GW - 32

REPORTS

YEAR(S):

1991 - MW - 17

GIANT REFINING CO.

Route 3, Box 7
Gallup, New Mexico
87301

505
722-3833

February 28, 1991

David Boyer
New Mexico Oil Conservation Division
P.O. Box 2088
State Land Office Building
Santa Fe, New Mexico 87504

RE: OBSERVATION WELL-17 INVESTIGATION

Dear Mr. Boyer:

Giant Refining Company's, Ciniza Refinery submitted reports to your office on April 4, 1990 and May 30, 1990 outlining the discovery of hydrocarbons in OW-17 and the following investigations and actions. Bill Olson, of your staff, requested a report be submitted to your office before the April 29, 1991 visit to Giant, outlining the corrective measures implemented for this investigation.

Giant has completed a cleaning and video inspection of the sewer system in the tank farm. This sewer system includes all of the underground piping associated with the tank drains which are routed to the API separator. This video consisted of approximately eighteen hours of tape. This was condensed to one, two hour tape, which was submitted along with the contractors report to your office in the Phase I RCRA Facility Investigation Draft Report on November 27, 1991. This inspection did not detect any leaks.

Giant has also drilled two additional wells (OW-25 and OW-26). Attachment A includes a map which specifies the location of these new wells. Attachment B includes the drilling information for OW-16, OW-17, OW-25 and OW-26. Each of these four wells have been sampled and analyzed. The sample dates are as follows:

OW-16: September 27, 1989
April 27, 1990
September 6, 1991 NSP

OW-25: September 6, 1991

OW-26: October 25, 1991

OW-17: October 25, 1991

Attachment C includes the list of parameters that was analyzed. Attachment D includes a computer printout of the analytical. The original analytical and the associated QA/QC is included in Attachment E.

A pump with a timer has been installed in OW-17 and is pumping water to the sewer system and API separator for hydrocarbon removal. Equipment has been purchased to set OW-25 and OW-26 up for pumping similar to OW-17.

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

Sincerely,

Claud Rosendale

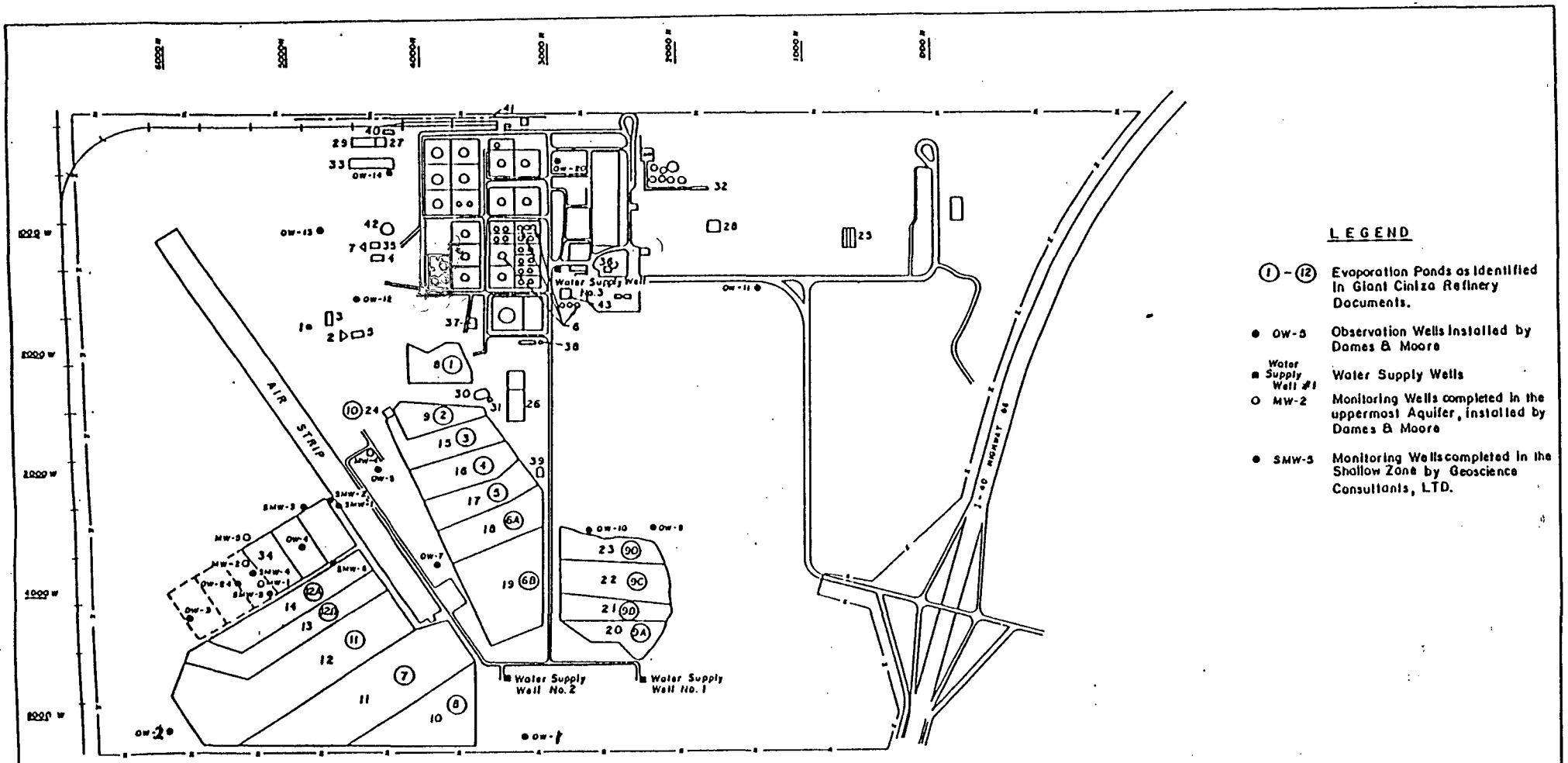
Claud Rosendale
Environmental Manager
Ciniza Refinery

cc: Kim Bullerdick - General Counsel
Giant Industries Arizona, Inc.

CCR/sp

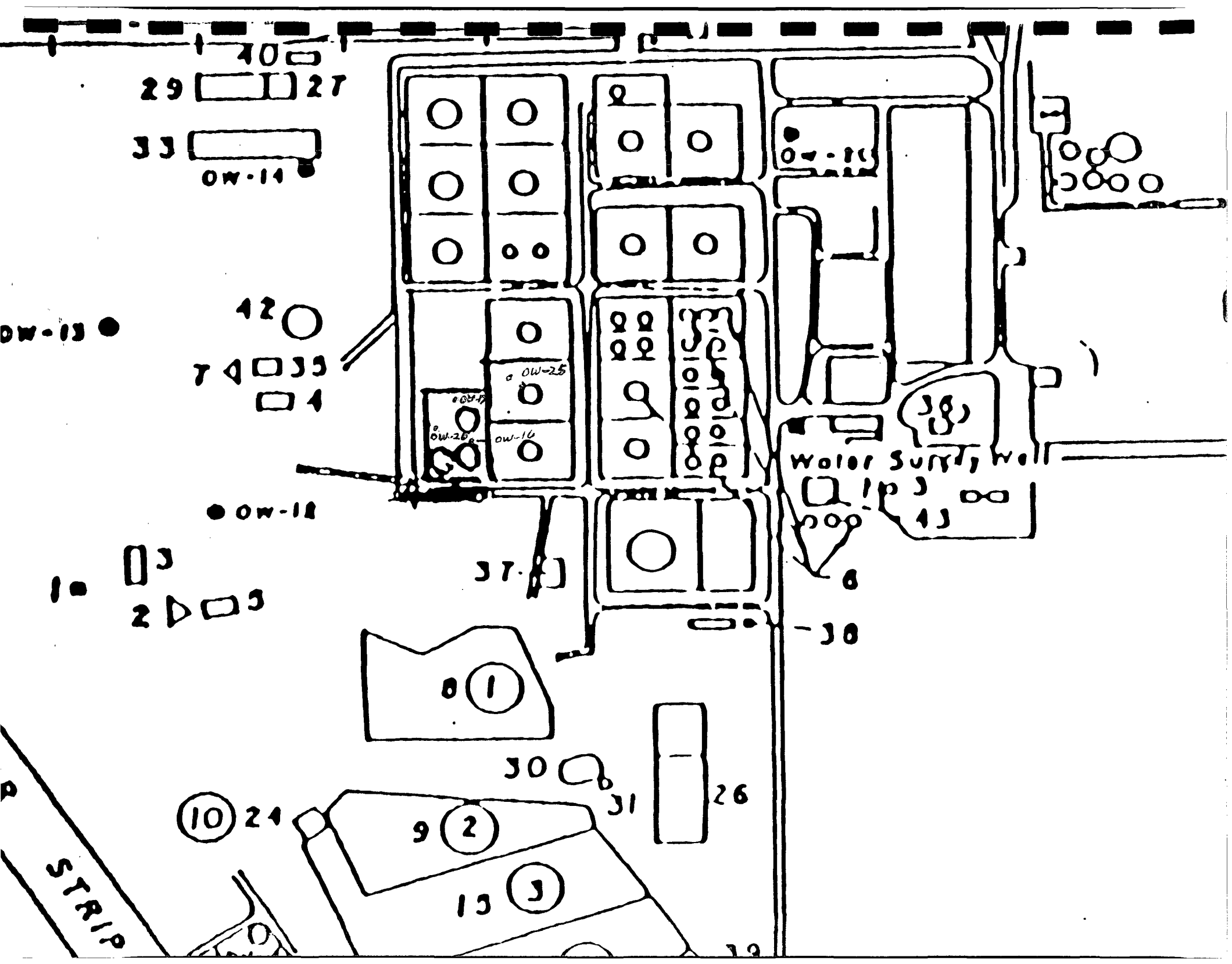
OW-17 INVESTIGATION

ATTACHMENT A



1. Landfill
2. Landfill
3. Landfill
4. Landfill
5. Landfill
6. Tank Farm
7. Burn Pit
8. Aeration Basin
9. Evaporation Pond
10. Evaporation Pond
11. Evaporation Pond
12. Evaporation Pond
13. Evaporation Pond
14. Evaporation Pond
15. Evaporation Pond
16. Evaporation Pond
17. Evaporation Pond
18. Evaporation Pond
19. Evaporation Pond
20. Evaporation Pond
21. Evaporation Pond
22. Evaporation Pond
23. Evaporation Pond
24. Drainage Ditch
25. Sewage Lagoon
26. Sewage Lagoon
27. Sewage Lagoon
28. Sewage Lagoon
29. Railroad Rack Lagoon
30. Sludge Pit
31. Sludge Pit
32. Asphalt Pit
33. Inactive Land Treatment
34. Active Land Treatment
35. Inactive Container Storage
36. Active Container Storage
37. API Separator
38. Neutralization Tank
39. Secondary Oil Skimmer
40. Underground Storage Tanks
41. Drainage From Process Area
42. Fire Training Area
43. Empty Container Storage

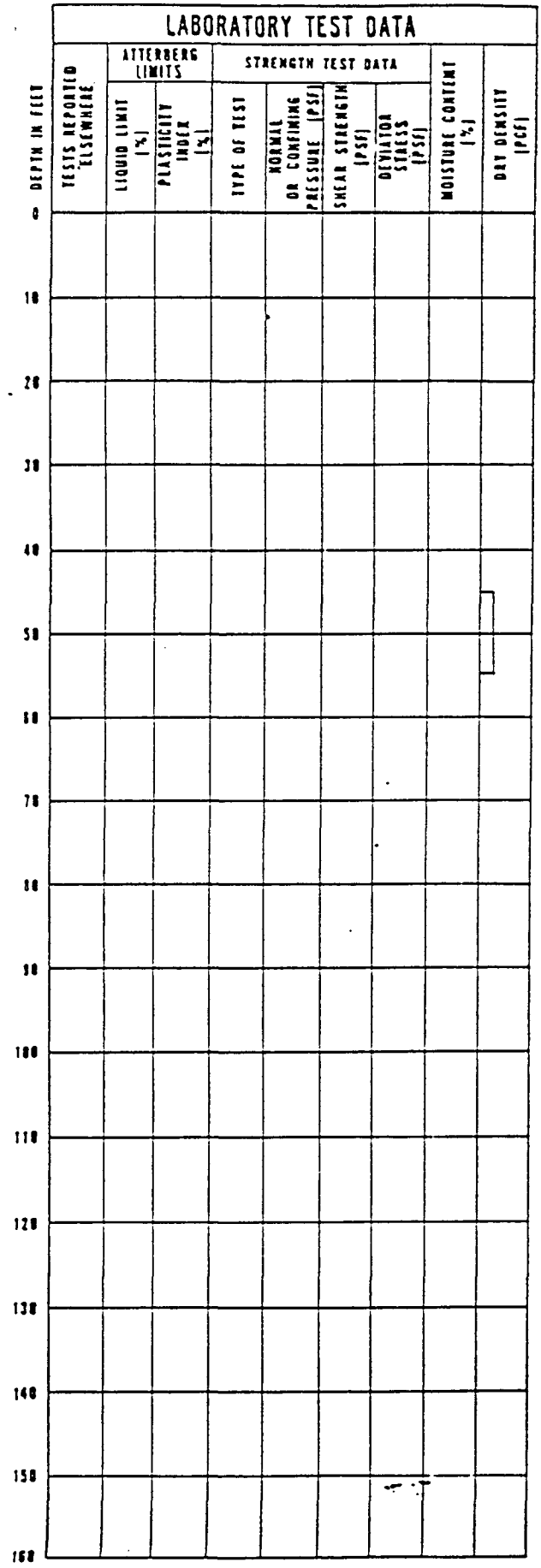
Applied Earth Sciences		NAME: GIANT REFINERY, Gallup, New Mexico	WELL LOCATION MAP	FIGURE 1
FILE No. 5202	MADE BY: R.G. DATE: 9-22-89			
	CHECKED BY: DATE:			


40
29
27
33
OW-14
OW-13
42
33
1
OW-25
OW-17
OW-26
OW-16
OW-12
3
2
3
37
OW-11
38
Water Supply Well
43
6
30
1
30
31
26
10
24
9
2
13
3
STRIP

ATTACHMENT B

BORING OW-16

SURFACE ELEVATION: 6942 FEET



PENETRATION RATE MINUTES/FOOT

SYMBOLS	DESCRIPTION
2.5 / 2.5 / 5.0 — SM	TRIASSIC PERIOD CHINLE FORMATION REDDISH BROWN SILTY FINE SAND WITH SOME GRAVEL, SOFT, HIGHLY WEATHERED
6.7 — SS	12 FEET: SANDSTONE, RED, FINE-GRAINED, HARD, FRESH
5.0 — SHALE	15 FEET: SHALE, RED, SANDY, HARD, FRESH
5.0 / 5.0 / 5.0 / 5.0 / 5.0	
10.0 — SS	47 FEET: SANDSTONE, GRAY, FINE-TO MEDIUM-GRAINED, CALCAREOUS, HARD, FRESH
4.3 — SHALE	50 FEET: SHALE, GRAY, SILTY, WITH SOME FINE SAND, HARD, FRESH

BORING COMPLETED AT 54.6 FEET ON 12/2/80.
4-INCH PVC PIEZOMETER INSTALLED WITH PERFORATIONS FROM 44.6 TO 54.6 FEET.
GRAVEL PLACED FROM 36.0 TO 54.6 FEET AND BORING SEALED WITH BENTONITE AND CEMENT TO SURFACE.
GROUND WATER LEVEL MEASURED AT 26.8 FEET BELOW GROUND ON 1/5/81.

LOG OF BORINGS

BORING OW-17

SURFACE ELEVATION: 6941 FEET

DEPTH IN FEET	TESTS REPORTED ELSEWHERE	ATTERBERG LIMITS: LIQUID LIMIT (%)	ATTERBERG LIMITS: PLASTICITY INDEX (%)	STRENGTH TEST DATA: TYPE OF TEST	STRENGTH TEST DATA: NORMAL OR CONFINING PRESSURE (PSF)	STRENGTH TEST DATA: SHEAR STRENGTH (PSF)	STRENGTH TEST DATA: DEVIATION STRESS (PSF)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)
0									
10									
20									
30									
40									
50									
60									
70									
80									
90									
100									
110									
120									
130									
140									
150									
160									

LABORATORY TEST DATA

PENETRATION RATE MINUTES/FOOT

	SYMBOLS	DESCRIPTION
3.0 3.2 6.0	SM SS	TRIASSIC PERIOD CHINLE FORMATION REDDISH BROWN SILTY FINE SAND WITH SOME GRAVEL-SIZED FRAGMENTS OF LIMESTONE AND SANDSTONE, SOFT, HIGHLY WEATHERED 11 FEET: SANDSTONE, REDDISH BROWN, FINE-GRAINED, NONCALCAREOUS, HARD, FRESH
2.9 5.6 2.8 3.8 3.2 3.3 4.3 5.0 4.3 4.0	SHALE SS SHALE	13 FEET: SHALE, REDDISH BROWN, SANDY, SOFT, FRESH GRADES HARD FROM 27.5 TO 30.0 FEET GRADES GRAY FROM 31 FEET GRADES WITH THIN LIMESTONE AND SANDSTONE INTERBEDS FROM 39 FEET 40 FEET: SANDSTONE, GRAY, FINE-GRAINED, SILTY, CALCAREOUS, HARD, FRESH 42 FEET: SHALE, GRAY, SILTY, SANDY, WITH SOME GRAVEL-SIZED FRAGMENTS OF CHERT AND LIMESTONE AND OCCASIONAL THIN INTERBEDS OF LIMESTONE, HARD, FRESH

BORING COMPLETED AT 50.0 FEET ON 1/3/81.
4-INCH PVC PIEZOMETER INSTALLED WITH PERFORATIONS FROM 38.0 TO 50.0 FEET.
GRAVEL PLACED FROM 24.0 TO 50.0 FEET AND BORING SEALED WITH BENTONITE AND CEMENT TO SURFACE.
GROUND WATER LEVEL MEASURED AT 31.8 FEET BELOW GROUND ON 1/5/81.

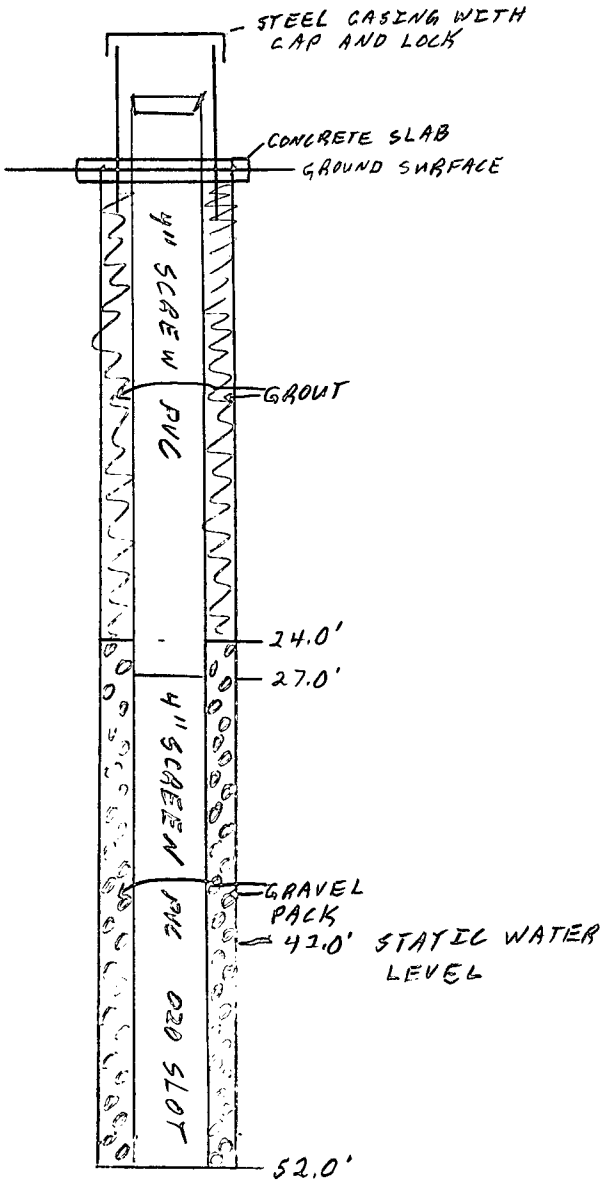
LOG OF BORINGS

DAMES & MOORE

CINIZA REFINERY

OW-26

DRILLED: JUNE 29, 1990



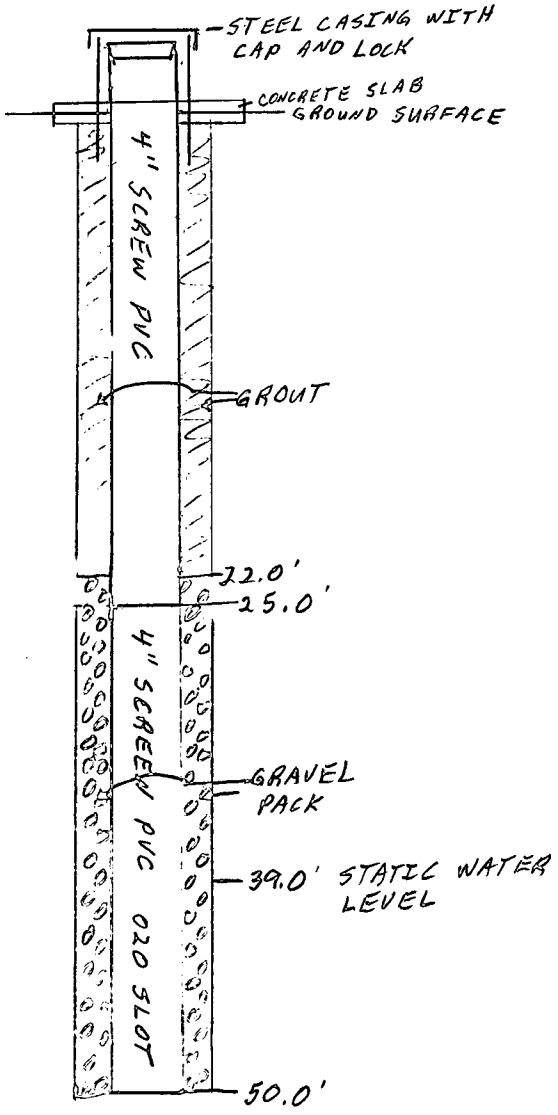
FORMATION LOG

Depth (ft)	Formation
0-5	Clay
5-19	Red sandy clay
19-42	Red clay with sand layers
42-52	Sand with thin clay layers

CINIZA REFINERY

OW-25

DRILLED: JUNE 28, 1990



FORMATION LOG

Depth(ft)	Formation
0-7	Clay
7-28	Red sandy clay
28-39	Clay with sand layers
39-50	Sand with thin clay layers

RODGERS & CO., INC.

December 10, 1990

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

RE: Formation Log for Holes #OW25 and #OW26

#OW25 - 0 - 7 - Clay
7 - 28 - Red sandy clay
28 - 39 - Clay with sand layers
39 - 50 - Sand with thin clay layers

#OW26 - 0 - 5 - Clay
5 - 19 - Red sandy clay
19 - 42 - Red clay with sand layers
42 - 52 - Sand with thin clay layers

If there is anything else we can help you with, please call.

Thank you,

Richard Bonaguidi

RB:jak

2615 Isleta Blvd. S.W. • Albuquerque, NM 87105 • (505) 877-1030

ATTACHMENT C

ATTACHMENT C

A. General Inorganics

1. Alkalinity-Carbonate
2. Alkalinity-Bicarbonate
3. Chloride
4. pH
5. Phenolics
6. Sulfate
7. Specific Conductance
8. Total Dissolved Solids

B. Dissolved Metals

1. Arsenic
2. Barium
3. Cadmium
4. Calcium
5. Chromium
6. Lead
7. Manganese
8. Selenium
9. Silver
10. Sodium

C. Halogenated Volatile Organics

D. Aromatic Volatile Organics

E. Appendix IX Semivolatiles Organics

ATTACHMENT D

OW-16 GIANT REFINING GALLUP, NEW MEXICO

APPENDIX IX SEMIVOLATILE ORGANICS

Date: 27 SEP 89 12 APR 90 6 SEP 90

Parameter	Results	Results	Results	Units	Reporting Limit
Acenaphthene	ND	ND	ND	ug/L	10
Acenaphthylene	ND	ND	ND	ug/L	10
Acetophenone	ND	ND	ND	ug/L	10
2-Acetylaminofluorene	ND	ND	ND	ug/L	10
4-Aminobiphenyl	ND	ND	ND	ug/L	10
Aniline	ND	ND	ND	ug/L	10
Anthracene	ND	ND	ND	ug/L	10
Aramite	ND	ND	ND	ug/L	10
Benzo(a)anthracene	ND	ND	ND	ug/L	10
Benzo(b)fluoranthene	ND	ND	ND	ug/L	10
Benzo(k)flouranthene	ND	ND	ND	ug/L	10
Benzo(g,h,i)perylene	ND	ND	ND	ug/L	10
Benzo(a)pyrene	ND	ND	ND	ug/L	10
Benzyl alcohol	ND	ND	ND	ug/L	10
bis(2-Chloroethoxy)-methane	ND	ND	ND	ug/L	10
bis(2-Chloroethyl)ether	ND	ND	ND	ug/L	10
bis(2-Chloroisopropyl) ether	ND	ND	ND	ug/L	10
bis(2-Ethylhexyl) phthalate	ND	ND	ND	ug/L	10
4-Bromophenyl phenyl ether	ND	ND	ND	ug/L	10
Butyl benzyl phthalate	ND	ND	ND	ug/L	10
2sec-Butyl-4,6-dinitro-phenol (Dinoseb)	ND	ND	ND	ug/L	10
4-Chloroaniline	ND	ND	ND	ug/L	10
4-Chloro-3-methylphenol	ND	ND	ND	ug/L	10
2-Chloronaphthalene	ND	ND	ND	ug/L	10
2-Chlorophenol	ND	ND	ND	ug/L	10
4-Chlorophenyl phenyl ether	ND	ND	ND	ug/L	10
o-Cresol	ND	ND		ug/L	10
m & p-Cresol(s)	ND	ND		ug/L	10
Chrysene	ND	ND	ND	ug/L	10
Dibenz(a,h)anthracene	ND	ND	ND	ug/L	10
Dibenzofuran	ND	ND	ND	ug/L	10
Di-n-butyl phthalate	ND	ND	ND	ug/L	10
1,2-Dichlorobenzene	ND	ND	ND	ug/L	10
1,3-Dichlorobenzene	ND	ND	ND	ug/L	10
1,4-Dichlorobenzene	ND	ND	ND	ug/L	10

OW-16 GIANT REFINING GALLUP, NEW MEXICO

APPENDIX IX SEMIVOLATILE ORGANICS

Parameter	Date: 28 SEP 89 Results	12 APR 90 Results	6 SEPT 90 Results	Units	Reporting Limit
3,3'-Dichlorobenzidine	ND	ND	ND	ug/L	20
2,4-Dichlorophenol	ND	ND	ND	ug/L	10
2,6-Dichlorophenol	ND	ND	ND	ug/L	10
Diethyl phthalate	ND	ND	ND	ug/L	10
Dimethoate	ND	ND	ND	ug/L	10
p-Dimethylaminoazobenzene	ND	ND	ND	ug/L	10
7,12-Dimethylbenz-anthracene	ND	ND	ND	ug/L	10
3,3'-Dimethylbenzidine	ND	ND	ND	ug/L	10
a,a-Dimethylphen-ethylamine	ND	ND	ND	ug/L	10
2,4-Dimethylphenol	ND	ND	ND	ug/L	10
Dimethyl phthalate	ND	ND	ND	ug/L	10
1,3-Dinitrobenzene	ND	ND	ND	ug/L	10
4,6-Dinitro-2-methylphenol	ND	ND	ND	ug/L	10
4,6-Dinitro-o-cresol	ND	ND		ug/L	50
2,4-Dinitrophenol	ND	ND	ND	ug/L	50
2,4-Dinitrotoluene	ND	ND	ND	ug/L	10
2,6-Dinitrotoluene	ND	ND	ND	ug/L	10
Di-n-octyl phthalate	ND	ND	ND	ug/L	10
Diphenylamine	ND	ND	ND	ug/L	10
Disulfoton	ND	ND	ND	ug/L	50
bis(2-Ethylhexyl) phthalate	ND	ND	ND	ug/L	10
Ethyl methanesulfonate	ND	ND	ND	ug/L	10
Famphur	ND	ND	ND	ug/L	--
Flouranthene	ND	ND	ND	ug/L	10
Flourene	ND	ND	ND	ug/L	10
Hexachlorobenzene	ND	ND	ND	ug/L	10
Hexachlorobutadiene	ND	ND	ND	ug/L	10
Hexachlororcyclopentadiene	ND	ND	ND	ug/L	10
Hexachloroethane					
Hexachlorophene	ND	ND	ND	ug/L	--
Hexachloropropene	ND	ND	ND	ug/L	10
Indeno(1,2,3-c,d)pyrene	ND	ND	ND	ug/L	10
Isophorone	ND	ND	ND	ug/L	10
Isosafrole	ND	ND	ND	ug/L	20
Methapyrilene	ND	ND	ND	ug/L	10
3-Methylcholanthrene	ND	ND	ND	ug/L	10
Methyl methanesulfonate	ND	ND	ND	ug/L	10
2-Methylnaphthalen	ND	ND	ND	ug/L	10
Methyl parathion	ND	ND	ND	ug/L	50
2-Methylphenol	ND	ND	ND	ug/L	10
3/4-Methylphenol	ND	ND	ND	ug/L	10
Methyl methacrylate	ND	ND	ND	ug/L	10
Napthalene	ND	ND	ND	ug/L	10

OW-16 GIANT REFINING GALLUP, NEW MEXICO

APPENDIX IX SEMIVOLATILE ORGANICS

Parameter	Date: 28 SEP 89 Results	12 APR 90 Results	6 SEPT 90 Results	Units	Reporting Limit
1,4-Naphthaquinone	ND	ND	ND	ug/L	10
1-Naphthylamine	ND	ND	ND	ug/L	10
2-Naphthylamine	ND	ND	ND	ug/L	10
2-Nitroaniline	ND	ND	ND	ug/L	50
3-Nitroaniline	ND	ND	ND	ug/L	50
4-Nitroaniline	ND	ND	ND	ug/L	50
Nitrobenzene	ND	ND	ND	ug/L	10
2-Nitrophenol	ND	ND	ND	ug/L	10
4-Nitrophenol	ND	ND	ND	ug/L	50
4-Nitroquinoline-1-oxide	ND	ND	ND	ug/L	--
N-Nitroso-di-n-butylamine	ND	ND	ND	ug/L	10
N-Nitrosodiethylamine	ND	ND	ND	ug/L	10
N-Nitrosodimethylamine	ND	ND	ND	ug/L	10
N-Nitrosodiphenylamine	ND	ND	ND	ug/L	10
N-Nitroso-di-n-propylamine	ND	ND	ND	ug/L	10
N-Nitrosomethylethylamine	ND	ND	ND	ug/L	10
N-Nitrosomorpholine	ND	ND	ND	ug/L	10
N-Nitrosopiperidine	ND	ND	ND	ug/L	10
5-Nitro-o-toluidine	ND	ND	ND	ug/L	10
N-Nitrosopyrrolidine	ND	ND	ND	ug/L	10
Parathion	ND	ND	ND	ug/L	50
Pentachlorobenzene	ND	ND	ND	ug/L	10
Pentachlorethane	ND	ND	ND	ug/L	10
Pentachloronitrobenzene	ND	ND	ND	ug/L	50
Pentachlorophenol	ND	ND	ND	ug/L	50
Phenacetin	ND	ND	ND	ug/L	10
Phenanthrene	ND	ND	ND	ug/L	10
Phenol	ND	ND	ND	ug/L	10
4-Phenylenediamine	ND	ND	ND	ug/L	--
Phorate	ND	ND	ND	ug/L	100
2-Picoline	ND	ND	ND	ug/L	10
Pronamide	ND	ND	ND	ug/L	10
Pyrene	ND	ND	ND	ug/L	10
Pyridine	ND	ND	ND	ug/L	20
Safrole	ND	ND	ND	ug/L	10
Sulfotepp	ND	ND	ND	ug/L	50
1,2,4,5-Tetrachloro-benzene	ND	ND	ND	ug/L	10
2,3,4,6-Tetrachlorophenol	ND	ND	ND	ug/L	50
Thionazin	ND	ND	ND	ug/L	50

OW-16 GIANT REFINING GALLUP, NEW MEXICO

APPENDIX IX SEMIVOLATILE ORGANICS

Parameter	Date: 28 SEP 89 Results	12 APR 90 Results	6 SEPT 90 Results	Units	Reporting Limit
sym-Trinitrobenzene	ND	ND	ND	ug/L	10
2-Toluidine	ND	ND	ND	ug/L	10
1,2,4-Trichlorobenzene	ND	ND	ND	ug/L	10
2,4,5-Trichlorophenol	ND	ND	ND	ug/L	50
0,0,0-Triethylphosphoro-thioate	ND	ND	ND	ug/L	10
2,4,6-Trichlorophenol	ND	ND	ND	ug/L	10
1,3,5-Trinitrobenzene	ND	ND	ND	ug/L	10
Ethyl methacrylate	ND	ND	ND	ug/L	10

OW-16 GIANT REFINING GALLUP, NEW MEXICO

Halogenated Volatile Organics

Date: 28 SEP 89 12 APR 90 6 SEP 90

Parameter	Results	Results	Results	Units	Reporting Limit
Chloromethane	ND	ND	ND	ug/L	5.0
Bromomethane	ND	ND	ND	ug/L	5.0
Vinyl chloride	ND	ND	ND	ug/L	1.0
Chloroethane	ND	ND	ND	ug/L	5.0
Methylene chloride	ND	ND	ND	ug/L	5.0
1,1-Dichloroethene	ND	ND	ND	ug/L	0.50
1,1-Dichloroethane	ND	ND	ND	ug/L	0.50
1,2-Dichloroethane	7.7	7.9	5.2	ug/L	1.0
trans-1,2-Dichloroethene	ND	ND	ND	ug/L	0.50
Chloroform	ND	ND	ND	ug/L	0.50
1,1,2-Trichloro-1,2,2-trifluoroethane					
1,1,1-Trichloroethane	ND	ND	ND	ug/L	0.50
Carbon tetrachloride	ND	ND	ND	ug/L	0.50
Bromodichloromethane	ND	ND	ND	ug/L	1.0
1,2-Dichloropropane	ND	ND	ND	ug/L	1.0
Bromoform	ND	ND	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ND	ND	ug/L	1.0
Tetrachloroethene	ND	ND	ND	ug/L	0.50
Chlorobenzene	ND	ND	ND	ug/L	2.0

OW-16 GIANT REFINING GALLUP, NEW MEXICO

AROMATIC VOLATILE ORGANICS

Date: 28 SEP 89 12 APR 90 6 SEP 90

Parameter	Results	Results	Results	Units	Reporting Limit
Benzene	ND	ND	ND	ug/L	0.50
Toluene	ND	ND	ND	ug/L	0.50
Chlorobenzene	ND	ND	ND	ug/L	0.50
Ethyl benzene	ND	ND	ND	ug/L	0.50
Total xylenes	ND	ND	ND	ug/L	1.0
1,3-Dichlorobenzene	ND	ND	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ND	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ND	ND	ug/L	0.50

OW-16 GIANT REFINING GALLUP, NEW MEXICO

METALS
DISSOLVED METALS

Parameter	Date: 27 SEP 89 Results	11 APR 90 Results	6 SEP 90 Results	Units	Reporting Limit
Arsenic	ND	ND	ND	mg/L	0.0050
Barium	0.06	0.038	0.031	mg/L	0.010
Cadmium	ND	ND	ND	mg/L	0.0050
Calcium	7.5	5.4	4.6	mg/L	0.20 (?)
Chromium	ND	ND	ND	mg/L	0.010
Lead	ND	ND	ND	mg/L	0.010
Manganese	0.02	ND	ND	mg/L	0.010
Selenium	0.024	ND	0.027	mg/L	0.0050
Silver	ND	ND	ND	mg/L	0.010
Sodium	260	242	244	mg/L	5.0

OW-16 GIANT REFINING GALLUP, NEW MEXICO

General Inorganics

Date:	27 SEP 89	11 APR 90	6 SEP 90		
Parameter	Results	Results	Results	Units	Reporting Limit
Alkalinity, Total as CaCO3 at pH 4.5	285			mg/L	5.0
Alkalinity, Bicarb. as CaCO3 at pH 4.5	272	285	279	mg/L	5.0
Alkalinity, Carb. as CaCO3at pH 8.3	13	14	14.1	mg/L	5.0
Alkalinity, Hydrox. as CaCO3	ND			mg/L	5.0
Chloride	168	154	156	mg/L	3.0
pH	8.5	8.5	8.5	units	--
Phenolics	ND	ND	ND	mg/L	0.010
Sulfate	34	28.4	31.6	mg/L	5.0
Specific Conductance at 25 deg.C	1070	1060	1100	umhos/c	1.0
Total Dissolved Solids	760	678	664	mg/L	10.0

OW-17 GIANT REFINING GALLUP, NEW MEXICO

Semivolatile Organics

Date: 25 OCT 90

Parameter	Result	Units	Reporting Limit
Acenapthene	ND	ug/L	500
Acenapthylene	ND	ug/L	500
Acetophenone	ND	ug/L	500
2-Acetylaminofluorene	ND	ug/L	5000
4-Aminobiphenyl	ND	ug/L	500
Aniline	ND	ug/L	500
Anthracene	ND	ug/L	500
Aramite	ND	ug/L	500
Benzo(a)anthracene	ND	ug/L	500
Benzo(b)fluoranthene	ND	ug/L	500
Benzo(k)fluoranthene	ND	ug/L	500
Benzo(g,h,i)perylene	ND	ug/L	500
Benzo(a)pyrene	ND	ug/L	500
Benzyl alcohol	ND	ug/L	500
4-Bromophenyl phenyl ether	ND	ug/L	500
Butyl Benzyl phthalate	ND	ug/L	500
2-sec-Butyl-4,6-dinitro-phenol	ND	ug/L	500
4-Chloroaniline	ND	ug/L	500
bis(2-Chloroethoxy)-methane	ND	ug/L	500
bis(2-Chloroethyl) ether	ND	ug/L	500
bis(2-Chloroisopropyl)-ether	ND	ug/L	500
4-Chloro-3-methylphenol	ND	ug/L	500
2-Chloronapthalene	ND	ug/L	500
2-Chlorophenol	ND	ug/L	500
4-Chlorophenyl phenyl ether	ND	ug/L	500
Chrysene	ND	ug/L	500
Dibenz(a,h)anthracene	ND	ug/L	500
Dibenzofuran	ND	ug/L	500
Di-n-butyl phthalate	ND	ug/L	500
1,2-Dichlorobenzene	ND	ug/L	500
1,3-Dichlorobenzene	ND	ug/L	500
1,4-Dichlorobenzene	ND	ug/L	500
3,3'-Dichlorobenzidine	ND	ug/L	5000
2,4-Dichlorophenol	ND	ug/L	500
2,6-Dichlorophenol	ND	ug/L	500

OW-17 GIANT REFINING GALLUP, NEW MEXICO

Appendix IX Semivolatile Organics

Date: 25 OCT 90

Parameter	Results	Units	Reporting Limit
Diethyl phthalate	ND	ug/L	500
Dimethoate	ND	ug/L	--
p-Dimethylaminoazobene	ND	ug/L	500
7,12-Dimethylbenz(a)-anthracene	ND	ug/L	500
3,3'-Dimethylbenzidine	ND	ug/L	500
a,a-Dimethylphenethyl-amine	ND	ug/L	500
2,4-Dimethylphenol	ND	ug/L	500
Dimethyl phthalate	ND	ug/L	500
1,3-Dinitrobenzene	ND	ug/L	500
4,6-Dinitro-'2-methylphenol	ND	ug/L	2500
2,4-Dinitrophenol	ND	ug/L	2500
2,4-Dinitrotoluene	ND	ug/L	500
2,6-Dinitrotoluene	ND	ug/L	500
Di-n-octyl phthalate	ND	ug/L	500
Diphenylamine	ND	ug/L	500
Disulfoton	ND	ug/L	2500
bis(2-Ethylhexyl) phthalate	ND	ug/L	500
Ethyl methanesulfonate	ND	ug/L	500
Famphur	ND	ug/L	---
Fluoranthene	ND	ug/L	500
Flourene	ND	ug/L	500
Hexachlorobenzene	ND	ug/L	500
Hexachlorobutadiene	ND	ug/L	500
Hexachlorocyclopentadiene	ND	ug/L	500
Hexachloroethane	ND	ug/L	500
Hexachlorophene	ND	ug/L	---
Hexachloropropene	ND	ug/L	500
Indeno(1,2,3-cd)pyrene	ND	ug/L	500
Isophorone	ND	ug/L	500
Isosafrole	ND	ug/L	1000
Methapyreline	ND	ug/L	500
3-Methylcholanthrene	ND	ug/L	500
Methyl methanesulfonate	ND	ug/L	500
2-Methylnapthalene	2400	ug/L	500
Methyl parathion	ND	ug/L	2500
2-Methylphenol	ND	ug/L	500
3/4-Methylphenol	ND	ug/L	500
Napthalene	1700	ug/L	500

OW-17 GIANT REFINING Gallup, New Mexico

Appendix IX Semivolatile Organics (cont)

Date: 25 OCT 90

Parameter	Results	Units	Reporting Limit
1,4-Naphthoquinone	ND	ug/L	500
1-Naphthylamine	ND	ug/L	500
2-Naphthylamine	ND	ug/L	500
2-Nitroaniline	ND	ug/L	2500
3-Nitroaniline	ND	ug/L	2500
4-Nitroaniline	ND	ug/L	2500
Nitrobenzene	ND	ug/L	500
2-Nitrophenol	ND	ug/L	500
4-Nitrophenol	ND	ug/L	2500
4-Nitroquinoline-1-oxide	ND	ug/L	---
N-Nitroso-di-n-butylamine	ND	ug/L	500
N-Nitrosodiethylamine	ND	ug/L	500
N-Nitrosodimethylamine	ND	ug/L	500
N-Nitrosodiphenylamine	ND	ug/L	500
N-Nitroso-di-n-propylamine	ND	ug/L	500
N-Nitrosomethylethylamine	ND	ug/L	500
N-Nitrosomorpholine	ND	ug/L	500
N-Nitrosopiperidine	ND	ug/L	500
N-Nitrosopyrrolidine	ND	ug/L	500
5-Nitro-o-toluidine	ND	ug/L	500
Parathion	ND	ug/L	2500
Pentachlorobenzene	ND	ug/L	500
Pentachloroethane	ND	ug/L	500
Pentachloronitrobenzene	ND	ug/L	2500
Pentachlorophenol	ND	ug/L	2500
Phenacetin	ND	ug/L	500
Phenanthrene	ND	ug/L	500
Phenol	ND	ug/L	500
4-Phenylenediamine	ND	ug/L	---
Phorate	ND	ug/L	5000
2-Picoline	ND	ug/L	500
pronamide	ND	ug/L	500
Pyrene	ND	ug/L	500
Pyridine	ND	ug/L	1000
Safrole	ND	ug/L	500
Sulfotepp	ND	ug/L	2500
1,2,4,5,-Tetrachloro-benzene	ND	ug/L	500
2,3,4,6-Tetrachlorophenol	ND	ug/L	2500
Thionazin	ND	ug/L	2500

OW-17 GIANT REFINING GALLUP, NEW MEXICO

Appendix IX Semivolatile Organics (cont)

Date: 25 OCT 90

Parameter	Results	Units	Reporting Limit
2-Toluidine	ND	ug/L	500
1,2,4-Trichlorobenzene	ND	ug/L	500
2,4,5-Trichlorophenol	ND	ug/L	2500
0,0,0-Triethylphosphoro-thioate	ND	ug/L	500
2,4,6-Trichlorophenol	ND	ug/L	500
1,3,5-Trinitrobenzene	ND	ug/L	500
Ethyl Methacrylate	ND	ug/L	500
Methyl methacrylate	ND	ug/L	500

OW-17 GIANT REFINING GALLUP, NEW MEXICO

Halogenated Volatile Organics

Date: 25 OCT 90

Parameter	Results	Units	Reporting Limit
Chloromethane	ND	ug/L	120
Bromomethane	ND	ug/L	120
Vinyl chloride	ND	ug/L	25
Chloroethane	ND	ug/L	120
Methylene chloride	ND	ug/L	120
1,1-Dichloroethene	ND	ug/L	12
1,1-Dichloroethane	ND	ug/L	12
trans-1,2-Dichloroethene	ND	ug/L	12
Chloroform	ND	ug/L	12
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	25
1,2-Dichloroethane	110	ug/L	25
1,1,1-Trichloroethane	ND	ug/L	12
Carbon tetrachloride	ND	ug/L	12
Bromodichloromethane	ND	ug/L	25
1,2-Dichloropropane	ND	ug/L	25
trans-1,3-Dichloropropene	ND	ug/L	25
Trichloroethene	ND	ug/L	12
Dibromochloromethane	ND	ug/L	25
cis-1,3-Dichloropropene	ND	ug/L	50
1,1,2-Trichloroethane	ND	ug/L	25
EDB (1,2-Dibromoethane	ND	ug/L	50
Bromoform	ND	ug/L	120
1,1,2,2-Tetrachloroethane	ND	ug/L	25
Tetrachloroethene	ND	ug/L	12
Chlorobenzene	ND	ug/L	50

OW-17 GIANT REFINING GALLUP, NEW MEXICO

Aromatic Volatile Organics

Date: 25 OCT 90

Parameter	Results	Units	Reporting Limit
Benzene	3100	ug/L	120
Toluene	5200	ug/L	120
Chlorobenzene	ND	ug/L	120
Ethylbenzene	920	ug/L	120
Xylenes (total)	5900	ug/L	120
1,3-Dichlorobenzene	ND	ug/L	120
1,4-Dichlorobenzene	ND	ug/L	120
1,2-Dichlorobenzene	ND	ug/L	120

OW-17 GIANT REFINING GALLUP, NEW MEXICO

METALS
DISSOLVED METALS

Date: 25 OCT 90

Parameter	Result	Units	Reporting Limit
Arsenic	ND	mg/L	0.0050
Barium	1.7	mg/L	0.010
Cadmium	ND	mg/L	0.0050
Calcium	143	mg/L	0.20
Chromium	ND	mg/L	0.010
Lead	0.046	mg/L	0.010
Manganese	5.8	mg/L	0.010
Selenium	ND	mg/L	0.0050
Silver	ND	mg/L	0.010
Sodium	319	mg/L	5.0

OW-17 GIANT REFINING GALLUP, NEW MEXICO

General Inorganics

Date: 25 OCT 90

Parameter	Result	Units	Reporting Limit
Alkalinity, Bicarb. as CaCO3 at pH 4.5	369	mg/L	5.0
Alkalinity/ Carb. as CaCO3 at pH 8.3	ND	mg/L	5.0
Chloride	642	mg/L	3.0
pH	7.1	units	--
Phenolics	0.057	mg/L	0.010
Sulfate	6.9	mg/L	5.0
Specific Conductance at 25 deg. C	2510	umhos/cm	1.0
Total Dissolved Solids	1420	mg/L	10.0

OW-25 GIANT REFINING GALLUP, NEW MEXICO

Appendix IX Semivolatile Organics

Date: 6 SEP 90

Parameter	Results	Units	Reporting Limit
Acenapthene	ND	ug/L	10
Acenapthylene	ND	ug/L	10
Acetophenone	ND	ug/L	10
2-Acetylaminofluorene	ND	ug/L	100
4-Aminobiphenyl	ND	ug/L	10
Aniline	ND	ug/L	10
Anthracene	ND	ug/L	10
Aramite	ND	ug/L	10
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(g,h,i)perylene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
Benzyl alcohol	ND	ug/L	10
4-Bromophenyl phenyl ether	ND	ug/L	10
Butyl Benzyl phthalate	ND	ug/L	10
2-sec-Butyl-4,6-dinitro-phenol	ND	ug/L	10
4-Chloroaniline	ND	ug/L	10
bis(2-Chloroethoxy)-methane	ND	ug/L	10
bis(2-Chloroethyl) ether	ND	ug/L	10
bis(2-Chloroisopropyl)-ether	ND	ug/L	10
4-Chloro-3-methylphenol	ND	ug/L	10
2-Chloronapthalene	ND	ug/L	10
2-Chlorophenol	ND	ug/L	10
4-Chlorophenyl phenyl ether	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenz(a,h)anthracene	ND	ug/L	10
Dibenzofuran	ND	ug/L	10
Di-n-butyl phthalate	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
3,3'-Dichlorobenzidine	ND	ug/L	10
2,4-Dichlorophenol	ND	ug/L	10
2,6-Dichlorophenol	ND	ug/L	10

OW-25 GIANT REFINING GALLUP, NEW MEXICO

Appendix IX Semivolatile Organics

Date: 6 SEP 90

Parameter	Results	Units	Reporting Limit
Dimethoate	ND	ug/L	--
p-Dimethylaminoazobene	ND	ug/L	10
7,12-Dimethylbenz(a)-anthracene	ND	ug/L	10
3,3'-Dimethylbenzidine	ND	ug/L	10
a,a-Dimethylphenethyl-amine	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
1,3-Dinitrobenzene	ND	ug/L	10
4,6-Dinitro-'2-methylphenol	ND	ug/L	50
2,4-Dinitrophenol	ND	ug/L	50
2,4-Dinitrotoluene	ND	ug/L	10
2,6-Dinitrotoluene	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Diphenylamine	ND	ug/L	10
Disulfoton	ND	ug/L	50
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
Ethyl methanesulfonate	ND	ug/L	10
Famphur	ND	ug/L	--
Fluoranthene	ND	ug/L	10
Flourene	ND	ug/L	10
Hexachlorobenzene	ND	ug/L	10
Hexachlorobutadiene	ND	ug/L	10
Hexachlorocyclopentadiene	ND	ug/L	10
Hexachloroethane	ND	ug/L	10
Hexachlorophene	ND	ug/L	--
Hexachloropropene	ND	ug/L	10
Indeno(1,2,3-cd)pyrene	ND	ug/L	10
Isophorone	ND	ug/L	10
Isosafrole	ND	ug/L	20
Methapyreline	ND	ug/L	10
3-Methylcholanthrene	ND	ug/L	10
Methyl methanesulfonate	ND	ug/L	10
2-Methylnapthalene	ND	ug/L	10
Methyl parathion	ND	ug/L	50
2-Methylphenol	ND	ug/L	10
3/4-Methylphenol	ND	ug/L	10
Napthalene	ND	ug/L	10

OW-25 GIANT REFINING Gallup, New Mexico

APPENDIX IX SEMIVOLATILE ORGANICS

Date:6 SEP 90

Parameter	Results	Units	Reporting Limit
1,4-Naphthoquinone	ND	ug/L	10
1-Naphthylamine	ND	ug/L	10
2-Naphthylamine	ND	ug/L	10
2-Nitroaniline	ND	ug/L	50
3-Nitroaniline	ND	ug/L	50
4-Nitroaniline	ND	ug/L	50
Nitrobenzene	ND	ug/L	10
2-Nitrophenol	ND	ug/L	10
4-Nitrophenol	ND	ug/L	50
4-Nitroquinoline-1-oxide	ND	ug/L	--
N-Nitroso-di-n-butylamine	ND	ug/L	10
N-Nitrosodiethylamine	ND	ug/L	10
N-Nitrosodimethylamine	ND	ug/L	10
N-Nitrosodiphenylamine	ND	ug/L	10
N-Nitroso-di-n-propylamine	ND	ug/L	10
N-Nitrosomethylethylamine	ND	ug/L	10
N-Nitrosomorpholine	ND	ug/L	10
N-Nitrosopiperidine	ND	ug/L	10
N-Nitrosopyrrolidine	ND	ug/L	10
5-Nitro-o-toluidine	ND	ug/L	10
Parathion	ND	ug/L	50
Pentachlorobenzene	ND	ug/L	10
Pentachloroethane	ND	ug/L	10
Pentachloronitrobenzene	ND	ug/L	50
Pentachlorophenol	ND	ug/L	50
Phenacetin	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Phenol	ND	ug/L	10
4-Phenylenediamine	ND	ug/L	--
Phorate	ND	ug/L	100
2-Picoline	ND	ug/L	10
pronamide	ND	ug/L	10
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	20
Safrole	ND	ug/L	10
Sulfotepp	ND	ug/L	50
1,2,4,5,-Tetrachloro-benzene	ND	ug/L	10
2,3,4,6-Tetrachlorophenol	ND	ug/L	50
Thionazin	ND	ug/L	50

OW-25 GIANT REFINING GALLUP, NEW MEXICO

APPENDIX IX SEMIVOLATILE ORGANICS

Date: 6 SEP 90

Parameter	Results	Units	Reporting Limit
2-Toluidine	ND	ug/L	10
1,2,4-Trichlorobenzene	ND	ug/L	10
2,4,5-Trichlorophenol	ND	ug/L	50
0,0,0-Triethylphosphoro-thioate	ND	ug/L	10
2,4,6-Trichlorophenol	ND	ug/L	10
1,3,5-Trinitrobenzene	ND	ug/L	10
Ethyl Methacrylate	ND	ug/L	10
Methyl methacrylate	ND	ug/L	10

OW-25 GIANT REFINING GALLUP, NEW MEXIC

HALOGENATED VOLATILE ORGANICS

Date: 6 Sep 90

Parameter	Results	Units	Reporting Limit
Chloromethane	ND	ug/L	5
Bromomethane	ND	ug/L	5
Vinyl chloride	ND	ug/L	1
Methylene chloride	ND	ug/L	5
1,1-Dichloroethene	ND	ug/L	0.5
1,1-Dichloroethane	1.1	ug/L	0.5
trans-1,2-Dichloroethene	ND	ug/L	0.5
Chloroform	ND	ug/L	0.5
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	1
1,2-Dichloroethane	24	ug/L	1
1,1,1-Trichloroethane	ND	ug/L	0.5
Carbon tetrachloride	ND	ug/L	0.5
Bromodichloromethane	ND	ug/L	1
1,2-Dichloropropane	ND	ug/L	1
trans-1,3-Dichloropropene	ND	ug/L	1
Trichloroethene	ND	ug/L	0.5
Dibromochloromethane	ND	ug/L	1
cis-1,3-Dichloropropene	ND	ug/L	2
1,1,2-Trichloroethane	ND	ug/L	1
EDB (1,2-Dibromoethane	ND	ug/L	2
Bromoform	ND	ug/L	5
1,1,2,2-Tetrachloroethane	ND	ug/L	1
Tetrachloroethene	ND	ug/L	0.5
Chlorobenzene	ND	ug/L	2

OW-25 GIANT REFINING GALLUP, NEW MEXICO

AROMATIC VOLATILE ORGANICS

Date: 6 SEP 90

Parameter	Results	Units	Reporting Limit
Benzene	1.2	ug/L	0.5
Toluene	ND	ug/L	0.5
Ethylbenzene	ND	ug/L	0.5
Xylenes (total)	ND	ug/L	1
1,3-Dichlorobenzene	ND	ug/L	0.5
1,4-Dichlorobenzene	ND	ug/L	0.5
1,2-Dichlorobenzene	ND	ug/L	0.5

OW-25 GIANT REFINING GALLUP, NEW MEXICO

METALS
DISSOLVED METALS

Parameter	6 SEP 90 Result	Units	Reporting Limit
Arsenic	ND	mg/L	0.0050
Barium	0.13	mg/L	0.010
Cadmium	ND	mg/L	0.0050
Calcium	16.7	mg/L	0.20
Chromium	ND	mg/L	0.010
Lead	ND	mg/L	0.0050
Manganese	0.024	mg/L	0.010
Selenium	0.0065	mg/L	0.0050
Silver	ND	mg/L	0.010
Sodium	256	mg/L	5.0

OW-25 GIANT REFINING GALLUP, NEW MEXICO

GENERAL ORGANICS

Parameter	Date: 6 SEP 90 Result	Units	Reporting Limit
Alkalinity, Bicarb as CaCO3 at pH 4.5	468	mg/L	5.0
Alkalinity, Carb. as CaCO3 at pH 8.3	ND	mg/L	5.0
Chloride	87.6	mg/L	3.0
pH	7.8	units	--
Phenolics	0.022	mg/L	0.010
Sulfate	35.8	mg/L	5.0
Specific Conductance at 25 deg. C	1170	umhos/cm	1.0
Total Dissolved Solids	773	mg/L	10.0

OW-26 GIANT REFINING GALLUP, NEW MEXICO

Semivolatile Organics

Date: 25 OCT 90

Parameter	Results	Units	Reporting Limit
Acenapthene	ND	ug/L	100
Acenapthylene	ND	ug/L	100
Acetophenone	ND	ug/L	100
2-Acetylaminofluorene	ND	ug/L	1000
4-Aminobiphenyl	ND	ug/L	100
Aniline	ND	ug/L	100
Anthracene	ND	ug/L	100
Aramite	ND	ug/L	100
Benzo(a)anthracene	ND	ug/L	100
Benzo(b)fluoranthene	ND	ug/L	100
Benzo(k)fluoranthene	ND	ug/L	100
Benzo(g,h,i)perylene	ND	ug/L	100
Benzo(a)pyrene	ND	ug/L	100
Benzyl alcohol	ND	ug/L	100
4-Bromophenyl phenyl ether	ND	ug/L	100
Butyl Benzyl phthalate	ND	ug/L	100
2-sec-Butyl-4,6-dinitro-phenol	ND	ug/L	100
4-Chloroaniline	ND	ug/L	100
bis(2-Chloroethoxy)-methane	ND	ug/L	100
bis(2-Chloroethyl) ether	ND	ug/L	100
bis(2-Chloroisopropyl)-ether	ND	ug/L	100
4-Chloro-3-methylphenol	ND	ug/L	100
2-Chloronapthalene	ND	ug/L	100
2-Chlorophenol	ND	ug/L	100
4-Chlorophenyl phenyl ether	ND	ug/L	100
Chrysene	ND	ug/L	100
Dibenz(a,h)anthracene	ND	ug/L	100
Dibenzofuran	ND	ug/L	100
Di-n-butyl phthalate	ND	ug/L	100
1,2-Dichlorobenzene	ND	ug/L	100
1,3-Dichlorobenzene	ND	ug/L	100
1,4-Dichlorobenzene	ND	ug/L	200
3,3'-Dichlorobenzidine	ND	ug/L	100
2,4-Dichlorophenol	ND	ug/L	100
2,6-Dichlorophenol	ND	ug/L	100

OW-26 GIANT REFINING GALLUP, NEW MEXICO

Appendix IX Semivolatile Organics

Date: 25 OCT 90

Parameter	Results	Units	Reporting Limit
Dimethoate	ND	ug/L	--
p-Dimethylaminoazobene	ND	ug/L	100
7,12-Dimethylbenz(a)-anthracene	ND	ug/L	100
3,3'-Dimethylbenzidine	ND	ug/L	100
a,a-Dimethylphenethyl-amine	ND	ug/L	100
2,4-Dimethylphenol	ND	ug/L	100
Dimethyl phthalate	ND	ug/L	100
1,3-Dinitrobenzene	ND	ug/L	100
4,6-Dinitro-'2-methylphenol	ND	ug/L	500
2,4-Dinitrophenol	ND	ug/L	500
2,4-Dinitrotoluene	ND	ug/L	100
2,6-Dinitrotoluene	ND	ug/L	100
Di-n-octyl phthalate	ND	ug/L	100
Diphenylamine	ND	ug/L	100
Disulfoton	ND	ug/L	500
bis(2-Ethylhexyl) phthalate	ND	ug/L	100
Ethyl methanesulfonate	ND	ug/L	100
Famphur	ND	ug/L	---
Fluoranthene	ND	ug/L	100
Flourene	ND	ug/L	100
Hexachlorobenzene	ND	ug/L	100
Hexachlorobutadiene	ND	ug/L	100
Hexachlorocyclopentadiene	ND	ug/L	100
Hexachloroethane	ND	ug/L	100
Hexachlorophene	ND	ug/L	---
Hexachloropropene	ND	ug/L	100
Indeno(1,2,3-cd)pyrene	ND	ug/L	100
Isophorone	ND	ug/L	100
Isosafrole	ND	ug/L	200
Methapyreline	ND	ug/L	100
3-Methylcholanthrene	ND	ug/L	100
Methyl methanesulfonate	ND	ug/L	100
2-Methylnapthalene	130	ug/L	100
Methyl parathion	ND	ug/L	500
2-Methylphenol	ND	ug/L	100
3/4-Methylphenol	ND	ug/L	100
Napthalene	320	ug/L	100

OW-26 GIANT REFINING Gallup, New Mexico

Appendix IX Semivolatile Organics (cont)

Date: 25 OCT 90

Parameter	Results	Units	Reporting Limit
1,4-Naphthoquinone	ND	ug/L	100
1-Naphthylamine	ND	ug/L	100
2-Naphthylamine	ND	ug/L	100
2-Nitroaniline	ND	ug/L	500
3-Nitroaniline	ND	ug/L	500
4-Nitroaniline	ND	ug/L	500
Nitrobenzene	ND	ug/L	100
2-Nitrophenol	ND	ug/L	100
4-Nitrophenol	ND	ug/L	500
4-Nitroquinoline-1-oxide	ND	ug/L	---
N-Nitroso-di-n-butylamine	ND	ug/L	100
N-Nitrosodiethylamine	ND	ug/L	100
N-Nitrosodimethylamine	ND	ug/L	100
N-Nitrosodiphenylamine	ND	ug/L	100
N-Nitroso-di-			100
n-propylamine	ND	ug/L	100
N-Nitrosomethylethylamine	ND	ug/L	100
N-Nitrosomorpholine	ND	ug/L	100
N-Nitrosopiperidine	ND	ug/L	100
N-Nitrosopyrrolidine	ND	ug/L	100
5-Nitro-o-toluidine	ND	ug/L	500
Parathion	ND	ug/L	100
Pentachlorobenzene	ND	ug/L	100
Pentachloroethane	ND	ug/L	500
Pentachloronitrobenzene	ND	ug/L	100
Pentachlorophenol	ND	ug/L	500
Phenacetin	ND	ug/L	100
Phenanthrene	ND	ug/L	100
Phenol	ND	ug/L	100
4-Phenylenediamine	ND	ug/L	---
Phorate	ND	ug/L	1000
2-Picoline	ND	ug/L	100
pronamide	ND	ug/L	100
Pyrene	ND	ug/L	100
Pyridine	ND	ug/L	200
Safrole	ND	ug/L	100
Sulfotepp	ND	ug/L	500
1,2,4,5,-Tetrachloro-			
benzene	ND	ug/L	100
2,3,4,6-Tetrachlorophenol	ND	ug/L	500
Thionazin	ND	ug/L	500

OW-26 GIANT REFINING GALLUP, NEW MEXICO

Appendix IX Semivolatile Organics (cont)

Date: 25 OCT 90

Parameter	Results	Units	Reporting Limit
2-Toluidine	ND	ug/L	100
1,2,4-Trichlorobenzene	ND	ug/L	100
2,4,5-Trichlorophenol	ND	ug/L	500
2,4,6-Trichlorophenol	ND	ug/L	100
0,0,0-Triethylphosphoro-thioate	ND	ug/L	100
1,3,5-Trinitrobenzene	ND	ug/L	100
Ethyl Methacrylate	ND	ug/L	100
Methyl methacrylate	ND	ug/L	100

OW-26 GIANT REFINING GALLUP, NEW MEXICO

HALOGENATED VOLATILE ORGANICS

Date: 25 OCT 90

Parameter	Results	Units	Reporting Limit
Chloromethane	ND	ug/L	5
Bromomethane	ND	ug/L	5
Vinyl chloride	ND	ug/L	1
Chloroethane	ND	ug/L	5
Methylene chloride	ND	ug/L	5
1,1-Dichloroethene	ND	ug/L	0.5
1,1-Dichloroethane	1.1	ug/L	0.5
trans-1,2-Dichloroethene	ND	ug/L	0.5
Chloroform	ND	ug/L	0.5
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	1
1,2-Dichloroethane	26	ug/L	1
1,1,1-Trichloroethane	ND	ug/L	0.5
Carbon tetrachloride	ND	ug/L	0.5
Bromodichloromethane	ND	ug/L	1
1,2-Dichloropropane	ND	ug/L	1
trans-1,3-Dichloropropene	ND	ug/L	1
Trichloroethene	ND	ug/L	0.5
Dibromochloromethane	ND	ug/L	1
cis-1,3-Dichloropropene	ND	ug/L	2
1,1,2-Trichloroethane	ND	ug/L	1
EDB (1,2-Dibromoethane	ND	ug/L	2
Bromoform	ND	ug/L	5
1,1,2,2-Tetrachloroethane	ND	ug/L	1
Tetrachloroethene	ND	ug/L	0.5
Chlorobenzene	ND	ug/L	2

OW-26 GIANT REFINING GALLUP, NEW MEXICO

Aromatic Volatile Organics

Date: 25 OCT 90

Parameter	Results	Units	Reporting Limit
Benzene	3100	ug/L	120
Toluene	2200	ug/L	120
Chlorobenzene	ND	ug/L	120
Ethylbenzene	970	ug/L	120
Xylenes (total)	6100	ug/L	120
1,3-Dichlorobenzene	ND	ug/L	120
1,4-Dichlorobenzene	ND	ug/L	120
1,2-Dichlorobenzene	ND	ug/L	120

OW-26 GIANT REFINING GALLUP, NEW MEXICO

Dissolved Metals

Parameter	Date: 25 OCT 90 Result	Units	Reporting Limit
Arsenic	0.011	mg/L	0.0050
Barium	2.3	mg/L	0.010
Cadmium	ND	mg/L	0.0050
Calcium	61.4	mg/L	0.20
Chromium	ND	mg/L	0.010
Lead	ND	mg/L	0.0050
Manganese	1.5	mg/L	0.010
Selenium	ND	mg/L	0.050
Silver	ND	mg/L	0.010
Sodium	252	mg/L	5.0

OW-26 GIANT REFINING GALLUP, NEW MEXICO

General Inorganics

Parameter	Date: Result	Units	Reporting Limit
Alkalinity, Bicarb as CaCO3 at pH 4.5	592	mg/L	5.0
Alkalinity, Carb as CaCO3 at pH 8.3	ND	mg/L	5.0
Chloride	156	mg/L	3.0
pH	7.4	units	---
Phenolics	0.015	mg/L	0.010
Sulfate	ND	mg/L	5.0
Specific Conductance at 25 deg C	1490	umhos/cm	1.0
Total Dissolved Solids	894	mg/L	10.0

ATTACHMENT E

Halogenated Volatile Organics

Method 601

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 006769-0008-SA
Matrix: AQUEOUS
Authorized: 28 SEP 89

Enseco ID: 1054296
Sampled: 27 SEP 89
Prepared: NA

Received: 28 SEP 89
Analyzed: 04 OCT 89

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
1,2-Dichloroethene (cis/trans)	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2-Trichloro-2,2, 1-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	7.7	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Chlorodibromomethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0

ND = Not detected
NA = Not applicable

Reported By: William Sullivan

Approved By: Stephanie Boehnke

Aromatic Volatile Organics

Method 602

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 006769-0008-SA
Matrix: AQUEOUS
Authorized: 28 SEP 89

Enseco ID: 1054296
Sampled: 27 SEP 89
Prepared: NA

Received: 28 SEP 89
Analyzed: 04 OCT 89

Parameter	Result	Units	Reporting Limit
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethyl benzene	ND	ug/L	0.50
Total xylenes	ND	ug/L	1.0
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50

ND = Not detected
NA = Not applicable

Reported By: William Sullivan

Approved By: Stephanie Boehnke

Appendix IX Semivolatile Organics

Method 625

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 006769-0008-SA Enseco ID: 1054296
Matrix: AQUEOUS Sampled: 27 SEP 89 Received: 28 SEP 89
Authorized: 28 SEP 89 Prepared: 02 OCT 89 Analyzed: 09 OCT 89

Parameter	Result	Units	Reporting Limit
Acenaphthene	ND	ug/L	10
Acenaphthylene	ND	ug/L	10
Acetophenone	ND	ug/L	10
2-Acetylaminofluorene	ND	ug/L	10
4-Aminobiphenyl	ND	ug/L	10
Aniline	ND	ug/L	10
Anthracene	ND	ug/L	10
Aramite	ND	ug/L	10
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(g,h,i)perylene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
bis(2-Chloroethoxy) methane	ND	ug/L	10
Benzyl alcohol	ND	ug/L	20
bis(2-Chloroethyl)ether	ND	ug/L	10
bis(2-Chloroisopropyl) ether	ND	ug/L	10
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
4-Bromophenyl phenyl ether	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
2sec-Butyl-4,6-dinitro-phenol (Dinoseb)	ND	ug/L	10
4-Chloroaniline	ND	ug/L	20
4-Chloro-3-methylphenol	ND	ug/L	20
2-Chloronaphthalene	ND	ug/L	10
2-Chlorophenol	ND	ug/L	10
4-Chlorophenyl phenyl ether	ND	ug/L	10
o-Cresol	ND	ug/L	10
m & p-Cresol(s)	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenz(a,h)anthracene	ND	ug/L	10
Dibenzofuran	ND	ug/L	10
Di-n-butyl phthalate	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 Gallik Approved By: Jeff Lowry

Appendix IX Semivolatile Organics (CONT.)

Method 625

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 006769-0008-SA Enseco ID: 1054296
Matrix: AQUEOUS Sampled: 27 SEP 89 Received: 28 SEP 89
Authorized: 28 SEP 89 Prepared: 02 OCT 89 Analyzed: 09 OCT 89

Parameter	Result	Units	Reporting Limit
3,3'-Dichlorobenzidine	ND	ug/L	20
2,4-Dichlorophenol	ND	ug/L	10
2,6-Dichlorophenol	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10
p-Dimethylaminoazobenzene	ND	ug/L	10
7,12-Dimethylbenz-anthracene	ND	ug/L	10
3,3'-Dimethylbenzidine	ND	ug/L	10
a,a-Dimethylphen-ethylamine	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
1,3-Dinitrobenzene	ND	ug/L	10
4,6-Dinitro-o-cresol	ND	ug/L	50
2,4-Dinitrophenol	ND	ug/L	50
2,4-Dinitrotoluene	ND	ug/L	10
2,6-Dinitrotoluene	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Diphenylamine	ND	ug/L	10
Ethyl methacrylate	ND	ug/L	10
Ethyl methanesulfonate	ND	ug/L	10
Fluoranthene	ND	ug/L	10
Fluorene	ND	ug/L	10
Hexachlorobenzene	ND	ug/L	10
Hexachlorobutadiene	ND	ug/L	10
Hexachlorocyclopentadiene	ND	ug/L	10
Hexachloroethane	ND	ug/L	10
Hexachlorophene	ND	ug/L	--
Hexachloropropene	ND	ug/L	20
Indeno(1,2,3-c,d)pyrene	ND	ug/L	10
Isophorone	ND	ug/L	10
Isosafrole	ND	ug/L	20
Methapyrilene	ND	ug/L	10
3-Methylcholanthrene	ND	ug/L	20
Methyl methacrylate	ND	ug/L	10
Methyl methanesulfonate	ND	ug/L	10
2-Methylnaphthalene	ND	ug/L	10
Naphthalene	ND	ug/L	10
1,4-Naphthoquinone	ND	ug/L	10
1-Naphthylamine	ND	ug/L	10
2-Naphthylamine	ND	ug/L	10

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Michael Gallik Approved By: Jeff Lowry

Appendix IX Semivolatile Organics (CONT.)

Method 625

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 006769-0008-SA Enseco ID: 1054296
Matrix: AQUEOUS Sampled: 27 SEP 89 Received: 28 SEP 89
Authorized: 28 SEP 89 Prepared: 02 OCT 89 Analyzed: 09 OCT 89

Parameter	Result	Units	Reporting Limit
2-Nitroaniline	ND	ug/L	50
3-Nitroaniline	ND	ug/L	50
4-Nitroaniline	ND	ug/L	50
Nitrobenzene	ND	ug/L	10
2-Nitrophenol	ND	ug/L	10
4-Nitrophenol	ND	ug/L	50
4-Nitroquinoline-1-oxide	ND	ug/L	--
N-Nitrosodi-n-butylamine	ND	ug/L	10
N-Nitrosodiethylamine	ND	ug/L	10
N-Nitrosodimethylamine	ND	ug/L	10
N-Nitrosodiphenylamine	ND	ug/L	10
N-Nitroso-di-n-propylamine	ND	ug/L	10
N-Nitrosomethylethylamine	ND	ug/L	10
N-Nitrosomorpholine	ND	ug/L	10
N-Nitrosopiperidine	ND	ug/L	10
N-Nitrosopyrrolidine	ND	ug/L	10
5-Nitro-o-toluidine	ND	ug/L	10
Pentachlorobenzene	ND	ug/L	10
Pentachloroethane	ND	ug/L	10
Pentachloronitrobenzene	ND	ug/L	50
Pentachlorophenol	ND	ug/L	50
Phenacetin	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Phenol	ND	ug/L	10
p-Phenylenediamine	ND	ug/L	--
2-Picoline	ND	ug/L	10
Pronamide	ND	ug/L	20
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	10
Safrole	ND	ug/L	10
1,2,4,5-Tetrachloro-benzene	ND	ug/L	10
2,3,4,6-Tetrachlorophenol	ND	ug/L	20
o-Toluidine	ND	ug/L	10
1,2,4-Trichlorobenzene	ND	ug/L	10
2,4,5-Trichlorophenol	ND	ug/L	50
o,o,o-Triethylphosphoro-thioate	ND	ug/L	50
2,4,6-Trichlorophenol	ND	ug/L	10
Ethyl parathion	ND	ug/L	50

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Michael Gallik Approved By: Jeff Lowry

Appendix IX Semivolatile Organics (CONT.)

Method 625

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 006769-0008-SA Enseco ID: 1054296
Matrix: AQUEOUS Sampled: 27 SEP 89 Received: 28 SEP 89
Authorized: 28 SEP 89 Prepared: 02 OCT 89 Analyzed: 09 OCT 89

Parameter	Result	Units	Reporting Limit
Phorate (Thimet)	ND	ug/L	100
Sulfotepp	ND	ug/L	50
Thionazin	ND	ug/L	50
sym-Trinitrobenzene	ND	ug/L	10
Dimethoate	ND	ug/L	--
Disulfoton	ND	ug/L	50
Famphur	ND	ug/L	100
Methyl parathion	ND	ug/L	50
Nitrobenzene-d5	57.1	%	--
2-Fluorobiphenyl	46.6	%	--
Terphenyl-d14	41.3	%	--
Phenol-d5	58.0	%	--
2-Fluorophenol	52.5	%	--
2,4,6-Tribromophenol	57.5	%	--

ND = Not detected
NA = Not applicable

Reported By: Michael Gallik Approved By: Jeff Lowry

Metals

Dissolved Metals

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 006769-0008-SA
Matrix: AQUEOUS
Authorized: 28 SEP 89
Enseco ID: 1054296
Sampled: 27 SEP 89
Prepared: See Below
Received: 28 SEP 89
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic	ND	mg/L	0.005	206.2	NA	24 OCT 89
Barium	0.06	mg/L	0.01	200.7	NA	01 NOV 89
Cadmium	ND	mg/L	0.005	200.7	NA	01 NOV 89
Calcium	7.5	mg/L	0.2	200.7	NA	01 NOV 89
Chromium	ND	mg/L	0.01	200.7	NA	01 NOV 89
Lead	ND	mg/L	0.01	239.2	NA	24 OCT 89
Manganese	0.02	mg/L	0.01	200.7	NA	01 NOV 89
Selenium	0.024	mg/L	0.005	270.2	NA	24 OCT 89
Silver	ND	mg/L	0.01	200.7	NA	01 NOV 89
Sodium	260	mg/L	5	200.7	NA	01 NOV 89

ND = Not detected
NA = Not applicable

Reported By: Bryan Anderson

Approved By: Tammy Bailey

General Inorganics

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 006769-0008-SA
Matrix: AQUEOUS
Authorized: 28 SEP 89

Enseco ID: 1054296
Sampled: 27 SEP 89
Prepared: See Below

Received: 28 SEP 89
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analy: Date
Alkalinity, Total as CaCO3 at pH 4.5	285	mg/L	5	310.1	NA	29 SE:
Alkalinity, Bicarb. as CaCO3 at pH 4.5	272	mg/L	5	310.1	NA	29 SE:
Alkalinity, Carb. as CaCO3 at pH 8.3	13	mg/L	5	310.1	NA	29 SE:
Alkalinity, Hydrox. as CaCO3	ND	mg/L	5	310.1	NA	29 SE:
Chloride	168	mg/L	3	300.0	NA	29 SE:
pH	8.5	units	--	150.1	NA	29 SE:
pH	8.5	units	--	150.1	NA	29 SE:
pH	8.5	units	--	150.1	NA	29 SE:
pH	8.5	units	--	150.1	NA	29 SE:
Phenolics	ND	mg/L	0.01	420.1	NA	19 OC:
Sulfate	34	mg/L	5	300.0	NA	29 SE:
Specific Conductance at 25 deg.C	1070	umhos/c	1	120.1	NA	29 SE:
Specific Conductance at 25 deg.C	1070	umhos/c	1	120.1	NA	29 SE:
Specific Conductance at 25 deg.C	1070	umhos/c	1	120.1	NA	29 SE:
Specific Conductance at 25 deg.C	1070	umhos/c	1	120.1	NA	29 SE:
Total Dissolved Solids	760	mg/L	10	160.1	NA	03 OC:

ND = Not detected
NA = Not applicable

Reported By: Blake Besser

Approved By: Kimberly Conroy

Rocky Mountain
Analytical Laboratory

Enseco

ANALYTICAL RESULTS

FOR

GIANT REFINING

ENSECO-RMAL NO. 009051

APRIL 27, 1990

OW-16

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.

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 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

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
009051-0001-SA	OW-16	AQUEOUS	11 APR 90	10:00	12 APR 90
009051-0002-SA	Trip Blank	AQUEOUS			12 APR 90

Enseco
A CORNING Company

ANALYTICAL TEST REQUESTS
for
Giant Refining

Lab ID: 009051	Group Code	Analysis Description	Custom Test?
0001	A	Alkalinity,	Y
		Total/Carbonate/Bicarbonate/Hydroxide	Y
		pH	N
		Chloride, Ion Chromatography	N
		Phenolics (4-AAP)	N
		Specific Conductance	N
		Total Dissolved Solids (TDS)	N
		ICP Metals (Dissolved)	Y
		Selenium, Furnace AA (Dissolved)	N
		Halogenated Volatile Organics	N
		Aromatic Volatile Organics	N
		Appendix IX Semivolatile Organics	N
		Prep - Semivolatile Organics by GC/MS	N
		Arsenic, Furnace AA (Dissolved)	N
		Lead, Furnace AA (Dissolved)	N
		Sulfate, Ion Chromatography	N
0002	B	Halogenated Volatile Organics	N
		Aromatic 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, 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

Appendix IX Semivolatile Organics

Method 8270

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 009051-0001-SA Enseco ID: 1071704
Matrix: AQUEOUS Sampled: 11 APR 90 Received: 12 APR 90
Authorized: 12 APR 90 Prepared: 15 APR 90 Analyzed: 19 APR 90

Parameter	Result	Units	Reporting Limit
Acenaphthene	ND	ug/L	10
Acenaphthylene	ND	ug/L	10
Acetophenone	ND	ug/L	10
2-Acetylaminofluorene	ND	ug/L	10
4-Aminobiphenyl	ND	ug/L	10
Aniline	ND	ug/L	10
Anthracene	ND	ug/L	10
Aramite	ND	ug/L	10
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(g,h,i)perylene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
bis(2-Chloroethoxy)-methane	ND	ug/L	10
Benzyl alcohol	ND	ug/L	20
bis(2-Chloroethyl) ether	ND	ug/L	10
bis(2-Chloroisopropyl)-ether	ND	ug/L	10
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
4-Bromophenyl phenyl ether	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
2-sec-Butyl-4,6-dinitro-phenol	ND	ug/L	10
4-Chloroaniline	ND	ug/L	20
4-Chloro-3-methylphenol	ND	ug/L	20
2-Chloronaphthalene	ND	ug/L	10
2-Chlorophenol	ND	ug/L	10
4-Chlorophenyl phenyl ether	ND	ug/L	10
o-Cresol	ND	ug/L	10
m & p-Cresol(s)	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenz(a,h)anthracene	ND	ug/L	10
Dibenzofuran	ND	ug/L	10
Di-n-butyl phthalate	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: Donna Reinwald Approved By: Jeff Lowry

Enseco
A CORNING Company

Appendix IX Semivolatile Organics (CONT.)

Method 8270

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 009051-0001-SA Enseco ID: 1071704
Matrix: AQUEOUS Sampled: 11 APR 90 Received: 12 APR 90
Authorized: 12 APR 90 Prepared: 15 APR 90 Analyzed: 19 APR 90

Parameter	Result	Units	Reporting Limit
3,3'-Dichlorobenzidine	ND	ug/L	20
2,4-Dichlorophenol	ND	ug/L	10
2,6-Dichlorophenol	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10
p-Dimethylaminoazobenzene	ND	ug/L	10
7,12-Dimethylbenz(a)-anthracene	ND	ug/L	10
3,3'-Dimethylbenzidine	ND	ug/L	10
a,a-Dimethylphenethyl-amine	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
1,3-Dinitrobenzene	ND	ug/L	10
4,6-Dinitro-o-cresol	ND	ug/L	50
2,4-Dinitrophenol	ND	ug/L	50
2,4-Dinitrotoluene	ND	ug/L	10
2,6-Dinitrotoluene	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Diphenylamine	ND	ug/L	10
Ethyl methacrylate	ND	ug/L	10
Ethyl methanesulfonate	ND	ug/L	10
Fluoranthene	ND	ug/L	10
Fluorene	ND	ug/L	10
Hexachlorobenzene	ND	ug/L	10
Hexachlorobutadiene	ND	ug/L	10
Hexachlorocyclopentadiene	ND	ug/L	10
Hexachloroethane	ND	ug/L	10
Hexachlorophene	ND	ug/L	--
Hexachloropropene	ND	ug/L	20
Indeno(1,2,3-cd)pyrene	ND	ug/L	10
Isophorone	ND	ug/L	10
Isosafrole	ND	ug/L	20
Methapyrilene	ND	ug/L	10
3-Methylcholanthrene	ND	ug/L	20
Methyl methacrylate	ND	ug/L	10
Methyl methanesulfonate	ND	ug/L	10
2-Methylnaphthalene	ND	ug/L	10
Naphthalene	ND	ug/L	10
1,4-Naphthoquinone	ND	ug/L	10
1-Naphthylamine	ND	ug/L	10
2-Naphthylamine	ND	ug/L	10

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Donna Reinwald Approved By: Jeff Lowry

Enseco
A CORNING Company

Appendix IX Semivolatile Organics (CONT.)

Method 8270

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 009051-0001-SA Enseco ID: 1071704
Matrix: AQUEOUS Sampled: 11 APR 90 Received: 12 APR 90
Authorized: 12 APR 90 Prepared: 15 APR 90 Analyzed: 19 APR 90

Parameter	Result	Units	Reporting Limit
2-Nitroaniline	ND	ug/L	50
3-Nitroaniline	ND	ug/L	50
4-Nitroaniline	ND	ug/L	50
Nitrobenzene	ND	ug/L	10
2-Nitrophenol	ND	ug/L	10
4-Nitrophenol	ND	ug/L	50
4-Nitroquinoline-1-oxide	ND	ug/L	--
N-Nitroso-di-n-butylamine	ND	ug/L	10
N-Nitrosodiethylamine	ND	ug/L	10
N-Nitrosodimethylamine	ND	ug/L	10
N-Nitrosodiphenylamine	ND	ug/L	10
N-Nitroso-di-n-propylamine	ND	ug/L	10
N-Nitrosomethylethylamine	ND	ug/L	10
N-Nitrosomorpholine	ND	ug/L	10
N-Nitrosopiperidine	ND	ug/L	10
N-Nitrosopyrrolidine	ND	ug/L	10
5-Nitro-o-toluidine	ND	ug/L	10
Pentachlorobenzene	ND	ug/L	10
Pentachloroethane	ND	ug/L	10
Pentachloronitrobenzene	ND	ug/L	50
Pentachlorophenol	ND	ug/L	50
Phenacetin	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Phenol	ND	ug/L	10
p-Phenylenediamine	ND	ug/L	--
2-Picoline	ND	ug/L	10
Pronamide	ND	ug/L	20
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	10
Safrole	ND	ug/L	10
1,2,4,5-Tetrachlorobenzene	ND	ug/L	10
2,3,4,6-Tetrachlorophenol	ND	ug/L	20
o-Toluidine	ND	ug/L	10
1,2,4-Trichlorobenzene	ND	ug/L	10
2,4,5-Trichlorophenol	ND	ug/L	50
O,O,O-Triethylphosphorothioate	ND	ug/L	50
2,4,6-Trichlorophenol	ND	ug/L	10
Ethyl parathion	ND	ug/L	50

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Donna Reinwald Approved By: Jeff Lowry

Enseco
A CORNING Company

Appendix IX Semivolatile Organics (CONT.)

Method 8270

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 009051-0001-SA Enseco ID: 1071704
Matrix: AQUEOUS Sampled: 11 APR 90 Received: 12 APR 90
Authorized: 12 APR 90 Prepared: 15 APR 90 Analyzed: 19 APR 90

Parameter	Result	Units	Reporting Limit
Phorate (Thimet)	ND	ug/L	100
Sulfotepp	ND	ug/L	50
Thionazin	ND	ug/L	50
sym-Trinitrobenzene	ND	ug/L	10
Dimethoate	ND	ug/L	--
Disulfoton	ND	ug/L	50
Famphur	ND	ug/L	100
Methyl parathion	ND	ug/L	50
Nitrobenzene-d5	58	%	--
2-Fluorobiphenyl	56	%	--
Terphenyl-d14	63	%	--
Phenol-d5	56	%	--
2-Fluorophenol	48	%	--
2,4,6-Tribromophenol	60	%	--

ND = Not detected
NA = Not applicable

Reported By: Donna Reinwald Approved By: Jeff Lowry

Enseco
A CORNING Company

Halogenated Volatile Organics

Method 8010

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 009051-0001-SA
Matrix: AQUEOUS
Authorized: 12 APR 90

Enseco ID: 1071704
Sampled: 11 APR 90
Prepared: NA

Received: 12 APR 90
Analyzed: 12 APR 90

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
trans-1,2-Dichloroethene	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	7.9	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Chlorodibromomethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0

ND = Not detected
NA = Not applicable

Reported By: Leewaphath Xaiyasang

Approved By: Kim Zilis

Enseco
A CORNING Company

Halogenated Volatile Organics

Method 8010

Client Name: Giant Refining
Client ID: Trip Blank
Lab ID: 009051-0002-SA Enseco ID: 1071707
Matrix: AQUEOUS Sampled: Unknown Received: 12 APR 90
Authorized: 12 APR 90 Prepared: NA Analyzed: 12 APR 90

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
trans-1,2-Dichloroethene	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	ND	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Chlorodibromomethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0

ND = Not detected
NA = Not applicable

Reported By: Leewaphath Xaiyasang Approved By: Kim Zilis

Enseco
A CORNING Company

Aromatic Volatile Organics

Method 8020

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 009051-0001-SA Enseco ID: 1071704
Matrix: AQUEOUS Sampled: 11 APR 90 Received: 12 APR 90
Authorized: 12 APR 90 Prepared: NA Analyzed: 12 APR 90

Parameter	Result	Units	Reporting Limit
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethylbenzene	ND	ug/L	0.50
Xylenes (total)	ND	ug/L	1.0
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50

ND = Not detected
NA = Not applicable

Reported By: Greg Gustina Approved By: Kim Zilis

Enseco
A CORNING Company

Aromatic Volatile Organics

Method 8020

Client Name: Giant Refining
Client ID: Trip Blank
Lab ID: 009051-0002-SA Enseco ID: 1071707
Matrix: AQUEOUS Sampled: Unknown Received: 12 APR 90
Authorized: 12 APR 90 Prepared: NA Analyzed: 12 APR 90

Parameter	Result	Units	Reporting Limit
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethylbenzene	ND	ug/L	0.50
Xylenes (total)	ND	ug/L	1.0
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50

ND = Not detected
NA = Not applicable

Reported By: Greg Gustina Approved By: Kim Zilis

Enseco
A CORNING Company

Metals

Dissolved Metals

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 009051-0001-SA
Enseco ID: 1071704
Matrix: AQUEOUS
Sampled: 11 APR 90
Received: 12 APR 90
Authorized: 12 APR 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	19 APR 90
Barium	0.038	mg/L	0.010	6010	NA	24 APR 90
Cadmium	ND	mg/L	0.0050	6010	NA	24 APR 90
Calcium	5.4	mg/L	0.20	6010	NA	24 APR 90
Chromium	ND	mg/L	0.010	6010	NA	24 APR 90
Lead	ND	mg/L	0.0050	7421	NA	19 APR 90
Manganese	ND	mg/L	0.010	6010	NA	24 APR 90
Selenium	ND	mg/L	0.025	7740	NA	19 APR 90
Silver	ND	mg/L	0.010	6010	NA	24 APR 90
Sodium	242	mg/L	5.0	6010	NA	24 APR 90

ND = Not detected
NA = Not applicable

Reported By: Fred Velasquez
Approved By: Toni Lusk

Enseco
A CORNING Company

General Inorganics

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 009051-0001-SA
Matrix: AQUEOUS
Authorized: 12 APR 90

Enseco ID: 1071704
Sampled: 11 APR 90
Prepared: See Below
Received: 12 APR 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Alkalinity, Bicarb. as CaCO3 at pH 4.5	285	mg/L	5.0	310.1	NA	12 APR 90
Alkalinity, Carb. as CaCO3 at pH 8.3	14.0	mg/L	5.0	310.1	NA	12 APR 90
Chloride	154	mg/L	3.0	300.0	NA	25 APR 90
pH	8.5	units	--	9040	NA	12 APR 90
Phenolics	ND	mg/L	0.010	9065	NA	17 APR 90
Sulfate	28.4	mg/L	5.0	300.0	NA	25 APR 90
Specific Conductance at 25 deg.C	1060	umhos/cm	1.0	120.1	NA	12 APR 90
Total Dissolved Solids	678	mg/L	10.0	160.1	NA	15 APR 90

ND = Not detected
NA = Not applicable

Reported By: Linda Sullivan

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).

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

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
Semivolatile Organics by GC/MS

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
009051-0001-SA	AQUEOUS	625-A	15 APR 90-A	15 APR 90-B

Enseco
A CORNING Company

DUPLICATE CONTROL SAMPLE REPORT
Semivolatile Organics by GC/MS

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: 625-A Matrix: AQUEOUS QC Lot: 15 APR 90-A Concentration Units: ug/L								
Phenol	100	67.2	62.3	64.8	65	12- 89	7.6	42
2-Chlorophenol	100	69.4	68.1	68.8	69	27-123	1.9	40
1,4-Dichlorobenzene	50	32.0	31.0	31.5	63	36- 97	3.2	28
N-Nitroso-di-n-propylamine	50	39.4	41.4	40.4	81	41-116	5.0	38
1,2,4-Trichlorobenzene	50	31.7	30.3	31.0	62	39- 98	4.5	28
4-Chloro-3-methylphenol	100	74.4	72.7	73.6	74	23- 97	2.3	42
Acenaphthene	50	36.1	38.8	37.4	75	46-118	7.2	31
4-Nitrophenol	100	49.5	36.6	43.0	43	10- 80	30	50
2,4-Dinitrotoluene	50	37.1	38.6	37.8	76	24- 96	4.0	38
Pentachlorophenol	100	69.0	66.4	67.7	68	9-103	3.8	50
Pyrene	50	38.7	42.7	40.7	81	26-127	9.8	31

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

Enseco
A CORNING Company

SINGLE CONTROL SAMPLE REPORT
Semivolatile Organics by GC/MS

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Category: 625-A				
Matrix: AQUEOUS				
QC Lot: 15 APR 90-A QC Run: 15 APR 90-B				
Concentration Units: ug/L				
Nitrobenzene-d5	100	64.5	64	35-114
2-Fluorobiphenyl	100	54.7	55	43-116
Terphenyl-d14	100	68.6	69	33-141
2-Fluorophenol	200	125	62	21-100
Phenol-d5	200	130	65	10- 94
2,4,6-Tribromophenol	200	133	66	10-123

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

Enseco
A CORNING Company

METHOD BLANK REPORT
Semivolatile Organics by GC/MS

Test: 625-AP9-A
Matrix: AQUEOUS
QC Lot: 15 APR 90-A QC Run: 15 APR 90-B

Analyte	Result	Units	Reporting Limit
Acenaphthene	ND	ug/L	10
Acenaphthylene	ND	ug/L	10
Acetophenone	ND	ug/L	10
2-Acetylaminofluorene	ND	ug/L	10
4-Aminobiphenyl	ND	ug/L	10
Aniline	ND	ug/L	10
Anthracene	ND	ug/L	10
Aramite	ND	ug/L	10
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(g,h,i)perylene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
Benzyl alcohol	ND	ug/L	20
bis(2-Chloroethoxy)-methane	ND	ug/L	10
bis(2-Chloroethyl) ether	ND	ug/L	10
bis(2-Chloroisopropyl)-ether	ND	ug/L	10
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
4-Bromophenyl phenyl ether	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
2-sec-Butyl-4,6-dinitro-phenol	ND	ug/L	10
4-Chloroaniline	ND	ug/L	20
4-Chloro-3-methylphenol	ND	ug/L	20
2-Chloronaphthalene	ND	ug/L	10
2-Chlorophenol	ND	ug/L	10
4-Chlorophenyl phenyl ether	ND	ug/L	10
o-Cresol	ND	ug/L	10
m & p-Cresol(s)	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenz(a,h)anthracene	ND	ug/L	10
Dibenzofuran	ND	ug/L	10
Di-n-butyl phthalate	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

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

Analyte	Result	Units	Reporting Limit
Test: 625-AP9-A			
Matrix: AQUEOUS			
QC Lot: 15 APR 90-A QC Run: 15 APR 90-B			
3,3'-Dichlorobenzidine	ND	ug/L	20
2,4-Dichlorophenol	ND	ug/L	10
2,6-Dichlorophenol	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10
p-Dimethylaminoazobenzene	ND	ug/L	10
7,12-Dimethylbenz(a)-anthracene	ND	ug/L	10
3,3'-Dimethylbenzidine	ND	ug/L	10
a,a-Dimethylphenethyl-amine	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
1,3-Dinitrobenzene	ND	ug/L	10
4,6-Dinitro-o-cresol	ND	ug/L	50
2,4-Dinitrophenol	ND	ug/L	50
2,4-Dinitrotoluene	ND	ug/L	10
2,6-Dinitrotoluene	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Diphenylamine	ND	ug/L	10
Ethyl methacrylate	ND	ug/L	10
Ethyl methanesulfonate	ND	ug/L	10
Fluoranthene	ND	ug/L	10
Fluorene	ND	ug/L	10
Hexachlorobenzene	ND	ug/L	10
Hexachlorobutadiene	ND	ug/L	10
Hexachlorocyclopentadiene	ND	ug/L	10
Hexachloroethane	ND	ug/L	10
Hexachlorophene	ND	ug/L	--
Hexachloropropene	ND	ug/L	20
Indeno(1,2,3-cd)pyrene	ND	ug/L	10
Isophorone	ND	ug/L	10
Isosafrole	ND	ug/L	20
Methapyrilene	ND	ug/L	10
3-Methylcholanthrene	ND	ug/L	20
Methyl methacrylate	ND	ug/L	10
Methyl methanesulfonate	ND	ug/L	10
2-Methylnaphthalene	ND	ug/L	10
Naphthalene	ND	ug/L	10
1,4-Naphthoquinone	ND	ug/L	10
1-Naphthylamine	ND	ug/L	10
2-Naphthylamine	ND	ug/L	10

Enseco
A CORNING Company

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

Test: 625-AP9-A
Matrix: AQUEOUS
QC Lot: 15 APR 90-A QC Run: 15 APR 90-B

Analyte	Result	Units	Reporting Limit
2-Nitroaniline	ND	ug/L	50
3-Nitroaniline	ND	ug/L	50
4-Nitroaniline	ND	ug/L	50
Nitrobenzene	ND	ug/L	10
2-Nitrophenol	ND	ug/L	10
4-Nitrophenol	ND	ug/L	50
4-Nitroquinoline-1-oxide	ND	ug/L	--
N-Nitroso-di-n-butylamine	ND	ug/L	10
N-Nitrosodiethylamine	ND	ug/L	10
N-Nitrosodimethylamine	ND	ug/L	10
N-Nitrosodiphenylamine	ND	ug/L	10
N-Nitroso-di-n-propylamine	ND	ug/L	10
N-Nitrosomethylethylamine	ND	ug/L	10
N-Nitrosomorpholine	ND	ug/L	10
N-Nitrosopiperidine	ND	ug/L	10
N-Nitrosopyrrolidine	ND	ug/L	10
5-Nitro-o-toluidine	ND	ug/L	10
Pentachlorobenzene	ND	ug/L	10
Pentachloroethane	ND	ug/L	10
Pentachloronitrobenzene	ND	ug/L	50
Pentachlorophenol	ND	ug/L	50
Phenacetin	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Phenol	ND	ug/L	10
p-Phenylenediamine	ND	ug/L	--
2-Picoline	ND	ug/L	10
Pronamide	ND	ug/L	20
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	10
Safrole	ND	ug/L	10
1,2,4,5-Tetrachlorobenzene	ND	ug/L	10
2,3,4,6-Tetrachlorophenol	ND	ug/L	20
o-Toluidine	ND	ug/L	10
1,2,4-Trichlorobenzene	ND	ug/L	10
2,4,5-Trichlorophenol	ND	ug/L	50
O,O,O-Triethylphosphorothioate	ND	ug/L	50
2,4,6-Trichlorophenol	ND	ug/L	10
Ethyl parathion	ND	ug/L	50

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

Test: 625-AP9-A
Matrix: AQUEOUS
QC Lot: 15 APR 90-A QC Run: 15 APR 90-B

Analyte	Result	Units	Reporting Limit
Phorate (Thimet)	ND	ug/L	100
Sulfotepp	ND	ug/L	50
Thionazin	ND	ug/L	50
sym-Trinitrobenzene	ND	ug/L	10
Dimethoate	ND	ug/L	--
Disulfoton	ND	ug/L	50
Famphur	ND	ug/L	100
Methyl parathion	ND	ug/L	50

Enseco
A CORNING Company

QC LOT ASSIGNMENT REPORT
Volatile Organics by GC

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
009051-0001-SA	AQUEOUS	601-A	12 APR 90-F	12 APR 90-F
009051-0001-SA	AQUEOUS	602-A	12 APR 90-R	12 APR 90-R
009051-0002-SA	AQUEOUS	601-A	12 APR 90-F	12 APR 90-F
009051-0002-SA	AQUEOUS	602-A	12 APR 90-R	12 APR 90-R

Enseco
A CORNING Company

DUPLICATE CONTROL SAMPLE REPORT
Volatile Organics by GC

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: 601-A Matrix: AQUEOUS QC Lot: 12 APR 90-F Concentration Units: ug/L								
1,1-Dichloroethane	5.0	4.82	5.03	4.92	99	80-130	4.3	20
Chloroform	5.0	5.01	5.26	5.14	103	80-120	4.9	20
Bromodichloromethane	10	9.37	9.67	9.52	95	80-120	3.2	20
Trichloroethene	5.0	5.76	5.99	5.88	118	70-120	3.9	20
Chlorobenzene	5.0	4.90	5.03	4.96	99	80-120	2.6	20
Category: 602-A Matrix: AQUEOUS QC Lot: 12 APR 90-R Concentration Units: ug/L								
Benzene	5.0	5.60	5.74	5.67	113	80-120	2.5	15
Toluene	5.0	5.41	5.52	5.46	109	80-120	2.0	15
Ethylbenzene	5.0	5.62	5.57	5.60	112	80-120	0.9	15
Xylenes (total)	5.0	5.33	5.42	5.38	108	80-120	1.7	15
1,3-Dichlorobenzene	5.0	5.37	5.66	5.52	110	80-120	5.3	15

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

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Category: 601-A Matrix: AQUEOUS QC Lot: 12 APR 90-F QC Run: 12 APR 90-F Concentration Units: ug/L				
Bromochloromethane	5.00	4.40	88	20-160
Category: 602-A Matrix: AQUEOUS QC Lot: 12 APR 90-R QC Run: 12 APR 90-R Concentration Units: ug/L				
a,a,a-Trifluorotoluene	5.00	6.11	122	20-160

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

Enseco
A CORNING Company

METHOD BLANK REPORT
Volatile Organics by GC

Analyte	Result	Units	Reporting Limit
Test: 601-A Matrix: AQUEOUS QC Lot: 12 APR 90-F QC Run: 12 APR 90-F			
Chloromethane	ND	ug/L	5.0
Bromomethane	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
trans-1,2-Dichloroethene	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	ND	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Chlorodibromomethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0
Test: 602-AP Matrix: AQUEOUS QC Lot: 12 APR 90-R QC Run: 12 APR 90-R			
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethylbenzene	ND	ug/L	0.50
Xylenes (total)	ND	ug/L	1.0
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50

METHOD BLANK REPORT
Volatile Organics by GC (cont.)

Test: 601-A
Matrix: AQUEOUS
QC Lot: 12 APR 90-F QC Run: 12 APR 90-F

Analyte	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
trans-1,2-Dichloroethene	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	ND	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Chlorodibromomethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0

Test: 602-AP
Matrix: AQUEOUS
QC Lot: 12 APR 90-R QC Run: 12 APR 90-R

Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethylbenzene	ND	ug/L	0.50
Xylenes (total)	ND	ug/L	1.0
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50

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)
009051-0001-SA	AQUEOUS	ICP-AD	24 APR 90-F	-
009051-0001-SA	AQUEOUS	SE-FAA-AD	19 APR 90-A	-
009051-0001-SA	AQUEOUS	AS-FAA-AD	19 APR 90-A	-
009051-0001-SA	AQUEOUS	PB-FAA-AD	19 APR 90-A	-

Enseco
A CORNING Company

DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: ICP-AD Matrix: AQUEOUS QC Lot: 24 APR 90-F Concentration Units: mg/L								
Aluminum	2.0	1.85	1.85	1.85	93	75-125	0.0	20
Antimony	0.5	0.456	0.444	0.450	90	75-125	2.7	20
Arsenic	0.5	0.477	0.458	0.468	94	75-125	4.1	20
Barium	2.0	1.67	1.67	1.67	84	75-125	0.0	20
Beryllium	0.05	0.0444	0.0442	0.0443	89	75-125	0.4	20
Cadmium	0.05	0.0485	0.0472	0.0478	96	75-125	2.7	20
Calcium	100	87.2	87.1	87.2	87	75-125	0.1	20
Chromium	0.2	0.184	0.184	0.184	92	75-125	0.0	20
Cobalt	0.5	0.471	0.468	0.470	94	75-125	0.6	20
Copper	0.25	0.257	0.254	0.256	102	75-125	1.2	20
Iron	1.0	0.944	0.938	0.941	94	75-125	0.6	20
Lead	0.5	0.481	0.482	0.482	96	75-125	0.2	20
Magnesium	50	45.0	45.0	45.0	90	75-125	0.0	20
Manganese	0.5	0.494	0.495	0.494	99	75-125	0.2	20
Nickel	0.5	0.457	0.456	0.456	91	75-125	0.2	20
Potassium	50	42.9	42.9	42.9	86	75-125	0.0	20
Silver	0.05	0.0431	0.0415	0.0423	85	75-125	3.8	20
Sodium	100	86.4	86.2	86.3	86	75-125	0.2	20
Vanadium	0.5	0.447	0.446	0.446	89	75-125	0.2	20
Zinc	0.5	0.478	0.478	0.478	96	75-125	0.0	20
Category: SE-FAA-AD Matrix: AQUEOUS QC Lot: 19 APR 90-A Concentration Units: mg/L								
Selenium	0.01	0.00900	0.00880	0.00890	89	75-125	2.2	20
Category: AS-FAA-AD Matrix: AQUEOUS QC Lot: 19 APR 90-A Concentration Units: mg/L								
Arsenic	0.04	0.0405	0.0406	0.0406	101	75-125	0.3	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: PB-FAA-AD Matrix: AQUEOUS QC Lot: 19 APR 90-A Concentration Units: mg/L								
Lead	0.02	0.0207	0.0180	0.0194	97	75-125	14	20

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

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)
009051-0001-SA	AQUEOUS	ALK-A	12 APR 90-0	-
009051-0001-SA	AQUEOUS	PH-A	12 APR 90-0	-
009051-0001-SA	AQUEOUS	CL-IC-A	25 APR 90-N	-
009051-0001-SA	AQUEOUS	PHEN-A	13 APR 90-A	13 APR 90-A
009051-0001-SA	AQUEOUS	COND-A	12 APR 90-0	-
009051-0001-SA	AQUEOUS	TDS-A	15 APR 90-A	15 APR 90-A
009051-0001-SA	AQUEOUS	SO4-IC-A	25 APR 90-N	-

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(%) Limits	Precision (RPD) DCS	Precision (RPD) Limit
Category: ALK-A Matrix: AQUEOUS QC Lot: 12 APR 90-O Concentration Units: mg/L								
Alkalinity, Total as CaCO3 at pH 4.5	157	160	160	160	102	90-110	0.0	10
Category: PH-A Matrix: AQUEOUS QC Lot: 12 APR 90-O Concentration Units: units								
pH	9.1	9.07	9.07	9.07	100	98-102	0.0	5
Category: CL-IC-A Matrix: AQUEOUS QC Lot: 25 APR 90-N Concentration Units: mg/L								
Chloride	100	98.4	97.6	98.0	98	92-108	0.8	20
Category: PHEN-A Matrix: AQUEOUS QC Lot: 13 APR 90-A Concentration Units: mg/L								
Phenolics	0.25	0.218	0.227	0.222	89	78-122	4.0	20
Category: COND-A Matrix: AQUEOUS QC Lot: 12 APR 90-O Concentration Units: umhos/cm								
Specific Conductance at 25 deg.C	1650	1650	1650	1650	100	95-105	0.0	5

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: TDS-A Matrix: AQUEOUS QC Lot: 15 APR 90-A Concentration Units: mg/L								
Total Dissolved Solids	1270	1240	1230	1240	97	90-110	0.8	10
Category: SO4-IC-A Matrix: AQUEOUS QC Lot: 25 APR 90-N Concentration Units: mg/L								
Sulfate	200	195	195	195	98	93-107	0.0	20

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

Enseco
A CORNING Company

METHOD BLANK REPORT
Wet Chemistry Analysis and Preparation

Analyte	Result	Units	Reporting Limit
Test: PHEN-SPEC-A Matrix: AQUEOUS QC Lot: 13 APR 90-A QC Run: 13 APR 90-A			
Phenolics	ND	mg/L	0.010
Test: TDS-BAL-A Matrix: AQUEOUS QC Lot: 15 APR 90-A QC Run: 15 APR 90-A			
Total Dissolved Solids	ND	mg/L	10.0

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 OW-16
Sampling Co. Giant Refining Co.
Sampling Site Ciniza Refinery
Team Leader Claud Rosendale

RMAL # 9051

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.: _____ °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
				Bottle # 1 2		
4-11-90	10:00am	OW-16 -1	Well Water	1 2	See Attachment 5	
				2 1		
				4 1		
				11 4		
				12 1		

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Claud Rosendale		4-11-90	11:00 a.m.
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Claud Rosendale
Method of Shipment: Fed Express Airbill # _____
Received for Lab: K Essex for Signed: RMAL Date/Time 4/12/90 0800
Enseco Project No. _____

White and Pink Copies to Lab Yellow to Sampler

SS-001

Rocky Mountain
Analytical Laboratory

ANALYTICAL RESULTS

FOR

GIANT REFINING

ENSECO-RMAL NO. 011197

OCTOBER 10, 1990

Enseco

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

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
011197-0001-SA	OW-16	AQUEOUS	06 SEP 90	09:00	07 SEP 90
011197-0002-SA	OW-25	AQUEOUS	06 SEP 90	09:40	07 SEP 90
011197-0003-SA	TRIP BLANK	AQUEOUS			07 SEP 90

Enseco
A Corning Company

ANALYTICAL TEST REQUESTS
for
Giant Refining

Lab ID: 011197	Group Code	Analysis Description	Custom Test?
0001 - 0002	A	pH	N
		Specific Conductance	N
		Alkalinity,	Y
		Total/Carbonate/Bicarbonate/Hydroxide	Y
		Chloride, Ion Chromatography	N
		Sulfate, Ion Chromatography	N
		Phenolics (4-AAP)	N
		Total Dissolved Solids (TDS)	N
		ICP Metals (Dissolved)	Y
		Arsenic, Furnace AA (Dissolved)	N
		Lead, Furnace AA (Dissolved)	N
		Selenium, Furnace AA (Dissolved)	N
		Aromatic Volatile Organics	N
		Halogenated Volatile Organics	N
		Semivolatile Organics	Y
		Appendix IX List	
		Prep - Semivolatile Organics by GC/MS	N
0003	B	Aromatic 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.

Enseco
A Corning Company

Semivolatile Organics
Appendix IX List
Method 8270

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 011197-0001-SA
Matrix: AQUEOUS
Authorized: 07 SEP 90

Sampled: 06 SEP 90
Prepared: 08 SEP 90

Received: 07 SEP 90
Analyzed: 27 SEP 90

Parameter	Result	Units	Reporting Limit
Acenaphthene	ND	ug/L	10
Acenaphthylene	ND	ug/L	10
Acetophenone	ND	ug/L	10
2-Acetylaminofluorene	ND	ug/L	100
4-Aminobiphenyl	ND	ug/L	10
Aniline	ND	ug/L	10
Anthracene	ND	ug/L	10
Aramite	ND	ug/L	10
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(g,h,i)perylene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
Benzyl alcohol	ND	ug/L	10
4-Bromophenyl phenyl ether	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
2-sec-Butyl-4,6-dinitro-phenol	ND	ug/L	10
4-Chloroaniline	ND	ug/L	10
bis(2-Chloroethoxy)-methane	ND	ug/L	10
bis(2-Chloroethyl) ether	ND	ug/L	10
bis(2-Chloroisopropyl)-ether	ND	ug/L	10
4-Chloro-3-methylphenol	ND	ug/L	10
2-Chloronaphthalene	ND	ug/L	10
2-Chlorophenol	ND	ug/L	10
4-Chlorophenyl phenyl ether	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenz(a,h)anthracene	ND	ug/L	10
Dibenzofuran	ND	ug/L	10
Di-n-butyl phthalate	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
3,3'-Dichlorobenzidine	ND	ug/L	20
2,4-Dichlorophenol	ND	ug/L	10
2,6-Dichlorophenol	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Ethan Hutchinson

Approved By: Jeff Lowry

Enseco
A Corning Company

Semivolatile Organics
Appendix IX List
Method 8270

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 011197-0001-SA
Matrix: AQUEOUS
Authorized: 07 SEP 90

Sampled: 06 SEP 90
Prepared: 08 SEP 90

Received: 07 SEP 90
Analyzed: 27 SEP 90

Parameter	Result	Units	Reporting Limit
Dimethoate	ND	ug/L	--
p-Dimethylaminoazobenzene	ND	ug/L	10
7,12-Dimethylbenz(a)-anthracene	ND	ug/L	10
3,3'-Dimethylbenzidine	ND	ug/L	10
a,a-Dimethylphenethyl-amine	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
1,3-Dinitrobenzene	ND	ug/L	10
4,6-Dinitro-2-methylphenol	ND	ug/L	50
2,4-Dinitrophenol	ND	ug/L	50
2,4-Dinitrotoluene	ND	ug/L	10
2,6-Dinitrotoluene	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Diphenylamine	ND	ug/L	10
Disulfoton	ND	ug/L	50
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
Ethyl methanesulfonate	ND	ug/L	10
Famphur	ND	ug/L	--
Fluoranthene	ND	ug/L	10
Fluorene	ND	ug/L	10
Hexachlorobenzene	ND	ug/L	10
Hexachlorobutadiene	ND	ug/L	10
Hexachlorocyclopentadiene	ND	ug/L	10
Hexachloroethane	ND	ug/L	10
Hexachlorophene	ND	ug/L	--
Hexachloropropene	ND	ug/L	10
Indeno(1,2,3-cd)pyrene	ND	ug/L	10
Isophorone	ND	ug/L	10
Isosafrole	ND	ug/L	20
Methapyrilene	ND	ug/L	10
3-Methylcholanthrene	ND	ug/L	10
Methyl methanesulfonate	ND	ug/L	10
2-Methylnaphthalene	ND	ug/L	10
Methyl parathion	ND	ug/L	50
2-Methylphenol	ND	ug/L	10
3/4-Methylphenol	ND	ug/L	10
Naphthalene	ND	ug/L	10

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Ethan Hutchinson

Approved By: Jeff Lowry

Enseco
A Corning Company

Semivolatile Organics
Appendix IX List
Method 8270

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 011197-0001-SA
Matrix: AQUEOUS Sampled: 06 SEP 90 Received: 07 SEP 90
Authorized: 07 SEP 90 Prepared: 08 SEP 90 Analyzed: 27 SEP 90

Parameter	Result	Units	Reporting Limit
1,4-Naphthoquinone	ND	ug/L	10
1-Naphthylamine	ND	ug/L	10
2-Naphthylamine	ND	ug/L	10
2-Nitroaniline	ND	ug/L	50
3-Nitroaniline	ND	ug/L	50
4-Nitroaniline	ND	ug/L	50
Nitrobenzene	ND	ug/L	10
2-Nitrophenol	ND	ug/L	10
4-Nitrophenol	ND	ug/L	50
4-Nitroquinoline-1-oxide	ND	ug/L	--
N-Nitroso-di-n-butylamine	ND	ug/L	10
N-Nitrosodiethylamine	ND	ug/L	10
N-Nitrosodimethylamine	ND	ug/L	10
N-Nitrosodiphenylamine	ND	ug/L	10
N-Nitroso-di-n-propylamine	ND	ug/L	10
N-Nitrosomethylethylamine	ND	ug/L	10
N-Nitrosomorpholine	ND	ug/L	10
N-Nitrosopiperidine	ND	ug/L	10
N-Nitrosopyrrolidine	ND	ug/L	10
5-Nitro-o-toluidine	ND	ug/L	10
Parathion	ND	ug/L	50
Pentachlorobenzene	ND	ug/L	10
Pentachloroethane	ND	ug/L	10
Pentachloronitrobenzene	ND	ug/L	50
Pentachlorophenol	ND	ug/L	50
Phenacetin	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Phenol	ND	ug/L	10
4-Phenylenediamine	ND	ug/L	--
Phorate	ND	ug/L	100
2-Picoline	ND	ug/L	10
Pronamide	ND	ug/L	10
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	20
Safrole	ND	ug/L	10
Sulfotepp	ND	ug/L	50
1,2,4,5-Tetrachloro-benzene	ND	ug/L	10
2,3,4,6-Tetrachlorophenol	ND	ug/L	50
Thionazin	ND	ug/L	50

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Ethan Hutchinson Approved By: Jeff Lowry

Enseco
A Corning Company

Semivolatile Organics
Appendix IX List
Method 8270

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 011197-0001-SA
Matrix: AQUEOUS Sampled: 06 SEP 90 Received: 07 SEP 90
Authorized: 07 SEP 90 Prepared: 08 SEP 90 Analyzed: 27 SEP 90

Parameter	Result	Units	Reporting Limit
2-Toluidine	ND	ug/L	10
1,2,4-Trichlorobenzene	ND	ug/L	10
2,4,5-Trichlorophenol	ND	ug/L	50
O,O,O-Triethylphosphoro-thioate	ND	ug/L	10
2,4,6-Trichlorophenol	ND	ug/L	10
1,3,5-Trinitrobenzene	ND	ug/L	10
Ethyl methacrylate	ND	ug/L	10
Methyl methacrylate	ND	ug/L	10
Surrogate	**Recovery**		
Nitrobenzene-d5	58	%	--
2-Fluorobiphenyl	56	%	--
Terphenyl-d14	62	%	--
Phenol-d5	47	%	--
2-Fluorophenol	30	%	--
2,4,6-Tribromophenol	44	%	--

ND = Not detected
NA = Not applicable

Reported By: Ethan Hutchinson Approved By: Jeff Lowry

Enseco
A Corning Company

Semivolatile Organics
Appendix IX List
Method 8270

Client Name: Giant Refining
Client ID: OW-25
Lab ID: 011197-0002-SA
Matrix: AQUEOUS Sampled: 06 SEP 90 Received: 07 SEP 90
Authorized: 07 SEP 90 Prepared: 08 SEP 90 Analyzed: 27 SEP 90

Parameter	Result	Units	Reporting Limit
Acenaphthene	ND	ug/L	10
Acenaphthylene	ND	ug/L	10
Acetophenone	ND	ug/L	10
2-Acetylaminofluorene	ND	ug/L	100
4-Aminobiphenyl	ND	ug/L	10
Aniline	ND	ug/L	10
Anthracene	ND	ug/L	10
Aramite	ND	ug/L	10
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(g,h,i)perylene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
Benzyl alcohol	ND	ug/L	10
4-Bromophenyl phenyl ether	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
2-sec-Butyl-4,6-dinitro-phenol	ND	ug/L	10
4-Chloroaniline	ND	ug/L	10
bis(2-Chloroethoxy)-methane	ND	ug/L	10
bis(2-Chloroethyl) ether	ND	ug/L	10
bis(2-Chloroisopropyl)-ether	ND	ug/L	10
4-Chloro-3-methylphenol	ND	ug/L	10
2-Chloronaphthalene	ND	ug/L	10
2-Chlorophenol	ND	ug/L	10
4-Chlorophenyl phenyl ether	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenz(a,h)anthracene	ND	ug/L	10
Dibenzofuran	ND	ug/L	10
Di-n-butyl phthalate	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
3,3'-Dichlorobenzidine	ND	ug/L	20
2,4-Dichlorophenol	ND	ug/L	10
2,6-Dichlorophenol	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Ethan Hutchinson Approved By: Jeff Lowry

Enseco
A Corning Company

Semivolatile Organics
Appendix IX List
Method 8270

Client Name: Giant Refining
Client ID: OW-25
Lab ID: 011197-0002-SA
Matrix: AQUEOUS Sampled: 06 SEP 90 Received: 07 SEP 90
Authorized: 07 SEP 90 Prepared: 08 SEP 90 Analyzed: 27 SEP 90

Parameter	Result	Units	Reporting Limit
Dimethoate	ND	ug/L	--
p-Dimethylaminoazobenzene	ND	ug/L	10
7,12-Dimethylbenz(a)-anthracene	ND	ug/L	10
3,3'-Dimethylbenzidine	ND	ug/L	10
a,a-Dimethylphenethyl-amine	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
1,3-Dinitrobenzene	ND	ug/L	10
4,6-Dinitro-2-methylphenol	ND	ug/L	50
2,4-Dinitrophenol	ND	ug/L	50
2,4-Dinitrotoluene	ND	ug/L	10
2,6-Dinitrotoluene	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Diphenylamine	ND	ug/L	10
Disulfoton	ND	ug/L	50
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
Ethyl methanesulfonate	ND	ug/L	10
Famphur	ND	ug/L	--
Fluoranthene	ND	ug/L	10
Fluorene	ND	ug/L	10
Hexachlorobenzene	ND	ug/L	10
Hexachlorobutadiene	ND	ug/L	10
Hexachlorocyclopentadiene	ND	ug/L	10
Hexachloroethane	ND	ug/L	10
Hexachlorophene	ND	ug/L	--
Hexachloropropene	ND	ug/L	10
Indeno(1,2,3-cd)pyrene	ND	ug/L	10
Isophorone	ND	ug/L	10
Isosafrole	ND	ug/L	20
Methapyrilene	ND	ug/L	10
3-Methylcholanthrene	ND	ug/L	10
Methyl methanesulfonate	ND	ug/L	10
2-Methylnaphthalene	ND	ug/L	10
Methyl parathion	ND	ug/L	50
2-Methylphenol	ND	ug/L	10
3/4-Methylphenol	ND	ug/L	10
Naphthalene	ND	ug/L	10

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Ethan Hutchinson Approved By: Jeff Lowry

Enseco
A Corning Company

Semivolatile Organics
Appendix IX List
Method 8270

Client Name: Giant Refining
Client ID: OW-25
Lab ID: 011197-0002-SA
Matrix: AQUEOUS Sampled: 06 SEP 90 Received: 07 SEP 90
Authorized: 07 SEP 90 Prepared: 08 SEP 90 Analyzed: 27 SEP 90

Parameter	Result	Units	Reporting Limit
1,4-Naphthoquinone	ND	ug/L	10
1-Naphthylamine	ND	ug/L	10
2-Naphthylamine	ND	ug/L	10
2-Nitroaniline	ND	ug/L	50
3-Nitroaniline	ND	ug/L	50
4-Nitroaniline	ND	ug/L	50
Nitrobenzene	ND	ug/L	10
2-Nitrophenol	ND	ug/L	10
4-Nitrophenol	ND	ug/L	50
4-Nitroquinoline-1-oxide	ND	ug/L	--
N-Nitroso-di-n-butylamine	ND	ug/L	10
N-Nitrosodiethylamine	ND	ug/L	10
N-Nitrosodimethylamine	ND	ug/L	10
N-Nitrosodiphenylamine	ND	ug/L	10
N-Nitroso-di-n-propylamine	ND	ug/L	10
N-Nitrosomethylethylamine	ND	ug/L	10
N-Nitrosomorpholine	ND	ug/L	10
N-Nitrosopiperidine	ND	ug/L	10
N-Nitrosopyrrolidine	ND	ug/L	10
5-Nitro-o-toluidine	ND	ug/L	10
Parathion	ND	ug/L	50
Pentachlorobenzene	ND	ug/L	10
Pentachloroethane	ND	ug/L	10
Pentachloronitrobenzene	ND	ug/L	50
Pentachlorophenol	ND	ug/L	50
Phenacetin	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Phenol	ND	ug/L	10
4-Phenylenediamine	ND	ug/L	--
Phorate	ND	ug/L	100
2-Picoline	ND	ug/L	10
Pronamide	ND	ug/L	10
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	20
Safrole	ND	ug/L	10
Sulfotepp	ND	ug/L	50
1,2,4,5-Tetrachloro-benzene	ND	ug/L	10
2,3,4,6-Tetrachlorophenol	ND	ug/L	50
Thionazin	ND	ug/L	50

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Ethan Hutchinson Approved By: Jeff Lowry

Enseco
A Corning Company

Semivolatile Organics
Appendix IX List
Method 8270

Client Name: Giant Refining
Client ID: OW-25
Lab ID: 011197-0002-SA
Matrix: AQUEOUS Sampled: 06 SEP 90 Received: 07 SEP 90
Authorized: 07 SEP 90 Prepared: 08 SEP 90 Analyzed: 27 SEP 90

Parameter	Result	Units	Reporting Limit
2-Toluidine	ND	ug/L	10
1,2,4-Trichlorobenzene	ND	ug/L	10
2,4,5-Trichlorophenol	ND	ug/L	50
O,O,O-Triethylphosphorothioate	ND	ug/L	10
2,4,6-Trichlorophenol	ND	ug/L	10
1,3,5-Trinitrobenzene	ND	ug/L	10
Ethyl methacrylate	ND	ug/L	10
Methyl methacrylate	ND	ug/L	10
Surrogate	**Recovery**		
Nitrobenzene-d5	71	%	--
2-Fluorobiphenyl	66	%	--
Terphenyl-d14	56	%	--
Phenol-d5	49	%	--
2-Fluorophenol	47	%	--
2,4,6-Tribromophenol	50	%	--

ND = Not detected
NA = Not applicable

Reported By: Ethan Hutchinson Approved By: Jeff Lowry

Enseco
A Corning Company

Halogenated Volatile Organics

Method 8010

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 011197-0001-SA
Matrix: AQUEOUS Sampled: 06 SEP 90 Received: 07 SEP 90
Authorized: 07 SEP 90 Prepared: NA Analyzed: 10 SEP 90

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
trans-1,2-Dichloroethene	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	5.2	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Dibromochloromethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0

ND = Not detected
NA = Not applicable

Reported By: Leewaphath Xaiyasang Approved By: Jeff Lowry

Enseco
A Corning Company

Halogenated Volatile Organics

Method 8010

Client Name: Giant Refining
Client ID: OW-25
Lab ID: 011197-0002-SA
Matrix: AQUEOUS Sampled: 06 SEP 90 Received: 07 SEP 90
Authorized: 07 SEP 90 Prepared: NA Analyzed: 11 SEP 90

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	1.1	ug/L	0.50
trans-1,2-Dichloroethene	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	24	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Dibromochloromethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0

ND = Not detected
NA = Not applicable

Reported By: Leewaphath Xaiyasang Approved By: Jeff Lowry

Enseco
A Corning Company

Aromatic Volatile Organics

Method 8020

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 011197-0001-SA
Matrix: AQUEOUS Sampled: 06 SEP 90 Received: 07 SEP 90
Authorized: 07 SEP 90 Prepared: NA Analyzed: 09 SEP 90

Parameter	Result	Units	Reporting Limit
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethylbenzene	ND	ug/L	0.50
Xylenes (total)	ND	ug/L	1.0
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50

ND = Not detected
NA = Not applicable

Reported By: Garth Atkins Approved By: Jeff Lowry

Enseco
A Corning Company

Aromatic Volatile Organics

Method 8020

Client Name: Giant Refining
Client ID: OW-25
Lab ID: 011197-0002-SA
Matrix: AQUEOUS Sampled: 06 SEP 90 Received: 07 SEP 90
Authorized: 07 SEP 90 Prepared: NA Analyzed: 09 SEP 90

Parameter	Result	Units	Reporting Limit
Benzene	1.2	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethylbenzene	ND	ug/L	0.50
Xylenes (total)	ND	ug/L	1.0
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50

ND = Not detected
NA = Not applicable

Reported By: Garth Atkins Approved By: Jeff Lowry

Enseco
A Corning Company

Aromatic Volatile Organics

Method 8020

Client Name: Giant Refining
Client ID: TRIP BLANK
Lab ID: 011197-0003-SA
Matrix: AQUEOUS Sampled: Unknown Received: 07 SEP 90
Authorized: 07 SEP 90 Prepared: NA Analyzed: 09 SEP 90

Parameter	Result	Units	Reporting Limit
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethylbenzene	ND	ug/L	0.50
Xylenes (total)	ND	ug/L	1.0
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50

ND = Not detected
NA = Not applicable

Reported By: Garth Atkins Approved By: Jeff Lowry

Enseco
A Corning Company

Metals

Dissolved Metals

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 011197-0001-SA
Matrix: AQUEOUS Sampled: 06 SEP 90 Received: 07 SEP 90
Authorized: 07 SEP 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	26 SEP 90
Barium	0.031	mg/L	0.010	6010	NA	04 OCT 90
Cadmium	ND	mg/L	0.0050	6010	NA	04 OCT 90
Calcium	4.6	mg/L	0.20	6010	NA	04 OCT 90
Chromium	ND	mg/L	0.010	6010	NA	04 OCT 90
Lead	ND	mg/L	0.010	7421	NA	26 SEP 90
Manganese	ND	mg/L	0.010	6010	NA	04 OCT 90
Selenium	0.027	mg/L	0.0050	7740	NA	25 SEP 90
Silver	ND	mg/L	0.010	6010	NA	04 OCT 90
Sodium	244	mg/L	5.0	6010	NA	04 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Leslie Gergurich Approved By: Dave Roberts

Enseco
A Corning Company

Metals

Dissolved Metals

Client Name: Giant Refining
Client ID: OW-25
Lab ID: 011197-0002-SA
Matrix: AQUEOUS Sampled: 06 SEP 90 Received: 07 SEP 90
Authorized: 07 SEP 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	26 SEP 90
Barium	0.13	mg/L	0.010	6010	NA	04 OCT 90
Cadmium	ND	mg/L	0.0050	6010	NA	04 OCT 90
Calcium	16.7	mg/L	0.20	6010	NA	04 OCT 90
Chromium	ND	mg/L	0.010	6010	NA	04 OCT 90
Lead	ND	mg/L	0.0050	7421	NA	26 SEP 90
Manganese	0.024	mg/L	0.010	6010	NA	04 OCT 90
Selenium	0.0065	mg/L	0.0050	7740	NA	25 SEP 90
Silver	ND	mg/L	0.010	6010	NA	04 OCT 90
Sodium	256	mg/L	5.0	6010	NA	04 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Leslie Gergurich Approved By: Dave Roberts

Enseco
A Corning Company

General Inorganics

Client Name: Giant Refining
Client ID: OW-16
Lab ID: 011197-0001-SA
Matrix: AQUEOUS
Authorized: 07 SEP 90

Sampled: 06 SEP 90
Prepared: See Below

Received: 07 SEP 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Alkalinity, Bicarb. as CaCO3 at pH 4.5	279	mg/L	5.0	310.1	NA	07 SEP 90
Alkalinity, Carb. as CaCO3 at pH 8.3	14.1	mg/L	5.0	310.1	NA	07 SEP 90
Chloride	156	mg/L	3.0	300.0	NA	15 SEP 90
pH	8.5	units	--	9040	NA	07 SEP 90
Phenolics	ND	mg/L	0.010	9065	NA	12 SEP 90
Sulfate	31.6	mg/L	5.0	300.0	NA	15 SEP 90
Specific Conductance at 25 deg.C	1100	umhos/cm	1.0	120.1	NA	07 SEP 90
Total Dissolved Solids	664	mg/L	10.0	160.1	NA	10 SEP 90

ND = Not detected
NA = Not applicable

Reported By: Tammy Bailey

Approved By: Toni Lusk

Enseco
A Corning Company

General Inorganics

Client Name: Giant Refining
Client ID: OW-25
Lab ID: 011197-0002-SA
Matrix: AQUEOUS Sampled: 06 SEP 90 Received: 07 SEP 90
Authorized: 07 SEP 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	468	mg/L	5.0	310.1	NA	07 SEP 90
Alkalinity, Carb. as CaCO3 at pH 8.3	ND	mg/L	5.0	310.1	NA	07 SEP 90
Chloride	87.6	mg/L	3.0	300.0	NA	15 SEP 90
pH	7.8	units	--	9040	NA	07 SEP 90
Phenolics	0.022	mg/L	0.010	9065	NA	12 SEP 90
Sulfate	35.8	mg/L	5.0	300.0	NA	15 SEP 90
Specific Conductance at 25 deg.C	1170	umhos/cm	1.0	120.1	NA	07 SEP 90
Total Dissolved Solids	773	mg/L	10.0	160.1	NA	10 SEP 90

ND = Not detected
NA = Not applicable

Reported By: Tammy Bailey 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).

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

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
Semivolatile Organics by GC/MS

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
011197-0001-SA	AQUEOUS	625-A	07 SEP 90-A	08 SEP 90-A
011197-0002-SA	AQUEOUS	625-A	07 SEP 90-A	08 SEP 90-A

Enseco
A Corning Company

DUPLICATE CONTROL SAMPLE REPORT
Semivolatile Organics by GC/MS

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	AVG	Accuracy Average(%) DCS	Limits	Precision (RPD) DCS	Limit
Category: 625-A								
Matrix: AQUEOUS								
QC Lot: 07 SEP 90-A								
Concentration Units: ug/L								
Phenol	100	87.1	80.3	83.7	84	12- 89	8.1	42
2-Chlorophenol	100	83.3	80.9	82.1	82	27-123	2.9	40
1,4-Dichlorobenzene	50	33.6	35.4	34.5	69	36- 97	5.2	28
N-Nitroso-di-n-propylamine	50	47.9	48.2	48.0	96	41-116	0.6	38
1,2,4-Trichlorobenzene	50	32.1	32.6	32.4	65	39- 98	1.5	28
4-Chloro-3-methylphenol	100	63.6	77.9	70.8	71	23- 97	20	42
Acenaphthene	50	36.7	36.0	36.4	73	46-118	1.9	31
4-Nitrophenol	100	60.6	51.5	56.0	56	10- 80	16	50
2,4-Dinitrotoluene	50	38.4	36.2	37.3	75	24- 96	5.9	38
Pentachlorophenol	100	31.5	14.2	22.8	23	9-103	76*	50
Pyrene	50	35.3	34.5	34.9	70	26-127	2.3	31

* = RPD outside QC Limits

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

SINGLE CONTROL SAMPLE REPORT
Semivolatile Organics by GC/MS

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Category: 625-A				
Matrix: AQUEOUS				
QC Lot: 07 SEP 90-A QC Run: 08 SEP 90-A				
Concentration Units: ug/L				
Nitrobenzene-d5	100	69.0	69	35-114
2-Fluorobiphenyl	100	63.4	63	43-116
Terphenyl-d14	100	70.1	70	33-141
2-Fluorophenol	200	148	74	21-100
Phenol-d5	200	151	76	10- 94
2,4,6-Tribromophenol	200	112	56	10-123

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

METHOD BLANK REPORT
Semivolatile Organics by GC/MS

Test: 8270CP-AP9-A
Matrix: AQUEOUS
QC Lot: 07 SEP 90-A QC Run: 08 SEP 90-A

Analyte	Result	Units	Reporting Limit
Acenaphthene	ND	ug/L	10
Acenaphthylene	ND	ug/L	10
Acetophenone	ND	ug/L	10
2-Acetylaminofluorene	ND	ug/L	100
4-Aminobiphenyl	ND	ug/L	10
Aniline	ND	ug/L	10
Anthracene	ND	ug/L	10
Aramite	ND	ug/L	10
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(g,h,i)perylene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
Benzyl alcohol	ND	ug/L	10
4-Bromophenyl phenyl ether	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
2-sec-Butyl-4,6-dinitro-phenol	ND	ug/L	10
4-Chloroaniline	ND	ug/L	10
bis(2-Chloroethoxy)-methane	ND	ug/L	10
bis(2-Chloroethyl) ether	ND	ug/L	10
bis(2-Chloroisopropyl)-ether	ND	ug/L	10
4-Chloro-3-methylphenol	ND	ug/L	10
2-Chloronaphthalene	ND	ug/L	10
2-Chlorophenol	ND	ug/L	10
4-Chlorophenyl phenyl ether	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenz(a,h)anthracene	ND	ug/L	10
Dibenzofuran	ND	ug/L	10
Di-n-butyl phthalate	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
3,3'-Dichlorobenzidine	ND	ug/L	20
2,4-Dichlorophenol	ND	ug/L	10
2,6-Dichlorophenol	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10

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

Test: 8270CP-AP9-A
Matrix: AQUEOUS
QC Lot: 07 SEP 90-A QC Run: 08 SEP 90-A

Analyte	Result	Units	Reporting Limit
Dimethoate	ND	ug/L	--
p-Dimethylaminoazobenzene	ND	ug/L	10
7,12-Dimethylbenz(a)-anthracene	ND	ug/L	10
3,3'-Dimethylbenzidine	ND	ug/L	10
a,a-Dimethylphenethyl-amine	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
1,3-Dinitrobenzene	ND	ug/L	10
4,6-Dinitro-2-methylphenol	ND	ug/L	50
2,4-Dinitrophenol	ND	ug/L	50
2,4-Dinitrotoluene	ND	ug/L	10
2,6-Dinitrotoluene	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Diphenylamine	ND	ug/L	10
Disulfoton	ND	ug/L	50
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
Ethyl methanesulfonate	ND	ug/L	10
Famphur	ND	ug/L	--
Fluoranthene	ND	ug/L	10
Fluorene	ND	ug/L	10
Hexachlorobenzene	ND	ug/L	10
Hexachlorobutadiene	ND	ug/L	10
Hexachlorocyclopentadiene	ND	ug/L	10
Hexachloroethane	ND	ug/L	10
Hexachlorophene	ND	ug/L	--
Hexachloropropene	ND	ug/L	10
Indeno(1,2,3-cd)pyrene	ND	ug/L	10
Isophorone	ND	ug/L	10
Isosafrole	ND	ug/L	20
Methapyrilene	ND	ug/L	10
3-Methylcholanthrene	ND	ug/L	10
Methyl methanesulfonate	ND	ug/L	10
2-Methylnaphthalene	ND	ug/L	10
Methyl parathion	ND	ug/L	50
2-Methylphenol	ND	ug/L	10
3/4-Methylphenol	ND	ug/L	10
Naphthalene	ND	ug/L	10

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

Test: 8270CP-AP9-A
Matrix: AQUEOUS
QC Lot: 07 SEP 90-A QC Run: 08 SEP 90-A

Analyte	Result	Units	Reporting Limit
1,4-Naphthoquinone	ND	ug/L	10
1-Naphthylamine	ND	ug/L	10
2-Naphthylamine	ND	ug/L	10
2-Nitroaniline	ND	ug/L	50
3-Nitroaniline	ND	ug/L	50
4-Nitroaniline	ND	ug/L	50
Nitrobenzene	ND	ug/L	10
2-Nitrophenol	ND	ug/L	10
4-Nitrophenol	ND	ug/L	50
4-Nitroquinoline-1-oxide	ND	ug/L	--
N-Nitroso-di-n-butylamine	ND	ug/L	10
N-Nitrosodiethylamine	ND	ug/L	10
N-Nitrosodimethylamine	ND	ug/L	10
N-Nitrosodiphenylamine	ND	ug/L	10
N-Nitroso-di-n-propylamine	ND	ug/L	10
N-Nitrosomethylethylamine	ND	ug/L	10
N-Nitrosomorpholine	ND	ug/L	10
N-Nitrosopiperidine	ND	ug/L	10
N-Nitrosopyrrolidine	ND	ug/L	10
5-Nitro-o-toluidine	ND	ug/L	10
Parathion	ND	ug/L	50
Pentachlorobenzene	ND	ug/L	10
Pentachloroethane	ND	ug/L	10
Pentachloronitrobenzene	ND	ug/L	50
Pentachlorophenol	ND	ug/L	50
Phenacetin	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Phenol	ND	ug/L	10
4-Phenylenediamine	ND	ug/L	--
Phorate	ND	ug/L	100
2-Picoline	ND	ug/L	10
Pronamide	ND	ug/L	10
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	20
Safrole	ND	ug/L	10
Sulfotepp	ND	ug/L	50
1,2,4,5-Tetrachlorobenzene	ND	ug/L	10
2,3,4,6-Tetrachlorophenol	ND	ug/L	50
Thionazin	ND	ug/L	50

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

Test: 8270CP-AP9-A
Matrix: AQUEOUS
QC Lot: 07 SEP 90-A QC Run: 08 SEP 90-A

Analyte	Result	Units	Reporting Limit
2-Toluidine	ND	ug/L	10
1,2,4-Trichlorobenzene	ND	ug/L	10
2,4,5-Trichlorophenol	ND	ug/L	50
2,4,6-Trichlorophenol	ND	ug/L	10
O,O,O-Triethylphosphoro-thioate	ND	ug/L	10
1,3,5-Trinitrobenzene	ND	ug/L	10
Ethyl methacrylate	ND	ug/L	10
Methyl methacrylate	ND	ug/L	10

Enseco
A Corning Company

QC LOT ASSIGNMENT REPORT
Volatile Organics by GC

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
011197-0001-SA	AQUEOUS	602-A	09 SEP 90-A	09 SEP 90-A
011197-0001-SA	AQUEOUS	601-A	10 SEP 90-F	10 SEP 90-F
011197-0002-SA	AQUEOUS	602-A	09 SEP 90-A	09 SEP 90-A
011197-0002-SA	AQUEOUS	601-A	10 SEP 90-F	10 SEP 90-F
011197-0003-SA	AQUEOUS	602-A	09 SEP 90-A	09 SEP 90-A

Enseco
A Corning Company

DUPLICATE CONTROL SAMPLE REPORT
Volatile Organics by GC

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: 602-A Matrix: AQUEOUS QC Lot: 09 SEP 90-A Concentration Units: ug/L								
Benzene	5.0	4.18	4.44	4.31	86	80-120	6.0	15
Toluene	5.0	4.12	4.33	4.23	85	80-120	5.0	15
Ethylbenzene	5.0	4.15	4.35	4.25	85	80-120	4.7	15
Xylenes (total)	5.0	4.40	4.76	4.58	92	80-120	7.9	15
1,3-Dichlorobenzene	5.0	4.60	4.75	4.68	94	80-120	3.2	15
Category: 601-A Matrix: AQUEOUS QC Lot: 10 SEP 90-F Concentration Units: ug/L								
1,1-Dichloroethane	5.0	4.09	4.26	4.18	84	80-130	4.1	20
Chloroform	5.0	5.14	5.13	5.14	103	80-120	0.2	20
Bromodichloromethane	10	9.25	8.87	9.06	91	80-120	4.2	20
Trichloroethene	5.0	4.72	4.91	4.82	96	70-120	3.9	20
Chlorobenzene	5.0	4.64	4.96	4.80	96	80-120	6.7	20

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

Analyte	Concentration Spiked	Measured	Accuracy(%) SCS	Limits
Category: 602-A Matrix: AQUEOUS QC Lot: 09 SEP 90-A QC Run: 09 SEP 90-A Concentration Units: ug/L				
a,a,a-Trifluorotoluene	30.0	30.7	102	20-160
Category: 601-A Matrix: AQUEOUS QC Lot: 10 SEP 90-F QC Run: 10 SEP 90-F Concentration Units: ug/L				
Bromochloromethane	5.00	4.41	88	20-160

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

Enseco
A Corning Company

METHOD BLANK REPORT
Volatile Organics by GC

Analyte	Result	Units	Reporting Limit
Test: 602-AP			
Matrix: AQUEOUS			
QC Lot: 09 SEP 90-A QC Run: 09 SEP 90-A			
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethylbenzene	ND	ug/L	0.50
Xylenes (total)	ND	ug/L	1.0
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50
Test: 601-A			
Matrix: AQUEOUS			
QC Lot: 10 SEP 90-F QC Run: 10 SEP 90-F			
Chloromethane	ND	ug/L	5.0
Bromomethane	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
trans-1,2-Dichloroethene	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	ND	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Dibromochloromethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0

METHOD BLANK REPORT
Volatile Organics by GC (cont.)

Analyte	Result	Units	Reporting Limit
Test: 602-AP			
Matrix: AQUEOUS			
QC Lot: 09 SEP 90-A QC Run: 09 SEP 90-A			
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethylbenzene	ND	ug/L	0.50
Xylenes (total)	ND	ug/L	1.0
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50

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)
011197-0001-SA	AQUEOUS	ICP-AD	04 OCT 90-C	-
011197-0001-SA	AQUEOUS	AS-FAA-AD	26 SEP 90-B	-
011197-0001-SA	AQUEOUS	PB-FAA-AD	26 SEP 90-B	-
011197-0001-SA	AQUEOUS	SE-FAA-AD	26 SEP 90-B	-
011197-0002-SA	AQUEOUS	ICP-AD	04 OCT 90-C	-
011197-0002-SA	AQUEOUS	AS-FAA-AD	26 SEP 90-B	-
011197-0002-SA	AQUEOUS	PB-FAA-AD	26 SEP 90-B	-
011197-0002-SA	AQUEOUS	SE-FAA-AD	26 SEP 90-B	-

Enseco
A Corning Company

DUPLICATE CONTROL SAMPLE REPORT
Metals Analysis and Preparation

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: ICP-AD Matrix: AQUEOUS QC Lot: 04 OCT 90-C Concentration Units: mg/L								
Aluminum	2.0	1.95	1.94	1.95	97	75-125	0.3	20
Antimony	0.5	0.474	0.472	0.473	95	75-125	0.4	20
Arsenic	2.0	1.62	1.63	1.62	81	75-125	0.7	20
Barium	2.0	1.87	1.87	1.87	93	75-125	0.1	20
Beryllium	0.05	0.0488	0.0489	0.0488	98	75-125	0.2	20
Cadmium	0.05	0.0470	0.0491	0.0481	96	75-125	4.4	20
Calcium	100	92.4	92.3	92.3	92	75-125	0.1	20
Chromium	0.2	0.186	0.188	0.187	94	75-125	1.3	20
Cobalt	0.5	0.466	0.468	0.467	93	75-125	0.3	20
Copper	0.25	0.256	0.255	0.256	102	75-125	0.4	20
Iron	1.0	1.00	1.00	1.00	100	75-125	0.2	20
Lead	0.5	0.493	0.481	0.487	97	75-125	2.5	20
Magnesium	50	45.8	45.8	45.8	92	75-125	0.1	20
Manganese	0.5	0.483	0.483	0.483	97	75-125	0.0	20
Nickel	0.5	0.484	0.480	0.482	96	75-125	0.8	20
Potassium	50	41.2	41.4	41.3	83	75-125	0.6	20
Silver	0.05	0.0512	0.0474	0.0493	99	75-125	7.8	20
Sodium	100	87.6	88.1	87.8	88	75-125	0.6	20
Vanadium	0.5	0.492	0.492	0.492	98	75-125	0.1	20
Zinc	0.5	0.480	0.478	0.479	96	75-125	0.5	20
Category: AS-FAA-AD Matrix: AQUEOUS QC Lot: 26 SEP 90-B Concentration Units: mg/L								
Arsenic	0.04	0.0409	0.0412	0.0410	103	75-125	0.7	20
Category: PB-FAA-AD Matrix: AQUEOUS QC Lot: 26 SEP 90-B Concentration Units: mg/L								
Lead	0.02	0.0179	0.0183	0.0181	91	75-125	2.2	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: SE-FAA-AD Matrix: AQUEOUS QC Lot: 26 SEP 90-B Concentration Units: mg/L								
Selenium	0.01	0.0110	0.0116	0.0113	113	75-125	5.3	20

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

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)
011197-0001-SA	AQUEOUS	PH-A	07 SEP 90-B	-
011197-0001-SA	AQUEOUS	COND-A	07 SEP 90-B	-
011197-0001-SA	AQUEOUS	ALK-A	07 SEP 90-B	-
011197-0001-SA	AQUEOUS	CL-IC-A	15 SEP 90-N	-
011197-0001-SA	AQUEOUS	SO4-IC-A	15 SEP 90-N	-
011197-0001-SA	AQUEOUS	PHEN-A	11 SEP 90-A	11 SEP 90-A
011197-0001-SA	AQUEOUS	TDS-A	10 SEP 90-C	10 SEP 90-C
011197-0002-SA	AQUEOUS	PH-A	07 SEP 90-B	-
011197-0002-SA	AQUEOUS	COND-A	07 SEP 90-B	-
011197-0002-SA	AQUEOUS	ALK-A	07 SEP 90-B	-
011197-0002-SA	AQUEOUS	CL-IC-A	15 SEP 90-N	-
011197-0002-SA	AQUEOUS	SO4-IC-A	15 SEP 90-N	-
011197-0002-SA	AQUEOUS	PHEN-A	11 SEP 90-A	11 SEP 90-A
011197-0002-SA	AQUEOUS	TDS-A	10 SEP 90-C	10 SEP 90-C

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	Precision (RPD) DCS	Limit
Category: PH-A Matrix: AQUEOUS QC Lot: 07 SEP 90-B Concentration Units: units								
pH	9.1	9.00	9.00	9.00	99	98-102	0.0	5
Category: COND-A Matrix: AQUEOUS QC Lot: 07 SEP 90-B Concentration Units: umhos/cm								
Specific Conductance at 25 deg.C	1070	1100	1090	1090	102	95-105	1.1	20
Category: ALK-A Matrix: AQUEOUS QC Lot: 07 SEP 90-B Concentration Units: mg/L								
Alkalinity, Total as CaCO3 at pH 4.5	148	149	148	148	100	90-110	0.7	10
Category: CL-IC-A Matrix: AQUEOUS QC Lot: 15 SEP 90-N Concentration Units: mg/L								
Chloride	100	102	99.3	101	101	92-108	2.7	20
Category: SO4-IC-A Matrix: AQUEOUS QC Lot: 15 SEP 90-N Concentration Units: mg/L								
Sulfate	200	211	206	208	104	93-107	2.4	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: PHEN-A Matrix: AQUEOUS QC Lot: 11 SEP 90-A Concentration Units: mg/L								
Phenolics	0.20	0.175	0.189	0.182	91	78-122	7.7	20
Category: TDS-A Matrix: AQUEOUS QC Lot: 10 SEP 90-C Concentration Units: mg/L								
Total Dissolved Solids	834	765	783	774	93	90-110	2.3	10

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

Enseco
A Corning Company

METHOD BLANK REPORT
Wet Chemistry Analysis and Preparation

Analyte	Result	Units	Reporting Limit
Test: PHEN-SPEC-A Matrix: AQUEOUS QC Lot: 11 SEP 90-A QC Run: 11 SEP 90-A			
Phenolics	ND	mg/L	0.010
Test: TDS-BAL-A Matrix: AQUEOUS QC Lot: 10 SEP 90-C QC Run: 10 SEP 90-C			
Total Dissolved Solids	ND	mg/L	10.0

Enseco - Rocky Mountain Analytical

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

Attn: Julie Essex

CHAIN OF CUSTODY

No.

Enseco Client: Giant Refining Co.
Project: Groundwater Investigation
Sampling Co.: Giant Refining Co.
Sampling Site: Ciniza Refinery
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.: _____ °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
9-6-90	9:00am	OW-16	Water	2 - #1	See Attached	Inorganics
				1 - #2	See Attached	Inorganics
				1 - #4	See Attached	Dissolved Metals
				6 - #11	See Attached	
					Volatile Organics	Method 8020
				3 - #12	See Attached	
					Halogenated Volatile Organics	Method 8010
					Appendix IX Semivolatile Organics	Method 8270

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Cland Rosendale		9-7-90	11:45am
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Cland Rosendale
Method of Shipment: Federal Express AirBill # 680679056l
Received for Lab: RMAL Signed: [signature] Date/Time 09-07-90 0800
Enseco Project No. 11197

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

Attn: Julie Essex

CHAIN OF CUSTODY

No.

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.: _____ °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: _____

Enseco Client: Giant Refining Co.
Project: Groundwater Investigation
Sampling Co.: Giant Refining Co.
Sampling Site: Ciniza Refinery
Team Leader: Cloud Rosendale

Date	Time	Sample ID/Description	Sample Type	No. Containers	Analysis Parameters	Remarks
01 9/6-90	9:40 AM	AW-25	Water	2 - #1	See Attached	Inorganics
				1 - #2	See Attached	Inorganics
				1 - #4	See Attached	Dissolved Metals
				6 - #11	See Attached	
					Volatile Organics	Method 8020
				3 - #12	See Attached	
					Halogenated Volatile Organics	Method 8010
					Appendix IX Semivolatile Organics	Method 8270
02 —	—	Trip Blank	Water	1 - #11	Volatile Organics	Method 8020

CUSTODY TRANSFERS PRIOR TO SHIPPING

	Relinquished by: (signed)	Received by: (signed)	Date	Time
1	Cloud Rosendale		9/6-90	11:45 a.m.
2				
3				

SHIPPING DETAILS

Delivered to Shipper by: Cloud Rosendale
Method of Shipment: Federal Express Airbill # 680679056l
Received for Lab: RMAL Signed: [signature] Date/Time 9-7-90 @ 8:00
Enseco Project No. 11197

White and Pink Copies to Lab Yellow to Sampler

SS-001

Rocky Mountain
Analytical Laboratory

ANALYTICAL RESULTS

FOR

GIANT REFINING

ENSECO-RMAL NO. 012009

JANUARY 8, 1991

DW 26417

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.

Samples 012009-0001 and -0002 by Method 8270 were diluted due to interferences originating from non-target compounds; whereas, sample 012009-0002 by Method 8010 and samples 012009-0001 and -0002 by Method 8020 were diluted due to elevated concentrations of target compounds. The reporting limits were raised proportionately. Because of dilutions made the surrogates by Method 8270 were not recovered for sample 012009-0002 and are, therefore, reported as ND (not detected).

The Single Control Sample (SCS) for QC Lot 28 OCT 90-A by Method 8270 had accuracy values for the base/neutral fraction (nitrobenzene-d5, 2-fluorobiphenyl, and terphenyl-d14) outside Enseco's established limits. All quantitation was reevaluated and found to be correct. The laboratory has stated that these low recoveries were isolated to the SCS; however, as a corrective and precautionary measure, all samples associated with this QC Lot were monitored for surrogate recovery and reextractions were performed as needed. Sample 012009-0001 had surrogate recoveries well within Enseco's limits. Because of the level of interferences in sample 012009-0002, a reextraction would not have resulted in measurable surrogate recoveries; therefore, the sample was not reextracted and the original data were reported.

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
012009-0001-SA	OW-26	AQUEOUS	25 OCT 90	08:40	26 OCT 90
012009-0002-SA	OW-17	AQUEOUS	25 OCT 90	08:50	26 OCT 90
012009-0003-SA	OW-11	AQUEOUS	25 OCT 90	08:15	26 OCT 90
012009-0004-SA	Trip Blank	AQUEOUS			26 OCT 90

Enseco
A Corning Company

ANALYTICAL TEST REQUESTS
for
Giant Refining

Lab ID: 012009	Group Code	Analysis Description	Custom Test?
0001 - 0002	A	pH	N
		Specific Conductance	N
		Alkalinity,	Y
		Total/Carbonate/Bicarbonate/Hydroxide	Y
		Chloride, Ion Chromatography	N
		Sulfate, Ion Chromatography	N
		Phenolics (4-AAP)	N
		Total Dissolved Solids (TDS)	N
		ICP Metals (Dissolved)	Y
		Arsenic, Furnace AA (Dissolved)	N
		Lead, Furnace AA (Dissolved)	N
		Selenium, Furnace AA (Dissolved)	N
		Aromatic Volatile Organics	N
		Halogenated Volatile Organics	N
		Semivolatile Organics	Y
		Appendix IX List	
		Prep - Semivolatile Organics by GC/MS	N
0003	B	Semivolatile Organics	Y
		Refinery List	
		Prep - Semivolatile Organics by GC/MS	N
0004	C	Halogenated 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.

Enseco
A Corning Company

Semivolatile Organics
Appendix IX List
Method 8270

Client Name: Giant Refining
Client ID: OW-26
Lab ID: 012009-0001-SA
Matrix: AQUEOUS Sampled: 25 OCT 90 Received: 26 OCT 90
Authorized: 26 OCT 90 Prepared: 28 OCT 90 Analyzed: 02 NOV 90

Parameter	Result	Units	Reporting Limit
Acenaphthene	ND	ug/L	100
Acenaphthylene	ND	ug/L	100
Acetophenone	ND	ug/L	100
2-Acetylaminofluorene	ND	ug/L	1000
4-Aminobiphenyl	ND	ug/L	100
Aniline	ND	ug/L	100
Anthracene	ND	ug/L	100
Aramite	ND	ug/L	100
Benzo(a)anthracene	ND	ug/L	100
Benzo(b)fluoranthene	ND	ug/L	100
Benzo(k)fluoranthene	ND	ug/L	100
Benzo(g,h,i)perylene	ND	ug/L	100
Benzo(a)pyrene	ND	ug/L	100
Benzyl alcohol	ND	ug/L	100
4-Bromophenyl phenyl ether	ND	ug/L	100
Butyl benzyl phthalate	ND	ug/L	100
2-sec-Butyl-4,6-dinitro-phenol	ND	ug/L	100
4-Chloroaniline	ND	ug/L	100
bis(2-Chloroethoxy)-methane	ND	ug/L	100
bis(2-Chloroethyl) ether	ND	ug/L	100
bis(2-Chloroisopropyl)-ether	ND	ug/L	100
4-Chloro-3-methylphenol	ND	ug/L	100
2-Chloronaphthalene	ND	ug/L	100
2-Chlorophenol	ND	ug/L	100
4-Chlorophenyl phenyl ether	ND	ug/L	100
Chrysene	ND	ug/L	100
Dibenz(a,h)anthracene	ND	ug/L	100
Dibenzofuran	ND	ug/L	100
Di-n-butyl phthalate	ND	ug/L	100
1,2-Dichlorobenzene	ND	ug/L	100
1,3-Dichlorobenzene	ND	ug/L	100
1,4-Dichlorobenzene	ND	ug/L	100
3,3'-Dichlorobenzidine	ND	ug/L	200
2,4-Dichlorophenol	ND	ug/L	100
2,6-Dichlorophenol	ND	ug/L	100
Diethyl phthalate	ND	ug/L	100

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Steven Francis Approved By: Jeff Lowry

Enseco
A Corning Company

Semivolatile Organics
Appendix IX List
Method 8270

Client Name: Giant Refining
Client ID: OW-26
Lab ID: 012009-0001-SA
Matrix: AQUEOUS Sampled: 25 OCT 90 Received: 26 OCT 90
Authorized: 26 OCT 90 Prepared: 28 OCT 90 Analyzed: 02 NOV 90

Parameter	Result	Units	Reporting Limit
Dimethoate	ND	ug/L	--
p-Dimethylaminoazobenzene	ND	ug/L	100
7,12-Dimethylbenz(a)-anthracene	ND	ug/L	100
3,3'-Dimethylbenzidine	ND	ug/L	100
a,a-Dimethylphenethyl-amine	ND	ug/L	100
2,4-Dimethylphenol	ND	ug/L	100
Dimethyl phthalate	ND	ug/L	100
1,3-Dinitrobenzene	ND	ug/L	100
4,6-Dinitro-2-methylphenol	ND	ug/L	500
2,4-Dinitrophenol	ND	ug/L	500
2,4-Dinitrotoluene	ND	ug/L	100
2,6-Dinitrotoluene	ND	ug/L	100
Di-n-octyl phthalate	ND	ug/L	100
Diphenylamine	ND	ug/L	100
Disulfoton	ND	ug/L	500
bis(2-Ethylhexyl) phthalate	ND	ug/L	100
Ethyl methanesulfonate	ND	ug/L	100
Famphur	ND	ug/L	--
Fluoranthene	ND	ug/L	100
Fluorene	ND	ug/L	100
Hexachlorobenzene	ND	ug/L	100
Hexachlorobutadiene	ND	ug/L	100
Hexachlorocyclopentadiene	ND	ug/L	100
Hexachloroethane	ND	ug/L	100
Hexachlorophene	ND	ug/L	--
Hexachloropropene	ND	ug/L	100
Indeno(1,2,3-cd)pyrene	ND	ug/L	100
Isophorone	ND	ug/L	100
Isosafrole	ND	ug/L	200
Methapyrilene	ND	ug/L	100
3-Methylcholanthrene	ND	ug/L	100
Methyl methanesulfonate	ND	ug/L	100
2-Methylnaphthalene	130	ug/L	100
Methyl parathion	ND	ug/L	500
2-Methylphenol	ND	ug/L	100
3/4-Methylphenol	ND	ug/L	100
Naphthalene	320	ug/L	100

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Steven Francis Approved By: Jeff Lowry

Enseco
A Corning Company

Semivolatile Organics
Appendix IX List
Method 8270

Client Name: Giant Refining
Client ID: OW-26
Lab ID: 012009-0001-SA
Matrix: AQUEOUS Sampled: 25 OCT 90 Received: 26 OCT 90
Authorized: 26 OCT 90 Prepared: 28 OCT 90 Analyzed: 02 NOV 90

Parameter	Result	Units	Reporting Limit
1,4-Naphthoquinone	ND	ug/L	100
1-Naphthylamine	ND	ug/L	100
2-Naphthylamine	ND	ug/L	100
2-Nitroaniline	ND	ug/L	500
3-Nitroaniline	ND	ug/L	500
4-Nitroaniline	ND	ug/L	500
Nitrobenzene	ND	ug/L	100
2-Nitrophenol	ND	ug/L	100
4-Nitrophenol	ND	ug/L	500
4-Nitroquinoline-1-oxide	ND	ug/L	--
N-Nitroso-di-n-butylamine	ND	ug/L	100
N-Nitrosodiethylamine	ND	ug/L	100
N-Nitrosodimethylamine	ND	ug/L	100
N-Nitrosodiphenylamine	ND	ug/L	100
N-Nitroso-di-n-propylamine	ND	ug/L	100
N-Nitrosomethylethylamine	ND	ug/L	100
N-Nitrosomorpholine	ND	ug/L	100
N-Nitrosopiperidine	ND	ug/L	100
N-Nitrosopyrrolidine	ND	ug/L	100
5-Nitro-o-toluidine	ND	ug/L	100
Parathion	ND	ug/L	500
Pentachlorobenzene	ND	ug/L	100
Pentachloroethane	ND	ug/L	100
Pentachloronitrobenzene	ND	ug/L	500
Pentachlorophenol	ND	ug/L	500
Phenacetin	ND	ug/L	100
Phenanthrene	ND	ug/L	100
Phenol	ND	ug/L	100
4-Phenylenediamine	ND	ug/L	--
Phorate	ND	ug/L	1000
2-Picoline	ND	ug/L	100
Pronamide	ND	ug/L	100
Pyrene	ND	ug/L	100
Pyridine	ND	ug/L	200
Safrole	ND	ug/L	100
Sulfotepp	ND	ug/L	500
1,2,4,5-Tetrachloro-benzene	ND	ug/L	100
2,3,4,6-Tetrachlorophenol	ND	ug/L	500
Thionazin	ND	ug/L	500

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Steven Francis Approved By: Jeff Lowry

Enseco
A Corning Company

Semivolatile Organics
Appendix IX List
Method 8270

Client Name: Giant Refining
Client ID: OW-26
Lab ID: 012009-0001-SA
Matrix: AQUEOUS
Authorized: 26 OCT 90

Sampled: 25 OCT 90
Prepared: 28 OCT 90

Received: 26 OCT 90
Analyzed: 02 NOV 90

Parameter	Result	Units	Reporting Limit
2-Toluidine	ND	ug/L	100
1,2,4-Trichlorobenzene	ND	ug/L	100
2,4,5-Trichlorophenol	ND	ug/L	500
2,4,6-Trichlorophenol	ND	ug/L	100
O,O,O-Triethylphosphorothioate	ND	ug/L	100
1,3,5-Trinitrobenzene	ND	ug/L	100
Ethyl methacrylate	ND	ug/L	100
Methyl methacrylate	ND	ug/L	100
Surrogate	**Recovery**		
Nitrobenzene-d5	65	%	--
2-Fluorobiphenyl	62	%	--
Terphenyl-d14	51	%	--
Phenol-d5	50	%	--
2-Fluorophenol	42	%	--
2,4,6-Tribromophenol	40	%	--

ND = Not detected
NA = Not applicable

Reported By: Steven Francis

Approved By: Jeff Lowry

Enseco
A Corning Company

Semivolatile Organics
Appendix IX List
Method 8270

Client Name: Giant Refining
Client ID: OW-17
Lab ID: 012009-0002-SA
Matrix: AQUEOUS Sampled: 25 OCT 90 Received: 26 OCT 90
Authorized: 26 OCT 90 Prepared: 28 OCT 90 Analyzed: 07 NOV 90

Parameter	Result	Units	Reporting Limit
Acenaphthene	ND	ug/L	500
Acenaphthylene	ND	ug/L	500
Acetophenone	ND	ug/L	500
2-Acetylaminofluorene	ND	ug/L	5000
4-Aminobiphenyl	ND	ug/L	500
Aniline	ND	ug/L	500
Anthracene	ND	ug/L	500
Aramite	ND	ug/L	500
Benzo(a)anthracene	ND	ug/L	500
Benzo(b)fluoranthene	ND	ug/L	500
Benzo(k)fluoranthene	ND	ug/L	500
Benzo(g,h,i)perylene	ND	ug/L	500
Benzo(a)pyrene	ND	ug/L	500
Benzyl alcohol	ND	ug/L	500
4-Bromophenyl phenyl ether	ND	ug/L	500
Butyl benzyl phthalate	ND	ug/L	500
2-sec-Butyl-4,6-dinitro-phenol	ND	ug/L	500
4-Chloroaniline	ND	ug/L	500
bis(2-Chloroethoxy)-methane	ND	ug/L	500
bis(2-Chloroethyl) ether	ND	ug/L	500
bis(2-Chloroisopropyl)-ether	ND	ug/L	500
4-Chloro-3-methylphenol	ND	ug/L	500
2-Chloronaphthalene	ND	ug/L	500
2-Chlorophenol	ND	ug/L	500
4-Chlorophenyl phenyl ether	ND	ug/L	500
Chrysene	ND	ug/L	500
Dibenz(a,h)anthracene	ND	ug/L	500
Dibenzofuran	ND	ug/L	500
Di-n-butyl phthalate	ND	ug/L	500
1,2-Dichlorobenzene	ND	ug/L	500
1,3-Dichlorobenzene	ND	ug/L	500
1,4-Dichlorobenzene	ND	ug/L	500
3,3'-Dichlorobenzidine	ND	ug/L	1000
2,4-Dichlorophenol	ND	ug/L	500
2,6-Dichlorophenol	ND	ug/L	500
Diethyl phthalate	ND	ug/L	500

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Donna Reinwald Approved By: Jeff Lowry

Enseco
A Corning Company

Semivolatile Organics
Appendix IX List
Method 8270

Client Name: Giant Refining
Client ID: OW-17
Lab ID: 012009-0002-SA
Matrix: AQUEOUS Sampled: 25 OCT 90 Received: 26 OCT 90
Authorized: 26 OCT 90 Prepared: 28 OCT 90 Analyzed: 07 NOV 90

Parameter	Result	Units	Reporting Limit
Dimethoate	ND	ug/L	--
p-Dimethylaminoazobenzene	ND	ug/L	500
7,12-Dimethylbenz(a)-anthracene	ND	ug/L	500
3,3'-Dimethylbenzidine	ND	ug/L	500
a,a-Dimethylphenethyl-amine	ND	ug/L	500
2,4-Dimethylphenol	ND	ug/L	500
Dimethyl phthalate	ND	ug/L	500
1,3-Dinitrobenzene	ND	ug/L	500
4,6-Dinitro-2-methylphenol	ND	ug/L	2500
2,4-Dinitrophenol	ND	ug/L	2500
2,4-Dinitrotoluene	ND	ug/L	500
2,6-Dinitrotoluene	ND	ug/L	500
Di-n-octyl phthalate	ND	ug/L	500
Diphenylamine	ND	ug/L	500
Disulfoton	ND	ug/L	2500
bis(2-Ethylhexyl) phthalate	ND	ug/L	500
Ethyl methanesulfonate	ND	ug/L	500
Famphur	ND	ug/L	--
Fluoranthene	ND	ug/L	500
Fluorene	ND	ug/L	500
Hexachlorobenzene	ND	ug/L	500
Hexachlorobutadiene	ND	ug/L	500
Hexachlorocyclopentadiene	ND	ug/L	500
Hexachloroethane	ND	ug/L	500
Hexachlorophene	ND	ug/L	--
Hexachloropropene	ND	ug/L	500
Indeno(1,2,3-cd)pyrene	ND	ug/L	500
Isophorone	ND	ug/L	500
Isosafrole	ND	ug/L	1000
Methapyrilene	ND	ug/L	500
3-Methylcholanthrene	ND	ug/L	500
Methyl methanesulfonate	ND	ug/L	500
2-Methylnaphthalene	2400	ug/L	500
Methyl parathion	ND	ug/L	2500
2-Methylphenol	ND	ug/L	500
3/4-Methylphenol	ND	ug/L	500
Naphthalene	1700	ug/L	500

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Donna Reinwald Approved By: Jeff Lowry

Enseco
A Corning Company

Semivolatile Organics
Appendix IX List
Method 8270

Client Name: Giant Refining
Client ID: OW-17
Lab ID: 012009-0002-SA
Matrix: AQUEOUS Sampled: 25 OCT 90 Received: 26 OCT 90
Authorized: 26 OCT 90 Prepared: 28 OCT 90 Analyzed: 07 NOV 90

Parameter	Result	Units	Reporting Limit
1,4-Naphthoquinone	ND	ug/L	500
1-Naphthylamine	ND	ug/L	500
2-Naphthylamine	ND	ug/L	500
2-Nitroaniline	ND	ug/L	2500
3-Nitroaniline	ND	ug/L	2500
4-Nitroaniline	ND	ug/L	2500
Nitrobenzene	ND	ug/L	500
2-Nitrophenol	ND	ug/L	500
4-Nitrophenol	ND	ug/L	2500
4-Nitroquinoline-1-oxide	ND	ug/L	--
N-Nitroso-di-n-butylamine	ND	ug/L	500
N-Nitrosodiethylamine	ND	ug/L	500
N-Nitrosodimethylamine	ND	ug/L	500
N-Nitrosodiphenylamine	ND	ug/L	500
N-Nitroso-di-n-propylamine	ND	ug/L	500
N-Nitrosomethylethylamine	ND	ug/L	500
N-Nitrosomorpholine	ND	ug/L	500
N-Nitrosopiperidine	ND	ug/L	500
N-Nitrosopyrrolidine	ND	ug/L	500
5-Nitro-o-toluidine	ND	ug/L	500
Parathion	ND	ug/L	2500
Pentachlorobenzene	ND	ug/L	500
Pentachloroethane	ND	ug/L	500
Pentachloronitrobenzene	ND	ug/L	2500
Pentachlorophenol	ND	ug/L	2500
Phenacetin	ND	ug/L	500
Phenanthrene	ND	ug/L	500
Phenol	ND	ug/L	500
4-Phenylenediamine	ND	ug/L	--
Phorate	ND	ug/L	5000
2-Picoline	ND	ug/L	500
Pronamide	ND	ug/L	500
Pyrene	ND	ug/L	500
Pyridine	ND	ug/L	1000
Safrole	ND	ug/L	500
Sulfotepp	ND	ug/L	2500
1,2,4,5-Tetrachloro-benzene	ND	ug/L	500
2,3,4,6-Tetrachlorophenol	ND	ug/L	2500
Thionazin	ND	ug/L	2500

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Donna Reinwald Approved By: Jeff Lowry

Enseco
A Corning Company

Semivolatile Organics
Appendix IX List
Method 8270

Client Name: Giant Refining
Client ID: OW-17
Lab ID: 012009-0002-SA
Matrix: AQUEOUS Sampled: 25 OCT 90 Received: 26 OCT 90
Authorized: 26 OCT 90 Prepared: 28 OCT 90 Analyzed: 07 NOV 90

Parameter	Result	Units	Reporting Limit
2-Toluidine	ND	ug/L	500
1,2,4-Trichlorobenzene	ND	ug/L	500
2,4,5-Trichlorophenol	ND	ug/L	2500
O,O,O-Triethylphosphorothioate	ND	ug/L	500
2,4,6-Trichlorophenol	ND	ug/L	500
1,3,5-Trinitrobenzene	ND	ug/L	500
Ethyl methacrylate	ND	ug/L	500
Methyl methacrylate	ND	ug/L	500
Surrogate	**Recovery**		
Nitrobenzene-d5	ND	%	--
2-Fluorobiphenyl	ND	%	--
Terphenyl-d14	ND	%	--
Phenol-d5	ND	%	--
2-Fluorophenol	ND	%	--
2,4,6-Tribromophenol	ND	%	--

ND = Not detected
NA = Not applicable

Reported By: Donna Reinwald Approved By: Jeff Lowry

Enseco
A Corning Company

Halogenated Volatile Organics

Method 8010

Client Name: Giant Refining
Client ID: OW-26
Lab ID: 012009-0001-SA
Matrix: AQUEOUS Sampled: 25 OCT 90 Received: 26 OCT 90
Authorized: 26 OCT 90 Prepared: NA Analyzed: 01 NOV 90

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	1.1	ug/L	0.50
trans-1,2-Dichloroethene	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	26	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Dibromochloromethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0

Surrogate	Recovery	
Bromochloromethane	121	%

ND = Not detected
NA = Not applicable

Reported By: Garth Atkins Approved By: Jeff Lowry

Enseco
A Corning Company

Halogenated Volatile Organics

Method 8010

Client Name: Giant Refining
Client ID: OW-17
Lab ID: 012009-0002-SA
Matrix: AQUEOUS Sampled: 25 OCT 90 Received: 26 OCT 90
Authorized: 26 OCT 90 Prepared: NA Analyzed: 01 NOV 90

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	120
Bromomethane	ND	ug/L	120
Vinyl chloride	ND	ug/L	25
Chloroethane	ND	ug/L	120
Methylene chloride	ND	ug/L	120
1,1-Dichloroethene	ND	ug/L	12
1,1-Dichloroethane	ND	ug/L	12
trans-1,2-Dichloroethene	ND	ug/L	12
Chloroform	ND	ug/L	12
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	25
1,2-Dichloroethane	110	ug/L	25
1,1,1-Trichloroethane	ND	ug/L	12
Carbon tetrachloride	ND	ug/L	12
Bromodichloromethane	ND	ug/L	25
1,2-Dichloropropane	ND	ug/L	25
trans-1,3-Dichloropropene	ND	ug/L	25
Trichloroethene	ND	ug/L	12
Dibromochloromethane	ND	ug/L	25
cis-1,3-Dichloropropene	ND	ug/L	50
1,1,2-Trichloroethane	ND	ug/L	25
EDB (1,2-Dibromoethane)	ND	ug/L	50
Bromoform	ND	ug/L	120
1,1,2,2-Tetrachloroethane	ND	ug/L	25
Tetrachloroethene	ND	ug/L	12
Chlorobenzene	ND	ug/L	50

Surrogate	Recovery	
Bromochloromethane	127	%

ND = Not detected
NA = Not applicable

Reported By: Garth Atkins Approved By: Jeff Lowry

Enseco
A Corning Company

Halogenated Volatile Organics

Method 8010

Client Name: Giant Refining
Client ID: Trip Blank
Lab ID: 012009-0004-SA
Matrix: AQUEOUS Sampled: Unknown Received: 26 OCT 90
Authorized: 26 OCT 90 Prepared: NA Analyzed: 02 NOV 90

Parameter	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
trans-1,2-Dichloroethene	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	ND	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Dibromochloromethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0

Surrogate	Recovery	
Bromochloromethane	123	%

ND = Not detected
NA = Not applicable

Reported By: Garth Atkins Approved By: Jeff Lowry

Enseco
A Corning Company

Aromatic Volatile Organics

Method 8020

Client Name: Giant Refining
Client ID: OW-26
Lab ID: 012009-0001-SA
Matrix: AQUEOUS Sampled: 25 OCT 90 Received: 26 OCT 90
Authorized: 26 OCT 90 Prepared: NA Analyzed: 31 OCT 90

Parameter	Result	Units	Reporting Limit
Benzene	3100	ug/L	120
Toluene	2200	ug/L	120
Chlorobenzene	ND	ug/L	120
Ethylbenzene	970	ug/L	120
Xylenes (total)	6100	ug/L	120
1,3-Dichlorobenzene	ND	ug/L	120
1,4-Dichlorobenzene	ND	ug/L	120
1,2-Dichlorobenzene	ND	ug/L	120

Surrogate	Recovery	
a,a,a-Trifluorotoluene	101	%

ND = Not detected
NA = Not applicable

Reported By: Garth Atkins Approved By: Jeff Lowry

Enseco
A Corning Company

Aromatic Volatile Organics

Method 8020

Client Name: Giant Refining
Client ID: OW-17
Lab ID: 012009-0002-SA
Matrix: AQUEOUS Sampled: 25 OCT 90 Received: 26 OCT 90
Authorized: 26 OCT 90 Prepared: NA Analyzed: 31 OCT 90

Parameter	Result	Units	Reporting Limit
Benzene	3100	ug/L	120
Toluene	5200	ug/L	120
Chlorobenzene	ND	ug/L	120
Ethylbenzene	920	ug/L	120
Xylenes (total)	5900	ug/L	120
1,3-Dichlorobenzene	ND	ug/L	120
1,4-Dichlorobenzene	ND	ug/L	120
1,2-Dichlorobenzene	ND	ug/L	120

Surrogate	Recovery	
a,a,a-Trifluorotoluene	100	%

ND = Not detected
NA = Not applicable

Reported By: Garth Atkins Approved By: Jeff Lowry

Enseco
A Corning Company

Metals

Dissolved Metals

Client Name: Giant Refining
Client ID: OW-26
Lab ID: 012009-0001-SA
Matrix: AQUEOUS
Authorized: 26 OCT 90

Sampled: 25 OCT 90
Prepared: See Below

Received: 26 OCT 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic	0.011	mg/L	0.0050	7060	NA	03 JAN 91
Barium	2.3	mg/L	0.010	6010	NA	03 JAN 91
Cadmium	ND	mg/L	0.0050	6010	NA	03 JAN 91
Calcium	61.4	mg/L	0.20	6010	NA	03 JAN 91
Chromium	ND	mg/L	0.010	6010	NA	03 JAN 91
Lead	ND	mg/L	0.0050	7421	NA	03 JAN 91
Manganese	1.5	mg/L	0.010	6010	NA	03 JAN 91
Selenium	ND	mg/L	0.050	7740	NA	03 JAN 91
Silver	ND	mg/L	0.010	6010	NA	03 JAN 91
Sodium	252	mg/L	5.0	6010	NA	03 JAN 91

ND = Not detected
NA = Not applicable

Reported By: Sandra Jones

Approved By: Roxanne Sullivan

Enseco
A Corning Company

Metals

Dissolved Metals

Client Name: Giant Refining
Client ID: OW-17
Lab ID: 012009-0002-SA
Matrix: AQUEOUS
Authorized: 26 OCT 90
Sampled: 25 OCT 90
Prepared: See Below
Received: 26 OCT 90
Analyzed: See Below

Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic	ND	mg/L	0.0050	7060	NA	03 JAN 91
Barium	1.7	mg/L	0.010	6010	NA	03 JAN 91
Cadmium	ND	mg/L	0.0050	6010	NA	03 JAN 91
Calcium	143	mg/L	0.20	6010	NA	03 JAN 91
Chromium	ND	mg/L	0.010	6010	NA	03 JAN 91
Lead	0.046	mg/L	0.025	7421	NA	03 JAN 91
Manganese	5.8	mg/L	0.010	6010	NA	03 JAN 91
Selenium	ND	mg/L	0.050	7740	NA	03 JAN 91
Silver	ND	mg/L	0.010	6010	NA	03 JAN 91
Sodium	319	mg/L	5.0	6010	NA	03 JAN 91

ND = Not detected
NA = Not applicable

Reported By: Sandra Jones

Approved By: Roxanne Sullivan

Enseco
A Corning Company

General Inorganics

Client Name: Giant Refining
Client ID: OW-26
Lab ID: 012009-0001-SA
Matrix: AQUEOUS Sampled: 25 OCT 90 Received: 26 OCT 90
Authorized: 26 OCT 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	592	mg/L	5.0	310.1	NA	26 OCT 90
Alkalinity, Carb. as CaCO3 at pH 8.3	ND	mg/L	5.0	310.1	NA	26 OCT 90
Chloride	156	mg/L	3.0	300.0	NA	07 NOV 90
pH	7.4	units	--	9040	NA	26 OCT 90
Phenolics	0.015	mg/L	0.010	9065	NA	18 NOV 90
Sulfate	ND	mg/L	5.0	300.0	NA	07 NOV 90
Specific Conductance at 25 deg.C	1490	umhos/cm	1.0	120.1	NA	26 OCT 90
Total Dissolved Solids	894	mg/L	10.0	160.1	NA	30 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Tammy Bailey Approved By: Roxanne Sullivan

Enseco
A Corning Company

General Inorganics

Client Name: Giant Refining
Client ID: OW-17
Lab ID: 012009-0002-SA
Matrix: AQUEOUS
Sampled: 25 OCT 90
Received: 26 OCT 90
Authorized: 26 OCT 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	369	mg/L	5.0	310.1	NA	26 OCT 90
Alkalinity, Carb. as CaCO3 at pH 8.3	ND	mg/L	5.0	310.1	NA	26 OCT 90
Chloride	642	mg/L	15.0	300.0	NA	07 NOV 90
pH	7.1	units	--	9040	NA	26 OCT 90
Phenolics	0.057	mg/L	0.010	9065	NA	21 NOV 90
Sulfate	6.9	mg/L	5.0	300.0	NA	07 NOV 90
Specific Conductance at 25 deg.C	2510	umhos/cm	1.0	120.1	NA	26 OCT 90
Total Dissolved Solids	1420	mg/L	10.0	160.1	NA	30 OCT 90

ND = Not detected
NA = Not applicable

Reported By: Tammy Bailey
Approved By: Roxanne Sullivan

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).

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

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
Semivolatile Organics by GC/MS

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
012009-0001-SA	AQUEOUS	625-A	28 OCT 90-A	28 OCT 90-A
012009-0002-SA	AQUEOUS	625-A	28 OCT 90-A	28 OCT 90-A
012009-0003-SA	AQUEOUS	625-A	28 OCT 90-B	28 OCT 90-B

Enseco
A Corning Company

DUPLICATE CONTROL SAMPLE REPORT
Semivolatile Organics by GC/MS

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: 625-A Matrix: AQUEOUS QC Lot: 28 OCT 90-A Concentration Units: ug/L								
Phenol	100	68.0	75.0	71.5	72	12- 89	9.8	42
2-Chlorophenol	100	88.1	82.7	85.4	85	27-123	6.3	40
1,4-Dichlorobenzene	50	30.0	28.1	29.0	58	36- 97	6.5	28
N-Nitroso-di-n-propylamine	50	42.9	43.7	43.3	87	41-116	1.8	38
1,2,4-Trichlorobenzene	50	30.7	29.0	29.8	60	39- 98	5.7	28
4-Chloro-3-methylphenol	100	75.9	77.0	76.4	76	23- 97	1.4	42
Acenaphthene	50	34.3	34.3	34.3	69	46-118	0.0	31
4-Nitrophenol	100	66.9	60.8	63.8	64	10- 80	9.6	50
2,4-Dinitrotoluene	50	43.1	36.4	39.8	80	24- 96	17	38
Pentachlorophenol	100	45.5	51.9	48.7	49	9-103	13	50
Pyrene	50	34.9	30.7	32.8	66	26-127	13	31
Category: 625-A Matrix: AQUEOUS QC Lot: 28 OCT 90-B Concentration Units: ug/L								
Phenol	100	69.7	69.7	69.7	70	12- 89	0.0	42
2-Chlorophenol	100	77.1	78.5	77.8	78	27-123	1.8	40
1,4-Dichlorobenzene	50	23.4	25.4	24.4	49	36- 97	8.2	28
N-Nitroso-di-n-propylamine	50	37.2	40.1	38.6	77	41-116	7.5	38
1,2,4-Trichlorobenzene	50	25.3	26.2	25.8	52	39- 98	3.5	28
4-Chloro-3-methylphenol	100	76.2	75.9	76.0	76	23- 97	0.4	42
Acenaphthene	50	30.3	33.2	31.8	64	46-118	9.1	31
4-Nitrophenol	100	64.4	55.6	60.0	60	10- 80	15	50
2,4-Dinitrotoluene	50	34.9	36.0	35.4	71	24- 96	3.1	38
Pentachlorophenol	100	45.4	40.3	42.8	43	9-103	12	50
Pyrene	50	33.2	35.0	34.1	68	26-127	5.3	31

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

Enseco
A Corning Company

SINGLE CONTROL SAMPLE REPORT
Semivolatile Organics by GC/MS

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) SCS	Accuracy(%) Limits
Category: 625-A Matrix: AQUEOUS QC Lot: 28 OCT 90-A QC Run: 28 OCT 90-A Concentration Units: ug/L				
Nitrobenzene-d5	100	33.1	33	35-114
2-Fluorobiphenyl	100	29.4	29	43-116
Terphenyl-d14	100	32.3	32	33-141
2-Fluorophenol	200	139	70	21-100
Phenol-d5	200	125	62	10- 94
2,4,6-Tribromophenol	200	133	66	10-123
Category: 625-A Matrix: AQUEOUS QC Lot: 28 OCT 90-B QC Run: 28 OCT 90-B Concentration Units: ug/L				
Nitrobenzene-d5	100	72.9	73	35-114
2-Fluorobiphenyl	100	65.4	65	43-116
Terphenyl-d14	100	73.1	73	33-141
2-Fluorophenol	200	145	72	21-100
Phenol-d5	200	151	76	10- 94
2,4,6-Tribromophenol	200	158	79	10-123

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

Enseco
A Coming Company

METHOD BLANK REPORT
Semivolatile Organics by GC/MS

Test: 8270CP-AP9-A
Matrix: AQUEOUS
QC Lot: 28 OCT 90-A QC Run: 28 OCT 90-A

Analyte	Result	Units	Reporting Limit
Acenaphthene	ND	ug/L	10
Acenaphthylene	ND	ug/L	10
Acetophenone	ND	ug/L	10
2-Acetylaminofluorene	ND	ug/L	100
4-Aminobiphenyl	ND	ug/L	10
Aniline	ND	ug/L	10
Anthracene	ND	ug/L	10
Aramite	ND	ug/L	10
Benzo(a)anthracene	ND	ug/L	10
Benzo(b)fluoranthene	ND	ug/L	10
Benzo(k)fluoranthene	ND	ug/L	10
Benzo(g,h,i)perylene	ND	ug/L	10
Benzo(a)pyrene	ND	ug/L	10
Benzyl alcohol	ND	ug/L	10
4-Bromophenyl phenyl ether	ND	ug/L	10
Butyl benzyl phthalate	ND	ug/L	10
2-sec-Butyl-4,6-dinitro-phenol	ND	ug/L	10
4-Chloroaniline	ND	ug/L	10
bis(2-Chloroethoxy)-methane	ND	ug/L	10
bis(2-Chloroethyl) ether	ND	ug/L	10
bis(2-Chloroisopropyl)-ether	ND	ug/L	10
4-Chloro-3-methylphenol	ND	ug/L	10
2-Chloronaphthalene	ND	ug/L	10
2-Chlorophenol	ND	ug/L	10
4-Chlorophenyl phenyl ether	ND	ug/L	10
Chrysene	ND	ug/L	10
Dibenz(a,h)anthracene	ND	ug/L	10
Dibenzofuran	ND	ug/L	10
Di-n-butyl phthalate	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
3,3'-Dichlorobenzidine	ND	ug/L	20
2,4-Dichlorophenol	ND	ug/L	10
2,6-Dichlorophenol	ND	ug/L	10
Diethyl phthalate	ND	ug/L	10

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

Test: 8270CP-AP9-A
Matrix: AQUEOUS
QC Lot: 28 OCT 90-A QC Run: 28 OCT 90-A

Analyte	Result	Units	Reporting Limit
Dimethoate	ND	ug/L	--
p-Dimethylaminoazobenzene	ND	ug/L	10
7,12-Dimethylbenz(a)-anthracene	ND	ug/L	10
3,3'-Dimethylbenzidine	ND	ug/L	10
a,a-Dimethylphenethyl-amine	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
1,3-Dinitrobenzene	ND	ug/L	10
4,6-Dinitro-2-methylphenol	ND	ug/L	50
2,4-Dinitrophenol	ND	ug/L	50
2,4-Dinitrotoluene	ND	ug/L	10
2,6-Dinitrotoluene	ND	ug/L	10
Di-n-octyl phthalate	ND	ug/L	10
Diphenylamine	ND	ug/L	10
Disulfoton	ND	ug/L	50
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
Ethyl methanesulfonate	ND	ug/L	10
Famphur	ND	ug/L	--
Fluoranthene	ND	ug/L	10
Fluorene	ND	ug/L	10
Hexachlorobenzene	ND	ug/L	10
Hexachlorobutadiene	ND	ug/L	10
Hexachlorocyclopentadiene	ND	ug/L	10
Hexachloroethane	ND	ug/L	10
Hexachlorophene	ND	ug/L	--
Hexachloropropene	ND	ug/L	10
Indeno(1,2,3-cd)pyrene	ND	ug/L	10
Isophorone	ND	ug/L	10
Isosafrole	ND	ug/L	20
Methapyrilene	ND	ug/L	10
3-Methylcholanthrene	ND	ug/L	10
Methyl methanesulfonate	ND	ug/L	10
2-Methylnaphthalene	ND	ug/L	10
Methyl parathion	ND	ug/L	50
2-Methylphenol	ND	ug/L	10
3/4-Methylphenol	ND	ug/L	10
Naphthalene	ND	ug/L	10

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

Test: 8270CP-AP9-A
Matrix: AQUEOUS
QC Lot: 28 OCT 90-A QC Run: 28 OCT 90-A

Analyte	Result	Units	Reporting Limit
1,4-Naphthoquinone	ND	ug/L	10
1-Naphthylamine	ND	ug/L	10
2-Naphthylamine	ND	ug/L	10
2-Nitroaniline	ND	ug/L	50
3-Nitroaniline	ND	ug/L	50
4-Nitroaniline	ND	ug/L	50
Nitrobenzene	ND	ug/L	10
2-Nitrophenol	ND	ug/L	10
4-Nitrophenol	ND	ug/L	50
4-Nitroquinoline-1-oxide	ND	ug/L	--
N-Nitroso-di-n-butylamine	ND	ug/L	10
N-Nitrosodiethylamine	ND	ug/L	10
N-Nitrosodimethylamine	ND	ug/L	10
N-Nitrosodiphenylamine	ND	ug/L	10
N-Nitroso-di-n-propylamine	ND	ug/L	10
N-Nitrosomethylethylamine	ND	ug/L	10
N-Nitrosomorpholine	ND	ug/L	10
N-Nitrosopiperidine	ND	ug/L	10
N-Nitrosopyrrolidine	ND	ug/L	10
5-Nitro-o-toluidine	ND	ug/L	10
Parathion	ND	ug/L	50
Pentachlorobenzene	ND	ug/L	10
Pentachloroethane	ND	ug/L	10
Pentachloronitrobenzene	ND	ug/L	50
Pentachlorophenol	ND	ug/L	50
Phenacetin	ND	ug/L	10
Phenanthrene	ND	ug/L	10
Phenol	ND	ug/L	10
4-Phenylenediamine	ND	ug/L	--
Phorate	ND	ug/L	100
2-Picoline	ND	ug/L	10
Pronamide	ND	ug/L	10
Pyrene	ND	ug/L	10
Pyridine	ND	ug/L	20
Safrole	ND	ug/L	10
Sulfotepp	ND	ug/L	50
1,2,4,5-Tetrachloro-benzene	ND	ug/L	10
2,3,4,6-Tetrachlorophenol	ND	ug/L	50
Thionazin	ND	ug/L	50

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

Analyte	Result	Units	Reporting Limit
Test: 8270CP-AP9-A			
Matrix: AQUEOUS			
QC Lot: 28 OCT 90-A QC Run: 28 OCT 90-A			
2-Toluidine	ND	ug/L	10
1,2,4-Trichlorobenzene	ND	ug/L	10
2,4,5-Trichlorophenol	ND	ug/L	50
2,4,6-Trichlorophenol	ND	ug/L	10
O,O,O-Triethylphosphoro-thioate	ND	ug/L	10
1,3,5-Trinitrobenzene	ND	ug/L	10
Ethyl methacrylate	ND	ug/L	10
Methyl methacrylate	ND	ug/L	10
Test: 8270CP-REF-A			
Matrix: AQUEOUS			
QC Lot: 28 OCT 90-B QC Run: 28 OCT 90-B			
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

Enseco
A Corning Company

QC LOT ASSIGNMENT REPORT
Volatile Organics by GC

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
012009-0001-SA	AQUEOUS	602-A	30 OCT 90-P	30 OCT 90-P
012009-0001-SA	AQUEOUS	601-A	01 NOV 90-H	01 NOV 90-H
012009-0002-SA	AQUEOUS	602-A	30 OCT 90-P	30 OCT 90-P
012009-0002-SA	AQUEOUS	601-A	01 NOV 90-H	01 NOV 90-H
012009-0004-SA	AQUEOUS	601-A	01 NOV 90-H	01 NOV 90-H

Enseco
A Corning Company

DUPLICATE CONTROL SAMPLE REPORT
Volatile Organics by GC

Analyte	Concentration Spiked	Measured DCS1	Measured DCS2	Measured AVG	Accuracy Average(%) DCS	Accuracy Limits	Precision (RPD) DCS	Precision Limit
Category: 602-A Matrix: AQUEOUS QC Lot: 30 OCT 90-P Concentration Units: ug/L								
Benzene	5.0	4.07	4.05	4.06	81	80-120	0.5	15
Toluene	5.0	4.37	4.33	4.35	87	80-120	0.9	15
Ethylbenzene	5.0	4.55	4.52	4.54	91	80-120	0.7	15
Xylenes (total)	5.0	4.60	4.67	4.64	93	80-120	1.5	15
1,3-Dichlorobenzene	5.0	5.02	4.76	4.89	98	80-120	5.3	15
Category: 601-A Matrix: AQUEOUS QC Lot: 01 NOV 90-H Concentration Units: ug/L								
1,1-Dichloroethane	5.0	4.60	4.40	4.50	90	80-130	4.4	20
Chloroform	5.0	5.91	5.84	5.88	118	80-120	1.2	20
Bromodichloromethane	10	10.0	10.1	10.0	101	80-120	1.0	20
Trichloroethene	5.0	5.02	5.06	5.04	101	70-120	0.8	20
Chlorobenzene	5.0	4.80	4.82	4.81	96	80-120	0.4	20

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

Analyte	Concentration Spiked	Measured	Accuracy(%) SCS	Limits
Category: 602-A Matrix: AQUEOUS QC Lot: 30 OCT 90-P QC Run: 30 OCT 90-P Concentration Units: ug/L				
a,a,a-Trifluorotoluene	30.0	30.0	100	20-160
Category: 601-A Matrix: AQUEOUS QC Lot: 01 NOV 90-H QC Run: 01 NOV 90-H Concentration Units: ug/L				
Bromochloromethane	5.00	5.04	101	20-160

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

Enseco
A Corning Company

METHOD BLANK REPORT
Volatile Organics by GC

Analyte	Result	Units	Reporting Limit
Test: 602-AP			
Matrix: AQUEOUS			
QC Lot: 30 OCT 90-P QC Run: 30 OCT 90-P			
Benzene	ND	ug/L	0.50
Toluene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	0.50
Ethylbenzene	ND	ug/L	0.50
Xylenes (total)	ND	ug/L	0.50
1,3-Dichlorobenzene	ND	ug/L	0.50
1,4-Dichlorobenzene	ND	ug/L	0.50
1,2-Dichlorobenzene	ND	ug/L	0.50
Test: 601-A			
Matrix: AQUEOUS			
QC Lot: 01 NOV 90-H QC Run: 01 NOV 90-H			
Chloromethane	ND	ug/L	5.0
Bromomethane	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
trans-1,2-Dichloroethene	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	ND	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Dibromochloromethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0

METHOD BLANK REPORT
Volatile Organics by GC (cont.)

Test: 601-A
Matrix: AQUEOUS
QC Lot: 01 NOV 90-H QC Run: 01 NOV 90-H

Analyte	Result	Units	Reporting Limit
Chloromethane	ND	ug/L	5.0
Bromomethane	ND	ug/L	5.0
Vinyl chloride	ND	ug/L	1.0
Chloroethane	ND	ug/L	5.0
Methylene chloride	ND	ug/L	5.0
1,1-Dichloroethene	ND	ug/L	0.50
1,1-Dichloroethane	ND	ug/L	0.50
trans-1,2-Dichloroethene	ND	ug/L	0.50
Chloroform	ND	ug/L	0.50
1,1,2 Trichloro-1,2,2-trifluoroethane	ND	ug/L	1.0
1,2-Dichloroethane	ND	ug/L	1.0
1,1,1-Trichloroethane	ND	ug/L	0.50
Carbon tetrachloride	ND	ug/L	0.50
Bromodichloromethane	ND	ug/L	1.0
1,2-Dichloropropane	ND	ug/L	1.0
trans-1,3-Dichloropropene	ND	ug/L	1.0
Trichloroethene	ND	ug/L	0.50
Dibromochloromethane	ND	ug/L	1.0
cis-1,3-Dichloropropene	ND	ug/L	2.0
1,1,2-Trichloroethane	ND	ug/L	1.0
EDB (1,2-Dibromoethane)	ND	ug/L	2.0
Bromoform	ND	ug/L	5.0
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0
Tetrachloroethene	ND	ug/L	0.50
Chlorobenzene	ND	ug/L	2.0

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)
012009-0001-SA	AQUEOUS	ICP-AD	03 JAN 91-A	-
012009-0001-SA	AQUEOUS	AS-FAA-AD	03 JAN 90-D	-
012009-0001-SA	AQUEOUS	PB-FAA-AD	03 JAN 91-A	-
012009-0001-SA	AQUEOUS	SE-FAA-AD	03 JAN 91-A	-
012009-0002-SA	AQUEOUS	ICP-AD	03 JAN 91-A	-
012009-0002-SA	AQUEOUS	AS-FAA-AD	03 JAN 90-D	-
012009-0002-SA	AQUEOUS	PB-FAA-AD	03 JAN 91-A	-
012009-0002-SA	AQUEOUS	SE-FAA-AD	03 JAN 91-A	-

Enseco
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	Precision (RPD) DCS	Precision (RPD) Limit
Category: ICP-AD Matrix: AQUEOUS QC Lot: 03 JAN 91-A Concentration Units: mg/L								
Aluminum	2.0	1.95	2.03	1.99	99	75-125	4.0	20
Antimony	0.5	0.433	0.430	0.431	86	75-125	0.7	20
Arsenic	0.5	0.447	0.461	0.454	91	75-125	3.1	20
Barium	2.0	1.75	1.78	1.76	88	75-125	1.2	20
Beryllium	0.05	0.0456	0.0460	0.0458	92	75-125	0.9	20
Cadmium	0.05	0.0410	0.0436	0.0423	85	75-125	6.2	20
Calcium	100	94.1	95.0	94.6	95	75-125	0.9	20
Chromium	0.2	0.177	0.183	0.180	90	75-125	3.0	20
Cobalt	0.5	0.441	0.445	0.443	89	75-125	0.9	20
Copper	0.25	0.234	0.235	0.235	94	75-125	0.3	20
Iron	1.0	0.921	0.931	0.926	93	75-125	1.0	20
Lead	0.5	0.443	0.458	0.450	90	75-125	3.2	20
Magnesium	50	47.7	48.0	47.9	96	75-125	0.6	20
Manganese	0.5	0.448	0.451	0.450	90	75-125	0.8	20
Nickel	0.5	0.452	0.457	0.455	91	75-125	0.9	20
Potassium	50	48.8	47.8	48.3	97	75-125	1.9	20
Silver	0.05	0.0454	0.0441	0.0448	90	75-125	2.9	20
Sodium	100	97.6	96.0	96.8	97	75-125	1.6	20
Vanadium	0.5	0.454	0.460	0.457	91	75-125	1.3	20
Zinc	0.5	0.438	0.443	0.440	88	75-125	1.1	20
Category: AS-FAA-AD Matrix: AQUEOUS QC Lot: 03 JAN 90-D Concentration Units: mg/L								
Arsenic	0.04	0.0355	0.0375	0.0365	91	75-125	5.5	20
Category: PB-FAA-AD Matrix: AQUEOUS QC Lot: 03 JAN 91-A Concentration Units: mg/L								
Lead	0.02	0.0172	0.0191	0.0182	91	75-125	10	20

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

Enseco
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 Limits	Precision (RPD) DCS	Precision Limit
Category: SE-FAA-AD Matrix: AQUEOUS QC Lot: 03 JAN 91-A Concentration Units: mg/L								
Selenium	0.010	0.0122	0.0112	0.0117	117	75-125	8.5	20

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

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)
012009-0001-SA	AQUEOUS	PH-A	26 OCT 90-A	-
012009-0001-SA	AQUEOUS	COND-A	26 OCT 90-A	-
012009-0001-SA	AQUEOUS	ALK-A	26 OCT 90-A	-
012009-0001-SA	AQUEOUS	CL-IC-A	07 NOV 90-M	-
012009-0001-SA	AQUEOUS	SO4-IC-A	07 NOV 90-M	-
012009-0001-SA	AQUEOUS	PHEN-A	16 NOV 90-A	16 NOV 90-A
012009-0001-SA	AQUEOUS	TDS-A	30 OCT 90-B	30 OCT 90-B
012009-0002-SA	AQUEOUS	PH-A	26 OCT 90-A	-
012009-0002-SA	AQUEOUS	COND-A	26 OCT 90-A	-
012009-0002-SA	AQUEOUS	ALK-A	26 OCT 90-A	-
012009-0002-SA	AQUEOUS	CL-IC-A	07 NOV 90-M	-
012009-0002-SA	AQUEOUS	SO4-IC-A	07 NOV 90-M	-
012009-0002-SA	AQUEOUS	PHEN-A	20 NOV 90-A	20 NOV 90-A
012009-0002-SA	AQUEOUS	TDS-A	30 OCT 90-B	30 OCT 90-B

DUPLICATE CONTROL SAMPLE REPORT
Wet Chemistry 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: PH-A Matrix: AQUEOUS QC Lot: 26 OCT 90-A Concentration Units: units								
pH	9.2	9.11	9.11	9.11	99	98-102	0.0	5
Category: COND-A Matrix: AQUEOUS QC Lot: 26 OCT 90-A Concentration Units: umhos/cm								
Specific Conductance at 25 deg.C	1910	1970	1980	1980	103	95-105	0.5	20
Category: ALK-A Matrix: AQUEOUS QC Lot: 26 OCT 90-A Concentration Units: mg/L								
Alkalinity, Total as CaCO3 at pH 4.5	216	216	213	214	99	90-110	1.4	10
Category: CL-IC-A Matrix: AQUEOUS QC Lot: 07 NOV 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: 07 NOV 90-M Concentration Units: mg/L								
Sulfate	200	205	203	204	102	93-107	1.0	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: PHEN-A Matrix: AQUEOUS QC Lot: 16 NOV 90-A Concentration Units: mg/L								
Phenolics	0.20	0.193	0.178	0.186	93	78-122	8.1	20
Category: TDS-A Matrix: AQUEOUS QC Lot: 30 OCT 90-B Concentration Units: mg/L								
Total Dissolved Solids	1490	1420	1400	1410	95	90-110	1.3	10
Category: PHEN-A Matrix: AQUEOUS QC Lot: 20 NOV 90-A Concentration Units: mg/L								
Phenolics	0.20	0.193	0.189	0.191	96	78-122	2.1	20

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

Enseco
A Corning Company

METHOD BLANK REPORT
Wet Chemistry Analysis and Preparation

Analyte	Result	Units	Reporting Limit
Test: PHEN-SPEC-A Matrix: AQUEOUS QC Lot: 16 NOV 90-A QC Run: 16 NOV 90-A			
Phenolics	ND	mg/L	0.010
Test: TDS-BAL-A Matrix: AQUEOUS QC Lot: 30 OCT 90-B QC Run: 30 OCT 90-B			
Total Dissolved Solids	ND	mg/L	10.0
Test: PHEN-SPEC-A Matrix: AQUEOUS QC Lot: 20 NOV 90-A QC Run: 20 NOV 90-A			
Phenolics	ND	mg/L	0.010

Enseco
A Corning Company

Rocky Mountain Analytical Laboratory
4955 Yarrow Street
Arvada, CO 80002
303/421-6611 FAX: 303/431-7171

CHAIN OF CUSTODY

ENSECO CLIENT: Giant Refining Co.
PROJECT: Groundwater
SAMPLING COMPANY: Giant Refining
SAMPLING SITE: Ciniza Refinery
TEAM LEADER: Cland Rosendale

SAMPLE SAFE™ CONDITIONS

PACKED BY:
SEAL NUMBER: ~~1021~~
SEAL INTACT UPON RECEIPT BY SAMPLING COMPANY: C Rosendale OK
CONDITION OF CONTENTS: Good
SEALED FOR SHIPPING BY: Cland Rosendale
INITIAL CONTENTS TEMP.: 52 °F
SEAL NUMBER: 1024
SAMPLING STATUS: ☒ Done ☐ Continuing Until
SEAL INTACT UPON RECEIPT BY LAB: ☐ Yes ☐ No
CONTENTS TEMPERATURE UPON RECEIPT BY LAB: °C

DATE	TIME	SAMPLE ID/DESCRIPTION	SAMPLE TYPE	# CONTAINERS	ANALYSIS PARAMETERS	REMARKS
10-25-90	0840	OW-26 RMAL # 01	Water	2-#1	See Attached	
				1-#2		
				1-#4		
				3-#11		
				2-#12		
10-25-90	0850	OW-17 02	Water	2-#1	See Attached	
				1-#2		
				1-#4		
				3-#11		
				2-72		
		Trip Blank	Water	1-#11		

CUSTODY TRANSFERS PRIOR TO SHIPPING

RELINQUISHED BY (SIGNED)	RECEIVED BY (SIGNED)	DATE	TIME
Cland Rosendale		10-25-90	1100am

SHIPPING DETAILS

DELIVERED TO SHIPPER BY: Cland Rosendale
METHOD OF SHIPMENT: Federal Express
AIRBILL NUMBER: 680679 1250
RECEIVED FOR LAB: RMAL
SIGNED:
DATE/TIME: 10-26-90 0800
ENSECO PROJECT NUMBER:

ENS—1133

White – CLIENT Pink – LAB

Enseco
A Corning Company

Rocky Mountain Analytical Laboratory
4955 Yarrow Street
Arvada, CO 80002
303/421-6611 FAX: 303/431-7171

CHAIN OF CUSTODY

ENSECO CLIENT: Giant Refining CO
PROJECT: Groundwater
SAMPLING COMPANY: Giant Refinery
SAMPLING SITE: Ciniza Refinery
TEAM LEADER: Cleon Kasendale

SAMPLE SAFE™ CONDITIONS

PACKED BY:
SEAL NUMBER:
SEAL INTACT UPON RECEIPT BY SAMPLING COMPANY: C Kasendale OK
CONDITION OF CONTENTS: Iced
SEALED FOR SHIPPING BY: C Kasendale
INITIAL CONTENTS TEMP.: 52°F °C
SEAL NUMBER: 10-24
SAMPLING STATUS: ☒ Done ☐ Continuing Until
SEAL INTACT UPON RECEIPT BY LAB: ☐ Yes ☐ No
CONTENTS TEMPERATURE UPON RECEIPT BY LAB: °C

DATE	TIME	SAMPLE ID/DESCRIPTION	SAMPLE TYPE	# CONTAINERS	ANALYSIS PARAMETERS	REMARKS
10-25-90	0815	RMAL # 03 GW-11	Water	2-40 12	Semi Volatiles	See Attached

CUSTODY TRANSFERS PRIOR TO SHIPPING

RELINQUISHED BY (SIGNED)	RECEIVED BY (SIGNED)	DATE	TIME

SHIPPING DETAILS

DELIVERED TO SHIPPER BY:
METHOD OF SHIPMENT:
AIRBILL NUMBER:
RECEIVED FOR LAB: RMAL
SIGNED:
DATE/TIME: 10-26-90 0800
ENSECO PROJECT NUMBER:

ENS—1133

White - CLIENT Pink - LAB