TEST PROGRAM

COMPLIANCE EMISSION TEST PROGRAM
CHLOROSORB SYSTEM

THE PREMCOR REFINING GROUP, INC.
PORT ARTHUR, TEXAS

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Hand Delivered
SEP 02 2005

faxed & Copy
SEP 28 2005

ARI PROJECT NO. H629-137
ARI PROPOSAL NO. H629-118
PREMCOR REFINING PO. NO. A306766
JUNE 29, 2005 TEST PROGRAM

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SECTIONONE Introduction and Summary

ARI Environmental Inc. (ARI) conducted a formal compliance emission test program at Premcor Refining (Premcor) located in Port Arthur, Texas. The compliance test program was conducted at the inlet and outlet of the Chlorosorb System.

Testing at the Chlorosorb System was conducted to determine the inlet and outlet concentrations of hydrogen chloride (HCL). Testing at the Chlorosorb outlet was also performed to determine the mass emission rate of Volatile Organic Compounds (VOC). The test program followed the regulatory requirements and sampling procedures as follows:

- **INLET** Title 40 of the Code of Federal Regulations (40 CFR), Part 60, 2004, Appendix A - USEPA Methods 1-4 and 26.
- **OUTLET** Title 40 of the Code of Federal Regulations (40 CFR), Part 60, 2004, Appendix A - USEPA Methods 1-4, 25A and 26.
- Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III - Stationary Source Specific Methods
- TCEQ Sampling Procedures Manual

Mr. Cameron Withers, Mr. James Wedemeier, and Mr. Joe Doby of ARI conducted the compliance test program. All testing activities were conducted June 29, 2005.

The results of the compliance test program are summarized below.

TABLE 1-1: SUMMARY OF RESULTS

Run Number	1	2	3	Average
Hydrogen Chloride (HCL)				
INLET				
ppmv db	1,412	1,416	1,285	1,371
lb/hr	0.5528	0.5546	0.4894	0.5323
OUTLET				
ppmv db	9.99	6.68	10.5	9.06
lb/hr	0.00383	0.00268	0.00419	0.00357
Removal Efficiency (%)	99.3	99.5	99.1	99.3
Volatile Organic Compounds (VOC)				
Concentration				
ppmv C_6 db @3% O_2	177.1	175.5	175.9	176.2

2.1 OVERVIEW

The testing was conducted during three (3) one-hour sampling runs on both the inlet and outlet of the scrubber in accordance with the following procedures:

- **INLET** Title 40 of the Code of Federal Regulations (40 CFR), Part 60, 2004, Appendix A - USEPA Methods 1-4, and 26.
- **OUTLET** Title 40 of the Code of Federal Regulations (40 CFR), Part 60, 2004, Appendix A - USEPA Methods 1-4, 25A and 26.
- Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III - Stationary Source Specific Methods
- TCEQ Sampling Procedures Manual

2.2 USEPA Method 1 - Sampling Location

Inlet and outlet sampling was conducted using the two (2) 3-inch diameter sampling ports provided. The inlet sampling port locations on the 4-inch diameter line were located greater than eight (8) duct diameters downstream and greater than two (2) duct diameters upstream from the nearest flow disturbances. The sampling point locations were determined following USEPA Method 1 procedures. Specifically, one (1) sample point was used on the inlet of the Chlorosorb System. See Figure 2-1.

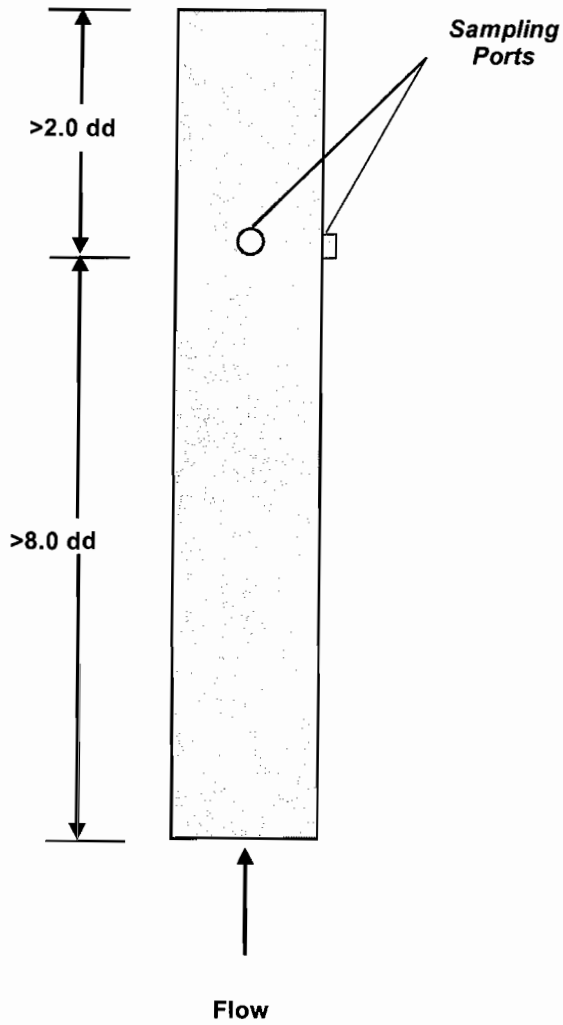
The inlet sampling port locations on the 4-inch diameter line were located greater than eight (8) duct diameters downstream and greater than two (2) duct diameters upstream from the nearest flow disturbances. The sampling point locations were determined following USEPA Method 1 procedures. Specifically, one (1) sample point was used on the outlet of the Chlorosorb System. See Figure 2-2.

2.3 USEPA Method 2 - Volumetric Flow Rate

Gas velocity and volumetric flow rate will be determined following USEPA Method 2 procedures. Velocity determinations will be performed using a Type S pitot tube. Temperature measurements will be conducted using a digital read-out meter and a Chromel-Alumel (Type K) thermocouple.

2.4 USEPA Method 3 and 3A - Molecular Weight

The stack gas oxygen (O_2) and carbon dioxide (CO_2) concentrations will be determined following USEPA Method 3 procedures. During each test run, an integrated bag sample of



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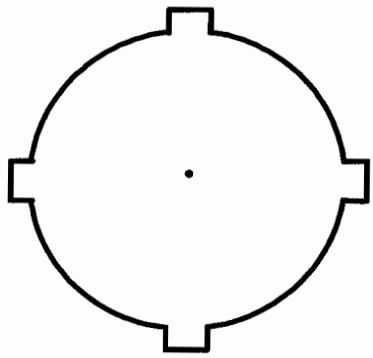
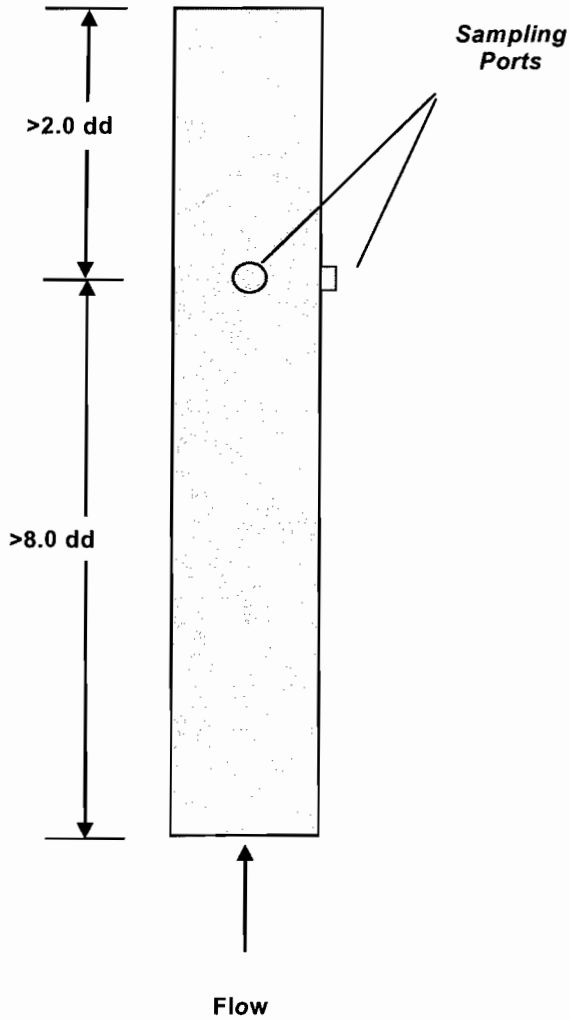


TRAVERSE POINTS: 1
NUMBER OF PORTS: 2
POINTS/PORT: 1
STACK ID: 4- in.
PORT LENGTH: 16-1/2 in.

TRAVERSE POINT NO.	DISTANCE FROM INSIDE WALL, in.
1	2-

Figure 2-1
Premcor Refining
Chlorsorb System Inlet
Stack Sampling Locations



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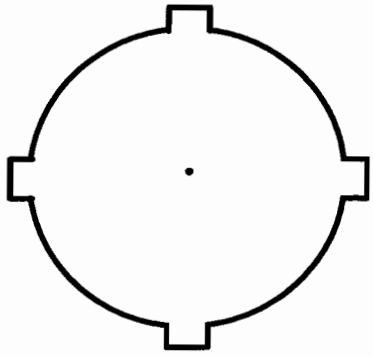


TRAVERSE POINTS: 1
NUMBER OF PORTS: 2
POINTS/PORT: 1
STACK ID: 4- in.
PORT LENGTH: 16-1/2 in.

TRAVERSE POINT NO.	DISTANCE FROM INSIDE WALL, in.
1	4-

Figure 2-2
Premcor Refining
Chlorsorb System Outlet
Stack Sampling Locations

the exhaust gases will be collected. An Orsat combustion analyzer will be used to determine the O_2 and CO_2 concentrations of each collected bag. At the Chlorosorb Outlet the molecular weight of the stack gas was calculated based on the concentrations of oxygen (O_2) and carbon dioxide (CO_2). Procedures described in USEPA Method 3A were used to measure the concentration of O_2 and CO_2.

2.5 USEPA METHOD 4 - MOISTURE CONTENT

Stack gas moisture content was determined following USEPA Method 4 procedures in conjunction with the USEPA Method M26/M26A sampling trains. See Figure 2-4.

2.6 USEPA METHOD 25A- VOLATILE ORGANIC COMPOUNDS

The determination of total volatile organic compounds (VOC) was conducted following USEPA Method 25A using a total hydrocarbon (THC) analyzer. The VIG Model 200 analyzer utilizes a continuous heated flame ionization detector and sample line that keeps the sample gas stream above the dew point.

As shown in Figure 2-4, the sampling system consisted of a stainless steel probe connected to a three-way calibration valve. The sample gases were transported through heated Teflon lines (>250° F) to the intake of the hydrocarbon analyzer.

Calibration gases were introduced at the three-way calibration valve located at the exit end of the sample probe. A pre-test and post-test system bias was performed using diluted propane in nitrogen standards of 300.0 ppm, 500.0 ppm and 850.0 ppm at an analyzer span of 1,000 ppm propane.

The results of the calibrations were within the ±5% of span for each calibration gas. The zero and upscale calibration gas drift values obtained after each run were within the ±3% of span allowed. The average zero and upscale calibration gas values obtained during each test run were used to correct the data for that test run.

Data was recorded and archived on ARI's data acquisition system consisting of a Molytek Model No. 3702 data recorder/logger linked to an IBM compatible computer for digital data archives and reduction.

2.7 USEPA METHOD 26- HYDROGEN CHLORIDE

Hydrogen chloride sampling on the inlet location was conducted following USEPA Method 26. As shown in Figure 2-3, the inlet and outlet sample gas was withdrawn from the stack location through a heated glass lined sample probe and heated Teflon filter followed by a series of chilled impingers.

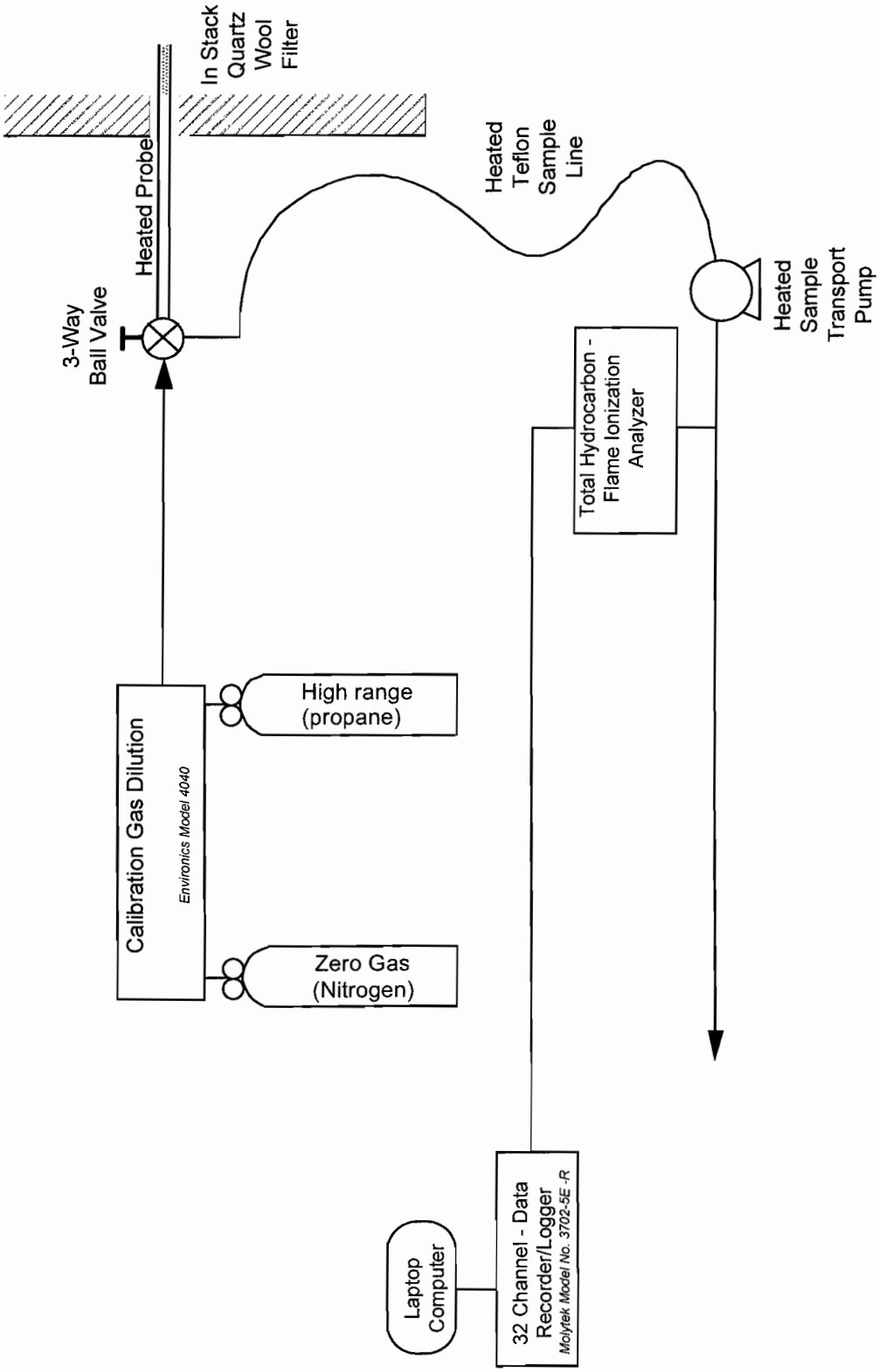


Figure 2-3. USEPA Method 25A - Total Volatile Organic Sampling System

The impinger trains consisted of five (5) impingers with the first and second impingers of the Greenburg-Smith design and the remaining impingers modified by replacing the tip with a 1/2-inch I.D. glass tube extending to 1/2 inch from the bottom of the flask. Impingers 1 and 2 contained 100ml of 0.1N Sulfuric Acid, which absorbed Hydrogen Chloride. Impingers 3 and 4 each contained 100ml of 0.1N Sodium Hydroxide, which absorbed chlorine from the stack gas. Impinger 5 contained approximately 200 grams (g) of silica gel.

After each inlet and outlet sample run, the impinger train ice bath was drained and each impinger and its contents were measured for moisture gain. The contents of each impinger were placed in an individual sample container. Each impinger along with the connecting glassware was washed with deionized water. The washings were placed in the corresponding sample container. The contents of impinger 5 were discarded after weighing.

At ARI's laboratory, the contents of each sample bottle were analyzed by ion chromatography (IC) to determine the concentration of the Hydrogen Chloride.

2.8 USEPA METHOD 205 - GAS DILUTION SYSTEM VERIFICATION

All diluted calibration standards were prepared using an Environics Model 4040 Dilution System that was verified by a field evaluation at the job site prior to testing following the requirements of USEPA Method 205.

ARI's California Analytical Model 100 NDIR CO_2 gas analyzer was calibrated following USEPA Method 3A procedures. After the calibration procedure was complete, diluted standards of 7.5% and 12.0% and a mid-range EPA Protocol 1 standard of 7.55% were alternately introduced in triplicate and an average instrument response was calculated for each standard. No single response differed by more than $\pm$2% from the average response for each standard. The difference between the instrument average and the predicted concentration was less than $\pm$2% for each diluted standard. The difference between the certified gas concentration and the average instrument response for the mid-range EPA Protocol 1 standard was less than $\pm$2%.

Complete documentation of the USEPA Method 205 Dilution System Verification is presented in Appendix E.

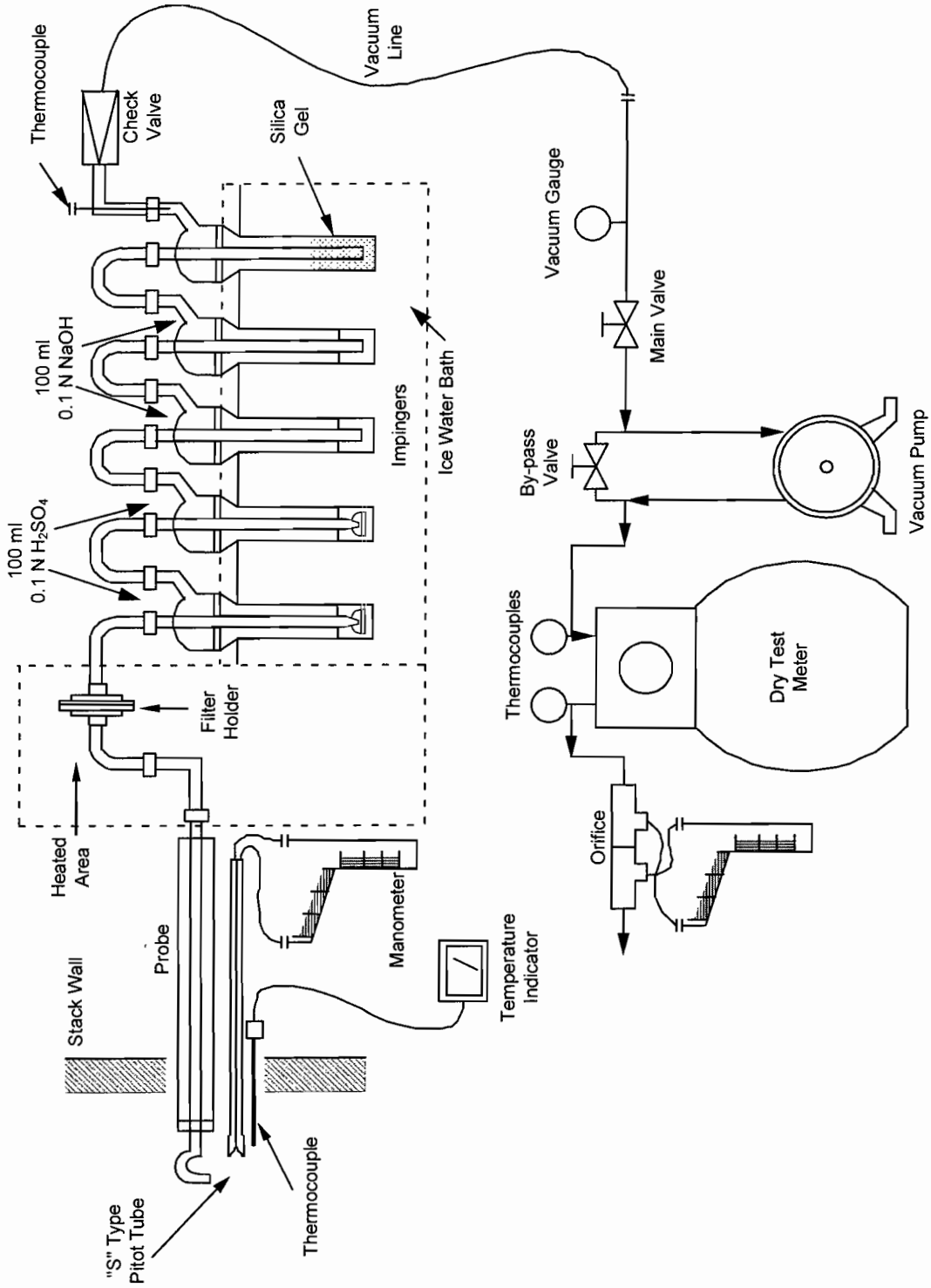


Figure 2-4. USEPA Method 26 Sampling Train

SECTIONTHREE Results

The results of the emission test program conducted on Chlorosorb System are presented in Table 3-1 and 3-2.

All computer printouts and example calculations are included in Appendix A. All field data are presented in Appendix B. Appendix C presents the laboratory data. Process operational data recorded during the test program is presented in Appendix D. ARI's Reference Method Monitoring Data is presented in Appendix E. Appendix F presents the calibration data for the equipment used during the compliance test program. Test personnel resumes are presented in Appendix G.

TABLE 3-1. CHLOROSORB SYSTEM INLET TEST RESULTS

Table : 3-1
Company : Premcor Refining – Port Arthur, Texas
Source : Chlorosorb System Inlet
Operators : J. Wedemeier, J. Doby, C. Withers

Test Run :	1	2	3	
Test Date :	6/29/05	6/29/05	6/29/05	
Test Time :	0822-0922	0937-1037	1048-1148	Average
PROCESS DATA				
Chloride on sorbent, % wt	0.87	0.89	0.88	0.88
Cooler Outlet Temp, °F	414.3	415.0	415.0	414.8
Platformer Charge, Mbpd	52.13	52.07	52.21	52.14
Naphfiner Charge, Mbpd	49.09	49.12	48.85	49.02
H_2 to HGS, gpm	0.68	0.68	0.68	0.68
Chloride on sorbent, % wt	0.87	0.89	0.88	0.88
STACK GAS PARAMETERS				
Temperature, av. °F	421.6	421.2	420.8	421.2
Velocity, av. ft/sec	23.06	23.01	22.42	22.83
Volume flow, acfm	121	120	117	119
Volume flow, scfh	4,377	4,370	4,261	4,336
Volume flow, dscfh	4,136	4,138	4,026	4,100
Moisture, av. % vol	5.5	5.3	5.5	5.4
CO_2, av. % vol, db	18.70	18.70	18.70	18.70
O_2, av. % vol, db	0.80	0.80	0.80	0.80
HYDROCHLORIC ACID (HCl)				
Concentration				
ppmv db	1,412	1,416	1,285	1371
lb/dscf x 10^{-6}	133.6	134.0	121.6	129.7
Emission rate				
lb/hr	0.5528	0.5546	0.4894	0.5323

TABLE 3-2. CHLOROSORB SYSTEM OUTLET TEST RESULTS

Table : 3-1
Company : Premcor Refining – Port Arthur, Texas
Source : Chlorosorb System Outlet
Operators : J. Wedemeier, J. Doby, C. Withers

Test Run :	1	2	3	
Test Date :	6/29/05	6/29/05	6/29/05	
Test Time :	0822-0922	0937-1037	1048-1148	Average
PROCESS DATA				
Chloride on sorbent, % wt	1.00	1.17	0.99	1.05
STACK GAS PARAMETERS				
Temperature, av. °F	338.3	326.3	328.3	331.0
Velocity, av. ft/sec	20.14	20.74	20.68	20.52
Volume flow, acfm	105	109	108	107
Volume flow, scfh	4,174	4,366	4,340	4,293
Volume flow, dscfh	4,049	4,246	4,217	4,171
Moisture, av. % vol	3.0	2.7	2.8	2.8
CO_2, av. % vol, db	18.61	18.64	18.62	18.62
O_2, av. % vol, db	0.15	0.15	0.15	0.15
HYDROCHLORIC ACID (HCl)				
Concentration				
ppmv db	9.99	6.68	10.5	9.06
lb/dscf x 10^{-6}	0.945	0.632	0.994	0.857
Emission rate				
lb/hr	0.00383	0.00268	0.00419	0.00357
% Destruction Efficiency	99.3	99.5	99.1	99.3
VOLATILE ORGANIC COMPOUNDS (VOC as C_1)				
Concentration				
ppmv wb	1,195	1,196	1,197	1,196
ppmv C_6 db @3% O_2	177.1	175.5	175.9	176.2
lb/dscf x 10^{-6}	37.21	37.26	37.29	37.25
Emission rate				
lb/hr	0.1553	0.1626	0.1618	0.1599

APPENDIX A Computer Printouts and Example Calculations

APPENDIX B

Field Data

APPENDIX C

Laboratory Data

APPENDIX D

Process Data

APPENDIX E

ARI Reference Method Data

APPENDIX F

Calibration Data

APPENDIX G Test Personnel Resumes

Example Calculations for CEMS Mass Emission Rate Data

1. Volume of dry gas sampled, corrected to standard conditions. Note: V_m must be corrected for leakage if any leakage rates exceed L_a.

$$V_{mstd} = \left(\frac{528}{29.92}\right) \times V_m \times \lambda \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m}\right]$$

2. Volume of water vapor at standard conditions, ft^3.

$$V_{wstd} = 0.04707 \times V_{lc}$$

3. Moisture content in stack gas.

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}}$$

4. Dry molecular weight of stack gas, lb/lb- mole.

$$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$$

5. Molecular weight of stack gas, lb/lb-mole.

$$M_s = M_d(1 - B_{ws}) + 18B_{ws}$$

6. Stack velocity at stack conditions, ft/s.

$$V_s = (85.49)(C_p)\left(avg\sqrt{\Delta P}\right)\sqrt{\frac{T_s}{(P_s)(M_s)}}$$

7. Stack gas volumetric flow rate at stack conditions, acfm. Note: $A_s = ft^2$.

$$Q_s = 60 \times V_s \times A_s$$

8. Dry stack gas volumetric flow rate at standard conditions, dscfm.

$$Q_{std} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)(1 - B_{ws})$$

9. Corrected effluent gas concentration.

$$C_{gas,ppm} = \left(\overline{C} - C_o\right)\frac{C_{ma}}{C_m - C_o}$$

10. CEMS data corrected from wet basis to dry basis

$$C_{cems,dry} = \left(\frac{C_{cems,wet}}{1 - B_{ws}}\right)$$

11. CEMS data corrected to an oxygen free basis (0% oxygen)

$$C_{cems@0\%O_2} = \left(C_{cems,dry}\right)\left(\frac{20.9}{20.9 - \%O_2}\right)$$

12. Pollutant concentration, parts per million to pounds per dry standard cubic foot

$$C_{gas,lb/dscf} = \left(C_{gas,ppm}\right)\left(\frac{MW}{385.26 \times 10^6 ft^3 / lb - mole}\right)$$

13. Mass emission rate, pounds per hour

$$pmr = \left(C_{gas,lb/dscf}\right)\left(Q_{std}\right)\left(60 min/ hour\right)$$

Nomenclature and Dimensions for CEMS Mass Emission Rate Data

B_{ws} = Proportion by volume of water vapor in the gas stream, dimensionless

C_{gas} = Effluent gas concentration, dry basis, ppmv

$\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppmv

$C_{cems,dry}$ = CEMS concentration on a dry basis, ppmv db

$C_{cems,wet}$ = CEMS actual concentration on a wet basis, ppmv wb

$C_{cems\ @\ 0\%\ O2}$ = CEMS concentration corrected to oxygen free basis (0% O2), ppmv

C_o = Average of initial and final system calibration check responses for the zero gas, ppmv

C_m = Average of initial and final system calibration check responses for the upscale calibration gas, ppmv.

C_{ma} = Actual concentration of the upscale calibration gas, ppmv.

C_s = Concentration of pollutant matter in stack gas - grains per dry standard cubic foot, gr/dscf

ΔH = Average pressure drop across the sampling meter flow orifice - inches of water, in.H_2O

L_a = Maximum acceptable leakage rate for either a pretest leak check or for a leak check following a component change; equal to 0.020 cubic foot per minute of 4% of the average sampling rate, whichever is less

λ = Dry gas meter calibration correction factor

$\%O_2$ = Percent oxygen in stack gas, percent by volume dry basis

MW = Molecular weight of pollutant, lb/lb-mole

Pbar = Barometric pressure - inches of mercury, in.Hg

pmr = Pollutant mass rate, lb/hr

Q_{std} = Volumetric flow rate of stack gas, dscfh

°R = Degrees Rankine = degrees Fahrenheit + 460, °F +460

T_m = Average temperature of dry gas meter, °R

T_{std} = Temperature at standard conditions, 528 °R

V_{lc} = Total volume of liquid collected in impingers and silica gel, ml

V_m = Volume of dry gas sampled at meter conditions - cubic feet, ft^3

V_{mstd} = Volume of dry gas sampled at standard conditions, cubic feet, ft^3

V_{wstd} = Volume of water vapor at standard conditions - cubic feet, ft^3

385.26 = Molecular volume of 1 lb-mole - cubic feet, ft^3

ARI ENVIRONMENTAL, INC.
MOISTURE CALCULATION SUMMARY

COMPANY:	Premcor Refining
LOCATION:	Port Arthur, Texas
SOURCE:	Chlorosorb Inlet
TEST DATE:	6/29/2005
RUN NUMBER:	1

γ FACTOR:	0.980	**STACK DIAM:**	4.0 **inches**
BAROMETRIC:	29.85 **in. Hg**	**METER VOLUME:**	46.346 **ft^3**
STATIC PRES:	4.60 **$in.H_2O$**	**METER TEMP:**	97.8 **°F**
STACK TEMP:	421.6 **°F**	**LIQUID COLL:**	53.3 **milliliters**
SQ.RT ΔP:	0.3271 **$in.H_2O$**	**CO_2:**	18.70 **% by volume**
ΔH:	1.60 **$in.H_2O$**	**O_2:**	0.80 **% by volume**

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE
@ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92}\right) \times V_m \times \gamma \left[\frac{P_{bar} + \left(\frac{\Delta H}{13.6}\right)}{T_m}\right] = 43.061 \text{ dscf}$$

γ = 0.980

VOLUME OF WATER IN SAMPLE
@ STANDARD CONDITIONS

$$V_{wstd} = 0.04707 \times V_{lc} = 2.509 \text{ scf}$$

V_{lc} = 53.3 mL

FRACTIONAL MOISTURE CONTENT OF STACK GAS

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} = 0.055$$

MOISTURE CONTENT OF STACK GAS @ SATURATION

= 1.000

MOISTURE CONTENT USED IN CALCULATIONS

B_{ws} = 0.055

ARI ENVIRONMENTAL, INC.
FLOW RATE CALCULATION SUMMARY

COMPANY:	Premcor Refining	**SOURCE:**	Chlorosorb Inlet
LOCATION:	Port Arthur, Texas	**TEST DATE:**	6/29/2005
RUN NUMBER:	1		

BAROMETRIC:	29.85 **in. Hg**	**STACK DIAM:**	4.0 **inches**
STATIC PRES:	4.6 **in.H_2O**	**CO_2:**	18.70 **% by volume**
STACK TEMP:	421.6 **°F**	**O_2:**	0.80 **% by volume**
SQ.RT ΔP:	0.3271 **in.H_2O**		

DRY MOLECULAR WEIGHT OF STACK GAS

$$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$$ = 31.02 **lb/lb-mole**

MOLECULAR WEIGHT OF STACK GAS, wet basis

$$M_s = M_d(1 - B_{ws}) + 18B_{ws}$$ = 30.31 **lb/lb-mole**

PITOT TUBE COEFFICIENT

C_p (from calibration curve or geometric specifications) = 0.84

AVERAGE VELOCITY HEAD OF STACK GAS, in. H_2O

$$\overline{\sqrt{\Delta P}} = \frac{1}{n}\sum_{i=1}^{n}\sqrt{\Delta p}$$ = 0.3271 **in. H_2O**

AVERAGE ABSOLUTE STACK GAS TEMPERATURE

T_s = 421.6 °F + 460 = 881.6 **°R**

ABSOLUTE STACK GAS PRESSURE

$$P_s = P_{bar} + \frac{P_{static}}{13.6}$$ = 30.19 **in.Hg**

STACK GAS VELOCITY

$$V_s = (85.49)(C_p)\left(\text{avg}\sqrt{\Delta P}\right)\sqrt{\frac{T_s}{(P_s)(M_s)}}$$ = 23.058 **ft/sec**

STACK GAS VOLUMETRIC FLOW RATE, actual

$$Q_s = 60 \times V_s \times A_s$$ = 121 **acfm**

Stack Area = 0.087 ft^2

STACK GAS VOLUMETRIC FLOW RATE,
standard conditions, wet basis

$$Q_{stdw} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)$$ = 73 **scfm, wb**
4,377 **scfh, wb**

STACK GAS VOLUMETRIC FLOW RATE,
standard conditions, dry basis

$$Q_{std} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)(1 - B_{ws})$$ = 69 **dscfm**
4,136 **dscfh**

ARI ENVIRONMENTAL, INC.
COMPOUND EMISSION
CALCULATION SUMMARY

COMPANY: Premcor Refining
LOCATION: Port Arthur, Texas
SOURCE: Chlorosorb Inlet
TEST DATE: 6/29/2005
RUN NUMBER: 1

INPUT

V_m:	46.346	ft3	Q_{std}:	69	dscfm
γ FACTOR:	0.98		T_s:	421.6	°F
P_{bar}:	29.85	in.Hg	Runtime:	60	minutes
ΔH:	1.6	in.H2O	V_s:	23.058	ft/sec
T_m:	97.8	°F	P_s:	30.19	in.Hg
V_{lc}:	53.3	mL			

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE @ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92}\right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m}\right] = 43.061 \text{ dscf}$$

γ = 0.980

VOLUME OF WATER IN SAMPLE @ STANDARD CONDITIONS

$$V_{wstd} = 0.04707 \times V_{lc} = 2.509 \text{ scf}$$

FRACTIONAL MOISTURE CONTENT OF STACK GAS

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} \times 100 = 5.51 \%$$

CONCENTRATION IN STACK GAS ON A DRY BASIS

$$C_{gas,lb/dscf} = \left(\frac{M_n}{(453.6 \times 10^3 \text{ mg/lb})(V_{mstd})}\right)$$

$$C_{gas,ppmv,db} = \left(C_{gas,lb/dscf}\right) \times \left(1 \times 10^6\right) \times \left(\frac{(385.26 \text{ft}^3 / \text{lb-mole})}{MW}\right)$$

Compound	Mass M_n, mg	Molecular Weight (MW)	C_{gas} lb/dscf x 10^{-6}	ppmv db	lb/h
Hydrochloric Acid	2610.511	36.46	133.6	1412	0.5528

MONITOR DATA SUMMARY

COMPANY :	Premcor Refining
LOCATION:	Port Arthur, Texas
SOURCE :	Chlorosorb Outlet
REPETITION :	1
TEST DATE :	6/29/2005

GAS ANALYZER **VOC**

SCALE :	0-1000 ppm
AVERAGE CAL. BIAS (C_m):	304.10
AVERAGE ZERO BIAS (C_o):	0.75
CALIBRATION GAS:	Diluted EPA Protocol CO2
CALIBRATION PPM (C_{ma}):	300.0
% CORRECTED (C_{gas}):	**398.2**

GAS ANALYZER **O2**

SCALE :	0 -10 %
AVERAGE CAL. BIAS (C_m):	5.01
AVERAGE ZERO BIAS (C_o):	0.02
CALIBRATION GAS:	Diluted EPA Protocol CO2
CALIBRATION % (C_{ma}):	5.00
% CORRECTED (C_{gas}):	**0.15**

GAS ANALYZER **CO2**

SCALE :	0 -20 %
AVERAGE CAL. BIAS (C_m):	9.60
AVERAGE ZERO BIAS (C_o):	0.01
CALIBRATION GAS:	Diluted EPA Protocol CO2
CALIBRATION % (C_{ma}):	10.00
% CORRECTED (C_{gas}):	**18.61**

***ND=Not detetected**

$$C_{gas} = (C - C_o)\frac{C_{ma}}{(C_m - C_o)}$$

CLOCK TIME	ELAPSED TIME	VOC	O2	CO2
8:22	0	------		
8:23	1	354.4	0.19	17.96
8:24	2	438.1	0.19	17.64
8:25	3	414.2	0.20	17.87
8:26	4	401.9	0.21	17.77
8:27	5	343.8	0.20	17.28
8:28	6	326.4	0.18	17.86
8:29	7	470.2	0.18	17.98
8:30	8	489.7	0.18	18.13
8:31	9	362.1	0.19	17.68
8:32	10	339.8	0.20	17.57
8:33	11	402.5	0.20	18.01
8:34	12	479.0	0.19	17.52
8:35	13	415.9	0.19	18.02
8:36	14	315.8	0.20	17.69
8:37	15	406.0	0.20	17.85
8:38	16	486.7	0.19	17.90
8:39	17	463.2	0.19	17.90
8:40	18	333.7	0.19	17.32
8:41	19	270.3	0.20	17.56
8:42	20	404.6	0.20	18.20
8:43	21	620.0	0.20	18.19
8:44	22	547.6	0.20	17.87
8:45	23	380.4	0.22	18.13
8:46	24	241.9	0.22	17.15
8:47	25	398.6	0.20	18.11
8:48	26	516.5	0.20	17.92
8:49	27	458.6	0.20	18.03
8:50	28	307.8	0.21	18.04
8:51	29	287.8	0.21	17.50
8:52	30	486.5	0.15	18.14
8:53	31	480.0	0.14	18.06
8:54	32	211.7	0.15	17.07
8:55	33	263.8	0.15	17.87
8:56	34	517.4	0.14	17.86
8:57	35	612.3	0.14	18.32
8:58	36	428.1	0.13	18.02
8:59	37	314.4	0.15	17.25
9:00	38	315.7	0.14	17.81
9:01	39	516.1	0.14	18.09
9:02	40	519.0	0.14	18.19
9:03	41	346.7	0.16	17.99
9:04	42	359.2	0.16	17.54
9:05	43	435.1	0.15	18.03
9:06	44	525.9	0.15	17.98
9:07	45	416.5	0.15	18.05
9:08	46	228.7	0.15	17.35
9:09	47	338.1	0.15	18.03
9:10	48	517.3	0.14	18.34
9:11	49	579.8	0.15	18.35
9:12	50	365.9	0.15	17.90
9:13	51	175.3	0.16	17.32
9:14	52	353.4	0.16	18.21
9:15	53	595.8	0.16	18.18
9:16	54	366.7	0.16	18.12
9:17	55	211.1	0.16	17.07
9:18	56	462.7	0.14	18.14
9:19	57	635.9	0.15	18.22
9:20	58	487.3	0.15	18.12
9:21	59	216.0	0.16	17.19
9:22	60	245.6	0.16	17.72
	AVG (C) =	**403.43**	**0.173**	**17.854**

ARI ENVIRONMENTAL, INC.
MOISTURE CALCULATION SUMMARY

COMPANY: Premcor Refining
LOCATION: Port Arthur, Texas
SOURCE: Chlorosorb Outlet
TEST DATE: 6/29/2005
RUN NUMBER: 1

γ FACTOR:	0.988	**STACK DIAM:**	4.0 **inches**
BAROMETRIC:	29.85 **in. Hg**	**METER VOLUME:**	44.194 **ft^3**
STATIC PRES:	-0.04 **in.H_2O**	**METER TEMP:**	95.4 **°F**
STACK TEMP:	338.3 **°F**	**LIQUID COLL:**	27.3 **milliliters**
SQ.RT ΔP:	0.2999 **in.H_2O**	**CO_2:**	18.61 **% by volume**
ΔH:	1.80 **in.H_2O**	**O_2:**	0.15 **% by volume**

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE
@ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92}\right) \times V_m \times \gamma \left[\frac{P_{bar} + \left(\frac{\Delta H}{13.6}\right)}{T_m}\right]$$

= 41.596 **dscf**

γ = 0.988

VOLUME OF WATER IN SAMPLE
@ STANDARD CONDITIONS

$$V_{wstd} = 0.04707 \times V_{lc}$$

= 1.285 **scf**

V_{lc} = 27.3 mL

FRACTIONAL MOISTURE CONTENT OF STACK GAS

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}}$$

= 0.030

MOISTURE CONTENT OF STACK GAS @ SATURATION

= 1.000

MOISTURE CONTENT USED IN CALCULATIONS

B_{ws} = 0.030

ARI ENVIRONMENTAL, INC.
FLOW RATE CALCULATION SUMMARY

COMPANY:	Premcor Refining	**SOURCE:**	Chlorosorb Outlet
LOCATION:	Port Arthur, Texas	**TEST DATE:**	6/29/2005
RUN NUMBER:	1		

BAROMETRIC:	29.85 **in. Hg**	**STACK DIAM:**	4 **inches**
STATIC PRES:	-0.035 **in.H_2O**	**CO_2:**	18.61 **% by volume**
STACK TEMP:	338.3 **°F**	**O_2:**	0.15 **% by volume**
SQ.RT ΔP:	0.2999 **in.H_2O**		

DRY MOLECULAR WEIGHT OF STACK GAS

$$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$$ = 30.98 **lb/lb-mole**

MOLECULAR WEIGHT OF STACK GAS, wet basis

$$M_s = M_d(1 - B_{ws}) + 18\,B_{ws}$$ = 30.59 **lb/lb-mole**

PITOT TUBE COEFFICIENT

C_p (from calibration curve or geometric specifications) = 0.84

AVERAGE VELOCITY HEAD OF STACK GAS, in. H_2O

$$\overline{\sqrt{\Delta P}} = \frac{1}{n}\sum_{i=1}^{n}\sqrt{\Delta p}$$ = 0.2999 **in. H_2O**

AVERAGE ABSOLUTE STACK GAS TEMPERATURE

T_s = 338.3 °F + 460 = 798 **°R**

ABSOLUTE STACK GAS PRESSURE

$$P_s = P_{bar} + \frac{P_{static}}{13.6}$$ = 29.85 **in.Hg**

STACK GAS VELOCITY

$$V_s = (85.49)(C_p)\left(\text{avg}\sqrt{\Delta P}\right)\sqrt{\frac{T_s}{(P_s)(M_s)}}$$ = 20.14 **ft/sec**

STACK GAS VOLUMETRIC FLOW RATE, actual

$$Q_s = 60 \text{ x } V_s \text{ x } A_s$$ = 105 **acfm**

Stack Area = 0.087 ft^2

STACK GAS VOLUMETRIC FLOW RATE,
standard conditions, wet basis

$$Q_{stdw} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)$$ = 70 **scfm, wb**
4,174 **scfh, wb**

STACK GAS VOLUMETRIC FLOW RATE,
standard conditions, dry basis

$$Q_{std} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)(1 - B_{ws})$$ = 67 **dscfm**
4,049 **dscfh**

VOC CALIBRATION CORRECTION DATA SHEET
USEPA METHOD 25A

COMPANY: Premcor Refining
LOCATION: Port Arthur, Texas
SOURCE: Chlorosorb Outlet
MONITOR ID: VIG Model 20/2 Heated
RUN NO: 1
TEST DATE: 6/29/2005

INPUT

VOC AVERAGE CHART READING (C):	403.4	ppmv C_3H_8
AVG PRE/POST ZERO DRIFT READING (C_o):	0.8	ppmv C_3H_8
CAL GAS CONCENTRATION (C_{ma}):	300.0	ppmv C_3H_8
AVG CAL PRE/POST TEST READING (C_m):	304.1	ppmv C_3H_8
STACK GAS VOLUMETRIC FLOW RATE (Q_{std}):	4,174	scfh

CALCULATIONS

STACK VOC AVERAGE CHART READING = 403.4 ppmv wb C_3H_8

STACK VOC CONC. (as C_1) CORRECTED FOR ZERO AND CALIBRATION DRIFT:

VOC CONC, ppmv = (corrected) $C_{gas,ppm} = (\bar{C} - C_o)\frac{C_{ma}}{C_m - C_o}$ = 398.2 ppmv wb C_3H_8

VOC CONC, ppmv = (corrected) $C_{gas,ppm\ C_1} = 3(C_{gas,ppm\ C_3H_8})$ = 1,195 ppmv wb C_1

(3 =carbon equivalent factor for propane)

VOC CONC, ppmv = $C_{gas,ppm\ C_6} = \left[\frac{(C_1/6)}{(1-Bws)}\right] * \left(\frac{17.9}{20.9 - O_2\%}\right)$ 177.1 ppmv wb C_6 @0% O_2

VOC CONC.(lbs/dscf) =

$C_{gas,lb/dscf} = (C_{gas,ppm})\left(\frac{12 lb/lb-mole}{385.26 \times 10^6 ft^3/lb-mole}\right)$ = 37.21 x 10^{-6} lbs C_1/scf

VOC EMISSION RATE (as C_1) :

STACK GAS VOLUMETRIC FLOW RATE = 4,174 scfh

STACK VOC EMISSION RATE =

$VOC_{pmr} = (C_{gas,lb/dscf})(Q_{std})$ = 0.1553 lbs/hr
= 0.6803 ton/yr

ARI ENVIRONMENTAL, INC.
COMPOUND EMISSION
CALCULATION SUMMARY

COMPANY: Premcor Refining
LOCATION: Port Arthur, Texas
SOURCE: Chlorosorb Outlet
TEST DATE: 6/29/2005
RUN NUMBER: 1

INPUT

V_m:	44.194	ft3	Q_{std}:	67	dscfm
γ FACTOR:	0.988		T_s:	338.3	°F
P_{bar}:	29.85	in.Hg	Runtime:	60	minutes
ΔH:	1.8	in.H2O	V_s:	20.136	ft/sec
T_m:	95.4	°F	P_s:	29.85	in.Hg
V_{lc}:	27.3	mL			

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE @ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92}\right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m}\right] = 41.596 \text{ dscf}$$

γ = 0.988

VOLUME OF WATER IN SAMPLE @ STANDARD CONDITIONS

$$V_{wstd} = 0.04707 \times V_{lc} = 1.285 \text{ scf}$$

FRACTIONAL MOISTURE CONTENT OF STACK GAS

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} \times 100 = 3.00 \%$$

CONCENTRATION IN STACK GAS ON A DRY BASIS

$$C_{gas,lb/dscf} = \left(\frac{M_n}{(453.6 \times 10^3 \text{ mg/lb})(V_{mstd})}\right)$$

$$C_{gas,ppmv,db} = (C_{gas,lb/dscf}) \times (1 \times 10^6) \times \left(\frac{(385.26 \text{ft}^3/\text{lb-mole})}{MW}\right)$$

Compound	Mass M_n, mg	Molecular Weight (MW)	C_{gas} lb/dscf x 10^{-6}	ppmv db	lb/h
Hydrochloric Acid	17.836	36.46	0.945	9.99	0.00383

HYDROCHLORIC ACID EMISSION RATE:

INLET HYDROCHLORIC ACID EMISSION RATE =

$$HCL_{pmr} = (C_{gas,lb/dscf})(Q_{std})$$

= 0.5528 lbs/hr
= 2.421 ton/yr

STACK HYDROCHLORIC ACID EMISSION RATE =

$$HCL_{pmr} = (C_{gas,lb/dscf})(Q_{std})$$

= 0.00383 lbs/hr
= 0.0168 ton/yr

DESTRUCTION AND REMOVAL EFFICENCY= 99.3 %

ARI ENVIRONMENTAL, INC.
MOISTURE CALCULATION SUMMARY

COMPANY: Premcor Refining
LOCATION: Port Arthur, Texas
SOURCE: Chlorosorb Inlet
TEST DATE: 6/29/2005
RUN NUMBER: 2

γ FACTOR:	0.980	**STACK DIAM:**	4.0 **inches**
BAROMETRIC:	29.85 **in. Hg**	**METER VOLUME:**	46.679 **ft^3**
STATIC PRES:	4.60 **$in.H_2O$**	**METER TEMP:**	104.1 **°F**
STACK TEMP:	421.2 **°F**	**LIQUID COLL:**	51.0 **milliliters**
SQ.RT ΔP:	0.327 **$in.H_2O$**	**CO_2:**	18.70 **% by volume**
ΔH:	1.60 **$in.H_2O$**	**O_2:**	0.80 **% by volume**

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE
@ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92}\right) \times V_m \times \gamma \left[\frac{P_{bar} + \left(\frac{\Delta H}{13.6}\right)}{T_m}\right] = 42.886 \text{ dscf}$$

γ = 0.980

VOLUME OF WATER IN SAMPLE
@ STANDARD CONDITIONS

$$V_{wstd} = 0.04707 \times V_{lc} = 2.401 \text{ scf}$$

V_{lc} = 51.0 mL

FRACTIONAL MOISTURE CONTENT OF STACK GAS

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} = 0.053$$

MOISTURE CONTENT OF STACK GAS @ SATURATION

= 1.000

MOISTURE CONTENT USED IN CALCULATIONS

B_{ws} = 0.053

ARI ENVIRONMENTAL, INC.
FLOW RATE CALCULATION SUMMARY

COMPANY:	Premcor Refining	**SOURCE:**	Chlorosorb Inlet
LOCATION:	Port Arthur, Texas	**TEST DATE:**	6/29/2005
RUN NUMBER:	2		

BAROMETRIC:	29.85 **in. Hg**	**STACK DIAM:**	4.0 **inches**
STATIC PRES:	4.6 **in.H_2O**	**CO_2:**	18.70 **% by volume**
STACK TEMP:	421.2 **°F**	**O_2:**	0.80 **% by volume**
SQ.RT ΔP:	0.3266 **in.H_2O**		

DRY MOLECULAR WEIGHT OF STACK GAS

$$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$$ = 31.02 **lb/lb-mole**

MOLECULAR WEIGHT OF STACK GAS, wet basis

$$M_s = M_d(1 - B_{ws}) + 18B_{ws}$$ = 30.33 **lb/lb-mole**

PITOT TUBE COEFFICIENT

C_p (from calibration curve or geometric specifications) = 0.84

AVERAGE VELOCITY HEAD OF STACK GAS, in. H_2O

$$\overline{\sqrt{\Delta P}} = \frac{1}{n}\sum_{i=1}^{n}\sqrt{\Delta p}$$ = 0.3266 **in. H_2O**

AVERAGE ABSOLUTE STACK GAS TEMPERATURE

T_s = 421.2 °F + 460 = 881.2 **°R**

ABSOLUTE STACK GAS PRESSURE

$$P_s = P_{bar} + \frac{P_{static}}{13.6}$$ = 30.19 **in.Hg**

STACK GAS VELOCITY

$$V_s = (85.49)(C_p)(\text{avg}\sqrt{\Delta P})\sqrt{\frac{T_s}{(P_s)(M_s)}}$$ = 23.007 **ft/sec**

STACK GAS VOLUMETRIC FLOW RATE, actual

$$Q_s = 60 \times V_s \times A_s$$ = 120 **acfm**

Stack Area = 0.087 ft^2

STACK GAS VOLUMETRIC FLOW RATE,
standard conditions, wet basis

$$Q_{stdw} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)$$ = 73 **scfm, wb**
4,370 **scfh, wb**

STACK GAS VOLUMETRIC FLOW RATE,
standard conditions, dry basis

$$Q_{std} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)(1 - B_{ws})$$ = 69 **dscfm**
4,138 **dscfh**

ARI ENVIRONMENTAL, INC.
COMPOUND EMISSION
CALCULATION SUMMARY

COMPANY: Premcor Refining
LOCATION: Port Arthur, Texas
SOURCE: Chlorosorb Inlet
TEST DATE: 6/29/2005
RUN NUMBER: 2

INPUT

V_m:	46.679	ft3	Q_{std}:	69	dscfm
γ FACTOR:	0.98		T_s:	421.2	°F
P_{bar}:	29.85	in.Hg	Runtime:	60	minutes
ΔH:	1.6	in.H2O	V_s:	23.007	ft/sec
T_m:	104.1	°F	P_s:	30.19	in.Hg
V_{lc}:	51	mL			

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE @ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92}\right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m}\right] = 42.886 \text{ dscf}$$

γ = 0.980

VOLUME OF WATER IN SAMPLE @ STANDARD CONDITIONS

$$V_{wstd} = 0.04707 \times V_{lc} = 2.401 \text{ scf}$$

FRACTIONAL MOISTURE CONTENT OF STACK GAS

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} \times 100 = 5.30 \%$$

CONCENTRATION IN STACK GAS ON A DRY BASIS

$$C_{gas,lb/dscf} = \left(\frac{M_n}{(453.6 \times 10^3 \text{ mg/lb})(V_{mstd})}\right)$$

$$C_{gas,ppmv,db} = (C_{gas,lb/dscf}) \times (1 \times 10^6) \times \left(\frac{(385.26 \text{ft}^3/\text{lb-mole})}{MW}\right)$$

Compound	Mass M_n, mg	Molecular Weight (MW)	C_{gas} lb/dscf x 10^{-6}	ppmv db	lb/h
Hydrochloric Acid	2607.298	36.46	134.0	1416	0.5546

MONITOR DATA SUMMARY

COMPANY :	Premcor Refining
LOCATION:	Port Arthur, Texas
SOURCE :	Chlorosorb Outlet
REPETITION :	2
TEST DATE :	6/29/2005

GAS ANALYZER **VOC**

SCALE :	0-1000 ppm
AVERAGE CAL. BIAS (C_m):	307.85
AVERAGE ZERO BIAS (C_o):	3.15
CALIBRATION GAS:	Diluted EPA Protocol CO2
CALIBRATION PPM (C_{ma}):	300.0
% CORRECTED (C_{gas}):	**398.7**

GAS ANALYZER **O2**

SCALE :	0 -10 %
AVERAGE CAL. BIAS (C_m):	5.01
AVERAGE ZERO BIAS (C_o):	0.02
CALIBRATION GAS:	Diluted EPA Protocol CO2
CALIBRATION % (C_{ma}):	5.00
% CORRECTED (C_{gas}):	**0.15**

GAS ANALYZER **CO2**

SCALE :	0 -20 %
AVERAGE CAL. BIAS (C_m):	9.63
AVERAGE ZERO BIAS (C_o):	0.04
CALIBRATION GAS:	Diluted EPA Protocol CO2
CALIBRATION % (C_{ma}):	10.00
% CORRECTED (C_{gas}):	**18.64**

***ND=Not detetected**

$$C_{gas} = (C - C_o)\frac{C_{ma}}{(C_m - C_o)}$$

CLOCK TIME	ELAPSED TIME	VOC	O2	CO2
9:37	0	-------		
9:38	1	378.13	0.15	18.18
9:39	2	347.22	0.15	17.27
9:40	3	485.95	0.14	18.24
9:41	4	487.40	0.15	18.07
9:42	5	423.93	0.15	17.77
9:43	6	278.44	0.16	17.63
9:44	7	307.50	0.15	17.44
9:45	8	445.77	0.15	18.17
9:46	9	583.66	0.16	18.40
9:47	10	494.42	0.15	17.89
9:48	11	377.11	0.15	17.78
9:49	12	293.25	0.16	17.95
9:50	13	336.10	0.16	17.60
9:51	14	429.38	0.16	18.04
9:52	15	465.56	0.15	17.74
9:53	16	492.45	0.16	18.20
9:54	17	334.22	0.17	17.69
9:55	18	404.40	0.17	18.16
9:56	19	437.47	0.17	18.08
9:57	20	427.90	0.15	17.81
9:58	21	342.22	0.16	17.77
9:59	22	303.91	0.16	17.46
10:00	23	363.93	0.15	18.00
10:01	24	499.54	0.16	18.24
10:02	25	529.19	0.16	18.03
10:03	26	386.39	0.16	17.91
10:04	27	319.26	0.16	17.46
10:05	28	348.29	0.16	17.61
10:06	29	467.61	0.16	18.37
10:07	30	465.41	0.16	18.03
10:08	31	461.87	0.16	17.93
10:09	32	370.79	0.16	17.91
10:10	33	310.38	0.16	17.64
10:11	34	367.64	0.16	17.74
10:12	35	499.51	0.16	18.30
10:13	36	482.45	0.17	17.98
10:14	37	427.38	0.17	17.89
10:15	38	323.45	0.17	17.95
10:16	39	324.17	0.17	17.74
10:17	40	357.23	0.16	17.70
10:18	41	447.26	0.16	18.03
10:19	42	448.83	0.16	18.10
10:20	43	409.37	0.16	17.83
10:21	44	380.14	0.16	17.94
10:22	45	369.22	0.17	17.90
10:23	46	463.19	0.17	17.76
10:24	47	506.76	0.17	18.34
10:25	48	412.42	0.18	17.62
10:26	49	419.88	0.17	18.07
10:27	50	375.20	0.16	17.93
10:28	51	402.25	0.17	18.11
10:29	52	433.25	0.16	17.72
10:30	53	479.81	0.16	18.29
10:31	54	362.53	0.18	17.60
10:32	55	351.96	0.17	17.71
10:33	56	387.23	0.17	18.06
10:34	57	448.92	0.17	18.15
10:35	58	514.40	0.18	17.87
10:36	59	397.62	0.18	18.32
10:37	60	295.03	0.17	17.38
	AVG (C) =	**408.103**	**0.162**	**17.908**

ARI ENVIRONMENTAL, INC.
MOISTURE CALCULATION SUMMARY

COMPANY:	Premcor Refining
LOCATION:	Port Arthur, Texas
SOURCE:	Chlorosorb Outlet
TEST DATE:	6/29/2005
RUN NUMBER:	2

γ FACTOR:	0.988	**STACK DIAM:**	4.0 **inches**
BAROMETRIC:	29.85 **in. Hg**	**METER VOLUME:**	45.571 **ft^3**
STATIC PRES:	-0.04 **$in.H_2O$**	**METER TEMP:**	105.8 **°F**
STACK TEMP:	326.3 **°F**	**LIQUID COLL:**	25.2 **milliliters**
SQ.RT ΔP:	0.3115 **$in.H_2O$**	**CO_2:**	18.64 **% by volume**
ΔH:	1.80 **$in.H_2O$**	**O_2:**	0.15 **% by volume**

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE
@ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92}\right) \times V_m \times \gamma \left[\frac{P_{bar} + \left(\frac{\Delta H}{13.6}\right)}{T_m}\right] = 42.104 \text{ dscf}$$

γ = 0.988

VOLUME OF WATER IN SAMPLE
@ STANDARD CONDITIONS

$$V_{wstd} = 0.04707 \times V_{lc} = 1.186 \text{ scf}$$

V_{lc} = 25.2 mL

FRACTIONAL MOISTURE CONTENT OF STACK GAS

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} = 0.027$$

MOISTURE CONTENT OF STACK GAS @ SATURATION

= 1.000

MOISTURE CONTENT USED IN CALCULATIONS

B_{ws} = 0.027

ARI ENVIRONMENTAL, INC.
FLOW RATE CALCULATION SUMMARY

COMPANY:	Premcor Refining	**SOURCE:**	Chlorosorb Outlet
LOCATION:	Port Arthur, Texas	**TEST DATE:**	6/29/2005
RUN NUMBER:	2		

BAROMETRIC:	29.85 **in. Hg**	**STACK DIAM:**	4 **inches**
STATIC PRES:	-0.035 **in.H_2O**	**CO_2:**	18.64 **% by volume**
STACK TEMP:	326.3 **°F**	**O_2:**	0.15 **% by volume**
SQ.RT ΔP:	0.3115 **in.H_2O**		

DRY MOLECULAR WEIGHT OF STACK GAS

$$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$$ = 30.99 **lb/lb-mole**

MOLECULAR WEIGHT OF STACK GAS, wet basis

$$M_s = M_d(1 - B_{ws}) + 18\,B_{ws}$$ = 30.63 **lb/lb-mole**

PITOT TUBE COEFFICIENT

C_p (from calibration curve or geometric specifications) = 0.84

AVERAGE VELOCITY HEAD OF STACK GAS, in. H_2O

$$\overline{\sqrt{\Delta P}} = \frac{1}{n}\sum_{i=1}^{n}\sqrt{\Delta p}$$ = 0.3115 **in. H_2O**

AVERAGE ABSOLUTE STACK GAS TEMPERATURE

T_s = 326.3 °F + 460 = 786 **°R**

ABSOLUTE STACK GAS PRESSURE

$$P_s = P_{bar} + \frac{P_{static}}{13.6}$$ = 29.85 **in.Hg**

STACK GAS VELOCITY

$$V_s = (85.49)(C_p)\left(\text{avg}\sqrt{\Delta P}\right)\sqrt{\frac{T_s}{(P_s)(M_s)}}$$ = 20.74 **ft/sec**

STACK GAS VOLUMETRIC FLOW RATE, actual

$$Q_s = 60 \text{ x } V_s \text{ x } A_s$$ = 109 **acfm**

Stack Area = 0.087 ft^2

STACK GAS VOLUMETRIC FLOW RATE,
standard conditions, wet basis

$$Q_{stdw} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)$$ = 73 **scfm, wb**
4,366 **scfh, wb**

STACK GAS VOLUMETRIC FLOW RATE,
standard conditions, dry basis

$$Q_{std} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)(1 - B_{ws})$$ = 71 **dscfm**
4,246 **dscfh**

VOC CALIBRATION CORRECTION DATA SHEET
USEPA METHOD 25A

COMPANY: Premcor Refining
LOCATION: Port Arthur, Texas
SOURCE: Chlorosorb Outlet
MONITOR ID: VIG Model 20/2 Heated
RUN NO: 2
TEST DATE: 6/29/2005

INPUT

VOC AVERAGE CHART READING (C):	408.1	ppmv C_3H_8
AVG PRE/POST ZERO DRIFT READING (C_o):	3.2	ppmv C_3H_8
CAL GAS CONCENTRATION (C_{ma}):	300.0	ppmv C_3H_8
AVG CAL PRE/POST TEST READING (C_m):	307.9	ppmv C_3H_8
STACK GAS VOLUMETRIC FLOW RATE (Q_{std}):	4,366	scfh

CALCULATIONS

STACK VOC AVERAGE CHART READING = 408.1 ppmv wb C_3H_8

STACK VOC CONC. (as C_1) CORRECTED FOR ZERO AND CALIBRATION DRIFT:

VOC CONC, ppmv (corrected) = $C_{gas,ppm} = (\overline{C} - C_o)\frac{C_{ma}}{C_m - C_o}$ = 398.7 ppmv wb C_3H_8

VOC CONC, ppmv (corrected) = $C_{gas,ppm\,C_1} = 3(C_{gas,ppm\,C_3H_8})$ = 1,196 ppmv wb C_1

(3 =carbon equivalent factor for propane)

VOC CONC, ppmv = $C_{gas,ppm\,C_6} = \left[\frac{(C_1/6)}{(1-Bws)}\right] * \left(\frac{17.9}{20.9 - O_2\%}\right)$ 175.5 ppmv wb C_6 @0% O_2

VOC CONC.(lbs/dscf) =

$C_{gas,lb/dscf} = (C_{gas,ppm})\left(\frac{12 lb/lb-mole}{385.26 \times 10^6 ft^3/lb-mole}\right)$ = 37.26 x 10^{-6} lbs C_1/scf

VOC EMISSION RATE (as C_1):

STACK GAS VOLUMETRIC FLOW RATE = 4,366 scfh

STACK VOC EMISSION RATE =

$VOC_{pmr} = (C_{gas,lb/dscf})(Q_{std})$ = 0.1626 lbs/hr
= 0.7124 ton/yr

ARI ENVIRONMENTAL, INC.
COMPOUND EMISSION
CALCULATION SUMMARY

COMPANY: Premcor Refining
LOCATION: Port Arthur, Texas
SOURCE: Chlorosorb Outlet
TEST DATE: 6/29/2005
RUN NUMBER: 2

INPUT

V_m:	45.571	ft3	Q_{std}:	71	dscfm
γ FACTOR:	0.988		T_s:	326.3	°F
P_{bar}:	29.85	in.Hg	Runtime:	60	minutes
ΔH:	1.8	in.H2O	V_s:	20.745	ft/sec
T_m:	105.8	°F	P_s:	29.85	in.Hg
V_{lc}:	25.2	mL			

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE @ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92}\right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m}\right] = 42.104 \text{ dscf}$$

$\gamma =$ 0.988

VOLUME OF WATER IN SAMPLE @ STANDARD CONDITIONS

$$V_{wstd} = 0.04707 \times V_{lc} = 1.186 \text{ scf}$$

FRACTIONAL MOISTURE CONTENT OF STACK GAS

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} \times 100 = 2.74 \%$$

CONCENTRATION IN STACK GAS ON A DRY BASIS

$$C_{gas,lb/dscf} = \left(\frac{M_n}{(453.6 \times 10^3 \text{ mg/lb})(V_{mstd})}\right)$$

$$C_{gas,ppmv,db} = (C_{gas,lb/dscf}) \times (1 \times 10^6) \times \left(\frac{(385.26 \text{ft}^3 / \text{lb-mole})}{MW}\right)$$

Compound	Mass M_n, mg	Molecular Weight (MW)	C_{gas} lb/dscf x 10^{-6}	ppmv db	lb/h
Hydrochloric Acid	12.071	36.46	0.632	6.68	0.00268

HYDROCHLORIC ACID EMISSION RATE:

INLET HYDROCHLORIC ACID EMISSION RATE =

$$HCL_{pmr} = (C_{gas,lb/dscf})(Q_{std})$$

= 0.5546 lbs/hr
= 2.429 ton/yr

STACK HYDROCHLORIC ACID EMISSION RATE =

$$HCL_{pmr} = (C_{gas,lb/dscf})(Q_{std})$$

= 0.00268 lbs/hr
= 0.0118 ton/yr

DESTRUCTION AND REMOVAL EFFICENCY= 99.5 %

ARI ENVIRONMENTAL, INC.
MOISTURE CALCULATION SUMMARY

COMPANY: Premcor Refining
LOCATION: Port Arthur, Texas
SOURCE: Chlorosorb Inlet
TEST DATE: 6/29/2005
RUN NUMBER: 3

γ FACTOR:	0.980	**STACK DIAM:**	4.0 **inches**
BAROMETRIC:	29.85 **in. Hg**	**METER VOLUME:**	46.501 **ft^3**
STATIC PRES:	4.60 **$in.H_2O$**	**METER TEMP:**	104.7 **°F**
STACK TEMP:	420.8 **°F**	**LIQUID COLL:**	53.0 **milliliters**
SQ.RT ΔP:	0.322 **$in.H_2O$**	**CO_2:**	18.70 **% by volume**
ΔH:	1.60 **$in.H_2O$**	**O_2:**	0.80 **% by volume**

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE
@ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92}\right) \times V_m \times \gamma \left[\frac{P_{bar} + \left(\frac{\Delta H}{13.6}\right)}{T_m}\right] = 42.677 \text{ dscf}$$

γ = 0.980

VOLUME OF WATER IN SAMPLE
@ STANDARD CONDITIONS

$$V_{wstd} = 0.04707 \times V_{lc} = 2.495 \text{ scf}$$

V_{lc} = 53.0 mL

FRACTIONAL MOISTURE CONTENT OF STACK GAS

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} = 0.055$$

MOISTURE CONTENT OF STACK GAS @ SATURATION

= 1.000

MOISTURE CONTENT USED IN CALCULATIONS

B_{ws} = 0.055

ARI ENVIRONMENTAL, INC.
FLOW RATE CALCULATION SUMMARY

COMPANY:	Premcor Refining	**SOURCE:**	Chlorosorb Inlet
LOCATION:	Port Arthur, Texas	**TEST DATE:**	6/29/2005
RUN NUMBER:	3		

BAROMETRIC:	29.85 **in. Hg**	**STACK DIAM:**	4.0 **inches**
STATIC PRES:	4.6 **in.H_2O**	**CO_2:**	18.70 **% by volume**
STACK TEMP:	420.8 **°F**	**O_2:**	0.80 **% by volume**
SQ.RT ΔP:	0.322 **in.H_2O**		

DRY MOLECULAR WEIGHT OF STACK GAS

$$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$$ = 31.02 **lb/lb-mole**

MOLECULAR WEIGHT OF STACK GAS, wet basis

$$M_s = M_d(1 - B_{ws}) + 18B_{ws}$$ = 31.02 **lb/lb-mole**

PITOT TUBE COEFFICIENT

C_p (from calibration curve or geometric specifications) = 0.84

AVERAGE VELOCITY HEAD OF STACK GAS, in. H_2O

$$\overline{\sqrt{\Delta P}} = \frac{1}{n}\sum_{i=1}^{n}\sqrt{\Delta p}$$ = 0.3220 **in. H_2O**

AVERAGE ABSOLUTE STACK GAS TEMPERATURE

T_s = 420.8 °F + 460 = 880.8 **°R**

ABSOLUTE STACK GAS PRESSURE

$$P_s = P_{bar} + \frac{P_{static}}{13.6}$$ = 30.19 **in.Hg**

STACK GAS VELOCITY

$$V_s = (85.49)(C_p)\left(\text{avg}\sqrt{\Delta P}\right)\sqrt{\frac{T_s}{(P_s)(M_s)}}$$ = 22.424 **ft/sec**

STACK GAS VOLUMETRIC FLOW RATE, actual

$$Q_s = 60 \times V_s \times A_s$$ = 117 **acfm**

Stack Area = 0.087 ft^2

STACK GAS VOLUMETRIC FLOW RATE,
standard conditions, wet basis

$$Q_{stdw} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)$$ = 71 **scfm, wb**
4,261 **scfh, wb**

STACK GAS VOLUMETRIC FLOW RATE,
standard conditions, dry basis

$$Q_{std} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)(1 - B_{ws})$$ = 67 **dscfm**
4,026 **dscfh**

ARI ENVIRONMENTAL, INC.
COMPOUND EMISSION
CALCULATION SUMMARY

COMPANY: Premcor Refining
LOCATION: Port Arthur, Texas
SOURCE: Chlorosorb Inlet
TEST DATE: 6/29/2005
RUN NUMBER: 3

INPUT

V_m:	46.501	ft3	Q_{std}:	67	dscfm
γ FACTOR:	0.98		T_s:	420.8	°F
P_{bar}:	29.85	in.Hg	Runtime:	60	minutes
ΔH:	1.6	in.H2O	V_s:	22.424	ft/sec
T_m:	104.7	°F	P_s:	30.19	in.Hg
V_{lc}:	53	mL			

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE @ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92}\right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m}\right] = 42.677 \text{ dscf}$$

γ = 0.980

VOLUME OF WATER IN SAMPLE @ STANDARD CONDITIONS

$$V_{wstd} = 0.04707 \times V_{lc} = 2.495 \text{ scf}$$

FRACTIONAL MOISTURE CONTENT OF STACK GAS

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} \times 100 = 5.52 \%$$

CONCENTRATION IN STACK GAS ON A DRY BASIS

$$C_{gas,lb/dscf} = \left(\frac{M_n}{(453.6 \times 10^3 \text{ mg/lb})(V_{mstd})}\right)$$

$$C_{gas,ppmv,db} = (C_{gas,lb/dscf}) \times (1 \times 10^6) \times \left(\frac{(385.26 \text{ft}^3/\text{lb-mole})}{MW}\right)$$

Compound	Mass M_n, mg	Molecular Weight (MW)	C_{gas} lb/dscf x 10^{-6}	ppmv db	lb/h
Hydrochloric Acid	2353.315	36.46	121.6	1285	0.4894

MONITOR DATA SUMMARY

COMPANY :	Premcor Refining
LOCATION:	Port Arthur, Texas
SOURCE :	Chlorosorb Outlet
REPETITION :	3
TEST DATE :	6/29/2005

GAS ANALYZER **VOC**

SCALE :	0-1000 ppm
AVERAGE CAL. BIAS (C_m):	309.20
AVERAGE ZERO BIAS (C_o):	3.50
CALIBRATION GAS:	Diluted EPA Protocol O2
CALIBRATION PPM (C_{ma}):	300.0
% CORRECTED (C_{gas}):	**400.2**

GAS ANALYZER **O2**

SCALE :	0 -10 %
AVERAGE CAL. BIAS (C_m):	5.02
AVERAGE ZERO BIAS (C_o):	0.02
CALIBRATION GAS:	Diluted EPA Protocol O2
CALIBRATION % (C_{ma}):	5.00
% CORRECTED (C_{gas}):	**0.15**

GAS ANALYZER **CO2**

SCALE :	0 -20 %
AVERAGE CAL. BIAS (C_m):	9.65
AVERAGE ZERO BIAS (C_o):	0.04
CALIBRATION GAS:	Diluted EPA Protocol O2
CALIBRATION % (C_{ma}):	10.00
% CORRECTED (C_{gas}):	**18.62**

***ND=Not detetected**

$$C_{gas} = (C - C_o)\frac{C_{ma}}{(C_m - C_o)}$$

CLOCK TIME	ELAPSED TIME	VOC	O2	CO2
10:48	0	-------		
10:49	1	583.71	0.16	18.31
10:50	2	410.58	0.17	18.14
10:51	3	182.62	0.18	17.15
10:52	4	362.30	0.17	18.27
10:53	5	620.07	0.17	18.31
10:54	6	473.66	0.18	18.28
10:55	7	262.94	0.18	17.57
10:56	8	198.37	0.18	17.34
10:57	9	470.33	0.16	18.34
10:58	10	644.89	0.17	18.29
10:59	11	380.34	0.17	18.00
11:00	12	214.18	0.17	17.63
11:01	13	304.75	0.16	17.74
11:02	14	556.20	0.17	18.35
11:03	15	594.06	0.17	18.25
11:04	16	314.96	0.18	17.36
11:05	17	189.66	0.17	17.65
11:06	18	348.10	0.17	18.04
11:07	19	610.29	0.16	18.32
11:08	20	581.32	0.17	18.26
11:09	21	324.78	0.17	17.55
11:10	22	164.43	0.16	17.14
11:11	23	373.85	0.16	18.22
11:12	24	624.89	0.17	18.35
11:13	25	571.07	0.18	18.27
11:14	26	301.85	0.18	17.61
11:15	27	212.56	0.17	17.31
11:16	28	459.82	0.18	18.30
11:17	29	652.15	0.17	18.24
11:18	30	411.35	0.17	17.84
11:19	31	208.17	0.17	17.55
11:20	32	255.75	0.16	17.63
11:21	33	547.88	0.17	18.36
11:22	34	647.41	0.18	18.29
11:23	35	447.31	0.18	18.30
11:24	36	182.40	0.19	17.32
11:25	37	293.09	0.18	18.14
11:26	38	533.00	0.17	17.91
11:27	39	429.44	0.17	18.24
11:28	40	259.07	0.17	17.08
11:29	41	347.72	0.16	17.93
11:30	42	575.40	0.16	18.26
11:31	43	540.19	0.16	18.17
11:32	44	356.37	0.17	17.50
11:33	45	314.28	0.17	17.70
11:34	46	398.29	0.17	18.18
11:35	47	537.94	0.17	17.79
11:36	48	517.00	0.17	18.29
11:37	49	358.20	0.17	17.71
11:38	50	358.48	0.17	17.61
11:39	51	369.76	0.17	18.10
11:40	52	420.45	0.16	17.65
11:41	53	490.29	0.17	18.00
11:42	54	506.19	0.17	18.32
11:43	55	442.70	0.17	17.80
11:44	56	368.96	0.17	18.07
11:45	57	333.35	0.17	17.91
11:46	58	392.00	0.17	17.69
11:47	59	391.46	0.17	17.98
11:48	60	456.24	0.18	17.53
	AVG (C) =	**411.314**	**0.170**	**17.924**

ARI ENVIRONMENTAL, INC.
MOISTURE CALCULATION SUMMARY

COMPANY:	Premcor Refining
LOCATION:	Port Arthur, Texas
SOURCE:	Chlorosorb Outlet
TEST DATE:	6/29/2005
RUN NUMBER:	3

γ FACTOR:	0.988	**STACK DIAM:**	4.0 **inches**
BAROMETRIC:	29.85 **in. Hg**	**METER VOLUME:**	44.755 **ft^3**
STATIC PRES:	-0.035 **$in.H_2O$**	**METER TEMP:**	111.0 **°F**
STACK TEMP:	328.3 **°F**	**LIQUID COLL:**	25.3 **milliliters**
SQ.RT ΔP:	0.3100 **$in.H_2O$**	**CO_2:**	18.62 **% by volume**
ΔH:	1.80 **$in.H_2O$**	**O_2:**	0.15 **% by volume**

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE
@ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92}\right) \text{ x } V_m \text{ x } \gamma \left[\frac{P_{bar} + \left(\frac{\Delta H}{13.6}\right)}{T_m}\right] = 40.973 \text{ dscf}$$

γ = 0.988

VOLUME OF WATER IN SAMPLE
@ STANDARD CONDITIONS

$$V_{wstd} = 0.04707 \text{ x } V_{lc} = 1.191 \text{ scf}$$

V_{lc} = 25.3 mL

FRACTIONAL MOISTURE CONTENT OF STACK GAS

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} = 0.028$$

MOISTURE CONTENT OF STACK GAS @ SATURATION

= 1.000

MOISTURE CONTENT USED IN CALCULATIONS

B_{ws} = 0.028

ARI ENVIRONMENTAL, INC.
FLOW RATE CALCULATION SUMMARY

COMPANY:	Premcor Refining	**SOURCE:**	Chlorosorb Outlet
LOCATION:	Port Arthur, Texas	**TEST DATE:**	6/29/2005
RUN NUMBER:	3		

BAROMETRIC:	29.85 **in. Hg**	**STACK DIAM:**	4 **inches**
STATIC PRES:	-0.035 **in.H_2O**	**CO_2:**	18.62 **% by volume**
STACK TEMP:	328.3 **°F**	**O_2:**	0.15 **% by volume**
SQ.RT ΔP:	0.31 **in.H_2O**		

DRY MOLECULAR WEIGHT OF STACK GAS

$$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$$ = 30.99 **lb/lb-mole**

MOLECULAR WEIGHT OF STACK GAS, wet basis

$$M_s = M_d(1 - B_{ws}) + 18\,B_{ws}$$ = 30.62 **lb/lb-mole**

PITOT TUBE COEFFICIENT

C_p (from calibration curve or geometric specifications) = 0.84

AVERAGE VELOCITY HEAD OF STACK GAS, in. H_2O

$$\overline{\sqrt{\Delta P}} = \frac{1}{n}\sum_{i=1}^{n}\sqrt{\Delta p}$$ = 0.3100 **in. H_2O**

AVERAGE ABSOLUTE STACK GAS TEMPERATURE

T_s = 328.3 °F + 460 = 788 **°R**

ABSOLUTE STACK GAS PRESSURE

$$P_s = P_{bar} + \frac{P_{static}}{13.6}$$ = 29.85 **in.Hg**

STACK GAS VELOCITY

$$V_s = (85.49)(C_p)\left(\text{avg}\sqrt{\Delta P}\right)\sqrt{\frac{T_s}{(P_s)(M_s)}}$$ = 20.68 **ft/sec**

STACK GAS VOLUMETRIC FLOW RATE, actual

$$Q_s = 60 \text{ x } V_s \text{ x } A_s$$ = 108 **acfm**

Stack Area = 0.087 ft^2

STACK GAS VOLUMETRIC FLOW RATE,
standard conditions, wet basis

$$Q_{stdw} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)$$ = 72 **scfm, wb**
4,340 **scfh, wb**

STACK GAS VOLUMETRIC FLOW RATE,
standard conditions, dry basis

$$Q_{std} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)(1 - B_{ws})$$ = 70 **dscfm**
4,217 **dscfh**

VOC CALIBRATION CORRECTION DATA SHEET
USEPA METHOD 25A

COMPANY: Premcor Refining
LOCATION: Port Arthur, Texas
SOURCE: Chlorosorb Outlet
MONITOR ID: VIG Model 20/2 Heated
RUN NO: 3
TEST DATE: 6/29/2005

INPUT

VOC AVERAGE CHART READING (C):	411.3	ppmv C_3H_8
AVG PRE/POST ZERO DRIFT READING (C_o):	0.0	ppmv C_3H_8
CAL GAS CONCENTRATION (C_{ma}):	300.0	ppmv C_3H_8
AVG CAL PRE/POST TEST READING (C_m):	309.2	ppmv C_3H_8
STACK GAS VOLUMETRIC FLOW RATE (Q_{std}):	4,340	scfh

CALCULATIONS

STACK VOC AVERAGE CHART READING = 411.3 ppmv wb C_3H_8

STACK VOC CONC. (as C_1) CORRECTED FOR ZERO AND CALIBRATION DRIFT:

VOC CONC, ppmv (corrected) = $C_{gas,ppm} = \left(\overline{C} - C_o\right)\frac{C_{ma}}{C_m - C_o}$ = 399.1 ppmv wb C_3H_8

VOC CONC, ppmv (corrected) = $C_{gas,ppm\ C_1} = 3\left(C_{gas,ppm\ C_3H_8}\right)$ = 1,197 ppmv wb C_1

(3 =carbon equivalent factor for propane)

VOC CONC, ppmv = $C_{gas,ppm\ C_6} = \left[\frac{(C_1/6)}{(1-Bws)}\right] * \left(\frac{17.9}{20.9 - O_2\%}\right)$ 175.9 ppmv wb C_6 @0% O_2

VOC CONC.(lbs/dscf) =

$C_{gas,lb/dscf} = \left(C_{gas,ppm}\right)\left(\frac{12 lb/lb-mole}{385.26 \times 10^6 ft^3/lb-mole}\right)$ = 37.29 x 10^{-6} lbs C_1/scf

VOC EMISSION RATE (as C_1) :

STACK GAS VOLUMETRIC FLOW RATE = 4,340 scfh

STACK VOC EMISSION RATE =

$VOC_{pmr} = \left(C_{gas,lb/dscf}\right)\left(Q_{std}\right)$ = 0.1618 lbs/hr
= 0.7089 ton/yr

ARI ENVIRONMENTAL, INC.
COMPOUND EMISSION
CALCULATION SUMMARY

COMPANY: Premcor Refining
LOCATION: Port Arthur, Texas
SOURCE: Chlorosorb Outlet
TEST DATE: 6/29/2005
RUN NUMBER: 3

INPUT

V_m:	44.755	ft3	Q_{std}:	70	dscfm
γ FACTOR:	0.988		T_s:	328.3	°F
P_{bar}:	29.85	in.Hg	Runtime:	60	minutes
ΔH:	1.8	in.H2O	V_s:	20.676	ft/sec
T_m:	111	°F	P_s:	29.85	in.Hg
V_{lc}:	25.3	mL			

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE @ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92}\right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m}\right] = 40.973 \text{ dscf}$$

γ = 0.988

VOLUME OF WATER IN SAMPLE @ STANDARD CONDITIONS

$$V_{wstd} = 0.04707 \times V_{lc} = 1.191 \text{ scf}$$

FRACTIONAL MOISTURE CONTENT OF STACK GAS

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} \times 100 = 2.82 \%$$

CONCENTRATION IN STACK GAS ON A DRY BASIS

$$C_{gas,lb/dscf} = \left(\frac{M_n}{(453.6 \times 10^3 \text{ mg/lb})(V_{mstd})}\right)$$

$$C_{gas,ppmv,db} = (C_{gas,lb/dscf}) \times (1 \times 10^6) \times \left(\frac{(385.26 \text{ft}^3/\text{lb-mole})}{MW}\right)$$

Compound	Mass M_n, mg	Molecular Weight (MW)	C_{gas} lb/dscf x 10^{-6}	ppmv db	lb/h
Hydrochloric Acid	18.477	36.46	0.994	10.5	0.00419

HYDROCHLORIC ACID EMISSION RATE:

INLET HYDROCHLORIC ACID EMISSION RATE =

$$HCL_{pmr} = (C_{gas,lb/dscf})(Q_{std})$$

= 0.4894 lbs/hr
= 2.143 ton/yr

STACK HYDROCHLORIC ACID EMISSION RATE =

$$HCL_{pmr} = (C_{gas,lb/dscf})(Q_{std})$$

= 0.00419 lbs/hr
= 0.0184 ton/yr

DESTRUCTION AND REMOVAL EFFICENCY= 99.1 %

CEMS CALIBRATION DATA

Plant	Premcor Refining
Location	Port Arthur, Texas
Source	Chlorosorb
Date	6/29/2005
Run Number	1
Start Time	8.22
Stop Time	9.22

Plant Rep.	John Jenkins
Team Leader	James Wedemeier
CEM Operator	James Wedemeier

Analyzer Span Values (% or ppm)		
CO	-	ppm
CO2	20	%
O2	10	%
THC	1000	ppm
NOx	-	ppm
SO2	-	ppm

	CALIBRATION ERROR - 7.47 hrs				SYSTEM BIAS CHECK					Calibration
					Pretest: 8.03		Posttest: 9.27 hrs			
	Cylinder Value (% or ppm)	Cylinder Number	Analyzer Calibration Response	Difference (% of Span)	System Response	Syst. Bias (% of Span)	System Response	Syst. Bias (% of Span)	Drift (% of Span)	Correction Factors
CO Zero										Co=
CO Low										
CO Mid										Cm=
CO High										
CO_2 Zero	0.00	CC3266	-0.04		-0.01		0.03			Co=
CO_2 Low		diluted								
CO_2 Mid	10.00	CC133854	9.86		9.60		9.60			Cm=
CO_2 High	18.00	25.26 %	17.95							
O_2 Zero	0.00	CC133854	-0.11		0.03		0.01			Co=
O_2 Low		diluted								
O_2 Mid	5.00	CC3266	4.93		5.01		5.00			Cm=
O_2 High	9.00	24.8 %	8.95							
THC Zero	0.0	CC3266	-1.5		-1.5		3.0			Co=
THC Low	300.0	diluted	300.3		300.3		307.9			
THC Mid	500.0	CC76030	500.7							Cm=
THC High	850.0	2002 ppm	845.0							
NO_x Zero										Co=
NO_x Low										
NO_x Mid										Cm=
NO_x High										
SO_2 Zero										Co=
SO_2 Low										
SO_2 Mid										Cm=
SO_2 High										

CEMS CALIBRATION DATA

Plant	Premcor Refining
Location	Port Arthur, Texas
Source	Chlorosorb
Date	6/29/2005
Run Number	2
Start Time	9.37
Stop Time	10.37

Plant Rep.	John Jenkins
Team Leader	James Wedemeier
CEM Operator	James Wedemeier

Analyzer Span Values (% or ppm)

CO	-	ppm
CO2	20	%
O2	10	%
THC	1000	ppm
NOx	-	ppm
SO2	-	ppm

	CALIBRATION ERROR - hrs				SYSTEM BIAS CHECK					Calibration Correction Factors
					Pretest:		Posttest: 10.39 hrs			
	Cylinder Value (% or ppm)	Cylinder Number	Analyzer Calibration Response	Difference (% of Span)	System Response	Syst. Bias (% of Span)	System Response	Syst. Bias (% of Span)	Drift (% of Span)	
CO Zero										Co=
CO Low										
CO Mid										Cm=
CO High										
CO_2 Zero	0.00	CC3266					0.04			Co=
CO_2 Low		diluted								
CO_2 Mid	10.00	CC133854					9.65			Cm=
CO_2 High	18.00	25.26 %								
O_2 Zero	0.00	CC133854					0.02			Co=
O_2 Low		diluted								
O_2 Mid	5.00	CC3266					5.02			Cm=
O_2 High	9.00	24.8 %								
THC Zero	0.0	CC3266					3.3			Co=
THC Low	300.0	diluted								
THC Mid	500.0	CC76030					307.8			Cm=
THC High	850.0	2002 ppm								
NO_x Zero										Co=
NO_x Low										
NO_x Mid										Cm=
NO_x High										
SO_2 Zero										Co=
SO_2 Low										
SO_2 Mid										Cm=
SO_2 High										

CEMS CALIBRATION DATA

Plant	Premcor Refining
Location	Port Arthur, Texas
Source	Chlorosorb
Date	6/29/2005
Run Number	3
Start Time	10.48
Stop Time	11.48

Plant Rep.	John Jenkins
Team Leader	James Wedemeier
CEM Operator	James Wedemeier

Analyzer Span Values (% or ppm)		
CO	-	ppm
CO2	20	%
O2	10	%
THC	1000	ppm
NOx	-	ppm
SO2	-	ppm

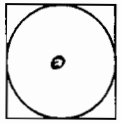
	CALIBRATION ERROR - hrs				SYSTEM BIAS CHECK					Calibration Correction Factors
					Pretest:		Posttest: 11.50 hrs			
	Cylinder Value (% or ppm)	Cylinder Number	Analyzer Calibration Response	Difference (% of Span)	System Response	Syst. Bias (% of Span)	System Response	Syst. Bias (% of Span)	Drift (% of Span)	
CO Zero										Co=
CO Low										
CO Mid										Cm=
CO High										
CO_2 Zero	0.00	CC3266					0.04			Co=
CO_2 Low		diluted								
CO_2 Mid	10.00	CC133854					9.64			Cm=
CO_2 High	18.00	25.26 %								
O_2 Zero	0.00	CC133854					0.02			Co=
O_2 Low		diluted								
O_2 Mid	5.00	CC3266					5.02			Cm=
O_2 High	9.00	24.8 %								
THC Zero	0.0	CC3266					3.7			Co=
THC Low	300.0	diluted								
THC Mid	500.0	CC76030					310.6			Cm=
THC High	850.0	2002 ppm								
NO_x Zero										Co=
NO_x Low										
NO_x Mid										Cm=
NO_x High										
SO_2 Zero										Co=
SO_2 Low										
SO_2 Mid										Cm=
SO_2 High										

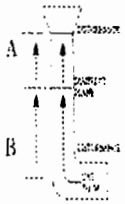
FIELD DATA

PLANT	PREMCOR	METER BOX NO.	50280	BAROMETER NO.	EB833-1
DATE	6-29-05	AMBIENT TEMPERATURE	90°	PROBE HEATER SETTING	—
LOCATION	P.A., TX	BAROMETRIC PRESSURE	29.85	HEATER BOX SETTING	—
OPERATOR	CW	ASSUMED MOISTURE, %		METER H	1.64
STACK NO.	Chlorosorb - INLET	PROBE LENGTH, in.	48"	C_d FACTOR	0.84
METHOD	26	NOZZLE DIAMETER, in.	—	Y FACTOR	0.980
RUN NO.	1	STACK DIAMETER, in.	4"		
METER NO.	—	PITOT NO.	P65		

PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

A= _____
B= _____





CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLE TIME min.	STATIC PRESSURE (in., H_2O)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_s)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE (ΔH) In., H_2O ACTUAL	PRESSURE DIFFERENTIAL ACROSS ORIFICE (ΔH) In., H_2O DESIRED	GAS SAMPLE VOLUME (V_m), ft^3	GAS TEMP AT DRY GAS METER INLET ($T_{m_{in}}$) F	GAS TEMP AT DRY GAS METER OUTLET ($T_{m_{out}}$) F	SAMPLE BOX TEMP F	TEMP OF GAS LEAVING LAST IMPINGER	PUMP VACUUM in., Hg
8:22		0	+4.6	419	0.10		1.6	1.64	95.109	90	90		64	3
		5		421	0.10		1.6	↓	98.9	93	91		62	3
8:32		10		420	0.10		1.6		102.8	97	91		60	3
		15		421	0.10		1.6		106.7	100	91		59	3
8:42		20		423	0.110		1.6		110.5	102	92		60	3
		25		423	0.110		1.6		114.4	103	93		60	3
8:52		30		421	0.115		1.6		118.2	104	94		61	3
		35		422	0.110		1.6		122.0	104	94		61	3
9:02		40		422	0.110		1.6		125.9	105	94		61	3
		45		421	0.115		1.6		129.7	107	95		62	3
9:12		50		422	0.105		1.6		133.6	110	97		63	3
		55		424	0.110		1.6		137.5	112	98		63	3
9:22		60		—	—		—	—	141.455	—	—		—	—
TOTAL				421.6		$\sqrt{0.3271}$			46.346	97.8				
AVERAGE														

VOLUME OR WEIGHT OF LIQUID COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT
CONTENTS	H_2SO_4	H_2SO_4	NaOH	NaOH	
FINAL	136	106	100	100	261.3
INITIAL	100	100	100	100	250.0
LIQUID COLLECTED	36	6	0	0	11.3
TOTAL 53.3 COLLECTED (specify ml or mg)					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1		18.7	0.8	
2				
3				
AVG				

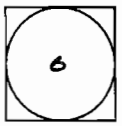
LEAK CHECK		
SYSTEM	PRE: 0.00	CFM at 15" Hg
	POST: 0.00	CFM at Hg
PITOT	PRE: ✓	3" H_2O for 15 sec
	POST: ✓	3" H_2O for 15 sec

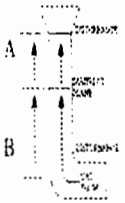
FIELD DATA

PLANT	PREMCOR	METER BOX NO.	50280	BAROMETER NO.	EB833-1
DATE	6-29-05	AMBIENT TEMPERATURE	93F	PROBE HEATER SETTING	—
LOCATION	P.A., TX	BAROMETRIC PRESSURE	29.85	HEATER BOX SETTING	—
OPERATOR	CW	ASSUMED MOISTURE, %		METER H	1.64
STACK NO.	Chlorosorb-INLET	PROBE LENGTH, in.	48"	C_d FACTOR	0.84
METHOD	M26	NOZZLE DIAMETER, in.		Y FACTOR	0.980
RUN NO.	2	STACK DIAMETER, in.	4"		
METER NO.	—	PITOT NO.	P65		

PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

A= ____
B= ____





CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLE TIME min.	STATIC PRESSURE (in., H_2O)	STACK TEMP (T_s), F	VELOCITY HEAD (ΔP_s)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE (ΔH) In., H_2O) ACTUAL	PRESSURE DIFFERENTIAL ACROSS ORIFICE (ΔH) In., H_2O) DESIRED	GAS SAMPLE VOLUME (V_m), ft^3	GAS TEMP AT DRY GAS METER INLET (Tm_{in}) F	GAS TEMP AT DRY GAS METER OUTLET (Tm_{out}) F	SAMPLE BOX TEMP F	TEMP OF GAS LEAVING LAST IMPINGER	PUMP VACUUM in., Hg
9:37		0	+4.6	422	0.11		1.6	1.64	141.641	98	99		64	3
		5		420	0.11		1.6		145.4	103	98		63	3
9:47		10		422	0.11		1.6		149.4	107	98		59	3
		15		420	0.105		1.6		153.2	108	98		58	3
9:57		20		421	0.10		1.6		157.1	109	99		60	3
		25		422	0.11		1.6		161.0	110	99		59	3
10:07		30		421	0.105		1.6		164.9	112	99		58	3
		35		422	0.105		1.6		168.8	112	100		58	3
10:17		40		422	0.105		1.6		172.7	112	100		59	3
		45		421	0.105		1.6		176.6	111	100		60	3
10:27		50		421	0.105		1.6		180.5	112	100		60	3
		55		420	0.110		1.6		184.4	113	101		60	3
10:37		60		—	—		—	—	188.320	—	—		—	—
TOTAL				421.2		0.3266			46.679		104.1			
AVERAGE														

VOLUME OR WEIGHT OF LIQUID COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT
CONTENTS	H_2SO_4	H_2SO_4	N_2O_4H	N_2O_4H	
FINAL	134	106	100	100	261.0
INITIAL	100	100	100	100	250.0
LIQUID COLLECTED	34	6	0	0	11.0
TOTAL 51	COLLECTED (specify ml or mg)				

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1		18.7	0.8	
2				
3				
AVG				

LEAK CHECK			
SYSTEM	PRE:	0.00	CFM at 15" Hg
	POST:	0.00	CFM at Hg
PITOT	PRE:	✓	3" H_2O for 15 sec
	POST:	✓	3" H_2O for 15 sec

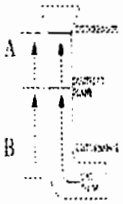
AKI ENVIRONMENTAL INC.

FIELD DATA

PLANT	PREMCOR	METER BOX NO.	50280	BAROMETER NO.	EB833-1
DATE	6-29-05	AMBIENT TEMPERATURE	94	PROBE HEATER SETTING	—
LOCATION	P.A., TX	BAROMETRIC PRESSURE	29.85	HEATER BOX SETTING	—
OPERATOR	CW	ASSUMED MOISTURE, %		METER H	1.64
STACK NO.	Chlorosorb-Inlet	PROBE LENGTH, in.	48"	C_d FACTOR	0.84
METHOD	26	NOZZLE DIAMETER, in.	—	Y FACTOR	0.980
RUN NO.	3	STACK DIAMETER, in.	4"		
METER NO.	—	PITOT NO.	P65		

PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

A= _____
B= _____



CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLE TIME min.	STATIC PRESSURE (in., H_2O)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_s)	VELOCITY HEAD ($\sqrt{\Delta P_s}$)	PRESSURE DIFFERENTIAL ACROSS ORIFICE (ΔH) in., H_2O) ACTUAL	PRESSURE DIFFERENTIAL ACROSS ORIFICE (ΔH) in., H_2O) DESIRED	GAS SAMPLE VOLUME (V_m), ft^3	GAS TEMP AT DRY GAS METER INLET (Tm_{in}) F	GAS TEMP AT DRY GAS METER OUTLET (Tm_{out}) F	SAMPLE BOX TEMP F	TEMP OF GAS LEAVING LAST IMPINGER	PUMP VACUUM in., Hg
10:48		0	+4.6	421	0.105		1.6	1.64	188.550	100	100		65	3
		5		421	0.105		1.6		192.3	106	100		63	3
10:58		10		420	0.10		1.6		196.4	108	100		62	3
		15		421	0.10		1.6		200.3	108	100		60	3
11:08		20		420	0.10		1.6		204.3	109	99		56	3
		25		420	0.10		1.6		208.2	110	100		54	3
11:18		30		421	0.105		1.6		212.1	110	100		54	3
		35		421	0.110		1.6		215.9	110	100		52	3
11:28		40		420	0.095		1.6		219.7	110	100		52	3
		45		421	0.105		1.6		223.5	112	101		53	3
11:38		50		422	0.110		1.6		227.4	113	102		54	3
		55		421	0.110		1.6		231.2	113	102		55	3
11:48		60		—	—		—	—	235.051	—	—		—	—
TOTAL				420.8		$\sqrt{0.3220}$			46.501	104.7				
AVERAGE														

VOLUME OR WEIGHT OF LIQUID COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT
CONTENTS	H_2SO_4	H_2SO_4	N_2O_4	N_2O_4	
FINAL	134	107	100	100	262.0
INITIAL	100	100	100	100	250.0
LIQUID COLLECTED	34	7	0	0	12.0
TOTAL 53	COLLECTED (specify ml or mg)				

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1		18.7	0.5	
2				
3				
AVG				

LEAK CHECK		
SYSTEM	PRE: 0.00	CFM at 15" Hg
	POST: 0.00	CFM at Hg
PITOT	PRE: ✓	3" H_2O for 15 sec
	POST: ✓	3" H_2O for 15 sec

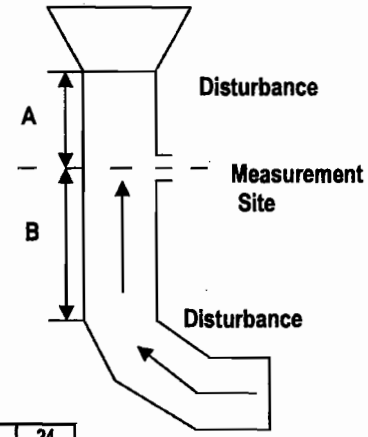
TRAVERSE POINT LOCATION FOR CIRCULAR AND RECTANGULAR DUCTS

PLANT Premcor Refining
DATE 6/29/05
SAMPLING LOCATION Chlorosorb Inlet
INSIDE OF FAR WALL TO
OUTSIDE OF PORT (DISTANCE C) 20½
INSIDE OF NEAR WALL TO
OUTSIDE OF PORT (DISTANCE D) 16½"
STACK ID 4"
NEAREST UPSTREAM DISTURBANCE (A) 72.0 dd
NEAREST DOWNSTREAM DISTURBANCE (B) 78.0 dd

CALCULATOR JW

Location of Traverse Points in Rectangular Stacks

	2	3	4	5	6	7	8	9	10	11	12
1	25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2	75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.5
3		83.3	62.5	60.0	41.7	35.7	31.3	27.8	25.0	22.7	20.8
4			87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5				90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6					91.7	78.6	68.8	61.1	55.0	50.0	45.8
7						92.9	81.3	72.2	65.0	59.1	54.2
8							93.8	83.3	75.0	68.2	62.5
9								94.4	85.0	77.3	70.8
10									95.0	86.4	79.2
11										95.5	87.5
12											95.8

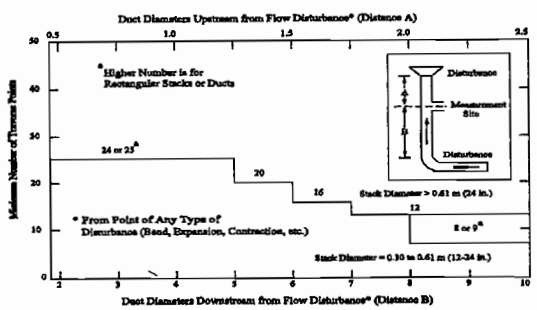


Rectangular Duct Equivalent Diameter Determination $\frac{2 \times L \times W}{L + W}$

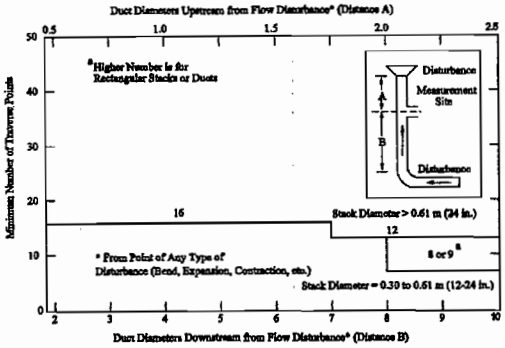
TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 1 AND 2 (TO NEAREST 1/8 INCH)	DISTANCE D (PORT DEPTH)	TRAVERSE POINT LOCATION FROM OUTSIDE OF PORT (SUM OF COLUMNS 3 AND 4)
1	0.50	4"	2"	16½	18½
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					

LOCATION OF TRAVERSE POINTS ON CIRCULAR STACKS

	4	6	8	10	12	14	16	18	20	22	24
1	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3	75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4	93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5		85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6		95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7			89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8			96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9				91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10				97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11					93.3	85.4	78.0	70.4	61.2	39.3	32.3
12					97.9	90.1	83.1	76.4	69.4	60.7	39.8
13						94.3	87.5	81.2	75.0	68.5	60.2
14						98.2	91.5	85.4	79.6	73.8	67.7
15							95.1	89.1	83.5	78.2	72.8
16							98.4	92.5	87.1	82.0	77.0
17								95.6	90.3	85.4	80.6
18								98.6	93.3	88.4	83.9
19									96.1	91.3	86.8
20									98.7	94.0	89.5
21										96.5	92.1
22										98.9	94.5
23											96.8
24											98.9



Minimum number of traverse points for particulate traverses.



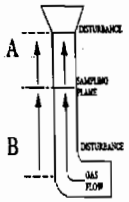
Minimum number of traverse points for velocity (nonparticulate) traverses.

FIELD DATA

PLANT	PRIMCOR	METER BOX NO.	604180	BAROMETER NO.	E0833-1
DATE	~~[illegible]~~ 6-29-05	AMBIENT TEMPERATURE	90°	PROBE HEATER SETTING	
LOCATION	Port Arthur, Tx	BAROMETRIC PRESSURE	29.85	HEATER BOX SETTING	
OPERATOR	JD	ASSUMED MOISTURE, %		METER H	1.83
STACK NO.	Chlorosorb Outlet	PROBE LENGTH, in.		C_d FACTOR	0.94
METHOD	26	NOZZLE DIAMETER, in.		Y FACTOR	0.998
RUN NO.	1	STACK DIAMETER, in.	8"		
METER NO.		PITOT NO.			

PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

A= _____
B= _____



CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLE TIME min.	STATIC PRESSURE (in., H_2O)	STACK TEMP (T_S), °F	VELOCITY HEAD (ΔP_S)	$\sqrt{\Delta P_S}$	PRESSURE DIFFERENTIAL ACROSS ORIFICE (ΔH) In., H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS TEMP AT DRY GAS METER INLET (Tm_{in}) °F	OUTLET (Tm_{out}) °F	SAMPLE BOX TEMP °F	TEMP OF GAS LEAVING LAST IMPINGER	PUMP VACUUM in., Hg
8:22		0	-.035	332	.095		1.80	1.83	895.874	98	85		58	3
8:27		5		329	.085		1.80		899.83	101	86		56	3
8:32		10		326	.090		1.80		903.50	101	87		60	3
8:37		15		327	.085		1.80		907.16	101	88		60	3
8:42		20		327	.090		1.80		910.83	101	88		60	3
8:47		25		330	.090		1.80		914.47	102	89		61	3
8:52		30		330	.095		1.80		918.37	102	89		61	3
8:57		35		336	.085		1.80		921.78	102	89		62	3
9:02		40		321	.090		1.80		925.44	102	90		60	3
9:07		45		320	.085		1.80		929.10	104	90		54	3
9:12		50		325	.095		1.80		932.76	106	91		53	3
9:17		55		336	.095		1.80		936.42	106	92		53	3
9:22		60		—	—		—	—	940.068	—	—	—	—	—
TOTAL				328.3	10.2999				44.194	95.4				
AVERAGE														

VOLUME OR WEIGHT OF LIQUID COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT
CONTENTS	H_2SO_4	H_2SO_4	NaOH	NaOH	
FINAL	110	103	100	100	214.3
INITIAL	100	100	100	100	250.0g
LIQUID COLLECTED	10	3	0	0	14.3
TOTAL 27.3 COLLECTED (specify ml or mg)					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
AVG				

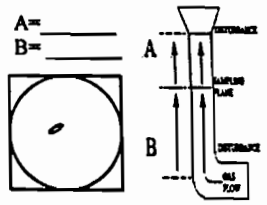
LEAK CHECK		
SYSTEM	PRE: 0.00	CFM at 15" Hg
	POST: ✓	CFM at ___ Hg
PITOT	PRE: ✓	3" H_2O for 15 sec
	POST: ✓	3" H_2O for 15 sec

FIELD DATA

PLANT	Premcor	METER BOX NO.	604180	BAROMETER NO.	EB833-1
DATE	6-29-05	AMBIENT TEMPERATURE	95°	PROBE HEATER SETTING	
LOCATION	Port Arthur, TX	BAROMETRIC PRESSURE	29.85	HEATER BOX SETTING	
OPERATOR	JA	ASSUMED MOISTURE, %		METER H	1.83
STACK NO.	Chlorosorb Outlet	PROBE LENGTH, in.		C_d FACTOR	0.84
METHOD	26	NOZZLE DIAMETER, in.		Y FACTOR	0.988
RUN NO.	2	STACK DIAMETER, in.	8"		
METER NO.		PITOT NO.			

PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

A= _____
B= _____



CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLE TIME min.	STATIC PRESSURE (in., H_2O)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_s)	$\sqrt{\Delta P_s}$	PRESSURE DIFFERENTIAL ACROSS ORIFICE (ΔH) In., H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS TEMP AT DRY GAS METER INLET (Tm_{in}) °F	OUTLET (Tm_{out}) °F	SAMPLE BOX TEMP °F	TEMP OF GAS LEAVING LAST IMPINGER	PUMP VACUUM in., Hg
9:37		0	-0.035	327	.10		1.80	1.83	940.514	100	92		63	3
9:42		5		319	.10		1.80		944.21	104	92		60	3
9:47		10		328	.095		1.80		947.94	110	92		59	3
9:52		15		334	.095		1.80		951.69	113	94		59	3
9:57		20		325	.095		1.80		955.46	117	94		55	3
10:02		25		324	.100		1.80		959.25	117	96		55	3
10:07		30		330	.100		1.80		963.01	118	98		55	3
10:12		35		331	.100		1.80		966.92	120	99		53	3
10:17		40		323	.100		1.80		970.76	121	100		53	3
10:22		45		324	.095		1.80		974.60	120	101		54	3
10:27		50		324	.090		1.80		978.37	119	101		54	3
10:32		55		326	.085		1.80		982.26	119	101		55	3
10:37		60		—	—		—	—	986.085	—	—		—	—
TOTAL				326.3	$\sqrt{0.3115}$				45.571	105.8				
AVERAGE														

VOLUME OR WEIGHT OF LIQUID COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT
CONTENTS	H_2SO_4	H_2SO_4	NaOH	NaOH	
FINAL	110	102	100	100	263.2
INITIAL	100	100	100	100	250.0g
LIQUID COLLECTED	10	2	0	0	13.2
TOTAL 25.2 COLLECTED (specify ml or mg)					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
AVG				

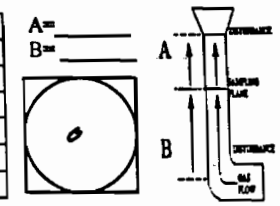
LEAK CHECK		
SYSTEM	PRE: 0.00	CFM at 15" Hg
	POST: 0.00	CFM at Hg
PITOT	PRE: ✓	3" H_2O for 15 sec
	POST: ✓	3" H_2O for 15 sec

FIELD DATA

PLANT	Premcor	METER BOX NO.	604180	BAROMETER NO.	EB833-1
DATE	6-24-05	AMBIENT TEMPERATURE	96°	PROBE HEATER SETTING	
LOCATION	Port Arthur, TX	BAROMETRIC PRESSURE	29.85	HEATER BOX SETTING	
OPERATOR	JD	ASSUMED MOISTURE, %		METER H	1.83
STACK NO.	Chlorosorb outlet	PROBE LENGTH, in.		C_d FACTOR	0.84
METHOD	26	NOZZLE DIAMETER, in.		Y FACTOR	0.988
RUN NO.	3	STACK DIAMETER, in.	8"		
METER NO.	—	PITOT NO.			

PARTICULATE COLLECTED, mg		
FILTER NO.		
SAMPLE	FILTER	PROBE
FINAL WEIGHT		
TARE WEIGHT		
WEIGHT GAIN		
TOTAL		

A= B=



CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLE TIME min.	STATIC PRESSURE (in., H_2O)	STACK TEMP (T_s), °F	VELOCITY HEAD (ΔP_s)	$\sqrt{\Delta P_s}$	PRESSURE DIFFERENTIAL ACROSS ORIFICE (ΔH) In., H_2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (Vm), ft^3	GAS TEMP AT DRY GAS METER INLET (Tm_{in}) °F	OUTLET (Tm_{out}) °F	SAMPLE BOX TEMP °F	TEMP OF GAS LEAVING LAST IMPINGER	PUMP VACUUM in., Hg
10:48		0	-0.035	333	.100		1.80	1.83	986.206	104	98		64	3
10:53		5		336	.110		1.80		989.83	120	101		56	3
10:58		10		333	.095		1.80		993.56	123	102		50	3
11:03		15		329	.100		1.80		997.39	123	103		51	3
11:08		20		331	.095		1.80		1001.22	123	104		51	3
11:13		25		321	.095		1.80		005.00	119	105		53	3
11:18		30		331	.110		1.80		008.72	118	105		54	3
11:23		35		323	.095		1.80		012.44	120	104		54	3
11:28		40		321	.085		1.80		016.16	120	104		55	3
11:33		45		327	.090		1.80		019.87	118	104		55	3
11:38		50		324	.085		1.80		023.58	119	104		54	3
11:43		55		330	.095		1.80		027.27	119	105		54	3
11:48		60					—	—	030.461	—	—		—	—
TOTAL				328.3	$\sqrt{0.3100}$				44.755	111.0				
AVERAGE														

VOLUME OR WEIGHT OF LIQUID COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g) 1	2	3	4	SILICA GEL WEIGHT
CONTENTS	H_2SO_4	H_2SO_4	NaOH	NaOH	
FINAL	112	102	100	100	261.3g
INITIAL	100	100	100	100	250.0g
LIQUID COLLECTED	12	2	0	0	11.3
TOTAL 25.3 COLLECTED (specify ml or mg)					

ORSAT MEASUREMENT	TIME	CO_2	O_2	CO
1				
2				
3				
AVG				

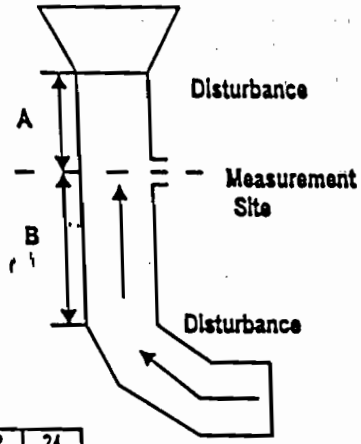
LEAK CHECK		
SYSTEM	PRE: 0.00	CFM at 15" Hg
	POST: 0.00	CFM at Hg
PITOT	PRE: ✓	3" H_2O for 15 sec
	POST: ✓	3" H_2O for 15 sec

TRAVERSE POINT LOCATION FOR CIRCULAR AND RECTANGULAR DUCTS

PLANT Premcor
DATE 6/28/05
SAMPLING LOCATION Chlorosorb outlet
INSIDE OF FAR WALL TO
OUTSIDE OF PORT (DISTANCE C) 24 1/2"
INSIDE OF NEAR WALL TO
OUTSIDE OF PORT (DISTANCE D) 16 1/2"
STACK ID 8"
NEAREST UPSTREAM DISTURBANCE (A) 6'
NEAREST DOWNSTREAM DISTURBANCE (B) 6'
CALCULATOR Joe Jorry

Location of Traverse Points in Rectangular Stacks

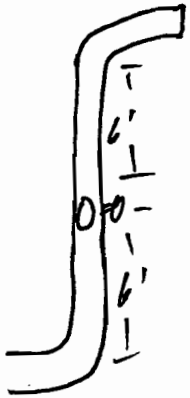
	2	3	4	5	6	7	8	9	10	11	12
1	25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2	75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.5
3		83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	22.7	20.8
4			87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5				90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6					91.7	78.6	68.8	61.1	55.0	50.0	45.8
7						92.9	81.3	72.2	65.0	59.1	54.2
8							93.8	83.3	75.0	68.2	62.5
9								94.4	85.0	77.3	70.8
10									95.0	86.4	79.2
11										95.5	87.5
12											95.8



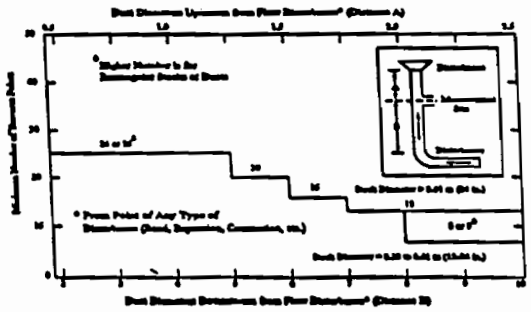
Rectangular Duct Equivalent Diameter Determination $\frac{2 \times L \times W}{L + W}$

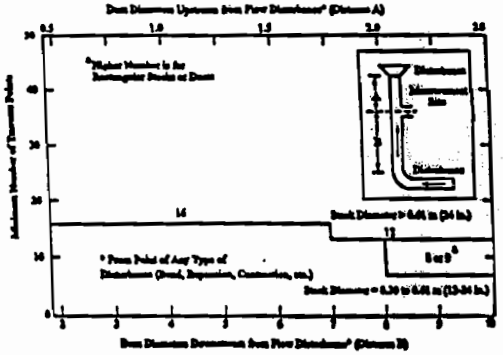
LOCATION OF TRAVERSE POINTS ON CIRCULAR STACKS

	4	6	8	10	12	14	16	18	20	22	24
1	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3	75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4	93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5		85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6		95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7			89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8			96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9				91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10				97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11					93.3	85.4	78.0	70.4	61.2	39.3	32.3
12					97.9	90.1	83.1	76.4	69.4	60.7	39.8
13						94.3	87.5	81.2	75.0	68.5	60.2
14						98.2	91.5	85.4	79.6	73.8	67.7
15							95.1	89.1	83.5	78.2	72.8
16							98.4	92.5	87.1	82.0	77.0
17								95.6	90.3	85.4	80.6
18								98.6	93.3	88.4	83.9
19									96.1	91.3	86.8
20									98.7	94.0	89.5
21										96.5	92.1
22										98.9	94.5
23											96.8
24											98.9



TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 1 AND 2 (TO NEAREST 1/8 INCH)	DISTANCE D (PORT DEPTH)	TRAVERSE POINT LOCATION FROM OUTSIDE OF PORT (SUM OF COLUMNS 3 AND 4)
1	.500	8"	4"	16 1/2"	20 1/2"
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					





Premcor, TX, Chlorosorb Inlet & Outlet; 6/28/05 -6/29/05
USEPA Method 26 40CFR60, Appx. A
HCl & Cl_2 Determination

Calibration Curve Calculation

Std. (µg/ml)	Pre Cal (µS*min)	Post Cal (µS*min)	Average (µS*min)
1.0	0.232	0.234	0.233
2.0	0.462	0.471	0.467
5.0	1.096	1.125	1.111
10.0	2.321	2.351	2.336
25.0	6.460	6.488	6.474
50.0	14.301	14.376	14.339

Sample Concentration Calculations

ID	Analysis 1 (µS*min)	Analysis 2 (µS*min)	Average (µS*min)	Concentration (µg/ml)	Deviation (%)	Dilution Factor	Sample volume(ml)	Sample HCl mass (µg)	Sample Cl_2 mass (µg)
Inlet Run 1 H_2SO_4 Imps	14.222	14.218	14.220	50.79	-0.01	200	250	2,610,511	-
Inlet Run 2 H_2SO_4 Imps	14.196	14.209	14.203	50.73	0.05	200	250	2,607,298	-
Inlet Run 3 H_2SO_4 Imps	12.738	12.900	12.819	45.78	0.63	200	250	2,353,315	-
Inlet Run 1 NaOH Imps	<0.020	<0.020	<0.020	<0.07	0.00	1	200	-	<14
Inlet Run 2 NaOH Imps	<0.020	<0.020	<0.020	<0.07	0.00	1	200	-	<14
Inlet Run 3 NaOH Imps	<0.020	<0.020	<0.020	<0.07	0.00	1	200	-	<14
Outlet Run 1 H_2SO_4 Imps	10.094	9.337	9.716	34.70	-3.90	2	250	17,836	-
Outlet Run 2 H_2SO_4 Imps	6.304	6.847	6.576	23.49	4.13	2	250	12,071	-
Outlet Run 3 H_2SO_4 Imps	10.074	10.056	10.065	35.95	-0.09	2	250	18,477	-
Outlet Run 1 NaOH Imps	<0.020	<0.020	<0.020	<0.07	0.00	1	200	-	<14
Outlet Run 2 NaOH Imps	<0.020	<0.020	<0.020	<0.07	0.00	1	200	-	<14
Outlet Run 3 NaOH Imps	<0.020	<0.020	<0.020	<0.07	0.00	1	200	-	<14
0.1 N H_2SO_4 Blank	0.023	0.022	0.023	0.08	-2.22	-	-	-	-
0.1 N NaOH Blank	<0.020	<0.020	<0.020	<0.07	0.00	-	-	-	-

Analyst: E. Vogt
Date: 7/19/05

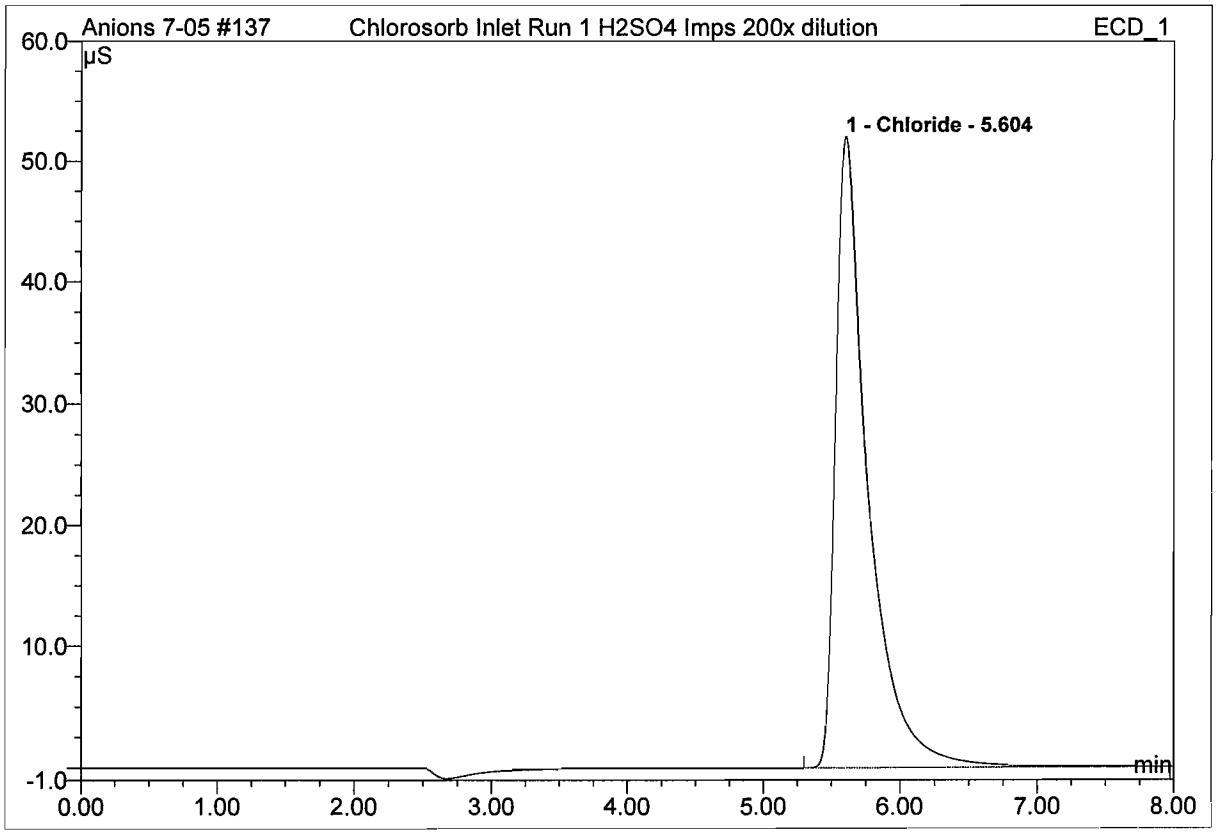
Standards Average for Calibration

1.0	0.233	0.233	-4.7
2.0	0.467	0.233	-4.6
5.0	1.111	0.222	-9.2
10.0	2.336	0.234	-4.5
25.0	6.474	0.259	5.9
50.0	14.339	0.287	17.2

Average RE 0.245

137 Chlorosorb Inlet Run 1 H2SO4 Imps 200x dilution

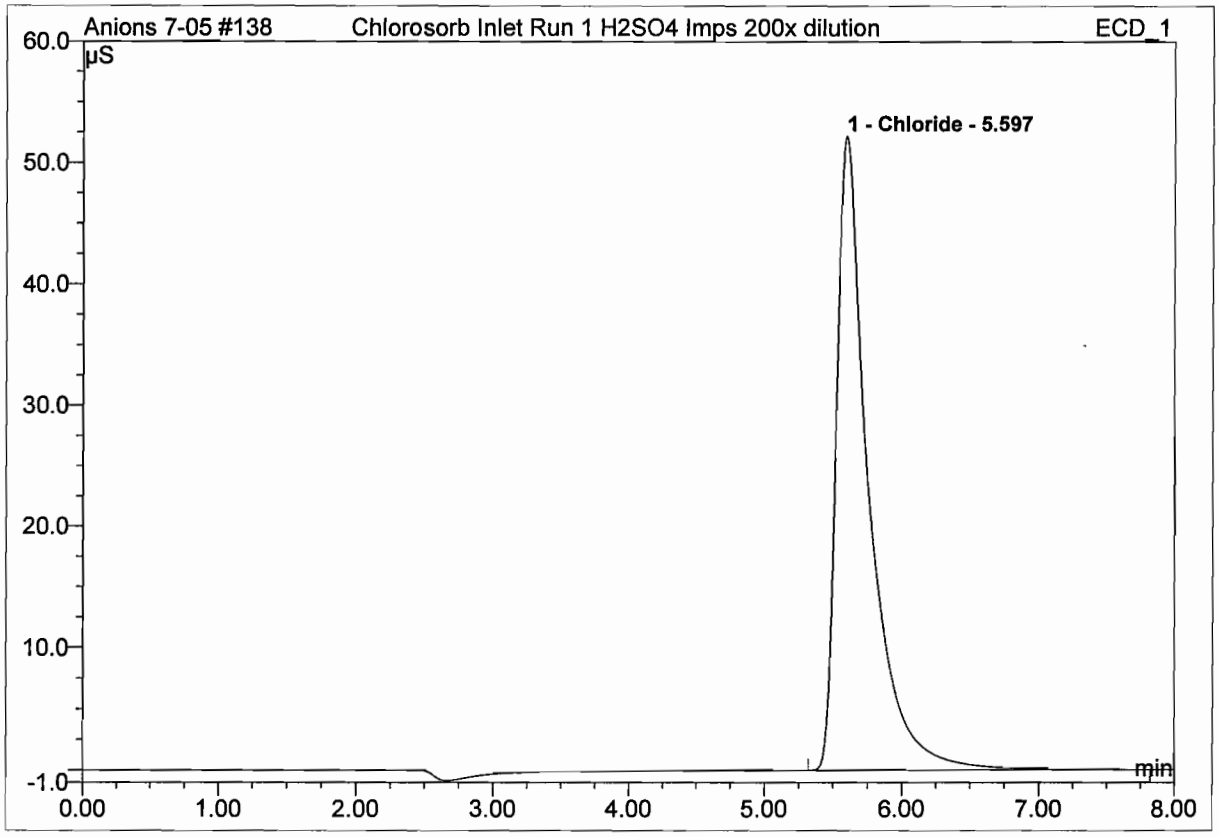
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**130**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 9:53**	*Sample Weight:*	**1.0000**
Run Time (min):	**19.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.60	Chloride	52.073	14.222
Total:			52.073	14.222

138 Chlorosorb Inlet Run 1 H2SO4 Imps 200x dilution

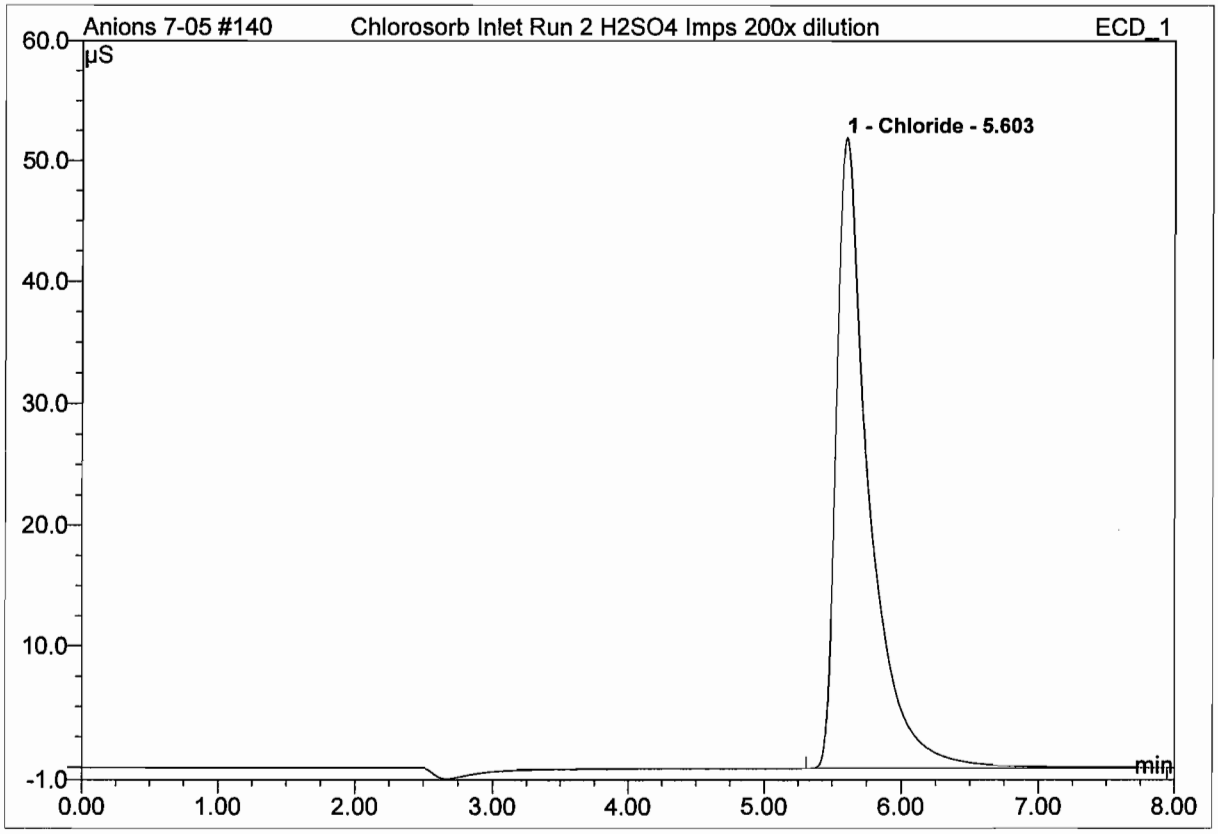
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**129**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 10:13**	*Sample Weight:*	**1.0000**
Run Time (min):	**19.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.60	Chloride	52.179	14.218
Total:			52.179	14.218

140 Chlorosorb Inlet Run 2 H2SO4 Imps 200x dilution

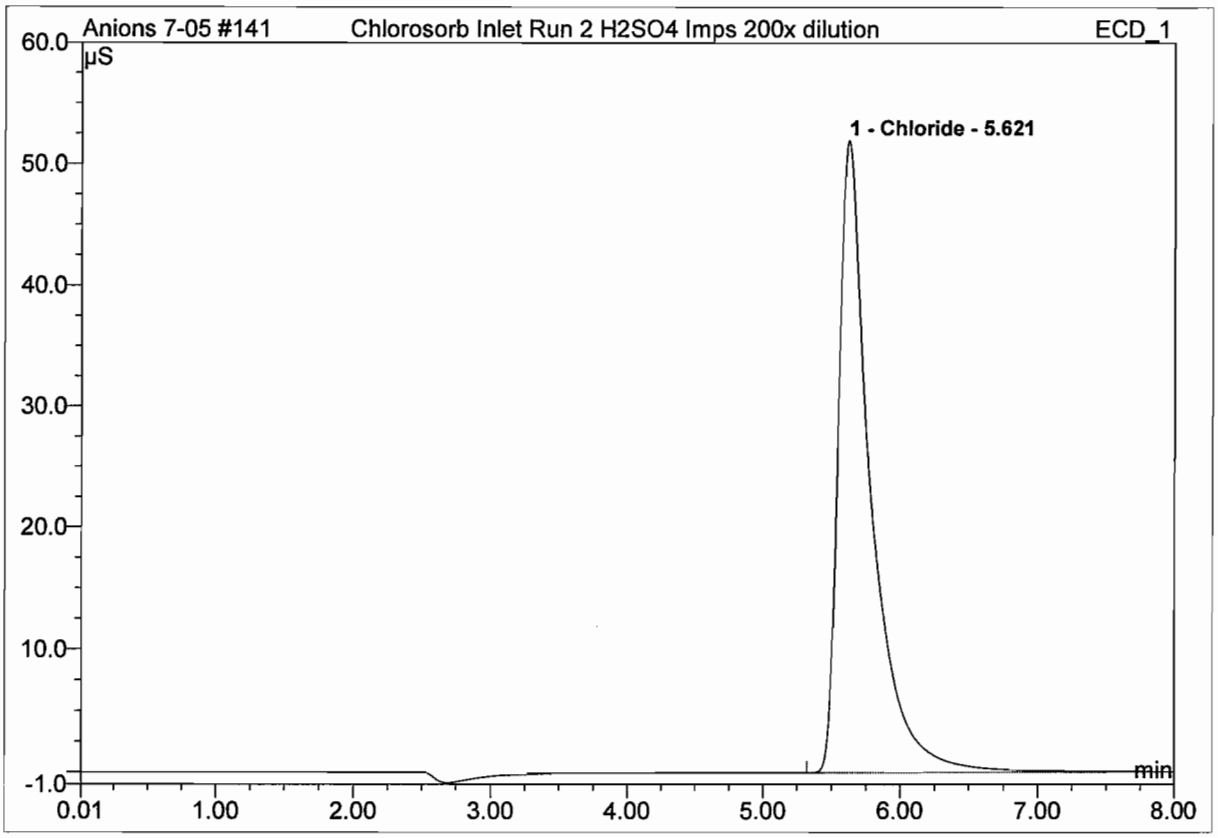
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**131**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 10:59**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.60	Chloride	51.995	14.196
Total:			51.995	14.196

141 Chlorosorb Inlet Run 2 H2SO4 Imps 200x dilution

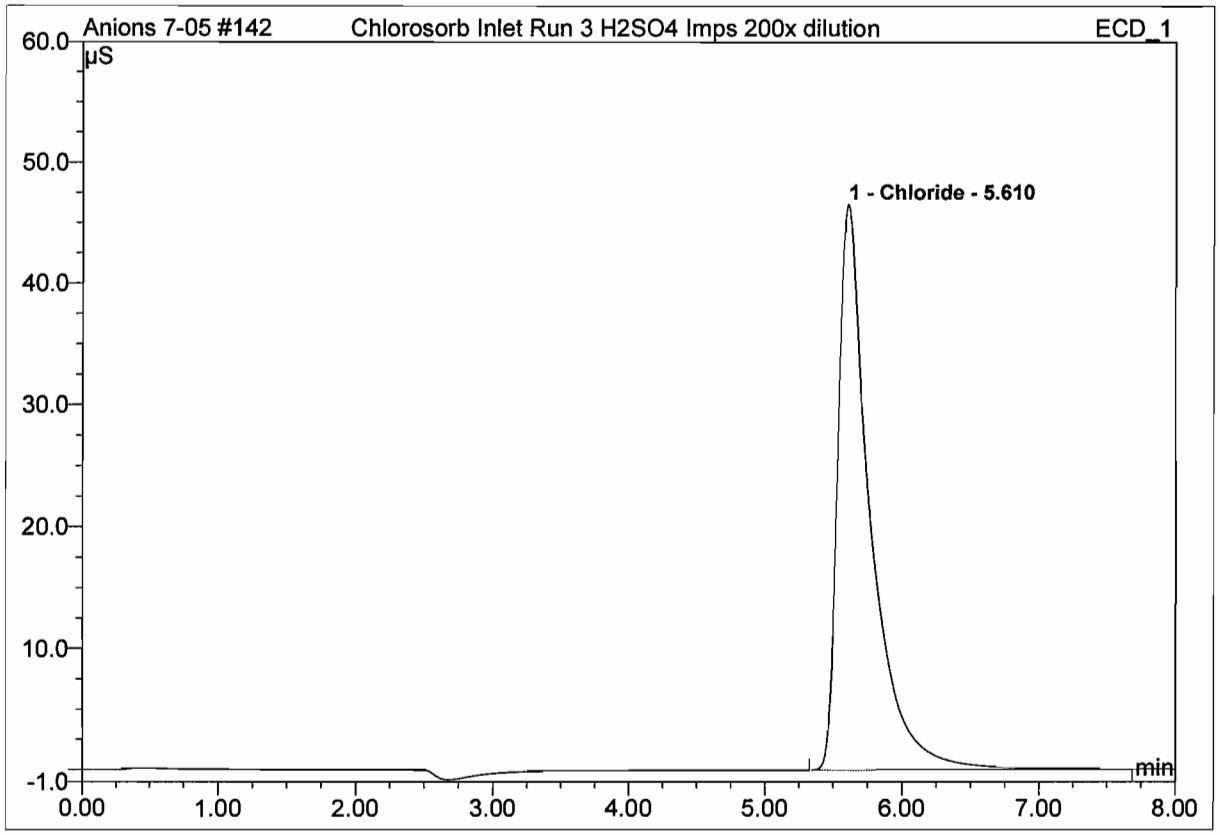
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**132**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 11:18**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.62	Chloride	51.966	14.209
Total:			51.966	14.209

142 Chlorosorb Inlet Run 3 H2SO4 Imps 200x dilution

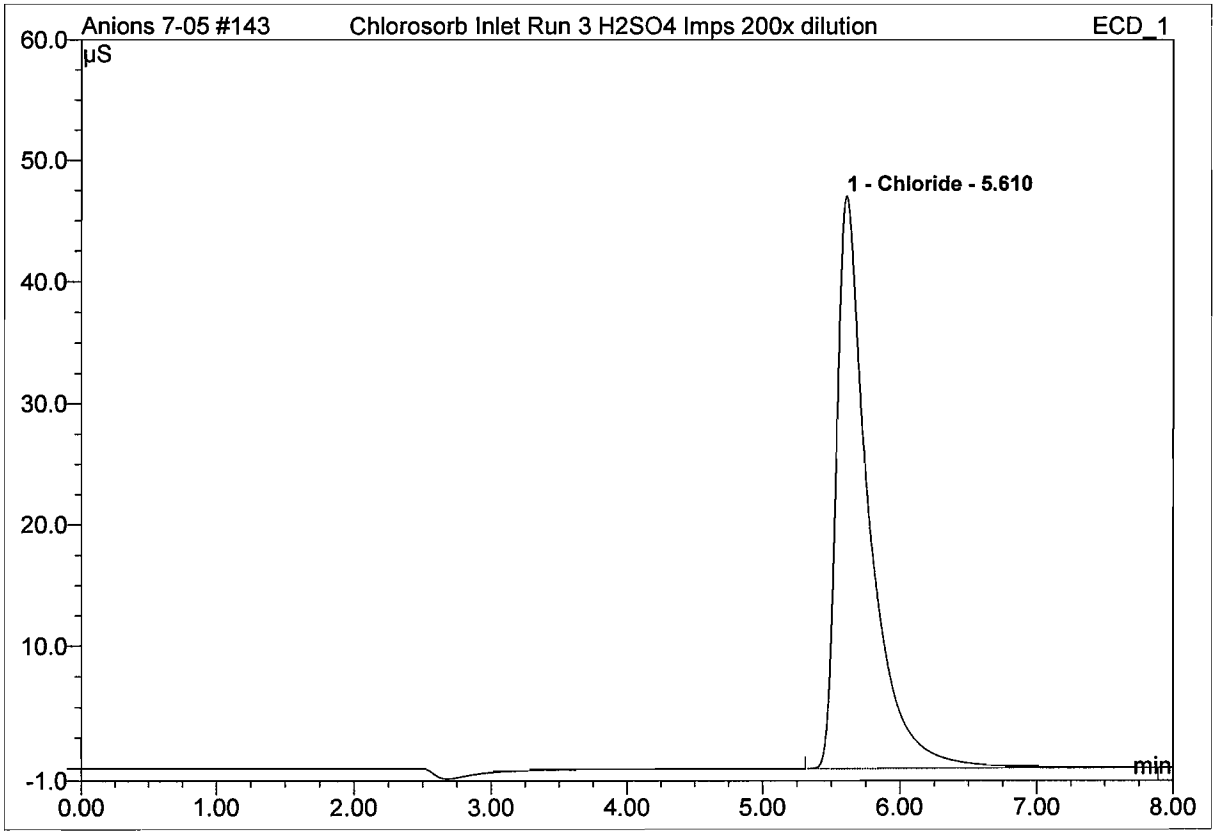
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**133**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 11:37**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.61	Chloride	46.525	12.738
Total:			46.525	12.738

143 Chlorosorb Inlet Run 3 H2SO4 Imps 200x dilution

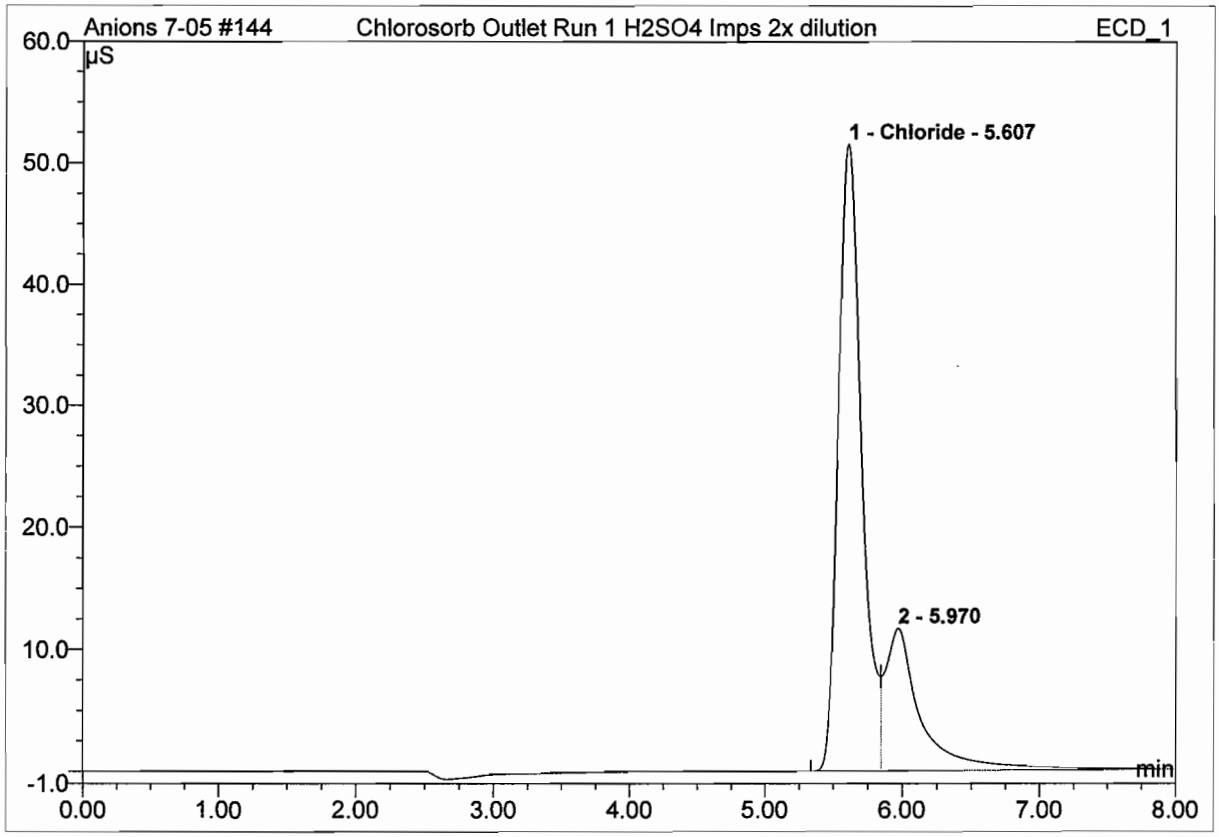
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**134**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 11:56**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.61	Chloride	47.060	12.900
Total:			47.060	12.900

144 Chlorosorb Outlet Run 1 H2SO4 Imps 2x dilution

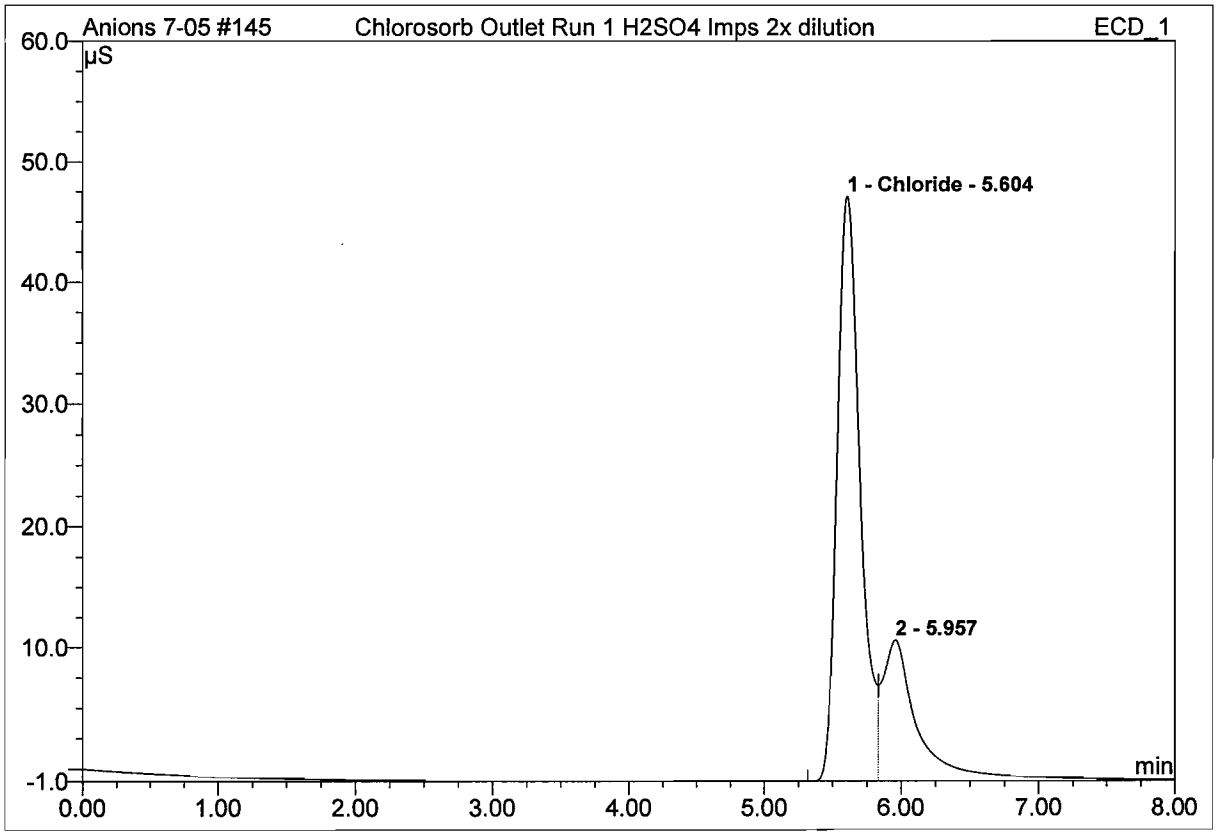
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**135**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 12:15**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.61	Chloride	51.536	10.094
Total:			51.536	10.094

145 Chlorosorb Outlet Run 1 H2SO4 Imps 2x dilution

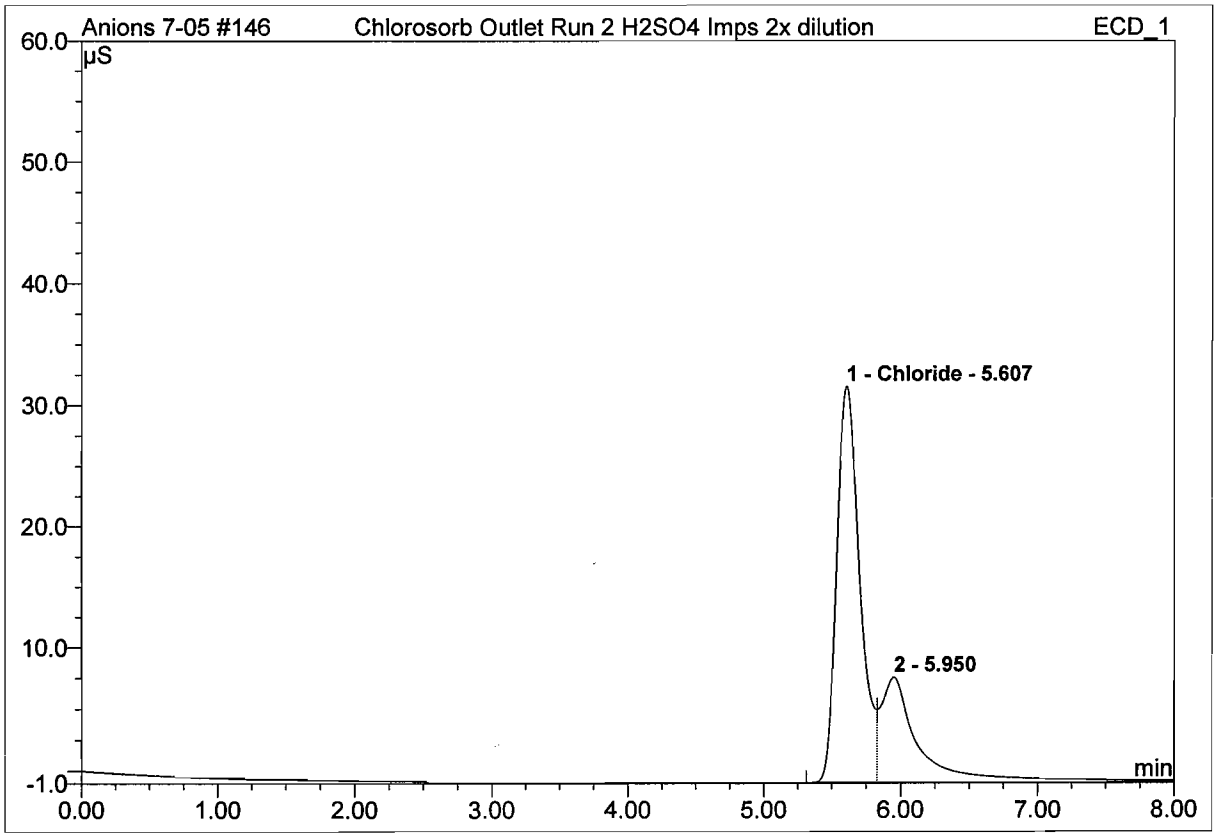
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**136**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 12:34**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.60	Chloride	48.160	9.337
Total:			48.160	9.337

146 Chlorosorb Outlet Run 2 H2SO4 Imps 2x dilution

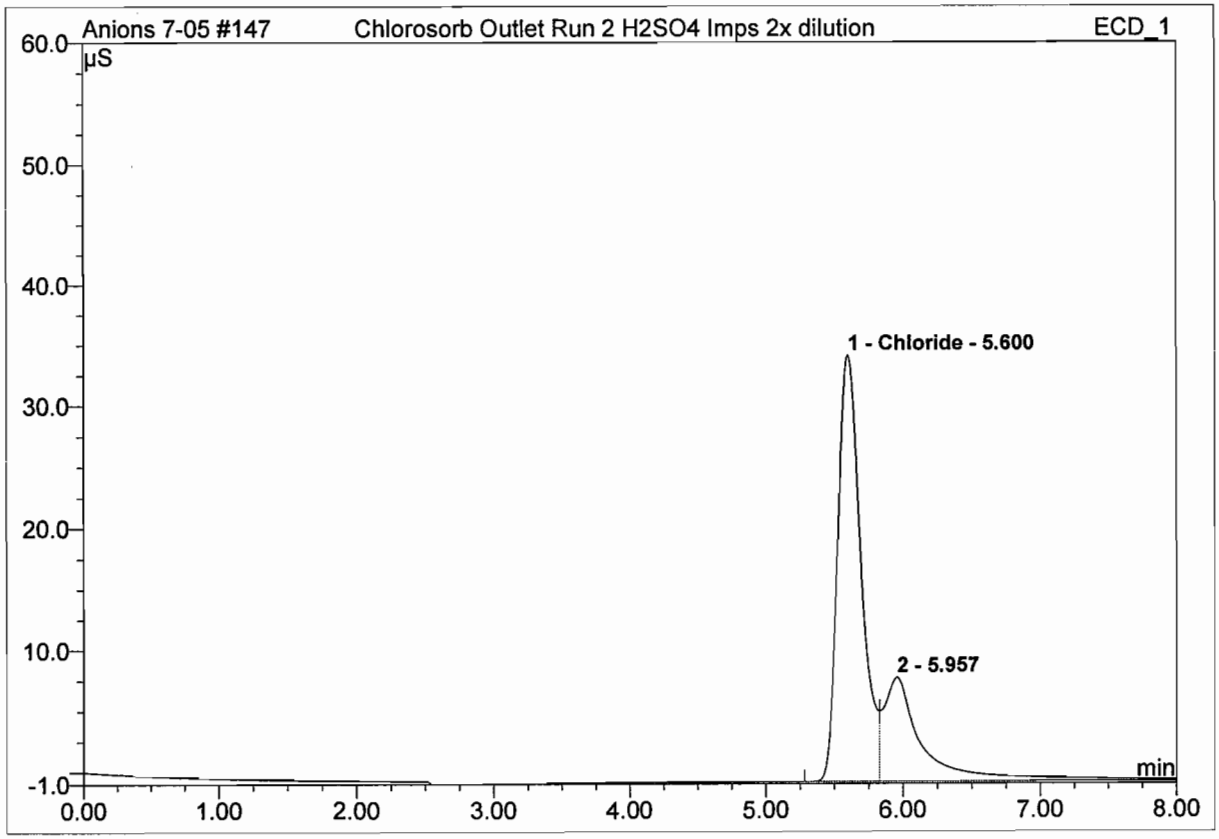
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**137**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 12:53**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.61	Chloride	32.516	6.304
Total:			32.516	6.304

147 Chlorosorb Outlet Run 2 H2SO4 Imps 2x dilution

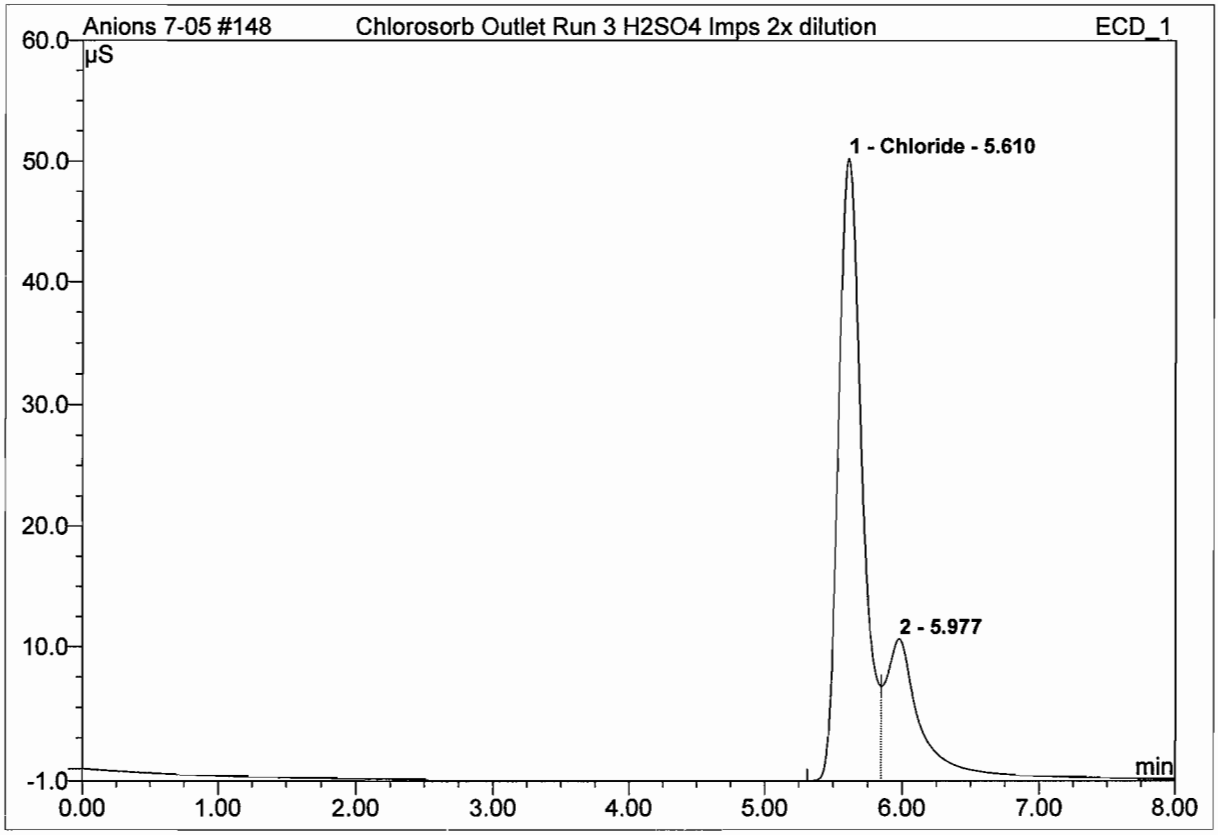
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**138**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 13:13**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.60	Chloride	34.968	6.847
Total:			34.968	6.847

148 Chlorosorb Outlet Run 3 H2SO4 Imps 2x dilution

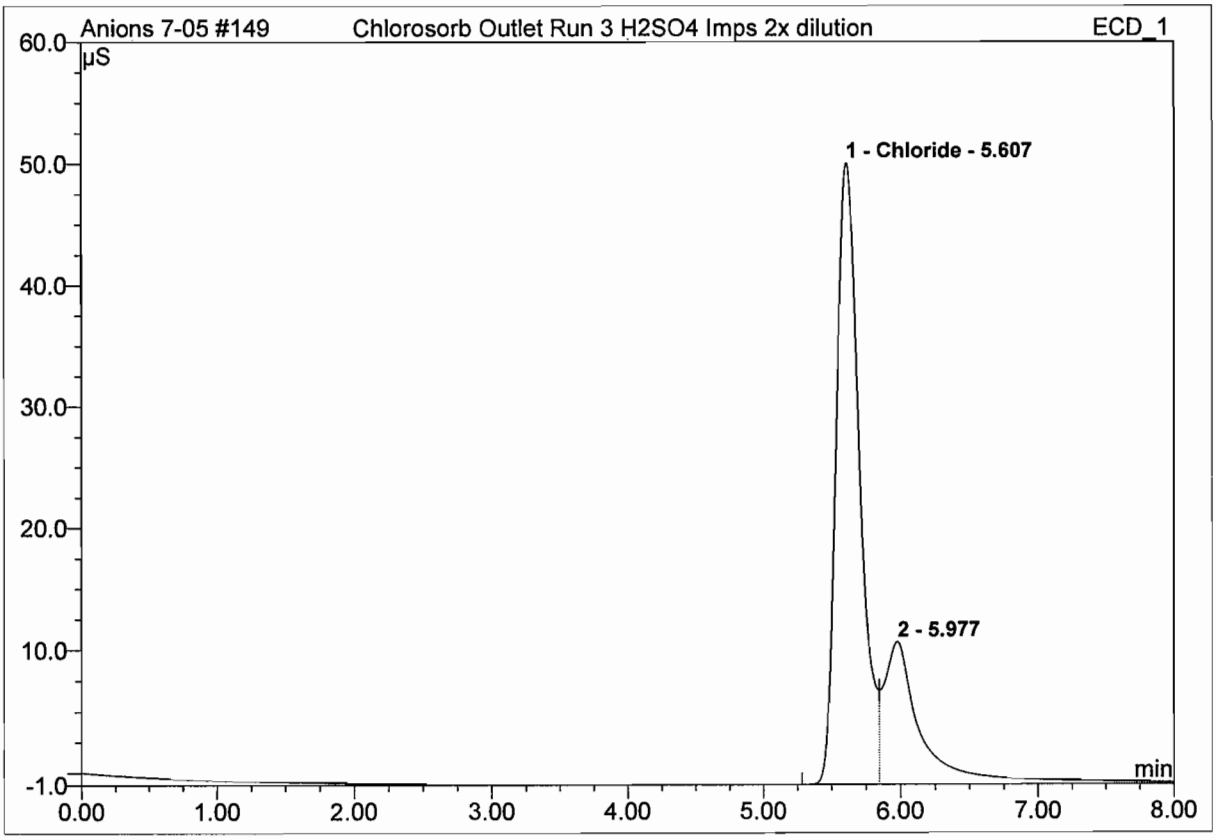
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**139**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 13:32**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.61	Chloride	51.211	10.074
Total:			51.211	10.074

149 Chlorosorb Outlet Run 3 H2SO4 Imps 2x dilution

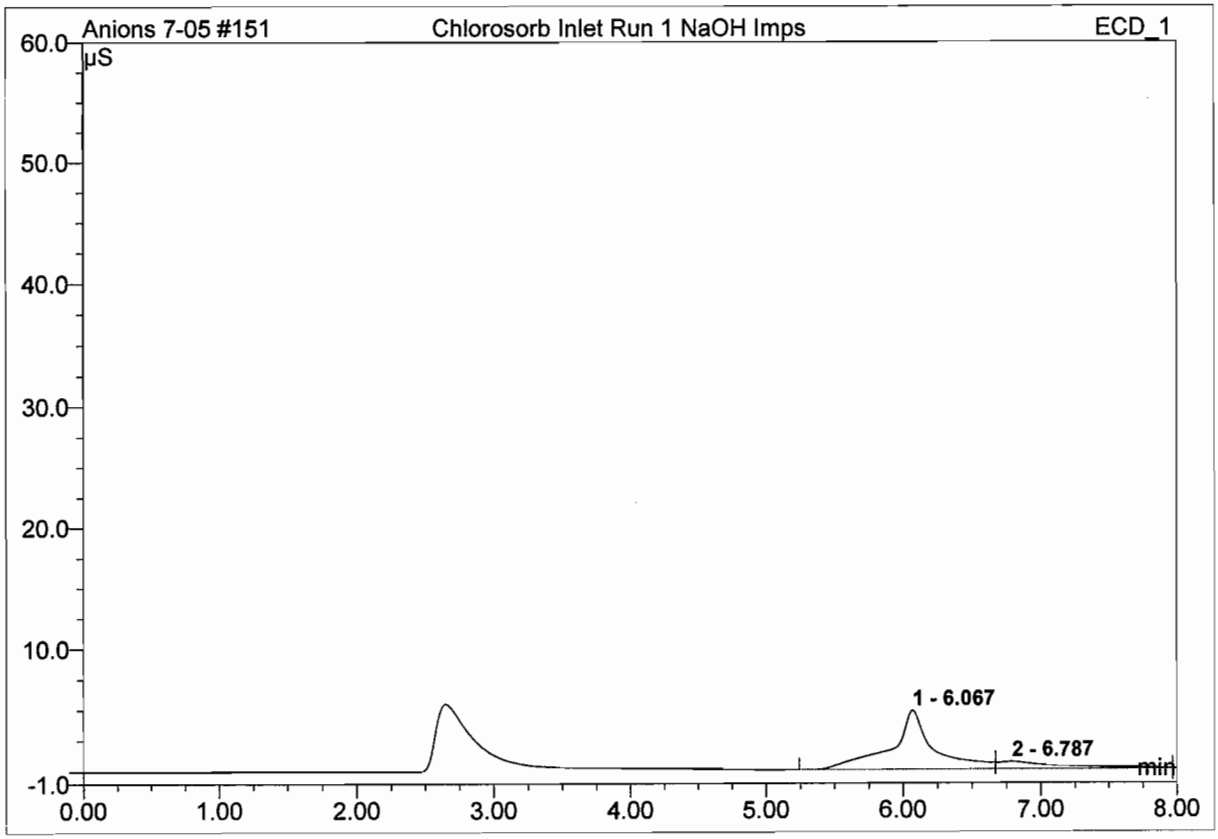
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**140**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 13:51**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.61	Chloride	51.053	10.056
Total:			51.053	10.056

151 Chlorosorb Inlet Run 1 NaOH Imps

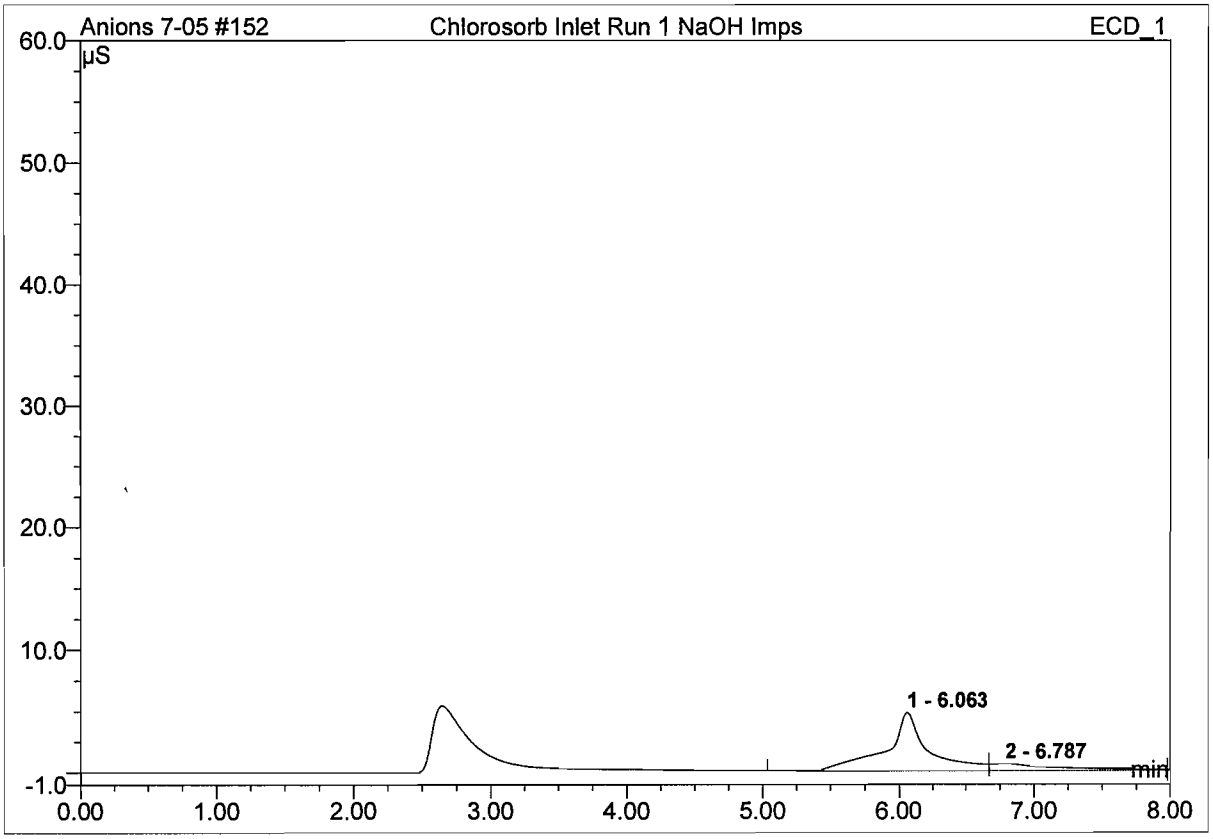
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**142**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 14:34**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
Total:			0.000	0.000

152 Chlorosorb Inlet Run 1 NaOH Imps

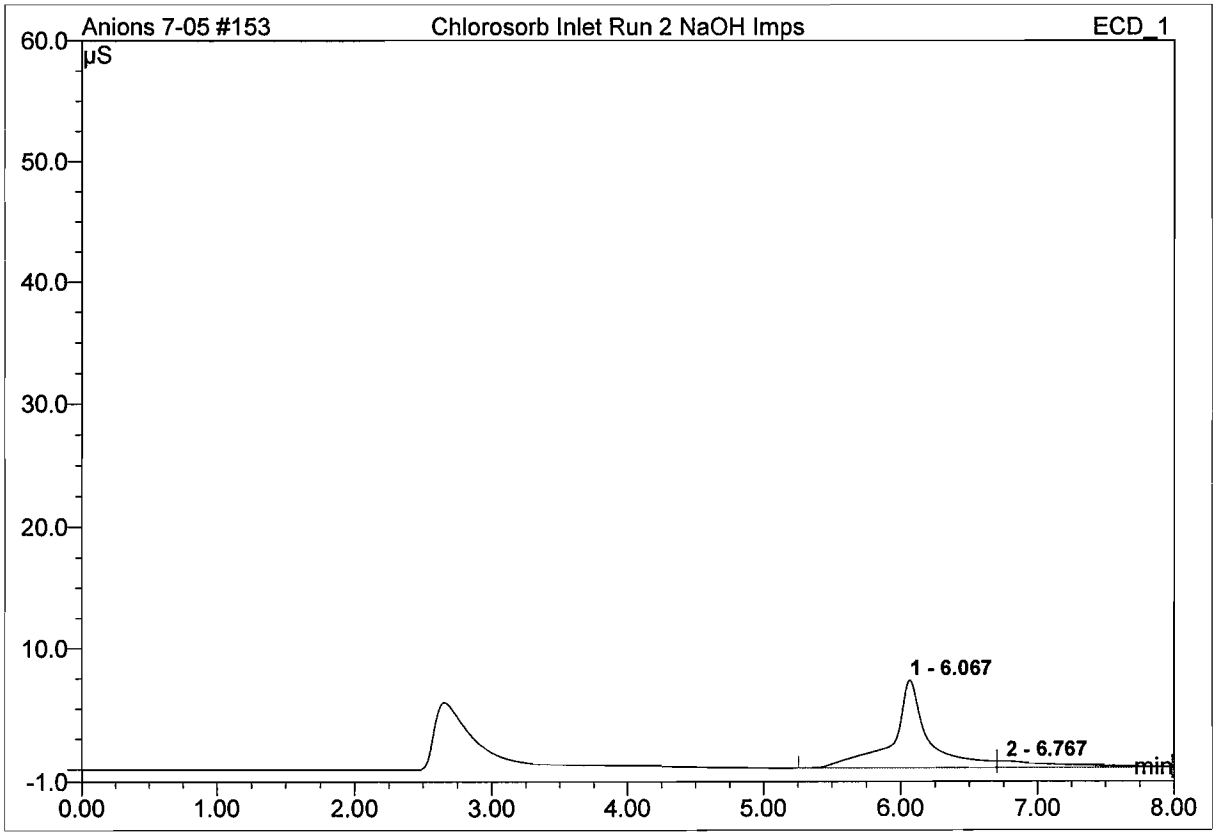
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**142**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 14:53**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
Total:			0.000	0.000

153 Chlorosorb Inlet Run 2 NaOH Imps

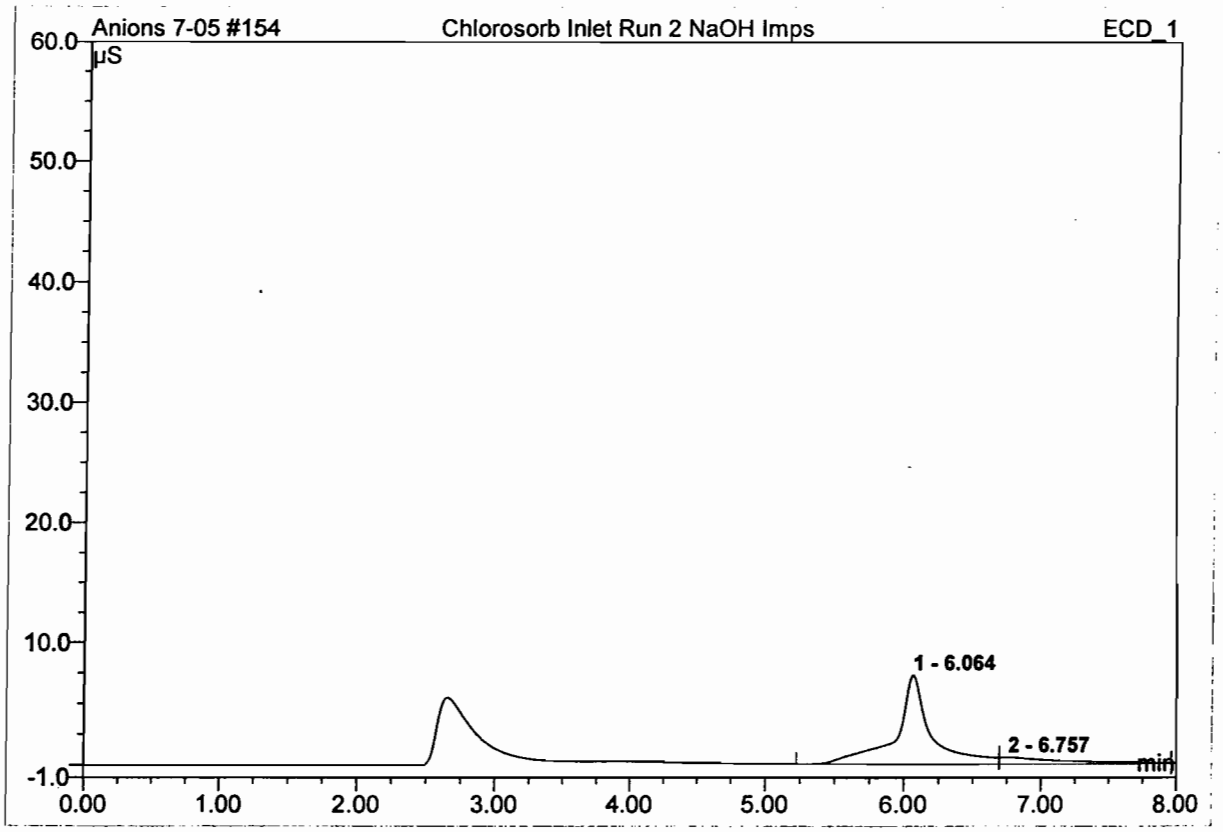
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**143**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 15:21**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
Total:			0.000	0.000

154 Chlorosorb Inlet Run 2 NaOH Imps

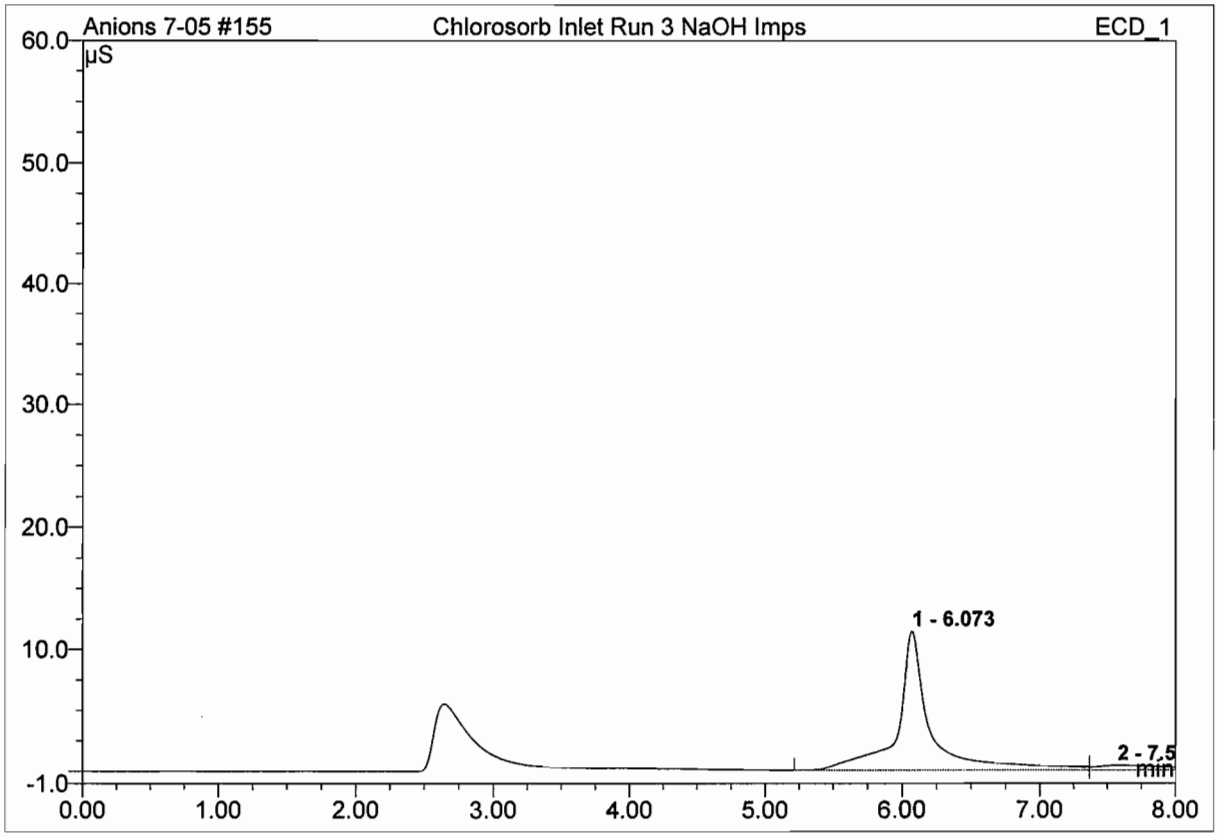
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**144**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 15:40**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
Total:			0.000	0.000

155 Chlorosorb Inlet Run 3 NaOH Imps

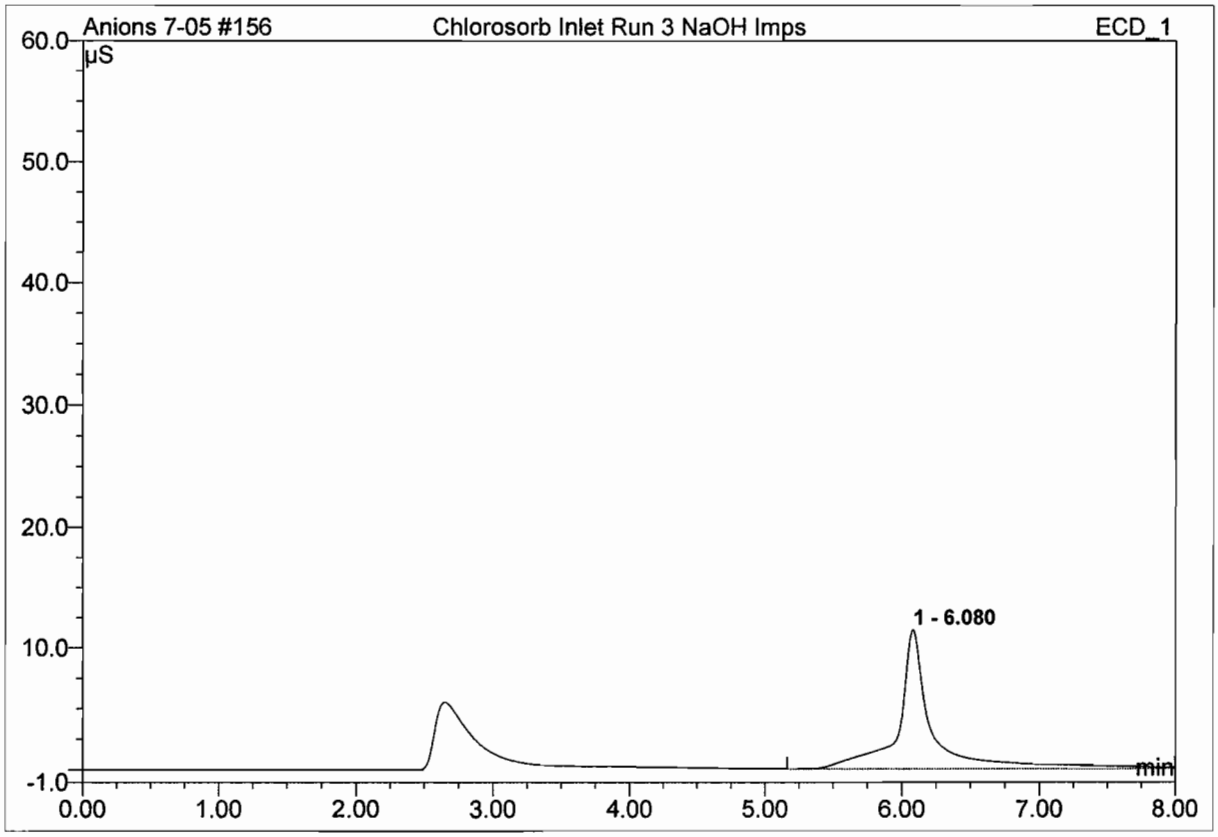
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**145**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 16:00**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
Total:			0.000	0.000

156 Chlorosorb Inlet Run 3 NaOH Imps

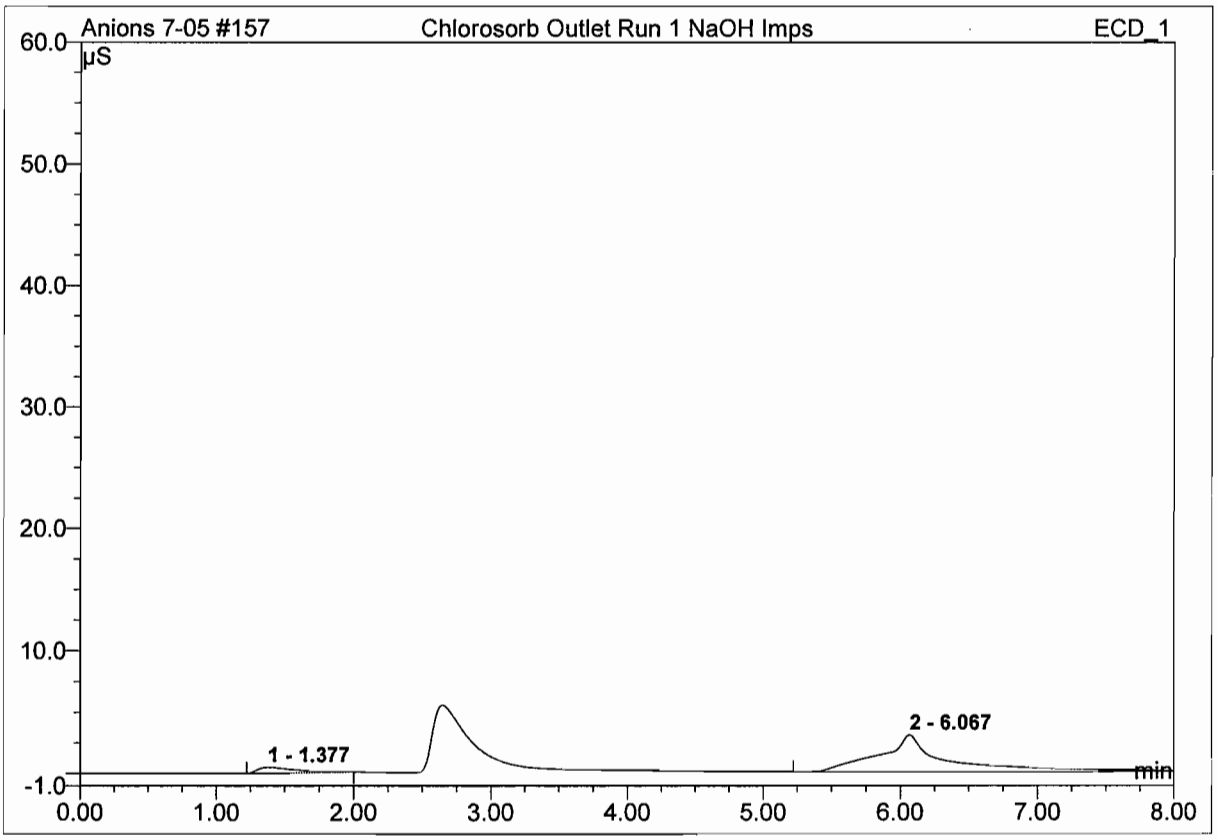
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**146**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 16:19**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
Total:			0.000	0.000

157 Chlorosorb Outlet Run 1 NaOH Imps

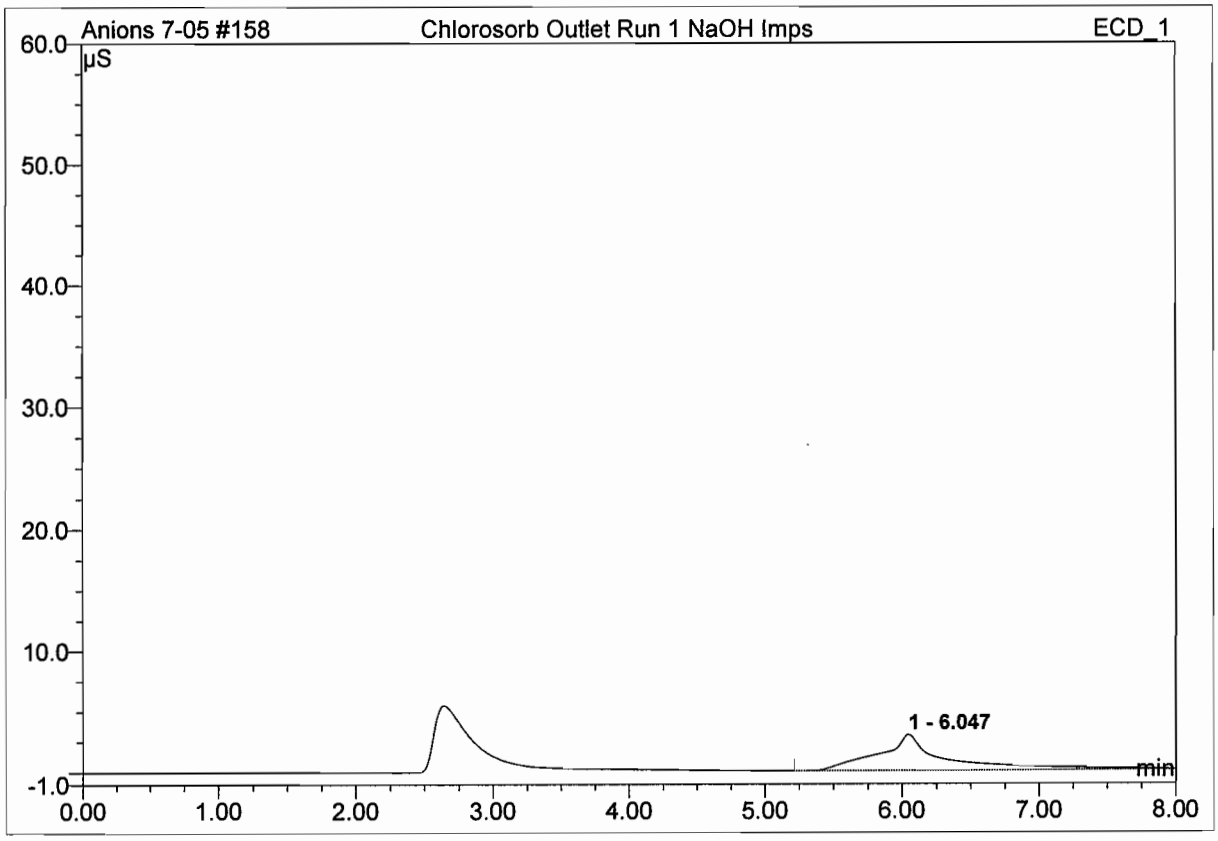
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**147**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 16:38**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
Total:			0.000	0.000

158 Chlorosorb Outlet Run 1 NaOH Imps

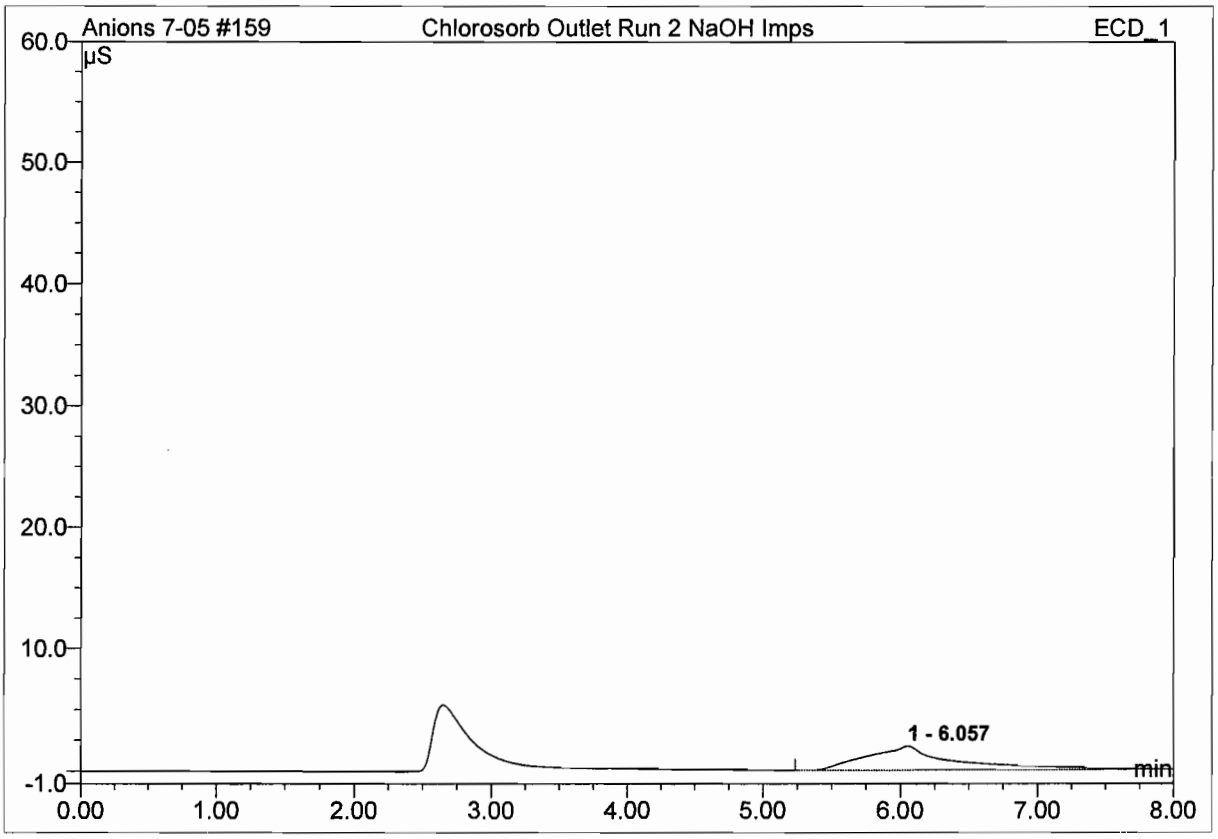
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**148**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 16:57**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
Total:			0.000	0.000

159 Chlorosorb Outlet Run 2 NaOH Imps

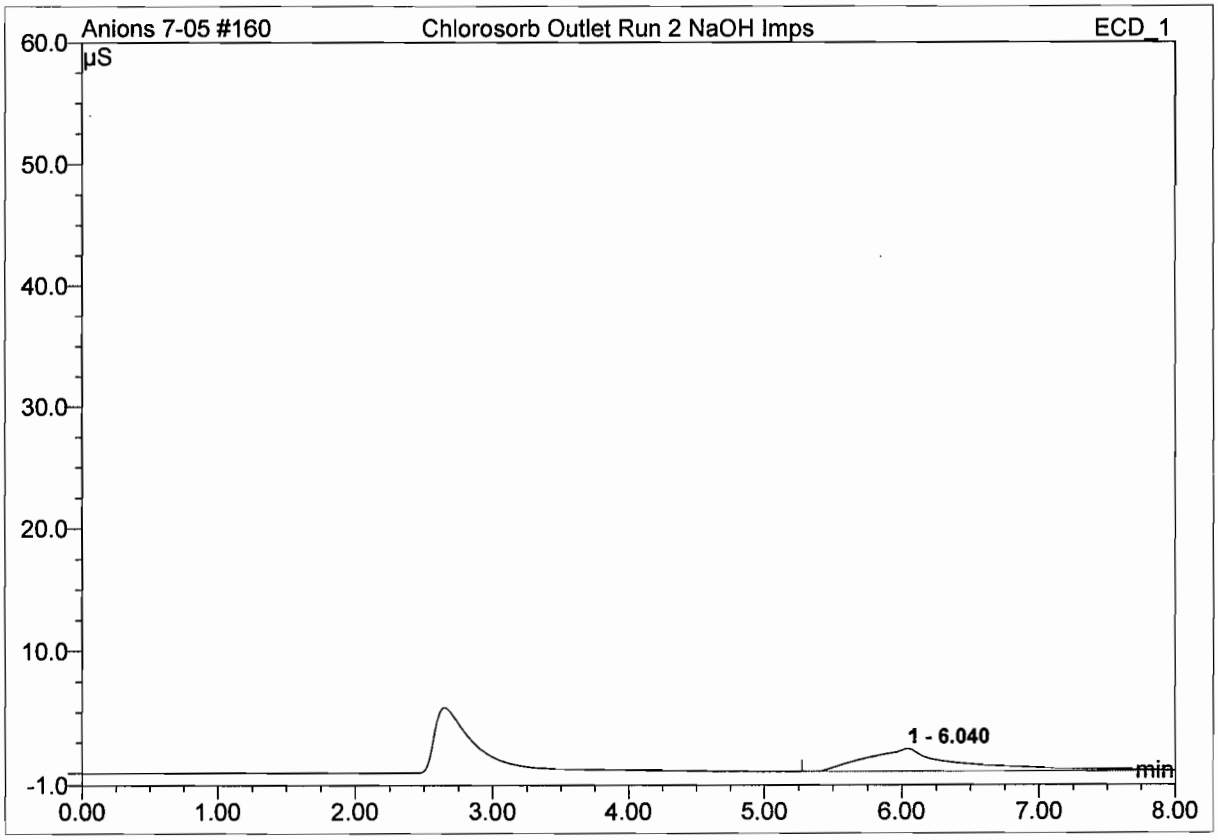
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**149**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 17:16**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
Total:			0.000	0.000

160 Chlorosorb Outlet Run 2 NaOH Imps

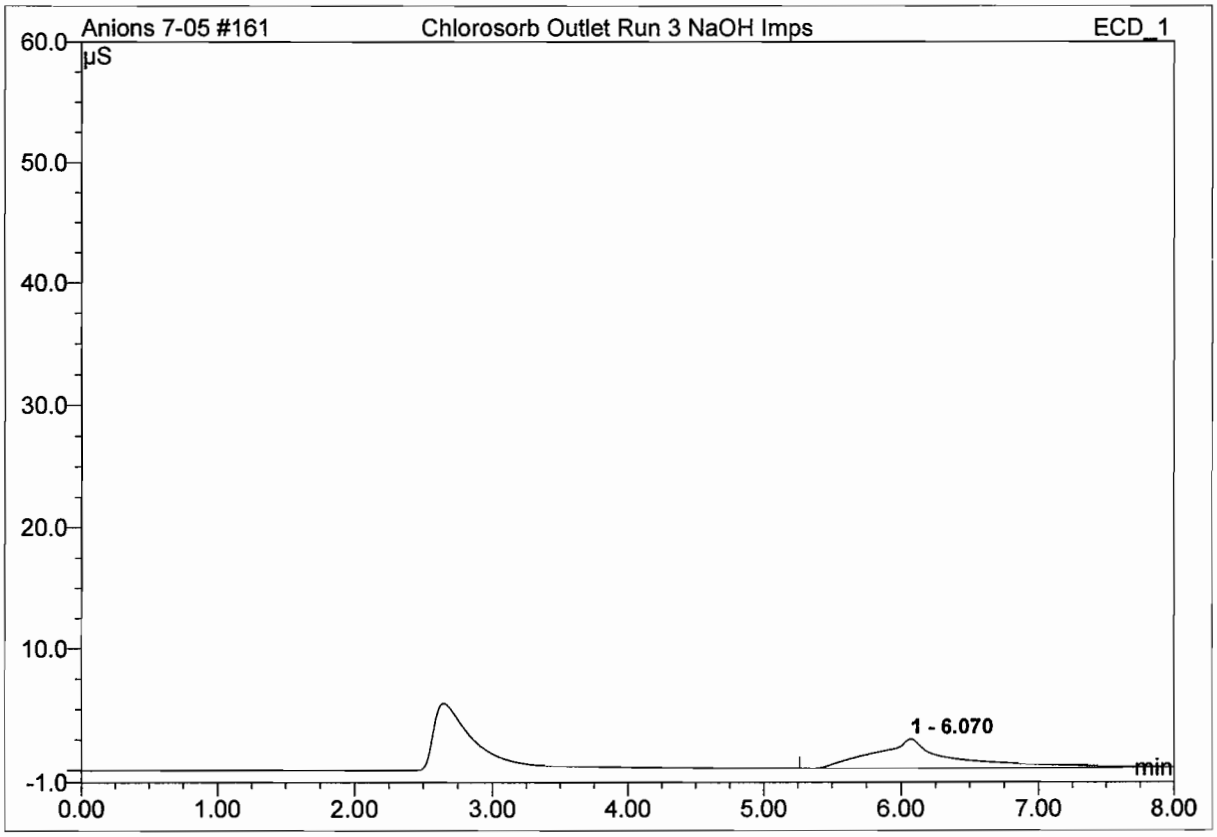
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**150**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 17:35**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
Total:			0.000	0.000

161 Chlorosorb Outlet Run 3 NaOH Imps

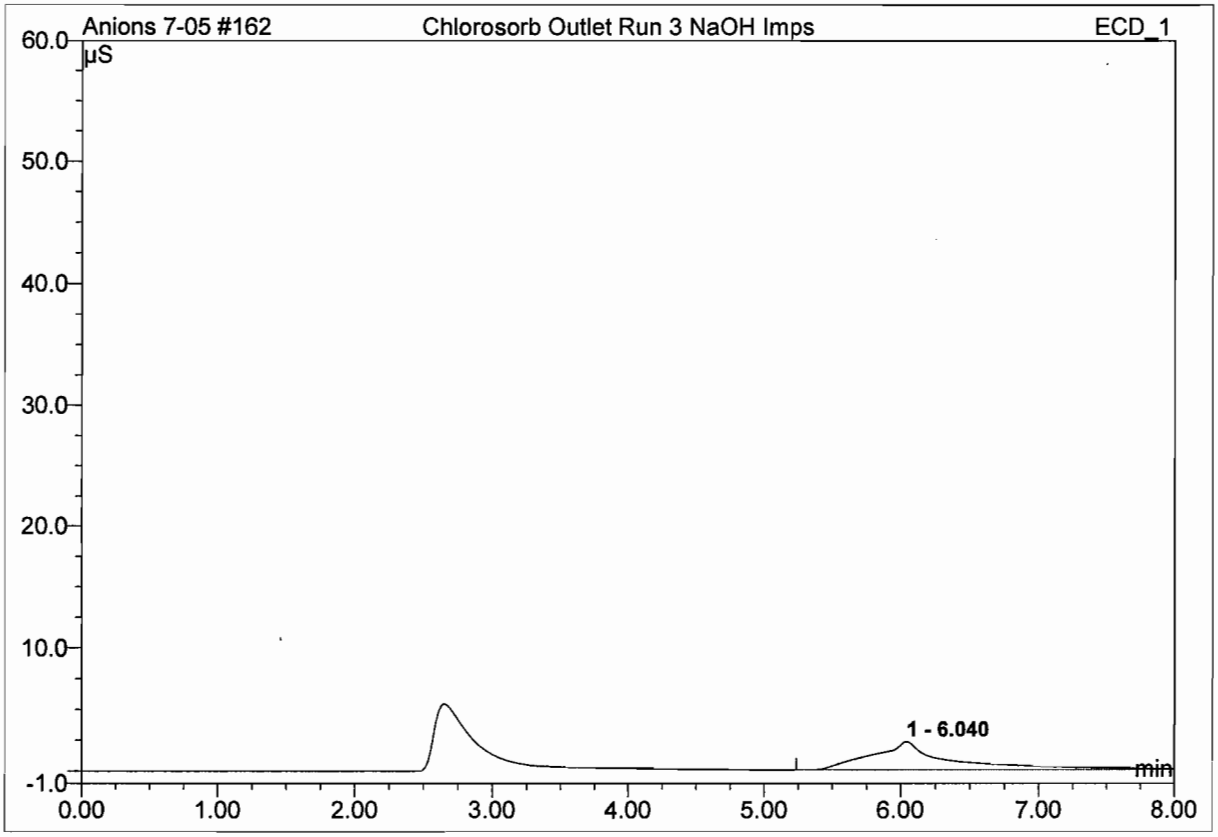
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**151**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 17:54**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
Total:			0.000	0.000

162 Chlorosorb Outlet Run 3 NaOH Imps

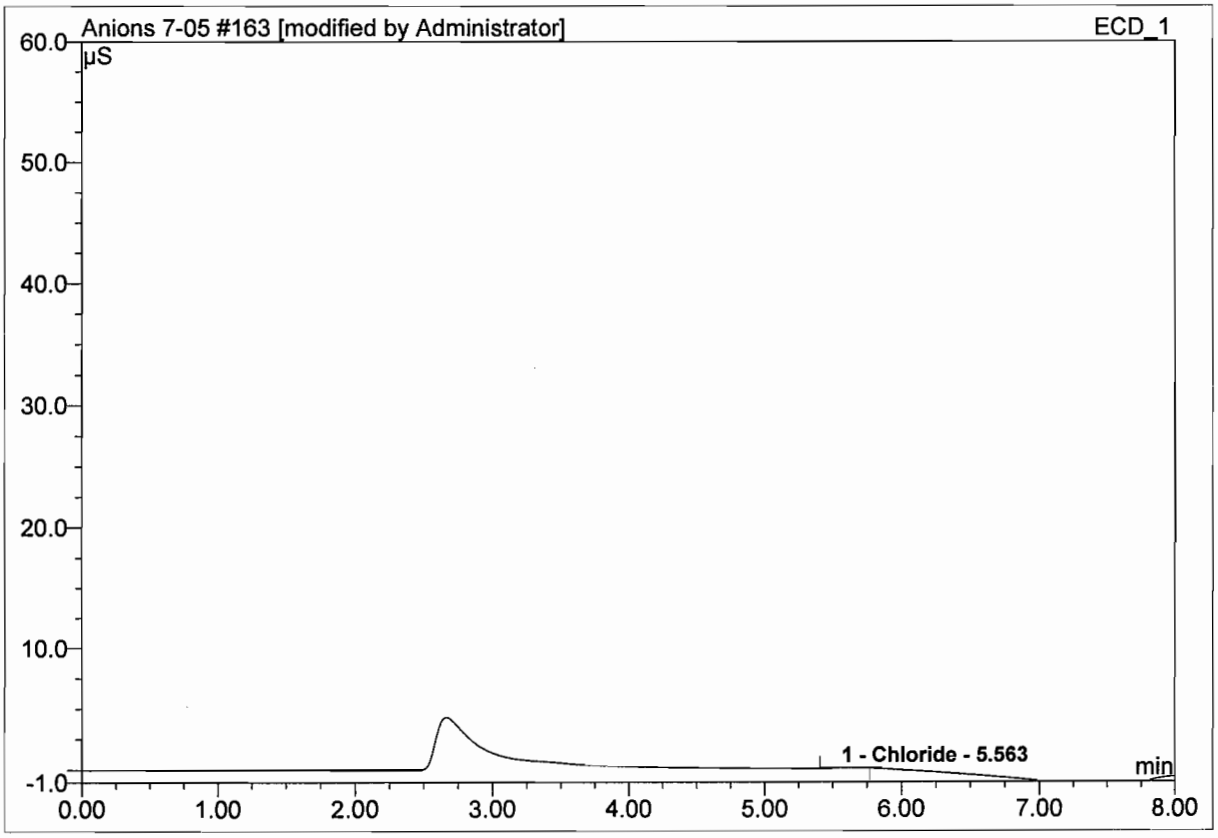
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**152**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 18:13**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
Total:			0.000	0.000

163 Blank 0.1 N NaOH

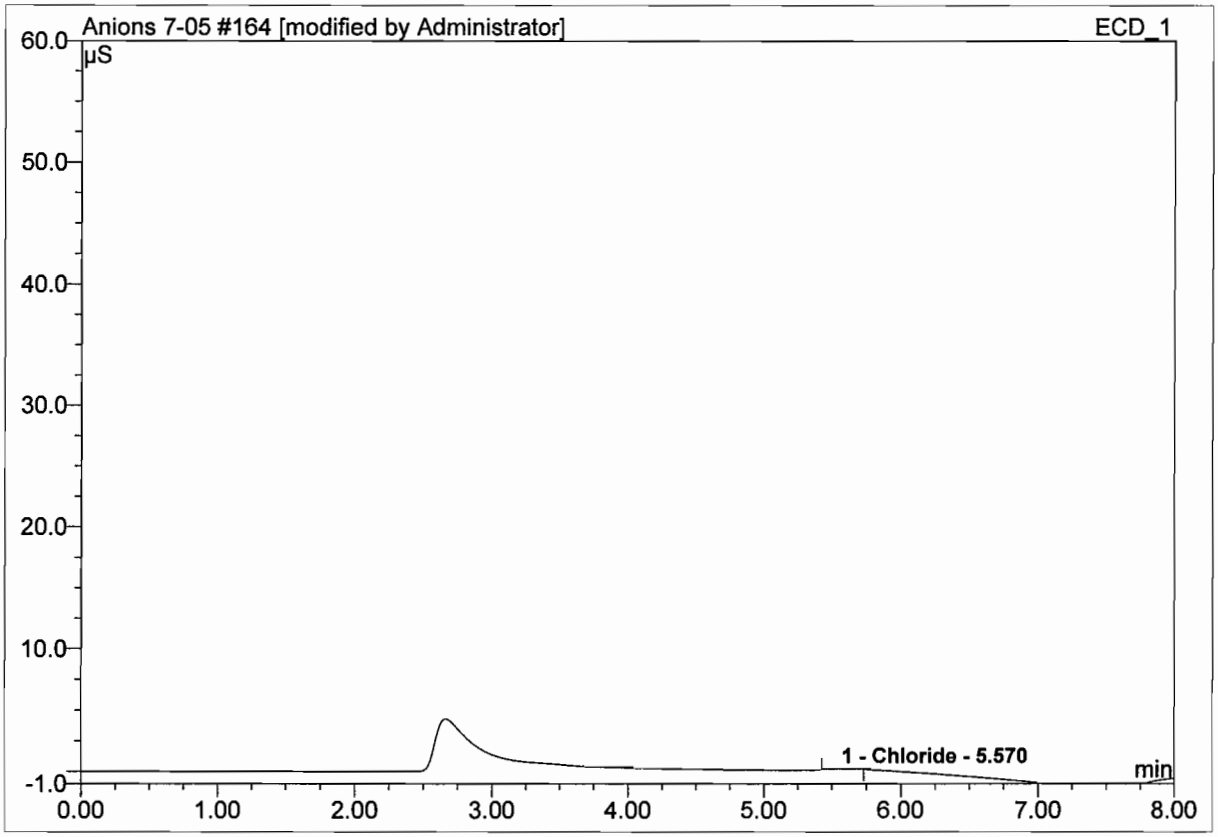
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**153**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 18:32**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.56	Chloride	0.072	0.017
Total:			0.072	0.017

164 Blank 0.1 N NaOH

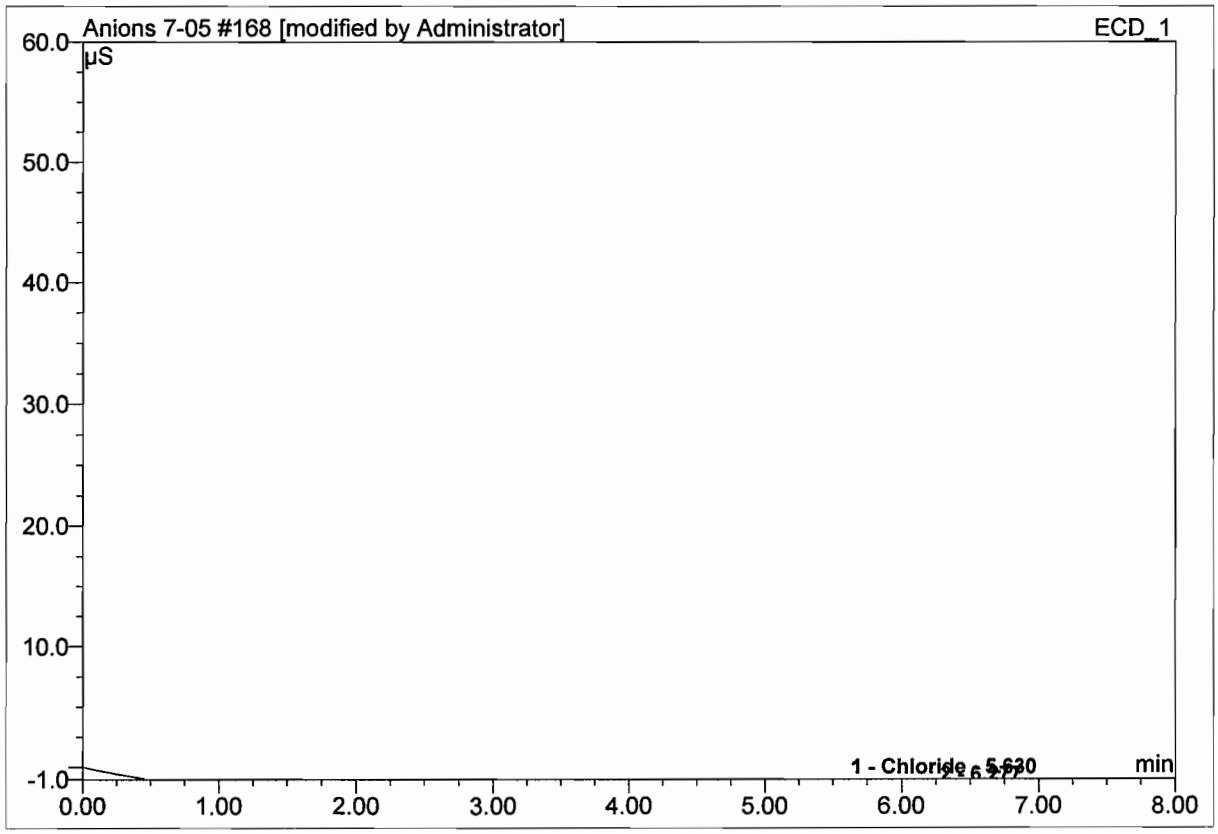
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**154**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 18:52**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.57	Chloride	0.095	0.019
Total:			0.095	0.019

168 Blank 0.1 N H2SO4

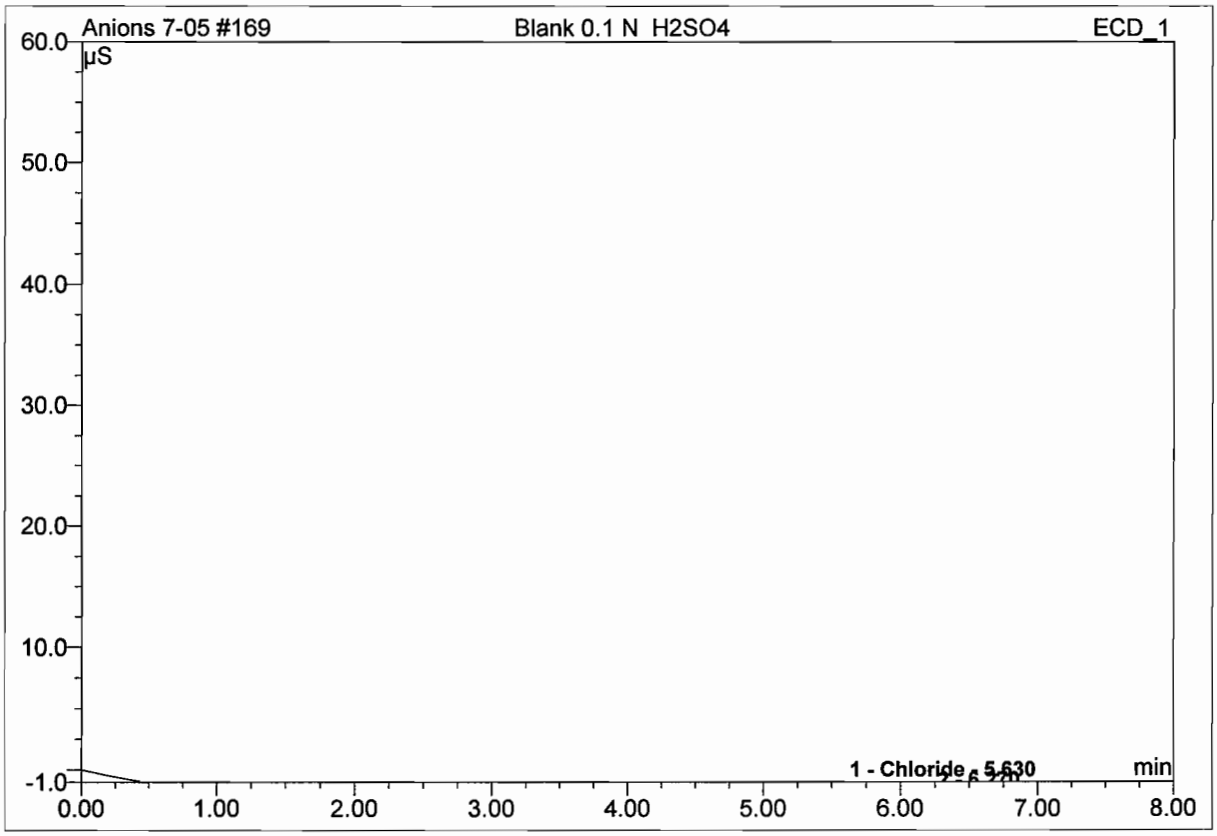
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**158**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 20:25**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



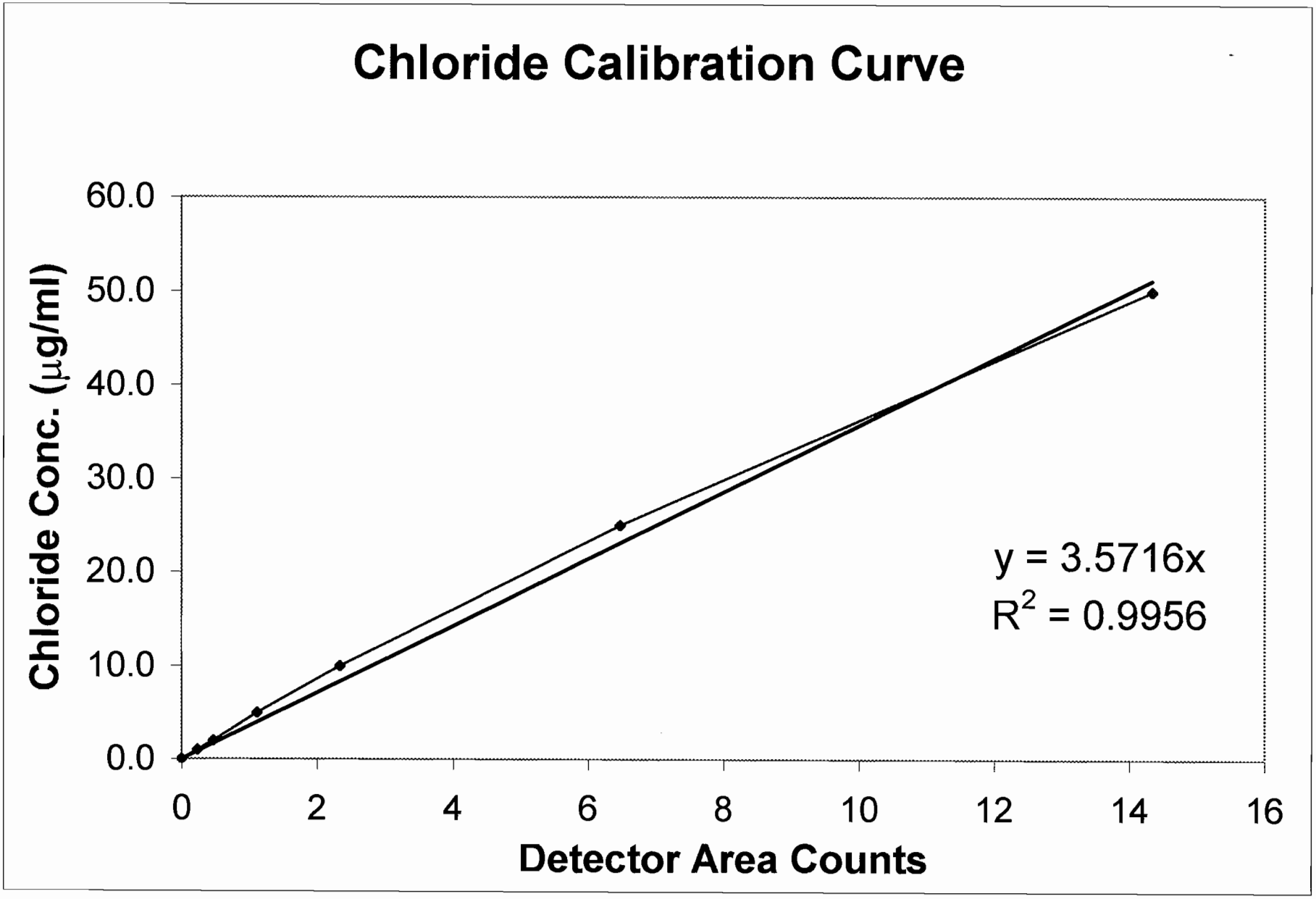
No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.63	Chloride	0.104	0.023
Total:			0.104	0.023

169 Blank 0.1 N H2SO4

Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**159**	*Channel:*	**ECD_1**
Sample Type:	**unknown**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 20:45**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**

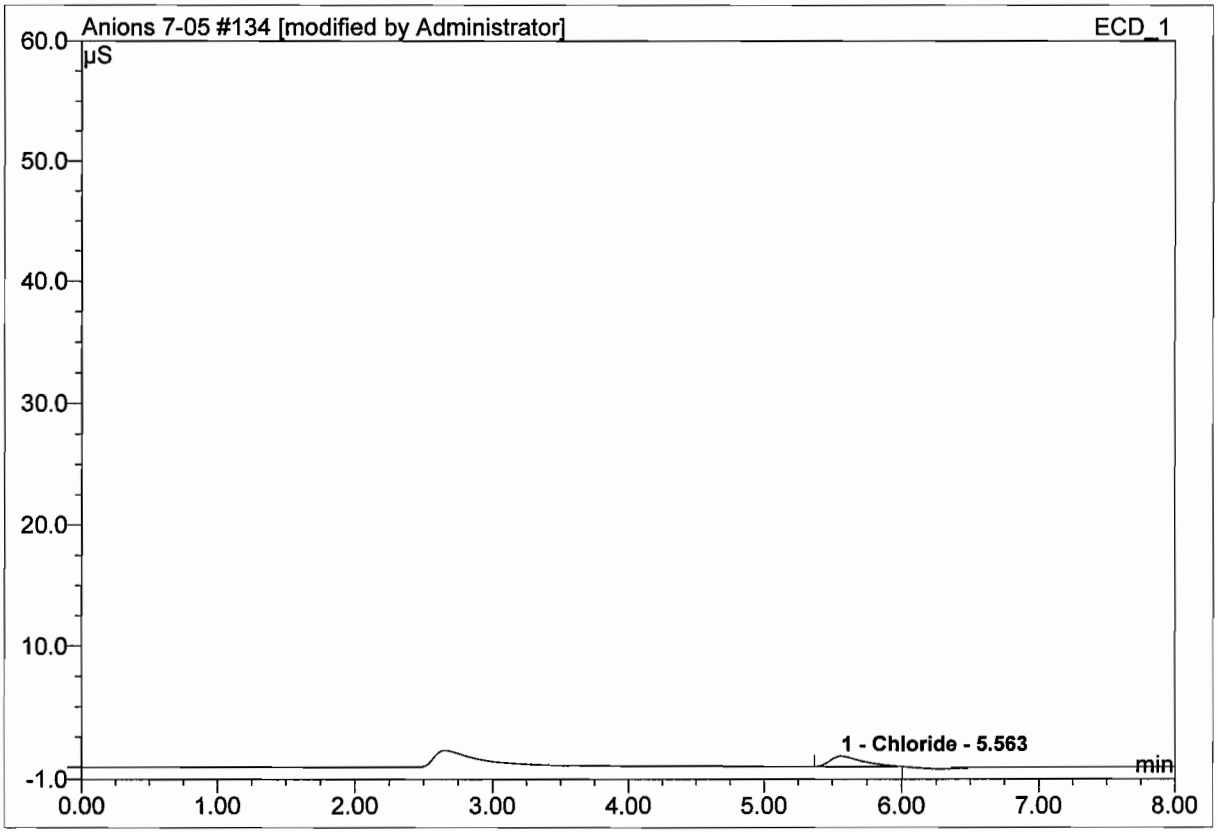


No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.63	Chloride	0.094	0.022
Total:			0.094	0.022


Chloride Calibration Curve
Chloride Conc. (µg/ml)
60.0
50.0
40.0
30.0
20.0
10.0
0.0
0
2
4
6
8
10
12
14
16
Detector Area Counts
y = 3.5716x
R2 = 0.9956

134 1.0 ppm Chlorine - pre

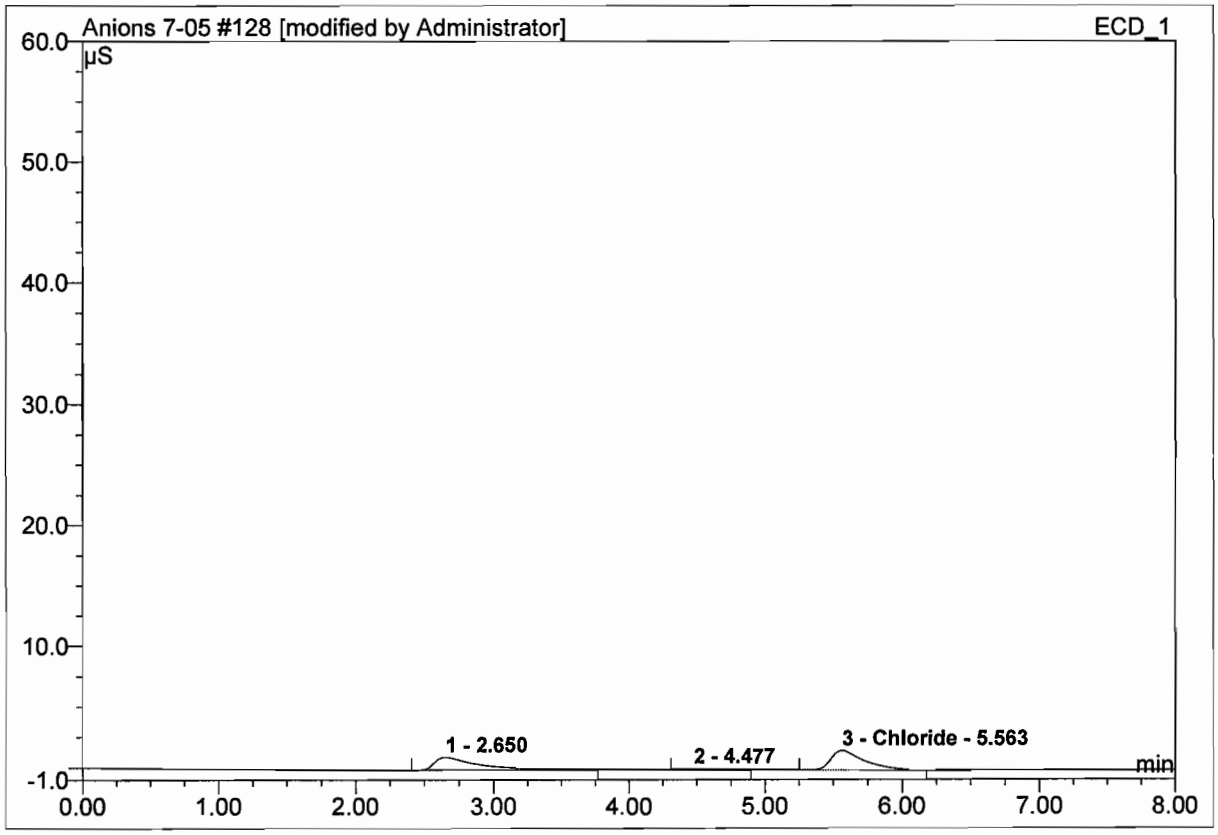
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**127**	*Channel:*	**ECD_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 8:26**	*Sample Weight:*	**1.0000**
Run Time (min):	**19.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.56	Chloride	0.859	0.232
Total:			0.859	0.232

128 2.0 ppm Chlorine - pre

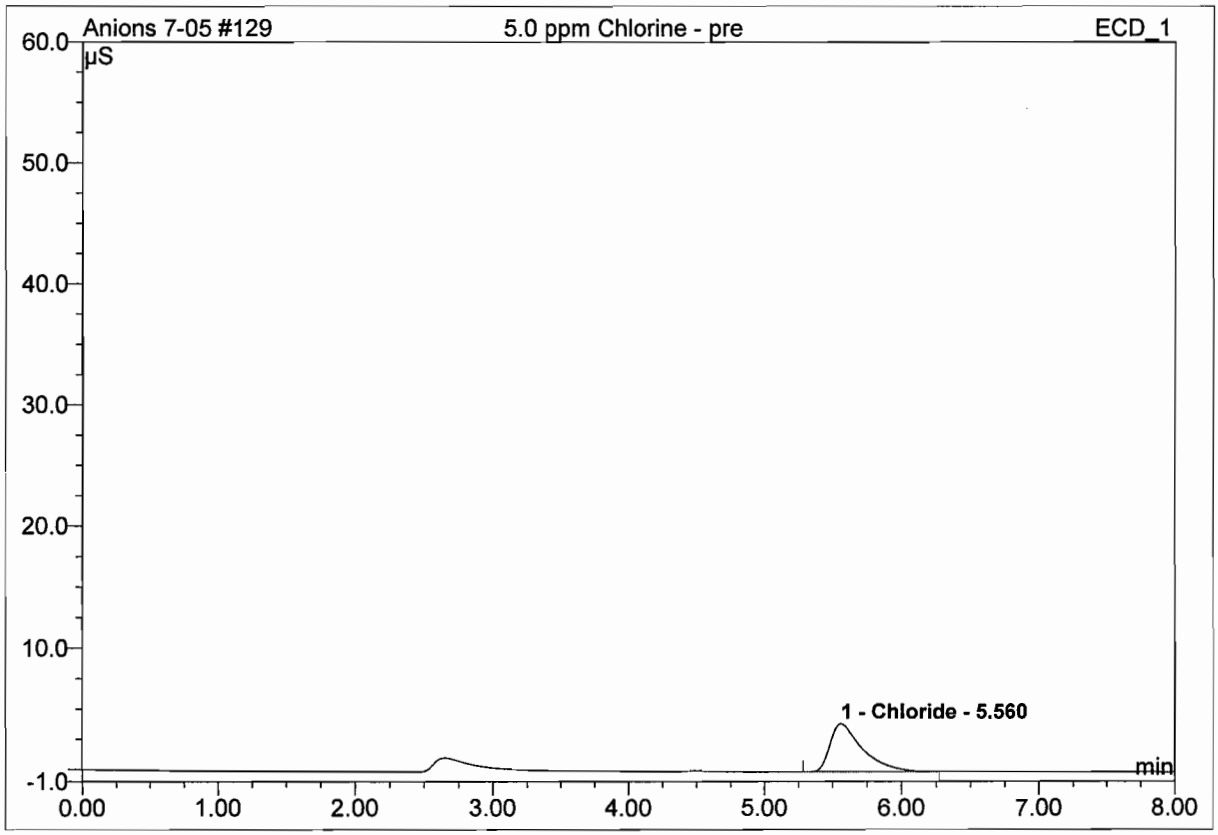
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**121**	*Channel:*	**ECD_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 5:05**	*Sample Weight:*	**1.0000**
Run Time (min):	**19.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
3	5.56	Chloride	1.618	0.462
Total:			1.618	0.462

129 5.0 ppm Chlorine - pre

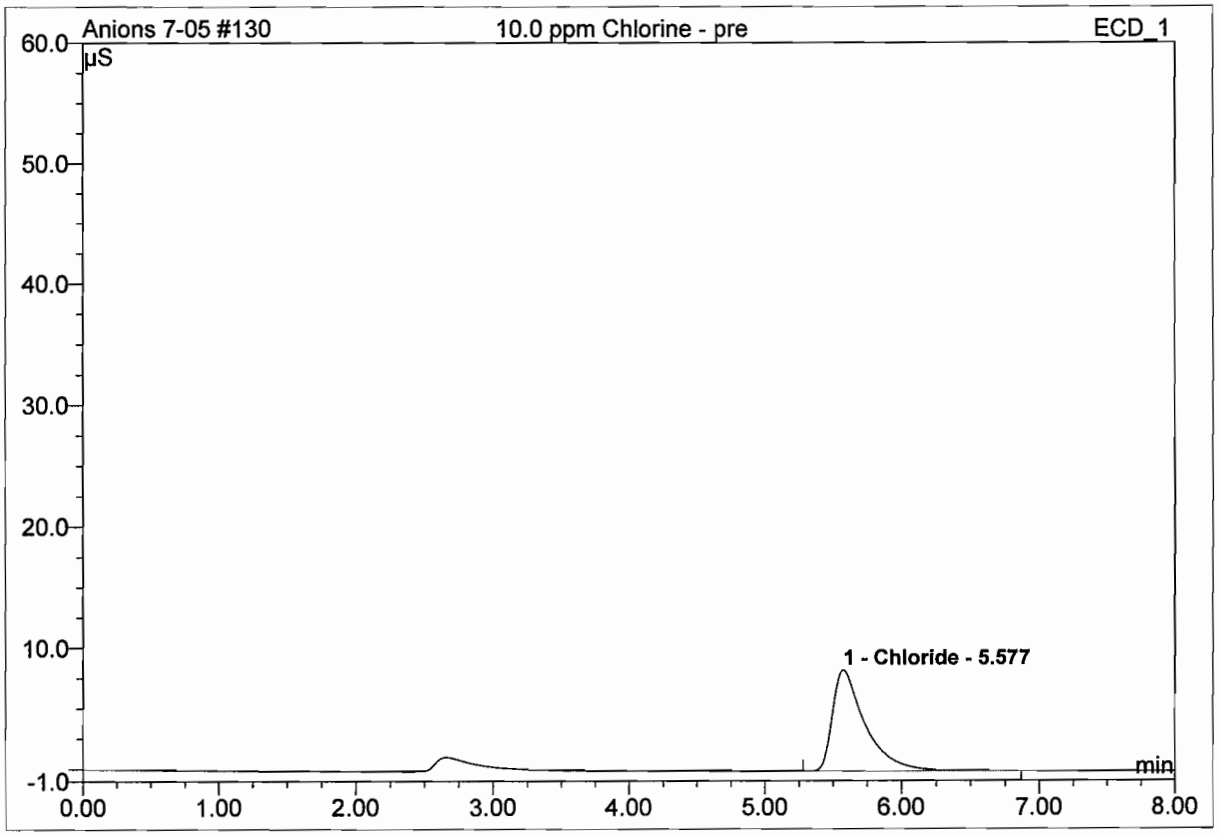
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**122**	*Channel:*	**ECD_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 5:25**	*Sample Weight:*	**1.0000**
Run Time (min):	**19.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.56	Chloride	3.994	1.096
Total:			3.994	1.096

130 10.0 ppm Chlorine - pre

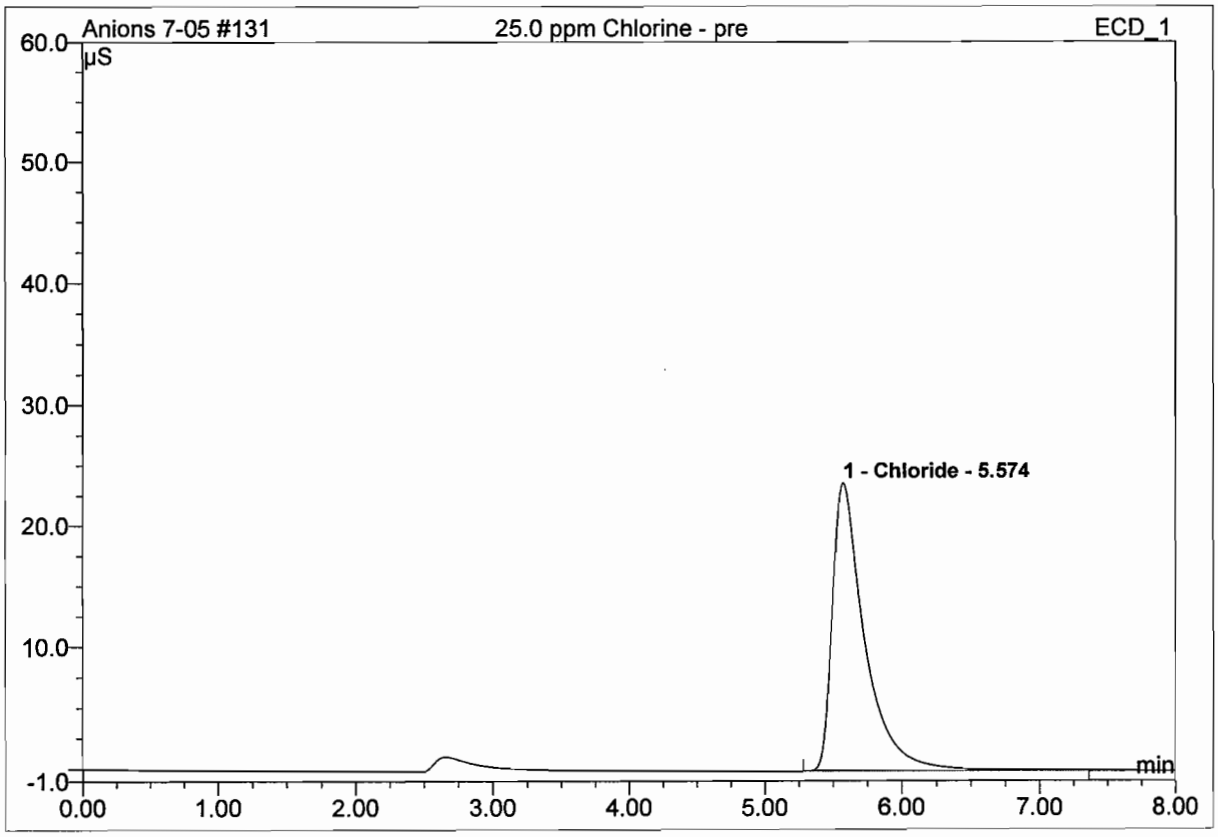
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**123**	*Channel:*	**ECD_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 5:45**	*Sample Weight:*	**1.0000**
Run Time (min):	**19.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.58	Chloride	8.370	2.321
Total:			8.370	2.321

131 25.0 ppm Chlorine - pre

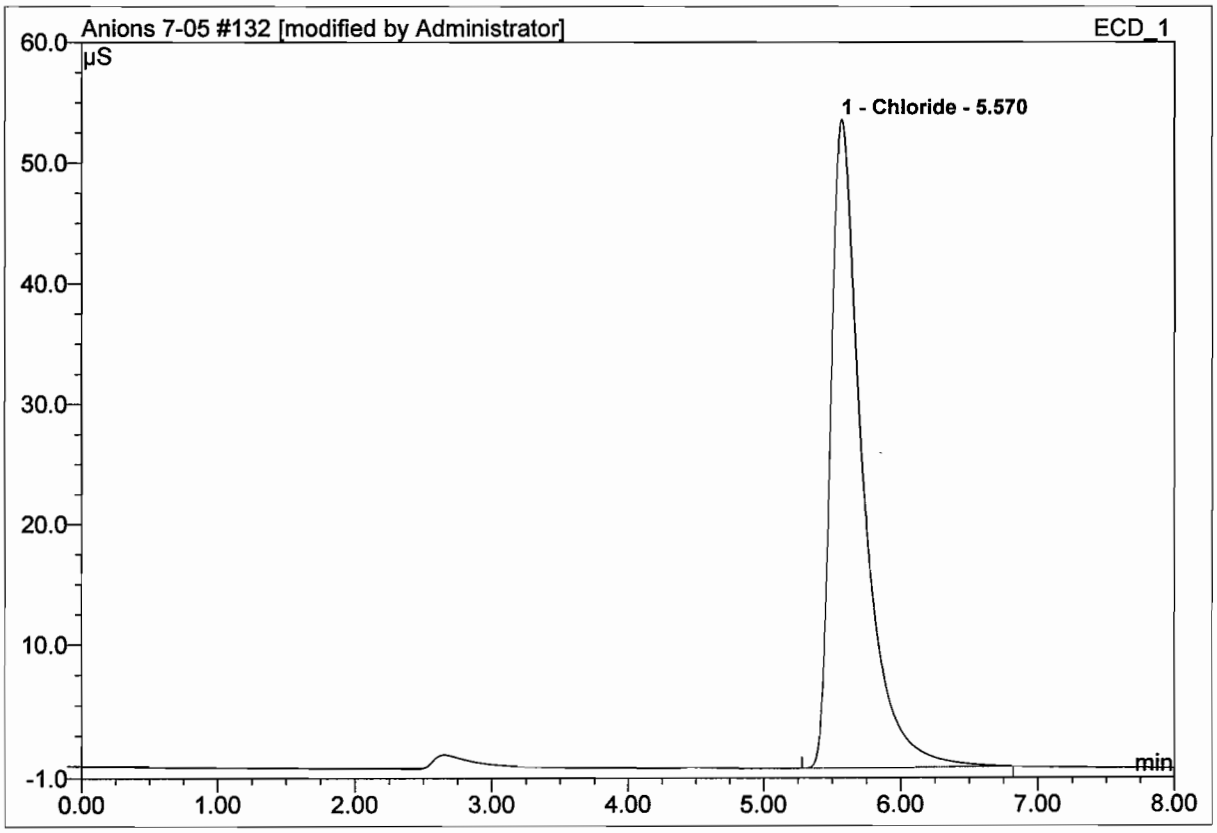
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**124**	*Channel:*	**ECD_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 6:06**	*Sample Weight:*	**1.0000**
Run Time (min):	**19.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.57	Chloride	23.731	6.460
Total:			23.731	6.460

132 50.0 ppm Chlorine - pre

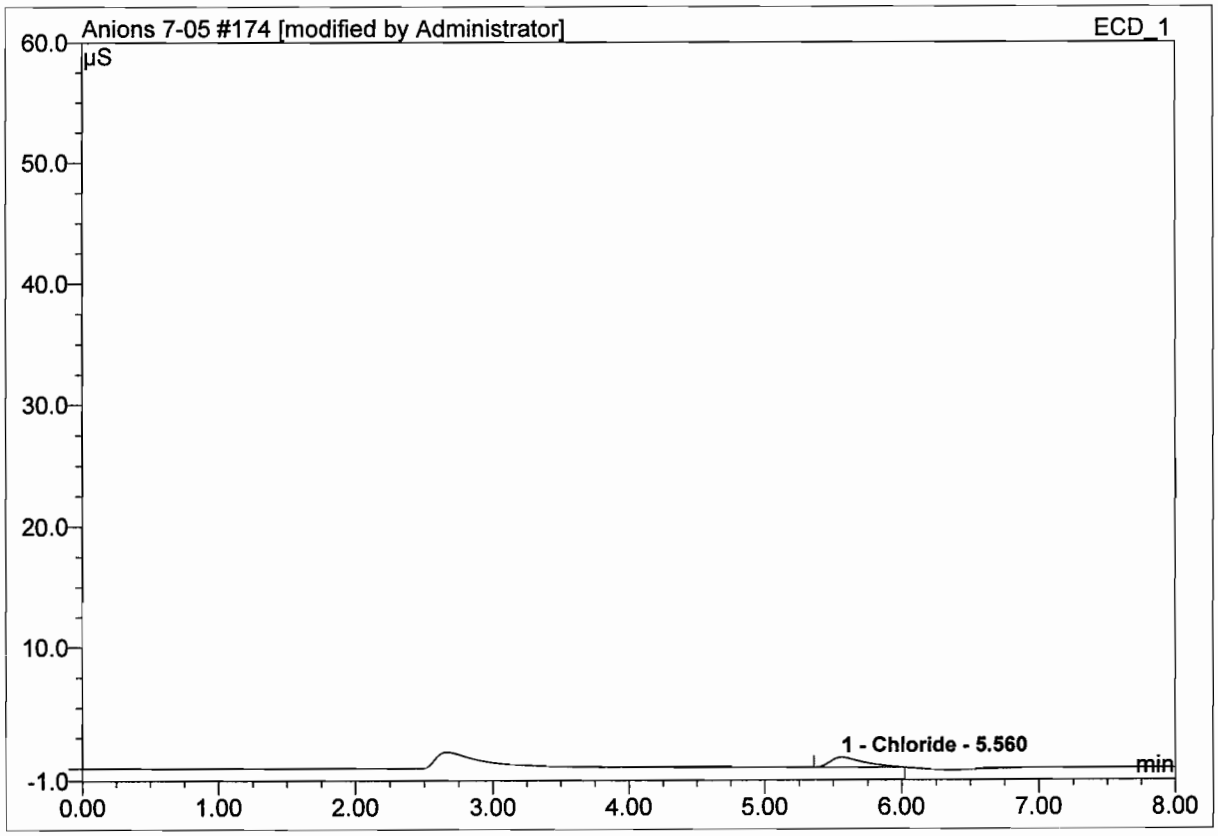
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**125**	*Channel:*	**ECD_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 6:26**	*Sample Weight:*	**1.0000**
Run Time (min):	**19.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.57	Chloride	53.781	14.301
Total:			53.781	14.301

174 1.0 ppm Chloride - Post

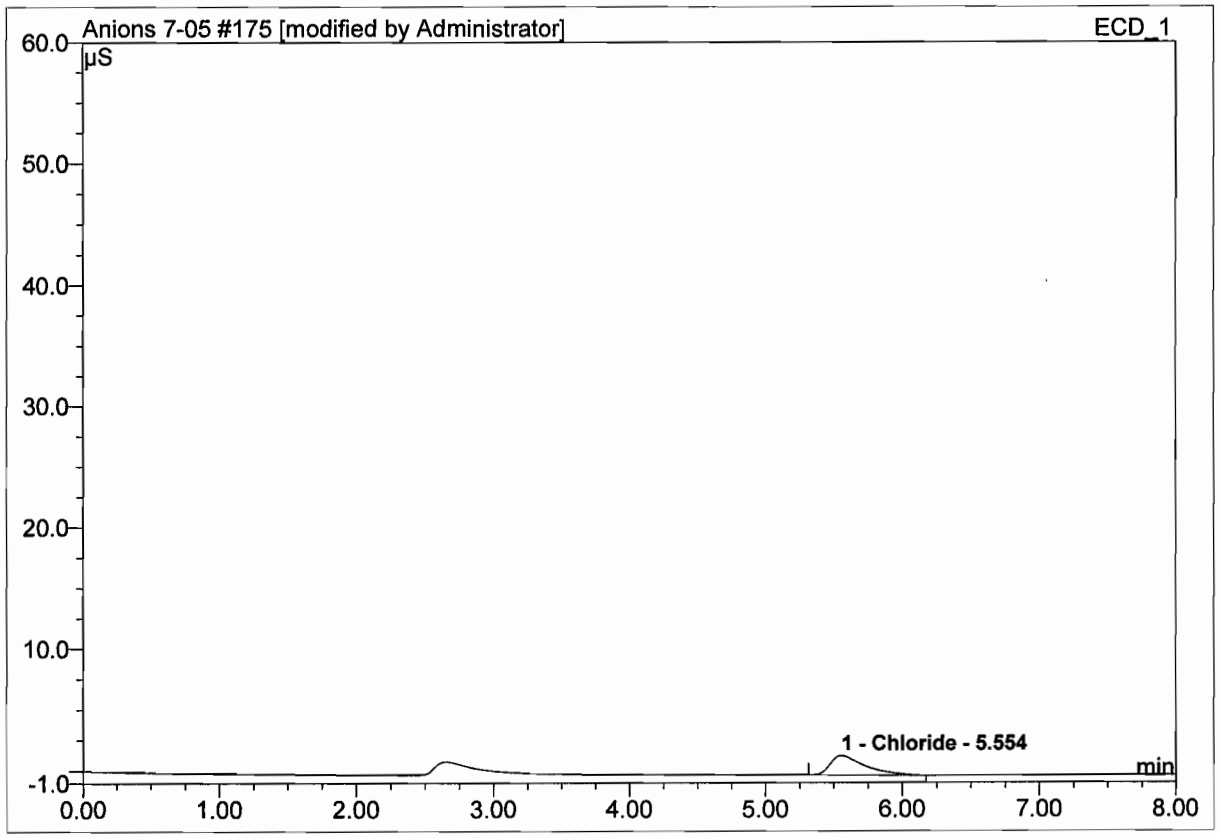
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**164**	*Channel:*	**ECD_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 22:20**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.56	Chloride	0.828	0.234
Total:			0.828	0.234

175 2.0 ppm Chloride - Post

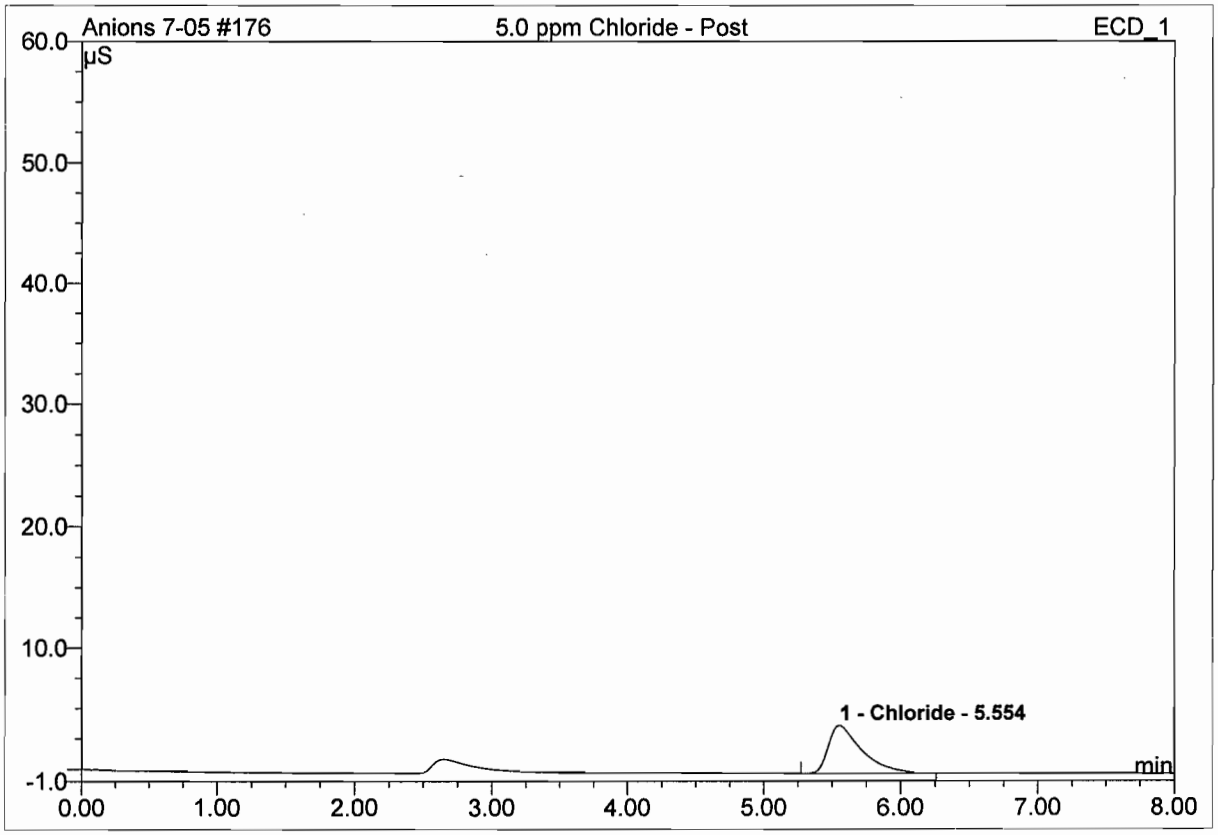
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**165**	*Channel:*	**ECD_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 22:39**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.55	Chloride	1.606	0.471
Total:			1.606	0.471

176 5.0 ppm Chloride - Post

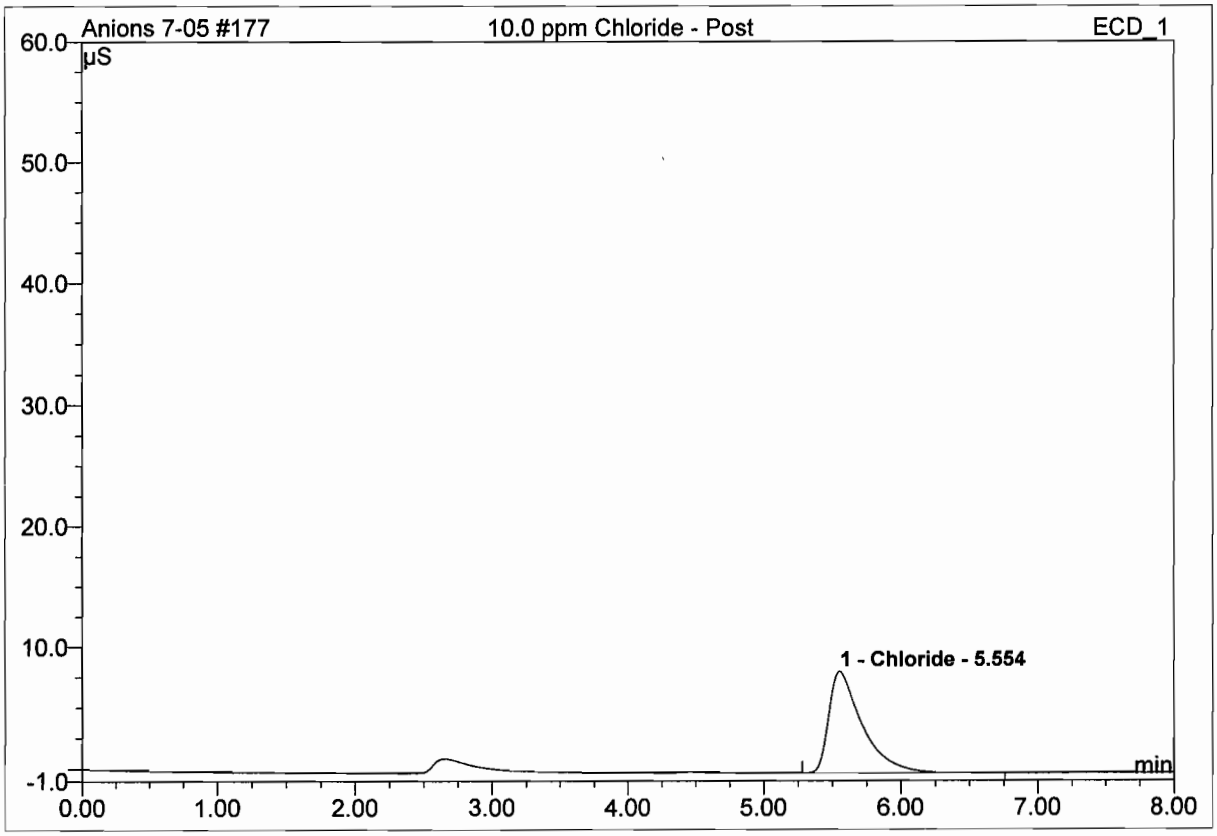
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**166**	*Channel:*	**ECD_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 22:58**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.55	Chloride	3.962	1.125
Total:			3.962	1.125

177 10.0 ppm Chloride - Post

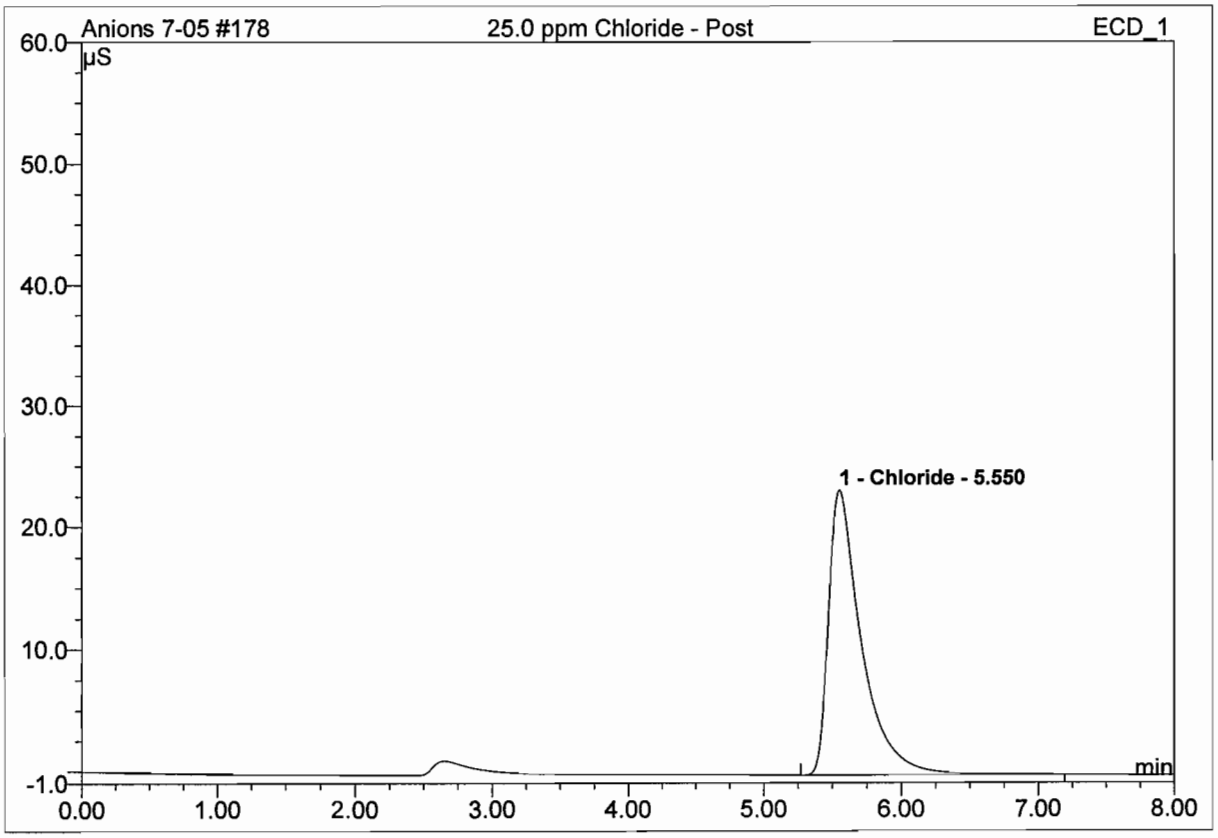
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**167**	*Channel:*	**ECD_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 23:17**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.55	Chloride	8.311	2.351
Total:			8.311	2.351

178 25.0 ppm Chloride - Post

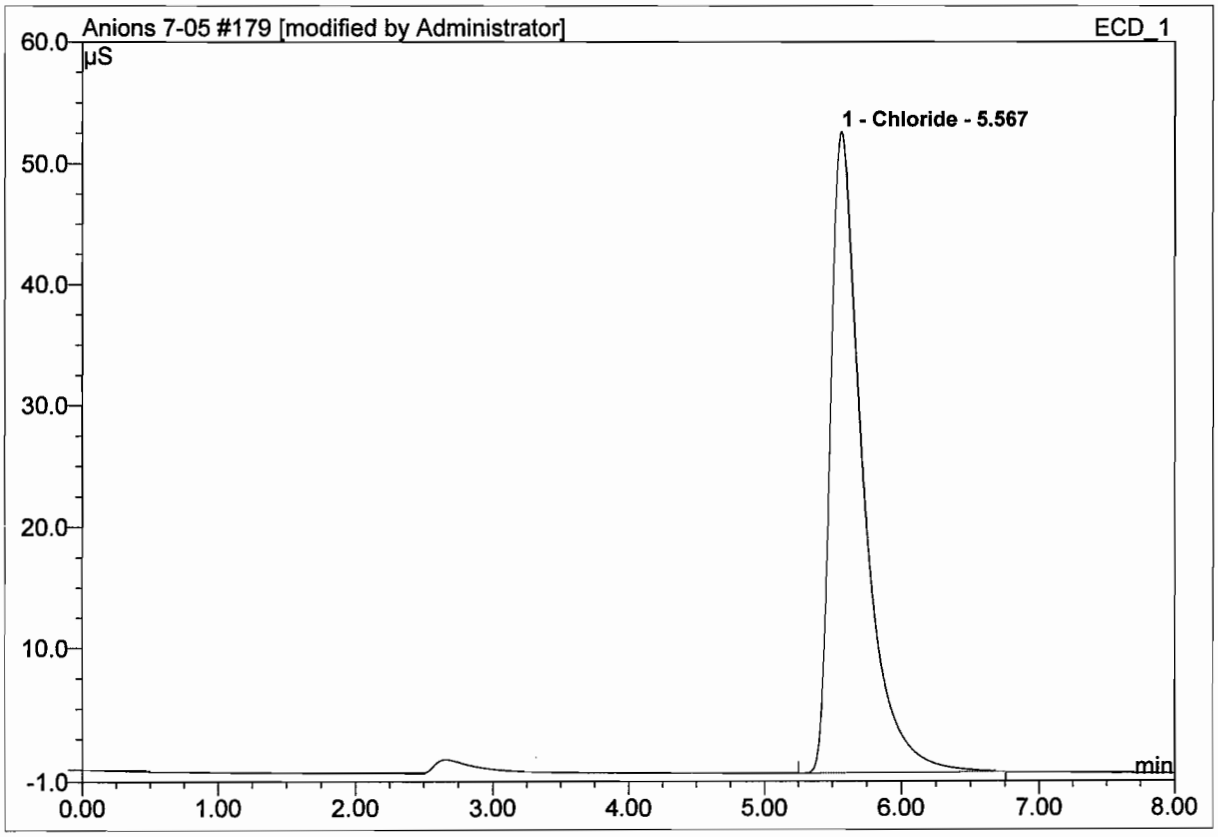
Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**168**	*Channel:*	**ECD_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 23:37**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.55	Chloride	23.349	6.488
Total:			23.349	6.488

179 50.0 ppm Chloride - Post

Client	**Premcor, TX**	*Injection Volume:*	**35.0**
Vial Number:	**169**	*Channel:*	**ECD_1**
Sample Type:	**standard**	*Wavelength:*	**n.a.**
Control Program:	**Sulfate**	*Bandwidth:*	**n.a.**
Quantif. Method:	**Sulfate**	*Dilution Factor:*	**1.0000**
Recording Time:	**7/14/2005 23:56**	*Sample Weight:*	**1.0000**
Run Time (min):	**18.00**	*Sample Amount:*	**1.0000**



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	5.57	Chloride	52.955	14.376
Total:			52.955	14.376

4521

CHAIN OF CU

C-44

PROJ. NO.

PROJECT NAME: PREMCOR

SAMPLERS: (Signature) Cameron Wiffle, Jim Dorr

LAB NO.	SAMPLE NO.	DATE	TIME	SAMPLE LOCATION	NO. OF CONTAINERS	Method 26 - HCl	Method 26 - Cl2					REMARKS
	20984	6/28/05		Chlorosorb			X					Blank - NaOH
	20979	6/28				X						Blank - H_2SO_4
	20931	6/29	9:22	- Inlet		X						run 1 - H_2SO_4
	20951	6/29	9:22	- Inlet			X					run 1 - NaOH
	19886	6/29	10:37	- Inlet		X						run 2 - H_2SO_4
	19887	6/29	10:37	- Inlet			X					run 2 - NaOH
	19890	6/29	11:48	- Inlet		X						run 3 - H_2SO_4
	19891	6/29	11:48	- Inlet			X					run 3 - NaOH
	20952	6/29	9:22	- Outlet		X						run 1 - H_2SO_4
	20953	6/29	9:22	- Outlet			X					run 1 - NaOH
	19888	6/29	10:37	- Outlet		X						run 2 - H_2SO_4
	19889	6/29	10:37	- Outlet			X					run 2 - NaOH
	19892	6/29	11:48	- Outlet		X						run 3 - H_2SO_4
	19893	6/29	11:48	- Outlet			X					run 3 - NaOH

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Cameron Wiffle		S Plattner			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
S Plattner	7/1/05 1315				
Relinquished by: (Signature)	Date / Time	Received for Laboratory by:	Date / Time		
		Em T Vont	7/5/05 11:00		

REMARKS:

ARI ENVIRONMENTAL INC.
951 Old Rand Road, Unit 106
Wauconda, IL 60084
Telephone (847) 487-1580
Fax (847) 487-1587

PRINT FILE COPY - WHITE RECORD FILE COPY - CANARY RETAIN COPY - PINK CUSTOMER COPY - GOLDENROD

1344 CCR Chlorosorb Sampling Results
In-house Data Measured During Performance Test

The Premcor Refining Group Inc.
Port Arthur Refinery

Date Sampled	06/29/05

Premcor On-Site Lab Data

INLET - EPA METHOD 5056 - MACT UUU			OUTLET - EPA METHOD 5056 - MACT UUU		
	VALUE WT %	LIMIT WT %		VALUE WT %	LIMIT WT %
RUN # 1 (8:22 am)	0.87	1.35		1	1.8
RUN # 2 (9:27 am)	0.89	1.35		1.17	1.8
RUN # 3 (10:48 am)	0.88	1.35		0.99	1.8
	AVERAGE:	1.35		AVERAGE:	1.8

Operational Parameters Measured During Test

Per 40 CFR 63.1567(a)(2) / Table 22 (Operating Limits for Inorganic HAP Emission Limitations for CCRs): The daily average temperature of the gas entering the adsorption system must not exceed the limit established during the performance test;

RUN TIMES START	FINISH	DEGF E-60 COOLER OUTLET 24TC2501.PV	MBPD PLATFORMER RX CHARGE 24FI863.PV	MBPD 1344 Naphfiner Charge 24FI677.PV	GPM HYDROGEN TO HGS 24FI007.PV	MMSCFD SMR H2 FLOW TO HGS 24FC0016.PV	MMSCFD H2 TO 15 BH 24FI052.PV	BPD 843 NAPHTHA TO 1344 24FC601.PV	% CALCULATED %WEIGHT OF COKE 24COKE_WT.PV
6/29/05 8:22 AM	6/29/05 9:22 AM	414.26	52.13	49.09	0.68	0.89	0.01	20122	3.82
6/29/05 9:27 AM	6/29/05 10:27 AM	415.00	52.07	49.12	0.68	0.90	0.01	19991	3.83
6/29/05 10:48 AM	6/29/05 11:48 AM	415.00	52.21	48.85	0.68	0.97	0.01	20225	3.84
	AVERAGE:	414.75	52.14	49.02	0.68	0.92	0.01	20113	3.83

D-1

Premcor Refining Port Arthur, Texas
Chlorosorb Stack
ARI Reference Method Monitoring Data

Date/Time	VOC	O2	CO2	Comments
6/29/05 7:46:00	-10.2	20.81	0.01	
6/29/05 7:46:15	-10.2	20.81	0.01	
6/29/05 7:46:30	-10.2	20.81	0.01	
6/29/05 7:46:45	-10.2	18.41	0.00	
6/29/05 7:47:00	-10.2	6.41	-0.03	
6/29/05 7:47:15	-10.2	0.53	-0.03	
6/29/05 7:47:30	-10.2	-0.06	-0.03	Calibration Error
6/29/05 7:47:45	-10.2	-0.10	-0.04	Zero O2
6/29/05 7:48:00	-10.2	-0.11	-0.03	-0.11
6/29/05 7:48:15	-10.2	-0.12	-0.04	Zero CO2
6/29/05 7:48:30	-10.2	-0.12	-0.05	-0.04
6/29/05 7:48:45	-10.2	-0.12	-0.03	
6/29/05 7:49:00	-10.2	-0.12	-0.04	
6/29/05 7:49:15	-10.2	0.58	-0.03	
6/29/05 7:49:30	-10.2	5.12	-0.03	
6/29/05 7:49:45	-10.2	8.11	-0.04	
6/29/05 7:50:00	-10.2	8.81	-0.04	Calibration Error
6/29/05 7:50:15	-10.2	8.92	-0.04	diluted 24.8% O2
6/29/05 7:50:30	-10.3	8.95	-0.04	9.00 % O2 (cyl# CC3266)
6/29/05 7:50:45	-10.2	8.95	-0.04	8.95
6/29/05 7:51:00	-10.2	8.96	-0.04	
6/29/05 7:51:15	-10.2	8.96	-0.04	
6/29/05 7:51:30	-10.3	8.97	-0.04	
6/29/05 7:51:45	-10.3	8.97	-0.04	
6/29/05 7:52:00	-10.3	8.25	-0.04	
6/29/05 7:52:15	-10.3	5.84	-0.04	
6/29/05 7:52:30	-10.3	5.02	-0.04	Calibration Error
6/29/05 7:52:45	-10.3	4.94	-0.04	diluted 24.8% O2
6/29/05 7:53:00	-10.3	4.93	-0.04	5.00 % O2 (cyl# CC3266)
6/29/05 7:53:15	-10.3	4.93	-0.04	4.93
6/29/05 7:53:30	-10.2	4.93	-0.04	
6/29/05 7:53:45	-10.3	4.93	-0.05	
6/29/05 7:54:00	-10.3	4.99	-0.05	
6/29/05 7:54:15	-10.3	6.45	1.22	
6/29/05 7:54:30	-10.3	3.66	6.48	
6/29/05 7:54:45	-10.3	0.66	11.89	
6/29/05 7:55:00	-10.3	-0.05	15.82	
6/29/05 7:55:15	-10.3	-0.18	17.66	
6/29/05 7:55:30	-10.3	-0.19	18.08	
6/29/05 7:55:45	-10.3	-0.20	18.18	
6/29/05 7:56:00	-10.2	-0.10	18.24	Calibration Error
6/29/05 7:56:15	-10.3	-0.01	18.04	diluted 25.26 % CO2
6/29/05 7:56:30	-10.3	-0.02	17.96	18.00 % O2 (cyl# CC133854)
6/29/05 7:56:45	-10.3	-0.02	17.91	17.95
6/29/05 7:57:00	-5.5	-0.02	17.89	
6/29/05 7:57:15	-5.8	-0.02	17.91	
6/29/05 7:57:30	-5.9	-0.02	17.91	
6/29/05 7:57:45	-6.7	-0.02	17.92	
6/29/05 7:58:00	-9.5	-0.02	17.94	
6/29/05 7:58:15	-9.4	-0.02	17.67	
6/29/05 7:58:30	-9.5	-0.01	14.00	
6/29/05 7:58:45	-9.6	0.00	10.69	Calibration Error
6/29/05 7:59:00	-9.7	0.00	9.89	diluted 25.26 % CO2
6/29/05 7:59:15	-9.7	0.00	9.84	10.00 % O2 (cyl# CC133854)
6/29/05 7:59:30	-9.8	0.00	9.84	9.86
6/29/05 7:59:45	-9.7	0.00	9.84	
6/29/05 8:00:00	-9.7	0.00	9.82	
6/29/05 8:00:15	-9.7	0.00	9.82	
6/29/05 8:00:30	-9.8	0.11	9.72	
6/29/05 8:00:45	-9.8	2.36	7.19	
6/29/05 8:01:00	254.8	10.33	2.23	
6/29/05 8:01:15	196.7	19.13	0.35	
6/29/05 8:01:30	3.1	19.23	1.62	
6/29/05 8:01:45	-2.6	10.12	2.72	
6/29/05 8:02:00	-4.3	2.61	0.82	
6/29/05 8:02:15	-5.2	0.54	0.11	
6/29/05 8:02:30	-5.7	0.33	0.02	
6/29/05 8:02:45	-1.9	0.30	0.01	System Bias
6/29/05 8:03:00	-1.2	0.17	0.01	Zero THC
6/29/05 8:03:15	-1.4	0.06	0.00	-1.5
6/29/05 8:03:30	-1.6	0.05	0.00	
6/29/05 8:03:45	-1.7	0.05	0.00	
6/29/05 8:04:00	-1.9	0.04	0.00	
6/29/05 8:04:15	-1.9	0.04	0.00	
6/29/05 8:04:30	2.8	0.03	-0.01	
6/29/05 8:04:45	722.2	0.03	-0.01	
6/29/05 8:05:00	833.7	0.04	0.04	
6/29/05 8:05:15	828.7	0.20	0.26	
6/29/05 8:05:30	813.2	0.18	0.10	
6/29/05 8:05:45	818.9	0.07	0.00	
6/29/05 8:06:00	837.8	0.04	-0.01	
6/29/05 8:06:15	838.4	0.03	-0.02	
6/29/05 8:06:30	837.9	0.03	-0.02	
6/29/05 8:06:45	843.5	0.03	-0.02	System Bias
6/29/05 8:07:00	845.2	0.03	-0.02	diluted 2002 C3H8
6/29/05 8:07:15	844.6	0.03	-0.02	850.0 ppm C3H8 (cyl# CC76030)

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Date/Time	VOC	O2	CO2	Comments
6/29/05 8:07:30	844.9	0.03	-0.03	845.0
6/29/05 8:07:45	845.3	0.03	-0.03	
6/29/05 8:08:00	845.2	0.03	-0.03	
6/29/05 8:08:15	844.7	0.03	-0.03	
6/29/05 8:08:30	713.0	0.03	-0.03	
6/29/05 8:08:45	506.1	0.03	-0.02	System Bias
6/29/05 8:09:00	501.3	0.03	-0.03	diluted 2002 C3H8
6/29/05 8:09:15	501.0	0.03	-0.02	500.0 ppm C3H8 (cyl# CC76030)
6/29/05 8:09:30	500.4	0.03	-0.02	500.7
6/29/05 8:09:45	500.2	0.03	-0.02	
6/29/05 8:10:00	499.7	0.03	-0.03	
6/29/05 8:10:15	499.4	0.03	-0.03	
6/29/05 8:10:30	473.4	0.03	-0.03	
6/29/05 8:10:45	309.8	0.03	-0.03	
6/29/05 8:11:00	301.6	0.03	-0.03	
6/29/05 8:11:15	301.0	0.03	-0.03	System Bias
6/29/05 8:11:30	300.4	0.03	-0.03	diluted 2002 C3H8
6/29/05 8:11:45	300.5	0.03	-0.02	300.0 ppm C3H8 (cyl# CC76030)
6/29/05 8:12:00	300.3	0.03	-0.03	300.3
6/29/05 8:12:15	299.9	0.03	-0.03	
6/29/05 8:12:30	250.3	0.03	-0.03	
6/29/05 8:12:45	312.9	0.03	-0.02	
6/29/05 8:13:00	326.0	0.05	3.11	
6/29/05 8:13:15	26.0	0.10	8.95	
6/29/05 8:13:30	6.8	0.32	6.89	
6/29/05 8:13:45	3.7	2.35	2.17	
6/29/05 8:14:00	2.2	4.48	0.27	
6/29/05 8:14:15	1.2	4.92	0.04	
6/29/05 8:14:30	0.6	4.98	0.01	
6/29/05 8:14:45	0.1	4.99	0.00	System Bias
6/29/05 8:15:00	-0.3	5.00	-0.01	diluted 24.8% O2
6/29/05 8:15:15	-0.6	5.01	-0.01	5.00 % O2 (cyl# CC3266)
6/29/05 8:15:30	-0.8	5.01	-0.01	5.01
6/29/05 8:15:45	-1.0	5.01	-0.02	Zero CO2
6/29/05 8:16:00	-1.1	5.01	-0.02	-0.01
6/29/05 8:16:15	-1.0	5.01	-0.02	
6/29/05 8:16:30	-0.8	5.01	-0.02	
6/29/05 8:16:45	-0.8	4.72	0.96	
6/29/05 8:17:00	-0.9	2.44	5.55	
6/29/05 8:17:15	-1.0	0.60	8.39	
6/29/05 8:17:30	-1.0	0.11	9.20	
6/29/05 8:17:45	-1.1	0.05	9.42	
6/29/05 8:18:00	-1.1	0.04	9.50	
6/29/05 8:18:15	-1.2	0.03	9.54	
6/29/05 8:18:30	-1.3	0.03	9.56	
6/29/05 8:18:45	-1.2	0.03	9.57	
6/29/05 8:19:00	-1.3	0.03	9.58	System Bias
6/29/05 8:19:15	-1.4	0.03	9.59	diluted 25.26 % CO2
6/29/05 8:19:30	-1.4	0.03	9.60	10.00 % O2 (cyl# CC133854)
6/29/05 8:19:45	-1.5	0.03	9.60	9.60
6/29/05 8:20:00	-1.3	0.03	9.60	Zero O2
6/29/05 8:20:15	217.3	0.03	9.60	0.03
6/29/05 8:20:30	376.2	0.03	9.69	
6/29/05 8:20:45	386.3	0.08	12.66	
6/29/05 8:21:00	341.2	0.16	16.33	
6/29/05 8:21:15	314.2	0.19	17.89	
6/29/05 8:21:30	317.2	0.20	17.62	
6/29/05 8:21:45	342.6	0.20	17.40	Start Run No. 1
6/29/05 8:22:00	**368.7**	**0.19**	**17.81**	
6/29/05 8:22:15	**348.1**	**0.19**	**18.10**	
6/29/05 8:22:30	**333.8**	**0.19**	**18.18**	
6/29/05 8:22:45	**366.9**	**0.19**	**17.75**	
6/29/05 8:23:00	**411.1**	**0.18**	**17.30**	
6/29/05 8:23:15	**439.2**	**0.19**	**17.52**	
6/29/05 8:23:30	**448.1**	**0.20**	**17.86**	
6/29/05 8:23:45	**454.1**	**0.20**	**17.90**	
6/29/05 8:24:00	**456.9**	**0.21**	**17.66**	
6/29/05 8:24:15	**456.4**	**0.21**	**17.78**	
6/29/05 8:24:30	**386.4**	**0.20**	**18.01**	
6/29/05 8:24:45	**357.3**	**0.20**	**18.04**	
6/29/05 8:25:00	**394.9**	**0.20**	**17.73**	
6/29/05 8:25:15	**425.9**	**0.21**	**17.45**	
6/29/05 8:25:30	**426.9**	**0.21**	**17.82**	
6/29/05 8:25:45	**359.7**	**0.20**	**18.07**	
6/29/05 8:26:00	**350.4**	**0.20**	**17.91**	
6/29/05 8:26:15	**336.3**	**0.20**	**16.68**	
6/29/05 8:26:30	**340.6**	**0.21**	**16.83**	
6/29/05 8:26:45	**348.1**	**0.20**	**17.70**	
6/29/05 8:27:00	**315.0**	**0.19**	**18.07**	
6/29/05 8:27:15	**298.8**	**0.19**	**18.15**	
6/29/05 8:27:30	**327.5**	**0.18**	**17.81**	
6/29/05 8:27:45	**364.3**	**0.17**	**17.42**	
6/29/05 8:28:00	**412.7**	**0.17**	**17.68**	
6/29/05 8:28:15	**454.0**	**0.17**	**17.97**	
6/29/05 8:28:30	**494.8**	**0.18**	**18.10**	
6/29/05 8:28:45	**519.4**	**0.18**	**18.17**	

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Date/Time	VOC	O2	CO2	Comments
6/29/05 8:29:00	531.8	0.18	18.18	
6/29/05 8:29:15	511.7	0.18	18.19	
6/29/05 8:29:30	467.3	0.19	18.20	
6/29/05 8:29:45	448.2	0.19	17.98	
6/29/05 8:30:00	440.7	0.19	17.54	
6/29/05 8:30:15	398.3	0.19	17.53	
6/29/05 8:30:30	297.7	0.19	17.86	
6/29/05 8:30:45	311.5	0.19	17.80	
6/29/05 8:31:00	330.2	0.20	16.75	
6/29/05 8:31:15	348.5	0.21	17.21	
6/29/05 8:31:30	351.2	0.20	18.04	
6/29/05 8:31:45	329.5	0.21	18.28	
6/29/05 8:32:00	332.5	0.20	18.23	
6/29/05 8:32:15	369.1	0.20	17.92	
6/29/05 8:32:30	436.1	0.20	17.87	
6/29/05 8:32:45	472.1	0.20	18.03	
6/29/05 8:33:00	470.7	0.20	18.09	
6/29/05 8:33:15	481.1	0.19	17.73	
6/29/05 8:33:30	485.5	0.18	17.02	
6/29/05 8:33:45	478.8	0.18	17.22	
6/29/05 8:34:00	438.0	0.19	17.78	
6/29/05 8:34:15	404.6	0.19	18.05	
6/29/05 8:34:30	402.7	0.20	18.11	
6/29/05 8:34:45	418.3	0.20	18.13	
6/29/05 8:35:00	386.6	0.20	18.15	
6/29/05 8:35:15	275.0	0.20	18.18	
6/29/05 8:35:30	281.6	0.20	17.90	
6/29/05 8:35:45	319.9	0.21	16.54	
6/29/05 8:36:00	367.0	0.21	16.99	
6/29/05 8:36:15	404.9	0.20	17.93	
6/29/05 8:36:30	415.9	0.20	18.23	
6/29/05 8:36:45	436.2	0.19	18.26	
6/29/05 8:37:00	454.0	0.19	18.06	
6/29/05 8:37:15	484.9	0.18	17.79	
6/29/05 8:37:30	506.4	0.19	17.78	
6/29/05 8:37:45	501.4	0.19	17.97	
6/29/05 8:38:00	499.9	0.19	17.99	
6/29/05 8:38:15	490.5	0.18	17.79	
6/29/05 8:38:30	472.3	0.19	17.82	
6/29/05 8:38:45	390.2	0.19	18.00	
6/29/05 8:39:00	325.6	0.20	18.03	
6/29/05 8:39:15	328.0	0.19	17.39	
6/29/05 8:39:30	349.1	0.18	16.67	
6/29/05 8:39:45	332.0	0.19	17.21	
6/29/05 8:40:00	229.1	0.19	17.81	
6/29/05 8:40:15	246.0	0.20	17.82	
6/29/05 8:40:30	284.3	0.20	17.05	
6/29/05 8:40:45	321.8	0.21	17.54	
6/29/05 8:41:00	341.0	0.21	18.19	
6/29/05 8:41:15	374.5	0.20	18.35	
6/29/05 8:41:30	417.3	0.20	18.27	
6/29/05 8:41:45	485.7	0.20	17.97	
6/29/05 8:42:00	568.2	0.20	18.07	
6/29/05 8:42:15	634.8	0.19	18.25	
6/29/05 8:42:30	645.9	0.20	18.26	
6/29/05 8:42:45	631.1	0.20	18.20	
6/29/05 8:43:00	607.3	0.19	17.91	
6/29/05 8:43:15	573.8	0.20	17.69	
6/29/05 8:43:30	527.6	0.20	17.85	
6/29/05 8:43:45	481.6	0.20	18.03	
6/29/05 8:44:00	458.1	0.21	18.10	
6/29/05 8:44:15	449.8	0.21	18.11	
6/29/05 8:44:30	374.6	0.22	18.14	
6/29/05 8:44:45	238.9	0.23	18.17	
6/29/05 8:45:00	213.1	0.22	17.64	
6/29/05 8:45:15	224.5	0.22	16.14	
6/29/05 8:45:30	247.2	0.22	16.92	
6/29/05 8:45:45	283.0	0.21	17.92	
6/29/05 8:46:00	321.1	0.21	18.23	
6/29/05 8:46:15	367.6	0.21	18.24	
6/29/05 8:46:30	423.0	0.20	18.04	
6/29/05 8:46:45	482.9	0.19	17.95	
6/29/05 8:47:00	526.6	0.20	18.06	
6/29/05 8:47:15	520.0	0.20	18.13	
6/29/05 8:47:30	510.1	0.20	17.90	
6/29/05 8:47:45	509.5	0.19	17.59	
6/29/05 8:48:00	497.1	0.19	17.79	
6/29/05 8:48:15	459.4	0.19	18.07	
6/29/05 8:48:30	443.9	0.20	18.16	
6/29/05 8:48:45	433.9	0.21	18.11	
6/29/05 8:49:00	428.4	0.21	18.17	
6/29/05 8:49:15	345.0	0.21	18.23	
6/29/05 8:49:30	236.3	0.21	18.23	
6/29/05 8:49:45	221.3	0.21	17.53	
6/29/05 8:50:00	237.2	0.21	16.30	
6/29/05 8:50:15	263.5	0.22	17.27	

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Date/Time	VOC	O2	CO2	Comments
6/29/05 8:50:30	304.4	0.21	18.10	
6/29/05 8:50:45	346.1	0.20	18.33	
6/29/05 8:51:00	396.2	0.18	18.36	
6/29/05 8:51:15	467.3	0.15	18.20	
6/29/05 8:51:30	529.6	0.14	17.98	
6/29/05 8:51:45	552.9	0.14	18.01	
6/29/05 8:52:00	533.9	0.14	18.14	
6/29/05 8:52:15	501.4	0.14	18.19	
6/29/05 8:52:30	478.3	0.14	18.00	
6/29/05 8:52:45	406.5	0.15	17.90	
6/29/05 8:53:00	231.9	0.15	17.99	
6/29/05 8:53:15	198.7	0.15	17.76	
6/29/05 8:53:30	203.4	0.16	15.98	
6/29/05 8:53:45	212.8	0.16	16.53	
6/29/05 8:54:00	235.0	0.15	17.82	
6/29/05 8:54:15	239.4	0.15	18.16	
6/29/05 8:54:30	260.0	0.14	18.03	
6/29/05 8:54:45	320.6	0.14	17.50	
6/29/05 8:55:00	398.7	0.14	17.43	
6/29/05 8:55:15	486.3	0.14	17.74	
6/29/05 8:55:30	566.6	0.14	18.05	
6/29/05 8:55:45	618.0	0.14	18.24	
6/29/05 8:56:00	633.0	0.14	18.28	
6/29/05 8:56:15	636.8	0.13	18.32	
6/29/05 8:56:30	619.4	0.14	18.33	
6/29/05 8:56:45	560.2	0.14	18.34	
6/29/05 8:57:00	521.9	0.13	18.27	
6/29/05 8:57:15	495.2	0.13	18.04	
6/29/05 8:57:30	411.4	0.13	17.85	
6/29/05 8:57:45	284.1	0.13	17.94	
6/29/05 8:58:00	289.2	0.14	17.63	
6/29/05 8:58:15	314.3	0.15	16.27	
6/29/05 8:58:30	334.5	0.15	17.03	
6/29/05 8:58:45	319.7	0.16	18.07	
6/29/05 8:59:00	288.3	0.15	18.32	
6/29/05 8:59:15	284.7	0.14	18.08	
6/29/05 8:59:30	316.8	0.13	17.48	
6/29/05 8:59:45	373.1	0.13	17.38	
6/29/05 9:00:00	443.3	0.13	17.89	
6/29/05 9:00:15	500.7	0.14	18.21	
6/29/05 9:00:30	543.5	0.14	18.26	
6/29/05 9:00:45	577.1	0.14	18.02	
6/29/05 9:01:00	578.3	0.14	17.99	
6/29/05 9:01:15	545.2	0.14	18.21	
6/29/05 9:01:30	485.9	0.15	18.32	
6/29/05 9:01:45	466.6	0.15	18.25	
6/29/05 9:02:00	449.8	0.15	18.04	
6/29/05 9:02:15	363.1	0.15	18.04	
6/29/05 9:02:30	274.9	0.16	18.19	
6/29/05 9:02:45	298.8	0.16	17.69	
6/29/05 9:03:00	338.2	0.17	16.36	
6/29/05 9:03:15	361.1	0.16	17.32	
6/29/05 9:03:30	371.2	0.16	18.16	
6/29/05 9:03:45	366.0	0.15	18.34	
6/29/05 9:04:00	386.6	0.15	18.30	
6/29/05 9:04:15	413.3	0.15	18.01	
6/29/05 9:04:30	453.4	0.15	17.85	
6/29/05 9:04:45	487.0	0.15	17.95	
6/29/05 9:05:00	511.2	0.15	18.13	
6/29/05 9:05:15	532.6	0.15	18.02	
6/29/05 9:05:30	535.9	0.15	17.80	
6/29/05 9:05:45	524.0	0.16	17.98	
6/29/05 9:06:00	476.0	0.16	18.20	
6/29/05 9:06:15	416.3	0.15	18.26	
6/29/05 9:06:30	389.4	0.14	18.05	
6/29/05 9:06:45	384.1	0.14	17.70	
6/29/05 9:07:00	296.3	0.15	17.71	
6/29/05 9:07:15	190.1	0.15	17.96	
6/29/05 9:07:30	195.6	0.15	17.49	
6/29/05 9:07:45	232.9	0.15	16.22	
6/29/05 9:08:00	278.2	0.16	17.22	
6/29/05 9:08:15	321.9	0.16	18.15	
6/29/05 9:08:30	358.6	0.15	18.37	
6/29/05 9:08:45	393.4	0.15	18.38	
6/29/05 9:09:00	426.8	0.15	18.35	
6/29/05 9:09:15	485.5	0.14	18.38	
6/29/05 9:09:30	550.7	0.14	18.33	
6/29/05 9:09:45	606.2	0.14	18.31	
6/29/05 9:10:00	628.6	0.15	18.35	
6/29/05 9:10:15	616.3	0.15	18.35	
6/29/05 9:10:30	582.9	0.15	18.35	
6/29/05 9:10:45	491.3	0.16	18.37	
6/29/05 9:11:00	423.9	0.16	18.35	
6/29/05 9:11:15	389.8	0.15	18.00	
6/29/05 9:11:30	368.7	0.15	17.53	
6/29/05 9:11:45	281.3	0.16	17.72	

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Date/Time	VOC	O2	CO2	Comments
6/29/05 9:12:00	169.9	0.16	18.08	
6/29/05 9:12:15	156.6	0.16	17.54	
6/29/05 9:12:30	171.1	0.16	16.34	
6/29/05 9:12:45	203.7	0.16	17.31	
6/29/05 9:13:00	258.3	0.16	18.12	
6/29/05 9:13:15	307.2	0.16	18.38	
6/29/05 9:13:30	381.6	0.16	18.31	
6/29/05 9:13:45	466.7	0.15	18.04	
6/29/05 9:14:00	546.6	0.15	18.03	
6/29/05 9:14:15	604.5	0.16	18.19	
6/29/05 9:14:30	622.4	0.16	18.25	
6/29/05 9:14:45	609.7	0.16	18.26	
6/29/05 9:15:00	580.7	0.16	18.25	
6/29/05 9:15:15	471.0	0.16	18.25	
6/29/05 9:15:30	248.2	0.16	18.24	
6/29/05 9:15:45	167.0	0.16	17.76	
6/29/05 9:16:00	159.5	0.17	15.91	
6/29/05 9:16:15	183.6	0.16	16.42	
6/29/05 9:16:30	224.8	0.15	17.71	
6/29/05 9:16:45	276.5	0.15	18.24	
6/29/05 9:17:00	339.1	0.15	18.34	
6/29/05 9:17:15	416.3	0.15	18.14	
6/29/05 9:17:30	504.0	0.14	17.99	
6/29/05 9:17:45	591.2	0.14	18.08	
6/29/05 9:18:00	638.8	0.15	18.19	
6/29/05 9:18:15	651.3	0.15	18.23	
6/29/05 9:18:30	637.1	0.14	18.22	
6/29/05 9:18:45	616.4	0.14	18.24	
6/29/05 9:19:00	566.3	0.15	18.27	
6/29/05 9:19:15	499.0	0.15	18.27	
6/29/05 9:19:30	456.5	0.15	18.12	
6/29/05 9:19:45	427.3	0.16	17.83	
6/29/05 9:20:00	325.0	0.16	17.83	
6/29/05 9:20:15	200.4	0.16	18.00	
6/29/05 9:20:30	168.1	0.16	17.30	
6/29/05 9:20:45	170.6	0.16	15.64	
6/29/05 9:21:00	191.1	0.16	16.61	
6/29/05 9:21:15	220.2	0.16	17.77	
6/29/05 9:21:30	260.5	0.15	18.20	
6/29/05 9:21:45	310.6	0.15	18.29	
6/29/05 9:22:00	396.9	0.16	18.31	End Run No. 1
6/29/05 9:22:15	499.9	0.16	18.33	
6/29/05 9:22:30	618.4	0.16	18.36	
6/29/05 9:22:45	688.4	0.16	18.37	
6/29/05 9:23:00	710.8	0.16	18.33	
6/29/05 9:23:15				
6/29/05 9:23:30				
6/29/05 9:23:45				
6/29/05 9:24:00				
6/29/05 9:24:15				
6/29/05 9:24:30				
6/29/05 9:24:45				
6/29/05 9:25:00	138.0	0.17	17.78	
6/29/05 9:25:15	146.8	0.17	16.06	
6/29/05 9:25:30	181.6	0.17	16.79	
6/29/05 9:25:45	254.8	0.17	17.91	
6/29/05 9:26:00	184.1	0.17	18.29	
6/29/05 9:26:15	294.4	0.31	17.27	
6/29/05 9:26:30	159.9	1.06	11.74	
6/29/05 9:26:45	317.9	0.89	10.74	
6/29/05 9:27:00	313.0	1.93	6.30	
6/29/05 9:27:15	310.8	1.30	1.88	
6/29/05 9:27:30	310.1	0.27	0.37	System Bias
6/29/05 9:27:45	308.7	0.06	0.19	diluted 2002 C3H8
6/29/05 9:28:00	308.8	0.03	0.15	300.0 ppm C3H8 (cyl# CC76030)
6/29/05 9:28:15	307.7	0.03	0.13	307.9
6/29/05 9:28:30	306.5	0.03	0.11	
6/29/05 9:28:45	305.8	0.03	0.09	
6/29/05 9:29:00	305.5	0.03	0.08	
6/29/05 9:29:15	323.2	0.02	0.07	
6/29/05 9:29:30	86.6	0.02	0.07	
6/29/05 9:29:45	8.1	0.05	0.06	
6/29/05 9:30:00	6.1	1.43	0.07	
6/29/05 9:30:15	5.3	4.01	0.06	
6/29/05 9:30:30	4.7	4.83	0.05	
6/29/05 9:30:45	4.3	4.96	0.04	
6/29/05 9:31:00	3.9	4.99	0.04	
6/29/05 9:31:15	3.6	4.99	0.03	System Bias
6/29/05 9:31:30	3.3	5.00	0.03	diluted 24.8% O2
6/29/05 9:31:45	3.1	5.00	0.03	5.00 % O2 (cyl# CC3266)
6/29/05 9:32:00	2.9	5.01	0.03	5.00
6/29/05 9:32:15	2.7	5.01	0.02	Zero THC
6/29/05 9:32:30	2.9	5.01	0.02	3.0
6/29/05 9:32:45	3.4	5.01	0.02	Zero CO2
6/29/05 9:33:00	3.3	4.56	1.37	0.03
6/29/05 9:33:15	3.2	2.12	5.91	

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Date/Time	VOC	O2	CO2	Comments
6/29/05 9:33:30	3.1	0.46	8.39	
6/29/05 9:33:45	2.9	0.08	9.06	
6/29/05 9:34:00	2.8	0.03	9.36	
6/29/05 9:34:15	2.7	0.02	9.51	System Bias
6/29/05 9:34:30	2.6	0.01	9.58	diluted 25.26 % CO2
6/29/05 9:34:45	2.4	0.01	9.58	10.00 % O2 (cyl# CC133854)
6/29/05 9:35:00	2.3	0.01	9.60	9.60
6/29/05 9:35:15	2.2	0.00	9.63	Zero O2
6/29/05 9:35:30	93.3	0.00	9.63	0.01
6/29/05 9:35:45	356.2	0.00	9.64	
6/29/05 9:36:00	404.3	0.02	10.88	
6/29/05 9:36:15	413.4	0.09	14.68	
6/29/05 9:36:30	411.7	0.14	17.12	
6/29/05 9:36:45	410.6	0.15	17.94	Start Run No. 2
6/29/05 9:37:00	**409.4**	**0.15**	**18.12**	
6/29/05 9:37:15	**418.4**	**0.15**	**18.19**	
6/29/05 9:37:30	**394.3**	**0.15**	**18.20**	
6/29/05 9:37:45	**290.5**	**0.15**	**18.20**	
6/29/05 9:38:00	**282.9**	**0.15**	**17.94**	
6/29/05 9:38:15	**326.4**	**0.15**	**16.63**	
6/29/05 9:38:30	**366.4**	**0.16**	**16.75**	
6/29/05 9:38:45	**413.2**	**0.15**	**17.77**	
6/29/05 9:39:00	**440.8**	**0.15**	**18.16**	
6/29/05 9:39:15	**472.5**	**0.14**	**18.25**	
6/29/05 9:39:30	**504.8**	**0.14**	**18.25**	
6/29/05 9:39:45	**525.8**	**0.14**	**18.29**	
6/29/05 9:40:00	**506.9**	**0.15**	**18.30**	
6/29/05 9:40:15	**477.2**	**0.16**	**18.27**	
6/29/05 9:40:30	**474.1**	**0.16**	**18.10**	
6/29/05 9:40:45	**491.4**	**0.15**	**17.60**	
6/29/05 9:41:00	**498.0**	**0.15**	**17.57**	
6/29/05 9:41:15	**442.0**	**0.15**	**17.90**	
6/29/05 9:41:30	**391.1**	**0.15**	**18.05**	
6/29/05 9:41:45	**364.6**	**0.16**	**17.56**	
6/29/05 9:42:00	**356.2**	**0.16**	**17.16**	
6/29/05 9:42:15	**303.6**	**0.16**	**17.59**	
6/29/05 9:42:30	**225.1**	**0.16**	**17.98**	
6/29/05 9:42:45	**228.9**	**0.16**	**17.79**	
6/29/05 9:43:00	**271.2**	**0.16**	**16.67**	
6/29/05 9:43:15	**306.6**	**0.15**	**16.95**	
6/29/05 9:43:30	**312.9**	**0.15**	**17.88**	
6/29/05 9:43:45	**339.3**	**0.15**	**18.26**	
6/29/05 9:44:00	**385.6**	**0.15**	**18.06**	
6/29/05 9:44:15	**426.9**	**0.15**	**17.93**	
6/29/05 9:44:30	**464.1**	**0.16**	**18.27**	
6/29/05 9:44:45	**506.4**	**0.16**	**18.42**	
6/29/05 9:45:00	**543.2**	**0.16**	**18.44**	
6/29/05 9:45:15	**577.7**	**0.16**	**18.38**	
6/29/05 9:45:30	**604.6**	**0.16**	**18.40**	
6/29/05 9:45:45	**609.1**	**0.16**	**18.36**	
6/29/05 9:46:00	**543.0**	**0.16**	**18.32**	
6/29/05 9:46:15	**488.8**	**0.15**	**18.27**	
6/29/05 9:46:30	**474.6**	**0.15**	**17.77**	
6/29/05 9:46:45	**471.3**	**0.14**	**17.22**	
6/29/05 9:47:00	**437.5**	**0.14**	**17.51**	
6/29/05 9:47:15	**356.0**	**0.15**	**17.97**	
6/29/05 9:47:30	**352.5**	**0.15**	**18.05**	
6/29/05 9:47:45	**362.4**	**0.16**	**17.60**	
6/29/05 9:48:00	**378.1**	**0.16**	**17.75**	
6/29/05 9:48:15	**307.3**	**0.16**	**18.17**	
6/29/05 9:48:30	**229.5**	**0.16**	**18.26**	
6/29/05 9:48:45	**258.0**	**0.15**	**17.60**	
6/29/05 9:49:00	**292.1**	**0.15**	**16.63**	
6/29/05 9:49:15	**334.4**	**0.16**	**17.35**	
6/29/05 9:49:30	**341.2**	**0.15**	**18.12**	
6/29/05 9:49:45	**376.7**	**0.15**	**18.28**	
6/29/05 9:50:00	**404.5**	**0.16**	**17.91**	
6/29/05 9:50:15	**420.9**	**0.16**	**17.81**	
6/29/05 9:50:30	**452.4**	**0.16**	**18.17**	
6/29/05 9:50:45	**439.7**	**0.16**	**18.28**	
6/29/05 9:51:00	**429.4**	**0.16**	**18.27**	
6/29/05 9:51:15	**451.4**	**0.15**	**17.82**	
6/29/05 9:51:30	**482.6**	**0.15**	**17.29**	
6/29/05 9:51:45	**498.9**	**0.15**	**17.57**	
6/29/05 9:52:00	**501.6**	**0.15**	**18.01**	
6/29/05 9:52:15	**500.9**	**0.16**	**18.22**	
6/29/05 9:52:30	**495.5**	**0.16**	**18.27**	
6/29/05 9:52:45	**471.8**	**0.16**	**18.29**	
6/29/05 9:53:00	**349.3**	**0.17**	**18.31**	
6/29/05 9:53:15	**292.0**	**0.17**	**18.28**	
6/29/05 9:53:30	**329.6**	**0.17**	**17.44**	
6/29/05 9:53:45	**366.0**	**0.18**	**16.72**	
6/29/05 9:54:00	**387.5**	**0.18**	**17.69**	
6/29/05 9:54:15	**400.6**	**0.17**	**18.28**	
6/29/05 9:54:30	**406.3**	**0.17**	**18.40**	
6/29/05 9:54:45	**423.2**	**0.17**	**18.27**	

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Date/Time	VOC	O2	CO2	Comments
6/29/05 9:55:00	437.4	0.17	18.09	
6/29/05 9:55:15	446.4	0.17	18.05	
6/29/05 9:55:30	436.7	0.17	18.13	
6/29/05 9:55:45	429.4	0.17	18.06	
6/29/05 9:56:00	442.9	0.16	17.61	
6/29/05 9:56:15	452.6	0.15	17.56	
6/29/05 9:56:30	440.0	0.15	17.88	
6/29/05 9:56:45	376.2	0.16	18.17	
6/29/05 9:57:00	351.8	0.16	18.13	
6/29/05 9:57:15	358.2	0.16	17.61	
6/29/05 9:57:30	364.3	0.16	17.49	
6/29/05 9:57:45	294.6	0.16	17.85	
6/29/05 9:58:00	265.8	0.16	18.11	
6/29/05 9:58:15	298.6	0.16	17.50	
6/29/05 9:58:30	316.6	0.16	16.73	
6/29/05 9:58:45	334.7	0.15	17.50	
6/29/05 9:59:00	333.2	0.15	18.11	
6/29/05 9:59:15	342.6	0.15	18.24	
6/29/05 9:59:30	371.1	0.16	17.86	
6/29/05 9:59:45	408.7	0.16	17.81	
6/29/05 10:00:00	452.9	0.15	18.20	
6/29/05 10:00:15	475.3	0.16	18.36	
6/29/05 10:00:30	516.7	0.16	18.33	
6/29/05 10:00:45	553.3	0.16	18.06	
6/29/05 10:01:00	576.8	0.16	17.91	
6/29/05 10:01:15	547.1	0.16	18.05	
6/29/05 10:01:30	515.7	0.16	18.20	
6/29/05 10:01:45	477.1	0.16	17.97	
6/29/05 10:02:00	461.0	0.16	17.56	
6/29/05 10:02:15	442.4	0.16	17.74	
6/29/05 10:02:30	348.0	0.16	18.11	
6/29/05 10:02:45	294.1	0.16	18.22	
6/29/05 10:03:00	308.6	0.17	17.68	
6/29/05 10:03:15	325.2	0.17	16.99	
6/29/05 10:03:30	337.6	0.16	17.32	
6/29/05 10:03:45	305.5	0.15	17.83	
6/29/05 10:04:00	302.3	0.15	18.00	
6/29/05 10:04:15	340.4	0.16	17.36	
6/29/05 10:04:30	368.5	0.16	17.23	
6/29/05 10:04:45	382.0	0.16	17.87	
6/29/05 10:05:00	418.8	0.16	18.28	
6/29/05 10:05:15	460.1	0.16	18.39	
6/29/05 10:05:30	485.6	0.16	18.39	
6/29/05 10:05:45	505.9	0.16	18.40	
6/29/05 10:06:00	486.8	0.16	18.39	
6/29/05 10:06:15	444.1	0.16	18.36	
6/29/05 10:06:30	450.9	0.16	17.98	
6/29/05 10:06:45	479.9	0.15	17.39	
6/29/05 10:07:00	495.4	0.16	17.68	
6/29/05 10:07:15	463.2	0.16	18.10	
6/29/05 10:07:30	448.7	0.16	18.20	
6/29/05 10:07:45	440.2	0.16	17.74	
6/29/05 10:08:00	438.7	0.16	17.49	
6/29/05 10:08:15	429.0	0.16	17.85	
6/29/05 10:08:30	325.5	0.16	18.15	
6/29/05 10:08:45	289.9	0.16	18.15	
8/29/05 10:09:00	306.2	0.16	17.45	
6/29/05 10:09:15	332.5	0.16	17.09	
6/29/05 10:09:30	318.7	0.16	17.76	
6/29/05 10:09:45	284.1	0.16	18.25	
6/29/05 10:10:00	309.0	0.16	18.02	
6/29/05 10:10:15	347.3	0.16	17.26	
6/29/05 10:10:30	384.0	0.16	17.59	
6/29/05 10:10:45	430.1	0.16	18.09	
6/29/05 10:11:00	455.4	0.16	18.31	
6/29/05 10:11:15	484.8	0.16	18.31	
6/29/05 10:11:30	520.4	0.16	18.27	
6/29/05 10:11:45	537.5	0.17	18.32	
6/29/05 10:12:00	495.2	0.17	18.32	
6/29/05 10:12:15	465.5	0.17	18.28	
6/29/05 10:12:30	476.6	0.17	17.81	
6/29/05 10:12:45	492.6	0.17	17.51	
6/29/05 10:13:00	480.0	0.17	17.89	
6/29/05 10:13:15	427.1	0.17	18.10	
6/29/05 10:13:30	398.8	0.17	18.02	
6/29/05 10:13:45	403.5	0.17	17.55	
6/29/05 10:14:00	396.5	0.17	17.55	
6/29/05 10:14:15	342.4	0.17	17.97	
6/29/05 10:14:30	268.5	0.17	18.24	
6/29/05 10:14:45	286.4	0.17	18.02	
6/29/05 10:15:00	322.7	0.17	17.23	
6/29/05 10:15:15	351.3	0.17	17.45	
6/29/05 10:15:30	319.1	0.17	18.01	
6/29/05 10:15:45	303.5	0.16	18.27	
6/29/05 10:16:00	328.7	0.17	17.82	
6/29/05 10:16:15	353.4	0.17	17.19	

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Date/Time	VOC	O2	CO2	Comments
6/29/05 10:16:30	377.1	0.17	17.64	
6/29/05 10:16:45	369.7	0.16	18.14	
6/29/05 10:17:00	398.4	0.16	18.29	
6/29/05 10:17:15	441.2	0.16	17.98	
6/29/05 10:17:30	471.6	0.16	17.74	
6/29/05 10:17:45	477.9	0.16	18.11	
6/29/05 10:18:00	448.5	0.16	18.32	
6/29/05 10:18:15	437.2	0.16	18.29	
6/29/05 10:18:30	450.6	0.15	18.01	
6/29/05 10:18:45	459.0	0.15	17.78	
6/29/05 10:19:00	437.2	0.15	17.92	
6/29/05 10:19:15	393.3	0.15	18.15	
6/29/05 10:19:30	393.0	0.16	17.99	
6/29/05 10:19:45	414.0	0.16	17.28	
6/29/05 10:20:00	425.5	0.16	17.47	
6/29/05 10:20:15	384.9	0.16	18.09	
6/29/05 10:20:30	347.9	0.17	18.30	
6/29/05 10:20:45	362.3	0.17	17.90	
6/29/05 10:21:00	379.7	0.17	17.52	
6/29/05 10:21:15	385.4	0.17	17.80	
6/29/05 10:21:30	342.3	0.16	18.14	
6/29/05 10:21:45	369.5	0.17	18.15	
6/29/05 10:22:00	419.0	0.17	17.46	
6/29/05 10:22:15	461.3	0.17	17.36	
6/29/05 10:22:30	477.4	0.17	17.96	
6/29/05 10:22:45	495.1	0.17	18.28	
6/29/05 10:23:00	515.9	0.17	18.34	
6/29/05 10:23:15	529.9	0.17	18.32	
6/29/05 10:23:30	531.9	0.17	18.33	
6/29/05 10:23:45	449.4	0.17	18.35	
6/29/05 10:24:00	378.4	0.18	18.34	
6/29/05 10:24:15	402.0	0.18	17.75	
6/29/05 10:24:30	422.7	0.18	16.88	
6/29/05 10:24:45	446.6	0.18	17.51	
6/29/05 10:25:00	442.0	0.17	18.11	
6/29/05 10:25:15	417.5	0.17	18.30	
6/29/05 10:25:30	409.1	0.17	18.17	
6/29/05 10:25:45	411.0	0.16	17.70	
6/29/05 10:26:00	406.2	0.16	17.68	
6/29/05 10:26:15	347.9	0.16	18.03	
6/29/05 10:26:30	352.3	0.16	18.18	
6/29/05 10:26:45	394.5	0.17	17.83	
6/29/05 10:27:00	440.4	0.17	17.83	
6/29/05 10:27:15	420.2	0.17	18.14	
6/29/05 10:27:30	375.5	0.16	18.35	
6/29/05 10:27:45	372.9	0.17	18.10	
6/29/05 10:28:00	398.6	0.17	17.27	
6/29/05 10:28:15	421.6	0.16	17.36	
6/29/05 10:28:30	443.8	0.16	17.97	
6/29/05 10:28:45	469.0	0.16	18.27	
6/29/05 10:29:00	498.9	0.16	18.31	
6/29/05 10:29:15	503.6	0.16	18.31	
6/29/05 10:29:30	498.2	0.16	18.27	
6/29/05 10:29:45	418.5	0.17	18.27	
6/29/05 10:30:00	380.3	0.18	18.21	
6/29/05 10:30:15	348.7	0.18	17.35	
6/29/05 10:30:30	359.1	0.18	17.02	
6/29/05 10:30:45	362.1	0.18	17.82	
6/29/05 10:31:00	342.4	0.18	18.22	
6/29/05 10:31:15	345.4	0.17	18.11	
6/29/05 10:31:30	355.8	0.16	17.32	
6/29/05 10:31:45	364.3	0.16	17.19	
6/29/05 10:32:00	372.2	0.17	17.65	
6/29/05 10:32:15	370.7	0.17	18.07	
6/29/05 10:32:30	382.7	0.17	18.25	
6/29/05 10:32:45	423.3	0.17	18.28	
6/29/05 10:33:00	458.2	0.17	18.31	
6/29/05 10:33:15	435.0	0.17	18.29	
6/29/05 10:33:30	433.0	0.17	18.26	
6/29/05 10:33:45	469.5	0.17	17.72	
6/29/05 10:34:00	508.9	0.18	17.22	
6/29/05 10:34:15	531.6	0.18	17.73	
6/29/05 10:34:30	522.8	0.18	18.19	
6/29/05 10:34:45	494.3	0.18	18.33	
6/29/05 10:35:00	475.6	0.18	18.32	
6/29/05 10:35:15	455.2	0.18	18.30	
6/29/05 10:35:30	391.2	0.18	18.32	
6/29/05 10:35:45	268.4	0.18	18.32	
6/29/05 10:36:00	243.4	0.18	17.97	
6/29/05 10:36:15	271.4	0.17	16.68	
6/29/05 10:36:30	312.3	0.17	17.00	
6/29/05 10:36:45	353.1	0.16	17.86	
6/29/05 10:37:00	368.9	0.16	18.29	End Run No. 2
6/29/05 10:37:15	375.1	0.16	18.35	
6/29/05 10:37:30	268.5	0.16	18.14	
6/29/05 10:37:45	172.1	0.18	17.89	

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Date/Time	VOC	O2	CO2	Comments
6/29/05 10:38:00	319.2	0.73	13.51	
6/29/05 10:38:15	314.8	0.83	6.36	
6/29/05 10:38:30	312.4	0.33	1.90	
6/29/05 10:38:45	311.5	0.09	0.40	
6/29/05 10:39:00	310.2	0.04	0.22	System Bias
6/29/05 10:39:15	309.2	0.04	0.17	diluted 2002 C3H8
6/29/05 10:39:30	308.2	0.04	0.15	300.0 ppm C3H8 (cyl# CC76030)
6/29/05 10:39:45	307.4	0.04	0.13	307.8
6/29/05 10:40:00	306.4	0.04	0.11	
6/29/05 10:40:15	306.1	0.03	0.10	
6/29/05 10:40:30	298.9	0.04	0.09	
6/29/05 10:40:45	27.4	0.04	0.08	
6/29/05 10:41:00	7.8	0.16	0.11	
6/29/05 10:41:15	6.4	2.18	0.18	
6/29/05 10:41:30	5.6	4.37	0.10	
6/29/05 10:41:45	5.0	4.90	0.07	
6/29/05 10:42:00	4.6	4.98	0.06	
6/29/05 10:42:15	4.2	5.00	0.05	
6/29/05 10:42:30	3.9	5.01	0.04	System Bias
6/29/05 10:42:45	3.5	5.02	0.04	diluted 24.8% O2
6/29/05 10:43:00	3.3	5.02	0.04	5.00 % O2 (cyl# CC3266)
6/29/05 10:43:15	3.1	5.03	0.04	5.02
6/29/05 10:43:30	3.3	5.03	0.03	Zero THC
6/29/05 10:43:45	3.8	5.03	0.03	3.3
6/29/05 10:44:00	3.6	4.63	1.28	Zero CO2
6/29/05 10:44:15	3.5	2.24	5.87	0.04
6/29/05 10:44:30	3.4	0.52	8.46	
6/29/05 10:44:45	3.2	0.10	9.14	
6/29/05 10:45:00	3.1	0.04	9.40	
6/29/05 10:45:15	3.0	0.03	9.54	
6/29/05 10:45:30	2.8	0.03	9.59	
6/29/05 10:45:45	2.7	0.02	9.62	System Bias
6/29/05 10:46:00	2.6	0.02	9.63	diluted 25.26 % CO2
6/29/05 10:46:15	2.5	0.02	9.65	10.00 % O2 (cyl# CC133854)
6/29/05 10:46:30	3.2	0.02	9.65	9.65
6/29/05 10:46:45	217.4	0.02	9.66	Zero O2
6/29/05 10:47:00	379.2	0.02	9.82	0.02
6/29/05 10:47:15	448.8	0.06	13.01	
6/29/05 10:47:30	510.7	0.13	16.51	
6/29/05 10:47:45	564.4	0.16	17.95	Start Run No. 3
6/29/05 10:48:00	**597.2**	**0.16**	**18.22**	
6/29/05 10:48:15	**610.2**	**0.16**	**18.30**	
6/29/05 10:48:30	**599.0**	**0.16**	**18.36**	
6/29/05 10:48:45	**528.4**	**0.17**	**18.38**	
6/29/05 10:49:00	**472.1**	**0.17**	**18.36**	
6/29/05 10:49:15	**438.9**	**0.17**	**18.19**	
6/29/05 10:49:30	**419.9**	**0.17**	**17.97**	
6/29/05 10:49:45	**311.5**	**0.17**	**18.03**	
6/29/05 10:50:00	**195.9**	**0.17**	**18.14**	
6/29/05 10:50:15	**164.9**	**0.17**	**17.31**	
6/29/05 10:50:30	**171.6**	**0.18**	**16.10**	
6/29/05 10:50:45	**198.1**	**0.18**	**17.05**	
6/29/05 10:51:00	**252.1**	**0.17**	**17.98**	
6/29/05 10:51:15	**321.1**	**0.17**	**18.33**	
6/29/05 10:51:30	**392.1**	**0.17**	**18.36**	
6/29/05 10:51:45	**483.9**	**0.17**	**18.40**	
6/29/05 10:52:00	**569.4**	**0.17**	**18.37**	
6/29/05 10:52:15	**622.6**	**0.17**	**18.32**	
6/29/05 10:52:30	**647.7**	**0.17**	**18.28**	
6/29/05 10:52:45	**640.6**	**0.17**	**18.26**	
6/29/05 10:53:00	**608.0**	**0.17**	**18.27**	
6/29/05 10:53:15	**557.6**	**0.18**	**18.30**	
6/29/05 10:53:30	**402.3**	**0.18**	**18.31**	
6/29/05 10:53:45	**326.8**	**0.18**	**18.24**	
6/29/05 10:54:00	**315.3**	**0.18**	**17.45**	
6/29/05 10:54:15	**324.7**	**0.18**	**17.05**	
6/29/05 10:54:30	**247.9**	**0.18**	**17.69**	
6/29/05 10:54:45	**163.8**	**0.18**	**18.11**	
6/29/05 10:55:00	**145.0**	**0.18**	**17.48**	
6/29/05 10:55:15	**169.2**	**0.18**	**16.67**	
6/29/05 10:55:30	**209.9**	**0.18**	**17.28**	
6/29/05 10:55:45	**269.4**	**0.17**	**17.94**	
6/29/05 10:56:00	**352.7**	**0.17**	**18.27**	
6/29/05 10:56:15	**429.9**	**0.17**	**18.36**	
6/29/05 10:56:30	**513.7**	**0.16**	**18.38**	
6/29/05 10:56:45	**585.0**	**0.16**	**18.34**	
6/29/05 10:57:00	**648.3**	**0.17**	**18.30**	
6/29/05 10:57:15	**662.2**	**0.17**	**18.27**	
6/29/05 10:57:30	**646.2**	**0.17**	**18.29**	
6/29/05 10:57:45	**622.9**	**0.16**	**18.31**	
6/29/05 10:58:00	**558.7**	**0.17**	**18.32**	
6/29/05 10:58:15	**377.9**	**0.17**	**18.35**	
6/29/05 10:58:30	**300.3**	**0.17**	**18.21**	
6/29/05 10:58:45	**284.5**	**0.18**	**17.13**	
6/29/05 10:59:00	**297.4**	**0.18**	**16.80**	
6/29/05 10:59:15	**237.9**	**0.17**	**17.77**	

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Date/Time	VOC	O2	CO2	Comments
6/29/05 10:59:30	162.2	0.17	18.25	
6/29/05 10:59:45	159.1	0.16	17.70	
6/29/05 11:00:00	198.6	0.16	17.02	
6/29/05 11:00:15	261.9	0.16	17.51	
6/29/05 11:00:30	339.9	0.16	18.11	
6/29/05 11:00:45	418.6	0.17	18.33	
6/29/05 11:01:00	483.5	0.17	18.37	
6/29/05 11:01:15	538.5	0.17	18.37	
6/29/05 11:01:30	583.5	0.17	18.35	
6/29/05 11:01:45	619.3	0.17	18.31	
6/29/05 11:02:00	636.9	0.17	18.27	
6/29/05 11:02:15	632.1	0.17	18.23	
6/29/05 11:02:30	603.6	0.17	18.24	
6/29/05 11:02:45	503.6	0.17	18.25	
6/29/05 11:03:00	343.8	0.18	18.25	
6/29/05 11:03:15	302.7	0.18	17.81	
6/29/05 11:03:30	301.9	0.18	16.48	
6/29/05 11:03:45	311.5	0.18	16.89	
6/29/05 11:04:00	240.5	0.17	17.89	
6/29/05 11:04:15	163.9	0.17	18.23	
6/29/05 11:04:30	159.6	0.17	17.58	
6/29/05 11:04:45	194.6	0.17	16.88	
6/29/05 11:05:00	243.2	0.17	17.47	
6/29/05 11:05:15	304.5	0.17	18.05	
6/29/05 11:05:30	381.9	0.16	18.30	
6/29/05 11:05:45	462.8	0.16	18.34	
6/29/05 11:06:00	537.0	0.16	18.36	
6/29/05 11:06:15	597.9	0.16	18.33	
6/29/05 11:06:30	643.1	0.16	18.31	
6/29/05 11:06:45	663.2	0.16	18.27	
6/29/05 11:07:00	663.8	0.16	18.23	
6/29/05 11:07:15	648.6	0.16	18.24	
6/29/05 11:07:30	578.5	0.17	18.28	
6/29/05 11:07:45	434.3	0.17	18.31	
6/29/05 11:08:00	378.5	0.17	18.17	
6/29/05 11:08:15	352.9	0.17	17.22	
6/29/05 11:08:30	338.6	0.17	17.07	
6/29/05 11:08:45	229.1	0.17	17.74	
6/29/05 11:09:00	144.9	0.16	18.01	
6/29/05 11:09:15	132.7	0.16	17.02	
6/29/05 11:09:30	163.4	0.16	16.30	
6/29/05 11:09:45	216.7	0.16	17.21	
6/29/05 11:10:00	276.6	0.16	17.93	
6/29/05 11:10:15	341.5	0.16	18.25	
6/29/05 11:10:30	405.0	0.16	18.35	
6/29/05 11:10:45	472.3	0.17	18.35	
6/29/05 11:11:00	542.0	0.17	18.36	
6/29/05 11:11:15	604.5	0.17	18.35	
6/29/05 11:11:30	661.5	0.17	18.35	
6/29/05 11:11:45	691.6	0.17	18.34	
6/29/05 11:12:00	687.4	0.17	18.33	
6/29/05 11:12:15	621.7	0.17	18.32	
6/29/05 11:12:30	514.0	0.18	18.34	
6/29/05 11:12:45	461.1	0.18	18.09	
6/29/05 11:13:00	422.0	0.18	17.22	
6/29/05 11:13:15	380.9	0.18	17.21	
6/29/05 11:13:30	246.1	0.18	17.90	
6/29/05 11:13:45	158.4	0.17	18.10	
6/29/05 11:14:00	149.9	0.17	17.16	
6/29/05 11:14:15	180.3	0.17	16.62	
6/29/05 11:14:30	228.4	0.17	17.42	
6/29/05 11:14:45	291.7	0.17	18.04	
6/29/05 11:15:00	354.8	0.18	18.27	
6/29/05 11:15:15	421.7	0.18	18.33	
6/29/05 11:15:30	497.6	0.18	18.33	
6/29/05 11:15:45	565.1	0.18	18.29	
6/29/05 11:16:00	626.2	0.17	18.25	
6/29/05 11:16:15	665.5	0.17	18.25	
6/29/05 11:16:30	669.0	0.17	18.21	
6/29/05 11:16:45	647.9	0.17	18.24	
6/29/05 11:17:00	554.8	0.17	18.25	
6/29/05 11:17:15	402.9	0.17	18.27	
6/29/05 11:17:30	353.3	0.17	17.94	
6/29/05 11:17:45	334.5	0.18	16.91	
6/29/05 11:18:00	330.6	0.18	17.13	
6/29/05 11:18:15	217.3	0.17	17.86	
6/29/05 11:18:30	143.7	0.16	18.10	
6/29/05 11:18:45	141.1	0.16	17.12	
6/29/05 11:19:00	170.8	0.16	16.60	
6/29/05 11:19:15	215.3	0.16	17.46	
6/29/05 11:19:30	279.9	0.16	18.10	
6/29/05 11:19:45	357.0	0.16	18.35	
6/29/05 11:20:00	441.3	0.16	18.41	
6/29/05 11:20:15	517.1	0.17	18.40	
6/29/05 11:20:30	587.4	0.17	18.34	
6/29/05 11:20:45	645.6	0.17	18.30	

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Date/Time	VOC	O2	CO2	Comments
6/29/05 11:21:00	674.7	0.18	18.28	
6/29/05 11:21:15	671.9	0.17	18.28	
6/29/05 11:21:30	647.6	0.17	18.29	
6/29/05 11:21:45	595.4	0.18	18.32	
6/29/05 11:22:00	506.6	0.18	18.34	
6/29/05 11:22:15	444.9	0.18	18.32	
6/29/05 11:22:30	431.3	0.18	18.27	
6/29/05 11:22:45	406.4	0.19	18.29	
6/29/05 11:23:00	236.8	0.19	18.31	
6/29/05 11:23:15	160.3	0.18	18.12	
6/29/05 11:23:30	155.2	0.18	16.48	
6/29/05 11:23:45	177.3	0.19	16.36	
6/29/05 11:24:00	220.5	0.18	17.66	
6/29/05 11:24:15	271.9	0.18	18.27	
6/29/05 11:24:30	300.0	0.18	18.40	
6/29/05 11:24:45	380.0	0.18	18.21	
6/29/05 11:25:00	460.4	0.17	17.79	
6/29/05 11:25:15	521.6	0.17	17.79	
6/29/05 11:25:30	568.8	0.17	17.97	
6/29/05 11:25:45	581.1	0.17	18.10	
6/29/05 11:26:00	572.4	0.17	18.22	
6/29/05 11:26:15	542.3	0.17	18.26	
6/29/05 11:26:30	355.8	0.17	18.27	
6/29/05 11:26:45	247.3	0.17	18.20	
6/29/05 11:27:00	235.5	0.18	16.90	
6/29/05 11:27:15	250.2	0.18	15.90	
6/29/05 11:27:30	274.8	0.17	17.37	
6/29/05 11:27:45	275.8	0.17	18.15	
6/29/05 11:28:00	277.0	0.17	18.32	
6/29/05 11:28:15	320.3	0.16	18.01	
6/29/05 11:28:30	365.3	0.15	17.58	
6/29/05 11:28:45	428.2	0.15	17.81	
6/29/05 11:29:00	496.8	0.16	18.14	
6/29/05 11:29:15	565.2	0.17	18.28	
6/29/05 11:29:30	614.0	0.16	18.31	
6/29/05 11:29:45	625.6	0.16	18.31	
6/29/05 11:30:00	609.6	0.16	18.25	
6/29/05 11:30:15	550.1	0.16	18.26	
6/29/05 11:30:30	514.9	0.16	18.24	
6/29/05 11:30:45	486.1	0.16	17.94	
6/29/05 11:31:00	465.7	0.17	17.61	
6/29/05 11:31:15	333.5	0.17	17.75	
6/29/05 11:31:30	311.3	0.17	17.89	
6/29/05 11:31:45	315.0	0.17	16.74	
6/29/05 11:32:00	323.1	0.18	16.43	
6/29/05 11:32:15	333.7	0.17	17.73	
6/29/05 11:32:30	295.1	0.17	18.29	
6/29/05 11:32:45	305.2	0.17	18.37	
6/29/05 11:33:00	343.0	0.17	18.10	
6/29/05 11:33:15	380.1	0.17	18.00	
6/29/05 11:33:30	425.5	0.17	18.23	
6/29/05 11:33:45	444.6	0.17	18.37	
6/29/05 11:34:00	480.0	0.18	18.30	
6/29/05 11:34:15	532.2	0.17	17.65	
6/29/05 11:34:30	564.5	0.16	17.36	
6/29/05 11:34:45	575.0	0.17	17.86	
6/29/05 11:35:00	546.2	0.17	18.23	
6/29/05 11:35:15	517.0	0.17	18.32	
6/29/05 11:35:30	506.7	0.17	18.32	
6/29/05 11:35:45	498.1	0.17	18.29	
6/29/05 11:36:00	397.3	0.17	18.29	
6/29/05 11:36:15	326.9	0.17	18.25	
6/29/05 11:36:30	337.8	0.18	17.60	
6/29/05 11:36:45	370.8	0.18	16.70	
6/29/05 11:37:00	376.3	0.18	17.20	
6/29/05 11:37:15	331.8	0.17	17.86	
6/29/05 11:37:30	350.5	0.17	18.01	
6/29/05 11:37:45	375.2	0.17	17.37	
6/29/05 11:38:00	390.2	0.17	17.69	
6/29/05 11:38:15	387.4	0.17	18.21	
6/29/05 11:38:30	352.0	0.17	18.32	
6/29/05 11:38:45	349.4	0.17	18.19	
6/29/05 11:39:00	379.4	0.16	17.53	
6/29/05 11:39:15	414.8	0.16	17.27	
6/29/05 11:39:30	434.2	0.16	17.73	
6/29/05 11:39:45	453.4	0.16	18.09	
6/29/05 11:40:00	482.5	0.16	18.08	
6/29/05 11:40:15	497.3	0.17	17.80	
6/29/05 11:40:30	504.0	0.17	17.92	
6/29/05 11:40:45	477.4	0.17	18.19	
6/29/05 11:41:00	479.3	0.17	18.31	
6/29/05 11:41:15	503.7	0.18	18.29	
6/29/05 11:41:30	524.9	0.17	18.33	
6/29/05 11:41:45	516.8	0.17	18.36	
6/29/05 11:42:00	454.1	0.16	18.39	
6/29/05 11:42:15	453.6	0.17	18.14	

Premcor Refining Port Arthur, Texas
Chlorosorb Stack
ARI Reference Method Monitoring Data

Date/Time	VOC	O2	CO2	Comments
6/29/05 11:42:30	**432.2**	**0.17**	**17.29**	
6/29/05 11:42:45	**430.9**	**0.17**	**17.40**	
6/29/05 11:43:00	**398.8**	**0.17**	**18.06**	
6/29/05 11:43:15	**358.4**	**0.17**	**18.33**	
6/29/05 11:43:30	**355.4**	**0.17**	**18.20**	
6/29/05 11:43:45	**363.3**	**0.17**	**17.71**	
6/29/05 11:44:00	**374.8**	**0.17**	**17.78**	
6/29/05 11:44:15	**339.5**	**0.17**	**18.00**	
6/29/05 11:44:30	**294.0**	**0.17**	**18.15**	
6/29/05 11:44:45	**325.1**	**0.17**	**17.70**	
6/29/05 11:45:00	**367.6**	**0.17**	**17.00**	
6/29/05 11:45:15	**392.0**	**0.17**	**17.50**	
6/29/05 11:45:30	**405.0**	**0.17**	**18.02**	
6/29/05 11:45:45	**403.5**	**0.17**	**18.23**	
6/29/05 11:46:00	**411.3**	**0.17**	**18.07**	
6/29/05 11:46:15	**419.6**	**0.16**	**17.75**	
6/29/05 11:46:30	**392.1**	**0.17**	**17.91**	
6/29/05 11:46:45	**342.8**	**0.17**	**18.18**	
6/29/05 11:47:00	**395.0**	**0.17**	**17.95**	
6/29/05 11:47:15	**451.5**	**0.18**	**16.97**	
6/29/05 11:47:30	**486.4**	**0.18**	**17.24**	
6/29/05 11:47:45	**492.1**	**0.17**	**17.94**	
6/29/05 11:48:00	478.7	0.17	18.24	End Run No.3
6/29/05 11:48:15	476.0	0.17	18.26	
6/29/05 11:48:30	456.2	0.17	18.28	
6/29/05 11:48:45	250.7	0.17	18.31	
6/29/05 11:49:00	209.8	0.20	18.07	
6/29/05 11:49:15	323.5	0.80	12.69	
6/29/05 11:49:30	318.4	0.76	5.76	
6/29/05 11:49:45	314.8	0.28	1.59	
6/29/05 11:50:00	313.8	0.07	0.36	System Bias
6/29/05 11:50:15	312.3	0.04	0.21	diluted 2002 C3H8
6/29/05 11:50:30	311.0	0.04	0.17	300.0 ppm C3H8 (cyl# CC76030)
6/29/05 11:50:45	310.4	0.04	0.15	310.6
6/29/05 11:51:00	308.8	0.04	0.13	
6/29/05 11:51:15	307.9	0.04	0.11	
6/29/05 11:51:30	307.3	0.04	0.10	
6/29/05 11:51:45	279.6	0.04	0.09	
6/29/05 11:52:00	18.9	0.04	0.08	
6/29/05 11:52:15	7.9	0.26	0.12	
6/29/05 11:52:30	6.7	2.56	0.17	
6/29/05 11:52:45	5.9	4.51	0.09	
6/29/05 11:53:00	5.3	4.92	0.07	
6/29/05 11:53:15	4.9	4.99	0.06	
6/29/05 11:53:30	4.5	5.01	0.05	
6/29/05 11:53:45	4.1	5.01	0.05	System Bias
6/29/05 11:54:00	3.9	5.02	0.04	diluted 24.8% O2
6/29/05 11:54:15	3.6	5.02	0.04	5.00 % O2 (cyl# CC3266)
6/29/05 11:54:30	3.4	5.02	0.04	5.02
6/29/05 11:54:45	3.7	5.03	0.04	Zero THC
6/29/05 11:55:00	4.2	5.03	0.03	3.7
6/29/05 11:55:15	4.0	4.47	1.69	Zero CO2
6/29/05 11:55:30	3.8	2.00	6.27	0.04
6/29/05 11:55:45	3.7	0.43	8.62	
6/29/05 11:56:00	3.5	0.09	9.18	
6/29/05 11:56:15	3.4	0.04	9.43	
6/29/05 11:56:30	3.2	0.03	9.55	
6/29/05 11:56:45	3.1	0.03	9.60	
6/29/05 11:57:00	3.0	0.03	9.62	System Bias
6/29/05 11:57:15	2.8	0.02	9.63	diluted 25.26 % CO2
6/29/05 11:57:30	2.7	0.02	9.64	10.00 % O2 (cyl# CC133854)
6/29/05 11:57:45	7.1	0.02	9.65	9.64
6/29/05 11:58:00	255.4	0.02	9.65	Zero O2
6/29/05 11:58:15	338.5	0.02	9.94	0.02
6/29/05 11:58:30	277.2	0.08	13.42	
6/29/05 11:58:45	242.1	0.14	16.62	
6/29/05 11:59:00	263.5	0.16	16.92	
6/29/05 11:59:15	301.3	0.17	16.62	
6/29/05 11:59:30	335.3	0.16	17.33	
6/29/05 11:59:45	378.7	0.16	17.98	

CEMS CALIBRATION DATA

Plant	Premcor Refining
Location	Port Arthur, Texas
Source	Chlorosorb Outlet
Date	6/29/2005
Run Number	1
Start Time	8:22
Stop Time	9:22

Plant Rep.	John Jenkins
Team Leader	James Wedemeier
CEM Operator	James Wedemeier

Analyzer Span Values (% or ppm)

CO	-	ppm
CO2	20	%
O2	10	%
THC	1000	ppm
NOx	-	ppm
SO2	-	ppm

	CALIBRATION ERROR -		7:47 hrs		SYSTEM BIAS CHECK					Calibration
					Pretest: 8:03		Posttest: 9:27 hrs			Correction
	Cylinder Value (% or ppm)	Cylinder Number	Analyzer Calibration Response	Difference (% of Span)	System Response	Syst. Bias (% of Span)	System Response	Syst. Bias (% of Span)	Drift (% of Span)	Factors
CO Zero										Co=
CO Low										
CO Mid										Cm=
CO High										
CO_2 Zero	0.00	CC3266	-0.04	-0.2	-0.01	0.2	0.03	0.4	0.2	Co=
CO_2 Low		diluted								**0.01**
CO_2 Mid	10.00	CC133854	9.86	-0.7	9.60	-1.3	9.60	-1.3	0.0	Cm=
CO_2 High	18.00	25.26 %	17.95	-0.3						**9.60**
O_2 Zero	0.00	CC133854	-0.11	-1.1	0.03	1.4	0.01	1.2	-0.2	Co=
O_2 Low		diluted								**0.02**
O_2 Mid	5.00	CC3266	4.93	-0.7	5.01	0.8	5.00	0.7	-0.1	Cm=
O_2 High	9.00	24.8 %	8.95	-0.5						**5.01**
THC Zero	0.0	CC3266	-1.5	-0.2	-1.5	0.0	3.0	0.5	0.5	Co=
THC Low	300.0	diluted	300.3	0.0	300.3	0.0	307.9	0.8	0.8	**0.8**
THC Mid	500.0	CC76030	500.7	0.1						Cm=
THC High	850.0	2002 ppm	845.0	-0.5						**304.1**
NO_x Zero										Co=
NO_x Low										
NO_x Mid										Cm=
NO_x High										
SO_2 Zero										Co=
SO_2 Low										
SO_2 Mid										Cm=
SO_2 High										

CEMS CALIBRATION DATA

Plant	Premcor Refining
Location	Port Arthur, Texas
Source	Chlorosorb Outlet
Date	6/29/2005
Run Number	2
Start Time	9:37
Stop Time	10:37

Plant Rep.	John Jenkins
Team Leader	James Wedemeier
CEM Operator	James Wedemeier

Analyzer Span Values (% or ppm)

CO	-	ppm
CO2	20	%
O2	10	%
THC	1000	ppm
NOx	-	ppm
SO2	-	ppm

	CALIBRATION ERROR - 7:47 hrs				SYSTEM BIAS CHECK					Calibration
					Pretest: 9:27		Posttest: 10:39 hrs			Correction
	Cylinder Value (% or ppm)	Cylinder Number	Analyzer Calibration Response	Difference (% of Span)	System Response	Syst. Bias (% of Span)	System Response	Syst. Bias (% of Span)	Drift (% of Span)	Factors
CO Zero										Co=
CO Low										
CO Mid										Cm=
CO High										
CO_2 Zero	0.00	CC3266	-0.04	-0.2	0.03	0.4	0.04	0.4	0.1	Co=
CO_2 Low		diluted								**0.04**
CO_2 Mid	10.00	CC133854	9.86	-0.7	9.60	-1.3	9.65	-1.1	0.3	Cm=
CO_2 High	18.00	25.26 %	17.95	-0.3						**9.63**
O_2 Zero	0.00	CC133854	-0.11	-1.1	0.01	1.2	0.02	1.3	0.1	Co=
O_2 Low		diluted								**0.02**
O_2 Mid	5.00	CC3266	4.93	-0.7	5.00	0.7	5.02	0.9	0.2	Cm=
O_2 High	9.00	24.8 %	8.95	-0.5						**5.01**
THC Zero	0.0	CC3266	-1.5	-0.2	3.0	0.5	3.3	0.5	0.0	Co=
THC Low	300.0	diluted	300.3	0.0	307.9	0.8	307.8	0.8	0.0	**3.2**
THC Mid	500.0	CC76030	500.7	0.1						Cm=
THC High	850.0	2002 ppm	845.0	-0.5						**307.9**
NO_x Zero										Co=
NO_x Low										
NO_x Mid										Cm=
NO_x High										
SO_2 Zero										Co=
SO_2 Low										
SO_2 Mid										Cm=
SO_2 High										

CEMS CALIBRATION DATA

Plant	Premcor Refining
Location	Port Arthur, Texas
Source	Chlorosorb Outlet
Date	6/29/2005
Run Number	3
Start Time	10:48
Stop Time	11:48

Plant Rep.	John Jenkins
Team Leader	James Wedemeier
CEM Operator	James Wedemeier

Analyzer Span Values (% or ppm)		
CO	-	ppm
CO2	20	%
O2	10	%
THC	1000	ppm
NOx	-	ppm
SO2	-	ppm

	CALIBRATION ERROR - 7:47 hrs				SYSTEM BIAS CHECK					Calibration
					Pretest: 10:39		Posttest: 11:50 hrs			Correction
	Cylinder Value (% or ppm)	Cylinder Number	Analyzer Calibration Response	Difference (% of Span)	System Response	Syst. Bias (% of Span)	System Response	Syst. Bias (% of Span)	Drift (% of Span)	Factors
CO Zero										Co=
CO Low										
CO Mid										Cm=
CO High										
CO_2 Zero	0.00	CC3266	-0.04	-0.2	0.04	0.4	0.04	0.4	0.0	Co=
CO_2 Low		diluted								**0.04**
CO_2 Mid	10.00	CC133854	9.86	-0.7	9.65	-1.1	9.64	-1.1	0.0	Cm=
CO_2 High	18.00	25.26 %	17.95	-0.3						**9.65**
O_2 Zero	0.00	CC133854	-0.11	-1.1	0.02	1.3	0.02	1.3	0.0	Co=
O_2 Low		diluted								**0.02**
O_2 Mid	5.00	CC3266	4.93	-0.7	5.02	0.9	5.02	0.9	0.0	Cm=
O_2 High	9.00	24.8 %	8.95	-0.5						**5.02**
THC Zero	0.0	CC3266	-1.5	-0.2	3.3	0.5	3.7	0.5	0.0	Co=
THC Low	300.0	diluted	300.3	0.0	307.8	0.8	310.6	1.0	0.3	**3.5**
THC Mid	500.0	CC76030	500.7	0.1						Cm=
THC High	850.0	2002 ppm	845.0	-0.5						**309.2**
NO_x Zero										Co=
NO_x Low										
NO_x Mid										Cm=
NO_x High										
SO_2 Zero										Co=
SO_2 Low										
SO_2 Mid										Cm=
SO_2 High										

ARI REFERENCE METHOD CEMS DATA
USEPA METHOD 205
DILUTION SYSTEM VERIFICATION

Company: Premcor
Location: Port Arthur, Texas
Dilution System ID: 2325
Dilution Flow Rate: 4.5 Lpm
Verification date: 2/3/2004

Analyzer Info

Monitor type: CO_2
Monitor range: 15 %
Monitor Serial No.: N3L60381

Initial Calibration Data

Calibration Concentration		Calibration results		% Difference	
Zero:	0.00	Zero:	0.02	Zero:	0.13
Low:		Low:		Low:	
Mid:	7.00	Mid:	6.96	Mid:	0.27
High:	13.99	High:	13.92	High:	0.47

Dilution System Verification

Mid level gas type: USEPA Protocol 1
Mid level concentration: 7.48 %
Mid level tank serial #: CC1029357

High level dilution gas type: USEPA Protocol 1
High level concentration: 25.41 %
High level tank serial #: CC145479
Target concentration No. 1: 12.00
Target concentration No. 2: 7.50

Dilution System Results

Target Concentration No. 1	Instrument Response	% difference from average*	Target Concentration No. 2	Instrument Response	% difference from average*
Trial No. 1:	11.95	0.94	Trial No. 1:	7.49	0.09
Trial No. 2:	12.12	0.47	Trial No. 2:	7.50	0.04
Trial No. 3:	12.12	0.47	Trial No. 3:	7.50	0.04
Average:	12.063		Average:	7.497	

% Difference from target concentration: 0.53%

% Difference from target concentration: 0.04%

Mid Level Calibration Gas Results

	Instrument Response
Trial No. 1:	7.39
Trial No. 2:	7.41
Trial No. 3:	7.41

Mid Level calibration gas concentration: 7.48%
Average analyzer response: 7.40
Percent difference: 1.02 *

* Must be less than 2 %

USEPA Method 205
Dilution System Verification Check

Date/Time	CO2	Comments
6/27/05 14:30:00	0.02	Calibration Error
6/27/05 14:30:15	0.02	Zero CO_2
6/27/05 14:30:30	0.02	0.02
6/27/05 14:30:45	0.02	
6/27/05 14:31:00	0.02	
6/27/05 14:31:15	0.02	
6/27/05 14:31:30	0.02	
6/27/05 14:31:45	0.02	
6/27/05 14:32:00	0.01	
6/27/05 14:32:15	-0.02	
6/27/05 14:32:30	-0.03	
6/27/05 14:32:45	-0.03	
6/27/05 14:33:00	-0.03	
6/27/05 14:33:15	-0.03	
6/27/05 14:33:30	-0.02	
6/27/05 14:33:45	-0.02	
6/27/05 14:34:00	-0.02	
6/27/05 14:34:15	-0.02	
6/27/05 14:34:30	-0.02	
6/27/05 14:34:45	-0.02	
6/27/05 14:35:00	-0.02	
6/27/05 14:35:15	-0.02	
6/27/05 14:35:30	-0.02	
6/27/05 14:35:45	-0.02	
6/27/05 14:36:00	-0.02	
6/27/05 14:36:15	-0.02	
6/27/05 14:36:30	-0.02	
6/27/05 14:36:45	-0.02	
6/27/05 14:37:00	-0.02	
6/27/05 14:37:15	1.16	
6/27/05 14:37:30	7.10	
6/27/05 14:37:45	11.44	
6/27/05 14:38:00	13.37	
6/27/05 14:38:15	13.80	
6/27/05 14:38:30	13.88	
6/27/05 14:38:45	13.90	Calibration Error
6/27/05 14:39:00	13.91	diluted 25.26 % CO2
6/27/05 14:39:15	13.91	14.00 % CO2 (cyl# CC133854)
6/27/05 14:39:30	13.93	13.92
6/27/05 14:39:45	13.94	
6/27/05 14:40:00	13.95	
6/27/05 14:40:15	13.62	
6/27/05 14:40:30	10.25	
6/27/05 14:40:45	7.50	
6/27/05 14:41:00	7.01	
6/27/05 14:41:15	6.97	
6/27/05 14:41:30	6.96	Calibration Error
6/27/05 14:41:45	6.96	diluted 25.26 % CO2
6/27/05 14:42:00	6.96	14.00 % CO2 (cyl# CC133854)
6/27/05 14:42:15	6.95	6.96
6/27/05 14:42:30	6.96	
6/27/05 14:42:45	7.11	
6/27/05 14:43:00	9.40	
6/27/05 14:43:15	11.42	
6/27/05 14:43:30	11.88	
6/27/05 14:43:45	11.93	System Verfication
6/27/05 14:44:00	11.95	High level dilution
6/27/05 14:44:15	11.95	11.95
6/27/05 14:44:30	11.95	
6/27/05 14:44:45	11.95	
6/27/05 14:45:00	11.96	
6/27/05 14:45:15	11.96	
6/27/05 14:45:30	10.73	
6/27/05 14:45:45	8.20	
6/27/05 14:46:00	7.45	
6/27/05 14:46:15	7.40	
6/27/05 14:46:30	7.39	
6/27/05 14:46:45	7.39	
6/27/05 14:47:00	7.39	
6/27/05 14:47:15	7.40	
6/27/05 14:47:30	7.49	
6/27/05 14:47:45	7.48	System Verfication
6/27/05 14:48:00	7.49	Low level dilution
6/27/05 14:48:15	7.49	7.49
6/27/05 14:48:30	7.49	
6/27/05 14:48:45	7.48	
6/27/05 14:49:00	7.47	
6/27/05 14:49:15	7.06	
6/27/05 14:49:30	7.08	
6/27/05 14:49:45	7.31	System Verfication
6/27/05 14:50:00	7.38	7.44 % CO2 (cyl# CC92677)
6/27/05 14:50:15	7.39	7.39
6/27/05 14:50:30	7.39	
6/27/05 14:50:45	7.40	
6/27/05 14:51:00	7.40	

USEPA Method 205
Dilution System Verification Check

Date/Time	CO2	Comments
6/27/05 14:51:15	7.41	
6/27/05 14:51:30	7.40	
6/27/05 14:51:45	7.15	
6/27/05 14:52:00	8.28	
6/27/05 14:52:15	11.03	
6/27/05 14:52:30	11.96	System Verfication
6/27/05 14:52:45	12.09	High level dilution
6/27/05 14:53:00	12.12	12.12
6/27/05 14:53:15	12.13	
6/27/05 14:53:30	12.13	
6/27/05 14:53:45	12.15	
6/27/05 14:54:00	12.11	
6/27/05 14:54:15	10.30	
6/27/05 14:54:30	8.03	
6/27/05 14:54:45	7.53	System Verfication
6/27/05 14:55:00	7.51	Low level dilution
6/27/05 14:55:15	7.50	7.50
6/27/05 14:55:30	7.50	
6/27/05 14:55:45	7.50	
6/27/05 14:56:00	7.45	
6/27/05 14:56:15	7.38	
6/27/05 14:56:30	7.39	System Verfication
6/27/05 14:56:45	7.41	7.44 % CO2 (cyl# CC92677)
6/27/05 14:57:00	7.41	7.41
6/27/05 14:57:15	7.41	
6/27/05 14:57:30	7.41	
6/27/05 14:57:45	7.41	
6/27/05 14:58:00	7.38	
6/27/05 14:58:15	7.22	
6/27/05 14:58:30	9.97	
6/27/05 14:58:45	11.75	System Verfication
6/27/05 14:59:00	12.08	High level dilution
6/27/05 14:59:15	12.13	12.12
6/27/05 14:59:30	12.14	
6/27/05 14:59:45	12.15	
6/27/05 15:00:00	12.15	
6/27/05 15:00:15	12.14	
6/27/05 15:00:30	11.37	
6/27/05 15:00:45	8.72	
6/27/05 15:01:00	7.61	System Verfication
6/27/05 15:01:15	7.51	Low level dilution
6/27/05 15:01:30	7.50	7.50
6/27/05 15:01:45	7.50	
6/27/05 15:02:00	7.50	
6/27/05 15:02:15	7.50	
6/27/05 15:02:30	7.44	
6/27/05 15:02:45	7.39	System Verfication
6/27/05 15:03:00	7.41	7.44 % CO2 (cyl# CC92677)
6/27/05 15:03:15	7.41	7.41
6/27/05 15:03:30	7.41	
6/27/05 15:03:45	7.41	
6/27/05 15:04:00	7.41	
6/27/05 15:04:15	7.25	

AIR LIQUIDE™

CERTIFICATE of ANALYSIS

EPA Protocol Gases

Cyl. Number:	Cyl. Pressure:*	Lot Number:
CC3266	2000PSIG	SFS70686
Assay Date:	**Expiration Date:**	**Document Number:**
07/28/04	07/28/07	13146418
Customer:	**P.O. Number:**	**Item Number:**
ARI ENVIRONMENTAL LA PORTE, TX	03-063-04	

*Mixture is valid only to 150 psig

COMPONENT Name	REQUESTED Concentration	ASSAY Concentration
Oxygen	23.75-26.24 %	24.8 ± 0.3 %
Nitrogen	Balance	Balance

EPA Protocol
Section No. 2.2, Procedure : G-1

Analyst: Eric Barron
Approved by: Thuan Tran

REFERENCE STANDARD EMPLOYED FOR ANALYSIS

Concentration	Component	Balance	SRM or GMIS Cyl. No.	NTRM No.	Exp. Date	Sample No.	Type
22.41 ± 0.16 %	Oxygen	Nitrogen	CC-62867	82659x	09/01/06	98080602	NTRM

Oxygen

GAS ANALYZER EMPLOYED

Manufacturer:	Hewlett Packard
Model Number:	5890A
Serial Number:	3336A54620
MPR Last Calibrated:	07/15/04
Analytical Principle:	FID & TCD

ANALYSIS SUMMARY

	07/28/04 Triad 1	07/28/04 Triad 2	07/28/04 Triad 3	Oxygen Units
Zero	0	0	0	Area
Reference	10962816	10970229	10968755	Area
Candidate	12137537	12150723	12122086	Area
Result	24.81	24.82	24.77	%
Evaluation	VALID	VALID	VALID	

MEAN ANALYTICAL RESULT: 24.80 %

Analyst: E. Barron

Approved by: Thuan Tran

AIR LIQUIDE AMERICA, L.P. Region Office • 8832 Dice Road, Santa Fe Springs, CA 90670-2516
Phone: (562) 945-1383 • Fax: (562) 693-1156

ATI

PRAXAIR

AERIFORM

CUSTOMER SERVICE
Phone: 281-474-4141 or 800-221-5091
Fax: 281-474-9151

9950 Chemical Road * Pasadena, TX 77507

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER PRAXAIR AUSTIN RETAIL **P.O NUMBER** 602535-00

REFERENCE STANDARD

COMPONENT	NIST SRM NO.	CYLINDER NO.	CONCENTRATION
CARBON DIOXIDE 14.08% GMIS VS	NTRM 82745X	SA17082	17.89%

ANALYZER READINGS

R=REFERENCE STANDARD *Z=ZERO GAS* *C=GAS CANDIDATE*

1. **COMPONENT** CARBON DIOXIDE 14.08% GMIS VS **ANALYZER MAKE-MODEL-S/N** HORIBA VIA 510, S/N 576979023

ANALYTICAL PRINCIPLE NON-DISPERSIVE INFRARED **LAST CALIBRATION DATE** 08/31/02

FIRST ANALYSIS DATE 09/16/02 **SECOND ANALYSIS DATE**

Z	0.00	R	14.14	C	7.51	CONC. 7.48	Z	R	C	CONC.
R	14.14	Z	0.00	C	7.52	CONC. 7.49	R	Z	C	CONC.
Z	0.00	C	7.52	R	14.14	CONC. 7.49	Z	C	R	CONC.

U/M % MEAN TEST ASSAY 7.48 U/M % MEAN TEST ASSAY

VALUES NOT VALID BELOW 150 PSIG

UNCERTAINTY OF CARBON DIOXIDE: ±0.01%

THIS CYLINDER NO. CC102935
HAS BEEN CERTIFIED ACCORDING TO SECTION 2.2
OF TRACEABILITY PROTOCOL NO. EPA-600/R97/121
PROCEDURE G1
CERTIFIED ACCURACY ±.1 **% NIST TRACEABLE**
CYLINDER PRESSURE 2000 **PSIG**
CERTIFICATION DATE 09/16/02
EXPIRATION DATE 09/16/05 **TERM**

CERTIFIED CONCENTRATION

CARBON DIOXIDE	7.48%
NITROGEN	BALANCE

ANALYZED BY JENNIFER MORYKIN

CERTIFIED BY KEVIN BRADY

ARI

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Fax: 281-474-9151

9950 Chemical Road * Pasadena, TX 77507

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER AERIFORM **P.O NUMBER** PA39898

REFERENCE STANDARD

COMPONENT	NIST SRM NO.	CYLINDER NO.	CONCENTRATION
CARBON DIOXIDE GMIS	vs.SRM# 274	8747556	17.99 %

ANALYZER READINGS

R=REFERENCE STANDARD *Z=ZERO GAS* *C=GAS CANDIDATE*

1. **COMPONENT** CARBON DIOXIDE GMIS **ANALYZER MAKE-MODEL-S/N** Siemens Ultramat 5E S/N A12-730

ANALYTICAL PRINCIPLE NDIR **LAST CALIBRATION DATE** 03/05/03

FIRST ANALYSIS DATE 03/21/03 **SECOND ANALYSIS DATE**

Z 0	R 17.98	C 17.62	CONC. 17.63	Z	R	C	CONC.
R 17.96	Z 0	C 17.58	CONC. 17.61	R	Z	C	CONC.
Z 0	C 17.56	R 17.94	CONC. 17.61	Z	C	R	CONC.
U/M %		MEAN TEST ASSAY	17.62	U/M %		MEAN TEST ASSAY	

All values not valid below 150 PSIG.
PROCEDURE G2 AT 70% DILUTION POINT, GAS DIVIDER STEC INC, TYPE SDG-710
ASSAY DATE AND RESULT: 03/21/03, 25.41 % CO2 Cf = 0.6935

THIS CYLINDER NO. CC 145479
HAS BEEN CERTIFIED ACCORDING TO SECTION EPA-60G/R97/121
OF TRACEABILITY PROTOCOL NO. Rev. 9/97
PROCEDURE G2 rev 08/25/99
CERTIFIED ACCURACY ± 2 **% NIST TRACEABLE**
CYLINDER PRESSURE 2000 **PSIG**
CERTIFICATION DATE 03/21/03
EXPIRATION DATE 03/21/06 **TERM** 36 MONTHS

CERTIFIED CONCENTRATION

CARBON DIOXIDE	25.41 %
NITROGEN	BALANCE

ANALYZED BY Nguyen THANHTRUC N. NGUYEN

CERTIFIED BY PHU TIEN NGUYEN

IMPORTANT
Information contained herein has been prepared at your request by qualified experts within Praxair Distribution, Inc. While we believe that the information is accurate within the limits of the analytical methods employed and is complete to the extent of the specific analyses performed, we make no warranty or representation as to the suitability of the use of the information for any particular purpose. The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall the liability of Praxair Distribution, Inc., arising out of the use of the information contained herein exceed the fee established for providing such information.

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Fax: 281-474-9151

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CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

CUSTOMER AERIFORM CORP **P.O NUMBER** PA35610

REFERENCE STANDARD

COMPONENT	NIST SRM NO.	CYLINDER NO.	CONCENTRATION
PROPANE GMIS	vs.SRM#2647	SA 15148	2442 ppm

ANALYZER READINGS

R=REFERENCE STANDARD *Z=ZERO GAS* *C=GAS CANDIDATE*

1. **COMPONENT** PROPANE GMIS **ANALYZER MAKE-MODEL-S/N** HORIBA, FIA-510, 851135122

ANALYTICAL PRINCIPLE Flame Ionization Detector **LAST CALIBRATION DATE** 10/10/02

FIRST ANALYSIS DATE 11/08/02 **SECOND ANALYSIS DATE**

Z 0	R 5140	C 4220	CONC. 2005	Z	R	C	CONC.
R 5150	Z 0	C 4220	CONC. 2001	R	Z	C	CONC.
Z 0	C 4220	R 5150	CONC. 2001	Z	C	R	CONC.
U/M ppm		MEAN TEST ASSAY 2002		U/M ppm		MEAN TEST ASSAY	

Values not valid below 150 psig

THIS CYLINDER NO. CC 76030
HAS BEEN CERTIFIED ACCORDING TO SECTION EPA-600/R97/121
OF TRACEABILITY PROTOCOL NO. Rev. 9/97
PROCEDURE G1
CERTIFIED ACCURACY ± 1 **% NIST TRACEABLE**
CYLINDER PRESSURE 2000 **PSIG**
CERTIFICATION DATE 11/08/02
EXPIRATION DATE 11/08/05 **TERM** 36 MONTHS

CERTIFIED CONCENTRATION

PROPANE	2002 ppm
NITROGEN	BALANCE

ANALYZED BY EDGAR CUEVAS

CERTIFIED BY CHRIS VU

IMPORTANT
Information contained herein has been prepared at your request by qualified experts within Praxair Distribution, Inc. While we believe that the information is accurate within the limits of the analytical methods employed and is complete to the extent of the specific analyses performed, we make no warranty or representation as to the suitability of the use of the information for any particular purpose. The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall the liability of Praxair Distribution, Inc., arising out of the use of the information contained herein exceed the fee established for providing such information.

F-10

BAROMETER CALIBRATION LOG

BAROMETER NO.	EB833-1	EB833-1	EB833-1	EB833-1	EB833-1	EB833-1	

PRE-TEST

BAROMETER READING	30.1	30.12	30.03	30.3	30.12	29.85	29.94
REFERENCE BAROMETER READING	30.09	30.15	30.02	30.3	30.11	29.84	29.96
DIFFERENCE	0.01	0.02	-0.01	0	-0.01	-0.01	0.02
DATE	7/2/2004	8/14/2004	10/10/2004	12/30/2004	2/25/2005	4/25/2005	6/27/2005
CALIBRATOR	JD	JFW	JFW	JFW	JFW	JFW	DAL

POST-TEST

BAROMETER READING	30.05	30.08	30.04	30.21	29.73	29.88	30.02
REFERENCE BAROMETER READING	30.08	30.07	30.05	30.2	29.7	29.8	30.03
DIFFERENCE	0.03	-0.01	0.01	-0.01	-0.03	-0.08	0.01
DATE	7/6/2004	9/30/2004	11/22/2004	1/25/2005	4/11/2005	5/25/2005	7/12/2005
CALIBRATOR	JD	JW	DL	JW	CW	JFW	JFW

ARI Environmental, Inc.
EPA METHOD 5
Initial Meter Box Calibration

Model No: Apex 522
Serial No. 50280

Operator: Joe Doby
Date: 1/4/2005

Pre-Test, Orifice Method
English Units

Barometric Pressure: 30.25 in.Hg

ΔH	Time		DRY GAS METER VOLUME			METER TEMPERATURE		ORIFICE		VAC.	AMBIENT TEMPERATURE		
						INLET	OUTLET						
						Initial	Initial						
in. H2O	Minutes	Seconds	Initial	Final	Total[1]	Final	Final	Number	K factor	in. Hg[2]	Inital	Final	Avg.
0.51	24	55	581.100	591.916	10.816	71 73	70 72	AJ47	0.3234	23.0	69	72	70.5
0.96	19	26	591.916	603.385	11.469	73 75	72 73	AJ55	0.4400	22.0	72	73	72.5
1.60	13	24	603.385	613.571	10.186	75 78	73 74	AJ63	0.5720	20.0	73	73	73.0
3.10	11	37	613.571	625.633	12.062	78 82	74 75	AJ73	0.7781	18.0	73	73	73.0
4.60	14	12	625.633	643.593	17.960	82 87	75 77	AJ81	0.9528	16.0	73	75	74.0

METER FLOW (cubic feet)	ORIFICE FLOW (cubic feet)	METER CALIBRATION FACTOR, Yc[3]	DH @[4]
10.877	10.583	0.9730	1.602
11.508	11.209	0.9740	1.634
10.203	10.043	0.9843	1.612
12.075	11.843	0.9808	1.693
17.945	17.711	0.9870	1.682

AVG. PRETEST METER CALIBRATION FACTOR: Y[5] = 0.980 ΔH@[6] = 1.64

ARI ENVIRONMENTAL, INC.
EPA METHOD 5
THERMOCOUPLE DIGITIAL INDICATOR CALIBRATION DATA SHEET

Operator: Joe Doby
Date: 1/4/2005

Meterbox No.: 50280
Calibrator No.: CL-300-21001

Calibrato	Digital Temperature Readout									
Setting	PROBE		STACK		FILTER		EXIT		AUX	
° F	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.
0	1	0.22	1	0.00	1	0.22	1	0.22	1	0.22
200	200	0.00	200	0.00	200	0.00	200	0.00	200	0.00
400	396	0.47	396	0.47	396	0.47	396	0.47	396	0.47
600	599	0.09	599	0.09	599	0.09	599	0.09	599	0.09
800	800	0.00	800	0.00	800	0.00	800	0.00	800	0.00
1000	999	0.07	1000	0.00	1000	0.00	1000	0.00	1000	0.00
1200	1197	0.18	1198	0.12	1197	0.18	1198	0.12	1198	0.12
1400	1395	0.27	1396	0.22	1396	0.22	1396	0.22	1396	0.22
1600	1599	0.05	1600	0.00	1599	0.05	1600	0.00	1600	0.00
1800	1798	0.09	1798	0.09	1798	0.09	1798	0.09	1799	0.04

Actual Maximum Difference = 0.47 %
Allowable Maximum Difference = 1.50 %

ARI Environmental, Inc.
EPA METHOD 5
Post-test Meter Box Calibration

Model #: Apex 522
Serial #: 50280
Pretest Y: 0.980
Pretest ΔH@: 1.64

Operator: Cameron Withers
Date: 7/13/2005

Post-Test, Orifice Method
English Units

Barometric Pressure: 29.80 in.Hg

ΔH	Time		DRY GAS METER VOLUME			METER TEMPERATURE		ORIFICE		VAC.	AMBIENT TEMPERATURE		
						INLET	OUTLET						
						Initial	Initial						
	Minutes	Seconds	Initial	Final	Total[1]	Final	Final	Number	K factor	in. Hg[2]	Inital	Final	Avg.
1.60	12	29	430.800	440.800	10.000	88 89	87 87	AJ63	0.5720	19.0	87	86	86.5
1.60	12	30	441.100	451.100	10.000	89 89	87 87	AJ63	0.5720	19.0	86	86	86.0
1.60	15	2	451.300	463.200	11.900	89 89	87 87	AJ63	0.5720	19.0	86	86	86.0

METER FLOW (cubic feet)	ORIFICE FLOW (cubic feet)	METER CALIBRATION FACTOR, Yc[3]	DH @[4]
9.639	9.102	0.9443	1.639
9.634	9.119	0.9465	1.637
11.465	10.967	0.9565	1.637

AVG. POST-TEST METER CALIBRATION FACTOR = 0.949 1.64

ABSOLUTE DIFFERENCE FROM PRETEST Y= 3.15
MAXIMUM ALLOWABLE DIFFERENCE= 5.00

ARI ENVIRONMENTAL, INC.
EPA METHOD 5
THERMOCOUPLE DIGITIAL INDICATOR CALIBRATION DATA SHEET

Operator: Cameron Withers
Date: 7/13/2005

Meterbox No.: 50280
Calibrator No.: CL-300-21001

Calibrator	Digital Temperature Readout									
Setting	PROBE		STACK		FILTER		EXIT		AUX	
° F	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.
0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
200	201	0.15	201	0.15	201	0.15	201	0.15	201	0.15
400	397	0.35	397	0.35	397	0.35	398	0.23	398	0.23
600	601	0.09	600	0.00	601	0.09	601	0.09	601	0.09
800	802	0.16	802	0.16	802	0.16	802	0.16	802	0.16
1000	1001	0.07	1001	0.07	1002	0.14	1002	0.14	1002	0.14
1200	1199	0.06	1199	0.06	1199	0.06	1200	0.00	1200	0.00
1400	1398	0.11	1398	0.11	1398	0.11	1398	0.11	1398	0.11
1600	1602	0.10	1602	0.10	1602	0.10	1602	0.10	1602	0.10
1800	1801	0.04	1801	0.04	1801	0.04	1801	0.04	1801	0.04

Actual Maximum Difference = 0.35 %
Allowable Maximum Difference = 1.50 %

ARI Environmental, Inc.
EPA METHOD 5
Initial Meter Box Calibration

Model No: Apex 522
Serial No. 604180

Operator: Cameron Withers
Date: 1/6/2005

Pre-Test, Orifice Method
English Units

Barometric Pressure: 30.20 in.Hg

ΔH	Time		DRY GAS METER VOLUME			METER TEMPERATURE		ORIFICE		VAC.	AMBIENT TEMPERATURE		
						INLET	OUTLET						
						Initial	Initial						
in. H2O	Minutes	Seconds	Initial	Final	Total[1]	Final	Final	Number	K factor	in. Hg[2]	Inital	Final	Avg.
0.60	24	28	623.600	633.900	10.300	53 54	56 57	AJ47	0.3234	23.0	52	53	52.5
1.10	18	55	634.700	645.600	10.900	54 54	57 61	AJ55	0.4400	22.0	53	54	53.5
1.80	16	56	647.200	659.800	12.600	54 56	58 67	AJ63	0.5720	20.0	58	54	56.0
3.30	16	53	661.100	678.400	17.300	56 58	68 77	AJ73	0.7781	17.0	55	57	56.0
4.90	15	50	680.300	700.200	19.900	58 61	78 85	AJ81	0.9528	15.0	57	59	58.0

METER FLOW (cubic feet)	ORIFICE FLOW (cubic feet)	METER CALIBRATION FACTOR, Yc[3]	DH @[4]
10.674	10.555	0.9889	1.883
11.277	11.093	0.9836	1.868
13.001	12.877	0.9904	1.816
17.711	17.465	0.9861	1.792
20.230	20.018	0.9895	1.775

AVG. PRETEST METER CALIBRATION FACTOR: Y[5] = 0.988 ΔH@[6] = 1.83

ARI ENVIRONMENTAL, INC.
EPA METHOD 5
THERMOCOUPLE DIGITIAL INDICATOR CALIBRATION DATA SHEET

Operator: Cameron Withers
Date: 1/6/2005

Meterbox No.: 604180
Calibrator No.: CL-300-21001

Calibrato	Digital Temperature Readout									
Setting	PROBE		STACK		FILTER		EXIT		AUX	
° F	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.
0	2	0.43	2	0.43	2	0.43	2	0.43	2	0.43
200	199	0.15	198	0.30	199	0.15	199	0.15	199	0.15
400	395	0.58	395	0.58	395	0.58	395	0.58	395	0.58
600	599	0.09	599	0.09	599	0.09	599	0.09	599	0.09
800	801	0.08	801	0.08	801	0.08	801	0.08	801	0.08
1000	1001	0.07	1001	0.07	1001	0.07	1001	0.07	1001	0.07
1200	1199	0.06	1199	0.06	1199	0.06	1199	0.06	1199	0.06
1400	1397	0.16	1397	0.16	1397	0.16	1398	0.11	1398	0.11
1600	1600	0.00	1600	0.00	1600	0.00	1600	0.00	1600	0.00
1800	1798	0.09	1798	0.09	1798	0.09	1799	0.04	1798	0.09

Actual Maximum Difference = 0.58 %
Allowable Maximum Difference = 1.50 %

ARI Environmental, Inc.
EPA METHOD 5
Post-test Meter Box Calibration

Model #: Apex 522
Serial #: 604180
Pretest Y: 0.988
Pretest ΔH@: 1.83

Operator: Cameron W.
Date: 7/14/2005

Post-Test, Orifice Method
English Units

Barometric Pressure: 29.95 in.Hg

ΔH	Time		DRY GAS METER VOLUME			METER TEMPERATURE		ORIFICE		VAC.	AMBIENT TEMPERATURE		
						INLET	OUTLET						
						Initial	Initial						
	Minutes	Seconds	Initial	Final	Total[1]	Final	Final	Number	K factor	in. Hg[2]	Inital	Final	Avg.
1.70	13	53	221.300	231.600	10.300	90 94	83 85	AJ63	0.5720	18.0	83	85	84.0
1.70	19	18	232.100	246.500	14.400	94 97	85 88	AJ63	0.5720	18.0	85	85	85.0
1.70	13	20	247.000	257.000	10.000	97 98	88 90	AJ63	0.5720	18.0	85	85	85.0

METER FLOW (cubic feet)	ORIFICE FLOW (cubic feet)	METER CALIBRATION FACTOR, Yc[3]	DH @[4]
9.975	10.197	1.0222	1.725
13.870	14.163	1.0211	1.719
9.593	9.784	1.0199	1.712

AVG. POST-TEST METER CALIBRATION FACTOR = 1.021 1.72

ABSOLUTE DIFFERENCE FROM PRETEST Y= 3.35
MAXIMUM ALLOWABLE DIFFERENCE= 5.00

ARI ENVIRONMENTAL, INC.
EPA METHOD 5
THERMOCOUPLE DIGITIAL INDICATOR CALIBRATION DATA SHEET

Operator: Cameron W.
Date: 7/14/2005

Meterbox No.: 604180
Calibrator No.: CL-300-21001

Calibrator	Digital Temperature Readout									
Setting	PROBE		STACK		FILTER		EXIT		AUX	
° F	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.
0	1	0.22	0	0.00	1	0.22	0	0.00	0	0.00
200	200	0.00	200	0.00	200	0.00	200	0.00	200	0.00
400	397	0.35	397	0.35	397	0.35	397	0.35	397	0.35
600	600	0.00	601	0.09	600	0.00	601	0.09	601	0.09
800	803	0.24	803	0.24	803	0.24	803	0.24	803	0.24
1000	1003	0.21	1003	0.21	1003	0.21	1003	0.21	1003	0.21
1200	1201	0.06	1201	0.06	1201	0.06	1201	0.06	1201	0.06
1400	1400	0.00	1400	0.00	1400	0.00	1400	0.00	1400	0.00
1600	1602	0.10	1603	0.15	1602	0.10	1603	0.15	1603	0.15
1800	1800	0.00	1801	0.04	1801	0.04	1801	0.04	1801	0.04

Actual Maximum Difference = 0.35 %
Allowable Maximum Difference = 1.50 %

Pitot Tube Calibration Data

Pitot Tube No.: P 64
Date: 2/15/2005
Calibrator: Joe Doby

Average Stack Temperature		Check-out Performed at approx. °F	Reference Temperature, °F/°R		Thermometer Temperature, °F/°R		Error, %
is more than °F	but less than °F						
100	212	Ambient	75	535	76	536	0.19
212	390	(water) 212					
390	760	(oil) 400					

Percent difference must not exceed 1.5% at any point.

α_1	α_2	β_1	β_2
0	*0*	*1*	*0*
< 10°	**< 10°**	**< 5°**	**< 5°**
D_t Inches	**P Inches**	**1.05 D_t Inches**	**1.50 D_t Inches**
0.25	***0.745***	***0.263***	***0.375***
$0.185 \leq Dt < 0.380$			
γ Degrees	**ϕ Degrees**	**$P_{sin}(\gamma)$ Inches**	**$P_{sin}(\phi)$ Inches**
0	***0***	***0.00000***	***0.00000***
		< 0.125	< 0.03125
P_1 Inches	P_2 Inches	(P_1-P_2) Inches	Meets Specifications
0.374	***0.372***	***0.002***	
$1.05\ D_t < P_1 < 1.50\ D_t$	$1.05\ D_t < P_1 < 1.50\ D_t$		yes

Pitot Tube Calibration Data

Pitot Tube No.: P 64
Date: 7/27/2005
Calibrator: Joe Doby

Average Stack Temperature		Check-out Performed at approx. °F	Reference Temperature, °F/°R		Thermometer Temperature, °F/°R		Error, %
is more than °F	but less than °F						
100	212	Ambient	90	550	91	551	0.18
212	390	(water) 212					
390	760	(oil) 400					

Percent difference must not exceed 1.5% at any point.

α_1	α_2	β_1	β_2
0	*0*	*1*	*0*
< 10°	**< 10°**	**< 5°**	**< 5°**
D_t Inches	**P Inches**	**1.05 D_t Inches**	**1.50 D_t Inches**
0.25	***0.745***	***0.263***	***0.375***
$0.185 \leq Dt < 0.380$			
γ Degrees	**ϕ Degrees**	**$P_{sin}(\gamma)$ Inches**	**$P_{sin}(\phi)$ Inches**
1	***0***	***0.01300***	***0.00000***
		< 0.125	< 0.03125
P_1 Inches	P_2 Inches	(P_1-P_2) Inches	Meets Specifications
0.373	***0.372***	***0.001***	
$1.05\ D_t < P_1 < 1.50\ D_t$	$1.05\ D_t < P_1 < 1.50\ D_t$		yes

Pitot Tube Calibration Data

Pitot Tube No.: P 65
Date: 6/7/2005
Calibrator: James Wedemeier

Average Stack Temperature		Check-out Performed at approx. °F	Reference Temperature, °F/°R		Thermometer Temperature, °F/°R		Error, %
is more than °F	but less than °F						
100	212	Ambient					
212	390	(water) 212					
390	760	(oil) 400	330	790	328	788	0.25

Percent difference must not exceed 1.5% at any point.

α_1	α_2	β_1	β_2
2	*2*	*1*	*1*
< 10°	**< 10°**	**< 5°**	**< 5°**
D_t Inches	**P Inches**	**1.05 D_t Inches**	**1.50 D_t Inches**
0.25	***0.75***	***0.263***	***0.375***
$0.185 \leq Dt < 0.380$			
γ Degrees	**ϕ Degrees**	**$P_{sin}(\gamma)$ Inches**	**$P_{sin}(\phi)$ Inches**
1	***0***	***0.01309***	***0.00000***
	555	< 0.125	< 0.03125
P_1 Inches	P_2 Inches	(P_1-P_2) Inches	Meets Specifications
0.36	***0.37***	***-0.01***	
$1.05\ D_t < P_1 < 1.50\ D_t$	$1.05\ D_t < P_1 < 1.50\ D_t$		yes

Pitot Tube Calibration Data

Pitot Tube No.: P 65
Date: 7/13/2005
Calibrator: C. Withers

Average Stack Temperature		Check-out Performed at approx. °F	Reference Temperature, °F/°R		Thermometer Temperature, °F/°R		Error, %
is more than °F	but less than °F						
100	212	Ambient	92	552	94	554	0.36
212	390	(water) 212					
390	760	(oil) 400					

Percent difference must not exceed 1.5% at any point.

α_1	α_2	β_1	β_2
2	*3*	*1*	*1*
< 10°	**< 10°**	**< 5°**	**< 5°**
D_t Inches	**P Inches**	**1.05 D_t Inches**	**1.50 D_t Inches**
0.25	***0.77***	***0.263***	***0.375***
0.185≤Dt<0.380			
γ Degrees	**ϕ Degrees**	**P_{sin} (γ) Inches**	**P_{sin} (ϕ) Inches**
1	***1***	***0.01344***	***0.01344***
	555	< 0.125	< 0.03125
P_1 Inches	P_2 Inches	(P_1-P_2) Inches	Meets Specifications
0.35	***0.36***	***-0.01***	
1.05 D_t< P_1<1.50 D_t	1.05 D_t<P_1< 1.50 D_t		yes

James Wedemeier

Mr. Wedemeier is a Project Manager with ARI. He has accumulated in-depth experience in conducting compliance emission tests and CEMS certification for a wide variety of industries including petrochemical and petroleum refineries. He is well versed in the operation of manual source sampling equipment and USEPA instrumental analyzer procedures. Mr. Wedemeier has over 5 years experience in conducting on-site emissions testing.

Joe Doby

Mr. Doby is a Source Sampling Field Technician. Mr. Doby is well versed in the operation and maintenance of manual source sampling equipment and has performed these functions on numerous tests for various clients throughout the Gulf Coast Region.

Mr. Doby's responsibilities include field sampling, sample analysis, data reduction and interpretation, and maintenance and calibration of continuous and manual source sampling equipment.

Cameron Withers

Mr. Withers is a Source Sampling Field Technician. Mr. Withers is well versed in the operation and maintenance of manual source sampling equipment and has performed these functions on numerous tests for various clients throughout the Gulf Coast Region.

Mr. Withers' responsibilities include field sampling, sample analysis, data reduction and interpretation, and maintenance and calibration of continuous and manual source sampling equipment.