GW - <u>32</u>

REPORTS

YEAR(S):

<u>1991- MW-17</u>

OIL CONSERVE FON DIVISION RECEIVED

February 928 FEB 29 AM 9 20

Route 3, Box 7 Gallup, New Mexico 87301

505 722-3833

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

OW-25: September 6, 199√

OW-26: October 25, 1991 ∧

OW-17: October 25, 199≵€

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,

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Claud Rosendale Environmental Manager Ciniza Refinery

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

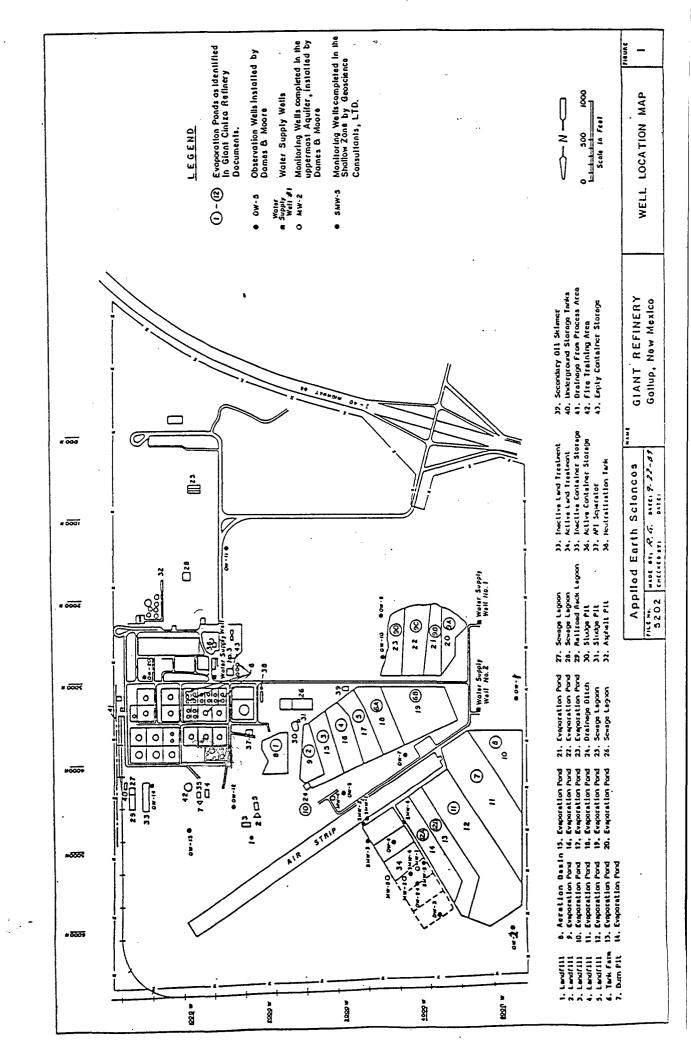
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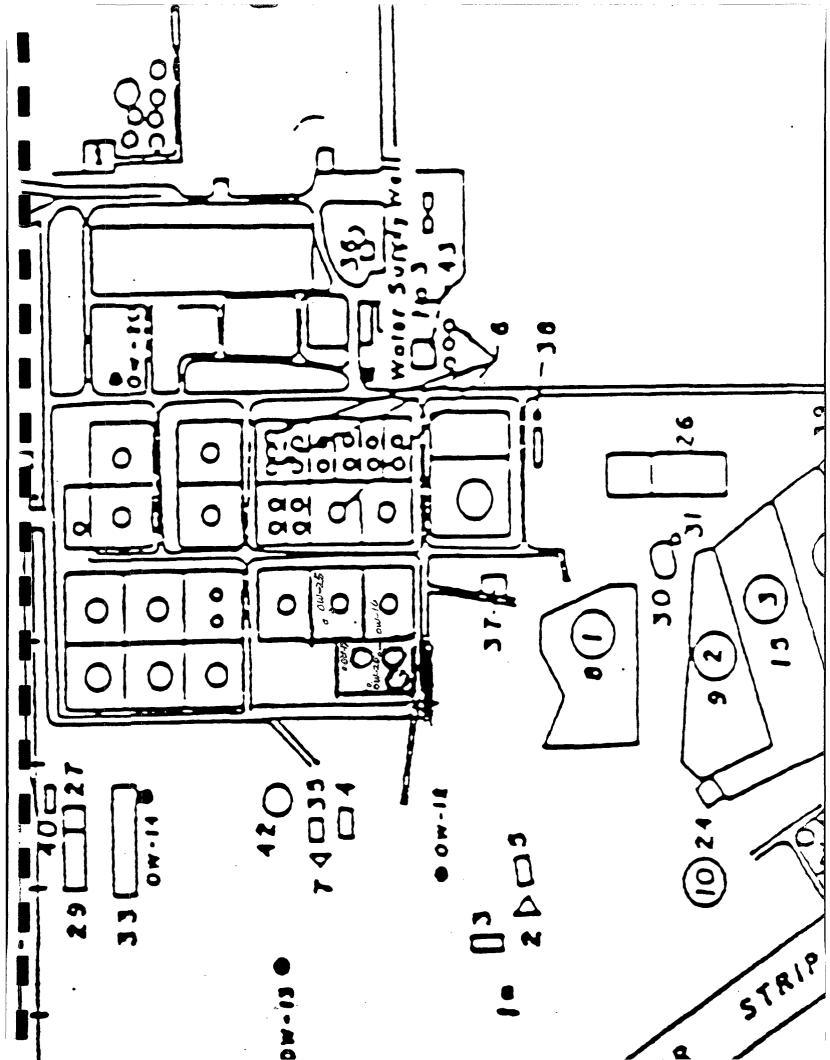
OW-17 INVESTIGATION

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ATTACHMENT A





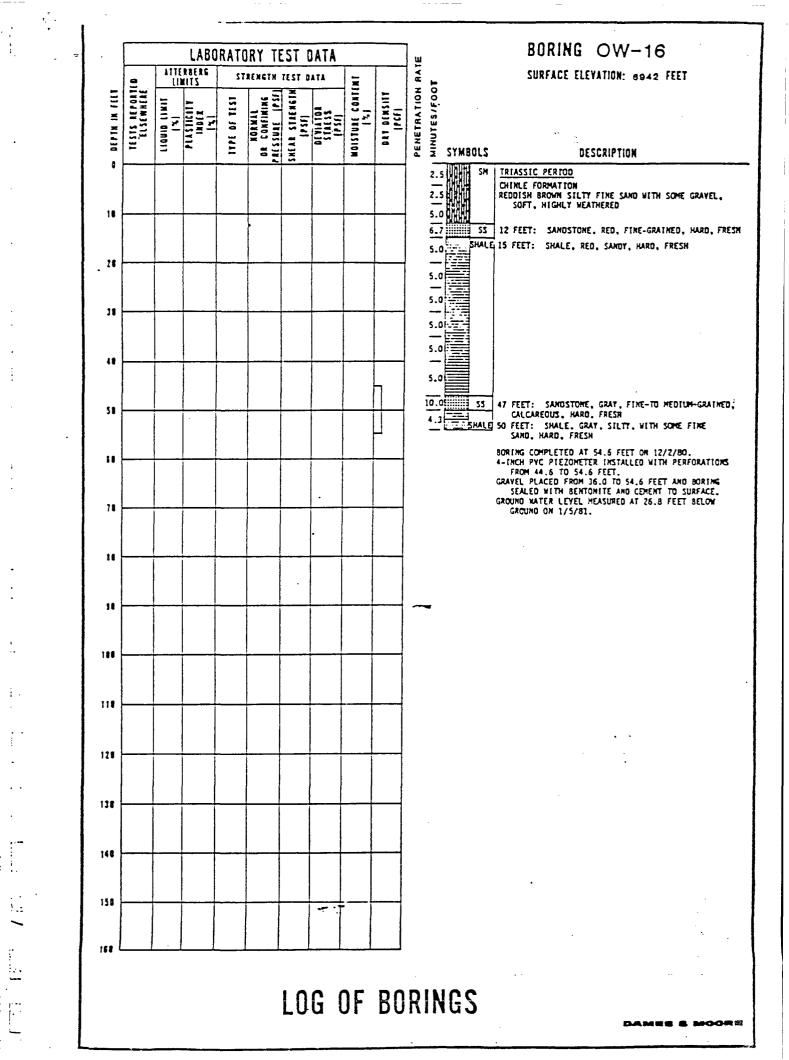
ATTACHMENT B

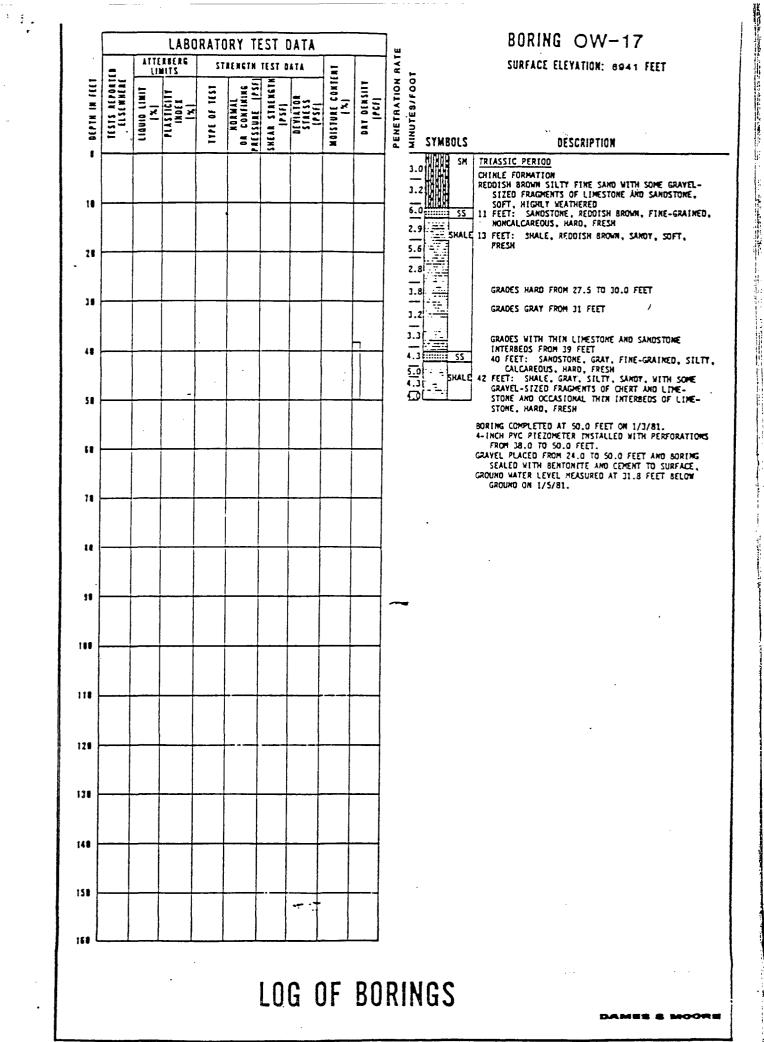
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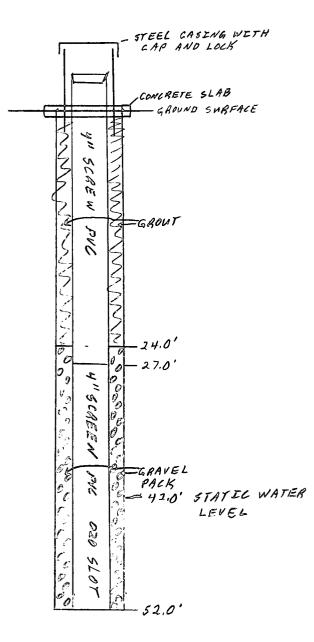
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CINIZA REFINERY OW-26

DRILLED; JUNE 29, 1990

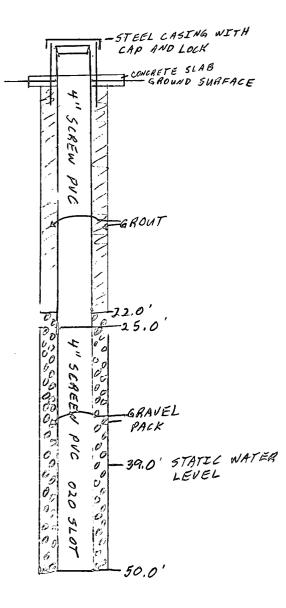


FORMATION LOG

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

CINIZA REFINERY OW-25

DRILLED: JUNE 28, 1990



FORMATION LOG

Dep+h(f+)	Formation
0-7	Clay
7-28	Red sandy clay
28-39	Clay with sond layers
39-50	Sond with this day layers



December 10, 1990

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

RE: Formation Log for Holes #0W25 and #0W26

#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

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ATTACHMENT C

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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

APPENDIX IX SEMIVOLATILE ORGANICS

Date: 27 SEP 89 12 APR 90 6 SEP 90

Date:	2/ SEP 09	12 APK 90	0 SEP 90		
					Reporting
Parameter	Results	Results	Results	Units	Limit
A second shall be a second	ND	ND	ND		10
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-				5	
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 ug/L	10
1,4-Dichlorobenzene	ND	ND	ND	ug/L ug/L	10
T'A DICUTOLODGUZGUG	1412	140	nD	uдıг	10

OW-16

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APPENDIX IX SEMIVOLATILE ORGANICS

Date: 28 SEP 89 12 APR 90 6 SEPT 90

					Reporting
Parameter	Results	Results	Results	Units	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	
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

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APPENDIX IX SEMIVOLATILE ORGANICS

Date:	28 SEP 89	12 APR 90	6 SEPT 90)	
					Reporting
Parameter	Results	Results	Results	Units	Limit
1. A. Nacabella muda ana	210	ND	ND		10
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
				-	

O₩-16

APPENDIX IX SEMIVOLATILE ORGANICS

Date: 28 SEP 89 12 APR 90 6 SEPT 90

Date:	28 SEP 89	12 APR 90	6 SEPT 9	0	
Parameter	Results	Results	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

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Halogenated Volatile Organics

Date: 28 SEP 89 12 APR 90 6 SEP 90

Date:	28 SEP 89	12 APR 90	6 SEP 90		
					Reporting
Parameter	Results	Results	Results	Units	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

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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

OW-16 GIANT REFINING GALLUP, NEW MEXICO

METALS DISSOLVED METALS Date: 27 SEP 89 11 APR 90 6 SEP 90

Parameter	Results	Results	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

General Inorganics

Date:	27 SEP 89	11 APR 90	6 SEP 90		n
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
рН	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-16

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GIANT REFINING GALLUP, NEW MEXICO

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Semivolatile Organics

Date: 25 OCT 90

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Date:	25 001 90		
_			Reporting
Parameter	Result	Units	Limit
Acenapthene	ND	ug/L	500
Acenapthylene	ND	ug/L ug/L	500
	ND	ug/L ug/L	500
	ND	ug/L ug/L	5000
2-Acetylaminofluorene 4-Aminobiphenyl	ND	ug/L ug/L	500
Aniline	ND	ug/L	500
Anthracene	ND	ug/L	500
Aramite	ND	ug/L	500
Benzo(a)anthracene	ND	ug/L ug/L	500
Benzo(b)fluoranthene	ND	ug/L ug/L	500
Benzo(k)fluoranthene	ND	ug/L ug/L	500
Benzo(g,h,i)perylene	ND	ug/L	500
Benzo(a)pyrene	ND	ug/L	500
Benzyl alcohol	ND	ug/L ug/L	500
4-Bromophenyl	ΠD	ug/L	500
phenyl ether	ND	ug/L	500
Butyl Benzyl phthalate	ND	ug/L ug/L	500
2-sec-Buty1-4,6-dinitro-	ND	ug/L	500
phenol	ND	ug/L	500
4-Chloroaniline	ND	ug/L	500
bis(2-Chloroethoxy)-	ND	ug/ш	500
methane	ND	ug/L	500
bis(2-Chloroethyl) ether	ND	ug/L	500
bis(2-Chloroisopropyl)-	ND ²	uy/u	500
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	ПD	ug/ ii	300
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
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Appendix IX Semivolatile Organics

Date: 25 OCT 90

Da	ate: 25 UCI 90		
			Reporting
Parameter	Results	Units	Limit
Diethyl phthalate	ND	ug/L	500
Dimethoate	ND	ug/L	
p-Dimethylaminoazobene	ND	ug/L	500
7,12-Dimethylbenz(a)-	ND	ug/ 11	500
	ND		500
anthracene	ND	ug/L	300
	810	/5	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
-	ND		500
Di-n-octyl phthalate		ug/L	
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		ug/L	500
Hexachloroethane	ND	ug/L	500
Hexachlorophene	ND	ug/L	
Hexachloropropene	ND	ug/L	500
Indeno(1,2,3-cd)pyrene	ND	-	500
		ug/L	500
Isophorone	ND	ug/L	
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
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GIANT REFINING

Appendix IX Semivolatile Organics (cont)

Date: 25 OCT 90

Dati	e: 25 0C1 90		Reporting
Parameter	Results	Units	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

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

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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

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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

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GIANT REFINING GALLUP, NEW MEXICO

METALS DISSOLVED METALS

	Date: 25 OCT 90		Reporting
Parameter	Result	Units	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

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General Inorganics

Date Parameter	: 25 OCT 90 Result	Units	Reporting Limit
Alkalinity, Bicarb. as			
CaCO3 at pH 4.5 Alkalinity/ Carb. as	369	mg/L	5.0
CaCO3 at pH 8.3	ND	mg/L	5.0
Chloride	642	mg/L	3.0
рН	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

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GIANT REFINING GALLUP, NEW MEXICO

Appendix IX Semivolatile Organics

Date: 6 SEP 90

	Date: 6 SEP 90)	
			Reporting
Parameter	Results	Units	Limit
Acenapthene	ND	ug/L	10
Acenapthylene	ND	ug/L ug/L	10
Acetophenone	ND	ug/L	10
2-Acetylaminofluorene	ND	ug/L	100
4-Aminobiphenyl	ND	ug/L ug/L	100
Aniline	ND	ug/L ug/L	10
Anthracene	ND	-	10
Aramite	ND	ug/L	10
		ug/L	
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

Appendix IX Semivolatile Organics

Date: 6 SEP 90

Date:	6 SEP 90		
			Reporting
Parameter	Results	Units	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
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GIANT REFINING Gallup, New Mexico

APPENDIX IX SEMIVOLATILE ORGANICS

Date:6 SEP 90

	Jace.0 DEF 90		Reporting
Parameter	Results	Units	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
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#### 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

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#### 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 5
Bromoform	ND	ug/L	
1,1,2,2-Tetrachloroethane	ND	ug/L	1
Tetrachloroethene	ND	ug/L	0.5
Chlorobenzene	ND	ug/L	2

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# 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

GIANT REFINING GALLUP, NEW MEXICO

#### METALS DISSOLVED METALS

	6 SEP 90		Reporting
Parameter	Result	Units	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

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# GIANT REFINING GALLUP, NEW MEXICO

#### GENERAL ORGANICS

Parameter	Date: 6 SEP 90 Result	0 Units	Reporting Limit
Alkalinity, Bicarb			
CaCO3 at pH 4.5	468	mg/L	5.0
Alkalinity, Carb. a	S		
CaCO3 at pH 8.3	ND	mg/L	5.0
Chloride	87.6	mg/L	3.0
рН	7.8	units	
Phenolics	0.022	mg/L	0.010
Sulfate	35.8	mg/L	5.0
Specific Conductance	е	-	
at 25 deg. C	1170	umhos/cm	1.0
Total Dissolved			
Solids	773	mg/L	10.0

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GIANT REFINING GALLUP, NEW MEXICO

#### Semivolatile Organics

Date: 25 OCT 90

Date	. 25 001 90		
			Reporting
Parameter	Results	Units	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
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# GIANT REFINING GALLUP, NEW MEXICO

Appendix IX Semivolatile Organics

Date: 25 OCT 90

Date	23 001 90		
			Reporting
Parameter	Results	Units	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
<b>3-Methylcholanthrene</b>	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

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GIANT REFINING

# Appendix IX Semivolatile Organics (cont)

Date: 25 OCT 90

Reporting				
Parameter	Results	Units	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	

# 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

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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 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

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#### 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

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GIANT REFINING GALLUP, NEW MEXICO

	Date: 25 OCT 90		Reporting
Parameter	Result	Units	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

#### Dissolved Metals

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GIANT REFINING GALLUP, NEW MEXICO

# General Inorganics

	Date:		Reporting
Parameter	Result	Units	Limit
Alkalinity, Bicarb a		/ <del>-</del>	<b>F</b> 0
CaCO3 at pH 4.5 Alkalinity, Carb as	592	mg/L	5.0
CaCO3 at pH 8.3	ND	mg/L	5.0
Chloride	156	mg/L	3.0
рН	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 Soli	ds 894	mg/L	10.0

ATTACHMENT E

# Halogenated Volatile Organics

Method 601

Client Name: Client ID: Lab ID: Matrix: Authorized:	Giant Refining OW-16 006769-0008-SA AQUEOUS 28 SEP 89	Enseco ID Sampled Prepared	: 27 SEP 89		Received: 28 SEI Analyzed: 04 OCT	
Parameter			Result	Units	Reporting Limit	
Chloromethane Bromomethane Vinyl chlorid Chloroethane Methylene ch 1,1-Dichlorod 1,2-Dichlorod 1,2-Dichlorod	de loride ethene ethane ethene		ND ND NO	ug/L ug/L ug/L ug/L ug/L ug/L	5.0 5.0 1.0 5.0 5.0 0.50 0.50 0.50	
1,2-Dichloro 1,1,1-Trichl Carbon tetra Bromodichlor 1,2-Dichloro trans-1,3-Di Trichloroeth Chlorodibrom cis-1,3-Dich 1,1,2-Trichl EDB (1,2-Dib Bromoform	oroethane ethane oroethane chloride omethane propane chloropropene ene omethane loropropene oroethane		ND 7.7 ND ND ND ND ND ND ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	0.50 1.0 0.50 0.50 1.0 1.0 1.0 1.0 2.0 1.0 2.0 1.0 2.0 1.0 2.0 1.0	
Tetrachloroe Chlorobenzen			ND ND	ug/L ug/L	0.50 2.0	

ND = Not detected NA = Not applicable

Reported By: William Sullivan

Approved By: Stephanie Boehnke

# Aromatic Volatile Organics

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J

# Method 602

Client Name: Giant R Client ID: OW-16 Lab ID: 006769- Matrix: AQUEOUS Authorized: 28 SEP	0008-SA Enseco ID: Sampled:	27 SEP 89		Received: 28 SEP 89 Analyzed: 04 OCT 89
Parameter		Result	Units	Reporting Limit
Benzene Toluene Chlorobenzene Ethyl benzene Total xylenes 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichlorobenzene		ND ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L	0.50 0.50 0.50 1.0 0.50 0.50 0.50 0.50
-				

ND = Not detected NA = Not applicable Reported By: William Sullivan

Approved By: Stephanie Boehnke

# Appendix IX Semivolatile Organics

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# Method 625

Client Name: Giant Refin Client ID: 0W-16 Lab ID: 006769-0008		1054296		 
Lab ID: 006769-0008 Matrix: AQUEOUS Authorized: 28 SEP 89	Sampled:	27 SEP 89 02 OCT 89		Received: 28 SEP 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 4-Aminobiphenyl		· ND ND	ug/L ug/L	10 10
Aniline		ND	ug/L	10
Anthracene		ND	ug/L	ĨŌ
Aramite		ND	ug/L	10
Benzo(a)anthracene		ND	ug/L	10
Benzo(b)fluoranthene		ND	ug/L	10
Benzo(k)fluoranthene		ND ND	ug/L	10 10
Benzo(g,h,i)perylene Benzo(a)pyrene		ND	ug/L ug/L	10
bis(2-Chloroethoxy)			49/ 4	
methane		ND	ug/L	10
Benzyl alcohol		ND	ug/L	20
bis(2-Chloroethyl)ether		ND	ug/L	10
bis(2-Chloroisopropyl)		ND	um /1	10
ether bis(2-Ethylhexyl)		ND	ug/L	10
phthalate		ND	ug/L	10
4-Bromophenyl			- 3/ -	
phenyl ether		ND	ug/L	10
Butyl benzyl phthalate		ND	ug/L	10
2sec-Butyl-4,6-dinitro-		20		10
phenol (Dinoseb) 4-Chloroaniline		ND	ug/L	. 10
4-Chloro-3-methylphenol		ND ND	ug/L ug/L	20 20
2-Chloronaphthalene		ND	ug/L	10
2-Chlorophenol		ND	ug/L	ÎO
4-Chlorophenyl			- 37 -	
phenyl ether		ND	ug/L	10
o-Cresol		ND	ug/L	10
m & p-Cresol(s)		ND	ug/L	10
Chrysene Diberz(, b)arthroene			ug/L	10 10
Dibenz(a,h)anthracene Dibenzofuran		ND ND	ug/L 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 fo	llowing pag	je)	-

(continued on following page)

ND = Not detected NA = Not applicable

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202

Reported By: Michael Gallik

Method 625

	Client Name:	Giant Refining		•		**	
	Client ID:	0W-16 006769-0008-SA	Enseco ID:	1051295		· ·	
	Lab ID: Matrix:	AQUEOUS		27 SEP 89		Received: 28	CED 00
	Authorized:	28 SEP 89		02 QCT 89		Analyzed: 09 (	107 89
				<b>.</b> .		Reporting	
	Parameter			Result	Units	Limit	
	3,3'-Dichlor	obenzidine		ND	$u\sigma/t$	20	
	2,4-Dichloro	nhenol		NO	ug/L ug/L	20 10	
	2,6-Dichloro	phenol		ND	ug/L	10	
	Diethyl phth	alate		ND	ug/L	10	
	p-Dimethylam	inoazobenzene		ND	ug/L	10	
	7,12-Dimethy						
	anthrace			ND	ug/L	10	
	3,3'-Dimethy			ND	ug/L	10	
	a,a-Dimethyl ethylami	pilell-		. ND	ug/L	10	
	2,4-Dimethyl	nhenol		≥ ND	ug/L	10 10	
	Dimethyl pht			R ND	ug/L	10	
	1,3-Dinitrob	enzene		· ND	ug/L	10	
	4,6-Dinitro-	o-cresol ·		SND	ug/L	50	
	2,4-Dinitrop			∵ ND	ug/L	50	
	2,4-Dinitrot		-	ND	ug/L	10	
	2,6-Dinitrot			· ND · ND	ug/L	10	
	Di-n-octyl p Diphenylamin			ND	ug/L ug/L	10	
÷	Ethyl methac	rvlate		ND	ug/L	10 10	
	Ethyl methan			ND	ug/L	10	
	Fluoranthene			. ND	ug/L	ĪŎ	
	Fluorene			[™] ND	ug/L	10	
	Hexachlorobe			ND	ug/L	10	
	Hexachlorobu			· ND ·· ND	ug/L	10	
	Hexachloroet	clopentadiene		ND	ug/L	10 10	
	Hexachloroph			ND	ug/L ug/L	10	
	Hexachloropr	opene –		∴ ND	ug/L	20	
	Indeno(1,2,3	-c,d)pyrene		ND	ug/L	10	
	Isophorone 🔍			-ND	ug/L	10	
	Isosafrole			<u>∼ND</u>	ug/L	20	
•	Methapyrilen	e 		ND	ug/L	10	
•	3-Methylchol	anthrene		ND	ug/L	20	
2.	Methyl metha Methyl metha	crylate nesulfonate		⁴ ND 11 ND	ug/L ug/L	10	
	2-Methylnaph	thalene			ug/L ug/L	10 10	
				- ND	ug/L	· 10	
•	Naphthalene 1,4-Naphthoq	uinone		2°ND	ug/L	10	
		5 8 A		' ND	ug/L	ĨŌ	
*	2-Naphthylam	ine		^C ND	ug/L	10	
<u>.</u>						•	

(continued on following page)

ND = Not detected NA = Not applicable

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Reported By: Michael Gallik

Method 625

	Client Name: Giant Refining Client ID: OW-16 Lab ID: 006769-0008-SA	Enseco ID: 1054296		
34	Matrix: AQUEOUS Authorized: 28 SEP 89	Sampled: 27 SEP 89 Prepared: 02 OCT 89		Received: 28 SEP 89 Analyzed: 09 OCT 89
-				Reporting
M	Parameter	Result	Units	Limit
_	2-Nitroaniline	ND	ug/L	50
	3-Nitroaniline	ND	ug/L	. 50 50
3	4-Nitroaniline Nitrobenzene	ND ND	ug/L 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 ND	ug/L	10 10
ļ	N-Nitrosodiphenylamine N-Nitroso-di-	nu -	ug/L	10
<b>ئ</b> ـــ	n-propylamine	ОИ	ug/L	10
-	N-Nitrosomethylethylamine	NO	ug/L	10
	N-Nitrosomorpholine	ND	ug/L	10
. 1	N-Nitrosopiperidine	. ND	ug/L	10
	N-Nitrosopyrrolidine	ND ND	ug/L	10 10
.=	5-Nitro-o-toluidine Pentachlorobenzene	ND	ug/L ug/L	10
	Pentachloroethane	ND	ug/L	10
•	Pentachloronitrobenzene	ND	ug/L	50
1	Pentachlorophenol	ND .	ug/L	50
	Phenacetin	ND	ug/L	10
	Phenanthrene	NO	ug/L	10
- ȶ	Phenol	ND ND	ug/L	10
	p-Phenylenediamine 2-Picoline	ND	ug/L ug/L	10
	Pronamide	ND	ug/L	20
	Pyrene	ND	ug/L	10
1	Pyridine	ND	ug/L	10
1	Safrole	ND	ug/L	10
	1,2,4,5-Tetrachloro-	ND	ua /1	10
7	benzene 2,3,4,6-Tetrachlorophenol	ND ND	ug/L ug/L	20
<b>P</b>	o-Toluidine	NO	ug/L	10
	1,2,4-Trichlorobenzene	ND	ug/L	ĪÕ
-7	2,4,5-Trichlorophenol	ND	ug/L	50
	o,o,o-Triethylphosphoro-			50
	thioate	ND .	ug/L	50
	2,4,6-Trichlorophenol	ND ND	ug/L ug/L	10 50.
	Ethyl parathion	NO	uy/L	50.
	. (cont	inued on following page	je)	
-7	ND = Not detected			
	NA = Not applicable			
	Depended Rys Hickord Collik	· Annound P	· .lo	Ff lowry

Reported By: Michael Gallik

Method 625

Lab ID:006769-0008-SA Authorized:Enseco ID:1054296 Sampled:Received:28 SEP 89Authorized:28 SEP 89Prepared:02 OCT 89Analyzed:09 OCT 89Authorized:28 SEP 89Prepared:02 OCT 89Analyzed:09 OCT 89ParameterResultUnitsLimitPhorate (Thimet)NDug/L100SulfoteppNDug/L50ThionazinNDug/L50sym-TrinitrobenzeneNDug/LDisulfotonNDug/L50FamphurNDug/L50FamphurNDug/L50Nitrobenzene-d557.1*2-Fluorobiphenyl46.6*Terphenyl-d1441.3*Phenol-d558.0*2-Fluorophenol52.5*2,4,6-Tribromophenol57.5*	- 1	Client ID:	Giant Refining OW-16				25		
ParameterResultUnitsLimitPhorate (Thimet)NDug/L100SulfoteppNDug/L50ThionazinNDug/L50sym-TrinitrobenzeneNOug/L10DisulfotonNDug/L50FamphurNDug/L50FamphurNDug/L50Methyl parathionNDug/L50Nitrobenzene-d557.1%2-Fluorobiphenyl46.6%Terphenyl-d1441.3%Phenol-d558.0%2-Fluorophenol52.5%	-1	Matrix:	AQUEOUS	Sampled:	27 SEP 89				
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       50         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       %				i i cpui cui			Reporti	ng	 
SulfoteppNDug/L50ThionazinNDug/L50sym-TrinitrobenzeneNDug/L10DimethoateNDug/LDisulfotonNDug/L50FamphurNDug/L50Methyl parathionNDug/L50Nitrobenzene-d557.12-Fluorobiphenyl46.6%Terphenyl-d1441.3%Phenol-d558.0%2-Fluorophenol52.5%	<b>-</b>	Parameter			Result	Units	Limit		
ThionazinNDug/L50sym-TrinitrobenzeneNOug/L10DimethoateNDug/LDisulfotonNDug/L50FamphurNDug/L100Methyl parathionNDug/L50Nitrobenzene-d557.1%2-Fluorobiphenyl46.6%Terphenyl-d1441.3%Phenol-d558.0%2-Fluorophenol52.5%		Sulfotepp	met)			ug/L ug/L	50		
DimethoateNDug/LDisulfotonNDug/L50FamphurNDug/L100Methyl parathionNDug/L50Nitrobenzene-d557.1%2-Fluorobiphenyl46.6%Terphenyl-d1441.3%Phenol-d558.0%2-Fluorophenol52.5%	٦		hanzana			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       %		Dimethoate	Denzene			ug/L			
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						ug/L			
2-Fluorobiphenyl       46.6 %          Terphenyl-d14       41.3 %          Phenol-d5       58.0 %          2-Fluorophenol       52.5 %	i		hion						
Image: Terphenyl-d14         41.3         %            Phenol-d5         58.0         %            2-Fluorophenol         52.5         %						%	·		
_ 2-Fluorophenol 52.5 %		2-Fluorobiph	enyl			%			
_ 2-Fluorophenol 52.5 %		Phenol-d5	4			70 04			
2,4,6-Tribromophenol 57.5 %	_	2-Fluorophen	01			2			
		2,4,6-Tribro	mophenol			04 10	<b></b>		

ND = Not detected NA = Not applicable Reported By: Michael Gallik

# Metals

# Dissolved Metals

Client Name: Client ID: Lab ID: Matrix: Authorized:	Giant Refinin OW-16 006769-0008-S AQUEOUS 28 SEP 89	SA Ense Sa	ampled:	1054296 27 SEP 89 See Below	Received: Analyzed:	28 SEP 89 See Below	
Parameter	F	Result	Units	Reporting Limit	Analytical Method	Prepared . Date	Analyzed Date
Arsenic Barium Cadmium Calcium Chromium Lead Manganese Selenium Silver Sodium		ND 0.06 ND 7.5 ND 0.02 0.024 ND 260	mg/l mg/l mg/l mg/l mg/l mg/l mg/l mg/l	0.005 0.01 0.005 0.2 0.01 0.01 0.01 0.005 0.01 5	206.2 200.7 200.7 200.7 200.7 239.2 200.7 270.2 200.7 200.7	NA NA NA NA NA NA NA NA	24 OCT 89 01 NOV 89 01 NOV 89 01 NOV 89 01 NOV 89 24 OCT 89 01 NOV 89 24 OCT 89 01 NOV 89 01 NOV 89 01 NOV 89

ND = Not detected NA = Not applicable Reported By: Bryan Anderson

Approved By: Tammy Bailey

# General Inorganics

	Client Name: Client ID: Lab ID: Matrix: Authorized:	Giant Refini OW-16 006769-0008- AQUEOUS 28 SEP 89	-SA En	seco ID: Sampled: repared:	1054296 27 SEP 89 See Below		28 SEP 89 See Below	1
	Parameter		Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analy: Date
	Alkalinity, T CaCO3 at	pH 4.5	285	mg/L	5	310.1	NA	29 SEE
	Alkalinity, E CaCO3 at Alkalinity, C	pH 4.5	272	mg/L	5	310.1	NA	29 SE:
	CaCO3 at Alkalinity, H	pH 8.3	13	mg/L	5	310.1	NA	29 SE:
	as CaCO3 Chloride	ijarux.	ND 168	mg/L mg/L units	5 3	310.1 300.0 150.1	NA NA NA	29 SEE 29 SEE 29 SEE
	pH pH pH		8.5 8.5 8.5 8.5	units units units units		150.1 150.1 150.1	NA NA NA	29 SEE 29 SEE 29 SEE 29 SEE
	pH Phenolics Sulfate	luctors	ND 34	mg/L mg/L	0.01 5	420.1 300.0	NA NA	19 OCT 29 SEF
۱	Specific Conc at 25 dec	g.C	1070	umhos/c	: 1	120.1	NA	29 SEF
]	Specific Cond at 25 dec	g.C	1070	umhos/c	: 1	120.1	NA	29 SEE
-	Specific Cond at 25 dec Specific Cond	<b>1.</b> C	1070	umhos/c	: 1	120.1	NA	29 SEF
]	at 25 dec Total Dissolv	J.C	1070 760	umhos/c mg/L	: 1 10	120.1 160.1	NA NA	29 SEF 03 OCT

ND = Not detected NA = Not applicable

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Reported By: Blake Besser

Rocky Mountain Analytical Laboratory

ANALYTICAL RESULTS

FOR

GIANT REFINING ENSECO-RMAL NO. 009051

> APRIL 27, 1990 0w-16



Reviewed by:

er 12 Julie Essey 1 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:

- o Sample Description Information
- o Analytical Test Requests
- o Analytical Results
- o 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

Element	Aqueous (mg/L)	<u>Soil_(mg/kg)</u>	<u>Waste (mg/kg)</u>	<u>Leachate (mg/L)</u>
Arsenic	0.005	0.5 **	0.5 **	0.05 **
Lead Selenium	0.005 0.005	0.5 0.5	0.5 ** 0.5	0.05 ** 0.05
Thallium	0.005	0.5	0.5	0.05

#### Reporting Limit / Units

** 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

# SAMPLE DESCRIPTION INFORMATION for Giant Refining

Lab ID	Client ID	Matrix	Sample Date	ed Time	Received Date
009051-0001-SA 009051-0002-SA		AQUEOUS AQUEOUS	11 APR 90	10:00	12 APR 90 12 APR 90

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# ANALYTICAL TEST REQUESTS for Giant Refining

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Enseco

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

# Appendix IX Semivolatile Organics

# Method 8270

Client Name: Giant Refining			
Client ID: OW-16	5 ID 1071704		
Lab ID: 009051-0001-SA	Enseco ID: 1071704 Sampled: 11 APR 90		Received: 12 APR 90
Matrix: AQUEOUS Authorized: 12 APR 90	Prepared: 15 APR 90		Analyzed: 19 APR 90
Authorized. 12 Ark 50	riepared. 15 Art 50		Analyzed: 19 And 30
			Reporting
Parameter	Result	Units	Limit
		/*	10
Acenaphthene	ND ND	ug/L	10 10
Acenaphthylene Acetophenone	ND	ug/L ug/L	10
2-Acetylaminofluorene	ND	ug/L	10
4-Aminobiphenyl	ND	ug/L	10
Aniline	ND	ug/L	10
Anthracene	ND	ug/Ĺ	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 ND	ug/L	10 10
Benzo(a)pyréne bis(2-Chloroethoxy)-	NU	ug/L	10
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)	ND	. /1	10
phthalate	ND	ug/L	10
4-Bromophenyl	ND	ug/L	10
phenyl ether Butyl benzyl phthalate	ND	ug/L	10
2-sec-Butyl-4,6-dinitro-	ND	ug/ L	10
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		um /1	10
phenyl ether o-Cresol	ND ND	ug/L	10 10
m & p-Cresol(s)	ND	ug/L 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

Enseco

Method 8270

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: 15 APR 90		d: 12 APR 90 d: 19 APR 90
Parameter	Result		rting mit
3,3'-Dichlorobenzidine 2,4-Dichlorophenol 2,6-Dichlorophenol Diethyl phthalate p-Dimethylaminoazobenzene 7,12-Dimethylbenz(a)-	ND ND ND ND ND	ug/L ug/L ug/L	20 10 10 10 10
anthracene 3,3'-Dimethylbenzidine a,a-Dimethylphenethyl-	ND ND		10 10
amine 2,4-Dimethylphenol Dimethyl phthalate 1,3-Dinitrobenzene 4,6-Dinitro-o-cresol 2,4-Dinitrophenol 2,4-Dinitrotoluene Di-n-octyl phthalate Diphenylamine Ethyl methacrylate Ethyl methanesulfonate Fluoranthene	ND ND ND ND ND ND ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	10 10 10 50 50 10 10 10 10 10 10
Fluorene Hexachlorobenzene Hexachlorobutadiene Hexachlorocyclopentadiene Hexachloroethane Hexachlorophene Hexachloropropene Indeno(1,2,3-cd)pyrene Isophorone Isosafrole Methapyrilene 3-Methylcholanthrene Methyl methacrylate Methyl methanesulfonate	ND ND ND ND ND ND ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	10 10 10 10 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 10 20 20 10 20 20 20 20 20 20 20 20 20 2
2-Methylnaphthalene Naphthalene 1,4-Naphthoquinone 1-Naphthylamine 2-Naphthylamine	ND ND ND ND ND	ug/L ug/L ug/L ug/L	10 10 10 10 10

(continued on following page)

ND = Not detected NA = Not applicable

Reported By: Donna Reinwald

LINSECO

# Method 8270

	•	•			
Client ID:	Giant Refining OW-16 OO9051-0001-SA AQUEOUS 12 APR 90	1071704 11 APR 90 15 APR 90		Received: 12 Analyzed: 19	
Parameter		Result	Units	Reporting Limit	
N-Nitrosodie N-Nitrosodim N-Nitrosodip	ne ne l line-l-oxide -n-butylamine thylamine ethylamine henylamine	ND ND ND ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	50 50 10 10 50  10 10 10	
N-Nitroso-di n-propyl N-Nitrosomet N-Nitrosomor N-Nitrosopip N-Nitrosopyr 5-Nitro-o-to Pentachlorob Pentachlorob Pentachlorop Phenacetin Phenanthrene Phenol p-Phenylened 2-Picoline Pronamide Pyrene Pyridine Safrole	amine hylethylamine pholine eridine rolidine luidine enzene thane itrobenzene henol	ND ND ND ND ND ND ND ND ND ND ND ND ND N	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	10 10 10 10 10 10 10 10 10 50 50 10 10 10 10 10 10	
o-Toluidine 1,2,4-Trichl 2.4.5-Trichl	achlorophenol orobenzene orophenol	ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L	10 20 10 10 50	
0,0,0-Trieth thioate 2,4,6-Trichl Ethyl parath	orophenol	ND · ND ND	ug/L ug/L ug/L	50 10 50	

(continued on following page)

ND = Not detected NA = Not applicable

Reported By: Donna Reinwald

LINSECO

# Method 8270

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: 15 APR 90		Received: 12 APR 90 Analyzed: 19 APR 90
Parameter	Result	Units	Reporting Limit
Phorate (Thimet) Sulfotepp Thionazin sym-Trinitrobenzene Dimethoate Disulfoton Famphur Methyl parathion	ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L	100 50 50 10  50 100 50
Nitrobenzene-d5 2-Fluorobiphenyl Terphenyl-d14 Phenol-d5 2-Fluorophenol 2,4,6-Tribromophenol	58 56 63 56 48 60	% % % % %	

ND = Not detected NA = Not applicable

Reported By: Donna Reinwald

Enseco

# Halogenated Volatile Organics

# Method 8010

Client Name: Giant Refining Client ID: OW-16 Lab ID: 009051-0001-SA Matrix: AQUEOUS Authorized: 12 APR 90			Received: 12 APR 90 Analyzed: 12 APR 90
Parameter	Result	Units	Reporting Limit
Chloromethane Bromomethane Vinyl chloride Chloroethane Methylene chloride 1,1-Dichloroethene 1,1-Dichloroethene trans-1,2-Dichloroethene Chloroform 1,1,2 Trichloro-1,2,2- trifluoroethane 1,2-Dichloroethane 1,2-Dichloroethane Carbon tetrachloride Bromodichloromethane 1,2-Dichloropropane trans-1,3-Dichloropropene Trichloroethene Chlorodibromomethane cis-1,3-Dichloropropene 1,1,2-Trichloroethane EDB (1,2-Dibromoethane) Bromoform 1,1,2,2-Tetrachloroethane Tetrachloroethene	ND ND ND ND ND ND ND ND ND ND ND ND ND N	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	5.0 5.0 1.0 5.0 0.50 0.50 0.50 0.50 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.
Chlorobenzene	ND	ug/L	2.0

ND = Not detected NA = Not applicable

Reported By: Leewaphath Xaiyasang

nseco

# Halogenated Volatile Organics

# Method 8010

Client Name: Giant Refin Client ID: Trip Blank Lab ID: 009051-0002 Matrix: AQUEOUS Authorized: 12 APR 90			Received: 12 / Analyzed: 12 /	
Parameter	Result	Units	Reporting Limit	
Chloromethane Bromomethane Vinyl chloride Chloroethane Methylene chloride 1,1-Dichloroethene 1,1-Dichloroethane trans-1,2-Dichloroethane trans-1,2-Dichloroethane 1,2-Trichloroethane 1,2-Dichloroethane 1,1,1-Trichloroethane 1,1,1-Trichloroethane 1,2-Dichloromethane 1,2-Dichloropropane trans-1,3-Dichloropropen Trichloroethene Chlorodibromomethane	ND ND ND ND ND ND ND ND ND ND ND ND ND N	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	5.0 5.0 1.0 5.0 0.50 0.50 0.50 0.50 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.	
cis-1,3-Dichloropropene 1,1,2-Trichloroethane EDB (1,2-Dibromoethane) Bromoform 1,1,2,2-Tetrachloroethan Tetrachloroethene Chlorobenzene	ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L	2.0 1.0 2.0 5.0 1.0 0.50 2.0	

ND = Not detected NA = Not applicable

Reported By: Leewaphath Xaiyasang

# Aromatic Volatile Organics

Enseco

# Method 8020

Client Name: Client ID: Lab ID: Matrix: Authorized:	Giant Refining OW-16 009051-0001-SA AQUEOUS 12 APR 90	Enseco ID: 1071704 Sampled: 11 APR 90 Prepared: NA		Received: 12 Analyzed: 12	
Parameter		Result	Units	Reporting Limit	
Benzene Toluene Chlorobenzene Ethylbenzene Xylenes (tot 1,3-Dichloro 1,4-Dichloro 1,2-Dichloro	al) benzene benzene	ND ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L	0.50 0.50 0.50 0.50 1.0 0.50 0.50 0.50	

ND = Not detected NA = Not applicable

Reported By: Greg Gustina

lnseco

# Aromatic Volatile Organics

# Method 8020

Client Name: Client ID: Lab ID: Matrix: Authorized:	Giant Refining Trip Blank 009051-0002-SA AQUEOUS 12 APR 90	Enseco ID: 1071707 Sampled: Unknown Prepared: NA		Received: Analyzed:		
Parameter		Result	Units	Reporti Limit		
Benzene Toluene Chlorobenzene Ethylbenzene Xylenes (tot 1,3-Dichloro 1,4-Dichloro 1,2-Dichloro	al) benzene benzene	ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L	0. 0. 0. 1. 0. 0.	50 50 50 0 50 50	

ND = Not detected NA = Not applicable

Reported By: Greg Gustina



# Metals

# Dissolved Metals

Client Name: Client ID: Lab ID: Matrix: Authorized:	Giant Refining OW-16 009051-0001-SA AQUEOUS 12 APR 90	Enseco ID: Sampled: Prepared:			ved: 12 APR 9 zed: See Belo	
Parameter	Result	F Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic Barium Cadmium Calcium Chromium Lead Manganese Selenium Silver Sodium	ND 0.038 ND 5.4 ND ND ND ND 242	mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L	$\begin{array}{c} 0.0050\\ 0.010\\ 0.0050\\ 0.20\\ 0.010\\ 0.0050\\ 0.010\\ 0.025\\ 0.010\\ 5.0\\ \end{array}$	7060 6010 6010 6010 7421 6010 7740 6010 6010	NA NA NA NA NA NA NA NA	19 APR 90 24 APR 90 24 APR 90 24 APR 90 24 APR 90 19 APR 90 24 APR 90 19 APR 90 24 APR 90 24 APR 90 24 APR 90

ND = Not detected NA = Not applicable

Reported By: Fred Velasquez

General Inorganics

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Enseco

Matrix: AQU		Enseco ID Sampled Prepared	: 1071704 : 11 APR 9 : See Belo	0 Receiv w Analyz	ved: 12 APR 9 red: See Belo	
Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Alkalinity, Bica CaCO3 at pH Alkalinity, Carb	4.5 285	mg/L	5.0	310.1	NA	12 APR 90
CaCO3 at pH Chloride pH Phenolics Sulfate Specific Conduct	8.3 14.0 154 8.5 ND 28.4	mg/L mg/L units mg/L mg/L	5.0 3.0  5.0	310.1 300.0 9040 9065 300.0	NA NA NA NA	12 APR 90 25 APR 90 12 APR 90 17 APR 90 25 APR 90
at 25 deg.C Total Dissolved Solids	1060 678	umhos/cm mg/L	1.0 10.0	120.1 160.1	NA NA	12 APR 90 15 APR 90

ND = Not detected NA = Not applicable

Reported By: Linda 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.

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

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

100

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

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# Enseco

# 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

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# DUPLICATE CONTROL SAMPLE REPORT Semivolatile Organics by GC/MS

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

SINGLE CONTROL SAMPLE REPORT Semivolatile Organics by GC/MS

Analyte	Concentration Spiked Measured	Accuracy(%) SCS Limits
Category: 625-A Matrix: AQUEOUS QC Lot: 15 APR 90-A QC Run: Concentration Units: ug/L	15 APR 90-B	
Nitrobenzene-d5 2-Fluorobiphenyl Terphenyl-d14 2-Fluorophenol Phenol-d5 2,4,6-Tribromophenol	10064.510054.710068.6200125200130200133	64 35-114 55 43-116 69 33-141 62 21-100 65 10- 94 66 10-123

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

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METHOD BLANK REPORT Semivolatile Organics by GC/MS

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Analyte	Result	Units	Reporting Limit
Test: 625-AP9-A Matrix: AQUEOUS QC Lot: 15 APR 90-A QC Run:	15 APR 90-B		
Acenaphthene Acenaphthylene Acetophenone 2-Acetylaminofluorene 4-Aminobiphenyl Aniline Anthracene Aramite Benzo(a)anthracene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(a)pyrene Benzo(a)alcobol	ND ND ND ND ND ND ND ND ND ND ND ND ND N	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	10 10 10 10 10 10 10 10 10 10 10 10 10 20
Benzyl alcohol bis(2-Chloroethoxy)- methane bis(2-Chloroethyl) ether	ND ND	ug/L ug/L ug/L	10 10
bis(2-Chloroisopropyl)- ether	ND	ug/L	10
bis(2-Ethylhexyl) phthalate	ND	ug/L	10
4-Bromophenyl phenyl ether Butyl benzyl phthalate	ND ND	ug/L ug/L	10 10
2-sec-Butyl-4,6-dinitro- phenol 4-Chloroaniline 4-Chloro-3-methylphenol 2-Chloronaphthalene 2-Chlorophenol	ND ND ND ND	ug/L ug/L ug/L ug/L ug/L	10 20 20 10 10
4-Chlorophenyl phenyl ether o-Cresol m & p-Cresol(s) Chrysene Dibenz(a,h)anthracene Dibenzofuran Di-n-butyl phthalate 1,2-Dichlorobenzene 1,3-Dichlorobenzene 1,4-Dichlorobenzene	ND ND ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	10 10 10 10 10 10 10 10 10

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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 2,4-Dichlorophenol 2,6-Dichlorophenol Diethyl phthalate p-Dimethylaminoazobenzene 7,12-Dimethylbenz(a)-	ND ND ND ND	ug/L ug/L ug/L ug/L ug/L	20 10 10 10 10
anthracene 3,3'-Dimethylbenzidine	ND ND	ug/L ug/L	10 10
a, a-Dimethylphenethyl- amine 2,4-Dimethylphenol Dimethyl phthalate 1,3-Dinitrobenzene 4,6-Dinitro-o-cresol 2,4-Dinitrophenol 2,4-Dinitrotoluene 2,6-Dinitrotoluene Di-n-octyl phthalate Diphenylamine Ethyl methacrylate Ethyl methanesulfonate Fluorene Hexachlorobenzene Hexachlorobenzene Hexachlorobutadiene Hexachloroptane Hexachloroptane Hexachloroptane Hexachloroptane Hexachloroptane Hexachloroptane Isosafrole Methapyrilene 3-Methylcholanthrene Methyl methacrylate Methyl methacsulfonate	ND ND ND ND ND ND ND ND ND ND ND ND ND N	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	10 10 10 10 50 50 50 10 10 10 10 10 10 10 10 10 10 10 10 10
2-Methylnaphthalene Naphthalene 1,4-Naphthoquinone 1-Naphthýlamine 2-Naphthylamine	ND ND ND ND ND	uğ/L ug/L ug/L ug/L ug/L ug/L	10 10 10 10 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 90-8	·	
2-Nitroaniline 3-Nitroaniline 4-Nitroaniline Nitrobenzene 2-Nitrophenol 4-Nitrophenol 4-Nitroquinoline-1-oxide N-Nitroso-di-n-butylamine N-Nitrosodiethylamine N-Nitrosodimethylamine	ND ND ND ND ND ND ND ND ND ND	ug/l ug/l ug/l ug/l ug/l ug/l ug/l ug/l	50 50 10 10 50  10 10 10
N-Nitrosodiphenylamine N-Nitroso-di- n-propylamine	ND ND	ug/L ug/L	10 10
N-Nitrosomethylethylamine N-Nitrosomorpholine N-Nitrosopiperidine N-Nitrosopyrrolidine 5-Nitro-o-toluidine	ND ND ND ND ND	ug/L ug/L ug/L ug/L	10 10 10 10 .10
Pentachlorobenzene Pentachloroethane Pentachloronitrobenzene Pentachlorophenol	ND ND ND ND	ug/L ug/L ug/L ug/L ug/L	10 10 50 50
Phenacetin Phenanthrene Phenol p-Phenylenediamine	ND ND ND ND	ug/L ug/L ug/L ug/L	10 10 10
2-Picoline Pronamide Pyrene Pyridine	ND ND ND ND	ug/L ug/L ug/L ug/L	10 20 10 10
Safrole 1,2,4,5-Tetrachloro- benzene 2,3,4,6-Tetrachlorophenol	ND ND ND	ug/L ug/L	10 10 20
o-Toluidine 1,2,4-Trichlorobenzene 2,4,5-Trichlorophenol	ND ND ND	ug/L ug/L ug/L ug/L	10 10 50
0,0,0-Triethylphosphoro- thioate 2,4,6-Trichlorophenol Ethyl parathion	ND ND ND	ug/L ug/L ug/L	50 10 50

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

Analyte	Result	Units	Limit
Test: 625-AP9-A Matrix: AQUEOUS QC Lot: 15 APR 90-A QC Run: 15	APR 90-B		
Phorate (Thimet) Sulfotepp Thionazin sym-Trinitrobenzene Dimethoate Disulfoton Famphur Methyl parathion	ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L	100 50 50 10 50 100 50

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# 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

# DUPLICATE CONTROL SAMPLE REPORT Volatile Organics by GC

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

SINGLE CONTROL SAMPLE REPORT Volatile Organics by GC

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

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

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METHOD BLANK REPORT Volatile Organics by GC

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Analyte	Result	Units	Reporting Limit
Test: 601-A Matrix: AQUEOUS QC Lot: 12 APR 90-F QC Run: 12	APR 90-F		
Chloromethane Bromomethane Vinyl chloride Chloroethane Methylene chloride 1,1-Dichloroethene 1,1-Dichloroethane trans-1,2-Dichloroethene Chloroform 1,1,2 Trichloro-1,2,2- trifluoroethane 1,2-Dichloroethane 1,1.1-Trichloroethane Carbon tetrachloride Bromodichloromethane 1,2-Dichloropropane trans-1,3-Dichloropropene Trichloroethene Chlorodibromomethane cis-1,3-Dichloropropene 1,1,2-Trichloroethane EDB (1,2-Dibromoethane) Bromoform 1,1,2,2-Tetrachloroethane Tetrachloroethene Chlorobenzene	ND ND ND ND ND ND ND ND ND ND ND ND ND N	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	$\begin{array}{c} 5.0\\ 5.0\\ 1.0\\ 5.0\\ 5.0\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 1.0\\ 1.0\\ 1.0\\ 1.0\\ 1.0\\ 1.0\\ 1.0\\ 1.$
Test: 602-AP Matrix: AQUEOUS QC Lot: 12 APR 90-R QC Run: 12	APR 90-R		
Benzene Toluene Chlorobenzene Ethylbenzene Xylenes (total) 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichlorobenzene	ND ND ND ND ND ND ND	ug/l ug/l ug/l ug/l ug/l ug/l ug/l	$\begin{array}{c} 0.50 \\ 0.50 \\ 0.50 \\ 1.0 \\ 0.50 \\ 1.0 \\ 0.50 \\ 0.50 \\ 0.50 \end{array}$



METHOD BLANK REPORT Volatile Organics by GC (cont.)

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

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# QC LOT ASSIGNMENT REPORT Metals Analysis and Preparation

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Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
009051-0001-SA	AOUEOUS	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	-

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# DUPLICATE CONTROL SAMPLE REPORT Metals Analysis and Preparation

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Analyte	Co Spiked	oncentrati DCS1	on Measure DCS2			uracy age(%) Limits	Precis (RPD) DCS L	)
Category: ICP-AD Matrix: AQUEOUS QC Lot: 24 APR 90-F Concentration Units: mg	g/L							
Aluminum Antimony Arsenic Barium Beryllium Cadmium Calcium Chromium Cobalt Copper Iron Lead Magnesium Manganese Nickel Potassium Silver Sodium Vanadium Zinc	2.0 0.5 0.5 2.0 0.05 100 0.2 1.0 0.25 1.0 0.5 50 0.5 50 0.5 50 0.5 50	1.850.4560.4771.670.04440.048587.20.1840.4710.2570.9440.4710.2570.9440.48145.00.4940.45742.90.043186.40.4470.478	$\begin{array}{c} 1.85\\ 0.444\\ 0.458\\ 1.67\\ 0.0442\\ 0.0472\\ 87.1\\ 0.184\\ 0.468\\ 0.254\\ 0.938\\ 0.482\\ 45.0\\ 0.495\\ 0.456\\ 42.9\\ 0.0415\\ 86.2\\ 0.446\\ 0.478\end{array}$	$\begin{array}{c} 1.85\\ 0.450\\ 0.468\\ 1.67\\ 0.0443\\ 0.0478\\ 87.2\\ 0.184\\ 0.470\\ 0.256\\ 0.941\\ 0.482\\ 45.0\\ 0.494\\ 0.456\\ 42.9\\ 0.0423\\ 86.3\\ 0.446\\ 0.478\end{array}$	93 90 94 89 96 87 92 94 102 94 90 99 91 865 889 96	75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125	$\begin{array}{c} 0.0\\ 2.7\\ 4.1\\ 0.0\\ 0.4\\ 2.7\\ 0.1\\ 0.6\\ 1.2\\ 0.6\\ 0.2\\ 0.2\\ 0.2\\ 0.2\\ 0.2\\ 0.2\\ 0.2\\ 0.2$	20 20 20 20 20 20 20 20 20 20 20 20 20 2
Selenium	g/L 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: my Arsenic	g/L 0.04	0.0405	0.0406	0.0406	101	75-125	0.3	20

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

Analyte		Con Spiked	centratio	Measured			uracy age(%)	Precis (RPD) DCS Li	
		·	DCS1	DCS2	AVG	DCS	Limits	DCS Li	imit
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

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# QC LOT ASSIGNMENT REPORT Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
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	-

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# DUPLICATE CONTROL SAMPLE REPORT Wet Chemistry Analysis and Preparation

Analyte		Conc Spiked	centration DCS1	n Measured DCS2	AVG	Aver	uracy age(%) Limits	Precis (RPD) DCS Li	)
Category: ALK-A Matrix: AQUEOUS QC Lot: 12 APR 90-0 Concentration Units: Alkalinity, Total as	mg/L								
CaCO3 at pH 4.5 Category: PH-A Matrix: AQUEOUS QC Lot: 12 APR 90-0		157	160	160	160	102	90-110	0.0	10
Concentration Units:	units	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: Chloride	mg/L	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 90-0 Concentration Units:	umhos/cm								
Specific Conductance at 25 deg.C		1650	1650	1650	1650	100	95-105	0.0	5

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

Analyte	Co Spiked	ncentratio DCSI	n Measured DCS2	AVG		uracy age(%) Limits	Precis (RPD) DCS Li	)
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

METHOD BLANK REPORT Wet Chemistry Analysis and Preparation

Analyte		Res	ult	Units	Reporting Limit
Test: PHEN-SPEC-A Matrix: AQUEOUS QC Lot: 13 APR 90-A Phenolics	QC Run:	13 APR 90-A	ND	mg/L	0.010
Test: TDS-BAL-A Matrix: AQUEOUS QC Lot: 15 APR 90-A Total Dissolved Solids	QC Run:	15 APR 90-A	ND	ma /1	10 0
201102			ND	mg/L	10.0

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2 2 2 2	Remarks	Date/Time///2/20 05070
ODY       SAMPLE SAFE" CONDITIONS         I. Packed by:       SAMPLE SAFE" CONDITIONS         S. Seal Intact Upon Receipt by Sampling Co.:       Seal #         2. Seal Intact Upon Receipt by Sampling Co.:       Yes         3. Condition of Contents:       Action of Contents:         4. Sealed for Shipping by:       Action of Contents:         5. Initial Contents Temp.:       One         6. Sampling Status:       Done         7. Seal Intact Upon Receipt by Laboratory:       Yes         8. Condition of Contents:       One         9. Condition of Contents:       Done	Analysis Parameters Se & Attachnen	aud Kosendal Land Data Contract Contract Contract Contract Contract Contract Contract Data Data Contract Data Data Contract Contract Data Data Contract Cont
	Sample Type No. Containers W/Wate/ Portle H 2 2 / 2 1 / 4 1 /	Date     Time     Delivered to Shipper by:     D       Dubble     Method of Shipment:     Method     Method       Method     Method of Shipment:     Method       Method     Method     Method       Mhite     Mhite     Method
	Sample ID/Description 7 00 Sar	CUSTODY TRANSFERS PRIOR TO SHIPPING apped) Received by: (signed) Date A-1/2011, 2020, A-1/2011, A-1/20
Enseco - Rocky Mountain Analytical 4955 Yarrow Street 4955 Yarrow Street Arvada, Colorado 80002 303/421-6611 Facsimile: 303/431-7171 Attn:: Jud/ie ESEC Atting Content Activity Content Project OM-1/C ESEC Project OM-1/C ESEC Sampling Co. Gan F defined Project Ciniza defined Sampling Ste Ciniza defined Team Leader Lagued OSeconde	Date Time Sa 4-1/-YO 10'ROqn. OW16	CUSTODY TRAI Relinquished by: (signed) 1 (law brite brite 2 3

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Rocky Mountain Analytical Laboratory

Enseco

ANALYTICAL RESULTS

FOR

GIANT REFINING

ENSECO-RMAL NO. 011197

OCTOBER 10, 1990 シーンジェンテ

Reviewed by: Viser 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:

- o Sample Description Information
- o Analytical Test Requests
- o Analytical Results
- o 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.

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# SAMPLE DESCRIPTION INFORMATION for Giant Refining

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Lab ID	Client ID	Matrix	Samp Date	ed Time	Received Date
011197-0001-SA 011197-0002-SA 011197-0003-SA	OW-25	AQUEOUS AQUEOUS AQUEOUS	06 SEP 90 06 SEP 90		07 SEP 90 07 SEP 90 07 SEP 90

# ANALYTICAL TEST REQUESTS for Giant Refining

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

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# Semivolatile Organics Appendix IX List Method 8270

Client Name: Giant Refining			
Client ID: OW-16			
Lab ID: 011197-0001-SA	Samplade OF SED OO	n	accived 07 SED 00
Matrix: AQUEOUS	Sampled: 06 SEP 90		eceived: 07 SEP 90
Authorized: 07 SEP 90	Prepared: 08 SEP 90		nalyzed: 27 SEP 90
			Reporting
Parameter	Result	Units	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) pervlene	ND ND	ug/L	10 10
Benzo(a) pýréne Benzyl alcohol	ND	ug/L ug/L	10
4-Bromophenyl	ND	uy/L	10
phenyl ether	ND	ug/L	10
_Butyl benzyl phthalate	ND	ug/L	10
2-sec-Butyl-4,6-dinitro-		49/ 5	10
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	ND	ug /1	10
phenyl ether Chrysene	ND	ug/L	10 10
Dibenz(a,h)anthracene	ND	ug/L	10
Dibenzofuran	ND	ug/L 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	ĨÕ
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

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Appendix IX List Method 8270
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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		eived: 07 SEP 90 lyzed: 27 SEP 90
Parameter	Result	Units	Reporting Limit
Dimethoate // p-Dimethylaminoazobenzene // 7,12-Dimethylbenz(a)-	ND ND	ug/L ug/L	10
anthracene 3,3'-Dimethylbenzidine a,a-Dimethylphenethyl-	ND ND	ug/L ug/L	10 10
amine	ND	ug/L	10
2,4-Dimethylphenol	ND	ug/L	10
Dimethyl phthalate	ND	ug/L	10
1,3-Dinitrobenzene 4,6-Dinitro- 2-methylphenol	ND ND	ug/L ug/L	10 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 Ethyl methanesulfonate/	ND ND	ug/L ug/L	10 10
Famphur Fluoranthene Fluorene	ND ND ND	ug/L ug/L ug/L	10 10
Hexachlorobenzene –	ND	ug/L	10
Hexachlorobutadiene –	ND	ug/L	10
Hexachlorocyclopentadiene –	ND	ug/L	10
Hexachlorophene	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 Naphthalene	ND ND	ug/L ug/L	10 10 10

(continued on following page)

ND = Not detected NA = Not applicable

Reported By: Ethan Hutchinson

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 Reporting
Parameter	Result Unit	ts Limit
1,4-Naphthoquinone 1-Naphthylamine 2-Nitroaniline 3-Nitroaniline 4-Nitrobenzene 2-Nitrophenol 4-Nitrophenol 4-Nitroso-di-n-butylamine N-Nitroso-di-n-butylamine N-Nitrosodiethylamine N-Nitrosodiphenylamine N-Nitrosodiphenylamine N-Nitrosomethylethylamine N-Nitrosomethylethylamine N-Nitrosopiperidine N-Nitrosopyrrolidine S-Nitro-o-toluidine Parathion Pentachlorobenzene Pentachlorobenzene Pentachlorophenol Phenacetin Phenanthrene Phenol 4-Phenylenediamine Phorate 2-Picoline Pronamide Pyrene Pyridine Safrole Sulfotepp 1,2,4,5-Tetrachloro- benzene 2,3,4,6-Tetrachlorophenol Thionazin	ND         ug/l           ND	$ \begin{array}{c} 10\\ 10\\ 50\\ 50\\ 50\\ 10\\ 10\\ 10\\ 10\\ 10\\ 10\\ 10\\ 10\\ 10\\ 1$
loonti	upd on following nage	

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ND = Not detected NA = Not applicable

Reported By: Ethan Hutchinson

Enseco A Corning Company

# Semivolatile Organics Appendix IX List Method 8270

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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	Reporting Units Limit
2-Toluidine 1,2,4-Trichlorobenzene 2,4,5-Trichlorophenol 0,0,0-Triethylphosphoro-	ND ND ND	ug/L 10 ug/L 10 ug/L 50
thioate 2,4,6-Trichlorophenol 1,3,5-Trinitrobenzene Ethyl methacrylate Methyl methacrylate	ND ND ND ND ND	ug/L 10 ug/L 10 ug/L 10 ug/L 10 ug/L 10
Surrogate	Recovery	
Nitrobenzene-d5 2-Fluorobiphenyl Terphenyl-d14 Phenol-d5 2-Fluorophenol 2,4,6-Tribromophenol	58 56 62 47 30 44	%        %        %        %        %        %        %

ND = Not detected NA = Not applicable

Reported By: Ethan Hutchinson



# Semivolatile Organics Appendix IX List Method 8270

Client Name: Giant Refining Client ID: OW-25 Lab ID: 011197-0002-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 Acenaphthylene Acetophenone 2-Acetylaminofluorene 4-Aminobiphenyl Aniline Anthracene Aramite Benzo(a)anthracene Benzo(b)fluoranthene Benzo(b)fluoranthene Benzo(g,h,i)perylene Benzo(a)pyrene Benzyl alcohol 4-Bromophenyl	ND ND ND ND ND ND ND ND ND ND ND ND ND N	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	10 10 10 100 10 10 10 10 10 10 10 10 10
phenyl ether Butyl benzyl phthalate	ND ND	ug/L ug/L	10 10
2-sec-Butyl-4,6-dinitro- phenol 4-Chloroaniline	ND ND	ug/L ug/L	10 10
bis(2-Chloroethoxy)- methane bis(2-Chloroethyl) ether bis(2-Chloroisopropyl)-	ND ND	ug/L ug/L	10 10
ether 4-Chloro-3-methylphenol 2-Chloronaphthalene 2-Chlorophenol 4-Chlorophenyl	ND ND ND ND	ug/L ug/L ug/L ug/L	10 10 10 10
phenyl ether Chrysene Dibenz(a,h)anthracene Dibenzofuran Di-n-butyl phthalate 1,2-Dichlorobenzene 1,3-Dichlorobenzene 3,3'-Dichlorobenzidine 2,4-Dichlorophenol 2,6-Dichlorophenol Diethyl phthalate	ND ND ND ND ND ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	10 10 10 10 10 10 10 10 10 10 10 10

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ND = Not detected NA = Not applicable

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# Semivolatile Organics Appendix IX List Method 8270

Client Name:	Giant Refining				
Client ID:	OW-25				
Lab ID:	011197-0002-SA			Destrict AT CED	~~
Matrix:	AQUEOUS	Sampled: 06 SEP 9	10	Received: 07 SEP	
Authorized:	07 SEP 90	Prepared: 08 SEP 9	10	Analyzed: 27 SEP	90
				Percenting	
Parameter		Result	Units	Reporting Limit	
rarameter		Result	011103		
Dimethoate		ND	ug/L		
	inoazobenzene	ND	ug/L	10	
7,12-Dimethy	lbenz(a)-		- Ji -		
anthrace	ne	ND	ug/L	10	
3,3'-Dimethy		ND	ug/L	10	
a,a-Dimethyl	phenethyl-				
amine		ND	ug/L	10	
2,4-Dimethyl	phenol	ND	ug/L	10	
Dimethyl pht		ND	ug/L	10	
1,3-Dinitrob	enzene	ND	ug/L	10	
4,6-Dinitro-	nhana]	ND	um /1	50	
2-methyl 2,4-Dinitrop	phenoi	ND	ug/L	50	
2,4-Dinitrot		ND	ug/L	10	
2,6-Dinitrot		ND	ug/L ug/L	10	
Di-n-octyl pl		ND	ug/L	10	
Diphenylamin		ND	ug/L	10	
Disulfoton		ND	ug/L	50	
bis(2-Ethylh	exv])		- 37 -		
phthalat	e	ND	ug/L	10	
Ethyl methan		ND	ug/L	10	
Famphur		ND	ug/L		
Fluoranthene		ND	ug/L	10	
Fluorene		ND	ug/L	10	
Hexachlorobe		ND	ug/L	10	
Hexachlorobu		ND	ug/L	10	
Hexachlorocy	clopentadiene	ND	ug/L	10	
Hexachloroet		ND	ug/L	10	
Hexachloroph		ND	ug/L		
Hexachloropr		ND ND	ug/L	10	
Indeno(1,2,3 Isophorone	-cu)pyrene	ND	ug/L	10 10	
Isosafrole		ND	ug/L	20	
Methapyrilen	A	ND	ug/L ug/L	10	
3-Methylchol	anthrene	ND	ug/L	10	
Methyl metha	nesulfonate	ND	ug/L	10	
2-Methylnaph		ND	ug/L	10	
Methyl parat		ND	ug/L	50	
2-Methylphen	0]	ND	ug/L	10	
3/4-Methylph	eno]	ND	ug/L	10	
Naphthalene		ND	ug/L	10	

(continued on following page)

ND = Not detected NA = Not applicable

Reported By: Ethan Hutchinson

# Semivolatile Organics Appendix IX List Method 8270

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Client Name: Giant Refining Client ID: OW-25 Lab ID: 011197-0002-SA Matrix: AQUEOUS Authorized: O7 SEP 90 Parameter	Sampled: 06 SEP 90 Prepared: 08 SEP 90 Result	Received: 07 SEP 90 Analyzed: 27 SEP 90 Reporting Units Limit
1,4-Naphthoquinone 1-Naphthylamine 2-Naphthylamine 2-Nitroaniline 3-Nitroaniline 4-Nitrobenzene 2-Nitrophenol 4-Nitrophenol 4-Nitroquinoline-1-oxide N-Nitroso-di-n-butylamine N-Nitrosodiethylamine N-Nitrosodimethylamine N-Nitrosodiphenylamine N-Nitroso-di-	ND ND ND ND ND ND ND ND ND ND ND ND	ug/L       10         ug/L       10         ug/L       10         ug/L       50         ug/L       50         ug/L       50         ug/L       10
n-propylamine N-Nitrosomethylethylamine N-Nitrosomorpholine N-Nitrosopiperidine N-Nitrosopyrrolidine 5-Nitro-o-toluidine Parathion Pentachlorobenzene Pentachlorobenzene Pentachlorophenol Phenacetin Phenacetin Phenanthrene Phenol 4-Phenylenediamine Phorate 2-Picoline Pronamide Pyrene Pyridine Safrole Sulfotepp 1,2,4,5-Tetrachloro- benzene	ND ND ND ND ND ND ND ND ND ND ND ND ND N	ug/L       10         ug/L       50         ug/L       50
2,3,4,6-Tetrachlorophenol Thionazin	ND ND	ug/L 50 ug/L 50

(continued on following page)

ND = Not detected NA = Not applicable

Reported By: Ethan Hutchinson

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#### Semivolatile Organics Appendix IX List Method 8270

Client Name: Giant Refining Client ID: OW-25 Lab ID: 011197-0002-SA Matrix: AQUEOUS Authorized: O7 SEP 90	Sampled: 06 SEP 90 Prepared: 08 SEP 90	, Received: 07 SEP 90 Analyzed: 27 SEP 90
Parameter	Result	Reporting Units Limit
2-Toluidine 1,2,4-Trichlorobenzene 2,4,5-Trichlorophenol 0,0,0-Triethylphosphoro-	ND ND ND	ug/L 10 ug/L 10 ug/L 50
thioate 2,4,6-Trichlorophenol 1,3,5-Trinitrobenzene Ethyl methacrylate Methyl methacrylate	ND ND ND ND ND	ug/L 10 ug/L 10 ug/L 10 ug/L 10 ug/L 10
Surrogate	Recovery	
Nitrobenzene-d5 2-Fluorobiphenyl Terphenyl-d14 Phenol-d5 2-Fluorophenol 2,4,6-Tribromophenol	71 66 56 49 47 50	% % % % %

ND = Not detected NA = Not applicable

Reported By: Ethan Hutchinson

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# Halogenated Volatile Organics

## Method 8010

Client Name: Giant Refining Client ID: OW-16 Lab ID: 011197-0001-SA Matrix: AQUEOUS Authorized: 07 SEP 90	Sampled: O6 SEP 90 Prepared: NA	Received: 07 SEP 90 Analyzed: 10 SEP 90
Parameter	Result U	Reporting nits Limit
Chloromethane Bromomethane Vinyl chloride Chloroethane Methylene chloride 1,1-Dichloroethene 1,1-Dichloroethane trans-1,2-Dichloroethene chloroform 1,1,2 Trichloro-1,2,2- trifluoroethane 1,2-Dichloroethane 1,1,1-Trichloroethane 1,2-Dichloropethane 1,2-Dichloropethane 1,2-Dichloropropane trans-1,3-Dichloropropene Trichloroethene Dibromochloromethane cis-1,3-Dichloropropene 1,1,2-Trichloroethane EDB (1,2-Dibromoethane) Bromoform 1,1,2,2-Tetrachloroethane Tetrachloroethene Chlorobenzene	ND U ND U ND U ND U ND U ND U ND U ND U	g/L $5.0$ $g/L$ $5.0$ $g/L$ $5.0$ $g/L$ $5.0$ $g/L$ $5.0$ $g/L$ $0.50$ $g/L$ $0.50$ $g/L$ $0.50$ $g/L$ $0.50$ $g/L$ $0.50$ $g/L$ $1.0$ $g/L$ $0.50$ $g/L$ $0.50$ $g/L$ $0.50$ $g/L$ $0.50$ $g/L$ $0.50$ $g/L$ $0.50$
		- 31 - 21 -

ND = Not detected NA = Not applicable

Reported By: Leewaphath Xaiyasang

Approved By: Jeff Lowry

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## Halogenated Volatile Organics

## Method 8010

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Client Name: Giant Refining Client ID: OW-25 Lab ID: 011197-0002-SA Matrix: AQUEOUS Authorized: 07 SEP 90	Sampled: O6 SEP 90 Prepared: NA		ved: 07 SEP 90 zed: 11 SEP 90
Parameter	Result		porting Limit
Chloromethane Bromomethane Vinyl chloride Chloroethane Methylene chloride 1,1-Dichloroethene 1,1-Dichloroethane trans-1,2-Dichloroethene Chloroform	ND ND ND ND ND 1.1 ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	5.0 5.0 1.0 5.0 5.0 0.50 0.50 0.50 0.50
<pre>1,1,2 Trichloro-1,2,2- trifluoroethane 1,2-Dichloroethane 1,1,1-Trichloroethane Carbon tetrachloride Bromodichloromethane 1,2-Dichloropropane trans-1,3-Dichloropropene Trichloroethene Dibromochloromethane cis-1,3-Dichloropropene 1,1,2-Trichloroethane EDB (1,2-Dibromoethane) Bromoform 1,1,2,2-Tetrachloroethane Tetrachloroethene Chlorobenzene</pre>	ND 24 ND ND ND ND ND ND ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	1.0 1.0 0.50 0.50 1.0 1.0 1.0 2.0 1.0 2.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0

ND = Not detected NA = Not applicable

Reported By: Leewaphath Xaiyasang Approved By: Jeff Lowry

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# Aromatic Volatile Organics

## Method 8020

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Client Name: Client ID: Lab ID: Matrix: Authorized:	Giant Refining OW-16 O11197-0001-SA AQUEOUS O7 SEP 90	Sampled: Prepared:	06 SEP 90 NA	)	Received: 07 Analyzed: 09	
Parameter			Result	Units	Reporting Limit	
Benzene Toluene Chlorobenzen Ethylbenzene Xylenes (tot 1,3-Dichloro 1,4-Dichloro 1,2-Dichloro	al) benzene benzene		ND ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L	0.50 0.50 0.50 0.50 1.0 0.50 0.50 0.50	

ND = Not detected NA = Not applicableReported By: Garth Atkins

Approved By: Jeff Lowry

## Aromatic Volatile Organics

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## Method 8020

Client Name: Giant Refining Client ID: OW-25 Lab ID: 011197-0002-SA Matrix: AQUEOUS Authorized: 07 SEP 90	Sampled: 06 SEP 90 Prepared: NA		Received: 07 SEP 90 Analyzed: 09 SEP 90
Parameter	Result	Units	Reporting Limit
Benzene Toluene Chlorobenzene Ethylbenzene Xylenes (total) 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichlorobenzene	1.2 ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L	0.50 0.50 0.50 0.50 1.0 0.50 0.50 0.50

ND = Not detected NA = Not applicable

Reported By: Garth Atkins

Approved By: Jeff Lowry

## Aromatic Volatile Organics

## Method 8020

Client Name: Client ID: Lab ID: Matrix: Authorized:	Giant Refining TRIP BLANK 011197-0003-SA AQUEOUS 07 SEP 90	Sampled: Unknown Prepared: NA		Received: 07 SEP 90 Analyzed: 09 SEP 90
Parameter		Result	Units	Reporting Limit
Benzene Toluene Chlorobenzen Ethylbenzene Xylenes (tot 1,3-Dichloro 1,4-Dichloro 1,2-Dichloro	al) benzene benzene	ND ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L	0.50 0.50 0.50 0.50 1.0 0.50 0.50 0.50

ND = Not detected NA = Not applicable

Reported By: Garth Atkins

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## Metals

## Dissolved Metals

Client Name: Client ID: Lab ID: Matrix: Authorized:	Giant Refining OW-16 011197-0001-SA AQUEOUS 07 SEP 90		ed: 06 SEP 9 ed: See Belo		ved: 07 SEP 9 zed: See Belo	
Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic Barium Cadmium Calcium Chromium Lead Manganese Selenium Silver Sodium	ND 0.031 ND 4.6 ND ND ND 0.027 ND 244	mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L	$\begin{array}{c} 0.0050\\ 0.010\\ 0.0050\\ 0.20\\ 0.010\\ 0.010\\ 0.010\\ 0.010\\ 0.0050\\ 0.010\\ 5.0 \end{array}$	7060 6010 6010 6010 7421 6010 7740 6010 6010	NA NA NA NA NA NA NA	26 SEP 90 04 OCT 90 04 OCT 90 04 OCT 90 04 OCT 90 26 SEP 90 04 OCT 90 25 SEP 90 04 OCT 90 04 OCT 90 04 OCT 90

ND = Not detected NA = Not applicable

Reported By: Leslie Gergurich

Approved By: Dave Roberts



## Metals

## Dissolved Metals

Client Name: Client ID: Lab ID: Matrix: Authorized:	Giant Refining OW-25 011197-0002-SA AQUEOUS 07 SEP 90	Sampl Prepare	ed: O6 SEP 9 ed: See Belo	0 Recei w Analy	ved: 07 SEP 9 zed: See Belo	
Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic Barium Cadmium Calcium Chromium Lead Manganese Selenium Silver Sodium	ND 0.13 ND 16.7 ND ND 0.024 0.0065 ND 256	mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L	$\begin{array}{c} 0.0050\\ 0.010\\ 0.0050\\ 0.20\\ 0.010\\ 0.0050\\ 0.010\\ 0.0050\\ 0.010\\ 0.0050\\ 0.010\\ 5.0\\ \end{array}$	7060 6010 6010 6010 7421 6010 7740 6010 6010	NA NA NA NA NA NA NA NA	26 SEP 90 04 OCT 90 04 OCT 90 04 OCT 90 04 OCT 90 26 SEP 90 04 OCT 90 25 SEP 90 04 OCT 90 04 OCT 90

ND = Not detected NA = Not applicable

Reported By: Leslie Gergurich

Approved By: Dave Roberts

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## General Inorganics

Client Name: Client ID: Lab ID: Matrix: Authorized:	Giant Refining OW-16 011197-0001-SA AQUEOUS 07 SEP 90	Sampled Prepared	: 06 SEP 9 : See Belo	0 Receiv w Analyz	ed: 07 SEP 9 ed: See Belo	
Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Alkalinity, CaCO3 at Alkalinity,	pH 4.5 279	mg/L	5.0	310.1	NA	07 SEP 90
CaCO3 at Chloride pH Phenolics Sulfate	pH 8.3 14.1 156 8.5 ND 31.6	mg/L mg/L units mg/L mg/L	5.0 3.0  5.0	310.1 300.0 9040 9065 300.0	NA NA NA NA NA	07 SEP 90 15 SEP 90 07 SEP 90 12 SEP 90 15 SEP 90
Specific Con at 25 de Total Dissol Solids	g.C 1100	umhos/cm mg/L	1.0 10.0	120.1 160.1	NA NA	07 SEP 90 10 SEP 90

ND = Not detected NA = Not applicable

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Reported By: Tammy Bailey

Approved By: Toni Lusk

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## General Inorganics

Lab ID: 0 Matrix: A	iant Refining V-25 L1197-0002-SA QUEOUS V SEP 90		: 06 SEP 9 : See Belo		ed: 07 SEP 9 ed: See Belo	
Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Alkalinity, Bi CaCO3 at p Alkalinity, Ca	4.5 468	mg/L	5.0	310.1	NA	07 SEP 90
CaCO3 at p Chloride pH Phenolics	H 8.3 ND 87.6 7.8 0.022	mg/L mg/L units mg/L	5.0 3.0 0.010	310.1 300.0 9040 9065	NA NA NA	07 SEP 90 15 SEP 90 07 SEP 90 12 SEP 90
Sulfate Specific Condu- at 25 deg. Total Dissolve	C 1170	mg/L umhos/cm	5.0 1.0	300.0 120.1	NA NA	15 SEP 90 07 SEP 90
Solids	773	mg/L	10.0	160.1	NA	10 SEP 90

ND = Not detected NA = Not applicable

Reported By: Tammy Bailey

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#### 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.

RPD =

Measured Concentration % Recovery = _____ X 100 Actual Concentration

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

Measured Concentration DCS1 - Measured Concentration DCS2

(Measured Concentration DCS1 + Measured Concentration DCS2)/2

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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.



## 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



## DUPLICATE CONTROL SAMPLE REPORT Semivolatile Organics by GC/MS

Analyte	Conc Spiked	entratior DCS1	Measured DCS2	AVG		uracy age(%) Limits	Precis (RPD) DCS Li	
Category: 625-A Matrix: AQUEOUS QC Lot: 07 SEP 90-A Concentration Units: ug/L								i
Phenol 2-Chlorophenol 1,4-Dichlorobenzene N-Nitroso-di-	100 100 50	87.1 83.3 33.6	80.3 80.9 35.4	83.7 82.1 34.5	84 82 69	12- 89 27-123 36- 97	8.1 2.9 5.2	42 40 28
n-propylamine 1,2,4-Trichlorobenzene 4-Chloro-3-methylphenol Acenaphthene 4-Nitrophenol 2,4-Dinitrotoluene Pentachlorophenol Pyrene	50 50 100 50 100 50 100 50	47.9 32.1 63.6 36.7 60.6 38.4 31.5 35.3	48.2 32.6 77.9 36.0 51.5 36.2 14.2 34.5	48.0 32.4 70.8 36.4 56.0 37.3 22.8 34.9	96 65 71 73 56 75 23 70	41-116 39- 98 23- 97 46-118 10- 80 24- 96 9-103 26-127	0.6 1.5 20 1.9 16 5.9 76* 2.3	38 28 42 31 50 38 50 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		Conc Spik	entrat ed Me	ion asured	Accur SCS	acy(%) Limits
Category: 625-A Matrix: AQUEOUS QC Lot: 07 SEP 90-A Concentration Units:	QC Run: ug/L	08 SEP 90-A	·			
Nitrobenzene-d5 2-Fluorobiphenyl Terphenyl-d14 2-Fluorophenol Phenol-d5 2,4,6-Tribromophenol		1 1 2 2	00 00 00 00 00	69.0 63.4 70.1 148 151 112	69 63 70 74 76 56	35-114 43-116 33-141 21-100 10- 94 10-123

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

LINSECO A Corning Company METHOD BLANK REPORT Semivolatile Organics by GC/MS

Analyte	Result	Units	Reporting Limit
Test: 8270CP-AP9-A Matrix: AQUEOUS QC Lot: 07 SEP 90-A QC Run: (	08 SEP 90-A		
Acenaphthene Acenaphthylene Acetophenone 2-Acetylaminofluorene 4-Aminobiphenyl Aniline Anthracene Aramite Benzo(a)anthracene Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(g,h,i)perylene Benzo(a)pyrene Benzyl alcohol	ND ND ND ND ND ND ND ND ND ND ND ND ND N	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	10 10 100 10 10 10 10 10 10 10 10 10
4-Bromophenyl phenyl ether Butyl benzyl phthalate	ND ND	ug/L ug/L	10 10
2-sec-Butyl-4,6-dinitro- phenol 4-Chloroaniline bis(2-Chloroethoxy)-	ND ND	ug/L ug/L	10 10
methane bis(2-Chloroethyl) ether bis(2-Chloroisopropyl)-	ND ND	ug/L ug/L	10 10
ether 4-Chloro-3-methylphenol 2-Chloronaphthalene 2-Chlorophenol	ND ND ND ND	ug/L ug/L ug/L ug/L	10 10 10 10
4-Chlorophenyl phenyl ether Chrysene Dibenz(a,h)anthracene Dibenzofuran Di-n-butyl phthalate 1,2-Dichlorobenzene 1,3-Dichlorobenzene 3,3'-Dichlorobenzidine 2,4-Dichlorophenol 2,6-Dichlorophenol Diethyl phthalate	ND ND ND ND ND ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	10 10 10 10 10 10 10 20 10 10

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

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Analyte	Result	Units	Reporting Limit
Test: 8270CP-AP9-A Matrix: AQUEOUS QC Lot: 07 SEP 90-A QC Run: 08	3 SEP 90-A		
Dimethoate p-Dimethylaminoazobenzene 7,12-Dimethylbenz(a)-	ND ND	ug/L ug/L	10
anthracene 3,3'-Dimethylbenzidine a,a-Dimethylphenethyl-	ND ND	ug/L ug/L	10 10
amine 2,4-Dimethylphenol Dimethyl phthalate 1,3-Dinitrobenzene	ND ND ND ND	ug/L ug/L ug/L ug/L	10 10 10 10
4,6-Dinitro- 2-methylphenol 2,4-Dinitrophenol 2,4-Dinitrotoluene 2,6-Dinitrotoluene Di-n-octyl phthalate Diphenylamine Disulfoton bis(2-Ethylhexyl)	ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L	50 50 10 10 10 10 50
phthalate Ethyl methanesulfonate Famphur Fluoranthene Fluorene Hexachlorobenzene Hexachlorobutadiene Hexachlorocyclopentadiene Hexachloroethane	ND ND ND ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	10 10  10 10 10 10 10 10
Hexachlorophene Hexachloropropene Indeno(1,2,3-cd)pyrene Isophorone Isosafrole Methapyrilene 3-Methylcholanthrene Methyl methanesulfonate 2-Methylnaphthalene Methyl parathion 2-Methylphenol 3/4-Methylphenol Naphthalene	ND ND ND ND ND ND ND ND ND ND ND ND ND N	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	10 10 20 10 10 10 10 50 10 10

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

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Analyte	Result	Units	Reporting Limit
Test: 8270CP-AP9-A Matrix: AQUEOUS QC Lot: 07 SEP 90-A QC Run:	08 SEP 90-A		
1,4-Naphthoquinone 1-Naphthylamine 2-Naphthylamine 2-Nitroaniline 3-Nitroaniline 4-Nitroaniline 2-Nitrophenol 4-Nitrophenol 4-Nitroguinoline-1-oxide N-Nitroso-di-n-butylamine N-Nitrosodiethylamine N-Nitrosodimethylamine N-Nitrosodiphenylamine	ND ND ND ND ND ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	10 10 50 50 50 10 10 10 10 10 10
N-Nitroso-di- n-propylamine N-Nitrosomethylethylamine N-Nitrosomorpholine N-Nitrosopyrrolidine S-Nitro-o-toluidine Parathion Pentachlorobenzene Pentachlorobenzene Pentachlorophenol Phenacetin Phenanthrene Phenol 4-Phenylenediamine Phorate 2-Picoline Pronamide Pyrene Pyridine Safrole Sulfotepp	ND ND ND ND ND ND ND ND ND ND ND ND ND N	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	10 10 10 10 10 10 50 10 10 10 10 10 10 10 10 10 10 10 10 10
1,2,4,5-Tetrachloro- benzene 2,3,4,6-Tetrachlorophenol Thionazin	ND ND ND	ug/L ug/L ug/L	10 50 50

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

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Analyte	Result	Units	Reporting Limit
Test: 8270CP-AP9-A Matrix: AQUEOUS QC Lot: 07 SEP 90-A QC Run: 08 SEF	90-A		
2-Toluidine 1,2,4-Trichlorobenzene 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol 0,0,0-Triethylphosphoro-	ND ND ND ND	ug/L ug/L ug/L ug/L	10 10 50 10
thioate 1,3,5-Trinitrobenzene Ethyl methacrylate Methyl methacrylate	ND ND ND ND	ug/L ug/L ug/L ug/L	10 10 10 10



## QC LOT ASSIGNMENT REPORT Volatile Organics by GC

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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

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#### DUPLICATE CONTROL SAMPLE REPORT Volatile Organics by GC

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Analyte		Conce Spiked	ntration M DCS1	easured DCS2	AVG		uracy age(%) Limits	Precis (RPD) DCS Li	
Category: 602-A Matrix: AQUEOUS QC Lot: 09 SEP 90-A Concentration Units:	ug/L								
Benzene Toluene Ethylbenzene Xylenes (total) 1,3-Dichlorobenzene		5.0 5.0 5.0 5.0 5.0	4.18 4.12 4.15 4.40 4.60	4.44 4.33 4.35 4.76 4.75	4.31 4.23 4.25 4.58 4.68	86 85 92 94	80-120 80-120 80-120 80-120 80-120 80-120	6.0 5.0 4.7 7.9 3.2	15 15 15 15
Category: 601-A Matrix: AQUEOUS QC Lot: 10 SEP 90-F Concentration Units:	ug/L								
1,1-Dichloroethane Chloroform Bromodichloromethane Trichloroethene Chlorobenzene		5.0 5.0 10 5.0 5.0	4.09 5.14 9.25 4.72 4.64	4.26 5.13 8.87 4.91 4.96	4.18 5.14 9.06 4.82 4.80	84 103 91 96 96	80-130 80-120 80-120 70-120 80-120	4.1 0.2 4.2 3.9 6.7	20 20 20 2C 2C

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

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: Concentration Units: ug/L	09 SEP 90-A	
a,a,a-Trifluorotoluene	30.0 30.7	102 20-160
Category: 601-A Matrix: AQUEOUS QC Lot: 10 SEP 90-F QC Run: Concentration Units: ug/L	10 SEP 90-F	
Bromochloromethane	5.00 4.41	88 20-160

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

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 Toluene Chlorobenzene Ethylbenzene Xylenes (total) 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichlorobenzene	ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L	$\begin{array}{c} 0.50 \\ 0.50 \\ 0.50 \\ 1.0 \\ 0.50 \\ 0.50 \\ 0.50 \\ 0.50 \\ 0.50 \end{array}$
Test: 601-A Matrix: AQUEOUS QC Lot: 10 SEP 90-F QC Run: 10	) SEP 90-F		
Chloromethane Bromomethane Vinyl chloride Chloroethane Methylene chloride 1,1-Dichloroethene 1,1-Dichloroethane trans-1,2-Dichloroethene Chloroform	ND ND ND ND ND ND ND ND	ug/l ug/l ug/l ug/l ug/l ug/l ug/l	5.0 5.0 1.0 5.0 5.0 0.50 0.50 0.50 0.50
<pre>1,1,2 Trichloro-1,2,2- trifluoroethane 1,2-Dichloroethane 1,1,1-Trichloroethane Carbon tetrachloride Bromodichloromethane 1,2-Dichloropropane trans-1,3-Dichloropropene Trichloroethene Dibromochloromethane cis-1,3-Dichloropropene 1,1,2-Trichloroethane EDB (1,2-Dibromoethane) Bromoform 1,1,2,2-Tetrachloroethane Tetrachloroethene Chlorobenzene</pre>	ND ND ND ND ND ND ND ND ND ND ND ND ND N	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	$ \begin{array}{c} 1.0\\ 1.0\\ 0.50\\ 0.50\\ 1.0\\ 1.0\\ 1.0\\ 2.0\\ 1.0\\ 2.0\\ 1.0\\ 2.0\\ 1.0\\ 2.0\\ 1.0\\ 2.0\\ 5.0\\ 1.0\\ 2.0\\ 5.0\\ 1.0\\ 2.0\\ 5.0\\ 1.0\\ 2.0\\ 5.0\\ 1.0\\ 0.50\\ 2.0\\ 0.50\\ 2.0\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 0$

METHOD BLANK REPORT Volatile Organics by GC (cont.)

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

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## QC LOT ASSIGNMENT REPORT Metals Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
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	-



## DUPLICATE CONTROL SAMPLE REPORT Metals Analysis and Preparation

0 1.95 5 0.474 0 1.62 0 1.87 05 0.0488 05 0.0470 092.4 2 0.186 5 0.466 25 0.256 0 1.00 5 0.493 60 45.8	4       0.472         2       1.63         7       1.87         8       0.0489         0       0.0491         4       92.3         6       0.188         6       0.468         6       0.255         0       1.00         3       0.481         8       45.8	1.95 0.473 1.62 1.87 0.0488 0.0481 92.3 0.187 0.467 0.256 1.00 0.487 45.8 0.483	97 95 81 93 96 92 94 93 102 100 97 92 97	75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125	0.3 0.4 0.7 0.2 4.4 0.1 1.3 0.4 0.2 2.5 0.1 0.0	20 20 20 20 20 20 20 20 20 20 20 20 20 2
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	4       0.472         2       1.63         7       1.87         8       0.0489         0       0.0491         4       92.3         6       0.188         6       0.468         6       0.255         0       1.00         3       0.481         8       45.8	0.473 1.62 1.87 0.0488 0.0481 92.3 0.187 0.467 0.256 1.00 0.487 45.8	95 81 98 96 92 94 93 102 100 97 92	75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125	0.4 0.7 0.2 4.4 0.1 1.3 0.3 0.4 0.2 2.5 0.1	20 20 20 20 20 20 20 20 20 20 20
5       0.483         5       0.484         50       41.2         05       0.0512         00       87.6         .5       0.480	4 0.480 2 41.4 2 0.0474 6 88.1 2 0.492	0.482 41.3 0.0493 87.8 0.492 0.479	96 83 99 88 98 98	75-125 75-125 75-125 75-125 75-125 75-125 75-125	0.0 0.8 0.6 7.8 0.6 0.1 0.5	20 20 20 20 20 20 20 20
0.0409	9 0.0412	0.0410	103	75-125	, 0 . 7	20
		0.0181	91	75-125	2.2	20
		04 0.0409 0.0412 02 0.0179 0.0183				04 0.0409 0.0412 0.0410 103 75-125 0.7

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

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

Analyte		Con Spiked	ncentratio	n Measured			curacy	Precis	
Allalyte		Spikeu	DCS1	DCS2	AVG	DCS	rage(%) Limits	(RPD) DCS Li	imit
Category: SE-FAA-AD Matrix: AQUEOUS QC Lot: 26 SEP 90-B Concentration Units:	mg/L	<b>1</b>							
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.



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

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#### DUPLICATE CONTROL SAMPLE REPORT Wet Chemistry Analysis and Preparation

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Analyte		Conc Spiked	entration DCS1	n Measured DCS2	AVG	Acc Aver DCS	uracy age(%) Limits	Precis (RPD) DCS Li	)
Category: PH-A Matrix: AQUEOUS QC Lot: O7 SEP 90-B Concentration Units:	units								
рН		9.1	9.00	9.00	9.00	99	98-102	0.0	5
Category: COND-A Matrix: AQUEOUS QC Lot: O7 SEP 90-B Concentration Units:	umhos/cm								
Specific Conductance at 25 deg.C		1070	1100	1090	1090	102	95-105	1.1	<b>2</b> C
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	<b>2</b> C
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	2C

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

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

Analyte		Conc Spiked	centratio	n Measured			curacy rage(%)	Precis (RPD)	
Andry to		opined	DCS1	DCS2	AVG	DCS	Limits	DCS Li	
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

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

METHOD BLANK REPORT Wet Chemistry Analysis and Preparation

Analyte		Res	sult	Units	Reporting Limit
Test: PHEN-SPEC-A Matrix: AQUEOUS QC Lot: 11 SEP 90-A Phenolics	QC Run:	11 SEP 90-A	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



Stody       NO.         I. Packed by:       SAMPLE SAFE" CONDITIONS         I. Packed by:       Seal Intact Upon Receipt by Sampling Co.:         2. Seal Intact Upon Receipt by Sampling Co.:       Seal #         0. Oudition of Contents:       Seal #         1. Packed by:       Seal #         2. Seal Intact Upon Receipt by Sampling Co.:       Seal #         1. Packed by:       Lawd       Resolution         1. Packed by:       Lawd       Resolution         2. Sealed for Shipping by:       Lawd       Resolution         3. Condition of Contents:       One       Continuing Until         6. Sampling Status:       One       Continuing Until       Seal #         7. Seat Intact Upon Receipt by Lab:       Yes       No         9. Condition of Contents:       One       One       Seal Intact Upon Receipt by Lab:	No. Containers Analysis Parameters Aemarks - # ) See Attached Taagaauss - # 4) See Attached Taagaauss - # 4) See Attached Ursselved Messals - # 11 See Attached Ursselved Messals - # 12 See Attached Ursselved Messals - # 12 See Attached Dissolved Messals - # 12 See Attached Besolved B	Delivered to Shipper by: <u>Clark</u> SHIPPING DETAILS Method of Shipment: <u>Fadera</u> <u>Faness</u> Airphy # <u>L</u> <u>S</u> <u>M</u> <u>A</u> <u>7</u> <u>9</u> <u>05</u> <u>1</u> Received for Lab: <u>AMA</u> <u>4</u> <u>C</u> Signed: <u>Cler</u> <u>os</u> Date/Time <u>a</u> <u>9-02</u> <u>60</u> Enseco Project No. <u>11</u> <u>7</u>
CHAIN OF CUSTODY 1. Pack 2. Seat 3. Con 4. Seat 5. Initia 6. Sam 8. Con	Sample Type	Date Time Delivere
Enseco - Rocky Mountain Analytical 4955 Yarow Street Avada, Colorado 80002 303/421 6641 Facsimile: 303/431-7171 Attn: Julie E5565 Attn: Julie E55655 Attn: Julie E55655 Attn:	Sample 1D/Description	ODY TRANSFERS PRIOR TO SHIPPING Received by: (signed)
Enseco - Rock 4955 Yarrow Street Arvada, Colorado 80002 803/421 6641 Facsimil Attn: Julie E Attn: Julie E Attn: Julie E attn: Colorate Enseco Client <u>Eiten</u> Project <u>Acoundudu</u> Sampling Co <u>Eiten</u> Sampling Site <u>Eiter</u> Team Leader <u>Clan</u>	Date Time Time	CUST Relinquished by (signed) 1 Mand Horred

SAME

ODY       SAMPLE SAFE* CONDITIONS         1. Packed by:       Seal #         2. Seal Intact Upon Receipt by Sampling Co.:       Seal #         3. Condition of Contents:       Seal #         4. Sealed for Shipping by:       Seal #         5. Initial Contents Temp.       Seal #         6. Sampling Status:       Done         7. Seal Intact Upon Receipt by Laboratory:       Yes         8. Condition of Contents       Yes	lainers Analysis Parameters Remarks	2 See Arrached Laaguarie 5 2 See Arrached Laaguaries	1 See Arrached . Markal 8	rached mered and and red and sol	1 Valot 10 01990 is Merhad 800	or by Cloud Stypping DETAILS
CHAIN OF CUSTODY 1. Pack 2. Seal 3. Com 4. Seal 6. Sam 6. Sam 8. Con	Sample Type No. Containers	Ware/ 2-#1 1-#2	+ - 0    + -   -	3. #1	W9YE/ 1-#1	E Time Delivered to Shipper by: <u>Low</u> <u>Method of Shipment</u>
Enseco - Kocky Mountain Analytical 4955 Yartow Street Avada, Colorado 80002 303/421-6611 Facsimile: 303/431-7171 Attn: Julie: 75552 Enseco Client Bister ReFrand Co. Enseco Client Bister ReFrand Co. Project Grant Bister Lawestrygot 100 Project Contant Bister Lawestrygot 100 Sampling Co. Enart Bistining Co. Sampling Site Chira ReFrand Co. Feam Leader Cland Rosendale	Sample ID/Description	04-25			Trip Blank	CUSTODY TRANSFERS PRIOR TO SHIPPING igned) Received by: (signed) Date
Team Leader <u>Corky Recever</u> 4955 Yarrow Street Arvada, Colorado 80002 303/421-6611 Facsimile: 3 Attn: <u>Julie</u> <u>FS</u> Attn: <u>Julie</u> <u>FS</u> Attn: <u>Julie</u> <u>FS</u> Attn: <u>Julie</u> <u>FS</u> Erseco Client <u>Ground utor</u> Project <u>Ground utor</u>	Date Time	1704;6 X76	· •		)	CUST Relinquished by: (signed)

Rocky Mountain Analytical Laboratory

ANALYTICAL RESULTS

GIANT REFINING

ENSECO-RMAL NO. 012009

JANUARY 8, 1991 in 26417



Reviewed by:

Julie Essey Sue Dalla

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

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#### 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: Corning Company

- o Sample Description Information
- o Analytical Test Requests
- o Analytical Results
- o 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, 2fluorobiphenyl, 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.

Corning Company

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.



## SAMPLE DESCRIPTION INFORMATION for Giant Refining

Lab ID	Client ID	Matrix	Sampie Date	ea Time	Date
012009-0001-SA 012009-0002-SA 012009-0003-SA 012009-0004-SA	OW-17 OW-11	AQUEOUS AQUEOUS AQUEOUS AQUEOUS	25 OCT 90 25 OCT 90 25 OCT 90	08:50	

## ANALYTICAL TEST REQUESTS for Giant Refining

Enseco A Corning Company

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

orning Company

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	Receiv	ed: 26 OCT 90
Authorized: 26 OCT 90	Prepared: 28 OCT 90		ed: 02 NOV 90
	•	•	
		Rep	orting
Parameter	Result		imit
Acenaphthene	ND	ug/L	100
Acenaphthylene		ug/L	100
Acetophenone	ND	ug/L	100
2-Acetylaminofluorene	ND	ug/L 10	000
4-Aminobiphenyl	ND	ug/L :	100
Aniline	ND		100
Anthracene	ND		100
Aramite	ND	ug/L :	100
Benzo(a)anthracene	ND		100
Benzo(b)fluoranthene	ND	ug/L I	100
Benzo(k)fluoranthene	ND	ug/L :	100
Benzo(g,h,i)perylene	ND		100
Benzo(a)pyrene	ND		100
Benzyl alcohol	ND	ug/L 1	100
4-Bromophenyl			
phenyl ether			100
Butyl benzyl phthalate	ND	ug/L :	100
2-sec-Buty1-4,6-dinitro-			
phenol			100
4-Chloroaniline	ND	ug/L 1	100
bis(2-Chloroethoxy)-			
methane			100
bis(2-Chloroethyl) ether	ND	ug/L 1	100
bis(2-Chloroisopropyl)-	NO		
ether		<b>V</b> ( ).	100
4-Chloro-3-methylphenol			100
2-Chloronaphthalene			100
2-Chlorophenol	ND	ug/L 1	100
4-Chlorophenyl	10	<i>.</i>	
phenyl ether			100
Chrysene	ND	ug/L I	100
Dibenz(a,h)anthracene	ND		100
Dibenzofuran			100
Di-n-butyl phthalate			100
1,2-Dichlorobenzene	ND		100
1,3-Dichlorobenzene	ND		100
1,4-Dichlorobenzene	ND		100
3,3'-Dichlorobenzidine			200
2,4-Dichlorophenol			100
2,6-Dichlorophenol		<b>V</b> ¹	100
Diethyl phthalate	ND	ug/L 1	100

(continued on following page)

ND = Not detected NA = Not applicable

Reported By: Steven Francis



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Lab ID: 012009-0001-SA Matrix: AQUEOUS Sampled: 25 OCT 90 Analyzed: 02 NOV 90 Authorized: 26 OCT 90 Prepared: 28 OCT 90 Analyzed: 02 NOV 90 Parameter Result Units Limit Dimethoate ND ug/L P-Dimethylbenz(a)- nathracene ND ug/L 100 7,12-Dimethylbenz(a)- anine ND ug/L 100 3,3'-Dimethylbenzidine ND ug/L 100 3,3'-Dimethylphenethyl- amine ND ug/L 100 2,4-Dimethylphenethyl- amine ND ug/L 100 1,3-Dinitrobenzene ND ug/L 100 1,3-Dinitrobenzene ND ug/L 100 1,3-Dinitrobenzene ND ug/L 100 1,3-Dinitrobenzene ND ug/L 100 2,4-Dinitrobenzene ND ug/L 100 2,4-Dinitrotoluene ND ug/L 100 2,4-Dinitrotoluene ND ug/L 100 Disulfoton ND ug/L 500 2,4-Dinitrotoluene ND ug/L 100 Disulfoton ND ug/L 500 5,2-Dinitrotoluene ND ug/L 100 Disulfoton ND ug/L 500 5,2-Dinitrotoluene ND ug/L 100 Disulfoton ND ug/L 500 Famphur ND ug/L 500 Famphur ND ug/L 100 Disulfoton ND ug/L 500 Famphur ND ug/L 100 Disulfoton ND ug/L 100 Disulfoton ND ug/L 500 Famphur ND ug/L 100 Hexachlorobenzene ND ug/L 100 Hexachlorobenz	Client Name: Giant Refining Client ID: OW-26		·	
ParameterResultUnitsLimitDimetholateNDug/Lp-Dimethylbenz(a)-NDug/L100anthraceneNDug/L100a,a-Dimethylbenz(a)-NDug/L100a,a-DimethylbenzidineNDug/L100a,a-DimethylbenzidineNDug/L100a,a-DimethylphenolNDug/L1002,4-DiniethylphenolNDug/L1001,3-DinitrobenzeneNDug/L1002,-methylphenolNDug/L5002,4-DinitrobenzeneNDug/L1002,4-DinitrobenzeneNDug/L1002,4-DinitrobenzeneNDug/L1002,4-DinitrobenzeneNDug/L1002,4-DinitroblueneNDug/L1002,4-DinitroblueneNDug/L1000:n-octyl phthalateNDug/L100DislfotonNDug/L100bisl(2-Ethylhexyl)Dit100phthalateNDug/L100fluorantheneNDug/L100HexachlorobenzeneNDug/L100HexachloropheneNDug/L100HexachloropheneNDug/L100HexachloropheneNDug/L100HexachloropheneNDug/L100HexachloropheneNDug/L100IsoshoroneNDug/L100Isosafrole <td>Matrix: AQUEOUS</td> <td>Sampled: 25 OCT 90 Prepared: 28 OCT 90</td> <td></td> <td></td>	Matrix: AQUEOUS	Sampled: 25 OCT 90 Prepared: 28 OCT 90		
p-DimethylaminoazobenzeneNDug/L1007,12-Dimethylbenz(a)- anthraceneNDug/L1003,3'-DimethylpenzidineNDug/L100a,a-DimethylpenzidineNDug/L100a,a-Dimethylpenethyl- amineNDug/L1002,4-DimethylphenolNDug/L1001,3-DinitrobenzeneNDug/L1001,3-DinitrobenzeneNDug/L1002,-methylphenolNDug/L5002,4-DinitrobueneNDug/L1002,6-DinitrotolueneNDug/L1000,6-DinitrotolueneNDug/L1000,6-DinitrotolueneNDug/L1000,6-DinitrotolueneNDug/L1000,6-DinitrotolueneNDug/L1000,6-DinitrotolueneNDug/L1000,6-DinitrotolueneNDug/L1000,6-DinitrotolueneNDug/L1000,6-DinitrotolueneNDug/L1000,6-DinitrotolueneNDug/L1000,6-DinitrotolueneNDug/L1000,6-DinitrotolueneNDug/L1000,6-DinitrotolueneNDug/L1000,6-DinitrotolueneNDug/L1000,6-DinitrotolueneNDug/L1000,6-DinitrotolueneNDug/L1000,6-DinitrotolueneNDug/L1000,6-DinitrotolueneNDug/L <td>Parameter</td> <td>Result</td> <td></td> <td></td>	Parameter	Result		
anthraceneNDug/L1003,3'-DimethylbenzidineNDug/L100a,a-Dimethylphenethyl-amineNDug/L1002,4-DimethylphenolNDug/L100Dimethyl phthalateNDug/L1001,3-DinitrobenzeneNDug/L1001,3-DinitrobenzeneNDug/L5002-methylphenolNDug/L5002,4-DinitrobleneNDug/L1002,4-DinitrobleneNDug/L1002,4-DinitrobleneNDug/L1002,4-DinitrobleneNDug/L1002,6-DinitrotolueneNDug/L100Din-octyl phthalateNDug/L100DisulfotonNDug/L100bis(2-Ethylhexyl)mthateNDug/LphthalateNDug/L100FamphurNDug/L100FluoreneNDug/L100HexachlorobutadieneNDug/L100HexachlorobutadieneNDug/L100HexachloropheneNDug/L100HexachloropheneNDug/L100HexachloropheneNDug/L100HexachloropheneNDug/L100HexachloropheneNDug/L100HexachloropheneNDug/L100HexachloropheneNDug/L100HexachloropheneNDug/L100 <trr< td=""><td>p-Dimethylaminoazobenzene</td><td></td><td></td><td></td></trr<>	p-Dimethylaminoazobenzene			
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-Dinitrobenzene         ND         ug/L         500           2,methylphenol         ND         ug/L         500           2,4-Dinitrobluene         ND         ug/L         100           2,6-Dinitrotoluene         ND         ug/L         100           2,6-Dinitrotoluene         ND         ug/L         100           Disulfoton         ND         ug/L         100           Distlfoton         ND         ug/L         100           bis(2-Ethylhexyl)         ug/L         100           phthalate         ND         ug/L         100           Fluoranthene         ND         ug/L         100           Hexachlorobenzene         ND         ug/L         100           Hexachlorobenzene         ND         ug/L         100           Hexachloropenetaleine         ND         ug/L         100           Hexachloropethane         ND         ug/L         100	anthracene 3,3'-Dimethylbenzidine			
1.3-DinitrobenzeneNDug/L1004,6-Dinitro- 2-methylphenolNDug/L5002.4-DinitrophenolNDug/L5002.4-DinitrotolueneNDug/L1002.6-DinitrotolueneNDug/L100Di-n-octyl phthalateNDug/L100DiphenylamineNDug/L100DisulfotonNDug/L100bis(2-Ethylhexyl)phthalateNDug/LphthalateNDug/L100Ethyl methanesulfonateNDug/L100FluorantheneNDug/L100HexachlorobenzeneNDug/L100HexachloroptoetnameNDug/L100HexachloroptoetnameNDug/L100HexachloroptoetnameNDug/L100HexachloroptoetnameNDug/L100HexachloroptoetnameNDug/L100HexachloroptoetnameNDug/L100IsophoroneNDug/L100IsophoroneNDug/L100IsophoroneNDug/L100SafroleNDug/L100MethapyrileneNDug/L100JopheneNDug/L100MethapyrileneNDug/L100MethapyrileneNDug/L100JopheneNDug/L100MethapyrileneNDug/L100JopheneND	amine 2,4-Dimethylphenol	ND	ug/L 100	
2,4-Dinitrophenol       ND       ug/L       500         2,4-Dinitrotoluene       ND       ug/L       100         2,6-Dinitrotoluene       ND       ug/L       100         Din-octyl phthalate       ND       ug/L       100         Diphenylamine       ND       ug/L       100         Disulfoton       ND       ug/L       100         Fluoranthene       ND       ug/L       100         Fluoranthene       ND       ug/L       100         Hexachlorobenzene       ND       ug/L       100         Hexachlorocyclopentadiene       ND       ug/L       100         Hexachloropopene       ND       ug/L       100         Hexachloropopene       ND       ug/L       100         Indeno(1,2,3-cd)pyrene       ND       ug/L       100         Isophorone       ND       ug/L       100	1,3-Dinitrobenzene 4,6-Dinitro-	ND	ug/L 100	
Di-n-octyl phthalateNDug/L100DiphenylamineNDug/L100DisulfotonNDug/L100DisulfotonNDug/L100bis(2-Ethylhexyl)nthalateNDug/LphthalateNDug/L100Ethyl methanesulfonateNDug/L100FamphurNDug/L100FluorantheneNDug/L100HexachlorobenzeneNDug/L100HexachlorobutadieneNDug/L100HexachloropheneNDug/L100HexachloropheneNDug/L100Indeno(1,2,3-cd)pyreneNDug/L100IsosafroleNDug/L100IsosafroleNDug/L100MethapyrileneNDug/L100J-MethylcholanthreneNDug/L100Methyl parathionNDug/L1003/4-MethylphenolNDug/L100	2,4-Dinitrophenol 2,4-Dinitrotoluene	ND ND	ug/L 500 ug/L 100	
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           Hexachloropopene         ND         ug/L         100           Hexachloropropene         ND         ug/L         100           Hexachloropropene         ND         ug/L         100           Indeno(1, 2, 3-cd)pyrene         ND         ug/L         100           Isophorone         ND         ug/L         100           Isosafrole         ND         ug/L         100           Methapyrilene         ND         ug/L         100           3-Methylcholanthrene         ND         ug/L         100           Methapyrilene         130         ug/L         100           2-Methylnaphthalene         130	Di-n-octyl phthalate Diphenylamine	ND ND	ug/L 100 ug/L 100	
FamphurNDug/LFluorantheneNDug/L100FluoreneNDug/L100HexachlorobenzeneNDug/L100HexachlorobutadieneNDug/L100HexachlorocyclopentadieneNDug/L100HexachloropheneNDug/L100HexachloropheneNDug/L100HexachloropropeneNDug/L100Indeno(1,2,3-cd)pyreneNDug/L100IsosafroleNDug/L100JsosafroleNDug/L100MethapyrileneNDug/L1003-MethylcholanthreneNDug/L100Methyl methanesulfonateNDug/L1002-Methyl naphthalene130ug/L1003/4-MethylphenolNDug/L100	bis(2-Ethylhexyl) phthalate	ND	ug/L 100	
HexachlorobenzeneNDug/L100HexachlorobutadieneNDug/L100HexachlorocyclopentadieneNDug/L100HexachloroethaneNDug/L100HexachloropheneNDug/L100HexachloropropeneNDug/L100Indeno(1,2,3-cd)pyreneNDug/L100IsophoroneNDug/L100IsosafroleNDug/L100MethapyrileneNDug/L1003-MethylcholanthreneNDug/L1002-Methylnaphthalene130ug/L1002-MethylphenolNDug/L100	Famphur Fluoranthene	ND ND	ug/L ug/L 100	
HexachloroethaneNDug/L100HexachloropheneNDug/LHexachloropropeneNDug/L100Indeno(1,2,3-cd)pyreneNDug/L100IsophoroneNDug/L100IsosafroleNDug/L100MethapyrileneNDug/L1003-MethylcholanthreneNDug/L100Methyl methanesulfonateNDug/L1002-Methylnaphthalene130ug/L100Methyl parathionNDug/L1003/4-MethylphenolNDug/L100	Hexachlorobenzene Hexachlorobutadiene	ND ND	ug/L 100 ug/L 100	
Indeno(1,2,3-cd)pyreneNDug/L100IsophoroneNDug/L100IsosafroleNDug/L200MethapyrileneNDug/L1003-MethylcholanthreneNDug/L100Methyl methanesulfonateNDug/L1002-Methylnaphthalene130ug/L100Methyl parathionNDug/L1003/4-MethylphenolNDug/L100	Hexachloroethane Hexachlorophene	ND ND	ug/L 100 ug/L	
MethapyrileneNDug/L1003-MethylcholanthreneNDug/L100Methyl methanesulfonateNDug/L1002-Methylnaphthalene130ug/L100Methyl parathionNDug/L5002-MethylphenolNDug/L1003/4-MethylphenolNDug/L100	Indeno(1,2,3-cd)pyrene Isophorone	ND ND	ug/L 100 ug/L 100	
2-Methylnaphthalene130ug/L100Methyl parathionNDug/L5002-MethylphenolNDug/L1003/4-MethylphenolNDug/L100	Methapyrilene 3-Methylcholanthrene	ND ND	ug/L 100 ug/L 100	
3/4-Methylphenol ND ug/L 100	2-Methylnaphthalene Methyl parathion	130 ND	ug/L 100 ug/L 500	
	3/4-Methylphenol	ND	ug/L 100	

(continued on following page)

ND = Not detected NA = Not applicable

Reported By: Steven Francis

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Client Name: Giant Refining			
Client ID: 0W-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
			Reporting
Parameter	Result	Units	Limit
1,4-Naphthoquinone	ND	ug/L	100
1-Naphthylamine	ND	uq/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	100 100
2-Nitrophenol	. ND ND	ug/L	500
4-Nitrophenol 4-Nitroquinoline-1-oxide	ND	ug/L 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-		51	
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 Parathion	ND ND	ug/L	100 500
Pentachlorobenzene	ND	ug/L 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 Byriding	ND ND	ug/L	100 200
Pyridine Safrole	ND	ug/L ug/L	100
Sulfotepp	ND	ug/L	500
1,2,4,5-Tetrachloro-		uy/ L	500
benzene	ND	ug/L	100
2,3,4,6-Tetrachlorophenol	ND	ug/L	500
Thionazin	ND	ug/L	500

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ND = Not detected NA = Not applicable

Reported By: Steven Francis

A Corning Company

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 1,2,4-Trichlorobenzene 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol 0,0,0-Triethylphosphoro- thioate 1,3,5-Trinitrobenzene Ethyl methacrylate Methyl methacrylate	ND ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L	100 100 500 100 100 100 100 100
Surrogate	Recovery		
Nitrobenzene-d5 2-Fluorobiphenyl Terphenyl-d14 Phenol-d5 2-Fluorophenol 2,4,6-Tribromophenol	65 62 51 50 42 40	% % % %	   

ND = Not detected NA = Not applicable

Reported By: Steven Francis

E Enseco A Corning Company

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Client Name: Giant Refining Client ID: OW-17					
Lab ID: 012009-0002-SA					
Matrix: AQUEOUS	Sampled: 25 OCT		Received: 26		
Authorized: 26 OCT 90	Prepared: 28 OCT	90	Analyzed: 07	NUV 9	U
			Reporting		
Parameter	Result	Units	Limit		
Acenaphthene	ND	ug/L	500		
Acenaphthylene	ND	uq/L	500		
Acetophenone	ND	ug/L	500		
2-Acetylaminofluorene	ND	ug/L	5000		
4-Aminobiphenyl	ND	ug/L	500		
Aniline Anthracene	ND ND	ug/L	500 500		
Aramite	ND	ug/L 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	ND		500		
phenyl ether	ND ND	ug/L	500 500		
Butyl benzyl phthalate 2-sec-Butyl-4,6-dinitro-	NU	ug/L	500		
phenol	ND	ug/L	500		
4-Chloroaniline	ND	ug/L	500		
bis(2-Chloroethoxy)-		57			
methane	ND	ug/L	500		
bis(2-Chloroethyl) ether	ND	ug/L	500		
bis(2-Chloroisopropyl)-	ND	um /1	500		
ether A Chlore 3 methylphonel	ND ND	ug/L	500 500		
4-Chloro-3-methylphenol 2-Chloronaphthalene	ND	ug/L ug/L	500		
2-Chlorophenol	ND	ug/L	500		
4-Chlorophenyl		49/ 2			
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 ND	ug/L	500 500		
1,3-Dichlorobenzene 1,4-Dichlorobenzene	ND	ug/L 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		

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ND = Not detected NA = Not applicable

Reported By: Donna Reinwald

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Approved By: Jeff Lowry

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#### Semivolatile Organics Appendix IX List Method 8270

Client Name: Giant Refining Client ID: OW-17			
Lab ID: 012009-0002-SA Matrix: AQUEOUS Authorized: 26 OCT 90	Sampled: 25 OCT 90 Prepared: 28 OCT 90		1: 26 OCT 90 1: 07 NOV 90
Parameter	Result		rting nit
Dimethoate p-Dimethylaminoazobenzene 7,12-Dimethylbenz(a)-	ND ND	wg/ =	00
anthracene 3,3'-Dimethylbenzidine a,a-Dimethylphenethyl-	ND ND		00 00
amine 2,4-Dimethylphenol Dimethyl phthalate	ND ND ND	ug/L 50	00 00 00
1,3-Dinitrobenzene 4,6-Dinitro-	ND	ug/L 50	00
2-methylphenol 2,4-Dinitrophenol 2,4-Dinitrotoluene	ND ND	ug/L 250 ug/L 50	00 00
2,6-Dinitrotoluene Di-n-octyl phthalate Diphenylamine	ND ND ND	ug/L 50 ug/L 50	00 00 00
Disulfoton bis(2-Ethylhexyl) phthalate	ND ND		00
Ethyl methanesulfonate Famphur Fluoranthene	ND ND ND	ug/L ug/L 50	20  20
Fluorene Hexachlorobenzene Hexachlorobutadiene	ND ND ND	ug/L 50 ug/L 50	00 00 00
Hexachlorocyclopentadiene Hexachloroethane Hexachlorophene	ND ND ND	ug/L 50	00 00 
Hexachloropropene Indeno(1,2,3-cd)pyrene Isophorone	ND ND ND	ug/L 50 ug/L 50	00 00 00
Isosafrole Methapyrilene 3-Methylcholanthrene	ND ND ND	ug/L 100 ug/L 50	
Methyl methanesulfonate 2-Methylnaphthalene Methyl parathion	ND 2400 ND	ug/L 50	00 00
2-Methylphenol 3/4-Methylphenol Naphthalene	ND ND 1700	ug/L 50 ug/L 50	00 00 00
maphonarono	1,00		

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ND = Not detected NA = Not applicable

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Reported By: Donna Reinwald

Enseco A Corning Company

Client Name: Giant Refining Client ID: OW-17 Lab ID: 012009-0002-SA Matrix: AQUEOUS Authorized: 26 OCT 90	Sampled: 25 OCT 90 Prepared: 28 OCT 90	Received: 26 OCT 90 Analyzed: 07 NOV 90
Parameter	Result U	Reporting nits Limit
1,4-Naphthoquinone 1-Naphthylamine 2-Naphthylamine 2-Nitroaniline 3-Nitroaniline 4-Nitroaniline Nitrobenzene 2-Nitrophenol 4-Nitrophenol 4-Nitroguinoline-1-oxide N-Nitroso-di-n-butylamine N-Nitrosodiethylamine N-Nitrosodiethylamine N-Nitrosodiphenylamine N-Nitrosodi-n-propylamine N-Nitrosomethylethylamine N-Nitrosomethylethylamine N-Nitrosopiperidine N-Nitrosopiperidine 5-Nitro-o-toluidine Parathion Pentachlorobenzene Pentachlorobenzene Pentachlorophenol Phenacetin Phenanthrene Phenol 4-Phenylenediamine Phorate 2-Picoline Pronamide Pyrene Pyridine Safrole		g/L       500 $g/L$ 500 $g/L$ 2500 $g/L$ 2500 $g/L$ 2500 $g/L$ 2500 $g/L$ 500 $g/L$
Sulfotepp 1,2,4,5-Tetrachloro- benzene 2,3,4,6-Tetrachlorophenol Thionazin	ND u ND u ND u	g/L 2500 g/L 500 g/L 2500 g/L 2500

(continued on following page)

ND = Not detected NA = Not applicable

Reported By: Donna Reinwald

A Corning Company

Client Name: Giant Refining Client ID: OW-17 Lab ID: O12009-0002-SA Matrix: AQUEOUS Authorized: 26 OCT 90	Sampled: 25 OCT 90 Prepared: 28 OCT 90	Received: 26 OCT 90 Analyzed: 07 NOV 90
Parameter	Result	Reporting Units Limit
2-Toluidine 1,2,4-Trichlorobenzene 2,4,5-Trichlorophenol 0,0,0-Triethylphosphoro- thioate	ND ND	ug/L 500 ug/L 500 ug/L 2500 ug/L 500
2,4,6-Trichlorophenol 1,3,5-Trinitrobenzene Ethyl methacrylate Methyl methacrylate	ND ND ND	ug/L 500 ug/L 500 ug/L 500 ug/L 500 ug/L 500
Surrogate	Recovery	
Nitrobenzene-d5 2-Fluorobiphenyl Terphenyl-d14 Phenol-d5 2-Fluorophenol 2,4,6-Tribromophenol	ND ND ND ND	% % % % %

ND = Not detected NA = Not applicable

Reported By: Donna Reinwald

A Corning Company

# Halogenated Volatile Organics

.Method 8010

Client Name: Giant Refining Client ID: OW-26			
Lab ID: 012009-0001-SA Matrix: AQUEOUS Authorized: 26 OCT 90	Sampled: 25 OCT 90 Prepared: NA		Received: 26 OCT 90 Analyzed: 01 NOV 90
Parameter	Result	Units	Reporting Limit
Chloromethane Bromomethane Vinyl chloride Chloroethane Methylene chloride 1,1-Dichloroethene 1,1-Dichloroethane trans-1,2-Dichloroethene Chloroform 1,1,2 Trichloro-1,2,2-	ND ND ND ND ND 1.1 ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	5.0 5.0 1.0 5.0 5.0 0.50 0.50 0.50 0.50
trifluoroethane 1,2-Dichloroethane 1,1,1-Trichloroethane Carbon tetrachloride Bromodichloromethane 1,2-Dichloropropane trans-1,3-Dichloropropene Trichloroethene Dibromochloromethane cis-1,3-Dichloropropene 1,1,2-Trichloroethane EDB (1,2-Dibromoethane) Bromoform 1,1,2,2-Tetrachloroethane Tetrachloroethene Chlorobenzene	ND 26 ND ND ND ND ND ND ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	1.0 1.0 0.50 0.50 1.0 1.0 1.0 2.0 1.0 2.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 5.0 1.0 2.0 5.0 1.0 5.0 1.0 2.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 1.0 5.0 2.0 5.0 2.0 5.0 2.0 5.0 2.0 5.0 2.0 5.0 2.0 5.0 2.0 5.0 2.0 5.0 2.0 5.0 2.0 5.0 2.0 5.0 2.0 5.0 2.0 5.0 2.0 5.0 2.0 5.0 2.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5
Surrogate	Recovery		
Bromochloromethane	121	%	

ND = Not detected NA = Not applicable

Reported By: Garth Atkins

^{*}Enseco A Corning Company

# Halogenated Volatile Organics

Method 8010

Client ID·	Giant Refining OW-17 012009-0002-SA				·· . 	
Matrix: Authorized:	AQUEOUS 26 OCT 90	Sampled: Prepared:	25 OCT 90 NA		Received: 26 Analyzed: 01	
Parameter		I	Result	Units	Reporting Limit	
Chloromethane Bromomethane Vinyl chlorid Chloroethane Methylene ch 1,1-Dichlorod trans-1,2-Dic Chloroform 1,1,2 Trichlo trifluord 1,2-Dichlorod 1,1,1-Trichlo Carbon tetrad Bromodichloro	de loride ethene ethane chloroethene oro-1,2,2- oethane ethane oroethane chloride omethane		ND ND ND ND ND ND ND ND 110 ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	120 120 25 120 120 12 12 12 12 12 12 25 25 12 12 12 25	
Trichloroethe Dibromochloro cis-1,3-Dich 1,1,2-Trichlo EDB (1,2-Dibu Bromoform	chloropropene ene omethane loropropene oroethane romoethane) achloroethane thene		ND ND ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	25 25 12 25 50 25 50 120 25 12 50	
Surrogate		ł	Recovery			
Bromochlorom	ethane		127	%		

ND = Not detected NA = Not applicable

Reported By: Garth Atkins

#Enseco A Corning Company

# Halogenated Volatile Organics

Method 8010

Client Name: Giant Refining Client ID: Trip Blank Lab ID: 012009-0004-SA Matrix: AQUEOUS Authorized: 26 OCT 90	Sampled: Unknown Prepared: NA		eceived: 26 OCT 90 nalyzed: 02 NOV 90
Parameter	Result	Units	Reporting Limit
Chloromethane Bromomethane Vinyl chloride Chloroethane Methylene chloride 1,1-Dichloroethene 1,1-Dichloroethane trans-1,2-Dichloroethene Chloroform	ND ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	5.0 5.0 1.0 5.0 5.0 0.50 0.50 0.50 0.50
<pre>1,1,2 Trichloro-1,2,2- trifluoroethane 1,2-Dichloroethane 1,1,1-Trichloroethane Carbon tetrachloride Bromodichloromethane 1,2-Dichloropropane trans-1,3-Dichloropropene Trichloroethene Dibromochloromethane cis-1,3-Dichloropropene 1,1,2-Trichloroethane EDB (1,2-Dibromoethane) Bromoform 1,1,2,2-Tetrachloroethane Tetrachloroethene Chlorobenzene</pre>	ND ND ND ND ND ND ND ND ND ND ND ND ND N	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	1.0 1.0 0.50 0.50 1.0 1.0 1.0 2.0 1.0 2.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 2.0 5.0 1.0 5.0 1.0 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5
Surrogate	Recovery		
Bromochloromethane	123	%	

ND = Not detected NA = Not applicable

Reported By: Garth Atkins

# Aromatic Volatile Organics

A Corning Company

Method 8020

Client Name: Giant Refining Client ID: OW-26 Lab ID: 012009-0001-SA Matrix: AQUEOUS Authorized: 26 OCT 90	Sampled: 25 OCT 90 Prepared: NA	Received: 26 OCT 90 Analyzed: 31 OCT 90
Parameter	Result U	Reporting nits Limit
Benzene Toluene Chlorobenzene Ethylbenzene Xylenes (total) 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichlorobenzene	2200 u ND u 970 u 6100 u ND u ND u	g/L       120         g/L       120
Surrogate	Recovery	
a,a,a-Trifluorotoluene	101 %	

ND = Not detected NA = Not applicable Reported By: Garth Atkins

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# Aromatic Volatile Organics

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Method 8020

Client Name: Client ID: Lab ID: Matrix: Authorized:	Giant Refining OW-17 012009-0002-SA AQUEOUS 26 OCT 90	Sampled: Prepared:	25 OCT 90 NA		Received: Analyzed:		
Parameter			Result	Units	Reporti Limit		
Benzene Toluene Chlorobenzene Ethylbenzene Xylenes (tot: 1,3-Dichlorol 1,4-Dichlorol 1,2-Dichlorol	al) benzene benzene		3100 5200 ND 920 5900 ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L	120 120 120 120 120 120 120 120		
Surrogate			Recovery				
a,a,a-Triflu	orotoluene		100	%			

ND = Not detected NA = Not applicable Reported By: Garth Atkins

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# Metals

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# Dissolved Metals

Client Name: Client ID: Lab ID: Matrix: Authorized:	Giant Refining OW-26 012009-0001-SA AQUEOUS 26 OCT 90		ed: 25 OCT 9 ed: See Belo		ved: 26 OCT 9 zed: See Belo	
Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic Barium Cadmium Calcium Chromium Lead Manganese Selenium Silver Sodium	0.011 2.3 ND 61.4 ND 1.5 ND ND 252	mg/l mg/l mg/l mg/l mg/l mg/l mg/l mg/l	$\begin{array}{c} 0.0050\\ 0.010\\ 0.0050\\ 0.20\\ 0.010\\ 0.0050\\ 0.010\\ 0.050\\ 0.010\\ 5.0\\ \end{array}$	7060 6010 6010 6010 7421 6010 7740 6010 6010	NA NA NA NA NA NA NA NA	03 JAN 91 03 JAN 91

ND = Not detected NA = Not applicable

Reported By: Sandra Jones

Enseco A Corning Company

# Metals

# Dissolved Metals

Client Name: Client ID: Lab ID: Matrix: Authorized:	Giant Refining OW-17 012009-0002-SA AQUEOUS 26 OCT 90		ed: 25 OCT 9 ed: See Belo		ved: 26 OCT 9 zed: See Belo	
Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Arsenic Barium Cadmium Calcium Chromium Lead Manganese Selenium Silver Sodium	ND 1.7 ND 143 ND 0.046 5.8 ND ND 319	mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L	0.0050 0.010 0.0050 0.20 0.010 0.025 0.010 0.050 0.010 5.0	7060 6010 6010 6010 7421 6010 7740 6010 6010	NA NA NA NA NA NA NA NA	03 JAN 91 03 JAN 91

ND = Not detected NA = Not applicable

Reported By: Sandra Jones

A Corning Company

## General Inorganics

.

Client Name: Giant Client ID: OW-26 Lab ID: 01200 Matrix: AQUE0 Authorized: 26 OC	9-0001-SA US	Sampled Prepared	: 25 OCT 9 : See Belo	0 Receiv w Analyz	ed: 26 OCT 9 ed: See Belo	
Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Alkalinity, Bicarb CaCO3 at pH 4. Alkalinity, Carb. CaCO3 at pH 8.	5 592 as 3 ND	mg/L mg/L	5.0 5.0	310.1 310.1	NA NA	26 OCT 90 26 OCT 90
pH Phenolics Sulfate	7.4 0.015 ND	mg/L units mg/L mg/L	3.0 0.010 5.0	300.0 9040 9065 300.0	NA NA NA NA	07 NOV 90 26 OCT 90 18 NOV 90 07 NOV 90
at 25 deg.C Total Dissolved	1490	umhos/cm ma/l	1.0	120.1 160_1	NA NA	26 OCT 90
CaCO3 at pH 4. Alkalinity, Carb. CaCO3 at pH 8. Chloride pH Phenolics Sulfate Specific Conductan at 25 deg.C	5 592 as 156 7.4 0.015 ND ce	mg/L mg/L units mg/L mg/L	5.0 3.0 0.010 5.0	310.1 300.0 9040 9065 300.0	NA NA NA NA NA	26 OCT 90 07 NOV 90 26 OCT 90 18 NOV 90 07 NOV 90

ND = Not detected NA = Not applicable

Reported By: Tammy Bailey

General Inorganics

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Client Name: Giant Client ID: OW-17 Lab ID: 01200 Matrix: AQUE0 Authorized: 26 OC	9-0002-SA JS		: 25 OCT 9 : See Belo		ved: 26 OCT 9 ed: See Belo	
Parameter	Result	Units	Reporting Limit	Analytical Method	Prepared Date	Analyzed Date
Alkalinity, Bicarb CaCO3 at pH 4. Alkalinity, Carb.	5 369	mg/L	5.0	310.1	NA	26 OCT 90
CaCO3 at pH 8.3 Chloride pH Phenolics Sulfate Specific Conductan	3 ND 642 7.1 0.057 6.9	mg/L mg/L units mg/L mg/L	5.0 15.0  0.010 5.0	310.1 300.0 9040 9065 300.0	NA NA NA NA	26 OCT 90 07 NOV 90 26 OCT 90 21 NOV 90 07 NOV 90
at 25 deg.C Total Dissolved Solids	2510 1420	umhos/cm mg/L	1.0 10.0	120.1 160.1	NA NA	26 OCT 90 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.

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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.

$$% \text{ Recovery} = \frac{\text{Measured Concentration}}{\text{Actual Concentration}} X 100$$
Precision for DCS is measured by Relative Percent Difference (RPD).
$$RPD = \frac{| \text{ Measured Concentration DCS1 - Measured Concentration DCS2 }|}{(\text{Measured Concentration DCS1 + Measured Concentration DCS2})/2} X 100$$

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

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## OC 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

MPLE REPORT

DUPLICATE CONTROL SAMPLE REPORT Semivolatile Organics by GC/MS

Analyte	Con Spiked	centratior DCS1	Measured DCS2	AVG		uracy age(%) Limits	Precis (RPD) DCS Li	
Category: 625-A Matrix: AQUEOUS QC Lot: 28 OCT 90-A Concentration Units: ug/L		0031	DUSL					
Phenol∽ 2-Chlorophenol 1,4-Dichlorobenzene N-Nitroso-di-	100 100 50	68.0 88.1 30.0	75.0 82.7 28.1	71.5 85.4 29.0	72 85 58	12- 89 27-123 36- 97	9.8 6.3 6.5	42 40 28
n-propylamine 1,2,4-Trichlorobenzene 4-Chloro-3-methylphenol Acenaphthene 4-Nitrophenol 2,4-Dinitrotoluene Pentachlorophenol Pyrene	50 50 100 50 100 50 100 50	42.9 30.7 75.9 34.3 66.9 43.1 45.5 34.9	43.7 29.0 77.0 34.3 60.8 36.4 51.9 30.7	43.3 29.8 76.4 34.3 63.8 39.8 48.7 32.8	87 60 76 69 64 80 49 66	41-116 39- 98 23- 97 46-118 10- 80 24- 96 9-103 26-127	1.8 5.7 1.4 0.0 9.6 17 13 13	38 28 31 50 38 50 31
Category: 625-A Matrix: AQUEOUS QC Lot: 28 OCT 90-B Concentration Units: ug/L								
Phenol 2-Chlorophenol 1,4-Dichlorobenzene N-Nitroso-di-	100 100 50	69.7 77.1 23.4	69.7 78.5 25.4	69.7 77.8 24.4	70 78 49	12- 89 27-123 36- 97	0.0 1.8 8.2	42 40 28
n-propylamine 1,2,4-Trichlorobenzene 4-Chloro-3-methylphenol Acenaphthene 4-Nitrophenol 2,4-Dinitrotoluene Pentachlorophenol Pyrene	50 50 100 50 100 50 100 50	37.2 25.3 76.2 30.3 64.4 34.9 45.4 33.2	40.1 26.2 75.9 33.2 55.6 36.0 40.3 35.0	38.6 25.8 76.0 31.8 60.0 35.4 42.8 34.1	77 52 76 64 60 71 43 68	41-116 39- 98 23- 97 46-118 10- 80 24- 96 9-103 26-127	7.5 3.5 0.4 9.1 15 3.1 12 5.3	38 28 42 31 50 38 50 31

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

SINGLE CONTROL SAMPLE REPORT Semivolatile Organics by GC/MS

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

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

METHOD BLANK REPORT Semivolatile Organics by GC/MS

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Result	Units	Reporting Limit
3 OCT 90-A		
ND ND ND ND ND ND ND ND ND ND ND ND ND N	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	10 10 10 100 10 10 10 10 10 10 10 10 10
ND ND	ug/L ug/L	10 10
ND ND	ug/L ug/L	10 10
ND ND	ug/L ug/L	10 10
ND ND ND ND	ug/L ug/L ug/L ug/L	10 10 10 10
ND ND ND ND ND ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	10 10 10 10 10 10 10 10 20 10 10
	B OCT 90-A	3 OCT 90-A           ND         ug/L           ND         ug/L

Enseco A Coming Company 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		
Dimethoate p-Dimethylaminoazobenzene 7,12-Dimethylbenz(a)-	ND ND	ug/L ug/L	10
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		10
1,3-Dinitrobenzene	ND	ug/L ug/L	10
4,6-Dinitro-	ND	uy/ L	10
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	ĩŏ
Di-n-octyl phthalate	ND	ug/L	10
Diphenylamine	ND	ug/L	10
Disulfoton	ND	ug/L	50
bis(2-Ethylhexyl)		57	
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 ND	ug/L	10 10
Naphthalene	ND	ug/L	10

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: 2	8 OCT 90-A		
1,4-Naphthoquinone 1-Naphthylamine 2-Naphthylamine 2-Nitroaniline 3-Nitroaniline 4-Nitroaniline 2-Nitrophenol 4-Nitrophenol 4-Nitrophenol N-Nitroso-di-n-butylamine N-Nitrosodiethylamine N-Nitrosodimethylamine N-Nitrosodimethylamine N-Nitrosodiphenylamine	ND ND ND ND ND ND ND ND ND ND ND ND ND N	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	10 10 50 50 10 10 10 10 10 10
N-Nitroso-di- n-propylamine N-Nitrosomethylethylamine N-Nitrosomorpholine N-Nitrosopyrrolidine 5-Nitro-o-toluidine Parathion Pentachlorobenzene Pentachloroethane Pentachloronitrobenzene Pentachlorophenol Phenacetin Phenanthrene Phenol 4-Phenylenediamine Phorate 2-Picoline Pronamide Pyrene	ND ND ND ND ND ND ND ND ND ND ND ND ND N	ug/l ug/l ug/l ug/l ug/l ug/l ug/l ug/l	10 10 10 10 10 10 50 10 10 50 10 10 10 10 10 10
Pyridine Safrole Sulfotepp 1,2,4,5-Tetrachloro- benzene 2,3,4,6-Tetrachlorophenol Thionazin	ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L	20 10 50 10 50 50

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METHOD_BLANK REPORT Semivolatile Organics by GC/MS (cont.)

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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 1,2,4-Trichlorobenzene 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol 0,0,0-Triethylphosphoro-	ND ND ND ND	ug/L ug/L ug/L ug/L	10 10 50 10
thioate 1,3,5-Trinitrobenzene Ethyl methacrylate Methyl methacrylate	ND ND ND ND	ug/L ug/L ug/L ug/L	10 10 10 10
Test: 8270CP-REF-A Matrix: AQUEOUS QC Lot: 28 OCT 90-B QC Run: 28	OCT 90-B		
Benzo(a)anthracene Benzo(b)fluoranthene Benzo(a)pyrene Chrysene 7,12-Dimethylbenz(a)-	ND ND ND ND	ug/L ug/L ug/L ug/L	10 10 10 10
anthracene Dimethyl phthalate bis(2-Ethylhexyl)	ND ND	ug/L ug/L	10 10
phthalate Fluoranthene 1-Methylnaphthalene 2-Methylphenol 3/4-Methylphenol Naphthalene Phenanthrene Pyrene 2,4,6-Trichlorophenol 2-Chlorophenol	ND ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	10 10 10 10 10 10 10 10 10



## 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 012009-0001-SA 012009-0002-SA 012009-0002-SA 012009-0002-SA 012009-0004-SA	AQUEOUS AQUEOUS AQUEOUS AQUEOUS AQUEOUS AQUEOUS	602-A 601-A 602-A 601-A 601-A	30 OCT 90-P 01 NOV 90-H 30 OCT 90-P 01 NOV 90-H 01 NOV 90-H	30 OCT 90-P 01 NOV 90-H 30 OCT 90-P 01 NOV 90-H 01 NOV 90-H

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## DUPLICATE CONTROL SAMPLE REPORT Volatile Organics by GC

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

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

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: Concentration Units: ug/L	30 OCT 90-P	
a,a,a-Trifluorotoluene	30.0 30.0	100 20-160
Category: 601-A Matrix: AQUEOUS QC Lot: 01 NOV 90-H QC Run: Concentration Units: ug/L	01 NOV 90-H	
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 Toluene Chlorobenzene Ethylbenzene Xylenes (total) 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1,2-Dichlorobenzene	ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L	$\begin{array}{c} 0.50 \\ 0.50 \\ 0.50 \\ 0.50 \\ 0.50 \\ 0.50 \\ 0.50 \\ 0.50 \\ 0.50 \\ 0.50 \end{array}$
Test: 601-A Matrix: AQUEOUS QC Lot: 01 NOV 90-H QC Run:	01 NOV 90-H		
Chloromethane Bromomethane Vinyl chloride Chloroethane Methylene chloride 1,1-Dichloroethene 1,1-Dichloroethane trans-1,2-Dichloroethene Chloroform	ND ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	5.0 5.0 1.0 5.0 5.0 0.50 0.50 0.50 0.50
<pre>1,1,2 Trichloro-1,2,2- trifluoroethane 1,2-Dichloroethane 1,1.1-Trichloroethane Carbon tetrachloride Bromodichloromethane 1,2-Dichloropropane trans-1,3-Dichloropropene Trichloroethene Dibromochloromethane cis-1,3-Dichloropropene 1,1,2-Trichloroethane EDB (1 2-Dibromoethane)</pre>	ND ND ND ND ND ND ND ND ND ND ND ND	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	1.0 1.0 0.50 0.50 1.0 1.0 1.0 0.50 1.0 2.0 1.0 2.0
EDB (1,2-Dibromoethane) Bromoform 1,1,2,2-Tetrachloroethane Tetrachloroethene Chlorobenzene	ND ND ND ND	ug/L ug/L ug/L ug/L ug/L	2.0 5.0 1.0 0.50 2.0

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METHOD BLANK REPORT Volatile Organics by GC (cont.)

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Analyte	Result	Units	Reporting Limit
Test: 601-A Matrix: AQUEOUS QC Lot: 01 NOV 90-H QC Run:	01 NOV 90-H		
Chloromethane Bromomethane Vinyl chloride Chloroethane Methylene chloride 1,1-Dichloroethene 1,1-Dichloroethane trans-1,2-Dichloroethene Chloroform 1,1,2 Trichloro-1,2,2- trifluoroethane 1,2-Dichloroethane 1,1,1-Trichloroethane 1,2-Dichloropethane 1,2-Dichloropropane trans-1,3-Dichloropropene Trichloroethene Dibromochloromethane cis-1,3-Dichloropropene 1,1,2-Trichloroethane EDB (1,2-Dibromoethane) Bromoform 1,1,2,2-Tetrachloroethane Tetrachloroethene Chlorobenzene	ND ND ND ND ND ND ND ND ND ND ND ND ND N	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L	$\begin{array}{c} 5.0\\ 5.0\\ 1.0\\ 5.0\\ 0.50\\ 0.50\\ 0.50\\ 0.50\\ 1.0\\ 1.0\\ 1.0\\ 1.0\\ 1.0\\ 1.0\\ 1.0\\ 1.$

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# QC LOT ASSIGNMENT REPORT Metals Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
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	AÒUEOUS	ICP-AD	03 JAN 91-A	-
012009-0002-SA	AÒUEOUS	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	-



## DUPLICATE CONTROL SAMPLE REPORT Metals Analysis and Preparation

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Analyte		Cor Spiked	ncentratio	n Measured		Acc	uracy age(%)	Precis (RPD)	
		opined	DCS1	DCS2	AVG	DCS	Limits	DCS L	
Category: ICP-AD Matrix: AQUEOUS QC Lot: O3 JAN 91-A Concentration Units:	mg/L								
Aluminum Antimony Arsenic Barium Beryllium Cadmium Calcium Chromium Cobalt Copper Iron Lead Magnesium Manganese Nickel Potassium Silver Sodium Vanadium Zinc		$\begin{array}{c} 2.0\\ 0.5\\ 0.5\\ 2.0\\ 0.05\\ 0.05\\ 100\\ 0.25\\ 1.0\\ 0.5\\ 0.5\\ 0.5\\ 0.5\\ 0.5\\ 0.5\\ 0.5\\ 0$	1.95 0.433 0.447 1.75 0.0456 0.0410 94.1 0.177 0.441 0.234 0.921 0.443 47.7 0.448 0.452 48.8 0.0454 97.6 0.438	$\begin{array}{c} 2.03\\ 0.430\\ 0.461\\ 1.78\\ 0.0460\\ 0.0436\\ 95.0\\ 0.183\\ 0.445\\ 0.235\\ 0.931\\ 0.458\\ 48.0\\ 0.451\\ 0.451\\ 0.457\\ 47.8\\ 0.0441\\ 96.0\\ 0.443\end{array}$	1.99 0.431 0.454 1.76 0.0458 0.0423 94.6 0.180 0.443 0.235 0.926 0.450 47.9 0.450 0.455 48.3 0.0448 96.8 0.457 0.440	99 86 91 88 92 85 90 89 94 90 90 91 97 90 91 88	75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125 75-125	4.0 0.7 3.1 0.9 6.9 0.3 0.3 0.3 0.3 0.3 0.3 0.9 9 1.9 2.9 0.3 1.0 2.9 0.3 1.0 2.9 0.3 1.0 2.9 0.1 1.0 0.1 1.0 0.1 1.0 0.1 0.1 0.1 0.1	20 20 20 20 20 20 20 20 20 20 20 20 20 2
Category: AS-FAA-AD Matrix: AQUEOUS QC Lot: O3 JAN 90-D Concentration Units: Arsenic	mg/L	0.04	0.0355	0.0375	0.0365	91	75-125	5.5	20
Category: PB-FAA-AD Matrix: AQUEOUS QC Lot: O3 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.

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

•	Co	Concentration				uracy	Precision	
Analyte	Spiked	DCS1	Measured DCS2	AVG		rage(%) Limits	(RPD DCS L	)
Category: SE-FAA-AD Matrix: AQUEOUS QC Lot: O3 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.

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# QC LOT ASSIGNMENT REPORT Wet Chemistry Analysis and Preparation

Laboratory Sample Number	QC Matrix	QC Category	QC Lot Number (DCS)	QC Run Number (SCS/BLANK)
012009-0001-SA 012009-0001-SA 012009-0001-SA 012009-0001-SA 012009-0001-SA 012009-0001-SA 012009-0002-SA 012009-0002-SA 012009-0002-SA 012009-0002-SA 012009-0002-SA	AQUEOUS AQUEOUS AQUEOUS AQUEOUS AQUEOUS AQUEOUS AQUEOUS AQUEOUS AQUEOUS AQUEOUS AQUEOUS AQUEOUS AQUEOUS AQUEOUS	PH-A COND-A ALK-A CL-IC-A SO4-IC-A PHEN-A TDS-A PH-A COND-A ALK-A CL-IC-A SO4-IC-A PHEN-A TDS-A	26 OCT 90-A 26 OCT 90-A 26 OCT 90-A 07 NOV 90-M 07 NOV 90-M 16 NOV 90-A 30 OCT 90-A 26 OCT 90-A 26 OCT 90-A 26 OCT 90-A 07 NOV 90-M 07 NOV 90-M 20 NOV 90-A 30 OCT 90-B	- - - - - - - - - - - - - - - - - - -

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## DUPLICATE CONTROL SAMPLE REPORT Wet Chemistry Analysis and Preparation

Analyte		Conc Spiked	entratior DCS1	Measured DCS2	AVG		uracy age(%) Limits	Precis (RPD) DCS Li	
Category: PH-A Matrix: AQUEOUS QC Lot: 26 OCT 90-A Concentration Units:	units								
рН		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: O7 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.

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

Analyte		Con Spiked	centratio DCS1	n Measured DCS2	AVG		curacy age(%) Limits	Preci (RPD DCS L	)
Category: PHEN-A Matrix: AQUEOUS QC Lot: 16 NOV 90-A Concentration Units:	mg/L								1
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								i
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.

METHOD BLANK REPORT Wet Chemistry Analysis and Preparation

Analyte		Res	ult	Units	Reporting Limit
Test: PHEN-SPEC-A Matrix: AQUEOUS QC Lot: 16 NOV 90-A Phenolics	QC Run:	16 NOV 90-A	ND	mg/L	0.010
Test: TDS-BAL-A				ing/ L	0.010
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

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		<b>Enseco</b>	Rocky Mountain Analytical Laboratory 4955 Yarrow Street Arvada, CO 80002	aboratory
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