



# GOLDEN

SPECIALTY CONSULTING, LTD.

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## Air Quality Test Report

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Compliance test for CO, H<sub>2</sub>S, and SO<sub>2</sub>

**Lyondell-Citgo Refining, LP**  
**Tail Gas Unit 440**  
**Thermal Oxidizer Exhaust Stack**

**TNRCC Account: HG-0048-L**  
**440 Tail Gas Unit (EPN TGU0-ICN2)**  
**TNRCC Flexible Permit No. 2167**

*Prepared for:* Mr. Roel Muñoz  
Lyondell-Citgo Refining LP  
12000 Lawndale  
Houston, Texas, 77017  
(713) 321-4094

*Prepared by:* Golden Specialty Consulting, Ltd.  
281-476-9898

*Date Tested:* March 29-30, 2005  
*Date Prepared:* May 16, 2005

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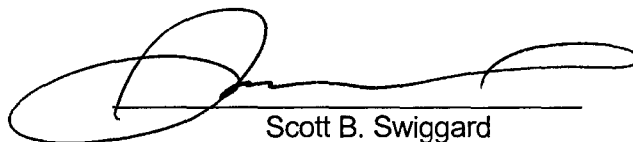
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Scott B. Swiggard

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## EXECUTIVE SUMMARY

On March 29 - 30, 2005 Golden Specialty Consulting, Inc. (GOLDEN) was contracted by Lyondell-Citgo Refining LP (LCR) to perform air testing at their facility located in Houston, Texas. GOLDEN was contracted to perform compliance testing of the thermal oxidizer (TO) exhaust stack on the 440 tail gas unit (TGU 440). The measured pollutants included carbon monoxide (CO), hydrogen sulfide (H<sub>2</sub>S) and sulfur dioxide (SO<sub>2</sub>). The test was conducted in accordance with all appropriate U.S. EPA Methodologies as well as all applicable Texas Commission on Environmental Quality (TCEQ) mandates.

The purpose of this test program was to provide data demonstrating continued compliance with the applicable regulations 40 CFR Part 60, Subpart J over various operational parameters to support modifications to TCEQ Permit No. 2167.

Changes in LCR's operating philosophy provide the motivational forces behind this test program. The previously permitted technique of determining emission compliance based on the operating temperatures of the thermal oxidizers resulted in excessive consumption of natural gas. The reasoning behind the temperature set point was as long as the operating temperature of the oxidizers did not fall below 1,500 degrees F, carbon monoxide (CO) emissions would stay below 100 ppmv. This approach was verified by permit compliance testing and did not require the installation of CEMS. The change in the operation philosophy of LCR to look at energy conservation measures has facilitated the installation of CO CEMS to be able to allow the natural gas addition to be controlled by CO emissions instead of temperature. Under this operating philosophy, compliance with the CO limit is drastically improved by direct measurement of the regulated pollutant over that of using a surrogate and natural gas addition is optimized.

On March 25-26 Compliance testing was performed on TGU 440 Exhaust Stack at each of three operating conditions to demonstrate SO<sub>2</sub>, H<sub>2</sub>S and CO emission compliance at various operating temperatures. Compliance testing at each operating condition consisted of three one hour runs for SO<sub>2</sub>, CO and H<sub>2</sub>S emissions. The compliance results for each condition are presented on the following pages in Tables 1-1 through 1-3.

Run Number	1	2	3	Average	Compliance Limit
Test Date	3/29/2005	3/29/2005	3/29/2005		
Run Start Time	8:45	10:11	11:28		
Run Finish Time	9:55	11:11	12:28		
Net Traversing Points	12	12	12		
Net Run Time, minutes	60	60	60	60	
Dry Gas Meter Volume Sampled, cubic feet	38.7	41.0	41.4	40.3	
Moisture Content of Stack Gas, %	15.9	13.4	14.3	14.5	
Carbon Dioxide, %	4.3	4.5	3.9	4.2	
Oxygen, %	3.52	1.37	1.73	2.21	
Dry Stack Volumetric Flow Rate, dry scfm	30,180	31,203	33,051	31,478	
SO <sub>2</sub> Sulfur Dioxide Concentration, ppm	105.0	136.02	124.58	121.88	235 ppm
SO <sub>2</sub> Sulfur Dioxide Emission Rate, lb/hr	31.60	42.30	41.04	38.32	
H <sub>2</sub> S Hydrogen Sulfide Concentration, ppm	< .10	< .10	< .10	< .10	
H <sub>2</sub> S Hydrogen Sulfide Emission Rate, lb/hr	< .02	< .02	< .02	< .02	0.06 lb/hr
CO Carbon Monoxide Concentration, ppm	73.3	51.4	57.6	60.8	100 ppm
CO Carbon Monoxide Emission Rate, lb/hr	9.65	6.99	8.31	8.32	

**Table 1-1 TGU 440 Test Results with TO at 1500 degrees.**

Run Number	1	2	3	Average	Compliance Limit
Test Date	3/29/2005	3/29/2005	3/29/2005		
Run Start Time	12:55	14:13	15:24		
Run Finish Time	13:55	15:13	16:24		
Net Traversing Points	12	12	12		
Net Run Time, minutes	60	60	60	60	
Dry Gas Meter Volume Sampled, cubic feet	37.7	37.8	38.6	38.0	
Moisture Content of Stack Gas, %	15.8	16.3	14.0	15.4	
Carbon Dioxide, %	4.2	4.4	4.4	4.3	
Oxygen, %	1.53	1.60	1.42	1.51	
Dry Stack Volumetric Flow Rate, dry scfm	32,184	32,476	33,266	32,642	
SO <sub>2</sub> Sulfur Dioxide Concentration, ppm	108.9	108.79	110.32	109.34	235 ppm
SO <sub>2</sub> Sulfur Dioxide Emission Rate, lb/hr	34.94	35.22	36.58	35.58	
H <sub>2</sub> S Hydrogen Sulfide Concentration, ppm	< .10	< .10	< .10	< .10	
H <sub>2</sub> S Hydrogen Sulfide Emission Rate, lb/hr	< .02	< .02	< .02	< .02	0.06 lb/hr
CO Carbon Monoxide Concentration, ppm	67.5	69.2	70.7	69.1	100 ppm
CO Carbon Monoxide Emission Rate, lb/hr	9.47	9.80	10.26	9.84	

**Table 1-2 TGU 440 Test Results with TO at 1475 degrees.**

Run Number	1	2	3	Average	Compliance Limit
Test Date	3/30/2005	3/30/2005	3/30/2005		
Run Start Time	10:06	11:21	12:34		
Run Finish Time	11:06	12:21	13:34		
Net Traversing Points	12	12	12		
Net Run Time, minutes	60	60	60	60	
Dry Gas Meter Volume Sampled, cubic feet	40.6	47.5	44.2	44.1	
Moisture Content of Stack Gas, %	15.6	15.2	15.1	15.3	
Carbon Dioxide, %	4.5	4.4	4.5	4.5	
Oxygen, %	1.46	2.00	2.37	1.95	
Dry Stack Volumetric Flow Rate, dry scfm	29,648	30,648	29,240	29,845	
SO <sub>2</sub> Sulfur Dioxide Concentration, ppm	131.5	120.40	117.19	123.02	235 ppm
SO <sub>2</sub> Sulfur Dioxide Emission Rate, lb/hr	38.85	36.78	34.15	36.60	
H <sub>2</sub> S Hydrogen Sulfide Concentration, ppm	< .10	< .10	< .10	< .10	
H <sub>2</sub> S Hydrogen Sulfide Emission Rate, lb/hr	< .02	< .02	< .02	< .02	0.06 lb/hr
CO Carbon Monoxide Concentration, ppm	89.2	89.2	83.9	87.4	100 ppm
CO Carbon Monoxide Emission Rate, lb/hr	11.53	11.92	10.69	11.38	

**Table 1-3 TGU 440 Test Results with TO at 1458 degrees.**

## INTRODUCTION

### Purpose of Test

The purpose of the tests conducted on TGU 440 was to show the unit was in compliance for CO, H<sub>2</sub>S and SO<sub>2</sub> emissions in accordance with the appropriate regulations. The test program for the Thermal Oxidizer consisted of measuring CO, CO<sub>2</sub>, O<sub>2</sub>, SO<sub>2</sub>, flow and moisture with Reference Methods (RMs) 1, 2, 3A, 4, 6C, 10, and 15 in accordance with 40 CFR 60 Appendix A. The RMs are discussed in detail in the Performance Test Procedures section of this report. Mr. Greg Burch managed this test program and testing was performed by Messrs. Gus Vargas, George Finlay and Dr. Sam Wang of Golden. Mr. Matt Brewer of LCR coordinated this project with operations.

During the compliance test, the flue gas stream was analyzed for the targeted pollutant and diluent gas concentrations. Testing for CO, CO<sub>2</sub>, O<sub>2</sub> and SO<sub>2</sub> consisted of drawing a representative sample of the exhaust gas stream into a conditioning system for removal of moisture. The sample was then allowed to pass into a set of reference method (RM) analyzers, where the concentrations of the targeted pollutant and diluent gas concentrations were determined. These instantaneous concentrations were compiled in a database on a minute-average basis.

Sampling for H<sub>2</sub>S was performed by extracting a sample of stack gas through a heated sample system directly to the gas chromatograph where H<sub>2</sub>S was speciated from other stack gas components.

Golden Specialty Consulting utilized two separate sampling systems for the performance of the RM 3A and 10 portion this test program. Utilization of two sampling systems provides a higher confidence in the reference method data by demonstrating redundancy between the two independent sampling systems. The first sampling system (System One) was utilized for RM measurements of CO, CO<sub>2</sub>, O<sub>2</sub> and SO<sub>2</sub>. The second system (System Two) was utilized to obtain a higher confidence level of analysis.

### Problems Encountered

No Problems were encountered with this test program.

## PERFORMANCE TEST PROCEDURES

### Instrumental Analyzer Procedure

Stack gas concentrations of CO, CO<sub>2</sub>, O<sub>2</sub> and SO<sub>2</sub> were measured with reference method (RM) analyzers. These tests were performed in accordance with the applicable test methods, as outlined in Title 40, Part 60, Appendix A of the Code of Federal Regulations. All instrumentation field data collected during the testing and photocopies of the actual one-minute averaged data are provided in this report.

### Sampling System

A gas sample was continuously extracted from the source with a stainless steel probe and channeled through a heated sample line to a gas sample conditioner. The entire sample extraction and delivery system was maintained at a temperature above 225°F to the point the sample enters the sample conditioner. The sample conditioner was employed to decrease the dew point of the combustion gases to a repeatable, stable, low dew point. Moisture was removed from the sample conditioner by peristaltic pump and continuously drained. The conditioned gas then traveled through a network of ¼-inch Teflon® tubing to a manifold in the mobile laboratory. From the manifold, the sample was directed to a set of fluid rotameters, where the flow of the sample gas into the analyzers was maintained at approximately 1 liter per minute.

### Analyzer Calibration

The calibration of the instruments was performed using certified gas standards composed of a known concentration of the given component in zero-grade nitrogen. A copy of the certification standards for each of the certified calibration standards used during the testing is included in Appendix E. All of the values obtained during the calibration process, including analyzer calibration, system bias analysis, and drift values, can be found in Appendix C of this report. The analyzer calibration procedures are identical, regardless of the constituent being evaluated by each analyzer. The range used for each analyzer was determined based on the expected concentration levels of the flue gas stream.

The first step in the analyzer calibration was to set the zero point on the analyzer using zero-grade nitrogen. The nitrogen is introduced directly to the back of each analyzer, and the zero potentiometer on the analyzer is adjusted until the proper output from the analyzer is realized. Next, a high-range calibration gas is introduced to each analyzer, with a concentration within the appropriate range of the instrument. The span potentiometer on each analyzer is then adjusted until the output from the analyzer corresponds to the value of the calibration standard. Finally, a mid-range calibration standard, with a concentration approximately one-half of the high-range calibration standards, is used to determine the linearity of the analyzer within the given range. For certain constituents, more than one mid-range value is required. The specific requirements for each constituent are discussed later in this section.



### Analyzer Error

The difference between the gas concentration exhibited by the gas analyzer and the known concentration of the calibration gas when the calibration gas is introduced directly to the analyzer is referred to as the analyzer error. The maximum allowable variance for the zero, mid-range, and high-range calibration gases is  $\pm 2\%$  of the span. The calibration values and corresponding percent errors associated with this project can be found in Appendix C of this report and are determined by the following equation.

$$E_{\text{analyzer}} = \left( \frac{|SpanValue - AnalyzerValue|}{SpanValue} \right) \times 100\%$$

### System Bias Check

Following the analyzer calibration procedure, a second test is required to determine the amount of bias, if any, the sampling system has on the known concentrations maintained in the calibration standards. This is important in determining if the system is scrubbing any of the targeted stack gases and if the sampling system has any leaks that could be caused by loose fittings and/or worn tubing. In this procedure, the same calibration standards that were used to perform the analyzer error test are introduced to the sampling system via a separate network of 1/4-inch Teflon® tubing. The calibration gases are allowed to flow through the sampling system to the end of the sample probe, which is plugged to prevent dilution of the calibration standards. The gas is then drawn back through the system by the conditioning pumps, and is once again introduced to the analyzers. The output from the analyzers is recorded, without adjusting the zero- and span potentiometers. The bias created by the sampling system is then determined by the following equation.

$$E_{\text{system}} = \left( \frac{|SystemValue - AnalyzerValue|}{SpanValue} \right) \times 100\%$$

The maximum allowable system bias for any one analyzer is  $\pm 5\%$  of the corresponding span value. The values determined for this portion of the calibration procedure can be found in Appendix C of this report.

### Analyzer Drift

Immediately following each test run, a third test is performed on the system to determine the amount of drift experienced during the test run. In this test, a calibration standard is introduced to the sampling system as in the system bias check. The corresponding value displayed on the analyzer must agree with the initial value for that standard before the test began. The amount of allowable drift is dependent on the constituent being tested for. If the drift value is greater than the allowable value, the test run is considered invalid, and the analyzers must be re-calibrated before continuing the test. The drift for each constituent is determined using the equation below.

$$Drift = \left( \frac{InitialValue - FinalValue}{SpanValue} \right) \times 100\%$$

The maximum allowable calibration drift for any one analyzer is  $\pm 3\%$  of the span over the period of each run. The values determined for this portion of the calibration procedure can be found in Appendix C of this report.

## **EPA Reference Methods**

This section provides a detailed description of the individual EPA Reference Methods employed in this test (40 CFR Part 60, Appendix A). A schematic of the sampling system used to perform the test programs on TGU 440 can be found in Figure 1-1. Specifics for each analyzer utilized in these test programs are presented in Appendix A.

### **Method 1A: Sample and Velocity Traverses for Stationary Sources**

The location of the traverse points used to determine the velocity of the stack gas within circular stack sources is based on the relation of the stack diameter to the upstream and downstream distances from disturbances. The minimum number of traverse points and the locations on each diameter area was determined from Figure 1-2 and Table 1-2 of Method 1, Appendix A, CFR 60 as presented in Appendix D of this report.

### **Method 2: Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)**

The average stack gas velocity of the source was determined from the measurement of the velocity head with a Type "S" Pitot tube. Based on verification of the face opening alignments, external tubing diameter, and base-to-opening plane distances, a base line coefficient value of 0.84 was assigned to the Pitot tube.

### **Method 3A: Oxygen and Carbon Dioxide Analysis (Instrumental Analysis)**

This method was employed to determine the concentrations of oxygen and carbon dioxide in the flue gas stream with the use of analytical instruments. A sample was continuously extracted from the stack and introduced to a California Analytical analyzer(s) for determination of concentration. The minimum detection limit for this instrument is one-hundredth of one percent (0.01%). An analog-to-digital converter connected a computer to the analyzer to collect the resulting values, and the data was recorded in one-minute averages. Zero-grade Nitrogen and EPA Protocol-1 calibration standards were used to calibrate the analytical instrument. The general guidelines for the calibration of RM analyzer are described above, with the specifics pertaining to the calibration of a O<sub>2</sub> and CO<sub>2</sub> analyzer being set forth in EPA Method 3A (40 CFR Part 60, Appendix A).

### **Method 4: Determination of Moisture Content**

The moisture content of the stack gas was determined in accordance with US EPA Reference Method 4 as shown in Figure 1-3. Stack gas was extracted at a constant rate

through a glass condenser train consisting of four impingers in series connected with leak free glass U-tube connections. The extracted sample temperature of the stack gas was reduced and maintained at a temperature below 68°F by use of an ice bath surrounding the glass impingers. The gas sample was extracted through the impinger train using a rotary vane vacuum pump, and the amount of gas sampled was measured with a calibrated dry gas meter. The pump flow was adjusted to maintain flow rate through the dry gas meter in order to obtain at least 21.0 dry, standard cubic feet (dscf) of sample gas during the test run. At the end of each run, the pump was turned off and the final readings were recorded. The amount of moisture in the gas stream was determined by measuring the volume of condensed moisture in impingers one through three and weighing the silica gel impinger to calculate percent moisture in the stack flue gas stream.

#### **Method 6C: Sulfur Dioxide Analysis (Instrumental Analyzer Procedure)**

This method was employed to determine the concentration of sulfur dioxide (SO<sub>2</sub>) present in the exhaust gas stream. A gas sample was continuously extracted from the stack, and a portion of the sample was introduced to an Advanced Pollution Instrumentation (API) Model 100AH Fluorescent SO<sub>2</sub> analyzer. The minimum detection limit of this analyzer is 0.1 ppm. An analog-to-digital converter connected a computer to the analyzer to collect the resulting values, and the data was recorded in one-minute averages. Zero-grade nitrogen and EPA Protocol-1 calibration standards were used to calibrate the analytical instrument. The general guidelines for the calibration of a RM analyzer are described above, with the specifics pertaining to the calibration of a SO<sub>2</sub> analyzer being set forth in EPA Method 6C (40 CFR Part 60, Appendix A).

#### **Method 10: Carbon Monoxide Analysis (Instrumental Analysis)**

This method is employed to determine the concentration of Carbon Monoxide (CO) present in the exhaust gas stream. A gas sample is continuously extracted from the stack, and a portion of the sample is introduced to the RM analyzer for analysis. The instrument is connected to a DAS computer via an analog-to-digital converter for recording the resulting values; this data is recorded in one-minute averages. Zero-grade Nitrogen and EPA Protocol-1 calibration standards are used to calibrate the analytical instrument. The general guidelines for the calibration of a RM analyzer are described above, with the specifics pertaining to the calibration of a CO analyzer being set forth in EPA Method 10 (40 CFR 60, Appendix A).

#### **Method 15: Determination of Hydrogen Sulfide, Carbonyl Sulfide and Carbon Disulfide Emissions from Stationary Sources**

A GC/FPD was employed to measure H<sub>2</sub>S concentrations on a real time basis. The gas sample was continuously extracted from the stream and routed through a heated sample line to the instrument. During the sample injection, a solenoid valve is switched and the content of the sample loop is introduced onto a column for H<sub>2</sub>S separation. When combusted in a hydrogen-rich flame, sulfur compounds emit light energy characteristic to all sulfur species. The intensity of light is detected by a flame photometric detector (FPD) and the analog signal is then converted to a digital signal and recorded continuously through a data acquisition system (DAS) as a peak on a chromatogram. The response is

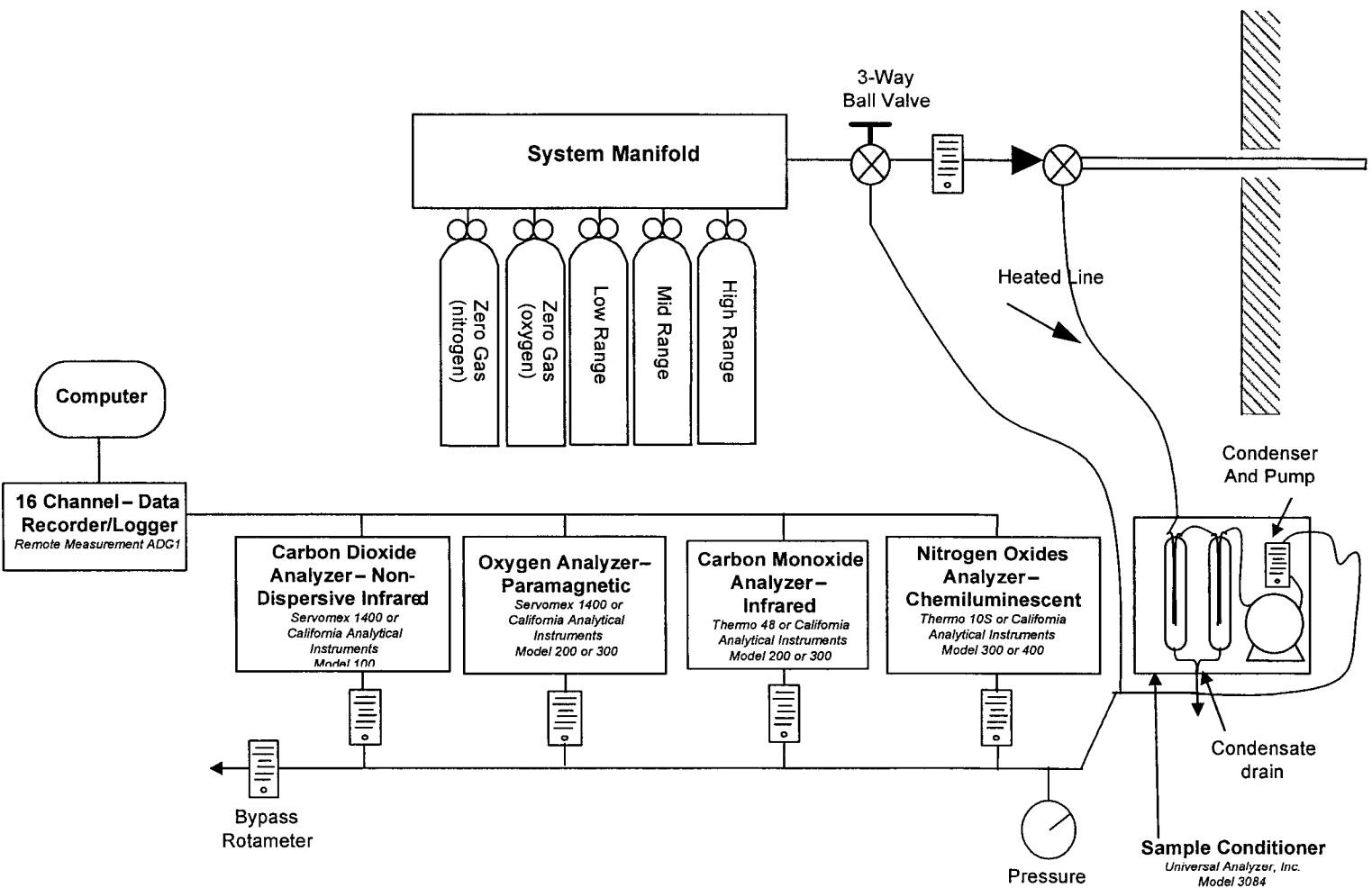
proportional to the concentration or the amount of sulfur in the gas stream. EZ Chrom software is used to measure the area under the peak and calculates the concentration by comparison to a calibration curve. The calibration curves are generated with NIST-traceable standards. If sample was extracted directly from the source, sample extraction and analysis were conducted on a cycle of about five minutes. The detection limit was approximately 0.1 ppm.

### **Sampling System**

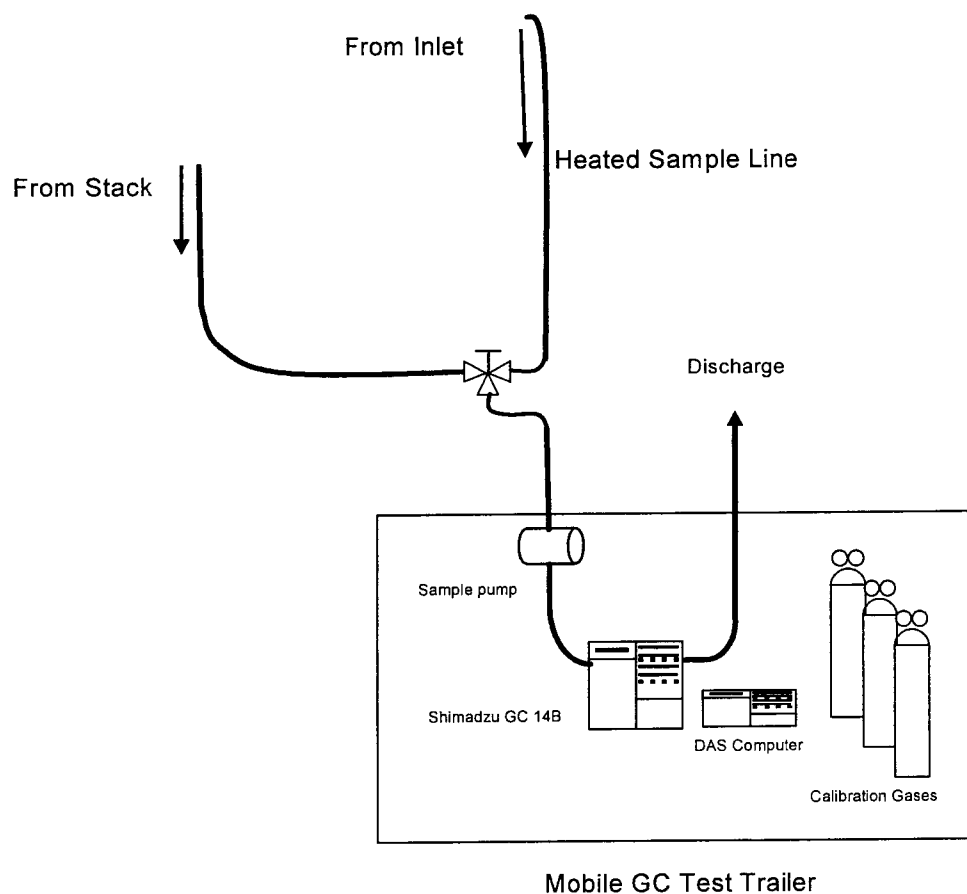
As presented in Figure 1-2, a gas sample was continuously extracted from the source with a stainless steel probe and channeled through a heated 3/8-inch O.D. Teflon® sample line. Digital temperature controller was used to maintained temperature at 250 °F.

### **GC Calibration**

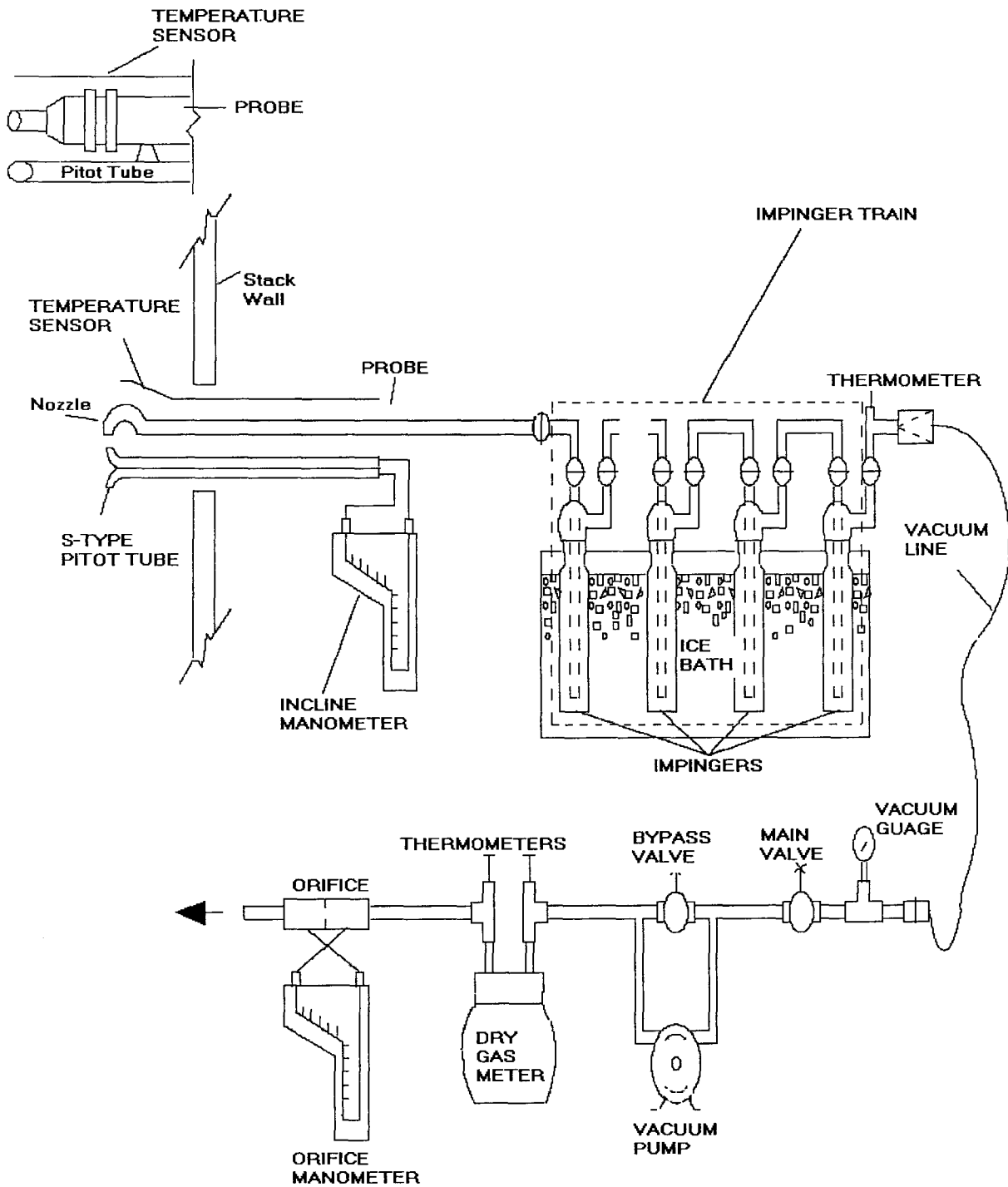
The calibration of the GC/FPD was performed using certified gas standards composed of a known concentration of the given component in zero-grade nitrogen. A copy of the certification standards for each of the certified calibration standards used during the testing is included in Appendix D. The range used for each analyzer was determined based on the expected concentration levels of the flue gas stream.



**Figure 1-1. Reference Method Analyzer System**



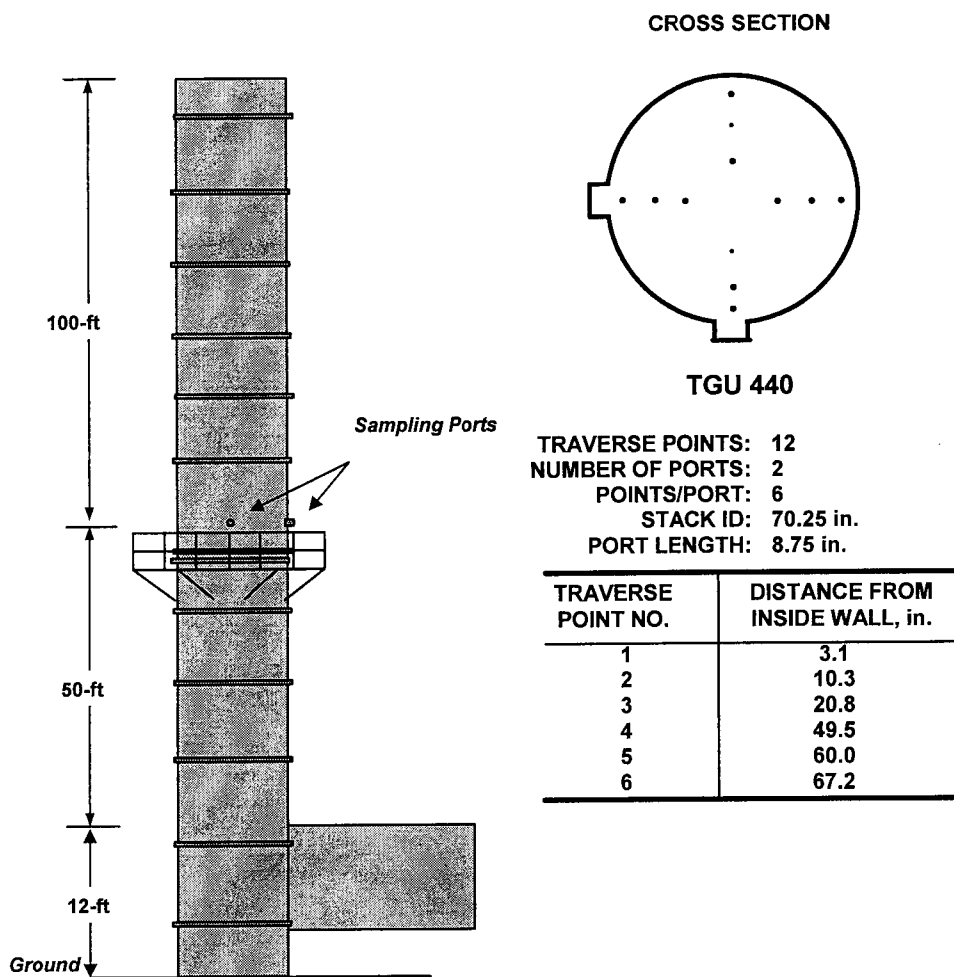
**Figure 1-2. Sampling System Schematic for GC/FPD**



**Figure 1-3. Method 4 Moisture Sampling Train**

**SOURCE INFORMATION**

The testing location on TGU 440 exhaust stack consisted of two (2) four inch diameter ports, located approximately sixty-two feet above ground level. The sample port on the 70.25-inch diameter stack is located approximately 50 feet (8.5 diameters) downstream and 100 feet (25.6 diameters) upstream from the nearest disturbances. This meets the requirements established in the Code of Federal Regulations for sample locations.



**Figure 1-4. Diagram of Testing Location**



## SAMPLE CALCULATIONS

The following calculations were used in the emission test program for TGU 440 Stack emissions from March 29, 2005. The values below represent the actual emission data from condition 1500 degrees, run 1.

### Calculations

#### Stack Gas Flow Rate

##### Absolute Stack Gas Pressure ( $P_s$ )

$$P_s = P_{bar} + \frac{P_{static}}{13.6}$$

Where:  $P_{bar}$  = Barometric pressure  
 $P_{static}$  = Static pressure of stack gas (in.)

$$\underline{P_s} = 29.65 \text{ in. Hg}$$

##### Gas Volume Sampled at Standard Conditions ( $V_{mstd}$ )

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

Where:  $V_m$  = Actual gas volume sampled  
 $\gamma$  = Gas meter correction factor  
 $P_{bar}$  = Measured Barometric Pressure  
 $\Delta H$  = Differential Pressure across meter orifice  
 $T_m$  = Meter temperature at standard conditions

$$\underline{V_{mstd}} = 37.718 \text{ ft}^3$$

##### Water Vapor Collected at Standard Conditions ( $V_{wstd}$ )

$$V_{wstd} = 0.04707 x V_{lc}$$

Where:  $V_{lc}$  = Liquid volume collected in impingers  
 (imp 1-3 mL + imp 4 mg)

$$\underline{V_{wstd}} = 7.11 \text{ ft}^3$$

### Stack Gas Moisture Content at Saturation (MF)

$$MF = \frac{\left( 10^{\left[ 8.361 - \left( \frac{1893.5}{T - 27.65} \right) \right]} - 0.5 \right)}{P}$$

Where:  $T$  = Stack gas temperature ( $^{\circ}\text{K}$ )  
 $P$  = Stack gas Pressure (mm/Hg)

$$\underline{MF} = 100 \%$$

### Measured Stack Gas Moisture Content ( $B_{ws}$ )

$$B_{ws} = \left( \frac{V_{wstd}}{V_{wstd} + V_{mstd}} \right)$$

$$\underline{B_{ws}} = 15.9 \%$$

### Dry Molecular Weight of Stack Gas ( $M_d$ )

$$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(100 - \%CO_2 - \%O_2)$$

$$\underline{M_d} = 28.83 \text{ lb/lb-Mole}$$

### Wet Molecular Weight of Stack Gas

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

$$\underline{M_s} = 27.11 \text{ lb/lb-Mole}$$

**Stack Gas Velocity**

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

Where:  $C_p$  = Pitot Coefficient (0.84)  
 $T_s$  = Stack Temperature ( $^{\circ}\text{R}$ )  
 $P_s$  = Absolute Stack gas Pressure  
 $M_s$  = Molecular weight of Stack gas (wet basis)

$$\underline{V_s} = 39.2 \text{ fps}$$

**Volumetric Flow Rate (Actual cubic feet per, wet basis)**

$$Q_{stdw} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)$$

Where:  $Q_s$  = Volumetric flow rate (acfm)  
 $P_s$  = Absolute Stack gas Pressure  
 $T_s$  = Stack Temperature ( $^{\circ}\text{R}$ )

$$\underline{Q_{stdw}} = 63,266 \text{ acfm}$$

**Volumetric Flow Rate (Standard Conditions, dry basis)**

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

Where:  $Q_s$  = Volumetric flow rate (acfm)  
 $P_s$  = Absolute Stack gas Pressure  
 $T_s$  = Stack Temperature ( $^{\circ}\text{R}$ )  
 $B_{ws}$  = Stack moisture content

$$\underline{Q_{std}} = 30,180 \text{ dscfm}$$

**Calibration Correction**

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

Where:

$C_{gas}$  = Effluent gas concentration – ppm, dry basis (ppm, db)

$\bar{C}$  = Average gas concentration of gas analyzer – dry basis (ppm, db)

$C_o$  = Average of initial and final system calibration bias check responses for zero gas (ppm, db)

$C_m$  = Average of initial and final system calibration bias check responses for the upscale calibration gas (ppm, db)

$C_{ma}$  = actual concentration of the upscale calibration gas (ppm, db)

**Pollutant Concentration Conversion From ppm to lb/dscf**

$$C_{lb/dscf} = C_{ppmvd} \left( \frac{MW}{385.26 \times 10^6} \right)$$

Where:  $MW$  = Molecular Weight of Pollutant (64 for  $SO_2$ )

$385.26 \times 10^6$  = Conversion from grams/mole to lb/ft<sup>3</sup>

$$\underline{SO_2 lb/dscf} = 17.45 \times 10^6 \text{ lb/ft}^3$$

## **TEST RESULTS**

A complete summary of the compliance testing performed on TGU 440 are listed in Tables 1-4 through 1-6 on the following pages. Appendices presenting lists of equipment used on this project, resumes of key personnel, all data collected in the field, calculated data, and calibration data are included in the Appendix section of this report.

Plant		Address			
LCR		HOUSTON TEXAS			
Location		Personnel			
TGU 440		GB SW GV			
Run Number		1	2	3	Average
Date	Test Date	3/29/2005	3/29/2005	3/29/2005	
Start	Run Start Time	8:45	10:11	11:28	
	Run Finish Time	9:55	11:11	12:28	
	Net Traversing Points	12	12	12	
Θ	Net Run Time, minutes	60	60	60	60
Y	Dry Gas Meter Calibration Factor	0.999	0.999	0.999	0.999
P <sub>Br</sub>	Barometric Pressure, inches of Mercury	29.76	29.76	29.76	29.76
ΔH	Average orifice meter Differential, inches H <sub>2</sub> O	1.70	1.70	1.70	1.70
V <sub>m</sub>	Dry Gas Meter Volume Sampled actual, acf	38.665	40.965	41.360	40.330
t <sub>m</sub>	Average Dry Gas Meter Temperature, °F	80.08	87.45	89.50	85.68
V <sub>mstd</sub>	Dry Gas Meter Volume Sampled standard, dscf	37.718	39.424	39.656	38.93
V <sub>lc</sub>	Total Moisture Liquid collected, ml	151	129.2	141	140.4
V <sub>wstd</sub>	Volume of Water Vapor, standard cubic feet	7.11	6.08	6.64	6.61
% H <sub>2</sub> O	Moisture Content of Stack Gas, %	15.9	13.4	14.3	14.5
% H <sub>2</sub> O <sub>sat</sub>	Moisture Saturation at Stack Gas Temperature, %	100.0	100.0	100.0	100.0
M <sub>fd</sub>	Dry Mole Fraction	0.841	0.866	0.857	0.855
%CO <sub>2</sub>	Carbon Dioxide, %	4.32	4.51	3.89	4.239
%O <sub>2</sub>	Oxygen, %	3.52	1.37	1.73	2.206
% CO+ N <sub>2</sub>	Carbon Monoxide & Nitrogen, %	92.2	94.1	94.4	93.6
F <sub>o</sub>	Fuel Factor	4.02	4.33	4.93	4.43
M <sub>d</sub>	Dry Molecular Weight, lb/lb-Mole	28.83	28.78	28.69	28.77
M <sub>s</sub>	Wet Molecular weight, lb/lb-Mole	27.11	27.34	27.16	27.20
P <sub>g</sub>	Flue Gas Static Pressure, inches of H <sub>2</sub> O	-1.5	-1.50	-1.50	-1.50
P <sub>s</sub>	Absolute Flue Gas Pressure, inches of Mercury	29.65	29.65	29.65	29.65
t <sub>s</sub>	Average Stack Gas Temperature, °F	462.9	461.8	460.0	461.58
ΔP <sub>avg</sub>	Average Velocity Head, inches of H <sub>2</sub> O	0.259	0.261	0.299	0.273
V <sub>s</sub>	Average Stack Gas Velocity, feet/second	39.2	39.3	42.1	40.2
A <sub>s</sub>	Stack Area, square feet	26.917	26.917	26.917	26.917
Q <sub>sd</sub>	Dry Volumetric Flow Rate, dry scfm	30,180	31,203	33,051	31,478
Q <sub>sw</sub>	Wet Volumetric Flow Rate, wet scfm	35,867	36,017	38,582	36,822
Q <sub>aw</sub>	Actual Wet Volumetric Flue Gas Flow Rate, acfm	63,266	63,454	67,950	64,890
SO <sub>2</sub> ppm	Sulfur Dioxide Concentration, ppm	105.0	136.0	124.6	121.9
SO <sub>2</sub> ppm@0%O <sub>2</sub>	Sulfur Dioxide Concentration, ppm@0%O <sub>2</sub>	126.3	145.6	135.9	135.9
SO <sub>2</sub> lb/dscf	Sulfur Dioxide Concentration, lb/dscf x 10E-6	17.45	22.60	20.70	20.25
SO <sub>2</sub> lb/hr	Sulfur Dioxide Emission Rate, lb/hr	31.60	42.30	41.04	38.32
H <sub>2</sub> S ppm	Hydrogen Sulfide Concentration, ppm	< .10	< .10	< .10	< .10
H <sub>2</sub> S lb/dscf	Hydrogen Sulfide Concentration, lb/dscf x 10E-6	0.0089	0.0089	0.0089	0.0089
H <sub>2</sub> S lb/hr	Hydrogen Sulfide Emission Rate, lb/hr	0.016	0.017	0.018	0.017
CO ppm	Carbon Monoxide Concentration, ppm	73.3	51.4	57.6	60.8
CO lb/dscf	Carbon Monoxide Concentration, lb/dscf x 10E-6	5.33	3.74	4.19	4.42
CO lb/hr	Carbon Monoxide Emission Rate, lb/hr	9.65	6.99	8.31	8.32

Table 1-4 TGU 440 Test Summary with TO at 1500 degrees.

Plant	LCR	Address	HOUSTON TEXAS		
Location	TGU 440	Personnel	GB SW GV		
Run Number		1	2	3	Average
Date	Test Date	3/29/2005	3/29/2005	3/29/2005	
Start	Run Start Time	12:55	14:13	15:24	
	Run Finish Time	13:55	15:13	16:24	
	Net Traversing Points	12	12	12	
⊖	Net Run Time, minutes	60	60	60	60
Y	Dry Gas Meter Calibration Factor	0.999	0.999	0.999	0.999
P <sub>Br</sub>	Barometric Pressure, inches of Mercury	29.76	29.76	29.76	29.76
ΔH	Average orifice meter Differential, inches H <sub>2</sub> O	1.70	1.70	1.70	1.70
V <sub>m</sub>	Dry Gas Meter Volume Sampled actual, acf	37.715	37.750	38.605	38.023
t <sub>m</sub>	Average Dry Gas Meter Temperature, °F	87.83	84.33	81.92	84.69
V <sub>mstd</sub>	Dry Gas Meter Volume Sampled standard, dscf	36.271	36.538	37.532	36.78
V <sub>lc</sub>	Total Moisture Liquid collected, ml	144.3	151.4	130.3	142.0
V <sub>wstd</sub>	Volume of Water Vapor, standard cubic feet	6.79	7.13	6.13	6.68
% H <sub>2</sub> O	Moisture Content of Stack Gas, %	15.8	16.3	14.0	15.4
% H <sub>2</sub> O <sub>sat</sub>	Moisture Saturation at Stack Gas Temperature, %	100.0	100.0	100.0	100.0
M <sub>fd</sub>	Dry Mole Fraction	0.842	0.837	0.860	0.846
%CO <sub>2</sub>	Carbon Dioxide, %	4.23	4.39	4.42	4.347
%O <sub>2</sub>	Oxygen, %	1.53	1.60	1.42	1.513
% CO+ N <sub>2</sub>	Carbon Monoxide & Nitrogen, %	94.2	94.0	94.2	94.1
F <sub>o</sub>	Fuel Factor	4.58	4.40	4.41	4.46
M <sub>d</sub>	Dry Molecular Weight, lb/lb-Mole	28.74	28.77	28.76	28.76
M <sub>s</sub>	Wet Molecular weight, lb/lb-Mole	27.04	27.01	27.25	27.10
P <sub>g</sub>	Flue Gas Static Pressure, inches of H <sub>2</sub> O	-1.5	-1.50	-1.50	-1.50
P <sub>s</sub>	Absolute Flue Gas Pressure, inches of Mercury	29.65	29.65	29.65	29.65
t <sub>s</sub>	Average Stack Gas Temperature, °F	458.4	460.5	453.0	457.31
ΔP <sub>avg</sub>	Average Velocity Head, inches of H <sub>2</sub> O	0.292	0.302	0.300	0.298
v <sub>s</sub>	Average Stack Gas Velocity, feet/second	41.5	42.3	42.2	42.0
A <sub>s</sub>	Stack Area, square feet	26.917	26.917	26.917	26.917
Q <sub>sd</sub>	Dry Volumetric Flow Rate, dry scfm	32,184	32,476	33,266	32,642
Q <sub>sw</sub>	Wet Volumetric Flow Rate, wet scfm	38,211	38,810	38,702	38,574
Q <sub>aw</sub>	Actual Wet Volumetric Flue Gas Flow Rate, acfm	67,071	68,277	68,093	67,814
SO <sub>2</sub> ppm	Sulfur Dioxide Concentration, ppmvd	108.9	108.8	110.3	109.3
SO <sub>2</sub> ppm@0%O <sub>2</sub>	Sulfur Dioxide Concentration, ppmvd@0%O <sub>2</sub>	117.5	117.8	118.3	117.9
SO <sub>2</sub> lb/dscf	Sulfur Dioxide Concentration, lb/dscf x 10E-6	18.09	18.07	18.33	18.16
SO <sub>2</sub> lb/hr	Sulfur Dioxied Emission Rate, lb/hr	34.94	35.22	36.58	35.58
H <sub>2</sub> S ppm	Hydrogen Sulfide Concentration, ppmvd	< .10	< .10	< .10	< .10
H <sub>2</sub> S lb/dscf	Hydrogen Sulfide Concentration, lb/dscf x 10E-6	0.0089	0.0089	0.0089	0.0089
H <sub>2</sub> S lb/hr	Hydrogen Sulfide Emission Rate, lb/hr	0.017	0.017	0.018	0.017
CO ppm	Carbon Monoxide Concentration, ppmvd	67.5	69.2	70.7	69.1
CO lb/dscf	Carbon Monoxide Concentration, lb/dscf x 10E-6	4.90	5.03	5.14	5.02
CO lb/hr	Carbon Monoxide Emission Rate, lb/hr	9.47	9.80	10.26	9.84

Table 1-5 TGU 440 Test Summary with TO at 1475 degrees.

Plant		Address			
LCR		HOUSTON TEXAS			
Location		Personnel			
TGU 440		GB SW GV			
Run Number		1	2	3	Average
Date	Test Date	3/30/2005	3/30/2005	3/30/2005	
Start	Run Start Time	10:06	11:21	12:34	
	Run Finish Time	11:06	12:21	13:34	
	Net Traversing Points	12	12	12	
Θ	Net Run Time, minutes	60	60	60	60
Y	Dry Gas Meter Calibration Factor	0.999	0.999	0.999	0.999
P <sub>Br</sub>	Barometric Pressure, inches of Mercury	29.69	29.69	29.69	29.69
ΔH	Average orifice meter Differential, inches H <sub>2</sub> O	1.70	1.70	1.70	1.70
V <sub>m</sub>	Dry Gas Meter Volume Sampled actual, acf	40.585	47.525	44.150	44.087
t <sub>m</sub>	Average Dry Gas Meter Temperature, °F	89.13	92.50	93.13	91.58
V <sub>mstd</sub>	Dry Gas Meter Volume Sampled standard, dscf	38.848	45.213	41.955	42.01
V <sub>lc</sub>	Total Moisture Liquid collected, ml	152.5	172.5	158.5	161.2
V <sub>wstd</sub>	Volume of Water Vapor, standard cubic feet	7.18	8.12	7.46	7.59
% H <sub>2</sub> O	Moisture Content of Stack Gas, %	15.6	15.2	15.1	15.3
% H <sub>2</sub> O <sub>sat</sub>	Moisture Saturation at Stack Gas Temperature, %	100.0	100.0	100.0	100.0
M <sub>fd</sub>	Dry Mole Fraction	0.844	0.848	0.849	0.847
%CO <sub>2</sub>	Carbon Dioxide, %	4.51	4.38	4.47	4.453
%O <sub>2</sub>	Oxygen, %	1.46	2.00	2.37	1.945
% CO+ N <sub>2</sub>	Carbon Monoxide & Nitrogen, %	94.0	93.6	93.2	93.6
F <sub>o</sub>	Fuel Factor	4.31	4.32	4.14	4.26
M <sub>d</sub>	Dry Molecular Weight, lb/lb-Mole	28.78	28.78	28.81	28.79
M <sub>s</sub>	Wet Molecular weight, lb/lb-Mole	27.10	27.14	27.18	27.14
P <sub>g</sub>	Flue Gas Static Pressure, inches of H <sub>2</sub> O	-1.5	-1.50	-1.50	-1.50
P <sub>s</sub>	Absolute Flue Gas Pressure, inches of Mercury	29.58	29.58	29.58	29.58
t <sub>s</sub>	Average Stack Gas Temperature, °F	451.9	453.0	440.0	448.31
ΔP <sub>avg</sub>	Average Velocity Head, inches of H <sub>2</sub> O	0.246	0.261	0.235	0.247
v <sub>s</sub>	Average Stack Gas Velocity, feet/second	38.0	39.2	37.0	38.1
A <sub>s</sub>	Stack Area, square feet	26.917	26.917	26.917	26.917
Q <sub>sd</sub>	Dry Volumetric Flow Rate, dry scfm	29,648	30,648	29,240	29,845
Q <sub>sw</sub>	Wet Volumetric Flow Rate, wet scfm	35,127	36,152	34,440	35,239
Q <sub>aw</sub>	Actual Wet Volumetric Flue Gas Flow Rate, acfm	61,365	63,231	59,770	61,456
SO <sub>2</sub> ppm	Sulfur Dioxide Concentration, ppm	131.5	120.4	117.2	123.0
SO <sub>2</sub> ppm@0% O <sub>2</sub>	Sulfur Dioxide Concentration, ppm@0% O <sub>2</sub>	141.4	133.1	132.2	135.6
SO <sub>2</sub> lb/dscf	Sulfur Dioxide Concentration, lb/dscf x 10E -6	21.84	20.00	19.47	20.44
SO <sub>2</sub> lb/hr	Sulfur Dioxide Emission Rate, lb/hr	38.85	36.78	34.15	36.60
H <sub>2</sub> S ppm	Hydrogen Sulfide Concentration, ppm	< .10	< .10	< .10	< .10
H <sub>2</sub> S lb/dscf	Hydrogen Sulfide Concentration, lb/dscf x 10E-6	0.0089	0.0089	0.0089	0.0089
H <sub>2</sub> S lb/hr	Hydrogen Sulfide Emission Rate, lb/hr	0.016	0.016	0.016	0.016
CO ppm	Carbon Monoxide Concentration, ppm	89.2	89.2	83.9	87.4
CO lb/dscf	Carbon Monoxide Concentration, lb/dscf x 10E-6	6.48	6.48	6.10	6.35
CO lb/hr	Carbon Monoxide Emission Rate, lb/hr	11.53	11.92	10.69	11.38

Table 1-6 TGU 440 Test Summary with TO at 1458 degrees.



## **APPENDIX A – TESTING EQUIPMENT USED**

## Testing Equipment

Provided in the table below is a list of all testing equipment used in the compliance testing of TGU 440.

<b>Golden Specialty Consulting Trailer #5</b>			
<b>Constituent</b>	<b>Make/ Model</b>	<b>Operating Range</b>	<b>Serial Number</b>
<b>CO #1</b>	CA Model 300	0-200 ppm	1K09008
<b>O<sub>2</sub>#1</b>	CA Model 300	0-25 %	1K09008
<b>CO<sub>2</sub> #1</b>	CA Model 300	0-25%	1K09008
<b>SO<sub>2</sub></b>	API Model 100AH	0-200 ppm	111
<b>CO#2</b>	CA Model 200	0-200 ppm	1L12019
<b>O<sub>2</sub> #2</b>	CA Model 200	0-25%	1L12019
<b>Golden Specialty Consulting Trailer #7</b>			
<b>H<sub>2</sub>S</b>	Shimadzu GC-14B	0- 1 ppm	C10734117085
<b>Stack Equipment</b>			
<b>Velocity</b>	Apex	0 – 10" H <sub>2</sub> O	GST 84A
<b>Moisture</b>	Millenium	∞	2030
<b>Temperature</b>	Apex	0 – 2,000° F	GST 84TC

**Table 1-9. Testing Equipment Used in the TGU 440 Compliance**

## **APPENDIX B – PERSONNEL**

# **Scott B. Swiggard**

## **President**

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### **Professional Experience Summary**

- Broad background in environmental compliance and regulatory issues. Has directed projects associated with air permitting, groundwater contamination, air toxins emissions control, hazardous materials control and reporting, wastewater process control (metals removal), energy conservation, industrial ventilation, noise control, bioremediation, and storm water control.
- Extensive background in emission testing, with over 1,300 tests personally conducted and/or supervised.
- Responsible for the continued development of testing capabilities and their research and development.
- Provides project management for testing at assigned client's facilities. Provides field support to the project managers on testing protocols and methods.
- Responsible for verification and validation on test data as part of a Quality Assurance/ Quality Control Program.

### **Work Experience**

GOLDEN SPECIALTY CONSULTING, LTD. (January 1997 - Present)

Position: President

RAMCON Environmental Corporation (March 1995 - January 1997)

Position: Gulf Coast Division Manager

Ark Latex Environmental Consultants, Inc. (April 1992 - February 1995)

Position: Environmental Engineer

Alloy Piping Products, Inc. (September 1990 - April 1992)

Position: Industrial Engineer

United States Air Force (June 1980 - September 1990)

Position: Quality Assurance Inspector/ Evaluator

### **Professional Affiliations**

Source Evaluation Society (SES) and Air and Waste Management Association (AWMA)

### **Education**

Bachelor of Science in Industrial Engineering, Southern Illinois University, 1991

Associate degree in Aviation Maintenance Technology, Community College of the Air Force, 1990

Graduate of the United States Air Force Air University in Management/Supervision, 1989

Licensed airframe and power plant mechanic

FTIR 80 hour training course conducted by Dr. Robert Spellicy, IMACC, Round Rock, Texas

Source Sampling and CEMS Workshop, Walter Smith & Associates, 2003 and 2004

# **Karen L. Swiggard**

## **Vice President/Quality Assurance Officer**

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### **Professional Work Summary**

- Broad background in Safety, environmental compliance and regulatory issues. Has managed projects associated with Hazard Communication, Blood borne pathogens, Tuberculosis Infection Control, Respiratory Protection, Personal Protective Equipment, Life Safety Code, Fire Safety, Electrical Safety, Back Injury Protection, Workplace Violence, Employee Injury and Illness Reporting, Emergency Response, Hazardous Drugs, Ventilation and Indoor Air Quality, and Joint Commission on Accreditation of Healthcare Organizations (JCAHO).
- Extensive background in employee Training in areas of: Hazard Communication, Blood borne pathogens, Tuberculosis Infection Control, Respiratory Protection, Personal Protective Equipment, Fire Safety, Electrical Safety, Back Injury Prevention, Emergency Response, and Computer Ergonomics.
- Developed and presented intensive training courses for Health and Safety professionals at all NASA centers including: Occupational Ergonomics and Blood borne Pathogens.
- While working for Texas Water Commission (now Texas Natural Resource Conservation Commission, TNRCC). She was responsible for the enforcement of RCRA program in Texas including the inspection and evaluation of RCRA programs at various chemical plants and other facilities handling hazardous waste. Was a key member for emergency response for chemical spills and accidents.
- Managed environment of care accreditation process of Kelsey-Seybold, Houston Texas, for JCAHO in which it was awarded.

### **Work Experience**

GOLDEN SPECIALTY CONSULTING, LTD. (February 1999 - Present)

Position: Vice President

Kelsey-Seybold Clinic (June 1995 – February 1999)

Position: Manager of Environmental Health and Safety

NASA-Johnson Space Center (April 1986 - June 1995)

Position: Health & Safety Training Specialist/Industrial Hygienist

Texas Water Commission (February 1984 – April 1986)

Position: Environmental Quality Specialist

### **Professional Affiliations**

Source Evaluation Society (SES)

Air and Waste Management Association (AWMA)

American Industrial Hygiene Association (AIHA)

### **Education**

Bachelor of Science in Environmental Science, University of Houston, 1984

Source Sampling and CEMS Workshop, Walter Smith & Associates, 2002

**Greg D. Burch**  
**Manager, Emissions Testing**

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**Professional Experience Summary**

- Responsible for designing, planning and managing sampling programs, daily assignments of field testing crews, sample analysis, data reduction, QA/QC reviews, and reporting activities.
- Broad background in environmental compliance and regulatory issues. Mr. Burch has extensive experience designing and managing test programs to meet federal, state and local compliance demonstration requirements.
- Participated in or supervised over 1,500 tests across twenty-three states and Puerto Rico, including 10 Hazardous Waste Incinerator Trial Burns, 2 EPA Superfund Cleanup Sites, and compliance testing performed as an agent for the South Coast Air Quality Management District (SCAQMD).
- Sampling experience includes flow stream characterization and monitoring of a number of types of flow streams for engineering purposes; emissions sampling for regulatory compliance demonstration; emissions sampling for systems audit requirements of continuous emission monitoring systems (CEMS) and predictive emissions monitoring systems (PEMS).
- Assist clients in troubleshooting and repairing existing emissions monitoring systems, or designing and implementing new systems.

**Work Experience**

GOLDEN SPECIALTY CONSULTING, LTD. (April 2000 - Present)

Position: Manager, Emissions Testing

ARI Environmental, Inc. (May 1996 – April 2000)

Position: Project Manager

RMT – Jones and Neuse, Inc. (May 1994 – May 1996)

Position: Program Director

Tracer Technology Division of Team, Inc. (May 1989 - May 1994)

Position: Staff Engineer

United States Navy (March 1983 - March 1989)

Position: Avionics Repair Technician Second Class / Work Center Supervisor

**Professional Education**

Kingwood College, Kingwood, TX, Currently Enrolled, 40 hrs – 4.0 GPA

Southwest Missouri State Electronics Vocational Technical School

Aviation Fundamentals Class A School – United States Navy

Basic Electronics and Electricity – United States Navy

Avionics Repair Class A School – United States Navy

Advanced First Term Avionics – United States Navy

Versatile Avionics Shop Test (VAST) Operator – United States Navy

Miniature Component Repair School – United States Navy

Micro-level Circuit Board/Solder Repair, Level F Certified – United States Navy

Versatile Avionics Shop Test – Program Set Analyst School – United States Navy

Quality Assurance Collateral Duty Inspector Certified – United States Navy

40 Hour Hazwoper Training 29 CFR 1910.120

Fundamentals of Instructor Training – American Red Cross

Visible Emissions Certified (EPA Method 9)

Source Sampling and CEMS Workshop, Walter Smith & Associates, 2003 and 2004

SkillPath® Seminars, Project Management Workshop, 2003

# **LaShandra Latin**

## **Technical Writer**

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### **Professional Experience Summary**

- Experience with EPA testing regulations, including 40 CFR, Part 60 and Part 75.
- CEM instrumentation projects include continuous analysis for carbon monoxide (CO), total oxides of nitrogen (NO<sub>x</sub>), oxygen (O<sub>2</sub>) and carbon dioxide (CO<sub>2</sub>).
- Knowledgeable in all required regulations and methodologies for the testing and analysis of stack gas velocity and moisture content analysis.
- Knowledgeable in the testing requirements and procedures for the testing and analysis of Predictive Emissions monitoring systems (PEMS) and Continuous Emission monitoring systems (CEMS).
- Responsible for coordinating, authoring, and reviewing reports for clients.

### **Work Experience**

GOLDEN SPECIALTY CONSULTING, LTD. (August 2004 – Present)

Position: Technical Writer

NORTH FOREST I.S.D- OAK VILLAGE MIDDLE SCHOOL (January 2001-May 2003)

Position: Math Teacher

PHILLIPS PETROLEUM COMPANY, (May 2000- August 2000)

Position: Mechanical Engineering Intern

### **Education**

Bachelor of Science in Mechanical Engineering, Prairie View A&M University, 2000

AutoCAD 2002 Certification, North Harris Community College, 2003

Solid Works 2002 Certification, North Harris Community College, 2003

Source Sampling and CEMS Workshop, Walter Smith & Associates, 2004

# **Dr. Shyh-Yau “Sam” Wang**

## **Project Supervisor**

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### **Professional Experience Summary**

- Experience with EPA testing regulations, including 40 CFR, Part 60 and Part 75.
- Specialized experience in air quality analysis and development of pollution controlling systems for particulate, SO<sub>x</sub>, NO<sub>x</sub>, CO, VOCs, and hydrocarbons.
- Expertise in designing remedial technologies of bioremediation, immobilization, soil washing, ion exchange, and carbon adsorption, as well as in air stripping for metals, petroleum hydrocarbons, VOCs, and NAPLs waste.
- Experience with Phase I and II investigation, risk assessment and site closure compliance of CERCLA and RCRA.
- Familiar with computer programs to model pollutant transport in water, air, soil and groundwater. Dr. Wang developed an analytical model to calculate the contaminant concentration change of a remedial process unit by considering mechanisms of absorption, dissolution, and degradation.
- Experience with EPA, AWWA, and ASTM methods for design water collection, rapid mixing, flocculation, filtration, carbon adsorption, and activated sludge units for domestic wastewater, petroleum produced water and industrial wastewater. Dr. Wang is also familiar with drinking water byproducts formation mechanisms and control processes.
- Proficient in FTIR analysis.

### **Work Experience**

GOLDEN SPECIALTY CONSULTING, LTD. (July 2003- Present)

Position: Project Supervisor

CITY OF HOUSTON, HOUSTON, TX (2002-2003)

Position: Hydraulic/Environmental Engineer

UNIVERSITY OF HOUSTON (1990-2002)

Position: Research Associate (1998-2002)

Position: Research Assistant (1990-1998)

INDUSTRIAL TECHNOLOGY RESEARCH INSTITUTE, TAWAIN (1989-1990)

Position: Engineer

CHINESE CORPS OF ENGINEERS (1987-1989)

Position: Second Lieutenant

### **Education**

Ph.D. in Environmental Engineering, University of Houston, 1998

Master of Science in Environmental Engineering, University of Houston, 1993

Bachelor of Science in Environmental Engineering, National Chung-Hsing University, Taiwan, 1987

Computer Skills in Windows, MS DOS, MAC OS, HTML, BASIC, FORTRAN, AutoCAD, Corel, Adobe

Texas E.I.T. Certificate

Source Sampling and CEMS Workshop, Walter Smith & Associates, 2003 and 2004



# **Gus Vargas**

## **Environmental Tech I**

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### **Professional Experience Summary**

- Proficient with instrumentation methods: carbon monoxide (CO), total oxides of nitrogen (NO<sub>x</sub>), oxygen (O<sub>2</sub>), and carbon dioxide (CO<sub>2</sub>), total hydrocarbons (THC), ammonia (NH<sub>3</sub>), and sulfur dioxide (SO<sub>2</sub>).
- Knowledgeable in source compliance testing and emission sampling methodologies for stack gas velocity, moisture, and a variety of isokinetic (wet chemistry/particulate) testing.
- Experience in performing maintenance and calibrations on a variety of air testing equipment.
- Experience with EPA testing regulations, including 40 CFR, Part 60 and Part 75.
- Knowledgeable in testing requirements and procedures for the testing and analysis of Predictive Emissions monitoring systems (PEMS) in accordance with Title 30 of the Texas Administrative Code, Chapter 117.
- Knowledgeable in OSHA, ISO 9001 regulations.
- Computer skills include: Windows 9x, Windows 2000, Excel, Word

### **Work Experience**

GOLDEN SPECIALTY CONSULTING, LTD. (October 2004-present)

Position: Environmental Consultant Tech I

CLEAN AIR ENGINEERING (January 2004-October 2004)

Position: Field Technician/Equipment Technician

AIRTECH ENVIRONMENTAL SERVICES, INC. (August 2001-November 2003)

Position: Field Technician/Equipment Technician

### **Education**

Law Degree Program, Universidad Autonoma de Nuevo Leon, Monterrey, Mexico

HM 232 Hazardous Materials security training

Basic Plus Training (ARSC)

Basic Plus Training (H.A.C.S.C.)

Man-Lift Training (3/1/05)

## APPENDIX C – CALIBRATION DATA

Calibration Gas & Analyzer Configuration Data		CO <sub>2</sub>	SO <sub>2</sub>	CO	O <sub>2</sub>
Mfg. And Model No.:	CA300	API 100AH	CA300	CA300	
Serial Number:	1K09008	111	1K09008	1K09008	1K09008
	25	200	200	200	25
Calibration span:	21	200	108	108	11
Zero Gas	Cyl #: AAL7981	AAL7981	AAL7981	AAL7981	AAL7981
	value: 0.00	0.0	0.0	0.0	0.00
Low Calibration Gas	Cyl #:		ALM057489		
	value:		30.1		
Mid Calibration Gas	Cyl #: ALM057489	ALM049276	ALM000935	ALM001211	
	value: 7.01	98.87	58.1	4.96	
High Calibration Gas	Cyl #: ALM060663	ALM045194	ALM000641	ALM007660	
	value: 17.9	181	90.2	9.08	
Bias Gas Used		mid	high	low	mid
Calibration Error					
	Zero Reading	-0.05	0.20	0.00	-0.01
	low reading			31.50	
	Mid Reading	7.12	97.30	58.30	4.96
	High Reading	17.94	180.70	91.00	9.08
RA Run 1		CO <sub>2</sub>	SO <sub>2</sub>	CO	O <sub>2</sub>
Pretest Bias	Zero Reading	0.00	0.50	1.00	0.03
	Mid Reading	7.02	183.35	31.50	4.96
	Zero Bias	-0.2	-0.2	-0.9	-0.4
	Span Bias	0.5	-1.3	0.0	0.0
Post Test Bias	Zero Reading	0.36	-1.00	4.00	0.03
	Mid Reading	7.32	183.90	34.50	4.97
	Zero Bias	-1.9	0.6	-3.7	-0.4
	Span Bias	-0.9	-1.6	-2.8	-0.1
	Zero Drift	1.7	-0.8	2.8	0.0
	Span Drift	1.4	0.3	2.8	0.1
Calculated Data					
	Ave. Zero Bias (C <sub>0</sub> )=	0.180	-0.250	2.500	0.030
	Ave upscale Bias(C <sub>m</sub> )=	7.170	183.625	33.000	4.965
	actual upscale Concentration (C <sub>ma</sub> )=	7.01	181.00	30.10	4.96
	Measured Concentration (C) =				
	Run 1	4.489	106.465	76.786	3.528
	Corrected Concentration (C <sub>gma</sub> ) =				
	C <sub>gma</sub> = (C-C <sub>0</sub> ) x (C <sub>ma</sub> /(C <sub>m</sub> -C <sub>0</sub> ))				
	Run 1	4.321	105.05	73.31	3.516
RA Run 2		CO <sub>2</sub>	SO <sub>2</sub>	CO	Oxygen
Pretest Bias	Zero Reading	0.36	-1.00	4.00	0.03
	Mid Reading	7.32	183.90	34.50	4.97
	Zero Bias	-1.9	0.6	-3.7	-0.4
	Span Bias	-0.9	-1.6	-2.8	-0.1
Post Test Bias	Zero Reading	0.47	-0.80	6.80	0.01
	Mid Reading	7.40	185.90	36.80	4.96
	Zero Bias	-2.4	0.5	-6.3	-0.2
	Span Bias	-1.3	-2.6	-4.9	0.0
	Zero Drift	0.5	0.1	2.6	-0.2
	Span Drift	0.4	1.0	2.1	-0.1
Calculated Data					
	Ave. Zero Bias (C <sub>0</sub> )=	0.415	-0.900	5.400	0.020
	Ave upscale Bias(C <sub>m</sub> )=	7.360	184.900	35.650	4.965
	actual upscale Concentration (C <sub>ma</sub> )=	7.01	181.00	30.10	4.96
	Measured Concentration (C) =				
	RA Run 2	4.881	138.730	57.057	1.385
	Corrected Concentration (C <sub>gma</sub> ) =				
	C <sub>gma</sub> = (C-C <sub>0</sub> ) x (C <sub>ma</sub> /(C <sub>m</sub> -C <sub>0</sub> ))				
	Run 2	4.508	136.02	51.40	1.369
RA Run 3		CO <sub>2</sub>	SO <sub>2</sub>	CO	Oxygen
Pretest Bias	Zero Reading	0.47	-0.80	6.80	0.01
	Mid Reading	7.32	185.90	36.80	4.96
	Zero Bias	-2.4	0.5	-6.3	-0.2
	Span Bias	-0.9	-2.6	-4.9	0.0
Post Test Bias	Zero Reading	-0.04	-0.70	3.20	0.01
	Mid Reading	6.92	186.60	33.80	4.96
	Zero Bias	0.0	0.5	-3.0	-0.2
	Span Bias	0.9	-3.0	-2.1	0.0
	Zero Drift	-2.4	0.1	-3.3	0.0
	Span Drift	-1.9	0.3	-2.8	0.0
Calculated Data					
	Ave. Zero Bias (C <sub>0</sub> )=	0.215	-0.750	5.000	0.010
	Ave upscale Bias(C <sub>m</sub> )=	7.120	186.250	35.300	4.960
	actual upscale Concentration (C <sub>ma</sub> )=	7.01	181.00	30.10	4.96
	Measured Concentration (C) =				
	Run 3	4.045	127.961	63.032	1.740
	Corrected Concentration (C <sub>gma</sub> ) =				
	C <sub>gma</sub> = (C-C <sub>0</sub> ) x (C <sub>ma</sub> /(C <sub>m</sub> -C <sub>0</sub> ))				
	Run 3	3.888	124.58	57.65	1.734

Calibration Gas & Analyzer Configuration Data		CO <sub>2</sub>	SO <sub>2</sub>	CO	O <sub>2</sub>
Mfg. And Model No.:	CA300	API 100AH	CA300	CA300	
Serial Number:	1K09008	111	1K09008	1K09008	
	25	200	200	25	
Calibration span:	21	200	108	11	
Zero Gas	Cyl #: AAL7981	AAL7981	AAL7981	AAL7981	AAL7981
	value: 0.00	0.0	0.0	0.00	0.00
Low Calibration Gas	Cyl #: ALM057489		ALM057489		
	value: 30.1		30.1		
Mid Calibration Gas	Cyl #: ALM057489	ALM049276	ALM000935	ALM001211	
	value: 7.01	98.87	58.1	4.96	
High Calibration Gas	Cyl #: ALM060663	ALM045194	ALM000641	ALM007660	
	value: 17.9	181	90.2	9.08	
Bias Gas Used	mid	high	low	mid	
Calibration Error					
	Zero Reading	-0.05	0.20	0.00	-0.01
	low reading			31.50	
	Mid Reading	7.12	97.30	58.30	4.96
	High Reading	17.94	180.70	91.00	9.08
RA Run 1		CO <sub>2</sub>	SO <sub>2</sub>	CO	O <sub>2</sub>
Pretest Bias	Zero Reading	-0.04	-0.70	3.20	0.01
	Mid Reading	6.92	186.60	33.80	4.96
	Zero Bias	0.0	0.5	-3.0	-0.2
	Span Bias	0.9	-3.0	-2.1	0.0
Post Test Bias	Zero Reading	-0.12	-0.20	3.00	0.01
	Mid Reading	6.40	186.70	33.20	4.96
	Zero Bias	0.3	0.2	-2.8	-0.2
	Span Bias	3.4	-3.0	-1.6	0.0
	Zero Drift	-0.4	0.3	-0.2	0.0
	Span Drift	-2.4	0.0	-0.6	0.0
Calculated Data					
	Ave. Zero Bias (C <sub>0</sub> )=	-0.080	-0.450	3.100	0.010
	Ave upscale Bias(C <sub>m</sub> )=	6.660	186.650	33.500	4.960
	actual upscale Concentration (C <sub>m</sub> )=	7.01	181.00	30.10	4.96
	Measured Concentration (C) =				
	Run 1	3.989	112.140	71.240	1.533
	Corrected Concentration (C <sub>gm</sub> ) =				
	C <sub>gm</sub> = (C-C <sub>0</sub> ) x (C <sub>m</sub> /(C <sub>m</sub> -C <sub>0</sub> ))				
	Run 1	4.232	108.92	67.47	1.526
RA Run 2		CO <sub>2</sub>	SO <sub>2</sub>	CO	Oxygen
Pretest Bias	Zero Reading	-0.12	-0.20	3.00	0.01
	Mid Reading	6.40	186.70	33.20	4.96
	Zero Bias	0.3	0.2	-2.8	-0.2
	Span Bias	3.4	-3.0	-1.6	0.0
Post Test Bias	Zero Reading	-0.20	-0.30	3.80	-0.01
	Mid Reading	6.35	186.70	33.80	4.97
	Zero Bias	0.7	0.3	-3.5	0.0
	Span Bias	3.6	-3.0	-2.1	-0.1
	Zero Drift	-0.4	-0.1	0.7	-0.2
	Span Drift	-0.2	0.0	0.6	0.1
Calculated Data					
	Ave. Zero Bias (C <sub>0</sub> )=	-0.160	-0.250	3.400	0.000
	Ave upscale Bias(C <sub>m</sub> )=	6.375	186.700	33.500	4.965
	actual upscale Concentration (C <sub>m</sub> )=	7.01	181.00	30.10	4.96
	Measured Concentration (C) =				
	RA Run 2	3.934	112.118	72.609	1.600
	Corrected Concentration (C <sub>gm</sub> ) =				
	C <sub>gm</sub> = (C-C <sub>0</sub> ) x (C <sub>m</sub> /(C <sub>m</sub> -C <sub>0</sub> ))				
	Run 2	4.391	108.79	69.21	1.598
RA Run 3		CO <sub>2</sub>	SO <sub>2</sub>	CO	Oxygen
Pretest Bias	Zero Reading	-0.20	-0.30	3.80	-0.01
	Mid Reading	6.35	186.70	33.80	4.97
	Zero Bias	0.7	0.3	-3.5	0.0
	Span Bias	3.6	-3.0	-2.1	-0.1
Post Test Bias	Zero Reading	-0.13	-0.30	3.40	0.01
	Mid Reading	6.32	186.10	32.80	4.96
	Zero Bias	0.4	0.3	-3.1	-0.2
	Span Bias	3.7	-2.7	-1.2	0.0
	Zero Drift	0.3	0.0	-0.4	0.2
	Span Drift	-0.1	-0.3	-0.9	-0.1
Calculated Data					
	Ave. Zero Bias (C <sub>0</sub> )=	-0.165	-0.300	3.600	0.000
	Ave upscale Bias(C <sub>m</sub> )=	6.335	186.400	33.300	4.965
	actual upscale Concentration (C <sub>m</sub> )=	7.01	181.00	30.10	4.96
	Measured Concentration (C) =				
	Run 3	3.932	113.491	73.361	1.417
	Corrected Concentration (C <sub>gm</sub> ) =				
	C <sub>gm</sub> = (C-C <sub>0</sub> ) x (C <sub>m</sub> /(C <sub>m</sub> -C <sub>0</sub> ))				
	Run 3	4.418	110.32	70.70	1.416

Calibration Gas & Analyzer Configuration Data		CO <sub>2</sub>	SO <sub>2</sub>	CO	O <sub>2</sub>
Mfg. And Model No.:		CA300	API 100AH	CA300	CA300
Serial Number:		1K09008	111	1K09008	1K09008
		25	200	200	25
Calibration span:		21	200	108	11
Zero Gas	Cyl #:	AAL7981	AAL7981	AAL7981	AAL7981
	value:	0.00	0.0	0.0	0.00
Low Calibration Gas	Cyl #:			ALM057489	
	value:			30.1	
Mid Calibration Gas	Cyl #:	ALM057489	ALM049276	ALM000935	ALM001211
	value:	7.01	98.87	58.1	4.96
High Calibration Gas	Cyl #:	ALM060663	ALM045194	ALM000641	ALM007660
	value:	17.9	181	90.2	9.08
Bias Gas Used		mid	high	low	mid
Calibration Error					
	Zero Reading	-0.05	0.20	0.00	-0.01
	low reading			31.50	
	Mid Reading	7.12	97.30	58.30	4.96
	High Reading	17.94	180.70	91.00	9.08
RA Run 1		CO <sub>2</sub>	SO <sub>2</sub>	CO	O <sub>2</sub>
Pretest Bias	Zero Reading	-0.21	-1.20	-0.20	0.00
	Mid Reading	6.59	183.30	29.80	4.96
	Zero Bias	0.7	0.7	0.2	-0.1
	Span Bias	2.5	-1.3	1.6	0.0
Post Test Bias	Zero Reading	-0.28	-1.10	0.00	-0.01
	Mid Reading	6.54	183.40	29.80	4.96
	Zero Bias	1.1	0.7	0.0	0.0
	Span Bias	2.7	-1.4	1.6	0.0
	Zero Drift	-0.3	0.0	0.2	-0.1
	Span Drift	-0.2	0.0	0.0	0.0
Calculated Data					
	Ave. Zero Bias (C <sub>0</sub> )=	-0.245	-1.150	-0.100	-0.005
	Ave upscale Bias(C <sub>m</sub> )=	6.565	183.350	29.800	4.960
	actual upscale Concentration (C <sub>m</sub> )=	7.01	181.00	30.10	4.96
	Measured Concentration (C) =				
	Run 1	4.137	132.874	88.467	1.458
	Corrected Concentration (C <sub>gas</sub> ) =				
	C <sub>gas</sub> = (C-C <sub>0</sub> ) x (C <sub>m</sub> /(C <sub>m</sub> -C <sub>0</sub> ))				
	Run 1	4.511	131.48	89.16	1.461
RA Run 2		CO <sub>2</sub>	SO <sub>2</sub>	CO	Oxygen
Pretest Bias	Zero Reading	-0.28	-1.10	0.00	-0.01
	Mid Reading	6.54	183.40	29.80	4.96
	Zero Bias	1.1	0.7	0.0	0.0
	Span Bias	2.7	-1.4	1.6	0.0
Post Test Bias	Zero Reading	-0.02	-1.60	-4.00	-0.01
	Mid Reading	6.76	183.90	28.50	4.94
	Zero Bias	-0.1	0.9	3.7	0.0
	Span Bias	1.7	-1.6	2.8	0.2
	Zero Drift	1.2	-0.3	-3.7	0.0
	Span Drift	1.0	0.3	-1.2	-0.2
Calculated Data					
	Ave. Zero Bias (C <sub>0</sub> )=	-0.150	-1.350	-2.000	-0.010
	Ave upscale Bias(C <sub>m</sub> )=	6.650	183.650	29.150	4.950
	actual upscale Concentration (C <sub>m</sub> )=	7.01	181.00	30.10	4.96
	Measured Concentration (C) =				
	RA Run 2	4.095	121.708	90.341	1.991
	Corrected Concentration (C <sub>gas</sub> ) =				
	C <sub>gas</sub> = (C-C <sub>0</sub> ) x (C <sub>m</sub> /(C <sub>m</sub> -C <sub>0</sub> ))				
	Run 2	4.376	120.40	89.23	2.001
RA Run 3		CO <sub>2</sub>	SO <sub>2</sub>	CO	Oxygen
Pretest Bias	Zero Reading	-0.02	-1.60	-4.00	-0.01
	Mid Reading	6.76	183.90	28.50	4.94
	Zero Bias	-0.1	0.9	3.7	0.0
	Span Bias	1.7	-1.6	2.8	0.2
Post Test Bias	Zero Reading	-0.05	-1.40	-6.00	0.00
	Mid Reading	6.75	184.10	28.80	4.92
	Zero Bias	0.0	0.8	5.5	-0.1
	Span Bias	1.7	-1.7	2.5	0.4
	Zero Drift	-0.1	0.1	-1.8	0.1
	Span Drift	0.0	0.1	0.3	-0.2
Calculated Data					
	Ave. Zero Bias (C <sub>0</sub> )=	-0.035	-1.500	-5.000	-0.005
	Ave upscale Bias(C <sub>m</sub> )=	6.755	184.000	28.650	4.930
	actual upscale Concentration (C <sub>m</sub> )=	7.01	181.00	30.10	4.96
	Measured Concentration (C) =				
	Run 3	4.298	118.603	88.767	2.356
	Corrected Concentration (C <sub>gas</sub> ) =				
	C <sub>gas</sub> = (C-C <sub>0</sub> ) x (C <sub>m</sub> /(C <sub>m</sub> -C <sub>0</sub> ))				
	Run 3	4.473	117.19	83.88	2.373

APEX INSTRUMENTS  
EPA Method 5  
522 Series Meter Box Calibration  
Pre-Test Orifice Method  
English Meter Box Units, English K' Factor

Meter #: 306  
Serial #: 2030

Date: 10/20/04  
Barometric Pressure: 30.06 (in. Hg)  
Theoretical Critical Vacuum: 14.18 (in. Hg)

!!!!!!!  
IMPORTANT For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.  
IMPORTANT The Critical Orifice Coefficient, K', must be entered in English units, (ft)<sup>3</sup>\*(deg R)<sup>0.5</sup>/((in.Hg)\*(min)).  
!!!!!!!

----- DRY GAS METER READINGS -----

ΔH (in H <sub>2</sub> O)	Time (min)	Volume Initial (ft <sup>3</sup> )	Volume Final (ft <sup>3</sup> )	Volume Total (ft <sup>3</sup> )
0.63	15.00	196.452	203.208	6.756
1.22	15.00	203.208	212.358	9.150
1.95	15.00	212.358	224.058	11.700
3.55	15.00	224.058	240.204	16.146
5.45	20.00	240.204	266.695	26.491

Initial Temps.		Final Temps.		Orifice Serial #	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temper	
Inlet ('°F)	Outlet ('°F)	Inlet ('°F)	Outlet ('°F)				Initial ('°F)	Final ('°F)
82.0	82.0	83.0	82.0	48	0.3445	19.8	82.0	83.0
83.0	82.0	84.0	83.0	53	0.4604	18.2	83.0	83.0
84.0	83.0	87.0	86.0	63	0.5900	16.8	83.0	85.0
87.0	86.0	91.0	85.0	73	0.8153	14.6	85.0	86.0
91.0	85.0	93.0	87.0	81	1.0073	12.2	86.0	88.0

----- CRITICAL ORIFICE READINGS -----

-- Average Temperatures --		
DGM Outlet ("R)	DGM Overall ("R)	Ambient Temp ("R)
542.0	542.3	542.5
542.5	543.0	543.0
544.5	545.0	544.0
545.5	547.3	545.5
546.0	549.0	547.0

\*\*\*\*\* RESULTS \*\*\*\*\*

--- DRY GAS METER ---

VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME NOMINAL
Vm(std) (dscf)	Vm(std) (liters)	Vcr(std) (dscf)	Vcr(std) (liters)	Vcr (dscf)
6.617	187.4	6.669	188.9	6.823
8.962	253.8	8.909	252.3	9.123
11.438	323.9	11.406	323.0	11.702
15.781	446.9	15.740	445.8	16.192
25.928	734.3	25.893	733.3	26.711

----- ORIFICE -----

-- DRY GAS METER --

CALIBRATION FACTOR		
Y	Value	Variation
(number)	(number)	(number)
0.008	0.009	Pass / Fail
0.994	-0.005	Pass
0.997	-0.002	Pass
0.997	-0.002	Pass
0.999	0.000	Pass

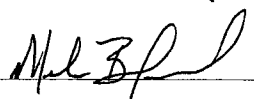
----- ORIFICE -----

CALIBRATION FACTOR		
ΔH@	Value	Variation
(in H <sub>2</sub> O)	(mm H <sub>2</sub> O)	(in H <sub>2</sub> O)
1.755	44.57	-0.055
1.902	48.32	0.093
1.848	46.94	0.039
1.764	44.79	-0.046
1.777	45.13	-0.032

Average Y -----> 0.999

Average ΔH@ -----> 1.809 45.95

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +0.02.

For Orifice Calibration Factor ΔH@, the orifice differential pressure in inches of H<sub>2</sub>O that equates to 0.75 cfm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +0.2. SIGNED: 

Date: 10-20-04

APEX INSTRUMENTS  
EPA Method 5  
522 Series Meter Box Calibration  
Pre-Test Orifice Method  
English Meter Box Units, English K' Factor

YD 1.002

Model #:   
Serial #:

Date:   
Barometric Pressure:  (in. Hg)  
Theoretical Critical Vacuum: 14.24 (in. Hg)

!!!!!!!  
IMPORTANT For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.  
IMPORTANT The Critical Orifice Coefficient, K', must be entered in English units, (ft)<sup>3</sup>/(deg R)<sup>0.5</sup>/((in.Hg)\*(min)).  
!!!!!!!

Deta H=1.771

----- DRY GAS METER READINGS -----

ΔH (in H <sub>2</sub> O)	Time (min)	Volume Initial (ft <sup>3</sup> )	Volume Final (ft <sup>3</sup> )	Volume Total (ft <sup>3</sup> )
0.64	15.00	872.465	879.285	6.820
1.10	18.00	880.030	890.805	10.775
1.90	15.00	891.530	903.140	11.610
3.50	15.00	903.670	919.650	15.980
5.40	15.00	920.420	939.990	19.570

Initial Temps.		Final Temps.		Orifice Serial #	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	-- Ambient Temperature --	
Inlet (°F)	Outlet (°F)	Inlet (°F)	Outlet (°F)				Initial (°F)	Final (°F)
77.0	75.0	77.0	75.0	48	0.3421	28.9	75.0	75.0
80.0	77.0	80.0	77.0	55	0.4582	26.0	77.0	75.0
84.0	78.0	84.0	78.0	63	0.5916	27.0	78.0	75.0
89.0	81.0	89.0	81.0	73	0.8103	24.0	80.0	81.0
92.0	82.0	92.0	82.0	81	0.9957	21.0	81.0	81.0

----- CRITICAL ORIFICE READINGS -----

-- Average Temperatures --		
DGM Outlet (°R)	DGM Overall (°R)	Ambient Temp (°R)
535.0	536.0	535.5
537.0	538.5	537.5
538.0	541.0	538.5
541.0	545.0	540.5
542.0	547.0	541.0

\*\*\*\*\* RESULTS \*\*\*\*\*

--- DRY GAS METER ---

VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME CORRECTED	VOLUME NOMINAL
Vm(std) (dscf)	Vm(std) (liters)	Vcr(std) (dscf)	Vcr(std) (liters)	Vcr (dscf)
6.784	192.1	6.692	189.5	6.732
10.681	302.5	10.739	304.1	10.842
11.478	325.1	11.541	326.8	11.674
15.743	445.8	15.788	447.1	16.029
19.297	546.5	19.457	551.0	19.772

----- ORIFICE -----

--- DRY GAS METER ---

CALIBRATION FACTOR		
Y	Value	Variation
(number)	(number)	(number)
0.986	-0.015	Pass
1.005	0.004	Pass
1.006	0.004	Pass
1.003	0.001	Pass
1.008	0.007	Pass

----- ORIFICE -----

CALIBRATION FACTOR		
ΔH@	Value	Variation
(in H <sub>2</sub> O)	(mm H <sub>2</sub> O)	(in H <sub>2</sub> O)
1.800	45.73	0.033
1.724	43.79	-0.043
1.787	45.39	0.020
1.749	44.44	-0.018
1.774	45.06	0.007

Average Y ----->

Average ΔH@ ----->  44.88

Note: For Calibration Factor Y, the ratio of the reading of the calibration meter to the dry gas meter, acceptable tolerance of individual values from the average is +0.02.

For Orifice Calibration Factor ΔH@, the orifice differential pressure in inches of H<sub>2</sub>O that equates to 0.75 cfm of air at 68 F and 29.92 inches of Hg, acceptable tolerance of individual values from the average is +0.2. SIGNED: \_\_\_\_\_

Date: 4/6/05

*[Handwritten Signature]*  
BUS VARGAS

## Thermocouple Calibration

Thermocouple ID:	65784A
Reference ID:	NIST-1
Calibration Date:	12-03-04
Personnel:	AW

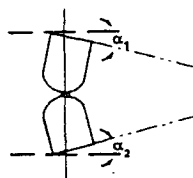
Free Thermocouple w/ Pitots (not attached to probe)

Range	Thermocouple		NIST Certified Reference		Percent Deviation	Pass / Fail
	(°F)	(°R)	(°F)	(°R)		
Low (Ice Water)	30.0	460.0	30.0	460.0	0.00	Pass
Ambient	65.0	460.0	65.0	460.0	0.00	Pass
Mid (Boiling Water)	207.0	460.0	209.0	460.0	0.00	Pass
High (Hot Oil)	396.0	460.0	397.0	460.0	0.00	Pass

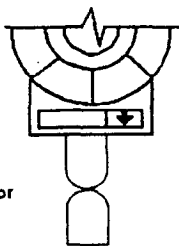
Deviation Tolerance 1.5%



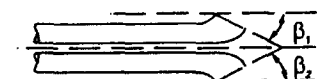
# CALIBRATION DATA SHEET 2 Type S Pitot Tube Inspection



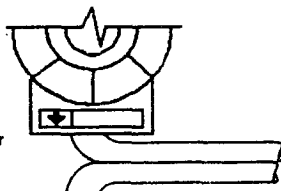
Degree indicating level position for determining  $\alpha_1$  and  $\alpha_2$ .



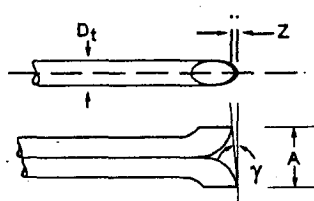
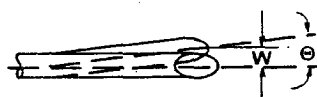
Degree indicating level position for determining  $\beta_1$  and  $\beta_2$ .



Degree indicating level position for determining  $\theta$ .



Degree indicating level position for determining  $\gamma$  then calculate Z.



Level and Perpendicular?	Y
Obstruction?	N
Damaged?	N
$\alpha_1$ ( $-10^\circ \leq \alpha_1 \leq +10^\circ$ )	Y
$\alpha_2$ ( $-10^\circ \leq \alpha_2 \leq +10^\circ$ )	Y
$\beta_1$ ( $-5^\circ \leq \beta_1 \leq +5^\circ$ )	Y
$\beta_2$ ( $-5^\circ \leq \beta_2 \leq +5^\circ$ )	Y
$\gamma$	0
$\theta$	0
$z = A \tan \gamma$ ( $\leq 0.125"$ )	Y
$w = A \tan \theta$ ( $\leq 0.03125"$ )	Y
$D_t$ ( $3/16" \leq D_t \leq 3/8"$ )	Y
A	0.721
$A/2D_t$ ( $1.05 \leq P_A/D_t \leq 1.5$ )	✓

## QA/QC Check

Completeness ✓

Legibility ✓

Accuracy ✓

Specifications ✓

Reasonableness ✓

## Certification

I certify that the Type S pitot tube/probe ID# 65C 84A meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor  $C_p$  of 0.84.

Certified by: \_\_\_\_\_

Personnel (Signature/Date)

Team Leader (Signature/Date) 3-29-05

## **APPENDIX D – CALCULATED DATA**

## Method 1 & 2 Data Sheet

Plant	LCR	Time	8:45	Date	03/29/05	Job #	
Address	Houston Texas	C <sub>p</sub>	0.840	Wetbulb temp		Ma	28.00 %CO <sub>2</sub>
Location	440	P <sub>Br</sub> in "Hg	29.82	% moisture	8.6	Ms	27.14 %O <sub>2</sub>
Personnel	GB SW	P static in H <sub>2</sub> O	-1.5			Mo	

Distance from Far Wall to Outside of Port, inches	79.000
Width (if Rectangular)	
Nipple Length and/or Wall Thickness, inches	8.75
Diameter, inches	70.25
Equivalent Diameter (only when rectangular)	
Area in square feet	26.92
Straight Distance before sampling location, inches	600.0
Number of Diameters Before Location*	8.5
Straight Distance after sampling location, inches	1800.0
Number of Diameters After Location*	25.6
Enter "P" for Particulates or "V" for velocity	v
Minimum Number of Total Points	12
Number of Total Points Chosen	12
Number of Ports	2
Number of Points per Port	6

Points	% Duct Depth	Distance from Outside of Port	Yaw Angle Degrees	ΔP Inch H <sub>2</sub> O	Temp °F	Velocity Feet/sec
A1	4.4%	11.8				
A2	14.6%	19.0				
A3	29.6%	29.5				
A4	70.4%	58.2				
A5	85.4%	68.7				
A6	95.6%	75.9				
B1	4.4%	11.8				
B2	14.6%	19.0				
B3	29.6%	29.5				
B4	70.4%	58.2				
B5	85.4%	68.7				
B6	95.6%	75.9				
Average						

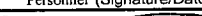

  

dscfm

Completeness	Accuracy	QA/QC Check	Reasonableness
Checked By: _____ Person (Signature/Date)	Leader (Signature/Date)		

**at 1500° F**

Completeness	✓	QA/QC Check	✓	Specifications	✓	Reasonableness	✓
Checked By:							
	Personnel (Signature/Date)		Team Leader (Signature/Date)				

**TGU 440**  
**at 1500° F**

Plant		LCR		Run No. 2		Date 3/29/2005		Job #	
Address		Houston Texas		Equipment ID		Cal Date		Constants	
Location		TGU 440		Reag. Box M5		Samp. box N/A		A <sub>s</sub> foot <sup>2</sup> 26.9	
Personnel		GB SW GV		Umbical 100ft		Meter box 10/20/04		Y 0.999	
% Moisture 13.4		Meas		Stack TC GSC84A		TC Readout 10/20/04		ΔH <sub>2</sub> 1.809	
P <sub>Br</sub> in"Hg 29.76				Tedlar Bag 2030		3/29/05		C <sub>p</sub> 0.840	
P <sub>static</sub> in H <sub>2</sub> O -1.50				Orsat Pump N/A		Nozzle N/A		D <sub>N</sub> in inches N/A	
K factor N/A				Est. Moisture 0.0		gm H <sub>2</sub> O 129.2		M3A 4.5 %CO <sub>2</sub>	
Filter # N/A				B <sub>measured</sub> 13.4		Fo= 4.33276		1.4 %O <sub>2</sub>	
Filter Wt. N/A				B <sub>unsaturated</sub> 100.0				Ms 27.34	
								M <sub>d</sub> 28.78	
Traverse Point No.		Elapsed Time In Minutes		Clock Time		DGM Reading		Velocity	
		Begin End		24 hr		ft <sup>3</sup>		ΔP	
A1		0.0 5.0		10:11		534.625		0.34	
A2		5.0 10.0		10:16				0.31	
A3		10.0 15.0		10:21				0.28	
A4		15.0 20.0		10:26				0.25	
A5		20.0 25.0		10:31		548.330		0.22	
A6		25.0 30.0		10:36		551.730		0.22	
B1		30.0 35.0		10:41		555.140		0.33	
B2		35.0 40.0		10:46		558.540		0.28	
B3		40.0 45.0		10:51		561.450		0.30	
B4		45.0 50.0		10:56		564.860		0.24	
B5		50.0 55.0		11:01		568.740		0.19	
B6		55.0 60.0		11:06		572.160		0.20	
						575.590			
Final		11:06		575.590					
Sum or avg		60.0		40.965		0.261		461.8	
								87.5	
								1.70	
Flow		ft/sec 39.3		scfm 36016.6		dacfm 31203.2		acfm 63454.5	
mmBTU/hr									
Impingers		Contents		Vol. (mL)		Post weight		Pre weight	
1		Water		100		210		100.0	
2		Water		100		110		100	
3		Empty		0		0		0.0	
4		SG		250		310.6		301.4	
								9.2	
Particulates		mgms		lb/hr		gr/scf		lb/mmBTU	
Probe Rinse									
Filter									
Impinger Catch									
Total									
Completeness		Accuracy		Specifications		Reasonableness			
Checked By		Personnel (Signature/Date)		Team Leader (Signature/Date)					

**at 1500° F**

Plant	LCR	Run No.	3	Date	3/29/2005	Job #							
Address	Houston Texas	Equipment ID	Cal	Constants	Checks	Pre	Mid	Post					
Location	TGU 440	Reag. Box M5	Samp. box N/A	A <sub>2</sub> foot <sup>2</sup>	26.9	Vacuum	13	8					
Personnel	GB SW GV	Umbical 100ft	Meter box 10/20/04 Y	0.999	Init DGM								
% Moisture	14.3 Meas	Stack TC GSC84A	TC Readout 10/20/04 ΔH <sub>g</sub>	1.809	Final DGM								
P <sub>Br</sub> in "Hg	29.76	Meter box 2030	Pitot 03/29/05 C <sub>p</sub>	0.840	Leak rate	0.001		0.000					
P static in H <sub>2</sub> O	-1.50	Orsat Pump N/A	Nozzle N/A	D <sub>N</sub> in inches	N/A	Pitot	N/A	N/A					
K factor	N/A	Est. Moisture 0.0	gm H <sub>2</sub> O 141.0	M3A 3.9 %CO <sub>2</sub>	Nozzle	Good	X	Good					
Filter # N/A		B <sub>wmeasured</sub> 14.3		1.7 %O <sub>2</sub>	Stack TC	Good	X	Good					
Filter Wt. N/A		B <sub>wassurated</sub> 100.0	Fo= 4.92911	Ms 27.16			M <sub>d</sub>	28.69					
Traverse Point No.	Elapsed Time In Minutes Begin End	Clock Time 24 hr	DGM Reading ft <sup>3</sup>	Velocity ΔP	Stack Temp. °F	DGM Temp. °F	Orifice Pressure ΔH in H <sub>2</sub> O Desired Actual	Probe Temp. °F	Box Temp. °F	Filter Outlet °F	Imping. Temp. °F	Pump Vac. Hg	Notes
A1	0.0 5.0	11:28	575.640	0.34	460	86.5	1.70				60	2.0	
A2	5.0 10.0	11:33	579.150	0.33	462	88.0	1.70				60	2.0	
A3	10.0 15.0	11:38	582.620	0.30	464	88.5	1.70				61	2.0	
A4	15.0 20.0	11:43	586.090	0.28	464	89.5	1.70				62	2.0	
A5	20.0 25.0	11:48	589.540	0.26	463	90.5	1.70				62	2.0	
A6	25.0 30.0	11:53	592.990	0.22	460	90.5	1.70				62	2.0	
B1	30.0 35.0	11:58	592.710	0.36	458	90.5	1.70				63	2.0	
B2	35.0 40.0	12:03	599.880	0.34	461	90.0	1.70				63	2.0	
B3	40.0 45.0	12:08	603.330	0.33	464	90.0	1.70				63	2.0	
B4	45.0 50.0	12:13	606.890	0.30	464	90.0	1.70				63	2.0	
B5	50.0 55.0	12:18	610.190	0.29	462	90.0	1.70				64	2.0	
B6	55.0 60.0	12:23	613.600	0.26	456	90.0	1.70				64	2.0	
			617.000										
Final		12:23	617.000										
Sum or avg	60.0		41.360	0.299	461.5	89.5	1.70				Max	2	
Flow	ft/sec 42.1												
scfm	38582.4												
dscfm	33050.9												
acfm	67950.5												
mmBTU/hr													
Impingers													
	Contents	Vol. (mL)	Post weight	Pre weight	gain								
1	Water	100	222	100.0	122								
2	Water	100	110	100	10								
3	Empty	0	0	0.0	0								
4	SG	250	382.4	373.4	9								
Particulates													
	mgms	lb/hr	gr/scf	lb/mmBTU									
Probe Rinse													
Filter													
Impinger Catch													
Total													
Completeness		Legibility		Accuracy		Specifications		Reasonableness					
Checked By:													
Personnel (Signature/Date)						Team Leader (Signature/Date)							

**TGU 440**  
**at 1475° F**

Plant Address Location Personnel	LCR Houston Texas TGU 440 GB SW GV	Run No. <b>1</b>	Date <b>3/29/2005</b>	Job #
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% Moisture <b>15.8</b> Meas P <sub>Br</sub> in "Hg <b>29.76</b> P static in H <sub>2</sub> O <b>-1.50</b> K factor <b>N/A</b>	Equipment ID      Cal Date Reag. Box M5      Samp. box N/A Umbilical 100ft      Meter box 10/20/04 Stack TC GSC84A      TC Readout 10/20/04 Meter box 2030      Pitot 3/29/05 Orsat Pump N/A      Nozzle N/A Est. Moisture 0.0      gm H <sub>2</sub> O 144.3 B <sub>wmeasured</sub> 15.8 B <sub>wsaturated</sub> 100.0	Constants A <sub>s</sub> foot <sup>2</sup> 26.9 Y 0.999 ΔH <sub>a</sub> 1.809 C <sub>p</sub> 0.840 D <sub>N</sub> in inches N/A M3A 4.2 %CO <sub>2</sub> 1.5 Fo= 4.57752	Checks      Pre      Mid      Post Vacuum (In. Hg) 15           10 Init DGM      0 Final DGM      0 Leak rate 0.00           0.00 Pitot      Good           Good Nozzle      N/A      X      N/A Stack TC      N/A      X      N/A Ms 27.04      M <sub>d</sub> 28.74
--	---	--	---

Traverse Point No.	Elapsed Time In Minutes		Clock Time	DGM Reading ft <sup>3</sup>	Velocity ΔP	Stack Temp. °F	DGM Temp. °F	Orifice Pressure ΔH in H <sub>2</sub> O		Probe Temp. °F	Box Temp. °F	Filter Outlet °F	Imping. Temp. °F	Pump Vac. Hg	Notes
	Begin	End						24 hr	Desired						
A1	0.0	5.0	12:55	617.080	0.38	450	87.5		1.70				60	4.0	
A2	5.0	10.0	13:00	620.290	0.36	452	88.0		1.70				60	4.0	
A3	10.0	15.0	13:05	623.480	0.33	454	88.5		1.70				61	4.0	
A4	15.0	20.0	13:10	626.640	0.29	456	88.5		1.70				61	4.0	
A5	20.0	25.0	13:15	630.030	0.26	458	87.5		1.70				60	4.0	
A6	25.0	30.0	13:20	633.000	0.22	462	87.5		1.70				60	4.0	
B1	30.0	35.0	13:25	636.420	0.36	458	87.5		1.70				60	4.0	
B2	35.0	40.0	13:30	639.310	0.34	460	88.0		1.70				61	4.0	
B3	40.0	45.0	13:35	642.450	0.30	461	88.0		1.70				62	4.0	
B4	45.0	50.0	13:40	645.590	0.28	462	88.0		1.70				63	4.0	
B5	50.0	55.0	13:45	648.730	0.22	464	87.5		1.70				64	4.0	
B6	55.0	60.0	13:50	651.860	0.20	464	87.5		1.70				64	4.0	
				654.795											
Final			13:50	654.795											

Sum or avg	60.0	37.715	0.292	458.4	87.8	1.70	Max	4
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Flow	
ft/sec	41.5
scfm	38211.1
dscfm	32184.2
acfm	67071.3
mmBTU/hr	

Impingers					
	Contents	Vol. (mL)	Post weight	Pre weight	gain
1	Water	100	226	100.0	126
2	Water	100	114	100	14
3	Empty	0	0	0.0	0
4	SG	250	301.6	297.3	4.3

Particulates				
	mg	lb/hr	gr/scf	lb/mmBTU
Probe Rinse				
Imp 1				
Imp 2				
Total				

Completeness \_\_\_\_\_ Legibility \_\_\_\_\_ Accuracy \_\_\_\_\_ Specifications \_\_\_\_\_ Reasonableness \_\_\_\_\_

Checked By: [Signature]      Team Leader (Signature/Date) \_\_\_\_\_

Personnel (Signature/Date)

TGU 440

at 1475° F

Plant	LCR	Run No.	2	Date	3/29/2005	Job #	
Address	Houston Texas	Equipment ID	Cal Date	Constants	Checks	Pre	Mid
Location	TGU 440	Reag. Box M5	Samp. box N/A	$A_s$ foot <sup>2</sup>	Vacuum	15	7
Personnel	GB SW GV	Umbical 100ft	Meter box 10/20/04	Y	Init DGM		
% Moisture	16.3 Meas	Stack TC GSC84A	TC Readout 10/20/04	$\Delta H_a$	Final DGM		
$P_{Br}$ in "Hg	29.76	Tedlar Bag 2030	Pitot 3/29/05	$C_p$	Leak rate	0.000	0.000
$P_{static}$ in H <sub>2</sub> O	-1.50	Orsat Pump N/A	Nozzle N/A	$D_N$ in inches	Pitot	Good	Good
K factor	N/A	Est. Moisture 0.0	gm H <sub>2</sub> O 151.4	M3A 4.4	Nozzle	N/A	X
Filter #	N/A	$B_{wmeasured}$	16.3	1.6 %CO <sub>2</sub>	Stack TC	N/A	X
Filter Wt.	N/A	$B_{wasturated}$	100.0	Fo= 4.39525	Ms	27.01	Md 28.77

Traverse Point No.	Elapsed Time In Minutes		Clock Time 24 hr	DGM Reading ft <sup>3</sup>	Velocity $\Delta P$	Stack Temp. °F	DGM Temp. °F	Orifice Pressure $\Delta H$ in H <sub>2</sub> O		Probe Temp. °F	Box Temp. °F	Filter Outlet °F	Imping. Temp. °F	Pump Vac. Hg	Notes
	Begin	End						Desired	Actual						
A1	0.0	5.0	14:13	654.925	0.36	454	84.5		1.70				60	3.0	
A2	5.0	10.0	14:18	658.210	0.34	458	85.0		1.70				60	3.0	
A3	10.0	15.0	14:23	661.310	0.30	460	85.0		1.70				61	3.0	
A4	15.0	20.0	14:28	664.470	0.29	462	85.0		1.70				60	3.0	
A5	20.0	25.0	14:33	667.840	0.24	464	85.0		1.70				60	3.0	
A6	25.0	30.0	14:38	671.650	0.22	464	84.5		1.70				59	3.0	
B1	30.0	35.0	14:43	674.110	0.34	463	84.5		1.70				60	3.0	
B2	35.0	40.0	14:48	677.410	0.34	464	84.0		1.70				60	3.0	
B3	40.0	45.0	14:53	679.880	0.33	462	84.0		1.70				61	3.0	
B4	45.0	50.0	14:58	683.650	0.30	460	83.5		1.70				62	3.0	
B5	50.0	55.0	15:03	686.440	0.29	457	83.5		1.70				62	3.0	
B6	55.0	60.0	15:08	689.560	0.29	458	83.5		1.70				63	3.0	
				692.675											

Final

15:08

692.675

Sum or avg

60.0

37.750

0.302

460.5

84.3

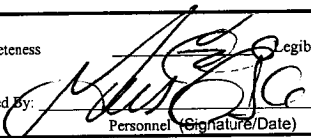
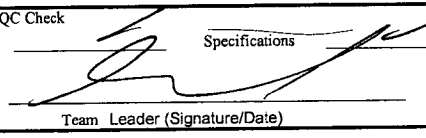
1.70

Max 3

Flow	
ft/sec	42.3
scfm	38810.0
uscfm	32475.8
acfm	68277.0
mmBTU/hr	

Impingers					
	Contents	Vol. (mL)	Post weight	Pre weight	gain
1	Water	100	230	100.0	130
2	Water	100	115	100	15
3	Empty	0	0	0.0	0
4	SG	250	317.4	311	6.4

Particulates			
	mgms	lb/hr	gr/scf
Probe Rinse			
Filter			
Impinger Catch			
Total			

Completeness	Legibility	QA/QC Check	Accuracy	Specifications	Reasonableness
Checked By: 	Personnel (Signature/Date)		Team Leader (Signature/Date)		



**TGU 440**  
**at 1475° F**

**संक्षेप**

**TGU 440**  
**at 1458° F**

Plant		LCR		Run No. 1		Date 3/30/2005		Job #	
Address		Houston Texas							
Location		TGU 440							
Personnel		GB SW GV							
% Moisture		15.6		Meas					
P <sub>Br</sub> in "Hg		29.69							
P static in H <sub>2</sub> O		-1.50							
K factor		N/A							
Filter #		N/A							
Filter Wt.		N/A							
Equipment ID		Cal Date		Constants		Checks		Pre Mid Post	
Reag. Box M5		Samp. box N/A		A <sub>2</sub> foot <sup>2</sup> 26.9		Vacuum (in. Hg) 15		16	
Umbical 100ft		Meter box 10/20/04		Y 0.999		Init DGM 0		0	
Stack TC GSC84A		TC Readout 10/20/04		ΔH <sub>2</sub> 1.809		Final DGM 0		0	
Meter box 2030		Pitot 3/29/05		C <sub>p</sub> 0.840		Leak rate 0.00		0.00	
Orsat Pump N/A		Nozzle N/A		D <sub>N</sub> in inches N/A		Pitot Good		Good	
Est. Moisture 0.0		gm H <sub>2</sub> O 152.5		M3A 4.5		%CO <sub>2</sub> N/A		X N/A	
		B <sub>w</sub> measured 15.6		1.5		%O <sub>2</sub> N/A		X N/A	
		B <sub>w</sub> saturated 100.0		Fo= 4.30953		Ms 27.10		M <sub>d</sub> 28.78	
Traverse Point No.		Elapsed Time In Minutes		Clock Time		DGM Reading		Velocity	
		Begin End		24 hr		ft <sup>3</sup>		ΔP	
A1		0.0 5.0		10:06		731.545		0.31	
A2		5.0 10.0		10:11		734.970		0.30	
A3		10.0 15.0		10:16		738.360		0.29	
A4		15.0 20.0		10:21		741.750		0.24	
A5		20.0 25.0		10:26		745.140		0.20	
A6		25.0 30.0		10:31		748.530		0.19	
B1		30.0 35.0		10:36		751.920		0.30	
B2		35.0 40.0		10:41		754.830		0.29	
B3		40.0 45.0		10:46		758.680		0.26	
B4		45.0 50.0		10:51		762.050		0.22	
B5		50.0 55.0		10:56		765.440		0.19	
B6		55.0 60.0		11:01		768.770		0.19	
						772.130			
Final		11:01		772.130					
Sum or avg		60.0		40.585		0.246		89.1	
						1.70		Max 4	
Flow		t/sec 38.0		acfm 35126.5		dscfm 29648.2		acfm 61365.4	
mmBTU/hr									
Impingers		Contents		Vol. (mL)		Post weight		Pre weight	
1		Water		100		228		100.0	
2		Water		100		114		100	
3		Empty		0		0		0.0	
4		SG		250		283.2		272.7	
Particulates		mg		lb/hr		gr/scf		lb/mmBTU	
Probe Rinse									
Imp 1									
Imp 2									
Total									
Completeness		Legibility		Accuracy		Specifications		Reasonableness	
Checked By:		Personnel (Signature/Date)		Team Leader (Signature/Date)					

**TGU 440**  
**at 1458° F**

Page

**TGU 440**  
**at 1458° F**

Plant	LCR	Run No.	3	Date	3/29/2005	Job #						
Address	Houston Texas	Equipment ID	Cal	Constants	Checks	Pre	Mid	Post				
Location	TGU 440	Reag. Box	M5	Samp. box	N/A	A <sub>1</sub> foot <sup>2</sup>	26.9	Vacuum	15	10		
Personnel	GB SW GV	Umbical	100ft	Meter box	10/20/04	Y	0.999	Init DGM				
% Moisture	15.1	Stack TC	GSC84A	TC Readout	10/20/04	ΔH <sub>lab</sub>	1.809	Final DGM				
P <sub>Br</sub> in "Hg	29.69	Meter box	2030	Pitot	03/29/05	C <sub>p</sub>	0.840	Leak rate	0	0		
P <sub>static</sub> in H <sub>2</sub> O	-1.50	Orsat Pump	N/A	Nozzle	N/A	D <sub>N</sub> in inches	N/A	Pitot	N/A	N/A		
K factor	N/A	Est. Moisture	0.0	gm H <sub>2</sub> O	158.5	M3A	4.5	%CO <sub>2</sub>	Nozzle	Good	X	Good
Filter #	N/A			B <sub>measured</sub>	15.1		2.4	%O <sub>2</sub>	Stack TC	Good	X	Good
Filter Wt.	N/A			B <sub>saturated</sub>	100.0	Fo=	4.14192	M <sub>s</sub>	27.18		M <sub>d</sub>	28.81

[illegible]

<b>Final</b>	<b>13:29</b>	<b>863.965</b>
--------------	--------------	----------------

4

Flow	
ft/sec	37.0
scfm	34440.1
dscfm	29240.4
acfm	59770.4
mmBTU/hr	

Impingers					
	Contents	Vol. (mL)	Post weight	Pre weight	gain
1	Water	100	236	100.0	136
2	Water	100	112	100	12
3	Empty	0	0	0.0	0
4	SG	250	284.6	274.1	10.5

Particulates				
	mgms	lb/hr	gr/scf	lb/mmBTU
Probe Rinse				
Filter				
Impinger Catch				
Total				

Completeness \_\_\_\_\_ QA/QC Check \_\_\_\_\_  
 Accuracy \_\_\_\_\_ Specifications \_\_\_\_\_ Reasonableness ☒  
 Checked By: \_\_\_\_\_  
 Personnel (Signature/Date) \_\_\_\_\_ Team Leader (Signature/Date) \_\_\_\_\_

## **APPENDIX E – CALIBRATION STANDARD CERTIFICATIONS**



Scott Specialty Gases

9810 BAY AREA BLVD, PASADENA, TX 77507

RATA CLASS

Dual-Analyzed Calibration Standard

Phone: 281-474-5800

Fax: 281-474-5857

**CERTIFICATE OF ACCURACY: Interference Free <sup>TM</sup> EPA Protocol Gas**

**Assay Laboratory**

SCOTT SPECIALTY GASES  
9810 BAY AREA BLVD  
PASADENA, TX 77507

P.O. No.: SBS081602  
Project No.: 04-22688-003

**Customer**

GOLDEN SPECIALTY CONSULTING, INC

PO BOX 1898  
DEER PARK TX 77536

**ANALYTICAL INFORMATION**

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM000641

Certification Date: 19Jun2003

Exp. Date: 18Jun2006

Cylinder Pressure\*\*\*: 2015 PSIG

**ANALYTICAL**

**ACCURACY\*\***

**TRACEABILITY**

**COMPONENT**

**CERTIFIED CONCENTRATION (Moles)**

+/- 1%

Direct NIST and NMI

CARBON MONOXIDE

90.2 PPM

NITROGEN

BALANCE

\*\*\* Do not use when cylinder pressure is below 150 psig.

\*\* Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

**REFERENCE STANDARD**

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM	01Mar2006	ALM031333	246.7 PPM	CO/N2

**INSTRUMENTATION**

**INSTRUMENT/MODEL/SERIAL#**

FTIR System/8220/AAB9400260

**DATE LAST CALIBRATED**

13Jun2003

**ANALYTICAL PRINCIPLE**

FTIR

**ANALYZER READINGS**

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis

Second Triad Analysis

Calibration Curve

**CARBON MONOXIDE**

Date: 12Jun2003 Response Unit: PPM  
Z1 = -0.95940 R1 = 246.6319 T1 = 90.21328  
R2 = 246.5404 Z2 = -0.96410 T2 = 90.35855  
Z3 = -0.99560 T3 = 90.42263 R3 = 246.9275  
Avg. Concentration: 90.33 PPM

Date: 19Jun2003 Response Unit: PPM  
Z1 = -0.26110 R1 = 246.9023 T1 = 90.13510  
R2 = 247.0919 Z2 = -0.28970 T2 = 90.23407  
Z3 = -0.33720 T3 = 90.03347 R3 = 246.1057  
Avg. Concentration: 90.13 PPM

Concentration = A + Bx + Cx2 + Dx3 + Ex4  
r = 0.999990  
Constants: A = 0.000000  
B = 1.000000 C = 0.000000  
D = 0.000000 E = 0.000000

APPROVED BY:

James Woods



# Scott Specialty Gases

9810 BAY AREA BLVD, PASADENA, TX 77507

## RATA CLASS

### Dual-Analyzed Calibration Standard

Phone: 281-474-5800

Fax: 281-474-5857

## CERTIFICATE OF ACCURACY: EPA Protocol Gas

### Assay Laboratory

SCOTT SPECIALTY GASES  
6141 EASTON ROAD, BLDG 1  
PLUMSTEADVILLE, PA 18949-0310

P.O. No.: SBS081602  
Project No.: 04-26789-004

### Customer

GOLDEN SPECIALTY CONSULTING, LTD

PO BOX 1898  
DEER PARK TX 77536

### ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM000935

Certification Date: 08Jun2004

Exp. Date: 08Jun2007

Cylinder Pressure\*\*\*: 2000 PSIG

### COMPONENT

CARBON DIOXIDE  
CARBON MONOXIDE  
NITROGEN

### CERTIFIED CONCENTRATION (Moles)

7.02 %  
58.1 PPM  
BALANCE

### ANALYTICAL

#### ACCURACY\*\*

+/- 1%  
+/- 1%

#### TRACEABILITY

Direct NIST and NMI  
Direct NIST and NMI

\*\*\* Do not use when cylinder pressure is below 150 psig.

\*\* Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

### REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2000	01Jun2005	K026511	5.006 %	CARBON DIOXIDE
NTRM 1679	01Jan2007	ALM031184	101.7 PPM	CARBON MONOXIDE

### INSTRUMENTATION

#### INSTRUMENT/MODEL/SERIAL#

MTI/M200/170927  
SIEMENS/6E/KN-240

#### DATE LAST CALIBRATED

07Jun2004  
17May2004

#### ANALYTICAL PRINCIPLE

GC-TCO  
NDIR

### ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

#### First Triad Analysis

#### Second Triad Analysis

#### Calibration Curve

### CARBON DIOXIDE

Date: 03Jun2004 Response Unit: AREA  
Z1 = 0.00000 R1 = 229747.0 T1 = 322211.0  
R2 = 229710.0 Z2 = 0.00000 T2 = 322205.0  
Z3 = 0.00000 T3 = 322168.0 R3 = 229704.0  
Avg. Concentration: 7.020 %

Concentration = A + Bx + Cx2 + Dx3 + Ex4  
r = 0.999998 2000  
Constants: A = 2.1841E-05  
B = 9.2408E-03 C =  
D = E =

### CARBON MONOXIDE

Date: 01Jun2004 Response Unit: VOLTS  
Z1 = 0.00490 R1 = 0.49570 T1 = 0.28320  
R2 = 0.49600 Z2 = 0.00520 T2 = 0.28280  
Z3 = 0.00490 T3 = 0.28320 R3 = 0.49600  
Avg. Concentration: 58.10 PPM

Date: 08Jun2004 Response Unit: VOLTS  
Z1 = 0.00520 R1 = 0.49530 T1 = 0.28320  
R2 = 0.49660 Z2 = 0.00430 T2 = 0.28360  
Z3 = 0.00480 T3 = 0.28320 R3 = 0.49590  
Avg. Concentration: 58.20 PPM

Concentration = A + Bx + Cx2 + Dx3 + Ex4  
r = 0.999997736 2636  
Constants: A = 0.858075  
B = 203.726835 C =  
D = E =

APPROVED BY:

PAT POLONI

SUPERVISOR:

RAY PENDLETON



# Scott Specialty Gases

9810 BAY AREA BLVD, PASADENA, TX 77507

## RATA CLASS

### Dual-Analyzed Calibration Standard

Phone: 281-474-5800

Fax: 281-474-5857

## CERTIFICATE OF ACCURACY: EPA Protocol Gas

### Assay Laboratory

SCOTT SPECIALTY GASES  
6141 EASTON ROAD, BLDG 1  
PLUMSTEADVILLE, PA 18949-0310

P.O. No.: SBS081602  
Project No.: 04-31628-001

### Customer

GOLDEN SPECIALTY CONSULTING, LTD  
GORDON GOSSETT  
931 SEACO COURT  
DEER PARK TX 77536

### ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM057489

Certification Date: 17Jan2005

Exp. Date: 17Jan2008

Cylinder Pressure\*\*\*: 2000 PSIG

### COMPONENT

### CERTIFIED CONCENTRATION (Moles)

### ANALYTICAL

### ACCURACY\*\*

### TRACEABILITY

CARBON DIOXIDE	7.01 %	+/- 1 %	Direct NIST and NMI
CARBON MONOXIDE	30.1 PPM	+/- 1 %	Direct NIST and NMI
NITROGEN	BALANCE		

\*\*\* Do not use when cylinder pressure is below 150 psig.

\*\* Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

### REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2000	01Jun2005	K026511	5.006 %	CARBON DIOXIDE
NTRM 1678	01Jun2006	ALM066465	49.16 PPM	CARBON MONOXIDE

### INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
MTI/M200/170927	10Jan2005	GC-TCD
SIEMENS/6E/KN-240	04Jan2005	NDIR

### ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis

Second Triad Analysis

Calibration Curve

#### CARBON DIOXIDE

Date: 12Jan2005 Response Unit: AREA

Z1 = 0.00000	R1 = 228926.0	T1 = 320089.0
R2 = 228936.0	Z2 = 0.00000	T2 = 320064.0
Z3 = 0.00000	T3 = 319971.0	R3 = 228703.0
Avg. Concentration: 7.010 %		



Concentration = A + Bx + Cx<sup>2</sup> + Dx<sup>3</sup> + Ex<sup>4</sup>

r = 0.999997 2000

Constants: A = 1.7342E-02

B = 2.1771E-05 C =

D = E =

#### CARBON MONOXIDE

Date: 07Jan2005 Response Unit: VOLTS

Z1 = 0.01430	R1 = 4.72450	T1 = 2.87180
R2 = 4.72010	Z2 = 0.01300	T2 = 2.87080
Z3 = 0.01420	T3 = 2.86730	R3 = 4.72640
Avg. Concentration: 30.10 PPM		

Date: 17Jan2005 Response Unit: VOLTS

Z1 = 0.00760	R1 = 4.85330	T1 = 2.95880
R2 = 4.85310	Z2 = 0.00290	T2 = 2.95790
Z3 = 0.00560	T3 = 2.95560	R3 = 4.84870
Avg. Concentration: 30.20 PPM		

Concentration = A + Bx + Cx<sup>2</sup> + Dx<sup>3</sup> + Ex<sup>4</sup>

r = 0.99979116 1678

Constants: A = .115274

B = 10.150546 C =

D = E =

APPROVED BY:

SUPERVISOR:





# Scott Specialty Gases

9810 BAY AREA BLVD, PASADENA, TX 77507

## RATA CLASS

### Dual-Analyzed Calibration Standard

Phone: 281-474-5800

Fax: 281-474-5857

## CERTIFICATE OF ACCURACY: EPA Protocol Gas

### Assay Laboratory

SCOTT SPECIALTY GASES  
9810 BAY AREA BLVD  
PASADENA, TX 77507

P.O. No.: SBS081602  
Project No.: 04-30594-007

### Customer

GOLDEN SPECIALTY CONSULTING, INC

GREG BURCH  
PO BOX 1898  
DEER PARK TX 77536

### ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: **ALM060663**  
Cylinder Pressure\*\*\*: 1800 PSIG

Certification Date: 13Dec2004

Exp. Date: 13Dec2007

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY**	TRACEABILITY
CARBON DIOXIDE	17.9 %	+/- 1%	Direct NIST and NMI
CARBON MONOXIDE	515 PPM	+/- 1%	Direct NIST and NMI
OXYGEN	19.9 %	+/- 1%	Direct NIST and NMI
NITROGEN	BALANCE		

\*\*\* Do not use when cylinder pressure is below 150 psig.

\*\* Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

### REFERENCE STANDARD

TYPE/CRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1875	04Jul2008	K000792	13.93 %	CARBON DIOXIDE
NTRM 2638	01Jun2008	ALM066506	4954. PPM	CARBON MONOXIDE
NTRM 2667	30Jun2007	AAI 067887	1.995 %	OXYGEN

### INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
MTI-A/M200/171109	07Dec2004	GAS CHROMATOGRAPHY
MTI-A/M200/171109	08Dec2004	GAS CHROMATOGRAPHY
MTI-A/M200/171109	01Dec2004	GAS CHROMATOGRAPHY

### ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

#### First Triad Analysis

##### CARBON DIOXIDE

Date: 13Dec2004 Response Unit: AREA  
Z1 = 7168.000 R1 = 49560.00 T1 = 63768.00  
R2 = 49563.00 Z2 = 7163.000 T2 = 63822.00  
Z3 = 7196.000 T3 = 63694.00 R3 = 49567.00  
Avg. Concentration: 17.92 %

#### Second Triad Analysis

Date: 20Dec2004 Response Unit: AREA  
Z1 = 7204.000 R1 = 49575.00 T1 = 63794.00  
R2 = 49502.00 Z2 = 7163.000 T2 = 63780.00  
Z3 = 7206.000 T3 = 63808.00 R3 = 49636.00  
Avg. Concentration: 17.93 %

#### Calibration Curve

Concentration = A + Bx + Cx2 + Dx3 + Ex4  
r = 0.99999596 1675  
Constants: A = 0.000282369  
B = -0.02728827 C =  
D = F =

##### CARBON MONOXIDE

Date: 13Dec2004 Response Unit: AREA  
Z1 = 18791.00 R1 = 197005.0 T1 = 19876.00  
R2 = 198883.0 Z2 = 18775.00 T2 = 19878.00  
Z3 = 18678.00 T3 = 19739.00 R3 = 198450.0  
Avg. Concentration: 513.5 PPM

Date: 20Dec2004 Response Unit: AREA  
Z1 = 18625.00 R1 = 196777.0 T1 = 19766.00  
R2 = 196517.0 Z2 = 18524.00 T2 = 19883.00  
Z3 = 18427.00 T3 = 19817.00 R3 = 196068.0  
Avg. Concentration: 517.2 PPM

Concentration = A + Bx + Cx2 + Dx3 + Ex4  
r = 0.99999838 2048  
Constants: A = 0.025009747  
B = 10.90503064 C =  
D = E =

##### OXYGEN

Date: 13Dec2004 Response Unit: AREA  
Z1 = 7364.000 R1 = 76897.00 T1 = 73079.00  
R2 = 76816.00 Z2 = 7404.000 T2 = 73103.00  
Z3 = 7388.000 T3 = 73079.00 R3 = 76866.00  
Avg. Concentration: 19.89 %

Date: 20Dec2004 Response Unit: AREA  
Z1 = 7398.000 R1 = 76949.00 T1 = 73150.00  
R2 = 76970.00 Z2 = 7450.000 T2 = 73176.00  
Z3 = 7504.000 T3 = 73194.00 R3 = 76945.00  
Avg. Concentration: 19.89 %

Concentration = A + Bx + Cx2 + Dx3 + Ex4  
r = 0.999997104 2659  
Constants: A = 0.000273558  
B = -0.028539115 C =  
D = E =

APPROVED BY:

JULIE CAO

SUPERVISOR:

SUSAN BRANDON



# Scott Specialty Gases

9810 BAY AREA BLVD, PASADENA, TX 77507

## RATA CLASS

### Dual-Analyzed Calibration Standard

Phone: 281-474-5800

Fax: 281-474-5857

## CERTIFICATE OF ACCURACY: EPA Protocol Gas

### Assay Laboratory

SCOTT SPECIALTY GASES  
9810 BAY AREA BLVD  
PASADENA, TX 77507

P.O. No.: SBS081602  
Project No.: 04-26478-004

### Customer

GOLDEN SPECIALTY CONSULTING, LTD

PO BOX 1898  
DEER PARK TX 77536

### ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM007660

Certification Date: 02Jun2004

Exp. Date: 02Jun2007

Cylinder Pressure\*\*\*: 2000 PSIG

### COMPONENT

OXYGEN  
NITROGEN

### CERTIFIED CONCENTRATION (Moles)

9.08 %  
BALANCE

### ANALYTICAL

### ACCURACY\*\*

+/- 1 %

### TRACEABILITY

Direct NIST and NMI

\*\*\* Do not use when cylinder pressure is below 150 psig.

\*\* Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

### REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2658	02Oct2006	ALM065073	9.930 %	OXYGEN

### INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#  
MTI-A/M200/171109

### DATE LAST CALIBRATED

01Jun2004

### ANALYTICAL PRINCIPLE

GAS CHROMATOGRAPHY

### ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis

Second Triad Analysis

Calibration Curve

### OXYGEN

Date: 02Jun2004 Response Unit: AREA

Z1 = 75.00000	R1 = 36372.00	T1 = 33253.00
R2 = 36280.00	Z2 = 108.0000	T2 = 33185.00
Z3 = 96.00000	T3 = 33124.00	R3 = 36229.00

Avg. Concentration: 9.080 %

Concentration = A + Bx + Cx2 + Dx3 + Ex4

r = 0.999991648

Constants: A = -0.029019805

B = 0.000273532 C =

D = E =

APPROVED BY:

DAVID KELLY

SUPERVISOR:

RAY PENDLETON



# Scott Specialty Gases

9810 BAY AREA BLVD, PASADENA, TX 77507

**RATA CLASS***Dual-Analyzed Calibration Standard*

Phone: 281-474-5800

Fax: 281-474-5857

## CERTIFICATE OF ACCURACY: EPA Protocol Gas

### Assay Laboratory

SCOTT SPECIALTY GASES  
9810 BAY AREA BLVD  
PASADENA, TX 77507P.O. No.: SBS081602  
Project No.: 04-33171-002

### Customer

GOLDEN SPECIALTY CONSULTING, LTD  
GORDPN GOSSETT  
931 SEACO COURT  
DEER PARK TX 77536

### ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay &amp; Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM001211

Certification Date: 10Feb2005

Exp. Date: 10Feb2008

Cylinder Pressure\*\*\*: 2000 PSIG

### COMPONENT

### CERTIFIED CONCENTRATION (Moles)

### ANALYTICAL

### ACCURACY\*\*

### TRACEABILITY

OXYGEN

4.96 %

+/- 1%

Direct NIST and NMI

NITROGEN

BALANCE

\*\*\* Do not use when cylinder pressure is below 150 psig.

\*\* Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

### REFERENCE STANDARD

#### TYPE/SRM NO.

#### EXPIRATION DATE

#### CYLINDER NUMBER

#### CONCENTRATION

#### COMPONENT

NTRM 2350

01Feb2008

XA5215

23.51 %

OXYGEN

### INSTRUMENTATION

#### INSTRUMENT/MODEL/SERIAL#

#### DATE LAST CALIBRATED

#### ANALYTICAL PRINCIPLE

MTI-A/M200/171109

28Jan2005

GAS CHROMATOGRAPHY

### ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis

Second Triad Analysis

Calibration Curve

### OXYGEN

Date: 10Feb2005 Response Unit: AREA

Z1 = 7392.000	R1 = 86260.00	T1 = 18229.00
R2 = 86101.00	Z2 = 7337.000	T2 = 18247.00
Z3 = 7331.000	T3 = 18222.00	R3 = 86094.00
Avg. Concentration: 4.962 %		

Concentration =  $A + Bx + Cx^2 + Dx^3 + Ex^4$   
 $r = 0.9999990$

Constants: A = -0.0132787

B = 0.000272977 C =

D = E =

APPROVED BY:

DAVID KELLY

SUPERVISOR:

RAY PENDLETON



# Scott Specialty Gases

9810 BAY AREA BLVD, PASADENA, TX 77507

## RATA CLASS

Dual-Analyzed Calibration Standard

Phone: 281-474-5800

Fax: 281-474-5857

### CERTIFICATE OF ACCURACY: Interference Free <sup>TM</sup> Multi-Component EPA Protocol Gas

#### Assay Laboratory

SCOTT SPECIALTY GASES  
9810 BAY AREA BLVD  
PASADENA, TX 77507

P.O. No.: SBS081602  
Project No.: 04-17813-003

#### Customer

GOLDEN SPECIALTY CONSULTING, INC  
PO BOX 1898  
DEER PARK TX 77536

#### ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM045194  
Cylinder Pressure\*\*\*: 1913 PSIG

Certification Date: 29Jul2003

Exp. Date: 28Jul2005

#### COMPONENT

SULFUR DIOXIDE \*  
NITROGEN

#### CERTIFIED CONCENTRATION (Moles)

181 PPM  
BALANCE

#### ANALYTICAL

#### ACCURACY\*\*

+/- 1%

#### TRACEABILITY

Direct NIST and NMI

\*\*\* Do not use when cylinder pressure is below 150 psig.

\*\* Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

\* This Protocol has been certified using corrected NIST SO2 standard values, per EPA guidance dated 7/24/96 and will not correlate with uncorrected Protocols.

#### REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM	01May2004	ALM017132	254.4 PPM	SO2/N2

#### INSTRUMENTATION

#### INSTRUMENT/MODEL/SERIAL#

FTIR System/8220/AAB9400260

#### DATE LAST CALIBRATED

28Jul2003

#### ANALYTICAL PRINCIPLE

FTIR

#### ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis

Second Triad Analysis

Calibration Curve

#### SULFUR DIOXIDE \*

Date: 20Jul2003	Response Unit: PPM
Z1 = -1.14620	R1 = 254.4118
T1 = 182.0358	
R2 = 254.5756	Z2 = -1.19170
T2 = 181.7935	
Z3 = -1.23640	T3 = 181.6475
R3 = 254.2125	
Avg. Concentration:	181.8 PPM

Date: 29Jul2003	Response Unit: PPM
Z1 = 1.81210	R1 = 254.0948
T1 = 181.3677	
R2 = 254.6413	Z2 = 1.73860
T2 = 181.7642	
Z3 = 2.65470	T3 = 181.8743
R3 = 254.4638	
Avg. Concentration:	181.7 PPM

Concentration = A + Bx + Cx<sup>2</sup> + Dx<sup>3</sup> + Ex<sup>4</sup>  
r = 0.999990  
Constants: A = 0.000000  
B = 1.000000 C = 0.000000  
D = 0.000000 E = 0.000000

APPROVED BY:

GARY WRIGHT

**RATA CLASS****Scott Specialty Gases****Dual-Analyzed Calibration Standard**

1290 COMBERMERE STREET, TROY, MI 48083

Phone: 248-589-2950

Fax: 248-589-2134

**CERTIFICATE OF ACCURACY: Interference Free <sup>TM</sup> EPA Protocol Gas****Assay Laboratory**SCOTT SPECIALTY GASES  
1290 COMBERMERE STREET  
TROY, MI 48083P.O. No.: 53021-71-65000  
Project No.: 05-14433-042**Customer**CLEAN AIR ENGINEERING  
DON ALLEN  
500 W. WOOD STREET  
PALATINE IL 60067**ANALYTICAL INFORMATION**

This certification was performed according to EPA Traceability Protocol For Assay &amp; Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM049276  
Cylinder Pressure\*\*\*: 1977 PSIG

Certification Date: 03Feb2004

Exp. Date: 02Feb2006

COMPONENT  
SULFUR DIOXIDE \*  
NITROGENCERTIFIED CONCENTRATION (Moles)  
98.87 PPM  
BALANCEANALYTICAL  
ACCURACY\*\*  
+/- 1%TRACEABILITY  
Direct NIST and NMI

\*\*\* Do not use when cylinder pressure is below 150 psig.

\*\* Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

\* This Protocol has been certified using corrected NIST SO2 standard values, per EPA guidance dated 7/24/96 and will not correlate with uncorrected Protocols.

**REFERENCE STANDARD**

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1694	01Sep2007	ALM054875	98.10 PPM	SO2/N2

**INSTRUMENTATION**INSTRUMENT/MODEL/SERIAL#  
FTIR System/8220/AAB9400262DATE LAST CALIBRATED  
05Jan2004ANALYTICAL PRINCIPLE  
Scott Enhanced FTIR**ANALYZER READINGS**

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis

Second Triad Analysis

Calibration Curve

**SULFUR DIOXIDE \***

Date: 27Jan2004	Response Unit: PPM		
Z1 = 0.12690	R1 = 98.23603	T1 = 98.84623	
R2 = 98.00211	Z2 = 0.16040	T2 = 98.46709	
Z3 = 0.40060	T3 = 98.54400	R3 = 98.06184	
Avg. Concentration:		98.62	PPM

Date: 03Feb2004	Response Unit: PPM		
Z1 = 0.04680	R1 = 98.10912	T1 = 99.52400	
R2 = 98.06901	Z2 = 0.85230	T2 = 98.94600	
Z3 = 0.60410	T3 = 98.87600	R3 = 98.12183	
Avg. Concentration:		99.11	PPM

Concentration = A + Bx + Cx2 + Dx3 + Ex4	
r = 0.999990	
Constants:	A = 0.000000
B = 1.000000	C = 0.000000
D = 0.000000	E = 0.000000

APPROVED BY

Scott King

## **APPENDIX F – FIELD DATA**

**REFERENCE METHOD**  
**Analyzer Calibration Error**

Project ID: 05LC142 Plant: Lyondell-Citgo Refining, LP Houston Source: TGU 440 Description: CEMS Compliance (CO, SO, H2S), Methods 1-4 Method 15	Test Date: 3-29-05	Analyst: GB
	Trailer Unit: 5	Analyzer System: Both
	Assigned Data: Compliance 1500	

Component	Cylinder Number	Range	Analyzer Response		Actual Conc.	Cylinder Exp. Date
			System 1	System 2		
Oxides of Nitrogen		High				
		Mid				
		Zero				
Nitrogen Dioxide		n/a				
Carbon Monoxide	ALM000641	High	91.0	95.3	90.2	6-13-06
	ALM000935	Mid	52.3	57.0	58.1	6-8-07
	ALM057489	Low	31.5	30.8	30.1	1-17-08
	AAL7981	Zero	0.0	-0.2	0.0	NA
Oxygen	ALM007660	High	9.08	9.10	9.08	6-2-07
	ALM001211	Mid	4.96	4.98	4.96	2-10-08
	AAL7981	Zero	-0.01	0.01	0.00	NA
Total Hydrocarbons		High				
		Mid				
		Low				
		Zero				
Sulfur Dioxide	ALM045194	High	180.7		181.0	7-28-05
	ALM049276	Mid	97.3		98.8	2-2-06
	AAL7981	Zero	0.2		0.0	NA
Carbon Dioxide	ALM060663	High	17.94		17.9	12-12-07
	ALM057489	Mid	7.12		7.01	1-17-08
	AAL7981	Zero	-0.05		0.0	NA

**ANALYZER INFORMATION**

Analyzer Type	SYSTEM #1			SYSTEM #2		
	Model	Serial #	Range	Model	Serial #	Range
NO <sub>x</sub>						
CO	300	1K09008	200	200	1L12019	200
O <sub>2</sub>	300	1K09008	25	200	1L12019	25
CO <sub>2</sub>	300	1K09008	25			
SO <sub>2</sub>	100AH	111	200			
VOC						

**REFERENCE METHOD**  
**Analyzer System Bias**

<b>Project ID: 05LC142</b> Plant: Lyondell-Citgo Refining, LP Houston Source: TGU 440 Description: CEMS Compliance (CO, SO, H2S), Methods 1-4 Method 15				Test Date(s): 3-29-05		Analyst: GB	
				Trailer Unit: 5		Analyzer System: Boil	
				Assigned Data: Compliance			

RUN NO:	Calibration Gas / Conc.	Pre-Test Calibration		Post Test Calibration		Bias <5% (Check)	Drift <3% Of Span
		ZERO	SPAN	ZERO	SPAN		
1							
Date:	NO <sub>x</sub> CO 100.1	1.8	30.4	4.8	33.2		
3-29-05	CO 100.1	1.0	31.5	4.0	34.5		
Start Time:	O <sub>2</sub> 4.96	0.01	4.96	0.00	4.96		
845	CO <sub>2</sub> 7.01	0.00	7.02	0.36	7.32		
End Time:	THC O <sub>2</sub> 4.96	0.03	4.96	0.03	4.97		
955	SO <sub>2</sub> 181	0.5	183.5	-1.0	183.9		
2							
Date:	NO <sub>x</sub>	4.8	33.2	4.8	32.0		
3-28-05	CO	4.0	34.5	6.8	36.8		
Start Time:	O <sub>2</sub>	0.00	4.96	0.01	4.96		
1011	CO <sub>2</sub>	0.36	7.32	0.47	7.40		
End Time:	THC	0.03	4.97	0.02	4.98		
1111	SO <sub>2</sub>	-1.0	183.9	-0.8	185.9		
3							
Date:	NO <sub>x</sub>	8.7	32.0	3.6	31.8		
3-28-05	CO	6.8	36.8	3.2	33.8		
Start Time:	O <sub>2</sub>	0.01	4.96	0.01	4.96		
1128	CO <sub>2</sub>	0.47	7.40	-0.04	6.92		
End Time:	THC	0.02	4.98	0.03	4.97		
1228	SO <sub>2</sub>	-0.8	185.9	-0.7	186.6		
Date:	NO <sub>x</sub>						
	CO						
Start Time:	O <sub>2</sub>						
	CO <sub>2</sub>						
End Time:	THC						
	SO <sub>2</sub>						
Date:	NO <sub>x</sub>						
	CO						
Start Time:	O <sub>2</sub>						
	CO <sub>2</sub>						
End Time:	THC						
	SO <sub>2</sub>						

<b>Comments:</b> 1500							
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## FIELD DATA SHEET 2

## Velocity Head, Temperature, and Stack Pressure Measurements

Client/Plant Name LER Job # \_\_\_\_\_  
 City/State HOUSTON, TX Date 3/29/05  
 Test Location/Run # 152 ~~130~~ <sup>60</sup> 440 Personnel GB, GV, SW

**Note:** Ensure that pitot tube is aligned parallel to the stack or duct axis.

Pitot Tube ID #	AST84A	
Pitot Tube Coefficient ( $C_p$ )	.84	
$\Delta p$ Gauge Sensitivity		
Barometric Pressure ( $P_b$ ) (in. Hg)	29.82	
Test Location Elevation Difference from Bar., (positive if higher) (B) (ft)	62'	
Corr $P_b = P_b - 0.001 B$ (in. Hg)	29.76	
( <input checked="" type="checkbox"/> ) Piezometer ( <input checked="" type="checkbox"/> Type S)		
Static Pressure ( $P_s$ ) -1.5 (in. H <sub>2</sub> O)		
Post-test Leak Check: Side	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Pressure Tap $\Delta p$ 3 (in. H <sub>2</sub> O)		
Stable for 15 seconds? (YES NO)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Pitot Tube Condition:		
Damaged?		
Post-test Intercomponent Spacing:		

Level/Zero Checks: Mark Pt. #'s with an asterisk (\*)

#1 Velocity Traverses #2					
Start Time:			Finish Time:		
Pt. #	$\Delta p$ in. H <sub>2</sub> O	Temp. °F	Pt. #	$\Delta p$ in. H <sub>2</sub> O	Temp. °F
1-1	.33	464	1-1	.34	461
2	.30	464	2	.31	463
3	.26	464	3	.28	464
4	.24	463	4	.25	464
5	.20	462	5	.22	463
6	.19	460	6	.22	460
2-1	.34	461	2-1	.33	459
2	.31	462	2	.28	461
3	.29	464	3	.30	462
4	.26	464	4	.24	463
5	.22	464	5	.19	462
6	.20	463	6	.20	460
Average:					

1. 11.8  
 2. 19.0  
 3. 29.5  
 4. 58.2  
 5. 68.7  
 6. 75.9

## QA/QC Check

Completeness            Legibility            Accuracy            Specifications            Reasonableness           

Checked by:            3/29/05

Personnel (Signature/Date)

Team Leader (Signature/Date)

## FIELD DATA SHEET 2

## Velocity Head, Temperature, and Stack Pressure Measurements

Client/Plant Name LCR Job # \_\_\_\_\_City/State Houston, TX Date 3/29/05Test Location/Run # 3 ~~430~~ 60 440° Personnel AB, GV, SW**Note:** Ensure that pitot tube is aligned parallel to the stack or duct axis.

Pitot Tube ID #	<u>GST84A</u>
Pitot Tube Coefficient ( $C_p$ )	<u>.84</u>
$\Delta p$ Gauge Sensitivity	
Barometric Pressure ( $P_b$ ) (in. Hg)	<u>29.82</u>
Test Location Elevation Difference from Bar., (positive if higher) (B) (ft)	<u>62'</u>
Corr $P_b = P_b - 0.001 B$ (in. Hg)	<u>29.76</u>
( <input checked="" type="checkbox"/> ) Piezometer ( <input checked="" type="checkbox"/> Type S)	
Static Pressure ( $P_s$ ) <u>-1.5</u> (in. H <sub>2</sub> O)	
Post-test Leak Check: Side <u>A</u> <u>4</u>	
Pressure Tap $\Delta p$ <u>3</u> (in. H <sub>2</sub> O)	
Stable for 15 seconds? ( <input checked="" type="checkbox"/> yes <input type="checkbox"/> no)	
Pitot Tube Condition: Damaged? Post-test Intercomponent Spacing:	

Level/Zero Checks: Mark Pt. #'s with an asterisk (\*)

#3 Velocity Traverses

Start Time:			Finish Time:		
Pt. #	$\Delta p$ in. H <sub>2</sub> O	Temp. °F	Pt. #	$\Delta p$ in. H <sub>2</sub> O	Temp. °F
<u>1-1</u>	<u>.34</u>	<u>466</u>			
<u>2</u>	<u>.33</u>	<u>462</u>			
<u>3</u>	<u>.30</u>	<u>464</u>			
<u>4</u>	<u>.28</u>	<u>464</u>			
<u>5</u>	<u>.26</u>	<u>463</u>			
<u>6</u>	<u>.22</u>	<u>460</u>			
<u>2-1</u>	<u>.36</u>	<u>458</u>			
<u>2</u>	<u>.34</u>	<u>461</u>			
<u>3</u>	<u>.33</u>	<u>464</u>			
<u>4</u>	<u>.30</u>	<u>464</u>			
<u>5</u>	<u>.29</u>	<u>462</u>			
<u>6</u>	<u>.26</u>	<u>456</u>			
Average:					

## QA/QC Check

Completeness            Legibility            Accuracy            Specifications            Reasonableness           Checked by [Signature] 3/29/05

Personnel (Signature/Date)

Team Leader (Signature/Date)

**FIELD DATA SHEET 4**  
Moisture Content (Reference)

Client/Plant Name ICR Job # \_\_\_\_\_

City/State HOUSTON, TX Date 3/28/05

Test Location/Run # 1 440 H300 Personnel GIB, GV, SW

Dry Gas Meter Cal Factor, Y = 0.999  
START 0845 - 0945 495.915

VAR. 4

Trav. Pt.	Samplg Time (min)	Stk Temp (°F)	ΔH (in. H <sub>2</sub> O)	Vol. Rdg, V <sub>m</sub> (cf)	ΔV (cf)	% Dev (≤10%)	DGM Temp., t <sub>m</sub>		Imp. Temp. °F
							In, °F	Out, °F	
1	5	NA	1.70	499.50			77	71	60
2	10			502.35			80	72	60
3	15			505.59			82	73	59
4	20			508.98			83	75	60
5	25			512.05			84	76	61
6	30			515.27			84	77	62
7	35			518.49			85	77	62
8	40			521.88			85	78	62
9	45			524.93			86	78	63
10	50			528.15			86	79	63
11	55			531.35			87	80	64
12	60			534.580			87	80	64
		NA	1.70	Avg: 138.665					

post 122K check .001 @ 15

**Analytical Data**

	Impinger Volume (mL)	Silica gel weight (g)
Final	V <sub>f</sub> 1230 I <sub>2</sub> 110 I <sub>3</sub> 0	W <sub>f</sub> 331.4
Initial	V <sub>i</sub> 100 100 0	W <sub>i</sub> 320.4
Difference		

$$V_{wc(std)} = 0.04707 (V_f - V_i)$$

$$V_{wsg(std)} = 0.04715 (W_f - W_i)$$

$$V_{m(std)} = 17.64 Y \frac{V_m P_m}{(t_m + 460)}$$

$$B_{ws} = \frac{V_{wc(std)} + V_{wsg(std)}}{V_{wc(std)} + V_{wsg(std)} + V_{m(std)}}$$

**QA/QC Check**

Completeness ✓ Legibility ✓ Accuracy ✓ Specifications ✓ Reasonableness ✓

Checked by: [Signature] 3/29/05

Personnel (Signature/Date)

Team Leader (Signature/Date)

**FIELD DATA SHEET 4**  
**Moisture Content (Reference)**

Client/Plant Name LCR Job # \_\_\_\_\_

City/State HOUSTON, TX Date 3/29/05

Test Location/Run # 2 #430 (AN) 440 Personnel GB, GV, SW

Dry Gas Meter Cal Factor, Y = 0.999 1011 - 1111 534.625 Val 2

Trav. Pt.	Samplg Time (min)	Stk Temp (°F)	$\Delta H$ (in. H <sub>2</sub> O)	Vol. Rdg, V <sub>m</sub> (cf)	$\Delta V$ (cf)	% Dev ( $\leq 10\%$ ?)	DGM Temp., t <sub>m</sub>		Imp. Temp. °F
							In, °F	Out, °F	
1	5	NA	1.70				90	83	59
2	10								60
3	15								60
4	20			548.33			90	83	61
5	25			551.73			90	83	61
6	30			555.14			90	83	61
7	35			558.54			90	83	62
8	40			561.45			91	85	62
9	45			564.86			91	85	62
10	50			568.74			91	85	62
11	55			572.16			92	85	63
12	60	NA	1.70	575.590			93	86	63
				Avg: <u>540.965</u>					4

100% Check 0.001 @ 24

**Analytical Data**

	Impinger Volume (mL)	Silica gel weight (g)
Final	V <sub>f</sub> <u>I<sub>1</sub> 100 I<sub>2</sub> 100 I<sub>3</sub> 0</u>	W <sub>f</sub> <u>310.6</u>
Initial	V <sub>i</sub> <u>100 100 0</u>	W <sub>i</sub> <u>301.4</u>
Difference		

$$V_{wc(std)} = 0.04707 (V_f - V_i)$$

$$V_{wsg(std)} = 0.04715 (W_f - W_i)$$

$$V_{m(std)} = 17.64 Y \frac{V_m P_m}{(t_m + 460)}$$

$$B_{ws} = \frac{V_{wc(std)} + V_{wsg(std)}}{V_{wc(std)} + V_{wsg(std)} + V_{m(std)}}$$

QA/QC Check  
 Completeness ☒

Legibility ☒

Accuracy ☒

Specifications ☒

Reasonableness ☒

Checked by: [Signature] 3/29/05

Personnel (Signature/Date)

Team Leader (Signature/Date)

**FIELD DATA SHEET 4**  
**Moisture Content (Reference)**

Client/Plant Name ICR Job # \_\_\_\_\_City/State HOUSTON, TX Date 3/28/05Test Location/Run # 3 ~~130~~ 440 <sup>1500</sup> Personnel GB, GV, SWDry Gas Meter Cal Factor, Y = 0.987 1A 2  
1128 - 1228 575.640

Trav. Pt.	Sample Time (min)	Stk Temp (°F)	ΔH (in. H <sub>2</sub> O)	Vol. Rdg, V <sub>m</sub> (cf)	ΔV (cf)	% Dev (≤10%)	DGM Temp., t <sub>m</sub>		Imp. Temp. °F
							In, °F	Out, °F	
1	5	NA	1.70	579.15			89	84	60
2	10			580.62			91	85	60
3	15			584.09			92	85	61
4	20			589.54			93	86	62
5	25			592.99			94	87	62
6	30			596.71			94	87	62
7	35			599.88			94	87	63
8	40			603.33			93	87	63
9	45			606.89			93	87	63
10	50			610.19			93	87	63
11	55			613.60			93	87	64
12	60			617.00			93	87	64
		NA	1.70	Avg: 41.37					

129K Check .001 @ 13  
 Final .000 @ 8

**Analytical Data**

	Impinger Volume (mL)	Silica gel weight (g)
Final	V <sub>f</sub> <u>I<sub>1</sub><sup>280</sup> I<sub>2</sub><sup>110</sup> I<sub>3</sub> 0</u>	W <sub>f</sub> <u>388.4</u>
Initial	V <sub>i</sub> <u>100 106 0</u>	W <sub>i</sub> <u>373.4</u>
Difference		

$$V_{wc(std)} = 0.04707 (V_f - V_i)$$

$$V_{wsg(std)} = 0.04715 (W_f - W_i)$$

$$V_{m(std)} = 17.64 Y \frac{V_m P_m}{(t_m + 460)}$$

$$B_{ws} = \frac{V_{wc(std)} + V_{wsg(std)}}{V_{wc(std)} + V_{wsg(std)} + V_{m(std)}}$$

QA/QC Check  
 Completeness ✓

Legibility ✓Accuracy ✓Specifications ✓Reasonableness ✓Checked by: [Signature]

Personnel (Signature/Date)

Team Leader (Signature/Date)

3/29/05

**REFERENCE METHOD**  
**Analyzer System Bias**

Project ID: <b>05EQCV278</b> Plant: <b>Equistar- Channelview</b> Source: <b>Unit: 13 DIESEL ENGINES</b> Description: <b>117.534 for Minor Sources</b> <b>Est. Dates 2/28/2005 to 3/11/2005</b>				Test Date(s): <b>3-29-05</b>		Analyst: <b>GD</b>	
				Trailer Unit: <b>5</b>		Analyzer System: <b>Dot4</b>	
				Assigned Data: <b>Compliance 1475</b>			

RUN NO:	Calibration Gas / Conc.	Pre-Test Calibration		Post Test Calibration		Bias <5% (Check)	Drift <3% Of Span
		ZERO	SPAN	ZERO	SPAN		
1	<del>NO<sub>x</sub></del> CO #2	3.6	31.8	2.6	31.2		
Date: 3-29-05	CO	3.2	33.8	3.0	33.2		
Start Time: 1255	O <sub>2</sub>	0.01	4.96	0.01	4.96		
	CO <sub>2</sub>	-0.04	6.92	-0.12	6.40		
End Time: 1350	THC O <sub>2</sub> #2	0.03	4.97	0.00	4.96		
	SO <sub>2</sub>	-0.2	186.6	-0.2	186.7		
2	<del>NO<sub>x</sub></del> CO #2	2.6	31.2	2.8 4.0	32.2		
Date: 3-29-05	CO	3.0	33.2	2.8	33.8		
Start Time: 1413	O <sub>2</sub>	0.01	4.96	-0.01	4.97		
	CO <sub>2</sub>	-0.12	6.40	-0.2	6.35		
End Time: 1510	THC O <sub>2</sub> #2	0.00	4.96	0.01	4.97		
	SO <sub>2</sub>	-0.2	186.7	-0.3	186.7		
3	<del>NO<sub>x</sub></del> CO	4.0	32.2	3.2	31.8		
Date: 3-29-05	CO	3.8	33.8	3.9	33.2		
Start Time: 1524	O <sub>2</sub>	-0.01	4.97	0.01	4.96		
	CO <sub>2</sub>	-0.2	6.35	-0.13	6.32		
End Time: 1624	THC CO <sub>2</sub> N/A	0.01	4.97	0.01	4.94		
	SO <sub>2</sub>	-0.3	186.7	-0.3	186.1		
	<del>NO<sub>x</sub></del> CO						
Date:	CO						
Start Time:	O <sub>2</sub>						
	CO <sub>2</sub>						
End Time:	THC						
	SO <sub>2</sub>						
	<del>NO<sub>x</sub></del> CO						
Date:	CO						
Start Time:	O <sub>2</sub>						
	CO <sub>2</sub>						
End Time:	THC						
	SO <sub>2</sub>						

Comments:

## FIELD DATA SHEET 2

## Velocity Head, Temperature, and Stack Pressure Measurements

Client/Plant Name LCR Job # \_\_\_\_\_City/State HOUSTON, TX Date 3/29/05Test Location/Run # 440 1475° Personnel GB, GV, SW**Note:** Ensure that pitot tube is aligned parallel to the stack or duct axis.

Pitot Tube ID #	G5T84A	
Pitot Tube Coefficient ( $C_p$ )	-84	
$\Delta p$ Gauge Sensitivity		
Barometric Pressure ( $P_b$ ) (in. Hg)	29.82	
Test Location Elevation Difference from Bar., (positive if higher) (B) (ft)	62	
Corr $P_b = P_b - 0.001 B$ (in. Hg)	29.76	
( <input checked="" type="checkbox"/> ) Piezometer ( <input checked="" type="checkbox"/> Type S)		
Static Pressure ( $P_s$ ) -1.5 (in. H <sub>2</sub> O)		
Post-test Leak Check: 30 Side A <input checked="" type="checkbox"/> B <input checked="" type="checkbox"/>		
Pressure Tap $\Delta p$ 3 (in. H <sub>2</sub> O)		
Stable for 15 seconds? ( <del>Yes</del> No) Y Y		
Pitot Tube Condition:		
Damaged?		
Post-test Intercomponent Spacing:		

Level/Zero Checks: Mark Pt. #'s with an asterisk (\*)

Velocity Traverses					
Start Time:			Finish Time:		
Pt. #	$\Delta p$ in. H <sub>2</sub> O	Temp. °F	Pt. #	$\Delta p$ in. H <sub>2</sub> O	Temp. °F
1-1	.38	450	1-1	.36	454
2	.36	452	2	.34	458
3	.33	454	3	.30	460
4	.29	456	4	.29	462
5	.26	458	5	.24	464
6	.22	462	6	.22	464
2-1	.36	458	2-1	.34	463
2	.34	460	2	.34	464
3	.30	461	3	.33	462
4	.28	462	4	.30	460
5	.22	464	5	.24	457
6	.20	464	6	.24	458
Average:					

## QA/QC Check

Completeness            Legibility            Accuracy            Specifications            Reasonableness           Checked by: [Signature] 3/29/05  
Personnel (Signature/Date)

Team Leader (Signature/Date)

## FIELD DATA SHEET 2

### Velocity Head, Temperature, and Stack Pressure Measurements

Client/Plant Name ICR Job # \_\_\_\_\_  
City/State Houston, TX Date 3/29/05  
Test Location/Run # 440 1475° Personnel GB, GV, SW

**Note:** Ensure that pitot tube is aligned parallel to the stack or duct axis.

Pitot Tube ID #	AST84A		
Pitot Tube Coefficient ( $C_p$ )	.84		
$\Delta p$ Gauge Sensitivity			
Barometric Pressure ( $P_b$ ) (in. Hg)	29.82		
Test Location Elevation Difference from Bar., (positive if higher) (B) (ft)	12		
Corr $P_b = P_b - 0.001 B$ (in. Hg)	29.76		
<input checked="" type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Type S			
Static Pressure ( $P_a$ ) (in. $H_2O$ )	-1.5		
Post-test Leak Check:	Side	A <input checked="" type="checkbox"/>	B <input checked="" type="checkbox"/>
Pressure Tap $\Delta p$ (in. $H_2O$ )	3		
Stable for 15 seconds?	<del>(Yes/No)</del>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Pitot Tube Condition: Damaged? Post-test Intercomponent Spacing:			

Level/Zero Checks: Mark Pt. #'s with an asterisk (\*)

Velocity Traverses					
Start Time:			Finish Time:		
Pt. #	$\Delta p$ in. H <sub>2</sub> O	Temp. °F	Pt. #	$\Delta p$ in. H <sub>2</sub> O	Temp. °F
1-1	.37	453			
2	.34	454			
3	.31	458			
4	.29	462			
5	.26	464			
6	.24	464			
2-1	.36	460			
2	.34	462			
3	.30	464			
4	.29	463			
5	.26	462			
6	.26	461			
Average:					

**QA/QC Check**

QA/QC Check  
Completeness / Legibility / Accuracy / Specifications / Reasonableness /

Checked by: W. D. Ne 3/29/05

Team Leader (Signature/Date)



**FIELD DATA SHEET 4**  
**Moisture Content (Reference)**

Client/Plant Name LCR Job # \_\_\_\_\_

City/State HOUSTON, TX Date 3/29/05

Test Location/Run # 1 1475 Personnel GB, Gr, SW

Dry Gas Meter Cal Factor, Y = 0.999  
1255 - 1355 617.080 VAR. 4

Trav. Pt.	Sample Time (min)	Stk Temp (°F)	ΔH (in. H <sub>2</sub> O)	Vol. Rdg, V <sub>m</sub> (cf)	ΔV (cf)	% Dev (≤10%?)	DGM Temp., t <sub>m</sub>		Imp. Temp. °F
							In, °F	Out, °F	
1	5	NA	1.70	620.29			89	86	60
2	10			623.48			90	86	60
3	15			626.64			91	86	61
4	20			630.03			91	86	61
5	25			633.00			90	85	60
6	30			636.42			90	85	60
7	35			639.31			90	85	60
8	40			642.45			91	85	61
9	45			645.59			91	85	62
10	50			648.73			91	85	63
11	55			651.86			90	85	64
12	60	NA	1.70	654.795			90	85	64
				Avg:					

leak check - 001 @ 15  
 final leak check - 001 @ 10

**Analytical Data**

	Impinger Volume (mL)	Silica gel weight (g)
Final	V <sub>f</sub> I <sub>1</sub> 296 I <sub>2</sub> 11 I <sub>3</sub> 0	W <sub>f</sub> 301.6
Initial	V <sub>i</sub> 100 100 0	W <sub>i</sub> 297.3
Difference		

$$V_{wc(std)} = 0.04707 (V_f - V_i)$$

$$V_{wsg(std)} = 0.04715 (W_f - W_i)$$

$$V_{m(std)} = 17.64 Y \frac{V_m P_m}{(t_m + 460)}$$

$$B_{ws} = \frac{V_{wc(std)} + V_{wsg(std)}}{V_{wc(std)} + V_{wsg(std)} + V_{m(std)}}$$

**QA/QC Check**

Completeness ✓ Legibility ✓ Accuracy ✓ Specifications ✓ Reasonableness ✓

Checked by: GB 3/29/05

Personnel (Signature/Date)

Team Leader (Signature/Date)

**FIELD DATA SHEET 4**  
**Moisture Content (Reference)**

 Client/Plant Name LCR Job # \_\_\_\_\_

 City/State HOUSTON, TX Date 3/29/05

 Test Location/Run # 2 1475 Personnel GB, GV, SW

 Dry Gas Meter Cal Factor, Y = 0.999 1413 - 1513 654.925 VAC - 3

Trav. Pt.	Samplg Time (min)	Stk Temp (°F)	$\Delta H$ (in. H <sub>2</sub> O)	Vol. Rdg, V <sub>m</sub> (cf)	$\Delta V$ (cf)	% Dev ( $\leq 10\%$ )	DGM Temp., t <sub>m</sub>		Imp. Temp. °F
							In, °F	Out, °F	
1	5	NA	1.70	658.21			87	82	60
2	10			661.31			88	82	60
3	15			664.47			88	82	61
4	20			667.84			88	82	60
5	25			671.65			88	82	60
6	30			674.11			87	82	59
7	35			677.41			87	82	60
8	40			679.88			87	81	60
9	45			683.65			87	81	61
10	50			686.44			87	80	62
11	55			689.56			86	81	62
12	60	NA	1.70	692.675			86	81	63
				Avg:					

 Tank Check 1001 @ 15  
 Final 1000 @ 9

**Analytical Data**

	Impinger Volume (mL)	Silica gel weight (g)
Final	V <sub>f</sub> <u>I<sub>1</sub> 230 I<sub>2</sub> 115 I<sub>3</sub> 0</u>	W <sub>f</sub> <u>317.4</u>
Initial	V <sub>i</sub> <u>100 100 0</u>	W <sub>i</sub> <u>311.0</u>
Difference		

$$V_{wc(std)} = 0.04707 (V_f - V_i)$$

$$V_{wsg(std)} = 0.04715 (W_f - W_i)$$

$$V_{m(std)} = 17.64 Y \frac{V_m P_m}{(t_m + 460)}$$

$$B_{ws} = \frac{V_{wc(std)} + V_{wsg(std)}}{V_{wc(std)} + V_{wsg(std)} + V_{m(std)}}$$

 QA/QC Check  
 Completeness 0

 Legibility 0

 Accuracy 0

 Specifications 0

 Reasonableness 0

Checked by:

Personnel (Signature/Date)

Team Leader (Signature/Date)

**FIELD DATA SHEET 4**  
Moisture Content (Reference)

Client/Plant Name ICR Job # \_\_\_\_\_City/State HOUSTON, TX Date 3/29/05Test Location/Run # 3 1475 Personnel GB, GV, SWDry Gas Meter Cal Factor, Y = 991 692.725 VAR 4  
1524 - 6624

Trav. Pt.	Samplg Time (min)	Stk Temp (°F)	ΔH (in. H <sub>2</sub> O)	Vol. Rdg, V <sub>m</sub> (cf)	ΔV (cf)	% Dev (≤10%?)	DGM Temp., t <sub>m</sub>		Imp. Temp. °F
							In, °F	Out, °F	
1	5	NA	1.70	695.87			83	79	60
2	10			699.12			84	79	61
3	15			700.36			85	79	60
4	20			705.60			85	79	60
5	25			708.91			85	79	61
6	30			712.31			86	78	60
7	35			715.28			86	78	61
8	40			718.86			86	79	62
9	45			721.73			86	78	62
10	50			724.95			86	78	63
11	55			728.12			86	78	63
12	60	NA	1.70	731.33			86	78	64
				Avg:					

120K Check .001 @ 15  
Final 120K Check .000 @ 6

## Analytical Data

	Impinger Volume (mL)	Silica gel weight (g)
Final	V <sub>f</sub> I <sub>1</sub> <sup>215</sup> I <sub>2</sub> <sup>110</sup> I <sub>3</sub> <sup>0</sup>	W <sub>f</sub> 287.6
Initial	V <sub>i</sub>	W <sub>i</sub> 282.3
Difference		

$$V_{wc(std)} = 0.04707 (V_f - V_i)$$

$$V_{wsg(std)} = 0.04715 (W_f - W_i)$$

$$V_{m(std)} = 17.64 Y \frac{V_m P_m}{(t_m + 460)}$$

$$B_{ws} = \frac{V_{wc(std)} + V_{wsg(std)}}{V_{wc(std)} + V_{wsg(std)} + V_{m(std)}}$$

QA/QC Check  
Completeness

Legibility

Accuracy

Specifications

Reasonableness

Checked by:

Personnel (Signature/Date)

Team Leader (Signature/Date)

**REFERENCE METHOD**  
**Analyzer System Bias**

<b>Project ID: 05LC142</b> Plant: Lyondell-Citgo Refining, LP Houston Source: TGU 440 Description: CEMS Compliance (CO, SO, H2S), Methods 1-4 Method 15				Test Date(s): <div style="font-size: 1.2em;">3-30-05</div>		Analyst: <div style="font-size: 1.2em;">GB / SCW</div>	
				Trailer Unit: <div style="font-size: 1.2em;">5</div>		Analyzer System: <div style="font-size: 1.2em;">B&amp;H 11</div>	
				Assigned Data: <div style="font-size: 1.2em;">Compliance</div>			

RUN NO:	Calibration Gas / Conc.	Pre-Test Calibration ZERO	Pre-Test Calibration SPAN	Post Test Calibration ZERO	Post Test Calibration SPAN	Bias <5% (Check)	Drift <3% Of Span
1							
Date:	NO <sub>x</sub> CO	0.4	28.6				
3-30-05	CO	-0.2	29.8				
Start Time:	O <sub>2</sub>	0.01	4.96				
	CO <sub>2</sub>	-0.17	6.37				
End Time:	THC	0.02	4.97				
	SO <sub>2</sub>	-1.4	183.9				
1							
Date:	NO <sub>x</sub> CO-2	-0.6	28.6	-0.2	28.0		
3-30-05	CO	-0.2	29.8	0.0	29.8		
Start Time:	O <sub>2</sub>	0.00	4.96	-0.01	4.96		
10:06	CO <sub>2</sub>	-0.01	6.59	-0.28	6.54		
End Time:	THC O <sub>2</sub> -2	0.01	4.91	0.01	4.96		
11:06	SO <sub>2</sub>	-1.2	183.3	-1.1	183.4		
2							
Date:	NO <sub>x</sub> CO-2	-0.2	28.0	-6.6	29.8		
3-30-05	CO	0.0	29.8	-4.0	29.5		
Start Time:	O <sub>2</sub>	-0.01	4.96	-0.01	4.94		
11:21	CO <sub>2</sub>	-0.28	6.54	-0.02	6.76		
End Time:	THC O <sub>2</sub> -2	0.01	4.96	0.01	4.92		
12:21	SO <sub>2</sub>	-1.1	183.4	-1.6	183.4		
3							
Date:	NO <sub>x</sub> CO-2	-6.6	29.8	10.9	23.6		
3-30-05	CO	-4.0	29.5	-6.0	28.8		
Start Time:	O <sub>2</sub>	-0.01	4.94	0.00	4.92		
1234	CO <sub>2</sub>	-0.02	6.76	-0.05	6.75		
End Time:	THC O <sub>2</sub> -2	0.01	4.92	-0.01	4.94		
1334	SO <sub>2</sub>	-1.6	183.4	-1.4	184.1		
Date:	NO <sub>x</sub>						
	CO						
Start Time:	O <sub>2</sub>						
	CO <sub>2</sub>						
End Time:	THC						
	SO <sub>2</sub>						

Comments: #150° 1458

**FIELD DATA SHEET 4**  
**Moisture Content (Reference)**

Client/Plant Name LCR Job # \_\_\_\_\_City/State HOUSTON, TX Date 3/30/05Test Location/Run # 1 1458° Personnel GV, SWDry Gas Meter Cal Factor, Y = 0.997 731.545 VAC. 4  
1006 - 1104

Trav. Pt.	Samplg Time (min)	Stk Temp (°F)	ΔH (in. H <sub>2</sub> O)	Vol. Rdg, V <sub>m</sub> (cf)	ΔV (cf)	% Dev (≤10%)	DGM Temp., t <sub>m</sub>		Imp. Temp. °F
							In, °F	Out, °F	
1	5	NA	1.70	734.97			88	82	59
2	10			738.36			90	82	59
3	15			741.75			92	83	60
4	20			745.14			94	84	60
5	25			748.53			95	85	60
6	30			751.92			97	86	61
7	35			754.83			92	87	61
8	40			758.68			91	87	62
9	45			762.05			92	87	62
10	50			765.44			92	88	63
11	55			768.77			92	89	64
12	60	NA	1.70	772.130			93	89	64
				Avg: (40.885)					

Test Check .001 @ 16

## Analytical Data

	Impinger Volume (mL)	Silica gel weight (g)
Final	V <sub>f</sub> <u>112.22</u> <u>114</u> <u>110</u>	W <sub>f</sub> <u>283.2</u>
Initial	V <sub>i</sub> <u>100</u> <u>100</u> <u>0</u>	W <sub>i</sub> <u>277.7</u>
Difference		

$$V_{wc(std)} = 0.04707 (V_f - V_i)$$

$$V_{wsg(std)} = 0.04715 (W_f - W_i)$$

$$V_{m(std)} = 17.64 Y \frac{V_m P_m}{(t_m + 460)}$$

$$B_{ws} = \frac{V_{wc(std)} + V_{wsg(std)}}{V_{wc(std)} + V_{wsg(std)} + V_{m(std)}}$$

## QA/QC Check

Completeness ☒ Legibility ☒ Accuracy ☒ Specifications ☒ Reasonableness ☒Checked by: [Signature] 3/30/05

Personnel (Signature/Date)

Team Leader (Signature/Date)

**FIELD DATA SHEET 4**  
**Moisture Content (Reference)**

Client/Plant Name LCR Job # \_\_\_\_\_City/State HOUSTON, TX Date 3/30/05Test Location/Run # 2 1458° Personnel GV, SWDry Gas Meter Cal Factor, Y = 0.999  
1121 - 1221 772.215 VAR. 4

Trav. Pt.	Samplg Time (min)	Stk Temp (°F)	$\Delta H$ (in. H <sub>2</sub> O)	Vol. Rdg, V <sub>m</sub> (cf)	$\Delta V$ (cf)	% Dev ( $\leq 10\%$ )	DGM Temp., t <sub>m</sub>		Imp. Temp. °F
							In, °F	Out, °F	
1	5	NA	1.70	776.22			92	90	60
2	10			780.26			94	90	60
3	15			784.32			95	91	61
4	20			788.14			95	91	61
5	25			792.10			95	91	61
6	30			796.07			95	91	62
7	35			800.04			95	92	62
8	40			803.99			94	91	63
9	45			807.94			94	91	63
10	50			812.22			94	91	63
11	55			815.83			94	90	63
12	60			819.740			94	90	63
		NA	1.70	Avg: (47.585)					

Leak Check .001 @ 13

## Analytical Data

	Impinger Volume (mL)	Silica gel weight (g)
Final	V <sub>f</sub> <u>120</u> <u>110</u> <u>0</u>	W <sub>f</sub> <u>315.0</u>
Initial	V <sub>i</sub> <u>100</u> <u>100</u> <u>0</u>	W <sub>i</sub> <u>298.5</u>
Difference		

$$V_{wc(std)} = 0.04707 (V_f - V_i)$$

$$V_{wsg(std)} = 0.04715 (W_f - W_i)$$

$$V_{m(std)} = 17.64 Y \frac{V_m P_m}{(t_m + 460)}$$

$$B_{ws} = \frac{V_{wc(std)} + V_{wsg(std)}}{V_{wc(std)} + V_{wsg(std)} + V_{m(std)}}$$

## QA/QC Check

Completeness ✓Legibility ✓Accuracy ✓Specifications ✓Reasonableness ✓Checked by: [Signature]3/30/05

Personnel (Signature/Date)

Team Leader (Signature/Date)

**FIELD DATA SHEET 4**  
**Moisture Content (Reference)**

Client/Plant Name LCR Job # \_\_\_\_\_

City/State HOUSTON, TX Date 3/30/05

Test Location/Run # 3 1458 Personnel GV, SW

Dry Gas Meter Cal Factor, Y = 0.997 819.815 Var 3  
1234 - 1334

Trav. Pt.	Samplg Time (min)	Stk Temp (°F)	ΔH (in. H <sub>2</sub> O)	Vol. Rdg, V <sub>m</sub> (cf)	ΔV (cf)	% Dev (≤10%?)	DGM Temp., t <sub>m</sub>		Imp. Temp. °F
							In, °F	Out, °F	
1	5	NA	1.70	823.82			92	89	60
2	10			827.79			94	90	59
3	15			831.81			95	91	60
4	20			835.70			95	91	61
5	25			839.97			95	91	62
6	30			842.80			96	91	62
7	35			846.34			96	92	61
8	40			849.87			97	92	61
9	45			853.45			96	92	62
10	50			856.94			95	92	62
11	55			860.45			95	91	63
12	60			863.965			95	92	64
		NA	1.70	Avg: 844.15					

Test Check .001 @ 15  
 Final Legn Chem .001 @ 16

**Analytical Data**

	Impinger Volume (mL)	Silica gel weight (g)
Final	V <sub>i</sub> 112.26 I <sub>2</sub> 112 I <sub>3</sub> 0	W <sub>i</sub> 284.6
Initial	V <sub>i</sub> 100 100 0	W <sub>i</sub> 274.1
Difference		

$$V_{wc(std)} = 0.04707 (V_i - V_i)$$

$$V_{wsg(std)} = 0.04715 (W_i - W_i)$$

$$V_{m(std)} = 17.64 Y \frac{V_m P_m}{(t_m + 460)}$$

$$B_{ws} = \frac{V_{wc(std)} + V_{wsg(std)}}{V_{wc(std)} + V_{wsg(std)} + V_{m(std)}}$$

QA/QC Check

Completeness

Legibility

Accuracy

Specifications

Reasonableness

Checked by:

Personnel (Signature/Date)

Team Leader (Signature/Date)

## FIELD DATA SHEET 2

### Velocity Head, Temperature, and Stack Pressure Measurements

Client/Plant Name ICR Job # \_\_\_\_\_

City/State HOUSTON, TX Date 3/30/05

Test Location/Run # 1458<sup>0</sup> Personnel GV, SW

**Note:** Ensure that pitot tube is aligned parallel to the stack or duct axis.

Pitot Tube ID #	GST 84A		
Pitot Tube Coefficient ( $C_p$ )	.84		
$\Delta p$ Gauge Sensitivity			
Barometric Pressure ( $P_b$ ) (in. Hg)	29.75		
Test Location Elevation Difference from Bar., (positive if higher) (B) (ft)	62		
Corr $P_b = P_b - 0.001 B$ (in. Hg)	29.69		
<input checked="" type="checkbox"/> Piezometer <input checked="" type="checkbox"/> Type S			
Static Pressure ( $P_o$ ) - 1.5 (in. $H_2O$ )			
Post-test Leak Check:	Side	A <input checked="" type="checkbox"/>	B <input checked="" type="checkbox"/>
Pressure Tap $\Delta p$ 3 (in. $H_2O$ )			
Stable for 15 seconds? (Yes, No)	Y <input checked="" type="checkbox"/> N <input type="checkbox"/>		
Pitot Tube Condition: Damaged? <input type="checkbox"/> Post-test Intercomponent Spacing:			

Level/Zero Checks: Mark Pt. #'s with an asterisk (\*)

[illegible]

**QA/QC Check**

Completeness ✓ Legibility ✓ Accuracy ✓ Specifications ✓ Reasonableness ✓

Checked by:

Personnel (Signature/Date)

Team Leader (Signature/Date)



**Note:** Ensure that pitot tube is aligned parallel to the stack or duct axis.

Level/Zero Checks: Mark Pt. #'s with an asterisk (\*)

#3 Velocity Traverses

Pt. #	$\Delta p$ in. H <sub>2</sub> O	Temp. $^{\circ}$ F	Pt. #	$\Delta p$ in. H <sub>2</sub> O	Temp. $^{\circ}$ F
1 - 1	.31	440			
2	.28	442			
3	.26	444			
4	.22	448			
5	.20	448			
6	.18	448			
2-1	.30	446			
2	.29	448			
3	.24	448			
4	.22	447			
5	.19	446			
6	.16	446			
Average:					

Team Leader (Signature/Date)

## **APPENDIX G – REFERENCE METHOD DATA LISTING**

Date	Time	NO <sub>x</sub> _1	CO_1	CO2	O <sub>2</sub> _1	SO <sub>2</sub>	NOx_2	CO_2	O2_2	ADC Temp	Calibration Status
Compliance System						Backup System					
		ppm	%	%	%	%	ppm	%	degF	degF	
03/29/05	7:37:00	19.26	64.47	3.98	2.63	98.22	18.98	69.8	1.89	77.62	
03/29/05	7:38:00	18.97	67.88	3.97	2.71	96.85	18.57	72.6	2.06	77.61	
03/29/05	7:39:00	11.68	74.19	3.91	3.03	110.12	12.72	60.4	1.88	77.61	
03/29/05	7:40:00	-0.65	68.18	3.88	3.03	55.26	17.58	93.9	2.29	77.61	Calibrating Compliance System
03/29/05	7:41:00	-0.65	67.96	3.86	4.42	7.90	17.44	101.0	2.37	77.61	Calibrating Compliance System
03/29/05	7:42:00	-0.65	67.87	3.85	7.56	6.31	2.37	13.0	0.25	77.54	Calibrating Both Systems
03/29/05	7:43:00	-0.65	67.80	3.83	10.41	4.95	0.22	-2.1	0.00	77.43	Calibrating Both Systems
03/29/05	7:44:00	-0.65	67.64	3.80	12.53	3.24	0.25	-2.2	0.00	77.46	Calibrating Both Systems
03/29/05	7:45:00	-0.65	67.60	3.78	14.13	1.49	5.31	21.2	0.69	77.49	Calibrating Compliance System
03/29/05	7:46:00	-0.65	67.60	3.76	15.37	0.90	16.45	81.1	2.13	77.49	Calibrating Compliance System
03/29/05	7:47:00	-0.64	67.37	3.74	16.32	2.24	16.06	66.7	1.97	77.48	Calibrating Compliance System
03/29/05	7:48:00	-0.65	67.43	3.72	17.08	2.38	2.97	8.4	1.74	77.43	Calibrating Both Systems
03/29/05	7:49:00	-0.65	67.39	3.70	17.69	0.83	16.58	87.4	3.46	77.42	Calibrating Compliance System
03/29/05	7:50:00	-0.65	67.47	3.68	18.19	1.91	5.07	28.2	15.97	77.31	Calibrating Compliance System
03/29/05	7:51:00	-0.65	67.48	3.66	18.60	1.02	0.28	-2.2	20.86	77.32	Calibrating Both Systems
03/29/05	7:52:00	-0.65	67.32	3.64	18.93	-0.36	0.36	-1.9	20.83	77.37	Calibrating Both Systems
03/29/05	7:53:00	-0.65	67.38	3.62	19.20	-0.56	3.00	8.5	18.29	77.43	Calibrating Compliance System
03/29/05	7:54:00	-0.65	67.41	3.60	19.43	-0.35	6.35	20.8	15.06	77.49	Calibrating Compliance System
03/29/05	7:55:00	-0.66	67.35	3.59	19.62	-0.23	14.64	63.9	6.79	77.53	Calibrating Compliance System
03/29/05	7:56:00	-0.65	67.33	3.57	19.77	0.55	16.41	76.8	5.11	77.53	Calibrating Compliance System
03/29/05	7:57:00	-0.65	67.34	3.55	19.90	1.11	15.65	72.7	5.95	77.58	Calibrating Compliance System
03/29/05	7:58:00	-0.65	67.40	3.54	20.00	1.39	16.01	67.7	5.83	77.60	Calibrating Compliance System
03/29/05	7:59:00	-0.65	67.40	3.52	20.10	1.72	17.70	75.1	4.31	77.61	Calibrating Compliance System
03/29/05	8:00:00	-0.66	67.35	3.51	20.17	2.42	17.19	76.1	4.78	77.61	Calibrating Compliance System
03/29/05	8:01:00	-0.66	67.30	3.49	20.23	2.70	16.68	73.6	5.24	77.61	Calibrating Compliance System
03/29/05	8:02:00	-0.65	67.30	3.48	20.28	3.44	16.12	67.7	5.73	77.65	Calibrating Compliance System
03/29/05	8:03:00	-0.65	67.38	3.47	20.32	4.58	17.03	70.0	5.03	77.68	Calibrating Compliance System
03/29/05	8:04:00	3.16	67.07	3.34	18.33	5.67	16.92	68.7	5.15	77.88	
03/29/05	8:05:00	20.10	80.58	3.68	2.39	86.05	16.75	71.9	5.19	77.97	
03/29/05	8:06:00	0.47	8.36	-0.93	-0.02	24.07	1.18	6.0	0.35	77.98	Calibrating Both Systems
03/29/05	8:07:00	-0.64	-0.75	-0.07	-0.04	2.05	0.33	-0.7	0.02	78.06	Calibrating Both Systems
03/29/05	8:08:00	-0.65	0.74	-0.06	0.02	-0.24	2.77	0.6	1.32	78.06	Calibrating Both Systems
03/29/05	8:09:00	-0.65	1.10	-0.05	0.32	-1.83	0.88	-0.5	9.07	78.06	Calibrating Both Systems
03/29/05	8:10:00	-0.01	1.09	-0.03	4.28	3.73	12.74	39.4	6.68	78.08	Calibrating Compliance System
03/29/05	8:11:00	11.95	42.70	2.36	4.25	45.80	16.60	68.0	5.47	78.13	
03/29/05	8:12:00	0.06	0.69	-0.13	9.07	9.26	0.53	3.2	9.05	78.20	Calibrating Both Systems
03/29/05	8:13:00	-0.23	-1.03	-0.16	8.22	-1.23	0.22	0.3	8.57	78.28	Calibrating Both Systems
03/29/05	8:14:00	-0.30	-0.48	-0.19	4.96	-1.59	-0.06	0.5	4.98	78.33	Calibrating Both Systems
03/29/05	8:15:00	-0.06	30.56	4.20	2.22	-1.79	0.08	29.7	2.68	78.34	Calibrating Both Systems
03/29/05	8:16:00	-0.18	58.35	7.35	-0.02	-1.74	0.05	58.9	0.01	78.34	Calibrating Both Systems
03/29/05	8:17:00	-0.29	62.22	5.89	0.00	-1.99	6.50	61.9	0.02	78.32	Calibrating Both Systems
03/29/05	8:18:00	1.87	116.19	2.96	3.51	0.46	3.23	117.8	2.77	78.41	Calibrating Compliance System
03/29/05	8:19:00	-0.30	544.35	18.57	19.83	1.57	0.01	563.3	19.87	78.43	Calibrating Both Systems
03/29/05	8:20:00	-0.36	130.66	8.31	1.93	-1.63	-0.05	140.9	3.24	78.41	Calibrating Both Systems
03/29/05	8:21:00	0.92	32.99	7.00	0.26	-0.73	-0.05	29.9	0.01	78.42	Calibrating Both Systems
03/29/05	8:22:00	1.93	36.32	6.84	0.19	15.34	0.68	32.0	0.28	78.39	Calibrating Both Systems
03/29/05	8:23:00	-0.03	5.59	0.37	0.01	56.10	14.67	61.3	6.27	78.42	Calibrating Compliance System
03/29/05	8:24:00	0.00	0.33	0.17	0.05	98.39	16.16	62.2	6.10	78.41	Calibrating Compliance System
03/29/05	8:25:00	-0.32	0.18	0.16	0.00	164.14	16.06	66.8	6.12	78.25	Calibrating Compliance System
03/29/05	8:26:00	-0.29	0.22	0.14	0.00	173.63	16.01	67.2	6.02	78.16	Calibrating Compliance System
03/29/05	8:27:00	-0.21	0.31	0.13	0.00	173.61	16.43	76.0	5.56	78.18	Calibrating Compliance System

Date	Time	NO <sub>x</sub> _1	CO_1	CO2	O <sub>2</sub> _1	SO <sub>2</sub>	NO <sub>x</sub> _2	CO_2	O <sub>2</sub> _2	ADC Temp	Calibration Status
Compliance System						Backup System					
		ppm	%	%	%	%	ppm	%	degF	degF	
03/29/05	8:28:00	-0.41	0.21	0.11	-0.01	126.96	16.21	64.0	5.96	78.15	Calibrating Compliance System
03/29/05	8:29:00	1.16	1.30	0.31	0.40	119.61	16.70	68.7	5.56	78.17	Calibrating Compliance System
03/29/05	8:30:00	1.09	9.11	0.39	0.11	89.53	16.51	73.2	5.73	78.16	Calibrating Compliance System
03/29/05	8:31:00	-0.32	0.31	0.06	0.00	96.59	15.94	69.0	6.25	78.27	Calibrating Compliance System
03/29/05	8:32:00	-0.24	0.95	0.08	0.01	74.62	8.09	35.5	2.14	78.40	Calibrating Compliance System
03/29/05	8:33:00	-0.45	0.62	0.02	4.07	8.63	0.14	1.8	3.87	78.47	Calibrating Both Systems
03/29/05	8:34:00	-0.46	16.90	4.39	1.67	1.97	0.06	17.5	2.00	78.47	Calibrating Both Systems
03/29/05	8:35:00	-0.22	19.36	3.46	0.02	4.88	0.14	18.8	0.09	78.50	Calibrating Both Systems
03/29/05	8:36:00	-0.56	0.84	0.01	0.00	2.67	-0.02	1.8	0.02	78.51	Calibrating Both Systems
03/29/05	8:37:00	-0.47	0.87	0.02	0.01	89.27	10.03	41.8	8.54	78.55	Calibrating Compliance System
03/29/05	8:38:00	-0.55	0.58	-0.03	0.00	177.32	12.07	49.0	9.69	78.56	Calibrating Compliance System
03/29/05	8:39:00	2.14	3.30	0.49	0.31	183.44	12.63	50.6	9.24	78.55	Calibrating Compliance System
03/29/05	8:40:00	18.83	80.51	4.34	2.08	119.74	12.22	52.8	9.64	78.51	
03/29/05	8:41:00	19.06	80.15	4.35	2.08	103.45	12.20	51.6	9.61	78.51	
03/29/05	8:42:00	19.43	77.97	4.38	2.03	100.41	12.46	50.1	9.49	78.51	
03/29/05	8:43:00	19.26	73.91	4.38	2.08	99.81	12.18	47.0	9.70	78.52	
03/29/05	8:44:00	18.83	87.79	4.31	2.42	99.01	12.80	59.0	9.10	78.53	
03/29/05	8:45:00	19.06	81.99	4.39	2.14	97.71	16.99	70.6	5.13	78.59	
03/29/05	8:46:00	18.88	82.56	4.39	2.24	100.50	11.76	52.5	10.09	78.65	
03/29/05	8:47:00	19.02	80.61	4.39	2.28	100.57	11.28	48.1	10.52	78.81	
03/29/05	8:48:00	19.19	75.47	4.42	2.21	99.93	11.35	44.9	10.50	78.91	
03/29/05	8:49:00	19.15	80.45	4.44	2.19	100.28	11.38	48.2	10.46	78.96	
03/29/05	8:50:00	18.75	83.35	4.40	2.40	100.60	11.25	50.0	10.45	78.95	
03/29/05	8:51:00	18.06	79.54	4.21	3.17	96.56	12.03	53.3	9.75	78.96	
03/29/05	8:52:00	18.24	80.15	4.26	3.06	94.59	11.68	51.9	10.10	78.96	
03/29/05	8:53:00	17.32	79.24	4.09	3.70	92.92	11.36	52.3	10.27	78.97	
03/29/05	8:54:00	16.78	75.34	3.98	4.43	90.78	6.05	29.7	15.49	78.98	
03/29/05	8:55:00	12.09	54.76	2.92	9.03	70.76	0.06	3.0	20.90	79.04	Calibrating Backup System
03/29/05	8:56:00	11.01	46.35	2.64	10.10	61.33	0.00	3.1	20.91	79.19	Calibrating Backup System
03/29/05	8:57:00	12.57	48.88	3.01	8.53	64.83	2.04	9.3	19.04	79.30	Calibrating Backup System
03/29/05	8:58:00	15.46	58.81	3.64	5.71	74.58	13.97	51.7	7.96	79.40	
03/29/05	8:59:00	19.10	79.65	4.50	2.25	104.69	20.67	83.4	2.02	79.41	
03/29/05	9:00:00	19.16	82.32	4.51	2.24	108.65	20.67	85.7	2.02	79.41	
03/29/05	9:01:00	19.13	83.38	4.53	2.18	111.28	20.58	86.6	2.03	79.42	
03/29/05	9:02:00	19.31	82.14	4.55	2.15	112.13	20.76	85.2	2.01	79.66	
03/29/05	9:03:00	19.31	78.08	4.57	2.14	113.45	20.72	81.1	2.01	79.86	
03/29/05	9:04:00	19.26	77.55	4.59	2.12	115.09	20.74	80.4	2.00	79.86	
03/29/05	9:05:00	19.29	75.55	4.58	2.18	111.44	20.96	78.0	2.00	79.87	
03/29/05	9:06:00	19.21	73.97	4.58	2.21	111.89	20.86	76.7	2.02	80.11	
03/29/05	9:07:00	19.32	73.33	4.62	2.18	113.44	20.92	75.7	1.99	80.29	
03/29/05	9:08:00	19.19	79.62	4.63	2.16	115.20	20.81	84.0	2.00	80.31	
03/29/05	9:09:00	19.28	80.33	4.64	2.20	116.62	20.88	82.0	2.04	80.32	
03/29/05	9:10:00	19.15	79.90	4.64	2.21	117.34	20.73	83.4	2.07	80.49	
03/29/05	9:11:00	18.89	79.24	4.62	2.28	118.99	20.49	81.9	2.16	80.69	
03/29/05	9:12:00	18.93	86.65	4.64	2.29	119.14	20.51	89.1	2.17	80.75	
03/29/05	9:13:00	19.00	79.22	4.64	2.32	119.31	20.63	82.2	2.14	80.76	
03/29/05	9:14:00	19.07	79.47	4.67	2.26	120.28	20.64	82.0	2.13	80.76	
03/29/05	9:15:00	18.73	89.76	4.65	2.32	120.77	20.33	93.7	2.20	80.76	
03/29/05	9:16:00	18.77	89.55	4.66	2.30	120.34	20.31	92.6	2.19	80.83	
03/29/05	9:17:00	18.78	86.73	4.65	2.35	120.64	20.32	89.3	2.21	81.06	
03/29/05	9:18:00	18.99	86.51	4.69	2.30	121.19	20.50	90.1	2.18	81.19	

Date	Time	NO <sub>x</sub> _1	CO_1	CO2	O <sub>2</sub> _1	SO <sub>2</sub>	NOx_2	CO_2	O2_2	ADC Temp	Calibration Status
Compliance System						Backup System					
		ppm	%	%	%	%	ppm	%	degF	degF	
03/29/05	9:19:00	18.73	92.17	4.67	2.37	121.69	20.34	95.9	2.21	81.21	
03/29/05	9:20:00	18.72	88.44	4.67	2.38	121.41	20.29	91.6	2.23	81.21	
03/29/05	9:21:00	18.76	85.52	4.69	2.35	121.04	20.29	88.5	2.24	81.21	
03/29/05	9:22:00	19.13	85.21	4.72	2.34	121.90	20.65	88.1	2.17	81.33	
03/29/05	9:23:00	19.14	81.43	4.73	2.33	122.11	20.67	84.5	2.16	81.56	
03/29/05	9:24:00	19.31	76.03	4.75	2.31	121.99	20.80	77.6	2.16	81.65	
03/29/05	9:25:00	19.24	81.01	4.76	2.28	122.70	20.70	83.8	2.16	81.66	
03/29/05	9:26:00	19.32	78.92	4.76	2.30	122.88	20.81	81.3	2.15	81.66	
03/29/05	9:27:00	19.26	76.85	4.76	2.30	122.93	20.74	78.8	2.16	81.76	
03/29/05	9:28:00	6.44	74.70	4.74	2.30	124.28	20.56	80.5	2.16	81.86	
03/29/05	9:29:00	-0.65	73.46	4.72	2.43	45.71	20.27	85.7	2.20	82.00	Calibrating Compliance System
03/29/05	9:30:00	-0.65	73.57	4.71	4.30	37.27	20.22	87.0	2.20	82.03	Calibrating Compliance System
03/29/05	9:31:00	-0.65	73.62	4.69	9.14	35.26	20.29	87.4	2.20	82.04	Calibrating Compliance System
03/29/05	9:32:00	-0.65	73.64	4.67	13.28	32.68	20.56	85.7	2.14	82.08	Calibrating Compliance System
03/29/05	9:33:00	-0.65	73.66	4.65	15.70	66.91	20.67	78.5	2.11	82.04	Calibrating Compliance System
03/29/05	9:34:00	-0.02	73.73	4.62	16.98	66.55	21.00	74.0	2.03	81.91	Calibrating Compliance System
03/29/05	9:35:00	10.30	68.35	4.45	2.81	113.45	21.08	70.9	1.99	81.81	
03/29/05	9:36:00	19.98	67.44	4.67	2.05	125.04	21.00	70.3	1.94	81.72	
03/29/05	9:37:00	20.06	68.58	4.65	2.08	128.41	21.01	71.2	1.92	81.68	
03/29/05	9:38:00	20.02	74.93	4.64	2.05	129.70	20.91	78.9	1.92	81.66	
03/29/05	9:39:00	19.92	77.76	4.63	2.08	130.51	20.86	81.7	1.93	81.66	
03/29/05	9:40:00	20.10	77.29	4.65	2.00	131.45	20.99	78.3	1.87	81.66	
03/29/05	9:41:00	20.17	74.74	4.66	1.95	132.26	21.02	76.9	1.84	81.66	
03/29/05	9:42:00	20.36	71.32	4.68	1.95	132.53	21.25	73.6	1.82	81.66	
03/29/05	9:43:00	20.37	68.66	4.69	1.94	132.45	21.26	70.8	1.79	81.66	
03/29/05	9:44:00	20.20	73.20	4.67	1.98	132.19	21.16	76.4	1.80	81.66	
03/29/05	9:45:00	20.09	74.44	4.68	1.99	132.53	21.03	76.5	1.84	81.66	
03/29/05	9:46:00	20.15	72.20	4.69	1.98	133.38	21.01	76.1	1.82	81.66	
03/29/05	9:47:00	20.24	73.57	4.72	1.89	133.26	21.18	76.5	1.74	81.66	
03/29/05	9:48:00	20.46	68.36	4.74	1.82	132.60	21.29	70.6	1.70	81.66	
03/29/05	9:49:00	20.49	72.39	4.75	1.80	133.16	21.29	75.1	1.70	81.66	
03/29/05	9:50:00	20.15	79.65	4.73	1.90	133.81	21.06	82.4	1.79	81.66	
03/29/05	9:51:00	20.29	95.37	4.77	1.94	134.72	21.12	99.5	1.81	81.66	
03/29/05	9:52:00	20.84	85.65	4.83	1.84	135.27	21.69	88.1	1.71	81.66	
03/29/05	9:53:00	21.61	65.49	4.88	1.71	136.51	22.36	67.0	1.57	81.66	
03/29/05	9:54:00	21.67	54.83	4.89	1.69	135.42	22.48	57.0	1.51	81.66	
03/29/05	9:55:00	21.37	53.38	4.88	1.64	134.08	22.22	54.8	1.49	81.70	
03/29/05	9:56:00	20.97	47.54	4.83	1.63	134.45	21.65	48.7	1.54	81.66	
03/29/05	9:57:00	4.19	8.36	0.55	4.59	54.72	0.59	9.3	4.66	81.66	Calibrating Backup System
03/29/05	9:58:00	-0.40	4.78	0.74	4.60	4.05	0.12	5.6	4.71	81.68	Calibrating Both Systems
03/29/05	9:59:00	-0.51	34.05	7.30	0.00	0.94	0.02	33.5	0.01	81.97	Calibrating Both Systems
03/29/05	10:00:00	-0.55	29.93	5.76	0.00	0.06	0.03	27.9	0.01	81.87	Calibrating Both Systems
03/29/05	10:01:00	-0.56	4.04	0.40	0.01	-0.20	0.00	4.8	0.02	82.04	Calibrating Both Systems
03/29/05	10:02:00	-0.59	4.21	0.38	0.01	-0.82	-0.01	5.0	0.02	82.02	Calibrating Both Systems
03/29/05	10:03:00	-0.39	4.30	0.40	0.03	-0.98	2.34	8.7	0.18	82.04	Calibrating Both Systems
03/29/05	10:04:00	-0.55	3.96	0.34	0.01	137.05	21.53	69.9	1.49	82.09	Calibrating Compliance System
03/29/05	10:05:00	-0.57	4.03	0.32	0.01	177.86	21.64	60.4	1.50	82.09	Calibrating Compliance System
03/29/05	10:06:00	-0.57	3.96	0.29	0.01	182.34	21.49	63.8	1.52	82.11	Calibrating Compliance System
03/29/05	10:07:00	7.84	23.89	2.02	0.72	175.50	21.45	71.9	1.53	82.11	
03/29/05	10:08:00	20.66	68.30	4.70	1.64	138.22	21.53	70.7	1.52	82.11	
03/29/05	10:09:00	20.61	65.49	4.69	1.64	135.43	21.43	67.3	1.53	82.11	

Date	Time	NO <sub>x</sub> _1	CO_1	CO2	O <sub>2</sub> _1	SO <sub>2</sub>	NO <sub>x</sub> _2	CO_2	O <sub>2</sub> _2	ADC Temp	Calibration Status
Compliance System						Backup System					
		ppm	%	%	%	%	ppm	%	degF	degF	
03/29/05	10:10:00	20.45	75.76	4.67	1.71	133.69	21.28	77.9	1.58	82.11	
03/29/05	10:11:00	20.46	67.51	4.68	1.64	132.33	21.23	69.0	1.55	82.11	
03/29/05	10:12:00	20.69	64.95	4.71	1.61	132.85	21.46	66.7	1.50	82.12	
03/29/05	10:13:00	20.64	61.62	4.71	1.65	133.48	21.47	63.2	1.50	82.15	
03/29/05	10:14:00	20.46	67.20	4.70	1.69	133.56	21.30	69.5	1.56	82.16	
03/29/05	10:15:00	20.37	72.47	4.69	1.70	132.52	21.16	74.6	1.59	82.26	
03/29/05	10:16:00	20.41	70.19	4.69	1.71	133.15	21.19	71.3	1.58	82.38	
03/29/05	10:17:00	20.66	65.65	4.74	1.68	132.90	21.45	68.2	1.56	82.33	
03/29/05	10:18:00	20.82	68.52	4.77	1.61	133.63	21.56	70.0	1.51	82.46	
03/29/05	10:19:00	20.66	65.59	4.75	1.68	133.51	21.47	67.4	1.53	82.54	
03/29/05	10:20:00	20.44	68.77	4.74	1.70	133.36	21.23	70.8	1.59	82.56	
03/29/05	10:21:00	20.51	67.30	4.76	1.67	132.91	21.29	69.5	1.56	82.56	
03/29/05	10:22:00	20.53	63.75	4.76	1.70	133.45	21.34	65.9	1.55	82.56	
03/29/05	10:23:00	20.58	64.28	4.76	1.72	133.80	21.40	66.1	1.56	82.57	
03/29/05	10:24:00	20.42	68.70	4.77	1.64	134.91	21.17	69.8	1.56	82.56	
03/29/05	10:25:00	20.46	63.28	4.77	1.68	135.08	21.25	65.2	1.54	82.59	
03/29/05	10:26:00	20.67	62.01	4.81	1.60	135.18	21.41	63.7	1.48	82.60	
03/29/05	10:27:00	20.68	57.90	4.82	1.61	134.57	21.44	59.7	1.45	82.56	
03/29/05	10:28:00	20.54	62.76	4.82	1.51	134.50	21.23	64.3	1.42	82.66	
03/29/05	10:29:00	20.66	59.71	4.82	1.49	135.31	21.40	61.8	1.34	82.76	
03/29/05	10:30:00	20.84	56.46	4.85	1.42	136.58	21.60	58.5	1.27	82.72	
03/29/05	10:31:00	20.90	52.58	4.85	1.39	136.72	21.65	54.5	1.23	82.82	
03/29/05	10:32:00	21.15	53.51	4.89	1.30	137.31	21.79	54.9	1.18	82.79	
03/29/05	10:33:00	20.92	57.74	4.87	1.33	136.69	21.61	59.9	1.23	82.85	
03/29/05	10:34:00	21.08	57.92	4.89	1.30	137.30	21.77	59.3	1.20	82.69	
03/29/05	10:35:00	21.03	57.36	4.91	1.29	137.39	21.74	59.1	1.18	82.84	
03/29/05	10:36:00	21.00	57.67	4.91	1.31	136.86	21.72	59.6	1.17	82.93	
03/29/05	10:37:00	21.09	52.94	4.92	1.30	137.05	21.80	54.2	1.18	82.96	
03/29/05	10:38:00	21.02	55.58	4.92	1.29	137.72	21.73	57.5	1.19	83.01	
03/29/05	10:39:00	20.99	56.28	4.93	1.27	138.05	21.68	58.0	1.17	83.01	
03/29/05	10:40:00	21.37	49.67	4.97	1.20	138.27	22.04	50.8	1.11	83.01	
03/29/05	10:41:00	21.19	49.24	4.95	1.25	138.26	21.93	50.7	1.10	83.01	
03/29/05	10:42:00	20.98	49.38	4.93	1.29	137.79	21.68	50.9	1.16	83.01	
03/29/05	10:43:00	20.94	46.38	4.94	1.31	137.64	21.70	48.0	1.13	83.01	
03/29/05	10:44:00	20.95	49.67	4.94	1.24	138.80	21.65	50.9	1.13	83.01	
03/29/05	10:45:00	20.89	49.47	4.93	1.25	139.33	21.56	51.1	1.16	83.01	
03/29/05	10:46:00	20.77	50.21	4.90	1.37	141.40	21.50	52.3	1.21	83.01	
03/29/05	10:47:00	20.51	54.74	4.87	1.38	144.71	21.22	57.1	1.24	83.01	
03/29/05	10:48:00	20.48	54.23	4.88	1.36	145.24	21.26	56.6	1.18	83.01	
03/29/05	10:49:00	20.66	51.98	4.91	1.26	146.00	21.31	53.9	1.15	83.01	
03/29/05	10:50:00	20.68	52.84	4.92	1.27	143.88	21.35	54.6	1.16	83.03	
03/29/05	10:51:00	20.55	52.37	4.91	1.29	144.27	21.21	54.5	1.19	83.02	
03/29/05	10:52:00	20.52	57.11	4.89	1.34	143.64	21.28	59.3	1.18	83.02	
03/29/05	10:53:00	20.70	56.29	4.92	1.27	142.38	21.35	58.4	1.16	83.06	
03/29/05	10:54:00	20.82	52.40	4.94	1.25	142.67	21.56	54.3	1.11	83.14	
03/29/05	10:55:00	21.12	50.92	4.96	1.20	143.45	21.78	52.7	1.09	83.19	
03/29/05	10:56:00	21.11	52.72	4.95	1.23	142.61	21.76	55.1	1.12	83.27	
03/29/05	10:57:00	21.03	52.24	4.97	1.18	143.04	21.72	54.1	1.08	83.29	
03/29/05	10:58:00	21.03	55.70	4.97	1.20	142.89	21.69	57.5	1.10	83.41	
03/29/05	10:59:00	20.87	56.78	4.95	1.26	142.04	21.60	59.2	1.12	83.44	
03/29/05	11:00:00	21.08	55.19	4.97	1.22	141.54	21.79	57.0	1.12	83.46	

Date	Time	NO <sub>x</sub> _1	CO_1	CO2	O <sub>2</sub> _1	SO <sub>2</sub>	NO <sub>x</sub> _2	CO_2	O <sub>2</sub> _2	ADC Temp	Calibration Status
		Compliance System					Backup System				
		ppm	%	%	%	%	ppm	%	degF	degF	
03/29/05	11:01:00	21.14	54.55	4.99	1.24	142.25	21.83	56.7	1.11	83.46	
03/29/05	11:02:00	20.91	55.42	4.97	1.27	141.94	21.68	58.3	1.10	83.46	
03/29/05	11:03:00	21.10	52.02	5.00	1.19	143.27	21.80	53.8	1.09	83.46	
03/29/05	11:04:00	21.05	51.56	4.97	1.24	141.60	21.78	53.7	1.09	83.46	
03/29/05	11:05:00	21.06	52.15	4.98	1.22	141.65	21.78	54.3	1.08	83.46	
03/29/05	11:06:00	20.97	50.81	4.97	1.22	141.53	21.63	52.9	1.13	83.46	
03/29/05	11:07:00	20.78	55.65	4.94	1.30	141.93	21.46	58.1	1.17	83.47	
03/29/05	11:08:00	20.88	58.12	4.97	1.23	142.32	21.54	60.3	1.14	83.48	
03/29/05	11:09:00	21.00	53.77	4.97	1.25	142.62	21.74	55.8	1.10	83.51	
03/29/05	11:10:00	21.05	53.92	4.98	1.26	142.07	21.78	55.9	1.13	83.65	
03/29/05	11:11:00	21.21	53.19	5.00	1.22	142.50	21.90	55.0	1.11	83.84	
03/29/05	11:12:00	20.91	53.94	4.98	1.26	141.92	21.65	56.1	1.14	83.88	
03/29/05	11:13:00	20.49	57.33	4.91	1.30	142.87	21.57	59.7	1.17	83.89	
03/29/05	11:14:00	0.18	12.72	0.65	4.71	47.84	0.99	14.1	4.57	83.91	Calibrating Both Systems
03/29/05	11:15:00	-0.56	6.58	0.50	4.97	2.62	0.04	8.1	4.98	83.91	Calibrating Both Systems
03/29/05	11:16:00	-0.46	22.12	4.75	1.72	1.17	0.02	23.2	2.13	83.91	Calibrating Both Systems
03/29/05	11:17:00	-0.58	36.37	7.40	0.00	0.20	0.00	36.8	0.01	83.91	Calibrating Both Systems
03/29/05	11:18:00	-0.60	36.52	7.40	0.00	-0.25	0.00	36.9	0.00	83.91	Calibrating Both Systems
03/29/05	11:19:00	-0.48	15.28	1.71	0.03	-0.04	0.02	16.3	0.02	83.91	Calibrating Both Systems
03/29/05	11:20:00	-0.60	6.74	0.49	0.02	-0.69	0.00	8.7	0.02	83.92	Calibrating Both Systems
03/29/05	11:21:00	-0.52	5.95	0.48	0.03	-0.91	-0.01	8.1	0.02	83.93	Calibrating Both Systems
03/29/05	11:22:00	1.25	6.86	0.60	0.16	117.18	0.05	3.0	0.03	84.01	Calibrating Both Systems
03/29/05	11:23:00	1.06	6.74	0.30	0.16	180.27	0.00	2.9	0.03	84.01	Calibrating Both Systems
03/29/05	11:24:00	1.04	6.41	0.26	0.14	184.79	0.00	2.9	0.02	84.05	Calibrating Both Systems
03/29/05	11:25:00	13.64	29.34	2.57	0.85	168.87	11.74	28.1	0.66	83.99	
03/29/05	11:26:00	20.92	50.83	4.03	1.31	145.08	21.66	51.5	1.17	84.04	
03/29/05	11:27:00	21.04	51.93	4.03	1.31	144.11	21.78	52.5	1.20	84.17	
03/29/05	11:28:00	21.04	53.52	4.01	1.35	142.67	21.75	53.9	1.27	84.19	
03/29/05	11:29:00	20.67	60.11	3.97	1.51	141.54	21.46	61.1	1.38	84.24	
03/29/05	11:30:00	20.75	60.60	3.98	1.52	139.90	21.46	61.7	1.41	84.28	
03/29/05	11:31:00	20.71	61.56	3.98	1.57	139.14	21.43	62.1	1.45	84.29	
03/29/05	11:32:00	20.90	59.40	4.01	1.56	138.94	21.58	60.1	1.46	84.34	
03/29/05	11:33:00	20.67	65.77	3.98	1.69	137.82	21.43	66.6	1.52	84.35	
03/29/05	11:34:00	20.98	59.47	4.02	1.58	137.73	21.67	59.6	1.50	84.34	
03/29/05	11:35:00	20.79	57.15	4.00	1.64	138.02	21.53	57.6	1.51	84.36	
03/29/05	11:36:00	20.93	56.36	4.01	1.60	138.07	21.64	57.0	1.50	84.36	
03/29/05	11:37:00	20.61	60.64	4.00	1.68	138.94	21.40	61.5	1.54	84.36	
03/29/05	11:38:00	20.58	63.44	4.00	1.67	138.89	21.25	64.3	1.58	84.36	
03/29/05	11:39:00	20.55	65.54	3.99	1.69	138.58	21.26	66.2	1.59	84.36	
03/29/05	11:40:00	20.68	62.77	4.01	1.66	139.45	21.32	63.4	1.56	84.36	
03/29/05	11:41:00	20.74	62.39	4.02	1.62	139.21	21.38	62.9	1.54	84.36	
03/29/05	11:42:00	20.72	59.62	4.02	1.64	139.38	21.41	60.5	1.53	84.36	
03/29/05	11:43:00	21.00	53.82	4.03	1.63	139.31	21.67	54.0	1.51	84.36	
03/29/05	11:44:00	21.16	54.26	4.04	1.63	139.37	21.86	54.2	1.50	84.36	
03/29/05	11:45:00	20.87	61.40	4.02	1.70	139.38	21.58	62.3	1.57	84.36	
03/29/05	11:46:00	20.80	62.71	4.03	1.67	139.18	21.48	63.5	1.57	84.36	
03/29/05	11:47:00	20.94	62.94	4.04	1.71	138.40	21.63	63.9	1.56	84.36	
03/29/05	11:48:00	20.95	55.50	4.04	1.70	137.40	21.62	55.9	1.57	84.36	
03/29/05	11:49:00	20.94	60.25	4.04	1.68	136.77	21.54	60.8	1.59	84.36	
03/29/05	11:50:00	21.01	55.44	4.04	1.70	132.59	21.64	55.5	1.60	84.36	
03/29/05	11:51:00	20.86	61.47	4.04	1.71	131.14	21.52	62.1	1.61	84.36	

Date	Time	NO <sub>x</sub> _1	CO_1	CO2	O <sub>2</sub> _1	SO <sub>2</sub>	NO <sub>x</sub> _2	CO_2	O <sub>2</sub> _2	ADC Temp	Calibration Status
		Compliance System					Backup System				
		ppm	%	%	%	%	ppm	%	degF	degF	
03/29/05	11:52:00	20.66	62.99	4.02	1.78	130.33	21.37	64.0	1.63	84.36	
03/29/05	11:53:00	20.53	63.26	4.04	1.74	129.97	21.21	63.9	1.64	84.36	
03/29/05	11:54:00	20.70	62.88	4.04	1.78	129.11	21.39	63.5	1.63	84.36	
03/29/05	11:55:00	20.70	64.46	4.05	1.75	127.65	21.39	65.4	1.63	84.39	
03/29/05	11:56:00	20.71	63.16	4.05	1.76	127.01	21.36	64.0	1.65	84.37	
03/29/05	11:57:00	20.46	71.57	4.03	1.81	126.46	21.11	72.6	1.70	84.41	
03/29/05	11:58:00	20.76	70.15	4.05	1.80	125.39	21.37	70.8	1.68	84.44	
03/29/05	11:59:00	20.79	68.71	4.05	1.83	124.44	21.46	69.6	1.70	84.38	
03/29/05	12:00:00	20.80	67.06	4.07	1.82	124.05	21.47	67.5	1.72	84.49	
03/29/05	12:01:00	20.79	71.36	4.06	1.84	123.84	21.45	72.3	1.72	84.45	
03/29/05	12:02:00	21.05	66.10	4.08	1.80	123.76	21.73	66.6	1.70	84.42	
03/29/05	12:03:00	21.06	67.06	4.08	1.80	123.33	21.71	68.1	1.69	84.49	
03/29/05	12:04:00	21.00	64.83	4.08	1.81	123.29	21.68	65.3	1.71	84.52	
03/29/05	12:05:00	20.76	68.57	4.06	1.87	123.08	21.45	69.3	1.73	84.59	
03/29/05	12:06:00	20.98	64.01	4.08	1.80	123.26	21.60	64.3	1.70	84.63	
03/29/05	12:07:00	21.00	64.78	4.07	1.81	122.33	21.67	65.4	1.70	84.76	
03/29/05	12:08:00	20.90	65.03	4.07	1.79	122.25	21.54	65.1	1.71	84.76	
03/29/05	12:09:00	20.68	65.00	4.05	1.86	121.86	21.35	65.6	1.73	84.78	
03/29/05	12:10:00	21.01	62.83	4.08	1.80	121.98	21.67	63.3	1.69	84.80	
03/29/05	12:11:00	20.94	58.94	4.07	1.82	121.55	21.66	59.3	1.66	84.81	
03/29/05	12:12:00	20.67	58.06	4.05	1.84	120.57	21.40	58.7	1.69	84.80	
03/29/05	12:13:00	20.50	68.69	4.04	1.85	120.83	21.14	69.7	1.75	84.79	
03/29/05	12:14:00	20.52	68.32	4.05	1.82	121.19	21.16	69.0	1.71	84.81	
03/29/05	12:15:00	20.61	66.00	4.05	1.84	121.01	21.27	66.8	1.70	84.81	
03/29/05	12:16:00	20.69	64.04	4.05	1.83	120.05	21.32	64.4	1.72	84.81	
03/29/05	12:17:00	21.01	62.15	4.07	1.78	119.62	21.63	62.7	1.68	84.81	
03/29/05	12:18:00	20.98	65.11	4.06	1.81	118.97	21.63	65.6	1.71	84.81	
03/29/05	12:19:00	20.81	66.16	4.05	1.88	117.83	21.53	66.7	1.73	84.81	
03/29/05	12:20:00	20.75	69.50	4.06	1.85	117.38	21.39	70.0	1.74	84.81	
03/29/05	12:21:00	20.75	69.07	4.07	1.86	116.74	21.36	69.9	1.74	84.81	
03/29/05	12:22:00	21.05	64.12	4.11	1.75	115.83	21.65	64.4	1.68	84.81	
03/29/05	12:23:00	21.20	59.65	4.10	1.76	116.08	21.84	59.5	1.68	84.81	
03/29/05	12:24:00	20.84	62.70	4.09	1.79	116.07	21.48	63.4	1.70	84.81	
03/29/05	12:25:00	20.64	66.26	4.08	1.81	115.50	21.27	66.6	1.73	84.82	
03/29/05	12:26:00	20.92	64.76	4.09	1.75	115.16	21.52	64.9	1.67	84.84	
03/29/05	12:27:00	21.05	53.62	4.12	1.67	115.24	21.70	53.3	1.57	84.86	
03/29/05	12:28:00	21.12	58.40	4.10	1.71	115.59	21.76	58.6	1.60	85.00	
03/29/05	12:29:00	21.02	59.26	4.10	1.69	115.21	21.66	59.0	1.58	85.05	
03/29/05	12:30:00	15.03	46.08	2.95	2.35	113.31	16.46	46.9	2.13	85.18	
03/29/05	12:31:00	-0.51	3.76	0.00	4.96	13.58	0.11	3.2	4.96	85.21	Calibrating Both Systems
03/29/05	12:32:00	-0.27	13.07	2.46	2.87	2.40	0.16	12.0	3.26	85.24	Calibrating Both Systems
03/29/05	12:33:00	-0.58	33.51	6.91	0.00	0.57	0.00	31.6	0.01	85.25	Calibrating Both Systems
03/29/05	12:34:00	-0.56	33.54	6.90	0.00	-0.18	0.00	31.6	0.01	85.25	Calibrating Both Systems
03/29/05	12:35:00	-0.61	6.49	0.06	0.02	-0.49	-0.04	5.8	0.03	85.26	Calibrating Both Systems
03/29/05	12:36:00	-0.37	4.40	-0.01	0.03	24.25	7.26	21.7	0.56	85.26	Calibrating Compliance System
03/29/05	12:37:00	-0.58	3.24	-0.11	0.01	174.74	20.87	75.1	1.61	85.26	Calibrating Compliance System
03/29/05	12:38:00	-0.57	3.26	-0.16	0.01	184.90	21.15	72.9	1.57	85.26	Calibrating Compliance System
03/29/05	12:39:00	11.03	32.42	2.05	1.00	164.14	21.33	65.1	1.55	85.26	
03/29/05	12:40:00	20.09	75.22	3.89	1.74	118.20	20.76	76.4	1.63	85.26	
03/29/05	12:41:00	19.86	80.92	3.87	1.76	115.11	20.50	82.5	1.66	85.26	
03/29/05	12:42:00	20.24	75.99	3.92	1.56	115.04	20.78	76.7	1.49	85.26	



Date	Time	NO <sub>x</sub> _1	CO_1	CO2	O <sub>2</sub> _1	SO <sub>2</sub>	NO <sub>x</sub> _2	CO_2	O <sub>2</sub> _2	ADC Temp	Calibration Status
Compliance System						Backup System					
		ppm	%	%	%	%	ppm	%	degF	degF	
03/29/05	12:43:00	20.49	63.19	3.93	1.50	115.60	21.12	63.4	1.39	85.26	
03/29/05	12:44:00	20.25	68.31	3.92	1.52	114.65	20.88	68.7	1.42	85.26	
03/29/05	12:45:00	20.34	66.44	3.93	1.50	114.40	20.94	67.0	1.38	85.26	
03/29/05	12:46:00	20.21	67.81	3.93	1.49	114.34	20.88	68.2	1.40	85.26	
03/29/05	12:47:00	19.87	81.09	3.90	1.58	113.96	20.49	82.3	1.45	85.27	
03/29/05	12:48:00	19.69	82.18	3.88	1.64	113.97	20.33	83.3	1.51	85.26	
03/29/05	12:49:00	19.80	80.27	3.90	1.61	114.04	20.42	81.1	1.50	85.31	
03/29/05	12:50:00	20.09	76.66	3.93	1.55	114.21	20.69	77.4	1.45	85.31	
03/29/05	12:51:00	20.10	70.92	3.93	1.56	113.99	20.74	71.1	1.44	85.40	
03/29/05	12:52:00	20.03	71.52	3.93	1.54	113.45	20.64	72.2	1.43	85.35	
03/29/05	12:53:00	20.06	78.87	3.94	1.57	113.72	20.66	79.5	1.45	85.38	
03/29/05	12:54:00	20.09	77.25	3.95	1.55	113.49	20.68	77.8	1.44	85.37	
03/29/05	12:55:00	20.22	74.68	3.96	1.55	113.16	20.82	75.2	1.43	85.38	
03/29/05	12:56:00	20.24	73.84	3.97	1.55	113.55	20.90	74.1	1.40	85.38	
03/29/05	12:57:00	20.35	71.37	3.98	1.47	113.80	20.88	71.3	1.40	85.46	
03/29/05	12:58:00	20.33	70.38	3.98	1.47	114.25	20.90	70.2	1.39	85.47	
03/29/05	12:59:00	20.44	66.49	3.97	1.52	113.60	21.05	66.4	1.38	85.46	
03/29/05	13:00:00	20.68	64.06	3.98	1.50	112.89	21.31	64.2	1.36	85.48	
03/29/05	13:01:00	20.70	60.46	4.00	1.47	112.74	21.32	60.6	1.32	85.55	
03/29/05	13:02:00	20.49	65.88	4.00	1.46	112.70	21.14	65.9	1.32	85.57	
03/29/05	13:03:00	20.27	71.51	3.97	1.55	112.25	20.88	71.5	1.41	85.60	
03/29/05	13:04:00	20.00	75.82	3.95	1.59	112.42	20.62	76.2	1.46	85.66	
03/29/05	13:05:00	19.90	76.44	3.95	1.59	112.41	20.55	77.3	1.43	85.69	
03/29/05	13:06:00	20.07	71.11	3.98	1.51	112.97	20.66	71.2	1.40	85.69	
03/29/05	13:07:00	20.25	71.07	3.98	1.53	112.92	20.87	71.3	1.40	85.70	
03/29/05	13:08:00	19.82	75.53	3.96	1.59	112.72	20.46	76.2	1.43	85.71	
03/29/05	13:09:00	19.83	76.14	3.95	1.62	112.53	20.47	76.9	1.44	85.69	
03/29/05	13:10:00	20.14	70.99	3.99	1.51	112.40	20.74	71.1	1.36	85.70	
03/29/05	13:11:00	20.45	65.13	4.03	1.40	113.03	20.96	64.7	1.33	85.66	
03/29/05	13:12:00	20.17	68.24	3.98	1.52	112.07	20.77	68.2	1.39	85.69	
03/29/05	13:13:00	19.86	73.58	3.97	1.54	112.26	20.44	73.9	1.43	85.65	
03/29/05	13:14:00	20.13	71.23	3.98	1.52	112.81	20.69	71.2	1.41	85.68	
03/29/05	13:15:00	20.25	70.00	3.99	1.52	111.98	20.80	69.9	1.38	85.70	
03/29/05	13:16:00	20.36	71.53	4.00	1.50	111.96	20.92	71.5	1.37	85.69	
03/29/05	13:17:00	20.23	73.13	4.01	1.48	112.23	20.74	73.3	1.42	85.67	
03/29/05	13:18:00	20.35	77.19	4.00	1.55	111.81	20.91	77.4	1.43	85.66	
03/29/05	13:19:00	20.49	68.49	4.01	1.50	112.17	21.01	68.3	1.38	85.66	
03/29/05	13:20:00	20.35	68.83	4.00	1.51	111.94	20.92	68.4	1.36	85.68	
03/29/05	13:21:00	20.15	71.08	3.98	1.53	112.03	20.72	71.3	1.42	85.69	
03/29/05	13:22:00	20.21	70.36	3.99	1.52	111.99	20.76	70.3	1.42	85.67	
03/29/05	13:23:00	20.06	75.10	3.96	1.62	111.93	20.62	75.3	1.48	85.68	
03/29/05	13:24:00	20.19	75.83	3.99	1.56	111.65	20.74	76.3	1.43	85.70	
03/29/05	13:25:00	20.34	72.18	4.00	1.52	111.41	20.86	72.1	1.40	85.70	
03/29/05	13:26:00	20.28	67.83	4.01	1.51	111.76	20.86	67.9	1.36	85.69	
03/29/05	13:27:00	20.21	75.45	4.00	1.55	111.33	20.80	75.7	1.43	85.71	
03/29/05	13:28:00	20.03	72.13	3.98	1.59	111.15	20.59	72.4	1.46	85.70	
03/29/05	13:29:00	20.27	72.64	4.00	1.53	111.78	20.82	72.9	1.42	85.71	
03/29/05	13:30:00	20.11	72.61	4.01	1.53	111.14	20.72	73.4	1.39	85.71	
03/29/05	13:31:00	20.01	73.19	4.01	1.54	111.21	20.56	73.5	1.42	85.71	
03/29/05	13:32:00	20.09	75.55	4.00	1.57	110.84	20.63	76.0	1.44	85.71	
03/29/05	13:33:00	20.25	71.15	4.01	1.54	110.98	20.80	71.6	1.40	85.71	

Date	Time	NO <sub>x</sub> _1	CO_1	CO2	O <sub>2</sub> _1	SO <sub>2</sub>	NO <sub>x</sub> _2	CO_2	O <sub>2</sub> _2	ADC Temp	Calibration Status
Compliance System						Backup System					
		ppm	%	%	%	%	ppm	%	degF	degF	
03/29/05	13:34:00	20.27	67.80	4.02	1.51	111.16	20.86	68.0	1.39	85.71	
03/29/05	13:35:00	20.10	70.11	4.00	1.56	111.07	20.69	70.7	1.42	85.71	
03/29/05	13:36:00	20.05	77.19	3.98	1.63	111.04	20.64	78.0	1.47	85.71	
03/29/05	13:37:00	20.18	78.25	3.99	1.60	110.97	20.76	78.9	1.46	85.71	
03/29/05	13:38:00	20.15	75.74	4.00	1.56	111.37	20.72	76.5	1.42	85.72	
03/29/05	13:39:00	20.13	69.71	3.99	1.58	111.47	20.80	69.8	1.39	85.75	
03/29/05	13:40:00	20.08	68.91	3.99	1.56	111.34	20.69	69.4	1.41	85.78	
03/29/05	13:41:00	19.93	72.88	3.97	1.57	111.35	20.52	73.5	1.44	85.89	
03/29/05	13:42:00	20.18	77.02	3.99	1.52	111.39	20.71	77.8	1.43	85.99	
03/29/05	13:43:00	20.20	70.57	3.99	1.51	111.93	20.79	71.1	1.39	86.07	
03/29/05	13:44:00	20.14	68.15	3.98	1.55	112.20	20.75	68.2	1.41	86.10	
03/29/05	13:45:00	20.11	74.82	3.99	1.57	112.22	20.71	75.8	1.42	86.15	
03/29/05	13:46:00	20.39	71.24	4.02	1.48	113.05	20.95	71.7	1.37	86.14	
03/29/05	13:47:00	20.33	63.37	4.01	1.49	112.69	20.92	63.8	1.36	86.15	
03/29/05	13:48:00	20.19	66.38	4.00	1.49	112.32	20.76	66.8	1.37	86.15	
03/29/05	13:49:00	20.11	68.31	3.99	1.52	112.84	20.71	68.9	1.40	86.16	
03/29/05	13:50:00	20.08	69.64	3.99	1.53	112.91	20.70	70.2	1.38	86.16	
03/29/05	13:51:00	19.91	70.51	3.99	1.55	112.35	20.53	71.1	1.37	86.16	
03/29/05	13:52:00	19.79	74.01	3.98	1.57	112.21	20.41	75.1	1.42	86.16	
03/29/05	13:53:00	20.00	71.09	3.99	1.57	112.37	20.64	71.5	1.40	86.16	
03/29/05	13:54:00	20.19	67.35	3.99	1.52	112.25	20.77	67.7	1.39	86.16	
03/29/05	13:55:00	20.39	67.87	4.01	1.48	112.30	20.96	68.4	1.35	86.16	
03/29/05	13:56:00	20.29	66.23	4.01	1.48	112.77	20.90	66.5	1.34	86.16	
03/29/05	13:57:00	20.44	64.91	4.02	1.45	112.54	21.02	65.3	1.33	86.16	
03/29/05	13:58:00	20.30	67.18	4.02	1.46	112.99	20.91	67.5	1.30	86.16	
03/29/05	13:59:00	20.12	70.85	4.02	1.47	112.69	20.74	71.1	1.33	86.16	
03/29/05	14:00:00	19.94	73.61	4.00	1.51	112.61	20.53	74.0	1.37	86.16	
03/29/05	14:01:00	20.06	73.98	4.02	1.44	112.20	20.60	74.3	1.33	86.16	
03/29/05	14:02:00	13.21	52.45	2.64	2.44	107.55	14.28	53.6	2.26	86.16	
03/29/05	14:03:00	-0.48	3.17	-0.04	4.95	8.52	0.06	2.7	4.96	86.18	Calibrating Both Systems
03/29/05	14:04:00	-0.52	26.99	5.62	0.44	1.30	0.03	25.4	0.77	86.16	Calibrating Both Systems
03/29/05	14:05:00	-0.41	26.37	4.36	0.01	0.55	0.07	24.4	0.02	86.16	Calibrating Both Systems
03/29/05	14:06:00	-0.56	3.07	-0.06	0.01	0.07	-0.08	2.6	0.02	86.22	Calibrating Both Systems
03/29/05	14:07:00	-0.56	3.00	-0.11	0.01	-0.64	-0.07	2.6	0.02	86.26	Calibrating Both Systems
03/29/05	14:08:00	-0.38	3.40	-0.11	0.03	49.77	9.75	30.4	0.65	86.22	Calibrating Compliance System
03/29/05	14:09:00	-0.56	2.84	-0.21	0.01	179.10	21.04	67.8	1.33	86.25	Calibrating Compliance System
03/29/05	14:10:00	-0.53	2.93	-0.26	0.02	186.04	21.06	66.6	1.32	86.21	Calibrating Compliance System
03/29/05	14:11:00	19.77	60.87	3.75	1.41	132.23	20.93	71.3	1.34	86.17	
03/29/05	14:12:00	20.15	66.70	3.86	1.48	113.62	20.77	67.0	1.36	86.16	
03/29/05	14:13:00	20.16	67.96	3.88	1.45	113.03	20.71	68.5	1.32	86.16	
03/29/05	14:14:00	20.43	63.43	3.90	1.40	113.26	20.97	63.8	1.29	86.16	
03/29/05	14:15:00	20.27	63.73	3.88	1.40	112.89	20.85	64.1	1.28	86.16	
03/29/05	14:16:00	19.98	69.89	3.86	1.45	112.07	20.54	70.4	1.33	86.16	
03/29/05	14:17:00	19.98	67.33	3.87	1.40	112.23	20.51	67.3	1.30	86.16	
03/29/05	14:18:00	20.18	68.94	3.89	1.35	112.09	20.69	69.3	1.27	86.16	
03/29/05	14:19:00	19.99	69.68	3.87	1.40	111.66	20.53	69.8	1.28	86.17	
03/29/05	14:20:00	19.83	71.15	3.86	1.43	111.80	20.39	72.0	1.31	86.16	
03/29/05	14:21:00	20.19	66.99	3.90	1.38	111.63	20.75	67.1	1.25	86.16	
03/29/05	14:22:00	20.19	62.38	3.90	1.37	111.72	20.77	62.7	1.25	86.16	
03/29/05	14:23:00	20.36	63.28	3.92	1.33	111.73	20.88	63.7	1.23	86.16	
03/29/05	14:24:00	20.42	67.05	3.94	1.32	112.06	20.97	67.5	1.23	86.16	

Date	Time	NO <sub>x</sub> _1	CO_1	CO2	O <sub>2</sub> _1	SO <sub>2</sub>	NO <sub>x</sub> _2	CO_2	O <sub>2</sub> _2	ADC Temp	Calibration Status
Compliance System						Backup System					
		ppm	%	%	%	%	ppm	%	degF	degF	
03/29/05	14:25:00	20.45	69.88	3.94	1.34	112.29	20.98	70.2	1.24	86.16	
03/29/05	14:26:00	20.36	64.46	3.95	1.35	112.21	20.96	65.2	1.21	86.16	
03/29/05	14:27:00	20.15	68.72	3.93	1.41	112.15	20.73	69.3	1.26	86.16	
03/29/05	14:28:00	20.23	69.36	3.93	1.42	112.59	20.78	70.0	1.29	86.16	
03/29/05	14:29:00	20.31	74.62	3.93	1.41	111.97	20.85	75.3	1.30	86.16	
03/29/05	14:30:00	20.15	74.00	3.93	1.42	112.42	20.70	74.4	1.32	86.16	
03/29/05	14:31:00	20.15	73.67	3.91	1.54	111.39	20.75	74.3	1.38	86.16	
03/29/05	14:32:00	20.20	75.77	3.93	1.49	111.77	20.73	76.5	1.39	86.16	
03/29/05	14:33:00	20.37	78.94	3.94	1.52	111.76	20.90	80.2	1.40	86.16	
03/29/05	14:34:00	20.37	83.28	3.94	1.55	111.41	20.95	84.8	1.41	86.16	
03/29/05	14:35:00	20.27	80.47	3.94	1.57	111.17	20.85	81.5	1.44	86.16	
03/29/05	14:36:00	20.36	75.53	3.96	1.54	112.16	20.91	76.2	1.42	86.16	
03/29/05	14:37:00	20.33	75.43	3.96	1.49	112.60	20.86	76.0	1.42	86.16	
03/29/05	14:38:00	20.55	65.81	3.97	1.50	112.84	21.07	66.6	1.39	86.16	
03/29/05	14:39:00	20.36	65.77	3.96	1.57	112.38	20.94	66.1	1.43	86.16	
03/29/05	14:40:00	20.28	76.07	3.95	1.58	112.45	20.78	77.1	1.50	86.16	
03/29/05	14:41:00	20.41	70.50	3.96	1.62	112.02	20.94	71.5	1.54	86.16	
03/29/05	14:42:00	20.30	72.09	3.97	1.70	111.52	20.85	73.1	1.56	86.16	
03/29/05	14:43:00	20.14	80.37	3.96	1.74	111.33	20.71	82.0	1.61	86.16	
03/29/05	14:44:00	20.01	82.65	3.94	1.77	111.41	20.56	83.8	1.67	86.16	
03/29/05	14:45:00	20.10	82.47	3.95	1.77	111.43	20.60	84.3	1.67	86.16	
03/29/05	14:46:00	20.14	74.81	3.95	1.77	111.77	20.72	75.7	1.64	86.16	
03/29/05	14:47:00	20.13	74.22	3.95	1.73	111.98	20.67	75.4	1.63	86.16	
03/29/05	14:48:00	19.90	76.61	3.93	1.76	112.56	20.46	77.9	1.64	86.16	
03/29/05	14:49:00	19.56	88.52	3.90	1.83	113.03	20.16	90.4	1.70	86.16	
03/29/05	14:50:00	19.42	88.70	3.91	1.80	112.38	19.94	90.5	1.71	86.16	
03/29/05	14:51:00	20.01	81.07	3.94	1.76	113.00	20.52	82.0	1.66	86.15	
03/29/05	14:52:00	20.06	79.06	3.93	1.80	112.81	20.65	80.8	1.66	86.16	
03/29/05	14:53:00	20.07	83.85	3.93	1.81	112.30	20.61	85.8	1.70	86.16	
03/29/05	14:54:00	19.81	82.80	3.92	1.87	112.54	20.40	84.2	1.73	86.15	
03/29/05	14:55:00	19.96	78.30	3.94	1.82	112.45	20.52	79.8	1.70	86.16	
03/29/05	14:56:00	20.12	77.51	3.95	1.80	112.15	20.65	78.6	1.69	86.15	
03/29/05	14:57:00	20.07	80.99	3.96	1.82	112.85	20.58	82.6	1.75	86.16	
03/29/05	14:58:00	19.82	82.28	3.93	1.92	112.02	20.37	84.2	1.82	86.16	
03/29/05	14:59:00	19.97	74.42	3.95	1.84	111.55	20.43	75.4	1.77	86.11	
03/29/05	15:00:00	19.80	67.35	3.92	1.91	111.49	20.43	68.7	1.73	86.11	
03/29/05	15:01:00	19.30	77.90	3.89	1.97	110.71	19.90	79.8	1.82	86.04	
03/29/05	15:02:00	19.14	86.62	3.88	1.97	110.42	19.68	88.7	1.85	86.07	
03/29/05	15:03:00	19.73	72.83	3.92	1.78	111.19	20.26	73.5	1.68	86.02	
03/29/05	15:04:00	19.87	67.34	3.93	1.72	111.67	20.41	68.6	1.60	86.05	
03/29/05	15:05:00	19.80	71.06	3.92	1.72	111.92	20.38	72.4	1.59	86.04	
03/29/05	15:06:00	20.11	68.87	3.95	1.60	112.61	20.62	69.9	1.51	86.07	
03/29/05	15:07:00	20.54	61.08	4.01	1.44	113.54	21.05	62.0	1.34	86.08	
03/29/05	15:08:00	20.46	59.27	4.00	1.46	113.89	21.02	60.0	1.33	86.11	
03/29/05	15:09:00	20.19	58.47	3.97	1.54	112.76	20.84	59.6	1.35	86.08	
03/29/05	15:10:00	20.11	62.93	3.98	1.50	112.66	20.68	64.1	1.35	86.07	
03/29/05	15:11:00	20.13	61.24	4.00	1.44	112.84	20.64	62.3	1.34	86.05	
03/29/05	15:12:00	19.96	62.51	3.96	1.56	112.70	20.57	63.9	1.38	86.06	
03/29/05	15:13:00	20.05	62.23	3.97	1.53	110.94	20.65	63.5	1.38	86.05	
03/29/05	15:14:00	15.59	61.70	3.15	2.02	111.28	16.94	63.2	1.83	86.06	
03/29/05	15:15:00	-0.45	3.84	-0.16	4.95	14.37	0.09	4.0	4.96	86.06	Calibrating Both Systems

Date	Time	NO <sub>x</sub> _1	CO_1	CO2	O <sub>2</sub> _1	SO <sub>2</sub>	NO <sub>x</sub> _2	CO_2	O <sub>2</sub> _2	ADC Temp	Calibration Status
Compliance System						Backup System					
		ppm	%	%	%	%	ppm	%	degF	degF	
03/29/05	15:16:00	-0.46	23.07	4.67	1.12	1.38	0.05	22.7	1.45	86.10	Calibrating Both Systems
03/29/05	15:17:00	-0.49	33.46	6.34	-0.01	0.07	0.01	32.4	0.01	86.12	Calibrating Both Systems
03/29/05	15:18:00	-0.54	8.34	0.15	0.01	-0.16	-0.05	8.1	0.02	86.13	Calibrating Both Systems
03/29/05	15:19:00	-0.30	4.24	-0.14	0.03	12.70	4.81	15.9	0.33	86.15	Calibrating Compliance System
03/29/05	15:20:00	-0.51	3.10	-0.26	0.01	171.83	20.68	53.9	1.22	86.16	Calibrating Compliance System
03/29/05	15:21:00	-0.52	3.27	-0.30	0.01	185.08	20.36	57.2	1.26	86.16	Calibrating Compliance System
03/29/05	15:22:00	11.20	32.86	2.09	0.90	162.18	19.99	63.9	1.34	86.14	
03/29/05	15:23:00	19.44	69.37	3.84	1.47	119.99	20.02	71.0	1.35	86.14	
03/29/05	15:24:00	19.87	69.49	3.86	1.45	117.31	20.41	70.5	1.33	86.15	
03/29/05	15:25:00	19.90	70.51	3.88	1.37	117.04	20.38	72.0	1.31	86.15	
03/29/05	15:26:00	19.92	65.23	3.87	1.43	115.66	20.49	66.5	1.28	86.14	
03/29/05	15:27:00	19.88	69.65	3.88	1.40	115.35	20.38	70.9	1.30	86.14	
03/29/05	15:28:00	19.83	69.96	3.88	1.42	114.68	20.35	71.4	1.30	86.11	
03/29/05	15:29:00	20.02	69.36	3.90	1.35	113.77	20.53	70.6	1.24	86.11	
03/29/05	15:30:00	20.04	58.01	3.91	1.33	113.48	20.56	58.9	1.18	86.04	
03/29/05	15:31:00	19.98	60.50	3.90	1.34	113.45	20.51	62.0	1.20	86.08	
03/29/05	15:32:00	19.79	65.11	3.90	1.31	113.46	20.32	66.0	1.20	86.03	
03/29/05	15:33:00	19.65	65.92	3.89	1.33	113.69	20.20	67.3	1.19	86.02	
03/29/05	15:34:00	19.61	62.92	3.90	1.26	113.24	20.13	64.0	1.16	85.86	
03/29/05	15:35:00	19.45	65.91	3.89	1.28	113.76	19.97	67.0	1.14	85.81	
03/29/05	15:36:00	19.50	69.83	3.89	1.26	113.44	19.96	71.2	1.17	85.74	
03/29/05	15:37:00	19.62	71.67	3.91	1.22	113.65	20.08	72.9	1.11	85.73	
03/29/05	15:38:00	19.76	65.06	3.92	1.21	113.65	20.32	66.3	1.07	85.71	
03/29/05	15:39:00	19.98	59.95	3.94	1.12	113.81	20.50	60.8	1.00	85.71	
03/29/05	15:40:00	19.95	53.24	3.94	1.10	113.99	20.47	54.1	0.98	85.71	
03/29/05	15:41:00	19.75	58.62	3.93	1.12	115.13	20.31	59.6	0.99	85.71	
03/29/05	15:42:00	19.55	65.55	3.91	1.16	115.14	20.06	66.8	1.05	85.71	
03/29/05	15:43:00	19.60	68.26	3.92	1.16	114.59	20.09	69.0	1.05	85.71	
03/29/05	15:44:00	19.64	70.53	3.93	1.16	114.49	20.13	71.7	1.05	85.71	
03/29/05	15:45:00	19.74	68.33	3.94	1.14	114.00	20.24	69.2	1.02	85.71	
03/29/05	15:46:00	19.93	64.71	3.97	1.08	114.42	20.41	65.5	0.98	85.71	
03/29/05	15:47:00	19.72	70.82	3.94	1.24	113.85	20.24	72.5	1.08	85.71	
03/29/05	15:48:00	19.62	79.59	3.92	1.34	112.38	20.11	81.3	1.23	85.71	
03/29/05	15:49:00	19.63	80.35	3.91	1.41	112.08	20.08	81.8	1.30	85.71	
03/29/05	15:50:00	19.86	77.53	3.91	1.45	111.20	20.37	79.0	1.31	85.71	
03/29/05	15:51:00	19.87	75.88	3.93	1.44	111.37	20.40	77.4	1.31	85.71	
03/29/05	15:52:00	19.87	71.44	3.94	1.43	111.06	20.40	72.8	1.31	85.71	
03/29/05	15:53:00	19.86	69.49	3.94	1.40	111.89	20.34	70.7	1.30	85.71	
03/29/05	15:54:00	19.79	71.39	3.92	1.48	111.47	20.29	72.5	1.36	85.70	
03/29/05	15:55:00	19.64	78.92	3.91	1.52	111.85	20.15	80.6	1.39	85.70	
03/29/05	15:56:00	19.65	79.84	3.91	1.50	112.30	20.15	81.4	1.39	85.70	
03/29/05	15:57:00	19.75	85.82	3.93	1.50	112.59	20.22	87.3	1.41	85.65	
03/29/05	15:58:00	19.78	87.22	3.93	1.53	112.83	20.24	88.9	1.42	85.66	
03/29/05	15:59:00	19.85	81.46	3.94	1.51	113.12	20.30	83.0	1.41	85.60	
03/29/05	16:00:00	20.23	78.20	3.99	1.43	114.24	20.69	79.6	1.33	85.55	
03/29/05	16:01:00	20.03	78.88	3.97	1.48	114.02	20.51	80.3	1.38	85.52	
03/29/05	16:02:00	19.86	80.22	3.94	1.59	113.45	20.40	81.9	1.43	85.52	
03/29/05	16:03:00	19.85	81.58	3.94	1.61	113.00	20.37	83.6	1.46	85.49	
03/29/05	16:04:00	19.76	78.50	3.93	1.63	113.11	20.30	80.6	1.46	85.40	
03/29/05	16:05:00	19.79	79.86	3.94	1.57	112.94	20.26	81.3	1.46	85.39	
03/29/05	16:06:00	20.08	72.43	3.97	1.54	113.37	20.59	73.4	1.41	85.31	

Date	Time	NO <sub>1</sub>	CO <sub>1</sub>	CO <sub>2</sub>	O <sub>2</sub> <sub>1</sub>	SO <sub>2</sub>	NOx <sub>2</sub>	CO <sub>2</sub>	O <sub>2</sub> <sub>2</sub>	ADC Temp	Calibration Status
Compliance System						Backup System					
		ppm	%	%	%	%	ppm	%	degF	degF	
03/29/05	16:07:00	19.96	77.14	3.96	1.54	113.49	20.46	78.5	1.42	85.31	
03/29/05	16:08:00	19.76	80.43	3.94	1.60	113.06	20.28	82.0	1.46	85.28	
03/29/05	16:09:00	19.66	78.78	3.94	1.58	112.54	20.14	80.3	1.47	85.26	
03/29/05	16:10:00	19.74	80.37	3.95	1.58	112.59	20.28	82.1	1.44	85.28	
03/29/05	16:11:00	19.76	81.67	3.96	1.54	112.87	20.23	83.1	1.45	85.28	
03/29/05	16:12:00	19.68	76.68	3.94	1.57	113.10	20.20	78.3	1.43	85.26	
03/29/05	16:13:00	19.74	76.25	3.95	1.55	113.00	20.25	77.9	1.43	85.27	
03/29/05	16:14:00	19.73	75.02	3.95	1.55	113.30	20.21	76.6	1.44	85.26	
03/29/05	16:15:00	19.67	77.08	3.95	1.54	113.35	20.16	78.4	1.43	85.26	
03/29/05	16:16:00	19.66	80.37	3.94	1.58	113.08	20.15	81.9	1.46	85.26	
03/29/05	16:17:00	19.85	83.65	3.95	1.58	113.62	20.38	85.5	1.45	85.26	
03/29/05	16:18:00	19.84	80.71	3.97	1.53	113.56	20.34	82.4	1.41	85.26	
03/29/05	16:19:00	20.07	73.54	3.98	1.50	114.84	20.58	75.3	1.37	85.26	
03/29/05	16:20:00	19.95	76.04	3.99	1.50	115.05	20.48	78.0	1.37	85.26	
03/29/05	16:21:00	19.73	76.79	3.96	1.54	114.98	20.23	77.5	1.43	85.26	
03/29/05	16:22:00	19.58	76.63	3.95	1.54	114.53	20.08	78.6	1.42	85.26	
03/29/05	16:23:00	19.74	75.55	3.97	1.50	113.80	20.22	76.8	1.39	85.26	
03/29/05	16:24:00	19.71	76.74	3.95	1.55	112.73	20.27	78.7	1.41	85.26	
03/29/05	16:25:00	18.95	76.09	3.83	1.52	113.32	20.19	78.7	1.43	85.26	
03/29/05	16:26:00	-0.18	11.42	-0.12	4.68	41.94	1.15	13.5	4.54	85.27	Calibrating Both Systems
03/29/05	16:27:00	-0.44	23.73	4.89	0.93	1.83	0.06	23.5	1.25	85.28	Calibrating Both Systems
03/29/05	16:28:00	-0.53	32.78	6.32	-0.02	0.12	0.00	31.7	0.00	85.30	Calibrating Both Systems
03/29/05	16:29:00	-0.53	25.29	3.95	-0.01	-0.39	-0.02	24.1	0.01	85.29	Calibrating Both Systems
03/29/05	16:30:00	-0.54	2.99	-0.21	0.00	-0.68	-0.08	3.3	0.02	85.30	Calibrating Both Systems
03/29/05	16:31:00	-0.16	3.84	-0.14	0.03	100.91	0.16	3.9	0.04	85.31	Calibrating Both Systems
03/29/05	16:32:00	-0.52	2.75	-0.30	0.01	183.00	-0.08	3.4	0.02	85.28	Calibrating Both Systems
03/29/05	16:33:00	4.06	9.12	0.55	0.38	183.03	3.18	10.6	0.25	85.29	Calibrating Backup System
03/29/05	16:34:00	20.11	67.24	3.92	1.51	119.21	20.58	69.1	1.38	85.26	
03/29/05	16:35:00	20.20	65.34	3.93	1.47	113.31	20.68	66.6	1.36	85.26	
03/29/05	16:36:00	20.26	65.48	3.93	1.54	111.57	20.83	67.4	1.36	85.26	
03/29/05	16:37:00	20.16	68.79	3.92	1.53	111.43	20.63	69.8	1.44	85.26	
03/29/05	16:38:00	19.94	71.10	3.90	1.60	110.92	20.48	72.9	1.44	85.25	
03/29/05	16:39:00	19.63	74.87	3.90	1.57	111.90	20.08	76.3	1.48	85.23	
03/30/05	7:37:00	18.10	93.33	4.04	1.81	153.12	18.63	95.5	1.67	81.49	
03/30/05	7:38:00	18.07	78.26	4.03	1.81	153.74	18.65	79.9	1.63	81.51	
03/30/05	7:39:00	17.98	79.70	4.02	1.80	154.17	18.61	81.9	1.59	81.55	
03/30/05	7:40:00	17.75	83.58	4.00	1.80	154.40	18.31	86.4	1.63	81.58	
03/30/05	7:41:01	17.56	93.27	3.97	1.84	154.59	18.14	95.3	1.66	81.58	
03/30/05	7:42:00	4.21	24.51	0.56	5.02	55.78	2.80	31.4	4.85	81.59	Calibrating Backup System
03/30/05	7:43:01	-0.50	-0.15	-0.05	4.95	0.71	-0.01	0.1	4.98	81.60	Calibrating Both Systems
03/30/05	7:44:00	-0.53	-0.14	-0.09	0.74	-0.78	-0.04	0.2	0.96	81.65	Calibrating Both Systems
03/30/05	7:45:01	-0.57	-0.16	-0.15	0.00	-1.38	-0.08	0.2	0.02	81.65	Calibrating Both Systems
03/30/05	7:46:01	-0.57	7.97	2.28	0.00	-1.56	-0.04	9.3	0.02	81.66	Calibrating Both Systems
03/30/05	7:47:00	-0.58	29.86	6.37	-0.02	-1.78	-0.01	28.8	-0.01	81.66	Calibrating Both Systems
03/30/05	7:48:01	-0.50	8.92	1.03	0.01	102.98	15.96	66.3	0.87	81.66	Calibrating Compliance System
03/30/05	7:49:00	-0.56	-0.33	-0.25	-0.01	183.90	19.11	80.0	1.10	81.67	Calibrating Compliance System
03/30/05	7:50:00	-0.56	-0.44	-0.28	-0.01	185.49	18.77	86.1	1.17	81.66	Calibrating Compliance System
03/30/05	7:51:00	3.30	9.37	0.54	0.24	182.12	18.75	81.4	1.18	81.67	Calibrating Compliance System
03/30/05	7:52:00	18.20	78.04	3.92	1.26	162.47	18.76	80.7	1.18	81.66	
03/30/05	7:53:00	18.36	83.24	3.93	1.20	159.56	18.79	85.2	1.14	81.66	
03/30/05	7:54:00	18.33	76.37	3.92	1.23	159.48	18.81	78.0	1.12	81.66	

Date	Time	NO <sub>x</sub> _1	CO_1	CO2	O <sub>2</sub> _1	SO <sub>2</sub>	NO <sub>x</sub> _2	CO_2	O <sub>2</sub> _2	ADC Temp	Calibration Status
Compliance System						Backup System					
		ppm	%	%	%	%	ppm	%	degF	degF	
03/30/05	7:55:01	18.48	69.70	3.95	1.16	159.17	18.95	70.7	1.07	81.66	
03/30/05	7:56:00	18.34	73.35	3.93	1.23	159.17	18.82	75.0	1.10	81.66	
03/30/05	7:57:00	18.21	78.49	3.93	1.26	158.93	18.70	80.3	1.14	81.66	
03/30/05	7:58:00	18.20	79.01	3.93	1.25	158.13	18.66	80.9	1.13	81.66	
03/30/05	7:59:00	18.07	85.40	3.91	1.29	158.12	18.56	87.6	1.16	81.69	
03/30/05	8:00:00	17.84	88.97	3.90	1.31	157.94	18.34	92.0	1.19	81.70	
03/30/05	8:01:00	17.84	89.79	3.91	1.29	158.17	18.33	91.7	1.20	81.74	
03/30/05	8:02:00	17.80	92.01	3.91	1.28	158.78	18.27	94.5	1.18	81.81	
03/30/05	8:03:00	17.88	87.76	3.92	1.27	159.12	18.38	89.2	1.15	81.81	
03/30/05	8:04:00	17.69	92.18	3.91	1.28	159.74	18.18	95.5	1.19	81.85	
03/30/05	8:05:00	17.65	89.88	3.91	1.30	159.19	18.13	92.3	1.19	81.89	
03/30/05	8:06:00	17.66	88.89	3.91	1.31	158.47	18.22	91.7	1.14	81.97	
03/30/05	8:07:00	17.59	84.27	3.91	1.33	158.52	18.16	86.7	1.15	81.96	
03/30/05	8:08:00	17.67	88.09	3.92	1.35	159.12	18.26	90.3	1.14	81.96	
03/30/05	8:09:00	17.59	87.54	3.92	1.34	158.60	18.20	90.6	1.13	82.02	
03/30/05	8:10:00	17.60	91.93	3.93	1.37	159.64	18.18	95.3	1.17	82.07	
03/30/05	8:11:00	17.29	108.14	3.90	1.45	160.13	17.87	112.4	1.25	82.08	
03/30/05	8:12:00	17.66	99.05	3.95	1.35	159.22	18.18	101.7	1.18	82.11	
03/30/05	8:13:00	17.80	88.73	3.96	1.36	158.95	18.39	90.9	1.13	82.11	
03/30/05	8:14:00	17.58	92.03	3.94	1.42	158.84	18.20	95.3	1.17	82.11	
03/30/05	8:15:00	17.29	105.43	3.91	1.48	158.36	17.89	109.8	1.25	82.11	
03/30/05	8:16:00	17.44	109.12	3.93	1.45	158.25	18.01	113.0	1.24	82.11	
03/30/05	8:17:00	17.69	103.27	3.97	1.39	157.62	18.26	106.9	1.17	82.11	
03/30/05	8:18:00	17.77	100.18	3.99	1.33	157.89	18.30	103.7	1.17	82.11	
03/30/05	8:19:00	17.66	109.68	3.98	1.36	158.42	18.18	113.6	1.21	82.11	
03/30/05	8:20:01	17.45	112.12	3.95	1.45	158.03	18.04	116.5	1.24	82.11	
03/30/05	8:21:00	17.75	99.44	3.99	1.33	156.94	18.29	101.4	1.15	82.12	
03/30/05	8:22:01	17.67	98.32	3.98	1.32	157.96	18.20	101.6	1.16	82.11	
03/30/05	8:23:00	17.69	96.17	3.99	1.32	158.22	18.22	99.2	1.15	82.11	
03/30/05	8:24:00	17.50	91.63	3.95	1.39	156.78	18.10	93.9	1.16	82.13	
03/30/05	8:25:00	17.42	93.77	3.95	1.38	157.72	18.01	97.0	1.17	82.13	
03/30/05	8:26:00	17.31	104.20	3.93	1.46	157.90	17.90	108.4	1.22	82.12	
03/30/05	8:27:00	17.36	107.94	3.96	1.31	158.29	17.84	111.1	1.22	82.14	
03/30/05	8:28:00	17.30	111.42	3.94	1.43	158.17	17.84	115.4	1.24	82.17	
03/30/05	8:29:00	17.52	109.03	3.98	1.34	158.18	18.02	112.5	1.21	82.14	
03/30/05	8:30:00	17.59	107.83	3.99	1.33	157.67	18.12	110.8	1.18	82.21	
03/30/05	8:31:00	17.78	101.74	4.02	1.30	157.46	18.32	104.9	1.12	82.26	
03/30/05	8:32:00	17.73	97.43	4.01	1.27	156.57	18.27	100.2	1.10	82.28	
03/30/05	8:33:00	17.62	95.67	4.00	1.34	157.36	18.20	99.1	1.12	82.30	
03/30/05	8:34:00	17.60	97.13	4.01	1.28	157.21	18.14	100.0	1.11	82.41	
03/30/05	8:35:00	17.51	104.70	3.99	1.35	157.66	18.06	108.5	1.17	82.42	
03/30/05	8:36:00	17.47	112.66	3.98	1.34	157.47	18.02	116.0	1.16	82.43	
03/30/05	8:37:00	17.55	104.85	4.00	1.31	157.07	18.08	107.1	1.14	82.48	
03/30/05	8:38:00	17.71	100.78	4.02	1.30	157.26	18.23	104.4	1.13	82.53	
03/30/05	8:39:00	17.79	100.21	4.03	1.31	156.91	18.34	104.0	1.12	82.53	
03/30/05	8:40:00	17.80	102.95	4.03	1.30	156.08	18.36	105.7	1.10	82.54	
03/30/05	8:41:00	17.92	100.51	4.05	1.25	156.65	18.43	103.4	1.11	82.56	
03/30/05	8:42:00	18.09	94.03	4.07	1.24	157.00	18.59	96.3	1.10	82.56	
03/30/05	8:43:00	18.08	91.85	4.07	1.28	156.76	18.63	95.0	1.06	82.56	
03/30/05	8:44:00	17.91	95.62	4.05	1.32	155.78	18.50	99.3	1.09	82.56	
03/30/05	8:45:00	17.58	104.75	4.01	1.36	156.14	18.15	108.8	1.18	82.56	

Date	Time	NO <sub>x</sub> _1	CO_1	CO2	O <sub>2</sub> _1	SO <sub>2</sub>	NOx_2	CO_2	O <sub>2</sub> _2	ADC Temp	Calibration Status
Compliance System						Backup System					
		ppm	%	%	%	%	ppm	%	degF	degF	
03/30/05	8:46:00	17.60	108.30	4.02	1.33	156.90	18.11	112.3	1.19	82.56	
03/30/05	8:47:00	17.73	111.33	4.04	1.25	157.74	18.19	113.8	1.16	82.56	
03/30/05	8:48:00	17.83	104.00	4.05	1.25	157.61	18.34	107.2	1.17	82.56	
03/30/05	8:49:00	17.69	108.12	4.01	1.39	156.90	18.24	111.9	1.24	82.56	
03/30/05	8:50:00	17.47	115.09	3.99	1.47	156.35	18.05	119.3	1.29	82.56	
03/30/05	8:51:00	17.55	114.09	3.98	1.51	155.55	18.14	118.5	1.30	82.57	
03/30/05	8:52:00	17.56	115.91	3.98	1.54	154.37	18.18	120.8	1.29	82.56	
03/30/05	8:53:01	17.52	121.31	3.97	1.58	154.35	18.16	126.8	1.34	82.31	
03/30/05	8:54:00	17.67	117.26	3.99	1.49	154.15	18.22	122.1	1.30	82.05	
03/30/05	8:55:01	17.87	107.18	4.00	1.45	153.64	18.44	109.7	1.26	81.63	
03/30/05	8:56:00	18.19	93.05	4.02	1.37	153.52	18.76	95.3	1.18	81.24	
03/30/05	8:57:00	18.11	80.17	3.98	1.43	153.23	18.74	82.6	1.18	80.82	
03/30/05	8:58:00	18.06	84.79	3.97	1.42	153.52	18.65	87.8	1.20	80.53	
03/30/05	8:59:00	17.94	85.55	3.94	1.43	153.74	18.55	87.8	1.24	80.26	
03/30/05	9:00:00	17.89	80.66	3.93	1.45	153.58	18.50	82.9	1.24	79.88	
03/30/05	9:01:01	18.05	81.93	3.93	1.40	153.93	18.60	83.6	1.23	79.79	
03/30/05	9:02:01	17.90	83.34	3.92	1.48	153.62	18.53	86.4	1.24	79.43	
03/30/05	9:03:00	17.74	89.07	3.89	1.51	153.80	18.36	92.4	1.31	79.41	
03/30/05	9:04:00	17.65	97.17	3.87	1.58	153.87	18.28	100.9	1.35	79.26	
03/30/05	9:05:00	17.65	98.36	3.87	1.60	154.41	18.30	103.0	1.36	78.99	
03/30/05	9:06:00	17.73	96.69	3.88	1.51	154.35	18.29	99.4	1.35	78.96	
03/30/05	9:07:00	17.84	94.89	3.89	1.47	155.91	18.43	97.8	1.31	78.96	
03/30/05	9:08:00	17.96	87.40	3.89	1.45	156.41	18.57	90.6	1.28	78.96	
03/30/05	9:09:00	17.97	85.54	3.89	1.47	155.43	18.58	87.3	1.28	78.93	
03/30/05	9:10:00	17.94	84.84	3.89	1.43	154.70	18.56	86.9	1.25	78.92	
03/30/05	9:11:01	17.76	83.87	3.86	1.47	154.40	18.38	86.3	1.27	78.85	
03/30/05	9:12:00	17.56	89.93	3.84	1.50	154.19	18.22	92.9	1.29	78.82	
03/30/05	9:13:00	17.64	86.01	3.85	1.45	154.66	18.24	88.0	1.26	78.84	
03/30/05	9:14:00	17.70	84.00	3.85	1.45	154.18	18.32	87.1	1.25	78.87	
03/30/05	9:15:00	17.69	88.27	3.86	1.39	153.58	18.30	90.9	1.23	78.87	
03/30/05	9:16:00	17.60	87.70	3.85	1.41	153.49	18.17	90.2	1.24	78.90	
03/30/05	9:17:00	17.59	88.76	3.84	1.43	153.04	18.20	92.0	1.24	78.93	
03/30/05	9:18:00	17.69	86.65	3.85	1.37	153.44	18.28	89.2	1.21	78.94	
03/30/05	9:19:00	17.68	90.95	3.84	1.39	152.81	18.27	93.6	1.22	78.95	
03/30/05	9:20:00	17.88	87.55	3.86	1.31	153.16	18.42	91.2	1.19	78.96	
03/30/05	9:21:00	17.89	92.57	3.86	1.36	152.52	18.48	96.2	1.19	78.95	
03/30/05	9:22:00	17.83	101.11	3.85	1.38	151.90	18.40	104.6	1.25	78.96	
03/30/05	9:23:00	18.10	105.92	3.87	1.36	151.17	18.67	109.8	1.23	78.96	
03/30/05	9:24:00	18.56	98.66	3.92	1.33	150.78	19.13	102.1	1.18	78.96	
03/30/05	9:25:00	18.76	102.57	3.96	1.30	149.24	19.30	106.1	1.19	78.96	
03/30/05	9:26:00	18.88	102.76	3.96	1.33	149.02	19.46	105.8	1.20	78.96	
03/30/05	9:27:00	18.98	102.99	3.98	1.32	148.98	19.52	106.6	1.20	78.96	
03/30/05	9:28:00	18.99	104.45	3.98	1.36	147.78	19.61	107.5	1.21	78.96	
03/30/05	9:29:00	19.18	99.87	4.00	1.36	147.87	19.78	104.1	1.20	78.96	
03/30/05	9:30:00	19.11	99.19	3.99	1.41	147.38	19.69	102.5	1.28	78.96	
03/30/05	9:31:00	19.01	88.06	3.95	1.49	147.02	19.62	91.0	1.36	78.96	
03/30/05	9:32:00	18.90	95.09	3.93	1.54	146.56	19.47	98.0	1.42	78.97	
03/30/05	9:33:00	18.51	93.85	3.89	1.60	146.20	19.12	97.2	1.46	79.00	
03/30/05	9:34:00	18.36	83.59	3.88	1.59	145.57	18.97	85.8	1.44	79.05	
03/30/05	9:35:00	17.95	85.36	3.85	1.62	145.79	18.59	88.1	1.46	79.12	
03/30/05	9:36:00	17.83	85.43	3.84	1.59	146.37	18.44	88.3	1.45	79.09	

Date	Time	NO <sub>x</sub> _1	CO_1	CO2	O <sub>2</sub> _1	SO <sub>2</sub>	NO <sub>x</sub> _2	CO_2	O <sub>2</sub> _2	ADC Temp	Calibration Status
Compliance System						Backup System					
		ppm	%	%	%	%	ppm	%	degF	degF	
03/30/05	9:37:00	17.64	88.91	3.82	1.70	146.03	18.29	91.9	1.52	79.15	
03/30/05	9:38:00	17.67	95.43	3.80	1.70	147.19	18.29	99.1	1.55	79.23	
03/30/05	9:39:00	17.76	92.45	3.81	1.67	147.55	18.36	96.7	1.55	79.32	
03/30/05	9:40:00	7.87	56.23	1.60	0.92	104.72	8.91	56.5	0.97	79.39	
03/30/05	9:41:01	-0.47	-2.65	-0.45	-0.01	3.31	0.00	-1.1	0.01	79.39	Calibrating Both Systems
03/30/05	9:42:00	-0.50	-3.01	-0.49	-0.01	0.13	-0.06	-1.2	0.01	79.41	Calibrating Both Systems
03/30/05	9:43:00	-0.52	-1.77	-0.54	0.00	-0.75	-0.07	-0.9	0.01	79.41	Calibrating Both Systems
03/30/05	9:44:01	-0.55	-0.26	-0.39	0.00	-1.10	-0.07	-0.3	0.01	79.42	Calibrating Both Systems
03/30/05	9:45:00	-0.54	-0.45	-0.15	3.00	-1.39	-0.07	-0.4	2.81	79.44	Calibrating Both Systems
03/30/05	9:46:01	-0.55	-0.47	-0.20	4.95	-1.57	-0.07	-0.6	4.97	79.49	Calibrating Both Systems
03/30/05	9:47:00	-0.55	17.31	4.43	1.36	-1.70	-0.02	17.7	1.61	79.56	Calibrating Both Systems
03/30/05	9:48:00	5.12	46.11	5.88	0.55	12.67	4.79	50.4	0.45	79.49	
03/30/05	9:49:00	18.11	104.10	4.14	1.69	130.57	19.02	108.1	1.55	79.61	
03/30/05	9:50:00	4.01	36.43	1.10	0.44	139.79	5.52	34.8	0.49	79.73	
03/30/05	9:51:00	-0.48	-0.33	-0.26	0.00	179.44	-0.02	-0.5	0.01	79.73	Calibrating Both Systems
03/30/05	9:52:01	-0.38	-0.36	-0.28	0.01	182.32	-0.05	-0.4	0.01	79.77	Calibrating Both Systems
03/30/05	9:53:00	18.12	74.78	3.94	1.56	153.57	17.89	79.3	1.35	79.80	
03/30/05	9:54:00	18.55	84.54	4.08	1.53	144.04	19.20	87.2	1.38	79.83	
03/30/05	9:55:00	18.70	84.05	4.10	1.47	143.21	19.30	85.7	1.34	79.83	
03/30/05	9:56:00	18.63	85.73	4.09	1.52	142.57	19.33	88.9	1.34	79.85	
03/30/05	9:57:00	18.39	89.98	4.08	1.50	141.89	19.03	91.4	1.36	79.86	
03/30/05	9:58:00	18.27	97.76	4.06	1.56	141.64	18.89	100.7	1.39	79.85	
03/30/05	9:59:00	18.53	86.67	4.11	1.44	142.11	19.19	87.7	1.24	79.86	
03/30/05	10:00:00	18.82	77.40	4.17	1.24	144.96	19.42	78.4	1.09	79.86	
03/30/05	10:01:01	18.57	81.20	4.14	1.36	144.33	19.24	82.9	1.15	79.86	
03/30/05	10:02:00	18.64	84.78	4.17	1.28	143.07	19.23	86.5	1.15	79.86	
03/30/05	10:03:01	18.56	81.70	4.15	1.33	142.75	19.23	82.8	1.14	79.86	
03/30/05	10:04:00	18.52	82.62	4.15	1.32	142.25	19.16	84.0	1.14	79.86	
03/30/05	10:05:00	18.60	72.25	4.17	1.25	142.33	19.24	72.9	1.09	79.86	
03/30/05	10:06:01	18.31	76.19	4.13	1.31	142.49	18.95	77.5	1.13	79.86	
03/30/05	10:07:00	18.04	86.02	4.09	1.40	142.65	18.71	89.1	1.22	79.87	
03/30/05	10:08:01	17.98	100.13	4.09	1.45	141.87	18.61	102.4	1.30	79.87	
03/30/05	10:09:00	18.38	91.32	4.14	1.42	141.44	19.01	94.2	1.27	79.88	
03/30/05	10:10:00	18.64	93.58	4.18	1.40	141.61	19.30	96.3	1.22	79.86	
03/30/05	10:11:00	18.82	91.95	4.20	1.39	141.38	19.47	94.2	1.22	79.85	
03/30/05	10:12:00	18.88	93.98	4.20	1.38	141.71	19.45	95.0	1.20	79.58	
03/30/05	10:13:00	18.74	84.57	4.19	1.36	141.51	19.42	86.3	1.17	79.41	
03/30/05	10:14:00	18.73	80.13	4.20	1.30	141.49	19.40	81.6	1.14	79.16	
03/30/05	10:15:00	18.41	87.15	4.15	1.35	141.25	19.07	89.2	1.19	78.96	
03/30/05	10:16:00	18.14	84.63	4.13	1.38	141.53	18.83	87.0	1.19	78.96	
03/30/05	10:17:01	18.29	80.60	4.16	1.32	141.59	18.96	81.9	1.16	78.76	
03/30/05	10:18:01	18.23	78.44	4.14	1.34	141.68	18.91	79.8	1.16	78.55	
03/30/05	10:19:00	18.19	75.61	4.15	1.28	141.25	18.87	77.1	1.12	78.51	
03/30/05	10:20:00	18.16	76.81	4.14	1.31	140.10	18.81	78.5	1.16	78.51	
03/30/05	10:21:00	18.18	80.36	4.13	1.38	138.38	18.86	82.4	1.19	78.54	
03/30/05	10:22:00	18.28	81.07	4.15	1.36	137.98	18.97	82.4	1.17	78.66	
03/30/05	10:23:00	18.27	89.53	4.15	1.37	137.23	18.94	93.3	1.21	78.79	
03/30/05	10:24:01	18.20	95.28	4.13	1.47	135.58	18.94	98.0	1.25	78.83	
03/30/05	10:25:00	18.39	92.99	4.15	1.43	134.30	19.04	94.8	1.26	78.59	
03/30/05	10:26:00	18.41	83.26	4.15	1.48	133.80	19.16	86.2	1.25	78.51	
03/30/05	10:27:00	18.61	81.64	4.20	1.35	133.76	19.29	83.3	1.16	78.46	



Date	Time	NO <sub>x</sub> _1	CO_1	CO2	O <sub>2</sub> _1	SO <sub>2</sub>	NO <sub>x</sub> _2	CO_2	O <sub>2</sub> _2	ADC Temp	Calibration Status
Compliance System						Backup System					
		ppm	%	%	%	%	ppm	%	degF	degF	
03/30/05	10:28:00	18.68	79.49	4.21	1.28	134.46	19.30	80.8	1.17	78.09	
03/30/05	10:29:00	18.46	84.39	4.16	1.39	134.16	19.15	87.6	1.19	78.06	
03/30/05	10:30:00	18.52	77.59	4.17	1.32	133.57	19.20	77.7	1.14	78.00	
03/30/05	10:31:00	18.69	60.32	4.17	1.28	133.29	19.39	60.7	1.09	77.74	
03/30/05	10:32:00	18.47	58.99	4.15	1.27	133.44	19.13	60.4	1.13	77.70	
03/30/05	10:33:00	17.98	79.27	4.08	1.42	133.71	18.67	81.5	1.27	77.72	
03/30/05	10:34:00	17.74	91.75	4.06	1.49	133.31	18.43	95.0	1.34	77.82	
03/30/05	10:35:00	18.02	92.77	4.08	1.50	133.68	18.67	95.2	1.34	77.99	
03/30/05	10:36:00	18.00	97.78	4.08	1.50	133.44	18.68	100.5	1.33	78.06	
03/30/05	10:37:00	18.24	91.65	4.13	1.46	133.23	18.92	94.2	1.27	78.06	
03/30/05	10:38:00	18.33	91.67	4.16	1.40	133.10	18.96	93.7	1.27	78.06	
03/30/05	10:39:00	18.35	101.19	4.16	1.42	132.85	18.98	104.5	1.29	77.89	
03/30/05	10:40:01	18.32	102.18	4.13	1.51	131.08	19.02	105.2	1.32	77.63	
03/30/05	10:41:00	18.41	104.34	4.16	1.46	130.47	19.07	107.6	1.31	77.59	
03/30/05	10:42:00	18.56	104.02	4.15	1.50	130.20	19.27	107.5	1.34	77.56	
03/30/05	10:43:00	18.83	96.00	4.17	1.45	129.39	19.49	97.7	1.30	77.26	
03/30/05	10:44:00	18.86	84.25	4.16	1.42	129.22	19.54	85.7	1.27	77.17	
03/30/05	10:45:00	18.92	79.17	4.17	1.41	129.44	19.58	80.4	1.27	77.18	
03/30/05	10:46:00	18.60	81.16	4.15	1.42	129.17	19.25	82.8	1.28	77.29	
03/30/05	10:47:01	18.38	85.45	4.12	1.47	128.80	19.02	88.3	1.34	77.53	
03/30/05	10:48:01	18.20	94.54	4.10	1.55	128.03	18.84	97.2	1.39	77.52	
03/30/05	10:49:00	18.41	97.98	4.11	1.56	126.39	19.01	99.6	1.42	77.40	
03/30/05	10:50:00	18.46	97.46	4.11	1.59	126.15	19.09	101.6	1.39	77.21	
03/30/05	10:51:00	18.61	90.81	4.13	1.50	125.89	19.24	91.3	1.35	77.16	
03/30/05	10:52:00	18.63	90.85	4.12	1.52	126.09	19.27	91.4	1.38	77.16	
03/30/05	10:53:00	18.96	83.59	4.12	1.55	126.08	19.60	85.2	1.38	77.13	
03/30/05	10:54:01	18.78	87.48	4.11	1.52	125.44	19.47	89.2	1.36	76.83	
03/30/05	10:55:01	18.66	90.52	4.11	1.55	125.47	19.35	91.8	1.37	76.71	
03/30/05	10:56:00	18.72	90.91	4.11	1.56	125.70	19.42	92.3	1.39	76.71	
03/30/05	10:57:00	18.48	98.94	4.08	1.60	125.68	19.14	101.3	1.45	76.49	
03/30/05	10:58:00	18.59	97.51	4.09	1.62	125.79	19.26	98.5	1.47	76.26	
03/30/05	10:59:00	18.73	95.25	4.10	1.66	127.38	19.44	97.9	1.47	76.26	
03/30/05	11:00:01	18.93	91.09	4.12	1.64	129.46	19.65	91.0	1.48	76.08	
03/30/05	11:01:00	18.76	97.54	4.12	1.66	127.13	19.45	98.8	1.51	75.83	
03/30/05	11:02:00	18.92	98.84	4.12	1.68	126.34	19.61	100.1	1.52	75.81	
03/30/05	11:03:00	19.16	93.22	4.15	1.60	125.86	19.82	92.5	1.48	75.78	
03/30/05	11:04:00	19.13	93.93	4.15	1.60	125.71	19.79	94.6	1.47	75.47	
03/30/05	11:05:00	19.08	89.23	4.12	1.63	125.57	19.75	88.5	1.47	75.36	
03/30/05	11:06:00	19.42	75.91	4.12	1.61	126.24	20.13	75.4	1.45	75.36	
03/30/05	11:07:00	19.19	80.83	4.11	1.64	126.46	19.91	80.7	1.48	75.29	
03/30/05	11:08:00	17.92	85.94	3.91	1.67	126.57	19.02	85.8	1.56	74.95	
03/30/05	11:09:01	-0.35	2.32	-0.22	0.00	33.70	0.22	-5.4	0.05	74.95	Calibrating Both Systems
03/30/05	11:10:00	-0.52	-2.79	-0.32	-0.01	0.80	-0.06	-3.8	0.00	74.91	Calibrating Both Systems
03/30/05	11:11:01	-0.53	-0.08	-0.36	2.62	-0.81	-0.07	-0.2	2.46	74.88	Calibrating Both Systems
03/30/05	11:12:00	-0.55	-0.28	-0.42	4.94	-1.46	-0.08	-0.7	4.96	74.77	Calibrating Both Systems
03/30/05	11:13:00	-0.51	19.13	4.71	1.11	-1.60	0.00	19.1	1.34	74.55	Calibrating Both Systems
03/30/05	11:14:00	-0.58	29.88	6.54	-0.03	-2.06	-0.05	27.8	-0.01	74.46	Calibrating Both Systems
03/30/05	11:15:01	-0.56	18.04	3.19	-0.02	46.96	-0.06	15.0	0.00	74.45	Calibrating Both Systems
03/30/05	11:16:01	-0.55	-1.30	-0.44	-0.01	175.04	-0.11	-2.7	0.00	74.42	Calibrating Both Systems
03/30/05	11:17:01	-0.46	-1.58	-0.48	0.01	182.03	-0.11	-2.8	0.00	74.18	Calibrating Both Systems
03/30/05	11:18:00	18.34	85.68	3.86	1.75	139.44	18.31	92.8	1.57	74.02	

Date	Time	NO <sub>x</sub> _1	CO_1	CO2	O <sub>2</sub> _1	SO <sub>2</sub>	NO <sub>x</sub> _2	CO_2	O <sub>2</sub> _2	ADC Temp	Calibration Status
Compliance System						Backup System					
		ppm	%	%	%	%	ppm	%	degF	degF	
03/30/05	11:19:00	19.12	83.03	4.00	1.68	125.88	19.80	83.7	1.56	74.01	
03/30/05	11:20:00	18.78	78.19	3.96	1.78	125.23	19.53	79.4	1.59	74.01	
03/30/05	11:21:00	18.64	77.51	3.96	1.76	123.17	19.41	78.7	1.60	73.99	
03/30/05	11:22:00	18.44	80.58	3.93	1.77	122.31	19.17	82.1	1.64	73.91	
03/30/05	11:23:00	18.38	89.20	3.93	1.78	122.15	19.05	90.7	1.68	73.83	
03/30/05	11:24:00	18.55	83.91	3.94	1.78	122.77	19.23	84.7	1.66	73.69	
03/30/05	11:25:00	18.43	88.97	3.93	1.82	123.16	19.08	90.5	1.70	73.70	
03/30/05	11:26:00	18.33	90.37	3.93	1.87	122.50	19.04	92.5	1.72	73.61	
03/30/05	11:27:00	18.28	97.12	3.93	1.89	122.59	19.00	98.9	1.74	73.70	
03/30/05	11:28:00	18.42	97.67	3.95	1.91	122.41	19.14	100.1	1.74	73.69	
03/30/05	11:29:00	18.51	102.14	3.97	1.89	122.94	19.20	105.1	1.78	73.81	
03/30/05	11:30:00	18.51	107.30	3.98	1.96	122.58	19.26	110.6	1.79	73.91	
03/30/05	11:31:00	18.73	105.95	4.01	1.93	122.68	19.43	107.2	1.78	73.95	
03/30/05	11:32:00	19.02	94.53	4.05	1.91	122.68	19.77	96.8	1.76	73.99	
03/30/05	11:33:00	19.13	97.43	4.07	1.88	122.81	19.87	100.1	1.73	74.01	
03/30/05	11:34:00	19.13	89.03	4.09	1.90	122.80	19.91	90.7	1.71	74.01	
03/30/05	11:35:00	18.98	95.25	4.10	1.87	123.04	19.70	97.4	1.73	74.01	
03/30/05	11:36:01	18.95	88.50	4.10	1.86	123.28	19.64	89.6	1.73	74.01	
03/30/05	11:37:00	18.80	83.29	4.08	1.90	123.22	19.54	84.0	1.73	74.01	
03/30/05	11:38:00	18.80	84.74	4.08	1.86	123.15	19.50	86.4	1.71	74.01	
03/30/05	11:39:00	18.72	85.08	4.08	1.85	123.50	19.43	85.9	1.71	74.01	
03/30/05	11:40:00	18.42	92.62	4.05	1.92	123.86	19.08	94.5	1.79	74.01	
03/30/05	11:41:00	18.38	96.31	4.06	1.94	123.44	19.09	98.9	1.80	74.01	
03/30/05	11:42:00	18.36	98.23	4.07	1.92	124.16	19.03	100.5	1.82	74.01	
03/30/05	11:43:00	18.20	98.97	4.06	2.00	124.46	18.90	101.8	1.86	74.01	
03/30/05	11:44:00	18.61	90.59	4.11	1.89	123.55	19.25	91.5	1.80	74.01	
03/30/05	11:45:00	18.58	87.45	4.08	2.00	123.40	19.33	88.4	1.80	74.01	
03/30/05	11:46:00	18.56	84.40	4.09	1.99	122.23	19.29	85.4	1.82	73.89	
03/30/05	11:47:00	18.38	91.13	4.08	2.00	122.33	19.05	92.9	1.86	73.66	
03/30/05	11:48:00	18.33	93.39	4.08	2.03	121.98	19.06	96.1	1.86	73.56	
03/30/05	11:49:01	18.43	96.83	4.10	2.00	122.12	19.12	99.5	1.86	73.56	
03/30/05	11:50:01	18.38	94.43	4.11	2.02	122.02	19.10	96.0	1.88	73.56	
03/30/05	11:51:00	18.56	86.90	4.12	2.00	121.77	19.26	87.4	1.84	73.54	
03/30/05	11:52:00	18.43	85.88	4.11	2.00	122.81	19.13	87.3	1.87	73.55	
03/30/05	11:53:00	18.47	83.96	4.10	2.01	122.22	19.17	83.8	1.86	73.43	
03/30/05	11:54:00	18.24	92.77	4.08	2.06	121.93	18.95	95.8	1.91	73.22	
03/30/05	11:55:00	18.30	99.74	4.10	2.01	121.51	18.96	102.8	1.91	73.12	
03/30/05	11:56:00	18.33	94.34	4.09	2.02	121.73	19.08	95.0	1.88	73.11	
03/30/05	11:57:00	18.22	89.51	4.09	2.03	122.71	18.94	91.3	1.88	73.11	
03/30/05	11:58:00	18.38	83.75	4.10	2.01	122.61	19.07	83.6	1.89	73.11	
03/30/05	11:59:00	18.33	79.13	4.09	2.05	122.87	19.05	79.4	1.92	73.11	
03/30/05	12:00:00	18.22	84.65	4.09	2.06	122.89	18.93	85.6	1.93	73.11	
03/30/05	12:01:00	18.12	88.80	4.09	2.06	121.31	18.85	90.8	1.95	73.11	
03/30/05	12:02:00	18.07	97.88	4.08	2.11	121.23	18.76	100.4	2.00	73.10	
03/30/05	12:03:00	18.25	96.58	4.11	2.11	121.45	18.97	98.2	1.97	73.10	
03/30/05	12:04:01	18.43	91.52	4.13	2.10	121.60	19.16	92.1	1.94	73.11	
03/30/05	12:05:00	18.49	83.74	4.14	2.12	121.10	19.23	85.5	1.95	73.11	
03/30/05	12:06:00	18.39	89.49	4.16	2.07	120.83	19.08	90.7	1.95	73.11	
03/30/05	12:07:01	18.43	86.26	4.17	2.08	120.03	19.16	87.7	1.92	73.11	
03/30/05	12:08:00	18.47	88.46	4.19	2.03	120.46	19.16	90.7	1.92	73.11	
03/30/05	12:09:00	18.37	87.73	4.17	2.12	119.62	19.10	89.3	1.96	73.11	

Date	Time	NO <sub>x</sub> _1	CO_1	CO2	O <sub>2</sub> _1	SO <sub>2</sub>	NOx_2	CO_2	O <sub>2</sub> _2	ADC Temp	Calibration Status
Compliance System						Backup System					
		ppm	%	%	%	%	ppm	%	degF	degF	
03/30/05	12:10:00	18.24	90.76	4.18	2.09	119.50	18.93	92.4	1.97	73.14	
03/30/05	12:11:00	18.17	90.37	4.16	2.13	119.19	18.89	92.6	1.98	73.24	
03/30/05	12:12:00	18.26	86.00	4.19	2.09	119.26	18.95	87.8	1.95	73.40	
03/30/05	12:13:00	18.23	86.07	4.20	2.07	119.30	18.92	87.1	1.93	73.51	
03/30/05	12:14:00	18.15	86.34	4.20	2.07	118.97	18.81	86.6	1.96	73.54	
03/30/05	12:15:00	18.22	80.79	4.21	2.05	119.02	18.89	81.1	1.94	73.52	
03/30/05	12:16:00	17.91	84.06	4.19	2.15	118.14	18.62	86.4	1.97	73.49	
03/30/05	12:17:00	17.96	92.53	4.20	2.14	118.55	18.63	93.5	2.00	73.40	
03/30/05	12:18:00	17.89	92.55	4.21	2.10	118.48	18.51	93.7	1.97	73.29	
03/30/05	12:19:00	18.02	82.36	4.23	2.05	119.01	18.67	83.5	1.93	73.16	
03/30/05	12:20:00	18.03	81.88	4.24	2.01	119.42	18.64	82.6	1.92	73.11	
03/30/05	12:21:00	17.80	90.26	4.19	2.17	118.90	18.51	93.1	1.99	73.11	
03/30/05	12:22:00	17.94	86.61	4.21	2.07	118.49	18.58	87.8	1.97	73.11	
03/30/05	12:23:00	7.22	47.55	1.81	3.54	86.83	8.25	42.5	3.41	73.10	
03/30/05	12:24:00	-0.46	-3.82	0.07	4.78	3.57	0.04	-6.8	4.92	73.03	Calibrating Both Systems
03/30/05	12:25:01	-0.54	24.18	6.61	0.01	-0.41	0.00	22.6	0.12	72.86	Calibrating Both Systems
03/30/05	12:26:01	-0.45	6.41	1.46	0.00	-0.95	0.03	1.5	0.01	72.76	Calibrating Both Systems
03/30/05	12:27:00	-0.41	-3.77	0.00	0.00	15.26	5.50	17.1	0.59	72.71	Calibrating Compliance System
03/30/05	12:28:01	-0.56	-5.03	-0.11	-0.01	169.33	18.58	79.5	1.87	72.68	Calibrating Compliance System
03/30/05	12:29:01	-0.56	-5.38	-0.17	-0.01	181.51	18.47	86.9	1.93	72.66	Calibrating Compliance System
03/30/05	12:30:00	-0.56	-5.47	-0.23	-0.01	183.32	18.33	97.9	2.00	72.65	Calibrating Compliance System
03/30/05	12:31:00	13.54	74.59	3.02	1.75	152.80	18.39	118.3	2.07	72.63	
03/30/05	12:32:00	18.04	108.18	4.05	2.17	122.52	18.83	108.7	2.03	72.49	
03/30/05	12:33:00	18.38	98.90	4.08	2.12	121.20	19.09	102.1	2.02	72.27	
03/30/05	12:34:00	18.72	93.13	4.13	2.07	119.62	19.43	92.3	1.94	72.21	
03/30/05	12:35:00	18.50	93.92	4.11	2.12	119.48	19.20	95.8	1.99	72.21	
03/30/05	12:36:00	18.54	90.05	4.12	2.11	118.94	19.22	91.9	2.03	72.21	
03/30/05	12:37:01	18.59	88.76	4.12	2.12	118.58	19.25	88.9	1.99	72.21	
03/30/05	12:38:01	18.59	74.24	4.11	2.06	118.32	19.26	73.9	1.91	72.21	
03/30/05	12:39:00	18.47	73.85	4.12	1.97	118.24	19.11	73.3	1.90	72.21	
03/30/05	12:40:00	18.35	74.23	4.09	2.02	118.72	18.98	74.5	1.92	72.21	
03/30/05	12:41:00	18.11	78.35	4.07	2.08	118.93	18.84	79.9	1.93	72.21	
03/30/05	12:42:00	18.11	84.87	4.06	2.14	118.72	18.83	85.4	2.01	72.21	
03/30/05	12:43:00	18.01	92.46	4.05	2.23	118.07	18.76	95.1	2.08	72.23	
03/30/05	12:44:00	18.13	95.21	4.07	2.25	117.60	18.88	97.5	2.10	72.40	
03/30/05	12:45:00	18.39	93.57	4.10	2.25	117.40	19.18	95.0	2.08	72.58	
03/30/05	12:46:01	18.42	91.08	4.13	2.24	117.54	19.18	93.3	2.10	72.66	
03/30/05	12:47:00	18.45	95.27	4.15	2.17	116.77	19.13	96.0	2.07	72.66	
03/30/05	12:48:00	18.33	84.93	4.16	2.16	117.30	19.11	85.2	2.01	72.66	
03/30/05	12:49:00	18.26	83.50	4.14	2.20	117.40	19.01	84.6	2.03	72.68	
03/30/05	12:50:00	17.96	84.06	4.13	2.25	117.08	18.73	86.9	2.05	72.74	
03/30/05	12:51:00	17.95	86.04	4.14	2.23	116.61	18.69	87.5	2.04	72.98	
03/30/05	12:52:00	17.84	85.80	4.13	2.24	116.71	18.58	87.6	2.07	73.09	
03/30/05	12:53:01	18.03	81.15	4.17	2.17	117.53	18.70	80.6	2.06	73.10	
03/30/05	12:54:00	18.11	71.21	4.18	2.20	117.87	18.80	71.2	2.06	73.10	
03/30/05	12:55:00	17.82	81.36	4.15	2.26	117.98	18.56	83.1	2.11	73.11	
03/30/05	12:56:00	17.76	90.46	4.15	2.26	118.80	18.40	93.3	2.16	73.08	
03/30/05	12:57:01	17.83	102.74	4.16	2.32	118.29	18.51	103.6	2.18	73.09	
03/30/05	12:58:00	18.12	93.95	4.19	2.27	117.97	18.79	95.3	2.14	73.06	
03/30/05	12:59:00	18.09	91.56	4.18	2.31	117.22	18.83	91.8	2.14	73.04	
03/30/05	13:00:00	18.13	91.51	4.19	2.34	117.78	18.89	93.0	2.16	72.94	

Date	Time	NO <sub>x</sub> _1	CO_1	CO2	O <sub>2</sub> _1	SO <sub>2</sub>	NO <sub>x</sub> _2	CO_2	O <sub>2</sub> _2	ADC Temp	Calibration Status
Compliance System						Backup System					
		ppm	%	%	%	%	ppm	%	degF	degF	
03/30/05	13:01:00	18.28	89.35	4.21	2.33	117.67	19.00	92.2	2.17	72.82	
03/30/05	13:02:00	18.28	88.17	4.21	2.34	117.80	18.99	88.3	2.20	72.67	
03/30/05	13:03:00	18.25	78.72	4.22	2.31	118.83	18.98	79.3	2.16	72.66	
03/30/05	13:04:04	18.09	85.03	4.20	2.39	118.52	18.83	85.8	2.20	72.69	
03/30/05	13:05:02	18.11	86.19	4.23	2.35	118.52	18.85	85.9	2.20	72.66	
03/30/05	13:06:00	18.07	84.23	4.24	2.41	118.70	18.81	85.1	2.23	72.66	
03/30/05	13:07:00	17.93	98.15	4.24	2.48	118.95	18.68	100.6	2.34	72.66	
03/30/05	13:08:00	17.93	102.55	4.26	2.49	118.98	18.68	104.4	2.36	72.66	
03/30/05	13:09:00	18.06	101.57	4.32	2.54	118.07	18.85	104.0	2.35	72.66	
03/30/05	13:10:00	18.47	96.29	4.42	2.43	118.88	19.19	97.1	2.29	72.66	
03/30/05	13:11:01	18.42	92.15	4.44	2.46	118.92	19.20	94.2	2.30	72.66	
03/30/05	13:12:00	18.48	89.53	4.46	2.47	118.62	19.27	90.5	2.26	72.66	
03/30/05	13:13:00	18.37	92.92	4.48	2.41	119.46	19.10	94.7	2.28	72.64	
03/30/05	13:14:00	18.14	97.19	4.49	2.43	120.07	18.85	99.1	2.29	72.64	
03/30/05	13:15:00	18.17	93.53	4.48	2.50	120.09	18.90	94.0	2.33	72.61	
03/30/05	13:16:00	18.31	90.99	4.52	2.47	119.69	18.98	92.0	2.34	72.57	
03/30/05	13:17:00	18.29	87.45	4.49	2.51	119.34	19.02	89.2	2.33	72.49	
03/30/05	13:18:00	18.13	93.45	4.47	2.54	118.53	18.86	94.9	2.38	72.29	
03/30/05	13:19:00	18.23	94.19	4.45	2.46	119.08	18.94	94.1	2.35	72.22	
03/30/05	13:20:01	18.36	77.09	4.44	2.47	119.33	19.13	77.4	2.29	72.21	
03/30/05	13:21:07	18.52	73.97	4.44	2.43	119.64	19.23	73.6	2.27	72.21	
03/30/05	13:22:00	18.05	79.40	4.46	2.52	119.45	18.81	78.8	2.31	72.21	
03/30/05	13:23:00	17.74	85.67	4.46	2.56	118.72	18.51	88.1	2.36	72.21	
03/30/05	13:24:00	17.76	88.08	4.50	2.55	119.41	18.54	88.1	2.34	72.21	
03/30/05	13:25:00	17.91	85.19	4.52	2.54	119.31	18.73	86.0	2.32	72.20	
03/30/05	13:26:00	17.89	91.12	4.55	2.51	119.10	18.64	92.7	2.35	72.12	
03/30/05	13:27:00	17.84	90.34	4.55	2.53	119.50	18.60	93.8	2.38	71.79	
03/30/05	13:28:00	17.98	90.51	4.58	2.56	120.04	18.73	89.9	2.39	71.76	
03/30/05	13:29:00	18.02	93.89	4.55	2.55	119.52	18.75	96.0	2.40	71.76	
03/30/05	13:30:00	18.08	94.59	4.58	2.61	119.38	18.89	96.2	2.41	71.76	
03/30/05	13:31:00	18.07	96.82	4.57	2.60	119.54	18.83	97.5	2.44	71.76	
03/30/05	13:32:00	18.07	93.95	4.53	2.55	119.75	18.83	95.1	2.43	71.73	
03/30/05	13:33:00	17.84	96.33	4.45	2.57	119.38	18.61	99.0	2.42	71.68	
03/30/05	13:34:01	17.86	93.31	4.48	2.55	119.53	18.61	94.5	2.40	71.48	
03/30/05	13:35:00	7.36	45.80	1.93	3.67	87.83	8.48	39.3	3.56	71.46	
03/30/05	13:36:00	-0.45	1.18	2.21	3.08	3.29	0.03	-1.0	3.33	71.44	Calibrating Both Systems
03/30/05	13:37:00	-0.54	26.09	6.38	-0.02	-0.50	-0.01	22.2	-0.01	71.39	Calibrating Both Systems
03/30/05	13:38:00	-0.57	-4.10	0.01	-0.01	-1.49	-0.06	-9.4	0.00	71.42	Calibrating Both Systems
03/30/05	13:39:01	4.43	17.34	1.17	0.70	88.74	3.28	9.4	0.43	71.55	
03/30/05	13:40:00	3.39	17.91	0.92	0.54	162.49	6.72	29.4	0.93	71.62	
03/30/05	13:41:00	-0.55	-7.76	-0.16	-0.01	182.24	17.93	78.8	2.25	71.28	Calibrating Compliance System
03/30/05	13:42:00	-0.81	-7.65	-0.20	0.13	75.57	0.12	56.4	1.99	71.71	Calibrating Both Systems

## **APPENDIX H – CEMS AND PROCESS DATA LISTING**

## **APPENDIX I – METHOD 15 DATA**

## Summary of H<sub>2</sub>S Calibration for LCR TO440

3/28/2005						
H <sub>2</sub> S concentration (ppmv)	Run	Area	Average	Upper	Lower	Drift (%)
0.1	1	61937	61826	64917	58734	
	2	62727				
	3	60813				
0.5	1	441670	448463	470887	426040	
	2	440139				
	3	463581				
1.0	1	1077437	1066138	1119445	1012831	
	2	1052925				
	3	1068053				

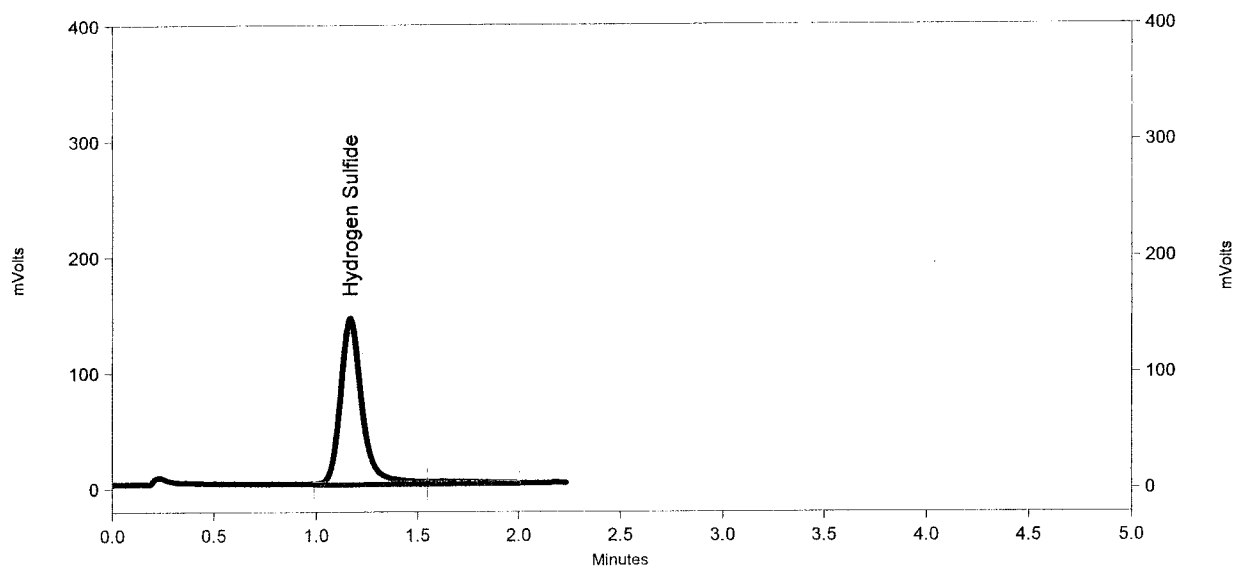
3/29/2005						
H <sub>2</sub> S concentration (ppmv)	Run	Area	Average	Upper	Lower	Drift (%)
0.1	1	61624	61779	64868	58690	0.08
	2	63089				
	3	60624				
0.5	1	503432	523159	549317	497001	16.66
	2	529825				
	3	536220				
1.0	1	1131627	1122333	1178449	1066216	5.27
	2	1128691				
	3	1106680				
				Average Drift (%)		7.33

3/30/2005						
H <sub>2</sub> S concentration (ppmv)	Run	Area	Average	Upper	Lower	Drift (%)
0.1	1	64906	64040	67242	60838	3.58
	2	60873				
	3	66340				
0.5	1	442038	431357	452925	409789	3.81
	2	440806				
	3	411226				
1.0	1	1087991	1125898	1182193	1069603	5.61
	2	1141129				
	3	1148574				
				Average Drift (%)		4.33

# Lyondell - Houston, TX

Sample ID: 1.0 ppm STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\calibration\1.0 ppm std 3-28-2005 3-59-12  
pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/28/2005 4:00:16 PM



## FPD Results

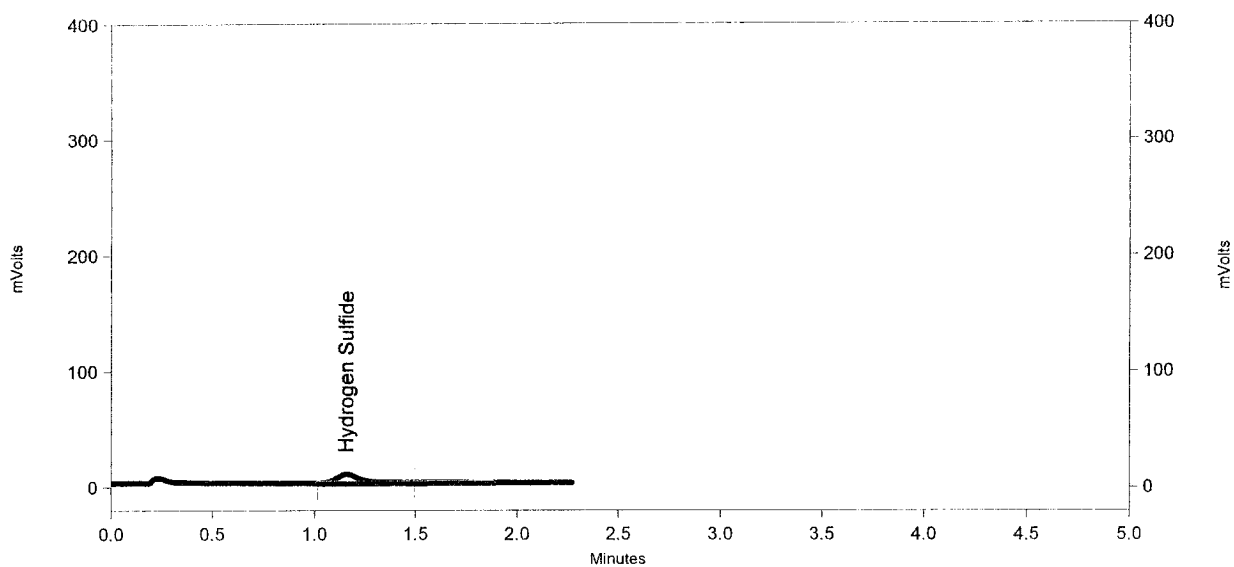
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.167	1068053	1.000 CAL
Totals		1068053	1.000 CAL



# Lyondell - Houston, TX

Sample ID: 0.1 ppm STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\calibration\0.1 ppm std 3-28-2005 5-15-05  
pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/28/2005 5:15:37 PM



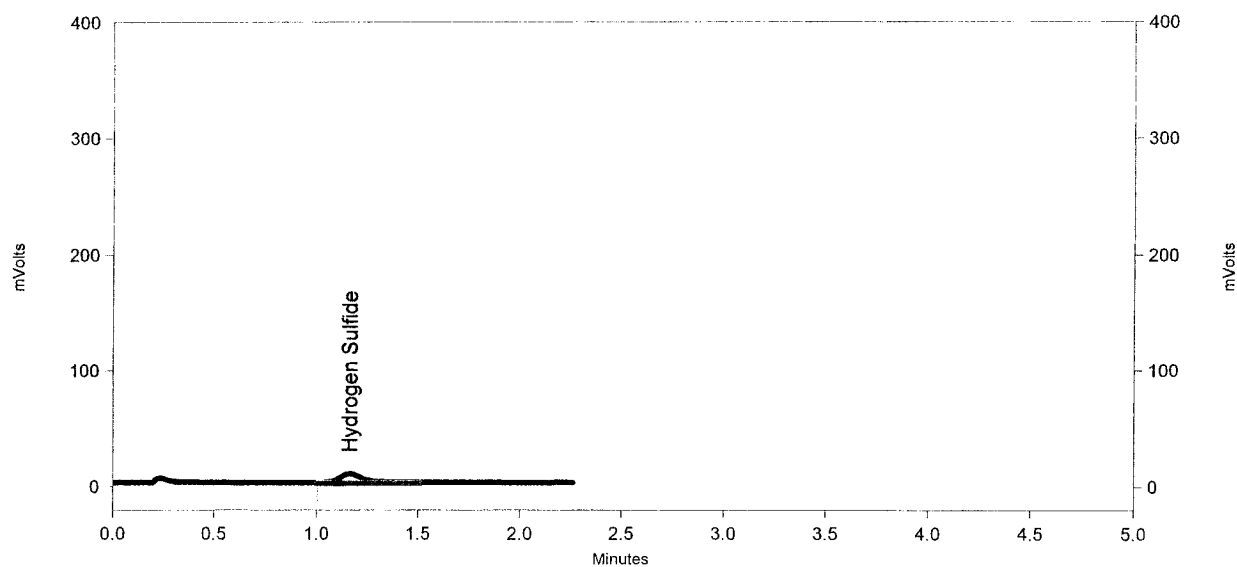
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.155	61937	0.100 CAL
Totals		61937	0.100 CAL

# Lyondell - Houston, TX

Sample ID: 0.1 ppm STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\calibration\0.1 ppm std 3-28-2005 5-44-25  
pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/28/2005 5:44:57 PM



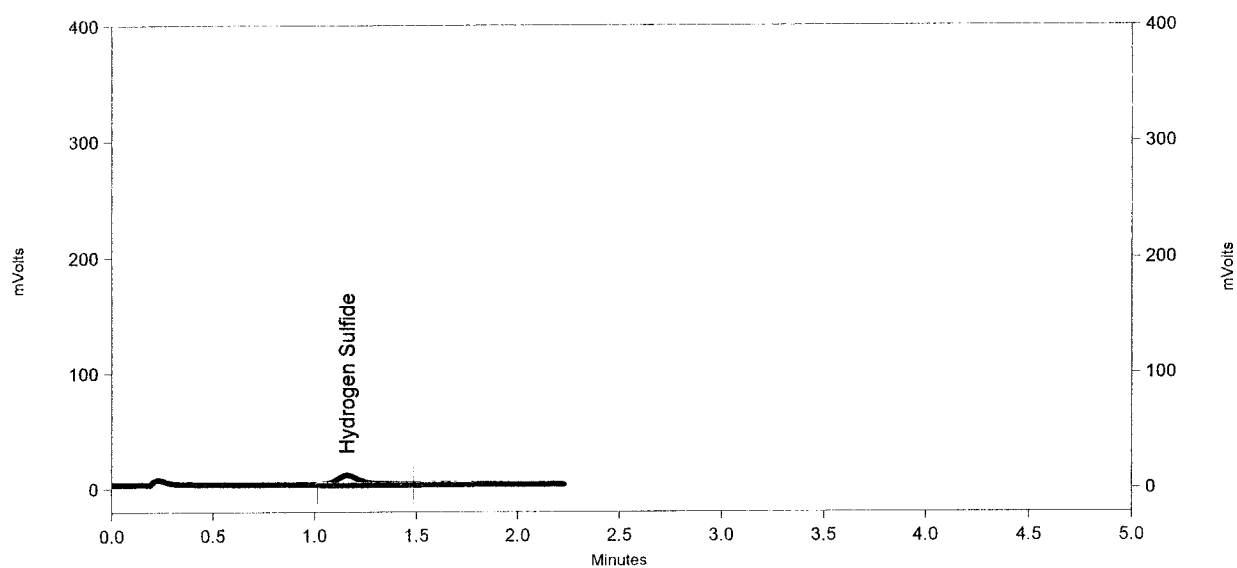
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.162	60813	0.100 CAL
Totals		60813	0.100 CAL

# Lyondell - Houston, TX

Sample ID: 0.1 ppm STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\calibration\0.1 ppm std 3-28-2005 5-47-43  
pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/28/2005 5:48:31 PM



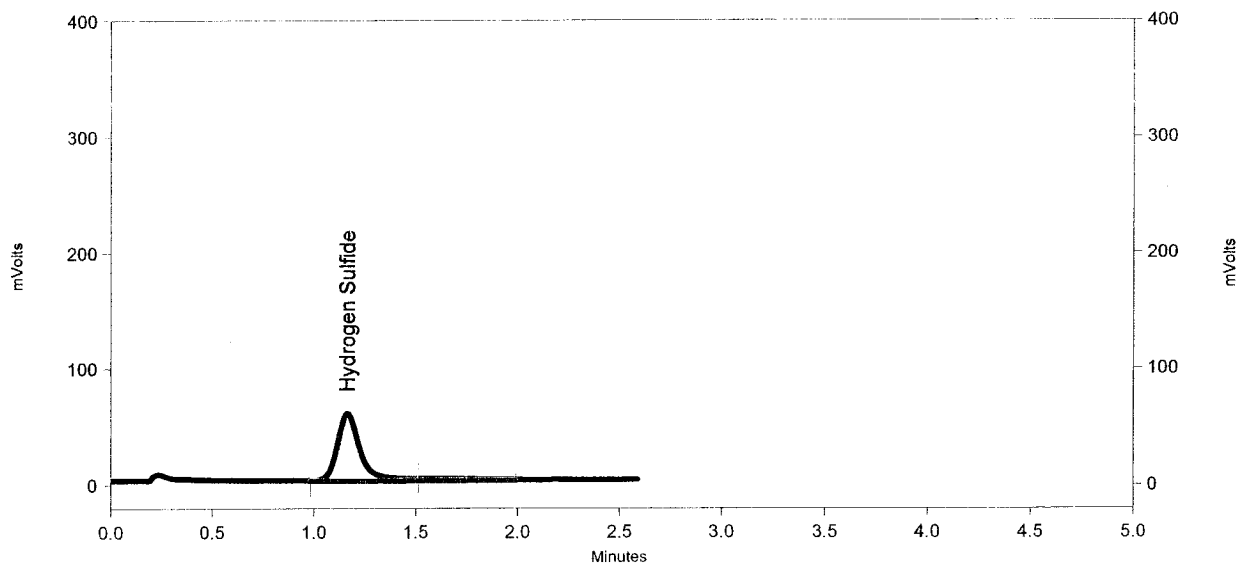
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.160	62727	0.100 CAL
Totals		62727	0.100 CAL

# Lyondell - Houston, TX

Sample ID: 0.5 ppm STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\calibration\0.5 ppm std 3-28-2005 4-09-45  
pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/28/2005 4:10:49 PM



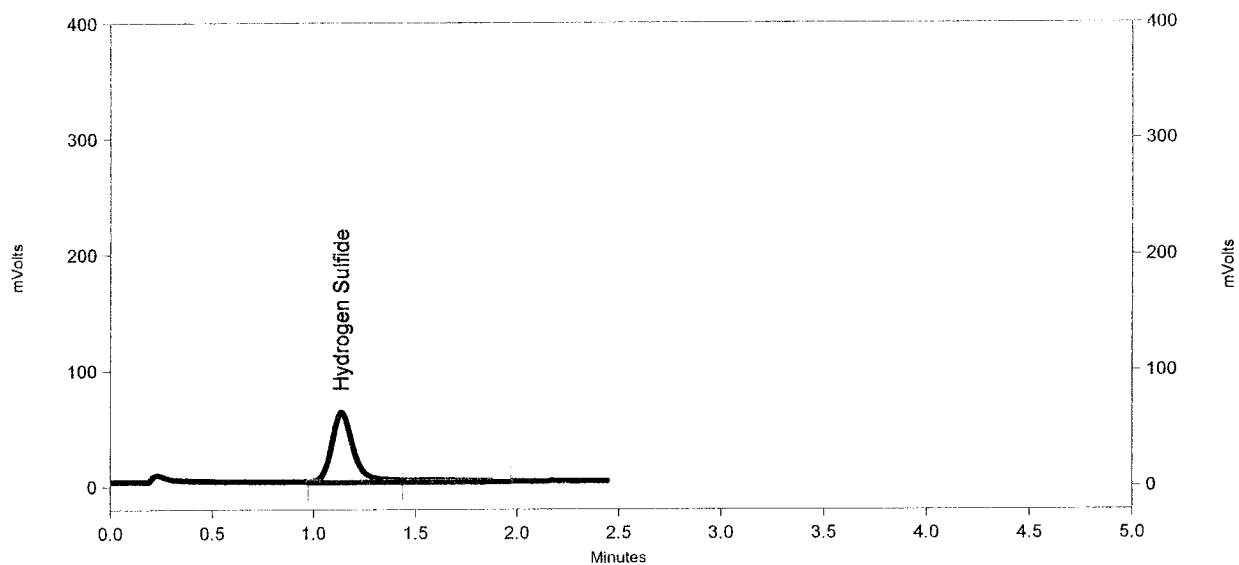
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.163	441670	0.500 CAL
Totals		441670	0.500 CAL

# Lyondell - Houston, TX

Sample ID: 0.5 ppm STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\calibration\0.5 ppm std 3-28-2005 4-32-22  
pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/28/2005 4:32:55 PM



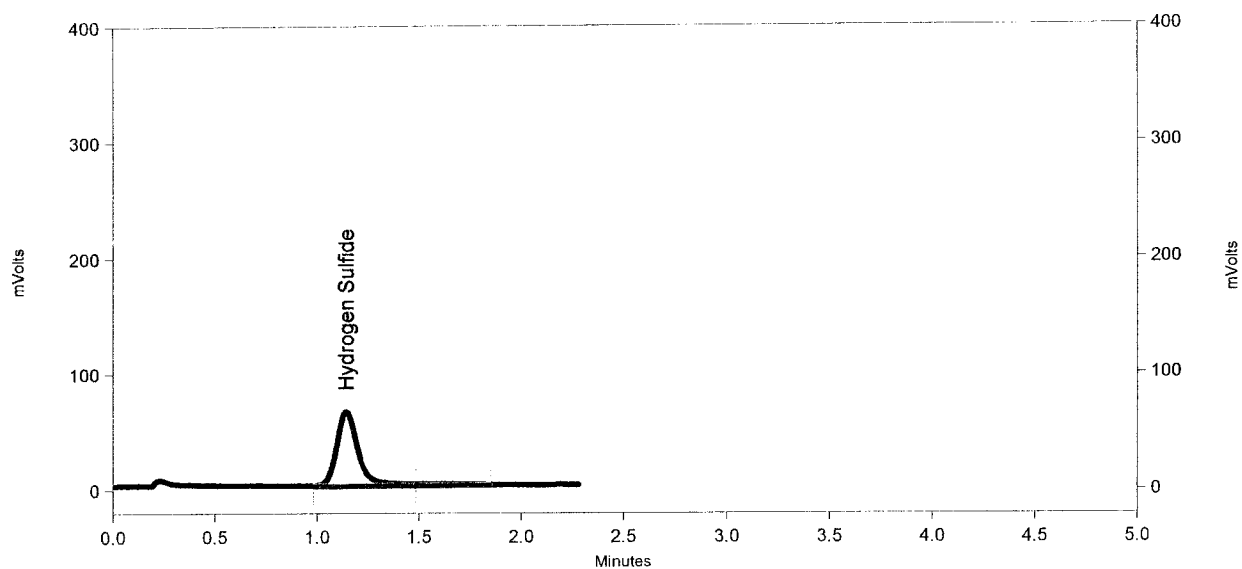
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.135	440139	0.500 CAL
Totals		440139	0.500 CAL

# Lyondell - Houston, TX

Sample ID: 0.5 ppm STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\calibration\0.5 ppm std 3-28-2005 4-44-15  
pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/28/2005 4:44:48 PM



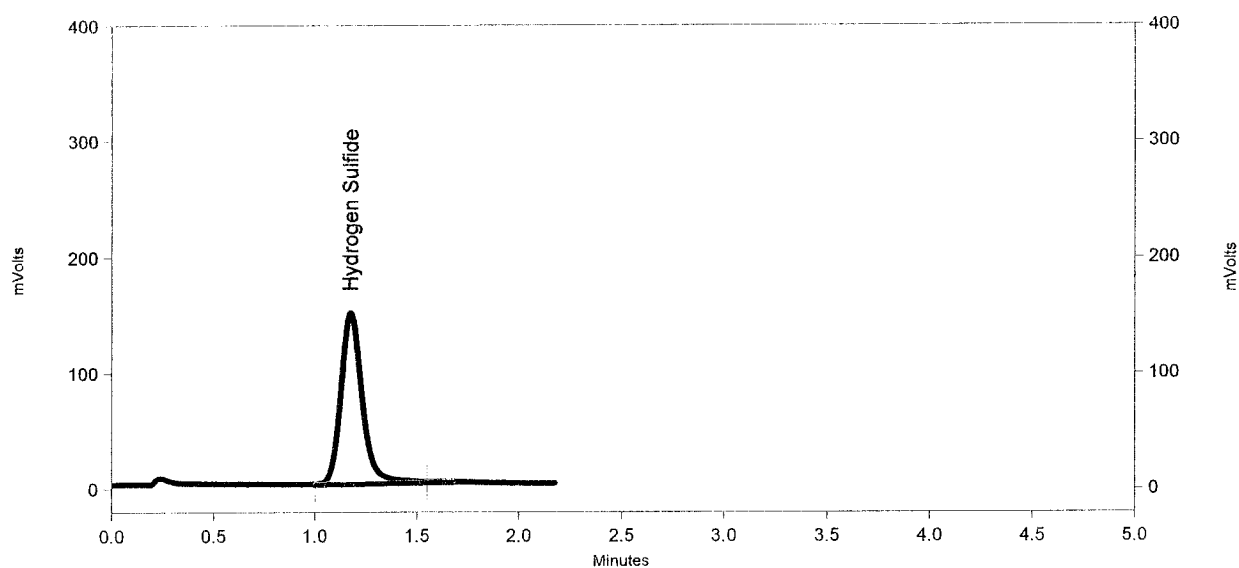
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.142	463581	0.500 CAL
Totals		463581	0.500 CAL

# Lyondell - Houston, TX

Sample ID: 1.0 ppm STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\calibration\1.0 ppm std 3-28-2005 3-52-08  
pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/28/2005 3:53:11 PM



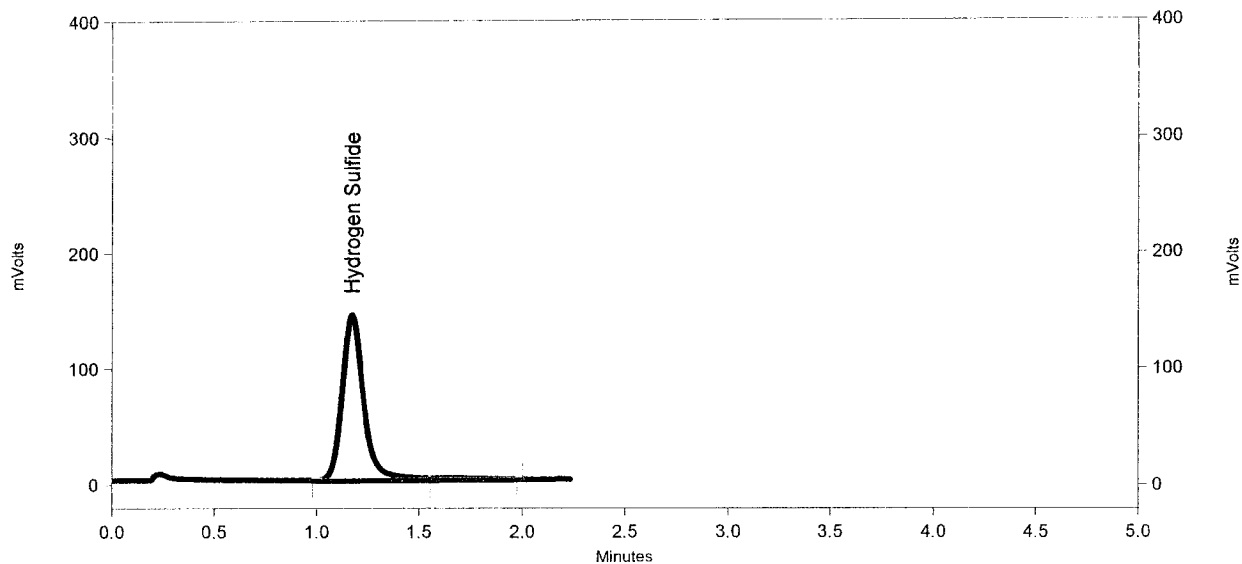
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.175	1077437	1.000 CAL
Totals		1077437	1.000 CAL

# Lyondell - Houston, TX

Sample ID: 1.0 ppm STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\calibration\1.0 ppm std 3-28-2005 3-55-35  
pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/28/2005 3:56:38 PM



## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.172	1052925	1.000 CAL
Totals		1052925	1.000 CAL



**Calibration Report**

Method: C:\CLASS-VP\Data\LCR-440\Low ppm H2S-3-29-05.met  
 Print Time: 3/31/2005 1:48:48 PM  
 User: System  
 Instrument: GC-14B (Offline)

Hydrogen Sulfide (FPD)

Average RF: 1.16185e-006 RF StDev: 4.22553e-007 RF %RSD: 36.3690

Scaling: None LSQ Weighting: None Force Through Zero: On

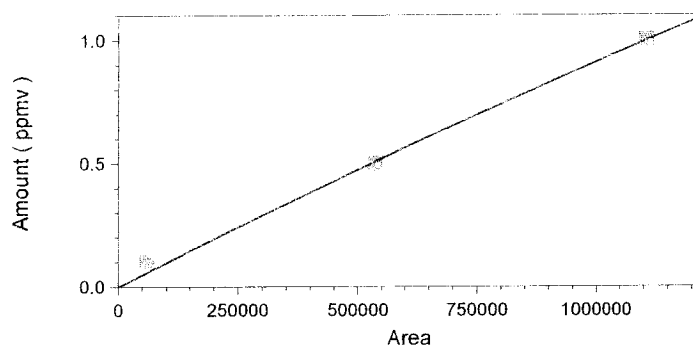
Replicate Mode: Replace

Fit Type: Quadratic

$y = -8.07263e-014x^2 + 9.91283e-007x + 0.000000$

Goodness of fit ( $r^2$ ): 0.995847

Peak: Hydrogen Sulfide -- ESTD -- FPD



	Level 1	Level 2	Level 3
Amount	0.1	0.5	1
Area	60625	536220	1106680
RF	1.649484536 08247e-006	9.32453097609 19e-007	9.036035710413 13e-007
Last Area			
Residual	0.0402002	-0.00833424	0.00183599
Rep StDev	1212.96	17380.7	13513.2
Rep %RSD	1.9639	3.32227	1.20416
Rep 1 Area	61624	503432	1131267
Rep 1 User	System	System	System
Rep 1 Data File	C:\CLASS-V P\Data\LCR-4 40\Drift Check 03-29-05\ST D 0.1 ppm 3-29-2005 5-11-09 PM.dat	C:\CLASS-VP\ Data\LCR-440\ Drift Check 03-29-05\STD 0.5 ppm 3-29-2005 5-51-40 PM.dat	C:\CLASS-VP\ Data\LCR-440\ Drift Check 03-29-05\STD 1.0 ppm 3-29-2005 6-28-09 PM.dat
Rep 1 Sample ID	STD	STD	STD
Rep 1 Calib. Time	3/31/2005 1:46:09 PM	3/31/2005 1:47:07 PM	3/31/2005 1:47:55 PM

**Calibration Report**

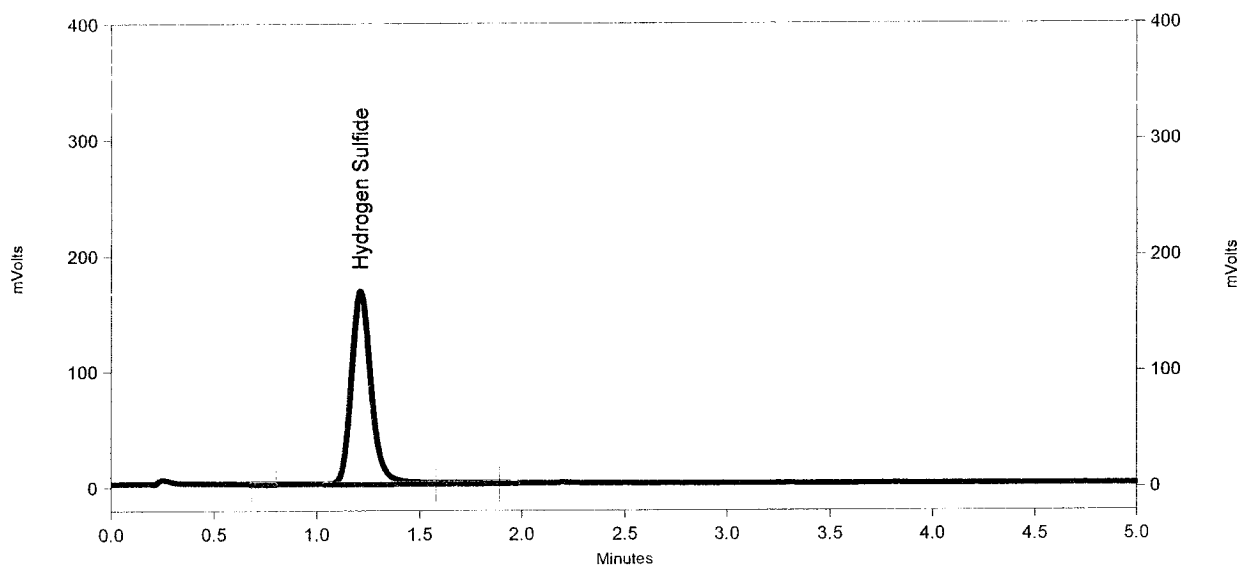
Method: C:\CLASS-VP\Data\LCR-440\Low ppm H2S-3-29-05.met  
 Print Time: 3/31/2005 1:48:48 PM  
 User: System  
 Instrument: GC-14B (Offline)

Rep 2 Area	63039	529825	1128691
Rep 2 User	System	System	System
Rep 2 Data File	C:\CLASS-VP\Data\LCR-440\Drift Check 03-29-05\STD D 0.1 ppm 3-29-2005 5-15-07 PM.dat	C:\CLASS-VP\Data\LCR-440\Drift Check 03-29-05\STD 0.5 ppm 3-29-2005 5-55-40 PM.dat	C:\CLASS-VP\Data\LCR-440\Drift Check 03-29-05\STD 1.0 ppm 3-29-2005 6-32-05 PM.dat
Rep 2 Sample ID	STD	STD	STD
Rep 2 Calib. Time	3/31/2005 1:46:35 PM	3/31/2005 1:47:25 PM	3/31/2005 1:48:09 PM
Rep 3 Area	60625	536220	1106680
Rep 3 User	System	System	System
Rep 3 Data File	C:\CLASS-VP\Data\LCR-440\Drift Check 03-29-05\STD D 0.1 ppm 3-29-2005 5-18-55 PM.dat	C:\CLASS-VP\Data\LCR-440\Drift Check 03-29-05\STD 0.5 ppm 3-29-2005 6-00-15 PM.dat	C:\CLASS-VP\Data\LCR-440\Drift Check 03-29-05\STD 1.0 ppm 3-29-2005 6-37-13 PM.dat
Rep 3 Sample ID	STD	STD	STD
Rep 3 Calib. Time	3/31/2005 1:46:50 PM	3/31/2005 1:47:38 PM	3/31/2005 1:48:21 PM

# Lyondell - Houston, TX

Sample ID: STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\drift check 03-29-05\std 1.0 ppm 3-29-2005  
6-37-13 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 6:37:40 PM



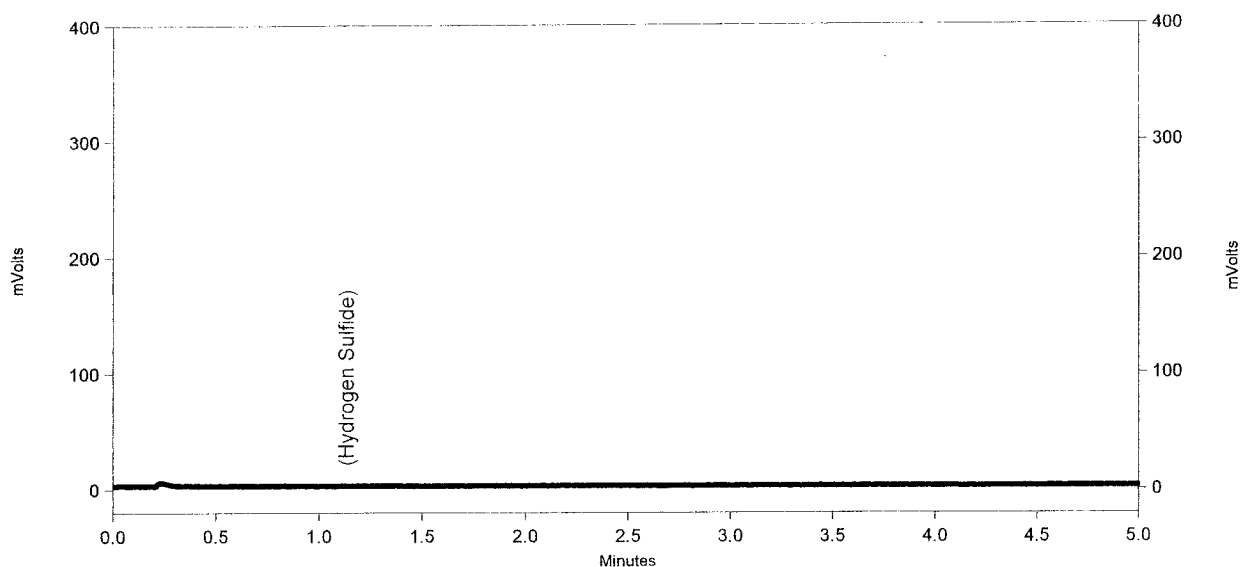
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.208	1106680	1.000 CAL
Totals		1106680	1.000 CAL

# Lyondell - Houston, TX

Sample ID: Blank  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\drift check 03-29-05\blank 3-29-2005 4-33-09  
pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 4:34:45 PM



## FPD Results

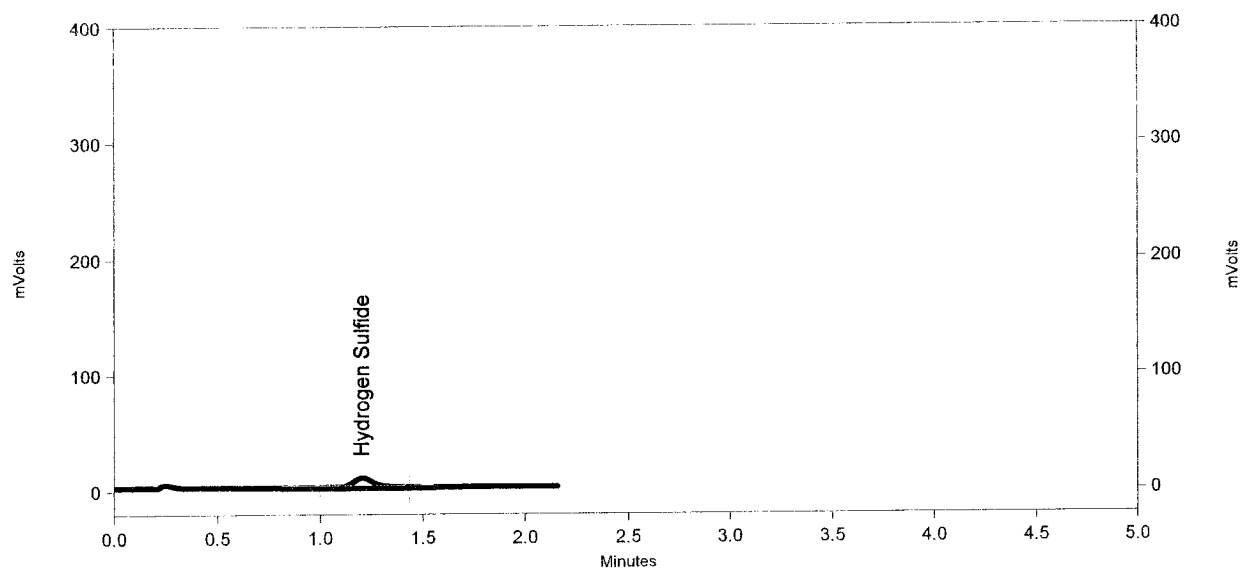
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
--------	--	--	--

# Lyondell - Houston, TX

Sample ID: STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\drift check 03-29-05\std 0.1 ppm 3-29-2005  
5-11-09 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 5:11:36 PM



FPD Results  
Name

Retention Time

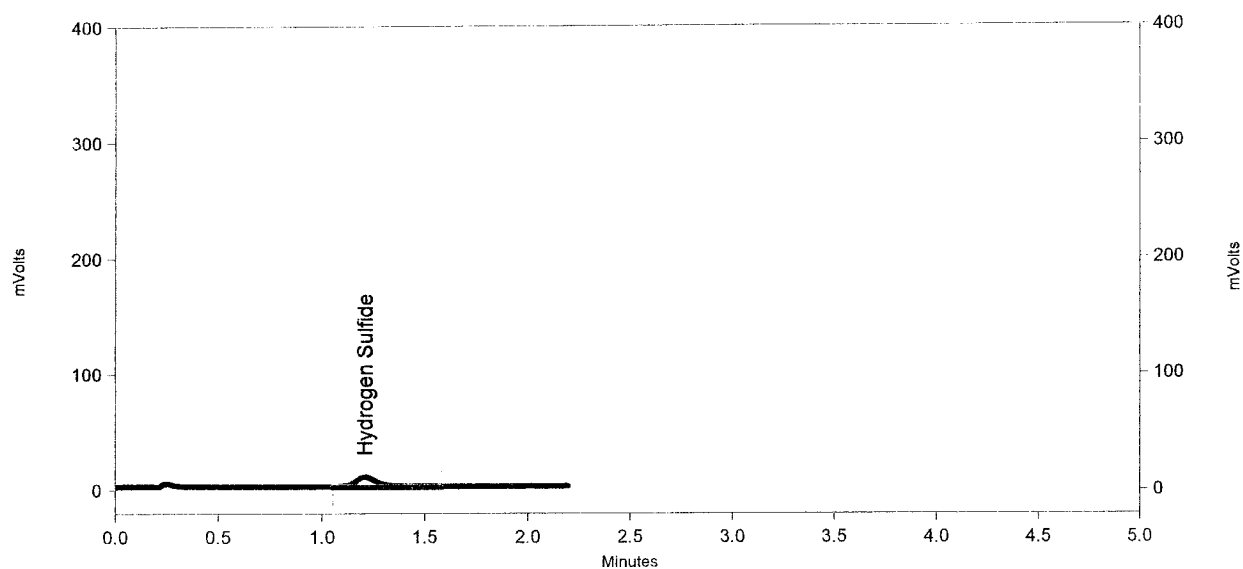
Area ESTD concentration  
(ppmv)

Hydrogen Sulfide	1.202	61624	0.100 CAL
Totals		61624	0.100 CAL

# Lyondell - Houston, TX

Sample ID: STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\drift check 03-29-05\std 0.1 ppm 3-29-2005  
5-15-07 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 5:15:34 PM



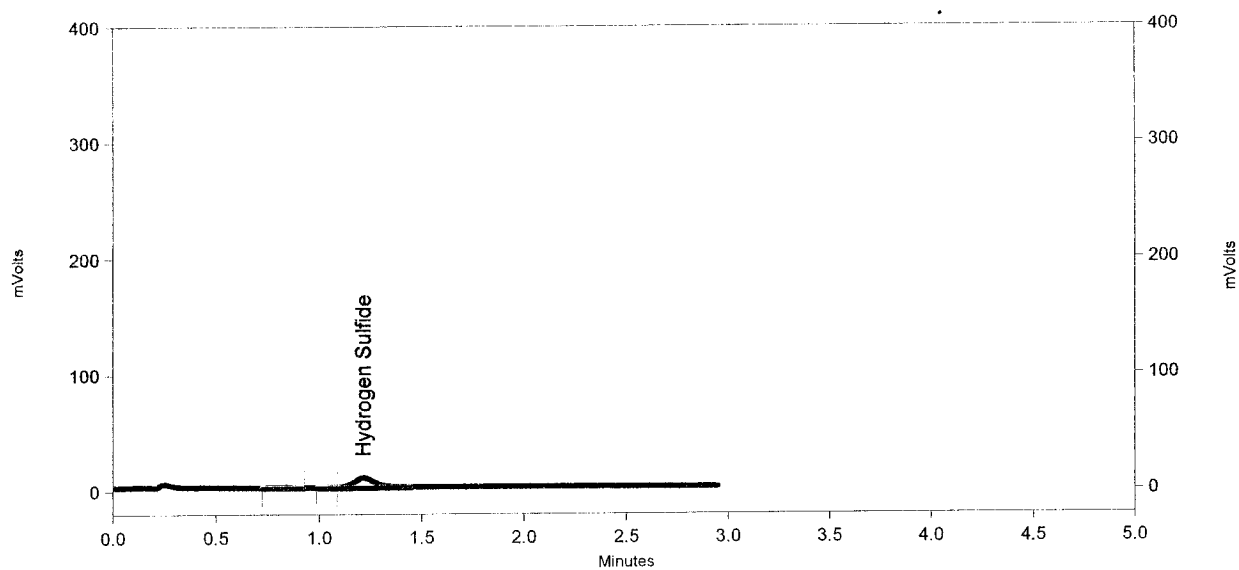
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.208	63039	0.100 CAL
Totals		63039	0.100 CAL

# Lyondell - Houston, TX

Sample ID: STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\drift check 03-29-05\std 0.1 ppm 3-29-2005  
5-18-55 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 5:19:22 PM



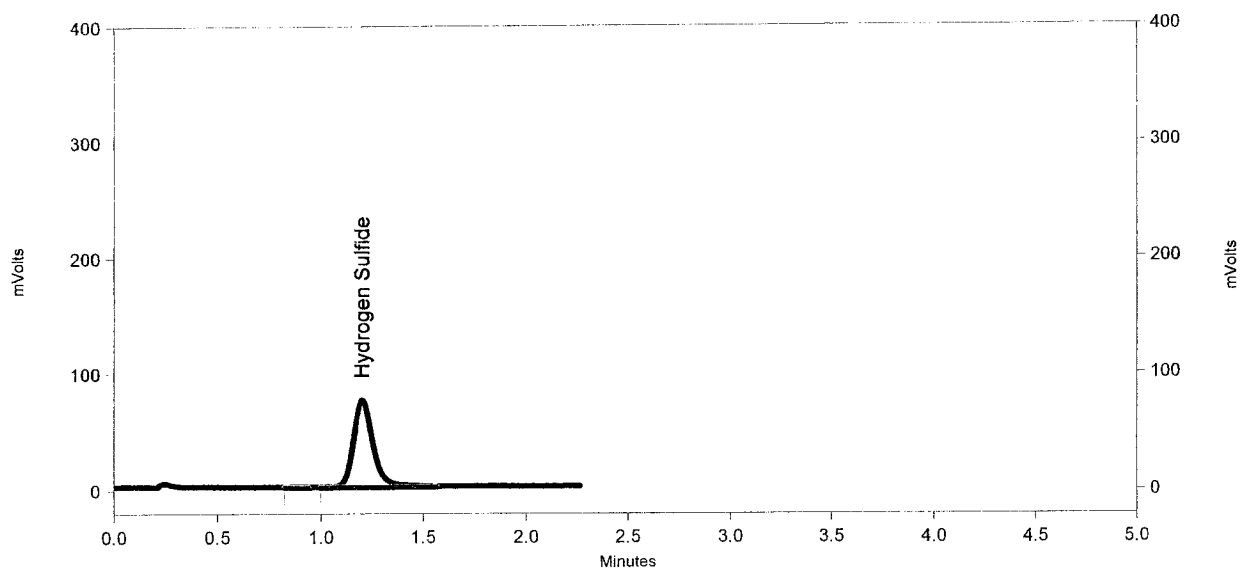
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.215	60625	0.100 CAL
Totals		60625	0.100 CAL

# Lyondell - Houston, TX

Sample ID: STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\drift check 03-29-05\std 0.5 ppm 3-29-2005  
5-51-40 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 5:52:07 PM



## FPD Results

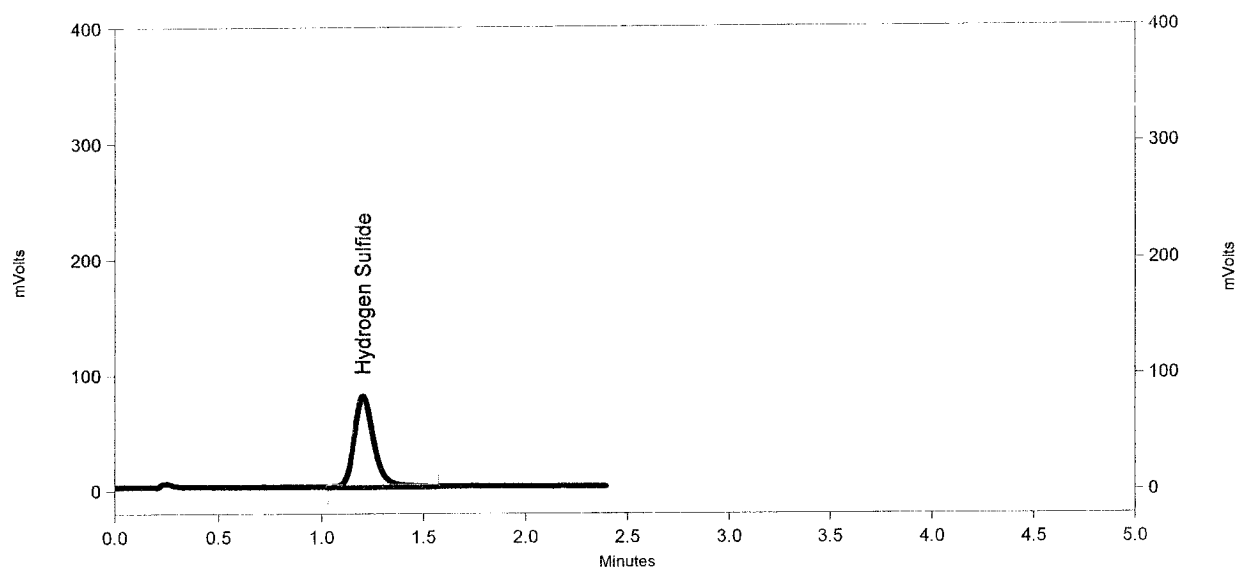
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.202	503432	0.500 CAL
Totals		503432	0.500 CAL



# Lyondell - Houston, TX

Sample ID: STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\drift check 03-29-05\std 0.5 ppm 3-29-2005  
5-55-40 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 5:56:07 PM



FPD Results  
Name

Retention Time

Area

ESTD concentration  
(ppmv)

Hydrogen Sulfide

1.203

529825

0.500 CAL

Totals

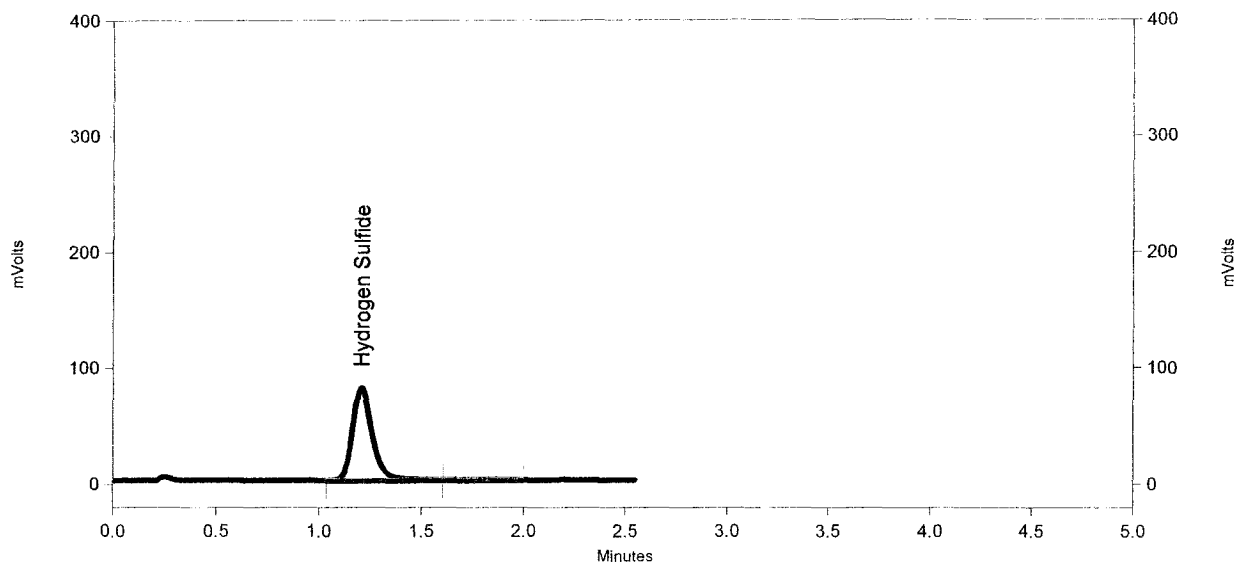
529825

0.500 CAL

# Lyondell - Houston, TX

Sample ID: STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\drift check 03-29-05\std 0.5 ppm 3-29-2005  
6-00-15 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 6:00:42 PM



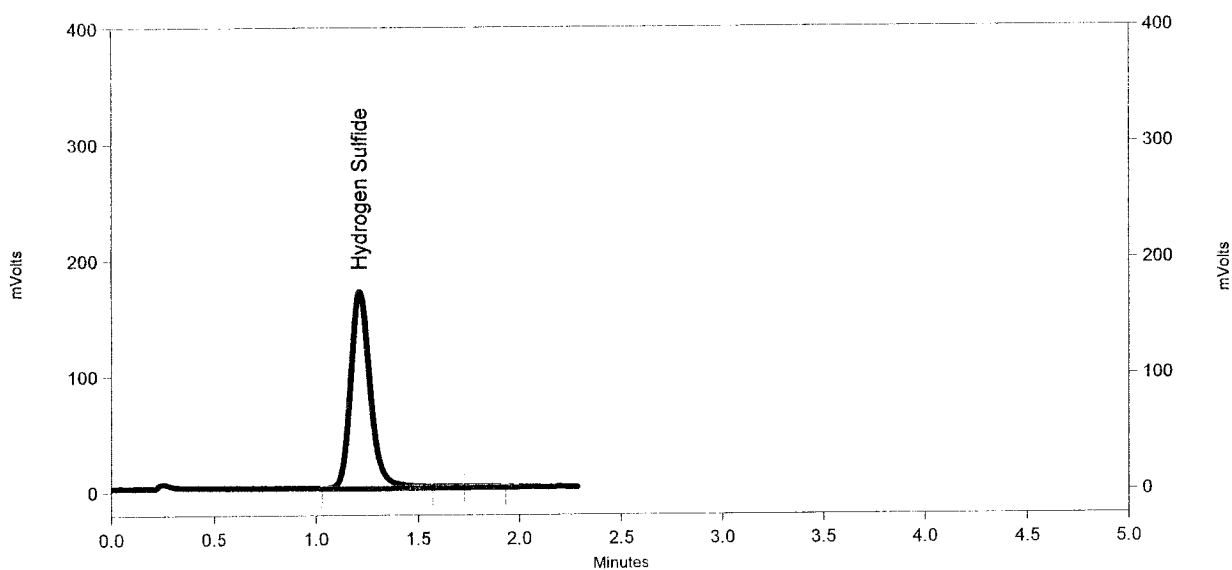
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.210	536220	0.500 CAL
Totals		536220	0.500 CAL

# Lyondell - Houston, TX

Sample ID: STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\drift check 03-29-05\std 1.0 ppm 3-29-2005  
6-28-09 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 6:28:35 PM



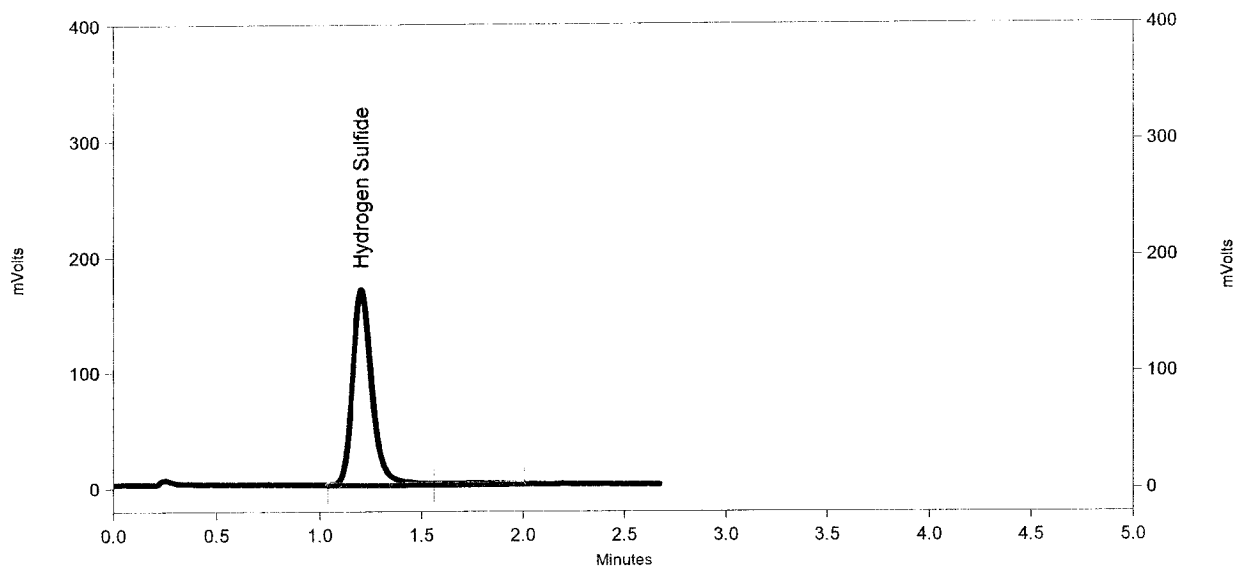
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.212	1131267	1.000 CAL
Totals		1131267	1.000 CAL

# Lyondell - Houston, TX

Sample ID: STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\drift check 03-29-05\std 1.0 ppm 3-29-2005  
6-32-05 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 6:32:32 PM



## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.205	1128691	1.000 CAL
Totals		1128691	1.000 CAL

**Calibration Report**

Method: C:\CLASS-VP\Data\LCR-440\Low ppm H2S-3-30-05.met  
 Print Time: 3/31/2005 1:39:18 PM  
 User: System  
 Instrument: GC-14B (Offline)

Hydrogen Sulfide (FPD)

Average RF: 1.22523e-006 RF StDev: 3.10882e-007 RF %RSD: 25.3732

Scaling: None LSQ Weighting: None Force Through Zero: On

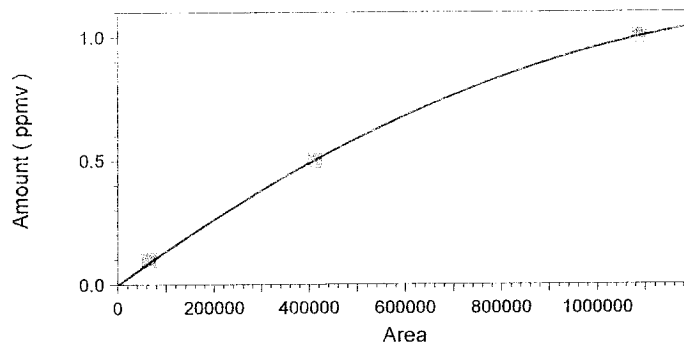
Replicate Mode: Replace

Fit Type: Quadratic

$y = -4.48014e-013x^2 + 1.40627e-006x + 0.000000$

Goodness of fit ( $r^2$ ): 0.999707

Peak: Hydrogen Sulfide -- ESTD -- FPD



	Level 1	Level 2	Level 3
Amount	0.1	0.5	1
Area	64906	411226	1087976
RF	1.540689612	1.21587642804	9.191379221600
	67063e-006	686e-006	48e-007
Last Area			
Residual	0.0106121	-0.00253211	0.000323978
Rep StDev	2834.59	17444.5	33047.4
Rep %RSD	4.42631	4.04411	2.93522
Rep 1 Area	66340	440806	1148574
Rep 1 User	System	System	System
Rep 1 Data File	C:\CLASS-VP\Data\LCR-440\Drift Check	C:\CLASS-VP\Data\LCR-440\Drift Check	C:\CLASS-VP\Data\LCR-440\Drift Check
	03-30-05\0.1 ppm STD	03-30-05\0.5 ppm STD	03-30-05\1.0 ppm STD
	3-30-2005 3-49-45 PM.dat	3-04-47 PM.dat	2-55-19 PM.dat
Rep 1 Sample ID	0.1 ppm STD	0.5 ppm STD	1.0 ppm STD
Rep 1 Calib. Time	3/31/2005 1:35:34 PM	3/31/2005 1:23:05 PM	3/31/2005 1:20:54 PM

**Calibration Report**

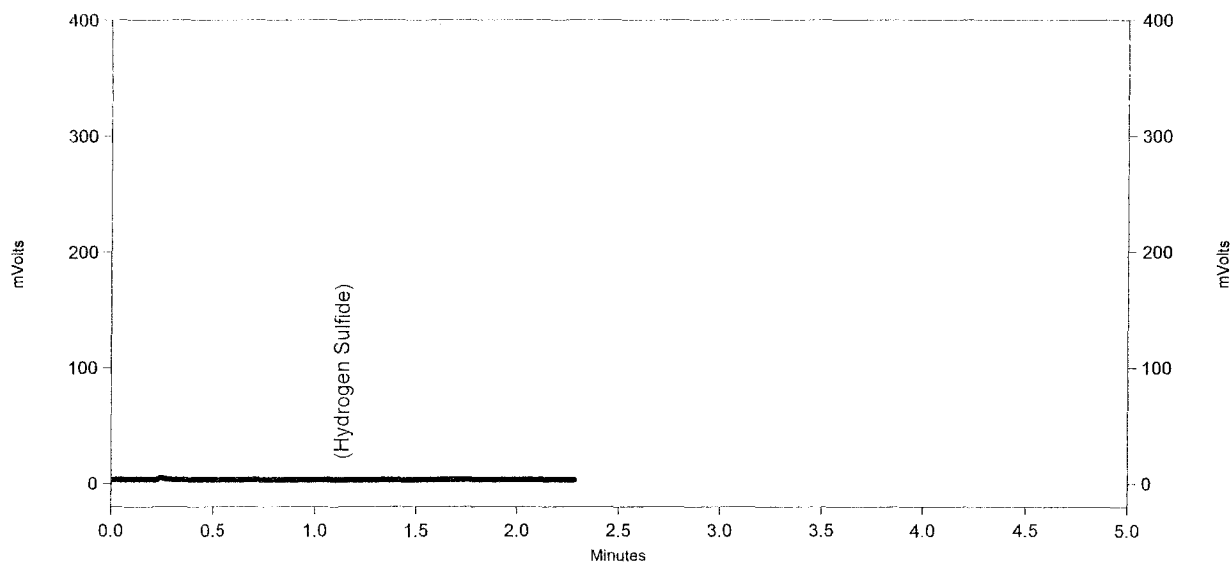
Method: C:\CLASS-VP\Data\LCR-440\Low ppm H2S-3-30-05.met  
 Print Time: 3/31/2005 1:39:18 PM  
 User: System  
 Instrument: GC-14B (Offline)

Rep 2 Area	60873	442038	1141129
Rep 2 User	System	System	System
Rep 2 Data File	C:\CLASS-V P\Data\LCR-4 40\Drift Check 03-30-05\0.1 ppm STD 3-30-2005 3-31-44 PM.dat	C:\CLASS-VP\ Data\LCR-440\ Drift Check 03-30-05\0.5 ppm STD 3-30-2005 3-13-19 PM.dat	C:\CLASS-VP\ Data\LCR-440\ Drift Check 03-30-05\1.0 ppm STD 3-30-2005 2-52-09 PM.dat
Rep 2 Sample ID	0.1 ppm STD	0.5 ppm STD	1.0 ppm STD
Rep 2 Calib. Time	3/31/2005 1:36:03 PM	3/31/2005 1:23:23 PM	3/31/2005 1:21:08 PM
Rep 3 Area	64906	411226	1087976
Rep 3 User	System	System	System
Rep 3 Data File	C:\CLASS-V P\Data\LCR-4 40\Drift Check 03-30-05\0.1 ppm STD 3-30-2005 3-19-36 PM.dat	C:\CLASS-VP\ Data\LCR-440\ Drift Check 03-30-05\0.5 ppm STD 3-30-2005 3-10-33 PM.dat	C:\CLASS-VP\ Data\LCR-440\ Drift Check 03-30-05\1.0 ppm STD 3-30-2005 2-48-49 PM.dat
Rep 3 Sample ID	0.1 ppm STD	0.5 ppm STD	1.0 ppm STD
Rep 3 Calib. Time	3/31/2005 1:36:21 PM	3/31/2005 1:23:43 PM	3/31/2005 1:21:21 PM

# Lyondell - Houston, TX

Sample ID: Blank  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\drift check 03-30-05\blank 3-30-2005 1-36-13  
pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 1:37:01 PM



## FPD Results

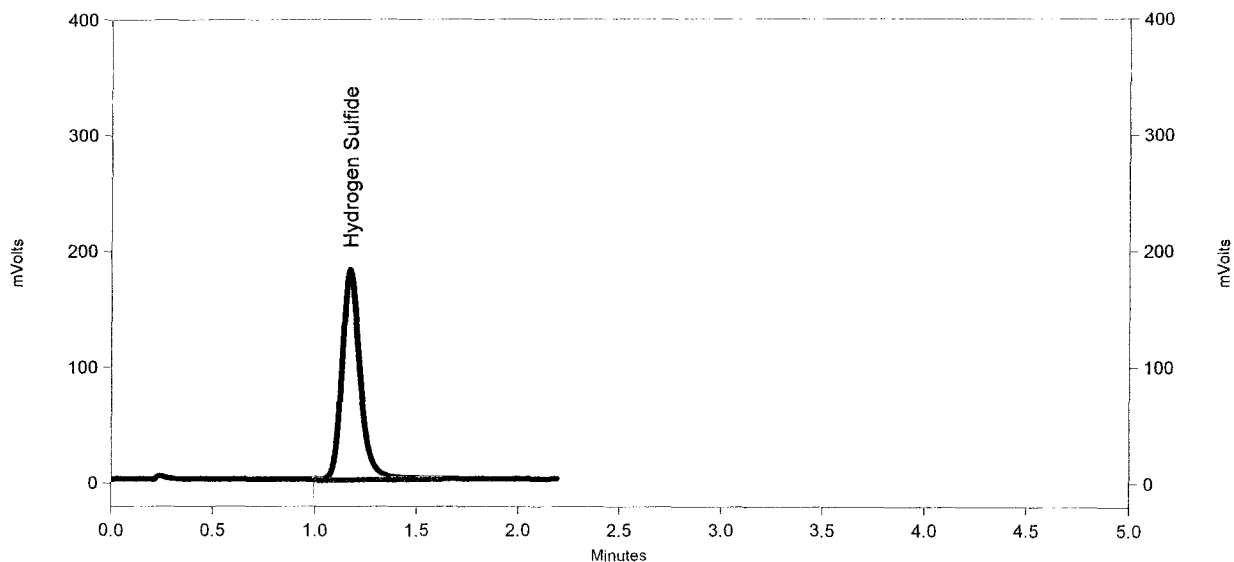
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: 1.0 ppm STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\drift check 03-30-05\1.0 ppm std 3-30-2005  
2-55-19 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 2:55:51 PM



## FPD Results

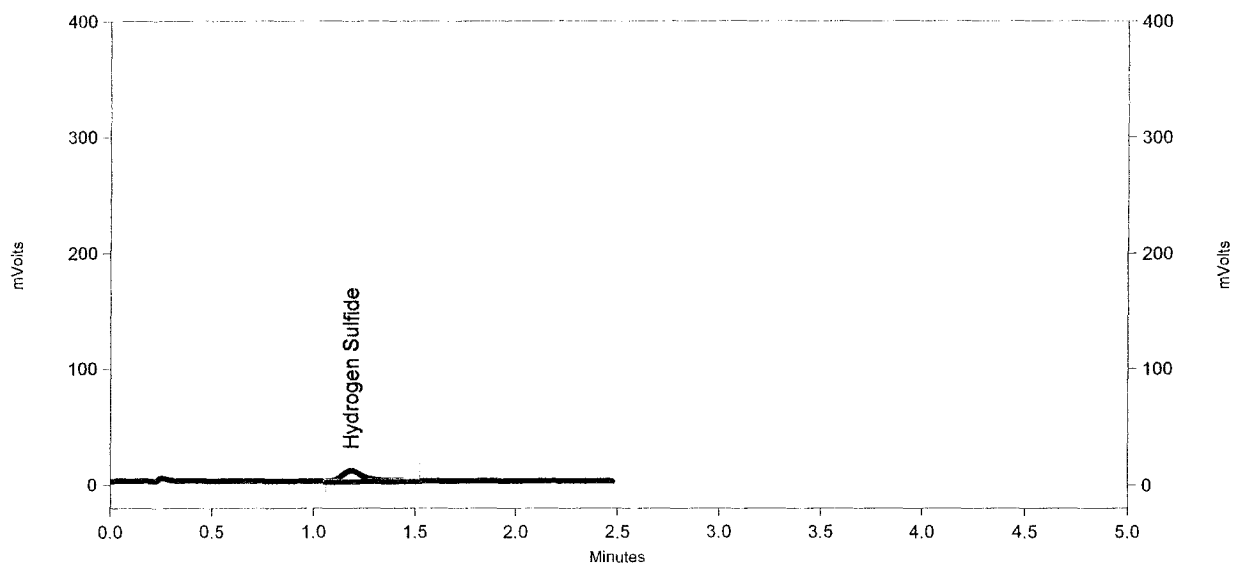
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.172	1148574	1.000 CAL
Totals		1148574	1.000 CAL



# Lyondell - Houston, TX

Sample ID: 0.1 ppm STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\drift check 03-30-05\0.1 ppm std 3-30-2005  
3-19-36 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 3:20:04 PM



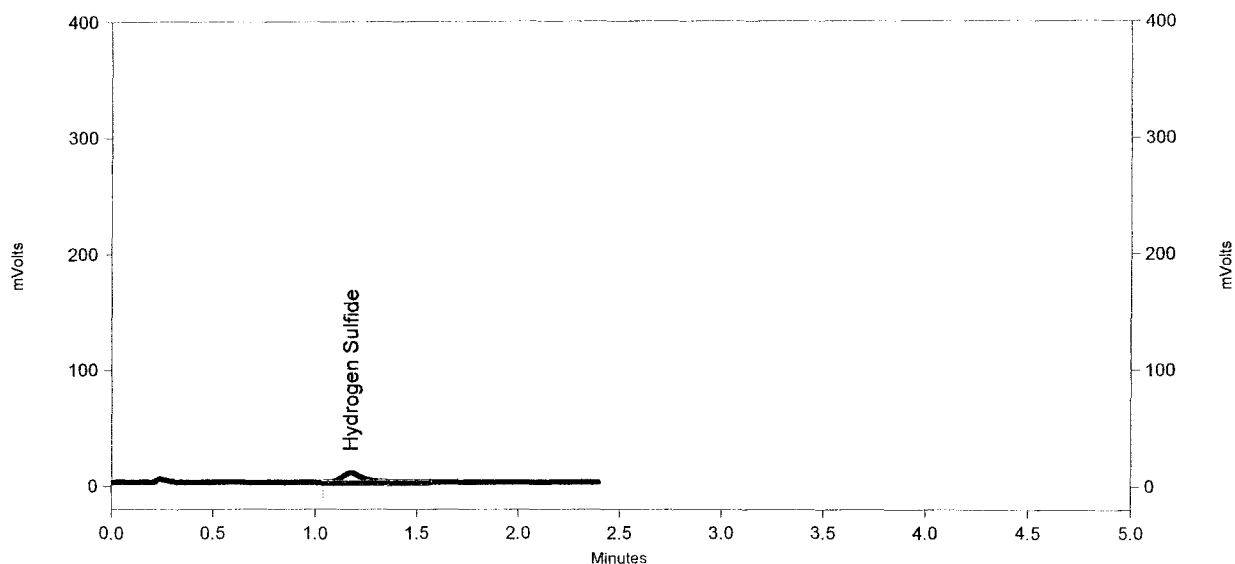
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.182	64906	0.100 CAL
Totals		64906	0.100 CAL

# Lyondell - Houston, TX

Sample ID: 0.1 ppm STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\drift check 03-30-05\0.1 ppm std 3-30-2005  
3-31-44 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 3:32:16 PM



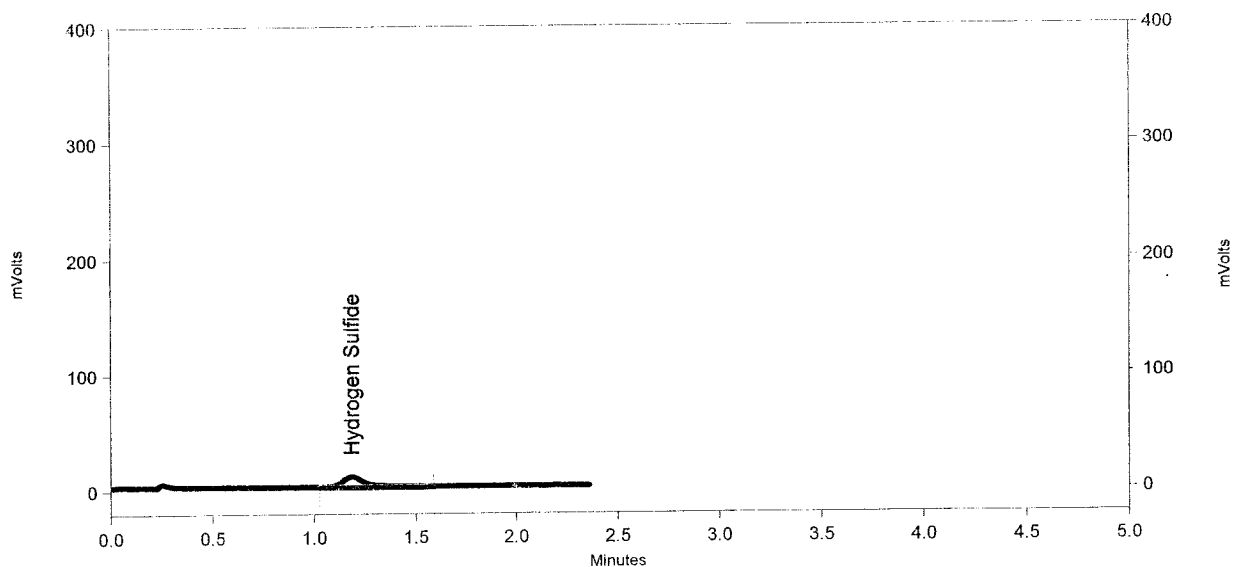
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.175	60873	0.100 CAL
Totals		60873	0.100 CAL

# Lyondell - Houston, TX

Sample ID: 0.1 ppm STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\drift check 03-30-05\0.1 ppm std 3-30-2005  
3-49-45 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 3:50:13 PM



FPD Results  
Name

Retention Time

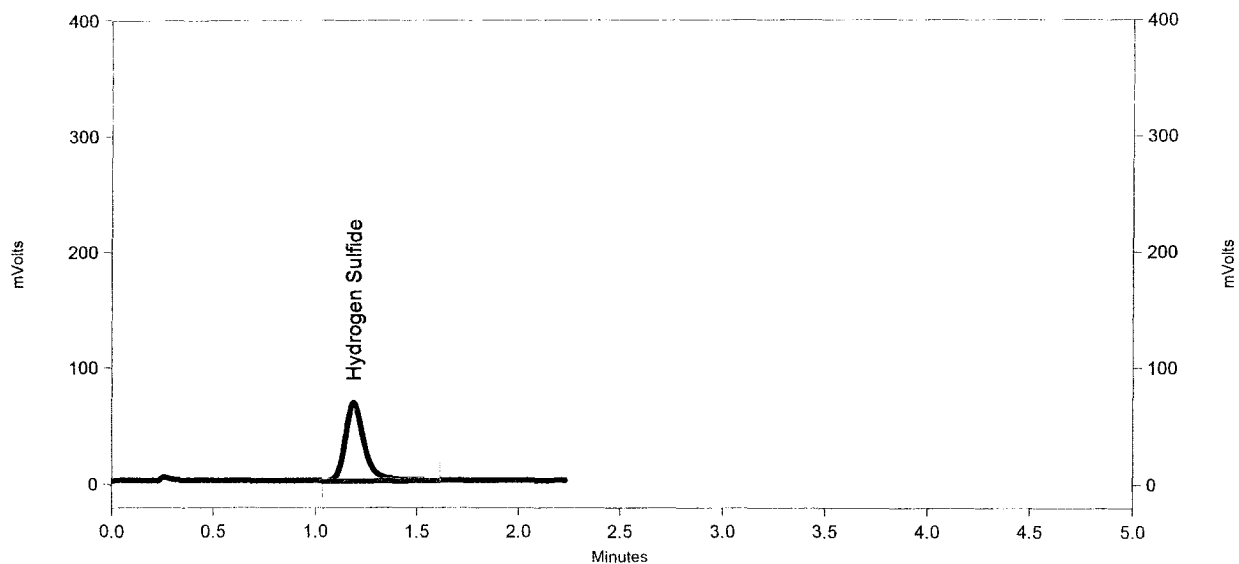
Area ESTD concentration  
(ppmv)

Hydrogen Sulfide	1.183	66340	0.100 CAL
Totals		66340	0.100 CAL

# Lyondell - Houston, TX

Sample ID: 0.5 ppm STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\drift check 03-30-05\0.5 ppm std 3-30-2005  
3-04-47 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 3:05:15 PM



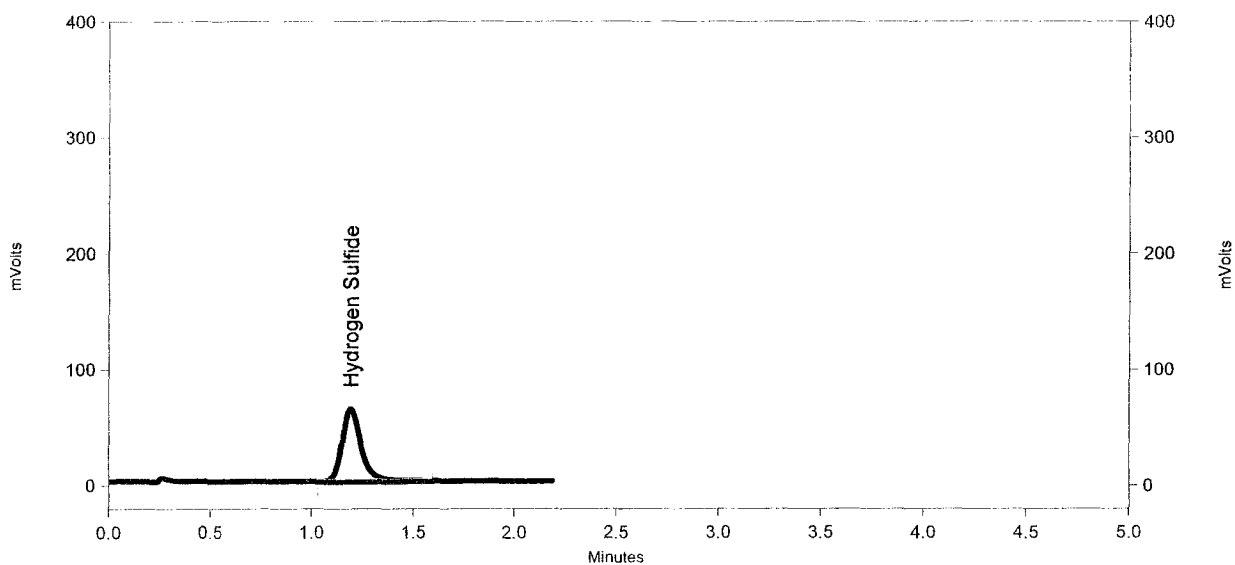
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.187	440806	0.500 CAL
Totals		440806	0.500 CAL

# Lyondell - Houston, TX

Sample ID: 0.5 ppm STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\drift check 03-30-05\0.5 ppm std 3-30-2005  
3-10-33 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 3:11:00 PM



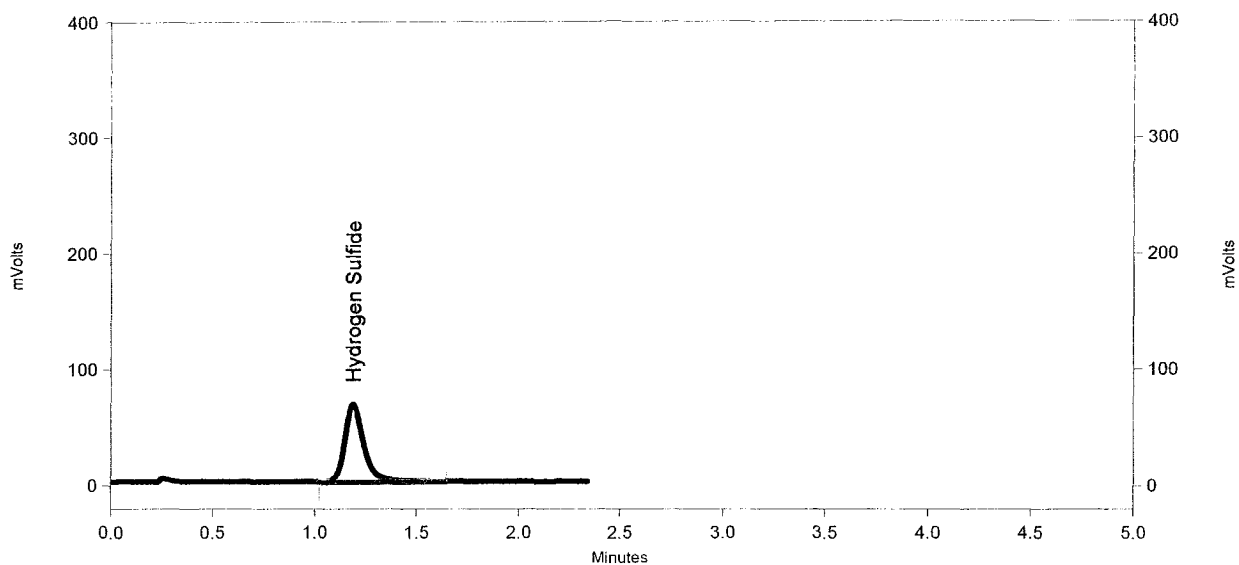
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.192	411226	0.500 CAL
Totals		411226	0.500 CAL

# Lyondell - Houston, TX

Sample ID: 0.5 ppm STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\drift check 03-30-05\0.5 ppm std 3-30-2005  
3-13-19 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 3:13:47 PM



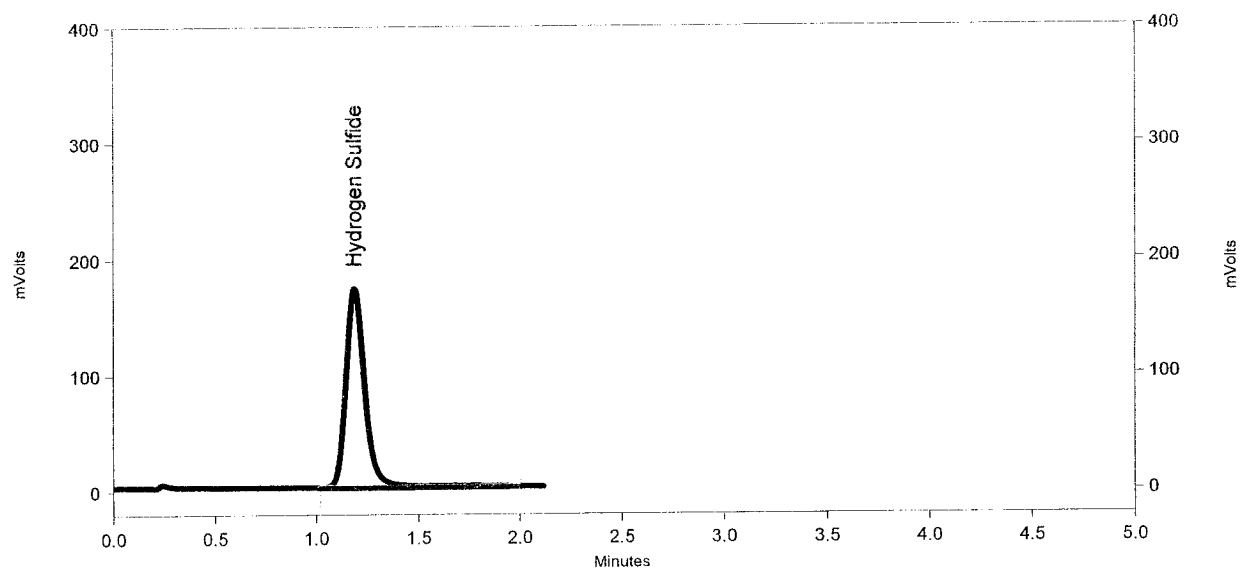
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.190	442038	0.500 CAL
Totals		442038	0.500 CAL

# Lyondell - Houston, TX

Sample ID: 1.0 ppm STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\drift check 03-30-05\1.0 ppm std 3-30-2005  
2-48-49 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 2:49:37 PM



FPD Results  
Name

Retention Time

Area ESTD concentration  
(ppmv)

Hydrogen Sulfide

1.185

1087976

1.000 CAL

Totals

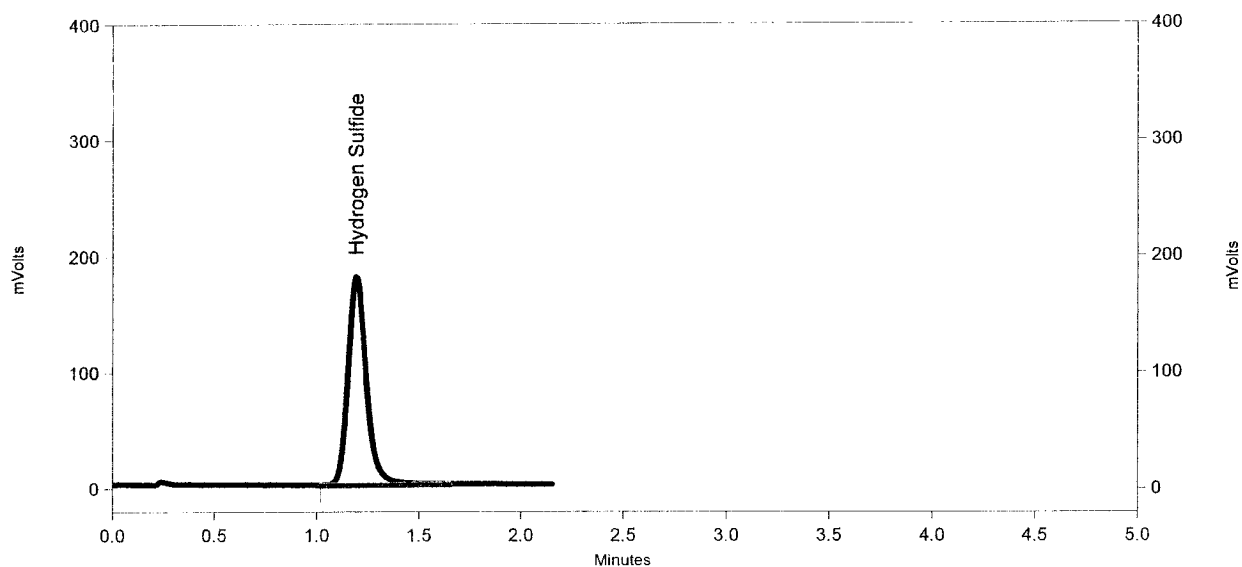
1087976

1.000 CAL

# Lyondell - Houston, TX

Sample ID: 1.0 ppm STD  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\drift check 03-30-05\1.0 ppm std 3-30-2005  
2-52-09 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 2:52:57 PM



FPD Results  
Name

Retention Time

Area ESTD concentration  
(ppmv)

Hydrogen Sulfide	1.192	1141129	1.000 CAL
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Totals		1141129	1.000 CAL
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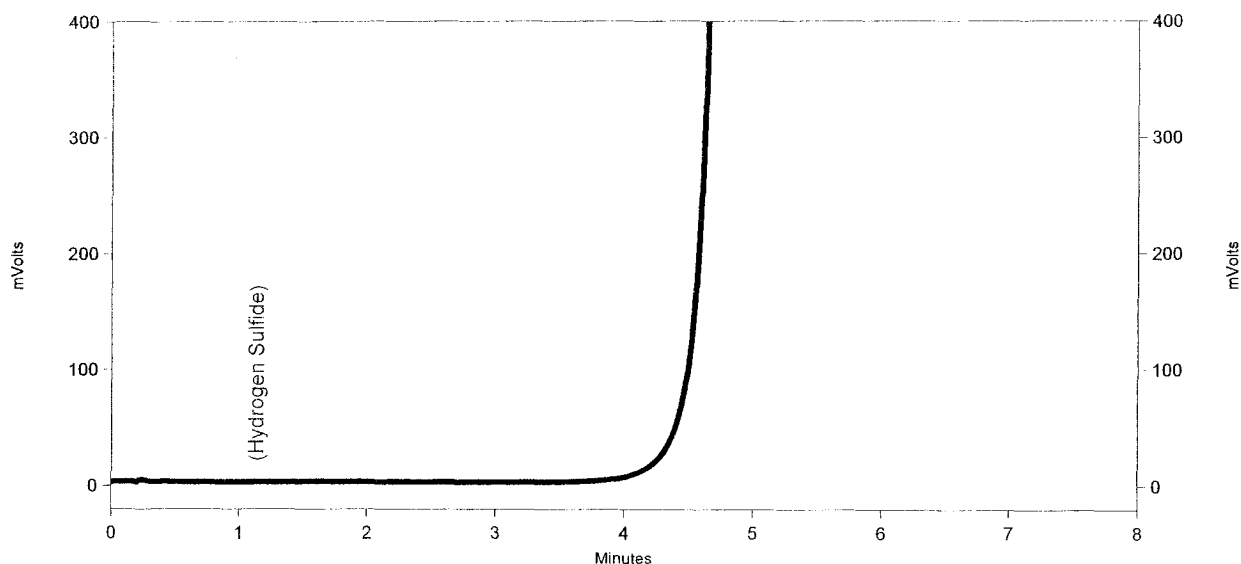


**LCR TO 440 Condition 1: 1500 °F**

# Lyondell - Houston, TX

Sample ID: LCR440 010  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition1-1500 oc\lcr440 3-29-2005  
10-18-13 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 10:24:06 AM



## FPD Results

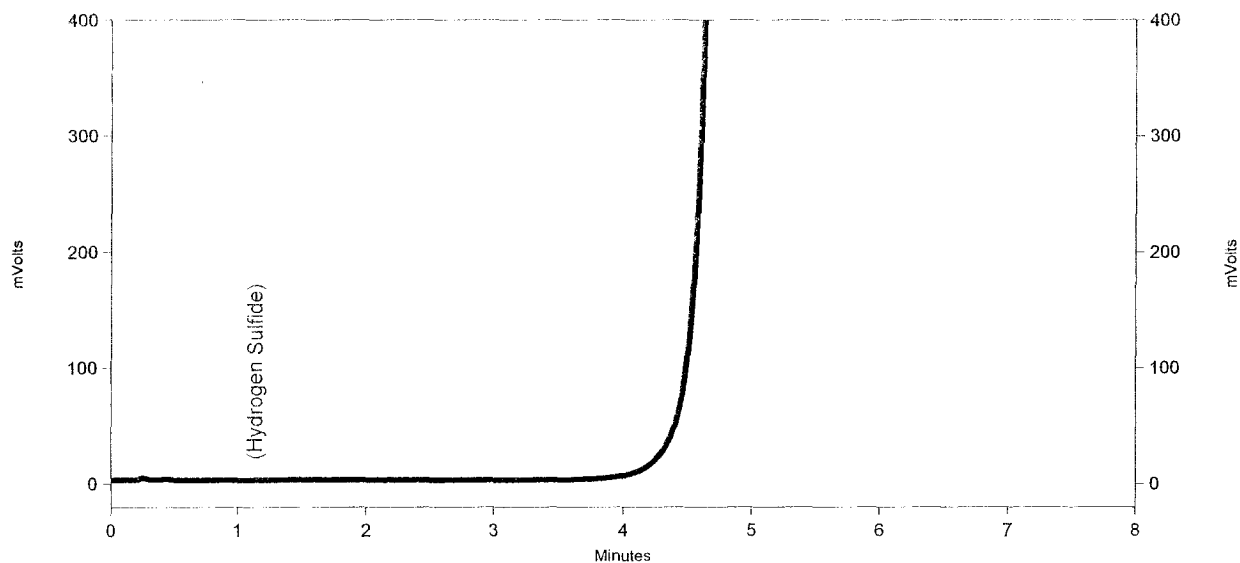
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 011  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition1-1500 oc\lcr440 3-29-2005  
10-32-11 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 10:37:15 AM



## FPD Results

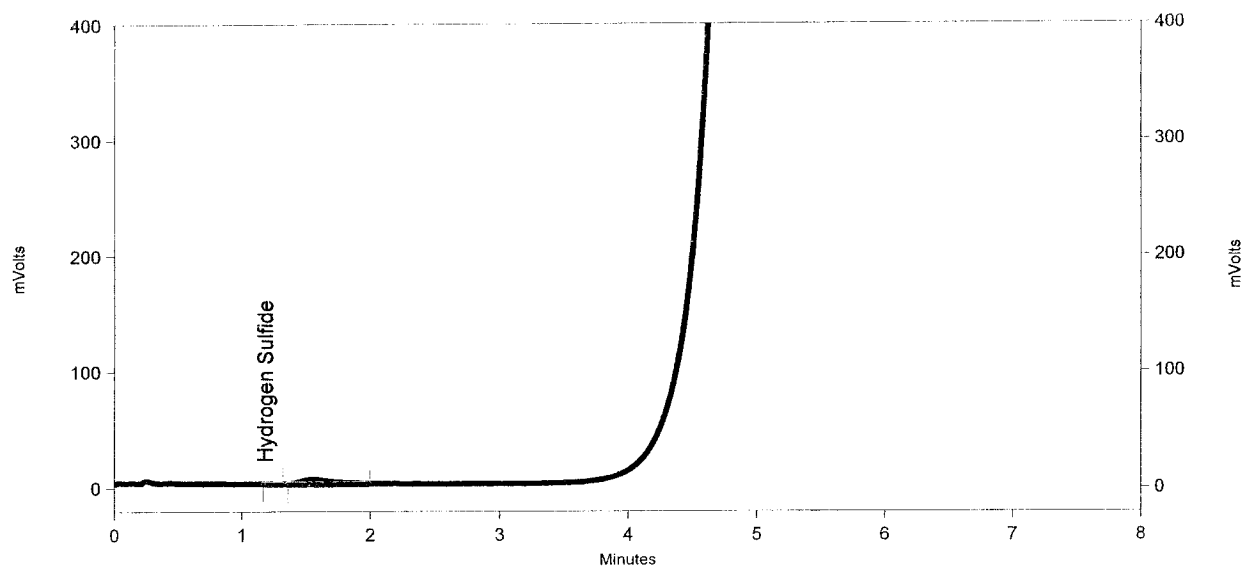
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 002  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition1-1500 oc\lcr440 3-29-2005  
8-29-08 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 8:38:30 AM



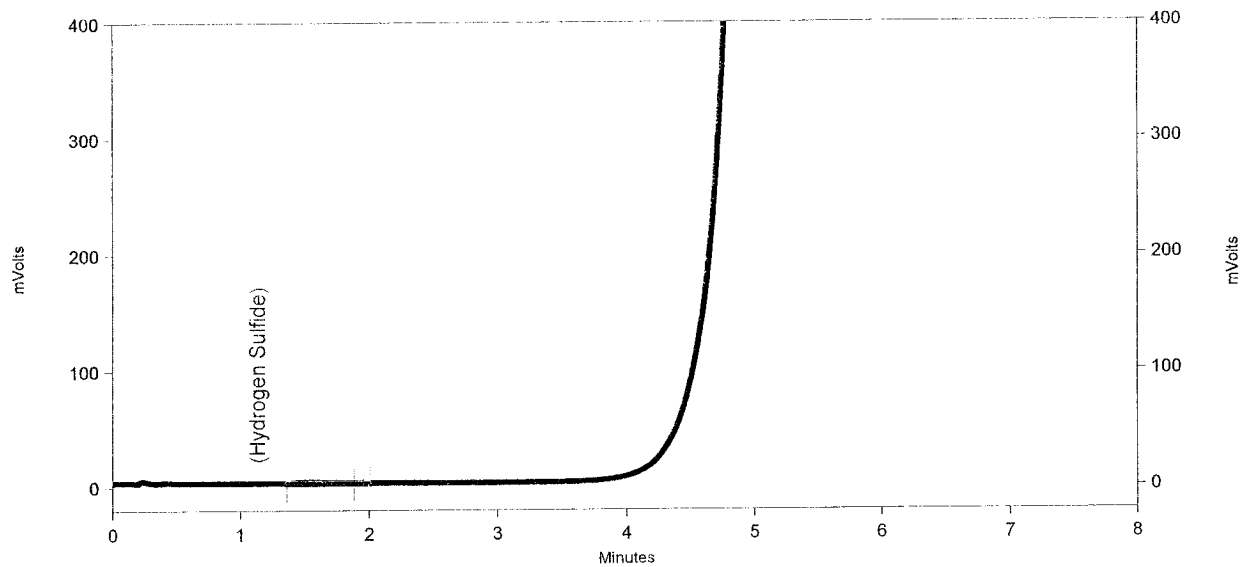
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.182	1039	0.001 LC
Totals		1039	0.001 LC

# Lyondell - Houston, TX

Sample ID: LCR440 003  
 Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
 Data: c:\class-vp\data\lcr-440\compliance\condition1-1500 oc\lcr440 3-29-2005  
 8-46-35 am.dat  
 Product: Shimadzu Client/Server  
 Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 8:51:05 AM



## FPD Results

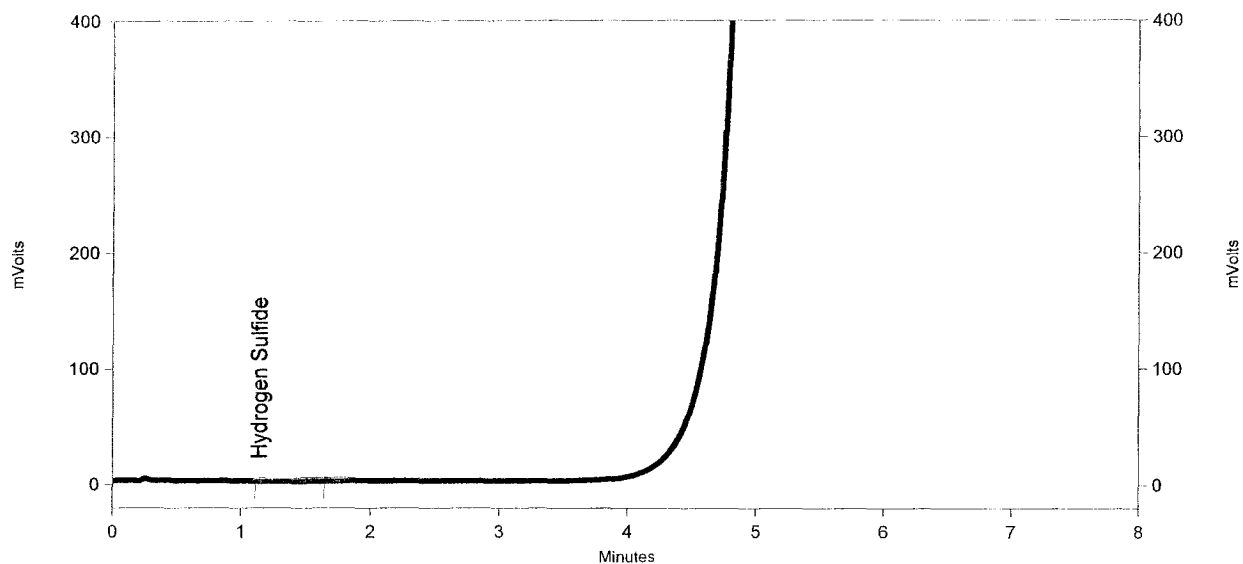
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 004  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition1-1500 oc\lcr440 3-29-2005  
8-59-10 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 9:04:43 AM



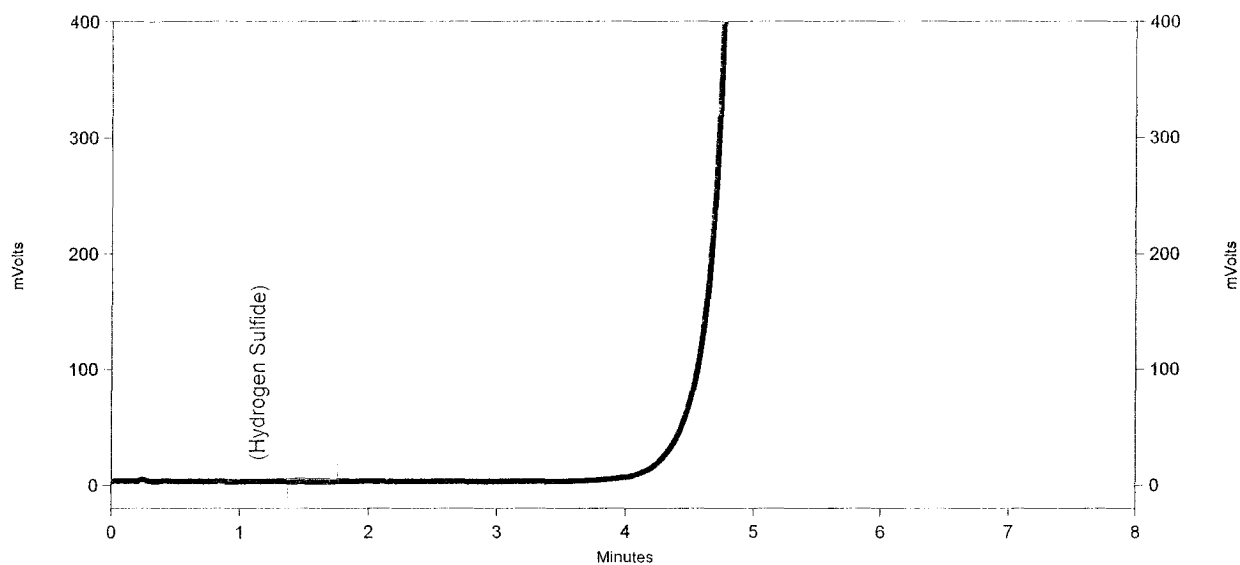
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.140	1718	0.002 LC
Totals		1718	0.002 LC

# Lyondell - Houston, TX

Sample ID: LCR440 005  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition1-1500 cc\lcr440 3-29-2005  
9-12-48 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 9:17:39 AM



## FPD Results

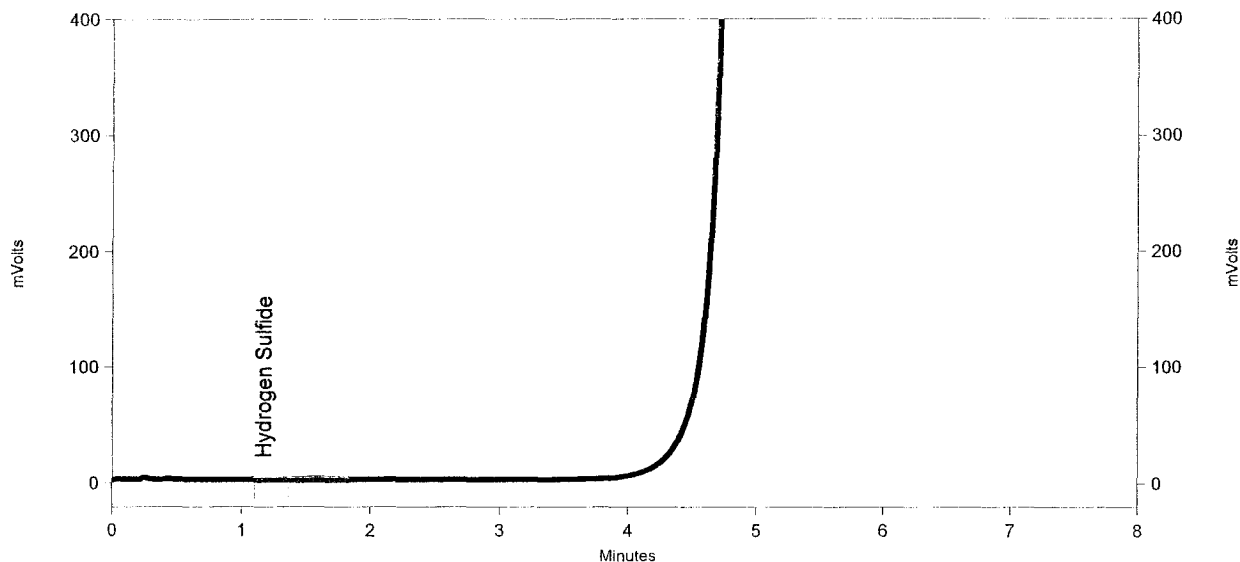
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 006  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition1-1500 oc\lcr440 3-29-2005  
9-25-44 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 9:30:19 AM



## FPD Results

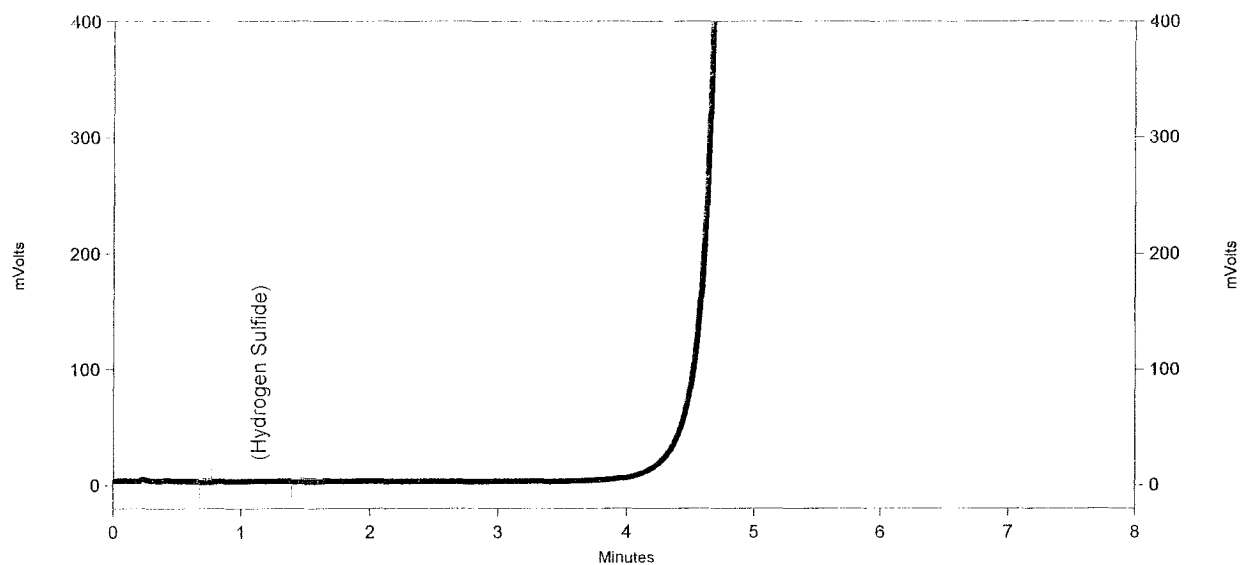
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.167	1821	0.002 LC
Totals		1821	0.002 LC



# Lyondell - Houston, TX

Sample ID: LCR440 007  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition1-1500 oc\lcr440 3-29-2005  
9-38-24 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 9:43:14 AM



## FPD Results

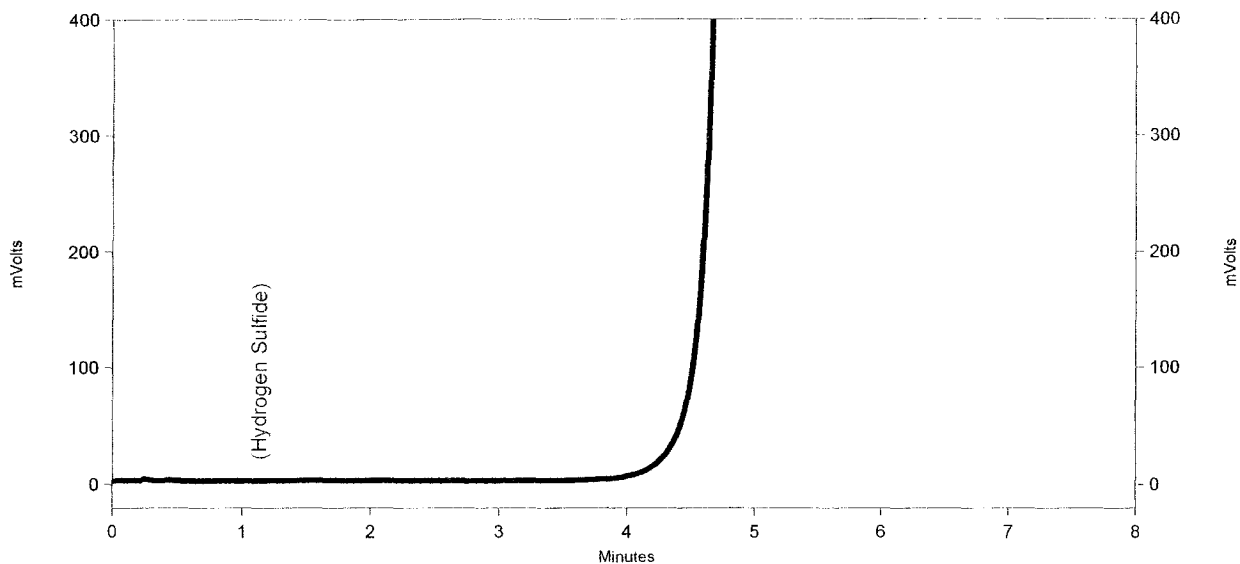
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 008  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition1-1500 oc\lcr440 3-29-2005  
9-51-18 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 9:56:41 AM



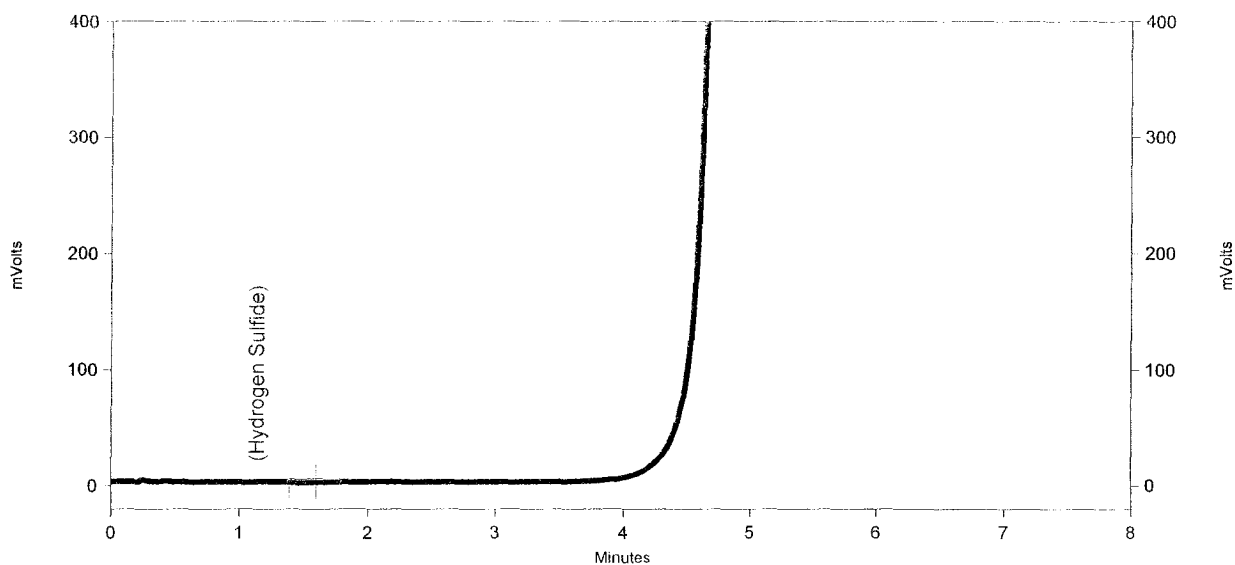
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL
Totals			

# Lyondell - Houston, TX

Sample ID: LCR440 009  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition1-1500 cc\lcr440 3-29-2005  
10-04-46 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 10:10:08 AM



## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
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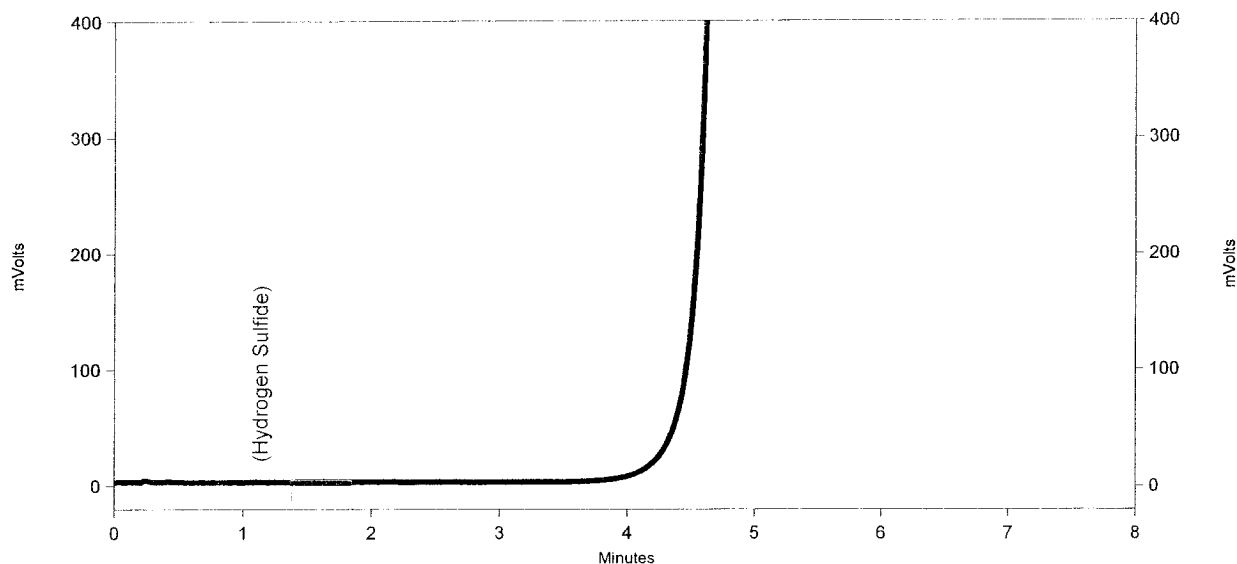
Hydrogen Sulfide			0.000 BDL
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Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 012  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.mat  
Data: c:\class-vp\data\lcr-440\compliance\condition1-1500 oc\lcr440 3-29-2005  
10-45-20 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 10:49:34 AM



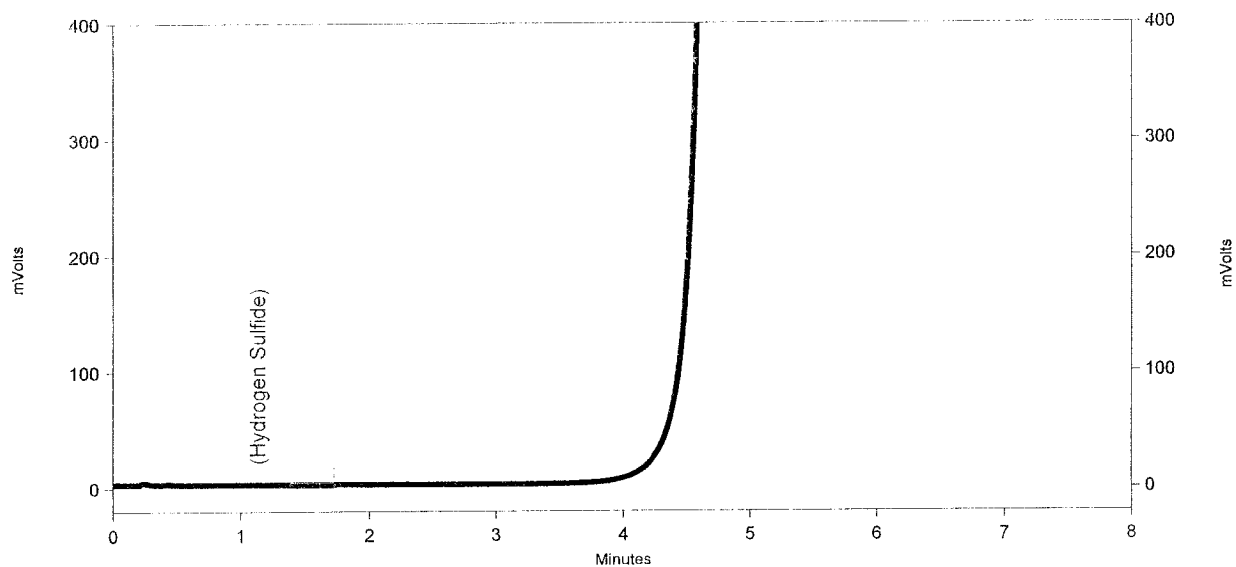
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL
Totals			

# Lyondell - Houston, TX

Sample ID: LCR440 013  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition1-1500 oc\lcr440 3-29-2005  
10-57-38 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 11:02:29 AM



## FPD Results

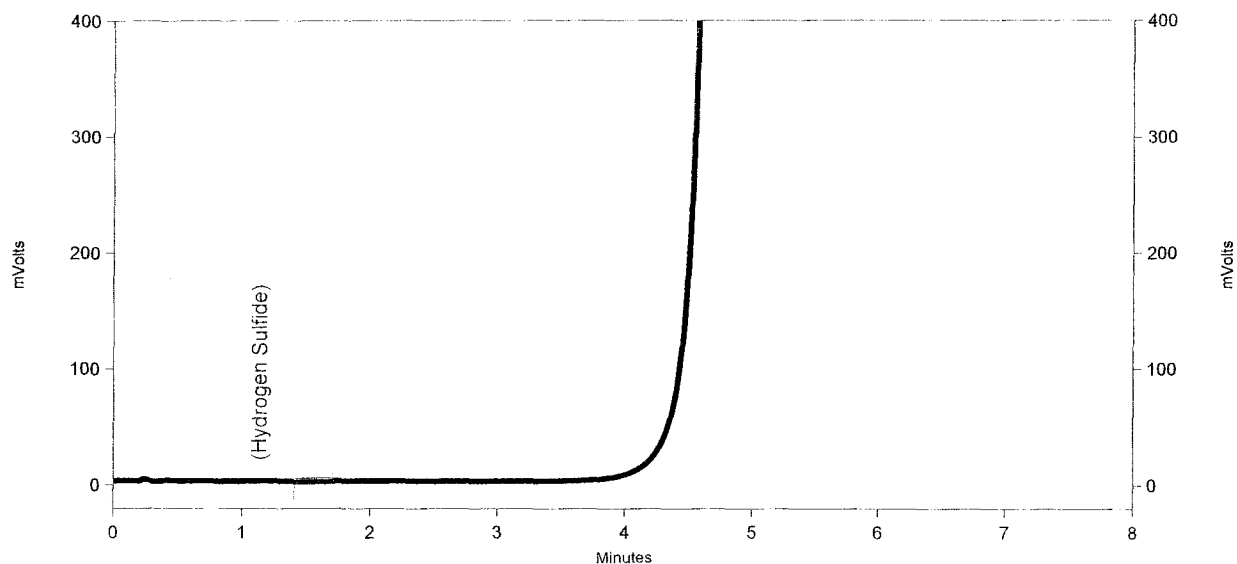
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 014  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition1-1500 oc\lcr440 3-29-2005  
11-10-34 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 11:15:35 AM



## FPD Results

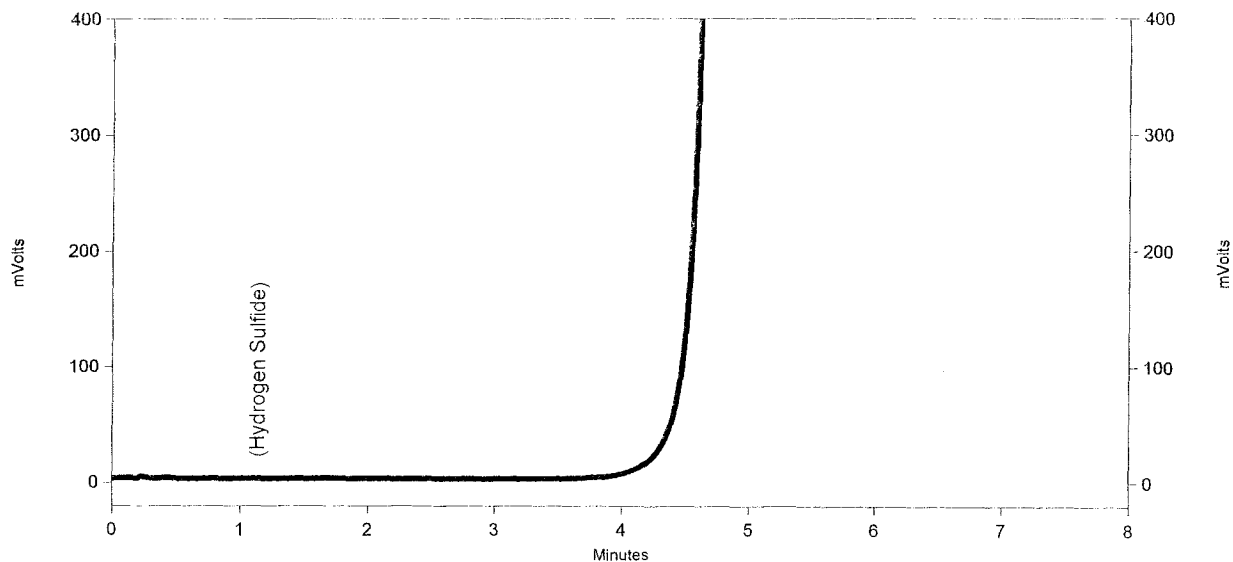
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 015  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\conditional-1500 oc\lcr440 3-29-2005  
11-23-40 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 11:28:30 AM



## FPD Results

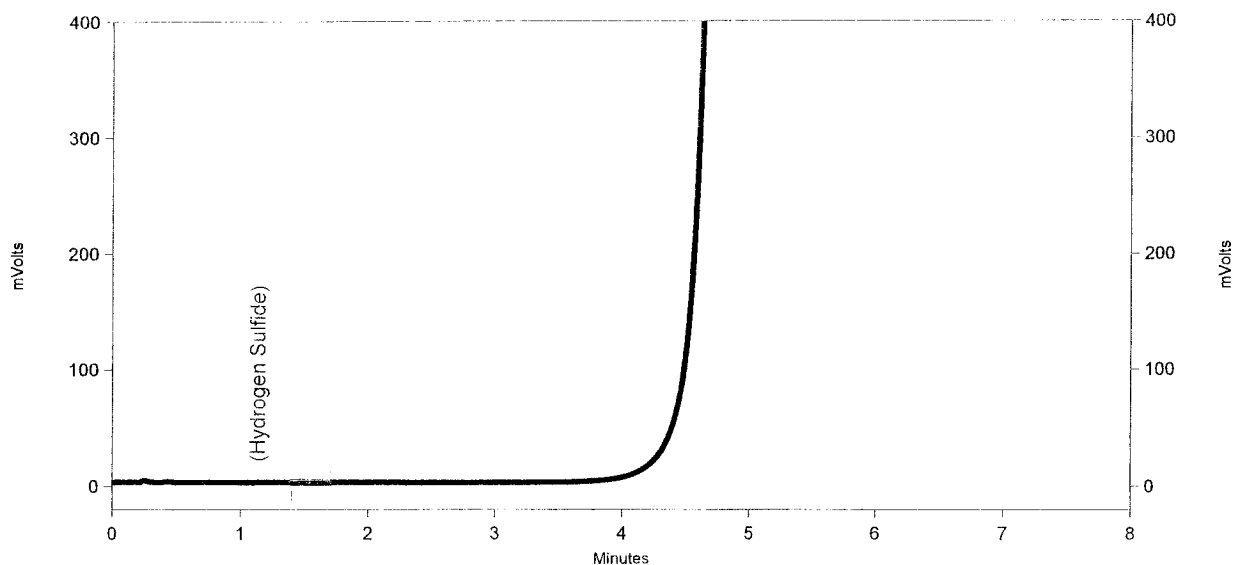
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 016  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition1-1500 oc\lcr440 3-29-2005  
11-36-35 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 11:41:41 AM



## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

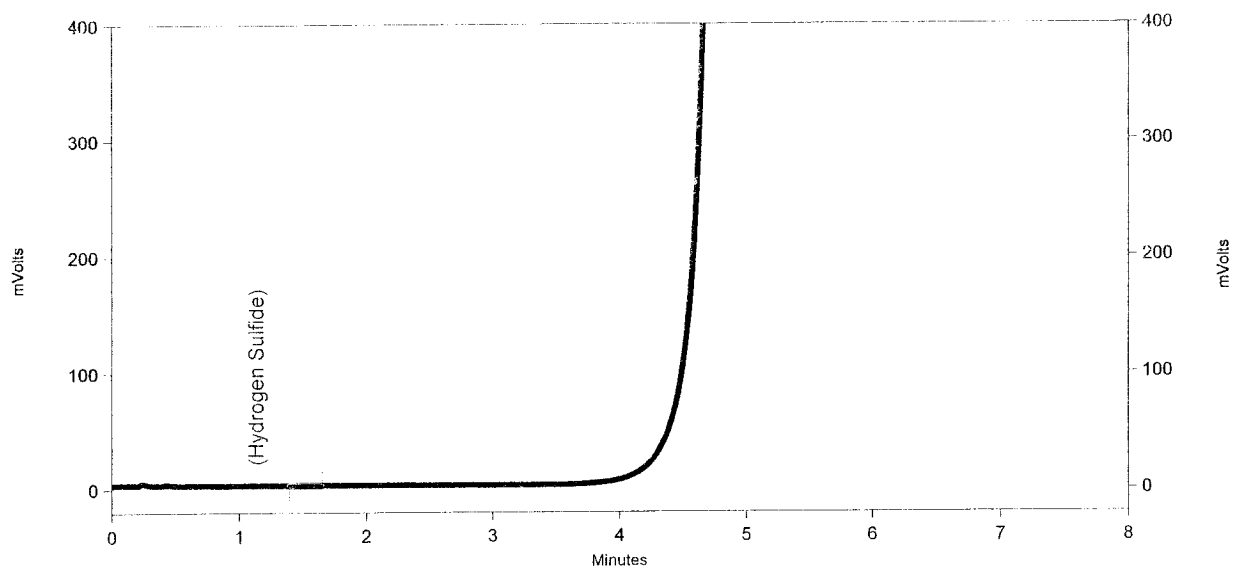
Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 017  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition1-1500 oc\lcr440 3-29-2005  
11-49-45 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 11:54:20 AM



## FPD Results

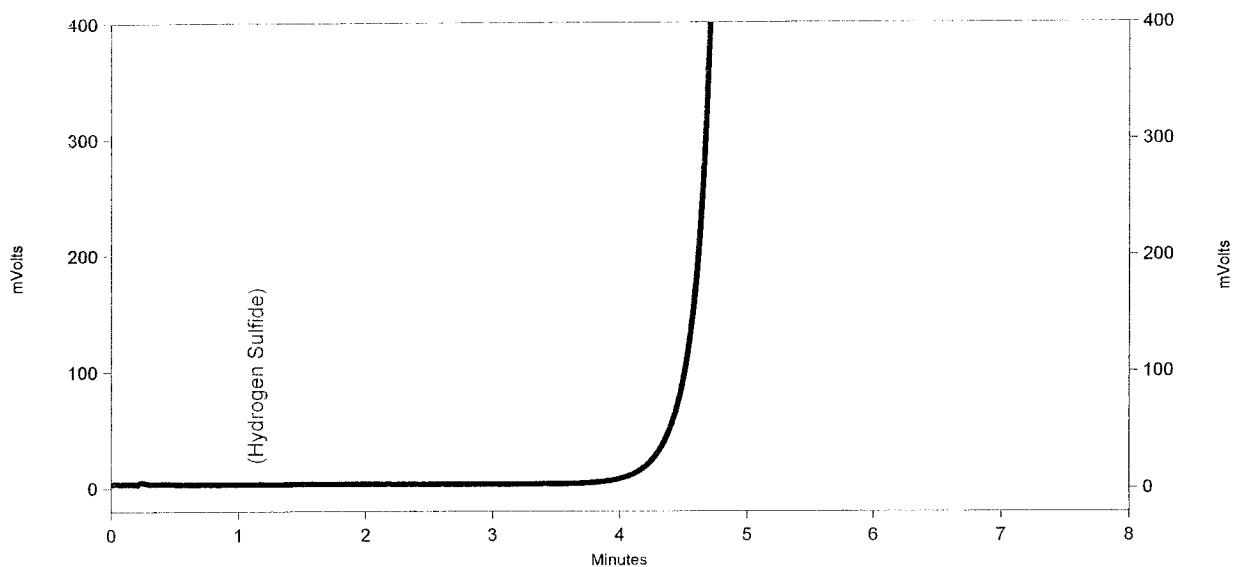
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 018  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition1-1500 oc\lcr440 3-29-2005  
12-02-25 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 12:06:58 PM



## FPD Results

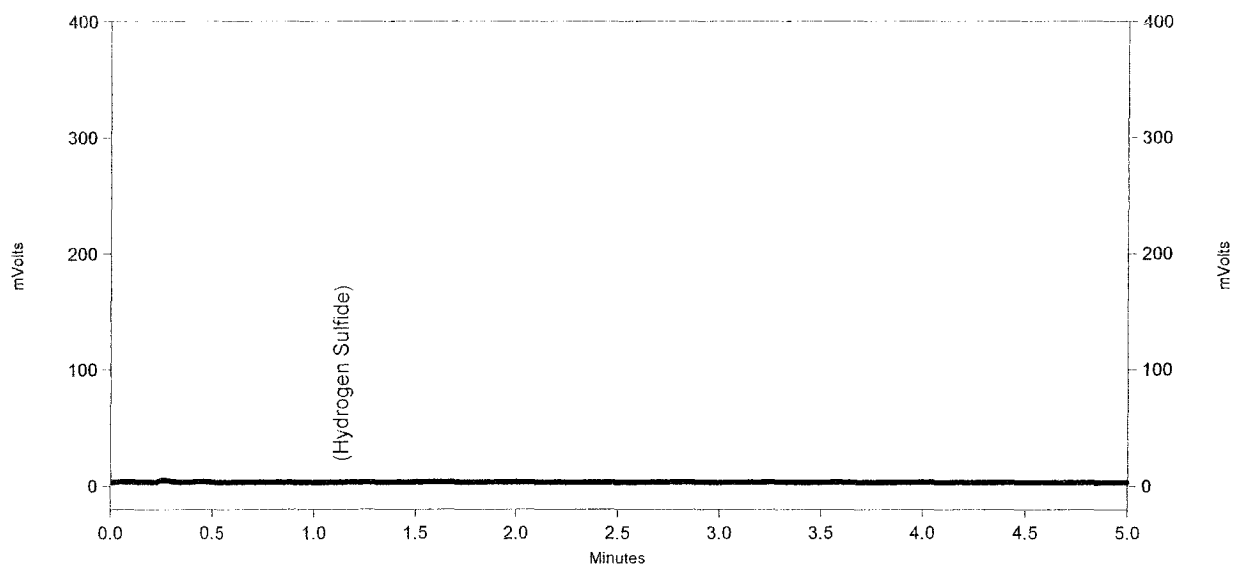
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 019  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition1-1500 oc\lcr440 3-29-2005  
12-15-03 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 12:19:01 PM



## FPD Results

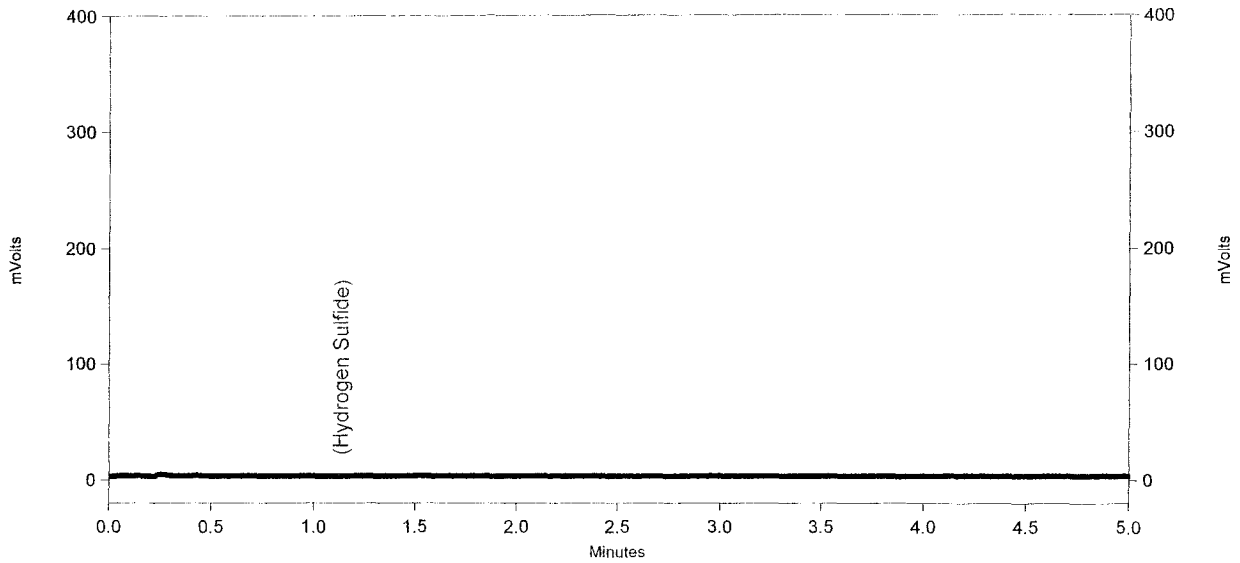
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 020  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition1-1500 oc\lcr440 3-29-2005  
12-24-06 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 12:26:42 PM



## FPD Results

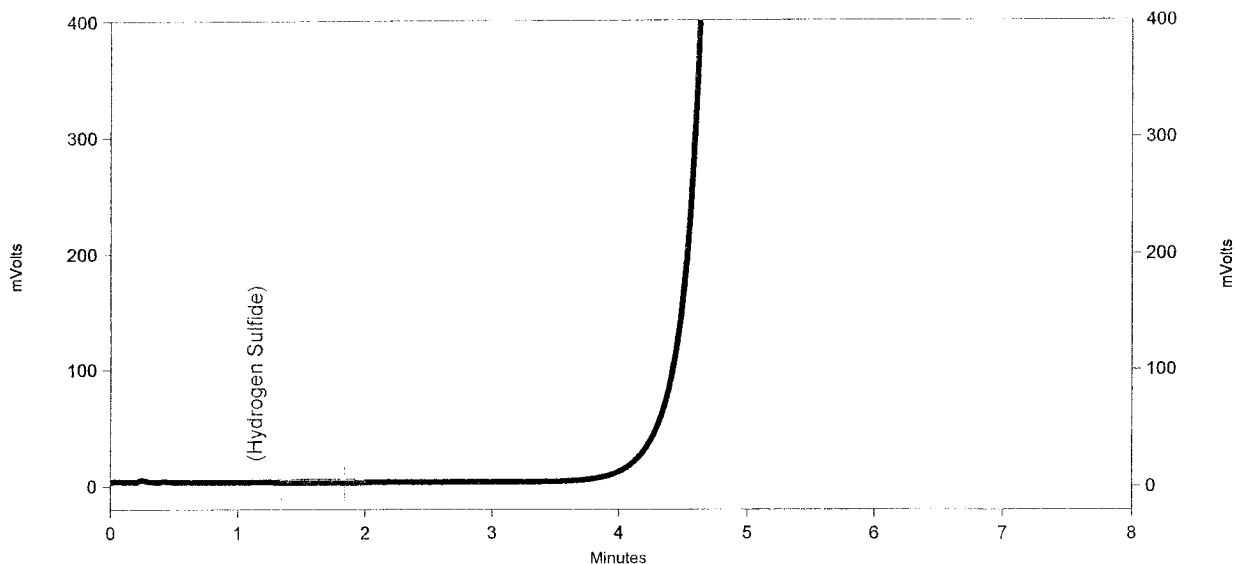
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL
Totals			

**LCR TO 440 Condition 2: 1475 °F**

# Lyondell - Houston, TX

Sample ID: LCR440 022  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition2-1475 oc\lcr440 3-29-2005  
12-42-21 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 12:46:56 PM



## FPD Results

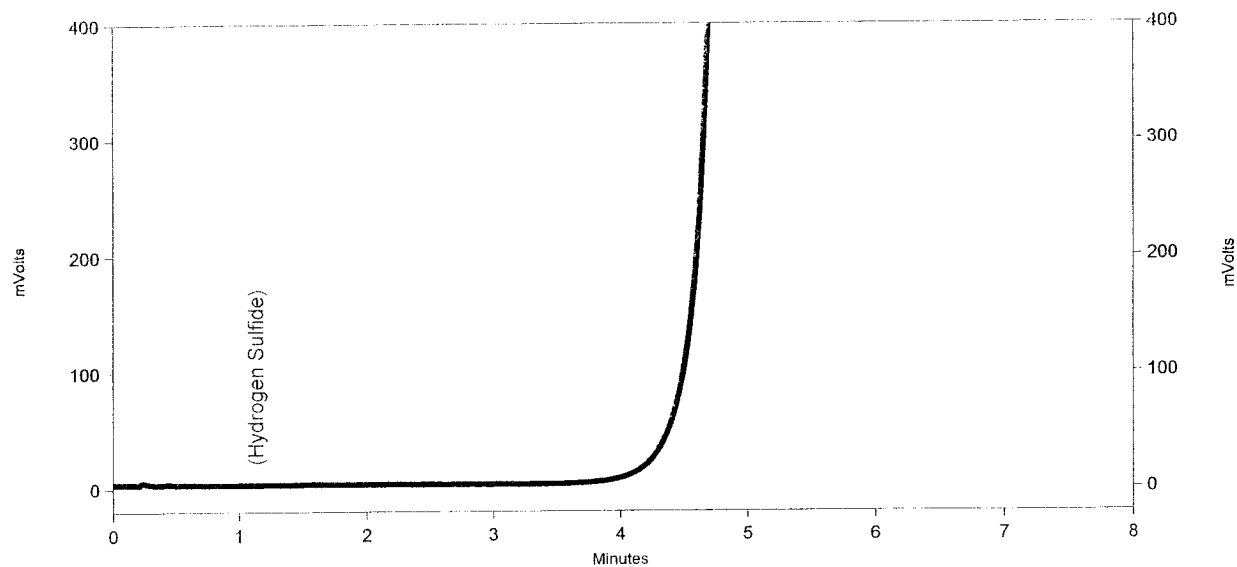
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 024  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition2-1475 oc\lcr440 3-29-2005  
1-07-56 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 1:12:26 PM



## FPD Results

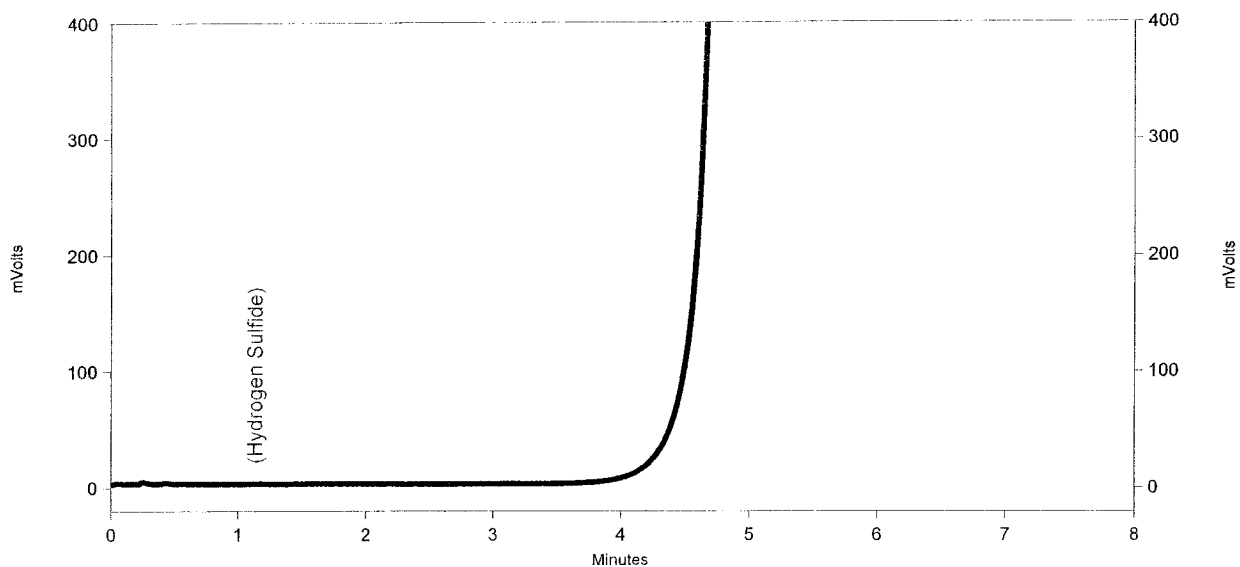
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 025  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition2-1475 oc\lcr440 3-29-2005  
1-20-31 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 1:24:34 PM



## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

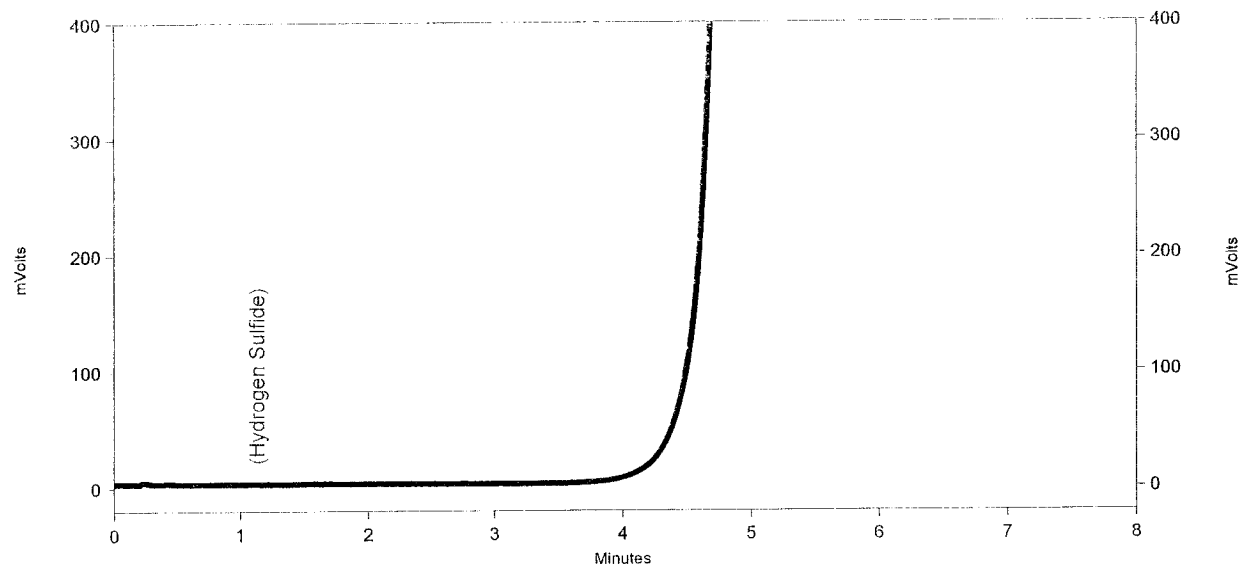
Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 026  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition2-1475 oc\lcr440 3-29-2005  
1-32-39 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 1:36:37 PM



FPD Results  
Name

Retention Time

Area ESTD concentration  
(ppmv)

Hydrogen Sulfide

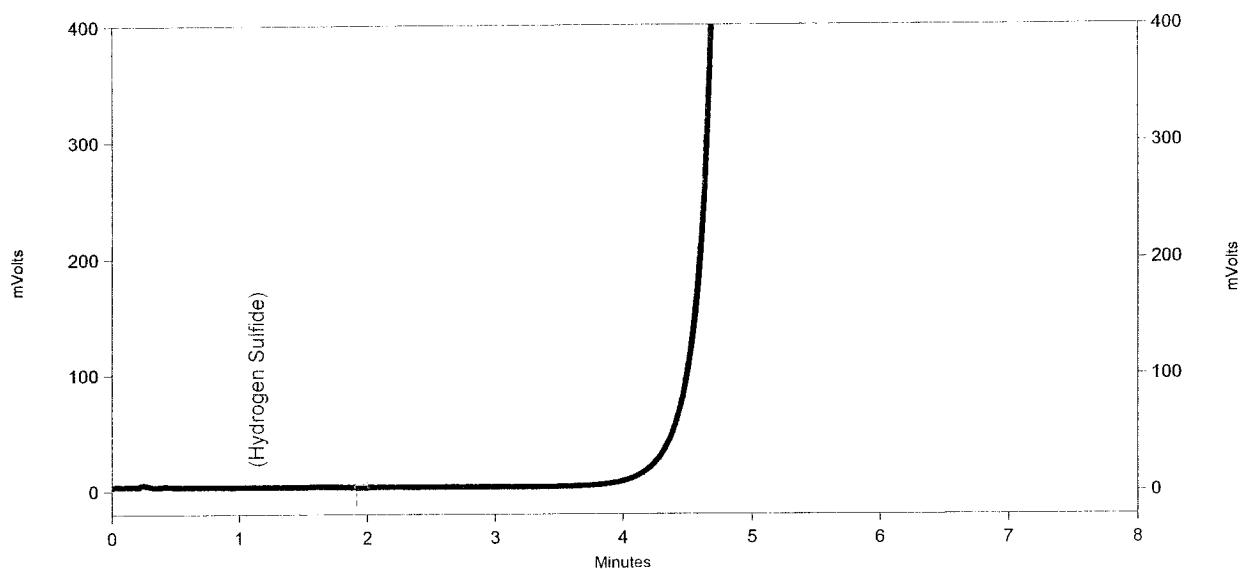
0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 027  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition2-1475 oc\lcr440 3-29-2005  
1-44-42 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 1:48:24 PM



FPD Results  
Name

Retention Time

Area ESTD concentration  
(ppmv)

Hydrogen Sulfide

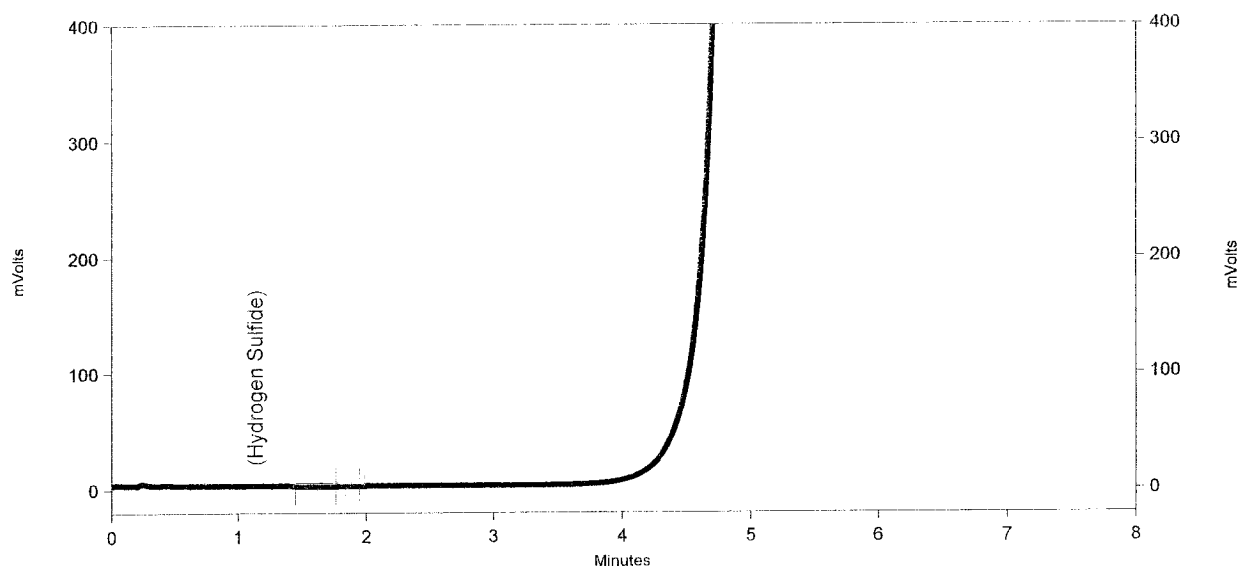
0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 028  
 Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
 Data: c:\class-vp\data\lcr-440\compliance\condition2-1475 oc\lcr440 3-29-2005  
 1-56-29 pm.dat  
 Product: Shimadzu Client/Server  
 Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 2:00:48 PM



## FPD Results

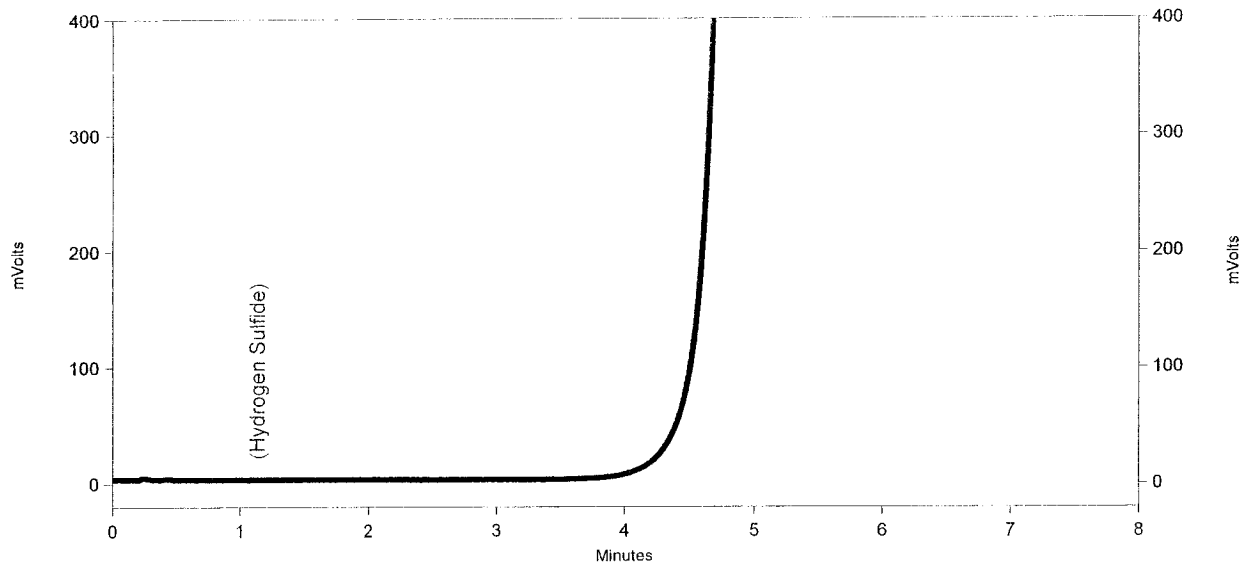
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 029  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition2-1475 oc\lcr440 3-29-2005  
2-08-53 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 2:12:56 PM



## FPD Results

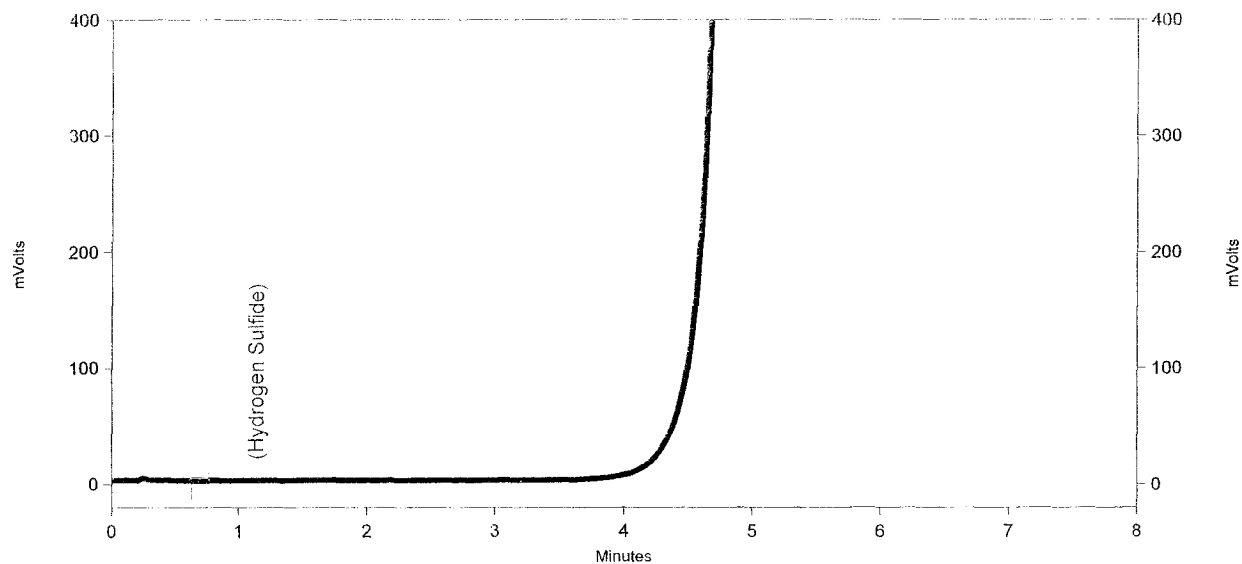
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 030  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition2-1475 oc\lcr440 3-29-2005  
2-21-02 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 2:25:16 PM



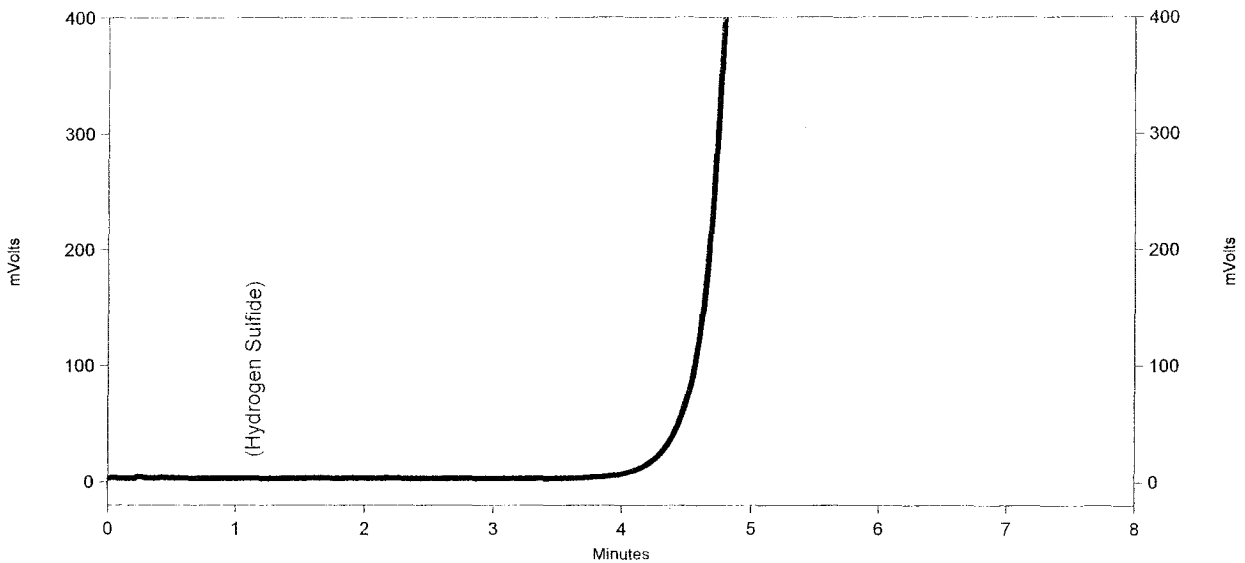
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL
Totals			

# Lyondell - Houston, TX

Sample ID: LCR440 031  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition2-1475 oc\lcr440 3-29-2005  
2-33-20 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 2:39:30 PM



## FPD Results

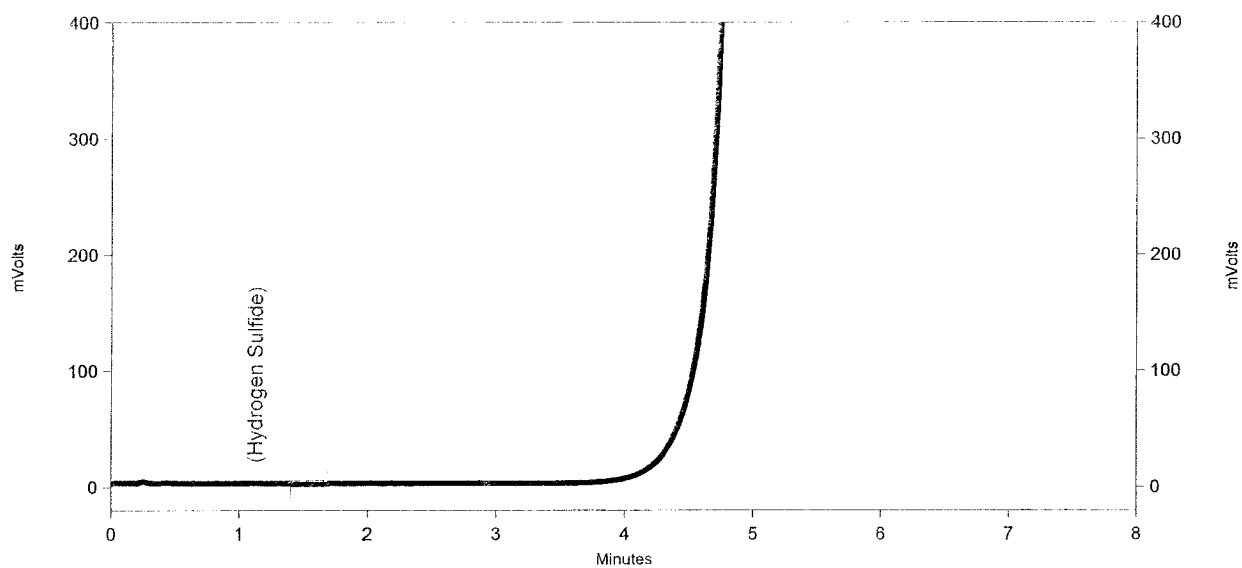
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 032  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition2-1475 oc\lcr440 3-29-2005  
2-47-36 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 2:53:45 PM



## FPD Results

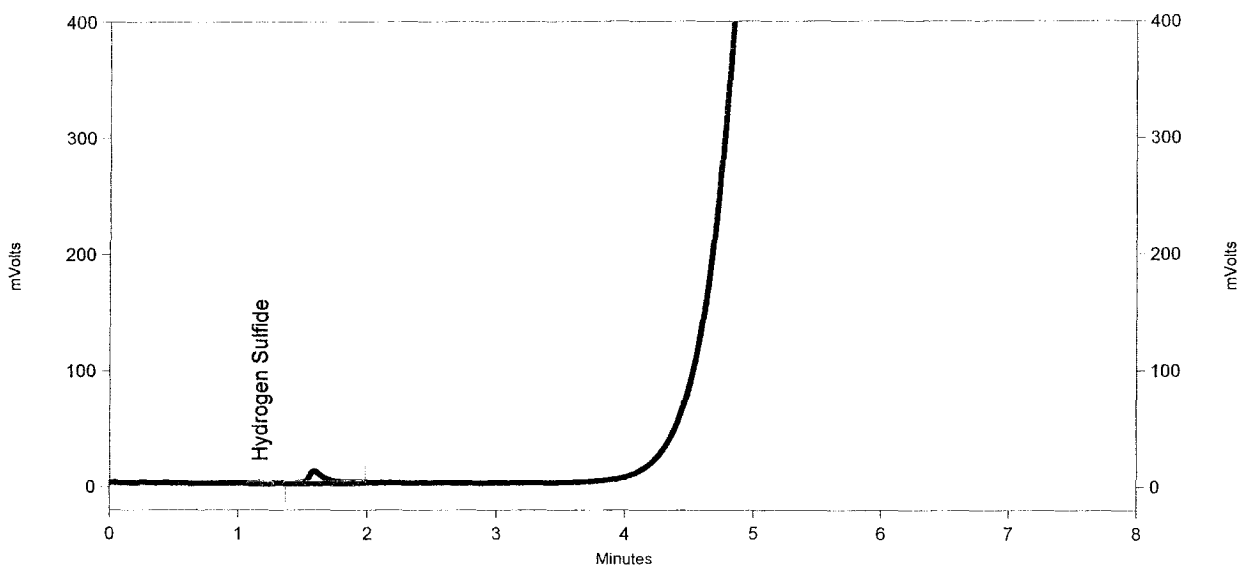
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 033  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition2-1475 oc\lcr440 3-29-2005  
3-01-50 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 3:07:54 PM



## FPD Results

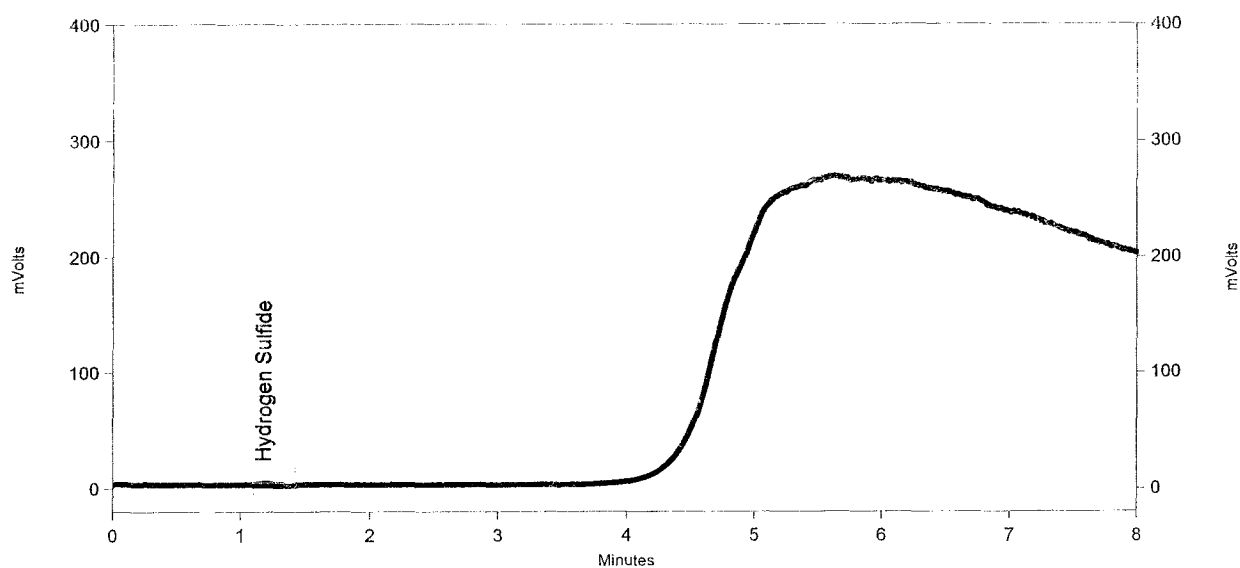
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.167	1584	0.002 LC
Totals		1584	0.002 LC



# Lyondell - Houston, TX

Sample ID: LCR440 036  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition2-1475 cc\lcr440 3-29-2005  
3-44-44 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 3:50:50 PM



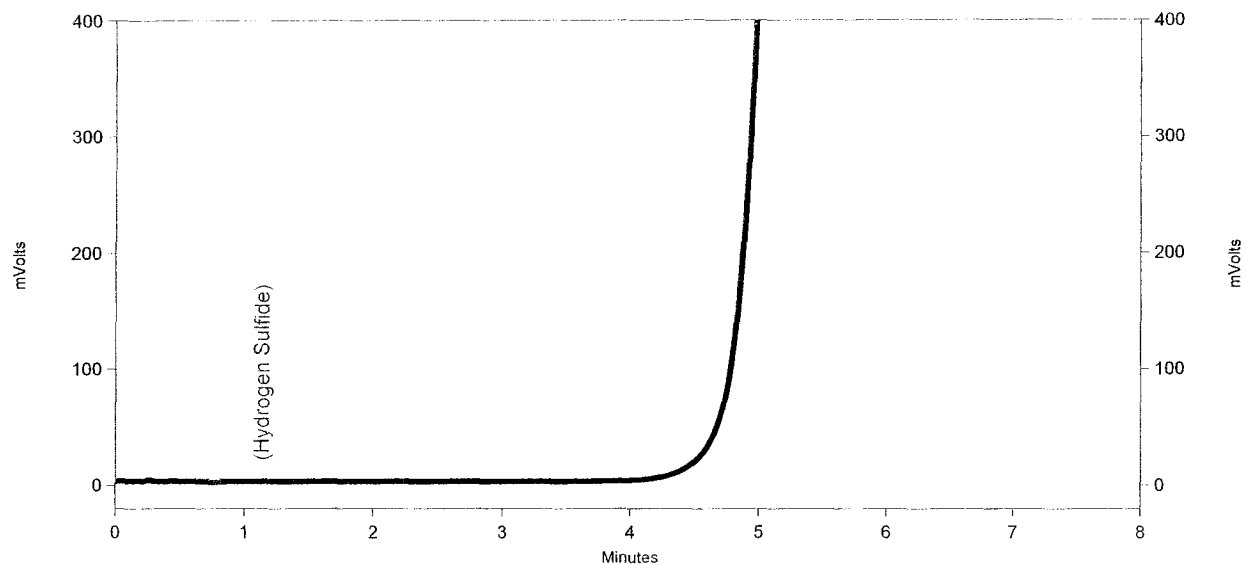
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.180	8996	0.009 LC
Totals		8996	0.009 LC

# Lyondell - Houston, TX

Sample ID: LCR440 037  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition2-1475 oc\lcr440 3-29-2005  
3-58-55 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 4:05:35 PM



## FPD Results

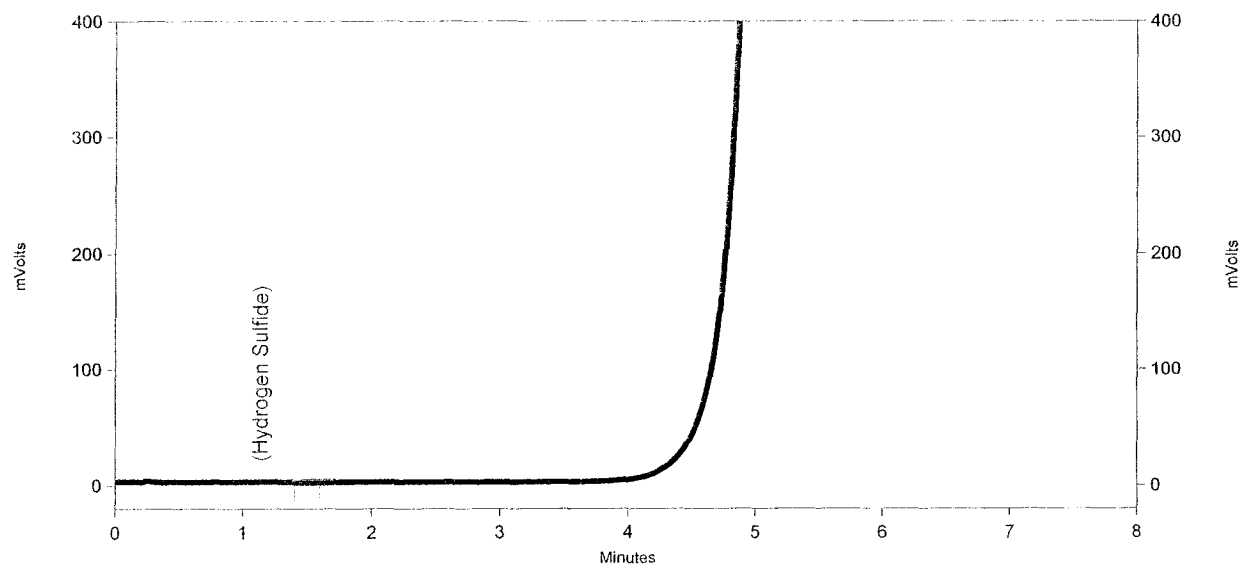
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 038  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition2-1475 oc\lcr440 3-29-2005  
4-13-40 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 4:20:20 PM



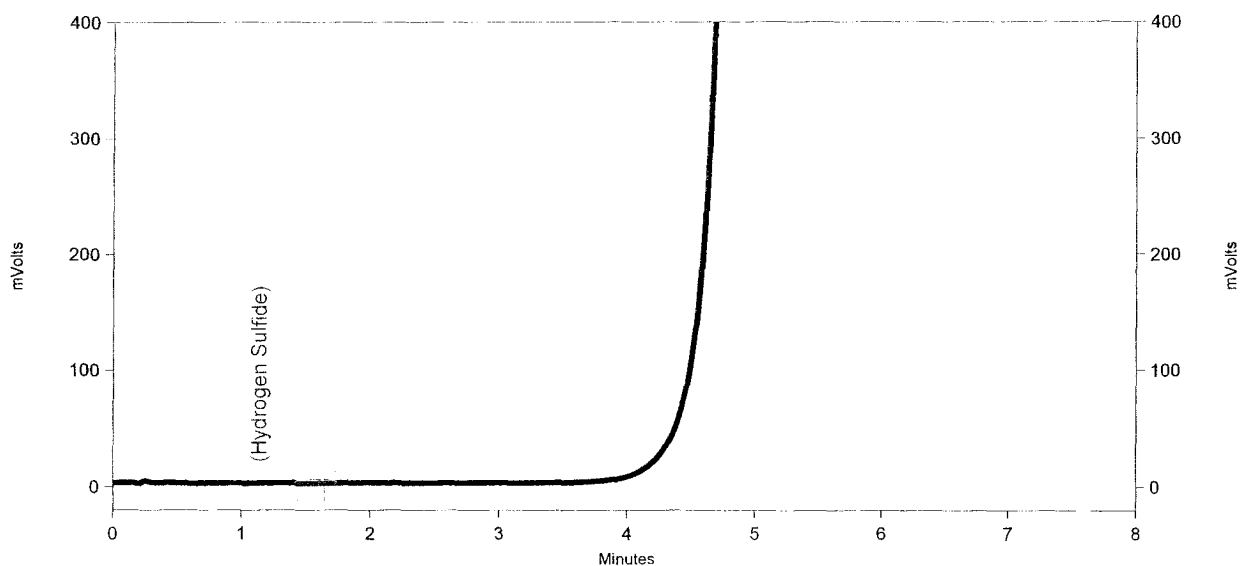
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL
Totals			

# Lyondell - Houston, TX

Sample ID: LCR440 023  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition2-1475 oc\lcr440 3-29-2005  
12-55-01 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 12:59:52 PM



## FPD Results

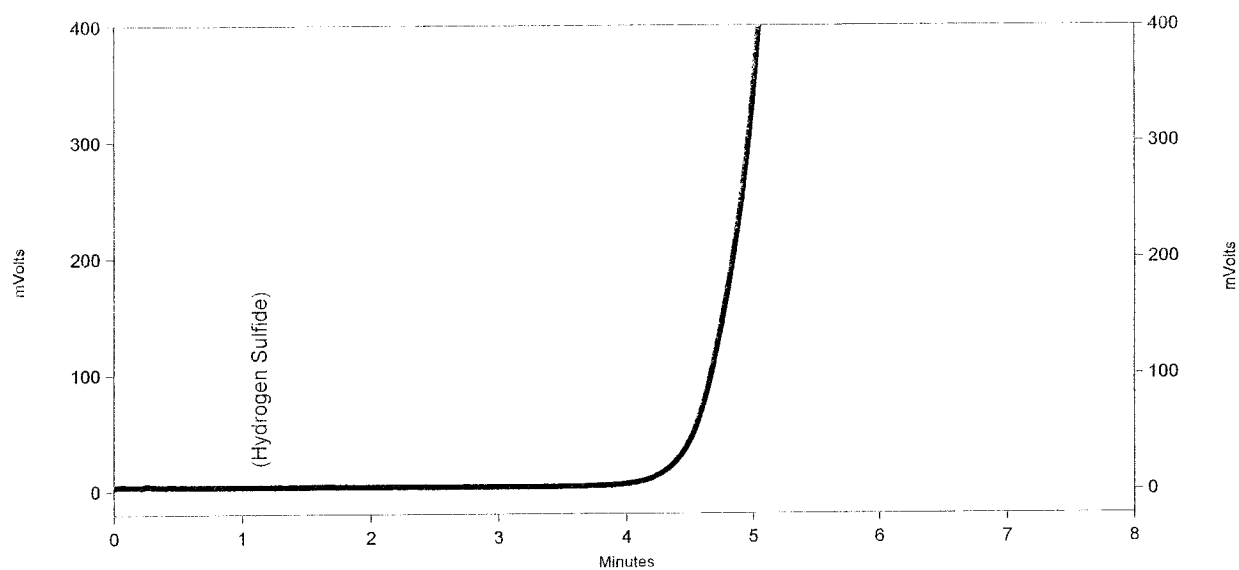
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 034  
Method Name: C:\CLASS-VP\Data\LCR-440\low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition2-1475 oc\lcr440 3-29-2005  
3-16-00 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 3:22:10 PM



## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
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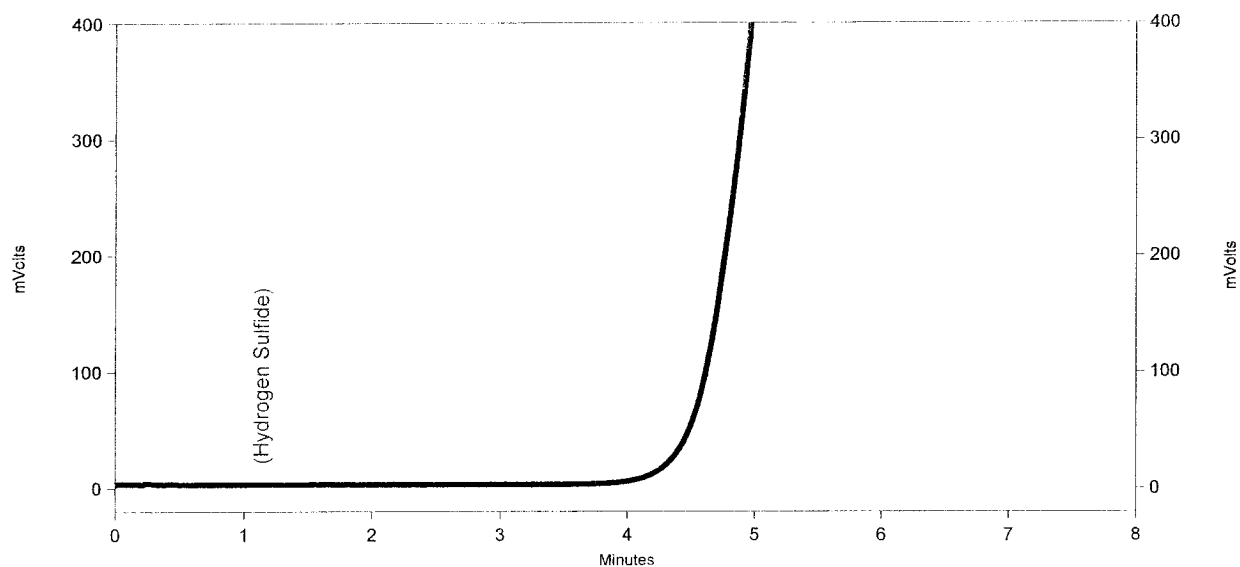
Hydrogen Sulfide			0.000 BDL
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Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 035  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition2-1475 oc\lcr440 3-29-2005  
3-30-14 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/29/2005 3:36:38 PM



## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

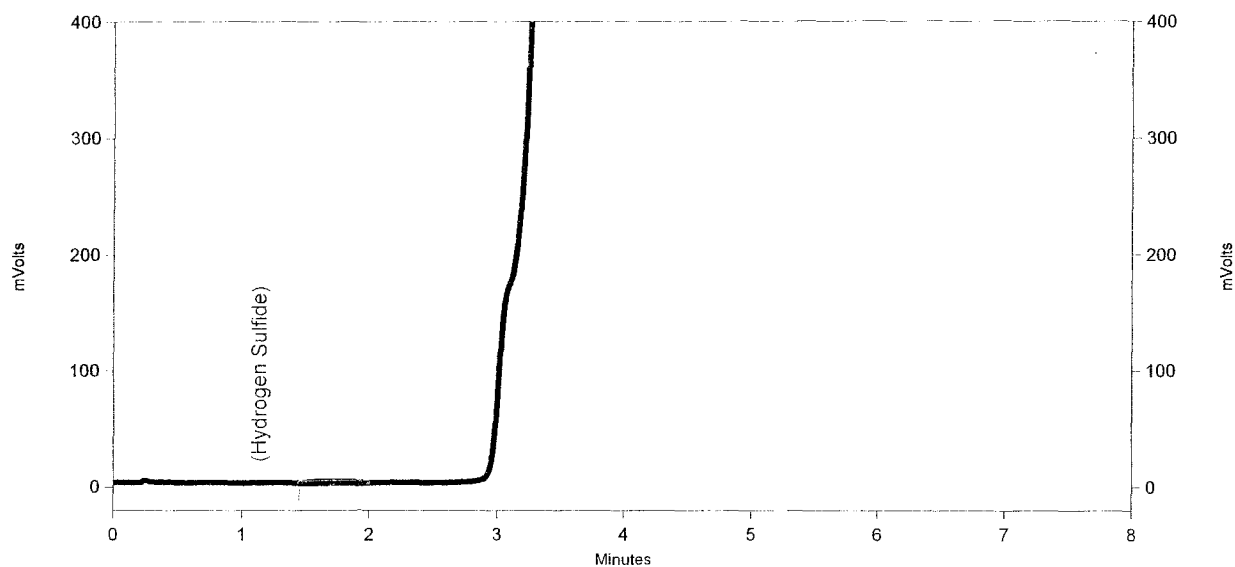
Totals			
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**LCR TO 440 Condition 3: 1458 °F**

# Lyondell - Houston, TX

Sample ID: LCR440 049  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition3-1458 oc\lcr440 3-30-2005  
10-04-39 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 10:06:30 AM



## FPD Results

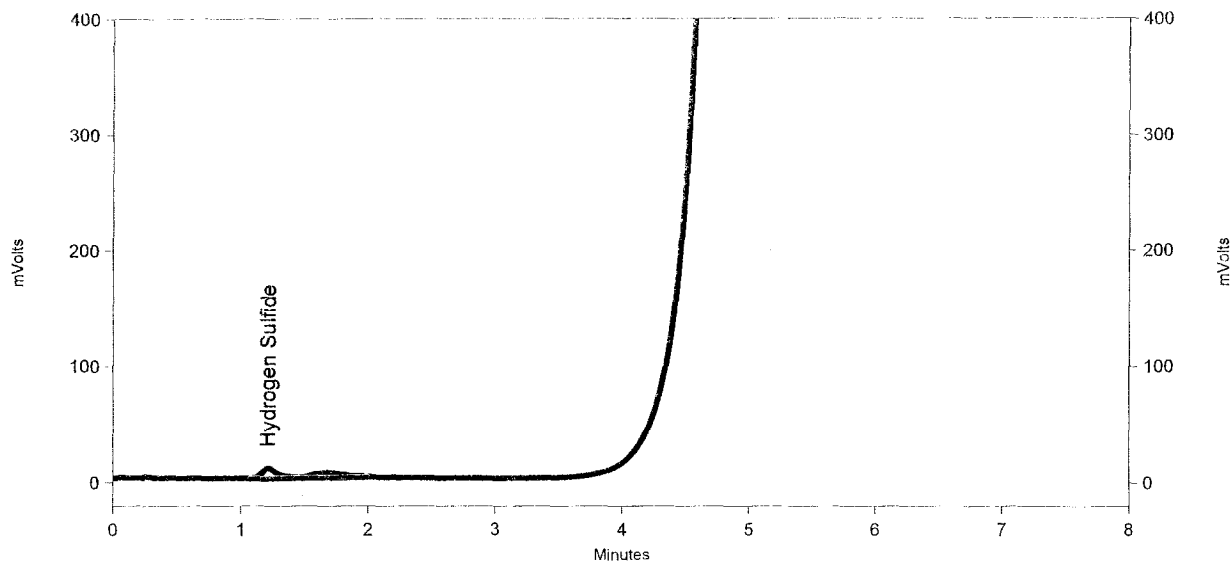
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL
Totals			



# Lyondell - Houston, TX

Sample ID: LCR440 050  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.mat  
Data: c:\class-vp\data\ler-440\compliance\condition3-1458 oc\ler440 3-30-2005  
10-14-34 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 10:18:33 AM



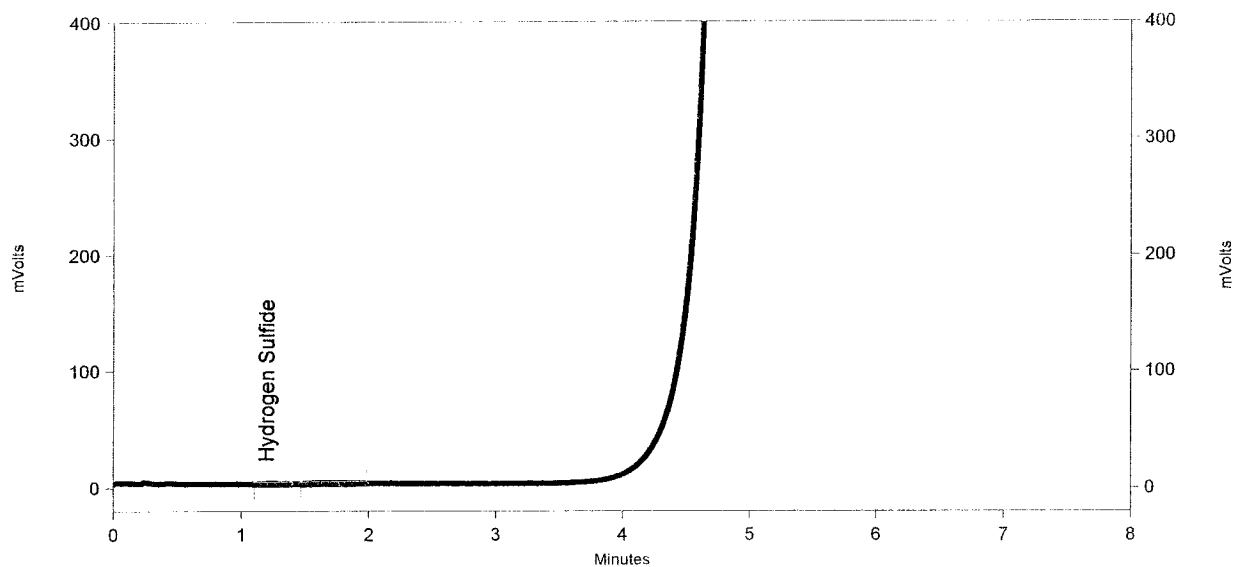
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.210	71650	0.071 LC
Totals		71650	0.071 LC

# Lyondell - Houston, TX

Sample ID: LCR440 051  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition3-1458 oc\lcr440 3-30-2005  
10-26-37 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 10:30:20 AM



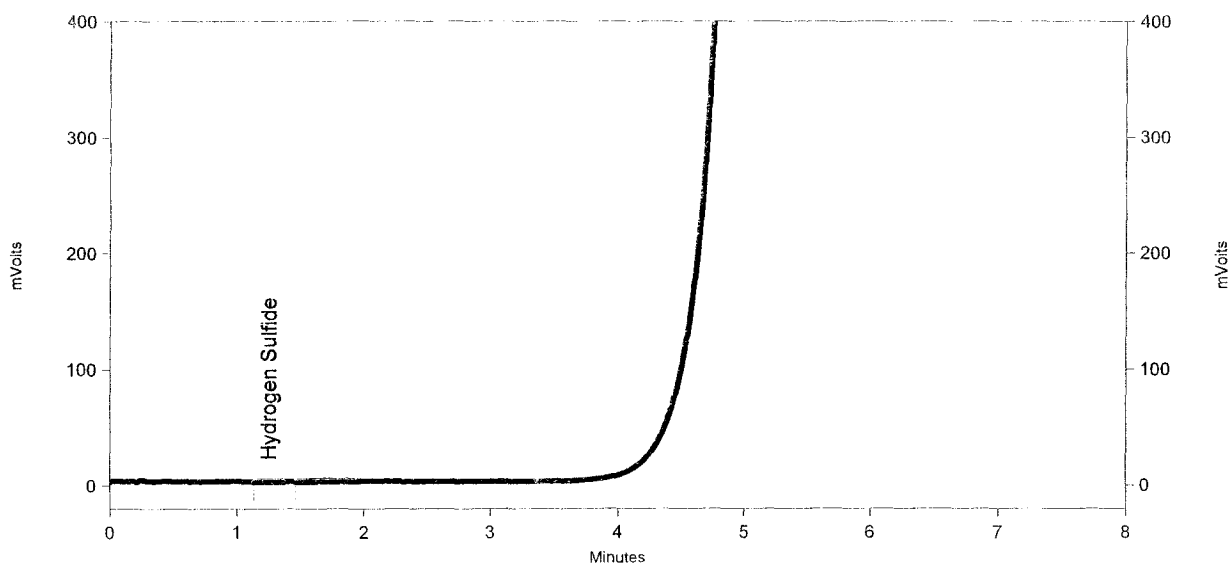
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.197	4498	0.004 LC
Totals		4498	0.004 LC

# Lyondell - Houston, TX

Sample ID: LCR440 052  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition3-1458 oc\lcr440 3-30-2005  
10-38-25 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 10:42:39 AM



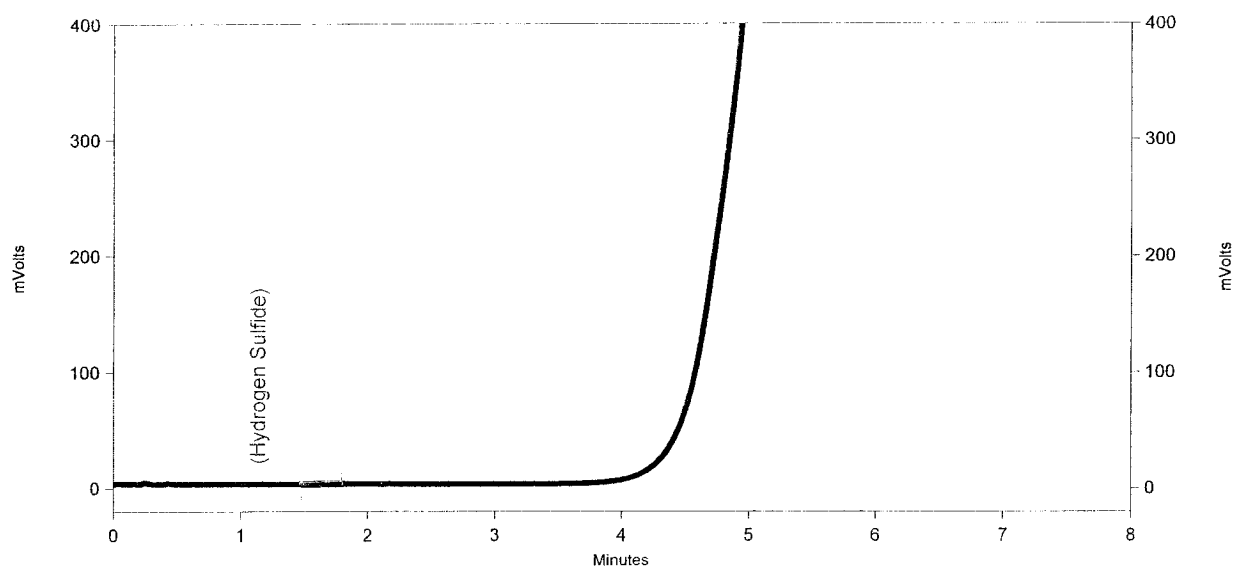
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.250	3009	0.003 LC
Totals		3009	0.003 LC

# Lyondell - Houston, TX

Sample ID: LCR440 053  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition3-1458 oc\lcr440 3-30-2005  
10-50-45 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 10:55:36 AM



## FPD Results

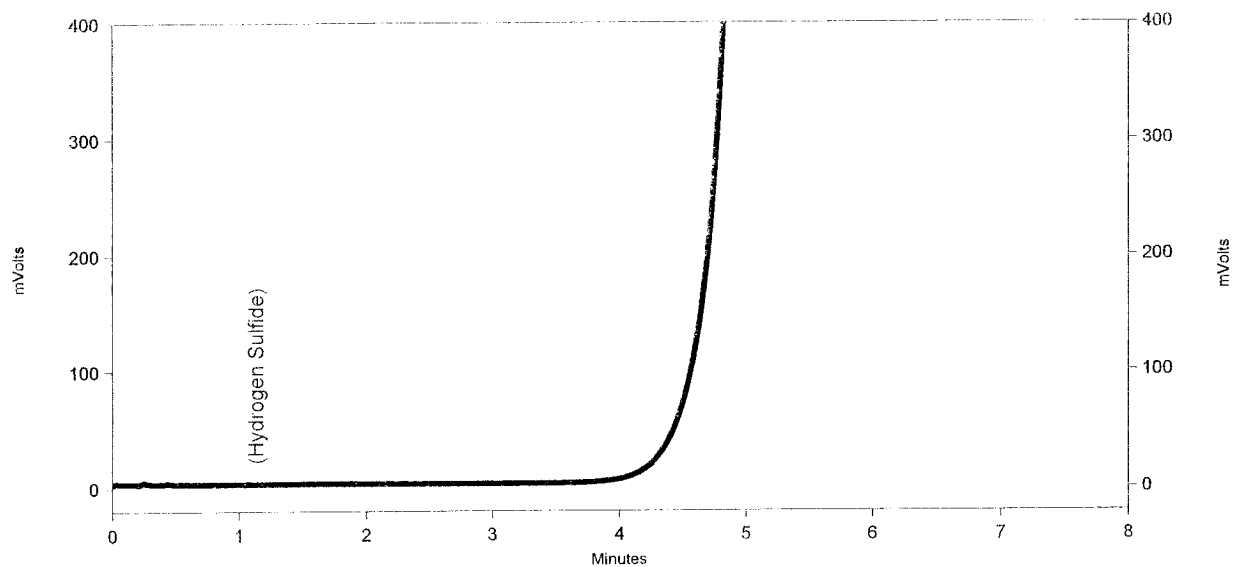
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 054  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lor-440\compliance\condition3-1458 cc\lor440 3-30-2005  
11-03-41 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 11:07:55 AM



## FPD Results

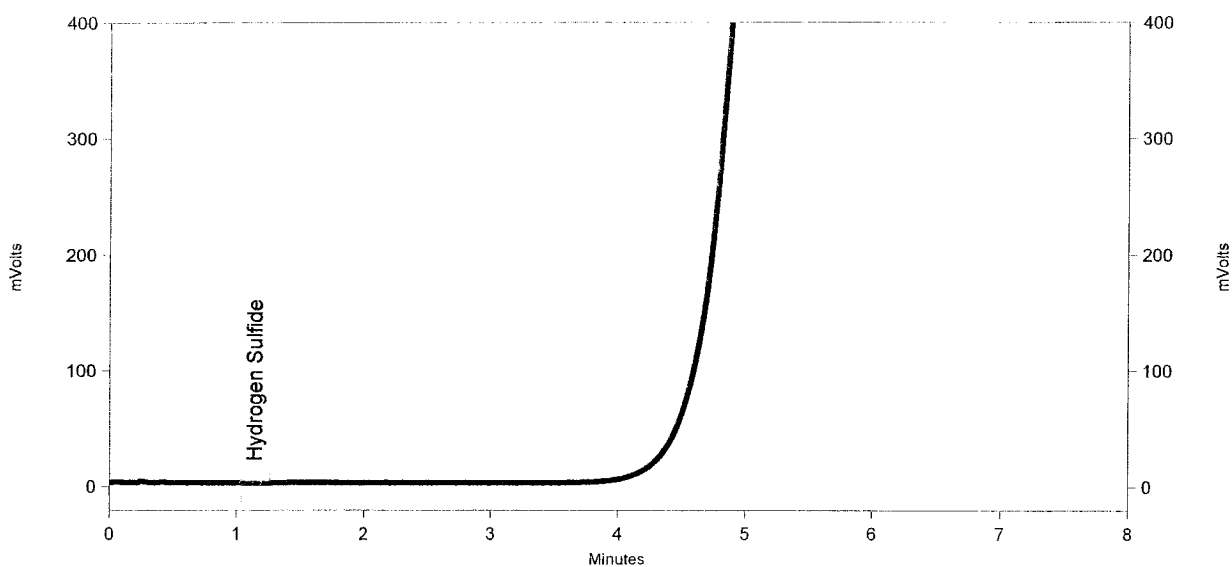
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 055  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition3-1458 oc\lcr440 3-30-2005  
11-16-01 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 11:19:12 AM



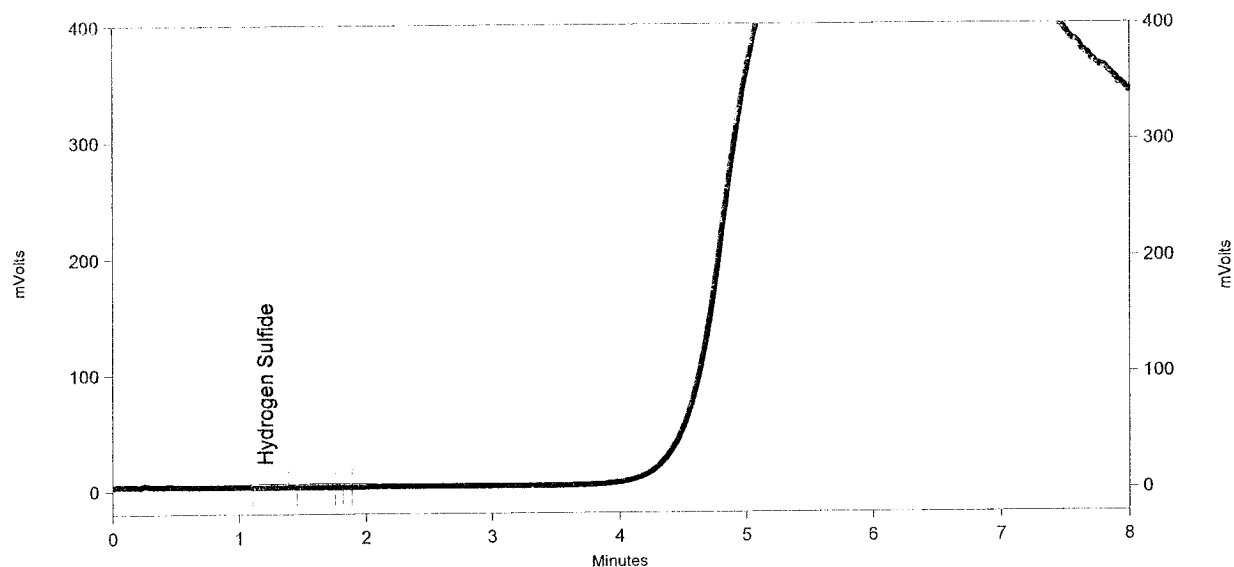
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.140	1684	0.002 LC
Totals		1684	0.002 LC

# Lyondell - Houston, TX

Sample ID: LCR440 056  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.mst  
Data: c:\class-vp\data\lcr-440\compliance\condition3-1458 oc\lcr440 3-30-2005  
11-27-13 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SPL Rev B

Run Time: 3/30/2005 11:32:24 AM



FPD Results  
Name

Retention Time

Area ESTD concentration  
(ppmv)

Hydrogen Sulfide

1.203

6939

0.007 LC

Totals

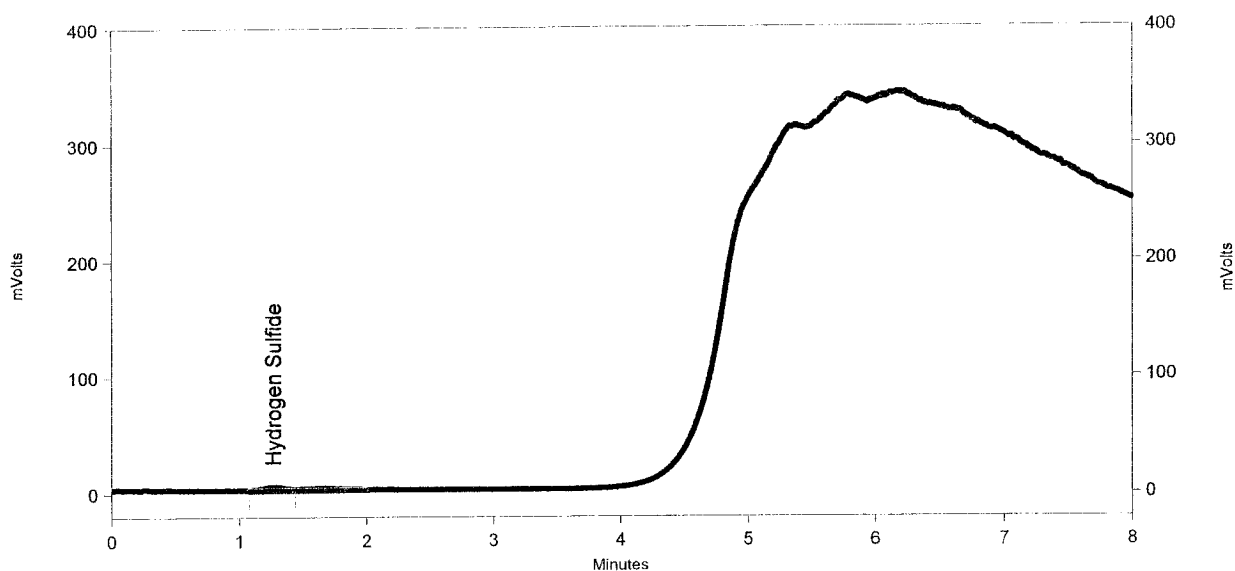
6939

0.007 LC

# Lyondell - Houston, TX

Sample ID: LCR440 057  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition3-1458 oc\lcr440 3-30-2005  
11-40-30 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 11:44:50 AM



FPD Results  
Name

Retention Time

Area ESTD concentration  
(ppmv)

Hydrogen Sulfide

1.265

32380

0.032 LC

Totals

32380

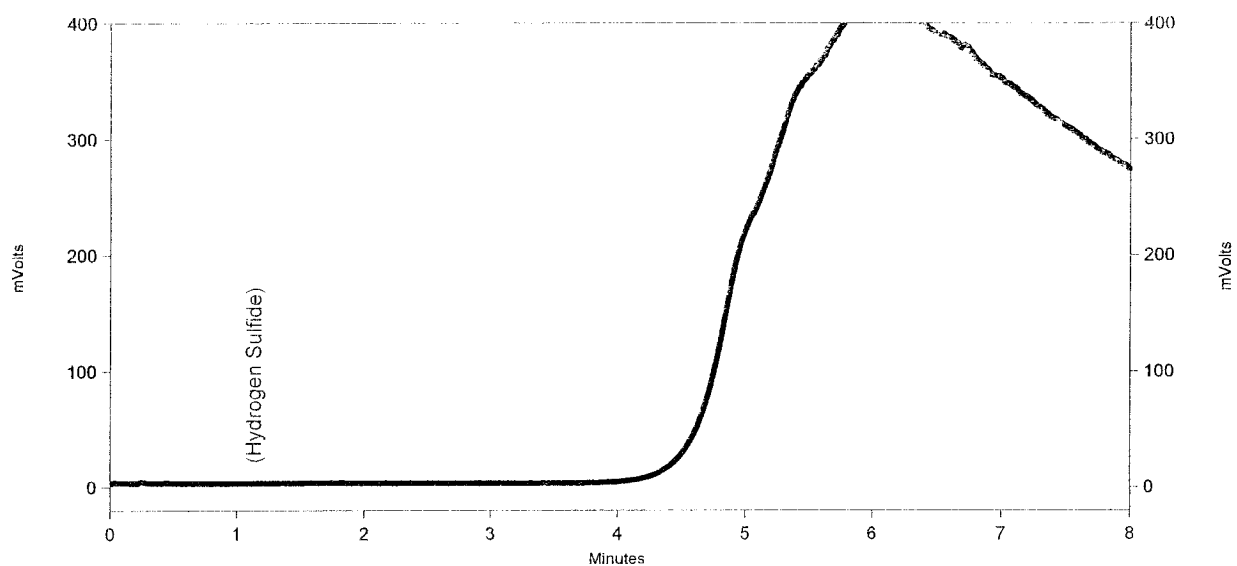
0.032 LC



# Lyondell - Houston, TX

Sample ID: LCR440 058  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition3-1458 oc\lcr440 3-30-2005  
11-52-56 am.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 11:57:31 AM



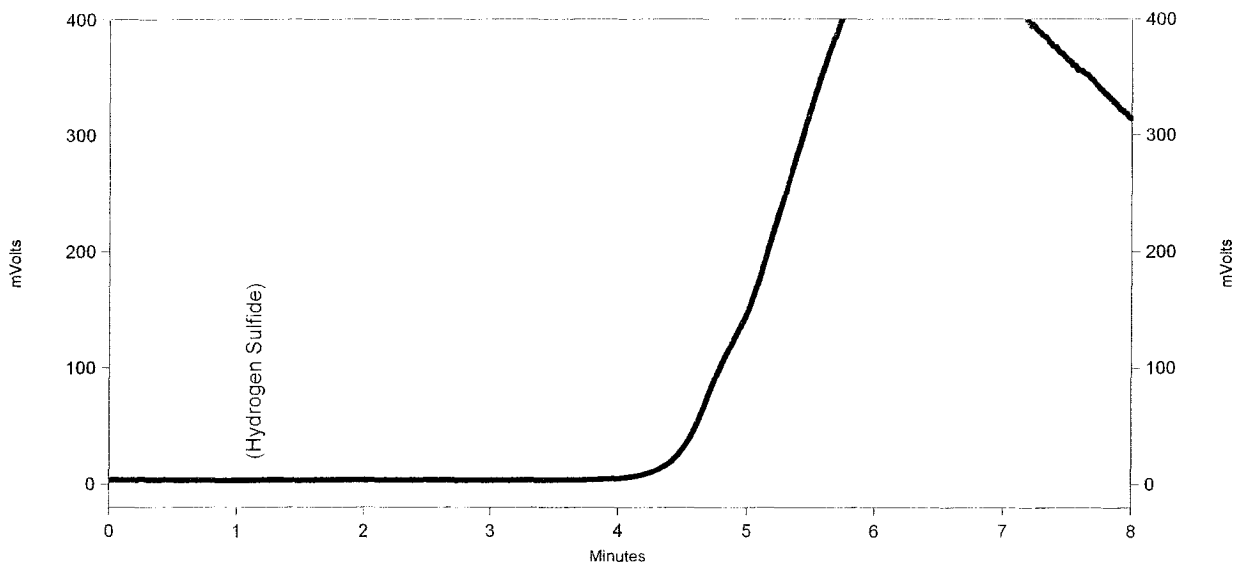
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL
Totals			

# Lyondell - Houston, TX

Sample ID: LCR440 059  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition3-1458 oc\lcr440 3-30-2005  
12-05-36 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 12:10:06 PM



## FPD Results

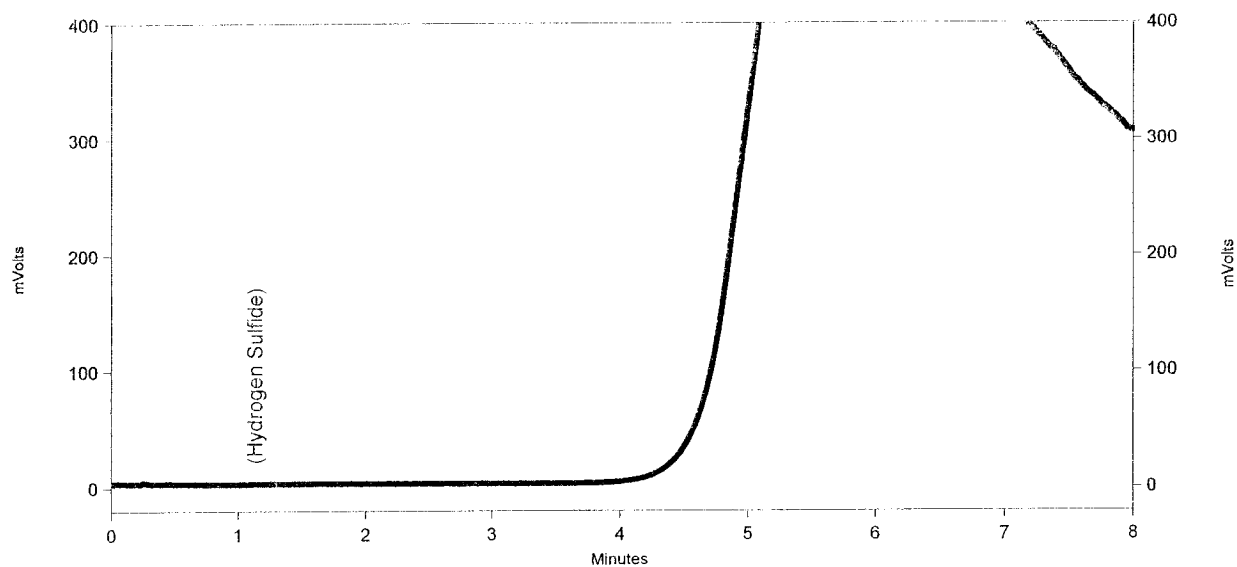
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 060  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition3-1458 oc\lcr440 3-30-2005  
12-18-10 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 12:22:27 PM



## FPD Results

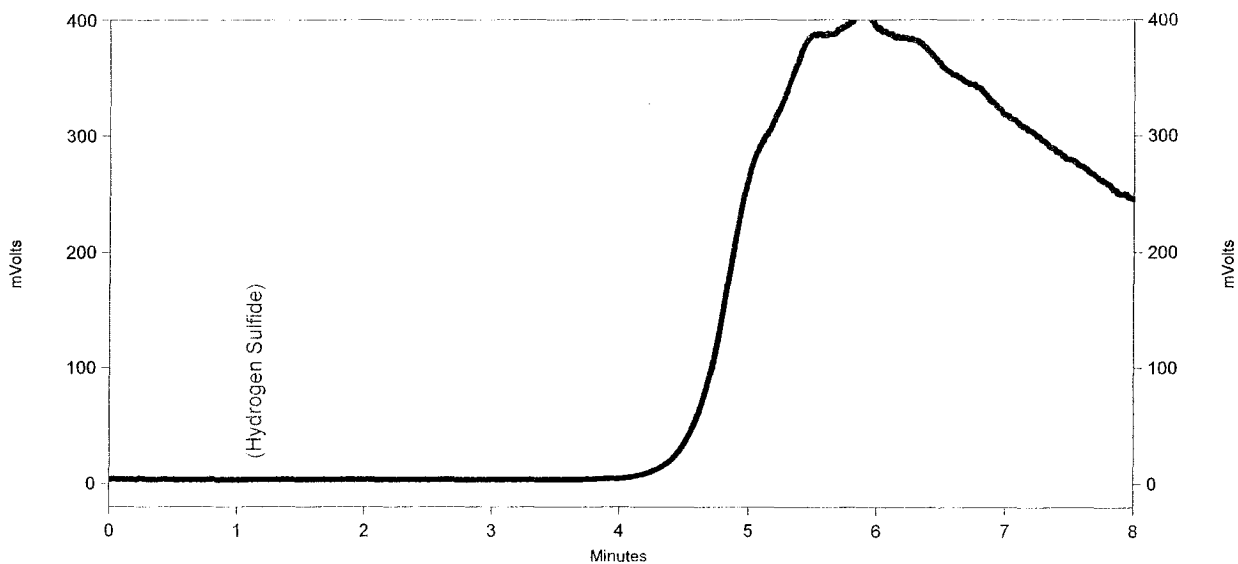
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide			0.000 BDL

Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 061  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition3-1458 oc\lcr440 3-30-2005  
12-30-32 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 12:35:02 PM



## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
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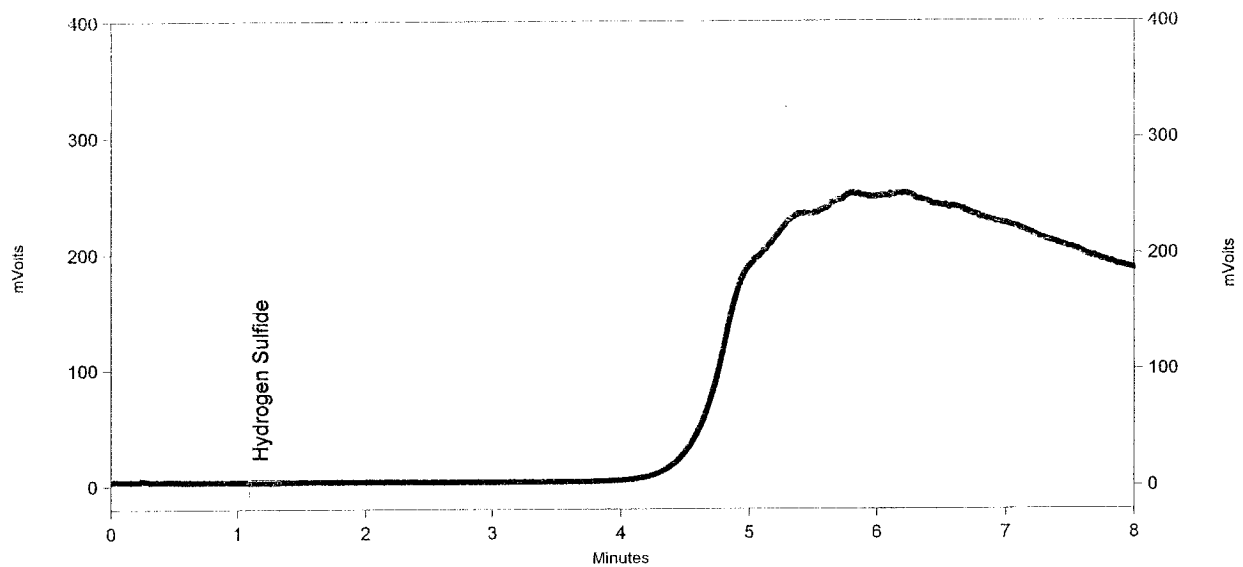
Hydrogen Sulfide			0.000 BDL
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Totals			
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# Lyondell - Houston, TX

Sample ID: LCR440 062  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.mst  
Data: c:\class-vp\data\lcr-440\compliance\condition3-1458 oc\lcr440 3-30-2005  
12-43-07 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 12:47:26 PM



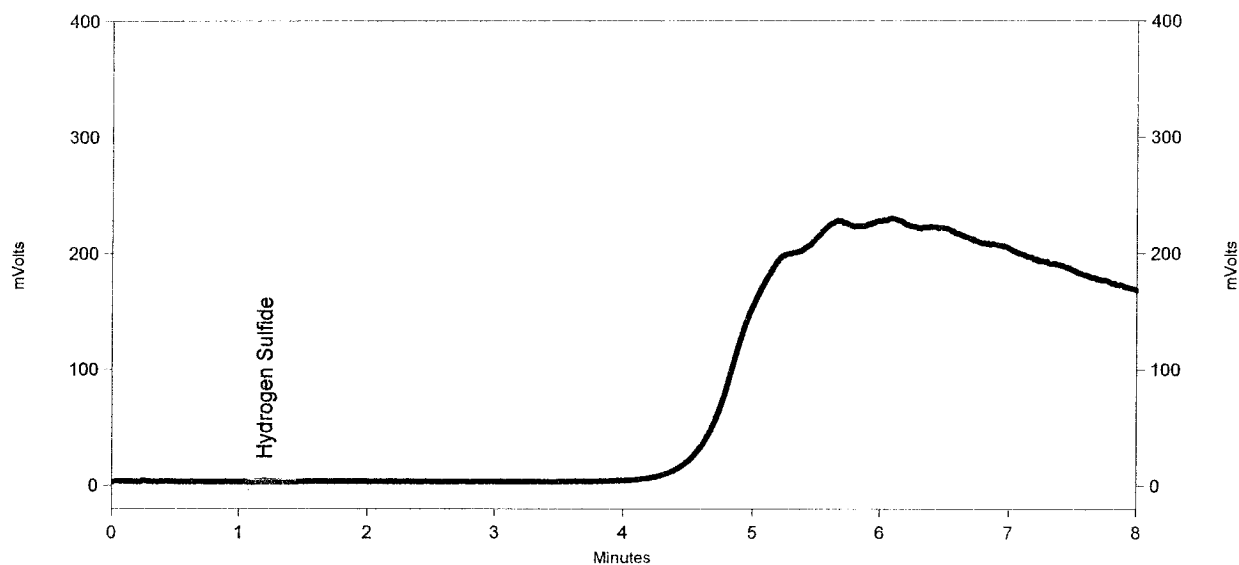
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.178	2448	0.002 LC
Totals		2448	0.002 LC

# Lyondell - Houston, TX

Sample ID: LCR440 063  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: c:\class-vp\data\lcr-440\compliance\condition3-1458 oc\lcr440 3-30-2005  
12-55-31 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 1:00:35 PM



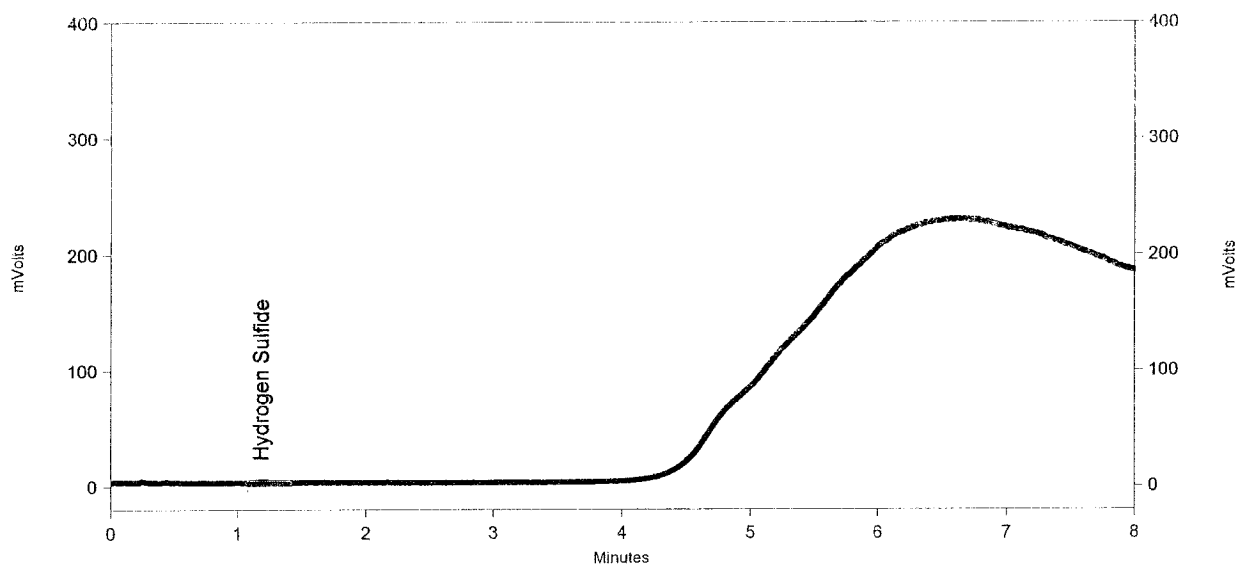
## FPD Results

Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.198	7897	0.008 LC
Totals		7897	0.008 LC

# Lyondell - Houston, TX

Sample ID: LCR440 064  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.met  
Data: g:\class-vp\data\lcr-440\compliance\condition3-1458 oc\lcr440 3-30-2005  
1-08-40 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 1:12:54 PM



## FPD Results

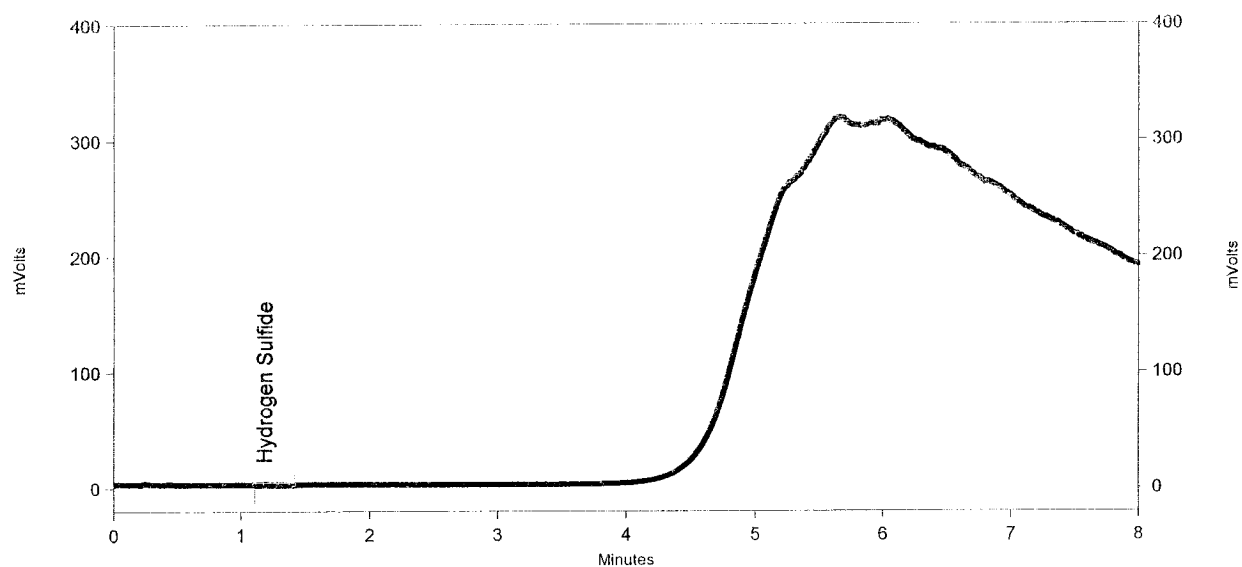
Name	Retention Time	Area	ESTD concentration (ppmv)
Hydrogen Sulfide	1.183	7952	0.008 LC

Totals		7952	0.008 LC
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# Lyondell - Houston, TX

Sample ID: LCR440 065  
Method Name: C:\CLASS-VP\Data\LCR-440\Low ppm H2S.test  
Data: c:\class-vp\data\lcr-440\compliance\condition3-1458 oc\lcr440 3-30-2005  
1-21-00 pm.dat  
Product: Shimadzu Client/Server  
Software: Version 7.2 SP1 Rev B

Run Time: 3/30/2005 1:24:41 PM



FPD Results  
Name

Retention Time

Area ESTD concentration  
(ppmv)

Hydrogen Sulfide	1.183	4211	0.004 LC
Totals		4211	0.004 LC