

# TEST REPORT

## EMISSION TEST PROGRAM

EPA ICR FOR PETROLEUM REFINERIES

SRU NO. 544 TGI STACK (EPN E-02-SCOT)

VALERO PORT ARTHUR REFINERY  
PORT ARTHUR, TEXAS

PREPARED FOR:

***THE PREMCOR REFINING GROUP INC.***

A Wholly-Owned Subsidiary of Valero Energy

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## REPORT CERTIFICATION

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### STATEMENT OF CONFORMANCE AND TEST REPORT CERTIFICATION

I certify, to the best of my knowledge, that this test program was conducted in a manner conforming to the criteria set forth in ASTM D 7036-04: Standard Practice for Competence of Air Emission Testing Bodies, and that project management and supervision of all project related activities were performed by qualified individuals as defined by this practice.

I further certify that this test report and all attachments were prepared under my direction or supervision in accordance with the ARI Environmental, Inc. quality management system designed to ensure that qualified personnel gathered and evaluated the test information submitted. Based on my inquiry of the person or persons who performed the sampling and analysis relating to this performance test, the information submitted in this test report is, to the best of my knowledge and belief, true, accurate, and complete.

A handwritten signature in black ink, reading 'Daniel E. Fitzgerald 8-19-11'. The signature is written in a cursive style and is positioned above a horizontal line.

Daniel E. Fitzgerald, QSTI  
Division Manager, Source Testing  
ARI Environmental, Inc.



## **SECTION ONE**

## **Introduction and Summary**

ARI Environmental, Inc. (ARI) was retained by the Valero Port Arthur Refinery (Valero) of The Premcor Refining Group Inc., a wholly owned subsidiary of Valero Energy, to conduct an emission test program at their refinery located in Port Arthur, Texas.

The testing was conducted on June 15 through 17, 2011 on the Sulfur Recovery Unit (SRU) No. 544 Tailgas Incinerator (TGI) stack in response to the USEPA Section 114 Information Collection Request (ICR) for Petroleum Refineries. The test program was conducted pursuant to the sampling and analytical procedures presented in the Test Protocol (ARI Project No. H453-306) dated May 16, 2011.

The specific pollutants, test run duration and units of measure that were determined are presented in Table 1-1. The parameters and associated test methods are presented in Table 1-2.

Under the direct supervision of Mr. Dan Fitzgerald, ARI's test team consisted of Messrs. Jerry Bovee, Greg Burch, Jeff Goldfine, Chris Hall, Andrew Hornbeck, Jeff Knapp and Ron Mullins. Sample recovery and laboratory shipment activities were performed by Messrs. Richard Brank-Campbell and Ron White of ARI. Mr. Robin Hill of Valero provided coordination of the test program with refinery operations.

The results of the test program are presented in Section 4. The calculation summaries, field data, ARI reference method monitoring data, laboratory data, process data, calibration data and test program qualifications are included in the appendices.

## SECTION ONE

## Introduction and Summary

**TABLE 1-1. POLLUTANTS, TEST RUN DURATION AND UNITS OF MEASURE**

Group <sup>1</sup>	Pollutant	Test Run Duration (hours) <sup>2</sup>	Units of Measure
A1	Speciated Volatile Organic Hazardous Air Pollutants (HAP)	1	lb/hr, µg/dscm
A2	Speciated Semi-Volatile Organic HAP	4	lb/hr, µg/dscm
A1	Aldehydes	1	lb/hr, µg/dscm
A3	Total Hydrocarbons (THC)	1	lb/hr, ppmv db
A3	Methane, Ethane	1	lb/hr, ppmv db
A3	Carbon Monoxide (CO)	1	lb/hr, ppmv db
F	Hydrogen Sulfide (H <sub>2</sub> S), Carbonyl Sulfide (COS) and Carbon Disulfide (CS <sub>2</sub> )	3	lb/hr, ppmv db
	Total Reduced Sulfur (TRS) compounds	3	ppmv db
A, F	Flow Oxygen (O <sub>2</sub> ), Carbon Dioxide (CO <sub>2</sub> ) Moisture	Conducted simultaneously with the sampling in each group.	acfm, scfm, dscfm % by volume db % by volume

<sup>1</sup>Simultaneous sampling was conducted for all pollutants in each group.

<sup>2</sup>Three test runs were conducted for each pollutant.



## SECTION ONE

## Introduction and Summary

**TABLE 1-2. POLLUTANTS AND TEST METHODS**

Group	Pollutants	Test Methods	Isokinetic Sampling
A1	Speciated Volatile Organic HAP	USEPA Methods 18 and 308	No
A2	Speciated Semi-Volatile Organic HAP	SW-846 Method 0010 with SW-846 Method 8270C/D analytical finish	Yes
A1	Aldehydes	SW-846 Method 0011 with SW-846 Method 8315A	Yes
A3	THC	USEPA Method 25A	No
A3	CO	USEPA Method 10	No
A3	Methane, Ethane	USEPA Method 18	No
F	H <sub>2</sub> S, COS and CS <sub>2</sub>	USEPA Method 15	No
F	TRS	USEPA Method 16A	No



## SECTION TWO

## Testing and Analytical Procedures

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### 2.1 OVERVIEW

ARI conducted an emission test program on the SRU No. 544 TGI stack at the Valero Refinery located in Port Arthur, Texas. Testing was conducted in response to the USEPA Section 114 ICR for Petroleum Refineries. Three (3) test runs were conducted at the SRU No. 544 TGI stack for all pollutants. The test run durations are shown in Table 1-1. The test methods are summarized in Table 1-2.

### 2.2 METHODOLOGY

Test methods followed the Code of Federal Regulations, Title 40, Part 60 (40 CFR 60), Appendix A, USEPA Methods 1-4, 10, 15, 16A, 18 and 25A; 40 CFR 51, Appendix M, USEPA Method 205; 40 CFR 63, Appendix A, USEPA Method 308; SW-846 Methods 0010, 0011, 8270C/D and 8315A; and the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods. The aforementioned methods that were followed are those listed in Component 4 of the Petroleum Refinery Emissions Information Collection, Part VIII, Test Procedures, Methods and Reporting Requirements for the Information Collection Request for Petroleum Refineries.

#### 2.2.1 Sampling Location (USEPA Method 1)

The sampling point locations for the determination of gas velocity and volume flow rate were determined following the procedural requirements as detailed in USEPA Method 1. Isokinetic sampling was conducted at the SRU No. 544 TGI stack in two (2) 90° opposed sampling ports provided on the cross-section of the 67-inch diameter duct. A third port was located 135° from both the isokinetic ports and was used for the non-isokinetic collection of gaseous samples. The sample point in the third port was located 30 inches from the stack inner wall. All sample ports were located approximately 840 inches (12.5 duct diameters) upstream and 582 inches downstream (8.7 duct diameters) from the nearest flow disturbances. Twelve (12) traverse points were used to sample the cross-sectional area of the stack. See Figure 2-1.

#### 2.2.2 Flue Gas Volumetric Flow Rate (USEPA Method 2)

Gas velocity and volumetric flow rate were determined following USEPA Method 2. Velocity head measurements were performed using a Type S pitot tube and Dwyer inclined 0 - 0.25-in. water manometer with a 0.005-in. resolution. Temperature measurements were conducted using a Chromel-Alumel (Type K) thermocouple connected to a digital direct read-out potentiometer.

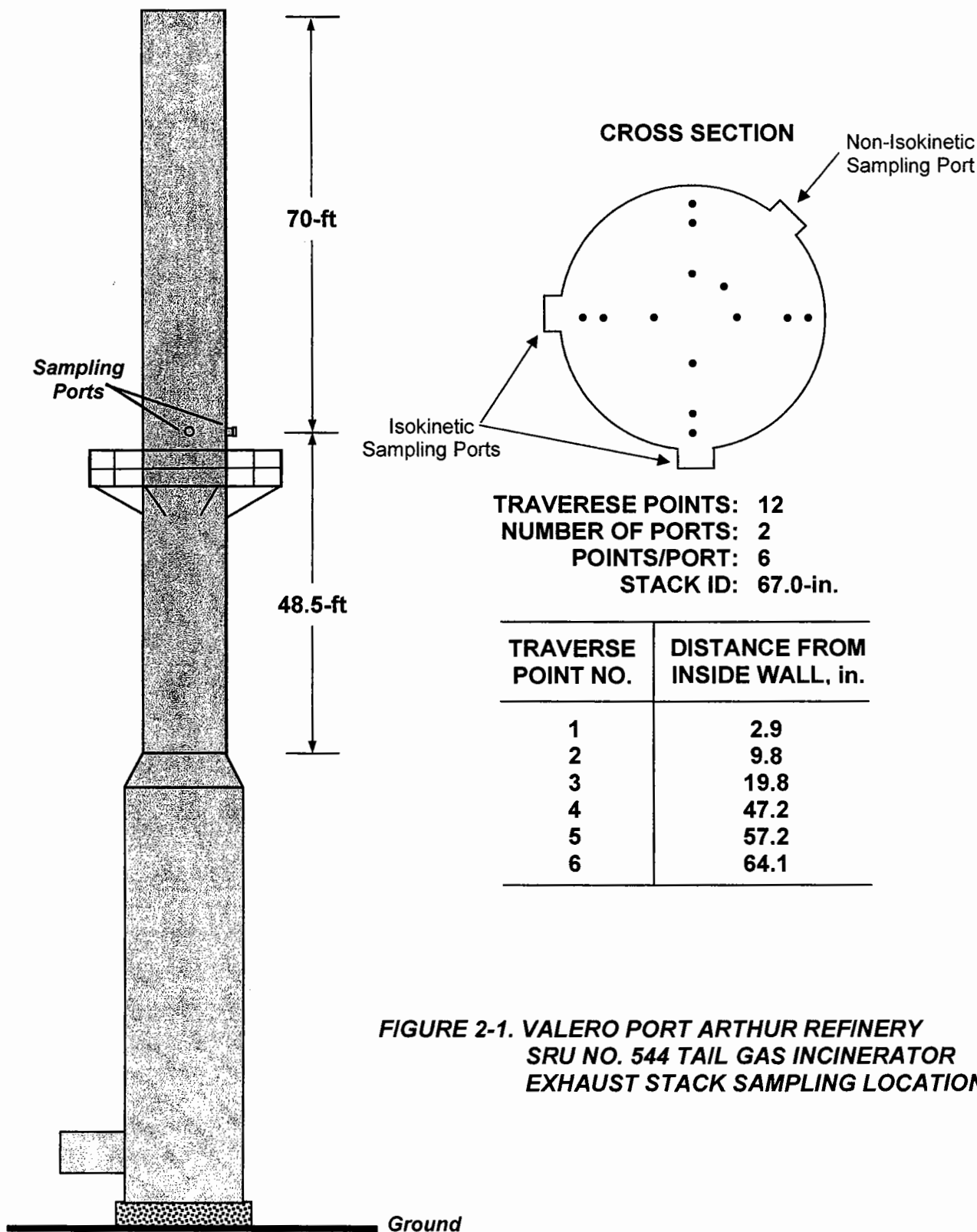
#### 2.2.3 Oxygen, Carbon Dioxide and Carbon Monoxide (USEPA Methods 3A and 10)

O<sub>2</sub> and CO<sub>2</sub> concentrations were determined following USEPA Method 3A procedures using ARI's Servomex, Inc. Model 1440C combination paramagnetic O<sub>2</sub> and non-dispersive infrared CO<sub>2</sub> analyzer. O<sub>2</sub> and CO<sub>2</sub> monitoring was conducted in conjunction with all pollutant testing and flue gas volumetric flow rate measurements.

CO sampling followed USEPA Method 10 procedures using ARI's Thermo Environmental Instruments, Inc. Model 48i gas filter correlation non-dispersive infrared CO analyzer. CO monitoring was conducted in conjunction with the USEPA SW-846 Method 0010 (semi-volatile) test runs.

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## Testing and Analytical Procedures



**FIGURE 2-1. VALERO PORT ARTHUR REFINERY  
SRU NO. 544 TAIL GAS INCINERATOR  
EXHAUST STACK SAMPLING LOCATION**

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## Testing and Analytical Procedures

As shown in Figure 2-2, ARI's sampling system consisted of a heated probe with in-stack filter followed by a calibration tee assembly. The probe system was connected to a heated Teflon sampling line that transported the gas sample through an ice-cooled condenser and an electronic chiller to remove moisture. The dry sample gas was then transported to a manifold system by a Teflon lined sample pump and Teflon sample line. The manifold was connected with sample gas intake lines for ARI's O<sub>2</sub>, CO<sub>2</sub> and CO analyzers.

ARI's monitors were calibrated with applicable zero, mid-range and high-range gases as specified in the applicable USEPA methods. The calibration gases were generated from Protocol 1 calibration gases using an EnviroNics Model 4040 Gas Dilution System. The gases met the calibration gas protocols as specified in USEPA Method 7E, Section 7.1.

Response time, calibration error and measurement system bias tests were performed prior to testing and a pre/post calibration drift test was conducted after each test repetition on each monitor. The average zero and calibration drift values obtained during each test run were used to correct each monitor's raw data for instrument zero and drift for each respective test run.

The monitor data were collected at 15-second intervals and one-minute averages were calculated by ARI's data acquisition system consisting of an Omega OMB-DAQ-56 data acquisition module connected to a computer for digital data archiving and data reduction.

### **2.2.4 Flue Gas Moisture Content (USEPA Method 4)**

The stack gas moisture content was determined following USEPA Method 4. This method was performed as part of the pollutant sampling trains. Moisture was collected in a series of chilled impingers containing methodology specific liquids and silica gel. A dry gas meter to determine the sample volume followed the impingers. The amount of volume gain in the water impingers and weight gain in the silica gel impinger were used to calculate the moisture content. Figure 2-3 presents a schematic of an example moisture train that is not combined with another sampling system.

### **2.2.5 COS, CS<sub>2</sub> and H<sub>2</sub>S (USEPA Method 15)**

Determination of COS, CS<sub>2</sub> and H<sub>2</sub>S was conducted in accordance with USEPA Method 15 using a gas chromatograph (GC) for separation of sulfur compounds and measurement by a flame photometric detector (FPD).

Modifications and improvements to USEPA Method 15 during the testing included the following:

1. No sample dilution was required (GC range ~500 ppm)
2. USEPA Protocol 1 calibration gases were used to calibrate the GC (no permeation tubes used)

The gas sampling system consisted of a ¼-inch stainless steel probe connected to a Teflon sampling line. The exhaust gas was then conveyed through a series of Teflon impingers located on the sampling platform containing a citrate buffer solution to remove most of the sulfur dioxide (SO<sub>2</sub>) from the sample stream.

A Teflon lined sample pump transported the sample in ¼-inch ID Teflon tubing to the ARI instrument trailer. The sample was transported to a manifold system at a flow rate of nominally 3-5 liters per minute from which a sample was introduced to the GC-FPD.

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## Testing and Analytical Procedures

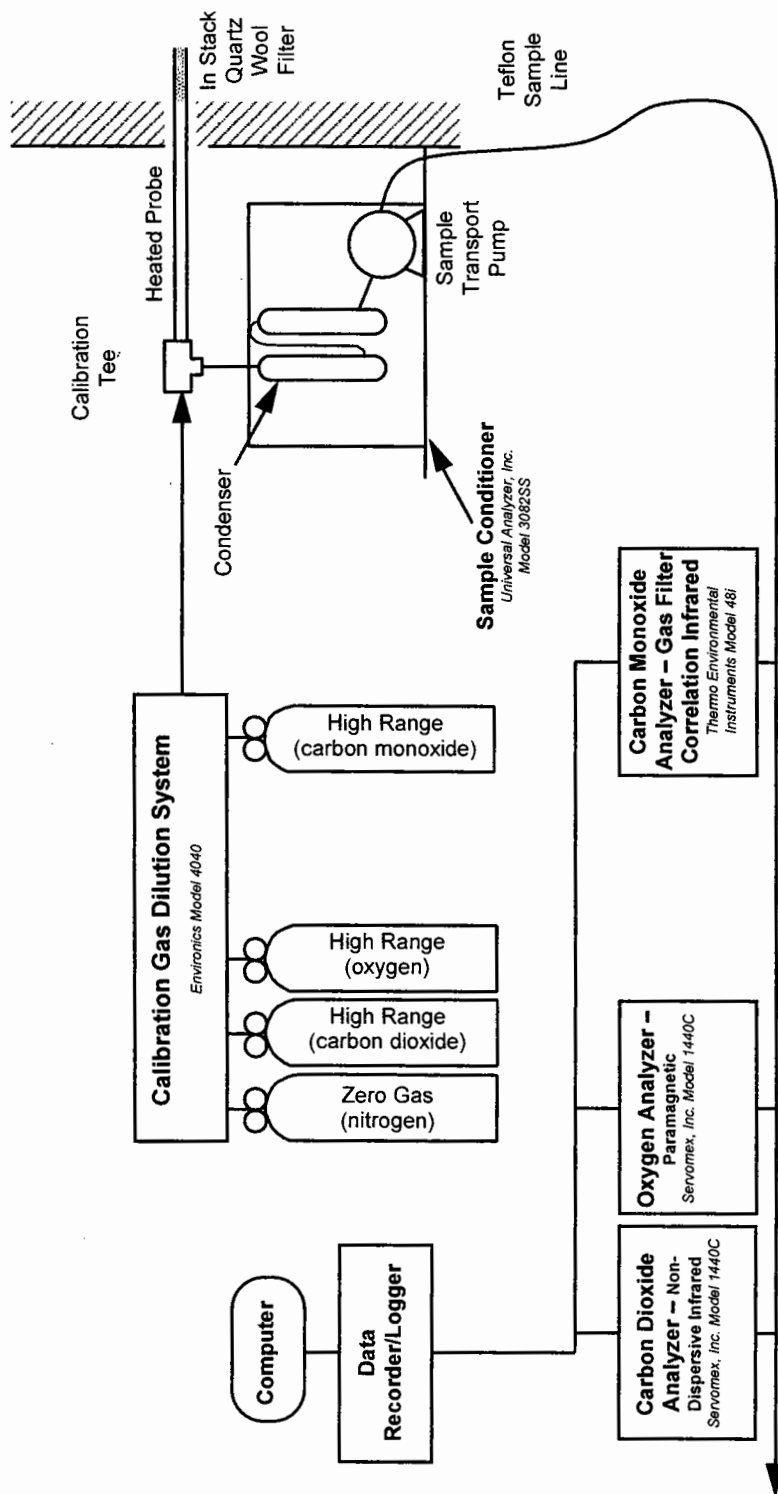
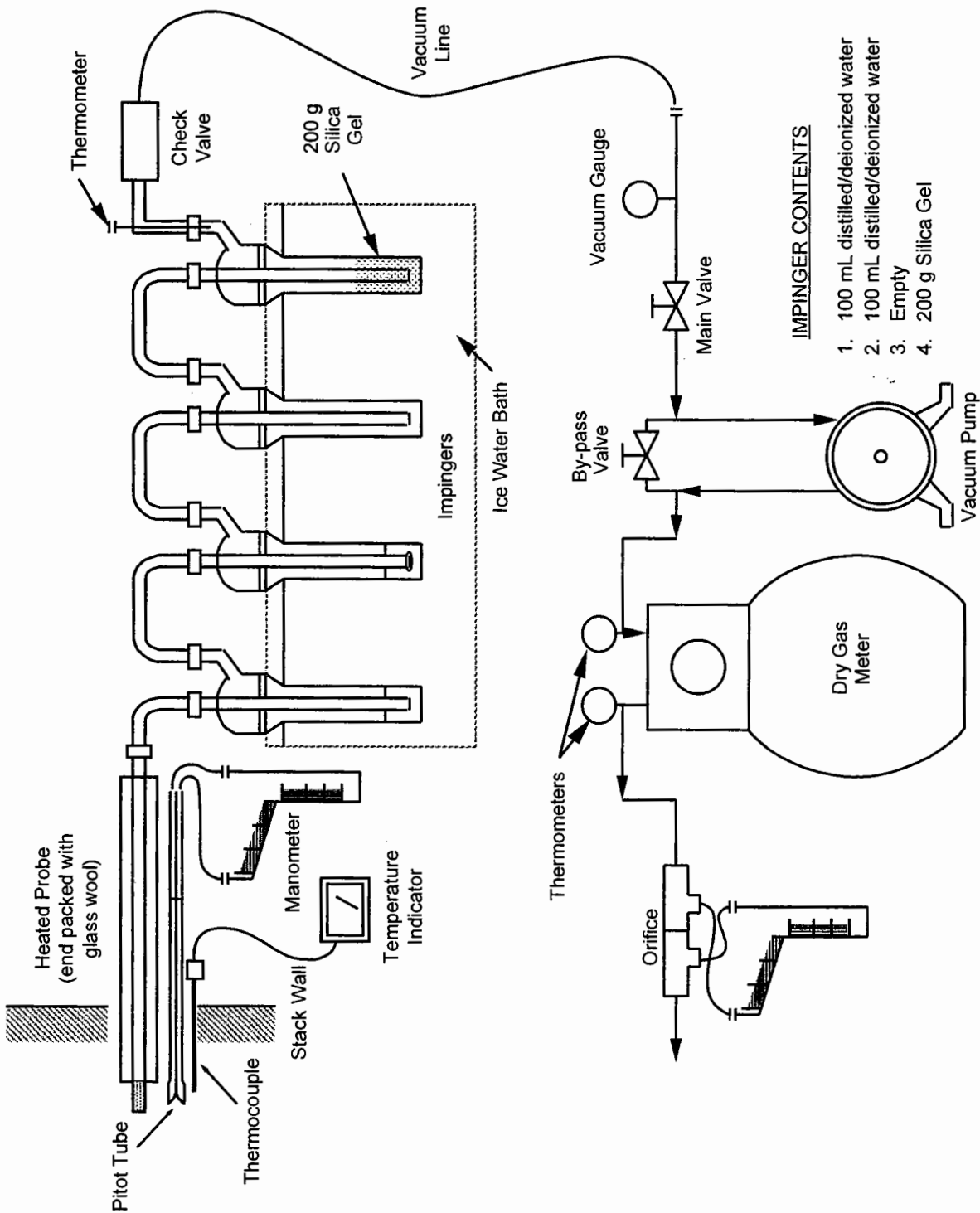


FIGURE 2-2. ARI REFERENCE METHOD CO<sub>2</sub>, O<sub>2</sub> AND CO SAMPLING SYSTEM

## SECTION TWO

## Testing and Analytical Procedures



**FIGURE 2-3. USEPA METHOD 4 SAMPLING TRAIN (MOISTURE)**

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## Testing and Analytical Procedures

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The GC-FPD system consisted of an SRI Model 8610C field GC containing a heated gas sampling valve, column oven and detector. A computer based integrator utilizing Peak Simple software was used for data acquisition and integration. Linear regressions of the square root of the area counts were used to calculate the calibration curves. A line loss test was conducted following each test run by introducing a known concentration of H<sub>2</sub>S at the probe and transporting the gas through the entire sampling system to the GC.

The GC-FPD was calibrated with USEPA Protocol 1 gas standards. A four point calibration was performed covering the expected range of concentrations using the mean of three consecutive injections at each calibration point. The gas standards were generated using an Environics Model 4040 Gas Dilution System. At the end of each test run or series of test runs within a 24-hour period, a post-test calibration was performed using H<sub>2</sub>S to determine the daily calibration drift. The post-test calibration consisted of injecting H<sub>2</sub>S at pre-test calibration concentrations and observing the response at each level. Pre and post-test calibration responses must agree within 5%. During each 180-minute test run, there were at least 16 injections to the GC-FPD.

### 2.2.6 TRS (USEPA Method 16A)

The determination of TRS was conducted in accordance with USEPA Method 16A. This method extracts an integrated sample from the stack and removes SO<sub>2</sub> using a citrate buffer scrubbing solution. TRS is then oxidized in a combustion tube to SO<sub>2</sub> and collected as sulfate in the hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) impinger assembly. The sample collection assembly was followed by a dry gas metering system. The mass of TRS as SO<sub>2</sub> collected was measured by the analytical procedures contained in USEPA Method 6 using a barium-thorin titration. The major components of the sampling system are depicted in Figure 2-4 and described below:

#### 2.2.6.1 Sampling Apparatus

Probe – ¼-in. quartz tubing.

Particulate Filter – 50 millimeter (mm) Teflon filter holder containing a 1-2 µm porosity Teflon filter. The filter holder was heated to a sufficient temperature that prevented condensation of moisture (>250°F).

SO<sub>2</sub> Scrubber – Three 300 milliliter (mL) Teflon segmented impingers connected in series by thick walled Teflon tubing. The first two impingers contained 100 mL of citrate buffer and the third impinger was initially empty. The tips of the impinger stems that were below the solution level had an inner diameter no greater than ¼-in.

Combustion Tube – Quartz glass tube with a 12-in. long, 1-in. expanded diameter combustion chamber with ¼-in. connections on both ends.

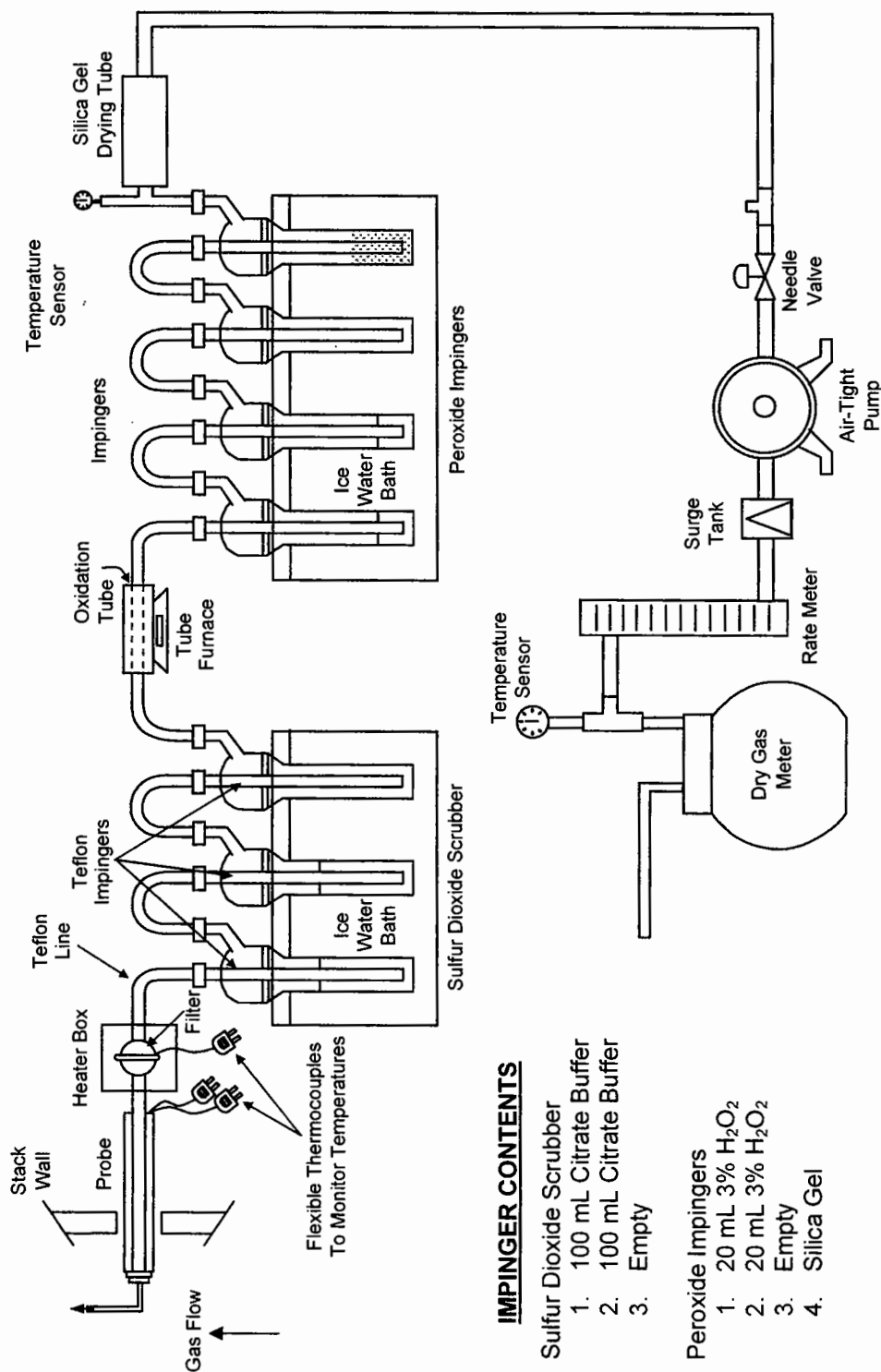
Furnace – Capable of housing and heating the combustion tube to 1,472°F ±180°F.

Peroxide Impingers – Four (4) midget impingers connected in series. The first two impingers contained 20 mL of 3% H<sub>2</sub>O<sub>2</sub>, the third impinger was initially empty and the fourth impinger contained silica gel.

Dry Gas Meter – Capable of measuring gas volume at a sample rate of 2 LPM at an accuracy of 2%.

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## Testing and Analytical Procedures



**FIGURE 2-4. USEPA METHOD 16A SAMPLING TRAIN**

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## Testing and Analytical Procedures

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### 2.2.6.2 Sampling Procedures

The sampling system was assembled with the probe connected to the heated filter followed by the citrate buffer  $\text{SO}_2$  scrubber, then to the heater combustion tube followed by the  $\text{H}_2\text{O}_2$  impingers and metering system. The appropriate volumes of solutions were placed in the  $\text{SO}_2$  scrubber and  $\text{H}_2\text{O}_2$  impingers. The citrate buffer was initially disconnected at the exit end and was conditioned by pulling stack gas through the system at 2 LPM for 10 minutes. After the initial conditioning period, the citrate buffer was reconnected to the entrance to the combustion tube and the sampling system was leak-checked. Following a successful leak-check, the system was ready to begin sampling stack gas at a rate of 2 LPM for 180 minutes.

### 2.2.6.3 Sample Recovery Procedures

After the 180-minute sampling period was over and the sampling system successfully passed a post-test leak check, the peroxide impingers were disconnected and recovered. The contents of the first three impingers were collected into a leak-free polyethylene jar and a subsequent rinse of the impingers and connecting glassware was also placed in the sample jar. The fluid level was marked and the sample jar was sealed and identified.

After completion of each 180-minute test run, a system performance check was conducted to validate the test run and the sample train components and procedure. This involved sampling a known concentration of  $\text{H}_2\text{S}$  prior to cleaning the components upstream of the peroxide impingers and before recharging the citrate buffer solution. A 30-minute sample was collected at a rate of 2.5 LPM and the  $\text{H}_2\text{O}_2$  impingers were recovered and analyzed in the same manner as the 180-minute stack samples.

### 2.2.6.4 Analytical Procedures

Analysis of each sample was conducted by ARI personnel while onsite by using the barium-thorin titration procedures described in USEPA Method 6.

Analysis of each sample consisted of diluting each sample with water to 100 mL in a 100 mL volumetric flask. For each sample, a 20 mL aliquot was pipetted into a 250 mL Erlenmeyer flask along with 80 mL of 100% isopropanol plus two to four drops of thorin indicator. The prepared sample was titrated to a pink end-point using approximately 0.0100 N barium standard solution. Each sample was analyzed in duplicate.

### 2.2.7 Methane and Ethane (USEPA Method 18)

Methane and ethane were measured in conjunction with the THC (USEPA Method 25A) procedures. Tedlar bag samples were collected concurrently with the USEPA SW-846 Method 0010 (semi-volatile) samples and analyzed by calibration procedures described in USEPA Method 18.

Specifically, the concentrations were measured by flame ionization detection with separation by gas chromatography (GC-FID). The GC-FID was calibrated by triplicate injections of cylinder gas standards to calculate a 4-point calibration curve. Since methane and ethane are non-reactive and considered stable in the bags, procedures were not conducted to determine the percent recovery of methane or ethane in the bags.



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Calibration gases were diluted from USEPA Protocol 1 high concentration standards. Dilution was performed using ARI's Environics Model 4040 Gas Dilution System. The dilution system was verified onsite before the start of testing following procedures described in USEPA Method 205.

### 2.2.8 Speciated Volatile Organic HAP (USEPA Method 18)

Volatile organic hazardous air pollutant (HAP) sampling and analysis were conducted following the Method 18 Midget Impinger Method approved by USEPA and referenced on the Refinery ICR Website (FAQ Test-029) as an alternate method to determine the stack gas concentrations and emission rates of target volatile analytes listed in Table 1.3 of Component 4 of the ICR. This method utilizes a midget impinger train with chilled ultrapure grade methanol as the volatiles collection media. Co-located sampling trains were performed as a duplicate determination of emissions. Therefore, the reported concentrations and mass emission rates were calculated as the average of the paired sampling trains.

The test consisted of three one-hour sampling runs and was conducted simultaneously with the semi-volatile organic HAP sampling. Each sampling run was conducted following USEPA Method 18 criteria for sorbent train sampling which requires that two co-located sampling trains be operated simultaneously. The co-located trains were spiked with both "labeled" and "native spikes" covering a specific list of recovery surrogates included in the refinery ICR Component 4 document. The labeled spikes were in the form of isotopologues that consisted of replacing the hydrogen atoms with deuterium (heavy hydrogen) isotope. The deuterated compounds can be differentiated from that of the naturally existing compounds by mass spectroscopy analytical detection and measurement. Respective recoveries for each deuterated compound can be calculated for each sample train without effect on the measurement of the flue gas native (naturally occurring) compounds. The purpose of this spiking was to determine the recovery efficiencies of each compound and to demonstrate the quality of the measurement data. The recovery surrogates that were spiked into the co-located trains included the following:

Labeled Spikes Plus the Corresponding Deuterium Count (added to each of the co-located trains):

1,3-Butadiene-d6	2,2,4-Trimethylpentane-d18
Pentane-d12	2-Nitropropane-d6
MTBE-d12	1,2-Dibromoethane-d4
n-Hexane-d14	Ethylbenzene-d10
Acrylonitrile-d3	Styrene-d8
Benzene-d6	Nitrobenzene-d5

Native Spikes (added to only one of the co-located trains):

Acrolein  
Acetonitrile  
Toluene  
Trichloroethene  
Methyl *iso*-Butyl Ketone

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## Testing and Analytical Procedures

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### 2.2.8.1 Sampling Apparatus

As shown in Figure 2-5, each of the two co-located sampling trains consisted of the following components:

Probe - Heated stainless steel probe with quartz liner.

Coil Condenser - Borosilicate glass condenser to cool the sample gas stream prior to entering the impinger train.

Impinger Train - Five borosilicate glass midjet impingers with the first impinger acting as a moisture and condensables knockout and fitted with a shortened impinger tip. The second, third, and fourth impingers each contained an ultrapure grade (purge and trap grade) of methanol (10-20 mL each) with each impinger fitted with a tapered or fritted insert. The fifth impinger contained approximately 25 grams of silica gel to remove the final traces of moisture from the gas sample.

Meter Console - A VOST type meter console was used to control the sampling rate through the impinger train and monitor the temperature of the sampling train components. The meter console itself contained a dry gas meter to measure the volume of gas sampled. The gas meter had an accuracy of  $\pm 1\%$ .

### 2.2.8.2 Sampling Procedures

#### Sampling Train Glassware Preparation

The sampling train glassware was pre-cleaned, thoroughly rinsed with ultrapure grade methanol, baked in an oven at 100°C for two hours, cooled, sealed and stored separately from other reagents and other equipment to avoid contamination prior to assembly of the sampling train.

#### Recovery Surrogate Spiking of Impinger Train

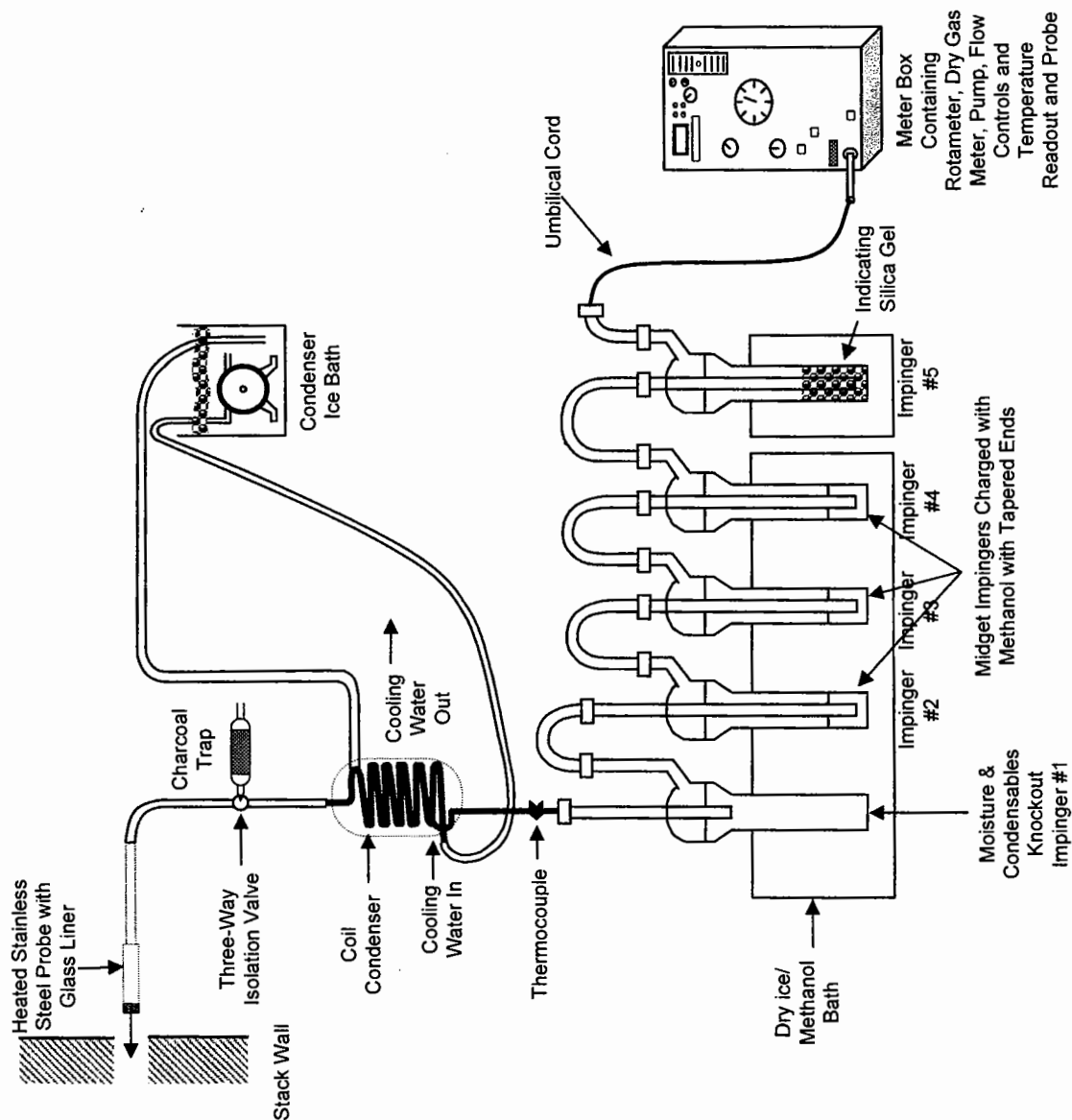
The co-located sampling trains were assembled prior to charging the impingers with methanol. The co-located trains were both field spiked with the "labeled" spikes and one of the co-located trains was also spiked with the "native" spikes using the surrogate recovery standards prepared by the analytical laboratory. The contents of the prepared spikes were charged directly into impinger #2 of the sampling train which contained pre-chilled purge and trap grade methanol.

#### Sampling Train Operation

A leak check of the sampling train was performed before and after each sampling run at near 10 inches of mercury and was performed such that exposure of sampling train components to possible ambient air contaminants was avoided.

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**FIGURE 2-5. USEPA METHOD 18 MIDGET IMPINGER TRAIN**

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Following the leak check and prior to sampling, the sampling probe was heated to a temperature to prevent the condensation of organics and water vapor (280° to 302°F). The first four impingers of the sampling train were placed into a dry ice/methanol water bath and allowed to cool the impinger absorbing solutions prior to the start of sampling. Under these conditions, the target analytes of interest were efficiently trapped and dissolved in the methanol and stability of the samples was assured prior to analysis. Ice water was circulated through the pre-impinger coil condenser to ensure that the first knockout impinger effectively collected sample gas condensate and low boiling organic components.

The probe was introduced into the stack and located either close to the centroid or greater than 3-feet from the inner wall of the stack cross-sectional plane. Sampling was conducted at a constant rate of 0.25 liters/minute during each sampling run to collect a nominal 15 L sample volume. Sampling train flow rate, temperature and gas volume data were recorded at five-minute intervals throughout each sampling run. Following completion of the run, the sampling train was leak checked following the pretest leak check procedure.

### 2.2.8.3 Sample Recovery Procedures

Sample recovery from each of the co-located sampling trains was conducted as follows:

Container No. 1 - The contents of midget impingers #1 and #2 were combined, rinsed with a small quantity of methanol, and placed in a labeled 40 mL VOA vial. The probe, coil condenser and connecting glassware and tubing to the first impinger were rinsed with three small volumes of methanol and added to the Container No. 1 (VOA vial). The vial was labeled as Method 18 1<sup>st</sup> and 2<sup>nd</sup> Methanol Impinger Composite.

Container No. 2 - The contents of midget impinger #3 and rinse were placed in a separate 40 mL VOA vial and labeled as Method 18 3<sup>rd</sup> Methanol Impinger. This fraction was analyzed separately from the first fraction.

Container No. 3 - The contents of midget impinger #4 and rinse were placed in a separate 40 mL VOA vial and labeled as Method 18 4<sup>th</sup> Methanol Impinger. This fraction was analyzed separately from the other fractions.

Following sample recovery, ultrapure methanol was added to the sample vials to reduce the headspace and the vials were then placed in separate sealable poly bags and stored in coolers on dry ice prior to and during shipment of all samples to the analytical laboratory.

### Blank Train and Trip Blanks (Quality Control Samples)

A train blank set of Method 18 samples and a methanol trip blank were collected one time during each source location.

During one of the sampling runs, a complete blank train was set up in the same manner as the sample trains. The methanol remained in the identical train for the same length of time as the duration of the sampling run. Beginning and end leak checks were performed and the probe was heated to temperature. The blank train samples were recovered in the same manner as those for the stack sampling runs.

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Additionally, once for each test, a field spike was prepared for each of the two spiking standards (native and labeled spikes) by adding the contents of each spiking ampoule to a VOA vial containing 5 to 10 mL of purge and trap grade methanol. The ampoule was not rinsed. The vial was then filled with additional methanol to reduce headspace. These field spikes were QC samples to provide additional baseline data for the recovery study.

### 2.2.8.4 Analytical Procedures

Analysis of the collected stack run samples, one methanol trip blank sample, and the two spike QC samples for one source was performed by ALS Environmental Laboratories following SW-846 Methods 8260B employing purge and trap GC/MS procedures.

Sample volumes of the methanol sorbent for the purge and trap analysis procedure were adjusted in order to achieve a low end target analysis concentration in the stack gas stream of 0.1 ppmv.

### 2.2.9 Total Hydrocarbons (USEPA Method 25A)

THC sampling was conducted in accordance with USEPA Method 25A using a VIG Industries hydrocarbon analyzer equipped with a heated FID.

The sample delivery system consisted of a stainless steel probe, filter and calibration tee (on the end of the probe) connected to a heated 250°F Teflon sampling line. The sampling lines connected directly into the analyzers located in ARI's monitoring trailer. The THC analyzer was internally heated to keep the sample gas stream above its dew point (see Figure 2-6).

The analyzer was calibrated with applicable zero, low-range, mid-range and high-range gases as specified in USEPA Method 25A. The calibration gases were generated from Protocol 1 calibration standards using an Environics Model 4040 Gas Dilution System. The dilution system was verified on-site in strict accordance with USEPA Method 205. The gases met the calibration gas protocols specified in USEPA Method 7E, Section 7.1.

A calibration error test and measurement system bias test were performed prior to testing and a post calibration drift test was done on the monitor. The average zero and calibration drift values were used to correct the raw monitor data for each respective test run.

The monitor's data was collected at 15-second intervals by ARI's data acquisition system which consisted of an Omega OMB-DAQ-56 datalogger connected to a computer for digital data archiving and data reduction. DaqViewXL and Excel spreadsheet computer software were used for calculation of emission rates.

### 2.2.10 Gas Dilution System Verification (USEPA Method 205)

All applicable calibration gases were certified by USEPA Protocol 1 procedures. All diluted calibration standards were prepared using an Environics Model 4040 Gas Dilution System that was verified by a field evaluation prior to testing following the requirements of USEPA Method 205 (40 CFR 51, Appendix M).

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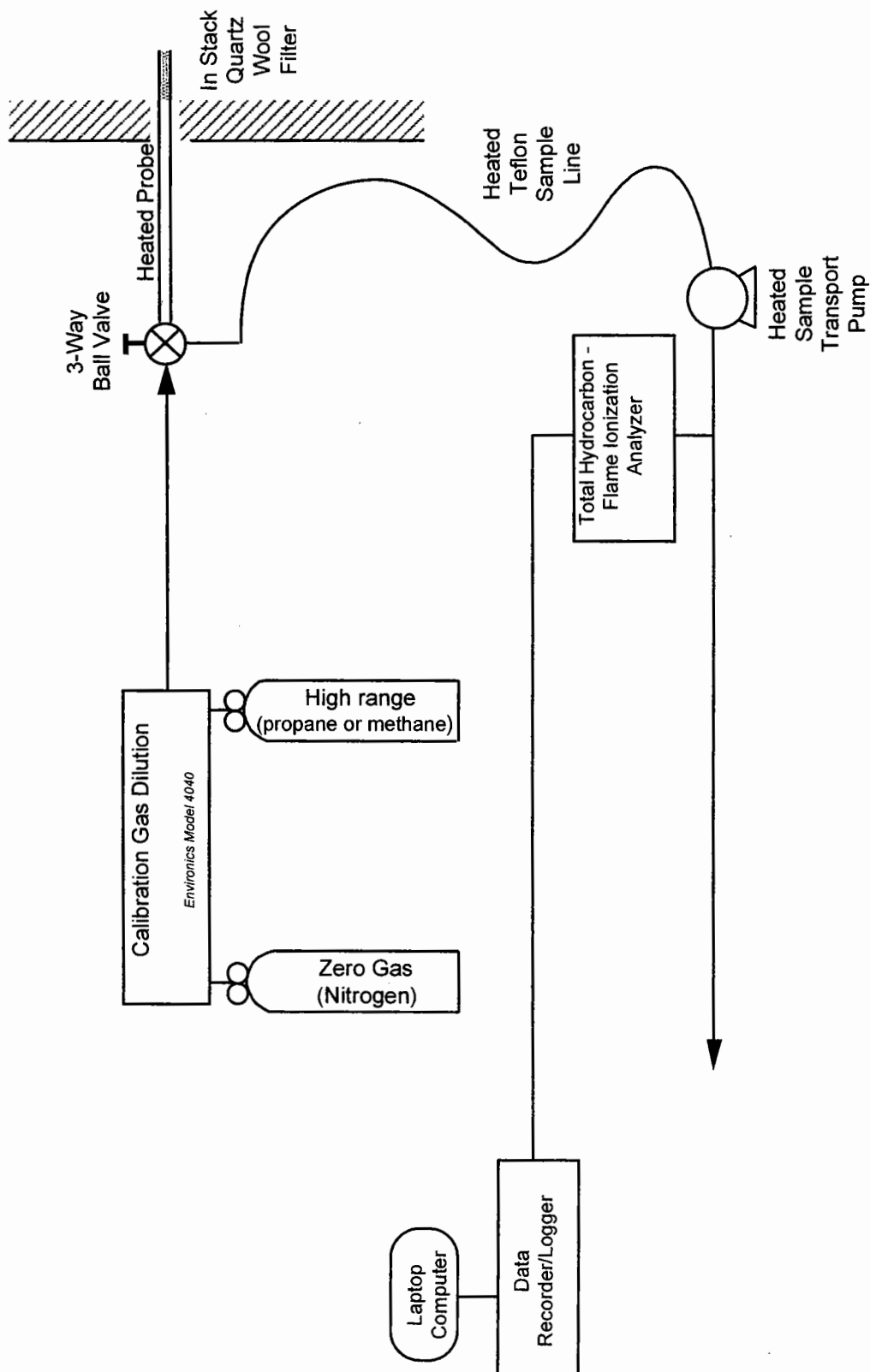


FIGURE 2-6. USEPA METHOD 25A - THC SAMPLING SYSTEM

## SECTION TWO

## Testing and Analytical Procedures

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ARI's Servomex Model 1440C O<sub>2</sub> analyzer was initially calibrated following USEPA Method 3A procedures. After the calibration procedure was complete, diluted low and mid-range standards and a mid-range EPA Protocol 1 standard were alternately introduced in triplicate and an average instrument response was calculated for each standard. No single response differed by more than  $\pm 2\%$  from the average response for each standard. The difference between the instrument average and the predicted concentration was less than  $\pm 2\%$  for each diluted standard. The difference between the certified gas concentration and the average instrument response for the mid-range EPA Protocol 1 standard was less than  $\pm 2\%$ .

### 2.2.11 Methanol Determination (USEPA Methods 308/18)

Methanol concentration and emission rate were determined following the basic principles of USEPA Method 308. Since the refinery ICR volatile organic HAP sampling requirements include surrogate spiking and recovery determination, the USEPA Method 308 test procedure included the addition of a co-located sampling train spiked with the target analyte (methanol) and operated simultaneously with the stack gas sampling train. This satisfies the ICR volatile organic HAP surrogate spiking and recovery requirement.

#### 2.2.11.1 Sampling Apparatus

As shown in Figure 2-7, each of the co-located sampling trains consisted of the following components:

Probe - Heated quartz lined probe.

Teflon Tube - Connected the probe to the absorbing solution/condensate impinger.

Impinger - Borosilicate glass impinger with tapered insert to collect moisture and condensable organics.

Sorbent Tube - Two section silica gel trap to collect non-condensable methanol fraction.

Pump - To transport gas sample through sampling train.

Needle Valve - To control gas sample flow rate through the sampling train.

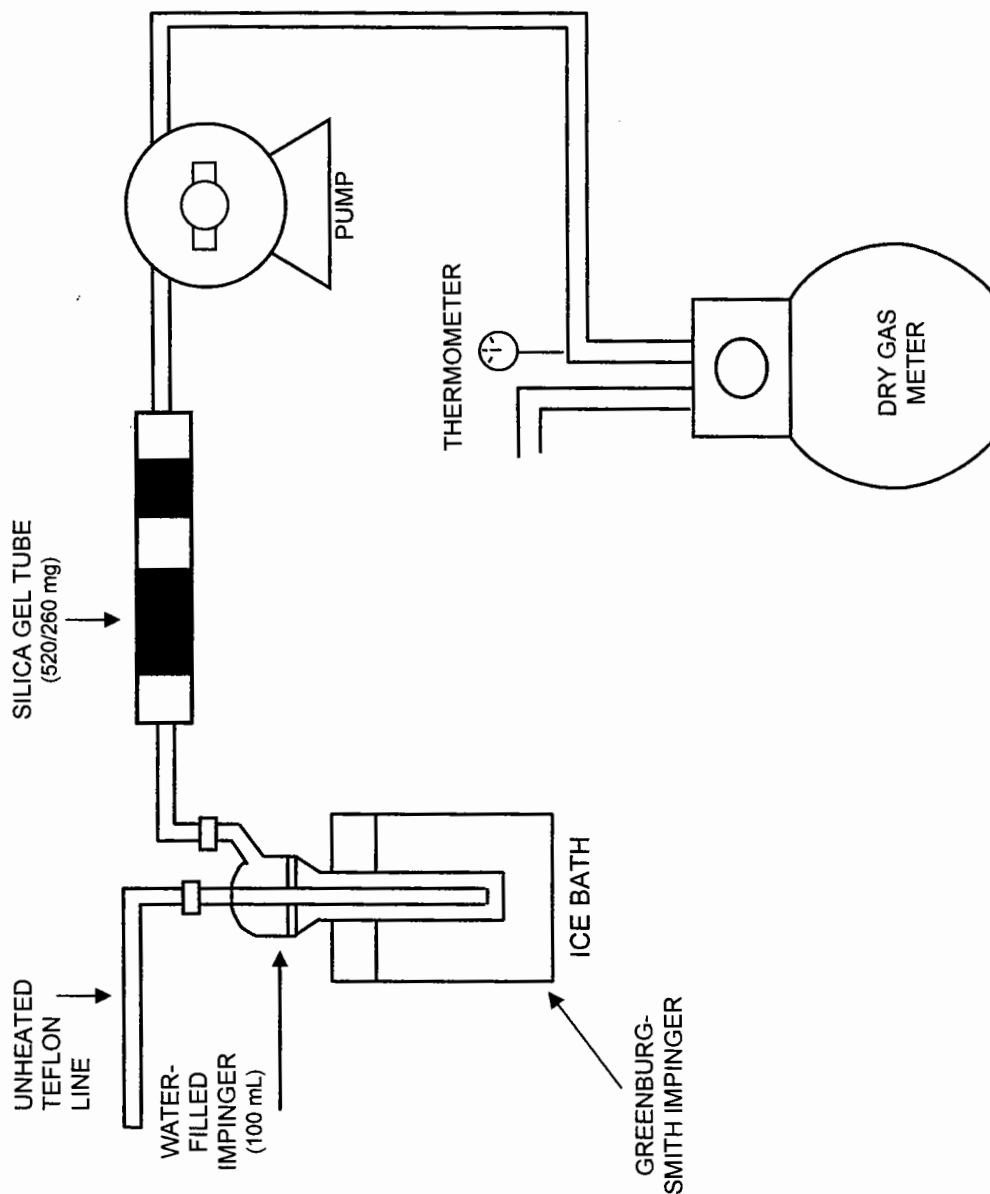
Meter Console - A VOST type meter console was used to control the sampling rate through the impinger train and monitor the temperature of the sampling train components. The meter console itself contained a dry gas meter to measure the volume of gas sampled. The gas meter had an accuracy of  $\pm 1\%$ .

The unspiked sampling train included one midget impinger charged with 20 mL of ultrapure deionized water.

The spiked train included one midget impinger charged with 20 mL of laboratory prepared spiking solution for the recovery determination. The spiked train also included a two-section silica gel sorbent tube spiked with a known mass of ultra pure methanol into the first section for the recovery determination.

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**FIGURE 2-7. USEPA METHOD 308 SAMPLING TRAIN**

## SECTION TWO

## Testing and Analytical Procedures

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### 2.2.11.2 Sampling Procedures

Prior to the start of sampling, each of the sampling trains was leak checked at 10 inches of Hg. Acceptable leak rate is  $\leq 2\%$  of the average sampling rate. Following the leak check, the impinger was immersed in an ice water bath and the sample probe was positioned in the centroid of the stack. The sample probe was purged and sampling began with the sample rate adjusted to a selected flow rate in the range of 200 to 1000 mL/minute (dependent upon the methanol concentration in the stack and the detection limit required). Sample train flow rate and temperature data were recorded at five-minute intervals throughout the duration of the test run. Following completion of the test run, a post-test leak check was performed in the same manner as that conducted prior to the start of the run.

### 2.2.11.3 Sample Recovery Procedures

Sample recovery from each of the two co-located trains was conducted as follows:

Container #1 - The impinger absorbing solution and water rinse of the impinger and upstream sample tubing were stored in a labeled and sealed 40 mL VOA vial and stored in a cooler with ice packs.

Silica Gel Sorbent Tube - The sorbent tube was capped, labeled and stored in a cooler with cold packs.

Blanks - A methanol field blank and a sorbent tube blank were collected once for each source tested.

### 2.2.11.4 Analytical Procedures

At ARI's laboratory, the collected samples were analyzed using an SRI Model 8610 gas chromatograph equipped with a FID following USEPA Method 308 procedures to determine the methanol concentration.

Calibration of the gas chromatograph was performed using liquid standards prepared in the same impinger absorbing solution matrix as well as standards prepared in the sorbent tube desorbing solution. The samples were analyzed and target analyte recoveries were determined to meet the QA recovery requirements set forth in USEPA Method 18. Analyte recovery was within the 70 to 130% R value range allowed by the method and the R value was applied to the analytical results.

### 2.2.12 Speciated Semi-Volatile Organic HAP (SW-846 Method 0010)

Sampling in accordance with SW-846 Method 0010 was conducted for the following target analytes:

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## Testing and Analytical Procedures

Acenaphthene	Dimethylaminobenzene
Acenaphthylene	7,12-Dimethylbenz(a)anthracene
Aniline	3,3-Dimethylbenzidine
Anthracene	$\alpha$ , $\alpha$ -Dimethylphenethylamine
Benzidine	2,4-Dimethylphenol
Benz[a]anthracene	Fluoranthene
Benzo[b]fluoranthene	Fluorene
Benzo[k]fluoranthene	Indeno(1,2,3-cd)pyrene
Benzo[g,h,i]perylene	Isophorone
Benzo[a]pyrene	3-Methylcholanthrene
Benzo[e]pyrene	2-Methylnaphthalene
Biphenyl	Naphthalene
Cresol (mixed isomers)	Perylene
Chrysene	Phenanthrene
Dibenz[a,h]anthracene	Phenol
Dibenzofuran	1,4-Phenylenediamine
Dibenzo(a,e)pyrene	Pyrene
3,3-Dimethoxybenzidine	o-Toluidine

The samples were withdrawn isokinetically from the stack location through a heated particulate filter followed by a condenser, a XAD-2 resin sorbent trap and a series of chilled impingers.

### 2.2.12.1 Sampling Apparatus

The sampling train was an Apex Instruments Modified Method 5 sampling train (see Figure 2-8). The major components are described below:

Nozzle - Quartz with sharp tapered leading edge.

Probe - Stainless steel with titanium liner and attached pitot tube and stack temperature thermocouple.

Apex Sample Box - Contained Pyrex glass filter holder, quartz fiber filter, a water jacketed sample chiller, a sorbent trap containing XAD-2 resin, five Greenburg-Smith impingers and the connecting glassware.

Apex Control Module - (per USEPA Method 5 specifications) contained pump, heat controllers and inclined-vertical oil gauge manometer.

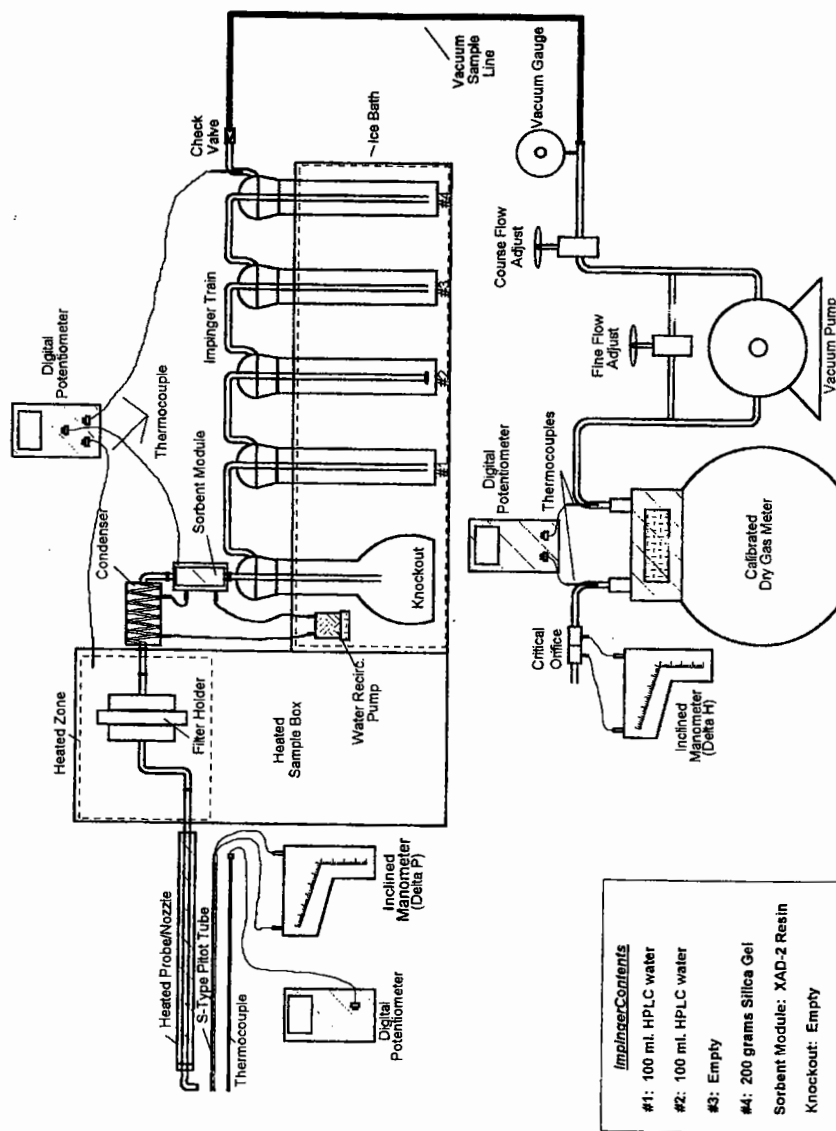
The sample adsorbent traps and filters were cleaned and prepared by the laboratory following SW-846 Method 0010 procedures. ARI cleaned all sampling train glassware to pesticide analytical requirements using procedures outlined in Section 3A of the "Manual of Analytical Methods for the Analysis of Pesticide in Human and Environmental Samples".

The sample train was assembled as follows:

1. A quartz nozzle was selected and attached to the probe.

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**FIGURE 2-8. SW-846 METHOD 0010 SAMPLING TRAIN**

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2. A pre-weighed, pre-cleaned quartz fiber filter was placed in the filter holder and its number recorded on the data sheets.
3. The water jacket sample condenser and sorbent trap containing 50 grams of XAD-2 resin were placed in series after the filter holder.
4. The back half of the train consisted of five impingers. The first impinger was assembled empty. The second and third impingers contained 100 mL of HPLC grade water. The fourth impinger was assembled empty. The fifth impinger contained 200 grams of silica gel.

All glassware, filter media and chemicals were prepared to pesticide grade cleanliness using solvent rinse procedures as specified in the method.

5. The sampling train was assembled on-site in ARI's monitoring trailer.

### 2.2.12.2 Sampling Procedures

The sampling train was leak checked prior to sampling using the following procedures:

1. The pump was started.
2. The course flow adjustment valve was opened.
3. Flow through the dry gas meter was checked.
4. The probe inlet was plugged.
5. The fine flow adjustment valve was adjusted so that the vacuum gauge read 15-in. Hg.
6. If the flow exceeded .02 ACFM, the pump was shut off and all connections were rechecked for tightness and the leak test procedure was repeated until acceptable results were obtained.

The pitot tube assembly was leak checked using the following procedures:

1. A positive (or negative) pressure of greater than 3 inches of water was created in the pitot line to be checked.
2. The line was plugged to hold the pressure, and the manometer was monitored to watch for any change in the reading.
3. If the reading changed, the system was rechecked for leaks and the leak check procedure was repeated until no leaks were present.

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## Testing and Analytical Procedures

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Crushed ice was added to the impinger compartment and the sample case was moved into position outside the first port to be sampled. When the filter holder assembly was properly heated, the nozzle was uncapped and the probe introduced into the stack to the first sampling point. The dry gas meter reading was recorded and sampling was started. At each point, a pitot reading was made and the sampling rate adjusted using calculations based on preliminary temperature, pressure and estimated moisture. The sorbent traps were maintained below 68°F to insure XAD collection efficiency during testing. When sampling at the last point in the port was completed, the pump was turned off and the probe was carefully removed from that port.

A final leak test was performed on the sampling train, as previously described. The umbilical cord was disconnected, and the sample case and probe were then disassembled.

### 2.2.12.3 Sample Recovery Procedures

Upon completion of each test run and final leak check, the following sampling train clean-up procedure was performed:

Container 1 - The filter was removed from its holder and was placed and sealed in a glass Petri dish.

Container 2 - All loose particulate matter and rinse washings from all sample-exposed surfaces preceding the filter paper were placed in this container and sealed. The probe, nozzle and connecting heated Teflon line were scrubbed with a stiff Teflon brush and rinsed with a 1 to 1 (1:1) mixture of methanol and methylene chloride. The final level of liquid was marked on the bottle.

Container 3 - The contents of impingers 1, 2, 3 and 4 were measured for volume and then placed in Container 3. The total volume was measured to the closest  $\pm 1$  mL and the liquid level was marked on the outside of the bottle.

Container 4 - The silica gel from impinger 5 was placed in Container 4.

Containers 5 & 6 - The sorbent traps were sealed with Teflon tape and glass ends. The traps were refrigerated in ARI's monitoring trailer.

Blanks - During testing, a 1:1 methanol/methylene chloride blank, XAD-2 resin blank and quartz fiber filter blank were collected and placed into respective glass bottles with Teflon lined lids for analysis.

### 2.2.12.4 Analytical Procedures

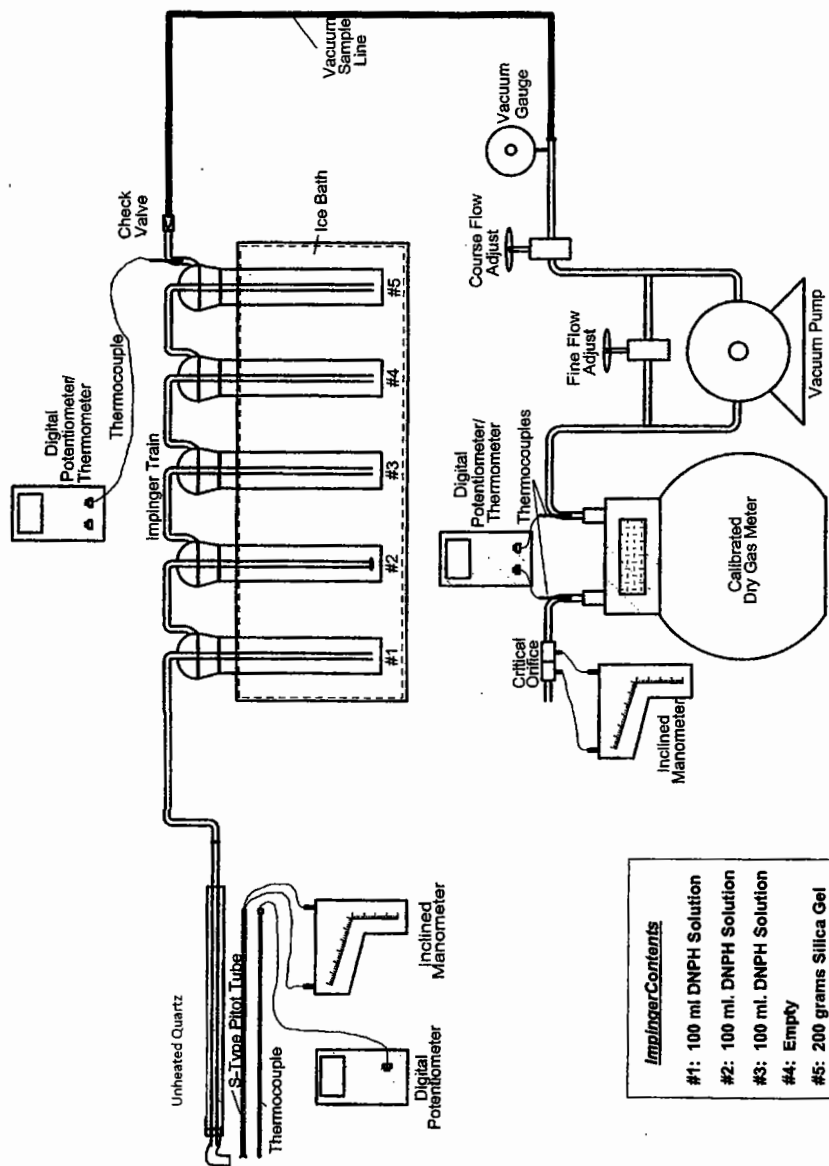
After all chain of custody forms were completed, the samples were shipped to the laboratory for analysis in accordance with SW-846 Method 0010 and 8270C or D. The samples were stored in ice chests containing cold packs.

### 2.2.13 Aldehydes (SW-846 Method 0011)

Sampling for aldehydes (formaldehyde, acetaldehyde, propanal) was conducted in accordance with SW-846 Method 0011 using an Apex Instruments, Inc. sampling train as shown in Figure 2-9. The impinger catch was analyzed for aldehydes in accordance with SW-846 Method 8315A procedures.

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## Testing and Analytical Procedures



**FIGURE 2-9. SW-846 METHOD 0011 SAMPLING TRAIN**

## SECTION TWO

## Testing and Analytical Procedures

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### 2.2.13.1 Sampling Apparatus

The aldehydes sampling train met design specifications established by the USEPA. Assembled by ARI personnel, it consisted of the following:

Nozzle - Quartz with sharp, tapered, leading edge and accurately measured round opening.

Probe - Titanium capable of maintaining a gas temperature of  $248^{\circ}\text{F} \pm 25^{\circ}\text{F}$  at the exit end during sampling.

Pitot Tube - A Type-S pitot tube that met all geometric standards; attached to the probe to monitor stack gas velocity.

Draft Gauge - A dual-inclined oil gauge manometer made by Dwyer with a readability of 0.01-in.  $\text{H}_2\text{O}$  in the 0- to 1-in. range and 0.1-in.  $\text{H}_2\text{O}$  in the 1- to 10-in. range. For velocity measurements, an inclined oil gauge manometer in the 0 - 0.25-in. range with a 0.005-in. resolution.

Impingers - Five impingers connected in series with O-ring ball joints. The first, third, fourth and fifth impingers were of the Greenburg-Smith design, modified by replacing the tip with a 1/2-in.-i.d. glass tube extending to 1/2-in. from the bottom of the flask. The first three impingers contained a 2,4-dinitrophenylhydrazine (DNPH) solution.

Metering System - Vacuum gauge, leak-free pump, thermometers capable of measuring temperature to within  $5^{\circ}\text{F}$ , dry gas meter with 2 percent accuracy, and related equipment to maintain an isokinetic sampling rate and to determine sample volume.

Barometer - Aneroid type to measure atmospheric pressure to  $\pm 0.1$ -in. Hg.

### 2.2.13.2 Sampling Procedures

Approximately 200 grams of silica gel was weighed and placed in a sealed impinger prior to each test run. 200 mL of DNPH was placed in the first impinger; the second and third impingers each contained 100 mL DNPH; the fourth impinger was empty, and the fifth impinger contained silica gel. The sampling train was leak-checked at the sampling site prior to each test run by plugging the inlet to the nozzle and pulling a 15-in. Hg vacuum; and at the conclusion of the test run, by plugging the inlet to the nozzle and pulling a vacuum equal to the highest vacuum reached during the test run.

The pitot tube and lines were leak-checked at the test site prior to and at the conclusion of each test run. The check was made by blowing into the impact opening of the pitot tube until 3 or more inches of water was recorded on the manometer and then capping the impact opening and holding it for 15 seconds to assure it was leak-free. The static pressure side of the pitot tube was leak-checked by the same procedure, except suction was used to obtain the 3-in.  $\text{H}_2\text{O}$  manometer reading. Crushed ice was placed around the impingers to keep the temperature of the gases leaving the last impinger at  $68^{\circ}\text{F}$  or less.

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## Testing and Analytical Procedures

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During sampling, stack gas and sampling train data were recorded at each sampling point and whenever significant changes occurred in stack flow conditions. Isokinetic sampling rates were maintained within 10% of true isokinetic throughout the sampling period using isokinetic calculations. Sample rates were less than 28 liters per minute.

### 2.2.13.3 Sample Recovery Procedures

The sampling train was moved carefully from the test site to the cleanup area. The volume of DNPH from the first three impingers was measured, and sample fractions were recovered as follows:

Container 1 - Methylene chloride washings from all sample-exposed surfaces prior to the impinger train were placed in an amber glass container. Particulate was removed from the probe with the aid of a Teflon brush. The DNPH in the first three impinger sections of the sampling train was measured volumetrically and placed in the amber glass container. The impingers and connecting glassware were rinsed with methylene chloride and this rinse was added to the container for shipment to the laboratory. A final rinse of the impinger section was conducted using distilled H<sub>2</sub>O and methylene chloride.

Container 2 - Sample blank equal in volume to the sample runs.

Container 3 - The silica gel from the fifth impinger was weighed, and this value was recorded on the Sample Recovery and Integrity Sheet along with other pertinent data. The color of the indicating silica gel was observed to determine if there had been moisture breakthrough. The silica gel was weighed to the nearest 0.5 g.

### 2.2.13.4 Analytical Procedures

The analytical procedures followed those described in SW-846 Method 8315A.

## SECTION THREE

## Process Description

### SULFUR RECOVERY UNITS (SRU-543 / 544 / 545 / 546)

The charge to the Sulfur Recovery Units consists of acid gas ( $H_2S$ ) produced from the various refinery amine treating units, SCOT 1, SCOT 2 and SCOT 3 recycle acid gas. These acid gas streams should normally contain less than 2% volume hydrocarbon compounds.

Conversion of  $H_2S$  to elemental sulfur is done by partial oxidation (combustion) in the reaction furnaces and catalytically in the reactors. Approximately 68% conversion of  $H_2S$  to elemental sulfur is achieved in the reaction furnaces, which are also referred to as the thermal reactors. In the process, one third of the oxygen required for total combustion is used and sulfur dioxide ( $SO_2$ ) is also formed. The SRU reactors are for the purpose of converting the  $SO_2$  to sulfur. The  $H_2S$  to  $SO_2$  ratio in the tail gas from the SRU reactors is controlled at 2-to-1 to maximize the conversion of  $H_2S$  and  $SO_2$  to sulfur, which overall exceeds 98% conversion.

The process consists of a reduction section in which all sulfur compounds present in the tail gas from the CLAUS Units (SRU 543/4) are combined with hydrogen and are catalytically converted to  $H_2S$ . The primary reaction converts  $SO_2$  to  $H_2S$  and any elemental sulfur present to  $H_2S$ . Also, COS (carbonyl sulfide) and  $CS_2$  (carbon disulfide) are converted to  $H_2S$  for recycling back to the SRU. All reactions are exothermic, resulting in a temperature rise across the SCOT reactors. The  $H_2S$  is removed by an amine unit. This  $H_2S$  is recycled back to SRU 543/4 as charge. SCOT 1 charges the tail gas from SRU 543. SCOT 2 charges the tail gas from SRU 544, Train A and B. These two parallel trains are also referred to as the 400 and 500 trains.

Table 3-1 presents the SCOT 2 (SRU 544) process data recorded during the test program.

**TABLE 3-1. PROCESS DATA – SRU 544**

DATE	:	6/15/11	6/16/11	6/17/11
TIME	:	<u>12:00-19:00</u>	<u>07:00-19:00</u>	<u>07:00-14:00</u>
Sulfur Production				
LT/D		69.6	69.4	69.3
Firebox Temperature				
°F		1,250	1,250	1,250
Natural Gas Flow				
scfh		24,672	24,479	29,229



## SECTION FOUR

## Test Results

The test results are presented in Tables 4-1 through 4-8.

The calculation summaries, field data, analytical data, ARI reference method monitoring data, USEPA Method 15 and GC-FPD data, calibration data, process data and test program qualifications are included in the appendices as detailed in the Table of Contents.

### **DISCUSSION**

#### **Volatile Organic HAPs**

Data presented for the volatile organic HAPs (see Tables 4-1 and 4-2) should be qualified with the following observances:

Concentrations of acetone, methylene chloride and methanol appear as artifacts of cross-method contamination. Elevated levels of these four compounds were found in the associated blanks, both field and reagent, and should not be considered characteristic of the SRU atmospheric emissions. This is further corroborated by the results of the USEPA Method 25A test runs presented in Table 4-6.

During the first test run (SRU-18-1), the concentrations of deuterated 1,3-butadiene and pentane were measured at 0% recovery. Therefore, no values were reported for the compounds during this sample run.

The laboratory reported inconsistencies with the recovery of nitrobenzene-d5 and subsequent quantification of native nitrobenzene. The purge and trap analysis suffered from run to run carry-over and there was no clear evidence of nitrobenzene in the samples. The detection limits for nitrobenzene were raised because of the uncertainty of low level data. Nitrobenzene data is also available from the SVOC data.

#### **Aldehydes**

The analytical results of the USEPA Method 0011 train indicated elevated values of aldehydes in the sample runs as well as the field blank train. These levels cannot be considered representative of the atmospheric emissions from the SRU stack. Therefore, the data represented in Table 4-3 has been corrected for the field blank levels.



## SECTION FOUR

## Test Results

TABLE 4-1. SRU NO. 544 TGI STACK VOLATILE ORGANIC HAP TEST RESULTS SUMMARY

TEST RUN	SRU-18-1	SRU-18-2	SRU-18-3	Average
TEST DATE	6/15/2011	6/15/2011	6/16/2011	6/16/2011
TEST TIME	12:53 - 13:53	16:02 - 17:02	07:27 - 08:27	
<b>Stack Gas Parameters</b>				
Temperature, av. °F	1,113.4	1,117.8	1,116.8	1,116.0
Velocity, av. ft/sec	27.76	30.46	30.75	29.66
Volume flow, acfm	40,786	44,742	45,176	43,568
Volume flow, scfm	13,653	14,921	15,090	14,555
Volume flow, dscfm	12,252	13,342	13,473	13,022
Volume flow, scfh	819,200	895,250	905,405	873,285
Volume flow, dscfh	735,090	800,492	808,402	781,328
Moisture, av. % vol	10.27	10.58	10.71	10.52
CO <sub>2</sub> , av. % vol, db	6.66	6.53	6.70	6.63
O <sub>2</sub> , av. % vol, db	5.45	5.43	5.42	5.43

Run Numbers	SRU-18-1			SRU-18-2			SRU-18-3			Average	
	Compound	VOC Concentration (µg/dscm)	VOC Emission Rate (lb/hr)	VOC Concentration (µg/dscm)	VOC Emission Rate (lb/hr)	VOC Concentration (µg/dscm)	VOC Concentration (µg/dscm)	VOC Emission Rate (lb/hr)	VOC Concentration (µg/dscm)	VOC Emission Rate (lb/hr)	
Acetone <sup>a</sup>		10,742	0.49299	7,748	0.38724	14,300	10,930	0.72177	10,930	0.53400	
Acetonitrile		< 255	< 0.01173	1,881	0.09400	4,686	< 2,274	0.23652	< 2,274	< 0.11408	
Acrolein		< 255	< 0.01173	259	0.01296	< 236	< 250	< 0.01191	< 250	< 0.01220	
Acrylonitrile		< 250	< 0.01149	< 389	< 0.01946	235	< 292	0.01186	< 292	< 0.01427	
Benzene		< 250	< 0.01149	< 219	< 0.01095	< 230	< 233	< 0.01159	< 233	< 0.01134	
1,3-Butadiene		N/A	N/A	< 109	< 0.00546	< 118	N/A	< 0.00595	N/A	N/A	
Carbon disulfide		< 250	< 0.01149	< 219	< 0.01095	< 230	< 233	< 0.01159	< 233	< 0.01134	
Chlorobenzene		< 250	< 0.01149	< 219	< 0.01095	< 230	< 233	< 0.01159	< 233	< 0.01134	
Cumene		< 250	< 0.01149	< 219	< 0.01095	< 230	< 233	< 0.01159	< 233	< 0.01134	
1,2-Dibromoethane		< 250	< 0.01149	< 219	< 0.01095	< 230	< 233	< 0.01159	< 233	< 0.01134	
Ethylbenzene		< 250	< 0.01149	< 219	< 0.01095	< 230	< 233	< 0.01159	< 233	< 0.01134	
Hexane		< 128	< 0.00586	< 219	< 0.01095	< 230	< 192	< 0.01159	< 192	< 0.00947	
Methyl isobutyl ketone		< 255	< 0.01173	< 219	< 0.01092	< 236	< 237	< 0.01191	< 237	< 0.01152	
Methyl t-butyl ether		< 250	< 0.01149	< 219	< 0.01095	< 230	< 233	< 0.01159	< 233	< 0.01134	
Methylene chloride <sup>a</sup>		10,735	0.49270	10,115	0.50552	12,114	10,988	0.61140	10,988	0.53654	
Nitrobenzene		< 1,252	< 0.05747	< 1,096	< 0.05477	< 1,148	< 1,165	< 0.05793	< 1,165	< 0.05672	
2-Nitropropane		< 250	< 0.01149	< 219	< 0.01095	< 230	< 233	< 0.01159	< 233	< 0.01134	
Pentane		N/A	N/A	< 109	< 0.00546	< 118	N/A	< 0.00595	N/A	N/A	
Styrene		< 250	< 0.01149	< 219	< 0.01095	< 230	< 233	< 0.01159	< 233	< 0.01134	
Tetrachloroethene		< 250	< 0.01149	< 219	< 0.01095	< 230	< 233	< 0.01159	< 233	< 0.01134	
Toluene		< 255	< 0.01173	< 219	< 0.01092	< 236	< 237	< 0.01191	< 237	< 0.01152	
Trichloroethene		< 255	< 0.01173	< 219	< 0.01092	< 236	< 237	< 0.01191	< 237	< 0.01152	
2,2,4 Trimethyl pentane		< 250	< 0.01149	< 219	< 0.01095	< 230	< 233	< 0.01159	< 233	< 0.01134	
Xylenes		< 250	< 0.01149	< 219	< 0.01095	< 230	< 233	< 0.01159	< 233	< 0.01134	



## SECTION FOUR

## Test Results

**TABLE 4-2. SRU NO. 544 TGI STACK METHANOL TEST RESULTS SUMMARY**

TEST RUN :	SRU-308-1	SRU-308-2	SRU-308-3	
TEST DATE :	6/15/2011	6/15/2011	6/16/2011	
TEST TIME :	<u>14:20 - 15:20</u>	<u>17:21 - 18:21</u>	<u>08:45 - 09:45</u>	<u>Average</u>
<b>Stack Gas Parameters</b>				
Temperature, av. °F	1,114.5	1,117.8	1,117.3	1,116.5
Velocity, av. ft/sec	29.36	30.46	30.00	29.94
Volume flow, acfm	43,136	44,742	44,076	43,985
Volume flow, scfm	14,415	14,921	14,718	14,685
Volume flow, dscfm	12,835	13,342	13,033	13,070
Volume flow, scfh	864,920	895,250	883,080	881,084
Volume flow, dscfh	770,123	800,492	781,978	784,198
Moisture, av. % vol	10.96	10.58	11.45	11.00
CO <sub>2</sub> , av. % vol, db	6.66	6.53	6.70	6.63
O <sub>2</sub> , av. % vol, db	5.45	5.43	5.42	5.43
<b>Spiked Train Parameters</b>				
Time, min	60	60	60	
Volume, std liters	57.865	57.350	58.169	
Volume, dscf	2.043	2.025	2.054	
<b>Unspiked Train Parameters</b>				
Time, min	60	60	60	
Volume, std liters	58.428	58.208	58.701	
Volume, dscf	2.063	2.055	2.073	
<b>Methanol Data<sup>a</sup></b>				
Spike Recovered (R), fractional	0.864	2.099	-7.785	
Concentration				
ppbv db	2,276	12,547	-5,232	3,197
μg/dscm	3,032	16,713	-6,969	4,258
lb/dscf x 10 <sup>-6</sup>	0.18930	1.04344	-0.43513	0.26587
Emission Rate				
lb/hr	0.14578	0.83527	-0.34026	0.21360

<sup>a</sup> Artifacts of cross-method contamination



## SECTION FOUR

## Test Results

**TABLE 4-3. SRU NO. 544 TGI STACK ALDEHYDES TEST RESULTS SUMMARY**

TEST RUN :	544SRU-0011-2	544SRU-0011-3	544SRU-0011-4	
TEST DATE :	6/15/2011	6/15/2011	6/16/2011	
TEST TIME :	<u>14:49 - 15:53</u>	<u>16:10 - 17:17</u>	<u>07:27 - 08:34</u>	<u>Average</u>
<b><u>Stack Gas Parameters</u></b>				
Temperature, av. °F	1,114.5	1,117.8	1,116.8	1,116.4
Velocity, av. ft/sec	29.36	30.46	30.75	30.19
Volume flow, acfm	43,136	44,742	45,176	44,351
Volume flow, scfh	864,920	895,250	905,405	888,525
Volume flow, dscfh	770,123	800,492	808,402	793,006
Moisture, av. % vol	10.96	10.58	10.71	10.75
CO <sub>2</sub> , av. % vol, db	6.66	6.53	6.70	6.63
O <sub>2</sub> , av. % vol, db	5.45	5.43	5.42	5.43
<b><u>Aldehydes Sample</u></b>				
Time, min	60.0	60.0	60.0	
Volume, dscf	45.658	47.199	48.053	
Volume, dscm	1.293	1.337	1.361	
Isokinetic Ratio, %	103.1	102.6	103.4	
<b><u>Formaldehyde</u></b>				
Concentration				
lb/dscf x 10 <sup>-6</sup>	< 0.0056	< 0.0054	< 0.0053	< 0.0054
µg/dscm	< 88.9	< 86.0	< 84.5	< 86.5
Emission rate				
lb/hr	< 0.00428	< 0.00430	< 0.00427	< 0.00428
<b><u>Acetaldehyde</u></b>				
Concentration				
lb/dscf x 10 <sup>-6</sup>	< 0.0011	< 0.0010	< 0.0010	< 0.0010
µg/dscm	< 17.0	< 16.5	< 16.2	< 16.5
Emission rate				
lb/hr	< 0.00082	< 0.00082	< 0.00082	< 0.00082
<b><u>Propanal</u></b>				
Concentration				
lb/dscf x 10 <sup>-6</sup>	< 0.0056	< 0.0054	< 0.0053	< 0.0054
µg/dscm	< 88.9	< 86.0	< 84.5	< 86.5
Emission rate				
lb/hr	< 0.00428	< 0.00430	< 0.00427	< 0.00428



## SECTION FOUR

## Test Results

**TABLE 4-4. SRU NO. 544 TGI STACK SVOC CONCENTRATION TEST RESULTS SUMMARY**

TEST RUN :	544SRU-0010-1	544SRU-0010-2	544SRU-0010-3	
TEST DATE :	6/16/2011	6/16/2011	6/17/2011	
TEST TIME :	09:09 - 13:21	13:58 - 18:08	07:25 - 13:36	<u>Average</u>
<b><u>SVOC Sample Parameters</u></b>				
Time, min	240	240	240	
Volume, dscm	5.277	5.289	5.301	
Volume, dscf	186.329	186.770	187.180	
Isokinetic rate, %	103.6	102.0	102.8	
<b><u>Concentration - µg/dscm</u></b>				
Acenaphthene	< 0.000758	< 0.003781	< 0.002151	< 0.002230
<b>Acenaphthylene</b>	< 0.000758	<b>0.004443</b>	< 0.007150	<b>&lt; 0.004117</b>
Aniline	< 0.000351	< 0.000350	< 0.000349	< 0.000350
<b>Anthracene</b>	<b>0.002767</b>	<b>0.002987</b>	<b>0.002566</b>	<b>&lt; 0.002773</b>
Benidine	< 0.007201	< 0.007184	< 0.007168	< 0.007185
Benzo[a]anthracene	< 0.000758	< 0.000756	< 0.000755	< 0.000756
Benzo[b]fluoranthene	< 0.000758	< 0.000756	< 0.000755	< 0.000756
Benzo[k]fluoranthene	< 0.000758	< 0.000756	< 0.000755	< 0.000756
<b>Benzo[g,h,i]perylene</b>	< 0.000758	<b>0.005218</b>	< 0.000755	<b>&lt; 0.002244</b>
Benzo[a]pyrene	< 0.000758	< 0.000756	< 0.000755	< 0.000756
Benzo[e]pyrene	< 0.002103	< 0.005123	< 0.006376	< 0.004534
<b>Biphenyl</b>	< 0.018439	< 0.021363	<b>0.082625</b>	<b>&lt; 0.040809</b>
Chrysene	< 0.000758	< 0.000756	< 0.000755	< 0.000756
Dibenz[a,h]anthracene	< 0.000758	< 0.000756	< 0.000755	< 0.000756
Dibenzofuran	< 0.000436	< 0.000435	< 0.000434	< 0.000435
Dibenzo(a,e)pyrene	< 0.000758	< 0.000756	< 0.000755	< 0.000756
3,3'-Dimethoxybenzidine	< 0.005496	< 0.005483	< 0.005471	< 0.005483
Dimethylaminobenzene	< 0.000379	< 0.000378	< 0.000377	< 0.000378
7,12-Dimethylbenz(a)anthracene	< 0.000758	< 0.000756	< 0.000755	< 0.000756
3,3'-Dimethylbenzidine	< 0.005496	< 0.005483	< 0.005471	< 0.005483
a,a-Dimethylphenethylamine	< 0.002274	< 0.002269	< 0.002264	< 0.002269
2,4-Dimethylphenol	< 0.000493	< 0.000492	< 0.000490	< 0.000492
Fluoranthene	< 0.003051	< 0.001581	< 0.001011	< 0.001881
<b>Fluorene</b>	<b>0.008357</b>	<b>0.007146</b>	<b>0.002452</b>	<b>0.005985</b>
<b>Indeno(1,2,3-cd)pyrene</b>	< 0.004359	<b>0.002685</b>	< 0.001769	< 0.002938
Isophorone	< 0.000426	< 0.000425	< 0.000424	< 0.000425
3-Methylcholanthrene	< 0.000758	< 0.000756	< 0.000755	< 0.000756
<b>2-Methylnaphthalene</b>	<b>0.005685</b>	<b>0.007959</b>	<b>0.006414</b>	<b>0.006686</b>
2-Methylphenol	< 0.000398	< 0.000397	< 0.000396	< 0.000397
3-Methylphenol & 4-Methylphenol	< 0.001071	< 0.001068	< 0.001066	< 0.001068
<b>Naphthalene</b>	<b>0.184198</b>	<b>0.196618</b>	<b>0.201847</b>	<b>0.194221</b>
Perylene	< 0.000758	< 0.000756	< 0.000755	< 0.000756
<b>Phenanthrene</b>	<b>0.006045</b>	<b>0.007543</b>	<b>0.006527</b>	<b>0.006705</b>
<b>Phenol</b>	<b>0.005155</b>	<b>0.004462</b>	<b>0.004678</b>	<b>0.004765</b>
1,4-Phenylenediamine	< 0.003411	< 0.003403	< 0.003396	< 0.003403
Pyrene	< 0.002293	< 0.001637	< 0.001185	< 0.001705
o-Toluidine	< 0.000948	< 0.000945	< 0.000943	< 0.000945



## SECTIONFOUR

## Test Results

**TABLE 4-5. SRU NO. 544 TGI STACK SVOC EMISSION RATE TEST RESULTS SUMMARY**

TEST RUN :	544SRU-0010-1	544SRU-0010-2	544SRU-0010-3	
TEST DATE :	6/16/2011	6/16/2011	6/17/2011	
TEST TIME :	09:09 - 13:21	13:58 - 18:08	07:25 - 13:36	<u>Average</u>
<b><u>Stack Gas Parameters</u></b>				
Temperature, av. °F	1,117.3	1,111.6	1,114.5	1,114.5
Velocity, av. ft/sec	30.003	30.215	30.198	30.139
Volume flow, acfm	44,076	44,386	44,361	44,274
Volume flow, scfm	14,718	14,875	14,840	14,811
Volume flow, dscfm	13,033	13,278	13,194	13,168
Volume flow, scfh	883,080	892,529	890,382	888,664
Volume flow, dscfh	781,978	796,659	791,659	790,099
Moisture, av. % vol	11.45	10.74	11.09	11.09
CO <sub>2</sub> , av. % vol, db	6.70	6.66	6.73	6.70
O <sub>2</sub> , av. % vol, db	5.42	5.40	5.48	5.43
<b><u>SVOC Sample Parameters</u></b>				
Time, min	240	240	240	
Volume, dscm	5.277	5.289	5.301	
Volume, dscf	186.329	186.770	187.180	
Isokinetic rate, %	103.6	102.0	102.8	
<b><u>Emission Rate - lb/hr x 10<sup>-3</sup></u></b>				
Acenaphthene	< 0.000037	< 0.000188	< 0.000106	< 0.000110
Acenaphthylene	< 0.000037	<b>0.000221</b>	< 0.000353	< <b>0.000204</b>
Aniline	< 0.000017	< 0.000017	< 0.000017	< 0.000017
Anthracene	<b>0.000135</b>	<b>0.000149</b>	<b>0.000127</b>	< <b>0.000137</b>
Benzidine	< 0.000352	< 0.000357	< 0.000354	< 0.000354
Benzo[a]anthracene	< 0.000037	< 0.000038	< 0.000037	< 0.000037
Benzo[b]fluoranthene	< 0.000037	< 0.000038	< 0.000037	< 0.000037
Benzo[k]fluoranthene	< 0.000037	< 0.000038	< 0.000037	< 0.000037
Benzo[g,h,i]perylene	< 0.000037	<b>0.000260</b>	< 0.000037	< <b>0.000111</b>
Benzo[a]pyrene	< 0.000037	< 0.000038	< 0.000037	< 0.000037
Benzo[e]pyrene	< 0.000103	< 0.000255	< 0.000315	< 0.000224
Biphenyl	< 0.000900	< 0.001063	<b>0.004084</b>	< <b>0.002016</b>
Chrysene	< 0.000037	< 0.000038	< 0.000037	< 0.000037
Dibenz[a,h]anthracene	< 0.000037	< 0.000038	< 0.000037	< 0.000037
Dibenzofuran	< 0.000021	< 0.000022	< 0.000021	< 0.000021
Dibenzo(a,e)pyrene	< 0.000037	< 0.000038	< 0.000037	< 0.000037
3,3'-Dimethoxybenzidine	< 0.000268	< 0.000273	< 0.000270	< 0.000270
Dimethylaminobenzene	< 0.000019	< 0.000019	< 0.000019	< 0.000019
7,12-Dimethylbenz(a)anthracene	< 0.000037	< 0.000038	< 0.000037	< 0.000037
3,3'-Dimethylbenzidine	< 0.000268	< 0.000273	< 0.000270	< 0.000270
a,a-Dimethylphenethylamine	< 0.000111	< 0.000113	< 0.000112	< 0.000112
2,4-Dimethylphenol	< 0.000024	< 0.000024	< 0.000024	< 0.000024
Fluoranthene	< 0.000149	< 0.000079	< 0.000050	< 0.000093
Fluorene	<b>0.000408</b>	<b>0.000355</b>	<b>0.000121</b>	<b>0.000295</b>
Indeno(1,2,3-cd)pyrene	< 0.000213	<b>0.000134</b>	< 0.000087	< 0.000145
Isophorone	< 0.000021	< 0.000021	< 0.000021	< 0.000021
3-Methylcholanthrene	< 0.000037	< 0.000038	< 0.000037	< 0.000037
2-Methylnaphthalene	<b>0.000278</b>	<b>0.000396</b>	<b>0.000317</b>	<b>0.000330</b>
2-Methylphenol	< 0.000019	< 0.000020	< 0.000020	< 0.000020
3-Methylphenol & 4-Methylphenol	< 0.000052	< 0.000053	< 0.000053	< 0.000053
Naphthalene	<b>0.008993</b>	<b>0.009780</b>	<b>0.009977</b>	<b>0.009583</b>
Perylene	< 0.000037	< 0.000038	< 0.000037	< 0.000037
Phenanthrene	<b>0.000295</b>	<b>0.000375</b>	<b>0.000323</b>	<b>0.000331</b>
Phenol	<b>0.000252</b>	<b>0.000222</b>	<b>0.000231</b>	<b>0.000235</b>
1,4-Phenylenediamine	< 0.000167	< 0.000169	< 0.000168	< 0.000168
Pyrene	< 0.000112	< 0.000081	< 0.000059	< 0.000084
o-Toluidine	< 0.000046	< 0.000047	< 0.000047	< 0.000047



## SECTION FOUR

## Test Results

**TABLE 4-6. SRU NO. 544 TGI STACK THC, CH<sub>4</sub>, C<sub>2</sub>H<sub>6</sub> AND CO  
TEST RESULTS SUMMARY**

TEST RUN	544SRU-0010-1	544SRU-0010-2	544SRU-0010-3	
TEST DATE	6/16/2011	6/16/2011	6/17/2011	
TEST TIME	09:09 - 13:21	13:58 - 18:08	07:25 - 13:36	Average
<b>Stack Gas Parameters</b>				
Temperature, av. °F	1,117.3	1,111.6	1,114.5	1,114.5
Velocity, av. ft/sec	30.003	30.215	30.198	30.139
Volume flow, acfm	44,076	44,386	44,361	44,274
Volume flow, scfm	14,718	14,875	14,840	14,811
Volume flow, dscfm	13,033	13,278	13,194	13,168
Volume flow, scfh	883,080	892,529	890,382	888,664
Volume flow, dscfh	781,978	796,659	791,659	790,099
Moisture, av. % vol	11.45	10.74	11.09	11.09
CO <sub>2</sub> , av. % vol, db	6.70	6.66	6.73	6.70
O <sub>2</sub> , av. % vol, db	5.42	5.40	5.48	5.43
<b>Total Hydrocarbons (THC) as Propane</b>				
Concentration				
ppmv db	0.10	0.40	0.29	0.26
lb/dscf x 10 <sup>-6</sup>	0.0112	0.0453	0.0337	0.0301
Emission rate				
lb/hr	0.0088	0.0361	0.0267	0.0238
<b>Methane (CH<sub>4</sub>)</b>				
Concentration				
ppmv db	1.6	1.1	1.0	1.2
lb/dscf x 10 <sup>-6</sup>	0.0666	0.0458	0.0416	0.0513
Emission rate				
lb/hr	0.0521	0.0365	0.0330	0.0405
<b>Ethane (C<sub>2</sub>H<sub>6</sub>)</b>				
Concentration				
ppmv db	< 1.0	< 1.0	< 1.0	< 1.0
lb/dscf x 10 <sup>-6</sup>	< 0.0781	< 0.0781	< 0.0781	< 0.0781
Emission rate				
lb/hr	< 0.0610	< 0.0622	< 0.0618	< 0.0617
<b>Carbon Monoxide (CO)</b>				
Concentration				
ppmv db	303.4	300.0	300.4	301.3
lb/dscf x 10 <sup>-6</sup>	22.049	21.807	21.830	21.895
Emission rate				
lb/hr	17.242	17.373	17.282	17.299



## SECTION FOUR

## Test Results

**TABLE 4-7. SRU NO. 544 TGI STACK COS, CS<sub>2</sub> AND H<sub>2</sub>S TEST RESULTS SUMMARY**

TEST RUN :	SRU-15-1	SRU-15-2	SRU-15-3	
TEST DATE :	6/16/2011	6/16/2011	6/17/2011	
TEST TIME :	10:28 - 13:28	14:42 - 17:42	09:08 - 12:08	<u>Average</u>
<b><u>Stack Gas Parameters</u></b>				
Temperature, av. °F	1,117.3	1,111.6	1,114.5	1,114.5
Velocity, av. ft/sec	30.003	30.215	30.198	30.139
Volume flow, acfm	44,076	44,386	44,361	44,274
Volume flow, scfm	14,718	14,875	14,840	14,811
Volume flow, dscfm	13,033	13,278	13,194	13,168
Volume flow, scfh	883,080	892,529	890,382	888,664
Volume flow, dscfh	781,978	796,659	791,659	790,099
Moisture, av. % vol	11.45	10.74	11.09	11.09
CO <sub>2</sub> , av. % vol, db	6.70	6.66	6.73	6.70
O <sub>2</sub> , av. % vol, db	5.42	5.40	5.48	5.43
<b><u>Carbonyl Sulfide (COS)</u></b>				
Concentration				
ppmv db	< 0.25	< 0.25	< 0.25	< 0.25
lb/dscf x 10 <sup>-6</sup>	< 0.0390	< 0.0390	< 0.0390	< 0.0390
Emission rate				
lb/hr	< 0.0305	< 0.0311	< 0.0309	< 0.0308
<b><u>Carbon Disulfide (CS<sub>2</sub>)</u></b>				
Concentration				
ppmv db	< 0.25	< 0.25	< 0.25	< 0.25
lb/dscf x 10 <sup>-6</sup>	< 0.0494	< 0.0494	< 0.0494	< 0.0494
Emission rate				
lb/hr	< 0.0386	< 0.0393	< 0.0391	< 0.0390
<b><u>Hydrogen Sulfide (H<sub>2</sub>S)</u></b>				
Concentration				
ppmv db	< 0.25	< 0.25	< 0.25	< 0.25
lb/dscf x 10 <sup>-6</sup>	< 0.0221	< 0.0221	< 0.0221	< 0.0221
Emission rate				
lb/hr	< 0.0173	< 0.0176	< 0.0175	< 0.0175
<b><u>TRS as SO<sub>2</sub></u></b>				
Concentration				
ppmv db	< 1.00	< 1.00	< 1.00	< 1.00
lb/dscf x 10 <sup>-6</sup>	< 0.1661	< 0.1661	< 0.1661	< 0.1661
Emission rate				
lb/hr	< 0.1299	< 0.1323	< 0.1315	< 0.1313



## SECTION FOUR

## Test Results

**TABLE 4-8. SRU NO. 544 TGI STACK TRS TEST RESULTS SUMMARY**

TEST RUN :	SRU-16A-1	SRU-16A-2	SRU-16A-3	
TEST DATE :	6/16/2011	6/16/2011	6/17/2011	
TEST TIME :	<u>10:28 - 13:28</u>	<u>14:42 - 17:42</u>	<u>09:08 - 12:08</u>	<u>Average</u>
<b><u>Stack Gas Parameters</u></b>				
Temperature, av. °F	1,117.3	1,111.6	1,114.5	1,114.5
Velocity, av. ft/sec	30.003	30.215	30.198	30.139
Volume flow, acfm	44,076	44,386	44,361	44,274
Volume flow, scfm	14,718	14,875	14,840	14,811
Volume flow, dscfm	13,033	13,278	13,194	13,168
Volume flow, scfh	883,080	892,529	890,382	888,664
Volume flow, dscfh	781,978	796,659	791,659	790,099
Moisture, av. % vol	11.45	10.74	11.09	11.09
CO <sub>2</sub> , av. % vol, db	6.70	6.66	6.73	6.70
O <sub>2</sub> , av. % vol, db	5.42	5.40	5.48	5.43
<b><u>Total Reduced Sulfur (TRS) as SO<sub>2</sub></u></b>				
Concentration				
ppmv db	0.17	0.53	0.52	0.41



Valero Port Arthur Refinery  
Source: SRU No. 544 TGI Stack  
Test Dates: 6/15 - 6/17/11

## **APPENDIX A**

## **Calculation Summaries**

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## MONITOR DATA SUMMARY

COMPANY : Valero Port Arthur Refinery  
 SOURCE : SRU 544 Incinerator Stack  
 REPETITION : 544SRU-18, 308, 0011-1 and 544SRU-0011-2  
 TEST DATE : 6/15/2011  
 START TIME : 12:53  
 END TIME : 15:53

GAS ANALYZER O<sub>2</sub>

SPAN VALUE : 10.00 %  
 AVERAGE CAL. BIAS (C<sub>m</sub>): 4.901  
 AVERAGE ZERO BIAS (C<sub>o</sub>): -0.025  
 CALIBRATION GAS: EPA Protocol O<sub>2</sub>  
 CALIBRATION % (C<sub>m</sub>): 5.00  
 % CORRECTED (C<sub>gas</sub>): 5.45

GAS ANALYZER CO<sub>2</sub>

SPAN VALUE : 8.63 %  
 AVERAGE CAL. BIAS (C<sub>m</sub>): 4.331  
 AVERAGE ZERO BIAS (C<sub>o</sub>): 0.104  
 CALIBRATION GAS: EPA Protocol CO<sub>2</sub>  
 CALIBRATION % (C<sub>m</sub>): 4.32  
 % CORRECTED (C<sub>gas</sub>): 6.66

$$\text{Example Calculation} = C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

CLOCK TIME ELAPSED TIME O<sub>2</sub> CO<sub>2</sub>

12:53	0		
12:54	1	5.42	6.68
12:55	2	5.43	6.72
12:56	3	5.40	6.71
12:57	4	5.42	6.72
12:58	5	5.42	8.70
12:59	6	5.37	6.71
13:00	7	5.37	8.69
13:01	8	5.33	6.69
13:02	9	5.37	6.69
13:03	10	5.39	6.69
13:04	11	5.39	6.71
13:05	12	5.37	6.73
13:06	13	5.34	6.73
13:07	14	5.33	6.73
13:08	15	5.35	6.68
13:09	16	5.36	8.67
13:10	17	5.33	6.67
13:11	18	5.37	6.64
13:12	19	5.37	6.65
13:13	20	5.41	6.64
13:14	21	5.35	6.67
13:15	22	5.37	6.67
13:16	23	5.37	6.65
13:17	24	5.38	6.68
13:18	25	5.34	6.68
13:19	26	5.40	6.67
13:20	27	5.39	6.65
13:21	28	5.40	6.66
13:22	29	5.37	6.66
13:23	30	5.39	6.66
13:24	31	5.35	6.67
13:25	32	5.39	6.68
13:26	33	5.39	6.67
13:27	34	5.33	6.69
13:28	35	5.32	6.67
13:29	36	5.31	6.69
13:30	37	5.32	6.66
13:31	38	5.30	6.66
13:32	39	5.38	6.64
13:33	40	5.46	6.61
13:34	41	5.63	6.63
13:35	42	5.62	6.67
13:36	43	5.50	6.78
13:37	44	5.40	6.83
13:38	45	5.27	6.86
13:39	46	5.08	6.91
13:40	47	5.07	6.84
13:41	48	5.22	6.70
13:42	49	5.33	6.60
13:43	50	5.35	6.56
13:44	51	5.35	6.57
13:45	52	5.35	6.57
13:46	53	5.33	6.61
13:47	54	5.35	6.62
13:48	55	5.32	6.66
13:49	56	5.35	6.65
13:50	57	5.32	6.66
13:51	58	5.30	6.68
13:52	59	5.35	6.62
13:53	60	5.33	6.65
13:54	61	5.36	6.64
13:55	62	5.32	6.68
13:56	63	5.33	6.67
13:57	64	5.35	6.66
13:58	65	5.32	6.68
13:59	66	5.36	6.65
14:00	67	5.32	6.66
14:01	68	5.30	6.69
14:02	69	5.30	6.66
14:03	70	5.32	6.66
14:04	71	5.31	6.64
14:05	72	5.31	6.63
14:06	73	5.30	6.62
14:07	74	5.31	6.60
14:08	75	5.29	6.59
14:09	76	5.26	6.59
14:10	77	5.32	6.56
14:11	78	5.36	6.56
14:12	79	5.35	6.53
14:13	80	5.33	6.59
14:14	81	5.35	6.54
14:15	82	5.37	6.59
14:16	83	5.33	6.59
14:17	84	5.31	6.62
14:18	85	5.36	6.60
14:19	86	5.34	6.62
14:20	87	5.36	6.60
14:21	88	5.30	6.64
14:22	89	5.30	6.59
14:23	90	5.33	6.60
14:24	91	5.39	6.52
14:25	92	5.38	6.56
14:26	93	5.34	6.55
14:27	94	5.29	6.58

## MONITOR DATA SUMMARY

CLOCK TIME ELAPSED TIME O<sub>2</sub> CO<sub>2</sub>

Continued (page 2 of 2):

SRU544-18, 308, 0011-1 and SRU544-0011-2

14:28	95	5.27	6.60
14:29	96	5.32	6.60
14:30	97	5.29	6.60
14:31	98	5.34	6.61
14:32	99	5.35	6.58
14:33	100	5.29	6.64
14:34	101	5.33	6.58
14:35	102	5.32	6.61
14:36	103	5.33	6.58
14:37	104	5.40	6.57
14:38	105	5.39	6.57
14:39	106	5.37	6.58
14:40	107	5.37	6.59
14:41	108	5.33	6.62
14:42	109	5.29	6.63
14:43	110	5.25	6.66
14:44	111	5.31	6.59
14:45	112	5.36	6.56
14:46	113	5.34	6.54
14:47	114	5.36	6.55
14:48	115	5.33	6.56
14:49	116	5.35	6.55
14:50	117	5.34	6.57
14:51	118	5.33	6.57
14:52	119	5.32	6.60
14:53	120	5.28	6.61
14:54	121	5.34	6.59
14:55	122	5.32	6.59
14:56	123	5.32	6.58
14:57	124	5.37	6.56
14:58	125	5.34	6.58
14:59	126	5.34	6.58
15:00	127	5.36	6.58
15:01	128	5.37	6.58
15:02	129	5.31	6.63
15:03	130	5.37	6.59
15:04	131	5.38	6.60
15:05	132	5.34	6.61
15:06	133	5.34	6.63
15:07	134	5.40	6.58
15:08	135	5.41	6.59
15:09	136	5.31	6.62
15:10	137	5.29	6.62
15:11	138	5.30	6.61
15:12	139	5.30	6.58
15:13	140	5.33	6.56
15:14	141	5.35	6.54
15:15	142	5.33	6.57
15:16	143	5.35	6.55
15:17	144	5.33	6.55
15:18	145	5.34	6.57
15:19	146	5.35	6.57
15:20	147	5.39	6.57
15:21	148	5.33	6.59
15:22	149	5.33	6.60
15:23	150	5.34	6.59
15:24	151	5.31	6.61
15:25	152	5.36	6.58
15:26	153	5.35	6.59
15:27	154	5.35	6.59
15:28	155	5.36	6.59
15:29	156	5.32	6.60
15:30	157	5.36	6.60
15:31	158	5.41	6.56
15:32	159	5.40	6.56
15:33	160	5.35	6.58
15:34	161	5.32	6.62
15:35	162	5.31	6.61
15:36	163	5.34	6.60
15:37	164	5.36	6.59
15:38	165	5.35	6.58
15:39	166	5.38	6.56
15:40	167	5.37	6.53
15:41	168	5.36	6.53
15:42	169	5.29	6.56
15:43	170	5.31	6.53
15:44	171	5.32	6.55
15:45	172	5.35	6.54
15:46	173	5.35	6.57
15:47	174	5.32	6.56
15:48	175	5.29	6.63
15:49	176	5.32	6.60
15:50	177	5.28	6.64
15:51	178	5.32	6.60
15:52	179	5.30	6.61
15:53	180	5.32	6.57
Uncorrected Average (C) =		5.344	6.621

**ARI ENVIRONMENTAL, INC.**  
**MOISTURE CALCULATION SUMMARY**

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**TEST DATE:** 6/15/2011  
**RUN NUMBER:** SRU-18-1

<b>γ FACTOR:</b>	0.999	<b>STACK DIAM:</b>	67.0 inches
<b>BAROMETRIC:</b>	29.85 in. Hg	<b>METER VOLUME:</b>	55.367 ft <sup>3</sup>
<b>STATIC PRES:</b>	-0.05 in.H <sub>2</sub> O	<b>METER TEMP:</b>	92.0 °F
<b>STACK TEMP:</b>	1113.4 °F	<b>LIQUID COLL:</b>	129.2 milliliters
<b>SQ.RT ΔP:</b>	0.2824 in.H <sub>2</sub> O	<b>CO<sub>2</sub>:</b>	6.66 % by volume
<b>ΔH:</b>	2.82 in.H <sub>2</sub> O	<b>O<sub>2</sub>:</b>	5.45 % by volume

**ENGLISH UNITS**  
**(29.92 in.Hg & 68 °F)**

<b>VOLUME OF SAMPLE</b> <b>@ STANDARD CONDITIONS, DRY BASIS</b>	
$V_{mstd} = \left( \frac{528}{29.92} \right) \times V_m \times \gamma \left[ \frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] =$	53.150 <b>dscf</b>
$\gamma =$ 0.999	
<b>VOLUME OF WATER IN SAMPLE</b> <b>@ STANDARD CONDITIONS</b>	
$V_{wstd} = 0.04707 \times V_{lc} =$	6.081 <b>scf</b>
$V_{lc} =$ 129.2 mL	
<b>FRACTIONAL MOISTURE CONTENT OF STACK GAS AS MEASURED</b>	
$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} =$	0.1027
<b>FRACTIONAL MOISTURE CONTENT OF STACK GAS @ SATURATION</b>	
$B_{ws@saturation} = \frac{S.V.P.}{P_{bar} + \frac{P_{static}}{13.6}} =$	0.7083
$S.V.P. =$ 21.14 in. Hg	
<b>FRACTIONAL MOISTURE CONTENT USED IN CALCULATIONS</b>	
$B_{ws} =$ 0.1027	

**ARI ENVIRONMENTAL, INC.**  
**FLOW RATE CALCULATION SUMMARY**

**COMPANY:** Valero Port Arthur Refin  
**LOCATION:** Port Arthur, Texas  
**RUN NUMBER:** SRU-18-1

**SOURCE:** SRU 544 Incinerator Stack  
**TEST DATE:** 6/15/2011

**BAROMETRIC:** 29.85 in. Hg  
**STATIC PRES:** -0.05 in.H<sub>2</sub>O  
**STACK TEMP:** 1113.4 °F  
**SQ.RT ΔP:** 0.2824 in.H<sub>2</sub>O

**STACK DIAM:** 67.0 inches  
**CO<sub>2</sub>:** 6.66 % by volume  
**O<sub>2</sub>:** 5.45 % by volume

<b>DRY MOLECULAR WEIGHT OF STACK GAS</b>			
$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$	=	29.28	lb/lb-mole
<b>MOLECULAR WEIGHT OF STACK GAS, wet basis</b>			
$M_s = M_d (1 - B_{ws}) + 18(B_{ws})$	=	28.13	lb/lb-mole
<b>PITOT TUBE COEFFICIENT</b>			
$C_p$ (from calibration curve or geometric specifications)	=	0.84	
<b>AVERAGE VELOCITY HEAD OF STACK GAS, in. H<sub>2</sub>O</b>			
$\sqrt{\Delta P} = \frac{1}{n} \sum_{i=1}^n \sqrt{\Delta p_i}$	=	0.2824	in. H <sub>2</sub> O
<b>AVERAGE ABSOLUTE STACK GAS TEMPERATURE</b>			
$T_s = 1113.4 \text{ °F} + 460$	=	1,573.4	°R
<b>ABSOLUTE STACK GAS PRESSURE</b>			
$P_s = P_{bar} + \frac{P_{static}}{13.6}$	=	29.85	in.Hg
<b>STACK GAS VELOCITY</b>			
$V_s = (85.49)(C_p)(\text{avg } \sqrt{\Delta P}) \sqrt{\frac{T_s}{(P_s)(M_s)}}$	=	27.764	ft/sec
<b>STACK GAS VOLUMETRIC FLOW RATE, actual</b>			
$Q_s = 60 \times V_s \times A_s$	=	40,786.35	acfm
Stack Area =	24.48370 ft <sup>2</sup>		
<b>STACK GAS VOLUMETRIC FLOW RATE, standard conditions, wet basis</b>			
$Q_{stdw} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)$	=	13,653.34 819,200	scfm, wb scfh, wb
<b>STACK GAS VOLUMETRIC FLOW RATE, standard conditions, dry basis</b>			
$Q_{std} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)(1 - B_{ws})$	=	12,251.51 735,090	dscfm dscfh

## Volatile Organic HAPs Laboratory Data Summary

**Client:** Valero Port Arthur Refinery  
**Location:** Port Arthur, Texas  
**Source:** SRU 544 Incinerator Stack  
**Date:**  
**Run No:**

6/15/2011

SRU-18-1

Compound	Molecular Weight	Sample Train A	% Recovery	Sample Train B	% Recovery
		Analysis (M <sub>u</sub> ) (micrograms)		Analysis (M <sub>u</sub> ) (micrograms)	
<b>Acetone</b>	<b>58.08</b>	<b>181</b>		<b>188</b>	
Acetonitrile	41.05	< 4.3	185	5845	185
Acrolein	56.06	< 4.3	187	5807	187
Acrylonitrile	53.06	< 4.3	94	4.3	86
Benzene	78.11	< 4.3	113	4.3	118
1,3-Butadiene	54.09	n/a	0		0
Carbon disulfide	76.14	< 4.3		4.3	
Chlorobenzene	112.56	< 4.3		4.3	
Cumene	120.19	< 4.3		4.3	
1,2-Dibromoethane	187.86	< 4.3	115	4.3	95
Ethylbenzene	106.17	< 4.3	134	4.3	114
Hexane	86.18	< 4.3	6		12
Methyl isobutyl ketone	100.16	< 4.3	143	4318	143
Methyl t-butyl ether	88.15	< 4.3	92	4.3	93
<b>Methylene chloride</b>	<b>84.93</b>	<b>200</b>		<b>168</b>	
Nitrobenzene	123.06	< 21.5	176	21.5	105
2-Nitropropane	89.09	< 4.3	96	4.3	75
Pentane	72.15	n/a	0		0
Styrene	104.15	< 4.3	128	4.3	104
Tetrachloroethene	165.83	< 4.3		4.3	111
Toluene	92.14	< 4.3	112	1574	112
Trichloroethene	131.39	< 4.3	111	3654	
2,2,4 Trimethyl pentane	114.23	< 4.3	58	4.3	78
Xylenes	106.16	< 4.3		4.3	

## VOLATILE ORGANIC HAPS CALCULATION SUMMARY

COMPANY: Valero Port Arthur Refinery  
 LOCATION: Port Arthur, Texas  
 SOURCE: SRU 544 Incinerator Stack  
 SAMPLE: VolHAPS - Methanol Impingers  
 TEST DATE: 6/15/2011  
 RUN NO: SRU-18-1

## INPUT

$Q_a$  : 735,090 dscfh  
 $P_{bar}$  : 29.82 in Hg

**A Train:** 17.541 liters **V<sub>m</sub> Spiked:** 18.199 liters  
**V<sub>m</sub> Unspiked:** 0.619 cubic ft **V<sub>m</sub> Spiked:** 0.643 cubic ft  
**Y Sample :** 1.000 **Y Sample :** 1.000  
**T<sub>m</sub> Sample :** 88.7 °F **T<sub>m</sub> Sample :** 87.0 °F  
**ΔH Sample:** 0.20 in. H<sub>2</sub>O **ΔH Sample:** 0.31 in. H<sub>2</sub>O

## Volume of sample at standard

conditions on dry basis

English units

(29.92 in. Hg 68° F)

$V_{std} \text{ Train A } (V_s) = (17.647(V_m)(P_{bar} + \Delta H / 13.6) / (T_m))$  = 0.594 dscf  
 $V_{std} \text{ Train A } (V_{s, liters}) = \text{dscf} \times 28.32$  = 16.831 std liters  
 $V_{std} \text{ Train B } (V_s) = (17.647(V_m)(P_{bar} + \Delta H / 13.6) / (T_m))$  = 0.619 dscf  
 $V_{std} \text{ Train B } (V_{s, liters}) = \text{dscf} \times 28.32$  = 17.522 std liters

Compound	Molecular Weight	A TRAIN				B TRAIN				AVERAGE	
		Mass/Volume (M <sub>v</sub> ) (μg/liter)	VOC Concentration (lb/dscf)	VOC Concentration (ppb)	VOC Concentration (μg/dscm)	Emission (lb/hr)	Mass/Volume (M <sub>v</sub> ) (μg/liter)	VOC Concentration (lb/dscf)	VOC Concentration (ppb)	VOC Concentration (μg/dscm)	Emission (lb/hr)
Acetone	58.08	10.7540	6.741E-07	4.454	10.754	0.49355	10.7296	6.6989E-07	4.444	10.730	0.49243
Acetonitrile	41.05	< 0.2555	< 1.5951E-08	< 150	< 255	< 0.01173	< 0.2454	< 1.5322E-08	< 111	< 245	< 0.01126
Acrolein	56.06	< 0.2555	< 1.5951E-08	< 110	< 255	< 0.01173	< 0.2454	< 1.5322E-08	< 76	< 245	< 0.01126
Acrylonitrile	53.06	< 0.2555	< 1.5951E-08	< 116	< 255	< 0.01173	0.0000	0.0000E+00	0	0	0.00000
Benzene	78.11	< 0.2555	< 1.5951E-08	< 79	< 255	< 0.01173	< 0.2454	< 1.5322E-08	< 78	< 245	< 0.01126
1,3-Butadiene	54.09	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	< 0.2454	< 1.5322E-08	< 52	< 245	< 0.01126
Carbon disulfide	76.14	< 0.2555	< 1.5951E-08	< 81	< 255	< 0.01173	< 0.2454	< 1.5322E-08	< 49	< 245	< 0.01126
Chlorobenzene	112.56	< 0.2555	< 1.5951E-08	< 55	< 255	< 0.01173	< 0.2454	< 1.5322E-08	< 31	< 245	< 0.01126
Cumene	120.19	< 0.2555	< 1.5951E-08	< 51	< 255	< 0.01173	< 0.2454	< 1.5322E-08	< 56	< 245	< 0.01126
1,2-Dibromoethane	187.86	< 0.2555	< 1.5951E-08	< 33	< 255	< 0.01173	< 0.2454	< 1.5322E-08	< 0	< 0	< 0.00000
Ethylbenzene	106.17	< 0.2555	< 1.5951E-08	< 58	< 255	< 0.01173	< 0.2454	< 1.5322E-08	< 67	< 245	< 0.01126
Hexane	86.18	< 0.2555	< 1.5951E-08	< 71	< 255	< 0.01173	< 0.2454	< 1.5322E-08	< 57	< 245	< 0.01126
Methyl isobutyl ketone	100.16	< 0.2555	< 1.5951E-08	< 61	< 255	< 0.01173	< 0.2454	< 1.5322E-08	< 36	< 245	< 0.01126
Methyl t-butyl ether	88.15	< 0.2555	< 1.5951E-08	< 70	< 255	< 0.01173	9.5881	5.9662E-07	2.715	9.588	0.44004
Methylene chloride	84.93	11.8829	7.4189E-07	3.365	11.883	0.54536	< 1.2271	< 7.6610E-08	< 1227	< 240	< 0.05631
Nitrobenzene	123.06	< 1.2774	< 7.9754E-08	< 250	< 1277	< 0.05863	< 0.2454	< 1.5322E-08	< 66	< 245	< 0.01126
2-Nitropropane	89.09	< 0.2555	< 1.5951E-08	< 69	< 255	< 0.01173	< 0.0000	< 0.0000E+00	< 0	< 0	< 0.00000
Pentane	72.15	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	< 0.2454	< 1.5322E-08	< 57	< 245	< 0.01126
Styrene	104.15	< 0.2555	< 1.5951E-08	< 59	< 255	< 0.01173	< 0.2454	< 1.5322E-08	< 52	< 245	< 0.01126
Tetrachloroethene	165.83	< 0.2555	< 1.5951E-08	< 37	< 255	< 0.01173	< 0.2454	< 1.5322E-08	< 56	< 245	< 0.01126
Toluene	92.14	< 0.2555	< 1.5951E-08	< 67	< 255	< 0.01173	< 0.2454	< 1.5322E-08	< 52	< 245	< 0.01126
Trichloroethene	131.39	< 0.2555	< 1.5951E-08	< 47	< 255	< 0.01173	< 0.2454	< 1.5322E-08	< 52	< 245	< 0.01126
2,2,4 Trimethyl pentane	114.23	< 0.2555	< 1.5951E-08	< 54	< 255	< 0.01173	< 0.2454	< 1.5322E-08	< 56	< 245	< 0.01126
Xylenes	106.16	< 0.2555	< 1.5951E-08	< 58	< 255	< 0.01173	< 0.2454	< 1.5322E-08	< 56	< 245	< 0.01126

**ARI ENVIRONMENTAL, INC.**  
**MOISTURE CALCULATION SUMMARY**

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**TEST DATE:** 6/15/2011  
**RUN NUMBER:** 544SRU-0011-2

<b>γ FACTOR:</b>	0.999	<b>STACK DIAM:</b>	67.0 inches
<b>BAROMETRIC:</b>	29.82 in. Hg	<b>METER VOLUME:</b>	47.573 ft <sup>3</sup>
<b>STATIC PRES:</b>	-0.05 in.H <sub>2</sub> O	<b>METER TEMP:</b>	90.3 °F
<b>STACK TEMP:</b>	1114.5 °F	<b>LIQUID COLL:</b>	119.4 milliliters
<b>SQ.RT ΔP:</b>	0.2980 in.H <sub>2</sub> O	<b>CO<sub>2</sub>:</b>	6.66 % by volume
<b>ΔH:</b>	1.88 in.H <sub>2</sub> O	<b>O<sub>2</sub>:</b>	5.45 % by volume

**ENGLISH UNITS**  
**(29.92 in.Hg & 68 °F)**

**VOLUME OF SAMPLE**

**@ STANDARD CONDITIONS, DRY BASIS**

$$V_{\text{mstd}} = \left( \frac{528}{29.92} \right) \times V_m \times \gamma \left[ \frac{P_{\text{bar}} + \frac{\Delta H}{13.6}}{T_m} \right] = 45.658 \quad \text{dscf}$$

$\gamma = 0.999$

**VOLUME OF WATER IN SAMPLE**

**@ STANDARD CONDITIONS**

$$V_{\text{wstd}} = 0.04707 \times V_{\text{lc}} = 5.620 \quad \text{scf}$$

$V_{\text{lc}} = 119.4 \text{ mL}$

**FRACTIONAL MOISTURE CONTENT OF STACK GAS AS MEASURED**

$$B_{\text{ws}} = \frac{V_{\text{wstd}}}{V_{\text{wstd}} + V_{\text{mstd}}} = 0.1096$$

**FRACTIONAL MOISTURE CONTENT OF STACK GAS @ SATURATION**

$$B_{\text{ws@saturation}} = \frac{\text{S.V.P.}}{P_{\text{bar}} + \frac{P_{\text{static}}}{13.6}} = 0.7090$$

$\text{S.V.P.} = 21.14 \text{ in. Hg}$

**FRACTIONAL MOISTURE CONTENT USED IN CALCULATIONS**

$$B_{\text{ws}} = 0.1096$$

**ARI ENVIRONMENTAL, INC.**  
**FLOW RATE CALCULATION SUMMARY**

**COMPANY:** Valero Port Arthur Refin  
**LOCATION:** Port Arthur, Texas  
**RUN NUMBER:** 544SRU-0011-2

**SOURCE:** SRU 544 Incinerator Stack  
**TEST DATE:** 6/15/2011

**BAROMETRIC:** 29.82 in. Hg  
**STATIC PRES:** -0.05 in.H<sub>2</sub>O  
**STACK TEMP:** 1114.5 °F  
**SQ.RT ΔP:** 0.298 in.H<sub>2</sub>O

**STACK DIAM:** 67.0 inches  
**CO<sub>2</sub>:** 6.66 % by volume  
**O<sub>2</sub>:** 5.45 % by volume

<b>DRY MOLECULAR WEIGHT OF STACK GAS</b>			
$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$	=	29.28	lb/lb-mole
<b>MOLECULAR WEIGHT OF STACK GAS, wet basis</b>			
$M_s = M_d (1 - B_{ws}) + 18(B_{ws})$	=	28.05	lb/lb-mole
<b>PITOT TUBE COEFFICIENT</b>			
$C_p$ (from calibration curve or geometric specifications)	=	0.84	
<b>AVERAGE VELOCITY HEAD OF STACK GAS, in. H<sub>2</sub>O</b>			
$\sqrt{\Delta P} = \frac{1}{n} \sum_{i=1}^n \sqrt{\Delta p_i}$	=	0.2980	in. H <sub>2</sub> O
<b>AVERAGE ABSOLUTE STACK GAS TEMPERATURE</b>			
$T_s = 1114.5 \text{ °F} + 460$	=	1,574.5	°R
<b>ABSOLUTE STACK GAS PRESSURE</b>			
$P_s = P_{bar} + \frac{P_{static}}{13.6}$	=	29.82	in.Hg
<b>STACK GAS VELOCITY</b>			
$V_s = (85.49)(C_p)(\text{avg } \sqrt{\Delta P}) \sqrt{\frac{T_s}{(P_s)(M_s)}}$	=	29.364	ft/sec
<b>STACK GAS VOLUMETRIC FLOW RATE, actual</b>			
$Q_s = 60 \times V_s \times A_s$	=	43,136.11	acfm
Stack Area =		24.48370	ft <sup>2</sup>
<b>STACK GAS VOLUMETRIC FLOW RATE, standard conditions, wet basis</b>			
$Q_{stdw} = \left( \frac{528}{29.92} \right) (Q_s) \left( \frac{P_s}{T_s} \right)$	=	14,415.34 864,920	scfm, wb scfh, wb
<b>STACK GAS VOLUMETRIC FLOW RATE, standard conditions, dry basis</b>			
$Q_{std} = \left( \frac{528}{29.92} \right) (Q_s) \left( \frac{P_s}{T_s} \right) (1 - B_{ws})$	=	12,835.39 770,123	dscfm dscfh

## ALDEHYDES CALCULATION SUMMARY

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**TEST DATE:** 6/15/2011  
**RUN NO:** 544SRU-0011-2

### INPUT

<b>V<sub>m</sub>:</b>	47.573 ft <sup>3</sup>	<b>Q<sub>s</sub>:</b>	770,123 dscfh
<b>γ FACTOR:</b>	0.999	<b>T<sub>s</sub>:</b>	1,114.5 °F
<b>P<sub>bar</sub>:</b>	29.82 in. Hg	<b>Θ:</b>	60.0 minutes
<b>ΔH:</b>	1.88	<b>V<sub>s</sub>:</b>	29.364 fps
<b>T<sub>m</sub>:</b>	90.3 °F	<b>P<sub>s</sub>:</b>	29.82 in. Hg
<b>Formaldehyde:</b>	< 115 μg	<b>V<sub>lc</sub>:</b>	119.4 mL
<b>Acetaldehyde:</b>	< 22 μg	<b>%O<sub>2</sub>:</b>	5.45 %
<b>Propanal:</b>	< 115 μg		

Volume of Sample at Standard Conditions on a Dry Basis:		English Units (29.92 in. Hg, 68 °F)	
$V_{mstd} = \left( \frac{528}{29.92} \right) \times V_m \times \gamma \left[ \frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right]$		=	45.658 dscf
<b>Isokinetic Sampling Rate</b>			
$\%ISO = \frac{(100)(T_s) \left[ (0.002669 \times V_{lc}) + \left( \frac{V_m}{T_m} \right) (\gamma) \left( P_{bar} + \left( \frac{\Delta H}{13.6} \right) \right) \right]}{(60)(\theta)(V_s)(P_s)(A_n)}$		=	103.1 % I
A <sub>n</sub> =	0.00140752 ft <sup>2</sup>	Runtime (θ) =	60 minutes
<b>Total μg Formaldehyde in sample (M<sub>n</sub>)</b>		=	< 115 μg
<b>Total μg Acetaldehyde in sample (M<sub>n</sub>)</b>		=	< 22 μg
<b>Total μg Propanal in sample (M<sub>n</sub>)</b>		=	< 115 μg
<b>Concentration of Aldehydes</b>			
$C'_{s(lb/dscf)} = \frac{(2.2046 \times 10^{-9} lb/\mu g)(M_n)}{V_{mstd}}$		=	<b>x 10<sup>-6</sup> lb/dscf</b>
		=	< 0.0056 formaldehyde
		=	< 0.0011 acetaldehyde
$C_{s(\mu g/dscm)} = \frac{(M_n)(35.31 ft^3/m^3)}{(V_{mstd})}$		=	< 0.0056 propanal
		=	<b>μg/dscm</b>
		=	< 84.5 formaldehyde
		=	< 16.2 acetaldehyde
		=	< 84.5 propanal
<b>Aldehydes Mass Rate:</b>			
$E = Q_s \times C'_{s(lb/dscf)}$		=	<b>lb/hr</b>
		=	< 0.0043 formaldehyde
		=	< 0.0008 acetaldehyde
		=	< 0.0043 propanal



## Methanol Laboratory Data Summary

**Client:** Valero Port Arthur Refinery  
**Location:** Port Arthur, Texas  
**Source:** 544 SRU Incinerator Stack  
**Date:** 6/15/2011  
**Run No:** SRU-308-1

Compound	Molecular Weight	Spiked Value (S) (micrograms)	Spiked Train Analysis (M <sub>s</sub> ) (micrograms)	Unspiked Train Analysis (M <sub>u</sub> ) (micrograms)
Methanol	32.04	317.8	426.0	153.0

**Client:** Valero Port Arthur Refinery  
**Location:** Port Arthur, Texas  
**Source:** 544 SRU Incinerator Stack  
**Date:** 6/15/2011  
**Run No:** SRU-308-2

Compound	Molecular Weight	Spiked Value (S) (micrograms)	Spiked Train Analysis (M <sub>s</sub> ) (micrograms)	Unspiked Train Analysis (M <sub>u</sub> ) (micrograms)
Methanol	32.04	317.8	2,679.0	2,042.0

**Client:** Valero Port Arthur Refinery  
**Location:** Port Arthur, Texas  
**Source:** 544 SRU Incinerator Stack  
**Date:** 6/16/2011  
**Run No:** SRU-308-3

Compound	Molecular Weight	Spiked Value (S) (micrograms)	Spiked Train Analysis (M <sub>s</sub> ) (micrograms)	Unspiked Train Analysis (M <sub>u</sub> ) (micrograms)
Methanol	32.04	317.8	682.0	3,185.0



# **METHANOL CALCULATION SUMMARY**

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** 544 SRU Incinerator Stack  
**SAMPLE:** Methanol  
**TEST DATE:** 6/15/2011  
**RUN NO:** SRU-308-1

## **INPUT**

**Q<sub>s</sub>:** 770,123 dscfh  
**P<sub>bar</sub>:** 29.85 in Hg

## **Spiked Train:**

**V<sub>m</sub> Spiked:** 60.118 liters  
**V<sub>m</sub> Spiked:** 2.123 cubic ft  
**Y Spiked:** 1.000  
**T<sub>m</sub> Spiked:** 87.8 °F  
**ΔH Spiked:** 0.39 in. H<sub>2</sub>O

## **Unspiked Train:**

**V<sub>m</sub> Unspiked:** 60.891 liters  
**V<sub>m</sub> Unspiked:** 2.150 cubic ft  
**Y Sample:** 1.000  
**T<sub>m</sub> Sample:** 89.5 °F  
**ΔH Sample:** 0.39 in. H<sub>2</sub>O

## **Volume of sample at standard**

### **conditions on dry basis**

$V_{mstd} \text{ Spiked } (V_s) = (17.647)(V_m)(Y_d)(P_{bar} + \Delta H / 13.6) / (T_m)$   
 $V_{mstd} \text{ Spiked } (V_{s-liters}) = \text{dscf} \times 28.32$   
 $V_{mstd} \text{ Unspiked } (V_u) = (17.647)(V_m)(Y_d)(P_{bar} + \Delta H / 13.6) / (T_m)$   
 $V_{mstd} \text{ Unspiked } (V_{u-liters}) = \text{dscf} \times 28.32$

## **English units**

**(29.92 in. Hg 68° F)**  
 = 2.043 dscf  
 = 57.865 std liters  
 = 2.063 dscf  
 = 58.428 std liters

## **Recovery Calculations**

$M_v = (M_v V_{s-liters}) - (M_u V_{u-liters})$   
 $R = (M_v \cdot V_{s-liters}) / S$

## **VOC Concentration**

$C_s = 2.2046 \times 10^{-9} \text{ lb}/\mu\text{g} \times M_u / V_u$   
 Reported  $C_s = C_s / R$   
 $\text{ppb} = C_s \cdot (385.26 \times 10^9 / \text{MW})$   
 Reported  $\text{ppb} = \text{ppb}/R$

## **Stack gas volume flow rate**

$Q_s = \text{dscfh}$

## **Stack VOC emission rate**

$Q_s \times C_s$

Compound	Molecular Weight	Mass/volume (M <sub>v</sub> ) (μg/liter)	Fraction of Spike Recovered R (fractional)	VOC Concentration (lb/dscf)	VOC Concentration (ppb)	Reported VOC Concentration (ppb)	VOC Concentration (μg/dscm)	Reported VOC Emission (lb/hr)
Methanol	32.04	4.7	0.9	1.6349E-07	1,966	2,276	3,032	0.14578

## MONITOR DATA SUMMARY

COMPANY : Valero Port Arthur Refinery  
 SOURCE : SRU 544 Incinerator Stack  
 REPETITION : 544SRU-18, 308-2 and 544SRU-0011-3  
 TEST DATE : 6/15/2011  
 START TIME : 16:02  
 END TIME : 18:21

## GAS ANALYZER

O<sub>2</sub>

SPAN VALUE : 10.00 %  
 AVERAGE CAL. BIAS (C<sub>m</sub>): 4.892  
 AVERAGE ZERO BIAS (C<sub>o</sub>): -0.018

CALIBRATION GAS: EPA Protocol O<sub>2</sub>  
 CALIBRATION % (C<sub>ma</sub>): 5.00  
 % CORRECTED (C<sub>gas</sub>): 5.43

## GAS ANALYZER

CO<sub>2</sub>

SPAN VALUE : 8.63 %  
 AVERAGE CAL. BIAS (C<sub>m</sub>): 4.354  
 AVERAGE ZERO BIAS (C<sub>o</sub>): 0.101

CALIBRATION GAS: EPA Protocol CO<sub>2</sub>  
 CALIBRATION % (C<sub>ma</sub>): 4.32  
 % CORRECTED (C<sub>gas</sub>): 6.53

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

CLOCK TIME ELAPSED TIME O<sub>2</sub> CO<sub>2</sub>

16:02	0		
16:03	1	5.33	6.55
16:04	2	5.29	6.63
16:05	3	5.32	6.60
16:06	4	5.27	6.64
16:07	5	5.33	6.60
16:08	6	5.34	6.59
16:09	7	5.37	6.56
16:10	8	5.36	6.58
16:11	9	5.35	6.58
16:12	10	5.37	6.57
16:13	11	5.37	6.53
16:14	12	5.28	6.58
16:15	13	5.35	6.58
16:16	14	5.28	6.60
16:17	15	5.31	6.60
16:18	16	5.28	6.59
16:19	17	5.32	6.57
16:20	18	5.27	6.58
16:21	19	5.29	6.56
16:22	20	5.29	6.55
16:23	21	5.33	6.54
16:24	22	5.34	6.54
16:25	23	5.35	6.55
16:26	24	5.32	6.56
16:27	25	5.30	6.57
16:28	26	5.26	6.57
16:29	27	5.28	6.62
16:30	28	5.33	6.57
16:31	29	5.26	6.62
16:32	30	5.34	6.58
16:33	31	5.35	6.62
16:34	32	5.34	6.58
16:35	33	5.36	6.60
16:36	34	5.36	6.57
16:37	35	5.37	6.62
16:38	36	5.36	6.60
16:39	37	5.33	6.67
16:40	38	5.34	6.63
16:41	39	5.33	6.68
16:42	40	5.34	6.65
16:43	41	5.32	6.67
16:44	42	5.27	6.70
16:45	43	5.28	6.67
16:46	44	5.34	6.65
16:47	45	5.35	6.64
16:48	46	5.33	6.65
16:49	47	5.38	6.64
16:50	48	5.39	6.63
16:51	49	5.38	6.66
16:52	50	5.33	6.68
16:53	51	5.36	6.64
16:54	52	5.35	6.67
16:55	53	5.34	6.63
16:56	54	5.32	6.65
16:57	55	5.32	6.60
16:58	56	5.32	6.60
16:59	57	5.36	6.55
17:00	58	5.41	6.53
17:01	59	5.39	6.53
17:02	60	5.37	6.56
17:03	61	5.38	6.54
17:04	62	5.39	6.55
17:05	63	5.34	6.53
17:06	64	5.34	6.54
17:07	65	5.34	6.50
17:08	66	5.35	6.52
17:09	67	5.34	6.48
17:10	68	5.37	6.47
17:11	69	5.37	6.47
17:12	70	5.37	6.48
17:13	71	5.36	6.50
17:14	72	5.37	6.50
17:15	73	5.40	6.49
17:16	74	5.35	6.51
17:17	75	5.34	6.49
17:18	76	5.32	6.49
17:19	77	5.32	6.47
17:20	78	5.34	6.48
17:21	79	5.33	6.44
17:22	80	5.37	6.44
17:23	81	5.35	6.44
17:24	82	5.33	6.47
17:25	83	5.32	6.48
17:26	84	5.31	6.49
17:27	85	5.31	6.48
17:28	86	5.31	6.50
17:29	87	5.28	6.49
17:30	88	5.28	6.49
17:31	89	5.32	6.45
17:32	90	5.31	6.46
17:33	91	5.31	6.46
17:34	92	5.40	6.41
17:35	93	5.37	6.43
17:36	94	5.36	6.43

## MONITOR DATA SUMMARY

	CLOCK TIME	ELAPSED TIME	O <sub>2</sub>	CO <sub>2</sub>
Continued (page 2 of 2):	17:37	95	5.31	6.48
	17:38	96	5.27	6.49
SRU544-18, 308-2 and SRU544-0011-3	17:39	97	5.28	6.51
	17:40	98	5.31	6.48
	17:41	99	5.26	6.48
	17:42	100	5.30	6.44
	17:43	101	5.34	6.44
	17:44	102	5.38	6.40
	17:45	103	5.30	6.46
	17:46	104	5.31	6.44
	17:47	105	5.34	6.48
	17:48	106	5.33	6.48
	17:49	107	5.28	6.55
	17:50	108	5.23	6.53
	17:51	109	5.24	6.55
	17:52	110	5.27	6.49
	17:53	111	5.33	6.50
	17:54	112	5.33	6.48
	17:55	113	5.37	6.49
	17:56	114	5.31	6.50
	17:57	115	5.36	6.50
	17:58	116	5.33	6.49
	17:59	117	5.27	6.55
	18:00	118	5.25	6.51
	18:01	119	5.21	6.57
	18:02	120	5.27	6.51
	18:03	121	5.24	6.54
	18:04	122	4.41	5.21
	18:05	123	5.23	6.51
	18:06	124	5.26	6.47
	18:07	125	5.27	6.50
	18:08	126	5.27	6.49
	18:09	127	5.26	6.51
	18:10	128	5.27	6.51
	18:11	129	5.32	6.50
	18:12	130	5.31	6.52
	18:13	131	5.30	6.52
	18:14	132	5.26	6.54
	18:15	133	5.26	6.56
	18:16	134	5.28	6.55
	18:17	135	5.30	6.57
	18:18	136	5.26	6.58
	18:19	137	5.25	6.57
	18:20	138	5.26	6.58
	18:21	139	5.30	6.53
Uncorrected Average (C) =			5.314	6.533

**ARI ENVIRONMENTAL, INC.**  
**MOISTURE CALCULATION SUMMARY**

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**TEST DATE:** 6/15/2011  
**RUN NUMBER:** 544SRU-0011-3

<b>γ FACTOR:</b>	0.999	<b>STACK DIAM:</b>	67.0 inches
<b>BAROMETRIC:</b>	29.82 in. Hg	<b>METER VOLUME:</b>	49.171 ft <sup>3</sup>
<b>STATIC PRES:</b>	-0.05 in.H <sub>2</sub> O	<b>METER TEMP:</b>	90.4 °F
<b>STACK TEMP:</b>	1117.8 °F	<b>LIQUID COLL:</b>	118.7 milliliters
<b>SQ. RT ΔP:</b>	0.3089 in.H <sub>2</sub> O	<b>CO<sub>2</sub>:</b>	6.53 % by volume
<b>ΔH:</b>	2.02 in.H <sub>2</sub> O	<b>O<sub>2</sub>:</b>	5.43 % by volume

**ENGLISH UNITS**  
**(29.92 in.Hg & 68 °F)**

<b>VOLUME OF SAMPLE</b> <b>@ STANDARD CONDITIONS, DRY BASIS</b>
$V_{mstd} = \left( \frac{528}{29.92} \right) \times V_m \times \gamma \left[ \frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = 47.199 \text{ dscf}$ <p style="text-align: center;">γ = 0.999</p>
<b>VOLUME OF WATER IN SAMPLE</b> <b>@ STANDARD CONDITIONS</b>
$V_{wstd} = 0.04707 \times V_{lc} = 5.587 \text{ scf}$ <p style="text-align: center;">V<sub>lc</sub> = 118.7 mL</p>
<b>FRACTIONAL MOISTURE CONTENT OF STACK GAS AS MEASURED</b>
$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} = 0.1058$
<b>FRACTIONAL MOISTURE CONTENT OF STACK GAS @ SATURATION</b>
$B_{ws@saturation} = \frac{S.V.P.}{P_{bar} + \frac{P_{static}}{13.6}} = 0.7090$ <p style="text-align: center;">S.V.P. = 21.14 in. Hg</p>
<b>FRACTIONAL MOISTURE CONTENT USED IN CALCULATIONS</b>
$B_{ws} = 0.1058$

**ARI ENVIRONMENTAL, INC.**  
**FLOW RATE CALCULATION SUMMARY**

**COMPANY:** Valero Port Arthur Refin  
**LOCATION:** Port Arthur, Texas  
**RUN NUMBER:** 544SRU-0011-3

**SOURCE:** SRU 544 Incinerator Stack  
**TEST DATE:** 6/15/2011

**BAROMETRIC:** 29.82 in. Hg  
**STATIC PRES:** -0.05 in.H<sub>2</sub>O  
**STACK TEMP:** 1117.8 °F  
**SQ.RT ΔP:** 0.3089 in.H<sub>2</sub>O

**STACK DIAM:** 67.0 inches  
**CO<sub>2</sub>:** 6.53 % by volume  
**O<sub>2</sub>:** 5.43 % by volume

<b>DRY MOLECULAR WEIGHT OF STACK GAS</b>			
$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$	=	29.26	lb/lb-mole
<b>MOLECULAR WEIGHT OF STACK GAS, wet basis</b>			
$M_s = M_d(1 - B_{ws}) + 18(B_{ws})$	=	28.07	lb/lb-mole
<b>PITOT TUBE COEFFICIENT</b>			
$C_p$ (from calibration curve or geometric specifications)	=	0.84	
<b>AVERAGE VELOCITY HEAD OF STACK GAS, in. H<sub>2</sub>O</b>			
$\sqrt{\Delta P} = \frac{1}{n} \sum_{i=1}^n \sqrt{\Delta p_i}$	=	0.3089	in. H <sub>2</sub> O
<b>AVERAGE ABSOLUTE STACK GAS TEMPERATURE</b>			
$T_s = 1117.8 \text{ °F} + 460$	=	1,577.8	°R
<b>ABSOLUTE STACK GAS PRESSURE</b>			
$P_s = P_{bar} + \frac{P_{static}}{13.6}$	=	29.82	in.Hg
<b>STACK GAS VELOCITY</b>			
$V_s = (85.49)(C_p)(\text{avg } \sqrt{\Delta P}) \sqrt{\frac{T_s}{(P_s)(M_s)}}$	=	30.457	ft/sec
<b>STACK GAS VOLUMETRIC FLOW RATE, actual</b>			
$Q_s = 60 \times V_s \times A_s$	=	44,742.35	acfm
Stack Area =	24.48370	ft <sup>2</sup>	
<b>STACK GAS VOLUMETRIC FLOW RATE, standard conditions, wet basis</b>			
$Q_{stdw} = \left( \frac{528}{29.92} \right) (Q_s) \left( \frac{P_s}{T_s} \right)$	=	14,920.84	scfm, wb
		895,250	scfh, wb
<b>STACK GAS VOLUMETRIC FLOW RATE, standard conditions, dry basis</b>			
$Q_{std} = \left( \frac{528}{29.92} \right) (Q_s) \left( \frac{P_s}{T_s} \right) (1 - B_{ws})$	=	13,341.53	dscfm
		800,492	dscfh

## Volatile Organic HAPs Laboratory Data Summary

**Client:** Valero Port Arthur Refinery  
**Location:** Port Arthur, Texas  
**Source:** SRU 544 Incinerator Stack  
**Date:**  
**Run No:**

6/15/2011

SRU-18-2

Compound	Molecular Weight	Sample Train A Analysis		Sample Train B Analysis	
		(M <sub>u</sub> ) (micrograms)	% Recovery	(M <sub>u</sub> ) (micrograms)	% Recovery
<b>Acetone</b>	<b>58.08</b>	<b>143</b>		<b>161</b>	
Acetonitrile	41.05	< 37.0		4954	157
Acrolein	56.06	5.1		4738	153
Acrylonitrile	53.06	11.0	88	4.3	74
Benzene	78.11	< 4.3	105	4.3	108
1,3-Butadiene	54.09	< 4.3	101		0
Carbon disulfide	76.14	< 4.3		4.3	
Chlorobenzene	112.56	< 4.3		4.3	
Cumene	120.19	< 4.3		4.3	
1,2-Dibromoethane	187.86	< 4.3	100	4.3	93
Ethylbenzene	106.17	< 4.3	106	4.3	113
Hexane	86.18	< 4.3	103	4.3	21
Methyl isobutyl ketone	100.16	< 4.3		4068	134
Methyl t-butyl ether	88.15	< 4.3	99	4.3	85
<b>Methylene chloride</b>	<b>84.93</b>	<b>214</b>		<b>183</b>	
Nitrobenzene	123.06	< 21.5	137	21.5	100
2-Nitropropane	89.09	< 4.3	90	4.3	81
Pentane	72.15	< 4.3	96		0
Styrene	104.15	< 4.3	106	4.3	104
Tetrachloroethene	165.83	< 4.3		4.3	
Toluene	92.14	< 4.3		1469	104
Trichloroethene	131.39	< 4.3		3408	102
2,2,4 Trimethyl pentane	114.23	< 4.3	102	4.3	87
Xylenes	106.16	< 4.3		4.3	

# **VOLATILE ORGANIC HAPS CALCULATION SUMMARY**

COMPANY: Valero Port Arthur Refinery  
 LOCATION: Port Arthur, Texas  
 SOURCE: SRU 544 Incinerator Stack  
 SAMPLE: VolHAPs - Methanol Impingers  
 TEST DATE: 6/15/2011  
 RUN NO: SRU-18-2

## **INPUT**

**Q<sub>a</sub> :** 800.492 dscfh  
**P<sub>bar</sub> :** 29.85 in Hg

## **A Train:**

**V<sub>m</sub> Unspiked:** 20.527 liters  
**V<sub>m</sub> Spiked:** 20.358 liters  
**V<sub>m</sub> Unspiked:** 0.725 cubic ft  
**V<sub>m</sub> Spiked:** 0.719 cubic ft  
**Y Sample :** 1.000  
**Y Sample :** 1.000  
**T<sub>m</sub> Sample:** 90.0 °F  
**T<sub>m</sub> Sample:** 88.3 °F  
**ΔH Sample:** 0.28 in. H<sub>2</sub>O  
**ΔH Sample:** 0.20 in. H<sub>2</sub>O

## **B Train:**

**V<sub>m</sub> Unspiked:** 20.527 liters  
**V<sub>m</sub> Spiked:** 20.358 liters  
**V<sub>m</sub> Unspiked:** 0.725 cubic ft  
**V<sub>m</sub> Spiked:** 0.719 cubic ft  
**Y Sample :** 1.000  
**Y Sample :** 1.000  
**T<sub>m</sub> Sample:** 90.0 °F  
**T<sub>m</sub> Sample:** 88.3 °F  
**ΔH Sample:** 0.28 in. H<sub>2</sub>O  
**ΔH Sample:** 0.20 in. H<sub>2</sub>O

Volume of sample at standard conditions on dry basis

English units  
 (29.92 in. Hg 68°F)

**V<sub>std</sub> Train A (V<sub>A</sub>) = (17.647)(V<sub>m</sub>)(Y<sub>A</sub>)(P<sub>bar</sub>+ΔH/13.6)/(T<sub>m</sub>)**  
**V<sub>std</sub> Train A (V<sub>A</sub>) = dscf x 28.32**  
**V<sub>std</sub> Train B (V<sub>B</sub>) = (17.647)(V<sub>m</sub>)(Y<sub>B</sub>)(P<sub>bar</sub>+ΔH/13.6)/(T<sub>m</sub>)**  
**V<sub>std</sub> Train B (V<sub>B</sub>) = dscf x 28.32**

**= 0.695 dscf**  
**= 19.673 std liters**  
**= 0.691 dscf**  
**= 19.568 std liters**

Compound	Molecular Weight	Mass/Volume (M <sub>v</sub> ) (μg/liter)	A TRAIN				B TRAIN				AVERAGE	
			VOC Concentration (lb/dscf)	VOC Concentration (ppb)	VOC Concentration (μg/dscm)	VOC Emission (lb/hr)	VOC Concentration (lb/dscf)	VOC Concentration (ppb)	VOC Concentration (μg/dscm)	VOC Emission (lb/hr)	VOC Concentration (μg/dscm)	VOC Emission (lb/hr)
Acetone	58.08	7.2688	4.5392E-07	3.010	7.269	0.36328	8.2278	5.1369E-07	3.407	8.228	7.748	0.38724
Acetonitrile	41.05	1.8807	1.1742E-07	1.102	1.881	0.09400					1.881	0.09400
Acrolein	56.06	0.2592	1.6185E-08	111	259	0.01296					259	0.01296
Acrylonitrile	53.06	< 0.5591	< 3.4909E-08	< 253	< 559	< 0.02794	< 0.2197	< 1.3720E-08	< 100	< 220	< 389	< 0.01946
Benzene	78.11	< 0.2186	< 1.3646E-08	< 67	< 219	< 0.01092	< 0.2197	< 1.3720E-08	< 68	< 220	< 219	< 0.01095
1,3-Butadiene	54.09	< 0.2186	< 1.3646E-08	< 97	< 219	< 0.01092	< 0.2197	< 1.3720E-08	< 69	< 220	< 109	< 0.00546
Carbon disulfide	76.14	< 0.2186	< 1.3646E-08	< 69	< 219	< 0.01092	< 0.2197	< 1.3720E-08	< 69	< 220	< 219	< 0.01095
Chlorobenzene	112.56	< 0.2186	< 1.3646E-08	< 47	< 219	< 0.01092	< 0.2197	< 1.3720E-08	< 47	< 220	< 219	< 0.01095
Cumene	120.19	< 0.2186	< 1.3646E-08	< 44	< 219	< 0.01092	< 0.2197	< 1.3720E-08	< 44	< 220	< 219	< 0.01095
1,2-Dibromoethane	187.86	< 0.2186	< 1.3646E-08	< 28	< 219	< 0.01092	< 0.2197	< 1.3720E-08	< 28	< 220	< 219	< 0.01095
Ethylbenzene	106.17	< 0.2186	< 1.3646E-08	< 50	< 219	< 0.01092	< 0.2197	< 1.3720E-08	< 50	< 220	< 219	< 0.01095
Hexane	86.18	< 0.2186	< 1.3646E-08	< 61	< 219	< 0.01092	< 0.2197	< 1.3720E-08	< 61	< 220	< 219	< 0.01095
Methyl isobutyl ketone	100.16	< 0.2186	< 1.3646E-08	< 52	< 219	< 0.01092	< 0.2197	< 1.3720E-08	< 52	< 220	< 219	< 0.01092
Methyl t-butyl ether	88.15	< 0.2186	< 1.3646E-08	< 60	< 219	< 0.01092	< 0.2197	< 1.3720E-08	< 60	< 220	< 219	< 0.01095
Methyl chloride	84.93	10.8778	6.7914E-07	3.081	10.878	0.54365	9.3521	5.8389E-07	2.649	9.352	10.115	0.50552
Nitrobenzene	123.06	< 1.0929	< 6.8232E-08	< 214	< 1093	< 0.05462	< 1.0987	< 6.8598E-08	< 215	< 1099	< 1096	< 0.05477
2-Nitropropane	89.09	< 0.2186	< 1.3646E-08	< 59	< 219	< 0.01092	< 0.2197	< 1.3720E-08	< 59	< 220	< 219	< 0.01095
Pentane	72.15	< 0.2186	< 1.3646E-08	< 73	< 219	< 0.01092	< 0.0000	< 0.0000E+00	< 0	< 220	< 109	< 0.00546
Styrene	104.15	< 0.2186	< 1.3646E-08	< 50	< 219	< 0.01092	< 0.2197	< 1.3720E-08	< 51	< 220	< 219	< 0.01095
Tetrachloroethene	168.83	< 0.2186	< 1.3646E-08	< 32	< 219	< 0.01092	< 0.2197	< 1.3720E-08	< 32	< 220	< 219	< 0.01095
Toluene	92.14	< 0.2186	< 1.3646E-08	< 57	< 219	< 0.01092	< 0.2197	< 1.3720E-08	< 57	< 220	< 219	< 0.01092
Trichloroethene	131.39	< 0.2186	< 1.3646E-08	< 40	< 219	< 0.01092	< 0.2197	< 1.3720E-08	< 46	< 220	< 219	< 0.01092
2,2,4 Trimethyl pentane	114.23	< 0.2186	< 1.3646E-08	< 46	< 219	< 0.01092	< 0.2197	< 1.3720E-08	< 46	< 220	< 219	< 0.01095
Xylenes	106.16	< 0.2186	< 1.3646E-08	< 50	< 219	< 0.01092	< 0.2197	< 1.3720E-08	< 50	< 220	< 219	< 0.01095

## ALDEHYDES CALCULATION SUMMARY

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**TEST DATE:** 6/15/2011  
**RUN NO:** 544SRU-0011-3

### INPUT

<b>V<sub>m</sub>:</b>	49.171 ft <sup>3</sup>	<b>Q<sub>s</sub>:</b>	800,492 dscfh
<b>γ FACTOR:</b>	0.999	<b>T<sub>s</sub>:</b>	1,117.8 °F
<b>P<sub>bar</sub>:</b>	29.82 in. Hg	<b>Θ:</b>	60.0 minutes
<b>ΔH:</b>	2.02	<b>V<sub>s</sub>:</b>	30.457 fps
<b>T<sub>m</sub>:</b>	90.4 °F	<b>P<sub>s</sub>:</b>	29.82 in. Hg
<b>Formaldehyde:</b>	< 115 μg	<b>V<sub>ic</sub>:</b>	118.7 mL
<b>Acetaldehyde:</b>	< 22 μg	<b>%O<sub>2</sub>:</b>	5.43 %
<b>Propanal:</b>	< 115 μg		

<b>Volume of Sample at Standard Conditions on a Dry Basis:</b>		<b>English Units (29.92 in. Hg, 68 °F)</b>	
$V_{mstd} = \left( \frac{528}{29.92} \right) \times V_m \times \gamma \left[ \frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right]$		=	47.199 dscf
<b>Isokinetic Sampling Rate</b>			
$\%ISO = \frac{(100)(T_s) \left[ (0.002669 \times V_{ic}) + \left( \frac{V_m}{T_m} \right) \left( \gamma \left( P_{bar} + \left( \frac{\Delta H}{13.6} \right) \right) \right) \right]}{(60)(\theta)(V_s)(P_s)(A_n)}$		=	102.6 % I
A <sub>n</sub> =	0.00140752 ft <sup>2</sup>	Runtime (θ) =	60 minutes
<b>Total μg Formaldehyde in sample (M<sub>n</sub>)</b>		=	< 115 μg
<b>Total μg Acetaldehyde in sample (M<sub>n</sub>)</b>		=	< 22 μg
<b>Total μg Propanal in sample (M<sub>n</sub>)</b>		=	< 115 μg
<b>Concentration of Aldehydes</b>		<b>× 10<sup>-6</sup> lb/dscf</b>	
C <sub>s(lb/dscf)</sub> = $\frac{(2.2046 \times 10^{-9} \text{ lb/μg})(M_n)}{V_{mstd}}$		=	< 0.0054 formaldehyde
		=	< 0.0010 acetaldehyde
		=	< 0.0054 propanal
		<b>μg/dscm</b>	
C <sub>s(μg/dscm)</sub> = $\frac{(M_n)(35.31 \text{ ft}^3/\text{m}^3)}{(V_{mstd})}$		=	< 84.5 formaldehyde
		=	< 16.2 acetaldehyde
		=	< 84.5 propanal
<b>Aldehydes Mass Rate:</b>		<b>lb/hr</b>	
E = Q <sub>s</sub> × C <sub>s(lb/dscf)</sub>		=	< 0.0043 formaldehyde
		=	< 0.0008 acetaldehyde
		=	< 0.0043 propanal



## METHANOL CALCULATION SUMMARY

COMPANY: Valero Port Arthur Refinery  
LOCATION: Port Arthur, Texas  
SOURCE: 544 SRU Incinerator Stack  
SAMPLE: Methanol  
TEST DATE: 6/15/2011  
RUN NO: SRU-308-2

### INPUT

$Q_s$  : 800,492 dscfh  
 $P_{bar}$  : 29.85 in Hg

### Spiked Train:

$V_m$  Spiked: 59,702 liters  
 $V_m$  Spiked: 2,108 cubic ft  
 $Y$  Spiked : 1,000  
 $T_m$  Spiked: 89 °F  
 $\Delta H$  Spiked: 0.47 in. H<sub>2</sub>O

### Unspiked Train:

$V_m$  Unspiked: 60,864 liters  
 $V_m$  Unspiked: 2,149 cubic ft  
 $Y$  Sample : 1,000  
 $T_m$  Sample: 91.6 °F  
 $\Delta H$  Sample: 0.59 in. H<sub>2</sub>O

### Volume of sample at standard conditions on dry basis

$V_{mstd}$  Spiked ( $V_d$ ) =  $(17.647)(V_m)(Y_d)(P_{bar} + \Delta H / 13.6) / (T_m)$   
 $V_{mstd}$  Spiked ( $V_{d-liters}$ ) = dscf x 28.32  
 $V_{mstd}$  Unspiked ( $V_u$ ) =  $(17.647)(V_m)(Y_d)(P_{bar} + \Delta H / 13.6) / (T_m)$   
 $V_{mstd}$  Unspiked ( $V_{u-liters}$ ) = dscf x 28.32

English units  
(29.92 in. Hg 68° F)

= 2.025 dscf  
= 57.350 std liters  
= 2.055 dscf  
= 58.208 std liters

### Recovery Calculations

$M_v = (M_g V_{g-liters}) - (M_u V_{u-liters})$   
 $R = (M_v * V_{g-liters}) / S$

### Stack gas volume flow rate

$Q_s = \text{dscfh}$

### Stack VOC emission rate

$Q_s \times C_s$

### VOC Concentration

$C_s = 2.2046 \times 10^{-9} \text{ lb}/\mu\text{g} \times M_u / V_u$   
Reported  $C_s = C_s / R$   
ppb =  $C_s * (385.26 \times 10^9 / \text{MW})$   
Reported ppb = ppb/R

Compound	Molecular Weight	Mass/volume (M <sub>v</sub> ) (μg/liter)	Fraction of Spike Recovered R (fractional)	VOC Concentration (lb/dscf)	Reported VOC Concentration (lb/dscf)	VOC Concentration (ppb)	Reported VOC Concentration (ppb)	Reported VOC Emission (lb/hr)
Methanol	32.04	11.63	2.10	2.1903E-06	1.0434E-06	26,336	12,547	0.83527

## MONITOR DATA SUMMARY

COMPANY : Valero Port Arthur Refinery  
 SOURCE : SRU544 Incinerator Exhaust  
 REPETITION : 544SRU-0011-4, 544SRU-18, 308-3, 544SRU-16A, 0010-1  
 TEST DATE : 6/16/2011  
 START TIME : 7:27  
 END TIME : 13:28

GAS ANALYZER O<sub>2</sub>

SPAN VALUE : 10.00 %  
 AVERAGE CAL. BIAS (C<sub>ma</sub>): 5.086  
 AVERAGE ZERO BIAS (C<sub>o</sub>): 0.091  
 CALIBRATION GAS: EPA Protocol O<sub>2</sub>  
 CALIBRATION % (C<sub>ma</sub>): 5.00  
 % CORRECTED (C<sub>gas</sub>): 5.42

GAS ANALYZER CO<sub>2</sub>

SPAN VALUE : 8.63 %  
 AVERAGE CAL. BIAS (C<sub>ma</sub>): 4.392  
 AVERAGE ZERO BIAS (C<sub>o</sub>): 0.121  
 CALIBRATION GAS: EPA Protocol CO<sub>2</sub>  
 CALIBRATION % (C<sub>ma</sub>): 4.32  
 % CORRECTED (C<sub>gas</sub>): 6.70

GAS ANALYZER CO

SPAN VALUE : 500 ppm  
 AVERAGE CAL. BIAS (C<sub>ma</sub>): 251.62  
 AVERAGE ZERO BIAS (C<sub>o</sub>): 1.33  
 CALIBRATION GAS: EPA Protocol CO  
 CALIBRATION PPM (C<sub>ma</sub>): 250.0  
 PPM CORRECTED (C<sub>gas</sub>): 303.4

GAS ANALYZER VOCs

SPAN VALUE : 90 ppm  
 AVERAGE CAL. BIAS (C<sub>ma</sub>): 30.18  
 AVERAGE ZERO BIAS (C<sub>o</sub>): 0.32  
 CALIBRATION GAS: EPA Protocol C<sub>3</sub>H<sub>8</sub>  
 CALIBRATION ppm (C<sub>ma</sub>): 30.0  
 ppm CORRECTED (C<sub>gas</sub>): -0.2

$$\text{Example Calculation} = C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

CLOCK TIME	ELAPSED TIME	CO	C <sub>3</sub> H <sub>8</sub>	O <sub>2</sub>	CO <sub>2</sub>
7:27	0				
7:28	1	327.7	0.0	5.53	6.68
7:29	2	327.6	0.0	5.53	6.71
7:30	3	322.7	0.0	5.51	6.71
7:31	4	330.0	0.0	5.54	6.68
7:32	5	330.7	0.0	5.53	6.70
7:33	6	328.9	0.0	5.53	6.70
7:34	7	324.2	0.0	5.51	6.72
7:35	8	321.1	0.0	5.50	6.71
7:36	9	325.6	0.0	5.52	6.70
7:37	10	328.6	0.0	5.53	6.67
7:38	11	332.1	0.0	5.53	6.69
7:39	12	328.8	0.0	5.53	6.66
7:40	13	326.2	0.0	5.54	6.69
7:41	14	330.7	0.0	5.53	6.65
7:42	15	332.4	0.0	5.55	6.69
7:43	16	322.5	0.0	5.53	6.67
7:44	17	321.8	0.0	5.52	6.69
7:45	18	313.8	0.0	5.46	6.71
7:46	19	317.1	0.0	5.48	6.70
7:47	20	309.8	0.0	5.46	6.68
7:48	21	322.8	0.0	5.47	6.70
7:49	22	337.1	0.0	5.52	6.62
7:50	23	329.0	0.0	5.50	6.67
7:51	24	328.6	0.0	5.51	6.63
7:52	25	332.7	0.0	5.50	6.67
7:53	26	330.8	0.0	5.53	6.64
7:54	27	328.4	0.0	5.52	6.66
7:55	28	327.5	0.0	5.53	6.66
7:56	29	326.6	0.0	5.53	6.67
7:57	30	324.9	0.0	5.54	6.68
7:58	31	323.0	0.0	5.54	6.69
7:59	32	318.5	0.0	5.54	6.69
8:00	33	321.2	0.0	5.56	6.68
8:01	34	317.8	0.0	5.56	6.68
8:02	35	319.8	0.0	5.56	6.68
8:03	36	312.1	0.0	5.52	6.70
8:04	37	320.9	0.0	5.54	6.70
8:05	38	323.9	0.0	5.55	6.69
8:06	39	312.0	0.0	5.51	6.70
8:07	40	314.0	0.1	5.51	6.71
8:08	41	312.7	0.0	5.50	6.69
8:09	42	313.6	0.0	5.51	6.72
8:10	43	322.4	0.0	5.53	6.68
8:11	44	336.0	0.0	5.53	6.71
8:12	45	338.3	0.0	5.52	6.70
8:13	46	332.1	0.0	5.54	6.70
8:14	47	329.3	0.0	5.52	6.70
8:15	48	332.2	0.0	5.56	6.69
8:16	49	325.4	0.0	5.51	6.69
8:17	50	323.9	0.0	5.53	6.70
8:18	51	318.5	0.0	5.51	6.66
8:19	52	316.5	0.0	5.52	6.69
8:20	53	310.0	0.0	5.51	6.65
8:21	54	326.1	0.0	5.57	6.65
8:22	55	315.7	0.0	5.54	6.63
8:23	56	316.8	0.0	5.51	6.67
8:24	57	329.6	0.0	5.55	6.66
8:25	58	338.8	0.0	5.54	6.70
8:26	59	339.2	0.0	5.57	6.68
8:27	60	339.0	0.0	5.62	6.69
8:28	61	320.3	0.0	5.58	6.70
8:29	62	314.5	0.0	5.54	6.75
8:30	63	308.8	0.0	5.54	6.70
8:31	64	306.6	0.0	5.53	6.73
8:32	65	314.5	0.0	5.47	6.72
8:33	66	321.9	0.0	5.48	6.71
8:34	67	328.0	0.0	5.51	6.69
8:35	68	349.1	0.0	5.56	6.69
8:36	69	353.8	0.0	5.56	6.68
8:37	70	345.5	0.0	5.57	6.69
8:38	71	327.4	0.0	5.56	6.66
8:39	72	319.0	0.0	5.57	6.67
8:40	73	300.1	0.0	5.51	6.67
8:41	74	295.1	0.0	5.49	6.68
8:42	75	298.9	0.0	5.50	6.69
8:43	76	312.8	0.0	5.52	6.67
8:44	77	322.2	0.0	5.54	6.69
8:45	78	327.6	0.0	5.55	6.67
8:46	79	326.1	0.0	5.57	6.68
8:47	80	315.1	0.0	5.53	6.71
8:48	81	307.6	0.0	5.51	6.72
8:49	82	300.0	0.0	5.50	6.71
8:50	83	318.9	0.0	5.54	6.70
8:51	84	321.2	0.0	5.51	6.69
8:52	85	327.1	0.0	5.52	6.71
8:53	86	333.0	0.0	5.54	6.68
8:54	87	336.3	0.0	5.56	6.72
8:55	88	322.5	0.0	5.53	6.70
8:56	89	325.0	0.0	5.54	6.75
8:57	90	314.0	0.0	5.54	6.72

## MONITOR DATA SUMMARY

	CLOCK TIME	ELAPSED TIME	CO	C <sub>2</sub> H <sub>6</sub>	O <sub>2</sub>	CO <sub>2</sub>
Continued (page 2 of 4):	8:58	91	302.6	0.0	5.53	6.73
	8:59	92	302.5	0.0	5.56	6.70
544SRU-0011-4, 544SRU-18, 308-3, 544SRU-16A, 0010-1	9:00	93	295.1	0.0	5.52	6.73
	9:01	94	295.7	0.0	5.50	6.71
	9:02	95	309.5	0.0	5.51	6.74
	9:03	96	317.5	0.0	5.52	6.69
	9:04	97	317.2	0.0	5.52	6.73
	9:05	98	312.5	0.0	5.50	6.72
	9:06	99	330.2	0.0	5.55	6.73
	9:07	100	321.4	0.0	5.55	6.71
	9:08	101	305.7	0.0	5.50	6.75
	9:09	102	304.4	0.0	5.52	6.74
	9:10	103	303.7	0.0	5.52	6.73
	9:11	104	293.4	0.0	5.46	6.75
	9:12	105	295.2	0.0	5.45	6.74
	9:13	106	308.6	0.0	5.50	6.70
	9:14	107	305.3	0.0	5.48	6.72
	9:15	108	312.2	0.0	5.49	6.71
	9:16	109	310.8	0.1	5.49	6.72
	9:17	110	310.3	0.0	5.48	6.73
	9:18	111	309.5	0.0	5.54	6.71
	9:19	112	296.3	0.0	5.53	6.74
	9:20	113	294.7	0.0	5.51	6.72
	9:21	114	292.7	0.0	5.52	6.71
	9:22	115	291.5	0.0	5.49	6.71
	9:23	116	297.2	0.0	5.50	6.71
	9:24	117	300.7	0.0	5.49	6.70
	9:25	118	309.6	0.0	5.48	6.72
	9:26	119	313.8	0.0	5.47	6.71
	9:27	120	329.8	0.0	5.53	6.73
	9:28	121	308.4	0.0	5.53	6.75
	9:29	122	314.4	0.0	5.54	6.75
	9:30	123	300.2	0.0	5.53	6.72
	9:31	124	284.9	0.0	5.50	6.77
	9:32	125	282.8	0.0	5.52	6.74
	9:33	126	287.3	0.0	5.52	6.75
	9:34	127	290.7	0.0	5.53	6.72
	9:35	128	290.7	0.0	5.48	6.75
	9:36	129	300.7	0.0	5.50	6.73
	9:37	130	309.4	0.0	5.51	6.75
	9:38	131	315.3	0.0	5.53	6.72
	9:39	132	320.1	0.0	5.54	6.74
	9:40	133	306.4	0.0	5.50	6.73
	9:41	134	311.5	0.0	5.52	6.75
	9:42	135	310.0	0.0	5.53	6.72
	9:43	136	314.5	0.0	5.53	6.75
	9:44	137	321.1	0.0	5.56	6.73
	9:45	138	321.0	0.0	5.56	6.75
	9:46	139	310.0	0.0	5.53	6.76
	9:47	140	312.3	0.0	5.52	6.75
	9:48	141	306.1	0.1	5.51	6.76
	9:49	142	303.7	0.0	5.50	6.76
	9:50	143	303.1	0.0	5.51	6.76
	9:51	144	302.6	0.0	5.48	6.75
	9:52	145	306.9	0.0	5.52	6.74
	9:53	146	318.7	0.0	5.54	6.74
	9:54	147	337.8	0.0	5.59	6.73
	9:55	148	331.7	0.0	5.58	6.75
	9:56	149	320.2	0.0	5.55	6.79
	9:57	150	303.6	0.0	5.53	6.77
	9:58	151	295.4	0.0	5.52	6.80
	9:59	152	299.6	0.0	5.54	6.74
	10:00	153	294.7	0.0	5.52	6.79
	10:01	154	291.0	0.0	5.49	6.75
	10:02	155	294.3	0.0	5.50	6.80
	10:03	156	293.6	0.0	5.51	6.74
	10:04	157	312.6	0.0	5.52	6.76
	10:05	158	309.8	0.0	5.48	6.75
	10:06	159	307.9	0.1	5.48	6.77
	10:07	160	307.7	0.0	5.49	6.75
	10:08	161	306.9	0.0	5.49	6.76
	10:09	162	308.3	0.0	5.49	6.75
	10:10	163	308.0	0.0	5.47	6.76
	10:11	164	321.7	0.0	5.54	6.71
	10:12	165	319.7	0.0	5.55	6.74
	10:13	166	309.6	0.0	5.52	6.73
	10:14	167	300.4	0.0	5.49	6.76
	10:15	168	287.2	0.0	5.44	6.77
	10:16	169	298.1	0.0	5.48	6.76
	10:17	170	306.3	0.0	5.50	6.73
	10:18	171	318.5	0.0	5.53	6.73
	10:19	172	318.6	0.0	5.52	6.74
	10:20	173	326.3	0.0	5.56	6.70
	10:21	174	310.8	0.1	5.52	6.76
	10:22	175	299.6	0.0	5.48	6.75
	10:23	176	296.1	0.0	5.48	6.77
	10:24	177	286.9	0.0	5.50	6.75
	10:25	178	288.9	0.0	5.52	6.75
	10:26	179	297.4	0.0	5.53	6.74
	10:27	180	304.4	0.0	5.53	6.75
	10:28	181	311.8	0.0	5.52	6.75

## MONITOR DATA SUMMARY

Continued (page 3 of 4):  
 544SRU-0011-4, 544SRU-18, 308-3, 544SRU-16A, 0010-1

CLOCK TIME	ELAPSED TIME	CO	C <sub>2</sub> H <sub>6</sub>	O <sub>2</sub>	CO <sub>2</sub>
10:29	182	308.5	0.0	5.49	6.77
10:30	183	303.9	0.0	5.47	6.76
10:31	184	321.0	0.0	5.53	6.77
10:32	185	305.0	0.0	5.49	6.75
10:33	186	305.9	0.0	5.50	6.78
10:34	187	294.5	0.0	5.46	6.76
10:35	188	308.6	0.0	5.52	6.75
10:36	189	300.6	0.0	5.48	6.75
10:37	190	301.1	0.0	5.49	6.77
10:38	191	295.2	0.0	5.46	6.77
10:39	192	304.5	0.0	5.48	6.77
10:40	193	296.1	0.0	5.47	6.77
10:41	194	307.4	0.0	5.49	6.78
10:42	195	307.5	0.0	5.53	6.75
10:43	196	303.2	0.0	5.49	6.80
10:44	197	299.6	0.0	5.48	6.77
10:45	198	297.2	0.0	5.48	6.81
10:46	199	285.6	0.0	5.45	6.79
10:47	200	293.9	0.0	5.48	6.81
10:48	201	294.1	0.0	5.56	6.75
10:49	202	294.1	0.0	5.51	6.80
10:50	203	296.1	0.0	5.50	6.78
10:51	204	310.7	0.0	5.47	6.81
10:52	205	307.9	0.1	5.48	6.80
10:53	206	300.1	0.0	5.49	6.79
10:54	207	300.7	0.1	5.51	6.78
10:55	208	291.9	0.1	5.49	6.79
10:56	209	288.8	0.0	5.47	6.79
10:57	210	298.3	0.1	5.50	6.79
10:58	211	305.2	0.1	5.50	6.81
10:59	212	305.5	0.0	5.49	6.82
11:00	213	314.5	0.0	5.53	6.78
11:01	214	314.2	0.0	5.51	6.80
11:02	215	302.0	0.0	5.51	6.80
11:03	216	284.6	0.0	5.47	6.81
11:04	217	275.3	0.0	5.44	6.83
11:05	218	276.9	0.0	5.47	6.81
11:06	219	292.0	0.0	5.47	6.81
11:07	220	301.1	0.0	5.48	6.80
11:08	221	310.8	0.1	5.49	6.77
11:09	222	320.8	0.1	5.49	6.80
11:10	223	331.9	0.1	5.54	6.76
11:11	224	338.6	0.1	5.57	6.79
11:12	225	325.2	0.1	5.54	6.80
11:13	226	301.5	0.1	5.49	6.85
11:14	227	287.6	0.1	5.45	6.84
11:15	228	288.8	0.0	5.46	6.85
11:16	229	287.3	0.1	5.46	6.83
11:17	230	304.7	0.1	5.50	6.82
11:18	231	316.5	0.1	5.53	6.78
11:19	232	323.7	0.1	5.52	6.80
11:20	233	322.7	0.1	5.55	6.78
11:21	234	316.5	0.1	5.52	6.82
11:22	235	316.2	0.1	5.53	6.79
11:23	236	306.1	0.1	5.49	6.83
11:24	237	308.1	0.1	5.54	6.80
11:25	238	300.4	0.1	5.51	6.83
11:26	239	293.6	0.1	5.48	6.81
11:27	240	296.2	0.1	5.46	6.83
11:28	241	299.2	0.1	5.48	6.77
11:29	242	300.2	0.1	5.47	6.81
11:30	243	309.4	0.1	5.51	6.75
11:31	244	304.6	0.1	5.47	6.78
11:32	245	305.4	0.1	5.49	6.75
11:33	246	297.2	0.1	5.47	6.77
11:34	247	294.6	0.1	5.46	6.74
11:35	248	303.6	0.1	5.50	6.74
11:36	249	305.6	0.1	5.50	6.72
11:37	250	305.6	0.1	5.51	6.75
11:38	251	291.8	0.1	5.48	6.74
11:39	252	292.3	0.1	5.48	6.79
11:40	253	282.4	0.1	5.45	6.78
11:41	254	294.0	0.1	5.45	6.81
11:42	255	306.0	0.1	5.52	6.75
11:43	256	295.7	0.0	5.46	6.81
11:44	257	289.0	0.0	5.47	6.79
11:45	258	291.8	0.0	5.47	6.81
11:46	259	291.5	0.0	5.50	6.80
11:47	260	294.7	0.0	5.50	6.80
11:48	261	281.7	0.0	5.47	6.79
11:49	262	272.3	0.1	5.44	6.83
11:50	263	275.2	0.1	5.45	6.79
11:51	264	282.6	0.1	5.47	6.80
11:52	265	284.6	0.1	5.46	6.76
11:53	266	294.4	0.1	5.47	6.78
11:54	267	294.9	0.1	5.47	6.74
11:55	268	301.2	0.1	5.48	6.76
11:56	269	298.6	0.1	5.47	6.72
11:57	270	292.0	0.1	5.45	6.78
11:58	271	288.2	0.1	5.45	6.75
11:59	272	290.5	0.1	5.45	6.77

## MONITOR DATA SUMMARY

Continued (page 4 of 4):

544SRU-0011-4, 544SRU-18, 308-3, 544SRU-16A, 0010-1

CLOCK TIME	ELAPSED TIME	CO	C <sub>3</sub> H <sub>8</sub>	O <sub>2</sub>	CO <sub>2</sub>
12:00	273	291.2	0.1	5.45	6.75
12:01	274	305.2	0.1	5.52	6.74
12:02	275	292.4	0.1	5.51	6.73
12:03	276	289.7	0.1	5.50	6.76
12:04	277	301.5	0.1	5.51	6.73
12:05	278	296.1	0.1	5.52	6.76
12:06	279	288.3	0.1	5.47	6.77
12:07	280	277.3	0.1	5.46	6.81
12:08	281	270.8	0.1	5.43	6.78
12:09	282	273.6	0.1	5.44	6.79
12:10	283	264.7	0.1	5.42	6.76
12:11	284	281.7	0.1	5.46	6.77
12:12	285	288.5	0.2	5.47	6.76
12:13	286	299.3	0.1	5.50	6.76
12:14	287	290.3	0.1	5.47	6.77
12:15	288	289.5	0.1	5.46	6.77
12:16	289	286.3	0.1	5.47	6.76
12:17	290	284.5	0.1	5.47	6.78
12:18	291	288.7	0.1	5.47	6.76
12:19	292	290.9	0.1	5.46	6.79
12:20	293	285.1	0.1	5.46	6.77
12:21	294	284.7	0.1	5.46	6.79
12:22	295	298.6	0.1	5.52	6.74
12:23	296	307.6	0.2	5.52	6.75
12:24	297	296.9	0.2	5.52	6.72
12:25	298	289.5	0.1	5.50	6.78
12:26	299	287.8	0.2	5.52	6.75
12:27	300	290.4	0.3	5.52	6.79
12:28	301	284.3	0.3	5.49	6.76
12:29	302	291.6	0.3	5.48	6.79
12:30	303	301.3	0.2	5.53	6.75
12:31	304	296.9	0.3	5.51	6.79
12:32	305	290.8	0.3	5.50	6.78
12:33	306	283.8	0.3	5.51	6.80
12:34	307	272.1	0.3	5.47	6.79
12:35	308	271.4	0.3	5.48	6.78
12:36	309	269.8	0.3	5.46	6.75
12:37	310	281.6	0.3	5.48	6.76
12:38	311	290.8	0.3	5.43	6.73
12:39	312	291.7	0.3	5.48	6.73
12:40	313	293.9	0.3	5.48	6.70
12:41	314	293.5	0.3	5.49	6.74
12:42	315	303.8	0.4	5.52	6.70
12:43	316	300.3	0.3	5.52	6.74
12:44	317	287.5	0.3	5.49	6.70
12:45	318	294.6	0.3	5.51	6.74
12:46	319	286.6	0.3	5.46	6.74
12:47	320	278.7	0.3	5.45	6.78
12:48	321	278.7	0.3	5.45	6.76
12:49	322	286.4	0.3	5.49	6.75
12:50	323	280.9	0.3	5.53	6.71
12:51	324	283.1	0.3	5.52	6.75
12:52	325	277.6	0.3	5.53	6.72
12:53	326	289.5	0.2	5.49	6.77
12:54	327	291.3	0.3	5.44	6.76
12:55	328	296.7	0.3	5.47	6.79
12:56	329	304.2	0.2	5.54	6.73
12:57	330	294.7	0.2	5.50	6.78
12:58	331	286.3	0.2	5.48	6.77
12:59	332	287.9	0.2	5.48	6.77
13:00	333	284.4	0.2	5.45	6.79
13:01	334	295.5	0.2	5.51	6.77
13:02	335	297.3	0.2	5.51	6.76
13:03	336	297.4	0.2	5.49	6.78
13:04	337	293.4	0.2	5.45	6.77
13:05	338	308.1	0.2	5.50	6.78
13:06	339	302.9	0.2	5.51	6.75
13:07	340	301.5	0.2	5.49	6.78
13:08	341	299.8	0.2	5.49	6.76
13:09	342	303.6	0.2	5.50	6.79
13:10	343	295.0	0.2	5.48	6.78
13:11	344	290.3	0.2	5.46	6.82
13:12	345	286.9	0.1	5.49	6.78
13:13	346	294.0	0.1	5.49	6.78
13:14	347	295.9	0.1	5.52	6.78
13:15	348	293.0	0.1	5.50	6.79
13:16	349	290.5	0.2	5.50	6.80
13:17	350	292.5	0.2	5.45	6.82
13:18	351	288.3	0.2	5.45	6.80
13:19	352	279.1	0.2	5.40	6.85
13:20	353	296.1	0.2	5.49	6.77
13:21	354	282.4	0.2	5.46	6.79
13:22	355	271.0	0.2	5.43	6.77
13:23	356	283.5	0.2	5.44	6.74
13:24	357	297.5	0.2	5.47	6.73
13:25	358	301.3	0.2	5.46	6.71
13:26	359	308.5	0.2	5.47	6.73
13:27	360	308.8	0.2	5.51	6.72
13:28	361	305.7	0.2	5.50	6.75
Uncorrected Average (C) =		305.06	0.09	5.503	6.744

**ARI ENVIRONMENTAL, INC.**  
**MOISTURE CALCULATION SUMMARY**

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**TEST DATE:** 6/16/2011  
**RUN NUMBER:** 544SRU-0011-4

<b>γ FACTOR:</b>	0.999	<b>STACK DIAM:</b>	67.0 inches
<b>BAROMETRIC:</b>	29.85 in. Hg	<b>METER VOLUME:</b>	49.751 ft <sup>3</sup>
<b>STATIC PRES:</b>	-0.05 in.H <sub>2</sub> O	<b>METER TEMP:</b>	87.6 °F
<b>STACK TEMP:</b>	1116.8 °F	<b>LIQUID COLL:</b>	122.5 milliliters
<b>SQ. RT ΔP:</b>	0.3122 in.H <sub>2</sub> O	<b>CO<sub>2</sub>:</b>	6.70 % by volume
<b>ΔH:</b>	2.06 in.H <sub>2</sub> O	<b>O<sub>2</sub>:</b>	5.42 % by volume

**ENGLISH UNITS**  
**(29.92 in.Hg & °F)**

<b>VOLUME OF SAMPLE</b> <b>@ STANDARD CONDITIONS, DRY BASIS</b>	
$V_{mstd} = \left( \frac{528}{29.92} \right) \times V_m \times \gamma \left[ \frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] =$	<b>48.053 dscf</b>
$\gamma = 0.999$	
<b>VOLUME OF WATER IN SAMPLE</b> <b>@ STANDARD CONDITIONS</b>	
$V_{wstd} = 0.04707 \times V_{lc} =$	<b>5.766 scf</b>
$V_{lc} = 122.5 \text{ mL}$	
<b>FRACTIONAL MOISTURE CONTENT OF STACK GAS AS MEASURED</b>	
$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} =$	<b>0.1071</b>
<b>FRACTIONAL MOISTURE CONTENT OF STACK GAS @ SATURATION</b>	
$B_{ws@saturation} = \frac{S.V.P.}{P_{bar} + \frac{P_{static}}{13.6}} =$	<b>0.7083</b>
$S.V.P. = 21.14 \text{ in. Hg}$	
<b>FRACTIONAL MOISTURE CONTENT USED IN CALCULATIONS</b>	
$B_{ws} = 0.1071$	

**ARI ENVIRONMENTAL, INC.**  
**FLOW RATE CALCULATION SUMMARY**

**COMPANY:** Valero Port Arthur Refin  
**LOCATION:** Port Arthur, Texas  
**RUN NUMBER:** 544SRU-0011-4

**SOURCE:** SRU 544 Incinerator Stack  
**TEST DATE:** 6/16/2011

**BAROMETRIC:** 29.85 in. Hg  
**STATIC PRES:** -0.05 in.H<sub>2</sub>O  
**STACK TEMP:** 1116.8 °F  
**SQ. RT ΔP:** 0.3122 in.H<sub>2</sub>O

**STACK DIAM:** 67.0 inches  
**CO<sub>2</sub>:** 6.70 % by volume  
**O<sub>2</sub>:** 5.42 % by volume

<b>DRY MOLECULAR WEIGHT OF STACK GAS</b>			
$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$	=	29.29	lb/lb-mole
<b>MOLECULAR WEIGHT OF STACK GAS, wet basis</b>			
$M_s = M_d(1 - B_{ws}) + 18(B_{ws})$	=	28.08	lb/lb-mole
<b>PITOT TUBE COEFFICIENT</b>			
$C_p$ (from calibration curve or geometric specifications)	=	0.84	
<b>AVERAGE VELOCITY HEAD OF STACK GAS, in. H<sub>2</sub>O</b>			
$\sqrt{\Delta P} = \frac{1}{n} \sum_{i=1}^n \sqrt{\Delta p_i}$	=	0.3122	in. H <sub>2</sub> O
<b>AVERAGE ABSOLUTE STACK GAS TEMPERATURE</b>			
$T_s = 1116.8 \text{ °F} + 460$	=	1,576.8	°R
<b>ABSOLUTE STACK GAS PRESSURE</b>			
$P_s = P_{bar} + \frac{P_{static}}{13.6}$	=	29.85	in.Hg
<b>STACK GAS VELOCITY</b>			
$V_s = (85.49)(C_p)(\text{avg } \sqrt{\Delta P}) \sqrt{\frac{T_s}{(P_s)(M_s)}}$	=	30.752	ft/sec
<b>STACK GAS VOLUMETRIC FLOW RATE, actual</b>			
$Q_s = 60 \times V_s \times A_s$	=	45,175.73	acfm
Stack Area =		24.48370	ft <sup>2</sup>
<b>STACK GAS VOLUMETRIC FLOW RATE, standard conditions, wet basis</b>			
$Q_{stdw} = \left( \frac{528}{29.92} \right) (Q_s) \left( \frac{P_s}{T_s} \right)$	=	15,090.09 905,405	scfm, wb scfh, wb
<b>STACK GAS VOLUMETRIC FLOW RATE, standard conditions, dry basis</b>			
$Q_{std} = \left( \frac{528}{29.92} \right) (Q_s) \left( \frac{P_s}{T_s} \right) (1 - B_{ws})$	=	13,473.36 808,402	dscfm dscfh

## Volatile Organic HAPs Laboratory Data Summary

**Client:** Valero Port Arthur Refinery  
**Location:** Port Arthur, Texas  
**Source:** SRU 544 Incinerator Stack  
**Date:**  
**Run No:**

6/16/2011  
 SRU-18-3

Compound	Molecular Weight	Sample Train A Analysis		Sample Train B Analysis	
		(M <sub>w</sub> ) (micrograms)	% Recovery	(M <sub>w</sub> ) (micrograms)	% Recovery
<b>Acetone</b>	<b>58.08</b>	<b>232</b>		<b>306</b>	
Acetonitrile	41.05	<b>85</b>		5451	171
Acrolein	56.06	< 4.3		5463	176
Acrylonitrile	53.06	<b>4.5</b>	86	4.3	
Benzene	78.11	< 4.3	126	4.3	125
1,3-Butadiene	54.09	< 4.3			0
Carbon disulfide	76.14	< 4.3		4.3	
Chlorobenzene	112.56	< 4.3		4.3	
Cumene	120.19	< 4.3		4.3	
1,2-Dibromoethane	187.86	< 4.3	102	4.3	97
Ethylbenzene	106.17	< 4.3	129	4.3	121
Hexane	86.18	< 4.3	35	4.3	23
Methyl isobutyl ketone	100.16	< 4.3		3935	130
Methyl t-butyl ether	88.15	< 4.3	99	4.3	100
<b>Methylene chloride</b>	<b>84.93</b>	<b>264</b>		<b>188</b>	
Nitrobenzene	123.06	< 21.5	60	21.5	90
2-Nitropropane	89.09	< 4.3	79	4.3	
Pentane	72.15	< 4.3	0		
Styrene	104.15	< 4.3	117	4.3	110
Tetrachloroethene	165.83	< 4.3		4.3	
Toluene	92.14	< 4.3		1529	110
Trichloroethene	131.39	< 4.3	102	3542	107
2,2,4 Trimethyl pentane	114.23	< 4.3	101	4.3	99
Xylenes	106.16	< 4.3		4.3	

# **VOLATILE ORGANIC HAPS CALCULATION SUMMARY**

COMPANY: Valero Port Arthur Refinery  
 LOCATION: Port Arthur, Texas  
 SOURCE: SRU 544 Incinerator Stack  
 SAMPLE: VolHAPs - Methanol Impingers  
 TEST DATE: 6/16/2011  
 RUN NO: SRU-18-3

## **INPUT**

**Q<sub>a</sub>** : 808,402 dscfh  
**P<sub>bar</sub>** : 29.85 in Hg

## **A Train:**

**V<sub>m</sub> Unspiked:** 18,821 liters  
**V<sub>m</sub> Spiked:** 19,856 liters  
**V<sub>m</sub> Unspiked:** 0.685 cubic ft  
**V<sub>m</sub> Spiked:** 0.701 cubic ft  
**Y Sample :** 1,000  
**T<sub>m</sub> Sample:** 84.3 °F  
**ΔH Sample:** 0.20 in. H<sub>2</sub>O  
**ΔH Sample:** 0.28 in. H<sub>2</sub>O

## **B Train:**

**V<sub>m</sub> Unspiked:** 18,821 liters  
**V<sub>m</sub> Spiked:** 19,856 liters  
**V<sub>m</sub> Unspiked:** 0.685 cubic ft  
**V<sub>m</sub> Spiked:** 0.701 cubic ft  
**Y Sample :** 1,000  
**T<sub>m</sub> Sample:** 83.2 °F  
**ΔH Sample:** 0.28 in. H<sub>2</sub>O

## **Volume of sample at standard**

**conditions on dry basis**

**V<sub>std</sub> Train A (V<sub>s</sub>) = (17.647)(V<sub>m</sub>)(Y<sub>d</sub>)(P<sub>bar</sub>ΔH/13.6)/(T<sub>m</sub>)**  
**V<sub>std</sub> Train A (V<sub>std</sub>) = dscf x 28.32**  
**V<sub>std</sub> Train B (V<sub>s</sub>) = (17.647)(V<sub>m</sub>)(Y<sub>d</sub>)(P<sub>bar</sub>ΔH/13.6)/(T<sub>m</sub>)**  
**V<sub>std</sub> Train B (V<sub>std</sub>) = dscf x 28.32**

English units  
 (29.92 in. Hg 68°F)

= 0.643 dscf  
 = 18.223 std liters  
 = 0.680 dscf  
 = 19.268 std liters

Compound	Molecular Weight	Mass/Volume (M <sub>v</sub> ) (μg/liter)	A TRAIN				B TRAIN				AVERAGE	
			VOC Concentration (lb/dscf)	VOC Concentration (ppb)	VOC Concentration (μg/dscm)	VOC Emission (lb/hr)	VOC Concentration (lb/dscf)	VOC Concentration (ppb)	VOC Concentration (μg/dscm)	VOC Emission (lb/hr)	VOC Concentration (μg/dscm)	VOC Emission (lb/hr)
Acetone	58.08	12.7199	7.9415E-07	5.268	12,720	0.64199	9.9152E-07	6,577	15,881	0.80154	14,300	0.72177
Acetonitrile	41.05	4.6863	2.9258E-07	2,746	4,686	0.23652			4,686	0.23652		
Acrolein	56.06	< 0.2360	< 1.4732E-08	< 101	< 236	< 0.01191			< 236	< 0.01191		
Acrylonitrile	53.06	0.2469	1.5417E-08	112	247	0.01246	1.3933E-08	101	223	0.01126	235	0.01186
1,3-Butadiene	54.09	< 0.2360	< 1.4732E-08	< 105	< 236	< 0.01191	< 0.0000E+00	< 0	< 0	< 0.00000	< 118	< 0.00595
Carbon disulfide	76.14	< 0.2360	< 1.4732E-08	< 75	< 236	< 0.01191	< 1.3933E-08	< 70	< 230	< 0.01126	< 230	< 0.01159
Chlorobenzene	112.56	< 0.2360	< 1.4732E-08	< 50	< 236	< 0.01191	< 1.3933E-08	< 48	< 223	< 0.01126	< 230	< 0.01159
Cumene	120.19	< 0.2360	< 1.4732E-08	< 47	< 236	< 0.01191	< 1.3933E-08	< 45	< 223	< 0.01126	< 230	< 0.01159
1,2-Dibromoethane	187.86	< 0.2360	< 1.4732E-08	< 30	< 236	< 0.01191	< 1.3933E-08	< 29	< 223	< 0.01126	< 230	< 0.01159
Ethylbenzene	106.17	< 0.2360	< 1.4732E-08	< 53	< 236	< 0.01191	< 1.3933E-08	< 51	< 230	< 0.01126	< 230	< 0.01159
Hexane	86.18	< 0.2360	< 1.4732E-08	< 66	< 236	< 0.01191	< 1.3933E-08	< 62	< 223	< 0.01126	< 230	< 0.01159
Methyl Isobutyl ketone	100.16	< 0.2360	< 1.4732E-08	< 57	< 236	< 0.01191			< 236	< 0.01191		
Methyl t-butyl ether	88.15	< 0.2360	< 1.4732E-08	< 64	< 236	< 0.01191			< 230	< 0.01159		
Methylene chloride	94.93	14.4704	9.0344E-07	4,098	14,470	0.73034	6.0917E-07	2,763	9,757	0.49245	12,114	0.61140
Nitrobenzene	123.06	< 1.1798	< 7.9659E-08	< 231	< 1180	< 0.05955	< 1.158	< 5.9665E-08	< 116	< 0.05632	< 1148	< 0.06793
2-Nitropropane	89.09	< 0.2360	< 1.4732E-08	< 64	< 236	< 0.01191	< 1.3933E-08	< 60	< 223	< 0.01126	< 230	< 0.01159
Pentane	72.15	< 0.2360	< 1.4732E-08	< 79	< 236	< 0.01191	< 0.0000E+00	< 0	< 0	< 0.00000	< 118	< 0.00595
Styrene	104.15	< 0.2360	< 1.4732E-08	< 54	< 236	< 0.01191	< 1.3933E-08	< 52	< 223	< 0.01126	< 230	< 0.01159
Tetrachloroethene	165.83	< 0.2360	< 1.4732E-08	< 34	< 236	< 0.01191	< 1.3933E-08	< 32	< 223	< 0.01126	< 230	< 0.01159
Toluene	92.14	< 0.2360	< 1.4732E-08	< 62	< 236	< 0.01191			< 236	< 0.01191		
Trichloroethene	131.39	< 0.2360	< 1.4732E-08	< 43	< 236	< 0.01191			< 236	< 0.01191		
2,2,4 Trimethyl pentane	114.23	< 0.2360	< 1.4732E-08	< 50	< 236	< 0.01191	< 1.3933E-08	< 47	< 223	< 0.01126	< 230	< 0.01159
Xylenes	106.16	< 0.2360	< 1.4732E-08	< 53	< 236	< 0.01191	< 1.3933E-08	< 51	< 223	< 0.01126	< 230	< 0.01159

## ALDEHYDES CALCULATION SUMMARY

**COMPANY:** Valero Port Arthur Refinery

**LOCATION:** Port Arthur, Texas

**SOURCE:** SRU 544 Incinerator Stack

**TEST DATE:** 6/16/2011

**RUN NO:** 544SRU-0011-4

### INPUT

<b>V<sub>m</sub>:</b>	49.751 ft <sup>3</sup>	<b>Q<sub>s</sub>:</b>	808,402 dscfh
<b>γ FACTOR:</b>	0.999	<b>T<sub>s</sub>:</b>	1,116.8 °F
<b>P<sub>bar</sub>:</b>	29.85 in. Hg	<b>Θ:</b>	60.0 minutes
<b>ΔH:</b>	2.06	<b>V<sub>s</sub>:</b>	30.752 fps
<b>T<sub>m</sub>:</b>	87.6 °F	<b>P<sub>s</sub>:</b>	29.85 in. Hg
<b>Formaldehyde:</b>	< 115 μg	<b>V<sub>lc</sub>:</b>	122.5 mL
<b>Acetaldehyde:</b>	< 22 μg	<b>%O<sub>2</sub>:</b>	5.42 %
<b>Propanal:</b>	< 115 μg		

<b>Volume of Sample at Standard Conditions on a Dry Basis:</b>		<b>English Units (29.92 in. Hg, 68 °F)</b>	
$V_{mstd} = \left( \frac{528}{29.92} \right) \times V_m \times \gamma \left[ \frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right]$		=	48.053 dscf
<b>Isokinetic Sampling Rate</b>			
$\%ISO = \frac{(100)(T_s) \left[ (0.002669 \times V_{lc}) + \left( \frac{V_m}{T_m} \right) \left( \gamma \left( P_{bar} + \left( \frac{\Delta H}{13.6} \right) \right) \right) \right]}{(60)(\theta)(V_s)(P_s)(A_n)}$		=	103.4 % I
A <sub>n</sub> =	0.00140752 ft <sup>2</sup>	Runtime (θ) =	60 minutes
<b>Total μg Formaldehyde in sample (M<sub>n</sub>)</b>		=	< 115 μg
<b>Total μg Acetaldehyde in sample (M<sub>n</sub>)</b>		=	< 22 μg
<b>Total μg Propanal in sample (M<sub>n</sub>)</b>		=	< 115 μg
<b>Concentration of Aldehydes</b>		<b>× 10<sup>-6</sup> lb/dscf</b>	
C <sub>s(lb/dscf)</sub> = $\frac{(2.2046 \times 10^{-9} \text{ lb/μg})(M_n)}{V_{mstd}}$		=	< 0.0053 formaldehyde
		=	< 0.0010 acetaldehyde
		=	< 0.0053 propanal
		<b>μg/dscm</b>	
C <sub>s(μg/dscm)</sub> = $\frac{(M_n)(35.31 \text{ ft}^3/\text{m}^3)}{(V_{mstd})}$		=	< 84.5 formaldehyde
		=	< 16.2 acetaldehyde
		=	< 84.5 propanal
<b>Aldehydes Mass Rate:</b>		<b>lb/hr</b>	
E = Q <sub>s</sub> × C <sub>s(lb/dscf)</sub>		=	< 0.0043 formaldehyde
		=	< 0.0008 acetaldehyde
		=	< 0.0043 propanal

**ARI ENVIRONMENTAL, INC.**  
**MOISTURE CALCULATION SUMMARY**

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**TEST DATE:** 6/16/2011  
**RUN NUMBER:** 544SRU-0010-1

<b>γ FACTOR:</b>	0.999	<b>STACK DIAM:</b>	67.000 inches
<b>BAROMETRIC:</b>	29.85 in. Hg	<b>METER VOLUME:</b>	194.441 ft <sup>3</sup>
<b>STATIC PRES:</b>	-0.050 in.H <sub>2</sub> O	<b>METER TEMP:</b>	91.8 °F
<b>STACK TEMP:</b>	1117.3 °F	<b>LIQUID COLL:</b>	511.8 milliliters
<b>SQ.RT ΔP:</b>	0.3041 in.H <sub>2</sub> O	<b>CO<sub>2</sub>:</b>	6.70 % by volume
<b>ΔH:</b>	1.96 in.H <sub>2</sub> O	<b>O<sub>2</sub>:</b>	5.42 % by volume

**ENGLISH UNITS**  
**(29.92 in.Hg & 68 °F)**

**VOLUME OF SAMPLE**

**@ STANDARD CONDITIONS, DRY BASIS**

$$V_{mstd} = \left( \frac{528}{29.92} \right) \times V_m \times \gamma \left[ \frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = 186.329 \text{ dscf}$$

$\gamma = 0.999$

**VOLUME OF WATER IN SAMPLE**

**@ STANDARD CONDITIONS**

$$V_{wstd} = 0.04707 \times V_{lc} = 24.090 \text{ scf}$$

$V_{lc} = 511.8 \text{ mL}$

**FRACTIONAL MOISTURE CONTENT OF STACK GAS AS MEASURED**

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} = 0.1145$$

**FRACTIONAL MOISTURE CONTENT OF STACK GAS @ SATURATION**

$$B_{ws@saturation} = \frac{S.V.P.}{P_{bar} + \frac{P_{static}}{13.6}} = 0.7083$$

$S.V.P. = 21.14 \text{ in. Hg}$

**FRACTIONAL MOISTURE CONTENT USED IN CALCULATIONS**

$$B_{ws} = 0.1145$$

**ARI ENVIRONMENTAL, INC.**  
**FLOW RATE CALCULATION SUMMARY**

**COMPANY:** Valero Port Arthur Refin  
**LOCATION:** Port Arthur, Texas  
**RUN NUMBER:** 544SRU-0010-1

**SOURCE:** SRU 544 Incinerator Stack  
**TEST DATE:** 6/16/2011

**BAROMETRIC:** 29.85 in. Hg  
**STATIC PRES:** -0.05 in.H<sub>2</sub>O  
**STACK TEMP:** 1117.3 °F  
**SQ.RT ΔP:** 0.3041 in.H<sub>2</sub>O

**STACK DIAM:** 67.000 inches  
**CO<sub>2</sub>:** 6.70 % by volume  
**O<sub>2</sub>:** 5.42 % by volume

<b>DRY MOLECULAR WEIGHT OF STACK GAS</b>			
$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$	=	29.289	lb/lb-mole
<b>MOLECULAR WEIGHT OF STACK GAS, wet basis</b>			
$M_s = M_d(1 - B_{ws}) + 18B_{ws}$	=	27.996	lb/lb-mole
<b>PITOT TUBE COEFFICIENT</b>			
$C_p$ (from calibration curve or geometric specifications)	=	0.84	
<b>AVERAGE VELOCITY HEAD OF STACK GAS, in. H<sub>2</sub>O</b>			
$\sqrt{\Delta P} = \frac{1}{n} \sum_{i=1}^n \sqrt{\Delta p_i}$	=	0.3041	in. H <sub>2</sub> O
<b>AVERAGE ABSOLUTE STACK GAS TEMPERATURE</b>			
$T_s = 1117.3 \text{ °F} + 460$	=	1,577.3	°R
<b>ABSOLUTE STACK GAS PRESSURE</b>			
$P_s = P_{bar} + \frac{P_{static}}{13.6}$	=	29.85	in.Hg
<b>STACK GAS VELOCITY</b>			
$V_s = (85.49)(C_p)(\text{avg } \sqrt{\Delta P}) \sqrt{\frac{T_s}{(P_s)(M_s)}}$	=	30.003	ft/sec
<b>STACK GAS VOLUMETRIC FLOW RATE, actual</b>			
$Q_s = 60 \times V_s \times A_s$	=	44,076	acfm
Stack Area =		24.4837	ft <sup>2</sup>
<b>STACK GAS VOLUMETRIC FLOW RATE, standard conditions, wet basis</b>			
$Q_{stdw} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)$	=	14,718.0 883,080	scfm, wb scfh, wb
<b>STACK GAS VOLUMETRIC FLOW RATE, standard conditions, dry basis</b>			
$Q_{std} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)(1 - B_{ws})$	=	13,033.0 781,978	dscfm dscfh



# METHANOL CALCULATION SUMMARY

COMPANY: Valero Port Arthur Refinery  
LOCATION: Port Arthur, Texas  
SOURCE: 544 SRU Incinerator Stack  
SAMPLE: Methanol  
TEST DATE: 6/16/2011  
RUN NO: SRU-308-3

## INPUT

$Q_g$  : 781,978 dscfh  
 $P_{bar}$  : 29.85 in Hg

## Spiked Train:

$V_m$  Spiked: 60.051 liters  
 $V_m$  Spiked: 2.120 cubic ft  
 $Y$  Spiked : 1.000  
 $T_m$  Spiked: 84.6 °F  
 $\Delta H$  Spiked: 0.59 in. H<sub>2</sub>O

## Unspiked Train:

$V_m$  Unspiked: 60.752 liters  
 $V_m$  Unspiked: 2.145 cubic ft  
 $Y$  Sample : 1.000  
 $T_m$  Sample: 85.8 °F  
 $\Delta H$  Sample: 0.47 in. H<sub>2</sub>O

## Volume of sample at standard

### conditions on dry basis

$V_{msld} \text{ Spiked } (V_s) = (17.647)(V_m)(Y_d)(P_{bar} + \Delta H / 13.6) / (T_m)$   
 $V_{msld} \text{ Spiked } (V_{s-liters}) = \text{dscf} \times 28.32$   
 $V_{msld} \text{ Unspiked } (V_u) = (17.647)(V_m)(Y_d)(P_{bar} + \Delta H / 13.6) / (T_m)$   
 $V_{msld} \text{ Unspiked } (V_{u-liters}) = \text{dscf} \times 28.32$

## English units

(29.92 in. Hg 68° F)  
= 2.054 dscf  
= 58.169 std liters  
= 2.073 dscf  
= 58.701 std liters

## Recovery Calculations

$M_v = (M_v / V_{s-liters}) - (M_u / V_{u-liters})$   
 $R = (M_v * V_{s-liters}) / S$

## VOC Concentration

$C_s = 2.2046 \times 10^{-9} \text{ lb}/\mu\text{g} \times M_u / V_u$   
Reported  $C_s = C_s / R$   
ppb =  $C_s * (385.26 \times 10^9 / \text{MW})$   
Reported ppb = ppb/R

## Stack gas volume flow rate

$Q_s = \text{dscfh}$

## Stack VOC emission rate

$Q_s \times C_s$

Compound	Molecular Weight	Mass/volume (M <sub>v</sub> ) (μg/liter)	Fraction of Spike Recovered R (fractional)	VOC Concentration (lb/dscf)	VOC Concentration (ppb)	Reported VOC Concentration (lb/dscf)	Reported VOC Concentration (ppb)	Reported VOC Concentration (μg/dscm)	Reported VOC Emission (lb/hr)
Methanol	32.04	-42.5	-7.79	3.3875E-06	40.733	-4.3513E-07	-5.232	-6.969.4	-0.34026

## METHOD 0010 ISOKINETIC CALCULATION SUMMARY

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**TEST DATE:** 6/16/2011  
**RUN NO:** 544SRU-0010-1

### INPUT

<b>V<sub>m</sub>:</b>	194.441 ft <sup>3</sup>	<b>Q<sub>s</sub>:</b>	781,978 dscfh
<b>γ FACTOR:</b>	0.999	<b>T<sub>s</sub>:</b>	1,117.3 °F
<b>P<sub>bar</sub>:</b>	29.85 in. Hg	<b>Θ:</b>	240 minutes
<b>ΔH:</b>	1.96 in. H <sub>2</sub> O	<b>V<sub>s</sub>:</b>	30.003 fps
<b>T<sub>m</sub>:</b>	91.8 °F	<b>P<sub>s</sub>:</b>	29.85 in. Hg
		<b>V<sub>ic</sub>:</b>	511.8 mL

**Volume of Sample at Standard  
 Conditions on a Dry Basis:**

**English Units  
 (29.92 in. Hg, 68 °F)**

$$V_{\text{mstd}} = \left( \frac{528}{29.92} \right) \times V_m \times \gamma \left[ \frac{P_{\text{bar}} + \frac{\Delta H}{13.6}}{T_m} \right] = 186.329 \text{ dscf}$$

**Isokinetic Sampling Rate**

$$\% \text{ISO} = \frac{(100)(T_s) \left[ (0.002669 \times V_{\text{ic}}) + \left( \frac{V_m}{T_m} \right) (\gamma) \left( P_{\text{bar}} + \left( \frac{\Delta H}{13.6} \right) \right) \right]}{(60)(\theta)(V_s)(P_s)(A_n)} = 103.63 \% \text{ I}$$

A<sub>n</sub> = 0.00140752 ft<sup>2</sup>      Runtime (θ) = 240 minutes

# SVOC CALCULATION SUMMARY



COMPANY : Valero Port Arthur Refinery  
 LOCATION : Port Arthur, Texas  
 SOURCE : SRU 544 Incinerator Stack  
 TEST DATE : 6/16/2011  
 TEST RUN NO. : 544SRU-0010-1

SAMPLE VOLUME : 186.329 dscf  
 SAMPLE VOLUME : 5.277 dscm  
 GAS FLOW RATE : 781,978 dscfh  
 STACK O<sub>2</sub> CONTENT : 5.42 %

VOST COMPOUND	TOTAL SAMPLE MASS (nanogram)	MOLECULAR WEIGHT	STACK GAS CONCENTRATION (lb/dscf x 10 <sup>-3</sup> )	STACK GAS CONCENTRATION (µg/dscm)	STACK GAS CONCENTRATION (ppb)	EMISSION RATE (lb/hr x 10 <sup>-3</sup> )
Acenaphthene	< 4	154.21	< 0.000047	< 0.000758	< 0.000118	< 0.000037
Acenaphthylene	< 4	152.19	< 0.000047	< 0.000758	< 0.000120	< 0.000037
Aniline	< 1.85	93.13	< 0.000022	< 0.000351	< 0.000091	< 0.000017
Anthracene	14.6	178.23	0.000173	0.002767	0.000373	0.000135
Benzdine	< 38	184.24	< 0.000450	< 0.007201	< 0.000940	< 0.000352
Benzo[a]anthracene	< 4	228.29	< 0.000047	< 0.000758	< 0.000080	< 0.000037
Benzo[b]fluoranthene	< 4	252.31	< 0.000047	< 0.000758	< 0.000072	< 0.000037
Benzo[k]fluoranthene	< 4	252.31	< 0.000047	< 0.000758	< 0.000072	< 0.000037
Benzo[g,h,i]perylene	< 4	276.33	< 0.000047	< 0.000758	< 0.000066	< 0.000037
Benzo[a]pyrene	< 4	252.31	< 0.000047	< 0.000758	< 0.000072	< 0.000037
Benzo[e]pyrene	< 11.1	252.31	< 0.000131	< 0.002103	< 0.000201	< 0.000103
Biphenyl	< 97.3	154.21	< 0.001151	< 0.018439	< 0.002876	< 0.000900
Chrysene	< 4	228.28	< 0.000047	< 0.000758	< 0.000080	< 0.000037
Dibenz[a,h]anthracene	< 4	278.35	< 0.000047	< 0.000758	< 0.000066	< 0.000037
Dibenzofuran	< 2.3	168.19	< 0.000027	< 0.000436	< 0.000062	< 0.000021
Dibenzo(a,e)pyrene	< 4	302.37	< 0.000047	< 0.000758	< 0.000060	< 0.000037
3,3'-Dimethoxybenzidine	< 29	244.29	< 0.000343	< 0.005496	< 0.000541	< 0.000268
Dimethylaminobenzene	< 2.0	225.29	< 0.000024	< 0.000379	< 0.000040	< 0.000019
7,12-Dimethylbenz(a)anthracene	< 4	256.34	< 0.000047	< 0.000758	< 0.000071	< 0.000037
3,3'-Dimethylbenzidine	< 29	212.29	< 0.000343	< 0.005496	< 0.000623	< 0.000268
a,a-Dimethylphenethylamine	< 12	149.23	< 0.000142	< 0.002274	< 0.000367	< 0.000111
2,4-Dimethylphenol	< 2.6	122.17	< 0.000031	< 0.000493	< 0.000097	< 0.000024
Fluoranthene	< 16.1	202.26	< 0.000190	< 0.003051	< 0.000363	< 0.000149
Fluorene	44.1	166.22	0.000522	0.008357	0.001209	0.000408
Indeno(1,2,3-cd)pyrene	< 23	276.33	< 0.000272	< 0.004359	< 0.000379	< 0.000213
Isophorone	< 2.25	138.21	< 0.000027	< 0.000426	< 0.000074	< 0.000021
3-Methylcholanthrene	< 4	268.35	< 0.000047	< 0.000758	< 0.000068	< 0.000037
2-Methylnaphthalene	30	142.20	0.000355	0.005685	0.000962	0.000278
2-Methylphenol	< 2.1	108.14	< 0.000025	< 0.000398	< 0.000089	< 0.000019
3-Methylphenol & 4-Methylphenol	< 5.65	108.14	< 0.000067	< 0.001071	< 0.000238	< 0.000052
Naphthalene	972	128.17	0.011500	0.184198	0.034569	0.008993
Perylene	< 4	252.31	< 0.000047	< 0.000758	< 0.000072	< 0.000037
Phenanthrene	31.9	178.23	0.000377	0.006045	0.000816	0.000295
Phenol	27.2	94.11	0.000322	0.005155	0.001317	0.000252
1,4-Phenylenediamine	< 18	108.10	< 0.000213	< 0.003411	< 0.000759	< 0.000167
Pyrene	< 12.1	202.25	< 0.000143	< 0.002293	< 0.000273	< 0.000112
o-Toluidine	< 5	107.17	< 0.000059	< 0.000948	< 0.000213	< 0.000046

# CO CALIBRATION CORRECTION DATA SHEET USEPA METHOD 10

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**MONITOR ID:** Thermo Environmental Model 48i  
**RUN NO:** 544SRU-0010-1  
**TEST DATE:** 6/16/2011

## INPUT

CO AVERAGE CHART READING (C): 305.06 ppmv  
 AVG PRE/POST ZERO DRIFT READING (C<sub>o</sub>): 1.33 ppmv  
 CAL GAS CONCENTRATION (C<sub>ma</sub>): 250.0 ppmv  
 AVG CAL PRE/POST TEST READING (C<sub>m</sub>): 251.62 ppmv  
 STACK GAS VOLUMETRIC FLOW RATE (Q<sub>std</sub>): 781,978 dscfh

## CALCULATIONS

STACK CO AVERAGE CHART READING = 305.1 ppmv

### STACK CO CONC. CORRECTED FOR ZERO AND CALIBRATION DRIFT:

$$\text{CO CONC, ppmv} = C_{\text{gas,ppm}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 303.4 \text{ ppmv db}$$

(corrected)

CO CONC.(lbs/dscf) =

$$C_{\text{gas,lb/dscf}} = (C_{\text{gas,ppm}}) \left( \frac{28 \text{ lb / lb - mole}}{385.26 \times 10^6 \text{ ft}^3 \text{ / lb - mole}} \right) = 22.0490 \times 10^{-6} \text{ lbs/dscf}$$

### CO EMISSION RATE:

STACK GAS VOLUMETRIC FLOW RATE = 781,978 dscfh

STACK CO EMISSION RATE =

$$\text{CO}_{\text{pmr}} = (C_{\text{gas,lb/dscf}})(Q_{\text{std}}) = 17.2418 \text{ lbs/hr}$$

$$= 75.519 \text{ ton/yr}$$

## METHOD 18 METHANE (CH<sub>4</sub>) AND ETHANE (C<sub>2</sub>H<sub>6</sub>) CALCULATION SUMMARY

COMPANY: Valero Port Arthur Refinery  
LOCATION: Port Arthur, Texas  
SOURCE: SRU 544 Incinerator Stack  
RUN NUMBER: 544SRU-0010-1  
TEST DATE: 6/16/2011

### INPUT DATA

Methane (CH<sub>4</sub>) = 1.6 ppmv db  
Ethane (C<sub>2</sub>H<sub>6</sub>) = < 1.0 ppmv db  
Stack gas volumetric flow rate (Q<sub>s</sub>) = 781,978 dscfh

### CALCULATIONS

Concentration in stack gas (lb/dscf)

Methane	$C'_{\text{gas(methane)}} = \frac{(C_{\text{gas(methane)}})(16.04)}{(385.26 \times 10^6)} =$	0.06661 x 10 <sup>-6</sup> lb/dscf as methane
Ethane	$C'_{\text{gas(ethane)}} = \frac{(C_{\text{gas(ethane)}})(30.07)}{(385.26 \times 10^6)} =$	< 0.07805 x 10 <sup>-6</sup> lb/dscf as ethane

Emission rates (lb/hr)

$$E_{\text{THC(methane)}} = C'_{\text{gas(methane)}} \times Q_s = 0.05209 \text{ lb/hr of methane}$$

$$E_{\text{THC(ethane)}} = C'_{\text{gas(ethane)}} \times Q_s = < 0.06103 \text{ lb/hr of ethane}$$

## METHOD 25A TOTAL HYDROCARBON (THC) CALCULATION SUMMARY

COMPANY: Valero Port Arthur Refinery  
LOCATION: Port Arthur, Texas  
SOURCE: SRU 544 Incinerator Stack  
RUN NUMBER: 544SRU-0010-1  
TEST DATE: 6/16/2011

### INPUT DATA

THC as propane ( $C_3H_8$ ) = 0.09 ppmv wb  
0.10 ppmv db  
Stack gas volumetric flow rate ( $Q_s$ ) = 781,978 dscfh

### CALCULATIONS

THC concentration in stack gas (lb/dscf)

$$C'_{\text{gas (propane)}} = \frac{(C_{\text{gas (propane)}})(44.09)}{(385.26 \times 10^6)} = 0.01124 \times 10^{-6} \text{ lb/dscf as propane}$$

THC emission rate

$$E_{\text{THC (propane)}} = C'_{\text{gas (propane)}} \times Q_s = 0.00879 \text{ lb/hr}$$

**CARBONYL SULFIDE EMISSION RATE CALCULATION SHEET  
USEPA METHOD 15**

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**MONITOR ID:** SRI-9300B: GC-FPD  
**RUN NO:** SRU-15-1  
**TEST DATE:** 6/16/2011

**INPUT**

---

COS CONCENTRATION (C): < 0.25 ppmv  
STACK GAS VOLUMETRIC FLOW RATE ( $Q_{std}$ ): 781,978 dscfh

**CALCULATIONS**

---

STACK COS AVERAGE CHART READING = < 0.25 ppmv

**COS CONCENTRATION (lbs/dscf) =**

$$C_{gas, lb/dscf} = (C_{gas, ppm}) \left( \frac{60.07 lb / lb - mole}{385.26 \times 10^{-6} ft^3 / lb - mole} \right) = < 0.0390 \times 10^{-6} \text{ lbs/dscf}$$

**COS EMISSION RATE:**

---

STACK GAS VOLUMETRIC FLOW RATE = 781,978 dscfh

STACK COS EMISSION RATE =

$$COS_{pmr} = (C_{gas, lb/dscf})(Q_{std}) = < 0.0305 \text{ lbs/hr}$$
$$= < 0.134 \text{ ton/yr}$$

# HYDROGEN SULFIDE EMISSION RATE CALCULATION SHEET

## USEPA METHOD 15

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**MONITOR ID:** SRI-9300B: GC-FPD  
**RUN NO:** SRU-15-1  
**TEST DATE:** 6/16/2011

### INPUT

H<sub>2</sub>S CONCENTRATION (C): < 0.25 ppmv  
STACK GAS VOLUMETRIC FLOW RATE (Q<sub>std</sub>): 781,978 dscfh

### CALCULATIONS

STACK H<sub>2</sub>S AVERAGE CHART READING = < 0.25 ppmv

H<sub>2</sub>S CONCENTRATION (lbs/dscf) =

$$C_{\text{gas, lb/dscf}} = (C_{\text{gas, ppm}}) \left( \frac{34.08 \text{ lb / lb - mole}}{385.26 \times 10^{-6} \text{ ft}^3 \text{ / lb - mole}} \right) = < 0.0221 \times 10^{-6} \text{ lbs/dscf}$$

### H<sub>2</sub>S EMISSION RATE:

STACK GAS VOLUMETRIC FLOW RATE = 781,978 dscfh

STACK H<sub>2</sub>S EMISSION RATE =

$$H_2S_{\text{pmr}} = (C_{\text{gas, lb/dscf}})(Q_{\text{std}}) = < 0.0173 \text{ lbs/hr}$$
$$= < 0.076 \text{ ton/yr}$$

**CARBON DISULFIDE EMISSION RATE CALCULATION SHEET**  
**USEPA METHOD 15**

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**MONITOR ID:** SRI-9300B: GC-FPD  
**RUN NO:** SRU-15-1  
**TEST DATE:** 6/16/2011

**INPUT**

---

CS<sub>2</sub> CONCENTRATION (C): < 0.25 ppmv  
STACK GAS VOLUMETRIC FLOW RATE (Q<sub>std</sub>): 781,978 dscfh

**CALCULATIONS**

---

STACK CS<sub>2</sub> AVERAGE CHART READING = < 0.25 ppmv

**CS<sub>2</sub> CONCENTRATION (lbs/dscf) =**

$$C_{\text{gas, lb/dscf}} = (C_{\text{gas, ppm}}) \left( \frac{76.1 \text{ lb / lb - mole}}{385.26 \times 10^{-6} \text{ ft}^3 \text{ / lb - mole}} \right) = < 0.0494 \times 10^{-6} \text{ lbs/dscf}$$

**CS<sub>2</sub> EMISSION RATE:**

---

STACK GAS VOLUMETRIC FLOW RATE = 781,978 dscfh

STACK CS<sub>2</sub> EMISSION RATE =

$$CS_{2\text{pmr}} = (C_{\text{gas, lb/dscf}})(Q_{\text{std}}) = < 0.0386 \text{ lbs/hr}$$
$$= < 0.169 \text{ ton/yr}$$

**TRS as SO<sub>2</sub> EMISSION RATE CALCULATION SHEET**  
**USEPA METHOD 15**

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**MONITOR ID:** SRI-9300B: GC-FPD  
**RUN NO:** SRU-15-1  
**TEST DATE:** 6/16/2011

**INPUT**

---

COS CONCENTRATION (C): < 0.25 ppmv  
CS<sub>2</sub> CONCENTRATION (C): < 0.25 ppmv  
H<sub>2</sub>S CONCENTRATION (C): < 0.25 ppmv  
STACK GAS VOLUMETRIC FLOW RATE (Q<sub>std</sub>): 781,978 dscfh

**CALCULATIONS**

---

AVERAGE STACK TRS as SO<sub>2</sub> = < 1.00 ppmv

**TRS as SO<sub>2</sub> CONCENTRATION (lbs/dscf) =**

$$C_{\text{gas, lb/dscf}} = (C_{\text{gas, ppm}}) \left( \frac{64 \text{ lb / lb - mole}}{385.26 \times 10^{-6} \text{ ft}^3 \text{ / lb - mole}} \right) = < 0.1661 \times 10^{-6} \text{ lbs/dscf}$$

**TRS as SO<sub>2</sub> EMISSION RATE:**

---

STACK GAS VOLUMETRIC FLOW RATE = 781,978 dscfh

STACK TRS as SO<sub>2</sub> EMISSION RATE =

$$\text{TRS}_{\text{pmr}} = (C_{\text{gas, lb/dscf}})(Q_{\text{std}}) = < 0.1299 \text{ lbs/hr}$$
$$= < 0.569 \text{ ton/yr}$$

**Company:** Valero Port Arthur Refinery  
**Location:** Port Arthur, Texas  
**Source:** SRU 544 Incinerator Stack  
**Test Date:** 6/16/2011  
**Run # :** SRU-16A-1

**Laboratory Analysis of Hydrogen Peroxide (H<sub>2</sub>O<sub>2</sub>) for SO<sub>2</sub>:**

**Standardization of Barium Chloride**

H <sub>2</sub> SO <sub>4</sub> used:	25.00 ml
BaCl used:	25.20 ml
Normality of BaCl <sub>2</sub> titrant:	0.00992 N
Volume of Blank titrant used:	0.1 milliliters

**Titration of Sample**

	<u>SRU-16A-1</u>	<u>SRU-16A-1RS</u>
Volume of Sample:	100 milliliters	100 milliliters
Volume of Sample Aliquot:	20 milliliters	20 milliliters

**1<sup>st</sup> titration**

Volume of BaCl <sub>2</sub> titrant used:	0.2 milliliters	2.5 milliliters
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**2<sup>nd</sup> titration**

Volume of BaCl <sub>2</sub> titrant used:	0.2 milliliters	2.4 milliliters
---	-----------------	-----------------

# USEPA METHOD 16A: TOTAL REDUCED SULFUR CALCULATION SHEET

**Company:** Valero Port Arthur Refinery  
**Location:** Port Arthur, Texas  
**Source:** SRU 544 Incinerator Stack  
**Test Date:** 6/16/2011  
**Run #:** SRU-16A-1

## Raw Test Data:

SRU-16A-1		SRU-16A-1RS	
V <sub>m</sub> :	13.125 ft <sup>3</sup>	V <sub>m</sub> :	2.579 ft <sup>3</sup>
Y <sub>d</sub> :	1.000 dimensionless	Y <sub>d</sub> :	1.000 dimensionless
P <sub>bar</sub> :	29.85 in.Hg	P <sub>bar</sub> :	29.85 in.Hg
ΔH:	0.24 in.H <sub>2</sub> O	ΔH:	0.10 in.H <sub>2</sub> O
T <sub>m</sub> :	98.3 °F	T <sub>m</sub> :	103.0 °F
Q <sub>s</sub> :	781,978 dscfh	C <sub>RG (act)</sub> :	20.0 ppm

## Laboratory Analysis of Hydrogen Peroxide (H<sub>2</sub>O<sub>2</sub>) for SO<sub>2</sub>:

	SRU-16A-1	SRU-16A-1RS
Normality of BaCl <sub>2</sub> titrant:	0.00992 N	0.00992 N
Volume of Sample:	100 milliliters	100 milliliters
Volume of Sample Aliquot:	20 milliliters	20 milliliters
Volume of BaCl <sub>2</sub> titrant used:	0.20 milliliters	2.45 milliliters
Volume of Blank titrant used:	0.1 milliliters	0.1 milliliters

## Calculations:

Volume of sample at standard conditions on dry basis:

$$V_{mstd} = \left( \frac{528}{29.92} \right) \times V_m \times \gamma \left[ \frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = \begin{matrix} \text{English Units} \\ (29.92 \text{ in. Hg, } 68^\circ \text{ F}) \\ 12.391 \text{ dscf} \\ 350.850 \text{ liters} \end{matrix}$$

Volume of recovery sample at standard conditions on dry basis:

$$V_{mstd} = \left( \frac{528}{29.92} \right) \times V_m \times \gamma \left[ \frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = \begin{matrix} 2.413 \text{ dscf} \\ 68.328 \text{ liters} \end{matrix}$$

Concentration of TRS as SO<sub>2</sub> in Sample

$$C_{TRS} = \frac{(12025)(N)(V_i - V_b) \left( \frac{V_{so/in}}{V_a} \right)}{V_{mstd}} = 0.170 \text{ ppmv db TRS as SO}_2$$

Concentration of TRS as SO<sub>2</sub> in Recovery Sample

$$C_{RG(m)} = \frac{(12025)(N)(V_i - V_b) \left( \frac{V_{so/in}}{V_a} \right)}{V_{mstd}} = 20.515 \text{ ppmv db TRS as SO}_2$$

Recovery Efficiency for the System Performance Check

$$R = \frac{C_{RG(m)}}{C_{RG(act)}} \times 100 = 102.57 \%$$

## MONITOR DATA SUMMARY

COMPANY : Valero Port Arthur Refinery  
 SOURCE : SRU544 Incinerator Exhaust  
 REPETITION : 544SRU-16A, 0010-2  
 TEST DATE : 6/16/2011  
 START TIME : 13:58  
 END TIME : 18:08

GAS ANALYZER O<sub>2</sub>

SPAN VALUE : 10.00 %  
 AVERAGE CAL. BIAS (C<sub>m</sub>): 5.084  
 AVERAGE ZERO BIAS (C<sub>o</sub>): 0.100  
 CALIBRATION GAS: EPA Protocol O<sub>2</sub>  
 CALIBRATION % (C<sub>ma</sub>): 5.00  
 % CORRECTED (C<sub>gas</sub>): 5.40

GAS ANALYZER CO<sub>2</sub>

SPAN VALUE : 8.63 %  
 AVERAGE CAL. BIAS (C<sub>m</sub>): 4.411  
 AVERAGE ZERO BIAS (C<sub>o</sub>): 0.133  
 CALIBRATION GAS: EPA Protocol CO<sub>2</sub>  
 CALIBRATION % (C<sub>ma</sub>): 4.32  
 % CORRECTED (C<sub>gas</sub>): 6.66

GAS ANALYZER CO

SPAN VALUE : 500 ppm  
 AVERAGE CAL. BIAS (C<sub>m</sub>): 252.84  
 AVERAGE ZERO BIAS (C<sub>o</sub>): 0.42  
 CALIBRATION GAS: EPA Protocol CO  
 CALIBRATION PPM (C<sub>ma</sub>): 250.0  
 PPM CORRECTED (C<sub>gas</sub>): 300.0

GAS ANALYZER VOCs

SPAN VALUE : 90 ppm  
 AVERAGE CAL. BIAS (C<sub>m</sub>): 29.86  
 AVERAGE ZERO BIAS (C<sub>o</sub>): 0.49  
 CALIBRATION GAS: EPA Protocol C<sub>3</sub>H<sub>8</sub>  
 CALIBRATION ppm (C<sub>ma</sub>): 30.0  
 ppm CORRECTED (C<sub>gas</sub>): -0.1

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

CLOCK TIME	ELAPSED TIME	CO	C <sub>3</sub> H <sub>8</sub>	O <sub>2</sub>	CO <sub>2</sub>
13:58	0	---	---	---	---
13:59	1	295.2	0.3	5.49	6.71
14:00	2	297.6	0.3	5.48	6.71
14:01	3	299.9	0.3	5.49	6.70
14:02	4	299.3	0.3	5.42	6.76
14:03	5	310.5	0.3	5.47	6.68
14:04	6	316.3	0.4	5.48	6.73
14:05	7	302.4	0.3	5.46	6.70
14:06	8	307.4	0.4	5.47	6.73
14:07	9	309.3	0.4	5.50	6.70
14:08	10	305.4	0.4	5.53	6.71
14:09	11	294.0	0.4	5.50	6.71
14:10	12	293.2	0.4	5.53	6.72
14:11	13	288.7	0.4	5.50	6.69
14:12	14	291.8	0.4	5.48	6.74
14:13	15	298.6	0.4	5.49	6.71
14:14	16	303.6	0.4	5.52	6.73
14:15	17	286.9	0.4	5.46	6.71
14:16	18	289.3	0.4	5.44	6.77
14:17	19	304.1	0.4	5.46	6.73
14:18	20	319.7	0.4	5.53	6.71
14:19	21	308.1	0.5	5.49	6.72
14:20	22	312.5	0.4	5.50	6.71
14:21	23	314.1	0.4	5.52	6.71
14:22	24	312.6	0.4	5.49	6.75
14:23	25	303.7	0.5	5.53	6.70
14:24	26	296.7	0.4	5.51	6.74
14:25	27	289.9	0.4	5.53	6.70
14:26	28	275.7	0.4	5.45	6.75
14:27	29	276.7	0.4	5.45	6.73
14:28	30	289.2	0.3	5.47	6.72
14:29	31	300.2	0.4	5.49	6.72
14:30	32	309.8	0.4	5.47	6.70
14:31	33	326.5	0.3	5.53	6.67
14:32	34	322.9	0.4	5.48	6.71
14:33	35	324.9	0.4	5.52	6.69
14:34	36	312.4	0.4	5.51	6.73
14:35	37	291.6	0.4	5.46	6.72
14:36	38	294.2	0.4	5.48	6.72
14:37	39	280.6	0.4	5.45	6.69
14:38	40	286.4	0.4	5.43	6.72
14:39	41	290.2	0.4	5.44	6.69
14:40	42	304.3	0.4	5.44	6.70
14:41	43	346.0	0.4	5.59	6.64
14:42	44	348.2	0.4	5.60	6.66
14:43	45	324.8	0.4	5.54	6.70
14:44	46	310.7	0.4	5.54	6.72
14:45	47	277.6	0.4	5.45	6.76
14:46	48	274.7	0.4	5.45	6.77
14:47	49	278.3	0.4	5.50	6.73
14:48	50	274.6	0.4	5.44	6.76
14:49	51	293.2	0.4	5.51	6.71
14:50	52	296.2	0.5	5.47	6.73
14:51	53	306.9	0.5	5.52	6.71
14:52	54	318.0	0.4	5.59	6.68
14:53	55	297.2	0.4	5.50	6.73
14:54	56	295.9	0.4	5.51	6.74
14:55	57	290.8	0.4	5.50	6.76
14:56	58	282.1	0.5	5.45	6.76
14:57	59	279.9	0.4	5.41	6.77
14:58	60	287.1	0.5	5.43	6.75
14:59	61	291.2	0.4	5.46	6.72
15:00	62	307.9	0.4	5.46	6.70
15:01	63	321.5	0.4	5.49	6.68
15:02	64	328.1	0.4	5.51	6.68
15:03	65	322.8	0.4	5.48	6.69
15:04	66	335.3	0.4	5.51	6.69
15:05	67	335.4	0.4	5.53	6.70
15:06	68	320.2	0.5	5.50	6.74
15:07	69	300.1	0.5	5.47	6.73
15:08	70	296.5	0.5	5.47	6.73
15:09	71	285.1	0.5	5.44	6.76
15:10	72	291.2	0.5	5.43	6.74
15:11	73	302.4	0.5	5.46	6.74
15:12	74	314.4	0.5	5.49	6.72
15:13	75	315.9	0.5	5.52	6.72
15:14	76	315.9	0.5	5.52	6.71
15:15	77	310.8	0.5	5.53	6.72
15:16	78	295.7	0.5	5.47	6.76
15:17	79	293.2	0.5	5.46	6.76
15:18	80	285.1	0.4	5.43	6.78
15:19	81	292.8	0.5	5.48	6.75
15:20	82	305.6	0.5	5.48	6.75
15:21	83	315.4	0.5	5.51	6.69
15:22	84	318.9	0.5	5.57	6.69

## MONITOR DATA SUMMARY

Continued (page 2 of 3): 544SRU-16A, 0010-2

CLOCK TIME ELAPSED TIME CO C<sub>2</sub>H<sub>6</sub> O<sub>2</sub> CO<sub>2</sub>

15:23	85	297.4	0.4	5.51	6.73
15:24	86	294.6	0.5	5.48	6.73
15:25	87	295.5	0.5	5.49	6.76
15:26	88	290.8	0.5	5.46	6.78
15:27	89	305.7	0.6	5.49	6.76
15:28	90	308.3	0.6	5.50	6.75
15:29	91	313.1	0.5	5.53	6.76
15:30	92	318.2	0.5	5.54	6.74
15:31	93	314.6	0.5	5.54	6.76
15:32	94	292.0	0.5	5.45	6.77
15:33	95	306.5	0.5	5.48	6.78
15:34	96	307.6	0.5	5.46	6.76
15:35	97	308.5	0.5	5.43	6.80
15:36	98	323.4	0.5	5.50	6.74
15:37	99	322.4	0.5	5.50	6.76
15:38	100	325.5	0.5	5.53	6.71
15:39	101	327.0	0.5	5.55	6.73
15:40	102	314.9	0.6	5.53	6.72
15:41	103	313.6	0.5	5.54	6.76
15:42	104	299.2	0.6	5.50	6.74
15:43	105	300.9	0.6	5.55	6.74
15:44	106	283.1	0.6	5.47	6.75
15:45	107	279.2	0.5	5.46	6.74
15:46	108	279.5	0.5	5.46	6.73
15:47	109	291.8	0.5	5.45	6.73
15:48	110	307.1	0.5	5.49	6.70
15:49	111	310.3	0.5	5.49	6.71
15:50	112	311.9	0.6	5.49	6.70
15:51	113	328.8	0.5	5.52	6.71
15:52	114	322.2	0.5	5.50	6.72
15:53	115	312.1	0.5	5.49	6.74
15:54	116	306.3	0.5	5.47	6.74
15:55	117	301.2	0.5	5.48	6.75
15:56	118	302.4	0.5	5.48	6.72
15:57	119	308.2	0.5	5.49	6.74
15:58	120	306.7	0.5	5.51	6.70
15:59	121	301.7	0.5	5.47	6.76
16:00	122	302.2	0.4	5.48	6.73
16:01	123	307.4	0.4	5.49	6.73
16:02	124	311.8	0.5	5.51	6.70
16:03	125	306.2	0.5	5.52	6.72
16:04	126	307.3	0.5	5.59	6.68
16:05	127	300.2	0.5	5.48	6.75
16:06	128	301.7	0.5	5.50	6.72
16:07	129	294.5	0.5	5.47	6.76
16:08	130	296.2	0.5	5.47	6.75
16:09	131	302.7	0.5	5.49	6.75
16:10	132	292.2	0.5	5.46	6.76
16:11	133	277.8	0.4	5.42	6.79
16:12	134	278.9	0.4	5.43	6.76
16:13	135	297.0	0.4	5.48	6.75
16:14	136	300.9	0.4	5.46	6.74
16:15	137	310.0	0.4	5.49	6.73
16:16	138	328.0	0.4	5.55	6.70
16:17	139	326.4	0.4	5.54	6.71
16:18	140	320.3	0.4	5.53	6.70
16:19	141	294.0	0.4	5.45	6.76
16:20	142	287.6	0.4	5.43	6.75
16:21	143	283.7	0.4	5.44	6.75
16:22	144	280.9	0.4	5.44	6.72
16:23	145	291.8	0.4	5.47	6.69
16:24	146	309.5	0.4	5.51	6.67
16:25	147	324.9	0.4	5.55	6.65
16:26	148	315.1	0.4	5.51	6.69
16:27	149	309.6	0.4	5.47	6.72
16:28	150	310.2	0.4	5.47	6.73
16:29	151	307.6	0.4	5.48	6.75
16:30	152	284.7	0.3	5.42	6.76
16:31	153	272.7	0.3	5.38	6.79
16:32	154	282.9	0.3	5.43	6.73
16:33	155	293.2	0.3	5.45	6.75
16:34	156	304.8	0.3	5.47	6.70
16:35	157	317.3	0.3	5.49	6.69
16:36	158	325.1	0.4	5.51	6.67
16:37	159	334.4	0.4	5.53	6.69
16:38	160	322.1	0.3	5.50	6.72
16:39	161	315.5	0.3	5.51	6.76
16:40	162	313.9	0.3	5.58	6.72
16:41	163	283.0	0.3	5.50	6.77
16:42	164	250.9	0.4	5.38	6.78
16:43	165	263.3	0.4	5.42	6.78
16:44	166	276.2	0.4	5.45	6.73
16:45	167	280.1	0.4	5.45	6.76
16:46	168	296.0	0.3	5.48	6.67
16:47	169	303.9	0.3	5.49	6.72

## MONITOR DATA SUMMARY

Continued (page 3 of 3): 544SRU-16A, 0010-2

CLOCK TIME	ELAPSED TIME	CO	C <sub>3</sub> H <sub>8</sub>	O <sub>2</sub>	CO <sub>2</sub>
16:48	170	309.3	0.3	5.50	6.68
16:49	171	315.1	0.3	5.50	6.71
16:50	172	309.6	0.3	5.49	6.71
16:51	173	303.7	0.4	5.45	6.76
16:52	174	310.3	0.3	5.50	6.71
16:53	175	293.4	0.3	5.44	6.76
16:54	176	290.0	0.3	5.45	6.69
16:55	177	284.6	0.3	5.42	6.73
16:56	178	290.6	0.3	5.44	6.66
16:57	179	325.6	0.3	5.53	6.66
16:58	180	325.5	0.3	5.52	6.66
16:59	181	318.3	0.3	5.49	6.70
17:00	182	314.3	0.3	5.48	6.71
17:01	183	317.0	0.3	5.49	6.74
17:02	184	310.4	0.3	5.49	6.72
17:03	185	317.2	0.3	5.51	6.74
17:04	186	305.3	0.3	5.45	6.75
17:05	187	318.0	0.3	5.50	6.76
17:06	188	313.3	0.3	5.48	6.73
17:07	189	313.8	0.3	5.49	6.73
17:08	190	316.3	0.3	5.54	6.69
17:09	191	306.9	0.2	5.51	6.75
17:10	192	303.1	0.3	5.55	6.72
17:11	193	292.8	0.2	5.50	6.76
17:12	194	294.9	0.2	5.50	6.78
17:13	195	289.6	0.2	5.48	6.75
17:14	196	300.8	0.2	5.53	6.75
17:15	197	278.5	0.2	5.41	6.78
17:16	198	288.0	0.2	5.42	6.78
17:17	199	317.5	0.2	5.49	6.74
17:18	200	329.9	0.1	5.53	6.72
17:19	201	328.8	0.2	5.52	6.73
17:20	202	322.6	0.2	5.52	6.73
17:21	203	310.1	0.2	5.49	6.72
17:22	204	295.2	0.2	5.45	6.76
17:23	205	282.6	0.1	5.42	6.74
17:24	206	288.8	0.2	5.44	6.77
17:25	207	291.9	0.2	5.42	6.73
17:26	208	304.8	0.2	5.46	6.74
17:27	209	311.1	0.1	5.45	6.72
17:28	210	318.0	0.2	5.48	6.70
17:29	211	322.0	0.1	5.48	6.69
17:30	212	307.2	0.1	5.50	6.75
17:31	213	322.9	0.1	5.50	6.70
17:32	214	316.5	0.1	5.48	6.74
17:33	215	314.3	0.1	5.50	6.70
17:34	216	310.3	0.1	5.50	6.75
17:35	217	306.2	0.1	5.52	6.69
17:36	218	302.5	0.1	5.51	6.75
17:37	219	294.1	0.1	5.49	6.74
17:38	220	287.1	0.1	5.44	6.79
17:39	221	292.4	0.1	5.46	6.78
17:40	222	302.1	0.1	5.49	6.79
17:41	223	300.6	0.1	5.50	6.74
17:42	224	298.9	0.1	5.50	6.77
17:43	225	289.3	0.1	5.49	6.73
17:44	226	303.6	0.1	5.51	6.73
17:45	227	296.1	0.1	5.48	6.70
17:46	228	299.9	0.1	5.50	6.71
17:47	229	297.5	0.1	5.51	6.67
17:48	230	295.3	0.1	5.46	6.73
17:49	231	302.0	0.1	5.48	6.73
17:50	232	309.8	0.1	5.48	6.74
17:51	233	314.0	0.1	5.52	6.74
17:52	234	307.3	0.1	5.50	6.77
17:53	235	303.2	0.1	5.50	6.77
17:54	236	299.2	0.1	5.47	6.78
17:55	237	309.9	0.1	5.47	6.78
17:56	238	327.9	0.2	5.51	6.79
17:57	239	329.1	0.2	5.53	6.77
17:58	240	326.6	0.1	5.52	6.79
17:59	241	327.6	0.1	5.55	6.77
18:00	242	316.1	0.1	5.53	6.78
18:01	243	303.2	0.1	5.51	6.77
18:02	244	285.6	0.1	5.51	6.76
18:03	245	275.3	0.1	5.47	6.80
18:04	246	275.2	0.1	5.48	6.75
18:05	247	286.0	0.1	5.48	6.76
18:06	248	285.1	0.1	5.49	6.69
18:07	249	289.6	0.1	5.47	6.70
18:08	250	296.5	0.1	5.48	6.66
Uncorrected Average (C) =		303.37	0.35	5.487	6.731

**ARI ENVIRONMENTAL, INC.**  
**MOISTURE CALCULATION SUMMARY**

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**TEST DATE:** 6/16/2011  
**RUN NUMBER:** 544SRU-0010-2

<b>γ FACTOR:</b>	0.999	<b>STACK DIAM:</b>	67.000 inches
<b>BAROMETRIC:</b>	29.85 in. Hg	<b>METER VOLUME:</b>	194.423 ft <sup>3</sup>
<b>STATIC PRES:</b>	-0.050 in.H <sub>2</sub> O	<b>METER TEMP:</b>	90.5 °F
<b>STACK TEMP:</b>	1111.6 °F	<b>LIQUID COLL:</b>	477.5 milliliters
<b>SQ.RT ΔP:</b>	0.3072 in.H <sub>2</sub> O	<b>CO<sub>2</sub>:</b>	6.66 % by volume
<b>ΔH:</b>	2.00 in.H <sub>2</sub> O	<b>O<sub>2</sub>:</b>	5.40 % by volume

**ENGLISH UNITS**  
**(29.92 in.Hg & 68 °F)**

<b>VOLUME OF SAMPLE</b> <b>@ STANDARD CONDITIONS, DRY BASIS</b>	
$V_{mstd} = \left( \frac{528}{29.92} \right) \times V_m \times \gamma \left[ \frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right]$	= 186.770 dscf
γ = 0.999	
<b>VOLUME OF WATER IN SAMPLE</b> <b>@ STANDARD CONDITIONS</b>	
$V_{wstd} = 0.04707 \times V_{lc}$	= 22.476 scf
V <sub>lc</sub> = 477.5 mL	
<b>FRACTIONAL MOISTURE CONTENT OF STACK GAS AS MEASURED</b>	
$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}}$	= 0.1074
<b>FRACTIONAL MOISTURE CONTENT OF STACK GAS @ SATURATION</b>	
$B_{ws@saturation} = \frac{S.V.P.}{P_{bar} + \frac{P_{static}}{13.6}}$	= 0.7083
S.V.P. = 21.14 in. Hg	
<b>FRACTIONAL MOISTURE CONTENT USED IN CALCULATIONS</b>	
B <sub>ws</sub> =	0.1074

**ARI ENVIRONMENTAL, INC.**  
**FLOW RATE CALCULATION SUMMARY**

**COMPANY:** Valero Port Arthur Refin  
**LOCATION:** Port Arthur, Texas  
**RUN NUMBER:** 544SRU-0010-2

**SOURCE:** SRU 544 Incinerator Stack  
**TEST DATE:** 6/16/2011

**BAROMETRIC:** 29.85 in. Hg  
**STATIC PRES:** -0.05 in.H<sub>2</sub>O  
**STACK TEMP:** 1111.6 °F  
**SQ.RT ΔP:** 0.3072 in.H<sub>2</sub>O

**STACK DIAM:** 67.000 inches  
**CO<sub>2</sub>:** 6.66 % by volume  
**O<sub>2</sub>:** 5.40 % by volume

<b>DRY MOLECULAR WEIGHT OF STACK GAS</b>			
$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$	=	29.28	lb/lb-mole
<b>MOLECULAR WEIGHT OF STACK GAS, wet basis</b>			
$M_s = M_d (1 - B_{ws}) + 18B_{ws}$	=	28.07	lb/lb-mole
<b>PITOT TUBE COEFFICIENT</b>			
$C_p$ (from calibration curve or geometric specifications)	=	0.84	
<b>AVERAGE VELOCITY HEAD OF STACK GAS, in. H<sub>2</sub>O</b>			
$\sqrt{\Delta P} = \frac{1}{n} \sum_{i=1}^n \sqrt{\Delta p_i}$	=	0.3072	in. H <sub>2</sub> O
<b>AVERAGE ABSOLUTE STACK GAS TEMPERATURE</b>			
$T_s = 1111.6 \text{ °F} + 460$	=	1,571.6	°R
<b>ABSOLUTE STACK GAS PRESSURE</b>			
$P_s = P_{bar} + \frac{P_{static}}{13.6}$	=	29.85	in.Hg
<b>STACK GAS VELOCITY</b>			
$V_s = (85.49)(C_p)(\text{avg } \sqrt{\Delta P}) \sqrt{\frac{T_s}{(P_s)(M_s)}}$	=	30.215	ft/sec
<b>STACK GAS VOLUMETRIC FLOW RATE, actual</b>			
$Q_s = 60 \times V_s \times A_s$	=	44,386	acfm
Stack Area =		24.4837	ft <sup>2</sup>
<b>STACK GAS VOLUMETRIC FLOW RATE, standard conditions, wet basis</b>			
$Q_{stdw} = \left( \frac{528}{29.92} \right) (Q_s) \left( \frac{P_s}{T_s} \right)$	=	14,875.5 892,529	scfm, wb scfh, wb
<b>STACK GAS VOLUMETRIC FLOW RATE, standard conditions, dry basis</b>			
$Q_{std} = \left( \frac{528}{29.92} \right) (Q_s) \left( \frac{P_s}{T_s} \right) (1 - B_{ws})$	=	13,277.6 796,659	dscfm dscfh

## METHOD 0010 ISOKINETIC CALCULATION SUMMARY

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**TEST DATE:** 6/16/2011  
**RUN NO:** 544SRU-0010-2

### INPUT

<b>V<sub>m</sub>:</b>	194.423 ft <sup>3</sup>	<b>Q<sub>s</sub>:</b>	796,659 dscfh
<b>γ FACTOR:</b>	0.999	<b>T<sub>s</sub>:</b>	1,111.6 °F
<b>P<sub>bar</sub>:</b>	29.85 in. Hg	<b>Θ:</b>	240 minutes
<b>ΔH:</b>	2.00 in. H <sub>2</sub> O	<b>V<sub>s</sub>:</b>	30.215 fps
<b>T<sub>m</sub>:</b>	90.5 °F	<b>P<sub>s</sub>:</b>	29.85 in. Hg
		<b>V<sub>ic</sub>:</b>	477.5 mL

**Volume of Sample at Standard  
 Conditions on a Dry Basis:**

**English Units  
 (29.92 in. Hg, 68 °F)**

$$V_{mstd} = \left( \frac{528}{29.92} \right) \times V_m \times \gamma \left[ \frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = 186.770 \text{ dscf}$$

**Isokinetic Sampling Rate**

$$\%ISO = \frac{(100)(T_s) \left[ (0.002669 \times V_{ic}) + \left( \frac{V_m}{T_m} \right) \left( \gamma \left( P_{bar} + \left( \frac{\Delta H}{13.6} \right) \right) \right) \right]}{(60)(\theta)(V_s)(P_s)(A_n)} = 101.96 \% I$$

A<sub>n</sub> = 0.00140752 ft<sup>2</sup>      Runtime (θ) = 60 minutes

**CO CALIBRATION CORRECTION DATA SHEET  
USEPA METHOD 10**

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**MONITOR ID:** Thermo Environmental Model 48i  
**RUN NO:** 544SRU-0010-2  
**TEST DATE:** 6/16/2011

**INPUT**

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CO AVERAGE CHART READING (C):	303.37	ppmv
AVG PRE/POST ZERO DRIFT READING (C <sub>o</sub> ):	0.42	ppmv
CAL GAS CONCENTRATION (C <sub>ma</sub> ):	250.0	ppmv
AVG CAL PRE/POST TEST READING (C <sub>m</sub> ):	252.84	ppmv
STACK GAS VOLUMETRIC FLOW RATE (Q <sub>std</sub> ):	796,659	dscfh

**CALCULATIONS**

---

STACK CO AVERAGE CHART READING = 303.37 ppmv

**STACK CO CONC. CORRECTED FOR ZERO AND CALIBRATION DRIFT:**

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$$\text{CO CONC, ppmv} = C_{\text{gas,ppm}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 300.0 \text{ ppmv db}$$

(corrected)

CO CONC.(lbs/dscf) =

$$C_{\text{gas,lb/dscf}} = (C_{\text{gas,ppm}}) \left( \frac{28 \text{ lb / lb - mole}}{385.26 \times 10^6 \text{ ft}^3 / \text{lb - mole}} \right) = 21.8069 \times 10^{-6} \text{ lbs/dscf}$$

**CO EMISSION RATE:**

---

STACK GAS VOLUMETRIC FLOW RATE = 796,659 dscfh

STACK CO EMISSION RATE =

$$\text{CO}_{\text{pmr}} = (C_{\text{gas,lb/dscf}})(Q_{\text{std}}) = 17.3727 \text{ lbs/hr}$$
$$= 76.0922 \text{ ton/yr}$$

# SVOC CALCULATION SUMMARY



COMPANY : Valero Port Arthur Refinery  
 LOCATION : Port Arthur, Texas  
 SOURCE : SRU 544 Incinerator Stack  
 TEST DATE : 6/16/2011  
 TEST RUN NO. : 544SRU-0010-2

SAMPLE VOLUME : 186.770 dscf  
 SAMPLE VOLUME : 5.289 dscm  
 GAS FLOW RATE : 796,659 dscfh  
 STACK O<sub>2</sub> CONTENT : 5.40 %

VOST COMPOUND	TOTAL SAMPLE MASS (nanogram)	MOLECULAR WEIGHT	STACK GAS CONCENTRATION (lb/dscf x 10 <sup>-6</sup> )	STACK GAS CONCENTRATION (µg/dscm)	STACK GAS CONCENTRATION (ppb)	EMISSION RATE (lb/hr x 10 <sup>-3</sup> )
Acenaphthene	< 20	154.21	< 0.000236	< 0.003781	0.000590	< 0.000188
Acenaphthylene	23.5	152.19	0.000277	0.004443	0.000702	0.000221
Aniline	< 1.85	93.13	< 0.000022	< 0.000350	0.000090	< 0.000017
Anthracene	15.8	178.23	0.000187	0.002987	0.000403	0.000149
Benzidine	< 38	184.24	< 0.000449	< 0.007184	0.000938	< 0.000357
Benzo[a]anthracene	< 4	228.29	< 0.000047	< 0.000756	0.000080	< 0.000038
Benzo[b]fluoranthene	< 4	252.31	< 0.000047	< 0.000756	0.000072	< 0.000038
Benzo[k]fluoranthene	< 4	252.31	< 0.000047	< 0.000756	0.000072	< 0.000038
Benzo[g,h,i]perylene	27.6	276.33	0.000326	0.005218	0.000454	0.000260
Benzo[a]pyrene	< 4	252.31	< 0.000047	< 0.000756	0.000072	< 0.000038
Benzo[e]pyrene	< 27.1	252.31	< 0.000320	< 0.005123	0.000488	< 0.000255
Biphenyl	< 113	154.21	< 0.001334	< 0.021363	0.003332	< 0.001063
Chrysene	< 4	228.28	< 0.000047	< 0.000756	0.000080	< 0.000038
Dibenz[a,h]anthracene	< 4	278.35	< 0.000047	< 0.000756	0.000065	< 0.000038
Dibenzofuran	< 2.3	168.19	< 0.000027	< 0.000435	0.000062	< 0.000022
Dibenzo(a,e)pyrene	< 4	302.37	< 0.000047	< 0.000756	0.000060	< 0.000038
3,3'-Dimethoxybenzidine	< 29	244.29	< 0.000342	< 0.005483	0.000540	< 0.000273
Dimethylaminobenzene	< 2	225.29	< 0.000024	< 0.000378	0.000040	< 0.000019
7,12-Dimethylbenz(a)anthracene	< 4	256.34	< 0.000047	< 0.000756	0.000071	< 0.000038
3,3'-Dimethylbenzidine	< 29	212.29	< 0.000342	< 0.005483	0.000621	< 0.000273
a,a-Dimethylphenethylamine	< 12	149.23	< 0.000142	< 0.002269	0.000366	< 0.000113
2,4-Dimethylphenol	< 2.6	122.17	< 0.000031	< 0.000492	0.000097	< 0.000024
Fluoranthene	< 8.36	202.26	< 0.000099	< 0.001581	0.000188	< 0.000079
Fluorene	37.8	166.22	0.000446	0.007146	0.001034	0.000355
Indeno(1,2,3-cd)pyrene	14.2	276.33	0.000168	0.002685	0.000234	0.000134
Isophorone	< 2.25	138.21	< 0.000027	< 0.000425	0.000074	< 0.000021
3-Methylcholanthrene	< 4	268.35	< 0.000047	< 0.000756	0.000068	< 0.000038
2-Methylnaphthalene	42.1	142.20	0.000497	0.007959	0.001346	0.000396
2-Methylphenol	< 2.1	108.14	< 0.000025	< 0.000397	0.000088	< 0.000020
3-Methylphenol & 4-Methylphenol	< 5.65	108.14	< 0.000067	< 0.001068	0.000238	< 0.000053
Naphthalene	1040	128.17	0.012276	0.196618	0.036900	0.009780
Perylene	< 4	252.31	< 0.000047	< 0.000756	0.000072	< 0.000038
Phenanthrene	39.9	178.23	0.000471	0.007543	0.001018	0.000375
Phenol	23.6	94.11	0.000279	0.004462	0.001140	0.000222
1,4-Phenylenediamine	< 18	108.10	< 0.000212	< 0.003403	0.000757	< 0.000169
Pyrene	< 8.66	202.25	< 0.000102	< 0.001637	0.000195	< 0.000081
o-Toluidine	< 5	107.17	< 0.000059	< 0.000945	0.000212	< 0.000047

## METHOD 18 METHANE (CH<sub>4</sub>) AND ETHANE (C<sub>2</sub>H<sub>6</sub>) CALCULATION SUMMARY

COMPANY: Valero Port Arthur Refinery  
LOCATION: Port Arthur, Texas  
SOURCE: SRU 544 Incinerator Stack  
RUN NUMBER: 544SRU-0010-2  
TEST DATE: 6/16/2011

### INPUT DATA

Methane (CH<sub>4</sub>) = 1.1 ppmv db  
Ethane (C<sub>2</sub>H<sub>6</sub>) = < 1.0 ppmv db  
Stack gas volumetric flow rate (Q<sub>s</sub>) = 796,659 dscfh

### CALCULATIONS

Concentration in stack gas (lb/dscf)

Methane	$C'_{\text{gas(methane)}} = \frac{(C_{\text{gas(methane)}})(16.04)}{(385.26 \times 10^6)} =$	0.04580 x 10 <sup>-6</sup> lb/dscf as methane
Ethane	$C'_{\text{gas(ethane)}} = \frac{(C_{\text{gas(ethane)}})(30.07)}{(385.26 \times 10^6)} =$	< 0.07805 x 10 <sup>-6</sup> lb/dscf as ethane

Emission rates (lb/hr)

$$E_{\text{THC(methane)}} = C'_{\text{gas(methane)}} \times Q_s = 0.03649 \text{ lb/hr of methane}$$

$$E_{\text{THC(ethane)}} = C'_{\text{gas(ethane)}} \times Q_s = < 0.06218 \text{ lb/hr of ethane}$$

## METHOD 25A TOTAL HYDROCARBON (THC) CALCULATION SUMMARY

COMPANY: Valero Port Arthur Refinery  
LOCATION: Port Arthur, Texas  
SOURCE: SRU 544 Incinerator Stack  
RUN NUMBER: 544SRU-0010-2  
TEST DATE: 6/16/2011

### INPUT DATA

THC as propane ( $C_3H_8$ ) = 0.35 ppmv wb  
0.40 ppmv db  
Stack gas volumetric flow rate ( $Q_s$ ) = 796,659 dscfh

### CALCULATIONS

THC concentration in stack gas (lb/dscf)

$$C'_{\text{gas (propane)}} = \frac{(C_{\text{gas (propane)}})(44.09)}{(385.26 \times 10^6)} = 0.04528 \times 10^{-6} \text{ lb/dscf as propane}$$

THC emission rate

$$E_{\text{THC (propane)}} = C'_{\text{gas (propane)}} \times Q_s = 0.03608 \text{ lb/hr}$$

**CARBONYL SULFIDE EMISSION RATE CALCULATION SHEET  
USEPA METHOD 15**

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**MONITOR ID:** SRI-9300B: GC-FPD  
**RUN NO:** SRU-15-2  
**TEST DATE:** 6/16/2011

**INPUT**

---

COS CONCENTRATION (C): < 0.25 ppmv  
STACK GAS VOLUMETRIC FLOW RATE (Q<sub>std</sub>): 796,659 dscfh

**CALCULATIONS**

---

STACK COS AVERAGE CHART READING = < 0.25 ppmv

**COS CONCENTRATION (lbs/dscf) =**

$$C_{\text{gas, lb/dscf}} = (C_{\text{gas, ppm}}) \left( \frac{60.07 \text{ lb / lb - mole}}{385.26 \times 10^{-6} \text{ ft}^3 \text{ / lb - mole}} \right) = < 0.0390 \times 10^{-6} \text{ lbs/dscf}$$

**COS EMISSION RATE:**

---

STACK GAS VOLUMETRIC FLOW RATE = 796,659 dscfh

STACK COS EMISSION RATE =

$$\text{COS}_{\text{pmr}} = (C_{\text{gas, lb/dscf}})(Q_{\text{std}}) = < 0.0311 \text{ lbs/hr}$$
$$= < 0.136 \text{ ton/yr}$$

# HYDROGEN SULFIDE CALIBRATION CORRECTION DATA SHEET

## USEPA METHOD 15

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**MONITOR ID:** SRI-9300B: GC-FPD  
**RUN NO:** SRU-15-2  
**TEST DATE:** 6/16/2011

### INPUT

H<sub>2</sub>S CONCENTRATION (C): < 0.25 ppmv  
STACK GAS VOLUMETRIC FLOW RATE (Q<sub>std</sub>): 796,659 dscfh

### CALCULATIONS

STACK H<sub>2</sub>S AVERAGE CHART READING = < 0.25 ppmv

H<sub>2</sub>S CONCENTRATION (lbs/dscf) =

$$C_{\text{gas, lb/dscf}} = (C_{\text{gas, ppm}}) \left( \frac{34.08 \text{ lb / lb - mole}}{385.26 \times 10^{-6} \text{ ft}^3 \text{ / lb - mole}} \right) = < 0.0221 \times 10^{-6} \text{ lbs/dscf}$$

### H<sub>2</sub>S EMISSION RATE:

STACK GAS VOLUMETRIC FLOW RATE = 796,659 dscfh

STACK H<sub>2</sub>S EMISSION RATE =

$$H_2S_{\text{pmr}} = (C_{\text{gas, lb/dscf}})(Q_{\text{std}}) = < 0.0176 \text{ lbs/hr}$$
$$= < 0.077 \text{ ton/yr}$$

**CARBON DISULFIDE EMISSION RATE CALCULATION SHEET  
USEPA METHOD 15**

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**MONITOR ID:** SRI-9300B: GC-FPD  
**RUN NO:** SRU-15-2  
**TEST DATE:** 6/16/2011

**INPUT**

---

CS<sub>2</sub> CONCENTRATION (C): < 0.25 ppmv  
STACK GAS VOLUMETRIC FLOW RATE (Q<sub>std</sub>): 796,659 dscfh

**CALCULATIONS**

---

STACK CS<sub>2</sub> AVERAGE CHART READING = < 0.25 ppmv

**CS<sub>2</sub> CONCENTRATION (lbs/dscf) =**

$$C_{\text{gas, lb/dscf}} = (C_{\text{gas, ppm}}) \left( \frac{76.1 \text{ lb/lb-mole}}{385.26 \times 10^{-6} \text{ ft}^3/\text{lb-mole}} \right) = < 0.0494 \times 10^{-6} \text{ lbs/dscf}$$

**CS<sub>2</sub> EMISSION RATE:**

---

STACK GAS VOLUMETRIC FLOW RATE = 796,659 dscfh

STACK CS<sub>2</sub> EMISSION RATE =

$$CS_{2 \text{ pmr}} = (C_{\text{gas, lb/dscf}})(Q_{\text{std}}) = < 0.0393 \text{ lbs/hr} \\ = < 0.172 \text{ ton/yr}$$

# **TRS as SO<sub>2</sub> EMISSION RATE CALCULATION SHEET** **USEPA METHOD 15**

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**MONITOR ID:** SRI-9300B: GC-FPD  
**RUN NO:** SRU-15-2  
**TEST DATE:** 6/16/2011

## **INPUT**

COS CONCENTRATION (C):	< 0.25 ppmv
CS <sub>2</sub> CONCENTRATION (C):	< 0.25 ppmv
H <sub>2</sub> S CONCENTRATION (C):	< 0.25 ppmv
STACK GAS VOLUMETRIC FLOW RATE (Q <sub>std</sub> ):	796,659 dscfh

## **CALCULATIONS**

AVERAGE STACK TRS as SO<sub>2</sub> = < 1.00 ppmv

**TRS as SO<sub>2</sub> CONCENTRATION (lbs/dscf) =**

$$C_{\text{gas, lb/dscf}} = (C_{\text{gas, ppm}}) \left( \frac{64 \text{ lb / lb - mole}}{385.26 \times 10^{-6} \text{ ft}^3 \text{ / lb - mole}} \right) = < 0.1661 \times 10^{-6} \text{ lbs/dscf}$$

**TRS as SO<sub>2</sub> EMISSION RATE:**

STACK GAS VOLUMETRIC FLOW RATE = 796,659 dscfh

STACK TRS as SO<sub>2</sub> EMISSION RATE =

$$\text{TRS}_{\text{pmr}} = (C_{\text{gas, lb/dscf}})(Q_{\text{std}}) = < 0.1323 \text{ lbs/hr}$$

$$= < 0.580 \text{ ton/yr}$$

**Company:** Valero Port Arthur Refinery  
**Location:** Port Arthur, Texas  
**Source:** SRU 544 Incinerator Stack  
**Test Date:** 6/16/2011  
**Run # :** SRU-16A-2

**Laboratory Analysis of Hydrogen Peroxide (H<sub>2</sub>O<sub>2</sub>) for SO<sub>2</sub>:**

**Standardization of Barium Chloride**

H <sub>2</sub> SO <sub>4</sub> used:	25.00 ml
BaCl used:	25.20 ml
Normality of BaCl <sub>2</sub> titrant:	0.00992 N
Volume of Blank titrant used:	0.1 milliliters

**Titration of Sample**

	<u>SRU-16A-2</u>	<u>SRU-16A-2RS</u>
Volume of Sample:	100 milliliters	100 milliliters
Volume of Sample Aliquot:	20 milliliters	20 milliliters

**1<sup>st</sup> titration**

Volume of BaCl <sub>2</sub> titrant used:	0.4 milliliters	3.9 milliliters
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**2<sup>nd</sup> titration**

Volume of BaCl <sub>2</sub> titrant used:	0.4 milliliters	3.7 milliliters
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# USEPA METHOD 16A: TOTAL REDUCED SULFUR CALCULATION SHEET

Company: Valero Port Arthur Refinery  
 Location: Port Arthur, Texas  
 Source: SRU 544 Incinerator Stack  
 Test Date: 6/16/2011  
 Run #: SRU-16A-2

## Raw Test Data:

SRU-16A-2		SRU-16A-2RS	
V <sub>m</sub> :	12.806 ft <sup>3</sup>	V <sub>m</sub> :	3.394 ft <sup>3</sup>
Y <sub>d</sub> :	1.0000 dimensionless	Y <sub>d</sub> :	1.0000 dimensionless
P <sub>bar</sub> :	29.85 in.Hg	P <sub>bar</sub> :	29.85 in.Hg
ΔH:	0.39 in.H <sub>2</sub> O	ΔH:	0.13 in.H <sub>2</sub> O
T <sub>m</sub> :	107.8 °F	T <sub>m</sub> :	99.2 °F
Q <sub>s</sub> :	796,659 dscfh	C <sub>RG (act)</sub> :	20.0 ppm

## Laboratory Analysis of Hydrogen Peroxide (H<sub>2</sub>O<sub>2</sub>) for SO<sub>2</sub>:

	SRU-16A-2	SRU-16A-2RS
Normality of BaCl <sub>2</sub> titrant:	0.00992 N	0.00992 N
Volume of Sample:	100 milliliters	100 milliliters
Volume of Sample Aliquot:	20 milliliters	20 milliliters
Volume of BaCl <sub>2</sub> titrant used:	0.40 milliliters	3.80 milliliters
Volume of Blank titrant used:	0.1 milliliters	0.1 milliliters

## Calculations:

Volume of sample at standard conditions on dry basis:

$$V_{mstd} = \left( \frac{528}{29.92} \right) \times V_m \times \gamma \left[ \frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = \begin{matrix} \text{English Units} \\ (29.92 \text{ in. Hg, } 68^\circ \text{ F}) \\ 11.892 \text{ dscf} \\ 336.731 \text{ liters} \end{matrix}$$

Volume of recovery sample at standard conditions on dry basis:

$$V_{mstd} = \left( \frac{528}{29.92} \right) \times V_m \times \gamma \left[ \frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = \begin{matrix} 3.199 \text{ dscf} \\ 90.568 \text{ liters} \end{matrix}$$

Concentration of TRS as SO<sub>2</sub>

$$C_{TRS} = \frac{(12025)(N)(V_t - V_b) \left( \frac{V_{soln}}{V_a} \right)}{V_{mstd}} = 0.531 \text{ ppmv db TRS as SO}_2$$

Concentration of TRS as SO<sub>2</sub> in Recovery Sample

$$C_{RG(m)} = \frac{(12025)(N)(V_t - V_b) \left( \frac{V_{soln}}{V_a} \right)}{V_{mstd}} = 24.368 \text{ ppmv db TRS as SO}_2$$

Recovery Efficiency for the System Performance Check

$$R = \frac{C_{RG(m)}}{C_{RG(act)}} \times 100 = 121.84 \%$$

## MONITOR DATA SUMMARY

COMPANY : Valero Port Arthur Refinery  
 SOURCE : SRU 544 Incinerator Exhaust  
 REPETITION : 544SRU-15, 16A, 0010-3  
 TEST DATE : 6/17/2011  
 START TIME : 7:28  
 END TIME : 12:07

GAS ANALYZER O<sub>2</sub>

SPAN VALUE : 10.00 %  
 AVERAGE CAL. BIAS (C<sub>m</sub>): 5.084  
 AVERAGE ZERO BIAS (C<sub>o</sub>): 0.081

CALIBRATION GAS: EPA Protocol O<sub>2</sub>  
 CALIBRATION % (C<sub>ma</sub>): 5.00  
 % CORRECTED (C<sub>gas</sub>): 5.48

GAS ANALYZER CO<sub>2</sub>

SPAN VALUE : 8.63 %  
 AVERAGE CAL. BIAS (C<sub>m</sub>): 4.341  
 AVERAGE ZERO BIAS (C<sub>o</sub>): 0.156

CALIBRATION GAS: EPA Protocol CO<sub>2</sub>  
 CALIBRATION % (C<sub>ma</sub>): 4.32  
 % CORRECTED (C<sub>gas</sub>): 6.73

GAS ANALYZER CO

SPAN VALUE : 500 ppm  
 AVERAGE CAL. BIAS (C<sub>m</sub>): 251.92  
 AVERAGE ZERO BIAS (C<sub>o</sub>): 0.62

CALIBRATION GAS: EPA Protocol CO  
 CALIBRATION PPM (C<sub>ma</sub>): 250.0  
 PPM CORRECTED (C<sub>gas</sub>): 300.4

GAS ANALYZER VOCs

SPAN VALUE : 90 ppm  
 AVERAGE CAL. BIAS (C<sub>m</sub>): 30.27  
 AVERAGE ZERO BIAS (C<sub>o</sub>): 0.54

CALIBRATION GAS: EPA Protocol C<sub>3</sub>H<sub>8</sub>  
 CALIBRATION ppm (C<sub>ma</sub>): 30.0  
 ppm CORRECTED (C<sub>gas</sub>): -0.3

$$\text{Example Calculation} = C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o}$$

CLOCK TIME	ELAPSED TIME	CO	C <sub>3</sub> H <sub>8</sub>	O <sub>2</sub>	CO <sub>2</sub>
7:28	0				
7:29	1	302.9	0.5	5.56	6.66
7:30	2	307.9	0.5	5.57	6.61
7:31	3	305.7	0.5	5.57	6.65
7:32	4	307.1	0.5	5.56	6.63
7:33	5	305.5	0.7	5.60	6.65
7:34	6	297.6	0.5	5.59	6.64
7:35	7	296.9	0.3	5.58	6.65
7:36	8	294.5	0.3	5.57	6.63
7:37	9	298.2	0.3	5.55	6.67
7:38	10	315.8	0.2	5.60	6.63
7:39	11	328.4	0.2	5.62	6.63
7:40	12	318.2	0.2	5.61	6.62
7:41	13	305.3	0.2	5.57	6.65
7:42	14	300.5	0.2	5.57	6.66
7:43	15	295.0	0.2	5.54	6.66
7:44	16	294.9	0.2	5.55	6.67
7:45	17	301.0	0.2	5.55	6.65
7:46	18	313.2	0.1	5.57	6.68
7:47	19	321.6	0.2	5.59	6.65
7:48	20	327.9	0.2	5.60	6.67
7:49	21	335.1	0.1	5.63	6.65
7:50	22	326.9	0.2	5.61	6.68
7:51	23	315.8	0.2	5.57	6.67
7:52	24	315.8	0.3	5.59	6.69
7:53	25	310.3	0.5	5.57	6.71
7:54	26	306.6	0.5	5.58	6.73
7:55	27	302.4	0.5	5.59	6.69
7:56	28	309.5	0.5	5.60	6.72
7:57	29	297.4	0.5	5.58	6.67
7:58	30	298.5	0.4	5.57	6.72
7:59	31	317.5	0.3	5.58	6.66
8:00	32	313.8	0.3	5.60	6.67
8:01	33	311.3	0.3	5.58	6.65
8:02	34	311.0	0.4	5.56	6.67
8:03	35	323.2	0.3	5.59	6.64
8:04	36	320.0	0.3	5.57	6.67
8:05	37	328.3	0.3	5.57	6.65
8:06	38	332.2	0.3	5.59	6.68
8:07	39	328.6	0.3	5.55	6.68
8:08	40	330.6	0.3	5.60	6.68
8:09	41	310.9	0.3	5.54	6.69
8:10	42	300.2	0.3	5.51	6.70
8:11	43	319.0	0.3	5.58	6.64
8:12	44	312.4	0.3	5.55	6.66
8:13	45	312.6	0.3	5.57	6.65
8:14	46	315.6	0.3	5.60	6.63
8:15	47	320.8	0.2	5.60	6.65
8:16	48	321.1	0.2	5.60	6.64
8:17	49	323.1	0.2	5.62	6.65
8:18	50	306.8	0.2	5.58	6.63
8:19	51	302.2	0.2	5.57	6.67
8:20	52	297.7	0.2	5.57	6.64
8:21	53	305.1	0.2	5.57	6.66
8:22	54	305.6	0.2	5.56	6.64
8:23	55	320.9	0.2	5.59	6.64
8:24	56	327.1	0.2	5.63	6.61
8:25	57	332.4	0.2	5.62	6.64
8:26	58	331.0	0.2	5.60	6.64
8:27	59	335.2	0.1	5.59	6.68
8:28	60	317.5	0.1	5.55	6.66
8:29	61	326.2	0.1	5.57	6.70
8:30	62	319.0	0.1	5.58	6.65
8:31	63	313.3	0.1	5.57	6.71
8:32	64	311.6	0.1	5.61	6.67
8:33	65	315.7	0.1	5.64	6.67
8:34	66	301.1	0.1	5.58	6.67
8:35	67	313.7	0.2	5.58	6.68
8:36	68	320.7	0.2	5.65	6.64
8:37	69	311.1	0.1	5.59	6.67
8:38	70	318.7	0.1	5.62	6.64
8:39	71	317.8	0.2	5.61	6.65
8:40	72	301.6	0.2	5.55	6.67
8:41	73	313.2	0.3	5.60	6.66
8:42	74	301.2	0.3	5.57	6.65
8:43	75	300.4	0.3	5.55	6.67
8:44	76	307.4	0.4	5.58	6.63
8:45	77	315.8	0.4	5.61	6.62
8:46	78	312.7	0.5	5.60	6.63
8:47	79	308.6	0.5	5.57	6.63
8:48	80	316.3	0.4	5.59	6.65
8:49	81	323.2	0.3	5.61	6.61
8:50	82	314.4	0.3	5.57	6.68
8:51	83	312.5	0.3	5.54	6.67
8:52	84	316.0	0.3	5.55	6.68
8:53	85	316.5	0.3	5.55	6.68
8:54	86	313.2	1.0	5.56	6.67
8:55	87	316.3	0.8	5.59	6.65
8:56	88	323.2	0.5	5.61	6.61
8:57	89	314.4	0.5	5.57	6.68
8:58	90	312.5	0.5	5.54	6.67
8:59	91	315.6	0.5	5.57	6.67
9:00	92	309.6	0.5	5.54	6.67
9:01	93	284.1	0.7	5.58	6.77

## MONITOR DATA SUMMARY

Continued (page 2 of 3): 544SRU-15, 16A, 0010-3

CLOCK TIME	ELAPSED TIME	CO	C <sub>2</sub> H <sub>4</sub>	O <sub>2</sub>	CO <sub>2</sub>
9:02	94	279.3	0.5	5.57	6.79
9:03	95	290.8	0.5	5.58	6.77
9:04	96	307.3	0.5	5.60	6.77
9:05	97	293.3	0.4	5.54	6.77
9:06	98	299.4	0.2	5.57	6.80
9:07	99	290.2	0.2	5.49	6.82
9:08	100	302.8	0.2	5.56	6.77
9:09	101	301.6	0.2	5.57	6.81
9:10	102	307.1	0.2	5.56	6.80
9:11	103	314.5	0.2	5.56	6.82
9:12	104	321.2	0.2	5.60	6.79
9:13	105	322.5	0.2	5.62	6.78
9:14	106	319.5	0.2	5.60	6.79
9:15	107	315.0	0.2	5.64	6.79
9:16	108	304.5	0.2	5.59	6.81
9:17	109	297.0	0.2	5.62	6.83
9:18	110	282.9	0.2	5.59	6.83
9:19	111	277.0	0.2	5.55	6.87
9:20	112	286.1	0.2	5.57	6.84
9:21	113	288.3	0.2	5.55	6.88
9:22	114	292.7	0.2	5.57	6.84
9:23	115	307.8	0.2	5.59	6.87
9:24	116	306.8	0.2	5.63	6.81
9:25	117	299.6	0.2	5.63	6.85
9:26	118	284.1	0.2	5.58	6.84
9:27	119	279.9	0.2	5.54	6.89
9:28	120	281.2	0.2	5.53	6.87
9:29	121	301.7	0.2	5.57	6.80
9:30	122	300.0	0.2	5.52	6.86
9:31	123	298.4	0.2	5.53	6.85
9:32	124	292.2	0.2	5.53	6.81
9:33	125	294.3	0.2	5.52	6.84
9:34	126	310.1	0.2	5.58	6.79
9:35	127	317.1	0.2	5.59	6.80
9:36	128	311.8	0.2	5.58	6.80
9:37	129	310.0	0.1	5.58	6.81
9:38	130	296.4	0.2	5.56	6.80
9:39	131	287.7	0.2	5.52	6.81
9:40	132	286.2	0.2	5.53	6.81
9:41	133	304.9	0.2	5.57	6.80
9:42	134	313.2	0.2	5.59	6.80
9:43	135	319.7	0.2	5.59	6.79
9:44	136	319.5	0.2	5.57	6.83
9:45	137	313.1	0.2	5.57	6.80
9:46	138	313.8	0.1	5.60	6.83
9:47	139	303.7	0.2	5.60	6.81
9:48	140	304.1	0.2	5.66	6.83
9:49	141	296.1	0.2	5.64	6.81
9:50	142	297.9	0.1	5.60	6.84
9:51	143	296.4	0.2	5.59	6.82
9:52	144	302.6	0.2	5.59	6.82
9:53	145	308.2	0.2	5.60	6.78
9:54	146	313.3	0.2	5.59	6.78
9:55	147	303.4	0.2	5.55	6.76
9:56	148	293.3	0.2	5.54	6.77
9:57	149	285.2	0.2	5.53	6.72
9:58	150	283.3	0.1	5.53	6.74
9:59	151	287.2	0.1	5.53	6.68
10:00	152	290.0	0.1	5.54	6.69
10:01	153	293.2	0.1	5.53	6.65
10:02	154	305.6	0.2	5.57	6.65
10:03	155	308.3	0.2	5.55	6.61
10:04	156	318.0	0.2	5.53	6.66
10:05	157	318.0	0.2	5.56	6.62
10:06	158	317.9	0.2	5.56	6.66
10:07	159	316.3	0.2	5.56	6.65
10:08	160	306.9	0.2	5.53	6.67
10:09	161	301.6	0.2	5.62	6.62
10:10	162	293.8	0.2	5.60	6.63
10:11	163	292.2	0.1	5.59	6.62
10:12	164	279.6	0.1	5.47	6.67
10:13	165	294.9	0.1	5.46	6.66
10:14	166	303.5	0.2	5.49	6.65
10:15	167	306.9	0.1	5.51	6.63
10:16	168	309.0	0.1	5.53	6.63
10:17	169	315.4	0.2	5.55	6.61
10:18	170	314.6	0.2	5.54	6.60
10:19	171	321.2	0.2	5.56	6.62
10:20	172	324.7	0.2	5.59	6.60
10:21	173	314.5	0.2	5.56	6.66
10:22	174	294.1	0.1	5.51	6.65
10:23	175	287.2	0.1	5.51	6.69
10:24	176	288.3	0.1	5.53	6.66
10:25	177	290.3	0.2	5.52	6.66
10:26	178	296.4	0.1	5.54	6.62
10:27	179	302.2	0.2	5.54	6.62
10:28	180	303.4	0.2	5.52	6.63
10:29	181	317.3	0.2	5.57	6.63
10:30	182	311.5	0.2	5.57	6.63
10:31	183	305.3	0.2	5.57	6.65
10:32	184	304.2	0.2	5.58	6.62
10:33	185	288.2	0.2	5.55	6.66
10:34	186	288.2	0.2	5.56	6.63
10:35	187	290.5	0.2	5.55	6.66

## MONITOR DATA SUMMARY

Continued (page 3 of 3): 544SRU-15, 16A, 0010-3

CLOCK TIME	ELAPSED TIME	CO	C <sub>3</sub> H <sub>8</sub>	O <sub>2</sub>	CO <sub>2</sub>
10:36	188	275.0	0.2	5.47	6.65
10:37	189	295.0	0.2	5.51	6.68
10:38	190	315.0	0.2	5.58	6.62
10:39	191	325.2	0.2	5.61	6.62
10:40	192	302.3	0.2	5.55	6.64
10:41	193	303.8	0.2	5.56	6.62
10:42	194	301.9	0.2	5.53	6.64
10:43	195	305.3	0.2	5.53	6.64
10:44	196	307.3	0.2	5.57	6.63
10:45	197	298.8	0.2	5.55	6.64
10:46	198	296.9	0.2	5.53	6.65
10:47	199	299.6	0.2	5.55	6.65
10:48	200	295.6	0.2	5.55	6.63
10:49	201	293.2	0.2	5.55	6.63
10:50	202	284.3	0.2	5.55	6.61
10:51	203	286.8	0.2	5.54	6.62
10:52	204	297.4	0.2	5.56	6.62
10:53	205	300.3	0.2	5.57	6.61
10:54	206	300.3	0.2	5.56	6.62
10:55	207	300.4	0.2	5.57	6.62
10:56	208	300.8	0.2	5.53	6.67
10:57	209	317.8	0.2	5.61	6.61
10:58	210	311.3	0.2	5.61	6.65
10:59	211	290.4	0.3	5.56	6.62
11:00	212	287.9	0.2	5.54	6.66
11:01	213	269.0	0.3	5.50	6.64
11:02	214	281.8	0.2	5.53	6.63
11:03	215	294.7	0.2	5.59	6.58
11:04	216	298.0	0.3	5.58	6.58
11:05	217	299.1	0.3	5.58	6.59
11:06	218	296.1	0.3	5.57	6.61
11:07	219	294.9	0.3	5.56	6.61
11:08	220	291.2	0.3	5.57	6.65
11:09	221	276.2	0.3	5.52	6.64
11:10	222	280.4	0.3	5.56	6.64
11:11	223	272.4	0.2	5.55	6.61
11:12	224	262.8	0.3	5.49	6.66
11:13	225	270.9	0.3	5.52	6.61
11:14	226	278.0	0.3	5.52	6.62
11:15	227	292.2	0.3	5.57	6.59
11:16	228	298.0	0.3	5.57	6.60
11:17	229	303.4	0.3	5.57	6.60
11:18	230	303.9	0.2	5.56	6.62
11:19	231	303.9	0.3	5.56	6.64
11:20	232	314.1	0.3	5.61	6.61
11:21	233	307.7	0.3	5.59	6.61
11:22	234	293.8	0.3	5.55	6.64
11:23	235	292.4	0.3	5.54	6.64
11:24	236	295.1	0.3	5.57	6.63
11:25	237	295.9	0.3	5.57	6.63
11:26	238	297.5	0.3	5.57	6.62
11:27	239	285.7	0.3	5.55	6.63
11:28	240	286.8	0.3	5.57	6.60
11:29	241	291.9	0.3	5.58	6.62
11:30	242	282.1	0.3	5.52	6.61
11:31	243	281.4	0.3	5.49	6.66
11:32	244	301.4	0.3	5.57	6.59
11:33	245	298.2	0.3	5.53	6.64
11:34	246	297.6	0.3	5.55	6.60
11:35	247	305.2	0.3	5.58	6.61
11:36	248	293.7	0.3	5.58	6.61
11:37	249	272.0	0.3	5.47	6.67
11:38	250	284.0	0.3	5.55	6.62
11:39	251	289.3	0.3	5.59	6.63
11:40	252	279.5	0.3	5.54	6.63
11:41	253	284.8	0.3	5.53	6.67
11:42	254	281.1	0.4	5.49	6.66
11:43	255	294.7	0.3	5.54	6.67
11:44	256	276.3	0.3	5.45	6.68
11:45	257	299.4	0.3	5.47	6.70
11:46	258	310.0	0.4	5.50	6.65
11:47	259	304.2	0.4	5.48	6.69
11:48	260	296.2	0.4	5.48	6.67
11:49	261	295.7	0.4	5.51	6.66
11:50	262	289.9	0.4	5.49	6.66
11:51	263	298.5	0.4	5.53	6.62
11:52	264	297.9	0.4	5.54	6.61
11:53	265	284.8	0.4	5.51	6.63
11:54	266	282.0	0.4	5.50	6.63
11:55	267	281.1	0.4	5.49	6.64
11:56	268	284.1	0.4	5.51	6.63
11:57	269	289.5	0.4	5.49	6.64
11:58	270	304.4	0.4	5.55	6.61
11:59	271	293.2	0.4	5.53	6.63
12:00	272	281.1	0.4	5.47	6.67
12:01	273	282.5	0.4	5.47	6.66
12:02	274	290.3	0.4	5.50	6.67
12:03	275	293.9	0.4	5.52	6.62
12:04	276	292.8	0.5	5.49	6.67
12:05	277	296.7	0.4	5.50	6.63
12:06	278	297.0	0.4	5.49	6.69
12:07	279	287.4	0.4	5.48	6.66
Uncorrected Average (C) =		302.56	0.26	5.560	6.680

**ARI ENVIRONMENTAL, INC.**  
**MOISTURE CALCULATION SUMMARY**

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**TEST DATE:** 6/17/2011  
**RUN NUMBER:** 544SRU-0010-3

<b>γ FACTOR:</b>	0.999	<b>STACK DIAM:</b>	67.000 inches
<b>BAROMETRIC:</b>	29.85 in. Hg	<b>METER VOLUME:</b>	193.793 ft <sup>3</sup>
<b>STATIC PRES:</b>	-0.050 in.H <sub>2</sub> O	<b>METER TEMP:</b>	87.5 °F
<b>STACK TEMP:</b>	1114.5 °F	<b>LIQUID COLL:</b>	495.9 milliliters
<b>SQ.RT ΔP:</b>	0.3066 in.H <sub>2</sub> O	<b>CO<sub>2</sub>:</b>	6.73 % by volume
<b>ΔH:</b>	1.99 in.H <sub>2</sub> O	<b>O<sub>2</sub>:</b>	5.48 % by volume

**ENGLISH UNITS**  
**(29.92 in.Hg & °F)**

<b>VOLUME OF SAMPLE</b> <b>@ STANDARD CONDITIONS, DRY BASIS</b>	
$V_{mstd} = \left( \frac{528}{29.92} \right) \times V_m \times \gamma \left[ \frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right]$	= 187.180 dscf
$\gamma = 0.999$	
<b>VOLUME OF WATER IN SAMPLE</b> <b>@ STANDARD CONDITIONS</b>	
$V_{wstd} = 0.04707 \times V_{lc}$	= 23.342 scf
$V_{lc} = 495.9 \text{ mL}$	
<b>FRACTIONAL MOISTURE CONTENT OF STACK GAS AS MEASURED</b>	
$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}}$	= 0.1109
<b>FRACTIONAL MOISTURE CONTENT OF STACK GAS @ SATURATION</b>	
$B_{ws@saturation} = \frac{S.V.P.}{P_{bar} + \frac{P_{static}}{13.6}}$	= 0.7083
$S.V.P. = 21.14 \text{ in. Hg}$	
<b>FRACTIONAL MOISTURE CONTENT USED IN CALCULATIONS</b>	
$B_{ws} =$	0.1109

**ARI ENVIRONMENTAL, INC.**  
**FLOW RATE CALCULATION SUMMARY**

**COMPANY:** Valero Port Arthur Refin  
**LOCATION:** Port Arthur, Texas  
**RUN NUMBER:** 544SRU-0010-3

**SOURCE:** SRU 544 Incinerator Stack  
**TEST DATE:** 6/17/2011

**BAROMETRIC:** 29.85 in. Hg  
**STATIC PRES:** -0.05 in.H<sub>2</sub>O  
**STACK TEMP:** 1114.5 °F  
**SQ.RT ΔP:** 0.3066 in.H<sub>2</sub>O

**STACK DIAM:** 67.000 inches  
**CO<sub>2</sub>:** 6.73 % by volume  
**O<sub>2</sub>:** 5.48 % by volume

**DRY MOLECULAR WEIGHT OF STACK GAS**

$$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO) = 29.30 \quad \text{lb/lb-mole}$$

**MOLECULAR WEIGHT OF STACK GAS, wet basis**

$$M_s = M_d (1 - B_{ws}) + 18B_{ws} = 28.04 \quad \text{lb/lb-mole}$$

**PITOT TUBE COEFFICIENT**

$$C_p \text{ (from calibration curve or geometric specifications)} = 0.84$$

**AVERAGE VELOCITY HEAD OF STACK GAS, in. H<sub>2</sub>O**

$$\sqrt{\Delta P} = \frac{1}{n} \sum_{i=1}^n \sqrt{\Delta p_i} = 0.3066 \quad \text{in. H}_2\text{O}$$

**AVERAGE ABSOLUTE STACK GAS TEMPERATURE**

$$T_s = 1114.5 \text{ °F} + 460 = 1,574.5 \quad \text{°R}$$

**ABSOLUTE STACK GAS PRESSURE**

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

**STACK GAS VELOCITY**

$$V_s = (85.49)(C_p)(\text{avg } \sqrt{\Delta P}) \sqrt{\frac{T_s}{(P_s)(M_s)}} = 30.198 \quad \text{ft/sec}$$

**STACK GAS VOLUMETRIC FLOW RATE, actual**

$$Q_s = 60 \times V_s \times A_s = 44,361 \quad \text{acfm}$$

$$\text{Stack Area} = 24.4837 \text{ ft}^2$$

**STACK GAS VOLUMETRIC FLOW RATE,  
standard conditions, wet basis**

$$Q_{stdw} = \left( \frac{528}{29.92} \right) (Q_s) \left( \frac{P_s}{T_s} \right) = \begin{matrix} 14,839.7 & \text{scfm, wb} \\ 890,382 & \text{scfh, wb} \end{matrix}$$

**STACK GAS VOLUMETRIC FLOW RATE,  
standard conditions, dry basis**

$$Q_{std} = \left( \frac{528}{29.92} \right) (Q_s) \left( \frac{P_s}{T_s} \right) (1 - B_{ws}) = \begin{matrix} 13,194.3 & \text{dscfm} \\ 791,659 & \text{dscfh} \end{matrix}$$

## METHOD 0010 ISOKINETIC CALCULATION SUMMARY

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**TEST DATE:** 6/17/2011  
**RUN NO:** 544SRU-0010-3

### INPUT

<b>V<sub>m</sub>:</b>	193.793 ft <sup>3</sup>	<b>Q<sub>s</sub>:</b>	791,659 dscfh
<b>γ FACTOR:</b>	0.999	<b>T<sub>s</sub>:</b>	1,114.5 °F
<b>P<sub>bar</sub>:</b>	29.85 in. Hg	<b>Θ:</b>	240 minutes
<b>ΔH:</b>	1.99 in. H <sub>2</sub> O	<b>V<sub>s</sub>:</b>	30.198 fps
<b>T<sub>m</sub>:</b>	87.5 °F	<b>P<sub>s</sub>:</b>	29.85 in. Hg
		<b>V<sub>ic</sub>:</b>	495.9 mL

**Volume of Sample at Standard  
 Conditions on a Dry Basis:**

**English Units  
 (29.92 in. Hg, 68 °F)**

$$V_{mstd} = \left( \frac{528}{29.92} \right) \times V_m \times \gamma \left[ \frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = 187.180 \text{ dscf}$$

**Isokinetic Sampling Rate**

$$\%ISO = \frac{(100)(T_s) \left[ (0.002669 \times V_{ic}) + \left( \frac{V_m}{T_m} \right) (\gamma) \left( P_{bar} + \left( \frac{\Delta H}{13.6} \right) \right) \right]}{(60)(\theta)(V_s)(P_s)(A_n)} = 102.83 \% I$$

A<sub>n</sub> = 0.00140752 ft<sup>2</sup>      Runtime (θ) = 60 minutes

# SVOC CALCULATION SUMMARY



COMPANY : Valero Port Arthur Refinery  
LOCATION : Port Arthur, Texas  
SOURCE : SRU 544 Incinerator Stack  
TEST DATE : 6/17/2011  
TEST RUN NO. : 544SRU-0010-3

SAMPLE VOLUME : 187.180 dscf  
SAMPLE VOLUME : 5.301 dscm  
GAS FLOW RATE : 791,659 dscfh  
STACK O<sub>2</sub> CONTENT : 5.48 %

VOST COMPOUND	TOTAL SAMPLE MASS (nanogram)	MOLECULAR WEIGHT	STACK GAS CONCENTRATION (lb/dscf x 10 <sup>-5</sup> )	STACK GAS CONCENTRATION (µg/dscm)	STACK GAS CONCENTRATION (ppb)	EMISSION RATE (lb/hr x 10 <sup>-3</sup> )
Acenaphthene	< 11.4	154.21	< 0.000134	< 0.002151	< 0.000335	< 0.000106
Acenaphthylene	< 37.9	152.19	< 0.000446	< 0.007150	< 0.001130	< 0.000353
Aniline	< 1.85	93.13	< 0.000022	< 0.000349	< 0.000090	< 0.000017
Anthracene	13.6	178.23	0.000160	0.002566	0.000346	0.000127
Benzidine	< 38	184.24	< 0.000448	< 0.007168	< 0.000936	< 0.000354
Benzo[a]anthracene	< 4	228.29	< 0.000047	< 0.000755	< 0.000080	< 0.000037
Benzo[b]fluoranthene	< 4	252.31	< 0.000047	< 0.000755	< 0.000072	< 0.000037
Benzo[k]fluoranthene	< 4	252.31	< 0.000047	< 0.000755	< 0.000072	< 0.000037
Benzo[g,h,i]perylene	< 4	276.33	< 0.000047	< 0.000755	< 0.000066	< 0.000037
Benzo[a]pyrene	< 4	252.31	< 0.000047	< 0.000755	< 0.000072	< 0.000037
Benzo[e]pyrene	< 33.8	252.31	< 0.000398	< 0.006376	< 0.000608	< 0.000315
Biphenyl	438	154.21	0.005159	0.082625	0.012888	0.004084
Chrysene	< 4	228.28	< 0.000047	< 0.000755	< 0.000080	< 0.000037
Dibenz[a,h]anthracene	< 4	278.35	< 0.000047	< 0.000755	< 0.000065	< 0.000037
Dibenzofuran	< 2.3	168.19	< 0.000027	< 0.000434	< 0.000062	< 0.000021
Dibenzo[a,e]pyrene	< 4	302.37	< 0.000047	< 0.000755	< 0.000060	< 0.000037
3,3'-Dimethoxybenzidine	< 29	244.29	< 0.000342	< 0.005471	< 0.000539	< 0.000270
Dimethylaminobenzene	< 2	225.29	< 0.000024	< 0.000377	< 0.000040	< 0.000019
7,12-Dimethylbenz(a)anthracene	< 4	256.34	< 0.000047	< 0.000755	< 0.000071	< 0.000037
3,3'-Dimethylbenzidine	< 29	212.29	< 0.000342	< 0.005471	< 0.000620	< 0.000270
a,a-Dimethylphenethylamine	< 12	149.23	< 0.000141	< 0.002264	< 0.000365	< 0.000112
2,4-Dimethylphenol	< 2.6	122.17	< 0.000031	< 0.000490	< 0.000097	< 0.000024
Fluoranthene	< 5.36	202.26	< 0.000063	< 0.001011	< 0.000120	< 0.000050
Fluorene	13	166.22	0.000153	0.002452	0.000355	0.000121
Indeno(1,2,3-cd)pyrene	< 9.38	276.33	< 0.000110	< 0.001769	< 0.000154	< 0.000087
Isophorone	< 2.25	138.21	< 0.000027	< 0.000424	< 0.000074	< 0.000021
3-Methylcholanthrene	< 4	268.35	< 0.000047	< 0.000755	< 0.000068	< 0.000037
2-Methylnaphthalene	34	142.20	0.000400	0.006414	0.001085	0.000317
2-Methylphenol	< 2.1	108.14	< 0.000025	< 0.000396	< 0.000088	< 0.000020
3-Methylphenol & 4-Methylphenol	< 5.65	108.14	< 0.000067	< 0.001066	< 0.000237	< 0.000053
Naphthalene	1070	128.17	0.012602	0.201847	0.037881	0.009977
Perylene	< 4	252.31	< 0.000047	< 0.000755	< 0.000072	< 0.000037
Phenanthrene	34.6	178.23	0.000408	0.006527	0.000881	0.000323
Phenol	24.8	94.11	0.000292	0.004678	0.001196	0.000231
1,4-Phenylenediamine	< 18	108.10	< 0.000212	< 0.003396	< 0.000756	< 0.000168
Pyrene	< 6.28	202.25	< 0.000074	< 0.001185	< 0.000141	< 0.000059
o-Toluidine	< 5	107.17	< 0.000059	< 0.000943	< 0.000212	< 0.000047

# CO CALIBRATION CORRECTION DATA SHEET USEPA METHOD 10

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**MONITOR ID:** Thermo Environmental Model 48i  
**RUN NO:** 544SRU-0010-3  
**TEST DATE:** 6/17/2011

## INPUT

CO AVERAGE CHART READING (C):	302.56	ppmv
AVG PRE/POST ZERO DRIFT READING (C <sub>o</sub> ):	0.62	ppmv
CAL GAS CONCENTRATION (C <sub>ma</sub> ):	250.0	ppmv
AVG CAL PRE/POST TEST READING (C <sub>m</sub> ):	251.92	ppmv
STACK GAS VOLUMETRIC FLOW RATE (Q <sub>std</sub> ):	791,659	dscfh

## CALCULATIONS

STACK CO AVERAGE CHART READING = 302.56 ppmv

### STACK CO CONC. CORRECTED FOR ZERO AND CALIBRATION DRIFT:

$$\text{CO CONC, ppmv} = C_{\text{gas,ppm}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 300.4 \text{ ppmv db}$$

(corrected)

CO CONC.(lbs/dscf) =

$$C_{\text{gas,lb/dscf}} = (C_{\text{gas,ppm}}) \left( \frac{28 \text{ lb / lb - mole}}{385.26 \times 10^6 \text{ ft}^3 \text{ / lb - mole}} \right) = 21.8303 \times 10^{-6} \text{ lbs/dscf}$$

### CO EMISSION RATE:

STACK GAS VOLUMETRIC FLOW RATE = 791,659 dscfh

STACK CO EMISSION RATE =

$$\text{CO}_{\text{pmr}} = (C_{\text{gas,lb/dscf}})(Q_{\text{std}}) = 17.2822 \text{ lbs/hr}$$

$$= 75.696 \text{ ton/yr}$$

## METHOD 18 METHANE (CH<sub>4</sub>) AND ETHANE (C<sub>2</sub>H<sub>6</sub>) CALCULATION SUMMARY

COMPANY: Valero Port Arthur Refinery  
LOCATION: Port Arthur, Texas  
SOURCE: SRU 544 Incinerator Stack  
RUN NUMBER: 544SRU-0010-3  
TEST DATE: 6/17/2011

### INPUT DATA

Methane (CH<sub>4</sub>) = 1.0 ppmv db  
Ethane (C<sub>2</sub>H<sub>6</sub>) = < 1.0 ppmv db  
Stack gas volumetric flow rate (Q<sub>s</sub>) = 791,659 dscfh

### CALCULATIONS

Concentration in stack gas (lb/dscf)

Methane	$C'_{\text{gas(methane)}} = \frac{(C_{\text{gas(methane)}})(16.04)}{(385.26 \times 10^6)} =$	0.04163 x 10 <sup>-6</sup> lb/dscf as methane
Ethane	$C'_{\text{gas(ethane)}} = \frac{(C_{\text{gas(ethane)}})(30.07)}{(385.26 \times 10^6)} =$	< 0.07805 x 10 <sup>-6</sup> lb/dscf as ethane

Emission rates (lb/hr)

$$E_{\text{THC(methane)}} = C'_{\text{gas(methane)}} \times Q_s = 0.03296 \text{ lb/hr of methane}$$

$$E_{\text{THC(ethane)}} = C'_{\text{gas(ethane)}} \times Q_s = < 0.06179 \text{ lb/hr of ethane}$$

## METHOD 25A TOTAL HYDROCARBON (THC) CALCULATION SUMMARY

COMPANY: Valero Port Arthur Refinery  
LOCATION: Port Arthur, Texas  
SOURCE: SRU 544 Incinerator Stack  
RUN NUMBER: 544SRU-0010-3  
TEST DATE: 6/17/2011

### INPUT DATA

THC as propane ( $C_3H_8$ ) = 0.26 ppmv wb  
0.29 ppmv db  
Stack gas volumetric flow rate ( $Q_s$ ) = 791,659 dscfh

### CALCULATIONS

THC concentration in stack gas (lb/dscf)

$$C'_{\text{gas (propane)}} = \frac{(C_{\text{gas (propane)}})(44.09)}{(385.26 \times 10^6)} = 0.03368 \times 10^{-6} \text{ lb/dscf as propane}$$

THC emission rate

$$E_{\text{THC(propane)}} = C'_{\text{gas(propane)}} \times Q_s = 0.02666 \text{ lb/hr}$$

**CARBONYL SULFIDE EMISSION RATE CALCULATION SHEET  
USEPA METHOD 15**

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**MONITOR ID:** SRI-9300B: GC-FPD  
**RUN NO:** SRU-15-3  
**TEST DATE:** 6/17/2011

**INPUT**

---

COS CONCENTRATION (C): < 0.25 ppmv  
STACK GAS VOLUMETRIC FLOW RATE (Q<sub>std</sub>): 791,659 dscfh

**CALCULATIONS**

---

STACK COS AVERAGE CHART READING = < 0.25 ppmv

**COS CONCENTRATION (lbs/dscf) =**

$$C_{\text{gas, lb/dscf}} = (C_{\text{gas, ppm}}) \left( \frac{60.07 \text{ lb / lb - mole}}{385.26 \times 10^{-6} \text{ ft}^3 \text{ / lb - mole}} \right) = < 0.0390 \times 10^{-6} \text{ lbs/dscf}$$

**COS EMISSION RATE:**

---

STACK GAS VOLUMETRIC FLOW RATE = 791,659 dscfh

STACK COS EMISSION RATE =

$$\text{COS}_{\text{pmr}} = (C_{\text{gas, lb/dscf}})(Q_{\text{std}}) = < 0.0309 \text{ lbs/hr} \\ = < 0.135 \text{ ton/yr}$$

**CARBON DISULFIDE EMISSION RATE CALCULATION SHEET  
USEPA METHOD 15**

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**MONITOR ID:** SRI-9300B: GC-FPD  
**RUN NO:** SRU-15-3  
**TEST DATE:** 6/17/2011

**INPUT**

---

CS<sub>2</sub> CONCENTRATION (C): < 0.25 ppmv  
STACK GAS VOLUMETRIC FLOW RATE (Q<sub>std</sub>): 791,659 dscfh

**CALCULATIONS**

---

STACK CS<sub>2</sub> AVERAGE CHART READING = < 0.25 ppmv

**CS<sub>2</sub> CONCENTRATION (lbs/dscf) =**

$$C_{\text{gas, lb/dscf}} = (C_{\text{gas, ppm}}) \left( \frac{76.1 \text{ lb / lb - mole}}{385.26 \times 10^{-6} \text{ ft}^3 \text{ / lb - mole}} \right) = < 0.0494 \times 10^{-6} \text{ lbs/dscf}$$

**CS<sub>2</sub> EMISSION RATE:**

---

STACK GAS VOLUMETRIC FLOW RATE = 791,659 dscfh

STACK CS<sub>2</sub> EMISSION RATE =

$$CS_{2\text{pmr}} = (C_{\text{gas, lb/dscf}})(Q_{\text{std}}) = < 0.0391 \text{ lbs/hr}$$
$$= < 0.171 \text{ ton/yr}$$

# HYDROGEN SULFIDE CALIBRATION CORRECTION DATA SHEET

## USEPA METHOD 15

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**MONITOR ID:** SRI-9300B: GC-FPD  
**RUN NO:** SRU-15-3  
**TEST DATE:** 6/17/2011

### INPUT

H<sub>2</sub>S CONCENTRATION (C): < 0.25 ppmv  
STACK GAS VOLUMETRIC FLOW RATE (Q<sub>std</sub>): 791,659 dscfh

### CALCULATIONS

STACK H<sub>2</sub>S AVERAGE CHART READING = < 0.25 ppmv

H<sub>2</sub>S CONCENTRATION (lbs/dscf) =

$$C_{\text{gas, lb/dscf}} = (C_{\text{gas, ppm}}) \left( \frac{34.08 \text{ lb / lb - mole}}{385.26 \times 10^{-6} \text{ ft}^3 \text{ / lb - mole}} \right) = < 0.0221 \times 10^{-6} \text{ lbs/dscf}$$

### H<sub>2</sub>S EMISSION RATE:

STACK GAS VOLUMETRIC FLOW RATE = 791,659 dscfh

STACK H<sub>2</sub>S EMISSION RATE =

$$H_2S_{\text{pmr}} = (C_{\text{gas, lb/dscf}})(Q_{\text{std}}) = < 0.0175 \text{ lbs/hr}$$
$$= < 0.077 \text{ ton/yr}$$

**TRS as SO<sub>2</sub> EMISSION RATE CALCULATION SHEET**  
**USEPA METHOD 15**

**COMPANY:** Valero Port Arthur Refinery  
**LOCATION:** Port Arthur, Texas  
**SOURCE:** SRU 544 Incinerator Stack  
**MONITOR ID:** SRI-9300B: GC-FPD  
**RUN NO:** SRU-15-3  
**TEST DATE:** 6/17/2011

**INPUT**

---

COS CONCENTRATION (C): < 0.25 ppmv  
CS<sub>2</sub> CONCENTRATION (C): < 0.25 ppmv  
H<sub>2</sub>S CONCENTRATION (C): < 0.25 ppmv  
STACK GAS VOLUMETRIC FLOW RATE (Q<sub>std</sub>): 791,659 dscfh

**CALCULATIONS**

---

AVERAGE STACK TRS as SO<sub>2</sub> = < 1.00 ppmv

**TRS as SO<sub>2</sub> CONCENTRATION (lbs/dscf) =**

$$C_{\text{gas, lb/dscf}} = (C_{\text{gas, ppm}}) \left( \frac{64 \text{ lb/lb-mole}}{385.26 \times 10^{-6} \text{ ft}^3/\text{lb-mole}} \right) = < 0.1661 \times 10^{-6} \text{ lbs/dscf}$$

**TRS as SO<sub>2</sub> EMISSION RATE:**

---

STACK GAS VOLUMETRIC FLOW RATE = 791,659 dscfh

STACK TRS as SO<sub>2</sub> EMISSION RATE =

$$\text{TRS}_{\text{pmr}} = (C_{\text{gas, lb/dscf}})(Q_{\text{std}}) = < 0.1315 \text{ lbs/hr}$$
$$= < 0.576 \text{ ton/yr}$$

**Company:** Valero Port Arthur Refinery  
**Location:** Port Arthur, Texas  
**Source:** SRU 544 Incinerator Stack  
**Test Date:** 6/17/2011  
**Run # :** SRU-16A-3

**Laboratory Analysis of Hydrogen Peroxide (H<sub>2</sub>O<sub>2</sub>) for SO<sub>2</sub>:**

**Standardization of Barium Chloride**

H <sub>2</sub> SO <sub>4</sub> used:	25.00 ml
BaCl used:	25.20 ml
Normality of BaCl <sub>2</sub> titrant:	0.00992 N
Volume of Blank titrant used:	0.1 milliliters

**Titration of Sample**

	<u>SRU-16A-3</u>	<u>SRU-16A-3RS</u>
Volume of Sample:	100 milliliters	100 milliliters
Volume of Sample Aliquot:	20 milliliters	20 milliliters

**1<sup>st</sup> titration**

Volume of BaCl <sub>2</sub> titrant used:	0.5 milliliters	3.9 milliliters
---	-----------------	-----------------

**2<sup>nd</sup> titration**

Volume of BaCl <sub>2</sub> titrant used:	0.3 milliliters	3.7 milliliters
---	-----------------	-----------------

# USEPA METHOD 16A: TOTAL REDUCED SULFUR CALCULATION SHEET

Company: Valero Port Arthur Refinery  
 Location: Port Arthur, Texas  
 Source: SRU 544 Incinerator Stack  
 Test Date: 6/17/2011  
 Run #: SRU-16A-3

## Raw Test Data:

SRU-16A-3		SRU-16A-3RS	
V <sub>m</sub> :	12.872 ft <sup>3</sup>	V <sub>m</sub> :	3.308 ft <sup>3</sup>
Y <sub>d</sub> :	1.000 dimensionless	Y <sub>d</sub> :	1.000 dimensionless
P <sub>bar</sub> :	29.85 in.Hg	P <sub>bar</sub> :	29.85 in.Hg
ΔH:	1.38 in.H <sub>2</sub> O	ΔH:	0.10 in.H <sub>2</sub> O
T <sub>m</sub> :	95.6 °F	T <sub>m</sub> :	99.7 °F
Q <sub>s</sub> :	791,659 dscfh	C <sub>RG (act)</sub> :	20.0 ppm

## Laboratory Analysis of Hydrogen Peroxide (H<sub>2</sub>O<sub>2</sub>) for SO<sub>2</sub>:

	SRU-16A-3	SRU-16A-3RS
Normality of BaCl <sub>2</sub> titrant:	0.00992 N	0.00992 N
Volume of Sample:	100 milliliters	100 milliliters
Volume of Sample Aliquot:	20 milliliters	20 milliliters
Volume of BaCl <sub>2</sub> titrant used:	0.40 milliliters	3.80 milliliters
Volume of Blank titrant used:	0.1 milliliters	0.1 milliliters

## Calculations:

Volume of sample at standard conditions on dry basis:

$$V_{mstd} = \left( \frac{528}{29.92} \right) \times V_m \times \gamma \left[ \frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = \begin{matrix} \text{English Units} \\ (29.92 \text{ in. Hg, } 68^\circ \text{ F}) \end{matrix} \begin{matrix} 12.245 \text{ dscf} \\ 346.725 \text{ liters} \end{matrix}$$

Volume of recovery sample at standard conditions on dry basis:

$$V_{mstd} = \left( \frac{528}{29.92} \right) \times V_m \times \gamma \left[ \frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = \begin{matrix} 3.114 \text{ dscf} \\ 88.168 \text{ liters} \end{matrix}$$

Concentration of TRS as SO<sub>2</sub>

$$C_{TRS} = \frac{(12025)(N)(V_t - V_b) \left( \frac{V_{soln}}{V_a} \right)}{V_{mstd}} = 0.516 \text{ ppmv db TRS as SO}_2$$

Concentration of TRS as SO<sub>2</sub> in Recovery Sample

$$C_{RG(m)} = \frac{(12025)(N)(V_t - V_b) \left( \frac{V_{soln}}{V_a} \right)}{V_{mstd}} = 25.032 \text{ ppmv db TRS as SO}_2$$

Recovery Efficiency for the System Performance Check

$$R = \frac{C_{RG(m)}}{C_{RG(act)}} \times 100 = 125.16 \%$$



Valero Port Arthur Refinery  
Source: SRU No. 544 TGI Stack  
Test Dates: 6/15 - 6/17/11

## APPENDIX B

## Field Data

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TRAVERSE POINT LOCATIONS FOR CIRCULAR AND RECTANGULAR STACKS AND DUCTS

Facility 1669  
Date 6-18-11  
Sampling Location SEU 544  
Inside of Far Wall to  
Outside of Port (Distance C) 75.0 in.  
Inside of Near Wall to  
Outside of Port (Distance D) 8.0 in.  
Stack ID (Distance C- Distance D) 67.0 in.  
Port Distance Downstream From Disturbance (B) 582 in.  
Port Distance Upstream From Disturbance (A) 840 in.  
Equivalent Diameters Downstream From Disturbance (B) 8.7 ( $\geq 2.0$ )  
Equivalent Diameters Upstream From Disturbance (A) 12.5 ( $\geq 0.5$ )  
Number of Ports Used 1 Traverse Points / Port 1

Note: Sketch Stack/Ports/Control Device on Back of Form

Equivalent Diameters Downstream From Disturbance (B) =  
[ Distance B / Stack ID ]

Equivalent Diameters Upstream From Disturbance (A) =  
[ Distance A / Stack ID ]

Equivalent Diameter For a Square or Rectangular Stack =  
[ (2 x L x W) / (L + W) ]

Port ID \_\_\_\_\_ in. (for monorail bracket specs.)  
Port Length Outside of Stack \_\_\_\_\_ in. (for monorail bracket specs.)

1 2 3 4 5 6

Port Traverse Point Number	Fractional % of Stack I.D. (frac. %)	Stack I.D. (inches)	Product of Columns 2 and 3 (inches)	Port Depth (inches)	Traverse Point Location From Outside of Port (Sum of 4 and 5 in inches)
1	0.044	67.0	2.95	8.0	10.95
2	0.146		9.78		17.73
3	0.296		19.87		27.83
4	0.704		47.19		55.17
5	0.854		57.22		65.22
6	0.956		64.05		72.05
7					
8					
9					
10					
11					
12					

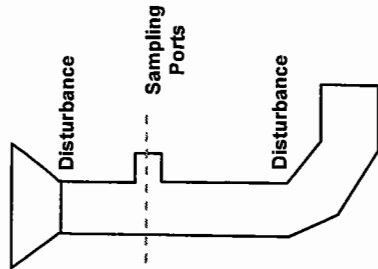
For Stacks / Ducts  $\leq 24$  inches ID - No traverse point shall be located less than 0.5 inches from stack wall

For Stacks / Ducts  $> 24$  inches ID - No traverse point shall be located less than 1.0 inches from stack wall

QA/QC Check:  
Completeness \_\_\_\_\_ Legibility \_\_\_\_\_ Accuracy \_\_\_\_\_ Specifications \_\_\_\_\_

Method 1 Calculator Signature/Date \_\_\_\_\_

Field Supervisor Signature/Date \_\_\_\_\_



LOCATION OF TRAVERSE POINTS IN RECTANGULAR STACKS

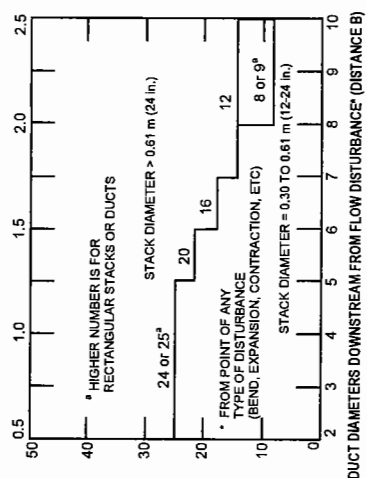
Port	2	3	4	5	6	7	8	9
1	25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6
2	75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7
3	83.3	62.5	50.0	41.7	35.7	31.3	27.8	
4		87.5	70.0	58.3	50.0	43.8	38.9	
5			90.0	75.0	64.3	55.3	50.0	
6				91.7	78.6	68.8	61.1	
7					92.9	81.3	72.2	
8						93.8	83.3	
9							94.4	

\*3 point CEMS RATA traverse point locations (valid for rectangular and round stacks)

LOCATION OF TRAVERSE POINTS IN CIRCULAR STACKS

Port	4	6	8	10	12
1	6.7	4.4	3.2	2.6	2.1
2	25.0	14.6	10.5	8.2	6.7
3	75.0	29.6	19.4	14.8	11.8
4	93.3	70.4	32.3	22.6	17.7
5		85.4	67.7	34.2	25.0
6		95.6	80.5	35.5	
7			89.5	77.4	64.4
8			96.8	85.4	75.0
9				91.8	82.3
10				97.4	88.2
11					93.3
12					97.9

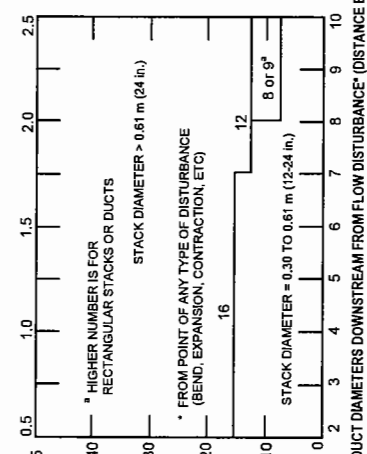
DUCT DIAMETERS UPSTREAM FROM FLOW DISTURBANCE\* (DISTANCE A)



DUCT DIAMETERS DOWNSTREAM FROM FLOW DISTURBANCE\* (DISTANCE B)

MINIMUM NUMBER OF TRAVERSE POINTS FOR VELOCITY (NON-ISOKINETIC) TRAVERSES

DUCT DIAMETERS UPSTREAM FROM FLOW DISTURBANCE\* (DISTANCE A)



DUCT DIAMETERS DOWNSTREAM FROM FLOW DISTURBANCE\* (DISTANCE B)

MINIMUM NUMBER OF TRAVERSE POINTS FOR VELOCITY (NON-ISOKINETIC) TRAVERSES



**ARI REFERENCE METHOD CEMS DATA  
USEPA METHOD 205  
DILUTION SYSTEM VERIFICATION**

<b>Company:</b> <u>VALEO PORT ARTHUR</u>	<b>Analyzer Info</b>
<b>Location:</b> <u>1241 FCC WGS/SA3 SICH</u>	
<b>Dilution System ID:</b> <u>3371</u>	<b>Monitor type:</b> <u>SERVO-MEX 1440 O<sub>2</sub></u>
<b>Dilution Flow Rate:</b> <u>5.0 LPM</u>	<b>Monitor range:</b> <u>22.70%</u>
<b>Verification date:</b> <u>6-3-11</u>	<b>Monitor Serial No.:</b> <u>0144001/4143</u>

**Initial Calibration Data**

<u>Calibration Concentration</u>	<u>Calibration results</u>	<u>Time</u>
Zero: <u>0.00</u>	Zero: <u>0.04</u>	Zero: <u>1706</u>
Low: <u>11.35</u>	Low: <u>11.45</u>	Low: <u>1714</u>
Mid: <u>22.70</u>	Mid: <u>22.73</u>	Mid: <u>1710</u>

**Dilution System Verification**

<b>Mid level gas type:</b> <u>USEPA Protocol 1</u>	<b>High level dilution gas type:</b> <u>USEPA Protocol 1</u>
<b>Mid level concentration:</b> <u>7.61%</u>	<b>High level concentration:</b> <u>22.70%</u>
<b>Mid level tank serial #:</b> <u>AAL5614</u>	<b>High level tank serial #:</b> <u>AC102306</u>
	<b>Target concentration No. 1:</b> <u>5.70</u>
	<b>Target concentration No. 2:</b> <u>17.10</u>

**Dilution System Results**

**Target Concentration No. 1**

	<u>Instrument Response</u>	<u>Time</u>
Trial No. 1:	<u>5.77</u>	<u>1716</u>
Trial No. 2:	<u>5.80</u>	<u>1724</u>
Trial No. 3:	<u>5.81</u>	<u>1733</u>
Average:	<u>          </u>	<u>          </u>

**Target Concentration No. 2**

	<u>Instrument Response</u>	<u>Time</u>
Trial No. 1:	<u>17.16</u>	<u>1719</u>
Trial No. 2:	<u>17.16</u>	<u>1727</u>
Trial No. 3:	<u>17.16</u>	<u>1736</u>
Average:	<u>          </u>	<u>          </u>

% Difference from target concentration:                           % Difference from target concentration:                     

**Mid Level Calibration Gas Results**

	<u>Instrument Response</u>	<u>Time</u>
Trial No. 1:	<u>7.62</u>	<u>1721</u>
Trial No. 2:	<u>7.62</u>	<u>1730</u>
Trial No. 3:	<u>7.62</u>	<u>1739</u>

**ARI REFERENCE METHOD CEMS DATA  
USEPA METHOD 205  
DILUTION SYSTEM VERIFICATION**

Company: Valeco  
Location: Port Arthur, TX  
Dilution System ID: 24171  
Dilution Flow Rate: 5 LPM  
Verification date: 6-10-11

**Analyzer Info**  
Monitor type: O2  
Monitor range: 15%  
Monitor Serial No.: X4440/046

**Initial Calibration Data**

Calibration Concentration

Zero: 0.00  
Low: \_\_\_\_\_  
Mid: 2.50  
High: 15.00

Calibration results

Zero: 0.03  
Low: \_\_\_\_\_  
Mid: 2.62  
High: 15.04

% diff  
Time  
Zero: 0.20  
Low: \_\_\_\_\_  
Mid: 0.83  
High: 0.25

**Dilution System Verification**

Mid level gas type: USEPA Protocol 1  
Mid level concentration: 2.609  
Mid level tank serial #: AAL5814

High level dilution gas type: USEPA Protocol 1  
High level concentration: 22.7  
High level tank serial #: CC102306  
Target concentration No. 1: 2.50  
Target concentration No. 2: 15.00

**Dilution System Results**

Target Concentration No. 1

	<u>Instrument Response</u>	<u>Time</u>
Trial No. 1:	<u>2.61</u>	_____
Trial No. 2:	<u>2.57</u>	_____
Trial No. 3:	<u>2.60</u>	_____
Average:	<u>2.593</u>	_____

Target Concentration No. 2

	<u>Instrument Response</u>	<u>Time</u>
Trial No. 1:	<u>14.98</u>	_____
Trial No. 2:	<u>14.98</u>	_____
Trial No. 3:	<u>14.98</u>	_____
Average:	<u>14.98</u>	_____

% Difference from target concentration: 1.24

% Difference from target concentration: 0.12

**Mid Level Calibration Gas Results**

	<u>Instrument Response</u>	<u>Time</u>
Trial No. 1:	<u>2.50</u>	_____
Trial No. 2:	<u>2.51</u>	_____
Trial No. 3:	<u>2.50</u>	_____

1.05% diff



## SAMPLING NOZZLE INSPECTION AND MEASUREMENT

Date: 6/8/11

Nozzle Clean: (Y) N

Nozzle ID: CR-1

Nozzle Undamaged: (Y) N

Nozzle Type: Glass

Absent of Nicks or Dents: (Y) N

Inspected By: AH

Leading Edge Sharp: (Y) N

Nozzle Diameter			$\Delta D$ (inches)	$D_{avg}$ (inches)
$D_1$ (inches)	$D_2$ (inches)	$D_3$ (inches)		
0.318	0.320	0.319	0.002	0.319

where:

$D_{1,2,3}$  = three different nozzle diameter measurements, (inches); each diameter must be measured to within 0.001 inches

$\Delta D$  = maximum difference between any two diameters, (inches);  $\Delta D \leq 0.004$  inches

$D_{avg}$  = average of  $D_1$ ,  $D_2$ , and  $D_3$ , (inches)



## SAMPLING NOZZLE INSPECTION AND MEASUREMENT

Date: 6/13/11

Nozzle ID: 58-1

Nozzle Type: 61055

Inspected By: AH

Nozzle Clean: Y / N

Nozzle Undamaged: Y / N

Absent of Nicks or Dents: Y / N

Leading Edge Sharp: Y / N

Nozzle Diameter			$\Delta D$ (inches)	$D_{avg}$ (inches)
$D_1$ (inches)	$D_2$ (inches)	$D_3$ (inches)		
0.374	0.373	0.373	.001	0.373

where:

$D_{1,2,3}$  = three different nozzle diameter measurements, (inches); each diameter must be measured to within 0.001 inches

$\Delta D$  = maximum difference between any two diameters, (inches);  $\Delta D \leq 0.004$  inches

$D_{avg}$  = average of  $D_1$ ,  $D_2$ , and  $D_3$ , (inches)

# CEMS CALIBRATION DATA



Plant Valero  
 Location Port Arthur, Texas  
 Source SRU-544  
 Date 6-15-11  
 Run Number SRU544-B-1, SRU544-308-1, SRU544-0011-1 - SRU544-0011-2  
 Start Time 1253  
 Stop Time 1557

Plant Rep. Robin Hill  
 Team Leader Greg D  
 CEM Operator Greg D

Analyzer Span Values (% or ppm)

CO		ppm
CO <sub>2</sub>		%
O <sub>2</sub>		%
THC		ppm
NO <sub>x</sub>		ppm
SO <sub>2</sub>		ppm

CALIBRATION ERROR - 0642 hrs				SYSTEM BIAS CHECK					Calibration Correction Factors		
Cylinder Value (% or ppm)	Cylinder Number	Analyzer Calibration Response	Time	Pretest: 1214 hrs 1558 hrs		System Response	Time	System Response		Time	Drift (% of Span)
				System Response	Time						
CO Zero											Co=
CO Low											
CO Mid											Cm=
CO High											
CO <sub>2</sub> Zero	0.00	<<64098	0.06		0.10			0.10			Co=
CO <sub>2</sub> Low		<<70254									
CO <sub>2</sub> Mid	5.432	<<73859	4.44		4.29			4.37			Cm=
CO <sub>2</sub> High	8.63		8.62								
O <sub>2</sub> Zero	0.00	<<64098	0.03		-0.03			-0.02			Co=
O <sub>2</sub> Low											
O <sub>2</sub> Mid	5.00	<<73859	5.05		4.90			4.90			Cm=
O <sub>2</sub> High	10.00		9.92								
THC Zero											Co=
THC Low											
THC Mid											Cm=
THC High											

# CEMS CALIBRATION DATA



Plant Valero  
 Location Port Arthur, Texas  
 Source SRU-544  
 Date 6-15-11  
 Run Number SRU 544-18-2, SRU 544-308-2, SRU 0011-2  
 Start Time 1602  
 Stop Time 1821

Plant Rep. Robin Hill  
 Team Leader  
 CEM Operator

Analyzer Span Values (% or ppm)

CO		ppm
CO <sub>2</sub>		%
O <sub>2</sub>		%
THC		ppm
NO <sub>x</sub>		ppm
SO <sub>2</sub>		ppm

CALIBRATION ERROR - 642 hrs					SYSTEM BIAS CHECK					Calibration Correction Factors
Cylinder Value (% or ppm)	Cylinder Number	Analyzer Calibration Response	Time	Pretest: 1558 hrs 1824 hrs				Drift (% of Span)		
				System Response	Time	System Response	Time			
CO Zero									Co=	
CO Low										
CO Mid									Cm=	
CO High										
CO <sub>2</sub> Zero	0.00	cc64098	0.06		0.10				Co=	
CO <sub>2</sub> Low		cc73859								
CO <sub>2</sub> Mid	4.32		4.44		4.37				Cm=	
CO <sub>2</sub> High	8.63	19.60	8.62							
O <sub>2</sub> Zero	0.00		0.03		-0.02				Co=	
O <sub>2</sub> Low		cc64898								
O <sub>2</sub> Mid	5.00		5.05		4.90				Cm=	
O <sub>2</sub> High	10.00	22.70	9.92							
THC Zero									Co=	
THC Low										
THC Mid									Cm=	
THC High										

# CEMS CALIBRATION DATA



Plant Valero  
 Location Port Arthur, Texas  
 Source SRU-544  
 Date 6-16-11  
 Run Number SRU-544-0010-1, SRU-0011-4, SRU-08-3, SRU-308-3, SRU-16A-1  
 Start Time 727  
 Stop Time 1328

Plant Rep. Robin Hill  
 Team Leader Gray Durek  
 CEM Operator Gray Durek

Analyzer Span Values (% or ppm)

CO ppm  
 CO<sub>2</sub> %  
 O<sub>2</sub> %  
 THC ppm  
 NO<sub>x</sub> ppm  
 SO<sub>2</sub> ppm

CALIBRATION ERROR - 0642 hrs					SYSTEM BIAS CHECK					Calibration Correction Factors
Cylinder Value (% or ppm)	Cylinder Number	Analyzer Calibration Response	Time	Pretest: 0716 hrs		1330 hrs		Drift (% of Span)		
				System Response	Time	System Response	Time			
CO Zero	0.0	CC64093	-1.4		1.1		1.6		Co=	
CO Low		ALM1003354								
CO Mid	250.0		251.9		249.2		259.1		Cm=	
CO High	500.0	1080	500.1							
CO <sub>2</sub> Zero	0.00	CC64098	0.07		0.08		0.16		Co=	
CO <sub>2</sub> Low		CC73859								
CO <sub>2</sub> Mid	4.32		4.46		4.30		<del>4.48</del> 4.48		Cm=	
CO <sub>2</sub> High	8.63	19.60	8.61							
O <sub>2</sub> Zero	0.00	CC64098	0.05		0.12		0.06		Co=	
O <sub>2</sub> Low		CC73859								
O <sub>2</sub> Mid	5.00		5.12		5.04		5.13		Cm=	
O <sub>2</sub> High	10.00	22.70	9.94							
THC Zero	0.0	CC64098	0.1		0.1		0.6		Co=	
THC Low	20.0	ALM1005822	30.7		30.7		29.6			
THC Mid	50.0		50.5						Cm=	
THC High	90.0	999.8	89.5							

# CEMS CALIBRATION DATA



Plant Valero  
 Location Port Arthur, Texas  
 Source SRU-544  
 Date 6-16-11  
 Run Number SRU544-0010-2, SRU544-16A-2, SRU544-TR5-2  
 Start Time 1358  
 Stop Time 1808

Plant Rep. Robin Hill  
 Team Leader Greg Duvall  
 CEM Operator Greg Duvall

## Analyzer Span Values (% or ppm)

CO ppm  
 CO<sub>2</sub> %  
 O<sub>2</sub> %  
 THC ppm  
 NO<sub>x</sub> ppm  
 SO<sub>2</sub> ppm

	CALIBRATION ERROR - 0642 hrs				SYSTEM BIAS CHECK					Calibration Correction Factors
	Cylinder Value (% or ppm)	Cylinder Number	Analyzer Calibration Response	Time	Pretest: 1330 hrs	1840 hrs	System Response	Time	Drift (% of Span)	
CO Zero	0.0	CC64098	-1.4		1.6		-0.7			Co=
CO Low		ALM003354								
CO Mid	250	1080	251.9		254.1		251.6			Cm=
CO High	500		500.1							
CO <sub>2</sub> Zero	0.00	CC64098	0.07		0.16		0.11			Co=
CO <sub>2</sub> Low		CC73859								
CO <sub>2</sub> Mid	4.32		4.46		4.48		4.34			Cm=
CO <sub>2</sub> High	8.63	19.60	8.61							
O <sub>2</sub> Zero	0.60	CC64098	0.05		0.06		0.14			Co=
O <sub>2</sub> Low		CC73859								
O <sub>2</sub> Mid	5.00		5.12		5.13		5.04			Cm=
O <sub>2</sub> High	10.00	22.70	9.94							
THC Zero	0.0	CC64098	0.1		0.6		0.4			Co=
THC Low	30.0	CC73859	30.7							
THC Mid	50.0	ALM003322	50.5		29.6		30.1			Cm=
THC High	90.0	999.8	89.5							

# CEMS CALIBRATION DATA



Plant Valero  
 Location Port Arthur, Texas  
 Source SRU-544  
 Date 6-18-11  
 Run Number SRU544-0010-3, SRU544-16A-3, SRU544-15-3  
 Start Time 0728  
 Stop Time 1207

Plant Rep. Robin Hill  
 Team Leader Greg Durck  
 CEM Operator Greg Durck

## Analyzer Span Values (% or ppm)

CO ppm  
 CO<sub>2</sub> %  
 O<sub>2</sub> %  
 THC ppm  
 NO<sub>x</sub> ppm  
 SO<sub>2</sub> ppm

	CALIBRATION ERROR - 0643 hrs				SYSTEM BIAS CHECK					Calibration Correction Factors
	Cylinder Value (% or ppm)	Cylinder Number	Analyzer Calibration Response	Time	Pretest: 0707 hrs		1243 hrs		Drift (% of Span)	
					System Response	Time	System Response	Time		
CO Zero	0.0	CC64098	-1.3		-0.3		1.6			Co=
CO Low		AL1003354								
CO Mid	250		254.3		251.7		252.1			Cm=
CO High	500	1080	502.0							
CO <sub>2</sub> Zero	0.00	CC64098	0.08		0.08		0.23			Co=
CO <sub>2</sub> Low		CC73859								
CO <sub>2</sub> Mid	4.32		4.45		4.33		4.35			Cm=
CO <sub>2</sub> High	8.63	19.60	8.60							
O <sub>2</sub> Zero	0.00	CC64098	0.06		0.10		0.07			Co=
O <sub>2</sub> Low		CC73859								
O <sub>2</sub> Mid	5.00		5.11		5.04		5.13			Cm=
O <sub>2</sub> High	10.00	22.70	9.93							
THC Zero	0.0	CC64098	0.3		0.7		0.7			Co=
THC Low	30.0	CC73859	30.7		30.7		29.8			
THC Mid	50.0	AL1005322	51.0							Cm=
THC High	90.0	997.8	87.6							



# FIELD DATA SHEET

Plant:	<u>Jack</u>	Meter No.:	<u>1105001</u>	Ambient Temperature:	<u>-90</u>
Date:	<u>6/16/11</u>	Y Factor:	<u>1.000</u>	Barometric Pressure:	<u>29.85</u>
Location:	<u>Port Arthur TX</u>	Trap Contents:	<u>3% H<sub>2</sub>O</u>	Stack Diameter:	<u>67</u>
Source:	<u>SRU</u>	USEPA Method:	<u>16A</u>	Pre-Test Leak Check:	<u>20.002/ok</u>
Run No.:	<u>SRU-16A-1</u>	Compound Analysis:	<u>TR5</u>	Post-Test Leak Check:	
Operators:	<u>AH</u>	Spike in Trap (Y/N):			
Comments:					

Clock Time	Sampling Time (min)	Meter Pressure (in. H <sub>2</sub> O)	Sample Vacuum (in. Hg)	Gas Sample Rate (liters/min)	Gas Sample Volume (V <sub>m</sub> liters)	Gas Meter Temperature (°F)
1028	0	40	6	2.0	0.000	92
	10	40	6	2.0	21.45	92
	20	40	6	2.0	43.96	94
	30	40	6	2.0	66.41	95
	40	40	6	2.0	88.72	97
	50	40	6	2.0	110.72	98
	60	40	6	2.0	132.40	99
	70	40	6	2.0	153.87	99
	80	40	6	2.0	175.33	99
	90	40	6	2.0	196.18	100
	100	40	6	2.0	217.13	100
	110	40	6	2.0	235.36	100
	120	40	6	2.0	256.51	101
	130	40	6	2.0	277.07	101
	140	40	6	2.0	298.91	101
	150	40	6	2.0	318.37	101
	160	40	6	2.0	337.89	100
	170	40	6	2.0	357.41	100
1328	180				371.664	
				2.0	371.664	98.3

801  
 799  
 800  
 800  
 800  
 800  
 801  
 799  
 800  
 799  
 800  
 800  
 800  
 800  
 800  
 801





# FIELD DATA SHEET

Plant:	Valero	Meter No.:	1105002	Ambient Temperature:	~95
Date:	6/16/11	Y Factor:	1.000	Barometric Pressure:	29.85
Location:	Port Arthur, TX	Trap Contents:	380 H <sub>2</sub> O	Stack Diameter:	6.7
Source:	SRU	USEPA Method:	16A	Pre-Test Leak Check:	no leak
Run No.:	SRU-16A-2	Compound Analysis:	TPS	Post-Test Leak Check:	no leak
Operators:	AA				
Comments:					

Clock Time	Sampling Time (min)	Meter Pressure (in. H <sub>2</sub> O)	Sample Vacuum (in. Hg)	Gas Sample Rate (liters/min)	Gas Sample Volume (Vm liters)	Gas Meter Temperature (°F)	Furnace Temp (°C)
1442	0	35	10	2.0	0.000	105	799
	10	35	10	2.0	20.21	105	800
	20	35	10	2.0	41.46	106	800
	30	35	10	2.0	61.91	107	800
	40	35	10	2.0	82.41	108	800
	50	35	10	2.0	103.10	109	801
	60	35	10	2.0	123.51	109	800
	70	35	10	2.0	141.93	109	801
	80	35	10	2.0	160.75	110	800
	90	35	10	2.0	180.52	110	800
	100	35	10	2.0	200.33	110	801
	110	35	10	2.0	220.91	109	800
	120	35	10	2.0	241.88	108	800
	130	35	10	2.0	262.51	108	800
	140	35	10	2.0	283.60	108	800
	150	35	10	2.0	303.79	107	800
	160	35	10	2.0	323.87	106	800
	170	35	10	2.0	342.02	106	800
1742	180				362.636		
							107.8
				7.0	362.636		
				35			



## FIELD DATA SHEET

Plant:	Valero	Meter No.:	1105002	Ambient Temperature:	~95
Date:	6/16/11	Y Factor:	1.000	Barometric Pressure:	29.85
Location:	Post Art-Hwy 7A	Trap Contents:	32g H <sub>2</sub> O	Stack Diameter:	67
Source:	SRU	USEPA Method:	16A	Pre-Test Leak Check:	0.002 J of
Run No.:	SRU-16A-2RS	Compound Analysis:	TRS	Post-Test Leak Check:	0.002 J of
Operators:	AT	Spike in Trap (Y/N):			
Comments:					

[illegible]

Euphorbia  
 Temp  
 100  
 100  
 100  
 100  
 100  
 100



Clock Time	Sampling Time (min)	Meter Pressure (in. H <sub>2</sub> O)	Sample Vacuum (in. Hg)	Gas Sample Rate (liters/min)	Gas Sample Volume (Vm liters)	Gas Meter Temperature (°F)
00:00:00	0	35	40	2.0	6.000	91.8
	10	35	40	2.0	20.17	92
	20	35	40	2.0	41.31	93
	30	35	40	2.0	62.53	94
	40	35	40	2.0	83.71	94
	50	35	40	2.0	104.86	94
	60	35	40	2.0	124.13	94
	70	35	40	2.0	144.27	95
	80	35	40	2.0	164.03	96
	90	35	40	2.0	184.27	96
	100	35	40	2.0	204.56	97
	110	35	40	2.0	224.43	97
	120	35	40	2.0	244.37	97
	130	35	40	2.0	264.51	98
	140	35	40	2.0	284.74	98
	150	35	40	2.0	304.26	98
	160	35	40	2.0	324.63	98
	170	35	40	2.0	344.17	98



# Analytical Titration Data Sheet – USEPA Methods 6 and/or 8



Company: Valero  
 Location: Port Arthur, TX  
 Source: SRU-544  
 Analytical Date: 6-16-11  
 Analyst: JB

BaCl<sub>2</sub> Normality: 0.0101 0.00992

0.01N H<sub>2</sub>SO<sub>4</sub> Standardization  
 #1: 25.3 mL  
 #2: 25.1 mL  
 Average: 25.2 mL

Blank  
 #1: 0.1 mL  
 #2: 0.1 mL  
 Average (V<sub>tb</sub>): 0.1 mL

Run No.	Aliquot Volume (V <sub>a</sub> ) mL	Sample Volume (V <sub>soln</sub> ) mL	Volume of Titrant (V <sub>t</sub> ) mL
1A	20	100	0.2
1B	20	100	0.2
RS 1A	20	100	2.5
RS 1B	20	100	2.4
2A	20	100	0.4
2B	20	100	0.4
RS 2A	20	100	3.9
RS 2B	20	100	3.7
3A	20	100	0.5
3B	20	100	0.3
RS 3A	20	100	3.9
RS 3B	20	100	3.8



# FIELD DATA SHEET

[illegible]



# IMPINGER RECOVERY DATA SHEET

Company:  
Location:  
Source:  
Run No.:

Valero  
Dort Arthm  
524 SRK  
SRK - 18-1A

Date Set-up:  
Test Date:  
Date Recovered:  
USEPA Method:  
Corresponding Filter No:  
Filter Container No:

6/14/11  
6/15/11  
6/15/11  
1g  
N/A  
N/A

Measurement Method: Weight or Volume

*Labeled spike*

Impinger No.	Impinger Contents	Initial wt/vol g/mL	Final wt/vol g/mL	Difference wt/vol g/mL	Sample Container No.
1	<u>Empty</u>	<u>82.0</u>	<u>82.4</u>	<u>0.4</u>	
2	<u>Methanol</u>	<u>91.5</u>	<u>93.5</u>	<u>2.0</u>	
3	<u>Methanol</u>	<u>97.8</u>	<u>97.6</u>	<u>-0.2</u>	
4	<u>Methanol</u>	<u>97.4</u>	<u>97.6</u>	<u>0.2</u>	
5	<u>Silica Gel</u>	<u>107.2</u>	<u>111.8</u>	<u>4.6</u>	
6					

- ① 1CR Deut. Field Spk  
L1010588-21 #14
- ② 1CR Deut. Field Spk  
L1010588-16 #9
- ③ 1CR Native Spk  
L1010588-25 #8



# FIELD DATA SHEET

Plant: Wabco Meter No.: 1105002 Ambient Temperature: ~90  
 Date: 6/15/11 Y Factor: 1.000 Barometric Pressure: 29.82  
 Location: Port Arthur, TX Trap Contents: Methanol Stack Diameter: 67  
 Source: SPU USEPA Method: 18 Pre-Test Leak Check: <0.002 Jsk  
 Run No.: SRW-18-1N Compound Analysis: 2R Speciated Volatiles Post-Test Leak Check: 900 Jsk  
 Operators: AH Spike in Trap (Y/N): Y-Labelled - L1010588-21  
 Comments: Y-Notified - L1010588-25

Clock Time	Sampling Time (min)	Meter Pressure (in. H <sub>2</sub> O)	Sample Vacuum (in. Hg)	Gas Sample Rate (liters/min)	Gas Sample Volume (V <sub>m</sub> liters)	Gas Meter Temperature (°F)
1253	0	0	0	0.20	0.000	87
	5	0	0	0.20	2.31	87
	10	0	0	0.20	3.53	87
	15	0	0	0.20	4.76	87
	20	0	0	0.20	5.99	87
	25	0	0	0.20	7.46	87
	30	0	0	0.20	8.87	87
	35	0	0	0.20	10.38	87
	40	0	0	0.20	11.77	87
	45	0	0	0.20	13.17	87
	50	0	0	0.20	15.34	87
	55	0	0	0.20	16.64	87
1353	60				18.199	
						87.0



IMPINGER RECOVERY DATA SHEET

Company:	Valero	Date Set-up:	6/14/11
Location:	Port Arthur	Test Date:	6/15/11
Source:	SRH SRH	Date Recovered:	6/15/11
Run No.:	SRH-18-18	USEPA Method:	18
		Corresponding Filter No:	N/A
		Filter Container No:	N/A

Labelled +  
Native

Measurement Method:		Weight or Volume	
Impinger No.	Impinger Contents	Initial wt/vol g/mL	Final wt/vol g/mL
1	Empty	83.3	85.9
2	Methanol	92.0	96.0
3	Methanol	97.8	98.1
4	Methanol	98.6	99.1
5	Silica Gel	107.4	110.3
6			
		Difference wt/vol g/mL	Sample Container No.
		2.6	
		4.0	
		0.3	
		0.5	
		2.9	



## FIELD DATA SHEET

[illegible]



Company:  
Location:  
Source:  
Run No.:

Vulero  
Port Arthur  
544 SPR  
SPR-18-2A

Corresponding Filter No:

Date Set-up:  
Test Date:  
Date Recovered:  
USEPA Method:  
Corresponding Filter No:  
Filter Container No:

6/15/11  
6/15/11  
6/15/11  
18  
N/A  
N/A

# IMPINGER RECOVERY DATA SHEET

OCR D.  
L1010588-17  
#10  
L1010588-15  
#8  
Native L1010588-24  
#7

## Measurement Method: Weight or Volume

*Labeld spike only*

Impinger No.	Impinger Contents	Initial wt/vol g/mL	Final wt/vol g/mL	Difference wt/vol g/mL	Sample Container No.
1	Empty	82.0	<del>82.7</del> 83.0	1.0	
2	Methanol	91.8	<del>43.5</del> 101.6	9.8	
3	Methanol	98.7	104.3	5.6	
4	Methanol	97.7	86.0	-11.7	
5	Silica Gel	107.5	107.8	0.3	
6					



# FIELD DATA SHEET

Plant: Valero Meter No.: 1105002 Ambient Temperature: ~90  
 Date: 6/15/11 Y Factor: 1.000 Barometric Pressure: 29.85  
 Location: Port Arthur, TX Trap Contents: Heptanol Stack Diameter: 67  
 Source: SRU USEPA Method: 18 Pre-Test Leak Check: <0.002 Jcf  
 Run No.: SRU-18-2N Compound Analysis: ICR Separated Volatiles Post-Test Leak Check: <0.002 Jcf  
 Operators: AK Spike in Trap (Y/N): Y-Labelled - 61010588-5  
 Comments: Y-Notative - 61010588-24

Clock Time	Sampling Time (min)	Meter Pressure (in. H <sub>2</sub> O)	Sample Vacuum (in. Hg)	Gas Sample Rate (liters/min)	Gas Sample Volume (V <sub>m</sub> liters)	Gas Meter Temperature (°F)
1602	0	5	0	0.20	0.000	88
	5	5	0	0.20	1.49	88
	10	5	0	0.20	2.95	88
	15	5	0	0.20	4.74	88
	20	5	0	0.20	6.21	88
	25	5	0	0.20	7.98	88
	30	5	0	0.20	9.94	88
	35	5	0	0.20	11.53	88
	40	5	0	0.20	13.48	88
	45	5	0	0.20	15.17	89
	50	5	0	0.20	16.82	89
	55	5	0	0.20	18.53	89
1702	60				20.358	
						88.3



IMPINGER RECOVERY DATA SHEET

Company:	<u>Valero</u>	Date Set-up:	<u>6/15/11</u>
Location:	<u>Port Arthur</u>	Test Date:	<u>6/15/11</u>
Source:	<u>544 SRU</u>	Date Recovered:	<u>6/15/11</u>
Run No.:	<u>SRU-18-28</u>	USEPA Method:	<u>18</u>
		Corresponding Filter No:	<u>NA</u>
		Filter Container No:	<u>NA</u>

Labeled + Native Spike		Measurement Method:	Weight or Volume		
Impinger No.	Impinger Contents	Initial wt/vol g/mL	Final wt/vol g/mL	Difference wt/vol g/mL	Sample Container No.
1	Empty	83.6	83.8	0.2	
2	Methanol	91.8	98.7	6.9	
3	Methanol	97.2	97.1	-0.1	
4	Methanol	97.8	97.8	0.0	
5	Silica gel	107.6	109.8	2.2	
6					



# FIELD DATA SHEET

Plant: Valero Meter No.: 1106003 Ambient Temperature: -85  
 Date: 6/15/11 Y Factor: 1.000 Barometric Pressure: 29.85  
 Location: Port Arthur, TX Trap Contents: Methanol Stack Diameter: 67  
 Source: SRU USEPA Method: 18 Pre-Test Leak Check: 0.002 J of  
 Run No.: SRU-18-3 Compound Analysis: ICP Speciated Volatiles Post-Test Leak Check: 0.002 J of  
 Operators: AA Spike in Trap (Y/N): Y (1010588-18-Labelled)  
 Comments:

Clock Time	Sampling Time (min)	Meter Pressure (in. H <sub>2</sub> O)	Sample Vacuum (in. Hg)	Gas Sample Rate (liters/min)	Gas Sample Volume (V <sub>m</sub> liters)	Gas Meter Temperature (°F)
0727	0	5	0	0.20	18.18 0.020	83
	5	5	0	0.20	18.286 1.18	84
	10	5	0	0.20	18.457 2.86	84
	15	5	0	0.20	4.57	84
	20	5	0	0.20	6.01	84
	25	5	0	0.20	7.73	84
	30	5	0	0.20	9.26	84
	35	5	0	0.20	10.90	85
	40	5	0	0.20	12.43	85
	45	5	0	0.20	14.01	85
	50	5	0	0.20	15.64	85
	55	5	0	0.20	17.27	85
0827	60				18.821	
						843



# IMPINGER RECOVERY DATA SHEET

Company:  
Location:  
Source:  
Run No.:

Valero  
Port Arthur  
544 S2U  
S2U-18-3A

Date Set-up:  
Test Date:  
Date Recovered:  
USEPA Method:  
Corresponding Filter No:  
Filter Container No:

6/15/11  
6/16/11  
6/16/11  
18  
N/A  
N/A

Measurement Method: Weight or Volume

Labelled spike

Impinger No.	Impinger Contents	Initial wt/vol g/mL	Final wt/vol g/mL	Difference wt/vol g/mL	Sample Container No.
1	Empty	82.1	82.2	0.1	
2	Methanol	91.8	95.2	3.4	
3	Methanol	98.0	98.0	0.0	
4	Methanol	97.7	97.8	0.1	
5	Silica Gel	107.2	108.7	1.5	
6					

Labelled  
L1010 588-16  
-19

Native  
-22



# FIELD DATA SHEET

[illegible]



# IMPINGER RECOVERY DATA SHEET

Company: Valsco  
 Location: Port Arthur  
 Source: 544 SRU  
 Run No.: SRU-18-3B  
 Date Set-up: 6/15/11  
 Test Date: 6/16/11  
 Date Recovered: 6/16/11  
 USEPA Method: 18  
 Corresponding Filter No: N/A  
 Filter Container No: N/A

## Measurement Method: Weight or Volume

*Labeled & Native Spike*

Impinger No.	Impinger Contents	Initial wt/vol g/mL	Final wt/vol g/mL	Difference wt/vol g/mL	Sample Container No.
1	Empty	83.4	85.5	2.1	
2	Methanol	92.3	97.9	5.6	
3	Methanol	97.8	97.8	0.0	
4	Methanol	98.5	98.7	0.2	
5	Silica Gel	107.2	109.3	2.1	
6					



# FIELD DATA SHEET

Plant: Valero  
 Date: 6/15/11  
 Location: Port Arthur, TX  
 Source: SRU  
 Run No.: SRU-308-13  
 Operators: AM  
 Comments: \_\_\_\_\_  
 Meter No.: 1105003  
 Y Factor: 1.000  
 Trap Contents: Water/56  
 USEPA Method: 308  
 Compound Analysis: Netheneo  
 Spike in Trap (Y/N): N  
 Ambient Temperature: ~90  
 Barometric Pressure: 29.85  
 Stack Diameter: 67  
 Pre-Test Leak Check: <0.002 of  
 Post-Test Leak Check: <0.002 of

Clock Time	Sampling Time (min)	Meter Pressure $\frac{1}{2}$ "(Hr. H <sub>2</sub> O)	Sample Vacuum (in. Hg)	Gas Sample Rate (liters/min)	Gas Sample Volume (Vm liters)	Gas Meter Temperature (°F)
1420	0	10	0	0.90	0.000	89
	5	10	0	0.90	3.97	89
	10	10	0	0.90	7.92	89
	15	10	0	0.90	11.91	89
	20	10	0	0.90	17.87	89
	25	10	0	0.90	23.04	89
	30	10	0	0.90	29.01	90
	35	10	0	0.90	34.63	90
	40	10	0	0.90	39.53	90
	45	10	0	0.90	45.16	90
	50	10	0	0.90	50.23	90
	55	10	0	0.90	55.67	90
1520	60				60.89	
						89.5



# FIELD DATA SHEET

Plant: Valero Meter No.: 1105003 Ambient Temperature: ~90  
 Date: 6/15/11 Y Factor: 1.000 Barometric Pressure: 29.85  
 Location: Post Arthur, TX Trap Contents: Water / SG Stack Diameter: 67  
 Source: SRU USEPA Method: 308 Pre-Test Leak Check: <0.002 J of  
 Run No.: SRU-308-15 Compound Analysis: Methanol Post-Test Leak Check: <0.002 J of  
 Operators: AT Spike in Trap (Y/N): Y  
 Comments:

Clock Time	Sampling Time (min)	Meter Pressure (in. H <sub>2</sub> O)	Sample Vacuum (in. Hg)	Gas Sample Rate (liters/min)	Gas Sample Volume (Vm liters)	Gas Meter Temperature (°F)
1420	0	10	0	0.9	0.00	87
	5	10	0	0.9	4.12	87
	10	10	0	0.9	8.34	87
	15	10	0	0.9	13.37	87
	20	10	0	0.9	18.72	88
	25	10	0	0.9	23.46	88
	30	10	0	0.9	28.78	88
	35	10	0	0.9	33.99	88
	40	10	0	0.9	39.42	88
	45	10	0	0.9	44.91	88
	50	10	0	0.9	49.80	88
	55	10	0	0.9	55.08	88
1520	60				60.18	
						87.8



# IMPINGER RECOVERY DATA SHEET

Company: Valero  
 Location: Port Arthur  
 Source: 544 SRU  
 Run No.: SRU - 308 - 10  
 Date Set-up: 6/15/11  
 Test Date: 6/15/11  
 Date Recovered: 6/15/11  
 USEPA Method: 308  
 Corresponding Filter No: N/A  
 Filter Container No: N/A

## Measurement Method: Weight or Volume

Impinger No.	Impinger Contents	Initial wt/vol (g/mL)	Final wt/vol (g/mL)	Difference wt/vol (g/mL)	Sample Container No.
1	Empty	83.3	88.1	4.8	
2	Water	103.0	103.1	0.1	
<del>3</del>					
<del>4</del> 1	Empty	<del>84.9</del> 83.3	87.3	4.0	
<del>5</del> 2	Spiked Soln	103.3	103.5	0.2	
<del>6</del>					



# FIELD DATA SHEET

Plant:	Valero	Meter No.:	1105003	Ambient Temperature:	~90
Date:	6/15/11	Y Factor:	1000	Barometric Pressure:	29.85
Location:	Port Arthur, TX	Trap Contents:	Water / 56	Stack Diameter:	67
Source:	SR4	USEPA Method:	308	Pre-Test Leak Check:	<0.002 Jof
Run No.:	SR4-308-2	Compound Analysis:	Methanol	Post-Test Leak Check:	<0.002 Jof
Operators:	AT	Spike in Trap (Y/N):	N		
Comments:					

[illegible]



# FIELD DATA SHEET

[illegible]



# IMPINGER RECOVERY DATA SHEET

Company:	Valero	Date Set-up:	6/15/11
Location:	Port Arthur	Test Date:	6/15/11
Source:	542 SRU	Date Recovered:	6/15/11
Run No.:	SRU-306-2	USEPA Method:	308
		Corresponding Filter No:	N/A
		Filter Container No:	N/A

## Measurement Method: Weight or Volume

Impinger No.	Impinger Contents	Initial wt/vol g/mL	Final wt/vol g/mL	Difference wt/vol g/mL	Sample Container No.
1	Empty	83.8	84.2	0.4	
2	Water	102.8	103.1	0.3	
<del>3</del>					
<del>4</del> 1	Empty	81.9	86.5	4.6	
<del>5</del> 2	Spiked Solu	105.4	105.4	0.0	
<del>6</del>					



# FIELD DATA SHEET

[illegible]



# FIELD DATA SHEET

Plant:	Urbco	Meter No.:	1105002	Ambient Temperature:	~90
Date:	6/16/11	Y Factor:	1.000	Barometric Pressure:	29.85
Location:	Port Arthur, TX	Trap Contents:	Water/SL	Stack Diameter:	67
Source:	SRU	USEPA Method:	308	Pre-Test Leak Check:	<0.002 Jpf
Run No.:	SRU-308-35	Compound Analysis:	Methanol	Post-Test Leak Check:	<0.002 Jpf
Operators:	AT	Spike in Trap (Y/N):	Y		
Comments:					

Clock Time	Sampling Time (min)	Meter Pressure (in. H <sub>2</sub> O)	Sample Vacuum (in. Hg)	Gas Sample Rate (liters/min)	Gas Sample Volume (Nm liters)	Gas Meter Temperature (°F)
0845	0	15	0	0.9	0.000	84
	5	15	0	0.9	5.13	84
	10	15	0	0.9	10.35	84
	15	15	0	0.9	15.64	84
	20	15	0	0.9	20.42	84
	25	15	0	0.9	25.10	85
	30	15	0	0.9	30.29	85
	35	15	0	0.9	35.27	85
	40	15	0	0.9	40.20	85
	45	15	0	0.9	45.16	85
	50	15	0	0.9	50.81	85
	55	15	0	0.9	55.13	85
0945	60				60.051	
						84.6



Company:  
Location:  
Source:  
Run No.:

Valero  
Port Arthur  
544 SR4  
544-308-3

Date Set-up:  
Test Date:  
Date Recovered:  
USEPA Method:  
Corresponding Filter No:  
Filter Container No:

6/13/11  
6/16/11  
6/16/11  
308  
N/A  
N/A

# IMPINGER RECOVERY DATA SHEET

Measurement Method: Weight or Volume

Impinger No.	Impinger Contents	Initial wt/vol g/mL	Final wt/vol g/mL	Difference wt/vol g/mL	Sample Container No.
1	Empty	83.5	87.7	4.2	
2	Water	103.2	103.2	0.0	
<del>3</del>					
<del>4</del>	Empty	83.4	87.4	4.0	
<del>5</del>	Spike Solu	103.2	103.4	0.2	
<del>6</del>					



# FIELD DATA

PLANT	14500	AMBIENT TEMPERATURE	89	PROBE HEATER SETTING	245	WEIGHT OF PARTICULATE, mg	
DATE	6/16/11	BAROMETRIC PRESSURE	29.85	HEATER BOX SETTING	1255	Filter No.	
LOCATION	Post Arthur	ASSUMED MOISTURE, %	120	METER H <sub>2</sub> O	0.84	Sample	
OPERATOR	Knoyer	PROBE LENGTH, in.	0.508	C <sub>2</sub> FACTOR	0.987	Final wt	
STACK NO	54450	NOZZLE DIAMETER, in.	67	PITOT/THERM #	P108	Wt gain	
RUN NO.	54450-0010-1	STACK DIAMETER, in.	72				
SAMPLE BOX NO	104027	MINUTES PER POINT	2				
METER BOX NO	0909	NUMBER OF POINTS					
START TIME		NUMBER OF PORTS					

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (9) min.	STATIC PRESSURE (in. H <sub>2</sub> O)	STACK TEMP (T <sub>g</sub> ) °F	VELOCITY		GAS SAMPLE VOLUME (V <sub>m</sub> ) ft <sup>3</sup>	DIFFERENTIAL ACROSS ORIFICE METER		GAS SAMPLE DRY GAS METER INLET (T <sub>in</sub> ) °F	GAS SAMPLE DRY GAS METER OUTLET (T <sub>out</sub> ) °F	COND. EXIT TEMP °F	SORBENT MODULE TEMP °F	LAST IMPINGER OUTLET TEMP °F	PUMP VACUUM in. Hg
					(ΔP <sub>s</sub> )	HEAD (ΔP <sub>s</sub> )		ACTUAL	DESIRED						
0909	86	0	2.05	1103	0.080	0.080	702.655	1.70	1.70	87	1114	57	57	58	5.0
0929	5	20		1110	0.090	0.090	718.14	1.90	1.90	88	247	56	56	58	5.0
0949	4	40		1114	0.110	0.110	733.84	2.30	2.30	90	246	59	58	60	5.0
1009	3	60		1118	0.110	0.110	751.43	2.30	2.30	91	243	64	62	65	5.0
1029	2	80		1124	0.095	0.095	768.90	2.0	2.0	92	242	58	57	60	5.0
1049	1	100		1128	0.080	0.080	785.51	1.70	1.70	93	242	58	57	59	5.0
1109/1121	45	120		1118	0.075	0.075	800.643	1.60	1.60	92	242	63	60	64	5.0
1141	5	140		1121	0.085	0.085	815.42	1.80	1.80	93	241	57	57	58	5.0
1201	4	160		1123	0.105	0.105	831.07	2.20	2.20	94	242	58	58	59	5.0
1221	3	180		1128	0.110	0.110	848.10	2.30	2.30	94	241	60	60	62	5.0
1241	2	200		1119	0.095	0.095	865.70	2.0	2.0	94	244	57	57	58	5.0
1301	1	220		1110	0.085	0.085	882.05	1.70	1.70	94	241	58	57	59	5.0
1321	END	240					899.096								
AVERAGE	12	240		1117.3	0.0929	0.0911	194.4410	1.583	1.583						

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g)	SILICA GEL WEIGHT	ORSAT DATA	TIME	CO <sub>2</sub>	O <sub>2</sub>
FINAL	#1	#2	TRIAL 1			
INITIAL	#3	#4	TRIAL 2			
LIQUID COLLECTED			TRIAL 3			
TOTAL	COLLECTED (specify ml or g)		AVERAGE			

LEAK CHECK  
SYSTEM PRE: 0.010 CFM@15"Hg  
POST: 0.010 CFM@15"Hg  
PITOT PRE: ✓ @ > 3"H<sub>2</sub>O  
POST: ✓ @ > 3"H<sub>2</sub>O



# IMPINGER RECOVERY DATA SHEET

Company: Valero  
Location: Port Arthur, TX  
Source: SRU-544  
Run No.: SRU-0010-1

Date Set-up: 6-16-11  
Test Date: 6-16-11  
Date Recovered: 6-16-11  
USEPA Method: 0010  
Corresponding Filter No: 44772  
Filter Container No: 891.0 mg

## Measurement Method: Weight or Volume

Impinger No.	Impinger Contents	Initial wt/vol g/mL	Final wt/vol g/mL	Difference wt/vol g/mL	Sample Container No.
1 KO	Empty	346.8	818.9	472.1	
2	Water	707.3	705.8	<del>85</del> 1.5	
3	Water	685.8	688.9	3.1	
4	Empty	613.6	616.4	2.8	
5	Silica Gel	808.9	844.2	35.3	
6				<u>511.8</u>	



# FIELD DATA

B-42

DATE 6/16/11  
LOCATION Port Arthur  
OPERATOR Knap  
STACK NO 544 SEJ  
RUN NO 5445A1-0010-2  
SAMPLE BOX NO 104027  
METER BOX NO 1258  
START TIME 1258

AMBIENT TEMPERATURE 94  
BAROMETRIC PRESSURE 29.85  
ASSUMED MOISTURE, % 120  
PROBE LENGTH, in. 120  
NOZZLE DIAMETER, in. 0.508  
STACK DIAMETER, in. 67  
MINUTES PER POINT 20  
NUMBER OF PORTS 12

PROBE HEATER SETTING  
HEATER BOX SETTING  
METER H<sub>2</sub>  
C<sub>2</sub> FACTOR  
Y<sub>2</sub> FACTOR  
PITOT/TERM #

WEIGHT OF PARTICULATE, mg  
Filter No.  
Sample  
Final wt  
Tare wt  
Wt. gain

A= B=  
SAME AS method 1

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (g) min.	STATIC PRESSURE (in. H <sub>2</sub> O)	STACK TEMP (T <sub>g</sub> ) °F	VELOCITY HEAD (ΔP <sub>h</sub> )	VELOCITY (ΔP <sub>h</sub> )	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H <sub>2</sub> O		GAS SAMPLE VOLUME (V <sub>m</sub> ) ft <sup>3</sup>	GAS SAMPLE TEMP AT DRY GAS METER (T <sub>mg</sub> ) °F		COND. EXIT TEMP °F	SORBENT MODULE TEMP °F	LAST IMPINGER OUTLET TEMP °F	PUMP VACUUM in. Hg
							ACTUAL	DESIRED		INLET (T <sub>mg</sub> ) °F	OUTLET (T <sub>mg</sub> ) °F				
1358	6	0	0.05	1101	0.080	0.080	1.70	1.70	846.773	91	NA	58	58	60	5.0
1408	6	10		1104	0.080	0.080	1.70	1.70	904.10	91		58	57	58	5.0
1418	5	20		1108	0.095	0.095	2.0	2.0	911.54	91		58	57	58	5.0
1428	5	30		1111	0.106	0.106	2.30	2.30	919.70	91		58	57	58	5.0
1438	4	40		1117	0.110	0.110	2.30	2.30	928.20	91		58	57	58	5.0
1448	4	50		1114	0.110	0.110	2.30	2.30	936.72	91		58	57	58	5.0
1458	3	60		1121	0.115	0.115	2.40	2.40	945.52	91		58	57	58	5.0
1508	3	70		1124	0.110	0.110	2.30	2.30	954.56	91		58	57	58	5.0
1518	2	80		1118	0.095	0.095	2.0	2.0	963.42	91		58	57	58	5.0
1528	2	90		1117	0.095	0.095	2.0	2.0	971.50	91		58	57	58	5.0
1538	1	100		1109	0.085	0.085	1.80	1.80	979.61	91		58	57	58	5.0
1548	1	110		1110	0.085	0.085	1.80	1.80	987.40	90		58	57	58	5.0
1558	6	120		1101	0.080	0.080	1.70	1.70	995.232	90		58	57	58	5.0
1608	5	130		1104	0.080	0.080	1.70	1.70	1002.61	90		58	57	58	5.0
1618	5	140		1109	0.090	0.090	1.90	1.90	1009.94	90		58	57	58	5.0
1628	5	150		1108	0.095	0.095	2.0	2.0	1017.37	90		58	57	58	5.0
1638	4	160		1111	0.105	0.105	2.20	2.20	1025.51	90		58	57	58	5.0
1648	4	170		1110	0.110	0.110	2.30	2.30	1034.46	90		58	57	58	5.0
1658	4	180		1116	0.110	0.110	2.30	2.30	1042.76	90		58	57	58	5.0
1708	3	190		1114	0.110	0.110	2.30	2.30	1051.82	90		58	57	58	5.0
1718	3	200		1121	0.090	0.090	1.80	1.80	1060.25	90		58	57	58	5.0
1728	2	210		1115	0.085	0.085	1.80	1.80	1068.31	90		58	57	58	5.0
1738	2	220		1109	0.080	0.080	1.70	1.70	1076.11	90		58	57	58	5.0
1748	1	230		1107	0.080	0.080	1.70	1.70	1083.68	90		58	57	58	5.0
1758	1	240							1091.46						5.0
1808															5.0
AVERAGE	12	240		1111.6	0.0948	0.0948	1.916	1.916	1044.23	90.5					

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	#1	#2	#3	#4	IMPINGER VOLUME (ml) OR WEIGHT (g)	SILICA GEL WEIGHT (g)
FINAL INITIAL						
LIQUID COLLECTED						
TOTAL						

ORSAT DATA	TIME	CO <sub>2</sub>	O <sub>2</sub>
TRIAL 1			
TRIAL 2			
TRIAL 3			
Average			

LEAK CHECK	
SYSTEM PRE: 0.010	CFM @ 15" Hg
POST: 0.010	CFM @ 15" Hg
PITOT PRE: ✓	@ > 3" H <sub>2</sub> O
POST: ✓	@ > 3" H <sub>2</sub> O



# IMPINGER RECOVERY DATA SHEET

Company: Valero  
 Location: Port Arthur, TX  
 Source: SRU-544  
 Run No.: SRU-0010-2  
 Date Set-up: 6-16-11  
 Test Date: 6-16-11  
 Date Recovered: 6-16-11  
 USEPA Method: 0010  
 Corresponding Filter No: 42995  
 Filter Container No: 779.6mg

## Measurement Method: Weight or Volume

Impinger No.	Impinger Contents	Initial wt/vol g/mL	Final wt/vol g/mL	Difference wt/vol g/mL	Sample Container No.
1	KO	357.1	795.7	438.6	
2	water	683.1	684.1	1.0	
3	water	683.3	685.6	2.3	
4	Empty	594.3	596.0	1.7	
5	Silica Gel	808.8	842.7	33.9	
6				477.5	

447.5



# FIELD DATA

DATE	6/17/11	VALERO	AMBIENT TEMPERATURE	84	PROBE HEATER SETTING	245	WEIGHT OF PARTICULATE, mg	
LOCATION	Port Arthur		BAROMETRIC PRESSURE	29.85	HEATER BOX SETTING	1.755	Filter No.	
OPERATOR	Knepp		ASSUMED MOISTURE, %	120.11	METER H <sub>2</sub> O	0.84	Sample	same
STACK NO	54980		PROBE LENGTH, in.	0.508	C <sub>2</sub> FACTOR	0.987	Final wt.	A3
RUN NO.	54450-0510-3		NOZZLE DIAMETER, in.	6.7	V <sub>2</sub> FACTOR	P108	Throw	Mo 4000
SAMPLE BOX NO	1104027		STACK DIAMETER, in.	12	PITOT/THERM #		Wt. gain	
METER BOX NO	0725		MINUTES PER POINT	2			TOTAL	
START TIME			NUMBER OF PORTS					

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (g) min.	STATIC PRESSURE (in. H <sub>2</sub> O)	STACK TEMP (T <sub>s</sub> ) °F	VELOCITY		GAS SAMPLE VOLUME (V <sub>m</sub> ) ft <sup>3</sup>	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H <sub>2</sub> O		GAS SAMPLE DRY GAS METER INLET (T <sub>inlet</sub> ) °F	GAS SAMPLE DRY GAS METER OUTLET (T <sub>outlet</sub> ) °F	SAMPLE BOX TEMP. °F	COND. EXIT TEMP. °F	SORBENT MODULE TEMP. °F	LAST IMPINGER OUTLET TEMP. °F	PUMP VACUUM in. Hg
					(ΔP <sub>s</sub> )	(ΔP <sub>s</sub> ) / ΔP <sub>h</sub>		ACTUAL	DESIRED							
0725	66	0	20.05	1102	0.080	0.080	91.604	1.70	1.70	82	N/A	248	61	61	65	4.0
0735	6	10		1109	0.080	0.080	98.92	1.70	1.70	83		247	57	56	57	4.0
0745	5	20		1110	0.085	0.085	106.31	2.0	2.0	84		245	56	57	57	4.0
0755	5	30		1113	0.100	0.100	114.40	2.10	2.10	86		244	57	57	58	4.0
0805	4	40		1111	0.105	0.105	122.52	2.20	2.20	87		243	58	57	59	4.0
0815	4	50		1117	0.103	0.103	131.13	2.20	2.20	87		241	59	57	60	4.0
0825	3	60		1122	0.110	0.110	135.54	2.30	2.30	87		243	62	63	63	4.0
0835	3	70		1126	0.115	0.115	148.22	2.40	2.40	87		244	57	57	58	4.0
0845	2	80		1124	0.095	0.095	157.61	2.0	2.0	87		242	57	56	57	4.0
0855	2	90		1120	0.090	0.090	165.33	1.90	1.90	88		244	58	58	59	4.0
0905	1	100		1116	0.085	0.085	173.23	1.80	1.80	88		245	59	60	60	4.0
0915	1	110		1112	0.080	0.080	180.97	1.70	1.70	88		243	60	61	62	4.0
0925	6	120		1107	0.080	0.080	188.507	1.70	1.70	88		241	64	64	63	4.0
0946	6	130		1111	0.085	0.085	196.01	1.80	1.80	88		243	59	60	60	4.0
0956	5	140		1114	0.095	0.095	203.60	2.0	2.0	88		244	57	57	58	4.0
1006	5	150		1112	0.095	0.095	211.65	2.0	2.0	88		246	58	57	58	4.0
1016	4	160		1118	0.105	0.105	219.78	2.20	2.20	89		245	59	58	59	4.0
1026	4	170		1124	0.110	0.110	228.360	2.30	2.30	89		244	60	61	61	4.0
1036	3	180		1121	0.110	0.110	237.026	2.30	2.30	89		247	61	62	64	4.0
1046	3	190		1122	0.105	0.105	245.90	2.20	2.20	89		246	56	57	57	4.0
1056	2	200		1114	0.095	0.095	254.31	2.0	2.0	89		243	57	58	59	4.0
1106	2	210		1110	0.090	0.090	262.60	1.90	1.90	89		244	58	59	54	4.0
1116	1	220		1107	0.080	0.080	270.56	1.70	1.70	90		241	59	59	61	4.0
1126	1	230		1100	0.075	0.075	278.15	1.60	1.60	90		242	60	61	63	4.0
1136	END	240					285.294									
AVERAGE	12	240		1114.5	0.096	0.096	193.793									

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g)	SILICA GEL WEIGHT
#1	#2	#3
#4	#5	#6
FINAL INITIAL LIQUID COLLECTED		
TOTAL	COLLECTED (specify ml or g)	

LEAK CHECK	SYSTEM PRE: 0.010	CFM@15"Hg
	POST: 0.010	CFM@15"Hg
PITOT PRE: <input checked="" type="checkbox"/>	POST: <input checked="" type="checkbox"/>	@ > 3"H <sub>2</sub> O



Company:  
Location:  
Source:  
Run No.:

Valero  
Port Arthur  
544 SK4  
SRU-0010-3

Date Set-up:  
Test Date:  
Date Recovered:  
USEPA Method:  
Corresponding Filter No:  
Filter Container No:

6/16/11  
6/17/11  
6/17/11  
0010  
47580-788.1g  
47580

Measurement Method: Weight or Volume

Impinger No.	Impinger Contents	Initial wt/vol g/mL	Final wt/vol g/mL	Difference wt/vol g/mL	Sample Container No.
1 KO	Empty	348.13	804.4	456.1	
2	water	709.6	710.3	0.7	
3	water	688.6	689.8	1.2	
4	Empty	616.1	618.3	2.2	
5	Silica Gel	828.5	864.2	35.7	
6				495.9	

IMPINGER RECOVERY DATA SHEET



# FIELD DATA

B-46

PLANT	VALSERO	AMBIENT TEMPERATURE	90
DATE	6/15/11	BAROMETRIC PRESSURE	29.85
LOCATION	Port Arthur	ASSUMED MOISTURE, %	14
OPERATOR	Vincenzo	PROBE LENGTH, in.	120"
STACK NO	54150	NOZZLE DIAMETER, in.	0.500
RUN NO	54150-01	STACK DIAMETER, in.	37"
SAMPLE BOX NO	1104027	MINUTES PER POINT	12
METER BOX NO	1253	NUMBER OF POINTS	2
START TIME		NUMBER OF PORTS	

WEIGHT OF PARTICULATE, mg

Filter No.	
Sample	
Final wt.	
Tare wt.	
Wt. gain	
TOTAL	

PROBE HEATER SETTING

HEATER BOX SETTING	11A
METER Hg	1.153
Cp FACTOR	0.84
Yd FACTOR	0.9587
PITOT/TERM #	P108

WEIGHT OF PARTICULATE, mg

Filter No.	
Sample	
Final wt.	
Tare wt.	
Wt. gain	
TOTAL	

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (s) min.	STATIC PRESSURE (in. H <sub>2</sub> O)	STACK TEMP (T <sub>s</sub> ) °F	VELOCITY HEAD (AP <sub>s</sub> )	DIFFERENTIAL PRESSURE ACROSS ORIFICE METER		GAS SAMPLE VOLUME (V <sub>m</sub> ) ft <sup>3</sup>	GAS SAMPLE TEMP AT DRY GAS METER		SAMPLE BOX TEMP. °F	SORBENT MODULE TEMP. °F	LAST IMPINGER OUTLET TEMP. °F	PUMP VACUUM in. Hg
						ACTUAL (ΔH) in. H <sub>2</sub> O	DESIRED		INLET (T <sub>in</sub> ) °F	OUTLET (T <sub>out</sub> ) °F				
1253	B6	6	-0.05	1100	0.070	3.55	3.65	496.816	90	N/A	250	N/A	62	5.0
1258	5	5		1106	0.080	4.20	4.10	502.60	90		251		63	5.0
1303	4	10		1122	0.090	4.75	4.15	508.20	90		250		64	5.0
1308	3	15		1112	0.090	4.75	4.75	514.52	91		256		65	5.0
1313	2	20		1111	0.075	3.95	3.95	520.80	91		255		64	5.0
1318	1	25		1110	0.070	3.65	3.65	526.30	92		256		64	5.0
1323	A6	30		1105	0.070	1.30	1.30	531.866	92		251		63	5.0
1328	5	35		1120	0.085	1.55	1.55	535.17	93		250		60	5.0
1333	4	40		1121	0.090	1.65	1.65	538.47	93		256		59	5.0
1338	3	45		1121	0.090	1.65	1.65	542.10	94		256		58	5.0
1343	2	50		1126	0.080	1.45	1.45	545.85	94		255		59	5.0
1348	1	55		1104	0.070	1.30	1.30	548.74	94		256		60	5.0
1408	E1	60						552.183						
AVERAGE	N	60												

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g)	SILICA GEL WEIGHT
#1	#2	#3
#4	#5	#6
FINAL INITIAL LIQUID COLLECTED		
TOTAL	COLLECTED (specify ml or g)	

LEAK CHECK

SYSTEM PRE: 0.010	CFM@15"Hg
POST: 0.010	CFM@15"Hg
PITOT PRE: ✓	@ > 3"H <sub>2</sub> O
POST: ✓	@ > 3"H <sub>2</sub> O



Company:  
Location:  
Source:  
Run No.:

Valero  
Pct Arthur, TX  
SRU-543 TGI  
SRU-0011-1

Date Set-up:  
Test Date:  
Date Recovered:  
USEPA Method:  
Corresponding Filter No:  
Filter Container No:

6-15-11  
6-15-11  
6-15-11  
0011  
N/A  
N/A

# IMPINGER RECOVERY DATA SHEET

Measurement Method: Weight or Volume

Impinger No.	Impinger Contents	Initial wt/vol g/mL	Final wt/vol g/mL	Difference wt/vol g/mL	Sample Container No.
1	DNPH	791.5	886.9	95.4	
2	DNPH	667.3	689.1	21.8	
3	DNPH	728.0	729.5	1.5	
4	Empty	600.0	602.1	2.1	
5	Silica Gel	822.1	830.5	8.4	
6				<u>129.2</u>	



# FIELD DATA

B-48

59.2 2.1

PLANT	VALERO	AMBIENT TEMPERATURE	97
DATE	6/15/11	BAROMETRIC PRESSURE	29.82
LOCATION	Rock + Arthur	HEATER BOX SETTING	245
OPERATOR	Knappp	METER H <sub>2</sub> O	1.755
STACK NO	544 38V	C <sub>p</sub> FACTOR	0.84
RUN NO	54486V-0011-2	Y <sub>4</sub> FACTOR	0.9987
SAMPLE BOX NO	10402	PTOT/THERM #	1108
METER BOX NO	1499		
START TIME			

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (min)	STATIC PRESSURE (in. H <sub>2</sub> O)	STACK TEMP (T <sub>s</sub> ) °F	VELOCITY HEAD		GAS SAMPLE VOLUME (V <sub>m</sub> ) ft <sup>3</sup>	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER		GAS SAMPLE TEMP AT DRY GAS METER INLET (T <sub>m</sub> ) °F	OUTLET (T <sub>m</sub> ) °F	SAMPLE BOX TEMP °F	F <sub>5</sub> /H <sub>2</sub> O CORRECTION TEMP °F	SORBENT MODULE TEMP °F	LAST IMPINGER OUTLET TEMP °F	PUMP VACUUM in. Hg
					(ΔP <sub>s</sub> )	(ΔP <sub>h</sub> )		ACTUAL	DESIRED							
1449	A 6	0	2.05	1108	0.075		353.055	1.60	1.60	89	N/A	246	251	N/A	64	5.0
1454	5	5		1112	0.085		356.10	1.80	1.80	90		247	250		61	5.0
1459	4	10		1121	0.085		360.53	2.0	2.0	91		246	252		58	5.0
1504	3	15		1128	0.095		364.60	2.0	2.0	90		245	250		57	5.0
1509	2	20		1124	0.080		368.56	1.70	1.70	90		244	251		58	5.0
1514	1	25		1107	0.075		372.50	1.60	1.60	90		243	252		59	5.0
1519	66	30		1112	0.075		376.05	1.60	1.60	90		244	250		60	5.0
1528	6	35		1114	0.090		379.80	1.90	1.90	90		243	251		61	5.0
1533	4	40		1118	0.110		383.77	2.30	2.30	90		244	253		61	5.0
1538	3	45		1117	0.110		388.16	2.30	2.30	90		243	253		62	5.0
1543	2	50		1111	0.095		392.65	2.0	2.0	91		244	252		62	5.0
1548	1	55		1102	0.085		396.63	1.80	1.80	91		242	251		63	5.0
1553	END	60					600.628									
AVERAGE																

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	#1	#2	#3	#4	IMPINGER VOLUME (ml) OR WEIGHT (g)	SILICA GEL WEIGHT
FINAL INITIAL LIQUID COLLECTED						
TOTAL	COLLECTED (specify ml or g)					

ORSAT DATA	TIME	CO <sub>2</sub>	O <sub>2</sub>
TRIAL 1			
TRIAL 2			
TRIAL 3			
Average			

LEAK CHECK	SYSTEM PRE: 0.007	CFM@15" Hg
	POST: 0.008	CFM@15" Hg
PITOT PRE: ✓		@ > 3" H <sub>2</sub> O
POST: ✓		@ > 3" H <sub>2</sub> O



IMPINGER RECOVERY DATA SHEET

Company: Valero  
Location: Port Arthur, TX  
Source: SRU-543 TGI  
Run No.: SRU-0011-2

Date Set-up: 6-15-11  
Test Date: 6-15-11  
Date Recovered: 6-15-11  
USEPA Method: 0011  
Corresponding Filter No: N/A  
Filter Container No: N/A

Measurement Method: Weight or Volume

Impinger No.	Impinger Contents	Initial (wt/vol) (g/mL)	Final (wt/vol) (g/mL)	Difference (wt/vol) (g/mL)	Sample Container No.
1	DNPH	817.5	915.9	98.4	
2	DNPH	695.1	707.4	12.3	
3	DNPH	673.5	674.1	0.6	
4	Empty	607.4	608.0	0.6	
5	Silica Gel	800.9	808.4	7.5	
6				119.4	



# FIELD DATA

A= B=

PLANT	116000	AMBIENT TEMPERATURE	92	PROBE HEATER SETTING	1
DATE	6/15/11	BAROMETRIC PRESSURE	29.82	HEATER BOX SETTING	245
LOCATION	Act Hwy	ASSUMED MOISTURE, %	10	METER H <sub>2</sub> O	1.35
OPERATOR	Knepp	PROBE LENGTH, in.	120"	C <sub>9</sub> FACTOR	0.84
STACK NO.	544 SEP	NOZZLE DIAMETER, in.	0.508	Y <sub>d</sub> FACTOR	0.9587
RUN NO.	544 SEP-0011-3	STACK DIAMETER, in.	67"	PITOT/THERMOCOUPLE NO.	1108
SAMPLE BOX NO.		MINUTES PER POINT	5		
METER BOX NO.	1104027	NUMBER OF POINTS	12		
START TIME	1610	NUMBER OF PORTS	2		

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (0) min.	STATIC PRESSURE (in. H <sub>2</sub> O)	STACK TEMP (T <sub>s</sub> ) °F	VELOCITY HEAD		PRESSURE DIFFERENTIAL ACROSS ORIFICE METER		GAS SAMPLE VOLUME (V <sub>m</sub> ) ft <sup>3</sup>	GAS SAMPLE TEMP AT DRY GAS METER		SAMPLE BOX TEMPERATURE °F / F <sub>16</sub>	TEMP OF GAS LEAVING CONDENSER OR LAST IMINGER °F	Pump Vacuum in. Hg
					(ΔP <sub>s</sub> )	(ΔP <sub>s</sub> )	ACTUAL (ΔH) in. H <sub>2</sub> O	DESIRED		INLET (T <sub>m</sub> ) °F	OUTLET (T <sub>m</sub> ) °F			
1610	86	0	0.05	1110	0.080	0.080	1.70	1.70	601.412	90	24	248/231	62	8.0
1615	5	5		1118	0.095	0.095	2.0	2.0	605.30	90		245/252	60	8.0
1620	4	10		1126	0.110	0.110	2.30	2.30	609.44	90		244/253	57	8.0
1625	3	15		1124	0.115	0.115	2.40	2.40	613.77	90		243/251	56	8.0
1630	2	20		1117	0.100	0.100	2.10	2.10	618.20	90		242/250	56	8.0
1635	1	25		1109	0.080	0.080	1.70	1.70	622.42	90		241/249	57	8.0
1640	1647	30		1104	0.085	0.085	1.80	1.80	626.171	90		242/250	64	8.0
1652	5	35		1121	0.095	0.095	2.0	2.0	629.94	91		243/248	57	8.0
1657	4	40		1127	0.110	0.110	2.30	2.30	634.03	91		243/247	57	8.0
1702	3	45		1125	0.110	0.110	2.30	2.30	638.40	91		242/248	58	8.0
1707	2	50		1120	0.090	0.090	1.90	1.90	642.80	91		243/249	59	8.0
1712	1	55		1113	0.080	0.080	1.70	1.70	646.90	91		244/250	60	8.0
1717	END	60							650.583					
TOTAL AVERAGE														
18 60 1117.0 0.0538 0.3589 2.017 14.171 90.4														

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	#1	#2	#3	#4	SILICA GEL WEIGHT g
FINAL INITIAL LIQUID COLLECTED					
LEAK CHECK					
SYSTEM PRE: 0.008			CFM@15in.Hg		
POST: 0.008			CFM@15in.Hg		
PITOT PRE: ✓			@ > 3 in. H <sub>2</sub> O		
POST: ✓			@ > 3 in. H <sub>2</sub> O		



# IMPINGER RECOVERY DATA SHEET

Company:  
Location:  
Source:  
Run No.:

Valero  
Port Arthur, TX  
SRU-543 TGI  
SRU-0011-3

Date Set-up:  
Test Date:  
Date Recovered:  
USEPA Method:  
Corresponding Filter No:  
Filter Container No:

6-15-11  
6-15-11  
6-15-11  
0011  
N/A  
N/A

Measurement Method: Weight or Volume

Impinger No.	Impinger Contents	Initial wt/vol g/mL	Final wt/vol g/mL	Difference wt/vol g/mL	Sample Container No.
1	DNPH	793.3	887.4	94.1	
2	DNPH	672.8	685.7	12.9	
3	DNPH	738.9	739.4	0.5	
4	Empty	601.9	602.4	0.5	
5	Silica Gel	806.1	816.8	10.7	
6				118.7	



# FIELD DATA

PLANT	DATE	LOCATION	OPERATOR	STACK NO	RUN NO	SAMPLE BOX NO	METER BOX NO	START TIME	AMBIENT TEMPERATURE	BAROMETRIC PRESSURE	ASSUMED MOISTURE, %	PROBE LENGTH, in.	NOZZLE DIAMETER, in.	STACK DIAMETER, in.	MINUTES PER POINT	NUMBER OF POINTS	PROBE HEATER SETTING	HEATER BOX SETTING	METER Hg	C <sub>g</sub> FACTOR	Y <sub>g</sub> FACTOR	PITOT/THERM #	Filter No.	Sample	Final wt	Tare wt	Wt. gain	TOTAL
U-1600	6/16/11	Port 4th floor	KAYAPPO	544320	544320-001-34	1104027	1104027	1104027	86	29.85	10	120"	0.008	120	3	12	245	1.755	0.84	0.8787	0.008	245	245	245	245	245	245	245

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (G) min.	STATIC PRESSURE (in. H <sub>2</sub> O)	STACK TEMP (T <sub>g</sub> ) °F	VELOCITY HEAD		GAS SAMPLE VOLUME (V <sub>m</sub> ) ft <sup>3</sup>	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER		GAS SAMPLE DRY GAS METER INLET (T <sub>m</sub> ) °F	OUTLET (T <sub>m</sub> ) °F	SAMPLE BOX TEMP. °F	Filter EXIT TEMP °F	SORBENT MODULE TEMP. °F	LAST IMPINGER OUTLET TEMP. °F	PUMP VACUUM in. Hg
					(ΔP <sub>s</sub> )	(ΔP <sub>h</sub> )		ACTUAL	DESIRED							
0727	A6	0	-0.05	1109	0.080	0.080	651.154	1.70	1.70	83	N/A	245	251	N/A	64	3.0
0732	3	5		1121	0.050	0.050	654.86	1.90	1.70	84		243	252		61	3.0
0737	4	10		1128	0.110	0.110	658.90	2.30	2.30	86		241	250		58	3.0
0742	3	15		1124	0.115	0.115	663.25	2.40	2.40	88		242	248		57	3.0
0747	2	20		1121	0.115	0.115	667.70	2.40	2.40	88		241	249		56	3.0
0752	4	25		1114	0.090	0.090	672.70	1.90	1.90	88		240	247		58	3.0
0757	86	30		1107	0.085	0.085	676.208	1.80	1.80	88		242	248		60	3.0
0809	5	35		1111	0.080	0.080	680.10	1.70	1.70	87		243	247		57	3.0
0814	4	40		1117	0.095	0.095	684.05	2.0	2.0	89		245	249		56	3.0
0819	3	45		1119	0.110	0.110	688.07	2.30	2.30	87		245	250		57	3.0
0824	2	50		1122	0.110	0.110	692.40	2.30	2.30	89		249	254		58	3.0
0829	1	55		1109	0.095	0.095	696.85	2.0	2.0	90		247	250		59	3.0
0834	END	60					100.905									
AVERAGE	12	60		1116.8	0.094	0.094	69.151	2.08		87.6						

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g)	SILICA GEL WEIGHT	LEAK CHECK
FINAL INITIAL LIQUID COLLECTED	#1 #2 #3 #4	TRIAL 1 TRIAL 2 TRIAL 3 Average	SYSTEM PRE: 0.008 CFM@15" Hg
TOTAL COLLECTED (specify ml or g)			POST: 0.008 CFM@15" Hg
			PITOT PRE: V POST: N
			@ > 3" H <sub>2</sub> O @ > 3" H <sub>2</sub> O



# IMPINGER RECOVERY DATA SHEET

Company: Valero  
Location: Port Arthur, TX  
Source: SRU-544  
Run No.: SRU-0011-4

Date Set-up: 6-15-11  
Test Date: 6-16-11  
Date Recovered: 6-16-11  
USEPA Method: 0011  
Corresponding Filter No: N/A  
Filter Container No: N/A

## Measurement Method: Weight or Volume

Impinger No.	Impinger Contents	Initial <u>wt/vol</u> <u>g/mL</u>	Final <u>wt/vol</u> <u>g/mL</u>	Difference <u>wt/vol</u> <u>g/mL</u>	Sample Container No.
1	<u>DNPH</u>	<u>837.6</u>	<u>934.7</u>	<u>97.1</u>	
2	<u>DNPH</u>	<u>695.6</u>	<u>708.4</u>	<u>12.8</u>	
3	<u>DNPH</u>	<u>707.1</u>	<u>708.1</u>	<u>1.0</u>	
4	<u>Empty</u>	<u>572.9</u>	<u>574.5</u>	<u>1.6</u>	
5	<u>Silica Gel</u>	<u>779.2</u>	<u>789.2</u>	<u>10.0</u>	
6				<u>122.5</u>	



Valero Port Arthur Refinery  
Source: SRU No. 544 TGI Stack  
Test Dates: 6/15 - 6/17/11

## APPENDIX C

## Analytical Data

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5420 Mainway Drive, Unit 5, Burlington ON, L7L 6A4  
Phone: 905-331-3111, FAX: 905-331-4567

SCC Accredited Lab ID# 1003-15/779    Ont DW License #: 2285  
NELAC Primary Accreditation, NJ DEP ID# CANA003: Secondary Accreditation, TX Cert# T104704433-08-TX

## Certificate of Analysis

ALS Project Contact: Ron McLeod  
ALS Project ID: ARI100  
ALS WO#: L1020437 Revision 1  
Date of Report 4-Aug-11  
Date of Sample Receipt 20-Jun-11

Client Name: ARI Environmental, INC.  
Client Address: 1710 Preston Road, Unit C  
Pasadena TX 77503

Client Contact: Dan Fitzgerald  
Client Project ID: Valero - 544 SRU Stack

**COMMENTS:**                    VOCs via modified method 18 - Chilled Methanol Impingers - GC/MS Selected Ion Monitoring  
                                      REVISÉD REPORT: to provide all target analyte data on the spiked fractions

Limits of Reporting have been defined by the level equivalent to the low instrument calibration point and sensitivity standard.

Nitrobenzene-d5 recoveries and nitrobenzene quantification were inconsistent. The purge and trap analysis suffered from run to run carry-over. There was no clear evidence for nitrobenzene source emissions. Detection limits for nitrobenzene were raised because of the uncertainty of low level data. Nitrobenzene data is also available from the SVOC data.

### Summary of the Method:

The sampling train consisted of 4 midget impingers. The 1st impinger was a moisture knock-out. The 2nd, 3rd and 4th impinger contained approximately 15mL each of methanol. Impingers 1 and 2 were recovered combined. Impingers 3 and 4 were each recovered separately. The methanolic impinger solutions were diluted 100-fold into water and analyzed by purge and trap GC/MS (i.e via SW846 5030B/8260B) using selected ion monitoring technique.

Certified by:

Ron McLeod, Ph.D.  
General Manager and Technical Director

Results in this certificate relate only to the samples as submitted to the laboratory.

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# ALS Environmental

## COMPOSITE TARGET ANALYTE DATA

Sample Name	Run 1A			Run 2A			Run 3A			Methanol Reagent Blank			Blank B Train			Laboratory Method Blank	
Client Container ID:	H44902 H44899 H44901			H44905 H44906 H44907			H44918 H44919 H44920			H44928			H44560 H44564 H44563				
ALS Sample ID	L1020437-1/2/3			L1020437-7/8/9			L1020437-13/14/15			L1020437-19			L1020406-16/17/18			WG1304163-1	
Matrix	Impinger			Impinger			Impinger			Impinger			Impinger			Impinger	
Sampling Date	15-Jun-11			15-Jun-11			16-Jun-11			16-Jun-11			9-Jun-11			n/a	
Date of Receipt	20-Jun-11			20-Jun-11			20-Jun-11			20-Jun-11			20-Jun-11			n/a	
VOC via Modified Method 18	Data			Data			Data			Data			Data			Data	
	ug	Qualifier	Source	ug	Qualifier	Source	ug	Qualifier	Source	ug	Qualifier	Source	ug	Qualifier	Source	ug	Qualifier
Target VOCs																	
1,3-Butadiene	n/a		UI1-4	<4.3	BDL	UI1-2	n/a		UI1-4	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<2.4	BDL
Pentane	n/a		UI1-4	<4.3	BDL	UI1-2	n/a		UI1-4	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<2.4	BDL
Acrolein	<4.3	BDL	UI1-2	<6	BDL	C	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	7.8	ADL	C	<2.4	BDL
Acetone	89	ADL	B	78.9	ADL	B	134	ADL	B	70.5	ADL	B	2344	ADL	B	<2.4	BDL
Acetonitrile	<4.3	BDL	UI1-2	<8	BDL	C	<6	BDL	C	<5	BDL	C	18.5	ADL	C	<2.4	BDL
Carbon Disulfide	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<2.4	BDL
Methylene Chloride	145	ADL	B	108	ADL	B	150	ADL	B	412	ADL	B	54.9	ADL	B	3.36	ADL
Acrylonitrile	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<2.4	BDL
Methyl t-Butyl Ether (MTBE)	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<2.4	BDL
Hexane	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<2.4	BDL
2,2,4-Trimethylpentane	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<2.4	BDL
Benzene	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<2.4	BDL
Trichloroethene	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<2.4	BDL
2-Nitropropane	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<2.4	BDL
Methyl iso-Butyl Ketone	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	13.8	ADL	C	<2.4	BDL
Toluene	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<2.4	BDL
Tetrachloroethene	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<2.4	BDL
1,2-Dibromoethane	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<2.4	BDL
Chlorobenzene	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<2.4	BDL
Ethylbenzene	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<2.4	BDL
m&p-Xylenes	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<2.4	BDL
o-Xylene	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<2.4	BDL
Styrene	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<2.4	BDL
Cumene (Isopropylbenzene)	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<4.3	BDL	UI1-2	<2.4	BDL
Nitrobenzene	<21.5	BDL	UI1-2	<21.5	BDL	UI1-2	<21.5	BDL	UI1-2	<21.5	BDL	UI1-2	<21.5	BDL	UI1-2	<12	BDL

ADL = Below Detection Limit

BDL = Below Detection Limit

DLL = Composite data where at least one data point (but not all data points) is above the detection limit

INT = Interference; Detection Limit Raised

UI# = Impinger Number from the Unspiked Train

SI# = Impinger Number from the Spiked Train

C = Carry-over from prior injection(s)

B = Observed in the Reagent Blank at similar levels to the field run samples

ADL = Below Detection Limit  
BDL = Below Detection Limit  
DLL = Composite data where at least one data point (but not all data points) is above the detection limit  
INT = Interference; Detection Limit Raised  
UI1# = Impinger Number from the Unspiked Train  
SI# = Impinger Number from the Spiked Train  
C = Carry-over from prior injection(s)  
B = Observed in the Reagent Blank at similar levels to the field run samples

ALS Environmental									
COMPOSITE SPIKE RECOVERY DATA									
Sample Name	Run 1A	Run 2A	Run 3A	Blank B Train	Run 1B (Spiked)	Run 2B (Spiked)	Run 3B (Spiked)	Blank A Train (Spiked)	
Client Container ID:	H44902 H44899 H44901	H44905 H44906 H44907	H44918 H44919 H44920	H44560 H44564 H44563	H44900 H44903 H44904	H44908 H44909 H44910	H44921 H44922 H44923	H44561 H44562 H44624	
ALS Sample ID	L1020437-1/2/3	L1020437-7/8/9	L1020437-13/14/15	L1020406-16/17/18	L1020437-4/5/6	L1020437-10/11/12	L1020437-16/17/18	L1020406-13/14/15	
Matrix	Impinger	Impinger	Impinger	Impinger	Impinger	Impinger	Impinger	Impinger	
Sampling Date	15-Jun-11	15-Jun-11	16-Jun-11	9-Jun-11	15-Jun-11	15-Jun-11	16-Jun-11	9-Jun-11	
Date of Receipt	20-Jun-11	20-Jun-11	20-Jun-11	20-Jun-11	20-Jun-11	20-Jun-11	20-Jun-11	20-Jun-11	
VOC via Modified Method 18									
	Data	Data	Data	Data	Data	Data	Data	Data	Data
	% Rec Qualifier Source	% Rec Qualifier Source	% Rec Qualifier Source	% Rec Qualifier Source	% Rec Qualifier Source	% Rec Qualifier Source	% Rec Qualifier Source	% Rec Qualifier Source	% Rec Qualifier Source
Labelled Analyte Recoveries									
1,3-Butadiene-d6	0 UI1-4	101 UI1-4	0 UI1-4	100 UI1-4	0 SI1-2 UI1-4	0 UI1-4	0 SI1-2	136 SI1-2	
Pentane-d12	0 UI1-4	96 UI1-4	1 UI1-4	100 UI1-4	0 UI1-4	0 SI1-4	0 SI1-2	151 SI1-4	
acrylonitrile-d3	95 UI1-4	89 UI1-4	86 UI1-4	100 SI1-2	86 UI1-4	75 SI1-4	85 SI1-4	47 SI1-2	
MTBE-d12	92 UI1-4	99 UI1-4	99 UI1-4	100 SI1-2	94 UI1-4	85 SI1-4	100 SI1-4	69 SI1-2	
n-Hexane-d14	6 UI1-4	103 UI1-4	35 UI1-4	100 SI1-2	12 UI1-4	21 SI1-4	23 SI1-4	149 SI1-2	
2,2,4-Trimethylpentane-d18	59 UI1-4	102 UI1-4	101 UI1-4	100 SI1-2	78 UI1-4	87 SI1-4	98 SI1-4	181 SI1-2	
Benzene-d6	113 UI1-4	105 UI1-4	127 UI1-4	100 SI1-2	117 UI1-4	108 SI1-4	126 SI1-4	123 SI1-2	
2-Nitropropane-d6	96 UI1-4	90 UI1-4	79 UI1-4	100 SI1-2	75 UI1-4	81 SI1-4	82 SI1-4	56 SI1-2	
1,2-Dibromothane-d4	116 UI1-4	109 UI1-4	102 UI1-4	100 SI1-2	95 UI1-4	93 SI1-4	97 SI1-4	72 SI1-2	
Ethylbenzene-d10	134 UI1-4	107 UI1-4	129 UI1-4	100 SI1-2	114 UI1-4	113 SI1-4	121 SI1-4	174 SI1-2	
Styrene-d8	127 UI1-4	106 UI1-4	118 UI1-4	100 SI1-2	105 UI1-4	105 SI1-4	111 SI1-4	78 SI1-2	
Nitrobenzene-d5	176 UI1-4	143 UI1-4	59 UI1-4	100 SI1-2	105 UI1-4	100 SI1-4	90 SI1-4	40 SI1-2	
Native Analyte Recoveries									
Acrolein	-	-	-	-	96 SI1-2	93 SI1-2	111 SI1-2	100 SI1-2	
Acetonitrile	-	-	-	-	56 SI1-2	81 SI1-2	79 SI1-2	100 SI1-2	
Trichloroethene	-	-	-	-	188 SI1-2	127 SI1-2	159 SI1-2	100 SI1-2	
Methyl Iso-Butyl Ketone	-	-	-	-	120 SI1-2	121 SI1-2	107 SI1-2	100 SI1-2	
Toluene	-	-	-	-	199 SI1-2	106 SI1-2	119 SI1-2	100 SI1-2	
n/s = not spiked INT = Interference UI# = Impinger Number from the Unspiked Train SI# = Impinger Number from the Spiked Train									

# ALS Environmental

Instrument Run Date: 04-Jul-11

## ANALYTICAL DATA FROM INDIVIDUAL GC/MS INSTRUMENT RUNS

Client Container ID:	H44902 - IMPINGER #1,2+CONDEN SOR RUN 1A	H44899 - IMPINGER #3 RUN 1A	H44901 - IMPINGER #4 RUN 1A	H44900 - IMPINGER #1,2+CONDEN SOR RUN 1B	H44903 - IMPINGER #3 RUN 1B	H44904 - IMPINGER #4 RUN 1B	H44905 - IMPINGER #1,2+CONDEN SOR RUN 2A	H44906 - IMPINGER #3 RUN 2A
ALS Sample ID	L1020437- 1;Rep1xEXT1	L1020437- 2;Rep1xEXT1	L1020437- 3;Rep1xEXT1	L1020437- 4;Rep1xEXT1	L1020437- 5;Rep1xEXT1	L1020437- 6;Rep1xEXT1	L1020437- 7;Rep1xEXT1	L1020437- 8;Rep1xEXT1
Instrument File #	3301033.D	3401034.D	3501035.D	3601036.D	3701037.D	3801038.D	3901039.D	4001040.D
Sample Volume (mL)	43	24	24	43	24	24	43	24
Dilution Factor	1	1	1	1	1	1	1	1
<b>VOC via Modified Method 18</b>								
	ug	ug	ug	ug	ug	ug	ug	ug
1,3-Butadiene	n/a	n/a	n/a	n/a	n/a	n/a	<4.3	<2.4
Pentane	n/a	n/a	n/a	n/a	n/a	n/a	<4.3	<2.4
Acrolein	<4.3	<2.4	<2.4	2456	2516	835	5.1 *	<2.4
Acetone	89	49	43	87	58	43	79	64
Acetonitrile	<4.3	<2.4	<2.4	3950	1634	261	7.3 *	3.7 *
Carbon Disulfide	<4.3	<2.4	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4
Methylene Chloride	145	31	24	107	27	34	108	41
Acrylonitrile	<4.3	<2.4	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4
Methyl t-Butyl Ether (MTBE)	<4.3	<2.4	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4
Hexane	n/a	n/a	<2.4	n/a	<2.4	<2.4	<4.3	<2.4
2,2,4-Trimethylpentane	<4.3	<2.4	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4
Benzene	<4.3	<2.4	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4
Trichloroethene	<4.3	<2.4	<2.4	2029	1211	414	<4.3	<2.4
2-Nitropropane	<4.3	<2.4	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4
Methyl iso-Butyl Ketone	<4.3	<2.4	<2.4	3822	473	23	<4.3	<2.4
Toluene	<4.3	<2.4	<2.4	1011	460	103	<4.3	<2.4
Tetrachloroethene	<4.3	<2.4	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4
1,2-Dibromoethane	<4.3	<2.4	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4
Chlorobenzene	<4.3	<2.4	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4
Ethylbenzene	<4.3	<2.4	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4
m&p-Xylenes	<4.3	<2.4	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4
o-Xylene	<4.3	<2.4	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4
Styrene	<4.3	<2.4	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4
Cumene (Isopropylbenzene)	<4.3	<2.4	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4
Nitrobenzene	<21.5	<12	<12	<21.5	<12	<12	<21.5	<12
<b>Labelled Analyte Recoveries</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>
1,3-Butadiene-d6	0	0	0	0	0	0	101	0
Pentane-d12	0	0	0	0	0	0	96	0
acrylonitrile-d3	60	27	7	55	26	5	88	0
MTBE-d12	34	36	22	39	37	17	99	0
n-Hexane-d14	0	1	5	1	3	8	103	0
2,2,4-Trimethylpentane-d18	6	20	32	15	29	34	102	0
Benzene-d6	47	42	24	56	43	19	105	0
2-Nitropropane-d6	85	11	0	74	0	1	90	0
1,2-Dibromoethane-d4	100	14	1	82	12	1	100	0
Ethylbenzene-d10	113	18	3	97	15	2	106	1
Styrene-d8	118	9	1	97	7	0	106	0
Nitrobenzene-d5	170	5	1	100	4	1	137	4
<b>Native Analyte Recoveries</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>
Acrolein	-	-	-	79	81	27	-	-
Acetonitrile	-	-	-	125	52	8	-	-
Trichloroethene	-	-	-	61	37	13	-	-
Methyl iso-Butyl Ketone	-	-	-	127	16	-	-	-
Toluene	-	-	-	72	33	7	-	-
<b>P&amp;T Surrogate Recoveries</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>
1,2,-Dichloroethane-d4	81	101	106	86	104	103	88	108
Toluene-d8	74	88	97	82	94	97	76	96
4-Fluorobenzene	101	110	102	101	112	109	99	113

\* Carry-over from prior run

INT = Interference

UI# = Impinger Number from the

Unspiked Train

SI# = Impinger Number from the

Spiked Train

# ALS Environmental

Instrument Run Date: 04-Jul-11

## ANALYTICAL DATA FROM INDIVIDUAL GC/MS INSTRUMENT RUNS

Client Container ID:	H44907 - IMPINGER #4 RUN 2A	H44908 - IMPINGER #1,2+CONDEN SOR RUN 2B	H44909 - IMPINGER #3 RUN 2B	H44910 - IMPINGER #4 RUN 2B	H44918 - IMPINGER #1,2+CONDEN SOR RUN 3A	H44919 - IMPINGER #3 RUN 3A	H44921 - IMPINGER #1,2+CONDEN SOR RUN 3B
ALS Sample ID	L1020437- 9;Rep1xEXT1	L1020437- 10;EXT1	L1020437- 11;EXT1	L1020437- 12;EXT1	L1020437- 13;EXT1	L1020437- 14;EXT1	L1020437- 16;EXT1
Instrument File #	4101041.D	4201042.D	4501045.D	4601046.D	4701047.D	4801048.D	5001050.D
Sample Volume (mL)	24	43	24	24	43	24	43
Dilution Factor	1	1	1	1	1	1	1
<b>VOC via Modified Method 18</b>							
	ug	ug	ug	ug	ug	ug	ug
1,3-Butadiene	<2.4	n/a	n/a	n/a	<4.3	<2.4	n/a
Pentane	<2.4	n/a	n/a	n/a	<4.3	<2.4	n/a
Acrolein	<2.4	3007	1107	624	<4.3	<2.4	2819
Acetone	37	87	32	42	134	54	99
Acetonitrile	<2.4	4071	693	190	5.9 *	2.5 *	3939
Carbon Disulfide	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4	<4.3
Methylene Chloride	65	81	34	68	150	111	95
Acrylonitrile	<2.4	<4.3	<2.4	<2.4	<4.3	4.5	<4.3
Methyl t-Butyl Ether (MTBE)	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4	<4.3
Hexane	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4	<4.3
2,2,4-Trimethylpentane	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4	<4.3
Benzene	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4	<4.3
Trichloroethene	<2.4	2166	1002	240	<4.3	<2.4	2213
2-Nitropropane	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4	<4.3
Methyl iso-Butyl Ketone	<2.4	3828	225	15	<4.3	<2.4	3587
Toluene	<2.4	1055	356	58	<4.3	<2.4	1077
Tetrachloroethene	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4	<4.3
1,2-Dibromoethane	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4	<4.3
Chlorobenzene	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4	<4.3
Ethylbenzene	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4	<4.3
m&p-Xylenes	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4	<4.3
o-Xylene	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4	<4.3
Styrene	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4	<4.3
Cumene (Isopropylbenzene)	<2.4	<4.3	<2.4	<2.4	<4.3	<2.4	<4.3
Nitrobenzene	<12	<21.5	<12	<12	<21.5	<12	<21.5
<b>Labeled Analyte Recoveries</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>
1,3-Butadiene-d6	0	0	0	0	0	0	0
Pentane-d12	0	0	0	0	0	1	0
Acrylonitrile-d3	0	60	11	3	69	16	59
MTBE-d12	0	50	22	13	63	33	49
n-Hexane-d14	0	2	7	12	8	26	3
2,2,4-Trimethylpentane-d18	0	23	36	28	42	54	27
Benzene-d6	0	68	28	12	85	37	71
2-Nitropropane-d6	0	77	4	0	74	5	74
1,2-Dibromoethane-d4	0	87	5	1	95	6	87
Ethylbenzene-d10	1	103	9	1	118	9	108
Styrene-d8	0	101	3	0	113	4	105
Nitrobenzene-d5	1	99	1	0	56	4	85
<b>Native Analyte Recoveries</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>
Acrolein	-	97	36	20	-	-	91
Acetonitrile	-	129	22	6	-	-	124
Trichloroethene	-	65	30	7	-	-	67
Methyl iso-Butyl Ketone	-	127	7	-	-	-	119
Toluene	-	75	25	4	-	-	77
<b>P&amp;T Surrogate Recoveries</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>
1,2-Dichloroethane-d4	97	86	91	104	82	98	83
Toluene-d8	99	81	107	98	75	94	80
4-Fluorobenzene	111	100	126	113	99	107	101

\* Carry-over from prior run

INT = Interference

UI# = Impinger Number from the

Unspiked Train

SI# = Impinger Number from the

Spiked Train

ALS Environmental			
Instrument Run Date: 04-Jul-11	ANALYTICAL DATA FROM INDIVIDUAL GC/MS INSTRUMENT RUNS		
Client Container ID:	H44922 - IMPINGER #3 RUN 3B	H44923 - IMPINGER #4 RUN 3B	H44920 - IMPINGER #4 RUN 3A
ALS Sample ID	L1020437-17;EXT1	L1020437-18;EXT1	L1020437-15
Instrument File #	5101051.D	5201052.D	9801003.D
Sample Volume (mL)	24	24	24
Dilution Factor	1	1	1
<b>VOC via Modified Method 18</b>			
	ug	ug	ug
1,3-Butadiene	n/a	n/a	<2.4
Pentane	n/a	n/a	<2.4
Acrolein	1993	651	2.6 *
Acetone	113	94	43.8
Acetonitrile	1308	204	77.0 *
Carbon Disulfide	<2.4	<2.4	<2.4
Methylene Chloride	43	50	2.7
Acrylonitrile	<2.4	<2.4	<2.4
Methyl t-Butyl Ether (MTBE)	<2.4	<2.4	<2.4
Hexane	<2.4	<2.4	<2.4
2,2,4-Trimethylpentane	<2.4	<2.4	<2.4
Benzene	<2.4	<2.4	<2.4
Trichloroethene	1056	273	93.6 *
2-Nitropropane	<2.4	<2.4	<2.4
Methyl iso-Butyl Ketone	332	16	17.4 *
Toluene	388	64	33.6 *
Tetrachloroethene	<2.4	<2.4	<2.4
1,2-Dibromoethane	<2.4	<2.4	<2.4
Chlorobenzene	<2.4	<2.4	<2.4
Ethylbenzene	<2.4	<2.4	<2.4
m&p-Xylenes	<2.4	<2.4	<2.4
o-Xylene	<2.4	<2.4	<2.4
Styrene	<2.4	<2.4	<2.4
Cumene (Isopropylbenzene)	<2.4	<2.4	<2.4
Nitrobenzene	<12	<12	<12
<b>Labeled Analyte Recoveries</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>
1,3-Butadiene-d6	0	0	0
Pentane-d12	0	0	0
acrylonitrile-d3	22	4	1
MTBE-d12	36	15	3
n-Hexane-d14	6	14	1
2,2,4-Trimethylpentane-d18	36	36	5
Benzene-d6	40	14	4
2-Nitropropane-d6	7	0	0
1,2-Dibromoethane-d4	9	1	1
Ethylbenzene-d10	11	2	2
Styrene-d8	5	0	0
Nitrobenzene-d5	4	1	0
<b>Native Analyte Recoveries</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>
Acrolein	64	21	-
Acetonitrile	41	6	-
Trichloroethene	32	8	-
Methyl iso-Butyl Ketone	11	-	-
Toluene	28	5	-
<b>P&amp;T Surrogate Recoveries</b>	<b>% Rec</b>	<b>% Rec</b>	<b>% Rec</b>
1,2-Dichloroethane-d4	107	106	105
Toluene-d8	93	97	102
4-Fluorobenzene	103	106	109
* Carry-over from prior run INT = Interference UI# = Impinger Number from the Unspiked Train SI# = Impinger Number from the Spiked Train			

ALS Environmental		
Instrument Run Date: 04-Jul-11		
ANALYTICAL DATA FROM INDIVIDUAL GC/MS INSTRUMENT RUNS		
Client Container ID:	H44560 - IMPINGERS #1,2+CONDENSOR BLANK B	H44561 - IMPINGERS #1,2+CONDENSOR BLANK A
ALS Sample ID	L1020406-16;Rep1xEXT1	L1020406-13;Rep1xEXT1
Instrument File #	2501025.D	2401024.D
Sample Volume (mL)	43	43
Dilution Factor	1	1
<b>VOC via Modified Method 18</b>		
	ug	ug
1,3-Butadiene	<4.3	<4.3
Pentane	<4.3	<4.3
Acrolein	7.8	3095
Acetone	2344	961
Acetonitrile	18.5	3164
Carbon Disulfide	<4.3	<4.3
Methylene Chloride	54.9	86
Acrylonitrile	<4.3	<4.3
Methyl t-Butyl Ether (MTBE)	<4.3	<4.3
Hexane	<4.3	<4.3
2,2,4-Trimethylpentane	<4.3	<4.3
Benzene	<4.3	<4.3
Trichloroethene	<4.3	3310
2-Nitropropane	10.4	<4.3
Methyl iso-Butyl Ketone	13.8	3017
Toluene	<4.3	1407
Tetrachloroethene	<4.3	<4.3
1,2-Dibromoethane	<4.3	<4.3
Chlorobenzene	<4.3	<4.3
Ethylbenzene	<4.3	<4.3
m&p-Xylenes	<4.3	<4.3
o-Xylene	<4.3	<4.3
Styrene	<4.3	<4.3
Cumene (Isopropylbenzene)	<4.3	<4.3
Nitrobenzene	<21.5	<21.5
<b>Labelled Analyte Recoveries</b>	<b>% Rec</b>	<b>% Rec</b>
1,3-Butadiene-d6	100	136
Pentane-d12	100	151
acrylonitrile-d3	100	47
MTBE-d12	100	69
n-Hexane-d14	100	149
2,2,4-Trimethylpentane-d18	100	181
Benzene-d6	100	123
2-Nitropropane-d6	100	56
1,2-Dibromoethane-d4	100	72
Ethylbenzene-d10	100	174
Styrene-d8	100	78
Nitrobenzene-d5	100	40
<b>Native Analyte Recoveries</b>	<b>% Rec</b>	<b>% Rec</b>
Acrolein	-	100
Acetonitrile	-	100
Trichloroethene	-	100
Methyl iso-Butyl Ketone	-	100
Toluene	-	100
<b>P&amp;T Surrogate Recoveries</b>	<b>% Rec</b>	<b>% Rec</b>
1,2-Dichloroethane-d4	91	80
Toluene-d8	77	91
4-Fluorobenzene	100	120
INT = Interference UI# = Impinger Number from the Unspiked Train SI# = Impinger Number from the Spiked Train		

ALS Environmental	
ANALYTICAL DATA FROM INDIVIDUAL GC/MS INSTRUMENT RUNS	
Instrument Run Date: 04-Jul-11	
Client Container ID:	H44928 - METHANOL REAGENT BLANK
ALS Sample ID	L1020437-19;EXT1
Instrument File #	0901009.D
Sample Volume (mL)	43
Dilution Factor	1
<b>VOC via Modified Method 18</b>	
	<b>ug</b>
1,3-Butadiene	<4.3
Pentane	<4.3
Acrolein	<4.3
Acetone	71
Acetonitrile	4.5
Carbon Disulfide	<4.3
Methylene Chloride	412
Acrylonitrile	<4.3
Methyl t-Butyl Ether (MTBE)	<4.3
Hexane	<4.3
2,2,4-Trimethylpentane	<4.3
Benzene	<4.3
Trichloroethene	<4.3
2-Nitropropane	<4.3
Methyl iso-Butyl Ketone	<4.3
Toluene	<4.3
Tetrachloroethene	<4.3
1,2-Dibromoethane	<4.3
Chlorobenzene	<4.3
Ethylbenzene	<4.3
m&p-Xylenes	<4.3
o-Xylene	<4.3
Styrene	<4.3
Cumene (Isopropylbenzene)	<4.3
Nitrobenzene	<21.5
<b>Labeled Analyte Recoveries</b>	<b>% Rec</b>
1,3-Butadiene-d6	0
Pentane-d12	0
acrylonitrile-d3	0
MTBE-d12	0
n-Hexane-d14	0
2,2,4-Trimethylpentane-d18	0
Benzene-d6	0
2-Nitropropane-d6	0
1,2-Dibromoethane-d4	0
Ethylbenzene-d10	0
Styrene-d8	0
Nitrobenzene-d5	0
<b>Native Analyte Recoveries</b>	<b>% Rec</b>
Acrolein	-
Acetonitrile	-
Trichloroethene	-
Methyl iso-Butyl Ketone	-
Toluene	-
<b>P&amp;T Surrogate Recoveries</b>	<b>% Rec</b>
1,2-Dichloroethane-d4	96
Toluene-d8	98
4-Fluorobenzene	113
INT = Interference UI# = Impinger Number from the Unspiked Train SI# = Impinger Number from the Spiked Train	

# ALS Environmental

## Analyte Quantitation References

VOC via Modified Method 18		
Target VOCs	Corresponding Purge & Trap Internal Standard <sup>2</sup>	Corresponding Field Spike <sup>1</sup>
1,3-Butadiene	Fluorobenzene	1,3-Butadiene-d6
Pentane	Fluorobenzene	Pentane-d12
Acrolein	Fluorobenzene	Benzene-d6
Acetone	Fluorobenzene	acrylonitrile-d3
Acetonitrile	Fluorobenzene	acrylonitrile-d3
Carbon Disulfide	Fluorobenzene	Benzene-d6
Methylene Chloride	Fluorobenzene	Benzene-d6
Acrylonitrile	Fluorobenzene	acrylonitrile-d3
Methyl t-Butyl Ether (MTBE)	Fluorobenzene	MTBE-d12
Hexane	Fluorobenzene	n-Hexane-d14
2,2,4-Trimethylpentane	Chlorobenzene-d5	2,2,4-Trimethylpentane-d18
Benzene	Chlorobenzene-d5	Benzene-d6
Trichloroethene	Chlorobenzene-d5	Benzene-d6
2-Nitropropane	Chlorobenzene-d5	2-Nitropropane-d6
Methyl iso-Butyl Ketone	Chlorobenzene-d5	Ethylbenzene-d10
Toluene	Chlorobenzene-d5	Ethylbenzene-d10
Tetrachloroethene	Chlorobenzene-d5	Ethylbenzene-d10
1,2-Dibromoethane	Chlorobenzene-d5	1,2-Dibromoethane-d4
Chlorobenzene	Chlorobenzene-d5	Ethylbenzene-d10
Ethylbenzene	1,4-Dichlorobenzene-d4	Ethylbenzene-d10
m&p-Xylenes	1,4-Dichlorobenzene-d4	Ethylbenzene-d10
o-Xylene	1,4-Dichlorobenzene-d4	Ethylbenzene-d10
Styrene	1,4-Dichlorobenzene-d4	Styrene-d8
Cumene (Isopropylbenzene)	1,4-Dichlorobenzene-d4	Ethylbenzene-d10
Nitrobenzene	1,4-Dichlorobenzene-d4	Nitrobenzene-d5
<b>Labelled Field Standards<sup>1</sup></b>		
1,3-Butadiene-d6	Fluorobenzene	-
Pentane-d12	Fluorobenzene	-
acrylonitrile-d3	Fluorobenzene	-
MTBE-d12	Fluorobenzene	-
n-Hexane-d14	Fluorobenzene	-
2,2,4-Trimethylpentane-d18	Chlorobenzene-d5	-
Benzene-d6	Chlorobenzene-d5	-
2-Nitropropane-d6	Chlorobenzene-d5	-
1,2-Dibromoethane-d4	Chlorobenzene-d5	-
Ethylbenzene-d10	1,4-Dichlorobenzene-d4	-
Styrene-d8	1,4-Dichlorobenzene-d4	-
Nitrobenzene-d5	1,4-Dichlorobenzene-d4	-
<b>Purge &amp; Trap Surrogate Standards<sup>2</sup></b>		
1,2-Dichloroethane-d4	Chlorobenzene-d5	-
Toluene-d8	Chlorobenzene-d5	-
4-Fluorobenzene	1,4-Dichlorobenzene-d4	-
<p>All target analyte and surrogate data are reported corrected for the corresponding P&amp;T internal standard responses.  Target analyte data including the native spike recoveries are reported uncorrected for corresponding labelled field spike recoveries.</p> <p><sup>1</sup> Spiked into impinger 2 just prior to sampling in the field.  <sup>2</sup> Spiked into the purge water just prior to instrumental analysis.</p>		



**ALS Environmental**

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NELAC Primary Accreditation, NJ DEP ID# CANA003: Secondary Accreditation, TX Cert# T104704433-08-TX

## Certificate of Analysis

ALS Project Contact: Ron McLeod  
ALS Project ID: ARI100  
ALS WO#: L1021357  
Date of Report 11-Jul-11  
Date of Sample Receipt 20-Jun-11


Client Name: ARI Environmental Inc.  
1710 Preston Rd. Unit C  
Pasadena, TX 77503  
USA  
Client Contact: Dan Fitzgerald  
Client Project ID: Valero - 544 SRU Stack

**COMMENTS:**                      **SVOC via SW846 Method 3542/8270D**

### Method Summary:

The 0010 train samples were extracted by SW846 Method 3542. For each train, the front half solids and the XAD2 sorbent were extracted together in a single soxhlet. The extraction standards for 8270D and PAH analyses were spiked into the solids/sorbent media just prior to extraction. The condensates were extracted by B/N/A liquid/liquid extraction technique using separatory funnels and dichloromethane as the extracting solvent. The extract from the soxhlet and the condensates for each train were combined for each train and reduced to a 5mL final volume. A 1/2 portion was removed and concentrated to 1mL for analysis of PAHs via isotope dilution and selected ion monitoring GC/LRMS analysis. A portion of the remaining extract was removed for analysis of semi-volatile organics via SW846 method 8270D.

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

  
Ron McLeod, Ph.D.  
General Manager and Technical Director

Results in this certificate relate only to the samples as submitted to the laboratory.  
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### Sample Analysis Summary Report

Sample Name	Method Blank	SRU-544 BLANK 45821/H44883/ H44885/H37513	SRU-544 FIELD BLANK 45821/H44770/ H44890	SRU-544 RUN 1 44772/H44891/ H44893/H44895/ H44699/H44894	SRU-544 RUN 2 42995/H44886/ H44888/H44889/ H44887	SRU-544 RUN 3 47580/H44882/ H44880/H44701/ H44881	Target Recovery Acceptance Limits
ALS Sample ID	WG1301133-1	L1021357-10	L1021357-9	L1021357-6	L1021357-7	L1021357-8	
Sample Size	1	1	1	1	1	1	
Sample units	sample	sample	sample	sample	sample	sample	
Matrix	QC	Stack	Stack	Stack	Stack	Stack	
Sampling Date	n/a	17-Jun-11	17-Jun-11	16-Jun-11	16-Jun-11	17-Jun-11	
Extraction Date	23-Jun-11	23-Jun-11	23-Jun-11	23-Jun-11	23-Jun-11	23-Jun-11	
Target Analytes	ug/sample	ug/sample	ug/sample	ug/sample	ug/sample	ug/sample	
Aniline	<1.85 U	<1.85 U	<1.85 U	<1.85 U	<1.85 U	<1.85 U	
Phenol	<1.95 U	<1.95 U	<1.95 U	27.2	23.6	24.8	
2-Methylphenol	<2.1 U	<2.1 U	<2.1 U	<2.1 U	<2.1 U	<2.1 U	
4-Methylphenol&3-Methylphenol	<5.65 U	<5.65 U	<5.65 U	<5.65 U	<5.65 U	<5.65 U	
o-Toluidine	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	
Nitrobenzene	<1.95 U	<1.95 U	<1.95 U	<1.95 U	<1.95 U	<1.95 U	
Isophorone	<2.25 U	<2.25 U	<2.25 U	<2.25 U	<2.25 U	<2.25 U	
2,4-Dimethylphenol	<2.6 U	<2.6 U	<2.6 U	<2.6 U	<2.6 U	<2.6 U	
Dibenzofuran	<2.3 U	<2.3 U	<2.3 U	<2.3 U	<2.3 U	<2.3 U	
a,a-Dimethylphenethylamine	<12 U	<12 U	<12 U	<12 U	<12 U	<12 U	
1,4-Phenylenediamine	<18 U	<18 U	<18 U	<18 U	<18 U	<18 U	
Benzidine	<38 U	<38 U	<38 U	<38 U	<38 U	<38 U	
Dimethylaminobenzene	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	<2.0 U	
3,3'-Dimethylbenzidine	<29 U	<29 U	<29 U	<29 U	<29 U	<29 U	
3,3'-Dimethoxybenzidine	<29 U	<29 U	<29 U	<29 U	<29 U	<29 U	
Extraction Standards	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec
2-Fluorophenol	25 M	53 M	27	43	29	28	25-121
d5-Phenol	40 M	52	41	49	41	41	24-113
d5-Nitrobenzene	70	79	70	80	78	74	23-120
2-Fluorobiphenyl	75	76	68	74	73	71	30-115
2,4,6-Tribromophenol	66	69	57	80	79	87	19-122
U Indicates that this compound was not detected above the LOD. M Indicates that a peak has been manually integrated. R Indicates ratio failure on confirming ion due to interference							

# ALS Laboratory Group

## ICR Petroleum Sector LCS Data for 0010/3542/8270D on 8270D LCS Performance Compounds

Sample Name	Laboratory Control Sample (LCS) #3	Laboratory Control Sample (LCS) #1	Laboratory Control Sample (LCS) #2	Target Solids Recovery Acceptance Limits
ALS Sample ID	WG1301133-2	WG1303407-2	WG1309259-2	
Sample Size	1	1	1	
ALS WO#	L1021357	L1022356	L1028521	
Extraction Date	23-Jun-11	28-Jun-11	11-Jul-11	
Target Analytes	% Recovery	% Recovery	% Recovery	% Recovery
Phenol	56	61	81	26-90
2-Chlorophenol	53	62	53	25-102
1,4-Dichlorobenzene	52	61	52	n/a
N-Nitrosodi-n-propylamine	66	66	67	41-126
1,2,4-Trichlorobenzene	64	71	61	n/a
4-Chloro-3-methylphenol	71	62	67	26-103
2,4-Dinitrotoluene	71	70	62	28-89
4-Nitrophenol	66	47	67	11-114
Acenaphthene	52	57	50	31-137
Pentachlorophenol	57	19	7 *	17-109
Pyrene	53	59	54	35-142
Extraction Standards	% Rec	% Rec	% Rec	% Rec
2-Fluorophenol	26	47	42	25-121
d5-Phenol	39	43	40	24-113
d5-Nitrobenzene	65	74	68	23-120
2-Fluorobiphenyl	70	71	63	30-115
2,4,6-Tribromophenol	66	60	47	19-122

\* A bias to low recoveries on non-acidified resin media is common for acidic compounds and is most commonly observed for the more acidic components such as PCP. Note that field 'run' samples do not often show this bias since these samples are usually acidified by the source stack gases.



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NELAC Primary Accreditation, NJ DEP ID# CANA003: Secondary Accreditation, TX Cert# T104704433-08-TX

## Certificate of Analysis

**ALS Project Contact:** Ron McLeod  
**ALS Project ID:** ARI100  
**ALS WO#:** L1021357  
**Date of Report:** 11-Jul-11  
**Date of Sample Receipt:** 20-Jun-11

**Client Name:** ARI Environmental Inc.  
1710 Preston Rd. Unit C  
Pasadena, TX 77503  
USA  
**Client Contact:** Dan Fitzgerald  
**Client Project ID:** Valero - 544 SRU Stack

### COMMENTS:      PAH by CARB Method 429 (LR Option) - Isotope Dilution

Selected extraction standard recoveries were below the CARB429 target recovery limits of 50-150%. However, the CARB 429 method does accept lower extraction standard recoveries as valid for accurate determination of target analytes as long as the corresponding labeled instrument response is quantifiable and above 10:1 signal to noise. Selected samples showed a low bias to acenaphthylene-d8 and perylene-d12 extraction standard recoveries. This represents a chemical loss of both the deuterated and the corresponding native targets, likely radical initiated. This pattern of losses has been observed for other samples and the sample susceptibility is related to the contents of the extract and therefore the sample matrix. All extraction standard recoveries showed a signal to noise of much greater than 10:1. Losses of the deuterium labeled extraction standards parallel the native target losses. Therefore the target analyte quantification is not compromised.

#### Method Summary:

The 0010 train samples were extracted by SW846 Method 3542. For each train, the front half solids and the XAD2 sorbent were extracted together in a single soxhlet. The extraction standards for 8270D and PAH analyses were spiked into the solids/sorbent media just prior to extraction. The condensates were extracted by B/N/A liquid/liquid extraction technique using separatory funnels and dichloromethane as the extracting solvent. The extract from the soxhlet and the condensates for each train were combined for each train and reduced to a 5mL final volume. A 1/2 portion was removed and concentrated to 1mL for analysis of PAHs via isotope dilution and selected ion monitoring GC/LRMS analysis. A portion of the remaining extract was removed for analysis of semi-volatile organics via SW846 method 8270D.

Certified by:

Ron McLeod, Ph.D.  
General Manager and Technical Director

Results in this certificate relate only to the samples as submitted to the laboratory.

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The test results herein meet all of the requirements of ISO 17025:2005 and NELAC (2003) standards unless stated otherwise in the comments above.

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## Sample Analysis Summary Report

Sample Name	Method Blank	SRU-544 BLANK 45821/H4488 3/ H44885/H375 13	SRU-544 FIELD BLANK 45821/H447 70/ H44890	SRU-544 RUN 1 44772/H448 91/H44893/ H44895/ H44699/ H44894	SRU-544 RUN 2 42995/H448 86/ H44888/ H44889/ H44887	SRU-544 RUN 3 47580/H4488 2/ H44880/ H44701/ H44881	Laboratory Control Sample
ALS Sample ID	WG1301133-1	L1021357-10	L1021357-9	L1021357-6	L1021357-7	L1021357-8	WG1301133-2
Sample Size	1	1	1	1	1	1	1
Sample units	sample	sample	sample	sample	sample	sample	n/a
Matrix	QC	Stack	Stack	Stack	Stack	Stack	QC
Sampling Date	n/a	17-Jun-11	17-Jun-11	16-Jun-11	16-Jun-11	17-Jun-11	n/a
Extraction Date	23-Jun-11	23-Jun-11	23-Jun-11	23-Jun-11	23-Jun-11	23-Jun-11	23-Jun-11
Target Analytes	ng/sample	ng/sample	ng/sample	ng/sample	ng/sample	ng/sample	% Recovery
Naphthalene	9.68	204	181	972	1040	1070	91
2-Methylnaphthalene	4.54	<11.4 R	<7.76 R	30	42.1	34.0	NS
Acenaphthylene	<4 U	<4 U	<4 U	<4 U	23.5	<37.9 R	69
Acenaphthene	<4 U	<4 U	<4 U	<4 U	<20	<11.4 R	103
Fluorene	<4 U	6.08	4.14	44.1	37.8	13.0	102
Phenanthrene	4.94	12.9	8.18	31.9	39.9	34.6	111
Anthracene	<4 U	<4 U	<4 U	14.6	15.8	13.6	110
Fluoranthene	<4 U	<4 U	<4 U	<16.1 R	<8.36 R	<5.36 R	110
Pyrene	<4 U	<4 U	<4 U	<12.1 R	<8.66 R	<6.28 R	89
Benzo(a)anthracene	<4 U	<4 U	<4 U	<4 U	<4 U	<4 U	120
Chrysene	<4 U	<4 U	<4 U	<4 U	<4 U	<4 U	116
Benzo(b)fluoranthene	<4 U	<4 U	<4 U	<4 U	<4 U	<4 U	115
Benzo(k)fluoranthene	<4 U	<4 U	<4 U	<4 U	<4 U	<4 U	123
Benzo(e)pyrene	<4 U	<16.7 EMPC	<8.26 EMPC	<11.1 EMPC	<27.1 EMPC	<33.8 R	NS
Benzo(a)pyrene	<4 U	<4 U	<4 U	<4 U	<4 U	<4 U	119
Perylene	<4 U	<4 U	<4 U	<4 U	<4 U	<4 U	NS
Indeno(1,2,3-cd)pyrene	<4 U	<4 U	<4 U	<23 EMPC	14.2	<9.38 R	112
Dibenzo(a,h)anthracene	<4 U	<4 U	<4 U	<4 U	<4 U	<4 U	123
Benzo(g,h,i)perylene	<4 U	<4 U	<4 U	<4 U	27.6	<4 U	116
Additional Analytes	ng/sample	ng/sample	ng/sample	ng/sample	ng/sample	ng/sample	% Recovery
2-Chloronaphthalene	<4 U	<4 U	<4 U	<10.7 R	<4 U	<16.7 R	NS
Biphenyl	164	<180 R	167	<97.3 R	<113 R	438	NS
7,12-Dimethylbenzo(a)anthracene	<4 U	<4 U	<4 U	<4 U	<4 U	<4 U	NS
3-Methylcholanthrene	<4 U	<4 U	<4 U	<4 U	<4 U	<4 U	NS
Dibenzo(a,e)pyrene	<4 U	<4 U	<4 U	<4 U	<4 U	<4 U	NS
Field Sampling Standards	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec
d10-Fluorene	NS	62	61	78	66	71	NS
d14-Terphenyl	NS	68	69	71	66	63	NS
Extraction Standards	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec	% Rec
d8-Naphthalene	100	86	90	74	77	52	96
d10-2-Methylnaphthalene	100	88	91	79	88	60	93
d8-Acenaphthylene	94	93	94	82	21	21	90
d10-Phenanthrene	106	102	95	98	102	104	100
d10-Anthracene	105	107	99	104	87	89	93
d10-Fluoranthene	102	104	100	108	118	118	96
d12-Benzo(a)anthracene	98	107	121	136	147	134	100
d12-Chrysene	94	87	98	100	117	104	94
d12-Benzo(b)fluoranthene	124	119	119	118	119	124	105
d12-Benzo(k)fluoranthene	101	104	101	96	99	106	99
d12-Benzo(a)pyrene	82	97	103	100	69	75	91
d12-Perylene	99	103	98	101	47	71	92
d12-Indeno(1,2,3-c-d)pyrene	82	110	94	107	146	120	86
d14-Dibenz(a,h)anthracene	74	88	82	99	125	107	77
d12-Benzo(ghi)perylene	76	84	81	80	100	85	78
U Indicates that this compound was not detected above the LOD. NS Indicates that this compound was not spiked R Indicates ratio failure on confirming ion due to interference EMPC Estimated maximum concentration due to interference							



## ***ANALYTICAL REPORT***

**Project Name:** SRU 544 3 Runs  
**Project Number:** HS 453-SRU-544  
**Sample Location:** Port Arthur, TX  
**Sample Date:** 6/16/2011 & 6/17/11  
**Analysis Date:** 6/18/11 & 6/20/11  
**Analytical Method:** M-18 Methane & Ethane GC/FID

### **Prepared For:**

ARI Environmental, Inc.  
951 N. Old Rand Rd., Unit 106  
Wauconda, IL 60084-1289  
Project Manager: Dan Fitzgerald  
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### **Prepared By:**

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ARI Environmental, Inc. Texas NELAP ID: T104704428-10-2



## **PROJECT NARRATIVE**

This report contains the results of analyses performed on samples received under the project name referenced on the cover page and identified with the ARI Project Number HS 453-SRU-544. All analytical results reported under this report number apply only to the samples as received and properly identified in the signed chain-of-custody. The original chain of custody documentation is included with this report.

The samples were caught at Valero in Port Arthur, TX and received in good condition. They were logged in on 6/16/2011 & 6/17/11 and analyzed at the ARI Environmental, Inc. laboratory located in Pasadena, TX on 6/18/2011 & 6/20/11.

Unless otherwise noted in this project narrative, all test results reported in this analytical report meet all requirements of the NELAC standards and all requirements set forth in the applicable USEPA reference methods.

This report will be filed for a minimum of five years after which it may be destroyed without further notice, unless otherwise arranged by the sponsoring client. The samples received and described in this report will be filed for 60 days after which they may be properly disposed without further notice, unless otherwise arranged by the sponsoring client.

### **Sample Receipt Quality Assurance:**

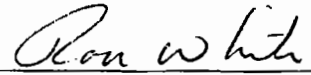
Unless otherwise noted, all sample receipt criteria listed on the ARI Sample Receipt Checklist were met.

### **Analytical Quality Assurance:**

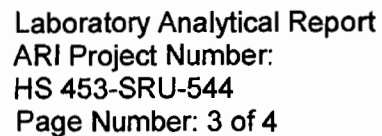
Unless otherwise noted, all sample analyses met the procedural requirements and QA/QC criteria contained in the test method(s), associated analytical standard operating procedure(s), and, where applicable, the project test plan.

  
Signature: Jim Presley, Senior Chemist

6-22-11  
Date

  
Signature: Ron White, Lab Manager

6-22-2011  
Date

[illegible]

- The analytical results of the samples listed above are presented on the following pages.

- All calculations are performed before rounding to avoid round-off errors in final results.
- Results noted as "ND" were not detected below the stated limit.
- This report shall not be reproduced, except in full, without the expressed written approval of ARI Environmental, Inc.



## ***DATA FLAGGING CRITERIA***

- X** Quality control deficiency observed and flagged as noted.
- B** A target analyte or common lab contaminant was identified in the blank which may indicate field or lab contamination.
- D** The sample(s) required dilution due to analyte detection over the highest calibration point. Test results are from a diluted sample.
- E** The results are reported as estimated since the data exceeds the upper calibration limit.
- J** Analyte was identified, but below the limit of quantitation (LOQ).
- U** Analyte was not detected (below the limit of detection).
- T** Sample(s) analyzed outside of maximum recommended holding time.

Client Valero  
Location Port Arthur TX  
Sample Date 6/16/11 & 6/17/11  
Analysis Date 6/18/11 & 6/19/11  
Project No: HS 453-SRU-544



### M-18 Analysis Summary

<u>Lab No:</u>	<u>Sample No:</u>	<u>Description</u>	<u>Methane ppmv</u>	<u>Ethane ppmv</u>
H0611066	H39696	SRU 544 Run 1	1.6	<1.0
H0611067	H39683	SRU 544 Run 2	1.1	<1.0
H0611068	H39886	SRU 544 Run 3	1.0	<1.0

M-18 Bias Calculations										
------------------------	--	--	--	--	--	--	--	--	--	--

Lab No:	Sample No:	Description	Methane Analysis ppmv	Ethane Analysis ppmv	Methane % Rec	Ethane % Rec	Methane Recovery Correction	Ethane Recovery Correction	Moisture Correction	M-18 Methane ppmv	M-18 Ethane ppmv
H0611066	H39696	SRU 544 Run 1	1.5	0.0	125.0	101.5	1.00	1.00	0.9785	1.6	0.0
H0611067	H39683	SRU 544 Run 2	1.1	0.0	125.0	101.5	1.00	1.00	0.9785	1.1	0.0
H0611068	H39886	SRU 544 Run 3	1.02	0.0	125.0	101.5	1.00	1.00	0.9785	1.0	0.0

**USEPA Method 4  
Relative Humidity and Moisture Calculation  
Using Wet Bulb/Dry Bulb Measurements**



<b>Client:</b>	Valero
<b>Location:</b>	Port Arthur, TX
<b>Source:</b>	HS 453-SRU-544
<b>Sample Date:</b>	6/16/11 & 6/17/11
<b>Analysis Date:</b>	6/18/11 & 6/19/11
<b>Instrument</b>	Agilent 6890 GC/FID

**Data Input:**

Barometric pressure ( $P_{bar}$ ):	29.95	inches Hg
Dry bulb ( $t_d$ ) or ambient ( $T_{amb}$ ) temperature:	68.1	°F
Wet bulb temperature ( $t_w$ )	68.1	°F
Static Pressure ( $S_i$ ):	0.0	inches H <sub>2</sub> O

**Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):**

**Absolute Pressure:**

= 29.95 inches Hg

= 760.76 mm Hg

**Saturated vapor pressure of  $t_d$ :**

$S_{vp}$  = 0.6899 inches Hg

**Actual vapor pressure:**

= 0.6899 inches Hg

**Fractional moisture content:**

= 0.0230 B<sub>wo</sub>

**Moisture content:**

2.30 %

**Fractional moisture content of gas at saturated conditions:**

= 293.1 °Kelvin

where:

A = 8.361

B = 1693.5

C = 27.65

= 0.0215 B<sub>wos</sub>

**Percent moisture at saturated conditions:**

= 2.15 %

**Percent relative humidity:**

= 100.00 %

**Percent moisture used for emissions calculations:**

For Bag Calculations not Stacks

= 2.15 %

**Percent moisture used for emissions calculations:**

= 0.0215 fractional

= 0.9785 correction

Client  
Location  
Project No:

Valero  
Port, Arthur, Tx  
HS 453-SRU-544

## Raw M-18 Analysis Results

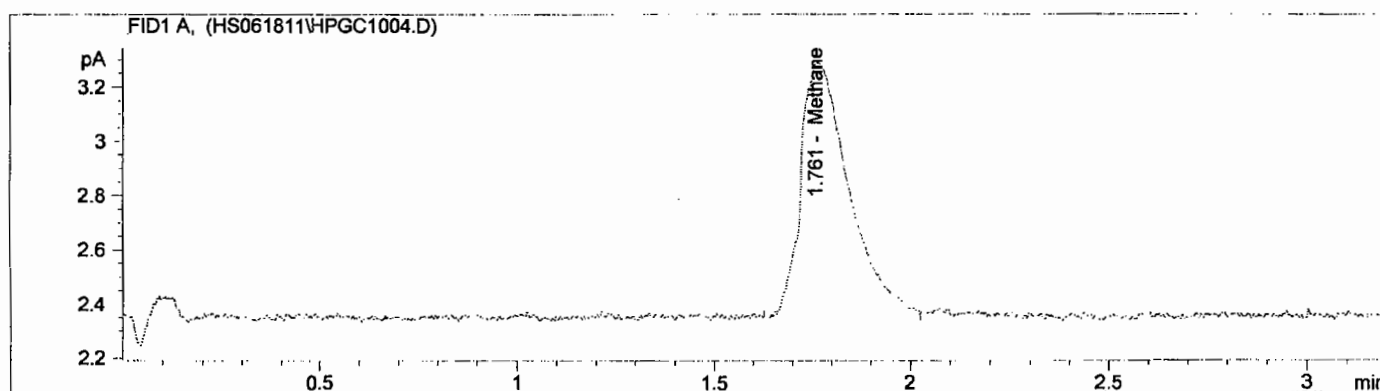
<u>Run Description</u>	<u>Lab No:</u>	<u>Sample No:</u>	<u>Methane ppmv</u>	<u>Ethane ppmv</u>
SRU 544 Run 1	H0611066	H39696	1.5	0.0
SRU 544 Run 1	H0611066	H39696	1.4	0.0
SRU 544 Run 1	H0611066	H39696	1.6	0.0
		<b>Ave = 1.5</b>		<b>0.0</b>
SRU 544 Run 2	H0611067	H39683	1.1	0.0
SRU 544 Run 2	H0611067	H39683	1.1	0.0
SRU 544 Run 2	H0611067	H39683	1.0	0.0
		<b>Ave = 1.1</b>		<b>0.0</b>
SRU 544 Run 3	H0611068	H39886	1.0	0.0
SRU 544 Run 3	H0611068	H39886	0.99	0.0
SRU 544 Run 3	H0611068	H39886	1.0	0.0
		<b>Ave = 1.0</b>		<b>0.0</b>
SRU 544 Run 3 Spike	H0611068	H39886	3.5	2.0
SRU 544 Run 3 Spike	H0611068	H39886	3.5	2.0
SRU 544 Run 3 Spike	H0611068	H39886	3.5	2.0
		<b>Ave = 3.5</b>		<b>2.0</b>
		<b>% Rec = 125.0</b>		<b>101.5</b>

SRU-544 Run 1 Sampled 6/16/11

Lab No: H0611066 Sample No: H39696

No Dilution

=====  
Injection Date : 6/18/2011 3:39:56 PM  
Sample Name : SRU-544 Run 1 Location : -  
Acq. Operator : JP Inj : 1  
Acq. Instrument : Instrument 1 Inj Volume : Manually  
Acq. Method : C:\HPCHEM\1\METHODS\METHANE.M  
Last changed : 6/10/2011 5:18:34 PM by JP  
Analysis Method : C:\HPCHEM\1\METHODS\METHANEE.M  
Last changed : 6/18/2011 3:45:08 PM by JP  
(modified after loading)  
=====  
Created 8-26-09  
=====



=====  
External Standard Report  
=====

Sorted By : Signal  
Calib. Data Modified : 6/18/2011 3:45:10 PM  
Multiplier : 1.0000  
Dilution : 1.0000  
Use Multiplier & Dilution Factor with ISTDs

Signal 1: FID1 A,

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ppm]	Grp	Name
1.761	BP	8.02624	1.34730e-1	1.08138		Methane
2.144		-	-	-		Ethane

Totals : 1.08138

Results obtained with enhanced integrator!  
1 Warnings or Errors :

Warning : Calibrated compound(s) not found

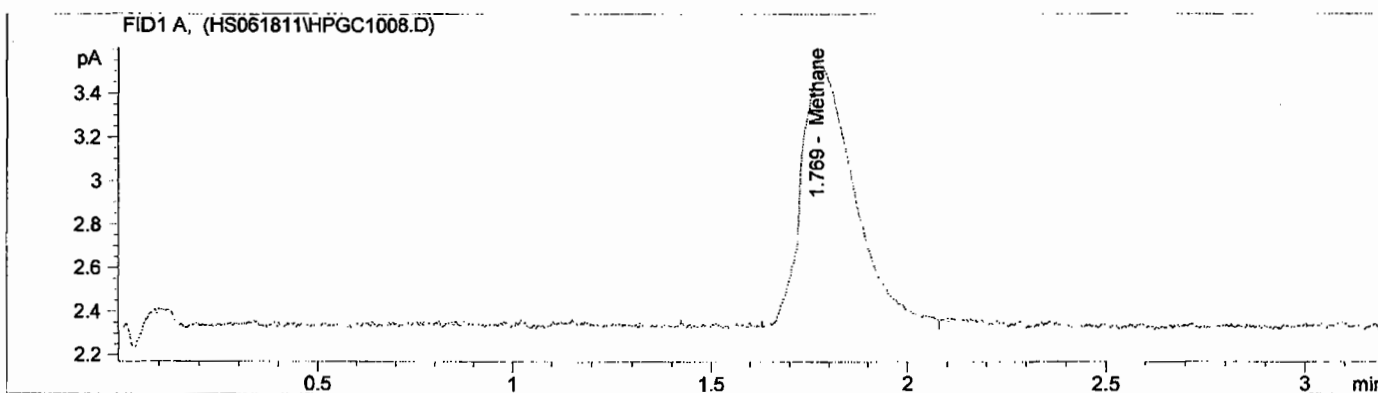
=====  
\*\*\* End of Report \*\*\*  
=====

SRU-544 Run 1 Sampled 6/16/11

Lab No: H0611066 Sample No: H39696

No Dilution

```
=====
Injection Date   : 6/18/2011 3:59:53 PM
Sample Name      : SRU-544 Run 1
Acq. Operator    : JP
Acq. Instrument  : Instrument 1
Acq. Method      : C:\HPCHEM\1\METHODS\METHANE.M
Last changed     : 6/10/2011 5:18:34 PM by JP
Analysis Method  : C:\HPCHEM\1\METHODS\METHANE.M
Last changed     : 6/18/2011 4:04:31 PM by JP
                  (modified after loading)
Created 8-26-09
=====
```



External Standard Report

```
=====
Sorted By       : Signal
Calib. Data Modified : 6/18/2011 4:04:34 PM
Multiplier      : 1.0000
Dilution        : 1.0000
Use Multiplier & Dilution Factor with ISTDs
=====
```

Signal 1: FID1 A,

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ppm]	Grp	Name
1.769	PP	11.17579	1.34730e-1	1.50572		Methane
2.144		-	-	-		Ethane

Totals : 1.50572

Results obtained with enhanced integrator!

1 Warnings or Errors :

Warning : Calibrated compound(s) not found

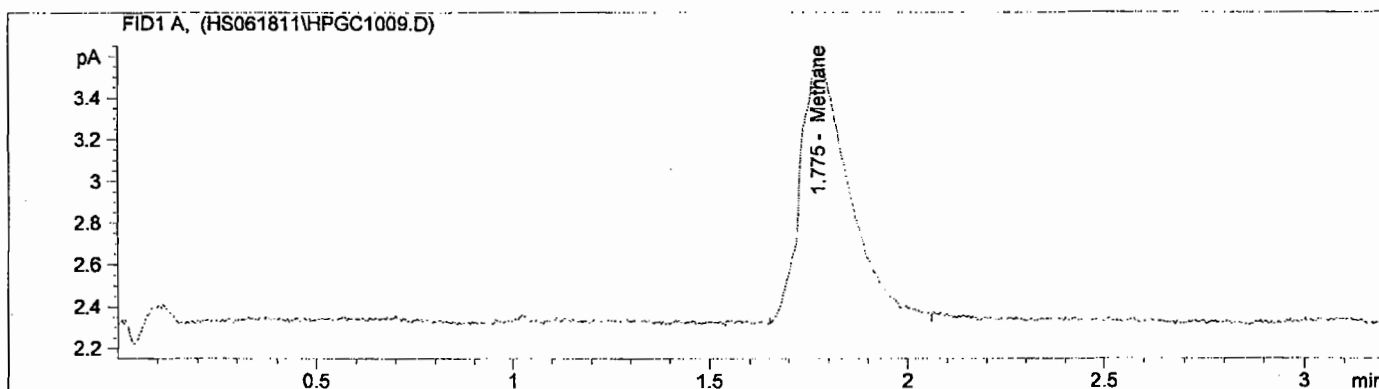
\*\*\* End of Report \*\*\*

SRU-544 Run 1 Sampled 6/16/11

Lab No: H0611066 Sample No: H39696

No Dilution

=====  
Injection Date : 6/18/2011 4:05:00 PM  
Sample Name : SRU-544 Run 1 Location : -  
Acq. Operator : JP Inj : 1  
Acq. Instrument : Instrument 1 Inj Volume : Manually  
Acq. Method : C:\HPCHEM\1\METHODS\METHANE.M  
Last changed : 6/10/2011 5:18:34 PM by JP  
Analysis Method : C:\HPCHEM\1\METHODS\METHANEE.M  
Last changed : 6/18/2011 4:04:31 PM by JP  
(modified after loading)  
=====  
Created 8-26-09  
=====



=====  
External Standard Report  
=====

Sorted By : Signal  
Calib. Data Modified : 6/18/2011 4:04:34 PM  
Multiplier : 1.0000  
Dilution : 1.0000  
Use Multiplier & Dilution Factor with ISTDs

Signal 1: FID1 A,

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ppm]	Grp	Name
1.775	PP	10.59593	1.34730e-1	1.42759		Methane
2.144		-	-	-		Ethane

Totals : 1.42759

Results obtained with enhanced integrator!  
1 Warnings or Errors :

Warning : Calibrated compound(s) not found

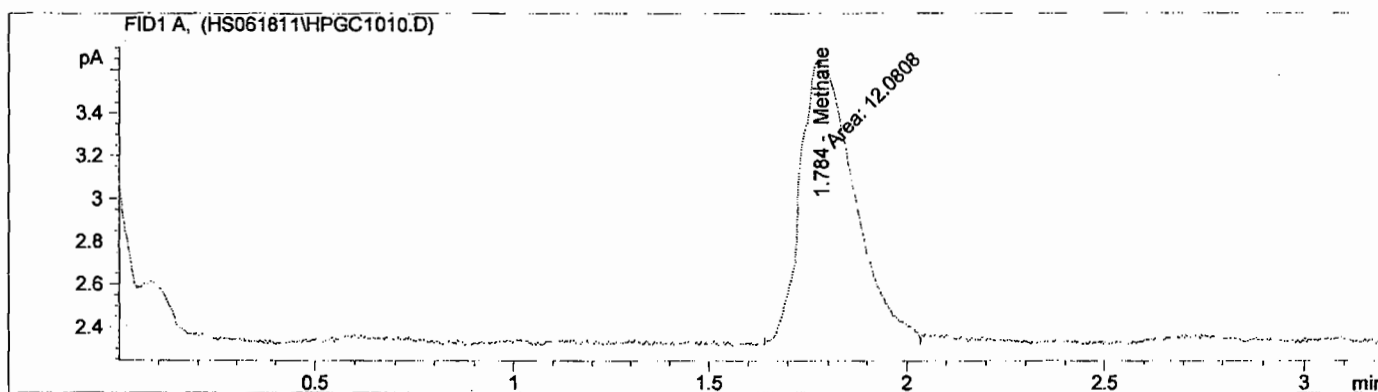
=====  
\*\*\* End of Report \*\*\*  
=====

SRU-544 Run 1 Sampled 6/16/11

Lab No: H0611066 Sample No: H39696

No Dilution

```
=====
Injection Date   : 6/18/2011 4:08:59 PM
Sample Name      : SRU-544 Run 1
Acq. Operator    : JP
Acq. Instrument  : Instrument 1
Acq. Method      : C:\HPCHEM\1\METHODS\METHANE.M
Last changed     : 6/10/2011 5:18:34 PM by JP
Analysis Method  : C:\HPCHEM\1\METHODS\METHANEE.M
Last changed     : 6/18/2011 4:04:31 PM by JP
                  (modified after loading)
Created 8-26-09
=====
```



External Standard Report

```
=====
Sorted By       : Signal
Calib. Data Modified : 6/18/2011 4:04:34 PM
Multiplier      : 1.0000
Dilution        : 1.0000
Use Multiplier & Dilution Factor with ISTDs
=====
```

Signal 1: FID1 A,

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ppm]	Grp	Name
1.784	MM	12.08085	1.34730e-1	1.62766		Methane
2.144		-	-	-		Ethane

Totals : 1.62766

Results obtained with enhanced integrator!  
1 Warnings or Errors :

Warning : Calibrated compound(s) not found

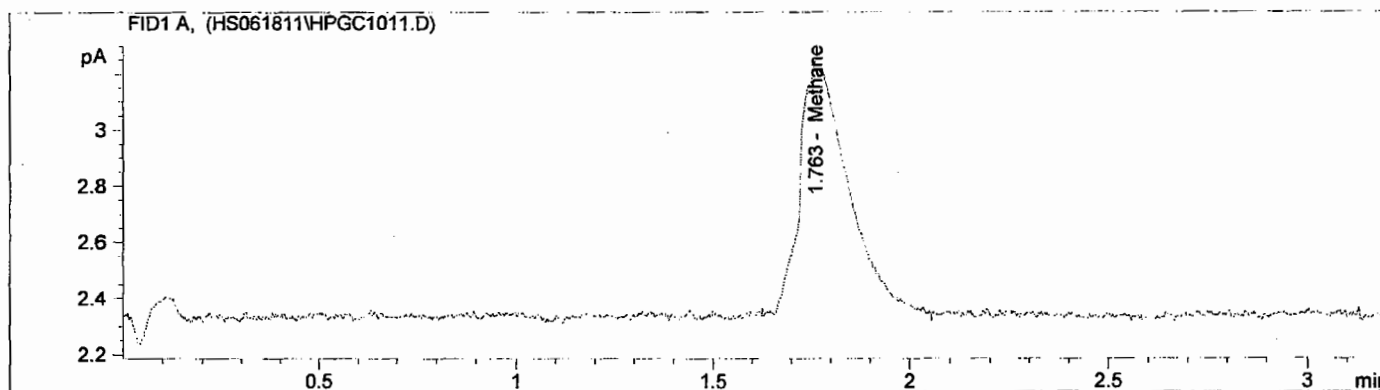
\*\*\* End of Report \*\*\*

SRU-544 Run Sampled 6/16/11

Lab No: H061106 Sample No: H396

No Dilution

=====  
Injection Date : 6/18/2011 4:14:34 PM  
Sample Name : SRU-544 Run Location : -  
Acq. Operator : JP Inj : 1  
Acq. Instrument : Instrument 1 Inj Volume : Manually  
Acq. Method : C:\HPCHEM\1\METHODS\METHANE.M  
Last changed : 6/10/2011 5:18:34 PM by JP  
Analysis Method : C:\HPCHEM\1\METHODS\METHANEE.M  
Last changed : 6/18/2011 4:04:31 PM by JP  
(modified after loading)  
Created 8-26-09  
=====



=====  
External Standard Report  
=====

Sorted By : Signal  
Calib. Data Modified : 6/18/2011 4:04:34 PM  
Multiplier : 1.0000  
Dilution : 1.0000  
Use Multiplier & Dilution Factor with ISTDs

Signal 1: FID1 A,

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ppm]	Grp	Name
1.763	BP	7.84652	1.34730e-1	1.05716		Methane
2.144		-	-	-		Ethane

Totals : 1.05716

Results obtained with enhanced integrator!  
1 Warnings or Errors :

Warning : Calibrated compound(s) not found

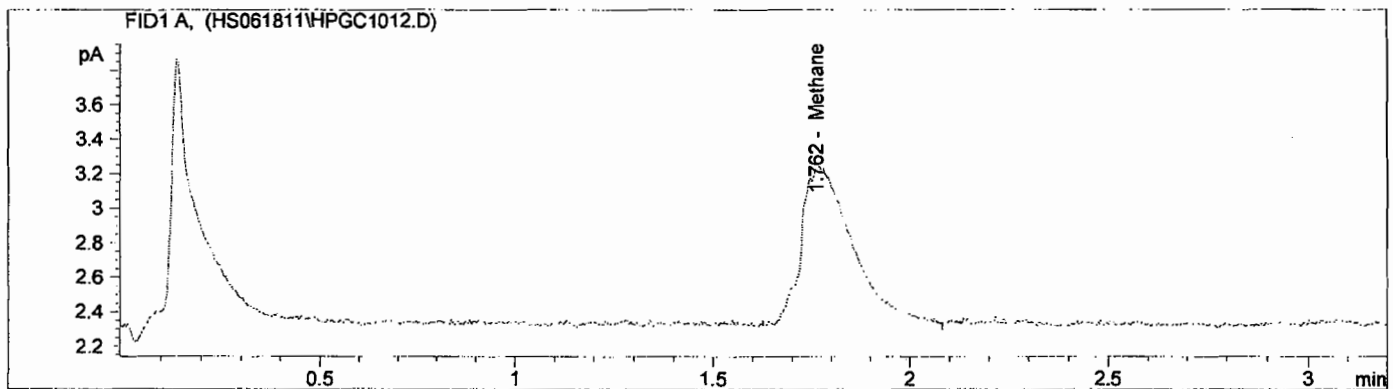
=====  
\*\*\* End of Report \*\*\*  
=====

SRU-544 Run Sampled 6/16/11

Lab No: H061106 Sample No: H396

No Dilution

=====  
Injection Date : 6/18/2011 4:18:23 PM  
Sample Name : SRU-544 Run Location : -  
Acq. Operator : JP Inj : 1  
Acq. Instrument : Instrument 1 Inj Volume : Manually  
Acq. Method : C:\HPCHEM\1\METHODS\METHANE.M  
Last changed : 6/10/2011 5:18:34 PM by JP  
Analysis Method : C:\HPCHEM\1\METHODS\METHANEE.M  
Last changed : 6/18/2011 4:04:31 PM by JP  
(modified after loading)  
Created 8-26-09  
=====



=====  
External Standard Report  
=====

Sorted By : Signal  
Calib. Data Modified : 6/18/2011 4:04:34 PM  
Multiplier : 1.0000  
Dilution : 1.0000  
Use Multiplier & Dilution Factor with ISTDs

Signal 1: FID1 A,

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ppm]	Grp	Name
1.762	PP	8.41529	1.34730e-1	1.13379		Methane
2.144		-	-	-		Ethane

Totals : 1.13379

Results obtained with enhanced integrator!

1 Warnings or Errors :

Warning : Calibrated compound(s) not found

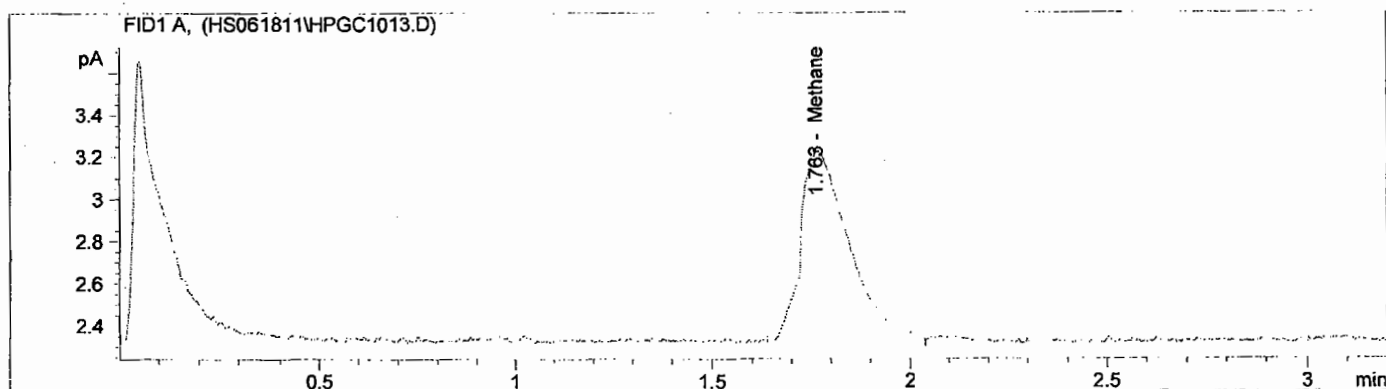
=====  
\*\*\* End of Report \*\*\*  
=====

SRU-544 Run Sampled 6/16/11

Lab No: H061106 Sample No: H396

No Dilution

=====  
Injection Date : 6/18/2011 4:22:17 PM  
Sample Name : SRU-544 Run Location : -  
Acq. Operator : JP Inj : 1  
Acq. Instrument : Instrument 1 Inj Volume : Manually  
Acq. Method : C:\HPCHEM\1\METHODS\METHANE.M  
Last changed : 6/10/2011 5:18:34 PM by JP  
Analysis Method : C:\HPCHEM\1\METHODS\METHANEE.M  
Last changed : 6/18/2011 4:04:31 PM by JP  
(modified after loading)  
Created 8-26-09  
=====



=====  
External Standard Report  
=====

Sorted By : Signal  
Calib. Data Modified : 6/18/2011 4:04:34 PM  
Multiplier : 1.0000  
Dilution : 1.0000  
Use Multiplier & Dilution Factor with ISTDs

Signal 1: FID1 A,

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ppm]	Grp	Name
1.763	PP	7.72437	1.34730e-1	1.04071		Methane
2.144		-	-	-		Ethane

Totals : 1.04071

Results obtained with enhanced integrator!  
1 Warnings or Errors :

Warning : Calibrated compound(s) not found

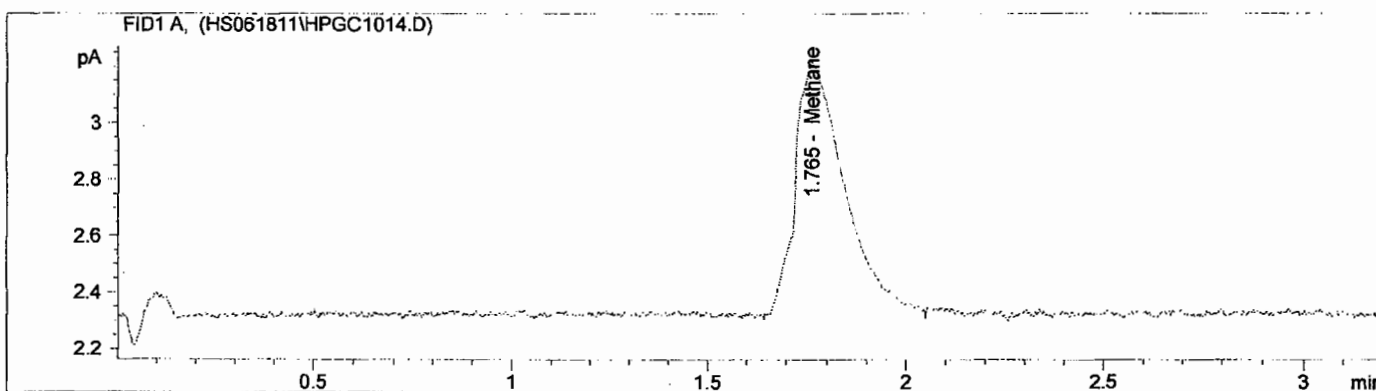
=====  
\*\*\* End of Report \*\*\*  
=====

SRU-544 Run 3 Sampled 6/17/11

Lab No: H0611068 Sample No: H39886

No Dilution

=====  
Injection Date : 6/18/2011 4:28:23 PM  
Sample Name : SRU-544 Run 3 Location : -  
Acq. Operator : JP Inj : 1  
Acq. Instrument : Instrument 1 Inj Volume : Manually  
Acq. Method : C:\HPCHEM\1\METHODS\METHANE.M  
Last changed : 6/10/2011 5:18:34 PM by JP  
Analysis Method : C:\HPCHEM\1\METHODS\METHANEE.M  
Last changed : 6/18/2011 4:04:31 PM by JP  
(modified after loading)  
Created 8-26-09  
=====



=====  
External Standard Report  
=====

Sorted By : Signal  
Calib. Data Modified : 6/18/2011 4:04:34 PM  
Multiplier : 1.0000  
Dilution : 1.0000  
Use Multiplier & Dilution Factor with ISTDs

Signal 1: FID1 A,

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ppm]	Grp	Name
1.765	PP	7.71477	1.34730e-1	1.03941		Methane
2.144		-	-	-		Ethane

Totals : 1.03941

Results obtained with enhanced integrator!  
1 Warnings or Errors :

Warning : Calibrated compound(s) not found

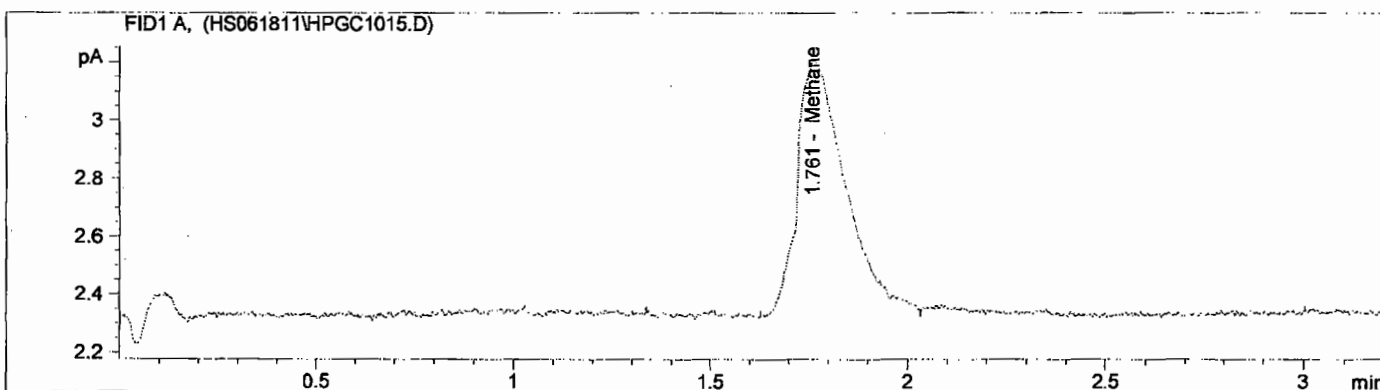
=====  
\*\*\* End of Report \*\*\*  
=====

SRU-544 Run 3 Sampled 6/17/11

Lab No: H0611068 Sample No: H39886

No Dilution

```
=====
Injection Date   : 6/18/2011 4:32:35 PM
Sample Name      : SRU-544 Run 3
Acq. Operator    : JP
Acq. Instrument  : Instrument 1
Acq. Method      : C:\HPCHEM\1\METHODS\METHANE.M
Last changed     : 6/10/2011 5:18:34 PM by JP
Analysis Method  : C:\HPCHEM\1\METHODS\METHANEE.M
Last changed     : 6/18/2011 4:04:31 PM by JP
                  (modified after loading)
Created 8-26-09
=====
```



External Standard Report

```
=====
Sorted By       : Signal
Calib. Data Modified : 6/18/2011 4:04:34 PM
Multiplier      : 1.0000
Dilution        : 1.0000
Use Multiplier & Dilution Factor with ISTDs
=====
```

Signal 1: FID1 A,

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ppm]	Grp	Name
1.761	PP	7.38383	1.34730e-1	9.94825e-1		Methane
2.144		-	-	-		Ethane

Totals : 9.94825e-1

Results obtained with enhanced integrator!  
1 Warnings or Errors :

Warning : Calibrated compound(s) not found

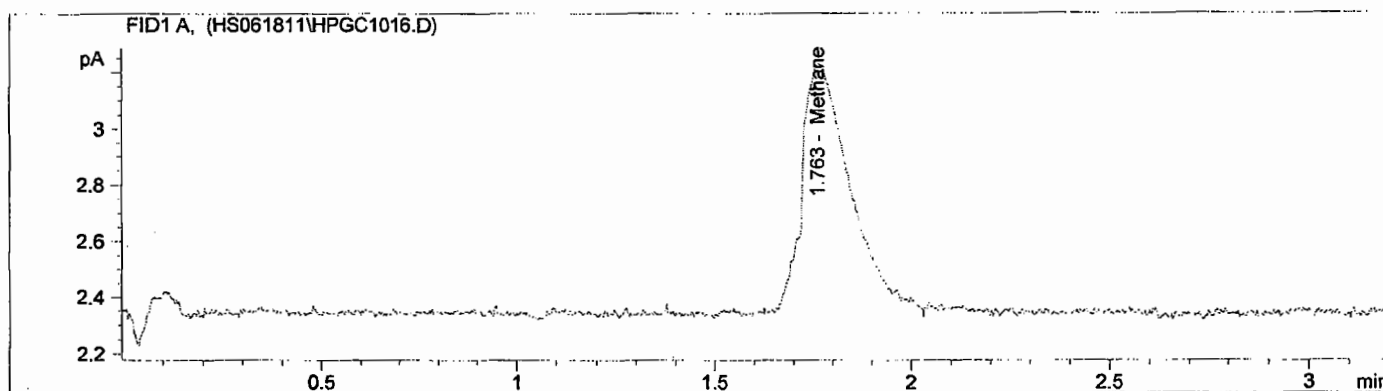
\*\*\* End of Report \*\*\*

SRU-544 Run 3 Sampled 6/17/11

Lab No: H0611068 Sample No: H39886

No Dilution

=====  
Injection Date : 6/18/2011 4:38:16 PM  
Sample Name : SRU-544 Run 3 Location : -  
Acq. Operator : JP Inj : 1  
Acq. Instrument : Instrument 1 Inj Volume : Manually  
Acq. Method : C:\HPCHEM\1\METHODS\METHANE.M  
Last changed : 6/10/2011 5:18:34 PM by JP  
Analysis Method : C:\HPCHEM\1\METHODS\METHANEE.M  
Last changed : 6/18/2011 4:04:31 PM by JP  
(modified after loading)  
Created 8-26-09  
=====



=====  
External Standard Report  
=====

Sorted By : Signal  
Calib. Data Modified : 6/18/2011 4:04:34 PM  
Multiplier : 1.0000  
Dilution : 1.0000  
Use Multiplier & Dilution Factor with ISTDs

Signal 1: FID1 A,

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ppm]	Grp	Name
1.763	BP	7.58995	1.34730e-1	1.02260		Methane
2.144		-	-	-		Ethane

Totals : 1.02260

Results obtained with enhanced integrator!  
1 Warnings or Errors :

Warning : Calibrated compound(s) not found

=====  
\*\*\* End of Report \*\*\*  
=====

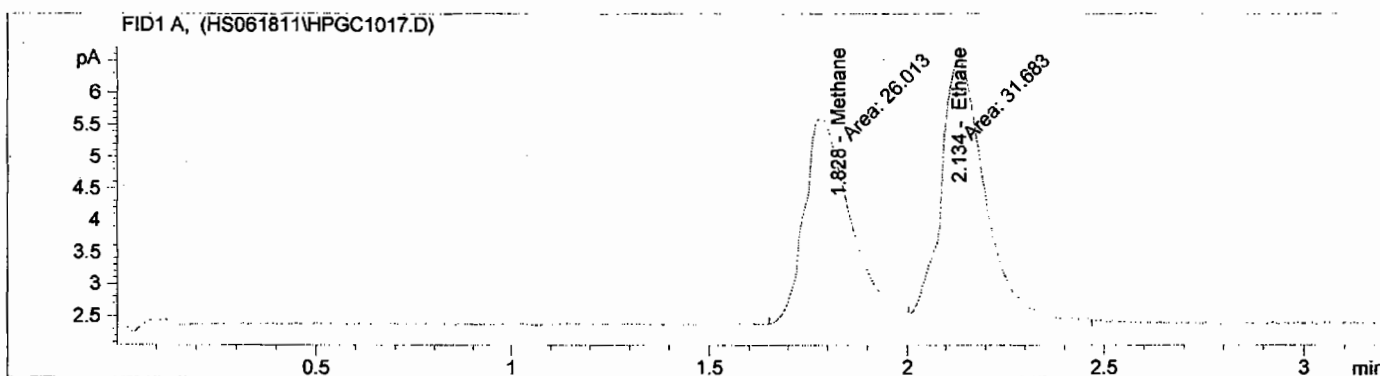
SRU-544 Run 3 SPIKE

Sampled 6/17/11 Recovery Spiked: 6/18/11 @ 4:25 pm

Lab No: H0611068 Sample No: H39886

4900 ml Sample + 100 ml 100 ppmv STD No: EB-0029963

```
=====
Injection Date   : 6/20/2011 9:57:17 AM
Sample Name      : SRU-544 Run 3 Sp           Location : -
Acq. Operator    : JP                        Inj       : 1
Acq. Instrument  : Instrument 1               Inj Volume : Manually
Acq. Method      : C:\HPCHEM\1\METHODS\METHANE.M
Last changed     : 6/10/2011 5:18:34 PM by JP
Analysis Method  : C:\HPCHEM\1\METHODS\METHANEE.M
Last changed     : 6/20/2011 10:04:08 AM by JP
                  (modified after loading)
Created 8-26-09
=====
```



External Standard Report

```
=====
Sorted By       : Signal
Calib. Data Modified : 6/20/2011 10:04:10 AM
Multiplier      : 1.0000
Dilution        : 1.0000
Use Multiplier & Dilution Factor with ISTDs
=====
```

Signal 1: FID1 A,

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ppm]	Grp	Name
1.828	MF	26.01305	1.34730e-1	3.50474		Methane
2.134	FM	31.68300	6.41801e-2	2.03342		Ethane

Totals : 5.53816

Results obtained with enhanced integrator!

\*\*\* End of Report \*\*\*

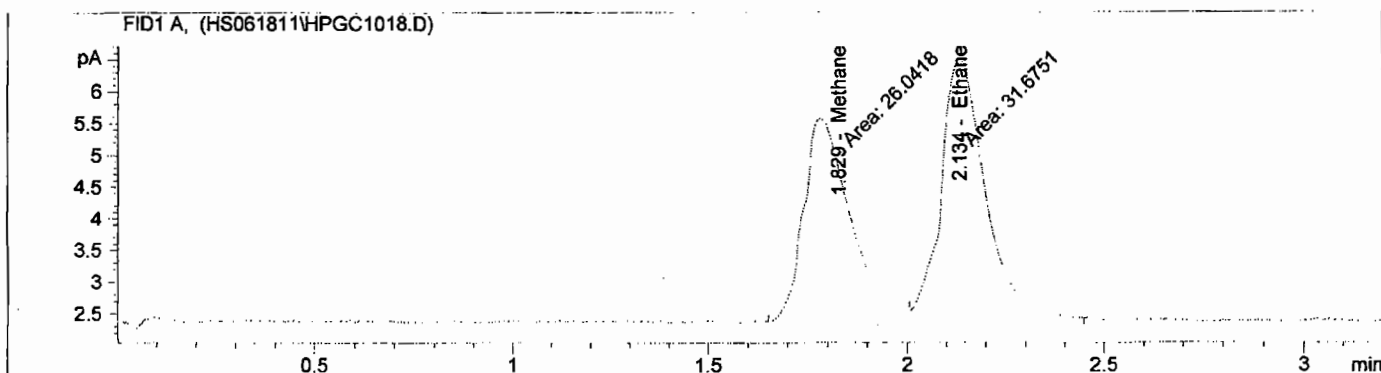
SRU-544 Run 3 SPIKE

Sampled 6/17/11 Recovery Spiked: 6/18/11 @ 4:25 pm

Lab No: H0611068 Sample No: H39886

4900 ml Sample + 100 ml 100 ppmv STD No: EB-0029963

```
=====
Injection Date   : 6/20/2011 10:03:08 AM
Sample Name     : SRU-544 Run 3 Sp           Location : -
Acq. Operator   : JP                       Inj : 1
Acq. Instrument : Instrument 1              Inj Volume : Manually
Acq. Method     : C:\HPCHEM\1\METHODS\METHANE.M
Last changed    : 6/10/2011 5:18:34 PM by JP
Analysis Method : C:\HPCHEM\1\METHODS\METHANEE.M
Last changed    : 6/20/2011 10:04:08 AM by JP
                  (modified after loading)
Created 8-26-09
=====
```



External Standard Report

```
=====
Sorted By      : Signal
Calib. Data Modified : 6/20/2011 10:04:10 AM
Multiplier     : 1.0000
Dilution       : 1.0000
Use Multiplier & Dilution Factor with ISTDs
=====
```

Signal 1: FID1 A,

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ppm]	Grp	Name
1.829	MF	26.04181	1.34730e-1	3.50862		Methane
2.134	FM	31.67509	6.41801e-2	2.03291		Ethane

Totals : 5.54153

Results obtained with enhanced integrator!

\*\*\* End of Report \*\*\*

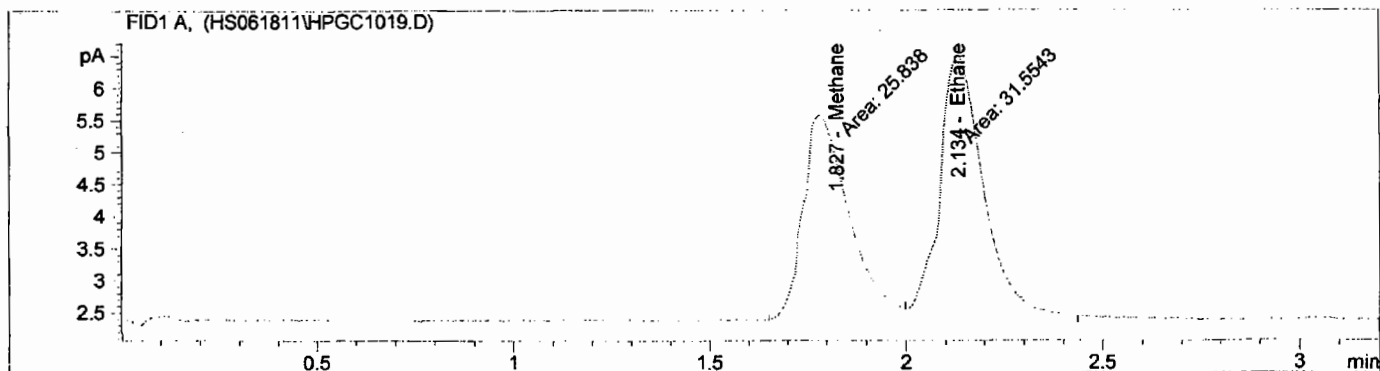
SRU-544 Run 3 SPIKE

Sampled 6/17/11 Recovery Spiked: 6/18/11 @ 4:25 pm

Lab No: H0611068 Sample No: H39886

4900 ml Sample + 100 ml 100 ppmv STD No: EB-0029963

=====  
Injection Date : 6/20/2011 10:07:13 AM  
Sample Name : SRU-544 Run 3 Sp Location : -  
Acq. Operator : JP Inj : 1  
Acq. Instrument : Instrument 1 Inj Volume : Manually  
Acq. Method : C:\HPCHEM\1\METHODS\METHANE.M  
Last changed : 6/10/2011 5:18:34 PM by JP  
Analysis Method : C:\HPCHEM\1\METHODS\METHANEE.M  
Last changed : 6/20/2011 10:04:08 AM by JP  
(modified after loading)  
Created 8-26-09  
=====



=====  
External Standard Report  
=====

Sorted By : Signal  
Calib. Data Modified : 6/20/2011 10:04:10 AM  
Multiplier : 1.0000  
Dilution : 1.0000  
Use Multiplier & Dilution Factor with ISTDs

Signal 1: FID1 A,

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ppm]	Grp	Name
1.827	MF	25.83797	1.34730e-1	3.48116		Methane
2.134	FM	31.55431	6.41801e-2	2.02516		Ethane

Totals : 5.50631

Results obtained with enhanced integrator!

=====  
\*\*\* End of Report \*\*\*  
=====

Calibration Date 6/10/11

Instrument ID Agilent 6890

### Continuing Calibration Check

Analyst JP

Date & Time 6-18-11 @ 3:22 PM

#### Initial Cal Values

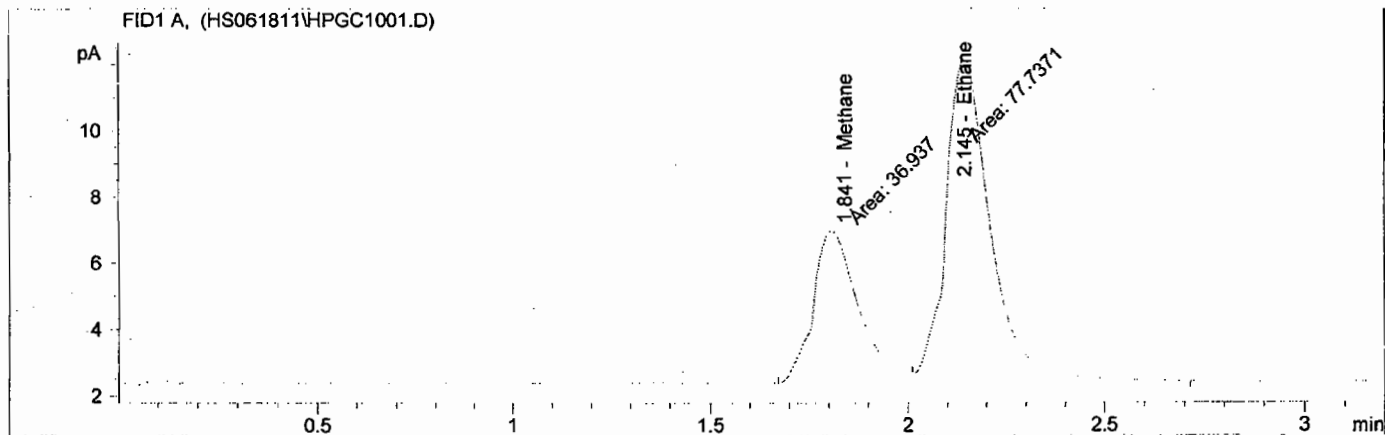
<u>Compound</u>	<u>Area (1)</u>	<u>Area (2)</u>	<u>Area (3)</u>	<u>Area (ave)</u>
Methane	37.0	36.8	37.1	37.0
Ethane	77.7	77.9	77.9	77.8

#### Continuing or End Cal Values

<u>Compound</u>	<u>Area (1)</u>	<u>Area (2)</u>	<u>Area (3)</u>	<u>Area (ave)</u>
Methane	36.94	36.68	37.20	36.94
Ethane	77.74	77.05	77.88	77.56

<u>Compound</u>	<u>Initial Area (ave)</u>	<u>Continuing or End Area (ave)</u>	<u>% Diff</u>	<u>M-18 QA/QC</u>
Methane	37.0	36.9	0.1	PASS
Ethane	77.8	77.6	0.3	PASS

=====  
Injection Date : 6/18/2011 3:22:53 PM  
Sample Name : 5.0 ppmv STD Location : -  
Acq. Operator : JP Inj : 1  
Acq. Instrument : Instrument 1 Inj Volume : Manually  
Acq. Method : C:\HPCHEM\1\METHODS\METHANE.M  
Last changed : 6/10/2011 5:18:34 PM by JP  
Analysis Method : C:\HPCHEM\1\METHODS\METHANEE.M  
Last changed : 6/18/2011 3:27:49 PM by JP  
(modified after loading)  
Created 8-26-09  
=====



=====  
External Standard Report  
=====

Sorted By : Signal  
Calib. Data Modified : 6/18/2011 3:27:51 PM  
Multiplier : 1.0000  
Dilution : 1.0000  
Use Multiplier & Dilution Factor with ISTDs

Signal 1: FID1 A,

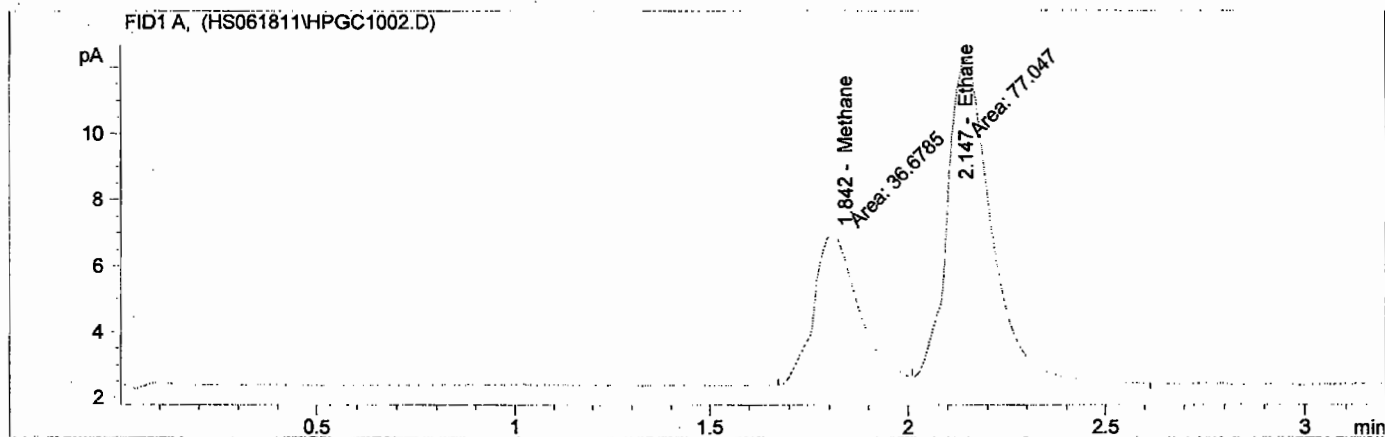
RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ppm]	Grp	Name
1.841	MF	36.93705	1.34730e-1	4.97654		Methane
2.145	FM	77.73711	6.41801e-2	4.98917		Ethane

Totals : 9.96571

Results obtained with enhanced integrator!

=====  
\*\*\* End of Report \*\*\*  
=====

=====  
Injection Date : 6/18/2011 3:26:38 PM  
Sample Name : 5.0 ppmv STD Location : -  
Acq. Operator : JP Inj : 1  
Acq. Instrument : Instrument 1 Inj Volume : Manually  
Acq. Method : C:\HPCHEM\1\METHODS\METHANE.M  
Last changed : 6/10/2011 5:18:34 PM by JP  
Analysis Method : C:\HPCHEM\1\METHODS\METHANEE.M  
Last changed : 6/18/2011 3:27:49 PM by JP  
(modified after loading)  
Created 8-26-09  
=====



=====  
External Standard Report  
=====

Sorted By : Signal  
Calib. Data Modified : 6/18/2011 3:27:51 PM  
Multiplier : 1.0000  
Dilution : 1.0000  
Use Multiplier & Dilution Factor with ISTDs

Signal 1: FID1 A,

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ppm]	Grp	Name
1.842	MF	36.67852	1.34730e-1	4.94170		Methane
2.147	FM	77.04704	6.41801e-2	4.94488		Ethane

Totals : 9.88659

Results obtained with enhanced integrator!

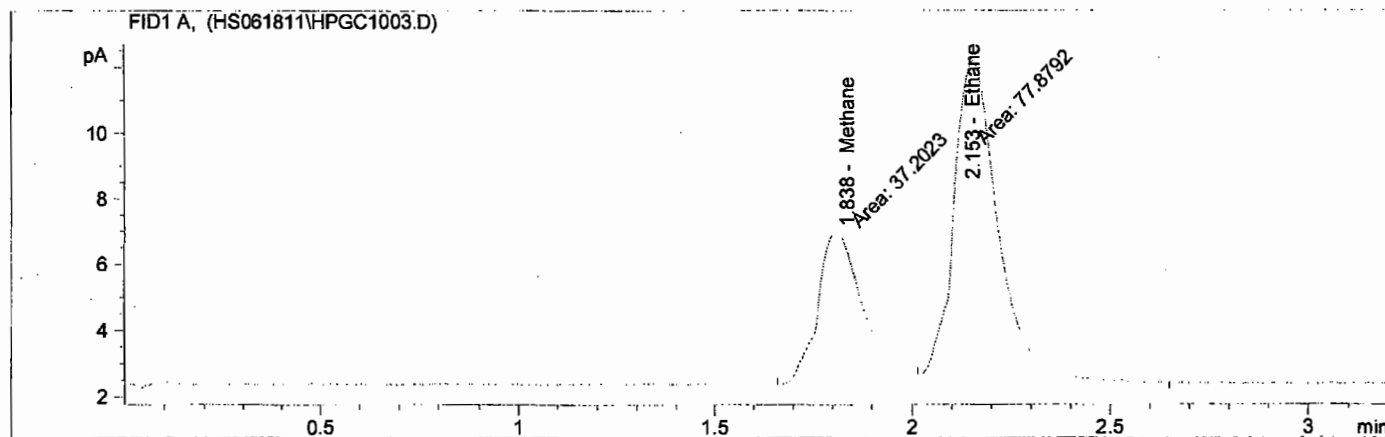
=====  
\*\*\* End of Report \*\*\*  
=====

=====

Injection Date	: 6/18/2011 3:30:30 PM	Location	: -
Sample Name	: 5.0 ppmv STD	Inj	: 1
Acq. Operator	: JP	Inj Volume	: Manually
Acq. Instrument	: Instrument 1		
Acq. Method	: C:\HPCHEM\1\METHODS\METHANE.M		
Last changed	: 6/10/2011 5:18:34 PM by JP		
Analysis Method	: C:\HPCHEM\1\METHODS\METHANEE.M		
Last changed	: 6/18/2011 3:27:49 PM by JP		
	(modified after loading)		

Created 8-26-09

=====



=====

External Standard Report

=====

Sorted By : Signal  
Calib. Data Modified : 6/18/2011 3:27:51 PM  
Multiplier : 1.0000  
Dilution : 1.0000  
Use Multiplier & Dilution Factor with ISTDs

Signal 1: FID1 A,

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ppm]	Grp	Name
1.838	MF	37.20227	1.34730e-1	5.01227		Methane
2.153	FM	77.87925	6.41801e-2	4.99830		Ethane

Totals : 10.01057

Results obtained with enhanced integrator!

=====

\*\*\* End of Report \*\*\*

Calibration Date

6/10/11

Instrument ID

Agilent 6890

### Continuing Calibration Check

Analyst

JP

Date & Time

6-20-11 @ 2:05 PM

#### Initial Cal Values

<u>Compound</u>	<u>Area (1)</u>	<u>Area (2)</u>	<u>Area (3)</u>	<u>Area (ave)</u>
Methane	37.0	36.8	37.1	37.0
Ethane	77.7	77.9	77.9	77.8

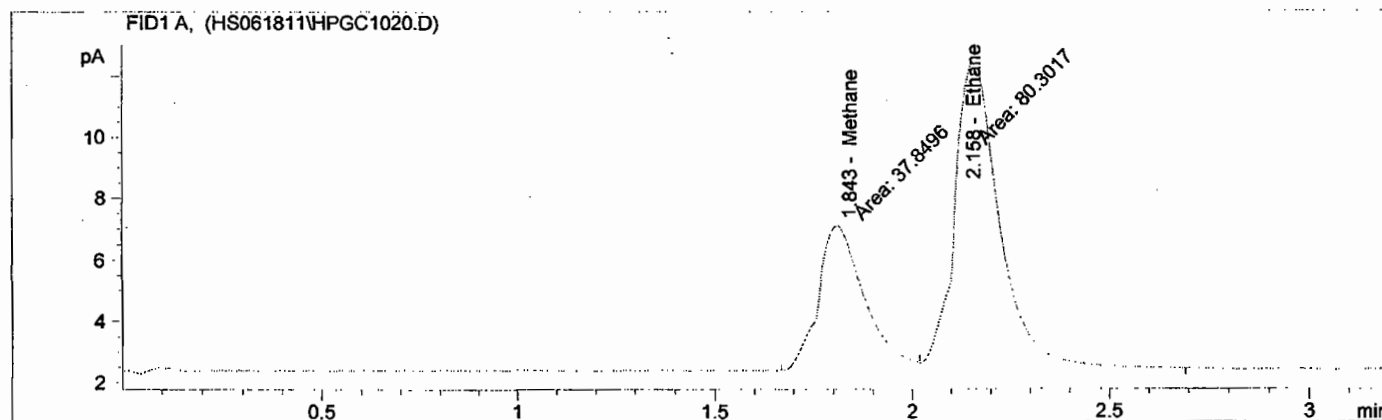
#### Continuing or End Cal Values

<u>Compound</u>	<u>Area (1)</u>	<u>Area (2)</u>	<u>Area (3)</u>	<u>Area (ave)</u>
Methane	37.85	37.51	37.82	37.73
Ethane	80.30	78.67	79.34	79.44

<u>Compound</u>	<u>Initial Area (ave)</u>	<u>Continuing or End Area (ave)</u>	<u>% Diff</u>	<u>M-18 QA/QC</u>
Methane	37.0	37.7	2.0	PASS
Ethane	77.8	79.4	2.0	PASS

Cylinder No: EB-0029963

```
=====
Injection Date   : 6/20/2011 2:05:10 PM
Sample Name      : 5.0 ppmv STD                Location   : -
Acq. Operator    : JP                        Inj         : 1
Acq. Instrument  : Instrument 1                Inj Volume  : Manually
Acq. Method      : C:\HPCHEM\1\METHODS\METHANE.M
Last changed     : 6/10/2011 5:18:34 PM by JP
Analysis Method  : C:\HPCHEM\1\METHODS\METHANEE.M
Last changed     : 6/20/2011 10:04:08 AM by JP
                  (modified after loading)
Created 8-26-09
=====
```



External Standard Report

```
=====
Sorted By       : Signal
Calib. Data Modified : 6/20/2011 10:04:10 AM
Multiplier      : 1.0000
Dilution        : 1.0000
Use Multiplier & Dilution Factor with ISTDs
=====
```

Signal 1: FID1 A,

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ppm]	Grp	Name
1.843	MF	37.84965	1.34730e-1	5.09949		Methane
2.158	FM	80.30170	6.41801e-2	5.15377		Ethane

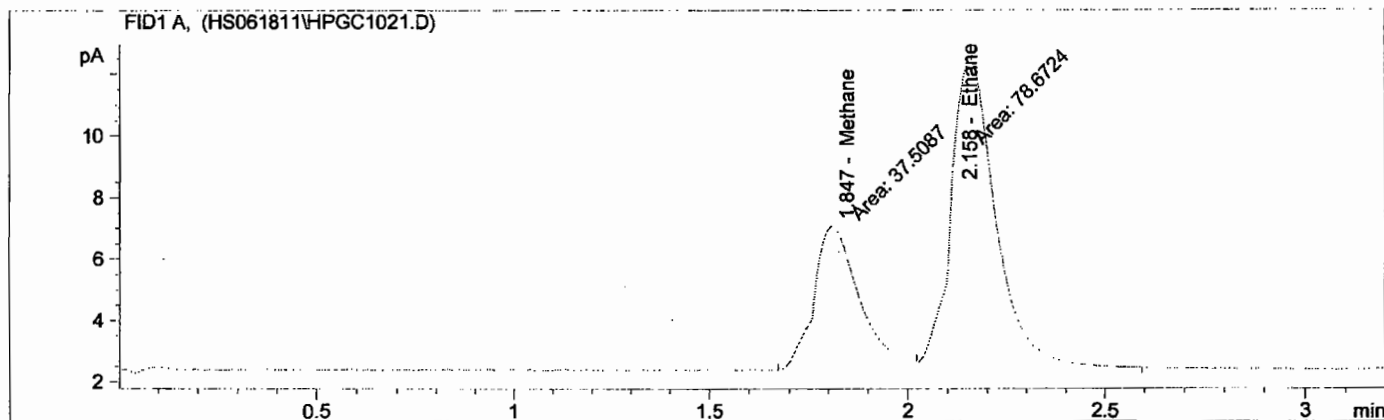
Totals : 10.25326

Results obtained with enhanced integrator!

\*\*\* End of Report \*\*\*

Cylinder No: EB-0029963

```
=====
Injection Date   : 6/20/2011 2:09:20 PM
Sample Name      : 5.0 ppmv STD                Location   : -
Acq. Operator    : JP                        Inj         : 1
Acq. Instrument  : Instrument 1                Inj Volume  : Manually
Acq. Method      : C:\HPCHEM\1\METHODS\METHANE.M
Last changed     : 6/10/2011 5:18:34 PM by JP
Analysis Method  : C:\HPCHEM\1\METHODS\METHANEE.M
Last changed     : 6/20/2011 10:04:08 AM by JP
                  (modified after loading)
Created 8-26-09
=====
```



External Standard Report

```
=====
Sorted By       : Signal
Calib. Data Modified : 6/20/2011 10:04:10 AM
Multiplier      : 1.0000
Dilution        : 1.0000
Use Multiplier & Dilution Factor with ISTDs
=====
```

Signal 1: FID1 A,

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ppm]	Grp	Name
1.847	MF	37.50867	1.34730e-1	5.05355		Methane
2.158	FM	78.67236	6.41801e-2	5.04920		Ethane

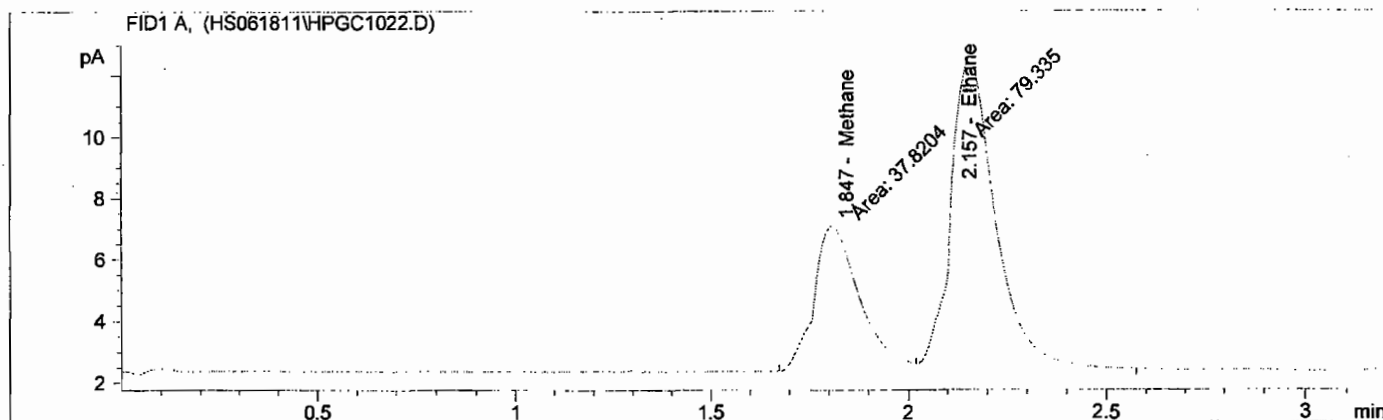
Totals : 10.10275

Results obtained with enhanced integrator!

\*\*\* End of Report \*\*\*

Cylinder No: EB-0029963

```
=====
Injection Date   : 6/20/2011 2:13:38 PM
Sample Name      : 5.0 ppmv STD
Acq. Operator    : JP
Acq. Instrument  : Instrument 1
Acq. Method      : C:\HPCHEM\1\METHODS\METHANE.M
Last changed     : 6/10/2011 5:18:34 PM by JP
Analysis Method  : C:\HPCHEM\1\METHODS\METHANEE.M
Last changed     : 6/20/2011 10:04:08 AM by JP
                  (modified after loading)
Created 8-26-09
=====
```



External Standard Report

```
=====
Sorted By       : Signal
Calib. Data Modified : 6/20/2011 10:04:10 AM
Multiplier      : 1.0000
Dilution        : 1.0000
Use Multiplier & Dilution Factor with ISTDs
=====
```

Signal 1: FID1 A,

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ppm]	Grp	Name
1.847	MF	37.82041	1.34730e-1	5.09555		Methane
2.157	FM	79.33501	6.41801e-2	5.09173		Ethane

Totals : 10.18728

Results obtained with enhanced integrator!

\*\*\* End of Report \*\*\*



951 N. Old Rand Rd., Unit 106  
Wauconda, Illinois 60084

LAB USE ONLY

Valero

Client Name

D. Fitzgerald

ARI Project Manager

Location

RW

ARI Sampler Initials

Analysis Location (Wauconda or Pasadena)

Engineering or Compliance Test Samples

Sample No. Date Collected

Sample ID

H39683 6-16-11 Methane + Ethane (Run 2)  
H39696 6-16-11 Methane + Ethane (Run 1)  
H39886 6-17-11 Methane + Ethane (Run 3)

Port Arthur, TX

Number of Containers

Container Type  
(Petr. Bottle, Bag, Tube,  
Summa, Bomb)

Preservation Code

Analysis Request

Preservation Code

1 = Ambient Temp.  
2 = 4°C (Ice Packs)  
3 = Dry Ice  
4 = Other (Noted)

Comments

H0611066  
H0611067  
H0611068

Special Instructions / Comments

(1) Relinquished By

(2) Relinquished By

(3) Relinquished By

SHIPMENT:

HAND CARRY

FEDX

UPS

Custody

Seal

Applied

Yes No

Requested Analysis Completion Date:

Report Level:

Tier I:  
Engineering

Tier II:  
Compliance

Tier III:  
QAPP

Route Results Through:

6-17-11 5:10 PM

6-17-11 17:00

6-17-11 17:00

6-17-11 17:00

6-17-11 17:00

6-17-11 17:00

6-17-11 17:00

6-17-11 17:00

6-17-11 17:00

6-17-11 17:00

6-17-11 17:00



951 Old Rand Road, Unit 106  
Wauconda, Illinois 60084



1710 Preston Road, Unit C  
Pasadena, Texas 77503

## SAMPLE RECEIPT CHECKLIST

Client Name: Valero

Site Location: Port Arthur, TX

ARI Project Manager: DF

Sample Collection Date(s): 6-16-11 & 6-17-11

Chain-of-Custody Number(s): H08025

Chain-of-Custody Form(s):

Custody release signatures, dates, and times present	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Preservation code noted	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Project information clearly identified	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Sample information clearly identified	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Analysis request clearly identified	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Report tier level noted	<input checked="" type="radio"/> Yes	<input type="radio"/> No

Sample Containers:

Custody seal(s) applied and intact	<input type="radio"/> Yes	<input checked="" type="radio"/> No
Quantity of samples match number on COC	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Container label ID numbers and descriptions match COC	<input checked="" type="radio"/> Yes	<input type="radio"/> No
All containers received in good condition	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Liquid levels marked and no indications of leakage	<input type="radio"/> Yes	<input checked="" type="radio"/> No
All container labels are legible	<input checked="" type="radio"/> Yes	<input type="radio"/> No
All sample IDs are unique	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Samples received in correct type of container	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Samples received within the required holding time	<input checked="" type="radio"/> Yes	<input type="radio"/> No
Samples received under the required preservation code	<input checked="" type="radio"/> Yes	<input type="radio"/> No

Non-Conformances and/or Corrective Actions Applied:

---

---

---

Samples Received by:

Tim Presley  
Printed Name

[Signature]  
Signature

Date and Time Received: 6-17-11 5:10 pm

## Calibration Curve Calculation

Std. (ppm)	Pre Cal 1 (area counts)	Pre Cal 2 (area counts)	Pre Cal 3 (area counts)	Average (area counts)	Post Cal 1 (area counts)	Post Cal 2 (area counts)	Average (area counts)	Pre-Post Average (%)	Pre-Post Deviation (%)
2.0	6.64	6.18	6.33	6.38					
5.0	15.24	14.89	14.87	15.00					
10.0	27.83	27.35	28.23	27.80	27.93	28.10	28.24	28.02	0.8
24.9	69.76	72.22	72.90	71.63					
49.8	135.23	136.25	139.34	136.94					
99.7	266.55	271.17	272.76	270.16					

## Sample Concentration Calculations

Location Description	Analysis 1 (area counts)	Analysis 2 (area counts)	Analysis 3 (area counts)	Average (area counts)	concentration (µg/ml)	Volume (mls)	Mass (µg)
Run 1 Imp Unspiked	4.62	4.79	4.78	4.73	1.73	50	87
Run 1 Tube No Spike	45.03	43.97	45.69	44.90	16.46	4	66
Run 1 Imp Spiked	19.50	21.82	20.92	20.75	7.61	50	380
Run 1 Tube Spiked	31.96	29.80	33.31	31.69	11.62	4	46
Run 2 Imp Unspiked	96.44	95.22	96.05	95.90	35.16	50	1,758
Run 2 Tube No Spike	198.37	189.22	193.03	193.54	70.95	4	284
Run 2 Imp Spiked	134.44	129.95	134.93	133.11	48.80	50	2,440
Run 2 Tube Spiked	161.80	161.88	165.75	163.14	59.81	4	239
Run 3 Imp Unspiked	164.04	167.87	163.29	165.06	60.51	50	3,026
Run 3 Tube 1 No Spike	111.52	109.32	104.80	108.55	39.79	4	159
Run 3 Imp Spiked	36.71	36.11	34.86	35.89	13.16	50	658
Run 3 Tube Spiked	16.32	16.42	16.42	16.39	6.01	4	24
Non-Spiked Water Field Blank	<0.45	<0.45	<0.45	<0.45	<0.165	25.7	<4.2
Spiked Water Field Blank	27.94	29.30	28.79	28.68	10.51	25.5	268
Non-Spiked Water Reagent Blank	<0.45	<0.45	<0.45	<0.45	<0.165	-	-
Spiked Water Reagent Blank	32.75	37.78	41.51	37.35	13.69	-	-
3% n-propanol Blank	1.25	0.68	1.37	1.10	0.40	-	-
Spiked Silica Trap Blank	51.88	51.99	53.20	52.36	19.19	4	76.8
Non-spiked Silica Trap Blank	4.51	3.97	5.42	4.64	1.70	4	6.8

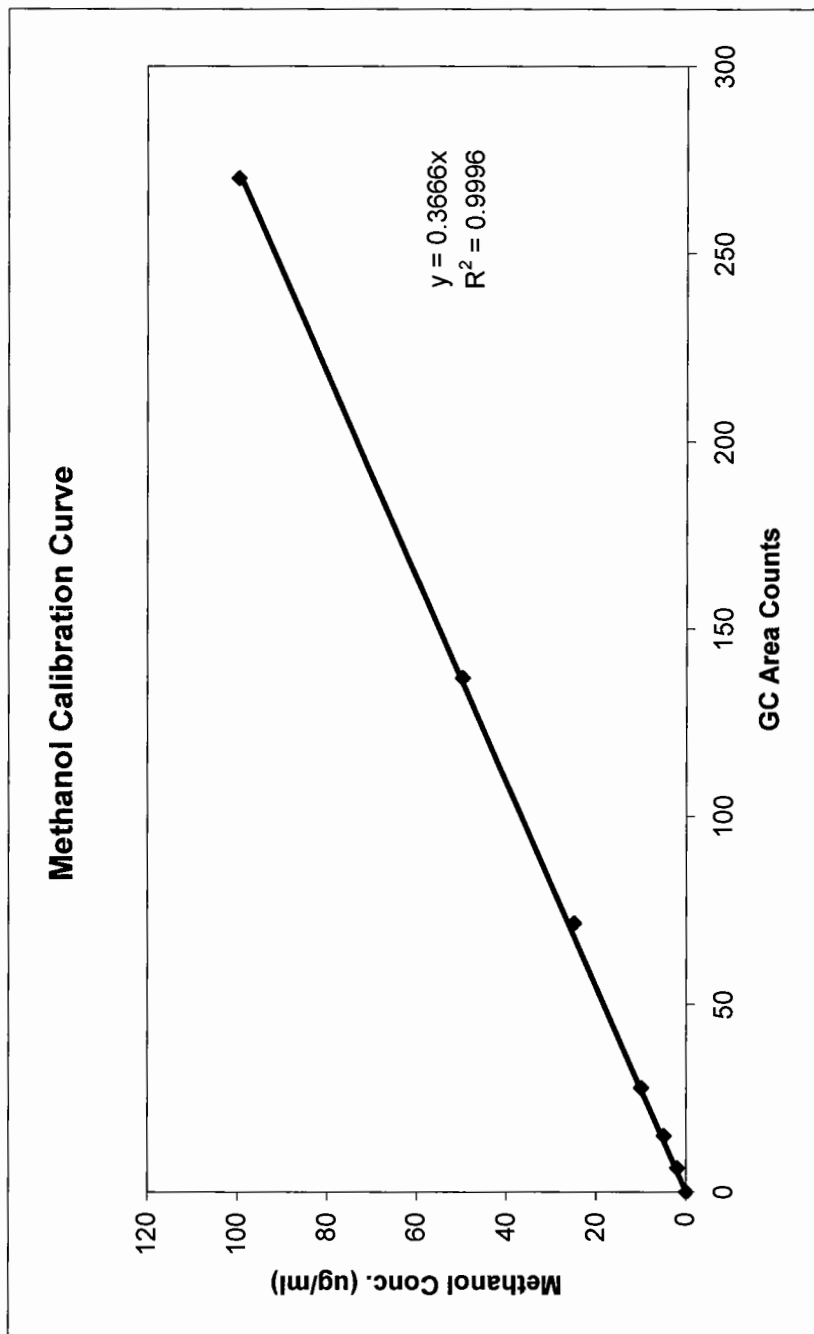
Sample Description	Analysis 1 (area counts)	Analysis 2 (area counts)	Analysis 3 (area counts)	Average (area counts)	concentration (µg/ml)	Certified (µg/ml)	% Difference	Acceptable
Secondary 25 ppm Standard	69.13	72.48	71.09	70.90	25.99	24.92	4.3	Yes

Sample Description	Analysis (area counts)	Pre Cal Average	% Difference
10 ppm Check Standard #232	27.49	27.80	-1.1
10 ppm Check Standard #255	28.41	27.80	2.2
10 ppm Check Standard #279	29.28	27.80	5.3
10 ppm Check Standard #305	29.62	27.80	6.5

Spike Amounts (µg): 316  
Tubes: 1.8

Analyst: E. Vogt  
Date: 7/27/11

Template Control ID: USEPA-M18-SORBENT-TEMPLATE-64T-REV1





**USEPA METHOD 18, ASTM 1945/1946 TASK  
SCHEDULE FORM**

Document Number: WL-M18TASK-FORM-038A

Revision Number: 1

Effective Date: 04/26/11

Page No.: 1 of 3

**USEPA METHOD 18 TASK SCHEDULE**

Client: Valero

Location: Port Arthur TX – 544 SRU

Project Manager: Dan Fitzgerald

Date Sampled: 6/15 - 6/16/11

Lab Project #: 08-315

Spreadsheet Template ID: USEPA-M18-SORBANT-TEMPLATE-64T-REV1

Analyst: E. Vogt

**Reagents**

Hydrogen Gas Manufacturer and Lot: Air Liquide Cylinder # K011471

Helium Gas Manufacturer and Lot: Air Liquide Cylinder # IO002919

Air Manufacturer and Lot: ALM042528

Nitrogen Manufacturer and Lot: N/A

**Standard Identification**

1) 996.6 µg/ml MeOH Stock Standard made from Fisher Purge & Trap Grade Lot #064748

2) 2.0 µg/ml MeOH

3) 5.0 µg/ml MeOH

4) 10.0 µg/ml MeOH

5) 24.9 µg/ml MeOH

6) 49.8 µg/ml MeOH

7) 99.7 µg/ml MeOH

8) 199.3 µg/ml MeOH

9) \_\_\_\_\_



**USEPA METHOD 18, ASTM 1945/1946 TASK  
SCHEDULE FORM**

Document Number: WL-M18TASK-FORM-038A

Revision Number: 1

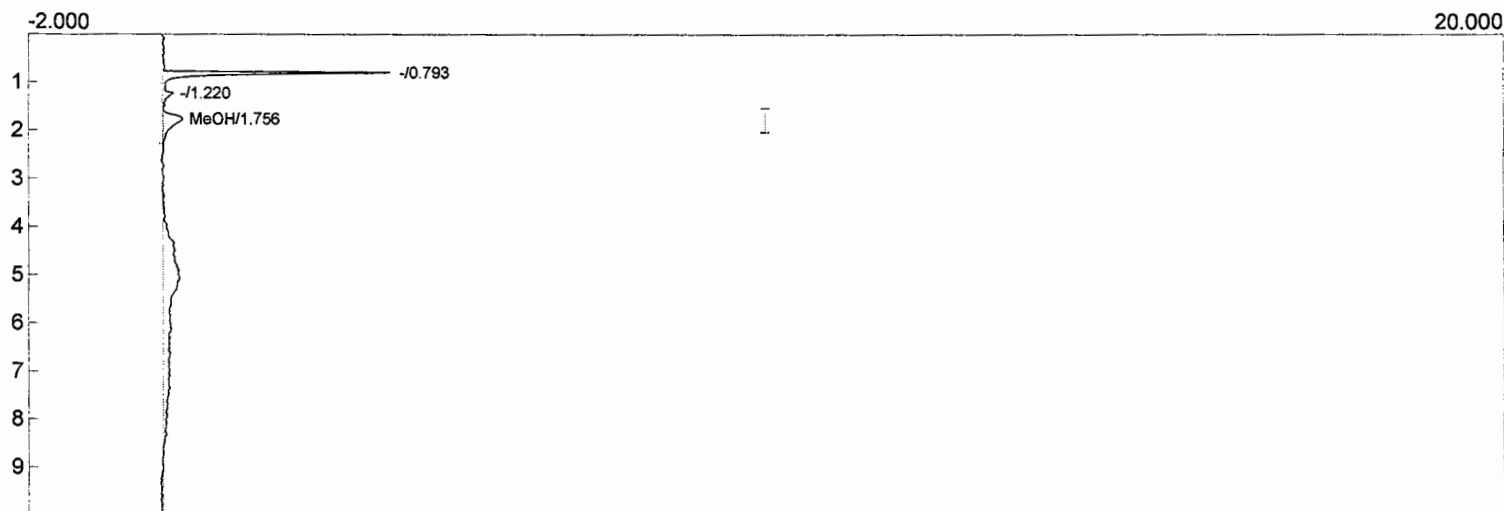
Effective Date: 04/26/11

Page No.: 2 of 3

Secondary standard: 996.6 µg/ml MeOH Stock Standard made from Fisher Purge & Trap Grade Lot #104737, then diluted to 24.9 µg/ml

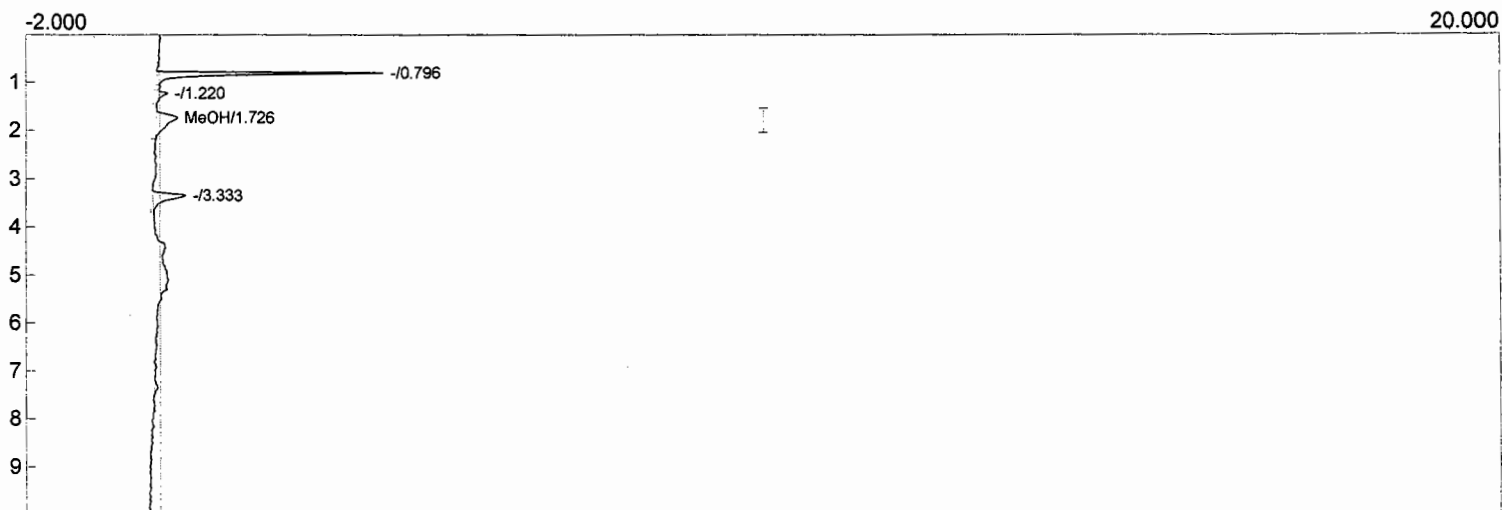
DATE	EQUIPMENT	TASK
7/19/11		Equilibrate the instrument until a stable baseline is achieved.
7/19/11	SRI GC #6	Inject each compound to be analyzed once. Establish the retention time windows for each compound. Adjust GC conditions if needed to ensure separation.
7/19/11	SRI GC #6	Inject each standard in triplicate. Ensure that each standard agrees within 5% of the mean of the three injections. Plot the standard injection areas against calibration standard concentrations to determine an initial calibration curve.
7/19 – 7/21/11	SRI GC #6	Inject each sample in triplicate.
N/A	SRI GC #6	If necessary, dilute samples if the peak areas are greater than the highest standard and re-inject in triplicate.
7/19 – 7/21/11	SRI GC #6	Inject the midpoint standard and a blank once after every 20 sample injections. Check that the midpoint standard is within 10% of the value generated by the initial calibration curve.
7/24/11	SRI GC #6	Inject each secondary standard in triplicate at the end of the run.
7/25/11		For each analyte, plot the average of the standard injections against calibration standard concentrations to determine a final calibration curve.
7/25/11		Determine the concentrations of each analyte in each sample using the calibration curve.
7/27/11		Prepare report
7/28/11		Report QA review
		Report distribution

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 01:05:42  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR208.chr ()  
Sample: 544 SRU Run 1 Unspiked Imp  
Operator: E. Vogt



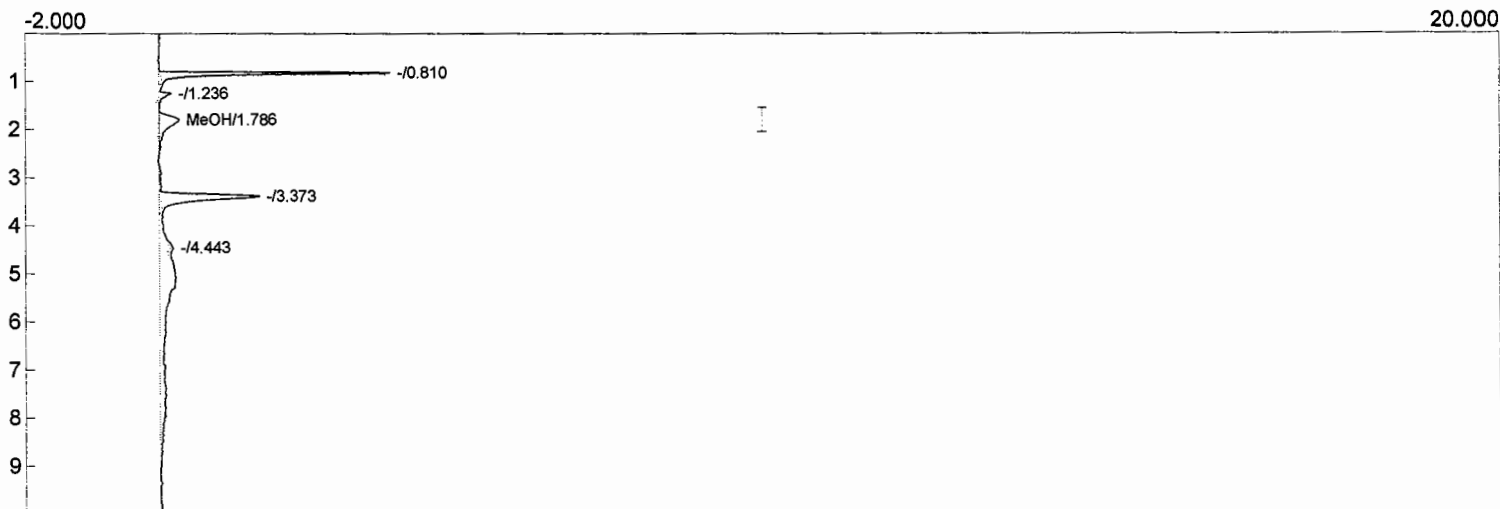
Component	Retention	Area
MeOH	1.756	4.6210
		4.6210

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 01:22:43  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR209.chr ()  
Sample: 544 SRU Run 1 Unspiked Imp  
Operator: E. Vogt



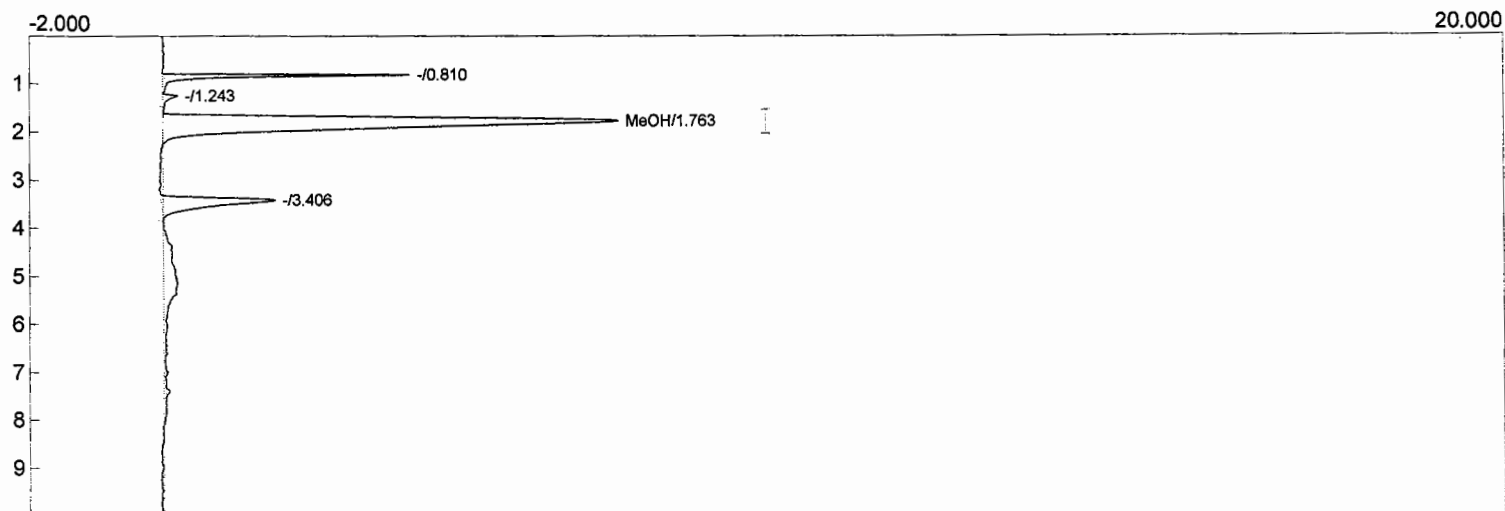
Component	Retention	Area
MeOH	1.726	4.7875
		4.7875

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 01:40:09  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR210.chr ()  
Sample: 544 SRU Run 1 Unspiked Imp  
Operator: E. Vogt



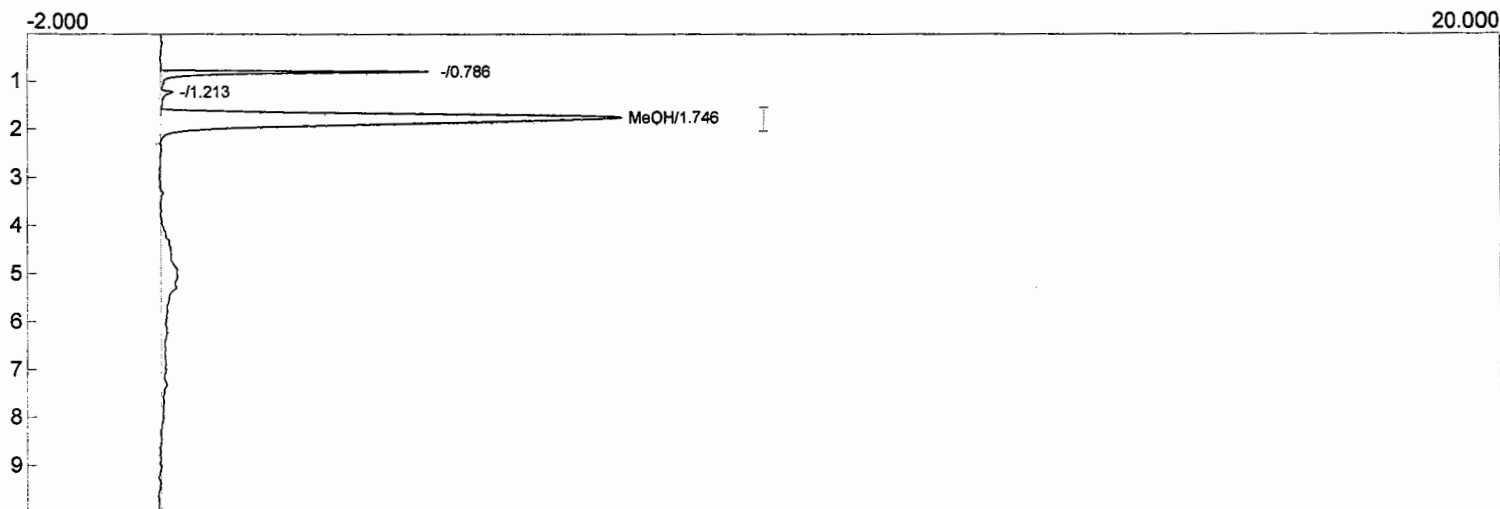
Component	Retention	Area
MeOH	1.786	4.7767
		4.7767

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 02:14:54  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR212.chr ()  
Sample: 544 SRU Run 2 Unspiked Imp  
Operator: E. Vogt



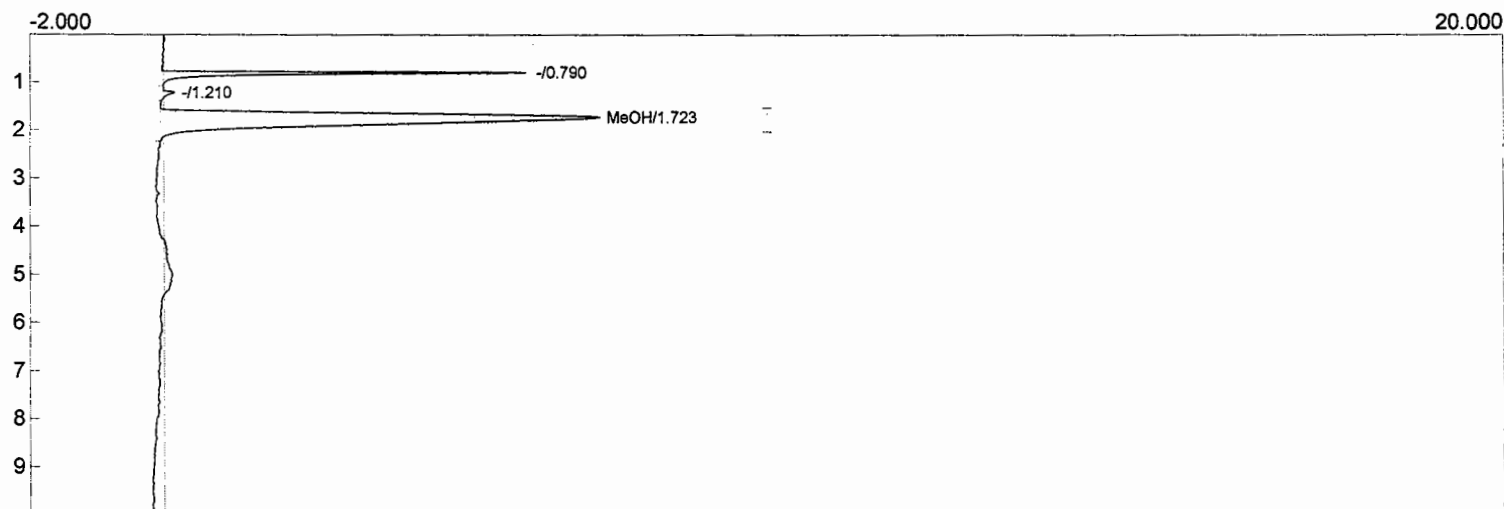
Component	Retention	Area
MeOH	1.763	96.4382
		96.4382

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 02:32:34  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR213.chr ()  
Sample: SRU 544 Run 2 Spiked Imp  
Operator: E. Vogt



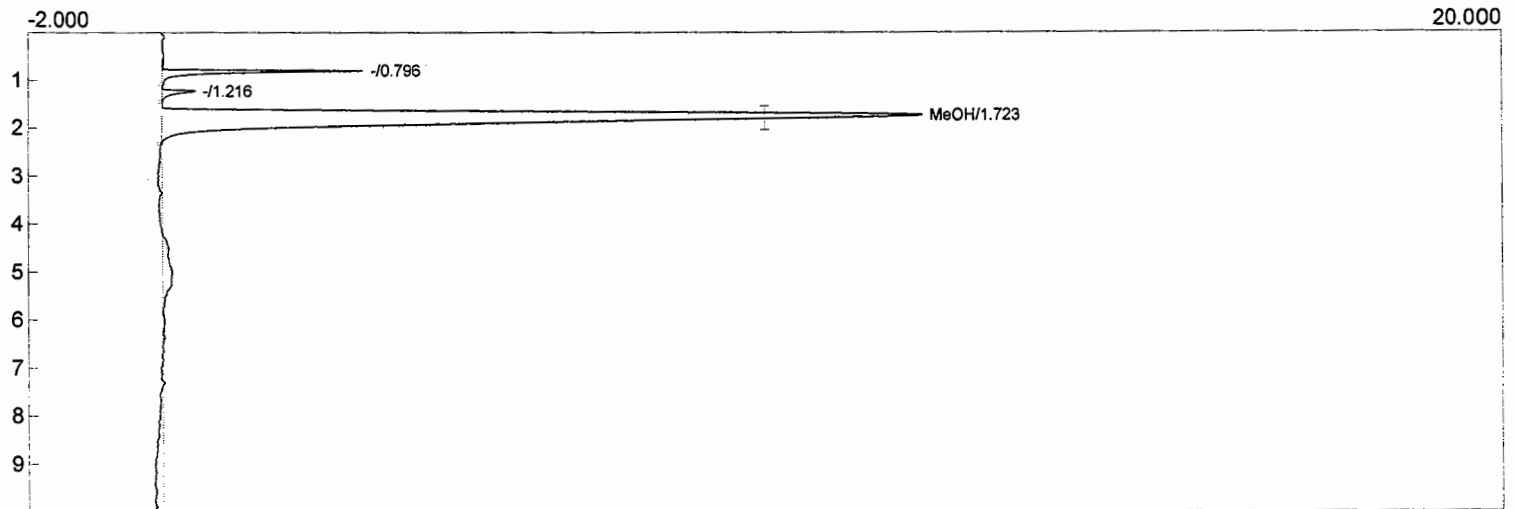
Component	Retention	Area
MeOH	1.746	95.2159
		95.2159

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 02:49:56  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR214.chr ()  
Sample: 544 SRU Run 2 Unspiked Imp  
Operator: E. Vogt



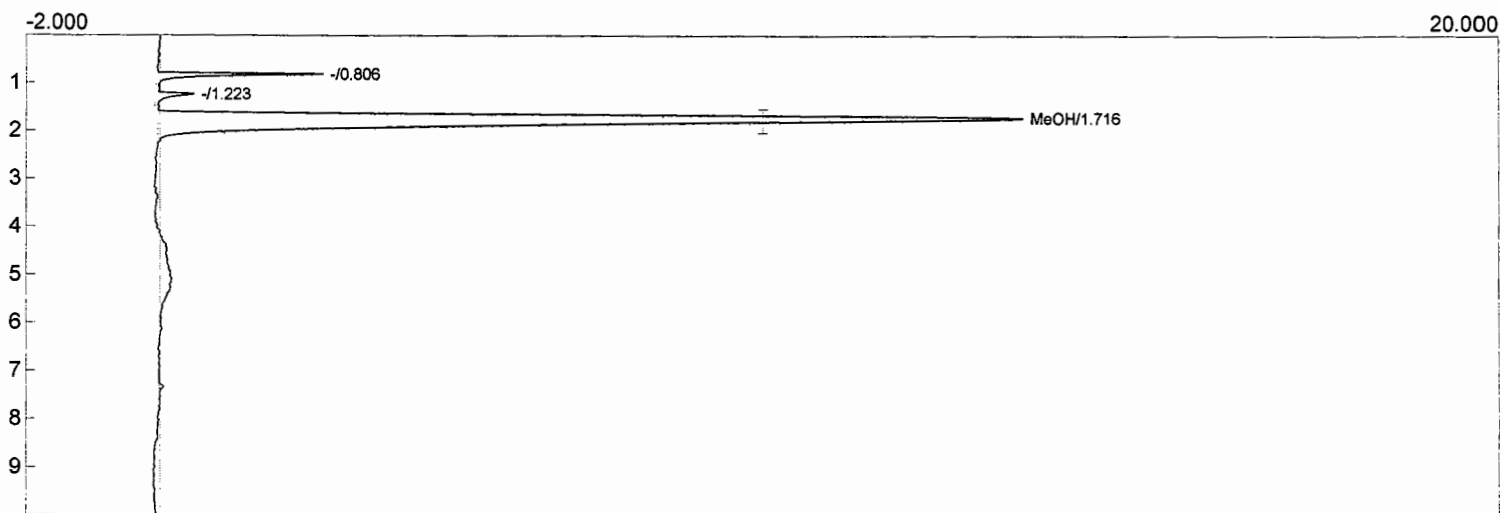
Component	Retention	Area
MeOH	1.723	96.0459
		96.0459

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 03:24:56  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR216.chr ()  
Sample: 544 SRU Run 3 Unspiked Imp  
Operator: E. Vogt



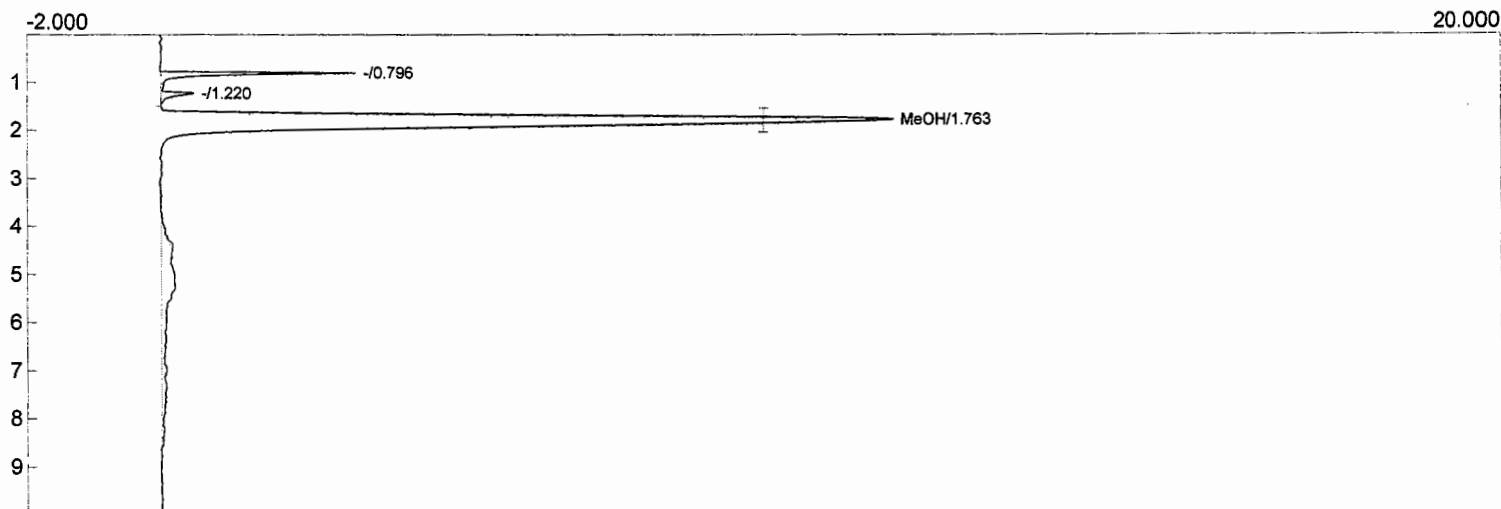
Component	Retention	Area
MeOH	1.723	164.0350
		164.0350

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 03:42:08  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR217.chr ()  
Sample: 544 SRU Run 3 Unspiked Imp  
Operator: E. Vogt



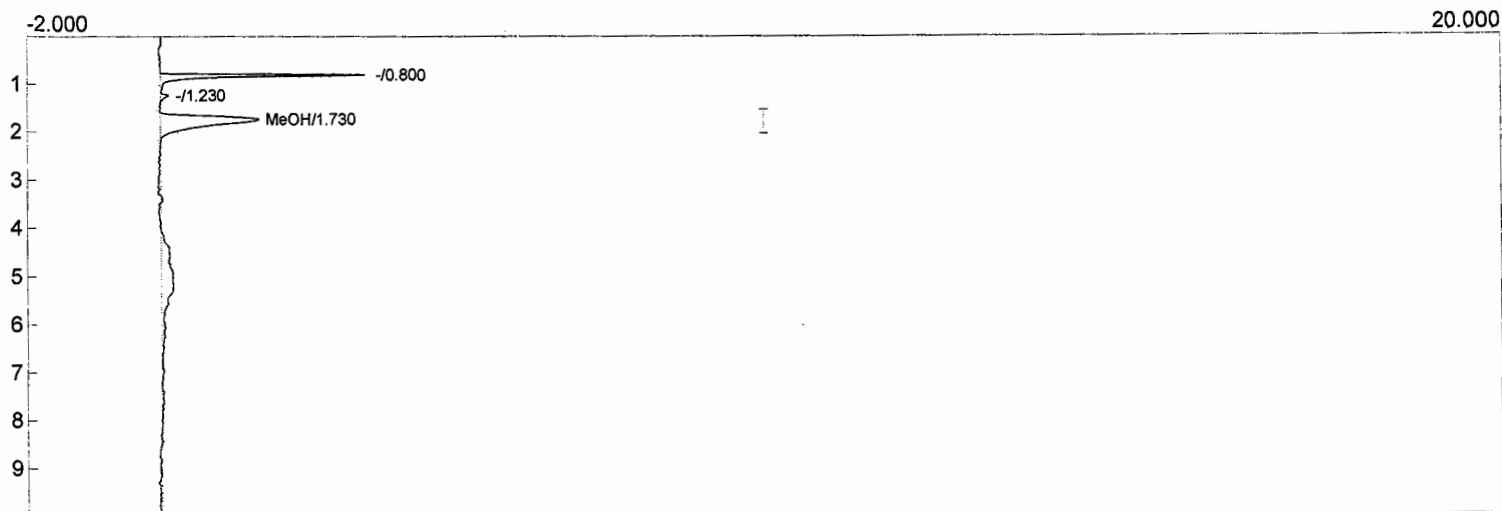
Component	Retention	Area
MeOH	1.716	167.8676
		167.8676

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 03:59:37  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR218.chr ()  
Sample: 544 SRU Run 3 Unspiked Imp  
Operator: E. Vogt



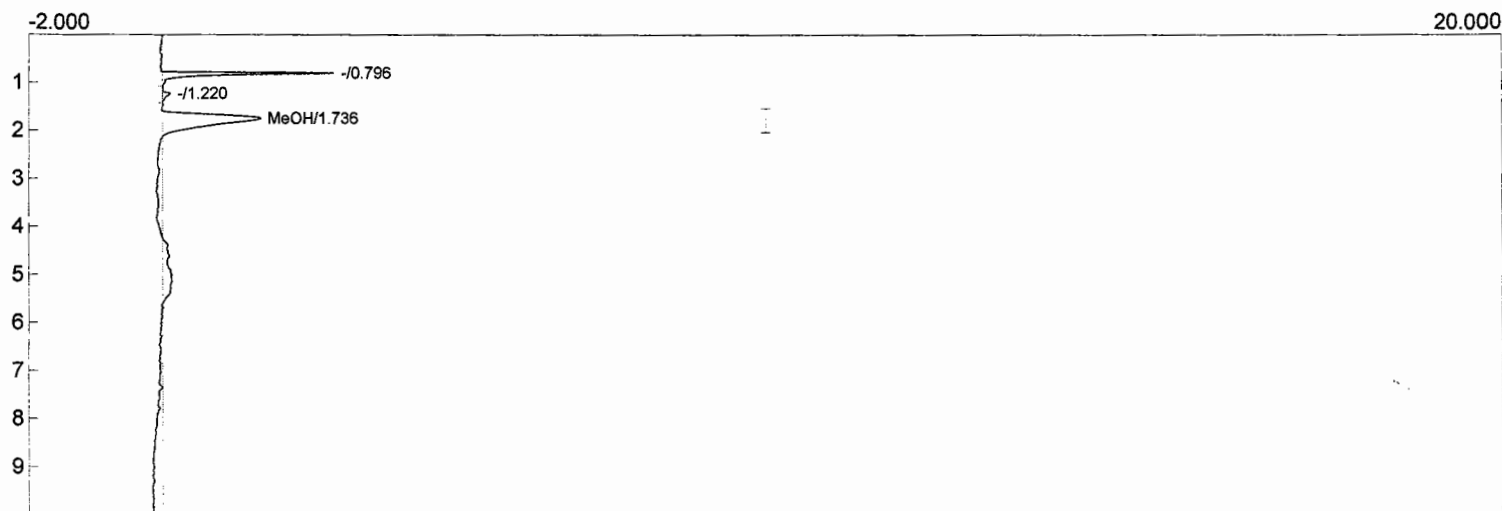
Component	Retention	Area
MeOH	1.763	163.2857
		163.2857

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 04:34:26  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR220.chr ()  
Sample: 544 SRU Run 1 Spiked Imp  
Operator: E. Vogt



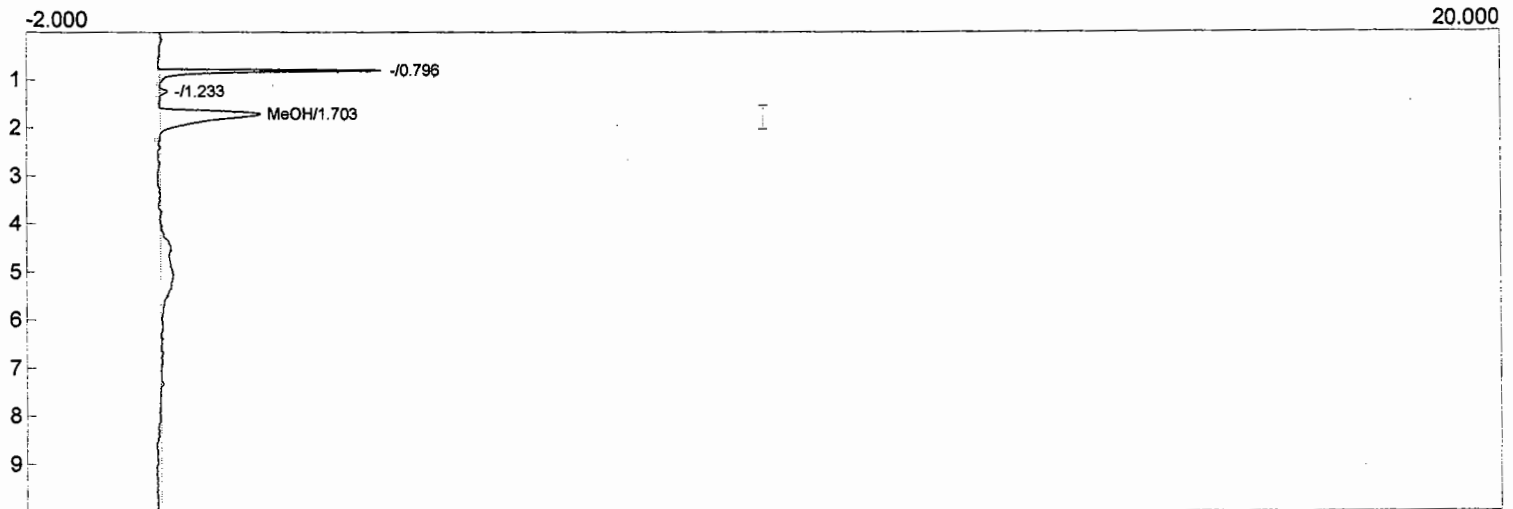
Component	Retention	Area
MeOH	1.730	19.4980
		19.4980

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 04:52:09  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR221.CHR ()  
Sample: 544 SRU Run 1 Spiked Imp  
Operator: E. Vogt



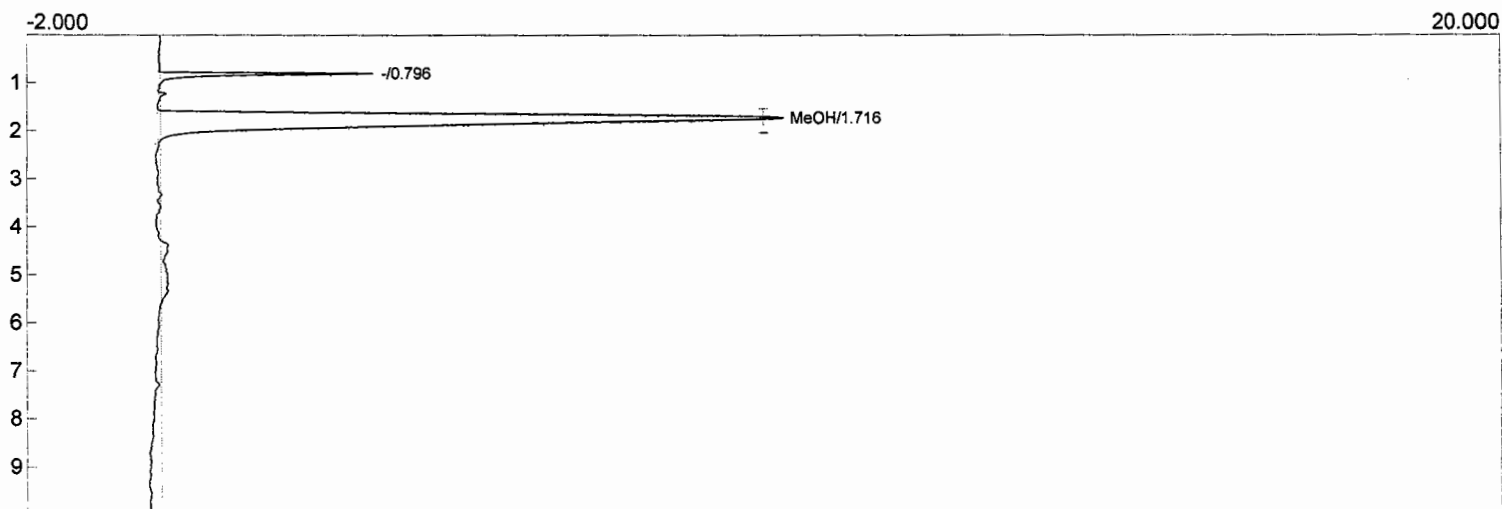
Component	Retention	Area
MeOH	1.736	21.8228
		21.8228

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 05:09:27  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR222.CHR ()  
Sample: 544 SRU Run 1 Spiked Imp  
Operator: E. Vogt



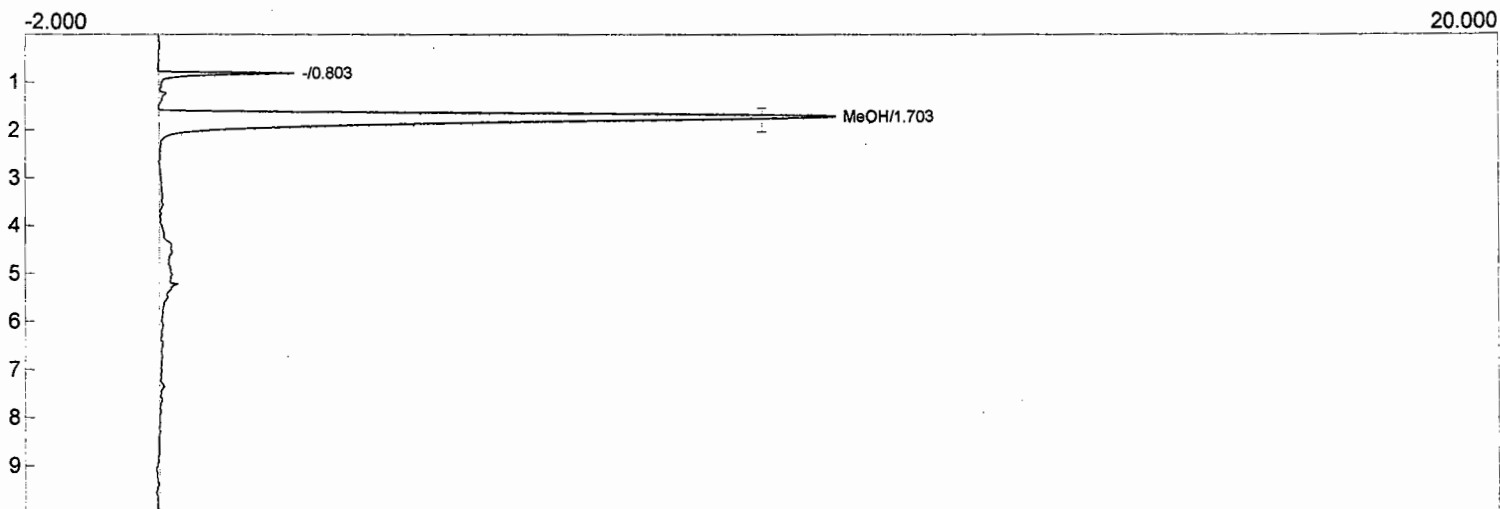
Component	Retention	Area
MeOH	1.703	20.9196
		20.9196

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 05:44:29  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR224.chr ()  
Sample: 544 SRU Run 2 Spiked Imp  
Operator: E. Vogt



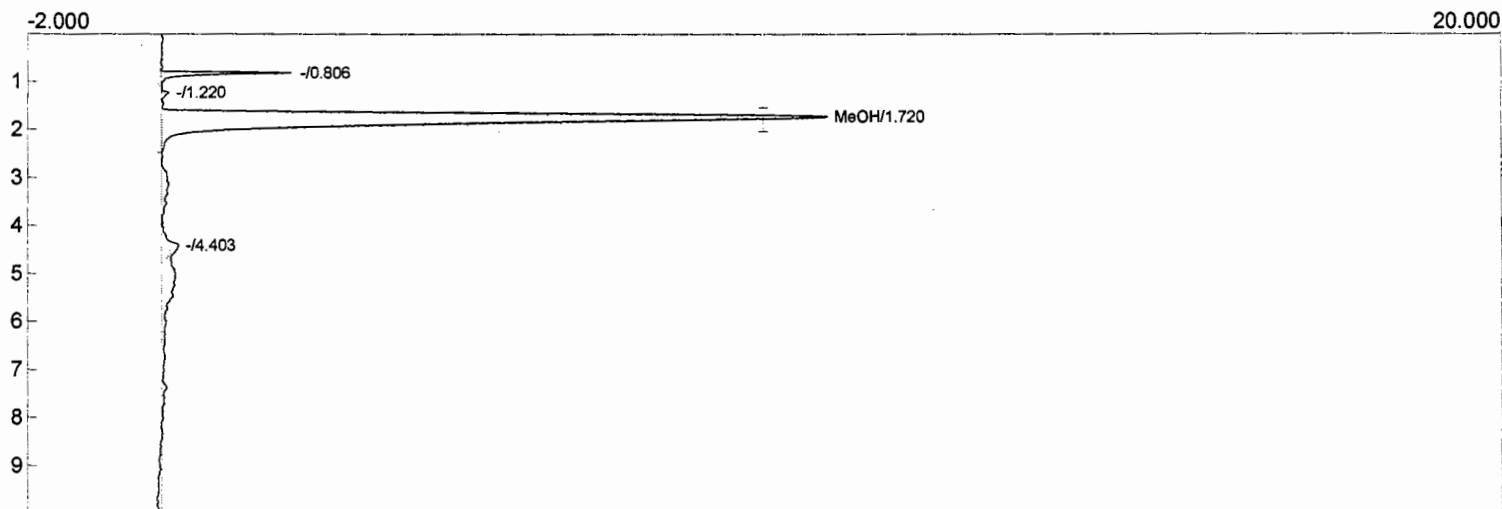
Component	Retention	Area
MeOH	1.716	134.4377
		134.4377

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 06:01:35  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR225.chr ()  
Sample: 544 SRU Run 2 Spiked Imp  
Operator: E. Vogt



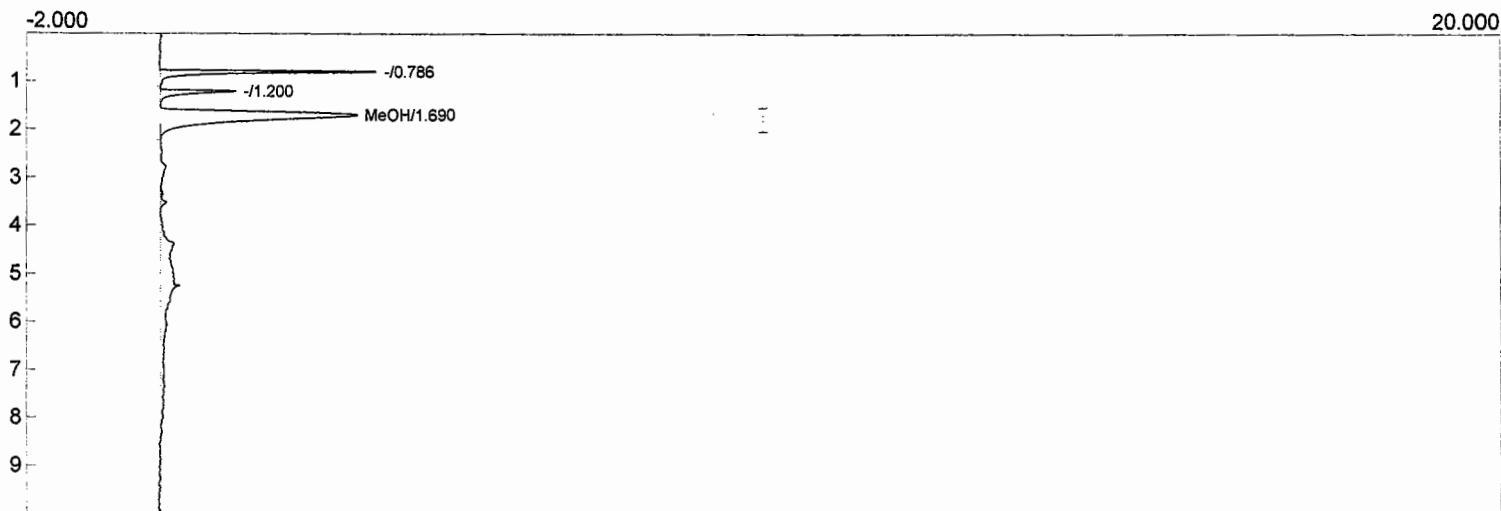
Component	Retention	Area
MeOH	1.703	129.9492
		129.9492

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 06:19:13  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR226.chr ()  
Sample: 544 SRU Run 2 Spiked Imp  
Operator: E. Vogt



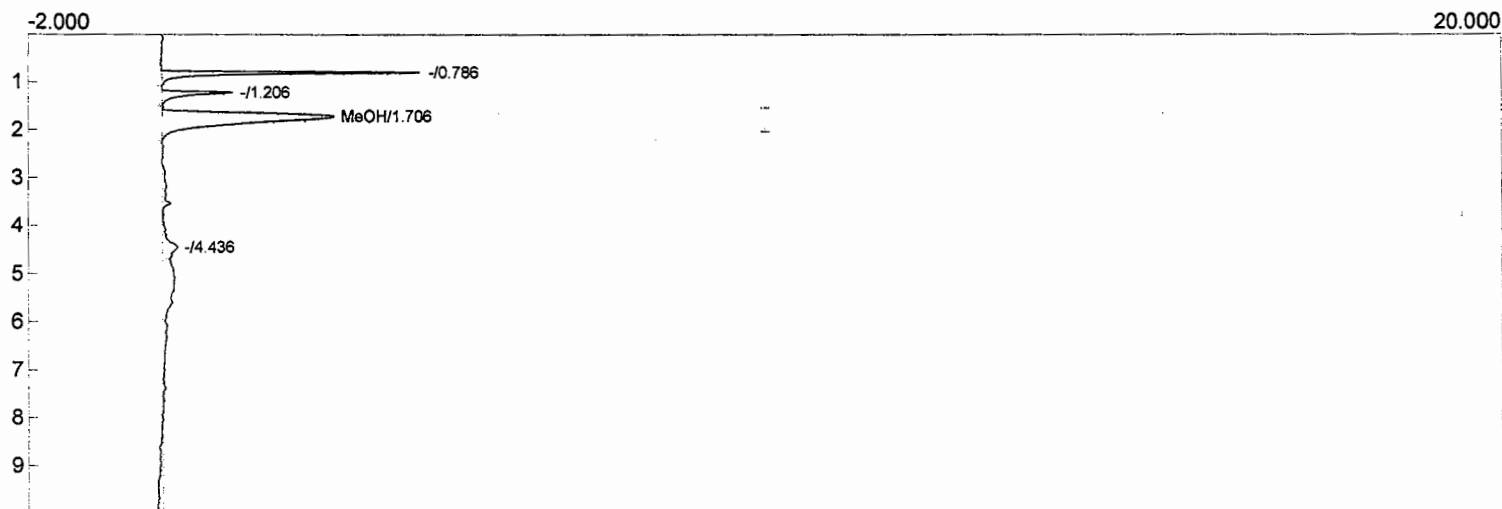
Component	Retention	Area
MeOH	1.720	134.9290
		134.9290

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 06:53:58  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR228.CHR ()  
Sample: 544 SRU Run 3 Spiked Imp  
Operator: E. Vogt



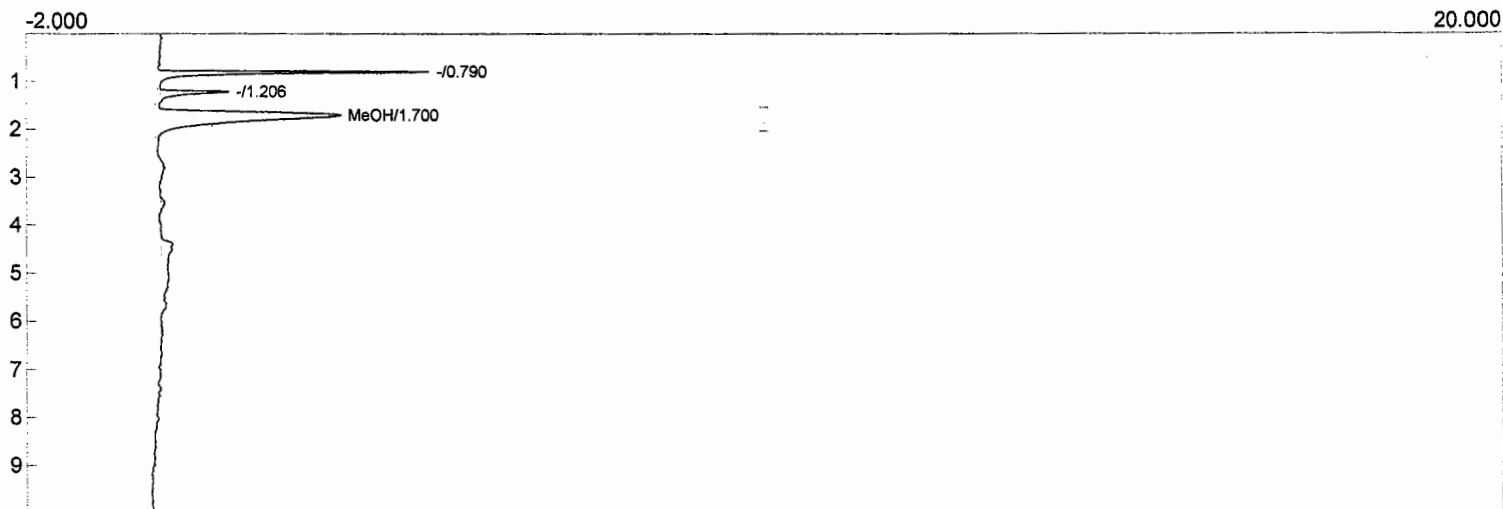
Component	Retention	Area
MeOH	1.690	36.7088
		36.7088

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 07:11:45  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR229.chr ()  
Sample: 544 SRU Run 3 Spiked Imp  
Operator: E. Vogt



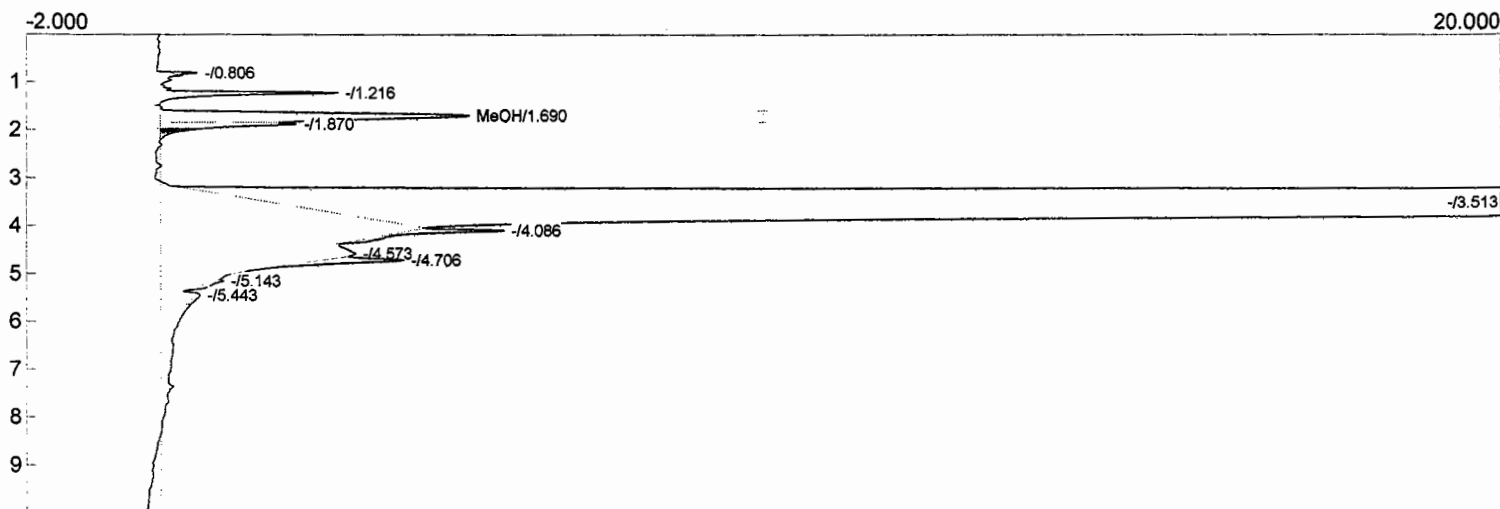
Component	Retention	Area
MeOH	1.706	36.1124
		36.1124

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 07:29:12  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR230.CHR ()  
Sample: 544 SRU Run 3 Spiked Imp  
Operator: E. Vogt



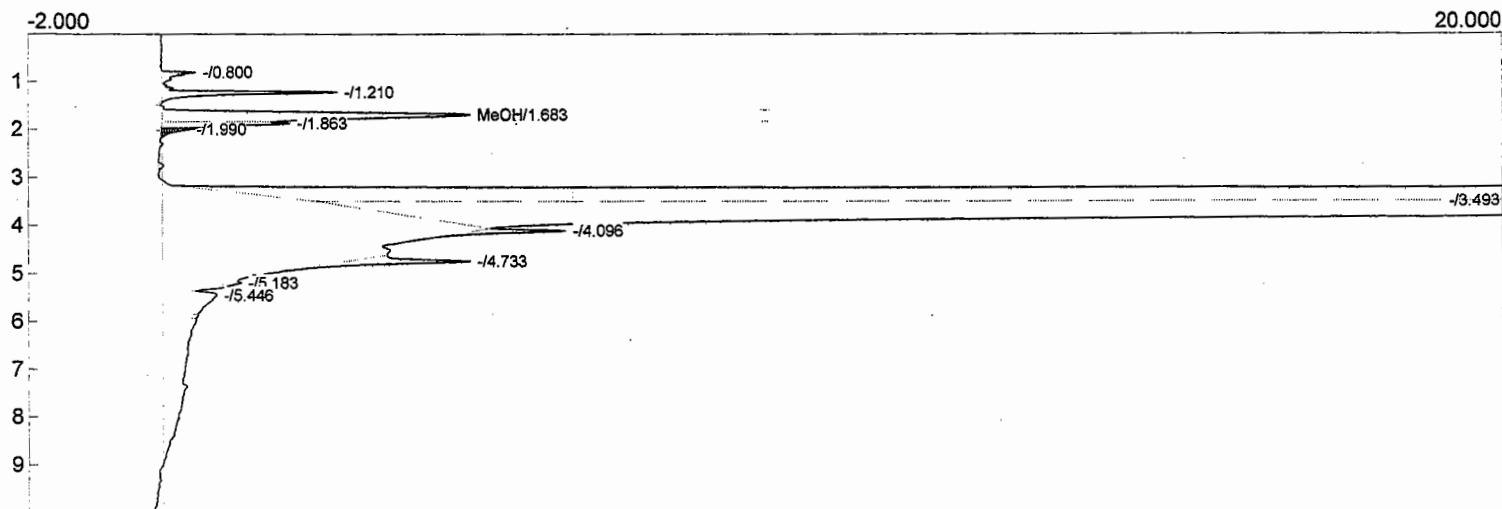
Component	Retention	Area
MeOH	1.700	34.8594
		34.8594

Lab name: ARI Environmental  
 Client: Valero, Port Arthur TX  
 Analysis date: 07/21/2011 12:42:31  
 Method: Syringe Injection  
 Description: GC FID  
 Carrier: HELIUM  
 Data file: MEOH ICR269.CHR ()  
 Sample: 544 SRU Run 1 Unspiked Tube  
 Operator: E. Vogt  
 Comments: 4 ml 3% n-propanol tube extraction volume



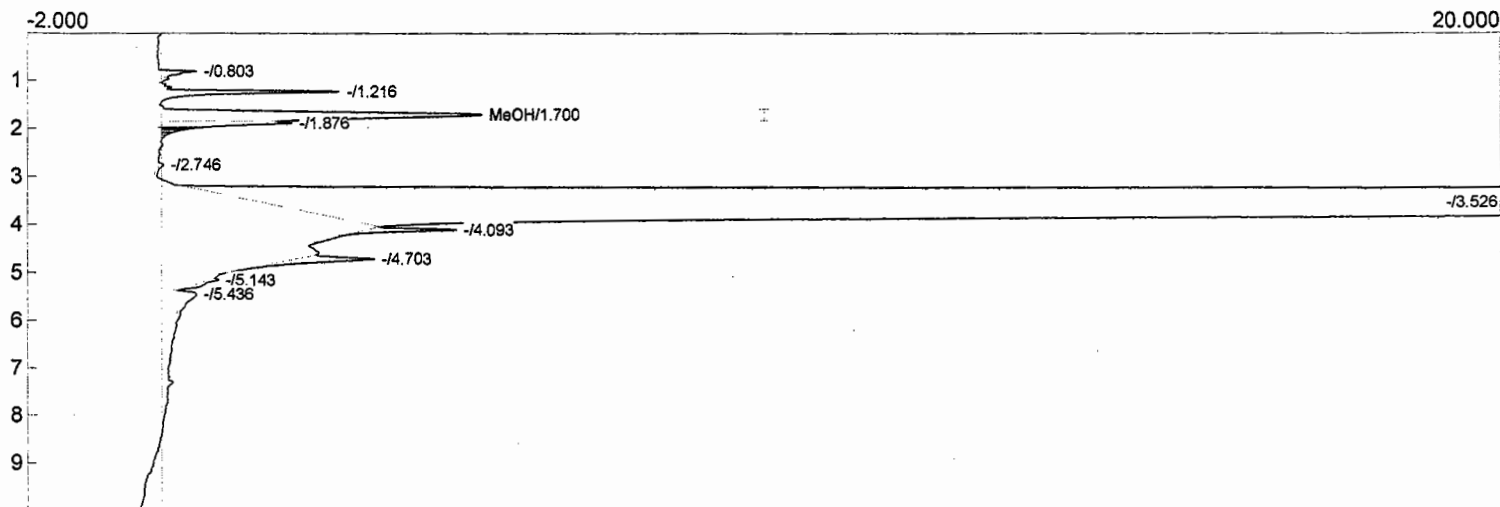
Component	Retention	Area
MeOH	1.690	45.0302
		45.0302

Lab name: ARI Environmental  
 Client: Valero, Port Arthur TX  
 Analysis date: 07/21/2011 13:04:03  
 Method: Syringe Injection  
 Description: GC FID  
 Carrier: HELIUM  
 Data file: MEOH ICR270.CHR ()  
 Sample: 544 SRU Run 1 Unspiked Tube  
 Operator: E. Vogt  
 Comments: 4 ml 3% n-propanol tube extraction volume



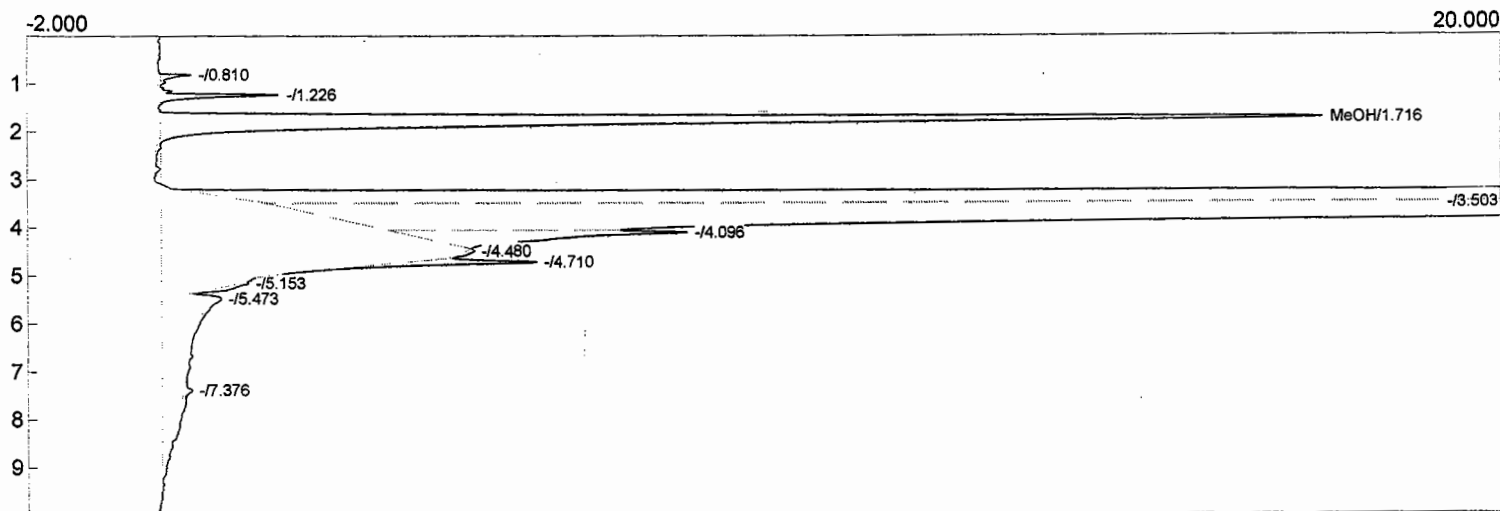
Component	Retention	Area
MeOH	1.683	43.9666
		43.9666

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/21/2011 13:21:09  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR271.CHR ()  
Sample: 544 SRU Run 1 Unspiked Tube  
Operator: E. Vogt  
Comments: 4 ml 3% n-propanol tube extraction volume



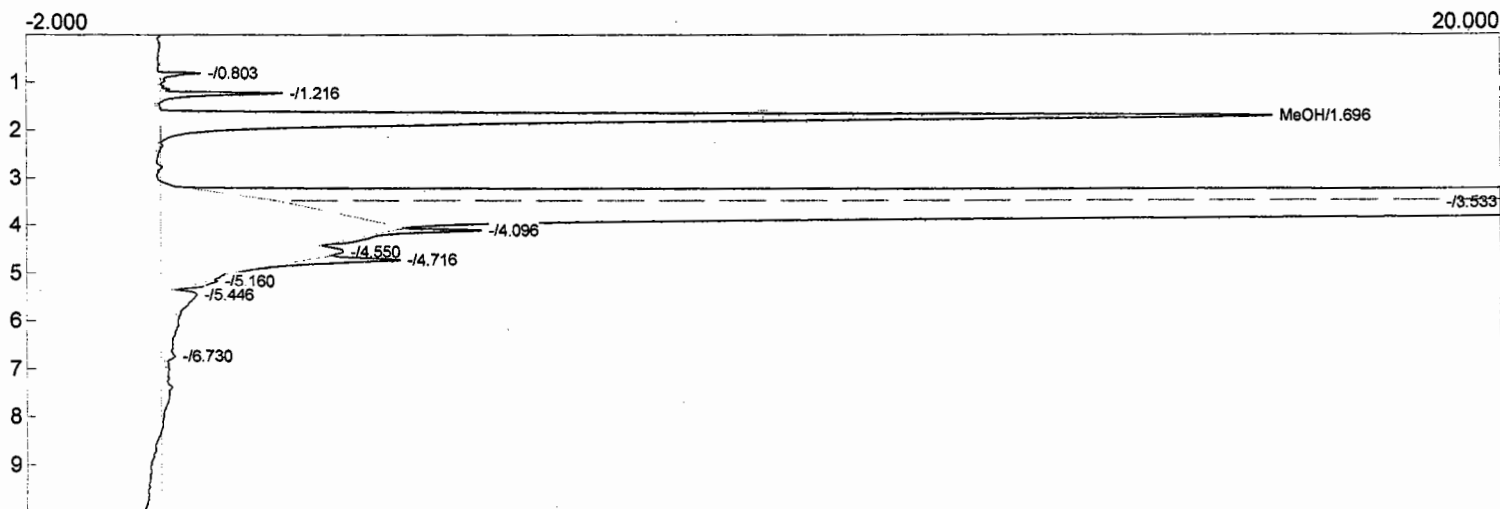
Component	Retention	Area
MeOH	1.700	45.6940
		45.6940

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/21/2011 13:44:00  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR272.CHR ()  
Sample: 544 SRU Run 2 Unspiked Tube  
Operator: E. Vogt  
Comments: 4 ml 3% n-propanol tube extraction volume



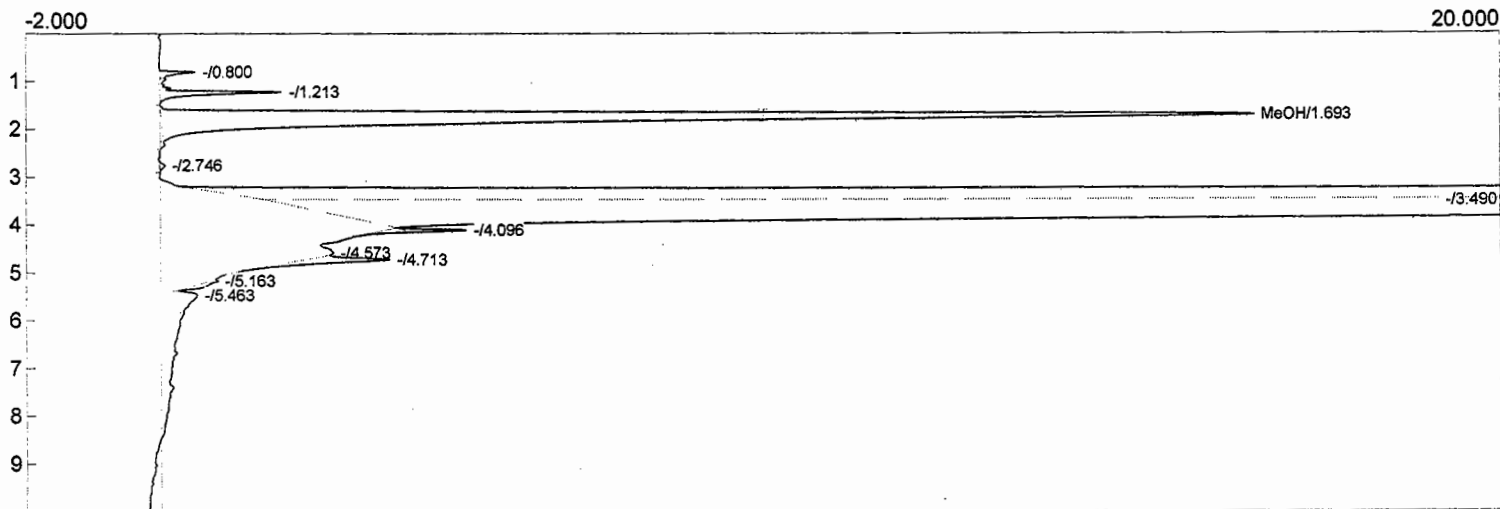
Component	Retention	Area
MeOH	1.716	198.3746
		198.3746

Lab name: ARI Environmental  
 Client: Valero, Port Arthur TX  
 Analysis date: 07/21/2011 14:01:35  
 Method: Syringe Injection  
 Description: GC FID  
 Carrier: HELIUM  
 Data file: MEOH ICR273.CHR ()  
 Sample: 544 SRU Run 2 Unspiked Tube  
 Operator: E. Vogt  
 Comments: 4 ml 3% n-propanol tube extraction volume



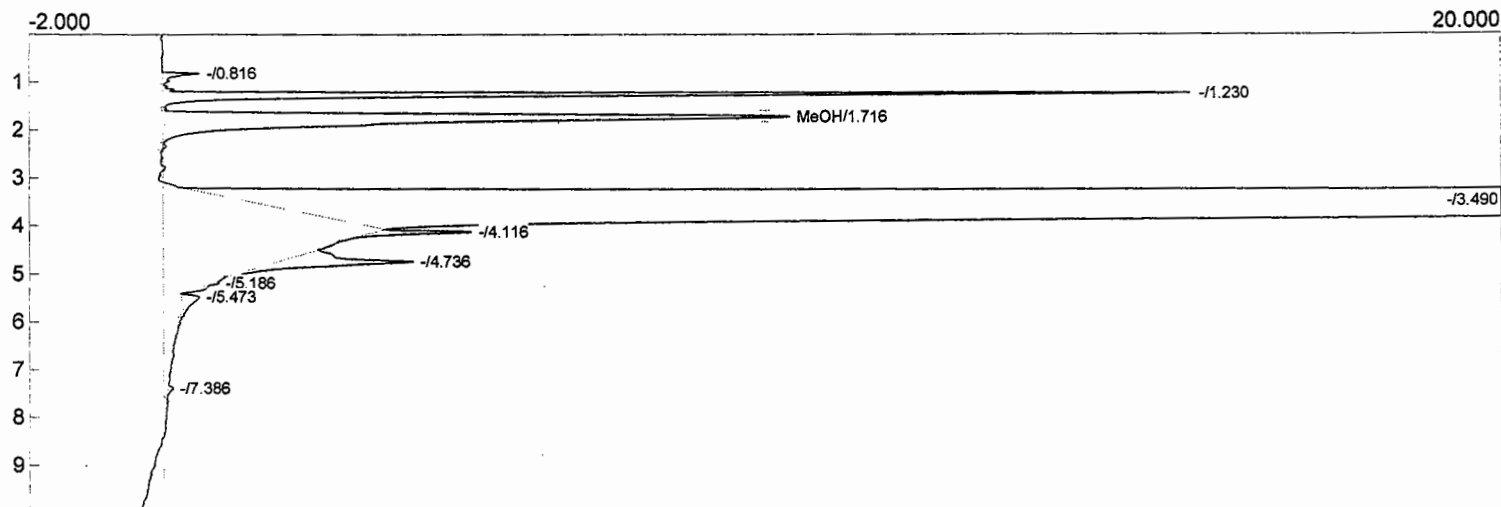
Component	Retention	Area
MeOH	1.696	189.2152
		189.2152

Lab name: ARI Environmental  
 Client: Valero, Port Arthur TX  
 Analysis date: 07/21/2011 14:19:17  
 Method: Syringe Injection  
 Description: GC FID  
 Carrier: HELIUM  
 Data file: MEOH ICR274.CHR ()  
 Sample: 544 SRU Run 2 Unspiked Tube  
 Operator: E. Vogt  
 Comments: 4 ml 3% n-propanol tube extraction volume



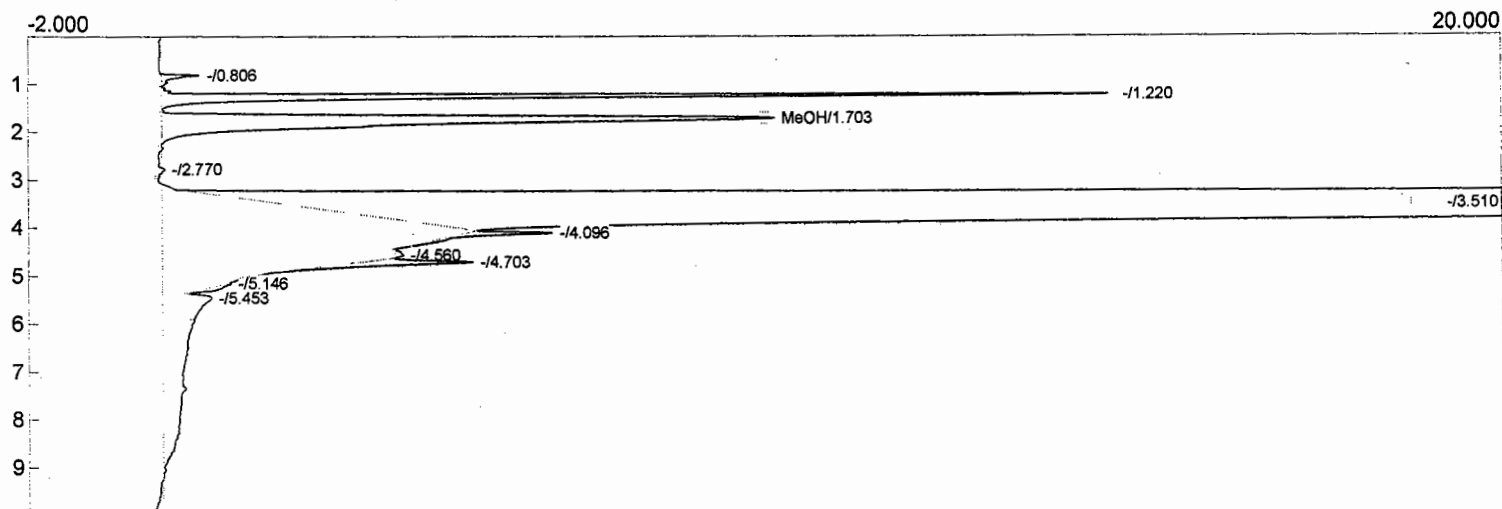
Component	Retention	Area
MeOH	1.693	193.0250
		193.0250

Lab name: ARI Environmental  
 Client: Valero, Port Arthur TX  
 Analysis date: 07/21/2011 14:37:13  
 Method: Syringe Injection  
 Description: GC FID  
 Carrier: HELIUM  
 Data file: MEOH ICR275.CHR ()  
 Sample: 544 SRU Run 3 Unspiked Tube  
 Operator: E. Vogt  
 Comments: 4 ml 3% n-propanol tube extraction volume



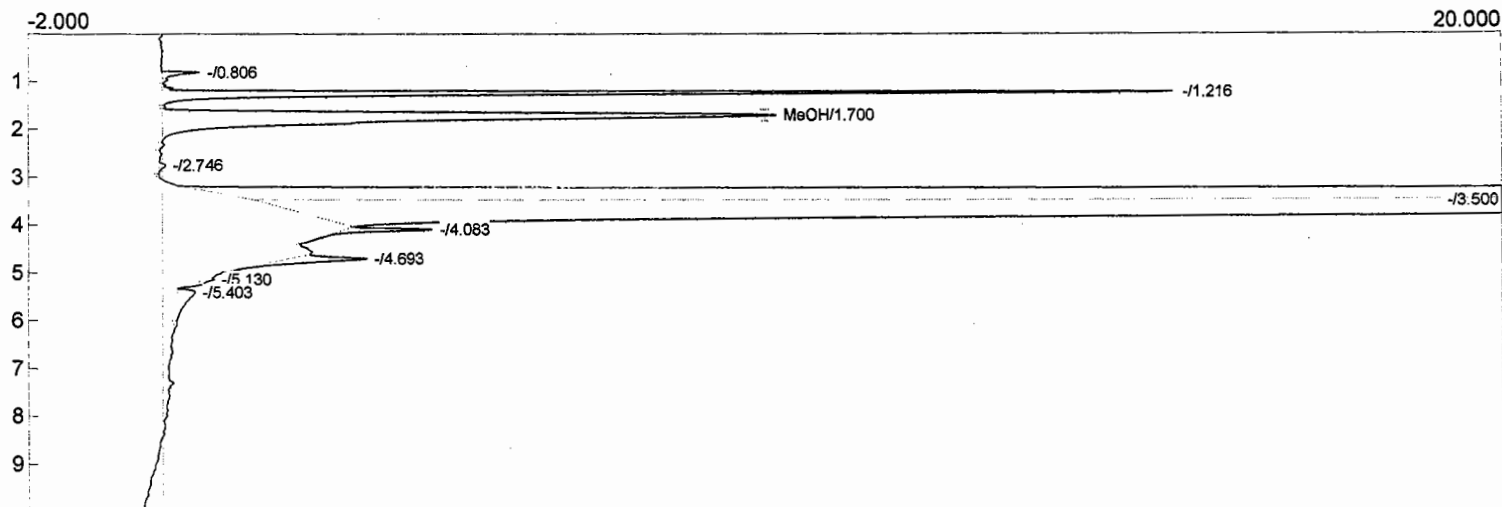
Component	Retention	Area
MeOH	1.716	111.5209
		111.5209

Lab name: ARI Environmental  
 Client: Valero, Port Arthur TX  
 Analysis date: 07/21/2011 14:56:46  
 Method: Syringe Injection  
 Description: GC FID  
 Carrier: HELIUM  
 Data file: MEOH ICR276.CHR ()  
 Sample: 544 SRU Run 3 Unspiked Tube  
 Operator: E. Vogt  
 Comments: 4 ml 3% n-propanol tube extraction volume



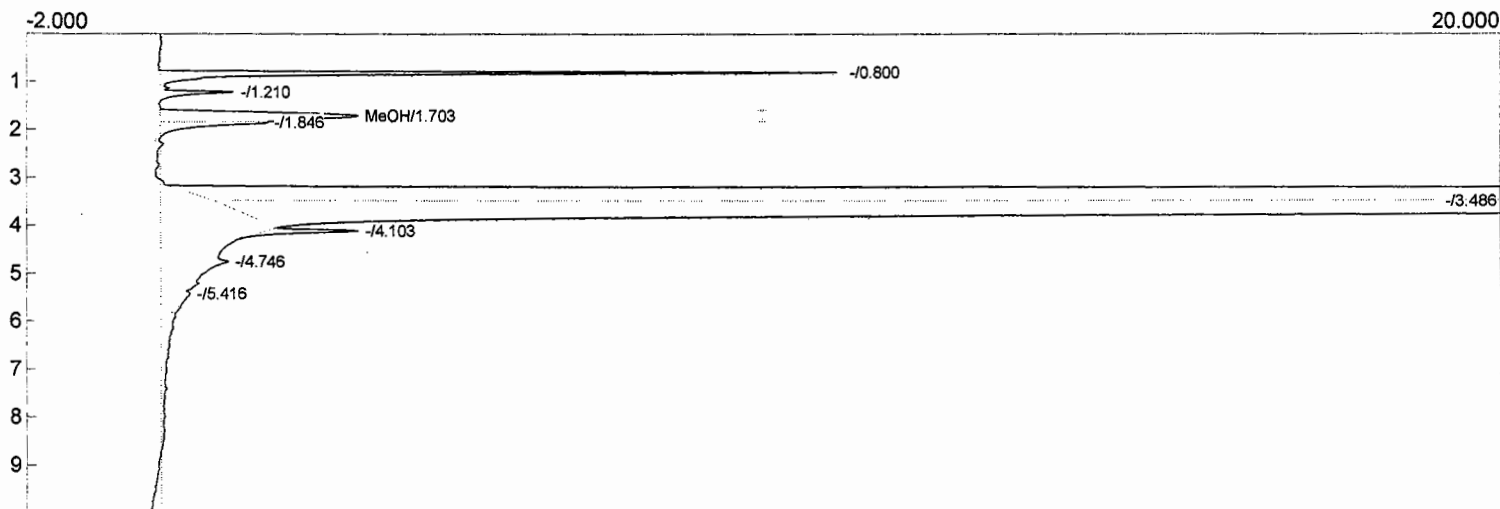
Component	Retention	Area
MeOH	1.703	109.3219
		109.3219

Lab name: ARI Environmental  
 Client: Valero, Port Arthur TX  
 Analysis date: 07/21/2011 15:14:47  
 Method: Syringe Injection  
 Description: GC FID  
 Carrier: HELIUM  
 Data file: MEOH ICR277.CHR ()  
 Sample: 544 SRU Run 3 Unspiked Tube  
 Operator: E. Vogt  
 Comments: 4 ml 3% n-propanol tube extraction volume



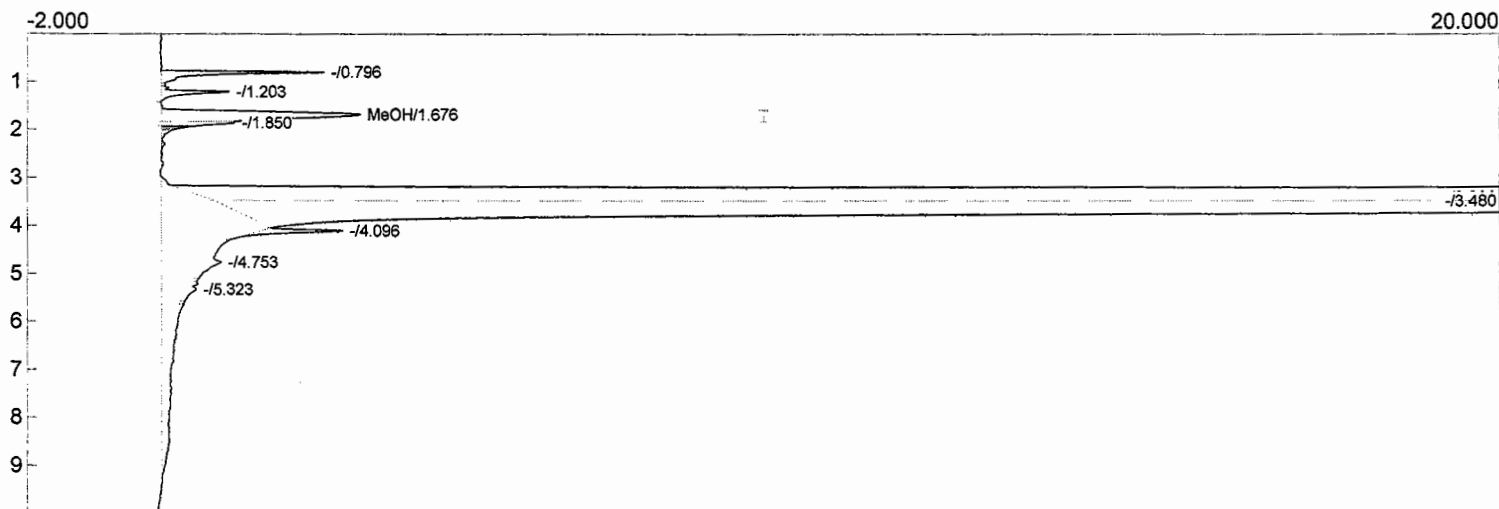
Component	Retention	Area
MeOH	1.700	104.8020
		104.8020

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 14:17:58  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR244.CHR ()  
Sample: 544 SRU Run 1 Spiked Tube  
Operator: E. Vogt  
Comments: 4 ml 3% n-propanol tube extraction volume



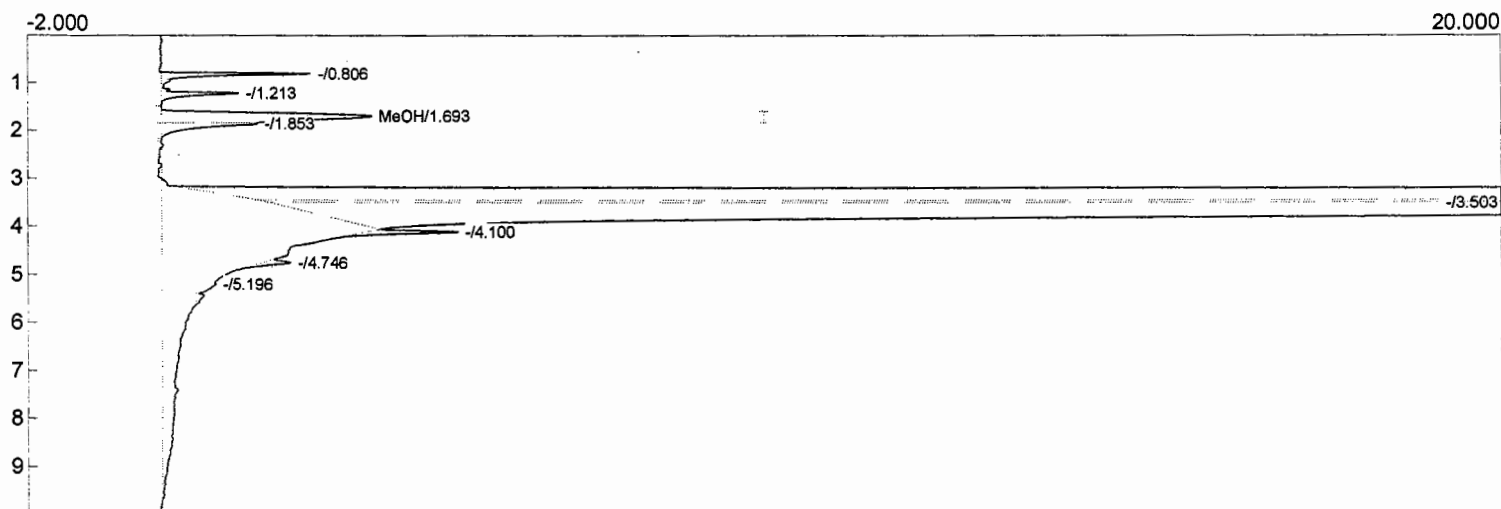
Component	Retention	Area
MeOH	1.703	31.9592
		31.9592

Lab name: ARI Environmental  
 Client: Valero, Port Arthur TX  
 Analysis date: 07/20/2011 14:36:15  
 Method: Syringe Injection  
 Description: GC FID  
 Carrier: HELIUM  
 Data file: MEOH ICR245.CHR ()  
 Sample: 544 SRU Run 1 Spiked Tube  
 Operator: E. Vogt  
 Comments: 4 ml 3% n-propanol tube extraction volume



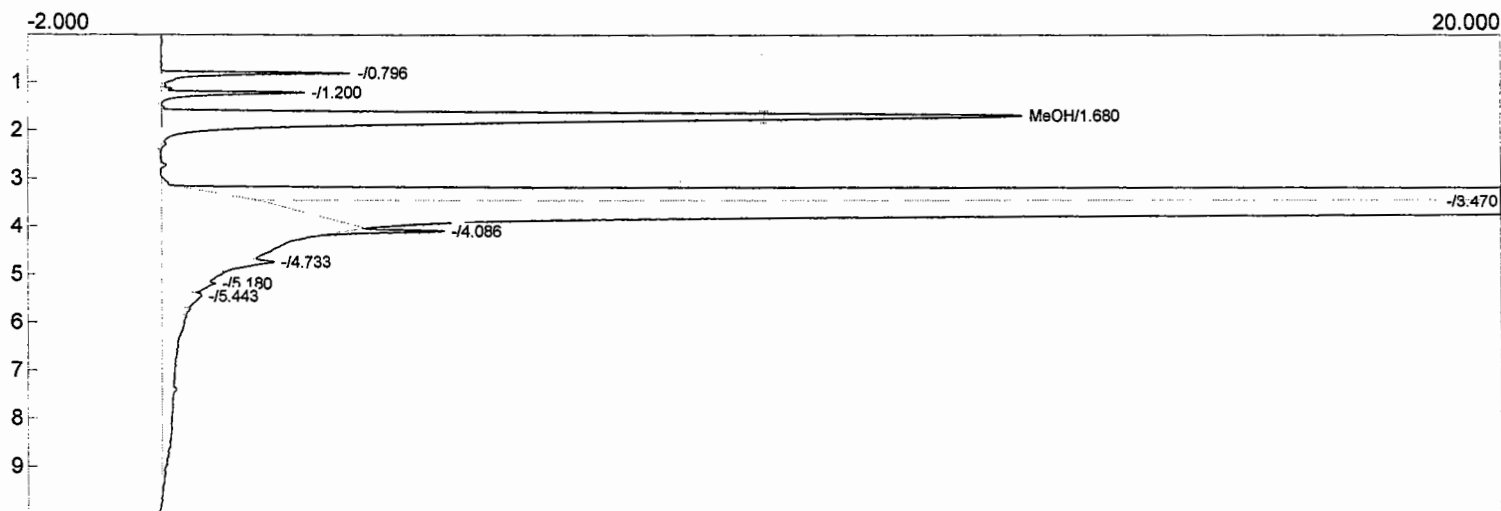
Component	Retention	Area
MeOH	1.676	29.8048
		29.8048

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 15:02:13  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR246.CHR ()  
Sample: 544 SRU Run 1 Spiked Tube  
Operator: E. Vogt  
Comments: 4 ml 3% n-propanol tube extraction volume



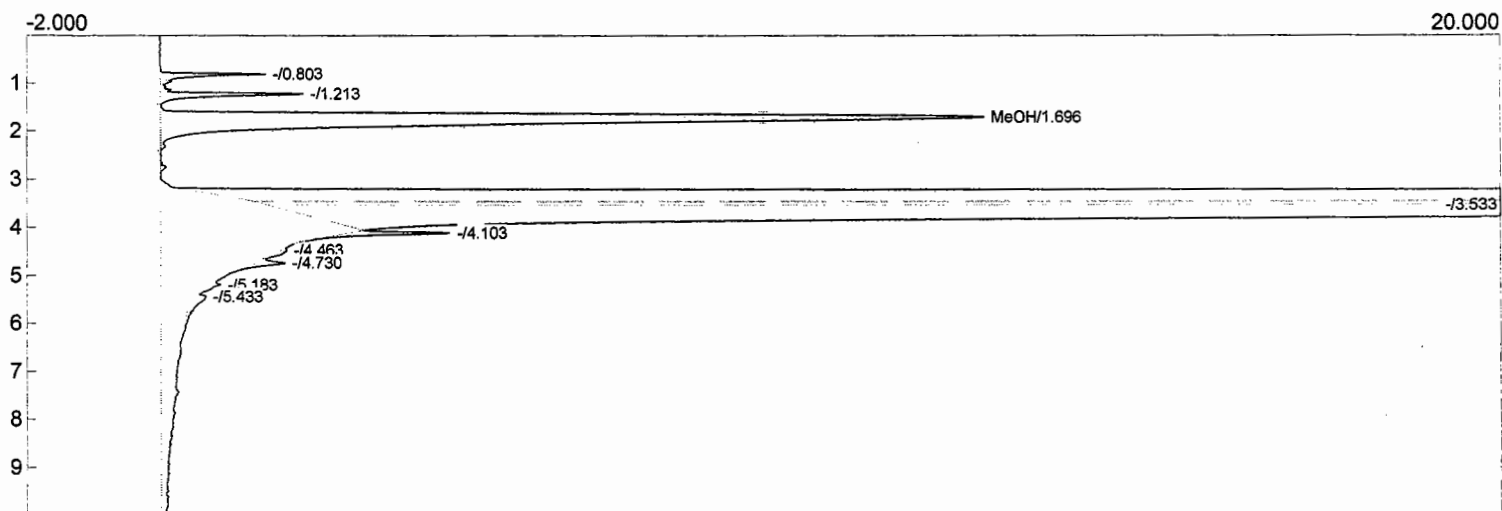
Component	Retention	Area
MeOH	1.693	33.3111
		33.3111

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 15:22:45  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR247.CHR ()  
Sample: 544 SRU Run 2 Spiked Tube  
Operator: E. Vogt  
Comments: 4 ml 3% n-propanol tube extraction volume



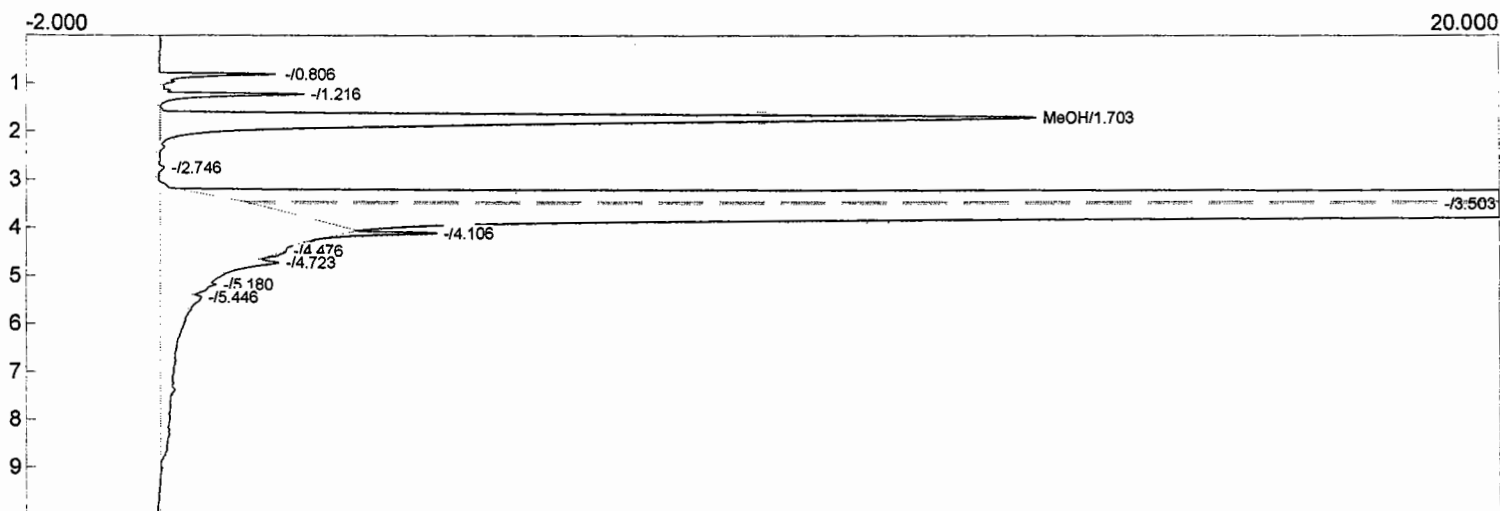
Component	Retention	Area
MeOH	1.680	161.7956
		161.7956

Lab name: ARI Environmental  
 Client: Valero, Port Arthur TX  
 Analysis date: 07/20/2011 15:40:25  
 Method: Syringe Injection  
 Description: GC FID  
 Carrier: HELIUM  
 Data file: MEOH ICR248.CHR ()  
 Sample: 544 SRU Run 2 Spiked Tube  
 Operator: E. Vogt  
 Comments: 4 ml 3% n-propanol tube extraction volume



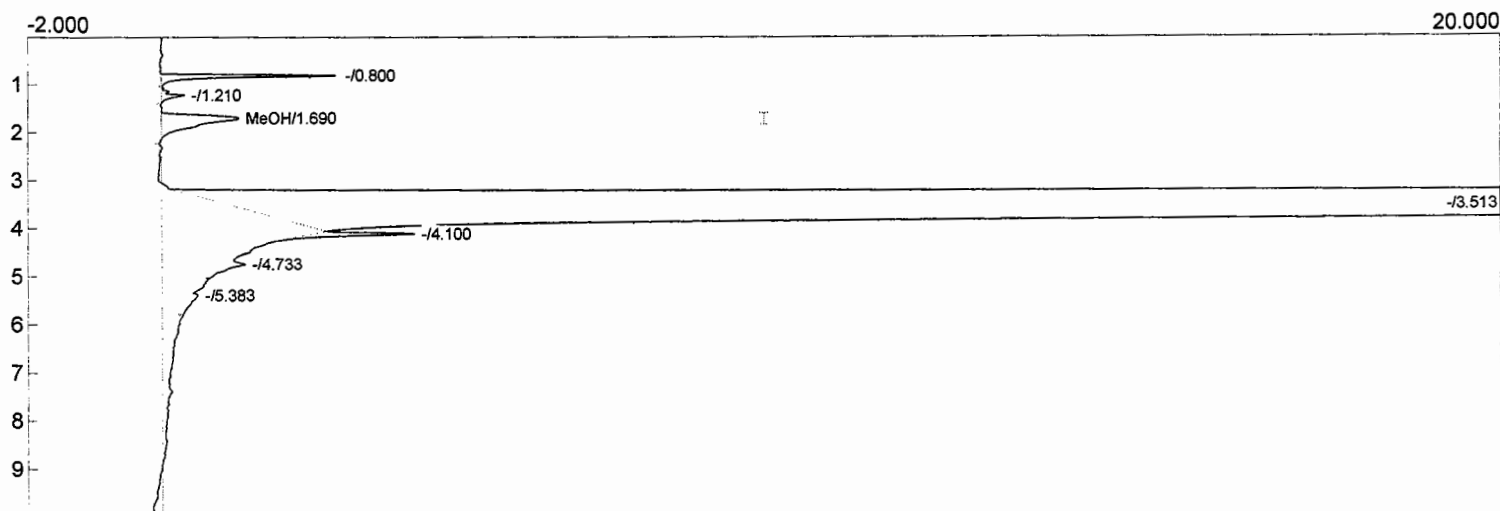
Component	Retention	Area
MeOH	1.696	161.8788
		161.8788

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 15:58:23  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR249.CHR ()  
Sample: 544 SRU Run 2 Spiked Tube  
Operator: E. Vogt  
Comments: 4 ml 3% n-propanol tube extraction volume



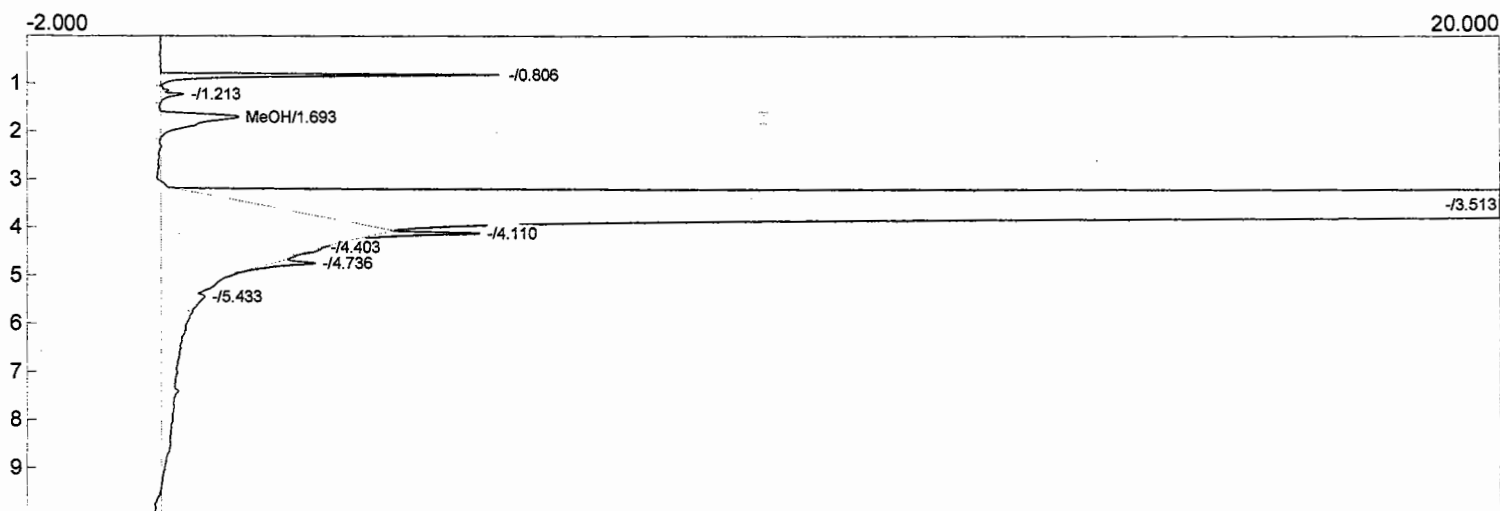
Component	Retention	Area
MeOH	1.703	165.7494
		165.7494

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 16:16:56  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR250.CHR ()  
Sample: 544 SRU Run 3 Spiked Tube  
Operator: E. Vogt  
Comments: 4 ml 3% n-propanol tube extraction volume



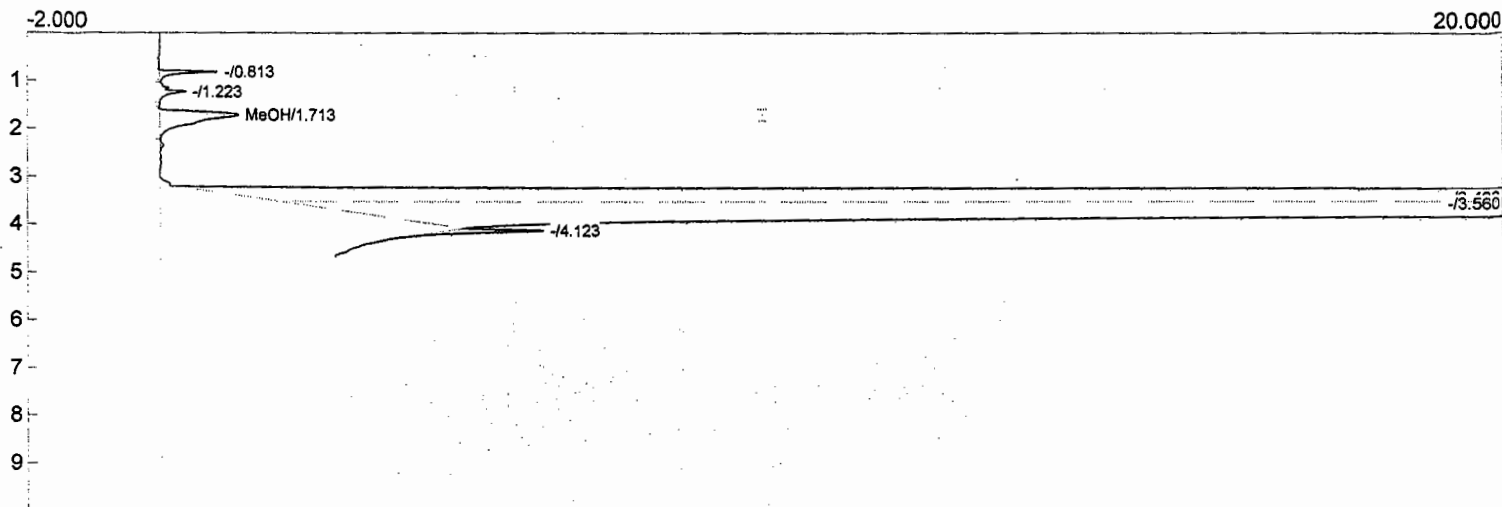
Component	Retention	Area
MeOH	1.690	16.3184
		16.3184

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 16:35:02  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR251.CHR ()  
Sample: 544 SRU Run 3 Spiked Tube  
Operator: E. Vogt  
Comments: 4 ml 3% n-propanol tube extraction volume



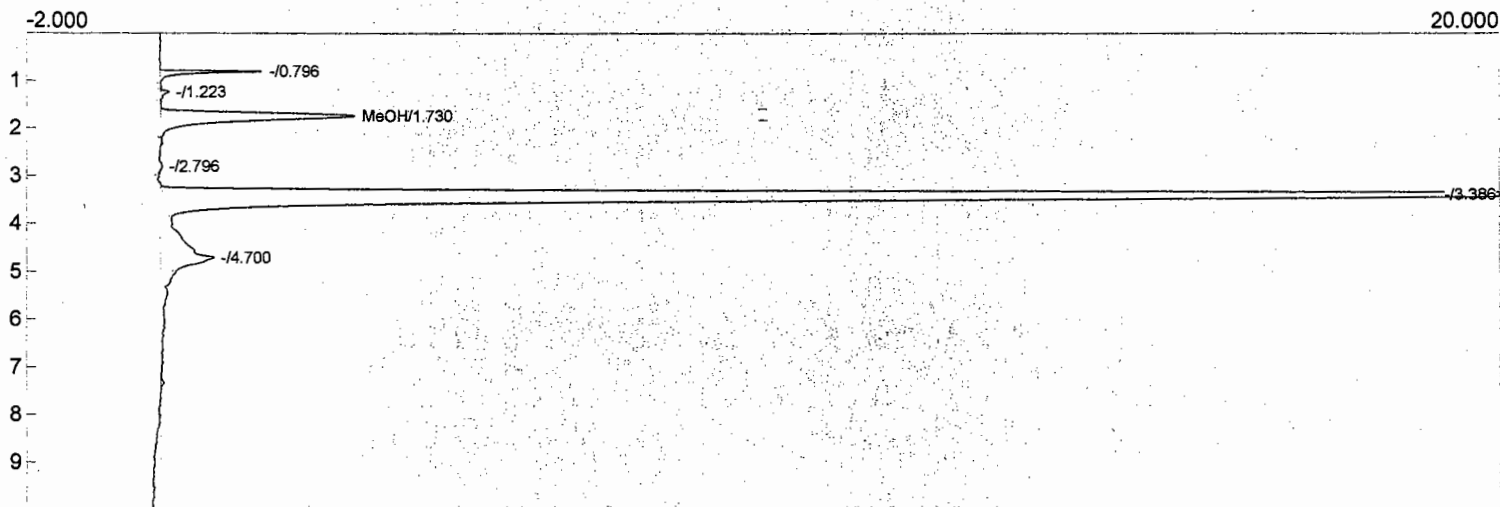
Component	Retention	Area
MeOH	1.693	16.4231
		16.4231

Lab name: ARI Environmental  
 Client: Valero, Port Arthur TX  
 Analysis date: 07/20/2011 17:30:24  
 Method: Syringe Injection  
 Description: GC FID  
 Carrier: HELIUM  
 Data file: MEOH ICR254.CHR ()  
 Sample: 544 SRU Run 3 Spiked Tube  
 Operator: E. Vogt  
 Comments: 4 ml 3% n-propanol tube extraction volume



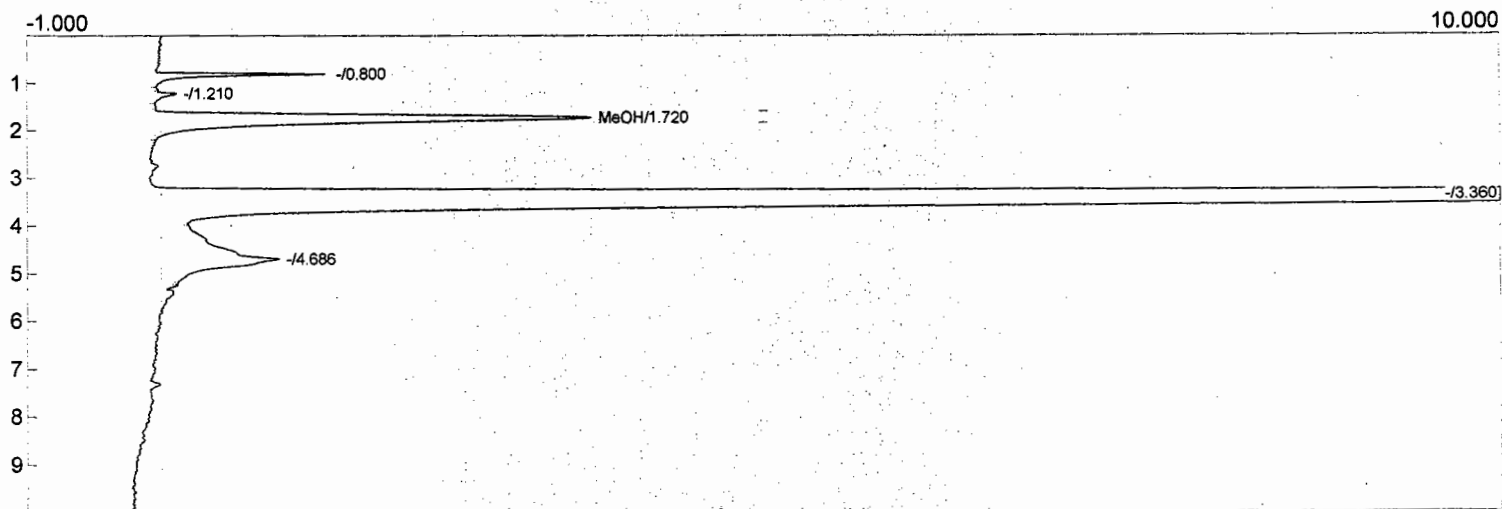
Component	Retention	Area
MeOH	1.713	16.4156
		16.4156

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/21/2011 22:34:42  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR300.chr ()  
Sample: MeOH Spiked Reagent Blank  
Operator: E. Vogt



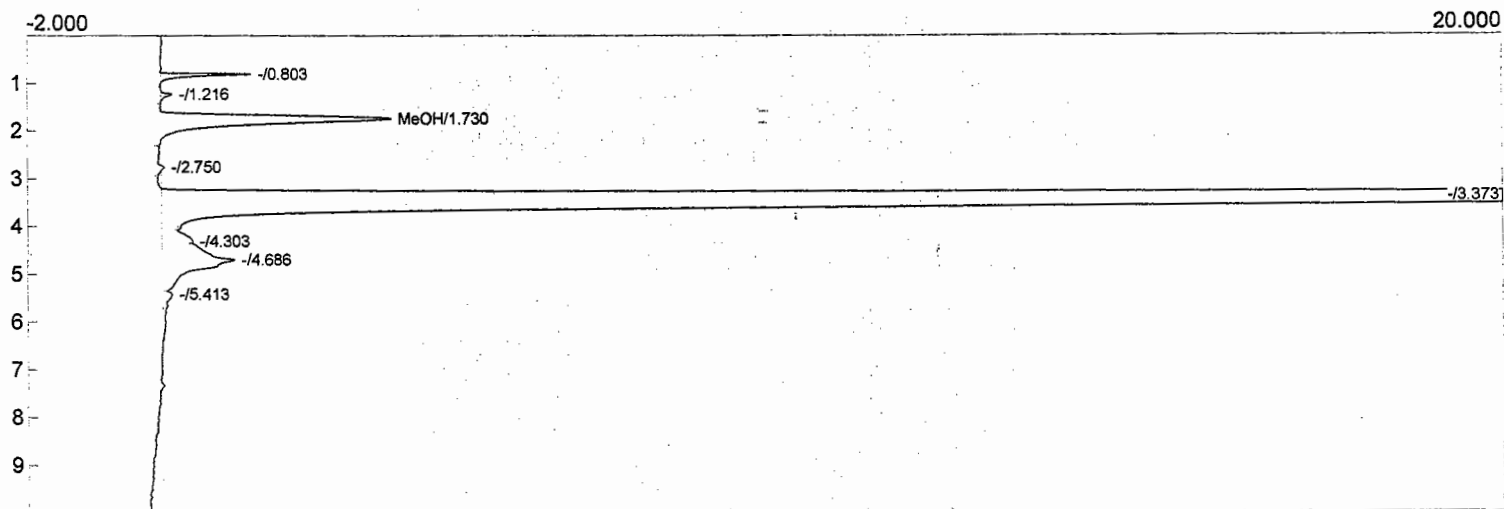
Component	Retention	Area
MeOH	1.730	32.7489
		32.7489

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/21/2011 22:17:10  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR299.chr ()  
Sample: MeOH Spiked Reagent Blank  
Operator: E. Vogt



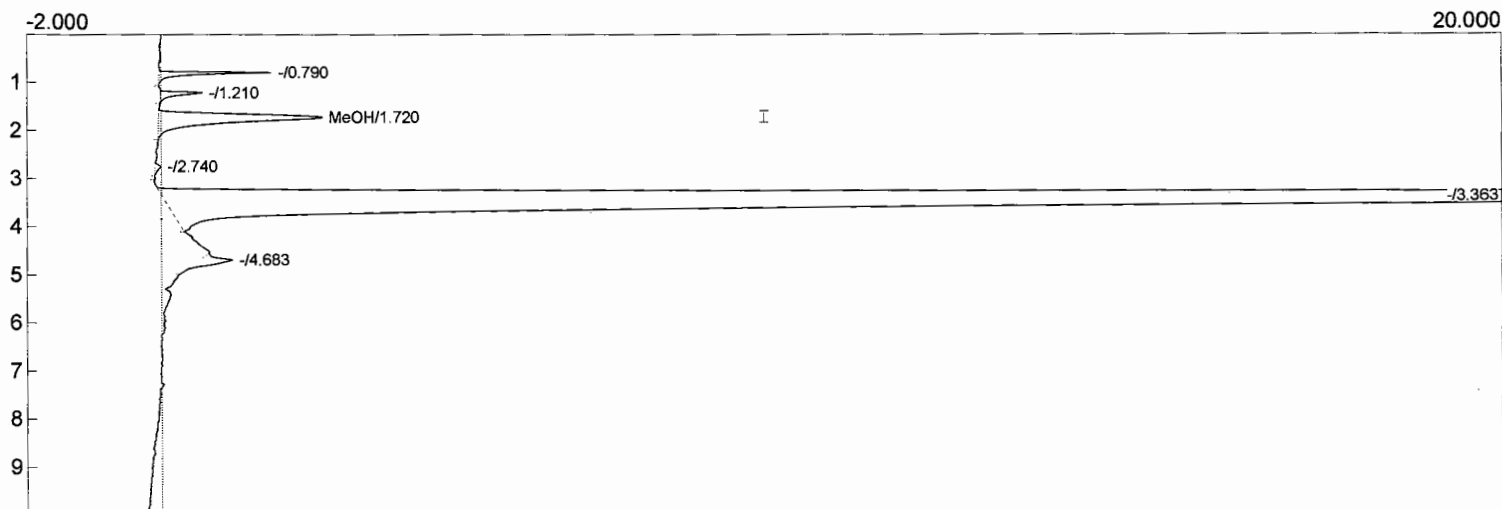
Component	Retention	Area
MeOH	1.720	37.7796
		37.7796

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/21/2011 22:00:05  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR298.CHR ()  
Sample: MeOH Spiked Reagent Blank  
Operator: E. Vogt



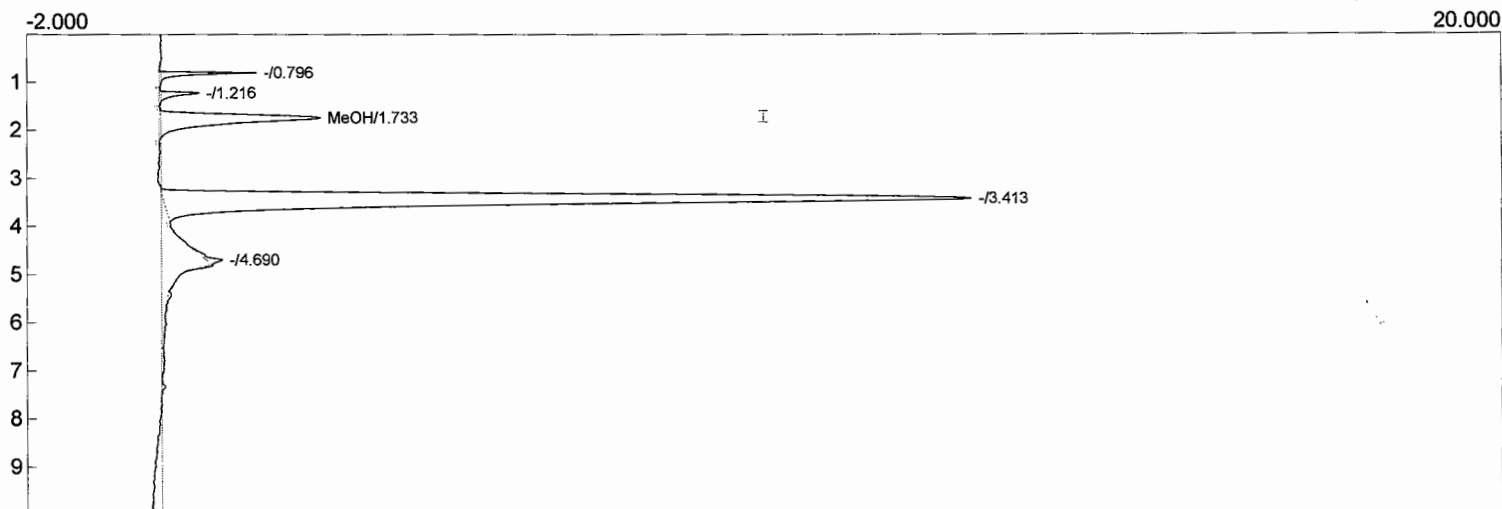
Component	Retention	Area
MeOH	1.730	41.5148
		41.5148

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/21/2011 21:24:59  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR296.chr ()  
Sample: MeOH Spiked Field Blank  
Operator: E. Vogt



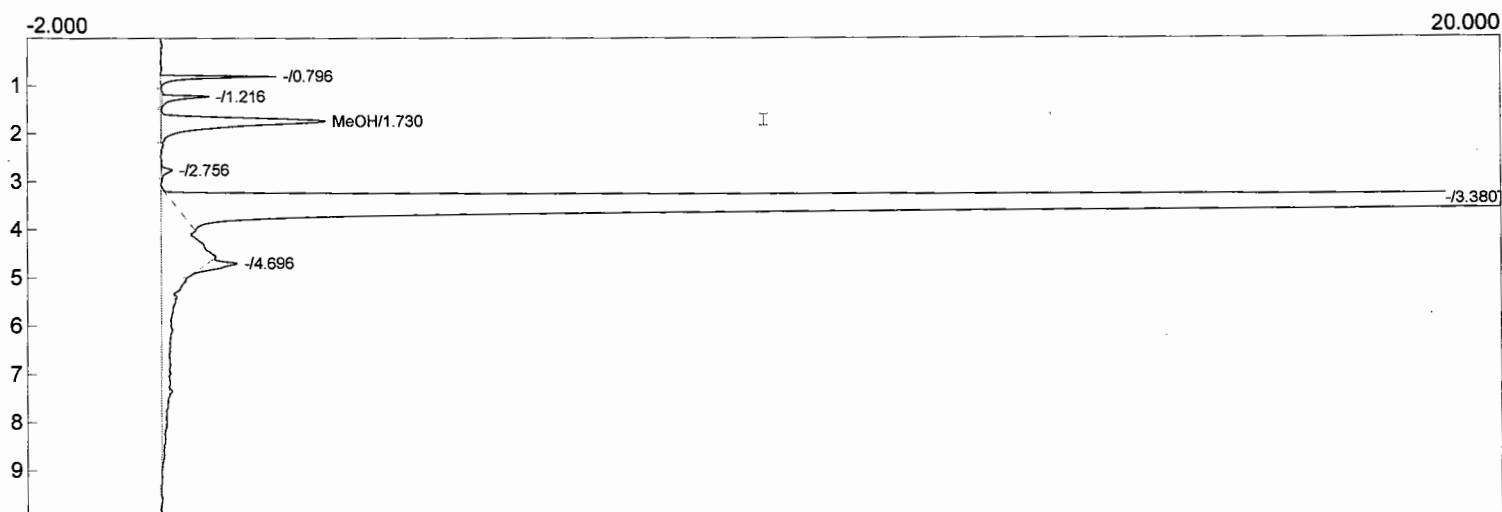
Component	Retention	Area
MeOH	1.720	27.9398
		27.9398

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/21/2011 21:07:41  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR295.chr ()  
Sample: MeOH Spiked Field Blank  
Operator: E. Vogt



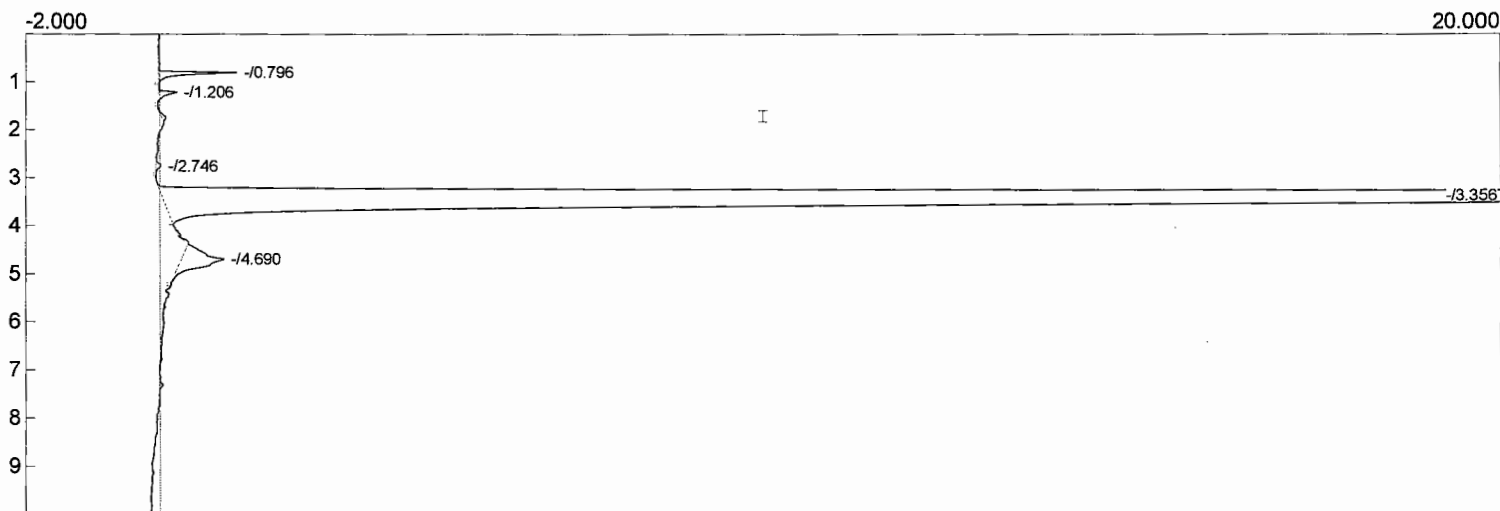
Component	Retention	Area
MeOH	1.733	29.3042
		29.3042

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/21/2011 20:49:44  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR294.chr ()  
Sample: MeOH Spiked Field Blank  
Operator: E. Vogt



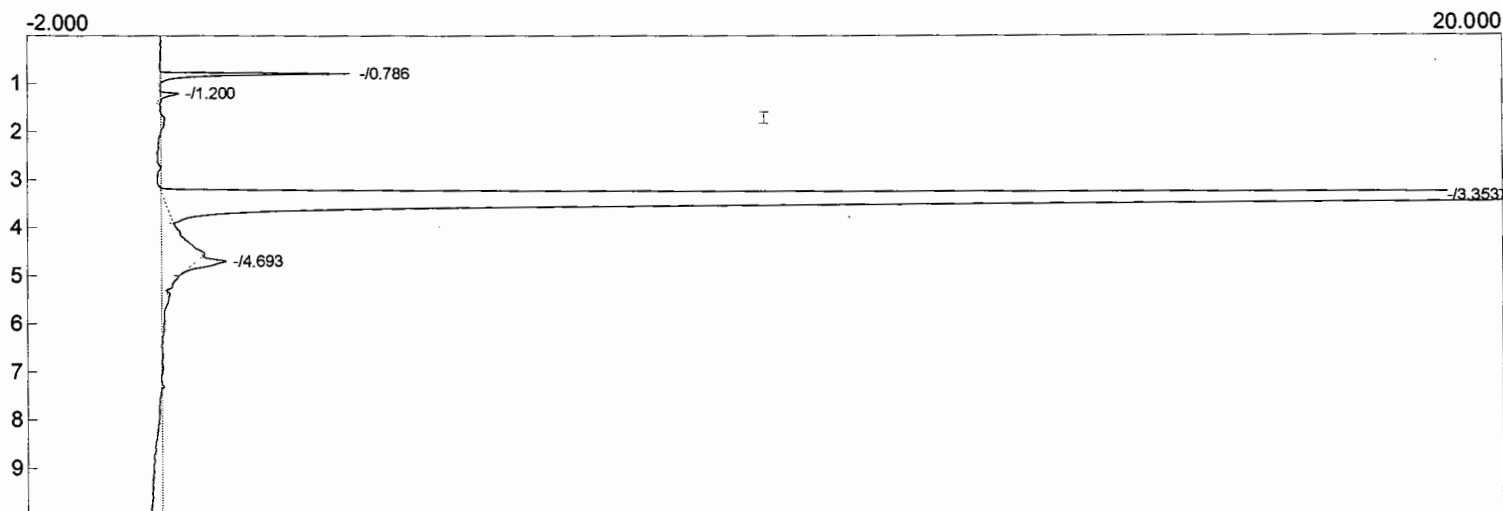
Component	Retention	Area
MeOH	1.730	28.7867
		28.7867

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/21/2011 20:32:39  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR293.chr ()  
Sample: Water Reagent Blank No spike  
Operator: E. Vogt



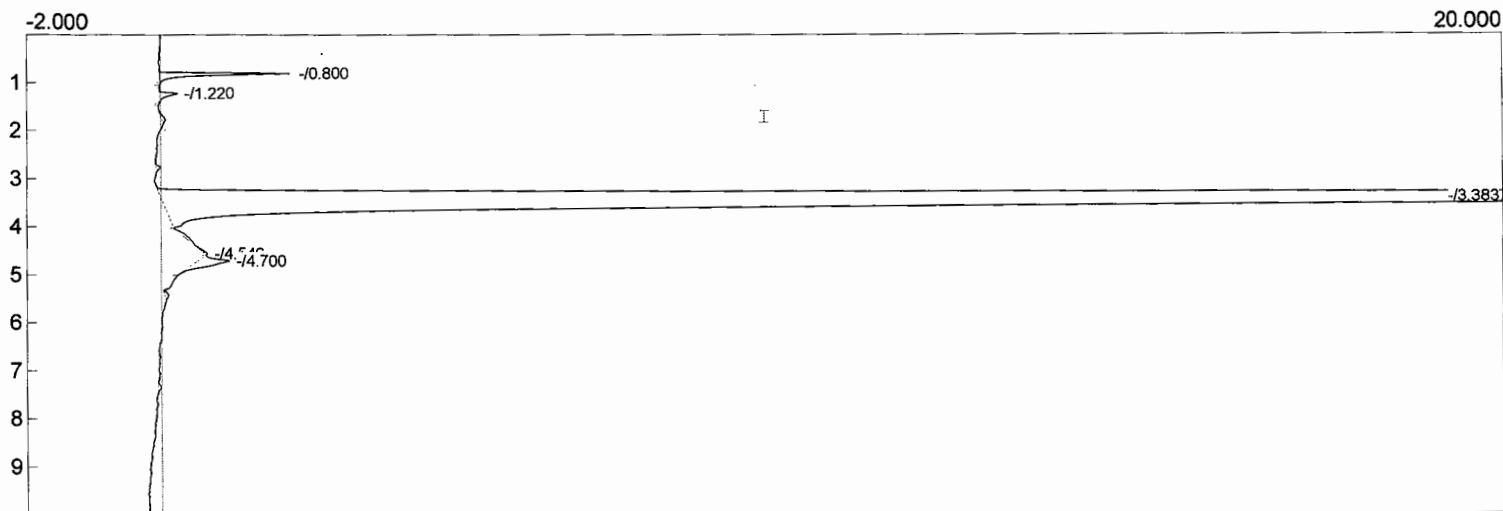
Component	Retention	Area
		0.0000

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/21/2011 20:15:35  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR292.chr ()  
Sample: Water Reagent Blank No Spike  
Operator: E. Vogt



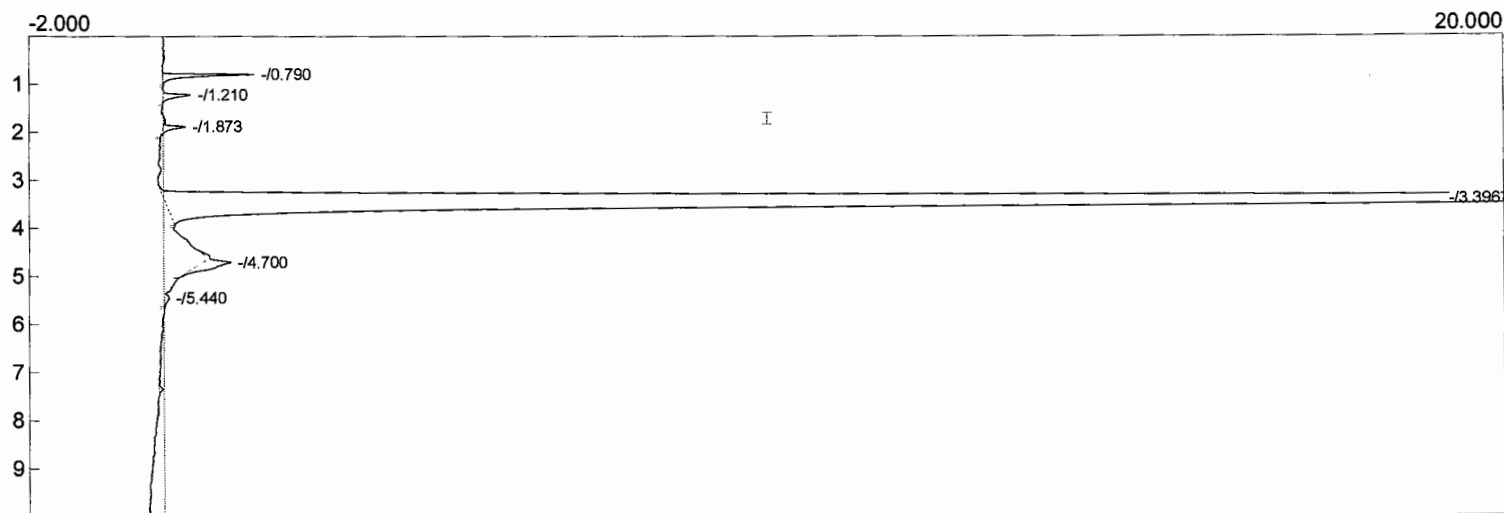
Component	Retention	Area
		0.0000

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/21/2011 19:41:20  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR290.chr ()  
Sample: Water Reagent Blank No Spike  
Operator: E. Vogt



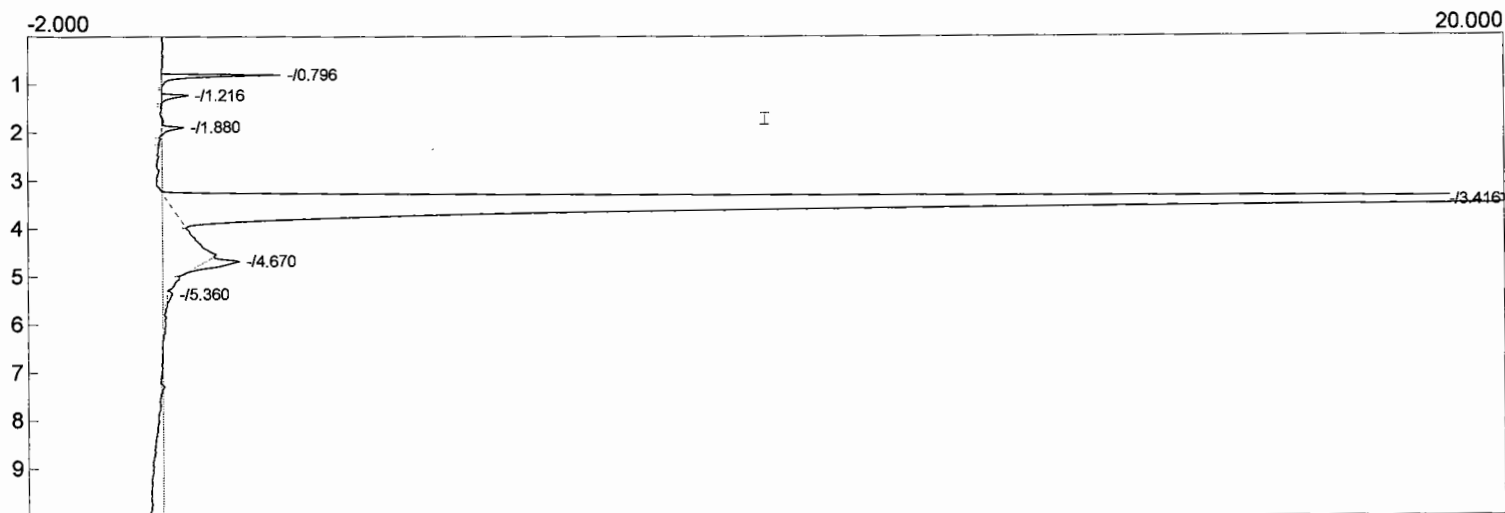
Component	Retention	Area
		0.0000

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/21/2011 19:24:12  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR289.chr ()  
Sample: Water Field Blank No spike  
Operator: E. Vogt



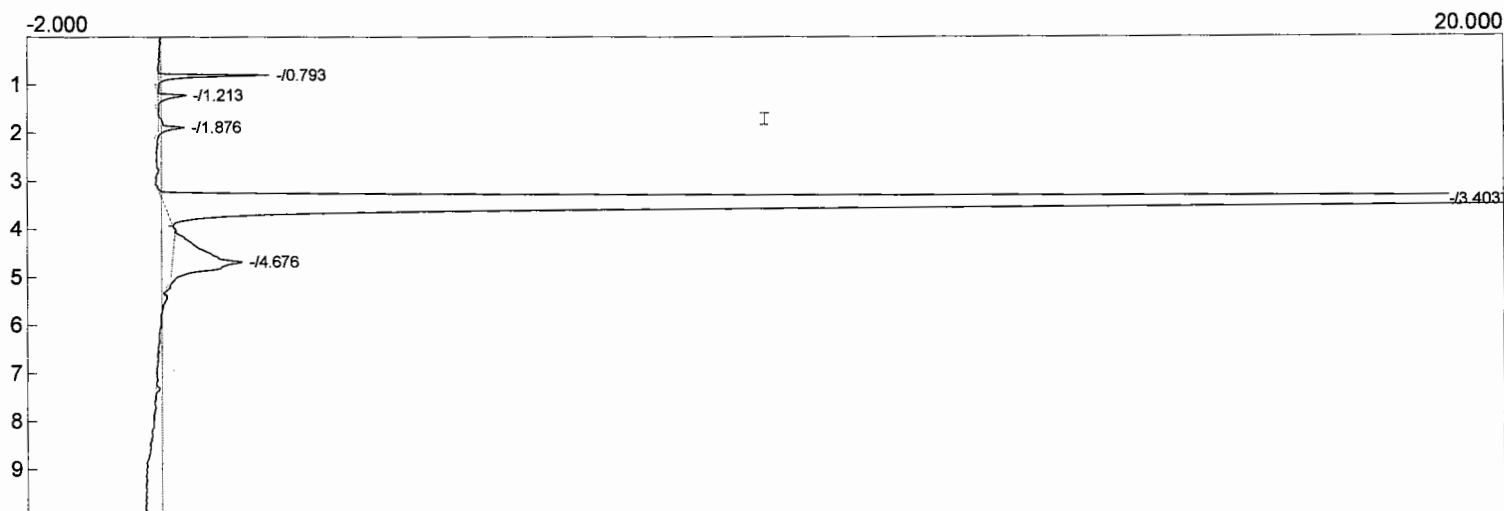
Component	Retention	Area
		0.0000

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/21/2011 19:06:35  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR288.chr ()  
Sample: Water Field Blank No Spike  
Operator: E. Vogt



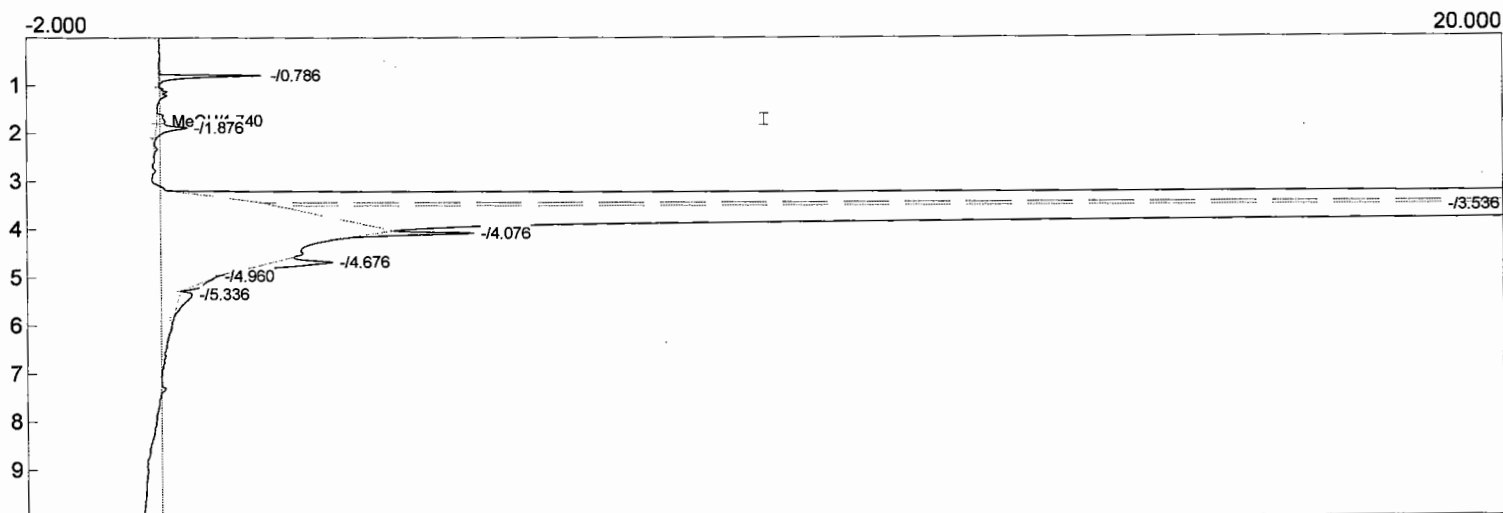
Component	Retention	Area
		0.0000

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/21/2011 18:48:54  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR287.chr ()  
Sample: Water Field Blank No Spike  
Operator: E. Vogt



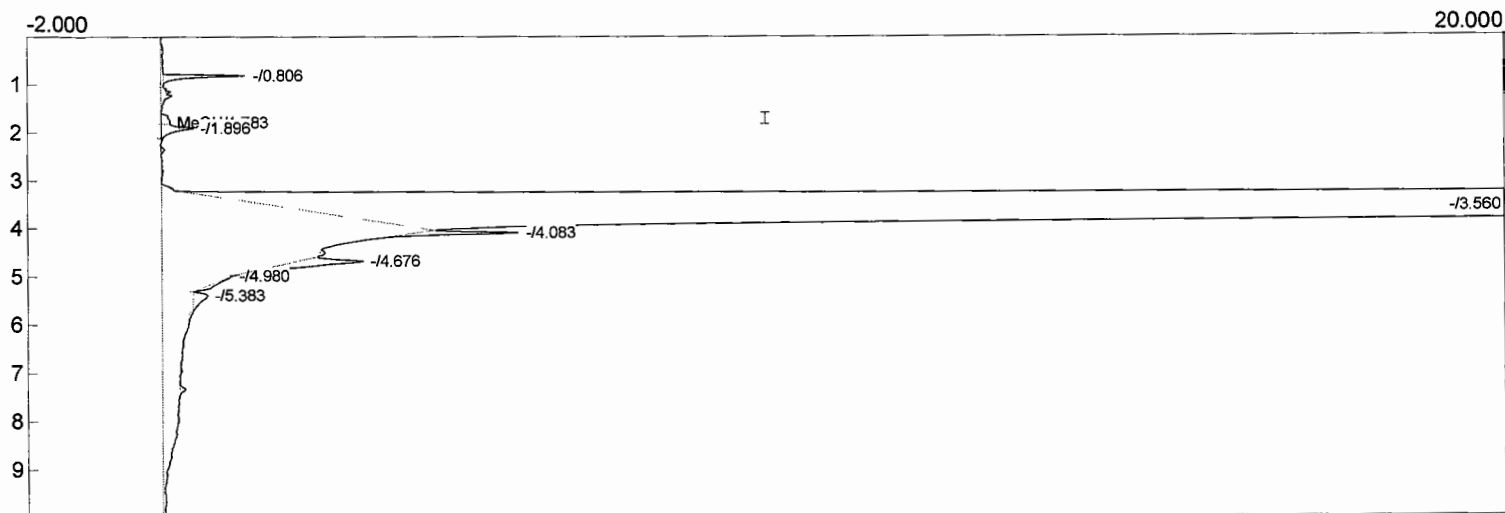
Component	Retention	Area
		0.0000

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/21/2011 17:55:12  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR284.CHR ()  
Sample: 3% n-propanol Blank  
Operator: E. Vogt



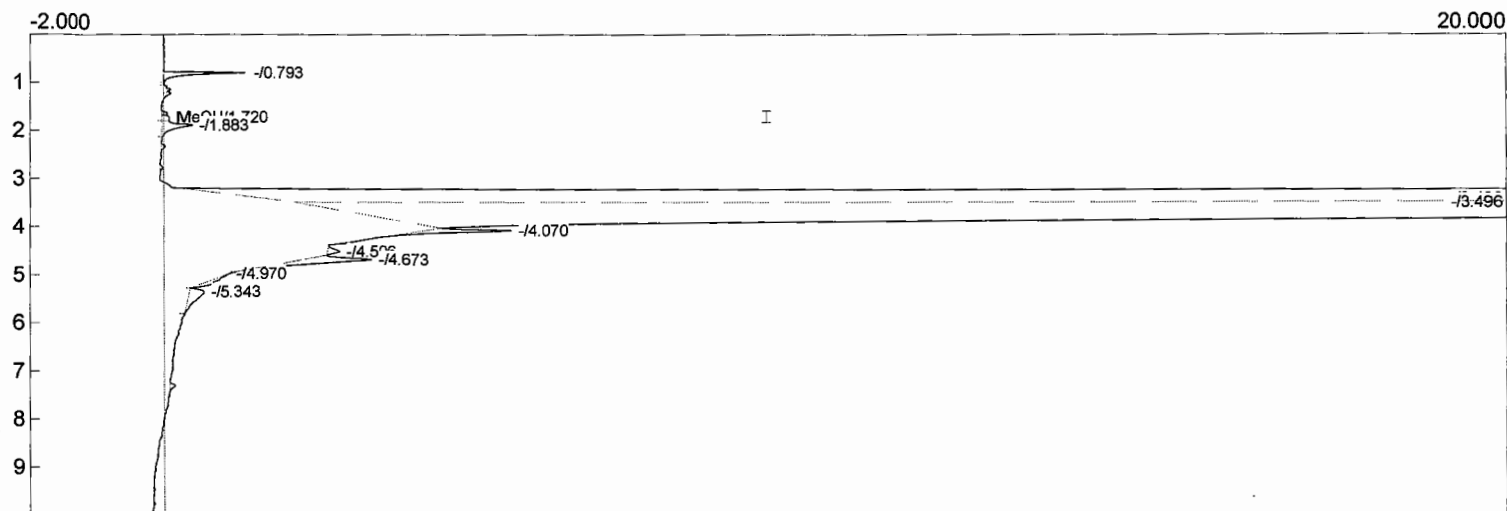
Component	Retention	Area
MeOH	1.740	1.2474
		1.2474

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/21/2011 17:18:33  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR282.chr ()  
Sample: 3% n-propanol Blank  
Operator: E. Vogt



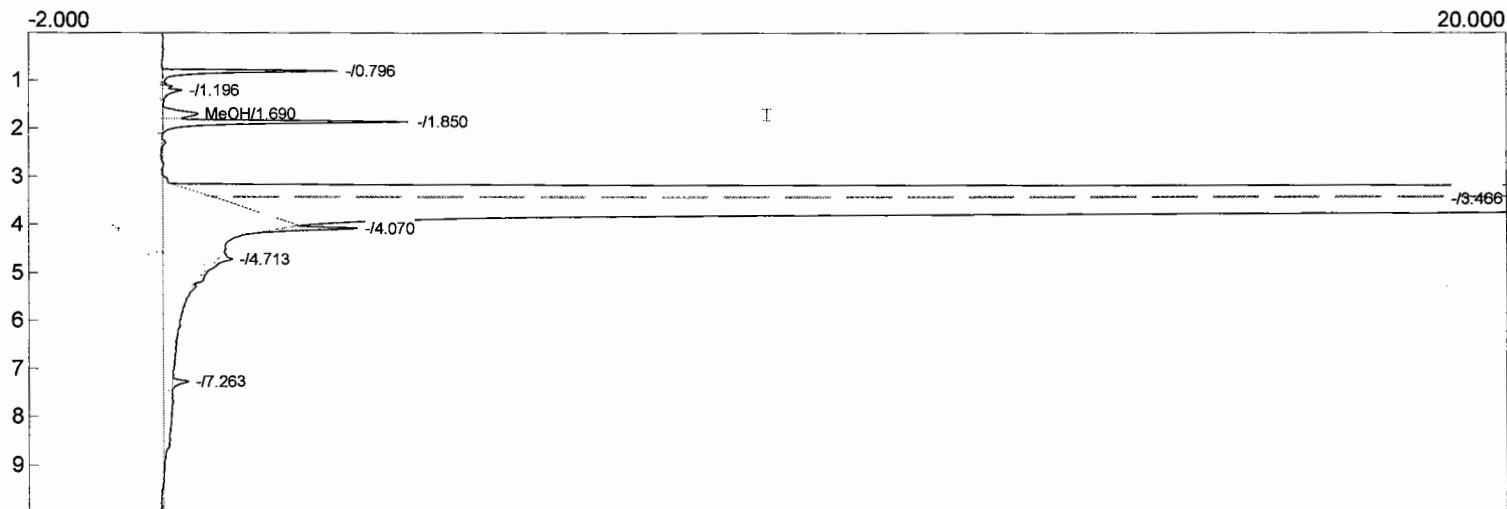
Component	Retention	Area
MeOH	1.783	1.3652
		1.3652

Lab name: ARI Environmental  
 Client: Valero, Port Arthur TX  
 Analysis date: 07/21/2011 17:37:00  
 Method: Syringe Injection  
 Description: GC FID  
 Carrier: HELIUM  
 Data file: MEOH ICR283.CHR ()  
 Sample: 3% n-propanol Blank  
 Operator: E. Vogt



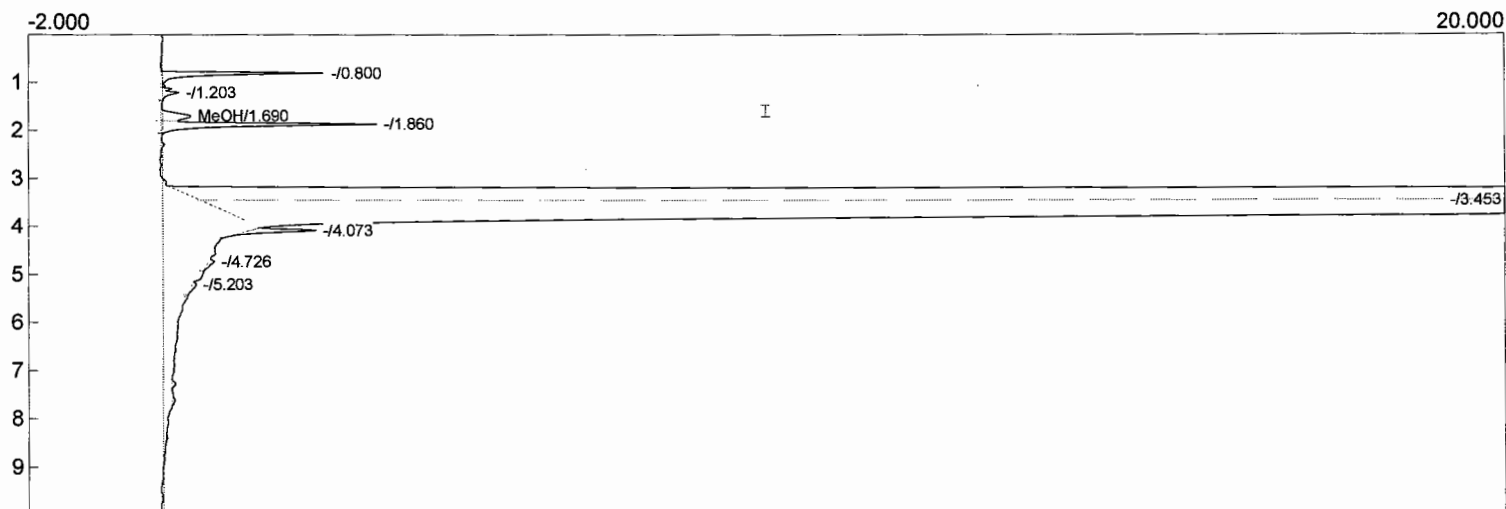
Component	Retention	Area
MeOH	1.720	0.6822
		0.6822

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/22/2011 10:04:45  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR302.CHR ()  
Sample: Field Blank unspiked Tube  
Operator: E. Vogt  
Comments: 4 ml 3% n-propanol tube extraction volume



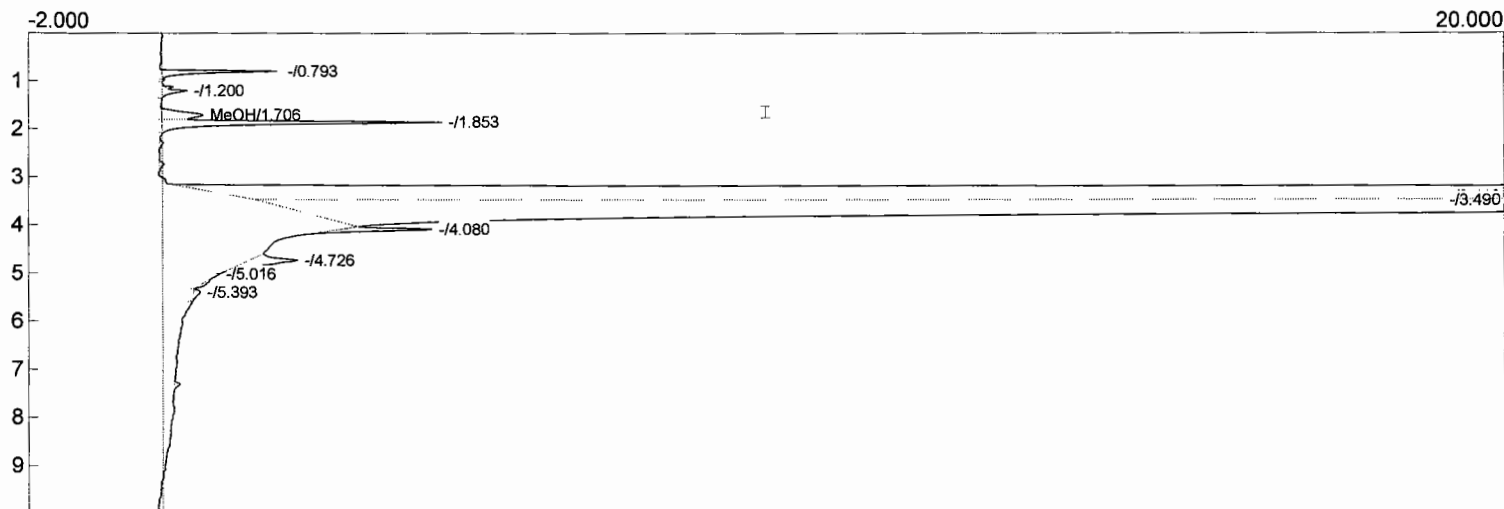
Component	Retention	Area
MeOH	1.690	4.5134
		4.5134

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/22/2011 10:21:32  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR303.CHR ()  
Sample: Field Blank unspiked Tube  
Operator: E. Vogt  
Comments: 4 ml 3% n-propanol tube extraction volume



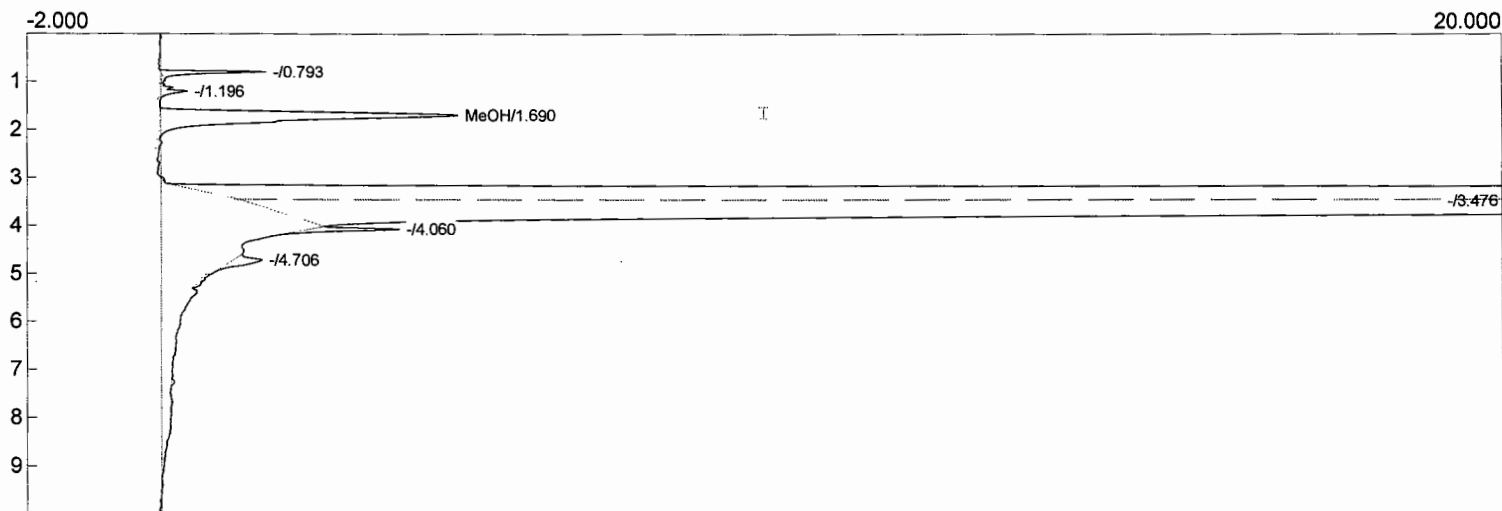
Component	Retention	Area
MeOH	1.690	3.9720
		3.9720

Lab name: ARI Environmental  
 Client: Valero, Port Arthur TX  
 Analysis date: 07/22/2011 10:39:38  
 Method: Syringe Injection  
 Description: GC FID  
 Carrier: HELIUM  
 Data file: MEOH ICR304.CHR ()  
 Sample: Field Blank unspiked Tube  
 Operator: E. Vogt  
 Comments: 4 ml 3% n-propanol tube extraction volume



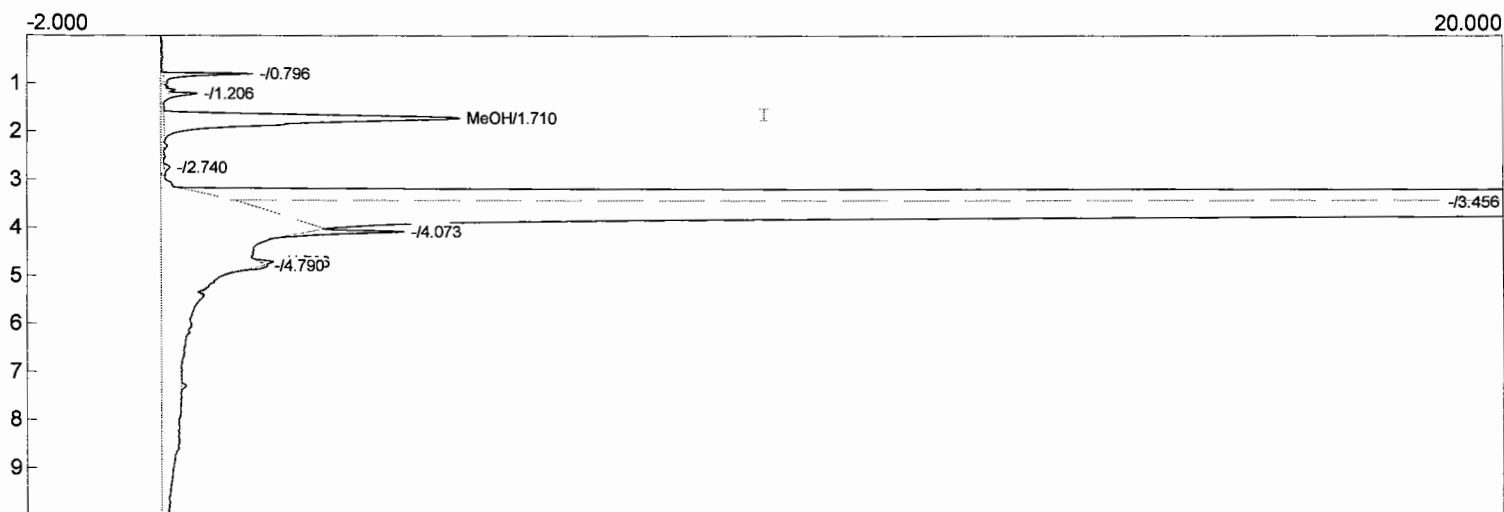
Component	Retention	Area
MeOH	1.706	5.4234
		5.4234

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/22/2011 11:25:04  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR307.CHR ()  
Sample: Field Blank Tube Spiked  
Operator: E. Vogt



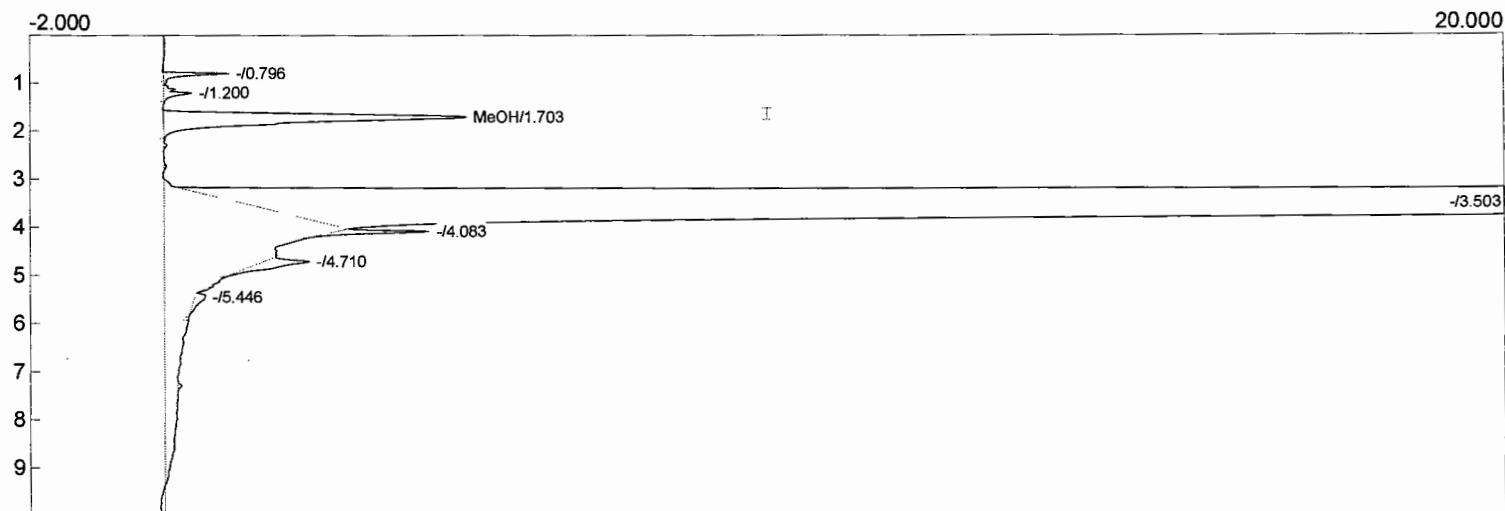
Component	Retention	Area
MeOH	1.690	51.8796
		51.8796

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/22/2011 11:42:02  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR308.CHR ()  
Sample: Field Blank Tube Spiked  
Operator: E. Vogt



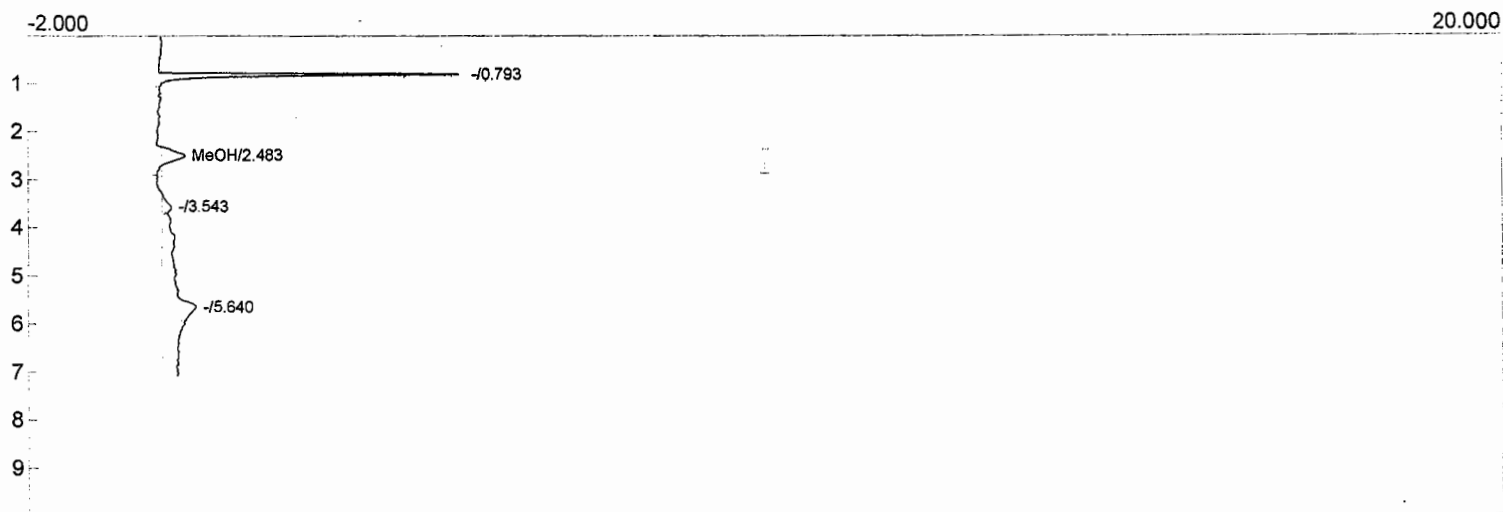
Component	Retention	Area
MeOH	1.710	51.9866
		51.9866

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/22/2011 11:59:35  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR309.CHR ()  
Sample: Field Blank Tube Spiked  
Operator: E. Vogt



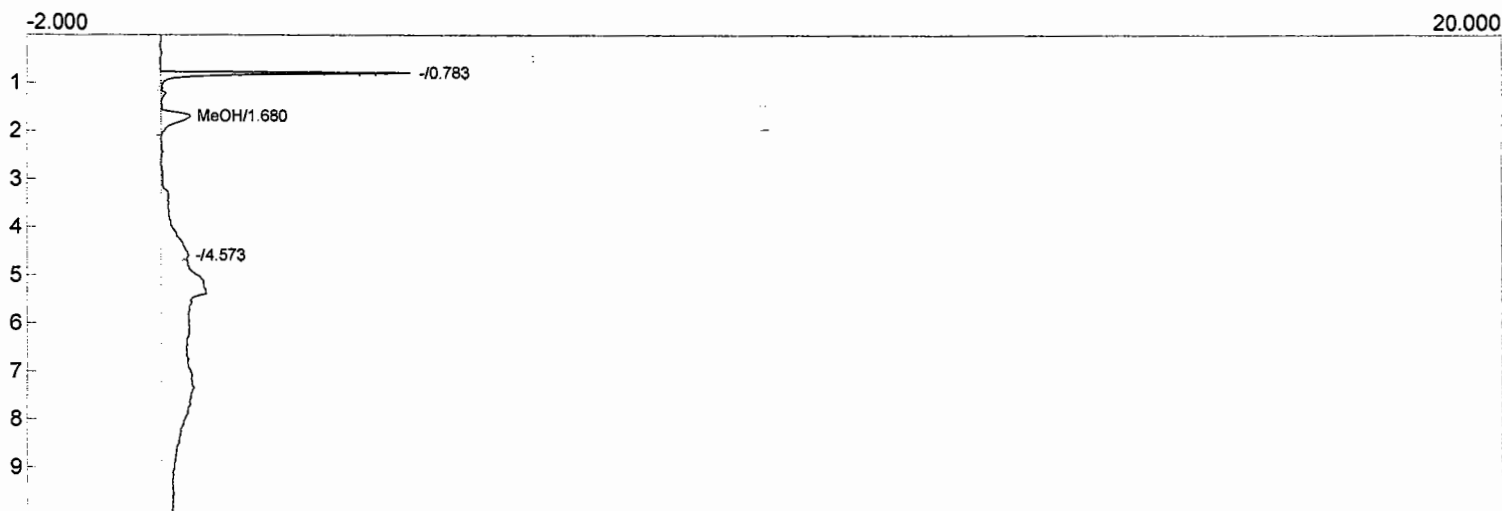
Component	Retention	Area
MeOH	1.703	53.2045
		53.2045

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/19/2011 10:03:17  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR163.CHR ()  
Sample: 2.0 ppm MeOH Std. - pre  
Operator: E. Vogt



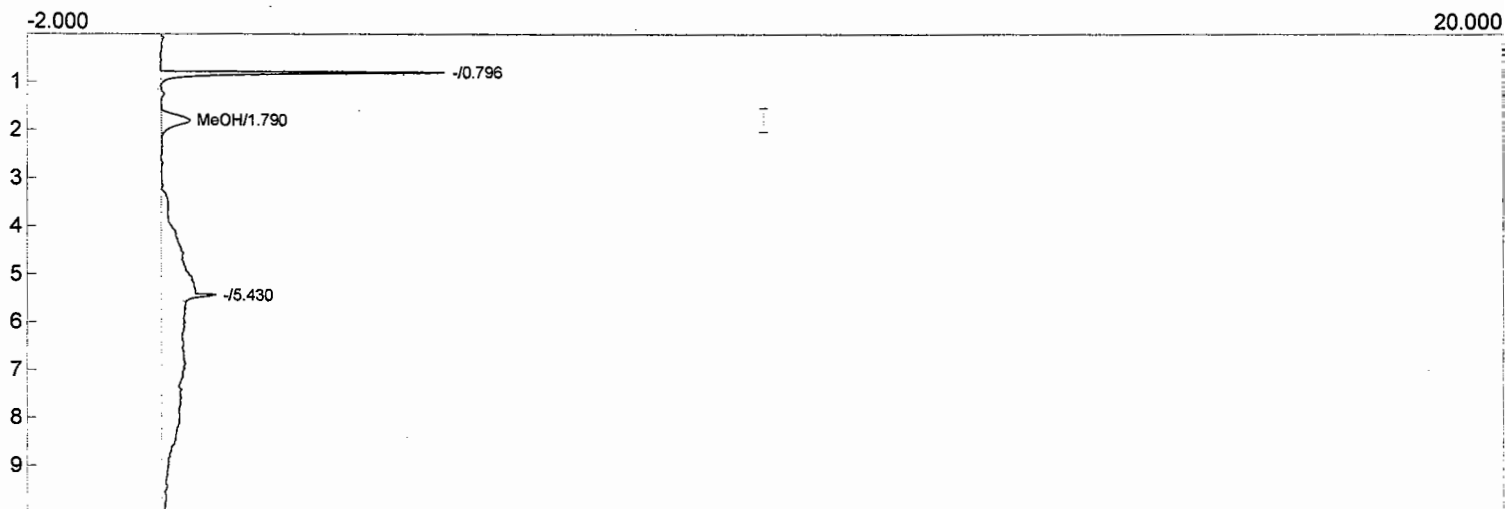
Component	Retention	Area
MeOH	2.483	6.6428
		6.6428

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/19/2011 12:00:09  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR164.CHR ()  
Sample: 2.0 ppm MeOH Std. - pre  
Operator: E. Vogt



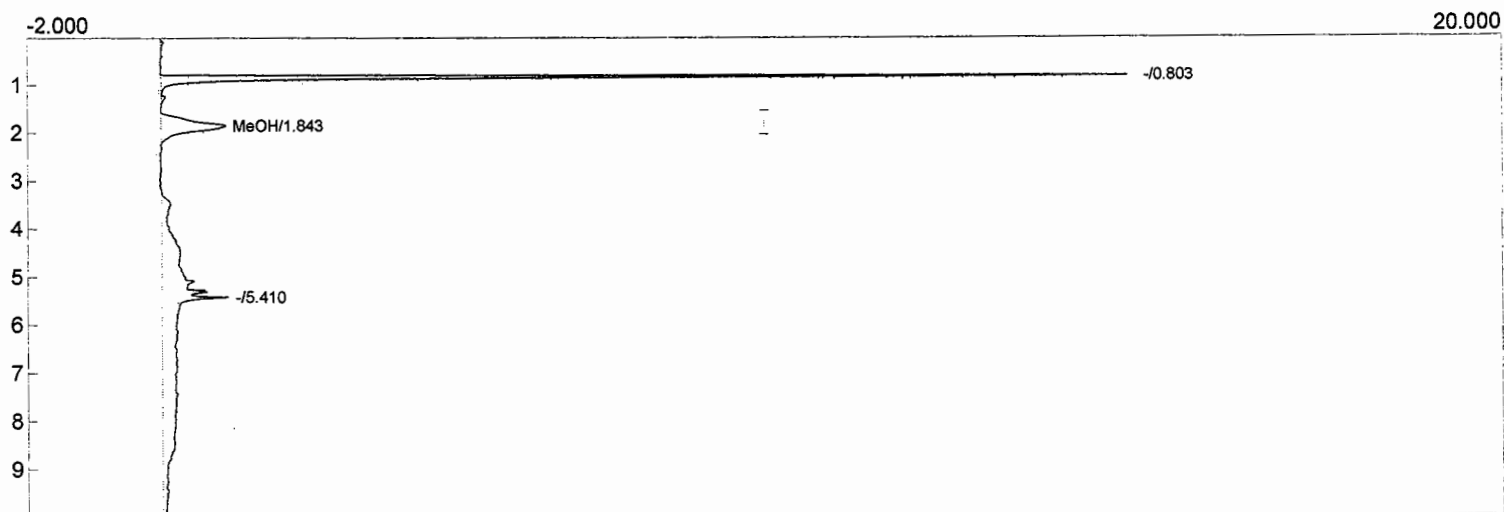
Component	Retention	Area
MeOH	1.680	6.1846
		6.1846

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/19/2011 12:16:49  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR165.CHR ()  
Sample: 2.0 ppm MeOH Std. - pre  
Operator: E. Vogt



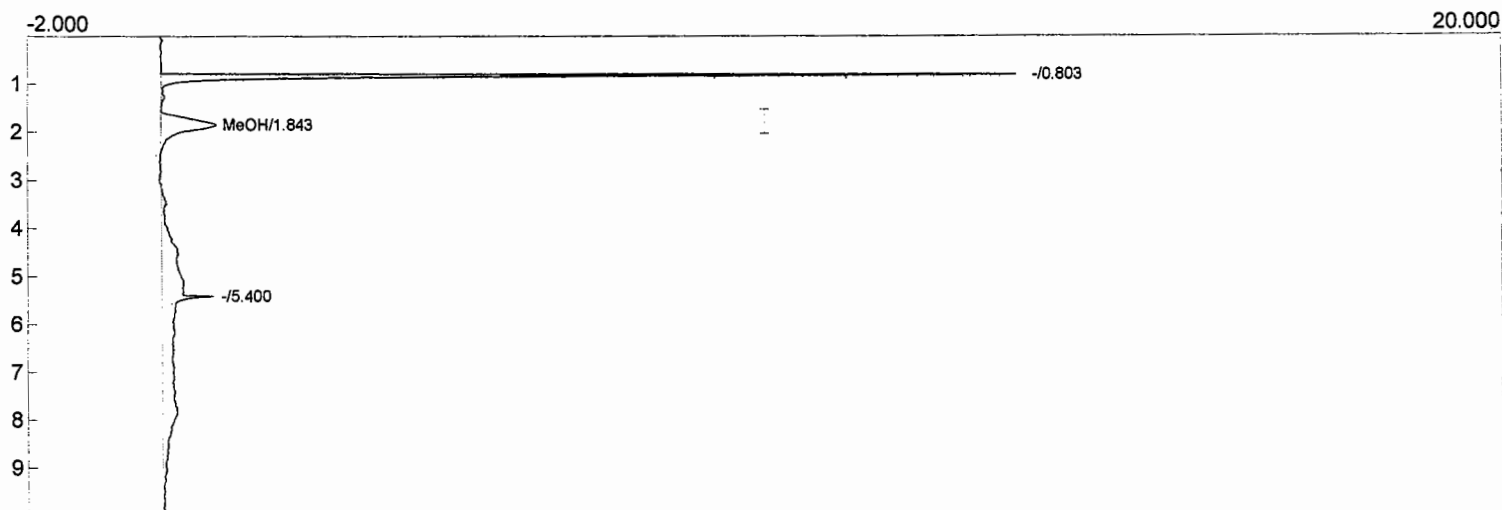
Component	Retention	Area
MeOH	1.790	6.3254
		6.3254

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/19/2011 12:33:31  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR166.CHR ()  
Sample: 5.0 ppm MeOH Std. - pre  
Operator: E. Vogt



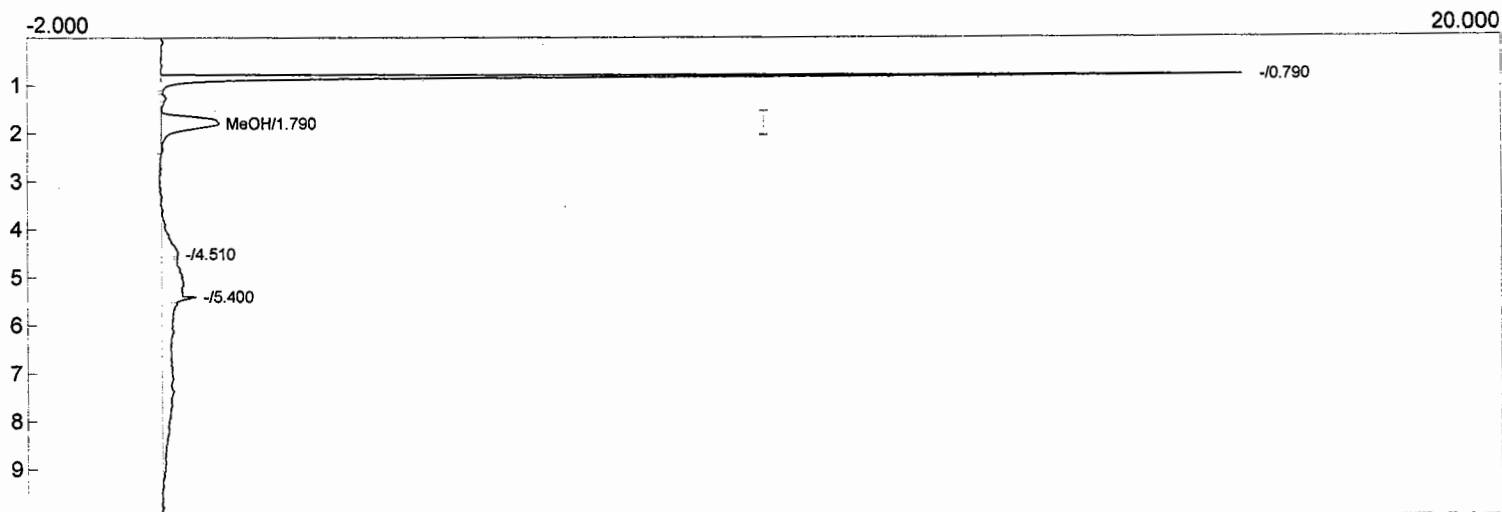
Component	Retention	Area
MeOH	1.843	15.2416
		15.2416

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/19/2011 12:50:29  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR167.CHR ()  
Sample: 5.0 ppm MeOH Std. - pre  
Operator: E. Vogt



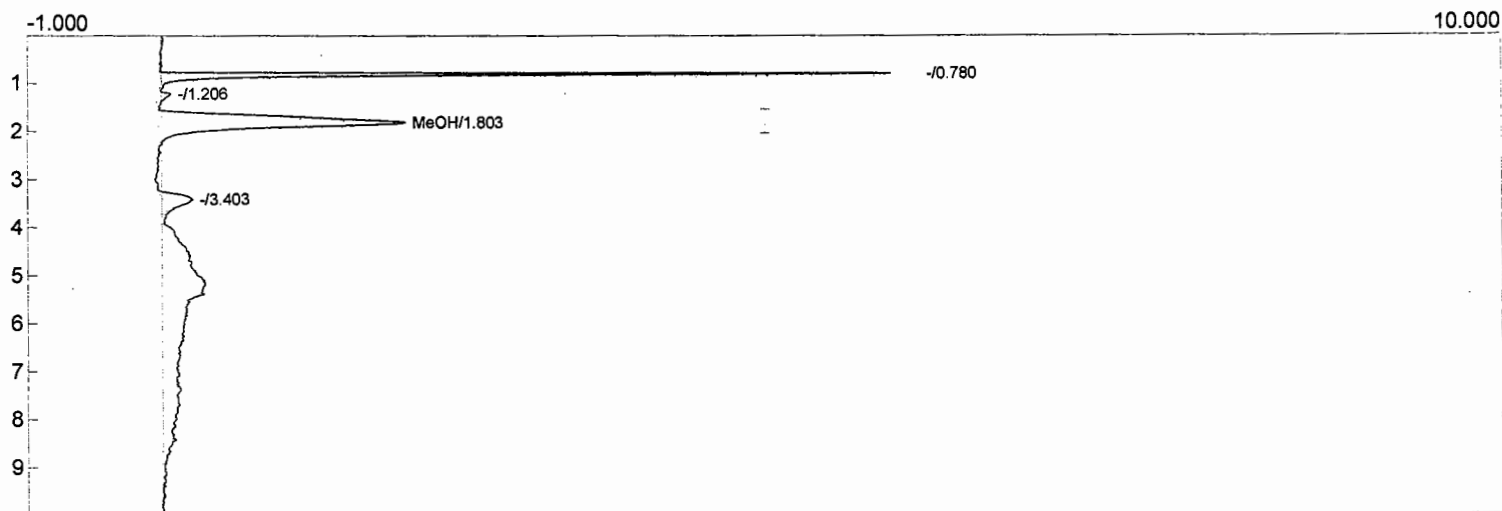
Component	Retention	Area
MeOH	1.843	14.8917
		14.8917

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/19/2011 13:07:34  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR168.CHR ()  
Sample: 5.0 ppm MeOH Std. - pre  
Operator: E. Vogt



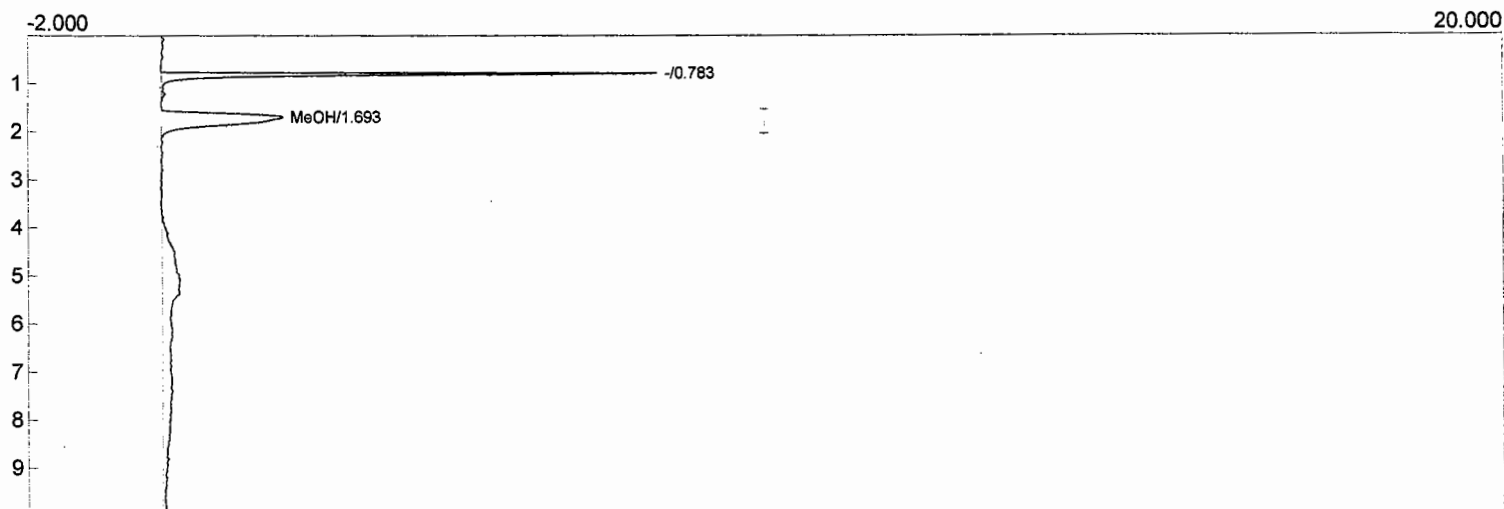
Component	Retention	Area
MeOH	1.790	14.8677
		14.8677

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/19/2011 13:24:31  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR169.CHR ()  
Sample: 10.0 ppm MeOH Std. - pre  
Operator: E. Vogt



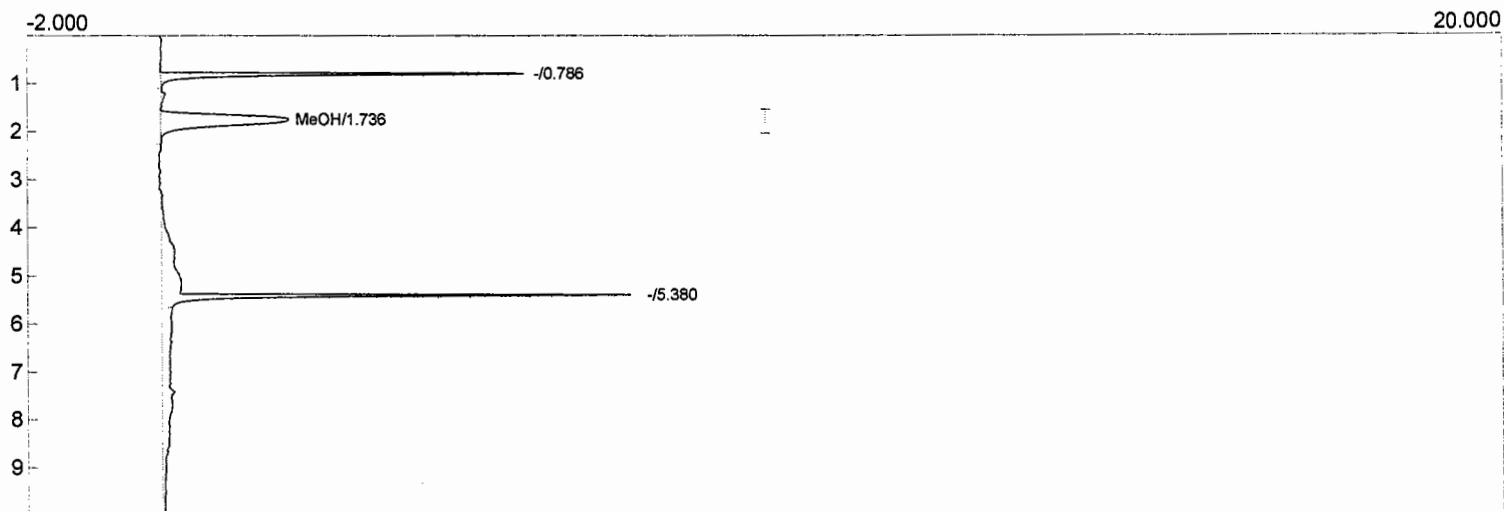
Component	Retention	Area
MeOH	1.803	27.8268
		27.8268

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/19/2011 13:41:31  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR170.CHR ()  
Sample: 10.0 ppm MeOH Std. - pre  
Operator: E. Vogt



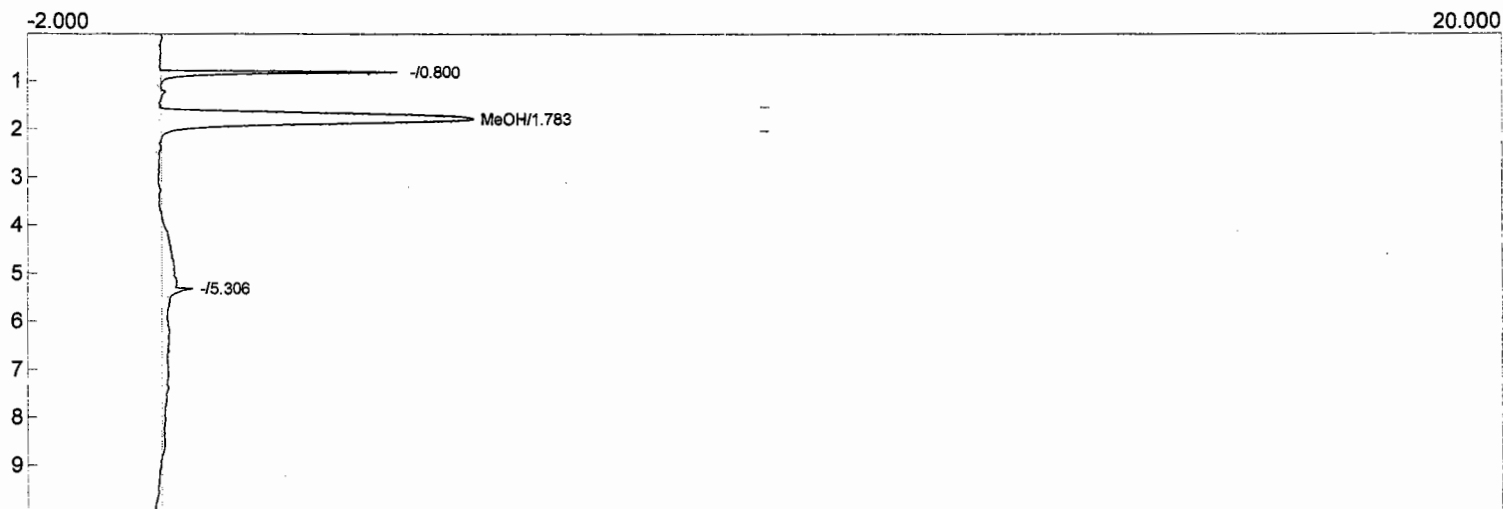
Component	Retention	Area
MeOH	1.693	27.3496
		27.3496

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/19/2011 13:58:27  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR171.CHR ()  
Sample: 10.0 ppm MeOH Std. - pre  
Operator: E. Vogt



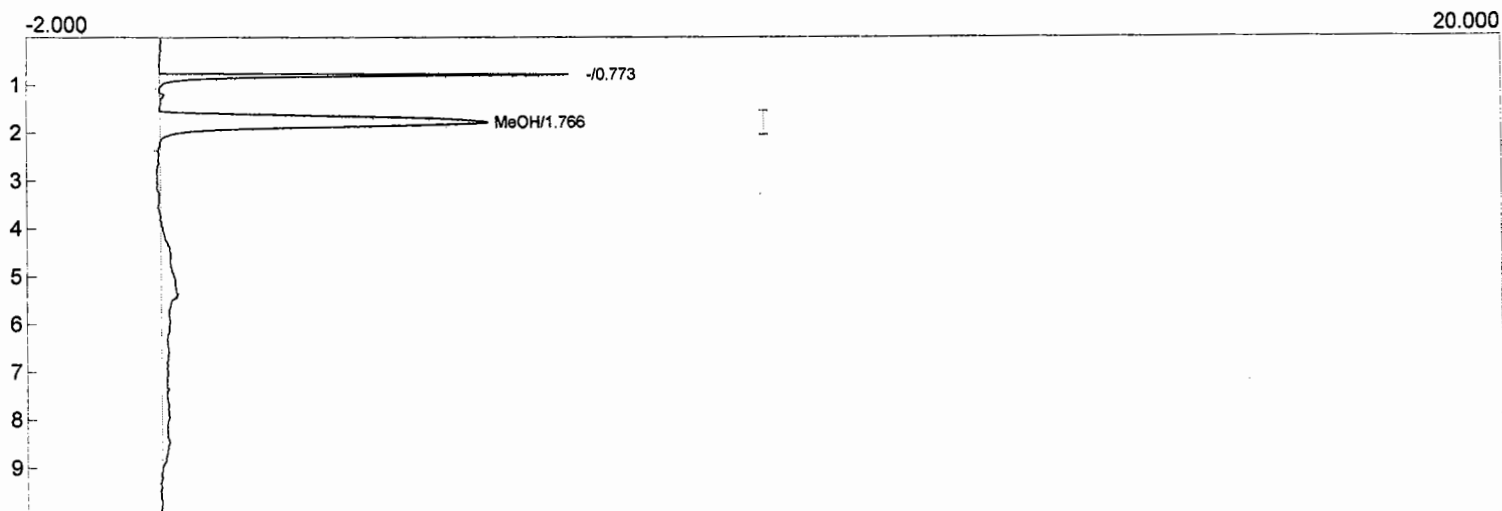
Component	Retention	Area
MeOH	1.736	28.2326
		28.2326

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/19/2011 14:15:26  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR172.CHR ()  
Sample: 25.0 ppm MeOH Std. - pre  
Operator: E. Vogt



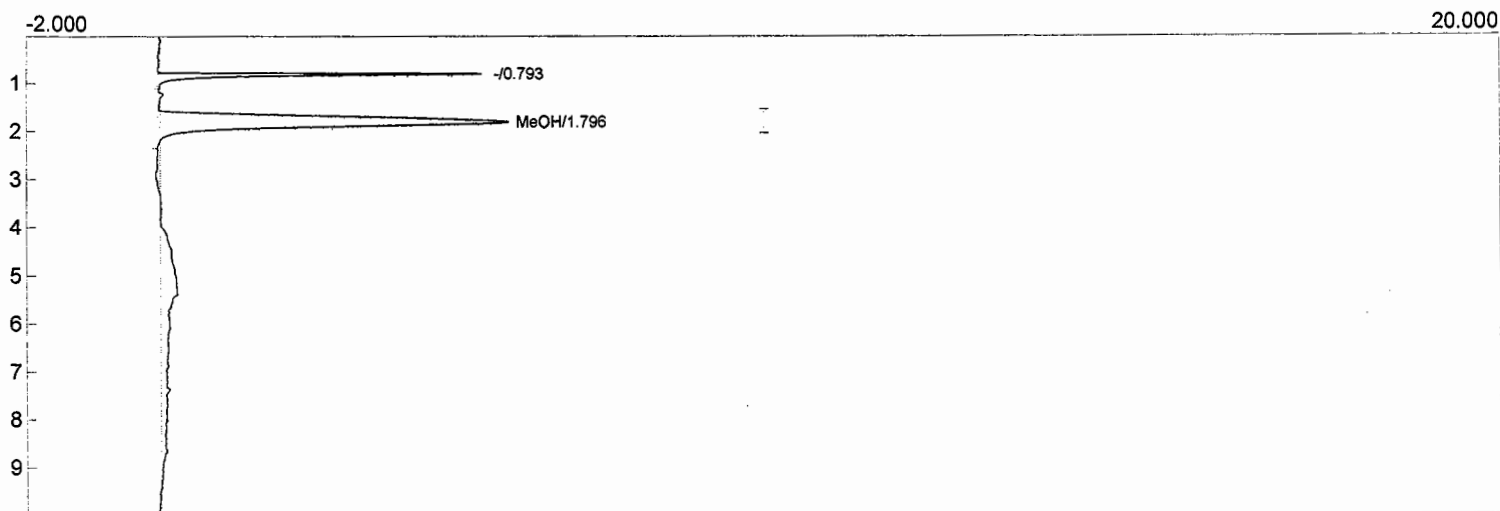
Component	Retention	Area
MeOH	1.783	69.7554
		69.7554

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/19/2011 14:37:17  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR173.CHR ()  
Sample: 25.0 ppm MeOH Std. - pre  
Operator: E. Vogt



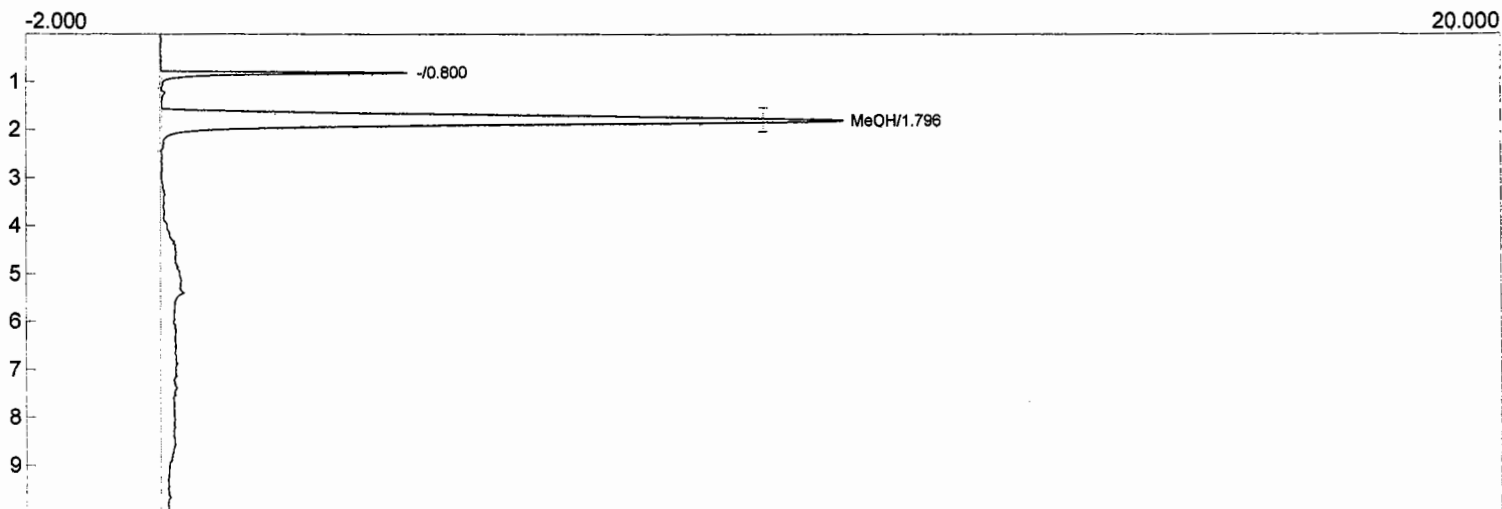
Component	Retention	Area
MeOH	1.766	72.2221
		72.2221

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/19/2011 14:54:10  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR174.CHR ()  
Sample: 25.0 ppm MeOH Std. - pre  
Operator: E. Vogt



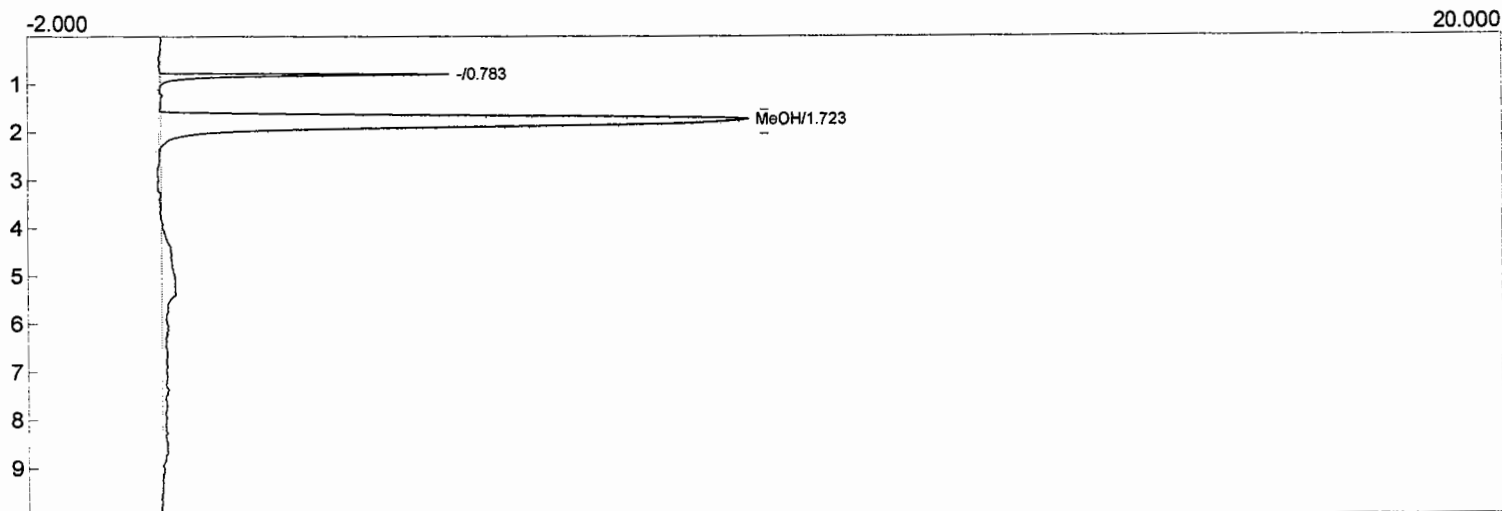
Component	Retention	Area
MeOH	1.796	72.9041
		72.9041

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/19/2011 15:09:20  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR175.CHR ()  
Sample: 50.0 ppm MeOH Std. - pre  
Operator: E. Vogt



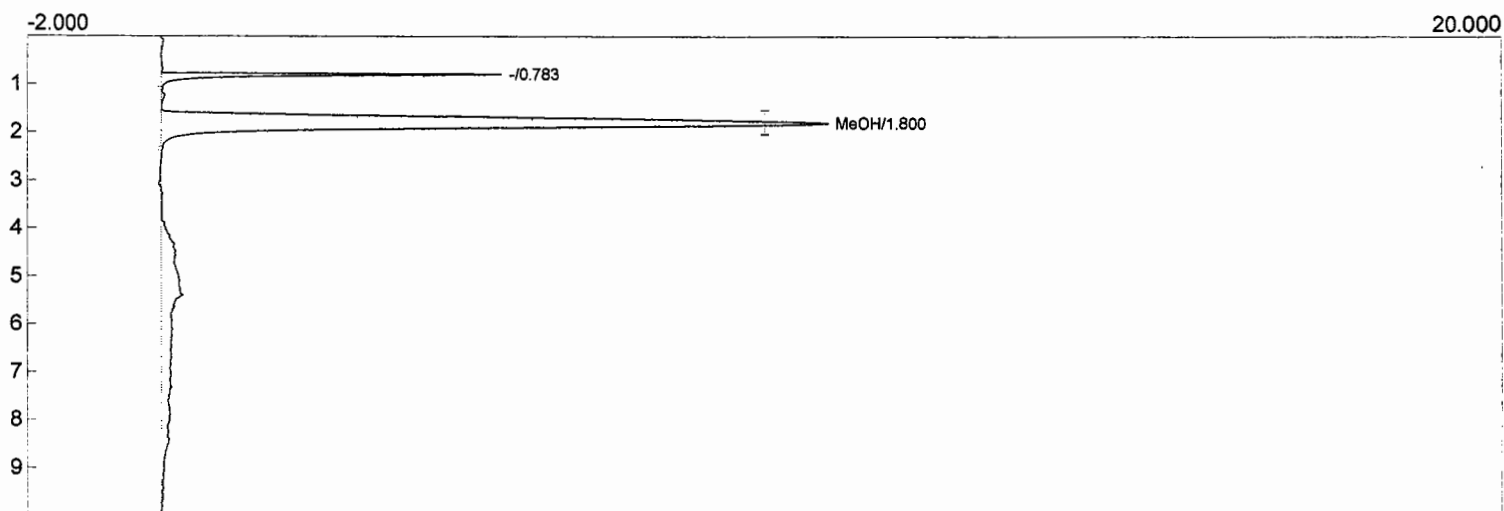
Component	Retention	Area
MeOH	1.796	135.2272
		135.2272

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/19/2011 15:26:16  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR176.CHR ()  
Sample: 50.0 ppm MeOH Std. - pre  
Operator: E. Vogt



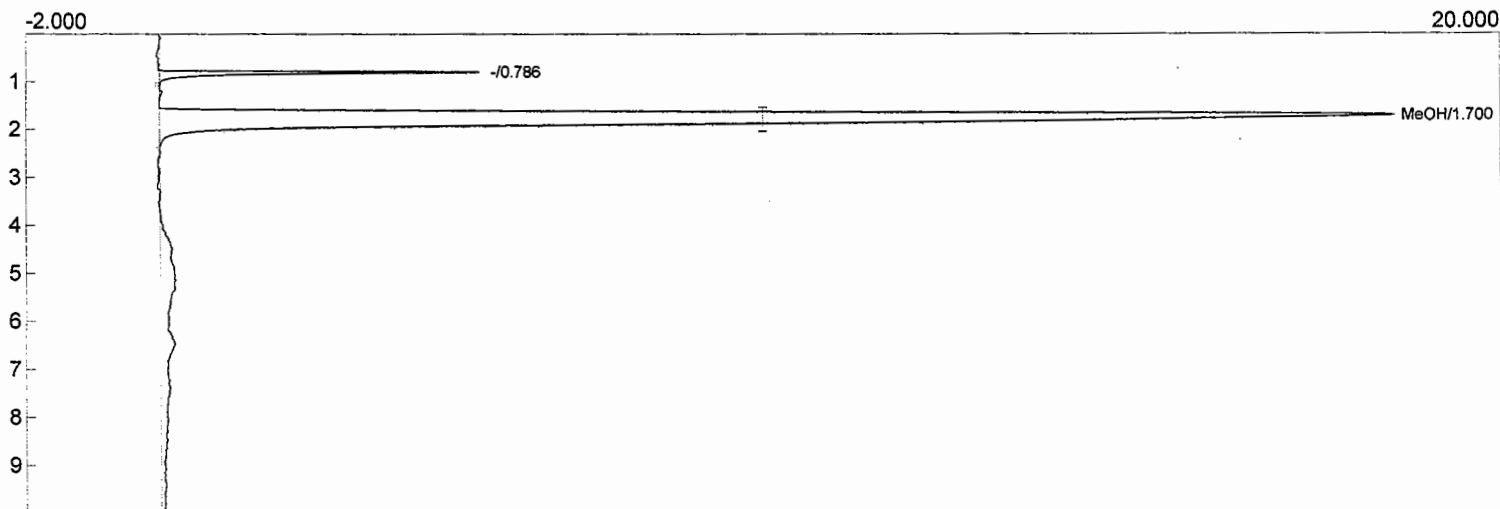
Component	Retention	Area
MeOH	1.723	136.2478
		136.2478

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/19/2011 15:44:04  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR177.CHR ()  
Sample: 50.0 ppm MeOH Std. - pre  
Operator: E. Vogt



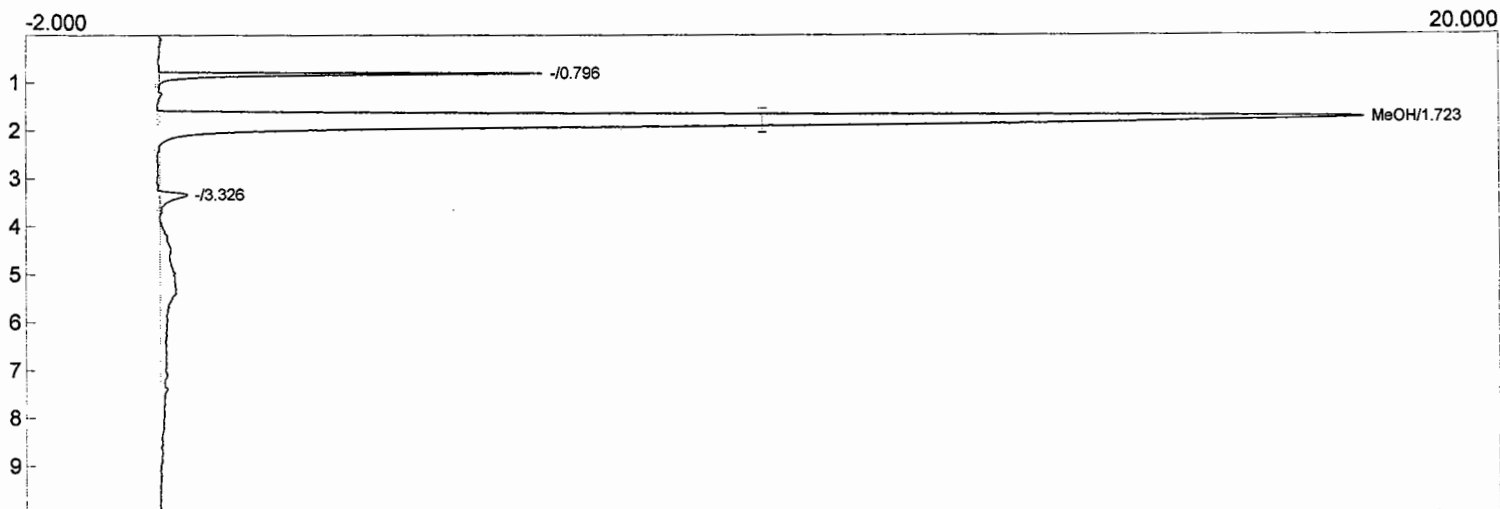
Component	Retention	Area
MeOH	1.800	139.3436
		139.3436

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/19/2011 16:01:05  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR178.CHR ()  
Sample: 100.0 ppm MeOH Std. - pre  
Operator: E. Vogt



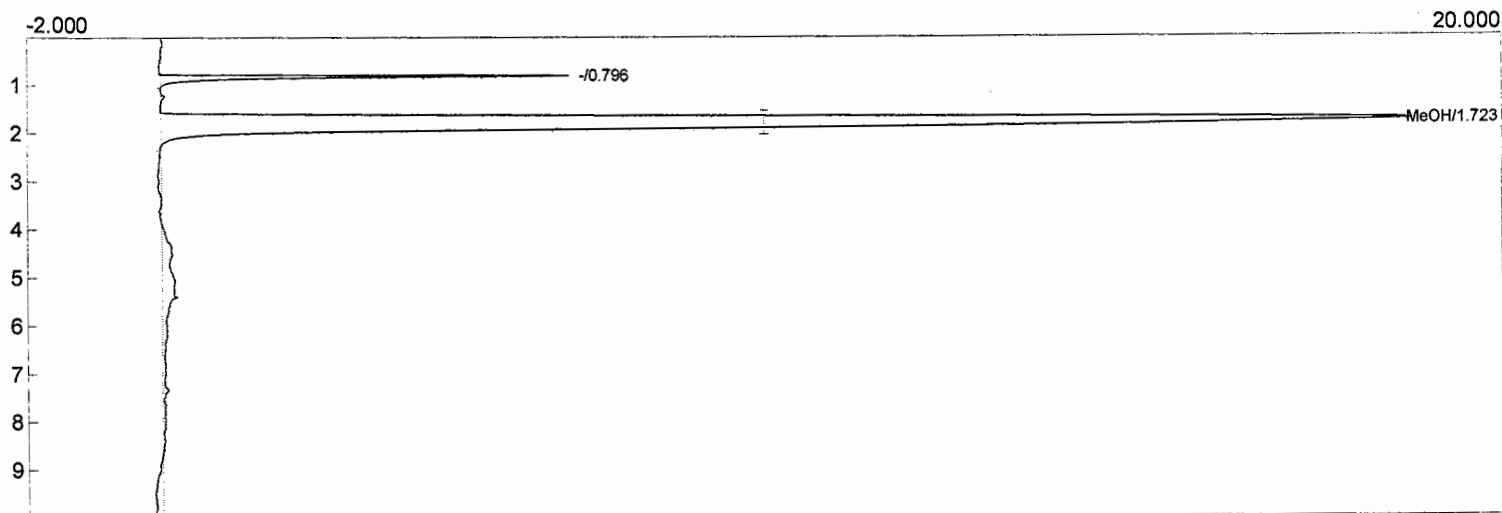
Component	Retention	Area
MeOH	1.700	266.5512
		266.5512

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/19/2011 16:18:37  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR179.CHR ()  
Sample: 100.0 ppm MeOH Std. - pre  
Operator: E. Vogt



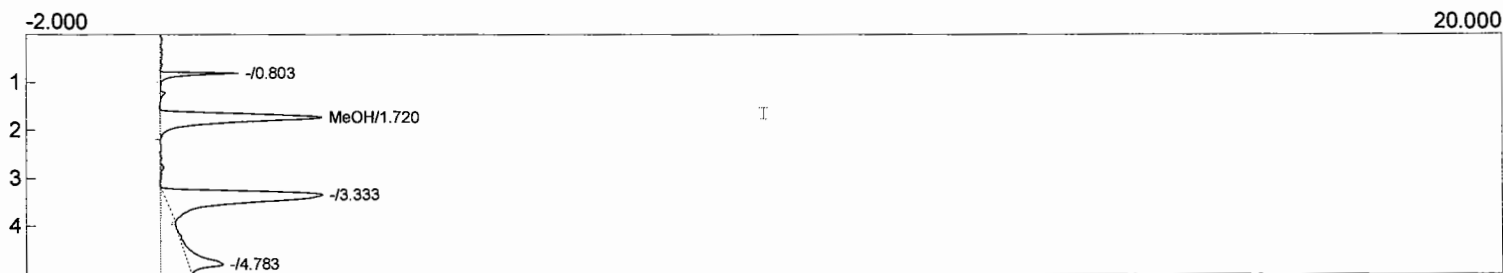
Component	Retention	Area
MeOH	1.723	271.1698
		271.1698

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/19/2011 16:36:23  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR180.CHR ()  
Sample: 100.0 ppm MeOH Std. - pre  
Operator: E. Vogt



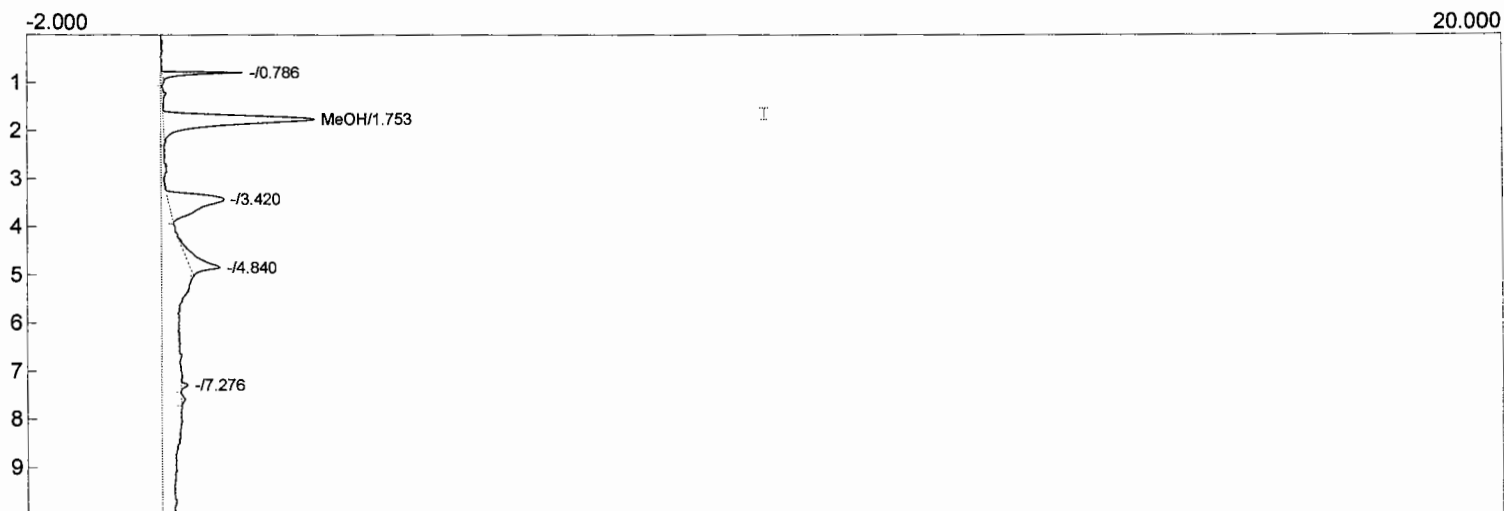
Component	Retention	Area
MeOH	1.723	272.7574
		272.7574

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/24/2011 11:13:26  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR310.CHR ()  
Sample: 10 ppm MeOH Std. - Post  
Operator: E. Vogt



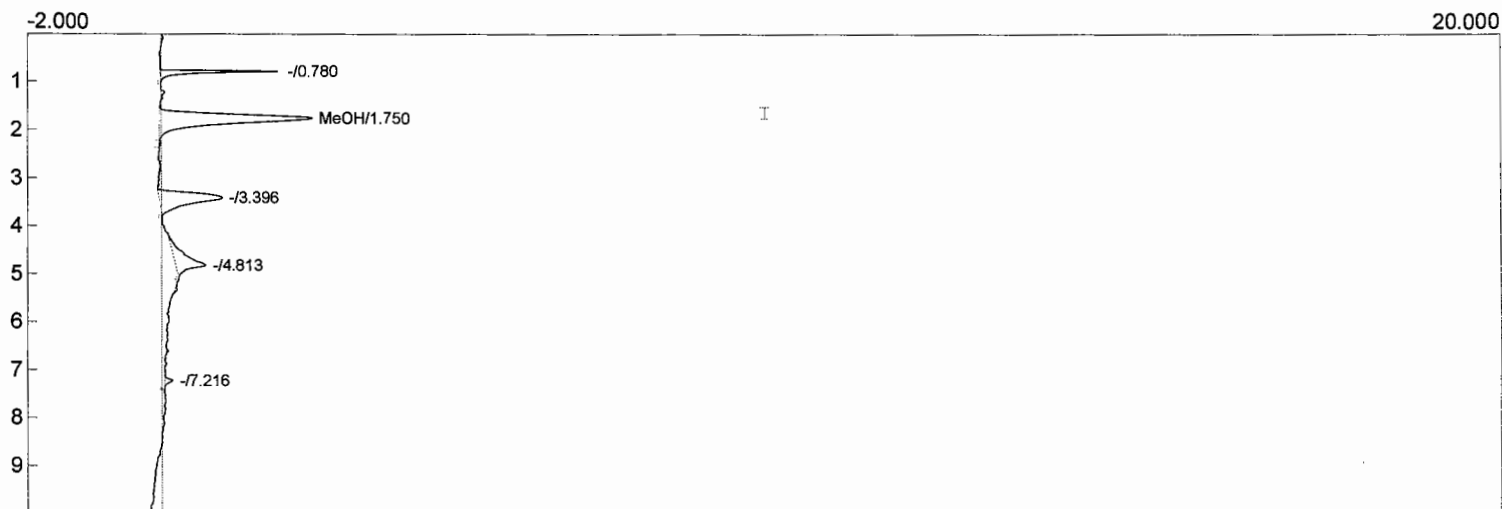
Component	Retention	Area
MeOH	1.720	27.9308
		27.9308

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/24/2011 11:30:10  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR311.CHR ()  
Sample: 10 ppm MeOH Std. - Post  
Operator: E. Vogt



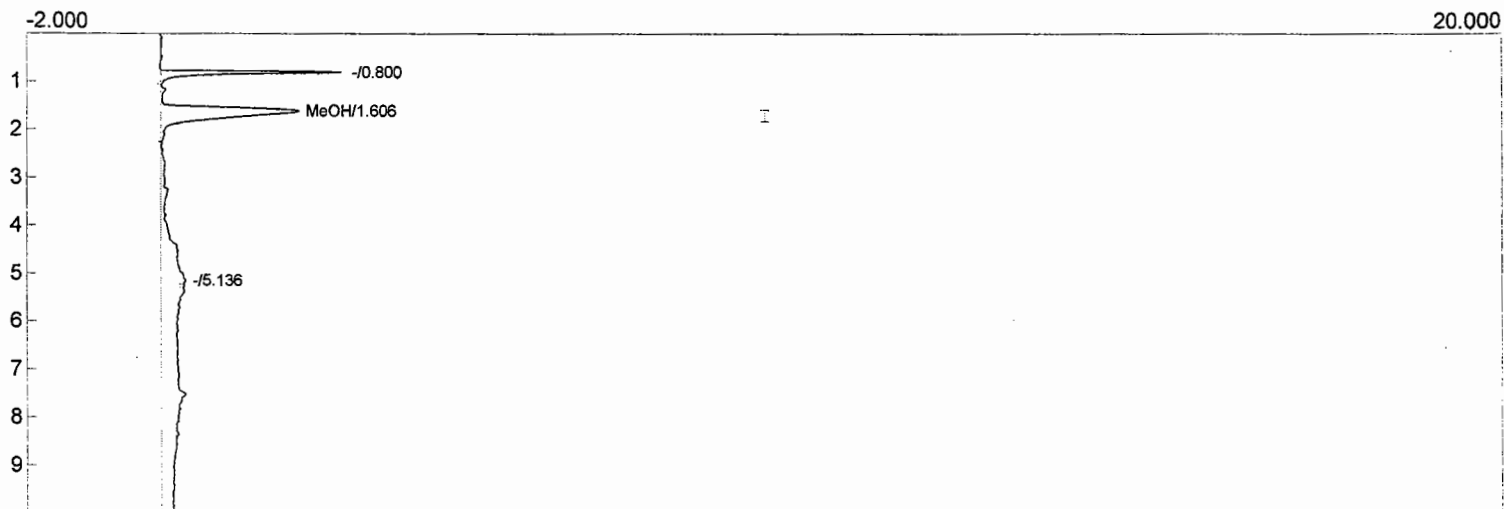
Component	Retention	Area
MeOH	1.753	28.1018
		28.1018

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/24/2011 11:47:22  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR312.CHR ()  
Sample: 10 ppm MeOH Std. - Post  
Operator: E. Vogt



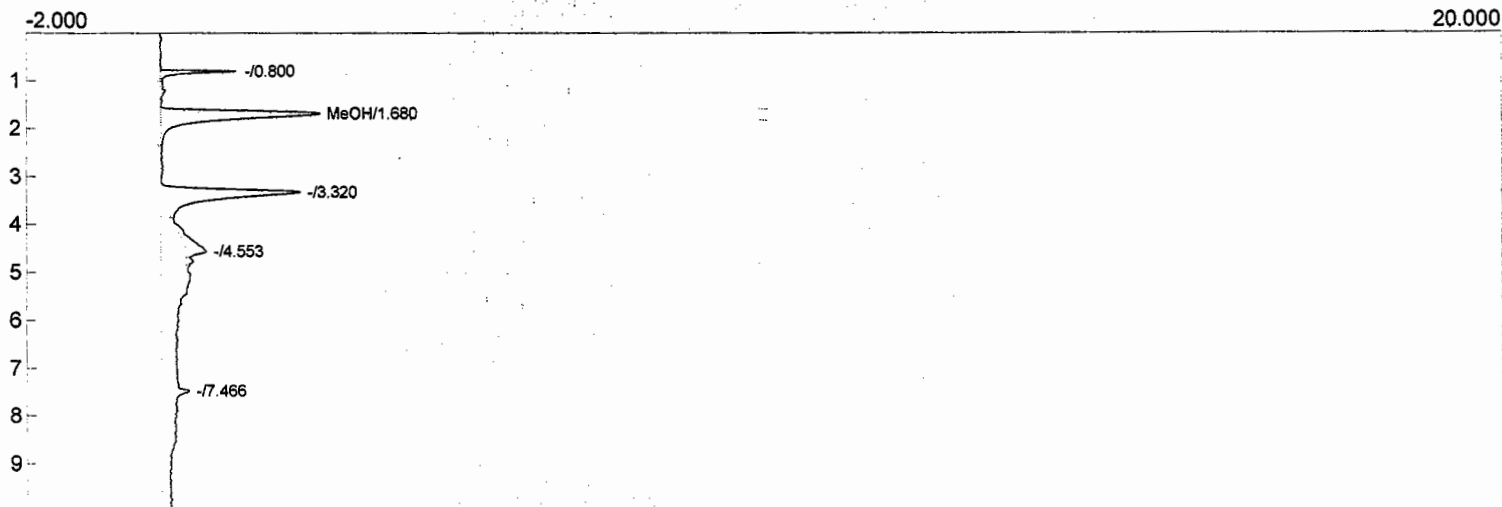
Component	Retention	Area
MeOH	1.750	28.6936
		28.6936

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/20/2011 10:41:17  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR232.CHR ()  
Sample: 10 ppm MeOH Check Std.  
Operator: E. Vogt



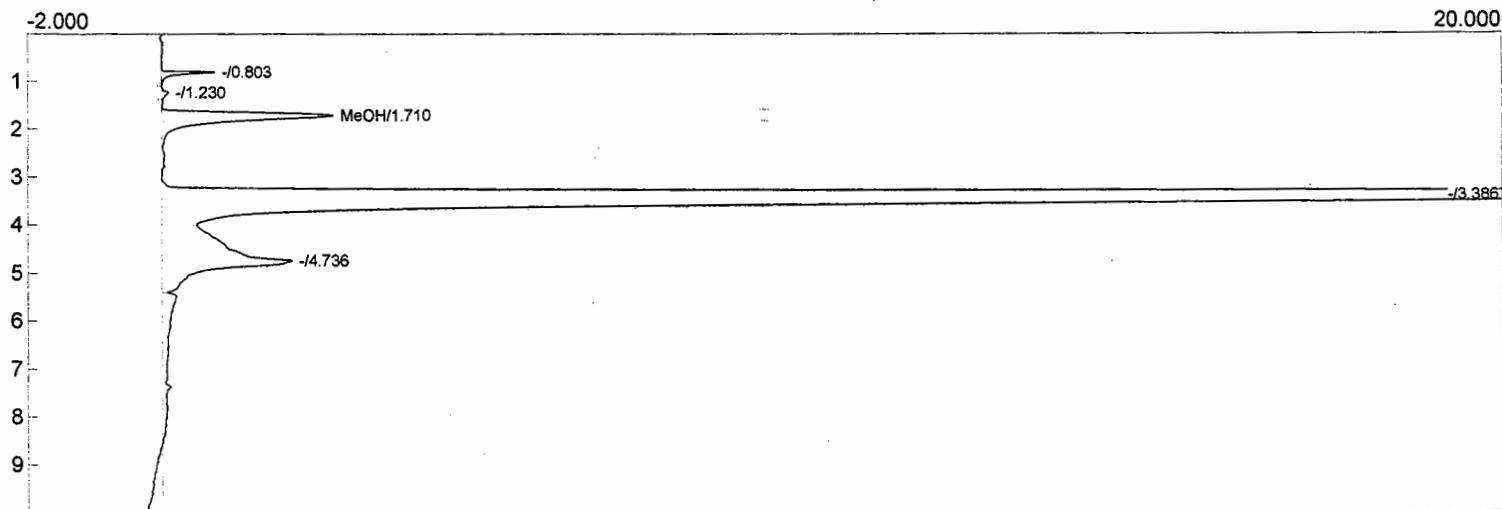
Component	Retention	Area
MeOH	1.606	27.4921
		27.4921

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/21/2011 08:28:29  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR255.CHR ()  
Sample: 10 ppm MeOH std. check  
Operator: E. Vogt  
Comments: 4 ml 3% n-propanol tube extraction volume



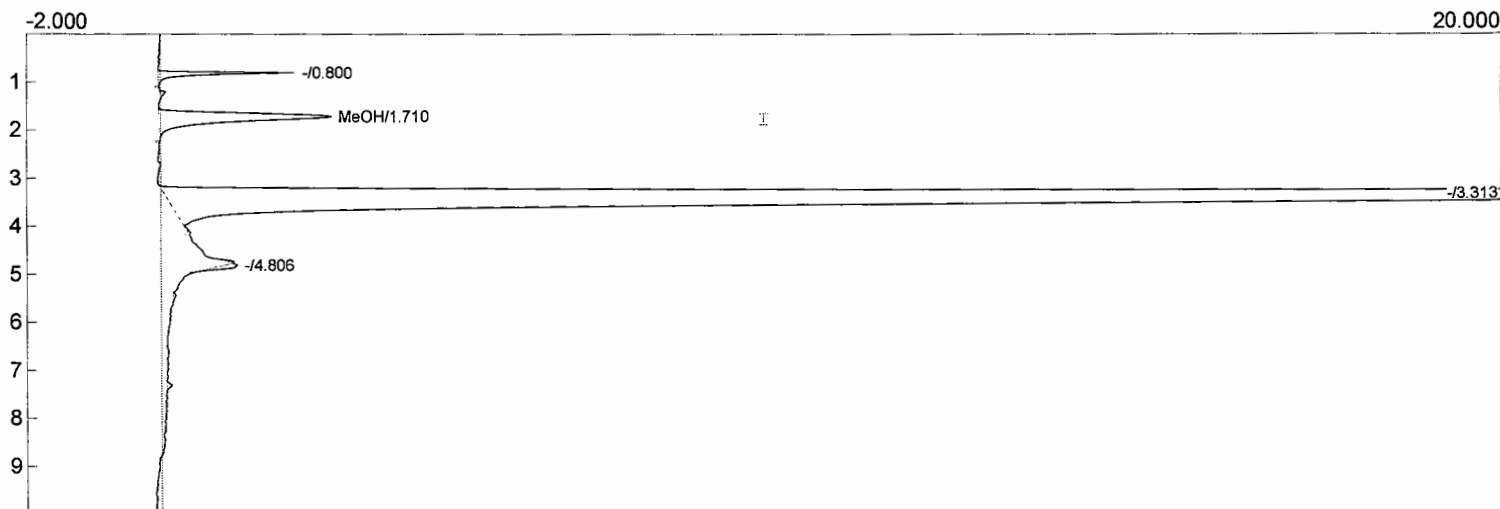
Component	Retention	Area
MeOH	1.680	28.4125
		28.4125

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/21/2011 16:02:53  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR279.CHR ()  
Sample: 10 ppm MeOH Std. - check  
Operator: E. Vogt  
Comments: 4 ml 3% n-propanol tube extraction volume



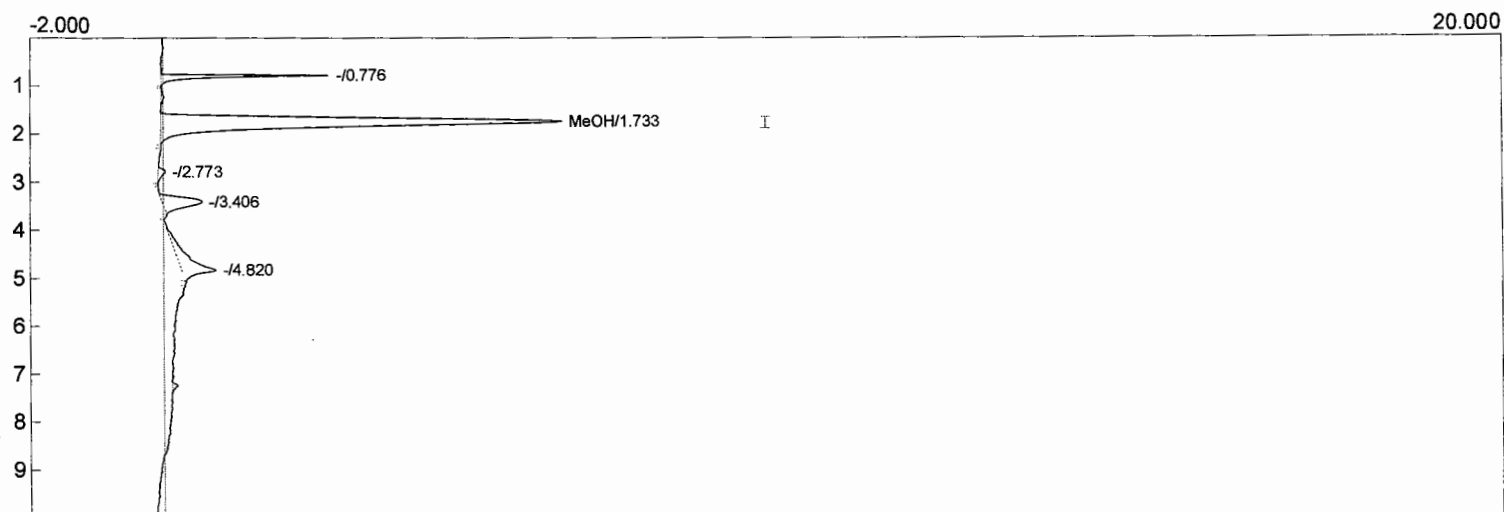
Component	Retention	Area
MeOH	1.710	29.2762
		29.2762

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/22/2011 10:57:17  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR305.chr ()  
Sample: 10 ppm MeOH std. - check  
Operator: E. Vogt



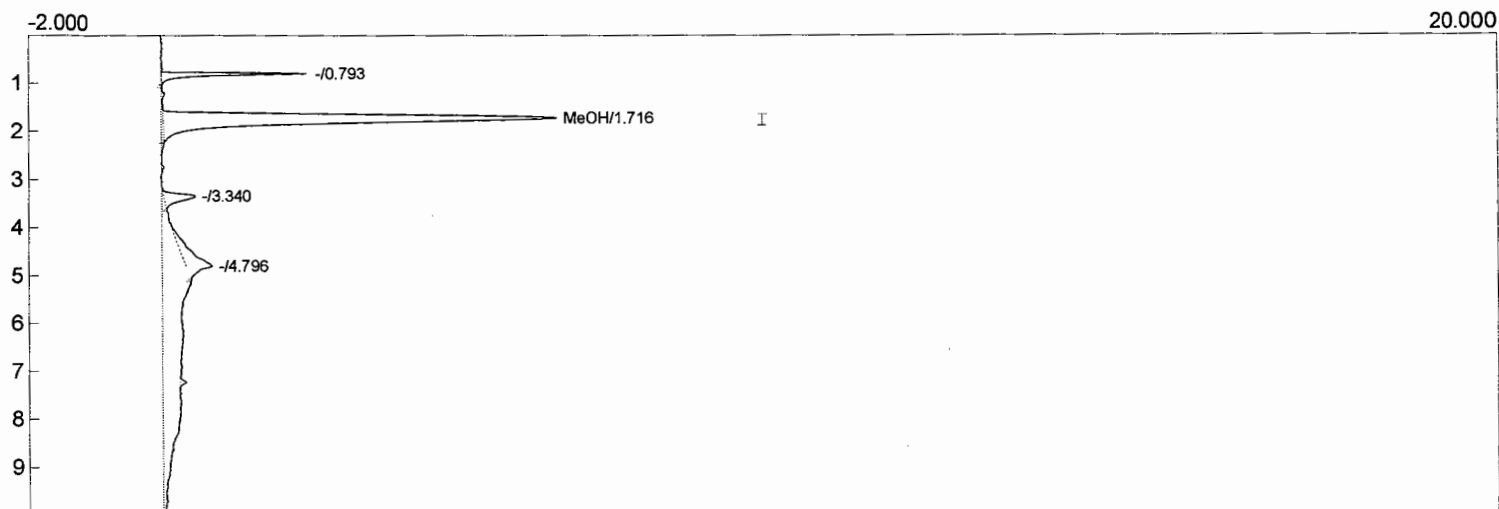
Component	Retention	Area
MeOH	1.710	29.6158
		29.6158

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/27/2011 16:45:30  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR317.CHR ()  
Sample: 25 ppm MeOH Sec. Std  
Operator: E. Vogt



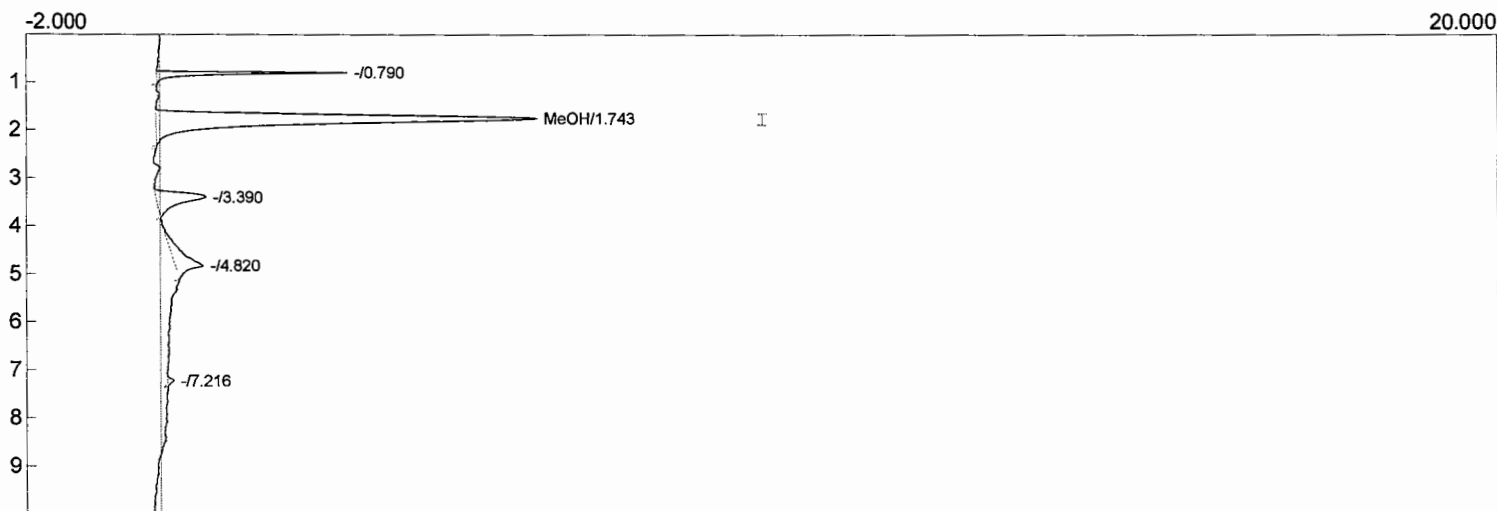
Component	Retention	Area
MeOH	1.733	72.4840
		72.4840

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/27/2011 16:26:51  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR316.CHR ()  
Sample: 25 ppm MeOH Sec. Std  
Operator: E. Vogt



Component	Retention	Area
MeOH	1.716	69.1308
		69.1308

Lab name: ARI Environmental  
Client: Valero, Port Arthur TX  
Analysis date: 07/27/2011 17:03:42  
Method: Syringe Injection  
Description: GC FID  
Carrier: HELIUM  
Data file: MEOH ICR318.CHR ()  
Sample: 25 ppm MeOH Sec. Std  
Operator: E. Vogt



Component	Retention	Area
MeOH	1.743	71.0927
		71.0927

# ANALYTICAL SUMMARY

**CLIENT:**  
**LOCATION:**  
**SAMPLE DATES:**  
**ANALYSIS:**  
**METHOD:**

Valero  
 Port Arthur, TX  
 6/15/11 - 6/16/11  
 Formaldehyde, SRU-544  
 8315A

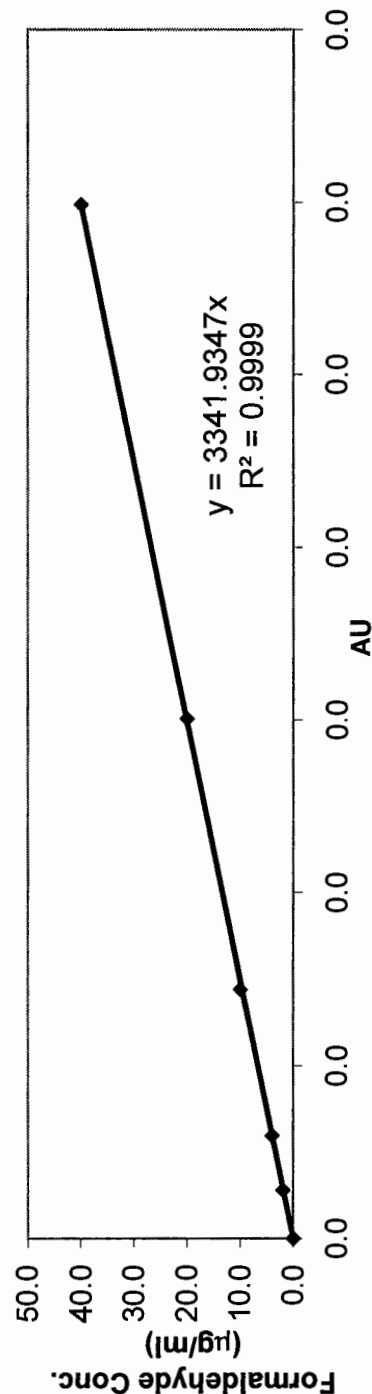
Analyst: J. Ruggaber  
 Date of Completion: 8/2/2011  
 Template Control ID: SW846-M0011-Aldehydes-Template-65T-Rev1

Std. (µg/ml)	Cal (AU*min)	RE	Cal Conc	% Dif	CCVs Conc. (µg/ml)	Area (AU*min)	Cal Conc.	% Dif
2.0	0.00056	0.00028	1.9	-6.43	9.99	0.00337	11.26	12.7
4.0	0.00119	0.00030	4.0	-0.58	9.99	0.00332	11.10	11.1
10.0	0.00288	0.00029	9.6	-3.76	9.99	0.00338	11.30	13.1
20.0	0.00601	0.00030	20.1	0.42	19.98	0.00630	21.05	5.4
40.0	0.01197	0.00030	40.8	2.12	19.98	0.00592	19.78	-1.0

## Sample Concentration Calculations

ID	Analysis 1 (AU*min)	Analysis 2 (AU*min)	Average (AU*min)	Concentration (µg/ml)	Deviation (%)	Dilution Factor	Aliquot volume(ml)	Aliquot Mass (µg)	Sample Mass (µg)
SRU-544-2	0.00557	0.00551	0.00554	18.51	-0.54	2	25	925.7	2314.3
SRU-544-3	0.00689	0.00689	0.00689	23.03	0.00	2	25	1151.3	2878.2
SRU-544-4	0.00533	0.00546	0.00540	18.03	1.20	2	25	901.5	2253.7
SRU-544-blank	0.00314	0.00322	0.00318	10.63	1.26	5	25	1328.4	3321.0
DNPH blank	0.00171	0.00165	0.00168	5.61	-1.79	1	-	-	-
HPLC water blank	<0.00011	<0.00011	<0.00011	<0.37	0.00	1	-	-	-
Lab acetonitrile blank	<0.00011	<0.00011	<0.00011	<0.37	0.00	1	-	-	-

## Formaldehyde Calibration Curve



## ANALYTICAL SUMMARY

## CLIENT:

Valero

## LOCATION:

Port Arthur, TX

## SAMPLE DATES:

6/15/11 - 6/16/11

## ANALYSIS:

Acetaldehyde, SRU-544

## METHOD:

8315A

Analyst: J. Ruggaber

Date of Completion: 8/2/2011

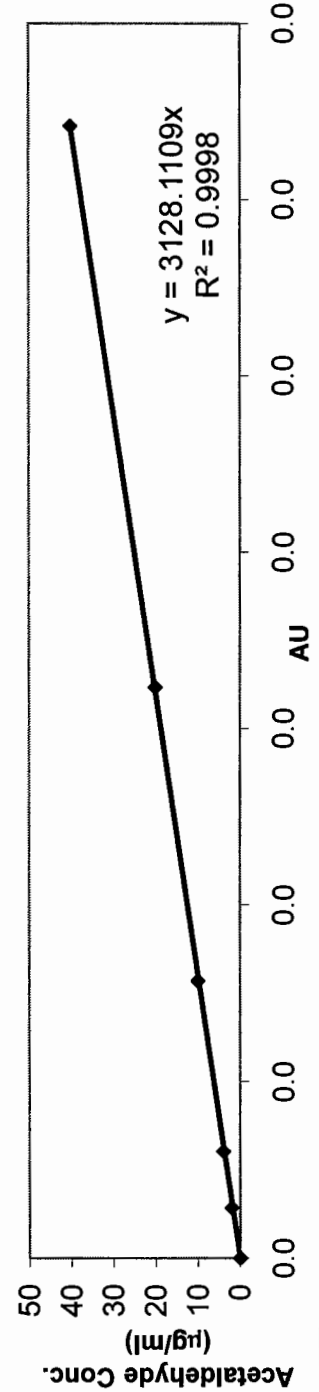
Template Control ID: SW846-M0011-Aldehydes-Template-65T-Rev1

Std. ( $\mu\text{g/ml}$ )	Cal (AU*min)	RE	Cal Conc	% Dif	CCVs Conc. ( $\mu\text{g/ml}$ )	Area (AU*min)	Cal. Conc.	% Dif
2.0	0.00057	0.00028	1.8	-11.21	10.04	0.00336	10.51	4.7
4.0	0.00121	0.00030	3.8	-5.76	10.04	0.00358	11.20	11.5
10.0	0.00314	0.00031	9.8	-2.18	10.04	0.00351	10.98	9.4
20.1	0.00647	0.00032	20.2	0.78	20.08	0.00658	20.58	2.5
40.2	0.01284	0.00032	41.7	3.82	20.08	0.00624	19.52	-2.8
<b>0.00031</b>								

## Sample Concentration Calculations

ID	Analysis 1 (AU*min)	Analysis 2 (AU*min)	Average (AU*min)	Concentration ( $\mu\text{g/ml}$ )	Deviation (%)	Dilution Factor	Aliquot volume(ml)	Aliquot Mass ( $\mu\text{g}$ )	Sample Mass ( $\mu\text{g}$ )
SRU-544-2	0.00298	0.00297	0.00298	9.31	-0.17	1	25	232.7	581.6
SRU-544-3	0.00273	0.00281	0.00277	8.66	1.44	1	25	216.6	541.6
SRU-544-4	0.00242	0.00245	0.00244	7.62	0.62	1	25	190.4	476.1
SRU-544-blank	0.00285	0.00291	0.00288	9.01	1.04	1	25	225.2	563.1
DNPH blank	0.00025	0.00023	0.0002	0.75	-4.17	1	-	-	-
HPLC water blank	<0.00011	<0.00011	<0.00011	<0.37	0.00	1	-	-	-
Lab acetonitrile blank	<0.00011	<0.00011	<0.00011	<0.37	0.00	1	-	-	-

## Acetaldehyde Calibration Curve



# ANALYTICAL SUMMARY

**CLIENT:** Valero  
**LOCATION:** Port Arthur, TX  
**SAMPLE DATES:** 6/15/11 - 6/16/11  
**ANALYSIS:** Propanal, SRU-544  
**METHOD:** 8315A

**Analyst:** J. Ruggaber  
**Date of Completion:** 8/2/2011  
**Template Control ID:** SW846-M0011-Aldehydes-Template-65T-Rev1

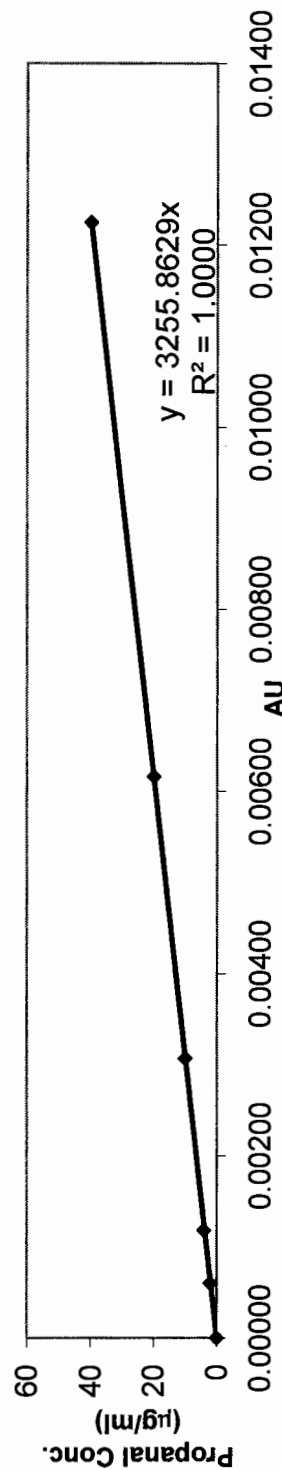
Std.	Cal	RE	Cal Conc	% Dif	CCVs	Conc. (µg/ml)	Area (AU*min)	Cal. Conc.	% Dif
(µg/ml)	(AU*min)								
2.0	0.00060	0.00030	2.0	-2.04	9.98	0.00348	11.33	11.33	13.5
4.0	0.00118	0.00030	3.8	-3.67	9.98	0.00351	11.43	11.43	14.5
10.0	0.00307	0.00031	10.0	0.24	9.98	0.00350	11.40	11.40	14.2
20.0	0.00616	0.00031	20.1	0.57	19.96	0.00632	20.58	20.58	3.1
39.9	0.01225	0.00031	40.3	0.99	19.96	0.00604	19.67	19.67	-1.5

mean RF --> 0.00030

## Sample Concentration Calculations

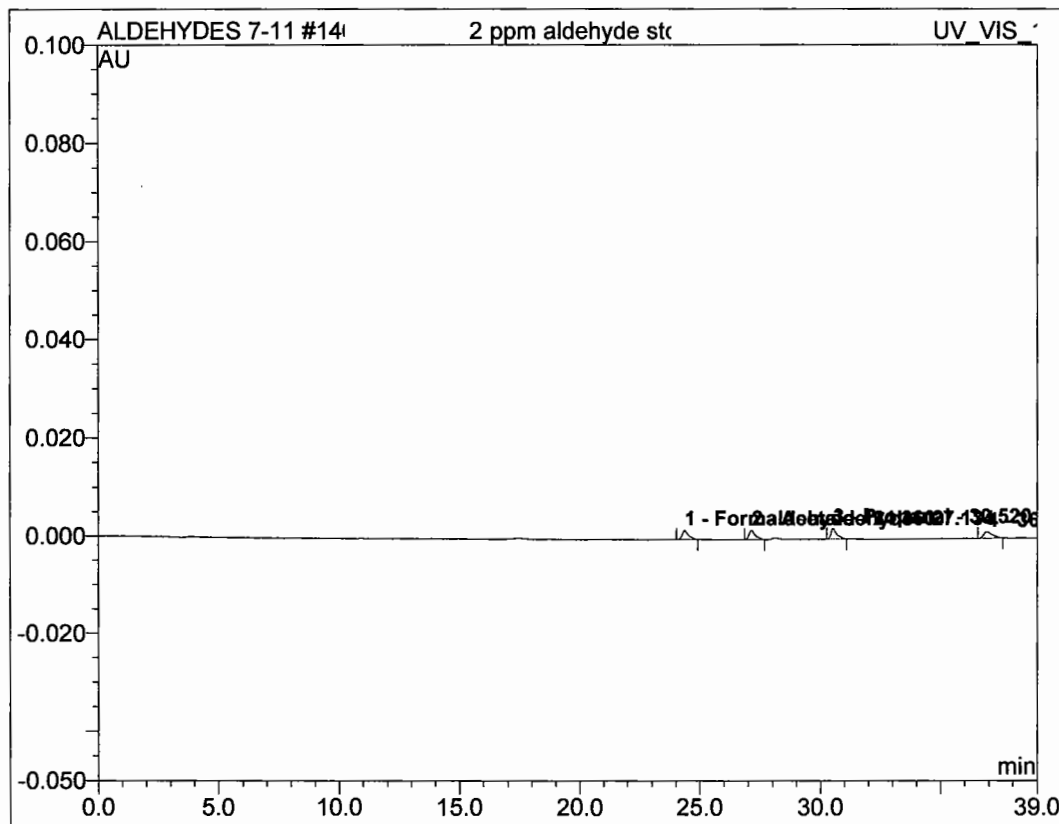
ID	Analysis 1 (AU*min)	Analysis 2 (AU*min)	Average (AU*min)	Concentration (µg/ml)	Deviation (%)	Dilution Factor	Aliquot volume(ml)	Aliquot Mass (µg)	Sample Mass (µg)
SRU-544-2	<0.00011	<0.00011	<0.00011	<0.36	0.00	1	25	<9.0	<22.4
SRU-544-3	<0.00011	<0.00011	<0.00011	<0.36	0.00	1	25	<9.0	<22.4
SRU-544-4	0.00011	0.00012	0.00012	0.37	4.35	1	25	9.4	23.4
SRU-544-blank	0.00049	0.00050	0.00050	1.61	1.01	1	25	40.3	100.7
DNPH blank	<0.00011	<0.00011	<0.00011	<0.37	0.00	1	-	-	-
HPLC water blank	<0.00011	<0.00011	<0.00011	<0.37	0.00	1	-	-	-
Lab acetonitrile blank	<0.00011	<0.00011	<0.00011	<0.37	0.00	1	-	-	-

## Propanal Calibration Curve



# 146 2 ppm aldehyde std

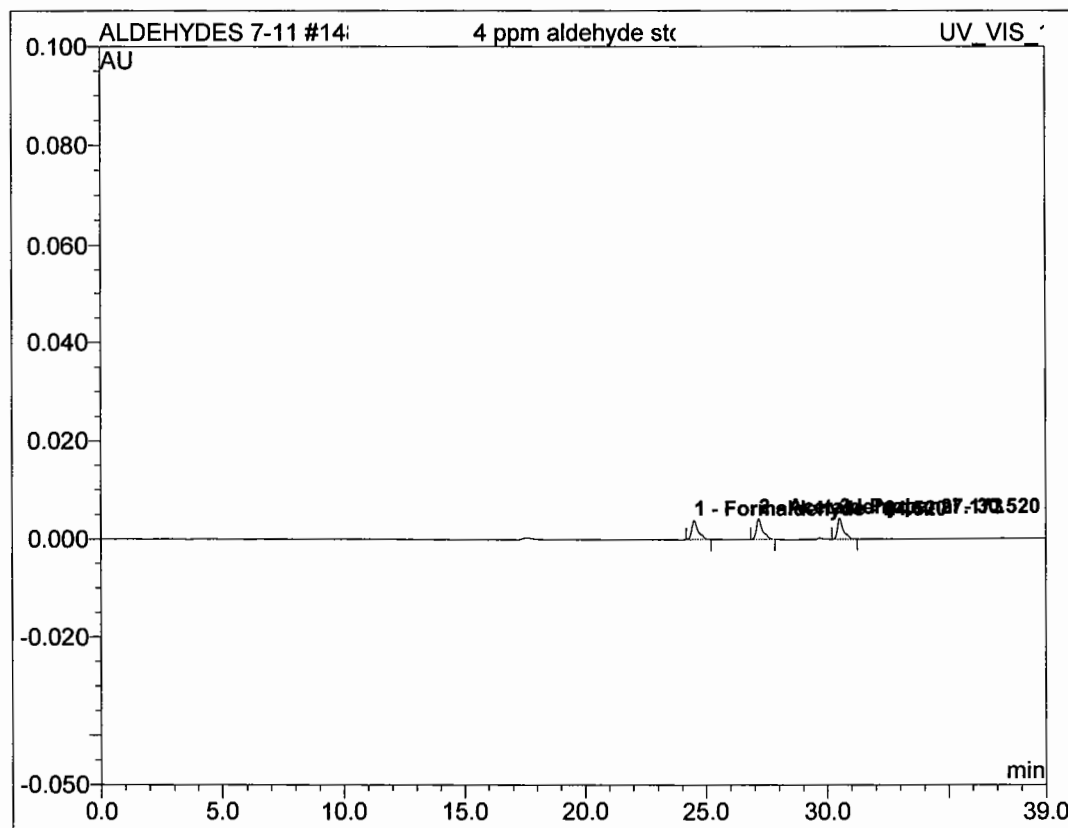
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	standard		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	7/30/2011 13:30		1.0000
Run Time (min):	39.00		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
1	24.36	Formaldehyde	0.0019	0.00056
2	27.13	Acetaldehyde	0.0019	0.00057
3	30.52	Propanal	0.0022	0.00060
Total:			0.006	0.350

# 148 4 ppm aldehyde std

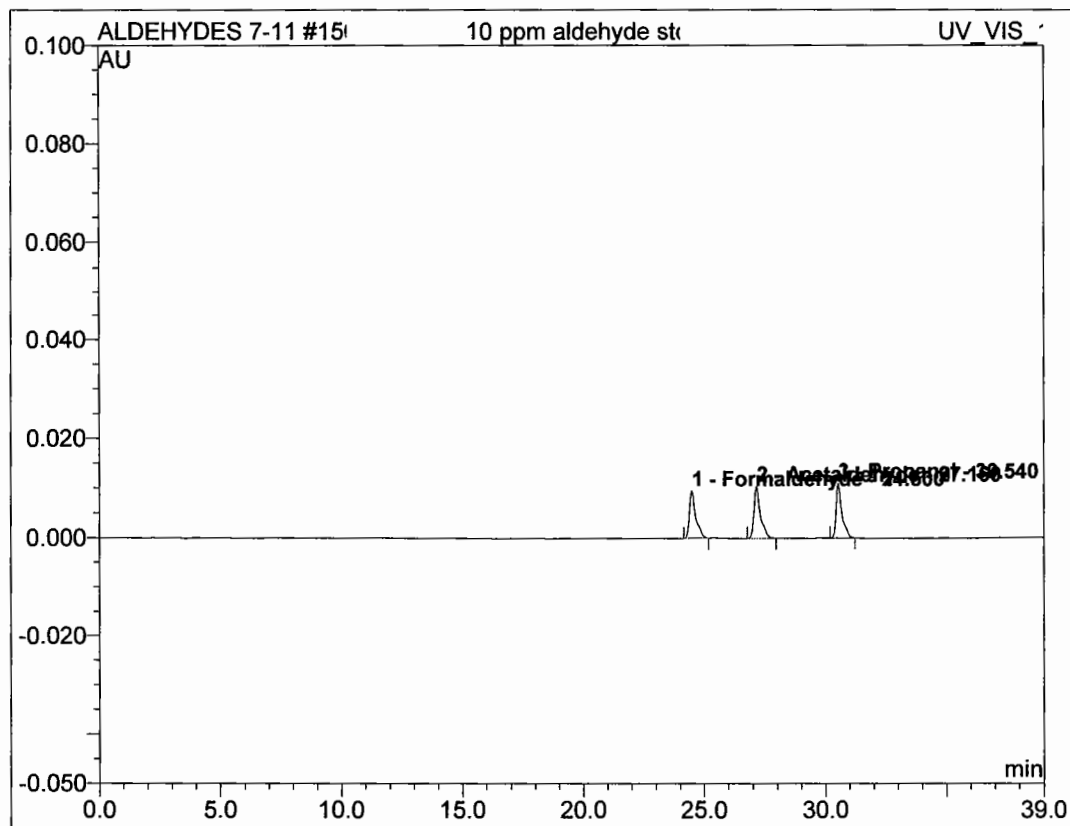
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	standard		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	7/30/2011 14:58		1.0000
Run Time (min):	39.00		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
1	24.52	Formaldehyde	0.0039	0.00119
2	27.17	Acetaldehyde	0.0042	0.00121
3	30.52	Propanal	0.0043	0.00118
<b>Total:</b>			0.012	0.781

# 150 10 ppm aldehyde std

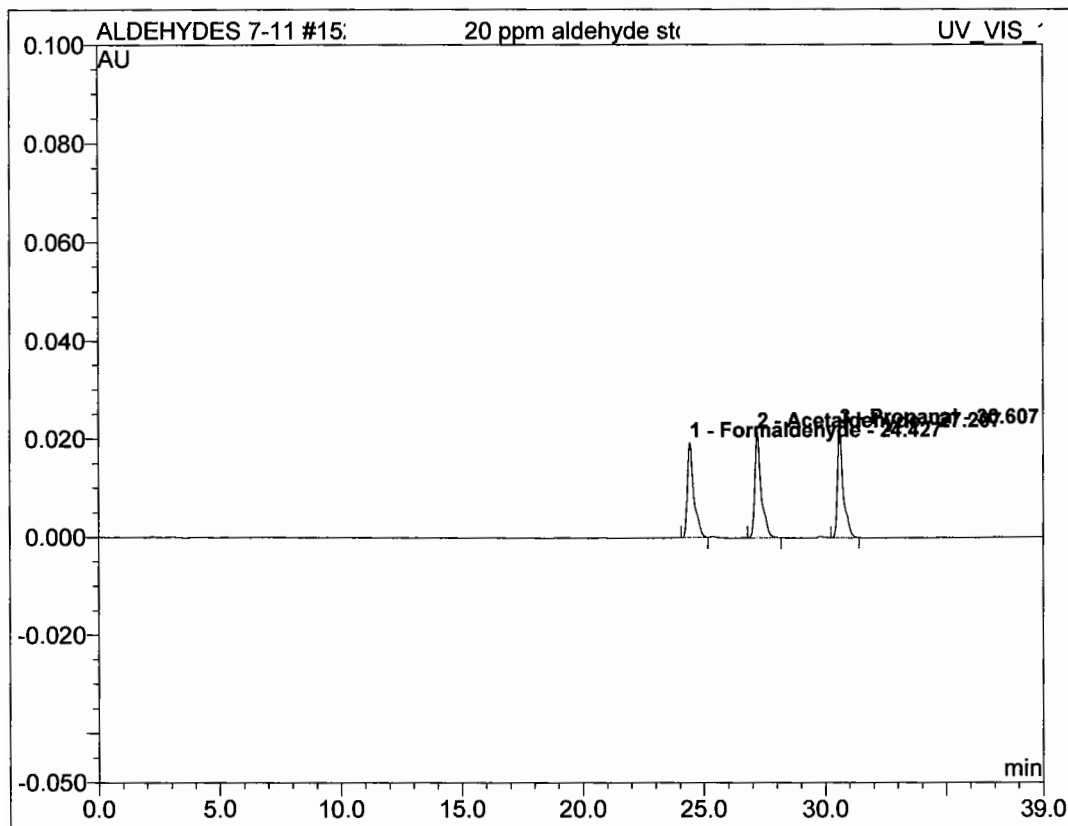
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	standard		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	7/30/2011 16:26		1.0000
Run Time (min):	39.00		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
1	24.50	Formaldehyde	0.0095	0.00288
2	27.16	Acetaldehyde	0.0103	0.00314
3	30.54	Propanal	0.0110	0.00307
Total:			0.031	1.981

## 152 20 ppm aldehyde std

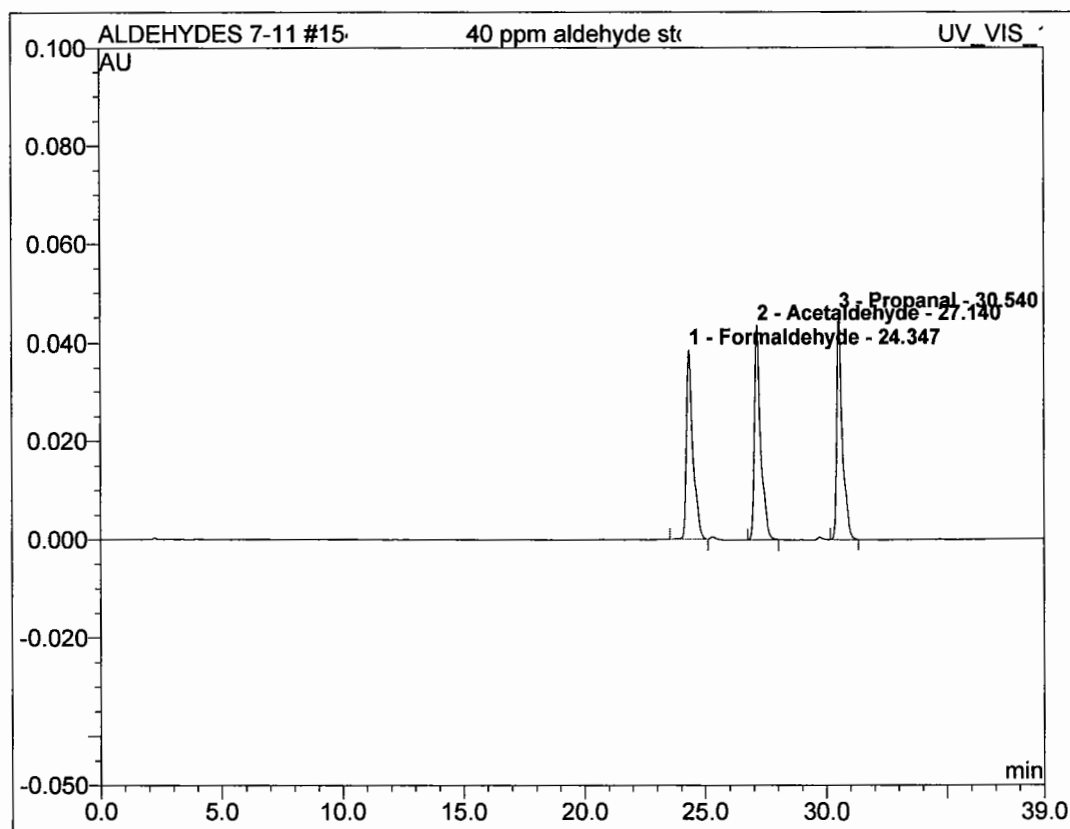
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	standard		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	7/30/2011 17:55		1.0000
Run Time (min):	39.00		1.0000



No.	Ret. Time min	Peak Name	Height AU	Area AU*min
1	24.43	Formaldehyde	0.0194	0.00601
2	27.21	Acetaldehyde	0.0214	0.00647
3	30.61	Propanal	0.0221	0.00616
<b>Total:</b>			0.063	4.069

# 154 40 ppm aldehyde std

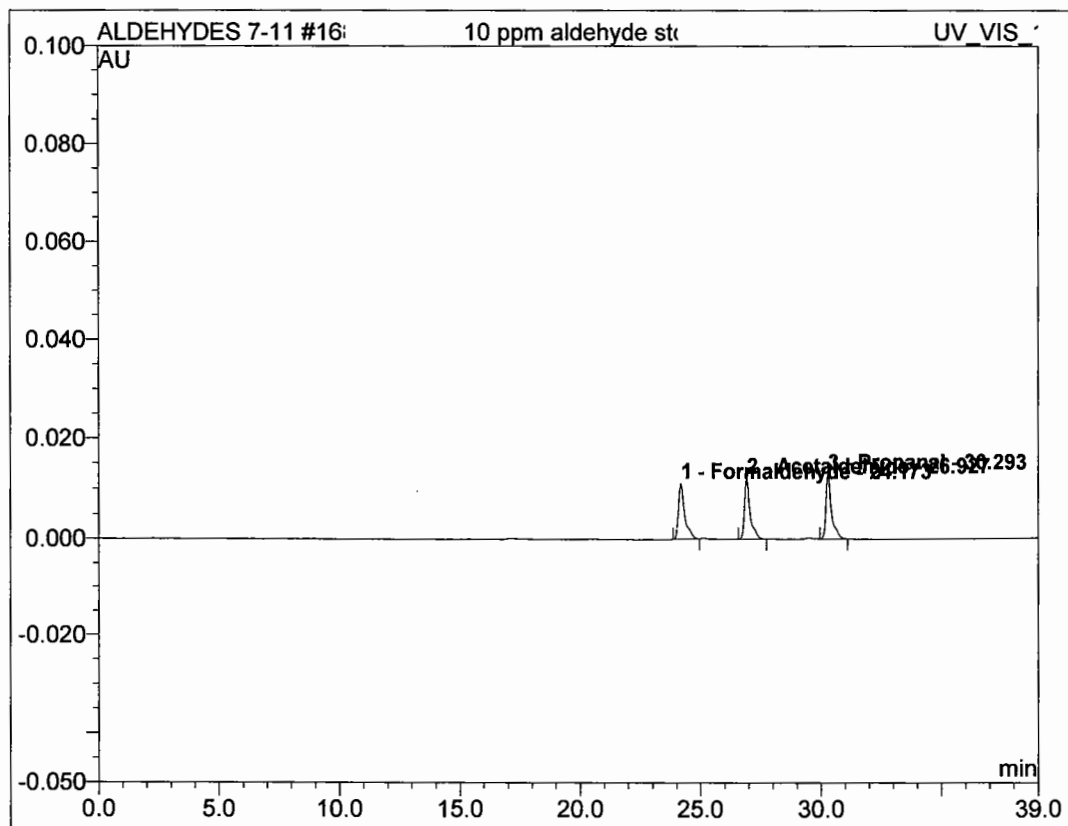
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	standard		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	7/30/2011 19:23		1.0000
Run Time (min):	39.00		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
1	24.35	Formaldehyde	0.0387	0.01197
2	27.14	Acetaldehyde	0.0436	0.01284
3	30.54	Propanal	0.0460	0.01225
<b>Total:</b>			0.128	8.089

# 168 10 ppm aldehyde std

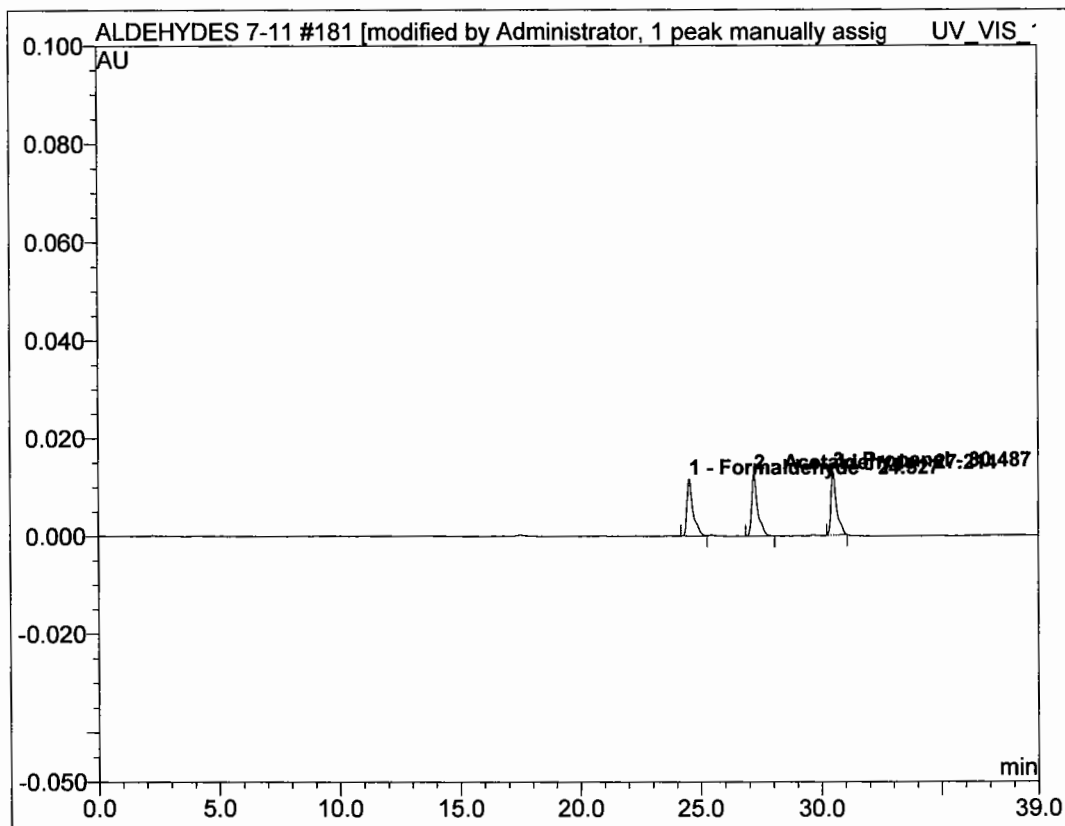
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	standard		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldededehydes		1.0000
Recording Time:	7/31/2011 5:40		1.0000
Run Time (min):	39.00		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
1	24.17	Formaldehyde	0.0111	0.00337
2	26.93	Acetaldehyde	0.0121	0.00336
3	30.29	Propanal	0.0128	0.00348
Total:			0.036	2.084

# 181 10 ppm aldehyde std

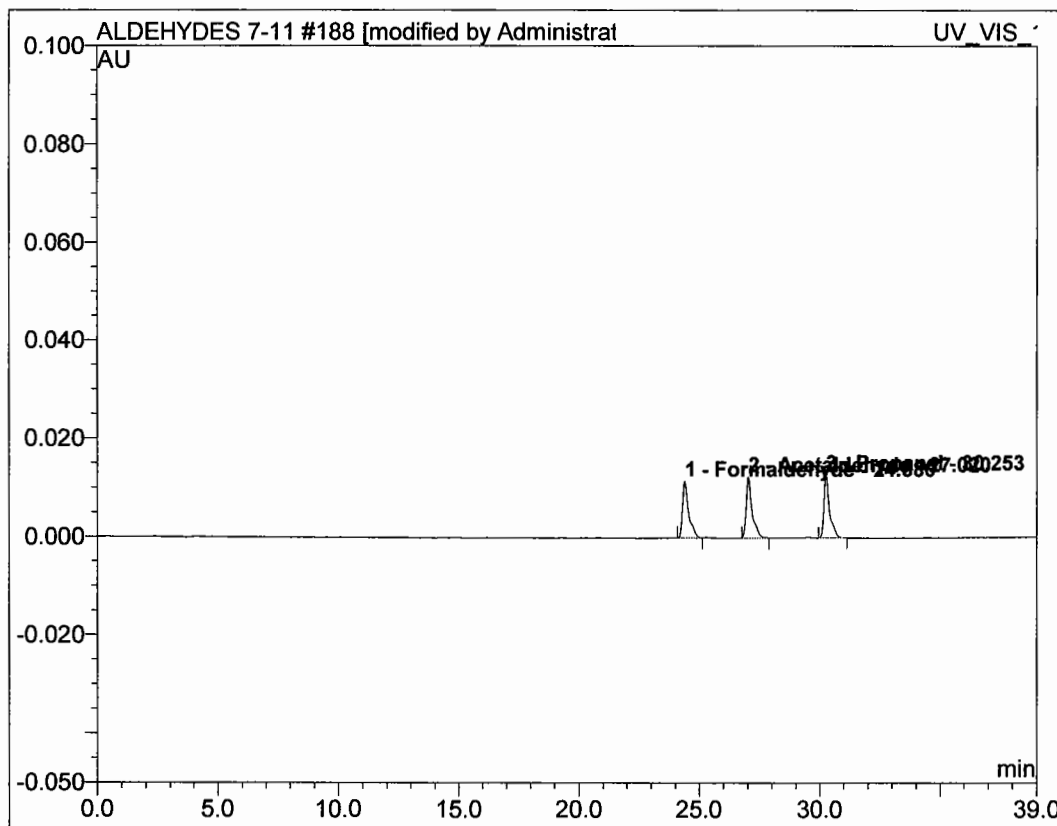
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	standard		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	7/31/2011 15:14		1.0000
Run Time (min):	39.00		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
1	24.53	Formaldehyde	0.0116	0.00332
2	27.21	Acetaldehyde	0.0126	0.00358
3	30.49	Propanal	0.0129	0.00351
Total:			0.037	2.110

# 188 10 ppm aldehyde std

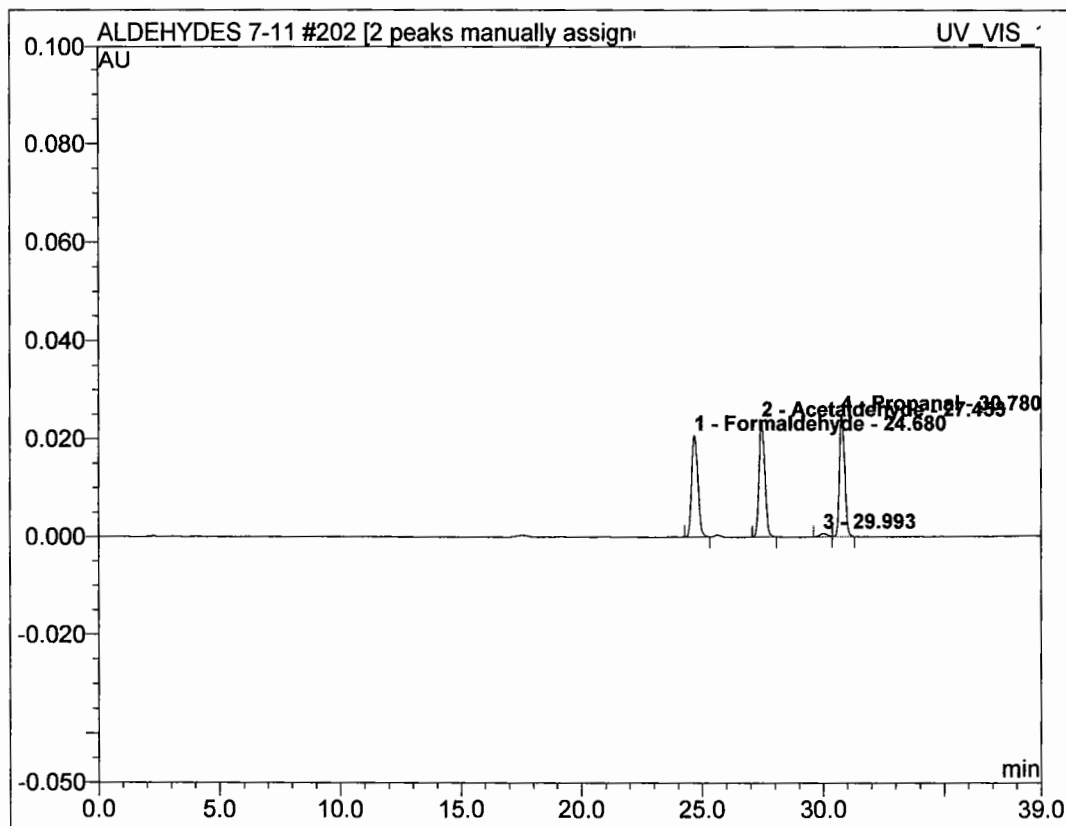
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	standard		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	7/31/2011 20:23		1.0000
Run Time (min):	39.00		1.0000



No.	Ret. Time min	Peak Name	Height AU	Area AU*min
1	24.38	Formaldehyde	0.0114	0.00338
2	27.02	Acetaldehyde	0.0124	0.00351
3	30.25	Propanal	0.0128	0.00350
Total:			0.037	2.106

## 202 20 ppm aldehyde std

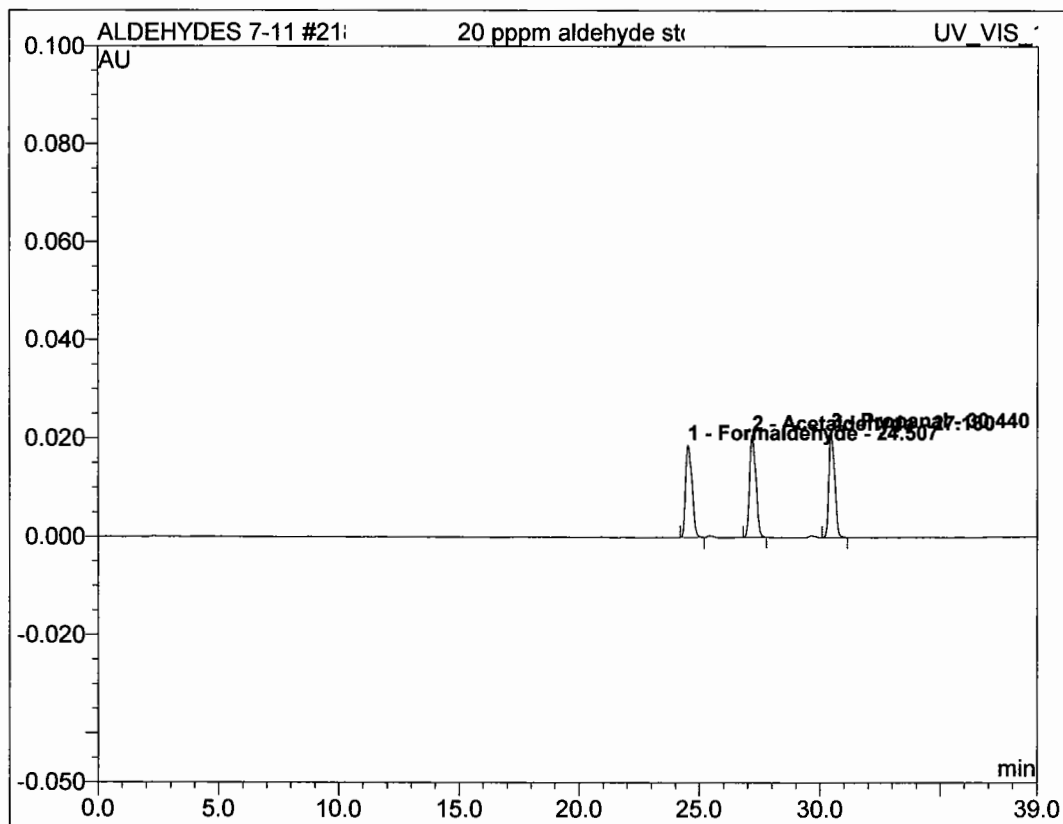
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	standard		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	8/1/2011 19:01		1.0000
Run Time (min):	39.00		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
1	24.68	Formaldehyde	0.0207	0.00630
2	27.45	Acetaldehyde	0.0235	0.00658
4	30.78	Propanal	0.0247	0.00632
Total:			0.069	3.907

## 218 20 ppm aldehyde std

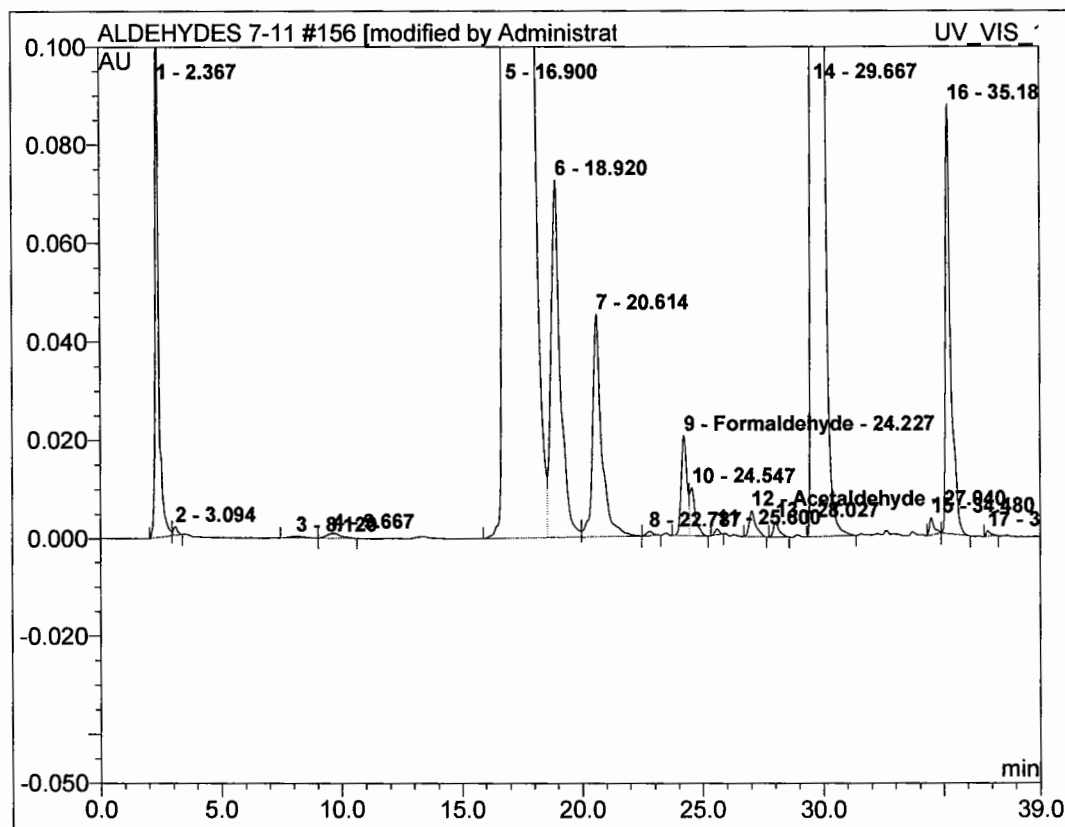
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	standard		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	8/2/2011 12:26		1.0000
Run Time (min):	39.00		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
1	24.51	Formaldehyde	0.0188	0.00592
2	27.16	Acetaldehyde	0.0207	0.00624
3	30.44	Propanal	0.0213	0.00604
Total:			0.061	3.690

# 156 SRU-544-2 2X

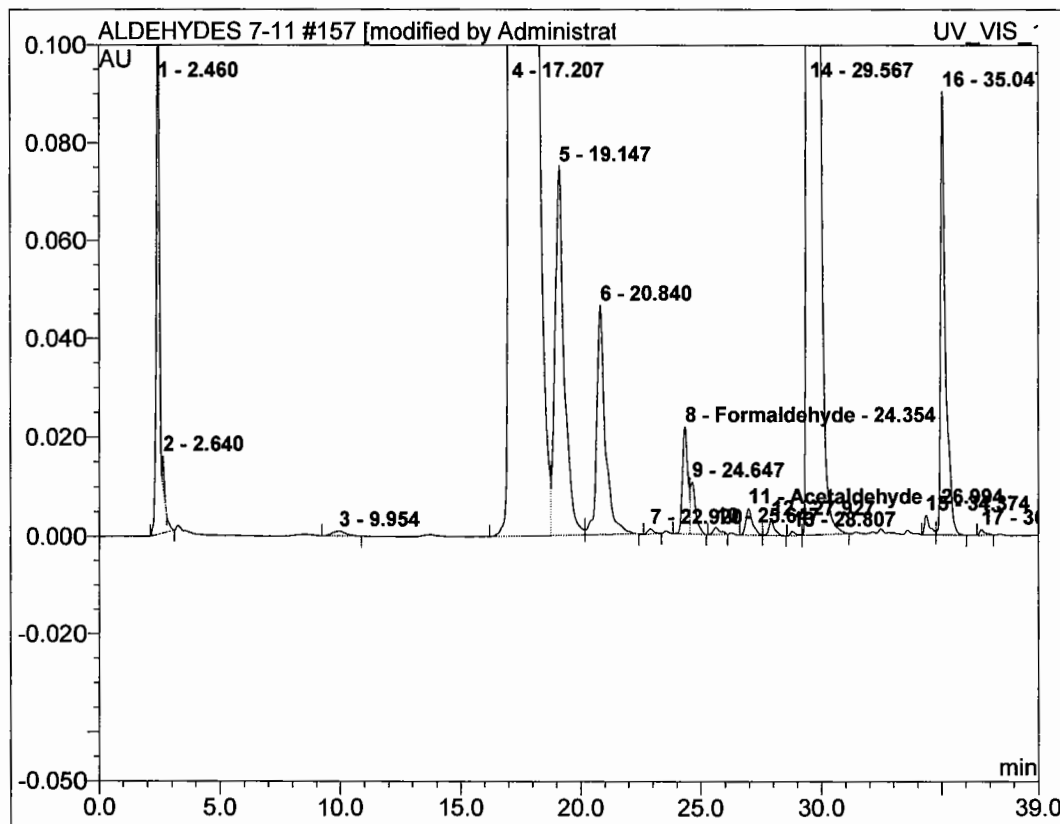
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	unknown		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	7/30/2011 20:51		1.0000
Run Time (min):	39.00		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
9	24.23	Formaldehyde	0.0204	0.00557
12	27.04	Acetaldehyde	0.0053	0.00169
Total:			0.026	1.551

# 157 SRU-544-2 2X

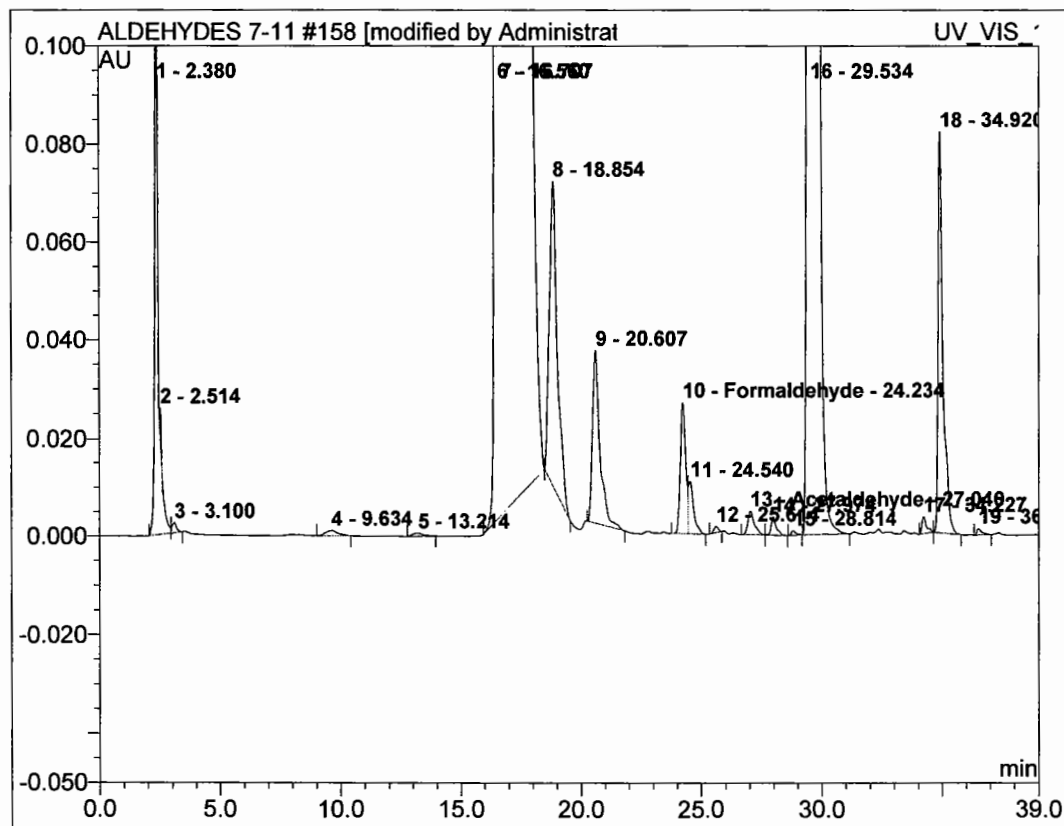
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	unknown		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	7/30/2011 21:35		1.0000
Run Time (min):	39.00		1.0000



No.	Ret. Time min	Peak Name	Height AU	Area AU*min
8	24.35	Formaldehyde	0.0216	0.00551
11	26.99	Acetaldehyde	0.0054	0.00173
Total:			0.027	1.544

# 158 SRU-544-3 2X

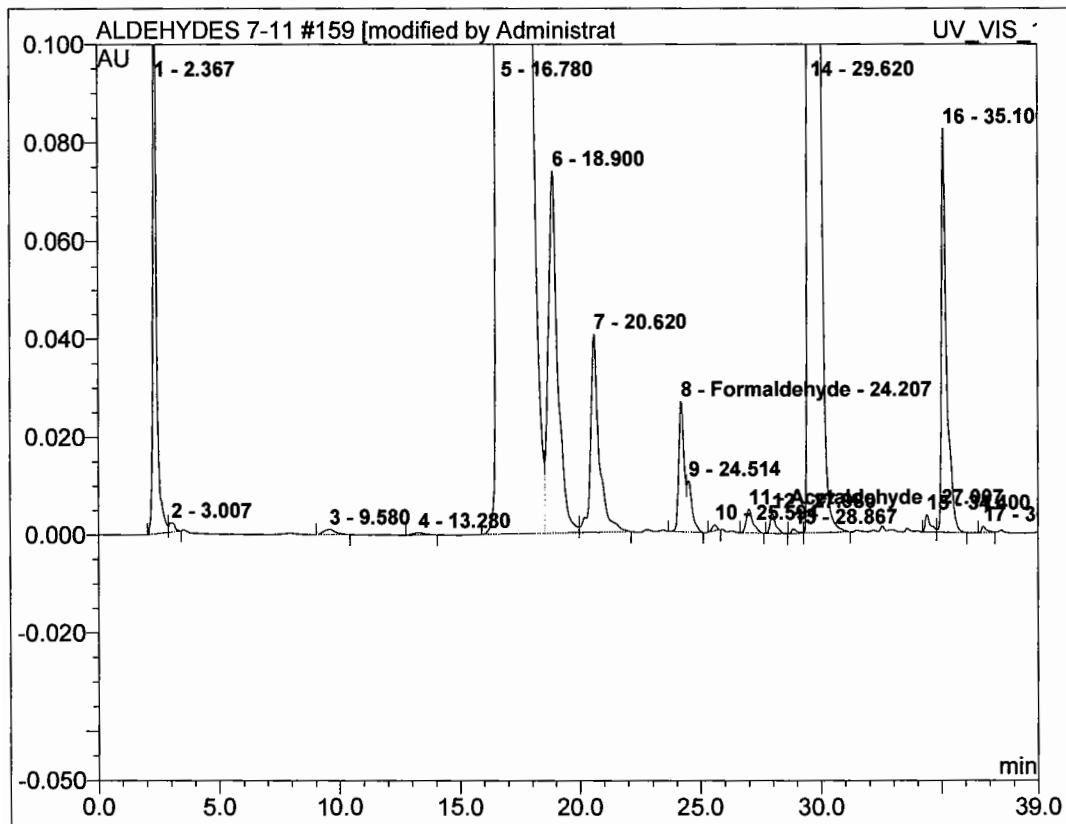
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	unknown		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	7/30/2011 22:19		1.0000
Run Time (min):	39.00		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
10	24.23	Formaldehyde	0.0268	0.00689
13	27.04	Acetaldehyde	0.0048	0.00149
Total:			0.032	1.815

# 159 SRU-544-3 2X

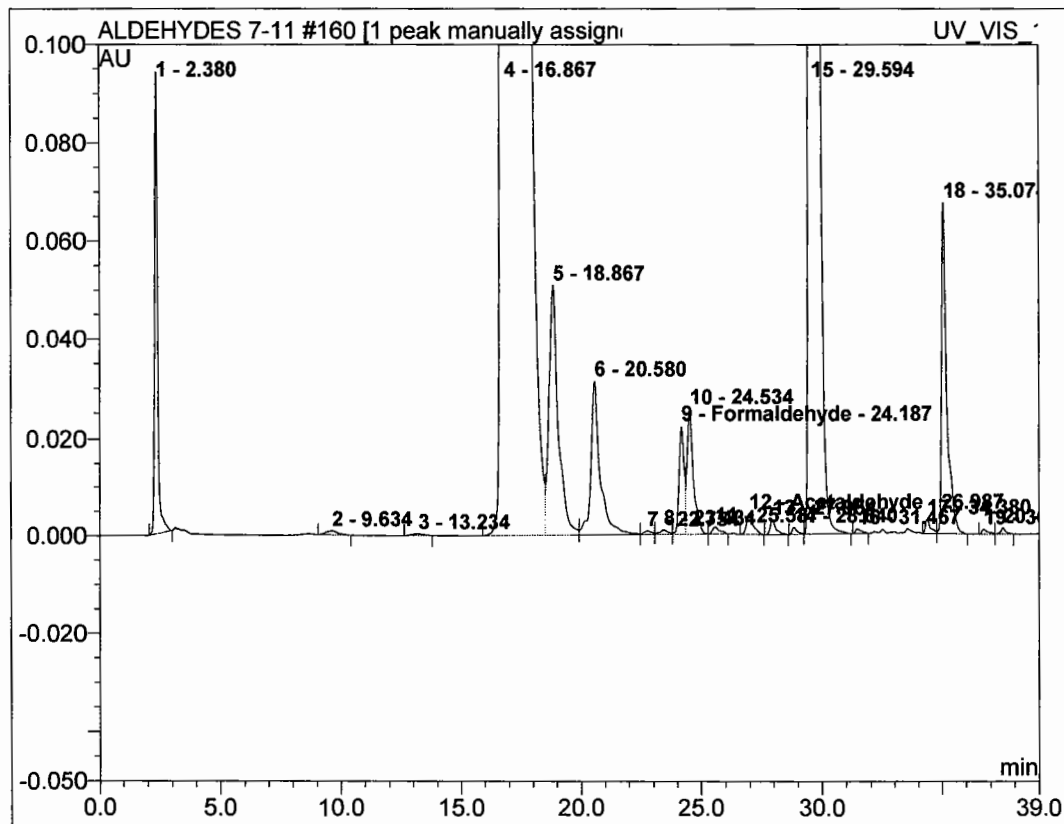
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	unknown		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	7/30/2011 23:03		1.0000
Run Time (min):	39.00		1.0000



No.	Ret. Time min	Peak Name	Height AU	Area AU*min
8	24.21	Formaldehyde	0.0266	0.00689
11	27.01	Acetaldehyde	0.0049	0.00154
Total:			0.032	1.824

# 160 SRU-544-4 2X

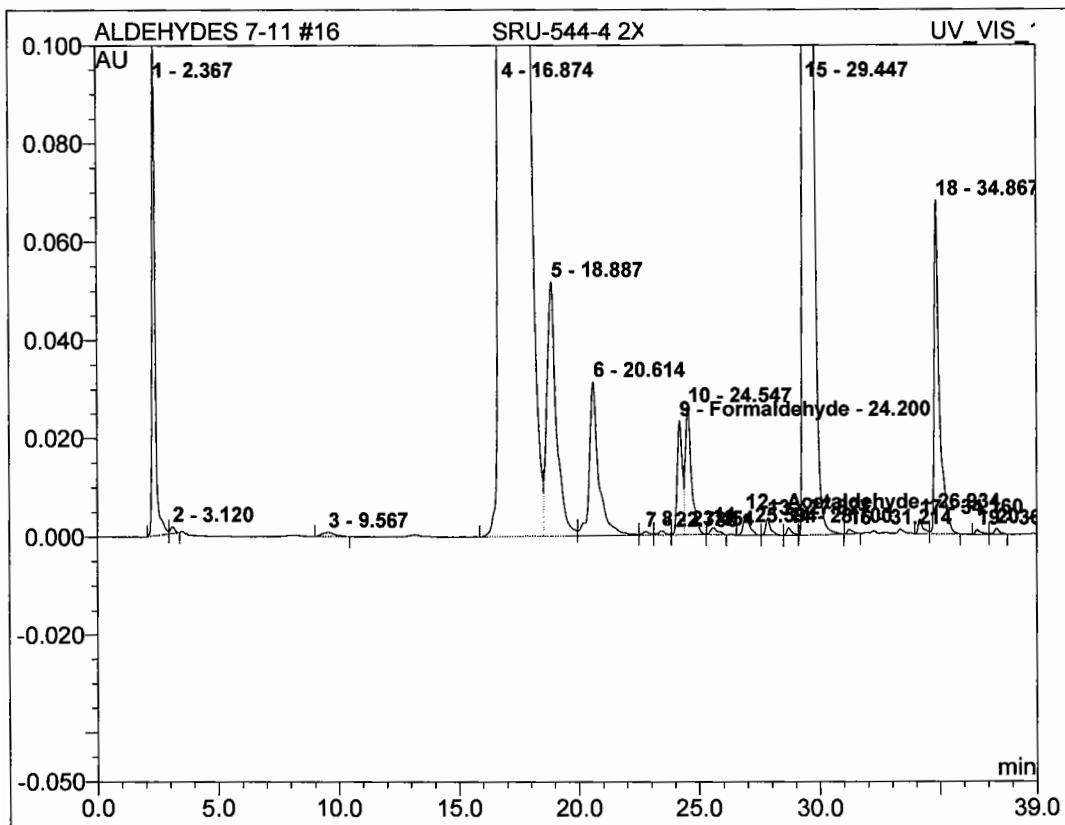
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	unknown		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	7/30/2011 23:47		1.0000
Run Time (min):	39.00		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
9	24.19	Formaldehyde	0.0222	0.00533
12	26.99	Acetaldehyde	0.0042	0.00136
Total:			0.026	1.439

# 161 SRU-544-4 2X

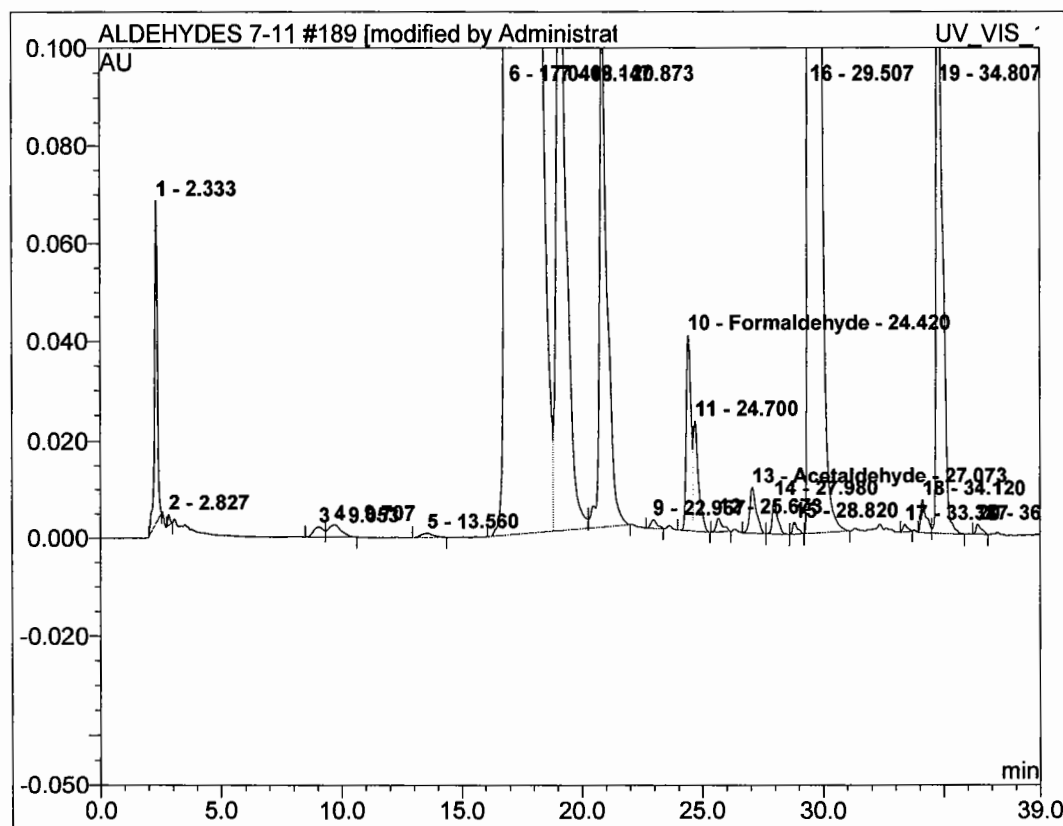
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	unknown		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	7/31/2011 0:32		1.0000
Run Time (min):	39.00		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
9	24.20	Formaldehyde	0.0232	0.00546
12	26.93	Acetaldehyde	0.0043	0.00129
Total:			0.027	1.459

# 189 SRU-544-2

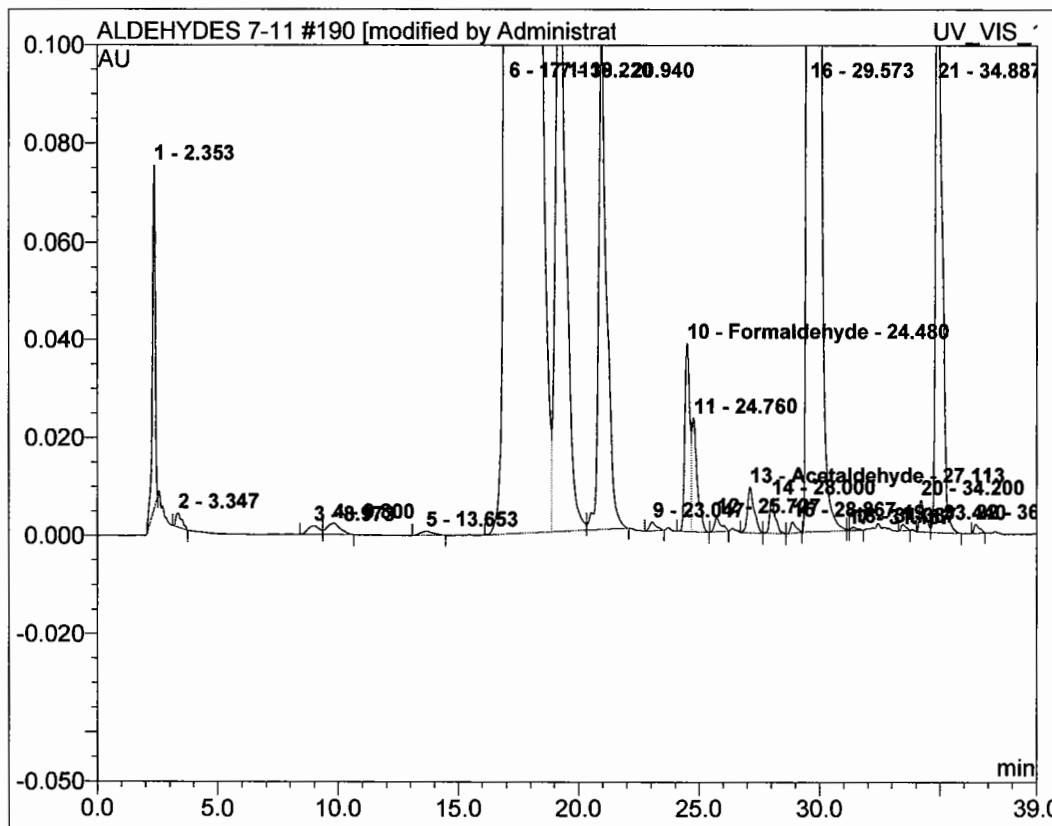
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	unknown		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldededehydes		1.0000
Recording Time:	8/1/2011 9:19		1.0000
Run Time (min):	39.00		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
10	24.42	Formaldehyde	0.0398	0.00934
13	27.07	Acetaldehyde	0.0095	0.00298
Total:			0.049	2.626

# 190 SRU-544-2

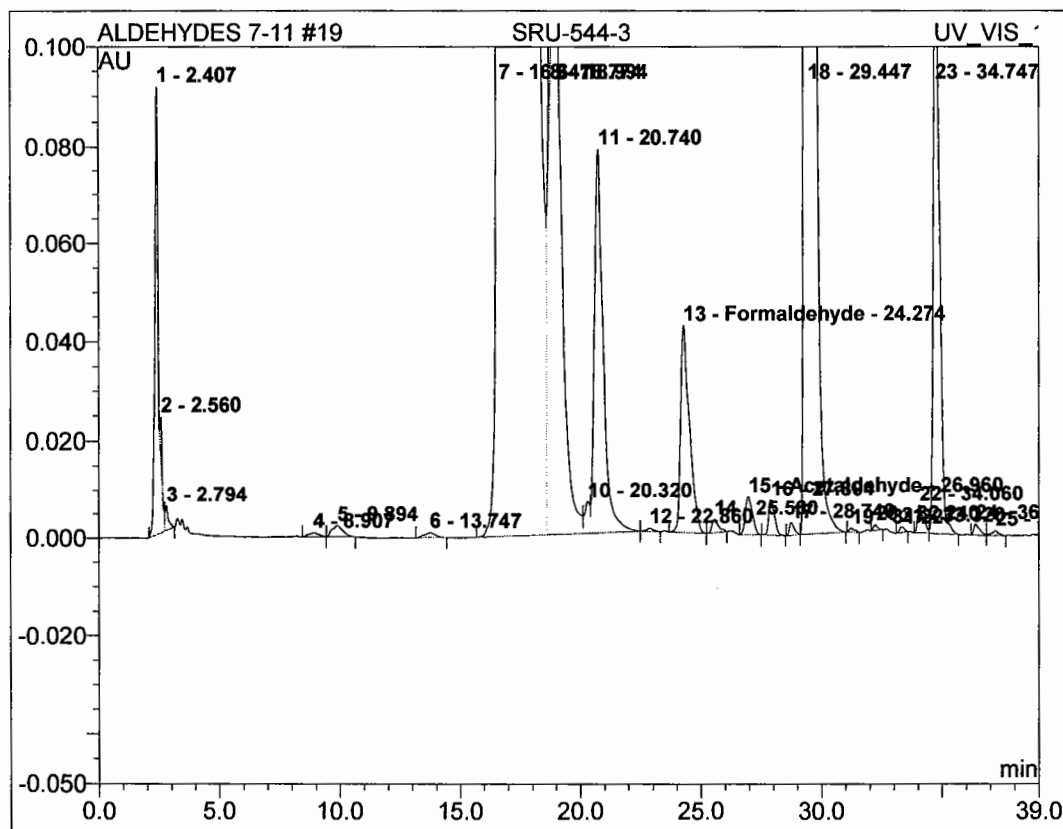
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	unknown		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	8/1/2011 10:03		1.0000
Run Time (min):	39.00		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
10	24.48	Formaldehyde	0.0383	0.00923
13	27.11	Acetaldehyde	0.0093	0.00297
Total:			0.048	2.598

# 191 SRU-544-3

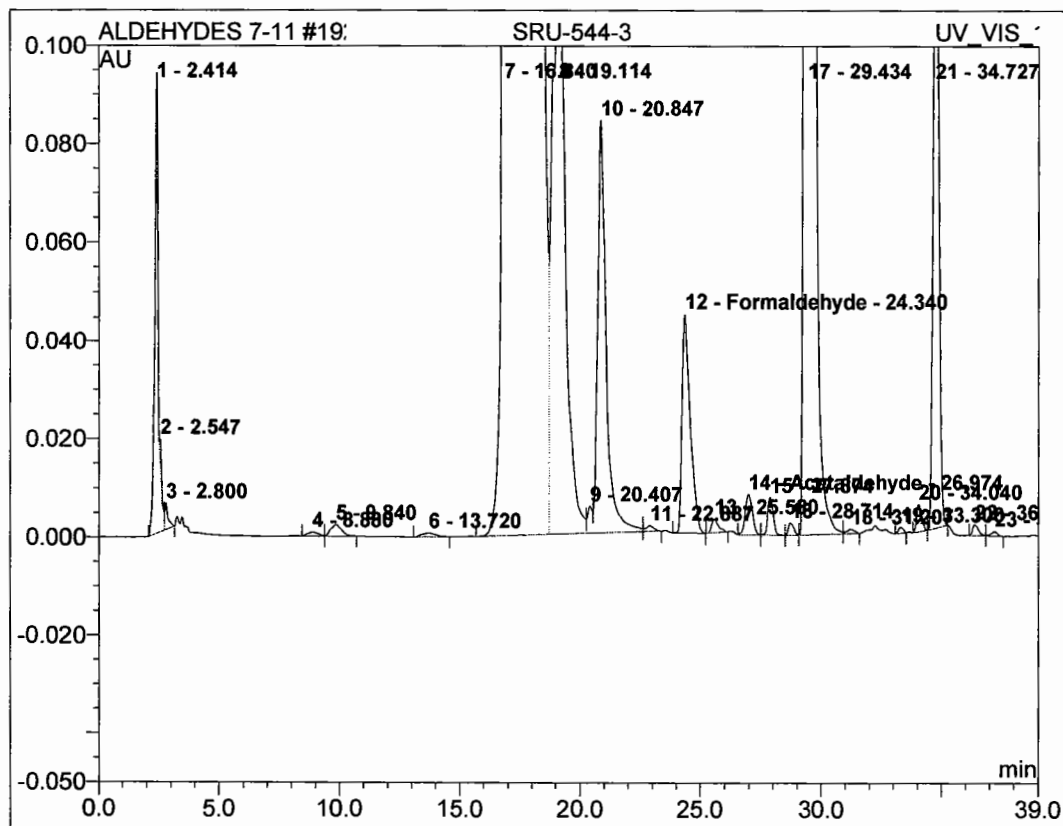
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	unknown		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	8/1/2011 10:48		1.0000
Run Time (min):	39.00		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
13	24.27	Formaldehyde	0.0421	0.01780
15	26.96	Acetaldehyde	0.0080	0.00273
Total:			0.050	4.499

# 192 SRU-544-3

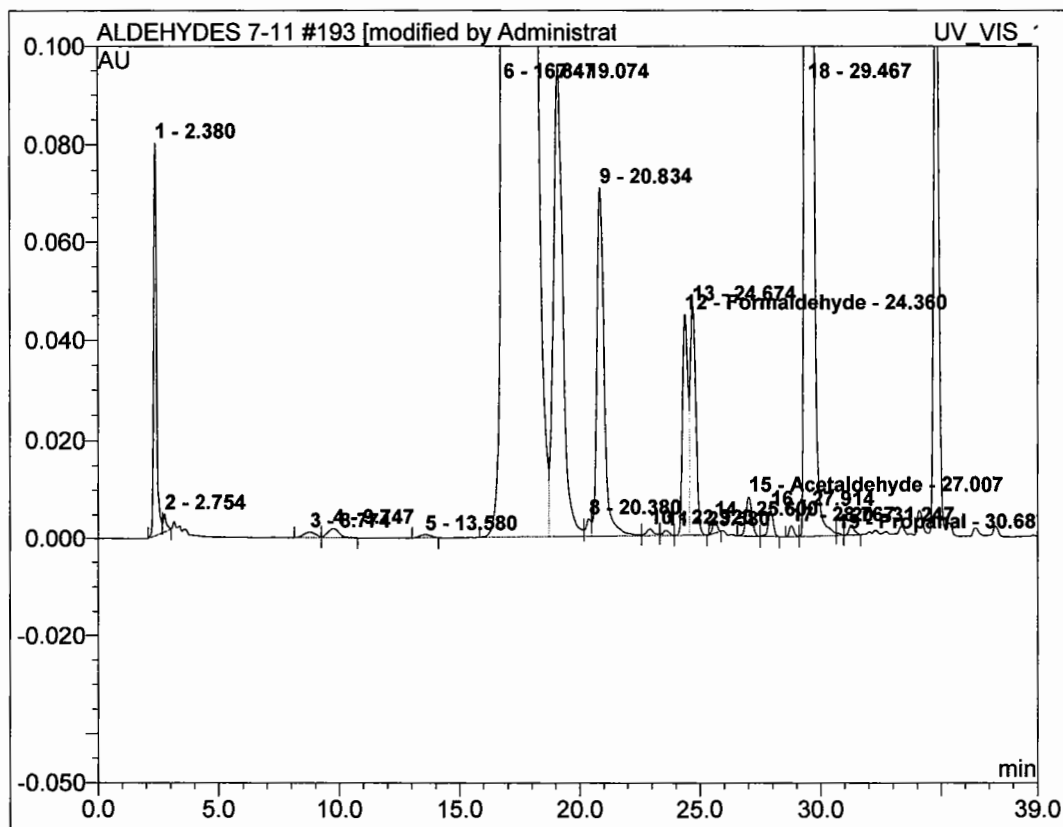
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	unknown		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	8/1/2011 11:32		1.0000
Run Time (min):	39.00		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
12	24.34	Formaldehyde	0.0447	0.01771
14	26.97	Acetaldehyde	0.0082	0.00281
Total:			0.053	4.494

# 193 SRU-544-4

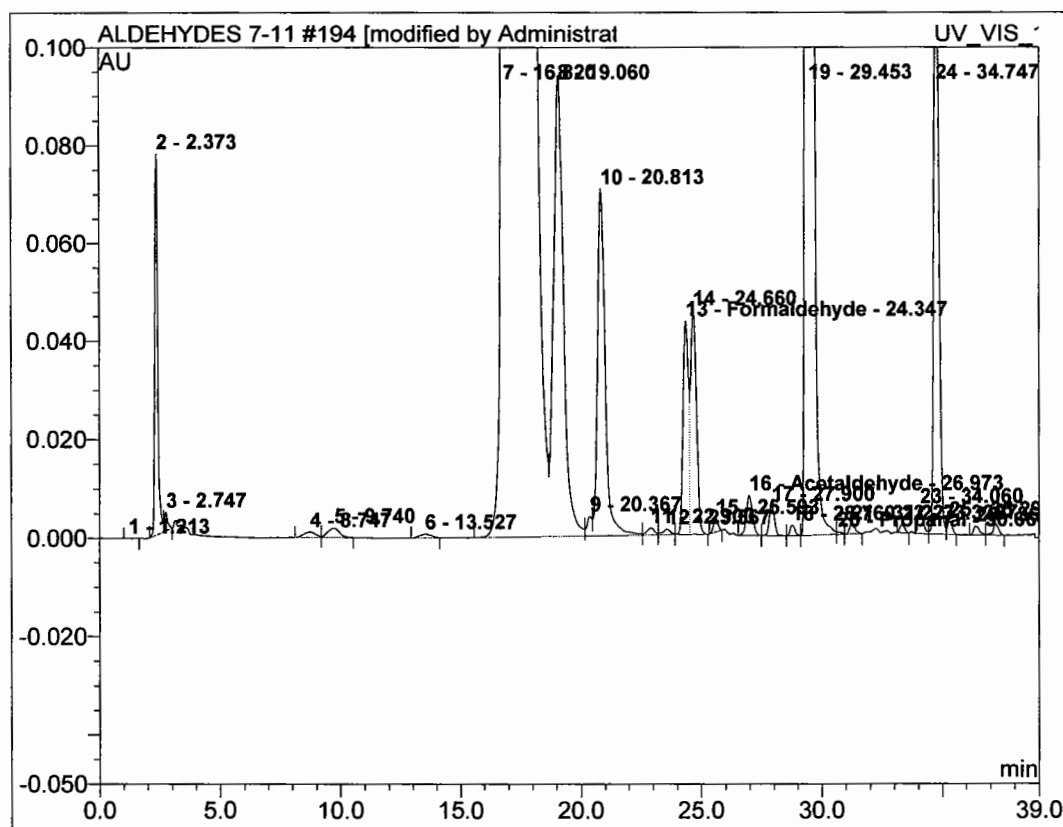
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	unknown		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	8/1/2011 12:16		1.0000
Run Time (min):	32.91		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
12	24.36	Formaldehyde	0.0446	0.01132
15	27.01	Acetaldehyde	0.0083	0.00242
19	30.69	Propanal	0.0005	0.00011
Total:			0.053	3.001

# 194 SRU-544-4

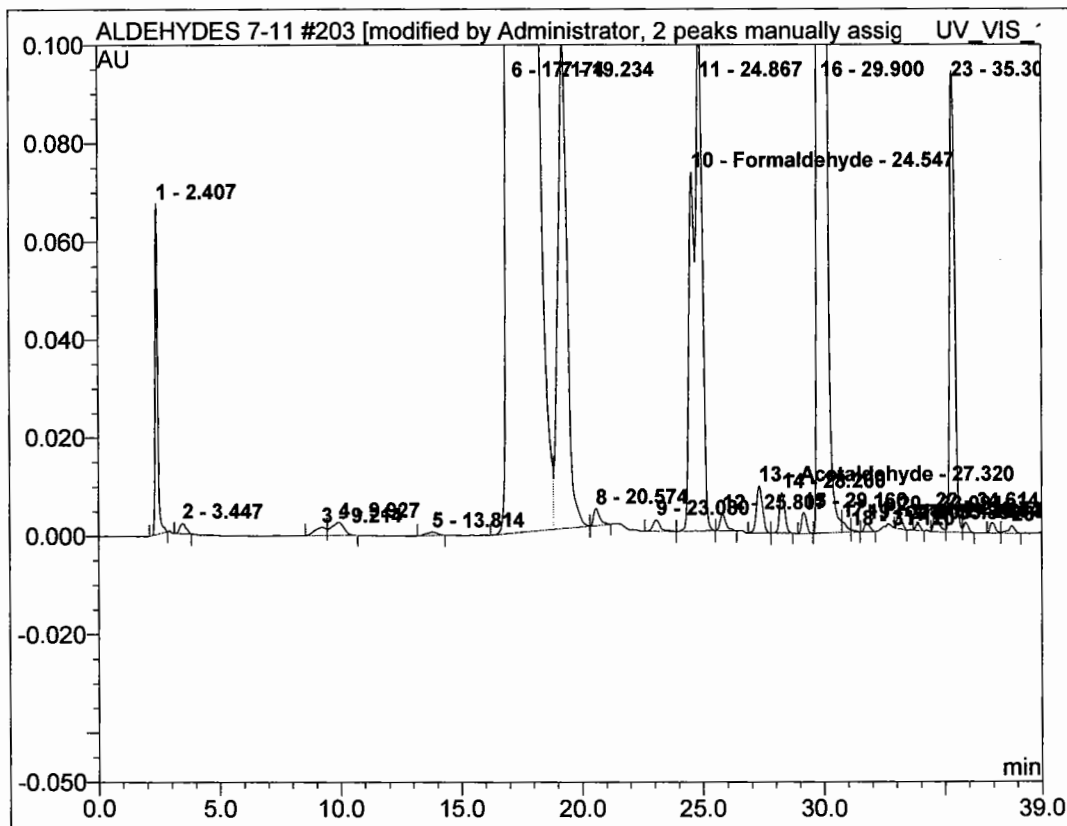
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	unknown		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	8/1/2011 13:00		1.0000
Run Time (min):	39.00		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
13	24.35	Formaldehyde	0.0434	0.01134
16	26.97	Acetaldehyde	0.0082	0.00245
20	30.66	Propanal	0.0005	0.00012
<b>Total:</b>			0.052	3.012

## 203 SRU-544 blank

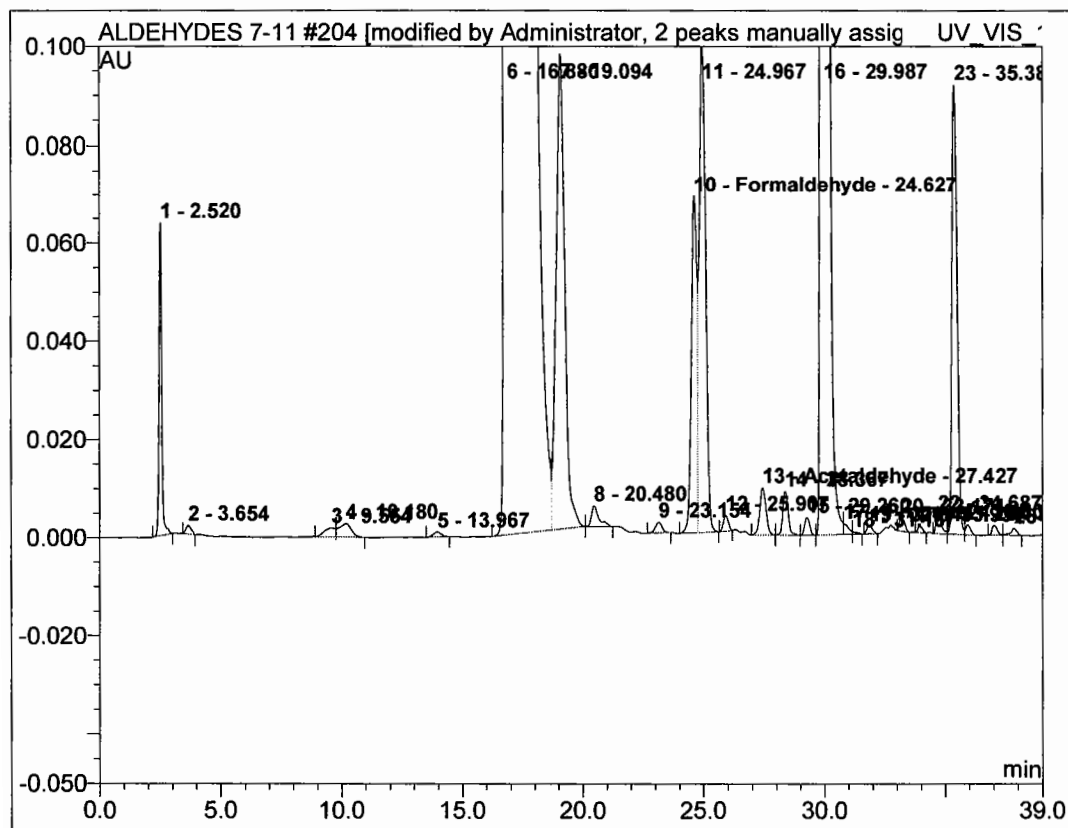
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	unknown		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	8/1/2011 19:45		1.0000
Run Time (min):	39.00		1.0000



No.	Ret. Time min	Peak Name	Height AU	Area AU*min
10	24.55	Formaldehyde	0.0731	0.01797
13	27.32	Acetaldehyde	0.0096	0.00285
17	30.74	Propanal	0.0021	0.00049
Total:			0.085	4.665

## 204 SRU-544 blank

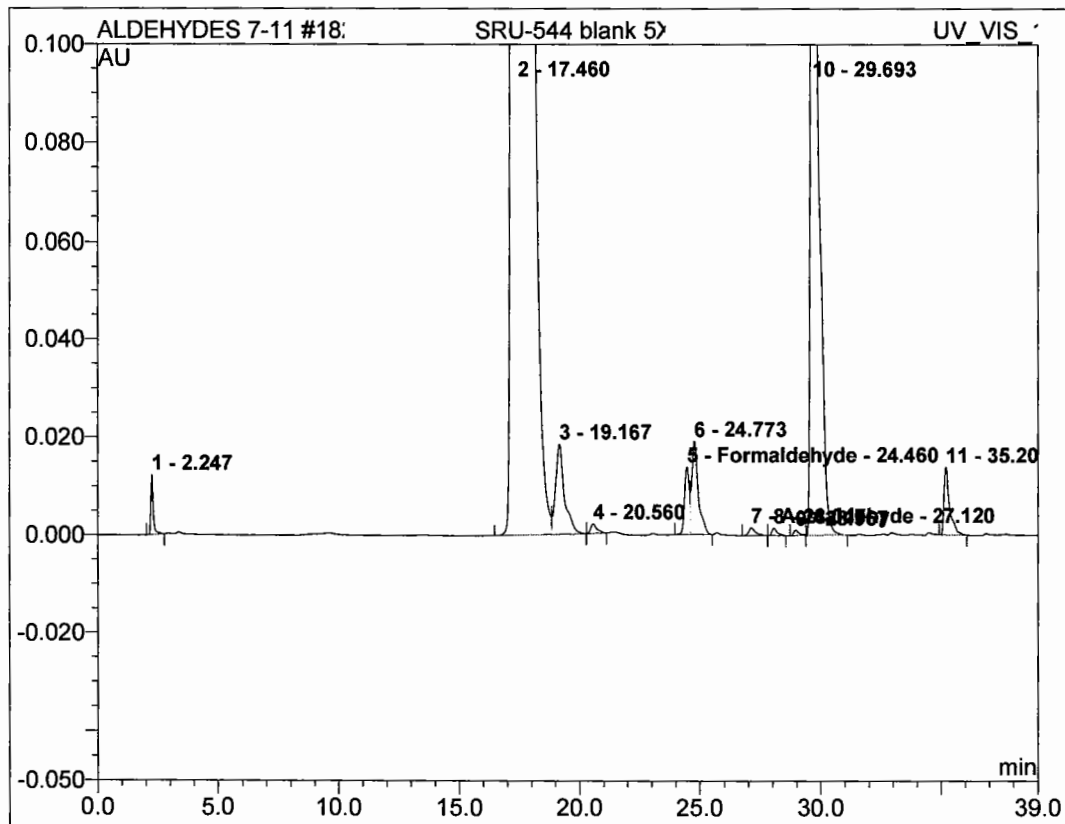
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	unknown		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	8/1/2011 20:29		1.0000
Run Time (min):	39.00		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
10	24.63	Formaldehyde	0.0687	0.01850
13	27.43	Acetaldehyde	0.0096	0.00291
17	30.81	Propanal	0.0022	0.00050
Total:			0.081	4.800

# 182 SRU-544 blank 5X

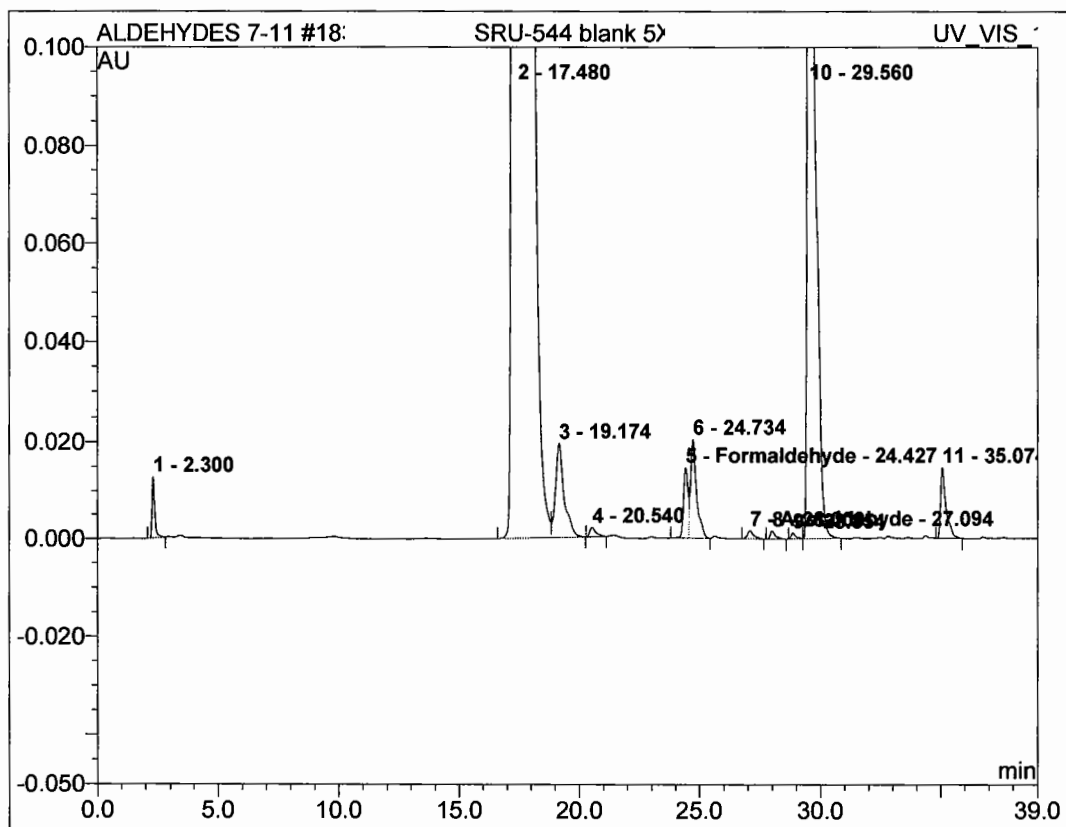
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	unknown		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	7/31/2011 15:58		1.0000
Run Time (min):	39.00		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
5	24.46	Formaldehyde	0.0138	0.00314
7	27.12	Acetaldehyde	0.0016	0.00053
Total:			0.015	0.802

# 183 SRU-544 blank 5X

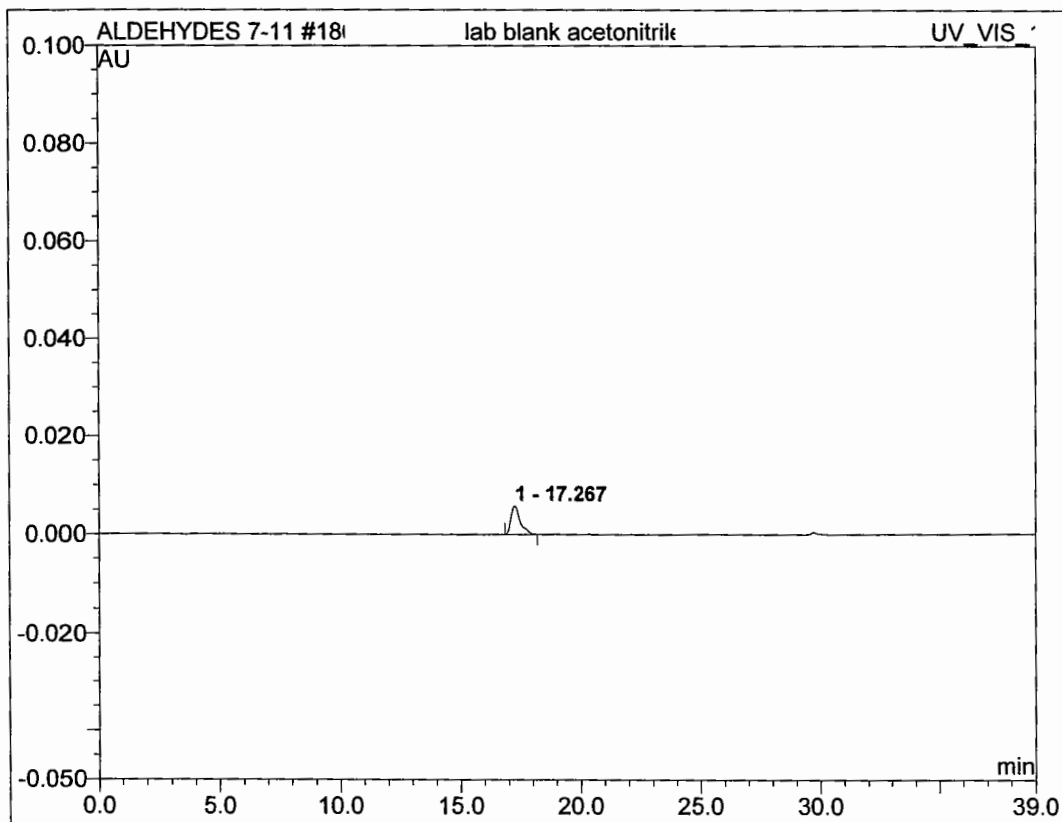
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	unknown		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	7/31/2011 16:42		1.0000
Run Time (min):	39.00		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
5	24.43	Formaldehyde	0.0147	0.00322
7	27.09	Acetaldehyde	0.0017	0.00052
Total:			0.016	0.817

## 186 lab blank acetonitrile

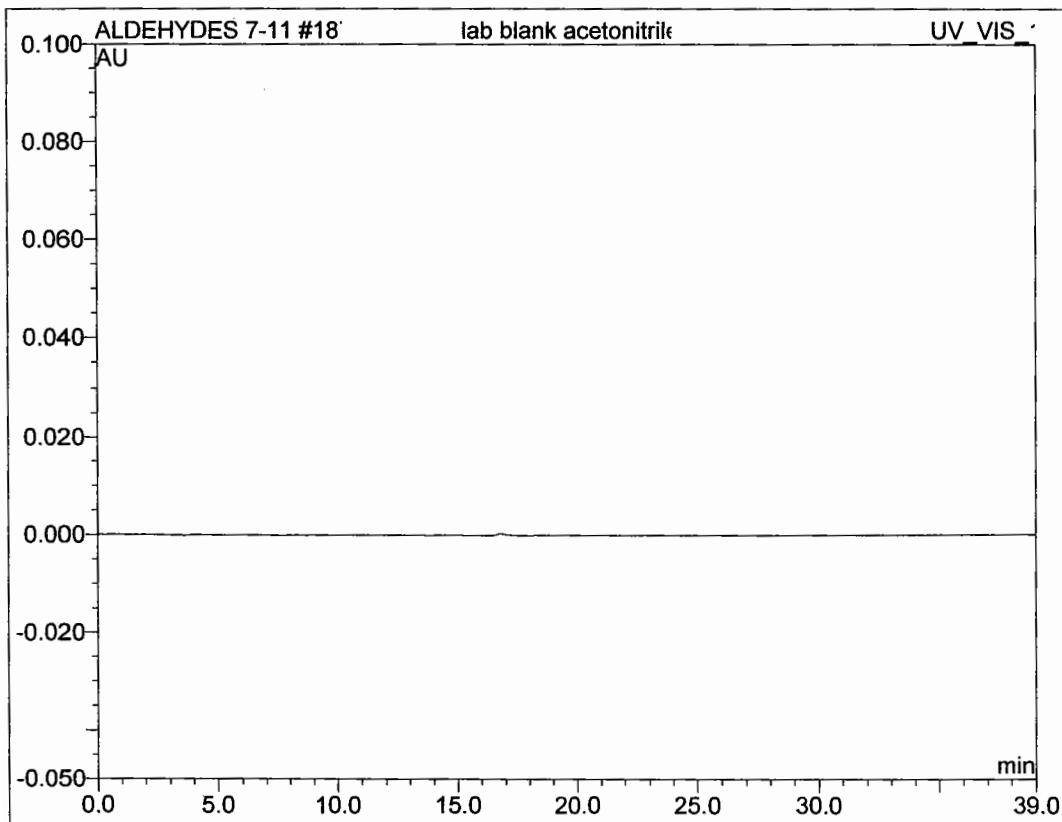
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	unknown		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	7/31/2011 18:54		1.0000
Run Time (min):	39.00		1.0000



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

## 187 lab blank acetonitrile

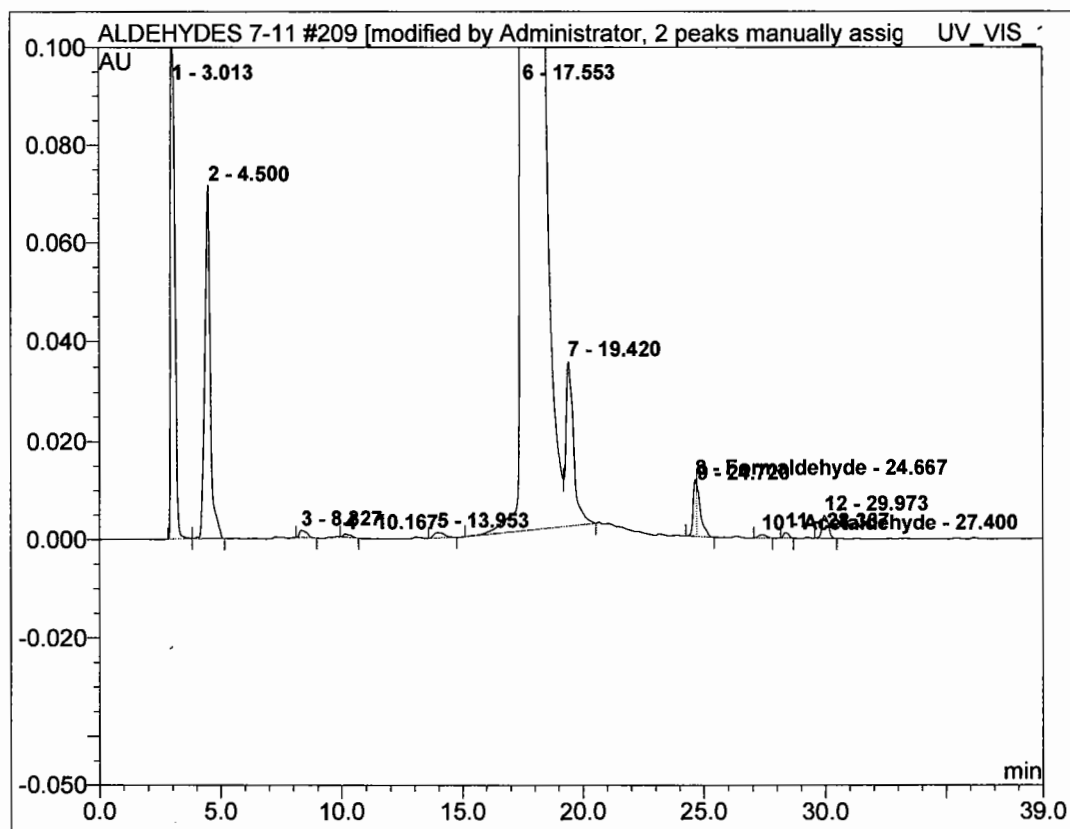
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	unknown		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Alddehydes		1.0000
Recording Time:	7/31/2011 19:38		1.0000
Run Time (min):	39.00		1.0000



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

## 209 SRU-544 DNPH blank

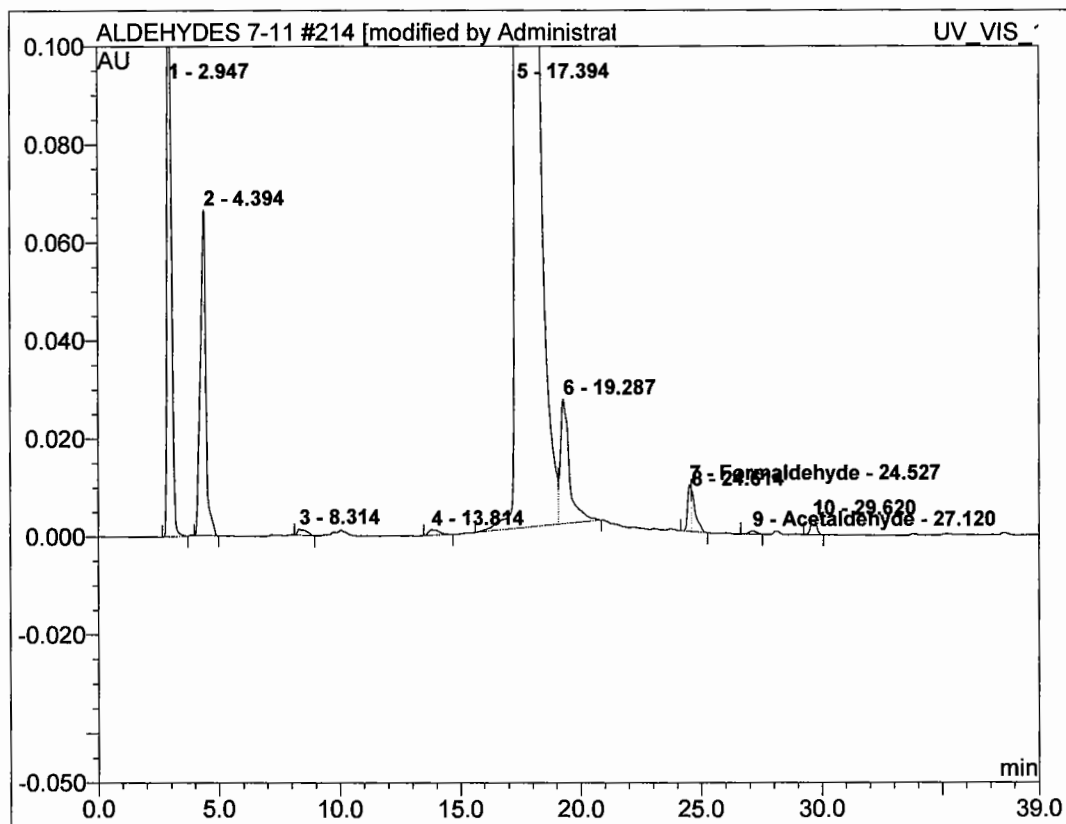
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	unknown		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldededehydes		1.0000
Recording Time:	8/2/2011 0:10		1.0000
Run Time (min):	39.00		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
8	24.67	Formaldehyde	0.0116	0.00171
10	27.40	Acetaldehyde	0.0007	0.00025
Total:			0.012	0.430

## 214 SRU-544 DNPH blank

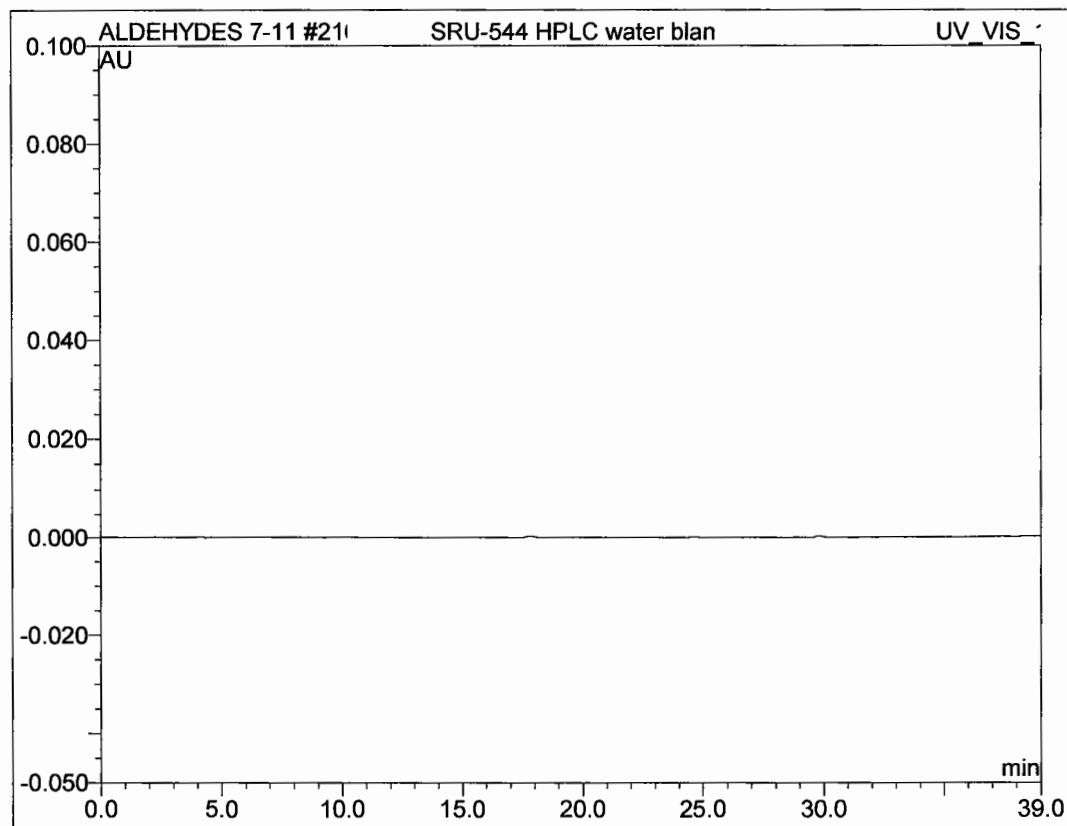
Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	unknown		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	8/2/2011 9:30		1.0000
Run Time (min):	39.00		1.0000



No.	Ret.Time min	Peak Name	Height AU	Area AU*min
7	24.53	Formaldehyde	0.0096	0.00165
9	27.12	Acetaldehyde	0.0006	0.00023
Total:			0.010	0.363

## 216 SRU-544 HPLC water blank

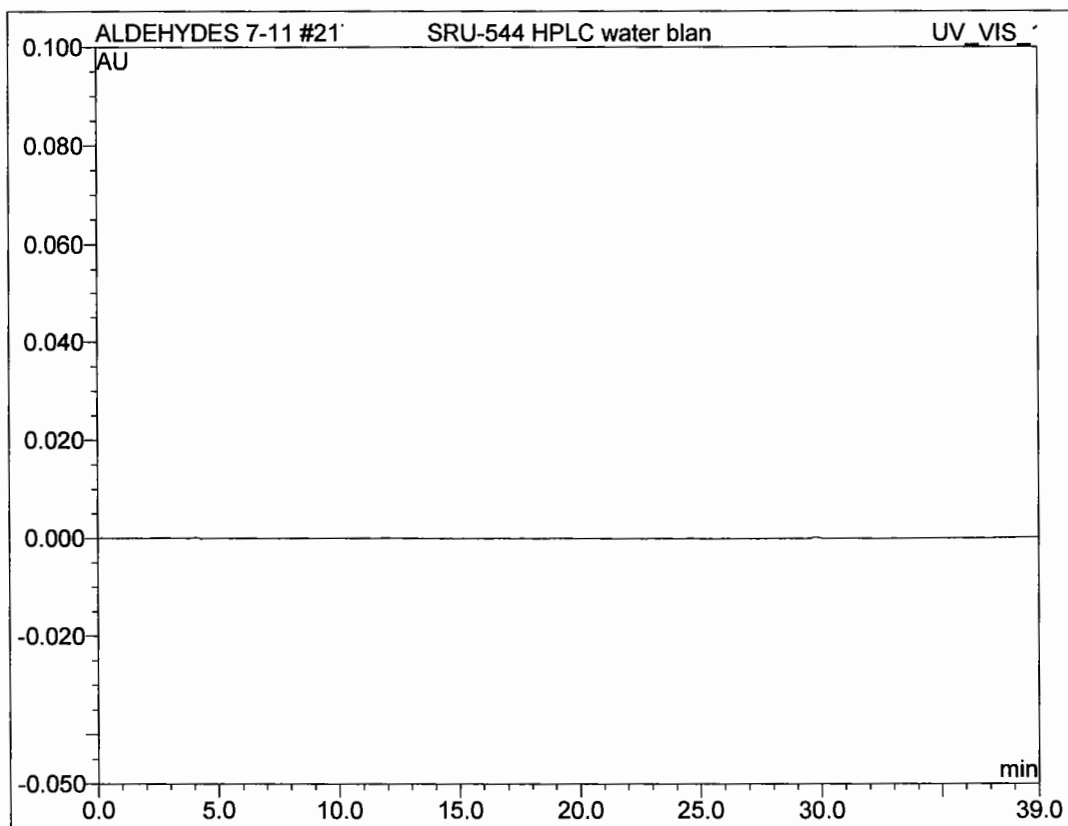
Client	Valero, PA	Unknown 13	Aldehyde C35
Vial Number:	1		UV_VIS_1
Sample Type:	unknown		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	8/2/2011 10:58		1.0000
Run Time (min):	39.00		1.0000



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

## 217 SRU-544 HPLC water blank

Client	Valero, PA	Unknown 13	Aldehyde C 35
Vial Number:	1		UV_VIS_1
Sample Type:	unknown		n.a.
Control Program:	ALDEHYDES 7-11		n.a.
Quantif. Method:	Aldedehydes		1.0000
Recording Time:	8/2/2011 11:42		1.0000
Run Time (min):	39.00		1.0000



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



## 8315A TASK SCHEDULE

Client: Valero

Location: Port Arthur, TX

Project Manager: D. Fitzgerald

Date Sampled: 6/8/11, 6/9/1, 6/15/11, 6/16/11

Lab Project #: 08-315, SRU-544 source

Spreadsheet Template ID: SW846-M0011-Aldehydes-Template-65T-Rev1

Analyst: J. Ruggaber

### Eluent

Acetonitrile manufacturer and lot: Fisher HPLC grade, lot 11641

DI Water

Calibration Standard Identification

- 1) 2 ppm aldehyde std, 7/29/11
- 2) 4 ppm aldehyde std, 7/29/11
- 3) 10 ppm aldehyde std, 7/29/11
- 4) 20 ppm aldehyde std, 7/29/11
- 5) 40 ppm aldehyde std, 7/29/11

**8315A TASK SCHEDULE FORM**

Document Number: WL-8315ATask-Form-040A

Revision Number: 1

Effective Date: 8/2/11

Equipment: ICS 2500 with Acclaim 120 C18 column, 4.6x250 mm

DATE	TASK
7/25/11	Transfer each sample to a separatory flask, and drain out the methylene chloride portion. Extract the aqueous portion twice more with 20 mL of methylene chloride. Transfer all of the methylene chloride to a 250 mL (or larger, if needed) volumetric flask and dilute to volume with methylene chloride.
7/25/11 – 7/26/11	Remove a 100 mL aliquot, and use a condenser and hot water bath to condense the sample to ~10 mL. Add ~10 mL of acetonitrile, and condense again. Transfer to an appropriate size volumetric flask (10 or 25 mL), and dilute to volume with acetonitrile.
7/30/11	Equilibrate the instrument until a stable baseline is achieved.
7/30/11	Inject each standard solution once. Plot the standard injection areas against calibration standard concentrations to determine a calibration curve.
7/30/11- 8/2/11	Inject each sample solution in duplicate. Check that the area count for each duplicate injection is within 5% of the mean.
7/30/11 – 8/2/11	If necessary, dilute sample solutions if the peak areas are greater than the highest standard and re-inject in duplicate.
7/30/11 – 8/2/11	Inject a midpoint standard once after every 10 sample injections. Check that the midpoint standard is within 15% of the value generated by the initial calibration curve.
7/30/11 – 8/2/11	Inject a midpoint standard solution once at the end of the run. Check that the midpoint standard is within 15% of the value generated by the initial calibration curve.
8/2/11	Determine the concentration for each component in each sample using the calibration curve.
8/2/11	Prepare report
	Report QA review
	Report distribution



Valero Port Arthur Refinery  
Source: SRU No. 544 TGI Stack  
Test Dates: 6/15 - 6/17/11

## **APPENDIX D**

## **ARI Reference Method Monitoring Data**

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**Valero Port Arthur Refinery: Port Arthur, Texas**

**SRU 544 Incinerator Stack**

**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	Comments
6/15/11 6:39:00	20.25	0.25	
6/15/11 6:39:15	20.25	0.25	
6/15/11 6:39:30	20.25	0.25	
6/15/11 6:39:45	20.25	0.25	
6/15/11 6:40:00	20.11	0.27	
6/15/11 6:40:15	13.51	0.29	
6/15/11 6:40:30	3.17	0.12	
6/15/11 6:40:45	0.38	0.06	
6/15/11 6:41:00	0.11	0.06	
6/15/11 6:41:15	0.07	0.06	
6/15/11 6:41:30	0.05	0.06	
6/15/11 6:41:45	0.04	0.06	
6/15/11 6:42:00	0.04	0.05	
6/15/11 6:42:15	0.04	0.06	
6/15/11 6:42:30	0.04	0.06	Calibration Error
6/15/11 6:42:45	0.03	0.06	O <sub>2</sub> CE Zero = 0.03
6/15/11 6:43:00	0.03	0.06	CO <sub>2</sub> CE Zero = 0.06
6/15/11 6:43:15	0.03	0.06	
6/15/11 6:43:30	0.02	0.06	
6/15/11 6:43:45	0.02	0.06	
6/15/11 6:44:00	0.02	0.06	
6/15/11 6:44:15	0.08	0.06	
6/15/11 6:44:30	5.74	0.14	
6/15/11 6:44:45	15.91	0.24	
6/15/11 6:45:00	19.77	0.29	
6/15/11 6:45:15	19.91	0.33	
6/15/11 6:45:30	12.33	0.26	
6/15/11 6:45:45	2.79	0.12	
6/15/11 6:46:00	0.42	0.08	
6/15/11 6:46:15	0.21	0.08	
6/15/11 6:46:30	0.44	0.08	
6/15/11 6:46:45	6.40	0.09	
6/15/11 6:47:00	7.70	1.69	
6/15/11 6:47:15	7.72	5.87	
6/15/11 6:47:30	9.29	8.19	
6/15/11 6:47:45	9.83	8.82	
6/15/11 6:48:00	9.90	8.89	
6/15/11 6:48:15	9.91	8.90	
6/15/11 6:48:30	9.91	8.69	Calibration Error
6/15/11 6:48:45	9.92	8.62	O <sub>2</sub> CE Span = 9.92
6/15/11 6:49:00	9.92	8.63	CO <sub>2</sub> CE Span = 8.62
6/15/11 6:49:15	9.92	8.63	
6/15/11 6:49:30	9.92	8.62	
6/15/11 6:49:45	9.92	8.63	
6/15/11 6:50:00	9.72	8.28	
6/15/11 6:50:15	7.38	6.05	
6/15/11 6:50:30	5.42	4.62	
6/15/11 6:50:45	5.08	4.45	Calibration Error
6/15/11 6:51:00	5.05	4.44	O <sub>2</sub> CE Mid = 5.05
6/15/11 6:51:15	5.05	4.44	CO <sub>2</sub> CE Mid = 4.44
6/15/11 6:51:30	5.05	4.44	
6/15/11 6:51:45	5.05	4.45	
6/15/11 6:52:00	5.05	4.44	
6/15/11 6:52:15	5.10	4.44	
6/15/11 6:52:30	6.65	4.66	
6/15/11 6:52:45	9.14	5.81	
6/15/11 6:53:00	10.41	6.78	
6/15/11 6:53:15	15.31	3.19	
6/15/11 6:53:30	19.45	0.61	
6/15/11 6:53:45	20.21	0.25	
6/15/11 6:54:00	20.27	0.20	
6/15/11 6:54:15	20.28	0.18	
6/15/11 6:54:30	20.29	0.17	
6/15/11 6:54:45	20.29	0.16	
6/15/11 6:55:00	20.29	0.16	
6/15/11 6:55:15	20.29	0.16	
6/15/11 6:55:30	20.29	0.15	
6/15/11 6:55:45	20.29	0.15	
6/15/11 6:56:00	20.29	0.15	
6/15/11 6:56:15	20.29	0.15	
6/15/11 6:56:30	20.29	0.14	
6/15/11 6:56:45	20.29	0.14	
6/15/11 6:57:00	20.29	0.14	
6/15/11 6:57:15	20.29	0.14	
6/15/11 6:57:30	20.29	0.14	
6/15/11 6:57:45	20.29	0.14	
6/15/11 6:58:00	20.29	0.14	
6/15/11 6:58:15	20.29	0.14	
6/15/11 6:58:30	20.29	0.13	
6/15/11 6:58:45	20.29	0.14	
6/15/11 6:59:00	20.28	0.14	
6/15/11 6:59:15	20.27	0.15	
6/15/11 6:59:30	20.26	0.16	
6/15/11 6:59:45	20.25	0.16	
6/15/11 7:00:00	20.25	0.16	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	Comments
6/15/11 11:57:45	5.40	6.61	
6/15/11 11:58:00	5.39	6.62	
6/15/11 11:58:15	5.37	6.64	
6/15/11 11:58:30	5.36	6.64	
6/15/11 11:58:45	5.39	6.64	
6/15/11 11:59:00	5.38	6.64	
6/15/11 11:59:15	5.39	6.64	
6/15/11 11:59:30	5.34	6.67	
6/15/11 11:59:45	5.31	6.70	
6/15/11 12:00:00	5.30	6.71	
6/15/11 12:00:15	5.30	6.71	
6/15/11 12:00:30	5.30	6.70	
6/15/11 12:00:45	5.33	6.67	
6/15/11 12:01:00	5.37	6.65	
6/15/11 12:01:15	5.37	6.65	
6/15/11 12:01:30	5.37	6.65	
6/15/11 12:01:45	5.35	6.67	
6/15/11 12:02:00	5.28	6.71	
6/15/11 12:02:15	5.28	6.71	
6/15/11 12:02:30	5.33	6.68	
6/15/11 12:02:45	5.36	6.66	
6/15/11 12:03:00	5.35	6.64	
6/15/11 12:03:15	5.32	6.64	
6/15/11 12:03:30	5.28	6.66	
6/15/11 12:03:45	5.29	6.66	
6/15/11 12:04:00	5.31	6.66	
6/15/11 12:04:15	5.35	6.66	
6/15/11 12:04:30	5.34	6.67	
6/15/11 12:04:45	5.33	6.67	
6/15/11 12:05:00	5.33	6.66	
6/15/11 12:05:15	5.36	6.63	
6/15/11 12:05:30	5.38	6.62	
6/15/11 12:05:45	5.38	6.63	
6/15/11 12:06:00	5.38	6.63	
6/15/11 12:06:15	5.37	6.65	
6/15/11 12:06:30	5.34	6.67	
6/15/11 12:06:45	5.31	6.68	
6/15/11 12:07:00	5.34	6.66	
6/15/11 12:07:15	5.38	6.63	
6/15/11 12:07:30	5.40	6.62	
6/15/11 12:07:45	5.42	6.62	
6/15/11 12:08:00	5.43	6.61	
6/15/11 12:08:15	5.41	6.62	
6/15/11 12:08:30	5.37	6.63	
6/15/11 12:08:45	5.37	6.62	
6/15/11 12:09:00	5.34	6.63	
6/15/11 12:09:15	5.37	6.62	
6/15/11 12:09:30	5.37	6.62	
6/15/11 12:09:45	5.34	6.64	
6/15/11 12:10:00	5.31	6.65	
6/15/11 12:10:15	5.33	6.64	
6/15/11 12:10:30	5.33	6.64	
6/15/11 12:10:45	5.32	6.64	
6/15/11 12:11:00	5.33	6.63	
6/15/11 12:11:15	5.35	6.63	
6/15/11 12:11:30	5.34	6.63	
6/15/11 12:11:45	5.34	6.64	Introduce Zero
6/15/11 12:12:00	5.35	6.64	
6/15/11 12:12:15	5.36	6.64	Downscale RT = 120 Seconds
6/15/11 12:12:30	5.34	6.65	
6/15/11 12:12:45	5.67	5.69	
6/15/11 12:13:00	6.09	2.30	
6/15/11 12:13:15	2.28	0.55	
6/15/11 12:13:30	0.26	0.19	
6/15/11 12:13:45	0.03	0.14	
6/15/11 12:14:00	-0.01	0.13	System Bias
6/15/11 12:14:15	-0.02	0.11	O <sub>2</sub> Bias 1 Zero = -0.03
6/15/11 12:14:30	-0.03	0.11	CO <sub>2</sub> Bias 1 Zero = 0.10
6/15/11 12:14:45	-0.03	0.10	
6/15/11 12:15:00	-0.03	0.09	Introduce Mid
6/15/11 12:15:15	-0.04	0.09	
6/15/11 12:15:30	-0.04	0.09	
6/15/11 12:15:45	0.02	0.18	Upscale RT = 120 Seconds
6/15/11 12:16:00	1.81	1.71	
6/15/11 12:16:15	4.11	3.37	
6/15/11 12:16:30	4.79	3.68	
6/15/11 12:16:45	4.89	3.90	System Bias
6/15/11 12:17:00	4.91	4.20	O <sub>2</sub> Bias 1 Mid = 4.90
6/15/11 12:17:15	4.90	4.30	CO <sub>2</sub> Bias 1 Mid = 4.29
6/15/11 12:17:30	4.90	4.33	
6/15/11 12:17:45	4.90	4.34	
6/15/11 12:18:00	4.91	4.34	
6/15/11 12:18:15	4.91	4.35	
6/15/11 12:18:30	4.91	4.35	
6/15/11 12:18:45	4.91	4.35	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	Comments
6/15/11 12:19:00	4.92	4.39	
6/15/11 12:19:15	5.05	5.23	
6/15/11 12:19:30	5.31	6.28	
6/15/11 12:19:45	5.39	6.54	
6/15/11 12:20:00	5.37	6.59	
6/15/11 12:20:15	5.33	6.62	
6/15/11 12:20:30	5.35	6.61	
6/15/11 12:20:45	5.35	6.61	
6/15/11 12:21:00	5.33	6.62	
6/15/11 12:21:15	5.31	6.62	
6/15/11 12:21:30	5.33	6.63	
6/15/11 12:21:45	5.35	6.63	
6/15/11 12:22:00	5.38	6.64	
6/15/11 12:22:15	5.36	6.65	
6/15/11 12:22:30	5.39	6.63	
6/15/11 12:22:45	5.40	6.62	
6/15/11 12:23:00	5.37	6.62	
6/15/11 12:23:15	5.41	6.60	
6/15/11 12:23:30	5.39	6.63	
6/15/11 12:23:45	5.36	6.66	
6/15/11 12:24:00	5.37	6.68	
6/15/11 12:24:15	5.38	6.69	
6/15/11 12:24:30	5.37	6.70	
6/15/11 12:24:45	5.35	6.69	
6/15/11 12:25:00	5.37	6.66	
6/15/11 12:25:15	5.37	6.65	
6/15/11 12:25:30	5.36	6.66	
6/15/11 12:25:45	5.37	6.66	
6/15/11 12:26:00	5.40	6.67	
6/15/11 12:26:15	5.39	6.69	
6/15/11 12:26:30	5.36	6.70	
6/15/11 12:26:45	5.37	6.69	
6/15/11 12:27:00	5.38	6.67	
6/15/11 12:27:15	5.40	6.65	
6/15/11 12:27:30	5.40	6.64	
6/15/11 12:27:45	5.37	6.66	
6/15/11 12:28:00	5.32	6.68	
6/15/11 12:28:15	5.33	6.68	
6/15/11 12:28:30	5.35	6.66	
6/15/11 12:28:45	5.40	6.65	
6/15/11 12:29:00	5.43	6.64	
6/15/11 12:29:15	5.41	6.65	
6/15/11 12:29:30	5.41	6.66	
6/15/11 12:29:45	5.40	6.68	
6/15/11 12:30:00	5.41	6.67	
6/15/11 12:30:15	5.42	6.67	
6/15/11 12:30:30	5.42	6.66	
6/15/11 12:30:45	5.43	6.65	
6/15/11 12:31:00	5.45	6.63	
6/15/11 12:31:15	5.44	6.65	
6/15/11 12:31:30	5.41	6.67	
6/15/11 12:31:45	5.36	6.70	
6/15/11 12:32:00	5.38	6.69	
6/15/11 12:32:15	5.41	6.67	
6/15/11 12:32:30	5.39	6.67	
6/15/11 12:32:45	5.40	6.66	
6/15/11 12:33:00	5.38	6.65	
6/15/11 12:33:15	5.39	6.66	
6/15/11 12:33:30	5.38	6.68	
6/15/11 12:33:45	5.36	6.71	
6/15/11 12:34:00	5.34	6.72	
6/15/11 12:34:15	5.25	6.76	
6/15/11 12:34:30	5.25	6.74	
6/15/11 12:34:45	5.28	6.71	
6/15/11 12:35:00	5.29	6.70	
6/15/11 12:35:15	5.31	6.69	
6/15/11 12:35:30	5.33	6.71	
6/15/11 12:35:45	5.31	6.73	
6/15/11 12:36:00	5.34	6.72	
6/15/11 12:36:15	5.38	6.70	
6/15/11 12:36:30	5.37	6.69	
6/15/11 12:36:45	5.37	6.67	
6/15/11 12:37:00	5.38	6.65	
6/15/11 12:37:15	5.35	6.66	
6/15/11 12:37:30	5.35	6.66	
6/15/11 12:37:45	5.33	6.67	
6/15/11 12:38:00	5.34	6.66	
6/15/11 12:38:15	5.37	6.64	
6/15/11 12:38:30	5.41	6.63	
6/15/11 12:38:45	5.42	6.62	
6/15/11 12:39:00	5.40	6.63	
6/15/11 12:39:15	5.39	6.64	
6/15/11 12:39:30	5.38	6.65	
6/15/11 12:39:45	5.40	6.64	
6/15/11 12:40:00	5.42	6.63	

**Valero Port Arthur Refinery: Port Arthur, Texas**

**SRU 544 Incinerator Stack**

**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	Comments
6/15/11 12:40:15	5.40	6.64	
6/15/11 12:40:30	5.41	6.63	
6/15/11 12:40:45	5.47	6.60	
6/15/11 12:41:00	5.48	6.60	
6/15/11 12:41:15	5.52	6.59	
6/15/11 12:41:30	5.52	6.62	
6/15/11 12:41:45	5.45	6.66	
6/15/11 12:42:00	5.41	6.67	
6/15/11 12:42:15	5.40	6.68	
6/15/11 12:42:30	5.40	6.66	
6/15/11 12:42:45	5.42	6.65	
6/15/11 12:43:00	5.39	6.65	
6/15/11 12:43:15	5.42	6.65	
6/15/11 12:43:30	5.39	6.68	
6/15/11 12:43:45	5.41	6.69	
6/15/11 12:44:00	5.39	6.71	
6/15/11 12:44:15	5.36	6.73	
6/15/11 12:44:30	5.30	6.74	
6/15/11 12:44:45	5.29	6.72	
6/15/11 12:45:00	5.36	6.68	
6/15/11 12:45:15	5.35	6.69	
6/15/11 12:45:30	5.33	6.72	
6/15/11 12:45:45	5.32	6.74	
6/15/11 12:46:00	5.31	6.75	
6/15/11 12:46:15	5.32	6.74	
6/15/11 12:46:30	5.31	6.74	
6/15/11 12:46:45	5.32	6.72	
6/15/11 12:47:00	5.29	6.72	
6/15/11 12:47:15	5.28	6.71	
6/15/11 12:47:30	5.28	6.71	
6/15/11 12:47:45	5.28	6.71	
6/15/11 12:48:00	5.30	6.71	
6/15/11 12:48:15	5.31	6.71	
6/15/11 12:48:30	5.32	6.69	
6/15/11 12:48:45	5.33	6.68	
6/15/11 12:49:00	5.33	6.67	
6/15/11 12:49:15	5.31	6.68	
6/15/11 12:49:30	5.33	6.67	
6/15/11 12:49:45	5.36	6.66	
6/15/11 12:50:00	5.39	6.65	
6/15/11 12:50:15	5.42	6.65	
6/15/11 12:50:30	5.43	6.63	
6/15/11 12:50:45	5.42	6.62	
6/15/11 12:51:00	5.37	6.63	
6/15/11 12:51:15	5.38	6.63	
6/15/11 12:51:30	5.40	6.64	
6/15/11 12:51:45	5.37	6.67	
6/15/11 12:52:00	5.39	6.67	
6/15/11 12:52:15	5.43	6.66	
6/15/11 12:52:30	5.44	6.64	
6/15/11 12:52:45	5.43	6.64	
6/15/11 12:53:00	5.43	6.64	Start 544SRU-18-1
6/15/11 12:53:15	5.43	6.66	Start 544SRU-0011-1
6/15/11 12:53:30	5.42	6.69	
6/15/11 12:53:45	5.39	6.72	
6/15/11 12:54:00	5.43	6.72	
6/15/11 12:54:15	5.43	6.72	
6/15/11 12:54:30	5.44	6.72	
6/15/11 12:54:45	5.42	6.71	
6/15/11 12:55:00	5.41	6.71	
6/15/11 12:55:15	5.40	6.70	
6/15/11 12:55:30	5.42	6.71	
6/15/11 12:55:45	5.39	6.73	
6/15/11 12:56:00	5.37	6.75	
6/15/11 12:56:15	5.39	6.73	
6/15/11 12:56:30	5.45	6.70	
6/15/11 12:56:45	5.45	6.70	
6/15/11 12:57:00	5.43	6.70	
6/15/11 12:57:15	5.40	6.70	
6/15/11 12:57:30	5.40	6.69	
6/15/11 12:57:45	5.38	6.70	
6/15/11 12:58:00	5.38	6.71	
6/15/11 12:58:15	5.35	6.71	
6/15/11 12:58:30	5.37	6.70	
6/15/11 12:58:45	5.38	6.68	
6/15/11 12:59:00	5.38	6.68	
6/15/11 12:59:15	5.35	6.69	
6/15/11 12:59:30	5.37	6.69	
6/15/11 12:59:45	5.36	6.69	
6/15/11 13:00:00	5.33	6.70	
6/15/11 13:00:15	5.30	6.70	
6/15/11 13:00:30	5.32	6.69	
6/15/11 13:00:45	5.34	6.68	
6/15/11 13:01:00	5.38	6.67	
6/15/11 13:01:15	5.38	6.68	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	Comments
6/15/11 13:01:30	5.38	6.70	
6/15/11 13:01:45	5.39	6.70	
6/15/11 13:02:00	5.44	6.67	
6/15/11 13:02:15	5.36	6.70	
6/15/11 13:02:30	5.36	6.69	
6/15/11 13:02:45	5.39	6.69	
6/15/11 13:03:00	5.40	6.70	
6/15/11 13:03:15	5.37	6.73	
6/15/11 13:03:30	5.41	6.73	
6/15/11 13:03:45	5.40	6.74	
6/15/11 13:04:00	5.35	6.75	
6/15/11 13:04:15	5.35	6.74	
6/15/11 13:04:30	5.38	6.70	
6/15/11 13:04:45	5.37	6.71	
6/15/11 13:05:00	5.33	6.73	
6/15/11 13:05:15	5.34	6.74	
6/15/11 13:05:30	5.32	6.76	
6/15/11 13:05:45	5.31	6.76	
6/15/11 13:06:00	5.31	6.75	
6/15/11 13:06:15	5.34	6.72	
6/15/11 13:06:30	5.36	6.69	
6/15/11 13:06:45	5.38	6.67	
6/15/11 13:07:00	5.36	6.67	
6/15/11 13:07:15	5.31	6.69	
6/15/11 13:07:30	5.34	6.68	
6/15/11 13:07:45	5.35	6.68	
6/15/11 13:08:00	5.36	6.67	
6/15/11 13:08:15	5.37	6.66	
6/15/11 13:08:30	5.34	6.66	
6/15/11 13:08:45	5.34	6.66	
6/15/11 13:09:00	5.34	6.66	
6/15/11 13:09:15	5.36	6.66	
6/15/11 13:09:30	5.29	6.68	
6/15/11 13:09:45	5.32	6.66	
6/15/11 13:10:00	5.38	6.63	
6/15/11 13:10:15	5.38	6.63	
6/15/11 13:10:30	5.38	6.62	
6/15/11 13:10:45	5.36	6.64	
6/15/11 13:11:00	5.36	6.64	
6/15/11 13:11:15	5.38	6.65	
6/15/11 13:11:30	5.38	6.66	
6/15/11 13:11:45	5.41	6.64	
6/15/11 13:12:00	5.41	6.64	
6/15/11 13:12:15	5.40	6.64	
6/15/11 13:12:30	5.41	6.63	
6/15/11 13:12:45	5.39	6.64	
6/15/11 13:13:00	5.35	6.66	
6/15/11 13:13:15	5.34	6.67	
6/15/11 13:13:30	5.33	6.69	
6/15/11 13:13:45	5.36	6.68	
6/15/11 13:14:00	5.37	6.68	
6/15/11 13:14:15	5.39	6.65	
6/15/11 13:14:30	5.37	6.65	
6/15/11 13:14:45	5.37	6.65	
6/15/11 13:15:00	5.37	6.65	
6/15/11 13:15:15	5.37	6.66	
6/15/11 13:15:30	5.39	6.67	
6/15/11 13:15:45	5.39	6.68	
6/15/11 13:16:00	5.38	6.69	
6/15/11 13:16:15	5.37	6.69	
6/15/11 13:16:30	5.37	6.67	
6/15/11 13:16:45	5.34	6.68	
6/15/11 13:17:00	5.30	6.69	
6/15/11 13:17:15	5.31	6.69	
6/15/11 13:17:30	5.40	6.66	
6/15/11 13:17:45	5.46	6.65	
6/15/11 13:18:00	5.41	6.68	
6/15/11 13:18:15	5.39	6.68	
6/15/11 13:18:30	5.35	6.69	
6/15/11 13:18:45	5.33	6.67	
6/15/11 13:19:00	5.36	6.65	
6/15/11 13:19:15	5.40	6.63	
6/15/11 13:19:30	5.46	6.62	
6/15/11 13:19:45	5.41	6.66	
6/15/11 13:20:00	5.42	6.65	
6/15/11 13:20:15	5.39	6.67	
6/15/11 13:20:30	5.37	6.66	
6/15/11 13:20:45	5.37	6.66	
6/15/11 13:21:00	5.34	6.67	
6/15/11 13:21:15	5.39	6.65	
6/15/11 13:21:30	5.39	6.65	
6/15/11 13:21:45	5.39	6.66	
6/15/11 13:22:00	5.39	6.66	
6/15/11 13:22:15	5.38	6.66	
6/15/11 13:22:30	5.41	6.64	

**Valero Port Arthur Refinery: Port Arthur, Texas**

**SRU 544 Incinerator Stack**

**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	Comments
6/15/11 13:22:45	5.50	6.61	544SRU-0011-1 Port Change
6/15/11 13:23:00	5.51	6.63	
6/15/11 13:23:15	5.46	6.66	
6/15/11 13:23:30	5.42	6.69	
6/15/11 13:23:45	5.36	6.71	
6/15/11 13:24:00	5.37	6.69	
6/15/11 13:24:15	5.40	6.66	
6/15/11 13:24:30	5.42	6.64	
6/15/11 13:24:45	5.41	6.65	
6/15/11 13:25:00	5.37	6.67	
6/15/11 13:25:15	5.38	6.67	
6/15/11 13:25:30	5.39	6.68	
6/15/11 13:25:45	5.38	6.69	
6/15/11 13:26:00	5.34	6.69	
6/15/11 13:26:15	5.28	6.70	
6/15/11 13:26:30	5.30	6.68	
6/15/11 13:26:45	5.32	6.66	
6/15/11 13:27:00	5.33	6.66	
6/15/11 13:27:15	5.32	6.68	
6/15/11 13:27:30	5.33	6.68	
6/15/11 13:27:45	5.34	6.68	
6/15/11 13:28:00	5.33	6.68	
6/15/11 13:28:15	5.28	6.70	
6/15/11 13:28:30	5.27	6.69	
6/15/11 13:28:45	5.29	6.68	
6/15/11 13:29:00	5.32	6.66	
6/15/11 13:29:15	5.35	6.65	
6/15/11 13:29:30	5.34	6.65	
6/15/11 13:29:45	5.33	6.66	
6/15/11 13:30:00	5.28	6.67	
6/15/11 13:30:15	5.28	6.66	
6/15/11 13:30:30	5.32	6.65	
6/15/11 13:30:45	5.36	6.65	
6/15/11 13:31:00	5.37	6.65	
6/15/11 13:31:15	5.38	6.65	
6/15/11 13:31:30	5.40	6.63	
6/15/11 13:31:45	5.43	6.61	
6/15/11 13:32:00	5.43	6.61	
6/15/11 13:32:15	5.46	6.60	
6/15/11 13:32:30	5.51	6.61	
6/15/11 13:32:45	5.53	6.63	
6/15/11 13:33:00	5.58	6.64	
6/15/11 13:33:15	5.67	6.62	
6/15/11 13:33:30	5.72	6.62	
6/15/11 13:33:45	5.66	6.65	
6/15/11 13:34:00	5.63	6.66	
6/15/11 13:34:15	5.63	6.66	
6/15/11 13:34:30	5.58	6.70	
6/15/11 13:34:45	5.52	6.75	
6/15/11 13:35:00	5.51	6.77	
6/15/11 13:35:15	5.51	6.79	
6/15/11 13:35:30	5.46	6.83	
6/15/11 13:35:45	5.45	6.82	
6/15/11 13:36:00	5.41	6.83	
6/15/11 13:36:15	5.38	6.83	
6/15/11 13:36:30	5.35	6.83	
6/15/11 13:36:45	5.31	6.84	
6/15/11 13:37:00	5.30	6.84	
6/15/11 13:37:15	5.26	6.86	
6/15/11 13:37:30	5.21	6.89	
6/15/11 13:37:45	5.15	6.90	
6/15/11 13:38:00	5.11	6.90	Restart 544SRU-0011-1
6/15/11 13:38:15	5.04	6.92	
6/15/11 13:38:30	5.00	6.92	
6/15/11 13:38:45	5.00	6.90	
6/15/11 13:39:00	5.05	6.86	
6/15/11 13:39:15	5.09	6.82	
6/15/11 13:39:30	5.13	6.79	
6/15/11 13:39:45	5.19	6.73	
6/15/11 13:40:00	5.23	6.71	
6/15/11 13:40:15	5.22	6.69	
6/15/11 13:40:30	5.24	6.66	
6/15/11 13:40:45	5.29	6.63	
6/15/11 13:41:00	5.32	6.60	
6/15/11 13:41:15	5.35	6.58	
6/15/11 13:41:30	5.34	6.58	
6/15/11 13:41:45	5.34	6.58	
6/15/11 13:42:00	5.34	6.57	
6/15/11 13:42:15	5.36	6.54	
6/15/11 13:42:30	5.37	6.54	
6/15/11 13:42:45	5.37	6.54	
6/15/11 13:43:00	5.37	6.56	
6/15/11 13:43:15	5.34	6.58	
6/15/11 13:43:30	5.33	6.59	
6/15/11 13:43:45	5.32	6.59	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	Comments
6/15/11 13:44:00	5.36	6.56	
6/15/11 13:44:15	5.37	6.55	
6/15/11 13:44:30	5.34	6.56	
6/15/11 13:44:45	5.30	6.58	
6/15/11 13:45:00	5.35	6.59	
6/15/11 13:45:15	5.34	6.62	
6/15/11 13:45:30	5.33	6.64	
6/15/11 13:45:45	5.36	6.62	
6/15/11 13:46:00	5.35	6.62	
6/15/11 13:46:15	5.34	6.61	
6/15/11 13:46:30	5.34	6.61	
6/15/11 13:46:45	5.33	6.62	
6/15/11 13:47:00	5.30	6.66	
6/15/11 13:47:15	5.30	6.68	
6/15/11 13:47:30	5.34	6.68	
6/15/11 13:47:45	5.36	6.68	
6/15/11 13:48:00	5.35	6.67	
6/15/11 13:48:15	5.35	6.64	
6/15/11 13:48:30	5.36	6.62	
6/15/11 13:48:45	5.36	6.61	
6/15/11 13:49:00	5.31	6.65	
6/15/11 13:49:15	5.28	6.68	
6/15/11 13:49:30	5.30	6.69	
6/15/11 13:49:45	5.31	6.70	
6/15/11 13:50:00	5.30	6.69	
6/15/11 13:50:15	5.29	6.67	
6/15/11 13:50:30	5.31	6.64	
6/15/11 13:50:45	5.32	6.62	
6/15/11 13:51:00	5.36	6.60	
6/15/11 13:51:15	5.37	6.62	
6/15/11 13:51:30	5.35	6.64	
6/15/11 13:51:45	5.33	6.66	
6/15/11 13:52:00	5.36	6.64	
6/15/11 13:52:15	5.34	6.66	
6/15/11 13:52:30	5.29	6.66	
6/15/11 13:52:45	5.32	6.64	
6/15/11 13:53:00	5.38	6.62	End Run 544SRU-18-1
6/15/11 13:53:15	5.40	6.63	
6/15/11 13:53:30	5.32	6.68	
6/15/11 13:53:45	5.31	6.68	
6/15/11 13:54:00	5.32	6.68	
6/15/11 13:54:15	5.31	6.68	
6/15/11 13:54:30	5.33	6.67	
6/15/11 13:54:45	5.35	6.66	
6/15/11 13:55:00	5.32	6.68	
6/15/11 13:55:15	5.31	6.69	
6/15/11 13:55:30	5.33	6.68	
6/15/11 13:55:45	5.34	6.67	
6/15/11 13:56:00	5.35	6.66	
6/15/11 13:56:15	5.35	6.66	
6/15/11 13:56:30	5.34	6.66	
6/15/11 13:56:45	5.34	6.67	
6/15/11 13:57:00	5.31	6.69	
6/15/11 13:57:15	5.30	6.69	
6/15/11 13:57:30	5.34	6.68	
6/15/11 13:57:45	5.37	6.66	
6/15/11 13:58:00	5.37	6.65	
6/15/11 13:58:15	5.36	6.64	
6/15/11 13:58:30	5.33	6.64	
6/15/11 13:58:45	5.33	6.64	
6/15/11 13:59:00	5.31	6.66	
6/15/11 13:59:15	5.32	6.67	
6/15/11 13:59:30	5.32	6.69	
6/15/11 13:59:45	5.34	6.69	
6/15/11 14:00:00	5.30	6.70	
6/15/11 14:00:15	5.28	6.70	
6/15/11 14:00:30	5.28	6.68	
6/15/11 14:00:45	5.29	6.66	
6/15/11 14:01:00	5.32	6.66	
6/15/11 14:01:15	5.31	6.66	
6/15/11 14:01:30	5.29	6.68	
6/15/11 14:01:45	5.28	6.68	
6/15/11 14:02:00	5.32	6.67	
6/15/11 14:02:15	5.33	6.66	
6/15/11 14:02:30	5.35	6.64	
6/15/11 14:02:45	5.39	6.62	
6/15/11 14:03:00	5.31	6.65	
6/15/11 14:03:15	5.25	6.67	
6/15/11 14:03:30	5.29	6.64	
6/15/11 14:03:45	5.33	6.63	
6/15/11 14:04:00	5.29	6.64	
6/15/11 14:04:15	5.30	6.63	
6/15/11 14:04:30	5.31	6.62	
6/15/11 14:04:45	5.30	6.62	
6/15/11 14:05:00	5.33	6.60	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	Comments
6/15/11 14:05:15	5.31	6.61	
6/15/11 14:05:30	5.28	6.62	
6/15/11 14:05:45	5.31	6.61	
6/15/11 14:06:00	5.33	6.60	
6/15/11 14:06:15	5.31	6.60	
6/15/11 14:06:30	5.30	6.59	
6/15/11 14:06:45	5.30	6.58	
6/15/11 14:07:00	5.27	6.60	
6/15/11 14:07:15	5.28	6.59	
6/15/11 14:07:30	5.33	6.59	
6/15/11 14:07:45	5.24	6.63	End 544SRU-0011-1
6/15/11 14:08:00	5.23	6.61	
6/15/11 14:08:15	5.27	6.58	
6/15/11 14:08:30	5.31	6.55	
6/15/11 14:08:45	5.32	6.54	
6/15/11 14:09:00	5.29	6.56	
6/15/11 14:09:15	5.33	6.55	
6/15/11 14:09:30	5.35	6.57	
6/15/11 14:09:45	5.34	6.58	
6/15/11 14:10:00	5.37	6.57	
6/15/11 14:10:15	5.38	6.54	
6/15/11 14:10:30	5.35	6.54	
6/15/11 14:10:45	5.36	6.52	
6/15/11 14:11:00	5.34	6.52	
6/15/11 14:11:15	5.34	6.53	
6/15/11 14:11:30	5.37	6.55	
6/15/11 14:11:45	5.37	6.57	
6/15/11 14:12:00	5.36	6.58	
6/15/11 14:12:15	5.31	6.60	
6/15/11 14:12:30	5.27	6.59	
6/15/11 14:12:45	5.29	6.56	
6/15/11 14:13:00	5.35	6.53	
6/15/11 14:13:15	5.38	6.53	
6/15/11 14:13:30	5.40	6.55	
6/15/11 14:13:45	5.40	6.57	
6/15/11 14:14:00	5.39	6.58	
6/15/11 14:14:15	5.37	6.59	
6/15/11 14:14:30	5.32	6.61	
6/15/11 14:14:45	5.28	6.61	
6/15/11 14:15:00	5.30	6.59	
6/15/11 14:15:15	5.37	6.57	
6/15/11 14:15:30	5.37	6.59	
6/15/11 14:15:45	5.31	6.62	
6/15/11 14:16:00	5.31	6.63	
6/15/11 14:16:15	5.30	6.63	
6/15/11 14:16:30	5.33	6.60	
6/15/11 14:16:45	5.37	6.59	
6/15/11 14:17:00	5.36	6.60	
6/15/11 14:17:15	5.35	6.61	
6/15/11 14:17:30	5.35	6.62	
6/15/11 14:17:45	5.35	6.62	
6/15/11 14:18:00	5.37	6.61	
6/15/11 14:18:15	5.32	6.63	
6/15/11 14:18:30	5.32	6.62	
6/15/11 14:18:45	5.38	6.58	
6/15/11 14:19:00	5.39	6.58	
6/15/11 14:19:15	5.36	6.60	
6/15/11 14:19:30	5.30	6.64	
6/15/11 14:19:45	5.31	6.65	
6/15/11 14:20:00	5.33	6.64	Start 544SRU-308-1
6/15/11 14:20:15	5.30	6.64	
6/15/11 14:20:30	5.28	6.62	
6/15/11 14:20:45	5.24	6.62	
6/15/11 14:21:00	5.30	6.57	
6/15/11 14:21:15	5.34	6.56	
6/15/11 14:21:30	5.31	6.59	
6/15/11 14:21:45	5.31	6.60	
6/15/11 14:22:00	5.32	6.61	
6/15/11 14:22:15	5.33	6.60	
6/15/11 14:22:30	5.35	6.58	
6/15/11 14:22:45	5.34	6.56	
6/15/11 14:23:00	5.37	6.52	
6/15/11 14:23:15	5.41	6.50	
6/15/11 14:23:30	5.42	6.51	
6/15/11 14:23:45	5.41	6.53	
6/15/11 14:24:00	5.38	6.56	
6/15/11 14:24:15	5.37	6.57	
6/15/11 14:24:30	5.36	6.57	
6/15/11 14:24:45	5.36	6.56	
6/15/11 14:25:00	5.32	6.57	
6/15/11 14:25:15	5.34	6.54	
6/15/11 14:25:30	5.35	6.53	
6/15/11 14:25:45	5.32	6.56	
6/15/11 14:26:00	5.28	6.59	
6/15/11 14:26:15	5.28	6.60	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	Comments
6/15/11 14:26:30	5.28	6.60	
6/15/11 14:26:45	5.27	6.59	
6/15/11 14:27:00	5.27	6.60	
6/15/11 14:27:15	5.26	6.61	
6/15/11 14:27:30	5.29	6.60	
6/15/11 14:27:45	5.33	6.60	
6/15/11 14:28:00	5.33	6.60	
6/15/11 14:28:15	5.32	6.60	
6/15/11 14:28:30	5.31	6.60	
6/15/11 14:28:45	5.29	6.60	
6/15/11 14:29:00	5.27	6.61	
6/15/11 14:29:15	5.29	6.60	
6/15/11 14:29:30	5.31	6.60	
6/15/11 14:29:45	5.36	6.60	
6/15/11 14:30:00	5.37	6.61	
6/15/11 14:30:15	5.33	6.63	
6/15/11 14:30:30	5.33	6.62	
6/15/11 14:30:45	5.35	6.59	
6/15/11 14:31:00	5.36	6.58	
6/15/11 14:31:15	5.35	6.57	
6/15/11 14:31:30	5.35	6.58	
6/15/11 14:31:45	5.28	6.63	
6/15/11 14:32:00	5.26	6.65	
6/15/11 14:32:15	5.30	6.64	
6/15/11 14:32:30	5.31	6.63	
6/15/11 14:32:45	5.31	6.61	
6/15/11 14:33:00	5.34	6.58	
6/15/11 14:33:15	5.35	6.56	
6/15/11 14:33:30	5.34	6.57	
6/15/11 14:33:45	5.34	6.58	
6/15/11 14:34:00	5.32	6.61	
6/15/11 14:34:15	5.31	6.63	
6/15/11 14:34:30	5.32	6.63	
6/15/11 14:34:45	5.33	6.60	
6/15/11 14:35:00	5.33	6.58	
6/15/11 14:35:15	5.32	6.58	
6/15/11 14:35:30	5.32	6.57	
6/15/11 14:35:45	5.38	6.55	
6/15/11 14:36:00	5.41	6.57	
6/15/11 14:36:15	5.39	6.59	
6/15/11 14:36:30	5.41	6.59	
6/15/11 14:36:45	5.42	6.57	
6/15/11 14:37:00	5.42	6.56	
6/15/11 14:37:15	5.37	6.57	
6/15/11 14:37:30	5.36	6.56	
6/15/11 14:37:45	5.39	6.56	
6/15/11 14:38:00	5.39	6.58	
6/15/11 14:38:15	5.36	6.60	
6/15/11 14:38:30	5.36	6.60	
6/15/11 14:38:45	5.36	6.60	
6/15/11 14:39:00	5.38	6.59	
6/15/11 14:39:15	5.36	6.59	
6/15/11 14:39:30	5.39	6.57	
6/15/11 14:39:45	5.37	6.59	
6/15/11 14:40:00	5.34	6.62	
6/15/11 14:40:15	5.30	6.64	
6/15/11 14:40:30	5.31	6.63	
6/15/11 14:40:45	5.30	6.63	
6/15/11 14:41:00	5.30	6.62	
6/15/11 14:41:15	5.29	6.63	
6/15/11 14:41:30	5.27	6.64	
6/15/11 14:41:45	5.22	6.67	
6/15/11 14:42:00	5.22	6.67	
6/15/11 14:42:15	5.24	6.67	
6/15/11 14:42:30	5.31	6.62	
6/15/11 14:42:45	5.34	6.60	
6/15/11 14:43:00	5.31	6.60	
6/15/11 14:43:15	5.29	6.59	
6/15/11 14:43:30	5.31	6.58	
6/15/11 14:43:45	5.34	6.56	
6/15/11 14:44:00	5.38	6.55	
6/15/11 14:44:15	5.35	6.57	
6/15/11 14:44:30	5.35	6.56	
6/15/11 14:44:45	5.35	6.55	
6/15/11 14:45:00	5.33	6.55	
6/15/11 14:45:15	5.34	6.54	
6/15/11 14:45:30	5.36	6.52	
6/15/11 14:45:45	5.39	6.51	
6/15/11 14:46:00	5.37	6.54	
6/15/11 14:46:15	5.34	6.57	
6/15/11 14:46:30	5.34	6.57	
6/15/11 14:46:45	5.37	6.55	
6/15/11 14:47:00	5.34	6.56	
6/15/11 14:47:15	5.30	6.56	
6/15/11 14:47:30	5.32	6.55	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	Comments
6/15/11 14:47:45	5.31	6.55	
6/15/11 14:48:00	5.35	6.54	
6/15/11 14:48:15	5.35	6.56	
6/15/11 14:48:30	5.38	6.56	
6/15/11 14:48:45	5.37	6.58	
6/15/11 14:49:00	5.33	6.58	Begin 544SRU-0011-2
6/15/11 14:49:15	5.32	6.57	
6/15/11 14:49:30	5.32	6.55	
6/15/11 14:49:45	5.32	6.56	
6/15/11 14:50:00	5.33	6.56	
6/15/11 14:50:15	5.34	6.57	
6/15/11 14:50:30	5.32	6.59	
6/15/11 14:50:45	5.34	6.59	
6/15/11 14:51:00	5.35	6.59	
6/15/11 14:51:15	5.31	6.60	
6/15/11 14:51:30	5.30	6.60	
6/15/11 14:51:45	5.30	6.59	
6/15/11 14:52:00	5.26	6.61	
6/15/11 14:52:15	5.28	6.62	
6/15/11 14:52:30	5.29	6.62	
6/15/11 14:52:45	5.33	6.61	
6/15/11 14:53:00	5.34	6.60	
6/15/11 14:53:15	5.31	6.60	
6/15/11 14:53:30	5.30	6.60	
6/15/11 14:53:45	5.30	6.60	
6/15/11 14:54:00	5.33	6.58	
6/15/11 14:54:15	5.35	6.58	
6/15/11 14:54:30	5.31	6.60	
6/15/11 14:54:45	5.31	6.60	
6/15/11 14:55:00	5.31	6.59	
6/15/11 14:55:15	5.32	6.58	
6/15/11 14:55:30	5.34	6.56	
6/15/11 14:55:45	5.36	6.55	
6/15/11 14:56:00	5.39	6.55	
6/15/11 14:56:15	5.38	6.56	
6/15/11 14:56:30	5.33	6.59	
6/15/11 14:56:45	5.31	6.60	
6/15/11 14:57:00	5.33	6.58	
6/15/11 14:57:15	5.37	6.56	
6/15/11 14:57:30	5.35	6.56	
6/15/11 14:57:45	5.32	6.57	
6/15/11 14:58:00	5.35	6.57	
6/15/11 14:58:15	5.33	6.59	
6/15/11 14:58:30	5.36	6.60	
6/15/11 14:58:45	5.35	6.60	
6/15/11 14:59:00	5.34	6.60	
6/15/11 14:59:15	5.35	6.58	
6/15/11 14:59:30	5.39	6.55	
6/15/11 14:59:45	5.39	6.55	
6/15/11 15:00:00	5.39	6.56	
6/15/11 15:00:15	5.35	6.60	
6/15/11 15:00:30	5.35	6.62	
6/15/11 15:00:45	5.31	6.64	
6/15/11 15:01:00	5.32	6.64	
6/15/11 15:01:15	5.31	6.63	
6/15/11 15:01:30	5.31	6.62	
6/15/11 15:01:45	5.33	6.60	
6/15/11 15:02:00	5.33	6.60	
6/15/11 15:02:15	5.39	6.59	
6/15/11 15:02:30	5.42	6.59	
6/15/11 15:02:45	5.41	6.61	
6/15/11 15:03:00	5.37	6.61	
6/15/11 15:03:15	5.37	6.59	
6/15/11 15:03:30	5.38	6.58	
6/15/11 15:03:45	5.37	6.58	
6/15/11 15:04:00	5.35	6.59	
6/15/11 15:04:15	5.34	6.61	
6/15/11 15:04:30	5.32	6.64	
6/15/11 15:04:45	5.33	6.65	
6/15/11 15:05:00	5.33	6.65	
6/15/11 15:05:15	5.34	6.63	
6/15/11 15:05:30	5.37	6.60	
6/15/11 15:05:45	5.41	6.57	
6/15/11 15:06:00	5.43	6.56	
6/15/11 15:06:15	5.39	6.58	
6/15/11 15:06:30	5.38	6.60	
6/15/11 15:06:45	5.38	6.60	
6/15/11 15:07:00	5.40	6.59	
6/15/11 15:07:15	5.46	6.57	
6/15/11 15:07:30	5.40	6.59	
6/15/11 15:07:45	5.30	6.62	
6/15/11 15:08:00	5.30	6.61	
6/15/11 15:08:15	5.30	6.62	
6/15/11 15:08:30	5.33	6.62	
6/15/11 15:08:45	5.30	6.63	

## Valero Port Arthur Refinery: Port Arthur, Texas

## SRU 544 Incinerator Stack

## ARI Reference Method Monitoring Data

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	Comments
6/15/11 15:09:00	5.29	6.63	
6/15/11 15:09:15	5.30	6.61	
6/15/11 15:09:30	5.30	6.61	
6/15/11 15:09:45	5.30	6.61	
6/15/11 15:10:00	5.32	6.60	
6/15/11 15:10:15	5.31	6.61	
6/15/11 15:10:30	5.27	6.63	
6/15/11 15:10:45	5.21	6.64	
6/15/11 15:11:00	5.28	6.59	
6/15/11 15:11:15	5.35	6.54	
6/15/11 15:11:30	5.37	6.53	
6/15/11 15:11:45	5.37	6.53	
6/15/11 15:12:00	5.34	6.56	
6/15/11 15:12:15	5.32	6.57	
6/15/11 15:12:30	5.31	6.57	
6/15/11 15:12:45	5.36	6.55	
6/15/11 15:13:00	5.37	6.54	
6/15/11 15:13:15	5.34	6.54	
6/15/11 15:13:30	5.34	6.54	
6/15/11 15:13:45	5.34	6.54	
6/15/11 15:14:00	5.33	6.56	
6/15/11 15:14:15	5.32	6.58	
6/15/11 15:14:30	5.31	6.59	
6/15/11 15:14:45	5.33	6.58	
6/15/11 15:15:00	5.33	6.56	
6/15/11 15:15:15	5.37	6.53	
6/15/11 15:15:30	5.38	6.52	
6/15/11 15:15:45	5.36	6.53	
6/15/11 15:16:00	5.32	6.55	
6/15/11 15:16:15	5.30	6.57	
6/15/11 15:16:30	5.34	6.56	
6/15/11 15:16:45	5.36	6.57	
6/15/11 15:17:00	5.34	6.58	
6/15/11 15:17:15	5.33	6.57	
6/15/11 15:17:30	5.32	6.57	
6/15/11 15:17:45	5.33	6.57	
6/15/11 15:18:00	5.35	6.56	
6/15/11 15:18:15	5.37	6.57	
6/15/11 15:18:30	5.37	6.58	
6/15/11 15:18:45	5.36	6.59	544SRU-0011-2 Port Change
6/15/11 15:19:00	5.38	6.57	
6/15/11 15:19:15	5.40	6.56	
6/15/11 15:19:30	5.41	6.55	
6/15/11 15:19:45	5.38	6.57	End 544SRU-308-1
6/15/11 15:20:00	5.33	6.59	
6/15/11 15:20:15	5.31	6.60	
6/15/11 15:20:30	5.31	6.61	
6/15/11 15:20:45	5.33	6.61	
6/15/11 15:21:00	5.35	6.59	
6/15/11 15:21:15	5.34	6.59	
6/15/11 15:21:30	5.32	6.59	
6/15/11 15:21:45	5.33	6.58	
6/15/11 15:22:00	5.34	6.58	
6/15/11 15:22:15	5.35	6.58	
6/15/11 15:22:30	5.32	6.60	
6/15/11 15:22:45	5.29	6.63	544SRU-0011-2 Restart
6/15/11 15:23:00	5.32	6.61	
6/15/11 15:23:15	5.31	6.61	
6/15/11 15:23:30	5.32	6.60	
6/15/11 15:23:45	5.36	6.58	
6/15/11 15:24:00	5.39	6.56	
6/15/11 15:24:15	5.35	6.59	
6/15/11 15:24:30	5.34	6.60	
6/15/11 15:24:45	5.33	6.61	
6/15/11 15:25:00	5.34	6.60	
6/15/11 15:25:15	5.38	6.57	
6/15/11 15:25:30	5.34	6.58	
6/15/11 15:25:45	5.34	6.57	
6/15/11 15:26:00	5.35	6.58	
6/15/11 15:26:15	5.34	6.60	
6/15/11 15:26:30	5.35	6.60	
6/15/11 15:26:45	5.39	6.59	
6/15/11 15:27:00	5.36	6.60	
6/15/11 15:27:15	5.35	6.59	
6/15/11 15:27:30	5.35	6.59	
6/15/11 15:27:45	5.33	6.59	
6/15/11 15:28:00	5.30	6.61	
6/15/11 15:28:15	5.31	6.60	
6/15/11 15:28:30	5.36	6.59	
6/15/11 15:28:45	5.37	6.60	
6/15/11 15:29:00	5.35	6.61	
6/15/11 15:29:15	5.34	6.60	
6/15/11 15:29:30	5.37	6.58	
6/15/11 15:29:45	5.39	6.56	
6/15/11 15:30:00	5.41	6.55	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	Comments
6/15/11 15:30:15	5.43	6.55	
6/15/11 15:30:30	5.41	6.57	
6/15/11 15:30:45	5.41	6.57	
6/15/11 15:31:00	5.41	6.57	
6/15/11 15:31:15	5.40	6.56	
6/15/11 15:31:30	5.39	6.55	
6/15/11 15:31:45	5.37	6.56	
6/15/11 15:32:00	5.39	6.55	
6/15/11 15:32:15	5.35	6.58	
6/15/11 15:32:30	5.30	6.62	
6/15/11 15:32:45	5.28	6.64	
6/15/11 15:33:00	5.32	6.62	
6/15/11 15:33:15	5.35	6.60	
6/15/11 15:33:30	5.32	6.61	
6/15/11 15:33:45	5.32	6.60	
6/15/11 15:34:00	5.32	6.60	
6/15/11 15:34:15	5.32	6.61	
6/15/11 15:34:30	5.30	6.63	
6/15/11 15:34:45	5.30	6.63	
6/15/11 15:35:00	5.32	6.62	
6/15/11 15:35:15	5.35	6.59	
6/15/11 15:35:30	5.39	6.57	
6/15/11 15:35:45	5.39	6.57	
6/15/11 15:36:00	5.35	6.59	
6/15/11 15:36:15	5.35	6.59	
6/15/11 15:36:30	5.34	6.60	
6/15/11 15:36:45	5.33	6.60	
6/15/11 15:37:00	5.34	6.59	
6/15/11 15:37:15	5.36	6.57	
6/15/11 15:37:30	5.36	6.57	
6/15/11 15:37:45	5.38	6.56	
6/15/11 15:38:00	5.36	6.57	
6/15/11 15:38:15	5.38	6.55	
6/15/11 15:38:30	5.40	6.55	
6/15/11 15:38:45	5.35	6.56	
6/15/11 15:39:00	5.40	6.52	
6/15/11 15:39:15	5.39	6.52	
6/15/11 15:39:30	5.36	6.52	
6/15/11 15:39:45	5.38	6.50	
6/15/11 15:40:00	5.38	6.52	
6/15/11 15:40:15	5.35	6.54	
6/15/11 15:40:30	5.34	6.56	
6/15/11 15:40:45	5.31	6.57	
6/15/11 15:41:00	5.29	6.58	
6/15/11 15:41:15	5.29	6.56	
6/15/11 15:41:30	5.29	6.54	
6/15/11 15:41:45	5.32	6.51	
6/15/11 15:42:00	5.31	6.52	
6/15/11 15:42:15	5.30	6.54	
6/15/11 15:42:30	5.31	6.55	
6/15/11 15:42:45	5.32	6.56	
6/15/11 15:43:00	5.31	6.56	
6/15/11 15:43:15	5.31	6.55	
6/15/11 15:43:30	5.34	6.53	
6/15/11 15:43:45	5.35	6.52	
6/15/11 15:44:00	5.33	6.53	
6/15/11 15:44:15	5.35	6.54	
6/15/11 15:44:30	5.36	6.56	
6/15/11 15:44:45	5.35	6.58	
6/15/11 15:45:00	5.34	6.58	
6/15/11 15:45:15	5.37	6.56	
6/15/11 15:45:30	5.35	6.56	
6/15/11 15:45:45	5.32	6.56	
6/15/11 15:46:00	5.31	6.56	
6/15/11 15:46:15	5.32	6.56	
6/15/11 15:46:30	5.35	6.58	
6/15/11 15:46:45	5.32	6.61	
6/15/11 15:47:00	5.30	6.63	
6/15/11 15:47:15	5.28	6.64	
6/15/11 15:47:30	5.26	6.64	
6/15/11 15:47:45	5.30	6.61	
6/15/11 15:48:00	5.32	6.60	
6/15/11 15:48:15	5.34	6.59	
6/15/11 15:48:30	5.33	6.60	
6/15/11 15:48:45	5.30	6.63	
6/15/11 15:49:00	5.27	6.65	
6/15/11 15:49:15	5.27	6.64	
6/15/11 15:49:30	5.28	6.63	
6/15/11 15:49:45	5.32	6.60	
6/15/11 15:50:00	5.31	6.61	
6/15/11 15:50:15	5.32	6.60	
6/15/11 15:50:30	5.32	6.60	
6/15/11 15:50:45	5.34	6.60	
6/15/11 15:51:00	5.31	6.62	
6/15/11 15:51:15	5.28	6.62	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	Comments
6/15/11 15:51:30	5.28	6.60	
6/15/11 15:51:45	5.33	6.56	
6/15/11 15:52:00	5.33	6.56	
6/15/11 15:52:15	5.31	6.57	
6/15/11 15:52:30	5.32	6.58	
6/15/11 15:52:45	5.31	6.60	End 544SRU-0011-2
6/15/11 15:53:00	5.33	6.59	
6/15/11 15:53:15	5.34	6.59	
6/15/11 15:53:30	5.34	6.58	
6/15/11 15:53:45	5.34	6.56	
6/15/11 15:54:00	5.33	6.55	
6/15/11 15:54:15	5.34	6.54	
6/15/11 15:54:30	5.39	6.54	
6/15/11 15:54:45	5.37	6.57	
6/15/11 15:55:00	5.34	6.60	
6/15/11 15:55:15	5.30	6.61	
6/15/11 15:55:30	5.35	6.57	
6/15/11 15:55:45	5.38	6.54	
6/15/11 15:56:00	5.39	6.51	
6/15/11 15:56:15	5.46	6.35	
6/15/11 15:56:30	7.05	4.49	
6/15/11 15:56:45	6.78	3.82	
6/15/11 15:57:00	5.26	3.95	
6/15/11 15:57:15	4.95	3.95	
6/15/11 15:57:30	4.92	4.19	
6/15/11 15:57:45	4.91	4.33	System Bias
6/15/11 15:58:00	4.90	4.37	O <sub>2</sub> Bias 2 Mid = 4.90
6/15/11 15:58:15	4.90	4.37	CO <sub>2</sub> Bias 2 Mid = 4.37
6/15/11 15:58:30	4.90	4.37	
6/15/11 15:58:45	4.90	4.37	
6/15/11 15:59:00	4.71	4.07	
6/15/11 15:59:15	2.50	1.94	
6/15/11 15:59:30	0.47	0.44	
6/15/11 15:59:45	0.04	0.17	
6/15/11 16:00:00	0.00	0.13	System Bias
6/15/11 16:00:15	-0.01	0.12	O <sub>2</sub> Bias 2 Zero = -0.02
6/15/11 16:00:30	-0.02	0.11	CO <sub>2</sub> Bias 2 Zero = 0.10
6/15/11 16:00:45	-0.02	0.10	
6/15/11 16:01:00	-0.03	0.09	
6/15/11 16:01:15	0.74	1.49	
6/15/11 16:01:30	3.29	4.44	
6/15/11 16:01:45	4.83	6.11	
6/15/11 16:02:00	5.29	6.47	Begin 544SRU-18-2
6/15/11 16:02:15	5.35	6.54	
6/15/11 16:02:30	5.35	6.58	
6/15/11 16:02:45	5.32	6.61	
6/15/11 16:03:00	5.30	6.63	
6/15/11 16:03:15	5.28	6.64	
6/15/11 16:03:30	5.26	6.64	
6/15/11 16:03:45	5.30	6.61	
6/15/11 16:04:00	5.32	6.60	
6/15/11 16:04:15	5.34	6.59	
6/15/11 16:04:30	5.33	6.60	
6/15/11 16:04:45	5.30	6.63	
6/15/11 16:05:00	5.27	6.65	
6/15/11 16:05:15	5.27	6.64	
6/15/11 16:05:30	5.28	6.63	
6/15/11 16:05:45	5.32	6.60	
6/15/11 16:06:00	5.31	6.61	
6/15/11 16:06:15	5.35	6.59	
6/15/11 16:06:30	5.35	6.59	
6/15/11 16:06:45	5.34	6.60	
6/15/11 16:07:00	5.33	6.60	
6/15/11 16:07:15	5.34	6.59	
6/15/11 16:07:30	5.36	6.57	
6/15/11 16:07:45	5.36	6.57	
6/15/11 16:08:00	5.38	6.56	
6/15/11 16:08:15	5.36	6.57	
6/15/11 16:08:30	5.38	6.55	
6/15/11 16:08:45	5.40	6.55	
6/15/11 16:09:00	5.33	6.60	
6/15/11 16:09:15	5.34	6.59	
6/15/11 16:09:30	5.36	6.57	
6/15/11 16:09:45	5.36	6.57	Begin 544SRU-0011-3
6/15/11 16:10:00	5.38	6.56	
6/15/11 16:10:15	5.33	6.60	
6/15/11 16:10:30	5.34	6.59	
6/15/11 16:10:45	5.36	6.57	
6/15/11 16:11:00	5.36	6.57	
6/15/11 16:11:15	5.38	6.56	
6/15/11 16:11:30	5.36	6.57	
6/15/11 16:11:45	5.38	6.55	
6/15/11 16:12:00	5.39	6.52	
6/15/11 16:12:15	5.40	6.50	
6/15/11 16:12:30	5.32	6.53	

**Valero Port Arthur Refinery: Port Arthur, Texas**

**SRU 544 Incinerator Stack**

**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	Comments
6/15/11 16:12:45	5.26	6.57	
6/15/11 16:13:00	5.26	6.58	
6/15/11 16:13:15	5.29	6.60	
6/15/11 16:13:30	5.33	6.59	
6/15/11 16:13:45	5.36	6.59	
6/15/11 16:14:00	5.38	6.57	
6/15/11 16:14:15	5.36	6.57	
6/15/11 16:14:30	5.31	6.58	
6/15/11 16:14:45	5.28	6.59	
6/15/11 16:15:00	5.27	6.59	
6/15/11 16:15:15	5.31	6.60	
6/15/11 16:15:30	5.28	6.63	
6/15/11 16:15:45	5.28	6.63	
6/15/11 16:16:00	5.32	6.60	
6/15/11 16:16:15	5.33	6.58	
6/15/11 16:16:30	5.31	6.58	
6/15/11 16:16:45	5.26	6.59	
6/15/11 16:17:00	5.27	6.59	
6/15/11 16:17:15	5.29	6.59	
6/15/11 16:17:30	5.31	6.59	
6/15/11 16:17:45	5.31	6.59	
6/15/11 16:18:00	5.30	6.59	
6/15/11 16:18:15	5.33	6.57	
6/15/11 16:18:30	5.35	6.55	
6/15/11 16:18:45	5.32	6.56	
6/15/11 16:19:00	5.26	6.59	
6/15/11 16:19:15	5.23	6.60	
6/15/11 16:19:30	5.28	6.57	
6/15/11 16:19:45	5.31	6.57	
6/15/11 16:20:00	5.28	6.58	
6/15/11 16:20:15	5.28	6.56	
6/15/11 16:20:30	5.31	6.55	
6/15/11 16:20:45	5.29	6.55	
6/15/11 16:21:00	5.28	6.55	
6/15/11 16:21:15	5.30	6.55	
6/15/11 16:21:30	5.31	6.55	
6/15/11 16:21:45	5.35	6.54	
6/15/11 16:22:00	5.34	6.54	
6/15/11 16:22:15	5.31	6.54	
6/15/11 16:22:30	5.32	6.53	
6/15/11 16:22:45	5.32	6.53	
6/15/11 16:23:00	5.33	6.54	
6/15/11 16:23:15	5.33	6.55	
6/15/11 16:23:30	5.36	6.55	
6/15/11 16:23:45	5.36	6.55	
6/15/11 16:24:00	5.35	6.55	
6/15/11 16:24:15	5.35	6.55	
6/15/11 16:24:30	5.34	6.55	
6/15/11 16:24:45	5.31	6.55	
6/15/11 16:25:00	5.33	6.54	
6/15/11 16:25:15	5.34	6.55	
6/15/11 16:25:30	5.30	6.58	
6/15/11 16:25:45	5.29	6.60	
6/15/11 16:26:00	5.32	6.58	
6/15/11 16:26:15	5.33	6.56	
6/15/11 16:26:30	5.27	6.56	
6/15/11 16:26:45	5.23	6.57	
6/15/11 16:27:00	5.25	6.56	
6/15/11 16:27:15	5.28	6.57	
6/15/11 16:27:30	5.27	6.59	
6/15/11 16:27:45	5.28	6.61	
6/15/11 16:28:00	5.28	6.62	
6/15/11 16:28:15	5.26	6.63	
6/15/11 16:28:30	5.29	6.61	
6/15/11 16:28:45	5.31	6.58	
6/15/11 16:29:00	5.35	6.56	
6/15/11 16:29:15	5.35	6.56	
6/15/11 16:29:30	5.30	6.60	
6/15/11 16:29:45	5.28	6.62	
6/15/11 16:30:00	5.24	6.64	
6/15/11 16:30:15	5.25	6.63	
6/15/11 16:30:30	5.28	6.61	
6/15/11 16:30:45	5.31	6.59	
6/15/11 16:31:00	5.33	6.57	
6/15/11 16:31:15	5.37	6.56	
6/15/11 16:31:30	5.34	6.59	
6/15/11 16:31:45	5.31	6.60	
6/15/11 16:32:00	5.33	6.59	
6/15/11 16:32:15	5.34	6.58	
6/15/11 16:32:30	5.33	6.57	
6/15/11 16:32:45	5.33	6.57	
6/15/11 16:33:00	5.33	6.57	
6/15/11 16:33:15	5.35	6.57	
6/15/11 16:33:30	5.35	6.60	
6/15/11 16:33:45	5.35	6.62	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	Comments
6/15/11 16:34:00	5.35	6.61	
6/15/11 16:34:15	5.37	6.60	
6/15/11 16:34:30	5.38	6.58	
6/15/11 16:34:45	5.38	6.56	
6/15/11 16:35:00	5.36	6.56	
6/15/11 16:35:15	5.34	6.58	
6/15/11 16:35:30	5.37	6.59	
6/15/11 16:35:45	5.38	6.61	
6/15/11 16:36:00	5.37	6.63	
6/15/11 16:36:15	5.35	6.63	
6/15/11 16:36:30	5.39	6.60	
6/15/11 16:36:45	5.38	6.59	
6/15/11 16:37:00	5.39	6.58	
6/15/11 16:37:15	5.35	6.60	
6/15/11 16:37:30	5.30	6.64	
6/15/11 16:37:45	5.31	6.66	
6/15/11 16:38:00	5.35	6.67	
6/15/11 16:38:15	5.32	6.69	
6/15/11 16:38:30	5.34	6.67	
6/15/11 16:38:45	5.36	6.64	
6/15/11 16:39:00	5.36	6.62	
6/15/11 16:39:15	5.31	6.63	
6/15/11 16:39:30	5.33	6.63	
6/15/11 16:39:45	5.33	6.65	544SRU-0011-3 Port Change
6/15/11 16:40:00	5.34	6.67	
6/15/11 16:40:15	5.32	6.70	
6/15/11 16:40:30	5.32	6.70	
6/15/11 16:40:45	5.33	6.69	
6/15/11 16:41:00	5.33	6.66	
6/15/11 16:41:15	5.35	6.63	
6/15/11 16:41:30	5.36	6.62	
6/15/11 16:41:45	5.36	6.63	
6/15/11 16:42:00	5.34	6.65	
6/15/11 16:42:15	5.29	6.69	
6/15/11 16:42:30	5.29	6.70	
6/15/11 16:42:45	5.29	6.71	
6/15/11 16:43:00	5.25	6.71	
6/15/11 16:43:15	5.28	6.69	
6/15/11 16:43:30	5.26	6.68	
6/15/11 16:43:45	5.27	6.67	
6/15/11 16:44:00	5.24	6.69	
6/15/11 16:44:15	5.29	6.66	
6/15/11 16:44:30	5.33	6.65	
6/15/11 16:44:45	5.35	6.65	
6/15/11 16:45:00	5.34	6.65	
6/15/11 16:45:15	5.35	6.64	
6/15/11 16:45:30	5.35	6.64	
6/15/11 16:45:45	5.34	6.64	
6/15/11 16:46:00	5.33	6.65	
6/15/11 16:46:15	5.35	6.64	
6/15/11 16:46:30	5.37	6.64	
6/15/11 16:46:45	5.35	6.65	
6/15/11 16:47:00	5.31	6.66	Restart 544SRU-0011-3
6/15/11 16:47:15	5.30	6.65	
6/15/11 16:47:30	5.34	6.63	
6/15/11 16:47:45	5.32	6.65	
6/15/11 16:48:00	5.38	6.63	
6/15/11 16:48:15	5.43	6.63	
6/15/11 16:48:30	5.39	6.66	
6/15/11 16:48:45	5.37	6.66	
6/15/11 16:49:00	5.39	6.64	
6/15/11 16:49:15	5.40	6.62	
6/15/11 16:49:30	5.40	6.60	
6/15/11 16:49:45	5.43	6.60	
6/15/11 16:50:00	5.41	6.64	
6/15/11 16:50:15	5.34	6.69	
6/15/11 16:50:30	5.34	6.70	
6/15/11 16:50:45	5.36	6.70	
6/15/11 16:51:00	5.34	6.69	
6/15/11 16:51:15	5.33	6.67	
6/15/11 16:51:30	5.32	6.66	
6/15/11 16:51:45	5.31	6.64	
6/15/11 16:52:00	5.35	6.63	
6/15/11 16:52:15	5.39	6.63	
6/15/11 16:52:30	5.40	6.66	
6/15/11 16:52:45	5.38	6.68	
6/15/11 16:53:00	5.33	6.69	
6/15/11 16:53:15	5.34	6.67	
6/15/11 16:53:30	5.34	6.65	
6/15/11 16:53:45	5.33	6.63	
6/15/11 16:54:00	5.33	6.62	
6/15/11 16:54:15	5.35	6.62	
6/15/11 16:54:30	5.34	6.64	
6/15/11 16:54:45	5.33	6.67	
6/15/11 16:55:00	5.32	6.66	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	Comments
6/15/11 16:55:15	5.33	6.65	
6/15/11 16:55:30	5.31	6.64	
6/15/11 16:55:45	5.31	6.61	
6/15/11 16:56:00	5.33	6.59	
6/15/11 16:56:15	5.32	6.60	
6/15/11 16:56:30	5.32	6.60	
6/15/11 16:56:45	5.35	6.60	
6/15/11 16:57:00	5.35	6.60	
6/15/11 16:57:15	5.31	6.61	
6/15/11 16:57:30	5.28	6.61	
6/15/11 16:57:45	5.31	6.58	
6/15/11 16:58:00	5.33	6.56	
6/15/11 16:58:15	5.38	6.52	
6/15/11 16:58:30	5.40	6.52	
6/15/11 16:58:45	5.43	6.51	
6/15/11 16:59:00	5.42	6.53	
6/15/11 16:59:15	5.39	6.54	
6/15/11 16:59:30	5.39	6.53	
6/15/11 16:59:45	5.39	6.52	
6/15/11 17:00:00	5.38	6.52	
6/15/11 17:00:15	5.38	6.53	
6/15/11 17:00:30	5.38	6.54	
6/15/11 17:00:45	5.39	6.55	
6/15/11 17:01:00	5.35	6.57	
6/15/11 17:01:15	5.35	6.56	
6/15/11 17:01:30	5.38	6.55	
6/15/11 17:01:45	5.39	6.54	
6/15/11 17:02:00	5.38	6.53	
6/15/11 17:02:15	5.37	6.54	
6/15/11 17:02:30	5.40	6.53	
6/15/11 17:02:45	5.42	6.54	
6/15/11 17:03:00	5.42	6.56	
6/15/11 17:03:15	5.36	6.57	
6/15/11 17:03:30	5.35	6.56	
6/15/11 17:03:45	5.35	6.54	
6/15/11 17:04:00	5.34	6.53	
6/15/11 17:04:15	5.34	6.52	
6/15/11 17:04:30	5.35	6.52	
6/15/11 17:04:45	5.35	6.54	
6/15/11 17:05:00	5.34	6.55	
6/15/11 17:05:15	5.35	6.54	
6/15/11 17:05:30	5.35	6.53	
6/15/11 17:05:45	5.33	6.52	
6/15/11 17:06:00	5.34	6.50	
6/15/11 17:06:15	5.35	6.49	
6/15/11 17:06:30	5.35	6.49	
6/15/11 17:06:45	5.37	6.51	
6/15/11 17:07:00	5.34	6.53	
6/15/11 17:07:15	5.35	6.53	
6/15/11 17:07:30	5.35	6.52	
6/15/11 17:07:45	5.32	6.51	
6/15/11 17:08:00	5.33	6.49	
6/15/11 17:08:15	5.35	6.46	
6/15/11 17:08:30	5.37	6.45	
6/15/11 17:08:45	5.36	6.46	
6/15/11 17:09:00	5.35	6.47	
6/15/11 17:09:15	5.37	6.47	
6/15/11 17:09:30	5.40	6.46	
6/15/11 17:09:45	5.39	6.47	
6/15/11 17:10:00	5.36	6.48	
6/15/11 17:10:15	5.35	6.48	
6/15/11 17:10:30	5.38	6.47	
6/15/11 17:10:45	5.38	6.48	
6/15/11 17:11:00	5.33	6.50	
6/15/11 17:11:15	5.36	6.48	
6/15/11 17:11:30	5.39	6.47	
6/15/11 17:11:45	5.35	6.49	
6/15/11 17:12:00	5.36	6.49	
6/15/11 17:12:15	5.38	6.49	
6/15/11 17:12:30	5.34	6.52	
6/15/11 17:12:45	5.34	6.52	
6/15/11 17:13:00	5.35	6.51	
6/15/11 17:13:15	5.41	6.48	
6/15/11 17:13:30	5.39	6.48	
6/15/11 17:13:45	5.40	6.47	
6/15/11 17:14:00	5.42	6.47	
6/15/11 17:14:15	5.40	6.50	
6/15/11 17:14:30	5.36	6.52	
6/15/11 17:14:45	5.35	6.53	
6/15/11 17:15:00	5.35	6.52	
6/15/11 17:15:15	5.36	6.51	
6/15/11 17:15:30	5.35	6.49	
6/15/11 17:15:45	5.38	6.47	
6/15/11 17:16:00	5.35	6.48	
6/15/11 17:16:15	5.35	6.50	

End 544SRU-18-2

**Valero Port Arthur Refinery: Port Arthur, Texas**

**SRU 544 Incinerator Stack**

**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	Comments
6/15/11 17:16:30	5.30	6.51	
6/15/11 17:16:45	5.35	6.49	
6/15/11 17:17:00	5.32	6.51	End 544SRU-0011-3
6/15/11 17:17:15	5.28	6.50	
6/15/11 17:17:30	5.33	6.46	
6/15/11 17:17:45	5.32	6.46	
6/15/11 17:18:00	5.29	6.47	
6/15/11 17:18:15	5.32	6.47	
6/15/11 17:18:30	5.33	6.48	
6/15/11 17:18:45	5.30	6.51	
6/15/11 17:19:00	5.32	6.49	
6/15/11 17:19:15	5.37	6.47	
6/15/11 17:19:30	5.37	6.45	
6/15/11 17:19:45	5.35	6.44	
6/15/11 17:20:00	5.31	6.44	
6/15/11 17:20:15	5.32	6.44	
6/15/11 17:20:30	5.33	6.44	
6/15/11 17:20:45	5.34	6.45	
6/15/11 17:21:00	5.35	6.45	Start 544SRU-308-2
6/15/11 17:21:15	5.39	6.43	
6/15/11 17:21:30	5.41	6.42	
6/15/11 17:21:45	5.40	6.42	
6/15/11 17:22:00	5.37	6.42	
6/15/11 17:22:15	5.34	6.44	
6/15/11 17:22:30	5.29	6.46	
6/15/11 17:22:45	5.30	6.47	
6/15/11 17:23:00	5.32	6.48	
6/15/11 17:23:15	5.36	6.47	
6/15/11 17:23:30	5.36	6.47	
6/15/11 17:23:45	5.34	6.48	
6/15/11 17:24:00	5.31	6.49	
6/15/11 17:24:15	5.32	6.48	
6/15/11 17:24:30	5.33	6.48	
6/15/11 17:24:45	5.32	6.48	
6/15/11 17:25:00	5.32	6.49	
6/15/11 17:25:15	5.29	6.51	
6/15/11 17:25:30	5.32	6.49	
6/15/11 17:25:45	5.31	6.49	
6/15/11 17:26:00	5.30	6.48	
6/15/11 17:26:15	5.30	6.48	
6/15/11 17:26:30	5.32	6.48	
6/15/11 17:26:45	5.33	6.49	
6/15/11 17:27:00	5.31	6.50	
6/15/11 17:27:15	5.29	6.51	
6/15/11 17:27:30	5.29	6.50	
6/15/11 17:27:45	5.30	6.49	
6/15/11 17:28:00	5.30	6.48	
6/15/11 17:28:15	5.26	6.50	
6/15/11 17:28:30	5.26	6.50	
6/15/11 17:28:45	5.27	6.51	
6/15/11 17:29:00	5.27	6.50	
6/15/11 17:29:15	5.28	6.49	
6/15/11 17:29:30	5.28	6.47	
6/15/11 17:29:45	5.31	6.44	
6/15/11 17:30:00	5.33	6.43	
6/15/11 17:30:15	5.32	6.45	
6/15/11 17:30:30	5.32	6.46	
6/15/11 17:30:45	5.27	6.50	
6/15/11 17:31:00	5.26	6.50	
6/15/11 17:31:15	5.29	6.47	
6/15/11 17:31:30	5.33	6.44	
6/15/11 17:31:45	5.36	6.41	
6/15/11 17:32:00	5.39	6.40	
6/15/11 17:32:15	5.40	6.40	
6/15/11 17:32:30	5.41	6.41	
6/15/11 17:32:45	5.38	6.43	
6/15/11 17:33:00	5.37	6.44	
6/15/11 17:33:15	5.36	6.44	
6/15/11 17:33:30	5.37	6.42	
6/15/11 17:33:45	5.37	6.42	
6/15/11 17:34:00	5.36	6.42	
6/15/11 17:34:15	5.35	6.43	
6/15/11 17:34:30	5.35	6.44	
6/15/11 17:34:45	5.38	6.45	
6/15/11 17:35:00	5.35	6.47	
6/15/11 17:35:15	5.31	6.48	
6/15/11 17:35:30	5.30	6.48	
6/15/11 17:35:45	5.30	6.48	
6/15/11 17:36:00	5.30	6.47	
6/15/11 17:36:15	5.29	6.48	
6/15/11 17:36:30	5.25	6.50	
6/15/11 17:36:45	5.25	6.51	
6/15/11 17:37:00	5.27	6.51	
6/15/11 17:37:15	5.28	6.51	
6/15/11 17:37:30	5.28	6.51	

**Valero Port Arthur Refinery: Port Arthur, Texas**

**SRU 544 Incinerator Stack**

**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	Comments
6/15/11 17:37:45	5.29	6.51	
6/15/11 17:38:00	5.31	6.48	
6/15/11 17:38:15	5.33	6.47	
6/15/11 17:38:30	5.30	6.48	
6/15/11 17:38:45	5.28	6.49	
6/15/11 17:39:00	5.27	6.49	
6/15/11 17:39:15	5.26	6.49	
6/15/11 17:39:30	5.24	6.49	
6/15/11 17:39:45	5.26	6.47	
6/15/11 17:40:00	5.27	6.45	
6/15/11 17:40:15	5.28	6.44	
6/15/11 17:40:30	5.31	6.43	
6/15/11 17:40:45	5.34	6.44	
6/15/11 17:41:00	5.34	6.44	
6/15/11 17:41:15	5.34	6.44	
6/15/11 17:41:30	5.33	6.44	
6/15/11 17:41:45	5.34	6.43	
6/15/11 17:42:00	5.35	6.42	
6/15/11 17:42:15	5.38	6.39	
6/15/11 17:42:30	5.41	6.38	
6/15/11 17:42:45	5.37	6.42	
6/15/11 17:43:00	5.28	6.47	
6/15/11 17:43:15	5.31	6.46	
6/15/11 17:43:30	5.32	6.46	
6/15/11 17:43:45	5.30	6.46	
6/15/11 17:44:00	5.31	6.43	
6/15/11 17:44:15	5.32	6.42	
6/15/11 17:44:30	5.31	6.44	
6/15/11 17:44:45	5.30	6.46	
6/15/11 17:45:00	5.30	6.48	
6/15/11 17:45:15	5.33	6.49	
6/15/11 17:45:30	5.36	6.48	
6/15/11 17:45:45	5.38	6.47	
6/15/11 17:46:00	5.36	6.47	
6/15/11 17:46:15	5.32	6.47	
6/15/11 17:46:30	5.31	6.48	
6/15/11 17:46:45	5.32	6.50	
6/15/11 17:47:00	5.32	6.53	
6/15/11 17:47:15	5.29	6.56	
6/15/11 17:47:30	5.27	6.56	
6/15/11 17:47:45	5.25	6.55	
6/15/11 17:48:00	5.24	6.53	
6/15/11 17:48:15	5.23	6.52	
6/15/11 17:48:30	5.22	6.53	
6/15/11 17:48:45	5.24	6.53	
6/15/11 17:49:00	5.22	6.55	
6/15/11 17:49:15	5.24	6.56	
6/15/11 17:49:30	5.24	6.56	
6/15/11 17:49:45	5.28	6.52	
6/15/11 17:50:00	5.26	6.50	
6/15/11 17:50:15	5.23	6.50	
6/15/11 17:50:30	5.28	6.47	
6/15/11 17:50:45	5.33	6.46	
6/15/11 17:51:00	5.34	6.48	
6/15/11 17:51:15	5.35	6.50	
6/15/11 17:51:30	5.32	6.52	
6/15/11 17:51:45	5.32	6.51	
6/15/11 17:52:00	5.33	6.49	
6/15/11 17:52:15	5.34	6.47	
6/15/11 17:52:30	5.30	6.48	
6/15/11 17:52:45	5.34	6.47	
6/15/11 17:53:00	5.36	6.48	
6/15/11 17:53:15	5.36	6.50	
6/15/11 17:53:30	5.37	6.49	
6/15/11 17:53:45	5.37	6.48	
6/15/11 17:54:00	5.34	6.49	
6/15/11 17:54:15	5.30	6.50	
6/15/11 17:54:30	5.29	6.50	
6/15/11 17:54:45	5.31	6.50	
6/15/11 17:55:00	5.33	6.51	
6/15/11 17:55:15	5.36	6.50	
6/15/11 17:55:30	5.38	6.50	
6/15/11 17:55:45	5.37	6.49	
6/15/11 17:56:00	5.34	6.49	
6/15/11 17:56:15	5.32	6.49	
6/15/11 17:56:30	5.33	6.49	
6/15/11 17:56:45	5.34	6.50	
6/15/11 17:57:00	5.32	6.53	
6/15/11 17:57:15	5.28	6.55	
6/15/11 17:57:30	5.25	6.55	
6/15/11 17:57:45	5.21	6.55	
6/15/11 17:58:00	5.23	6.53	
6/15/11 17:58:15	5.27	6.50	
6/15/11 17:58:30	5.27	6.50	
6/15/11 17:58:45	5.22	6.53	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	Comments
6/15/11 17:59:00	5.22	6.56	
6/15/11 17:59:15	5.22	6.57	
6/15/11 17:59:30	5.20	6.58	
6/15/11 17:59:45	5.21	6.56	
6/15/11 18:00:00	5.27	6.52	
6/15/11 18:00:15	5.27	6.51	
6/15/11 18:00:30	5.27	6.50	
6/15/11 18:00:45	5.27	6.51	
6/15/11 18:01:00	5.25	6.54	
6/15/11 18:01:15	5.22	6.56	
6/15/11 18:01:30	5.23	6.55	
6/15/11 18:01:45	5.24	6.53	
6/15/11 18:02:00	5.23	6.51	
6/15/11 18:02:15	5.23	6.49	
6/15/11 18:02:30	5.20	6.50	
6/15/11 18:02:45	5.23	6.49	
6/15/11 18:03:00	5.23	6.50	
6/15/11 18:03:15	5.22	6.52	
6/15/11 18:03:30	5.22	6.52	
6/15/11 18:03:45	5.24	6.51	
6/15/11 18:04:00	5.24	6.50	
6/15/11 18:04:15	5.26	6.47	
6/15/11 18:04:30	5.28	6.46	
6/15/11 18:04:45	5.29	6.46	
6/15/11 18:05:00	5.29	6.48	
6/15/11 18:05:15	5.27	6.50	
6/15/11 18:05:30	5.27	6.52	
6/15/11 18:05:45	5.26	6.52	
6/15/11 18:06:00	5.27	6.51	
6/15/11 18:06:15	5.28	6.49	
6/15/11 18:06:30	5.26	6.48	
6/15/11 18:06:45	5.25	6.49	
6/15/11 18:07:00	5.25	6.49	
6/15/11 18:07:15	5.27	6.50	
6/15/11 18:07:30	5.26	6.52	
6/15/11 18:07:45	5.25	6.54	
6/15/11 18:08:00	5.27	6.53	
6/15/11 18:08:15	5.26	6.53	
6/15/11 18:08:30	5.26	6.51	
6/15/11 18:08:45	5.29	6.49	
6/15/11 18:09:00	5.32	6.47	
6/15/11 18:09:15	5.33	6.48	
6/15/11 18:09:30	5.30	6.52	
6/15/11 18:09:45	5.30	6.53	
6/15/11 18:10:00	5.32	6.53	
6/15/11 18:10:15	5.29	6.53	
6/15/11 18:10:30	5.30	6.52	
6/15/11 18:10:45	5.33	6.50	
6/15/11 18:11:00	5.32	6.50	
6/15/11 18:11:15	5.32	6.51	
6/15/11 18:11:30	5.29	6.54	
6/15/11 18:11:45	5.28	6.55	
6/15/11 18:12:00	5.24	6.57	
6/15/11 18:12:15	5.24	6.55	
6/15/11 18:12:30	5.28	6.52	
6/15/11 18:12:45	5.30	6.51	
6/15/11 18:13:00	5.26	6.54	
6/15/11 18:13:15	5.25	6.55	
6/15/11 18:13:30	5.26	6.57	
6/15/11 18:13:45	5.27	6.57	
6/15/11 18:14:00	5.31	6.55	
6/15/11 18:14:15	5.29	6.55	
6/15/11 18:14:30	5.26	6.55	
6/15/11 18:14:45	5.27	6.54	
6/15/11 18:15:00	5.28	6.54	
6/15/11 18:15:15	5.29	6.56	
6/15/11 18:15:30	5.31	6.59	
6/15/11 18:15:45	5.31	6.60	
6/15/11 18:16:00	5.31	6.60	
6/15/11 18:16:15	5.25	6.60	
6/15/11 18:16:30	5.24	6.57	
6/15/11 18:16:45	5.27	6.54	
6/15/11 18:17:00	5.27	6.54	
6/15/11 18:17:15	5.24	6.56	
6/15/11 18:17:30	5.23	6.59	
6/15/11 18:17:45	5.24	6.60	
6/15/11 18:18:00	5.24	6.61	
6/15/11 18:18:15	5.24	6.60	
6/15/11 18:18:30	5.26	6.57	
6/15/11 18:18:45	5.29	6.53	
6/15/11 18:19:00	5.28	6.52	
6/15/11 18:19:15	5.29	6.52	
6/15/11 18:19:30	5.30	6.54	
6/15/11 18:19:45	5.31	6.56	
6/15/11 18:20:00	5.33	6.56	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	Comments
6/15/11 18:20:15	5.35	6.56	
6/15/11 18:20:30	5.33	6.55	
6/15/11 18:20:45	5.31	6.54	End 544SRU-308-2
6/15/11 18:21:00	5.31	6.52	
6/15/11 18:21:15	5.34	6.51	
6/15/11 18:21:30	5.33	6.52	
6/15/11 18:21:45	5.35	6.54	
6/15/11 18:22:00	5.32	6.57	
6/15/11 18:22:15	5.34	6.52	
6/15/11 18:22:30	5.52	4.49	
6/15/11 18:22:45	5.38	1.38	
6/15/11 18:23:00	1.65	0.31	
6/15/11 18:23:15	0.19	0.16	
6/15/11 18:23:30	0.03	0.13	
6/15/11 18:23:45	0.00	0.12	System Bias
6/15/11 18:24:00	-0.01	0.11	O <sub>2</sub> Bias 3 Zero = -0.01
6/15/11 18:24:15	-0.01	0.10	CO <sub>2</sub> Bias 3 Zero = 0.10
6/15/11 18:24:30	-0.02	0.09	
6/15/11 18:24:45	-0.02	0.09	
6/15/11 18:25:00	-0.02	0.09	
6/15/11 18:25:15	-0.02	0.09	
6/15/11 18:25:30	0.04	0.19	
6/15/11 18:25:45	1.83	1.81	
6/15/11 18:26:00	4.09	3.52	
6/15/11 18:26:15	4.77	3.91	
6/15/11 18:26:30	4.86	4.09	
6/15/11 18:26:45	4.88	4.26	
6/15/11 18:27:00	4.88	4.31	
6/15/11 18:27:15	4.88	4.33	System Bias
6/15/11 18:27:30	4.88	4.33	O <sub>2</sub> Bias 3 Mid = 4.89
6/15/11 18:27:45	4.89	4.34	CO <sub>2</sub> Bias 3 Mid = 4.34
6/15/11 18:28:00	4.89	4.34	
6/15/11 18:28:15	4.89	4.34	
6/15/11 18:28:30	4.89	4.34	
6/15/11 18:28:45	4.91	4.48	
6/15/11 18:29:00	5.09	5.54	
6/15/11 18:29:15	5.26	6.32	
6/15/11 18:29:30	5.31	6.48	
6/15/11 18:29:45	5.32	6.52	
6/15/11 18:30:00	5.30	6.56	
6/15/11 18:30:15	5.29	6.57	
6/15/11 18:30:30	5.32	6.55	
6/15/11 18:30:45	5.34	6.52	

**Valero Port Arthur Refinery: Port Arthur, Texas**

**SRU 544 Incinerator Exhaust Stack**

**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 6:39:00	5.38	6.67	82.1	0.1	
6/16/11 6:39:15	5.36	6.66	36.1	0.6	
6/16/11 6:39:30	5.36	6.64	288.4	3.9	
6/16/11 6:39:45	5.37	6.65	290.2	3.9	
6/16/11 6:40:00	5.39	6.66	291.3	9.1	
6/16/11 6:40:15	5.35	6.69	287.5	10.1	
6/16/11 6:40:30	5.65	6.35	236.7	5.0	
6/16/11 6:40:45	8.02	3.28	142.9	4.6	
6/16/11 6:41:00	4.13	0.89	35.2	4.5	
6/16/11 6:41:15	0.46	0.16	6.1	4.5	
6/16/11 6:41:30	-0.06	0.09	-1.3	4.5	
6/16/11 6:41:45	-0.10	0.08	-2.0	4.4	
6/16/11 6:42:00	-0.11	0.08	-2.2	4.2	
6/16/11 6:42:15	-0.08	0.07	-2.2	4.4	Calibration Error
6/16/11 6:42:30	0.05	0.07	-1.1	4.4	O <sub>2</sub> CE Zero = 0.05
6/16/11 6:42:45	0.05	0.07	-1.1	4.3	CO <sub>2</sub> CE Zero = 0.07
6/16/11 6:43:00	0.05	0.07	-1.3	4.2	CO CE Zero = -1.4
6/16/11 6:43:15	0.05	0.07	-2.0	4.1	
6/16/11 6:43:30	0.05	0.08	7.9	4.1	
6/16/11 6:43:45	2.18	2.07	35.0	4.0	
6/16/11 6:44:00	6.78	4.85	69.8	4.1	
6/16/11 6:44:15	9.30	7.01	77.5	4.0	
6/16/11 6:44:30	9.88	8.26	78.4	4.0	
6/16/11 6:44:45	9.93	8.55	78.4	4.0	Calibration Error
6/16/11 6:45:00	9.94	8.59	78.4	4.0	O <sub>2</sub> CE Span = 9.94
6/16/11 6:45:15	9.94	8.60	77.9	4.0	CO <sub>2</sub> CE Span = 8.61
6/16/11 6:45:30	9.94	8.61	77.5	3.9	
6/16/11 6:45:45	9.94	8.61	77.5	4.0	
6/16/11 6:46:00	9.95	8.62	78.4	4.0	
6/16/11 6:46:15	9.95	8.62	77.9	3.9	
6/16/11 6:46:30	9.95	8.63	76.6	3.9	
6/16/11 6:46:45	9.89	8.49	68.9	3.9	
6/16/11 6:47:00	7.92	6.48	51.0	4.0	
6/16/11 6:47:15	5.60	4.72	42.7	3.9	
6/16/11 6:47:30	5.15	4.49	38.6	3.9	
6/16/11 6:47:45	5.12	4.47	38.6	3.9	Calibration Error
6/16/11 6:48:00	5.12	4.47	39.5	3.9	O <sub>2</sub> CE Mid = 5.12
6/16/11 6:48:15	5.12	4.47	39.5	4.0	CO <sub>2</sub> CE Mid = 4.46
6/16/11 6:48:30	5.12	4.46	39.3	4.0	
6/16/11 6:48:45	5.12	4.45	38.6	4.0	
6/16/11 6:49:00	5.14	4.44	36.8	3.9	
6/16/11 6:49:15	6.33	4.00	31.9	3.9	
6/16/11 6:49:30	9.80	3.12	25.1	3.9	
6/16/11 6:49:45	11.78	2.65	35.0	4.3	
6/16/11 6:50:00	12.10	2.37	169.6	4.3	
6/16/11 6:50:15	7.05	1.07	321.4	4.2	
6/16/11 6:50:30	3.07	0.22	438.8	4.1	
6/16/11 6:50:45	2.43	0.09	453.7	4.0	
6/16/11 6:51:00	2.39	0.08	454.4	4.0	
6/16/11 6:51:15	2.38	0.07	455.5	4.0	
6/16/11 6:51:30	2.38	0.07	456.9	4.0	
6/16/11 6:51:45	2.37	0.07	456.9	4.0	
6/16/11 6:52:00	2.37	0.07	455.7	4.0	
6/16/11 6:52:15	2.37	0.07	411.7	4.0	
6/16/11 6:52:30	2.37	0.07	410.4	4.0	
6/16/11 6:52:45					
6/16/11 6:53:00					
6/16/11 6:53:15					
6/16/11 6:53:30	2.37	0.06	50.7	4.0	
6/16/11 6:53:45	2.37	0.07	506.1	4.0	
6/16/11 6:54:00	2.37	0.07	505.1	3.9	Calibration Error
6/16/11 6:54:15	2.37	0.07	500.1	3.9	CO CE Span = 500.1
6/16/11 6:54:30	2.36	0.07	501.1	3.9	
6/16/11 6:54:45	2.37	0.07	500.1	3.9	
6/16/11 6:55:00	2.36	0.07	499.1	3.9	
6/16/11 6:55:15	2.36	0.07	476.0	3.9	
6/16/11 6:55:30	2.26	0.07	396.8	4.0	
6/16/11 6:55:45	1.58	0.07	300.6	3.9	
6/16/11 6:56:00	1.25	0.06	255.9	3.9	Calibration Error
6/16/11 6:56:15	1.22	0.06	251.4	3.9	CO CE Mid = 251.9
6/16/11 6:56:30	1.22	0.06	251.9	3.9	
6/16/11 6:56:45	1.22	0.06	252.4	3.9	
6/16/11 6:57:00	1.22	0.06	251.9	3.9	
6/16/11 6:57:15	1.22	0.06	250.9	3.9	
6/16/11 6:57:30	1.22	0.06	248.4	3.9	
6/16/11 6:57:45	1.34	0.51	257.4	3.8	
6/16/11 6:58:00	3.04	3.50	288.5	4.0	
6/16/11 6:58:15	4.84	5.83	307.1	4.6	
6/16/11 6:58:30	5.37	6.27	253.9	4.2	
6/16/11 6:58:45	3.68	3.41	132.4	4.2	
6/16/11 6:59:00	1.27	0.88	39.9	3.5	
6/16/11 6:59:15	0.26	0.20	7.8	0.2	Calibration Error
6/16/11 6:59:30	0.14	0.13	0.3	0.1	C <sub>3</sub> H <sub>8</sub> CE Zero = 0.1
6/16/11 6:59:45	0.13	0.11	-0.2	0.1	
6/16/11 7:00:00	0.12	0.10	-0.2	0.1	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 7:00:15	0.12	0.10	-0.2	0.1	
6/16/11 7:00:30	0.12	0.09	-0.7	45.5	
6/16/11 7:00:45	0.12	0.09	-0.2	102.6	
6/16/11 7:01:00	0.14	0.09	0.8	102.6	
6/16/11 7:01:15	0.35	0.09	0.5	102.6	
6/16/11 7:01:30	0.38	0.09	-0.2	96.5	
6/16/11 7:01:45	0.21	0.08	-0.7	86.6	Calibration Error
6/16/11 7:02:00	0.15	0.08	-0.2	89.4	C <sub>3</sub> H <sub>8</sub> CE Span = 89.5
6/16/11 7:02:15	0.14	0.08	-0.2	89.1	
6/16/11 7:02:30	0.13	0.08	-0.7	90.0	
6/16/11 7:02:45	0.12	0.08	-1.2	89.4	
6/16/11 7:03:00	0.11	0.08	-0.7	89.2	
6/16/11 7:03:15	0.11	0.08	-0.2	77.4	
6/16/11 7:03:30	0.11	0.08	-0.2	51.2	Calibration Error
6/16/11 7:03:45	0.11	0.08	-1.0	50.5	C <sub>3</sub> H <sub>8</sub> CE Mid = 50.5
6/16/11 7:04:00	0.11	0.08	-1.2	50.6	
6/16/11 7:04:15	0.11	0.08	-1.0	50.6	
6/16/11 7:04:30	0.11	0.08	-0.2	50.5	
6/16/11 7:04:45	0.11	0.08	-1.0	50.5	
6/16/11 7:05:00	0.11	0.08	-1.2	47.0	
6/16/11 7:05:15	0.11	0.08	-1.0	31.7	
6/16/11 7:05:30	0.11	0.08	-0.2	31.0	
6/16/11 7:05:45	0.11	0.07	-0.5	31.0	Calibration Error
6/16/11 7:06:00	0.10	0.07	-1.2	30.8	C <sub>3</sub> H <sub>8</sub> CE Low = 30.7
6/16/11 7:06:15	0.10	0.07	-1.2	30.7	
6/16/11 7:06:30	0.10	0.07	-0.7	30.8	
6/16/11 7:06:45	0.10	0.07	-0.2	30.6	Introduce Zero
6/16/11 7:07:00	0.10	0.07	-0.7	30.6	
6/16/11 7:07:15	0.10	0.07	-1.2	30.6	
6/16/11 7:07:30	0.10	0.07	-1.2	27.6	RT = 60 seconds
6/16/11 7:07:45	0.10	0.07	-0.5	2.9	
6/16/11 7:08:00	0.10	0.07	-0.2	0.7	Introduce Low
6/16/11 7:08:15	0.10	0.07	-1.0	0.6	
6/16/11 7:08:30	0.10	0.07	-1.2	0.6	RT = 60 seconds
6/16/11 7:08:45	0.10	0.07	-0.5	24.4	
6/16/11 7:09:00	0.10	0.07	-0.2	30.8	Introduce Zero
6/16/11 7:09:15	0.10	0.07	-1.0	30.6	
6/16/11 7:09:30	0.10	0.07	-1.2	30.7	
6/16/11 7:09:45	0.10	0.07	-0.5	14.2	RT = 60 seconds
6/16/11 7:10:00	0.10	0.07	-0.2	1.2	Introduce Low
6/16/11 7:10:15	0.10	0.07	-0.5	0.9	
6/16/11 7:10:30	0.10	0.07	-1.2	0.9	RT = 60 seconds
6/16/11 7:10:45	0.10	0.07	-1.0	18.9	
6/16/11 7:11:00	0.10	0.07	-0.2	31.0	
6/16/11 7:11:15	0.10	0.07	-0.5	31.1	Introduce Zero
6/16/11 7:11:30	0.10	0.07	-1.2	31.1	
6/16/11 7:11:45	0.10	0.07	-1.0	31.2	
6/16/11 7:12:00	0.10	0.07	-0.2	19.3	
6/16/11 7:12:15	0.10	0.07	-0.5	2.0	
6/16/11 7:12:30	0.10	0.07	-1.2	1.6	Introduce Low
6/16/11 7:12:45	0.10	0.07	-1.2	1.6	
6/16/11 7:13:00	0.10	0.07	-0.7	1.7	
6/16/11 7:13:15	0.10	0.07	-0.2	9.1	
6/16/11 7:13:30	0.10	0.07	-0.7	31.3	
6/16/11 7:13:45	0.10	0.07	-1.2	32.5	
6/16/11 7:14:00	0.10	0.07	-1.2	32.4	Introduce Mid O <sub>2</sub> /CO <sub>2</sub>
6/16/11 7:14:15	0.10	0.07	-0.5	32.5	
6/16/11 7:14:30	0.10	0.07	0.8	17.8	
6/16/11 7:14:45	0.12	0.16	31.9	34.4	Upscale RT = 120 Seconds
6/16/11 7:15:00	1.19	1.67	70.4	3.4	
6/16/11 7:15:15	2.03	2.19	63.2	2.0	
6/16/11 7:15:30	3.70	3.38	47.9	1.9	
6/16/11 7:15:45	4.82	4.07	43.4	1.9	System Bias
6/16/11 7:16:00	5.02	4.22	42.9	2.0	O <sub>2</sub> Bias 1 Mid = 5.04
6/16/11 7:16:15	5.04	4.30	42.9	2.1	CO <sub>2</sub> Bias 1 Mid = 4.30
6/16/11 7:16:30	5.04	4.34	42.9	2.1	
6/16/11 7:16:45	5.05	4.35	42.9	2.1	
6/16/11 7:17:00	5.05	4.35	42.9	2.2	
6/16/11 7:17:15	5.05	4.36	42.2	2.1	
6/16/11 7:17:30	5.05	4.36	42.9	2.1	
6/16/11 7:17:45	5.06	4.36	42.9	2.0	Introduce Mid CO
6/16/11 7:18:00	5.06	4.36	42.9	2.0	
6/16/11 7:18:15	5.06	4.37	42.1	1.8	
6/16/11 7:18:30	5.06	4.37	49.4	2.4	
6/16/11 7:18:45	5.07	4.48	95.3	2.2	Downscale RT = 120 Seconds
6/16/11 7:19:00	5.16	4.94	135.6	1.4	CO Upscale RT = 120 Seconds
6/16/11 7:19:15	4.03	3.01	193.0	1.5	
6/16/11 7:19:30	1.99	0.74	226.9	1.6	
6/16/11 7:19:45	1.35	0.20	247.2	1.6	System Bias
6/16/11 7:20:00	1.28	0.13	249.4	1.7	CO Bias 1 Mid = 249.2
6/16/11 7:20:15	1.28	0.11	249.2	1.7	
6/16/11 7:20:30	1.27	0.10	248.4	1.7	
6/16/11 7:20:45	1.27	0.10	249.7	1.7	
6/16/11 7:21:00	1.27	0.09	250.4	1.7	Introduce Low C <sub>3</sub> H <sub>8</sub>
6/16/11 7:21:15	1.27	0.09	249.4	1.6	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 7:21:30	1.27	0.09	249.4	1.4	
6/16/11 7:21:45	1.27	0.08	252.2	2.5	
6/16/11 7:22:00	1.51	0.69	250.9	25.7	
6/16/11 7:22:15	2.35	1.87	163.5	32.3	Downscale RT = 105 Seconds
6/16/11 7:22:30	1.16	0.68	73.0	32.0	
6/16/11 7:22:45	0.25	0.15	8.5	31.7	System Bias
6/16/11 7:23:00	0.13	0.09	1.3	31.6	O <sub>2</sub> Bias 1 Zero = 0.12
6/16/11 7:23:15	0.12	0.08	0.5	31.7	CO <sub>2</sub> Bias 1 Zero = 0.08
6/16/11 7:23:30	0.11	0.08	-0.7	31.5	CO Bias 1 Zero = 1.1
6/16/11 7:23:45	0.11	0.08	3.3	6.3	
6/16/11 7:24:00	0.17	0.27	48.4	1.1	
6/16/11 7:24:15	1.93	2.91	193.0	0.6	
6/16/11 7:24:30	4.30	5.46	269.5	0.4	
6/16/11 7:24:45	5.29	6.53	310.8	0.2	
6/16/11 7:25:00	5.46	6.66	318.6	0.2	
6/16/11 7:25:15	5.48	6.66	317.8	0.1	
6/16/11 7:25:30	5.49	6.65	314.6	0.1	
6/16/11 7:25:45	5.49	6.66	315.3	0.1	
6/16/11 7:26:00	5.50	6.68	319.6	0.0	
6/16/11 7:26:15	5.50	6.70	325.9	0.0	
6/16/11 7:26:30	5.51	6.72	327.1	0.0	
6/16/11 7:26:45	5.50	6.72	327.4	0.0	Start Run 3
6/16/11 7:27:00	5.50	6.71	327.1	0.0	544SRU-0011-4
6/16/11 7:27:15	5.53	6.69	329.6	0.0	Start 544SRU-18-3
6/16/11 7:27:30	5.55	6.67	328.6	0.0	
6/16/11 7:27:45	5.53	6.68	325.4	0.0	
6/16/11 7:28:00	5.52	6.69	325.1	0.0	
6/16/11 7:28:15	5.52	6.70	327.1	0.0	
6/16/11 7:28:30	5.54	6.72	329.1	0.0	
6/16/11 7:28:45	5.53	6.73	329.1	0.0	
6/16/11 7:29:00	5.53	6.73	326.1	0.0	
6/16/11 7:29:15	5.51	6.72	322.4	0.0	
6/16/11 7:29:30	5.51	6.70	321.1	0.0	
6/16/11 7:29:45	5.50	6.69	321.4	0.0	
6/16/11 7:30:00	5.51	6.68	325.1	0.0	
6/16/11 7:30:15	5.54	6.68	331.1	0.0	
6/16/11 7:30:30	5.56	6.68	332.6	0.0	
6/16/11 7:30:45	5.54	6.71	330.4	0.0	
6/16/11 7:31:00	5.51	6.72	329.6	0.0	
6/16/11 7:31:15	5.53	6.70	330.1	0.0	
6/16/11 7:31:30	5.55	6.68	332.6	0.0	
6/16/11 7:31:45	5.54	6.68	330.6	0.0	
6/16/11 7:32:00	5.53	6.69	326.6	0.0	
6/16/11 7:32:15	5.52	6.70	328.1	0.0	
6/16/11 7:32:30	5.53	6.71	330.1	0.0	
6/16/11 7:32:45	5.53	6.72	329.4	0.0	
6/16/11 7:33:00	5.51	6.73	327.1	0.0	
6/16/11 7:33:15	5.50	6.72	321.1	0.0	
6/16/11 7:33:30	5.49	6.71	319.1	0.0	
6/16/11 7:33:45	5.48	6.71	318.1	0.0	
6/16/11 7:34:00	5.48	6.71	320.6	0.0	
6/16/11 7:34:15	5.52	6.70	322.6	0.0	
6/16/11 7:34:30	5.53	6.71	323.1	0.0	
6/16/11 7:34:45	5.52	6.71	326.4	0.0	
6/16/11 7:35:00	5.53	6.70	329.1	0.0	
6/16/11 7:35:15	5.52	6.69	325.6	0.0	
6/16/11 7:35:30	5.50	6.69	321.1	0.0	
6/16/11 7:35:45	5.50	6.67	318.1	0.0	
6/16/11 7:36:00	5.51	6.67	321.6	0.0	
6/16/11 7:36:15	5.54	6.67	334.4	0.0	
6/16/11 7:36:30	5.56	6.67	340.1	0.0	
6/16/11 7:36:45	5.54	6.69	334.4	0.0	
6/16/11 7:37:00	5.52	6.71	330.6	0.0	
6/16/11 7:37:15	5.51	6.69	333.4	0.0	
6/16/11 7:37:30	5.54	6.67	330.1	0.0	
6/16/11 7:37:45	5.51	6.66	326.1	0.0	
6/16/11 7:38:00	5.53	6.65	328.6	0.0	
6/16/11 7:38:15	5.54	6.65	329.9	0.0	
6/16/11 7:38:30	5.54	6.67	330.6	0.0	
6/16/11 7:38:45	5.55	6.69	329.1	0.0	
6/16/11 7:39:00	5.55	6.70	326.6	0.0	
6/16/11 7:39:15	5.53	6.70	324.6	0.0	
6/16/11 7:39:30	5.54	6.68	324.6	0.0	
6/16/11 7:39:45	5.53	6.67	325.1	0.0	
6/16/11 7:40:00	5.52	6.65	328.6	0.0	
6/16/11 7:40:15	5.55	6.64	333.4	0.0	
6/16/11 7:40:30	5.53	6.66	335.7	0.0	
6/16/11 7:40:45	5.56	6.67	334.4	0.0	
6/16/11 7:41:00	5.54	6.70	333.1	0.0	
6/16/11 7:41:15	5.54	6.70	332.4	0.0	
6/16/11 7:41:30	5.55	6.70	329.6	0.0	
6/16/11 7:41:45	5.53	6.69	324.4	0.0	
6/16/11 7:42:00	5.53	6.67	322.6	0.0	
6/16/11 7:42:15	5.53	6.66	319.9	0.0	
6/16/11 7:42:30	5.51	6.67	323.1	0.0	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 7:42:45	5.54	6.66	327.4	0.0	
6/16/11 7:43:00	5.53	6.69	324.6	0.0	
6/16/11 7:43:15	5.52	6.70	319.1	0.0	
6/16/11 7:43:30	5.50	6.71	316.1	0.0	
6/16/11 7:43:45	5.47	6.71	311.3	0.0	
6/16/11 7:44:00	5.45	6.71	311.1	0.0	
6/16/11 7:44:15	5.45	6.71	315.1	0.0	
6/16/11 7:44:30	5.47	6.70	317.6	0.0	
6/16/11 7:44:45	5.49	6.70	319.6	0.0	
6/16/11 7:45:00	5.47	6.71	319.6	0.0	
6/16/11 7:45:15	5.48	6.71	316.6	0.0	
6/16/11 7:45:30	5.48	6.69	312.6	0.0	
6/16/11 7:45:45	5.48	6.68	310.3	0.0	
6/16/11 7:46:00	5.46	6.67	309.1	0.0	
6/16/11 7:46:15	5.46	6.68	308.1	0.0	
6/16/11 7:46:30	5.45	6.69	311.6	0.0	
6/16/11 7:46:45	5.48	6.69	319.1	0.0	
6/16/11 7:47:00	5.48	6.70	320.6	0.0	
6/16/11 7:47:15	5.48	6.70	321.9	0.0	
6/16/11 7:47:30	5.47	6.69	329.6	0.0	
6/16/11 7:47:45	5.52	6.63	340.4	0.0	
6/16/11 7:48:00	5.53	6.61	341.7	0.0	
6/16/11 7:48:15	5.53	6.61	334.9	0.0	
6/16/11 7:48:30	5.50	6.63	331.6	0.0	
6/16/11 7:48:45	5.50	6.66	328.9	0.0	
6/16/11 7:49:00	5.49	6.68	330.1	0.0	
6/16/11 7:49:15	5.51	6.68	329.1	0.0	
6/16/11 7:49:30	5.51	6.67	327.6	0.0	
6/16/11 7:49:45	5.50	6.66	327.6	0.0	
6/16/11 7:50:00	5.50	6.63	327.6	0.0	
6/16/11 7:50:15	5.50	6.62	328.9	0.0	
6/16/11 7:50:30	5.51	6.62	330.1	0.0	
6/16/11 7:50:45	5.50	6.64	331.6	0.0	
6/16/11 7:51:00	5.50	6.66	331.6	0.0	
6/16/11 7:51:15	5.49	6.68	332.9	0.0	
6/16/11 7:51:30	5.51	6.68	334.6	0.0	
6/16/11 7:51:45	5.54	6.66	333.9	0.0	
6/16/11 7:52:00	5.54	6.65	331.1	0.0	
6/16/11 7:52:15	5.52	6.63	330.4	0.0	
6/16/11 7:52:30	5.53	6.63	327.6	0.0	
6/16/11 7:52:45	5.50	6.65	323.9	0.0	
6/16/11 7:53:00	5.50	6.66	326.1	0.0	
6/16/11 7:53:15	5.52	6.67	331.1	0.0	
6/16/11 7:53:30	5.55	6.67	332.6	0.0	
6/16/11 7:53:45	5.53	6.68	330.4	0.0	
6/16/11 7:54:00	5.53	6.67	328.6	0.0	
6/16/11 7:54:15	5.54	6.65	326.4	0.0	
6/16/11 7:54:30	5.53	6.65	324.6	0.0	
6/16/11 7:54:45	5.53	6.65	324.1	0.0	
6/16/11 7:55:00	5.55	6.66	326.6	0.0	
6/16/11 7:55:15	5.53	6.69	329.1	0.0	
6/16/11 7:55:30	5.53	6.70	326.6	0.0	
6/16/11 7:55:45	5.51	6.71	325.9	0.0	
6/16/11 7:56:00	5.53	6.69	327.6	0.0	
6/16/11 7:56:15	5.55	6.67	325.6	0.0	
6/16/11 7:56:30	5.56	6.66	320.6	0.0	
6/16/11 7:56:45	5.52	6.68	315.1	0.0	
6/16/11 7:57:00	5.50	6.69	318.6	0.0	544SRU-0011-4 Port Change
6/16/11 7:57:15	5.53	6.69	319.9	0.0	
6/16/11 7:57:30	5.54	6.71	317.1	0.0	
6/16/11 7:57:45	5.54	6.71	318.8	0.0	
6/16/11 7:58:00	5.54	6.70	319.1	0.0	
6/16/11 7:58:15	5.54	6.69	317.6	0.0	
6/16/11 7:58:30	5.55	6.68	318.6	0.0	
6/16/11 7:58:45	5.57	6.67	321.6	0.0	
6/16/11 7:59:00	5.55	6.68	320.6	0.0	
6/16/11 7:59:15	5.54	6.69	320.1	0.0	
6/16/11 7:59:30	5.56	6.69	322.6	0.0	
6/16/11 7:59:45	5.56	6.69	322.9	0.0	
6/16/11 8:00:00	5.56	6.68	318.6	0.0	
6/16/11 8:00:15	5.54	6.68	315.3	0.0	
6/16/11 8:00:30	5.57	6.66	314.6	0.0	
6/16/11 8:00:45	5.56	6.67	317.3	0.0	
6/16/11 8:01:00	5.57	6.67	321.1	0.0	
6/16/11 8:01:15	5.57	6.68	322.1	0.0	
6/16/11 8:01:30	5.54	6.70	318.6	0.0	
6/16/11 8:01:45	5.53	6.71	312.3	0.0	
6/16/11 8:02:00	5.52	6.71	311.6	0.0	
6/16/11 8:02:15	5.52	6.69	311.6	0.0	
6/16/11 8:02:30	5.50	6.69	312.7	0.0	
6/16/11 8:02:45	5.53	6.68	314.3	0.0	
6/16/11 8:03:00	5.54	6.68	318.4	0.0	
6/16/11 8:03:15	5.55	6.70	323.4	0.0	
6/16/11 8:03:30	5.54	6.72	327.5	0.0	
6/16/11 8:03:45	5.58	6.71	329.1	0.0	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 8:04:00	5.57	6.70	326.4	0.0	
6/16/11 8:04:15	5.55	6.69	322.6	0.0	
6/16/11 8:04:30	5.52	6.68	317.6	0.0	
6/16/11 8:04:45	5.51	6.68	314.3	0.0	
6/16/11 8:05:00	5.50	6.69	312.9	0.0	
6/16/11 8:05:15	5.51	6.70	310.3	0.0	
6/16/11 8:05:30	5.51	6.73	310.3	0.0	
6/16/11 8:05:45	5.50	6.74	312.8	0.0	
6/16/11 8:06:00	5.51	6.73	313.6	0.0	
6/16/11 8:06:15	5.53	6.70	314.8	0.0	
6/16/11 8:06:30	5.51	6.68	314.8	0.1	
6/16/11 8:06:45	5.52	6.67	313.8	0.0	
6/16/11 8:07:00	5.51	6.68	313.1	0.0	
6/16/11 8:07:15	5.50	6.70	311.6	0.0	
6/16/11 8:07:30	5.48	6.72	312.3	0.0	
6/16/11 8:07:45	5.50	6.73	310.1	0.0	
6/16/11 8:08:00	5.50	6.74	310.1	0.0	
6/16/11 8:08:15	5.51	6.72	314.6	0.0	
6/16/11 8:08:30	5.52	6.70	319.9	0.0	
6/16/11 8:08:45	5.52	6.68	324.9	0.0	
6/16/11 8:09:00	5.57	6.66	323.4	0.0	Restart 544SRU-0011-4
6/16/11 8:09:15	5.53	6.69	318.3	0.0	
6/16/11 8:09:30	5.51	6.71	322.9	0.0	
6/16/11 8:09:45	5.53	6.71	334.1	0.0	
6/16/11 8:10:00	5.55	6.71	339.4	0.0	
6/16/11 8:10:15	5.53	6.71	335.9	0.0	
6/16/11 8:10:30	5.51	6.71	334.4	0.0	
6/16/11 8:10:45	5.50	6.70	336.4	0.0	
6/16/11 8:11:00	5.53	6.69	335.7	0.0	
6/16/11 8:11:15	5.51	6.70	338.4	0.0	
6/16/11 8:11:30	5.53	6.70	342.9	0.0	
6/16/11 8:11:45	5.55	6.70	343.4	0.0	
6/16/11 8:12:00	5.55	6.70	333.6	0.0	
6/16/11 8:12:15	5.53	6.70	326.1	0.0	
6/16/11 8:12:30	5.51	6.70	325.4	0.0	
6/16/11 8:12:45	5.50	6.70	328.9	0.0	
6/16/11 8:13:00	5.51	6.70	329.6	0.0	
6/16/11 8:13:15	5.52	6.70	329.6	0.0	
6/16/11 8:13:30	5.53	6.70	328.9	0.0	
6/16/11 8:13:45	5.51	6.71	330.9	0.0	
6/16/11 8:14:00	5.55	6.69	336.1	0.0	
6/16/11 8:14:15	5.57	6.67	333.9	0.0	
6/16/11 8:14:30	5.55	6.67	327.9	0.0	
6/16/11 8:14:45	5.52	6.68	320.9	0.0	
6/16/11 8:15:00	5.48	6.70	320.9	0.0	
6/16/11 8:15:15	5.50	6.70	327.6	0.0	
6/16/11 8:15:30	5.53	6.70	332.1	0.0	
6/16/11 8:15:45	5.54	6.71	329.9	0.0	
6/16/11 8:16:00	5.56	6.71	325.4	0.0	
6/16/11 8:16:15	5.52	6.70	322.9	0.0	
6/16/11 8:16:30	5.52	6.69	317.6	0.0	
6/16/11 8:16:45	5.48	6.68	315.1	0.0	
6/16/11 8:17:00	5.49	6.66	317.3	0.0	
6/16/11 8:17:15	5.54	6.65	320.1	0.0	
6/16/11 8:17:30	5.54	6.66	321.6	0.0	
6/16/11 8:17:45	5.53	6.68	318.9	0.0	
6/16/11 8:18:00	5.52	6.70	316.6	0.0	
6/16/11 8:18:15	5.52	6.69	317.1	0.0	
6/16/11 8:18:30	5.52	6.68	313.3	0.0	
6/16/11 8:18:45	5.51	6.66	308.6	0.0	
6/16/11 8:19:00	5.51	6.64	304.8	0.0	
6/16/11 8:19:15	5.51	6.65	308.8	0.0	
6/16/11 8:19:30	5.53	6.65	317.9	0.0	
6/16/11 8:19:45	5.55	6.65	324.4	0.0	
6/16/11 8:20:00	5.57	6.65	327.4	0.0	
6/16/11 8:20:15	5.57	6.65	326.6	0.0	
6/16/11 8:20:30	5.57	6.65	325.9	0.0	
6/16/11 8:20:45	5.56	6.63	321.1	0.0	
6/16/11 8:21:00	5.55	6.63	313.6	0.0	
6/16/11 8:21:15	5.53	6.63	312.1	0.0	
6/16/11 8:21:30	5.53	6.63	315.8	0.0	
6/16/11 8:21:45	5.52	6.65	316.8	0.0	
6/16/11 8:22:00	5.51	6.67	313.8	0.0	
6/16/11 8:22:15	5.49	6.69	315.3	0.0	
6/16/11 8:22:30	5.50	6.68	321.4	0.0	
6/16/11 8:22:45	5.53	6.66	325.9	0.0	
6/16/11 8:23:00	5.54	6.66	327.4	0.0	
6/16/11 8:23:15	5.56	6.66	331.1	0.0	
6/16/11 8:23:30	5.56	6.67	334.1	0.0	
6/16/11 8:23:45	5.55	6.69	339.4	0.0	
6/16/11 8:24:00	5.55	6.70	342.4	0.0	
6/16/11 8:24:15	5.54	6.71	339.4	0.0	
6/16/11 8:24:30	5.53	6.71	334.1	0.0	
6/16/11 8:24:45	5.52	6.70	336.4	0.0	
6/16/11 8:25:00	5.56	6.68	340.2	0.0	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 8:25:15	5.59	6.67	341.2	0.0	
6/16/11 8:25:30	5.62	6.68	338.9	0.0	
6/16/11 8:25:45	5.62	6.69	339.2	0.0	
6/16/11 8:26:00	5.62	6.70	341.4	0.0	
6/16/11 8:26:15	5.63	6.69	340.7	0.0	
6/16/11 8:26:30	5.62	6.69	334.6	0.0	
6/16/11 8:26:45	5.60	6.69	329.9	0.0	
6/16/11 8:27:00	5.59	6.69	323.9	0.0	End 544SRU-18-3
6/16/11 8:27:15	5.58	6.70	316.3	0.0	
6/16/11 8:27:30	5.56	6.71	311.1	0.0	
6/16/11 8:27:45	5.53	6.74	312.3	0.0	
6/16/11 8:28:00	5.54	6.75	316.1	0.0	
6/16/11 8:28:15	5.55	6.75	317.1	0.0	
6/16/11 8:28:30	5.54	6.74	312.6	0.0	
6/16/11 8:28:45	5.53	6.72	306.8	0.0	
6/16/11 8:29:00	5.52	6.71	307.6	0.0	
6/16/11 8:29:15	5.56	6.68	311.6	0.0	
6/16/11 8:29:30	5.56	6.69	309.3	0.0	
6/16/11 8:29:45	5.54	6.71	307.1	0.0	
6/16/11 8:30:00	5.53	6.72	304.8	0.0	
6/16/11 8:30:15	5.53	6.74	305.1	0.0	
6/16/11 8:30:30	5.52	6.74	309.6	0.0	
6/16/11 8:30:45	5.49	6.73	315.1	0.0	
6/16/11 8:31:00	5.49	6.72	316.6	0.0	
6/16/11 8:31:15	5.46	6.71	313.1	0.0	
6/16/11 8:31:30	5.45	6.72	313.1	0.0	
6/16/11 8:31:45	5.46	6.71	319.1	0.0	
6/16/11 8:32:00	5.50	6.70	321.4	0.0	
6/16/11 8:32:15	5.48	6.72	323.6	0.0	
6/16/11 8:32:30	5.47	6.72	323.6	0.0	
6/16/11 8:32:45	5.49	6.71	322.9	0.0	
6/16/11 8:33:00	5.51	6.69	325.1	0.0	
6/16/11 8:33:15	5.52	6.68	328.6	0.0	
6/16/11 8:33:30	5.52	6.68	335.4	0.0	
6/16/11 8:33:45	5.54	6.68	341.7	0.0	544SRU-0011-4 End
6/16/11 8:34:00	5.56	6.68	346.9	0.0	
6/16/11 8:34:15	5.57	6.69	353.2	0.0	
6/16/11 8:34:30	5.57	6.69	354.7	0.0	
6/16/11 8:34:45	5.56	6.69	352.0	0.0	
6/16/11 8:35:00	5.54	6.69	348.9	0.0	
6/16/11 8:35:15	5.55	6.68	354.2	0.0	
6/16/11 8:35:30	5.58	6.67	360.2	0.0	
6/16/11 8:35:45	5.58	6.68	358.2	0.0	
6/16/11 8:36:00	5.58	6.68	352.2	0.0	
6/16/11 8:36:15	5.58	6.69	339.9	0.0	
6/16/11 8:36:30	5.54	6.71	331.6	0.0	
6/16/11 8:36:45	5.51	6.70	329.6	0.0	
6/16/11 8:37:00	5.55	6.67	328.9	0.0	
6/16/11 8:37:15	5.59	6.64	327.1	0.0	
6/16/11 8:37:30	5.58	6.64	324.1	0.0	
6/16/11 8:37:45	5.58	6.65	321.4	0.0	
6/16/11 8:38:00	5.58	6.67	321.4	0.0	
6/16/11 8:38:15	5.57	6.68	320.1	0.0	
6/16/11 8:38:30	5.56	6.69	313.3	0.0	
6/16/11 8:38:45	5.53	6.70	304.1	0.0	
6/16/11 8:39:00	5.51	6.68	301.0	0.0	
6/16/11 8:39:15	5.51	6.66	298.3	0.0	
6/16/11 8:39:30	5.49	6.66	296.8	0.0	
6/16/11 8:39:45	5.50	6.65	295.3	0.0	
6/16/11 8:40:00	5.50	6.67	293.8	0.0	
6/16/11 8:40:15	5.48	6.70	293.0	0.0	
6/16/11 8:40:30	5.49	6.71	298.3	0.0	
6/16/11 8:40:45	5.52	6.70	302.8	0.0	
6/16/11 8:41:00	5.52	6.69	296.8	0.0	
6/16/11 8:41:15	5.47	6.69	295.1	0.0	
6/16/11 8:41:30	5.47	6.67	301.1	0.0	
6/16/11 8:41:45	5.52	6.65	308.3	0.0	
6/16/11 8:42:00	5.51	6.66	312.1	0.0	
6/16/11 8:42:15	5.53	6.68	314.6	0.0	
6/16/11 8:42:30	5.53	6.70	316.1	0.0	
6/16/11 8:42:45	5.52	6.71	320.1	0.0	
6/16/11 8:43:00	5.53	6.71	323.1	0.0	
6/16/11 8:43:15	5.53	6.69	324.4	0.0	
6/16/11 8:43:30	5.55	6.67	321.4	0.0	
6/16/11 8:43:45	5.53	6.67	320.4	0.0	
6/16/11 8:44:00	5.53	6.66	324.9	0.0	
6/16/11 8:44:15	5.56	6.66	330.6	0.0	
6/16/11 8:44:30	5.59	6.66	334.4	0.0	
6/16/11 8:44:45	5.62	6.67	331.9	0.0	Begin 544SRU-308-3
6/16/11 8:45:00	5.57	6.69	327.4	0.0	
6/16/11 8:45:15	5.56	6.69	324.1	0.0	
6/16/11 8:45:30	5.54	6.69	321.1	0.0	
6/16/11 8:45:45	5.54	6.69	315.1	0.0	
6/16/11 8:46:00	5.51	6.71	313.6	0.0	
6/16/11 8:46:15	5.53	6.71	314.3	0.0	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 8:46:30	5.55	6.71	317.3	0.0	
6/16/11 8:46:45	5.54	6.72	313.6	0.0	
6/16/11 8:47:00	5.50	6.73	309.1	0.0	
6/16/11 8:47:15	5.52	6.71	306.1	0.0	
6/16/11 8:47:30	5.50	6.71	301.6	0.0	
6/16/11 8:47:45	5.49	6.71	298.1	0.0	
6/16/11 8:48:00	5.49	6.71	296.6	0.0	
6/16/11 8:48:15	5.51	6.71	299.3	0.0	
6/16/11 8:48:30	5.52	6.71	306.1	0.0	
6/16/11 8:48:45	5.53	6.71	315.8	0.0	
6/16/11 8:49:00	5.55	6.70	320.4	0.0	
6/16/11 8:49:15	5.56	6.69	319.6	0.0	
6/16/11 8:49:30	5.53	6.69	319.6	0.0	
6/16/11 8:49:45	5.53	6.67	319.4	0.0	
6/16/11 8:50:00	5.52	6.68	318.6	0.0	
6/16/11 8:50:15	5.50	6.70	321.5	0.0	
6/16/11 8:50:30	5.51	6.72	325.1	0.0	
6/16/11 8:50:45	5.52	6.73	327.6	0.0	
6/16/11 8:51:00	5.51	6.73	326.1	0.0	
6/16/11 8:51:15	5.52	6.71	326.4	0.0	
6/16/11 8:51:30	5.54	6.68	328.4	0.0	
6/16/11 8:51:45	5.53	6.68	327.6	0.0	
6/16/11 8:52:00	5.53	6.68	328.4	0.0	
6/16/11 8:52:15	5.55	6.68	335.4	0.0	
6/16/11 8:52:30	5.57	6.70	340.7	0.0	
6/16/11 8:52:45	5.58	6.71	340.7	0.0	
6/16/11 8:53:00	5.57	6.73	337.4	0.0	
6/16/11 8:53:15	5.55	6.73	333.6	0.0	
6/16/11 8:53:30	5.56	6.71	333.6	0.0	
6/16/11 8:53:45	5.55	6.69	329.6	0.0	
6/16/11 8:54:00	5.54	6.69	323.9	0.0	
6/16/11 8:54:15	5.52	6.71	318.1	0.0	
6/16/11 8:54:30	5.51	6.73	318.3	0.0	
6/16/11 8:54:45	5.52	6.75	322.1	0.0	
6/16/11 8:55:00	5.54	6.75	326.6	0.0	
6/16/11 8:55:15	5.56	6.74	327.6	0.0	
6/16/11 8:55:30	5.55	6.74	323.6	0.0	
6/16/11 8:55:45	5.55	6.73	319.1	0.0	
6/16/11 8:56:00	5.54	6.72	316.1	0.0	
6/16/11 8:56:15	5.53	6.72	313.1	0.0	
6/16/11 8:56:30	5.53	6.72	307.8	0.0	
6/16/11 8:56:45	5.53	6.73	301.6	0.0	
6/16/11 8:57:00	5.52	6.74	301.3	0.0	
6/16/11 8:57:15	5.53	6.73	303.6	0.0	
6/16/11 8:57:30	5.55	6.71	303.8	0.0	
6/16/11 8:57:45	5.56	6.70	303.1	0.0	
6/16/11 8:58:00	5.58	6.69	301.8	0.0	
6/16/11 8:58:15	5.55	6.71	302.6	0.0	
6/16/11 8:58:30	5.54	6.71	302.6	0.0	
6/16/11 8:58:45	5.53	6.73	300.6	0.0	
6/16/11 8:59:00	5.54	6.73	296.6	0.0	
6/16/11 8:59:15	5.53	6.73	291.5	0.0	
6/16/11 8:59:30	5.50	6.73	291.5	0.0	
6/16/11 8:59:45	5.50	6.72	288.5	0.0	
6/16/11 9:00:00	5.49	6.71	289.0	0.0	
6/16/11 9:00:15	5.49	6.72	299.6	0.0	
6/16/11 9:00:30	5.52	6.71	305.6	0.0	
6/16/11 9:00:45	5.51	6.73	306.6	0.0	
6/16/11 9:01:00	5.51	6.75	308.1	0.0	
6/16/11 9:01:15	5.52	6.74	311.1	0.0	
6/16/11 9:01:30	5.51	6.74	312.3	0.0	
6/16/11 9:01:45	5.50	6.71	314.6	0.0	
6/16/11 9:02:00	5.53	6.69	313.8	0.0	
6/16/11 9:02:15	5.52	6.69	319.1	0.0	
6/16/11 9:02:30	5.54	6.68	322.4	0.0	
6/16/11 9:02:45	5.53	6.71	318.6	0.0	
6/16/11 9:03:00	5.51	6.74	318.3	0.0	
6/16/11 9:03:15	5.51	6.75	318.6	0.0	
6/16/11 9:03:30	5.52	6.74	313.1	0.0	
6/16/11 9:03:45	5.50	6.74	310.6	0.0	
6/16/11 9:04:00	5.50	6.72	313.8	0.0	
6/16/11 9:04:15	5.51	6.71	313.1	0.0	
6/16/11 9:04:30	5.49	6.72	312.6	0.0	
6/16/11 9:04:45	5.51	6.73	320.1	0.0	
6/16/11 9:05:00	5.54	6.73	328.1	0.0	
6/16/11 9:05:15	5.56	6.74	335.1	0.0	
6/16/11 9:05:30	5.58	6.72	337.4	0.0	
6/16/11 9:05:45	5.58	6.72	329.6	0.0	
6/16/11 9:06:00	5.56	6.71	320.3	0.0	
6/16/11 9:06:15	5.52	6.71	318.6	0.0	
6/16/11 9:06:30	5.56	6.69	317.1	0.0	
6/16/11 9:06:45	5.56	6.70	308.6	0.0	
6/16/11 9:07:00	5.49	6.76	303.3	0.0	
6/16/11 9:07:15	5.46	6.78	304.6	0.0	
6/16/11 9:07:30	5.50	6.77	306.3	0.0	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 9:07:45	5.52	6.77	306.1	0.0	
6/16/11 9:08:00	5.52	6.75	304.1	0.0	
6/16/11 9:08:15	5.52	6.73	302.6	0.0	
6/16/11 9:08:30	5.51	6.72	305.1	0.0	
6/16/11 9:08:45	5.54	6.70	306.1	0.0	
6/16/11 9:09:00	5.54	6.71	303.3	0.0	
6/16/11 9:09:15	5.52	6.74	302.1	0.0	Start 544SRU-0010-1
6/16/11 9:09:30	5.47	6.76	303.3	0.0	
6/16/11 9:09:45	5.47	6.75	300.1	0.0	
6/16/11 9:10:00	5.45	6.75	295.6	0.0	
6/16/11 9:10:15	5.46	6.74	290.0	0.0	
6/16/11 9:10:30	5.45	6.74	288.0	0.0	
6/16/11 9:10:45	5.43	6.74	289.0	0.0	
6/16/11 9:11:00	5.44	6.74	294.3	0.0	
6/16/11 9:11:15	5.47	6.73	298.1	0.0	
6/16/11 9:11:30	5.48	6.73	299.3	0.0	
6/16/11 9:11:45	5.48	6.73	304.1	0.0	
6/16/11 9:12:00	5.49	6.71	310.3	0.0	
6/16/11 9:12:15	5.52	6.69	311.6	0.0	
6/16/11 9:12:30	5.51	6.69	308.3	0.0	
6/16/11 9:12:45	5.47	6.70	304.1	0.0	
6/16/11 9:13:00	5.47	6.71	304.3	0.0	
6/16/11 9:13:15	5.49	6.72	305.6	0.0	
6/16/11 9:13:30	5.48	6.74	307.1	0.0	
6/16/11 9:13:45	5.49	6.73	312.6	0.0	
6/16/11 9:14:00	5.51	6.71	312.8	0.0	
6/16/11 9:14:15	5.49	6.70	311.1	0.0	
6/16/11 9:14:30	5.49	6.69	312.3	0.0	
6/16/11 9:14:45	5.50	6.69	311.1	0.1	
6/16/11 9:15:00	5.49	6.71	309.1	0.0	
6/16/11 9:15:15	5.47	6.74	310.6	0.0	
6/16/11 9:15:30	5.48	6.75	312.3	0.0	
6/16/11 9:15:45	5.48	6.76	311.6	0.0	
6/16/11 9:16:00	5.48	6.74	309.3	0.0	
6/16/11 9:16:15	5.47	6.72	308.6	0.0	
6/16/11 9:16:30	5.49	6.70	311.8	0.0	
6/16/11 9:16:45	5.52	6.69	313.6	0.0	
6/16/11 9:17:00	5.53	6.70	311.3	0.0	
6/16/11 9:17:15	5.54	6.71	306.6	0.0	
6/16/11 9:17:30	5.55	6.72	306.3	0.0	
6/16/11 9:17:45	5.56	6.73	302.1	0.0	
6/16/11 9:18:00	5.53	6.75	298.1	0.0	
6/16/11 9:18:15	5.51	6.74	294.1	0.0	
6/16/11 9:18:30	5.52	6.72	291.0	0.0	
6/16/11 9:18:45	5.51	6.72	292.0	0.0	
6/16/11 9:19:00	5.52	6.71	293.3	0.0	
6/16/11 9:19:15	5.50	6.72	295.6	0.0	
6/16/11 9:19:30	5.50	6.73	298.1	0.0	
6/16/11 9:19:45	5.53	6.72	299.6	0.0	
6/16/11 9:20:00	5.54	6.71	296.6	0.0	
6/16/11 9:20:15	5.52	6.71	289.5	0.0	
6/16/11 9:20:30	5.48	6.71	285.3	0.0	
6/16/11 9:20:45	5.47	6.71	285.5	0.0	
6/16/11 9:21:00	5.49	6.70	291.3	0.0	
6/16/11 9:21:15	5.52	6.70	296.1	0.0	
6/16/11 9:21:30	5.49	6.72	293.3	0.0	
6/16/11 9:21:45	5.48	6.73	290.5	0.0	
6/16/11 9:22:00	5.49	6.72	293.8	0.0	
6/16/11 9:22:15	5.51	6.70	301.1	0.0	
6/16/11 9:22:30	5.53	6.68	303.6	0.0	
6/16/11 9:22:45	5.53	6.68	299.1	0.0	
6/16/11 9:23:00	5.49	6.70	299.3	0.0	
6/16/11 9:23:15	5.48	6.71	302.1	0.0	
6/16/11 9:23:30	5.48	6.73	302.6	0.0	
6/16/11 9:23:45	5.45	6.74	305.1	0.0	
6/16/11 9:24:00	5.48	6.72	308.8	0.0	
6/16/11 9:24:15	5.51	6.70	313.1	0.0	
6/16/11 9:24:30	5.46	6.71	311.3	0.0	
6/16/11 9:24:45	5.44	6.71	307.1	0.0	
6/16/11 9:25:00	5.45	6.71	308.1	0.0	
6/16/11 9:25:15	5.47	6.71	316.6	0.0	
6/16/11 9:25:30	5.51	6.72	323.4	0.0	
6/16/11 9:25:45	5.53	6.74	329.6	0.0	
6/16/11 9:26:00	5.52	6.74	332.1	0.0	
6/16/11 9:26:15	5.55	6.72	330.1	0.0	
6/16/11 9:26:30	5.54	6.71	327.1	0.0	
6/16/11 9:26:45	5.52	6.71	325.1	0.0	
6/16/11 9:27:00	5.50	6.71	327.1	0.0	
6/16/11 9:27:15	5.54	6.70	326.6	0.0	
6/16/11 9:27:30	5.54	6.72	327.4	0.0	
6/16/11 9:27:45	5.56	6.73	324.6	0.0	
6/16/11 9:28:00	5.53	6.76	318.1	0.0	
6/16/11 9:28:15	5.53	6.76	310.1	0.0	
6/16/11 9:28:30	5.54	6.75	304.8	0.0	
6/16/11 9:28:45	5.51	6.74	301.6	0.0	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 9:29:00	5.52	6.72	302.3	0.0	
6/16/11 9:29:15	5.53	6.71	300.6	0.0	
6/16/11 9:29:30	5.54	6.72	296.6	0.0	
6/16/11 9:29:45	5.55	6.74	288.5	0.0	
6/16/11 9:30:00	5.50	6.77	285.8	0.0	
6/16/11 9:30:15	5.49	6.78	283.5	0.0	
6/16/11 9:30:30	5.47	6.78	281.8	0.0	
6/16/11 9:30:45	5.50	6.76	281.0	0.0	
6/16/11 9:31:00	5.50	6.74	281.3	0.0	
6/16/11 9:31:15	5.53	6.73	285.0	0.0	
6/16/11 9:31:30	5.55	6.73	284.0	0.0	
6/16/11 9:31:45	5.53	6.75	281.0	0.0	
6/16/11 9:32:00	5.51	6.76	284.5	0.0	
6/16/11 9:32:15	5.52	6.75	290.0	0.0	
6/16/11 9:32:30	5.53	6.73	293.8	0.0	
6/16/11 9:32:45	5.54	6.72	294.6	0.0	
6/16/11 9:33:00	5.55	6.71	292.0	0.0	
6/16/11 9:33:15	5.53	6.72	289.0	0.0	
6/16/11 9:33:30	5.50	6.74	287.0	0.0	
6/16/11 9:33:45	5.49	6.75	286.5	0.0	
6/16/11 9:34:00	5.48	6.76	287.3	0.0	
6/16/11 9:34:15	5.47	6.76	293.0	0.0	
6/16/11 9:34:30	5.50	6.73	296.1	0.0	
6/16/11 9:34:45	5.51	6.72	300.6	0.0	
6/16/11 9:35:00	5.51	6.72	300.8	0.0	
6/16/11 9:35:15	5.49	6.73	299.6	0.0	
6/16/11 9:35:30	5.48	6.74	301.8	0.0	
6/16/11 9:35:45	5.51	6.74	307.1	0.0	
6/16/11 9:36:00	5.50	6.75	310.1	0.0	
6/16/11 9:36:15	5.51	6.75	311.6	0.0	
6/16/11 9:36:30	5.50	6.75	309.1	0.0	
6/16/11 9:36:45	5.48	6.74	311.1	0.0	
6/16/11 9:37:00	5.53	6.71	314.1	0.0	
6/16/11 9:37:15	5.54	6.70	317.6	0.0	
6/16/11 9:37:30	5.55	6.71	318.6	0.0	
6/16/11 9:37:45	5.54	6.73	320.1	0.0	
6/16/11 9:38:00	5.55	6.74	320.8	0.0	
6/16/11 9:38:15	5.54	6.74	322.1	0.0	
6/16/11 9:38:30	5.53	6.74	317.4	0.0	
6/16/11 9:38:45	5.50	6.74	312.6	0.0	
6/16/11 9:39:00	5.51	6.72	310.3	0.0	
6/16/11 9:39:15	5.52	6.72	302.6	0.0	
6/16/11 9:39:30	5.48	6.74	299.9	0.0	
6/16/11 9:39:45	5.49	6.75	302.6	0.0	
6/16/11 9:40:00	5.49	6.77	308.6	0.0	
6/16/11 9:40:15	5.54	6.75	316.1	0.0	
6/16/11 9:40:30	5.56	6.74	318.9	0.0	
6/16/11 9:40:45	5.55	6.73	316.6	0.0	
6/16/11 9:41:00	5.55	6.71	312.1	0.0	
6/16/11 9:41:15	5.54	6.71	306.1	0.0	
6/16/11 9:41:30	5.49	6.72	305.1	0.0	
6/16/11 9:41:45	5.51	6.73	308.6	0.0	
6/16/11 9:42:00	5.53	6.75	312.8	0.0	
6/16/11 9:42:15	5.53	6.77	317.1	0.0	
6/16/11 9:42:30	5.55	6.76	319.6	0.0	
6/16/11 9:42:45	5.54	6.76	321.6	0.0	
6/16/11 9:43:00	5.57	6.73	321.9	0.0	
6/16/11 9:43:15	5.57	6.72	322.1	0.0	
6/16/11 9:43:30	5.57	6.71	318.8	0.0	
6/16/11 9:43:45	5.54	6.73	315.6	0.0	
6/16/11 9:44:00	5.54	6.74	318.1	0.0	
6/16/11 9:44:15	5.57	6.75	324.1	0.0	
6/16/11 9:44:30	5.58	6.76	326.1	0.0	
6/16/11 9:44:45	5.59	6.76	318.6	0.0	
6/16/11 9:45:00	5.52	6.77	309.3	0.0	End 544SRU-308-3
6/16/11 9:45:15	5.51	6.76	305.1	0.0	
6/16/11 9:45:30	5.51	6.74	306.8	0.0	
6/16/11 9:45:45	5.51	6.73	310.6	0.0	
6/16/11 9:46:00	5.52	6.74	313.8	0.0	
6/16/11 9:46:15	5.54	6.74	313.6	0.0	
6/16/11 9:46:30	5.52	6.77	311.1	0.0	
6/16/11 9:46:45	5.50	6.78	309.6	0.0	
6/16/11 9:47:00	5.52	6.76	306.1	0.1	
6/16/11 9:47:15	5.52	6.76	305.1	0.2	
6/16/11 9:47:30	5.52	6.74	303.8	0.1	
6/16/11 9:47:45	5.49	6.75	301.1	0.1	End 544SRU-308-3
6/16/11 9:48:00	5.48	6.75	300.6	0.0	
6/16/11 9:48:15	5.49	6.76	305.1	0.0	
6/16/11 9:48:30	5.52	6.76	308.1	0.0	
6/16/11 9:48:45	5.51	6.77	308.1	0.0	
6/16/11 9:49:00	5.53	6.76	304.8	0.0	
6/16/11 9:49:15	5.50	6.76	301.0	0.0	
6/16/11 9:49:30	5.48	6.75	298.3	0.0	
6/16/11 9:49:45	5.46	6.75	299.6	0.0	
6/16/11 9:50:00	5.48	6.75	303.6	0.0	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 9:50:15	5.50	6.74	304.1	0.0	
6/16/11 9:50:30	5.50	6.75	303.3	0.0	
6/16/11 9:50:45	5.52	6.74	304.1	0.0	
6/16/11 9:51:00	5.53	6.74	306.8	0.0	
6/16/11 9:51:15	5.53	6.73	306.6	0.1	
6/16/11 9:51:30	5.52	6.73	310.1	0.0	
6/16/11 9:51:45	5.55	6.71	312.6	0.0	
6/16/11 9:52:00	5.53	6.74	313.8	0.0	
6/16/11 9:52:15	5.52	6.76	320.1	0.0	
6/16/11 9:52:30	5.57	6.75	328.4	0.0	
6/16/11 9:52:45	5.60	6.74	335.6	0.0	
6/16/11 9:53:00	5.58	6.74	339.2	0.0	
6/16/11 9:53:15	5.59	6.73	339.2	0.0	
6/16/11 9:53:30	5.58	6.72	337.4	0.0	
6/16/11 9:53:45	5.58	6.72	334.6	0.0	
6/16/11 9:54:00	5.59	6.73	331.1	0.0	
6/16/11 9:54:15	5.57	6.76	330.6	0.0	
6/16/11 9:54:30	5.57	6.77	330.4	0.0	
6/16/11 9:54:45	5.58	6.78	324.6	0.0	
6/16/11 9:55:00	5.53	6.80	321.9	0.0	
6/16/11 9:55:15	5.54	6.78	320.1	0.0	
6/16/11 9:55:30	5.54	6.77	314.3	0.0	
6/16/11 9:55:45	5.54	6.76	307.6	0.0	
6/16/11 9:56:00	5.53	6.77	304.6	0.0	
6/16/11 9:56:15	5.52	6.77	303.1	0.0	
6/16/11 9:56:30	5.54	6.79	299.1	0.0	
6/16/11 9:56:45	5.51	6.82	293.5	0.0	
6/16/11 9:57:00	5.50	6.82	292.8	0.0	
6/16/11 9:57:15	5.53	6.79	295.6	0.0	
6/16/11 9:57:30	5.54	6.76	299.6	0.0	
6/16/11 9:57:45	5.54	6.74	298.1	0.0	
6/16/11 9:58:00	5.54	6.73	298.1	0.0	
6/16/11 9:58:15	5.55	6.74	301.0	0.0	
6/16/11 9:58:30	5.53	6.77	301.3	0.0	
6/16/11 9:58:45	5.53	6.79	299.1	0.0	
6/16/11 9:59:00	5.51	6.81	294.8	0.0	
6/16/11 9:59:15	5.51	6.80	294.1	0.0	
6/16/11 9:59:30	5.52	6.77	291.0	0.0	
6/16/11 9:59:45	5.49	6.76	289.5	0.0	
6/16/11 10:00:00	5.47	6.75	290.5	0.0	
6/16/11 10:00:15	5.50	6.74	291.0	0.0	
6/16/11 10:00:30	5.51	6.76	292.8	0.0	
6/16/11 10:00:45	5.52	6.78	296.6	0.0	
6/16/11 10:01:00	5.52	6.79	295.6	0.0	
6/16/11 10:01:15	5.50	6.81	291.0	0.0	
6/16/11 10:01:30	5.47	6.80	294.1	0.0	
6/16/11 10:01:45	5.51	6.76	296.1	0.0	
6/16/11 10:02:00	5.51	6.74	291.8	0.0	
6/16/11 10:02:15	5.51	6.73	289.0	0.0	
6/16/11 10:02:30	5.50	6.74	297.3	0.0	
6/16/11 10:02:45	5.52	6.74	310.6	0.0	
6/16/11 10:03:00	5.52	6.75	315.8	0.0	
6/16/11 10:03:15	5.52	6.77	314.1	0.0	
6/16/11 10:03:30	5.52	6.77	310.1	0.0	
6/16/11 10:03:45	5.48	6.77	309.1	0.0	
6/16/11 10:04:00	5.48	6.75	309.3	0.0	
6/16/11 10:04:15	5.48	6.74	309.1	0.0	
6/16/11 10:04:30	5.49	6.73	311.6	0.0	
6/16/11 10:04:45	5.52	6.73	313.1	0.0	
6/16/11 10:05:00	5.50	6.76	308.8	0.1	
6/16/11 10:05:15	5.46	6.79	305.1	0.0	
6/16/11 10:05:30	5.45	6.78	304.6	0.0	
6/16/11 10:05:45	5.48	6.76	305.1	0.0	
6/16/11 10:06:00	5.49	6.75	307.3	0.0	
6/16/11 10:06:15	5.50	6.74	309.1	0.0	
6/16/11 10:06:30	5.50	6.73	309.3	0.0	
6/16/11 10:06:45	5.50	6.74	307.6	0.0	
6/16/11 10:07:00	5.50	6.76	306.3	0.0	
6/16/11 10:07:15	5.47	6.78	307.6	0.0	
6/16/11 10:07:30	5.48	6.77	306.1	0.0	
6/16/11 10:07:45	5.47	6.77	305.6	0.0	
6/16/11 10:08:00	5.48	6.75	307.1	0.0	
6/16/11 10:08:15	5.49	6.74	310.6	0.0	
6/16/11 10:08:30	5.51	6.73	310.1	0.0	
6/16/11 10:08:45	5.47	6.76	306.6	0.0	
6/16/11 10:09:00	5.46	6.77	305.1	0.0	
6/16/11 10:09:15	5.47	6.77	307.1	0.0	
6/16/11 10:09:30	5.48	6.76	313.3	0.0	
6/16/11 10:09:45	5.51	6.74	319.6	0.0	
6/16/11 10:10:00	5.54	6.71	322.4	0.0	
6/16/11 10:10:15	5.56	6.70	322.1	0.0	
6/16/11 10:10:30	5.56	6.71	322.9	0.0	
6/16/11 10:10:45	5.57	6.72	326.1	0.0	
6/16/11 10:11:00	5.58	6.72	325.9	0.0	
6/16/11 10:11:15	5.56	6.75	316.6	0.0	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 10:11:30	5.50	6.77	310.1	0.0	
6/16/11 10:11:45	5.51	6.75	308.1	0.0	
6/16/11 10:12:00	5.51	6.74	309.8	0.0	
6/16/11 10:12:15	5.53	6.72	312.1	0.0	
6/16/11 10:12:30	5.53	6.71	308.3	0.0	
6/16/11 10:12:45	5.51	6.73	303.6	0.0	
6/16/11 10:13:00	5.48	6.76	301.8	0.0	
6/16/11 10:13:15	5.48	6.77	300.6	0.0	
6/16/11 10:13:30	5.48	6.78	295.6	0.0	
6/16/11 10:13:45	5.46	6.79	290.0	0.0	
6/16/11 10:14:00	5.43	6.78	287.0	0.0	
6/16/11 10:14:15	5.43	6.77	286.0	0.0	
6/16/11 10:14:30	5.45	6.75	285.8	0.0	
6/16/11 10:14:45	5.43	6.76	291.0	0.0	
6/16/11 10:15:00	5.48	6.75	298.1	0.0	
6/16/11 10:15:15	5.50	6.76	301.6	0.0	
6/16/11 10:15:30	5.50	6.77	301.6	0.0	
6/16/11 10:15:45	5.49	6.76	302.6	0.0	
6/16/11 10:16:00	5.49	6.74	306.8	0.0	
6/16/11 10:16:15	5.50	6.72	308.1	0.0	
6/16/11 10:16:30	5.49	6.72	307.8	0.0	
6/16/11 10:16:45	5.51	6.71	310.1	0.0	
6/16/11 10:17:00	5.54	6.72	316.8	0.0	
6/16/11 10:17:15	5.55	6.74	324.1	0.0	
6/16/11 10:17:30	5.53	6.77	323.1	0.0	
6/16/11 10:17:45	5.50	6.78	319.1	0.0	
6/16/11 10:18:00	5.52	6.75	319.9	0.0	
6/16/11 10:18:15	5.54	6.72	318.1	0.0	
6/16/11 10:18:30	5.53	6.71	317.3	0.0	
6/16/11 10:18:45	5.52	6.69	321.1	0.0	
6/16/11 10:19:00	5.56	6.68	324.9	0.0	
6/16/11 10:19:15	5.57	6.70	329.1	0.0	
6/16/11 10:19:30	5.57	6.71	330.1	0.0	
6/16/11 10:19:45	5.58	6.73	322.6	0.0	
6/16/11 10:20:00	5.52	6.77	311.8	0.1	
6/16/11 10:20:15	5.49	6.77	304.1	0.1	
6/16/11 10:20:30	5.47	6.76	304.6	0.0	
6/16/11 10:20:45	5.51	6.73	305.6	0.0	
6/16/11 10:21:00	5.48	6.74	300.8	0.0	
6/16/11 10:21:15	5.46	6.75	296.6	0.0	
6/16/11 10:21:30	5.49	6.76	295.6	0.0	
6/16/11 10:21:45	5.46	6.78	299.1	0.0	
6/16/11 10:22:00	5.48	6.77	299.5	0.0	
6/16/11 10:22:15	5.49	6.76	294.5	0.0	
6/16/11 10:22:30	5.48	6.76	291.3	0.0	
6/16/11 10:22:45	5.50	6.74	288.0	0.0	
6/16/11 10:23:00	5.47	6.75	286.0	0.1	
6/16/11 10:23:15	5.50	6.74	286.0	0.0	
6/16/11 10:23:30	5.51	6.75	287.5	0.0	
6/16/11 10:23:45	5.52	6.76	289.5	0.0	
6/16/11 10:24:00	5.53	6.76	288.8	0.0	
6/16/11 10:24:15	5.52	6.75	288.5	0.0	
6/16/11 10:24:30	5.51	6.74	288.8	0.0	
6/16/11 10:24:45	5.52	6.73	291.0	0.0	
6/16/11 10:25:00	5.54	6.72	295.1	0.0	
6/16/11 10:25:15	5.52	6.74	300.1	0.0	
6/16/11 10:25:30	5.54	6.75	303.6	0.0	
6/16/11 10:25:45	5.54	6.76	307.6	0.0	
6/16/11 10:26:00	5.54	6.75	308.3	0.0	
6/16/11 10:26:15	5.55	6.74	302.1	0.0	
6/16/11 10:26:30	5.50	6.75	299.8	0.0	
6/16/11 10:26:45	5.51	6.73	303.1	0.0	
6/16/11 10:27:00	5.52	6.73	311.8	0.0	
6/16/11 10:27:15	5.52	6.73	315.6	0.0	
6/16/11 10:27:30	5.52	6.75	316.7	0.0	
6/16/11 10:27:45	5.51	6.76	316.6	0.0	
6/16/11 10:28:00	5.50	6.77	309.8	0.0	Begin 544SRU-16A-1
6/16/11 10:28:15	5.47	6.78	305.6	0.0	
6/16/11 10:28:30	5.47	6.76	302.1	0.0	
6/16/11 10:28:45	5.46	6.75	299.1	0.0	
6/16/11 10:29:00	5.45	6.76	298.8	0.0	
6/16/11 10:29:15	5.47	6.76	305.1	0.0	
6/16/11 10:29:30	5.51	6.76	312.8	0.0	
6/16/11 10:29:45	5.51	6.78	320.1	0.0	
6/16/11 10:30:00	5.53	6.78	326.9	0.0	
6/16/11 10:30:15	5.58	6.76	322.1	0.0	
6/16/11 10:30:30	5.52	6.77	314.8	0.0	
6/16/11 10:30:45	5.51	6.74	310.1	0.0	
6/16/11 10:31:00	5.49	6.74	302.8	0.0	
6/16/11 10:31:15	5.49	6.74	301.0	0.0	
6/16/11 10:31:30	5.48	6.76	306.1	0.0	
6/16/11 10:31:45	5.50	6.77	308.1	0.0	
6/16/11 10:32:00	5.51	6.78	309.3	0.0	
6/16/11 10:32:15	5.50	6.78	307.1	0.0	
6/16/11 10:32:30	5.48	6.78	299.3	0.0	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 10:32:45	5.48	6.76	293.6	0.0	
6/16/11 10:33:00	5.44	6.77	291.8	0.0	
6/16/11 10:33:15	5.45	6.75	293.5	0.0	
6/16/11 10:33:30	5.48	6.74	299.3	0.0	
6/16/11 10:33:45	5.49	6.76	303.6	0.0	
6/16/11 10:34:00	5.51	6.76	312.6	0.0	
6/16/11 10:34:15	5.55	6.74	313.6	0.0	
6/16/11 10:34:30	5.55	6.74	304.8	0.0	
6/16/11 10:34:45	5.50	6.75	302.6	0.0	
6/16/11 10:35:00	5.50	6.74	300.0	0.0	
6/16/11 10:35:15	5.47	6.75	298.6	0.0	
6/16/11 10:35:30	5.47	6.75	301.3	0.0	
6/16/11 10:35:45	5.50	6.75	303.6	0.0	
6/16/11 10:36:00	5.51	6.76	302.6	0.0	
6/16/11 10:36:15	5.49	6.77	301.5	0.1	
6/16/11 10:36:30	5.47	6.78	296.8	0.0	
6/16/11 10:36:45	5.47	6.77	295.1	0.0	
6/16/11 10:37:00	5.47	6.76	296.6	0.0	
6/16/11 10:37:15	5.46	6.76	295.6	0.0	
6/16/11 10:37:30	5.44	6.78	293.8	0.0	
6/16/11 10:37:45	5.43	6.78	295.1	0.0	
6/16/11 10:38:00	5.47	6.78	302.1	0.0	
6/16/11 10:38:15	5.50	6.76	308.6	0.0	
6/16/11 10:38:30	5.50	6.76	312.3	0.0	
6/16/11 10:38:45	5.51	6.75	308.6	0.0	
6/16/11 10:39:00	5.51	6.74	296.3	0.0	
6/16/11 10:39:15	5.45	6.78	290.5	0.0	
6/16/11 10:39:30	5.42	6.80	288.8	0.0	
6/16/11 10:39:45	5.44	6.80	296.0	0.0	
6/16/11 10:40:00	5.48	6.79	306.6	0.0	
6/16/11 10:40:15	5.51	6.77	311.6	0.0	
6/16/11 10:40:30	5.53	6.75	315.6	0.0	
6/16/11 10:40:45	5.55	6.73	314.1	0.0	
6/16/11 10:41:00	5.53	6.74	307.8	0.0	
6/16/11 10:41:15	5.52	6.75	305.1	0.0	
6/16/11 10:41:30	5.50	6.77	303.1	0.0	
6/16/11 10:41:45	5.47	6.80	301.0	0.0	
6/16/11 10:42:00	5.49	6.80	301.8	0.0	
6/16/11 10:42:15	5.49	6.80	303.6	0.0	
6/16/11 10:42:30	5.50	6.78	306.6	0.0	
6/16/11 10:42:45	5.52	6.76	305.6	0.0	
6/16/11 10:43:00	5.50	6.76	300.6	0.0	
6/16/11 10:43:15	5.47	6.78	296.1	0.0	
6/16/11 10:43:30	5.45	6.79	296.1	0.0	
6/16/11 10:43:45	5.47	6.80	298.1	0.0	
6/16/11 10:44:00	5.47	6.82	299.5	0.0	
6/16/11 10:44:15	5.48	6.81	298.6	0.0	
6/16/11 10:44:30	5.48	6.80	292.8	0.0	
6/16/11 10:44:45	5.47	6.79	289.5	0.0	
6/16/11 10:45:00	5.45	6.78	287.0	0.0	
6/16/11 10:45:15	5.47	6.78	283.5	0.0	
6/16/11 10:45:30	5.41	6.82	282.3	0.0	
6/16/11 10:45:45	5.43	6.82	287.0	0.0	
6/16/11 10:46:00	5.47	6.81	294.3	0.0	
6/16/11 10:46:15	5.49	6.81	297.1	0.0	
6/16/11 10:46:30	5.53	6.78	297.3	0.0	
6/16/11 10:46:45	5.56	6.75	296.1	0.0	
6/16/11 10:47:00	5.58	6.73	294.3	0.0	
6/16/11 10:47:15	5.55	6.75	293.5	0.0	
6/16/11 10:47:30	5.54	6.76	292.5	0.0	
6/16/11 10:47:45	5.53	6.79	293.0	0.0	
6/16/11 10:48:00	5.51	6.80	294.3	0.0	
6/16/11 10:48:15	5.50	6.81	293.6	0.0	
6/16/11 10:48:30	5.49	6.80	295.3	0.0	
6/16/11 10:48:45	5.53	6.77	298.1	0.0	
6/16/11 10:49:00	5.54	6.76	295.1	0.0	
6/16/11 10:49:15	5.50	6.78	293.6	0.0	
6/16/11 10:49:30	5.44	6.81	297.6	0.0	
6/16/11 10:49:45	5.42	6.82	301.5	0.0	
6/16/11 10:50:00	5.43	6.82	308.6	0.0	
6/16/11 10:50:15	5.50	6.79	313.6	0.0	
6/16/11 10:50:30	5.53	6.78	319.1	0.0	
6/16/11 10:50:45	5.52	6.78	319.1	0.0	
6/16/11 10:51:00	5.51	6.79	310.1	0.2	
6/16/11 10:51:15	5.46	6.81	303.1	0.0	
6/16/11 10:51:30	5.45	6.82	299.6	0.1	
6/16/11 10:51:45	5.47	6.81	299.6	0.1	
6/16/11 10:52:00	5.49	6.81	301.0	0.0	
6/16/11 10:52:15	5.49	6.78	301.5	0.0	
6/16/11 10:52:30	5.50	6.77	298.3	0.1	
6/16/11 10:52:45	5.50	6.77	298.1	0.1	
6/16/11 10:53:00	5.50	6.78	302.1	0.1	
6/16/11 10:53:15	5.51	6.79	302.6	0.1	
6/16/11 10:53:30	5.51	6.80	300.3	0.1	
6/16/11 10:53:45	5.50	6.81	298.1	0.1	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 10:54:00	5.50	6.80	292.8	0.1	
6/16/11 10:54:15	5.48	6.79	290.0	0.1	
6/16/11 10:54:30	5.48	6.77	286.5	0.0	
6/16/11 10:54:45	5.47	6.77	281.5	0.0	
6/16/11 10:55:00	5.44	6.79	281.8	0.0	
6/16/11 10:55:15	5.47	6.79	289.0	0.1	
6/16/11 10:55:30	5.49	6.80	303.1	0.0	
6/16/11 10:55:45	5.54	6.79	306.6	0.1	
6/16/11 10:56:00	5.52	6.80	297.6	0.1	
6/16/11 10:56:15	5.45	6.81	294.1	0.0	
6/16/11 10:56:30	5.47	6.78	295.1	0.0	
6/16/11 10:56:45	5.49	6.76	298.6	0.1	
6/16/11 10:57:00	5.50	6.76	300.3	0.0	
6/16/11 10:57:15	5.47	6.80	300.5	0.0	
6/16/11 10:57:30	5.48	6.81	306.3	0.0	
6/16/11 10:57:45	5.51	6.81	307.6	0.0	
6/16/11 10:58:00	5.51	6.82	302.3	0.0	
6/16/11 10:58:15	5.46	6.83	303.1	0.1	
6/16/11 10:58:30	5.47	6.80	309.1	0.0	
6/16/11 10:58:45	5.52	6.78	312.1	0.0	
6/16/11 10:59:00	5.52	6.77	316.8	0.0	
6/16/11 10:59:15	5.55	6.76	316.6	0.0	
6/16/11 10:59:30	5.53	6.79	312.3	0.0	
6/16/11 10:59:45	5.48	6.82	311.6	0.0	
6/16/11 11:00:00	5.49	6.82	313.1	0.0	
6/16/11 11:00:15	5.52	6.80	315.6	0.0	
6/16/11 11:00:30	5.56	6.77	316.3	0.0	
6/16/11 11:00:45	5.55	6.77	309.6	0.0	
6/16/11 11:01:00	5.49	6.81	304.6	0.0	
6/16/11 11:01:15	5.51	6.80	302.6	0.0	
6/16/11 11:01:30	5.51	6.81	291.3	0.0	
6/16/11 11:01:45	5.47	6.82	287.5	0.0	
6/16/11 11:02:00	5.47	6.81	287.0	0.0	
6/16/11 11:02:15	5.47	6.81	284.5	0.0	
6/16/11 11:02:30	5.46	6.80	279.5	0.0	
6/16/11 11:02:45	5.47	6.80	274.5	0.0	
6/16/11 11:03:00	5.41	6.83	273.5	0.0	
6/16/11 11:03:15	5.43	6.84	277.5	0.0	
6/16/11 11:03:30	5.46	6.84	275.7	0.0	
6/16/11 11:03:45	5.45	6.85	273.0	0.0	
6/16/11 11:04:00	5.46	6.82	275.2	0.0	
6/16/11 11:04:15	5.49	6.79	279.0	0.0	
6/16/11 11:04:30	5.49	6.78	280.3	0.0	
6/16/11 11:04:45	5.45	6.80	280.0	0.0	
6/16/11 11:05:00	5.44	6.81	288.5	0.0	
6/16/11 11:05:15	5.50	6.80	297.1	0.0	
6/16/11 11:05:30	5.50	6.82	302.6	0.0	
6/16/11 11:05:45	5.49	6.82	301.5	0.0	
6/16/11 11:06:00	5.48	6.81	299.6	0.0	
6/16/11 11:06:15	5.47	6.79	300.0	0.0	
6/16/11 11:06:30	5.47	6.77	303.3	0.0	
6/16/11 11:06:45	5.48	6.75	307.1	0.0	
6/16/11 11:07:00	5.49	6.75	308.6	0.1	
6/16/11 11:07:15	5.49	6.77	310.1	0.2	
6/16/11 11:07:30	5.50	6.79	317.3	0.1	
6/16/11 11:07:45	5.51	6.80	319.6	0.1	
6/16/11 11:08:00	5.50	6.81	315.3	0.1	
6/16/11 11:08:15	5.47	6.81	317.6	0.1	
6/16/11 11:08:30	5.50	6.78	330.6	0.1	
6/16/11 11:08:45	5.56	6.74	333.6	0.0	
6/16/11 11:09:00	5.56	6.75	331.1	0.1	Port Change 544SRU-0010-1
6/16/11 11:09:15	5.54	6.77	330.1	0.1	
6/16/11 11:09:30	5.53	6.79	332.9	0.1	
6/16/11 11:09:45	5.56	6.80	335.6	0.1	
6/16/11 11:10:00	5.57	6.79	344.2	0.1	
6/16/11 11:10:15	5.60	6.77	343.2	0.1	
6/16/11 11:10:30	5.54	6.79	331.4	0.1	
6/16/11 11:10:45	5.53	6.78	326.6	0.1	
6/16/11 11:11:00	5.54	6.79	326.6	0.1	
6/16/11 11:11:15	5.53	6.80	326.6	0.1	
6/16/11 11:11:30	5.54	6.81	321.1	0.1	
6/16/11 11:11:45	5.52	6.84	313.6	0.0	
6/16/11 11:12:00	5.50	6.85	304.3	0.1	
6/16/11 11:12:15	5.49	6.85	298.1	0.1	
6/16/11 11:12:30	5.45	6.85	290.0	0.1	
6/16/11 11:12:45	5.45	6.84	288.0	0.1	
6/16/11 11:13:00	5.46	6.83	287.3	0.1	
6/16/11 11:13:15	5.46	6.84	286.0	0.0	
6/16/11 11:13:30	5.44	6.86	289.0	0.1	
6/16/11 11:13:45	5.47	6.86	291.1	0.0	
6/16/11 11:14:00	5.46	6.86	290.3	0.0	
6/16/11 11:14:15	5.45	6.85	288.9	0.1	
6/16/11 11:14:30	5.46	6.83	285.0	0.0	
6/16/11 11:14:45	5.45	6.83	284.1	0.0	
6/16/11 11:15:00	5.46	6.82	286.0	0.1	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 11:15:15	5.47	6.83	288.9	0.1	
6/16/11 11:15:30	5.47	6.84	290.3	0.0	
6/16/11 11:15:45	5.45	6.86	298.4	0.1	
6/16/11 11:16:00	5.50	6.82	307.1	0.1	
6/16/11 11:16:15	5.53	6.80	307.8	0.1	
6/16/11 11:16:30	5.51	6.79	305.6	0.0	
6/16/11 11:16:45	5.49	6.79	307.1	0.1	
6/16/11 11:17:00	5.52	6.78	314.1	0.1	
6/16/11 11:17:15	5.55	6.78	321.6	0.1	
6/16/11 11:17:30	5.55	6.79	323.4	0.0	
6/16/11 11:17:45	5.54	6.80	321.1	0.1	
6/16/11 11:18:00	5.50	6.82	321.4	0.1	
6/16/11 11:18:15	5.50	6.80	325.1	0.1	
6/16/11 11:18:30	5.54	6.77	327.4	0.0	
6/16/11 11:18:45	5.56	6.76	324.4	0.1	
6/16/11 11:19:00	5.52	6.78	323.9	0.1	
6/16/11 11:19:15	5.55	6.78	323.9	0.1	
6/16/11 11:19:30	5.55	6.81	318.9	0.1	
6/16/11 11:19:45	5.50	6.84	315.8	0.1	
6/16/11 11:20:00	5.51	6.84	316.8	0.1	
6/16/11 11:20:15	5.52	6.82	317.6	0.1	
6/16/11 11:20:30	5.54	6.79	315.6	0.1	
6/16/11 11:20:45	5.54	6.78	317.1	0.0	
6/16/11 11:21:00	5.53	6.77	320.6	0.1	
6/16/11 11:21:15	5.54	6.79	317.6	0.1	
6/16/11 11:21:30	5.50	6.83	309.6	0.1	
6/16/11 11:21:45	5.47	6.85	305.8	0.1	
6/16/11 11:22:00	5.48	6.85	306.3	0.1	
6/16/11 11:22:15	5.50	6.83	305.6	0.1	
6/16/11 11:22:30	5.51	6.80	306.6	0.1	
6/16/11 11:22:45	5.54	6.78	305.8	0.1	
6/16/11 11:23:00	5.53	6.79	304.3	0.1	
6/16/11 11:23:15	5.54	6.80	305.8	0.1	
6/16/11 11:23:30	5.55	6.82	308.3	0.1	
6/16/11 11:23:45	5.53	6.84	306.1	0.1	
6/16/11 11:24:00	5.52	6.84	301.6	0.1	
6/16/11 11:24:15	5.51	6.84	297.8	0.1	
6/16/11 11:24:30	5.49	6.82	296.1	0.1	
6/16/11 11:24:45	5.48	6.80	293.0	0.1	
6/16/11 11:25:00	5.47	6.80	294.8	0.1	
6/16/11 11:25:15	5.48	6.80	294.8	0.1	
6/16/11 11:25:30	5.48	6.82	291.8	0.1	
6/16/11 11:25:45	5.45	6.85	289.5	0.0	
6/16/11 11:26:00	5.44	6.85	292.5	0.1	
6/16/11 11:26:15	5.46	6.83	299.3	0.1	
6/16/11 11:26:30	5.49	6.78	303.6	0.1	
6/16/11 11:26:45	5.52	6.75	301.3	0.1	
6/16/11 11:27:00	5.49	6.77	298.6	0.1	
6/16/11 11:27:15	5.46	6.78	297.8	0.1	
6/16/11 11:27:30	5.46	6.80	299.1	0.1	
6/16/11 11:27:45	5.48	6.81	301.3	0.1	
6/16/11 11:28:00	5.47	6.82	301.8	0.1	
6/16/11 11:28:15	5.48	6.81	298.1	0.1	
6/16/11 11:28:30	5.45	6.81	299.8	0.1	
6/16/11 11:28:45	5.47	6.77	307.3	0.1	
6/16/11 11:29:00	5.54	6.73	311.6	0.1	
6/16/11 11:29:15	5.54	6.74	310.8	0.1	
6/16/11 11:29:30	5.50	6.76	307.8	0.1	
6/16/11 11:29:45	5.47	6.79	304.1	0.1	
6/16/11 11:30:00	5.45	6.79	303.1	0.1	
6/16/11 11:30:15	5.48	6.77	305.3	0.1	
6/16/11 11:30:30	5.50	6.76	305.8	0.1	
6/16/11 11:30:45	5.49	6.75	305.1	0.1	
6/16/11 11:31:00	5.49	6.75	302.6	0.1	
6/16/11 11:31:15	5.47	6.75	305.6	0.1	
6/16/11 11:31:30	5.51	6.75	308.3	0.1	
6/16/11 11:31:45	5.50	6.76	301.6	0.1	
6/16/11 11:32:00	5.45	6.79	292.3	0.1	
6/16/11 11:32:15	5.43	6.78	295.3	0.1	
6/16/11 11:32:30	5.49	6.74	299.5	0.1	
6/16/11 11:32:45	5.50	6.72	296.6	0.0	
6/16/11 11:33:00	5.47	6.73	290.5	0.1	
6/16/11 11:33:15	5.44	6.75	292.8	0.1	
6/16/11 11:33:30	5.45	6.76	298.3	0.0	
6/16/11 11:33:45	5.47	6.76	302.8	0.0	
6/16/11 11:34:00	5.49	6.75	305.6	0.1	
6/16/11 11:34:15	5.50	6.74	304.8	0.0	
6/16/11 11:34:30	5.52	6.72	301.3	0.0	
6/16/11 11:34:45	5.49	6.72	301.3	0.0	
6/16/11 11:35:00	5.50	6.71	306.3	0.1	
6/16/11 11:35:15	5.51	6.72	307.8	0.1	
6/16/11 11:35:30	5.50	6.75	306.8	0.1	
6/16/11 11:35:45	5.50	6.76	306.8	0.1	
6/16/11 11:36:00	5.50	6.77	306.1	0.1	
6/16/11 11:36:15	5.50	6.75	307.6	0.1	

Restart 544SRU-0010-1

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 11:36:30	5.53	6.73	301.8	0.1	
6/16/11 11:36:45	5.51	6.72	292.0	0.0	
6/16/11 11:37:00	5.48	6.73	289.0	0.1	
6/16/11 11:37:15	5.45	6.75	292.0	0.1	
6/16/11 11:37:30	5.49	6.76	294.1	0.0	
6/16/11 11:37:45	5.48	6.79	296.3	0.0	
6/16/11 11:38:00	5.49	6.79	295.8	0.1	
6/16/11 11:38:15	5.48	6.79	290.5	0.0	
6/16/11 11:38:30	5.45	6.79	286.5	0.1	
6/16/11 11:38:45	5.45	6.77	285.0	0.1	
6/16/11 11:39:00	5.45	6.76	282.3	0.0	
6/16/11 11:39:15	5.45	6.78	281.5	0.0	
6/16/11 11:39:30	5.43	6.80	281.0	0.1	
6/16/11 11:39:45	5.40	6.84	279.5	0.1	
6/16/11 11:40:00	5.42	6.84	285.5	0.1	
6/16/11 11:40:15	5.47	6.81	299.8	0.1	
6/16/11 11:40:30	5.52	6.76	311.1	0.1	
6/16/11 11:40:45	5.56	6.74	311.1	0.1	
6/16/11 11:41:00	5.52	6.74	307.8	0.1	
6/16/11 11:41:15	5.51	6.75	303.3	0.0	
6/16/11 11:41:30	5.50	6.77	301.8	0.1	
6/16/11 11:41:45	5.49	6.79	301.0	0.0	
6/16/11 11:42:00	5.45	6.82	297.1	0.0	
6/16/11 11:42:15	5.45	6.83	293.3	0.0	
6/16/11 11:42:30	5.46	6.81	291.5	0.0	
6/16/11 11:42:45	5.47	6.79	291.5	0.0	
6/16/11 11:43:00	5.47	6.78	290.0	0.1	
6/16/11 11:43:15	5.45	6.79	287.8	0.0	
6/16/11 11:43:30	5.47	6.79	286.5	0.0	
6/16/11 11:43:45	5.46	6.81	287.3	0.0	
6/16/11 11:44:00	5.47	6.81	292.3	0.0	
6/16/11 11:44:15	5.47	6.81	294.6	0.0	
6/16/11 11:44:30	5.48	6.80	293.0	0.0	
6/16/11 11:44:45	5.50	6.79	290.0	0.0	
6/16/11 11:45:00	5.49	6.80	288.0	0.0	
6/16/11 11:45:15	5.49	6.80	292.5	0.1	
6/16/11 11:45:30	5.52	6.80	295.3	0.0	
6/16/11 11:45:45	5.53	6.80	294.6	0.0	
6/16/11 11:46:00	5.50	6.81	296.1	0.1	
6/16/11 11:46:15	5.49	6.80	296.1	0.0	
6/16/11 11:46:30	5.51	6.79	292.0	0.0	
6/16/11 11:46:45	5.50	6.78	283.0	0.0	
6/16/11 11:47:00	5.45	6.79	278.7	0.0	
6/16/11 11:47:15	5.46	6.80	281.8	0.0	
6/16/11 11:47:30	5.48	6.80	283.3	0.0	
6/16/11 11:47:45	5.48	6.82	279.5	0.0	
6/16/11 11:48:00	5.45	6.83	272.5	0.0	
6/16/11 11:48:15	5.43	6.84	268.7	0.1	
6/16/11 11:48:30	5.42	6.82	268.5	0.1	
6/16/11 11:48:45	5.41	6.81	269.2	0.1	
6/16/11 11:49:00	5.45	6.79	271.2	0.1	
6/16/11 11:49:15	5.47	6.79	277.2	0.1	
6/16/11 11:49:30	5.47	6.80	283.3	0.1	
6/16/11 11:49:45	5.48	6.81	287.0	0.1	
6/16/11 11:50:00	5.48	6.81	284.3	0.2	
6/16/11 11:50:15	5.46	6.81	279.8	0.1	
6/16/11 11:50:30	5.45	6.78	279.5	0.1	
6/16/11 11:50:45	5.45	6.77	279.5	0.1	
6/16/11 11:51:00	5.44	6.77	279.3	0.0	
6/16/11 11:51:15	5.45	6.76	286.0	0.0	
6/16/11 11:51:30	5.50	6.75	293.8	0.1	
6/16/11 11:51:45	5.50	6.78	293.0	0.1	
6/16/11 11:52:00	5.45	6.80	295.1	0.1	
6/16/11 11:52:15	5.46	6.78	295.8	0.1	
6/16/11 11:52:30	5.46	6.76	293.8	0.1	
6/16/11 11:52:45	5.46	6.73	296.1	0.1	
6/16/11 11:53:00	5.49	6.72	298.3	0.1	
6/16/11 11:53:15	5.47	6.74	294.6	0.1	
6/16/11 11:53:30	5.44	6.77	290.8	0.1	
6/16/11 11:53:45	5.46	6.78	295.3	0.1	
6/16/11 11:54:00	5.49	6.77	302.6	0.1	
6/16/11 11:54:15	5.50	6.75	305.6	0.1	
6/16/11 11:54:30	5.49	6.74	301.3	0.0	
6/16/11 11:54:45	5.46	6.73	295.3	0.1	
6/16/11 11:55:00	5.46	6.71	296.3	0.1	
6/16/11 11:55:15	5.47	6.71	301.6	0.1	
6/16/11 11:55:30	5.49	6.72	301.3	0.1	
6/16/11 11:55:45	5.46	6.76	292.3	0.1	
6/16/11 11:56:00	5.43	6.79	286.8	0.1	
6/16/11 11:56:15	5.42	6.80	292.0	0.0	
6/16/11 11:56:30	5.48	6.76	296.8	0.1	
6/16/11 11:56:45	5.46	6.76	290.0	0.1	
6/16/11 11:57:00	5.42	6.75	282.8	0.1	
6/16/11 11:57:15	5.44	6.75	287.3	0.1	
6/16/11 11:57:30	5.47	6.74	292.8	0.1	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 11:57:45	5.46	6.77	292.8	0.1	
6/16/11 11:58:00	5.46	6.77	291.3	0.1	
6/16/11 11:58:15	5.45	6.77	289.0	0.1	
6/16/11 11:58:30	5.43	6.77	289.0	0.1	
6/16/11 11:58:45	5.45	6.75	291.3	0.1	
6/16/11 11:59:00	5.48	6.73	289.8	0.1	
6/16/11 11:59:15	5.43	6.75	288.3	0.0	
6/16/11 11:59:30	5.43	6.76	295.5	0.1	
6/16/11 11:59:45	5.50	6.74	306.1	0.1	
6/16/11 12:00:00	5.54	6.74	310.6	0.1	
6/16/11 12:00:15	5.53	6.73	306.8	0.1	
6/16/11 12:00:30	5.52	6.73	297.5	0.1	
6/16/11 12:00:45	5.50	6.73	293.8	0.1	
6/16/11 12:01:00	5.51	6.73	291.5	0.1	
6/16/11 12:01:15	5.50	6.73	292.3	0.1	
6/16/11 12:01:30	5.51	6.73	292.2	0.1	
6/16/11 12:01:45	5.51	6.75	290.8	0.1	
6/16/11 12:02:00	5.49	6.76	289.5	0.1	
6/16/11 12:02:15	5.50	6.76	288.8	0.1	
6/16/11 12:02:30	5.49	6.75	289.7	0.1	
6/16/11 12:02:45	5.51	6.72	294.6	0.1	
6/16/11 12:03:00	5.50	6.72	300.4	0.1	
6/16/11 12:03:15	5.50	6.73	303.8	0.1	
6/16/11 12:03:30	5.53	6.74	307.1	0.1	
6/16/11 12:03:45	5.55	6.75	301.1	0.1	
6/16/11 12:04:00	5.52	6.77	297.6	0.1	
6/16/11 12:04:15	5.51	6.76	296.8	0.1	
6/16/11 12:04:30	5.49	6.76	289.0	0.0	
6/16/11 12:04:45	5.46	6.76	284.3	0.1	
6/16/11 12:05:00	5.46	6.77	284.5	0.1	
6/16/11 12:05:15	5.47	6.78	289.3	0.1	
6/16/11 12:05:30	5.48	6.79	295.1	0.1	
6/16/11 12:05:45	5.51	6.80	290.8	0.1	
6/16/11 12:06:00	5.48	6.82	276.0	0.1	
6/16/11 12:06:15	5.41	6.83	271.0	0.1	
6/16/11 12:06:30	5.43	6.80	271.5	0.1	
6/16/11 12:06:45	5.43	6.78	271.5	0.1	
6/16/11 12:07:00	5.43	6.77	270.0	0.1	
6/16/11 12:07:15	5.43	6.78	269.5	0.1	
6/16/11 12:07:30	5.41	6.79	272.5	0.1	
6/16/11 12:07:45	5.42	6.80	276.0	0.1	
6/16/11 12:08:00	5.45	6.79	276.0	0.1	
6/16/11 12:08:15	5.44	6.80	274.0	0.1	
6/16/11 12:08:30	5.43	6.78	268.5	0.1	
6/16/11 12:08:45	5.42	6.77	263.5	0.1	
6/16/11 12:09:00	5.39	6.77	261.5	0.1	
6/16/11 12:09:15	5.42	6.76	263.7	0.1	
6/16/11 12:09:30	5.44	6.76	270.0	0.1	
6/16/11 12:09:45	5.44	6.78	273.7	0.1	
6/16/11 12:10:00	5.45	6.78	280.0	0.1	
6/16/11 12:10:15	5.46	6.78	284.5	0.1	
6/16/11 12:10:30	5.47	6.76	288.5	0.1	
6/16/11 12:10:45	5.49	6.75	287.8	0.1	
6/16/11 12:11:00	5.47	6.76	284.0	0.1	
6/16/11 12:11:15	5.45	6.77	286.5	0.1	
6/16/11 12:11:30	5.46	6.76	295.6	0.3	
6/16/11 12:11:45	5.50	6.75	298.3	0.2	
6/16/11 12:12:00	5.51	6.76	298.6	0.1	
6/16/11 12:12:15	5.48	6.76	299.3	0.1	
6/16/11 12:12:30	5.50	6.75	301.0	0.1	
6/16/11 12:12:45	5.51	6.74	300.8	0.1	
6/16/11 12:13:00	5.50	6.75	291.0	0.2	
6/16/11 12:13:15	5.45	6.78	285.3	0.1	
6/16/11 12:13:30	5.42	6.80	284.0	0.1	
6/16/11 12:13:45	5.45	6.79	285.3	0.1	
6/16/11 12:14:00	5.45	6.78	289.0	0.2	
6/16/11 12:14:15	5.46	6.77	292.0	0.2	
6/16/11 12:14:30	5.49	6.74	291.5	0.1	
6/16/11 12:14:45	5.48	6.75	289.0	0.2	
6/16/11 12:15:00	5.47	6.76	287.0	0.2	
6/16/11 12:15:15	5.47	6.76	285.0	0.1	
6/16/11 12:15:30	5.46	6.78	284.0	0.1	
6/16/11 12:15:45	5.46	6.79	286.0	0.2	
6/16/11 12:16:00	5.47	6.78	289.5	0.1	
6/16/11 12:16:15	5.49	6.77	285.0	0.1	
6/16/11 12:16:30	5.46	6.76	277.5	0.1	
6/16/11 12:16:45	5.44	6.76	278.8	0.1	
6/16/11 12:17:00	5.44	6.77	287.5	0.1	
6/16/11 12:17:15	5.48	6.76	293.6	0.1	
6/16/11 12:17:30	5.52	6.76	295.1	0.1	
6/16/11 12:17:45	5.49	6.79	293.8	0.1	
6/16/11 12:18:00	5.45	6.80	294.6	0.1	
6/16/11 12:18:15	5.46	6.78	291.5	0.1	
6/16/11 12:18:30	5.44	6.78	283.5	0.1	
6/16/11 12:18:45	5.44	6.77	280.0	0.1	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 12:19:00	5.47	6.76	282.0	0.1	
6/16/11 12:19:15	5.47	6.77	287.3	0.1	
6/16/11 12:19:30	5.47	6.78	291.0	0.1	
6/16/11 12:19:45	5.48	6.79	286.8	0.1	
6/16/11 12:20:00	5.45	6.80	280.5	0.1	
6/16/11 12:20:15	5.45	6.79	282.0	0.1	
6/16/11 12:20:30	5.47	6.77	289.5	0.1	
6/16/11 12:20:45	5.50	6.74	294.6	0.1	
6/16/11 12:21:00	5.51	6.73	298.1	0.1	
6/16/11 12:21:15	5.55	6.73	298.6	0.1	
6/16/11 12:21:30	5.52	6.76	303.1	0.1	
6/16/11 12:21:45	5.50	6.77	306.8	0.1	
6/16/11 12:22:00	5.54	6.76	308.6	0.1	
6/16/11 12:22:15	5.54	6.75	306.8	0.2	
6/16/11 12:22:30	5.51	6.74	308.1	0.2	
6/16/11 12:22:45	5.55	6.70	307.1	0.2	
6/16/11 12:23:00	5.54	6.70	299.6	0.2	
6/16/11 12:23:15	5.50	6.72	292.0	0.1	
6/16/11 12:23:30	5.49	6.74	289.0	0.1	
6/16/11 12:23:45	5.49	6.77	291.0	0.1	
6/16/11 12:24:00	5.50	6.79	289.5	0.1	
6/16/11 12:24:15	5.50	6.79	287.8	0.1	
6/16/11 12:24:30	5.49	6.78	289.5	0.2	
6/16/11 12:24:45	5.53	6.75	290.5	0.2	
6/16/11 12:25:00	5.53	6.74	288.0	0.2	
6/16/11 12:25:15	5.50	6.75	286.8	0.2	
6/16/11 12:25:30	5.51	6.77	286.0	0.2	
6/16/11 12:25:45	5.51	6.78	287.3	0.3	
6/16/11 12:26:00	5.53	6.79	289.5	0.2	
6/16/11 12:26:15	5.52	6.80	292.8	0.3	
6/16/11 12:26:30	5.52	6.78	292.0	0.3	
6/16/11 12:26:45	5.51	6.77	288.3	0.3	
6/16/11 12:27:00	5.49	6.75	287.5	0.3	
6/16/11 12:27:15	5.50	6.74	284.5	0.2	
6/16/11 12:27:30	5.47	6.76	277.0	0.2	
6/16/11 12:27:45	5.46	6.79	278.5	0.3	
6/16/11 12:28:00	5.47	6.79	288.5	0.3	
6/16/11 12:28:15	5.48	6.80	296.8	0.3	
6/16/11 12:28:30	5.51	6.77	302.5	0.3	
6/16/11 12:28:45	5.52	6.76	301.8	0.2	
6/16/11 12:29:00	5.52	6.75	300.0	0.2	
6/16/11 12:29:15	5.53	6.74	301.3	0.2	
6/16/11 12:29:30	5.54	6.75	302.0	0.2	
6/16/11 12:29:45	5.52	6.77	304.1	0.2	
6/16/11 12:30:00	5.53	6.78	302.6	0.3	
6/16/11 12:30:15	5.52	6.79	296.1	0.3	
6/16/11 12:30:30	5.48	6.81	285.0	0.2	
6/16/11 12:30:45	5.45	6.80	281.8	0.3	
6/16/11 12:31:00	5.47	6.78	289.0	0.3	
6/16/11 12:31:15	5.52	6.76	296.3	0.3	
6/16/11 12:31:30	5.57	6.75	296.1	0.3	
6/16/11 12:31:45	5.54	6.78	292.3	0.3	
6/16/11 12:32:00	5.52	6.79	287.0	0.3	
6/16/11 12:32:15	5.51	6.80	280.8	0.3	
6/16/11 12:32:30	5.46	6.81	275.0	0.3	
6/16/11 12:32:45	5.47	6.79	276.0	0.3	
6/16/11 12:33:00	5.48	6.78	274.5	0.3	
6/16/11 12:33:15	5.46	6.79	269.5	0.3	
6/16/11 12:33:30	5.45	6.80	268.5	0.3	
6/16/11 12:33:45	5.47	6.79	271.0	0.3	
6/16/11 12:34:00	5.50	6.78	274.0	0.3	
6/16/11 12:34:15	5.49	6.77	273.0	0.3	
6/16/11 12:34:30	5.48	6.76	267.5	0.3	
6/16/11 12:34:45	5.46	6.75	265.7	0.3	
6/16/11 12:35:00	5.44	6.75	264.5	0.3	
6/16/11 12:35:15	5.44	6.75	270.0	0.3	
6/16/11 12:35:30	5.49	6.74	279.0	0.3	
6/16/11 12:35:45	5.50	6.76	281.3	0.3	
6/16/11 12:36:00	5.49	6.76	282.5	0.3	
6/16/11 12:36:15	5.49	6.76	281.0	0.3	
6/16/11 12:36:30	5.44	6.76	281.5	0.3	
6/16/11 12:36:45	5.41	6.74	287.0	0.3	
6/16/11 12:37:00	5.42	6.72	293.0	0.3	
6/16/11 12:37:15	5.43	6.72	292.8	0.3	
6/16/11 12:37:30	5.45	6.72	290.5	0.3	
6/16/11 12:37:45	5.47	6.73	292.0	0.3	
6/16/11 12:38:00	5.49	6.73	293.0	0.3	
6/16/11 12:38:15	5.48	6.74	291.8	0.3	
6/16/11 12:38:30	5.47	6.72	290.0	0.3	
6/16/11 12:38:45	5.47	6.70	289.5	0.3	
6/16/11 12:39:00	5.46	6.70	294.5	0.4	
6/16/11 12:39:15	5.51	6.69	296.6	0.3	
6/16/11 12:39:30	5.50	6.71	295.1	0.3	
6/16/11 12:39:45	5.48	6.74	293.8	0.3	
6/16/11 12:40:00	5.48	6.74	293.5	0.3	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 12:40:15	5.50	6.74	293.5	0.3	
6/16/11 12:40:30	5.49	6.72	293.0	0.4	
6/16/11 12:40:45	5.48	6.72	294.0	0.4	
6/16/11 12:41:00	5.49	6.71	302.1	0.3	
6/16/11 12:41:15	5.53	6.70	307.6	0.3	
6/16/11 12:41:30	5.56	6.69	311.6	0.4	
6/16/11 12:41:45	5.58	6.71	308.6	0.3	
6/16/11 12:42:00	5.51	6.76	300.6	0.3	
6/16/11 12:42:15	5.49	6.76	297.1	0.3	
6/16/11 12:42:30	5.50	6.74	295.0	0.3	
6/16/11 12:42:45	5.53	6.70	292.0	0.3	
6/16/11 12:43:00	5.51	6.69	286.0	0.3	
6/16/11 12:43:15	5.47	6.70	282.8	0.3	
6/16/11 12:43:30	5.47	6.72	289.0	0.3	
6/16/11 12:43:45	5.51	6.73	294.6	0.2	
6/16/11 12:44:00	5.51	6.74	300.0	0.3	
6/16/11 12:44:15	5.54	6.74	296.8	0.3	
6/16/11 12:44:30	5.49	6.76	287.0	0.3	
6/16/11 12:44:45	5.45	6.76	285.5	0.3	
6/16/11 12:45:00	5.45	6.75	286.5	0.3	
6/16/11 12:45:15	5.47	6.74	288.3	0.3	
6/16/11 12:45:30	5.48	6.73	286.0	0.3	
6/16/11 12:45:45	5.49	6.75	283.8	0.3	
6/16/11 12:46:00	5.46	6.77	280.5	0.3	
6/16/11 12:46:15	5.44	6.79	277.2	0.3	
6/16/11 12:46:30	5.41	6.80	273.5	0.3	
6/16/11 12:46:45	5.43	6.78	274.2	0.3	
6/16/11 12:47:00	5.44	6.76	277.0	0.3	
6/16/11 12:47:15	5.47	6.74	279.0	0.3	
6/16/11 12:47:30	5.47	6.74	284.5	0.3	
6/16/11 12:47:45	5.47	6.75	284.8	0.3	
6/16/11 12:48:00	5.47	6.76	285.5	0.3	
6/16/11 12:48:15	5.51	6.75	290.4	0.3	
6/16/11 12:48:30	5.50	6.74	285.0	0.3	
6/16/11 12:48:45	5.49	6.74	280.2	0.3	
6/16/11 12:49:00	5.52	6.71	279.5	0.3	
6/16/11 12:49:15	5.54	6.70	281.3	0.3	
6/16/11 12:49:30	5.55	6.71	282.5	0.3	
6/16/11 12:49:45	5.52	6.74	283.5	0.3	
6/16/11 12:50:00	5.52	6.75	283.5	0.3	
6/16/11 12:50:15	5.52	6.76	283.4	0.3	
6/16/11 12:50:30	5.53	6.74	282.0	0.3	
6/16/11 12:50:45	5.53	6.72	278.8	0.2	
6/16/11 12:51:00	5.54	6.71	276.0	0.3	
6/16/11 12:51:15	5.53	6.71	276.0	0.2	
6/16/11 12:51:30	5.51	6.73	279.5	0.3	
6/16/11 12:51:45	5.52	6.75	284.8	0.3	
6/16/11 12:52:00	5.52	6.76	290.0	0.2	
6/16/11 12:52:15	5.48	6.78	292.5	0.3	
6/16/11 12:52:30	5.44	6.79	290.5	0.2	
6/16/11 12:52:45	5.42	6.78	290.5	0.3	
6/16/11 12:53:00	5.46	6.75	292.0	0.2	
6/16/11 12:53:15	5.46	6.74	292.3	0.3	
6/16/11 12:53:30	5.43	6.76	290.5	0.3	
6/16/11 12:53:45	5.44	6.78	291.8	0.3	
6/16/11 12:54:00	5.46	6.79	296.1	0.3	
6/16/11 12:54:15	5.49	6.80	299.0	0.2	
6/16/11 12:54:30	5.49	6.80	300.0	0.2	
6/16/11 12:54:45	5.49	6.77	303.6	0.3	
6/16/11 12:55:00	5.55	6.72	306.6	0.2	
6/16/11 12:55:15	5.56	6.71	304.6	0.2	
6/16/11 12:55:30	5.54	6.72	302.0	0.2	
6/16/11 12:55:45	5.53	6.75	298.6	0.3	
6/16/11 12:56:00	5.50	6.78	295.6	0.2	
6/16/11 12:56:15	5.49	6.80	294.1	0.3	
6/16/11 12:56:30	5.49	6.80	290.5	0.2	
6/16/11 12:56:45	5.50	6.79	289.0	0.3	
6/16/11 12:57:00	5.48	6.77	288.5	0.2	
6/16/11 12:57:15	5.46	6.76	284.0	0.2	
6/16/11 12:57:30	5.47	6.74	283.5	0.2	
6/16/11 12:57:45	5.49	6.74	288.8	0.3	
6/16/11 12:58:00	5.51	6.76	290.0	0.2	
6/16/11 12:58:15	5.48	6.78	288.3	0.2	
6/16/11 12:58:30	5.46	6.79	284.5	0.2	
6/16/11 12:58:45	5.46	6.80	280.3	0.2	
6/16/11 12:59:00	5.42	6.80	281.5	0.2	
6/16/11 12:59:15	5.44	6.78	286.8	0.2	
6/16/11 12:59:30	5.48	6.77	289.0	0.2	
6/16/11 12:59:45	5.49	6.77	291.0	0.2	
6/16/11 13:00:00	5.49	6.78	296.0	0.2	
6/16/11 13:00:15	5.54	6.76	299.3	0.2	
6/16/11 13:00:30	5.52	6.77	295.6	0.2	
6/16/11 13:00:45	5.49	6.78	293.8	0.3	
6/16/11 13:01:00	5.51	6.76	296.6	0.2	
6/16/11 13:01:15	5.52	6.75	299.8	0.3	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 13:01:30	5.52	6.75	299.1	0.3	
6/16/11 13:01:45	5.50	6.76	296.6	0.2	
6/16/11 13:02:00	5.47	6.78	295.1	0.2	
6/16/11 13:02:15	5.48	6.78	298.8	0.2	
6/16/11 13:02:30	5.52	6.77	299.0	0.2	
6/16/11 13:02:45	5.48	6.79	293.5	0.3	
6/16/11 13:03:00	5.44	6.79	289.0	0.2	
6/16/11 13:03:15	5.44	6.77	290.5	0.2	
6/16/11 13:03:30	5.46	6.76	293.5	0.2	
6/16/11 13:03:45	5.46	6.77	300.3	0.3	
6/16/11 13:04:00	5.49	6.77	309.1	0.2	
6/16/11 13:04:15	5.52	6.78	309.1	0.2	
6/16/11 13:04:30	5.50	6.79	306.6	0.2	
6/16/11 13:04:45	5.51	6.78	307.8	0.2	
6/16/11 13:05:00	5.53	6.75	308.6	0.2	
6/16/11 13:05:15	5.53	6.74	303.8	0.2	
6/16/11 13:05:30	5.50	6.75	299.5	0.2	
6/16/11 13:05:45	5.49	6.75	299.5	0.2	
6/16/11 13:06:00	5.48	6.77	301.0	0.2	
6/16/11 13:06:15	5.48	6.79	303.1	0.3	
6/16/11 13:06:30	5.50	6.78	302.6	0.2	
6/16/11 13:06:45	5.52	6.78	299.3	0.2	
6/16/11 13:07:00	5.49	6.77	299.0	0.2	
6/16/11 13:07:15	5.50	6.75	298.6	0.2	
6/16/11 13:07:30	5.48	6.75	298.6	0.3	
6/16/11 13:07:45	5.48	6.75	303.1	0.2	
6/16/11 13:08:00	5.52	6.75	305.1	0.2	
6/16/11 13:08:15	5.49	6.80	303.1	0.2	
6/16/11 13:08:30	5.47	6.82	303.1	0.2	
6/16/11 13:08:45	5.50	6.80	303.1	0.2	
6/16/11 13:09:00	5.51	6.78	300.0	0.2	
6/16/11 13:09:15	5.49	6.77	295.6	0.2	
6/16/11 13:09:30	5.48	6.77	292.0	0.2	
6/16/11 13:09:45	5.45	6.78	292.5	0.2	
6/16/11 13:10:00	5.45	6.80	293.5	0.2	
6/16/11 13:10:15	5.46	6.82	291.5	0.2	
6/16/11 13:10:30	5.47	6.84	288.5	0.1	
6/16/11 13:10:45	5.48	6.84	287.5	0.2	
6/16/11 13:11:00	5.49	6.82	287.5	0.2	
6/16/11 13:11:15	5.48	6.79	287.5	0.1	
6/16/11 13:11:30	5.49	6.76	286.5	0.1	
6/16/11 13:11:45	5.49	6.75	286.0	0.1	
6/16/11 13:12:00	5.48	6.76	288.5	0.1	
6/16/11 13:12:15	5.51	6.77	292.3	0.1	
6/16/11 13:12:30	5.48	6.80	295.6	0.2	
6/16/11 13:12:45	5.51	6.80	299.8	0.1	
6/16/11 13:13:00	5.52	6.80	301.5	0.1	
6/16/11 13:13:15	5.54	6.78	299.8	0.1	
6/16/11 13:13:30	5.54	6.77	293.5	0.1	
6/16/11 13:13:45	5.49	6.78	288.5	0.1	
6/16/11 13:14:00	5.46	6.79	290.5	0.1	
6/16/11 13:14:15	5.50	6.78	293.5	0.1	
6/16/11 13:14:30	5.50	6.80	294.6	0.1	
6/16/11 13:14:45	5.52	6.81	293.3	0.1	
6/16/11 13:15:00	5.49	6.81	291.5	0.1	
6/16/11 13:15:15	5.48	6.80	293.0	0.2	
6/16/11 13:15:30	5.51	6.78	291.5	0.2	
6/16/11 13:15:45	5.49	6.79	286.0	0.2	
6/16/11 13:16:00	5.45	6.81	284.0	0.2	
6/16/11 13:16:15	5.46	6.81	288.5	0.2	
6/16/11 13:16:30	5.44	6.83	297.0	0.2	
6/16/11 13:16:45	5.46	6.82	300.3	0.2	
6/16/11 13:17:00	5.47	6.81	296.0	0.2	
6/16/11 13:17:15	5.45	6.80	289.8	0.2	
6/16/11 13:17:30	5.45	6.79	285.0	0.2	
6/16/11 13:17:45	5.43	6.79	282.5	0.2	
6/16/11 13:18:00	5.43	6.80	280.5	0.2	
6/16/11 13:18:15	5.40	6.85	276.7	0.2	
6/16/11 13:18:30	5.37	6.87	276.0	0.2	
6/16/11 13:18:45	5.39	6.86	283.3	0.2	
6/16/11 13:19:00	5.45	6.82	291.0	0.2	
6/16/11 13:19:15	5.49	6.78	297.8	0.2	
6/16/11 13:19:30	5.51	6.75	299.5	0.2	
6/16/11 13:19:45	5.50	6.74	296.0	0.1	
6/16/11 13:20:00	5.50	6.75	289.5	0.2	
6/16/11 13:20:15	5.46	6.78	282.5	0.2	
6/16/11 13:20:30	5.43	6.81	280.5	0.2	
6/16/11 13:20:45	5.46	6.80	277.0	0.2	
6/16/11 13:21:00	5.44	6.80	272.0	0.2	
6/16/11 13:21:15	5.43	6.78	271.5	0.2	
6/16/11 13:21:30	5.43	6.75	271.0	0.2	
6/16/11 13:21:45	5.41	6.74	269.7	0.2	
6/16/11 13:22:00	5.41	6.73	270.0	0.2	
6/16/11 13:22:15	5.42	6.74	277.0	0.2	
6/16/11 13:22:30	5.44	6.74	289.0	0.2	

End 544SRU-0010-1

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 13:22:45	5.50	6.74	298.0	0.2	
6/16/11 13:23:00	5.49	6.75	301.0	0.2	
6/16/11 13:23:15	5.49	6.74	298.3	0.2	
6/16/11 13:23:30	5.47	6.73	294.6	0.2	
6/16/11 13:23:45	5.43	6.71	296.1	0.2	
6/16/11 13:24:00	5.47	6.68	300.0	0.2	
6/16/11 13:24:15	5.46	6.69	298.3	0.2	
6/16/11 13:24:30	5.44	6.72	300.1	0.2	
6/16/11 13:24:45	5.48	6.72	306.8	0.2	
6/16/11 13:25:00	5.47	6.74	310.1	0.2	
6/16/11 13:25:15	5.48	6.74	310.1	0.2	
6/16/11 13:25:30	5.50	6.73	307.1	0.2	
6/16/11 13:25:45	5.45	6.73	306.8	0.2	
6/16/11 13:26:00	5.49	6.71	309.6	0.2	
6/16/11 13:26:15	5.52	6.70	309.3	0.2	
6/16/11 13:26:30	5.51	6.72	308.1	0.2	
6/16/11 13:26:45	5.50	6.74	308.3	0.2	
6/16/11 13:27:00	5.53	6.74	307.1	0.2	
6/16/11 13:27:15	5.51	6.75	305.6	0.2	
6/16/11 13:27:30	5.50	6.74	304.6	0.2	
6/16/11 13:27:45	5.47	6.75	305.6	0.2	End 544SRU-16A-1
6/16/11 13:28:00	5.49	6.75	306.1	2.3	
6/16/11 13:28:15	5.50	6.76	300.6	19.6	
6/16/11 13:28:30	5.51	6.68	269.0	3.8	
6/16/11 13:28:45	6.76	4.75	189.0	0.8	
6/16/11 13:29:00	8.53	3.50	112.6	0.7	
6/16/11 13:29:15	6.30	4.08	79.7	0.7	
6/16/11 13:29:30	5.28	4.03	70.0	0.7	
6/16/11 13:29:45	5.17	4.19	67.9	0.7	
6/16/11 13:30:00	5.15	4.49	66.4	0.7	System Bias
6/16/11 13:30:15	5.14	4.48	64.9	0.7	O <sub>2</sub> Bias 2 Mid = 5.13
6/16/11 13:30:30	5.13	4.49	63.4	0.7	CO <sub>2</sub> Bias 2 Mid = 4.48
6/16/11 13:30:45	5.13	4.49	62.7	0.7	
6/16/11 13:31:00	5.13	4.48	61.4	0.7	
6/16/11 13:31:15	5.12	4.47	63.9	0.5	
6/16/11 13:31:30	5.13	4.60	84.5	1.8	
6/16/11 13:31:45	5.20	5.08	118.3	0.8	
6/16/11 13:32:00	4.91	4.38	161.7	0.6	
6/16/11 13:32:15	3.08	2.04	212.8	0.6	
6/16/11 13:32:30	1.29	0.27	245.4	0.6	System Bias
6/16/11 13:32:45	1.04	0.12	252.9	0.5	CO Bias 2 Mid = 254.1
6/16/11 13:33:00	1.02	0.11	254.4	0.5	C <sub>3</sub> H <sub>8</sub> Bias 2 Zero = 0.6
6/16/11 13:33:15	1.04	0.09	254.4	0.6	
6/16/11 13:33:30	1.00	0.01	254.4	0.6	
6/16/11 13:33:45	0.95	-0.04	254.2	0.6	
6/16/11 13:34:00	0.98	0.00	252.9	0.5	
6/16/11 13:34:15	1.00	0.03	256.7	0.9	
6/16/11 13:34:30	1.61	1.33	262.0	17.9	
6/16/11 13:34:45	2.36	2.04	214.3	30.8	
6/16/11 13:35:00	1.22	0.68	122.6	29.6	
6/16/11 13:35:15	0.39	0.29	58.4	27.4	
6/16/11 13:35:30	0.13	0.19	4.9	27.0	
6/16/11 13:35:45	0.07	0.16	1.9	27.0	
6/16/11 13:36:00	0.06	0.15	0.9	27.8	System Bias
6/16/11 13:36:15	0.06	0.15	0.9	29.5	C <sub>3</sub> H <sub>8</sub> Bias 2 Low = 29.6
6/16/11 13:36:30	0.06	0.16	0.9	29.6	O <sub>2</sub> Bias 2 Zero = 0.06
6/16/11 13:36:45	0.06	0.16	2.1	29.7	CO <sub>2</sub> Bias 2 Zero = 0.16
6/16/11 13:37:00	0.07	0.16	2.4	29.7	CO Bias 2 Zero = 1.6
6/16/11 13:37:15	0.08	0.17	4.6	29.7	
6/16/11 13:37:30	0.08	0.17	3.4	19.4	
6/16/11 13:37:45	0.08	0.17	20.5	1.1	
6/16/11 13:38:00	1.13	1.18	127.1	0.5	
6/16/11 13:38:15	3.49	4.57	242.5	0.4	
6/16/11 13:38:30	5.02	6.29	286.5	0.3	
6/16/11 13:38:45	5.40	6.70	307.7	0.3	
6/16/11 13:39:00	5.50	6.74	311.6	0.3	
6/16/11 13:39:15	5.49	6.75	308.3	0.2	
6/16/11 13:39:30	5.47	6.76	302.6	0.3	
6/16/11 13:39:45	5.45	6.76	302.3	0.2	
6/16/11 13:40:00	5.48	6.74	305.1	0.3	
6/16/11 13:40:15	5.52	6.73	304.8	0.2	
6/16/11 13:40:30	5.53	6.75	305.6	0.3	
6/16/11 13:40:45	5.58	6.75	306.1	0.3	
6/16/11 13:41:00	5.57	6.78	302.1	0.2	
6/16/11 13:41:15	5.55	6.79	295.8	0.2	
6/16/11 13:41:30	5.55	6.79	292.5	0.3	
6/16/11 13:41:45	5.51	6.78	286.8	0.3	
6/16/11 13:42:00	5.49	6.77	277.5	0.2	
6/16/11 13:42:15	5.44	6.79	269.5	0.2	
6/16/11 13:42:30	5.44	6.79	275.5	0.2	
6/16/11 13:42:45	5.51	6.77	279.5	0.2	
6/16/11 13:43:00	5.50	6.80	275.0	0.2	
6/16/11 13:43:15	5.46	6.83	272.5	0.2	
6/16/11 13:43:30	5.46	6.83	270.5	0.3	
6/16/11 13:43:45	5.45	6.82	263.0	0.2	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 13:44:00	5.43	6.81	261.0	0.2	
6/16/11 13:44:15	5.44	6.79	260.5	0.2	
6/16/11 13:44:30	5.41	6.81	261.0	0.2	
6/16/11 13:44:45	5.40	6.82	271.2	0.2	
6/16/11 13:45:00	5.45	6.81	284.5	0.3	
6/16/11 13:45:15	5.49	6.80	293.8	0.3	
6/16/11 13:45:30	5.44	6.81	294.1	0.3	
6/16/11 13:45:45	5.43	6.80	288.8	0.2	
6/16/11 13:46:00	5.38	6.81	287.0	0.3	
6/16/11 13:46:15	5.40	6.79	288.3	0.3	
6/16/11 13:46:30	5.40	6.79	288.0	0.2	
6/16/11 13:46:45	5.42	6.79	295.0	0.3	
6/16/11 13:47:00	5.47	6.77	300.5	0.3	
6/16/11 13:47:15	5.46	6.77	301.3	0.3	
6/16/11 13:47:30	5.47	6.76	301.0	0.3	
6/16/11 13:47:45	5.48	6.74	304.1	0.2	
6/16/11 13:48:00	5.49	6.73	306.1	0.2	
6/16/11 13:48:15	5.49	6.74	306.6	0.3	
6/16/11 13:48:30	5.49	6.74	307.6	0.3	
6/16/11 13:48:45	5.51	6.74	311.8	0.3	
6/16/11 13:49:00	5.51	6.74	312.6	0.3	
6/16/11 13:49:15	5.51	6.73	313.6	0.3	
6/16/11 13:49:30	5.51	6.72	313.1	0.2	
6/16/11 13:49:45	5.51	6.70	311.6	0.3	
6/16/11 13:50:00	5.54	6.68	311.6	0.4	
6/16/11 13:50:15	5.55	6.69	310.1	0.3	
6/16/11 13:50:30	5.54	6.72	308.6	0.3	
6/16/11 13:50:45	5.52	6.75	307.3	0.3	
6/16/11 13:51:00	5.53	6.75	307.1	0.3	
6/16/11 13:51:15	5.55	6.74	304.8	0.3	
6/16/11 13:51:30	5.53	6.74	300.6	0.3	
6/16/11 13:51:45	5.53	6.72	295.1	0.3	
6/16/11 13:52:00	5.53	6.71	292.0	0.3	
6/16/11 13:52:15	5.54	6.71	287.3	0.3	
6/16/11 13:52:30	5.54	6.72	286.0	0.3	
6/16/11 13:52:45	5.52	6.75	282.3	0.3	
6/16/11 13:53:00	5.48	6.77	281.5	0.3	
6/16/11 13:53:15	5.49	6.76	283.0	0.3	
6/16/11 13:53:30	5.51	6.75	279.5	0.3	
6/16/11 13:53:45	5.47	6.76	272.2	0.3	
6/16/11 13:54:00	5.46	6.75	272.0	0.3	
6/16/11 13:54:15	5.46	6.74	272.0	0.3	
6/16/11 13:54:30	5.47	6.75	268.5	0.3	
6/16/11 13:54:45	5.46	6.77	268.0	0.3	
6/16/11 13:55:00	5.46	6.77	275.5	0.3	
6/16/11 13:55:15	5.49	6.76	278.8	0.4	
6/16/11 13:55:30	5.47	6.76	276.0	0.4	
6/16/11 13:55:45	5.47	6.75	278.0	0.4	
6/16/11 13:56:00	5.48	6.74	280.0	0.3	
6/16/11 13:56:15	5.46	6.75	276.0	0.3	
6/16/11 13:56:30	5.43	6.76	274.0	0.3	
6/16/11 13:56:45	5.43	6.77	272.5	0.3	
6/16/11 13:57:00	5.44	6.76	274.0	0.3	
6/16/11 13:57:15	5.44	6.75	284.5	0.3	
6/16/11 13:57:30	5.49	6.72	293.1	0.3	
6/16/11 13:57:45	5.50	6.70	299.1	0.4	
6/16/11 13:58:00	5.51	6.69	300.0	0.4	Begin 544SRU-0010-2
6/16/11 13:58:15	5.49	6.71	294.8	0.3	
6/16/11 13:58:30	5.47	6.72	292.0	0.3	
6/16/11 13:58:45	5.48	6.73	294.1	0.3	
6/16/11 13:59:00	5.45	6.73	296.1	0.4	
6/16/11 13:59:15	5.47	6.72	295.6	0.3	
6/16/11 13:59:30	5.48	6.70	296.6	0.4	
6/16/11 13:59:45	5.50	6.68	302.3	0.3	
6/16/11 14:00:00	5.52	6.66	304.1	0.3	
6/16/11 14:00:15	5.50	6.68	303.3	0.3	
6/16/11 14:00:30	5.48	6.71	300.1	0.3	
6/16/11 14:00:45	5.44	6.75	292.3	0.3	
6/16/11 14:01:00	5.41	6.77	294.0	0.3	
6/16/11 14:01:15	5.43	6.76	302.6	0.4	
6/16/11 14:01:30	5.44	6.74	306.6	0.3	
6/16/11 14:01:45	5.47	6.69	308.3	0.3	
6/16/11 14:02:00	5.49	6.67	307.6	0.3	
6/16/11 14:02:15	5.45	6.68	310.6	0.4	
6/16/11 14:02:30	5.47	6.69	315.6	0.3	
6/16/11 14:02:45	5.48	6.71	319.6	0.3	
6/16/11 14:03:00	5.48	6.73	318.1	0.4	
6/16/11 14:03:15	5.48	6.74	315.1	0.4	
6/16/11 14:03:30	5.46	6.73	312.6	0.4	
6/16/11 14:03:45	5.47	6.71	309.8	0.3	
6/16/11 14:04:00	5.48	6.69	305.6	0.4	
6/16/11 14:04:15	5.47	6.69	298.5	0.3	
6/16/11 14:04:30	5.43	6.72	295.6	0.3	
6/16/11 14:04:45	5.42	6.73	300.1	0.4	
6/16/11 14:05:00	5.46	6.73	306.6	0.3	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 14:05:15	5.50	6.73	311.6	0.4	
6/16/11 14:05:30	5.50	6.72	311.6	0.3	
6/16/11 14:05:45	5.50	6.71	306.8	0.4	
6/16/11 14:06:00	5.48	6.72	304.6	0.4	
6/16/11 14:06:15	5.49	6.70	310.3	0.4	
6/16/11 14:06:30	5.54	6.69	315.6	0.4	
6/16/11 14:06:45	5.55	6.70	306.8	0.3	
6/16/11 14:07:00	5.49	6.74	301.5	0.4	
6/16/11 14:07:15	5.51	6.72	306.3	0.4	
6/16/11 14:07:30	5.55	6.70	307.1	0.5	
6/16/11 14:07:45	5.50	6.71	298.3	0.4	
6/16/11 14:08:00	5.47	6.71	294.0	0.4	
6/16/11 14:08:15	5.50	6.70	292.3	0.4	
6/16/11 14:08:30	5.52	6.71	291.5	0.4	
6/16/11 14:08:45	5.52	6.72	293.8	0.4	
6/16/11 14:09:00	5.53	6.72	294.6	0.4	
6/16/11 14:09:15	5.53	6.72	293.3	0.4	
6/16/11 14:09:30	5.53	6.70	291.0	0.4	
6/16/11 14:09:45	5.51	6.70	285.8	0.4	
6/16/11 14:10:00	5.48	6.70	288.5	0.4	
6/16/11 14:10:15	5.51	6.68	290.3	0.4	
6/16/11 14:10:30	5.50	6.70	290.0	0.3	
6/16/11 14:10:45	5.49	6.73	291.5	0.4	
6/16/11 14:11:00	5.47	6.75	292.0	0.4	
6/16/11 14:11:15	5.48	6.75	293.0	0.4	
6/16/11 14:11:30	5.48	6.75	290.5	0.4	
6/16/11 14:11:45	5.46	6.74	289.8	0.4	
6/16/11 14:12:00	5.48	6.71	292.5	0.4	
6/16/11 14:12:15	5.49	6.70	302.8	0.4	
6/16/11 14:12:30	5.53	6.69	309.1	0.4	
6/16/11 14:12:45	5.53	6.71	314.6	0.4	
6/16/11 14:13:00	5.56	6.72	312.1	0.4	
6/16/11 14:13:15	5.53	6.75	298.3	0.4	
6/16/11 14:13:30	5.46	6.76	289.5	0.4	
6/16/11 14:13:45	5.44	6.75	288.5	0.4	
6/16/11 14:14:00	5.47	6.70	288.0	0.4	
6/16/11 14:14:15	5.48	6.69	285.5	0.4	
6/16/11 14:14:30	5.46	6.71	285.5	0.4	
6/16/11 14:14:45	5.44	6.75	285.3	0.4	
6/16/11 14:15:00	5.42	6.78	285.0	0.4	
6/16/11 14:15:15	5.44	6.79	290.8	0.4	
6/16/11 14:15:30	5.47	6.78	296.1	0.4	
6/16/11 14:15:45	5.45	6.78	298.6	0.4	
6/16/11 14:16:00	5.43	6.75	299.5	0.4	
6/16/11 14:16:15	5.45	6.72	306.6	0.4	
6/16/11 14:16:30	5.50	6.69	311.6	0.4	
6/16/11 14:16:45	5.53	6.68	318.6	0.4	
6/16/11 14:17:00	5.55	6.70	322.1	0.4	
6/16/11 14:17:15	5.52	6.73	320.9	0.4	
6/16/11 14:17:30	5.51	6.73	317.1	0.5	
6/16/11 14:17:45	5.52	6.73	313.3	0.4	
6/16/11 14:18:00	5.51	6.72	311.1	0.5	
6/16/11 14:18:15	5.47	6.73	305.1	0.5	
6/16/11 14:18:30	5.47	6.72	303.1	0.4	
6/16/11 14:18:45	5.47	6.72	304.6	0.4	
6/16/11 14:19:00	5.48	6.71	309.6	0.4	
6/16/11 14:19:15	5.53	6.70	316.3	0.5	
6/16/11 14:19:30	5.53	6.71	319.6	0.5	
6/16/11 14:19:45	5.53	6.70	321.1	0.4	
6/16/11 14:20:00	5.55	6.70	317.1	0.4	
6/16/11 14:20:15	5.51	6.72	309.3	0.4	
6/16/11 14:20:30	5.48	6.74	309.1	0.5	
6/16/11 14:20:45	5.49	6.75	308.6	0.5	
6/16/11 14:21:00	5.47	6.77	310.1	0.4	
6/16/11 14:21:15	5.50	6.75	315.8	0.4	
6/16/11 14:21:30	5.52	6.73	316.1	0.5	
6/16/11 14:21:45	5.54	6.71	311.8	0.5	
6/16/11 14:22:00	5.55	6.70	307.6	0.5	
6/16/11 14:22:15	5.52	6.70	299.5	0.5	
6/16/11 14:22:30	5.50	6.71	296.1	0.4	
6/16/11 14:22:45	5.50	6.72	295.6	0.4	
6/16/11 14:23:00	5.51	6.74	295.6	0.4	
6/16/11 14:23:15	5.50	6.75	297.8	0.5	
6/16/11 14:23:30	5.51	6.74	298.0	0.4	
6/16/11 14:23:45	5.54	6.71	296.6	0.4	
6/16/11 14:24:00	5.56	6.68	294.1	0.4	
6/16/11 14:24:15	5.54	6.69	286.5	0.4	
6/16/11 14:24:30	5.49	6.70	282.3	0.4	
6/16/11 14:24:45	5.47	6.72	278.5	0.3	
6/16/11 14:25:00	5.45	6.76	273.6	0.4	
6/16/11 14:25:15	5.42	6.77	274.0	0.3	
6/16/11 14:25:30	5.45	6.76	276.8	0.4	
6/16/11 14:25:45	5.46	6.75	277.7	0.3	
6/16/11 14:26:00	5.45	6.74	277.8	0.3	
6/16/11 14:26:15	5.46	6.72	275.2	0.4	

## Valero Port Arthur Refinery: Port Arthur, Texas

## SRU 544 Incinerator Exhaust Stack

## ARI Reference Method Monitoring Data

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 14:26:30	5.45	6.72	276.0	0.4	
6/16/11 14:26:45	5.44	6.72	283.0	0.3	
6/16/11 14:27:00	5.48	6.71	290.5	0.4	
6/16/11 14:27:15	5.48	6.72	292.3	0.3	
6/16/11 14:27:30	5.46	6.73	290.8	0.3	
6/16/11 14:27:45	5.45	6.72	288.8	0.4	
6/16/11 14:28:00	5.45	6.71	286.5	0.4	
6/16/11 14:28:15	5.42	6.70	290.5	0.4	
6/16/11 14:28:30	5.47	6.68	295.1	0.4	
6/16/11 14:28:45	5.46	6.69	298.1	0.3	
6/16/11 14:29:00	5.45	6.71	302.6	0.3	
6/16/11 14:29:15	5.46	6.71	314.1	0.4	
6/16/11 14:29:30	5.51	6.68	324.6	0.3	
6/16/11 14:29:45	5.55	6.67	325.1	0.4	
6/16/11 14:30:00	5.51	6.68	329.6	0.4	
6/16/11 14:30:15	5.54	6.66	330.1	0.4	
6/16/11 14:30:30	5.52	6.68	321.1	0.3	
6/16/11 14:30:45	5.45	6.72	316.8	0.4	
6/16/11 14:31:00	5.47	6.72	319.8	0.4	
6/16/11 14:31:15	5.50	6.71	325.6	0.4	
6/16/11 14:31:30	5.52	6.70	329.4	0.4	
6/16/11 14:31:45	5.54	6.69	327.9	0.4	
6/16/11 14:32:00	5.51	6.69	323.4	0.4	
6/16/11 14:32:15	5.51	6.69	323.1	0.4	
6/16/11 14:32:30	5.52	6.68	325.4	0.4	
6/16/11 14:32:45	5.55	6.70	321.9	0.4	
6/16/11 14:33:00	5.51	6.73	316.6	0.4	
6/16/11 14:33:15	5.49	6.74	309.3	0.4	
6/16/11 14:33:30	5.49	6.74	301.8	0.4	
6/16/11 14:33:45	5.49	6.73	296.1	0.4	
6/16/11 14:34:00	5.45	6.72	293.0	0.4	
6/16/11 14:34:15	5.45	6.71	289.0	0.4	
6/16/11 14:34:30	5.44	6.71	288.3	0.4	
6/16/11 14:34:45	5.47	6.71	293.3	0.4	
6/16/11 14:35:00	5.49	6.72	298.5	0.4	
6/16/11 14:35:15	5.49	6.73	297.0	0.4	
6/16/11 14:35:30	5.46	6.73	288.0	0.4	
6/16/11 14:35:45	5.45	6.72	282.3	0.4	
6/16/11 14:36:00	5.44	6.70	282.3	0.4	
6/16/11 14:36:15	5.46	6.67	281.5	0.4	
6/16/11 14:36:30	5.44	6.68	276.2	0.4	
6/16/11 14:36:45	5.40	6.70	280.0	0.4	
6/16/11 14:37:00	5.45	6.70	288.3	0.4	
6/16/11 14:37:15	5.46	6.72	289.0	0.4	
6/16/11 14:37:30	5.43	6.74	288.3	0.4	
6/16/11 14:37:45	5.47	6.71	291.8	0.4	
6/16/11 14:38:00	5.47	6.69	291.0	0.4	
6/16/11 14:38:15	5.42	6.69	288.5	0.4	
6/16/11 14:38:30	5.42	6.67	289.3	0.4	
6/16/11 14:38:45	5.40	6.69	292.5	0.4	
6/16/11 14:39:00	5.42	6.70	298.5	0.4	
6/16/11 14:39:15	5.46	6.71	306.3	0.4	
6/16/11 14:39:30	5.49	6.70	319.9	0.4	
6/16/11 14:39:45	5.54	6.68	335.6	0.4	
6/16/11 14:40:00	5.59	6.64	345.4	0.4	
6/16/11 14:40:15	5.61	6.63	349.2	0.4	
6/16/11 14:40:30	5.61	6.62	353.7	0.4	
6/16/11 14:40:45	5.64	6.62	355.5	0.5	
6/16/11 14:41:00	5.62	6.65	347.2	0.4	
6/16/11 14:41:15	5.56	6.70	345.9	0.4	
6/16/11 14:41:30	5.58	6.68	344.4	0.4	
6/16/11 14:41:45	5.56	6.70	333.6	0.4	
6/16/11 14:42:00	5.53	6.71	323.9	0.4	
6/16/11 14:42:15	5.51	6.71	320.9	0.5	
6/16/11 14:42:30	5.54	6.69	320.9	0.5	
6/16/11 14:42:45	5.56	6.70	319.4	0.4	
6/16/11 14:43:00	5.54	6.72	317.8	0.4	
6/16/11 14:43:15	5.53	6.73	310.3	0.4	
6/16/11 14:43:30	5.53	6.74	295.3	0.4	
6/16/11 14:43:45	5.47	6.77	282.3	0.4	
6/16/11 14:44:00	5.42	6.77	277.7	0.4	
6/16/11 14:44:15	5.45	6.75	277.0	0.4	
6/16/11 14:44:30	5.46	6.74	273.2	0.4	
6/16/11 14:44:45	5.43	6.76	271.5	0.4	
6/16/11 14:45:00	5.45	6.76	272.2	0.4	
6/16/11 14:45:15	5.45	6.78	275.2	0.4	
6/16/11 14:45:30	5.47	6.78	279.8	0.4	
6/16/11 14:45:45	5.49	6.76	281.8	0.4	
6/16/11 14:46:00	5.49	6.74	283.3	0.4	
6/16/11 14:46:15	5.52	6.71	279.8	0.4	
6/16/11 14:46:30	5.49	6.73	268.5	0.4	
6/16/11 14:46:45	5.42	6.76	265.5	0.4	
6/16/11 14:47:00	5.43	6.76	269.2	0.4	
6/16/11 14:47:15	5.46	6.77	275.5	0.4	
6/16/11 14:47:30	5.47	6.76	288.3	0.4	

Start 544SRU-16A-2

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 14:47:45	5.52	6.73	296.8	0.4	
6/16/11 14:48:00	5.51	6.71	296.1	0.4	
6/16/11 14:48:15	5.50	6.70	291.0	0.4	
6/16/11 14:48:30	5.50	6.69	288.8	0.5	
6/16/11 14:48:45	5.47	6.70	291.5	0.4	
6/16/11 14:49:00	5.47	6.72	297.5	0.5	
6/16/11 14:49:15	5.47	6.74	299.0	0.5	
6/16/11 14:49:30	5.48	6.75	296.8	0.5	
6/16/11 14:49:45	5.49	6.74	300.8	0.5	
6/16/11 14:50:00	5.51	6.71	307.6	0.4	
6/16/11 14:50:15	5.53	6.69	309.6	0.4	
6/16/11 14:50:30	5.53	6.68	309.6	0.5	
6/16/11 14:50:45	5.55	6.68	310.1	0.4	
6/16/11 14:51:00	5.58	6.67	315.3	0.4	
6/16/11 14:51:15	5.60	6.68	324.4	0.4	
6/16/11 14:51:30	5.62	6.69	322.1	0.4	
6/16/11 14:51:45	5.56	6.72	306.1	0.4	
6/16/11 14:52:00	5.48	6.74	294.8	0.4	
6/16/11 14:52:15	5.49	6.72	292.0	0.5	
6/16/11 14:52:30	5.49	6.72	295.8	0.4	
6/16/11 14:52:45	5.51	6.71	297.3	0.4	
6/16/11 14:53:00	5.51	6.73	295.1	0.4	
6/16/11 14:53:15	5.50	6.75	294.8	0.4	
6/16/11 14:53:30	5.52	6.76	296.3	0.4	
6/16/11 14:53:45	5.51	6.77	296.6	0.4	
6/16/11 14:54:00	5.50	6.76	295.1	0.4	
6/16/11 14:54:15	5.51	6.75	290.3	0.4	
6/16/11 14:54:30	5.47	6.75	281.3	0.5	
6/16/11 14:54:45	5.43	6.77	278.2	0.5	
6/16/11 14:55:00	5.43	6.76	282.8	0.4	
6/16/11 14:55:15	5.46	6.76	286.0	0.5	
6/16/11 14:55:30	5.47	6.76	281.5	0.5	
6/16/11 14:55:45	5.45	6.77	276.0	0.4	
6/16/11 14:56:00	5.41	6.77	276.0	0.4	
6/16/11 14:56:15	5.39	6.77	281.3	0.5	
6/16/11 14:56:30	5.41	6.75	286.5	0.5	
6/16/11 14:56:45	5.43	6.74	289.5	0.4	
6/16/11 14:57:00	5.44	6.74	288.8	0.5	
6/16/11 14:57:15	5.45	6.74	287.0	0.4	
6/16/11 14:57:30	5.41	6.76	283.3	0.5	
6/16/11 14:57:45	5.40	6.75	283.8	0.5	
6/16/11 14:58:00	5.45	6.72	292.0	0.4	
6/16/11 14:58:15	5.48	6.70	295.3	0.4	
6/16/11 14:58:30	5.49	6.69	293.8	0.4	
6/16/11 14:58:45	5.47	6.70	294.5	0.4	
6/16/11 14:59:00	5.45	6.70	302.1	0.4	
6/16/11 14:59:15	5.46	6.71	313.3	0.4	
6/16/11 14:59:30	5.49	6.69	321.6	0.4	
6/16/11 14:59:45	5.52	6.68	320.6	0.5	
6/16/11 15:00:00	5.48	6.69	318.3	0.4	
6/16/11 15:00:15	5.47	6.68	322.4	0.4	
6/16/11 15:00:30	5.49	6.67	324.6	0.4	
6/16/11 15:00:45	5.51	6.66	325.6	0.4	
6/16/11 15:01:00	5.53	6.66	329.4	0.4	
6/16/11 15:01:15	5.51	6.69	327.9	0.4	
6/16/11 15:01:30	5.49	6.70	329.4	0.4	
6/16/11 15:01:45	5.51	6.69	327.6	0.4	
6/16/11 15:02:00	5.48	6.70	322.4	0.4	
6/16/11 15:02:15	5.47	6.69	321.4	0.4	
6/16/11 15:02:30	5.48	6.68	319.9	0.4	
6/16/11 15:02:45	5.48	6.69	325.4	0.4	
6/16/11 15:03:00	5.51	6.68	335.1	0.5	
6/16/11 15:03:15	5.53	6.70	339.1	0.5	
6/16/11 15:03:30	5.54	6.70	341.4	0.4	
6/16/11 15:03:45	5.56	6.70	341.1	0.4	
6/16/11 15:04:00	5.54	6.70	337.4	0.4	
6/16/11 15:04:15	5.51	6.71	333.1	0.4	
6/16/11 15:04:30	5.52	6.70	330.1	0.4	
6/16/11 15:04:45	5.51	6.71	325.1	0.6	
6/16/11 15:05:00	5.50	6.72	321.3	0.5	
6/16/11 15:05:15	5.50	6.75	318.3	0.5	
6/16/11 15:05:30	5.47	6.77	316.1	0.5	
6/16/11 15:05:45	5.48	6.75	309.6	0.5	
6/16/11 15:06:00	5.47	6.73	302.8	0.5	
6/16/11 15:06:15	5.48	6.71	295.5	0.5	
6/16/11 15:06:30	5.46	6.71	292.5	0.4	
6/16/11 15:06:45	5.47	6.70	293.5	0.4	
6/16/11 15:07:00	5.48	6.72	294.3	0.5	
6/16/11 15:07:15	5.46	6.75	296.6	0.5	
6/16/11 15:07:30	5.47	6.77	301.8	0.5	
6/16/11 15:07:45	5.50	6.76	297.5	0.6	
6/16/11 15:08:00	5.45	6.77	286.3	0.5	
6/16/11 15:08:15	5.41	6.76	279.0	0.5	
6/16/11 15:08:30	5.39	6.74	277.5	0.5	
6/16/11 15:08:45	5.41	6.73	279.5	0.5	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 15:09:00	5.42	6.73	287.8	0.5	
6/16/11 15:09:15	5.46	6.74	297.3	0.5	
6/16/11 15:09:30	5.45	6.77	300.3	0.5	
6/16/11 15:09:45	5.44	6.77	300.8	0.5	
6/16/11 15:10:00	5.47	6.75	302.3	0.5	
6/16/11 15:10:15	5.47	6.73	302.8	0.5	
6/16/11 15:10:30	5.47	6.71	303.6	0.5	
6/16/11 15:10:45	5.47	6.71	305.6	0.5	
6/16/11 15:11:00	5.48	6.72	312.3	0.4	
6/16/11 15:11:15	5.51	6.72	319.3	0.5	
6/16/11 15:11:30	5.52	6.74	320.6	0.5	
6/16/11 15:11:45	5.52	6.75	314.1	0.5	
6/16/11 15:12:00	5.50	6.74	311.6	0.5	
6/16/11 15:12:15	5.51	6.72	317.5	0.5	
6/16/11 15:12:30	5.54	6.69	320.6	0.5	
6/16/11 15:12:45	5.56	6.68	317.8	0.5	
6/16/11 15:13:00	5.52	6.71	315.8	0.5	
6/16/11 15:13:15	5.50	6.73	314.6	0.5	
6/16/11 15:13:30	5.51	6.74	315.3	0.5	
6/16/11 15:13:45	5.51	6.74	315.6	0.5	
6/16/11 15:14:00	5.51	6.73	314.8	0.5	
6/16/11 15:14:15	5.57	6.71	309.6	0.5	
6/16/11 15:14:30	5.54	6.72	303.0	0.5	
6/16/11 15:14:45	5.50	6.73	298.0	0.5	
6/16/11 15:15:00	5.47	6.75	296.8	0.5	
6/16/11 15:15:15	5.45	6.77	294.6	0.5	
6/16/11 15:15:30	5.45	6.78	293.5	0.5	
6/16/11 15:15:45	5.45	6.78	296.6	0.5	
6/16/11 15:16:00	5.48	6.76	296.8	0.5	
6/16/11 15:16:15	5.46	6.76	292.0	0.5	
6/16/11 15:16:30	5.45	6.75	287.5	0.4	
6/16/11 15:16:45	5.45	6.76	281.5	0.5	
6/16/11 15:17:00	5.42	6.78	281.3	0.5	
6/16/11 15:17:15	5.42	6.79	287.0	0.4	
6/16/11 15:17:30	5.43	6.79	290.8	0.4	
6/16/11 15:17:45	5.46	6.78	292.0	0.5	
6/16/11 15:18:00	5.48	6.76	290.8	0.4	
6/16/11 15:18:15	5.48	6.74	292.5	0.5	
6/16/11 15:18:30	5.49	6.72	295.8	0.4	
6/16/11 15:18:45	5.47	6.73	303.6	0.4	
6/16/11 15:19:00	5.48	6.73	308.8	0.5	
6/16/11 15:19:15	5.51	6.75	305.1	0.4	
6/16/11 15:19:30	5.45	6.78	305.1	0.5	
6/16/11 15:19:45	5.48	6.76	310.6	0.5	
6/16/11 15:20:00	5.50	6.75	312.3	0.5	
6/16/11 15:20:15	5.49	6.72	317.6	0.5	
6/16/11 15:20:30	5.57	6.67	321.1	0.5	
6/16/11 15:20:45	5.58	6.67	321.1	0.5	
6/16/11 15:21:00	5.56	6.69	320.6	0.5	
6/16/11 15:21:15	5.56	6.70	318.6	0.5	
6/16/11 15:21:30	5.56	6.72	315.3	0.5	
6/16/11 15:21:45	5.53	6.74	307.6	0.4	
6/16/11 15:22:00	5.52	6.73	301.8	0.4	
6/16/11 15:22:15	5.50	6.73	291.5	0.5	
6/16/11 15:22:30	5.47	6.73	288.8	0.5	
6/16/11 15:22:45	5.47	6.72	290.5	0.5	
6/16/11 15:23:00	5.49	6.72	293.0	0.5	
6/16/11 15:23:15	5.48	6.74	296.6	0.4	
6/16/11 15:23:30	5.49	6.75	298.3	0.6	
6/16/11 15:23:45	5.50	6.75	297.1	0.6	
6/16/11 15:24:00	5.49	6.76	298.3	0.5	
6/16/11 15:24:15	5.49	6.75	296.1	0.5	
6/16/11 15:24:30	5.49	6.75	290.8	0.5	
6/16/11 15:24:45	5.46	6.77	285.5	0.5	
6/16/11 15:25:00	5.43	6.79	287.5	0.5	
6/16/11 15:25:15	5.44	6.79	294.0	0.5	
6/16/11 15:25:30	5.49	6.77	296.3	0.6	
6/16/11 15:25:45	5.49	6.77	301.0	0.6	
6/16/11 15:26:00	5.47	6.77	301.5	0.6	
6/16/11 15:26:15	5.48	6.76	307.6	0.5	
6/16/11 15:26:30	5.52	6.74	312.8	0.6	
6/16/11 15:26:45	5.55	6.74	311.1	0.6	
6/16/11 15:27:00	5.53	6.75	312.1	0.5	
6/16/11 15:27:15	5.53	6.76	314.1	0.6	
6/16/11 15:27:30	5.52	6.76	313.6	0.5	
6/16/11 15:27:45	5.53	6.76	312.6	0.5	
6/16/11 15:28:00	5.54	6.75	312.6	0.5	
6/16/11 15:28:15	5.53	6.74	313.6	0.6	
6/16/11 15:28:30	5.55	6.74	318.3	0.5	
6/16/11 15:28:45	5.56	6.74	328.1	0.5	
6/16/11 15:29:00	5.58	6.73	328.9	0.5	
6/16/11 15:29:15	5.57	6.75	319.1	0.5	
6/16/11 15:29:30	5.51	6.77	311.1	0.5	
6/16/11 15:29:45	5.48	6.78	299.5	0.5	
6/16/11 15:30:00	5.44	6.78	293.5	0.5	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 15:30:15	5.42	6.78	289.5	0.5	
6/16/11 15:30:30	5.45	6.77	290.3	0.5	
6/16/11 15:30:45	5.47	6.77	294.5	0.5	
6/16/11 15:31:00	5.48	6.78	301.0	0.5	
6/16/11 15:31:15	5.49	6.77	308.6	0.5	
6/16/11 15:31:30	5.49	6.77	308.8	0.5	
6/16/11 15:31:45	5.45	6.78	307.6	0.5	
6/16/11 15:32:00	5.46	6.76	309.1	0.5	
6/16/11 15:32:15	5.48	6.74	308.6	0.4	
6/16/11 15:32:30	5.46	6.76	306.8	0.5	
6/16/11 15:32:45	5.44	6.78	306.1	0.5	
6/16/11 15:33:00	5.43	6.80	309.6	0.5	
6/16/11 15:33:15	5.44	6.80	309.6	0.5	
6/16/11 15:33:30	5.43	6.81	306.3	0.5	
6/16/11 15:33:45	5.42	6.80	308.6	0.5	
6/16/11 15:34:00	5.44	6.77	312.8	0.5	
6/16/11 15:34:15	5.49	6.73	323.1	0.5	
6/16/11 15:34:30	5.54	6.71	328.9	0.5	
6/16/11 15:34:45	5.51	6.74	328.6	0.5	
6/16/11 15:35:00	5.50	6.76	326.1	0.5	
6/16/11 15:35:15	5.49	6.77	320.1	0.5	
6/16/11 15:35:30	5.49	6.77	319.3	0.5	
6/16/11 15:35:45	5.52	6.73	324.1	0.5	
6/16/11 15:36:00	5.52	6.72	325.4	0.5	
6/16/11 15:36:15	5.53	6.70	325.6	0.5	
6/16/11 15:36:30	5.55	6.71	324.1	0.5	
6/16/11 15:36:45	5.54	6.73	327.1	0.5	
6/16/11 15:37:00	5.54	6.74	330.1	0.4	
6/16/11 15:37:15	5.55	6.74	331.1	0.5	
6/16/11 15:37:30	5.56	6.73	327.6	0.5	
6/16/11 15:37:45	5.55	6.73	319.1	0.5	
6/16/11 15:38:00	5.51	6.73	315.1	0.6	
6/16/11 15:38:15	5.52	6.72	314.1	0.5	
6/16/11 15:38:30	5.54	6.72	314.3	0.5	
6/16/11 15:38:45	5.55	6.73	316.1	0.5	
6/16/11 15:39:00	5.53	6.77	318.1	0.5	
6/16/11 15:39:15	5.54	6.76	318.1	0.5	
6/16/11 15:39:30	5.56	6.76	313.6	0.5	
6/16/11 15:39:45	5.54	6.75	304.6	0.6	
6/16/11 15:40:00	5.47	6.76	297.1	0.6	
6/16/11 15:40:15	5.47	6.75	293.5	0.6	
6/16/11 15:40:30	5.50	6.74	299.0	0.6	
6/16/11 15:40:45	5.55	6.72	307.1	0.6	
6/16/11 15:41:00	5.57	6.73	309.3	0.6	
6/16/11 15:41:15	5.57	6.74	304.1	0.6	
6/16/11 15:41:30	5.53	6.76	298.5	0.6	
6/16/11 15:41:45	5.53	6.74	291.5	0.6	
6/16/11 15:42:00	5.51	6.75	288.0	0.6	
6/16/11 15:42:15	5.48	6.75	284.0	0.6	
6/16/11 15:42:30	5.45	6.75	279.5	0.6	
6/16/11 15:42:45	5.43	6.76	281.0	0.5	
6/16/11 15:43:00	5.48	6.74	282.5	0.5	
6/16/11 15:43:15	5.47	6.75	278.5	0.5	
6/16/11 15:43:30	5.44	6.74	277.5	0.5	
6/16/11 15:43:45	5.46	6.73	278.5	0.5	
6/16/11 15:44:00	5.48	6.72	277.0	0.5	
6/16/11 15:44:15	5.45	6.73	277.5	0.5	
6/16/11 15:44:30	5.46	6.74	280.0	0.5	
6/16/11 15:44:45	5.45	6.75	283.5	0.5	
6/16/11 15:45:00	5.43	6.75	286.0	0.5	
6/16/11 15:45:15	5.42	6.74	289.0	0.5	
6/16/11 15:45:30	5.46	6.72	293.5	0.5	
6/16/11 15:45:45	5.50	6.69	298.5	0.5	
6/16/11 15:46:00	5.48	6.70	301.8	0.5	
6/16/11 15:46:15	5.48	6.70	308.1	0.5	
6/16/11 15:46:30	5.49	6.70	309.6	0.5	
6/16/11 15:46:45	5.51	6.72	309.1	0.5	
6/16/11 15:47:00	5.49	6.72	311.8	0.5	
6/16/11 15:47:15	5.51	6.71	312.6	0.5	
6/16/11 15:47:30	5.50	6.71	309.3	0.5	
6/16/11 15:47:45	5.47	6.70	307.6	0.5	
6/16/11 15:48:00	5.49	6.68	309.3	0.6	
6/16/11 15:48:15	5.50	6.69	311.1	0.6	
6/16/11 15:48:30	5.49	6.71	311.6	0.6	
6/16/11 15:48:45	5.49	6.72	315.6	0.6	
6/16/11 15:49:00	5.48	6.73	318.8	0.6	
6/16/11 15:49:15	5.48	6.73	329.6	0.5	
6/16/11 15:49:30	5.55	6.69	336.6	0.5	
6/16/11 15:49:45	5.57	6.68	330.1	0.5	
6/16/11 15:50:00	5.52	6.70	324.4	0.5	
6/16/11 15:50:15	5.50	6.71	322.6	0.6	
6/16/11 15:50:30	5.50	6.73	320.1	0.5	
6/16/11 15:50:45	5.49	6.75	321.6	0.5	
6/16/11 15:51:00	5.52	6.74	321.9	0.5	
6/16/11 15:51:15	5.51	6.75	313.1	0.5	

## Valero Port Arthur Refinery: Port Arthur, Texas

## SRU 544 Incinerator Exhaust Stack

## ARI Reference Method Monitoring Data

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 15:51:30	5.45	6.75	308.3	0.5	
6/16/11 15:51:45	5.46	6.74	305.1	0.5	
6/16/11 15:52:00	5.47	6.73	301.3	0.5	
6/16/11 15:52:15	5.44	6.74	303.6	0.5	
6/16/11 15:52:30	5.46	6.74	309.3	0.5	
6/16/11 15:52:45	5.50	6.75	311.1	0.5	
6/16/11 15:53:00	5.49	6.76	306.6	0.5	
6/16/11 15:53:15	5.48	6.76	301.6	0.5	
6/16/11 15:53:30	5.47	6.75	298.0	0.5	
6/16/11 15:53:45	5.46	6.73	298.5	0.5	
6/16/11 15:54:00	5.49	6.71	298.8	0.5	
6/16/11 15:54:15	5.48	6.71	299.5	0.6	
6/16/11 15:54:30	5.48	6.73	303.6	0.5	
6/16/11 15:54:45	5.49	6.75	307.6	0.5	
6/16/11 15:55:00	5.49	6.76	306.8	0.5	
6/16/11 15:55:15	5.49	6.76	307.6	0.5	
6/16/11 15:55:30	5.50	6.73	308.3	0.5	
6/16/11 15:55:45	5.50	6.71	310.1	0.5	
6/16/11 15:56:00	5.52	6.68	309.6	0.5	
6/16/11 15:56:15	5.52	6.69	310.1	0.5	
6/16/11 15:56:30	5.52	6.70	305.8	0.5	
6/16/11 15:56:45	5.49	6.74	301.5	0.5	
6/16/11 15:57:00	5.46	6.76	302.3	0.5	
6/16/11 15:57:15	5.46	6.77	300.0	0.5	
6/16/11 15:57:30	5.45	6.76	301.0	0.5	
6/16/11 15:57:45	5.49	6.73	303.6	0.5	
6/16/11 15:58:00	5.50	6.71	306.1	0.5	Port Change 544SRU-010-2
6/16/11 15:58:15	5.51	6.71	310.1	0.5	
6/16/11 15:58:30	5.50	6.72	310.5	0.5	
6/16/11 15:58:45	5.51	6.73	307.6	0.5	
6/16/11 15:59:00	5.50	6.75	302.5	0.4	
6/16/11 15:59:15	5.47	6.75	303.1	0.5	
6/16/11 15:59:30	5.48	6.73	308.9	0.4	
6/16/11 15:59:45	5.50	6.70	315.1	0.4	
6/16/11 16:00:00	5.54	6.68	314.4	0.6	
6/16/11 16:00:15	5.51	6.70	310.6	0.5	
6/16/11 16:00:30	5.51	6.71	310.0	0.5	
6/16/11 16:00:45	5.50	6.73	312.1	0.5	
6/16/11 16:01:00	5.49	6.73	309.6	0.5	
6/16/11 16:01:15	5.52	6.73	302.5	0.5	
6/16/11 16:01:30	5.50	6.73	302.0	0.5	
6/16/11 16:01:45	5.56	6.69	310.6	0.5	
6/16/11 16:02:00	5.64	6.65	318.3	0.5	
6/16/11 16:02:15	5.64	6.65	316.6	0.5	
6/16/11 16:02:30	5.58	6.69	303.6	0.5	
6/16/11 16:02:45	5.50	6.74	290.5	0.5	
6/16/11 16:03:00	5.44	6.78	289.5	0.5	
6/16/11 16:03:15	5.45	6.77	297.0	0.5	
6/16/11 16:03:30	5.49	6.74	305.8	0.5	
6/16/11 16:03:45	5.53	6.71	308.6	0.5	
6/16/11 16:04:00	5.52	6.70	304.6	0.5	
6/16/11 16:04:15	5.51	6.71	301.0	0.5	
6/16/11 16:04:30	5.50	6.73	300.5	0.5	
6/16/11 16:04:45	5.48	6.75	300.5	0.5	
6/16/11 16:05:00	5.50	6.75	298.3	0.4	
6/16/11 16:05:15	5.48	6.77	294.0	0.5	
6/16/11 16:05:30	5.46	6.77	292.0	0.5	
6/16/11 16:05:45	5.46	6.76	293.5	0.5	
6/16/11 16:06:00	5.46	6.75	296.3	0.5	
6/16/11 16:06:15	5.48	6.74	296.1	0.4	
6/16/11 16:06:30	5.48	6.75	294.3	0.5	
6/16/11 16:06:45	5.46	6.77	298.0	0.5	
6/16/11 16:07:00	5.49	6.76	305.1	0.5	
6/16/11 16:07:15	5.50	6.75	307.6	0.5	
6/16/11 16:07:30	5.49	6.75	301.8	0.4	
6/16/11 16:07:45	5.46	6.75	296.6	0.5	
6/16/11 16:08:00	5.48	6.73	293.8	0.4	Restart 544SRU-0010-2
6/16/11 16:08:15	5.46	6.75	292.5	0.4	
6/16/11 16:08:30	5.44	6.78	292.8	0.5	
6/16/11 16:08:45	5.46	6.78	289.5	0.5	
6/16/11 16:09:00	5.44	6.80	283.3	0.5	
6/16/11 16:09:15	5.43	6.80	279.0	0.4	
6/16/11 16:09:30	5.41	6.79	275.0	0.5	
6/16/11 16:09:45	5.40	6.77	274.0	0.4	
6/16/11 16:10:00	5.42	6.75	275.5	0.4	
6/16/11 16:10:15	5.41	6.76	277.5	0.4	
6/16/11 16:10:30	5.43	6.76	279.8	0.4	
6/16/11 16:10:45	5.44	6.77	283.0	0.5	
6/16/11 16:11:00	5.45	6.78	288.3	0.4	
6/16/11 16:11:15	5.49	6.75	297.0	0.5	
6/16/11 16:11:30	5.50	6.73	301.8	0.4	
6/16/11 16:11:45	5.49	6.72	301.0	0.4	
6/16/11 16:12:00	5.48	6.72	300.3	0.4	
6/16/11 16:12:15	5.49	6.72	298.5	0.4	
6/16/11 16:12:30	5.43	6.76	300.1	0.4	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 16:12:45	5.45	6.76	304.6	0.5	
6/16/11 16:13:00	5.50	6.75	306.3	0.4	
6/16/11 16:13:15	5.48	6.75	307.6	0.5	
6/16/11 16:13:30	5.47	6.73	312.1	0.4	
6/16/11 16:13:45	5.52	6.69	314.1	0.4	
6/16/11 16:14:00	5.53	6.68	316.1	0.4	
6/16/11 16:14:15	5.51	6.70	326.1	0.4	
6/16/11 16:14:30	5.56	6.70	334.6	0.4	
6/16/11 16:14:45	5.58	6.71	335.1	0.4	
6/16/11 16:15:00	5.55	6.73	327.1	0.4	
6/16/11 16:15:15	5.52	6.74	322.1	0.4	
6/16/11 16:15:30	5.52	6.71	326.9	0.4	
6/16/11 16:15:45	5.55	6.68	329.6	0.4	
6/16/11 16:16:00	5.55	6.67	328.4	0.4	
6/16/11 16:16:15	5.55	6.68	324.1	0.4	
6/16/11 16:16:30	5.53	6.71	317.6	0.4	
6/16/11 16:16:45	5.50	6.75	311.1	0.4	
6/16/11 16:17:00	5.47	6.77	304.1	0.4	
6/16/11 16:17:15	5.47	6.77	298.5	0.4	
6/16/11 16:17:30	5.46	6.76	290.5	0.4	
6/16/11 16:17:45	5.42	6.75	283.0	0.4	
6/16/11 16:18:00	5.41	6.75	284.8	0.4	
6/16/11 16:18:15	5.44	6.73	289.0	0.3	
6/16/11 16:18:30	5.43	6.75	288.5	0.4	
6/16/11 16:18:45	5.43	6.76	288.0	0.4	
6/16/11 16:19:00	5.47	6.75	288.8	0.4	
6/16/11 16:19:15	5.46	6.75	285.5	0.4	
6/16/11 16:19:30	5.40	6.76	281.0	0.4	
6/16/11 16:19:45	5.42	6.73	279.5	0.4	
6/16/11 16:20:00	5.43	6.72	280.0	0.4	
6/16/11 16:20:15	5.45	6.70	282.5	0.4	
6/16/11 16:20:30	5.47	6.71	281.5	0.4	
6/16/11 16:20:45	5.43	6.73	279.5	0.4	
6/16/11 16:21:00	5.40	6.73	284.0	0.4	
6/16/11 16:21:15	5.44	6.70	292.0	0.4	
6/16/11 16:21:30	5.50	6.66	296.0	0.4	
6/16/11 16:21:45	5.51	6.66	295.0	0.4	
6/16/11 16:22:00	5.50	6.67	294.5	0.4	
6/16/11 16:22:15	5.48	6.68	302.6	0.4	
6/16/11 16:22:30	5.52	6.67	315.8	0.4	
6/16/11 16:22:45	5.56	6.66	325.1	0.4	
6/16/11 16:23:00	5.56	6.66	328.9	0.4	
6/16/11 16:23:15	5.56	6.65	327.6	0.4	
6/16/11 16:23:30	5.55	6.64	324.4	0.4	
6/16/11 16:23:45	5.53	6.65	318.6	0.4	
6/16/11 16:24:00	5.50	6.67	313.3	0.4	
6/16/11 16:24:15	5.50	6.69	313.1	0.4	
6/16/11 16:24:30	5.50	6.71	316.3	0.4	
6/16/11 16:24:45	5.53	6.71	317.6	0.4	
6/16/11 16:25:00	5.51	6.72	313.1	0.4	
6/16/11 16:25:15	5.45	6.73	309.6	0.4	
6/16/11 16:25:30	5.47	6.71	308.3	0.4	
6/16/11 16:25:45	5.45	6.71	307.6	0.4	
6/16/11 16:26:00	5.46	6.70	307.6	0.4	
6/16/11 16:26:15	5.45	6.73	309.1	0.3	
6/16/11 16:26:30	5.47	6.74	311.6	0.4	
6/16/11 16:26:45	5.50	6.75	312.6	0.4	
6/16/11 16:27:00	5.48	6.76	311.3	0.3	
6/16/11 16:27:15	5.47	6.76	307.6	0.4	
6/16/11 16:27:30	5.47	6.75	305.3	0.4	
6/16/11 16:27:45	5.49	6.72	306.1	0.4	
6/16/11 16:28:00	5.50	6.72	298.3	0.4	
6/16/11 16:28:15	5.44	6.75	287.5	0.3	
6/16/11 16:28:30	5.38	6.78	279.5	0.3	
6/16/11 16:28:45	5.38	6.80	273.5	0.3	
6/16/11 16:29:00	5.38	6.81	272.5	0.3	
6/16/11 16:29:15	5.38	6.81	271.5	0.3	
6/16/11 16:29:30	5.37	6.79	271.2	0.4	
6/16/11 16:29:45	5.39	6.76	275.5	0.3	
6/16/11 16:30:00	5.42	6.73	278.7	0.3	
6/16/11 16:30:15	5.43	6.72	279.5	0.3	
6/16/11 16:30:30	5.42	6.73	284.5	0.3	
6/16/11 16:30:45	5.46	6.73	289.0	0.4	
6/16/11 16:31:00	5.46	6.75	288.0	0.3	
6/16/11 16:31:15	5.43	6.76	290.0	0.4	
6/16/11 16:31:30	5.46	6.74	296.0	0.3	
6/16/11 16:31:45	5.47	6.73	298.5	0.3	
6/16/11 16:32:00	5.45	6.72	299.5	0.3	
6/16/11 16:32:15	5.46	6.70	301.5	0.3	
6/16/11 16:32:30	5.47	6.69	306.6	0.3	
6/16/11 16:32:45	5.50	6.68	311.6	0.3	
6/16/11 16:33:00	5.50	6.70	314.3	0.3	
6/16/11 16:33:15	5.50	6.70	315.1	0.3	
6/16/11 16:33:30	5.48	6.70	316.6	0.4	
6/16/11 16:33:45	5.49	6.68	323.1	0.4	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 16:34:00	5.52	6.66	327.1	0.4	
6/16/11 16:34:15	5.52	6.66	324.1	0.4	
6/16/11 16:34:30	5.50	6.67	323.1	0.3	
6/16/11 16:34:45	5.53	6.67	326.1	0.4	
6/16/11 16:35:00	5.51	6.69	330.4	0.4	
6/16/11 16:35:15	5.51	6.70	334.1	0.4	
6/16/11 16:35:30	5.53	6.69	337.9	0.4	
6/16/11 16:35:45	5.56	6.67	335.1	0.3	
6/16/11 16:36:00	5.53	6.70	324.4	0.3	
6/16/11 16:36:15	5.47	6.73	318.6	0.3	
6/16/11 16:36:30	5.49	6.73	321.3	0.4	
6/16/11 16:36:45	5.51	6.74	324.1	0.3	
6/16/11 16:37:00	5.53	6.75	320.3	0.4	
6/16/11 16:37:15	5.51	6.76	314.1	0.3	
6/16/11 16:37:30	5.49	6.77	312.8	0.3	
6/16/11 16:37:45	5.52	6.75	314.6	0.3	
6/16/11 16:38:00	5.55	6.73	317.3	0.3	
6/16/11 16:38:15	5.58	6.72	318.6	0.3	
6/16/11 16:38:30	5.61	6.71	314.1	0.3	
6/16/11 16:38:45	5.57	6.74	305.5	0.3	
6/16/11 16:39:00	5.52	6.77	299.5	0.3	
6/16/11 16:39:15	5.55	6.76	292.5	0.3	
6/16/11 16:39:30	5.49	6.78	278.0	0.3	
6/16/11 16:39:45	5.42	6.79	262.0	0.3	
6/16/11 16:40:00	5.38	6.78	254.9	0.3	
6/16/11 16:40:15	5.41	6.76	252.4	0.3	
6/16/11 16:40:30	5.39	6.78	249.4	0.6	
6/16/11 16:40:45	5.36	6.80	246.9	0.4	
6/16/11 16:41:00	5.35	6.82	248.9	0.4	
6/16/11 16:41:15	5.39	6.81	259.4	0.4	
6/16/11 16:41:30	5.45	6.77	270.2	0.4	
6/16/11 16:41:45	5.47	6.74	274.5	0.4	
6/16/11 16:42:00	5.45	6.73	274.7	0.4	
6/16/11 16:42:15	5.45	6.72	271.5	0.4	
6/16/11 16:42:30	5.43	6.73	275.2	0.4	
6/16/11 16:42:45	5.46	6.73	283.5	0.3	
6/16/11 16:43:00	5.49	6.74	283.8	0.4	
6/16/11 16:43:15	5.44	6.78	278.5	0.4	
6/16/11 16:43:30	5.42	6.78	276.5	0.4	
6/16/11 16:43:45	5.44	6.74	281.5	0.4	
6/16/11 16:44:00	5.48	6.69	288.3	0.3	
6/16/11 16:44:15	5.48	6.67	293.5	0.3	
6/16/11 16:44:30	5.49	6.66	298.1	0.3	
6/16/11 16:44:45	5.49	6.67	304.1	0.4	
6/16/11 16:45:00	5.51	6.69	310.3	0.3	
6/16/11 16:45:15	5.51	6.71	308.6	0.3	
6/16/11 16:45:30	5.48	6.74	300.3	0.3	
6/16/11 16:45:45	5.46	6.74	296.6	0.4	
6/16/11 16:46:00	5.49	6.71	299.9	0.3	
6/16/11 16:46:15	5.51	6.68	306.1	0.3	
6/16/11 16:46:30	5.52	6.67	313.0	0.4	
6/16/11 16:46:45	5.50	6.67	318.1	0.3	
6/16/11 16:47:00	5.53	6.67	318.8	0.3	
6/16/11 16:47:15	5.54	6.70	315.1	0.4	
6/16/11 16:47:30	5.48	6.73	313.0	0.3	
6/16/11 16:47:45	5.46	6.73	313.6	0.4	
6/16/11 16:48:00	5.48	6.71	312.8	0.3	
6/16/11 16:48:15	5.50	6.70	309.6	0.3	
6/16/11 16:48:30	5.48	6.70	308.6	0.3	
6/16/11 16:48:45	5.50	6.72	307.6	0.3	
6/16/11 16:49:00	5.47	6.74	303.1	0.3	
6/16/11 16:49:15	5.42	6.78	302.0	0.4	
6/16/11 16:49:30	5.44	6.76	303.0	0.4	
6/16/11 16:49:45	5.47	6.74	306.6	0.4	
6/16/11 16:50:00	5.49	6.71	313.3	0.3	
6/16/11 16:50:15	5.51	6.69	314.6	0.4	
6/16/11 16:50:30	5.51	6.70	309.6	0.3	
6/16/11 16:50:45	5.48	6.73	303.6	0.3	
6/16/11 16:51:00	5.45	6.76	295.1	0.3	
6/16/11 16:51:15	5.43	6.78	293.5	0.3	
6/16/11 16:51:30	5.43	6.76	294.0	0.3	
6/16/11 16:51:45	5.44	6.73	291.0	0.3	
6/16/11 16:52:00	5.44	6.70	290.0	0.3	
6/16/11 16:52:15	5.46	6.67	291.0	0.4	
6/16/11 16:52:30	5.46	6.68	288.8	0.3	
6/16/11 16:52:45	5.44	6.71	290.0	0.3	
6/16/11 16:53:00	5.44	6.73	287.5	0.3	
6/16/11 16:53:15	5.43	6.74	282.5	0.3	
6/16/11 16:53:30	5.41	6.75	281.5	0.3	
6/16/11 16:53:45	5.41	6.72	287.0	0.3	
6/16/11 16:54:00	5.46	6.67	287.5	0.3	
6/16/11 16:54:15	5.44	6.66	283.5	0.3	
6/16/11 16:54:30	5.40	6.67	289.0	0.3	
6/16/11 16:54:45	5.45	6.66	302.6	0.3	
6/16/11 16:55:00	5.52	6.65	321.4	0.3	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 16:55:15	5.55	6.66	327.1	0.3	
6/16/11 16:55:30	5.54	6.67	327.4	0.3	
6/16/11 16:55:45	5.52	6.67	326.6	0.3	
6/16/11 16:56:00	5.53	6.65	329.9	0.3	
6/16/11 16:56:15	5.56	6.64	329.6	0.3	
6/16/11 16:56:30	5.51	6.66	324.4	0.3	
6/16/11 16:56:45	5.48	6.68	318.1	0.3	
6/16/11 16:57:00	5.46	6.70	313.1	0.3	
6/16/11 16:57:15	5.46	6.72	317.1	0.3	
6/16/11 16:57:30	5.50	6.70	322.6	0.3	
6/16/11 16:57:45	5.54	6.69	320.6	0.3	
6/16/11 16:58:00	5.50	6.70	312.8	0.3	
6/16/11 16:58:15	5.46	6.71	311.6	0.3	
6/16/11 16:58:30	5.46	6.71	315.1	0.3	
6/16/11 16:58:45	5.49	6.71	317.6	0.3	
6/16/11 16:59:00	5.51	6.71	319.4	0.3	
6/16/11 16:59:15	5.51	6.73	317.6	0.3	
6/16/11 16:59:30	5.47	6.76	314.8	0.3	
6/16/11 16:59:45	5.48	6.75	316.1	0.3	
6/16/11 17:00:00	5.50	6.73	312.6	0.3	
6/16/11 17:00:15	5.48	6.73	308.6	0.3	
6/16/11 17:00:30	5.48	6.72	308.3	0.3	
6/16/11 17:00:45	5.51	6.72	312.1	0.3	
6/16/11 17:01:00	5.51	6.73	318.6	0.3	
6/16/11 17:01:15	5.53	6.73	321.6	0.3	
6/16/11 17:01:30	5.50	6.75	318.4	0.3	
6/16/11 17:01:45	5.52	6.74	310.1	0.3	
6/16/11 17:02:00	5.45	6.77	298.5	0.2	
6/16/11 17:02:15	5.42	6.76	300.0	0.3	
6/16/11 17:02:30	5.45	6.75	307.8	0.3	
6/16/11 17:02:45	5.48	6.74	314.6	0.3	
6/16/11 17:03:00	5.50	6.75	321.6	0.3	
6/16/11 17:03:15	5.51	6.76	320.6	0.3	
6/16/11 17:03:30	5.50	6.77	316.8	0.3	
6/16/11 17:03:45	5.48	6.77	313.1	0.3	
6/16/11 17:04:00	5.46	6.76	310.8	0.3	
6/16/11 17:04:15	5.48	6.73	312.1	0.3	
6/16/11 17:04:30	5.50	6.71	314.1	0.3	
6/16/11 17:04:45	5.49	6.71	316.1	0.3	
6/16/11 17:05:00	5.50	6.71	313.8	0.3	
6/16/11 17:05:15	5.47	6.74	310.1	0.2	
6/16/11 17:05:30	5.47	6.75	312.1	0.3	
6/16/11 17:05:45	5.51	6.73	319.1	0.3	
6/16/11 17:06:00	5.55	6.70	320.8	0.3	
6/16/11 17:06:15	5.53	6.69	318.1	0.3	
6/16/11 17:06:30	5.54	6.68	314.1	0.3	
6/16/11 17:06:45	5.53	6.69	312.1	0.2	
6/16/11 17:07:00	5.51	6.71	312.6	0.2	
6/16/11 17:07:15	5.51	6.73	311.1	0.2	
6/16/11 17:07:30	5.51	6.76	302.8	0.2	
6/16/11 17:07:45	5.49	6.78	301.0	0.2	
6/16/11 17:08:00	5.52	6.76	305.8	0.3	
6/16/11 17:08:15	5.55	6.72	306.1	0.2	
6/16/11 17:08:30	5.55	6.70	303.3	0.3	
6/16/11 17:08:45	5.56	6.69	297.0	0.3	
6/16/11 17:09:00	5.51	6.71	293.5	0.2	
6/16/11 17:09:15	5.53	6.73	293.0	0.2	
6/16/11 17:09:30	5.48	6.79	291.0	0.2	
6/16/11 17:09:45	5.47	6.81	293.5	0.2	
6/16/11 17:10:00	5.50	6.81	294.6	0.2	
6/16/11 17:10:15	5.50	6.79	295.1	0.3	
6/16/11 17:10:30	5.50	6.76	295.3	0.2	
6/16/11 17:10:45	5.51	6.74	294.6	0.2	
6/16/11 17:11:00	5.50	6.73	291.8	0.2	
6/16/11 17:11:15	5.48	6.74	288.0	0.2	
6/16/11 17:11:30	5.47	6.76	288.0	0.2	
6/16/11 17:11:45	5.46	6.78	290.5	0.2	
6/16/11 17:12:00	5.50	6.78	296.8	0.2	
6/16/11 17:12:15	5.52	6.77	303.1	0.2	
6/16/11 17:12:30	5.55	6.74	305.3	0.2	
6/16/11 17:12:45	5.54	6.73	298.0	0.2	
6/16/11 17:13:00	5.47	6.75	285.0	0.2	
6/16/11 17:13:15	5.41	6.78	278.5	0.2	
6/16/11 17:13:30	5.37	6.80	274.0	0.2	
6/16/11 17:13:45	5.38	6.81	276.5	0.2	
6/16/11 17:14:00	5.41	6.80	280.0	0.2	
6/16/11 17:14:15	5.40	6.80	283.5	0.2	
6/16/11 17:14:30	5.42	6.77	291.8	0.2	
6/16/11 17:14:45	5.45	6.74	296.6	0.2	
6/16/11 17:15:00	5.45	6.74	301.3	0.2	
6/16/11 17:15:15	5.46	6.74	310.6	0.1	
6/16/11 17:15:30	5.51	6.74	325.6	0.2	
6/16/11 17:15:45	5.53	6.73	332.6	0.2	
6/16/11 17:16:00	5.53	6.74	332.6	0.2	
6/16/11 17:16:15	5.54	6.72	332.6	0.1	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 17:16:30	5.55	6.70	328.6	0.1	
6/16/11 17:16:45	5.52	6.71	325.6	0.1	
6/16/11 17:17:00	5.52	6.70	326.6	0.2	
6/16/11 17:17:15	5.53	6.71	326.6	0.2	
6/16/11 17:17:30	5.51	6.74	329.4	0.1	
6/16/11 17:17:45	5.53	6.76	332.6	0.2	
6/16/11 17:18:00	5.54	6.76	331.1	0.1	
6/16/11 17:18:15	5.54	6.74	328.1	0.2	
6/16/11 17:18:30	5.52	6.72	318.1	0.2	
6/16/11 17:18:45	5.49	6.71	313.1	0.1	
6/16/11 17:19:00	5.50	6.69	312.1	0.2	
6/16/11 17:19:15	5.50	6.70	310.1	0.1	
6/16/11 17:19:30	5.48	6.73	309.6	0.2	
6/16/11 17:19:45	5.48	6.75	308.6	0.2	
6/16/11 17:20:00	5.47	6.78	303.1	0.2	
6/16/11 17:20:15	5.46	6.77	300.0	0.2	
6/16/11 17:20:30	5.46	6.75	293.0	0.1	
6/16/11 17:20:45	5.43	6.73	284.5	0.2	
6/16/11 17:21:00	5.40	6.74	277.7	0.1	
6/16/11 17:21:15	5.40	6.73	280.0	0.2	
6/16/11 17:21:30	5.43	6.75	285.3	0.1	
6/16/11 17:21:45	5.45	6.76	287.5	0.2	
6/16/11 17:22:00	5.44	6.79	287.5	0.1	
6/16/11 17:22:15	5.42	6.79	292.0	0.2	
6/16/11 17:22:30	5.47	6.76	290.3	0.2	
6/16/11 17:22:45	5.42	6.76	285.5	0.2	
6/16/11 17:23:00	5.40	6.74	288.3	0.2	
6/16/11 17:23:15	5.45	6.71	291.0	0.2	
6/16/11 17:23:30	5.40	6.74	292.0	0.2	
6/16/11 17:23:45	5.42	6.75	296.0	0.2	
6/16/11 17:24:00	5.44	6.75	305.6	0.1	
6/16/11 17:24:15	5.45	6.75	308.6	0.2	
6/16/11 17:24:30	5.48	6.73	304.6	0.1	
6/16/11 17:24:45	5.48	6.71	300.5	0.1	
6/16/11 17:25:00	5.46	6.72	300.6	0.1	
6/16/11 17:25:15	5.43	6.73	306.6	0.1	
6/16/11 17:25:30	5.45	6.72	316.8	0.2	
6/16/11 17:25:45	5.48	6.71	320.6	0.1	
6/16/11 17:26:00	5.51	6.71	319.1	0.1	
6/16/11 17:26:15	5.48	6.72	317.1	0.2	
6/16/11 17:26:30	5.46	6.71	317.8	0.2	
6/16/11 17:26:45	5.48	6.69	318.1	0.2	
6/16/11 17:27:00	5.48	6.68	317.1	0.1	
6/16/11 17:27:15	5.47	6.69	321.1	0.1	
6/16/11 17:27:30	5.49	6.69	325.6	0.1	
6/16/11 17:27:45	5.48	6.72	324.1	0.1	
6/16/11 17:28:00	5.48	6.73	318.1	0.1	
6/16/11 17:28:15	5.45	6.73	316.1	0.1	
6/16/11 17:28:30	5.46	6.71	319.8	0.1	
6/16/11 17:28:45	5.49	6.68	325.6	0.1	
6/16/11 17:29:00	5.53	6.67	328.4	0.1	
6/16/11 17:29:15	5.51	6.68	325.6	0.1	
6/16/11 17:29:30	5.50	6.70	320.1	0.1	
6/16/11 17:29:45	5.47	6.74	317.6	0.1	
6/16/11 17:30:00	5.47	6.76	316.8	0.1	
6/16/11 17:30:15	5.46	6.77	317.6	0.1	
6/16/11 17:30:30	5.49	6.74	316.3	0.1	
6/16/11 17:30:45	5.51	6.71	315.1	0.1	
6/16/11 17:31:00	5.49	6.69	314.3	0.1	
6/16/11 17:31:15	5.50	6.69	314.1	0.1	
6/16/11 17:31:30	5.51	6.70	314.6	0.1	
6/16/11 17:31:45	5.51	6.72	314.1	0.1	
6/16/11 17:32:00	5.52	6.74	312.3	0.1	
6/16/11 17:32:15	5.49	6.77	311.6	0.1	
6/16/11 17:32:30	5.49	6.76	309.3	0.2	
6/16/11 17:32:45	5.50	6.73	308.1	0.1	
6/16/11 17:33:00	5.52	6.69	306.3	0.1	
6/16/11 17:33:15	5.52	6.68	305.6	0.1	
6/16/11 17:33:30	5.51	6.68	304.8	0.1	
6/16/11 17:33:45	5.52	6.70	308.0	0.1	
6/16/11 17:34:00	5.52	6.72	307.6	0.2	
6/16/11 17:34:15	5.51	6.75	302.0	0.1	
6/16/11 17:34:30	5.49	6.77	299.8	0.2	
6/16/11 17:34:45	5.50	6.75	300.5	0.1	
6/16/11 17:35:00	5.50	6.74	300.3	0.1	
6/16/11 17:35:15	5.52	6.72	296.9	0.2	
6/16/11 17:35:30	5.51	6.73	290.8	0.1	
6/16/11 17:35:45	5.45	6.76	288.5	0.1	
6/16/11 17:36:00	5.44	6.78	289.8	0.1	
6/16/11 17:36:15	5.45	6.79	289.0	0.1	
6/16/11 17:36:30	5.44	6.81	285.3	0.1	
6/16/11 17:36:45	5.44	6.80	284.5	0.1	
6/16/11 17:37:00	5.45	6.79	286.0	0.1	
6/16/11 17:37:15	5.46	6.78	290.5	0.1	
6/16/11 17:37:30	5.45	6.78	295.8	0.1	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 17:37:45	5.49	6.77	297.3	0.1	
6/16/11 17:38:00	5.47	6.80	301.0	0.1	
6/16/11 17:38:15	5.48	6.80	302.5	0.1	
6/16/11 17:38:30	5.49	6.80	302.8	0.1	
6/16/11 17:38:45	5.50	6.78	302.1	0.1	
6/16/11 17:39:00	5.48	6.77	298.3	0.1	
6/16/11 17:39:15	5.48	6.75	298.3	0.1	
6/16/11 17:39:30	5.51	6.73	302.1	0.1	
6/16/11 17:39:45	5.54	6.72	303.6	0.1	
6/16/11 17:40:00	5.52	6.76	299.8	0.1	
6/16/11 17:40:15	5.48	6.79	298.3	0.1	
6/16/11 17:40:30	5.49	6.78	299.5	0.1	
6/16/11 17:40:45	5.51	6.76	298.1	0.1	
6/16/11 17:41:00	5.49	6.74	293.8	0.1	
6/16/11 17:41:15	5.49	6.72	289.3	0.1	
6/16/11 17:41:30	5.48	6.72	286.3	0.1	
6/16/11 17:41:45	5.48	6.72	287.8	0.1	
6/16/11 17:42:00	5.48	6.73	296.0	0.1	End 544SRU-16A-2
6/16/11 17:42:15	5.50	6.74	303.6	0.1	
6/16/11 17:42:30	5.52	6.73	308.6	0.1	
6/16/11 17:42:45	5.54	6.72	306.3	0.1	
6/16/11 17:43:00	5.47	6.72	301.5	0.1	
6/16/11 17:43:15	5.48	6.70	296.3	0.1	
6/16/11 17:43:30	5.47	6.69	292.5	0.1	
6/16/11 17:43:45	5.48	6.68	294.0	0.1	
6/16/11 17:44:00	5.48	6.70	297.3	0.1	
6/16/11 17:44:15	5.49	6.72	301.0	0.1	
6/16/11 17:44:30	5.50	6.72	302.0	0.1	
6/16/11 17:44:45	5.51	6.72	299.1	0.1	
6/16/11 17:45:00	5.50	6.70	299.3	0.1	
6/16/11 17:45:15	5.51	6.67	297.1	0.1	
6/16/11 17:45:30	5.49	6.66	297.6	0.1	
6/16/11 17:45:45	5.52	6.64	296.1	0.1	
6/16/11 17:46:00	5.49	6.68	292.3	0.1	
6/16/11 17:46:15	5.46	6.73	292.3	0.1	
6/16/11 17:46:30	5.43	6.76	295.3	0.1	
6/16/11 17:46:45	5.48	6.76	301.3	0.1	
6/16/11 17:47:00	5.50	6.74	303.8	0.1	
6/16/11 17:47:15	5.51	6.73	298.6	0.1	
6/16/11 17:47:30	5.45	6.74	299.8	0.1	
6/16/11 17:47:45	5.46	6.72	305.8	0.1	
6/16/11 17:48:00	5.49	6.71	307.3	0.1	
6/16/11 17:48:15	5.48	6.73	307.3	0.1	
6/16/11 17:48:30	5.48	6.75	310.1	0.1	
6/16/11 17:48:45	5.49	6.76	314.6	0.1	
6/16/11 17:49:00	5.51	6.76	317.6	0.1	
6/16/11 17:49:15	5.53	6.74	316.8	0.1	
6/16/11 17:49:30	5.52	6.73	311.8	0.1	
6/16/11 17:49:45	5.51	6.73	309.6	0.1	
6/16/11 17:50:00	5.51	6.73	309.3	0.1	
6/16/11 17:50:15	5.50	6.76	307.8	0.1	
6/16/11 17:50:30	5.48	6.78	305.3	0.1	
6/16/11 17:50:45	5.50	6.79	306.8	0.1	
6/16/11 17:51:00	5.52	6.78	310.3	0.1	
6/16/11 17:51:15	5.52	6.77	306.6	0.1	
6/16/11 17:51:30	5.49	6.77	300.5	0.1	
6/16/11 17:51:45	5.46	6.77	295.3	0.1	
6/16/11 17:52:00	5.46	6.77	293.8	0.1	
6/16/11 17:52:15	5.47	6.77	296.8	0.1	
6/16/11 17:52:30	5.47	6.78	301.3	0.1	
6/16/11 17:52:45	5.47	6.79	305.1	0.1	
6/16/11 17:53:00	5.46	6.80	306.6	0.1	
6/16/11 17:53:15	5.46	6.79	307.3	0.1	
6/16/11 17:53:30	5.48	6.77	310.3	0.1	
6/16/11 17:53:45	5.48	6.77	315.6	0.2	
6/16/11 17:54:00	5.50	6.77	322.1	0.2	
6/16/11 17:54:15	5.51	6.78	325.1	0.2	
6/16/11 17:54:30	5.51	6.80	328.9	0.2	
6/16/11 17:54:45	5.52	6.80	335.6	0.2	
6/16/11 17:55:00	5.54	6.78	335.6	0.2	
6/16/11 17:55:15	5.53	6.77	329.6	0.2	
6/16/11 17:55:30	5.53	6.76	325.6	0.2	
6/16/11 17:55:45	5.54	6.75	325.6	0.2	
6/16/11 17:56:00	5.52	6.76	323.9	0.2	
6/16/11 17:56:15	5.51	6.78	325.4	0.1	
6/16/11 17:56:30	5.53	6.80	327.9	0.1	
6/16/11 17:56:45	5.53	6.81	329.4	0.2	
6/16/11 17:57:00	5.53	6.81	329.6	0.1	
6/16/11 17:57:15	5.54	6.78	330.4	0.2	
6/16/11 17:57:30	5.55	6.75	329.6	0.1	
6/16/11 17:57:45	5.55	6.74	320.6	0.2	
6/16/11 17:58:00	5.52	6.76	312.6	0.1	
6/16/11 17:58:15	5.51	6.78	316.3	0.1	
6/16/11 17:58:30	5.53	6.78	319.4	0.2	
6/16/11 17:58:45	5.54	6.80	316.3	0.1	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 17:59:00	5.53	6.80	310.6	0.1	
6/16/11 17:59:15	5.50	6.79	305.3	0.1	
6/16/11 17:59:30	5.50	6.75	300.0	0.1	
6/16/11 17:59:45	5.50	6.74	297.1	0.1	
6/16/11 18:00:00	5.53	6.72	293.8	0.1	
6/16/11 18:00:15	5.51	6.75	288.5	0.1	
6/16/11 18:00:30	5.49	6.78	282.3	0.1	
6/16/11 18:00:45	5.49	6.81	277.7	0.1	
6/16/11 18:01:00	5.49	6.82	277.0	0.1	
6/16/11 18:01:15	5.47	6.82	274.0	0.1	
6/16/11 18:01:30	5.45	6.79	274.0	0.1	
6/16/11 18:01:45	5.47	6.75	276.2	0.1	
6/16/11 18:02:00	5.48	6.73	276.0	0.1	
6/16/11 18:02:15	5.49	6.73	273.7	0.1	
6/16/11 18:02:30	5.49	6.76	274.0	0.1	
6/16/11 18:02:45	5.45	6.79	277.0	0.1	
6/16/11 18:03:00	5.46	6.79	282.5	0.1	
6/16/11 18:03:15	5.47	6.78	287.0	0.1	
6/16/11 18:03:30	5.47	6.76	289.0	0.1	
6/16/11 18:03:45	5.50	6.71	285.3	0.1	
6/16/11 18:04:00	5.50	6.68	282.8	0.1	
6/16/11 18:04:15	5.49	6.67	284.3	0.1	
6/16/11 18:04:30	5.49	6.68	286.0	0.1	
6/16/11 18:04:45	5.48	6.71	287.5	0.1	
6/16/11 18:05:00	5.47	6.73	286.8	0.1	
6/16/11 18:05:15	5.46	6.72	289.0	0.1	
6/16/11 18:05:30	5.49	6.69	289.8	0.1	
6/16/11 18:05:45	5.48	6.67	292.8	0.1	
6/16/11 18:06:00	5.50	6.64	293.0	0.1	
6/16/11 18:06:15	5.47	6.65	291.5	0.1	
6/16/11 18:06:30	5.47	6.67	295.8	0.1	
6/16/11 18:06:45	5.46	6.69	305.6	0.1	
6/16/11 18:07:00	5.51	6.69	313.8	0.1	
6/16/11 18:07:15	5.53	6.69	313.1	0.1	
6/16/11 18:07:30	5.49	6.70	309.6	0.1	
6/16/11 18:07:45	5.45	6.69	313.3	0.1	End 544SRU-0010-2
6/16/11 18:08:00	5.49	6.65	320.1	0.1	
6/16/11 18:08:15	5.51	6.64	320.9	0.1	
6/16/11 18:08:30	5.48	6.66	322.1	0.1	
6/16/11 18:08:45	5.49	6.67	325.9	0.1	
6/16/11 18:09:00	5.53	6.68	329.6	0.1	
6/16/11 18:09:15	5.52	6.70	328.1	0.1	
6/16/11 18:09:30	5.48	6.71	324.1	0.1	
6/16/11 18:09:45	5.48	6.70	323.4	0.1	
6/16/11 18:10:00	5.52	6.67	325.6	0.1	
6/16/11 18:10:15	5.53	6.67	324.9	0.1	
6/16/11 18:10:30	5.50	6.69	321.1	0.1	
6/16/11 18:10:45	5.49	6.71	319.6	0.1	
6/16/11 18:11:00	5.49	6.73	318.1	0.1	
6/16/11 18:11:15	5.50	6.74	315.8	0.1	
6/16/11 18:11:30	5.48	6.74	313.1	0.1	
6/16/11 18:11:45	5.50	6.71	311.6	0.1	
6/16/11 18:12:00	5.52	6.70	309.8	0.1	
6/16/11 18:12:15	5.49	6.71	305.3	0.1	
6/16/11 18:12:30	5.49	6.71	302.5	0.1	
6/16/11 18:12:45	5.48	6.73	304.1	0.1	
6/16/11 18:13:00	5.50	6.74	307.3	0.1	
6/16/11 18:13:15	5.51	6.75	303.6	0.1	
6/16/11 18:13:30	5.50	6.75	294.6	0.1	
6/16/11 18:13:45	5.49	6.74	290.8	0.1	
6/16/11 18:14:00	5.48	6.72	289.0	0.1	
6/16/11 18:14:15	5.46	6.73	285.3	0.1	
6/16/11 18:14:30	5.44	6.74	282.0	0.1	
6/16/11 18:14:45	5.46	6.74	287.3	0.1	
6/16/11 18:15:00	5.48	6.75	297.8	0.1	
6/16/11 18:15:15	5.51	6.74	301.5	0.1	
6/16/11 18:15:30	5.49	6.75	300.5	0.0	
6/16/11 18:15:45	5.49	6.72	299.8	0.1	
6/16/11 18:16:00	5.50	6.71	299.0	0.1	
6/16/11 18:16:15	5.48	6.71	300.5	0.2	
6/16/11 18:16:30	5.49	6.73	295.8	0.1	
6/16/11 18:16:45	5.45	6.77	295.1	0.1	
6/16/11 18:17:00	5.48	6.76	300.3	0.1	
6/16/11 18:17:15	5.49	6.76	303.3	0.1	
6/16/11 18:17:30	5.49	6.75	306.6	0.1	
6/16/11 18:17:45	5.52	6.72	311.8	0.1	
6/16/11 18:18:00	5.55	6.70	309.3	0.1	
6/16/11 18:18:15	5.52	6.71	303.3	0.1	
6/16/11 18:18:30	5.48	6.73	300.5	0.1	
6/16/11 18:18:45	5.47	6.76	301.3	0.1	
6/16/11 18:19:00	5.49	6.77	301.0	0.1	
6/16/11 18:19:15	5.48	6.79	296.6	0.1	
6/16/11 18:19:30	5.45	6.79	296.1	0.0	
6/16/11 18:19:45	5.48	6.76	299.0	0.1	
6/16/11 18:20:00	5.51	6.72	298.8	0.1	

**Valero Port Arthur Refinery: Port Arthur, Texas**

**SRU 544 Incinerator Exhaust Stack**

**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 18:20:15	5.54	6.69	292.8	0.1	
6/16/11 18:20:30	5.53	6.70	291.3	0.0	
6/16/11 18:20:45	5.55	6.71	296.6	0.0	
6/16/11 18:21:00	5.55	6.74	298.2	0.0	
6/16/11 18:21:15	5.52	6.76	294.5	0.0	
6/16/11 18:21:30	5.50	6.76	287.4	0.0	
6/16/11 18:21:45	5.49	6.74	285.5	0.0	
6/16/11 18:22:00	5.50	6.70	285.9	0.0	
6/16/11 18:22:15	5.51	6.67	286.5	0.0	
6/16/11 18:22:30	5.50	6.67	289.5	0.0	
6/16/11 18:22:45	5.49	6.69	288.0	0.0	
6/16/11 18:23:00	5.47	6.73	291.8	0.0	
6/16/11 18:23:15	5.49	6.74	298.3	0.0	
6/16/11 18:23:30	5.51	6.75	303.1	0.1	
6/16/11 18:23:45	5.50	6.73	302.8	0.0	
6/16/11 18:24:00	5.50	6.71	296.6	0.0	
6/16/11 18:24:15	5.47	6.70	293.8	0.0	
6/16/11 18:24:30	5.45	6.69	294.6	0.0	
6/16/11 18:24:45	5.44	6.69	299.3	0.0	
6/16/11 18:25:00	5.45	6.71	307.6	0.0	
6/16/11 18:25:15	5.47	6.72	311.8	0.0	
6/16/11 18:25:30	5.47	6.74	318.1	0.0	
6/16/11 18:25:45	5.47	6.73	321.1	0.0	
6/16/11 18:26:00	5.50	6.71	319.6	0.0	
6/16/11 18:26:15	5.48	6.70	318.6	0.0	
6/16/11 18:26:30	5.49	6.68	317.1	0.0	
6/16/11 18:26:45	5.51	6.68	317.3	0.0	
6/16/11 18:27:00	5.50	6.69	324.1	0.0	
6/16/11 18:27:15	5.52	6.71	324.9	0.0	
6/16/11 18:27:30	5.51	6.72	321.6	0.0	
6/16/11 18:27:45	5.51	6.72	318.3	0.0	
6/16/11 18:28:00	5.49	6.72	314.6	0.0	
6/16/11 18:28:15	5.49	6.71	315.3	0.0	
6/16/11 18:28:30	5.52	6.69	313.1	0.0	
6/16/11 18:28:45	5.50	6.70	307.6	0.0	
6/16/11 18:29:00	5.49	6.71	308.1	0.0	
6/16/11 18:29:15	5.51	6.71	309.6	0.0	
6/16/11 18:29:30	5.50	6.72	306.1	0.0	
6/16/11 18:29:45	5.52	6.71	303.3	0.0	
6/16/11 18:30:00	5.49	6.71	299.5	0.0	
6/16/11 18:30:15	5.49	6.70	300.3	0.0	
6/16/11 18:30:30	5.48	6.70	299.0	0.0	
6/16/11 18:30:45	5.47	6.71	297.1	0.0	
6/16/11 18:31:00	5.46	6.73	292.5	0.0	
6/16/11 18:31:15	5.47	6.73	292.3	0.0	
6/16/11 18:31:30	5.46	6.73	299.0	0.0	
6/16/11 18:31:45	5.48	6.72	299.8	0.0	
6/16/11 18:32:00	5.46	6.71	298.6	0.0	
6/16/11 18:32:15	5.48	6.69	297.1	0.0	
6/16/11 18:32:30	5.50	6.68	298.1	0.0	
6/16/11 18:32:45	5.49	6.69	298.6	0.0	
6/16/11 18:33:00	5.47	6.72	299.1	0.0	
6/16/11 18:33:15	5.49	6.73	297.8	0.0	
6/16/11 18:33:30	5.48	6.74	297.1	0.0	
6/16/11 18:33:45	5.46	6.73	296.6	0.0	
6/16/11 18:34:00	5.48	6.70	300.0	0.0	
6/16/11 18:34:15	5.49	6.68	299.1	0.0	
6/16/11 18:34:30	5.47	6.67	296.1	0.0	
6/16/11 18:34:45	5.47	6.67	296.3	0.0	
6/16/11 18:35:00	5.47	6.69	299.5	0.0	
6/16/11 18:35:15	5.47	6.71	300.3	0.0	
6/16/11 18:35:30	5.45	6.74	306.1	0.0	
6/16/11 18:35:45	5.49	6.72	307.6	0.0	
6/16/11 18:36:00	5.50	6.70	307.6	0.0	
6/16/11 18:36:15	5.49	6.68	306.8	0.0	
6/16/11 18:36:30	5.50	6.65	301.6	0.0	
6/16/11 18:36:45	5.47	6.67	298.8	0.0	
6/16/11 18:37:00	5.46	6.68	302.6	0.0	
6/16/11 18:37:15	5.52	6.68	306.8	0.0	
6/16/11 18:37:30	5.51	6.72	306.1	0.0	
6/16/11 18:37:45	5.47	6.74	304.8	0.0	
6/16/11 18:38:00	5.46	6.74	302.1	0.0	
6/16/11 18:38:15	5.46	6.71	298.3	0.0	
6/16/11 18:38:30	5.45	6.69	297.1	0.1	
6/16/11 18:38:45	5.46	6.66	297.6	16.5	
6/16/11 18:39:00	5.48	6.64	260.5	27.5	
6/16/11 18:39:15	6.12	4.98	181.0	38.8	
6/16/11 18:39:30	6.29	1.69	61.4	33.6	
6/16/11 18:39:45	2.06	0.38	17.1	28.1	
6/16/11 18:40:00	0.38	0.16	1.3	27.3	
6/16/11 18:40:15	0.18	0.13	0.0	27.3	
6/16/11 18:40:30	0.15	0.12	-0.7	28.5	System Bias
6/16/11 18:40:45	0.14	0.11	-1.2	30.4	C <sub>3</sub> H <sub>8</sub> Bias 3 Low = 30.1
6/16/11 18:41:00	0.13	0.10	-0.7	30.7	O <sub>2</sub> Bias 3 Zero = 0.14
6/16/11 18:41:15	0.13	0.10	-0.2	30.8	CO <sub>2</sub> Bias 3 Zero = 0.11
					CO Bias 3 Zero = -0.7

**Valero Port Arthur Refinery: Port Arthur, Texas**

**SRU 544 Incinerator Exhaust Stack**

**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/16/11 18:41:30	0.12	0.10	-0.2	19.0	
6/16/11 18:41:45	0.12	0.10	13.3	28.2	
6/16/11 18:42:00	0.74	1.13	65.9	2.5	
6/16/11 18:42:15	1.51	1.53	119.8	0.6	
6/16/11 18:42:30	1.18	0.40	204.8	0.5	
6/16/11 18:42:45	1.23	0.13	240.4	0.5	
6/16/11 18:43:00	1.22	0.10	249.9	0.5	
6/16/11 18:43:15	1.24	0.09	250.4	0.5	
6/16/11 18:43:30	1.26	0.09	251.9	0.4	
6/16/11 18:43:45	1.27	0.09	252.4	0.4	System Bias
6/16/11 18:44:00	1.27	0.09	251.9	0.4	CO Bias 3 Mid = 251.6
6/16/11 18:44:15	1.27	0.08	250.7	0.4	C <sub>3</sub> H <sub>8</sub> Bias 3 Zero = 0.4
6/16/11 18:44:30	1.27	0.08	251.4	0.4	
6/16/11 18:44:45	1.27	0.08	252.2	0.4	
6/16/11 18:45:00	1.27	0.08	252.4	0.4	
6/16/11 18:45:15	1.27	0.08	252.4	0.2	
6/16/11 18:45:30	1.49	0.71	272.0	2.4	
6/16/11 18:45:45	3.14	3.21	274.5	0.3	
6/16/11 18:46:00	3.42	2.81	184.2	0.2	
6/16/11 18:46:15	4.16	3.12	104.3	0.2	
6/16/11 18:46:30	4.88	3.63	53.9	0.2	
6/16/11 18:46:45	5.02	3.84	46.6	0.2	
6/16/11 18:47:00	5.04	4.18	44.4	0.2	
6/16/11 18:47:15	5.03	4.30	43.9	0.3	
6/16/11 18:47:30	5.03	4.33	43.4	0.3	System Bias
6/16/11 18:47:45	5.03	4.34	42.9	0.3	O <sub>2</sub> Bias 3 Mid = 5.04
6/16/11 18:48:00	5.04	4.34	42.9	0.3	CO <sub>2</sub> Bias 3 Mid = 4.34
6/16/11 18:48:15	5.04	4.35	43.6	0.4	
6/16/11 18:48:30	5.04	4.35	57.4	0.3	
6/16/11 18:48:45	5.07	4.54	118.1	0.2	
6/16/11 18:49:00	5.30	5.75	242.9	0.1	
6/16/11 18:49:15	5.48	6.51	291.3	0.1	
6/16/11 18:49:30	5.49	6.67	300.5	0.0	
6/16/11 18:49:45	5.49	6.71	298.8	0.0	
6/16/11 18:50:00	5.50	6.71	294.5	0.0	
6/16/11 18:50:15	5.48	6.71	289.5	0.0	
6/16/11 18:50:30	5.47	6.70	284.5	0.0	
6/16/11 18:50:45	5.47	6.69	283.5	0.0	
6/16/11 18:51:00	5.46	6.69	279.5	0.0	
6/16/11 18:51:15	5.43	6.73	275.2	0.0	
6/16/11 18:51:30	5.40	6.75	279.0	0.0	
6/16/11 18:51:45	5.45	6.76	286.3	0.0	
6/16/11 18:52:00	5.47	6.76	289.0	0.0	
6/16/11 18:52:15	5.45	6.75	287.0	0.0	
6/16/11 18:52:30	5.46	6.72	283.0	0.0	
6/16/11 18:52:45	5.48	6.70	282.5	0.0	
6/16/11 18:53:00	5.49	6.69	286.0	0.0	
6/16/11 18:53:15	5.48	6.70	292.3	0.0	
6/16/11 18:53:30	5.50	6.72	296.1	0.0	
6/16/11 18:53:45	5.50	6.75	297.3	0.0	
6/16/11 18:54:00	5.48	6.77	297.6	0.0	
6/16/11 18:54:15	5.46	6.76	292.8	0.0	
6/16/11 18:54:30	5.45	6.74	287.5	0.0	
6/16/11 18:54:45	5.45	6.71	288.3	0.0	
6/16/11 18:55:00	5.46	6.69	286.5	0.0	
6/16/11 18:55:15	5.42	6.71	284.8	0.0	
6/16/11 18:55:30	5.43	6.72	288.5	0.0	
6/16/11 18:55:45	5.45	6.73	295.1	0.0	
6/16/11 18:56:00	5.47	6.74	300.0	0.0	
6/16/11 18:56:15	5.46	6.74	297.3	0.0	
6/16/11 18:56:30	5.43	6.74	295.1	0.0	
6/16/11 18:56:45	5.43	6.70	298.6	0.0	
6/16/11 18:57:00	5.45	6.67	309.1	0.0	
6/16/11 18:57:15	5.50	6.64	314.8	0.0	
6/16/11 18:57:30	5.50	6.65	319.1	0.0	
6/16/11 18:57:45	5.50	6.68	322.1	0.0	
6/16/11 18:58:00	5.49	6.71	322.6	0.0	
6/16/11 18:58:15	5.49	6.71	323.4	0.0	
6/16/11 18:58:30	5.50	6.70	325.1	0.0	
6/16/11 18:58:45	5.51	6.67	326.4	0.0	
6/16/11 18:59:00	5.52	6.65	328.1	0.0	
6/16/11 18:59:15	5.53	6.64	328.6	0.0	
6/16/11 18:59:30	5.54	6.66	327.1	0.0	
6/16/11 18:59:45	5.50	6.70	330.6	0.0	
6/16/11 19:00:00	5.53	6.72	336.1	0.0	
6/16/11 19:00:15	5.53	6.73	336.6	0.0	
6/16/11 19:00:30	5.52	6.73	335.6	0.0	
6/16/11 19:00:45	5.52	6.70	331.6	0.0	
6/16/11 19:01:00	5.51	6.69	323.6	0.0	
6/16/11 19:01:15	5.51	6.69	318.6	0.0	
6/16/11 19:01:30	5.50	6.71	315.6	0.0	
6/16/11 19:01:45	5.48	6.73	314.8	0.0	
6/16/11 19:02:00	5.49	6.75	315.6	0.0	
6/16/11 19:02:15	5.49	6.76	317.3	0.0	
6/16/11 19:02:30	5.51	6.76	316.6	0.0	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/17/11 6:40:00	5.59	6.62	324.4	0.0	
6/17/11 6:40:15	5.54	6.67	323.6	0.0	
6/17/11 6:40:30	5.56	6.67	326.4	0.0	
6/17/11 6:40:45	5.59	6.65	332.1	0.0	
6/17/11 6:41:00	5.62	6.62	327.6	0.0	
6/17/11 6:41:15	5.58	6.60	315.6	0.0	
6/17/11 6:41:30	5.56	6.59	311.8	0.0	
6/17/11 6:41:45	5.55	6.60	312.6	0.0	
6/17/11 6:42:00	5.54	6.63	314.1	0.0	
6/17/11 6:42:15	5.55	6.66	300.5	0.0	
6/17/11 6:42:30	5.39	6.01	210.1	0.0	
6/17/11 6:42:45	3.10	2.69	88.0	0.0	
6/17/11 6:43:00	0.73	0.51	21.8	0.0	
6/17/11 6:43:15	0.12	0.12	1.3	0.0	Calibration Error
6/17/11 6:43:30	0.06	0.09	-1.2	0.0	O <sub>2</sub> CE Zero = 0.06
6/17/11 6:43:45	0.05	0.08	-1.7	0.0	CO <sub>2</sub> CE Zero = 0.08
6/17/11 6:44:00	0.05	0.08	-1.2	0.0	CO CE Zero = -1.3
6/17/11 6:44:15	0.05	0.08	-1.2	0.0	
6/17/11 6:44:30	0.05	0.08	-1.5	0.0	
6/17/11 6:44:45	0.05	0.08	-1.7	0.0	
6/17/11 6:45:00	0.09	0.15	12.8	0.0	
6/17/11 6:45:15	2.91	2.53	48.4	0.0	
6/17/11 6:45:30	7.36	5.20	76.2	0.0	
6/17/11 6:45:45	9.47	7.35	85.5	0.0	
6/17/11 6:46:00	9.88	8.37	85.2	0.0	
6/17/11 6:46:15	9.92	8.57	85.5	0.0	Calibration Error
6/17/11 6:46:30	9.93	8.59	86.0	0.0	O <sub>2</sub> CE Span = 9.93
6/17/11 6:46:45	9.93	8.60	85.5	0.0	CO <sub>2</sub> CE Span = 8.60
6/17/11 6:47:00	9.93	8.61	84.5	0.0	
6/17/11 6:47:15	9.93	8.61	85.0	0.0	
6/17/11 6:47:30	9.92	8.58	77.5	0.0	
6/17/11 6:47:45	8.55	7.03	60.9	0.0	
6/17/11 6:48:00	5.91	4.92	47.4	0.0	
6/17/11 6:48:15	5.16	4.48	42.9	0.0	Calibration Error
6/17/11 6:48:30	5.11	4.46	42.9	0.0	O <sub>2</sub> CE Mid = 5.11
6/17/11 6:48:45	5.11	4.46	42.9	0.0	CO <sub>2</sub> CE Mid = 4.45
6/17/11 6:49:00	5.11	4.46	42.9	0.0	
6/17/11 6:49:15	5.11	4.44	42.4	0.0	
6/17/11 6:49:30	5.11	4.46	53.9	0.0	
6/17/11 6:49:45	5.24	4.40	138.6	0.2	
6/17/11 6:50:00	4.74	2.64	321.9	0.2	
6/17/11 6:50:15	2.88	0.54	460.0	0.2	
6/17/11 6:50:30	2.30	0.12	496.3	0.2	Calibration Error
6/17/11 6:50:45	2.34	0.08	502.6	0.2	CO CE Span = 502.0
6/17/11 6:51:00	2.37	0.08	502.9	0.2	
6/17/11 6:51:15	2.37	0.07	501.6	0.2	
6/17/11 6:51:30	2.37	0.07	500.8	0.2	
6/17/11 6:51:45	2.36	0.07	447.4	0.2	
6/17/11 6:52:00	1.93	0.07	343.4	0.2	
6/17/11 6:52:15	1.34	0.07	271.5	0.2	
6/17/11 6:52:30	1.24	0.07	255.4	0.2	Calibration Error
6/17/11 6:52:45	1.23	0.07	253.9	0.2	CO CE Mid = 254.3
6/17/11 6:53:00	1.23	0.07	254.7	0.2	
6/17/11 6:53:15	1.23	0.07	254.9	0.2	
6/17/11 6:53:30	1.23	0.07	253.7	0.2	
6/17/11 6:53:45	1.22	0.07	253.9	0.2	
6/17/11 6:54:00	1.24	0.16	263.0	0.2	
6/17/11 6:54:15	2.49	2.58	281.5	4.9	
6/17/11 6:54:30	4.55	5.28	292.3	4.6	
6/17/11 6:54:45	6.03	5.94	291.0	2.4	
6/17/11 6:55:00	7.64	5.07	255.2	0.6	
6/17/11 6:55:15	5.98	2.53	155.2	0.4	
6/17/11 6:55:30	1.85	0.61	55.4	0.4	Calibration Error
6/17/11 6:55:45	0.31	0.18	7.3	0.3	C <sub>3</sub> H <sub>8</sub> CE Zero = 0.3
6/17/11 6:56:00	0.16	0.14	0.5	0.4	
6/17/11 6:56:15	0.14	0.12	0.8	0.4	
6/17/11 6:56:30	0.13	0.12	0.5	0.3	
6/17/11 6:56:45	0.12	0.11	-0.2	4.1	
6/17/11 6:57:00	0.12	0.10	0.0	99.1	
6/17/11 6:57:15	0.12	0.10	0.8	93.0	
6/17/11 6:57:30	0.18	0.11	1.3	83.6	
6/17/11 6:57:45	0.22	0.10	0.3	83.7	
6/17/11 6:58:00	0.15	0.09	-0.7	84.9	
6/17/11 6:58:15	0.12	0.09	-0.2	86.2	
6/17/11 6:58:30	0.11	0.09	-0.2	90.5	Calibration Error
6/17/11 6:58:45	0.11	0.09	-0.2	90.2	C <sub>3</sub> H <sub>8</sub> CE Span = 89.6
6/17/11 6:59:00	0.11	0.08	-1.0	89.7	
6/17/11 6:59:15	0.11	0.08	-0.7	89.4	
6/17/11 6:59:30	0.11	0.08	-0.2	89.4	
6/17/11 6:59:45	0.10	0.08	-0.2	89.8	
6/17/11 7:00:00	0.10	0.08	-0.5	89.9	
6/17/11 7:00:15	0.10	0.08	-0.7	76.5	
6/17/11 7:00:30	0.10	0.08	-0.2	51.4	
6/17/11 7:00:45	0.10	0.07	-0.2	50.7	
6/17/11 7:01:00	0.10	0.07	-0.5	50.7	Calibration Error

**Valero Port Arthur Refinery: Port Arthur, Texas**

**SRU 544 Incinerator Exhaust Stack**

**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/17/11 7:01:15	0.10	0.07	-1.2	51.0	C <sub>3</sub> H <sub>8</sub> CE Mid = 51.0
6/17/11 7:01:30	0.10	0.07	-0.5	50.9	
6/17/11 7:01:45	0.10	0.07	-0.2	51.0	
6/17/11 7:02:00	0.10	0.07	-0.2	51.1	
6/17/11 7:02:15	0.10	0.07	-0.7	51.1	Calibration Error
6/17/11 7:02:30	0.10	0.07	-1.0	51.2	
6/17/11 7:02:45	0.10	0.07	-0.2	51.4	
6/17/11 7:03:00	0.10	0.07	-0.2	39.8	
6/17/11 7:03:15	0.10	0.07	-0.7	31.9	
6/17/11 7:03:30	0.10	0.07	-1.2	31.8	
6/17/11 7:03:45	0.10	0.07	-0.7	31.8	
6/17/11 7:04:00	0.10	0.07	-0.2	30.9	
6/17/11 7:04:15	0.10	0.07	-0.2	30.8	
6/17/11 7:04:30	0.10	0.07	-1.0	30.9	
6/17/11 7:04:45	0.10	0.08	-0.7	30.6	C <sub>3</sub> H <sub>8</sub> CE Low = 30.7
6/17/11 7:05:00	0.10	0.08	-0.2	30.6	
6/17/11 7:05:15	0.10	0.08	-0.2	30.9	
6/17/11 7:05:30	0.10	0.08	-0.5	30.9	
6/17/11 7:05:45	0.10	0.08	-1.2	31.0	System Bias
6/17/11 7:06:00	0.10	0.08	-0.2	31.2	
6/17/11 7:06:15	0.10	0.08	-0.2	21.3	
6/17/11 7:06:30	0.10	0.08	17.8	23.7	
6/17/11 7:06:45	0.55	0.89	54.9	3.5	
6/17/11 7:07:00	1.57	1.79	51.9	1.8	
6/17/11 7:07:15	0.63	0.53	21.3	1.8	
6/17/11 7:07:30	0.15	0.13	1.3	1.9	
6/17/11 7:07:45	0.10	0.09	-0.7	2.0	
6/17/11 7:08:00	0.10	0.08	-0.2	2.1	
6/17/11 7:08:15	0.10	0.08	-0.2	2.1	O <sub>2</sub> Bias 1 Zero = 0.10 CO <sub>2</sub> Bias 1 Zero = 0.08 CO Bias 1 Zero = -0.3
6/17/11 7:08:30	0.10	0.08	-0.2	2.2	
6/17/11 7:08:45	0.10	0.07	-0.2	2.3	
6/17/11 7:09:00	0.09	0.07	-1.2	2.5	
6/17/11 7:09:15	0.09	0.07	-0.7	5.2	System Bias
6/17/11 7:09:30	0.09	0.07	2.3	4.2	
6/17/11 7:09:45	0.24	0.30	12.8	2.8	
6/17/11 7:10:00	2.31	2.27	32.6	2.9	
6/17/11 7:10:15	4.39	3.81	39.9	3.0	
6/17/11 7:10:30	4.97	4.19	43.1	3.1	
6/17/11 7:10:45	5.03	4.29	43.9	3.2	
6/17/11 7:11:00	5.04	4.33	42.9	3.2	
6/17/11 7:11:15	5.04	4.35	42.9	3.3	
6/17/11 7:11:30	5.04	4.35	42.9	3.4	
6/17/11 7:11:45	5.05	4.36	43.4	3.4	System Bias
6/17/11 7:12:00	5.05	4.36	50.6	3.2	
6/17/11 7:12:15	5.06	4.45	84.5	3.8	
6/17/11 7:12:30	5.21	5.01	138.1	2.8	
6/17/11 7:12:45	4.33	3.43	179.2	2.9	
6/17/11 7:13:00	2.19	0.95	231.6	3.1	
6/17/11 7:13:15	1.37	0.22	246.9	3.2	
6/17/11 7:13:30	1.29	0.13	250.7	3.3	
6/17/11 7:13:45	1.28	0.11	251.4	3.3	
6/17/11 7:14:00	1.27	0.10	252.4	3.3	CO Bias 1 Mid = 251.7
6/17/11 7:14:15	1.27	0.10	252.4	3.3	
6/17/11 7:14:30	1.27	0.09	251.4	3.2	
6/17/11 7:14:45	1.27	0.09	251.4	3.1	
6/17/11 7:15:00	1.27	0.09	252.9	2.7	System Bias
6/17/11 7:15:15	1.28	0.17	259.9	2.1	
6/17/11 7:15:30	2.44	2.48	284.0	1.5	
6/17/11 7:15:45	4.44	5.17	293.0	1.2	
6/17/11 7:16:00	5.36	6.40	293.0	1.0	
6/17/11 7:16:15	5.52	6.57	291.0	0.9	
6/17/11 7:16:30	5.53	6.59	289.5	0.8	
6/17/11 7:16:45	5.53	6.60	288.5	0.7	
6/17/11 7:17:00	5.52	6.62	287.5	0.7	
6/17/11 7:17:15	5.53	6.65	288.0	0.6	
6/17/11 7:17:30	5.51	6.68	287.3	0.6	System Bias
6/17/11 7:17:45	5.50	6.67	285.0	0.6	
6/17/11 7:18:00	5.50	6.66	283.0	0.6	
6/17/11 7:18:15	5.50	6.64	286.5	0.6	
6/17/11 7:18:30	5.52	6.61	293.3	0.6	
6/17/11 7:18:45	5.53	6.60	296.1	0.5	
6/17/11 7:19:00	5.55	6.60	295.8	0.5	
6/17/11 7:19:15	5.55	6.62	298.0	0.5	
6/17/11 7:19:30	5.55	6.65	300.8	0.5	
6/17/11 7:19:45	5.53	6.66	303.1	0.5	
6/17/11 7:20:00	5.53	6.65	308.6	0.5	System Bias
6/17/11 7:20:15	5.56	6.63	313.6	0.5	
6/17/11 7:20:30	5.57	6.60	317.8	0.5	
6/17/11 7:20:45	5.57	6.59	320.1	0.4	
6/17/11 7:21:00	5.58	6.58	326.4	0.5	
6/17/11 7:21:15	5.60	6.58	330.6	0.4	
6/17/11 7:21:30	5.62	6.59	339.1	0.4	
6/17/11 7:21:45	5.64	6.60	339.6	0.4	
6/17/11 7:22:00	5.63	6.62	336.1	0.4	
6/17/11 7:22:15	5.62	6.60	333.6	0.4	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/17/11 7:22:30	5.60	6.59	333.4	0.4	
6/17/11 7:22:45	5.62	6.57	331.6	0.3	
6/17/11 7:23:00	5.61	6.57	328.1	0.3	
6/17/11 7:23:15	5.62	6.57	325.6	0.4	
6/17/11 7:23:30	5.60	6.60	321.1	0.3	
6/17/11 7:23:45	5.58	6.63	319.1	0.4	
6/17/11 7:24:00	5.57	6.65	316.8	0.4	
6/17/11 7:24:15	5.56	6.65	313.1	0.4	
6/17/11 7:24:30	5.55	6.63	307.1	0.4	
6/17/11 7:24:45	5.54	6.61	306.6	0.4	
6/17/11 7:25:00	5.55	6.59	309.6	0.4	
6/17/11 7:25:15	5.58	6.58	311.1	0.4	
6/17/11 7:25:30	5.58	6.60	322.1	0.4	
6/17/11 7:25:45	5.64	6.60	327.1	0.4	
6/17/11 7:26:00	5.64	6.63	322.1	0.4	
6/17/11 7:26:15	5.58	6.66	314.1	0.4	
6/17/11 7:26:30	5.55	6.66	303.8	0.4	
6/17/11 7:26:45	5.53	6.65	302.0	0.4	
6/17/11 7:27:00	5.54	6.63	309.1	0.5	
6/17/11 7:27:15	5.58	6.60	313.6	0.5	
6/17/11 7:27:30	5.59	6.61	310.1	0.4	
6/17/11 7:27:45	5.56	6.64	308.1	0.5	
6/17/11 7:28:00	5.56	6.66	305.1	0.5	Start 544SRU-15-3
6/17/11 7:28:15	5.55	6.67	302.6	0.5	Start 544SRU-0010-3
6/17/11 7:28:30	5.55	6.67	301.0	0.4	
6/17/11 7:28:45	5.56	6.65	303.1	0.5	
6/17/11 7:29:00	5.57	6.62	301.5	0.5	
6/17/11 7:29:15	5.57	6.61	303.1	0.5	
6/17/11 7:29:30	5.54	6.61	311.1	0.5	
6/17/11 7:29:45	5.58	6.61	316.1	0.6	
6/17/11 7:30:00	5.62	6.62	312.3	0.5	
6/17/11 7:30:15	5.60	6.65	306.1	0.5	
6/17/11 7:30:30	5.54	6.67	300.8	0.5	
6/17/11 7:30:45	5.50	6.67	303.6	0.6	
6/17/11 7:31:00	5.57	6.63	306.3	0.4	
6/17/11 7:31:15	5.55	6.64	306.1	0.5	
6/17/11 7:31:30	5.55	6.63	310.1	0.5	
6/17/11 7:31:45	5.59	6.63	311.1	0.8	
6/17/11 7:32:00	5.60	6.65	308.1	0.7	
6/17/11 7:32:15	5.60	6.65	305.1	0.7	
6/17/11 7:32:30	5.62	6.66	297.8	0.6	
6/17/11 7:32:45	5.58	6.67	295.6	0.5	
6/17/11 7:33:00	5.59	6.64	300.0	0.5	
6/17/11 7:33:15	5.62	6.63	300.0	0.5	
6/17/11 7:33:30	5.59	6.64	294.8	0.4	
6/17/11 7:33:45	5.58	6.64	297.6	0.3	
6/17/11 7:34:00	5.59	6.64	300.8	0.4	
6/17/11 7:34:15	5.59	6.65	296.0	0.3	
6/17/11 7:34:30	5.54	6.67	293.3	0.3	
6/17/11 7:34:45	5.58	6.64	297.1	0.3	
6/17/11 7:35:00	5.59	6.62	297.8	0.3	
6/17/11 7:35:15	5.57	6.63	293.5	0.3	
6/17/11 7:35:30	5.53	6.64	289.8	0.3	
6/17/11 7:35:45	5.55	6.65	290.5	0.3	
6/17/11 7:36:00	5.55	6.67	293.8	0.3	
6/17/11 7:36:15	5.54	6.68	300.6	0.3	
6/17/11 7:36:30	5.56	6.67	308.1	0.2	
6/17/11 7:36:45	5.57	6.66	310.1	0.2	
6/17/11 7:37:00	5.61	6.63	313.1	0.3	
6/17/11 7:37:15	5.61	6.61	316.6	0.3	
6/17/11 7:37:30	5.61	6.61	323.4	0.2	
6/17/11 7:37:45	5.62	6.61	327.6	0.2	
6/17/11 7:38:00	5.63	6.62	330.4	0.2	
6/17/11 7:38:15	5.63	6.64	328.6	0.2	
6/17/11 7:38:30	5.60	6.66	326.9	0.2	
6/17/11 7:38:45	5.60	6.65	323.1	0.2	
6/17/11 7:39:00	5.60	6.63	319.4	0.2	
6/17/11 7:39:15	5.62	6.60	318.1	0.2	
6/17/11 7:39:30	5.62	6.59	312.3	0.2	
6/17/11 7:39:45	5.57	6.62	306.1	0.2	
6/17/11 7:40:00	5.55	6.64	302.8	0.2	
6/17/11 7:40:15	5.57	6.66	304.6	0.3	
6/17/11 7:40:30	5.58	6.67	307.8	0.2	
6/17/11 7:40:45	5.57	6.69	307.6	0.2	
6/17/11 7:41:00	5.57	6.67	301.8	0.3	
6/17/11 7:41:15	5.57	6.65	298.5	0.2	
6/17/11 7:41:30	5.57	6.64	294.0	0.2	
6/17/11 7:41:45	5.55	6.64	293.0	0.2	
6/17/11 7:42:00	5.54	6.65	293.5	0.2	
6/17/11 7:42:15	5.53	6.67	294.6	0.2	
6/17/11 7:42:30	5.56	6.68	298.8	0.2	
6/17/11 7:42:45	5.56	6.69	298.5	0.2	
6/17/11 7:43:00	5.55	6.69	294.3	0.2	
6/17/11 7:43:15	5.53	6.68	293.0	0.3	
6/17/11 7:43:30	5.57	6.64	293.8	0.2	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/17/11 7:43:45	5.57	6.62	295.6	0.2	
6/17/11 7:44:00	5.56	6.63	300.0	0.2	
6/17/11 7:44:15	5.55	6.65	302.0	0.2	
6/17/11 7:44:30	5.54	6.68	306.3	0.2	
6/17/11 7:44:45	5.56	6.69	309.1	0.1	
6/17/11 7:45:00	5.55	6.70	310.3	0.2	
6/17/11 7:45:15	5.56	6.69	314.6	0.1	
6/17/11 7:45:30	5.61	6.65	318.8	0.1	
6/17/11 7:45:45	5.60	6.63	319.6	0.2	
6/17/11 7:46:00	5.60	6.63	319.9	0.2	
6/17/11 7:46:15	5.57	6.66	322.1	0.2	
6/17/11 7:46:30	5.58	6.67	324.9	0.3	
6/17/11 7:46:45	5.60	6.68	326.6	0.2	
6/17/11 7:47:00	5.62	6.67	327.4	0.1	
6/17/11 7:47:15	5.59	6.69	327.1	0.1	
6/17/11 7:47:30	5.61	6.66	330.6	0.1	
6/17/11 7:47:45	5.62	6.64	334.6	0.2	
6/17/11 7:48:00	5.65	6.63	336.9	0.2	
6/17/11 7:48:15	5.63	6.65	336.6	0.1	
6/17/11 7:48:30	5.63	6.66	332.1	0.1	
6/17/11 7:48:45	5.60	6.69	329.6	0.2	
6/17/11 7:49:00	5.61	6.68	327.4	0.2	
6/17/11 7:49:15	5.62	6.67	326.1	0.2	
6/17/11 7:49:30	5.62	6.66	324.6	0.2	
6/17/11 7:49:45	5.59	6.66	318.6	0.2	
6/17/11 7:50:00	5.56	6.68	310.6	0.2	
6/17/11 7:50:15	5.56	6.68	313.1	0.2	
6/17/11 7:50:30	5.59	6.68	321.1	0.2	
6/17/11 7:50:45	5.60	6.68	322.1	0.3	
6/17/11 7:51:00	5.60	6.69	314.3	0.3	
6/17/11 7:51:15	5.58	6.70	311.1	0.3	
6/17/11 7:51:30	5.57	6.69	315.8	0.3	
6/17/11 7:51:45	5.58	6.68	316.1	0.3	
6/17/11 7:52:00	5.59	6.68	310.6	0.3	
6/17/11 7:52:15	5.56	6.72	306.5	0.8	
6/17/11 7:52:30	5.54	6.74	308.1	0.6	
6/17/11 7:52:45	5.57	6.74	310.1	0.5	
6/17/11 7:53:00	5.59	6.74	309.8	0.5	
6/17/11 7:53:15	5.57	6.73	305.7	0.5	
6/17/11 7:53:30	5.57	6.71	300.8	0.5	
6/17/11 7:53:45	5.57	6.69	297.3	0.5	
6/17/11 7:54:00	5.57	6.69	298.6	0.5	
6/17/11 7:54:15	5.58	6.69	304.7	0.5	
6/17/11 7:54:30	5.62	6.69	309.1	0.5	
6/17/11 7:54:45	5.61	6.72	310.6	0.5	
6/17/11 7:55:00	5.57	6.74	312.8	0.5	
6/17/11 7:55:15	5.60	6.71	310.6	0.5	
6/17/11 7:55:30	5.60	6.70	303.8	0.5	
6/17/11 7:55:45	5.58	6.67	300.8	0.5	
6/17/11 7:56:00	5.60	6.64	299.8	0.5	
6/17/11 7:56:15	5.57	6.66	295.3	0.5	
6/17/11 7:56:30	5.56	6.69	293.8	0.5	
6/17/11 7:56:45	5.56	6.71	298.3	0.4	
6/17/11 7:57:00	5.58	6.72	303.3	0.4	
6/17/11 7:57:15	5.60	6.73	299.5	0.4	
6/17/11 7:57:30	5.54	6.73	293.0	0.4	
6/17/11 7:57:45	5.52	6.71	293.0	0.4	
6/17/11 7:58:00	5.54	6.67	298.3	0.3	
6/17/11 7:58:15	5.58	6.64	303.6	0.4	
6/17/11 7:58:30	5.57	6.65	308.8	0.4	
6/17/11 7:58:45	5.60	6.65	316.3	0.3	
6/17/11 7:59:00	5.63	6.66	315.6	0.4	
6/17/11 7:59:15	5.60	6.69	311.1	0.3	
6/17/11 7:59:30	5.58	6.69	312.3	0.3	
6/17/11 7:59:45	5.60	6.67	314.6	0.3	
6/17/11 8:00:00	5.58	6.66	309.8	0.3	
6/17/11 8:00:15	5.56	6.65	308.3	0.3	
6/17/11 8:00:30	5.57	6.64	312.6	0.3	
6/17/11 8:00:45	5.59	6.64	311.8	0.4	
6/17/11 8:01:00	5.56	6.67	309.1	0.3	
6/17/11 8:01:15	5.54	6.68	309.1	0.3	
6/17/11 8:01:30	5.56	6.67	314.1	0.3	
6/17/11 8:01:45	5.57	6.66	317.8	0.3	
6/17/11 8:02:00	5.59	6.64	323.4	0.3	
6/17/11 8:02:15	5.61	6.63	326.4	0.3	
6/17/11 8:02:30	5.59	6.64	325.1	0.3	
6/17/11 8:02:45	5.59	6.64	322.1	0.3	
6/17/11 8:03:00	5.57	6.66	318.1	0.3	
6/17/11 8:03:15	5.56	6.68	317.3	0.3	
6/17/11 8:03:30	5.57	6.67	322.4	0.3	
6/17/11 8:03:45	5.57	6.66	326.1	0.3	
6/17/11 8:04:00	5.56	6.66	326.1	0.3	
6/17/11 8:04:15	5.55	6.65	329.1	0.3	
6/17/11 8:04:30	5.58	6.65	331.9	0.3	
6/17/11 8:04:45	5.60	6.65	334.1	0.3	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/17/11 8:05:00	5.61	6.66	336.1	0.3	
6/17/11 8:05:15	5.59	6.69	331.6	0.3	
6/17/11 8:05:30	5.54	6.71	326.9	0.3	
6/17/11 8:05:45	5.53	6.70	324.6	0.3	
6/17/11 8:06:00	5.54	6.68	325.9	0.3	
6/17/11 8:06:15	5.56	6.67	329.6	0.3	
6/17/11 8:06:30	5.57	6.66	334.1	0.3	
6/17/11 8:06:45	5.62	6.65	336.4	0.3	
6/17/11 8:07:00	5.61	6.67	334.1	0.3	
6/17/11 8:07:15	5.58	6.69	329.6	0.3	
6/17/11 8:07:30	5.59	6.70	322.1	0.3	
6/17/11 8:07:45	5.55	6.71	313.8	0.3	
6/17/11 8:08:00	5.53	6.70	310.3	0.3	
6/17/11 8:08:15	5.54	6.67	310.3	0.3	
6/17/11 8:08:30	5.54	6.66	309.3	0.3	
6/17/11 8:08:45	5.53	6.68	300.3	0.3	
6/17/11 8:09:00	5.51	6.70	294.8	0.3	
6/17/11 8:09:15	5.51	6.72	299.3	0.3	
6/17/11 8:09:30	5.50	6.72	306.3	0.3	
6/17/11 8:09:45	5.52	6.69	316.1	0.3	
6/17/11 8:10:00	5.61	6.64	320.9	0.3	
6/17/11 8:10:15	5.60	6.62	320.9	0.3	
6/17/11 8:10:30	5.60	6.62	318.1	0.3	
6/17/11 8:10:45	5.56	6.63	316.6	0.3	
6/17/11 8:11:00	5.56	6.65	314.6	0.3	
6/17/11 8:11:15	5.55	6.68	309.3	0.3	
6/17/11 8:11:30	5.52	6.70	309.3	0.3	
6/17/11 8:11:45	5.54	6.69	313.1	0.3	
6/17/11 8:12:00	5.57	6.66	312.3	0.3	
6/17/11 8:12:15	5.57	6.64	311.6	0.3	
6/17/11 8:12:30	5.60	6.61	313.3	0.3	
6/17/11 8:12:45	5.60	6.60	315.6	0.3	
6/17/11 8:13:00	5.60	6.62	314.6	0.3	
6/17/11 8:13:15	5.59	6.65	314.6	0.2	
6/17/11 8:13:30	5.61	6.66	317.6	0.3	
6/17/11 8:13:45	5.58	6.68	325.1	0.3	
6/17/11 8:14:00	5.63	6.64	326.4	0.3	
6/17/11 8:14:15	5.63	6.64	318.1	0.2	
6/17/11 8:14:30	5.56	6.64	313.6	0.2	
6/17/11 8:14:45	5.58	6.63	315.1	0.3	
6/17/11 8:15:00	5.59	6.63	318.6	0.2	
6/17/11 8:15:15	5.61	6.65	324.6	0.2	
6/17/11 8:15:30	5.63	6.66	326.1	0.2	
6/17/11 8:15:45	5.64	6.67	324.6	0.2	
6/17/11 8:16:00	5.64	6.66	325.4	0.2	
6/17/11 8:16:15	5.61	6.65	323.9	0.2	
6/17/11 8:16:30	5.60	6.62	318.6	0.2	
6/17/11 8:16:45	5.61	6.61	310.3	0.2	
6/17/11 8:17:00	5.58	6.62	303.6	0.2	
6/17/11 8:17:15	5.56	6.64	305.1	0.2	
6/17/11 8:17:30	5.59	6.65	308.3	0.2	
6/17/11 8:17:45	5.59	6.67	305.3	0.2	
6/17/11 8:18:00	5.57	6.68	301.3	0.3	
6/17/11 8:18:15	5.56	6.68	301.3	0.3	
6/17/11 8:18:30	5.58	6.65	300.8	0.2	
6/17/11 8:18:45	5.59	6.63	297.1	0.3	
6/17/11 8:19:00	5.57	6.63	294.6	0.2	
6/17/11 8:19:15	5.56	6.64	296.8	0.2	
6/17/11 8:19:30	5.55	6.65	302.6	0.2	
6/17/11 8:19:45	5.57	6.66	307.8	0.2	
6/17/11 8:20:00	5.58	6.66	308.3	0.2	
6/17/11 8:20:15	5.58	6.65	305.3	0.2	
6/17/11 8:20:30	5.55	6.66	298.8	0.2	
6/17/11 8:20:45	5.54	6.65	298.8	0.2	
6/17/11 8:21:00	5.56	6.64	305.3	0.2	
6/17/11 8:21:15	5.57	6.64	307.6	0.2	
6/17/11 8:21:30	5.56	6.65	310.6	0.2	
6/17/11 8:21:45	5.58	6.64	316.6	0.2	
6/17/11 8:22:00	5.59	6.64	320.9	0.2	
6/17/11 8:22:15	5.57	6.64	322.4	0.2	
6/17/11 8:22:30	5.61	6.61	323.9	0.2	
6/17/11 8:22:45	5.63	6.60	324.6	0.2	
6/17/11 8:23:00	5.61	6.60	324.9	0.2	
6/17/11 8:23:15	5.62	6.61	327.9	0.2	
6/17/11 8:23:30	5.64	6.62	330.9	0.2	
6/17/11 8:23:45	5.64	6.64	333.1	0.2	
6/17/11 8:24:00	5.62	6.65	334.4	0.2	
6/17/11 8:24:15	5.60	6.65	332.9	0.2	
6/17/11 8:24:30	5.60	6.63	329.1	0.2	
6/17/11 8:24:45	5.60	6.62	326.1	0.2	
6/17/11 8:25:00	5.60	6.63	326.6	0.2	
6/17/11 8:25:15	5.59	6.64	333.4	0.2	
6/17/11 8:25:30	5.61	6.65	337.9	0.2	
6/17/11 8:25:45	5.61	6.68	337.1	0.1	
6/17/11 8:26:00	5.59	6.70	335.9	0.1	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/17/11 8:26:15	5.58	6.69	336.6	0.1	
6/17/11 8:26:30	5.58	6.66	331.1	0.1	
6/17/11 8:26:45	5.55	6.66	321.4	0.1	
6/17/11 8:27:00	5.56	6.64	316.3	0.1	
6/17/11 8:27:15	5.55	6.65	314.8	0.1	
6/17/11 8:27:30	5.54	6.68	317.3	0.1	
6/17/11 8:27:45	5.55	6.70	322.6	0.1	
6/17/11 8:28:00	5.58	6.70	326.6	0.1	
6/17/11 8:28:15	5.58	6.71	327.4	0.1	
6/17/11 8:28:30	5.59	6.68	328.1	0.1	
6/17/11 8:28:45	5.61	6.65	323.6	0.1	
6/17/11 8:29:00	5.59	6.64	318.1	0.1	
6/17/11 8:29:15	5.57	6.65	317.3	0.1	
6/17/11 8:29:30	5.57	6.66	317.1	0.1	
6/17/11 8:29:45	5.57	6.69	314.8	0.1	
6/17/11 8:30:00	5.58	6.71	314.6	0.1	
6/17/11 8:30:15	5.58	6.72	313.8	0.1	
6/17/11 8:30:30	5.56	6.72	310.1	0.1	
6/17/11 8:30:45	5.56	6.71	309.3	0.1	
6/17/11 8:31:00	5.60	6.67	311.6	0.1	
6/17/11 8:31:15	5.63	6.65	312.3	0.1	
6/17/11 8:31:30	5.65	6.64	313.1	0.1	
6/17/11 8:31:45	5.63	6.66	311.6	0.1	
6/17/11 8:32:00	5.62	6.68	314.8	0.1	
6/17/11 8:32:15	5.66	6.67	320.1	0.1	
6/17/11 8:32:30	5.67	6.67	316.3	0.1	
6/17/11 8:32:45	5.60	6.69	308.8	0.1	
6/17/11 8:33:00	5.58	6.67	301.3	0.1	
6/17/11 8:33:15	5.58	6.65	295.3	0.1	
6/17/11 8:33:30	5.55	6.66	299.1	0.1	
6/17/11 8:33:45	5.56	6.66	307.3	0.1	
6/17/11 8:34:00	5.58	6.68	313.1	0.1	
6/17/11 8:34:15	5.59	6.69	314.6	0.4	
6/17/11 8:34:30	5.59	6.69	319.8	0.3	
6/17/11 8:34:45	5.66	6.65	325.1	0.2	
6/17/11 8:35:00	5.66	6.64	323.1	0.2	
6/17/11 8:35:15	5.63	6.64	320.1	0.1	
6/17/11 8:35:30	5.63	6.63	314.6	0.2	
6/17/11 8:35:45	5.61	6.65	311.6	0.2	
6/17/11 8:36:00	5.57	6.67	310.6	0.1	
6/17/11 8:36:15	5.57	6.68	310.6	0.1	
6/17/11 8:36:30	5.59	6.67	311.8	0.1	
6/17/11 8:36:45	5.60	6.66	314.8	0.1	
6/17/11 8:37:00	5.61	6.64	318.6	0.1	
6/17/11 8:37:15	5.63	6.63	319.4	0.1	
6/17/11 8:37:30	5.63	6.62	321.9	0.1	
6/17/11 8:37:45	5.63	6.63	321.1	0.2	
6/17/11 8:38:00	5.61	6.64	319.1	0.2	
6/17/11 8:38:15	5.62	6.66	316.8	0.2	
6/17/11 8:38:30	5.59	6.67	314.1	0.2	
6/17/11 8:38:45	5.57	6.68	302.8	0.2	
6/17/11 8:39:00	5.53	6.68	296.6	0.1	
6/17/11 8:39:15	5.55	6.67	299.5	0.3	
6/17/11 8:39:30	5.56	6.66	307.6	0.2	
6/17/11 8:39:45	5.59	6.65	310.6	0.3	
6/17/11 8:40:00	5.59	6.66	312.1	0.2	
6/17/11 8:40:15	5.61	6.67	314.3	0.3	
6/17/11 8:40:30	5.60	6.67	315.9	0.3	
6/17/11 8:40:45	5.60	6.65	315.1	0.3	
6/17/11 8:41:00	5.59	6.64	306.3	0.3	
6/17/11 8:41:15	5.58	6.64	296.6	0.3	
6/17/11 8:41:30	5.51	6.67	286.8	0.3	
6/17/11 8:41:45	5.49	6.67	289.3	0.3	
6/17/11 8:42:00	5.53	6.67	299.9	0.3	
6/17/11 8:42:15	5.58	6.66	306.6	0.4	
6/17/11 8:42:30	5.60	6.66	305.6	0.4	
6/17/11 8:42:45	5.55	6.68	303.1	0.4	
6/17/11 8:43:00	5.55	6.65	307.6	0.4	
6/17/11 8:43:15	5.59	6.61	310.3	0.4	
6/17/11 8:43:30	5.61	6.59	308.6	0.4	
6/17/11 8:43:45	5.60	6.59	310.1	0.4	
6/17/11 8:44:00	5.60	6.60	315.6	0.4	
6/17/11 8:44:15	5.62	6.62	318.1	0.5	
6/17/11 8:44:30	5.62	6.65	319.6	0.4	
6/17/11 8:44:45	5.61	6.65	319.6	0.5	
6/17/11 8:45:00	5.60	6.64	315.6	0.5	
6/17/11 8:45:15	5.60	6.62	310.6	0.5	
6/17/11 8:45:30	5.60	6.60	305.1	0.5	
6/17/11 8:45:45	5.58	6.61	305.3	0.5	
6/17/11 8:46:00	5.57	6.62	307.1	0.5	
6/17/11 8:46:15	5.58	6.64	309.8	0.5	
6/17/11 8:46:30	5.57	6.66	312.1	0.5	
6/17/11 8:46:45	5.58	6.67	310.8	0.4	
6/17/11 8:47:00	5.57	6.67	315.1	0.4	
6/17/11 8:47:15	5.60	6.64	318.1	0.4	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/17/11 8:47:30	5.60	6.61	321.1	0.3	
6/17/11 8:47:45	5.61	6.58	321.6	0.4	
6/17/11 8:48:00	5.62	6.59	322.6	0.4	
6/17/11 8:48:15	5.61	6.62	325.1	0.3	
6/17/11 8:48:30	5.61	6.64	323.6	0.3	
6/17/11 8:48:45	5.59	6.67	317.8	0.3	
6/17/11 8:49:00	5.56	6.69	317.1	0.3	
6/17/11 8:49:15	5.57	6.68	314.6	0.3	
6/17/11 8:49:30	5.55	6.67	308.1	0.3	
6/17/11 8:49:45	5.54	6.67	308.3	0.3	
6/17/11 8:50:00	5.54	6.66	311.6	0.2	
6/17/11 8:50:15	5.53	6.67	314.1	0.3	
6/17/11 8:50:30	5.54	6.67	316.1	0.3	
6/17/11 8:50:45	5.54	6.69	318.1	0.3	
6/17/11 8:51:00	5.56	6.68	317.6	0.3	
6/17/11 8:51:15	5.56	6.68	316.8	0.3	
6/17/11 8:51:30	5.54	6.66	311.6	0.2	
6/17/11 8:51:45	5.53	6.67	314.1	0.3	
6/17/11 8:52:00	5.54	6.67	316.1	0.3	
6/17/11 8:52:15	5.54	6.69	318.1	0.3	
6/17/11 8:52:30	5.56	6.68	317.6	0.3	
6/17/11 8:52:45	5.56	6.68	316.8	0.9	
6/17/11 8:53:00	5.57	6.66	313.6	1.0	
6/17/11 8:53:15	5.55	6.67	310.3	1.0	
6/17/11 8:53:30	5.57	6.66	312.1	0.9	
6/17/11 8:53:45	5.58	6.67	310.8	1.6	
6/17/11 8:54:00	5.57	6.67	315.1	0.8	
6/17/11 8:54:15	5.60	6.64	318.1	0.5	
6/17/11 8:54:30	5.60	6.61	321.1	0.5	
6/17/11 8:54:45	5.61	6.58	321.6	0.5	
6/17/11 8:55:00	5.62	6.59	322.6	0.5	
6/17/11 8:55:15	5.61	6.62	325.1	0.5	
6/17/11 8:55:30	5.61	6.64	323.6	0.5	
6/17/11 8:55:45	5.59	6.67	317.8	0.5	
6/17/11 8:56:00	5.56	6.69	317.1	0.4	
6/17/11 8:56:15	5.57	6.68	314.6	0.5	
6/17/11 8:56:30	5.55	6.67	308.1	0.5	
6/17/11 8:56:45	5.54	6.67	308.3	0.6	
6/17/11 8:57:00	5.54	6.66	311.6	0.5	
6/17/11 8:57:15	5.53	6.67	314.1	0.5	
6/17/11 8:57:30	5.54	6.67	316.1	0.4	
6/17/11 8:57:45	5.56	6.68	317.6	0.3	
6/17/11 8:58:00	5.56	6.68	316.8	0.3	
6/17/11 8:58:15	5.57	6.66	313.6	0.8	
6/17/11 8:58:30	5.57	6.68	314.6	0.5	
6/17/11 8:58:45	5.55	6.67	310.3	0.3	
6/17/11 8:59:00	5.52	6.67	304.6	0.4	
6/17/11 8:59:15	5.52	6.68	305.8	0.6	
6/17/11 8:59:30	5.56	6.68	317.6	0.9	
6/17/11 8:59:45	5.59	6.79	285.5	0.9	
6/17/11 9:00:00	5.59	6.77	280.0	0.7	
6/17/11 9:00:15	5.56	6.77	281.5	0.5	
6/17/11 9:00:30	5.58	6.75	289.5	0.5	
6/17/11 9:00:45	5.61	6.74	289.8	0.5	
6/17/11 9:01:00	5.60	6.76	281.5	0.5	
6/17/11 9:01:15	5.55	6.81	273.0	0.5	
6/17/11 9:01:30	5.50	6.83	273.0	0.5	
6/17/11 9:01:45	5.53	6.81	280.8	0.5	
6/17/11 9:02:00	5.58	6.77	291.0	0.4	
6/17/11 9:02:15	5.61	6.75	294.0	0.5	
6/17/11 9:02:30	5.61	6.74	297.5	0.5	
6/17/11 9:02:45	5.60	6.76	308.8	0.5	
6/17/11 9:03:00	5.63	6.75	315.6	0.4	
6/17/11 9:03:15	5.62	6.77	306.8	0.4	
6/17/11 9:03:30	5.56	6.80	298.1	0.4	
6/17/11 9:03:45	5.56	6.79	297.6	0.5	
6/17/11 9:04:00	5.55	6.78	294.6	0.5	
6/17/11 9:04:15	5.53	6.75	288.5	0.3	
6/17/11 9:04:30	5.53	6.77	292.5	0.3	
6/17/11 9:04:45	5.54	6.79	292.0	0.2	
6/17/11 9:05:00	5.53	6.81	299.6	0.2	
6/17/11 9:05:15	5.56	6.81	307.3	0.2	
6/17/11 9:05:30	5.63	6.79	298.6	0.3	
6/17/11 9:05:45	5.52	6.83	288.3	0.3	
6/17/11 9:06:00	5.42	6.86	286.0	0.2	
6/17/11 9:06:15	5.49	6.82	291.3	0.2	
6/17/11 9:06:30	5.53	6.77	295.1	0.3	
6/17/11 9:06:45	5.52	6.77	293.0	0.2	
6/17/11 9:07:00	5.55	6.76	297.0	0.2	
6/17/11 9:07:15	5.56	6.78	306.6	0.2	
6/17/11 9:07:30	5.61	6.78	314.6	0.2	
6/17/11 9:07:45	5.62	6.79	313.3	0.2	
6/17/11 9:08:00	5.60	6.81	303.1	0.2	
6/17/11 9:08:15	5.54	6.82	296.6	0.2	
6/17/11 9:08:30	5.51	6.81	293.5	0.2	

Start 544SRU-16A-3

## Valero Port Arthur Refinery: Port Arthur, Texas

## SRU 544 Incinerator Exhaust Stack

## ARI Reference Method Monitoring Data

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/17/11 9:08:45	5.52	6.80	296.6	0.3	
6/17/11 9:09:00	5.54	6.79	307.1	0.2	
6/17/11 9:09:15	5.59	6.79	312.8	0.2	
6/17/11 9:09:30	5.58	6.81	312.1	0.2	
6/17/11 9:09:45	5.54	6.84	310.8	0.2	
6/17/11 9:10:00	5.54	6.84	314.6	0.2	
6/17/11 9:10:15	5.57	6.82	315.6	0.2	
6/17/11 9:10:30	5.58	6.80	317.1	0.2	
6/17/11 9:10:45	5.60	6.78	319.1	0.2	
6/17/11 9:11:00	5.60	6.78	320.6	0.2	
6/17/11 9:11:15	5.60	6.79	320.6	0.2	
6/17/11 9:11:30	5.61	6.79	324.6	0.2	
6/17/11 9:11:45	5.63	6.79	327.4	0.2	
6/17/11 9:12:00	5.63	6.79	323.1	0.2	
6/17/11 9:12:15	5.59	6.79	320.9	0.2	
6/17/11 9:12:30	5.62	6.77	318.6	0.2	
6/17/11 9:12:45	5.60	6.77	317.6	0.2	
6/17/11 9:13:00	5.57	6.78	320.6	0.2	
6/17/11 9:13:15	5.61	6.79	320.9	0.2	
6/17/11 9:13:30	5.61	6.80	319.1	0.2	
6/17/11 9:13:45	5.64	6.80	321.1	0.2	
6/17/11 9:14:00	5.67	6.79	320.1	0.2	
6/17/11 9:14:15	5.64	6.79	314.8	0.2	
6/17/11 9:14:30	5.61	6.80	304.1	0.2	
6/17/11 9:14:45	5.57	6.81	299.3	0.2	
6/17/11 9:15:00	5.58	6.81	301.6	0.2	
6/17/11 9:15:15	5.59	6.81	306.6	0.2	
6/17/11 9:15:30	5.62	6.82	310.6	0.2	
6/17/11 9:15:45	5.64	6.82	308.3	0.2	
6/17/11 9:16:00	5.63	6.82	300.1	0.2	
6/17/11 9:16:15	5.61	6.83	293.8	0.2	
6/17/11 9:16:30	5.59	6.83	286.0	0.2	
6/17/11 9:16:45	5.56	6.83	281.3	0.2	
6/17/11 9:17:00	5.57	6.83	282.5	0.2	
6/17/11 9:17:15	5.61	6.81	286.0	0.2	
6/17/11 9:17:30	5.60	6.84	282.0	0.2	
6/17/11 9:17:45	5.56	6.87	279.8	0.2	
6/17/11 9:18:00	5.56	6.87	278.5	0.2	
6/17/11 9:18:15	5.55	6.88	275.2	0.2	
6/17/11 9:18:30	5.53	6.87	274.5	0.2	
6/17/11 9:18:45	5.54	6.85	279.3	0.2	
6/17/11 9:19:00	5.56	6.83	285.5	0.2	
6/17/11 9:19:15	5.57	6.83	288.0	0.2	
6/17/11 9:19:30	5.59	6.84	291.5	0.2	
6/17/11 9:19:45	5.58	6.87	292.5	0.2	
6/17/11 9:20:00	5.56	6.89	288.0	0.2	
6/17/11 9:20:15	5.53	6.90	285.8	0.2	
6/17/11 9:20:30	5.54	6.87	287.0	0.2	
6/17/11 9:20:45	5.56	6.85	290.8	0.2	
6/17/11 9:21:00	5.58	6.83	293.0	0.2	
6/17/11 9:21:15	5.57	6.83	292.8	0.2	
6/17/11 9:21:30	5.56	6.85	294.0	0.2	
6/17/11 9:21:45	5.56	6.87	298.6	0.2	
6/17/11 9:22:00	5.58	6.88	307.1	0.2	
6/17/11 9:22:15	5.59	6.88	312.6	0.2	
6/17/11 9:22:30	5.62	6.85	313.1	0.2	
6/17/11 9:22:45	5.61	6.84	309.3	0.2	
6/17/11 9:23:00	5.61	6.82	306.6	0.2	
6/17/11 9:23:15	5.65	6.79	305.8	0.2	
6/17/11 9:23:30	5.64	6.81	305.6	0.2	
6/17/11 9:23:45	5.64	6.82	304.1	0.2	
6/17/11 9:24:00	5.64	6.85	300.0	0.2	
6/17/11 9:24:15	5.62	6.86	297.8	0.2	
6/17/11 9:24:30	5.62	6.86	296.6	0.2	
6/17/11 9:24:45	5.62	6.84	291.8	0.2	
6/17/11 9:25:00	5.60	6.83	283.0	0.1	Change Ports 544SRU-0010-3
6/17/11 9:25:15	5.56	6.84	279.8	0.2	
6/17/11 9:25:30	5.54	6.84	282.0	0.2	
6/17/11 9:25:45	5.55	6.85	281.8	0.2	
6/17/11 9:26:00	5.54	6.89	279.5	0.2	
6/17/11 9:26:15	5.54	6.91	279.5	0.2	
6/17/11 9:26:30	5.53	6.91	279.0	0.2	
6/17/11 9:26:45	5.52	6.90	280.3	0.2	
6/17/11 9:27:00	5.53	6.87	281.5	0.2	
6/17/11 9:27:15	5.55	6.85	281.5	0.2	
6/17/11 9:27:30	5.53	6.85	281.5	0.2	
6/17/11 9:27:45	5.51	6.86	284.9	0.2	
6/17/11 9:28:00	5.50	6.87	290.0	0.2	
6/17/11 9:28:15	5.48	6.89	292.4	0.2	
6/17/11 9:28:30	5.49	6.89	293.5	0.2	
6/17/11 9:28:45	5.51	6.88	291.4	0.2	
6/17/11 9:29:00	5.49	6.88	295.0	0.2	
6/17/11 9:29:15	5.51	6.85	304.8	0.2	
6/17/11 9:29:30	5.57	6.82	308.6	0.2	
6/17/11 9:29:45	5.54	6.84	306.7	0.2	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/17/11 9:30:00	5.54	6.85	303.1	0.2	
6/17/11 9:30:15	5.52	6.86	296.2	0.2	
6/17/11 9:30:30	5.50	6.86	287.5	0.2	
6/17/11 9:30:45	5.51	6.84	287.3	0.2	
6/17/11 9:31:00	5.53	6.81	292.5	0.2	
6/17/11 9:31:15	5.54	6.80	295.1	0.2	
6/17/11 9:31:30	5.54	6.80	294.0	0.2	
6/17/11 9:31:45	5.53	6.82	292.5	0.2	
6/17/11 9:32:00	5.53	6.84	291.5	0.2	
6/17/11 9:32:15	5.50	6.85	294.0	0.2	
6/17/11 9:32:30	5.52	6.84	299.0	0.2	
6/17/11 9:32:45	5.55	6.82	303.8	0.2	
6/17/11 9:33:00	5.58	6.79	309.6	0.2	
6/17/11 9:33:15	5.60	6.77	312.6	0.2	
6/17/11 9:33:30	5.60	6.77	314.6	0.2	
6/17/11 9:33:45	5.59	6.78	317.3	0.2	
6/17/11 9:34:00	5.61	6.79	318.1	0.2	
6/17/11 9:34:15	5.59	6.82	316.8	0.2	
6/17/11 9:34:30	5.57	6.83	316.1	0.2	
6/17/11 9:34:45	5.58	6.82	314.1	0.2	
6/17/11 9:35:00	5.57	6.81	313.6	0.2	
6/17/11 9:35:15	5.59	6.79	311.3	0.2	
6/17/11 9:35:30	5.59	6.78	308.1	0.2	
6/17/11 9:35:45	5.57	6.80	308.8	0.2	
6/17/11 9:36:00	5.56	6.81	311.1	0.1	Restart 544SRU-0010-3
6/17/11 9:36:15	5.60	6.81	310.6	0.2	
6/17/11 9:36:30	5.58	6.83	309.6	0.1	
6/17/11 9:36:45	5.59	6.82	308.8	0.2	
6/17/11 9:37:00	5.57	6.81	302.6	0.1	
6/17/11 9:37:15	5.55	6.79	291.0	0.2	
6/17/11 9:37:30	5.53	6.80	283.0	0.2	
6/17/11 9:37:45	5.49	6.81	282.0	0.2	
6/17/11 9:38:00	5.48	6.82	286.0	0.2	
6/17/11 9:38:15	5.55	6.81	292.8	0.2	
6/17/11 9:38:30	5.58	6.81	290.0	0.2	
6/17/11 9:38:45	5.53	6.83	281.8	0.2	
6/17/11 9:39:00	5.49	6.83	282.0	0.2	
6/17/11 9:39:15	5.53	6.79	289.0	0.2	
6/17/11 9:39:30	5.58	6.76	292.0	0.2	
6/17/11 9:39:45	5.56	6.77	293.0	0.2	
6/17/11 9:40:00	5.55	6.79	302.1	0.2	
6/17/11 9:40:15	5.58	6.80	311.6	0.2	
6/17/11 9:40:30	5.59	6.82	313.1	0.2	
6/17/11 9:40:45	5.59	6.82	309.6	0.2	
6/17/11 9:41:00	5.57	6.81	311.6	0.2	
6/17/11 9:41:15	5.61	6.78	315.1	0.1	
6/17/11 9:41:30	5.58	6.78	316.6	0.2	
6/17/11 9:41:45	5.59	6.76	317.6	0.1	
6/17/11 9:42:00	5.60	6.77	315.6	0.1	
6/17/11 9:42:15	5.58	6.81	320.3	0.2	
6/17/11 9:42:30	5.61	6.82	325.1	0.2	
6/17/11 9:42:45	5.58	6.84	323.6	0.2	
6/17/11 9:43:00	5.57	6.84	320.1	0.2	
6/17/11 9:43:15	5.56	6.82	317.6	0.2	
6/17/11 9:43:30	5.57	6.80	316.6	0.2	
6/17/11 9:43:45	5.58	6.79	316.3	0.2	
6/17/11 9:44:00	5.57	6.79	314.1	0.2	
6/17/11 9:44:15	5.55	6.81	310.3	0.2	
6/17/11 9:44:30	5.57	6.82	311.6	0.2	
6/17/11 9:44:45	5.60	6.82	317.6	0.1	
6/17/11 9:45:00	5.61	6.83	318.1	0.1	
6/17/11 9:45:15	5.59	6.84	312.6	0.1	
6/17/11 9:45:30	5.59	6.82	307.1	0.1	
6/17/11 9:45:45	5.58	6.81	303.8	0.1	
6/17/11 9:46:00	5.60	6.80	302.0	0.2	
6/17/11 9:46:15	5.60	6.82	303.6	0.2	
6/17/11 9:46:30	5.62	6.83	305.6	0.2	
6/17/11 9:46:45	5.65	6.83	305.6	0.2	
6/17/11 9:47:00	5.66	6.84	305.1	0.2	
6/17/11 9:47:15	5.66	6.84	303.6	0.2	
6/17/11 9:47:30	5.65	6.82	302.0	0.1	
6/17/11 9:47:45	5.67	6.81	298.6	0.2	
6/17/11 9:48:00	5.64	6.80	294.6	0.1	
6/17/11 9:48:15	5.63	6.81	294.6	0.1	
6/17/11 9:48:30	5.61	6.82	296.6	0.2	
6/17/11 9:48:45	5.60	6.83	298.8	0.2	
6/17/11 9:49:00	5.60	6.84	298.6	0.1	
6/17/11 9:49:15	5.59	6.85	298.1	0.1	
6/17/11 9:49:30	5.58	6.84	296.1	0.1	
6/17/11 9:49:45	5.58	6.83	296.3	0.2	
6/17/11 9:50:00	5.61	6.80	297.1	0.2	
6/17/11 9:50:15	5.60	6.81	297.3	0.2	
6/17/11 9:50:30	5.58	6.82	295.1	0.2	
6/17/11 9:50:45	5.56	6.84	295.3	0.2	
6/17/11 9:51:00	5.57	6.84	301.1	0.2	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/17/11 9:51:15	5.62	6.81	306.6	0.1	
6/17/11 9:51:30	5.63	6.80	307.6	0.2	
6/17/11 9:51:45	5.61	6.79	307.1	0.2	
6/17/11 9:52:00	5.61	6.78	307.6	0.2	
6/17/11 9:52:15	5.60	6.78	308.1	0.1	
6/17/11 9:52:30	5.59	6.78	310.1	0.2	
6/17/11 9:52:45	5.62	6.78	312.3	0.2	
6/17/11 9:53:00	5.59	6.79	314.1	0.2	
6/17/11 9:53:15	5.57	6.78	314.3	0.1	
6/17/11 9:53:30	5.58	6.76	312.6	0.2	
6/17/11 9:53:45	5.57	6.76	307.8	0.2	
6/17/11 9:54:00	5.55	6.76	303.6	0.2	
6/17/11 9:54:15	5.53	6.76	301.8	0.2	
6/17/11 9:54:30	5.56	6.75	300.5	0.2	
6/17/11 9:54:45	5.57	6.76	297.6	0.2	
6/17/11 9:55:00	5.53	6.78	294.0	0.1	
6/17/11 9:55:15	5.52	6.78	291.5	0.2	
6/17/11 9:55:30	5.53	6.75	290.0	0.1	
6/17/11 9:55:45	5.54	6.72	288.3	0.2	
6/17/11 9:56:00	5.56	6.71	285.0	0.2	
6/17/11 9:56:15	5.52	6.73	283.0	0.2	
6/17/11 9:56:30	5.51	6.74	284.5	0.1	
6/17/11 9:56:45	5.54	6.74	286.0	0.2	
6/17/11 9:57:00	5.56	6.74	284.0	0.1	
6/17/11 9:57:15	5.53	6.74	281.0	0.1	
6/17/11 9:57:30	5.50	6.73	282.0	0.2	
6/17/11 9:57:45	5.53	6.70	285.5	0.2	
6/17/11 9:58:00	5.55	6.67	288.0	0.1	
6/17/11 9:58:15	5.54	6.67	287.8	0.1	
6/17/11 9:58:30	5.51	6.69	287.5	0.1	
6/17/11 9:58:45	5.54	6.69	287.8	0.2	
6/17/11 9:59:00	5.54	6.70	289.0	0.1	
6/17/11 9:59:15	5.55	6.70	290.8	0.1	
6/17/11 9:59:30	5.54	6.68	292.5	0.1	
6/17/11 9:59:45	5.52	6.67	292.0	0.1	
6/17/11 10:00:00	5.53	6.65	292.0	0.2	
6/17/11 10:00:15	5.55	6.63	292.3	0.1	
6/17/11 10:00:30	5.54	6.64	296.6	0.2	
6/17/11 10:00:45	5.56	6.64	302.6	0.1	
6/17/11 10:01:00	5.58	6.65	307.6	0.2	
6/17/11 10:01:15	5.58	6.65	307.3	0.2	
6/17/11 10:01:30	5.55	6.64	305.1	0.2	
6/17/11 10:01:45	5.56	6.62	305.1	0.2	
6/17/11 10:02:00	5.56	6.59	307.1	0.1	
6/17/11 10:02:15	5.54	6.60	309.3	0.2	
6/17/11 10:02:30	5.53	6.61	311.6	0.2	
6/17/11 10:02:45	5.53	6.64	314.8	0.2	
6/17/11 10:03:00	5.54	6.66	318.1	0.2	
6/17/11 10:03:15	5.54	6.68	319.4	0.2	
6/17/11 10:03:30	5.53	6.68	319.6	0.2	
6/17/11 10:03:45	5.56	6.65	318.6	0.2	
6/17/11 10:04:00	5.55	6.63	317.6	0.2	
6/17/11 10:04:15	5.57	6.60	317.1	0.2	
6/17/11 10:04:30	5.56	6.61	318.6	0.2	
6/17/11 10:04:45	5.57	6.62	320.6	0.2	
6/17/11 10:05:00	5.56	6.65	321.6	0.2	
6/17/11 10:05:15	5.56	6.67	317.8	0.2	
6/17/11 10:05:30	5.54	6.69	311.6	0.2	
6/17/11 10:05:45	5.52	6.69	313.3	0.2	
6/17/11 10:06:00	5.56	6.65	319.6	0.2	
6/17/11 10:06:15	5.60	6.63	319.6	0.2	
6/17/11 10:06:30	5.56	6.64	312.6	0.1	
6/17/11 10:06:45	5.51	6.67	306.3	0.2	
6/17/11 10:07:00	5.51	6.68	304.6	0.2	
6/17/11 10:07:15	5.53	6.69	307.3	0.2	
6/17/11 10:07:30	5.56	6.67	309.6	0.2	
6/17/11 10:07:45	5.59	6.65	308.6	0.1	
6/17/11 10:08:00	5.63	6.62	305.6	0.2	
6/17/11 10:08:15	5.65	6.61	298.8	0.2	
6/17/11 10:08:30	5.63	6.62	293.5	0.1	
6/17/11 10:08:45	5.59	6.63	291.8	0.2	
6/17/11 10:09:00	5.58	6.64	293.0	0.2	
6/17/11 10:09:15	5.61	6.63	295.3	0.2	
6/17/11 10:09:30	5.62	6.63	295.1	0.2	
6/17/11 10:09:45	5.60	6.63	292.0	0.2	
6/17/11 10:10:00	5.57	6.63	291.0	0.2	
6/17/11 10:10:15	5.59	6.61	293.8	0.1	
6/17/11 10:10:30	5.61	6.60	292.0	0.1	
6/17/11 10:10:45	5.57	6.63	284.0	0.1	
6/17/11 10:11:00	5.49	6.66	279.0	0.1	
6/17/11 10:11:15	5.44	6.69	277.0	0.2	
6/17/11 10:11:30	5.38	6.71	278.5	0.2	
6/17/11 10:11:45	5.41	6.69	288.3	0.1	
6/17/11 10:12:00	5.46	6.66	297.6	0.2	
6/17/11 10:12:15	5.48	6.64	298.3	0.1	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/17/11 10:12:30	5.48	6.64	295.6	0.1	
6/17/11 10:12:45	5.46	6.66	295.6	0.1	
6/17/11 10:13:00	5.46	6.66	301.6	0.2	
6/17/11 10:13:15	5.52	6.65	307.8	0.2	
6/17/11 10:13:30	5.52	6.65	309.1	0.1	
6/17/11 10:13:45	5.51	6.65	306.6	0.1	
6/17/11 10:14:00	5.51	6.64	304.6	0.2	
6/17/11 10:14:15	5.51	6.63	306.8	0.1	
6/17/11 10:14:30	5.51	6.62	309.6	0.2	
6/17/11 10:14:45	5.54	6.61	307.8	0.1	
6/17/11 10:15:00	5.51	6.62	306.1	0.2	
6/17/11 10:15:15	5.53	6.63	308.1	0.1	
6/17/11 10:15:30	5.53	6.64	314.1	0.2	
6/17/11 10:15:45	5.55	6.63	318.2	0.2	
6/17/11 10:16:00	5.54	6.62	317.1	0.2	
6/17/11 10:16:15	5.55	6.61	313.6	0.2	
6/17/11 10:16:30	5.55	6.60	312.6	0.2	
6/17/11 10:16:45	5.55	6.59	313.7	0.2	
6/17/11 10:17:00	5.54	6.59	315.1	0.2	
6/17/11 10:17:15	5.53	6.61	315.3	0.2	
6/17/11 10:17:30	5.54	6.62	314.1	0.2	
6/17/11 10:17:45	5.55	6.63	314.1	0.2	
6/17/11 10:18:00	5.53	6.64	317.6	0.2	
6/17/11 10:18:15	5.57	6.62	325.3	0.2	
6/17/11 10:18:30	5.59	6.59	327.6	0.1	
6/17/11 10:18:45	5.60	6.58	324.1	0.2	
6/17/11 10:19:00	5.56	6.60	323.1	0.2	
6/17/11 10:19:15	5.58	6.60	325.9	0.2	
6/17/11 10:19:30	5.61	6.62	325.6	0.2	
6/17/11 10:19:45	5.58	6.65	324.6	0.1	
6/17/11 10:20:00	5.61	6.65	322.1	0.2	
6/17/11 10:20:15	5.57	6.67	309.1	0.2	
6/17/11 10:20:30	5.49	6.68	302.1	0.1	
6/17/11 10:20:45	5.50	6.66	295.5	0.1	
6/17/11 10:21:00	5.50	6.65	291.5	0.1	
6/17/11 10:21:15	5.51	6.65	293.3	0.2	
6/17/11 10:21:30	5.52	6.66	296.1	0.1	
6/17/11 10:21:45	5.52	6.68	292.3	0.1	
6/17/11 10:22:00	5.50	6.70	286.0	0.1	
6/17/11 10:22:15	5.51	6.69	284.0	0.1	
6/17/11 10:22:30	5.50	6.68	286.5	0.2	
6/17/11 10:22:45	5.53	6.66	287.3	0.1	
6/17/11 10:23:00	5.52	6.66	286.5	0.1	
6/17/11 10:23:15	5.52	6.66	288.3	0.1	
6/17/11 10:23:30	5.54	6.65	291.0	0.1	
6/17/11 10:23:45	5.53	6.67	290.0	0.1	
6/17/11 10:24:00	5.51	6.68	288.5	0.2	
6/17/11 10:24:15	5.50	6.67	290.8	0.2	
6/17/11 10:24:30	5.52	6.64	292.0	0.2	
6/17/11 10:24:45	5.53	6.63	293.8	0.1	
6/17/11 10:25:00	5.54	6.62	295.6	0.1	
6/17/11 10:25:15	5.53	6.62	297.6	0.2	
6/17/11 10:25:30	5.55	6.61	298.6	0.2	
6/17/11 10:25:45	5.55	6.62	303.0	0.2	
6/17/11 10:26:00	5.56	6.61	304.1	0.2	
6/17/11 10:26:15	5.53	6.63	301.3	0.2	
6/17/11 10:26:30	5.50	6.63	300.5	0.1	
6/17/11 10:26:45	5.51	6.63	301.8	0.2	
6/17/11 10:27:00	5.52	6.62	302.0	0.2	
6/17/11 10:27:15	5.53	6.63	303.1	0.2	
6/17/11 10:27:30	5.52	6.65	306.6	0.2	
6/17/11 10:27:45	5.54	6.64	311.3	0.2	
6/17/11 10:28:00	5.57	6.63	315.6	0.2	
6/17/11 10:28:15	5.59	6.62	320.9	0.2	
6/17/11 10:28:30	5.59	6.62	321.6	0.2	
6/17/11 10:28:45	5.60	6.61	319.6	0.2	
6/17/11 10:29:00	5.60	6.61	314.1	0.1	
6/17/11 10:29:15	5.56	6.64	307.1	0.1	
6/17/11 10:29:30	5.54	6.67	305.1	0.2	
6/17/11 10:29:45	5.56	6.66	306.8	0.2	
6/17/11 10:30:00	5.59	6.65	307.1	0.1	
6/17/11 10:30:15	5.58	6.64	304.3	0.2	
6/17/11 10:30:30	5.56	6.64	303.1	0.2	
6/17/11 10:30:45	5.57	6.63	305.1	0.2	
6/17/11 10:31:00	5.59	6.61	306.1	0.2	
6/17/11 10:31:15	5.59	6.62	304.1	0.1	
6/17/11 10:31:30	5.60	6.63	301.5	0.2	
6/17/11 10:31:45	5.58	6.65	297.6	0.2	
6/17/11 10:32:00	5.57	6.66	291.0	0.2	
6/17/11 10:32:15	5.54	6.68	281.3	0.2	
6/17/11 10:32:30	5.52	6.66	283.0	0.2	
6/17/11 10:32:45	5.58	6.63	289.3	0.2	
6/17/11 10:33:00	5.57	6.62	287.5	0.1	
6/17/11 10:33:15	5.54	6.64	286.0	0.2	
6/17/11 10:33:30	5.54	6.65	290.0	0.2	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/17/11 10:33:45	5.55	6.65	299.0	0.2	
6/17/11 10:34:00	5.59	6.64	298.1	0.2	
6/17/11 10:34:15	5.55	6.66	286.0	0.1	
6/17/11 10:34:30	5.50	6.67	279.0	0.2	
6/17/11 10:34:45	5.49	6.65	272.0	0.2	
6/17/11 10:35:00	5.45	6.66	271.0	0.2	
6/17/11 10:35:15	5.47	6.65	276.5	0.2	
6/17/11 10:35:30	5.48	6.66	280.5	0.2	
6/17/11 10:35:45	5.48	6.68	287.5	0.2	
6/17/11 10:36:00	5.50	6.69	296.5	0.2	
6/17/11 10:36:15	5.54	6.68	299.5	0.2	
6/17/11 10:36:30	5.53	6.68	296.6	0.2	
6/17/11 10:36:45	5.53	6.66	303.8	0.2	
6/17/11 10:37:00	5.58	6.61	314.1	0.2	
6/17/11 10:37:15	5.61	6.59	319.9	0.2	
6/17/11 10:37:30	5.59	6.60	322.1	0.2	
6/17/11 10:37:45	5.60	6.60	325.9	0.2	
6/17/11 10:38:00	5.61	6.62	326.6	0.2	
6/17/11 10:38:15	5.62	6.63	325.4	0.2	
6/17/11 10:38:30	5.62	6.64	323.1	0.2	
6/17/11 10:38:45	5.59	6.65	314.1	0.2	
6/17/11 10:39:00	5.55	6.65	306.6	0.2	
6/17/11 10:39:15	5.53	6.64	295.6	0.2	
6/17/11 10:39:30	5.51	6.63	293.0	0.2	
6/17/11 10:39:45	5.53	6.62	298.6	0.2	
6/17/11 10:40:00	5.57	6.61	303.1	0.2	
6/17/11 10:40:15	5.56	6.63	306.1	0.2	
6/17/11 10:40:30	5.58	6.63	307.6	0.2	
6/17/11 10:40:45	5.55	6.64	307.6	0.2	
6/17/11 10:41:00	5.54	6.64	307.1	0.2	
6/17/11 10:41:15	5.54	6.64	300.0	0.2	
6/17/11 10:41:30	5.49	6.65	293.0	0.2	
6/17/11 10:41:45	5.48	6.65	292.5	0.2	
6/17/11 10:42:00	5.50	6.64	303.1	0.2	
6/17/11 10:42:15	5.57	6.62	312.8	0.2	
6/17/11 10:42:30	5.58	6.63	312.6	0.2	
6/17/11 10:42:45	5.55	6.64	309.3	0.2	
6/17/11 10:43:00	5.58	6.62	308.1	0.2	
6/17/11 10:43:15	5.59	6.62	306.3	0.2	
6/17/11 10:43:30	5.55	6.63	305.6	0.2	
6/17/11 10:43:45	5.57	6.62	302.6	0.2	
6/17/11 10:44:00	5.55	6.63	298.6	0.2	
6/17/11 10:44:15	5.55	6.64	296.6	0.2	
6/17/11 10:44:30	5.54	6.65	297.6	0.2	
6/17/11 10:44:45	5.53	6.65	297.8	0.2	
6/17/11 10:45:00	5.54	6.65	294.0	0.2	
6/17/11 10:45:15	5.51	6.65	294.8	0.2	
6/17/11 10:45:30	5.53	6.64	301.1	0.2	
6/17/11 10:45:45	5.55	6.64	304.3	0.3	
6/17/11 10:46:00	5.56	6.65	302.6	0.2	
6/17/11 10:46:15	5.55	6.66	298.5	0.2	
6/17/11 10:46:30	5.54	6.66	293.0	0.2	
6/17/11 10:46:45	5.52	6.66	289.5	0.3	
6/17/11 10:47:00	5.52	6.64	295.0	0.2	
6/17/11 10:47:15	5.57	6.61	299.3	0.3	
6/17/11 10:47:30	5.57	6.60	298.6	0.3	
6/17/11 10:47:45	5.56	6.61	294.6	0.3	
6/17/11 10:48:00	5.54	6.64	291.0	0.2	
6/17/11 10:48:15	5.53	6.65	292.3	0.2	
6/17/11 10:48:30	5.56	6.64	295.1	0.2	
6/17/11 10:48:45	5.57	6.62	289.3	0.2	
6/17/11 10:49:00	5.55	6.62	284.0	0.2	
6/17/11 10:49:15	5.53	6.61	281.8	0.2	
6/17/11 10:49:30	5.54	6.60	282.0	0.2	
6/17/11 10:49:45	5.55	6.60	278.5	0.2	
6/17/11 10:50:00	5.53	6.62	280.5	0.2	
6/17/11 10:50:15	5.53	6.63	290.0	0.2	
6/17/11 10:50:30	5.54	6.64	298.0	0.2	
6/17/11 10:50:45	5.58	6.63	303.8	0.2	
6/17/11 10:51:00	5.58	6.62	299.0	0.2	
6/17/11 10:51:15	5.55	6.62	293.3	0.2	
6/17/11 10:51:30	5.53	6.61	293.5	0.2	
6/17/11 10:51:45	5.56	6.60	297.1	0.2	
6/17/11 10:52:00	5.57	6.60	299.0	0.3	
6/17/11 10:52:15	5.56	6.61	300.6	0.2	
6/17/11 10:52:30	5.58	6.62	304.6	0.2	
6/17/11 10:52:45	5.58	6.63	305.1	0.2	
6/17/11 10:53:00	5.55	6.63	302.6	0.2	
6/17/11 10:53:15	5.55	6.62	297.1	0.2	
6/17/11 10:53:30	5.55	6.61	296.6	0.3	
6/17/11 10:53:45	5.58	6.59	301.0	0.2	
6/17/11 10:54:00	5.58	6.60	303.1	0.3	
6/17/11 10:54:15	5.57	6.62	301.3	0.2	
6/17/11 10:54:30	5.54	6.66	296.1	0.3	
6/17/11 10:54:45	5.50	6.69	295.3	0.2	

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/17/11 10:55:00	5.52	6.68	299.5	0.2	
6/17/11 10:55:15	5.55	6.65	303.8	0.3	
6/17/11 10:55:30	5.55	6.64	304.6	0.3	
6/17/11 10:55:45	5.55	6.62	308.8	0.2	
6/17/11 10:56:00	5.59	6.60	315.1	0.2	
6/17/11 10:56:15	5.62	6.60	322.4	0.3	
6/17/11 10:56:30	5.65	6.62	325.1	0.2	
6/17/11 10:56:45	5.64	6.64	321.3	0.2	
6/17/11 10:57:00	5.63	6.65	315.1	0.2	
6/17/11 10:57:15	5.59	6.65	306.6	0.3	
6/17/11 10:57:30	5.58	6.64	302.1	0.2	
6/17/11 10:57:45	5.57	6.64	292.3	0.3	
6/17/11 10:58:00	5.53	6.65	286.5	0.2	
6/17/11 10:58:15	5.53	6.65	285.3	0.2	
6/17/11 10:58:30	5.52	6.67	288.5	0.3	
6/17/11 10:58:45	5.53	6.67	289.3	0.2	
6/17/11 10:59:00	5.53	6.68	289.0	0.2	
6/17/11 10:59:15	5.54	6.66	288.8	0.2	
6/17/11 10:59:30	5.57	6.64	284.5	0.2	
6/17/11 10:59:45	5.53	6.64	278.5	0.3	
6/17/11 11:00:00	5.52	6.62	273.0	0.3	
6/17/11 11:00:15	5.48	6.64	263.7	0.2	
6/17/11 11:00:30	5.47	6.65	261.0	0.3	
6/17/11 11:00:45	5.48	6.66	265.7	0.2	
6/17/11 11:01:00	5.50	6.65	273.5	0.3	
6/17/11 11:01:15	5.53	6.63	289.8	0.2	
6/17/11 11:01:30	5.60	6.59	298.0	0.2	
6/17/11 11:01:45	5.62	6.58	297.5	0.2	
6/17/11 11:02:00	5.59	6.58	293.5	0.3	
6/17/11 11:02:15	5.57	6.58	294.5	0.3	
6/17/11 11:02:30	5.59	6.57	293.0	0.2	
6/17/11 11:02:45	5.54	6.60	291.0	0.2	
6/17/11 11:03:00	5.55	6.59	294.6	0.2	
6/17/11 11:03:15	5.61	6.57	302.1	0.3	
6/17/11 11:03:30	5.62	6.57	304.1	0.3	
6/17/11 11:03:45	5.61	6.57	301.0	0.3	
6/17/11 11:04:00	5.58	6.58	298.9	0.3	
6/17/11 11:04:15	5.57	6.60	298.6	0.3	
6/17/11 11:04:30	5.57	6.60	297.9	0.3	
6/17/11 11:04:45	5.56	6.62	298.6	0.2	
6/17/11 11:05:00	5.57	6.62	297.3	0.2	
6/17/11 11:05:15	5.58	6.61	295.3	0.3	
6/17/11 11:05:30	5.57	6.61	293.1	0.3	
6/17/11 11:05:45	5.55	6.61	292.5	0.3	
6/17/11 11:06:00	5.54	6.60	292.5	0.3	
6/17/11 11:06:15	5.56	6.60	295.3	0.3	
6/17/11 11:06:30	5.60	6.61	299.0	0.3	
6/17/11 11:06:45	5.61	6.63	300.3	0.3	
6/17/11 11:07:00	5.59	6.65	295.8	0.3	
6/17/11 11:07:15	5.56	6.66	287.0	0.3	
6/17/11 11:07:30	5.52	6.67	281.8	0.2	
6/17/11 11:07:45	5.53	6.65	281.0	0.3	
6/17/11 11:08:00	5.54	6.64	276.5	0.2	
6/17/11 11:08:15	5.51	6.64	273.2	0.3	
6/17/11 11:08:30	5.52	6.64	274.0	0.3	
6/17/11 11:08:45	5.54	6.65	278.2	0.3	
6/17/11 11:09:00	5.56	6.65	280.5	0.3	
6/17/11 11:09:15	5.56	6.65	281.0	0.3	
6/17/11 11:09:30	5.59	6.63	281.8	0.3	
6/17/11 11:09:45	5.58	6.61	277.7	0.2	
6/17/11 11:10:00	5.56	6.61	274.7	0.2	
6/17/11 11:10:15	5.55	6.60	270.7	0.2	
6/17/11 11:10:30	5.53	6.61	266.2	0.3	
6/17/11 11:10:45	5.52	6.63	260.7	0.2	
6/17/11 11:11:00	5.48	6.67	259.2	0.3	
6/17/11 11:11:15	5.47	6.67	264.2	0.3	
6/17/11 11:11:30	5.50	6.66	267.2	0.3	
6/17/11 11:11:45	5.51	6.64	270.5	0.3	
6/17/11 11:12:00	5.53	6.61	272.0	0.3	
6/17/11 11:12:15	5.53	6.59	269.5	0.3	
6/17/11 11:12:30	5.51	6.59	271.7	0.3	
6/17/11 11:12:45	5.52	6.60	276.0	0.3	
6/17/11 11:13:00	5.52	6.61	277.5	0.3	
6/17/11 11:13:15	5.53	6.63	277.0	0.3	
6/17/11 11:13:30	5.51	6.64	281.5	0.2	
6/17/11 11:13:45	5.55	6.61	289.0	0.3	
6/17/11 11:14:00	5.57	6.60	292.0	0.3	
6/17/11 11:14:15	5.57	6.58	293.5	0.3	
6/17/11 11:14:30	5.58	6.57	294.3	0.3	
6/17/11 11:14:45	5.58	6.57	295.3	0.3	
6/17/11 11:15:00	5.57	6.59	294.6	0.3	
6/17/11 11:15:15	5.56	6.61	300.3	0.3	
6/17/11 11:15:30	5.59	6.61	301.8	0.3	
6/17/11 11:15:45	5.56	6.62	299.8	0.3	
6/17/11 11:16:00	5.55	6.61	302.0	0.3	

## Valero Port Arthur Refinery: Port Arthur, Texas

## SRU 544 Incinerator Exhaust Stack

## ARI Reference Method Monitoring Data

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/17/11 11:16:15	5.57	6.60	305.1	0.3	
6/17/11 11:16:30	5.58	6.58	306.6	0.3	
6/17/11 11:16:45	5.58	6.59	302.8	0.2	
6/17/11 11:17:00	5.56	6.61	299.0	0.2	
6/17/11 11:17:15	5.55	6.64	302.8	0.2	
6/17/11 11:17:30	5.56	6.64	311.1	0.3	
6/17/11 11:17:45	5.61	6.62	315.8	0.2	
6/17/11 11:18:00	5.61	6.62	306.1	0.3	
6/17/11 11:18:15	5.53	6.65	294.3	0.3	
6/17/11 11:18:30	5.49	6.66	299.5	0.3	
6/17/11 11:18:45	5.56	6.62	314.6	0.3	
6/17/11 11:19:00	5.65	6.59	316.8	0.3	
6/17/11 11:19:15	5.62	6.61	313.3	0.3	
6/17/11 11:19:30	5.60	6.62	311.8	0.3	
6/17/11 11:19:45	5.60	6.61	311.3	0.3	
6/17/11 11:20:00	5.59	6.61	309.8	0.3	
6/17/11 11:20:15	5.57	6.61	307.1	0.3	
6/17/11 11:20:30	5.59	6.60	302.6	0.3	
6/17/11 11:20:45	5.58	6.62	296.1	0.3	
6/17/11 11:21:00	5.55	6.64	295.3	0.3	
6/17/11 11:21:15	5.56	6.64	294.6	0.3	
6/17/11 11:21:30	5.52	6.66	289.3	0.3	
6/17/11 11:21:45	5.52	6.66	284.3	0.3	
6/17/11 11:22:00	5.51	6.66	286.5	0.3	
6/17/11 11:22:15	5.53	6.63	296.0	0.3	
6/17/11 11:22:30	5.59	6.60	302.8	0.2	
6/17/11 11:22:45	5.59	6.61	299.5	0.2	
6/17/11 11:23:00	5.57	6.62	294.3	0.3	
6/17/11 11:23:15	5.57	6.63	291.8	0.3	
6/17/11 11:23:30	5.54	6.65	294.8	0.3	
6/17/11 11:23:45	5.54	6.65	299.5	0.3	
6/17/11 11:24:00	5.59	6.63	297.3	0.2	
6/17/11 11:24:15	5.59	6.62	293.3	0.3	
6/17/11 11:24:30	5.57	6.61	293.3	0.3	
6/17/11 11:24:45	5.55	6.61	295.1	0.3	
6/17/11 11:25:00	5.56	6.62	297.3	0.3	
6/17/11 11:25:15	5.58	6.62	299.5	0.3	
6/17/11 11:25:30	5.60	6.63	298.1	0.3	
6/17/11 11:25:45	5.58	6.64	295.1	0.3	
6/17/11 11:26:00	5.56	6.63	290.5	0.2	
6/17/11 11:26:15	5.55	6.62	281.3	0.3	
6/17/11 11:26:30	5.52	6.62	276.0	0.3	
6/17/11 11:26:45	5.53	6.60	279.2	0.3	
6/17/11 11:27:00	5.58	6.58	282.3	0.3	
6/17/11 11:27:15	5.59	6.59	288.3	0.3	
6/17/11 11:27:30	5.60	6.61	297.3	0.3	
6/17/11 11:27:45	5.61	6.62	297.6	0.3	
6/17/11 11:28:00	5.57	6.64	293.8	0.3	
6/17/11 11:28:15	5.56	6.62	292.5	0.3	
6/17/11 11:28:30	5.56	6.61	283.5	0.3	
6/17/11 11:28:45	5.51	6.62	276.5	0.3	
6/17/11 11:29:00	5.50	6.61	278.0	0.3	
6/17/11 11:29:15	5.53	6.61	285.5	0.3	
6/17/11 11:29:30	5.54	6.62	288.5	0.3	
6/17/11 11:29:45	5.52	6.65	283.3	0.3	
6/17/11 11:30:00	5.48	6.68	278.0	0.3	
6/17/11 11:30:15	5.48	6.67	279.2	0.3	
6/17/11 11:30:30	5.49	6.65	285.3	0.3	
6/17/11 11:30:45	5.52	6.61	295.3	0.3	
6/17/11 11:31:00	5.58	6.57	302.8	0.3	
6/17/11 11:31:15	5.58	6.57	305.3	0.3	
6/17/11 11:31:30	5.58	6.60	302.3	0.3	
6/17/11 11:31:45	5.53	6.64	299.3	0.3	
6/17/11 11:32:00	5.52	6.66	298.6	0.3	
6/17/11 11:32:15	5.53	6.65	298.3	0.3	
6/17/11 11:32:30	5.55	6.63	296.8	0.3	
6/17/11 11:32:45	5.56	6.61	296.3	0.3	
6/17/11 11:33:00	5.55	6.60	294.8	0.3	
6/17/11 11:33:15	5.55	6.59	297.3	0.3	
6/17/11 11:33:30	5.56	6.59	301.8	0.3	
6/17/11 11:33:45	5.57	6.60	303.1	0.3	
6/17/11 11:34:00	5.57	6.61	305.3	0.3	
6/17/11 11:34:15	5.58	6.61	306.6	0.3	
6/17/11 11:34:30	5.59	6.60	305.8	0.3	
6/17/11 11:34:45	5.59	6.60	304.3	0.3	
6/17/11 11:35:00	5.59	6.59	301.3	0.3	
6/17/11 11:35:15	5.59	6.60	290.3	0.3	
6/17/11 11:35:30	5.53	6.64	279.0	0.3	
6/17/11 11:35:45	5.46	6.67	272.7	0.3	
6/17/11 11:36:00	5.46	6.68	269.7	0.3	
6/17/11 11:36:15	5.47	6.67	271.0	0.3	
6/17/11 11:36:30	5.50	6.65	274.7	0.3	
6/17/11 11:36:45	5.52	6.64	275.2	0.3	
6/17/11 11:37:00	5.53	6.63	277.5	0.3	
6/17/11 11:37:15	5.55	6.62	287.5	0.3	

End 544SRU-0010-3

**Valero Port Arthur Refinery: Port Arthur, Texas**  
**SRU 544 Incinerator Exhaust Stack**  
**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/17/11 11:37:30	5.61	6.60	295.8	0.3	
6/17/11 11:37:45	5.61	6.61	298.6	0.4	
6/17/11 11:38:00	5.62	6.62	294.8	0.3	
6/17/11 11:38:15	5.58	6.64	284.3	0.3	
6/17/11 11:38:30	5.54	6.64	279.8	0.3	
6/17/11 11:38:45	5.53	6.63	280.5	0.3	
6/17/11 11:39:00	5.54	6.62	280.5	0.3	
6/17/11 11:39:15	5.55	6.63	280.0	0.3	
6/17/11 11:39:30	5.53	6.65	277.0	0.3	
6/17/11 11:39:45	5.50	6.68	281.0	0.3	
6/17/11 11:40:00	5.53	6.67	288.5	0.3	
6/17/11 11:40:15	5.55	6.66	287.5	0.3	
6/17/11 11:40:30	5.53	6.67	282.3	0.4	
6/17/11 11:40:45	5.50	6.66	279.7	0.4	
6/17/11 11:41:00	5.51	6.65	276.7	0.3	
6/17/11 11:41:15	5.48	6.66	279.0	0.3	
6/17/11 11:41:30	5.49	6.66	288.8	0.4	
6/17/11 11:41:45	5.52	6.66	297.8	0.3	
6/17/11 11:42:00	5.57	6.66	302.3	0.4	
6/17/11 11:42:15	5.57	6.68	296.5	0.3	
6/17/11 11:42:30	5.50	6.70	282.3	0.3	
6/17/11 11:42:45	5.45	6.70	272.0	0.3	
6/17/11 11:43:00	5.44	6.69	272.0	0.3	
6/17/11 11:43:15	5.45	6.67	276.5	0.3	
6/17/11 11:43:30	5.47	6.67	284.8	0.3	
6/17/11 11:43:45	5.48	6.68	292.5	0.3	
6/17/11 11:44:00	5.47	6.70	297.8	0.4	
6/17/11 11:44:15	5.47	6.72	300.5	0.4	
6/17/11 11:44:30	5.47	6.70	306.6	0.4	
6/17/11 11:44:45	5.50	6.67	313.8	0.4	
6/17/11 11:45:00	5.53	6.64	317.6	0.4	
6/17/11 11:45:15	5.52	6.63	310.3	0.3	
6/17/11 11:45:30	5.46	6.66	298.3	0.4	
6/17/11 11:45:45	5.44	6.68	296.3	0.4	
6/17/11 11:46:00	5.47	6.69	303.1	0.4	
6/17/11 11:46:15	5.49	6.70	309.6	0.4	
6/17/11 11:46:30	5.52	6.70	308.1	0.4	
6/17/11 11:46:45	5.50	6.69	302.3	0.4	
6/17/11 11:47:00	5.47	6.68	296.3	0.4	
6/17/11 11:47:15	5.48	6.65	293.5	0.4	
6/17/11 11:47:30	5.49	6.64	292.8	0.4	
6/17/11 11:47:45	5.49	6.64	290.8	0.4	
6/17/11 11:48:00	5.49	6.66	294.6	0.3	
6/17/11 11:48:15	5.53	6.66	300.5	0.4	
6/17/11 11:48:30	5.53	6.67	296.8	0.4	
6/17/11 11:48:45	5.48	6.69	289.8	0.4	
6/17/11 11:49:00	5.47	6.68	286.8	0.4	
6/17/11 11:49:15	5.48	6.65	290.0	0.4	
6/17/11 11:49:30	5.53	6.62	293.0	0.4	
6/17/11 11:49:45	5.53	6.61	296.1	0.4	
6/17/11 11:50:00	5.52	6.61	297.6	0.4	
6/17/11 11:50:15	5.51	6.63	298.3	0.4	
6/17/11 11:50:30	5.54	6.62	302.0	0.4	
6/17/11 11:50:45	5.54	6.62	299.7	0.4	
6/17/11 11:51:00	5.51	6.62	296.8	0.4	
6/17/11 11:51:15	5.53	6.61	297.3	0.4	
6/17/11 11:51:30	5.56	6.59	297.8	0.4	
6/17/11 11:51:45	5.56	6.60	289.9	0.4	
6/17/11 11:52:00	5.51	6.63	283.3	0.4	
6/17/11 11:52:15	5.48	6.64	284.5	0.4	
6/17/11 11:52:30	5.50	6.64	281.5	0.4	
6/17/11 11:52:45	5.48	6.65	278.9	0.4	
6/17/11 11:53:00	5.48	6.64	282.5	0.4	
6/17/11 11:53:15	5.52	6.61	284.5	0.4	
6/17/11 11:53:30	5.52	6.61	282.0	0.4	
6/17/11 11:53:45	5.48	6.63	281.0	0.4	
6/17/11 11:54:00	5.51	6.63	281.5	0.4	
6/17/11 11:54:15	5.48	6.65	280.5	0.4	
6/17/11 11:54:30	5.48	6.65	281.3	0.4	
6/17/11 11:54:45	5.51	6.64	285.5	0.4	
6/17/11 11:55:00	5.54	6.62	285.8	0.4	
6/17/11 11:55:15	5.52	6.62	282.0	0.4	
6/17/11 11:55:30	5.46	6.63	283.0	0.4	
6/17/11 11:55:45	5.49	6.62	284.0	0.4	
6/17/11 11:56:00	5.49	6.64	281.0	0.4	
6/17/11 11:56:15	5.47	6.66	290.5	0.4	
6/17/11 11:56:30	5.52	6.64	302.3	0.4	
6/17/11 11:56:45	5.56	6.62	308.1	0.4	
6/17/11 11:57:00	5.55	6.62	306.1	0.4	
6/17/11 11:57:15	5.55	6.61	302.6	0.4	
6/17/11 11:57:30	5.55	6.59	300.8	0.4	
6/17/11 11:57:45	5.55	6.60	298.5	0.4	
6/17/11 11:58:00	5.55	6.61	299.3	0.4	
6/17/11 11:58:15	5.54	6.63	293.0	0.4	
6/17/11 11:58:30	5.50	6.67	282.0	0.4	

## Valero Port Arthur Refinery: Port Arthur, Texas

## SRU 544 Incinerator Exhaust Stack

## ARI Reference Method Monitoring Data

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/17/11 11:58:45	5.45	6.70	270.5	0.4	
6/17/11 11:59:00	5.42	6.70	274.0	0.4	
6/17/11 11:59:15	5.49	6.65	288.5	0.4	
6/17/11 11:59:30	5.53	6.62	291.5	0.4	
6/17/11 11:59:45	5.51	6.63	285.5	0.4	
6/17/11 12:00:00	5.46	6.65	282.0	0.4	
6/17/11 12:00:15	5.44	6.67	280.5	0.4	
6/17/11 12:00:30	5.45	6.69	282.0	0.4	
6/17/11 12:00:45	5.47	6.70	285.0	0.4	
6/17/11 12:01:00	5.47	6.69	286.3	0.4	
6/17/11 12:01:15	5.51	6.66	293.0	0.4	
6/17/11 12:01:30	5.54	6.62	297.1	0.5	
6/17/11 12:01:45	5.55	6.60	293.5	0.4	
6/17/11 12:02:00	5.50	6.62	290.0	0.4	
6/17/11 12:02:15	5.50	6.63	294.0	0.4	
6/17/11 12:02:30	5.53	6.64	297.8	0.4	
6/17/11 12:02:45	5.51	6.66	297.5	0.4	
6/17/11 12:03:00	5.51	6.68	295.0	0.4	
6/17/11 12:03:15	5.48	6.69	290.0	0.4	
6/17/11 12:03:30	5.46	6.67	288.5	0.5	
6/17/11 12:03:45	5.47	6.65	291.0	0.4	
6/17/11 12:04:00	5.50	6.62	296.3	0.4	
6/17/11 12:04:15	5.53	6.62	300.5	0.5	
6/17/11 12:04:30	5.52	6.65	299.0	0.4	
6/17/11 12:04:45	5.49	6.67	299.0	0.4	
6/17/11 12:05:00	5.51	6.69	302.0	0.4	
6/17/11 12:05:15	5.50	6.69	296.5	0.4	
6/17/11 12:05:30	5.46	6.70	290.5	0.5	
6/17/11 12:05:45	5.46	6.67	288.0	0.5	
6/17/11 12:06:00	5.49	6.65	287.5	0.4	
6/17/11 12:06:15	5.48	6.64	285.5	0.4	
6/17/11 12:06:30	5.48	6.66	288.5	0.4	
6/17/11 12:06:45	5.49	6.66	294.0	0.4	End 544SRU-16A-3
6/17/11 12:07:00	5.49	6.68	295.3	0.5	
6/17/11 12:07:15	5.50	6.67	299.5	0.4	
6/17/11 12:07:30	5.54	6.65	296.8	0.5	
6/17/11 12:07:45	5.49	6.66	288.0	0.5	
6/17/11 12:08:00	5.46	6.66	284.3	0.4	
6/17/11 12:08:15	5.47	6.65	281.0	0.4	
6/17/11 12:08:30	5.46	6.66	283.8	0.5	
6/17/11 12:08:45	5.48	6.66	290.0	0.6	
6/17/11 12:09:00	5.50	6.66	294.6	1.3	
6/17/11 12:09:15	5.54	6.59	295.5	52.6	
6/17/11 12:09:30	5.82	5.82	261.4	31.4	
6/17/11 12:09:45	5.43	3.31	158.2	24.3	
6/17/11 12:10:00	2.68	1.86	91.5	23.6	
6/17/11 12:10:15	1.33	1.39	56.4	23.5	
6/17/11 12:10:30	0.14	0.33	3.4	23.6	
6/17/11 12:10:45	0.12	0.31	1.9	23.7	
6/17/11 12:11:00	0.10	0.29	1.9	23.8	
6/17/11 12:11:15	0.09	0.27	2.9	23.8	
6/17/11 12:11:30	0.09	0.27	2.9	24.1	
6/17/11 12:11:45	0.09	0.28	0.4	22.0	
6/17/11 12:12:00	0.07	0.27	-3.1	25.1	
6/17/11 12:12:15	0.08	0.26	0.4	29.1	
6/17/11 12:12:30	0.08	0.24	0.9	30.1	Calibration Error
6/17/11 12:12:45	0.05	0.19	-0.6	29.7	C <sub>3</sub> H <sub>8</sub> Bias 2 Low = 29.8
6/17/11 12:13:00	0.02	0.16	-0.4	29.5	O <sub>2</sub> Bias 2 Zero = 0.07
6/17/11 12:13:15	0.06	0.21	2.4	29.5	CO <sub>2</sub> Bias 2 Zero = 0.23
6/17/11 12:13:30	0.09	0.26	2.9	30.7	CO Bias 2 Zero = 1.6
6/17/11 12:13:45	0.09	0.30	1.4	2.7	
6/17/11 12:14:00	0.10	0.32	4.9	1.0	
6/17/11 12:14:15	0.09	0.32	4.9	0.5	
6/17/11 12:14:30	0.07	0.29	4.9	0.5	
6/17/11 12:14:45	-0.10	0.03	8.4	0.5	
6/17/11 12:15:00	-0.36	1.39	20.3	0.9	
6/17/11 12:15:15	-0.48	0.33	37.4	1.9	
6/17/11 12:15:30	0.40	0.31	94.0	2.5	
6/17/11 12:15:45	0.72	0.29	174.3	2.7	
6/17/11 12:16:00	0.51	0.27	208.1	2.8	
6/17/11 12:16:15	0.47	0.27	261.5	2.9	
6/17/11 12:16:30	0.40	1.39	283.6	2.8	
6/17/11 12:16:45	0.41	0.33	281.6	2.8	
6/17/11 12:17:00	0.43	0.31	273.0	7.2	
6/17/11 12:17:15	0.48	0.29	261.0	1.3	System Bias
6/17/11 12:17:30	0.32	0.27	252.7	1.1	CO Bias 2 Mid = 252.1
6/17/11 12:17:45	0.27	0.27	250.0	1.0	
6/17/11 12:18:00	0.56	0.28	251.2	1.0	
6/17/11 12:18:15	1.94	1.15	254.5	0.9	
6/17/11 12:18:30	2.06	1.35	256.2	0.9	
6/17/11 12:18:45	2.08	1.40	260.0	0.8	
6/17/11 12:19:00	2.62	2.46	265.5	5.0	
6/17/11 12:19:15	3.24	3.09	222.9	0.9	
6/17/11 12:19:30	4.04	3.64	200.3	0.8	
6/17/11 12:19:45	4.87	4.38	145.1	0.7	System Bias

**Valero Port Arthur Refinery: Port Arthur, Texas**

**SRU 544 Incinerator Exhaust Stack**

**ARI Reference Method Monitoring Data**

Date/Time	O <sub>2</sub> % db by vol.	CO <sub>2</sub> % db by vol.	CO ppmv db	C <sub>3</sub> H <sub>8</sub> ppmv wb	Comments
6/17/11 12:20:00	5.10	4.36	121.1	0.8	O <sub>2</sub> Bias 2 Mid = 5.13
6/17/11 12:20:15	5.14	4.33	114.6	0.7	CO <sub>2</sub> Bias 2 Mid = 4.35
6/17/11 12:20:30	5.14	4.39	113.3	0.8	C <sub>3</sub> H <sub>8</sub> Bias 2 Zero = 0.7
6/17/11 12:20:45	5.15	4.34	113.1	0.7	
6/17/11 12:21:00	5.14	4.45	113.1	0.7	
6/17/11 12:21:15	5.13	4.57	113.1	0.7	
6/17/11 12:21:30	5.13	4.67	108.6	0.9	
6/17/11 12:21:45	4.28	4.62	82.0	0.9	
6/17/11 12:22:00	2.24	4.38	64.7	0.9	
6/17/11 12:22:15	1.33	2.61	56.9	0.9	
6/17/11 12:22:30	1.20	1.50	57.7	0.8	
6/17/11 12:22:45	1.20	1.49	58.9	0.8	
6/17/11 12:23:00	1.21	1.50	58.2	0.9	
6/17/11 12:23:15	1.20	1.51	57.4	0.9	
6/17/11 12:23:30	1.20	1.51	58.7	0.7	
6/17/11 12:23:45	1.24	1.59	107.1	0.5	
6/17/11 12:24:00	2.60	3.55	193.5	0.6	
6/17/11 12:24:15	4.33	5.40	279.5	0.6	
6/17/11 12:24:30	5.24	6.47	312.1	0.6	
6/17/11 12:24:45	5.47	6.76	325.1	0.6	
6/17/11 12:25:00	5.50	6.78	336.9	0.6	
6/17/11 12:25:15	5.57	6.82	348.7	0.6	
6/17/11 12:25:30	5.59	6.85	345.2	1.2	
6/17/11 12:25:45	5.53	6.76	286.0	55.8	
6/17/11 12:26:00	4.43	4.91	220.6	2.2	
6/17/11 12:26:15	3.93	3.14	150.2	1.1	
6/17/11 12:26:30	5.46	2.33	109.1	1.0	



Valero Port Arthur Refinery  
Source: SRU No. 544 TGI Stack  
Test Dates: 6/15 - 6/17/11

## **APPENDIX E**

## **USEPA Method 15 GC-FPD Data**

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# Test Data Summary



Company: Valero  
 Location: Port Arthur, TX  
 Source: 544 SRU  
 Date sampled: 6/16-17/2011  
 Analyte: H2S, COS, CS2  
 Method: USEPA Method 15  
 Instrument: SRI-8610C  
 Detector: GC-FPD  
 Units Detection: ppm

Run No.	Clock Time	Sample File Name	Hydrogen Sulfide Conc. (ppm)	Carbonyl Sulfide Conc. (ppm)	Carbon Disulfide Conc. (ppm)	Total TRS Conc. (ppm)	Total TRS by run Conc. (ppm)
1	10:28	ValeroPA_SRU_Run01.chr	<0.25	<0.25	<0.25	<1.00	Run No. 1 <1.00
1	10:39	ValeroPA_SRU_Run02.chr	<0.25	<0.25	<0.25	<1.00	
1	10:50	ValeroPA_SRU_Run03.chr	<0.25	<0.25	<0.25	<1.00	
1	11:01	ValeroPA_SRU_Run04.chr	<0.25	<0.25	<0.25	<1.00	
1	11:13	ValeroPA_SRU_Run05.chr	<0.25	<0.25	<0.25	<1.00	
1	11:24	ValeroPA_SRU_Run06.chr	<0.25	<0.25	<0.25	<1.00	
1	11:35	ValeroPA_SRU_Run07.chr	<0.25	<0.25	<0.25	<1.00	
1	11:46	ValeroPA_SRU_Run08.chr	<0.25	<0.25	<0.25	<1.00	
1	11:58	ValeroPA_SRU_Run09.chr	<0.25	<0.25	<0.25	<1.00	
1	12:09	ValeroPA_SRU_Run10.chr	<0.25	<0.25	<0.25	<1.00	
1	12:20	ValeroPA_SRU_Run11.chr	<0.25	<0.25	<0.25	<1.00	Run No. 2 <1.00
1	12:31	ValeroPA_SRU_Run12.chr	<0.25	<0.25	<0.25	<1.00	
1	12:43	ValeroPA_SRU_Run13.chr	<0.25	<0.25	<0.25	<1.00	
1	12:54	ValeroPA_SRU_Run14.chr	<0.25	<0.25	<0.25	<1.00	
1	13:05	ValeroPA_SRU_Run15.chr	<0.25	<0.25	<0.25	<1.00	
1	13:17	ValeroPA_SRU_Run16.chr	<0.25	<0.25	<0.25	<1.00	
2	14:42	ValeroPA_SRU_Run24.chr	<0.25	<0.25	<0.25	<1.00	
2	15:01	ValeroPA_SRU_Run25.chr	<0.25	<0.25	<0.25	<1.00	
2	15:13	ValeroPA_SRU_Run26.chr	<0.25	<0.25	<0.25	<1.00	
2	15:24	ValeroPA_SRU_Run27.chr	<0.25	<0.25	<0.25	<1.00	
2	15:35	ValeroPA_SRU_Run28.chr	<0.25	<0.25	<0.25	<1.00	Run No. 3 <1.00
2	15:46	ValeroPA_SRU_Run29.chr	<0.25	<0.25	<0.25	<1.00	
2	15:58	ValeroPA_SRU_Run30.chr	<0.25	<0.25	<0.25	<1.00	
2	16:09	ValeroPA_SRU_Run31.chr	<0.25	<0.25	<0.25	<1.00	
2	16:20	ValeroPA_SRU_Run32.chr	<0.25	<0.25	<0.25	<1.00	
2	16:31	ValeroPA_SRU_Run33.chr	<0.25	<0.25	<0.25	<1.00	
2	16:43	ValeroPA_SRU_Run34.chr	<0.25	<0.25	<0.25	<1.00	
2	16:54	ValeroPA_SRU_Run35.chr	<0.25	<0.25	<0.25	<1.00	
2	17:05	ValeroPA_SRU_Run36.chr	<0.25	<0.25	<0.25	<1.00	
2	17:16	ValeroPA_SRU_Run37.chr	<0.25	<0.25	<0.25	<1.00	
2	17:28	ValeroPA_SRU_Run38.chr	<0.25	<0.25	<0.25	<1.00	Run No. 3 <1.00
2	17:39	ValeroPA_SRU_Run39.chr	<0.25	<0.25	<0.25	<1.00	
3	9:08	ValeroPA_SRU_Run49.chr	<0.25	<0.25	<0.25	<1.00	
3	9:19	ValeroPA_SRU_Run50.chr	<0.25	<0.25	<0.25	<1.00	
3	9:30	ValeroPA_SRU_Run51.chr	<0.25	<0.25	<0.25	<1.00	
3	9:41	ValeroPA_SRU_Run52.chr	<0.25	<0.25	<0.25	<1.00	
3	9:53	ValeroPA_SRU_Run53.chr	<0.25	<0.25	<0.25	<1.00	
3	10:04	ValeroPA_SRU_Run54.chr	<0.25	<0.25	<0.25	<1.00	
3	10:15	ValeroPA_SRU_Run55.chr	<0.25	<0.25	<0.25	<1.00	
3	10:26	ValeroPA_SRU_Run56.chr	<0.25	<0.25	<0.25	<1.00	
3	10:38	ValeroPA_SRU_Run57.chr	<0.25	<0.25	<0.25	<1.00	Run No. 3 <1.00
3	10:49	ValeroPA_SRU_Run58.chr	<0.25	<0.25	<0.25	<1.00	
3	11:00	ValeroPA_SRU_Run59.chr	<0.25	<0.25	<0.25	<1.00	
3	11:11	ValeroPA_SRU_Run60.chr	<0.25	<0.25	<0.25	<1.00	
3	11:23	ValeroPA_SRU_Run61.chr	<0.25	<0.25	<0.25	<1.00	
3	11:34	ValeroPA_SRU_Run62.chr	<0.25	<0.25	<0.25	<1.00	
3	11:45	ValeroPA_SRU_Run63.chr	<0.25	<0.25	<0.25	<1.00	
3	11:56	ValeroPA_SRU_Run64.chr	<0.25	<0.25	<0.25	<1.00	

## TRS STANDARDS PRETEST DATA



**Client:** Valero  
**Location:** Port Arthur, TX  
**Source:** 544 SRU  
**Date sampled:** 6/16-17/2011  
**Run Number:** 1  
**Compound Analyzed:** H<sub>2</sub>S, COS, CS<sub>2</sub>  
**Method:** USEPA Method 15  
**Instrument:** SRI-8610C  
**Detector:** GC-FPD  
**Units of Detection:** ppm

Carbonyl Sulfide Standards			
Standard No	Concentration	Area	Sq Rt Area Counts
1	0.0	0.0	0.0
2	12.9	548.4	23.4
3	25.8	2,095.7	45.8
4	51.5	7,711.8	87.8

Hydrogen Sulfide Standards			
Standard No	Concentration	Area	Sq Rt Area Counts
1	0.0	0.0	0.0
2	12.5	360.4	19.0
3	25.0	1,437.9	37.9
4	50.0	5,488.1	74.1

Carbon Disulfide Standards			
Standard No	Concentration	Area	Sq Rt Area Counts
1	0.0	0.0	0.0
2	13.2	1,474.4	38.4
3	26.5	5,418.0	73.6
4	52.9	19,502.3	139.7

Client: Valero

Location: Port Arthur, TX

Source: 544 SRU

Date: 6/16-17/2011

Pre-Calibration



Description	File Name	H <sub>2</sub> S Area (mv)	Square Root H <sub>2</sub> S Area	COS Area (mv)	Square Root COS Area	CS <sub>2</sub> Area (mv)	Square Root CS <sub>2</sub> Area
12.5		356.7	18.89	547.1	23.39	1455.9	38.16
		350.2	18.71	531.8	23.06	1463.9	38.26
		374.4	19.35	566.3	23.80	1503.4	38.77
Average		360.4	18.98	548.4	23.42	1474.4	38.40
Deviation (%)		3.47	1.73	3.15	1.58	1.72	0.86
25		1394.0	37.34	2053.1	45.31	5428.1	73.68
		1444.3	38.00	2110.6	45.94	5392.4	73.43
		1475.4	38.41	2123.5	46.08	5433.5	73.71
Average		1437.9	37.92	2095.7	45.78	5418.0	73.61
Deviation (%)		2.85	1.43	1.79	0.90	0.41	0.21
50		5362.8	73.23	7722.3	87.88	19297.3	138.91
		5593.1	74.79	7712.8	87.82	19540.4	139.79
		5508.3	74.22	7700.3	87.75	19669.1	140.25
Average		5488.1	74.08	7711.8	87.82	19502.3	139.65
Deviation (%)		2.12	1.06	0.14	0.07	0.97	0.48
0 ppm		0.0	0.00	0.0	0.00	0.0	0.00
		0.0	0.00	0.0	0.00	0.0	0.00
		0.0	0.00	0.0	0.00	0.0	0.00
Average		0.0	0.00	0.0	0.00	0.0	0.00

## Analytical Calculation Summary

### Calibration Standards Area Linear Regression Fit

**Client:** Valero  
**Location:** Port Arthur, TX  
**Source:** 544 SRU  
**Date sampled:** 6/16-17/2011  
**Run Number:** 1  
**Compound Analyzed:** Hydrogen Sulfide  
**Method:** USEPA Method 15  
**Instrument:** SRI-8610C  
**Detector:** GC-FPD  
**Units of Detection:** ppm

#### Calibration Standards

#### Statistical Analysis Summary

Standard #	Standard Peak Area (mv)	Square Root Peak Area (mv)	Standard Concentration (ppm)
1	0.0	0.0	0.0
2	360.4	19.0	12.5
3	1,437.9	37.9	25.0
4	5,488.1	74.1	50.0

$\Sigma xy$ : 4889.38  
 $\Sigma x$ : 131.0  
 $\Sigma y$ : 87.5  
 $\Sigma x^2$ : 7286  
 $\Sigma (x)^2$ : 17157  
 $N$ : 4  
 $m$ : 0.67534  
 $b$ : -0.24008

## Analytical Calculation Summary

### Calibration Standards Area Linear Regression Fit

**Client:** Valero  
**Location:** Port Arthur, TX  
**Source:** 544 SRU  
**Date sampled:** 6/16-17/2011  
**Run Number:** 1  
**Compound Analyzed:** Carbonyl Sulfide  
**Method:** USEPA Method 15  
**Instrument:** SRI-8610C  
**Detector:** GC-FPD  
**Units of Detection:** ppm

#### Calibration Standards

#### Statistical Analysis Summary

Standard #	Standard Peak Area (mv)	Square Root Peak Area (mv)	Standard Concentration (ppm)	
1	0.0	0.0	0.0	$\Sigma xy$ : 6004.64
2	548.4	23.4	12.9	$\Sigma x$ : 157.0
3	2,095.7	45.8	25.8	$\Sigma y$ : 90.1515
4	7,711.8	87.8	51.5	$\Sigma x^2$ : 10356
				$\Sigma (x)^2$ : 24653
				N: 4
				m: 0.58816
				b: -0.54926

## Analytical Calculation Summary

### Calibration Standards Area Linear Regression Fit

**Client:** Valero  
**Location:** Port Arthur, TX  
**Source:** 544 SRU  
**Date sampled:** 6/16-17/2011  
**Run Number:** 1  
**Compound Analyzed:** Carbon Disulfide  
**Method:** USEPA Method 15  
**Instrument:** SRI-8610C  
**Detector:** GC-FPD  
**Units of Detection:** ppm

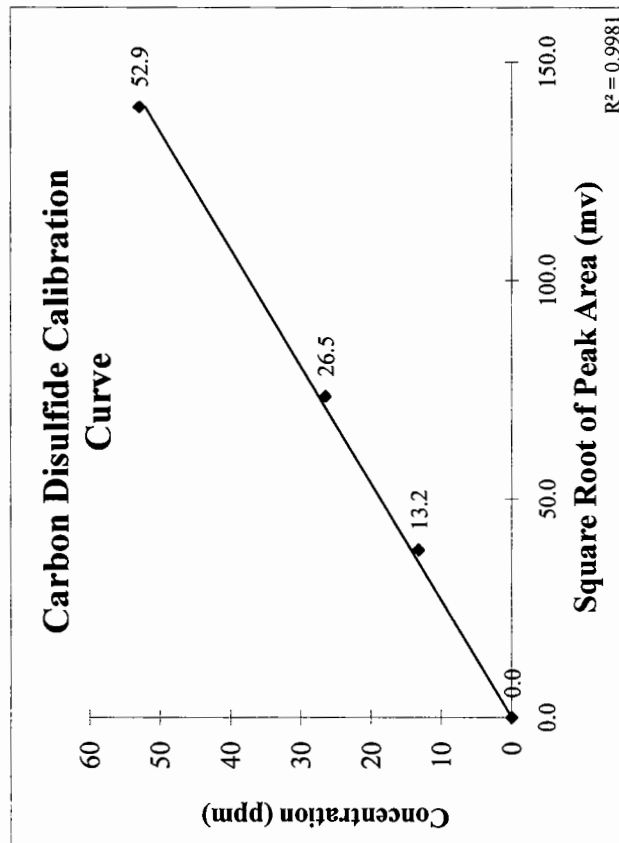
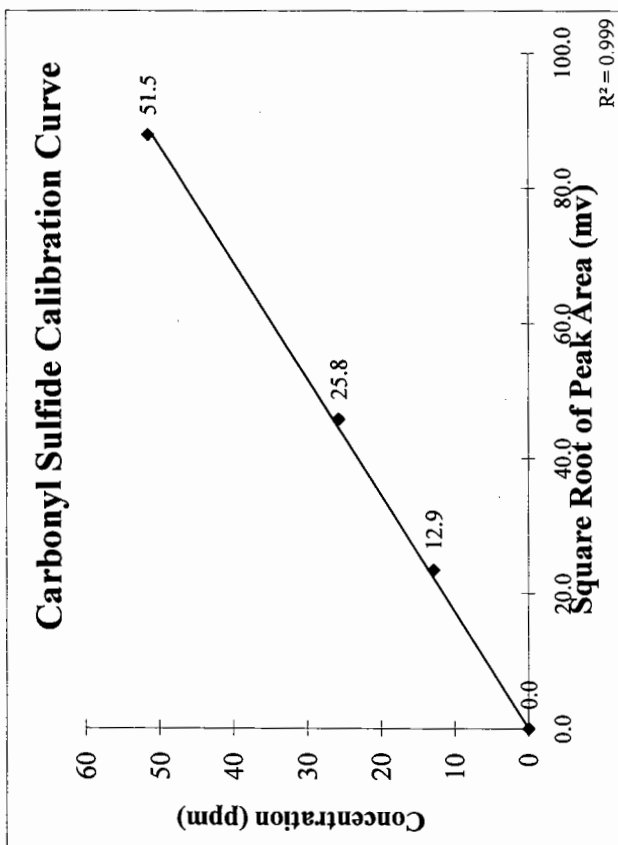
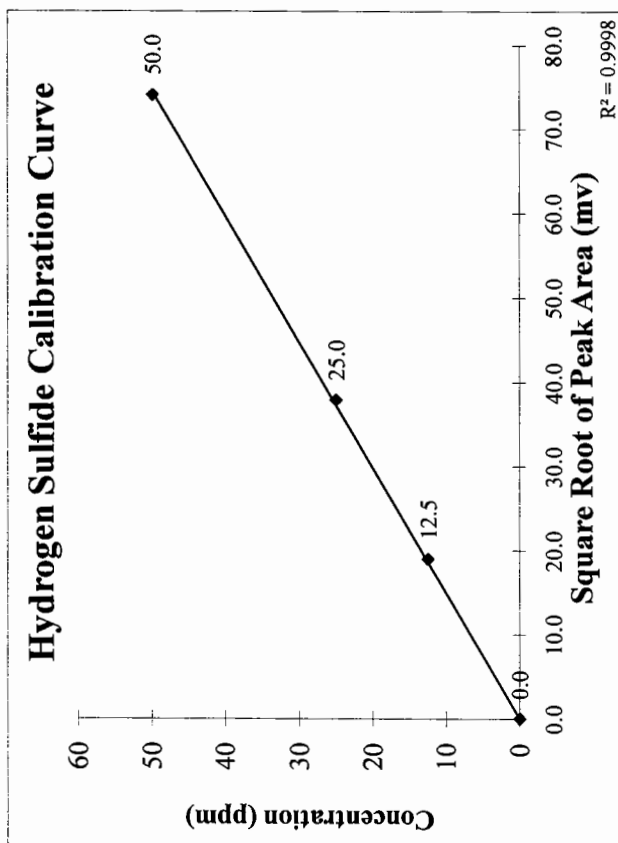
#### Calibration Standards

#### Statistical Analysis Summary

Standard #	Standard Peak Area (mv)	Square Root Peak Area (mv)	Standard Concentration (ppm)	
1	0.0	0.0	0.0	$\Sigma xy$ : 9847.67
2	1,474.4	38.4	13.2	$\Sigma x$ : 251.7
3	5,418.0	73.6	26.5	$\Sigma y$ : 92.6263
4	19,502.3	139.7	52.9	$\Sigma x^2$ : 26395
				$\Sigma (x)^2$ : 63330
				N: 4
				m: 0.38063
				b: -0.79016

## Calibration Curves

6/16-17/2011



Client: Valero  
 Location: Port Arthur, TX  
 Source: 544 SRU  
 Date: 6/16-17/2011

Runs 1 & 2 Post Calibration Check

Description	File Name	H <sub>2</sub> S Area (mv)	Square Root H <sub>2</sub> S Area
12.5		344.8	18.57
		346.6	18.62
		348.6	18.67
Average		346.7	18.62
Deviation (%)		0.55	0.27
25		1437.9	37.92
		1453.0	38.12
		1466.0	38.29
Average		1452.3	38.11
Deviation (%)		0.97	0.48
50		5355.1	73.18
		5169.2	71.90
		5197.1	72.09
Average		5240.5	72.39
Deviation (%)		1.91	0.95
0 ppm		0.0	0.00
		0.0	0.00
		0.0	0.00
Average		0.0	0.00

Runs 3 Post Calibration Check

Description	File Name	H <sub>2</sub> S Area (mv)	Square Root H <sub>2</sub> S Area
12.5		344.4	18.56
		344.5	18.56
		342.6	18.51
Average		343.8	18.54
Deviation (%)		0.31	0.16
25		1438.7	37.93
		1423.4	37.73
		1453.7	38.13
Average		1438.6	37.93
Deviation (%)		1.06	0.53
50		5359.3	73.21
		5318.2	72.93
		5341.5	73.09
Average		5339.7	73.07
Deviation (%)		0.39	0.19
0 ppm		0.0	0.00
		0.0	0.00
		0.0	0.00
Average		0.0	0.00



## TRS STANDARDS POSTTEST DATA

Client: Valero  
Location: Port Arthur, TX  
Source: 544 SRU  
Date sampled: 6/16-17/2011  
Run Number: 1  
Compound Analyzed: H<sub>2</sub>S, COS, CS<sub>2</sub>  
Method: USEPA Method 15  
Instrument: SRI-8610C  
Detector: GC-FPD  
Units of Detection: ppm

Runs 1 & 2 Post

Hydrogen Sulfide Standards				Drift %
Standard No	Concentration	Area	Sq Rt Area Counts	
1	0.0	0.0	0.0	0.0
2	12.5	346.7	18.6	3.8
3	25.0	1,452.3	38.1	-1.0
4	50.0	5,240.5	72.4	4.5

Runs 3 Post

Hydrogen Sulfide Standards				Drift %
Standard No	Concentration	Area	Sq Rt Area Counts	
1	0.0	0.0	0.0	0.0
2	12.5	343.8	18.5	4.6
3	25.0	1,438.6	37.9	0.0
4	50.0	5,339.7	73.1	2.7

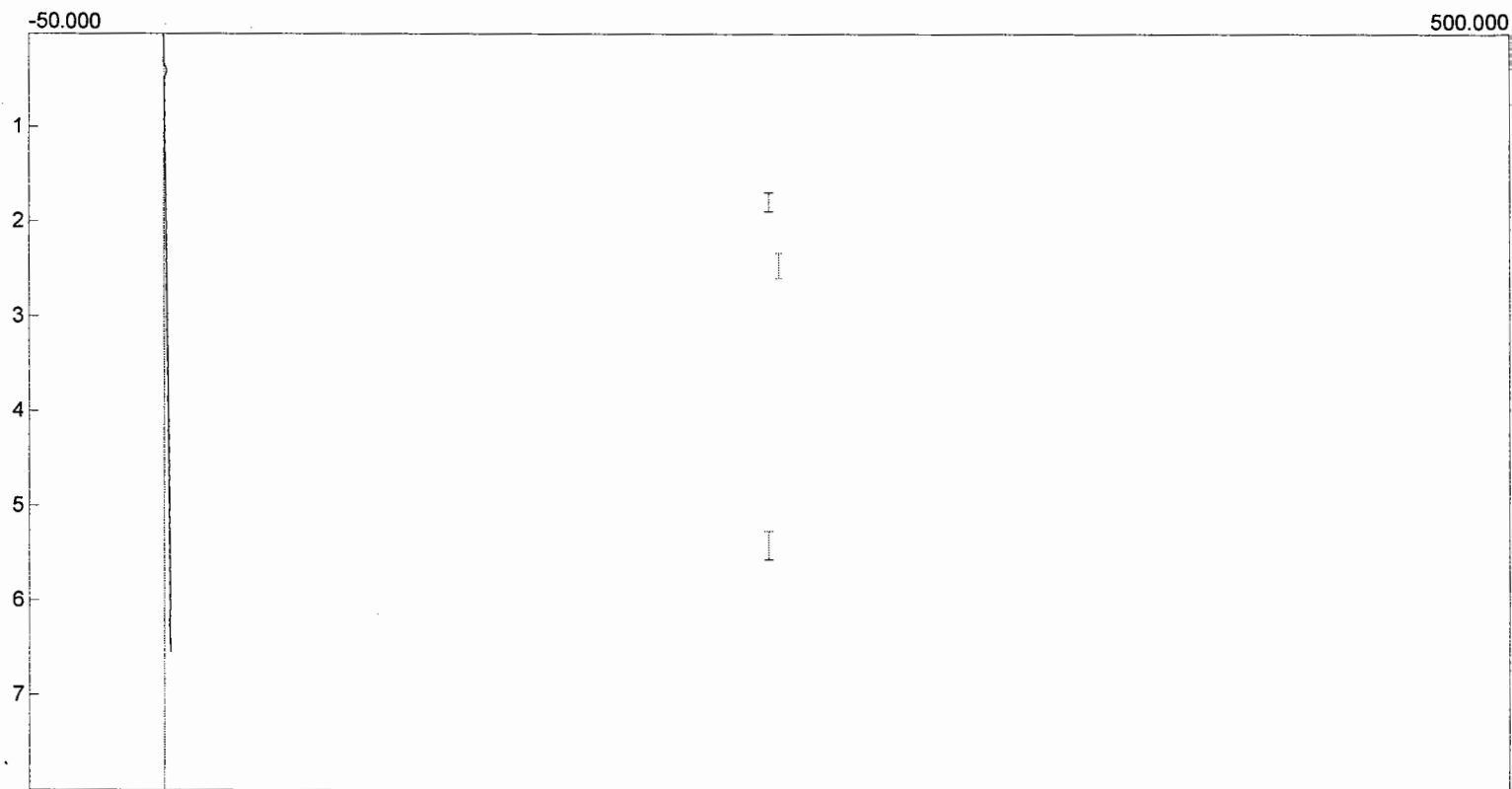
## TRS LINE LOSS DATA



**Client:** Valero  
**Location:** Port Arthur, TX  
**Source:** 544 SRU  
**Date sampled:** 6/16-17/2011  
**Run Number:** 1  
**Compound Analyzed:** H<sub>2</sub>S, COS, CS<sub>2</sub>  
**Method:** USEPA Method 15  
**Instrument:** SRI-8610C  
**Detector:** GC-FPD  
**Units of Detection:** ppm

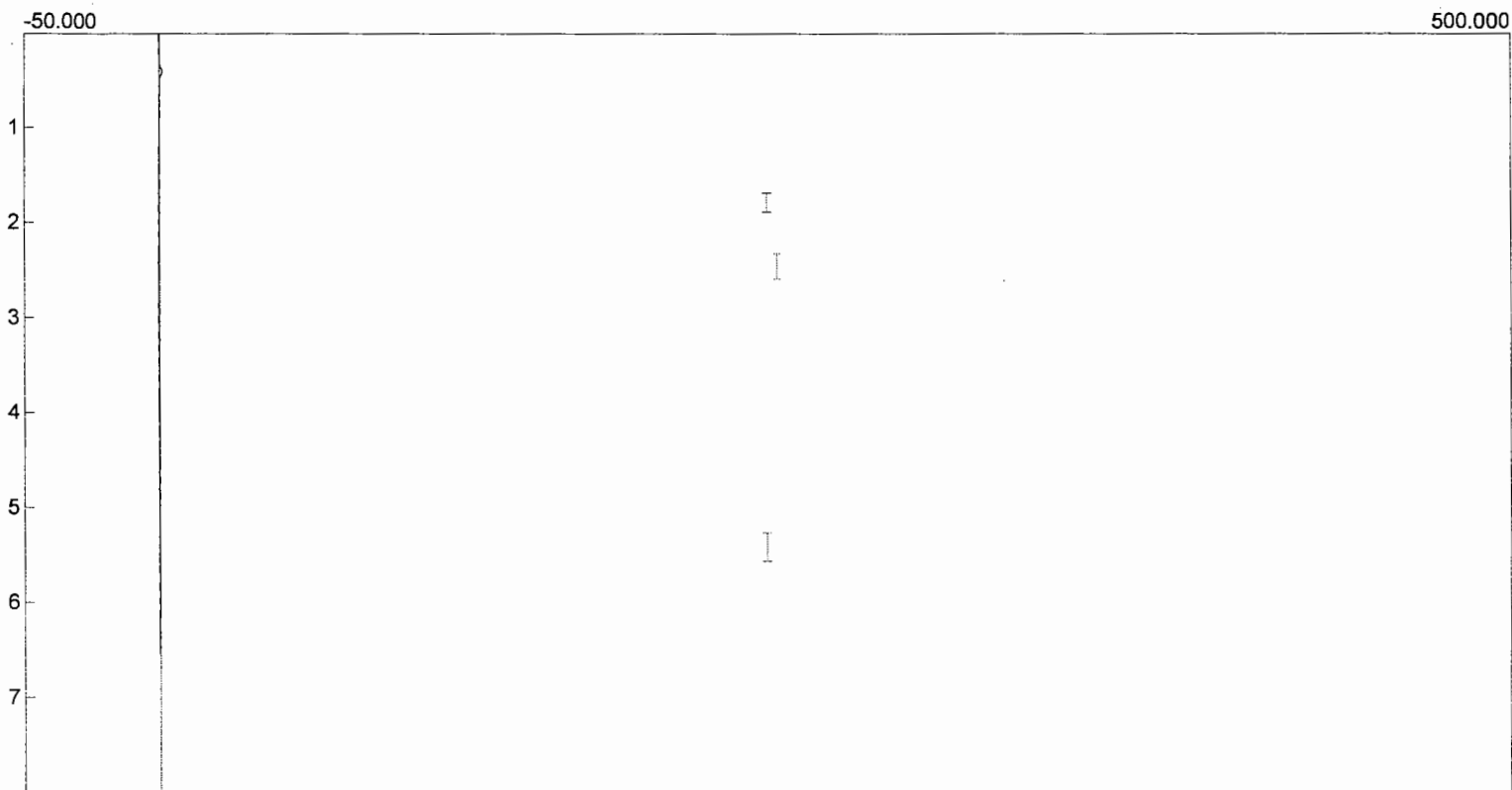
<b>Trial #1 Compound</b>	<b>Injected Concentration</b>	<b>Area Counts</b>	<b>Measured Concentration</b>	<b>% Loss (-) or % Gain (+)</b>
Run 1 Post H <sub>2</sub> S	20.0	804.3	18.91	-5.4
Run 2 Post H <sub>2</sub> S	20.0	809.1	18.97	-5.1
Run 3 Post H <sub>2</sub> S	20.0	805.8	18.93	-5.3

Lab name: ARI Environmental, Inc.  
 Client: Valero, Port Arthur  
 Client ID: 544 SRU  
 Collected: 6/16/11  
 Method: USEPA M15  
 Description: FPD  
 Data file: ValeroPA\_Cal01.chr ()  
 Sample: Zero Pre  
 Operator: JAB



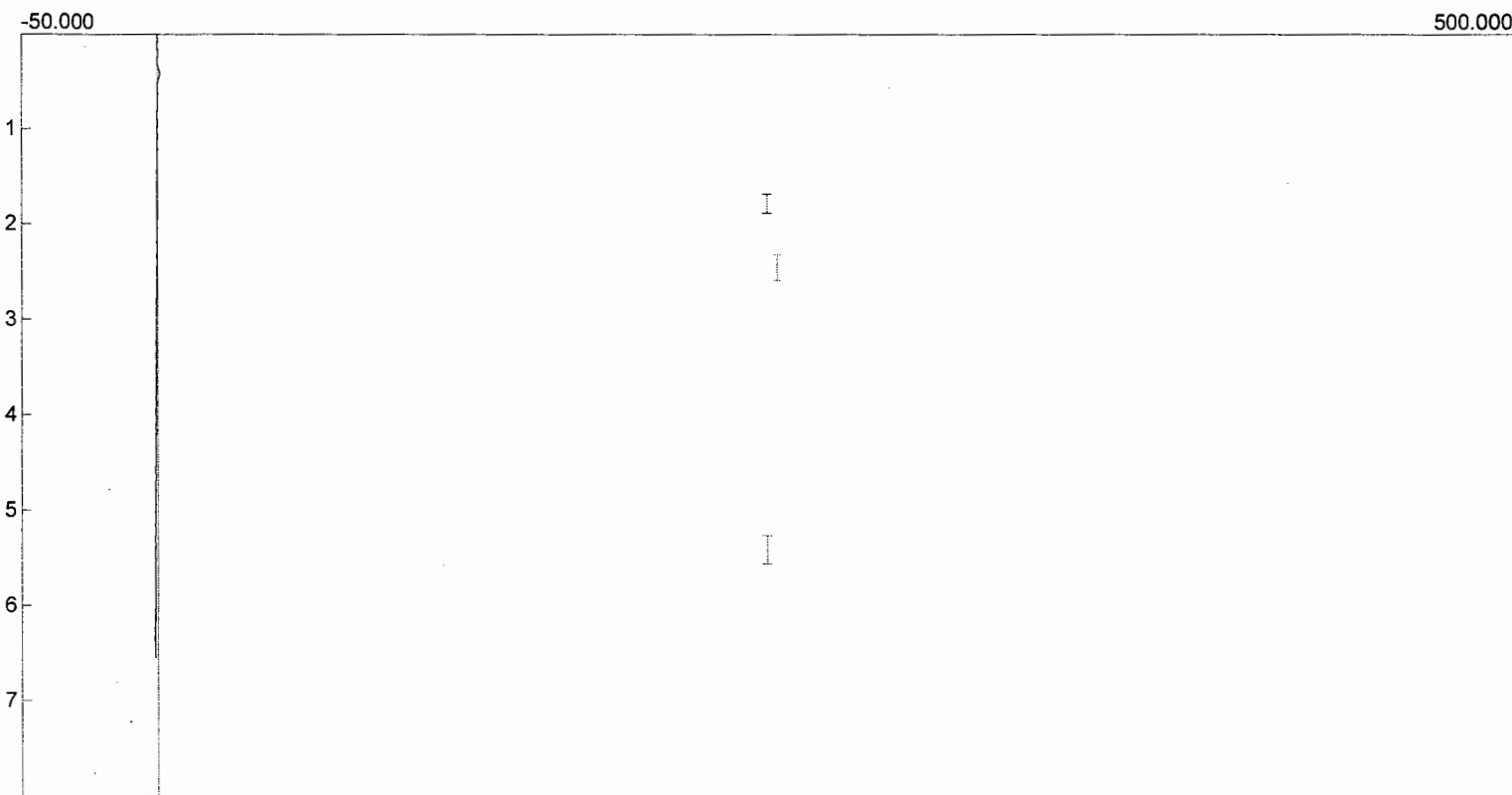
Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_Cal02.CHR ()  
Sample: Zero Pre  
Operator: JAB



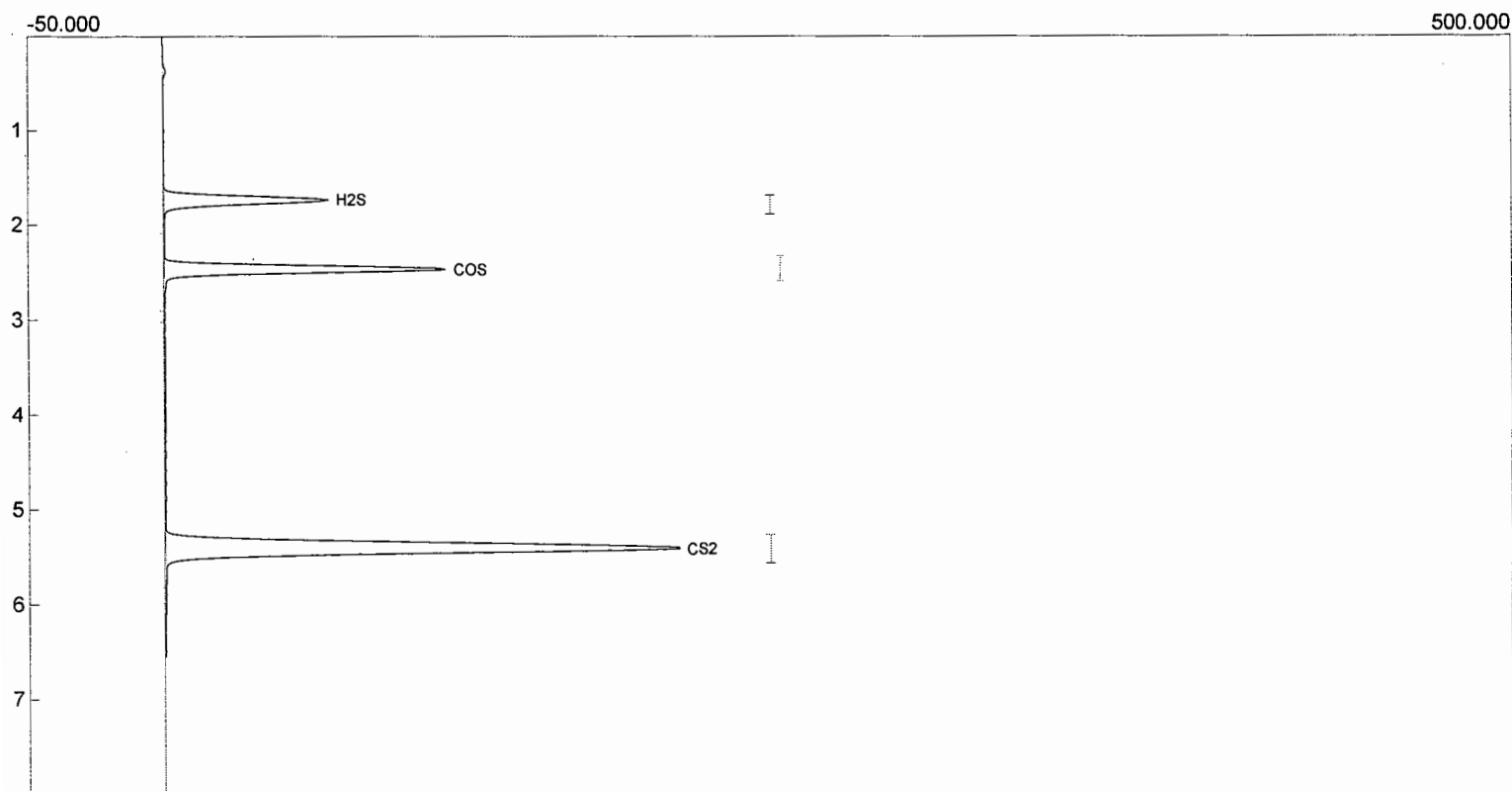
Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
 Client: Valero, Port Arthur  
 Client ID: 544 SRU  
 Collected: 6/16/11  
 Method: USEPA M15  
 Description: FPD  
 Data file: ValeroPA\_Cal03.CHR ()  
 Sample: Zero Pre  
 Operator: JAB



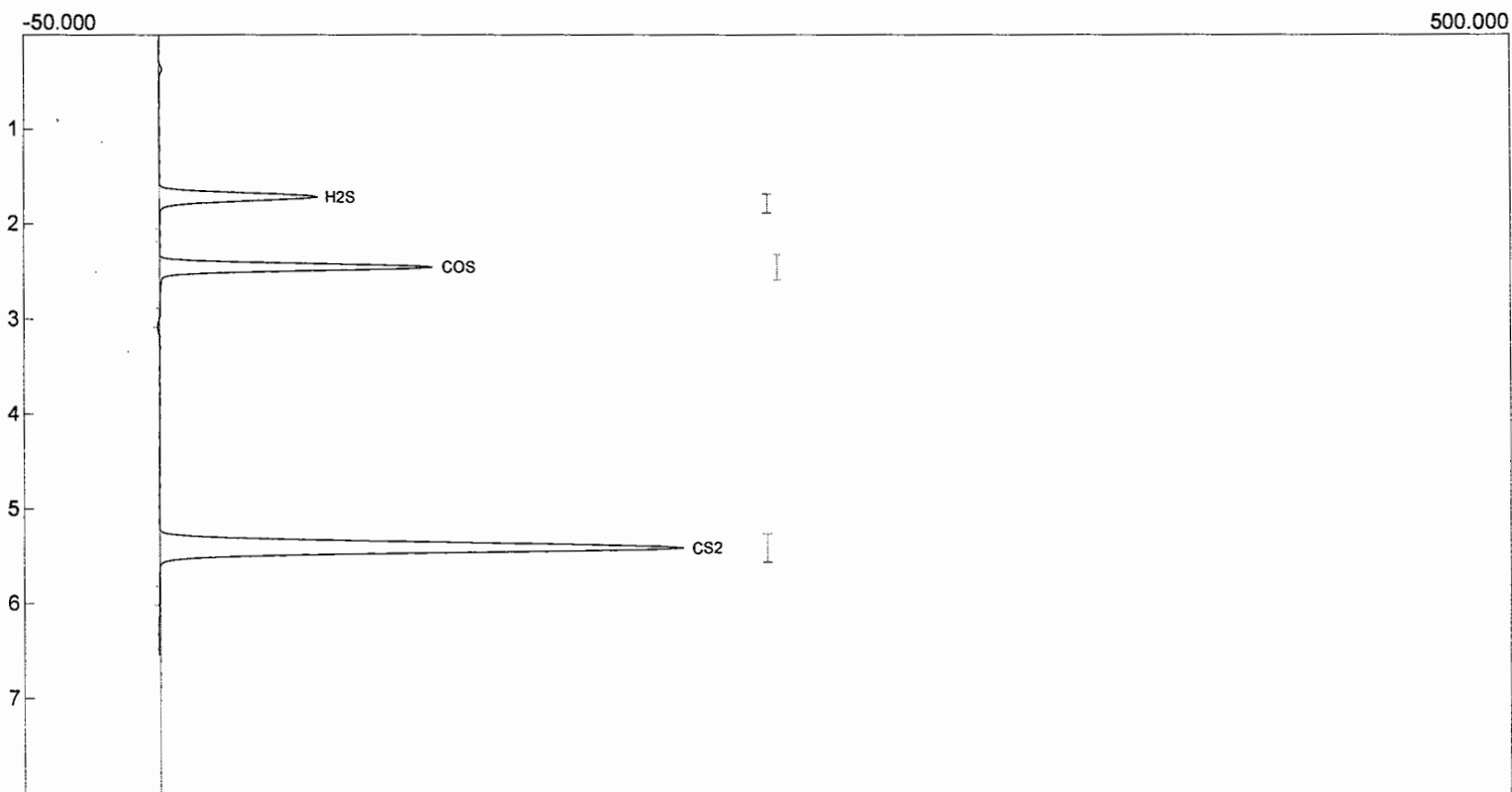
Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_Cal12.CHR ()  
Sample: 12.5 ppm Cal Pre  
Operator: JAB



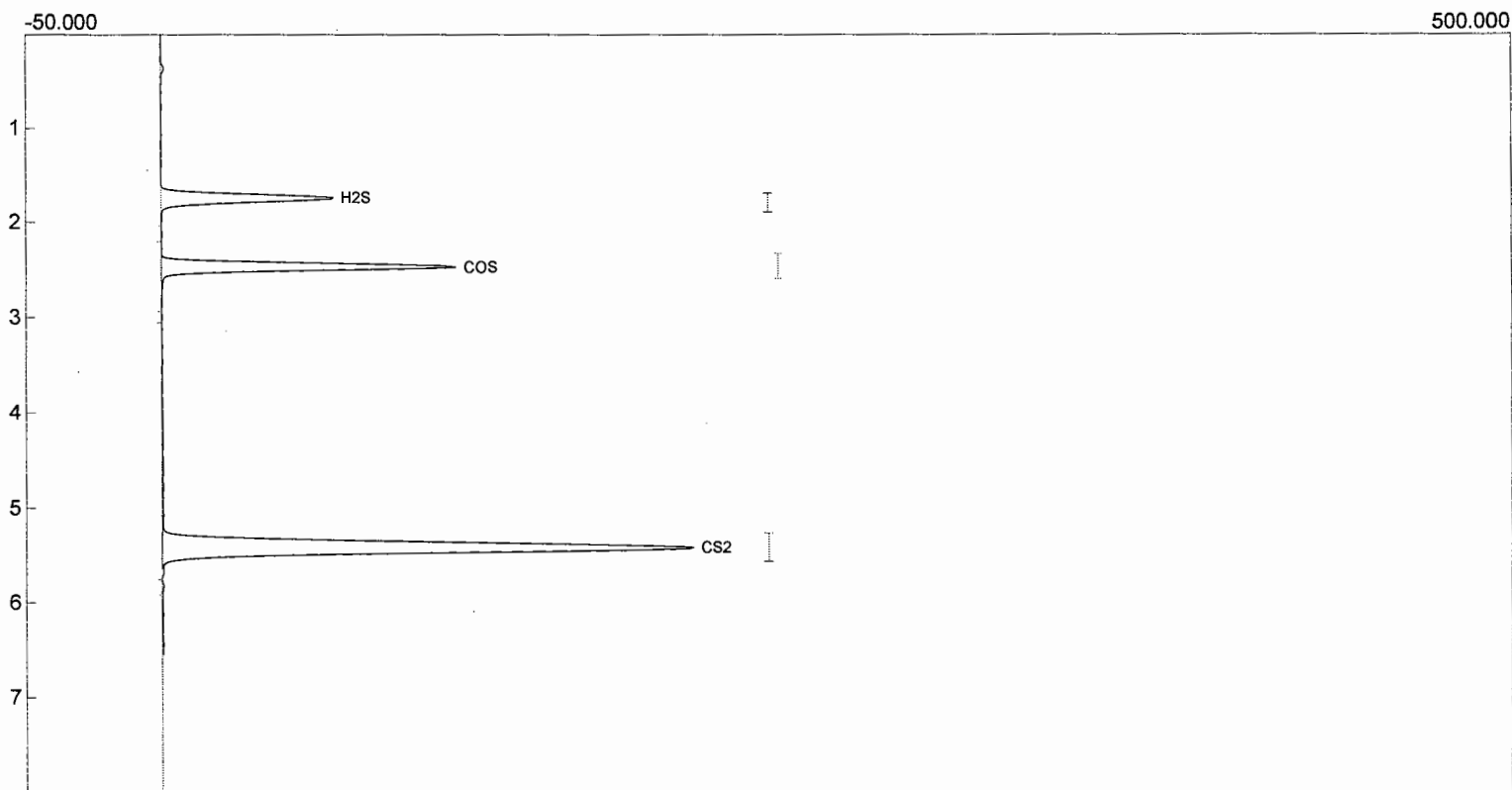
Component	Area
H2S	356.6695
COS	547.0525
CS2	1455.9470
	2359.6690

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_Cal13.CHR ()  
Sample: 12.5 ppm Cal Pre  
Operator: JAB



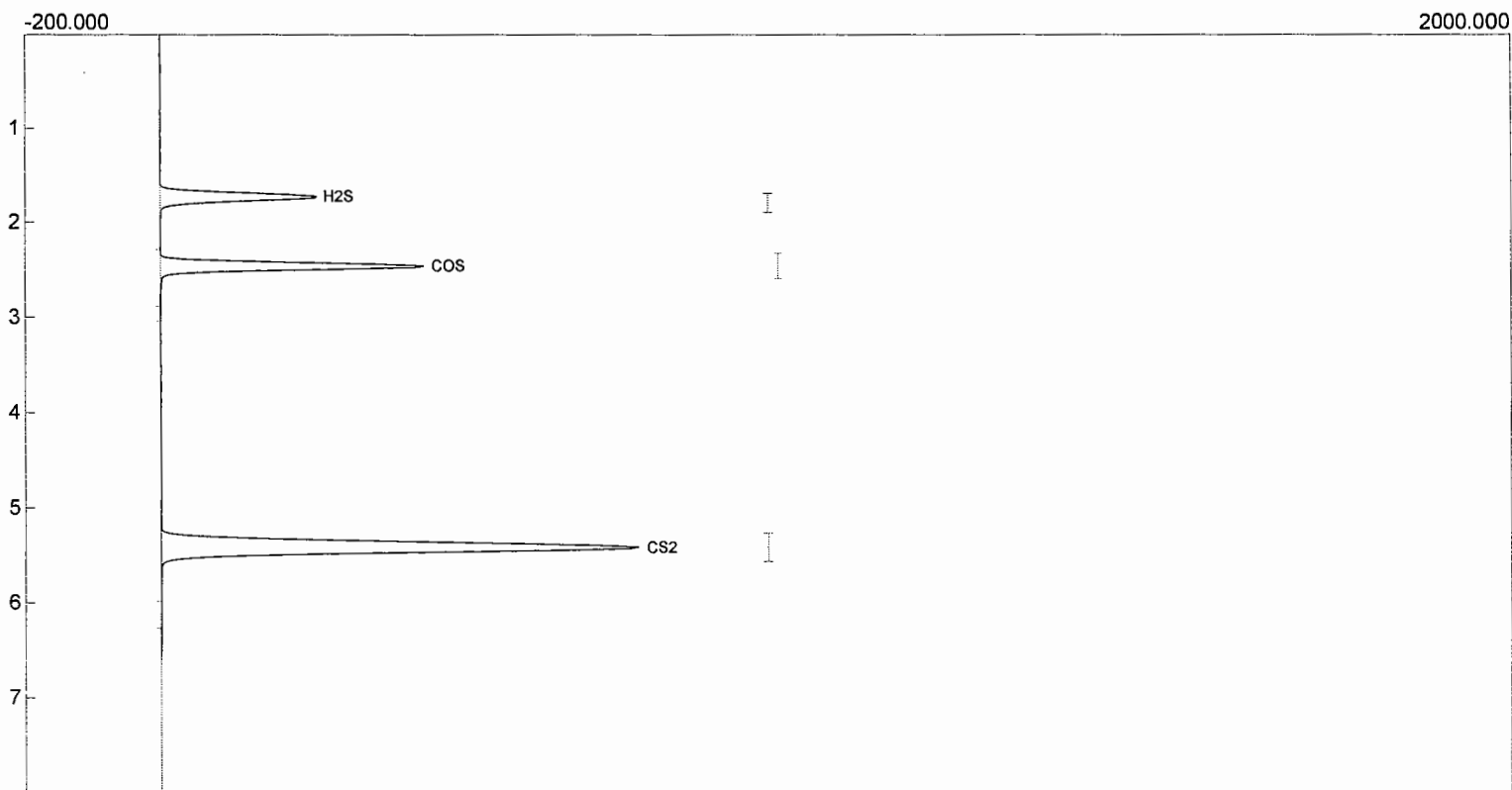
Component	Area
H2S	350.1650
COS	531.8185
CS2	1463.8635
	2345.8470

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_Cal14.CHR ()  
Sample: 12.5 ppm Cal Pre  
Operator: JAB



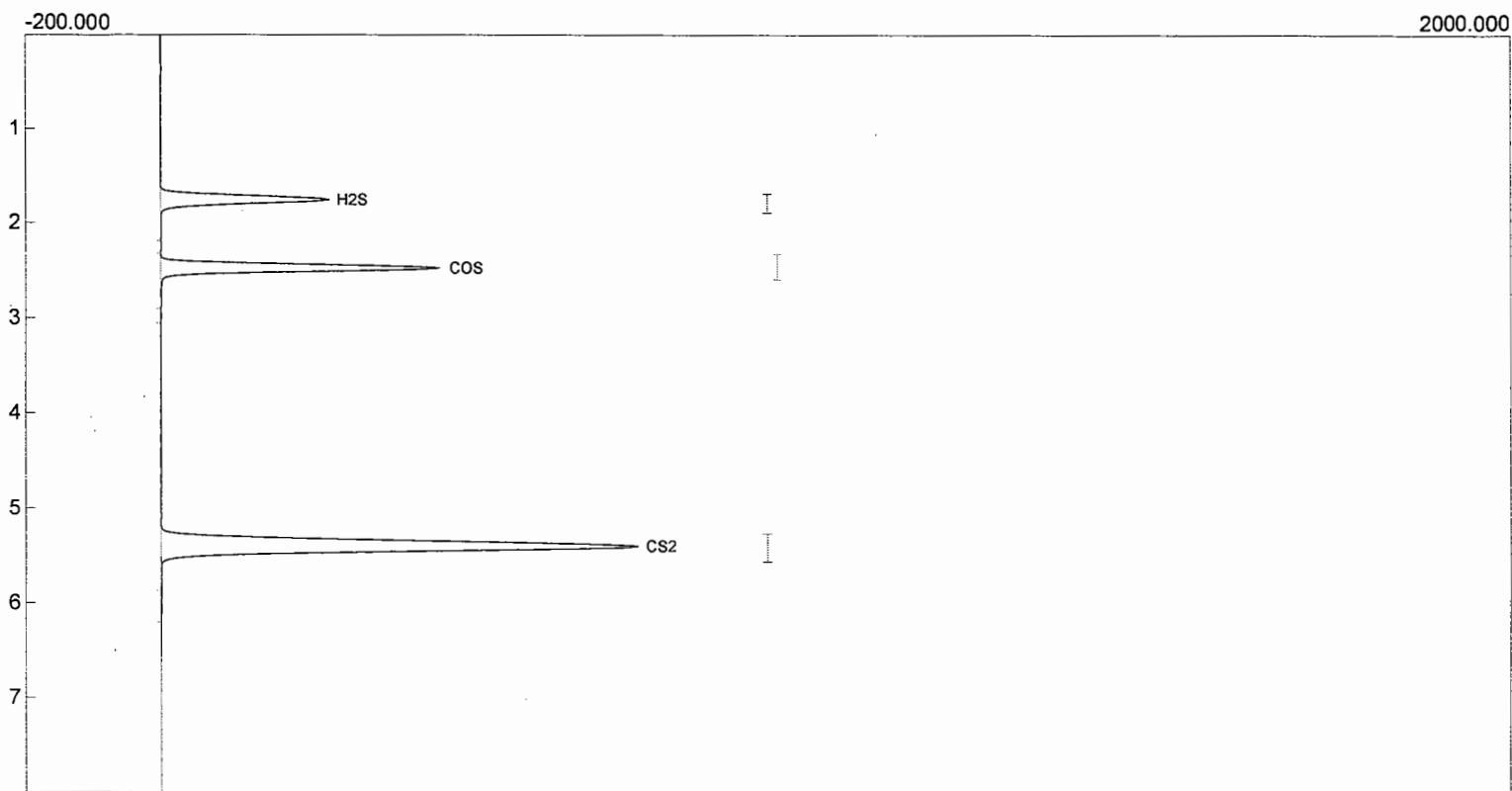
Component	Area
H2S	374.3540
COS	566.3225
CS2	1503.3700
	2444.0465

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_Cal09.CHR ()  
Sample: 25 ppm Cal Pre  
Operator: JAB



Component	Area
H2S	1394.0480
COS	2053.0810
CS2	5428.0500
	8875.1790

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_Cal10.CHR ()  
Sample: 25 ppm Cal Pre  
Operator: JAB



Component	Area
H2S	1444.3075
COS	2110.5755
CS2	5392.3555
	8947.2385

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/16/11

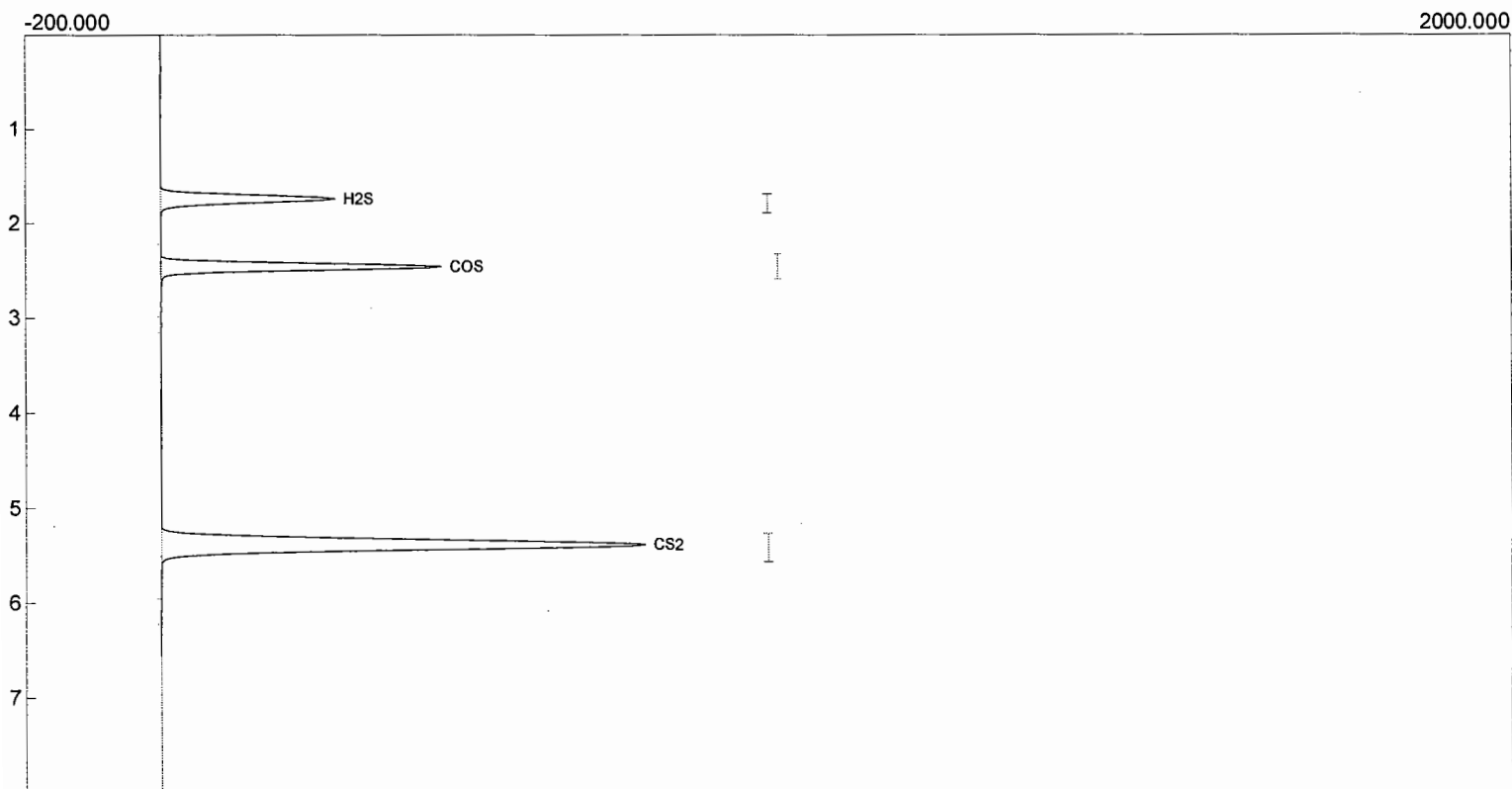
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_Cal11.CHR ()

Sample: 25 ppm Cal Pre

Operator: JAB



Component	Area
H2S	1475.3930
COS	2123.4960
CS2	5433.4875
	9032.3765

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/16/11

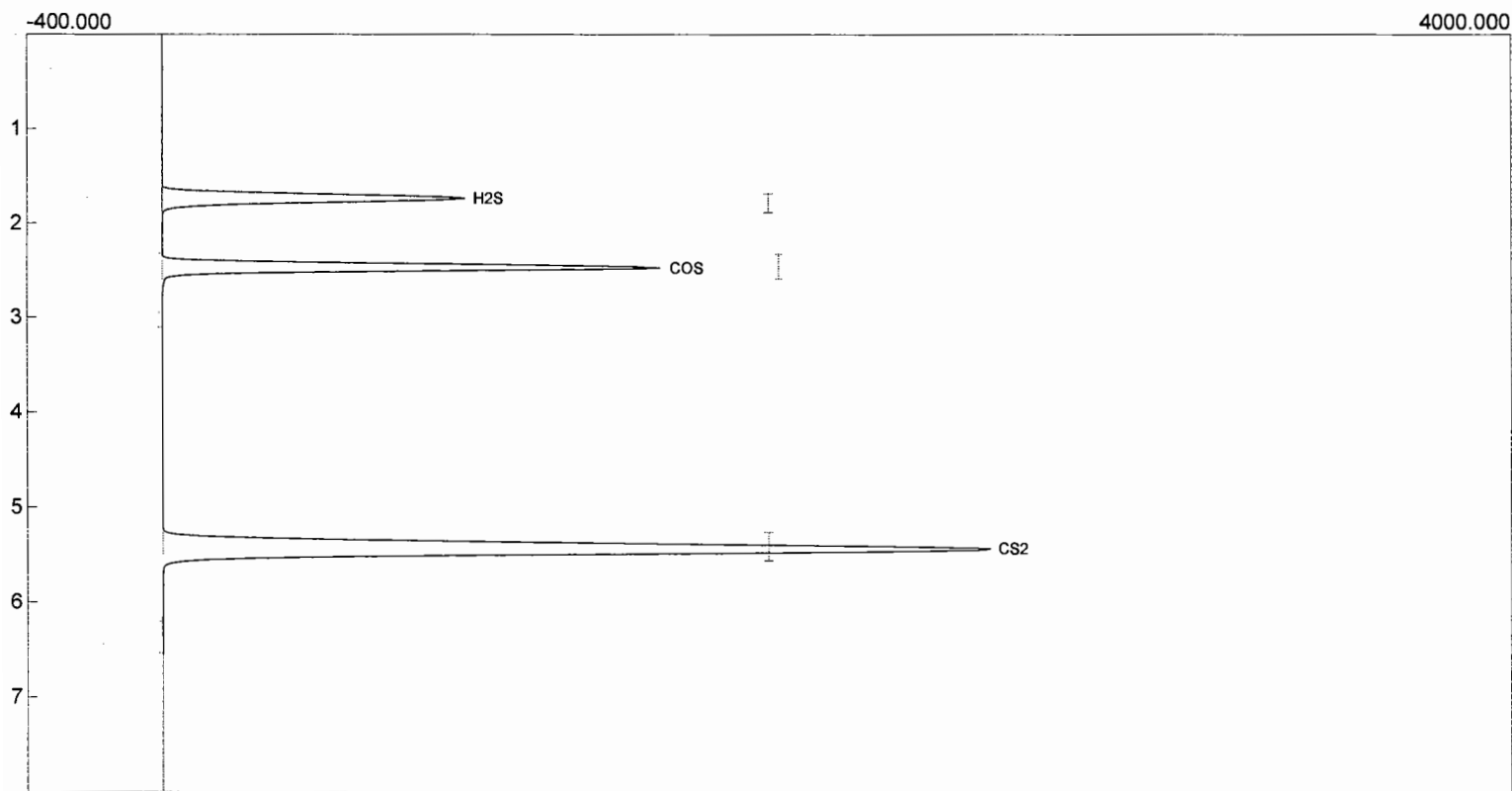
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_Cal06.CHR ()

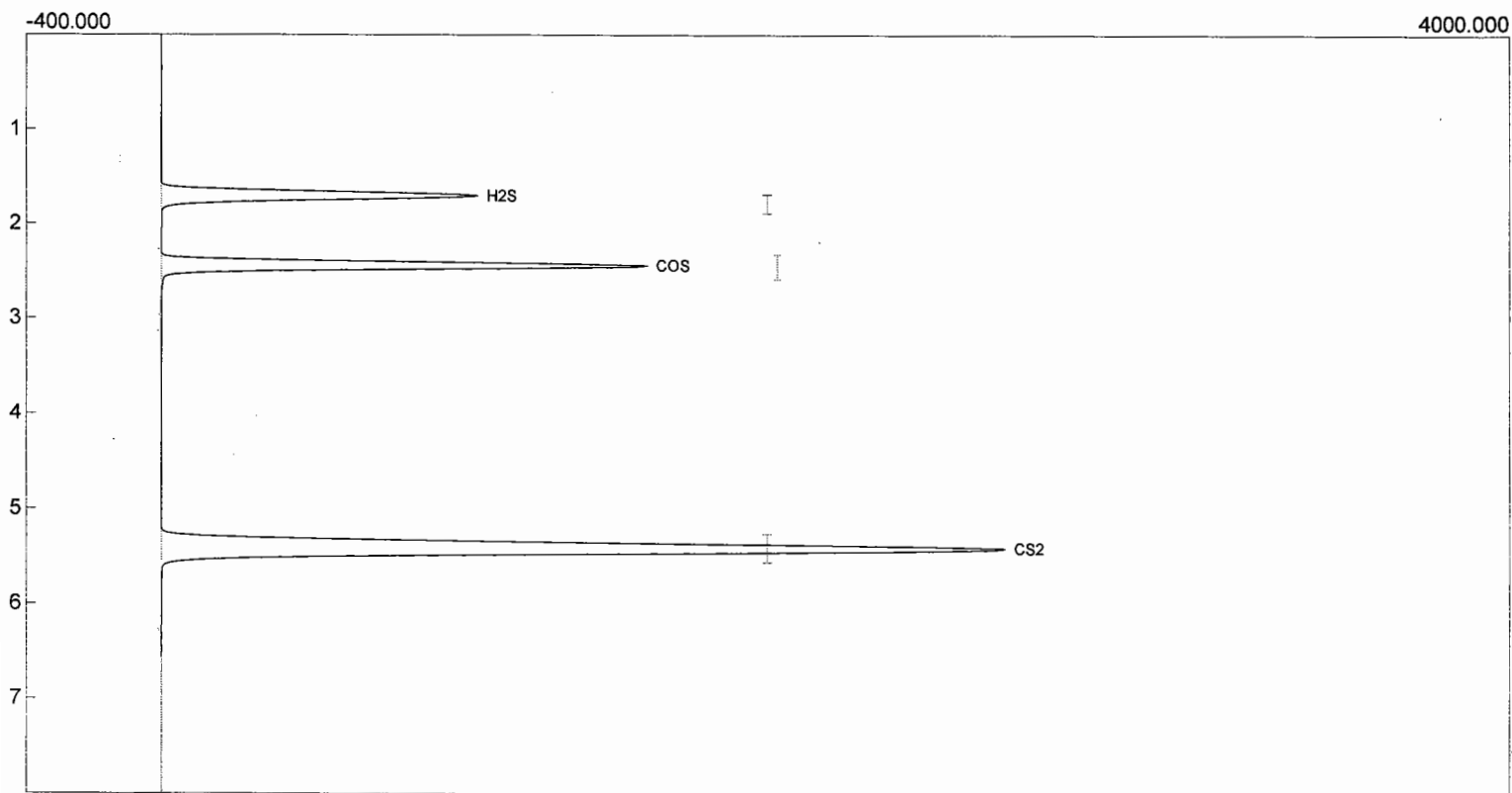
Sample: 50 ppm Cal Pre

Operator: JAB



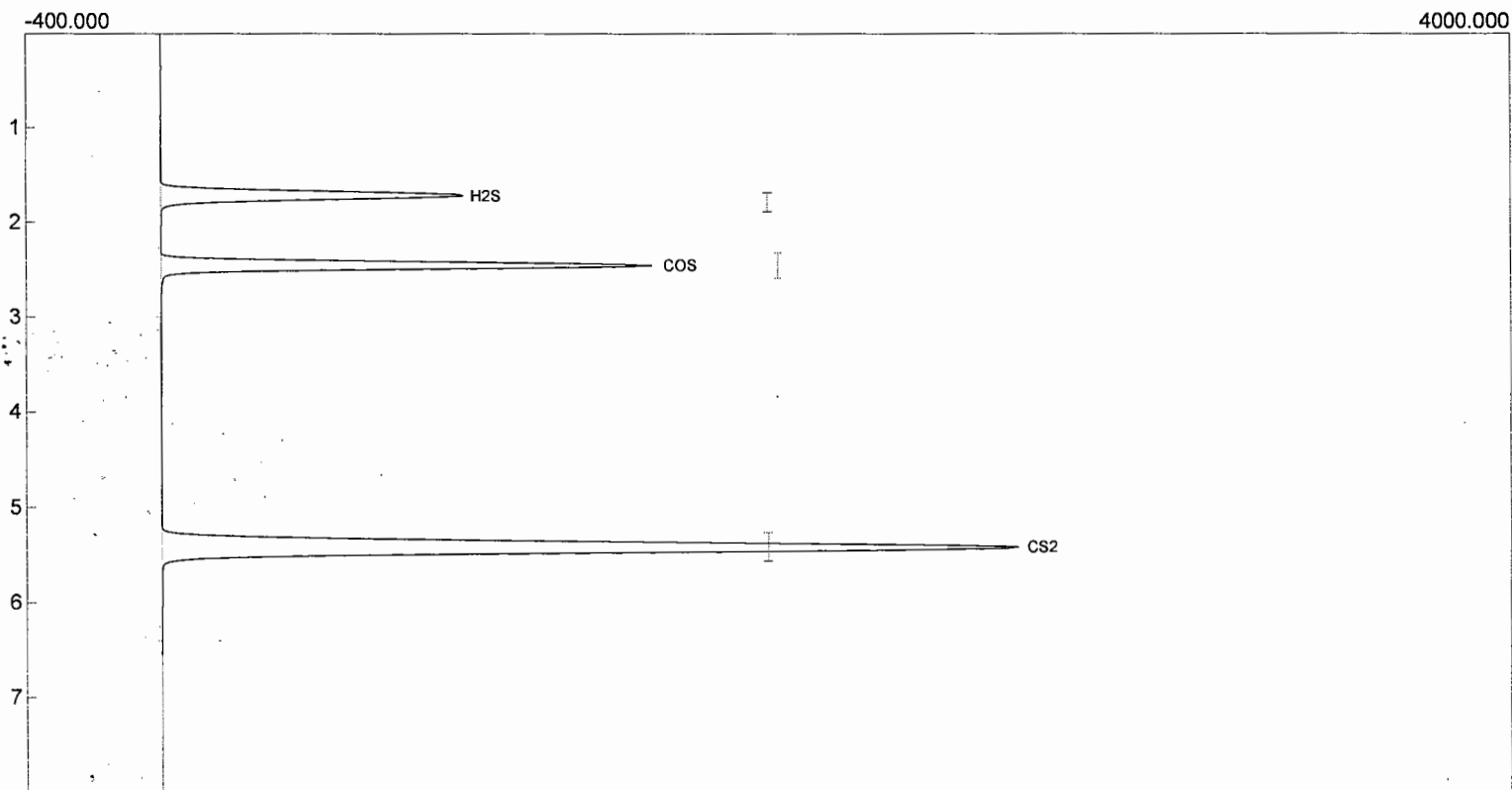
Component	Area
H2S	5362.8270
COS	7722.2580
CS2	19297.3285
	32382.4135

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_Cal07.CHR ()  
Sample: 50 ppm Cal Pre  
Operator: JAB



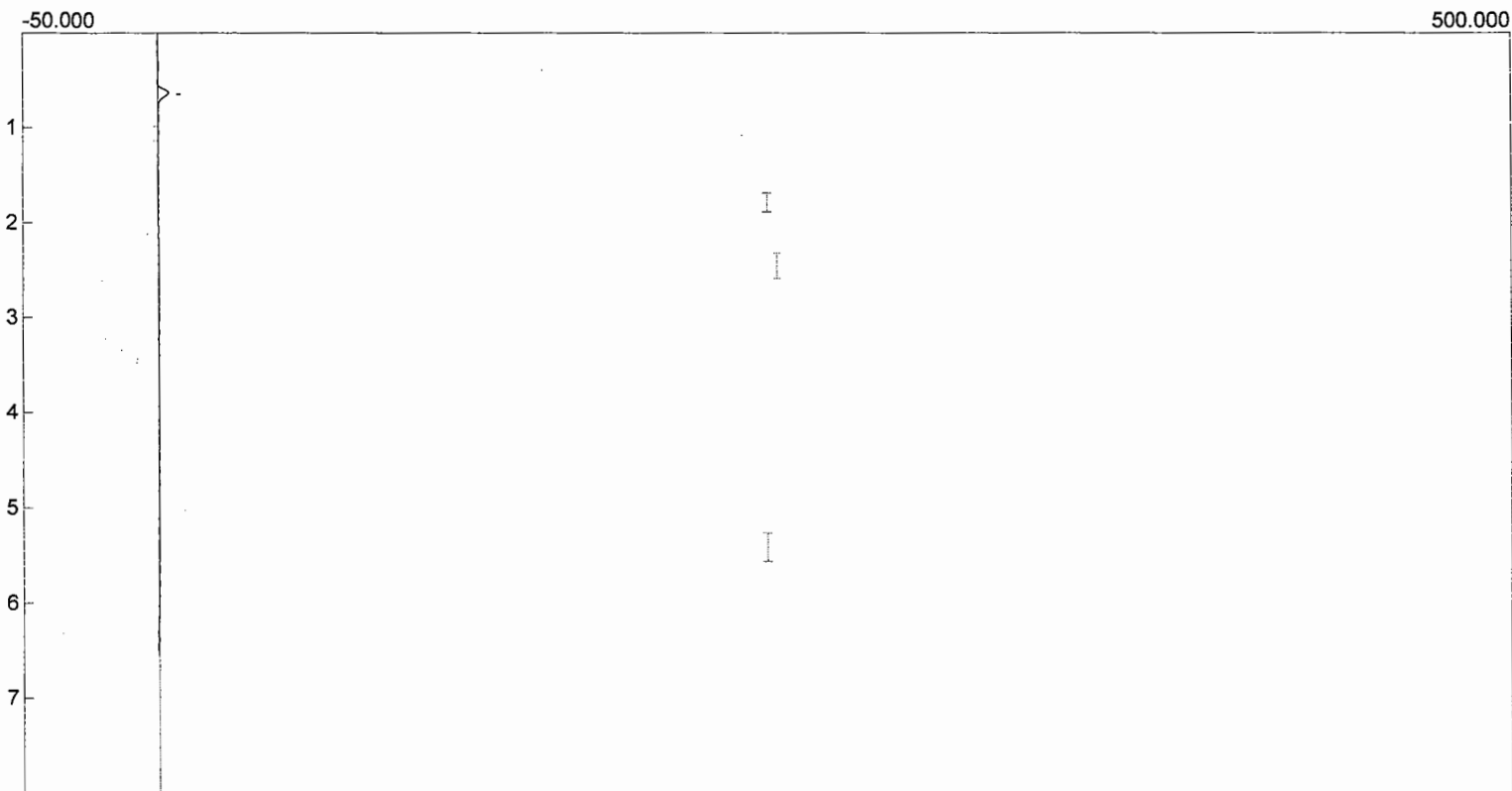
Component	Area
H2S	5593.1270
COS	7712.7910
CS2	19540.4080
	32846.3260

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_Cal08.CHR ()  
Sample: 50 ppm Cal Pre  
Operator: JAB



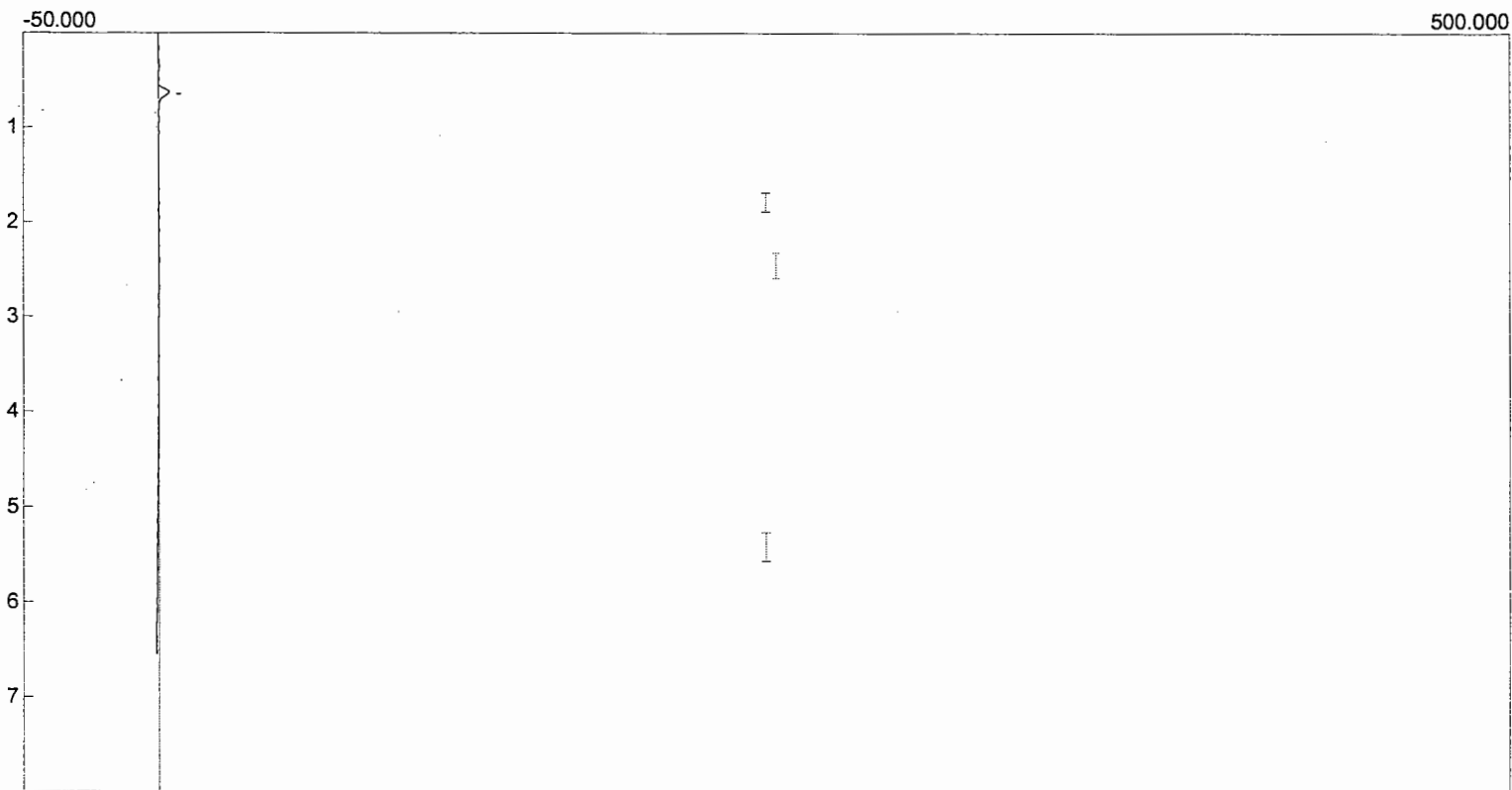
Component	Area
H2S	5508.3480
COS	7700.2820
CS2	19669.0610
	32877.6910

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_SRU\_Run01.chr ()  
Sample: Run No. 1  
Operator: JAB



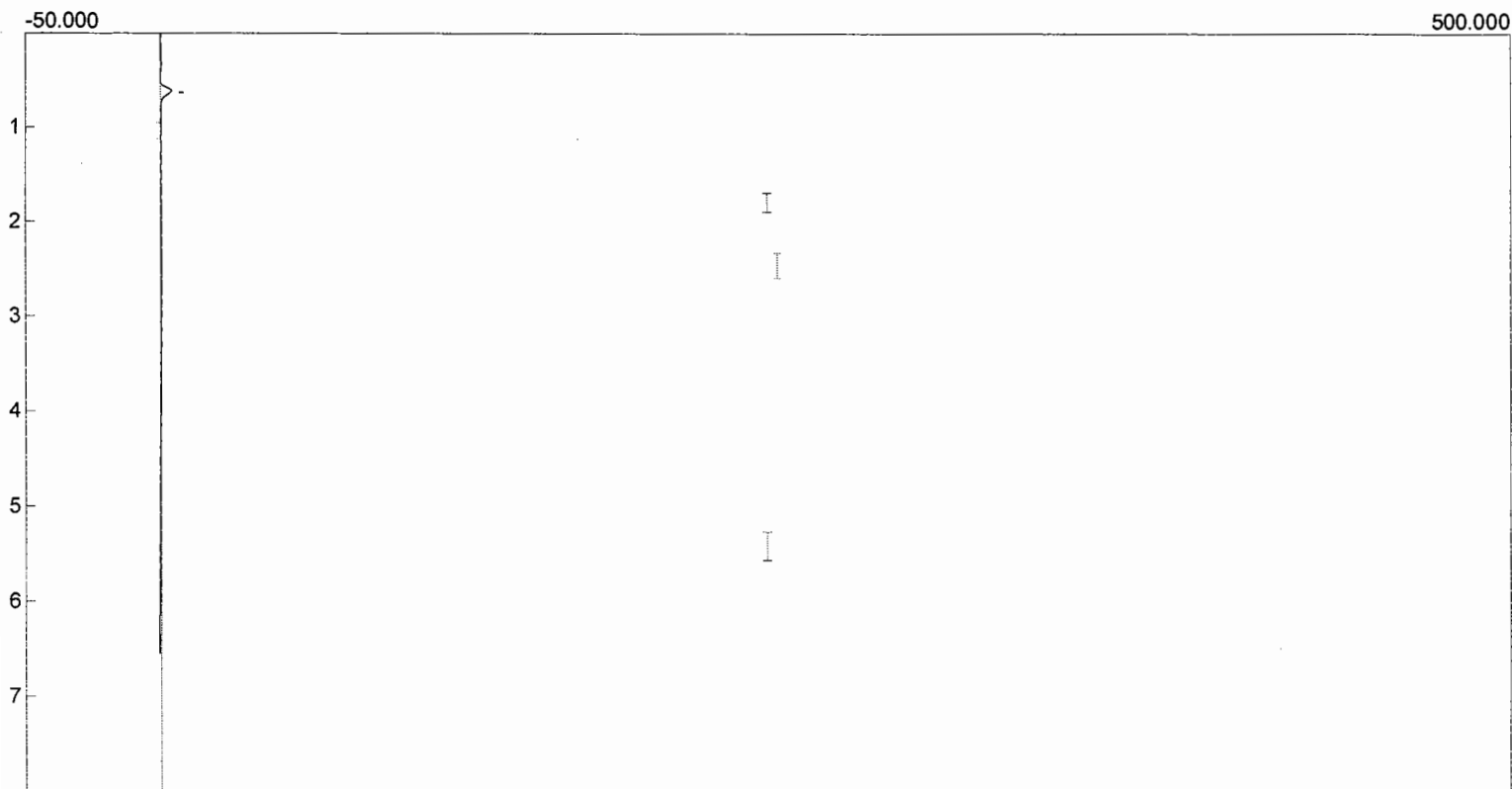
Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_SRU\_Run02.CHR ()  
Sample: Run No. 1  
Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_SRU\_Run03.CHR ()  
Sample: Run No. 1  
Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/16/11

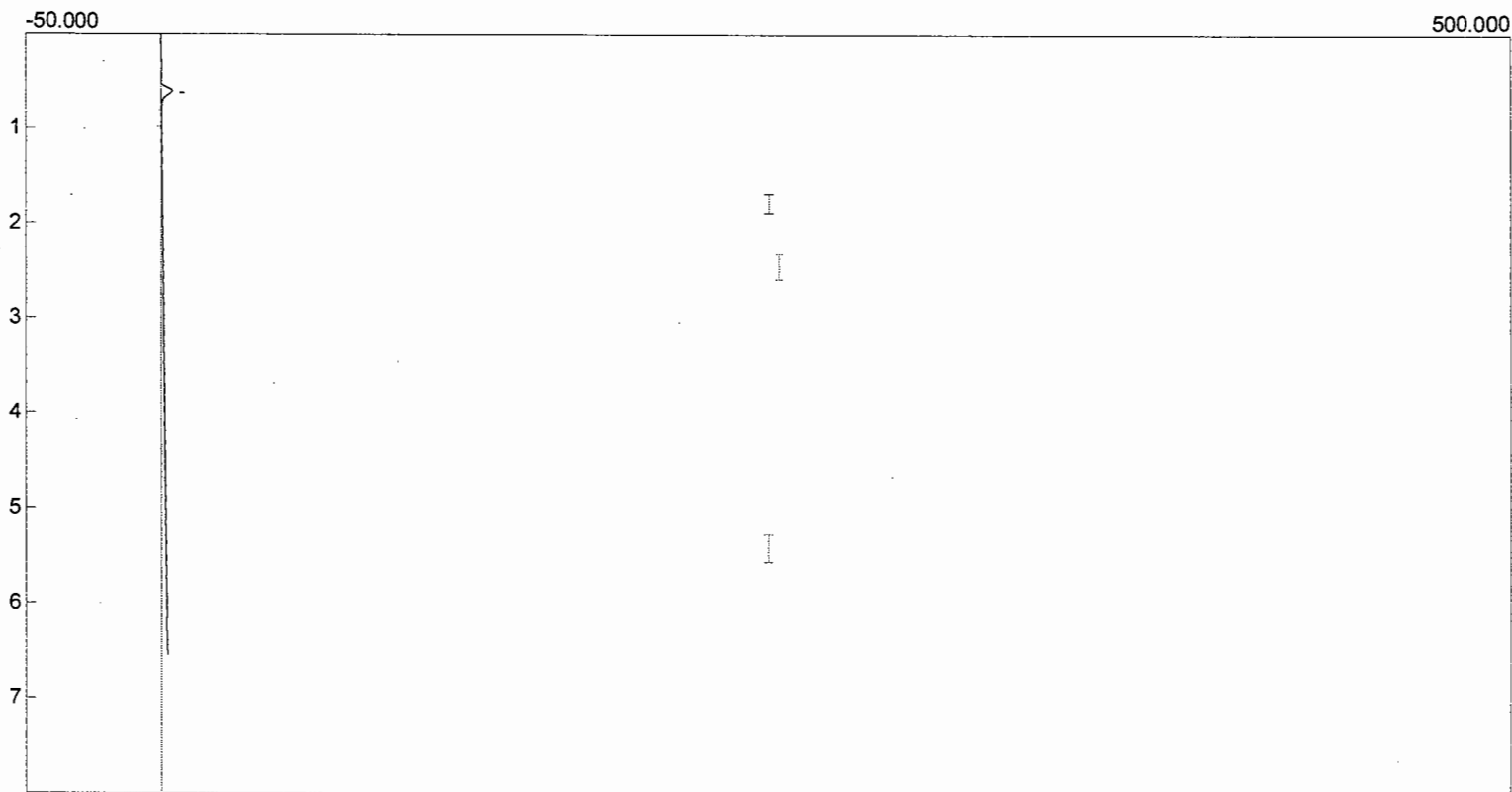
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run04.CHR ()

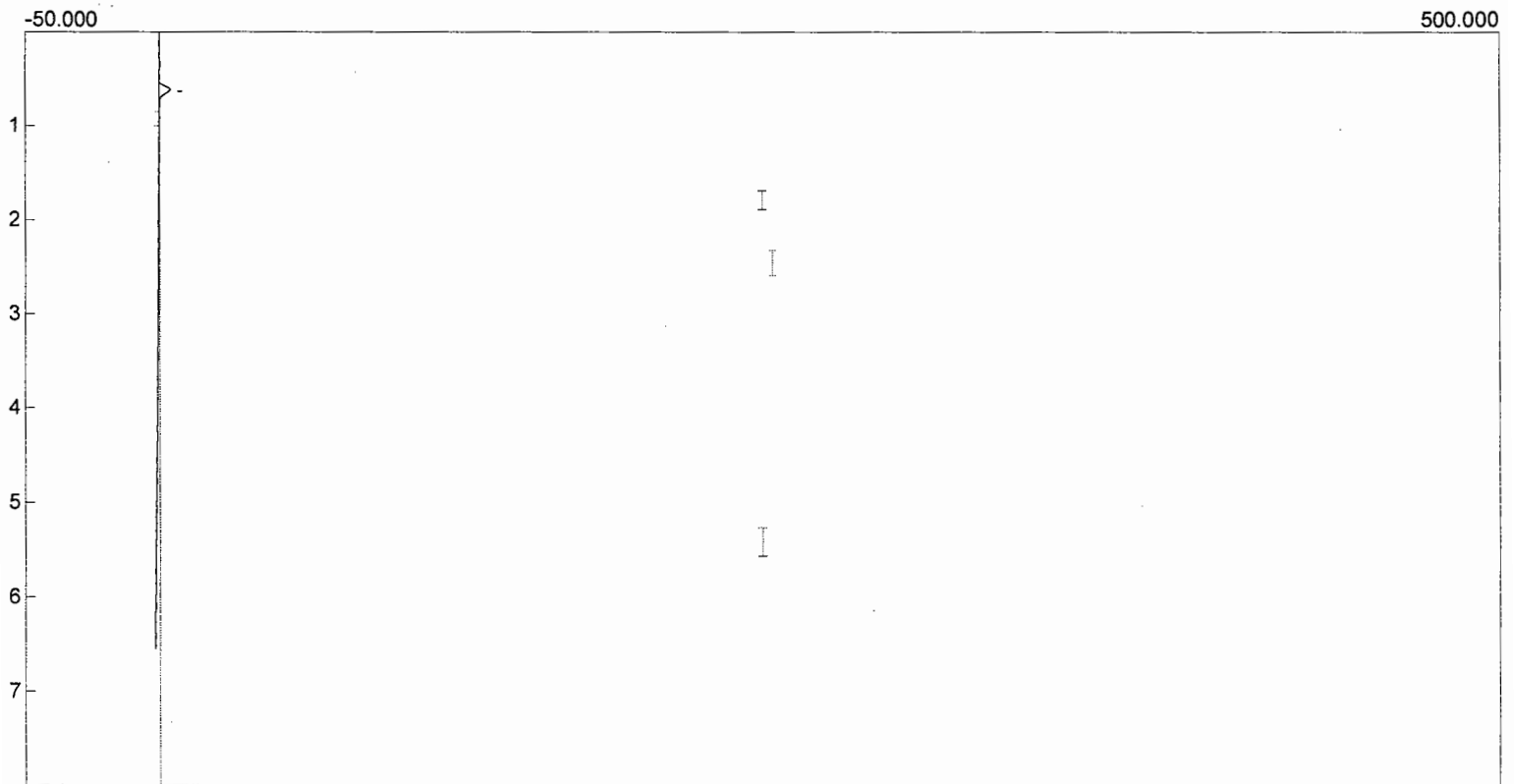
Sample: Run No. 1

Operator: JAB



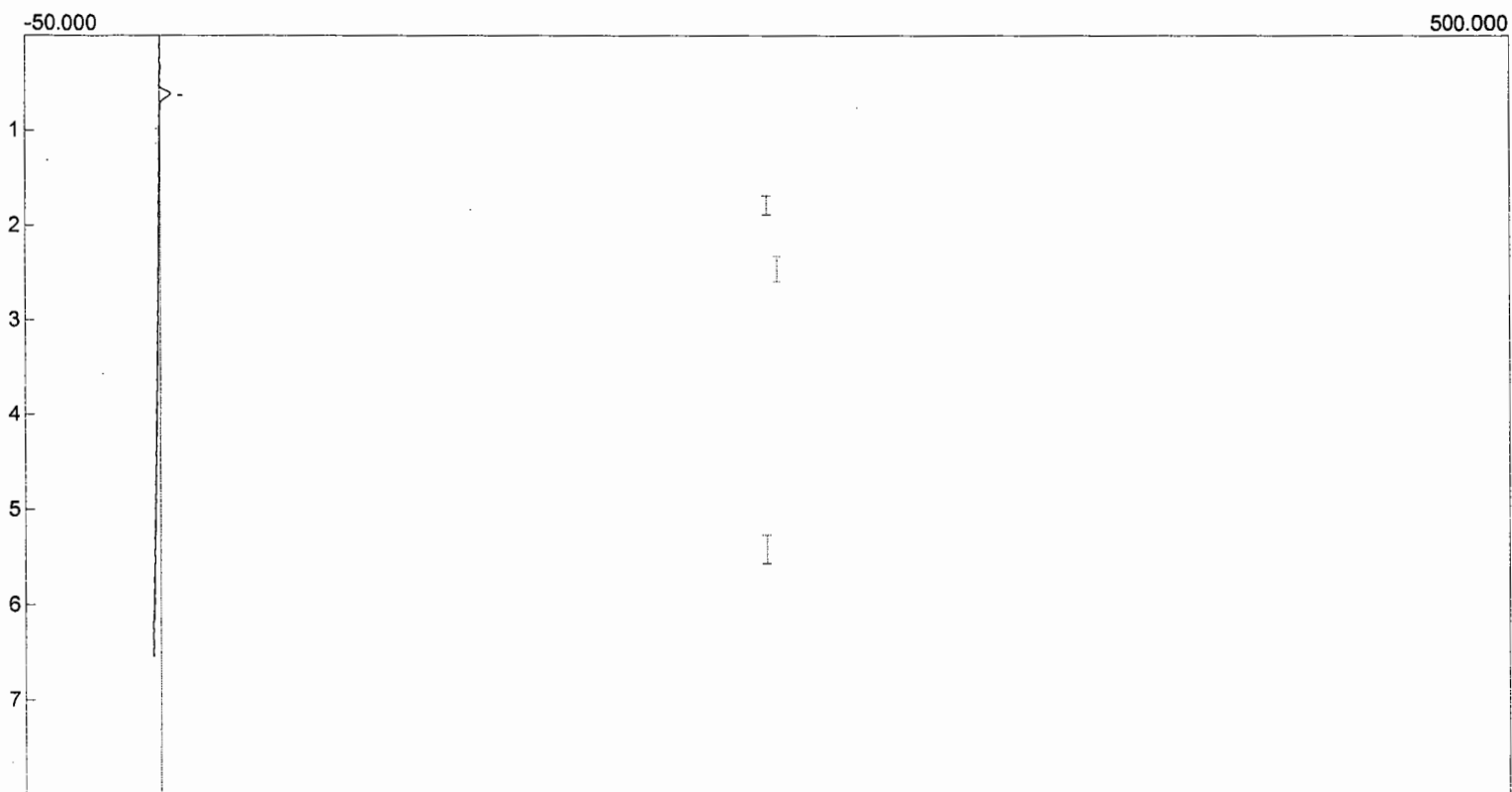
Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_SRU\_Run05.CHR ()  
Sample: Run No. 1  
Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
 Client: Valero, Port Arthur  
 Client ID: 544 SRU  
 Collected: 6/16/11  
 Method: USEPA M15  
 Description: FPD  
 Data file: ValeroPA\_SRU\_Run06.CHR ()  
 Sample: Run No. 1  
 Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/16/11

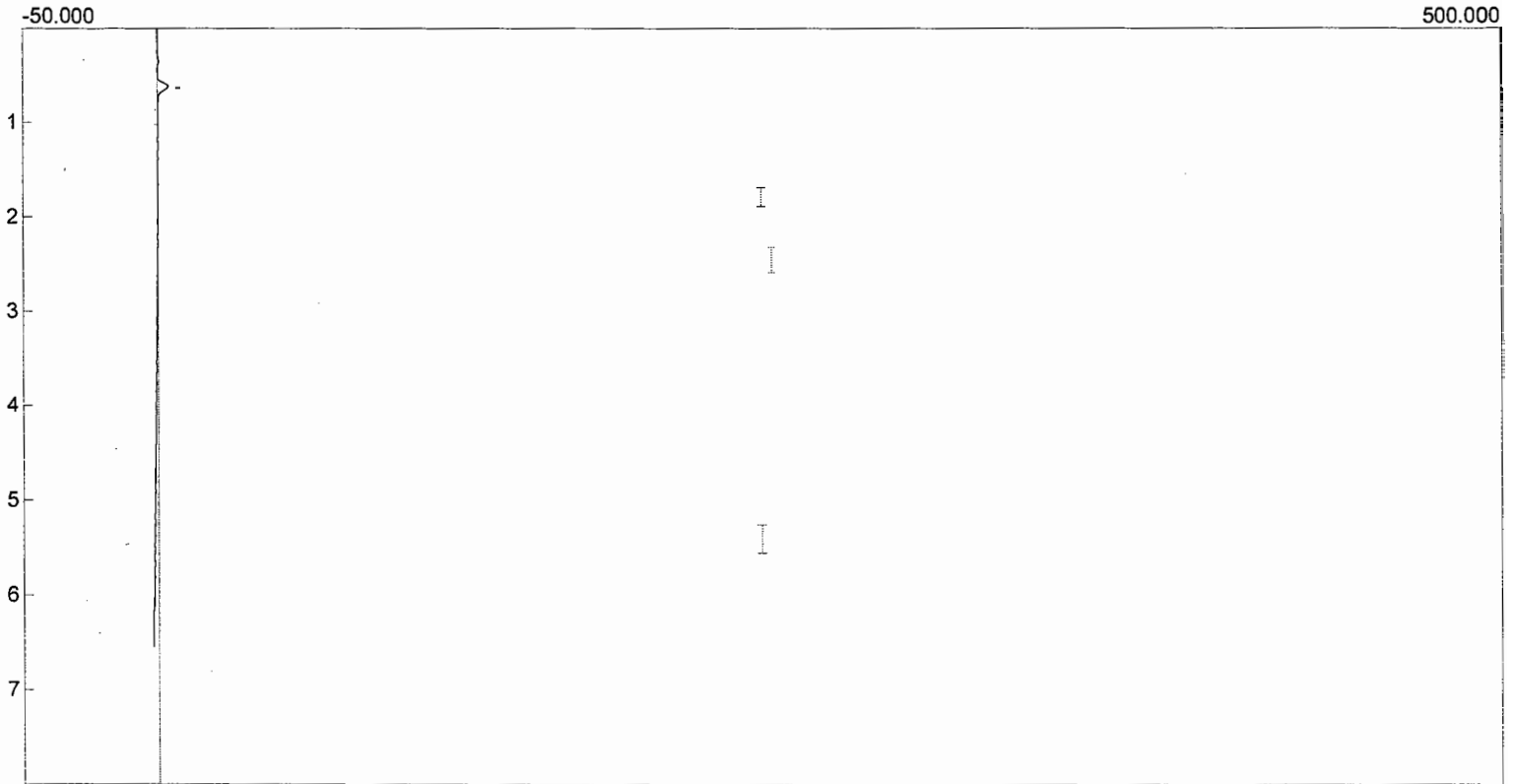
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run07.CHR ()

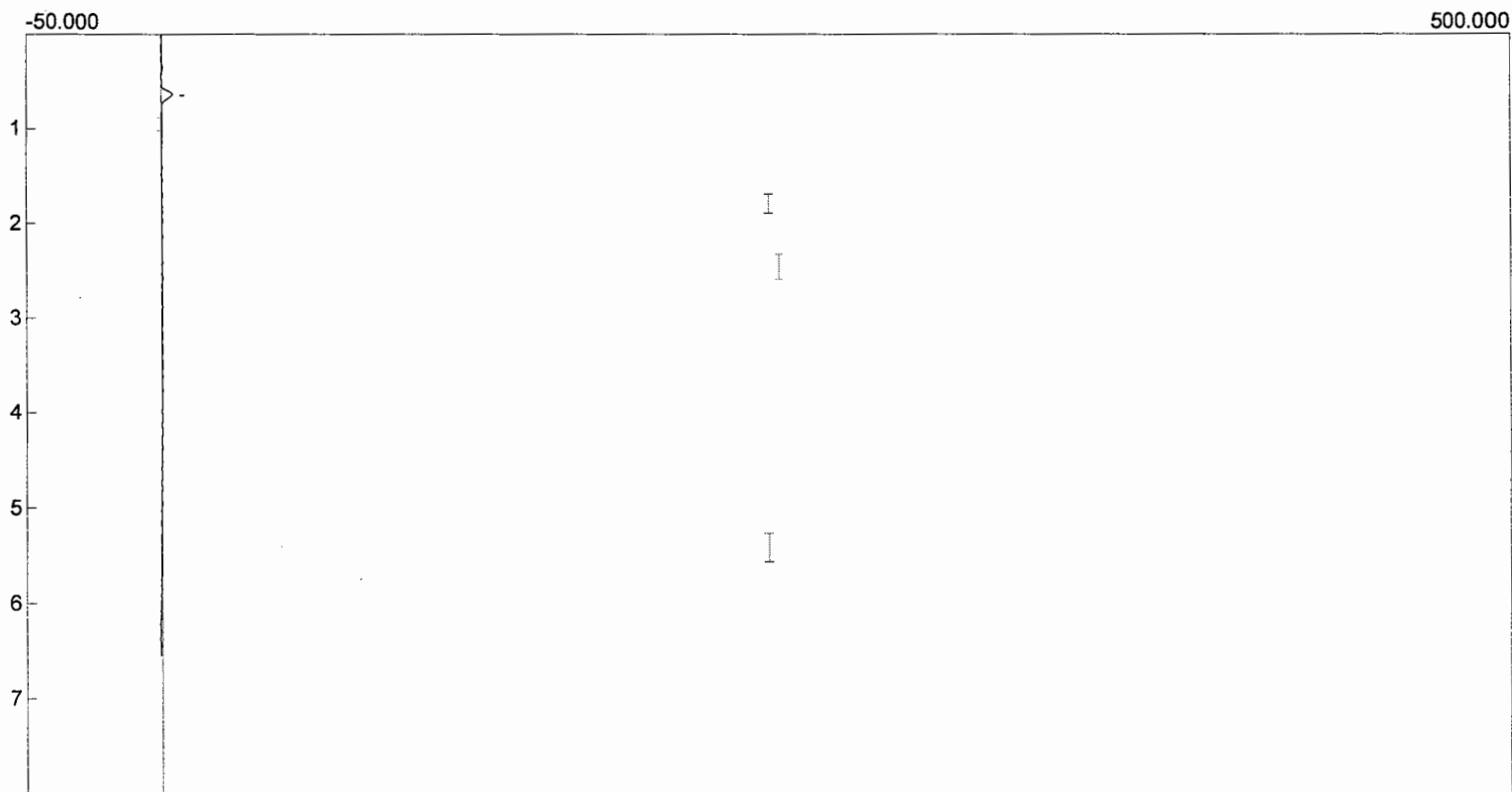
Sample: Run No. 1

Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
 Client: Valero, Port Arthur  
 Client ID: 544 SRU  
 Collected: 6/16/11  
 Method: USEPA M15  
 Description: FPD  
 Data file: ValeroPA\_SRU\_Run08.CHR ()  
 Sample: Run No. 1  
 Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/16/11

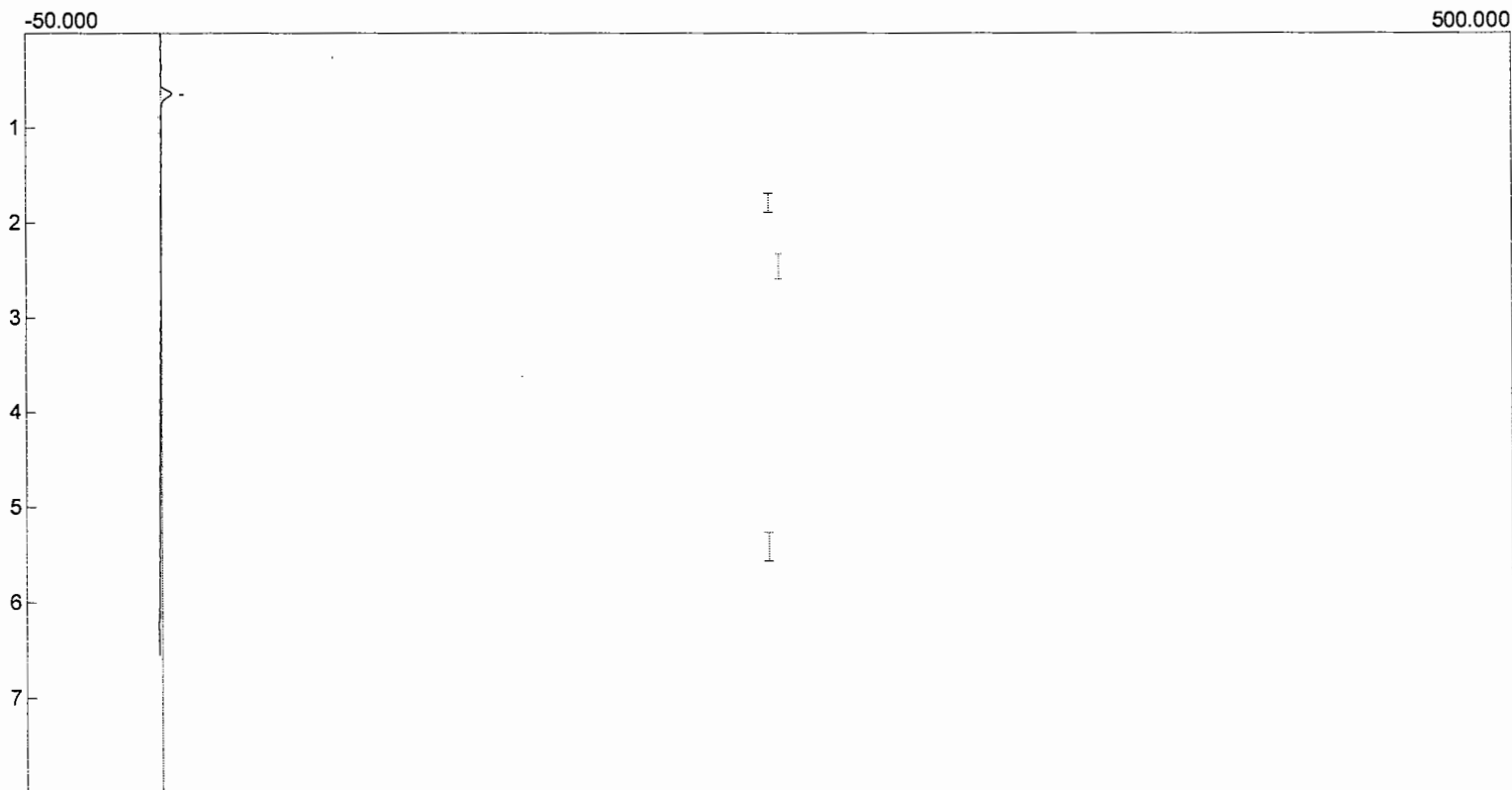
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run09.CHR ()

Sample: Run No. 1

Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/16/11

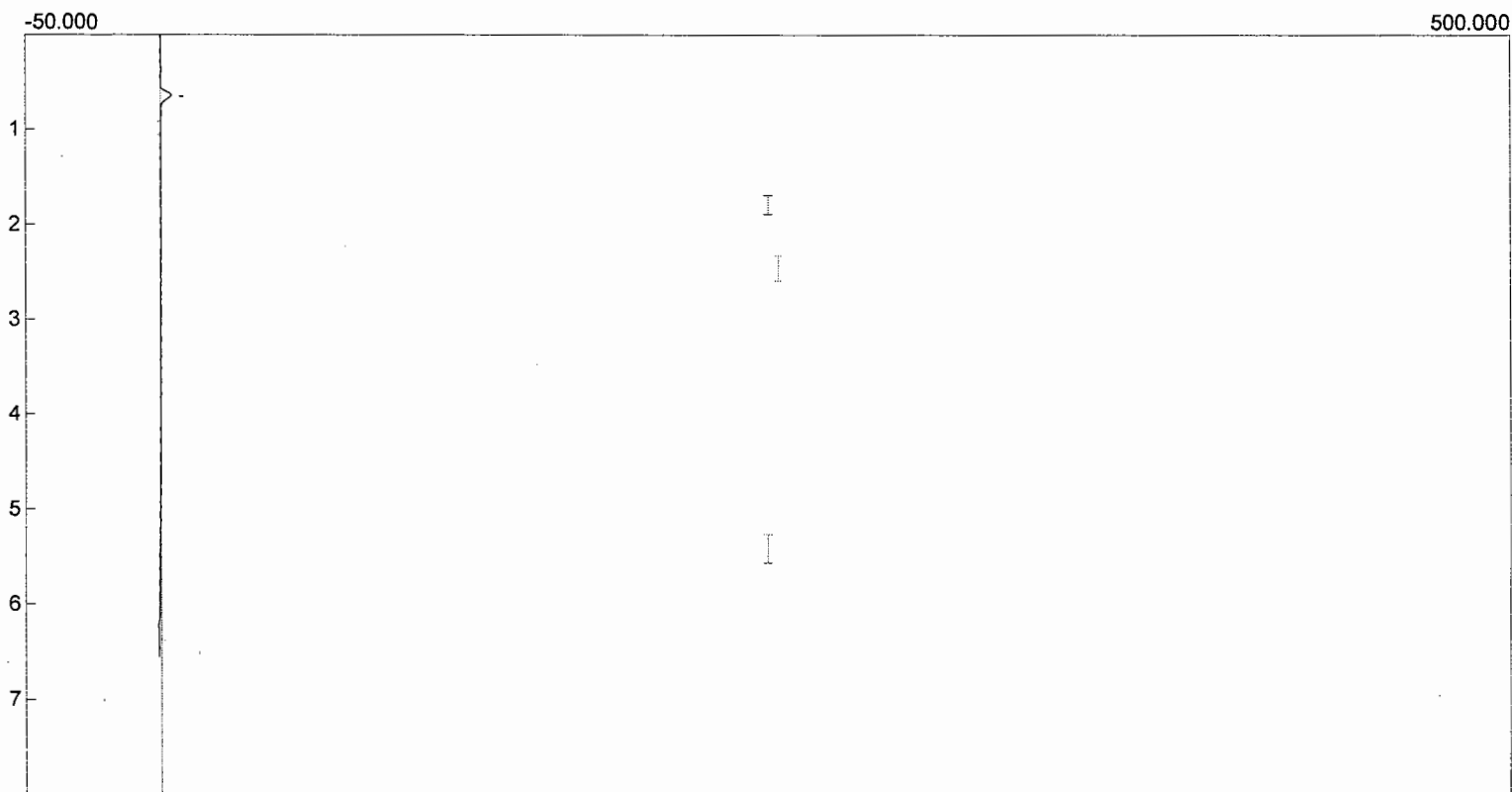
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run10.CHR ()

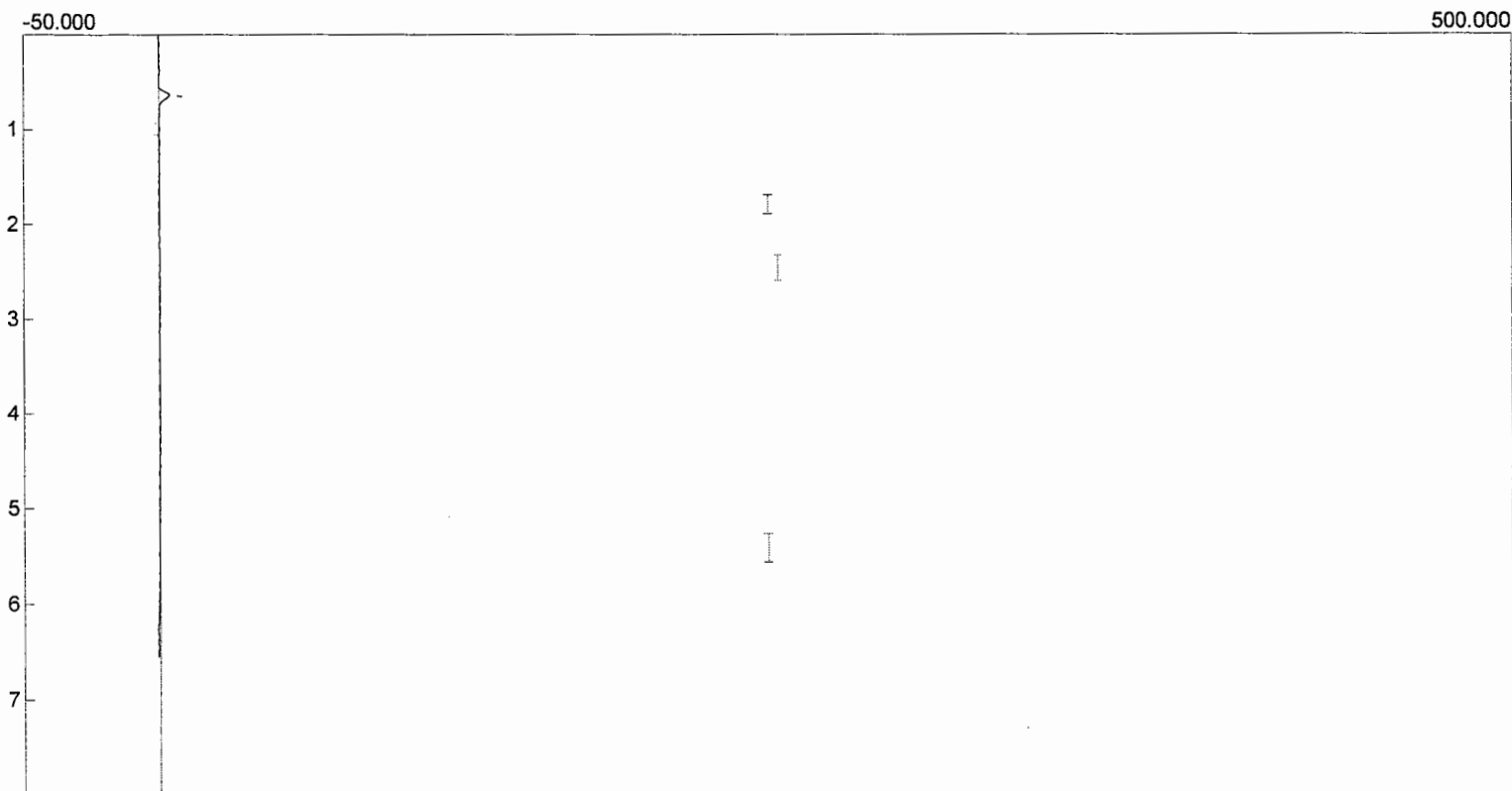
Sample: Run No. 1

Operator: JAB



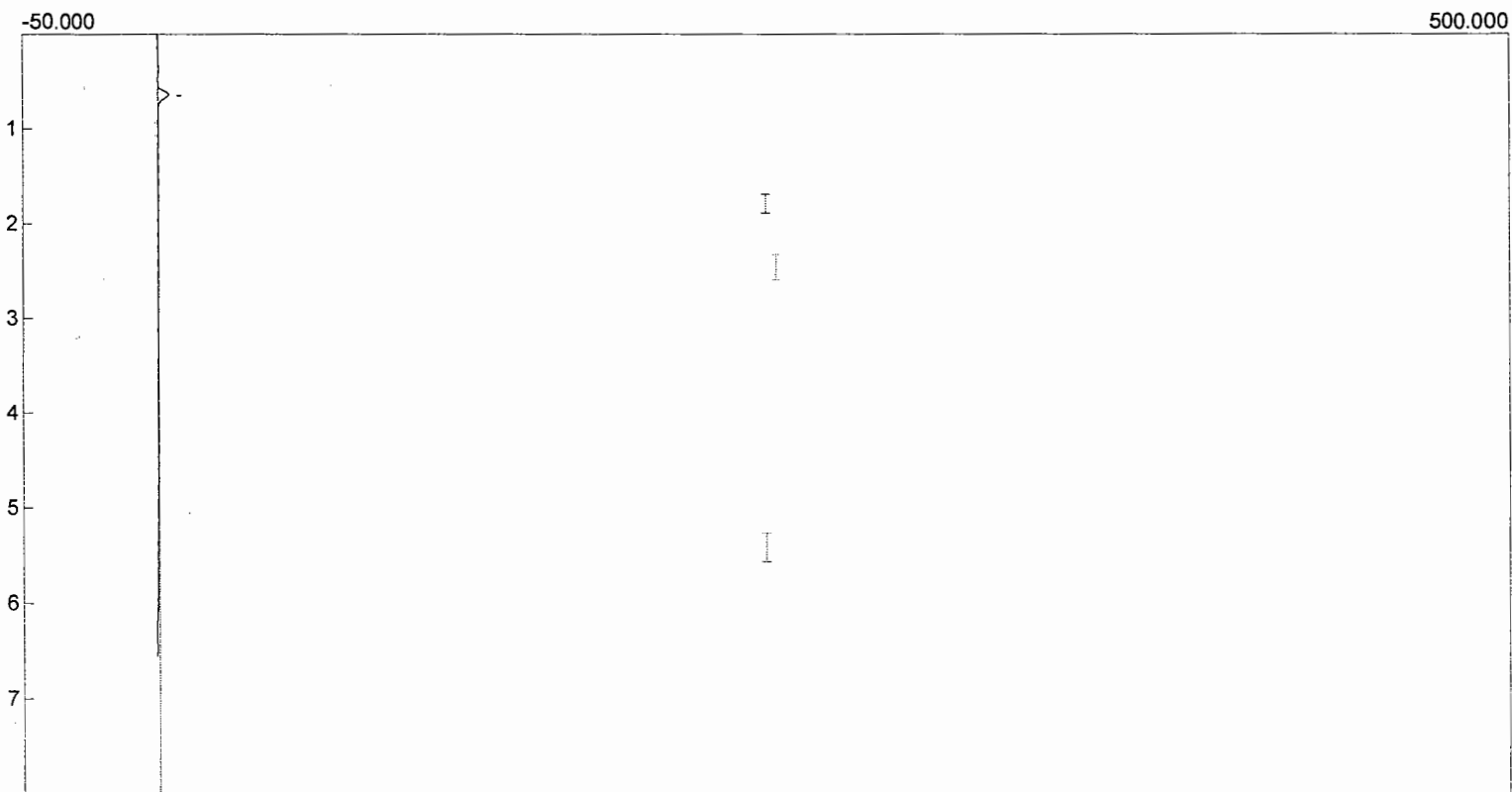
Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_SRU\_Run11.CHR ()  
Sample: Run No. 1  
Operator: JAB



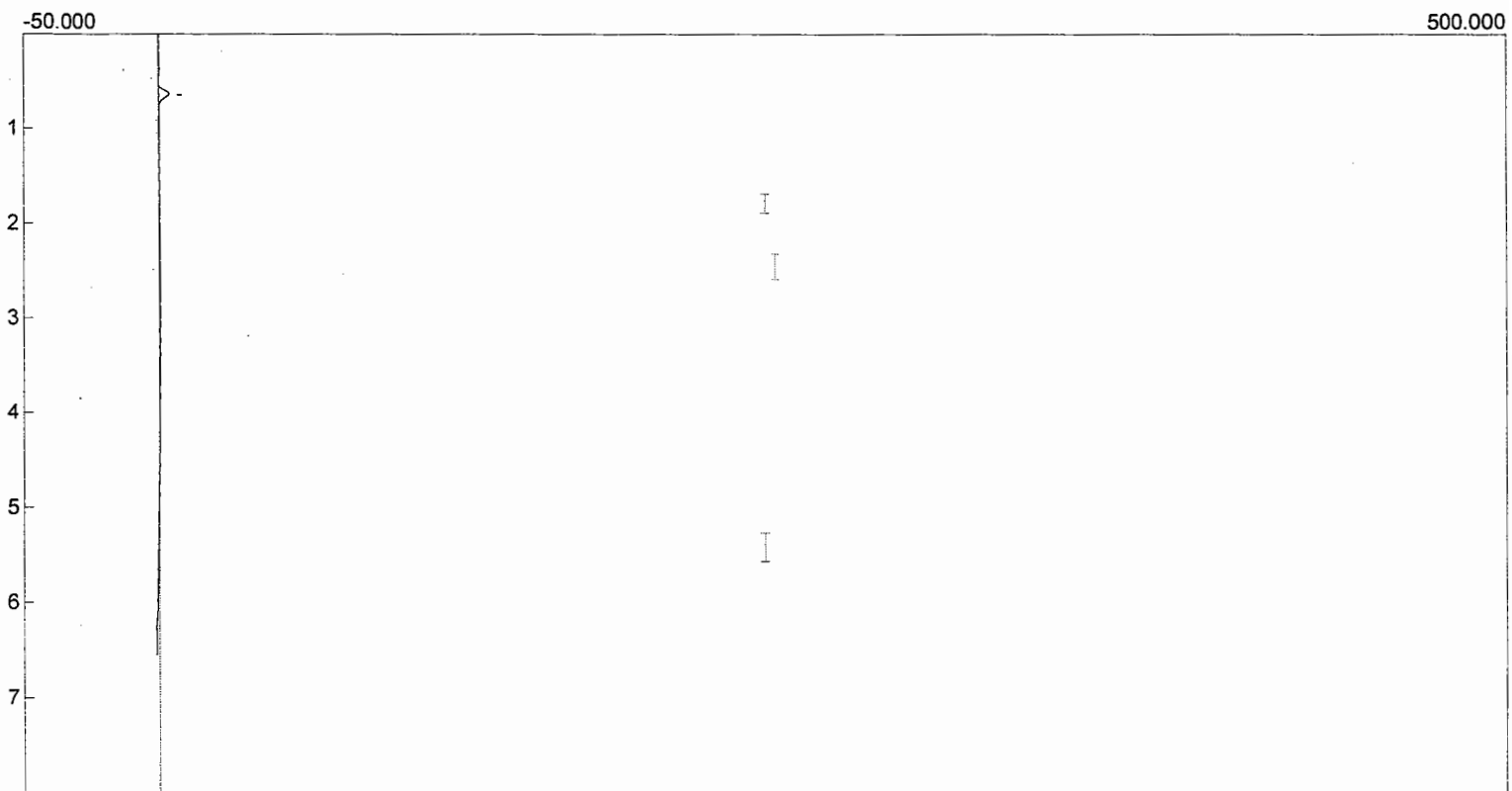
Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_SRU\_Run12.CHR ()  
Sample: Run No. 1  
Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
 Client: Valero, Port Arthur  
 Client ID: 544 SRU  
 Collected: 6/16/11  
 Method: USEPA M15  
 Description: FPD  
 Data file: ValeroPA\_SRU\_Run13.CHR ()  
 Sample: Run No. 1  
 Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/16/11

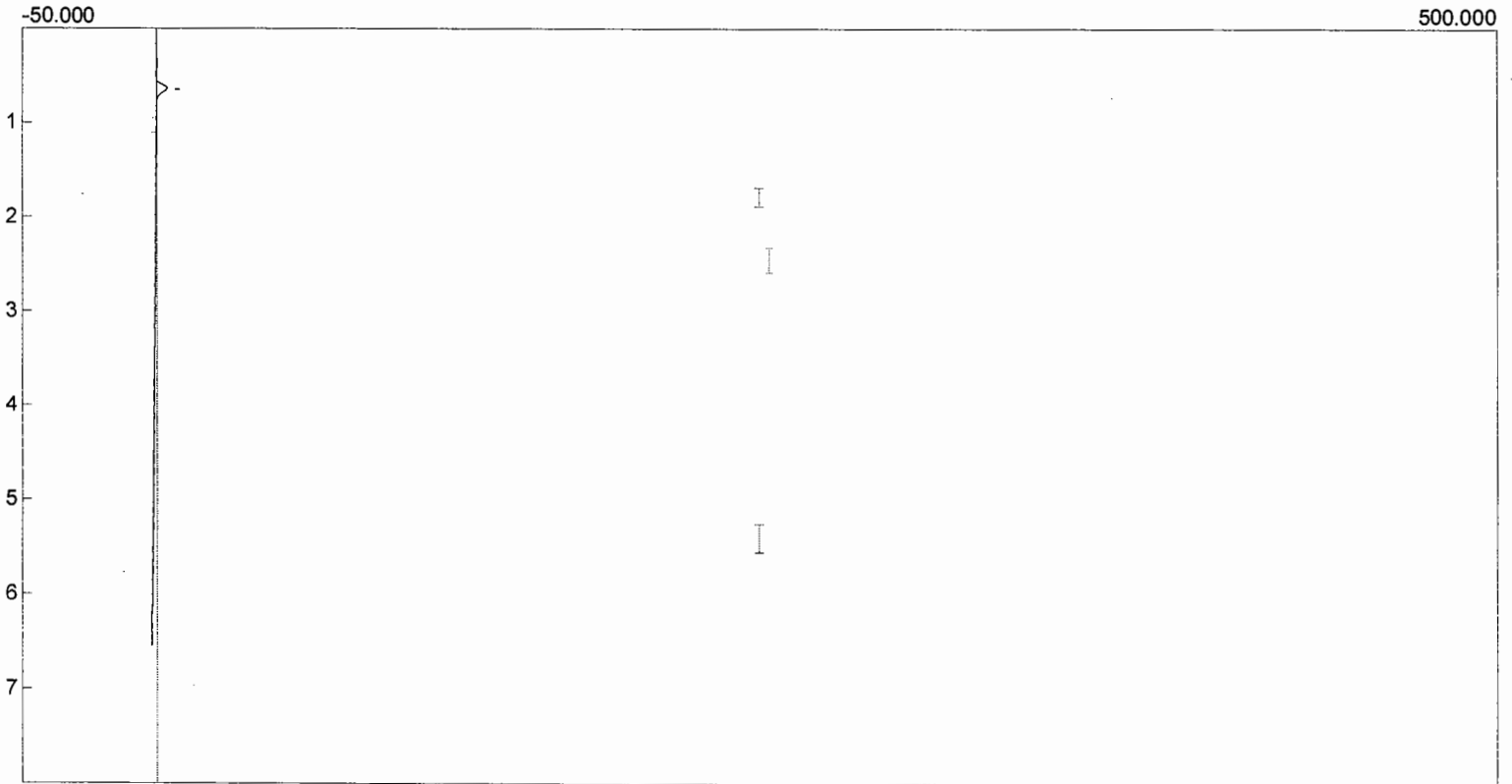
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run14.CHR ()

Sample: Run No. 1

Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/16/11

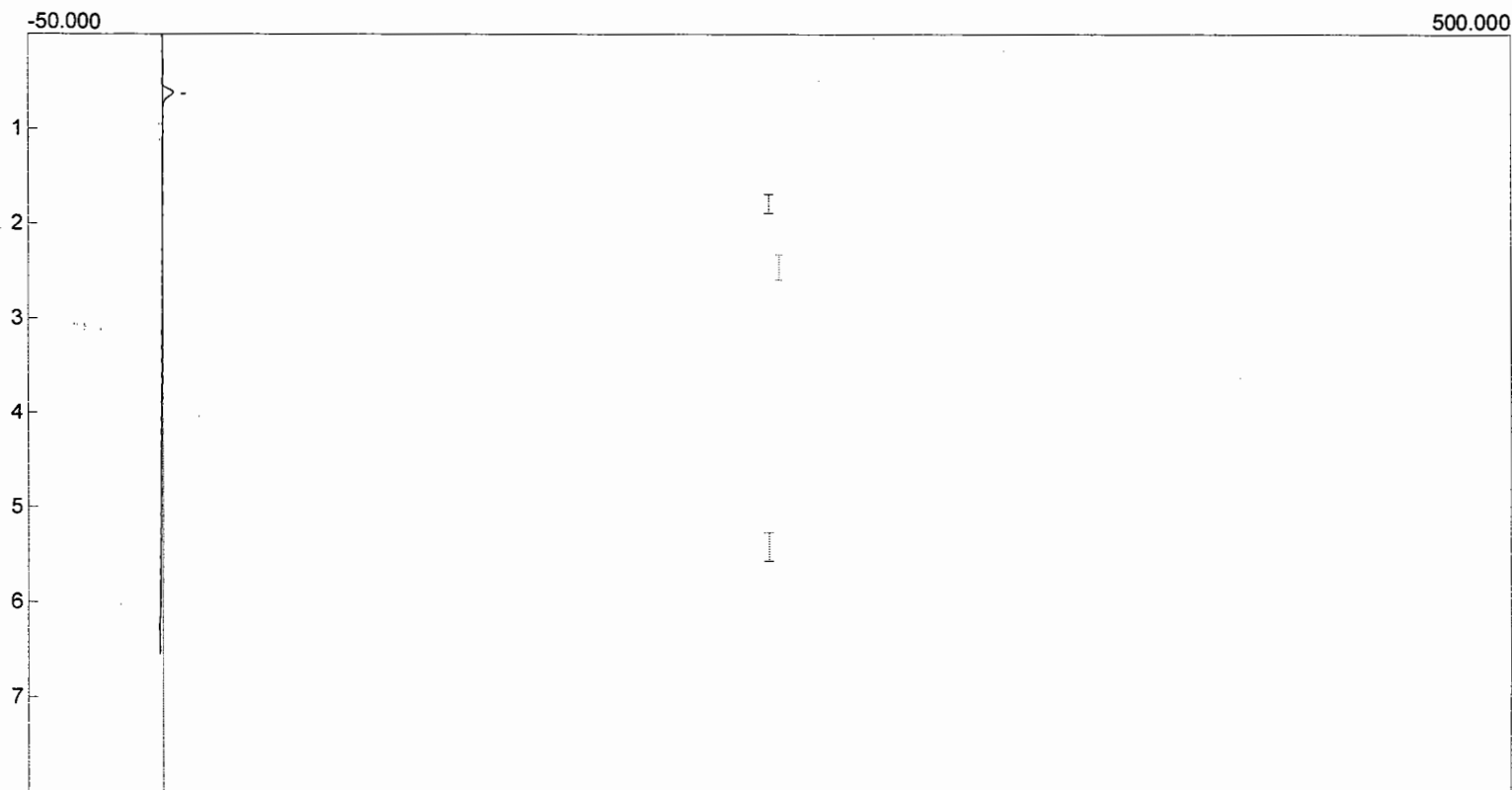
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run15.CHR ()

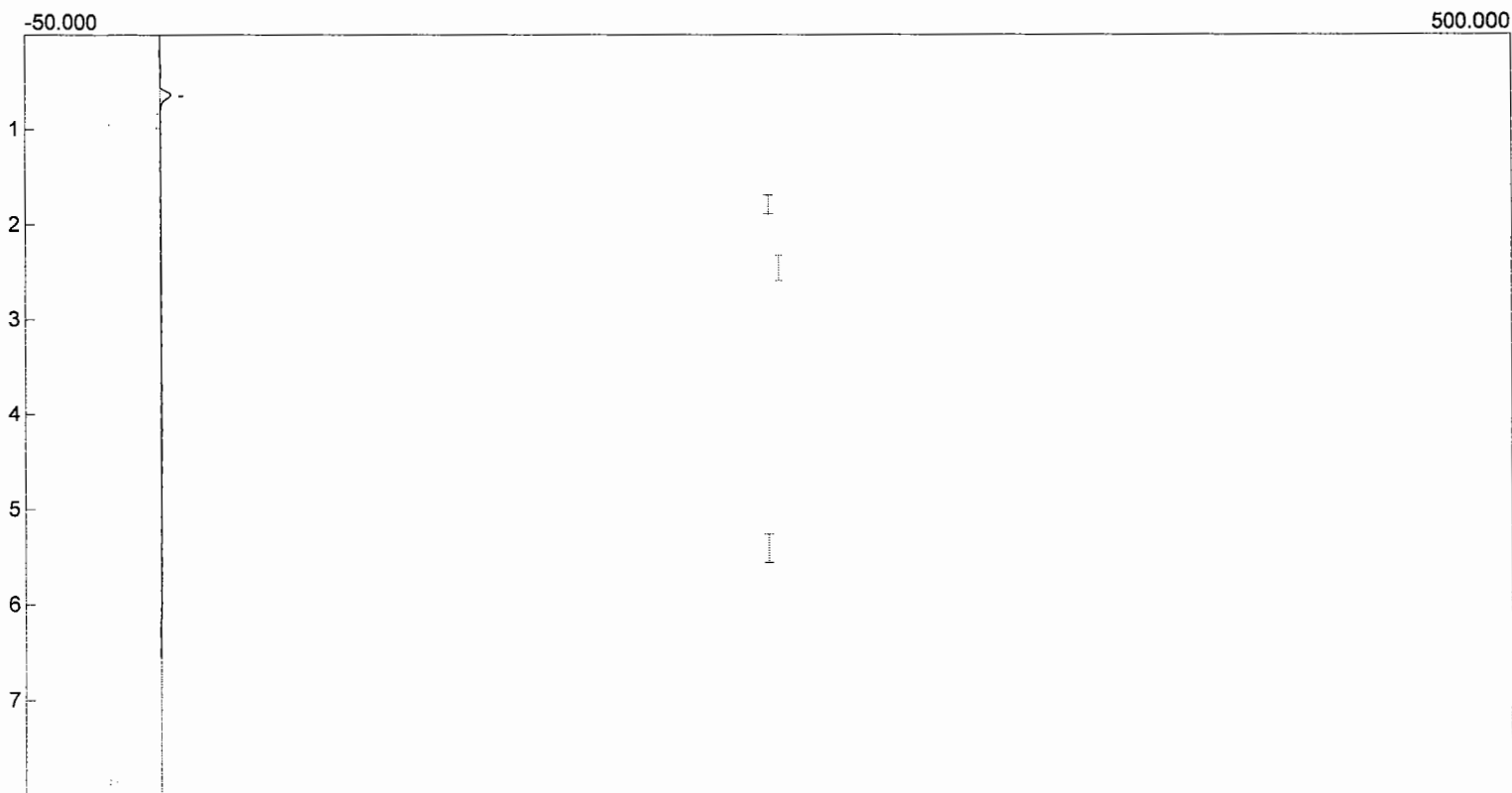
Sample: Run No. 1

Operator: JAB



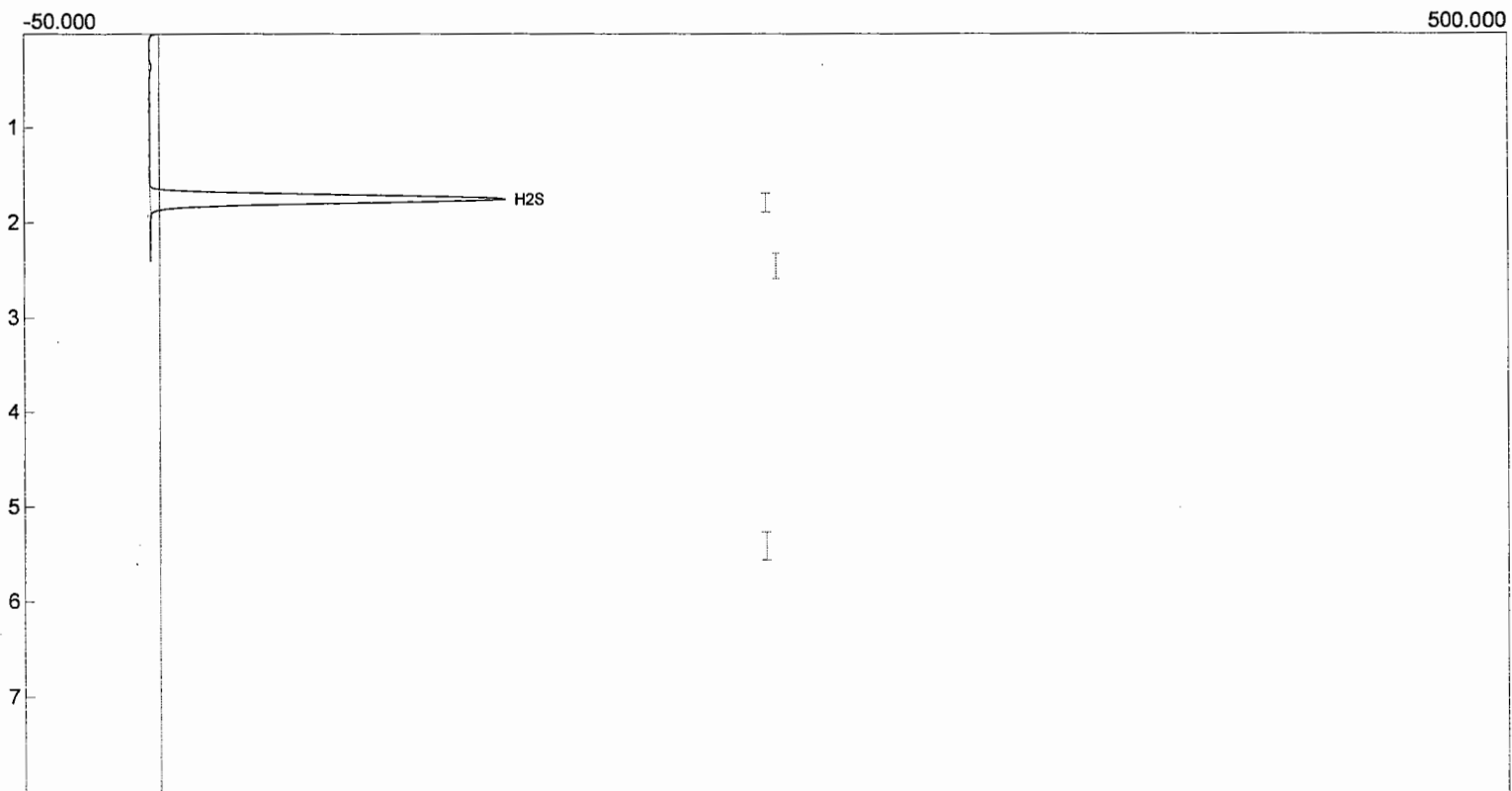
Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_SRU\_Run16.CHR ()  
Sample: Run No. 1  
Operator: JAB



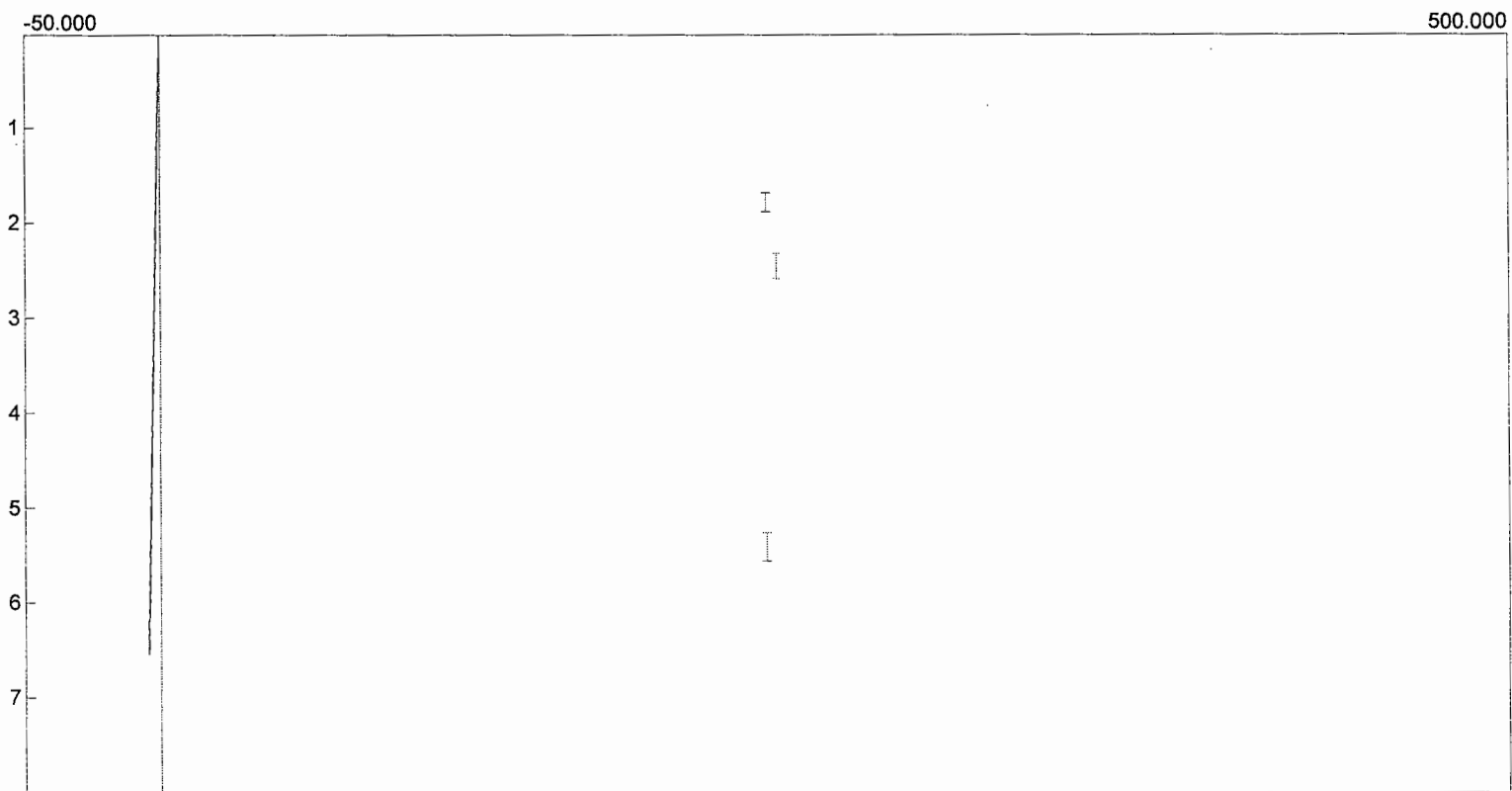
Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_SRU\_Run18.CHR ()  
Sample: Run No. 1 LL Check  
Operator: JAB



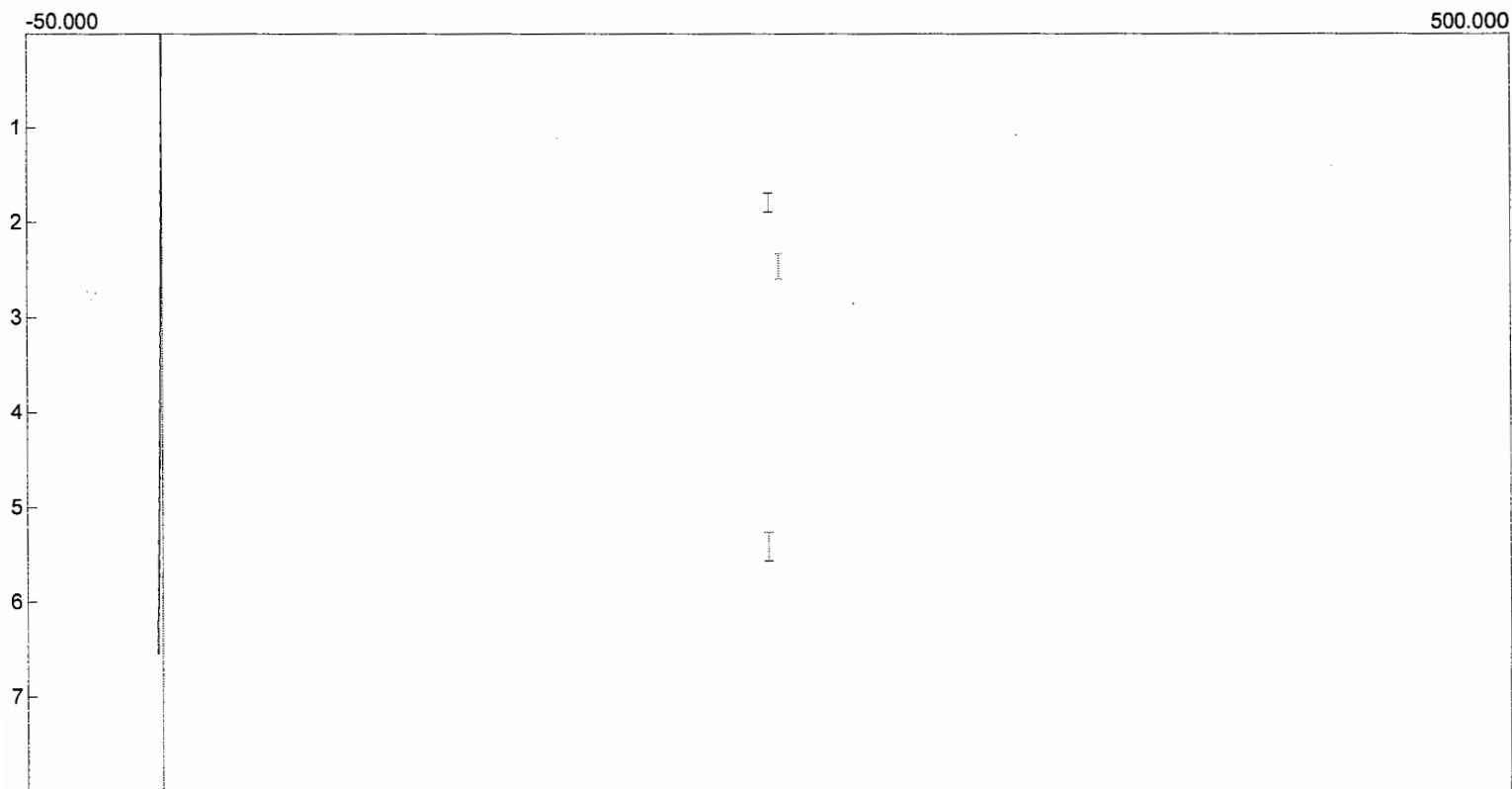
Component	Area
H2S	804.3000
COS	0.0000
CS2	0.0000
	804.3000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_SRU\_Run24.CHR ()  
Sample: Run No. 2  
Operator: JAB



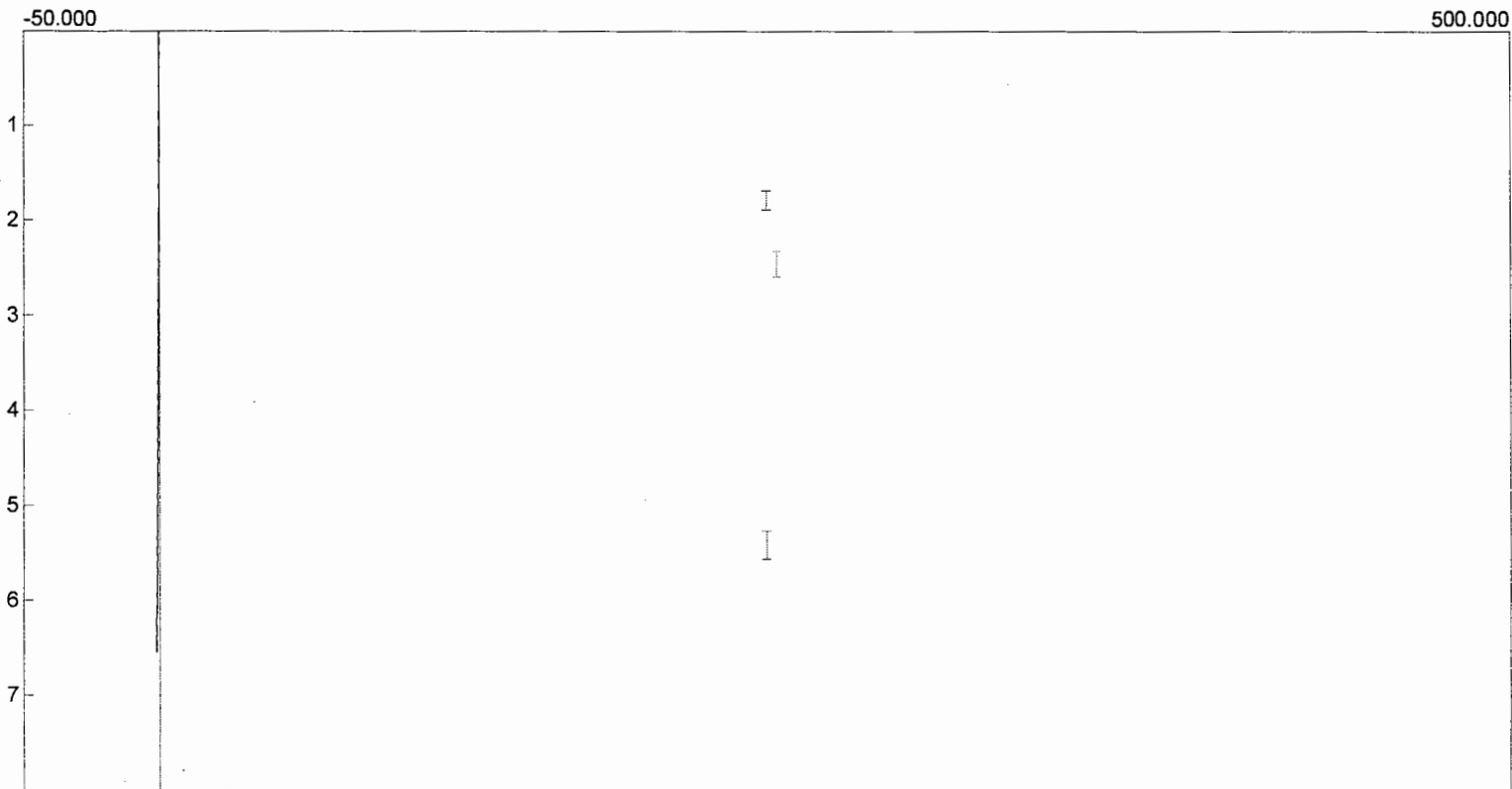
Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_SRU\_Run25.CHR ()  
Sample: Run No. 2  
Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_SRU\_Run26.CHR ()  
Sample: Run No. 2  
Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/16/11

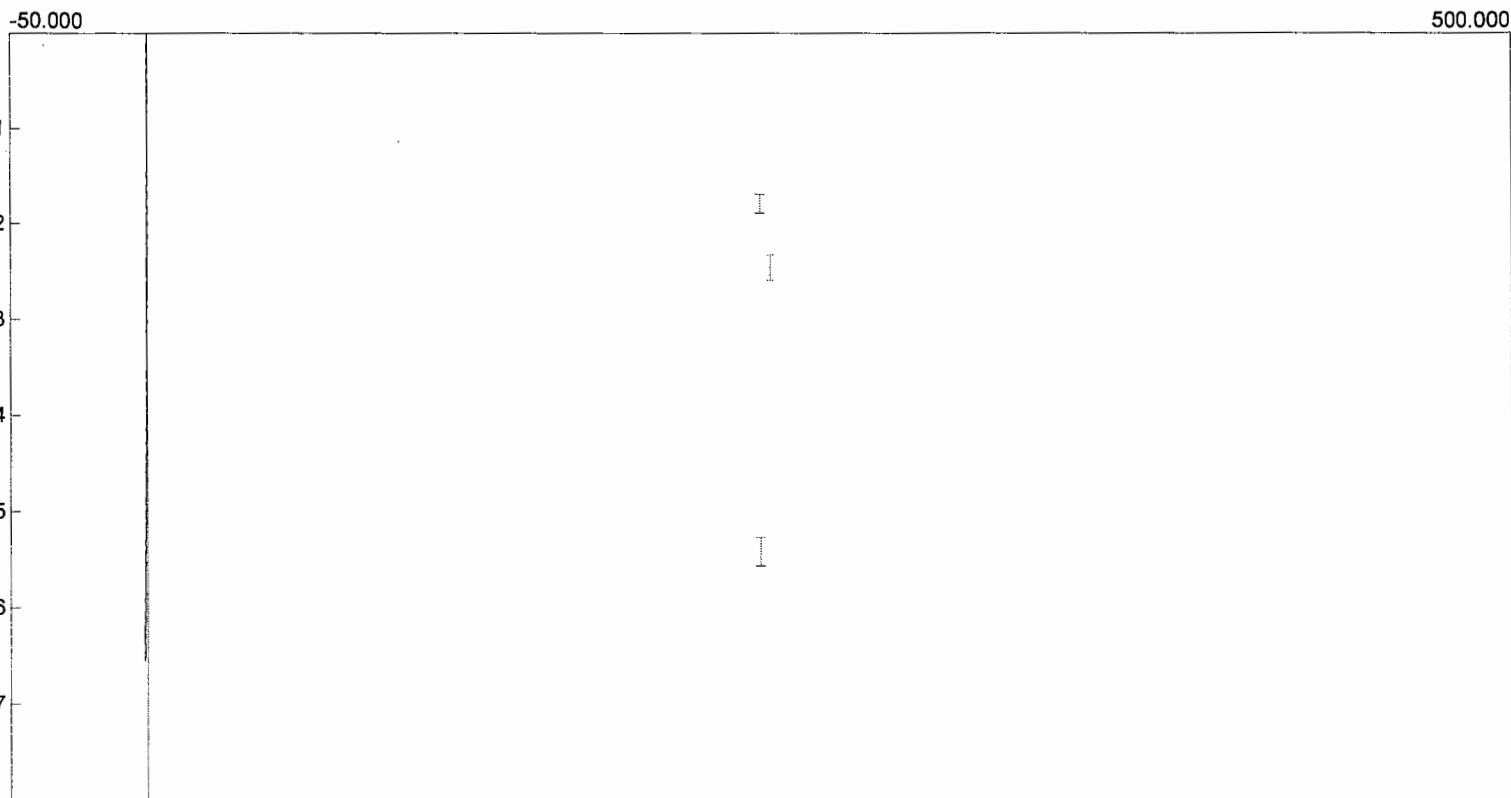
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run27.CHR ()

Sample: Run No. 2

Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
 Client: Valero, Port Arthur  
 Client ID: 544 SRU  
 Collected: 6/16/11  
 Method: USEPA M15  
 Description: FPD  
 Data file: ValeroPA\_SRU\_Run28.CHR ()  
 Sample: Run No. 2  
 Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/16/11

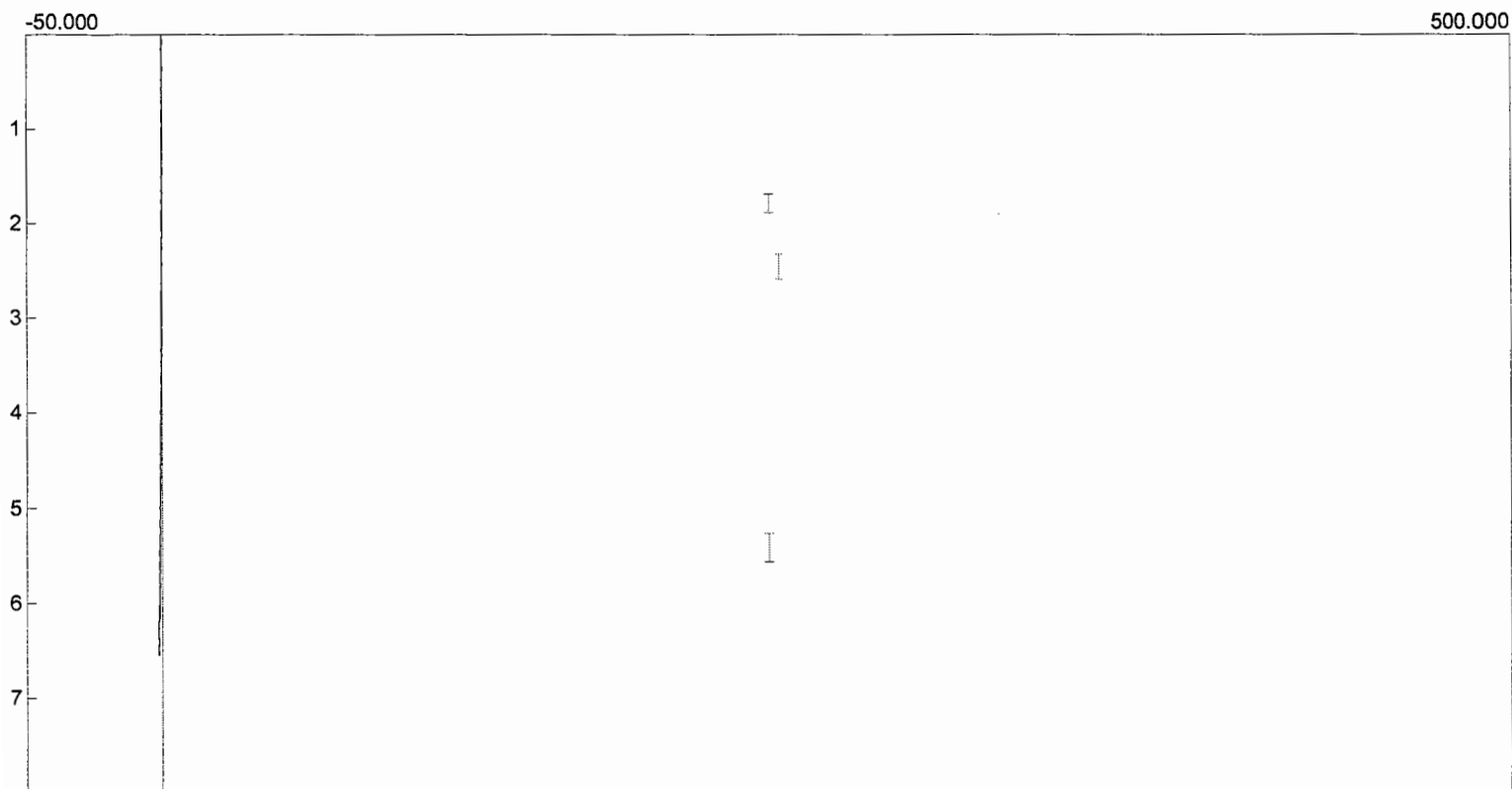
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run29.CHR ()

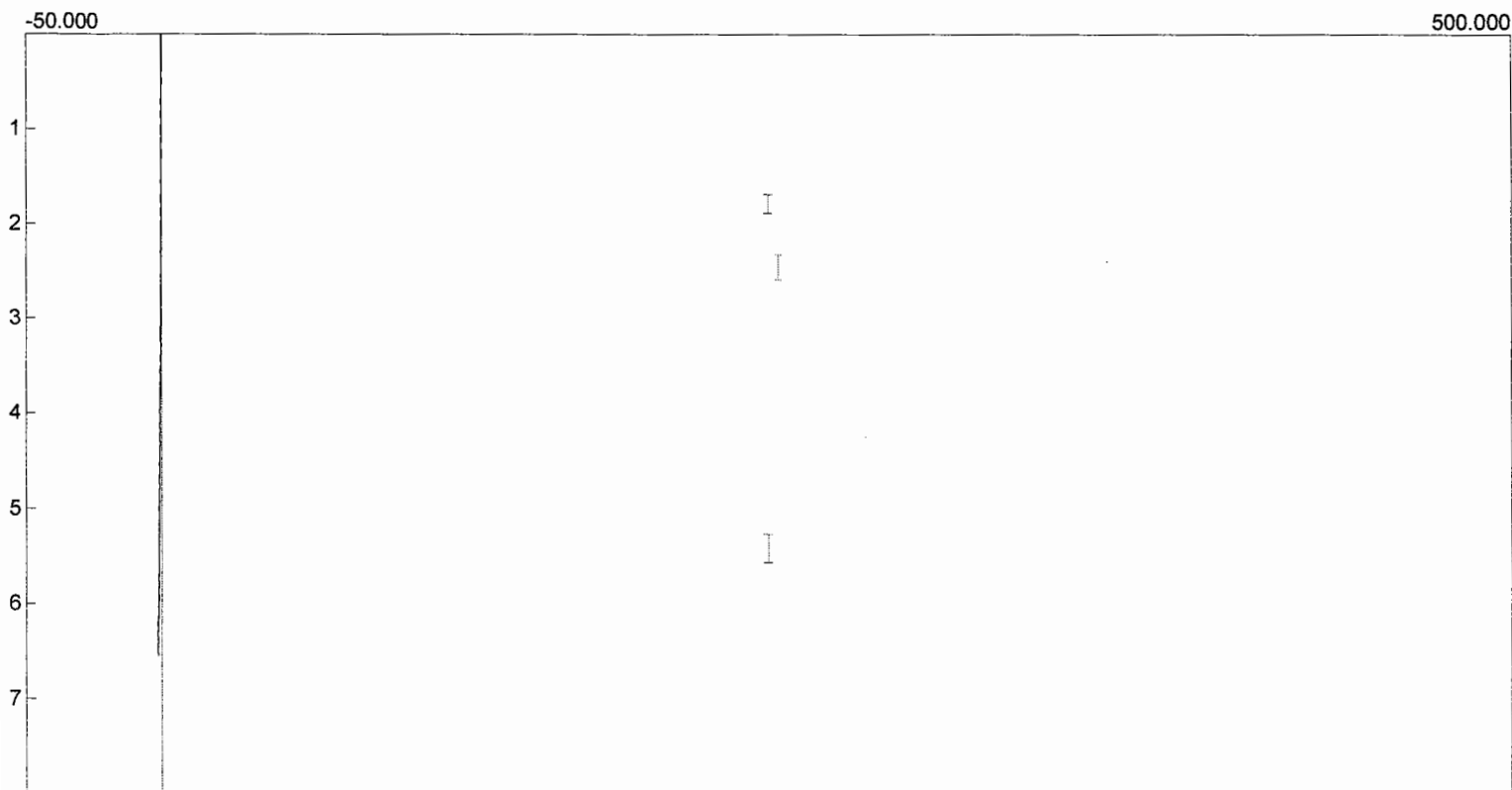
Sample: Run No. 2

Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_SRU\_Run30.CHR ()  
Sample: Run No. 2  
Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/16/11

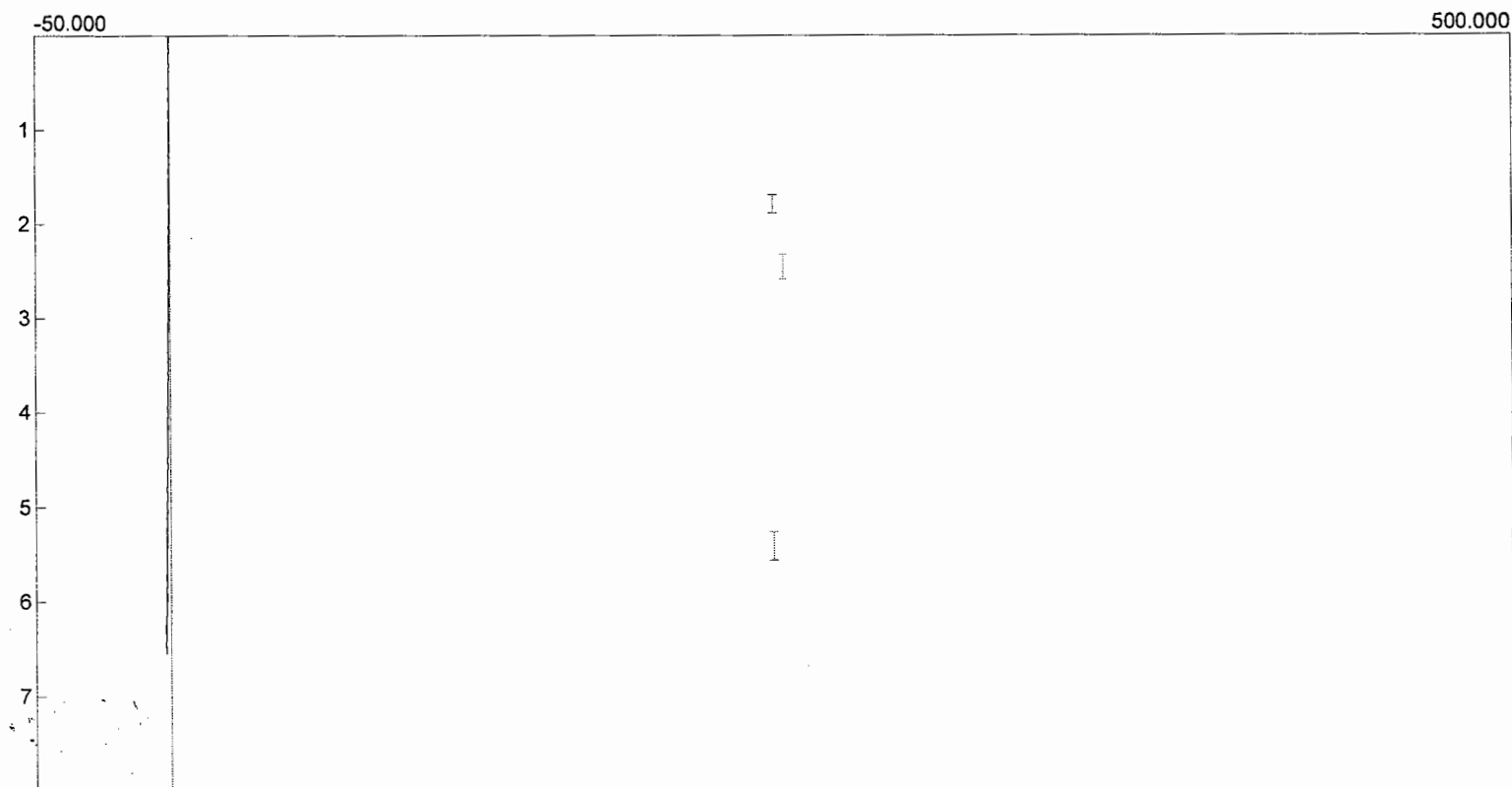
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run31.CHR ()

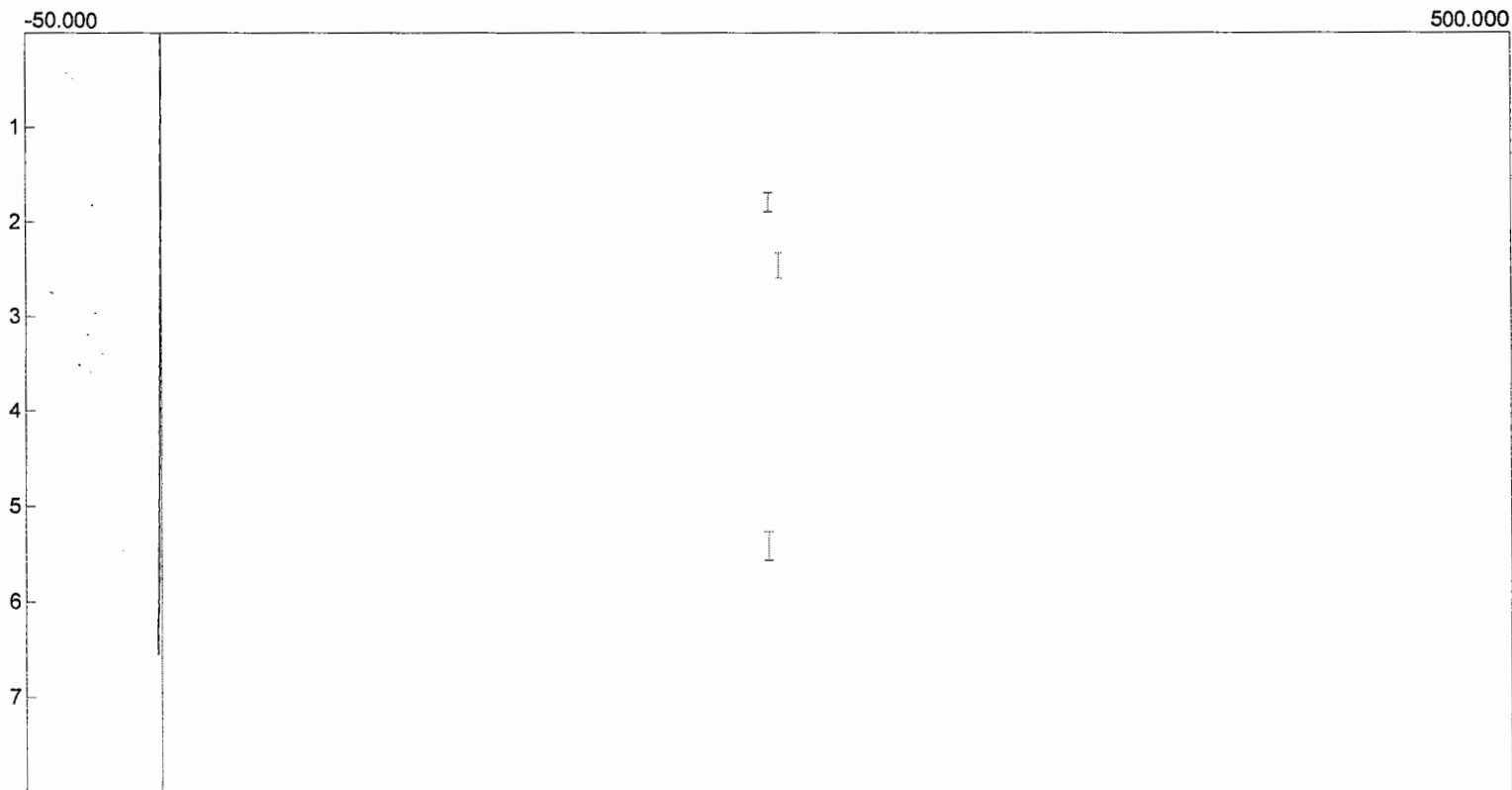
Sample: Run No. 2

Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_SRU\_Run32.CHR ()  
Sample: Run No. 2  
Operator: JAB



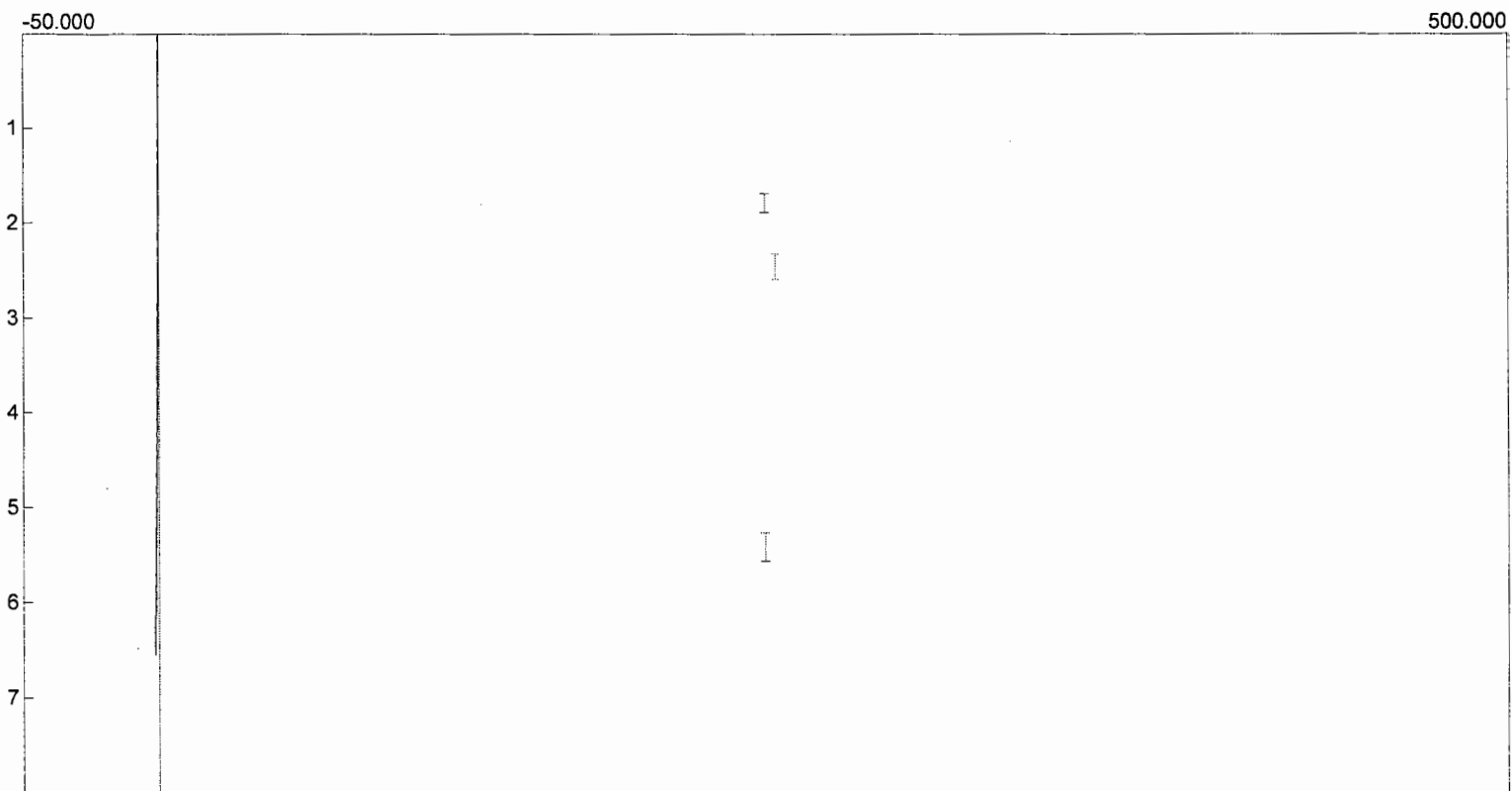
Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_SRU\_Run33.CHR ()  
Sample: Run No. 2  
Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_SRU\_Run34.CHR ()  
Sample: Run No. 2  
Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/16/11

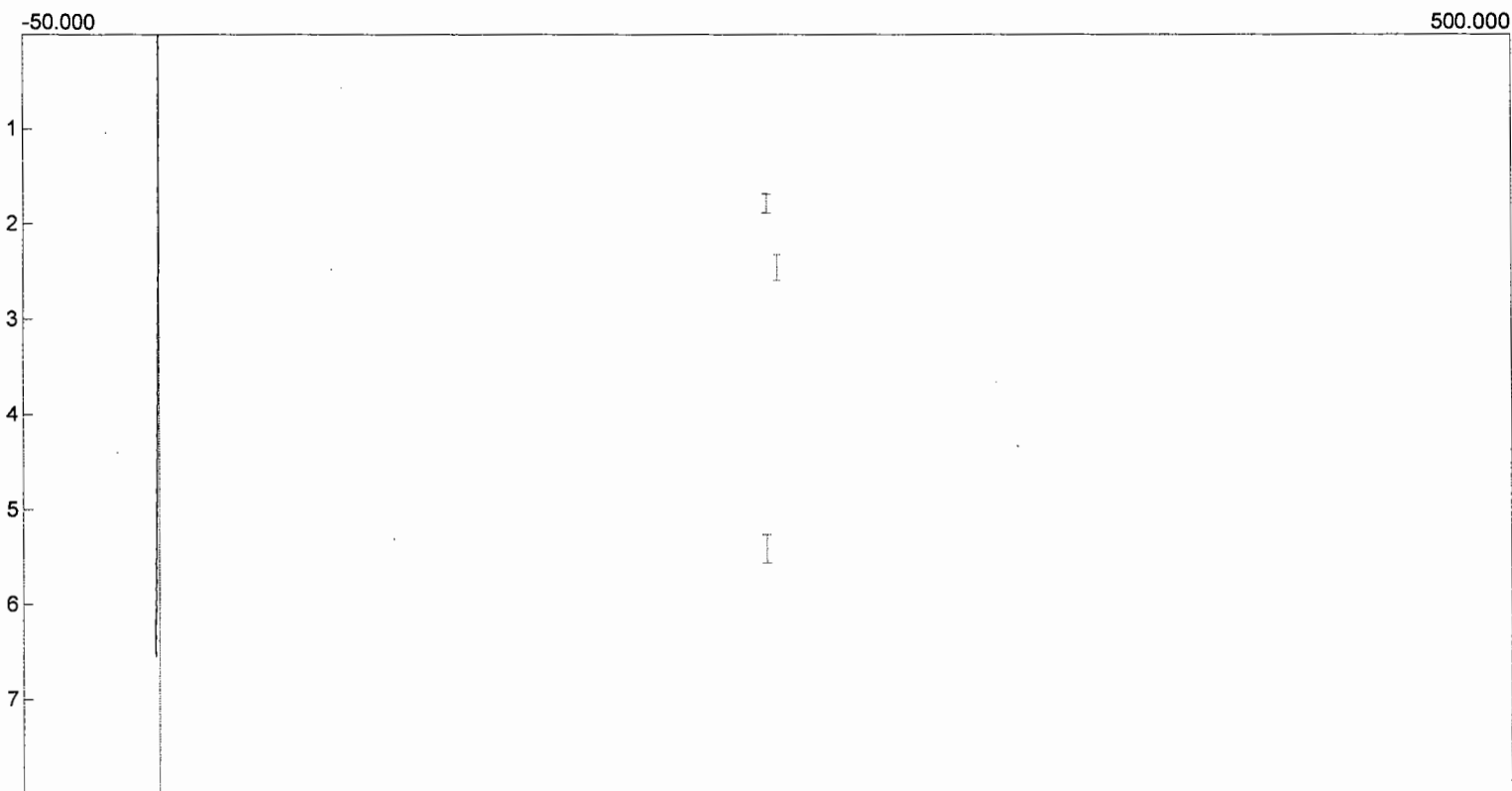
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run35.CHR ()

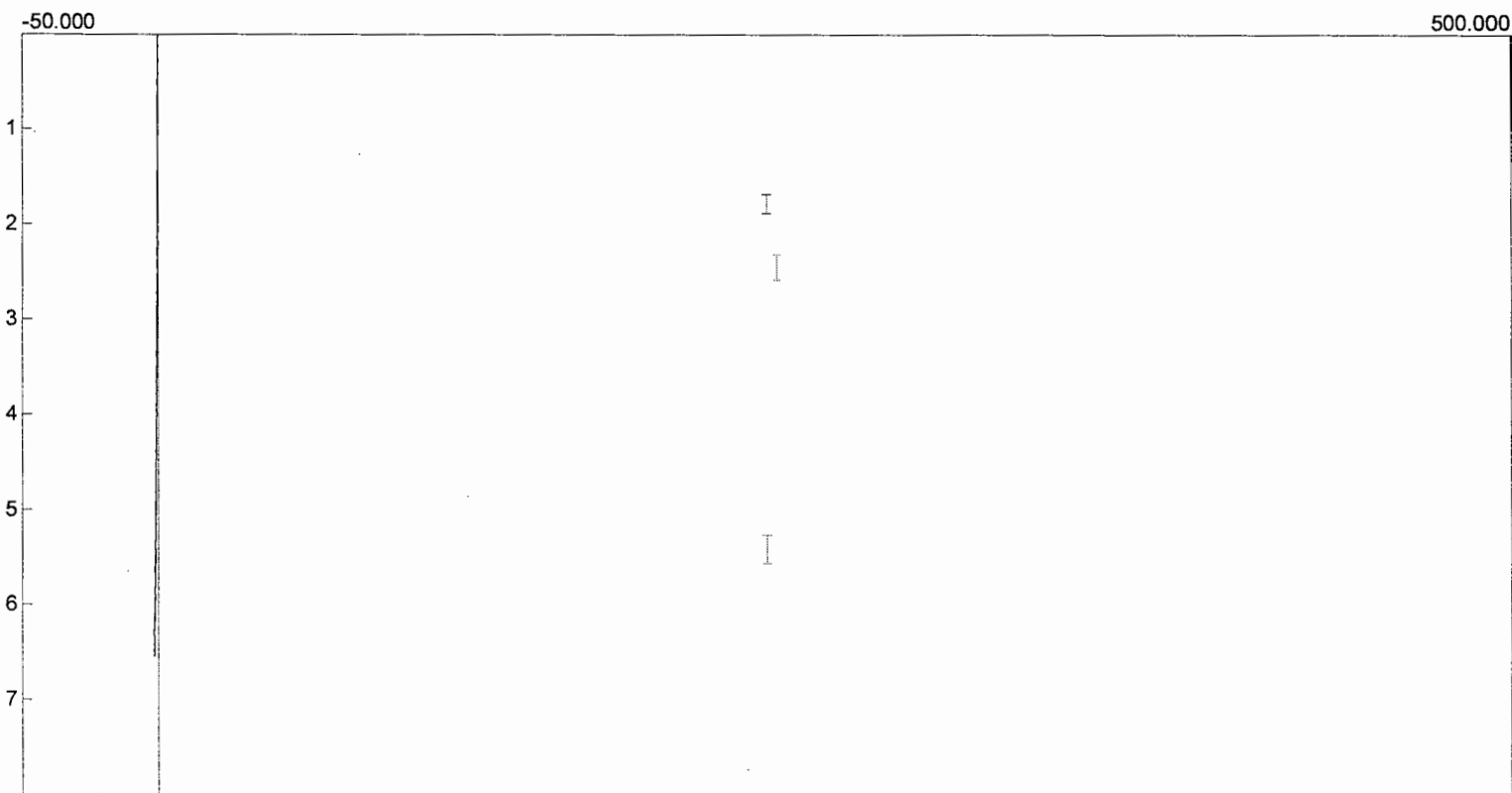
Sample: Run No. 2

Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_SRU\_Run36.CHR ()  
Sample: Run No. 2  
Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/16/11

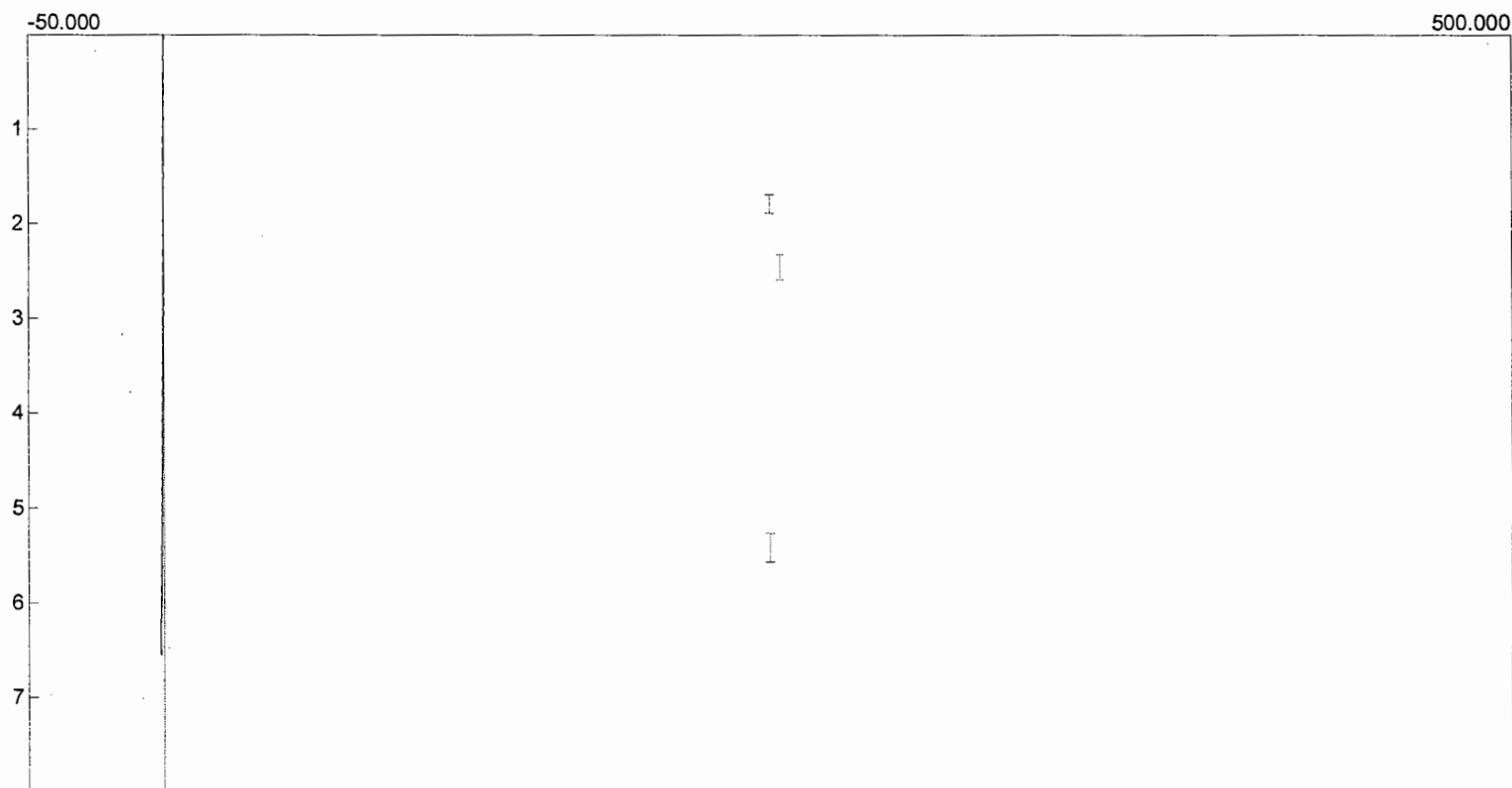
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run37.CHR ()

Sample: Run No. 2

Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/16/11

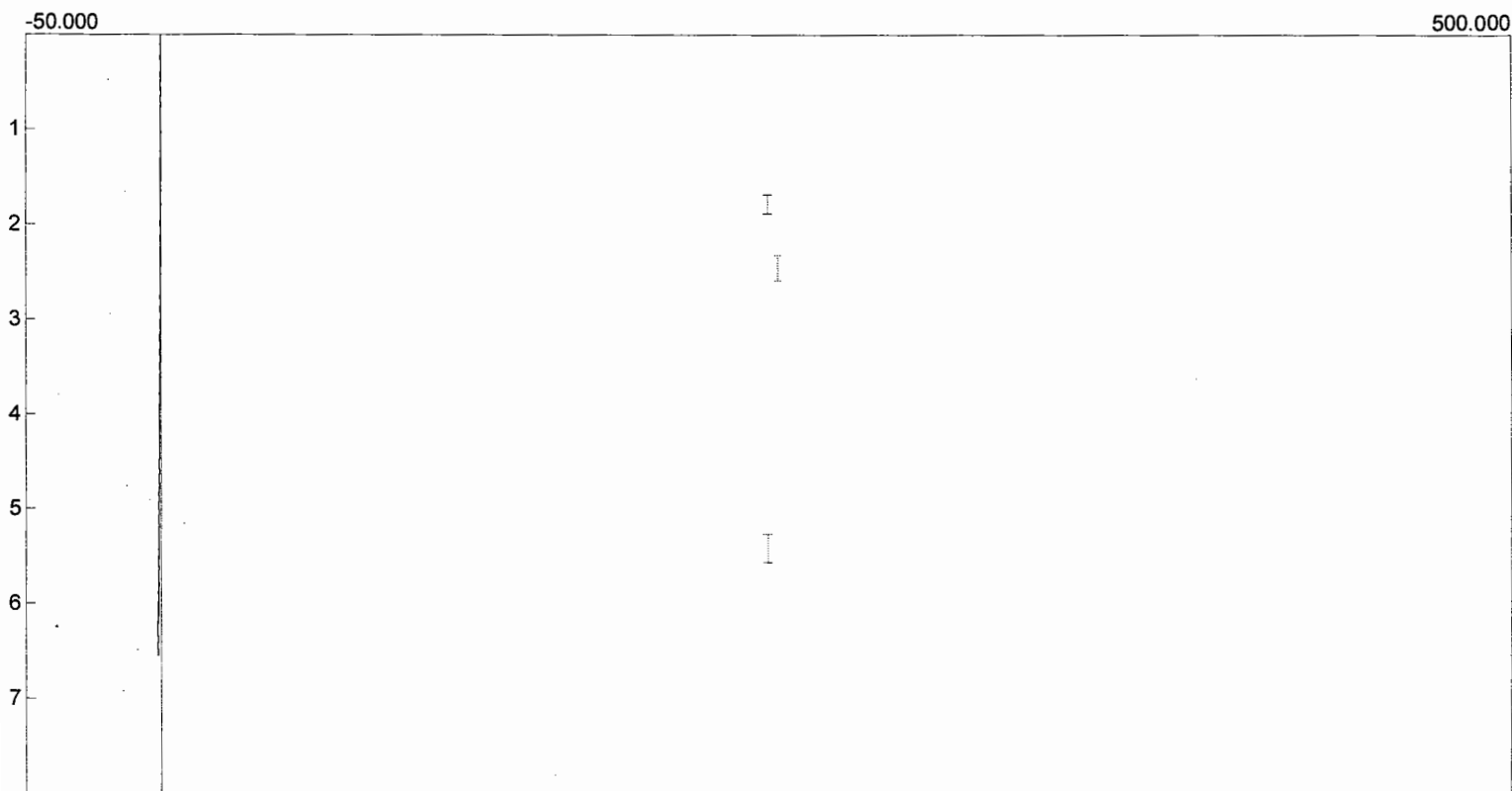
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run38.CHR ()

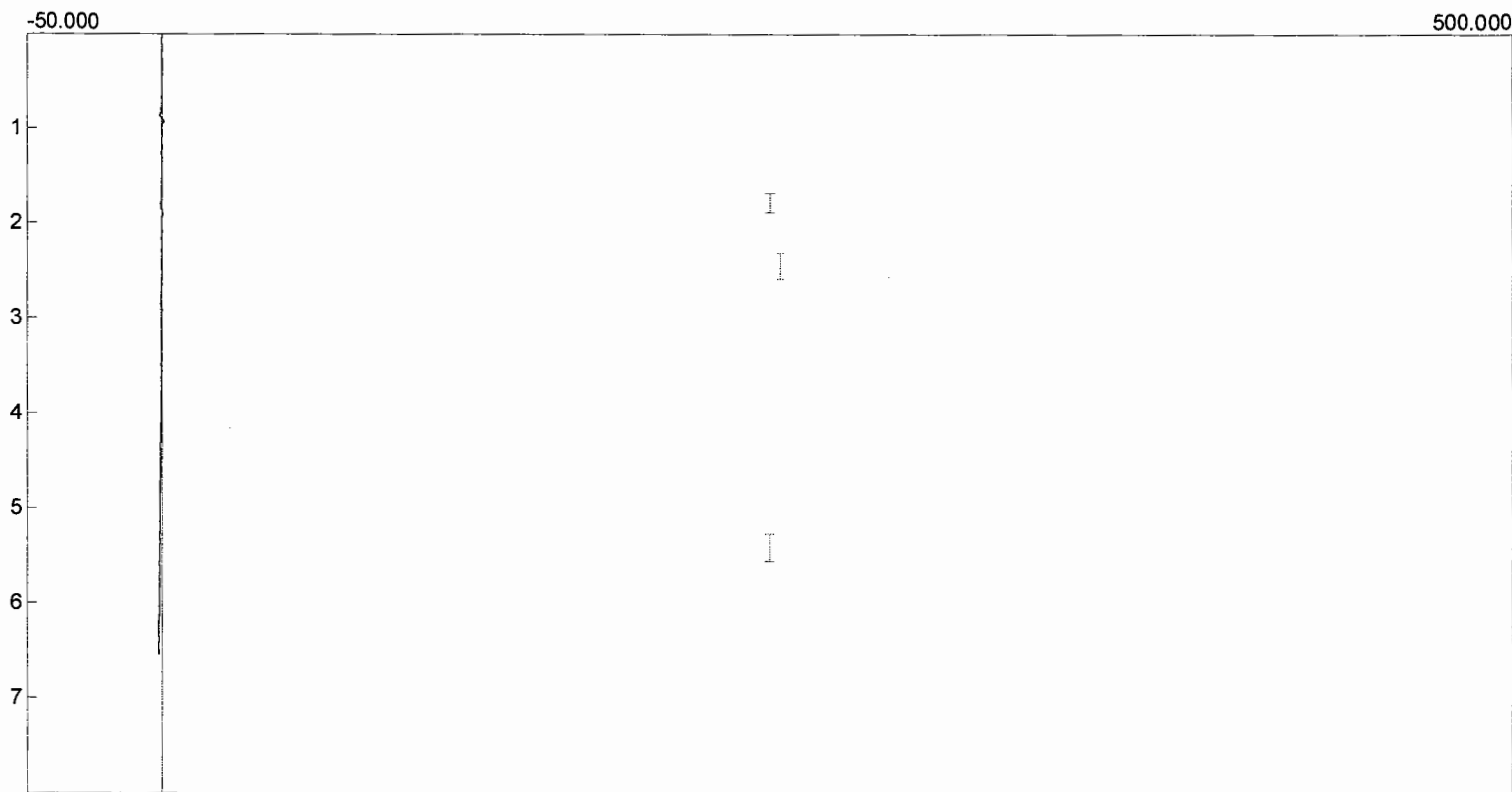
Sample: Run No. 2

Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
 Client: Valero, Port Arthur  
 Client ID: 544 SRU  
 Collected: 6/16/11  
 Method: USEPA M15  
 Description: FPD  
 Data file: ValeroPA\_SRU\_Run39.CHR ()  
 Sample: Run No. 2  
 Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/16/11

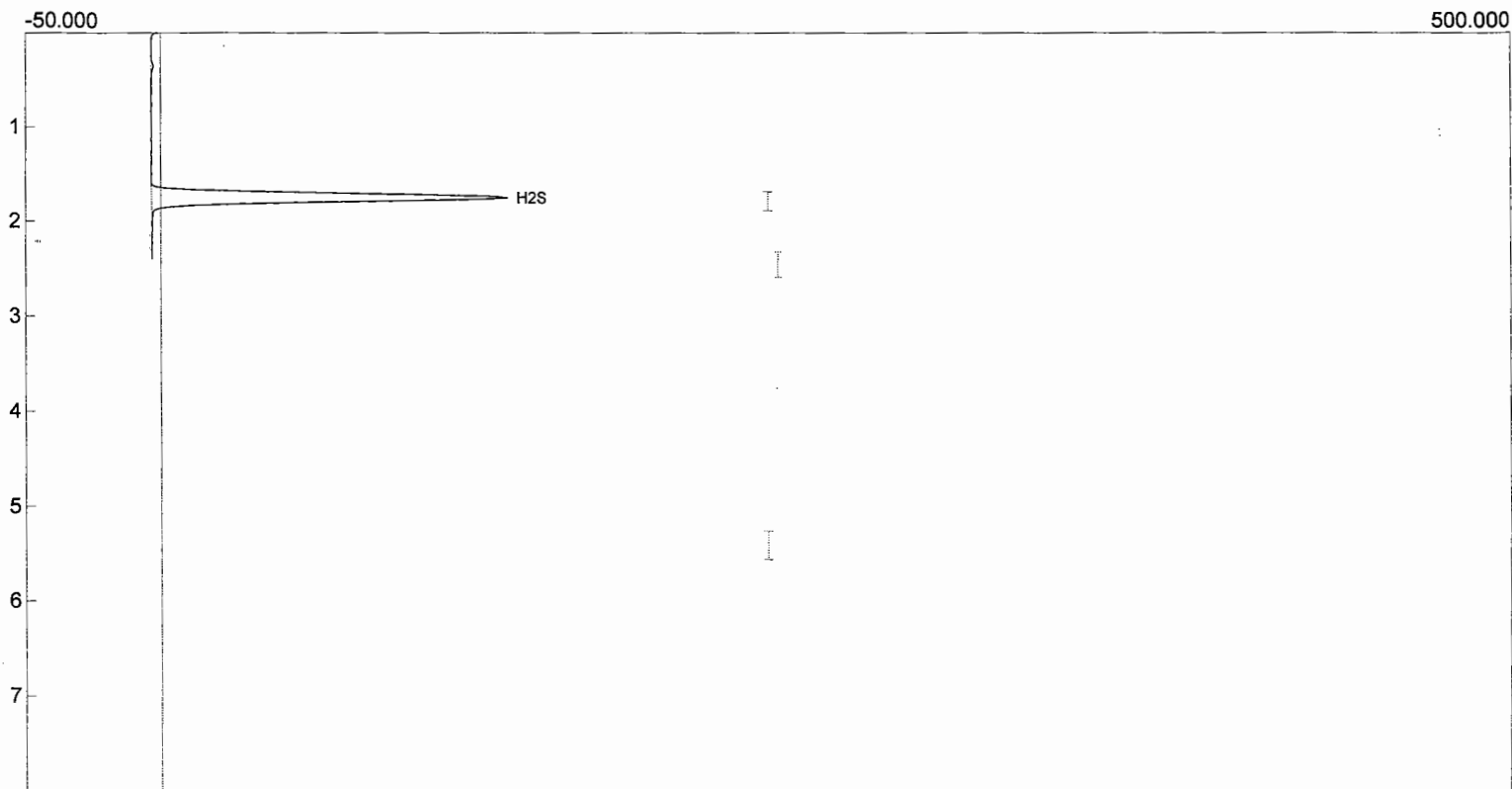
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run43.CHR ()

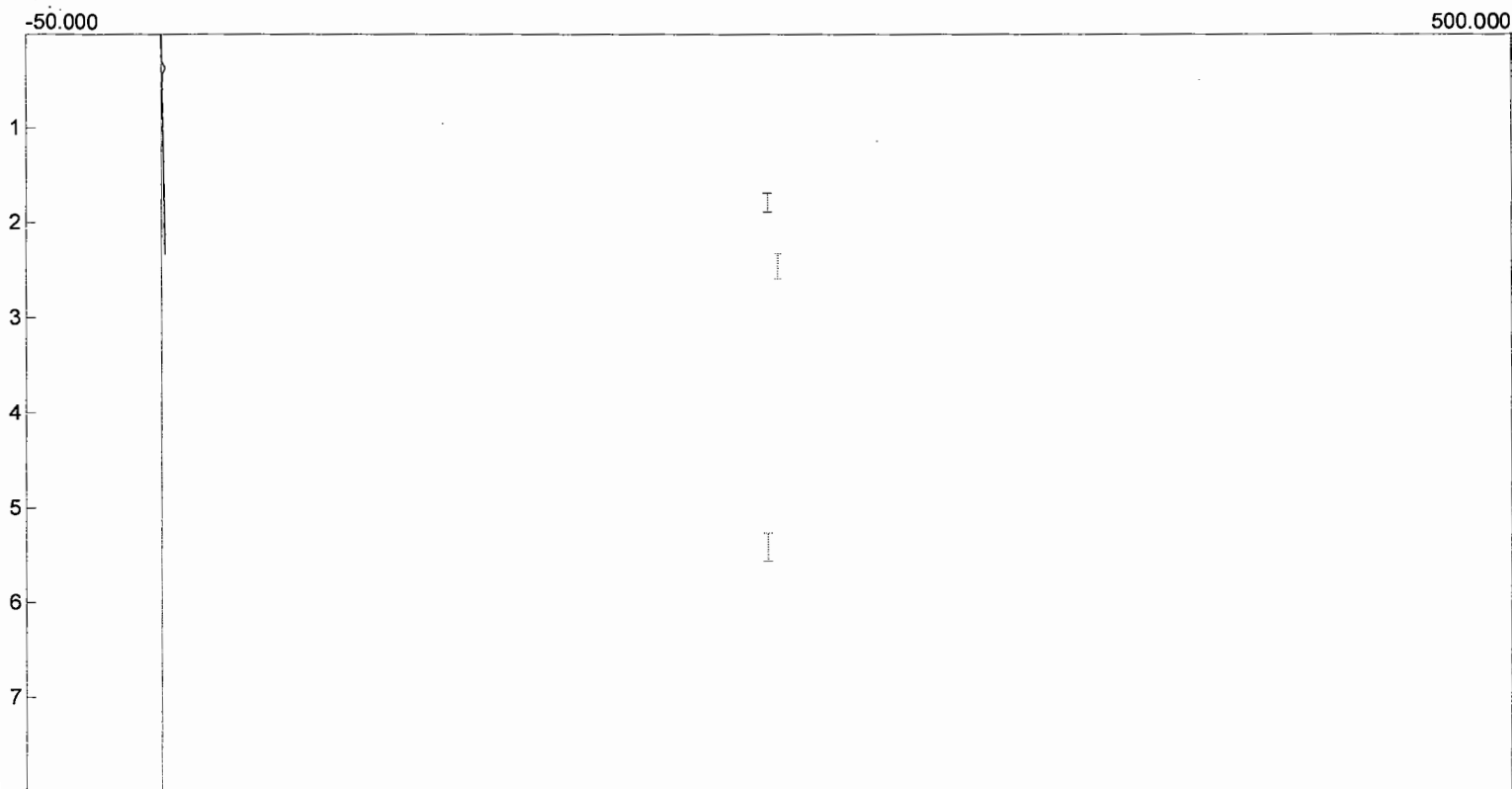
Sample: Run No. 2 LL Check

Operator: JAB



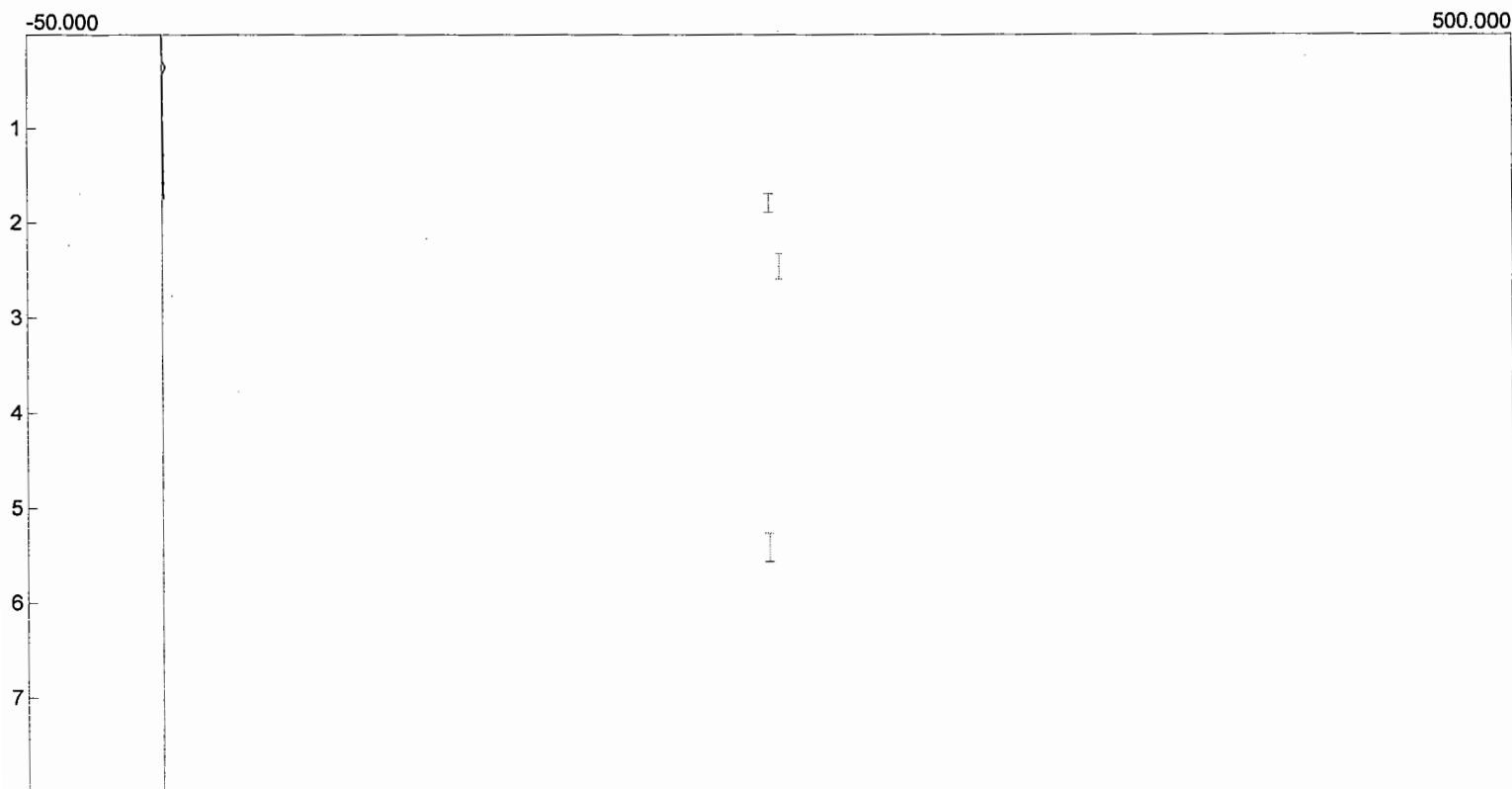
Component	Area
H2S	809.1495
COS	0.0000
CS2	0.0000
	809.1495

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_Cal20.chr ()  
Sample: Post 1\_2 Zero Cal Check  
Operator: JAB



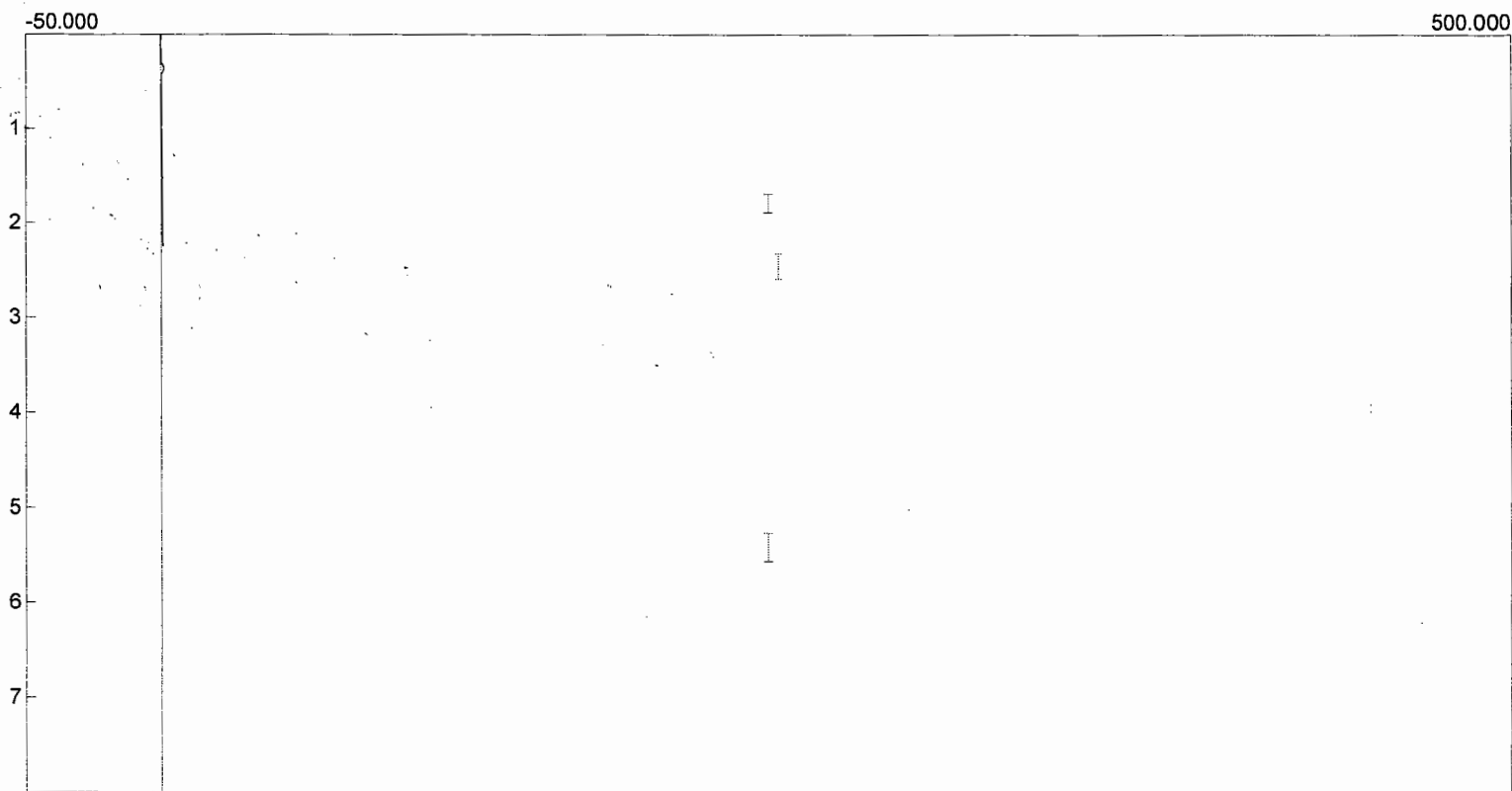
Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
 Client: Valero, Port Arthur  
 Client ID: 544 SRU  
 Collected: 6/16/11  
 Method: USEPA M15  
 Description: FPD  
 Data file: ValeroPA\_Cal21.CHR ()  
 Sample: Post 1\_2 Zero Cal Check  
 Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_Cal22.CHR ()  
Sample: Post 1\_2 Zero Cal Check  
Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/16/11

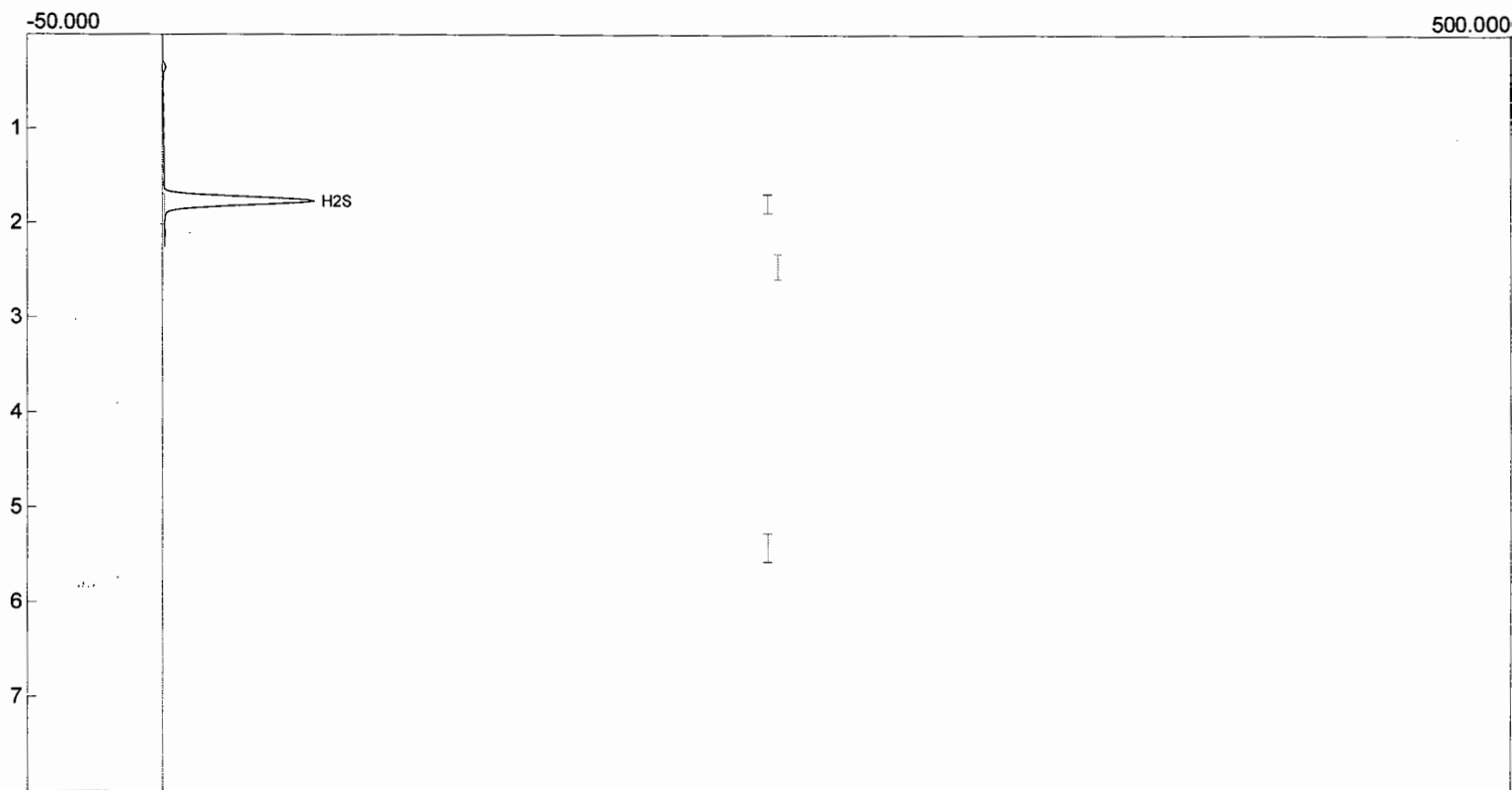
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_Cal34.CHR ()

Sample: Post 1\_2 12.5 ppm Check

Operator: JAB



Component	Area
H2S	344.8020
COS	0.0000
CS2	0.0000
	344.8020

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/16/11

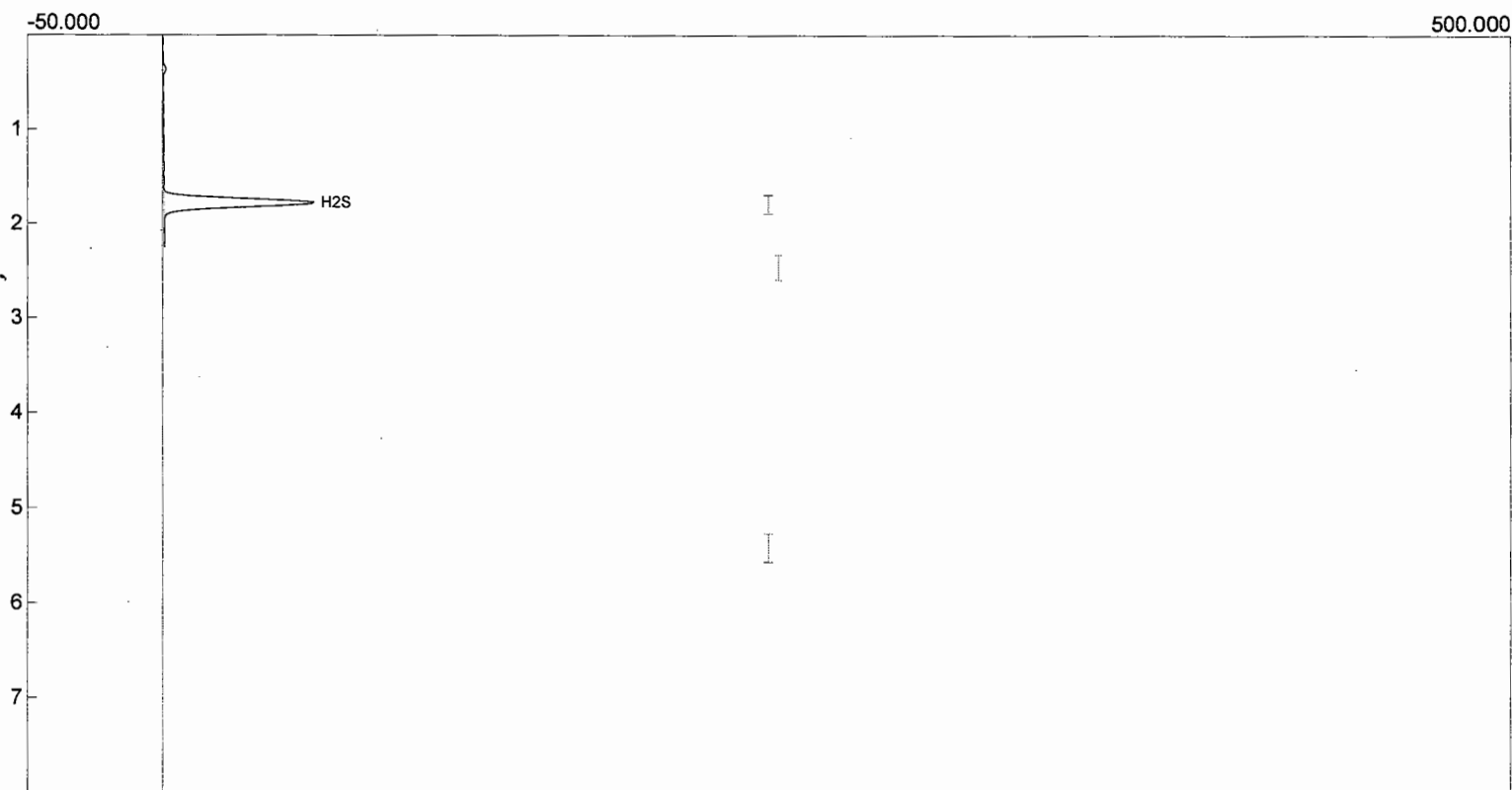
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_Cal35.CHR ()

Sample: Post 1\_2 12.5 ppm Check

Operator: JAB



Component	Area
H2S	346.6175
COS	0.0000
CS2	0.0000
	346.6175

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/16/11

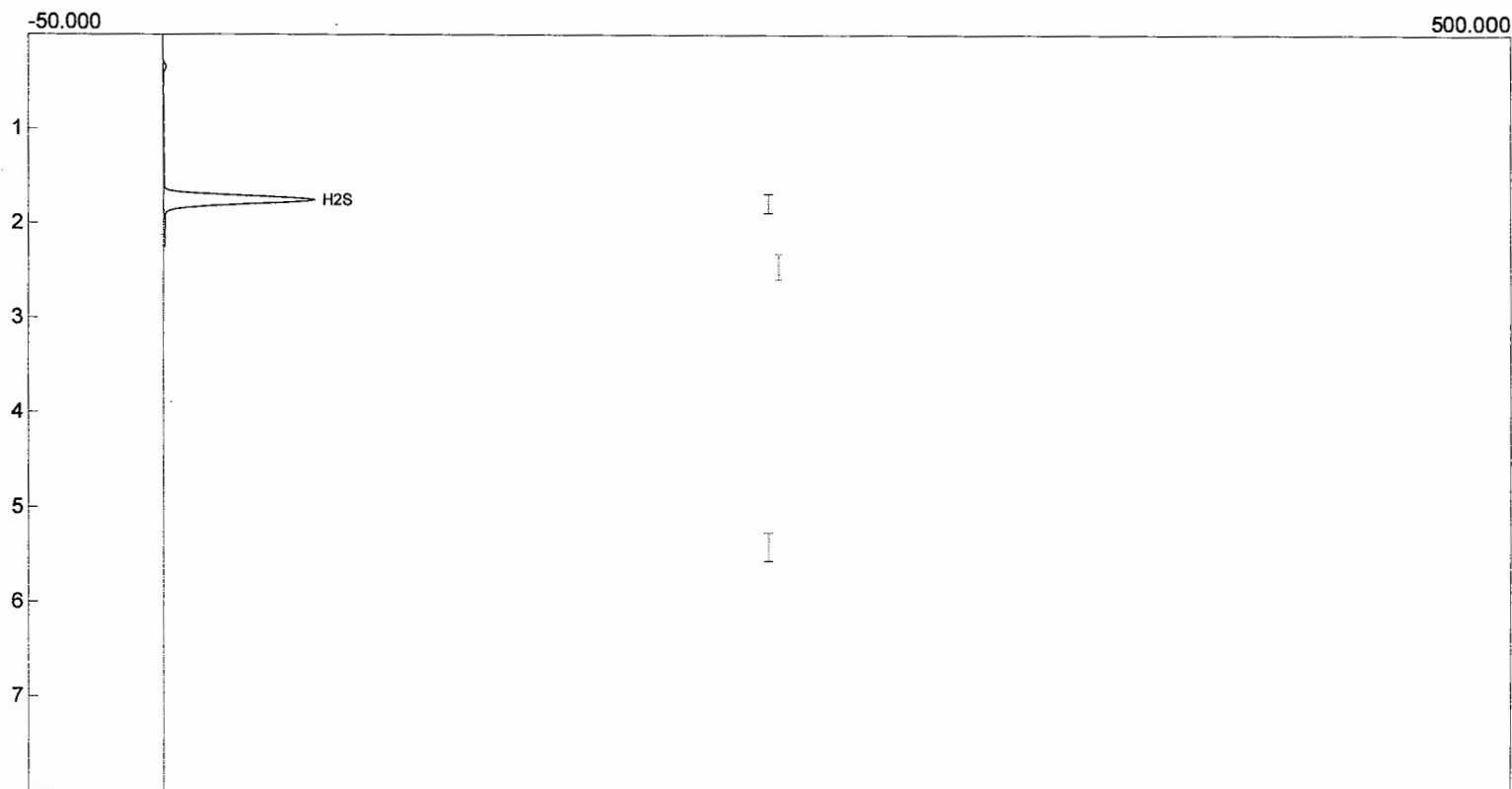
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_Cal36.CHR ()

Sample: Post 1\_2 12.5 ppm Check

Operator: JAB



Component	Area
H2S	348.5830
COS	0.0000
CS2	0.0000
	348.5830

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/16/11

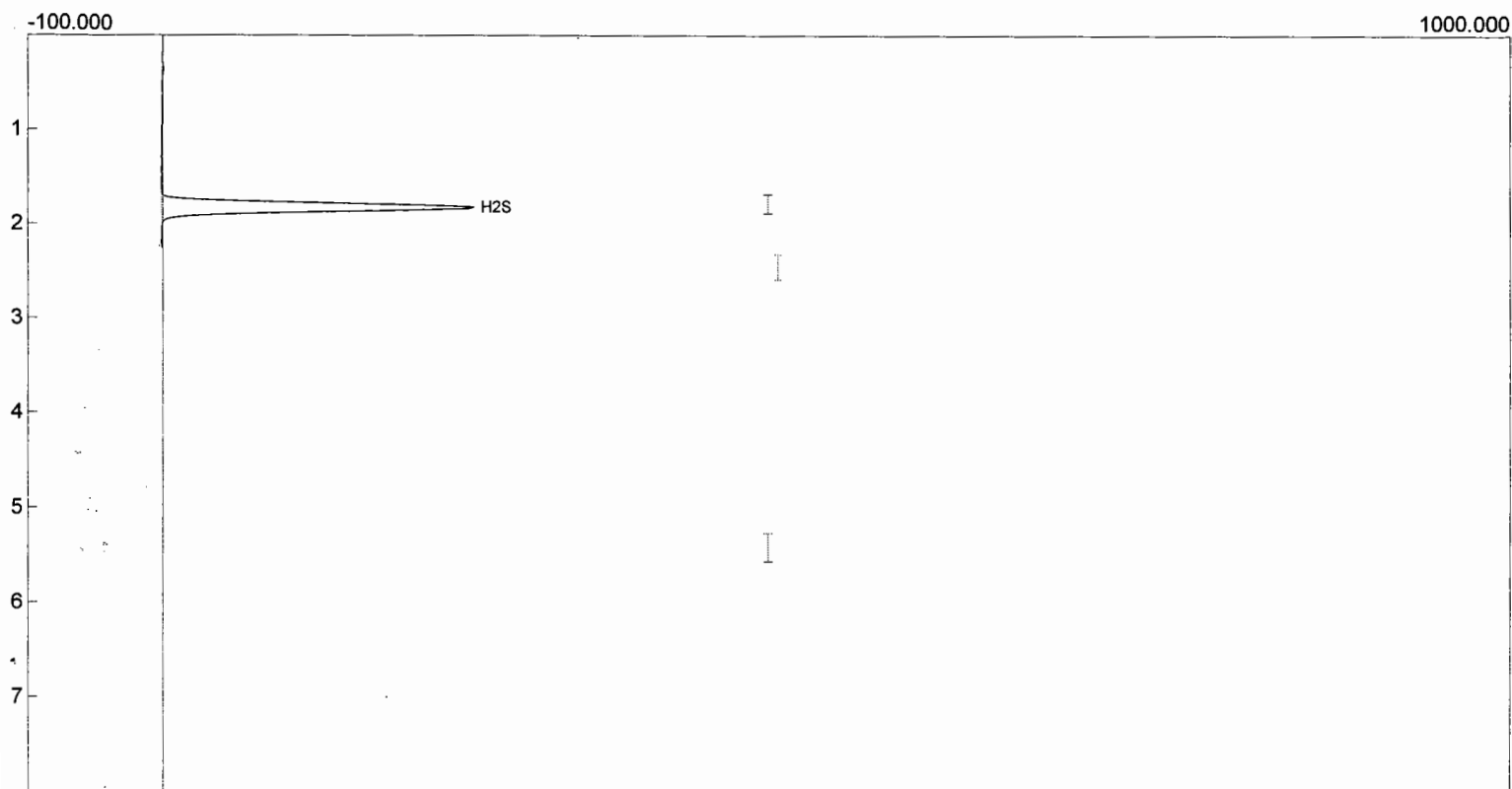
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_Cal31.CHR ()

Sample: Post 1\_2 25 ppm Cal Check

Operator: JAB



Component	Area
H2S	1437.9195
COS	0.0000
CS2	0.0000
	1437.9195

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/16/11

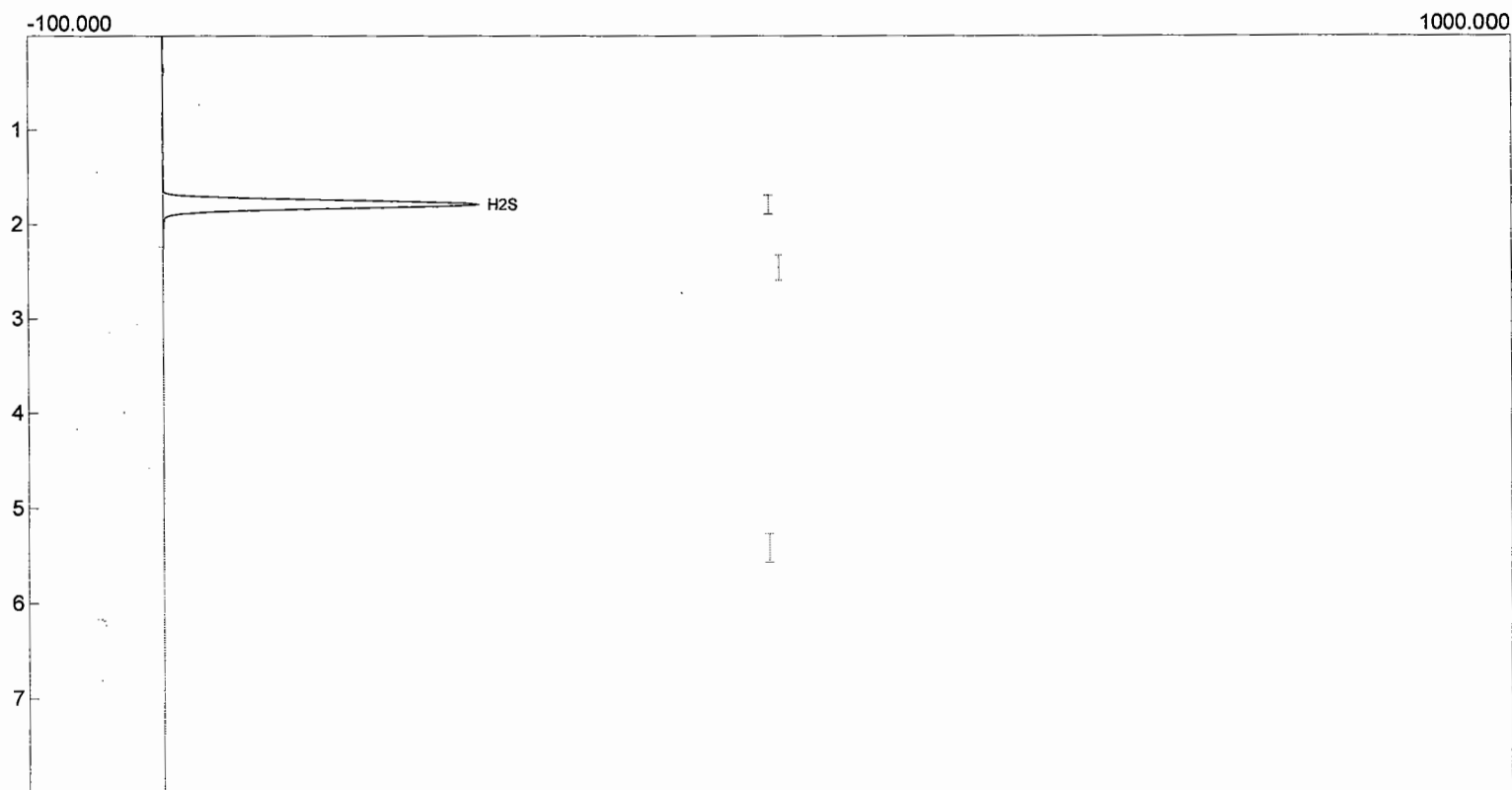
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_Cal32.CHR ()

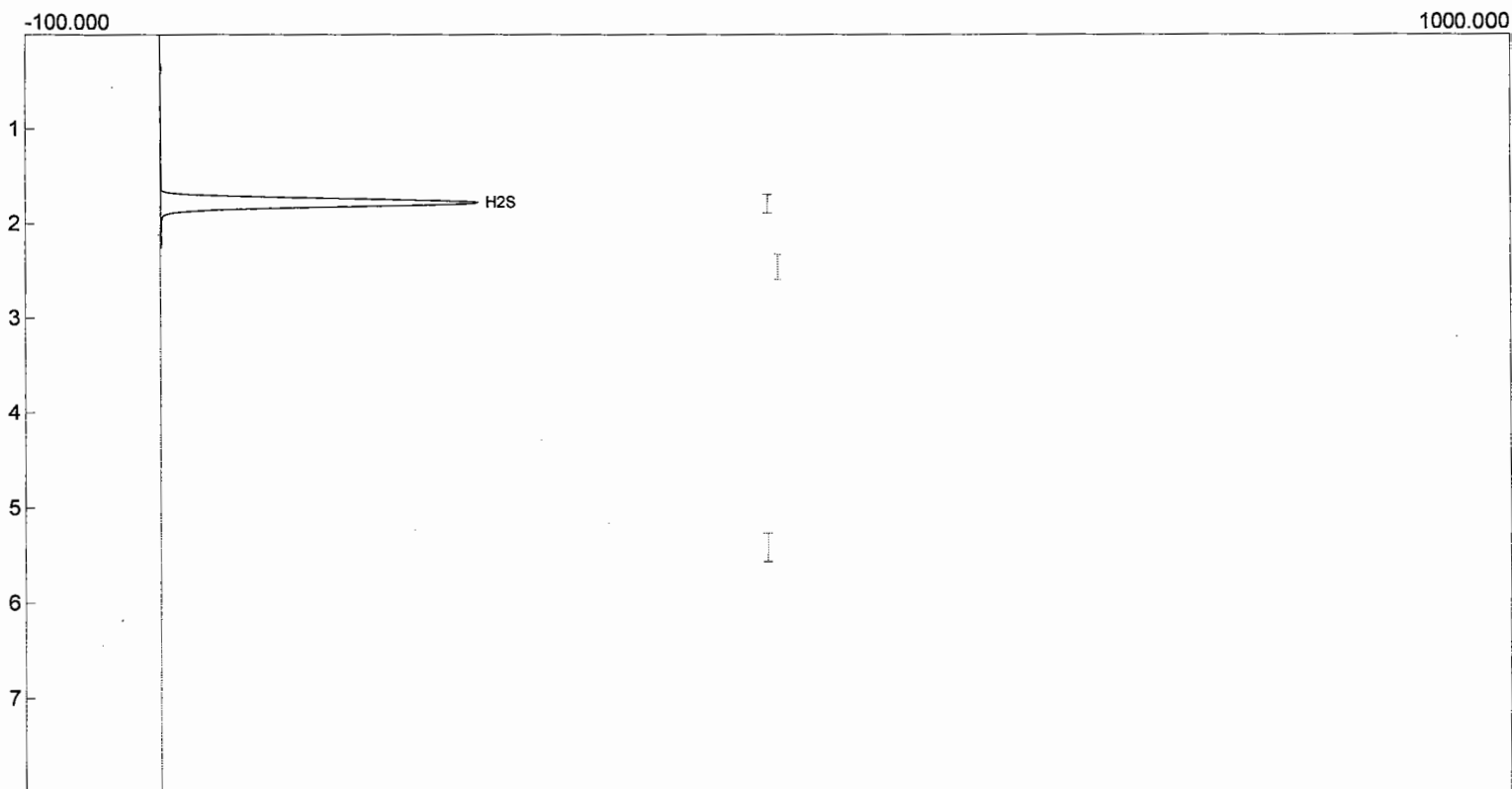
Sample: Post 1\_2 25 ppm Cal Check

Operator: JAB



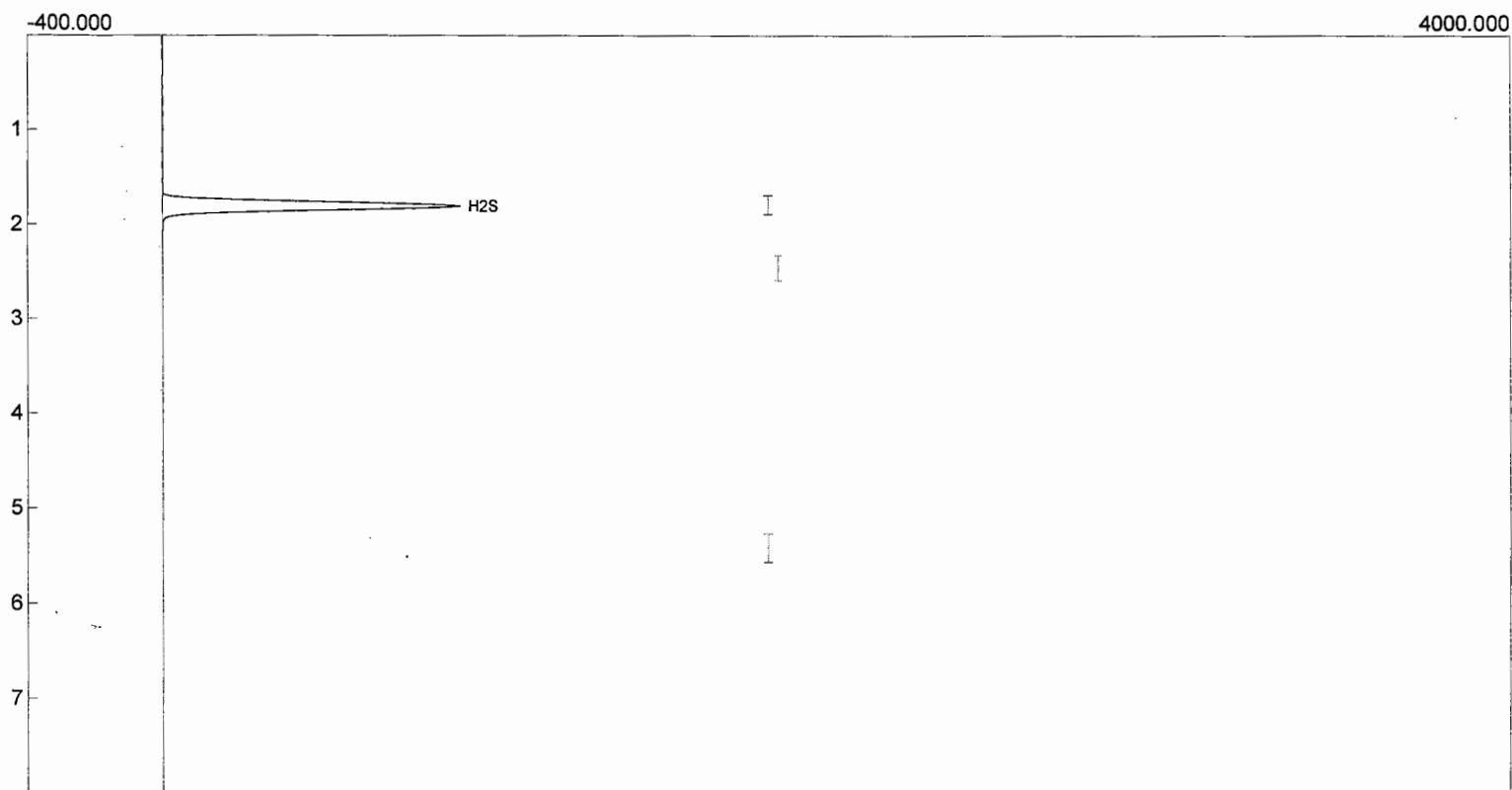
Component	Area
H2S	1453.0130
COS	0.0000
CS2	0.0000
	1453.0130

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_Cal33.CHR ()  
Sample: Post 1\_2 25 ppm Cal Check  
Operator: JAB



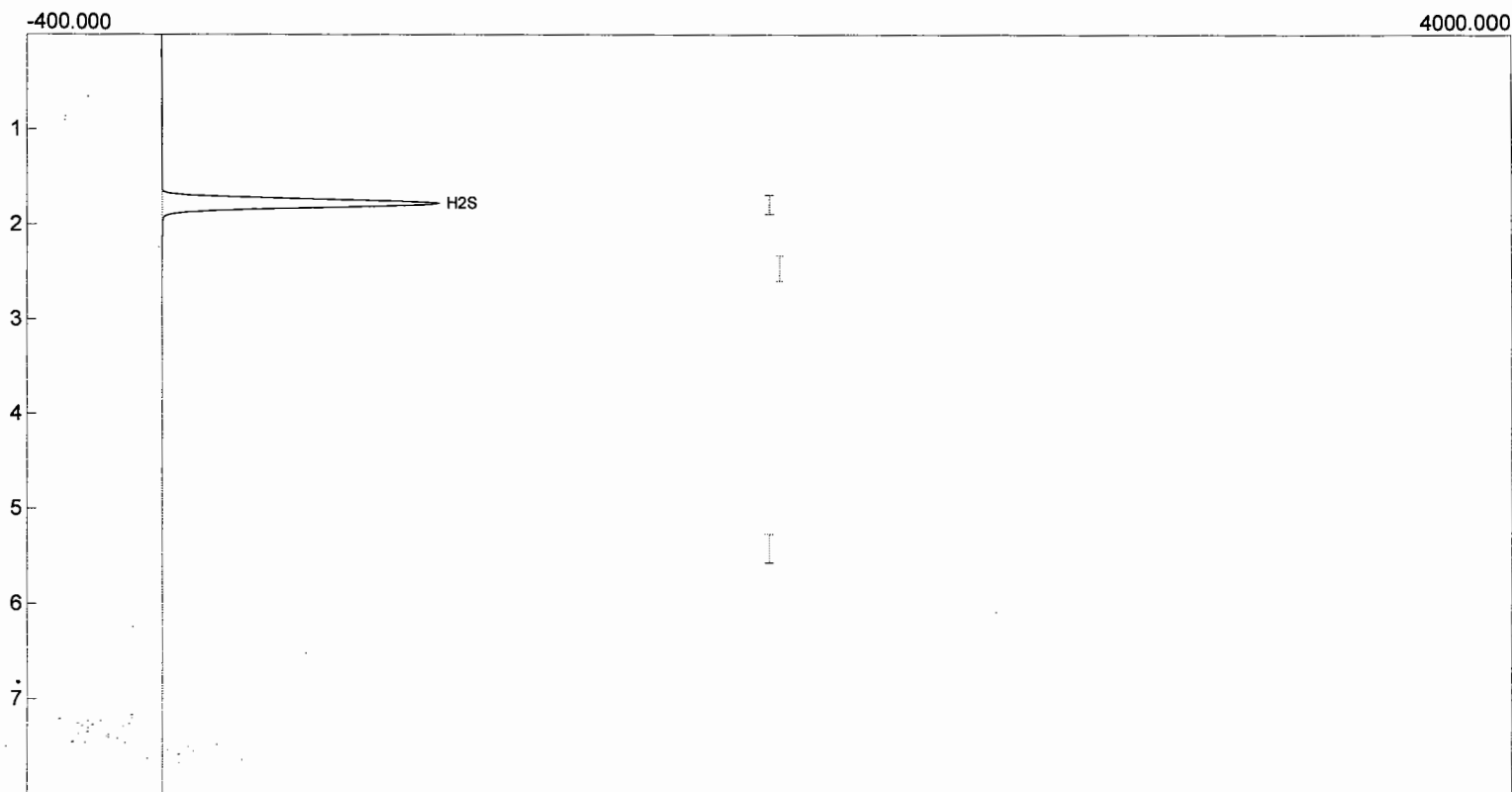
Component	Area
H2S	1466.0015
COS	0.0000
CS2	0.0000
	1466.0015

Lab name: ARI Environmental, Inc.  
 Client: Valero, Port Arthur  
 Client ID: 544 SRU  
 Collected: 6/16/11  
 Method: USEPA M15  
 Description: FPD  
 Data file: ValeroPA\_Cal26.CHR ()  
 Sample: Post 1\_2 50 ppm Cal Check  
 Operator: JAB



Component	Area
H2S	5355.0560
COS	0.0000
CS2	0.0000
	5355.0560

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/16/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_Cal27.CHR ()  
Sample: Post 1\_2 50 ppm Cal Check  
Operator: JAB



Component	Area
H2S	5169.2000
COS	0.0000
CS2	0.0000
	5169.2000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/16/11

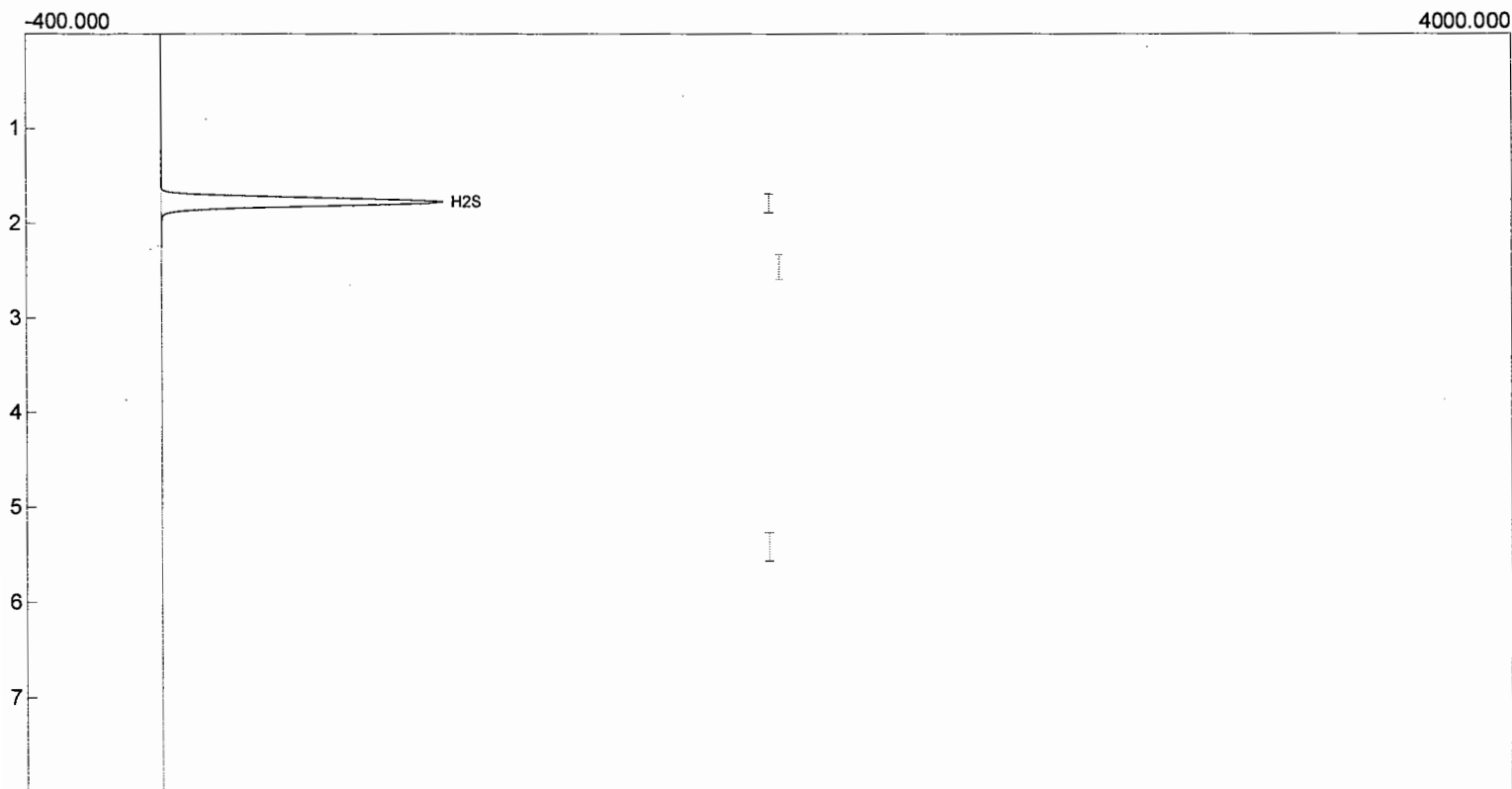
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_Cal28.CHR ()

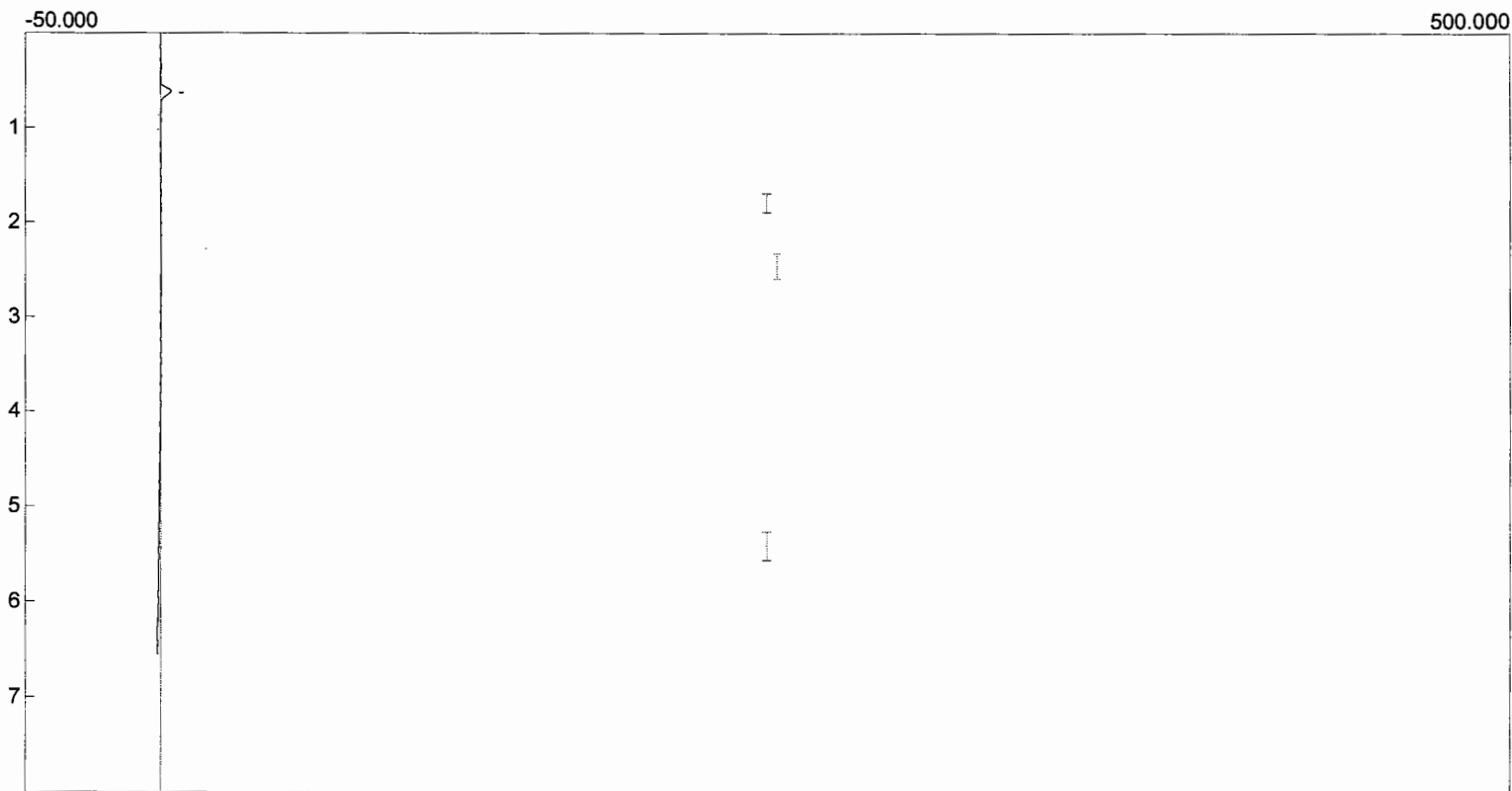
Sample: Post 1\_2 50 ppm Cal Check

Operator: JAB



Component	Area
H2S	5197.0970
COS	0.0000
CS2	0.0000
	5197.0970

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/17/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_SRU\_Run49.chr ()  
Sample: Run No. 3  
Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/17/11

Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run50.CHR ()

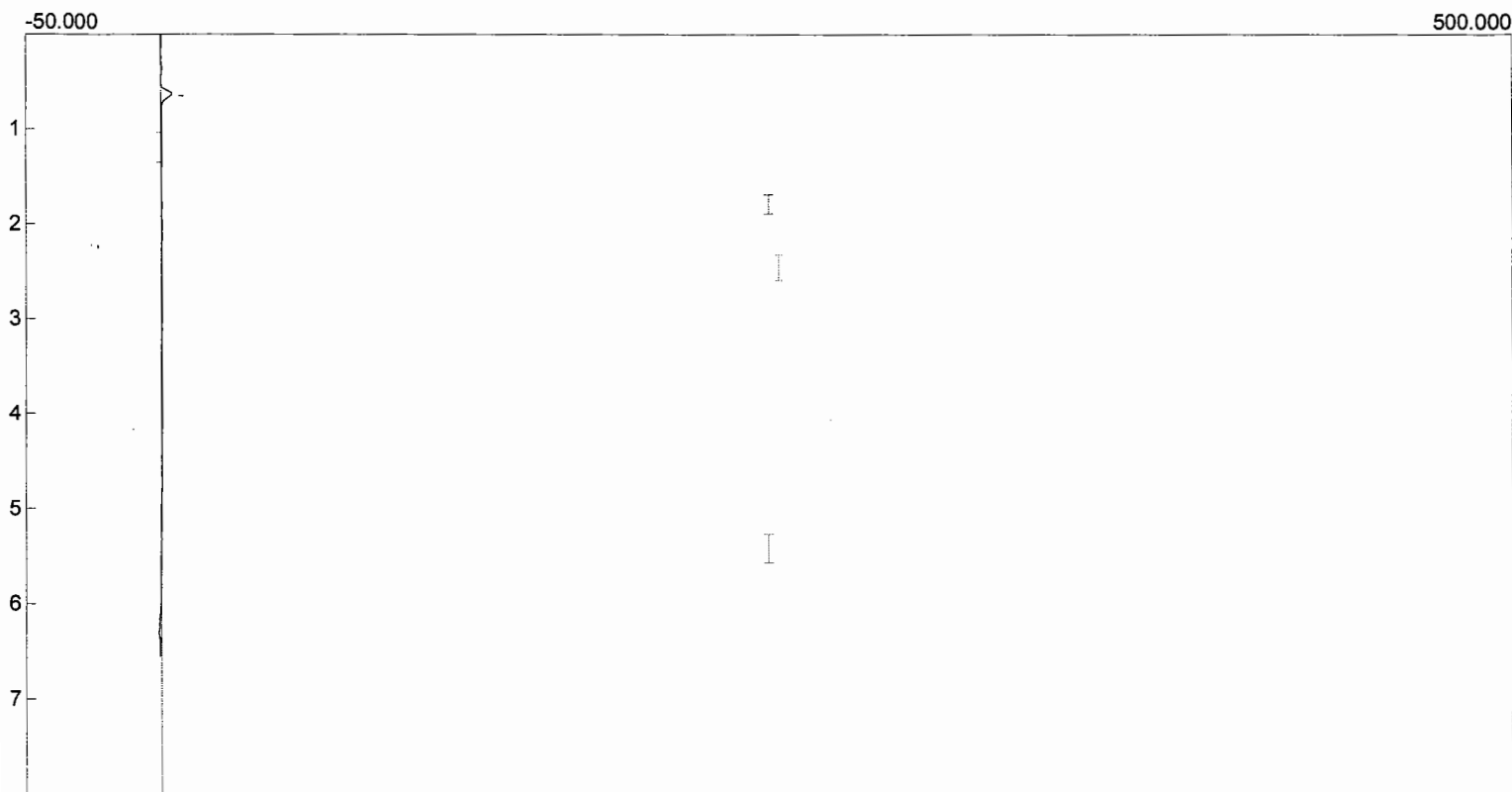
Sample: Run No. 3

Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/17/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_SRU\_Run51.CHR ()  
Sample: Run No. 3  
Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/17/11

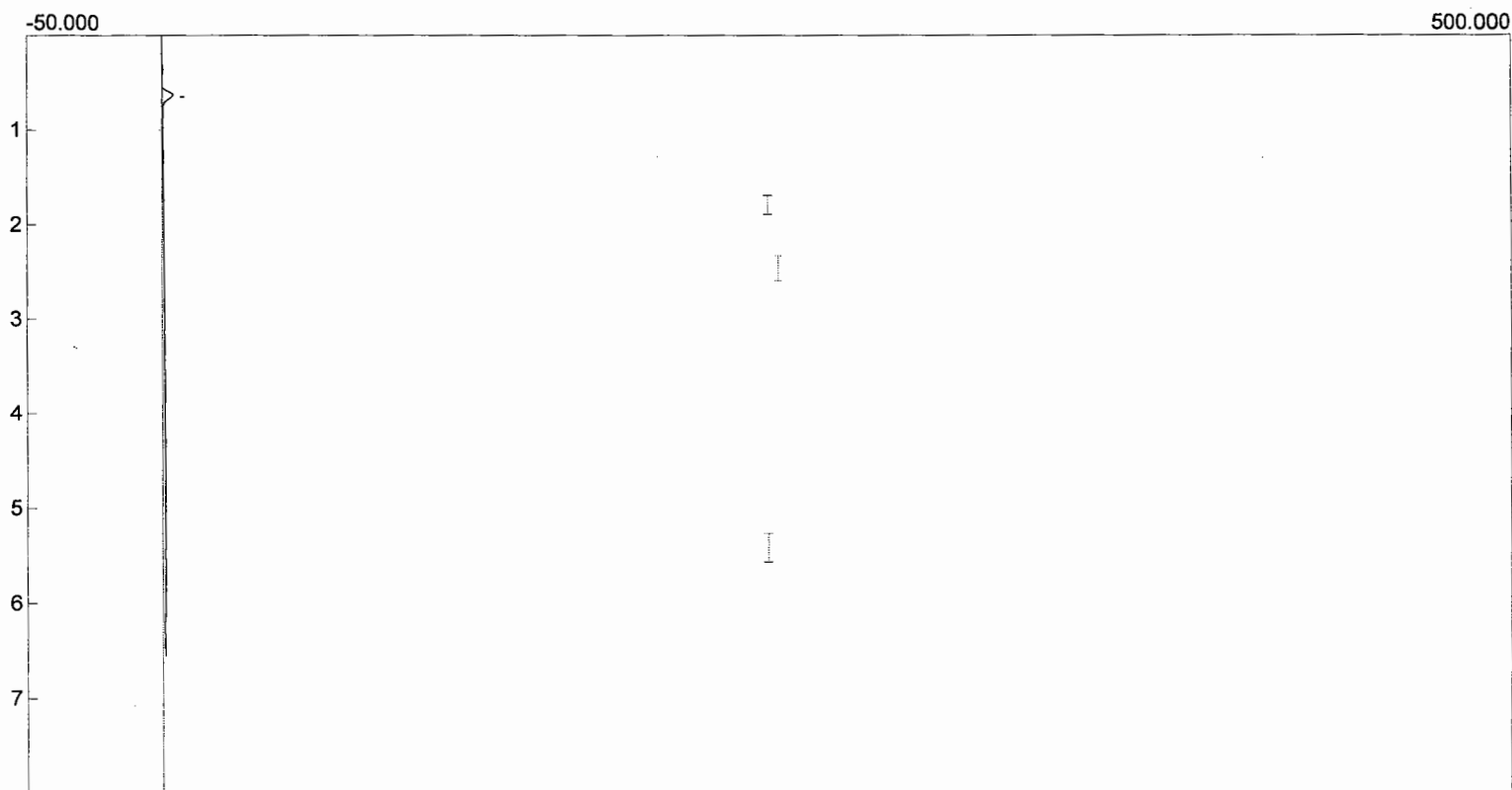
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run52.CHR ()

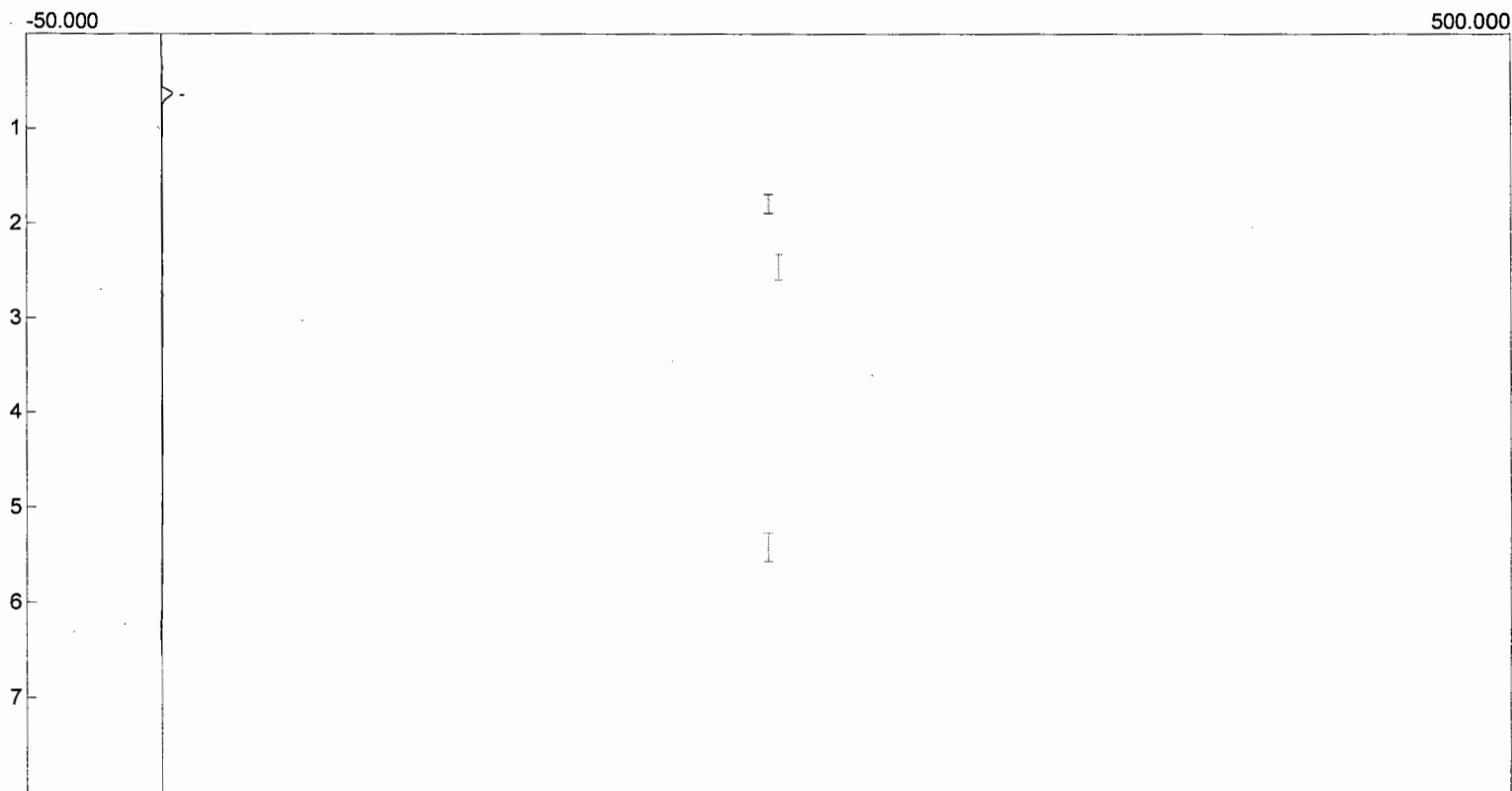
Sample: Run No. 3

Operator: JAB



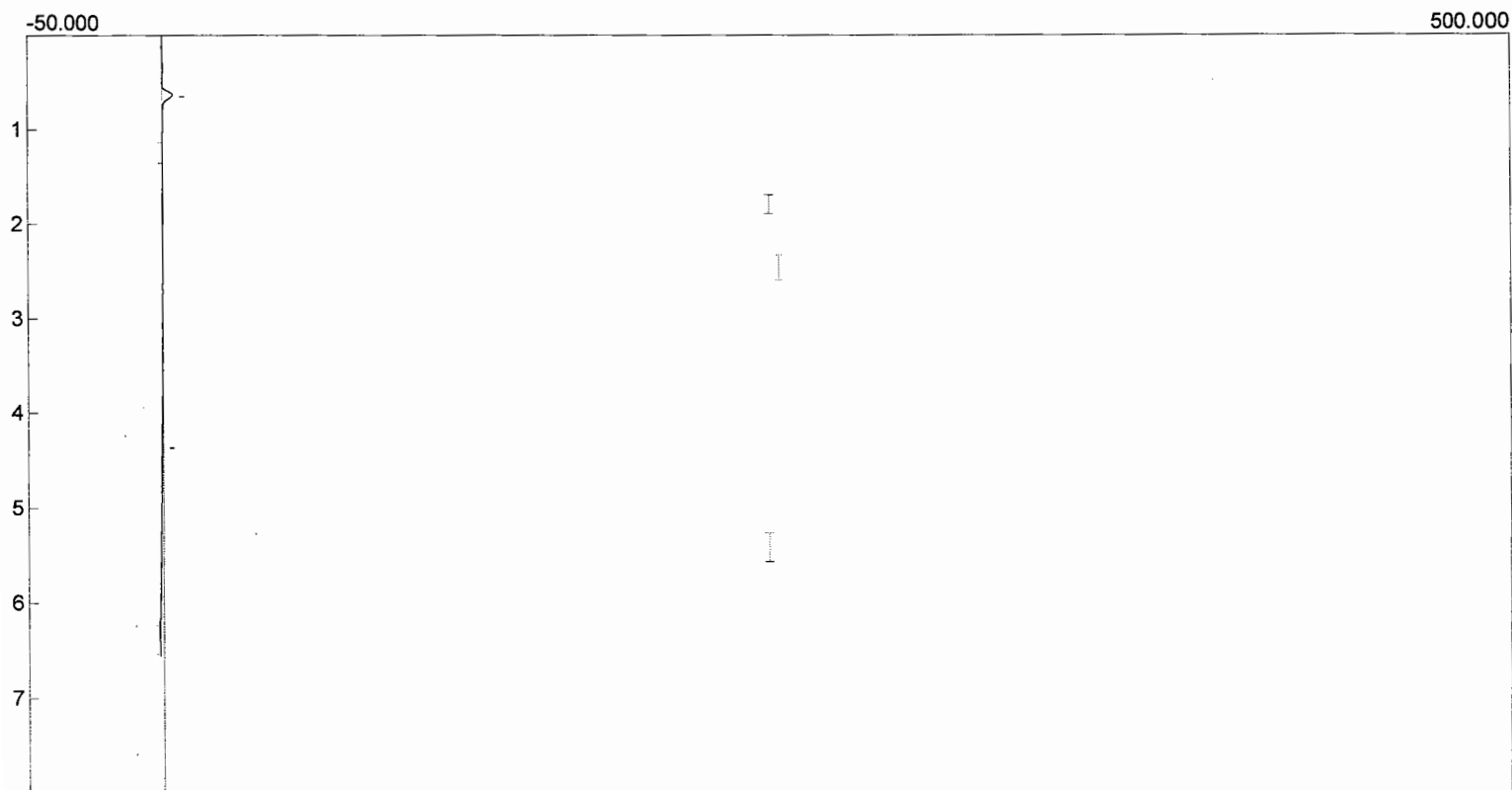
Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/17/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_SRU\_Run53.CHR ()  
Sample: Run No. 3  
Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/17/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_SRU\_Run54.CHR ()  
Sample: Run No. 3  
Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/17/11

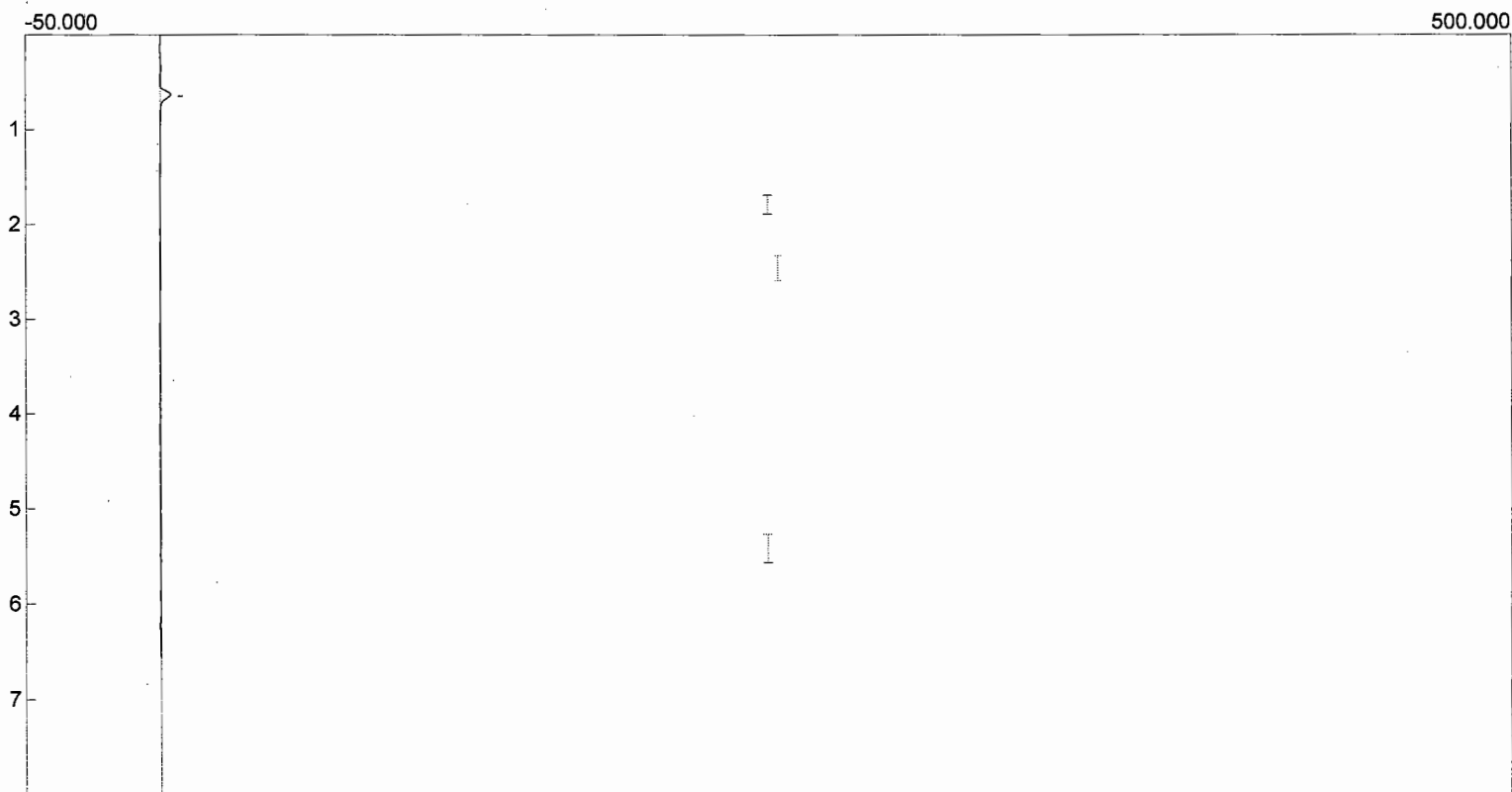
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run55.CHR ()

Sample: Run No. 3

Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/17/11

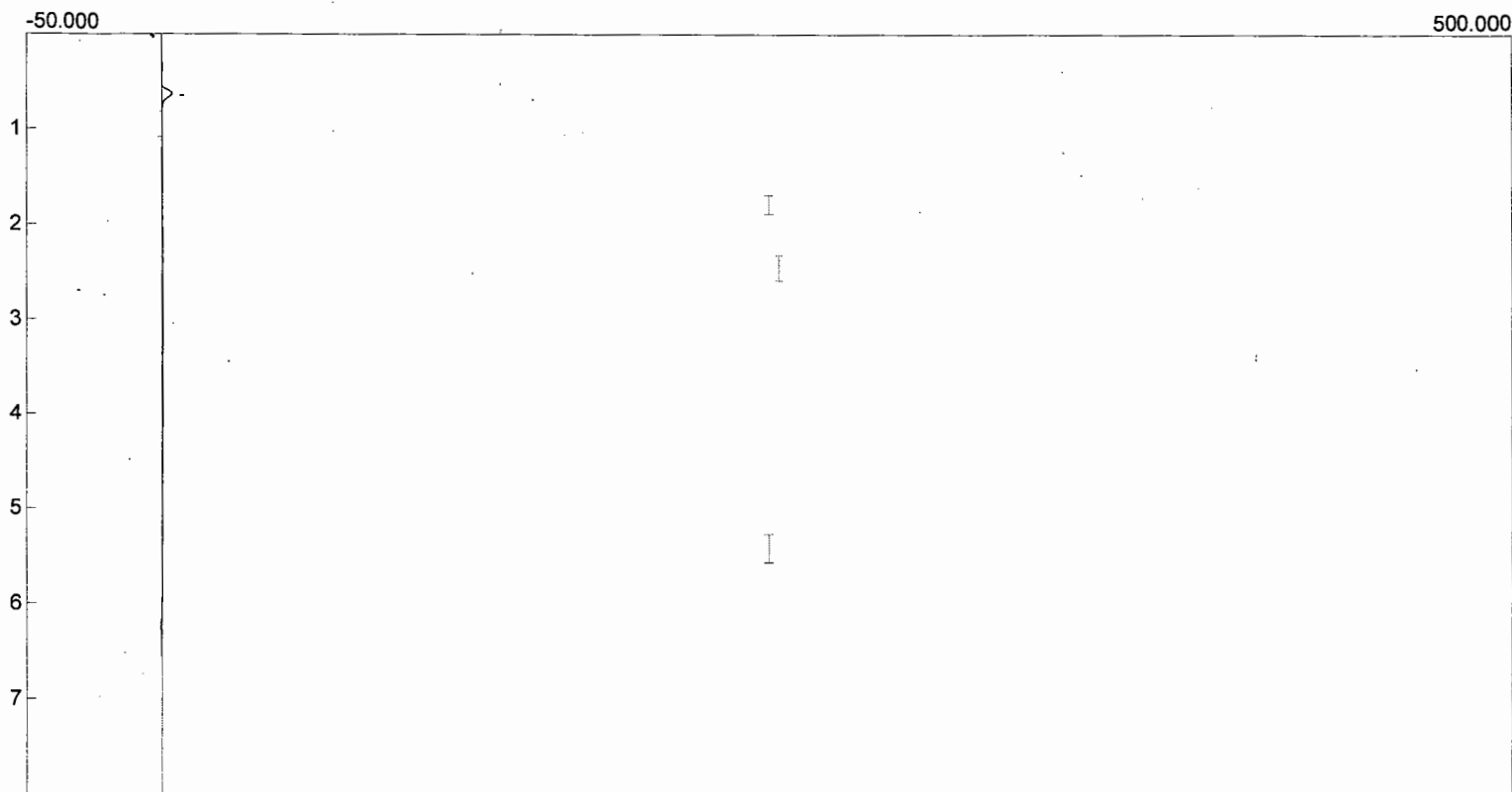
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run56.CHR ()

Sample: Run No. 3

Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/17/11

Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run57.CHR ()

Sample: Run No. 3

Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/17/11

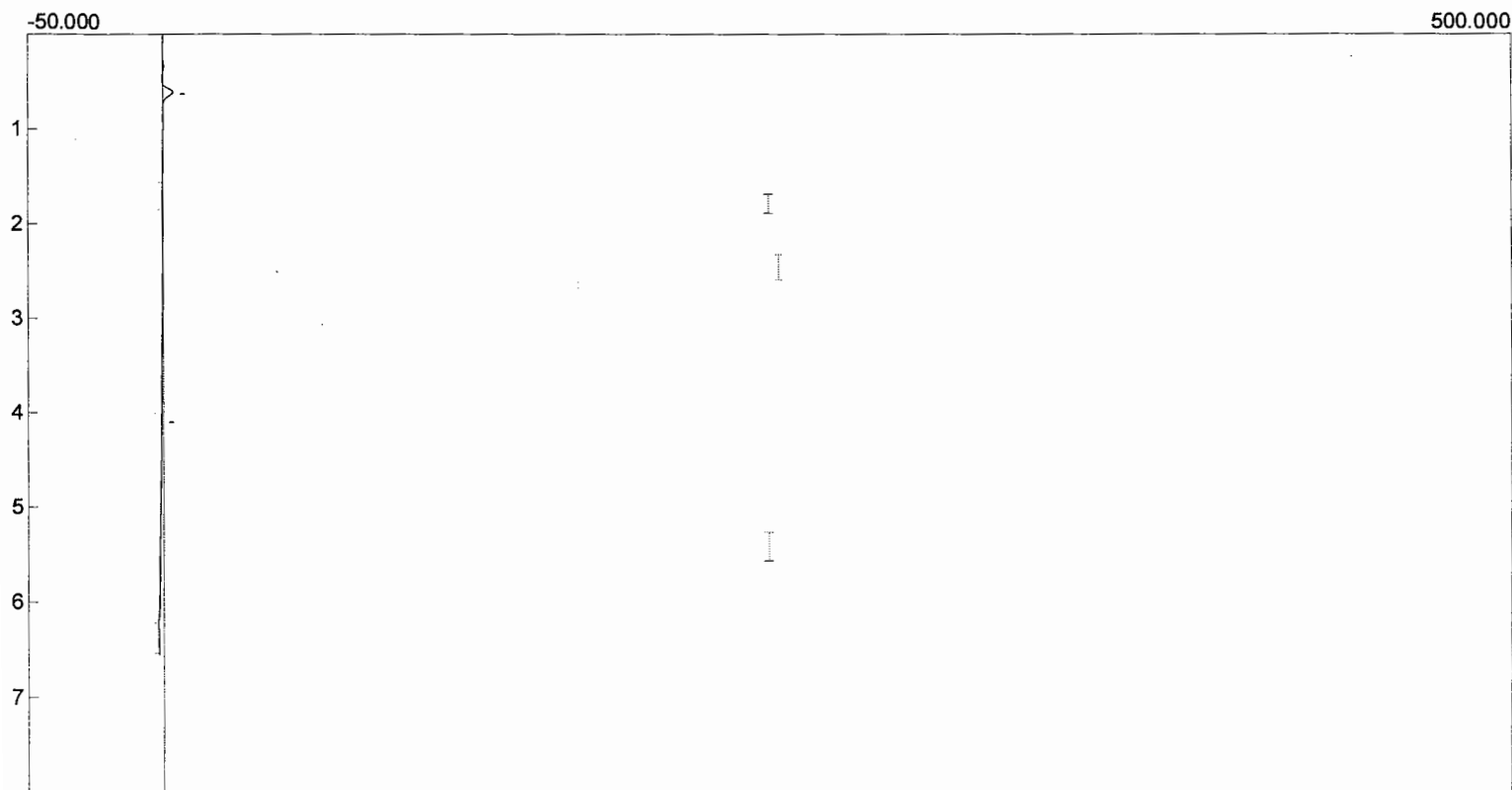
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run58.CHR ()

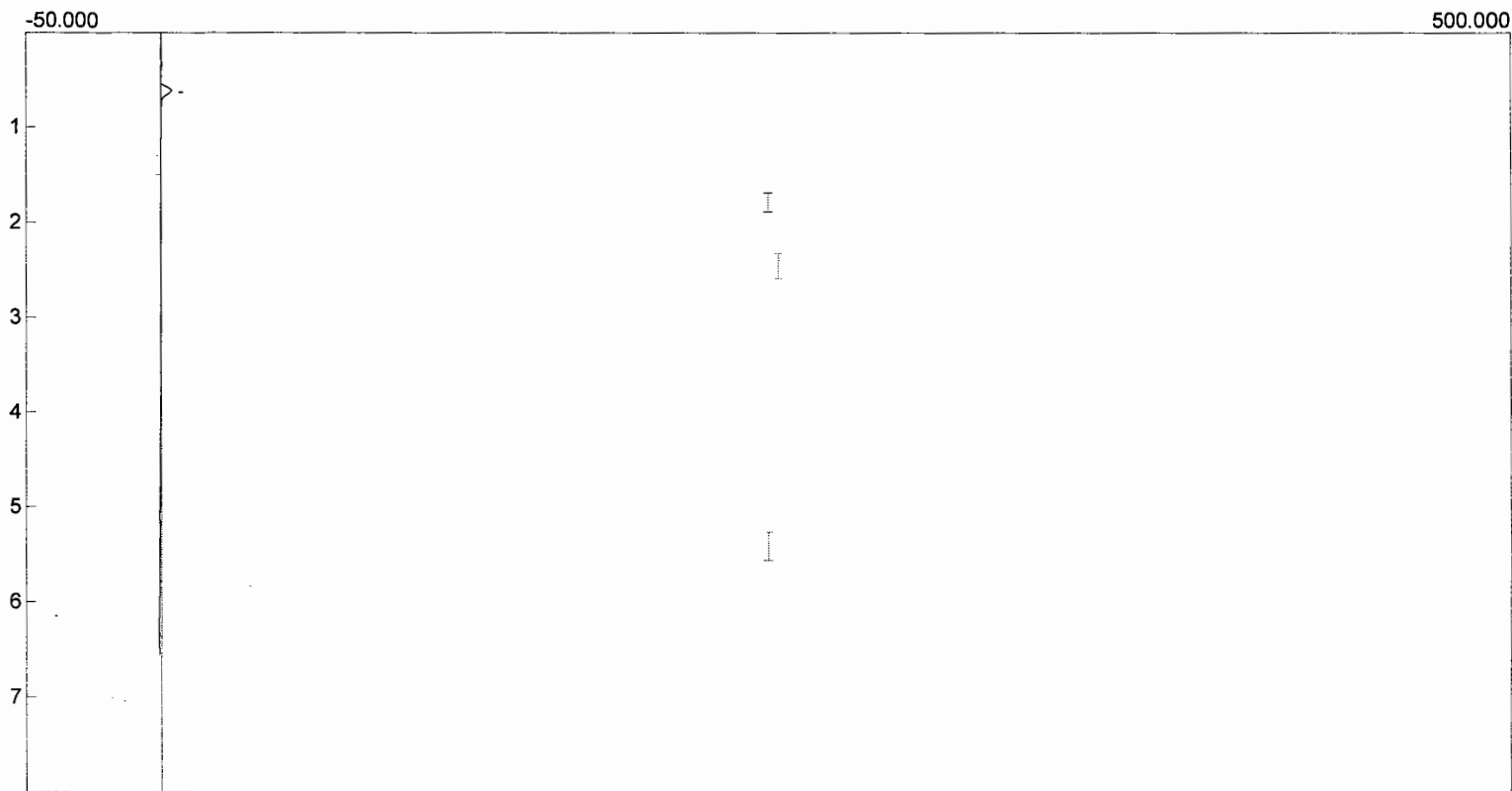
Sample: Run No. 3

Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/17/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_SRU\_Run59.CHR ()  
Sample: Run No. 3  
Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/17/11

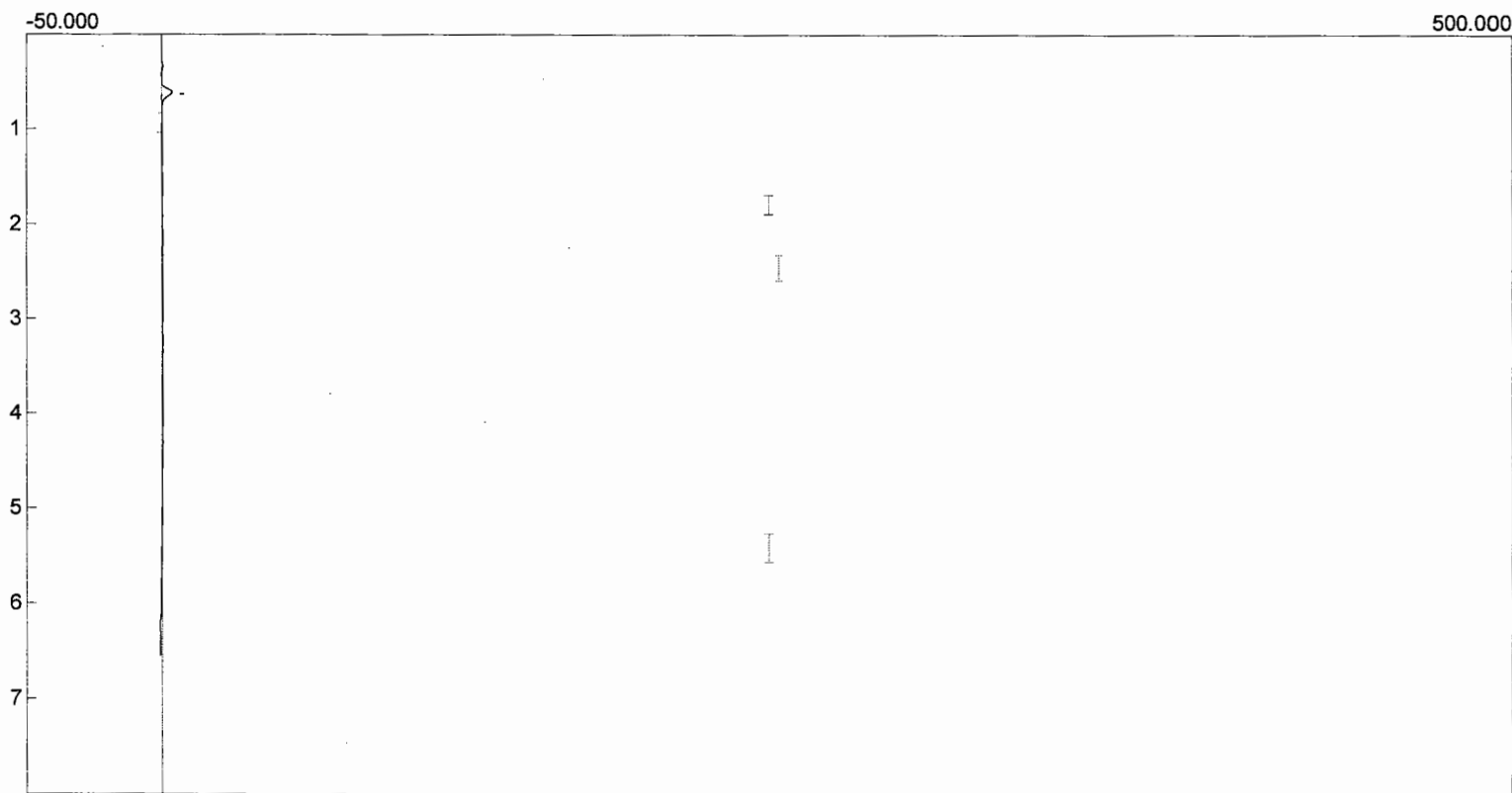
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run60.CHR ()

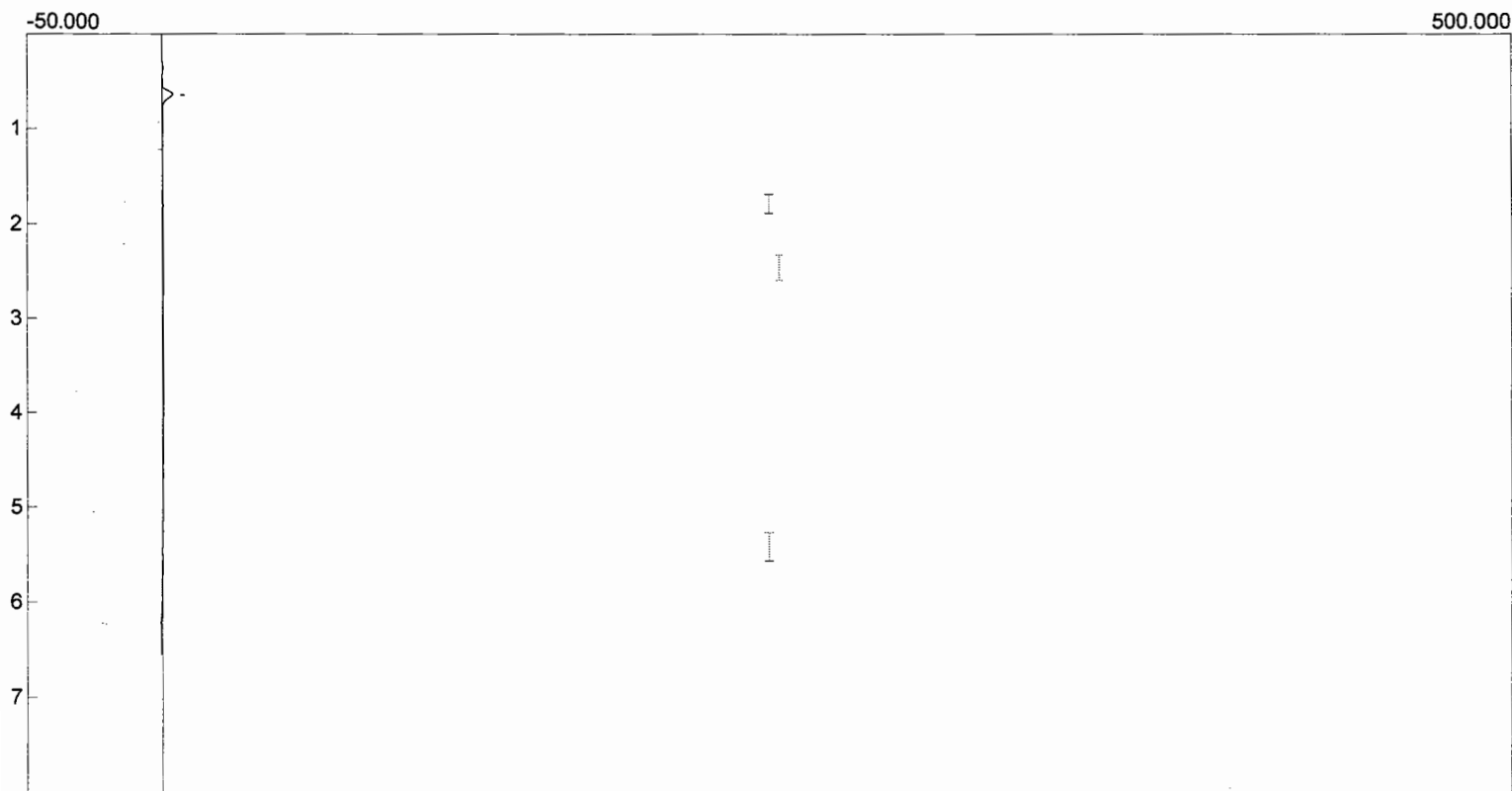
Sample: Run No. 3

Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
 Client: Valero, Port Arthur  
 Client ID: 544 SRU  
 Collected: 6/17/11  
 Method: USEPA M15  
 Description: FPD  
 Data file: ValeroPA\_SRU\_Run61.CHR ()  
 Sample: Run No. 3  
 Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/17/11

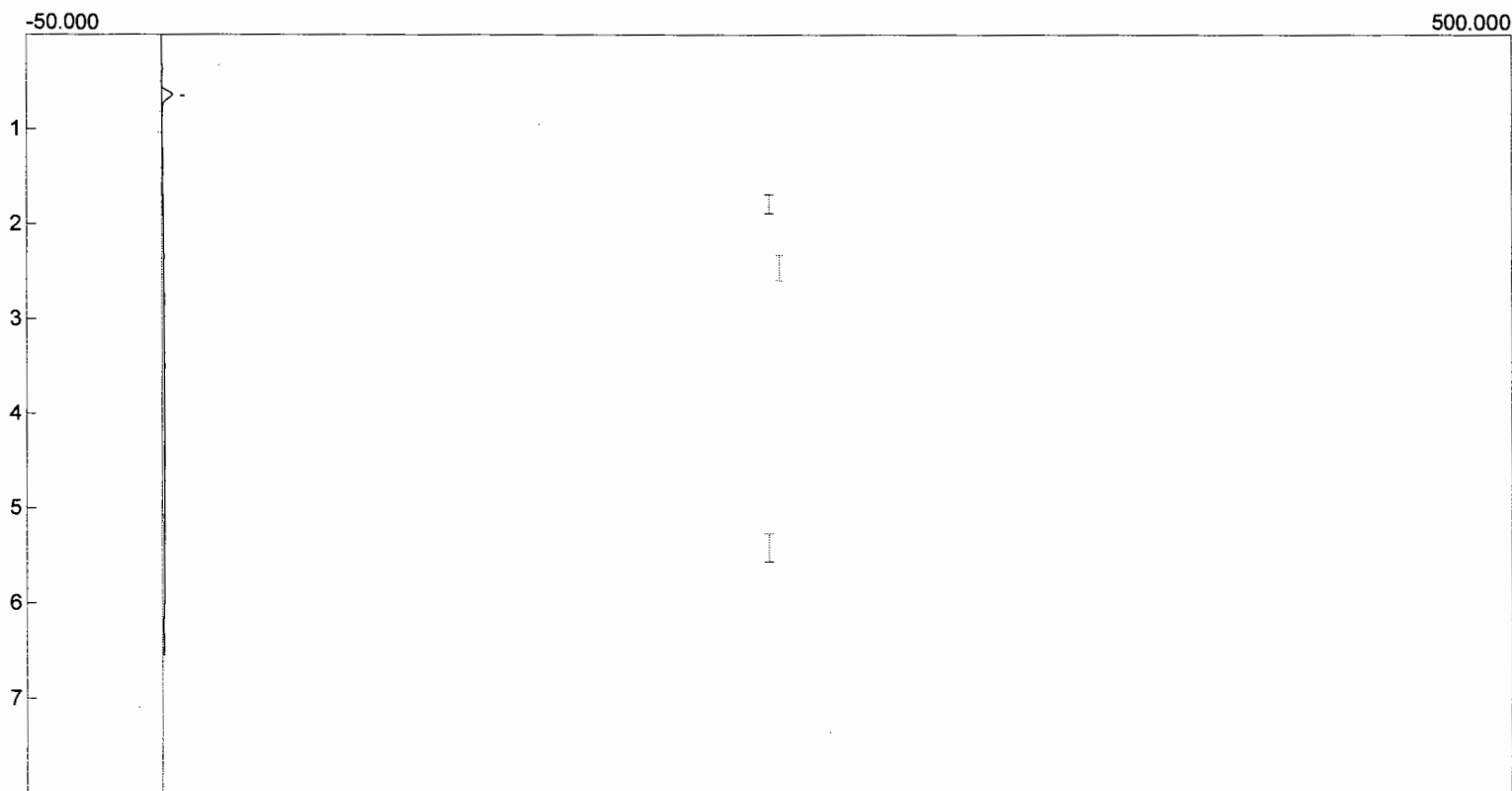
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run62.CHR ()

Sample: Run No. 3

Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/17/11

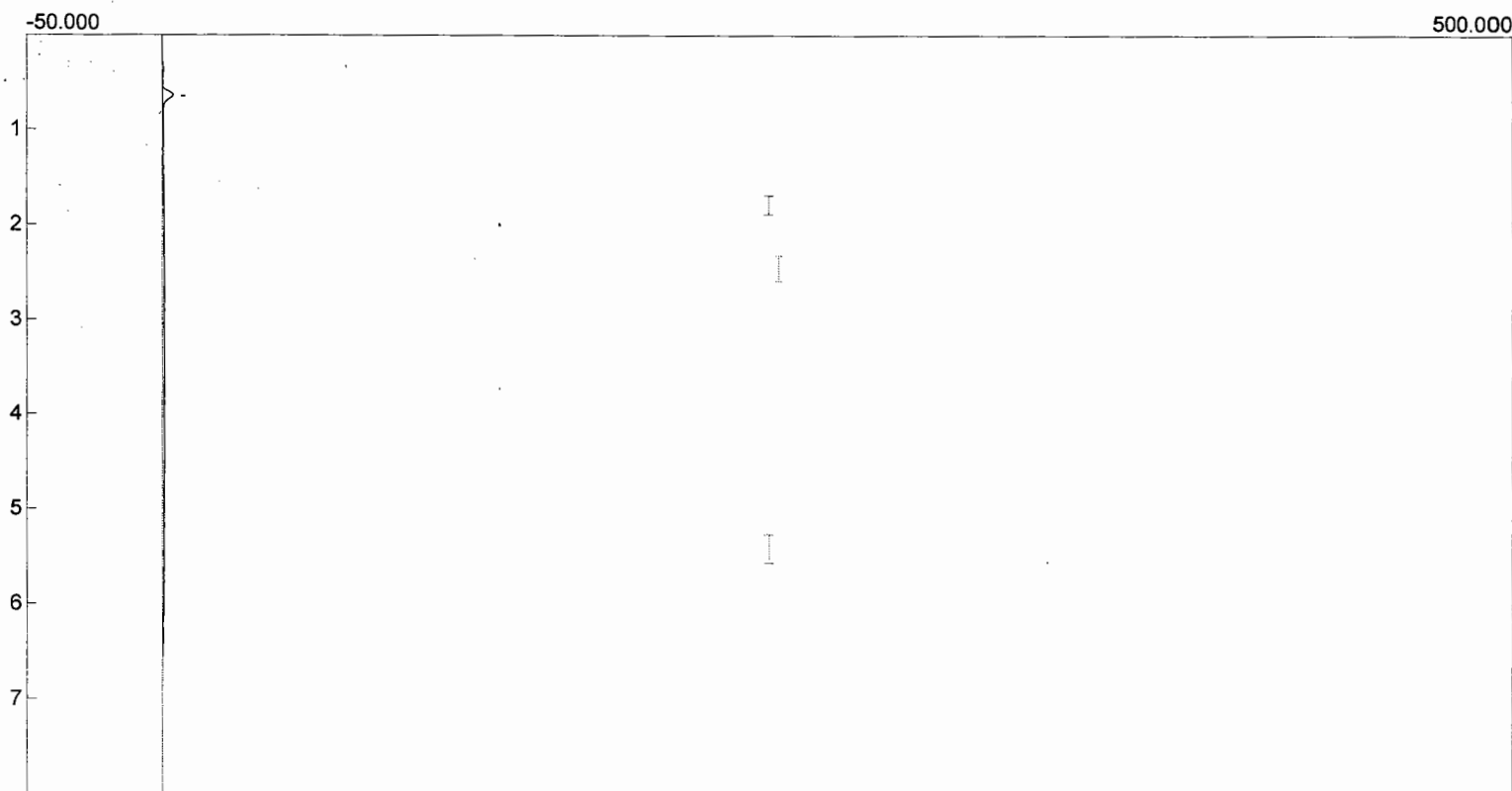
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run63.CHR ()

Sample: Run No. 3

Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/17/11

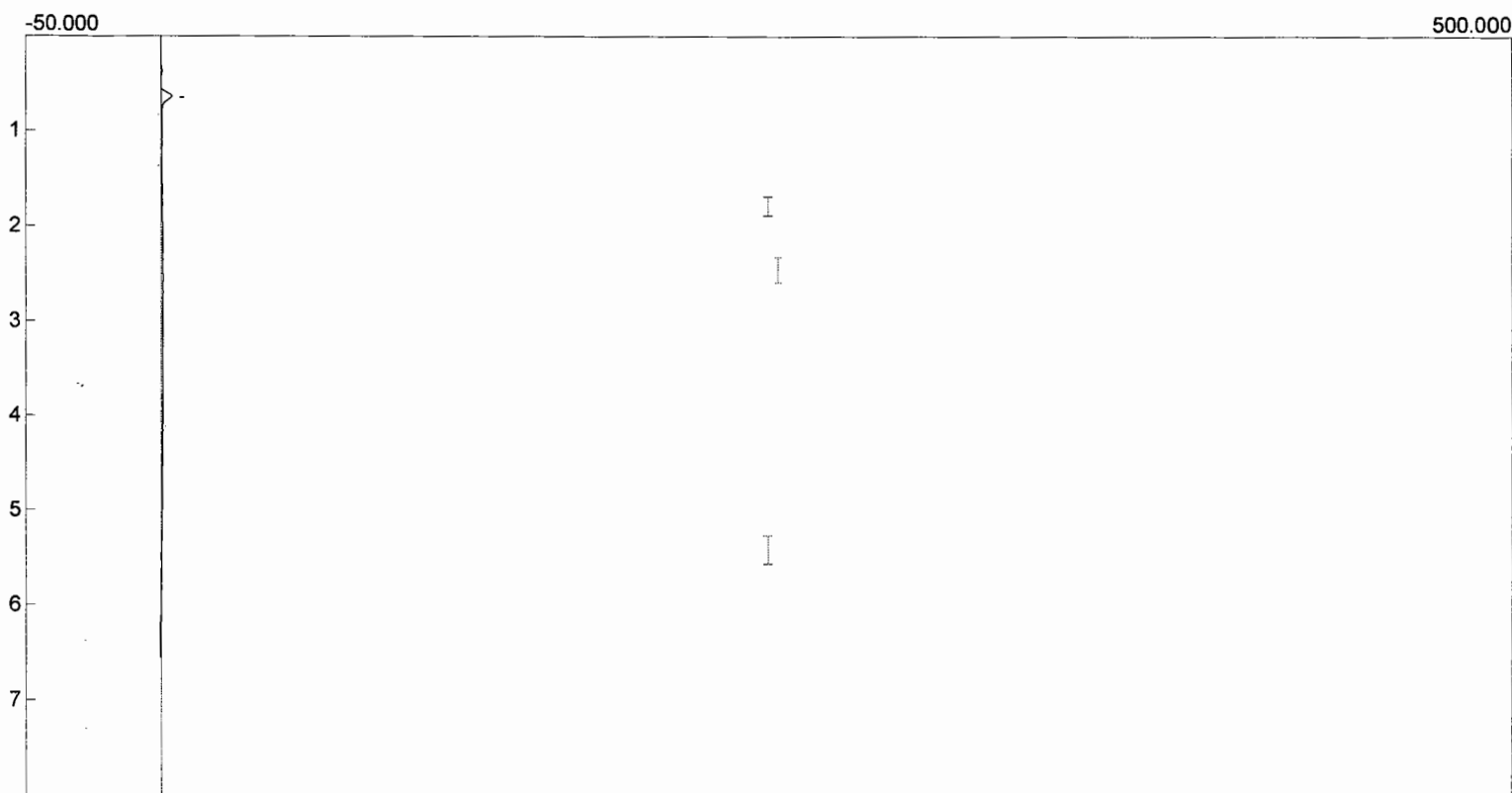
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run64.CHR ()

Sample: Run No. 3

Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/17/11

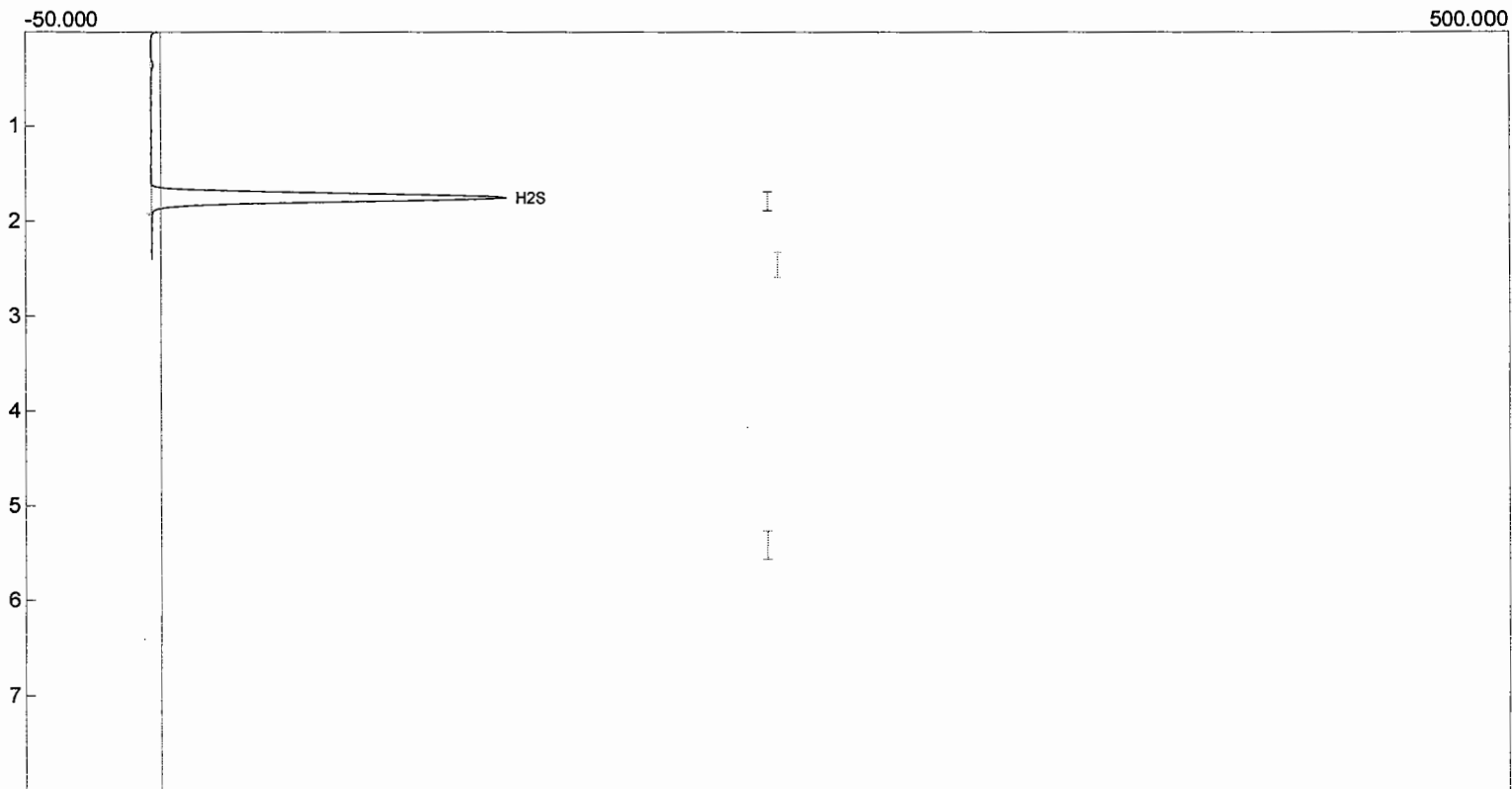
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_SRU\_Run65.CHR ()

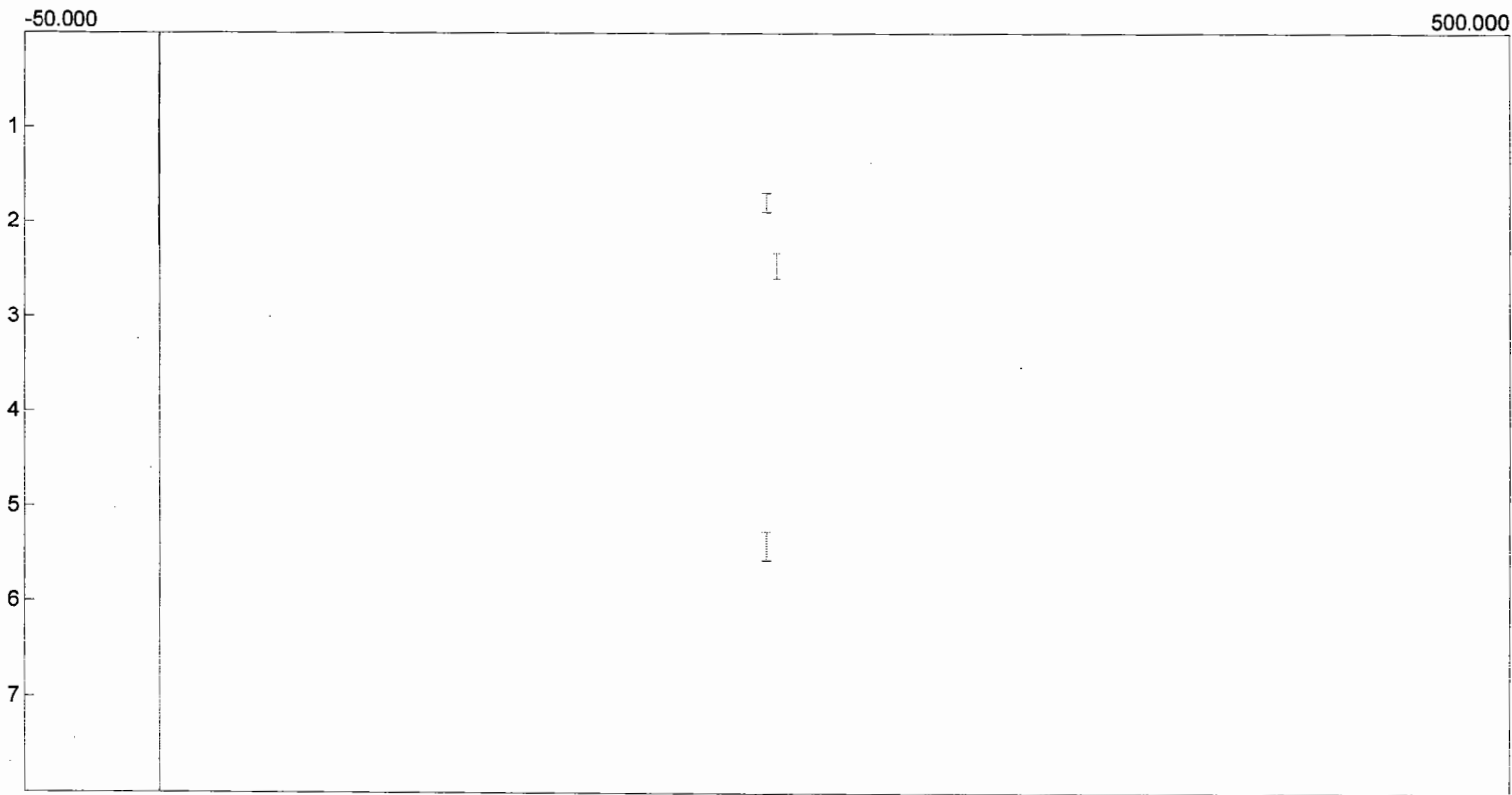
Sample: Run No. 3 LL Check

Operator: JAB



Component	Area
H2S	805.8390
COS	0.0000
CS2	0.0000
	805.8390

Lab name: ARI Environmental, Inc.  
 Client: Valero, Port Arthur  
 Client ID: 544 SRU  
 Collected: 6/17/11  
 Method: USEPA M15  
 Description: FPD  
 Data file: ValeroPA\_Cal38.chr ()  
 Sample: Zero Post  
 Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/17/11

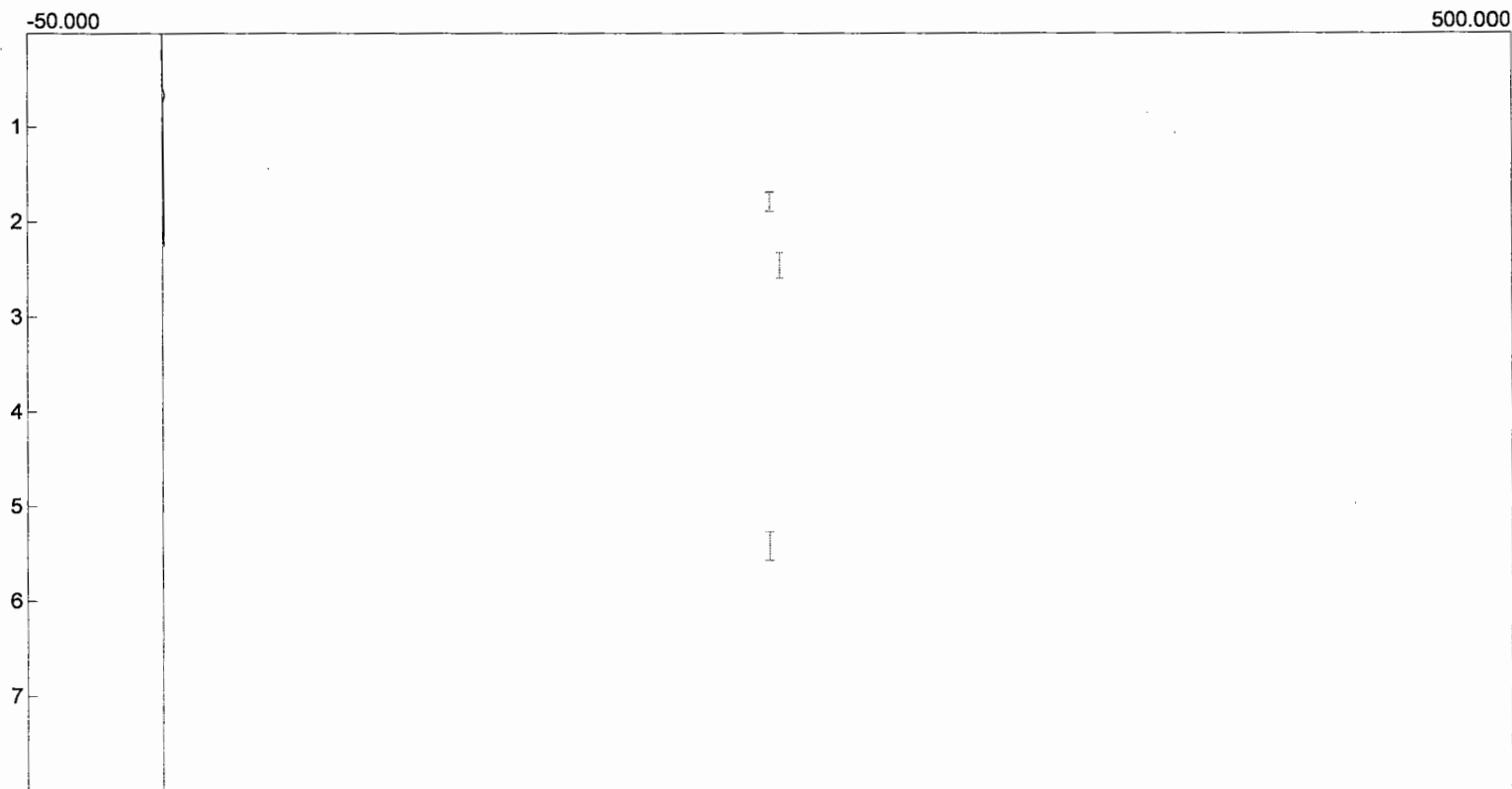
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_Cal39.CHR ()

Sample: Zero Post

Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/17/11

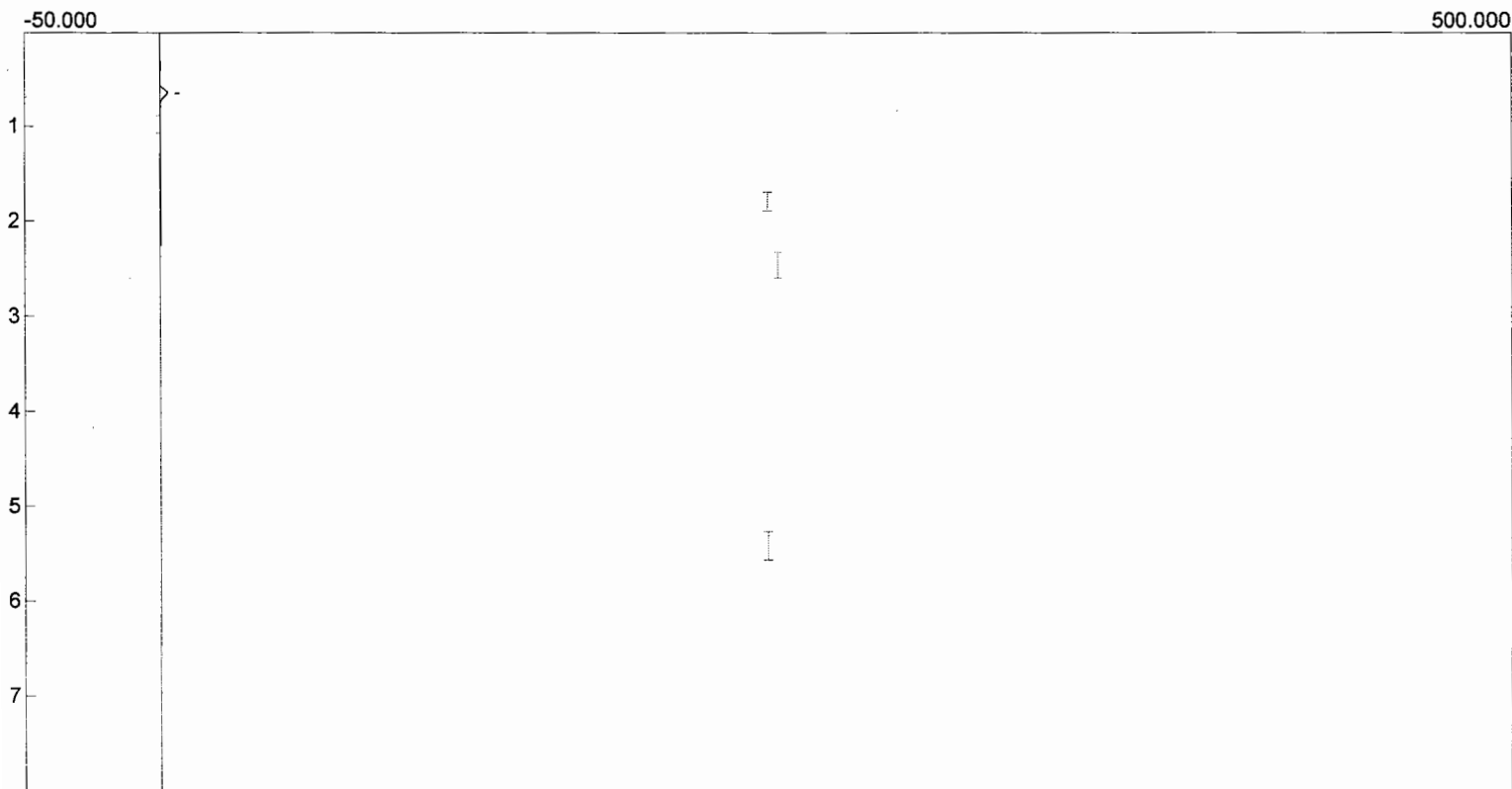
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_Cal40.CHR ()

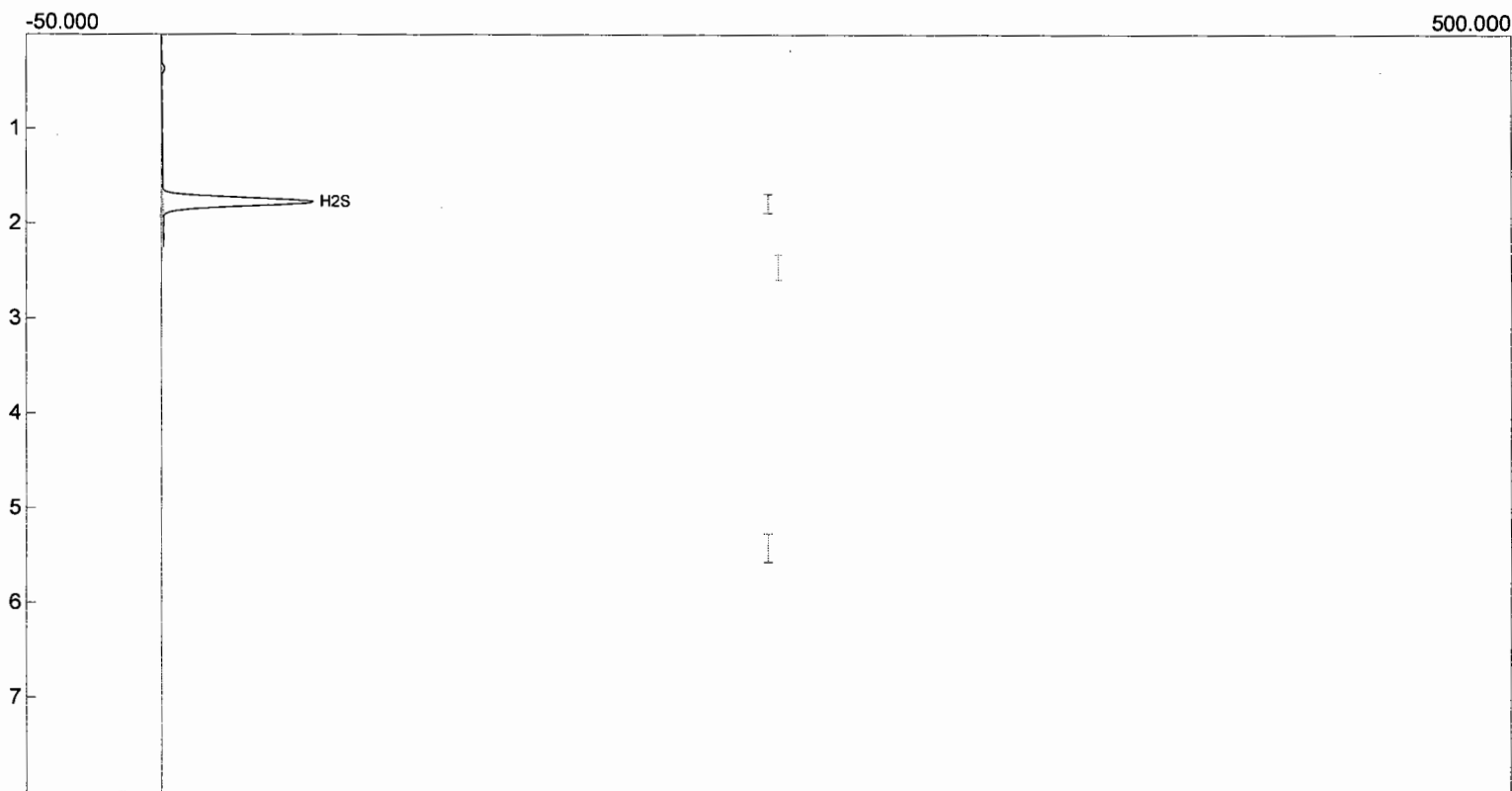
Sample: Zero Post

Operator: JAB



Component	Area
H2S	0.0000
COS	0.0000
CS2	0.0000
	0.0000

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/17/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_Cal54.CHR ()  
Sample: 12.5 ppm Post  
Operator: JAB



Component	Area
H2S	344.4170
COS	0.0000
CS2	0.0000
	344.4170

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/17/11

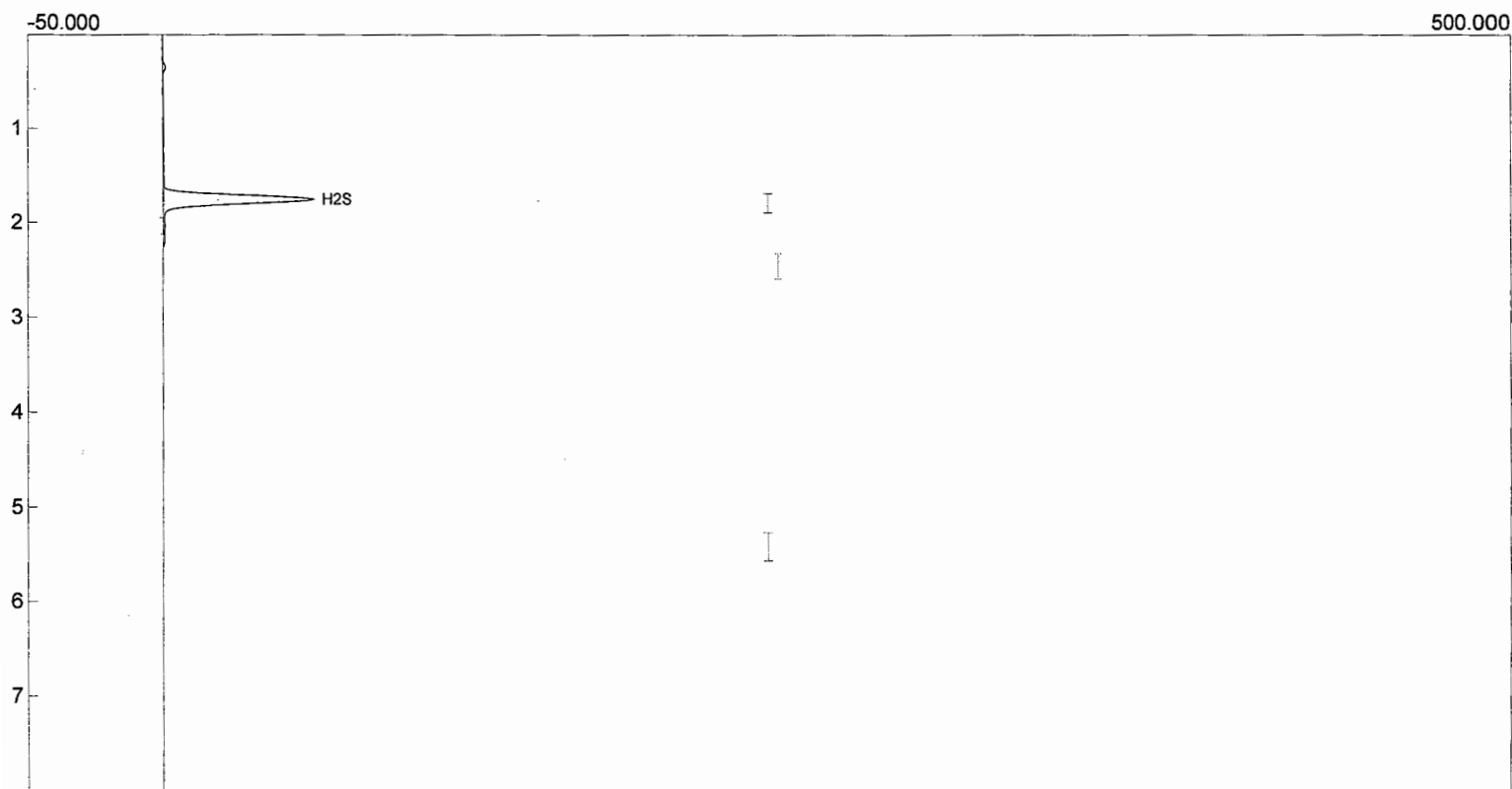
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_Cal55.CHR ()

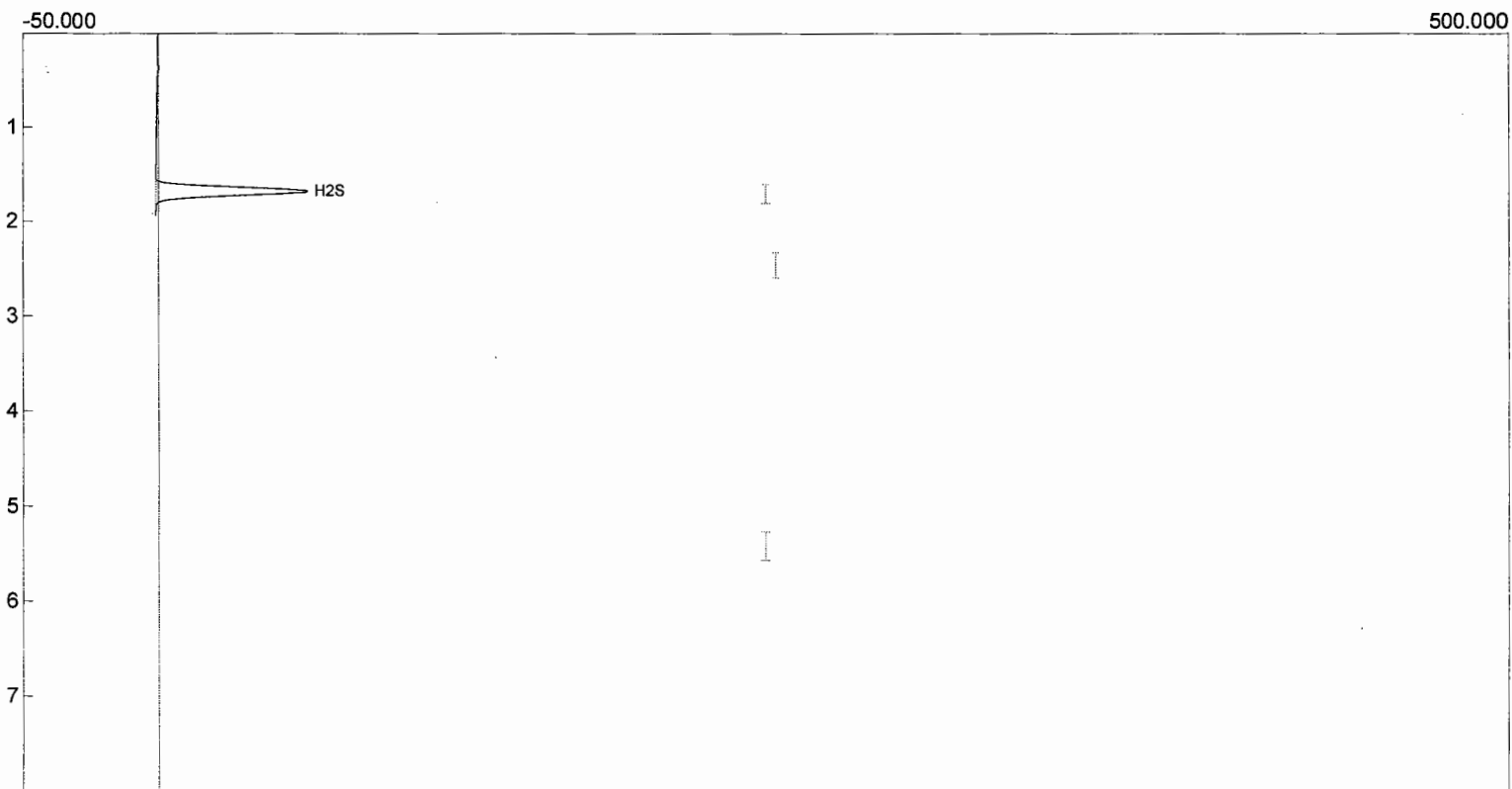
Sample: 12.5 ppm Post

Operator: JAB



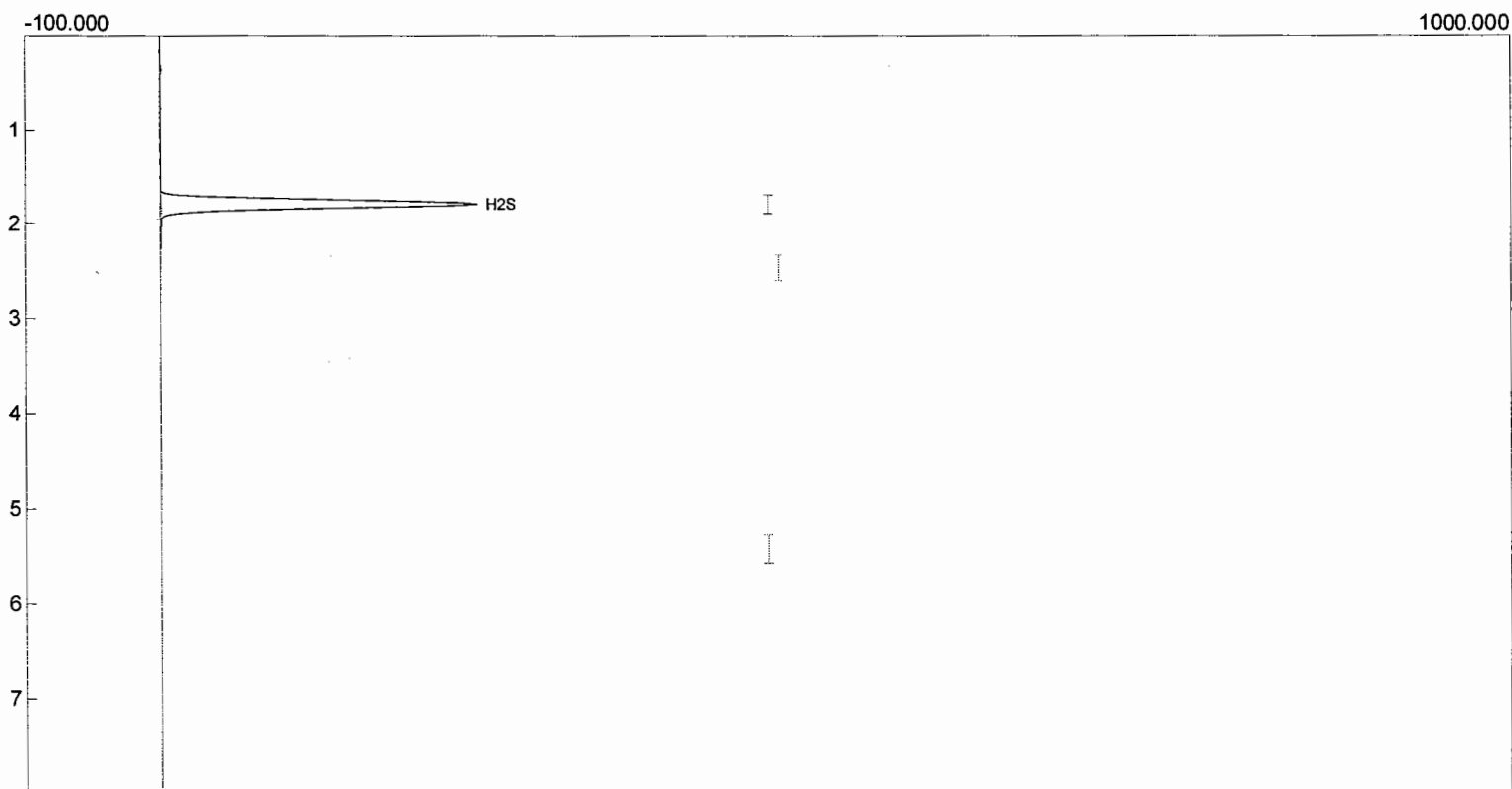
Component	Area
H2S	344.5115
COS	0.0000
CS2	0.0000
	344.5115

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/17/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_Cal56.CHR ()  
Sample: 12.5 ppm Post  
Operator: JAB



Component	Area
H2S	342.6045
COS	0.0000
CS2	0.0000
	342.6045

Lab name: ARI Environmental, Inc.  
Client: Valero, Port Arthur  
Client ID: 544 SRU  
Collected: 6/17/11  
Method: USEPA M15  
Description: FPD  
Data file: ValeroPA\_Cal49.CHR ()  
Sample: 25 ppm Post  
Operator: JAB



Component	Area
H2S	1438.6930
COS	0.0000
CS2	0.0000
	1438.6930

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/17/11

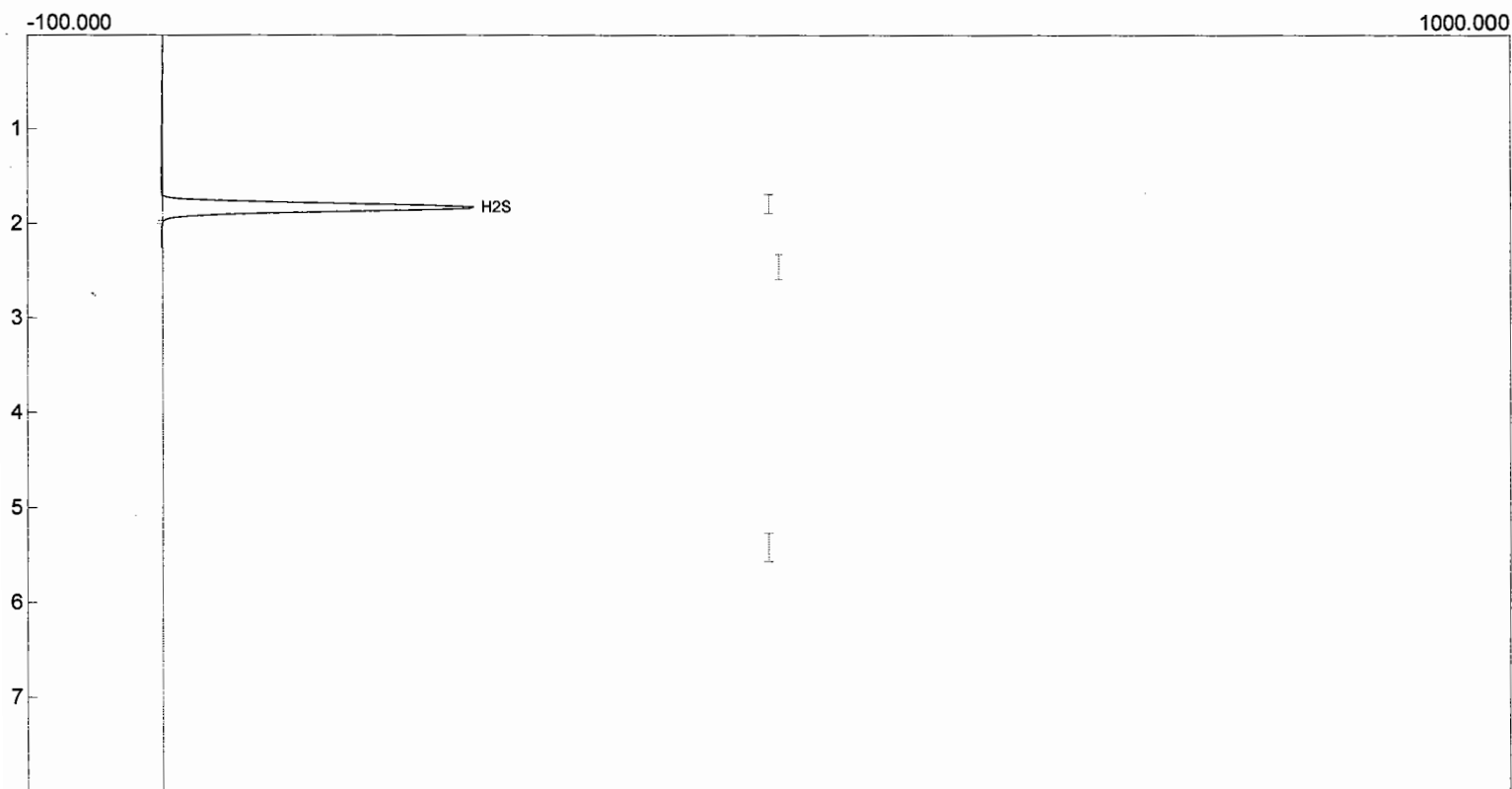
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_Cal50.CHR ()

Sample: 25 ppm Post

Operator: JAB



Component	Area
H2S	1423.3755
COS	0.0000
CS2	0.0000
	1423.3755

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/17/11

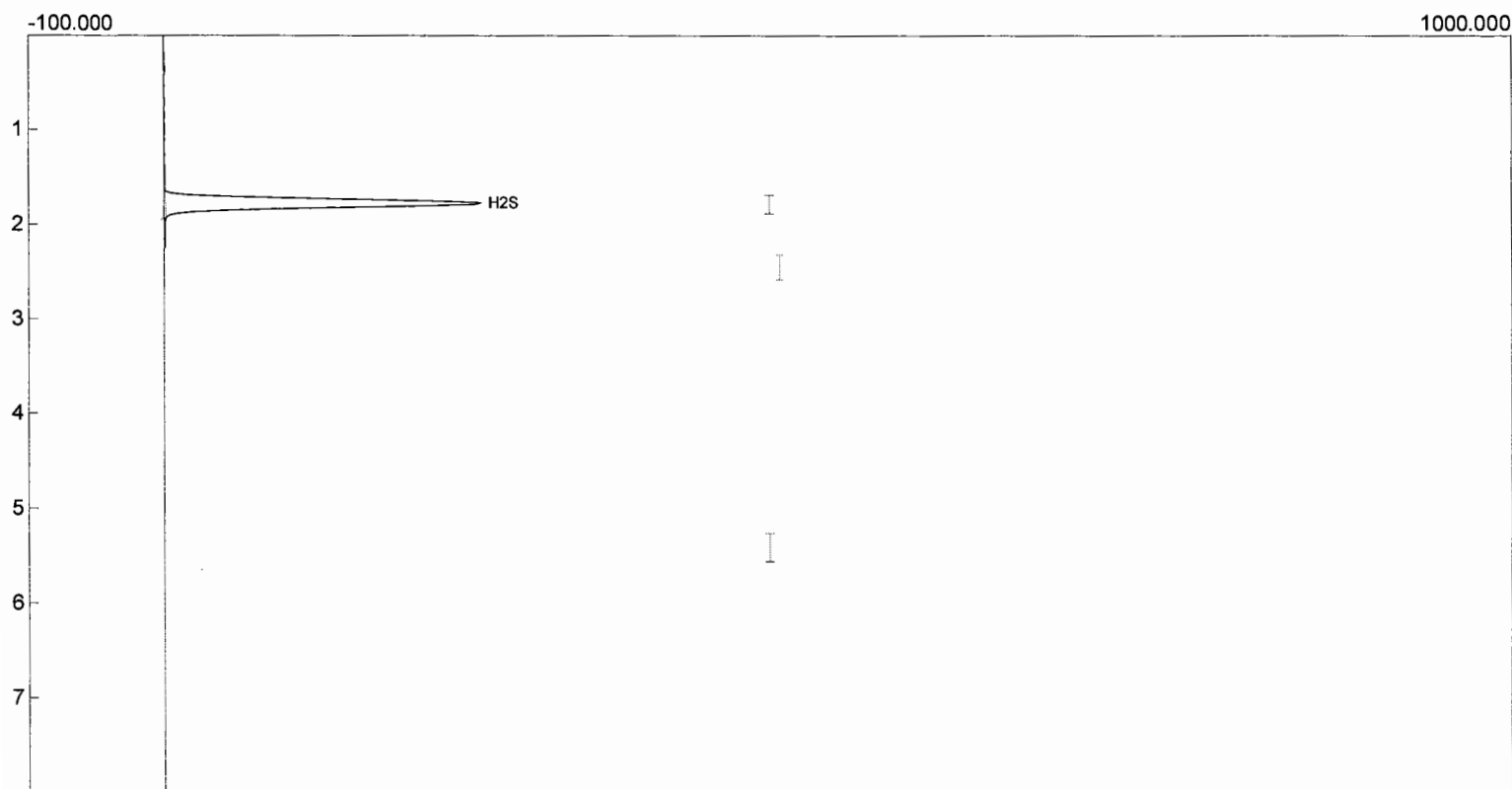
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_Cal51.CHR ()

Sample: 25 ppm Post

Operator: JAB



Component	Area
H2S	1453.7435
COS	0.0000
CS2	0.0000
	1453.7435

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/17/11

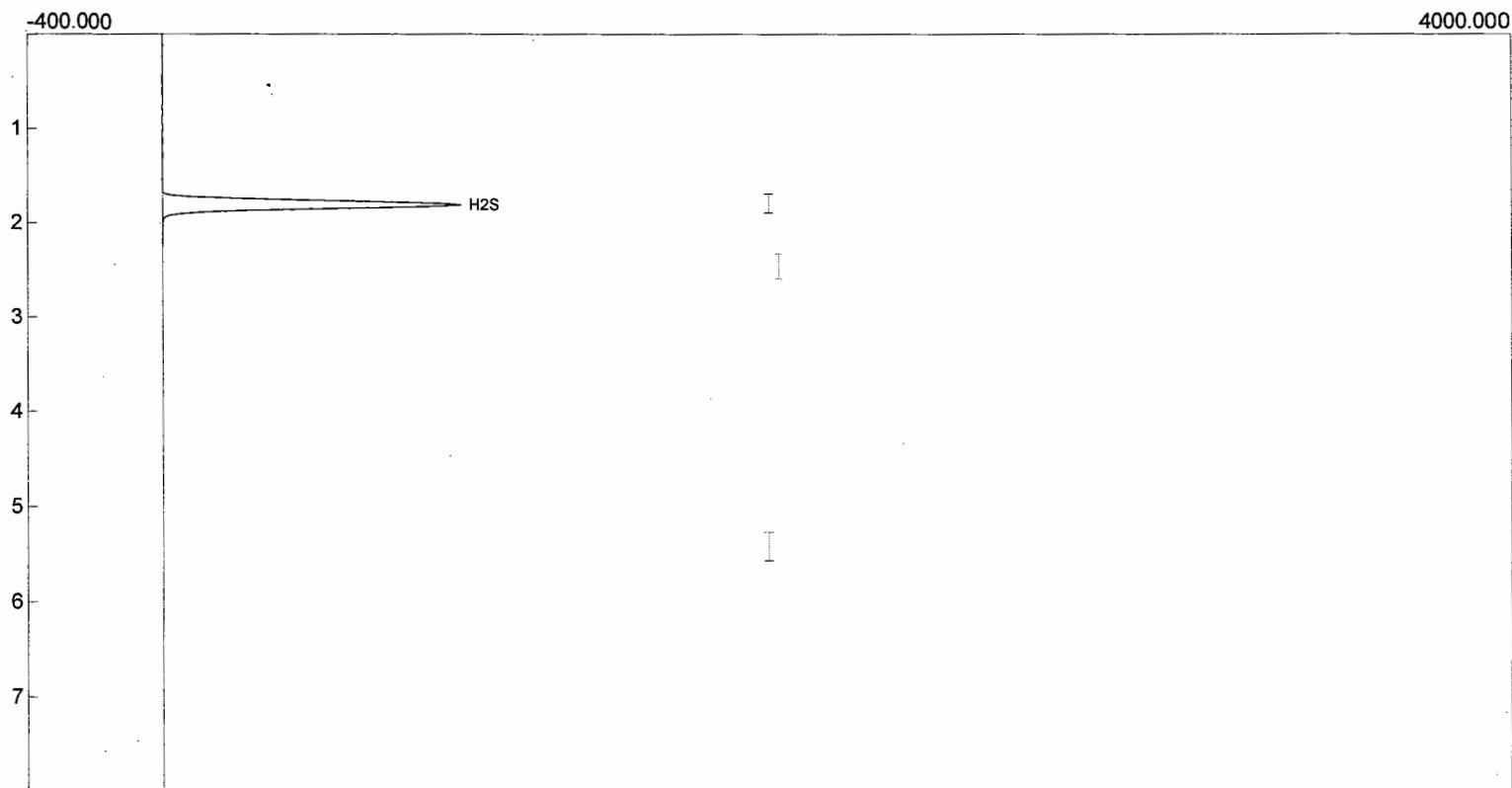
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_Cal47.CHR ()

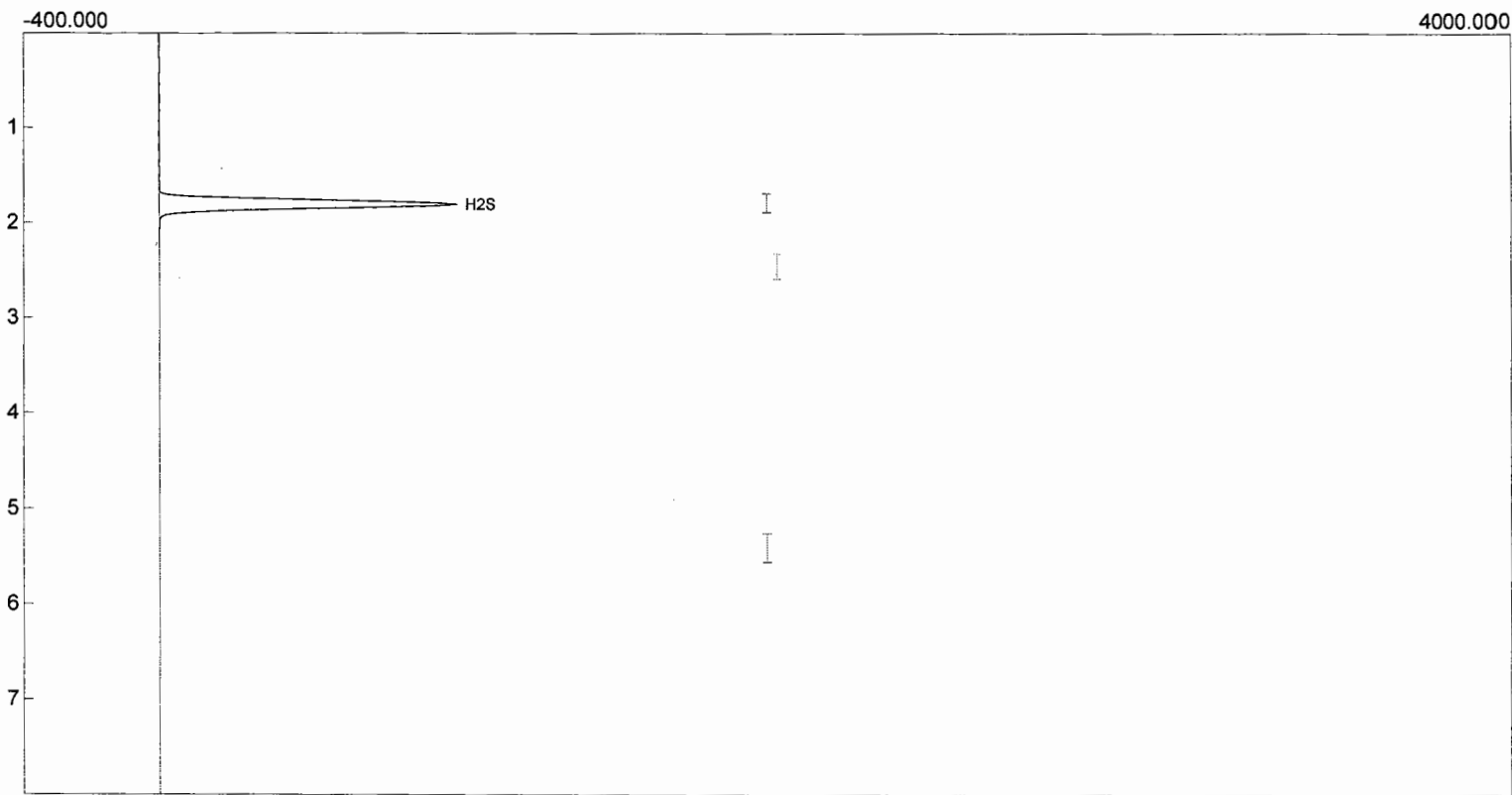
Sample: 50 ppm Post

Operator: JAB



Component	Area
H2S	5318.1540
COS	0.0000
CS2	0.0000
	5318.1540

Lab name: ARI Environmental, Inc.  
 Client: Valero, Port Arthur  
 Client ID: 544 SRU  
 Collected: 6/17/11  
 Method: USEPA M15  
 Description: FPD  
 Data file: ValeroPA\_Cal46.CHR ()  
 Sample: 50 ppm Post  
 Operator: JAB



Component	Area
H2S	5359.3295
COS	0.0000
CS2	0.0000
	5359.3295

Lab name: ARI Environmental, Inc.

Client: Valero, Port Arthur

Client ID: 544 SRU

Collected: 6/17/11

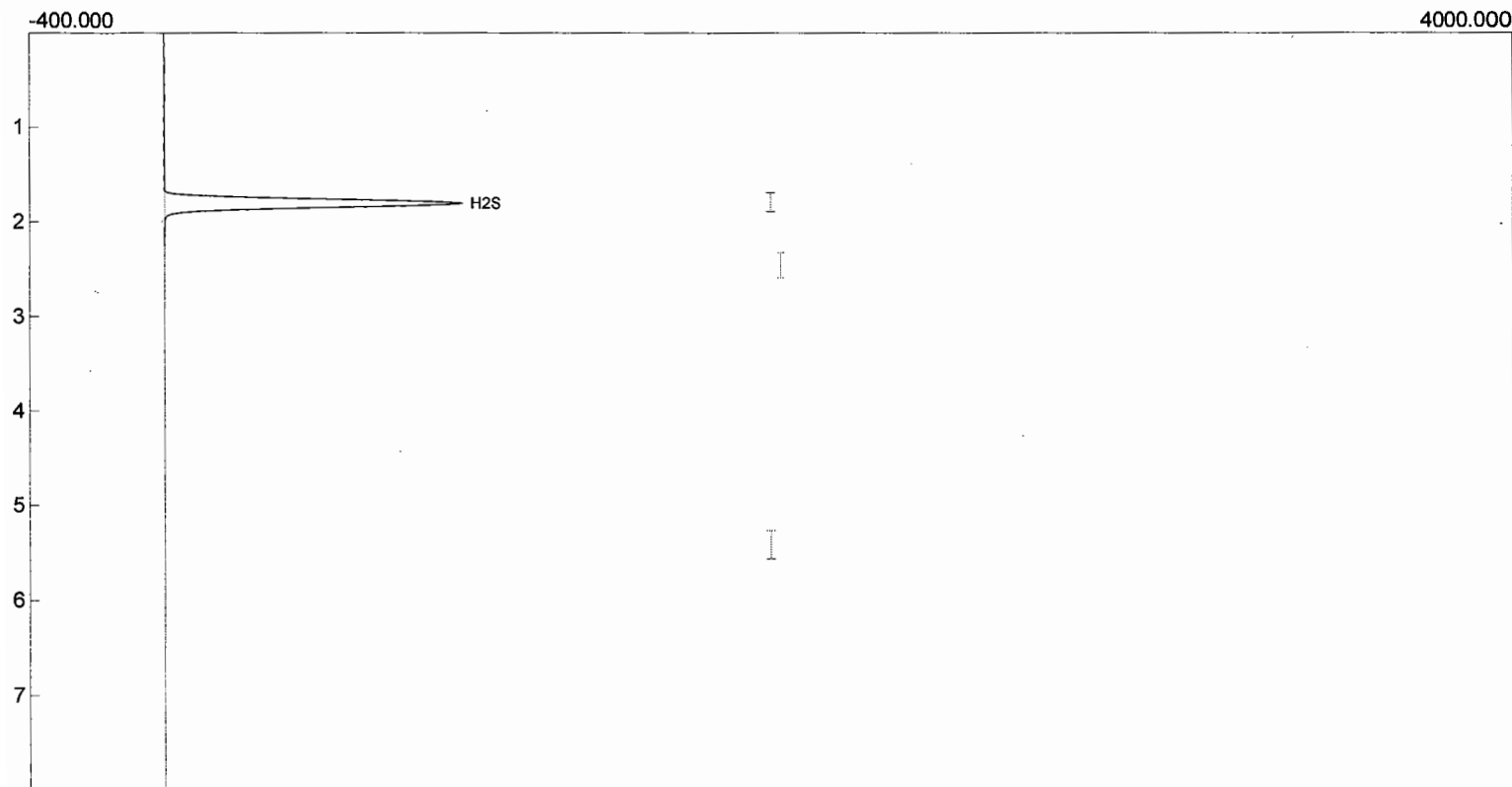
Method: USEPA M15

Description: FPD

Data file: ValeroPA\_Cal48.CHR ()

Sample: 50 ppm Post

Operator: JAB



Component	Area
H2S	5341.5440
COS	0.0000
CS2	0.0000
	5341.5440



Valero Port Arthur Refinery  
Source: SRU No. 544 TGI Stack  
Test Dates: 6/15 - 6/17/11

## **APPENDIX F**

## **Calibration Data**

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# CEMS CALIBRATION DATA

Plant Name	Valero Port Arthur Refinery	Plant Rep.	Robin Hill
Sampling Location	SRU 544 Incinerator Stack	Team Leader	Dan Fitzgerald
Date	6/15/2011	CEM Operator	Greg Burch
Run Number	544SRU-18, 308, 0011-1 and 544SRU-0011-2		
Start Time	6/15/11 12:53		
Stop Time	6/15/11 15:53		

## Analyzer Span Values (% or ppm)

CO		ppm
CO <sub>2</sub>	8.63	%
O <sub>2</sub>	10.00	%
THC		ppm
NO <sub>x</sub>		ppm
SO <sub>2</sub>		ppm

	CALIBRATION ERROR - 6:42 hrs				SYSTEM BIAS CHECK					Calibration Correction Factors
	Cylinder Value (% or ppm)	Cylinder Number	Analyzer Calibration Response	Difference (% of Span)	Pretest: 12:14		Posttest: 15:58 hrs			
					System Response	Syst. Bias (% of Span)	System Response	Syst. Bias (% of Span)	Drift (% of Span)	
CO <sub>2</sub> Zero	0.00	CC64098	0.06	0.6	0.10	0.6	0.10	0.6	0.0	Co=
CO <sub>2</sub> Low		Diluted from								<b>0.104</b>
CO <sub>2</sub> Mid	4.32	CC73859	4.44	1.4	4.29	-1.7	4.37	-0.8	0.9	Cm=
CO <sub>2</sub> High	8.63	19.60 %	8.62	-0.1						<b>4.331</b>
O <sub>2</sub> Zero	0.00	CC64098	0.03	0.3	-0.03	-0.6	-0.02	-0.5	0.1	Co=
O <sub>2</sub> Low		Diluted from								<b>-0.025</b>
O <sub>2</sub> Mid	5.00	CC73859	5.05	0.5	4.90	-1.5	4.90	-1.6	-0.1	Cm=
O <sub>2</sub> High	10.00	22.70 %	9.92	-0.8						<b>4.901</b>

# CEMS CALIBRATION DATA

Plant Name Valero Port Arthur Refinery  
 Sampling Location SRU 544 Incinerator Stack  
 Date 6/15/2011  
 Run Number 544SRU-18, 308-2 and 544SRU-0011-3  
 Start Time 6/15/11 16:02  
 Stop Time 6/15/11 18:21

Plant Rep. Robin Hill  
 Team Leader Dan Fitzgerald  
 CEM Operator Greg Burch

Analyzer Span Values (% or ppm)  
 CO ppm  
 CO<sub>2</sub> 8.63 %  
 O<sub>2</sub> 10.00 %  
 THC ppm  
 NO<sub>x</sub> ppm  
 SO<sub>2</sub> ppm

	CALIBRATION ERROR - 6:42 hrs				SYSTEM BIAS CHECK					Calibration Correction Factors
	Cylinder Value (% or ppm)	Cylinder Number	Analyzer Calibration Response	Difference (% of Span)	Pretest: 15:58		Posttest: 18:24 hrs			
					System Response	Syst. Bias (% of Span)	System Response	Syst. Bias (% of Span)	Drift (% of Span)	
CO <sub>2</sub> Zero	0.00	CC64098	0.06	0.6	0.10	0.6	0.10	0.5	-0.1	Co=
CO <sub>2</sub> Low		Diluted from								<b>0.101</b>
CO <sub>2</sub> Mid	4.32	CC73859	4.44	1.4	4.37	-0.8	4.34	-1.2	-0.4	Cm=
CO <sub>2</sub> High	8.63	19.60 %	8.62	-0.1						<b>4.354</b>
O <sub>2</sub> Zero	0.00	CC64098	0.03	0.3	-0.02	-0.5	-0.01	-0.4	0.1	Co=
O <sub>2</sub> Low		Diluted from								<b>-0.018</b>
O <sub>2</sub> Mid	5.00	CC73859	5.05	0.5	4.90	-1.6	4.89	-1.7	-0.1	Cm=
O <sub>2</sub> High	10.00	22.70 %	9.92	-0.8						<b>4.892</b>

# CEMS CALIBRATION DATA

Plant Name	Valero Port Arthur Refinery	Plant Rep.	Robin Hill
Sampling Location	SRU544 Incinerator Exhaust	Team Leader	Dan Fitzgerald
Date	6/16/2011	CEM Operator	Greg Burch
Run Number	544SRU-0011-4, 544SRU-18, 308-3, 544SRU-16A, 0010-1		
Start Time	6/16/11 7:27		
Stop Time	6/16/11 13:28		

Analyzer Span Values (% or ppm)		
CO	500.0	ppm
CO <sub>2</sub>	8.63	%
O <sub>2</sub>	10.00	%
THC	90.0	ppm
NO <sub>x</sub>		ppm
SO <sub>2</sub>		ppm

	CALIBRATION ERROR - 6:42 hrs				SYSTEM BIAS CHECK					Calibration Correction Factors
	Cylinder Value (% or ppm)	Cylinder Number	Analyzer Calibration Response	Difference (% of Span)	Pretest: 7:16		Posttest: 13:30 hrs			
					System Response	Syst. Bias (% of Span)	System Response	Syst. Bias (% of Span)	Drift (% of Span)	
CO Zero	0.0	CC64098	-1.4	-0.3	1.1	0.5	1.6	0.6	0.1	Co=
CO Low		Diluted from								1.33
CO Mid	250.0	ALM003354	251.9	0.4	249.2	-0.5	254.1	0.4	1.0	Cm=
CO High	500.0	1080 ppm	500.1	0.0						251.62
CO <sub>2</sub> Zero	0.00	CC64098	0.07	0.8	0.08	0.1	0.16	1.0	0.9	Co=
CO <sub>2</sub> Low		Diluted from								0.121
CO <sub>2</sub> Mid	4.32	CC73859	4.46	1.6	4.30	-1.8	4.48	0.3	2.1	Cm=
CO <sub>2</sub> High	8.63	19.60 %	8.61	-0.3						4.392
O <sub>2</sub> Zero	0.00	CC64098	0.05	0.5	0.12	0.6	0.06	0.1	-0.5	Co=
O <sub>2</sub> Low		Diluted from								0.091
O <sub>2</sub> Mid	5.00	CC73859	5.12	1.2	5.04	-0.8	5.13	0.1	0.9	Cm=
O <sub>2</sub> High	10.00	22.70 %	9.94	-0.6						5.086
THC Zero	0.0	CC64098	0.1	0.1	0.1	0.0	0.6	0.5	0.5	Co=
THC Low	30.0	Diluted from	30.7	0.8	30.7	0.0	29.6	-1.2	-1.2	0.32
THC Mid	50.0	ALM005822	50.5	0.6						Cm=
THC High	90.0	999.8	89.5	-0.6						30.18

# CEMS CALIBRATION DATA

Plant Name	Valero Port Arthur Refinery
Sampling Location	SRU544 Incinerator Exhaust
Date	6/16/2011
Run Number	544SRU-16A, 0010-2
Start Time	6/16/11 13:58
Stop Time	6/16/11 18:08

Plant Rep.	Robin Hill
Team Leader	Dan Fitzgerald
CEM Operator	Greg Burch

Analyzer Span Values (% or ppm)		
CO	500.0	ppm
CO <sub>2</sub>	8.63	%
O <sub>2</sub>	10.00	%
THC	90.0	ppm
NO <sub>x</sub>		ppm
SO <sub>2</sub>		ppm

	CALIBRATION ERROR - 6:42 hrs				SYSTEM BIAS CHECK					Calibration Correction Factors
	Cylinder Value (% or ppm)	Cylinder Number	Analyzer Calibration Response	Difference (% of Span)	Pretest: 13:30		Posttest: 18:40 hrs			
					System Response	Syst. Bias (% of Span)	System Response	Syst. Bias (% of Span)	Drift (% of Span)	
CO Zero	0.0	CC64098	-1.4	-0.3	1.6	0.6	-0.7	0.1	-0.5	Co=
CO Low		Diluted from								0.42
CO Mid	250.0	ALM003354	251.9	0.4	254.1	0.4	251.6	-0.1	-0.5	Cm=
CO High	500.0	1080 ppm	500.1	0.0						252.84
CO <sub>2</sub> Zero	0.00	CC64098	0.07	0.8	0.16	1.0	0.11	0.4	-0.6	Co=
CO <sub>2</sub> Low		Diluted from								0.133
CO <sub>2</sub> Mid	4.32	CC73859	4.46	1.6	4.48	0.3	4.34	-1.4	-1.6	Cm=
CO <sub>2</sub> High	8.63	19.60 %	8.61	-0.3						4.411
O <sub>2</sub> Zero	0.00	CC64098	0.05	0.5	0.06	0.1	0.14	0.8	0.7	Co=
O <sub>2</sub> Low		Diluted from								0.100
O <sub>2</sub> Mid	5.00	CC73859	5.12	1.2	5.13	0.1	5.04	-0.8	-1.0	Cm=
O <sub>2</sub> High	10.00	22.70 %	9.94	-0.6						5.084
THC Zero	0.0	CC64098	0.1	0.1	0.6	0.5	0.4	0.4	-0.2	Co=
THC Low	30.0	Diluted from	30.7	0.8	29.6	-1.2	30.1	-0.7	0.5	0.49
THC Mid	50.0	ALM005822	50.5	0.6						Cm=
THC High	90.0	999.8	89.5	-0.6						29.86

# CEMS CALIBRATION DATA

Plant Name **Valero Port Arthur Refinery**  
 Sampling Location **SRU 544 Incinerator Exhaust**  
 Date **6/17/2011**  
 Run Number **544SRU-15, 16A, 0010-3**  
 Start Time **6/17/11 7:28**  
 Stop Time **6/17/11 12:07**

Plant Rep. **Robin Hill**  
 Team Leader **Greg Burch**  
 CEM Operator **Greg Burch**

Analyzer Span Values (% or ppm)

CO	500.0	ppm
CO <sub>2</sub>	8.63	%
O <sub>2</sub>	10.00	%
THC	90.0	ppm
NO <sub>x</sub>		ppm
SO <sub>2</sub>		ppm

	CALIBRATION ERROR - 6:43 hrs				SYSTEM BIAS CHECK					Calibration Correction Factors
	Cylinder Value (% or ppm)	Cylinder Number	Analyzer Calibration Response	Difference (% of Span)	Pretest: 7:07		Posttest: 12:43 hrs			
					System Response	Syst. Bias (% of Span)	System Response	Syst. Bias (% of Span)	Drift (% of Span)	
CO Zero	0.0	CC64098	-1.3	-0.3	-0.3	0.2	1.6	0.6	0.4	Co=
CO Low		Diluted from								0.62
CO Mid	250.0	ALM003354	254.3	0.9	251.7	-0.5	252.1	-0.4	0.1	Cm=
CO High	500.0	1080 ppm	502.0	0.4						251.92
CO <sub>2</sub> Zero	0.00	CC64098	0.08	0.9	0.08	0.0	0.23	1.7	1.8	Co=
CO <sub>2</sub> Low		Diluted from								0.156
CO <sub>2</sub> Mid	4.32	CC73859	4.45	1.6	4.33	-1.4	4.35	-1.2	0.3	Cm=
CO <sub>2</sub> High	8.63	19.60 %	8.60	-0.3						4.341
O <sub>2</sub> Zero	0.00	CC64098	0.06	0.6	0.10	0.4	0.07	0.1	-0.3	Co=
O <sub>2</sub> Low		Diluted from								0.081
O <sub>2</sub> Mid	5.00	CC73859	5.11	1.1	5.04	-0.7	5.13	0.2	0.9	Cm=
O <sub>2</sub> High	10.00	22.70 %	9.93	-0.7						5.084
THC Zero	0.0	CC64098	0.3	0.4	0.3	0.0	0.7	0.4	0.4	Co=
THC Low	30.0	Diluted from	30.7	0.8	30.7	0.0	29.8	-1.0	-1.0	0.54
THC Mid	50.0	ALM005822	51.0	1.1						Cm=
THC High	90.0	999.8	89.6	-0.4						30.27

**ARI REFERENCE METHOD CEMS DATA  
USEPA METHOD 205  
DILUTION SYSTEM VERIFICATION**

**Company:** Valero  
**Location:** Port Arthur, Texas  
**Source:** FCCU WGS  
**Dilution System ID:** 3371  
**Dilution Flow Rate:** 5.0 Lpm  
**Verification date:** 6/3/2011

**Analyzer Info**  
**Monitor type:** O<sub>2</sub>  
**Monitor Span:** 22.70  
**Monitor Serial No.:** X1440D1/46

**Initial Calibration Data**

<u>Calibration Concentration</u>	<u>Calibration results</u>	<u>% Difference</u>
Zero: 0.00	Zero: 0.04	Zero: 0.18
Low:	Low:	Low:
Mid: 11.35	Mid: 11.45	Mid: 0.44
High: 22.70	High: 22.73	High: 0.13

**Dilution System Verification**

Mid level gas type: <u>EPA Protocol 1</u>	High level dilution gas type: <u>O<sub>2</sub>/N<sub>2</sub></u>
Mid level concentration: <u>7.610</u>	High level concentration: <u>22.70</u>
Mid level tank serial #: <u>AAL5614</u>	High level tank serial #: <u>CC102306</u>
	Target concentration No. 1: <u>5.70</u>
	Target concentration No. 2: <u>17.10</u>

**Dilution System Results**

<u>Target Concentration No. 1</u>			<u>Target Concentration No. 2</u>		
	<u>Instrument Response</u>	<u>% difference from average*</u>		<u>Instrument Response</u>	<u>% difference from average*</u>
Trial No. 1:	<u>5.77</u>	<u>0.40</u>	Trial No. 1:	<u>17.16</u>	<u>0.00</u>
Trial No. 2:	<u>5.80</u>	<u>0.12</u>	Trial No. 2:	<u>17.16</u>	<u>0.00</u>
Trial No. 3:	<u>5.81</u>	<u>0.29</u>	Trial No. 3:	<u>17.16</u>	<u>0.00</u>
Average:	<u>5.793</u>		Average:	<u>17.160</u>	

% Difference from target concentration: 1.64%      % Difference from target concentration: 0.35%

**Mid Level Calibration Gas Results**

<u>Instrument Response</u>	
Trial No. 1: <u>7.62</u>	Mid Level calibration gas concentration: <u>7.610%</u>
Trial No. 2: <u>7.62</u>	Average analyzer response: <u>7.620</u>
Trial No. 3: <u>7.62</u>	Percent difference: <u>0.13</u> *

\* Must be less than 2 %

**USEPA Method 205 Dilution System Verification**  
**15-second data (Unit #3371)**

Date/Time	O <sub>2</sub> % db by vol.	Comments
6/3/11 16:59:15	21.44	
6/3/11 16:59:30	21.45	
6/3/11 16:59:45	21.44	
6/3/11 17:00:00	21.44	
6/3/11 17:00:15	21.44	
6/3/11 17:00:30	21.42	
6/3/11 17:00:45	21.40	
6/3/11 17:01:00	21.37	
6/3/11 17:01:15	21.31	
6/3/11 17:01:30	21.26	
6/3/11 17:01:45	21.23	
6/3/11 17:02:00	21.21	
6/3/11 17:02:15	17.35	
6/3/11 17:02:30	5.42	
6/3/11 17:02:45	0.47	
6/3/11 17:03:00	-0.01	
6/3/11 17:03:15	-0.05	
6/3/11 17:03:30	-0.06	
6/3/11 17:03:45	-0.06	
6/3/11 17:04:00	-0.07	
6/3/11 17:04:15	-0.07	
6/3/11 17:04:30	-0.07	
6/3/11 17:04:45	-0.08	
6/3/11 17:05:00	-0.08	
6/3/11 17:05:15	0.08	
6/3/11 17:05:30	0.08	
6/3/11 17:05:45	0.07	
6/3/11 17:06:00	0.04	
6/3/11 17:06:15	0.04	
6/3/11 17:06:30	0.04	Calibration Error
6/3/11 17:06:45	0.04	O <sub>2</sub> CE Zero = 0.04
6/3/11 17:07:00	0.04	
6/3/11 17:07:15	0.04	
6/3/11 17:07:30	0.04	
6/3/11 17:07:45	0.04	
6/3/11 17:08:00	0.07	
6/3/11 17:08:15	6.01	
6/3/11 17:08:30	15.39	
6/3/11 17:08:45	20.42	
6/3/11 17:09:00	22.77	
6/3/11 17:09:15	23.46	
6/3/11 17:09:30	23.54	
6/3/11 17:09:45	23.55	
6/3/11 17:10:00	23.40	
6/3/11 17:10:15	22.78	
6/3/11 17:10:30	22.72	Calibration Error
6/3/11 17:10:45	22.72	O <sub>2</sub> CE Span = 22.73
6/3/11 17:11:00	22.73	
6/3/11 17:11:15	22.73	
6/3/11 17:11:30	22.73	
6/3/11 17:11:45	22.73	
6/3/11 17:12:00	22.70	
6/3/11 17:12:15	19.78	
6/3/11 17:12:30	14.63	
6/3/11 17:12:45	11.98	
6/3/11 17:13:00	11.51	
6/3/11 17:13:15	11.47	
6/3/11 17:13:30	11.46	
6/3/11 17:13:45	11.46	Calibration Error
6/3/11 17:14:00	11.45	O <sub>2</sub> CE Mid = 11.45
6/3/11 17:14:15	11.45	
6/3/11 17:14:30	11.45	
6/3/11 17:14:45	11.45	
6/3/11 17:15:00	11.27	
6/3/11 17:15:15	8.62	
6/3/11 17:15:30	6.19	
6/3/11 17:15:45	5.80	
6/3/11 17:16:00	5.78	
6/3/11 17:16:15	5.78	Target Concentration No. 1; Trial No. 1
6/3/11 17:16:30	5.78	Mid Level Trial 1 = 5.77
6/3/11 17:16:45	5.77	
6/3/11 17:17:00	5.77	
6/3/11 17:17:15	5.77	
6/3/11 17:17:30	6.21	
6/3/11 17:17:45	10.82	
6/3/11 17:18:00	15.01	
6/3/11 17:18:15	16.82	
6/3/11 17:18:30	17.13	
6/3/11 17:18:45	17.16	Target Concentration No. 2; Trial No. 1
6/3/11 17:19:00	17.16	High Level Trial 1 = 17.16
6/3/11 17:19:15	17.16	
6/3/11 17:19:30	17.16	
6/3/11 17:19:45	17.16	
6/3/11 17:20:00	17.04	
6/3/11 17:20:15	13.79	

**USEPA Method 205 Dilution System Verification**  
**15-second data (Unit #3371)**

Date/Time	O <sub>2</sub> % db by vol.	Comments
6/3/11 17:20:30	9.78	
6/3/11 17:20:45	7.96	
6/3/11 17:21:00	7.64	
6/3/11 17:21:15	7.62	Mid-Level Concentration; Trial No. 1
6/3/11 17:21:30	7.62	Mid Std. Trial 1 = 7.62
6/3/11 17:21:45	7.62	
6/3/11 17:22:00	7.62	
6/3/11 17:22:15	7.62	
6/3/11 17:22:30	7.62	
6/3/11 17:22:45	6.34	
6/3/11 17:23:00	4.07	
6/3/11 17:23:15	5.02	
6/3/11 17:23:30	5.68	
6/3/11 17:23:45	5.77	Target Concentration No. 1; Trial No. 2
6/3/11 17:24:00	5.79	Mid Level Trial 2 = 5.80
6/3/11 17:24:15	5.80	
6/3/11 17:24:30	5.80	
6/3/11 17:24:45	5.80	
6/3/11 17:25:00	5.81	
6/3/11 17:25:15	6.13	
6/3/11 17:25:30	10.53	
6/3/11 17:25:45	14.85	
6/3/11 17:26:00	16.78	
6/3/11 17:26:15	17.13	
6/3/11 17:26:30	17.15	
6/3/11 17:26:45	17.16	
6/3/11 17:27:00	17.16	
6/3/11 17:27:15	17.16	Target Concentration No. 2; Trial No. 2
6/3/11 17:27:30	17.16	High Level Trial 2 = 17.16
6/3/11 17:27:45	17.16	
6/3/11 17:28:00	17.16	
6/3/11 17:28:15	17.16	
6/3/11 17:28:30	17.16	
6/3/11 17:28:45	15.74	
6/3/11 17:29:00	11.52	
6/3/11 17:29:15	8.65	
6/3/11 17:29:30	7.72	
6/3/11 17:29:45	7.63	
6/3/11 17:30:00	7.62	
6/3/11 17:30:15	7.62	
6/3/11 17:30:30	7.62	Mid-Level Concentration; Trial No. 2
6/3/11 17:30:45	7.62	Mid Std. Trial 2 = 7.62
6/3/11 17:31:00	7.62	
6/3/11 17:31:15	7.62	
6/3/11 17:31:30	7.62	
6/3/11 17:31:45	7.05	
6/3/11 17:32:00	4.37	
6/3/11 17:32:15	4.72	
6/3/11 17:32:30	5.60	
6/3/11 17:32:45	5.76	
6/3/11 17:33:00	5.78	
6/3/11 17:33:15	5.79	Target Concentration No. 1; Trial No. 3
6/3/11 17:33:30	5.80	Mid Level Trial 3 = 5.81
6/3/11 17:33:45	5.80	
6/3/11 17:34:00	5.81	
6/3/11 17:34:15	5.81	
6/3/11 17:34:30	6.53	
6/3/11 17:34:45	11.43	
6/3/11 17:35:00	15.35	
6/3/11 17:35:15	16.90	
6/3/11 17:35:30	17.14	
6/3/11 17:35:45	17.15	
6/3/11 17:36:00	17.15	Target Concentration No. 2; Trial No. 3
6/3/11 17:36:15	17.16	High Level Trial 3 = 17.16
6/3/11 17:36:30	17.16	
6/3/11 17:36:45	17.16	
6/3/11 17:37:00	17.16	
6/3/11 17:37:15	17.08	
6/3/11 17:37:30	14.26	
6/3/11 17:37:45	10.27	
6/3/11 17:38:00	8.13	
6/3/11 17:38:15	7.66	
6/3/11 17:38:30	7.63	
6/3/11 17:38:45	7.62	
6/3/11 17:39:00	7.62	Mid-Level Concentration; Trial No. 3
6/3/11 17:39:15	7.62	Mid Std. Trial 3 = 7.62
6/3/11 17:39:30	7.62	
6/3/11 17:39:45	7.62	
6/3/11 17:40:00	7.62	
6/3/11 17:40:15	7.63	
6/3/11 17:40:30	10.81	
6/3/11 17:40:45	17.85	
6/3/11 17:41:00	20.49	
6/3/11 17:41:15		
6/3/11 17:41:30		

Instrument: 3371 MFC: 1

MAX Flow: 10,000.00 CCM  
 Cal Date: 02/15/2011 , 16:13:32  
 Reference Gas: NITROGEN  
 Description: Factory MFC #1 Calibration Table

Set Flow	True Flow	- Table is selected
500.00	496.86	
1,000.00	1,019.10	
2,000.00	2,047.90	
3,000.00	3,061.90	
4,000.00	4,070.40	
5,000.00	5,070.40	
6,000.00	6,073.20	
7,000.00	7,072.40	
8,000.00	8,082.40	
9,000.00	9,099.80	
10,000.00	10,139.00	

Instrument: 3371 MFC: 2

MAX Flow: 10,000.00 CCM  
 Cal Date: 02/15/2011 , 16:13:40  
 Reference Gas: NITROGEN  
 Description: Factory MFC #2 Calibration Table

Set Flow	True Flow	- Table is selected
500.00	464.75	
1,000.00	1,019.50	
2,000.00	2,055.00	
3,000.00	3,075.00	
4,000.00	4,088.80	
5,000.00	5,093.60	
6,000.00	6,099.00	
7,000.00	7,094.10	
8,000.00	8,090.70	
9,000.00	9,084.50	
10,000.00	10,070.00	

Instrument: 3371 MFC: 3

MAX Flow: 1,000.00 CCM  
 Cal Date: 02/15/2011 , 16:13:51  
 Reference Gas: NITROGEN  
 Description: Factory MFC #3 Calibration Table

Set Flow	True Flow	- Table is selected
50.00	48.42	
100.00	99.98	

200.00	203.07
300.00	305.63
400.00	408.86
500.00	512.23
600.00	614.79
700.00	718.86
800.00	824.09
900.00	931.08
1,000.00	1,038.80

Instrument: 3371

MFC: 4

MAX Flow: 100.00 CCM

Cal Date: 02/15/2011 , 16:13:59

Reference Gas: NITROGEN

Description: Factory MFC #4 Calibration Table

Set Flow	True Flow	- Table is selected
5.00	5.55	
10.00	11.08	
20.00	22.03	
30.00	32.76	
40.00	43.34	
50.00	53.68	
60.00	63.90	
70.00	74.08	
80.00	85.06	
90.00	96.60	
100.00	108.46	

**ARI REFERENCE METHOD CEMS DATA  
USEPA METHOD 205  
DILUTION SYSTEM VERIFICATION**

**Company:** Valero  
**Location:** Port Arthur, Texas  
**Source:** FCCU WGS  
**Dilution System ID:** 2431  
**Dilution Flow Rate:** 5.0 Lpm  
**Verification date:** 6/10/2011

**Analyzer Info**  
**Monitor type:** O<sub>2</sub>  
**Monitor Span:** 15.00  
**Monitor Serial No.:** X1440D1/46

**Initial Calibration Data**

<u>Calibration Concentration</u>	<u>Calibration results</u>	<u>% Difference</u>
Zero: 0.00	Zero: 0.03	Zero: 0.20
Low:	Low:	Low:
Mid: 7.50	Mid: 7.62	Mid: 0.83
High: 15.00	High: 15.04	High: 0.25

**Dilution System Verification**

Mid level gas type: <u>EPA Protocol 1</u>	High level dilution gas type: <u>O<sub>2</sub>/N<sub>2</sub></u>
Mid level concentration: <u>7.609</u>	High level concentration: <u>22.7</u>
Mid level tank serial #: <u>AAL5614</u>	High level tank serial #: <u>CC102306</u>
	Target concentration No. 1: <u>7.50</u>
	Target concentration No. 2: <u>15.00</u>

**Dilution System Results**

**Target Concentration No. 1**

	<u>Instrument Response</u>	<u>% difference from average*</u>
Trial No. 1:	<u>7.61</u>	<u>0.22</u>
Trial No. 2:	<u>7.57</u>	<u>0.29</u>
Trial No. 3:	<u>7.60</u>	<u>0.07</u>
Average:	<u>7.593</u>	

**Target Concentration No. 2**

	<u>Instrument Response</u>	<u>% difference from average*</u>
Trial No. 1:	<u>14.98</u>	<u>0.00</u>
Trial No. 2:	<u>14.98</u>	<u>0.02</u>
Trial No. 3:	<u>14.98</u>	<u>0.02</u>
Average:	<u>14.982</u>	

% Difference from target concentration: 1.24%      % Difference from target concentration: 0.12%

**Mid Level Calibration Gas Results**

	<u>Instrument Response</u>	
Trial No. 1:	<u>7.50</u>	Mid Level calibration gas concentration: <u>7.609%</u>
Trial No. 2:	<u>7.51</u>	Average analyzer response: <u>7.506</u>
Trial No. 3:	<u>7.50</u>	Percent difference: <u>1.35</u> *

\* Must be less than 2 %

**USEPA Method 205 Dilution System Verification**  
**15-second data**

Date/Time	O <sub>2</sub> % db by vol.	Comments
6/10/11 7:34:00	0.88	
6/10/11 7:34:15	0.09	
6/10/11 7:34:30	-0.02	
6/10/11 7:34:45	-0.04	
6/10/11 7:35:00	-0.05	
6/10/11 7:35:15	-0.05	
6/10/11 7:35:30	-0.05	
6/10/11 7:35:45	-0.05	
6/10/11 7:36:00	-0.06	Calibration Error
6/10/11 7:36:15	-0.01	O <sub>2</sub> CE Zero = 0.03
6/10/11 7:36:30	0.04	
6/10/11 7:36:45	0.04	
6/10/11 7:37:00	0.04	
6/10/11 7:37:15	0.04	
6/10/11 7:37:30	0.04	
6/10/11 7:37:45	0.04	
6/10/11 7:38:00	0.04	
6/10/11 7:38:15	0.04	
6/10/11 7:38:30	0.03	
6/10/11 7:38:45	0.03	
6/10/11 7:39:00	0.03	
6/10/11 7:39:15	0.03	
6/10/11 7:39:30	0.06	
6/10/11 7:39:45	2.98	
6/10/11 7:40:00	8.04	
6/10/11 7:40:15	11.80	
6/10/11 7:40:30	14.06	
6/10/11 7:40:45	15.03	
6/10/11 7:41:00	15.25	
6/10/11 7:41:15	15.27	
6/10/11 7:41:30	15.28	
6/10/11 7:41:45	15.28	
6/10/11 7:42:00	15.16	
6/10/11 7:42:15	15.12	
6/10/11 7:42:30	15.12	
6/10/11 7:42:45	15.08	
6/10/11 7:43:00	15.05	
6/10/11 7:43:15	15.05	
6/10/11 7:43:30	15.05	
6/10/11 7:43:45	15.05	
6/10/11 7:44:00	15.06	
6/10/11 7:44:15	15.06	
6/10/11 7:44:30	14.60	
6/10/11 7:44:45	11.70	
6/10/11 7:45:00	8.95	
6/10/11 7:45:15	7.83	
6/10/11 7:45:30	7.67	
6/10/11 7:45:45	7.65	
6/10/11 7:46:00	7.65	
6/10/11 7:46:15	7.63	
6/10/11 7:46:30	7.63	
6/10/11 7:46:45	7.91	
6/10/11 7:47:00	10.31	
6/10/11 7:47:15	12.96	
6/10/11 7:47:30	14.49	Calibration Error
6/10/11 7:47:45	14.99	O <sub>2</sub> CE Span = 15.04
6/10/11 7:48:00	15.07	
6/10/11 7:48:15	15.06	
6/10/11 7:48:30	15.03	
6/10/11 7:48:45	15.02	
6/10/11 7:49:00	15.02	
6/10/11 7:49:15	14.53	
6/10/11 7:49:30	11.59	
6/10/11 7:49:45	8.86	
6/10/11 7:50:00	7.80	
6/10/11 7:50:15	7.65	
6/10/11 7:50:30	7.64	Calibration Error
6/10/11 7:50:45	7.63	O <sub>2</sub> CE Mid = 7.62
6/10/11 7:51:00	7.62	
6/10/11 7:51:15	7.62	
6/10/11 7:51:30	7.62	
6/10/11 7:51:45	7.36	
6/10/11 7:52:00	5.01	
6/10/11 7:52:15	2.55	
6/10/11 7:52:30	1.68	
6/10/11 7:52:45	1.57	
6/10/11 7:53:00	1.56	
6/10/11 7:53:15	1.66	
6/10/11 7:53:30	4.88	
6/10/11 7:53:45	9.48	
6/10/11 7:54:00	12.67	
6/10/11 7:54:15	14.37	
6/10/11 7:54:30	14.90	Target Concentration No. 2; Trial No. 1
6/10/11 7:54:45	14.98	High Level Trial 1 = 14.98
6/10/11 7:55:00	14.98	

**USEPA Method 205 Dilution System Verification**  
**15-second data**

Date/Time	O <sub>2</sub> % db by vol.	Comments
6/10/11 7:55:15	14.98	
6/10/11 7:55:30	14.98	
6/10/11 7:55:45	14.20	
6/10/11 7:56:00	11.00	
6/10/11 7:56:15	8.51	
6/10/11 7:56:30	7.71	Target Concentration No. 1; Trial No. 1
6/10/11 7:56:45	7.62	Mid Level Trial 1 = 7.61
6/10/11 7:57:00	7.61	
6/10/11 7:57:15	7.61	
6/10/11 7:57:30	7.61	
6/10/11 7:57:45	7.61	
6/10/11 7:58:00	7.61	
6/10/11 7:58:15	7.61	
6/10/11 7:58:30	8.00	
6/10/11 7:58:45	8.88	
6/10/11 7:59:00	8.14	
6/10/11 7:59:15	7.59	Mid-Level Concentration; Trial No. 1
6/10/11 7:59:30	7.51	Mid Std. Trial 1 = 7.50
6/10/11 7:59:45	7.50	
6/10/11 8:00:00	7.50	
6/10/11 8:00:15	7.50	
6/10/11 8:00:30	7.50	
6/10/11 8:00:45	7.50	
6/10/11 8:01:00	7.10	
6/10/11 8:01:15	3.91	
6/10/11 8:01:30	0.82	
6/10/11 8:01:45	0.30	
6/10/11 8:02:00	2.58	
6/10/11 8:02:15	5.40	
6/10/11 8:02:30	7.02	Target Concentration No. 1; Trial No. 2
6/10/11 8:02:45	7.51	Mid Level Trial 2 = 7.57
6/10/11 8:03:00	7.58	
6/10/11 8:03:15	7.59	
6/10/11 8:03:30	7.60	
6/10/11 8:03:45	10.49	
6/10/11 8:04:00	13.14	
6/10/11 8:04:15	14.55	
6/10/11 8:04:30	14.93	Target Concentration No. 2; Trial No. 2
6/10/11 8:04:45	14.98	High Level Trial 2 = 14.98
6/10/11 8:05:00	14.98	
6/10/11 8:05:15	14.98	
6/10/11 8:05:30	14.98	
6/10/11 8:05:45	14.98	
6/10/11 8:06:00	14.98	
6/10/11 8:06:15	14.91	
6/10/11 8:06:30	12.96	
6/10/11 8:06:45	10.05	
6/10/11 8:07:00	8.23	
6/10/11 8:07:15	7.60	Mid-Level Concentration; Trial No. 2
6/10/11 8:07:30	7.52	Mid Std. Trial 2 = 7.51
6/10/11 8:07:45	7.51	
6/10/11 8:08:00	7.51	
6/10/11 8:08:15	7.51	
6/10/11 8:08:30	7.51	
6/10/11 8:08:45	8.48	
6/10/11 8:09:00	11.16	
6/10/11 8:09:15	13.30	
6/10/11 8:09:30	14.51	
6/10/11 8:09:45	14.92	Target Concentration No. 2; Trial No. 3
6/10/11 8:10:00	14.99	High Level Trial 3 = 14.98
6/10/11 8:10:15	14.99	
6/10/11 8:10:30	14.98	
6/10/11 8:10:45	14.98	
6/10/11 8:11:00	14.47	
6/10/11 8:11:15	11.38	
6/10/11 8:11:30	8.66	
6/10/11 8:11:45	7.72	Target Concentration No. 1; Trial No. 3
6/10/11 8:12:00	7.61	Mid Level Trial 3 = 7.60
6/10/11 8:12:15	7.60	
6/10/11 8:12:30	7.59	
6/10/11 8:12:45	7.60	
6/10/11 8:13:00	7.60	
6/10/11 8:13:15	7.60	
6/10/11 8:13:30	7.57	Mid-Level Concentration; Trial No. 3
6/10/11 8:13:45	7.51	Mid Std. Trial 3 = 7.50
6/10/11 8:14:00	7.50	
6/10/11 8:14:15	7.50	
6/10/11 8:14:30	7.50	
6/10/11 8:14:45	7.50	
6/10/11 8:15:00	7.50	

Instrument: 2431 MFC: 1

MAX Flow: 5,000.00 CCM  
 Cal Date: 01/13/2011 , 11:35:41  
 Reference Gas: NITROGEN  
 Description: Factory MFC #1 Calibration Table

Set Flow	True Flow	- Table is selected
250.00	247.10	
500.00	505.81	
1,000.00	1,019.40	
1,500.00	1,531.60	
2,000.00	2,042.80	
2,500.00	2,551.50	
3,000.00	3,059.80	
3,500.00	3,568.40	
4,000.00	4,075.20	
4,500.00	4,583.80	
5,000.00	5,082.50	

Instrument: 2431 MFC: 2

MAX Flow: 5,000.00 CCM  
 Cal Date: 01/13/2011 , 11:35:01  
 Reference Gas: NITROGEN  
 Description: Factory MFC #2 Calibration Table

Set Flow	True Flow	- Table is selected
250.00	252.06	
500.00	510.40	
1,000.00	1,024.90	
1,500.00	1,536.80	
2,000.00	2,050.20	
2,500.00	2,561.30	
3,000.00	3,075.20	
3,500.00	3,581.20	
4,000.00	4,092.00	
4,500.00	4,598.20	
5,000.00	5,084.30	

Instrument: 2431 MFC: 3

MAX Flow: 500.00 CCM  
 Cal Date: 01/13/2011 , 11:34:20  
 Reference Gas: NITROGEN  
 Description: Factory MFC #3 Calibration Table

Set Flow	True Flow	- Table is selected
25.00	31.21	
50.00	57.48	

100.00	109.80
150.00	161.72
200.00	213.63
250.00	265.29
300.00	316.81
350.00	368.44
400.00	420.04
450.00	471.69
500.00	523.83

Instrument: 2431

MFC: 4

MAX Flow: 50.00 CCM

Cal Date: 01/13/2011 , 11:33:46

Reference Gas: NITROGEN

Description: Factory MFC #4 Calibration Table

Set Flow	True Flow	- Table is selected
2.50	2.91	
5.00	5.98	
10.00	12.11	
15.00	18.03	
20.00	24.30	
25.00	30.40	
30.00	36.51	
35.00	42.65	
40.00	48.81	
45.00	55.01	
50.00	61.28	

## Interference Response

Analyzer Type: Oxygen (O<sub>2</sub>)  
 Manufacturer: Servomex  
 Detector Type: Paramagnetic  
 Model No.: 1440  
 Serial No.: 1420C/2765  
 Calibration Span (%): 11.27

Test Gas	Test Gas Conc.	High Standard		Zero		Maximum % Interference
		O <sub>2</sub> without Interferent	O <sub>2</sub> with Interferent	Zero without Interferent	Zero with Interferent	
NH <sub>3</sub>	10 ppm	11.27	11.27	0.03	0.01	0.18
SO <sub>2</sub>	20 ppm	11.25	11.25	0.01	0.01	0.00
CH <sub>4</sub>	50 ppm	11.24	11.25	0.02	0.04	0.18
CO	50 ppm	11.23	11.24	0.00	0.01	0.09
CO <sub>2</sub>	5%	11.23	11.26	0.00	-0.01	0.27
CO <sub>2</sub>	12.55%	11.25	11.27	0.03	-0.02	0.44
NO <sub>2</sub>	15 ppm	11.22	11.24	0.01	0.00	0.18
NO <sub>x</sub>	15 ppm	11.22	11.25	0.01	0.01	0.27
H <sub>2</sub>	1,020 ppm	11.24	11.23	0.02	0.01	0.09
HCl	10 ppm	11.29	11.31	0.00	-0.01	0.18

Sum of the highest absolute value obtained with and without the pollutant present: 1.88 %  
 Allowable interference response: 2.5 %

Certification Date: 8/9/2006


Operator: 

## Interference Response

Analyzer Type: Carbon Dioxide (CO<sub>2</sub>)  
 Manufacturer: Servomex  
 Detector Type: NDJR  
 Model No.: 1440  
 Serial No.: 1415C  
 Calibration Span (%): 11.41

Test Gas	Test Gas Conc.	High Standard			Zero			Maximum % Interference
		CO <sub>2</sub> without Interferent	CO <sub>2</sub> with Interferent	% Interference	Zero without Interferent	Zero with Interferent	% Interference	
NH <sub>3</sub>	10 ppm	11.41	11.39	-0.18	0.01	0.01	0.00	0.18
SO <sub>2</sub>	20 ppm	11.37	11.37	0.00	0.01	0.01	0.00	0.00
CH <sub>4</sub>	50 ppm	11.37	11.37	0.00	0.01	0.01	0.00	0.00
CO	50 ppm	11.41	11.41	0.00	0.01	0.01	0.00	0.00
NO <sub>2</sub>	15 ppm	11.37	11.37	0.00	0.01	0.01	0.00	0.00
NO <sub>x</sub>	15 ppm	11.37	11.37	0.00	0.01	0.01	0.00	0.00
H <sub>2</sub>	1,020 ppm	11.37	11.37	0.00	0.01	0.01	0.00	0.00
HCl	10 ppm	11.41	11.38	-0.26	0.01	0.01	0.00	0.26

Sum of the highest absolute value obtained with and without the pollutant present: 0.44 %  
 Allowable interference response: 2.5 %

Certification Date: 8/9/2006  
 Operator: 

**AMETEK****PROCESS & ANALYTICAL INSTRUMENTS****Western Research**

2876 Sunridge Way N.E., Calgary, AB T1Y 7H9 Canada  
Telephone: 403-235-8480, Fax: 403-248-3550  
E-mail: georges.deon@ametek.com

August 3, 2006

Craig James  
ARI Environmental

RE: Interference Check, EPA 40CFR60, Method 6C for the Model 721 or 921 Series  
SO2 UV Analyzer.

Dear Craig:

In reference to Table 7E-3 – Interference Check Gas Concentrations. The Model 721 or 921 UV absorption Analyzer measures SO2 at 285nm wavelength with a reference wavelength of 585nm. The following table shows if any species presented interferes with the SO2 measurement.

Potential Interferent	Test % or PPM	Resultant Interference
CO2	5 and 15%	Does not absorb in the UV
H2O	1.0%	Does not absorb in the UV
NO	15ppmv	Does not absorb at 285nm or 585nm
NO2	15ppmv	-0.15ppm interference
N2O	10ppmv	Does not absorb at 285nm or 585nm
CO	50ppmv	Does not absorb in the UV
NH3	10ppmv	Does not absorb at 285nm or 585nm
CH4	50ppmv	Does not absorb in the UV
SO2	20ppmv	Not Applicable – Measured Species
H2	50ppmv	Does not absorb in the UV
HCL	10ppmv	Does not absorb in the UV

Sincerely,

Georges D'Eon  
Product Applications Specialist


## Interference Response

Analyzer Type: Sulfur Dioxide (SO<sub>2</sub>)  
 Manufacturer: Bivar Engineered Products (Western Research)  
 Detector Type: Pulsed Fluorescence  
 Model No.: 721-ATM  
 Serial No.: 92-721ATM-7947-1-1  
 Calibration Span (%): 100

Test Gas	Test Gas Conc.	High Standard		Zero		Maximum % Interference
		SO <sub>2</sub> without interferent	SO <sub>2</sub> with interferent %	Zero without interferent	Zero with interferent %	
NH <sub>3</sub>	10 ppm	100.1	100.1	0.1	0.1	0.0
CH <sub>4</sub>	50 ppm	102.6	103.1	0.1	0.3	0.5
CO	50 ppm	100.5	100.5	0.3	0.3	0.0
CO <sub>2</sub>	5%	100.9	101.1	0.1	0.1	0.2
CO <sub>2</sub>	12.55%	100.9	101.2	0.1	0.2	0.3
NO <sub>2</sub>	15 ppm	101.6	102.2	0.3	0.5	0.6
NO <sub>x</sub>	15 ppm	101.4	101.4	0.3	0.3	0.0
H <sub>2</sub>	1020 ppm	100.6	100.6	0.4	0.4	0.0
HCl	10 ppm	100.8	100.6	0.1	0.3	0.2

Sum of the highest absolute value obtained with and without the pollutant present: 1.80 %  
 Allowable interference response: 2.5 %

Certification Date: 8/9/2006

Operator: 



## Model 600 HCLD NO Interference Data

### Interference Response

Date of Test 7/26/2006  
 Analyzer Type NO  
 Model No. 600-HCLD  
 Serial No. S050301  
 Calibration Span 3000ppm

Test Gas Type		Concentration (ppm)	Analyzer Response	
			Wet	Dry
H2O		2.5%	0	0
CO2		5%	0	0
CO2		15%	0	0
CO		50	0	0
CH4		50	0	0
SO2		N/A	N/A	N/A
NH3		15	0	0
NO		N/A	N/A	N/A
N2O		9	0	0
NO2		N/A	N/A	N/A


## Interference Response

Analyzer Type: Carbon Monoxide (CO)  
 Manufacturer: Thermo Electron Corporation  
 Detector Type: Non-Dispersive Infrared (NDIR)  
 Model No.: 48C  
 Serial No.: 506610701  
 Calibration Span (ppm): 100

Test Gas	Test Gas Conc.	High Standard		Zero		Maximum % Interference
		CO without interferent	CO with interferent	Zero without Interferent	Zero with interferent	
NH <sub>3</sub>	10 ppm	100.0	100.0	0.0	0.0	0.0
SO <sub>2</sub>	20 ppm	100.0	100.0	0.0	0.3	0.3
CH <sub>4</sub>	50 ppm	100.0	100.0	0.0	0.1	0.1
CO <sub>2</sub>	5%	100.0	99.8	0.0	0.2	0.2
CO <sub>2</sub>	12.55%	100.0	99.6	0.0	-0.1	0.4
NO <sub>2</sub>	15 ppm	100.0	100.0	0.0	0.2	0.2
NO <sub>x</sub>	15 ppm	100.0	100.0	0.0	0.2	0.2
H <sub>2</sub>	1020 ppm	100.0	100.0	0.0	0.1	0.1
HCl	10 ppm	100.0	100.0	0.0	0.1	0.1

Sum of the highest absolute value obtained with and without the pollutant present: 1.6 %  
 Allowable interference response: 2.5 %

Certification Date: 8/10/2006

Operator: 

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

Model No: Apex 522  
 Serial No. 504019

Operator: ZRM  
 Date: 11/12/2010

Pre-Test, Orifice Method  
 English Units

Barometric Pressure: 30.16 in.Hg

ΔH	Time		DRY GAS METER VOLUME			METER TEMPERATURE			ORIFICE		VAC.	AMBIENT TEMPERATURE		
						INLET		OUTLET						
	Minutes	Seconds	Initial	Final	Total <sup>1</sup>	Initial	Final	Initial	Number	K factor	in. Hg <sup>2</sup>	Initial	Final	Avg.
0.57	10	51	437.100	441.572	4.472	71	72	71	AJ47	0.3164	18.5	73	73	73.0
1.05	10	5	441.700	447.350	5.650	72	72	72	AJ55	0.4303	16.5	73	73	73.0
1.75	10	5	447.500	454.698	7.198	72	72	72	AJ63	0.5482	14.5	73	73	73.0
3.20	11	52	455.100	466.780	11.680	74	76	74	AJ73	0.7621	11.5	74	74	74.0
4.70	10	5	467.100	479.123	12.023	76	77	76	AJ81	0.9339	10.0	74	74	74.0

METER FLOW (cubic feet)	ORIFICE FLOW (cubic feet)	METER CALIBRATION	
		FACTOR, Yc <sup>3</sup>	DH @ <sup>4</sup>
4.484	4.485	1.0001	1.886
5.667	5.668	1.0002	1.881
7.218	7.221	1.0004	1.934
11.710	11.803	1.0079	1.840
12.064	12.290	1.0188	1.807

<b>AVG. PRETEST METER CALIBRATION FACTOR: Y<sup>5</sup> =</b>	<b>1.005</b>	<b><math>\Delta H @^6 =</math></b>	<b>1.87</b>
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- <sup>1</sup> Must pull at least 5 cubic feet per orifice
- <sup>2</sup> Vacuum must be 15" of Hg or greater
- <sup>3</sup> Individual Ys can not vary from  $\pm 0.02Y$  of the average
- <sup>4</sup> Delta H@ can not be more than  $\pm 0.15$  of average delta H
- <sup>5</sup> Ideal Y is 1.000 and can vary no more than  $\pm 0.05$
- <sup>6</sup> Ideal Delta H@ is 1.84 and should not vary more than 0.21

Operator: RC  
Date: 6/22/2011  
Barometric Pressure: 30.12 in.Hg  
Post-Test, Orifice Method  
English Units

ΔH	Time		DRY GAS METER VOLUME			METER TEMPERATURE			ORIFICE		VAC.	AMBIENT TEMPERATURE				
						INLET		OUTLET								
	Minutes	Seconds	Initial	Final	Total <sup>1</sup>	Initial	Final	Initial								
1.70	15	50				80	81	80								
					680.600	692.099	11.499	81	81	AJ63	0.5482	12.0	79	79		79.0
1.70	17	18			692.300	704.915	12.615	82	82	AJ63	0.5482	12.0	79	79		79.0
								82	82							
1.75	10	0			705.300	712.618	7.318	83	83	AJ63	0.5482	13.0	79	79		79.0

METER FLOW (cubic feet)	ORIFICE FLOW (cubic feet)	METER CALIBRATION FACTOR, YC <sup>3</sup>	DH @ <sup>4</sup>
11.355	11.261	0.9917	1.876
12.434	12.304	0.9895	1.873
7.201	7.112	0.9877	1.925
AVG. POST-TEST METER CALIBRATION FACTOR =			0.990
			1.89

**PERCENT DIFFERENCE FROM PRETEST Y=  
MAXIMUM ALLOWABLE DIFFERENCE=**

**1 Must pull at least 5 cubic feet per orifice**  
**2 Vacuum must be 15" of Hg or greater**

3 Individual Ys can not vary from  $\pm 0.02Y$  of the average  
4 Delta H@ can not be more than  $\pm 0.15$  of average delta H

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

Operator: ZRM  
 Date: 11/12/2010

Meterbox No.: 504019  
 Calibrator No.: CL-300-21001

Calibrator Setting ° F	Digital Temperature Readout									
	PROBE		STACK		FILTER		EXIT		AUX	
	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.
0	-2	0.43	0	0.00	0	0.00	-1	0.22	-1	0.22
200	198	0.30	200	0.00	200	0.00	200	0.00	201	0.15
400	397	0.35	397	0.35	397	0.35	397	0.35	397	0.35
600	600	0.00	600	0.00	600	0.00	600	0.00	600	0.00
800	801	0.08	802	0.16	802	0.16	802	0.16	803	0.24
1000	1001	0.07	1001	0.07	1001	0.07	1001	0.07	1002	0.14
1200	1198	0.12	1198	0.12	1198	0.12	1198	0.12	1199	0.06
1400	1399	0.05	1400	0.00	1400	0.00	1401	0.05	1401	0.05
1600	1599	0.05	1599	0.05	1598	0.10	1600	0.00	1599	0.05
1800	1800	0.00	1801	0.04	1801	0.04	1801	0.04	1801	0.04

Actual Maximum Difference = 0.43 %  
 Allowable Maximum Difference = 1.50 %

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

Operator: RC  
 Date: 6/22/2011

Meterbox No.: 504019  
 Calibrator No.: CL-300-21001

Calibrator Setting	Digital Temperature Readout											
	PROBE		STACK		FILTER		EXIT		AUX			
° F	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.
0	0	0.00	1	0.22	0	0.00	0	0.00	0	0.00	0	0.00
200	199	0.15	198	0.30	198	0.30	198	0.30	198	0.30	198	0.30
400	397	0.35	397	0.35	397	0.35	397	0.35	397	0.35	397	0.35
600	598	0.19	597	0.28	597	0.28	597	0.28	598	0.19	598	0.19
800	799	0.08	797	0.24	798	0.16	799	0.08	799	0.08	799	0.08
1000	999	0.07	999	0.07	999	0.07	999	0.07	999	0.07	999	0.07
1200	1197	0.18	1198	0.12	1198	0.12	1198	0.12	1199	0.06	1199	0.06
1400	1398	0.11	1397	0.16	1398	0.11	1398	0.11	1399	0.05	1399	0.05
1600	1597	0.15	1599	0.05	1597	0.15	1597	0.15	1598	0.10	1598	0.10
1800	1798	0.09	1799	0.04	1798	0.09	1798	0.09	1799	0.04	1799	0.04

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

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

Model No: Apex 522  
 Serial No. 604180

Operator: ZRM  
 Date: 11/19/2010

Pre-Test, Orifice Method  
 English Units

Barometric Pressure: 30.36 in.Hg

$\Delta H$	Time		DRY GAS METER VOLUME			METER TEMPERATURE			ORIFICE		VAC.	AMBIENT TEMPERATURE		
	Minutes	Seconds	Initial	Final	Total <sup>1</sup>	INLET	OUTLET		Number	K factor		Initial	Final	Avg.
in. H <sub>2</sub> O						Initial	Final				in. Hg <sup>2</sup>			
0.54	10	10	323.300	327.500	4.200	64	63		AJ47	0.3164	23.5	66	66	66.0
0.99	10	10	327.500	333.300	5.800	67	65		AJ55	0.4303	22.0	66	66	66.0
1.70	10	42	333.400	341.257	7.857	71	66		AJ63	0.5482	20.5	66	66	66.0
3.20	13	40	341.800	355.231	13.431	59	55		AJ73	0.7621	18.5	59	59	59.0
4.70	13	26	356.200	372.512	16.312	70	57		AJ81	0.9339	17.0	59	59	59.0

METER FLOW (cubic feet)	ORIFICE FLOW (cubic feet)	METER CALIBRATION FACTOR, Y <sub>c</sub> <sup>3</sup>	DH @ <sup>4</sup>
4.298	4.258	0.9908	1.776
5.908	5.791	0.9802	1.754
7.998	7.765	0.9709	1.857
13.939	13.880	0.9958	1.826
16.764	16.719	0.9973	1.775

<b>AVG. PRETEST METER CALIBRATION FACTOR: Y<sup>5</sup> =</b>	<b>0.987</b>	<b><math>\Delta H @^6 =</math></b>	<b>1.80</b>
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<sup>1</sup> Must pull at least 5 cubic feet per orifice

<sup>2</sup> Vacuum must be 15" of Hg or greater

<sup>3</sup> Individual Ys can not vary from +/-0.02Y of the average

<sup>4</sup>

Delta H@ can not be more than +/- 0.15 of average delta H

<sup>5</sup> Ideal Y is 1.000 and can vary no more than +/- 0.05

<sup>6</sup> Ideal Delta H@ is 1.84 and should not vary more than 0.2!

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

Model #: Apex 522  
 Serial #: 604180  
 Pretest Y: 0.987  
 Pretest  $\Delta H@$ : 1.80

Operator: RC  
 Date: 6/22/2011

Post-Test, Orifice Method  
 English Units

Barometric Pressure: 30.12 in.Hg

ΔH	Time		DRY GAS METER VOLUME			METER TEMPERATURE			ORIFICE		VAC.	AMBIENT TEMPERATURE			
						INLET		OUTLET							
	Minutes	Seconds	Initial	Final	Total <sup>1</sup>	Initial	Final	Initial	Final	Number	K factor	Initial	Final	Avg.	
	1.65	11	10	66.500	74.824	8.324	90	90	76	78	AJ63	0.5482		79	79
1.65	11	13	75.250	83.627	8.377	90	93	80	78	AJ63	0.5482		79	79	79.0
1.65	12	32	83.900	93.264	9.364	93	94	80	81	AJ63	0.5482		79	79	79.0

METER FLOW (cubic feet)	ORIFICE FLOW (cubic feet)	METER CALIBRATION FACTOR, $Y_c^3$	DH @ <sup>4</sup>
8.173	7.942	0.9717	1.810
8.199	7.977	0.9730	1.805
9.136	8.914	0.9757	1.799
<b>. POST-TEST METER CALIBRATION FACTOR =</b>			<b>0.973</b>
<b>PERCENT DIFFERENCE FROM PRETEST Y=</b>			<b>1.37</b>
<b>MAXIMUM ALLOWABLE DIFFERENCE=</b>			<b>5.00</b>

<sup>1</sup> Must pull at least 5 cubic feet per orifice  
<sup>2</sup> Vacuum must be 15" of Hg or greater

<sup>3</sup> Individual  $Y_s$  can not vary from  $\pm 0.02Y$  of the average  
<sup>4</sup> Delta H@ can not be more than  $\pm 0.15$  of average delta H

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

Operator: ZRM  
 Date: 11/19/2010

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

Calibrator Setting	Digital Temperature Readout											
	PROBE			STACK			FILTER			EXIT		
° F	Acutal	Diff.		Acutal	Diff.		Acutal	Diff.		Acutal	Diff.	
0	-1	0.22	-1	-1	0.22	-2	-2	0.43	-2	-2	0.43	-1
200	199	0.15	199	199	0.15	199	199	0.15	199	199	0.15	199
400	395	0.58	396	396	0.47	395	395	0.58	395	395	0.58	396
600	599	0.09	599	599	0.09	598	598	0.19	598	598	0.19	599
800	800	0.00	800	800	0.00	799	799	0.08	800	800	0.00	800
1000	999	0.07	999	999	0.07	999	999	0.07	999	999	0.07	1000
1200	1197	0.18	1197	1197	0.18	1197	1197	0.18	1197	1197	0.18	1197
1400	1396	0.22	1396	1396	0.22	1395	1395	0.27	1395	1395	0.27	1396
1600	1599	0.05	1599	1599	0.05	1599	1599	0.05	1599	1599	0.05	1600
1800	1797	0.13	1798	1798	0.09	1797	1797	0.13	1798	1798	0.09	1798

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

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

Operator: RC  
 Date: 6/22/2011

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

Calibrator Setting	Digital Temperature Readout											
	PROBE		STACK		FILTER		EXIT		AUX			
° F	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.
0	-2	0.43	-2	0.43	-3	0.65	-3	0.65	-3	0.65	-3	0.65
200	196	0.61	196	0.61	195	0.76	195	0.76	195	0.76	195	0.76
400	395	0.58	395	0.58	394	0.70	393	0.81	393	0.81	393	0.81
600	596	0.38	594	0.57	594	0.57	594	0.57	593	0.66	593	0.66
800	794	0.48	795	0.40	795	0.40	795	0.40	794	0.48	794	0.48
1000	994	0.41	996	0.27	995	0.34	995	0.34	993	0.48	993	0.48
1200	1194	0.36	1196	0.24	1195	0.30	1194	0.36	1193	0.42	1193	0.42
1400	1390	0.54	1393	0.38	1392	0.43	1391	0.48	1390	0.54	1390	0.54
1600	1592	0.39	1595	0.24	1594	0.29	1594	0.29	1594	0.29	1594	0.29
1800	1793	0.31	1794	0.27	1793	0.31	1793	0.31	1793	0.31	1793	0.31

Actual Maximum Difference = 0.81 %  
 Allowable Maximum Difference = 1.50 %

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

Model No: 522  
 Serial No. 903012

Operator: ZRM  
 Date: 11/19/2010

Pre-Test, Orifice Method  
 English Units

Barometric Pressure: 30.36 in. Hg

ΔH	Time		DRY GAS METER VOLUME			METER TEMPERATURE		ORIFICE		VAC.	AMBIENT TEMPERATURE				
						INLET	OUTLET				Initial	Final	Initial	Final	Avg.
	in. H2O	Minutes	Seconds	Initial	Final	Total <sup>1</sup>	Number	K factor	in. Hg <sup>2</sup>	Initial					
0.56	10	41	462.800	467.123	4.323	58	58		AJ47	0.3164	20.0	62	62	62.0	
1.00	10	5	467.200	472.811	5.611	59	59								
1.70	11	27	473.100	481.222	8.122	61	61		AJ55	0.4303	18.5	62	62	62.0	
						61	61								
						64	64		AJ63	0.5482	17.5	62	62	62.0	
3.20	10	21	481.400	491.643	10.243	69	69								
4.80	13	29	494.600	510.998	16.398	70	70		AJ73	0.7621	15.5	63	63	63.0	
						71	71								
						76	76		AJ81	0.9339	12.5	63	63	63.0	

**METER FLOW      ORIFICE FLOW      METER CALIBRATION**

(cubic feet)	(cubic feet)	FACTOR, Y <sub>c</sub> <sup>3</sup>	DH @ <sup>4</sup>
4.473	4.492	1.0042	1.848
5.795	5.766	0.9949	1.783
8.362	8.341	0.9974	1.864
10.444	10.471	1.0026	1.808
16.659	16.717	1.0035	1.807

**AVG. PRETEST METER CALIBRATION FACTOR: Y<sup>5</sup> = 1.001     $\Delta H@^6$  = 1.82**

<sup>1</sup> Must pull at least 5 cubic feet per orifice

<sup>2</sup> Vacuum must be 15" of Hg or greater

<sup>3</sup> Individual Ys can not vary from  $\pm 0.02Y$  of the average

<sup>4</sup>

<sup>5</sup>

<sup>6</sup>

<sup>4</sup> Delta H@ can not be more than  $\pm 0.15$  of average delta H

<sup>5</sup> Ideal Y is 1.000 and can vary no more than  $\pm 0.05$

<sup>6</sup> Ideal Delta H@ is 1.84 and should not vary more than 0.2!

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

Model #: Apex 522      Operator: ZRM      Post-Test, Orifice Method  
 Serial #: 903012      Date: 6/22/2011      English Units  
 Pretest Y: 1.000  
 Pretest  $\Delta H@$ : 1.94      Barometric Pressure: 30.12 in.Hg

ΔH	Time		DRY GAS METER VOLUME			METER TEMPERATURE			ORIFICE		VAC.	AMBIENT TEMPERATURE		
						INLET		OUTLET						
	Minutes	Seconds	Initial	Final	Total <sup>1</sup>	Initial	Final	Initial						
									Number	K factor	in. Hg <sup>2</sup>	Initial	Final	Avg.
1.75	12	14	672.200	681.121	8.921	78	79	78	AJ63	0.5482	20.0	79	79	79.0
1.75	10	0	681.300	688.565	7.265	79	80	79	AJ63	0.5482	20.0	79	79	79.0
1.75	21	16	688.900	704.417	15.517	80	81	80	AJ63	0.5482	20.0	79	79	79.0

METER FLOW (cubic feet)	ORIFICE FLOW (cubic feet)	METER CALIBRATION FACTOR, Yc <sup>3</sup>	DH @ <sup>4</sup>
8.843	8.701	0.9839	1.939
7.188	7.112	0.9894	1.935
15.325	15.125	0.9870	1.932
<b>AVG. POST-TEST METER CALIBRATION FACTOR =</b>			<b>0.987</b>
<b>ABSOLUTE DIFFERENCE FROM PRETEST Y=</b>			<b>1.32</b>
<b>MAXIMUM ALLOWABLE DIFFERENCE=</b>			<b>5.00</b>

- <sup>1</sup> Must pull at least 5 cubic feet per orifice  
<sup>2</sup> Vacuum must be 15" of Hg or greater  
<sup>3</sup> Individual Ys can not vary from +/-0.02Y of the average  
<sup>4</sup> Delta H@ can not be more than +/- 0.15 of average delta H

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

Operator: ZRM  
 Date: 11/19/2010

Meterbox No.: 903012  
 Calibrator No.: CL-300-21001

Calibrator Setting ° F	Digital Temperature Readout											
	PROBE		STACK		FILTER		EXIT		AUX		OVEN	
	Actual	Diff.	Actual	Diff.	Actual	Diff.	Actual	Diff.	Actual	Diff.	Actual	Diff.
0	-1	0.22	-1	0.22	-1	0.22	-1	0.22	-1	0.22	-1	0.22
200	199	0.15	199	0.15	199	0.15	199	0.15	199	0.15	200	0.00
400	396	0.47	396	0.47	396	0.47	395	0.58	396	0.47	396	0.47
600	599	0.09	598	0.19	598	0.19	598	0.19	598	0.19	599	0.09
800	800	0.00	799	0.08	799	0.08	799	0.08	800	0.00	800	0.00
1000	1000	0.00	999	0.07	999	0.07	999	0.07	999	0.07	1000	0.00
1200	1199	0.06	1197	0.18	1197	0.18	1197	0.18	1197	0.18	1198	0.12
1400	1396	0.22	1395	0.27	1395	0.27	1396	0.22	1395	0.27	1399	0.05
1600	1599	0.05	1598	0.10	1598	0.10	1598	0.10	1598	0.10	1599	0.05
1800	1797	0.13	1796	0.18	1796	0.18	1796	0.18	1796	0.18	1798	0.09

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

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

Operator: ZRM  
 Date: 6/22/2011

Meterbox No.: 903012  
 Calibrator No.: CL-300-21001

Calibrator Setting ° F	Digital Temperature Readout											
	AUX		STACK		PROBE		OVEN		FILTER		EXIT	
	Actual	Diff.	Actual	Diff.	Actual	Diff.	Actual	Diff.	Actual	Diff.	Actual	Diff.
0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
200	201	0.15	201	0.15	201	0.15	201	0.15	201	0.15	201	0.15
400	397	0.35	397	0.35	398	0.23	398	0.23	397	0.35	398	0.23
600	601	0.09	601	0.09	601	0.09	601	0.09	601	0.09	601	0.09
800	802	0.16	802	0.16	803	0.24	802	0.16	802	0.16	802	0.16
1000	1002	0.14	1002	0.14	1003	0.21	1003	0.21	1002	0.14	1002	0.14
1200	1200	0.00	1200	0.00	1201	0.06	1201	0.06	1200	0.00	1200	0.00
1400	1399	0.05	1398	0.11	1400	0.00	1399	0.05	1398	0.11	1398	0.11
1600	1603	0.15	1602	0.10	1603	0.15	1603	0.15	1602	0.10	1602	0.10
1800	1800	0.00	1800	0.00	1802	0.09	1801	0.04	1800	0.00	1800	0.00

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

**APEX INSTRUMENTS METHOD 5 PRE-TEST CONSOLE CALIBRATION**  
**USING WET-TEST METER #11AE6**  
**5-POINT ENGLISH UNITS**

Factors/Conversions	
Std Temp	528 °R
Std Press	29.92 in Hg
K <sub>1</sub>	17.647 °R/in Hg

Meter Console Information	
Console Model Number	XC-522
Console Serial Number	1104027
DGM Model Number	T-110
DGM Serial Number	26158

Calibration Conditions	
Date	18-Apr-11
Barometric Pressure	29.7 in Hg
Calibration Technician	EW
Calibration Meter Gamma	0.9999

Run Time		Metering Console				Calibration Data				Calibration Meter			
Elapsed (e)	min	DGM Orifice ΔH (P <sub>1</sub> ) in H <sub>2</sub> O	Volume Initial (V <sub>mi</sub> ) cubic feet	Volume Final (V <sub>mf</sub> ) cubic feet	Sample Volume (V <sub>m</sub> ) cubic feet	Outlet Temp Initial (t <sub>mi</sub> ) °F	Outlet Temp Final (t <sub>mf</sub> ) °F	Volume Initial (V <sub>vi</sub> ) cubic feet	Volume Final (V <sub>vf</sub> ) cubic feet	Sample Volume (V <sub>m</sub> ) cubic feet	Outlet Temp Initial (t <sub>mi</sub> ) °F	Outlet Temp Final (t <sub>mf</sub> ) °F	Outlet Temp Final (t <sub>mf</sub> ) °F
5.00		5.0	33.777	40.202	6.425	74	75	426.720	433.155	6.435	70.5	70.5	70.5
6.00		3.0	46.216	52.223	6.007	75	77	439.145	445.110	5.965	70.5	70.5	70.5
7.00		2.0	52.223	57.908	5.685	77	78	445.110	450.730	5.620	70.5	70.5	70.5
10.00		1.0	57.908	63.646	5.738	78	78	450.730	456.410	5.680	70.5	70.5	70.5
15.00		0.5	40.202	46.216	6.014	75	75	433.155	439.145	5.990	70.5	70.5	70.5

Results									
Standardized Data					Dry Gas Meter				
Dry Gas Meter (V <sub>std</sub> ) cubic feet	(Q <sub>std</sub> ) cfm	Calibration Meter (V <sub>wet</sub> ) cubic feet	(Q <sub>wet</sub> ) cfm	Calibration Factor Value (Y)	Calibration Factor		Flowrate		ΔH @ 0.75 SCFM (ΔH <sub>0</sub> ) in H <sub>2</sub> O
					Value (Y)	Variation (ΔY)	Std & Corr (Q <sub>std</sub> ) cfm	Variation (ΔH <sub>0</sub> )	
6.378	1.276	6.357	1.271	0.9987	-0.002		1.271	1.750	-0.005
5.917	0.986	5.893	0.982	0.9958	-0.003		0.982	1.738	-0.018
5.571	0.796	5.552	0.793	0.9966	-0.002		0.793	1.763	0.007
5.604	0.560	5.611	0.561	1.0013	0.003		0.561	1.750	-0.005
5.899	0.393	5.917	0.394	1.0031	0.004		0.394	1.776	0.021
				0.9987	Y Average			1.755	ΔH @ Average



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.

Note: For ΔH<sub>0</sub>, orifice pressure differential that equates to 0.75 cfm (0.0212 m<sup>3</sup>/min) at standard temperature and pressure, acceptable tolerance of individual values from the average is +0.2 inches (5.1 mm) H<sub>2</sub>O.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR 40 Part 60, using the Precision Wet Test Meter # 11AE6, which in turn was calibrated using the American Bell Prover # 157, certified 05/26/2006 using PI Tape S/N 20700139, which is traceable to the National Bureau of Standards (N.I.S.T.).

Signature *Paul Salter*

Date *4/18/11*

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

Model #: Apex 522  
 Serial #: 1104027  
 Pretest Y: 0.999  
 Pretest  $\Delta H$ @: 1.76

Operator: ZRM  
 Date: 6/22/2011

Post-Test, Orifice Method  
 English Units

Barometric Pressure: 30.12 in.Hg

$\Delta H$	Time		DRY GAS METER VOLUME			METER TEMPERATURE			ORIFICE		VAC.	AMBIENT TEMPERATURE		
						INLET		OUTLET						
	Minutes	Seconds	Initial	Final	Total <sup>1</sup>	Initial	Final	Initial	Number	K factor	in. Hg <sup>2</sup>	Initial	Final	Avg.
1.65	11	54	297.300	305.851	8.551	81	82	81	AJ63	0.5482	21.0	81	81	81.0
1.65	15	38	306.000	317.263	11.263	82	82	82	AJ63	0.5482	21.0	81	81	81.0
1.65	12	22	317.500	326.421	8.921	83	84	83	AJ63	0.5482	20.0	81	81	81.0

METER FLOW (cubic feet)	ORIFICE FLOW (cubic feet)	METER CALIBRATION FACTOR, Yc <sup>3</sup>	DH @ <sup>4</sup>
8.427	8.448	1.0024	1.824
11.085	11.098	1.0012	1.821
8.760	8.779	1.0022	1.817
<b>. POST-TEST METER CALIBRATION FACTOR =</b>			<b>1.002</b>

**PERCENT DIFFERENCE FROM PRETEST Y= 0.33**  
**MAXIMUM ALLOWABLE DIFFERENCE= 5.00**

<sup>1</sup> Must pull at least 5 cubic feet per orifice  
<sup>2</sup> Vacuum must be 15" of Hg or greater

<sup>3</sup> Individual Ys can not vary from +/-0.02Y of the average  
<sup>4</sup> Delta H@ can not be more than +/- 0.15 of average delta H

## Temperature Sensor Calibration Data Sheet

Unit XC-522 Serial # 1104027  
 Date 4/18/2011 ThermoCouple No Model Altek Series 22 Type K  
 Personnel EW Reference 105795  
 Ambient temp \_\_\_\_\_ ASTM Mercury-In-Glass ID \_\_\_\_\_  
 NIST Reference TC ID 90728323

Date	Reference Point Number	Source (specify)	Reference Thermometer Temperature F	Thermocouple Display Temperature F	Absolute Temperature Difference %
	1		100	98	0.4
	2		200	200	0.0
	3		300	300	0.0
	4		500	497	0.3
	5		700	700	0.0
	6		900	900	0.0
	7		1100	1100	0.0
	8		1500	1499	0.1
	9		1900	1900	0.0
	10				
	11				
	12				
					0.080

<1.5

NIST Reference TC ID		90728323
Ice Water	Meter TC	
32° F / 0°	Reading	
32.0	31.0	

Checked By EWT/et 4/18/11  
 (Personnel (Sign/Date))

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

Operator: ZRM  
Date: 6/22/2011

Meterbox No.: 1104027  
Calibrator No.: CL-300-21001

Calibrator Setting	Digital Temperature Readout											
	PROBE		STACK		FILTER		EXIT		AUX			
° F	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.	Acutal	Diff.
0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
200	200	0.00	200	0.00	200	0.00	200	0.00	200	0.00	200	0.00
400	400	0.00	400	0.00	400	0.00	400	0.00	400	0.00	400	0.00
600	599	0.09	598	0.19	598	0.19	598	0.19	598	0.19	598	0.19
800	800	0.00	800	0.00	799	0.08	799	0.08	799	0.08	799	0.08
1000	999	0.07	999	0.07	999	0.07	999	0.07	999	0.07	999	0.07
1200	1200	0.00	1200	0.00	1200	0.00	1200	0.00	1200	0.00	1200	0.00
1400	1399	0.05	1399	0.05	1399	0.05	1399	0.05	1400	0.00	1400	0.00
1600	1599	0.05	1599	0.05	1598	0.10	1598	0.10	1599	0.05	1599	0.05
1800	1798	0.09	1800	0.00	1800	0.00	1800	0.00	1800	0.00	1800	0.00

Actual Maximum Difference = 0.19 %  
Allowable Maximum Difference = 1.50 %



## APEX INSTRUMENTS METER CONSOLE CALIBRATION

Meter Console Information			
Console Model	MC-623	Console Serial Number	1105002
Gas Meter Model	AP25	Totalizer Scale Factor (Initial)	3.9000
Gas Meter Serial#	1900905	Totalizer Scale Factor (Final)	3.9203
		Encoder Model	HEDS-5701-A02
		Totalizer Model	Red Lion
		Temp Display Model	Watlow SD31

Calibration Conditions			
WTM ID	539784	Calibration Technician	EW
WTM Cal Factor	1.0024	Barometric Pressure (Pb)	759 mm Hg
		Calibration Date	5-May-11

Calibration Data										Results		
Run Time		Dry Gas Meter			Wet Test Meter			Standardized Volumes			Totalizer Gamma Value	Corrected Flowrate
Elapsed (h)	min	Gas Pressure (P <sub>m</sub> ) mm H <sub>2</sub> O	Gas Temp (T <sub>m</sub> ) °C	Totalizer Display	Gas Volume (V <sub>w</sub> ) liters	Gas Temp (T <sub>w</sub> ) °C	Totalizer Initial SF (V <sub>m(Std)</sub> )	Final SF (V <sub>m(Std)</sub> )	Wet Test Meter (V <sub>w(Std)</sub> )	std liters	(Y)	(Q <sub>m</sub> ) slm
Run 1 - Initial		0.00	100.0	21.0	0.000	901.971	21.0					
Final		5.00	100.0	21.0	18.408	920.752	21.0					
Total/Avg		5.00	100.0	21.0	18.408	18.781	21.0	18.512	18.608	18.751	1.0077	0.008
Run 2 - Initial		0.00	80.0	21.0	18.408	920.752	21.0					
Final		5.00	80.0	21.0	33.524	935.917	21.0					
Total/Avg		5.00	80.0	21.0	15.116	15.165	21.0	15.172	15.251	15.140	0.9928	-0.007
Run 3 - Initial		0.00	50.0	21.0	33.524	935.917	21.0					
Final		6.00	50.0	22.0	46.305	948.822	21.0					
Total/Avg		6.00	50.0	21.5	12.781	12.905	21.0	12.770	12.836	12.884	1.0037	0.004
Run 4 - Initial		0.00	27.0	22.0	46.305	948.822	21.0					
Final		12.00	27.0	22.0	61.148	963.662	21.0					
Total/Avg		12.00	27.0	22.0	14.843	14.840	21.0	14.772	14.849	14.816	0.9978	-0.002
Run 5 - Initial		0.00	18.0	22.0	61.148	963.662	21.0					
Final		24.00	18.0	22.0	78.484	981.013	22.0					
Total/Avg		24.00	18.0	22.0	17.336	17.351	21.5	17.238	17.328	17.294	0.9980	-0.002

Average Meter Calibration Factor Y

1.0000

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.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR 40 Part 60, using a Precision Wet Test Meter, which in turn was calibrated using the American Bell Prover # 3785, certificate # P-107, which is traceable to the National Bureau of Standards (N.I.S.I.).

Signature *Emilio*

Date 5/5/11

# POST TEST METER CALIBRATION DATA AND CALCULATION FORM

COMPANY: ARI Environmental

METER NUMBER: 1105002

BAROMETRIC PRESSURE: 30.12

DATE: 02/27/2011

CALIBRATED BY: RC

PRETEST Y FACTOR: 1.000

ROTAMETER SETTING	GILBRATOR FLOWRATE	TIME	PK III INITIAL READING	PK III FINAL READING	PK III VOLUME (Vm) liters	CALCULATED GILBRATOR VOLUME (Vw) liters	CALCULATED Y
1.0	1.009	10.00	0.0	10.452	10.45	10.09	0.965
1.0	1.022	10.00	0.0	10.589	10.59	10.22	0.965
1.0	1.010	10.00	0.0	10.440	10.44	10.10	0.967
Average =							0.966

PRETEST Y FACTOR = 1.000

POSTTEST Y FACTOR = 0.966

DIFFERENCE, % = -3.5 (Must be < 5%)

## Temperature Sensor Calibration Data Sheet

Unit	MC-623	Serial #	1105002
Date	5/4/2011	ThermoCouple No	Model Altek Series 22 Type K
Personnel	EW	Reference	105795

Reference Point Number	Reference Thermometer Temperature C	Thermocouple Display Temperature C	Absolute Temperature Difference %
1	38	38	0.0
2	93	93	0.0
3	149	149	0.0
4	260	259	0.2
5	371	370	0.2
6	482	482	0.0
7	593	594	-0.1
8	816	816	0.0
9	1038	1038	0.0
10			
11			
12			
			0.025
			<1.5

NIST Reference TC ID		90728323
Ice Water	Meter TC	
32° F / 0° C	Reading	
0.00	0.000	

Checked By *EW* 5/4/11  
 (Personnel (Sign/Date))

# Temperature Sensor Calibration Data Sheet

Unit  
Date  
Personnel

MC-623

5/5/2011

EW

Serial #

1105003

ThermoCouple No Model Altek Series 22 Type K

Reference

105795

Reference Point Number	Reference Thermometer Temperature C	Thermocouple Display Temperature C	Absolute Temperature Difference %
1	38	38	0.0
2	93	93	0.0
3	149	149	0.0
4	260	260	0.0
5	371	371	0.0
6	482	482	0.0
7	593	593	0.0
8	816	816	0.0
9	1038	1038	0.0
10			
11			
12			
			0.000

<1.5

NIST Reference TC ID 90728323	
Ice Water	Meter TC
32° F / 0° C	Reading
0.00	0.000

Checked By

*EW* 5/5/11  
(Personnel (Sign/Date))

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

Operator: RC  
Date: 6/22/2011

Meterbox No.: 1105002  
Calibrator No.: CL-300-21001

Calibrator Setting ° F	PROBE			Blank			Digital Temperature Readout			Blank			AUX		
	Actual	Diff.		Actual	Diff.		Actual	Diff.		Actual	Diff.		Actual	Diff.	
0	-1	0.22		-1	0.22		-1	0.22		-1	0.22		-1	0.22	
200	199	0.15		199	0.15		199	0.15		199	0.15		199	0.15	
400	398	0.23		398	0.23		398	0.23		398	0.23		398	0.23	
600	599	0.09		599	0.09		599	0.09		599	0.09		599	0.09	
800	799	0.08		799	0.08		799	0.08		799	0.08		799	0.08	
1000	999	0.07		999	0.07		999	0.07		999	0.07		999	0.07	
1200	1199	0.06		1199	0.06		1199	0.06		1199	0.06		1199	0.06	
1400	1399	0.05		1399	0.05		1399	0.05		1399	0.05		1399	0.05	
1600	1599	0.05		1599	0.05		1599	0.05		1599	0.05		1599	0.05	
1800	1799	0.04		1799	0.04		1799	0.04		1799	0.04		1799	0.04	

Actual Maximum Difference = 0.23 %  
Allowable Maximum Difference = 1.50 %



## APEX INSTRUMENTS METER CONSOLE CALIBRATION

Meter Console Information			
Console Model	MC-623	Console Serial Number	1105003
Encoder Model	HEDS-5701-A02	Totalizer Scale Factor (Initial)	3.9000
Gas Meter Model	AP25	Totalizer Scale Factor (Final)	3.8671
Gas Meter Serial#	N/A		
		Temp Display Model	Watlow SD31

Calibration Conditions			
WTM ID	539784	Calibration Technician	EW
WTM Cal Factor	1.0024	Barometric Pressure (Pb)	759 mm Hg
		Calibration Date	5-May-11

Calibration Data									
Run Time	Dry Gas Meter			Wet Test Meter			Standardized Volumes		
	Gas Pressure (P <sub>m</sub> ) mm H <sub>2</sub> O	Gas Temp (t <sub>m</sub> ) °C	Totalizer Display	Gas Volume (V <sub>w</sub> ) liters	Gas Temp (t <sub>w</sub> ) °C	Totalizer Initial SF (V <sub>m</sub> ) std liters	Totalizer Final SF (V <sub>w</sub> ) std liters	Wet Test Meter (V <sub>wet</sub> ) std liters	Corrected Flowrate (Q <sub>sc</sub> ) slm
Run 1 - Initial	0.00	100.0	23.0	0.000	205.800	22.0			
Final	5.00	100.0	23.0	18.763	224.408	22.5			
Total/Avg	5.00	100.0	23.0	18.763	18.608	22.3	18.741	18.584	18.499
Run 2 - Initial	0.00	77.0	23.0	18.763	224.408	22.5			
Final	5.00	77.0	24.0	34.320	239.876	22.5			
Total/Avg	5.00	77.0	23.5	15.557	15.468	22.5	15.479	15.348	15.365
Run 3 - Initial	0.00	48.0	24.0	34.320	239.876	22.5			
Final	6.00	48.0	24.0	47.280	252.737	22.5			
Total/Avg	6.00	48.0	24.0	12.960	12.861	22.5	12.837	12.729	12.775
Run 4 - Initial	0.00	26.0	24.0	47.280	252.737	22.5			
Final	12.00	26.0	24.0	60.961	266.253	23.0			
Total/Avg	12.00	26.0	24.0	13.681	13.516	22.8	13.523	13.409	13.414
Run 5 - Initial	0.00	17.0	24.0	60.961	266.253	23.0			
Final	24.00	17.0	24.0	77.860	282.931	23.0			
Total/Avg	24.00	17.0	24.0	16.899	16.678	23.0	16.689	16.548	16.539
Average Meter Calibration Factor Y							1.0000		

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  $\pm 0.02$ .

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR 40 Part 60, using a Precision Wet Test Meter, which in turn was calibrated using the American Bell Prover # 3785, certificate # 1-107, which is traceable to the National Bureau of Standards (N.I.S.I.).

Signature

Date

5/5/11

**POST TEST METER CALIBRATION DATA AND CALCULATION FORM**

COMPANY: ARI Environmental

METER NUMBER: 1105003

BAROMETRIC PRESSURE: 30.12

DATE: 6/22/2011

CALIBRATED BY: RC

PRETEST Y FACTOR: 1.000

ROTAMETER SETTING	GILBRATOR FLOWRATE	TIME	PK III INITIAL READING	PK III FINAL READING	PK III VOLUME (Vm) liters	CALCULATED GILBRATOR VOLUME (Vw) liters	CALCULATED Y
1.0	0.998	10.57	0.0	10.774	10.77	10.55	0.979
1.0	1.022	11.57	0.0	11.891	11.89	11.82	0.994
1.0	1.008	11.00	0.0	11.508	11.51	11.09	0.964
Average =							0.979

PRETEST Y FACTOR = 1.000

POSTTEST Y FACTOR = 0.979

DIFFERENCE, % = -2.2 (Must be < 5%)

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

Operator: RC  
Date: 6/22/2011

Meterbox No.: 1105003  
Calibrator No.: CL-300-21001

Calibrator Setting ° F	PROBE			Digital Temperature Readout					
	Actual	Diff.	Blank	Actual	Diff.	Blank	Actual	Diff.	AUX
0	-2	0.43	-2	-2	0.43	-2	-2	0.43	-2
200	199	0.15	199	199	0.15	199	199	0.15	199
400	398	0.23	398	398	0.23	398	398	0.23	398
600	598	0.19	598	598	0.19	598	598	0.19	598
800	799	0.08	799	799	0.08	799	799	0.18	788
1000	999	0.07	999	999	0.07	999	999	0.07	999
1200	1199	0.06	1199	1199	0.06	1199	1199	0.06	1199
1400	1399	0.05	1399	1399	0.05	1399	1399	0.05	1399
1600	1599	0.05	1599	1599	0.05	1599	1599	0.05	1599
1800	1800	0.00	1800	1800	0.00	1800	1800	0.00	1800

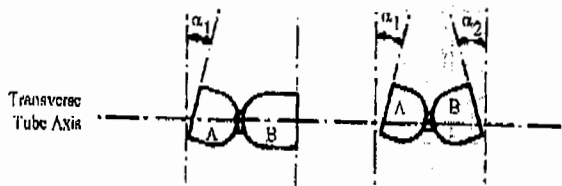
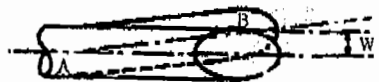
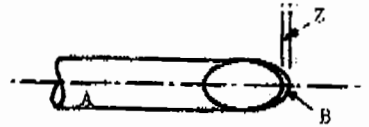
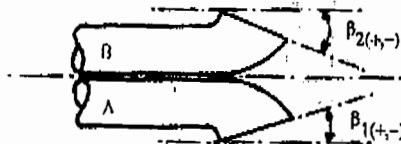
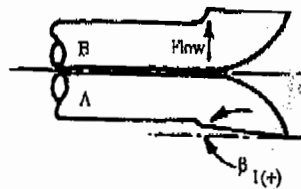
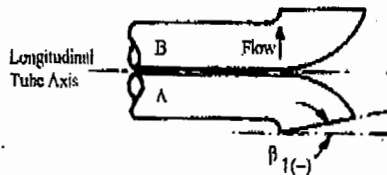
Actual Maximum Difference = 0.43 %  
Allowable Maximum Difference = 1.50 %

# Pitot Tube Inspection Data

Client Name: \_\_\_\_\_

Date: Pre-Sample  
2/13/2009

Date: Post-Sample  
6/22/2011



y	level?	y
n	obstructions?	n
n	damaged?	n
1	$-10^\circ < \alpha_1 < +10^\circ$	0
0	$-10^\circ < \alpha_2 < +10^\circ$	1
0	$-5^\circ < \beta_1 < +5^\circ$	0
0	$-5^\circ < \beta_2 < +5^\circ$	0
0	$\gamma$	2
0	$\theta$	1
0.830	$\Lambda$	0.95
0.415	$0.3843 < P_A < 0.549$	0.475
0.415	$0.3843 < P_B < 0.549$	0.475
0.366	$0.1875 \leq D_1 \leq 0.375$	0.366
0.000	$A \tan \gamma < 0.125''$	0.033
0.00000	$A \tan \theta < 0.03125''$	0.01658
TRUE	$P_A = P_B \pm 0.063$	TRUE
PASS	PASS/FAIL	PASS

Comments:

Pitot tube/probe number P83 meets or exceeds all specifications and criteria and/or applicable design features (per 40CFR60 Appendix A: Method 2) and is hereby assigned a pitot tube calibration factor of 0.84.

Signature:  
Date:

*[Signature]*  
8/2/11

# Pitot Tube Inspection Data

Client Name: \_\_\_\_\_

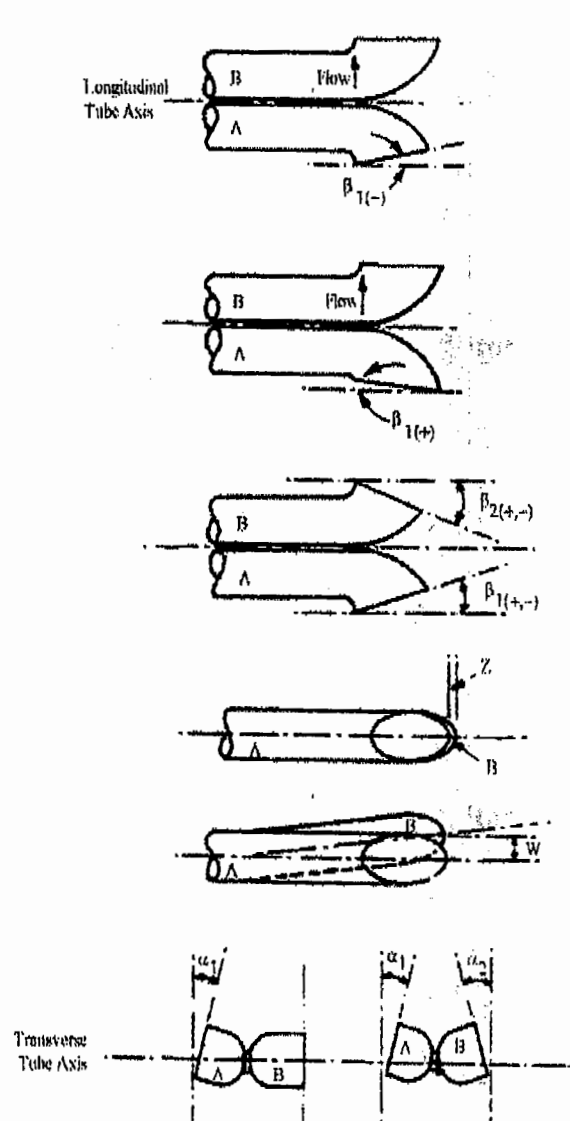
Date: \_\_\_\_\_

Pre-Sample

5/31/2011

Post-Sample

6/22/2011



y	level?	y
n	obstructions?	n
n	damaged?	n
0	$-10^\circ < \alpha_1 < +10^\circ$	0
0	$-10^\circ < \alpha_2 < +10^\circ$	0
1	$-5^\circ < \beta_1 < +5^\circ$	2
0	$-5^\circ < \beta_2 < +5^\circ$	1
0	$\gamma$	0
0	$\theta$	0
0.95	A	0.95
0.475	$0.3675 < P_A < 0.525$	0.475
0.475	$0.3675 < P_B < 0.525$	0.475
0.350	$0.1875 \leq D_t \leq 0.375$	0.350
0.000	$A \tan \gamma < 0.125''$	0.000
0.00000	$A \tan \theta < 0.03125''$	0.00000
TRUE	$P_A = P_B \pm 0.063$	TRUE
PASS	PASS/FAIL	PASS

Comments:

Pitot tube/probe number 250 meets or exceeds all specifications and criteria and/or applicable design features (per 40CFR60 Appendix A; Method 2) and is hereby assigned a pitot tube calibration factor of 0.84.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

*[Signature]*  
8/2/11

# Pitot Tube Inspection Data

Client Name: \_\_\_\_\_

Date: \_\_\_\_\_

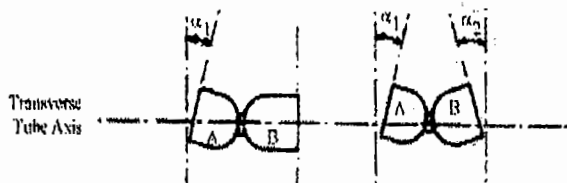
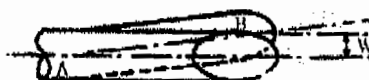
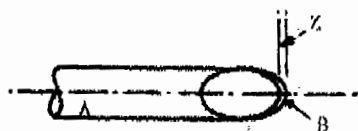
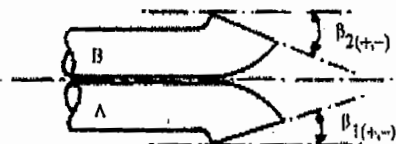
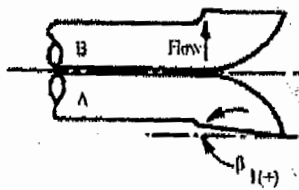
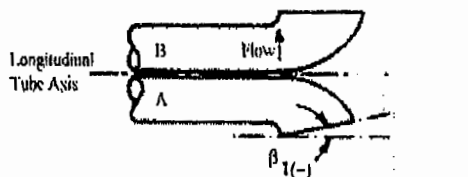
Pre-Sample

5/31/2011

Date: \_\_\_\_\_

Post-Sample

6/22/2011



y	level?	y
n	obstructions?	n
n	damaged?	n
0	$-10^\circ < \alpha_1 < +10^\circ$	1
0	$-10^\circ < \alpha_2 < +10^\circ$	0
0	$-5^\circ < \beta_1 < +5^\circ$	1
0	$-5^\circ < \beta_2 < +5^\circ$	0
0	$\gamma$	0
0	$\theta$	0
0.9	A	0.9
0.450	$0.3255 < P_A < 0.465$	0.450
0.450	$0.3255 < P_B < 0.465$	0.450
0.310	$0.1875 \leq D_r \leq 0.375$	0.310
0.000	$A \tan \gamma < 0.125''$	0.000
0.00000	$A \tan \theta < 0.03125''$	0.00000
TRUE	$P_A = P_B \pm 0.063$	TRUE
PASS	PASS/FAIL	PASS

Comments:

Pitot tube/probe number 251 meets or exceeds all specifications and criteria and/or applicable design features (per 40CFR60 Appendix A: Method 2) and is hereby assigned a pitot tube calibration factor of 0.84.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

**ARI Environmental Inc.**  
**Thermocouple Calibration Data Form**



Calibrator: RC  
 Thermocouple ID. P83  
 Date: pretest 2/13/2009 posttest 6/22/2011  
 Barometric: 29.77 29.94  
 Reference Thermometer = Mercury in glass

	Reference Point Number	Source	Reference Thermometer Temperature	Meter Readout Temperature	Difference (%)
<b>Pre- Test</b>	T.C	Ice Water	30.0	32.0	-0.41
		Ambient	69.0	65.0	0.76
		Hot Water	139.0	139.0	0.00
<b>Post- Test</b>	T.C	Ice Water	38.0	36.0	0.40
		Ambient	78.0	76.0	0.37
		Hot Water	145.0	143.0	0.33

$$a \text{ (temp. diff.)} = (\text{ref.temp} + 460) - (\text{Thermo. temp.} + 460) / (\text{ref. temp.} + 460) \times 100$$

Where  $-1.5 < a < 1.5$

**ARI Environmental Inc.**  
**Thermocouple Calibration Data Form**



Calibrator: RC  
 Thermocouple ID. P250 (1104250)  
 Date: pretest 5/31/2011 posttest 6/22/2011  
 Barometric: 30.12 29.97  
 Reference Thermometer = Mercury in glass

	Reference Point Number	Source	Reference Thermometer Temperature	Meter Readout Temperature	Difference (%)
Pre- Test	T.C	Ice Water	40.0	39.0	0.20
		Ambient	81.0	81.0	0.00
		Hot Water	162.0	162.0	0.00
Post- Test	T.C	Ice Water	38.0	37.0	0.20
		Ambient	78.0	78.0	0.00
		Hot Water	144.0	145.0	-0.17

$$a \text{ (temp. diff.)} = (\text{ref. temp} + 460) - (\text{Thermo. temp.} + 460) / (\text{ref. temp.} + 460) \times 100$$

Where  $-1.5 < a < 1.5$

**ARI Environmental Inc.**  
**Thermocouple Calibration Data Form**



**Calibrator:** RC  
**Thermocouple ID.** P251 (1104251)  
**Date:**                      **pretest**                      **posttest**  
                                  5/31/2011                      6/22/2011  
**Barometric:**            30.12                      29.94  
**Reference Thermometer = Mercury in glass**

	Reference Point Number	Source	Reference Thermometer Temperature	Meter Readout Temperature	Difference (%)
<b>Pre- Test</b>	T.C	Ice Water	41.0	40.0	0.20
		Ambient	83.0	82.0	0.18
		Hot Water	169.0	168.0	0.16
<b>Post- Test</b>	T.C	Ice Water	38.0	36.0	0.40
		Ambient	78.0	76.0	0.37
		Hot Water	144.0	142.0	0.33

$$a \text{ (temp. diff.)} = (\text{ref. temp} + 460) - (\text{Thermo. temp.} + 460) / (\text{ref. temp.} + 460) \times 100$$

Where  $-1.5 < a < 1.5$

## BAROMETER CALIBRATION

### PRE-TEST

CALIBRATOR INITIALS	BAROMETER NUMBER	CALIBRATION DATE	BAROMETER READING (in. Hg)	REFERENCE READING (in Hg.)	DIFFERENCE (+/- 0.1 in Hg)
ZRM	EB833-T7	5/5/2011	30.21	30.21	0

### POST-TEST

CALIBRATOR INITIALS	BAROMETER NUMBER	CALIBRATION DATE	BAROMETER READING (in. Hg)	REFERENCE READING (in Hg.)	DIFFERENCE (+/- 0.1 in Hg)
ZRM	EB833-T7	6/22/2011	29.94	29.94	0

**AIR LIQUIDE**Air Liquide America  
Specialty Gases LLC

Scott™

**CERTIFIED MASTER CLASS***Single-Certified Calibration Standard*

11426 FAIRMONT PKWY, LA PORTE, TX 77571

Phone: 800-248-1427 Fax: 281-474-8419

**CERTIFICATE OF ACCURACY: Certified Master Class Calibration Standard****Product Information**Document #: 41403901-001  
Item No.: M0004060-P-30AL  
P.O. No.: 09-024-11**Customer**ARI ENVIRONMENTAL, INC.  
1710 C PRESTON RD  
PASADENA, TX 77503  
USCylinder Number: CC105969  
Cylinder Size: 30AL  
Certification Date: 25Apr2011  
Expiration Date: 24Apr2012  
Lot Number: LAP0039741**CERTIFIED CONCENTRATION**

<u>Component Name</u>	<u>Concentration (Moles)</u>	<u>Accuracy (+/-%)</u>
CARBON DISULFIDE	524. PPM	2
CARBONYL SULFIDE	510. PPM	2
HYDROGEN SULFIDE	495. PPM	2
NITROGEN	BALANCE	

**TRACEABILITY****Traceable To**

Scott Reference Standard

APPROVED BY:

  
YANG QIN

DATE:

  
8/25/11

## SPECIFICATIONS

Component Name	Requested Concentration (Moles)		Certified Concentration (Moles)		Blend Tolerance Result (+/- %)	Certified Accuracy Result (+/- %)
CARBON DISULFIDE	500.	PPM	524.	PPM	4.8	2.00
CARBONYL SULFIDE	500.	PPM	510.	PPM	2.0	2.00
HYDROGEN SULFIDE	500.	PPM	495.	PPM	1.0	2.00
NITROGEN		BAL		BAL		

## TRACEABILITY

Traceable To  
Scott Reference Standard

## PHYSICAL PROPERTIES

Cylinder Size: 30AL

Pressure: 2000 PSIG  
Expiration Date: 24Apr2012

## SPECIAL HANDLING INSTRUCTIONS

Do not use or store cylinder at or below the stated dew point temperature. Possible condensation of heavier components could result. In the event the cylinder has been exposed to temperatures at or below the dew point, place cylinder in heated area for 24 hours and then roll cylinder for 15 minutes to re-mix.

Use of calibration standards at or below dew point temperature may result in calibration error.

## COMMENTS

PI# 52297 CMC CERTS AND TAGS TO REFLECT ARI52297

**AIR LIQUIDE**Air Liquide America  
Specialty Gases LLC**SCOTT™****RATA CLASS***Dual-Analyzed Calibration Standard*

11426 FAIRMONT PKWY, LA PORTE, TX 77571

Phone: 800-248-1427

Fax: 281-474-8419

**CERTIFICATE OF ACCURACY: EPA Protocol Gas**Assay LaboratoryAIR LIQUIDE AMERICA SPECIALTY GASES LLC  
11426 FAIRMONT PKWY  
LA PORTE, TX 77571

P.O. No.: 03-127-09

Project No.: 04-77649-003

CustomerARI ENVIRONMENTAL, INC.  
03-127-09  
1710 C PRESTON RD  
PASADENA TX 77503**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: AAL5614  
Cylinder Pressure\*\*\*: 1850 PSIG

Certification Date: 04Nov2009

Exp. Date: 04Nov2012  
Batch No: LAP0003619COMPONENTCERTIFIED CONCENTRATION (Moles)ANALYTICALACCURACY\*\*  
+/- 1%TRACEABILITY

Direct NIST and VSL

OXYGEN

7.609 %

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.

**REFERENCE STANDARD**

<u>TYPE/SRM NO.</u>	<u>EXPIRATION DATE</u>	<u>CYLINDER NUMBER</u>	<u>CONCENTRATION</u>	<u>COMPONENT</u>
NTRM 2350	01Apr2012	A6820	23.51 %	OXYGEN

**INSTRUMENTATION**INSTRUMENT/MODEL/SERIAL#

BIG SERVOMEX/1101-4605C/4605C

DATE LAST CALIBRATED

16Oct2009

ANALYTICAL PRINCIPLE

PARAMAGNETIC

**ANALYZER READINGS**

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

## First Triad Analysis

## Second Triad Analysis

## Calibration Curve

**OXYGEN**Date: 04Nov2009 Response Unit: %  
Z1 = 0.00000 R1 = 23.58000 T1 = 7.64000  
R2 = 23.58000 Z2 = 0.01000 T2 = 7.64000  
Z3 = 0.00000 T3 = 7.64000 R3 = 23.56000  
Avg. Concentration: 7.609 %Concentration = A + Bx + Cx2 + Dx3 + Ex4  
r = 0.9999997  
Constants: A = -0.00811775  
B = 1.000029704 C =  
D = E =

APPROVED BY:

DAVID KELLY

**AIR LIQUIDE**Air Liquide America  
Specialty Gases LLC**Scott™****RATA CLASS***Dual-Analyzed Calibration Standard*

11426 FAIRMONT PKWY, LA PORTE, TX 77571

Phone: 800-248-1427

Fax: 281-474-8419

**CERTIFICATE OF ACCURACY: Interference Free Multi-Component EPA Protocol Gas****Assay Laboratory**AIR LIQUIDE AMERICA SPECIALTY GASES LLC  
11426 FAIRMONT PKWY  
LA PORTE, TX 77571P.O. No.: 03-008-11  
Document #: 40555687-001**Customer**

ARI ENVIRONMENTAL, INC.

1710 C PRESTON RD  
PASADENA TX 77503  
US**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: CC102306  
Cylinder Pressure\*\*\*: 1850 PSIG

Certification Date: 19Feb2011

Exp. Date: 19Feb2014  
Batch No: LAP0034896

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY**	TRACEABILITY
CARBON MONOXIDE	202 PPM	+/- 1%	Direct NIST and VSL
CARBON DIOXIDE	19.6 %	+/- 1%	
OXYGEN	22.7 %	+/- 1%	
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.

**REFERENCE STANDARD**

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2636	02Oct2011	KAL003851	240.8 PPM	CARBON MONOXIDE
NTRM 2300	02Jan2012	K002682	23.01 %	CARBON DIOXIDE
NTRM 2350	01May2013	K026427	23.50 %	OXYGEN

**INSTRUMENTATION****INSTRUMENT/MODEL/SERIAL#**SIEMENS CO/ULTRAMAT 6E-HIGH/WO355  
FTIR//MG-09-149  
SERVOMEX/MODEL 244A/701/716**DATE LAST CALIBRATED**02Mar2011  
11Feb2011  
20Jan2011**ANALYTICAL PRINCIPLE**NDIR  
FTIR  
PARAMAGNETIC**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: 17Feb2011 Response Unit: PPM  
Z1=0.00000 R1=240.8000 T1=202.3500  
R2=240.8000 Z2=0.00000 T2=202.3500  
Z3=0.00000 T3=202.5500 R3=240.9000  
Avg. Concentration: 202.4 PPMDate: 02Mar2011 Response Unit: PPM  
Z1=0.00000 R1=241.1000 T1=202.5500  
R2=241.2000 Z2=0.00000 T2=202.6500  
Z3=0.00000 T3=202.6500 R3=241.2000  
Avg. Concentration: 202.3 PPMConcentration = A + Bx + Cx2 + Dx3 + Ex4  
r = 0.9999998  
Constants: A = -0.00359496  
B = 0.999310841 C =  
D = E =**CARBON DIOXIDE**Date: 19Feb2011 Response Unit: %  
Z1=0.00251 R1=22.99574 T1=19.80655  
R2=22.99866 Z2=0.00414 T2=19.62374  
Z3=0.00424 T3=19.64123 R3=23.07062  
Avg. Concentration: 19.61 %Concentration = A + Bx + Cx2 + Dx3 + Ex4  
r = 0.99989E-1  
Constants: A = 0.00000E+0  
B = 5.49122E-1 C = 3.87100E-3  
D = 0.00000E+0 E = 0.00000E+0**OXYGEN**Date: 17Feb2011 Response Unit: VOLTS  
Z1=0.00000 R1=0.94000 T1=0.90820  
R2=0.94050 Z2=0.00000 T2=0.90850  
Z3=0.00000 T3=0.90850 R3=0.94060  
Avg. Concentration: 22.68 %Concentration = A + Bx + Cx2 + Dx3 + Ex4  
r = 0.9999971  
Constants: A = -0.01046095  
B = 24.96689325 C =  
D = E =

APPROVED BY:

DAVID KELLY

**AIR LIQUIDE**Air Liquide America  
Specialty Gases LLC**Scott****RATA CLASS***Dual-Analyzed Calibration Standard*

11426 FAIRMONT PKWY, LA PORTE, TX 77571

Phone: 800-248-1427

Fax: 281-474-8419

**CERTIFICATE OF ACCURACY: Interference Free Multi-Component EPA Protocol Gas****Assay Laboratory**AIR LIQUIDE AMERICA SPECIALTY GASES LLC  
11426 FAIRMONT PKWY  
LA PORTE, TX 77571

P.O. No.: TBA

Document #: 40354688-001

**Customer**

ARI ENVIRONMENTAL, INC.

1710 C PRESTON RD  
PASADENA TX 77503  
US**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:** CC73859  
**Cylinder Pressure\*\*\*:** 1850 PSIG**Certification Date:** 26Jan2011**Exp. Date:** 26Jan2014  
**Batch No:** LAP0033126

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ACCURACY**	TRACEABILITY
OXYGEN	22.7	%	+/- 1%	Direct NIST and VSL
CARBON DIOXIDE	19.7	%	+/- 1%	
CARBON MONOXIDE	202	PPM	+/- 1%	
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.

**REFERENCE STANDARD**

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2350	01May2013	K026427	23.50 %	OXYGEN
NTRM 1800	01Mar2013	K017950	17.87 %	CARBON DIOXIDE
NTRM 2636	02Oct2011	KAL003851	240.8 PPM	CARBON MONOXIDE

**INSTRUMENTATION****INSTRUMENT/MODEL/SERIAL#**

SERVOMEX/MODEL 244A/701/716

FTIR/000929060

SIEMENS CO/ULTRAMAT 6E-HIGH/WO355

**DATE LAST CALIBRATED**

20Jan2011

15Jan2011

24Jan2011

**ANALYTICAL PRINCIPLE**

PARAMAGNETIC

FTIR

NDIR

**ANALYZER READINGS**

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

**First Triad Analysis****Second Triad Analysis****Calibration Curve****OXYGEN**

Date: 31Jan2011 Response Unit: VOLTS  
 Z1=0.00000 R1=0.98350 T1=0.90720  
 R2=0.98350 Z2=0.00000 T2=0.90780  
 Z3=0.00000 T3=0.90800 R3=0.93880  
 Avg. Concentration: 22.71 %

Concentration = A + Bx + Cx2 + Dx3 + Ex4  
 r = 0.9999971  
 Constants: A = -0.01046095  
 B = 24.96589325 C =  
 D = E =

**CARBON DIOXIDE**

Date: 26Jan2011 Response Unit: %  
 Z1=0.00063 R1=17.79329 T1=19.63725  
 R2=17.79531 Z2=0.00229 T2=19.64001  
 Z3=0.00334 T3=19.65110 R3=17.80542  
 Avg. Concentration: 19.72 %

Concentration = A + Bx + Cx2 + Dx3 + Ex4  
 r = 0.99987E-1  
 Constants: A = 0.00000E+0  
 B = 9.04431E-1 C = 1.20800E-2  
 D = 0.00000E+0 E = 0.00000E+0

**CARBON MONOXIDE**

Date: 24Jan2011 Response Unit: PPM  
 Z1=0.00000 R1=239.3000 T1=201.2000  
 R2=239.3000 Z2=0.00000 T2=201.2000  
 Z3=0.00000 T3=201.2000 R3=239.3000  
 Avg. Concentration: 202.5 PPM

Date: 31Jan2011 Response Unit: PPM  
 Z1=0.00000 R1=240.6000 T1=202.4500  
 R2=240.8000 Z2=0.00000 T2=202.4500  
 Z3=0.00000 T3=202.4500 R3=240.8000  
 Avg. Concentration: 202.5 PPM

Concentration = A + Bx + Cx2 + Dx3 + Ex4  
 r = 0.999999  
 Constants: A = -0.04240763  
 B = 1.000069172 C =  
 D = E =

APPROVED BY:

DAVID KELLY

**AIR LIQUIDE**Air Liquide America  
Specialty Gases LLC**SCOTT****RATA CLASS***Dual-Analyzed Calibration Standard*

11426 FAIRMONT PKWY, LA PORTE, TX 77571

Phone: 800-248-1427

Fax: 281-474-8419

**CERTIFICATE OF ACCURACY: EPA Protocol Gas**Assay LaboratoryAIR LIQUIDE AMERICA SPECIALTY GASES LLC  
11426 FAIRMONT PKWY  
LA PORTE, TX 77571

P.O. No.: 03-031-10

Project No.: 04-83032-009

CustomerARI ENVIRONMENTAL, INC.  
PO# 03-031-10  
1710 C PRESTON RD  
PASADENA TX 77503**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: CC102277  
Cylinder Pressure\*\*\*: 1900 PSIG

Certification Date: 09Apr2010

Exp. Date: 08Apr2013

Batch No: LAP0014028

COMPONENTSULFUR DIOXIDE \*  
NITROGENCERTIFIED CONCENTRATION (Moles)1,001 PPM  
BALANCEANALYTICALACCURACY\*\*

+/- 1%

TRACEABILITY

Direct NIST and VSL

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

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

**REFERENCE STANDARD**

<u>TYPE/SRM NO.</u>	<u>EXPIRATION DATE</u>	<u>CYLINDER NUMBER</u>	<u>CONCENTRATION</u>	<u>COMPONENT</u>
NTRM 1662	15May2010	KAL003122	975.0 PPM	SULFUR DIOXIDE

**INSTRUMENTATION**

<u>INSTRUMENT/MODEL/SERIAL#</u>	<u>DATE LAST CALIBRATED</u>	<u>ANALYTICAL PRINCIPLE</u>
FTIR/000929060	01Apr2010	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: 02Apr2010 Response Unit: PPM  
Z1=0.04528 R1=973.5997 T1=999.4752  
R2=973.7617 Z2=0.07089 T2=999.8500  
Z3=0.29218 T3=1000.016 R3=974.0854  
Avg. Concentration: 1001. PPM

Date: 09Apr2010 Response Unit: PPM  
Z1=-0.31001 R1=975.1909 T1=1001.608  
R2=975.6375 Z2=0.10122 T2=1001.619  
Z3=0.25661 T3=1002.101 R3=975.7456  
Avg. Concentration: 1001. PPM

Concentration = A + Bx + Cx<sup>2</sup> + Dx<sup>3</sup> + Ex<sup>4</sup>  
r = 9.99994E-1  
Constants: A = 0.00000E+0  
B = 9.93708E-1 C = 3.00000E-6  
D = 0.00000E+0 E = 0.00000E+0

APPROVED BY:

Ron Stitt

**AIR LIQUIDE**Air Liquide America  
Specialty Gases LLC**SCOTT™****RATA CLASS***Dual-Analyzed Calibration Standard*

11426 FAIRMONT PKWY, LA PORTE, TX 77571

Phone: 800-248-1427

Fax: 281-474-8419

**CERTIFICATE OF ACCURACY: EPA Protocol Gas**Assay Laboratory

P.O. No.: 03-031-10  
 AIR LIQUIDE AMERICA SPECIALTY GASES LLC Project No.: 04-83032-006  
 11426 FAIRMONT PKWY  
 LA PORTE, TX 77571

Customer

ARI ENVIRONMENTAL, INC.  
 PO# 03-031-10  
 1710 C PRESTON RD  
 PASADENA TX 77503

**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: CC149689 Certification Date: 09Apr2010 Exp. Date: 08Apr2012  
 Cylinder Pressure\*\*\*: 1900 PSIG Batch No: LAP0014139

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
NITRIC OXIDE	993.9	PPM	+/- 1%	Direct NIST and VSL
NITROGEN - OXYGEN FREE		BALANCE		
TOTAL OXIDES OF NITROGEN	1,002.	PPM		Reference Value Only

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

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

**REFERENCE STANDARD**

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1687	02Oct2012	AAL070258	970.3 PPM	NITRIC OXIDE

**INSTRUMENTATION**

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
FTIR/000929060	11Mar2010	FTIR

**ANALYZER READINGS**

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

## First Triad Analysis

## Second Triad Analysis

## Calibration Curve

**NITRIC OXIDE**

Date: 02Apr2010 Response Unit: PPM  
 Z1=0.00160 R1=966.5002 T1=988.4431  
 R2=967.5684 Z2=0.84577 T2=990.2120  
 Z3=0.97668 T3=992.0400 R3=967.8732  
 Avg. Concentration: 993.3 PPM

Date: 09Apr2010 Response Unit: PPM  
 Z1=-0.03177 R1=966.6850 T1=990.9666  
 R2=967.2875 Z2=-0.02486 T2=991.2590  
 Z3=0.83149 T3=992.2364 R3=968.0659  
 Avg. Concentration: 994.5 PPM

Concentration = A + Bx + Cx<sup>2</sup> + Dx<sup>3</sup> + Ex<sup>4</sup>  
 r = 9.99999E-1  
 Constants: A = 0.00000E+0  
 B = 9.08129E-1 C = 1.68000E-4  
 D = 0.00000E+0 E = 0.00000E+0

APPROVED BY:

Ron Stitt

**AIR LIQUIDE**Air Liquide America  
Specialty Gases LLC**Scott™****COMPLIANCE CLASS***Dual-Analyzed Calibration Standard*

500 WEAVER PARK RD, LONGMONT, CO 80501

Phone: 888-253-1635

Fax: 303-772-7673

**CERTIFICATE OF ACCURACY: EPA Protocol Gas**Assay LaboratoryAIR LIQUIDE AMERICA SPECIALTY GASES LLC  
500 WEAVER PARK RD  
LONGMONT, CO 80501

P.O. No.: 03-008-11

Document # : 40557418-001

CustomerARI ENVIRONMENTAL, INC.  
1710 C PRESTON RD  
PASADENA TX 77503  
US**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: **AAL13927**Certification Date: **14Feb2011**Exp. Date: **15Aug2011**Cylinder Pressure\*\*\*: **1900 PSIG****COMPONENT**NITROGEN DIOXIDE  
AIR**CERTIFIED CONCENTRATION (Moles)**49.8 PPM  
BALANCE**ACCURACY\*\***

+/- 2%

**TRACEABILITY**

GMIS

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

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

**REFERENCE STANDARD**TYPE/SRM NO.    EXPIRATION DATE  
NO2/AIR GMIS    16Nov2012CYLINDER NUMBER  
ALM032519CONCENTRATION  
48.30 PPMCOMPONENT  
NITROGEN DIOXIDE**INSTRUMENTATION**INSTRUMENT/MODEL/SERIAL#  
NONOX/CLA-220/41528750062DATE LAST CALIBRATED  
17Jan2011ANALYTICAL PRINCIPLE  
CHEMILUMINESCENT

APPROVED BY: \_\_\_\_\_

JON WITZAK



AIR LIQUIDE Air Liquide America  
Specialty Gases LLC



Scott

## RATA CLASS

Dual-Analyzed Calibration Standard

9810 BAY AREA BLVD, PASADENA, TX 77507

Phone: 281-474-5800

Fax: 281-474-5857

### CERTIFICATE OF ACCURACY: EPA Protocol Gas

#### Assay Laboratory

AIR LIQUIDE AMERICA SPECIALTY GASES LLC Project No.: 04-73756-002  
9810 BAY AREA BLVD  
PASADENA, TX 77507

P.O. No.: 03-048-09

#### Customer

ARI ENVIRONMENTAL, INC.  
03-048-09  
1710 C PRESTON RD  
PASADENA TX 77503

### 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: ALM005822 Certification Date: 02Jun2009 Exp. Date: 02Jun2012  
Cylinder Pressure\*\*\*: 1950 PSIG

#### COMPONENT

PROPANE  
NITROGEN

#### CERTIFIED CONCENTRATION (Moles)

999.8 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.

### REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1200	02Feb2010	K008942	1186. PPM	PROPANE

### INSTRUMENTATION

#### INSTRUMENT/MODEL/SERIAL#

MTIA/M200/171109

#### DATE LAST CALIBRATED

02Jun2009

#### 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

#### PROPANE

Date: 02Jun2009 Response Unit: AREA  
Z1=0.00000 R1=1250118. T1=1053279.  
R2=1251037. Z2=0.00000 T2=1053122.  
Z3=0.00000 T3=1051722. R3=1249358.  
Avg. Concentration: 999.8 PPM

Concentration =  $A + Bx + Cx^2 + Dx^3 + Ex^4$   
 $r = 0.9999979$   
Constants:  $A = 4.886695186$   
 $B = 0.000943706$   $C =$   
 $D =$   $E =$

APPROVED BY:

DAVID KELLY

**AIR LIQUIDE**Air Liquide America  
Specialty Gases LLC**SCOTT™****RATA CLASS***Dual-Analyzed Calibration Standard*

9810 BAY AREA BLVD, PASADENA, TX 77507

Phone: 281-474-5800

Fax: 281-474-5857

**CERTIFICATE OF ACCURACY: Interference Free <sup>TM</sup> Multi-Component EPA Protocol Gas**Assay LaboratorySCOTT SPECIALTY GASES  
9810 BAY AREA BLVD  
PASADENA, TX 77507P.O. No.: 03-097-08  
Project No.: 04-68297-001CustomerARI ENVIRONMENTAL, INC.  
  
1710 C PRESTON RD  
PASADENA TX 77503**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: ALM003354 Certification Date: 22Oct2008 Exp. Date: 22Oct2011  
Cylinder Pressure\*\*\*: 1867 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
CARBON MONOXIDE	1,080	PPM	+/- 1%	Direct NIST and NMI
OXYGEN	5.01	%	+/- 1%	
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.

**REFERENCE STANDARD**

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1681	02Oct2010	KAL003229	970.1 PPM	CARBON MONOXIDE
NTRM 2658	01Jan2010	K025996	10.03 %	OXYGEN

**INSTRUMENTATION**

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
FTIR/000929080	09Oct2008	FTIR
SERVOMEX/MODEL 244A/701/716	30Sep2008	PARAMAGNETIC

**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: 14Oct2008	Response Unit: PPM	
Z1=0.00454	R1=972.0945	T1=1088.827
R2=974.0379	Z2=0.06443	T2=1089.233
Z3=0.06575	T3=1090.131	R3=976.2085
Avg. Concentration:	1085.	PPM

Date: 21Oct2008	Response Unit: PPM	
Z1=0.00023	R1=975.1502	T1=1089.256
R2=975.3679	Z2=0.05594	T2=1089.891
Z3=0.05915	T3=1090.824	R3=976.3323
Avg. Concentration:	1084.	PPM

Concentration = A + 8x + Cx2 + Dx3 + Ex4	
r = 9.99997E-1	
Constants:	A = 0.00000E+0
8 = 1.85520E-2	C = 2.11000E-4
D = 0.00000E+0	E = 0.00000E+0

**OXYGEN**

Date: 16Oct2008	Response Unit: VOLTS	
Z1=0.00000	R1=0.99000	T1=0.49170
R2=0.98950	Z2=0.00030	T2=0.49200
Z3=0.00000	T3=0.49200	R3=0.98950
Avg. Concentration:	5.007	%

Concentration = A + 8x + Cx2 + Dx3 + Ex4	
r = .9999879	
Constants:	A = .014189372
8 = 10.14820299	C =
D =	E =

APPROVED BY: \_\_\_\_\_

Ramien JR

Page 1 of 1 P:G:



Valero Port Arthur Refinery  
Source: SRU No. 544 TGI Stack  
Test Dates: 6/15 - 6/17/11

## APPENDIX G

## Process Data

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**Daily Process Data File**  
**SRU-544 SCOT II Tail Gas Incinerator**  
**Valero Port Arthur Refinery**

Run Start/Stop Date/Time	Production by		Tail Gas Incinerator			O2 Injection			
	LT/D	544	Firebox Temp	DEGF	Nat Gas Flow	400 Train		500 Train	
						MSCFH	Ton/Day	MSCFH	Ton/Day
6/1/11 12:00 AM	219		1,330		20.74	18.0	18.2	17.0	17.2
6/2/11 12:00 AM	215		1,330		20.95	18.0	18.2	17.0	17.2
6/3/11 12:00 AM	215		1,330		20.97	18.0	18.2	17.0	17.2
6/4/11 12:00 AM	215		1,330		20.74	18.0	18.2	17.0	17.2
6/5/11 12:00 AM	209		1,330		20.66	12.8	13.0	16.7	16.9
6/6/11 12:00 AM	203		1,308		20.31	11.4	11.5	16.6	16.8
6/7/11 12:00 AM	119		1,250		20.65	11.0	11.1	8.8	8.9
6/8/11 12:00 AM	72		1,250		26.41	6.6	6.7	0.0	0.0
6/9/11 12:00 AM	76		1,250		25.44	4.9	4.9	0.0	0.0
6/10/11 12:00 AM	76		1,250		25.04	10.0	10.1	0.0	0.0
6/11/11 12:00 AM	77		1,250		25.34	10.1	10.2	0.0	0.0
6/12/11 12:00 AM	79		1,250		25.79	10.0	10.1	0.0	0.0
6/13/11 12:00 AM	73		1,250		25.28	10.0	10.1	0.0	0.0
6/14/11 12:00 AM	69		1,250		25.17	10.0	10.1	0.0	0.0
6/15/11 12:00 AM	69		1,250		24.71	10.0	10.1	0.0	0.0
6/16/11 12:00 AM	69		1,250		24.39	10.0	10.1	0.0	0.0
6/17/11 12:00 AM	69		1,250		24.09	10.0	10.1	0.0	0.0
6/18/11 12:00 AM	69		1,250		24.24	10.0	10.1	0.0	0.0
6/19/11 12:00 AM	69		1,250		24.37	10.0	10.1	0.0	0.0
6/20/11 12:00 AM	36		1,249		26.44	5.2	5.2	0.0	0.0
6/21/11 12:00 AM	39		1,250		27.58	0.0	0.0	0.0	0.0
6/22/11 12:00 AM	120		1,250		20.76	0.0	0.0	0.0	0.0
6/23/11 12:00 AM	153		1,250		18.69	0.0	0.0	0.0	0.0
6/24/11 12:00 AM	194		1,250		19.54	6.2	6.3	6.8	6.9
6/25/11 12:00 AM	202		1,250		19.01	10.0	10.1	10.0	10.1
6/26/11 12:00 AM	201		1,250		19.19	10.0	10.1	10.0	10.1
6/27/11 12:00 AM	199		1,250		19.02	10.0	10.1	10.0	10.1
6/28/11 12:00 AM	194		1,250		18.65	10.0	10.1	10.0	10.1
6/29/11 12:00 AM	194		1,250		18.75	10.0	10.1	10.0	10.1
6/30/11 12:00 AM	194		1,250		18.80	10.0	10.1	10.0	10.1

Hourly Process Data File: 6/13/11 @ 00:00 through 6/20/11 @ 00:00  
 SRU-544 SCOT II Tail Gas Incinerator  
 Valero Port Arthur Refinery

Run Start/Stop Date/Time	Sulfur Production LT/D	Tail Gas Incinerator			O2 Injection			
		Firebox Temp	Nat Gas Flow		400 Train	500 Train		
		DEGF	MSCFH	Ton/Day	MSCFH	MSCFH	Ton/Day	Ton/Day
6/13/11 12:00 AM	80	1,250	25.53	10.1	10.0	0.0	10.1	0.0
6/13/11 1:00 AM	80	1,250	25.52	10.1	10.0	0.0	10.1	0.0
6/13/11 2:00 AM	80	1,250	25.57	10.1	10.0	0.0	10.1	0.0
6/13/11 3:00 AM	80	1,250	25.62	10.1	10.0	0.0	10.1	0.0
6/13/11 4:00 AM	80	1,250	25.65	10.1	10.0	0.0	10.1	0.0
6/13/11 5:00 AM	80	1,250	25.61	10.1	10.0	0.0	10.1	0.0
6/13/11 6:00 AM	80	1,250	25.67	10.1	10.0	0.0	10.1	0.0
6/13/11 7:00 AM	76	1,251	25.47	10.1	10.0	0.0	10.1	0.0
6/13/11 8:00 AM	70	1,252	25.06	10.1	10.0	0.0	10.1	0.0
6/13/11 9:00 AM	70	1,250	24.98	10.1	10.0	0.0	10.1	0.0
6/13/11 10:00 AM	69	1,250	24.95	10.1	10.0	0.0	10.1	0.0
6/13/11 11:00 AM	69	1,250	24.96	10.1	10.0	0.0	10.1	0.0
6/13/11 12:00 PM	69	1,250	24.92	10.1	10.0	0.0	10.1	0.0
6/13/11 1:00 PM	69	1,250	25.00	10.1	10.0	0.0	10.1	0.0
6/13/11 2:00 PM	69	1,250	25.07	10.1	10.0	0.0	10.1	0.0
6/13/11 3:00 PM	70	1,250	25.11	10.1	10.0	0.0	10.1	0.0
6/13/11 4:00 PM	70	1,250	25.17	10.1	10.0	0.0	10.1	0.0
6/13/11 5:00 PM	69	1,250	25.22	10.1	10.0	0.0	10.1	0.0
6/13/11 6:00 PM	69	1,250	25.30	10.1	10.0	0.0	10.1	0.0
6/13/11 7:00 PM	69	1,250	25.30	10.1	10.0	0.0	10.1	0.0
6/13/11 8:00 PM	69	1,250	25.26	10.1	10.0	0.0	10.1	0.0
6/13/11 9:00 PM	70	1,250	25.23	10.1	10.0	0.0	10.1	0.0
6/13/11 10:00 PM	69	1,250	25.30	10.1	10.0	0.0	10.1	0.0
6/13/11 11:00 PM	69	1,250	25.36	10.1	10.0	0.0	10.1	0.0
6/14/11 12:00 AM	70	1,250	25.25	10.1	10.0	0.0	10.1	0.0
6/14/11 1:00 AM	70	1,250	25.19	10.1	10.0	0.0	10.1	0.0
6/14/11 2:00 AM	69	1,250	25.21	10.1	10.0	0.0	10.1	0.0
6/14/11 3:00 AM	70	1,250	25.16	10.1	10.0	0.0	10.1	0.0
6/14/11 4:00 AM	70	1,250	25.09	10.1	10.0	0.0	10.1	0.0
6/14/11 5:00 AM	69	1,250	25.17	10.1	10.0	0.0	10.1	0.0
6/14/11 6:00 AM	70	1,250	25.22	10.1	10.0	0.0	10.1	0.0
6/14/11 7:00 AM	69	1,250	25.37	10.1	10.0	0.0	10.1	0.0
6/14/11 8:00 AM	69	1,249	25.48	10.1	10.0	0.0	10.1	0.0

Hourly Process Data File: 6/13/11 @ 00:00 through 6/20/11 @ 00:00  
 SRU-544 SCOT II Tail Gas Incinerator  
 Valero Port Arthur Refinery

Run Start/Stop Date/Time	Sulfur Production		Tail Gas Incinerator		O2 Injection			
	LT/D	Firebox Temp	Nat Gas Flow	DEGF	MSCFH	Ton/Day	400 Train	500 Train
6/14/11 9:00 AM	70	1,250	25.45	10.1	10.0	10.1	0.0	0.0
6/14/11 10:00 AM	69	1,250	25.46	10.1	10.0	10.1	0.0	0.0
6/14/11 11:00 AM	70	1,250	25.32	10.1	10.0	10.1	0.0	0.0
6/14/11 12:00 PM	69	1,251	25.18	10.0	9.9	10.0	0.0	0.0
6/14/11 1:00 PM	69	1,250	25.22	10.0	9.9	10.0	0.0	0.0
6/14/11 2:00 PM	69	1,250	25.25	10.1	10.0	10.1	0.0	0.0
6/14/11 3:00 PM	69	1,250	25.15	10.2	10.0	10.2	0.0	0.0
6/14/11 4:00 PM	69	1,250	25.11	10.2	10.0	10.2	0.0	0.0
6/14/11 5:00 PM	70	1,250	25.02	10.2	10.0	10.2	0.0	0.0
6/14/11 6:00 PM	69	1,250	24.97	10.1	10.0	10.1	0.0	0.0
6/14/11 7:00 PM	70	1,250	24.95	10.1	10.0	10.1	0.0	0.0
6/14/11 8:00 PM	69	1,250	24.98	10.1	10.0	10.1	0.0	0.0
6/14/11 9:00 PM	69	1,250	24.90	10.1	10.0	10.1	0.0	0.0
6/14/11 10:00 PM	69	1,250	24.96	10.1	10.0	10.1	0.0	0.0
6/14/11 11:00 PM	69	1,250	24.94	10.1	10.0	10.1	0.0	0.0
6/15/11 12:00 AM	69	1,250	24.91	10.1	10.0	10.1	0.0	0.0
6/15/11 1:00 AM	69	1,250	24.88	10.1	10.0	10.1	0.0	0.0
6/15/11 2:00 AM	69	1,250	24.85	10.1	10.0	10.1	0.0	0.0
6/15/11 3:00 AM	70	1,250	24.83	10.1	10.0	10.1	0.0	0.0
6/15/11 4:00 AM	69	1,250	24.79	10.1	10.0	10.1	0.0	0.0
6/15/11 5:00 AM	70	1,250	24.78	10.1	10.0	10.1	0.0	0.0
6/15/11 6:00 AM	69	1,250	24.79	10.1	10.0	10.1	0.0	0.0
6/15/11 7:00 AM	69	1,250	24.76	10.1	10.0	10.1	0.0	0.0
6/15/11 8:00 AM	70	1,249	24.90	10.1	10.0	10.1	0.0	0.0
6/15/11 9:00 AM	69	1,250	25.00	10.1	10.0	10.1	0.0	0.0
6/15/11 10:00 AM	70	1,250	24.93	10.1	10.0	10.1	0.0	0.0
6/15/11 11:00 AM	70	1,250	24.95	10.1	10.0	10.1	0.0	0.0
6/15/11 12:00 PM	69	1,250	24.89	9.9	9.8	9.9	0.0	0.0
6/15/11 1:00 PM	70	1,250	24.87	9.9	9.8	9.9	0.0	0.0
6/15/11 2:00 PM	70	1,251	24.80	10.2	10.0	10.2	0.0	0.0
6/15/11 3:00 PM	70	1,250	24.68	10.1	10.0	10.1	0.0	0.0
6/15/11 4:00 PM	70	1,250	24.67	10.1	10.0	10.1	0.0	0.0
					Total Sulfur Production			
					69.6 LT/D			
					Firebox Temperature			
					1,250.3 °F			
					Natural Gas Flow			

Hourly Process Data File: 6/13/11 @ 00:00 through 6/20/11 @ 00:00  
 SRU-544 SCOT II Tail Gas Incinerator  
 Valero Port Arthur Refinery

Run Start/Stop Date/Time	Sulfur Production		Tail Gas Incinerator		O2 Injection			
	LT/D	Firebox Temp	DEGF	Nat Gas Flow	400 Train	500 Train	Ton/Day	Ton/Day
				MSCFH	MSCFH	MSCFH		
6/15/11 5:00 PM	69	1,250	24.66	10.1	10.0	0.0	10.1	0.0
6/15/11 6:00 PM	69	1,251	24.42	10.1	10.0	0.0	10.1	0.0
6/15/11 7:00 PM	69	1,250	24.36	10.1	10.0	0.0	10.1	0.0
6/15/11 8:00 PM	69	1,250	24.37	10.1	10.0	0.0	10.1	0.0
6/15/11 9:00 PM	70	1,250	24.33	10.1	10.0	0.0	10.1	0.0
6/15/11 10:00 PM	69	1,250	24.36	10.1	10.0	0.0	10.1	0.0
6/15/11 11:00 PM	69	1,250	24.28	10.1	10.0	0.0	10.1	0.0
6/16/11 12:00 AM	69	1,250	24.18	10.1	10.0	0.0	10.1	0.0
6/16/11 1:00 AM	70	1,250	24.26	10.1	10.0	0.0	10.1	0.0
6/16/11 2:00 AM	70	1,250	24.38	10.1	10.0	0.0	10.1	0.0
6/16/11 3:00 AM	70	1,250	24.22	10.1	10.0	0.0	10.1	0.0
6/16/11 4:00 AM	69	1,250	24.25	10.1	10.0	0.0	10.1	0.0
6/16/11 5:00 AM	70	1,250	24.28	10.1	10.0	0.0	10.1	0.0
6/16/11 6:00 AM	70	1,250	24.29	10.1	10.0	0.0	10.1	0.0
6/16/11 7:00 AM	69	1,250	24.23	10.1	10.0	0.0	10.1	0.0
6/16/11 8:00 AM	69	1,249	24.29	10.1	10.0	0.0	10.1	0.0
6/16/11 9:00 AM	70	1,250	24.55	10.1	10.0	0.0	10.1	0.0
6/16/11 10:00 AM	69	1,250	24.68	10.1	10.0	0.0	10.1	0.0
6/16/11 11:00 AM	70	1,250	24.69	10.1	10.0	0.0	10.1	0.0
6/16/11 12:00 PM	70	1,250	24.56	10.1	10.0	0.0	10.1	0.0
6/16/11 1:00 PM	70	1,250	24.59	10.2	10.0	0.0	10.2	0.0
6/16/11 2:00 PM	69	1,250	24.42	10.2	10.0	0.0	10.2	0.0
6/16/11 3:00 PM	69	1,250	24.48	10.2	10.0	0.0	10.2	0.0
6/16/11 4:00 PM	69	1,250	24.48	10.2	10.0	0.0	10.2	0.0
6/16/11 5:00 PM	69	1,250	24.40	10.1	10.0	0.0	10.1	0.0
6/16/11 6:00 PM	69	1,250	24.45	10.1	10.0	0.0	10.1	0.0
6/16/11 7:00 PM	70	1,250	24.40	10.1	10.0	0.0	10.1	0.0
6/16/11 8:00 PM	70	1,250	24.46	10.1	10.0	0.0	10.1	0.0
6/16/11 9:00 PM	69	1,250	24.39	10.1	10.0	0.0	10.1	0.0
6/16/11 10:00 PM	69	1,250	24.31	10.1	10.0	0.0	10.1	0.0
6/16/11 11:00 PM	69	1,250	24.12	10.1	10.0	0.0	10.1	0.0
6/17/11 12:00 AM	70	1,250	24.18	10.1	10.0	0.0	10.1	0.0
Total Sulfur Production								
69.4 LT/D								
Firebox Temperature								
1,250.0 °F								
Natural Gas Flow								
24.479 MSCFH								

Hourly Process Data File: 6/13/11 @ 00:00 through 6/20/11 @ 00:00  
SRU-544 SCOT II Tail Gas Incinerator  
Valero Port Arthur Refinery

Run Start/Stop Date/Time	Sulfur Production		Tail Gas Incinerator		O <sub>2</sub> Injection	
	LT/D	Firebox Temp	Nat Gas Flow	400 Train	500 Train	Ton/Day
6/17/11 1:00 AM	69	1,250	24.13	10.0	0.0	0.0
6/17/11 2:00 AM	69	1,250	24.04	10.0	0.0	0.0
6/17/11 3:00 AM	69	1,250	23.91	10.0	0.0	0.0
6/17/11 4:00 AM	69	1,250	23.93	10.0	0.0	0.0
6/17/11 5:00 AM	69	1,249	24.02	10.0	0.0	0.0
6/17/11 6:00 AM	69	1,250	24.01	10.0	0.0	0.0
6/17/11 7:00 AM	69	1,250	24.08	10.0	0.0	0.0
6/17/11 8:00 AM	69	1,250	24.05	10.0	0.0	0.0
6/17/11 9:00 AM	69	1,250	24.21	10.0	0.0	0.0
6/17/11 10:00 AM	69	1,250	24.26	10.0	0.0	0.0
6/17/11 11:00 AM	69	1,250	24.42	10.0	0.0	0.0
6/17/11 12:00 PM	69	1,250	24.43	9.9	0.0	0.0
6/17/11 1:00 PM	70	1,250	24.18	9.9	0.0	0.0
6/17/11 2:00 PM	70	1,250	24.20	10.0	0.0	0.0
6/17/11 3:00 PM	69	1,250	24.13	10.0	0.0	0.0
6/17/11 4:00 PM	70	1,250	24.02	10.0	0.0	0.0
6/17/11 5:00 PM	69	1,250	24.04	10.0	0.0	0.0
6/17/11 6:00 PM	68	1,250	24.03	10.0	0.0	0.0
6/17/11 7:00 PM	69	1,250	24.17	10.0	0.0	0.0
6/17/11 8:00 PM	69	1,250	24.13	10.0	0.0	0.0
6/17/11 9:00 PM	69	1,250	24.05	10.0	0.0	0.0
6/17/11 10:00 PM	69	1,250	23.81	10.0	0.0	0.0
6/17/11 11:00 PM	69	1,250	23.85	9.9	0.0	0.0
6/18/11 12:00 AM	69	1,250	24.04	9.9	0.0	0.0
6/18/11 1:00 AM	69	1,250	23.99	10.0	0.0	0.0
6/18/11 2:00 AM	69	1,250	23.94	9.9	0.0	0.0
6/18/11 3:00 AM	69	1,250	24.19	10.0	0.0	0.0
6/18/11 4:00 AM	69	1,250	24.18	10.0	0.0	0.0
6/18/11 5:00 AM	70	1,250	24.12	10.0	0.0	0.0
6/18/11 6:00 AM	70	1,250	24.20	10.0	0.0	0.0
6/18/11 7:00 AM	69	1,250	24.04	10.0	0.0	0.0
6/18/11 8:00 AM	70	1,249	23.98	10.1	0.0	0.0

Total Sulfur Production  
69.3 LT/D  
Firebox Temperature  
1,250.0 °F  
Natural Gas Flow  
24.229 MSCFH

Hourly Process Data File: 6/13/11 @ 00:00 through 6/20/11 @ 00:00  
 SRU-544 SCOT II Tail Gas Incinerator  
 Valero Port Arthur Refinery

Run Start/Stop Date/Time	Sulfur Production LT/D	Tail Gas Incinerator		O2 Infection				
		Firebox Temp DEGF	Nat Gas Flow MSCFH	Ton/Day	400 Train MSCFH	Ton/Day	500 Train MSCFH	Ton/Day
6/18/11 9:00 AM	69	1,250	24.38	10.1	10.0	10.1	0.0	0.0
6/18/11 10:00 AM	70	1,250	24.11	10.1	10.0	10.1	0.0	0.0
6/18/11 11:00 AM	70	1,249	24.11	10.1	10.0	10.1	0.0	0.0
6/18/11 12:00 PM	70	1,250	24.24	10.1	10.0	10.1	0.0	0.0
6/18/11 1:00 PM	68	1,250	24.22	10.1	10.0	10.1	0.0	0.0
6/18/11 2:00 PM	69	1,250	24.27	10.1	10.0	10.1	0.0	0.0
6/18/11 3:00 PM	69	1,250	24.49	10.1	10.0	10.1	0.0	0.0
6/18/11 4:00 PM	70	1,251	24.42	10.2	10.0	10.2	0.0	0.0
6/18/11 5:00 PM	70	1,250	24.43	10.2	10.1	10.2	0.0	0.0
6/18/11 6:00 PM	69	1,250	24.40	10.2	10.1	10.2	0.0	0.0
6/18/11 7:00 PM	69	1,250	24.42	10.2	10.1	10.2	0.0	0.0
6/18/11 8:00 PM	70	1,250	24.41	10.2	10.0	10.2	0.0	0.0
6/18/11 9:00 PM	69	1,250	24.43	10.1	10.0	10.1	0.0	0.0
6/18/11 10:00 PM	70	1,250	24.46	10.1	10.0	10.1	0.0	0.0
6/18/11 11:00 PM	69	1,250	24.37	10.1	10.0	10.1	0.0	0.0
6/19/11 12:00 AM	70	1,250	24.42	10.1	10.0	10.1	0.0	0.0
6/19/11 1:00 AM	70	1,250	24.50	10.1	10.0	10.1	0.0	0.0
6/19/11 2:00 AM	70	1,250	24.46	10.1	10.0	10.1	0.0	0.0
6/19/11 3:00 AM	70	1,250	24.53	10.1	10.0	10.1	0.0	0.0
6/19/11 4:00 AM	69	1,251	24.38	10.1	10.0	10.1	0.0	0.0
6/19/11 5:00 AM	69	1,250	24.41	10.1	10.0	10.1	0.0	0.0
6/19/11 6:00 AM	69	1,250	24.36	10.1	9.9	10.1	0.0	0.0
6/19/11 7:00 AM	69	1,250	24.46	10.1	9.9	10.1	0.0	0.0
6/19/11 8:00 AM	69	1,249	24.40	10.1	9.9	10.1	0.0	0.0
6/19/11 9:00 AM	69	1,250	24.52	10.1	9.9	10.1	0.0	0.0
6/19/11 10:00 AM	69	1,250	24.51	10.1	9.9	10.1	0.0	0.0
6/19/11 11:00 AM	69	1,250	24.52	10.1	10.0	10.1	0.0	0.0
6/19/11 12:00 PM	69	1,250	24.30	10.1	10.0	10.1	0.0	0.0
6/19/11 1:00 PM	69	1,250	24.67	10.1	10.0	10.1	0.0	0.0
6/19/11 2:00 PM	69	1,250	24.28	10.1	10.0	10.1	0.0	0.0
6/19/11 3:00 PM	69	1,250	24.26	10.1	10.0	10.1	0.0	0.0
6/19/11 4:00 PM	69	1,250	24.24	10.1	10.0	10.1	0.0	0.0
6/19/11 5:00 PM	69	1,250	24.19	10.1	10.0	10.1	0.0	0.0

Hourly Process Data File: 6/13/11 @ 00:00 through 6/20/11 @ 00:00  
 SRU-544 SCOT II Tail Gas Incinerator  
 Valero Port Arthur Refinery

Run Start/Stop Date/Time	Sulfur Production LT/D	Tail Gas Incinerator			O2 Injection			
		Firebox Temp	Nat Gas Flow		400 Train	500 Train		
		DEGF	MSCFH	Ton/Day	MSCFH	MSCFH	Ton/Day	Ton/Day
6/19/11 6:00 PM	69	1,250	24.22	10.1	10.0	0.0	10.1	0.0
6/19/11 7:00 PM	69	1,250	24.10	10.1	10.0	0.0	10.1	0.0
6/19/11 8:00 PM	70	1,249	24.21	10.1	10.0	0.0	10.1	0.0
6/19/11 9:00 PM	69	1,249	24.16	10.1	10.0	0.0	10.1	0.0
6/19/11 10:00 PM	70	1,250	24.32	10.1	10.0	0.0	10.1	0.0
6/19/11 11:00 PM	69	1,250	24.43	10.1	10.0	0.0	10.1	0.0
6/20/11 12:00 AM	70	1,250	24.79	10.1	10.0	0.0	10.1	0.0



Valero Port Arthur Refinery  
Source: SRU No. 544 TGI Stack  
Test Dates: 6/15 - 6/17/11

## APPENDIX H

## Test Program Qualifications

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## Test Program Qualifications

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ARI Environmental's offices in Wauconda, Illinois and Pasadena, Texas specialize in conducting stack emission, fugitive leak detection, ambient air and in-plant OSHA type testing for industrial clients.

ARI is organized so that its facilities and resources meet the requirements of ASTM D7036, Standard Practice for Competence of Air Emission Testing Bodies. ARI's laboratories in Pasadena, Texas and Wauconda, Illinois hold TCEQ NELAP Certificate No. T104704428-10-2.

During the past 27 years, ARI personnel have conducted over 5,000 separate stack emission tests for a variety of industrial clients throughout North America for the determination of degree of source compliance and to yield emissions data and control equipment performance data for in-house engineering purposes.

ARI presently has over 80 trained personnel for conducting source emission sampling, fugitive leak detection monitoring, ambient air monitoring and OSHA sampling programs. All test programs are supervised and conducted by onsite Qualified Individuals (QI) and/or Qualified Source Testing Individuals (QSTI) pursuant to ASTM D7036.

The key personnel involved in the test program were as follows:

### **Daniel Fitzgerald**

Mr. Fitzgerald is the Division Manager of ARI's Source Testing Division with offices located in Wauconda, Illinois and Houston, Texas. With over 32 years experience in process evaluation, emission compliance and control equipment efficiency test programs, Mr. Fitzgerald specializes in the technical planning, coordination and performance of environmental test programs. Mr. Fitzgerald has an extensive background in EPA sampling and analysis applications, incinerator design and optimization, VOC sampling and analysis, RCRA trial burn testing, sampling equipment design and fabrication, implementation of innovative sampling and analysis techniques, methods validation and R&D. Mr. Fitzgerald is presently certified as a QSTI by the Source Evaluation Society (SES) pursuant to the requirements of ASTM D7036-04.

His source sampling experience includes conducting over 1,000 separate test programs involving emissions testing at automotive manufacturing, steel mills, refineries, printing operations, food processing, chemical plants, fume incineration systems, hazardous waste incinerators, bulk gasoline terminals and power plants.

### **Greg Burch**

Mr. Burch is ARI's Source Testing Division South Central Regional Manager and is responsible for planning and managing sampling programs, sample analysis, data reduction, QA/QC reviews, and reporting activity for the regional office. He is certified as a QSTI through the SES. Mr. Burch has been involved with source testing since 1990. He has accumulated extensive experience in flow stream characterization for engineering purposes; emissions sampling for regulatory compliance demonstration and emissions sampling for system audit requirements of CEMS and PEMS.

### **Jerry Bovee**

Mr. Bovee is the Northeast Regional Manager and a Senior Project Manager with ARI. His 20 years of experience includes emission compliance and CEM certification testing for a wide variety of industries including petrochemical, steel mills, electric utilities, cement plants, pulp and paper mills, asphalt plants and general manufacturing plants. Mr. Bovee is presently certified as a QSTI by the SES pursuant to the requirements of ASTM D7036-04.



## Test Program Qualifications

---

### **Jeff Goldfine**

Mr. Goldfine is a Project Manager with ARI. His 7 years experience includes emission compliance and CEM certification testing for a wide variety of industries including petrochemical, steel mills, electric utilities, cement plants, asphalt plants and general manufacturing plants. Mr. Goldfine is presently certified as a QSTI by the SES pursuant to the requirements of ASTM D7036-04.

### **Jeff Knapp**

Mr. Knapp is a Project Manager with ARI. His 20 years experience includes emission compliance and CEM certification testing for a wide variety of industries including petrochemical, steel mills, electric utilities, cement plants, asphalt plants and general manufacturing plants.

### **Andrew Hornbeck**

Mr. Hornbeck is a field technician specializing in sampling equipment preparation, maintenance and calibration, equipment setup, field sampling, sample recovery, and posttest equipment clean up.

### **Chris Hall**

Mr. Hall is a source sampling field technician. Mr. Hall is well versed in the operation and maintenance of manual source sampling equipment and has performed these functions on numerous tests for various clients.

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

### **Ronnie Mullins**

Mr. Mullins is a source sampling field technician. Mr. Mullins is well versed in the operation and maintenance of manual source sampling equipment and has performed these functions on numerous tests for various clients.

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

### **Ron White**

Mr. White is the Laboratory Manager with ARI. He is experienced in wet chemistry and chromatography work. He conducts routine analysis of Appendix A reference method samples as well as comprehensive characterization of water samples for a variety of volatile organics. In addition to his analytical responsibilities, Mr. White coordinates the collection, documentation, storage and chain of custody for many of ARI's more comprehensive compliance test programs.

### **Richard Brank-Campbell**

Mr. Brank-Campbell is a source sampling field technician. Mr. Brank-Campbell is well versed in the operation and maintenance of manual source sampling equipment and has performed these functions on numerous tests for various clients.

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

# SOURCE EVALUATION SOCIETY



## Qualified Source Testing Individual

LET IT BE KNOWN THAT

**DANIEL E. FITZGERALD**

HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED  
EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES  
ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR

**MANUAL GAS VOLUME MEASUREMENTS AND ISOKINETIC PARTICULATE  
SAMPLING METHODS**

ISSUED THIS 5<sup>TH</sup> DAY OF NOVEMBER 2008 AND EFFECTIVE UNTIL NOVEMBER 4<sup>TH</sup>, 2013

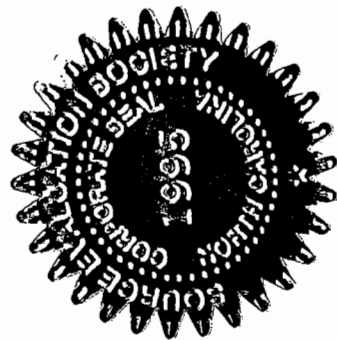
Peter R. Westlin, QSTI/QSTO Review Board

Peter S. Pakalnis, QSTI/QSTO Review Board

C. David Bagwell, QSTI/QSTO Review Board

John R. Smith, QSTI/QSTO Review Board

APPLICATION  
NO.  
2008-218



# SOURCE EVALUATION SOCIETY



## Qualified Source Testing Individual

LET IT BE KNOWN THAT

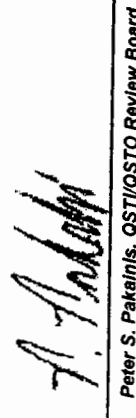
**DANIEL E. FITZGERALD**

HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED  
EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES  
ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR

### **MANUAL GASEOUS POLLUTANTS SOURCE SAMPLING METHODS**

ISSUED THIS 5<sup>TH</sup> DAY OF NOVEMBER 2008 AND EFFECTIVE UNTIL NOVEMBER 4<sup>TH</sup>, 2013

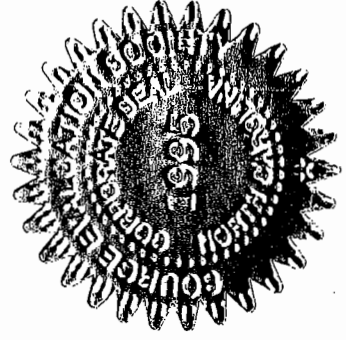
  
Peter R. Westlin, QSTI/QSTO Review Board

  
Peter S. Pakalnis, QSTI/QSTO Review Board

  
C. David Bagwell, QSTI/QSTO Review Board

  
John R. Smith, QSTI/QSTO Review Board

APPLICATION  
NO.  
2008-218



# SOURCE EVALUATION SOCIETY



## Qualified Source Testing Individual

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**DANIEL E. FITZGERALD**

HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED  
EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES  
ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR

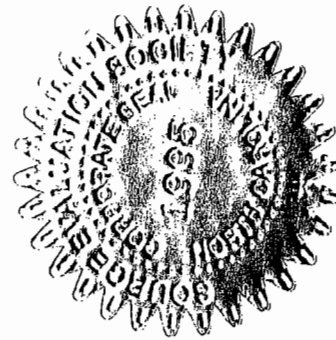
**GASEOUS POLLUTANTS INSTRUMENTAL SAMPLING METHODS**

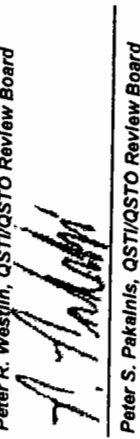
ISSUED THIS 5<sup>TH</sup> DAY OF NOVEMBER 2008 AND EFFECTIVE UNTIL NOVEMBER 4<sup>TH</sup>, 2013

  
Peter R. Westlin, QSTI/QSTO Review Board

  
C. David Bagwell, QSTI/QSTO Review Board

APPLICATION  
NO.  
2008-218



  
Peter S. Pakalnis, QSTI/QSTO Review Board

  
John R. Smith, QSTI/QSTO Review Board

# SOURCE EVALUATION SOCIETY



## Qualified Source Testing Individual


LET IT BE KNOWN THAT


**DANIEL E. FITZGERALD**

HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED  
EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES  
ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR

### **HAZARDOUS METALS MEASUREMENT SAMPLING METHODS**

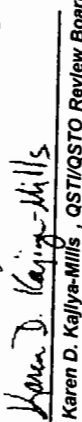
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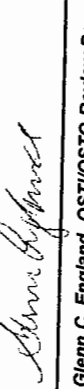
  
Peter R. Westlin, QSTI/QSTO Review Board

  
Peter S. Pakalnis, QSTI/QSTO Review Board

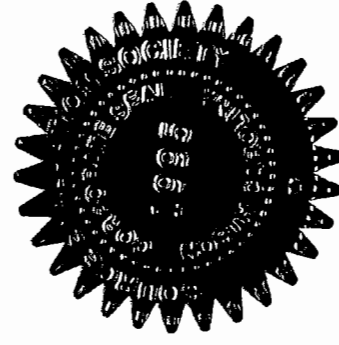
  
Leroy Owens, QSTI/QSTO Review Board

  
C. David Bagweff, QSTI/QSTO Review Board

  
Karen D. Kallja-Mills, QSTI/QSTO Review Board

  
Glenn C. England, QSTI/QSTO Review Board

APPLICATION  
NO.  
2008-218



# SOURCE EVALUATION SOCIETY



## Qualified Source Test Individual

LET IT BE KNOWN THAT

**GREG D. BURCH**

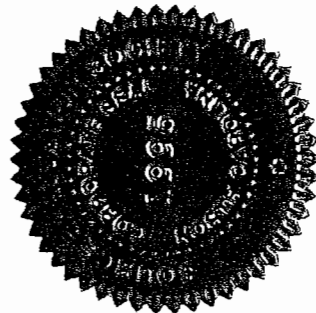
HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED  
EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES  
ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR

**BASIC KNOWLEDGE AND MANUAL PARTICULATE SAMPLING METHODS**

ISSUED THIS 20<sup>TH</sup> DAY OF APRIL 2006 AND EFFECTIVE UNTIL APRIL 19<sup>TH</sup>, 2011

Peter R. Westlin  
QSTI Review Board

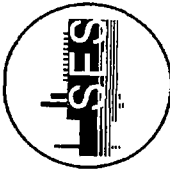
Leroy F. Owens  
QSTI Review Board



Glenn C. England  
QSTI Review Board

APPLICATION NO. 2006-027

# SOURCE EVALUATION SOCIETY



## Qualified Source Test Individual

LET IT BE KNOWN THAT

**GREG D. BURCH**

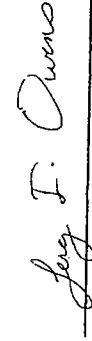
HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED  
EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES  
ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR

### **MANUAL GAS SOURCE SAMPLING METHODS**

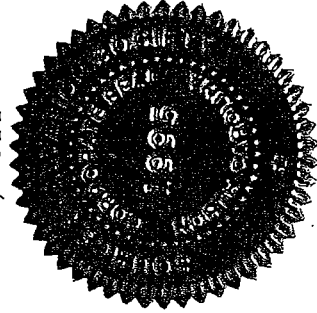
ISSUED THIS 8<sup>TH</sup> DAY OF JUNE 2006 AND EFFECTIVE UNTIL JUNE 7<sup>TH</sup>, 2011

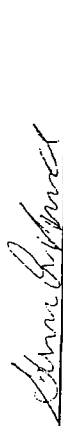


Peter R. Westlin  
QSTI Review Board



LeRoy F. Owens  
QSTI Review Board





Glenn C. England  
QSTI Review Board

APPLICATION NO. 2006-027

# SOURCE EVALUATION SOCIETY



## Qualified Source Test Individual

LET IT BE KNOWN THAT

**GREG D. BURCH**

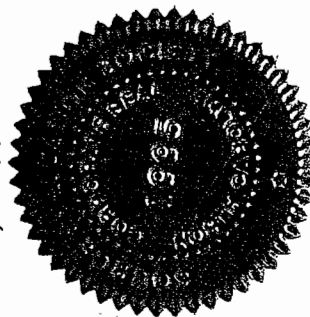
HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED  
EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES  
ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR

### ***INSTRUMENTAL METHODS***

ISSUED THIS 8<sup>TH</sup> DAY OF JUNE 2006 AND EFFECTIVE UNTIL JUNE 7<sup>TH</sup>, 2011

Peter R. Westlin  
QSTI Review Board

LeRoy F. Owens  
QSTI Review Board



Glenn C. England  
QSTI Review Board

APPLICATION NO. 2006-027

# SOURCE EVALUATION SOCIETY



## Qualified Source Testing Individual

LET IT BE KNOWN THAT

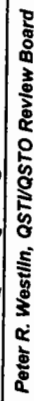
**JERRY A. BOVEE**

HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED  
EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES  
ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR

### **MANUAL GASEOUS POLLUTANTS SOURCE SAMPLING METHODS**

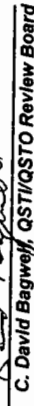
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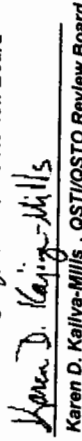
  
Peter R. Westlin, QSTI/QSTO Review Board

  
Peter S. Pakalnis, QSTI/QSTO Review Board

  
Leroy F. Owens, QSTI/QSTO Review Board

  
C. David Bagwey, QSTI/QSTO Review Board

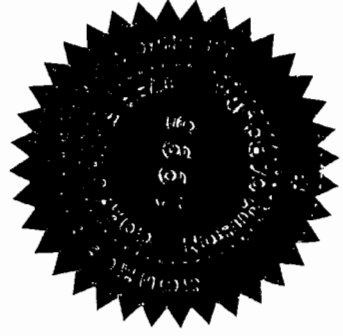
  
Karen D. Kallja-Mills, QSTI/QSTO Review Board

  
Glenn C. England, QSTI/QSTO Review Board

APPLICATION

NO.

2009-354



# SOURCE EVALUATION SOCIETY



## Qualified Source Testing Individual

LET IT BE KNOWN THAT

**JERRY A. BOVEE**

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EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES  
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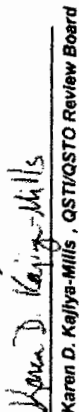
### **GASEOUS POLLUTANTS INSTRUMENTAL SAMPLING METHODS**

ISSUED THIS 8<sup>TH</sup> DAY OF JULY 2009 AND EFFECTIVE UNTIL JULY 7<sup>TH</sup> 2014

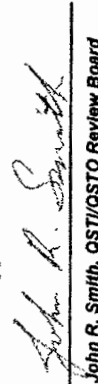
  
Peter R. Westlin, QSTI/QSTO Review Board

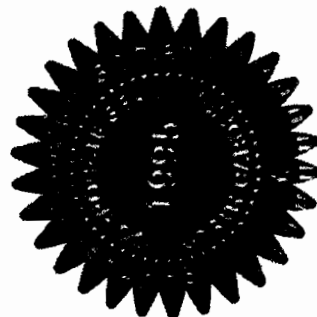
APPLICATION  
NO.  
2009-354

  
C. David Begwey, QSTI/QSTO Review Board

  
Karen D. Kallja-Mills, QSTI/QSTO Review Board

  
Peter S. Pakalnis, QSTI/QSTO Review Board

  
John R. Smith, QSTI/QSTO Review Board



# SOURCE EVALUATION SOCIETY



## Qualified Source Testing Individual

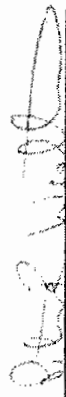
LET IT BE KNOWN THAT

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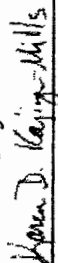
**MANUAL GAS VOLUME MEASUREMENTS AND ISOKINETIC PARTICULATE  
SAMPLING METHODS**

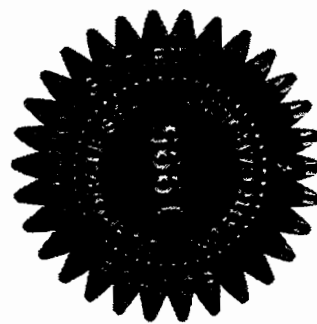
ISSUED THIS 8<sup>TH</sup> DAY OF JULY 2009 AND EFFECTIVE UNTIL JULY 7<sup>TH</sup>, 2014

  
Peter R. Westlin, QSTI/QSTO Review Board


  
C. David Bagwey, QSTI/QSTO Review Board

APPLICATION  
NO.  
2009-354

  
Karen D. Kajiye-Mills, QSTI/QSTO Review Board



  
Peter S. Pakalnis, QSTI/QSTO Review Board

  
John R. Smith, QSTI/QSTO Review Board

# SOURCE EVALUATION SOCIETY



## Qualified Source Testing Individual

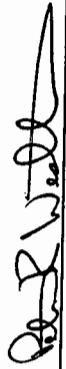
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### **HAZARDOUS METALS MEASUREMENT SAMPLING METHODS**

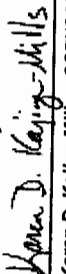
ISSUED THIS 19<sup>TH</sup> DAY OF OCTOBER 2010 AND EFFECTIVE UNTIL OCTOBER 18<sup>TH</sup> 2015


  
Peter R. Westlin, QSTI/QSTO Review Board

  
Peter S. Pakalnis, QSTI/QSTO Review Board

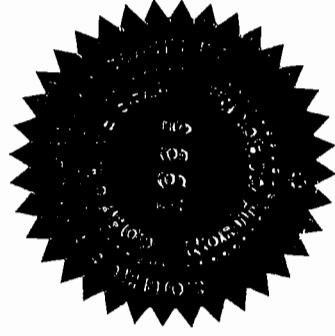
  
LeRoy Owens, QSTI/QSTO Review Board

  
C. David Bagweff, QSTI/QSTO Review Board

  
Karen D. Kallya-Mills, QSTI/QSTO Review Board

  
Glenn C. England, QSTI/QSTO Review Board

APPLICATION  
NO.  
2009-354



# SOURCE EVALUATION SOCIETY



## Qualified Source Testing Individual

LET IT BE KNOWN THAT

**JEFF S. GOLDFINE**

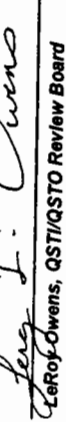
HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED  
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ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR

**MANUAL GAS VOLUME MEASUREMENTS AND ISOKINETIC PARTICULATE  
SAMPLING METHODS**

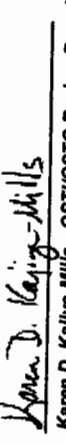
ISSUED THIS 16<sup>TH</sup> OF NOVEMBER 2010 AND EFFECTIVE UNTIL NOVEMBER 15<sup>TH</sup>, 2015

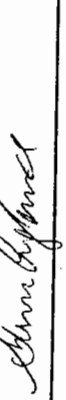
  
Peter R. Westlin, QSTI/QSTO Review Board

  
Peter S. Pakalnis, QSTI/QSTO Review Board

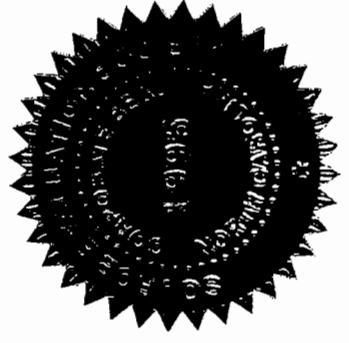
  
LeRoy Owens, QSTI/QSTO Review Board

  
C. David Bagwell, QSTI/QSTO Review Board

  
Karen D. Kallie-Mills, QSTI/QSTO Review Board

  
Glenn C. England, QSTI/QSTO Review Board

APPLICATION  
NO.  
2010-489



# SOURCE EVALUATION SOCIETY



## Qualified Source Testing Individual


LET IT BE KNOWN THAT


**JEFF S. GOLDFINE**

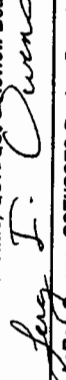
HAS SUCCESSFULLY PASSED A COMPREHENSIVE EXAMINATION AND SATISFIED  
EXPERIENCE REQUIREMENTS IN ACCORDANCE WITH THE GUIDELINES  
ISSUED BY THE SES QUALIFIED SOURCE TEST INDIVIDUAL REVIEW BOARD FOR


### **MANUAL GASEOUS POLLUTANTS SOURCE SAMPLING METHODS**

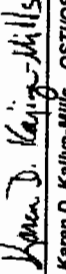
ISSUED THIS 16<sup>TH</sup> DAY OF NOVEMBER 2010 AND EFFECTIVE UNTIL NOVEMBER 15<sup>TH</sup>, 2015


  
Peter R. Westlin, QSTI/QSTO Review Board

  
Peter S. Pakalnis, QSTI/QSTO Review Board

  
Greg I. Owens, QSTI/QSTO Review Board

  
C. David Bagweff, QSTI/QSTO Review Board

  
Karen D. Kajiya-Mills, QSTI/QSTO Review Board

  
Glenn C. England, QSTI/QSTO Review Board

APPLICATION  
NO.  
2010-489

