	10

OW-11 Giant Refinery Gallup, New Mexico

Metals
Dissolved Metals

Date:	04 APR 90	13 JUN 90	13 SEP 90		Reporting
Parameter	Result	Result	Result	Units	Limit
Arsenic	ND	ND	ND	mg/L	0.0050
Barium	0.014	0.016	0.018	mg/L	0.010
Cadmium	ND	ND	ND	mg/L	0.0050
Calcium	4.8	5.2	5.8	mg/L	0.20
Copper	ND	ND	ND	mg/L	0.010
Manganese	ND	ND	ND	mg/L	0.010
Nickel	ND	ND	ND	mg/L	0.040
Selenium	ND	0.024	0.020	mg/L	0.050
Silver	ND	ND	ND	mg/L	0.010
Sodium	382	425	459	mg/L	5.0
Zinc	ND	ND	ND	mg/L	0.010

OW-11 Giant Refining Gallup, New Mexico

Metals
Total Metals

Date:	04 APR 90	13 JUN 90	13 SEP 90		Reporting
Parameter	Result	'Result	Result	Units	Limit
Chromium	ND	ND	ND	mg/L	0.010
Lead	ND	ND	0.011	mg/L	0.0050
Mercury	ND	ND	ND	mg/L	0.00020

OW-11 Giant Refining Gallup, New Mexico

Total Metals
Dissolved Metals

Date:	04 APR 90	13 JUN 90	13 SEP 90		Reporting
Parameter	Result	'Result	Result	Units	Limit
Chromium	ND	ND	ND	mg/L	0.010
Lead	ND	ND	0.011	mg/L	0.0050
Mercury	ND	ND	ND	mg/L	0.00020

OW-11 Giant Refining Gallup, New Mexico

General Inorganics

Parameter	04 APR 90 Result	13 JUN 90 Result	13 SEP 90 Result	Units	Reporting Limit
Alkalinity, Bicarb. as CaCO3 at pH 4.5	461	440	424	mg/L	5.0
Alkalinity, Carb. as CaCO3 at pH 8.3	ND	ND	14.5	mg/L	5.0
Chloride	123	117	118	mg/L	3.0
pH	8.26	8.26	7.98	units	--
pH	8.24	8.30	7.99	units	--
pH	8.21	8.30	7.99	units	--
pH	8.24	8.32	7.98	units	--
Phenolics	ND	ND	0.022	mg/L	0.010
Sulfate	294	327	351	mg/L	5.0
Specific Conductance at 25 deg.C	1640	1420	1710	umhos/cm	1.0
Specific Conductance at 25 deg.C	1640	1420	1700	umhos/cm	1.0
Specific Conductance at 25 deg.C	1640	1410	1700	umhos/cm	1.0
Specific Conductance at 25 deg.C	1630	1420	1710 1710	umhos/cm	1.0
Total Organic Carbon	6.0	4.4	4.4	mg/L	1.0
Total Organic Carbon	6.0	4.2	4.3	mg/L	1.0
Total Organic Carbon	6.0	4.2	4.3	mg/L	1.0
Total Organic Carbon	6.0	4.3	4.4	mg/L	1.0
Total Organic Halogen as Cl	ND	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ND	ug/L	30.0
Total Dissolved Solids	1110	1180	1220	mg/L	10.0
Water Elevation	6902.09	6902.06	6902.07	ft	--

MW-1 Giant Refining Gallup, New Mexico

TCL Volatile Organics
Method 8240

Parameter	01 APR 90 Result	02 OCT 90 Result	Units	Reporting Limit
Chloromethane	ND	ND	ug/L	10
Bromomethane	ND	ND	ug/L	10
Vinyl chloride	ND	ND	ug/L	10
Chloroethane	ND	ND	ug/L	10
Methylene chloride	ND	ND	ug/L	5.0
Acetone	ND	ND	ug/L	10
Carbon disulfide	ND	ND	ug/L	5.0
1,1-Dichloroethene	ND	ND	ug/L	5.0
1,1-Dichloroethane	ND	ND	ug/L	5.0
1,2-Dichloroethene (cis/trans)	ND	ND	ug/L	5.0
Chloroform	ND	ND	ug/L	5.0
1,2-Dichloroethane	ND	ND	ug/L	5.0
2-Butanone	ND	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ND	ug/L	10
Carbon tetrachloride	ND	ND	ug/L	5.0
Vinyl acetate	ND	ND	ug/L	5.0
Bromodichloromethane	ND	ND	ug/L	10
trans-1,3-Dichloropropene	ND	ND	ug/L	5.0
Trichloroethene	ND	ND	ug/L	5.0
Chlorodibromomethane	ND	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ND	ug/L	5.0
Benzene	ND	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ND	ug/L	10
Bromoform	ND	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ND	ug/L	10
2-Hexanone	ND	ND	ug/L	10
1,1,2,2-Tetrachloroethane	ND	ND	ug/L	5.0
Tetrachloroethene	ND	ND	ug/L	5.0
Toluene	ND	ND	ug/L	5.0
Chlorobenzene	ND	ND	ug/L	5.0
Ethylbenzene	ND	ND	ug/L	5.0
Stryene	ND	ND	ug/L	5.0
Xylenes (total)	ND	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ND	ug/L	10
1,2-Dibromoethane (EDB)	ND	ND	ug/L	10
1,2-Dichlorobenzene	ND	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ND	ug/L	5.0

MW-1 Giant Refinery Gallup, New Mexico

Metals
Dissolved Metals

Parameter	03 APR 90 Result	Units	Reporting Limit
Arsenic	ND	mg/L	0.0050
Barium	ND	mg/L	0.010
Cadmium	ND	mg/L	0.0050
Calcium	1.8	mg/L	0.20
Magnesium	0.25	mg/L	0.20
Manganese	ND	mg/L	0.010
Potassium	ND	mg/L	5.00
Selenium	ND	mg/L	0.0050
Silver	ND	mg/L	0.010
Sodium	252	mg/L	5.0

MW-1 Giant Refining Gallup, New Mexico

Metals
Total Metals

Parameter	01 APR 90 Result	02 OCT 90 Result	Units
Chromium	ND	ND	mg/L
Lead	ND	ND	mg/L
Mercury	ND	-----	mg/L

MW-1 Giant Refining Gallup, New Mexico

General Inorganics

Parameter	03 APR 90 Result	03 OCT 90 Result	Units	Reporting Limit
Alkalinity, Bicarb. as CaCO3 at pH 4.5	300	-----	mg/L	5.0
Alkalinity, Carb. as CaCO3 at pH 8.3	48.6	-----	mg/L	5.0
Chloride	44.9	-----	mg/L	3.0
pH	8.61	8.58	units	--
pH	8.64	8.57	units	--
pH	8.61	8.57	units	--
pH	8.65	8.56	units	--
Phenolics	ND	-----	mg/L	0.010
Sulfate	156	-----	mg/L	5.0
Specific Conductance at 25 deg.C	1120	1180	umhos/cm	1.0
Specific Conductance at 25 deg.C	1120	1170	umhos/cm	1.0
Specific Conductance at 25 deg.C	1110	1170	umhos/cm	1.0
Specific Conductance at 25 deg.C	1120	1160	umhos/cm	1.0
Total Organic Carbon	1.0	0.70	mg/L	1.0
Total Organic Carbon	1.0	0.71	mg/L	1.0
Total Organic Carbon	1.0	0.69	mg/L	1.0
Total Organic Carbon	1.0	0.71	mg/L	1.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Dissolved Solids	687	-----	mg/L	10.0
Water Elevation	6869.12	6869.65	ft	--

MW-2 Giant Refining Gallup, New Mexico

TCL Volatile Organics
Method 8240

Parameter	01 APR 90 Result	02 OCT 90 Result	Units
Chloromethane	ND	ND	ug/L
Bromomethane	ND	ND	ug/L
Vinyl chloride	ND	ND	ug/L
Chloroethane	ND	ND	ug/L
Methylene chloride	ND	ND	ug/L
Acetone	ND	ND	ug/L
Carbon disulfide	ND	ND	ug/L
1,1-Dichloroethene	ND	ND	ug/L
1,1-Dichloroethane	ND	ND	ug/L
1,2-Dichloroethene (cis/trans)	ND	ND	ug/L
Chloroform	ND	ND	ug/L
1,2-Dichloroethane	ND	ND	ug/L
2-Butanone	ND	ND	ug/L
1,1,1-Trichloroethane	ND	ND	ug/L
Carbon tetrachloride	ND	ND	ug/L
Vinyl acetate	ND	ND	ug/L
Bromodichloromethane	ND	ND	ug/L
trans-1,3-Dichloropropene	ND	ND	ug/L
Trichloroethene	ND	ND	ug/L
Chlorodibromomethane	ND	ND	ug/L
1,1,2-Trichloroethane	ND	ND	ug/L
Benzene	ND	ND	ug/L
cis-1,3-Dichloropropene	ND	ND	ug/L
2-Chloroethyl vinyl ether	ND	ND	ug/L
Bromoform	ND	ND	ug/L
4-Methyl-2-pentanone	ND	ND	ug/L
2-Hexanone	ND	ND	ug/L
1,1,2,2-Tetrachloroethane	ND	ND	ug/L
Tetrachloroethene	ND	ND	ug/L
Toluene	ND	ND	ug/L
Chlorobenzene	ND	ND	ug/L
Ethylbenzene	ND	ND	ug/L
Stryene	ND	ND	ug/L
Xylenes (total)	ND	ND	ug/L
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ND	ug/L
1,2-Dibromoethane (EDB)	ND	ND	ug/L
1,2-Dichlorobenzene	ND	ND	ug/L
1,3-Dichlorobenzene	ND	ND	ug/L
1,4-Dichlorobenzene	ND	ND	ug/L

MW-2 Giant Refinery Gallup, New Mexico

Metals
Dissolved Metals

Parameter	01 APR 90 rESULT	Units	Reporting Limit
Arsenic	ND	mg/L	0.010
Barium	0.019	mg/L	0.010
Cadmium	ND	mg/L	0.0050
Calcium	1.7	mg/L	0.20
Magnesium	ND	mg/L	0.20
Manganese	ND	mg/L	0.010
Potassium	ND	mg/L	5.00
Selenium	ND	mg/L	0.0050
Silver	ND	mg/L	0.010
Sodium	259	mg/L	5.0

MW-2 Giant Refining Gallup, New Mexico

Metals
Total Metals

Parameter	01 APR 90 Result	02 OCT 90 Result	Units	Reporting Limit
Chromium	ND	ND	mg/L	0.010
Lead	ND	ND	mg/L	0.010
Mercury	ND	------	mg/L	0.00020

MW-2 Giant Refining Gallup, New Mexico

General Inorganics

Parameter	02 APR 90 Result	02 OCT 90 Result	Units	Reporting Limit
Alkalinity, Bicarb. as CaCO3 at pH 4.5	288		mg/L	5.0
Alkalinity, Carb. as CaCO3 at pH 8.3	47.6		mg/L	5.0
Chloride	54.0		mg/L	3.0
pH	8.63	8.62	units	--
pH	8.60	8.62	units	--
pH	8.72	8.62	units	--
pH	8.64	8.63	units	--
Phenolics	ND		mg/L	0.010
Sulfate	165		mg/L	5.0
Specific Conductance at 25 deg.C	1030	1180	umhos/cm	1.0
Specific Conductance at 25 deg.C	1040	1170	umhos/cm	1.0
Specific Conductance at 25 deg.C	1030	1180	umhos/cm	1.0
Specific Conductance at 25 deg.C	1050	1170	umhos/cm	1.0
Total Organic Carbon	1.0		mg/L	1.0
Total Organic Carbon	1.0		mg/L	1.0
Total Organic Carbon	1.0		mg/L	1.0
Total Organic Carbon	1.0		mg/L	1.0
Total Organic Halogen as Cl	ND		ug/L	30.0
Total Organic Halogen as Cl	31.5		ug/L	30.0
Total Organic Halogen as Cl	ND		ug/L	30.0
Total Organic Halogen as Cl	ND		ug/L	30.0
Total Dissolved Solids	688		mg/L	10.0
Water Elevation	6869.98	6871.28	ft	--

MW-4 Giant Refining Gallup, New Mexico

TCL Volatile Organics
Method 8240

Parameter	01 APR 90 Result	02 OCT 90 Result	Units	Reporting Limit
Chloromethane	ND	ND	ug/L	10
Bromomethane	ND	ND	ug/L	10
Vinyl chloride	ND	ND	ug/L	10
Chloroethane	ND	ND	ug/L	10
Methylene chloride	ND	ND	ug/L	5.0
Acetone	ND	ND	ug/L	10
Carbon disulfide	ND	ND	ug/L	5.0
1,1-Dichloroethene	ND	ND	ug/L	5.0
1,1-Dichloroethane	ND	ND	ug/L	5.0
1,2-Dichloroethene (cis/trans)	ND	ND	ug/L	5.0
Chloroform	ND	ND	ug/L	5.0
1,2-Dichloroethane	ND	ND	ug/L	5.0
2-Butanone	ND	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ND	ug/L	10
Carbon tetrachloride	ND	ND	ug/L	5.0
Vinyl acetate	ND	ND	ug/L	5.0
Bromodichloromethane	ND	ND	ug/L	10
trans-1,3-Dichloropropene	ND	ND	ug/L	5.0
Trichloroethene	ND	ND	ug/L	5.0
Chlorodibromomethane	ND	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ND	ug/L	5.0
Benzene	ND	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ND	ug/L	10
Bromoform	ND	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ND	ug/L	10
2-Hexanone	ND	ND	ug/L	10
1,1,2,2-Tetrachloroethane	ND	ND	ug/L	5.0
Tetrachloroethene	ND	ND	ug/L	5.0
Toluene	ND	ND	ug/L	5.0
Chlorobenzene	ND	ND	ug/L	5.0
Ethylbenzene	ND	ND	ug/L	5.0
Stryene	ND	ND	ug/L	5.0
Xylenes (total)	ND	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ND	ug/L	5.0
1,2-Dibromoethane (EDB)	ND	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ND	ug/L	5.0

MW-4 Giant Refinery Gallup, New Mexic

Metals
Dissolved Metals

Parameter	01 APR 90 Result	Units	Reporting Limit
Arsenic	ND	mg/L	0.010
Barium	0.017	mg/L	0.010
Cadmium	ND	mg/L	0.0050
Calcium	2.0	mg/L	0.20
Magnesium	0.24	mg/L	0.20
Manganese	ND	mg/L	0.010
Potassium	ND	mg/L	5.00
Selenium	ND	mg/L	0.0050
Silver	ND	mg/L	0.010
Sodium	277	mg/L	5.0

MW-4 Giant Refining Gallup, New Mexico

Metals
Total Metals

Parameter	01 APR 90 Result	02 OCT 90 Result	Units
Chromium	ND	ND	mg/L
Lead	ND	0.0071	mg/L
Mercury	ND	-----	mg/L

MW-4 Giant Refining Gallup, New Mexico

General Inorganics

Parameter	03 APR 90 Result	02 OCT 90 Result	Units	Reporting Limit
Alkalinity, Bicarb. as CaCO3 at pH 4.5	424	-----	mg/L	5.0
Alkalinity, Carb. as CaCO3 at pH 8.3	31.3	-----	mg/L	5.0
Chloride	14.0	-----	mg/L	3.0
pH	8.38	8.42	units	--
pH	8.41	8.43	units	--
pH	8.40	8.43	units	--
pH	8.42	8.43	units	--
Phenolics	ND	-----	mg/L	0.010
Sulfate	143	-----	mg/L	5.0
Specific Conductance at 25 deg.C	1090	1170	umhos/cm	1.0
Specific Conductance at 25 deg.C	1110	1180	umhos/cm	1.0
Specific Conductance at 25 deg.C	1100	1160	umhos/cm	1.0
Specific Conductance at 25 deg.C	1110	1170	umhos/cm	1.0
Total Organic Carbon	1.0	0.65	mg/L	1.0
Total Organic Carbon	2.0	0.67	mg/L	1.0
Total Organic Carbon	2.0	0.64	mg/L	1.0
Total Organic Carbon	1.0	0.68	mg/L	1.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Dissolved Solids	729	-----	mg/L	10.0
Water Elevation	6873.12	6870.05	ft	--

MW-5 Giant Refining Gallup, New Mexico

TCL Volatile Organics
Method 8240

Parameter	01 APR 90 Result	02 OCT 90 Result	Units	Reporting Limit
Chloromethane	ND	ND	ug/L	10
Bromomethane	ND	ND	ug/L	10
Vinyl chloride	ND	ND	ug/L	10
Chloroethane	ND	ND	ug/L	10
Methylene chloride	ND	ND	ug/L	5.0
Acetone	ND	ND	ug/L	10
Carbon disulfide	ND	ND	ug/L	5.0
1,1-Dichloroethene	ND	ND	ug/L	5.0
1,1-Dichloroethane	ND	ND	ug/L	5.0
1,2-Dichloroethene (cis/trans)	ND	ND	ug/L	5.0
Chloroform	ND	ND	ug/L	5.0
1,2-Dichloroethane	ND	ND	ug/L	5.0
2-Butanone	ND	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ND	ug/L	10
Carbon tetrachloride	ND	ND	ug/L	5.0
Vinyl acetate	ND	ND	ug/L	5.0
Bromodichloromethane	ND	ND	ug/L	10
trans-1,3-Dichloropropene	ND	ND	ug/L	5.0
Trichloroethene	ND	ND	ug/L	5.0
Chlorodibromomethane	ND	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ND	ug/L	5.0
Benzene	ND	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ND	ug/L	10
Bromoform	ND	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ND	ug/L	10
2-Hexanone	ND	ND	ug/L	10
1,1,2,2-Tetrachloroethane	ND	ND	ug/L	5.0
Tetrachloroethene	ND	ND	ug/L	5.0
Toluene	ND	ND	ug/L	5.0
Chlorobenzene	ND	ND	ug/L	5.0
Ethylbenzene	ND	ND	ug/L	5.0
Stryene	ND	ND	ug/L	5.0
Xylenes (total)	ND	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ND	ug/L	10
1,2-Dibromoethane (EDB)	ND	ND	ug/L	10
1,2-Dichlorobenzene	ND	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ND	ug/L	5.0

MW-5 Giant Refinery Gallup, New Mexico

Metals
Dissolved Metals

Parameter	02 APR 90 Result	Units	Reporting Limit
Arsenic	ND	mg/L	0.010
Barium	0.12	mg/L	0.010
Cadmium	ND	mg/L	0.0050
Calcium	1.9	mg/L	0.20
Magnesium	0.20	mg/L	0.20
Manganese	ND	mg/L	0.010
Potassium	ND	mg/L	5.00
Selenium	ND	mg/L	0.0050
Silver	ND	mg/L	0.010
Sodium	255	mg/L	5.0

MW-5 Giant Refining Gallup, New Mexico

Metals
Total Metals

Parameter	01 APR 90 Result	02 OCT 90 Result	Units
Chromium	ND	ND	mg/L
Lead	ND	ND	mg/L
Mercury	ND	-----	mg/L

MW-5 Giant Refining Gallup, New Mexico

General Inorganics

Parameter	03 APR 90 Result	02 OCT 90 Result	Units	Reporting Limit
Alkalinity, Bicarb. as CaCO3 at pH 4.5	272	-----	mg/L	5.0
Alkalinity, Carb. as CaCO3 at pH 8.3	47.0	-----	mg/L	5.0
Chloride	62.1	-----	mg/L	3.0
pH	8.46	8.63	units	--
pH	8.49	8.63	units	--
pH	8.52	8.63	units	--
pH	8.50	8.62	units	--
Phenolics	ND	-----	mg/L	0.010
Sulfate	170	-----	mg/L	5.0
Specific Conductance at 25 deg.C	1070	1170	umhos/cm	1.0
Specific Conductance at 25 deg.C	1060	1160	umhos/cm	1.0
Specific Conductance at 25 deg.C	1080	1160	umhos/cm	1.0
Specific Conductance at 25 deg.C	1080	1150	umhos/cm	1.0
Total Organic Carbon	1.0	0.56	mg/L	1.0
Total Organic Carbon	2.0	0.58	mg/L	1.0
Total Organic Carbon	1.0	0.58	mg/L	1.0
Total Organic Carbon	1.0	0.59	mg/L	1.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Organic Halogen as Cl	ND	ND	ug/L	30.0
Total Dissolved Solids	687		mg/L	10.0
Water Elevation	6870.44	6868.27	ft	--

APPENDIX E

ORIGINAL ANALYTICAL

Rocky Mountain
Analytical Laboratory

Enseco

ANALYTICAL RESULTS
FOR
GIANT REFINING
ENSECO-RMAL NO. 008875

APRIL 17, 1990

Reviewed by: Julie Essey

Jeanne B. Howbert

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

Introduction

This report presents the analytical results as well as supporting information to aid in the evaluation and interpretation of the data and is arranged in the following order:

- Sample Description Information
- Analytical Test Requests
- Analytical Results
- Quality Control Report

All analyses at Enseco are performed so that the maximum concentration of sample consistent with the method is analyzed. Dilutions are at times required to achieve linearity of the specific parameter or to reduce matrix interferences. In this event, reporting limits are adjusted proportionately.

Although benzo(j)fluoranthene was an analyte of interest, it does not appear in this report. This compound exhibits identical mass ionization to that of other benzo fluoranthene compounds and cannot be chromatographically resolved (or isolated) from its isomers. Laboratory studies have shown that benzo(j)fluoranthene will coelute with either benzo(b)fluoranthene or benzo(k)fluoranthene depending on the relative concentration of these two compounds in solution. Therefore, if benzo(j)fluoranthene is present, it will be detected and reported as benzo(b) and/or benzo(k)fluoranthene. To further complicate the issue, a standard for benzo(j)fluoranthene is not commercially available and many times is not obtainable at all. Because of these problems, Enseco does not offer this analyte by Method 8270.

Sample Description Information

The Sample Description Information lists all of the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Enseco - RMAL is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Test Requests

The Analytical Test Requests lists the analyses that were performed on each sample. The Custom Test column indicates where tests have been modified to conform to the specific requirements of this project.

Enseco
A CORNING Company

SAMPLE DESCRIPTION INFORMATION
for
Giant Refining

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
008875-0001-SA	OW-1	AQUEOUS	28 MAR 90	09:30	29 MAR 90
008875-0002-SA	OW-2	AQUEOUS	28 MAR 90	09:05	29 MAR 90
008875-0003-SA	OW-3	AQUEOUS	28 MAR 90	08:35	29 MAR 90
008875-0004-SA	OW-11	AQUEOUS	28 MAR 90	08:02	29 MAR 90
008875-0005-SA	TRIP BLANK	AQUEOUS	28 MAR 90	08:50	29 MAR 90

ANALYTICAL TEST REQUESTS
for
Giant Refining

Lab ID: 008875	Group Code	Analysis Description	Custom Test?
0004	A	Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		ICP Metals (Dissolved)	Y
		Arsenic, Furnace AA (Dissolved)	N
		Selenium, Furnace AA (Dissolved)	N
		ICP Metals (Total)	Y
		Prep - Total Metals, ICP	N
		Lead, Furnace AA (Total)	N
		Prep - Total Metals, Furnace AA	N
		Mercury, Cold Vapor AA (Total)	N
		Prep - Mercury, Cold Vapor AA (Total)	N
		Chloride, Ion Chromatography	N
		Sulfate, Ion Chromatography	N
		Alkalinity,	Y
		Total/Carbonate/Bicarbonate/Hydroxide	Y
		Total Dissolved Solids (TDS)	N
		Phenolics (4-AAP)	N
		TCL Volatile Organics	Y
		Prep-Volatile Organics by GC/MS	N
		pH	N
		Specific Conductance	N
		Prep - Semivolatile Organics by GC/MS	N
		Refinery Hazardous Constituent Semivolatiles	Y
		TCL Volatile Organics	Y
0001 - 0003	B	Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		ICP Metals (Dissolved)	Y
		Chloride, Ion Chromatography	N
		Sulfate, Ion Chromatography	N
		Alkalinity,	Y

ANALYTICAL TEST REQUESTS
for
Giant Refining

Lab ID: 008875	Group Code	Analysis Description	Custom Test?
		Total/Carbonate/Bicarbonate/Hydroxide	Y
		Total Dissolved Solids (TDS)	N
		TCL Volatile Organics	Y
		Prep-Volatile Organics by GC/MS	N
		pH	N
		Specific Conductance	N
0005	C	Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		ICP Metals (Dissolved)	Y
		Arsenic, Furnace AA (Dissolved)	N
		Selenium, Furnace AA (Dissolved)	N
		ICP Metals (Total)	Y
		Prep - Total Metals, ICP	N
		Lead, Furnace AA (Total)	N
		Prep - Total Metals, Furnace AA	N
		Mercury, Cold Vapor AA (Total)	N
		Prep - Mercury, Cold Vapor AA (Total)	N
		Chloride, Ion Chromatography	N
		Sulfate, Ion Chromatography	N
		Alkalinity,	Y
		Total/Carbonate/Bicarbonate/Hydroxide	Y
		Total Dissolved Solids (TDS)	N
		Phenolics (4-AAP)	N
		pH	N
		Specific Conductance	N
		TCL Volatile Organics	Y
		Prep-Volatile Organics by GC/MS	N
		TCL Volatile Organics	Y

Analytical Results

The analytical results for this project are presented in the following data tables. Each data table includes sample identification information, and when available and appropriate, dates sampled, received, authorized, prepared and analyzed. The authorization data is the date when the project was defined by the client such that laboratory work could begin.

Data sheets contain a listing of the parameters measured in each test, the analytical results and the Enseco reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e. no correction is made for moisture content.

Enseco-RMAL is no longer routinely blank-correcting analytical data. Uncorrected analytical results are reported, along with associated blank results, for all organic and metals analyses. Analytical results and blank results are reported for conventional inorganic parameters as specified in the method. This policy is described in detail in the Enseco Incorporated Quality Assurance Program Plan for Environmental Chemical Monitoring, Revision 3.3, April, 1989.

The results from the Standard Enseco QA/QC Program, which generates data which are independent of matrix effects, is provided subsequently.

Enseco
A CORNING Company

TCL Volatile Organics

Method 8240

Client Name: Giant Refining
Client ID: OW-11
Lab ID: 008875-0004-SA
Matrix: AQUEOUS
Authorized: 29 MAR 90

Enseco ID: 1070251
Sampled: 28 MAR 90
Prepared: 02 APR 90

Received: 29 MAR 90
Analyzed: 04 APR 90

Parameter	Result	Units	Reporting Limit
1,1-Dichloroethene	ND	ug/L	5.0
2-Butanone	ND	ug/L	10
1,1,1-Trichloroethane	ND	ug/L	5.0
Benzene	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
Xylenes (total)	ND	ug/L	5.0
Toluene-d8	103	%	--
4-Bromofluorobenzene	94	%	--
1,2-Dichloroethane-d4	96	%	--

ND = Not detected
NA = Not applicable

Reported By: Cesar Rojas

Approved By: Jeff Lowry

Enseco
A CORNING Company

TCL Volatile Organics

Method 8240

Client Name: Giant Refining
Client ID: OW-11
Lab ID: 008875-0004-SA
Enseco ID: 1070251
Matrix: AQUEOUS
Sampled: 28 MAR 90
Received: 29 MAR 90
Authorized: 29 MAR 90
Prepared: 02 APR 90
Analyzed: 04 APR 90

Parameter	Result	Units	Reporting Limit
1,1-Dichloroethene	ND	ug/L	5.0
2-Butanone	ND	ug/L	10
1,1,1-Trichloroethane	ND	ug/L	5.0
Benzene	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
Xylenes (total)	ND	ug/L	5.0
Toluene-d8	102	%	--
4-Bromofluorobenzene	95	%	--
1,2-Dichloroethane-d4	98	%	--

ND = Not detected
NA = Not applicable

Reported By: Cesar Rojas

Approved By: Jeff Lowry

Enseco
A CORNING Company

Refinery Hazardous Constituent Semivolatiles

Method 8270

Client Name: Giant Refining
Client ID: OW-11
Lab ID: 008875-0004-SA
Matrix: AQUEOUS
Authorized: 29 MAR 90

Enseco ID: 1070251
Sampled: 28 MAR 90
Prepared: 01 APR 90

Received: 29 MAR 90
Analyzed: 06 APR 90

Parameter	Result	Units	Reporting Limit
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
Chrysene	ND	ug/L	10
7,12-Dimethylbenz(a)-anthracene	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
Fluoranthene	ND	ug/L	10
1-Methylnaphthalene	ND	ug/L	10
Naphthalene	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Pyrene	ND	ug/L	10
o-Cresol	ND	ug/L	10
m & p-Cresol(s)	ND	ug/L	10
2,4,6-Trichlorophenol	ND	ug/L	10
2-Chlorophenol	ND	ug/L	10
Nitrobenzene-d5	49	%	--
2-Fluorobiphenyl	53	%	--
Terphenyl-d14	79	%	--
Phenol-d5	54	%	--
2-Fluorophenol	49	%	--
2,4,6-Tribromophenol	88	%	--

ND = Not detected
NA = Not applicable

Reported By: Belinda Guerra

Approved By: Jeff Lowry

Enseco
A CORNING Company

Metals

Dissolved Metals

Client Name: Giant Refining
Client ID: OW-11
Lab ID: 008875-0004-SA
Enseco ID: 1070251
Matrix: AQUEOUS
Sampled: 28 MAR 90
Received: 29 MAR 90
Authorized: 29 MAR 90
Prepared: See Below
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic	ND	mg/L	0.0050	7060	NA	03 APR 90
Barium	0.014	mg/L	0.010	6010	NA	04 APR 90
Cadmium	ND	mg/L	0.0050	6010	NA	04 APR 90
Calcium	4.8	mg/L	0.20	6010	NA	04 APR 90
Copper	ND	mg/L	0.010	6010	NA	04 APR 90
Manganese	ND	mg/L	0.010	6010	NA	04 APR 90
Nickel	ND	mg/L	0.040	6010	NA	04 APR 90
Selenium	ND	mg/L	0.050	7740	NA	03 APR 90
Silver	ND	mg/L	0.010	6010	NA	04 APR 90
Sodium	382	mg/L	5.0	6010	NA	04 APR 90
Zinc	ND	mg/L	0.010	6010	NA	04 APR 90

ND = Not detected
NA = Not applicable

Reported By: Sandra Jones

Approved By: Roxanne Sullivan

Enseco
A CORNING Company

Metals

Total Metals

Client Name: Giant Refining
Client ID: OW-11
Lab ID: 008875-0004-SA
Enseco ID: 1070251
Matrix: AQUEOUS
Sampled: 28 MAR 90
Received: 29 MAR 90
Authorized: 29 MAR 90
Prepared: See Below
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	ND	mg/L	0.010	6010	31 MAR 90	03 APR 90
Lead	ND	mg/L	0.0050	7421	31 MAR 90	02 APR 90
Mercury	ND	mg/L	0.00020	7470	31 MAR 90	31 MAR 90

ND = Not detected
NA = Not applicable

Reported By: Frank Carman

Approved By: Roxanne Sullivan

Enseco
A CORNING Company

General Inorganics

Client Name: Giant Refining
Client ID: OW-11
Lab ID: 008875-0004-SA
Enseco ID: 1070251
Matrix: AQUEOUS
Sampled: 28 MAR 90
Received: 29 MAR 90
Authorized: 29 MAR 90
Prepared: See Below
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Alkalinity, Bicarb. as CaCO3 at pH 4.5	461	mg/L	5.0	310.1	NA	29 MAR 90
Alkalinity, Carb. as CaCO3 at pH 8.3	ND	mg/L	5.0	310.1	NA	29 MAR 90
Chloride	123	mg/L	3.0	300.0	NA	03 APR 90
pH	8.3	units	--	9040	NA	29 MAR 90
Phenolics	ND	mg/L	0.010	9065	NA	04 APR 90
Sulfate	294	mg/L	5.0	300.0	NA	03 APR 90
Specific Conductance at 25 deg.C	1650	umhos/cm	1.0	120.1	NA	29 MAR 90
Total Organic Carbon	6.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	6.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	6.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	6.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	05 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	05 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	05 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	05 APR 90
Total Dissolved Solids	1110	mg/L	10.0	160.1	NA	29 MAR 90

ND = Not detected
NA = Not applicable

Reported By: Jennifer Franzen
Approved By: Tammy Bailey

Enseco
A CORNING Company

TCL Volatile Organics

Method 8240

Client Name: Giant Refining
Client ID: TRIP BLANK
Lab ID: 008875-0005-SA
Enseco ID: 1070252
Matrix: AQUEOUS
Sampled: 28 MAR 90
Received: 29 MAR 90
Authorized: 29 MAR 90
Prepared: 04 APR 90
Analyzed: 04 APR 90

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	10
Bromomethane	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Chloroethane	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
Acetone	14	ug/L	10
Carbon disulfide	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethene (cis/trans)	ND	ug/L	5.0
Chloroform	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
2-Butanone	ND	ug/L	10
1,1,1-Trichloroethane	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Bromodichloromethane	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Chlorodibromomethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Benzene	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	10
4-Methyl-2-pentanone	ND	ug/L	10
2-Hexanone	ND	ug/L	10
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
Styrene	ND	ug/L	5.0
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	10
1,2-Dibromoethane (EDB)	ND	ug/L	10
1,2-Dichlorobenzene	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Cesar Rojas
Approved By: Jeff Lowry

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TCL Volatile Organics (CONT.)

Method 8240

Client Name: Giant Refining
Client ID: TRIP BLANK
Lab ID: 008875-0005-SA
Enseco ID: 1070252
Matrix: AQUEOUS
Sampled: 28 MAR 90
Received: 29 MAR 90
Authorized: 29 MAR 90
Prepared: 04 APR 90
Analyzed: 04 APR 90

Parameter	Result	Units	Reporting Limit
Toluene-d8	101	%	--
4-Bromofluorobenzene	93	%	--
1,2-Dichloroethane-d4	94	%	--

ND = Not detected
NA = Not applicable

Reported By: Cesar Rojas

Approved By: Jeff Lowry

Enseco
A CORNING Company

Metals

Dissolved Metals

Client Name: Giant Refining
Client ID: TRIP BLANK
Lab ID: 008875-0005-SA
Enseco ID: 1070252
Matrix: AQUEOUS
Sampled: 28 MAR 90
Received: 29 MAR 90
Authorized: 29 MAR 90
Prepared: See Below
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic	ND	mg/L	0.0050	7060	NA	04 APR 90
Barium	ND	mg/L	0.010	6010	NA	04 APR 90
Cadmium	ND	mg/L	0.0050	6010	NA	04 APR 90
Calcium	ND	mg/L	0.20	6010	NA	04 APR 90
Magnesium	ND	mg/L	0.20	6010	NA	04 APR 90
Manganese	ND	mg/L	0.010	6010	NA	04 APR 90
Potassium	ND	mg/L	5.0	6010	NA	04 APR 90
Selenium	ND	mg/L	0.0050	7740	NA	05 APR 90
Silver	ND	mg/L	0.010	6010	NA	04 APR 90
Sodium	ND	mg/L	5.0	6010	NA	04 APR 90
Zinc	ND	mg/L	0.010	6010	NA	04 APR 90

ND = Not detected
NA = Not applicable

Reported By: Sandra Jones

Approved By: Roxanne Sullivan

Enseco
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Metals

Total Metals

Client Name: Giant Refining
Client ID: TRIP BLANK
Lab ID: 008875-0005-SA
Enseco ID: 1070252
Matrix: AQUEOUS
Sampled: 28 MAR 90
Received: 29 MAR 90
Authorized: 29 MAR 90
Prepared: See Below
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	ND	mg/L	0.010	6010	31 MAR 90	03 APR 90
Lead	ND	mg/L	0.010	7421	31 MAR 90	02 APR 90
Mercury	ND	mg/L	0.00020	7470	31 MAR 90	31 MAR 90

ND = Not detected
NA = Not applicable

Reported By: Frank Carman

Approved By: Roxanne Sullivan

Enseco
A CORNING Company

General Inorganics

Client Name: Giant Refining
Client ID: TRIP BLANK
Lab ID: 008875-0005-SA
Matrix: AQUEOUS
Authorized: 29 MAR 90

Enseco ID: 1070252
Sampled: 28 MAR 90
Prepared: See Below

Received: 29 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Alkalinity, Bicarb. as CaCO3 at pH 4.5	ND	mg/L	5.0	310.1	NA	29 MAR 90
Alkalinity, Carb. as CaCO3 at pH 8.3	ND	mg/L	5.0	310.1	NA	29 MAR 90
Chloride	ND	mg/L	3.0	300.0	NA	03 APR 90
pH	5.0	units	--	9040	NA	29 MAR 90
Phenolics	ND	mg/L	0.010	9065	NA	04 APR 90
Sulfate	ND	mg/L	5.0	300.0	NA	03 APR 90
Specific Conductance at 25 deg.C	3.5	umhos/cm	1.0	120.1	NA	29 MAR 90
Total Organic Carbon	ND	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	ND	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	ND	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	ND	mg/L	1.0	9060	NA	10 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	10 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	10 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	10 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	10 APR 90
Total Dissolved Solids	ND	mg/L	10.0	160.1	NA	29 MAR 90

ND = Not detected
NA = Not applicable

Reported By: Jennifer Franzen

Approved By: Tammy Bailey

Quality Control Results

The Enseco laboratories operate under a vigorous QA/QC program designed to ensure the generation of scientifically valid, legally defensible data by monitoring every aspect of laboratory operations. Routine QA/QC procedures include the use of approved methodologies, independent verification of analytical standards, use of duplicate Laboratory Control Samples to assess the precision and accuracy of the methodology on a routine basis, and a rigorous system of data review.

In addition, the Enseco laboratories maintain a comprehensive set of certifications from both state and federal governmental agencies which require frequent analyses of blind audit samples. Enseco - Rocky Mountain Analytical Laboratory is certified by the EPA under the EPA/CLP program for both Organic and Inorganic analyses, under the USATHAMA (U.S. Army) program, by the Army Corps of Engineers, and the states of Colorado, New Jersey, New York, Utah, and Florida, among others.

The standard laboratory QC package is designed to:

1) establish a strong, cost-effective QC program that ensures the generation of scientifically valid, legally defensible data

2) assess the laboratory's performance of the analytical method using control limits generated with a well-defined matrix

3) establish clear-cut guidelines for acceptability of analytical data so that QC decisions can be made immediately at the bench, and

4) provide a standard set of reportables which assures the client of the quality of his data.

The Enseco QC program is based upon monitoring the precision and accuracy of an analytical method by analyzing a set of Duplicate Control Samples (DCS) at frequent, well-defined intervals. Each DCS is a well-characterized matrix which is spiked with target compounds at 5-100 times the reporting limit, depending upon the methodology being monitored. The purpose of the DCS is not to duplicate the sample matrix, but rather to provide an interference-free, homogeneous matrix from which to gather data to establish control limits. These limits are used to determine whether data generated by the laboratory on any given day is in control.

Control limits for accuracy (percent recovery) are based on the average, historical percent recovery +/- 3 standard deviation units. Control limits for precision (relative percent difference) range from 0 (identical duplicate DCS results) to the average, historical relative percent difference + 3 standard deviation units. These control limits are fairly narrow based on the consistency of the matrix being monitored and are updated on a quarterly basis.

For each batch of samples analyzed, an additional control measure is taken in the form of a Single Control Sample (SCS). The SCS consists of a control matrix that is spiked with either representative target compounds or surrogate compounds appropriate to the method being used. An SCS is prepared for each sample lot for which the DCS pair are not analyzed.

Accuracy for DCS and SCS is measured by Percent Recovery.

$$\% \text{ Recovery} = \frac{\text{Measured Concentration}}{\text{Actual Concentration}} \times 100$$

Precision for DCS is measured by Relative Percent Difference (RPD).

$$\text{RPD} = \frac{|\text{Measured Concentration DCS1} - \text{Measured Concentration DCS2}|}{(\text{Measured Concentration DCS1} + \text{Measured Concentration DCS2})/2} \times 100$$

All samples analyzed concurrently by the same test are assigned the same QC lot number. Projects which contain numerous samples, analyzed over several days, may have multiple QC lot numbers associated with each test. The QC information which follows includes a listing of the QC lot numbers associated with each of the samples reported, DCS and SCS (where applicable) recoveries from the QC lots associated with the samples, and control limits for these lots. The QC data is reported by test code, in the order that the tests are reported in the analytical results section of this report.

Enseco
A CORNING Company

QC LOT ASSIGNMENT REPORT
Volatile Organics by GC/MS

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
008875-0001-SA	AQUEOUS	624-A	02 APR 90-F	03 APR 90-F2
008875-0002-SA	AQUEOUS	624-A	02 APR 90-F	03 APR 90-F2
008875-0003-SA	AQUEOUS	624-A	02 APR 90-F	03 APR 90-F2
008875-0004-SA	AQUEOUS	624-A	02 APR 90-F	03 APR 90-F2
008875-0004-SA	AQUEOUS	624-A	02 APR 90-F	03 APR 90-F2
008875-0005-SA	AQUEOUS	624-A	02 APR 90-F	03 APR 90-F2

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DUPLICATE CONTROL SAMPLE REPORT
Volatile Organics by GC/MS

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
Category: 624-A								
Matrix: AQUEOUS								
QC Lot: 02 APR 90-F								
Concentration Units: ug/L								
1,1-Dichloroethene	50	48.5	47.9	48.2	96	61-145	1.2	14
Trichloroethene	50	51.9	51.6	51.8	104	71-120	0.6	14
Benzene	50	51.1	54.1	52.6	105	76-127	5.7	11
Toluene	50	55.0	53.5	54.2	109	76-125	2.8	13
Chlorobenzene	50	54.8	54.1	54.4	109	75-130	1.3	13

Calculations are performed before rounding to avoid round-off errors in calculated results.

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SINGLE CONTROL SAMPLE REPORT
Volatile Organics by GC/MS

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Category: 624-A				
Matrix: AQUEOUS				
QC Lot: 02 APR 90-F QC Run: 03 APR 90-F2				
Concentration Units: ug/L				
1,2-Dichloroethane-d4	50.0	48.8	98	76-114
4-Bromofluorobenzene	50.0	47.9	96	86-115
Toluene-d8	50.0	49.8	100	88-110

Calculations are performed before rounding to avoid round-off errors in calculated results.

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METHOD BLANK REPORT
Volatile Organics by GC/MS

Analyte	Result	Units	Reporting Limit
Test: 624-TCL-AP Matrix: AQUEOUS QC Lot: 02 APR 90-F QC Run: 03 APR 90-F2			
Benzene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
Xylenes (total)	ND	ug/L	5.0
Test: 624-TCL-AP Matrix: AQUEOUS QC Lot: 02 APR 90-F QC Run: 03 APR 90-F2			
1,1-Dichloroethene	ND	ug/L	5.0
2-Butanone	ND	ug/L	10
1,1,1-Trichloroethane	ND	ug/L	5.0
Benzene	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
Xylenes (total)	ND	ug/L	5.0
Test: 624-TCL-AP Matrix: AQUEOUS QC Lot: 02 APR 90-F QC Run: 03 APR 90-F2			
Chloromethane	ND	ug/L	10
Bromomethane	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Chloroethane	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
Acetone	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethene (cis/trans)	ND	ug/L	5.0
Chloroform	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
2-Butanone	ND	ug/L	10
1,1,1-Trichloroethane	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10

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METHOD BLANK REPORT
Volatile Organics by GC/MS (cont.)

Test: 624-TCL-AP
Matrix: AQUEOUS
QC Lot: 02 APR 90-F QC Run: 03 APR 90-F2

Analyte	Result	Units	Reporting Limit
Bromodichloromethane	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Chlorodibromomethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Benzene	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	10
4-Methyl-2-pentanone	ND	ug/L	10
2-Hexanone	ND	ug/L	10
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
Styrene	ND	ug/L	5.0
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	10
1,2-Dibromoethane (EDB)	ND	ug/L	10
1,2-Dichlorobenzene	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0

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QC LOT ASSIGNMENT REPORT
Semivolatile Organics by GC/MS

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
008875-0004-SA	AQUEOUS	625-A	01 APR 90-A	01 APR 90-A

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DUPLICATE CONTROL SAMPLE REPORT
Semivolatile Organics by GC/MS

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
Category: 625-A								
Matrix: AQUEOUS								
QC Lot: 01 APR 90-A								
Concentration Units: ug/L								
Phenol	100	69.6	82.9	76.2	76	12- 89	17	42
2-Chlorophenol	100	65.1	76.1	70.6	71	27-123	16	40
1,4-Dichlorobenzene	50	22.1	24.0	23.0	46	36- 97	8.2	28
N-Nitroso-di-n-propylamine	50	39.1	45.7	42.4	85	41-116	16	38
1,2,4-Trichlorobenzene	50	24.2	25.0	24.6	49	39- 98	3.3	28
4-Chloro-3-methylphenol	100	75.5	87.1	81.3	81	23- 97	14	42
Acenaphthene	50	27.6	31.3	29.4	59	46-118	13	31
4-Nitrophenol	100	68.5	66.7	67.6	68	10- 80	2.7	50
2,4-Dinitrotoluene	50	29.1	35.1	32.1	64	24- 96	19	38
Pentachlorophenol	100	78.8	79.6	79.2	79	9-103	1.0	50
Pyrene	50	27.2	33.4	30.3	61	26-127	20	31

Calculations are performed before rounding to avoid round-off errors in calculated results.

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SINGLE CONTROL SAMPLE REPORT
Semivolatile Organics by GC/MS

Category: 625-A
Matrix: AQUEOUS
QC Lot: 01 APR 90-A QC Run: 01 APR 90-A
Concentration Units: ug/L

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Nitrobenzene-d5	100	55.7	56	35-114
2-Fluorobiphenyl	100	49.7	50	43-116
Terphenyl-d14	100	53.5	54	33-141
2-Fluorophenol	200	124	62	21-100
Phenol-d5	200	133	66	10- 94
2,4,6-Tribromophenol	200	154	77	10-123

Calculations are performed before rounding to avoid round-off errors in calculated results.

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METHOD BLANK REPORT
Semivolatile Organics by GC/MS

Test: 625-REF-A
Matrix: AQUEOUS
QC Lot: 01 APR 90-A QC Run: 01 APR 90-A

Analyte	Result	Units	Reporting Limit
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
Chrysene	ND	ug/L	10
7,12-Dimethylbenz(a)-anthracene	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
Fluoranthene	ND	ug/L	10
1-Methylnaphthalene	ND	ug/L	10
Naphthalene	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Pyrene	ND	ug/L	10
o-Cresol	ND	ug/L	10
m & p-Cresol(s)	ND	ug/L	10
2,4,6-Trichlorophenol	ND	ug/L	10
2-Chlorophenol	ND	ug/L	10

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QC LOT ASSIGNMENT REPORT
Metals Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
008875-0001-SA	AQUEOUS	ICP-AD	04 APR 90-A	-
008875-0002-SA	AQUEOUS	ICP-AD	04 APR 90-A	-
008875-0003-SA	AQUEOUS	ICP-AD	04 APR 90-A	-
008875-0004-SA	AQUEOUS	ICP-AD	04 APR 90-A	-
008875-0004-SA	AQUEOUS	AS-FAA-AD	03 APR 90-D	-
008875-0004-SA	AQUEOUS	SE-FAA-AD	03 APR 90-D	-
008875-0004-SA	AQUEOUS	ICP-AT	31 MAR 90-D	31 MAR 90-D
008875-0004-SA	AQUEOUS	PB-FAA-AT	31 MAR 90-D	31 MAR 90-D
008875-0004-SA	AQUEOUS	HG-CVAA-AT	31 MAR 90-A	31 MAR 90-A
008875-0005-SA	AQUEOUS	ICP-AD	04 APR 90-A	-
008875-0005-SA	AQUEOUS	AS-FAA-AD	04 APR 90-A	-
008875-0005-SA	AQUEOUS	SE-FAA-AD	05 APR 90-A	-
008875-0005-SA	AQUEOUS	ICP-AT	31 MAR 90-D	31 MAR 90-D
008875-0005-SA	AQUEOUS	PB-FAA-AT	31 MAR 90-D	31 MAR 90-D
008875-0005-SA	AQUEOUS	HG-CVAA-AT	31 MAR 90-A	31 MAR 90-A

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DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
Category: ICP-AD								
Matrix: AQUEOUS								
QC Lot: 04 APR 90-A								
Concentration Units: mg/L								
Aluminum	2.0	1.90	1.91	1.90	95	75-125	0.7	20
Antimony	0.5	0.473	0.474	0.473	95	75-125	0.2	20
Arsenic	0.5	0.461	0.462	0.461	92	75-125	0.2	20
Barium	2.0	1.65	1.66	1.66	83	75-125	0.9	20
Beryllium	0.05	0.0456	0.0457	0.0456	91	75-125	0.4	20
Cadmium	0.05	0.0475	0.0461	0.0468	94	75-125	3.1	20
Calcium	100	88.1	88.9	88.5	88	75-125	0.9	20
Chromium	0.2	0.193	0.190	0.192	96	75-125	1.5	20
Cobalt	0.5	0.455	0.459	0.457	91	75-125	0.8	20
Copper	0.25	0.247	0.250	0.248	99	75-125	0.9	20
Iron	1.0	0.948	0.956	0.952	95	75-125	0.8	20
Lead	0.5	0.475	0.479	0.477	95	75-125	1.0	20
Magnesium	50	44.3	44.9	44.6	89	75-125	1.5	20
Manganese	0.5	0.487	0.491	0.489	98	75-125	0.9	20
Nickel	0.5	0.445	0.449	0.447	89	75-125	0.9	20
Potassium	50	43.7	44.7	44.2	88	75-125	2.2	20
Silver	0.05	0.0426	0.0426	0.0426	85	75-125	0.0	20
Sodium	100	88.0	89.7	88.9	89	75-125	2.0	20
Vanadium	0.5	0.456	0.461	0.458	92	75-125	0.9	20
Zinc	0.5	0.461	0.466	0.463	93	75-125	1.0	20
Category: AS-FAA-AD								
Matrix: AQUEOUS								
QC Lot: 03 APR 90-D								
Concentration Units: mg/L								
Arsenic	0.04	0.0378	0.0403	0.0390	98	75-125	6.4	20
Category: SE-FAA-AD								
Matrix: AQUEOUS								
QC Lot: 03 APR 90-D								
Concentration Units: mg/L								
Selenium	0.01	0.00930	0.00950	0.00940	94	75-125	2.1	20

Calculations are performed before rounding to avoid round-off errors in calculated results.

DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation (cont.)

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: ICP-AT								
Matrix: AQUEOUS								
QC Lot: 31 MAR 90-D								
Concentration Units: mg/L								
Aluminum	2.0	1.89	1.89	1.89	94	75-125	0.2	20
Antimony	0.5	0.461	0.470	0.465	93	75-125	2.1	20
Arsenic	0.5	0.443	0.473	0.458	92	75-125	6.6	20
Barium	2.0	1.63	1.65	1.64	82	75-125	1.3	20
Beryllium	0.05	0.0446	0.0440	0.0443	89	75-125	1.2	20
Cadmium	0.05	0.0474	0.0450	0.0462	92	75-125	5.2	20
Calcium	100	87.7	90.6	89.1	89	75-125	3.2	20
Chromium	0.2	0.191	0.192	0.191	96	75-125	0.8	20
Cobalt	0.5	0.437	0.461	0.449	90	75-125	5.5	20
Copper	0.25	0.241	0.249	0.245	98	75-125	3.4	20
Iron	1.0	0.943	0.954	0.948	95	75-125	1.2	20
Lead	0.5	0.455	0.476	0.465	93	75-125	4.4	20
Magnesium	50	43.9	45.4	44.6	89	75-125	3.4	20
Manganese	0.5	0.462	0.490	0.476	95	75-125	5.8	20
Nickel	0.5	0.425	0.453	0.439	88	75-125	6.3	20
Potassium	50	43.7	45.5	44.6	89	75-125	3.9	20
Silver	0.05	0.0422	0.0435	0.0429	86	75-125	3.1	20
Sodium	100	87.7	90.9	89.3	89	75-125	3.5	20
Vanadium	0.5	0.455	0.461	0.458	92	75-125	1.2	20
Zinc	0.5	0.451	0.483	0.467	93	75-125	6.7	20
Category: PB-FAA-AT								
Matrix: AQUEOUS								
QC Lot: 31 MAR 90-D								
Concentration Units: mg/L								
Lead	0.020	0.0230	0.0238	0.0234	117	75-125	3.4	20
Category: HG-CVAA-AT								
Matrix: AQUEOUS								
QC Lot: 31 MAR 90-A								
Concentration Units: mg/L								
Mercury	0.0010	0.00107	0.00111	0.00109	109	75-125	3.7	20

Calculations are performed before rounding to avoid round-off errors in calculated results.

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DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation (cont.)

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: AS-FAA-AD Matrix: AQUEOUS QC Lot: 04 APR 90-A Concentration Units: mg/L								
Arsenic	0.04	0.0384	0.0347	0.0366	91	75-125	10	20
Category: SE-FAA-AD Matrix: AQUEOUS QC Lot: 05 APR 90-A Concentration Units: mg/L								
Selenium	0.01	0.00960	0.00900	0.00930	93	75-125	6.5	20

Calculations are performed before rounding to avoid round-off errors in calculated results.

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METHOD BLANK REPORT
Metals Analysis and Preparation

Analyte	Result	Units	Reporting Limit
Test: ICP-AT Matrix: AQUEOUS QC Lot: 31 MAR 90-D QC Run: 31 MAR 90-D			
Chromium	ND	mg/L	0.010
Test: PB-FAA-AT Matrix: AQUEOUS QC Lot: 31 MAR 90-D QC Run: 31 MAR 90-D			
Lead	ND	mg/L	0.0050
Test: HG-CVAA-AT Matrix: AQUEOUS QC Lot: 31 MAR 90-A QC Run: 31 MAR 90-A			
Mercury	ND	mg/L	0.00020
Test: ICP-AT Matrix: AQUEOUS QC Lot: 31 MAR 90-D QC Run: 31 MAR 90-D			
Chromium	ND	mg/L	0.010
Test: PB-FAA-AT Matrix: AQUEOUS QC Lot: 31 MAR 90-D QC Run: 31 MAR 90-D			
Lead	ND	mg/L	0.0050
Test: HG-CVAA-AT Matrix: AQUEOUS QC Lot: 31 MAR 90-A QC Run: 31 MAR 90-A			
Mercury	ND	mg/L	0.00020

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QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
008875-0001-SA	AQUEOUS	TOX-A	05 APR 90-A	-
008875-0001-SA	AQUEOUS	TOX-A	05 APR 90-A	-
008875-0001-SA	AQUEOUS	TOX-A	05 APR 90-A	-
008875-0001-SA	AQUEOUS	TOX-A	05 APR 90-A	-
008875-0001-SA	AQUEOUS	CL-IC-A	03 APR 90-M	-
008875-0001-SA	AQUEOUS	SO4-IC-A	03 APR 90-M	-
008875-0001-SA	AQUEOUS	ALK-A	29 MAR 90-O	-
008875-0001-SA	AQUEOUS	TDS-A	29 MAR 90-R	29 MAR 90-R
008875-0001-SA	AQUEOUS	PH-A	29 MAR 90-O	-
008875-0001-SA	AQUEOUS	COND-A	29 MAR 90-O	-
008875-0002-SA	AQUEOUS	TOX-A	05 APR 90-A	-
008875-0002-SA	AQUEOUS	TOX-A	05 APR 90-A	-
008875-0002-SA	AQUEOUS	TOX-A	05 APR 90-A	-
008875-0002-SA	AQUEOUS	TOX-A	05 APR 90-A	-
008875-0002-SA	AQUEOUS	CL-IC-A	03 APR 90-M	-
008875-0002-SA	AQUEOUS	SO4-IC-A	03 APR 90-M	-
008875-0002-SA	AQUEOUS	ALK-A	29 MAR 90-O	-
008875-0002-SA	AQUEOUS	TDS-A	29 MAR 90-R	29 MAR 90-R
008875-0002-SA	AQUEOUS	PH-A	29 MAR 90-O	-
008875-0002-SA	AQUEOUS	COND-A	29 MAR 90-O	-
008875-0003-SA	AQUEOUS	TOX-A	05 APR 90-A	-
008875-0003-SA	AQUEOUS	TOX-A	05 APR 90-A	-
008875-0003-SA	AQUEOUS	TOX-A	05 APR 90-A	-
008875-0003-SA	AQUEOUS	TOX-A	05 APR 90-A	-
008875-0003-SA	AQUEOUS	CL-IC-A	03 APR 90-M	-
008875-0003-SA	AQUEOUS	SO4-IC-A	03 APR 90-M	-
008875-0003-SA	AQUEOUS	ALK-A	29 MAR 90-O	-
008875-0003-SA	AQUEOUS	TDS-A	29 MAR 90-R	29 MAR 90-R
008875-0003-SA	AQUEOUS	PH-A	29 MAR 90-O	-
008875-0003-SA	AQUEOUS	COND-A	29 MAR 90-O	-
008875-0004-SA	AQUEOUS	TOX-A	05 APR 90-A	-
008875-0004-SA	AQUEOUS	TOX-A	05 APR 90-A	-
008875-0004-SA	AQUEOUS	TOX-A	05 APR 90-A	-
008875-0004-SA	AQUEOUS	TOX-A	05 APR 90-A	-
008875-0004-SA	AQUEOUS	CL-IC-A	03 APR 90-M	-
008875-0004-SA	AQUEOUS	SO4-IC-A	03 APR 90-M	-
008875-0004-SA	AQUEOUS	ALK-A	29 MAR 90-O	-
008875-0004-SA	AQUEOUS	TDS-A	29 MAR 90-R	29 MAR 90-R
008875-0004-SA	AQUEOUS	PHEN-A	03 APR 90-R	03 APR 90-R
008875-0004-SA	AQUEOUS	PH-A	29 MAR 90-O	-
008875-0004-SA	AQUEOUS	COND-A	29 MAR 90-O	-
008875-0005-SA	AQUEOUS	TOX-A	10 APR 90-A	-
008875-0005-SA	AQUEOUS	TOX-A	10 APR 90-A	-
008875-0005-SA	AQUEOUS	TOX-A	10 APR 90-A	-
008875-0005-SA	AQUEOUS	TOX-A	10 APR 90-A	-
008875-0005-SA	AQUEOUS	CL-IC-A	03 APR 90-M	-
008875-0005-SA	AQUEOUS	SO4-IC-A	03 APR 90-M	-

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QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation (cont.)

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
008875-0005-SA	AQUEOUS	ALK-A	29 MAR 90-0	-
008875-0005-SA	AQUEOUS	TDS-A	29 MAR 90-R	29 MAR 90-R
008875-0005-SA	AQUEOUS	PHEN-A	03 APR 90-R	03 APR 90-R
008875-0005-SA	AQUEOUS	PH-A	29 MAR 90-0	-
008875-0005-SA	AQUEOUS	COND-A	29 MAR 90-0	-

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DUPLICATE CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: TOX-A Matrix: AQUEOUS QC Lot: 05 APR 90-A Concentration Units: ug Cl/L								
Total Organic Halogen as Cl	100	98.3	114	106	106	80-120	15	20
Category: CL-IC-A Matrix: AQUEOUS QC Lot: 03 APR 90-M Concentration Units: mg/L								
Chloride	100	99.9	98.4	99.2	99	92-108	1.5	20
Category: SO4-IC-A Matrix: AQUEOUS QC Lot: 03 APR 90-M Concentration Units: mg/L								
Sulfate	200	198	194	196	98	93-107	2.0	20
Category: ALK-A Matrix: AQUEOUS QC Lot: 29 MAR 90-O Concentration Units: mg/L								
Alkalinity, Total as CaCO3 at pH 4.5	157	163	161	162	103	90-110	1.2	10
Category: TDS-A Matrix: AQUEOUS QC Lot: 29 MAR 90-R Concentration Units: mg/L								
Total Dissolved Solids	1270	1200	1200	1200	94	90-110	0.0	10

Calculations are performed before rounding to avoid round-off errors in calculated results.

DUPLICATE CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation (cont.)

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
Category: PH-A Matrix: AQUEOUS QC Lot: 29 MAR 90-O Concentration Units: units								
pH	9.1	9.06	9.06	9.06	100	98-102	0.0	5
Category: COND-A Matrix: AQUEOUS QC Lot: 29 MAR 90-O Concentration Units: umhos/cm								
Specific Conductance at 25 deg.C	1650	1650	1650	1650	100	95-105	0.0	5
Category: PHEN-A Matrix: AQUEOUS QC Lot: 03 APR 90-R Concentration Units: mg/L								
Phenolics	0.20	0.203	0.208	0.206	103	78-122	2.4	20
Category: TOX-A Matrix: AQUEOUS QC Lot: 10 APR 90-A Concentration Units: ug Cl/L								
Total Organic Halogen as Cl	100	110	94.9	102	102	80-120	15	20

Calculations are performed before rounding to avoid round-off errors in calculated results.

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METHOD BLANK REPORT
Wet Chemistry Analysis and Preparation

Analyte	Result	Units	Reporting Limit
Test: TDS-BAL-A Matrix: AQUEOUS QC Lot: 29 MAR 90-R QC Run: 29 MAR 90-R			
Total Dissolved Solids	ND	mg/L	10.0
Test: TDS-BAL-A Matrix: AQUEOUS QC Lot: 29 MAR 90-R QC Run: 29 MAR 90-R			
Total Dissolved Solids	ND	mg/L	10.0
Test: PHEN-SPEC-A Matrix: AQUEOUS QC Lot: 03 APR 90-R QC Run: 03 APR 90-R			
Phenolics	ND	mg/L	0.010
Test: TDS-BAL-A Matrix: AQUEOUS QC Lot: 29 MAR 90-R QC Run: 29 MAR 90-R			
Total Dissolved Solids	ND	mg/L	10.0
Test: PHEN-SPEC-A Matrix: AQUEOUS QC Lot: 03 APR 90-R QC Run: 03 APR 90-R			
Phenolics	ND	mg/L	0.010

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QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)
008875-0001-SA	AQUEOUS	TOC-A	10 APR 90-Z
008875-0001-SA	AQUEOUS	TOC-A	10 APR 90-Z
008875-0001-SA	AQUEOUS	TOC-A	10 APR 90-Z
008875-0001-SA	AQUEOUS	TOC-A	10 APR 90-Z
008875-0002-SA	AQUEOUS	TOC-A	10 APR 90-Z
008875-0002-SA	AQUEOUS	TOC-A	10 APR 90-Z
008875-0002-SA	AQUEOUS	TOC-A	10 APR 90-Z
008875-0002-SA	AQUEOUS	TOC-A	10 APR 90-Z
008875-0003-SA	AQUEOUS	TOC-A	10 APR 90-Z
008875-0003-SA	AQUEOUS	TOC-A	10 APR 90-Z
008875-0003-SA	AQUEOUS	TOC-A	10 APR 90-Z
008875-0003-SA	AQUEOUS	TOC-A	10 APR 90-Z
008875-0004-SA	AQUEOUS	TOC-A	10 APR 90-Z
008875-0004-SA	AQUEOUS	TOC-A	10 APR 90-Z
008875-0004-SA	AQUEOUS	TOC-A	10 APR 90-Z
008875-0004-SA	AQUEOUS	TOC-A	10 APR 90-Z
008875-0005-SA	AQUEOUS	TOC-A	10 APR 90-Z
008875-0005-SA	AQUEOUS	TOC-A	10 APR 90-Z
008875-0005-SA	AQUEOUS	TOC-A	10 APR 90-Z
008875-0005-SA	AQUEOUS	TOC-A	10 APR 90-Z

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DUPLICATE CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limit	Precision (RPD) DCS	Precision (RPD) Limit
Category: TOC-A								
Matrix: AQUEOUS								
QC Lot: 10 APR 90-Z								
Concentration Units: mg/L								
Total Organic Carbon	200	216	216	216	108	70-130	0	30

Calculations are performed before rounding to avoid round-off errors in calculated results.

Enseco
A CORNING Company

DUPLICATE CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limit	Precision (RPD) DCS	Precision (RPD) Limit
Category: TOC-A								
Matrix: AQUEOUS								
QC Lot: 10 APR 90-Z								
Concentration Units: mg/L								
Total Organic Carbon	200	216	216	216	108	70-130	0	30

Calculations are performed before rounding to avoid round-off errors in calculated results.

Enseco - Rocky Mountain Analytical
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No.

Attn: Julie Essey

Enseco Client: Giant Refinery

Project: Spring Wells OCD+EID

Sampling Co.: Ginizg

Sampling Site: Ginizg

Team Leader: Cloud Rosendale

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: (Yes) No
3. Condition of Contents: Good
4. Sealed for Shipping by: Cloud Rosendale
5. Initial Contents Temp.: 45 °~~F~~ Seal # _____
6. Sampling Status: (Done) Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description	Sample Type	No. Containers	Bottle #	Analysis Parameters	Remarks
3-28-90	0930	OW-1	Water	1	1		
				1	2		
				1	4		Filtered
				3	11		
				1	15		

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Cloud Rosendale		3-28-90	1115
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Cloud Rosendale

Method of Shipment: Fed. Ex. Airbill # _____

Received for Lab: RMAL Signed: [signature] Date/Time 03-29-90 0800

Enseco Project No. _____

White and Pink Copies to Lab Yellow to Sampler

SS-001

Enseco - Rocky Mountain Analytical

4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No.

Attn: Julie Essey

Enseco Client: Giant Refining
Project: Spring Wells OCD + EID
Sampling Co.: Cinizo
Sampling Site: Cinizo
Team Leader: Claud Rosendale

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: (Yes) No
3. Condition of Contents: Good
4. Sealed for Shipping by: Claud Rosendale
5. Initial Contents Temp.: 49 °F Seal # _____
6. Sampling Status: (Done) Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description	Sample Type	No. Containers	Bottle	Analysis Parameters	Remarks
3-28-90	0905	OW-2	Water	1	1		
				1	2		
				1	4		Filtered
				3	11		
				1	15		

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Claud Rosendale		3-28-90	1115
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Claud Rosendale
Method of Shipment: Fed. Ex. Airbill # _____
Received for Lab: RMAL Signed: [illegible] Date/Time 03-29-90 0800
Enseco Project No. _____

White and Pink Copies to Lab Yellow to Sampler

SS-001

Enseco - Rocky Mountain Analytical

4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No.

Attn: Julie Essey

Enseco Client: Giant Refinery

Project: Spring Sampling OCD + EED

Sampling Co.: Ciniza

Sampling Site: Ciniza

Team Leader: Cland Rosendale

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: (Yes) No
3. Condition of Contents: Good
4. Sealed for Shipping by: Cland Rosendale
5. Initial Contents Temp.: 49 °F Seal # _____
6. Sampling Status: (Done) Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description	Sample Type	No. Containers	Bottle #	Analysis Parameters	Remarks
03 3-28-90	0835	OW-3	Water	1	1		
				1	2		
				1	4		Filtered
				3	11		
				1	15		

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Cland Rosendale		3-28-90	1115
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Cland Rosendale

Method of Shipment: Fed. Ex. Airbill # _____

Received for Lab: RMAL Signed: [signature] Date/Time 03-29-90 0800

Enseco Project No. _____

White and Pink Copies to Lab Yellow to Sampler

SS-001

Enseco - Rocky Mountain Analytical
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No.

Attn: Julie Essey

Enseco Client: Giant Refinery
Project: Spring Wells OCD + EID
Sampling Co.: Cinizg
Sampling Site: Cinizg
Team Leader: Claud Rosendale

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: (Yes) No
3. Condition of Contents: good
4. Sealed for Shipping by: Claud Rosendale
5. Initial Contents Temp.: 52 °F Seal # _____
6. Sampling Status: (Done) Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description	Sample Type	No. Containers	Bottle #	Analysis Parameters	Remarks
54 3-28-90	0802	OW-11	Water	1	1		
				1	2		
				1	4		
				1	4		Filtered
				6	11		2 Replicates
				2	12	Omit per Claude Rosendale telephone 4-3-90 AE	~~2 Replicates~~
				1	15		

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Claud Rosendale		3-28-90	1115
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Claud Rosendale
Method of Shipment: Fed. Ex. AirBill #
Received for Lab: RMAL Signed: [signature] Date/Time 03-29-90 0700
Enseco Project No.

White and Pink Copies to Lab Yellow to Sampler

SS-001

Enseco - Rocky Mountain Analytical

4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No.

Attn: Julie Essey

Enseco Client: Giant Refinery

Project: Spring Sampling OCD+EID

Sampling Co.: Cinizg

Sampling Site: Cinizg

Team Leader: Clard Rosendale

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: (Yes) No
3. Condition of Contents: good
4. Sealed for Shipping by: Clard Rosendale
5. Initial Contents Temp.: 58°F °C Seal # _____
6. Sampling Status: (Done) Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description	Sample Type	No. Containers	Bottle #	Analysis Parameters	Remarks
~~3-28-90~~ 5 ~~[illegible]~~	0850	Trip Blank	Water	1	1		
				1	2		
				~~1~~	4		
				3	11		
				1	12		
				1	15		

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Clard Rosendale		3-28-90	1115
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Clard Rosendale

Method of Shipment: Fed. Ex. Airbill # _____

Received for Lab: RMAL Signed: [illegible] Date/Time 03-29-90 0700

Enseco Project No. _____

White and Pink Copies to Lab Yellow to Sampler

SS-001

Analysis for OW-1, OW-2, OW-3

Parameter		Method
1. Total Organic Carbon (TOC)	4 replicates	415.1
2. Total Organic Halogen (TOX)	4 replicates	9020
3 Sodium		6010
4 Calcium		6010
5. Potassium		6010
6. Magnesium		6010
7. Chloride		300.0
8. Sulfate		300.0
9. Carbonate		310.1
10. Bicarbonate		310.1
11. Total Dissolved Solids (TDS)		160.1
12 Volatile Aromatic Compounds		8240 TCL Partia
a) Benzene		
b) Ethyl benzene		
c) Toluene		
d) Total Xylenes		

Analysis For OW-11

Parameter	Method
1. Total Organic Carbon (TOC) 4 replicates	415.1
2. Total Organic Halogens (TOX) 4 replicates	9020
3. Arsenic FAA	7060
4. Barium	6010
5. Cadmium	6010
6. Chromium (Total) ICP	6010
7. Copper	6010
8. Lead (Total) FAA	7421
9. Mercury Total	7470
10. Nickle	6010
11. Selenium FAA	7740
12. Silver	6010
13. Sodium	6010
14. Zinc	6010
15. Calcium	6010
16. Manganese ~~Magnesium~~ 3:30:90	6010
17. Chloride	300.0
18. Sulfate	300.0
19. Carbonate 3 pH	310.1
20. Bicarbonate	310.1
21. Total Dissolved Solids (TDS)	160.1
22. Phenol	9065
23. Organic PHC's (see attached)	

ORGANIC PHC'S

For Giant Refining

WELLS

OW-11

VOLATILES

8240-TCL (partial)	mit. ug/L
1,1-dichloroethene	5.0
1,1,1-trichloroethane	5.0
Tetrachloroethene	5.0
Benzene	5.0
Ethyl benzene	5.0
Toluene	
Total xylenes	
Methyl ethyl ketone (2-Butanone)	

SEMIVOLATILES

8270-Refinery (partial)	
o-Cresol 2-m phenol	10
m&p-Cresol 3 4 p phenol	10
Pyrene	10
Phenanthrene	10
1-Methylnaphthalene *	10
Chrysene	10
Benzo(b)fluoranthene	10
7,12-Dimethylbenzanthracene *	10
Benzo(a)anthracene	10
bis(2-Ethylhexyl)phthalate	10
Fluoranthene	10
Benzo(a)pyrene	10
Naphthalene	10

8270-TCL (partial)	
2,4,6-Trichlorophenol	10
2-Chlorophenol	10

Library Search	
Benzo(j)fluoranthene	--

coelutes w/ Benzo(b) Benzo(k)

Trip Blank & Field Blank

Parameter	Method
1. Total Organic Carbon (TOC) 4 replicates	415.1
2. Total Organic Halogen (TOX) 4 replicates	9020
Arsenic	7060
Barium	6010
Cadmium	6010
Chromium (Total)	6010
Lead (Total) NO COPPER	7421
Mercury (Total) NO NICKEL	7470
Silver	6010
Selenium	7740
Sodium	6010
Calcium	6010
Potassium ADD	6010
Magnesium ADD	6010
Manganese	6010
Chloride	300.0
Sulfate	300.0
Carbonate	310.1
Bicarbonate	310.1
Total Dissolved Solids (TDS)	160.1
Phenol	9065

Volatile Contaminant List (See Attached)

2 Replicates

VOLATILE CONTAMINANT LIST
For Giant Refining
wells

SMW-1, SMW-2, SMW-3, SMW-4, SMW-5, SMW-6
MW-1, MW-2, MW-4, MW-5

Method 8240-TCL

Chloromethane
Bromomethane
Vinyl chloride
Chloroethane
Methylene chloride
1,1-Dichloroethene
1,1-Dichloroethane
1,2-Dichloroethane (cis/trans)
Chloroform
1,1,2-Trichloro-2,2,1-trifluoroethane *
1,2-Dichloroethane
1,1,1-Trichloroethane
Carbon tetrachloride
Bromodichloromethane
1,2-Dichloropropane
trans-1,3-Dichloropropene
Trichloroethene
Chlorodibromomethane
Cis-1,3-Dichloropropene
1,1,2-Trichloroethane
EDB (1,2-Dibromomethane *
1,1,2,2,-Tetrachloroethane

Continued for SMW + MW wells

Tetrachloroethene -
Chlorobenzene -
Methyl ethyl Ketone (2-Butanone) -
Benzene -
Toluene -
Chlorobenzene
Ethylbenzene -
Xylenes (Total) -
1,3-Dichlorobenzene *
1,4-Dichlorobenzene *
1,2-Dichlorobenzene *
Acetone -
Carbon disulfide -
Vinyl Acetate -
Styrene -
2-Hexanone
4-methyl-2-pentanone
2-chloroethyl vinyl ether -

Rocky Mountain
Analytical Laboratory

Enseco

ANALYTICAL RESULTS

FOR

GIANT REFINING

ENSECO-RMAL NO. 008847

APRIL 20, 1990

Reviewed by: Julie Essey

Jeanne B. Howbert

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

Introduction

This report presents the analytical results as well as supporting information to aid in the evaluation and interpretation of the data and is arranged in the following order:

- Sample Description Information
- Analytical Test Requests
- Analytical Results
- Quality Control Report

All analyses at Enseco are performed so that the maximum concentration of sample consistent with the method is analyzed. Dilutions are at times required to achieve linearity of the specific parameter or to reduce matrix interferences. In this event, reporting limits are adjusted proportionately.

Due to matrix interference originating from non-target analytes, dilutions were performed for the tests and samples listed below:

Sample Number	Test
008847-0005	Method 6010
008847-0006	Method 6010
008847-0007	Method 6010

Following is a discussion concerning samples analyzed by graphite furnace atomic absorption (GFAA):

Enseco protocol states that samples analyzed by graphite furnace atomic absorption (GFAA), will have a spiked aliquot analyzed with each sample. If the spike recovery does not meet established criteria, the reporting limit for that analysis is raised proportionately. Poor spike recoveries of this type are typically due to interferences from the sample matrix.

In reviewing the GFAA metals data it is necessary to know what the nominal reporting limits are in order to determine whether or not those limits were raised due to matrix interference. The most common GFAA elements and their nominal reporting limits are listed in the table following. These are provided to facilitate the review of the GFAA metals data.

Common GFAA Elements

Element	Reporting Limit / Units Aqueous (mg/L)	Soil (mg/kg)	Waste (mg/kg)	Leachate (mg/L)
Arsenic	0.005	0.5 **	0.5 **	0.050**
Lead	0.005	0.5	0.5 **	0.050**
Selenium	0.005	0.5	0.5	0.050
Thallium	0.005	0.5	0.5	0.050

** For the matrix listed, the preferred method for this element is by Method 6010

Sample Description Information

The Sample Description Information lists all of the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Enseco - RMAL is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Test Requests

The Analytical Test Requests lists the analyses that were performed on each sample. The Custom Test column indicates where tests have been modified to conform to the specific requirements of this project.

Enseco
A CORNING Company

SAMPLE DESCRIPTION INFORMATION
for
Giant Refining

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
008847-0001-SA	MW-1	AQUEOUS	27 MAR 90	10:00	28 MAR 90
008847-0002-SA	MW-2	AQUEOUS	27 MAR 90	09:35	28 MAR 90
008847-0003-SA	MW-4	AQUEOUS	27 MAR 90	07:30	28 MAR 90
008847-0004-SA	MW-5	AQUEOUS	27 MAR 90	09:15	28 MAR 90
008847-0005-SA	SMW-1	AQUEOUS	27 MAR 90	11:40	28 MAR 90
008847-0006-SA	SMW-2	AQUEOUS	27 MAR 90	11:10	28 MAR 90
008847-0007-SA	SMW-3	AQUEOUS	27 MAR 90	08:30	28 MAR 90
008847-0008-SA	SMW-4	AQUEOUS	27 MAR 90	12:45	28 MAR 90
008847-0009-SA	SMW-5	AQUEOUS	27 MAR 90	12:20	28 MAR 90
008847-0010-SA	SMW-6	AQUEOUS	27 MAR 90	12:00	28 MAR 90
008847-0011-SA	Duplicate 1	AQUEOUS	27 MAR 90	08:00	28 MAR 90

ANALYTICAL TEST REQUESTS
for
Giant Refining

Lab ID: 008847	Group Code	Analysis Description	Custom Test?
0001 - 0004	A	Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		ICP Metals (Dissolved)	Y
		Arsenic, Furnace AA (Dissolved)	N
		Selenium, Furnace AA (Dissolved)	N
		ICP Metals (Total)	Y
		Prep - Total Metals, ICP	N
		Lead, Furnace AA (Total)	N
		Prep - Total Metals, Furnace AA	N
		Mercury, Cold Vapor AA (Total)	N
		Prep - Mercury, Cold Vapor AA (Total)	N
		Chloride, Ion Chromatography	N
		Sulfate, Ion Chromatography	N
		Alkalinity,	Y
		Total/Carbonate/Bicarbonate/Hydroxide	Y
		Total Dissolved Solids (TDS)	N
		Phenolics (4-AAP)	N
		TCL Volatile Organics	Y
		Prep-Volatile Organics by GC/MS	N
		TCL Volatile Organics	Y
		pH	N
		Specific Conductance	N
0005 - 0011	B	Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		ICP Metals (Dissolved)	Y
		ICP Metals (Total)	Y
		Prep - Total Metals, ICP	N
		Lead, Furnace AA (Total)	N
		Prep - Total Metals, Furnace AA	N
		Chloride, Ion Chromatography	N

ANALYTICAL TEST REQUESTS
for
Giant Refining

Lab ID: 008847	Group Code	Analysis Description	Custom Test?
		Sulfate, Ion Chromatography	N
		Alkalinity,	Y
		Total/Carbonate/Bicarbonate/Hydroxide	Y
		Total Dissolved Solids (TDS)	N
		TCL Volatile Organics	Y
		Prep-Volatile Organics by GC/MS	N
		pH	N
		Specific Conductance	N

Analytical Results

The analytical results for this project are presented in the following data tables. Each data table includes sample identification information, and when available and appropriate, dates sampled, received, authorized, prepared and analyzed. The authorization data is the date when the project was defined by the client such that laboratory work could begin.

Data sheets contain a listing of the parameters measured in each test, the analytical results and the Enseco reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e. no correction is made for moisture content.

Enseco-RMAL is no longer routinely blank-correcting analytical data. Uncorrected analytical results are reported, along with associated blank results, for all organic and metals analyses. Analytical results and blank results are reported for conventional inorganic parameters as specified in the method. This policy is described in detail in the Enseco Incorporated Quality Assurance Program Plan for Environmental Chemical Monitoring, Revision 3.3, April, 1989.

The results from the Standard Enseco QA/QC Program, which generates data which are independent of matrix effects, is provided subsequently.

Enseco
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TCL Volatile Organics

Method 8240

Client Name: Giant Refining
Client ID: MW-1
Lab ID: 008847-0001-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070038
Sampled: 27 MAR 90
Prepared: 01 APR 90

Received: 28 MAR 90
Analyzed: 01 APR 90

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

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(continued on following page)

14 14 10

ND = Not detected
NA = Not applicable

Reported By: Keith Beauvais

Approved By: Jeff Lowry

Enseco
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TCL Volatile Organics (CONT.)

Method 8240

Client Name: Giant Refining
Client ID: MW-1
Lab ID: 008847-0001-SA
Enseco ID: 1070038
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: 01 APR 90
Analyzed: 01 APR 90

Parameter	Result	Units	Reporting Limit
1,4-Dichlorobenzene	ND	ug/L	5.0
Toluene-d8	99	%	--
4-Bromofluorobenzene	95	%	--
1,2-Dichloroethane-d4	87	%	--

ND = Not detected
NA = Not applicable

Reported By: Keith Beauvais

Approved By: Jeff Lowry

Enseco
A CORNING Company

TCL Volatile Organics

Method 8240

Client Name: Giant Refining
Client ID: MW-1
Lab ID: 008847-0001-SA
Enseco ID: 1070038
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: 01 APR 90
Analyzed: 03 APR 90

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

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ND = Not detected
NA = Not applicable

Reported By: Bryan Anderson
Approved By: Jeff Lowry

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A CORNING Company

TCL Volatile Organics (CONT.)

Method 8240

Client Name: Giant Refining
Client ID: MW-1
Lab ID: 008847-0001-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070038
Sampled: 27 MAR 90
Prepared: 01 APR 90

Received: 28 MAR 90
Analyzed: 03 APR 90

Parameter	Result	Units	Reporting Limit
1,3-Dichlorobenzene	ND	ug/L	5.0
Toluene-d8	105	%	--
4-Bromofluorobenzene	99	%	--
1,2-Dichloroethane-d4	102	%	--

ND = Not detected
NA = Not applicable

Reported By: Bryan Anderson

Approved By: Jeff Lowry

Enseco
A CORNING Company

Metals

Dissolved Metals

Client Name: Giant Refining
Client ID: MW-1
Lab ID: 008847-0001-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070038
Sampled: 27 MAR 90
Prepared: See Below

Received: 28 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic	ND	mg/L	0.010	7060	NA	02 APR 90
Barium	ND	mg/L	0.010	6010	NA	03 APR 90
Cadmium	ND	mg/L	0.0050	6010	NA	03 APR 90
Calcium	1.8	mg/L	0.20	6010	NA	03 APR 90
Magnesium	0.25	mg/L	0.20	6010	NA	03 APR 90
Manganese	ND	mg/L	0.010	6010	NA	03 APR 90
Potassium	ND	mg/L	5.0	6010	NA	03 APR 90
Selenium	ND	mg/L	0.0050	7740	NA	30 MAR 90
Silver	ND	mg/L	0.010	6010	NA	03 APR 90
Sodium	252	mg/L	5.0	6010	NA	03 APR 90

ND = Not detected
NA = Not applicable

Reported By: Sandra Jones

Approved By: Toni Lusk

Enseco
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Metals

Total Metals

Client Name: Giant Refining
Client ID: MW-1
Lab ID: 008847-0001-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070038
Sampled: 27 MAR 90
Prepared: See Below

Received: 28 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	ND	mg/L	0.010	6010	29 MAR 90	31 MAR 90
Lead	ND	mg/L	0.0050	7421	29 MAR 90	02 APR 90
Mercury	ND	mg/L	0.00020	7470	29 MAR 90	30 MAR 90

ND = Not detected
NA = Not applicable

Reported By: Micky Gehring

Approved By: Toni Lusk

Enseco
A CORNING Company

General Inorganics

Client Name: Giant Refining
Client ID: MW-1
Lab ID: 008847-0001-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070038
Sampled: 27 MAR 90
Prepared: See Below

Received: 28 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Alkalinity, Bicarb. as CaCO3 at pH 4.5	300	mg/L	5.0	310.1	NA	28 MAR 90
Alkalinity, Carb. as CaCO3 at pH 8.3	48.6	mg/L	5.0	310.1	NA	28 MAR 90
Chloride	44.9	mg/L	3.0	300.0	NA	02 APR 90
pH	8.9	units	--	9040	NA	28 MAR 90
Phenolics	ND	mg/L	0.010	9065	NA	30 MAR 90
Sulfate	156	mg/L	5.0	300.0	NA	02 APR 90
Specific Conductance at 25 deg.C	1040	umhos/cm	1.0	120.1	NA	28 MAR 90
Total Organic Carbon	1.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	1.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	1.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	1.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	02 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	02 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	02 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	02 APR 90
Total Dissolved Solids	687	mg/L	10.0	160.1	NA	29 MAR 90

ND = Not detected
NA = Not applicable

Reported By: Jennifer Franzen

Approved By: Toni Stovall

Enseco
A CORNING Company

TCL Volatile Organics

Method 8240

Client Name: Giant Refining
Client ID: MW-2
Lab ID: 008847-0002-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070039
Sampled: 27 MAR 90
Prepared: 01 APR 90

Received: 28 MAR 90
Analyzed: 03 APR 90

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

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ND = Not detected
NA = Not applicable

Reported By: Bryan Anderson

Approved By: Jeff Lowry

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TCL Volatile Organics (CONT.)

Method 8240

Client Name: Giant Refining
Client ID: MW-2
Lab ID: 008847-0002-SA
Enseco ID: 1070039
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: 01 APR 90
Analyzed: 03 APR 90

Parameter	Result	Units	Reporting Limit
1,3-Dichlorobenzene	ND	ug/L	5.0
Toluene-d8	101	%	--
4-Bromofluorobenzene	97	%	--
1,2-Dichloroethane-d4	94	%	--

ND = Not detected
NA = Not applicable

Reported By: Bryan Anderson

Approved By: Jeff Lowry

Enseco
A CORNING Company

TCL Volatile Organics

Method 8240

Client Name: Giant Refining
Client ID: MW-2
Lab ID: 008847-0002-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070039
Sampled: 27 MAR 90
Prepared: 01 APR 90

Received: 28 MAR 90
Analyzed: 05 APR 90

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

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ND = Not detected
NA = Not applicable

Reported By: Cesar Rojas

Approved By: Jeff Lowry

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A CORNING Company

TCL Volatile Organics (CONT.)

Method 8240

Client Name: Giant Refining
Client ID: MW-2
Lab ID: 008847-0002-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070039
Sampled: 27 MAR 90
Prepared: 01 APR 90

Received: 28 MAR 90
Analyzed: 05 APR 90

Parameter	Result	Units	Reporting Limit
1,3-Dichlorobenzene	ND	ug/L	5.0
Toluene-d8	102	%	--
4-Bromofluorobenzene	98	%	--
1,2-Dichloroethane-d4	100	%	--

ND = Not detected
NA = Not applicable

Reported By: Cesar Rojas

Approved By: Jeff Lowry

Enseco
A CORNING Company

Metals

Dissolved Metals

Client Name: Giant Refining
Client ID: MW-2
Lab ID: 008847-0002-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070039
Sampled: 27 MAR 90
Prepared: See Below

Received: 28 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic	ND	mg/L	0.010	7060	NA	02 APR 90
Barium	0.019	mg/L	0.010	6010	NA	03 APR 90
Cadmium	ND	mg/L	0.0050	6010	NA	03 APR 90
Calcium	1.7	mg/L	0.20	6010	NA	03 APR 90
Magnesium	ND	mg/L	0.20	6010	NA	03 APR 90
Manganese	ND	mg/L	0.010	6010	NA	03 APR 90
Potassium	ND	mg/L	5.0	6010	NA	03 APR 90
Selenium	ND	mg/L	0.0050	7740	NA	30 MAR 90
Silver	ND	mg/L	0.010	6010	NA	03 APR 90
Sodium	259	mg/L	5.0	6010	NA	03 APR 90

ND = Not detected
NA = Not applicable

Reported By: Sandra Jones

Approved By: Toni Lusk

Enseco
A CORNING Company

Metals

Total Metals

Client Name: Giant Refining
Client ID: MW-2
Lab ID: 008847-0002-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070039
Sampled: 27 MAR 90
Prepared: See Below

Received: 28 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	ND	mg/L	0.010	6010	29 MAR 90	31 MAR 90
Lead	ND	mg/L	0.010	7421	29 MAR 90	02 APR 90
Mercury	ND	mg/L	0.00020	7470	29 MAR 90	30 MAR 90

ND = Not detected
NA = Not applicable

Reported By: Micky Gehring

Approved By: Toni Lusk

Enseco
A CORNING Company

General Inorganics

Client Name: Giant Refining
Client ID: MW-2
Lab ID: 008847-0002-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070039
Sampled: 27 MAR 90
Prepared: See Below

Received: 28 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Alkalinity, Bicarb. as CaCO3 at pH 4.5	288	mg/L	5.0	310.1	NA	28 MAR 90
Alkalinity, Carb. as CaCO3 at pH 8.3	47.6	mg/L	5.0	310.1	NA	28 MAR 90
Chloride	54.0	mg/L	3.0	300.0	NA	02 APR 90
pH	8.9	units	--	9040	NA	28 MAR 90
Phenolics	ND	mg/L	0.010	9065	NA	30 MAR 90
Sulfate	165	mg/L	5.0	300.0	NA	02 APR 90
Specific Conductance at 25 deg.C	1050	umhos/cm	1.0	120.1	NA	28 MAR 90
Total Organic Carbon	1.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	1.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	1.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	1.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	02 APR 90
Total Organic Halogen as Cl	31.5	ug/L	30.0	9020	NA	02 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	02 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	02 APR 90
Total Dissolved Solids	688	mg/L	10.0	160.1	NA	29 MAR 90

ND = Not detected
NA = Not applicable

Reported By: Jennifer Franzen

Approved By: Toni Stovall

Enseco
A CORNING Company

TCL Volatile Organics

Method 8240

Client Name: Giant Refining
Client ID: MW-4
Lab ID: 008847-0003-SA
Enseco ID: 1070040
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: 01 APR 90
Analyzed: 03 APR 90

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

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Bryan Anderson
Approved By: Jeff Lowry

Enseco
A CORNING Company

TCL Volatile Organics (CONT.)

Method 8240

Client Name: Giant Refining
Client ID: MW-4
Lab ID: 008847-0003-SA
Enseco ID: 1070040
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: 01 APR 90
Analyzed: 03 APR 90

Parameter	Result	Units	Reporting Limit
1,4-Dichlorobenzene	ND	ug/L	5.0
Toluene-d8	104	%	--
4-Bromofluorobenzene	99	%	--
1,2-Dichloroethane-d4	98	%	--

ND = Not detected
NA = Not applicable

Reported By: Bryan Anderson

Approved By: Jeff Lowry

Enseco
A CORNING Company

TCL Volatile Organics

Method 8240

Client Name: Giant Refining
Client ID: MW-4
Lab ID: 008847-0003-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070040
Sampled: 27 MAR 90
Prepared: 01 APR 90

Received: 28 MAR 90
Analyzed: 05 APR 90

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

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Cesar Rojas

Approved By: Jeff Lowry

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TCL Volatile Organics (CONT.)

Method 8240

Client Name: Giant Refining
Client ID: MW-4
Lab ID: 008847-0003-SA
Enseco ID: 1070040
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: 01 APR 90
Analyzed: 05 APR 90

Parameter	Result	Units	Reporting Limit
1,4-Dichlorobenzene	ND	ug/L	5.0
Toluene-d8	103	%	--
4-Bromofluorobenzene	98	%	--
1,2-Dichloroethane-d4	95	%	--

ND = Not detected
NA = Not applicable

Reported By: Cesar Rojas

Approved By: Jeff Lowry

Enseco
A CORNING Company

Metals

Dissolved Metals

Client Name: Giant Refining
Client ID: MW-4
Lab ID: 008847-0003-SA
Enseco ID: 1070040
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: See Below
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic	ND	mg/L	0.010	7060	NA	02 APR 90
Barium	0.017	mg/L	0.010	6010	NA	03 APR 90
Cadmium	ND	mg/L	0.0050	6010	NA	03 APR 90
Calcium	2.0	mg/L	0.20	6010	NA	03 APR 90
Magnesium	0.24	mg/L	0.20	6010	NA	03 APR 90
Manganese	ND	mg/L	0.010	6010	NA	03 APR 90
Potassium	ND	mg/L	5.0	6010	NA	03 APR 90
Selenium	ND	mg/L	0.0050	7740	NA	30 MAR 90
Silver	ND	mg/L	0.010	6010	NA	03 APR 90
Sodium	277	mg/L	5.0	6010	NA	03 APR 90

ND = Not detected
NA = Not applicable

Reported By: Sandra Jones

Approved By: Toni Lusk

Enseco
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Metals

Total Metals

Client Name: Giant Refining
Client ID: MW-4
Lab ID: 008847-0003-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070040
Sampled: 27 MAR 90
Prepared: See Below

Received: 28 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	ND	mg/L	0.010	6010	29 MAR 90	31 MAR 90
Lead	ND	mg/L	0.0050	7421	29 MAR 90	02 APR 90
Mercury	ND	mg/L	0.00020	7470	29 MAR 90	30 MAR 90

ND = Not detected
NA = Not applicable

Reported By: Micky Gehring

Approved By: Toni Lusk

Enseco
A CORNING Company

General Inorganics

Client Name: Giant Refining
Client ID: MW-4
Lab ID: 008847-0003-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070040
Sampled: 27 MAR 90
Prepared: See Below

Received: 28 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Alkalinity, Bicarb. as CaCO3 at pH 4.5	424	mg/L	5.0	310.1	NA	28 MAR 90
Alkalinity, Carb. as CaCO3 at pH 8.3	31.3	mg/L	5.0	310.1	NA	28 MAR 90
Chloride	14.0	mg/L	3.0	300.0	NA	02 APR 90
pH	8.6	units	--	9040	NA	28 MAR 90
Phenolics	ND	mg/L	0.010	9065	NA	30 MAR 90
Sulfate	143	mg/L	5.0	300.0	NA	02 APR 90
Specific Conductance at 25 deg.C	1070	umhos/cm	1.0	120.1	NA	28 MAR 90
Total Organic Carbon	1.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	2.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	2.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	2.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	03 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	03 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	03 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	03 APR 90
Total Dissolved Solids	729	mg/L	10.0	160.1	NA	29 MAR 90

ND = Not detected
NA = Not applicable

Reported By: Jennifer Franzen

Approved By: Toni Stovall

Enseco
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TCL Volatile Organics

Method 8240

Client Name: Giant Refining
Client ID: MW-5
Lab ID: 008847-0004-SA
Enseco ID: 1070041
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: 01 APR 90
Analyzed: 02 APR 90

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

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Keith Beauvais
Approved By: Jeff Lowry

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TCL Volatile Organics (CONT.)

Method 8240

Client Name: Giant Refining
Client ID: MW-5
Lab ID: 008847-0004-SA
Enseco ID: 1070041
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: 01 APR 90
Analyzed: 02 APR 90

Parameter	Result	Units	Reporting Limit
1,3-Dichlorobenzene	ND	ug/L	5.0
Toluene-d8	100	%	--
4-Bromofluorobenzene	93	%	--
1,2-Dichloroethane-d4	98	%	--

ND = Not detected
NA = Not applicable

Reported By: Keith Beauvais
Approved By: Jeff Lowry

Enseco
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TCL Volatile Organics

Method 8240

Client Name: Giant Refining
Client ID: MW-5
Lab ID: 008847-0004-SA
Enseco ID: 1070041
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: 01 APR 90
Analyzed: 03 APR 90

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

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Bryan Anderson
Approved By: Jeff Lowry

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TCL Volatile Organics (CONT.)

Method 8240

Client Name: Giant Refining
Client ID: MW-5
Lab ID: 008847-0004-SA Enseco ID: 1070041
Matrix: AQUEOUS Sampled: 27 MAR 90 Received: 28 MAR 90
Authorized: 28 MAR 90 Prepared: 01 APR 90 Analyzed: 03 APR 90

Parameter	Result	Units	Reporting Limit
1,4-Dichlorobenzene	ND	ug/L	5.0
Toluene-d8	104	%	--
4-Bromofluorobenzene	100	%	--
1,2-Dichloroethane-d4	97	%	--

ND = Not detected
NA = Not applicable

Reported By: Bryan Anderson Approved By: Jeff Lowry

Enseco
A CORNING Company

Metals

Dissolved Metals

Client Name: Giant Refining
Client ID: MW-5
Lab ID: 008847-0004-SA
Enseco ID: 1070041
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: See Below
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic	ND	mg/L	0.010	7060	NA	02 APR 90
Barium	0.12	mg/L	0.010	6010	NA	03 APR 90
Cadmium	ND	mg/L	0.0050	6010	NA	03 APR 90
Calcium	1.9	mg/L	0.20	6010	NA	03 APR 90
Magnesium	0.20	mg/L	0.20	6010	NA	03 APR 90
Manganese	ND	mg/L	0.010	6010	NA	03 APR 90
Potassium	ND	mg/L	5.0	6010	NA	03 APR 90
Selenium	ND	mg/L	0.0050	7740	NA	30 MAR 90
Silver	ND	mg/L	0.010	6010	NA	03 APR 90
Sodium	255	mg/L	5.0	6010	NA	03 APR 90

ND = Not detected
NA = Not applicable

Reported By: Sandra Jones

Approved By: Toni Lusk

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Metals

Total Metals

Client Name: Giant Refining
Client ID: MW-5
Lab ID: 008847-0004-SA
Enseco ID: 1070041
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: See Below
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	ND	mg/L	0.010	6010	29 MAR 90	31 MAR 90
Lead	ND	mg/L	0.0050	7421	29 MAR 90	02 APR 90
Mercury	ND	mg/L	0.00020	7470	29 MAR 90	30 MAR 90

ND = Not detected
NA = Not applicable

Reported By: Micky Gehring

Approved By: Toni Lusk

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General Inorganics

Client Name: Giant Refining
Client ID: MW-5
Lab ID: 008847-0004-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070041
Sampled: 27 MAR 90
Prepared: See Below

Received: 28 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Alkalinity, Bicarb. as CaCO3 at pH 4.5	272	mg/L	5.0	310.1	NA	28 MAR 90
Alkalinity, Carb. as CaCO3 at pH 8.3	47.0	mg/L	5.0	310.1	NA	28 MAR 90
Chloride	62.1	mg/L	3.0	300.0	NA	02 APR 90
pH	8.9	units	--	9040	NA	28 MAR 90
Phenolics	ND	mg/L	0.010	9065	NA	30 MAR 90
Sulfate	170	mg/L	5.0	300.0	NA	02 APR 90
Specific Conductance at 25 deg.C	1040	umhos/cm	1.0	120.1	NA	28 MAR 90
Total Organic Carbon	1.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	2.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	1.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	1.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	03 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	03 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	03 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	03 APR 90
Total Dissolved Solids	687	mg/L	10.0	160.1	NA	29 MAR 90

ND = Not detected
NA = Not applicable

Reported By: Jennifer Franzen

Approved By: Toni Stovall

Enseco
A CORNING Company

TCL Volatile Organics

Method 8240

Client Name: Giant Refining
Client ID: SMW-1
Lab ID: 008847-0005-SA
Enseco ID: 1070043
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: 01 APR 90
Analyzed: 02 APR 90

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

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Keith Beauvais
Approved By: Jeff Lowry

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TCL Volatile Organics (CONT.)

Method 8240

Client Name: Giant Refining
Client ID: SMW-1
Lab ID: 008847-0005-SA Enseco ID: 1070043
Matrix: AQUEOUS Sampled: 27 MAR 90 Received: 28 MAR 90
Authorized: 28 MAR 90 Prepared: 01 APR 90 Analyzed: 02 APR 90

Parameter	Result	Units	Reporting Limit
1,3-Dichlorobenzene	ND	ug/L	5.0
Toluene-d8	104	%	--
4-Bromofluorobenzene	91	%	--
1,2-Dichloroethane-d4	99	%	--

ND = Not detected
NA = Not applicable

Reported By: Keith Beauvais Approved By: Jeff Lowry

Enseco
A CORNING Company

Metals

Dissolved Metals

Client Name: Giant Refining
Client ID: SMW-1
Lab ID: 008847-0005-SA
Enseco ID: 1070043
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: See Below
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Calcium	182	mg/L	0.40	6010	NA	03 APR 90
Magnesium	56.5	mg/L	0.40	6010	NA	03 APR 90
Potassium	ND	mg/L	10.0	6010	NA	03 APR 90
Sodium	1250	mg/L	10.0	6010	NA	03 APR 90

ND = Not detected
NA = Not applicable

Reported By: Sandra Jones

Approved By: Toni Lusk

Enseco
A CORNING Company

Metals

Total Metals

Client Name: Giant Refining
Client ID: SMW-1
Lab ID: 008847-0005-SA
Enseco ID: 1070043
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: See Below
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	0.077	mg/L	0.020	6010	29 MAR 90	31 MAR 90
Lead	ND	mg/L	0.010	7421	29 MAR 90	02 APR 90

ND = Not detected
NA = Not applicable

Reported By: Mike Befort

Approved By: Toni Lusk

Enseco
A CORNING Company

General Inorganics

Client Name: Giant Refining
Client ID: SMW-1
Lab ID: 008847-0005-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070043
Sampled: 27 MAR 90
Prepared: See Below

Received: 28 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Alkalinity, Bicarb. as CaCO3 at pH 4.5	611	mg/L	5.0	310.1	NA	28 MAR 90
Alkalinity, Carb. as CaCO3 at pH 8.3	ND	mg/L	5.0	310.1	NA	28 MAR 90
Chloride	1120	mg/L	30.0	300.0	NA	02 APR 90
pH	7.5	units	--	9040	NA	28 MAR 90
Sulfate	1330	mg/L	50.0	300.0	NA	02 APR 90
Specific Conductance at 25 deg.C	5630	umhos/cm	1.0	120.1	NA	28 MAR 90
Total Organic Carbon	19.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	16.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	18.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	21.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Halogen as Cl	61.6	ug/L	30.0	9020	NA	03 APR 90
Total Organic Halogen as Cl	49.2	ug/L	30.0	9020	NA	03 APR 90
Total Organic Halogen as Cl	48.9	ug/L	30.0	9020	NA	03 APR 90
Total Organic Halogen as Cl	46.7	ug/L	30.0	9020	NA	03 APR 90
Total Dissolved Solids	4330	mg/L	50.0	160.1	NA	29 MAR 90

ND = Not detected
NA = Not applicable

Reported By: Jennifer Franzen

Approved By: Toni Stovall

Enseco
A CORNING Company

TCL Volatile Organics

Method 8240

Client Name: Giant Refining
Client ID: SMW-2
Lab ID: 008847-0006-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070044
Sampled: 27 MAR 90
Prepared: 01 APR 90

Received: 28 MAR 90
Analyzed: 02 APR 90

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

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Keith Beauvais

Approved By: Jeff Lowry

Enseco
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TCL Volatile Organics (CONT.)

Method 8240

Client Name: Giant Refining
Client ID: SMW-2
Lab ID: 008847-0006-SA Enseco ID: 1070044
Matrix: AQUEOUS Sampled: 27 MAR 90 Received: 28 MAR 90
Authorized: 28 MAR 90 Prepared: 01 APR 90 Analyzed: 02 APR 90

Parameter	Result	Units	Reporting Limit
1,3-Dichlorobenzene	ND	ug/L	5.0
Toluene-d8	99	%	--
4-Bromofluorobenzene	90	%	--
1,2-Dichloroethane-d4	97	%	--

ND = Not detected
NA = Not applicable

Reported By: Keith Beauvais Approved By: Jeff Lowry

Enseco
A CORNING Company

Metals

Dissolved Metals

Client Name: Giant Refining
Client ID: SMW-2
Lab ID: 008847-0006-SA
Enseco ID: 1070044
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: See Below
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Calcium	147	mg/L	1.0	6010	NA	03 APR 90
Magnesium	44.3	mg/L	1.0	6010	NA	03 APR 90
Potassium	ND	mg/L	25.0	6010	NA	03 APR 90
Sodium	1630	mg/L	25.0	6010	NA	03 APR 90

ND = Not detected
NA = Not applicable

Reported By: Sandra Jones

Approved By: Toni Lusk

Enseco
A CORNING Company

Metals

Total Metals

Client Name: Giant Refining
Client ID: SMW-2
Lab ID: 008847-0006-SA Enseco ID: 1070044
Matrix: AQUEOUS Sampled: 27 MAR 90 Received: 28 MAR 90
Authorized: 28 MAR 90 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	0.19	mg/L	0.050	6010	29 MAR 90	31 MAR 90
Lead	0.0071	mg/L	0.0050	7421	29 MAR 90	02 APR 90

ND = Not detected
NA = Not applicable

Reported By: Mike Befort Approved By: Toni Lusk

Enseco
A CORNING Company

General Inorganics

Client Name: Giant Refining
Client ID: SMW-2
Lab ID: 008847-0006-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070044
Sampled: 27 MAR 90
Prepared: See Below

Received: 28 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Alkalinity, Bicarb. as CaCO3 at pH 4.5	563	mg/L	5.0	310.1	NA	28 MAR 90
Alkalinity, Carb. as CaCO3 at pH 8.3	ND	mg/L	5.0	310.1	NA	28 MAR 90
Chloride	1320	mg/L	30.0	300.0	NA	02 APR 90
pH	7.7	units	--	9040	NA	28 MAR 90
Sulfate	1590	mg/L	50.0	300.0	NA	02 APR 90
Specific Conductance at 25 deg.C	6980	umhos/cm	1.0	120.1	NA	28 MAR 90
Total Organic Carbon	12.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	12.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	14.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	13.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Halogen as Cl	45.6	ug/L	30.0	9020	NA	03 APR 90
Total Organic Halogen as Cl	39.7	ug/L	30.0	9020	NA	03 APR 90
Total Organic Halogen as Cl	37.2	ug/L	30.0	9020	NA	03 APR 90
Total Organic Halogen as Cl	49.0	ug/L	30.0	9020	NA	03 APR 90
Total Dissolved Solids	5180	mg/L	50.0	160.1	NA	29 MAR 90

ND = Not detected
NA = Not applicable

Reported By: Jennifer Franzen

Approved By: Toni Stovall

Enseco
A CORNING Company

TCL Volatile Organics

Method 8240

Client Name: Giant Refining
Client ID: SMW-3
Lab ID: 008847-0007-SA Enseco ID: 1070045
Matrix: AQUEOUS Sampled: 27 MAR 90 Received: 28 MAR 90
Authorized: 28 MAR 90 Prepared: 01 APR 90 Analyzed: 02 APR 90

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

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Keith Beauvais Approved By: Jeff Lowry

Enseco
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TCL Volatile Organics (CONT.)

Method 8240

Client Name: Giant Refining
Client ID: SMW-3
Lab ID: 008847-0007-SA Enseco ID: 1070045
Matrix: AQUEOUS Sampled: 27 MAR 90 Received: 28 MAR 90
Authorized: 28 MAR 90 Prepared: 01 APR 90 Analyzed: 02 APR 90

Parameter	Result	Units	Reporting Limit
1,4-Dichlorobenzene	ND	ug/L	5.0
Toluene-d8	100	%	--
4-Bromofluorobenzene	94	%	--
1,2-Dichloroethane-d4	96	%	--

ND = Not detected
NA = Not applicable

Reported By: Keith Beauvais Approved By: Jeff Lowry

Enseco
A CORNING Company

Metals

Dissolved Metals

Client Name: Giant Refining
Client ID: SMW-3
Lab ID: 008847-0007-SA
Enseco ID: 1070045
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: See Below
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Calcium	59.0	mg/L	0.40	6010	NA	03 APR 90
Magnesium	16.2	mg/L	0.40	6010	NA	03 APR 90
Potassium	ND	mg/L	10.0	6010	NA	03 APR 90
Sodium	739	mg/L	10.0	6010	NA	03 APR 90

ND = Not detected
NA = Not applicable

Reported By: Sandra Jones

Approved By: Toni Lusk

Enseco
A CORNING Company

Metals

Total Metals

Client Name: Giant Refining
Client ID: SMW-3
Lab ID: 008847-0007-SA
Enseco ID: 1070045
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: See Below
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	0.023	mg/L	0.010	6010	29 MAR 90	02 APR 90
Lead	0.0065	mg/L	0.0050	7421	29 MAR 90	02 APR 90

ND = Not detected
NA = Not applicable

Reported By: Mike Befort

Approved By: Toni Lusk

Enseco
A CORNING Company

General Inorganics

Client Name: Giant Refining
Client ID: SMW-3
Lab ID: 008847-0007-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070045
Sampled: 27 MAR 90
Prepared: See Below

Received: 28 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Alkalinity, Bicarb. as CaCO3 at pH 4.5	681	mg/L	5.0	310.1	NA	28 MAR 90
Alkalinity, Carb. as CaCO3 at pH 8.3	ND	mg/L	5.0	310.1	NA	28 MAR 90
Chloride	49.1	mg/L	3.0	300.0	NA	02 APR 90
pH	8.1	units	--	9040	NA	28 MAR 90
Sulfate	1180	mg/L	25.0	300.0	NA	02 APR 90
Specific Conductance at 25 deg.C	3060	umhos/cm	1.0	120.1	NA	28 MAR 90
Total Organic Carbon	4.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	4.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	4.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	4.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	03 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	03 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	03 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	03 APR 90
Total Dissolved Solids	2560	mg/L	50.0	160.1	NA	29 MAR 90

ND = Not detected
NA = Not applicable

Reported By: Jennifer Franzen

Approved By: Toni Stovall

Enseco
A CORNING Company

TCL Volatile Organics

Method 8240

Client Name: Giant Refining
Client ID: SMW-4
Lab ID: 008847-0008-SA
Enseco ID: 1070046
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: 01 APR 90
Analyzed: 02 APR 90

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

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Keith Beauvais
Approved By: Jeff Lowry

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TCL Volatile Organics (CONT.)

Method 8240

Client Name: Giant Refining
Client ID: SMW-4
Lab ID: 008847-0008-SA
Enseco ID: 1070046
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: 01 APR 90
Analyzed: 02 APR 90

Parameter	Result	Units	Reporting Limit
1,4-Dichlorobenzene	ND	ug/L	5.0
Toluene-d8	99	%	--
4-Bromofluorobenzene	92	%	--
1,2-Dichloroethane-d4	96	%	--

ND = Not detected
NA = Not applicable

Reported By: Keith Beauvais

Approved By: Jeff Lowry

Enseco
A CORNING Company

Metals

Dissolved Metals

Client Name: Giant Refining
Client ID: SMW-4
Lab ID: 008847-0008-SA
Enseco ID: 1070046
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: See Below
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Calcium	4.7	mg/L	0.20	6010	NA	31 MAR 90
Magnesium	1.2	mg/L	0.20	6010	NA	31 MAR 90
Potassium	ND	mg/L	5.0	6010	NA	31 MAR 90
Sodium	296	mg/L	5.0	6010	NA	31 MAR 90

ND = Not detected
NA = Not applicable

Reported By: Fred Velasquez
Approved By: Toni Lusk

Enseco
A CORNING Company

Metals

Total Metals

Client Name: Giant Refining
Client ID: SMW-4
Lab ID: 008847-0008-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070046
Sampled: 27 MAR 90
Prepared: See Below

Received: 28 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	ND	mg/L	0.010	6010	29 MAR 90	31 MAR 90
Lead	ND	mg/L	0.0050	7421	29 MAR 90	02 APR 90

ND = Not detected
NA = Not applicable

Reported By: Mike Befort

Approved By: Toni Lusk

Enseco
A CORNING Company

General Inorganics

Client Name: Giant Refining
Client ID: SMW-4
Lab ID: 008847-0008-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070046
Sampled: 27 MAR 90
Prepared: See Below

Received: 28 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Alkalinity, Bicarb. as CaCO3 at pH 4.5	434	mg/L	5.0	310.1	NA	28 MAR 90
Alkalinity, Carb. as CaCO3 at pH 8.3	9.4	mg/L	5.0	310.1	NA	28 MAR 90
Chloride	53.2	mg/L	3.0	300.0	NA	04 APR 90
pH	8.4	units	--	9040	NA	28 MAR 90
Sulfate	178	mg/L	5.0	300.0	NA	04 APR 90
Specific Conductance at 25 deg.C	1200	umhos/cm	1.0	120.1	NA	28 MAR 90
Total Organic Carbon	3.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	2.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	2.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	2.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	04 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	04 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	04 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	04 APR 90
Total Dissolved Solids	852	mg/L	10.0	160.1	NA	29 MAR 90

ND = Not detected
NA = Not applicable

Reported By: Jennifer Franzen

Approved By: Toni Stovall

Enseco
A CORNING Company

TCL Volatile Organics

Method 8240

Client Name: Giant Refining
Client ID: SMW-5
Lab ID: 008847-0009-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070047
Sampled: 27 MAR 90
Prepared: 01 APR 90

Received: 28 MAR 90
Analyzed: 05 APR 90

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

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Cesar Rojas

Approved By: Jeff Lowry

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TCL Volatile Organics (CONT.)

Method 8240

Client Name: Giant Refining
Client ID: SMW-5
Lab ID: 008847-0009-SA
Enseco ID: 1070047
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: 01 APR 90
Analyzed: 05 APR 90

Parameter	Result	Units	Reporting Limit
1,3-Dichlorobenzene	ND	ug/L	5.0
Toluene-d8	104	%	--
4-Bromofluorobenzene	97	%	--
1,2-Dichloroethane-d4	96	%	--

ND = Not detected
NA = Not applicable

Reported By: Cesar Rojas

Approved By: Jeff Lowry

Enseco
A CORNING Company

Metals

Dissolved Metals

Client Name: Giant Refining
Client ID: SMW-5
Lab ID: 008847-0009-SA
Enseco ID: 1070047
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: See Below
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Calcium	3.9	mg/L	0.20	6010	NA	03 MAR 90
Magnesium	0.82	mg/L	0.20	6010	NA	03 MAR 90
Potassium	5.6	mg/L	5.0	6010	NA	03 MAR 90
Sodium	254	mg/L	5.0	6010	NA	03 MAR 90

ND = Not detected
NA = Not applicable

Reported By: Sandra Jones

Approved By: Toni Lusk

Enseco
A CORNING Company

Metals

Total Metals

Client Name: Giant Refining
Client ID: SMW-5
Lab ID: 008847-0009-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070047
Sampled: 27 MAR 90
Prepared: See Below

Received: 28 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	0.025	mg/L	0.010	6010	29 MAR 90	31 MAR 90
Lead	0.018	mg/L	0.0050	7421	29 MAR 90	02 APR 90

ND = Not detected
NA = Not applicable

Reported By: Mike Befort

Approved By: Toni Lusk

Enseco
A CORNING Company

General Inorganics

Client Name: Giant Refining
Client ID: SMW-5
Lab ID: 008847-0009-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070047
Sampled: 27 MAR 90
Prepared: See Below

Received: 28 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Alkalinity, Bicarb. as CaCO3 at pH 4.5	287	mg/L	5.0	310.1	NA	28 MAR 90
Alkalinity, Carb. as CaCO3 at pH 8.3	24.2	mg/L	5.0	310.1	NA	28 MAR 90
Chloride	55.1	mg/L	3.0	300.0	NA	04 APR 90
pH	8.7	units	--	9040	NA	28 MAR 90
Sulfate	147	mg/L	5.0	300.0	NA	04 APR 90
Specific Conductance at 25 deg.C	1050	umhos/cm	1.0	120.1	NA	28 MAR 90
Total Organic Carbon	2.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	2.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	2.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	1.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	04 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	04 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	04 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	04 APR 90
Total Dissolved Solids	769	mg/L	10.0	160.1	NA	29 MAR 90

ND = Not detected
NA = Not applicable

Reported By: Jennifer Franzen

Approved By: Toni Stovall

Enseco
A CORNING Company

TCL Volatile Organics

Method 8240

Client Name: Giant Refining
Client ID: SMW-6
Lab ID: 008847-0010-SA
Enseco ID: 1070048
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: 01 APR 90
Analyzed: 05 APR 90

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

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Cesar Rojas
Approved By: Jeff Lowry

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TCL Volatile Organics (CONT.)

Method 8240

Client Name: Giant Refining
Client ID: SMW-6
Lab ID: 008847-0010-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070048
Sampled: 27 MAR 90
Prepared: 01 APR 90

Received: 28 MAR 90
Analyzed: 05 APR 90

Parameter	Result	Units	Reporting Limit
1,4-Dichlorobenzene	ND	ug/L	5.0
Toluene-d8	104	%	--
4-Bromofluorobenzene	98	%	--
1,2-Dichloroethane-d4	96	%	--

ND = Not detected
NA = Not applicable

Reported By: Cesar Rojas

Approved By: Jeff Lowry

Enseco
A CORNING Company

Metals

Dissolved Metals

Client Name: Giant Refining
Client ID: SMW-6
Lab ID: 008847-0010-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070048
Sampled: 27 MAR 90
Prepared: See Below

Received: 28 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Calcium	8.3	mg/L	0.20	6010	NA	03 APR 90
Magnesium	2.5	mg/L	0.20	6010	NA	03 APR 90
Potassium	ND	mg/L	5.0	6010	NA	03 APR 90
Sodium	379	mg/L	5.0	6010	NA	03 APR 90

ND = Not detected
NA = Not applicable

Reported By: Sandra Jones

Approved By: Toni Lusk

Enseco
A CORNING Company

Metals

Total Metals

Client Name: Giant Refining
Client ID: SMW-6
Lab ID: 008847-0010-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070048
Sampled: 27 MAR 90
Prepared: See Below

Received: 28 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	0.011	mg/L	0.010	6010	29 MAR 90	31 MAR 90
Lead	ND	mg/L	0.0050	7421	29 MAR 90	02 APR 90

ND = Not detected
NA = Not applicable

Reported By: Mike Befort

Approved By: Toni Lusk

Enseco
A CORNING Company

General Inorganics

Client Name: Giant Refining
Client ID: SMW-6
Lab ID: 008847-0010-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070048
Sampled: 27 MAR 90
Prepared: See Below

Received: 28 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Alkalinity, Bicarb. as CaCO3 at pH 4.5	572	mg/L	5.0	310.1	NA	28 MAR 90
Alkalinity, Carb. as CaCO3 at pH 8.3	ND	mg/L	5.0	310.1	NA	28 MAR 90
Chloride	77.3	mg/L	3.0	300.0	NA	02 APR 90
pH	8.3	units	--	9040	NA	28 MAR 90
Sulfate	215	mg/L	5.0	300.0	NA	02 APR 90
Specific Conductance at 25 deg.C	1570	umhos/cm	1.0	120.1	NA	28 MAR 90
Total Organic Carbon	1.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	2.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	3.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	2.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	04 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	04 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	04 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	04 APR 90
Total Dissolved Solids	1090	mg/L	10.0	160.1	NA	29 MAR 90

ND = Not detected
NA = Not applicable

Reported By: Jennifer Franzen

Approved By: Toni Stovall

Enseco
A CORNING Company

TCL Volatile Organics

Method 8240

Client Name: Giant Refining
Client ID: Duplicate 1
Lab ID: 008847-0011-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070049
Sampled: 27 MAR 90
Prepared: 01 APR 90

Received: 28 MAR 90
Analyzed: 02 APR 90

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

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Keith Beauvais

Approved By: Jeff Lowry

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TCL Volatile Organics (CONT.)

Method 8240

Client Name: Giant Refining
Client ID: Duplicate 1
Lab ID: 008847-0011-SA
Enseco ID: 1070049
Matrix: AQUEOUS
Sampled: 27 MAR 90
Received: 28 MAR 90
Authorized: 28 MAR 90
Prepared: 01 APR 90
Analyzed: 02 APR 90

Parameter	Result	Units	Reporting Limit
1,3-Dichlorobenzene	ND	ug/L	5.0
Toluene-d8	102	%	--
4-Bromofluorobenzene	92	%	--
1,2-Dichloroethane-d4	104	%	--

ND = Not detected
NA = Not applicable

Reported By: Keith Beauvais
Approved By: Jeff Lowry

Enseco
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Metals

Dissolved Metals

Client Name: Giant Refining
Client ID: Duplicate 1
Lab ID: 008847-0011-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070049
Sampled: 27 MAR 90
Prepared: See Below

Received: 28 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Calcium	2.0	mg/L	0.20	6010	NA	03 APR 90
Magnesium	0.26	mg/L	0.20	6010	NA	03 APR 90
Potassium	ND	mg/L	5.0	6010	NA	03 APR 90
Sodium	273	mg/L	5.0	6010	NA	03 APR 90

ND = Not detected
NA = Not applicable

Reported By: Sandra Jones

Approved By: Toni Lusk

Enseco
A CORNING Company

Metals

Total Metals

Client Name: Giant Refining
Client ID: Duplicate 1
Lab ID: 008847-0011-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070049
Sampled: 27 MAR 90
Prepared: See Below

Received: 28 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	ND	mg/L	0.010	6010	29 MAR 90	31 MAR 90
Lead	ND	mg/L	0.0050	7421	29 MAR 90	02 APR 90

ND = Not detected
NA = Not applicable

Reported By: Mike Befort

Approved By: Toni Lusk

Enseco
A CORNING Company

General Inorganics

Client Name: Giant Refining
Client ID: Duplicate 1
Lab ID: 008847-0011-SA
Matrix: AQUEOUS
Authorized: 28 MAR 90

Enseco ID: 1070049
Sampled: 27 MAR 90
Prepared: See Below

Received: 28 MAR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Alkalinity, Bicarb. as CaCO3 at pH 4.5	421	mg/L	5.0	310.1	NA	28 MAR 90
Alkalinity, Carb. as CaCO3 at pH 8.3	33.8	mg/L	5.0	310.1	NA	28 MAR 90
Chloride	14.1	mg/L	3.0	300.0	NA	02 APR 90
pH	8.7	units	--	9040	NA	28 MAR 90
Sulfate	146	mg/L	5.0	300.0	NA	02 APR 90
Specific Conductance at 25 deg.C	1090	umhos/cm	1.0	120.1	NA	28 MAR 90
Total Organic Carbon	2.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	2.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	2.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Carbon	2.0	mg/L	1.0	9060	NA	10 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	04 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	04 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	04 APR 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	04 APR 90
Total Dissolved Solids	724	mg/L	10.0	160.1	NA	29 MAR 90

ND = Not detected
NA = Not applicable

Reported By: Jennifer Franzen

Approved By: Toni Stovall

Quality Control Results

The Enseco laboratories operate under a vigorous QA/QC program designed to ensure the generation of scientifically valid, legally defensible data by monitoring every aspect of laboratory operations. Routine QA/QC procedures include the use of approved methodologies, independent verification of analytical standards, use of duplicate Laboratory Control Samples to assess the precision and accuracy of the methodology on a routine basis, and a rigorous system of data review.

In addition, the Enseco laboratories maintain a comprehensive set of certifications from both state and federal governmental agencies which require frequent analyses of blind audit samples. Enseco - Rocky Mountain Analytical Laboratory is certified by the EPA under the EPA/CLP program for both Organic and Inorganic analyses, under the USATHAMA (U.S. Army) program, by the Army Corps of Engineers, and the states of Colorado, New Jersey, New York, Utah, and Florida, among others.

The standard laboratory QC package is designed to:

1) establish a strong, cost-effective QC program that ensures the generation of scientifically valid, legally defensible data

2) assess the laboratory's performance of the analytical method using control limits generated with a well-defined matrix

3) establish clear-cut guidelines for acceptability of analytical data so that QC decisions can be made immediately at the bench, and

4) provide a standard set of reportables which assures the client of the quality of his data.

The Enseco QC program is based upon monitoring the precision and accuracy of an analytical method by analyzing a set of Duplicate Control Samples (DCS) at frequent, well-defined intervals. Each DCS is a well-characterized matrix which is spiked with target compounds at 5-100 times the reporting limit, depending upon the methodology being monitored. The purpose of the DCS is not to duplicate the sample matrix, but rather to provide an interference-free, homogeneous matrix from which to gather data to establish control limits. These limits are used to determine whether data generated by the laboratory on any given day is in control.

Control limits for accuracy (percent recovery) are based on the average, historical percent recovery +/- 3 standard deviation units. Control limits for precision (relative percent difference) range from 0 (identical duplicate DCS results) to the average, historical relative percent difference + 3 standard deviation units. These control limits are fairly narrow based on the consistency of the matrix being monitored and are updated on a quarterly basis.

For each batch of samples analyzed, an additional control measure is taken in the form of a Single Control Sample (SCS). The SCS consists of a control matrix that is spiked with either representative target compounds or surrogate compounds appropriate to the method being used. An SCS is prepared for each sample lot for which the DCS pair are not analyzed.

Accuracy for DCS and SCS is measured by Percent Recovery.

$$\% \text{ Recovery} = \frac{\text{Measured Concentration}}{\text{Actual Concentration}} \times 100$$

Precision for DCS is measured by Relative Percent Difference (RPD).

$$\text{RPD} = \frac{|\text{Measured Concentration DCS1} - \text{Measured Concentration DCS2}|}{(\text{Measured Concentration DCS1} + \text{Measured Concentration DCS2})/2} \times 100$$

All samples analyzed concurrently by the same test are assigned the same QC lot number. Projects which contain numerous samples, analyzed over several days, may have multiple QC lot numbers associated with each test. The QC information which follows includes a listing of the QC lot numbers associated with each of the samples reported, DCS and SCS (where applicable) recoveries from the QC lots associated with the samples, and control limits for these lots. The QC data is reported by test code, in the order that the tests are reported in the analytical results section of this report.

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QC LOT ASSIGNMENT REPORT
Volatile Organics by GC/MS

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
008847-0001-SA	AQUEOUS	624-A	20 MAR 90-L	01 APR 90-L
008847-0001-SA	AQUEOUS	624-A	02 APR 90-F	03 APR 90-F
008847-0002-SA	AQUEOUS	624-A	02 APR 90-F	03 APR 90-F
008847-0002-SA	AQUEOUS	624-A	06 APR 90-F	05 APR 90-F
008847-0003-SA	AQUEOUS	624-A	02 APR 90-F	03 APR 90-F
008847-0003-SA	AQUEOUS	624-A	06 APR 90-F	05 APR 90-F
008847-0004-SA	AQUEOUS	624-A	20 MAR 90-L	01 APR 90-L
008847-0004-SA	AQUEOUS	624-A	02 APR 90-F	03 APR 90-F
008847-0005-SA	AQUEOUS	624-A	20 MAR 90-L	01 APR 90-L
008847-0006-SA	AQUEOUS	624-A	20 MAR 90-L	01 APR 90-L
008847-0007-SA	AQUEOUS	624-A	20 MAR 90-L	01 APR 90-L
008847-0008-SA	AQUEOUS	624-A	20 MAR 90-L	01 APR 90-L
008847-0009-SA	AQUEOUS	624-A	06 APR 90-F	05 APR 90-F
008847-0010-SA	AQUEOUS	624-A	06 APR 90-F	05 APR 90-F
008847-0011-SA	AQUEOUS	624-A	02 APR 90-L	01 APR 90-L

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DUPLICATE CONTROL SAMPLE REPORT
Volatile Organics by GC/MS

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: 624-A Matrix: AQUEOUS QC Lot: 20 MAR 90-L Concentration Units: ug/L								
1,1-Dichloroethene	50	56.7	57.0	56.8	114	61-145	0.5	14
Trichloroethene	50	48.7	51.2	50.0	100	71-120	5.0	14
Benzene	50	54.2	54.1	54.2	108	76-127	0.2	11
Toluene	50	54.1	55.9	55.0	110	76-125	3.3	13
Chlorobenzene	50	52.4	54.8	53.6	107	75-130	4.5	13
Category: 624-A Matrix: AQUEOUS QC Lot: 02 APR 90-F Concentration Units: ug/L								
1,1-Dichloroethene	50	48.5	47.9	48.2	96	61-145	1.2	14
Trichloroethene	50	51.9	51.6	51.8	104	71-120	0.6	14
Benzene	50	51.1	54.1	52.6	105	76-127	5.7	11
Toluene	50	55.0	53.5	54.2	109	76-125	2.8	13
Chlorobenzene	50	54.8	54.1	54.4	109	75-130	1.3	13
Category: 624-A Matrix: AQUEOUS QC Lot: 06 APR 90-F Concentration Units: ug/L								
1,1-Dichloroethene	50	49.4	47.2	48.3	97	61-145	4.6	14
Trichloroethene	50	54.1	51.1	52.6	105	71-120	5.7	14
Benzene	50	43.6	42.8	43.2	86	76-127	1.9	11
Toluene	50	52.4	53.7	53.0	106	76-125	2.5	13
Chlorobenzene	50	54.2	54.1	54.2	108	75-130	0.2	13
Category: 624-A Matrix: AQUEOUS QC Lot: 02 APR 90-L Concentration Units: ug/L								
1,1-Dichloroethene	50	45.0	47.5	46.2	93	61-145	5.4	14
Trichloroethene	50	55.6	56.6	56.1	112	71-120	1.8	14
Benzene	50	55.2	57.4	56.3	113	76-127	3.9	11
Toluene	50	52.3	50.8	51.6	103	76-125	2.9	13

Calculations are performed before rounding to avoid round-off errors in calculated results.

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DUPLICATE CONTROL SAMPLE REPORT
Volatile Organics by GC/MS (cont.)

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
Category: 624-A								
Matrix: AQUEOUS								
QC Lot: 02 APR 90-L								
Concentration Units: ug/L								
Chlorobenzene	50	54.0	53.0	53.5	107	75-130	1.9	13

Calculations are performed before rounding to avoid round-off errors in calculated results.

Enseco
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SINGLE CONTROL SAMPLE REPORT
Volatile Organics by GC/MS

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Category: 624-A Matrix: AQUEOUS QC Lot: 20 MAR 90-L QC Run: 01 APR 90-L Concentration Units: ug/L				
1,2-Dichloroethane-d4	50.0	46.0	92	76-114
4-Bromofluorobenzene	50.0	46.2	92	86-115
Toluene-d8	50.0	48.0	96	88-110
Category: 624-A Matrix: AQUEOUS QC Lot: 02 APR 90-F QC Run: 03 APR 90-F Concentration Units: ug/L				
1,2-Dichloroethane-d4	50.0	49.0	98	76-114
4-Bromofluorobenzene	50.0	49.7	99	86-115
Toluene-d8	50.0	52.2	104	88-110
Category: 624-A Matrix: AQUEOUS QC Lot: 06 APR 90-F QC Run: 05 APR 90-F Concentration Units: ug/L				
1,2-Dichloroethane-d4	50.0	48.4	97	76-114
4-Bromofluorobenzene	50.0	48.7	97	86-115
Toluene-d8	50.0	51.5	103	88-110
Category: 624-A Matrix: AQUEOUS QC Lot: 02 APR 90-L QC Run: 01 APR 90-L Concentration Units: ug/L				
1,2-Dichloroethane-d4	50.0	46.0	92	76-114
4-Bromofluorobenzene	50.0	46.2	92	86-115
Toluene-d8	50.0	48.0	96	88-110

Calculations are performed before rounding to avoid round-off errors in calculated results.

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METHOD BLANK REPORT
Volatile Organics by GC/MS

Test: 624-TCL-AP
Matrix: AQUEOUS
QC Lot: 20 MAR 90-L QC Run: 01 APR 90-L

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

METHOD BLANK REPORT
Volatile Organics by GC/MS (cont.)

Analyte	Result	Units	Reporting Limit
Test: 624-TCL-AP Matrix: AQUEOUS QC Lot: 20 MAR 90-L QC Run: 01 APR 90-L			
1,4-Dichlorobenzene	ND	ug/L	5.0
Test: 624-TCL-AP Matrix: AQUEOUS QC Lot: 02 APR 90-F QC Run: 03 APR 90-F			
Chloromethane	ND	ug/L	10
Bromomethane	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Chloroethane	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
Acetone	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethene (cis/trans)	ND	ug/L	5.0
Chloroform	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
2-Butanone	ND	ug/L	10
1,1,1-Trichloroethane	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Bromodichloromethane	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Chlorodibromomethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Benzene	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	10
Bromoform	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ug/L	10
2-Hexanone	ND	ug/L	10
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0

METHOD BLANK REPORT
Volatile Organics by GC/MS (cont.)

Analyte	Result	Units	Reporting Limit
Test: 624-TCL-AP			
Matrix: AQUEOUS			
QC Lot: 02 APR 90-F QC Run: 03 APR 90-F			
Styrene	ND	ug/L	5.0
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	5.0
1,2-Dibromoethane (EDB)	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0
Test: 624-TCL-AP			
Matrix: AQUEOUS			
QC Lot: 06 APR 90-F QC Run: 05 APR 90-F			
Chloromethane	ND	ug/L	10
Bromomethane	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Chloroethane	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
Acetone	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethene (cis/trans)	ND	ug/L	5.0
Chloroform	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
2-Butanone	ND	ug/L	10
1,1,1-Trichloroethane	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Bromodichloromethane	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Chlorodibromomethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Benzene	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	10
Bromoform	ND	ug/L	5.0

METHOD BLANK REPORT
Volatile Organics by GC/MS (cont.)

Analyte	Result	Units	Reporting Limit
Test: 624-TCL-AP			
Matrix: AQUEOUS			
QC Lot: 06 APR 90-F QC Run: 05 APR 90-F			
4-Methyl-2-pentanone	ND	ug/L	10
2-Hexanone	ND	ug/L	10
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
Styrene	ND	ug/L	5.0
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	5.0
1,2-Dibromoethane (EDB)	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0
Test: 624-TCL-AP			
Matrix: AQUEOUS			
QC Lot: 20 MAR 90-L QC Run: 01 APR 90-L			
Chloromethane	ND	ug/L	10
Bromomethane	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Chloroethane	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
Acetone	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethene (cis/trans)	ND	ug/L	5.0
Chloroform	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
2-Butanone	ND	ug/L	10
1,1,1-Trichloroethane	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Bromodichloromethane	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0

METHOD BLANK REPORT
Volatile Organics by GC/MS (cont.)

Analyte	Result	Units	Reporting Limit
Test: 624-TCL-AP			
Matrix: AQUEOUS			
QC Lot: 20 MAR 90-L QC Run: 01 APR 90-L			
Trichloroethene	ND	ug/L	5.0
Chlorodibromomethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Benzene	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	10
Bromoform	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ug/L	10
2-Hexanone	ND	ug/L	10
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
Styrene	ND	ug/L	5.0
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	5.0
1,2-Dibromoethane (EDB)	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0
Test: 624-TCL-AP			
Matrix: AQUEOUS			
QC Lot: 06 APR 90-F QC Run: 05 APR 90-F			
Chloromethane	ND	ug/L	10
Bromomethane	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Chloroethane	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
Acetone	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethene (cis/trans)	ND	ug/L	5.0
Chloroform	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0

METHOD BLANK REPORT
Volatile Organics by GC/MS (cont.)

Analyte	Result	Units	Reporting Limit
Test: 624-TCL-AP			
Matrix: AQUEOUS			
QC Lot: 06 APR 90-F QC Run: 05 APR 90-F			
2-Butanone	ND	ug/L	10
1,1,1-Trichloroethane	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Bromodichloromethane	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Chlorodibromomethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Benzene	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	10
Bromoform	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ug/L	10
2-Hexanone	ND	ug/L	10
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
Styrene	ND	ug/L	5.0
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	5.0
1,2-Dibromoethane (EDB)	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0
Test: 624-TCL-AP			
Matrix: AQUEOUS			
QC Lot: 02 APR 90-L QC Run: 01 APR 90-L			
Chloromethane	ND	ug/L	10
Bromomethane	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Chloroethane	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
Acetone	ND	ug/L	10

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METHOD BLANK REPORT
Volatile Organics by GC/MS (cont.)

Test: 624-TCL-AP
Matrix: AQUEOUS
QC Lot: 02 APR 90-L QC Run: 01 APR 90-L

Analyte	Result	Units	Reporting Limit
Carbon disulfide	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethene (cis/trans)	ND	ug/L	5.0
Chloroform	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
2-Butanone	ND	ug/L	10
1,1,1-Trichloroethane	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Bromodichloromethane	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Chlorodibromomethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Benzene	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	10
Bromoform	ND	ug/L	5.0
4-Methyl-2-pentanone	ND	ug/L	10
2-Hexanone	ND	ug/L	10
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
Styrene	ND	ug/L	5.0
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	5.0
1,2-Dibromoethane (EDB)	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0

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QC LOT ASSIGNMENT REPORT
Metals Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
008847-0001-SA	AQUEOUS	ICP-AD	03 APR 90-A	-
008847-0001-SA	AQUEOUS	AS-FAA-AD	02 APR 90-A	-
008847-0001-SA	AQUEOUS	SE-FAA-AD	30 MAR 90-B	-
008847-0001-SA	AQUEOUS	ICP-AT	29 MAR 90-D	29 MAR 90-D
008847-0001-SA	AQUEOUS	PB-FAA-AT	29 MAR 90-D	29 MAR 90-D
008847-0001-SA	AQUEOUS	HG-CVAA-AT	29 MAR 90-A	29 MAR 90-A
008847-0002-SA	AQUEOUS	ICP-AD	03 APR 90-A	-
008847-0002-SA	AQUEOUS	AS-FAA-AD	02 APR 90-A	-
008847-0002-SA	AQUEOUS	SE-FAA-AD	30 MAR 90-B	-
008847-0002-SA	AQUEOUS	ICP-AT	29 MAR 90-D	29 MAR 90-D
008847-0002-SA	AQUEOUS	PB-FAA-AT	29 MAR 90-D	29 MAR 90-D
008847-0002-SA	AQUEOUS	HG-CVAA-AT	29 MAR 90-A	29 MAR 90-A
008847-0003-SA	AQUEOUS	ICP-AD	03 APR 90-A	-
008847-0003-SA	AQUEOUS	AS-FAA-AD	02 APR 90-A	-
008847-0003-SA	AQUEOUS	SE-FAA-AD	30 MAR 90-B	-
008847-0003-SA	AQUEOUS	ICP-AT	29 MAR 90-D	29 MAR 90-D
008847-0003-SA	AQUEOUS	PB-FAA-AT	29 MAR 90-D	29 MAR 90-D
008847-0003-SA	AQUEOUS	HG-CVAA-AT	29 MAR 90-A	29 MAR 90-A
008847-0004-SA	AQUEOUS	ICP-AD	03 APR 90-A	-
008847-0004-SA	AQUEOUS	AS-FAA-AD	02 APR 90-A	-
008847-0004-SA	AQUEOUS	SE-FAA-AD	30 MAR 90-B	-
008847-0004-SA	AQUEOUS	ICP-AT	29 MAR 90-D	29 MAR 90-D
008847-0004-SA	AQUEOUS	PB-FAA-AT	29 MAR 90-D	29 MAR 90-D
008847-0004-SA	AQUEOUS	HG-CVAA-AT	29 MAR 90-A	29 MAR 90-A
008847-0005-SA	AQUEOUS	ICP-AD	03 APR 90-A	-
008847-0005-SA	AQUEOUS	ICP-AT	29 MAR 90-D	29 MAR 90-D
008847-0005-SA	AQUEOUS	PB-FAA-AT	29 MAR 90-D	29 MAR 90-D
008847-0006-SA	AQUEOUS	ICP-AD	03 APR 90-A	-
008847-0006-SA	AQUEOUS	ICP-AT	29 MAR 90-D	29 MAR 90-D
008847-0006-SA	AQUEOUS	PB-FAA-AT	29 MAR 90-D	29 MAR 90-D
008847-0007-SA	AQUEOUS	ICP-AD	03 APR 90-A	-
008847-0007-SA	AQUEOUS	ICP-AT	29 MAR 90-D	29 MAR 90-D
008847-0007-SA	AQUEOUS	PB-FAA-AT	29 MAR 90-D	29 MAR 90-D
008847-0008-SA	AQUEOUS	ICP-AD	03 APR 90-A	-
008847-0008-SA	AQUEOUS	ICP-AT	29 MAR 90-D	29 MAR 90-D
008847-0008-SA	AQUEOUS	PB-FAA-AT	29 MAR 90-D	29 MAR 90-D
008847-0009-SA	AQUEOUS	ICP-AD	03 APR 90-A	-
008847-0009-SA	AQUEOUS	ICP-AT	29 MAR 90-D	29 MAR 90-D
008847-0009-SA	AQUEOUS	PB-FAA-AT	29 MAR 90-D	29 MAR 90-D
008847-0010-SA	AQUEOUS	ICP-AD	03 APR 90-A	-
008847-0010-SA	AQUEOUS	ICP-AT	29 MAR 90-D	29 MAR 90-D
008847-0010-SA	AQUEOUS	PB-FAA-AT	29 MAR 90-D	29 MAR 90-D
008847-0011-SA	AQUEOUS	ICP-AD	03 APR 90-A	-
008847-0011-SA	AQUEOUS	ICP-AT	29 MAR 90-D	29 MAR 90-D
008847-0011-SA	AQUEOUS	PB-FAA-AT	29 MAR 90-D	29 MAR 90-D

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DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
Category: ICP-AD Matrix: AQUEOUS QC Lot: 03 APR 90-A Concentration Units: mg/L								
Aluminum	2.0	1.86	1.89	1.88	94	75-125	1.3	20
Antimony	0.5	0.461	0.476	0.468	94	75-125	3.2	20
Arsenic	0.5	0.488	0.484	0.486	97	75-125	0.9	20
Barium	2.0	1.63	1.66	1.64	82	75-125	1.4	20
Beryllium	0.05	0.0451	0.0453	0.0452	90	75-125	0.4	20
Cadmium	0.05	0.0427	0.0456	0.0441	88	75-125	6.6	20
Calcium	100	87.7	88.9	88.3	88	75-125	1.3	20
Chromium	0.2	0.191	0.191	0.191	96	75-125	0.0	20
Cobalt	0.5	0.438	0.444	0.441	88	75-125	1.3	20
Copper	0.25	0.235	0.238	0.236	95	75-125	1.2	20
Iron	1.0	0.946	0.955	0.950	95	75-125	0.9	20
Lead	0.5	0.446	0.462	0.454	91	75-125	3.3	20
Magnesium	50	43.4	44.1	43.8	88	75-125	1.6	20
Manganese	0.5	0.466	0.472	0.469	94	75-125	1.2	20
Nickel	0.5	0.424	0.429	0.426	85	75-125	1.2	20
Potassium	50	42.9	43.6	43.2	86	75-125	1.6	20
Silver	0.05	0.0409	0.0419	0.0414	83	75-125	2.4	20
Sodium	100	86.8	88.0	87.4	87	75-125	1.4	20
Vanadium	0.5	0.453	0.457	0.455	91	75-125	1.1	20
Zinc	0.5	0.447	0.455	0.451	90	75-125	1.7	20
Category: AS-FAA-AD Matrix: AQUEOUS QC Lot: 02 APR 90-A Concentration Units: mg/L								
Arsenic	0.04	0.0343	0.0406	0.0374	94	75-125	17	20
Category: SE-FAA-AD Matrix: AQUEOUS QC Lot: 30 MAR 90-B Concentration Units: mg/L								
Selenium	0.01	0.0104	0.00940	0.00990	99	75-125	10	20

Calculations are performed before rounding to avoid round-off errors in calculated results.

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DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation (cont.)

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
Category: ICP-AT Matrix: AQUEOUS QC Lot: 29 MAR 90-D Concentration Units: mg/L								
Aluminum	2.0	2.01	2.01	2.01	101	75-125	0.0	20
Antimony	0.5	0.495	0.490	0.492	98	75-125	1.0	20
Arsenic	0.5	0.558	0.549	0.554	111	75-125	1.6	20
Barium	2.0	1.81	1.81	1.81	90	75-125	0.3	20
Beryllium	0.05	0.0486	0.0484	0.0485	97	75-125	0.4	20
Cadmium	0.05	0.0495	0.0556	0.0526	105	75-125	12	20
Calcium	100	94.2	93.5	93.8	94	75-125	0.8	20
Chromium	0.2	0.197	0.194	0.196	98	75-125	1.8	20
Cobalt	0.5	0.508	0.505	0.507	101	75-125	0.7	20
Copper	0.25	0.274	0.278	0.276	110	75-125	1.2	20
Iron	1.0	1.06	1.04	1.05	105	75-125	1.9	20
Lead	0.5	0.524	0.516	0.520	104	75-125	1.5	20
Magnesium	50	47.4	47.2	47.3	95	75-125	0.5	20
Manganese	0.5	0.524	0.521	0.523	105	75-125	0.5	20
Nickel	0.5	0.492	0.492	0.492	98	75-125	0.0	20
Potassium	50	46.9	46.8	46.9	94	75-125	0.2	20
Silver	0.05	0.0469	0.0446	0.0458	92	75-125	5.0	20
Sodium	100	91.7	91.2	91.5	91	75-125	0.5	20
Vanadium	0.5	0.503	0.502	0.503	101	75-125	0.2	20
Zinc	0.5	0.533	0.530	0.531	106	75-125	0.5	20
Category: PB-FAA-AT Matrix: AQUEOUS QC Lot: 29 MAR 90-D Concentration Units: mg/L								
Lead	0.02	0.0257	0.0238	0.0248	124	75-125	7.7	20
Category: HG-CVAA-AT Matrix: AQUEOUS QC Lot: 29 MAR 90-A Concentration Units: mg/L								
Mercury	0.0010	0.00108	0.00103	0.00106	106	75-125	4.7	20

Calculations are performed before rounding to avoid round-off errors in calculated results.

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METHOD BLANK REPORT
Metals Analysis and Preparation

Analyte	Result	Units	Reporting Limit
Test: ICP-AT Matrix: AQUEOUS QC Lot: 29 MAR 90-D QC Run: 29 MAR 90-D			
Chromium	ND	mg/L	0.010
Test: PB-FAA-AT Matrix: AQUEOUS QC Lot: 29 MAR 90-D QC Run: 29 MAR 90-D			
Lead	ND	mg/L	0.0050
Test: HG-CVAA-AT Matrix: AQUEOUS QC Lot: 29 MAR 90-A QC Run: 29 MAR 90-A			
Mercury	ND	mg/L	0.00020
Test: ICP-AT Matrix: AQUEOUS QC Lot: 29 MAR 90-D QC Run: 29 MAR 90-D			
Chromium	ND	mg/L	0.010
Test: PB-FAA-AT Matrix: AQUEOUS QC Lot: 29 MAR 90-D QC Run: 29 MAR 90-D			
Lead	ND	mg/L	0.0050

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QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
008847-0001-SA	AQUEOUS	TOX-A	02 APR 90-A	-
008847-0001-SA	AQUEOUS	TOX-A	02 APR 90-A	-
008847-0001-SA	AQUEOUS	TOX-A	02 APR 90-A	-
008847-0001-SA	AQUEOUS	TOX-A	02 APR 90-A	-
008847-0001-SA	AQUEOUS	CL-IC-A	02 APR 90-M	-
008847-0001-SA	AQUEOUS	SO4-IC-A	02 APR 90-M	-
008847-0001-SA	AQUEOUS	ALK-A	28 MAR 90-A	-
008847-0001-SA	AQUEOUS	TDS-A	29 MAR 90-S	29 MAR 90-S
008847-0001-SA	AQUEOUS	PHEN-A	29 MAR 90-R	29 MAR 90-R
008847-0001-SA	AQUEOUS	PH-A	28 MAR 90-C	-
008847-0001-SA	AQUEOUS	COND-A	28 MAR 90-A	-
008847-0002-SA	AQUEOUS	TOX-A	02 APR 90-A	-
008847-0002-SA	AQUEOUS	TOX-A	02 APR 90-A	-
008847-0002-SA	AQUEOUS	TOX-A	02 APR 90-A	-
008847-0002-SA	AQUEOUS	TOX-A	02 APR 90-A	-
008847-0002-SA	AQUEOUS	CL-IC-A	02 APR 90-M	-
008847-0002-SA	AQUEOUS	SO4-IC-A	02 APR 90-M	-
008847-0002-SA	AQUEOUS	ALK-A	28 MAR 90-A	-
008847-0002-SA	AQUEOUS	TDS-A	29 MAR 90-S	29 MAR 90-S
008847-0002-SA	AQUEOUS	PHEN-A	29 MAR 90-R	29 MAR 90-R
008847-0002-SA	AQUEOUS	PH-A	28 MAR 90-C	-
008847-0002-SA	AQUEOUS	COND-A	28 MAR 90-A	-
008847-0003-SA	AQUEOUS	TOX-A	03 APR 90-A	-
008847-0003-SA	AQUEOUS	TOX-A	03 APR 90-A	-
008847-0003-SA	AQUEOUS	TOX-A	03 APR 90-A	-
008847-0003-SA	AQUEOUS	TOX-A	03 APR 90-A	-
008847-0003-SA	AQUEOUS	CL-IC-A	02 APR 90-M	-
008847-0003-SA	AQUEOUS	SO4-IC-A	02 APR 90-M	-
008847-0003-SA	AQUEOUS	ALK-A	28 MAR 90-A	-
008847-0003-SA	AQUEOUS	TDS-A	29 MAR 90-S	29 MAR 90-S
008847-0003-SA	AQUEOUS	PHEN-A	29 MAR 90-R	29 MAR 90-R
008847-0003-SA	AQUEOUS	PH-A	28 MAR 90-C	-
008847-0003-SA	AQUEOUS	COND-A	28 MAR 90-A	-
008847-0004-SA	AQUEOUS	TOX-A	03 APR 90-A	-
008847-0004-SA	AQUEOUS	TOX-A	03 APR 90-A	-
008847-0004-SA	AQUEOUS	TOX-A	03 APR 90-A	-
008847-0004-SA	AQUEOUS	TOX-A	03 APR 90-A	-
008847-0004-SA	AQUEOUS	CL-IC-A	02 APR 90-M	-
008847-0004-SA	AQUEOUS	SO4-IC-A	02 APR 90-M	-
008847-0004-SA	AQUEOUS	ALK-A	28 MAR 90-A	-
008847-0004-SA	AQUEOUS	TDS-A	29 MAR 90-S	29 MAR 90-S
008847-0004-SA	AQUEOUS	PHEN-A	29 MAR 90-R	29 MAR 90-R
008847-0004-SA	AQUEOUS	PH-A	28 MAR 90-C	-
008847-0004-SA	AQUEOUS	COND-A	28 MAR 90-A	-
008847-0005-SA	AQUEOUS	TOX-A	03 APR 90-A	-
008847-0005-SA	AQUEOUS	TOX-A	03 APR 90-A	-
008847-0005-SA	AQUEOUS	TOX-A	03 APR 90-A	-

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation (cont.)

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
008847-0005-SA	AQUEOUS	TOX-A	03 APR 90-A	-
008847-0005-SA	AQUEOUS	CL-IC-A	02 APR 90-M	-
008847-0005-SA	AQUEOUS	SO4-IC-A	02 APR 90-M	-
008847-0005-SA	AQUEOUS	ALK-A	28 MAR 90-A	-
008847-0005-SA	AQUEOUS	TDS-A	29 MAR 90-S	29 MAR 90-S
008847-0005-SA	AQUEOUS	PH-A	28 MAR 90-C	-
008847-0005-SA	AQUEOUS	COND-A	28 MAR 90-A	-
008847-0006-SA	AQUEOUS	TOX-A	03 APR 90-A	-
008847-0006-SA	AQUEOUS	TOX-A	03 APR 90-A	-
008847-0006-SA	AQUEOUS	TOX-A	03 APR 90-A	-
008847-0006-SA	AQUEOUS	TOX-A	03 APR 90-A	-
008847-0006-SA	AQUEOUS	CL-IC-A	02 APR 90-M	-
008847-0006-SA	AQUEOUS	SO4-IC-A	02 APR 90-M	-
008847-0006-SA	AQUEOUS	ALK-A	28 MAR 90-A	-
008847-0006-SA	AQUEOUS	TDS-A	29 MAR 90-S	29 MAR 90-S
008847-0006-SA	AQUEOUS	PH-A	28 MAR 90-C	-
008847-0006-SA	AQUEOUS	COND-A	28 MAR 90-A	-
008847-0007-SA	AQUEOUS	TOX-A	03 APR 90-A	-
008847-0007-SA	AQUEOUS	TOX-A	03 APR 90-A	-
008847-0007-SA	AQUEOUS	TOX-A	03 APR 90-A	-
008847-0007-SA	AQUEOUS	TOX-A	03 APR 90-A	-
008847-0007-SA	AQUEOUS	CL-IC-A	02 APR 90-M	-
008847-0007-SA	AQUEOUS	SO4-IC-A	02 APR 90-M	-
008847-0007-SA	AQUEOUS	ALK-A	28 MAR 90-A	-
008847-0007-SA	AQUEOUS	TDS-A	29 MAR 90-S	29 MAR 90-S
008847-0007-SA	AQUEOUS	PH-A	28 MAR 90-C	-
008847-0007-SA	AQUEOUS	COND-A	28 MAR 90-A	-
008847-0008-SA	AQUEOUS	TOX-A	04 APR 90-A	-
008847-0008-SA	AQUEOUS	TOX-A	04 APR 90-A	-
008847-0008-SA	AQUEOUS	TOX-A	04 APR 90-A	-
008847-0008-SA	AQUEOUS	TOX-A	04 APR 90-A	-
008847-0008-SA	AQUEOUS	CL-IC-A	04 APR 90-M	-
008847-0008-SA	AQUEOUS	SO4-IC-A	04 APR 90-M	-
008847-0008-SA	AQUEOUS	ALK-A	28 MAR 90-A	-
008847-0008-SA	AQUEOUS	TDS-A	29 MAR 90-S	29 MAR 90-S
008847-0008-SA	AQUEOUS	PH-A	28 MAR 90-C	-
008847-0008-SA	AQUEOUS	COND-A	28 MAR 90-A	-
008847-0009-SA	AQUEOUS	TOX-A	04 APR 90-A	-
008847-0009-SA	AQUEOUS	TOX-A	04 APR 90-A	-
008847-0009-SA	AQUEOUS	TOX-A	04 APR 90-A	-
008847-0009-SA	AQUEOUS	TOX-A	04 APR 90-A	-
008847-0009-SA	AQUEOUS	CL-IC-A	04 APR 90-M	-
008847-0009-SA	AQUEOUS	SO4-IC-A	04 APR 90-M	-
008847-0009-SA	AQUEOUS	ALK-A	28 MAR 90-A	-
008847-0009-SA	AQUEOUS	TDS-A	29 MAR 90-S	29 MAR 90-S
008847-0009-SA	AQUEOUS	PH-A	28 MAR 90-C	-
008847-0009-SA	AQUEOUS	COND-A	28 MAR 90-A	-

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation (cont.)

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
008847-0010-SA	AQUEOUS	TOX-A	04 APR 90-A	-
008847-0010-SA	AQUEOUS	TOX-A	04 APR 90-A	-
008847-0010-SA	AQUEOUS	TOX-A	04 APR 90-A	-
008847-0010-SA	AQUEOUS	TOX-A	04 APR 90-A	-
008847-0010-SA	AQUEOUS	CL-IC-A	02 APR 90-M	-
008847-0010-SA	AQUEOUS	SO4-IC-A	02 APR 90-M	-
008847-0010-SA	AQUEOUS	ALK-A	28 MAR 90-A	-
008847-0010-SA	AQUEOUS	TDS-A	29 MAR 90-S	29 MAR 90-S
008847-0010-SA	AQUEOUS	PH-A	28 MAR 90-C	-
008847-0010-SA	AQUEOUS	COND-A	28 MAR 90-A	-
008847-0011-SA	AQUEOUS	TOX-A	04 APR 90-A	-
008847-0011-SA	AQUEOUS	TOX-A	04 APR 90-A	-
008847-0011-SA	AQUEOUS	TOX-A	04 APR 90-A	-
008847-0011-SA	AQUEOUS	TOX-A	04 APR 90-A	-
008847-0011-SA	AQUEOUS	CL-IC-A	02 APR 90-M	-
008847-0011-SA	AQUEOUS	SO4-IC-A	02 APR 90-M	-
008847-0011-SA	AQUEOUS	ALK-A	28 MAR 90-A	-
008847-0011-SA	AQUEOUS	TDS-A	29 MAR 90-S	29 MAR 90-S
008847-0011-SA	AQUEOUS	PH-A	28 MAR 90-C	-
008847-0011-SA	AQUEOUS	COND-A	28 MAR 90-A	-

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A CORNING Company

DUPLICATE CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: TOX-A Matrix: AQUEOUS QC Lot: 02 APR 90-A Concentration Units: ug Cl/L								
Total Organic Halogen as Cl	100	102	111	106	107	80-120	8.5	20
Category: CL-IC-A Matrix: AQUEOUS QC Lot: 02 APR 90-M Concentration Units: mg/L								
Chloride	100	102	102	102	102	92-108	0.0	20
Category: SO4-IC-A Matrix: AQUEOUS QC Lot: 02 APR 90-M Concentration Units: mg/L								
Sulfate	200	202	202	202	101	93-107	0.0	20
Category: ALK-A Matrix: AQUEOUS QC Lot: 28 MAR 90-A Concentration Units: mg/L								
Alkalinity, Total as CaCO3 at pH 4.5	157	162	162	162	103	90-110	0.0	10
Category: TDS-A Matrix: AQUEOUS QC Lot: 29 MAR 90-S Concentration Units: mg/L								
Total Dissolved Solids	1270	1210	1220	1220	96	90-110	0.8	10

Calculations are performed before rounding to avoid round-off errors in calculated results.

DUPLICATE CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation (cont.)

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: PHEN-A Matrix: AQUEOUS QC Lot: 29 MAR 90-R Concentration Units: mg/L								
Phenolics	0.20	0.206	0.205	0.206	103	78-122	0.5	20
Category: PH-A Matrix: AQUEOUS QC Lot: 28 MAR 90-C Concentration Units: units								
pH	9.1	9.01	9.04	9.02	99	98-102	0.3	5
Category: COND-A Matrix: AQUEOUS QC Lot: 28 MAR 90-A Concentration Units: umhos/cm								
Specific Conductance at 25 deg.C	1650	1660	1650	1660	100	95-105	0.6	5
Category: TOX-A Matrix: AQUEOUS QC Lot: 03 APR 90-A Concentration Units: ug Cl/L								
Total Organic Halogen as Cl	100	96.1	98.4	97.2	97	80-120	2.4	20
Category: TOX-A Matrix: AQUEOUS QC Lot: 04 APR 90-A Concentration Units: ug Cl/L								
Total Organic Halogen as Cl	100	98.1	97.7	97.9	98	80-120	0.4	20

Calculations are performed before rounding to avoid round-off errors in calculated results.

DUPLICATE CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation (cont.)

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: CL-IC-A Matrix: AQUEOUS QC Lot: 04 APR 90-M Concentration Units: mg/L								
Chloride	100	98.1	98.2	98.2	98	92-108	0.1	20
Category: SO4-IC-A Matrix: AQUEOUS QC Lot: 04 APR 90-M Concentration Units: mg/L								
Sulfate	200	195	194	194	97	93-107	0.5	20

Calculations are performed before rounding to avoid round-off errors in calculated results.

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METHOD BLANK REPORT
Wet Chemistry Analysis and Preparation

Analyte	Result	Units	Reporting Limit
Test: TDS-BAL-A Matrix: AQUEOUS QC Lot: 29 MAR 90-S QC Run: 29 MAR 90-S			
Total Dissolved Solids	ND	mg/L	10.0
Test: PHEN-SPEC-A Matrix: AQUEOUS QC Lot: 29 MAR 90-R QC Run: 29 MAR 90-R			
Phenolics	ND	mg/L	0.010
Test: TDS-BAL-A Matrix: AQUEOUS QC Lot: 29 MAR 90-S QC Run: 29 MAR 90-S			
Total Dissolved Solids	ND	mg/L	10.0

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QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)
008847-0001-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0001-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0001-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0001-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0002-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0002-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0002-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0002-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0003-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0003-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0003-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0003-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0004-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0004-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0004-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0004-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0005-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0005-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0005-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0005-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0006-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0006-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0006-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0006-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0007-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0007-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0007-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0007-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0008-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0008-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0008-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0008-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0009-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0009-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0009-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0009-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0010-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0010-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0010-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0010-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0011-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0011-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0011-SA	AQUEOUS	TOC-A	10 APR 90-Z
008847-0011-SA	AQUEOUS	TOC-A	10 APR 90-Z

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DUPLICATE CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limit	Precision (RPD) DCS	Precision (RPD) Limit
Category: TOC-A								
Matrix: AQUEOUS								
QC Lot: 10 APR 90-Z								
Concentration Units: mg/L								
Total Organic Carbon	200	217	219	218	109	70-130	1	30

Calculations are performed before rounding to avoid round-off errors in calculated results.

Appendix

Enseco - Rocky Mountain Analytical

4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No.

Attn: Julie Essey

Enseco Client: Giant Refining
Project: Spring Sampling EID & OCD
Sampling Co.: Cinizza
Sampling Site: Cinizza
Team Leader: Claud Rosendale

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: Yes (✓) No
3. Condition of Contents: good
4. Sealed for Shipping by: Claud Rosendale
5. Initial Contents Temp.: 50 °F Seal # _____
6. Sampling Status: Done Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description	Sample Type	No. Containers	Bottle #	Analysis Parameters	Remarks
		8847					
3-27-90	1000	MW-1 01	Water	1	1		
				1	2		
				1	4		
				1	4		Filtered
				6	11	2 replicates	
				1	15		

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Claud Rosendale		3-27-90	1430
2				

SHIPPING DETAILS

Delivered to Shipper by: Claud Rosendale
Method of Shipment: Fed. Ex Airbill #
Received for Lab: RMAL Signed: [signature] Date/Time 3/28/90 0800
Enseco Project No. 008847

White and Pink Copies to Lab Yellow to Sampler

SS-001

Enseco - Rocky Mountain Analytical

4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No.

Attn: Julie Essey

Enseco Client: Giant Refining

Project: Spring Well OCD & EID

Sampling Co.: Cinizg

Sampling Site: Cinizg

Team Leader: Claud Rosendale

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: (Yes) No
3. Condition of Contents: good
4. Sealed for Shipping by: Claud Rosendale
5. Initial Contents Temp.: 50 °~~C~~ Seal # _____
6. Sampling Status: (Done) Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description 8847	Sample Type	No. Containers	Bottle #	Analysis Parameters	Remarks
3-22-90	0935	MW-2 02	Water	1	1		
				1	2		
				1	4		
				1	4		Filtered
				6	11	2 replicates	
				1	15		

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Claud Rosendal		3-22-90	1430
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Claud Rosendale

Method of Shipment: Fed Ex. Airbill #

Received for Lab: RMA Signed: [illegible] Date/Time 0800 3/23/90

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CHAIN OF CUSTODY

No.

Attn: Julie Essey

Enseco Client: Giant Refinery

Project: Spring well

Sampling Co.: Cinizg

Sampling Site: Cinizg

Team Leader: Claud Rosendale

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: (Yes) No
3. Condition of Contents: good
4. Sealed for Shipping by: Claud Rosendale
5. Initial Contents Temp.: 51 °F Seal # _____
6. Sampling Status: (Done) Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description 8847	Sample Type	No. Containers	Bottle #	Analysis Parameters	Remarks
3-27-90	0730	MW-4 03	Water	1	1		
				1	2		
				1	4		
				1	4		Filtered
				6	11	2 replicates	
				1	15		

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Claud Rosendale		3-27-90	1430
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Claud Rosendale

Method of Shipment: Fed Ex. Airbill #

Received for Lab: RMAL Signed: [illegible] Date/Time 3/28/90 0800

Enseco Project No. 008847

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CHAIN OF CUSTODY

No.

Attn: Julie Essey

Enseco Client: Giant Refinery

Project: Spring Sampling

Sampling Co.: Cinizza

Sampling Site: Cinizza

Team Leader: Claud Rosendale

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: (Yes) No
3. Condition of Contents: good
4. Sealed for Shipping by: Claud Rosendale
5. Initial Contents Temp.: 50 °F Seal # _____
6. Sampling Status: (Done) Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description 8847	Sample Type	No. Containers	Bottle #	Analysis Parameters	Remarks
3-27-90	0915	MW-5 04	Water	1	1		
				1	2		
				1	4		
				1	4		Filtered
				6	11	2 replicates	
				1	15		

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Claud Rosendale		3-27-90	1430
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Claud Rosendale

Method of Shipment: Fed Ex. Airbill #: _____

Received for Lab: RMAL Signed: [illegible] Date/Time: 3/28/90 0800

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CHAIN OF CUSTODY

No.

Attn: Julie Essex

Enseco Client: Giant Refinery
Project: Spring Wells OCD & EID
Sampling Co.: Ginizo
Sampling Site: Ginizo
Team Leader: Claud Rosendale

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: (Yes) No
3. Condition of Contents: good
4. Sealed for Shipping by: Claud Rosendale
5. Initial Contents Temp.: 54 °F Seal # _____
6. Sampling Status: (Done) Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description 8847	Sample Type	No. Containers	Bottle #	Analysis Parameters	Remarks
3-22-90	1140	SMW-1 05	Water	1	1		
				1	2		
				1	4		
				1	4		Filtered
				3	11		
				1	15		

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Claud Rosendale		3-22-90	1430
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Claud Rosendale
Method of Shipment: Fed. Ex. Airbill #
Received for Lab: RMAL Signed: [illegible] Date/Time 3/23/90 0800
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CHAIN OF CUSTODY

No.

Attn: Julie Essey

Enseco Client: Giant Refining

Project: Spring wells OCD + EID

Sampling Co.: Cinizo

Sampling Site: Cinizo

Team Leader: Claud Rosendale

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: (Yes) No
3. Condition of Contents: good
4. Sealed for Shipping by: Claud Rosendale
5. Initial Contents Temp.: 53 °~~C~~F Seal # _____
6. Sampling Status: (Done) Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description 8847	Sample Type	No. Containers	Bottle #	Analysis Parameters	Remarks
3-27-90	1110	SMW-2 06	Water	1	1		
				1	2		
				1	4		
				1	4		filtered
				3	11		
				1	15		

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Claud Rosendale		3-27-90	1450
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Claud Rosendale

Method of Shipment: Fed EX Airbill #

Received for Lab: RMAL Signed: [illegible] Date/Time 3/28/90 0800

Enseco Project No. 008847

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CHAIN OF CUSTODY

No.

Attn: Julie Essey

Enseco Client: Giant Refining
Project: Spring Well OCD + EED
Sampling Co.: Cinizq
Sampling Site: Cinizq
Team Leader: Claud Rosendale

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: (Yes) No
3. Condition of Contents: good
4. Sealed for Shipping by: Claud Rosendale
5. Initial Contents Temp.: 52 °F Seal # _____
6. Sampling Status: (Done) Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description 8847	Sample Type	No. Containers	Bottle #	Analysis Parameters	Remarks
3-27-90	0830	SMW-3 07	Water	1	1		
				1	2		
				1	4		
				1	4		Filtered
				3	11		
				1	15		

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Claud Rosendale		3-27-90	1450
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Claud Rosendale
Method of Shipment: Fed Ex Airbill #: _____
Received for Lab: RMAL Signed: [illegible] Date/Time 03/28/90 0800
Enseco Project No. 008847

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Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No.

Attn: Julie Essey

Enseco Client: Giant Refining
Project: Spring Sampling
Sampling Co.: Cinizo
Sampling Site: Cinizo
Team Leader: Claud Rosendale

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: (Yes) No
3. Condition of Contents: good
4. Sealed for Shipping by: Claud Rosendale
5. Initial Contents Temp.: 52 °F Seal # _____
6. Sampling Status: (Done) Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description 8847	Sample Type	No. Containers	Bottle	Analysis Parameters	Remarks
3-27-90	1245	SMW-4 08	Water	1	1		
				1	2		
				1	4		
				1	4		Filtered
				3	11		
				1	15		

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Claud Rosendale		3-27	1450
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Claud Rosendale
Method of Shipment: Fed Ex Airbill #
Received for Lab: RMAL Signed: ~~03~~ AM [signature] Date/Time 03/28/90 0800
Enseco Project No. 008847

White and Pink Copies to Lab Yellow to Sampler SS-001

Enseco - Rocky Mountain Analytical

4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No.

Attn: Jake Essey

Enseco Client: Giant Refinery

Project: Spring well OCDO EED

Sampling Co.: Cinizo

Sampling Site: Cinizo

Team Leader: Claud Rosendale

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: (Yes) No
3. Condition of Contents: good
4. Sealed for Shipping by: Claud Rosendale
5. Initial Contents Temp.: 52 °~~F~~ Seal # _____
6. Sampling Status: (Done) Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description 8847	Sample Type	No. Containers	Bottle #	Analysis Parameters	Remarks
3-27-90	1220	SMW-5 09	Water	1	1		
				1	2		
				1	4		
				1	4		filtered
				3	11		
				1	15		

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Claud Rosendale		3-27-90	1450
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Claud Rosendale

Method of Shipment: Fed Ex.

Airbill #

Received for Lab: RMAL Signed: [illegible] Date/Time 3/28/90 0800

Enseco Project No. 008847

White and Pink Copies to Lab Yellow to Sampler

SS-001

Enseco - Rocky Mountain Analytical

4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No.

Attn: Julie Essey

Enseco Client: Giant Refinery
Project: Spring Well OCD + EED
Sampling Co.: Cizizg
Sampling Site: Cizizg
Team Leader: Chad Rosendale

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: (Yes) No
3. Condition of Contents: good
4. Sealed for Shipping by: Chad Rosendale
5. Initial Contents Temp.: 50 °F Seal # _____
6. Sampling Status: (Done) Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description 8847	Sample Type	No. Containers	Bottle #	Analysis Parameters	Remarks
3-27-90	1200	SMW-6 10	Water	1	1		
				1	2		
				1	4		
				1	4		Filtered
				3	11		
				1	15		

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Chad Rosendale		3-27-90	1450
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Chad Rosendale
Method of Shipment: Fed EX Airbill #
Received for Lab: RMAL Signed: [illegible] Date/Time 3/28/90 0800
Enseco Project No. 008847

White and Pink Copies to Lab Yellow to Sampler

SS-001

Enseco - Rocky Mountain Analytical

4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No.

Attn: Julie Essey

Enseco Client: Giant Refinery

Project: Sampling OCDD&EID

Sampling Co.: Cinizg

Sampling Site: Cinizg

Team Leader: Clay Rosendale

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: Yes (circled) No
3. Condition of Contents: good
4. Sealed for Shipping by: Clay Rosendale
5. Initial Contents Temp.: 51 °F Seal # _____
6. Sampling Status: Done (circled) Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description 8847	Sample Type	No. Containers	Bottle #	Analysis Parameters	Remarks
3-27-90	0800	~~Field Blank~~	Water	1	1		
		Duplicate 1 11		1	2		
				2	4		
				3	11		
				~~1~~	~~12~~		
				1	15		

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Clay Rosendale		3-27-90	1430
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Clay Rosendale

Method of Shipment: Fed. Ex Airbill #: _____

Received for Lab: Rural Signed: [illegible] Date/Time 3/28/90 0800

Enseco Project No. _____

White and Pink Copies to Lab Yellow to Sampler

SS-001

Rocky Mountain
Analytical Laboratory

Enseco

ANALYTICAL RESULTS

FOR

GIANT REFINING

ENSECO-RMAL NO. 011329

OCTOBER 22, 1990

Reviewed by: Julie Essey

Sue Dalla

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

Introduction

This report presents the analytical results as well as supporting information to aid in the evaluation and interpretation of the data and is arranged in the following order:

- Sample Description Information
- Analytical Test Requests
- Analytical Results
- Quality Control Report

All analyses at Enseco are performed so that the maximum concentration of sample consistent with the method is analyzed. Dilutions are at times required to avoid saturation of the detector, to achieve linearity for a specific target compound or to reduce matrix interferences. In this event, reporting limits are adjusted proportionately. Surrogate compounds may not be measurable in samples which have been diluted.

Due to interferences originating from non-target compounds, dilutions were performed for sample 011329-0001 by Method 8240. The reporting limits were raised accordingly.

For sample 011329-0010 by Method 8270, the compound bis(2-Ethylhexyl)phthlate was reported at 80 ug/L with a reporting limit of 10 ug/L. Because this is a common laboratory contaminant, the sample was reprepped and reanalyzed. The reanalysis produced a result of ND (not detected), thereby confirming laboratory contamination. Because the reprep was performed outside holding times, the original analysis was reported.

Metals Data Review

Enseco protocol states that samples analyzed by graphite furnace atomic absorption (GFAA), will have a spiked aliquot analyzed with each sample. If the spike recovery does not meet established criteria, the reporting limit for that analysis is raised proportionately. Poor spike recoveries of this type are typically due to interferences from the sample matrix.

In reviewing the GFAA metals data it is necessary to know what the nominal reporting limits are in order to determine whether or not those limits were raised due to matrix interference. The most common GFAA elements and their nominal reporting limits are listed in the table below. These are provided to facilitate the review of the GFAA metals data.

Common GFAA Elements

	Reporting Limit / Units			
Element	Aqueous (mg/L)	Soil (mg/kg)	Waste (mg/kg)	Leachate (mg/L)
Arsenic	0.005	0.5 **	0.5 **	0.05 **
Lead	0.005	0.5	0.5 **	0.05 **
Selenium	0.005	0.5	0.5	0.05
Thallium	0.005	0.5	0.5	0.05

** For the matrix listed, the preferred method for this element is by Method 6010

Mercury by cold vapor atomic absorption (CVAA), Method 245.1/7470/7471, and analytes performed by Method 200.7/6010 are not subject to the same type of interferences as GFAA metals and therefore do not require a spiked aliquot for each sample. The nominal reporting limits for analytes by these methods are given in the method blank report. Typically a raised reporting limit by these methods is also due to matrix interferences. However, for all methods mentioned here, a raised reporting limit may also be the result of target analyte concentrations or blank contamination.

Sample Description Information

The Sample Description Information lists all of the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Enseco - RMAL is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Test Requests

The Analytical Test Requests lists the analyses that were performed on each sample. The Custom Test column indicates where tests have been modified to conform to the specific requirements of this project.

Enseco
A Corning Company

SAMPLE DESCRIPTION INFORMATION
for
Giant Refining

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
011329-0001-SA	SMW-1	AQUEOUS	13 SEP 90	10:35	14 SEP 90
011329-0002-SA	SMW-2	AQUEOUS	13 SEP 90	10:55	14 SEP 90
011329-0003-SA	SMW-3	AQUEOUS	13 SEP 90	11:20	14 SEP 90
011329-0004-SA	SMW-4	AQUEOUS	13 SEP 90	11:35	14 SEP 90
011329-0005-SA	SMW-5	AQUEOUS	13 SEP 90	11:55	14 SEP 90
011329-0006-SA	SMW-6	AQUEOUS	13 SEP 90	09:55	14 SEP 90
011329-0007-SA	OW-1	AQUEOUS	13 SEP 90	08:50	14 SEP 90
011329-0008-SA	OW-2	AQUEOUS	13 SEP 90	09:15	14 SEP 90
011329-0009-SA	OW-3	AQUEOUS	13 SEP 90	09:35	14 SEP 90
011329-0010-SA	OW-11	AQUEOUS	13 SEP 90	08:00	14 SEP 90
011329-0011-SA	TRIP BLANK	AQUEOUS			14 SEP 90

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A Corning Company

ANALYTICAL TEST REQUESTS
for
Giant Refining

Lab ID: 011329	Group Code	Analysis Description	Custom Test?
0001 - 0006	A	pH	N
		Specific Conductance	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		ICP Metals (Total)	Y
		Prep - Total Metals, ICP	N
		Lead, Furnace AA (Total)	N
		Prep - Total Metals, Furnace AA	N
		Volatile Organics	Y
		Target Compound List (TCL)	Y
		Screen - Volatile Organics	N
0007 - 0008	B	pH	N
		Specific Conductance	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
0010	C	pH	N
		Specific Conductance	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		ICP Metals (Total)	Y
		Prep - Total Metals, ICP	N
		Lead, Furnace AA (Total)	N
		Prep - Total Metals, Furnace AA	N

ANALYTICAL TEST REQUESTS
for
Giant Refining

Lab ID: 011329	Group Code	Analysis Description	Custom Test?
		Mercury, Cold Vapor AA (Total)	N
		Prep - Mercury, Cold Vapor AA (Total)	N
		ICP Metals (Dissolved)	Y
		Arsenic, Furnace AA (Dissolved)	N
		Selenium, Furnace AA (Dissolved)	N
		Chloride, Ion Chromatography	N
		Sulfate, Ion Chromatography	N
		Alkalinity,	Y
		Total/Carbonate/Bicarbonate/Hydroxide	Y
		Total Dissolved Solids (TDS)	N
		Phenolics (4-AAP)	N
		Volatile Organics	Y
		Target Compound List (TCL)	Y
		Screen - Volatile Organics	N
		Semivolatile Organics	Y
		Refinery List	
		Prep - Semivolatile Organics by GC/MS	N
0011	D	Volatile Organics	Y
		Target Compound List (TCL)	Y
		Screen - Volatile Organics	N
0009	E	pH	N
		Specific Conductance	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N

Analytical Results

The analytical results for this project are presented in the following data tables. Each data table includes sample identification information, and when available and appropriate, dates sampled, received, authorized, prepared and analyzed. The authorization data is the date when the project was defined by the client such that laboratory work could begin.

Data sheets contain a listing of the parameters measured in each test, the analytical results and the Enseco reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e. no correction is made for moisture content.

Enseco-RMAL is no longer routinely blank-correcting analytical data. Uncorrected analytical results are reported, along with associated blank results, for all organic and metals analyses. Analytical results and blank results are reported for conventional inorganic parameters as specified in the method. This policy is described in detail in the Enseco Incorporated Quality Assurance Program Plan for Environmental Chemical Monitoring, Revision 3.3, May, 1989.

The results from the Standard Enseco QA/QC Program, which generates data which are independent of matrix effects, is provided subsequently.

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: SMW-1
Lab ID: 011329-0001-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: 17 SEP 90 Analyzed: 18 SEP 90

Parameter	Result	Units	Reporting Limit
Acetone	ND	ug/L	20
Benzene	ND	ug/L	10
Bromodichloromethane	ND	ug/L	10
Bromoform	ND	ug/L	10
Bromomethane	ND	ug/L	20
2-Butanone (MEK)	ND	ug/L	20
Carbon disulfide	ND	ug/L	10
Carbon tetrachloride	ND	ug/L	10
Chlorobenzene	ND	ug/L	10
Chloroethane	ND	ug/L	20
Chloroform	ND	ug/L	10
Chloromethane	ND	ug/L	20
Dibromochloromethane	ND	ug/L	10
1,1-Dichloroethane	ND	ug/L	10
1,2-Dichloroethane	ND	ug/L	10
1,1-Dichloroethene	ND	ug/L	10
1,2-Dichloroethene (total)	ND	ug/L	10
1,2-Dichloropropane	ND	ug/L	10
cis-1,3-Dichloropropene	ND	ug/L	10
trans-1,3-Dichloropropene	ND	ug/L	10
Ethylbenzene	ND	ug/L	10
2-Hexanone	ND	ug/L	20
Methylene chloride	ND	ug/L	10
4-Methyl-2-pentanone (MIBK)	ND	ug/L	20
Styrene	ND	ug/L	10
1,1,2,2-Tetrachloroethane	ND	ug/L	10
Tetrachloroethene	ND	ug/L	10
Toluene	ND	ug/L	10
1,1,1-Trichloroethane	ND	ug/L	10
1,1,2-Trichloroethane	ND	ug/L	10
Trichloroethene	ND	ug/L	10
Vinyl acetate	ND	ug/L	20
Vinyl chloride	ND	ug/L	20
Xylenes (total)	ND	ug/L	10
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	10
1,2-Dichlorobenzene	ND	ug/L	10
1,3-Dichlorobenzene	ND	ug/L	10
1,4-Dichlorobenzene	ND	ug/L	10

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Michael Blades Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: SMW-1
Lab ID: 011329-0001-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: 17 SEP 90 Analyzed: 18 SEP 90

Parameter	Result	Units	Reporting Limit
1,2-Dibromoethane (EDB)	ND	ug/L	10
2-Chloroethyl vinyl ether	ND	ug/L	20
Surrogate	**Recovery**		
Toluene-d8	100	%	--
4-Bromofluorobenzene	102	%	--
1,2-Dichloroethane-d4	97	%	--

ND = Not detected
NA = Not applicable

Reported By: Michael Blades Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: SMW-2
Lab ID: 011329-0002-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: 17 SEP 90 Analyzed: 18 SEP 90

Parameter	Result	Units	Reporting Limit
Acetone	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Dibromochloromethane	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
2-Hexanone	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Styrene	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Michael Blades Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: SMW-2
Lab ID: 011329-0002-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: 17 SEP 90 Analyzed: 18 SEP 90

Parameter	Result	Units	Reporting Limit
1,2-Dibromoethane (EDB)	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	10
Surrogate	**Recovery**		
Toluene-d8	102	%	--
4-Bromofluorobenzene	106	%	--
1,2-Dichloroethane-d4	99	%	--

ND = Not detected
NA = Not applicable

Reported By: Michael Blades Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: SMW-3
Lab ID: 011329-0003-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: 17 SEP 90 Analyzed: 18 SEP 90

Parameter	Result	Units	Reporting Limit
Acetone	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Dibromochloromethane	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
2-Hexanone	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Styrene	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Michael Blades Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: SMW-3
Lab ID: 011329-0003-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: 17 SEP 90 Analyzed: 18 SEP 90

Parameter	Result	Units	Reporting Limit
1,2-Dibromoethane (EDB)	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	10
Surrogate	**Recovery**		
Toluene-d8	104	%	--
4-Bromofluorobenzene	98	%	--
1,2-Dichloroethane-d4	94	%	--

ND = Not detected
NA = Not applicable

Reported By: Michael Blades Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: SMW-4
Lab ID: 011329-0004-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: 17 SEP 90 Analyzed: 18 SEP 90

Parameter	Result	Units	Reporting Limit
Acetone	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Dibromochloromethane	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
2-Hexanone	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Styrene	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Michael Blades Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: SMW-4
Lab ID: 011329-0004-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: 17 SEP 90 Analyzed: 18 SEP 90

Parameter	Result	Units	Reporting Limit
1,2-Dibromoethane (EDB)	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	10
Surrogate	**Recovery**		
Toluene-d8	103	%	--
4-Bromofluorobenzene	100	%	--
1,2-Dichloroethane-d4	100	%	--

ND = Not detected
NA = Not applicable

Reported By: Michael Blades Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: SMW-5
Lab ID: 011329-0005-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: 17 SEP 90 Analyzed: 18 SEP 90

Parameter	Result	Units	Reporting Limit
Acetone	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Dibromochloromethane	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
2-Hexanone	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Styrene	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Michael Blades Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: SMW-5
Lab ID: 011329-0005-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: 17 SEP 90 Analyzed: 18 SEP 90

Parameter	Result	Units	Reporting Limit
1,2-Dibromoethane (EDB)	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	10
Surrogate	**Recovery**		
Toluene-d8	104	%	--
4-Bromofluorobenzene	96	%	--
1,2-Dichloroethane-d4	100	%	--

ND = Not detected
NA = Not applicable

Reported By: Michael Blades Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: SMW-6
Lab ID: 011329-0006-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: 17 SEP 90 Analyzed: 18 SEP 90

Parameter	Result	Units	Reporting Limit
Acetone	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Dibromochloromethane	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
2-Hexanone	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Styrene	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Michael Blades Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: SMW-6
Lab ID: 011329-0006-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: 17 SEP 90 Analyzed: 18 SEP 90

Parameter	Result	Units	Reporting Limit
1,2-Dibromoethane (EDB)	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	10
Surrogate	**Recovery**		
Toluene-d8	103	%	--
4-Bromofluorobenzene	98	%	--
1,2-Dichloroethane-d4	95	%	--

ND = Not detected
NA = Not applicable

Reported By: Michael Blades Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: OW-11
Lab ID: 011329-0010-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: 17 SEP 90 Analyzed: 19 SEP 90

Parameter	Result	Units	Reporting Limit
Benzene	ND	ug/L	5.0
2-Butanone (MEK)	ND	ug/L	10
1,1-Dichloroethene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
Xylenes (total)	ND	ug/L	5.0

Surrogate	Recovery		
Toluene-d8	102	%	--
4-Bromofluorobenzene	96	%	--
1,2-Dichloroethane-d4	97	%	--

ND = Not detected
NA = Not applicable

Reported By: Michael Blades Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: TRIP BLANK
Lab ID: 011329-0011-SA
Matrix: AQUEOUS Sampled: Unknown Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: 17 SEP 90 Analyzed: 19 SEP 90

Parameter	Result	Units	Reporting Limit
Acetone	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Dibromochloromethane	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
2-Hexanone	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Styrene	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Tim Miller Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: TRIP BLANK
Lab ID: 011329-0011-SA
Matrix: AQUEOUS Sampled: Unknown Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: 17 SEP 90 Analyzed: 19 SEP 90

Parameter	Result	Units	Reporting Limit
1,2-Dibromoethane (EDB)	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	10
Surrogate	**Recovery**		
Toluene-d8	107	%	--
4-Bromofluorobenzene	100	%	--
1,2-Dichloroethane-d4	99	%	--

ND = Not detected
NA = Not applicable

Reported By: Tim Miller Approved By: Jeff Lowry

Enseco
A Corning Company

Semivolatile Organics
Refinery List
Method 8270

Client Name: Giant Refining
Client ID: OW-11
Lab ID: 011329-0010-SA
Matrix: AQUEOUS — Sampled: 13 SEP 90 — Received: 14 SEP 90
Authorized: 14 SEP 90 — Prepared: 15 SEP 90 — Analyzed: 01 OCT 90

Parameter	Result	Units	Reporting Limit
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
Chrysene	ND	ug/L	10
7,12-Dimethylbenz(a)-anthracene	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
bis(2-Ethylhexyl) phthalate	80	ug/L	10
Fluoranthene	ND	ug/L	10
1-Methylnaphthalene	ND	ug/L	10
2-Methylphenol	ND	ug/L	10
3/4-Methylphenol	ND	ug/L	10
Naphthalene	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Pyrene	ND	ug/L	10
2,4,6-Trichlorophenol	ND	ug/L	10
2-Chlorophenol	ND	ug/L	10

Surrogate	Recovery		
Nitrobenzene-d5	68	%	--
2-Fluorobiphenyl	70	%	--
Terphenyl-d14	85	%	--
Phenol-d5	73	%	--
2-Fluorophenol	66	%	--
2,4,6-Tribromophenol	84	%	--

ND = Not detected
NA = Not applicable

Reported By: Steve Siegel — Approved By: Jeff Lowry

Enseco
A Corning Company

Semivolatile Organics
Refinery List
Method 8270

Client Name: Giant Refining
Client ID: OW-11
Lab ID: 012009-0003-SA
Matrix: AQUEOUS
Authorized: 26 OCT 90

Sampled: 25 OCT 90
Prepared: 28 OCT 90

Received: 26 OCT 90
Analyzed: 05 NOV 90

Parameter	Result	Units	Reporting Limit
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
Chrysene	ND	ug/L	10
7,12-Dimethylbenz(a)-anthracene	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
Fluoranthene	ND	ug/L	10
1-Methylnaphthalene	ND	ug/L	10
2-Methylphenol	ND	ug/L	10
3/4-Methylphenol	ND	ug/L	10
Naphthalene	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Pyrene	ND	ug/L	10
2,4,6-Trichlorophenol	ND	ug/L	10
2-Chlorophenol	ND	ug/L	10

Surrogate	Recovery		
Nitrobenzene-d5	76	%	--
2-Fluorobiphenyl	77	%	--
Terphenyl-d14	88	%	--
Phenol-d5	85	%	--
2-Fluorophenol	80	%	--
2,4,6-Tribromophenol	93	%	--

Resample

ND = Not detected
NA = Not applicable

Reported By: Dan Albritton

Approved By: Jeff Lowry

Enseco
A Corning Company

Metals

Total Metals

Client Name: Giant Refining
Client ID: SMW-1
Lab ID: 011329-0001-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	0.030	mg/L	0.020	6010	03 OCT 90	05 OCT 90
Lead	ND	mg/L	0.050	7421	01 OCT 90	03 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Mark Brundege Approved By: Roxanne Sullivan

Enseco
A Corning Company

Metals

Total Metals

Client Name: Giant Refining
Client ID: SMW-2
Lab ID: 011329-0002-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	0.19	mg/L	0.020	6010	03 OCT 90	05 OCT 90
Lead	0.034	mg/L	0.025	7421	01 OCT 90	03 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Mark Brundege Approved By: Roxanne Sullivan

Enseco
A Corning Company

Metals

Total Metals

Client Name: Giant Refining
Client ID: SMW-3
Lab ID: 011329-0003-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	0.034	mg/L	0.010	6010	03 OCT 90	05 OCT 90
Lead	0.021	mg/L	0.0050	7421	01 OCT 90	03 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Mark Brundege Approved By: Roxanne Sullivan

Enseco
A Corning Company

Metals

Total Metals

Client Name: Giant Refining
Client ID: SMW-4
Lab ID: 011329-0004-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	0.019	mg/L	0.010	6010	03 OCT 90	05 OCT 90
Lead	0.015	mg/L	0.0050	7421	01 OCT 90	03 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Mark Brundege Approved By: Roxanne Sullivan

Enseco
A Corning Company

Metals

Total Metals

Client Name: Giant Refining
Client ID: SMW-5
Lab ID: 011329-0005-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	0.037	mg/L	0.010	6010	03 OCT 90	05 OCT 90
Lead	0.012	mg/L	0.0050	7421	01 OCT 90	03 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Mark Brundege Approved By: Roxanne Sullivan

Enseco
A Corning Company

Metals

Total Metals

Client Name: Giant Refining
Client ID: SMW-6
Lab ID: 011329-0006-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	0.11	mg/L	0.010	6010	03 OCT 90	05 OCT 90
Lead	0.026	mg/L	0.0050	7421	01 OCT 90	03 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Mark Brundege Approved By: Roxanne Sullivan

Enseco
A Corning Company

Metals

Total Metals

Client Name: Giant Refining
Client ID: OW-11
Lab ID: 011329-0010-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	ND	mg/L	0.010	6010	03 OCT 90	05 OCT 90
Lead	0.011	mg/L	0.0050	7421	01 OCT 90	03 OCT 90
Mercury	ND	mg/L	0.00020	7470	02 OCT 90	03 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Bill McCall Approved By: Toni Lusk

Enseco
A Corning Company

Metals

Dissolved Metals

Client Name: Giant Refining
Client ID: OW-11
Lab ID: 011329-0010-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic	ND	mg/L	0.010	7060	NA	12 OCT 90
Barium	0.018	mg/L	0.010	6010	NA	11 OCT 90
Cadmium	ND	mg/L	0.0050	6010	NA	11 OCT 90
Calcium	5.8	mg/L	0.20	6010	NA	11 OCT 90
Copper	ND	mg/L	0.020	6010	NA	11 OCT 90
Manganese	ND	mg/L	0.010	6010	NA	11 OCT 90
Nickel	ND	mg/L	0.040	6010	NA	11 OCT 90
Selenium	0.020	mg/L	0.010	7740	NA	12 OCT 90
Silver	ND	mg/L	0.010	6010	NA	11 OCT 90
Sodium	459	mg/L	5.0	6010	NA	11 OCT 90
Zinc	ND	mg/L	0.020	6010	NA	11 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Sandra Jones Approved By: Toni Lusk

Enseco
A Corning Company

General Inorganics

Client Name: Giant Refining
Client ID: SMW-1
Lab ID: 011329-0001-SA
Matrix: AQUEOUS
Authorized: 14 SEP 90

Sampled: 13 SEP 90
Prepared: See Below

Received: 14 SEP 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
pH	7.5	units	--	9040	NA	14 SEP 90
Specific Conductance at 25 deg.C	6140	umhos/cm	1.0	120.1	NA	14 SEP 90
Total Organic Carbon	10.1	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Carbon	10.2	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Carbon	10.2	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Carbon	10.1	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Halogen as Cl	47.9	ug/L	30.0	9020	NA	01 OCT 90
Total Organic Halogen as Cl	41.5	ug/L	30.0	9020	NA	01 OCT 90
Total Organic Halogen as Cl	52.5	ug/L	30.0	9020	NA	01 OCT 90
Total Organic Halogen as Cl	50.9	ug/L	30.0	9020	NA	01 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Dan Appelhans

Approved By: Toni Lusk

Enseco
A Corning Company

General Inorganics

Client Name: Giant Refining
Client ID: SMW-2
Lab ID: 011329-0002-SA
Matrix: AQUEOUS
Authorized: 14 SEP 90

Sampled: 13 SEP 90
Prepared: See Below

Received: 14 SEP 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
pH	7.7	units	--	9040	NA	14 SEP 90
Specific Conductance at 25 deg.C	7510	umhos/cm	1.0	120.1	NA	14 SEP 90
Total Organic Carbon	8.0	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Carbon	7.9	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Carbon	8.3	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Carbon	8.0	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Halogen as Cl	ND	ug/L	60.0	9020	NA	01 OCT 90
Total Organic Halogen as Cl	ND	ug/L	60.0	9020	NA	01 OCT 90
Total Organic Halogen as Cl	ND	ug/L	60.0	9020	NA	01 OCT 90
Total Organic Halogen as Cl	65.7	ug/L	60.0	9020	NA	01 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Dan Appelhans

Approved By: Toni Lusk

Enseco
A Corning Company

General Inorganics

Client Name: Giant Refining
Client ID: SMW-3
Lab ID: 011329-0003-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
pH	8.1	units	--	9040	NA	14 SEP 90
Specific Conductance at 25 deg.C	3300	umhos/cm	1.0	120.1	NA	14 SEP 90
Total Organic Carbon	2.7	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Carbon	2.8	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Carbon	2.9	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Carbon	2.6	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	01 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	01 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	01 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	01 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Dan Appelhans Approved By: Toni Lusk

Enseco
A Corning Company

General Inorganics

Client Name: Giant Refining
Client ID: SMW-4
Lab ID: 011329-0004-SA
Matrix: AQUEOUS
Authorized: 14 SEP 90

Sampled: 13 SEP 90
Prepared: See Below

Received: 14 SEP 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
pH	8.5	units	--	9040	NA	14 SEP 90
Specific Conductance at 25 deg.C	1240	umhos/cm	1.0	120.1	NA	14 SEP 90
Total Organic Carbon	0.76	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Carbon	0.82	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Carbon	0.73	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Carbon	0.75	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	01 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	01 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	01 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	01 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Dan Appelhans

Approved By: Toni Lusk

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General Inorganics

Client Name: Giant Refining
Client ID: SMW-5
Lab ID: 011329-0005-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
pH	8.7	units	--	9040	NA	14 SEP 90
Specific Conductance at 25 deg.C	1180	umhos/cm	1.0	120.1	NA	14 SEP 90
Total Organic Carbon	0.77	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Carbon	0.76	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Carbon	0.70	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Carbon	0.77	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	02 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	02 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	02 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	02 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Dan Appelhans Approved By: Toni Lusk

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General Inorganics

Client Name: Giant Refining
Client ID: SMW-6
Lab ID: 011329-0006-SA
Matrix: AQUEOUS Sampled: 13 SEP 90 Received: 14 SEP 90
Authorized: 14 SEP 90 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
pH	8.3	units	--	9040	NA	14 SEP 90
Specific Conductance at 25 deg.C	1770	umhos/cm	1.0	120.1	NA	14 SEP 90
Total Organic Carbon	0.92	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Carbon	0.96	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Carbon	0.97	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Carbon	0.70	mg/L	0.50	9060	NA	17 SEP 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	02 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	02 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	02 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	02 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Dan Appelhans Approved By: Toni Lusk

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General Inorganics

Client Name: Giant Refining
Client ID: OW-11
Lab ID: 011329-0010-SA
Matrix: AQUEOUS
Authorized: 14 SEP 90

Sampled: 13 SEP 90
Prepared: See Below

Received: 14 SEP 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Alkalinity, Bicarb. as CaCO3 at pH 4.5	424	mg/L	5.0	310.1	NA	14 SEP 90
Alkalinity, Carb. as CaCO3 at pH 8.3	14.5	mg/L	5.0	310.1	NA	14 SEP 90
Chloride	118	mg/L	3.0	300.0	NA	27 SEP 90
pH	8.4	units	--	9040	NA	14 SEP 90
Phenolics	0.022	mg/L	0.010	9065	NA	20 SEP 90
Sulfate	351	mg/L	5.0	300.0	NA	27 SEP 90
Specific Conductance at 25 deg.C	1990	umhos/cm	1.0	120.1	NA	14 SEP 90
Total Organic Carbon	4.4	mg/L	0.50	9060	NA	18 SEP 90
Total Organic Carbon	4.3	mg/L	0.50	9060	NA	18 SEP 90
Total Organic Carbon	4.3	mg/L	0.50	9060	NA	18 SEP 90
Total Organic Carbon	4.4	mg/L	0.50	9060	NA	18 SEP 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	02 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	02 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	02 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	02 OCT 90
Total Dissolved Solids	1220	mg/L	10.0	160.1	NA	18 SEP 90

ND = Not detected
NA = Not applicable

Reported By: Eileen Burke

Approved By: Toni Lusk

Quality Control Results

The Enseco laboratories operate under a vigorous QA/QC program designed to ensure the generation of scientifically valid, legally defensible data by monitoring every aspect of laboratory operations. Routine QA/QC procedures include the use of approved methodologies, independent verification of analytical standards, use of duplicate Laboratory Control Samples to assess the precision and accuracy of the methodology on a routine basis, and a rigorous system of data review.

In addition, the Enseco laboratories maintain a comprehensive set of certifications from both state and federal governmental agencies which require frequent analyses of blind audit samples. Enseco - Rocky Mountain Analytical Laboratory is certified by the EPA under the EPA/CLP program for both Organic and Inorganic analyses, under the USATHAMA (U.S. Army) program, by the Army Corps of Engineers, and the states of Colorado, New Jersey, New York, Utah, and Florida, among others.

The standard laboratory QC package is designed to:

1) establish a strong, cost-effective QC program that ensures the generation of scientifically valid, legally defensible data

2) assess the laboratory's performance of the analytical method using control limits generated with a well-defined matrix

3) establish clear-cut guidelines for acceptability of analytical data so that QC decisions can be made immediately at the bench, and

4) provide a standard set of reportables which assures the client of the quality of his data.

The Enseco QC program is based upon monitoring the precision and accuracy of an analytical method by analyzing a set of Duplicate Control Samples (DCS) at frequent, well-defined intervals. Each DCS is a well-characterized matrix which is spiked with target compounds at 5-100 times the reporting limit, depending upon the methodology being monitored. The purpose of the DCS is not to duplicate the sample matrix, but rather to provide an interference-free, homogeneous matrix from which to gather data to establish control limits. These limits are used to determine whether data generated by the laboratory on any given day is in control.

Control limits for accuracy (percent recovery) are based on the average, historical percent recovery +/- 3 standard deviation units. Control limits for precision (relative percent difference) range from 0 (identical duplicate DCS results) to the average, historical relative percent difference + 3 standard deviation units. These control limits are fairly narrow based on the consistency of the matrix being monitored and are updated on a quarterly basis.

For each batch of samples analyzed, an additional control measure is taken in the form of a Single Control Sample (SCS). The SCS consists of a control matrix that is spiked with either representative target compounds or surrogate compounds appropriate to the method being used. An SCS is prepared for each sample lot for which the DCS pair are not analyzed.

Accuracy for DCS and SCS is measured by Percent Recovery.

$$\% \text{ Recovery} = \frac{\text{Measured Concentration}}{\text{Actual Concentration}} \times 100$$

Precision for DCS is measured by Relative Percent Difference (RPD).

$$\text{RPD} = \frac{|\text{Measured Concentration DCS1} - \text{Measured Concentration DCS2}|}{(\text{Measured Concentration DCS1} + \text{Measured Concentration DCS2})/2} \times 100$$

All samples analyzed concurrently by the same test are assigned the same QC lot number. Projects which contain numerous samples, analyzed over several days, may have multiple QC lot numbers associated with each test. The QC information which follows includes a listing of the QC lot numbers associated with each of the samples reported, DCS and SCS (where applicable) recoveries from the QC lots associated with the samples, and control limits for these lots. The QC data is reported by test code, in the order that the tests are reported in the analytical results section of this report.

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QC LOT ASSIGNMENT REPORT
Volatile Organics by GC/MS

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
011329-0001-SA	AQUEOUS	624-A	18 SEP 90-H	18 SEP 90-H2
011329-0002-SA	AQUEOUS	624-A	18 SEP 90-H	18 SEP 90-H2
011329-0003-SA	AQUEOUS	624-A	18 SEP 90-H	18 SEP 90-H2
011329-0004-SA	AQUEOUS	624-A	18 SEP 90-H	18 SEP 90-H2
011329-0005-SA	AQUEOUS	624-A	18 SEP 90-H	18 SEP 90-H2
011329-0006-SA	AQUEOUS	624-A	18 SEP 90-H	18 SEP 90-H2
011329-0010-SA	AQUEOUS	624-A	18 SEP 90-H	18 SEP 90-H2
011329-0011-SA	AQUEOUS	624-A	16 SEP 90-B	18 SEP 90-B2

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DUPLICATE CONTROL SAMPLE REPORT
Volatile Organics by GC/MS

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: 624-A Matrix: AQUEOUS QC Lot: 18 SEP 90-H Concentration Units: ug/L								
1,1-Dichloroethene	50	54.5	53.9	54.2	108	61-145	1.1	14
Trichloroethene	50	57.0	53.5	55.2	111	71-120	6.3	14
Benzene	50	58.9	55.6	57.2	115	76-127	5.8	11
Toluene	50	59.7	55.5	57.6	115	76-125	7.3	13
Chlorobenzene	50	59.9	56.5	58.2	116	75-130	5.8	13
Category: 624-A Matrix: AQUEOUS QC Lot: 16 SEP 90-B Concentration Units: ug/L								
1,1-Dichloroethene	50	57.1	56.2	56.6	113	61-145	1.6	14
Trichloroethene	50	57.0	57.2	57.1	114	71-120	0.3	14
Benzene	50	59.9	61.2	60.6	121	76-127	2.1	11
Toluene	50	57.0	58.0	57.5	115	76-125	1.7	13
Chlorobenzene	50	61.3	63.1	62.2	124	75-130	2.9	13

Calculations are performed before rounding to avoid round-off errors in calculated results.

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SINGLE CONTROL SAMPLE REPORT
Volatile Organics by GC/MS

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Category: 624-A				
Matrix: AQUEOUS				
QC Lot: 18 SEP 90-H QC Run: 18 SEP 90-H2				
Concentration Units: ug/L				
1,2-Dichloroethane-d4	50.0	46.9	94	76-114
4-Bromofluorobenzene	50.0	48.6	97	86-115
Toluene-d8	50.0	51.0	102	88-110
Category: 624-A				
Matrix: AQUEOUS				
QC Lot: 16 SEP 90-B QC Run: 18 SEP 90-B2				
Concentration Units: ug/L				
1,2-Dichloroethane-d4	50.0	50.4	101	76-114
4-Bromofluorobenzene	50.0	48.5	97	86-115
Toluene-d8	50.0	51.0	102	88-110

Calculations are performed before rounding to avoid round-off errors in calculated results.

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METHOD BLANK REPORT
Volatile Organics by GC/MS

Test: 8240CP-TCL-AP
Matrix: AQUEOUS
QC Lot: 18 SEP 90-H QC Run: 18 SEP 90-H2

Analyte	Result	Units	Reporting Limit
Acetone	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Dibromochloromethane	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
2-Hexanone	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Styrene	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0

METHOD BLANK REPORT
Volatile Organics by GC/MS (cont.)

Analyte	Result	Units	Reporting Limit
Test: 8240CP-TCL-AP Matrix: AQUEOUS QC Lot: 18 SEP 90-H QC Run: 18 SEP 90-H2			
1,2-Dibromoethane (EDB)	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	10
Test: 8240CP-TCL-AP Matrix: AQUEOUS QC Lot: 18 SEP 90-H QC Run: 18 SEP 90-H2			
Benzene	ND	ug/L	5.0
2-Butanone (MEK)	ND	ug/L	10
1,1-Dichloroethene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
Xylenes (total)	ND	ug/L	5.0
Test: 8240CP-TCL-AP Matrix: AQUEOUS QC Lot: 16 SEP 90-B QC Run: 18 SEP 90-B2			
Acetone	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Dibromochloromethane	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0

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METHOD BLANK REPORT
Volatile Organics by GC/MS (cont.)

Test: 8240CP-TCL-AP
Matrix: AQUEOUS
QC Lot: 16 SEP 90-B QC Run: 18 SEP 90-B2

Analyte	Result	Units	Reporting Limit
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
2-Hexanone	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Styrene	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0
1,2-Dibromoethane (EDB)	ND	ug/L	5.0
2-Chloroethyl vinyl ether	ND	ug/L	10

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QC LOT ASSIGNMENT REPORT
Semivolatile Organics by GC/MS

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
011329-0010-SA	AQUEOUS	625-A	15 SEP 90-A	15 SEP 90-A

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DUPLICATE CONTROL SAMPLE REPORT
Semivolatile Organics by GC/MS

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
Category: 625-A								
Matrix: AQUEOUS								
QC Lot: 15 SEP 90-A								
Concentration Units: ug/L								
Phenol	100	81.9	81.1	81.5	82	12- 89	1.0	42
2-Chlorophenol	100	73.5	73.5	73.5	74	27-123	0.0	40
1,4-Dichlorobenzene	50	32.4	35.2	33.8	68	36- 97	8.3	28
N-Nitroso-di-n-propylamine	50	42.5	45.7	44.1	88	41-116	7.3	38
1,2,4-Trichlorobenzene	50	33.2	36.8	35.0	70	39- 98	10	28
4-Chloro-3-methylphenol	100	71.9	68.6	70.2	70	23- 97	4.7	42
Acenaphthene	50	34.6	37.7	36.2	72	46-118	8.6	31
4-Nitrophenol	100	69.8	67.4	68.6	69	10- 80	3.5	50
2,4-Dinitrotoluene	50	38.8	43.4	41.1	82	24- 96	11	38
Pentachlorophenol	100	75.4	75.5	75.4	75	9-103	0.1	50
Pyrene	50	37.8	41.6	39.7	79	26-127	9.6	31

Calculations are performed before rounding to avoid round-off errors in calculated results.

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SINGLE CONTROL SAMPLE REPORT
Semivolatile Organics by GC/MS

Category: 625-A
Matrix: AQUEOUS
QC Lot: 15 SEP 90-A QC Run: 15 SEP 90-A
Concentration Units: ug/L

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Nitrobenzene-d5	100	65.2	65	35-114
2-Fluorobiphenyl	100	66.8	67	43-116
Terphenyl-d14	100	79.5	80	33-141
2-Fluorophenol	200	115	58	21-100
Phenol-d5	200	144	72	10- 94
2,4,6-Tribromophenol	200	121	60	10-123

Calculations are performed before rounding to avoid round-off errors in calculated results.

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METHOD BLANK REPORT
Semivolatile Organics by GC/MS

Test: 8270CP-REF-A
Matrix: AQUEOUS
QC Lot: 15 SEP 90-A QC Run: 15 SEP 90-A

Analyte	Result	Units	Reporting Limit
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
Chrysene	ND	ug/L	10
7,12-Dimethylbenz(a)-anthracene	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
Fluoranthene	ND	ug/L	10
1-Methylnaphthalene	ND	ug/L	10
2-Methylphenol	ND	ug/L	10
3/4-Methylphenol	ND	ug/L	10
Naphthalene	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Pyrene	ND	ug/L	10
2,4,6-Trichlorophenol	ND	ug/L	10
2-Chlorophenol	ND	ug/L	10

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QC LOT ASSIGNMENT REPORT
Metals Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
011329-0001-SA	AQUEOUS	ICP-AT	03 OCT 90-A	03 OCT 90-A
011329-0001-SA	AQUEOUS	PB-FAA-AT	01 OCT 90-Z	01 OCT 90-Z
011329-0002-SA	AQUEOUS	ICP-AT	03 OCT 90-A	03 OCT 90-A
011329-0002-SA	AQUEOUS	PB-FAA-AT	01 OCT 90-Z	01 OCT 90-Z
011329-0003-SA	AQUEOUS	ICP-AT	03 OCT 90-A	03 OCT 90-A
011329-0003-SA	AQUEOUS	PB-FAA-AT	01 OCT 90-Z	01 OCT 90-Z
011329-0004-SA	AQUEOUS	ICP-AT	03 OCT 90-A	03 OCT 90-A
011329-0004-SA	AQUEOUS	PB-FAA-AT	01 OCT 90-Z	01 OCT 90-Z
011329-0005-SA	AQUEOUS	ICP-AT	03 OCT 90-A	03 OCT 90-A
011329-0005-SA	AQUEOUS	PB-FAA-AT	01 OCT 90-Z	01 OCT 90-Z
011329-0006-SA	AQUEOUS	ICP-AT	03 OCT 90-A	03 OCT 90-A
011329-0006-SA	AQUEOUS	PB-FAA-AT	01 OCT 90-Z	01 OCT 90-Z
011329-0010-SA	AQUEOUS	SE-FAA-AD	12 OCT 90-A	-
011329-0010-SA	AQUEOUS	AS-FAA-AD	12 OCT 90-A	-
011329-0010-SA	AQUEOUS	ICP-AD	11 OCT 90-A	-
011329-0010-SA	AQUEOUS	ICP-AT	03 OCT 90-A	03 OCT 90-A
011329-0010-SA	AQUEOUS	PB-FAA-AT	01 OCT 90-Z	01 OCT 90-Z
011329-0010-SA	AQUEOUS	HG-CVAA-AT	02 OCT 90-A	02 OCT 90-A

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DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
Category: ICP-AT Matrix: AQUEOUS QC Lot: 03 OCT 90-A Concentration Units: mg/L								
Aluminum	2.0	1.86	1.88	1.87	94	75-125	1.0	20
Antimony	0.5	0.464	0.471	0.467	93	75-125	1.5	20
Arsenic	0.5	0.461	0.467	0.464	93	75-125	1.2	20
Barium	2.0	1.84	1.86	1.85	92	75-125	0.8	20
Beryllium	0.05	0.0460	0.0458	0.0459	92	75-125	0.3	20
Cadmium	0.05	0.0401	0.0461	0.0431	86	75-125	14	20
Calcium	100	92.3	90.6	91.4	91	75-125	1.9	20
Chromium	0.2	0.192	0.189	0.191	95	75-125	1.2	20
Cobalt	0.5	0.451	0.449	0.450	90	75-125	0.6	20
Copper	0.25	0.235	0.235	0.235	94	75-125	0.4	20
Iron	1.0	0.960	1.00	0.981	98	75-125	4.2	20
Lead	0.5	0.452	0.454	0.453	91	75-125	0.4	20
Magnesium	50	45.6	44.8	45.2	90	75-125	1.8	20
Manganese	0.5	0.456	0.457	0.456	91	75-125	0.2	20
Nickel	0.5	0.464	0.462	0.463	93	75-125	0.4	20
Potassium	50	41.9	41.2	41.6	83	75-125	1.7	20
Silver	0.05	0.0477	0.0488	0.0483	97	75-125	2.4	20
Sodium	100	87.9	86.0	86.9	87	75-125	2.2	20
Vanadium	0.5	0.479	0.482	0.480	96	75-125	0.6	20
Zinc	0.5	0.451	0.456	0.453	91	75-125	1.2	20
Category: PB-FAA-AT Matrix: AQUEOUS QC Lot: 01 OCT 90-Z Concentration Units: mg/L								
Lead	0.02	0.0218	0.0186	0.0202	101	75-125	16	20
Category: SE-FAA-AD Matrix: AQUEOUS QC Lot: 12 OCT 90-A Concentration Units: mg/L								
Selenium	0.01	0.00830	0.00950	0.00890	89	75-125	13	20

Calculations are performed before rounding to avoid round-off errors in calculated results.

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A Corning Company

DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation (cont.)

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
Category: AS-FAA-AD Matrix: AQUEOUS QC Lot: 12 OCT 90-A Concentration Units: mg/L								
Arsenic	0.04	0.0359	0.0389	0.0374	94	75-125	8.0	20
Category: ICP-AD Matrix: AQUEOUS QC Lot: 11 OCT 90-A Concentration Units: mg/L								
Aluminum	2.0	2.00	1.98	1.99	100	75-125	0.9	20
Antimony	0.5	0.485	0.479	0.482	96	75-125	1.2	20
Arsenic	0.5	0.485	0.480	0.482	96	75-125	1.1	20
Barium	2.0	1.96	1.95	1.95	98	75-125	0.3	20
Beryllium	0.05	0.0499	0.0495	0.0497	99	75-125	0.8	20
Cadmium	0.05	0.0446	0.0451	0.0448	90	75-125	1.3	20
Calcium	100	100	99.7	99.9	100	75-125	0.3	20
Chromium	0.2	0.201	0.201	0.201	100	75-125	0.4	20
Cobalt	0.5	0.484	0.480	0.482	96	75-125	0.9	20
Copper	0.25	0.251	0.253	0.252	101	75-125	0.9	20
Iron	1.0	1.19	1.18	1.19	119	75-125	0.6	20
Lead	0.5	0.479	0.485	0.482	96	75-125	1.2	20
Magnesium	50	49.4	49.4	49.4	99	75-125	0.2	20
Manganese	0.5	0.487	0.482	0.484	97	75-125	1.0	20
Nickel	0.5	0.483	0.481	0.482	96	75-125	0.5	20
Potassium	50	49.3	49.0	49.1	98	75-125	0.7	20
Silver	0.05	0.0480	0.0476	0.0478	96	75-125	0.8	20
Sodium	100	101	100	100	100	75-125	1.0	20
Vanadium	0.5	0.507	0.506	0.507	101	75-125	0.2	20
Zinc	0.5	0.481	0.481	0.481	96	75-125	0.0	20
Category: HG-CVAA-AT Matrix: AQUEOUS QC Lot: 02 OCT 90-A Concentration Units: mg/L								
Mercury	0.0010	0.00103	0.00103	0.00103	103	75-125	0.0	20

Calculations are performed before rounding to avoid round-off errors in calculated results.

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METHOD BLANK REPORT
Metals Analysis and Preparation

Analyte	Result	Units	Reporting Limit
Test: ICP-AT Matrix: AQUEOUS QC Lot: 03 OCT 90-A QC Run: 03 OCT 90-A			
Chromium	ND	mg/L	0.010
Test: PB-FAA-AT Matrix: AQUEOUS QC Lot: 01 OCT 90-Z QC Run: 01 OCT 90-Z			
Lead	ND	mg/L	0.0050
Test: ICP-AT Matrix: AQUEOUS QC Lot: 03 OCT 90-A QC Run: 03 OCT 90-A			
Chromium	ND	mg/L	0.010
Test: PB-FAA-AT Matrix: AQUEOUS QC Lot: 01 OCT 90-Z QC Run: 01 OCT 90-Z			
Lead	ND	mg/L	0.0050
Test: HG-CVAA-AT Matrix: AQUEOUS QC Lot: 02 OCT 90-A QC Run: 02 OCT 90-A			
Mercury	ND	mg/L	0.00020

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QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
011329-0001-SA	AQUEOUS	PH-A	14 SEP 90-A	-
011329-0001-SA	AQUEOUS	COND-A	14 SEP 90-A	-
011329-0001-SA	AQUEOUS	TOC-A	17 SEP 90-B	-
011329-0001-SA	AQUEOUS	TOC-A	17 SEP 90-B	-
011329-0001-SA	AQUEOUS	TOC-A	17 SEP 90-B	-
011329-0001-SA	AQUEOUS	TOC-A	17 SEP 90-B	-
011329-0001-SA	AQUEOUS	TOX-A	01 OCT 90-A	-
011329-0001-SA	AQUEOUS	TOX-A	01 OCT 90-A	-
011329-0001-SA	AQUEOUS	TOX-A	01 OCT 90-A	-
011329-0001-SA	AQUEOUS	TOX-A	01 OCT 90-A	-
011329-0002-SA	AQUEOUS	PH-A	14 SEP 90-A	-
011329-0002-SA	AQUEOUS	COND-A	14 SEP 90-A	-
011329-0002-SA	AQUEOUS	TOC-A	17 SEP 90-B	-
011329-0002-SA	AQUEOUS	TOC-A	17 SEP 90-B	-
011329-0002-SA	AQUEOUS	TOC-A	17 SEP 90-B	-
011329-0002-SA	AQUEOUS	TOC-A	17 SEP 90-B	-
011329-0002-SA	AQUEOUS	TOX-A	01 OCT 90-A	-
011329-0002-SA	AQUEOUS	TOX-A	01 OCT 90-A	-
011329-0002-SA	AQUEOUS	TOX-A	01 OCT 90-A	-
011329-0002-SA	AQUEOUS	TOX-A	01 OCT 90-A	-
011329-0003-SA	AQUEOUS	PH-A	14 SEP 90-A	-
011329-0003-SA	AQUEOUS	COND-A	14 SEP 90-A	-
011329-0003-SA	AQUEOUS	TOC-A	17 SEP 90-B	-
011329-0003-SA	AQUEOUS	TOC-A	17 SEP 90-B	-
011329-0003-SA	AQUEOUS	TOC-A	17 SEP 90-B	-
011329-0003-SA	AQUEOUS	TOC-A	17 SEP 90-B	-
011329-0003-SA	AQUEOUS	TOX-A	01 OCT 90-A	-
011329-0003-SA	AQUEOUS	TOX-A	01 OCT 90-A	-
011329-0003-SA	AQUEOUS	TOX-A	01 OCT 90-A	-
011329-0003-SA	AQUEOUS	TOX-A	01 OCT 90-A	-
011329-0004-SA	AQUEOUS	PH-A	14 SEP 90-A	-
011329-0004-SA	AQUEOUS	COND-A	14 SEP 90-A	-
011329-0004-SA	AQUEOUS	TOC-A	17 SEP 90-B	-
011329-0004-SA	AQUEOUS	TOC-A	17 SEP 90-B	-
011329-0004-SA	AQUEOUS	TOC-A	17 SEP 90-B	-
011329-0004-SA	AQUEOUS	TOC-A	17 SEP 90-B	-
011329-0004-SA	AQUEOUS	TOX-A	01 OCT 90-A	-
011329-0004-SA	AQUEOUS	TOX-A	01 OCT 90-A	-
011329-0004-SA	AQUEOUS	TOX-A	01 OCT 90-A	-
011329-0004-SA	AQUEOUS	TOX-A	01 OCT 90-A	-
011329-0005-SA	AQUEOUS	PH-A	14 SEP 90-A	-
011329-0005-SA	AQUEOUS	COND-A	14 SEP 90-A	-
011329-0005-SA	AQUEOUS	TOC-A	17 SEP 90-B	-
011329-0005-SA	AQUEOUS	TOC-A	17 SEP 90-C	-
011329-0005-SA	AQUEOUS	TOC-A	17 SEP 90-C	-
011329-0005-SA	AQUEOUS	TOC-A	17 SEP 90-C	-
011329-0005-SA	AQUEOUS	TOX-A	02 OCT 90-A	-

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QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation (cont.)

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
011329-0005-SA	AQUEOUS	TOX-A	02 OCT 90-A	-
011329-0005-SA	AQUEOUS	TOX-A	02 OCT 90-A	-
011329-0005-SA	AQUEOUS	TOX-A	02 OCT 90-A	-
011329-0006-SA	AQUEOUS	PH-A	14 SEP 90-A	-
011329-0006-SA	AQUEOUS	COND-A	14 SEP 90-A	-
011329-0006-SA	AQUEOUS	TOC-A	17 SEP 90-C	-
011329-0006-SA	AQUEOUS	TOC-A	17 SEP 90-C	-
011329-0006-SA	AQUEOUS	TOC-A	17 SEP 90-C	-
011329-0006-SA	AQUEOUS	TOC-A	17 SEP 90-C	-
011329-0006-SA	AQUEOUS	TOX-A	02 OCT 90-A	-
011329-0006-SA	AQUEOUS	TOX-A	02 OCT 90-A	-
011329-0006-SA	AQUEOUS	TOX-A	02 OCT 90-A	-
011329-0006-SA	AQUEOUS	TOX-A	02 OCT 90-A	-
011329-0007-SA	AQUEOUS	PH-A	14 SEP 90-A	-
011329-0007-SA	AQUEOUS	COND-A	14 SEP 90-A	-
011329-0007-SA	AQUEOUS	TOC-A	17 SEP 90-C	-
011329-0007-SA	AQUEOUS	TOC-A	17 SEP 90-C	-
011329-0007-SA	AQUEOUS	TOC-A	17 SEP 90-C	-
011329-0007-SA	AQUEOUS	TOC-A	17 SEP 90-C	-
011329-0007-SA	AQUEOUS	TOX-A	02 OCT 90-A	-
011329-0007-SA	AQUEOUS	TOX-A	02 OCT 90-A	-
011329-0007-SA	AQUEOUS	TOX-A	02 OCT 90-A	-
011329-0007-SA	AQUEOUS	TOX-A	02 OCT 90-A	-
011329-0008-SA	AQUEOUS	PH-A	14 SEP 90-A	-
011329-0008-SA	AQUEOUS	COND-A	14 SEP 90-A	-
011329-0008-SA	AQUEOUS	TOC-A	18 SEP 90-A	-
011329-0008-SA	AQUEOUS	TOC-A	18 SEP 90-A	-
011329-0008-SA	AQUEOUS	TOC-A	18 SEP 90-A	-
011329-0008-SA	AQUEOUS	TOC-A	18 SEP 90-A	-
011329-0008-SA	AQUEOUS	TOX-A	02 OCT 90-A	-
011329-0008-SA	AQUEOUS	TOX-A	02 OCT 90-A	-
011329-0008-SA	AQUEOUS	TOX-A	02 OCT 90-A	-
011329-0008-SA	AQUEOUS	TOX-A	02 OCT 90-A	-
011329-0009-SA	AQUEOUS	PH-A	14 SEP 90-A	-
011329-0009-SA	AQUEOUS	COND-A	14 SEP 90-A	-
011329-0009-SA	AQUEOUS	TOC-A	18 SEP 90-A	-
011329-0009-SA	AQUEOUS	TOC-A	18 SEP 90-A	-
011329-0009-SA	AQUEOUS	TOC-A	18 SEP 90-A	-
011329-0009-SA	AQUEOUS	TOC-A	18 SEP 90-A	-
011329-0010-SA	AQUEOUS	PHEN-A	20 SEP 90-A	20 SEP 90-A
011329-0010-SA	AQUEOUS	TDS-A	18 SEP 90-A	18 SEP 90-A
011329-0010-SA	AQUEOUS	ALK-A	14 SEP 90-A	-
011329-0010-SA	AQUEOUS	SO4-IC-A	27 SEP 90-M	-
011329-0010-SA	AQUEOUS	CL-IC-A	27 SEP 90-M	-
011329-0010-SA	AQUEOUS	PH-A	14 SEP 90-A	-
011329-0010-SA	AQUEOUS	COND-A	14 SEP 90-A	-
011329-0010-SA	AQUEOUS	TOC-A	18 SEP 90-A	-

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QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation (cont.)

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
011329-0010-SA	AQUEOUS	TOC-A	18 SEP 90-A	-
011329-0010-SA	AQUEOUS	TOC-A	18 SEP 90-A	-
011329-0010-SA	AQUEOUS	TOC-A	18 SEP 90-A	-
011329-0010-SA	AQUEOUS	TOX-A	02 OCT 90-A	-
011329-0010-SA	AQUEOUS	TOX-A	02 OCT 90-A	-
011329-0010-SA	AQUEOUS	TOX-A	02 OCT 90-A	-
011329-0010-SA	AQUEOUS	TOX-A	02 OCT 90-A	-

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DUPLICATE CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: PH-A Matrix: AQUEOUS QC Lot: 14 SEP 90-A Concentration Units: units								
pH	9.1	9.00	9.01	9.00	99	98-102	0.1	5
Category: COND-A Matrix: AQUEOUS QC Lot: 14 SEP 90-A Concentration Units: umhos/cm								
Specific Conductance at 25 deg.C	1070	1050	1060	1060	99	95-105	0.9	20
Category: TOC-A Matrix: AQUEOUS QC Lot: 17 SEP 90-B Concentration Units: mg/L								
Total Organic Carbon	25	26.0	25.8	25.9	104	91-109	0.8	20
Category: TOX-A Matrix: AQUEOUS QC Lot: 01 OCT 90-A Concentration Units: ug Cl/L								
Total Organic Halogen as Cl	100	104	100	102	102	80-120	3.9	20
Category: TOC-A Matrix: AQUEOUS QC Lot: 17 SEP 90-C Concentration Units: mg/L								
Total Organic Carbon	25.0	25.3	25.2	25.2	101	91-109	0.4	20

Calculations are performed before rounding to avoid round-off errors in calculated results.

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DUPLICATE CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation (cont.)

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
Category: TOX-A Matrix: AQUEOUS QC Lot: 02 OCT 90-A Concentration Units: ug Cl/L								
Total Organic Halogen as Cl	100	104	107	106	106	80-120	2.8	20
Category: TOC-A Matrix: AQUEOUS QC Lot: 18 SEP 90-A Concentration Units: mg/L								
Total Organic Carbon	25	25.8	25.8	25.8	103	91-109	0.3	20
Category: PHEN-A Matrix: AQUEOUS QC Lot: 20 SEP 90-A Concentration Units: mg/L								
Phenolics	0.20	0.224	0.230	0.227	114	78-122	2.6	20
Category: TDS-A Matrix: AQUEOUS QC Lot: 18 SEP 90-A Concentration Units: mg/L								
Total Dissolved Solids	834	784	780	782	94	90-110	0.5	10
Category: ALK-A Matrix: AQUEOUS QC Lot: 14 SEP 90-A Concentration Units: mg/L								
Alkalinity, Total as CaCO3 at pH 4.5	148	152	146	149	101	90-110	4.0	10

Calculations are performed before rounding to avoid round-off errors in calculated results.

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DUPLICATE CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation (cont.)

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: SO4-IC-A Matrix: AQUEOUS QC Lot: 27 SEP 90-M Concentration Units: mg/L								
Sulfate	200	205	200	202	101	93-107	2.5	20
Category: CL-IC-A Matrix: AQUEOUS QC Lot: 27 SEP 90-M Concentration Units: mg/L								
Chloride	100	101	97.8	99.4	99	92-108	3.2	20

Calculations are performed before rounding to avoid round-off errors in calculated results.

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METHOD BLANK REPORT
Wet Chemistry Analysis and Preparation

Analyte	Result	Units	Reporting Limit
Test: PHEN-SPEC-A Matrix: AQUEOUS QC Lot: 20 SEP 90-A QC Run: 20 SEP 90-A			
Phenolics	ND	mg/L	0.010
Test: TDS-BAL-A Matrix: AQUEOUS QC Lot: 18 SEP 90-A QC Run: 18 SEP 90-A			
Total Dissolved Solids	ND	mg/L	10.0

Appendix

Enseco - Rocky Mountain Analytical

4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No.

Attn: Julie Essex

Enseco Client: Giant Refining Co
Project: Semi annual Well
Sampling Co.: Giant Refining Co
Sampling Site: Ciniza Refinery
Team Leader: Claud Rosendale
RMAL # 11329

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: (Yes) No
3. Condition of Contents: Good
4. Sealed for Shipping by: C. Rosendale
5. Initial Contents Temp.: – °C Seal # –
6. Sampling Status: (Done) Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

#	Date	Time	Sample ID/Description	Sample Type	No. Containers	Analysis Parameters	Remarks
01	9/13/90	1035	SMW-1	Water	1 - #1	pH, Conductance	
					1 - #2	Total Organic Carbon	4 replicates
					1 - #4	Total Chromium, Total Lead	
					3 - #11	TCL Volatile Organics	See Attached
					1 - #15	TOX	4 replicates
02	9/13/90	1055	SMW-2	Water	1 - #1	pH, Conductance	
					1 - #2	Total Organic Carbon	4 replicates
					1 - #4	Total Chromium, Total Lead	
					3 - #11	TCL Volatile Organics	See Attached
					1 - #15	TOX	4 replicates

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Claud Rosendale		9/13/90	1400
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Claud Rosendale
Method of Shipment: Federal Express Airbill # _____
Received for Lab: RMAL Signed: Bob Reitz Date/Time 14 SEP 90, 0800 hrs
Enseco Project No. 11329

White and Pink Copies to Lab Yellow to Sampler

SS-001

Rocky Mountain
Analytical Laboratory

Enseco

ANALYTICAL RESULTS

FOR

GIANT REFINING

ENSECO-RMAL NO. 011629

NOVEMBER 15, 1990

Reviewed by: J A Essey
Julie Essey

Susan C Wyatt for
Sue Dalla

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

Introduction

This report presents the analytical results as well as supporting information to aid in the evaluation and interpretation of the data and is arranged in the following order:

- Sample Description Information
- Analytical Test Requests
- Analytical Results
- Quality Control Report

Because of sediment present in the TOX bottles for samples 011629-0001 through 0003, the samples were decanted prior to analysis.

Metals Data Review

Enseco protocol states that samples analyzed by graphite furnace atomic absorption (GFAA), will have a spiked aliquot analyzed with each sample. If the spike recovery does not meet established criteria, the reporting limit for that analysis is raised proportionately. Poor spike recoveries of this type are typically due to interferences from the sample matrix.

In reviewing the GFAA metals data it is necessary to know what the nominal reporting limits are in order to determine whether or not those limits were raised due to matrix interference. The most common GFAA elements and their nominal reporting limits are listed in the table below. These are provided to facilitate the review of the GFAA metals data.

Common GFAA Elements

	Reporting Limit / Units			
Element	Aqueous (mg/L)	Soil (mg/kg)	Waste (mg/kg)	Leachate (mg/L)
Arsenic	0.005	0.5 **	0.5 **	0.05 **
Lead	0.005	0.5	0.5 **	0.05 **
Selenium	0.005	0.5	0.5	0.05
Thallium	0.005	0.5	0.5	0.05

** For the matrix listed, the preferred method for this element is by Method 6010

Mercury by cold vapor atomic absorption (CVAA), Method 245.1/7470/7471, and analytes performed by Method 200.7/6010 are not subject to the same type of interferences as GFAA metals and therefore do not require a spiked aliquot for each sample. The nominal reporting limits for analytes by these methods are given in the method blank report. Typically a raised reporting limit by these methods is also due to matrix interferences. However, for all methods mentioned here, a raised reporting limit may also be the result of target analyte concentrations or blank contamination.

Sample Description Information

The Sample Description Information lists all of the samples received in this project together with the internal laboratory identification number assigned for each sample. Each project received at Enseco - RMAL is assigned a unique six digit number. Samples within the project are numbered sequentially. The laboratory identification number is a combination of the six digit project code and the sample sequence number.

Also given in the Sample Description Information is the Sample Type (matrix), Date of Sampling (if known) and Date of Receipt at the laboratory.

Analytical Test Requests

The Analytical Test Requests lists the analyses that were performed on each sample. The Custom Test column indicates where tests have been modified to conform to the specific requirements of this project.

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A Corning Company

SAMPLE DESCRIPTION INFORMATION
for
Giant Refining

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
011629-0001-SA	MW-1	AQUEOUS	02 OCT 90	08:45	03 OCT 90
011629-0002-SA	MW-2	AQUEOUS	02 OCT 90	09:30	03 OCT 90
011629-0003-SA	MW-4	AQUEOUS	02 OCT 90	10:40	03 OCT 90
011629-0004-SA	MW-5	AQUEOUS	02 OCT 90	10:10	03 OCT 90
011629-0005-SA	OW-3	AQUEOUS	02 OCT 90	08:15	03 OCT 90
011629-0006-SA	Trip Blank	AQUEOUS			03 OCT 90

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ANALYTICAL TEST REQUESTS
for
Giant Refining

Lab ID: 011629	Group Code	Analysis Description	Custom Test?
0001 - 0004	A	pH	N
		Specific Conductance	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Carbon (TOC)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		ICP Metals (Total)	Y
		Prep - Total Metals, ICP	N
		Lead, Furnace AA (Total)	N
		Prep - Total Metals, Furnace AA	N
		Volatile Organics	Y
		Target Compound List (TCL)	Y
		Screen - Volatile Organics	N
0005	B	Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
		Total Organic Halogen (TOX)	N
0006	C	Volatile Organics	Y
		Target Compound List (TCL)	Y
		Screen - Volatile Organics	N

Analytical Results

The analytical results for this project are presented in the following data tables. Each data table includes sample identification information, and when available and appropriate, dates sampled, received, authorized, prepared and analyzed. The authorization data is the date when the project was defined by the client such that laboratory work could begin.

Data sheets contain a listing of the parameters measured in each test, the analytical results and the Enseco reporting limit. Reporting limits are adjusted to reflect dilution of the sample, when appropriate. Solid and waste samples are reported on an "as received" basis, i.e. no correction is made for moisture content.

Enseco-RMAL is no longer routinely blank-correcting analytical data. Uncorrected analytical results are reported, along with associated blank results, for all organic and metals analyses. Analytical results and blank results are reported for conventional inorganic parameters as specified in the method. This policy is described in detail in the Enseco Incorporated Quality Assurance Program Plan for Environmental Chemical Monitoring, Revision 3.3, May, 1989.

The results from the Standard Enseco QA/QC Program, which generates data which are independent of matrix effects, is provided subsequently.

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Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: MW-1
Lab ID: 011629-0001-SA
Matrix: AQUEOUS Sampled: 02 OCT 90 Received: 03 OCT 90
Authorized: 03 OCT 90 Prepared: 12 OCT 90 Analyzed: 04 OCT 90

Parameter	Result	Units	Reporting Limit
Acetone	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Dibromochloromethane	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
2-Hexanone	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Styrene	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	5.0
1,2-Dibromoethane (EDB)	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Cesar Rojas Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: MW-1
Lab ID: 011629-0001-SA
Matrix: AQUEOUS Sampled: 02 OCT 90 Received: 03 OCT 90
Authorized: 03 OCT 90 Prepared: 12 OCT 90 Analyzed: 04 OCT 90

Parameter	Result	Units	Reporting Limit
1,3-Dichlorobenzene	ND	ug/L	5.0
Surrogate	Recovery		
Toluene-d8	108	%	--
4-Bromofluorobenzene	100	%	--
1,2-Dichloroethane-d4	103	%	--

ND = Not detected
NA = Not applicable

Reported By: Cesar Rojas Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: MW-2
Lab ID: 011629-0002-SA
Matrix: AQUEOUS Sampled: 02 OCT 90 Received: 03 OCT 90
Authorized: 03 OCT 90 Prepared: 12 OCT 90 Analyzed: 04 OCT 90

Parameter	Result	Units	Reporting Limit
Acetone	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Dibromochloromethane	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
2-Hexanone	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Styrene	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	5.0
1,2-Dibromoethane (EDB)	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Stephanie Boehnke Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: MW-2
Lab ID: 011629-0002-SA
Matrix: AQUEOUS Sampled: 02 OCT 90 Received: 03 OCT 90
Authorized: 03 OCT 90 Prepared: 12 OCT 90 Analyzed: 04 OCT 90

Parameter	Result	Units	Reporting Limit
1,3-Dichlorobenzene	ND	ug/L	5.0
Surrogate	Recovery		
Toluene-d8	103	%	--
4-Bromofluorobenzene	95	%	--
1,2-Dichloroethane-d4	110	%	--

ND = Not detected
NA = Not applicable

Reported By: Stephanie Boehnke Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: MW-4
Lab ID: 011629-0003-SA
Matrix: AQUEOUS Sampled: 02 OCT 90 Received: 03 OCT 90
Authorized: 03 OCT 90 Prepared: 12 OCT 90 Analyzed: 04 OCT 90

Parameter	Result	Units	Reporting Limit
Acetone	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Dibromochloromethane	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
2-Hexanone	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Styrene	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	5.0
1,2-Dibromoethane (EDB)	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Cesar Rojas Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: MW-4
Lab ID: 011629-0003-SA
Matrix: AQUEOUS Sampled: 02 OCT 90 Received: 03 OCT 90
Authorized: 03 OCT 90 Prepared: 12 OCT 90 Analyzed: 04 OCT 90

Parameter	Result	Units	Reporting Limit
1,3-Dichlorobenzene	ND	ug/L	5.0
Surrogate	Recovery		
Toluene-d8	107	%	--
4-Bromofluorobenzene	100	%	--
1,2-Dichloroethane-d4	103	%	--

ND = Not detected
NA = Not applicable

Reported By: Cesar Rojas Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: MW-5
Lab ID: 011629-0004-SA
Matrix: AQUEOUS Sampled: 02 OCT 90 Received: 03 OCT 90
Authorized: 03 OCT 90 Prepared: 12 OCT 90 Analyzed: 04 OCT 90

Parameter	Result	Units	Reporting Limit
Acetone	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Dibromochloromethane	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
2-Hexanone	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Styrene	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	5.0
1,2-Dibromoethane (EDB)	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Stephanie Boehnke Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: MW-5
Lab ID: 011629-0004-SA
Matrix: AQUEOUS Sampled: 02 OCT 90 Received: 03 OCT 90
Authorized: 03 OCT 90 Prepared: 12 OCT 90 Analyzed: 04 OCT 90

Parameter	Result	Units	Reporting Limit
1,3-Dichlorobenzene	ND	ug/L	5.0
Surrogate	Recovery		
Toluene-d8	99	%	--
4-Bromofluorobenzene	93	%	--
1,2-Dichloroethane-d4	107	%	--

ND = Not detected
NA = Not applicable

Reported By: Stephanie Boehnke Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: Trip Blank
Lab ID: 011629-0006-SA
Matrix: AQUEOUS Sampled: Unknown Received: 03 OCT 90
Authorized: 03 OCT 90 Prepared: 04 OCT 90 Analyzed: 04 OCT 90

Parameter	Result	Units	Reporting Limit
Acetone	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Dibromochloromethane	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
2-Hexanone	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Styrene	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	5.0
1,2-Dibromoethane (EDB)	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Cesar Rojas Approved By: Jeff Lowry

Enseco
A Corning Company

Volatile Organics
Target Compound List (TCL)
Method 8240

Client Name: Giant Refining
Client ID: Trip Blank
Lab ID: 011629-0006-SA
Matrix: AQUEOUS Sampled: Unknown Received: 03 OCT 90
Authorized: 03 OCT 90 Prepared: 04 OCT 90 Analyzed: 04 OCT 90

Parameter	Result	Units	Reporting Limit
1,3-Dichlorobenzene	ND	ug/L	5.0
Surrogate	Recovery		
Toluene-d8	109	%	--
4-Bromofluorobenzene	99	%	--
1,2-Dichloroethane-d4	104	%	--

ND = Not detected
NA = Not applicable

Reported By: Cesar Rojas Approved By: Jeff Lowry

Enseco
A Corning Company

Metals

Total Metals

Client Name: Giant Refining
Client ID: MW-1
Lab ID: 011629-0001-SA
Matrix: AQUEOUS
Authorized: 03 OCT 90

Sampled: 02 OCT 90
Prepared: See Below

Received: 03 OCT 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	ND	mg/L	0.010	6010	23 OCT 90	30 OCT 90
Lead	ND	mg/L	0.010	7421	23 OCT 90	30 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Leslie Gergurich

Approved By: John Laferty

Enseco
A Corning Company

Metals

Total Metals

Client Name: Giant Refining
Client ID: MW-2
Lab ID: 011629-0002-SA
Matrix: AQUEOUS
Authorized: 03 OCT 90

Sampled: 02 OCT 90
Prepared: See Below

Received: 03 OCT 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	ND	mg/L	0.010	6010	23 OCT 90	30 OCT 90
Lead	ND	mg/L	0.010	7421	23 OCT 90	30 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Leslie Gergurich

Approved By: John Laferty

Enseco
A Corning Company

Metals

Total Metals

Client Name: Giant Refining
Client ID: MW-4
Lab ID: 011629-0003-SA
Matrix: AQUEOUS Sampled: 02 OCT 90 Received: 03 OCT 90
Authorized: 03 OCT 90 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	ND	mg/L	0.010	6010	23 OCT 90	30 OCT 90
Lead	0.0071	mg/L	0.0050	7421	23 OCT 90	30 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Leslie Gergurich Approved By: John Laferty

Enseco
A Corning Company

Metals

Total Metals

Client Name: Giant Refining
Client ID: MW-5
Lab ID: 011629-0004-SA
Matrix: AQUEOUS Sampled: 02 OCT 90 Received: 03 OCT 90
Authorized: 03 OCT 90 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Chromium	ND	mg/L	0.010	6010	23 OCT 90	30 OCT 90
Lead	ND	mg/L	0.010	7421	23 OCT 90	30 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Leslie Gergurich Approved By: John Laferty

Enseco
A Corning Company

General Inorganics

Client Name: Giant Refining
Client ID: MW-1
Lab ID: 011629-0001-SA
Matrix: AQUEOUS
Authorized: 03 OCT 90

Sampled: 02 OCT 90
Prepared: See Below

Received: 03 OCT 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
pH	8.9	units	--	9040	NA	03 OCT 90
Specific Conductance at 25 deg.C	1160	umhos/cm	1.0	120.1	NA	03 OCT 90
Total Organic Carbon	0.70	mg/L	0.50	9060	NA	12 OCT 90
Total Organic Carbon	0.71	mg/L	0.50	9060	NA	12 OCT 90
Total Organic Carbon	0.69	mg/L	0.50	9060	NA	12 OCT 90
Total Organic Carbon	0.71	mg/L	0.50	9060	NA	12 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	11 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	11 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	11 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	11 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Dan Appelhans

Approved By: Will Pratt

Enseco
A Corning Company

General Inorganics

Client Name: Giant Refining
Client ID: MW-2
Lab ID: 011629-0002-SA
Matrix: AQUEOUS
Authorized: 03 OCT 90

Sampled: 02 OCT 90
Prepared: See Below

Received: 03 OCT 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
pH	8.9	units	--	9040	NA	03 OCT 90
Specific Conductance at 25 deg.C	1200	umhos/cm	1.0	120.1	NA	03 OCT 90
Total Organic Carbon	0.57	mg/L	0.50	9060	NA	12 OCT 90
Total Organic Carbon	0.59	mg/L	0.50	9060	NA	12 OCT 90
Total Organic Carbon	0.58	mg/L	0.50	9060	NA	12 OCT 90
Total Organic Carbon	0.51	mg/L	0.50	9060	NA	12 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	11 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	11 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	11 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	11 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Dan Appelhans

Approved By: Will Pratt

Enseco
A Corning Company

General Inorganics

Client Name: Giant Refining
Client ID: MW-4
Lab ID: 011629-0003-SA
Matrix: AQUEOUS
Authorized: 03 OCT 90

Sampled: 02 OCT 90
Prepared: See Below

Received: 03 OCT 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
pH	8.7	units	--	9040	NA	03 OCT 90
Specific Conductance at 25 deg.C	1230	umhos/cm	1.0	120.1	NA	03 OCT 90
Total Organic Carbon	0.65	mg/L	0.50	9060	NA	12 OCT 90
Total Organic Carbon	0.67	mg/L	0.50	9060	NA	12 OCT 90
Total Organic Carbon	0.64	mg/L	0.50	9060	NA	12 OCT 90
Total Organic Carbon	0.68	mg/L	0.50	9060	NA	12 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	11 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	11 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	11 OCT 90
Total Organic Halogen as Cl	ND	ug/L	30.0	9020	NA	11 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Dan Appelhans

Approved By: Will Pratt

Enseco
A Corning Company

General Inorganics

Client Name: Giant Refining
Client ID: MW-5
Lab ID: 011629-0004-SA
Matrix: AQUEOUS Sampled: 02 OCT 90 Received: 03 OCT 90
Authorized: 03 OCT 90 Prepared: See Below Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
pH	8.9	units	--	9040	NA	03 OCT 90
Specific Conductance at 25 deg.C	1210	umhos/cm	1.0	120.1	NA	03 OCT 90
Total Organic Carbon	0.56	mg/L	0.50	9060	NA	13 OCT 90
Total Organic Carbon	0.58	mg/L	0.50	9060	NA	13 OCT 90
Total Organic Carbon	0.58	mg/L	0.50	9060	NA	13 OCT 90
Total Organic Carbon	0.59	mg/L	0.50	9060	NA	13 OCT 90
Total Organic Halogen as Cl	61.4	ug/L	30.0	9020	NA	14 OCT 90
Total Organic Halogen as Cl	48.6	ug/L	30.0	9020	NA	14 OCT 90
Total Organic Halogen as Cl	49.6	ug/L	30.0	9020	NA	14 OCT 90
Total Organic Halogen as Cl	58.9	ug/L	30.0	9020	NA	14 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Steve Pope Approved By: Will Pratt

Quality Control Results

The Enseco laboratories operate under a vigorous QA/QC program designed to ensure the generation of scientifically valid, legally defensible data by monitoring every aspect of laboratory operations. Routine QA/QC procedures include the use of approved methodologies, independent verification of analytical standards, use of duplicate Laboratory Control Samples to assess the precision and accuracy of the methodology on a routine basis, and a rigorous system of data review.

In addition, the Enseco laboratories maintain a comprehensive set of certifications from both state and federal governmental agencies which require frequent analyses of blind audit samples. Enseco - Rocky Mountain Analytical Laboratory is certified by the EPA under the EPA/CLP program for both Organic and Inorganic analyses, under the USATHAMA (U.S. Army) program, by the Army Corps of Engineers, and the states of Colorado, New Jersey, New York, Utah, and Florida, among others.

The standard laboratory QC package is designed to:

1) establish a strong, cost-effective QC program that ensures the generation of scientifically valid, legally defensible data

2) assess the laboratory's performance of the analytical method using control limits generated with a well-defined matrix

3) establish clear-cut guidelines for acceptability of analytical data so that QC decisions can be made immediately at the bench, and

4) provide a standard set of reportables which assures the client of the quality of his data.

The Enseco QC program is based upon monitoring the precision and accuracy of an analytical method by analyzing a set of Duplicate Control Samples (DCS) at frequent, well-defined intervals. Each DCS is a well-characterized matrix which is spiked with target compounds at 5-100 times the reporting limit, depending upon the methodology being monitored. The purpose of the DCS is not to duplicate the sample matrix, but rather to provide an interference-free, homogeneous matrix from which to gather data to establish control limits. These limits are used to determine whether data generated by the laboratory on any given day is in control.

Control limits for accuracy (percent recovery) are based on the average, historical percent recovery +/- 3 standard deviation units. Control limits for precision (relative percent difference) range from 0 (identical duplicate DCS results) to the average, historical relative percent difference + 3 standard deviation units. These control limits are fairly narrow based on the consistency of the matrix being monitored and are updated on a quarterly basis.

For each batch of samples analyzed, an additional control measure is taken in the form of a Single Control Sample (SCS). The SCS consists of a control matrix that is spiked with either representative target compounds or surrogate compounds appropriate to the method being used. An SCS is prepared for each sample lot for which the DCS pair are not analyzed.

Accuracy for DCS and SCS is measured by Percent Recovery.

$$\% \text{ Recovery} = \frac{\text{Measured Concentration}}{\text{Actual Concentration}} \times 100$$

Precision for DCS is measured by Relative Percent Difference (RPD).

$$\text{RPD} = \frac{|\text{Measured Concentration DCS1} - \text{Measured Concentration DCS2}|}{(\text{Measured Concentration DCS1} + \text{Measured Concentration DCS2})/2} \times 100$$

All samples analyzed concurrently by the same test are assigned the same QC lot number. Projects which contain numerous samples, analyzed over several days, may have multiple QC lot numbers associated with each test. The QC information which follows includes a listing of the QC lot numbers associated with each of the samples reported, DCS and SCS (where applicable) recoveries from the QC lots associated with the samples, and control limits for these lots. The QC data is reported by test code, in the order that the tests are reported in the analytical results section of this report.

Enseco
A Corning Company

QC LOT ASSIGNMENT REPORT
Volatile Organics by GC/MS

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
011629-0001-SA	AQUEOUS	624-A	03 OCT 90-B	03 OCT 90-B
011629-0002-SA	AQUEOUS	624-A	03 OCT 90-B	04 OCT 90-B
011629-0003-SA	AQUEOUS	624-A	03 OCT 90-B	03 OCT 90-B
011629-0004-SA	AQUEOUS	624-A	03 OCT 90-B	04 OCT 90-B
011629-0006-SA	AQUEOUS	624-A	03 OCT 90-B	03 OCT 90-B

Enseco
A Corning Company

DUPLICATE CONTROL SAMPLE REPORT
Volatile Organics by GC/MS

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precisio (RPD) DCS	Precisio (RPD) Limi
Category: 624-A								
Matrix: AQUEOUS								
QC Lot: 03 OCT 90-B								
Concentration Units: ug/L								
1,1-Dichloroethene	50	38.1	33.5	35.8	72	61-145	13	1
Trichloroethene	50	44.8	44.1	44.4	89	71-120	1.6	1
Benzene	50	48.1	47.3	47.7	95	76-127	1.7	1
Toluene	50	51.4	47.6	49.5	99	76-125	7.7	1
Chlorobenzene	50	53.9	51.6	52.8	106	75-130	4.4	1

Calculations are performed before rounding to avoid round-off errors in calculated results.

Enseco
A Corning Company

SINGLE CONTROL SAMPLE REPORT
Volatile Organics by GC/MS

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Category: 624-A				
Matrix: AQUEOUS				
QC Lot: 03 OCT 90-B QC Run: 03 OCT 90-B				
Concentration Units: ug/L				
1,2-Dichloroethane-d4	50.0	53.9	108	76-114
4-Bromofluorobenzene	50.0	51.3	103	86-115
Toluene-d8	50.0	54.3	109	88-110
Category: 624-A				
Matrix: AQUEOUS				
QC Lot: 03 OCT 90-B QC Run: 04 OCT 90-B				
Concentration Units: ug/L				
1,2-Dichloroethane-d4	50.0	52.0	104	76-114
4-Bromofluorobenzene	50.0	49.3	99	86-115
Toluene-d8	50.0	49.8	100	88-110

Calculations are performed before rounding to avoid round-off errors in calculated results.

Enseco
A Corning Company

METHOD BLANK REPORT
Volatile Organics by GC/MS

Test: 8240CP-TCL-AP
Matrix: AQUEOUS
QC Lot: 03 OCT 90-B QC Run: 03 OCT 90-B

Analyte	Result	Units	Reporting Limit
Acetone	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Dibromochloromethane	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
2-Hexanone	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Styrene	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	5.0
1,2-Dibromoethane (EDB)	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0

Enseco
A Corning Company

METHOD BLANK REPORT
Volatile Organics by GC/MS (cont.)

Analyte	Result	Units	Reporting Limit
Test: 8240CP-TCL-AP Matrix: AQUEOUS QC Lot: 03 OCT 90-B QC Run: 03 OCT 90-B			
1,3-Dichlorobenzene	ND	ug/L	5.0
Test: 8240CP-TCL-AP Matrix: AQUEOUS QC Lot: 03 OCT 90-B QC Run: 04 OCT 90-B			
Acetone	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Dibromochloromethane	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
2-Hexanone	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Styrene	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10

Enseco
A Corning Company

METHOD BLANK REPORT
Volatile Organics by GC/MS (cont.)

Analyte	Result	Units	Reporting Limit
Test: 8240CP-TCL-AP			
Matrix: AQUEOUS			
QC Lot: 03 OCT 90-B QC Run: 04 OCT 90-B			
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	5.0
1,2-Dibromoethane (EDB)	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ug/L	5.0
Test: 8240CP-TCL-AP			
Matrix: AQUEOUS			
QC Lot: 03 OCT 90-B QC Run: 03 OCT 90-B			
Acetone	ND	ug/L	10
Benzene	ND	ug/L	5.0
Bromodichloromethane	ND	ug/L	5.0
Bromoform	ND	ug/L	5.0
Bromomethane	ND	ug/L	10
2-Butanone (MEK)	ND	ug/L	10
Carbon disulfide	ND	ug/L	5.0
Carbon tetrachloride	ND	ug/L	5.0
Chlorobenzene	ND	ug/L	5.0
Chloroethane	ND	ug/L	10
Chloroform	ND	ug/L	5.0
Chloromethane	ND	ug/L	10
Dibromochloromethane	ND	ug/L	5.0
1,1-Dichloroethane	ND	ug/L	5.0
1,2-Dichloroethane	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	5.0
1,2-Dichloroethene (total)	ND	ug/L	5.0
1,2-Dichloropropane	ND	ug/L	5.0
cis-1,3-Dichloropropene	ND	ug/L	5.0
trans-1,3-Dichloropropene	ND	ug/L	5.0
Ethylbenzene	ND	ug/L	5.0
2-Hexanone	ND	ug/L	10
Methylene chloride	ND	ug/L	5.0
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10
Styrene	ND	ug/L	5.0

Enseco
A Corning Company

METHOD BLANK REPORT
Volatile Organics by GC/MS (cont.)

Test: 8240CP-TCL-AP
Matrix: AQUEOUS
QC Lot: 03 OCT 90-B QC Run: 03 OCT 90-B

Analyte	Result	Units	Reporting Limit
1,1,2,2-Tetrachloroethane	ND	ug/L	5.0
Tetrachloroethene	ND	ug/L	5.0
Toluene	ND	ug/L	5.0
1,1,1-Trichloroethane	ND	ug/L	5.0
1,1,2-Trichloroethane	ND	ug/L	5.0
Trichloroethene	ND	ug/L	5.0
Vinyl acetate	ND	ug/L	10
Vinyl chloride	ND	ug/L	10
Xylenes (total)	ND	ug/L	5.0
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	5.0
1,2-Dibromoethane (EDB)	ND	ug/L	5.0
1,2-Dichlorobenzene	ND	ug/L	5.0
1,4-Dichlorobenzene	ND	ug/L	5.0
1,3-Dichlorobenzene	ND	ug/L	5.0

Enseco
A Corning Company

QC LOT ASSIGNMENT REPORT
Metals Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
011629-0001-SA	AQUEOUS	ICP-AT	23 OCT 90-D	23 OCT 90-D
011629-0001-SA	AQUEOUS	PB-FAA-AT	23 OCT 90-C	23 OCT 90-C
011629-0002-SA	AQUEOUS	ICP-AT	23 OCT 90-D	23 OCT 90-D
011629-0002-SA	AQUEOUS	PB-FAA-AT	23 OCT 90-C	23 OCT 90-C
011629-0003-SA	AQUEOUS	ICP-AT	23 OCT 90-D	23 OCT 90-D
011629-0003-SA	AQUEOUS	PB-FAA-AT	23 OCT 90-C	23 OCT 90-C
011629-0004-SA	AQUEOUS	ICP-AT	23 OCT 90-D	23 OCT 90-D
011629-0004-SA	AQUEOUS	PB-FAA-AT	23 OCT 90-C	23 OCT 90-C

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A Corning Company

DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Average(%) Limits	Precisi (RPD) DCS	Precisi (RPD) Lim
Category: ICP-AT								
Matrix: AQUEOUS								
QC Lot: 23 OCT 90-D								
Concentration Units: mg/L								
Aluminum	2.0	2.00	1.98	1.99	100	75-125	1.1	
Antimony	0.5	0.524	0.527	0.525	105	75-125	0.5	
Arsenic	0.5	0.483	0.491	0.487	97	75-125	1.6	
Barium	2.0	2.02	1.99	2.01	100	75-125	1.5	
Beryllium	0.05	0.0512	0.0508	0.0510	102	75-125	0.8	
Cadmium	0.05	0.0457	0.0422	0.0439	88	75-125	7.8	
Calcium	100	99.4	100	99.8	100	75-125	0.9	
Chromium	0.2	0.207	0.202	0.205	102	75-125	2.3	
Cobalt	0.5	0.508	0.505	0.507	101	75-125	0.8	
Copper	0.25	0.252	0.250	0.251	101	75-125	0.8	
Iron	1.0	1.04	1.00	1.02	102	75-125	3.7	
Lead	0.5	0.483	0.473	0.478	96	75-125	2.2	
Magnesium	50	48.8	48.9	48.9	98	75-125	0.4	
Manganese	0.5	0.513	0.504	0.508	102	75-125	1.8	
Nickel	0.5	0.507	0.508	0.507	101	75-125	0.2	
Potassium	50	49.0	47.6	48.3	97	75-125	2.9	
Silver	0.05	0.0559	0.0544	0.0551	110	75-125	2.7	
Sodium	100	100	99.5	99.7	100	75-125	0.5	
Vanadium	0.5	0.513	0.508	0.511	102	75-125	1.0	
Zinc	0.5	0.492	0.483	0.488	98	75-125	1.7	
Category: PB-FAA-AT								
Matrix: AQUEOUS								
QC Lot: 23 OCT 90-C								
Concentration Units: mg/L								
Lead	0.02	0.0205	0.0215	0.0210	105	75-125	4.8	

Calculations are performed before rounding to avoid round-off errors in calculated results

Enseco
A Corning Company

METHOD BLANK REPORT
Metals Analysis and Preparation

Analyte	Result	Units	Reporting Limit
Test: ICP-AT Matrix: AQUEOUS QC Lot: 23 OCT 90-D QC Run: 23 OCT 90-D			
Chromium	ND	mg/L	0.010
Test: PB-FAA-AT Matrix: AQUEOUS QC Lot: 23 OCT 90-C QC Run: 23 OCT 90-C			
Lead	ND	mg/L	0.0050

Enseco
A Corning Company

QC LOT ASSIGNMENT REPORT
Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
011629-0001-SA	AQUEOUS	PH-A	03 OCT 90-A	-
011629-0001-SA	AQUEOUS	COND-A	03 OCT 90-A	-
011629-0001-SA	AQUEOUS	TOC-A	12 OCT 90-B	-
011629-0001-SA	AQUEOUS	TOC-A	12 OCT 90-B	-
011629-0001-SA	AQUEOUS	TOC-A	12 OCT 90-B	-
011629-0001-SA	AQUEOUS	TOC-A	12 OCT 90-B	-
011629-0001-SA	AQUEOUS	TOX-A	11 OCT 90-A	-
011629-0001-SA	AQUEOUS	TOX-A	11 OCT 90-A	-
011629-0001-SA	AQUEOUS	TOX-A	11 OCT 90-A	-
011629-0001-SA	AQUEOUS	TOX-A	11 OCT 90-A	-
011629-0002-SA	AQUEOUS	PH-A	03 OCT 90-A	-
011629-0002-SA	AQUEOUS	COND-A	03 OCT 90-A	-
011629-0002-SA	AQUEOUS	TOC-A	12 OCT 90-B	-
011629-0002-SA	AQUEOUS	TOC-A	12 OCT 90-B	-
011629-0002-SA	AQUEOUS	TOC-A	12 OCT 90-B	-
011629-0002-SA	AQUEOUS	TOC-A	12 OCT 90-B	-
011629-0002-SA	AQUEOUS	TOX-A	11 OCT 90-A	-
011629-0002-SA	AQUEOUS	TOX-A	11 OCT 90-A	-
011629-0002-SA	AQUEOUS	TOX-A	11 OCT 90-A	-
011629-0002-SA	AQUEOUS	TOX-A	11 OCT 90-A	-
011629-0003-SA	AQUEOUS	PH-A	03 OCT 90-A	-
011629-0003-SA	AQUEOUS	COND-A	03 OCT 90-A	-
011629-0003-SA	AQUEOUS	TOC-A	12 OCT 90-B	-
011629-0003-SA	AQUEOUS	TOC-A	12 OCT 90-B	-
011629-0003-SA	AQUEOUS	TOC-A	12 OCT 90-B	-
011629-0003-SA	AQUEOUS	TOC-A	12 OCT 90-B	-
011629-0003-SA	AQUEOUS	TOX-A	11 OCT 90-A	-
011629-0003-SA	AQUEOUS	TOX-A	11 OCT 90-A	-
011629-0003-SA	AQUEOUS	TOX-A	11 OCT 90-A	-
011629-0003-SA	AQUEOUS	TOX-A	11 OCT 90-A	-
011629-0004-SA	AQUEOUS	PH-A	03 OCT 90-A	-
011629-0004-SA	AQUEOUS	COND-A	03 OCT 90-A	-
011629-0004-SA	AQUEOUS	TOC-A	13 OCT 90-A	-
011629-0004-SA	AQUEOUS	TOC-A	13 OCT 90-A	-
011629-0004-SA	AQUEOUS	TOC-A	13 OCT 90-A	-
011629-0004-SA	AQUEOUS	TOC-A	13 OCT 90-A	-
011629-0004-SA	AQUEOUS	TOX-A	14 OCT 90-A	-
011629-0004-SA	AQUEOUS	TOX-A	14 OCT 90-A	-
011629-0004-SA	AQUEOUS	TOX-A	14 OCT 90-A	-
011629-0004-SA	AQUEOUS	TOX-A	14 OCT 90-A	-
011629-0005-SA	AQUEOUS	TOX-A	14 OCT 90-A	-
011629-0005-SA	AQUEOUS	TOX-A	14 OCT 90-A	-
011629-0005-SA	AQUEOUS	TOX-A	14 OCT 90-A	-
011629-0005-SA	AQUEOUS	TOX-A	14 OCT 90-A	-

Enseco
A Corning Company

DUPLICATE CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precisi (RPD) DCS Lim
Category: PH-A Matrix: AQUEOUS QC Lot: 03 OCT 90-A Concentration Units: units							
pH	9.1	8.92	8.94	8.93	98	98-102	0.2
Category: COND-A Matrix: AQUEOUS QC Lot: 03 OCT 90-A Concentration Units: umhos/cm							
Specific Conductance at 25 deg.C	1070	1060	1060	1060	99	95-105	0.3
Category: TOC-A Matrix: AQUEOUS QC Lot: 12 OCT 90-B Concentration Units: mg/L							
Total Organic Carbon	25	24.8	24.9	24.8	99	91-109	0.4
Category: TOX-A Matrix: AQUEOUS QC Lot: 11 OCT 90-A Concentration Units: ug Cl/L							
Total Organic Halogen as Cl	100	89.5	100	94.8	95	80-120	11
Category: TOC-A Matrix: AQUEOUS QC Lot: 13 OCT 90-A Concentration Units: mg/L							
Total Organic Carbon	25	24.5	24.5	24.5	98	91-109	0.0

Calculations are performed before rounding to avoid round-off errors in calculated results

Enseco
A Corning Company

DUPLICATE CONTROL SAMPLE REPORT
Wet Chemistry Analysis and Preparation (cont.)

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precisi (RPD) DCS	Lim
Category: TOX-A								
Matrix: AQUEOUS								
QC Lot: 14 OCT 90-A								
Concentration Units: ug Cl/L								
Total Organic Halogen as Cl	100	103	95.3	99.2	99	80-120	7.8	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Appendix

Enseco - Rocky Mountain Analytical
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No.

Attn: Julie Essex

Enseco Client: Giant Refining
Project: Monitor Wells
Sampling Co.: Giant Refining
Sampling Site: Ginizo Refinery
Team Leader: Claud Rosendale
RMAL # 11630

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: Yes (circled) No
3. Condition of Contents: Good
4. Sealed for Shipping by: C Rosendale
5. Initial Contents Temp.: — °C Seal # —
6. Sampling Status: Done (circled) Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description	Sample Type	No. Containers	Analysis Parameters	Remarks
10-2-90	0845	MW-1	Water	1 - #1	pH; Conductance	
				1 - #2	Total Organic Carbon	4 replicates
				1 - #4	Total Appendix IX Metals	See Attached
				1 - #6	Cyanide	9010
				1 - #7	Sulfide	9030
				2 - #12	Base Neutral/Acid Compounds	Appendix IX
				2 - #13	PCB's Appendix IX	See Attached
				1 - #15	Total Organic Halogen	4 replicates

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Claud Rosendale		10-2-90	1300
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Claud Rosendale
Method of Shipment: Federal Express Airbill # 6806791110
Received for Lab: RMAL Signed: [signature] Date/Time 10-03-90 0800
Enseco Project No. 11627 R2 11630

White and Pink Copies to Lab Yellow to Sampler

SS 001

Enseco - Rocky Mountain Analytical
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No.

Attn: JULIE ESSEX

Enseco Client: GIANT REFINING

Project: MONITOR WELLS

Sampling Co.: GIANT REFINING

Sampling Site: CINIZA REFINERY

Team Leader: CLAUD ROSENDALE

RMAL #11630

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: (Yes) No
3. Condition of Contents: GOOD.
4. Sealed for Shipping by: C. ROSENDALE
5. Initial Contents Temp.: — °C Seal # —
6. Sampling Status: (Done) Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description	Sample Type	No. Containers	Analysis Parameters	Remarks
10-2-90	0930	MW-2	WATER	1 - #1	pH, CONDUCTANCE	
				1 - #2	TOTAL ORGANIC CARBON	4 REPLICATES
			—	1 - #4	TOTAL APPENDIX IX METALS	SEE ATTACHED
				1 - #6	CYANIDE	9010
				1 - #7	SULFIDE	9030
				2 - #12	BASE NEUTRAL/ACID COMPOUNDS	APPENDIX IX
				2 - #13	PCBs APPENDIX IX	SEE ATTACHED
				1 - #15	TOTAL ORGANIC HALOGEN	4 Replicates

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Claud Rosendale		10-2-90	1300
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Claud Rosendale

Method of Shipment: Federal Express Airbill # 6806791110

Received for Lab: Clapo Signed: RMAL Date/Time 10-03-90 0800

Enseco Project No. 11629BR 11630

White and Pink Copies to Lab Yellow to Sampler

Enseco - Rocky Mountain Analytical
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No.

Attn: JULIE ESSEX

Enseco Client: GIANT REFINING
Project: MONITOR WELLS
Sampling Co.: GIANT REFINING
Sampling Site: GINIZA REFINERY
Team Leader: CLAUD ROSENDALE
RMAL # 11630

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: (Yes) No
3. Condition of Contents: GOOD
4. Sealed for Shipping by: C. ROSENDALE
5. Initial Contents Temp.: – °C Seal # –
6. Sampling Status: (Done) Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description	Sample Type	No. Containers	Analysis Parameters	Remarks
10-2-90	1040	MW-4	WATER	1-#1	pH, CONDUCTANCE	
				1-#2	TOTAL ORGANIC CARBON	4 Replicates
				1-#4	TOTAL APPENDIX IX METALS	SEE ATTACHED
				1-#6	CYANIDE	9010
				1-#7	SULFIDE	9030
				2-#12	BASE NEUTRAL / ACID COMPOUNDS	APPENDIX IX
				2-#13	PCB'S APPENDIX IX	SEE ATTACHED
				1-#15	TOTAL ORGANIC HALOGEN	4 Replicates

CUSTODY TRANSFERS PRIOR TO SHIPPING

Relinquished by: (signed)	Received by: (signed)	Date	Time
1 Claud Rosendale		10-2-90	1300
2			
3			

SHIPPING DETAILS

Delivered to Shipper by: Claud Rosendale
Method of Shipment: Federal Express AWB # 6806791121
Received for Lab: RMAL Signed: [illegible] Date/Time 10-03-90 0800
Enseco Project No. 11629-BR 11630

White and Pink Copies to Lab Yellow to Sampler

SS 001

Enseco - Rocky Mountain Analytical
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No.

Attn: JULIE ESSEX

Enseco Client: GIANT REFINING
Project: MONITOR WELLS
Sampling Co.: GIANT REFINING
Sampling Site: CINIZA REFINERY
Team Leader: CLAUD ROSENDALE
EMAL # 11630

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: (Yes) No
3. Condition of Contents: GOOD
4. Sealed for Shipping by: C. ROSENDALE
5. Initial Contents Temp.: — °C Seal # —
6. Sampling Status: (Done) Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description	Sample Type	No. Containers	Analysis Parameters	Remarks
10-2	1010	MW-5	WATER	1-#1	pH, CONDUCTANCE	
				1-#2	TOTAL ORGANIC CARBON	4 Replicates
				1-#4	TOTAL APPENDIX IX METALS	SEE ATTACHED
				1-#6	CYANIDE	9010
				1-#7	SULFIDE	9030
				2-#12	BASE NEUTRAL / ACID COMPOUNDS	APPENDIX IX
				2-#13	PCB's APPENDIX IX	SEE ATTACHED
				1-#15	TOTAL ORGANIC HALOGEN	4 Replicates

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by (signed)	Received by: (signed)	Date	Time
1	Claud Rosendale		10-2-90	1300
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Claud Rosendale
Method of Shipment: Federal Express Airbill # 6806791121
Received for Lab: EMAL Signed: [illegible] Date/Time 10-03-90 0800
Enseco Project No. 11629BR 11630

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Enseco - Rocky Mountain Analytical
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Facsimile: 303/431-7171

CHAIN OF CUSTODY

No.

Attn: Julie Essey

Enseco Client: Giant Refining

Project: Monitor Wells

Sampling Co.: Giant Refinery

Sampling Site: Ciniza Refinery

Team Leader: Claud Rosendale

RMAL # 11629

SAMPLE SAFE™ CONDITIONS

1. Packed by: _____ Seal # _____
2. Seal Intact Upon Receipt by Sampling Co.: (Yes) No
3. Condition of Contents: ~~C. Rosendale~~ Good
4. Sealed for Shipping by: C. Rosendale
5. Initial Contents Temp.: — °C Seal # —
6. Sampling Status: (Done) Continuing Until _____
7. Seal Intact Upon Receipt by Laboratory: Yes No
8. Contents Temperature Upon Receipt by Lab: _____ °C
9. Condition of Contents: _____

Date	Time	Sample ID/Description	Sample Type	No. Containers	Analysis Parameters	Remarks
10-2-90	0815	OW-3	Water	1-#15	Total Organic Halogens	4 Replicates
—	—	Trip Blank 11630-5	Water	1-#11	VOA's	

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Claud Rosendale		10-2-90	1300
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Claud Rosendale

Method of Shipment: Federal Express AirBill # 6806791110

Received for Lab: RMAL Signed: [illegible] Date/Time 10-03-90 0800

Enseco Project No. 11629, 11630

White and Pink Copies to Lab Yellow to Sampler

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