

TEST REPORT

COMPLIANCE EMISSIONS TEST PROGRAM FCCU SCRUBBER STACK PROGRAM INTEREST NO. 55829 PERMIT NO. 060007 TEST NO. 060004

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PAULSBORO, NEW JERSEY**

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SECTION ONE

Introduction and Summary

ARI Environmental, Inc. (ARI) was retained by the Valero Refining Company - New Jersey (Valero) to conduct an emissions test program at their refinery located in Paulsboro, New Jersey.

Testing was conducted at the scrubber exhaust of Valero's fluidized catalytic cracking unit (FCCU) pursuant to the requirements of their USEPA Title V Operating Permit No. 060007. Testing was conducted on August 28 through 30, 2007.

The purpose of the testing was to determine the concentration and mass emission rates of the following pollutants:

Particulate Matter (PM) – filterable and condensable
PM less than 10 microns (PM₁₀)
Sulfur Dioxide (SO₂)
Sulfuric Acid (H₂SO₄)
Nitrogen Oxides (NO_x)
Carbon Monoxide (CO)
Total Non-Methane Organic Compounds (TNMOC)
Hydrogen Cyanide (HCN)
Copper (Cu)
Nickel (Ni)
Vanadium (V)
Benzene (C₆H₆)

Each of the above pollutants was tested during a series of triplicate sample runs ranging from 60 to 240 minutes in duration.

The testing was conducted in accordance with the following procedures and regulations:

- Code of Federal Regulations, Title 40 (40CFR), Part 60, 2006, Appendix A, USEPA Methods 1-5B, 6C, 7E, 8 (Modified), 10, 18, 25A and 29
- 40CFR, Part 51, Appendix M, USEPA Methods 202 and 205
- New Jersey Air Test Method 1 (NJATM 1)
- USEPA Conditional Test Method 033 (CTM-033)
- Texas Commission on Environmental Quality (TCEQ), Laboratory Methods Manual, Method 24
- SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Method 0031
- Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III - Stationary Source Specific Methods

The test program was coordinated by Mr. Kevin Harren of Valero. The ARI test team was led by Mr. Dan Fitzgerald and consisted of Messrs. Rob Burton, Jeff Goldfine, Craig James, Walter Page, Bill Pearce and Dr. Steve Yuchs. Testing activities were witnessed by Messrs. Robert Kettig and John Kitson of the New Jersey Department of Environmental Protection (NJDEP).

The test results are summarized in Table 1-1.



SECTION ONE

Introduction and Summary

TABLE 1-1. SUMMARY OF TEST RESULTS

Test Run	1	2	3	Average	Allowable
<u>Sulfur Dioxide (SO₂)</u>					
Concentration					
ppmv db @ 0%O ₂	17	19	9	15	25
Emission rate					
lb/hr	16.4	17.3	8.6	14.1	39.3
<u>Nitrogen Oxides as NO₂ (NO_x)</u>					
Concentration					
ppmv db @ 0%O ₂	18	15	15	16	45
Emission rate					
lb/hr	12.8	10.1	10.5	11.1	50.9
<u>Carbon Monoxide (CO)</u>					
Concentration					
ppmv db @ 0%O ₂	4	10	12	9	50
Emission rate					
lb/hr	1.5	4.1	4.9	3.5	34.4
<u>Total Suspended Particulate (TSP) Matter-Method 5B</u>					
Emission rate					
gr/dscf	0.03	0.03	0.03	0.03	0.02
lb/hr	29.6	26.5	26.9	27.7	27.5
lb/1000 lb coke burn	0.8	0.7	0.7	0.7	1.0
<u>Particulate Matter Less Than 10 Microns (PM₁₀) – NJATM1/USEPA Method 202</u>					
Emission rate					
lb/hr	32.9	36.2	33.6	34.2	27.5
<u>Sulfuric Acid (H₂SO₄)</u>					
Emission rate					
lb/hr	1.47	3.91	5.30	3.56	11.77
<u>Copper (Cu)</u>					
Emission rate					
lb/hr	0.0007	0.0003	0.0002	0.0004	0.03
<u>Nickel (Ni)</u>					
Emission rate					
lb/hr	0.0005	0.0006	0.0005	0.0005	0.0124
<u>Vanadium (V)</u>					
Emission rate					
lb/hr	< 0.0006	< 0.0005	< 0.0005	< 0.0005	0.046
<u>Hydrogen Cyanide (HCN)</u>					
Emission rate					
lb/hr	5.1	5.0	15.6	8.6	6.0
<u>Total Non-methane Organic Compounds (TNMOC)</u>					
Concentration					
ppmv db @ 0%O ₂	14	5	17	12	25
Emission rate					
lb/hr	2.5	0.8	3.0	2.1	9.8
<u>Benzene (C₆H₆)</u>					
Emission rate					
lb/hr	0.003	0.002	0.002	0.002	0.64



SECTION TWO

Process Description

2.1 PROCESS DESCRIPTION

The Fluid Catalytic Cracking Unit (FCCU) process converts refinery intermediate products into high octane gasoline by a catalytic cracking reaction. The FCC process utilizes a catalyst in the form of very fine particles that behave like a fluid when aerated with a vapor. The major components of the FCC process are the reactor and the regenerator. The cracking process in the reactor produces coke that remains on the catalyst and lowers its activity. Catalyst is continuously moved between the reactor and regenerator. The "spent" catalyst leaves the reactor and is regenerated in the regenerator by burning off the coke in the presence of air. The regenerator gas contains a mixture of carbon monoxide and carbon dioxide.

A schematic of the scrubber and test platform location is presented in Figure 2-1. The test platform is located approximately 200 feet above grade. All test runs were conducted using the four (4) 4-inch sample ports that are located at 0°, 90°, 180° and 270° upon the cross-sectional area of the 117-in. diameter stack.

Table 2-1 presents the operational data recorded during the daily testing windows.

TABLE 2-1. FCCU OPERATIONAL DATA

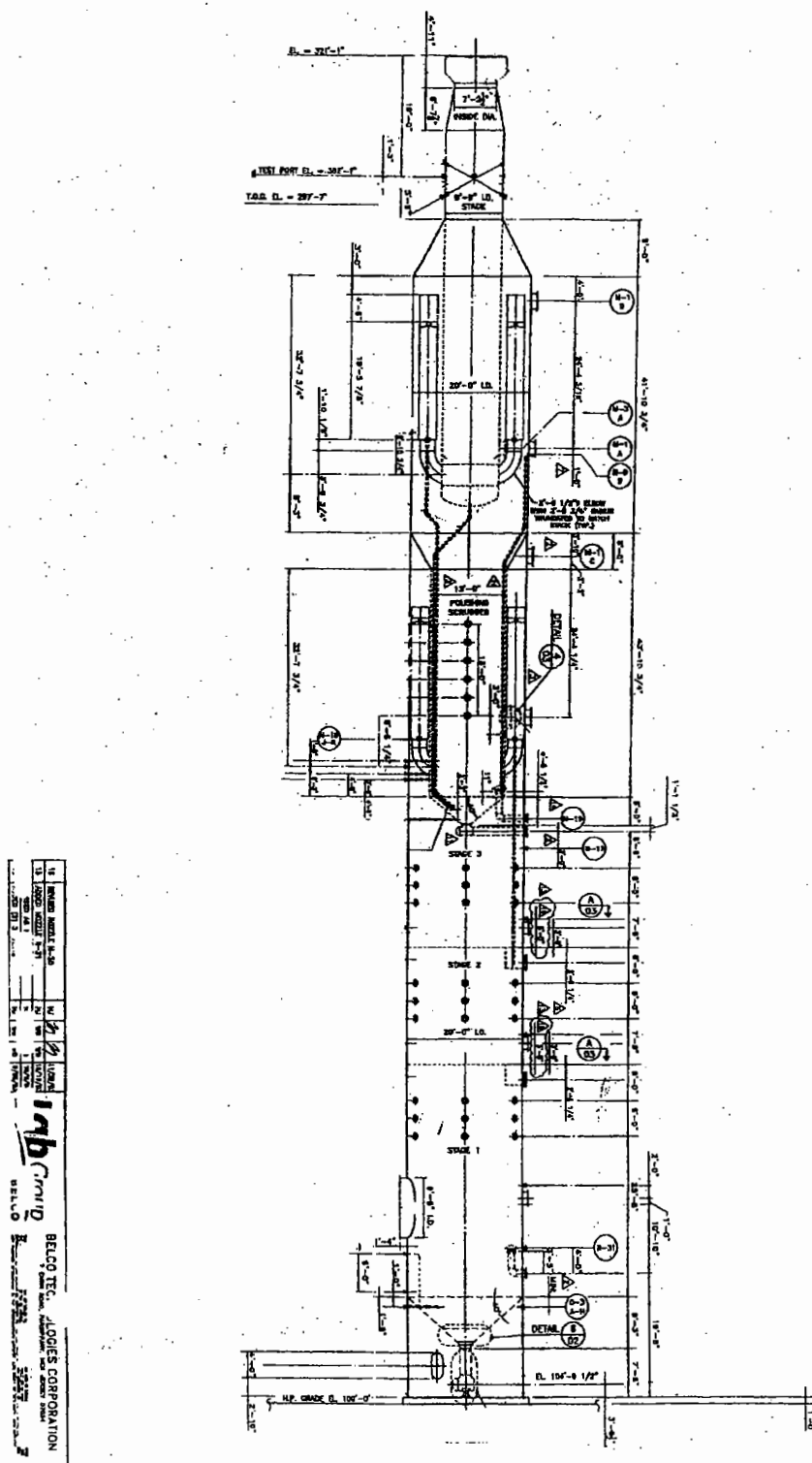
Date	Test Time Window	FCC Fresh Feed BBL/Day	Coke Burn Rate lb/hr
8/28/07	10:00 – 20:00	54,570	39,001
8/29/07	09:00 – 22:00	54,550	37,842
8/30/07	08:00 – 19:00	54,660	38,077



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Process Description

FIGURE 2-1. SCRUBBER AND TEST PLATFORM LOCATION





SECTION THREE

Testing and Analytical Procedures

3.1 OVERVIEW

ARI conducted an emission compliance test program on the FCCU Scrubber Stack at the Valero Refinery located in Paulsboro, New Jersey.

3.2 METHODOLOGY

Test methods followed the Code of Federal Regulations, 40CFR, Part 60, 2006, Appendix A, USEPA Methods 1-5B, 6C, 7E, 8 (Modified), 10, 18, 25A and 29; 40CFR, Part 51, Appendix M, USEPA Methods 202 and 205; NJATM 1; USEPA CTM-033; TCEQ, Laboratory Methods Manual, Method 24; SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Method 0031; and the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III - Stationary Source Specific Methods.

The testing procedures are outlined in the following table:

TABLE 3-1. FCCU SCRUBBER STACK TEST MATRIX

No. of Runs	Run Time (min)	Sample/Type Pollutant	Sampling Method	Resultant Units
6 3	60 240	Volumetric Flow	1, 2	acfm, scfm, dscfm
6 3	60 240	O ₂ and CO ₂	3A	% vol, db
6 3	60 240	Moisture	4	% vol
3	60	PM	5B	gr/dscf, lb/hr, lb/1000 lb coke burn
3	60	PM ₁₀	NJATM 1/ USEPA 202	gr/dscf, lb/hr, lb/1000 lb coke burn
3	60	SO ₂ , NO _x and CO	USEPA 6C, 7E and 10	ppmv db, ppmv db @ 0% O ₂ , lb/dscf, lb/hr,
3	60	H ₂ SO ₄	Modified USEPA 8	ppmv db, lb/dscf, lb/hr
3	120 (9 40-min)	Benzene (C ₆ H ₆)	SW-846 0031	ppmv db, lb/dscf, lb/hr
3	60	HCN	CTM-033	ppmv db, lb/dscf, lb/hr
3	60	TNMOC	USEPA 18 and 25A	ppmv db, lb/dscf, lb/hr
3	240	Cu, Ni, V	USEPA 29	mg/m ³ , lb/dscf, lb/hr



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3.2.1 Sampling and Velocity Traverses for Stationary Sources (USEPA Method 1)

The velocity sample points for the exhaust stack were determined following the procedural requirements as detailed in USEPA Method 1. The stack geometry and test ports for the sampling location are as follows:

Sampling Location	Duct Diameter ID (inches)	Flow Disturbance Upstream Distance (diameters)	Flow Disturbance Downstream Distance (diameters)	No. of Ports	Sampling Points per Port	Total Points
FCCU Wet Gas Scrubber Stack	117	4.8	0.9	4	6	24

A cyclonic flow check was performed prior to testing at the sampling location. Conducted on August 28, 2007, the cyclonic flow check indicated that the average angle was $\leq 5.2^\circ$. See Appendix B.

3.2.2 Determination of Stack Gas Velocity and Volumetric Flow Rate (USEPA Method 2)

Velocity traverses were performed using type "S" pitot tubes. The velocity head was measured using a 0.00-in. to 10.0-in. Dwyer inclined oil manometer read to the nearest 0.01 in. H₂O. Temperature measurements were conducted using a Chromel-Alumel thermocouple connected to a digital direct read-out potentiometer. This apparatus was integrated into all isokinetic sampling as shown in Figure 3-1.

3.2.3 Gas Analysis for Carbon Dioxide, Oxygen, Excess Air and Dry Molecular Weight (USEPA Method 3A)

The stack gas molecular weight at each sampling location was determined following USEPA Method 3A. CO₂ and O₂ sampling was conducted continuously in accordance with USEPA Method 3A procedures using reference method monitoring systems. Please refer to section 3.2.8 for a detailed description of ARI's reference method monitoring system specifications.

3.2.4 Determination of Moisture Content in Stack Gases (USEPA Method 4)

Stack gas moisture content was determined by a separate impinger train (see Figure 3-2) or in conjunction with each isokinetic sampling system. As a separate sampling train, the moisture was collected in a series of ice-cooled impingers. The moisture collected was measured volumetrically and gravimetrically. The stack gas moisture was calculated using the amount of moisture collected in the impingers and the volume of gas sampled to determine the % volume moisture content of the stack gas.

In some instances, the moisture content that was calculated using the increase in liquid volume of the impingers and weight gain of the silica gel exceeded the levels of saturation based upon the vapor pressure of water at the measured pressure and temperature. In those cases, the moisture content was calculated based upon psychometric calculations using the measured temperature and pressure.

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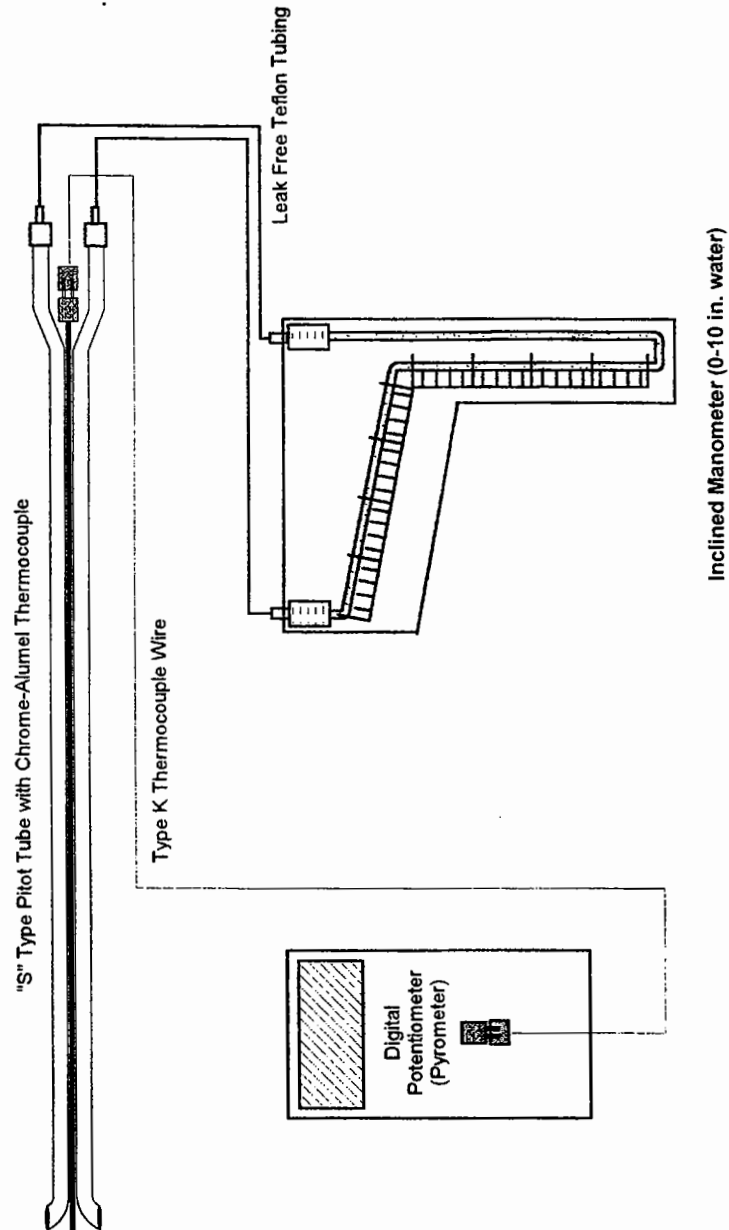


FIGURE 3-1. USEPA METHOD 2 VELOCITY DETERMINATION SAMPLE SYSTEM

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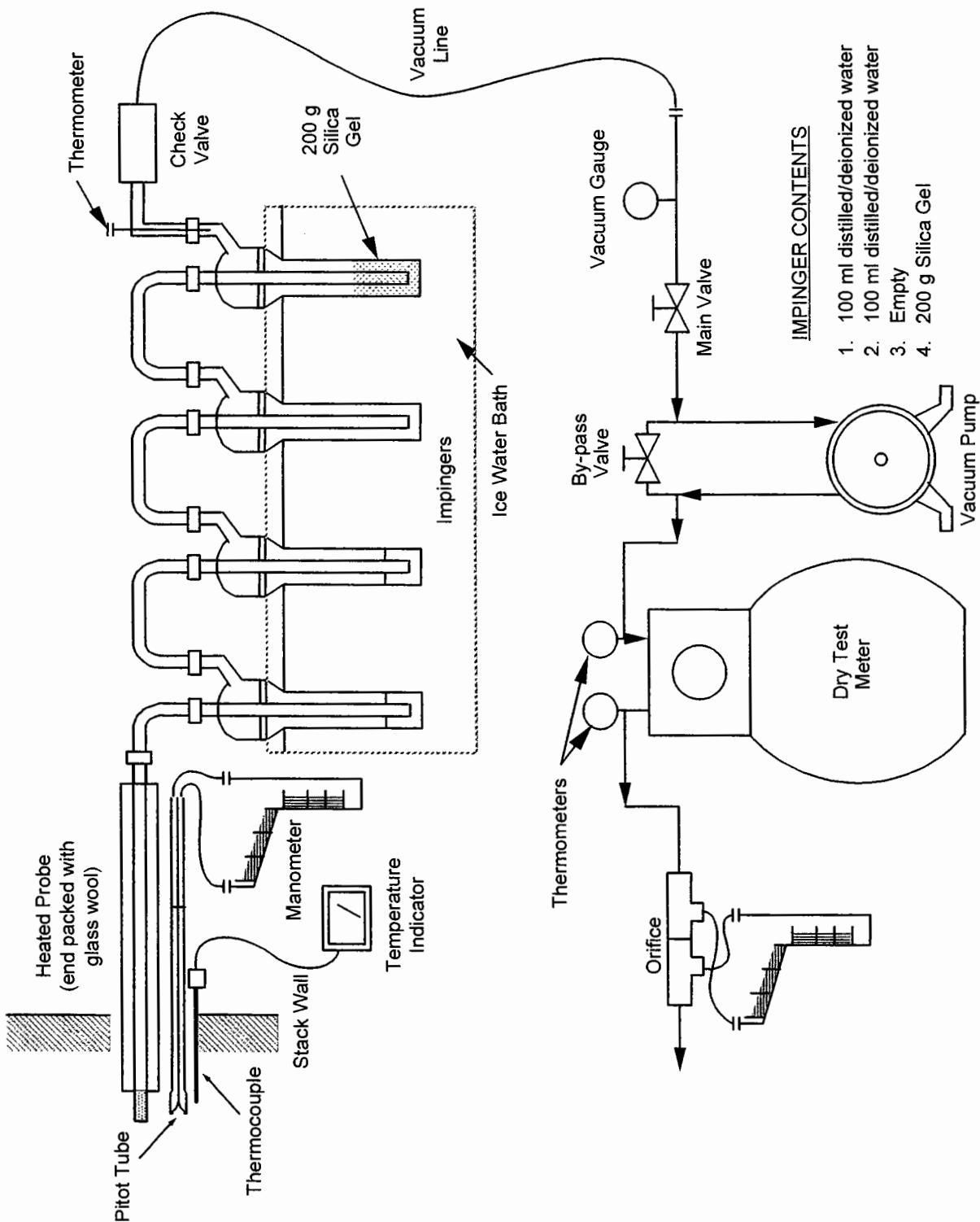


FIGURE 3-2. USEPA METHOD 4 SAMPLING TRAIN (MOISTURE)



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3.2.5 *Particulate Matter Determination (USEPA Method 5B)*

Sampling was conducted in accordance with USEPA Method 5B using an Apex Instruments, Inc. particulate sampling train. Three (3) 60-minute sample runs were conducted.

3.2.5.1 Sampling Apparatus

Nozzle – Borosilicate glass with sharp, tapered leading edge.

Probe - Borosilicate glass with a heating system capable of maintaining a probe exit temperature of 320°F.

Pitot Tube - Type-S, attached to probe for monitoring stack gas velocity.

Filter Holder - Borosilicate glass with a 4-in. teflon frit filter support and a silicone rubber gasket. The holder design provides a positive seal against leakage from the outside or around the filter. The filter holder was heated to 320°F ± 25°F during sampling.

Draft Gauge - Inclined manometer with a readability of 0.01 in. H₂O in the 0- to 10-in. range.

Impingers – Four (4) impingers connected in series with glass ball joints. The second impinger is of the Greenburg-Smith design with a standard tip. The first, third and fourth are of the Greenburg-Smith design, but modified by replacing the standard tip with a ½-in.-i.d. glass tube extending to within ½ in. of the bottom of the impinger flask.

Metering System - Apex Model 522. Vacuum gauge, leak-free pump, thermometers capable of measuring temperature to within 5°F, dry gas meter with ±2 percent accuracy, and related equipment as required to maintain an isokinetic sampling rate and to determine sample volume.

Barometer - Mercury barometer capable of measuring atmospheric pressure to within ±0.1 in. Hg.

3.2.5.2 Sampling Procedures

After the minimum number of traverse points were selected, the stack pressure, temperature, moisture, and range of velocity head were measured according to procedures described in USEPA Methods 1 through 4. The first and second impingers initially contained 100 mL of deionized/distilled water. The third was initially empty. The fourth contained 200 g of silica gel. The train was set up with the probe and filter holder as shown in Figure 3-3.

The sampling train was leak-checked at the sampling site by plugging the inlet to the nozzle and pulling a vacuum of 15 in. Hg. Leak rates of less than 0.02 ft³/min at a vacuum of 15 in. Hg were recorded in all cases. At the completion of each test, the sampling train was again leak-checked by the same procedure, but at the highest vacuum attained during the test run. Both pre- and post-test leak checks of the pitot tube were made for each test run. Ice was placed around the impingers to keep the temperature of the gases leaving the last impinger at less than 68°F.

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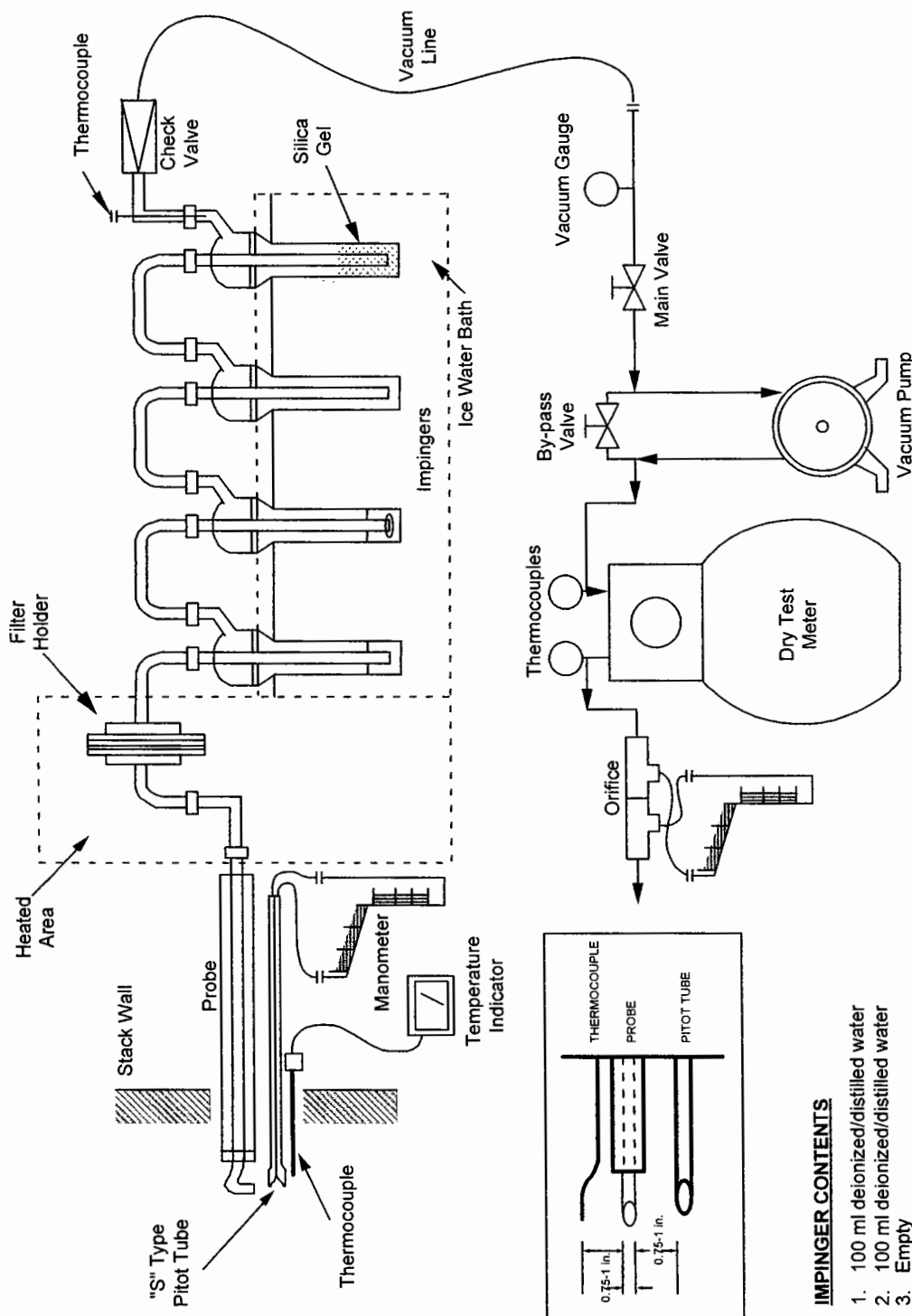


FIGURE 3-3. USEPA METHOD 5B PARTICULATE MATTER SAMPLING TRAIN



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During sampling, stack gas and sampling train data were recorded at specified intervals. Isokinetic sampling rates were set throughout the sampling period with the aid of a programmable calculator.

3.2.5.3 Sample Recovery Procedures

After sampling was completed, the sampling train was then moved carefully from the test site to the recovery area.

The sample fractions were recovered as follows:

Container 1 - The filter holder was sealed.

Container 2 - Loose particulate and acetone washings from all sample-exposed surfaces prior to the filter were placed in a glass bottle, sealed, and labeled. Particulate was removed from the probe with the aid of a brush and acetone rinsing. The liquid level was marked after the container was sealed.

Container 3 - A minimum of 200 mL of acetone was taken for the blank analysis. The blank was obtained and treated in a similar manner as the contents of Container 2.

3.2.5.4 Analytical Procedures

Although the laboratory was notified and USEPA Method 5B procedures were requested, the laboratory originally performed USEPA Method 5 analytical procedures on the samples. Upon receipt of the initial data, it was evident that the samples were not analyzed correctly and ARI requested that the sample be heated in an oven at $320^{\circ}\text{F} \pm 10^{\circ}\text{F}$ for six hours pursuant to USEPA Method 5B protocol. Analytical data contained in Appendix C presents filter weights before and after heating, however, only one weight is recorded for the probe rinse. The laboratory indicated that the sample was not retained after the initial weighing. Therefore, a second weighing after heating could not be performed.

The analytical procedures followed were those described in USEPA Methods 5 and 5B.

Container 1 - The filter and any loose particulate matter from this sample container were placed in a tared glass weighing dish, placed in a desiccator for 24 hours and weighed to a constant weight to the nearest 0.1 mg. A second weighing was conducted after the filter was heated in an oven at $320^{\circ}\text{F} \pm 10^{\circ}\text{F}$ for six hours.

Container 2 - The acetone washings were transferred to a tared beaker and evaporated to dryness at ambient temperature and pressure. The contents were placed in a desiccator for 24 hours and weighed to a constant weight to the nearest 0.1 mg. A second weighing was not conducted after heating since the sample was not retained by the laboratory after the ambient procedures.

Container 3 - The acetone blank was transferred to a tared beaker and evaporated to dryness at ambient temperature and pressure. Then the contents were placed in a desiccator for 24 hours and weighed to a constant weight to the nearest 0.1mg.



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The term "constant weight" means a difference of no more than 0.5 mg or 1 percent of total weight less tare weight, whichever is greater between two consecutive readings, with no less than 6 hours of desiccation between weighings. The analytical was conducted by Test America, Inc. located in Knoxville, Tennessee. Emissions rates were calculated from the sum of the USEPA Method 5B filter weights and the USEPA Method 5 probe rinse weights.

3.2.6 *Particulate Matter Determination Including PM₁₀ (NJATM 1 and USEPA Method 202)*

Sampling was conducted in accordance with New Jersey Air Test Method 1 (NJATM 1) and USEPA Method 202 using an Apex Instruments, Inc. particulate sampling train. The back half impinger catch was analyzed for particulate in accordance with USEPA Method 202 procedures for condensible particulate determination.

It should be noted that the PM₁₀ emissions in this report are conservatively calculated as the results of the sum of the N3A7M 1 filterable PM (front-half) and the USEPA Method 202 condensible (back-half) PM. This approach was used since conventional size selective separator devices as described in USEPA Method 201 and 201A are not acceptable in high moisture and near saturation sources.

3.2.6.1 **Sampling Apparatus**

Nozzle – Borosilicate glass with sharp, tapered leading edge.

Probe - Borosilicate glass with a heating system capable of maintaining a probe exit temperature of <225°F.

Pitot Tube - Type-S, attached to probe for monitoring stack gas velocity.

Filter Holder - Borosilicate glass with a glass frit filter support and a silicone rubber gasket. The holder design provides a positive seal against leakage from the outside or around the filter. The filter holder was heated to <225°F during sampling.

Draft Gauge - Inclined manometer with a readability of 0.01 in. H₂O in the 0- to 10-in. range.

Impingers – Four (4) impingers connected in series with glass ball joints. The first and second impingers are of the Greenburg-Smith design with a standard tip. The third and fourth are of the Greenburg-Smith design, but modified by replacing the standard tip with a ½-in.-i.d. glass tube extending to within ½ in. of the bottom of the impinger flask.

Metering System - Apex Model 522. Vacuum gauge, leak-free pump, thermometers capable of measuring temperature to within 5°F, dry gas meter with ±2 percent accuracy, and related equipment as required to maintain an isokinetic sampling rate and to determine sample volume.

Barometer - Mercury barometer capable of measuring atmospheric pressure to within ±0.1 in. Hg.



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3.2.6.2 Sampling Procedures

After the minimum number of traverse points were selected, the stack pressure, temperature, moisture, and range of velocity head were measured according to procedures described in USEPA Methods 1 through 4. The first, second and third impingers initially contained 100 mL of deionized/distilled water. The fourth contained 200 g of silica gel. The train was set up with the probe and filter holder as shown in Figure 3-4.

The sampling train was leak-checked at the sampling site by plugging the inlet to the nozzle and pulling a vacuum of 15 in. Hg. Leak rates of less than 0.02 ft³/min at a vacuum of 15 in. Hg were recorded in all cases. At the completion of each test, the sampling train was again leak-checked by the same procedure, but at the highest vacuum attained during the test run. Both pre- and post-test leak checks of the pitot tube were made for each test run. Ice was placed around the impingers to keep the temperature of the gases leaving the last impinger at less than 68°F.

During sampling, stack gas and sampling train data were recorded at specified intervals. Isokinetic sampling rates were set throughout the sampling period with the aid of a programmable calculator.

3.2.6.3 Sample Recovery Procedures

After sampling was completed and the final leak checks were performed, the filter and probe (front half) were disconnected from the impinger train. The sampling train was then moved carefully from the test site to the recovery area. A nitrogen line was attached to the inlet of impinger 1 and the last impinger was connected to a dry gas meter. The impinger train was purged with nitrogen at approximately 0.75 scfm for 60 minutes. During the purge, the impingers were kept on ice to prevent any loss of collected water vapor. After the purge period was completed, the sample fractions were recovered as follows:

Container 1 - The filter holder was sealed.

Container 2 - Loose particulate and acetone washings from all sample-exposed surfaces prior to the filter were placed in a glass bottle, sealed, and labeled. Particulate was removed from the probe with the aid of a brush and acetone rinsing. The liquid level was marked after the container was sealed.

Container 3 - A minimum of 200 mL of acetone was taken for the blank analysis. The blank was obtained and treated in a similar manner as the contents of Container 2.

Container 4 - The contents of impingers 1 through 3 were measured volumetrically and placed in a glass bottle, sealed and labeled. The contents of impinger 4 were weighed and then discarded.

Container 5 - The impingers were quantitatively rinsed with methylene chloride and placed in a glass bottle, sealed and labeled.

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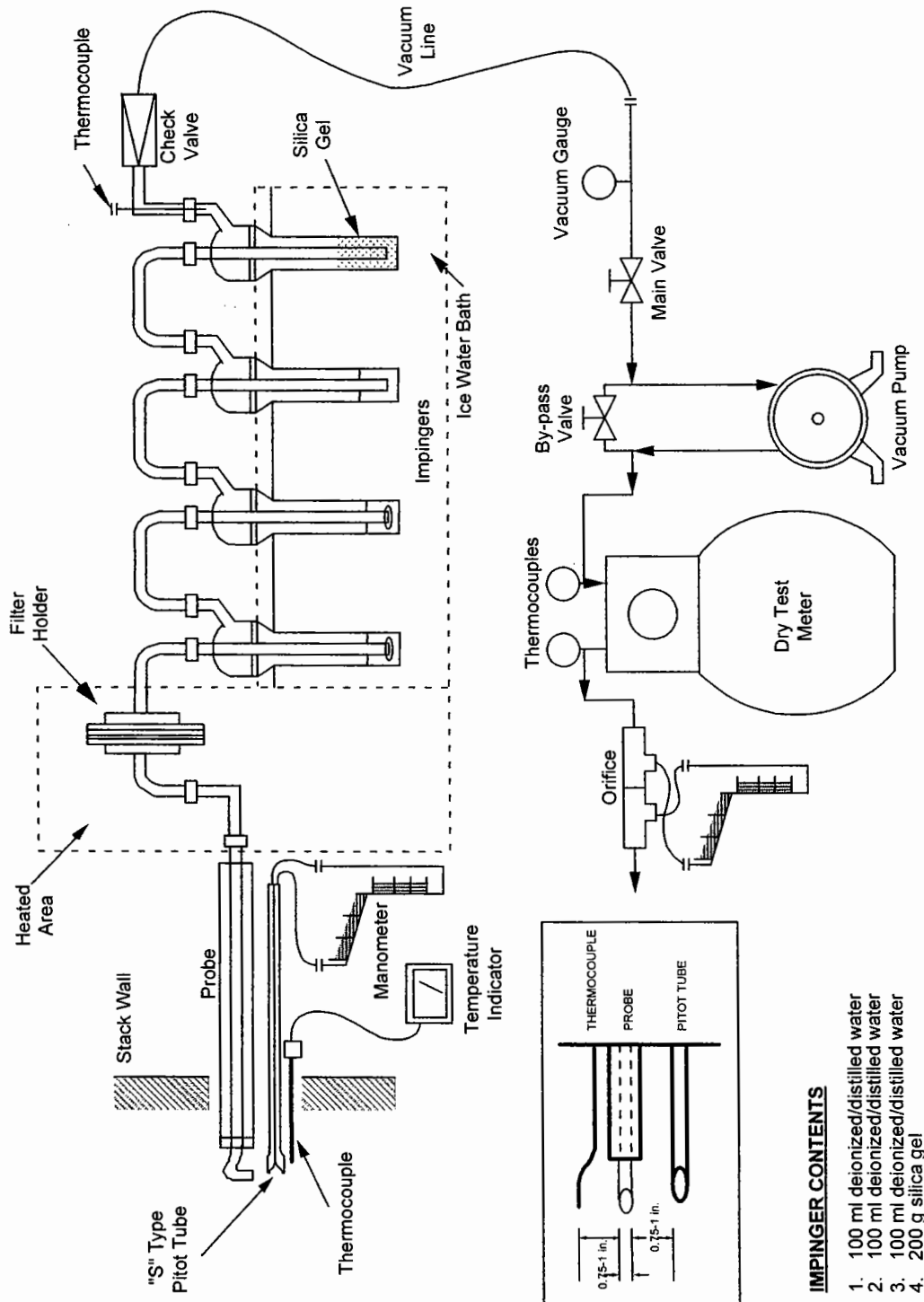


FIGURE 3-4. NJATM 1/USEPA 202 PARTICULATE MATTER SAMPLING TRAIN



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3.2.6.4 Analytical Procedures

The analytical procedures followed those described in NJATM 1 and USEPA Method 202. The analytical was conducted by Clean Air Engineering, Inc. located in Palatine, Illinois.

Container 1 - The filter and any loose particulate matter from this sample container were placed in a tared glass weighing dish, heated in an oven at less than 225°F for six hours, placed in a desiccator for 24 hours and weighed to a constant weight to the nearest 0.1 mg.

Container 2 - The acetone washings were transferred to a tared beaker and evaporated to dryness at ambient temperature and pressure. The beaker was placed in a desiccator for 24 hours and weighed to a constant weight to the nearest 0.1 mg.

Container 3 - The acetone blank was transferred to a tared beaker and evaporated to dryness at ambient temperature and pressure. Then the contents were placed in a desiccator for 24 hours and weighed to a constant weight to the nearest 0.1mg.

Containers 4 and 5 - The impinger water was quantitatively extracted with methylene chloride. The methylene chloride extract was combined with container 5 contents.

The impinger water was placed in a tared beaker. The beaker was placed in an oven set at 105°C, evaporated to dryness, desiccated and re-weighed. The gain in mass represents the inorganic PM collected in the sampling train back half.

The methylene chloride solution was placed in a tared beaker. The beaker was placed in a fume hood and allowed to evaporate. The beaker was then desiccated and re-weighed. The gain in mass represents the organic PM collected in the sampling train back half.

The term "constant weight" means a difference of no more than 0.5 mg or 1 percent of total weight less tare weight, whichever is greater between two consecutive readings, with no less than 6 hours of desiccation between weighings.

3.2.7 Sulfuric Acid Determination (Modified USEPA Method 8)

The sampling procedures during this test program followed those described in USEPA Method 8 - Determination of Sulfuric Acid Mist and Sulfur Dioxide Emissions from Stationary Sources, but modified to include analysis of the additional anions and cations. Analytical and calculation procedures were based on those described in Method 24 of the TCEQ Laboratory Methods Manual. Three (3) 60-minute sample runs were conducted. The modifications to this method were approved by a letter from Mr. Gary McAllister of the USEPA. See Appendix G.



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The use of Method 8 for complicated flue gas streams such as from an FCCU is not appropriate and can lead to a significant overestimate of actual emission rates. This is because Method 8 assumes that all sulfate identified is present as free acid. It does not account for the fact that sulfates can also be present in the form of water soluble salts. This is supported by the EPA Technology Transfer Network Frequently Asked Question document on Method 8 that states the method was developed specifically for sulfuric acid plants with clean and dry emission streams with few or no interferences and should not be used for sources that have significant emissions of solid sulfates that are water soluble or that have significant emissions of sulfur dioxide and ammonia. The FCCU flue gas stream contains sulfate salts and can also contain significant levels of sulfur dioxide.

This modified Method 8 procedure provides a more accurate determination of H_2SO_4 in FCCU flue gas because it accounts for the presence of sulfate salts such as ammonium sulfate $(\text{NH}_4)_2\text{SO}_4$, sodium sulfate Na_2SO_4 , potassium sulfate K_2SO_4 , calcium sulfate CaSO_4 and aluminum sulfate $\text{Al}_2(\text{SO}_4)_3$.

3.2.7.1 Sampling Apparatus

The sampling train used at the exit stack during this test met design specifications established by the USEPA. Assembled by ARI personnel, it consisted of the following:

Nozzle – Borosilicate glass with sharp, tapered, leading edge and accurately measured round opening.

Probe - Borosilicate glass with a heating system capable of preventing visible condensation at the exit end during sampling.

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

Filter Holder - 4-in. borosilicate glass with a Teflon frit.

Filter - Fisher Brand G6, glass-fiber, 4-in.-diameter.

Draft Gauge - A dual-inclined manometer made by Dwyer with a readability of 0.01 in. H_2O in the 0- to 1-in. range and 0.1 in. H_2O in the 1- to 10-in. range. Velocity determination was conducted with a 0- to 0.25 in. H_2O range manometer with a readability of 0.005 in. H_2O .

Impingers - Four impingers connected in series with glass ball joints. The first and third impingers are of the Greenburg-Smith design. The second and fourth are Greenburg-Smith impingers 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.

Metering System - Vacuum gauge, leak-free pump, thermometers capable of measuring temperature to within 5°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 ± 0.1 in. Hg.



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3.2.7.2 Sampling Procedures

Approximately 200 grams of silica gel was weighed and placed in a sealed impinger prior to each test. 100 mL of 80% isopropanol was placed in the first impinger; 100 mL of 3% hydrogen peroxide was placed in the second and third impingers; and the fourth impinger contained 200 grams of silica gel. The train was set up with the probe as shown in Figure 3-5. 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, 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. H₂O manometer reading. Crushed ice was placed around the impingers to keep the temperature of the gases leaving the last impinger at 68°F or less.

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 set throughout the sampling period with the aid of a calculator.

3.2.7.3 Sample Recovery Procedures

After sampling was completed and final leak-checks were performed, the ice bath was drained, probe disconnected and the impingers were purged with ambient air at the average sample rate for 15 minutes. The sampling train was moved carefully from the test site to the cleanup area. The sample fraction was recovered as follows:

Container No. 1 - The contents of the first impinger were weighed and then transferred to a 250 mL graduated cylinder. The probe, first impinger and connecting glassware before the filter were rinsed and added to the graduated cylinder. The solution was diluted to 250 mL with 80% isopropanol and the filter was added and then mixed. The solution was stored in a 500 mL polyethylene container.

The contents of impingers 2 and 3 were weighed but not recovered. They were used to absorb SO₂ to prevent corrosion of the dry gas meter and sampling pump assemblies. SO₂ emissions were determined following the procedures described in Subsection 3.2.8.

3.2.7.4 Analytical Procedures

With the exception of aluminum, all analytical was performed by ARI's laboratory located in Wauconda, Illinois. The aluminum analysis was conducted by DAT Laboratories, Inc. located in Plain City, Ohio.

The analytical and calculation procedures are given below:

The contents of Container No. 1 was analyzed for ammonium (NH₄⁺), potassium (K⁺), sodium (Na⁺), and calcium (Ca⁺⁺) cations, and chloride (Cl⁻), fluoride (F⁻), sulfite (SO₃⁼) and sulfate (SO₄⁼) anions by ion chromatography (IC). The aluminum (Al⁺⁺⁺) cation was analyzed by inductively coupled argon plasma spectroscopy (ICAP) after filtration.

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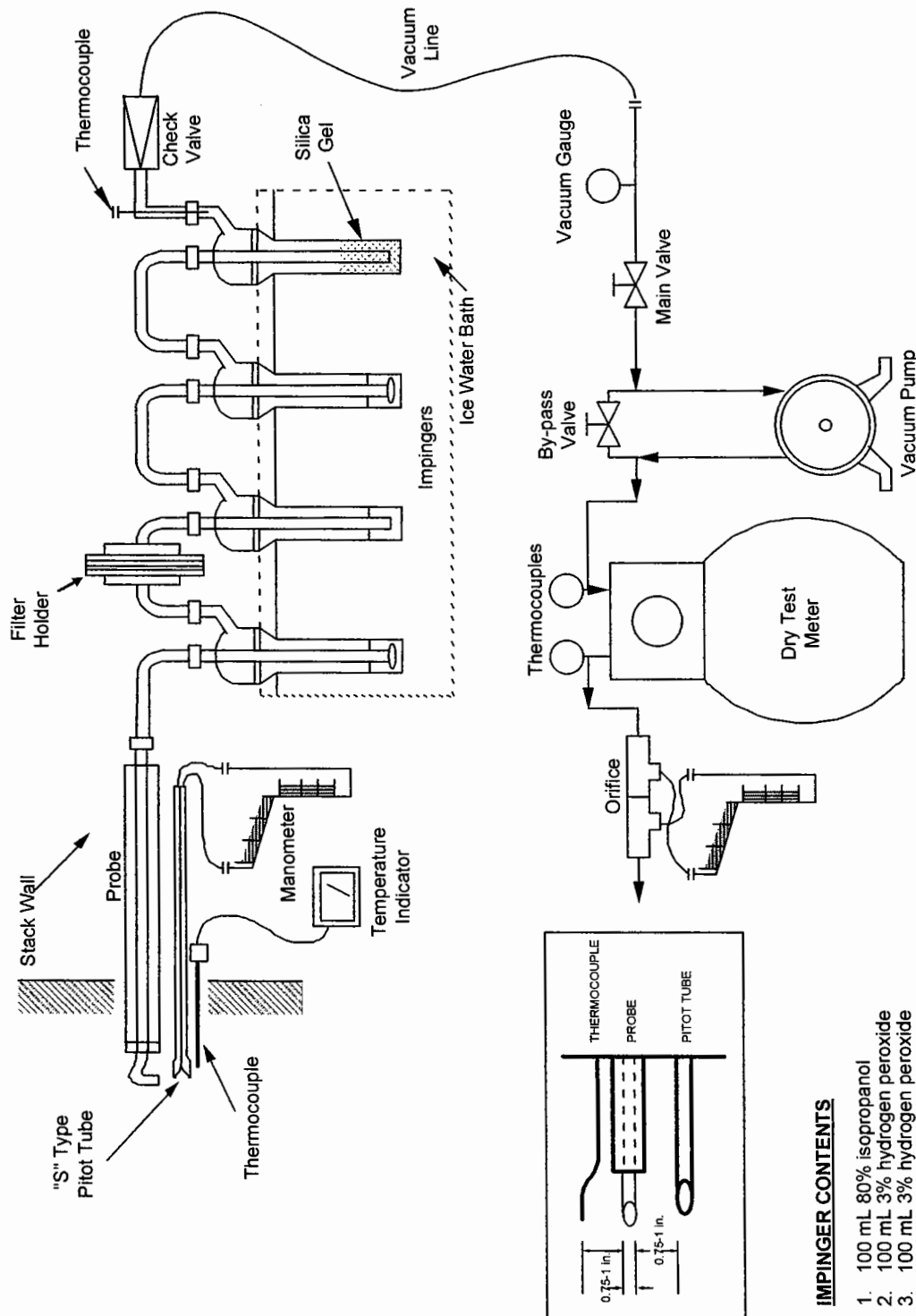


FIGURE 3-5. MODIFIED USEPA METHOD 8 SULFURIC ACID SAMPLING TRAIN

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The total moles of each ion is calculated and multiplied by its absolute charge. The cations and anions are summed separately and then the cations are subtracted from the anions. A positive value means that there is sulfate left; whereas, a negative value would indicate that no sulfate is left in the sample. A positive value is divided by the absolute charge of sulfate (2) to return to the total moles of sulfate. The remaining moles of sulfate are multiplied by the molecular weight of sulfuric acid to calculate the total weight of H₂SO₄ in the sample.

3.2.7.5 Calculations

MOLES OF SPECIFIC IONS IN CONTAINER 1 GIVEN BY:

$$M_{\text{analyte}} = \frac{(C_{\text{analyte}})(D_{\text{factor}})(V_{\text{IPA sol}})}{(MW_{\text{analyte}})}$$

where: M_{analyte} = μmoles of stack ion in Container 1, μmoles

C_{analyte} = ion concentration in Container 1, $\mu\text{g/mL}$

D_{factor} = Dilution factor used in analytical preparation

$V_{\text{IPA sol}}$ = volume of Container 1, mL

MW_{analyte} = molecular weight of the ion

analyte = cations of NH_4^{+1} , Na^{+1} , K^{+1} , Ca^{+2} and Al^{+3} ; anions of Cl^{-1} , F^{-1} , SO_3^{-2} and SO_4^{-2}

TOTAL MOLES OF ANIONS

$$M_{\text{Total Anions}} = M_{\text{Cl}} + M_{\text{F}} + 2M_{\text{SO}_3} + 2M_{\text{SO}_4}$$

where: $M_{\text{Total Anions}}$ = μmoles of total anions in Container 1, μmoles

M_{Cl} = μmoles of chloride anion in Container 1, μmoles

M_{F} = μmoles of fluoride anion in Container 1, μmoles

M_{SO_3} = μmoles of sulfite anion in Container 1, μmoles

M_{SO_4} = μmoles of sulfate anion in Container 1, μmoles

2 = absolute ionic charge of sulfite and sulfate

TOTAL MOLES OF CATIONS

$$M_{\text{Total Cations}} = M_{\text{NH}_4} + M_{\text{Na}} + M_{\text{K}} + 2M_{\text{Ca}} + 3M_{\text{Al}}$$

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where: $M_{\text{Total Cations}}$ = μmoles of total cations in Container 1, μmoles
 M_{NH_4} = μmoles of ammonium cation in Container 1, μmoles
 M_{Na} = μmoles of sodium cation in Container 1, μmoles
 M_{K} = μmoles of potassium cation in Container 1, μmoles
 M_{Ca} = μmoles of calcium cation in Container 1, μmoles
 M_{Al} = μmoles of aluminum cation in Container 1, μmoles
2 = absolute ionic charge of calcium
3 = absolute ionic charge of aluminum

REMAINING MOLES OF IONS

$$M_{\text{Remaining Anions}} = \frac{M_{\text{Total Anions}} - M_{\text{Total Cations}}}{2}$$

where: $M_{\text{Remaining Ions}}$ = μmoles of remaining anions as sulfate in Container 1, μmoles ; if value is <0, then total sulfate is 0.
2 = absolute ionic charge of sulfate

CALCULATE THE WEIGHT OF STACK H_2SO_4 IN CONTAINER 1 GIVEN BY:

$$W_{\text{H}_2\text{SO}_4} = M_{\text{Remaining Anions}} \times 98.0$$

where: $W_{\text{H}_2\text{SO}_4}$ = weight of sulfuric acid in Container 1, μg
98.0 = molecular weight of sulfuric acid

3.2.8 Determination of SO_2 , NO_x and CO Emissions from Stationary Sources (USEPA Methods 6C, 7E AND 10)

ARI's continuous emission monitors (CEM) sampling systems strictly followed USEPA instrument sample delivery and data acquisition protocols. Three (3) 60-minute test runs were conducted.

O_2 concentration was determined in accordance with USEPA Method 3A using ARI's Servomex, Inc. Model 1440C paramagnetic O_2 analyzer. A pre-test and post-test system bias along with the initial calibration error test were performed using diluted O_2 balance nitrogen standards of zero, 5.00% and 10.00% at an analyzer span of 10.00%.

CO_2 concentration was determined in accordance with USEPA Method 3A using ARI's Servomex, Inc. Model 1440C non-dispersive infrared (NDIR) CO_2 analyzer. A pre-test and post-test system bias along with the initial calibration error test were performed using diluted CO_2 balance nitrogen standards of zero, 10.00% and 22.82% at an analyzer span of 22.82%.

The stack gas SO_2 measurements were conducted in accordance with USEPA Method 6C using a Ametek Model 921-CE photometric SO_2 monitor. A pre-test and post-test system bias along with the initial calibration error test were performed using diluted SO_2 balance nitrogen standards of zero, 20.0 ppm, 50.0 ppm and 100.0 ppm at an analyzer span of 100.0 ppm.



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Continuous NO_x sampling was conducted following USEPA Method 7E. The NO_x monitor used was a Thermo Environmental Instruments Model 42 CAL chemiluminescent analyzer. A pre-test and post-test system bias, along with an initial calibration error were performed using NO_x balance nitrogen standards of zero, 20.0 ppm, 50.0 ppm and 100.0 ppm at an analyzer span of 100.0 ppm. The Model 42CH2 was used in the NO mode with a low temperature M&C Products, Inc. Model CG-2MH-W NO₂ gas converter placed inline just upstream of the instrument's sample inlet. The NO_x converter check was performed following USEPA Method 7E procedures. This procedure uses a NO₂ cylinder gas (40-60 ppm) to provide direct measurement of the converter efficiency. The converter is acceptable if the NO₂ to NO conversion rate is greater than 90%. The converter check was performed on August 29, 2007 at 07:27 and demonstrated a converter efficiency of 91.6%.

The stack gas CO measurements were conducted in accordance with USEPA Method 10 using a Thermo Environmental Model 48H gas filter correlation monitor. A pre-test and post-test system bias along with the initial calibration error test were performed using diluted CO balance nitrogen standards of zero, 20.0 ppm, 50.0 ppm and 100.0 ppm at an analyzer span of 100.0 ppm.

ARI's CEM sample delivery system consisted of a heated probe with an in-stack filter followed by a 3-way calibration valve connected to a heated Teflon sampling line. The Teflon line was connected to an electronic chiller and sample conditioner to remove moisture. A Teflon lined pump transported the sample to the analyzers. A sample manifold was connected to the exhaust side of the pump with intake to ARI's O₂, CO₂, SO₂ NO_x, and CO reference method monitors (see Figure 3-6).

The monitors were calibrated with applicable zero, low range, mid-range and high-range gases as specified in each applicable USEPA method. The gases met the calibration gas verification protocols of Alternate Number 1 or Alternate Number 2 as specified in USEPA Method 6C, Section 6. An Environics gas dilution system was used to prepare the calibration gases. The system was verified on-site following USEPA Method 205 procedures.

A pre-test calibration error test and pre/post-test measurement system bias tests were performed after each test repetition on each monitor. The average zero and calibration bias values obtained during each test run on the monitors was used to correct the data for that test run.

All monitor data were recorded at 15-second intervals by ARI's data acquisition system consisting of an Omega OMB-DAQ-56 recorder and datalogger connected to a computer for digital data archiving and data reduction.

3.2.9 Metals Emissions (USEPA Method 29)

Sampling and analysis for copper (Cu), nickel (Ni) and vanadium (V) at the exhaust stack were performed in accordance with USEPA Method 29. Three (3) 240-minute test runs were conducted. All analytical was performed by TestAmerica, Inc. (formerly STL, Inc.) located in Knoxville, Tennessee.

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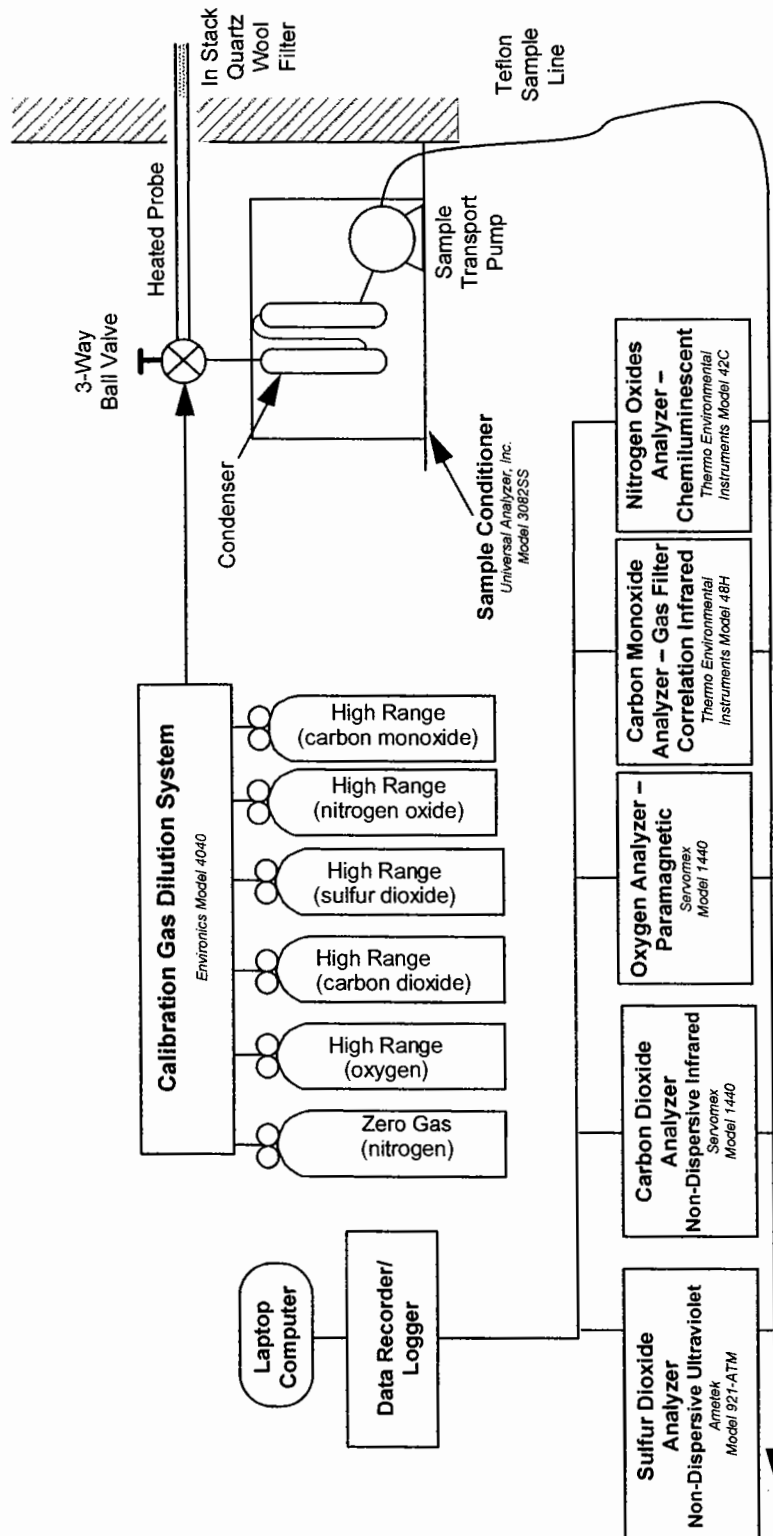


FIGURE 3-6. ARI REFERENCE METHOD O_2 , CO_2 , SO_2 , NO_x AND CO SAMPLING SYSTEM

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Testing and Analytical Procedures

The samples were withdrawn isokinetically from the exhaust stack and collected in a heated sample probe, heated filter (front half catch) and a series of ice cooled impingers containing an acid/peroxide solution (back half catch).

As shown in Figure 3-7, the metals sampling train used for testing was an Apex Instruments Method 5/29 sampling train. The major components included the following:

1. Nozzle - Borosilicate glass with sharp tapered leading edge.
2. Probe - Type 316 stainless steel with borosilicate glass liner and attached pitot tube and stack temperature thermocouple.
3. Apex Sample Box - Containing Pyrex glass filter holder, glass fiber filter, seven Greenburg-Smith impingers and connecting glassware.
4. Apex Control Module – (per USEPA Method 5/29 specifications) containing pump, heat controllers and oil gauge manometers.

The sample train was assembled as follows:

1. A glass nozzle was selected and attached to the probe.
2. A pre-weighed quartz fiber filter was placed in the filter holder and its number recorded on the data sheets.
3. The back half of the train consisted of five impingers. The first impinger was empty with a shortened stem, the second and third impingers contained 100 mls of dilute nitric acid/ hydrogen peroxide mixture, the fourth impinger was empty, and the fifth impinger contained approximately 200 grams of silica gel. All glassware, filter media and chemicals were prepared in the laboratory in accordance with the required USEPA procedures.
4. The sampling train was then assembled at the sampling location.

The metals sampling train was leak checked using the following procedures:

- a) The pump was started.
- b) The course flow adjustment valve was opened.
- c) Flow through the dry gas meter was checked.
- d) The probe inlet was plugged.
- e) The fine flow adjustment valve was adjusted so that the vacuum gauge read 15 in. Hg.

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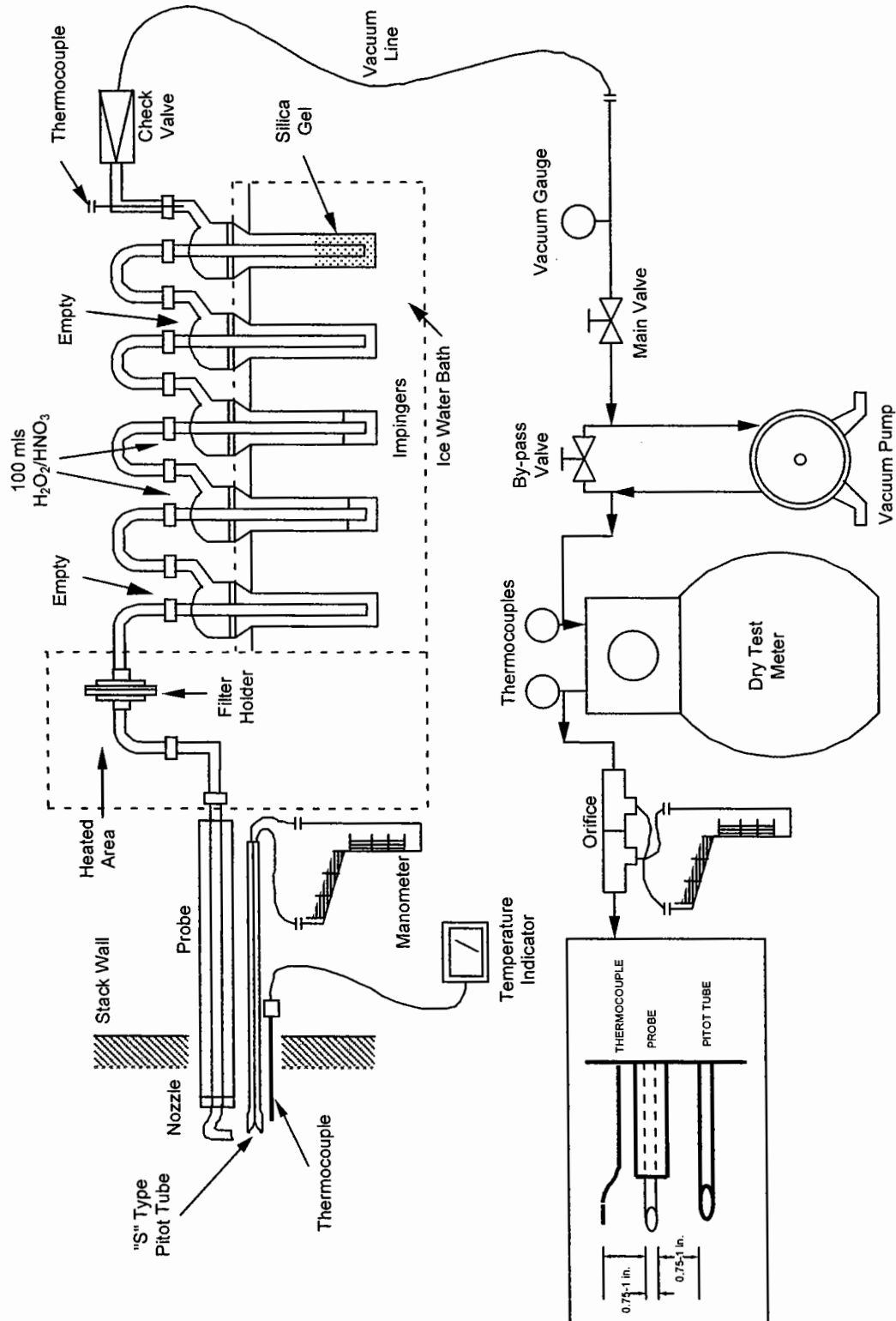


FIGURE 3-7. USEPA METHOD 29 SAMPLING TRAIN



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- f) If the flow exceeded 0.02 ACFM, the pump is shut off and all connections are rechecked for tightness and the leak test procedure repeated until acceptable results are obtained.

Crushed ice was added to the impinger compartment and the sample case 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. 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.

Upon completion of each test run and final leak check, the following sampling train clean-up procedure was performed. All probe samples were recovered on-site.

1. The filter was removed from the filter holder and placed in a clean Petri dish and labeled as Container #1.
2. A brush and acetone were used to clean the probe and other fittings as required. The washings from the inner surfaces of the nozzle and upstream portions of the filter holder were collected in a bottle and labeled Container #2.
3. A brush and 0.1N HNO₃ were then used to rinse the probe and other fittings as required. The washings from the inner surfaces of the nozzle and upstream portions of the filter holder were collected in a bottle and labeled as Container #3.
4. The contents of impingers #1, #2 and #3 were placed in a graduated cylinder to measure the total volume collected then rinsed with 0.1N HNO₃, then transferred to a bottle and labeled as Container #4.
5. The contents of impingers #4 were placed in a graduated cylinder to measure the total volume.
6. The contents of impinger 5 were transferred to a clean bottle and labeled as Container #5. The weight of the silica gel was then determined. The difference between this final weight and the initial weight was the total moisture collected by the silica gel.

Containers #1, #2, #3 and #4 were transported to TestAmerica Laboratories, Inc. (formerly STL) located in Knoxville, Tennessee and analyzed for copper, nickel and vanadium by Inductively Coupled Plasma/Mass Spectroscopy (ICP/MS) in accordance with USEPA Method 29 and SW-846 6010B. See project narrative contained in Appendix C.



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3.2.10 Total Non-Methane Organic Compounds (USEPA Methods 18 and 25A)

The determination of TNMOC was conducted following procedures described in USEPA Method 25A using total hydrocarbon analyzers. These analyzers utilize a continuous heated flame ionization detector (FID) and sample line that keeps the sample gas stream above the dew point. The sampling system consisted of a stainless steel probe with an in-stack filter holder connected to a three-way calibration valve. The sample gas was transported by a Teflon lined heated pump through a heated Teflon line ($>250^{\circ}\text{F}$) to the intake of the hydrocarbon analyzer (see Figure 3-8).

Calibration gases were introduced at the three-way calibration valve located at the exit end of the sample probe. A pre-test and post-test system bias was performed using methane in air standards of zero, 25.0 ppm, 50.0 ppm and 85.0 ppm at an analyzer range of 100.0 ppm. The results of the calibration were within the $\pm 5\%$ of span allowed. The zero and upscale calibration gas drift values obtained after each run were within the $\pm 3\%$ of span allowed. The average zero and upscale calibration gas values obtained during each test run were used to correct the data for that test run.

In addition, USEPA Method 18 procedures were conducted at the outlet to determine the concentration of methane. Any methane detected was subtracted from the total organic compounds measured by the USEPA Method 25A procedures. Specifically, the concentrations were determined by direct interface using ARI's VIG Model 200 methane/non-methane hydrocarbon analyzer. This analyzer splits the sample gas between two (2) channels; one is a continuously heated FID and the second is a gas chromatograph (GC) equipped with a FID and separation column that is specific to methane. The GC/FID was calibrated by cylinder gas standards of methane in air standards to calculate a 3-point calibration curve. Standards of zero, 25.0 ppm, 50.0 ppm and 85.0 ppm were used during calibration. Three (3) 60-minute test runs were conducted. Results for methane analysis indicated concentrations below the detectable limit of 1.0 ppm. Therefore, TNMOC concentrations were calculated using zero for methane concentration.

The analyzers were calibrated with applicable zero, low-range, mid-range and high-range gases as specified in the USEPA methods. The gases met the calibration gas verification protocols of Alternate Number 1 or Alternate Number 2 as specified in USEPA Method 6C, Section 6. An Environics gas dilution system was used to prepare the calibration gases. The system was verified on-site following USEPA Method 205 procedures.

3.2.11 Validation of Gas Dilution Systems (USEPA Method 205)

All diluted calibration standards were prepared using an Environics Model 4040 Dilution System that is verified by a field evaluation at the job site prior to testing following the requirements of USEPA Method 205 (40 CFR 51, Appendix M).

ARI's Servomex Model 1440 paramagnetic O_2 gas analyzer was calibrated following USEPA Method 3A procedures using O_2 in nitrogen standards. After the calibration procedure is complete, diluted standards of 12.47% and 20.00% and a mid-range EPA Protocol 1 standard of 12.47% were alternately introduced in triplicate and an average instrument response was calculated for each standard.

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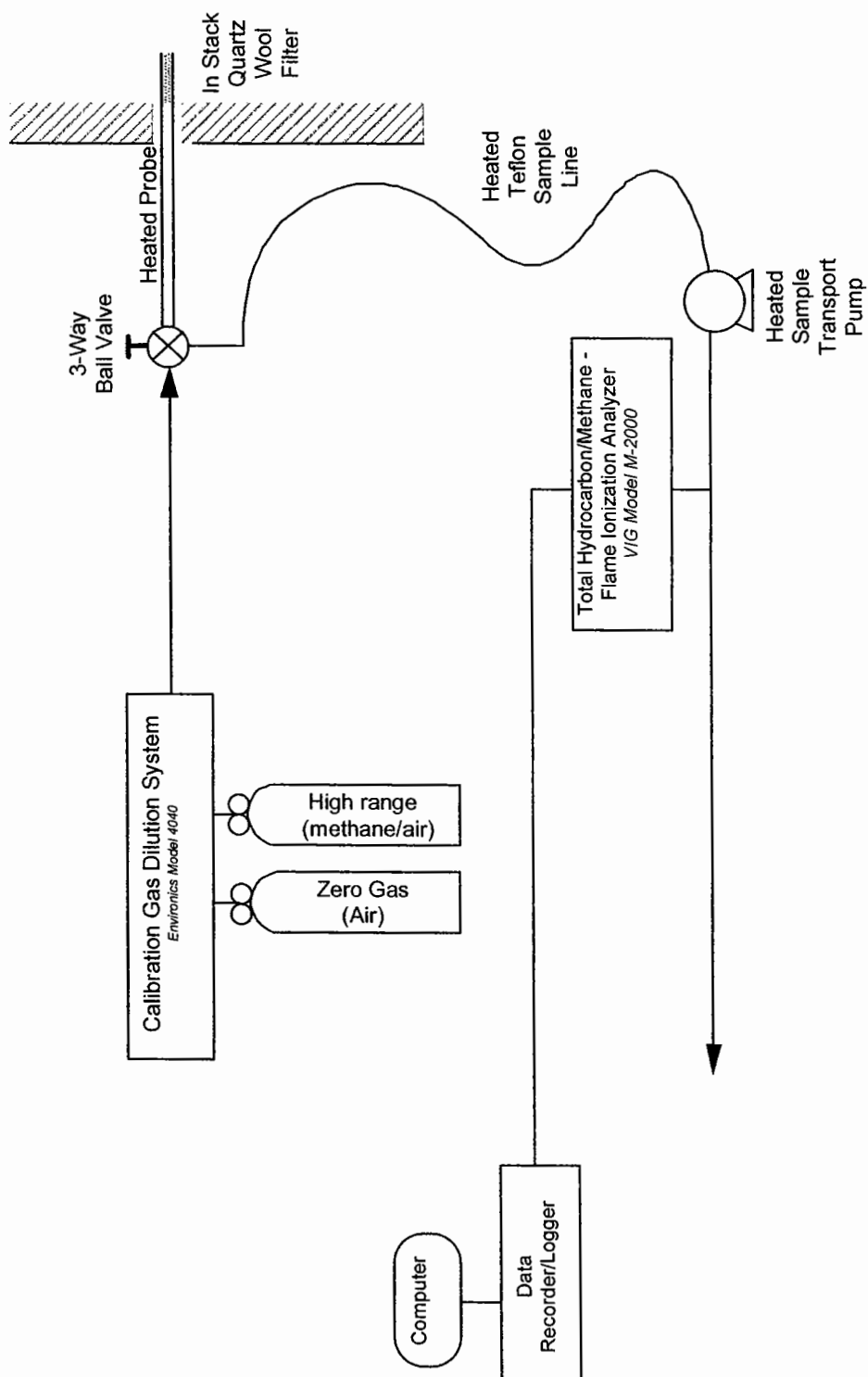


FIGURE 3-8. USEPA METHOD 25A TOTAL ORGANIC COMPOUNDS SAMPLING SYSTEM



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Testing and Analytical Procedures

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 $\pm 2\%$.

Actual results of the USEPA Method 205 dilution system verifications are presented in Appendix E – Calibration Data.

3.2.12 Determination of Benzene (SW-846 Method 0031)

The concentration and mass emission rate of benzene were determined using sorbent tubes in accordance with Method 0031 – SMVOC using an Apex volatile organic sampling train (VOST). The samples were collected following the “SLO-SMVOC” procedures over a 40-minute period.

The SLO-SMVOC train consisted of a heated sampling probe, the sample collection glassware, a series of three sorbent traps, umbilical cord, vacuum pump and dry gas meter. A sampling train diagram is presented in Figure 3-9.

The SLO-VOST glassware consisted of a heated borosilicate glass probe followed by an isolation valve, a water-cooled glass condenser, two sorbent cartridges containing Tenax®-GC, an empty impinger for condensate removal, a second water-cooled glass condenser, and a second sorbent cartridge containing Anasorb®-747 charcoal.

The metered gas sample was drawn through the sampling train at a rate of 0.5 liter/minute for 40 minutes. Three 40-minute repetitions were performed for each sample run. Three (3) sample runs were conducted that resulted in a total of 9 sets of tubes.

Pre-sampling leak checks were performed on the sampling train for each sample run. After each run the sorbent traps were removed and the end caps were replaced on each trap. The samples were stored on ice for shipment.

It should be noted that for the determination benzene, no spiking of the traps for surrogate compounds was performed.

Analysis of the samples was conducted using gas chromatographic/mass spectrographic (GC/MS) techniques presented in analytical methods 8260B and 5041A. All analytical was conducted by Test America, Inc. (formerly STL, Inc.) located in Knoxville, Tennessee.

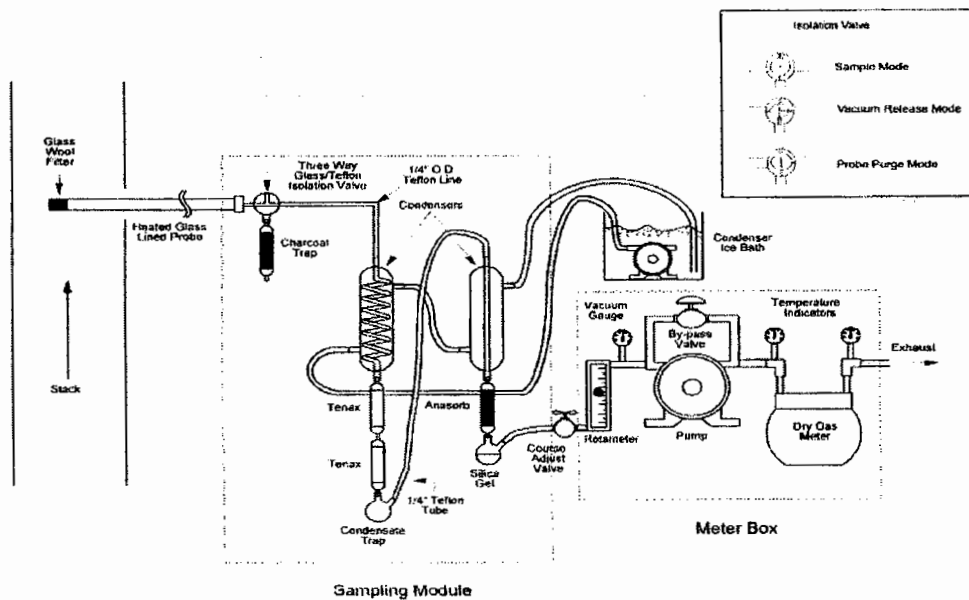
3.2.13 Hydrogen Cyanide (HCN) Determination (CTM-033)

Sampling was conducted in accordance with USEPA CTM-033 using an Apex Instruments, Inc. particulate sampling train. The back half impinger catch was analyzed for HCN in accordance with CTM-033 procedures for HCN by ion chromatography (IC).

SECTION THREE

Testing and Analytical Procedures

FIGURE 3-9. USEPA METHOD 18 MINII IMPINGER/SORBENT TUBE SAMPLING TRAIN



SECTION THREE

Testing and Analytical Procedures

An initial four impinger HCN sample run was performed with the impinger solutions containing 2.0 N NaOH. Upon recovery it was discovered that the pH of the sample was <12 and modifications were made. An empty impinger was placed first in a series of five impingers. The second, third and fourth impingers were filled with 100 mL of 6.0 N NaOH. The subsequent sample runs were considered valid if the contents of the fourth impinger demonstrated a post-test run of ≥ 12 pH.

3.2.13.1 Sampling Apparatus

Nozzle – Borosilicate glass with sharp, tapered leading edge.

Probe - Borosilicate glass with a heating system capable of maintaining a probe exit temperature of 248°F.

Pitot Tube - Type-S, attached to probe for monitoring stack gas velocity.

Filter Holder - Borosilicate glass with a glass frit filter support and a silicone rubber gasket. The holder design provides a positive seal against leakage from the outside or around the filter. The filter holder was heated to 248°F $\pm$ 25°F during sampling.

Draft Gauge - Inclined manometer with a readability of 0.01 in. H₂O in the 0- to 10-in. range.

Impingers – Five (5) impingers connected in series with glass ball joints. The second, third and fourth are of the Greenburg-Smith design with a standard tip. The first and fifth were of the Greenburg-Smith design, but modified by replacing the standard tip with a ½-in.-i.d. glass tube extending to within ½ in. of the bottom of the impinger flask.

Metering System - Apex Model 522. Vacuum gauge, leak-free pump, thermometers capable of measuring temperature to within 5°F, dry gas meter with ± 2 percent accuracy, and related equipment as required to maintain an isokinetic sampling rate and to determine sample volume.

Barometer - Mercury barometer capable of measuring atmospheric pressure to within ± 0.1 in. Hg.

3.2.13.2 Sampling Procedures

After the minimum number of traverse points was selected, the stack pressure, temperature, moisture, and range of velocity head were measured according to procedures described in USEPA Methods 1 through 4. The first impinger was initially empty, the second, third and fourth impingers initially contained 100 mL of 6.0N sodium hydroxide (NaOH). The fifth impinger contained 200 g of silica gel. The train was set up with the probe and filter holder as shown in Figure 3-10.

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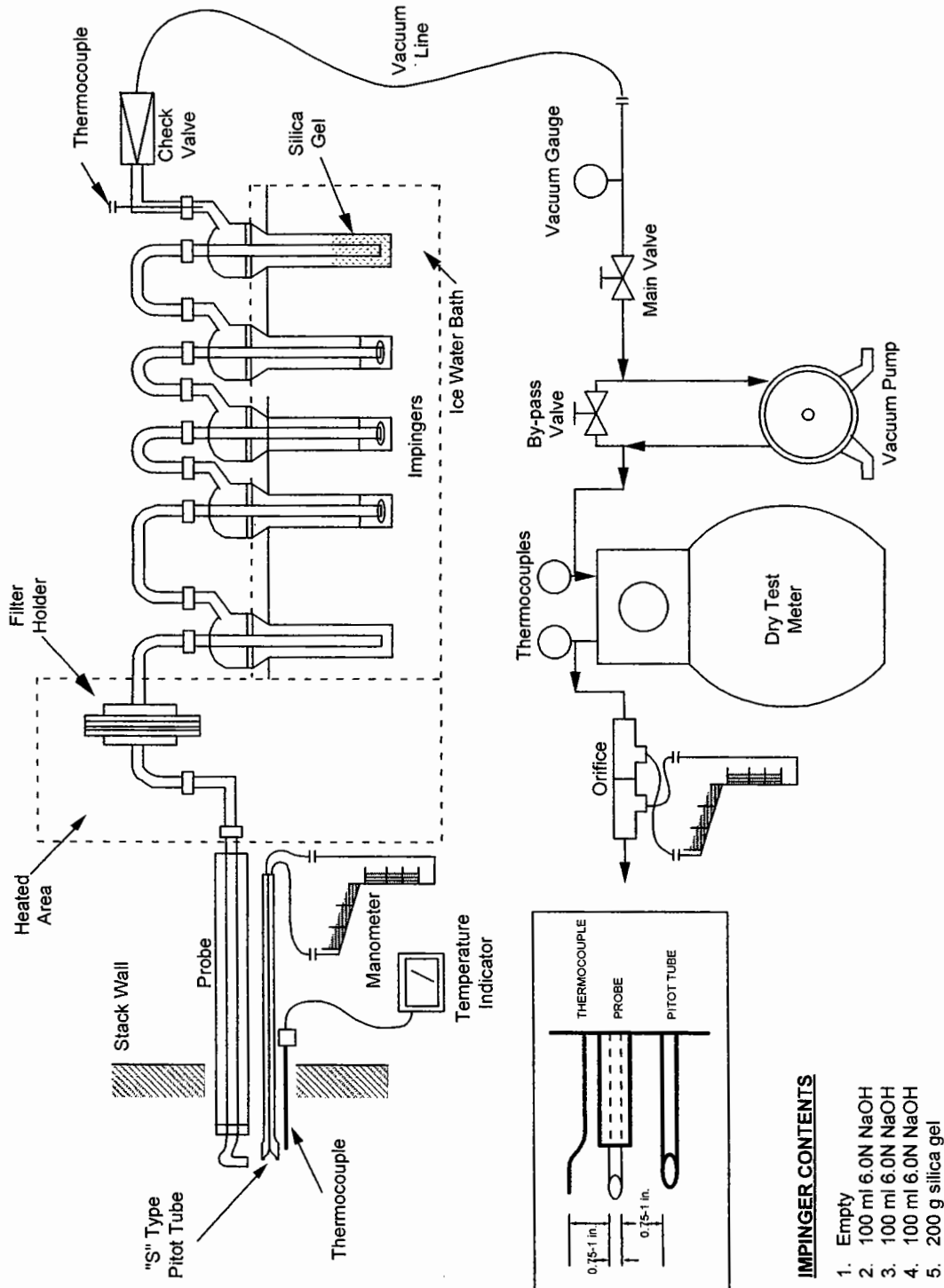


FIGURE 3-10. USEPA CTM-033 HYDROGEN CYANIDE SAMPLING TRAIN



SECTION THREE

Testing and Analytical Procedures

The sampling train was leak-checked at the sampling site by plugging the inlet to the nozzle and pulling a vacuum of 15 in. Hg. Leak rates of less than 0.02 ft³/min at a vacuum of 15 in. Hg were recorded in all cases. At the completion of each test, the sampling train was again leak-checked by the same procedure, but at the highest vacuum attained during the test run.

Both pre- and post-test leak checks of the pitot tube were made for each test run. Ice was placed around the impingers to keep the temperature of the gases leaving the last impinger at less than 68°F.

Isokinetic sampling rates were set throughout the sampling period with the aid of a programmable calculator. Three (3) 60-minute sample runs were conducted.

3.2.13.3 Sample Recovery Procedures

After sampling was completed, the sampling train was then moved carefully from the test site to the recovery area. The pH of each impinger was measured and recorded on the recovery data sheet. The sample was considered acceptable if the pH of the fourth impinger was ≥ 12 .

The sample fractions were recovered as follows:

Container 1 - The contents of impingers 1 through 3 were measured volumetrically and placed in a glass bottle, sealed and labeled. A rinse of 0.1N NaOH was performed on each of the first three impingers and placed in the same container. The contents of impinger 4 were weighed and then discarded.

Container 2 - 100 mL of 6.0N NaOH was collected for blank analysis.

3.2.13.4 Analytical Procedures

The analytical procedures followed those described in USEPA CTM-033.

Containers 1 and 2 - The contents of each container were analyzed for CN⁻ by ion chromatography.

All analytical was conducted by Enthalpy Analytical, Inc. located in Durham, North Carolina.



SECTION FOUR

Test Results

The test results are presented in Tables 4-1 through 4-6

The emission rates calculated for SO₂, NO_x, CO and TNMOC were based upon volumetric flow rates that were concurrently measured during the USEPA Method 8 sampling periods.

Also, for benzene/SW-846 0031 emission rate determination, volumetric flow rates were used from measured values obtained by concurrently run Method 29 (runs 2 and 3) sampling apparatus.

TNMOC concentrations were calculated using a methane concentration of zero, as average methane values obtained during each test run were found to be below the detectable limit of 1.0 ppmv.

The calculation summaries, field data, ARI reference method monitoring data, laboratory data, process data and calibration data are included in the appendices.



SECTION FOUR

Test Results

**TABLE 4-1. SUMMARY OF NON-SULFURIC ACID PARTICULATE MATTER
(USPEA METHOD 5B)**

COMPANY	:	Valero Refining Company			
LOCATION	:	Paulsboro, NJ			
SOURCE	:	FCC FGS			
TEST RUN	:	5B-1	5B-2	5B-3	
TEST DATE	:	8/28/2007	8/28/2007	8/28/2007	
TEST TIME	:	13:54 – 15:09	16:01 – 17:20	18:13 – 19:23	Average
Stack Gas					
Temperature, av. °F		145.2	144.2	144.5	144.6
Velocity, av. ft/sec		34.810	32.430	34.336	33.858
Volume flow, acfm		155,937	145,276	153,815	151,676
Volume flow, scfm		137,022	127,862	135,314	133,399
Volume flow, dscfm		106,648	100,227	105,319	104,065
Volume flow, dscfh		6,398,877	6,013,613	6,319,123	6,243,871
Moisture, av. % vol		22.17	21.61	22.17	21.98
CO ₂ , av. % vol, db		19.50	19.66	19.67	19.61
O ₂ , av. % vol, db		1.21	1.16	1.15	1.17
Sample Conditions					
Time, min.		60.0	60.0	60.0	60.0
Sample Volume, dscf		46.336	41.506	43.817	43.886
% Isokinetic		102.5	97.7	98.5	99.6
Particulate Matter (PM)					
Filterable PM collected, mg		97.2	83.1	84.5	88.3
Concentration					
gr/dscf		0.03	0.03	0.03	0.03
lb/dscf x 10 ⁻⁶		4.6255	4.4147	4.2523	4.4309
Emission rate					
lb/hr		29.6	26.5	26.9	27.7
lb/1000 lb coke burn		0.8	0.7	0.7	0.7



SECTION FOUR

Test Results

**TABLE 4-2. SUMMARY OF PM₁₀ TEST RESULTS
(NJATM1 + USEPA METHOD 202)**

COMPANY	:	Valero Refining Company			
LOCATION	:	Paulsboro, NJ			
SOURCE	:	FCC FGS			
TEST RUN	:	202-1	202-2	202-3	
TEST DATE	:	8/28/2007	8/28/2007	8/28/2007	
TEST TIME	:	10:31 - 12:07	13:54 - 15:04	16:15 - 17:35	Average
Stack Gas					
Temperature, av. °F		149.4	150.4	149.9	149.9
Velocity, av. ft/sec		32.984	34.305	34.905	34.064
Volume flow, acfm		147,757	153,676	156,362	152,598
Volume flow, scfm		128,939	133,752	136,337	133,009
Volume flow, dscfm		97,345	101,497	104,340	101,061
Volume flow, dscfh		5,840,686	6,089,835	6,260,384	6,063,635
Moisture, av. % vol		24.50	24.12	23.47	24.03
CO ₂ , av. % vol, db		19.62	19.50	19.68	19.60
O ₂ , av. % vol, db		1.08	1.21	1.14	1.14
Sample Conditions					
Time, Min.		60.0	60.0	60.0	60.0
Sample Volume, dscf		44.300	44.702	43.500	44.167
% Isokinetic		108.8	105.3	99.6	104.5
Particulate Matter (PM) (TSP)					
Filterable PM collected, mg		113.07	120.51	95.26	109.61
Concentration					
gr/dscf		0.04	0.04	0.03	0.04
lb/dscf x 10 ⁻⁶		5.6280	5.9443	4.8287	5.4670
Emission rate					
lb/hr		32.9	36.2	30.2	33.1
Condensable PM					
Concentration					
gr/dscf		0.000	0.000	0.004	0.001
lb/dscf x 10 ⁻⁶		0.000	0.000	0.534	0.178
Emission rate					
lb/hr		0.0	0.0	3.3	1.1
Total PM including PM₁₀					
Emission rate					
lb/hr		32.9	36.2	33.6	34.2



SECTION FOUR

Test Results

TABLE 4-3. SUMMARY OF SO₂, NO_x, CO, TNMOC AND SULFURIC ACID TEST RESULTS (USEPA METHOD 8 – MODIFIED)

COMPANY	:	Valero Refining Company			
LOCATION	:	Paulsboro, NJ			
SOURCE	:	FCC FGS			
TEST RUN	:	M8-1	M8-2	M8-3	
TEST DATE	:	8/29/2007	8/29/2007	8/29/2007	
TEST TIME	:	09:36 – 10:48	13:00 – 14:10	15:05 – 16:26	Average
Stack Gas					
Temperature, av. °F		151.2	152.1	151.3	151.5
Velocity, av. ft/sec		34.75	33.22	33.84	33.94
Volume flow, acfm		155,683	148,810	151,577	152,023
Volume flow, scfh		8,119,988	7,741,654	7,880,191	7,913,944
Volume flow, dscfh		6,107,199	5,779,259	5,986,109	5,957,523
Moisture, av. % vol		24.79	25.35	24.04	24.72
CO ₂ , av. % vol, db		19.46	19.75	19.85	19.69
O ₂ , av. % vol, db		1.10	0.82	0.81	0.91
Sample Conditions					
Time, min.		60.0	60.0	60.0	60.0
Sample Volume, dscf		43.260	41.586	43.245	42.697
% Isokinetic		101.6	103.2	103.6	102.8
Free Sulfuric Acid (H₂SO₄) - Modified 8 with IC analysis (Anions - Cations)					
Concentration					
ppmv db		0.943	2.659	3.479	2.360
lb/dscf x 10 ⁻⁶		0.2400	0.6763	0.8850	0.6004
Emission rate					
lb/hr		1.47	3.91	5.30	3.56
Sulfur Dioxide (SO₂)					
Concentration					
ppmv db		16	18	9	14
ppmv db @ 0%O ₂		17	19	9	15
lb/dscf x 10 ⁻⁶		2.683	2.999	1.429	2.370
Emission rate					
lb/hr		16.4	17.3	8.6	14.1
Nitrogen Oxides as NO₂ (NO_x)					
Concentration					
ppmv db		18	15	15	16
ppmv db @ 0%O ₂		18	15	15	16
lb/dscf x 10 ⁻⁶		2.090	1.746	1.761	1.866
Emission rate					
lb/hr		12.8	10.1	10.5	11.1



SECTION FOUR

Test Results

**TABLE 4-3 (CONTINUED). SUMMARY OF SO₂, NO_x, CO, TNMOC AND SULFURIC ACID
TEST RESULTS (USEPA METHOD 8 – MODIFIED)**

TEST RUN	:	M8-1	M8-2	M8-3	
TEST DATE	:	8/29/2007	8/29/2007	8/29/2007	
TEST TIME	:	09:36 – 10:48	13:00 – 14:10	15:05 – 16:26	<u>Average</u>

Carbon Monoxide (CO)

Concentration				
ppmv db	3	10	11	8
ppmv db @ 0%O ₂	4	10	12	8
lb/dscf x 10 ⁻⁶	0.254	0.702	0.817	0.591
Emission rate				
lb/hr	1.5	4.1	4.9	3.5

Total Non-methane Organic Compounds (TNMOC)

Concentration				
ppmv db	13	5	16	11
ppmv db @ 0%O ₂	14	5	17	12
lb/dscf x 10 ⁻⁶	0.409	0.141	0.498	0.349
Emission rate				
lb/hr	2.5	0.8	3.0	2.1



SECTION FOUR

Test Results

TABLE 4-4. SUMMARY OF METALS TEST RESULTS (USEPA METHOD 29)

COMPANY	:	Valero Refining Company			
LOCATION	:	Paulsboro, NJ			
SOURCE	:	FCC FGS			
TEST RUN	:	M29-1	M29-2	M29-3	
TEST DATE	:	8/29/2007	8/30/2007	8/30/2007	
TEST TIME	:	17:44-22:01	08:38-12:55	13:25-18:05	Average
Stack Gas					
Temperature, av. °F		152.2	151.5	152.7	152.1
Velocity, av. ft/sec		34.403	34.369	34.821	34.531
Volume flow, acfm		154,117	153,963	155,986	154,689
Volume flow, scfm		133,328	133,220	134,443	133,664
Volume flow, dscfm		101,654	102,311	101,584	101,850
Volume flow, dscfh		6,099,243	6,138,686	6,095,037	6,110,989
Moisture, av. % vol		23.76	23.20	24.44	23.80
CO ₂ , av. % vol, db		19.81	19.58	19.72	19.70
O ₂ , av. % vol, db		0.99	1.18	0.89	1.02
Sample Conditions					
Time, min.		240.0	240.0	240.0	240.0
Sample Volume, dscf		174.422	174.084	175.552	174.686
% Isokinetic		100.0	99.1	100.7	99.9
Copper (Cu), µg					
Concentration		9.34	4.24	2.34	5.31
µg/dscm		1.891	0.860	0.471	1.074
lb/dscf x 10 ⁻⁹		0.118	0.054	0.029	0.067
Emission rate					
lb/hr		0.0007	0.0003	0.0002	0.0004
Nickel (Ni), µg					
Concentration		6.80	7.60	6.17	6.86
µg/dscm		1.377	1.542	1.241	1.386
lb/dscf x 10 ⁻⁹		0.086	0.096	0.077	0.087
Emission rate					
lb/hr		0.0005	0.0006	0.0005	0.0005
Vanadium (V), µg					
Concentration		< 7.30	< 5.90	< 6.40	< 6.53
µg/dscm		< 1.478	< 1.197	< 1.287	< 1.321
lb/dscf x 10 ⁻⁹		< 0.092	< 0.075	< 0.080	< 0.082
Emission rate					
lb/hr		< 0.0006	< 0.0005	< 0.0005	< 0.0005



SECTION FOUR

Test Results

TABLE 4-5. SUMMARY OF HYDROGEN CYANIDE TEST RESULTS (CTM-033)

COMPANY : Valero Refining Company
LOCATION : Paulsboro, NJ
SOURCE : FCC FGS

TEST RUN	HCN-1	HCN-2	HCN-3	
TEST DATE	8/26/2007	8/29/2007	8/29/2007	
TEST TIME	13:00 - 14:10	15:05 - 16:26	17:44 - 20:12	<u>Average</u>

Stack Gas Parameters

Temperature, av. °F	146.2	145.4	145.5	145.7
Velocity, av. ft/sec	35.3	35.0	36.1	35.5
Volume flow, acfm	158,100	156,873	161,752	158,908
Volume flow, scfm	138,555	137,250	141,485	139,096
Volume flow, dscfm	107,028	106,704	109,192	107,641
Volume flow, scfh	8,313,289	8,234,979	8,489,073	8,345,780
Volume flow, dscfh	6,421,690	6,402,222	6,551,542	6,458,485
Moisture, av. % vol	22.75	22.26	22.82	22.61
CO ₂ , av. % vol, db	19.75	19.85	19.81	19.80
O ₂ , av. % vol, db	0.82	0.81	0.99	0.87

Sampling Train Data

Sample volume, dscf	44.635	43.084	43.987	43.902
Sample volume, dscm	1.264	1.220	1.246	1.243
% Isokinetic	98.4	95.3	95.0	96.2
Total Sample Time, θ	60.0	60.0	60.0	60.0
HCN collected, µg	16,090	15,290	47,390	26,257

Hydrogen Cyanide (HCN) Emissions

Concentration				
lb/dscf x 10 ⁻⁶	0.795	0.783	2.376	1.318
ppmv db	11.33	11.15	33.86	18.78
ppmv db @ 7 % O ₂	7.84	7.72	23.64	13.07
Emission rate				
lb/hr	5.1	5.0	15.6	8.6



SECTION FOUR

Test Results

TABLE 4-6. BENZENE TEST RESULTS (SW-846 0031)

COMPANY Valero Refining Company
LOCATION Paulsboro, NJ
SOURCE FCC FGS
TEST DATE 8/30/2007

RUN NO. :	VOST - 1A	VOST - 1B	VOST - 1C	
TEST TIME :	09:29 – 10:09	10:19 – 10:59	11:06 – 11:46	Average

Benzene Sample Parameters

Time, min	40	40	40	40
Volume, std liters	18.333	19.631	19.368	19.110
Volume, dscf	0.647	0.693	0.684	0.675
VOC collected, micrograms	0.14	0.13	0.12	0.13
Volumetric flow rate, dscfh	6,138,686	6,138,686	6,138,686	6,138,686

Benzene Emission Rate

Concentration				
ppb v db	2.3	2.0	1.9	2.1
ppm v db	0.00234	0.00204	0.00191	0.00209
x 10 ⁻⁶ lb/dscf	0.000473	0.000414	0.000387	0.000425
Emission Rate				
lb/hr	0.003	0.003	0.002	0.003

RUN NO. :	VOST - 2A	VOST - 2B	VOST - 2C	
TEST TIME :	13:25 – 14:05	14:14 – 14:54	15:01 – 15:41	Average

Benzene Sample Parameters

Time, min	40	40	40	40
Volume, std liters	18.606	19.217	19.376	19.066
Volume, dscf	0.657	0.679	0.684	0.673
VOC collected, micrograms	0.10	0.09	0.11	0.10
Volumetric flow rate, dscfh	6,095,037	6,095,037	6,095,037	6,095,037

Benzene Emission Rate

Concentration				
ppb v db	1.7	1.5	1.7	1.6
ppm v db	0.00166	0.00146	0.00175	0.00162
x 10 ⁻⁶ lb/dscf	0.000336	0.000296	0.000355	0.000329
Emission Rate				
lb/hr	0.002	0.002	0.002	0.002

RUN NO. :	VOST - 3A	VOST - 3B	VOST - 3C	
TEST TIME :	15:58 – 16:38	16:46 – 17:26	17:33 – 18:13	Average

Benzene Sample Parameters

Time, min	40	40	40	40
Volume, std liters	20.074	18.997	19.134	19.402
Volume, dscf	0.709	0.671	0.676	0.685
VOC collected, micrograms	0.12	0.12	0.11	0.12
Volumetric flow rate, dscfh	6,095,037	6,095,037	6,095,037	6,095,037

Benzene Emission Rate

Concentration				
ppb v db	1.8	1.9	1.8	1.9
ppm v db	0.00184	0.00195	0.00177	0.00185
x 10 ⁻⁶ lb/dscf	0.000373	0.000394	0.000359	0.000376
Emission Rate				
lb/hr	0.002	0.002	0.002	0.002



Valero Refining Company - New Jersey
Source: FCCU Scrubber Stack
Test Dates: 8/28 - 8/30/07

APPENDIX A

Calculation Summaries



Reference Method Monitor Data One-Minute Averages

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/28/2007
Run #: 202-1
Test Time: 1031-1207

Reference Method Monitor #1:	
Analyzer Type:	Stack Oxygen
Analyzer Scale:	10.00 %
Pre-test calibration span value:	10.06 %
Post-test calibration span value:	9.95 %
Pre-test calibration zero value:	0.11 %
Post-test calibration zero value:	0.05 %
Calibration gas type:	Protocol 1 Oxygen %
Calibration gas concentration:	10.00 %
Monitor uncorrected average:	1.15 %
Monitor drift corrected average:	1.08 %

Reference Method Monitor #2:	
Analyzer Type:	Stack CO2
Analyzer Scale:	22.82 %
Pre-test calibration span value:	9.80 %
Post-test calibration span value:	9.89 %
Pre-test calibration zero value:	0.12 %
Post-test calibration zero value:	0.14 %
Calibration gas type:	Protocol 1 CO2 %
Calibration gas concentration:	10.00 %
Monitor uncorrected average:	19.19 %
Monitor drift corrected average:	19.62 %

Clock Time	Elapsed Time	Monitor #1 Stack Oxygen %	Monitor #2 Stack CO2 %
10 : 31	0		
10 : 32	1	1.2	19.1
10 : 33	2	1.3	19.0
10 : 34	3	1.2	19.1
10 : 35	4	1.2	19.1
10 : 36	5	1.1	19.2
10 : 37	6	1.2	19.1
10 : 38	7	1.2	19.1
10 : 39	8	1.2	19.1
10 : 40	9	1.2	19.1
10 : 41	10	1.1	19.2
10 : 42	11	1.1	19.2
10 : 43	12	1.1	19.3
10 : 44	13	1.1	19.2
10 : 45	14	1.0	19.3
10 : 46	15	1.1	19.2
10 : 51	16	1.1	19.2
10 : 52	17	1.1	19.2
10 : 53	18	1.2	19.1
10 : 54	19	1.2	19.1
10 : 55	20	1.1	19.2
10 : 56	21	1.2	19.2
10 : 57	22	1.2	19.1
10 : 58	23	1.2	19.1
10 : 59	24	1.2	19.1
11 : 0	25	1.2	19.2
11 : 1	26	1.1	19.2
11 : 2	27	1.2	19.2
11 : 3	28	1.2	19.2
11 : 4	29	1.1	19.3
11 : 5	30	1.1	19.3
11 : 29	31	1.1	19.2
11 : 30	32	1.1	19.3
11 : 29	33	1.2	19.2
11 : 30	34	1.3	19.1
11 : 31	35	1.2	19.2
11 : 32	36	1.2	19.2
11 : 33	37	1.2	19.2
11 : 34	38	1.2	19.2
11 : 35	39	1.3	19.1
11 : 36	40	1.3	19.1
11 : 37	41	1.3	19.1
11 : 38	42	1.2	19.1
11 : 39	43	1.2	19.2
11 : 40	44	1.1	19.2
11 : 41	45	1.1	19.3
11 : 52	46	1.0	19.3
11 : 53	47	1.1	19.2
11 : 54	48	1.1	19.2
11 : 55	49	1.1	19.3
11 : 56	50	1.1	19.2
11 : 57	51	1.1	19.3
11 : 58	52	1.1	19.2
11 : 59	53	1.2	19.2
12 : 0	54	1.1	19.2
12 : 1	55	1.1	19.2
12 : 2	56	1.1	19.2
12 : 3	57	1.0	19.3
12 : 4	58	1.1	19.2
12 : 5	59	1.1	19.2
12 : 6	60	1.1	19.2
AVERAGE:		1.2	19.2



**USEPA Method 3-A
Stack Oxygen
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/28/2007
Test Run #: 202-1
Test Time: 1031-1207

Data Input:

Average chart reading (C):	1.15 % db
Average pre/post-test zero calibration reading (C _o):	0.08 % db
Calibration gas concentration (C _{ma}):	10.0 % db
Average pre/post-test calibration gas reading (C _m):	10.01 % db

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack Oxygen

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 1.08 \% \text{ db}$$



**USEPA Method 3-A
Stack CO2
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/28/2007
Test Run #: 202-1
Test Time: 1031-1207

Data Input:

Average chart reading (C):	19.19 % db
Average pre/post-test zero calibration reading (C _o):	0.13 % db
Calibration gas concentration (C _{ma}):	10.0 % db
Average pre/post-test calibration gas reading (C _m):	9.84 % db

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack CO2

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 19.62 \% \text{ db}$$



Reference Method Monitor Data One-Minute Averages

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/28/2007
Run #: 202-2/5B-1
Test Time: 1354-1510

Reference Method Monitor #1:	
Analyzer Type:	Stack Oxygen
Analyzer Scale:	10.00 %
Pre-test calibration span value:	9.95 %
Post-test calibration span value:	9.95 %
Pre-test calibration zero value:	0.05 %
Post-test calibration zero value:	0.06 %
Calibration gas type:	Protocol 1 Oxygen %
Calibration gas concentration:	10.00 %
Monitor uncorrected average:	1.25 %
Monitor drift corrected average:	1.21 %

Reference Method Monitor #2:	
Analyzer Type:	Stack CO2
Analyzer Scale:	22.82 %
Pre-test calibration span value:	9.89 %
Post-test calibration span value:	9.84 %
Pre-test calibration zero value:	0.14 %
Post-test calibration zero value:	0.17 %
Calibration gas type:	Protocol 1 CO2 %
Calibration gas concentration:	10.00 %
Monitor uncorrected average:	19.08 %
Monitor drift corrected average:	19.50 %

Clock Time	Elapsed Time	Monitor #1 Stack Oxygen %	Monitor #2 Stack CO2 %
13 : 54	0		
13 : 55	1	1.4	19.0
13 : 56	2	1.3	19.0
13 : 57	3	1.3	19.0
13 : 58	4	1.3	19.0
13 : 59	5	1.3	19.0
14 : 0	6	1.4	19.0
14 : 1	7	1.3	19.0
14 : 2	8	1.2	19.1
14 : 3	9	1.1	19.2
14 : 4	10	1.1	19.2
14 : 5	11	1.1	19.2
14 : 6	12	1.1	19.2
14 : 7	13	1.2	19.1
14 : 8	14	1.2	19.1
14 : 9	15	1.2	19.2
14 : 10	16	1.2	19.2
14 : 14	17	1.2	19.1
14 : 15	18	1.2	19.2
14 : 16	19	1.1	19.2
14 : 17	20	1.2	19.2
14 : 18	21	1.3	19.1
14 : 19	22	1.3	19.1
14 : 20	23	1.3	19.1
14 : 21	24	1.5	18.9
14 : 22	25	1.4	19.0
14 : 23	26	1.4	19.0
14 : 24	27	1.4	18.9
14 : 25	28	1.4	18.9
14 : 26	29	1.4	19.0
14 : 27	30	1.3	19.0
14 : 28	31	1.4	18.9
14 : 29	32	1.4	19.0
14 : 34	33	1.3	19.1
14 : 35	34	1.3	19.1
14 : 36	35	1.1	19.2
14 : 37	36	1.1	19.2
14 : 38	37	1.2	19.1
14 : 39	38	9.9	8.9
14 : 40	39	19.4	1.2
14 : 41	40	19.5	1.3
14 : 42	41	18.0	4.0
14 : 43	42	2.7	18.3
14 : 44	43	1.2	19.0
14 : 45	44	1.4	18.9
14 : 46	45		18.9
14 : 54	46	6.6	12.3
14 : 55	47	18.9	1.6
14 : 56	48	1.3	19.0
14 : 57	49	1.3	19.0
14 : 58	50	1.3	18.9
14 : 59	51	1.3	19.0
15 : 0	52	0.9	19.3
15 : 1	53	1.0	19.2
15 : 2	54	1.0	19.2
15 : 3	55	1.0	19.2
15 : 4	56	1.2	19.1
15 : 5	57	1.2	19.1
15 : 6	58	1.2	19.1
15 : 7	59	1.3	19.0
15 : 8	60	1.3	19.1
15 : 9	61	1.4	19.0
AVERAGE:		1.3	19.1

Data not used: sample conditioner pump overheated and was turned off

Data not used: sample conditioner pump overheated and was turned off



**USEPA Method 3-A
Stack Oxygen
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/28/2007
Test Run #: 202-2/5B-1
Test Time: 1354-1510

Data Input:

Average chart reading (C):	1.25 % db
Average pre/post-test zero calibration reading (C _o):	0.05 % db
Calibration gas concentration (C _{ma}):	10.0 % db
Average pre/post-test calibration gas reading (C _m):	9.95 % db

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack Oxygen

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 1.21 \% \text{ db}$$



**USEPA Method 3-A
Stack CO2
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/28/2007
Test Run #: 202-2/5B-1
Test Time: 1354-1510

Data Input:

Average chart reading (C):	19.08 % db
Average pre/post-test zero calibration reading (C _o):	0.16 % db
Calibration gas concentration (C _{ma}):	10.0 % db
Average pre/post-test calibration gas reading (C _m):	9.86 % db

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack CO2

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{\text{ma}}}{C_m - C_o} = 19.50 \% \text{ db}$$



Reference Method Monitor Data One-Minute Averages

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/28/2007
Run #: 202-3/5B-2
Test Time: 1601-1735

		Clock Time	Elapsed Time	Monitor #1 Stack Oxygen %	Monitor #2 Stack CO2 %	
Reference Method Monitor #1:		16 : 01	0			5B start
Analyzer Type:	Stack Oxygen	16 : 2	1	1.4	19.0	
Analyzer Scale:	10.00 %	16 : 3	2	1.4	19.1	
Pre-test calibration span value:	9.95 %	16 : 4	3	1.4	19.0	
Post-test calibration span value:	9.95 %	16 : 5	4	1.3	19.1	
Pre-test calibration zero value:	0.06 %	16 : 6	5	1.2	19.2	
Post-test calibration zero value:	0.06 %	16 : 7	6	1.2	19.2	
Calibration gas type:	Protocol 1 Oxygen %	16 : 8	7	1.1	19.3	
Calibration gas concentration:	10.00 %	16 : 9	8	1.0	19.3	
Monitor uncorrected average (Method 5B):	1.20 %	16 : 10	9	1.2	19.2	
Monitor uncorrected average (Method 202):	1.18 %	16 : 11	10	1.2	19.1	
Monitor drift corrected average (Method 5B):	1.16 %	16 : 12	11	1.1	19.2	
Monitor drift corrected average (Method 202):	1.14 %	16 : 13	12	1.0	19.3	
Reference Method Monitor #2:		16 : 14	13	1.0	19.3	
Analyzer Type:	Stack CO2	16 : 15	14	1.1	19.3	5B stop
Analyzer Scale:	22.82 %	16 : 16	15	1.1	19.2	202 start
Pre-test calibration span value:	9.84 %	16 : 17	16	1.1	19.2	
Post-test calibration span value:	9.83 %	16 : 18	17	1.2	19.1	
Pre-test calibration zero value:	0.17 %	16 : 19	18	1.2	19.1	
Post-test calibration zero value:	0.15 %	16 : 20	19	1.2	19.1	5B start
Calibration gas type:	Protocol 1 CO2 %	16 : 21	20	1.3	19.0	
Calibration gas concentration:	10.00 %	16 : 22	21	1.3	19.1	
Monitor uncorrected average (Method 5B):	19.18 %	16 : 23	22	1.1	19.2	
Monitor uncorrected average (Method 202):	19.20 %	16 : 24	23	1.1	19.2	
Monitor drift corrected average (Method 5B):	19.66 %	16 : 25	24	1.2	19.2	
Monitor drift corrected average (Method 202):	19.68 %	16 : 26	25	1.1	19.3	
		16 : 27	26	1.3	19.1	
		16 : 28	27	1.3	19.2	
		16 : 29	28	1.2	19.2	
		16 : 30	29	1.0	19.3	202 stop
		16 : 31	30	1.1	19.2	
		16 : 32	31	1.1	19.3	
		16 : 33	32	1.2	19.2	
		16 : 34	33	1.2	19.2	
		16 : 35	34	1.2	19.1	
		16 : 36	35	1.2	19.2	202 start
		16 : 37	36	1.2	19.2	5B stop
		16 : 38	37	1.2	19.2	
		16 : 39	38	1.2	19.2	
		16 : 40	39	1.3	19.1	
		16 : 41	40	1.3	19.1	5B start
		16 : 42	41	1.3	19.1	
		16 : 43	42	1.2	19.2	
		16 : 44	43	1.2	19.2	
		16 : 45	44	1.2	19.2	
		16 : 46	45	1.0	19.4	
		16 : 47	46	1.0	19.4	
		16 : 48	47	1.1	19.2	
		16 : 49	48	1.2	19.1	
		16 : 50	49	1.2	19.1	
		16 : 51	50	1.3	19.1	202 stop
		16 : 52	51	1.3	19.0	
		16 : 53	52	1.4	19.0	202 start
		16 : 54	53	1.5	18.9	
		16 : 55	54	1.3	19.1	
		16 : 56	55	1.3	19.1	
		16 : 57	56	1.3	19.1	
		16 : 58	57	1.2	19.2	5B stop
		16 : 59	58	1.2	19.1	
		17 : 0	59	1.2	19.2	
		17 : 1	60	1.1	19.3	
		17 : 2	61	1.2	19.2	
		17 : 3	62	1.1	19.3	



Reference Method Monitor Data
One-Minute Averages

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/28/2007
Run #: 202-3/5B-2
Test Time: 1601-1735

Clock Time	Elapsed Time	Monitor #1	Monitor #2	
		Stack Oxygen %	Stack CO2 %	
17 : 4	63	1.1	19.3	5B start
17 : 5	64	1.1	19.3	
17 : 6	65	1.0	19.3	
17 : 7	66	1.0	19.4	
17 : 8	67	1.1	19.3	
17 : 9	68	1.2	19.2	
17 : 10	69	1.3	19.1	
17 : 11	70	1.3	19.1	
17 : 12	71	1.2	19.2	
17 : 13	72	1.2	19.2	
17 : 14	73	1.3	19.1	
17 : 15	74	1.3	19.1	
17 : 16	75	1.2	19.2	
17 : 17	76	1.1	19.2	202 stop
17 : 18	77	1.2	19.2	
17 : 19	78	1.4	19.1	202 start
17 : 20	79	1.2	19.2	5B end
17 : 21	80	1.2	19.2	
17 : 22	81	1.2	19.2	
17 : 23	82	1.2	19.1	
17 : 24	83	1.1	19.2	
17 : 25	84	1.2	19.2	
17 : 26	85	1.2	19.2	
17 : 27	86	1.2	19.2	
17 : 28	87	1.1	19.2	
17 : 29	88	1.2	19.2	
17 : 30	89	1.1	19.3	
17 : 31	90	1.1	19.3	
17 : 32	91	1.2	19.2	
17 : 33	92	1.2	19.2	
17 : 34	93	1.1	19.3	
17 : 35	94	1.1	19.4	202 end
M5B AVERAGE:		1.20	19.18	
M202 AVERAGE:		1.18	19.20	



**USEPA Method 3-A
Stack Oxygen
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/28/2007
Test Run #: 202-3/5B-2
Test Time: 1601-1735

Data Input:

Average chart reading (C):	1.20 % db
Average pre/post-test zero calibration reading (C _o):	0.06 % db
Calibration gas concentration (C _{ma}):	10.0 % db
Average pre/post-test calibration gas reading (C _m):	9.95 % db

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack Oxygen

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 1.16 \% \text{ db}$$



**USEPA Method 3-A
Stack CO₂
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/28/2007
Test Run #: 202-3/5B-2
Test Time: 1601-1735

Data Input:

Average chart reading (C):	19.18 % db
Average pre/post-test zero calibration reading (C _o):	0.16 % db
Calibration gas concentration (C _{ma}):	10.0 % db
Average pre/post-test calibration gas reading (C _m):	9.84 % db

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack CO₂

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{\text{ma}}}{C_m - C_o} = 19.66 \% \text{ db}$$



Reference Method Monitor Data One-Minute Averages

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/28/2007
Run #: M5B-3
Test Time: 1813-1923

Reference Method Monitor #1:	
Analyzer Type:	Stack Oxygen
Analyzer Scale:	10.00 %
Pre-test calibration span value:	9.95 %
Post-test calibration span value:	9.94 %
Pre-test calibration zero value:	0.06 %
Post-test calibration zero value:	0.05 %
Calibration gas type:	Protocol 1 Oxygen %
Calibration gas concentration:	10.00 %
Monitor uncorrected average:	1.19 %
Monitor drift corrected average:	1.15 %

Analyzer Type:	Stack CO2
Analyzer Scale:	22.82 %
Pre-test calibration span value:	9.83 %
Post-test calibration span value:	9.85 %
Pre-test calibration zero value:	0.15 %
Post-test calibration zero value:	0.14 %
Calibration gas type:	Protocol 1 CO2 %
Calibration gas concentration:	10.00 %
Monitor uncorrected average:	19.22 %
Monitor drift corrected average:	19.67 %

Clock Time	Elapsed Time	Monitor #1 Stack Oxygen %	Monitor #2 Stack CO2 %
18 : 13	0		
18 : 14	1	1.1	19.3
18 : 15	2	1.2	19.2
18 : 16	3	1.2	19.2
18 : 17	4	1.2	19.2
18 : 18	5	1.1	19.3
18 : 19	6	1.1	19.3
18 : 20	7	1.2	19.2
18 : 21	8	1.3	19.1
18 : 22	9	1.2	19.2
18 : 23	10	1.1	19.3
18 : 24	11	1.1	19.2
18 : 25	12	1.0	19.4
18 : 26	13	1.1	19.3
18 : 27	14	1.2	19.2
18 : 28	15	1.1	19.2
18 : 32	16	1.2	19.1
18 : 33	17	1.1	19.3
18 : 34	18	1.0	19.3
18 : 35	19	1.1	19.3
18 : 36	20	1.1	19.3
18 : 37	21	1.1	19.2
18 : 38	22	1.1	19.2
18 : 39	23	1.1	19.3
18 : 40	24	1.3	19.1
18 : 41	25	1.2	19.2
18 : 42	26	1.1	19.3
18 : 43	27	1.1	19.3
18 : 44	28	1.2	19.2
18 : 45	29	1.3	19.1
18 : 46	30	1.3	19.1
18 : 47	31	1.3	19.1
18 : 50	32	1.1	19.2
18 : 51	33	1.3	19.1
18 : 52	34	1.3	19.1
18 : 53	35	1.1	19.2
18 : 54	36	1.1	19.3
18 : 55	37	1.3	19.1
18 : 56	38	1.4	19.0
18 : 57	39	1.4	19.0
18 : 58	40	1.3	19.1
18 : 59	41	1.1	19.3
19 : 0	42	1.1	19.3
19 : 1	43	1.2	19.3
19 : 2	44	1.2	19.3
19 : 3	45	1.3	19.2
19 : 4	46	1.3	19.2
19 : 5	47	1.2	19.2
19 : 8	48	1.2	19.2
19 : 9	49	1.3	19.2
19 : 10	50	1.1	19.3
19 : 11	51	1.2	19.3
19 : 12	52	1.1	19.3
19 : 13	53	1.2	19.3
19 : 14	54	1.1	19.3
19 : 15	55	1.2	19.2
19 : 16	56	1.2	19.3
19 : 17	57	1.2	19.2
19 : 18	58	1.2	19.2
19 : 19	59	1.3	19.2
19 : 20	60	1.3	19.1
19 : 21	61	1.3	19.2
19 : 22	62	1.2	19.3
19 : 23	63	1.1	19.3
AVERAGE:		1.2	19.2



**USEPA Method 3-A
Stack Oxygen
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/28/2007
Test Run #: M5B-3
Test Time: 1813-1923

Data Input:

Average chart reading (C):	1.19 % db
Average pre/post-test zero calibration reading (C _o):	0.06 % db
Calibration gas concentration (C _{ma}):	10.0 % db
Average pre/post-test calibration gas reading (C _m):	9.94 % db

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack Oxygen

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 1.15 \% \text{ db}$$



**USEPA Method 3-A
Stack CO2
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/28/2007
Test Run #: M5B-3
Test Time: 1813-1923

Data Input:

Average chart reading (C):	19.22 % db
Average pre/post-test zero calibration reading (C _o):	0.15 % db
Calibration gas concentration (C _{ma}):	10.0 % db
Average pre/post-test calibration gas reading (C _m):	9.84 % db

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack CO2

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 19.67 \% \text{ db}$$

ARI ENVIRONMENTAL, INC.
MOISTURE CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/28/2007
RUN NUMBER: 5B-1

γ FACTOR:	0.969	STACK DIAM:	117.00 inches
BAROMETRIC:	30.12 in. Hg	METER VOLUME:	49.278 ft ³
STATIC PRES:	0.20 in.H ₂ O	METER TEMP:	90.3 °F
STACK TEMP:	145.2 °F	LIQUID COLL:	337.4 milliliters
SQ.RT ΔP:	0.5749 in.H ₂ O	CO₂:	19.50 % by volume
ΔH:	1.90 in.H ₂ O	O₂:	1.21 % by volume

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE

@ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92} \right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = 46.336 \text{ dscf}$$

$\gamma = 0.969$

VOLUME OF WATER IN SAMPLE

@ STANDARD CONDITIONS

$$V_{wstd} = 0.04707 \times V_{lc} = 15.881 \text{ scf}$$

$$V_{lc} = 337.4 \text{ mL}$$

$$V_{lc} = 280.4 \text{ mL adjusted for saturation}$$

FRACTIONAL MOISTURE CONTENT OF STACK GAS AS MEASURED

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} = 0.2553$$

FRACTIONAL MOISTURE CONTENT OF STACK GAS @ SATURATION

$$B_{ws@saturation} = \frac{S.V.P.}{P_{bar} + \frac{P_{static}}{13.6}} = 0.2217$$

$$S.V.P. = 6.68 \text{ in. Hg}$$

FRACTIONAL MOISTURE CONTENT USED IN CALCULATIONS

$$B_{ws} = 0.2217$$

ARI ENVIRONMENTAL, INC.
FLOW RATE CALCULATION SUMMARY

COMPANY: Valero Refining Compar
LOCATION: Paulsboro, NJ
RUN NUMBER: 5B-1

SOURCE: FCC FGS
TEST DATE: 8/28/2007

BAROMETRIC: 30.12 in. Hg	STACK DIAM: 117.00 inches
STATIC PRES: 0.2 in.H ₂ O	CO₂: 19.50 % by volume
STACK TEMP: 145.2 °F	O₂: 1.21 % by volume
SQ.RT ΔP: 0.5749 in.H ₂ O	

DRY MOLECULAR WEIGHT OF STACK GAS			
$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$	=	31.17	lb/lb-mole
MOLECULAR WEIGHT OF STACK GAS, wet basis			
$M_s = M_d(1 - B_{ws}) + 18B_{ws}$	=	28.25	lb/lb-mole
PITOT TUBE COEFFICIENT			
C_p (from calibration curve or geometric specifications)	=	0.84	
AVERAGE VELOCITY HEAD OF STACK GAS, in. H₂O			
$\sqrt{\Delta P} = \frac{1}{n} \sum_{i=1}^n \sqrt{\Delta p_i}$	=	0.5749	in. H ₂ O
AVERAGE ABSOLUTE STACK GAS TEMPERATURE			
$T_s = 145.2 \text{ °F} + 460$	=	605.2	°R
ABSOLUTE STACK GAS PRESSURE			
$P_s = P_{bar} + \frac{P_{static}}{13.6}$	=	30.13	in.Hg
STACK GAS VELOCITY			
$V_s = (85.49)(C_p)(\text{avg}\sqrt{\Delta P})\sqrt{\frac{T_s}{(P_s)(M_s)}}$	=	34.810	ft/sec
$Q_s = 60 \times V_s \times A_s$	=	155,937	acfm
Stack Area =		74.662 ft ²	
STACK GAS VOLUMETRIC FLOW RATE, standard conditions, wet basis			
$Q_{stdw} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)$	=	137,022 8,221,304	scfm, wb scfh, wb
STACK GAS VOLUMETRIC FLOW RATE, standard conditions, dry basis			
$Q_{std} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)(1 - B_{ws})$	=	106,648 6,398,877	dscfm dscfh

ARI ENVIRONMENTAL, INC.
USEPA METHOD 5B - FILTERABLE NONSULFURIC ACID PARTICULATE CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/28/07
RUN NUMBER: 5B-1

INPUT

V_m:	49.278	ft³	Q_s:	106,648	dscfm
γ FACTOR:	0.969		T_s:	145.2	°F
P_{bar}:	30.12	in.Hg	Runtime:	60	minutes
ΔH:	1.9	in.H₂O	V_s:	34.810	ft/sec
T_m:	90.3	°F	P_s:	30.13	in.Hg
V_{ic}:	337.4	mL	Noz. diam:	0.311	inches
M_n front:	97.2	mg	Regenerator Coke Burn (R_c):	39,072	lb/hr

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE @ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92} \right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = 46.336 \text{ dscf}$$

$\gamma = 0.969$

PARTICULATE CONCENTRATION IN STACK GAS ON A DRY BASIS

$$C_s = (0.01543) \left(\frac{M_n}{V_{mstd}} \right) \quad \text{Total} = 0.03237 \text{ gr/dscf}$$

$$C'_s = (2.205 \times 10^{-6}) \left(\frac{M_n}{V_{mstd}} \right) \quad C'_s \text{ Total} = 4.6255 \times 10^{-6} \text{ lbs/dscf}$$

EMISSION RATE

$$pmr = \left(\frac{C_s}{7000} \right) (Q_{std})(60) \quad \text{Total} = 29.589 \text{ lbs/hr}$$

$$pmr_{lb/1000lb \text{ coke burn}} = \frac{(pmr)(1000)}{(R_c)} = 129.60 \text{ ton/yr}$$

$$= 0.757 \text{ lb/1000 lb coke burn}$$

ISOKINETIC SAMPLING RATE

$$\%ISO = \frac{(100)(T_s) \left[(0.002669 \times V_{ic}) + \left(\frac{V_m}{T_m} \right) (\gamma) \left(P_{bar} + \left(\frac{\Delta H}{13.6} \right) \right) \right]}{(60)(\theta)(V_s)(P_s)(A_n)} = 107.12 \text{ \% I}$$

102.50 @ saturation

A_n = 0.000528 ft² **Runtime = 60 minutes**

ARI ENVIRONMENTAL, INC.
NJATM1 - FILTERABLE PARTICULATE CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/28/07
RUN NUMBER: 202-1

INPUT

V_m:	45.242	ft ³	Q_s:	97,345	dscfm
γ FACTOR:	1.002		T_s:	149.4	°F
P_{bar}:	30.12	in.Hg	Runtime:	60	minutes
ΔH:	1.87	in.H ₂ O	V_s:	32.984	ft/sec
T_m:	86.4	°F	P_s:	30.13	in.Hg
V_{lc}:	316.6	mL	Noz. diam:	0.309	inches
M_n front:	113.07	mg			

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE @ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92} \right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = 44.300 \text{ dscf}$$

$\gamma = 1.002$

PARTICULATE CONCENTRATION IN STACK GAS ON A DRY BASIS

$$C_s = (0.01543) \left(\frac{M_n}{V_{mstd}} \right) \quad \text{Total} = 0.03938 \text{ gr/dscf}$$

$$C'_s = (2.205 \times 10^{-6}) \left(\frac{M_n}{V_{mstd}} \right) \quad C'_s \text{ Total} = 5.6280 \times 10^{-6} \text{ lbs/dscf}$$

EMISSION RATE

$$pmr = \left(\frac{C_s}{7000} \right) (Q_{std}) (60) \quad \text{Total} = \begin{matrix} 32.8606 \text{ lbs/hr} \\ 143.9293 \text{ ton/yr} \end{matrix}$$

ISOKINETIC SAMPLING RATE

$$\%ISO = \frac{(100)(T_s) \left[(0.002669 \times V_{lc}) + \left(\frac{V_m}{T_m} \right) (\gamma) \left(P_{bar} + \left(\frac{\Delta H}{13.6} \right) \right) \right]}{(60)(\theta)(V_s)(P_s)(A_n)} = \begin{matrix} 109.73 \text{ \% I} \\ 108.76 \text{ @ saturation} \end{matrix}$$

$A_n = 0.000521 \text{ ft}^2 \quad \text{Runtime} = 60 \text{ minutes}$

ARI ENVIRONMENTAL, INC.
USEPA METHOD 202 - CONDENSIBLE PARTICULATE CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/28/07
RUN NUMBER: 202-1

INPUT

V_m:	45.242	ft ³	Q_s:	97,345	dscfm
γ FACTOR:	1.002		T_s:	149.4	°F
P_{bar}:	30.12	in.Hg	Runtime:	60	minutes
ΔH:	1.87	in.H ₂ O	V_s:	32.984	ft/sec
T_m:	86.4	°F	P_s:	30.13	in.Hg
V_{lc}:	316.6	mL	Noz. diam:	0.309	inches
K:	0.1840		V_{ic}:	660	mL
C_{SO4}:	0.04931	mg/mL	V_b:	10	mL
m_r:	38.68	mg	m_b:	59.79	mg
m_o:	20.4	mg			

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

MASS OF NH₄⁺ ADDED TO SAMPLE TO FORM AMMONIUM SULFATE

$$m_c = K C_{SO_2} V_{lc} = 5.9882 \text{ mg}$$

MASS OF INORGANIC CONDENSIBLE PARTICULATE MATTER

$$m_i = m_r \frac{V_{lc}}{V_{lc} - V_b} - m_c = 33.29 \text{ mg}$$

CONCENTRATION OF CONDENSIBLE PARTICULATE MATTER

$$C_{cpm} = \frac{m_o + m_i - m_b}{V M_{std}} = \begin{matrix} 0.0000 & \text{mg/dscf} \\ 0.000 & \text{lb/dscf} \times 10^{-6} \end{matrix}$$

PARTICULATE CONCENTRATION IN STACK GAS ON A DRY BASIS

$$C_s = (0.01543)(C_{cpm}) \quad \text{Total} = 0.00000 \text{ gr/dscf}$$

$$C'_s = (2.205 \times 10^{-6})(C_{cpm}) \quad C'_s \text{ Total} = 0.0000 \times 10^{-6} \text{ lbs/dscf}$$

EMISSION RATE

$$pmr = \left(\frac{C_s}{7000} \right) (Q_{std})(60) \quad \text{Total} = \begin{matrix} 0.00000 & \text{lbs/hr} \\ 0.00000 & \text{ton/yr} \end{matrix}$$

ISOKINETIC SAMPLING RATE

$$\%ISO = \frac{(100)(T_s) \left[(0.002669 \times V_{lc}) + \left(\frac{V_m}{T_m} \right) (\gamma) \left(P_{bar} + \left(\frac{\Delta H}{13.6} \right) \right) \right]}{(60)(\theta)(V_s)(P_s)(A_n)} = \begin{matrix} 109.73 & \% I \\ 108.76 & @ \text{ saturation} \end{matrix}$$

$$A_n = 0.000521 \text{ ft}^2 \quad \text{Runtime} = 60 \text{ minutes}$$

ARI ENVIRONMENTAL, INC.
MOISTURE CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/28/2007
RUN NUMBER: 5B-2

γ FACTOR:	0.969	STACK DIAM:	117.00 inches
BAROMETRIC:	30.12 in. Hg	METER VOLUME:	44.835 ft ³
STATIC PRES:	0.19 in.H ₂ O	METER TEMP:	98.5 °F
STACK TEMP:	144.2 °F	LIQUID COLL:	289.2 milliliters
SQ.RT ΔP:	0.5369 in.H ₂ O	CO₂:	19.66 % by volume
ΔH:	1.57 in.H ₂ O	O₂:	1.16 % by volume

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE

@ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92} \right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = 41.506 \text{ dscf}$$

$\gamma = 0.969$

VOLUME OF WATER IN SAMPLE

@ STANDARD CONDITIONS

$$V_{wstd} = 0.04707 \times V_{lc} = 13.613 \text{ scf}$$

$$V_{lc} = 289.2 \text{ mL}$$

$$V_{lc} = 243.1 \text{ mL adjusted for saturation}$$

FRACTIONAL MOISTURE CONTENT OF STACK GAS AS MEASURED

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} = 0.2470$$

FRACTIONAL MOISTURE CONTENT OF STACK GAS @ SATURATION

$$B_{ws@saturation} = \frac{S.V.P.}{P_{bar} + \frac{P_{static}}{13.6}} = 0.2161$$

$$S.V.P. = 6.513 \text{ in. Hg}$$

FRACTIONAL MOISTURE CONTENT USED IN CALCULATIONS

$$B_{ws} = 0.2161$$

ARI ENVIRONMENTAL, INC.
USEPA METHOD 5B - FILTERABLE NONSULFURIC ACID PARTICULATE CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/28/07
RUN NUMBER: 5B-2

INPUT

V_m:	44.835	ft³	Q_s:	100,227	dscfm
γ FACTOR:	0.969		T_s:	144.2	°F
P_{bar}:	30.12	in.Hg	Runtime:	60	minutes
ΔH:	1.57	in.H₂O	V_s:	32.430	ft/sec
T_m:	98.5	°F	P_s:	30.13	in.Hg
V_{lc}:	289.2	mL	Noz. diam:	0.311	inches
M_n front:	83.1	mg	Regenerator Coke Burn (R_c):	39,421	lb/hr

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE @ STANDARD CONDITIONS, DRY BASIS					
$V_{mstd} = \left(\frac{528}{29.92} \right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right]$		=	41.506	dscf	
$\gamma = 0.969$					
PARTICULATE CONCENTRATION IN STACK GAS ON A DRY BASIS					
$C_s = (0.01543) \left(\frac{M_n}{V_{mstd}} \right)$		Total	=	0.03089	gr/dscf
$C'_s = (2.205 \times 10^{-6}) \left(\frac{M_n}{V_{mstd}} \right)$		C' s Total	=	4.4147	x 10⁻⁶ lbs/dscf
EMISSION RATE					
$pmr = \left(\frac{C_s}{7000} \right) (Q_{std})(60)$		Total	=	26.540 116.24	lbs/hr ton/yr
$pmr_{lb/1000lb\ coke\ burn} = \frac{(pmr)(1000)}{(R_c)}$		=	0.673	lb/1000 lb coke burn	
ISOKINETIC SAMPLING RATE					
$\%ISO = \frac{(100)(T_s) \left[(0.002669 \times V_{lc}) + \left(\frac{V_m}{T_m} \right) \left(\gamma \left(P_{bar} + \left(\frac{\Delta H}{13.6} \right) \right) \right) \right]}{(60)(\theta)(V_s)(P_s)(A_n)}$		=	101.70 97.70	% I @ saturation	
$A_n = 0.000528 \text{ ft}^2$		Runtime =	60	minutes	

ARI ENVIRONMENTAL, INC.
FLOW RATE CALCULATION SUMMARY

COMPANY: Valero Refining Compar
LOCATION: Paulsboro, NJ
RUN NUMBER: 5B-2

SOURCE: FCC FGS
TEST DATE: 8/28/2007

BAROMETRIC: 30.12 in. Hg	STACK DIAM: 117.00 inches
STATIC PRES: 0.19 in.H ₂ O	CO₂: 19.66 % by volume
STACK TEMP: 144.2 °F	O₂: 1.16 % by volume
SQ.RT ΔP: 0.5369 in.H ₂ O	

DRY MOLECULAR WEIGHT OF STACK GAS			
$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$	=	31.19	lb/lb-mole
MOLECULAR WEIGHT OF STACK GAS, wet basis			
$M_s = M_d (1 - B_{ws}) + 18B_{ws}$	=	28.34	lb/lb-mole
PITOT TUBE COEFFICIENT			
C_p (from calibration curve or geometric specifications)	=	0.84	
AVERAGE VELOCITY HEAD OF STACK GAS, in. H₂O			
$\sqrt{\Delta P} = \frac{1}{n} \sum_{i=1}^n \sqrt{\Delta p_i}$	=	0.5369	in. H ₂ O
AVERAGE ABSOLUTE STACK GAS TEMPERATURE			
$T_s = 144.2 \text{ °F} + 460$	=	604.2	°R
ABSOLUTE STACK GAS PRESSURE			
$P_s = P_{bar} + \frac{P_{static}}{13.6}$	=	30.13	in.Hg
STACK GAS VELOCITY			
$V_s = (85.49)(C_p)(\text{avg } \sqrt{\Delta P}) \sqrt{\frac{T_s}{(P_s)(M_s)}}$	=	32.430	ft/sec
STACK GAS VOLUMETRIC FLOW RATE, actual			
$Q_s = 60 \times V_s \times A_s$	=	145,276	acfm
Stack Area =		74.662	ft ²
STACK GAS VOLUMETRIC FLOW RATE, standard conditions, wet basis			
$Q_{stdw} = \left(\frac{528}{29.92} \right) (Q_s) \left(\frac{P_s}{T_s} \right)$	=	127,862 7,671,744	scfm, wb scfh, wb
STACK GAS VOLUMETRIC FLOW RATE, standard conditions, dry basis			
$Q_{std} = \left(\frac{528}{29.92} \right) (Q_s) \left(\frac{P_s}{T_s} \right) (1 - B_{ws})$	=	100,227 6,013,613	dscfm dscfh

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

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/28/2007
RUN NUMBER: 5B-3

γ FACTOR:	0.969	STACK DIAM:	117.00 inches
BAROMETRIC:	30.12 in. Hg	METER VOLUME:	46.479 ft ³
STATIC PRES:	0.20 in.H ₂ O	METER TEMP:	88.6 °F
STACK TEMP:	144.5 °F	LIQUID COLL:	293.7 milliliters
SQ.RT ΔP:	0.5676 in.H ₂ O	CO₂:	19.67 % by volume
ΔH:	1.69 in.H ₂ O	O₂:	1.15 % by volume

**ENGLISH UNITS
(29.92 in.Hg & °F)**

VOLUME OF SAMPLE

@ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92} \right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = 43.817 \text{ dscf}$$

$\gamma = 0.969$

VOLUME OF WATER IN SAMPLE

@ STANDARD CONDITIONS

$$V_{wstd} = 0.04707 \times V_{lc} = 13.824 \text{ scf}$$

$$V_{lc} = 293.7 \text{ mL}$$

$$V_{lc} = 265.1 \text{ mL adjusted for saturation}$$

FRACTIONAL MOISTURE CONTENT OF STACK GAS AS MEASURED

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} = 0.2398$$

FRACTIONAL MOISTURE CONTENT OF STACK GAS @ SATURATION

$$B_{ws@saturation} = \frac{S.V.P.}{P_{bar} + \frac{P_{static}}{13.6}} = 0.2217$$

$$S.V.P. = 6.68 \text{ in. Hg}$$

FRACTIONAL MOISTURE CONTENT USED IN CALCULATIONS

$$B_{ws} = 0.2217$$

ARI ENVIRONMENTAL, INC.
FLOW RATE CALCULATION SUMMARY

COMPANY: Valero Refining Compar
LOCATION: Paulsboro, NJ
RUN NUMBER: 5B-3

SOURCE: FCC FGS
TEST DATE: 8/28/2007

BAROMETRIC: 30.12 in. Hg STATIC PRES: 0.2 in.H ₂ O STACK TEMP: 144.5 °F SQ.RT ΔP: 0.5676 in.H ₂ O	STACK DIAM: 117.00 inches CO₂: 19.67 % by volume O₂: 1.15 % by volume

DRY MOLECULAR WEIGHT OF STACK GAS			
$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$	=	31.19	lb/lb-mole
MOLECULAR WEIGHT OF STACK GAS, wet basis			
$M_s = M_d (1 - B_{ws}) + 18B_{ws}$	=	28.27	lb/lb-mole
PITOT TUBE COEFFICIENT			
C_p (from calibration curve or geometric specifications)	=	0.84	
AVERAGE VELOCITY HEAD OF STACK GAS, in. H₂O			
$\overline{\sqrt{\Delta P}} = \frac{1}{n} \sum_{i=1}^n \sqrt{\Delta p_i}$	=	0.5676	in. H ₂ O
AVERAGE ABSOLUTE STACK GAS TEMPERATURE			
$T_s = 144.5 \text{ °F} + 460$	=	604.5	°R
ABSOLUTE STACK GAS PRESSURE			
$P_s = P_{bar} + \frac{P_{static}}{13.6}$	=	30.13	in.Hg
STACK GAS VELOCITY			
$V_s = (85.49)(C_p)(\text{avg}\sqrt{\Delta P})\sqrt{\frac{T_s}{(P_s)(M_s)}}$	=	34.336	ft/sec
STACK GAS VOLUMETRIC FLOW RATE, actual			
$Q_s = 60 \times V_s \times A_s$	=	153,815	acfm
Stack Area =		74.662 ft ²	
STACK GAS VOLUMETRIC FLOW RATE, standard conditions, wet basis			
$Q_{stdw} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)$	=	135,314 8,118,836	scfm, wb scfh, wb
STACK GAS VOLUMETRIC FLOW RATE, standard conditions, dry basis			
$Q_{std} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)(1 - B_{ws})$	=	105,319 6,319,123	dscfm dscfh

ARI ENVIRONMENTAL, INC.
NJATM1 - FILTERABLE PARTICULATE CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/28/07
RUN NUMBER: 202-2

INPUT

V_m:	46.046	ft³	Q_s:	101,497	dscfm
γ FACTOR:	1.002		T_s:	150.4	°F
P_{bar}:	30.09	in.Hg	Runtime:	60	minutes
ΔH:	1.9	in.H₂O	V_s:	34.305	ft/sec
T_m:	90.6	°F	P_s:	30.10	in.Hg
V_{lc}:	301.8	mL	Noz. diam:	0.309	inches
M_n front:	120.51	mg			

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE @ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92} \right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = 44.702 \text{ dscf}$$

$$\gamma = 1.002$$

PARTICULATE CONCENTRATION IN STACK GAS ON A DRY BASIS

$$C_s = (0.01543) \left(\frac{M_n}{V_{mstd}} \right) \quad \text{Total} = 0.04160 \text{ gr/dscf}$$

$$C'_s = (2.205 \times 10^{-6}) \left(\frac{M_n}{V_{mstd}} \right) \quad C'_s \text{ Total} = 5.9443 \times 10^{-6} \text{ lbs/dscf}$$

EMISSION RATE

$$pmr = \left(\frac{C_s}{7000} \right) (Q_{std})(60) \quad \text{Total} = \begin{matrix} 36.1882 \text{ lbs/hr} \\ 158.5042 \text{ ton/yr} \end{matrix}$$

ISOKINETIC SAMPLING RATE

$$\%ISO = \frac{(100)(T_s) \left[(0.002669 \times V_{lc}) + \left(\frac{V_m}{T_m} \right) (\gamma) \left(P_{bar} + \left(\frac{\Delta H}{13.6} \right) \right) \right]}{(60)(\theta)(V_s)(P_s)(A_n)} = 105.26 \text{ \% I}$$

A_n = 0.000521 ft² Runtime = 60 minutes

ARI ENVIRONMENTAL, INC.
USEPA METHOD 202 - CONDENSIBLE PARTICULATE CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/28/07
RUN NUMBER: 202-2

INPUT

V_m: 46.046 ft³
γ FACTOR: 1.002
P_{bar}: 30.09 in.Hg
ΔH: 1.9 in.H₂O
T_m: 90.6 °F
V_{ic}: 301.8 mL
K: 0.1840
C_{SO4}: 0.04931 mg/mL
m_r: 38.68 mg
m_o: 20.40 mg

Q_s: 101,497 dscfm
T_s: 150.4 °F
Runtime: 60 minutes
V_s: 34.305 ft/sec
P_s: 30.10 in.Hg
Noz. diam: 0.309 inches
V_{ic}: 600 mL
V_b: 10 mL
m_b: 59.79 mg

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

MASS OF NH₄⁺ ADDED TO SAMPLE TO FORM AMMONIUM SULFATE

$$m_c = KC_{SO_2} V_{ic} = 5.4438 \text{ mg}$$

MASS OF INORGANIC CONDENSIBLE PARTICULATE MATTER

$$m_i = m_r \frac{V_{ic}}{V_{ic} - V_b} - m_c = 33.89 \text{ mg}$$

CONCENTRATION OF CONDENSIBLE PARTICULATE MATTER

$$C_{cpm} = \frac{m_o + m_i - m_b}{VM_{std}} = \begin{matrix} 0.0000 & \text{mg/dscf} \\ 0.000 & \text{lb/dscf} \times 10^{-6} \end{matrix}$$

PARTICULATE CONCENTRATION IN STACK GAS ON A DRY BASIS

$$C_s = (0.01543)(C_{cpm}) \quad \text{Total} = 0.00000 \text{ gr/dscf}$$

$$C'_s = (2.205 \times 10^{-6})(C_{cpm}) \quad C'_s \text{ Total} = 0.0000 \times 10^{-6} \text{ lbs/dscf}$$

EMISSION RATE

$$pmr = \left(\frac{C_s}{7000} \right) (Q_{std})(60) \quad \text{Total} = \begin{matrix} 0.0000 & \text{lbs/hr} \\ 0.0000 & \text{ton/yr} \end{matrix}$$

ISOKINETIC SAMPLING RATE

$$\%ISO = \frac{(100)(T_s) \left[(0.002669 \times V_{ic}) + \left(\frac{V_m}{T_m} \right) (\gamma) \left(P_{bar} + \left(\frac{\Delta H}{13.6} \right) \right) \right]}{(60)(\theta)(V_s)(P_s)(A_n)} = 105.26 \%$$

$$A_n = 0.000521 \text{ ft}^2$$

$$\text{Runtime} = 60 \text{ minutes}$$

ARI ENVIRONMENTAL, INC.
USEPA METHOD 5B - FILTERABLE NONSULFURIC ACID PARTICULATE CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/28/07
RUN NUMBER: 5B-3

INPUT

V_m:	46.479	ft³	Q_s:	105,319	dscfm
γ FACTOR:	0.969		T_s:	144.5	°F
P_{bar}:	30.12	in.Hg	Runtime:	60	minutes
ΔH:	1.69	in.H₂O	V_s:	34.336	ft/sec
T_m:	88.6	°F	P_s:	30.13	in.Hg
V_{ic}:	293.7	mL	Noz. diam:	0.311	inches
M_n front:	84.5	mg	Regenerator Coke Burn (R_c):	38,845	lb/hr

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE @ STANDARD CONDITIONS, DRY BASIS					
$V_{mstd} = \left(\frac{528}{29.92} \right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right]$			=	43.817	dscf
$\gamma = 0.969$					
PARTICULATE CONCENTRATION IN STACK GAS ON A DRY BASIS					
$C_s = (0.01543) \left(\frac{M_n}{V_{mstd}} \right)$			Total	=	0.02976 gr/dscf
$C'_s = (2.205 \times 10^{-6}) \left(\frac{M_n}{V_{mstd}} \right)$			C'_s Total	=	4.2523 x 10⁻⁶ lbs/dscf
EMISSION RATE					
$pmr = \left(\frac{C_s}{7000} \right) (Q_{std})(60)$			Total	=	26.862 lbs/hr
				=	117.66 ton/yr
$pmr_{lb/1000lb\ coke\ burn} = \frac{(pmr)(1000)}{(R_c)}$				=	0.692 lb/1000 lb coke burn
ISOKINETIC SAMPLING RATE					
$\%ISO = \frac{(100)(T_s) \left[(0.002669 \times V_{IC}) + \left(\frac{V_m}{T_m} \right) (\gamma) \left(P_{bar} + \left(\frac{\Delta H}{13.6} \right) \right) \right]}{(60)(\theta)(V_s)(P_s)(A_n)}$			=	100.50 % I	
$A_n = 0.000528 \text{ ft}^2$			Runtime =	60	minutes
					98.15 @ saturation

ARI ENVIRONMENTAL, INC.
NJATM1 - FILTERABLE PARTICULATE CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/28/07
RUN NUMBER: 202-3

INPUT

V_m:	45.367	ft³	Q_s:	104,340	dscfm
γ FACTOR:	1.002		T_s:	149.9	°F
P_{bar}:	30.12	in.Hg	Runtime:	60	minutes
ΔH:	1.877	in.H₂O	V_s:	34.905	ft/sec
T_m:	98	°F	P_s:	30.13	in.Hg
V_{lc}:	283.4	mL	Noz. diam:	0.309	inches
M_n front:	95.26	mg			

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE @ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92} \right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = 43.500 \text{ dscf}$$

$\gamma = 1.002$

PARTICULATE CONCENTRATION IN STACK GAS ON A DRY BASIS

$$C_s = (0.01543) \left(\frac{M_n}{V_{mstd}} \right) \quad \text{Total} = 0.03379 \text{ gr/dscf}$$

$$C'_s = (2.205 \times 10^{-6}) \left(\frac{M_n}{V_{mstd}} \right) \quad C'_s \text{ Total} = 4.8287 \times 10^{-6} \text{ lbs/dscf}$$

EMISSION RATE

$$pmr = \left(\frac{C_s}{7000} \right) (Q_{std}) (60) \quad \text{Total} = \begin{matrix} 30.2199 \text{ lbs/hr} \\ 132.3632 \text{ ton/yr} \end{matrix}$$

ISOKINETIC SAMPLING RATE

$$\%ISO = \frac{(100)(T_s) \left[(0.002669 \times V_{lc}) + \left(\frac{V_m}{T_m} \right) \left(\gamma \left(P_{bar} + \left(\frac{\Delta H}{13.6} \right) \right) \right) \right]}{(60)(\theta)(V_s)(P_s)(A_n)} = 99.63 \%$$

$A_n = 0.000521 \text{ ft}^2$ Runtime = 60 minutes

ARI ENVIRONMENTAL, INC.
USEPA METHOD 202 - CONDENSIBLE PARTICULATE CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/28/07
RUN NUMBER: 202-3

INPUT

V_m: 45.367 ft³
γ FACTOR: 1.002
P_{bar}: 30.12 in.Hg
ΔH: 1.877 in.H₂O
T_m: 98.0 °F
V_{ic}: 283.4 mL
K: 0.1840
C_{SO4}: 0.03512 mg/mL
m_r: 52.83 mg
m_o: 20.40 mg

Q_s: 104,340 dscfm
T_s: 149.9 °F
Runtime: 60 minutes
V_s: 34.905 ft/sec
P_s: 30.13 in.Hg
Noz. diam: 0.309 inches
V_{ic}: 590 mL
V_b: 10 mL
m_b: 59.79 mg

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

MASS OF NH₄⁺ ADDED TO SAMPLE TO FORM AMMONIUM SULFATE

$$m_c = KC_{SO_2}V_{ic} = 3.8126 \text{ mg}$$

MASS OF INORGANIC CONDENSIBLE PARTICULATE MATTER

$$m_i = m_r \frac{V_{ic}}{V_{ic} - V_b} - m_c = 49.93 \text{ mg}$$

CONCENTRATION OF CONDENSIBLE PARTICULATE MATTER

$$C_{cpm} = \frac{m_o + m_i - m_b}{VM_{std}} = \begin{matrix} 0.2423 \text{ mg/dscf} \\ 0.534 \text{ lb/dscf} \times 10^{-6} \end{matrix}$$

PARTICULATE CONCENTRATION IN STACK GAS ON A DRY BASIS

$$C_s = (0.01543)(C_{cpm}) \quad \text{Total} = 0.00374 \text{ gr/dscf}$$

$$C'_s = (2.205 \times 10^{-6})(C_{cpm}) \quad C'_s \text{ Total} = 0.5342 \times 10^{-6} \text{ lbs/dscf}$$

EMISSION RATE

$$pmr = \left(\frac{C_s}{7000} \right) (Q_{std})(60) \quad \text{Total} = \begin{matrix} 3.3431 \text{ lbs/hr} \\ 14.643 \text{ ton/yr} \end{matrix}$$

ISOKINETIC SAMPLING RATE

$$\%ISO = \frac{(100)(T_s) \left[(0.002669 \times V_{ic}) + \left(\frac{V_m}{T_m} \right) (\gamma) \left(P_{bar} + \left(\frac{\Delta H}{13.6} \right) \right) \right]}{(60)(\theta)(V_s)(P_s)(A_n)} = 99.63 \%$$

$$A_n = 0.000521 \text{ ft}^2$$

$$\text{Runtime} = 60 \text{ minutes}$$

Ion Data - Corrected for Blank Analysis

IPA	Uncorrected data from 8/29/07				Volume of Solutions, mL				Blank corrected Data		
	M8-1	M8-2	M8-3	Blank	M8-1	M8-2	M8-3	Blank	M8-1	M8-2	M8-3
Ammonium	14.14	12.64	12.06	0.08	1000	1000	1000	1000	14.140	12.640	12.060
Aluminum	0.500	0.369	0.347	0.271	1000	1000	1000	1000	0.229	0.098	0.076
Calcium	1.210	0.630	0.600	0.080	1000	1000	1000	1000	1.130	0.550	0.520
Potassium	1.380	0.900	0.840	0.110	1000	1000	1000	1000	1.270	0.790	0.730
Sodium	5.730	4.050	4.180	0.860	1000	1000	1000	1000	4.870	3.190	3.320
Chloride	0.40	0.58	0.56	0.15	1000	1000	1000	1000	0.400	0.580	0.560
Flouride	0.17	ND	0.17	ND	1000	1000	1000	1000	ND	ND	ND
Sulfate	55.64	51.68	57.88	0.26	1000	1000	1000	1000	55.640	51.680	57.880
Sulfite	1.49	2.67	0.22	ND	1000	1000	1000	1000	1.490	2.670	ND

MODIFIED USEPA METHOD 8/TACB METHOD 24 CALCULATION SHEET
(modified to include sodium, potassium, calcium and aluminum)

IPA 1 of 2

Client: Valero Refining Company
Source: FCC FGS

Run Numbers:	M8-1	M8-2	M8-3
Date:	1/16/2007	1/16/2007	1/16/2007

INPUT DATA:

IPA Absorber

Ammonium Cation

NH ₄ ⁺ conc. in IPA Absorber Extract, E = µg/mL	14.14	12.64	12.06
Dilution Factor (DF) =	1	1	1
Volume of Extracting Solution (V _{sol}) = mL	1000	1000	1000
Ionic weight of NH ₄ ⁺ =	18	18	18
$D_{NH_4} = \frac{E \times (DF)(V_{sol})}{18} =$ µmoles	785.56	702.22	670.00

Sodium Cation

Na ⁺ conc. in IPA Absorber Extract, E _e = µg/mL	4.87	3.19	3.32
Dilution Factor (DF) =	1	1	1
Volume of Extracting Solution (V _{sol}) = mL	1000	1000	1000
Ionic weight of Na ⁺ =	23	23	23
$D_{Na} = \frac{E_e \times (DF)(V_{sol})}{23} =$ µmoles	211.74	138.70	144.35

Potassium Cation

K ⁺ conc. in IPA Absorber Extract, E _{ee} = µg/mL	1.27	0.79	0.73
Dilution Factor (DF) =	1	1	1
Volume of Extracting Solution (V _{sol}) = mL	1000	1000	1000
Ionic weight of K ⁺ =	39.1	39.1	39.1
$D_K = \frac{E_{ee} \times (DF)(V_{sol})}{39.1} =$ µmoles	32.48	20.20	18.67

Calcium Cation

Ca ²⁺ conc. in IPA Absorber Extract, E _{ee} = µg/mL	1.13	0.55	0.52
Dilution Factor (DF) =	1	1	1
Volume of Extracting Solution (V _{sol}) = mL	1000	1000	1000
Ionic weight of Ca ²⁺ =	40.1	40.1	40.1
$D_{Ca} = \frac{E_{ee} \times (DF)(V_{sol})}{40.1} =$ µmoles	28.18	13.72	12.97

Aluminum Cation

Al ³⁺ conc. in IPA Absorber Extract, E _{ee} = µg/mL	0.229	0.098	0.076
Dilution Factor (DF) =	1	1	1
Volume of Extracting Solution (V _{sol}) = mL	1000	1000	1000
Ionic weight of Al ³⁺ =	27.0	27.0	27.0
$D_{Al} = \frac{E_{ee} \times (DF)(V_{sol})}{27.0} =$ µmoles	8.49	3.64	2.82

Chloride Ion

Cl ⁻ conc. in IPA Absorber Extract, E _{ee} = µg/mL	0.40	0.58	0.56
Dilution Factor (DF) =	1	1	1
Volume of Extracting Solution (V _{sol}) = mL	1000	1000	1000
Ionic weight of Cl ⁻ =	35.5	35.5	35.5
$D_{Cl} = \frac{E_{ee} \times (DF)(V_{sol})}{35.0} =$ µmoles	11.27	16.34	15.77

MODIFIED USEPA METHOD 8/TACB METHOD 24 CALCULATION SHEET
(modified to include sodium, potassium, calcium and aluminum)

IPA 2 of 2

Client: Valero Refining Company
Source: FCC FGS

	Run Numbers:	M8-1	M8-2	M8-3
	Date:	1/16/2007	1/16/2007	1/16/2007
<u>Flouride Ion</u>				
F ⁻¹ conc. in IPA Absorber Extract, E _{ee} = µg/mL		0.00	0.00	0.00
Dilution Factor (DF) =	1	1	1	1
Volume of Extracting Solution (V _{sol}) = mL	1000	1000	1000	1000
Ionic weight of F ⁻¹ =	19.0	19.0	19.0	19.0
$D_F = \frac{E_{ee} \times (DF)(V_{sol})}{19.0} =$	µmoles	0.00	0.00	0.00
<u>Sulfite Ion</u>				
SO ₃ ⁻² conc. in IPA Absorber Extract, G = µg/mL		1.49	2.67	0.00
Dilution Factor (DF) =	1	1	1	1
Volume of Extracting Solution (V _{sol}) = mL	1000	1000	1000	1000
Ionic weight of SO ₃ ⁻² =	80	80	80	80
$F = \frac{G \times (DF)(V_{sol})}{80.0} =$	µmoles	18.63	33.38	0.00
<u>Sulfate Ion</u>				
SO ₄ ⁻² conc. in IPA Absorber Extract, I = µg/mL		55.64	51.68	57.88
Dilution Factor (DF) =	1	1	1	1
Volume of Extracting Solution (V _{sol}) = mL	1000	1000	1000	1000
Ionic weight of SO ₄ ⁻² =	96	96	96	96
$H = \frac{I \times (DF)(V_{sol})}{96} =$	µmoles	579.58	538.33	602.92

CALCULATE TOTAL µMOLES OF IONS

Cations:

Ammonium (M _{NH4}) = µmoles	785.56	702.22	670.00
Sodium (M _{Na}) = µmoles	211.74	138.70	144.35
Potassium (M _K) = µmoles	32.48	20.20	18.67
Calcium (M _{Ca}) = µmoles	28.18	13.72	12.97
Aluminum (M _{Al}) = µmoles	8.49	3.64	2.82

Anions

Chloride (M _{Cl}) = µmoles	11.27	16.34	15.77
Fluoride (M _F) = µmoles	0.00	0.00	0.00
Sulfite (M _{SO3}) = µmoles	18.63	33.38	0.00
Sulfate (M _{SO4}) = µmoles	579.58	538.33	602.92

Calculate Total Moles of Anions

$M_{TotalAnions} = M_{Cl} + M_F + 2M_{SO3} + 2M_{SO4}$	Total Anions = µmoles	1207.68	1159.75	1221.61

Calculate Total Moles of Cations

$M_{TotalCations} = M_{NH4} + M_{Na} + M_K + 2M_{Ca} + 3M_{Al}$	Total Cations = µmoles	1,111.60	899.46	867.40

Calculate Remaining Moles of Anions

$M_{RemainingAnions} = \frac{M_{TotalAnions} - M_{TotalCations}}{2}$	Remaining Anions = µmoles	48.04	130.15	177.10

Calculate Free Sulfuric Acid

Molecular Weight of H ₂ SO ₄ =		98	98	98
W _{H₂SO₄} = M _{Remaining Anions} × 98.0	MW x Remaining Sulfate Anion = µg H ₂ SO ₄	4,708	12,754	17,356

ARI ENVIRONMENTAL, INC.
MOISTURE CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/29/2007
RUN NUMBER: M8-1

γ FACTOR:	1.002	STACK DIAM:	117 inches
BAROMETRIC:	30.09 in. Hg	METER VOLUME:	44.370 ft ³
STATIC PRES:	0.24 in.H ₂ O	METER TEMP:	88.1 °F
STACK TEMP:	151.2 °F	LIQUID COLL:	302.9 milliliters
SQ. RT ΔP:	0.5673 in.H ₂ O	CO₂:	19.46 % by volume
ΔH:	1.79 in.H ₂ O	O₂:	1.10 % by volume

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE @ STANDARD CONDITIONS, DRY BASIS	
$V_{mstd} = \left(\frac{528}{29.92} \right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right]$	= 43.260 dscf
$\gamma = 1.002$	
VOLUME OF WATER IN SAMPLE @ STANDARD CONDITIONS	
$V_{wstd} = 0.04707 \times V_{lc} = 14.258 \text{ scf}$	
$V_{lc} = 302.9 \text{ mL}$	
FRACTIONAL MOISTURE CONTENT OF STACK GAS AS MEASURED	
$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} = 0.2479$	
FRACTIONAL MOISTURE CONTENT OF STACK GAS @ SATURATION	
$B_{ws@saturation} = \frac{S.V.P.}{P_{bar} + \frac{P_{static}}{13.6}} = 0.2577$	
$S.V.P. = 7.759 \text{ in. Hg}$	
FRACTIONAL MOISTURE CONTENT USED IN CALCULATIONS	
$B_{ws} = 0.2479$	

ARI ENVIRONMENTAL, INC.
FLOW RATE CALCULATION SUMMARY

COMPANY: Valero Refining Compar
LOCATION: Paulsboro, NJ
RUN NUMBER: M8-1

SOURCE: FCC FGS
TEST DATE: 8/29/2007

BAROMETRIC: 30.09 in. Hg	STACK DIAM: 117 inches
STATIC PRES: 0.238 in.H ₂ O	CO₂: 19.46 % by volume
STACK TEMP: 151.2 °F	O₂: 1.10 % by volume
SQ.RT ΔP: 0.5673 in.H ₂ O	

DRY MOLECULAR WEIGHT OF STACK GAS			
$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$	=	31.16	lb/lb-mole
MOLECULAR WEIGHT OF STACK GAS, wet basis			
$M_s = M_d(1 - B_{ws}) + 18B_{ws}$	=	27.90	lb/lb-mole
PITOT TUBE COEFFICIENT			
C_p (from calibration curve or geometric specifications)	=	0.84	
AVERAGE VELOCITY HEAD OF STACK GAS, in. H₂O			
$\sqrt{\Delta P} = \frac{1}{n} \sum_{i=1}^n \sqrt{\Delta p_i}$	=	0.5673	in. H ₂ O
AVERAGE ABSOLUTE STACK GAS TEMPERATURE			
$T_s = 151.2 \text{ °F} + 460$	=	611.2	°R
ABSOLUTE STACK GAS PRESSURE			
$P_s = P_{bar} + \frac{P_{static}}{13.6}$	=	30.11	in.Hg
STACK GAS VELOCITY			
$V_s = (85.49)(C_p)(\text{avg } \sqrt{\Delta P}) \sqrt{\frac{T_s}{(P_s)(M_s)}}$	=	34.753	ft/sec
STACK GAS VOLUMETRIC FLOW RATE, actual			
$Q_s = 60 \times V_s \times A_s$	=	155,683	acfm
Stack Area =		74.662	ft ²
STACK GAS VOLUMETRIC FLOW RATE, standard conditions, wet basis			
$Q_{stdw} = \left(\frac{528}{29.92} \right) (Q_s) \left(\frac{P_s}{T_s} \right)$	=	135,333 8,119,988	scfm, wb scfh, wb
STACK GAS VOLUMETRIC FLOW RATE, standard conditions, dry basis			
$Q_{std} = \left(\frac{528}{29.92} \right) (Q_s) \left(\frac{P_s}{T_s} \right) (1 - B_{ws})$	=	101,787 6,107,199	dscfm dscfh



Reference Method Monitor Data
One-Minute Averages

Company: Valero
Location: Paulsboro, New Jersey
Source: FCG FGS Stack
Test Date: 8/28/2007
Run #: M8-1
Test Time: 0936-1048

Source: FCC FGS Stack			Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	Monitor	
Test Date: 8/28/2007			#1	#2	#3	#4	#5	#6	#7	
Run #: M8-1			Stack Oxygen	Stack CO2	Stack SO2	Stack NOx	Stack CO	Stack VOC	Stack Methane	
Test Time: 0936-1048			%	%	ppm	ppm	ppm	ppm	ppm	
Reference Method Monitor #1:										
Analyzer Type:	Stack Oxygen	09 : 36	0							
Analyzer Scale:	10.00 %	09 : 37	1	1.2	19.1	14.0	18.5	3.2	11.2	
Pre-test calibration span value:	5.00 %	09 : 38	2	1.2	19.2	14.2	17.7	4.0	10.7	
Post-test calibration span value:	5.04 %	09 : 39	3	1.1	19.2	14.3	17.9	4.2	11.6	
Pre-test calibration zero value:	0.10 %	09 : 40	4	1.1	19.2	14.8	17.5	3.7	9.7	
Post-test calibration zero value:	0.11 %	09 : 41	5	1.1	19.2	14.6	18.2	3.6	11.3	
Calibration gas type:	Protocol 1 Oxygen %	09 : 42	6	1.1	19.2	14.3	17.7	5.5	11.1	
Calibration gas concentration:	5.00 %	09 : 43	7	1.2	19.2	14.0	18.2	3.2	10.6	
Monitor uncorrected average:	1.18 %	09 : 44	8	1.3	19.1	14.0	19.0	3.2	10.0	
Monitor drift corrected average:	1.10 %	09 : 45	9	1.2	19.1	14.3	18.6	3.2	10.3	
		09 : 46	10	1.2	19.1	14.0	18.4	3.7	10.4	
Reference Method Monitor #2:										
Analyzer Type:	Stack CO2	09 : 47	11	1.2	19.1	13.2	16.7	3.5	11.0	
Analyzer Scale:	22.82 %	09 : 48	12	1.2	19.1	12.3	17.0	3.2	8.0	
Pre-test calibration span value:	22.46 %	09 : 49	13	1.2	19.2	12.4	17.4	3.5	10.1	
Post-test calibration span value:	22.47 %	09 : 50	14	1.2	19.2	13.0	17.0	4.9	11.8	
Pre-test calibration zero value:	0.10 %	09 : 51	15	1.0	19.3	13.5	16.3	4.8	11.1	
Post-test calibration zero value:	0.16 %	09 : 52	16	1.1	19.2	13.7	16.9	4.5	10.7	
Calibration gas type:	Protocol 1 CO2 %	09 : 53	17	1.1	19.3	13.8	16.5	5.2	10.8	
Calibration gas concentration:	22.82 %	09 : 54	18	1.0	19.3	14.0	16.7	5.3	10.0	
Monitor uncorrected average:	19.18 %	09 : 55	19	1.0	19.3	13.7	16.2	5.1	11.4	
Monitor drift corrected average:	19.46 %	09 : 56	20	1.1	19.3	13.7	16.7	5.0	10.9	
		09 : 57	21	1.1	19.3	14.3	17.2	4.3	11.3	
Reference Method Monitor #3:										
Analyzer Type:	Stack SO2	09 : 58	22	1.1	19.3	14.9	17.4	3.6	9.6	
Analyzer Scale:	100.00 ppm	09 : 59	23	1.1	19.3	15.3	17.2	4.0	10.8	
Pre-test calibration span value:	18.50 ppm	10 : 0	24	1.1	19.3	15.5	16.8	4.0	10.9	
Post-test calibration span value:	18.01 ppm	10 : 1	25	1.2	19.1	15.3	17.8	3.7	10.5	
Pre-test calibration zero value:	0.90 ppm	10 : 2	26	1.1	19.2	15.2	17.7	3.1	9.9	
Post-test calibration zero value:	1.43 ppm	10 : 3	27	1.3	19.1	15.5	18.7	2.8	10.3	
Calibration gas type:	Protocol 1 SO2 ppm	10 : 4	28	1.2	19.2	15.7	17.8	4.7	9.3	
Calibration gas concentration:	20.00 ppm	10 : 5	29	1.2	19.1	15.9	18.4	2.9	10.4	
Monitor uncorrected average:	14.97 ppm	10 : 6	30	1.3	19.1	15.9	18.7	3.2	9.7	
Monitor drift corrected average:	16.15 ppm	10 : 7	31	1.1	19.2	15.9	18.1	3.2	10.1	
		10 : 8	32	1.2	19.2	15.6	18.1	4.2	9.5	
Reference Method Monitor #4:										
Analyzer Type:	Stack NOx	10 : 9	33	1.1	19.2	15.7	17.5	4.1	9.7	
Analyzer Scale:	100.00 ppm	10 : 10	34	1.2	19.1	15.7	18.3	3.7	9.5	
Pre-test calibration span value:	20.21 ppm	10 : 11	35	1.2	19.2	15.4	16.0	4.6	10.7	
Post-test calibration span value:	20.03 ppm	10 : 12	36	1.2	19.2	15.2	16.5	3.9	9.8	
Pre-test calibration zero value:	0.20 ppm	10 : 13	37	1.1	19.2	14.9	16.2	4.1	10.4	
Post-test calibration zero value:	0.21 ppm	10 : 14	38	1.2	19.2	14.9	16.7	3.9	11.4	
Calibration gas type:	Protocol 1 NOx ppm	10 : 15	39	1.1	19.2	15.1	16.4	4.0	9.7	
Calibration gas concentration:	20.00 ppm	10 : 16	40	1.1	19.3	15.0	16.3	4.2	10.5	
Monitor uncorrected average:	17.64 ppm	10 : 17	41	1.1	19.2	14.9	17.0	5.1	10.6	
Monitor drift corrected average:	17.50 ppm	10 : 18	42	1.1	19.2	14.9	16.7	3.6	10.5	
		10 : 19	43	1.1	19.2	14.9	17.0	3.8	10.5	
Reference Method Monitor #5:										
Analyzer Type:	Stack CO	10 : 20	44	1.2	19.1	14.9	18.2	3.5	10.4	
Analyzer Scale:	100.00 ppm	10 : 21	45	1.1	19.2	14.9	17.2	3.5	8.8	
Pre-test calibration span value:	20.11 ppm	10 : 22	46	1.1	19.2	14.9	17.3	3.4	8.9	
Post-test calibration span value:	19.23 ppm	10 : 23	47	1.1	19.2	15.0	17.9	3.2	9.9	
Pre-test calibration zero value:	0.22 ppm	10 : 24	48	1.1	19.2	15.6	17.4	3.3	10.6	
Post-test calibration zero value:	0.22 ppm	10 : 25	49	1.2	19.1	15.0	18.2	2.7	4.6	
Calibration gas type:	Protocol 1 CO ppm	10 : 26	50	1.2	19.2	14.6	17.7	3.7	0.4	
Calibration gas concentration:	20.00 ppm	10 : 27	51	1.2	19.2	14.8	17.5	3.6	4.6	
Monitor uncorrected average:	3.62 ppm	10 : 28	52	1.3	19.1	14.8	18.4	3.2	9.5	
Monitor drift corrected average:	3.49 ppm	10 : 29	53	1.2	19.2	15.1	18.2	3.2	10.3	
		10 : 30	54	1.2	19.2	15.6	18.1	3.2	10.2	
Reference Method Monitor #6:										
Analyzer Type:	Stack VOC	10 : 31	55	1.2	19.2	15.6	18.0	3.2	10.3	
Analyzer Scale:	100.00 ppm	10 : 32	56	1.2	19.2	15.8	17.8	2.4	10.0	
Pre-test calibration span value:	25.16 ppm	10 : 33	57	1.3	19.1	16.2	18.3	2.9	10.2	
Post-test calibration span value:	24.31 ppm	10 : 34	58	1.2	19.1	16.5	18.2	2.5	9.6	
Pre-test calibration zero value:	0.48 ppm	10 : 35	59	1.3	19.1	16.4	17.0	3.3	11.1	
Post-test calibration zero value:	0.48 ppm	10 : 36	60	1.2	19.2	16.2	16.2	3.9	10.4	
Calibration gas type:	Protocol 1 Methane ppm	10 : 37	61	1.1	19.2	15.9	15.8	4.2	10.9	
Calibration gas concentration:	25.00 ppm	10 : 38	62	1.1	19.2	15.8	15.8	3.2	11.4	
Monitor uncorrected average:	10.05 ppm	10 : 39	63	1.2	19.2	15.5	16.8	3.3	10.7	
Monitor drift corrected average:	9.87 ppm	10 : 40	64	1.2	19.2	15.6	17.3	3.3	9.9	
		10 : 41	65	1.4	19.1	15.7	19.3	2.2	10.7	
Reference Method Monitor #7:										
Analyzer Type:	Stack Methane	10 : 42	66	1.4	19.1	15.8	19.3	2.2	10.0	
Analyzer Scale:	100.00 ppm	10 : 43	67	1.3	19.2	15.9	18.7	2.7	10.5	
Pre-test calibration span value:	0.00 ppm	10 : 44	68	1.3	19.2	15.6	19.1	2.7	10.6	
Post-test calibration span value:	0.00 ppm	10 : 45	69	1.3	19.2	15.6	18.8	2.7	11.1	
Pre-test calibration zero value:	0.00 ppm	10 : 46	70	1.4	19.1	15.8	19.7	2.9	10.1	
Post-test calibration zero value:	0.00 ppm	10 : 47	71	1.4	19.1	15.8	19.6	2.2	10.1	
Calibration gas type:	Protocol 1 Oxygen ppm	10 : 48	72	1.4	19.0	15.6	19.7	2.2	9.9	
Calibration gas concentration:	25.00 ppm	AVERAGE:			1.2	19.2	15.0	17.6	3.6	10.1
Monitor uncorrected average:	0.60 ppm									0.6
Monitor drift corrected average:	#DIV/0! ppm									



**USEPA Method 3-A
Stack Oxygen
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/28/2007
Test Run #: M8-1
Test Time: 0936-1048

Data Input:

Average chart reading (C):	1.18 % db
Average pre/post-test zero calibration reading (C _o):	0.10 % db
Calibration gas concentration (C _{ma}):	5.0 % db
Average pre/post-test calibration gas reading (C _m):	5.02 % db

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack Oxygen

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 1.10 \% \text{ db}$$



**USEPA Method 3-A
Stack CO2
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/28/2007
Test Run #: M8-1
Test Time: 0936-1048

Data Input:

Average chart reading (C):	19.18 % db
Average pre/post-test zero calibration reading (C _o):	0.13 % db
Calibration gas concentration (C _{ma}):	22.8 % db
Average pre/post-test calibration gas reading (C _m):	22.47 % db

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack CO2

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 19.46 \% \text{ db}$$



USEPA Method 6C
Stack SO₂
Calibration Drift Correction And Emission Rate Calculation

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/28/2007
Test Run #: M8-1
Test Time: 0936-1048

Data Input:

Average chart reading (C):	14.97 ppmv db
Average pre/post-test zero calibration reading (C _o):	1.17 ppmv db
Calibration gas concentration (C _{ma}):	20.0 ppmv db
Average pre/post-test calibration gas reading (C _m):	18.26 ppmv db
Stack gas volumetric flow rate (Q _{std}):	6,107,199 dscfh
Compound molecular weight (MW):	64.00 lb/lb-mole
Stack gas oxygen concentration (%O ₂):	1.10 % db
Fuel gas F-factor (F _d):	n/a dscf/MMBtu

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack SO₂

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 16.1 \text{ ppmv db}$$

Stack SO₂

Concentration:

$$C_{\text{gas @ \%O}_2} = C_{\text{gas}} \times \left(\frac{20.9}{20.0 - \%O_2} \right) = 17.0 \text{ ppmv db @ 0\% O}_2$$

$$C_{\text{gas, lb/dscf}} = C_{\text{gas}} \times \left(\frac{\text{MW lb/lb-mole}}{385.26 \times 10^6 \text{ ft}^3 / \text{lb-mole}} \right) = 2.683 \times 10^{-6} \text{ lb/dscf}$$

Stack SO₂

Emission rate:

$$E_{\text{gas, lb/hr}} = (C_{\text{gas, lb/dscf}}) \times (Q_{\text{std}}) = 16.384 \text{ lb/hr}$$

$$E_{\text{gas, tons/year}} = \left(\frac{E_{\text{gas, lb/hr}} \times 24 \times 365}{2000} \right) = 71.76 \text{ tons/year}$$



**USEPA Method 7-E
Stack NO_x
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/28/2007
Test Run #: M8-1
Test Time: 0936-1048

Data Input:

Average chart reading (C):	17.64 ppmv db
Average pre/post-test zero calibration reading (C _o):	0.21 ppmv db
Calibration gas concentration (C _{ma}):	20.0 ppmv db
Average pre/post-test calibration gas reading (C _m):	20.12 ppmv db
Stack gas volumetric flow rate (Q _{std}):	6,107,199 dscfh
Compound molecular weight (MW):	46.00 lb/lb-mole
Stack gas oxygen concentration (%O ₂):	1.10 % db
Fuel gas F-factor (F _d):	n/a dscf/MMBtu

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack NO_x

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 17.5 \text{ ppmv db}$$

Stack NO_x

Concentration:

$$C_{\text{gas @ } \%O_2} = C_{\text{gas}} \times \left(\frac{20.9}{20.0 - \%O_2} \right) = 18.5 \text{ ppmv db @ 0\% O}_2$$

$$C_{\text{gas, lb/dscf}} = C_{\text{gas}} \times \left(\frac{\text{MW lb/lb-mole}}{385.26 \times 10^6 \text{ ft}^3 / \text{lb-mole}} \right) = 2.090 \times 10^{-6} \text{ lb/dscf}$$

Stack NO_x

Emission rate:

$$E_{\text{gas, lb/hr}} = (C_{\text{gas, lb/dscf}}) \times (Q_{\text{std}}) = 12.764 \text{ lb/hr}$$

$$E_{\text{gas, tons/year}} = \left(\frac{E_{\text{gas, lb/hr}} \times 24 \times 365}{2000} \right) = 55.91 \text{ tons/year}$$



USEPA Method 10
Stack CO
Calibration Drift Correction And Emission Rate Calculation

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/28/2007
Test Run #: M8-1
Test Time: 0936-1048

Data Input:

Average chart reading (C):	3.62 ppmv db
Average pre/post-test zero calibration reading (C _o):	0.22 ppmv db
Calibration gas concentration (C _{ma}):	20.0 ppmv db
Average pre/post-test calibration gas reading (C _m):	19.67 ppmv db
Stack gas volumetric flow rate (Q _{std}):	6,107,199 dscfh
Compound molecular weight (MW):	28.00 lb/lb-mole
Stack gas oxygen concentration (%O ₂):	1.10 % db
Fuel gas F-factor (F _d):	n/a dscf/MMBtu

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack CO

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 3.5 \text{ ppmv db}$$

Stack CO

Concentration:

$$C_{\text{gas @ \%O}_2} = C_{\text{gas}} \times \left(\frac{20.9}{20.0 - \%O_2} \right) = 3.7 \text{ ppmv db @ 0\% O}_2$$

$$C_{\text{gas, lb / dscf}} = C_{\text{gas}} \times \left(\frac{\text{MW lb / lb - mole}}{385.26 \times 10^6 \text{ ft}^3 / \text{lb - mole}} \right) = 0.254 \times 10^{-6} \text{ lb / dscf}$$

Stack CO

Emission rate:

$$E_{\text{gas, lb / hr}} = (C_{\text{gas, lb / dscf}}) \times (Q_{\text{std}}) = 1.549 \text{ lb / hr}$$

$$E_{\text{gas, tons / year}} = \left(\frac{E_{\text{gas, lb / hr}} \times 24 \times 365}{2000} \right) = 6.79 \text{ tons / year}$$



**USEPA Method 25-A
Stack TNMOC
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/28/2007
Test Run #: M8-1
Test Time: 0936-1048

Data Input:

Average chart reading (C):	10.06 ppmv wb
Average pre/post-test zero calibration reading (C _o):	0.48 ppmv wb
Calibration gas concentration (C _{ma}):	25.0 ppmv wb
Average pre/post-test calibration gas reading (C _m):	24.73 ppmv wb
Stack gas volumetric flow rate (Q _{std}):	6,107,199 dscfh
Compound molecular weight (MW):	12.00 lb/lb-mole
Stack gas oxygen concentration (%O ₂):	1.10 % db
Moisture content (B _{ws}):	0.2479

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack TNMOC

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 9.9 \text{ ppmv wb}$$

Stack TNMOC

Corrected to a dry basis

$$C_{\text{gas(dry)}} = \frac{C_{\text{gas}}}{(1 - B_{ws})} = 13.1 \text{ ppmv db}$$

$$C_{\text{gas @ \%O}_2} = C_{\text{gas}} \times \left(\frac{20.9}{20.0 - \%O_2} \right) = 13.9 \text{ ppmv db @ 0\% O}_2$$

Stack TNMOC

Concentration:

$$C_{\text{gas, lb / dscf}} = C_{\text{gas}} \times \left(\frac{\text{MW lb / lb - mole}}{385.26 \times 10^6 \text{ ft}^3 / \text{lb - mole}} \right) = 0.409 \times 10^{-6} \text{ lb/dscf}$$

Stack TNMOC

Emission rate:

$$E_{\text{gas, lb / hr}} = (C_{\text{gas, lb / dscf}}) \times (Q_{\text{std}}) = 2.497 \text{ lb/hr}$$

$$E_{\text{gas, tons / year}} = \left(\frac{E_{\text{gas, lb / hr}} \times 24 \times 365}{2000} \right) = 10.94 \text{ tons/year}$$

ARI ENVIRONMENTAL, INC.
FREE SULFURIC ACID CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/29/2007
RUN NUMBER: M8-1

INPUT

V_m:	44.37	ft ³	Q_s:	101,787	dscfm
γ FACTOR:	1.002		T_s:	151.2	°F
P_{bar}:	30.09	in.Hg	Runtime:	60	minutes
ΔH:	1.79	in.H ₂ O	V_s:	34.753	ft/sec
T_m:	88.1	°F	P_s:	30.11	in.Hg
V_{lc}:	302.9	mL	Noz. diam:	0.309	inches
M_n:	4.708	mg			

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE @ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92} \right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = 43.260 \text{ dscf}$$

$\gamma = 1.002$

VOLUME OF WATER IN SAMPLE @ STANDARD CONDITIONS

$$V_{wstd} = 0.04707 \times V_{lc} = 14.258 \text{ scf}$$

FRACTIONAL MOISTURE CONTENT OF STACK GAS

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} \times 100 = 24.79 \%$$

PARTICULATE CONCENTRATION IN STACK GAS ON A DRY BASIS

$$C_s = (C'_s) \left(\frac{385.26}{98} \right) (10^6) \quad \text{Total} = 0.943 \text{ ppmv db}$$

$$C'_s = (2.205 \times 10^{-6}) \left(\frac{M_n}{V_{mstd}} \right) \quad C'_s \text{ Total} = 0.2400 \times 10^{-6} \text{ lbs/dscf}$$

EMISSION RATE

$$pmr = (C'_s)(Q_{std})(60) \quad \text{Total} = 1.466 \text{ lbs/hr}$$

ISOKINETIC SAMPLING RATE

$$\%ISO = \frac{(100)(T_s) \left[(0.002669 \times V_{lc}) + \left(\frac{V_m}{T_m} \right) (\gamma) \left(P_{bar} + \left(\frac{\Delta H}{13.6} \right) \right) \right]}{(60)(\theta)(V_s)(P_s)(A_n)} = 101.57 \%$$

$A_n = 0.00052077 \text{ ft}^2 \quad \text{Runtime} = 60 \text{ minutes}$

ARI ENVIRONMENTAL, INC.
MOISTURE CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/29/2007
RUN NUMBER: M8-2

γ FACTOR:	1.002	STACK DIAM:	117 inches
BAROMETRIC:	30.06 in. Hg	METER VOLUME:	43.248 ft ³
STATIC PRES:	0.20 in.H ₂ O	METER TEMP:	95.0 °F
STACK TEMP:	152.1 °F	LIQUID COLL:	300.0 milliliters
SQ. RT ΔP:	0.5411 in.H ₂ O	CO₂:	19.75 % by volume
ΔH:	1.65 in.H ₂ O	O₂:	0.82 % by volume

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE @ STANDARD CONDITIONS, DRY BASIS	
$V_{mstd} = \left(\frac{528}{29.92} \right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right]$	= 41.586 dscf
$\gamma = 1.002$	
VOLUME OF WATER IN SAMPLE @ STANDARD CONDITIONS	
$V_{wstd} = 0.04707 \times V_{lc}$	= 14.121 scf
$V_{lc} = 300.0 \text{ mL}$	
FRACTIONAL MOISTURE CONTENT OF STACK GAS AS MEASURED	
$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}}$	= 0.2535
FRACTIONAL MOISTURE CONTENT OF STACK GAS @ SATURATION	
$B_{ws@saturation} = \frac{S.V.P.}{P_{bar} + \frac{P_{static}}{13.6}}$	= 0.2644
$S.V.P. = 7.952 \text{ in. Hg}$	
FRACTIONAL MOISTURE CONTENT USED IN CALCULATIONS	
B_{ws} = 0.2535	

ARI ENVIRONMENTAL, INC.
FLOW RATE CALCULATION SUMMARY

COMPANY: Valero Refining Compar
LOCATION: Paulsboro, NJ
RUN NUMBER: M8-2

SOURCE: FCC FGS
TEST DATE: 8/29/2007

BAROMETRIC: 30.06 in. Hg	STACK DIAM: 117 inches
STATIC PRES: 0.20 in.H ₂ O	CO₂: 19.75 % by volume
STACK TEMP: 152.1 °F	O₂: 0.82 % by volume
SQ.RT ΔP: 0.5411 in.H ₂ O	

DRY MOLECULAR WEIGHT OF STACK GAS			
$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$	=	31.19	lb/lb-mole
MOLECULAR WEIGHT OF STACK GAS, wet basis			
$M_s = M_d(1 - B_{ws}) + 18B_{ws}$	=	27.85	lb/lb-mole
PITOT TUBE COEFFICIENT			
C_p (from calibration curve or geometric specifications)	=	0.84	
AVERAGE VELOCITY HEAD OF STACK GAS, in. H₂O			
$\overline{\sqrt{\Delta P}} = \frac{1}{n} \sum_{i=1}^n \sqrt{\Delta p}$	=	0.5411	in. H ₂ O
AVERAGE ABSOLUTE STACK GAS TEMPERATURE			
$T_s = 152.1 \text{ °F} + 460$	=	612.1	°R
ABSOLUTE STACK GAS PRESSURE			
$P_s = P_{bar} + \frac{P_{static}}{13.6}$	=	30.07	in.Hg
STACK GAS VELOCITY			
$V_s = (85.49)(C_p)(\text{avg}\sqrt{\Delta P})\sqrt{\frac{T_s}{(P_s)(M_s)}}$	=	33.219	ft/sec
STACK GAS VOLUMETRIC FLOW RATE, actual			
$Q_s = 60 \times V_s \times A_s$	=	148,810	acfm
Stack Area =		74.662 ft ²	
STACK GAS VOLUMETRIC FLOW RATE, standard conditions, wet basis			
$Q_{stdw} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)$	=	129,028 7,741,654	scfm, wb scfh, wb
STACK GAS VOLUMETRIC FLOW RATE, standard conditions, dry basis			
$Q_{std} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)(1 - B_{ws})$	=	96,321 5,779,259	dscfm dscfh



Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Run #: M8-2/HCN-1
Test Time: 1300-1410

Reference Method Monitor Data
One-Minute Averages

			Monitor #1	Monitor #2	Monitor #3	Monitor #4	Monitor #5	Monitor #6	Monitor #7
	Clock Time	Elapsed Time	Stack Oxygen %	Stack CO2 %	Stack SO2 ppm	Stack NOx ppm	Stack CO ppm	Stack VOC ppm	Stack Methane ppm
Reference Method Monitor #1:									
Analyzer Type:									
Analyzer Scale:									
Pre-test calibration span value:									
Post-test calibration span value:									
Pre-test calibration zero value:									
Post-test calibration zero value:									
Calibration gas type:									
Calibration gas concentration:									
Monitor uncorrected average:									
Monitor drift corrected average:									
Reference Method Monitor #2:									
Analyzer Type:									
Analyzer Scale:									
Pre-test calibration span value:									
Post-test calibration span value:									
Pre-test calibration zero value:									
Post-test calibration zero value:									
Calibration gas type:									
Calibration gas concentration:									
Monitor uncorrected average:									
Monitor drift corrected average:									
Reference Method Monitor #3:									
Analyzer Type:									
Analyzer Scale:									
Pre-test calibration span value:									
Post-test calibration span value:									
Pre-test calibration zero value:									
Post-test calibration zero value:									
Calibration gas type:									
Calibration gas concentration:									
Monitor uncorrected average:									
Monitor drift corrected average:									
Reference Method Monitor #4:									
Analyzer Type:									
Analyzer Scale:									
Pre-test calibration span value:									
Post-test calibration span value:									
Pre-test calibration zero value:									
Post-test calibration zero value:									
Calibration gas type:									
Calibration gas concentration:									
Monitor uncorrected average:									
Monitor drift corrected average:									
Reference Method Monitor #5:									
Analyzer Type:									
Analyzer Scale:									
Pre-test calibration span value:									
Post-test calibration span value:									
Pre-test calibration zero value:									
Post-test calibration zero value:									
Calibration gas type:									
Calibration gas concentration:									
Monitor uncorrected average:									
Monitor drift corrected average:									
Reference Method Monitor #6:									
Analyzer Type:									
Analyzer Scale:									
Pre-test calibration span value:									
Post-test calibration span value:									
Pre-test calibration zero value:									
Post-test calibration zero value:									
Calibration gas type:									
Calibration gas concentration:									
Monitor uncorrected average:									
Monitor drift corrected average:									
Reference Method Monitor #7:									
Analyzer Type:									
Analyzer Scale:									
Pre-test calibration span value:									
Post-test calibration span value:									
Pre-test calibration zero value:									
Post-test calibration zero value:									
Calibration gas type:									
Calibration gas concentration:									
Monitor uncorrected average:									
Monitor drift corrected average:									
AVERAGE:									



**USEPA Method 3-A
Stack Oxygen
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Test Run #: M8-2/HCN-1
Test Time: 1300-1410

Data Input:

Average chart reading (C):	0.91 % db
Average pre/post-test zero calibration reading (C _o):	0.11 % db
Calibration gas concentration (C _{ma}):	5.0 % db
Average pre/post-test calibration gas reading (C _m):	4.99 % db

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack Oxygen

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 0.82 \% \text{ db}$$



**USEPA Method 3-A
Stack CO2
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Test Run #: M8-2/HCN-1
Test Time: 1300-1410

Data Input:

Average chart reading (C):	19.43 % db
Average pre/post-test zero calibration reading (C _o):	0.16 % db
Calibration gas concentration (C _{ma}):	22.8 % db
Average pre/post-test calibration gas reading (C _m):	22.42 % db

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack CO2

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 19.75 \% \text{ db}$$



**USEPA Method 6C
Stack SO₂
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Test Run #: M8-2/HCN-1
Test Time: 1300-1410

Data Input:

Average chart reading (C):	16.53 ppmv db
Average pre/post-test zero calibration reading (C _o):	1.43 ppmv db
Calibration gas concentration (C _{ma}):	20.0 ppmv db
Average pre/post-test calibration gas reading (C _m):	18.16 ppmv db
Stack gas volumetric flow rate (Q _{std}):	5,779,259 dscfh
Compound molecular weight (MW):	64.00 lb/lb-mole
Stack gas oxygen concentration (%O ₂):	0.82 % db
Fuel gas F-factor (F _d):	n/a dscf/MMBtu

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack SO₂

Corrected for zero and calibration drift:

$$C_{gas} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 18.1 \text{ ppmv db}$$

Stack SO₂

Concentration:

$$C_{gas @ \% O_2} = C_{gas} \times \left(\frac{20.9}{20.0 - \% O_2} \right) = 18.8 \text{ ppmv db @ 0\% O}_2$$

$$C_{gas, lb/dscf} = C_{gas} \times \left(\frac{MW \text{ lb/lb-mole}}{385.26 \times 10^6 \text{ ft}^3 / \text{lb-mole}} \right) = 2.999 \times 10^{-6} \text{ lb/dscf}$$

Stack SO₂

Emission rate:

$$E_{gas, lb/hr} = (C_{gas, lb/dscf}) \times (Q_{std}) = 17.332 \text{ lb/hr}$$

$$E_{gas, tons/year} = \left(\frac{E_{gas, lb/hr} \times 24 \times 365}{2000} \right) = 75.91 \text{ tons/year}$$



**USEPA Method 7-E
Stack NO_x
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Test Run #: M8-2/HCN-1
Test Time: 1300-1410

Data Input:

Average chart reading (C):	14.15 ppmv db
Average pre/post-test zero calibration reading (C _o):	0.50 ppmv db
Calibration gas concentration (C _{ma}):	20.0 ppmv db
Average pre/post-test calibration gas reading (C _m):	19.17 ppmv db
Stack gas volumetric flow rate (Q _{std}):	5,779,259 dscfh
Compound molecular weight (MW):	46.00 lb/lb-mole
Stack gas oxygen concentration (%O ₂):	0.82 % db
Fuel gas F-factor (F _d):	n/a dscf/MMBtu

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack NO_x

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{\text{ma}}}{C_m - C_o} = 14.6 \text{ ppmv db}$$

Stack NO_x

Concentration:

$$C_{\text{gas @ \% O}_2} = C_{\text{gas}} \times \left(\frac{20.9}{20.0 - \% \text{O}_2} \right) = 15.2 \text{ ppmv db @ 0\% O}_2$$

$$C_{\text{gas, lb/dscf}} = C_{\text{gas}} \times \left(\frac{\text{MW lb/lb-mole}}{385.26 \times 10^6 \text{ ft}^3 / \text{lb-mole}} \right) = 1.746 \times 10^{-6} \text{ lb/dscf}$$

Stack NO_x

Emission rate:

$$E_{\text{gas, lb/hr}} = (C_{\text{gas, lb/dscf}}) \times (Q_{\text{std}}) = 10.088 \text{ lb/hr}$$

$$E_{\text{gas, tons/year}} = \left(\frac{E_{\text{gas, lb/hr}} \times 24 \times 365}{2000} \right) = 44.19 \text{ tons/year}$$



**USEPA Method 10
Stack CO
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Test Run #: M8-2/HCN-1
Test Time: 1300-1410

Data Input:

Average chart reading (C):	9.40 ppmv db
Average pre/post-test zero calibration reading (C _o):	0.22 ppmv db
Calibration gas concentration (C _{ma}):	20.0 ppmv db
Average pre/post-test calibration gas reading (C _m):	19.23 ppmv db
Stack gas volumetric flow rate (Q _{std}):	5,779,259 dscfh
Compound molecular weight (MW):	28.00 lb/lb-mole
Stack gas oxygen concentration (%O ₂):	0.82 % db
Fuel gas F-factor (F _d):	n/a dscf/MMBtu

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack CO

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 9.7 \text{ ppmv db}$$

Stack CO

Concentration:

$$C_{\text{gas} @ \% O_2} = C_{\text{gas}} \times \left(\frac{20.9}{20.0 - \% O_2} \right) = 10.0 \text{ ppmv db @ 0\% O}_2$$

$$C_{\text{gas, lb/dscf}} = C_{\text{gas}} \times \left(\frac{\text{MW lb/lb-mole}}{385.26 \times 10^6 \text{ ft}^3 / \text{lb-mole}} \right) = 0.702 \times 10^{-6} \text{ lb/dscf}$$

Stack CO

Emission rate:

$$E_{\text{gas, lb/hr}} = (C_{\text{gas, lb/dscf}}) \times (Q_{\text{std}}) = 4.054 \text{ lb/hr}$$

$$E_{\text{gas, tons/year}} = \left(\frac{E_{\text{gas, lb/hr}} \times 24 \times 365}{2000} \right) = 17.76 \text{ tons/year}$$



**USEPA Method 25-A
Stack TNMOC
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Test Run #: M8-2/HCN-1
Test Time: 1300-1410

Data Input:

Average chart reading (C):	3.71 ppmv wb
Average pre/post-test zero calibration reading (C _o):	0.47 ppmv wb
Calibration gas concentration (C _{ma}):	25.0 ppmv wb
Average pre/post-test calibration gas reading (C _m):	24.41 ppmv wb
Stack gas volumetric flow rate (Q _{std}):	5,779,259 dscfh
Compound molecular weight (MW):	12.00 lb/lb-mole
Stack gas oxygen concentration (%O ₂):	0.82 % db
Moisture content (B _{ws}):	0.2535

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack TNMOC

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{\text{ma}}}{C_m - C_o} = 3.4 \text{ ppmv wb}$$

Stack TNMOC

Corrected to a dry basis

$$C_{\text{gas(dry)}} = \frac{C_{\text{gas}}}{(1 - B_{\text{ws}})} = 4.5 \text{ ppmv db}$$

$$C_{\text{gas @ } \%O_2} = C_{\text{gas}} \times \left(\frac{20.9}{20.0 - \%O_2} \right) = 4.7 \text{ ppmv db @ } 0\% O_2$$

Stack TNMOC

Concentration:

$$C_{\text{gas, lb/dscf}} = C_{\text{gas}} \times \left(\frac{\text{MW lb/lb-mole}}{385.26 \times 10^6 \text{ ft}^3 / \text{lb-mole}} \right) = 0.141 \times 10^{-6} \text{ lb/dscf}$$

Stack TNMOC

Emission rate:

$$E_{\text{gas, lb/hr}} = (C_{\text{gas, lb/dscf}}) \times (Q_{\text{std}}) = 0.815 \text{ lb/hr}$$

$$E_{\text{gas, tons/year}} = \left(\frac{E_{\text{gas, lb/hr}} \times 24 \times 365}{2000} \right) = 3.57 \text{ tons/year}$$

ARI ENVIRONMENTAL, INC.
FREE SULFURIC ACID CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/29/2007
RUN NUMBER: M8-2

INPUT

V_m:	43.248	ft ³	Q_s:	96,321	dscfm
γ FACTOR:	1.002		T_s:	152.1	°F
P_{bar}:	30.06	in.Hg	Runtime:	60	minutes
ΔH:	1.65	in.H ₂ O	V_s:	33.219	ft/sec
T_m:	95	°F	P_s:	30.07	in.Hg
V_{lc}:	300	mL	Noz. diam:	0.309	inches
M_n:	12.754	mg			

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE @ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92} \right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = 41.586 \text{ dscf}$$

$$\gamma = 1.002$$

VOLUME OF WATER IN SAMPLE @ STANDARD CONDITIONS

$$V_{wstd} = 0.04707 \times V_{lc} = 14.121 \text{ scf}$$

FRACTIONAL MOISTURE CONTENT OF STACK GAS

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} \times 100 = 25.35 \%$$

PARTICULATE CONCENTRATION IN STACK GAS ON A DRY BASIS

$$C_s = \left(C'_s \right) \left(\frac{385.26}{98} \right) (10^6) \quad \text{Total} = 2.659 \text{ ppmv db}$$

$$C'_s = (2.205 \times 10^{-6}) \left(\frac{M_n}{V_{mstd}} \right) \quad C'_s \text{ Total} = 0.6763 \times 10^{-5} \text{ lbs/dscf}$$

EMISSION RATE

$$pmr = (C'_s)(Q_{std})(60) \quad \text{Total} = 3.908 \text{ lbs/hr}$$

ISOKINETIC SAMPLING RATE

$$\%ISO = \frac{(100)(T_s) \left[(0.002669 \times V_{lc}) + \left(\frac{V_m}{T_m} \right) \left(\gamma \left(P_{bar} + \left(\frac{\Delta H}{13.6} \right) \right) \right) \right]}{(60)(\theta)(V_s)(P_s)(A_n)} = 103.18 \%$$

$$A_n = 0.00052077 \text{ ft}^2 \quad \text{Runtime} = 60 \text{ minutes}$$

ARI ENVIRONMENTAL, INC.
MOISTURE CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/29/2007
RUN NUMBER: M8-3

γ FACTOR:	1.002	STACK DIAM:	117 inches
BAROMETRIC:	30.00 in. Hg	METER VOLUME:	45.441 ft ³
STATIC PRES:	0.20 in.H ₂ O	METER TEMP:	99.8 °F
STACK TEMP:	151.3 °F	LIQUID COLL:	290.7 milliliters
SQ. RT ΔP:	0.5528 in.H ₂ O	CO₂:	19.85 % by volume
ΔH:	1.75 in.H ₂ O	O₂:	0.81 % by volume

ENGLISH UNITS
(29.92 in.Hg & °F)

VOLUME OF SAMPLE @ STANDARD CONDITIONS, DRY BASIS $V_{mstd} = \left(\frac{528}{29.92} \right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = 43.245 \text{ dscf}$ $\gamma = 1.002$
VOLUME OF WATER IN SAMPLE @ STANDARD CONDITIONS $V_{wstd} = 0.04707 \times V_{lc} = 13.683 \text{ scf}$ $V_{lc} = 290.7 \text{ mL}$
FRACTIONAL MOISTURE CONTENT OF STACK GAS AS MEASURED $B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} = 0.2404$
FRACTIONAL MOISTURE CONTENT OF STACK GAS @ SATURATION $B_{ws@saturation} = \frac{S.V.P.}{P_{bar} + \frac{P_{static}}{13.6}} = 0.2585$ $S.V.P. = 7.759 \text{ in. Hg}$
FRACTIONAL MOISTURE CONTENT USED IN CALCULATIONS $B_{ws} = 0.2404$

ARI ENVIRONMENTAL, INC.
FLOW RATE CALCULATION SUMMARY

COMPANY: Valero Refining Compar
LOCATION: Paulsboro, NJ
RUN NUMBER: M8-3

SOURCE: FCC FGS
TEST DATE: 8/29/2007

BAROMETRIC: 30 in. Hg
STATIC PRES: 0.20 in.H₂O
STACK TEMP: 151.3 °F
SQ. RT ΔP: 0.5528 in.H₂O

STACK DIAM: 117 inches
CO₂: 19.85 % by volume
O₂: 0.81 % by volume

DRY MOLECULAR WEIGHT OF STACK GAS			
$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$	=	31.21	lb/lb-mole
MOLECULAR WEIGHT OF STACK GAS, wet basis			
$M_s = M_d (1 - B_{ws}) + 18B_{ws}$	=	28.03	lb/lb-mole
PITOT TUBE COEFFICIENT			
C_p (from calibration curve or geometric specifications)	=	0.84	
AVERAGE VELOCITY HEAD OF STACK GAS, in. H₂O			
$\overline{\sqrt{\Delta P}} = \frac{1}{n} \sum_{i=1}^n \sqrt{\Delta p_i}$	=	0.5528	in. H ₂ O
AVERAGE ABSOLUTE STACK GAS TEMPERATURE			
$T_s = 151.3 \text{ °F} + 460$	=	611.3	°R
ABSOLUTE STACK GAS PRESSURE			
$P_s = P_{bar} + \frac{P_{static}}{13.6}$	=	30.01	in.Hg
STACK GAS VELOCITY			
$V_s = (85.49)(C_p)(\text{avg } \sqrt{\Delta P}) \sqrt{\frac{T_s}{(P_s)(M_s)}}$	=	33.84	ft/sec
STACK GAS VOLUMETRIC FLOW RATE, actual			
$Q_s = 60 \times V_s \times A_s$	=	151,577	acfm
Stack Area =		74.662	ft ²
STACK GAS VOLUMETRIC FLOW RATE, standard conditions, wet basis			
$Q_{stdw} = \left(\frac{528}{29.92} \right) (Q_s) \left(\frac{P_s}{T_s} \right)$	=	131,337 7,880,191	scfm, wb scfh, wb
STACK GAS VOLUMETRIC FLOW RATE, standard conditions, dry basis			
$Q_{std} = \left(\frac{528}{29.92} \right) (Q_s) \left(\frac{P_s}{T_s} \right) (1 - B_{ws})$	=	99,768 5,986,109	dscfm dscfh



Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Run #: M8-3/HCN-2
Test Time: 1505-1626

Reference Method Monitor Data
One-Minute Averages

	Clock Time	Elapsed Time	Monitor #1 Stack Oxygen %	Monitor #2 Stack CO2 %	Monitor #3 Stack SO2 ppm	Monitor #4 Stack NOx ppm	Monitor #5 Stack CO ppm	Monitor #6 Stack VOC ppm	Monitor #7 Stack Methane ppm
Reference Method Monitor #1:									
Analyzer Type:			Stack Oxygen						
Analyzer Scale:	15 : 05	0							
Pre-test calibration span value:	15 : 6	1	0.9	19.4	12.6	13.4	12.1	13.4	0.4
Post-test calibration span value:	15 : 7	2	0.8	19.5	13.1	13.0	10.2	13.8	0.4
Pre-test calibration zero value:	15 : 8	3	0.9	19.4	13.5	13.9	6.0	13.2	0.4
Post-test calibration zero value:	15 : 9	4	0.9	19.4	12.6	14.8	2.7	13.3	0.4
Pre-test calibration zero value:	15 : 10	5	1.1	19.2	12.3	16.1	1.9	12.3	0.4
Post-test calibration zero value:	15 : 11	6	1.0	19.4	11.8	15.0	4.2	12.5	0.4
Calibration gas type:	15 : 12	7	1.1	19.3	11.4	16.0	1.4	11.8	0.4
Calibration gas concentration:	15 : 13	8	1.2	19.2	11.1	16.7	2.2	12.3	0.4
Monitor uncorrected average:	15 : 14	9	1.1	19.3	11.0	16.3	1.5	11.5	0.4
Monitor drift corrected average:	15 : 15	10	1.2	19.2	10.9	16.7	2.2	12.4	0.4
Reference Method Monitor #2:									
Analyzer Type:	15 : 16	11	1.1	19.3	10.7	15.6	4.2	12.0	1.1
Analyzer Scale:	15 : 17	12	1.0	19.3	10.5	14.9	4.5	11.9	1.4
Pre-test calibration span value:	15 : 18	13	0.9	19.4	10.7	14.2	5.6	12.5	1.4
Post-test calibration span value:	15 : 19	14	1.0	19.4	10.4	14.7	3.9	11.6	0.7
Pre-test calibration zero value:	15 : 20	15	1.0	19.4	10.1	14.5	8.3	11.9	0.4
Post-test calibration zero value:	15 : 21	16	0.9	19.5	10.2	13.3	16.5	11.5	0.4
Pre-test calibration zero value:	15 : 22	17	0.8	19.5	10.3	12.3	11.4	11.9	0.4
Calibration gas type:	15 : 23	18	0.9	19.4	10.1	13.2	9.9	12.4	0.4
Calibration gas concentration:	15 : 24	19	0.8	19.5	10.1	12.2	24.0	13.2	0.4
Monitor uncorrected average:	15 : 25	20	0.8	19.5	10.1	12.0	12.9	13.5	0.4
Monitor drift corrected average:	15 : 26	21	0.8	19.5	9.9	12.5	13.7	13.4	0.4
Reference Method Monitor #3:									
Analyzer Type:	15 : 27	22	0.8	19.5	9.6	12.2	16.4	12.4	0.4
Analyzer Scale:	15 : 28	23	0.7	19.6	9.8	11.7	34.2	13.0	0.4
Pre-test calibration span value:	15 : 29	24	0.7	19.6	9.9	11.4	30.1	12.9	0.4
Post-test calibration span value:	15 : 30	25	0.7	19.6	9.5	11.5	18.0	13.9	0.4
Pre-test calibration zero value:	15 : 31	26	0.8	19.5	9.2	13.3	5.3	12.8	0.4
Post-test calibration zero value:	15 : 32	27	0.9	19.4	9.1	14.0	7.4	11.9	0.4
Pre-test calibration zero value:	15 : 33	28	0.9	19.4	9.5	13.7	7.7	12.3	0.4
Calibration gas type:	15 : 34	29	0.8	19.5	9.2	13.2	14.0	12.9	0.4
Calibration gas concentration:	15 : 35	30	0.8	19.5	8.8	12.7	23.1	13.0	0.4
Monitor uncorrected average:	15 : 36	31	0.8	19.5	8.7	13.2	5.3	11.4	0.4
Monitor drift corrected average:	15 : 37	32	1.0	19.3	8.4	14.9	5.7	11.9	0.4
Reference Method Monitor #4:									
Analyzer Type:	15 : 38	33	1.0	19.4	8.2	14.6	13.0	11.3	0.4
Analyzer Scale:	15 : 39	34	0.8	19.5	8.4	13.0	10.1	10.9	0.4
Pre-test calibration span value:	15 : 40	35	0.9	19.5	8.2	13.9	5.0	11.3	0.4
Post-test calibration span value:	15 : 41	36	0.9	19.5	8.2	14.2	3.5	10.9	0.4
Pre-test calibration zero value:	15 : 42	37	1.0	19.4	7.9	15.6	2.0	10.7	0.4
Post-test calibration zero value:	15 : 43	38	1.1	19.3	7.9	16.1	2.7	10.8	0.7
Pre-test calibration zero value:	15 : 44	39	1.0	19.4	7.6	14.7	5.9	10.9	0.9
Calibration gas type:	15 : 45	40	0.9	19.5	7.6	13.2	7.4	11.3	0.9
Calibration gas concentration:	15 : 46	41	0.8	19.5	7.6	12.5	10.9	11.8	0.5
Monitor uncorrected average:	15 : 47	42	0.9	19.4	7.6	13.5	9.7	12.1	0.4
Monitor drift corrected average:	15 : 48	43	0.9	19.5	7.9	12.6	18.2	12.3	0.4
Reference Method Monitor #5:									
Analyzer Type:	15 : 49	44	0.8	19.5	7.9	12.4	7.8	12.6	1.1
Analyzer Scale:	15 : 50	45	0.9	19.4	7.9	13.6	20.4	9.0	1.4
Pre-test calibration span value:	15 : 51	46	0.8	19.5	7.9	12.9	6.3	9.8	1.4
Post-test calibration span value:	15 : 52	47	0.8	19.5	7.9	12.9	9.5	11.4	0.7
Pre-test calibration zero value:	15 : 53	48	0.8	19.5	7.7	13.2	8.6	10.7	0.4
Post-test calibration zero value:	15 : 54	49	0.8	19.5	7.7	13.1	12.3	11.9	0.4
Pre-test calibration zero value:	15 : 55	50	0.8	19.5	7.5	12.7	18.1	12.6	0.4
Calibration gas type:	15 : 56	51	0.7	19.6	7.3	12.0	21.2	12.2	0.4
Calibration gas concentration:	15 : 57	52	0.7	19.6	7.3	12.2	9.8	13.0	0.4
Monitor uncorrected average:	15 : 58	53	0.8	19.6	7.3	13.2	6.7	13.7	0.4
Monitor drift corrected average:	15 : 59	54	0.8	19.5	7.3	13.4	9.4	12.6	0.4
Reference Method Monitor #6:									
Analyzer Type:	16 : 0	55	0.8	19.5	7.4	13.6	6.1	12.7	0.4
Analyzer Scale:	16 : 1	56	0.9	19.5	7.6	13.6	8.7	11.3	0.4
Pre-test calibration span value:	16 : 2	57	0.8	19.6	7.6	12.7	12.9	11.6	0.4
Post-test calibration span value:	16 : 3	58	0.9	19.4	7.3	13.7	6.2	11.5	0.4
Pre-test calibration zero value:	16 : 4	59	0.9	19.4	7.3	13.4	6.5	12.2	0.4
Post-test calibration zero value:	16 : 5	60	0.9	19.4	7.3	13.8	4.4	13.0	0.4
Pre-test calibration zero value:	16 : 6	61	1.0	19.3	7.5	14.2	7.5	12.6	0.4
Calibration gas type:	16 : 7	62	0.9	19.4	7.9	13.2	8.0	12.2	0.4
Calibration gas concentration:	16 : 8	63	1.0	19.4	7.8	14.1	5.7	11.9	0.4
Monitor uncorrected average:	16 : 9	64	0.9	19.4	7.6	13.9	4.5	11.9	0.4
Monitor drift corrected average:	16 : 10	65	1.0	19.4	7.6	13.4	9.4	12.9	0.4
Reference Method Monitor #7:									
Analyzer Type:	16 : 11	66	0.9	19.4	7.6	12.3	17.5	13.0	0.4
Analyzer Scale:	16 : 12	67	0.8	19.5	7.3	11.7	11.7	13.4	0.4
Pre-test calibration span value:	16 : 13	68	0.8	19.5	7.2	12.0	15.5	12.7	0.4
Post-test calibration span value:	16 : 14	69	0.8	19.5	7.1	11.6	22.9	12.7	0.4
Pre-test calibration zero value:	16 : 15	70	0.6	19.7	7.3	10.1	82.1	14.1	0.4
Post-test calibration zero value:	16 : 16	71	0.7	19.6	7.3	11.1	20.9	14.7	0.4
Pre-test calibration zero value:	16 : 17	72	0.8	19.5	7.4	12.5	17.4	15.0	0.4
Calibration gas type:	16 : 18	73	0.7	19.6	7.6	11.4	26.3	14.1	0.4
Calibration gas concentration:	16 : 19	74	0.7	19.5	7.4	12.7	6.0	12.9	0.4
Monitor uncorrected average:	16 : 20	75	0.9	19.5	7.6	14.1	4.2	12.7	0.4
Monitor drift corrected average:	16 : 21	76	1.0	19.6	7.7	15.3	1.9	12.4	0.4
	16 : 22	77	1.2	19.5	7.3	16.4	2.5	12.6	0.4
	16 : 23	78	1.0	19.6	7.3	15.7	1.9	11.7	0.4
	16 : 24	79	1.1	19.6	7.3	15.1	4.0	12.0	0.4
	16 : 25	80	1.0	19.5	7.0	15.2	2.0	11.2	0.4
	16 : 26	81	1.1	19.4	7.0	16.5	1.0	11.3	0.4
AVERAGE:			0.9	19.5	8.7	13.6	10.7	12.3	0.5



**USEPA Method 3-A
Stack Oxygen
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Test Run #: M8-3/HCN-2
Test Time: 1505-1626

Data Input:

Average chart reading (C):	0.89 % db
Average pre/post-test zero calibration reading (C _o):	0.11 % db
Calibration gas concentration (C _{ma}):	5.0 % db
Average pre/post-test calibration gas reading (C _m):	4.93 % db

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack Oxygen

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 0.81 \% \text{ db}$$



**USEPA Method 3-A
Stack CO2
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Test Run #: M8-3/HCN-2
Test Time: 1505-1626

Data Input:

Average chart reading (C):	19.46 % db
Average pre/post-test zero calibration reading (C _o):	0.16 % db
Calibration gas concentration (C _{ma}):	22.8 % db
Average pre/post-test calibration gas reading (C _m):	22.35 % db

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack CO2

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 19.85 \% \text{ db}$$



USEPA Method 6C Stack SO₂ Calibration Drift Correction And Emission Rate Calculation

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Test Run #: M8-3/HCN-2
Test Time: 1505-1626

Data Input:

Average chart reading (C):	8.72 ppmv db
Average pre/post-test zero calibration reading (C _o):	1.10 ppmv db
Calibration gas concentration (C _{ma}):	20.0 ppmv db
Average pre/post-test calibration gas reading (C _m):	18.81 ppmv db
Stack gas volumetric flow rate (Q _{std}):	5,986,109 dscfh
Compound molecular weight (MW):	64.00 lb/lb-mole
Stack gas oxygen concentration (%O ₂):	0.81 % db
Fuel gas F-factor (F _d):	n/a dscf/MMBtu

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack SO₂

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 8.6 \text{ ppmv db}$$

Stack SO₂

Concentration:

$$C_{\text{gas @ \%O}_2} = C_{\text{gas}} \times \left(\frac{20.9}{20.0 - \%O_2} \right) = 9.0 \text{ ppmv db @ 0\% O}_2$$

$$C_{\text{gas, lb/dscf}} = C_{\text{gas}} \times \left(\frac{\text{MW lb/lb-mole}}{385.26 \times 10^6 \text{ ft}^3 / \text{lb-mole}} \right) = 1.429 \times 10^{-6} \text{ lb/dscf}$$

Stack SO₂

Emission rate:

$$E_{\text{gas, lb/hr}} = (C_{\text{gas, lb/dscf}}) \times (Q_{\text{std}}) = 8.555 \text{ lb/hr}$$

$$E_{\text{gas, tons/year}} = \left(\frac{E_{\text{gas, lb/hr}} \times 24 \times 365}{2000} \right) = 37.47 \text{ tons/year}$$



**USEPA Method 7-E
Stack NO_x
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Test Run #: M8-3/HCN-2
Test Time: 1505-1626

Data Input:

Average chart reading (C):	13.61 ppmv db
Average pre/post-test zero calibration reading (C _o):	0.51 ppmv db
Calibration gas concentration (C _{ma}):	20.0 ppmv db
Average pre/post-test calibration gas reading (C _m):	18.27 ppmv db
Stack gas volumetric flow rate (Q _{std}):	5,986,109 dscfh
Compound molecular weight (MW):	46.00 lb/lb-mole
Stack gas oxygen concentration (%O ₂):	0.81 % db
Fuel gas F-factor (F _d):	n/a dscf/MMBtu

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack NO_x

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 14.8 \text{ ppmv db}$$

Stack NO_x

Concentration:

$$C_{\text{gas @ } \%O_2} = C_{\text{gas}} \times \left(\frac{20.9}{20.0 - \%O_2} \right) = 15.3 \text{ ppmv db @ 0\% O}_2$$

$$C_{\text{gas, lb/dscf}} = C_{\text{gas}} \times \left(\frac{\text{MW lb/lb-mole}}{385.26 \times 10^6 \text{ ft}^3 / \text{lb-mole}} \right) = 1.761 \times 10^{-6} \text{ lb/dscf}$$

Stack NO_x

Emission rate:

$$E_{\text{gas, lb/hr}} = (C_{\text{gas, lb/dscf}}) \times (Q_{\text{std}}) = 10.544 \text{ lb/hr}$$

$$E_{\text{gas, tons/year}} = \left(\frac{E_{\text{gas, lb/hr}} \times 24 \times 365}{2000} \right) = 46.18 \text{ tons/year}$$



**USEPA Method 10
Stack CO
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Test Run #: M8-3/HCN-2
Test Time: 1505-1626

Data Input:

Average chart reading (C):	10.65 ppmv db
Average pre/post-test zero calibration reading (C _o):	-0.09 ppmv db
Calibration gas concentration (C _{ma}):	20.0 ppmv db
Average pre/post-test calibration gas reading (C _m):	19.01 ppmv db
Stack gas volumetric flow rate (Q _{std}):	5,986,109 dscfh
Compound molecular weight (MW):	28.00 lb/lb-mole
Stack gas oxygen concentration (%O ₂):	0.81 % db
Fuel gas F-factor (F _d):	n/a dscf/MMBtu

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack CO

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 11.2 \text{ ppmv db}$$

Stack CO

Concentration:

$$C_{\text{gas @ \%O}_2} = C_{\text{gas}} \times \left(\frac{20.9}{20.0 - \%O_2} \right) = 11.7 \text{ ppmv db @ 0\% O}_2$$

$$C_{\text{gas, lb/dscf}} = C_{\text{gas}} \times \left(\frac{\text{MW lb/lb-mole}}{385.26 \times 10^6 \text{ ft}^3 / \text{lb-mole}} \right) = 0.817 \times 10^{-6} \text{ lb/dscf}$$

Stack CO

Emission rate:

$$E_{\text{gas, lb/hr}} = (C_{\text{gas, lb/dscf}}) \times (Q_{\text{std}}) = 4.893 \text{ lb/hr}$$

$$E_{\text{gas, tons/year}} = \left(\frac{E_{\text{gas, lb/hr}} \times 24 \times 365}{2000} \right) = 21.43 \text{ tons/year}$$



USEPA Method 25-A Stack TNMOC Calibration Drift Correction And Emission Rate Calculation

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Test Run #: M8-3/HCN-2
Test Time: 1505-1626

Data Input:

Average chart reading (C):	12.28 ppmv wb
Average pre/post-test zero calibration reading (C _o):	0.46 ppmv wb
Calibration gas concentration (C _{ma}):	25.0 ppmv wb
Average pre/post-test calibration gas reading (C _m):	24.77 ppmv wb
Stack gas volumetric flow rate (Q _{std}):	5,986,109 dscfh
Compound molecular weight (MW):	12.00 lb/lb-mole
Stack gas oxygen concentration (%O ₂):	0.81 % db
Moisture content (B _{ws}):	0.2404

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack TNMOC

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{\text{ma}}}{C_m - C_o} = 12.2 \text{ ppmv wb}$$

Stack TNMOC

Corrected to a dry basis

$$C_{\text{gas(dry)}} = \frac{C_{\text{gas}}}{(1 - B_{\text{ws}})} = 16.0 \text{ ppmv db}$$

$$C_{\text{gas @ } \%O_2} = C_{\text{gas}} \times \left(\frac{20.9}{20.0 - \%O_2} \right) = 16.7 \text{ ppmv db @ 0\% } O_2$$

Stack TNMOC

Concentration:

$$C_{\text{gas, lb / dscf}} = C_{\text{gas}} \times \left(\frac{\text{MW lb / lb - mole}}{385.26 \times 10^6 \text{ ft}^3 / \text{lb - mole}} \right) = 0.498 \times 10^{-6} \text{ lb/dscf}$$

Stack TNMOC

Emission rate:

$$E_{\text{gas, lb / hr}} = (C_{\text{gas, lb / dscf}}) \times (Q_{\text{std}}) = 2.984 \text{ lb/hr}$$

$$E_{\text{gas, tons / year}} = \left(\frac{E_{\text{gas, lb / hr}} \times 24 \times 365}{2000} \right) = 13.07 \text{ tons/year}$$

ARI ENVIRONMENTAL, INC.
FREE SULFURIC ACID CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/29/2007
RUN NUMBER: M8-3

INPUT

V_m:	45.441	ft ³	Q_s:	99,768	dscfm
γ FACTOR:	1.002		T_s:	151.3	°F
P_{bar}:	30	in.Hg	Runtime:	60	minutes
ΔH:	1.75	in.H ₂ O	V_s:	33.836	ft/sec
T_m:	99.8	°F	P_s:	30.01	in.Hg
V_{lc}:	290.7	mL	Noz. diam:	0.309	inches
M_n:	17.356	mg			

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE @ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92} \right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = 43.245 \text{ dscf}$$

$\gamma = 1.002$

VOLUME OF WATER IN SAMPLE @ STANDARD CONDITIONS

$$V_{wstd} = 0.04707 \times V_{lc} = 13.683 \text{ scf}$$

FRACTIONAL MOISTURE CONTENT OF STACK GAS

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} \times 100 = 24.04 \%$$

PARTICULATE CONCENTRATION IN STACK GAS ON A DRY BASIS

$$C_s = (C'_s) \left(\frac{385.26}{98} \right) (10^6) \quad \text{Total} = 3.479 \text{ ppmv db}$$

$$C'_s = (2.205 \times 10^{-6}) \left(\frac{M_n}{V_{mstd}} \right) \quad C'_s \text{ Total} = 0.8850 \times 10^{-6} \text{ lbs/dscf}$$

EMISSION RATE

$$pmr = (C'_s)(Q_{std})(60) \quad \text{Total} = 5.297 \text{ lbs/hr}$$

ISOKINETIC SAMPLING RATE

$$\%ISO = \frac{(100)(T_s) \left[(0.002669 \times V_{lc}) + \left(\frac{V_m}{T_m} \right) (\gamma) \left(P_{bar} + \left(\frac{\Delta H}{13.6} \right) \right) \right]}{(60)(\theta)(V_s)(P_s)(A_n)} = 103.59 \%$$

$A_n = 0.00052077 \text{ ft}^2 \quad \text{Runtime} = 60 \text{ minutes}$

TABLE
COMPANY USEPA Method 29 Metals Emissions Summary
LOCATION Valero
SOURCE Paulsboro, New Jersey
TEST DATE FCCU FGS Stack
8/29-30/2007

SUMMARY OF TEST RESULTS

RUN NO		M29-1		M29-2		M29-3	
TEST DATE		8/29/2007		8/30/2007		8/30/2007	
TEST TIME		1744-2201		0838-1255		1325-1805	
Stack Gas Parameters							
Temperature, °F		152.2		151.5		152.7	
Velocity, av. ft/sec		34.40		34.37		34.82	
Volumetric flow, acfm		154,117		153,963		155,986	
Volumetric flow, scfm		133,328		133,220		134,443	
Volumetric flow, dscfh		6,099,243		6,138,686		6,095,037	
Moisture, av. % vol		23.76		23.20		24.44	
Carbon Dioxide, av. % vol		19.81		19.58		19.72	
Oxygen, av. % vol		0.99		1.18		0.89	
Metals Sample							
Time, min		240.0		240.0		240.0	
Volume, dscf		174,422		174,084		175,552	
Isokinetic Ratio, %		100.0		99.1		100.7	
Metals Emissions							
Analyte		Mass		Concentration		Emission Rate	
		ug	ug/dscm	ug/dscm	x10⁻³ lb/dscf	ug	x10⁻³ lb/dscf
						ug	x10⁻¹ lb/hr
Copper		9.34	1.891	4.24	0.860	2.34	0.029
Nickel		6.80	1.377	7.60	1.542	6.17	0.077
Vanadium		<7.30	<1.478	<5.90	<1.197	<6.40	<0.080



USEPA Method 2 Volumetric Flow Rate Sample Calculations (Circular Ducts)

Client: Valero
Location: Paulsboro, New Jersey
Source: FCCU FGS Stack
Date: 8/29/2007
Run #: M29-1

Data Input

Carbon Dioxide (CO ₂):	19.8 %
Oxygen (O ₂):	1.0 %
Nitrogen (N ₂):	79.2 %
Fractional Moisture Content (B _{ws})	0.2376 dimensionless
Stack Temperature (T _s):	152.2 °F
Pitot Coefficient (C _p):	0.84 dimensionless
Average square root of ΔP	0.5620 inches H ₂ O
Barometric Pressure (P _{bar}):	30.00 inches Hg
Static Pressure (S _t)	0.16 inches H ₂ O
Stack diameter:	117.00 inches
Stack area (A _s):	74.6619 ft ²

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Dry molecular weight of stack gas:

$$M_d = (0.44 \times \%CO_2) + (0.32 \times \%O_2) + (0.28 \times \%N_2) = 31.209 \text{ lb/lb-mole}$$

Molecular weight of stack gas, wet basis:

$$M_s = (M_d \times (1 - B_{ws})) + (18 \times B_{ws}) = 28.071 \text{ lb/lb-mole}$$

Absolute stack gas pressure:

$$P_s = P_{bar} + \left(\frac{S_t}{13.6} \right) = 30.012 \text{ inches H}_2\text{O}$$

Stack gas velocity:

$$V_s = 85.49 \times C_p \times \sqrt{\Delta P} \times \sqrt{\frac{(T_s + 460)}{(P_s \times M_s)}} = 34.403 \text{ feet/second}$$

Stack gas volumetric flow rate:

$$Q_a = A_s \times V_s \times 60 = 154,117 \text{ acfm}$$

Stack gas volumetric flow rate, wet basis:

$$Q_{sw} = Q_a \times \left[\left(\frac{528^\circ R}{29.92 \text{ in. Hg}} \right) \times \left(\frac{P_s}{T_s + 460} \right) \right] = 133,328 \text{ scfm}$$

$$Q_{sw} = Q_a \times \left[\left(\frac{528^\circ R}{29.92 \text{ in. Hg}} \right) \times \left(\frac{P_s}{T_s + 460} \right) \right] \times 60 = 7,999,670 \text{ scfh}$$

Stack gas volumetric flow rate, dry basis:

$$Q_{std} = Q_{sw} \times (1 - B_{ws}) = 101,654 \text{ dscfm}$$

$$Q_{std} = Q_{sw} \times (1 - B_{ws}) \times 60 = 6,099,243 \text{ dscfh}$$



USEPA Method 4 Moisture Determination Sample Calculations

Client: Valero
Location: Paulsboro, New Jersey
Source: FCCU FGS Stack
Date: 8/29/2007
Run #: M29-1

Data Input:

Volume metered (V_m):	177.843 ft ³
Meter calibration coefficient (Y_d):	1.002 dimensionless
Barometric pressure (P_{bar}):	30.00 inches Hg
Meter sample rate (ΔH):	1.83 inches H ₂ O
Meter inlet/outlet temperature (T_m):	83.3 °F
Volume of moisture collected (V_{lc}):	1154.6 milliliters
Stack Temperature (T_s):	152.2 °F
Static Pressure (St):	0.2 inches H ₂ O

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Volume of sample, dry basis:

$$V_{mstd} = V_m \times Y_d \times \left(\frac{528.0^\circ R}{29.92 \text{ "Hg}} \right) \times \left(\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m + 460} \right) = 174.422 \text{ dscf}$$

Volume of water vapor in sample:

$$V_{wstd} = \frac{0.04707 \text{ ft}^3}{\text{ml}} \times V_{lc} = 54.347 \text{ scf}$$

Fractional moisture content of stack gas:

$$B_{ws} = \frac{V_{wstd}}{(V_{mstd} + V_{wstd})} = 0.2376 B_{wo}$$

Percent Moisture:

$$\% \text{moisture} = B_{ws} \times 100 = 23.76 \%$$

Fractional moisture content of stack gas at saturated conditions:

$$T_{s(K)} = ((T_s - 32) \times 0.5556) + 273 = 339.8 \text{ °Kelvin}$$

$$P_{s(\text{mmHg})} = \left(P_{bar} + \frac{S_t}{13.6} \right) \times 25.401 = 762.03 \text{ mm Hg}$$

$$B_{ws@saturation} = \frac{S.V.P.}{P_{bar} + \frac{P_{static}}{13.6}} = 0.2650$$

$$S.V.P. = 7.952 \text{ in. Hg}$$

Percent moisture at saturated conditions:

$$\% \text{moisture}_{saturated} = B_{wos} \times 100 = 26.50 \%$$

Percent moisture used for emissions calculations:

ARI Environmental Inc.	Moisture Calculations	=	23.76 %



USEPA Method 29 Metals Emissions Calculation Summary

Client: Valero
Location: Paulsboro, New Jersey
Source: FCCU FGS Stack
Date: 8/29/2007
Run #: M29-1

Test Data Input

Barometric pressure (P_{bar}):	30.00 inches Hg
Stack pressure (P_s):	30.01 Inches Hg Abs.
Test length (θ):	240.0 minutes
Sample nozzle diameter (D_n):	0.3130 inches
Sample nozzle area (S_b):	0.000534 ft^2
Stack temperature (T_s):	152.2 °F
Volume metered (V_{mstd}):	174.422 dscf
Stack gas velocity (V_s):	34.403 ft/sec
Stack gas volumetric flow (Q_{std}):	6,099,243 dscfh
Fractional Moisture content (B_{wo}):	0.2376 %

Metals Laboratory Analysis Weights (Mt)

Copper (Cu):	9.340 ug
Nickel (Ni):	6.800 ug
Vanadium (V):	<7.300 ug

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Percent Isokinetic:

$$\% \text{Isokinetic} = \frac{0.0945 \times V_{mstd} \times (T_s + 460)}{P_s \times V_s \times \theta \times A_n \times (1 - B_{wo})} = 100.0 \% \text{ isokinetic}$$

Metals concentration (ug/dscm):

$$C_s = \frac{M_t}{\left[\frac{V_{mstd}}{35.31 \text{ dscf} / \text{dscm}} \right]} = \begin{array}{ll} 1.891 & \text{ug/dscm Copper (Cu)} \\ 1.377 & \text{ug/dscm Nickel (Ni)} \\ <1.478 & \text{ug/dscm Vanadium (V)} \end{array}$$

Metals concentration ($\times 10^{-9}$ lb/dscf):

$$C'_s = \frac{\left(\frac{2.205 \times 10^{-9} \text{ lb}}{\mu\text{g}} \times M_t \right)}{V_{mstd}} = \begin{array}{ll} 0.118 \times 10^{-9} & \text{lb/dscf Copper (Cu)} \\ 0.086 \times 10^{-9} & \text{lb/dscf Nickel (Ni)} \\ <0.092 \times 10^{-9} & \text{lb/dscf Vanadium (V)} \end{array}$$

Metals emission rate ($\times 10^{-4}$ lb/hr):

$$E_m = C'_s \times Q_{std} = \begin{array}{ll} 7.202 & \times 10^{-4} \text{ lb/hr Copper (Cu)} \\ 5.243 & \times 10^{-4} \text{ lb/hr Nickel (Ni)} \\ <5.629 & \times 10^{-4} \text{ lb/hr Vanadium (V)} \end{array}$$



Client: Valero
Location: Paulsboro, New Jersey
Source: FCCU FGS Stack
Date: 8/29/2007
Run #: M29-1

Metals Laboratory Data Summary

Front Half Metal Calculation

Metal	FH Sample (M _{fh}) (micrograms)	FH Blank (M _{fhb}) (micrograms)	<u>I Value</u>			<u>II Values</u>			Blank Value Used (micrograms)	Blank Corrected Sample Mass (micrograms)
			A Value (4 inch filter) (micrograms)	5 % of FH Sample (micrograms)	Lesser value (M _{fhb}) vs 5% (micrograms)	Greater Value I vs II (micrograms)	Lesser value (M _{fhb}) vs 5% (micrograms)	Greater Value I vs II (micrograms)		
Copper	5.500	0.960	17.590	0.275	0.275	17.590	0.275	17.590	0.960	4.540
Nickel	9.600	4.900	17.590	0.480	0.480	17.590	0.480	17.590	4.900	4.700
Vanadium	6.800	0.000	17.590	0.340	0.340	17.590	0.340	17.590	0.000	6.800

Back Half Metal Calculation

Metal	BH Sample (M _{bh}) (micrograms)	BH Blank (M _{bhb}) (micrograms)	<u>I Value</u>			<u>II Values</u>			Blank Value Used (micrograms)	Blank Corrected Sample Mass (micrograms)
			5 % of BH Sample (micrograms)	Lesser value (M _{bh}) vs 5% (micrograms)	Greater Value I vs II (micrograms)	5 % of BH Sample (micrograms)	Lesser value (M _{bh}) vs 5% (micrograms)	Greater Value I vs II (micrograms)		
Copper	5.800	7.400	1.000	0.290	1.000	1.000	0.290	1.000	1.000	4.800
Nickel	2.100	0.000	1.000	0.105	1.000	1.000	0.105	1.000	0.000	2.100
Vanadium	<0.500	0.000	1.000	0.025	1.000	1.000	0.025	1.000	0.000	<0.500

Metal	FH Sample (M _{fh}) (micrograms)	FH Blank (M _{fhb}) (micrograms)	BH Sample (M _{bh}) (micrograms)	BH Blank (M _{bhb}) (micrograms)	Total Metal (M _t) (micrograms)
Copper	5.500	0.960	5.800	1.000	9.340
Nickel	9.600	4.900	2.100	0.000	6.800
Vanadium	6.800	0.000	0.500	0.000	<7.300



USEPA Method 2 Volumetric Flow Rate Sample Calculations (Circular Ducts)

Client: Valero
Location: Paulsboro, New Jersey
Source: FCCU FGS Stack
Date: 8/30/2007
Run #: M29-2

Data Input

Carbon Dioxide (CO ₂):	19.6 %
Oxygen (O ₂):	1.2 %
Nitrogen (N ₂):	79.2 %
Fractional Moisture Content (B _{ws}):	0.2320 dimensionless
Stack Temperature (T _s):	151.5 °F
Pitot Coefficient (C _p):	0.84 dimensionless
Average square root of ΔP	0.5620 inches H ₂ O
Barometric Pressure (P _{bar}):	29.97 inches Hg
Static Pressure (S _t):	0.18 inches H ₂ O
Stack diameter:	117.00 inches
Stack area (A _s):	74.6619 ft ²

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Dry molecular weight of stack gas:

$$M_d = (0.44 \times \%CO_2) + (0.32 \times \%O_2) + (0.28 \times \%N_2) = 31.180 \text{ lb/lb-mole}$$

Molecular weight of stack gas, wet basis:

$$M_s = (M_d \times (1 - B_{ws})) + (18 \times B_{ws}) = 28.122 \text{ lb/lb-mole}$$

Absolute stack gas pressure:

$$P_s = P_{bar} + \left(\frac{S_t}{13.6} \right) = 29.983 \text{ inches H}_2\text{O}$$

Stack gas velocity:

$$V_s = 85.49 \times C_p \times \sqrt{\Delta P} \times \sqrt{\frac{(T_s + 460)}{(P_s \times M_s)}} = 34.369 \text{ feet/second}$$

Stack gas volumetric flow rate:

$$Q_a = A_s \times V_s \times 60 = 153,963 \text{ acfm}$$

Stack gas volumetric flow rate, wet basis:

$$Q_{sw} = Q_a \times \left[\left(\frac{528^\circ R}{29.92 \text{ in. Hg}} \right) \times \left(\frac{P_s}{T_s + 460} \right) \right] = 133,220 \text{ scfm}$$

$$Q_{sw} = Q_a \times \left[\left(\frac{528^\circ R}{29.92 \text{ in. Hg}} \right) \times \left(\frac{P_s}{T_s + 460} \right) \right] \times 60 = 7,993,197 \text{ scfh}$$

Stack gas volumetric flow rate, dry basis:

$$Q_{std} = Q_{sw} \times (1 - B_{ws}) = 102,311 \text{ dscfm}$$

$$Q_{std} = Q_{sw} \times (1 - B_{ws}) \times 60 = 6,138,686 \text{ dscfh}$$



USEPA Method 4 Moisture Determination Sample Calculations

Client: Valero
Location: Paulsboro, New Jersey
Source: FCCU FGS Stack
Date: 8/30/2007
Run #: M29-2

Data Input:

Volume metered (V_m):	181.116 ft ³
Meter calibration coefficient (Y_d):	1.002 dimensionless
Barometric pressure (P_{bar}):	29.97 inches Hg
Meter sample rate (ΔH):	1.89 inches H ₂ O
Meter inlet/outlet temperature (T_m):	93.9 °F
Volume of moisture collected (V_{lc}):	1117.3 milliliters
Stack Temperature (T_s):	151.5 °F
Static Pressure (St):	0.2 inches H ₂ O

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Volume of sample, dry basis:

$$V_{mstd} = V_m \times Y_d \times \left(\frac{528.0^\circ R}{29.92'' \text{ Hg}} \right) \times \left(\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m + 460} \right) = 174.084 \text{ dscf}$$

Volume of water vapor in sample:

$$V_{wstd} = \frac{0.04707 \text{ ft}^3}{\text{ml}} \times V_{lc} = 52.591 \text{ scf}$$

Fractional moisture content of stack gas:

$$B_{ws} = \frac{V_{wstd}}{(V_{mstd} + V_{wstd})} = 0.2320 B_{wo}$$

Percent Moisture:

$$\% \text{moisture} = B_{ws} \times 100 = 23.20 \%$$

Fractional moisture content of stack gas at saturated conditions:

$$T_{s(K)} = ((T_s - 32) \times 0.5556) + 273 = 339.4 \text{ °Kelvin}$$

$$P_{s(\text{mmHg})} = \left(P_{bar} + \frac{S_t}{13.6} \right) \times 25.401 = 761.27 \text{ mm Hg}$$

$$B_{ws@ \text{saturation}} = \frac{\text{S.V.P.}}{P_{bar} + \frac{P_{static}}{13.6}} = 0.2652$$

$$\text{S.V.P.} = 7.952 \text{ in. Hg}$$

Percent moisture at saturated conditions:

$$\% \text{moisture}_{\text{saturated}} = B_{ws} \times 100 = 26.52 \%$$

Percent moisture used for emissions calculations:

$$\text{ARI Environmental Inc.} \quad \text{Moisture Calculations} = 23.20 \%$$



USEPA Method 29 Metals Emissions Calculation Summary

Client: Valero
Location: Paulsboro, New Jersey
Source: FCCU FGS Stack
Date: 8/30/2007
Run #: M29-2

Test Data Input

Barometric pressure (P_{bar}):	29.97 inches Hg
Stack pressure (P_s):	29.98 Inches Hg Abs.
Test length (θ):	240.0 minutes
Sample nozzle diameter (D_n):	0.3130 inches
Sample nozzle area (S_b):	0.000534 ft^2
Stack temperature (T_s):	151.5 $^{\circ}F$
Volume metered (V_{mstd}):	174.084 dscf
Stack gas velocity (V_g):	34.369 ft/sec
Stack gas volumetric flow (Q_{std}):	6,138,686 dscfh
Fractional Moisture content (B_{w0}):	0.2320 %

Metals Laboratory Analysis Weights (Mt)

Copper (Cu):	4.240 ug
Nickel (Ni):	7.600 ug
Vanadium (V)	<5.900 ug

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 $^{\circ}F$):

Percent Isokinetic:

$$\%Isokinetic = \frac{0.0945 \times V_{mstd} \times (T_s + 460)}{P_s \times V_g \times \theta \times A_n \times (1 - B_{w0})} = 99.1 \% \text{ isokinetic}$$

Metals concentration (ug/dscm):

$$C_s = \frac{M_t}{\left[\frac{V_{mstd}}{35.31 \text{ dscf / dscm}} \right]} = \begin{matrix} 0.860 & \text{ug/dscm Copper (Cu)} \\ 1.542 & \text{ug/dscm Nickel (Ni)} \\ <1.197 & \text{ug/dscm Vanadium (V)} \end{matrix}$$

Metals concentration ($\times 10^{-9}$ lb/dscf):

$$C'_s = \frac{\left(\frac{2.205 \times 10^{-9} \text{ lb}}{\mu\text{g}} \times M_t \right)}{V_{mstd}} = \begin{matrix} 0.054 \times 10^{-9} \text{ lb/dscf Copper (Cu)} \\ 0.096 \times 10^{-9} \text{ lb/dscf Nickel (Ni)} \\ <0.075 \times 10^{-9} \text{ lb/dscf Vanadium (V)} \end{matrix}$$

Metals emission rate ($\times 10^{-4}$ lb/hr):

$$E_m = C'_s \times Q_{std} = \begin{matrix} 3.297 & \times 10^{-4} \text{ lb/hr Copper (Cu)} \\ 5.909 & \times 10^{-4} \text{ lb/hr Nickel (Ni)} \\ <4.587 & \times 10^{-4} \text{ lb/hr Vanadium (V)} \end{matrix}$$



Client: Valero
Location: Paulsboro, New Jersey
Source: FCCU FGS Stack
Date: 8/30/2007
Run #: M29-2

Metals Laboratory Data Summary

Front Half Metal Calculation

Metal	<u>I Value</u>		<u>II Values</u>			Blank Value Used	Blank Corrected Sample Mass (micrograms)
	FH Sample (M _{fh}) (micrograms)	FH Blank (M _{fhb}) (micrograms)	5 % of FH Sample (micrograms)	Lesser value (M _{fhb}) vs 5% (micrograms)	Greater Value I vs II (micrograms)		
Copper	3.000	0.960	17.590	0.150	17.590	0.960	2.040
Nickel	11.300	4.900	17.590	0.565	17.590	4.900	6.400
Vanadium	5.400	0.000	17.590	0.270	17.590	0.000	5.400

Back Half Metal Calculation

Metal	<u>I Value</u>		<u>II Values</u>			Blank Value Used	Blank Corrected Sample Mass (micrograms)
	BH Sample (M _{bh}) (micrograms)	BH Blank (M _{bhb}) (micrograms)	5 % of BH Sample (micrograms)	Lesser value (M _{bh}) vs 5% (micrograms)	Greater Value I vs II (micrograms)		
Copper	3.200	7.400	1.000	0.160	1.000	1.000	2.200
Nickel	1.200	0.000	1.000	0.060	1.000	0.000	1.200
Vanadium	<0.500	0.000	1.000	0.025	1.000	0.000	<0.500

Metal	FH Sample (M _{fh}) (micrograms)	FH Blank (M _{fhb}) (micrograms)	BH Sample (M _{bh}) (micrograms)	BH Blank (M _{bhb}) (micrograms)	Total Metal (M _t) (micrograms)
Copper	3.000	0.960	3.200	1.000	4.240
Nickel	11.300	4.900	1.200	0.000	7.600
Vanadium	<5.400	0.000	0.500	0.000	<5.900



USEPA Method 2 Volumetric Flow Rate Sample Calculations (Circular Ducts)

Client: Valero
Location: Paulsboro, New Jersey
Source: FCCU FGS Stack
Date: 8/30/2007
Run #: M29-3

Data Input

Carbon Dioxide (CO ₂):	19.7 %
Oxygen (O ₂):	0.9 %
Nitrogen (N ₂):	79.4 %
Fractional Moisture Content (B _{ws}):	0.2444 dimensionless
Stack Temperature (T _s):	152.7 °F
Pitot Coefficient (C _p):	0.84 dimensionless
Average square root of ΔP	0.5667 inches H ₂ O
Barometric Pressure (P _{bar}):	29.91 inches Hg
Static Pressure (S _t):	0.20 inches H ₂ O
Stack diameter:	117.00 inches
Stack area (A _s):	74.6619 ft ²

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Dry molecular weight of stack gas:

$$M_d = (0.44 \times \%CO_2) + (0.32 \times \%O_2) + (0.28 \times \%N_2) = 31.191 \text{ lb/lb-mole}$$

Molecular weight of stack gas, wet basis:

$$M_s = (M_d \times (1 - B_{ws})) + (18 \times B_{ws}) = 27.967 \text{ lb/lb-mole}$$

Absolute stack gas pressure:

$$P_s = P_{bar} + \left(\frac{S_t}{13.6} \right) = 29.925 \text{ inches H}_2\text{O}$$

Stack gas velocity:

$$V_s = 85.49 \times C_p \times \sqrt{\Delta P} \times \sqrt{\frac{(T_s + 460)}{(P_s \times M_s)}} = 34.821 \text{ feet/second}$$

Stack gas volumetric flow rate:

$$Q_a = A_s \times V_s \times 60 = 155,986 \text{ acfm}$$

Stack gas volumetric flow rate, wet basis:

$$Q_{sw} = Q_a \times \left[\left(\frac{528^\circ R}{29.92 \text{ in. Hg}} \right) \times \left(\frac{P_s}{T_s + 460} \right) \right] = 134,443 \text{ scfm}$$

$$Q_{sw} = Q_a \times \left[\left(\frac{528^\circ R}{29.92 \text{ in. Hg}} \right) \times \left(\frac{P_s}{T_s + 460} \right) \right] \times 60 = 8,066,580 \text{ scfh}$$

Stack gas volumetric flow rate, dry basis:

$$Q_{std} = Q_{sw} \times (1 - B_{ws}) = 101,584 \text{ dscfm}$$

$$Q_{std} = Q_{sw} \times (1 - B_{ws}) \times 60 = 6,095,037 \text{ dscfh}$$



USEPA Method 4 Moisture Determination Sample Calculations

Client: Valero
Location: Paulsboro, New Jersey
Source: FCCU FGS Stack
Date: 8/30/2007
Run #: M29-3

Data Input:

Volume metered (V_m):	185.661 ft ³
Meter calibration coefficient (Y_d):	1.002 dimensionless
Barometric pressure (P_{bar}):	29.91 inches Hg
Meter sample rate (ΔH):	1.94 inches H ₂ O
Meter inlet/outlet temperature (T_m):	102.0 °F
Volume of moisture collected (V_{lc}):	1206.4 milliliters
Stack Temperature (T_s):	152.7 °F
Static Pressure (St):	0.2 inches H ₂ O

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Volume of sample, dry basis:

$$V_{m_{std}} = V_m \times Y_d \times \left(\frac{528.0^\circ R}{29.92 \text{ "Hg}} \right) \times \left(\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m + 460} \right) = 175.552 \text{ dscf}$$

Volume of water vapor in sample:

$$V_{wstd} = \frac{0.04707 \text{ ft}^3}{\text{ml}} \times V_{lc} = 56.785 \text{ scf}$$

Fractional moisture content of stack gas:

$$B_{ws} = \frac{V_{wstd}}{(V_{mstd} + V_{wstd})} = 0.2444 B_{wo}$$

Percent Moisture:

$$\% \text{moisture} = B_{ws} \times 100 = 24.44 \%$$

Fractional moisture content of stack gas at saturated conditions:

$$T_{s(^\circ K)} = ((T_s - 32) \times 0.5556) + 273 = 340.1 \text{ }^\circ \text{Kelvin}$$

$$P_{s(\text{mmHg})} = \left(P_{bar} + \frac{S_t}{13.6} \right) \times 25.401 = 759.74 \text{ mm Hg}$$

$$B_{ws@saturation} = \frac{S.V.P.}{P_{bar} + \frac{P_{static}}{13.6}} = 0.2724$$

$$S.V.P. = 8.150 \text{ in. Hg}$$

Percent moisture at saturated conditions:

$$\% \text{moisture}_{saturated} = B_{wos} \times 100 = 27.24 \%$$

Percent moisture used for emissions calculations:

ARI Environmental Inc.	Moisture Calculations	=	24.44 %



USEPA Method 29 Metals Emissions Calculation Summary

Client: Valero
Location: Paulsboro, New Jersey
Source: FCCU FGS Stack
Date: 8/30/2007
Run #: M29-3

Test Data Input

Barometric pressure (P_{bar}):	29.91 inches Hg
Stack pressure (P_s):	29.92 Inches Hg Abs.
Test length (θ):	240.0 minutes
Sample nozzle diameter (D_n):	0.3130 inches
Sample nozzle area (S_b):	0.000534 ft^2
Stack temperature (T_s):	152.7 $^{\circ}F$
Volume metered (V_{mstd}):	175.552 dscf
Stack gas velocity (V_s):	34.821 ft/sec
Stack gas volumetric flow (Q_{std}):	6,095,037 dscfh
Fractional Moisture content (B_{ws}):	0.2444 %

Metals Laboratory Analysis Weights (Mt)

Copper (Cu):	2.340 ug
Nickel (Ni):	6.170 ug
Vanadium (V):	<6.400 ug

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 $^{\circ}F$):

Percent Isokinetic:

$$\%Isokinetic = \frac{0.0945 \times V_{mstd} \times (T_s + 460)}{P_s \times V_s \times \theta \times A_n \times (1 - B_{ws})} = 100.7 \% \text{ isokinetic}$$

Metals concentration (ug/dscm):

$$C_s = \frac{M_t}{\left[\frac{V_{mstd}}{35.31 \text{ dscf / dscm}} \right]} = \begin{array}{ll} 0.471 & \text{ug/dscm Copper (Cu)} \\ 1.241 & \text{ug/dscm Nickel (Ni)} \\ <1.287 & \text{ug/dscm Vanadium (V)} \end{array}$$

Metals concentration ($\times 10^{-9}$ lb/dscf):

$$C_s^1 = \frac{\left(\frac{2.205 \times 10^{-9} \text{ lb}}{\mu\text{g}} \times M_t \right)}{V_{mstd}} = \begin{array}{ll} 0.029 \times 10^{-9} & \text{lb/dscf Copper (Cu)} \\ 0.077 \times 10^{-9} & \text{lb/dscf Nickel (Ni)} \\ <0.080 \times 10^{-9} & \text{lb/dscf Vanadium (V)} \end{array}$$

Metals emission rate ($\times 10^{-4}$ lb/hr):

$$E_m = C_s^1 \times Q_{std} = \begin{array}{ll} 1.791 & \times 10^{-4} \text{ lb/hr Copper (Cu)} \\ 4.724 & \times 10^{-4} \text{ lb/hr Nickel (Ni)} \\ <4.900 & \times 10^{-4} \text{ lb/hr Vanadium (V)} \end{array}$$



Client: Valero
Location: Paulsboro, New Jersey
Source: FCCU FGS Stack
Date: 8/30/2007
Run #: M29-3

Metals Laboratory Data Summary

Front Half Metal Calculation

Metal	<u>I Value</u>		<u>II Values</u>		Blank Value Used	Blank Corrected Sample Mass (micrograms)
	FH Sample (M _{fh}) (micrograms)	FH Blank (M _{fbh}) (micrograms)	5 % of FH Sample (micrograms)	Lesser value (M _{fbh}) vs 5% I vs II (micrograms)		
Copper	1.900	0.960	17.590	0.095	17.590	0.940
Nickel	10.100	4.900	17.590	0.505	17.590	5.200
Vanadium	5.900	0.000	17.590	0.295	17.590	5.900

Back Half Metal Calculation

Metal	<u>I Value</u>		<u>II Values</u>		Blank Value Used	Blank Corrected Sample Mass (micrograms)
	BH Sample (M _{bh}) (micrograms)	BH Blank (M _{bhb}) (micrograms)	5 % of BH Sample (micrograms)	Lesser value (M _{bh}) vs 5% I vs II (micrograms)		
Copper	2.400	7.400	1.000	0.120	1.000	1.400
Nickel	0.970	0.000	1.000	0.049	1.000	0.970
Vanadium	<0.500	0.000	1.000	0.025	1.000	<0.500

Metal	FH Sample (M _{fh}) (micrograms)	FH Blank (M _{fbh}) (micrograms)	BH Sample (M _{bh}) (micrograms)	BH Blank (M _{bhb}) (micrograms)	Total Metal (M _t) (micrograms)
Copper	1.900	0.960	2.400	1.000	2.340
Nickel	10.100	4.900	0.970	0.000	6.170
Vanadium	<5.900	0.000	0.500	0.000	<6.400

ARI ENVIRONMENTAL, INC.
MOISTURE CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/26/2007
RUN NUMBER: HCN-1

γ FACTOR:	0.969	STACK DIAM:	117.00 inches
BAROMETRIC:	30.09 in. Hg	METER VOLUME:	47.607 ft ³
STATIC PRES:	0.20 in.H ₂ O	METER TEMP:	91.2 °F
STACK TEMP:	146.2 °F	LIQUID COLL:	321.8 milliliters
SQ.RT ΔP:	0.5815 in.H ₂ O	CO₂:	19.75 % by volume
ΔH:	1.79 in.H ₂ O	O₂:	0.82 % by volume

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE

@ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92} \right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = 44.635 \text{ dscf}$$

$\gamma = 0.969$

VOLUME OF WATER IN SAMPLE

@ STANDARD CONDITIONS

$$V_{wstd} = 0.04707 \times V_{lc} = 15.147 \text{ scf}$$

$V_{lc} = 321.8 \text{ mL}$
 $V_{lc} = 279.3 \text{ mL adjusted for saturation}$

FRACTIONAL MOISTURE CONTENT OF STACK GAS AS MEASURED

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} = 0.2534$$

FRACTIONAL MOISTURE CONTENT OF STACK GAS @ SATURATION

$$B_{ws@saturation} = \frac{S.V.P.}{P_{bar} + \frac{P_{static}}{13.6}} = 0.2275$$

$S.V.P. = 6.85 \text{ in. Hg}$

FRACTIONAL MOISTURE CONTENT USED IN CALCULATIONS

$$B_{ws} = 0.2275$$

ARI ENVIRONMENTAL, INC.
FLOW RATE CALCULATION SUMMARY

COMPANY: Valero Refining Compar
LOCATION: Paulsboro, NJ
RUN NUMBER: HCN-1

SOURCE: FCC FGS
TEST DATE: 8/26/2007

BAROMETRIC: 30.09 in. Hg	STACK DIAM: 117.00 inches
STATIC PRES: 0.2 in.H ₂ O	CO₂: 19.75 % by volume
STACK TEMP: 146.2 °F	O₂: 0.82 % by volume
SQ.RT ΔP: 0.5815 in.H ₂ O	

DRY MOLECULAR WEIGHT OF STACK GAS			
$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$	=	31.19	lb/lb-mole
MOLECULAR WEIGHT OF STACK GAS, wet basis			
$M_s = M_d(1 - B_{ws}) + 18B_{ws}$	=	28.19	lb/lb-mole
PITOT TUBE COEFFICIENT			
C_p (from calibration curve or geometric specifications)	=	0.84	
AVERAGE VELOCITY HEAD OF STACK GAS, in. H₂O			
$\sqrt{\Delta P} = \frac{1}{n} \sum_{i=1}^n \sqrt{\Delta p_i}$	=	0.5815	in. H ₂ O
AVERAGE ABSOLUTE STACK GAS TEMPERATURE			
$T_s = 146.2\text{ °F} + 460$	=	606.2	°R
ABSOLUTE STACK GAS PRESSURE			
$P_s = P_{bar} + \frac{P_{static}}{13.6}$	=	30.10	in.Hg
STACK GAS VELOCITY			
$V_s = (85.49)(C_p)(\text{avg}\sqrt{\Delta P})\sqrt{\frac{T_s}{(P_s)(M_s)}}$	=	35.292	ft/sec
STACK GAS VOLUMETRIC FLOW RATE, actual			
$Q_s = 60 \times V_s \times A_s$	=	158,100	acfm
Stack Area =		74.662	ft ²
STACK GAS VOLUMETRIC FLOW RATE, standard conditions, wet basis			
$Q_{stdw} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)$	=	138,554.8 8,313,289	scfm, wb scfh, wb
STACK GAS VOLUMETRIC FLOW RATE, standard conditions, dry basis			
$Q_{std} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)(1 - B_{ws})$	=	107,028.2 6,421,690	dscfm dscfh

HYDROGEN CYANIDE CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/26/2007
RUN NO: HCN-1

INPUT

V_m:	47.607 ft ³	Q_s:	6,421,690 dscfh
γ FACTOR:	0.969	T_s:	146.2 °F
P_{bar}:	30.09 in. Hg	θ:	60 minutes
ΔH:	1.79 in. H ₂ O	V_s:	35.292 fps
T_m:	91.2 °F	P_s:	30.10 in. Hg
HCN in sample:	16090 μg	V_{lc}:	321.8 mL
		%O₂:	0.82 %

Volume of Sample at Standard Conditions on a Dry Basis:		English Units (29.92 in. Hg, 68 °F)	
$V_{mstd} = \left(\frac{528}{29.92} \right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right]$		=	44.635 dscf
Isokinetic Sampling Rate			
$\%ISO = \frac{(100)(T_s) \left[(0.002669 \times V_{lc}) + \left(\frac{V_m}{T_m} \right) (\gamma) \left(P_{bar} + \left(\frac{\Delta H}{13.6} \right) \right) \right]}{(60)(\theta)(V_s)(P_s)(A_n)}$		=	101.8 % I
A _n =	0.00052753 ft ²	Runtime (θ) =	98.4 @ saturation 60 minutes
Total μg HCN in sample (M_n)		=	16,090.00 μg
Concentration of HCN			
$C'_{s(lb/dscf)} = \frac{(2.205 \times 10^{-9} lb/\mu g)(M_n)}{V_{mstd}}$		=	0.7949 x 10 ⁻⁶ lbs/dscf
$C_{s(ppmvdb)} = C'_{s(lb/dscf)} \times \frac{385.26 ft^3/lb - mole}{27.03 lb/lb - mole} \times 10^6$		=	11.33 ppmv db
$C_{s(ppmvdb@7\%O_2)} = C_{s(ppmvdb)} \times \frac{20.9 - 7}{20.9 - \%O_2}$		=	7.84 ppmv db @ 7% O ₂
HCN Mass Rate:			
E = Q _s × C' _{s(lb/dscf)}		=	5.104 lbs/hr

ARI ENVIRONMENTAL, INC.
MOISTURE CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/29/2007
RUN NUMBER: HCN-2

γ FACTOR:	0.969	STACK DIAM:	117.00 inches
BAROMETRIC:	30.00 in. Hg	METER VOLUME:	46.502 ft ³
STATIC PRES:	0.20 in.H ₂ O	METER TEMP:	96.1 °F
STACK TEMP:	145.4 °F	LIQUID COLL:	309.3 milliliters
SQ. RT ΔP:	0.5773 in.H ₂ O	CO₂:	19.85 % by volume
ΔH:	1.77 in.H ₂ O	O₂:	0.81 % by volume

ENGLISH UNITS
(29.92 in.Hg & 68 °F)

VOLUME OF SAMPLE

@ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92} \right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = 43.084 \text{ dscf}$$

$\gamma = 0.969$

VOLUME OF WATER IN SAMPLE

@ STANDARD CONDITIONS

$$V_{wstd} = 0.04707 \times V_{lc} = 14.559 \text{ scf}$$

$$V_{lc} = 309.3 \text{ mL}$$

$$V_{lc} = 262.0 \text{ mL adjusted for saturation}$$

FRACTIONAL MOISTURE CONTENT OF STACK GAS AS MEASURED

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} = 0.2526$$

FRACTIONAL MOISTURE CONTENT OF STACK GAS @ SATURATION

$$B_{ws@saturation} = \frac{S.V.P.}{P_{bar} + \frac{P_{static}}{13.6}} = 0.2226$$

$$S.V.P. = 6.68 \text{ in. Hg}$$

FRACTIONAL MOISTURE CONTENT USED IN CALCULATIONS

$$B_{ws} = 0.2226$$

ARI ENVIRONMENTAL, INC.
FLOW RATE CALCULATION SUMMARY

COMPANY: Valero Refining Compar
LOCATION: Paulsboro, NJ
RUN NUMBER: HCN-2

SOURCE: FCC FGS
TEST DATE: 8/29/2007

BAROMETRIC: 30 in. Hg	STACK DIAM: 117.00 inches
STATIC PRES: 0.2 in.H ₂ O	CO₂: 19.85 % by volume
STACK TEMP: 145.4 °F	O₂: 0.81 % by volume
SQ.RT ΔP: 0.5773 in.H ₂ O	

DRY MOLECULAR WEIGHT OF STACK GAS			
$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$	=	31.21	lb/lb-mole
MOLECULAR WEIGHT OF STACK GAS, wet basis			
$M_s = M_d(1 - B_{ws}) + 18B_{ws}$	=	28.27	lb/lb-mole
PITOT TUBE COEFFICIENT			
C_p (from calibration curve or geometric specifications)	=	0.84	
AVERAGE VELOCITY HEAD OF STACK GAS, in. H₂O			
$\sqrt{\Delta P} = \frac{1}{n} \sum_{i=1}^n \sqrt{\Delta p_i}$	=	0.5773	in. H ₂ O
AVERAGE ABSOLUTE STACK GAS TEMPERATURE			
$T_s = 145.4 \text{ °F} + 460$	=	605.4	°R
ABSOLUTE STACK GAS PRESSURE			
$P_s = P_{bar} + \frac{P_{static}}{13.6}$	=	30.01	in.Hg
STACK GAS VELOCITY			
$V_s = (85.49)(C_p)(\text{avg}\sqrt{\Delta P})\sqrt{\frac{T_s}{(P_s)(M_s)}}$	=	35.018	ft/sec
STACK GAS VOLUMETRIC FLOW RATE, actual			
$Q_s = 60 \times V_s \times A_s$	=	156,873	acfm
Stack Area =		74.662	ft ²
STACK GAS VOLUMETRIC FLOW RATE, standard conditions, wet basis			
$Q_{stdw} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)$	=	137,249.6 8,234,979	scfm, wb scfh, wb
STACK GAS VOLUMETRIC FLOW RATE, standard conditions, dry basis			
$Q_{std} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)(1 - B_{ws})$	=	106,703.7 6,402,222	dscfm dscfh

HYDROGEN CYANIDE CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/29/2007
RUN NO: HCN-2

INPUT

V_m:	46.502 ft ³	Q_s:	6,402,222 dscfh
γ FACTOR:	0.969	T_s:	145.4 °F
P_{bar}:	30.00 in. Hg	Θ:	60 minutes
ΔH:	1.77 in. H ₂ O	V_s:	35.018 fps
T_m:	96.1 °F	P_s:	30.01 in. Hg
HCN in sample:	15290 μg	V_{lc}:	309.3 mL
		%O₂:	0.81 %

Volume of Sample at Standard Conditions on a Dry Basis:		English Units (29.92 in. Hg, 68 °F)	
$V_{mstd} = \left(\frac{528}{29.92} \right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right]$		=	43.084 dscf
Isokinetic Sampling Rate			
$\%ISO = \frac{(100)(T_s) \left[(0.002669 \times V_{lc}) + \left(\frac{V_m}{T_m} \right) (\gamma) \left(P_{bar} + \left(\frac{\Delta H}{13.6} \right) \right) \right]}{(60)(\theta)(V_s)(P_s)(A_n)}$		=	99.1 % I
A_n =	0.00052753 ft ²	Runtime (θ) =	95.3 @ saturation 60 minutes
Total μg HCN in sample (M_n)		=	15,290.00 μg
Concentration of HCN			
$C'_{s(lb/dscf)} = \frac{(2.205 \times 10^{-9} lb/\mu g)(M_n)}{V_{mstd}}$		=	0.7825 x 10 ⁻⁶ lbs/dscf
$C_{s(ppmvdb)} = C'_{s(lb/dscf)} \times \frac{385.26 ft^3/lb - mole}{27.03 lb/lb - mole} \times 10^6$		=	11.15 ppmv db
$C_{s(ppmv db @ 7\% O_2)} = C_{s(ppmv db)} \times \frac{20.9 - 7}{20.9 - \%O_2}$		=	7.72 ppmv db @ 7% O ₂
HCN Mass Rate:			
$E = Q_s \times C'_{s(lb/dscf)}$		=	5.010 lbs/hr

ARI ENVIRONMENTAL, INC.
MOISTURE CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/29/2007
RUN NUMBER: HCN-3

γ FACTOR:	0.969	STACK DIAM:	117.00 inches
BAROMETRIC:	30.00 in. Hg	METER VOLUME:	46.286 ft ³
STATIC PRES:	0.17 in.H ₂ O	METER TEMP:	82.4 °F
STACK TEMP:	145.5 °F	LIQUID COLL:	307.8 milliliters
SQ. RT ΔP:	0.5944 in.H ₂ O	CO₂:	19.81 % by volume
ΔH:	1.96 in.H ₂ O	O₂:	0.99 % by volume

ENGLISH UNITS
(29.92 in.Hg & °F)

VOLUME OF SAMPLE

@ STANDARD CONDITIONS, DRY BASIS

$$V_{mstd} = \left(\frac{528}{29.92} \right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right] = 43.987 \text{ dscf}$$

$\gamma = 0.969$

VOLUME OF WATER IN SAMPLE

@ STANDARD CONDITIONS

$$V_{wstd} = 0.04707 \times V_{lc} = 14.488 \text{ scf}$$

$$V_{lc} = 307.8 \text{ mL}$$

$$V_{lc} = 276.4 \text{ mL adjusted for saturation}$$

FRACTIONAL MOISTURE CONTENT OF STACK GAS AS MEASURED

$$B_{ws} = \frac{V_{wstd}}{V_{wstd} + V_{mstd}} = 0.2478$$

FRACTIONAL MOISTURE CONTENT OF STACK GAS @ SATURATION

$$B_{ws@saturation} = \frac{S.V.P.}{P_{bar} + \frac{P_{static}}{13.6}} = 0.2282$$

$$S.V.P. = 6.85 \text{ in. Hg}$$

FRACTIONAL MOISTURE CONTENT USED IN CALCULATIONS

$$B_{ws} = 0.2282$$

ARI ENVIRONMENTAL, INC.
FLOW RATE CALCULATION SUMMARY

COMPANY: Valero Refining Compar
LOCATION: Paulsboro, NJ
RUN NUMBER: HCN-3

SOURCE: FCC FGS
TEST DATE: 8/29/2007

BAROMETRIC: 30 in. Hg STATIC PRES: 0.17 in.H ₂ O STACK TEMP: 145.5 °F SQ.RT ΔP: 0.5944 in.H ₂ O	STACK DIAM: 117.00 inches CO₂: 19.81 % by volume O₂: 0.99 % by volume

DRY MOLECULAR WEIGHT OF STACK GAS			
$M_d = 0.44(\%CO_2) + 0.32(\%O_2) + 0.28(\%N_2 + \%CO)$	=	31.21	lb/lb-mole
MOLECULAR WEIGHT OF STACK GAS, wet basis			
$M_s = M_d(1 - B_{ws}) + 18B_{ws}$	=	28.19	lb/lb-mole
PITOT TUBE COEFFICIENT			
C_p (from calibration curve or geometric specifications)	=	0.84	
AVERAGE VELOCITY HEAD OF STACK GAS, in. H₂O			
$\sqrt{\Delta P} = \frac{1}{n} \sum_{i=1}^n \sqrt{\Delta p_i}$	=	0.5944	in. H ₂ O
AVERAGE ABSOLUTE STACK GAS TEMPERATURE			
$T_s = 145.5 \text{ °F} + 460$	=	605.5	°R
ABSOLUTE STACK GAS PRESSURE			
$P_s = P_{bar} + \frac{P_{static}}{13.6}$	=	30.01	in.Hg
STACK GAS VELOCITY			
$V_s = (85.49)(C_p)(\text{avg } \sqrt{\Delta P}) \sqrt{\frac{T_s}{(P_s)(M_s)}}$	=	36.108	ft/sec
STACK GAS VOLUMETRIC FLOW RATE, actual			
$Q_s = 60 \times V_s \times A_s$	=	161,752	acfm
Stack Area = 74.662 ft ²			
STACK GAS VOLUMETRIC FLOW RATE, standard conditions, wet basis			
$Q_{stdw} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)$	=	141,484.6 8,489,073	scfm, wb scfh, wb
STACK GAS VOLUMETRIC FLOW RATE, standard conditions, dry basis			
$Q_{std} = \left(\frac{528}{29.92}\right)(Q_s)\left(\frac{P_s}{T_s}\right)(1 - B_{ws})$	=	109,192.4 6,551,542	dscfm dscfh

HYDROGEN CYANIDE CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
TEST DATE: 8/29/2007
RUN NO: HCN-3

INPUT

V_m:	46.286 ft ³	Q_s:	6,551,542 dscfh
γ FACTOR:	0.969	T_s:	145.5 °F
P_{bar}:	30.00 in. Hg	Θ:	60 minutes
ΔH:	1.96 in. H ₂ O	V_s:	36.108 fps
T_m:	82.4 °F	P_s:	30.01 in. Hg
HCN in sample:	47390 μg	V_{lc}:	307.8 mL
		%O₂:	0.99 %

Volume of Sample at Standard Conditions on a Dry Basis:	English Units (29.92 in. Hg, 68 °F)	
$V_{mstd} = \left(\frac{528}{29.92} \right) \times V_m \times \gamma \left[\frac{P_{bar} + \frac{\Delta H}{13.6}}{T_m} \right]$	=	43.987 dscf
Isokinetic Sampling Rate		
$\%ISO = \frac{(100)(T_s) \left[(0.002669 \times V_{lc}) + \left(\frac{V_m}{T_m} \right) \left(\gamma \left(P_{bar} + \left(\frac{\Delta H}{13.6} \right) \right) \right) \right]}{(60)(\Theta)(V_s)(P_s)(A_n)}$	=	97.5 % I
A _n = 0.00052753 ft ²	Runtime (Θ) =	95.0 @ saturation 60 minutes
Total μg HCN in sample (M_n)	=	47,390.00 μg
Concentration of HCN		
$C'_{s(lb/dscf)} = \frac{(2.205 \times 10^{-9} lb/\mu g)(M_n)}{V_{mstd}}$	=	2.3756 x 10 ⁻⁶ lbs/dscf
$C_{s(ppmvdb)} = C'_{s(lb/dscf)} \times \frac{385.26 ft^3/lb - mole}{27.03 lb/lb - mole} \times 10^6$	=	33.86 ppmv db
$C_{s(ppmv db @ 7\% O_2)} = C_{s(ppmv db)} \times \frac{20.9 - 7}{20.9 - \%O_2}$	=	23.64 ppmv db @ 7% O ₂
HCN Mass Rate:		
	$E = Q_s \times C'_{s(lb/dscf)}$	= 15.564 lbs/hr

ORGANIC CALCULATION SUMMARY



COMPANY: Valero Refining Company

LOCATION: Paulsboro, NJ

SOURCE: FCC FGS

SAMPLE: SW-846 0031

TEST DATE: 8/30/2007

RUN NO: VOST - 1A

INPUT

Compound: Benzene
MW: 78.11 lb/lb-mole
Qs : 6,138,686 dscfh
Pbar : 29.97 in Hg

Sample Train:

Vm Sample: 19.202 liters
Vm Sample: 0.678 cubic ft
Y Sample : 1.006
Tm Sample: 98.6 deg F
ΔH Sample: 0.96 in. H₂O
Mu : 0.14 Total micrograms

Volume of sample at standard conditions on dry basis

English units
(29.92 in. Hg 68° F)

Vmstd Sample (Vu) = (17.647)(Vm)(Yd)(Pbar+DH/13.6)/(Tm) = 0.647 dscf
Vmstd Sample (Vu_{liters}) = dscf x 28.32 = 18.333 std liters

Organic concentration in stack gas on dry basis

C's = 2.205 x 10⁻⁹ lbs/ug x Mu / Vu = 0.00047 x10⁻⁶ lbs/dscf
ppb = C's * (385.26 x 10⁹ / MW) = 2.34 ppbv db

Stack gas volume flow rate on dry basis

Qs = 6,138,686 dscfh

Stack organic emission rate

Qs x Cs = 0.002906 lbs/hr

ORGANIC CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
SAMPLE: SW-846 0031
TEST DATE: 8/30/2007
RUN NO: VOST - 1B



INPUT

Compound: Benzene
MW: 78.11 lb/lb-mole
Qs : 6,138,686 dscfh
Pbar : 29.97 in Hg

Sample Train:
Vm Sample: 20.075 liters
Spiked Train: 0.709 cubic ft
Y Sample : 1.006
Tm Sample: 85 deg F
ΔH Sample: 0.68 in. H₂O
Mu : 0.13 Total micrograms

Volume of sample at standard conditions on dry basis

English units
(29.92 in. Hg 68° F)

$$\begin{aligned} \text{Vmstd Sample (Vu)} &= (17.647)(\text{Vm})(Y_d)(P_{\text{bar}} + \Delta H / 13.6) / (T_m) &= & 0.693 \text{ dscf} \\ \text{Vmstd Sample (Vu}_{\text{liters}}) &= \text{dscf} \times 28.32 &= & 19.631 \text{ std liters} \end{aligned}$$

Organic concentration in stack gas on dry basis

$$\begin{aligned} C's &= 2.205 \times 10^{-9} \text{ lbs/ug} \times \text{Mu} / \text{Vu} &= & 0.00041 \times 10^{-6} \text{ lbs/dscf} \\ \text{ppb} &= C's \times (385.26 \times 10^9 / \text{MW}) &= & 2.04 \text{ ppbv db} \end{aligned}$$

Stack gas volume flow rate on dry basis

$$Q_s = 6,138,686 \text{ dscfh}$$

Stack organic emission rate

$$Q_s \times C_s = 0.002539 \text{ lbs/hr}$$

ORGANIC CALCULATION SUMMARY

COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
SAMPLE: SW-846 0031
TEST DATE: 8/30/2007
RUN NO: VOST - 1C



INPUT

Compound: Benzene
MW: 78.11 lb/lb-mole
Qs : 6,138,686 dscfh
Pbar : 29.97 in Hg

Sample Train:
Vm Sample: 20.169 liters
Spiked Train: 0.712 cubic ft
Y Sample : 1.006
Tm Sample: 94.8 deg F
ΔH Sample: 0.54 in. H₂O
Mu : 0.12 Total micrograms

Volume of sample at standard conditions on dry basis

English units
(29.92 in. Hg 68° F)

$$\begin{aligned} \text{Vmstd Sample (Vu)} &= (17.647)(\text{Vm})(Y_d)(P_{\text{bar}} + \Delta H / 13.6) / (T_m) &= & 0.684 \text{ dscf} \\ \text{Vmstd Sample (Vu}_{\text{liters}}) &= \text{dscf} \times 28.32 &= & 19.368 \text{ std liters} \end{aligned}$$

Organic concentration in stack gas on dry basis

$$\begin{aligned} C's &= 2.205 \times 10^{-9} \text{ lbs/ug} \times \text{Mu} / \text{Vu} &= & 0.00039 \text{ x}10^{-6} \text{ lbs/dscf} \\ \text{ppb} &= C's * (385.26 \times 10^9 / \text{MW}) &= & 1.91 \text{ ppbv db} \end{aligned}$$

Stack gas volume flow rate on dry basis

$$Q_s = 6,138,686 \text{ dscfh}$$

Stack organic emission rate

$$Q_s \times C_s = 0.002375 \text{ lbs/hr}$$

ORGANIC CALCULATION SUMMARY



COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
SAMPLE: SW-846 0031
TEST DATE: 8/30/2007
RUN NO: VOST - 2A

INPUT

Compound: Benzene
MW: 78.11 lb/lb-mole
Qs : 6,095,037 dscfh
Pbar : 29.94 in Hg

Sample Train:

Vm Sample: 19.265 liters
Vm Sample: 0.680 cubic ft
Y Sample : 1.009
Tm Sample: 92.8 deg F
ΔH Sample: 0.6 in. H₂O
Mu : 0.10 Total micrograms

Volume of sample at standard conditions on dry basis

English units
(29.92 in. Hg 68° F)

$$\begin{aligned} \text{Vmstd Sample (Vu)} &= (17.647)(\text{Vm})(\text{Yd})(\text{Pbar} + \text{DH}/13.6)/(\text{Tm}) &= & 0.657 \text{ dscf} \\ \text{Vmstd Sample (Vu}_{\text{liters}}) &= \text{dscf} \times 28.32 &= & 18.606 \text{ std liters} \end{aligned}$$

Organic concentration in stack gas on dry basis

$$\begin{aligned} \text{C's} &= 2.205 \times 10^{-9} \text{ lbs/ug} \times \text{Mu} / \text{Vu} &= & 0.00034 \times 10^{-6} \text{ lbs/dscf} \\ \text{ppb} &= \text{C's} \times (385.26 \times 10^9 / \text{MW}) &= & 1.66 \text{ ppbv db} \end{aligned}$$

Stack gas volume flow rate on dry basis

$$\text{Qs} = 6,095,037 \text{ dscfh}$$

Stack organic emission rate

$$\text{Qs} \times \text{Cs} = 0.002046 \text{ lbs/hr}$$

ORGANIC CALCULATION SUMMARY



COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
SAMPLE: SW-846 0031
TEST DATE: 8/30/2007
RUN NO: VOST - 2B

INPUT

Compound: Benzene
MW: 78.11 lb/lb-mole
Qs : 6,095,037 dscfh
Pbar : 29.91 in Hg

Sample Train:
Vm Sample: 20.018 liters
Spiked Train: 0.707 cubic ft
Y Sample : 1.009
Tm Sample: 95.4 deg F
ΔH Sample: 0.47 in. H₂O
Mu : 0.09 Total micrograms

Volume of sample at standard conditions on dry basis

English units
(29.92 in. Hg 68° F)

Vmstd Sample (Vu) = (17.647)(Vm)(Yd)(Pbar+DH/13.6)/(Tm) = 0.679 dscf
Vmstd Sample (Vu_{liters}) = dscf x 28.32 = 19.217 std liters

Organic concentration in stack gas on dry basis

C's = 2.205×10^{-9} lbs/ug x Mu / Vu = 0.00030×10^{-6} lbs/dscf
ppb = C's * (385.26 x 10⁹ / MW) = 1.46 ppbv db

Stack gas volume flow rate on dry basis

Qs = 6,095,037 dscfh

Stack organic emission rate

Qs x Cs = 0.001802 lbs/hr

ORGANIC CALCULATION SUMMARY



COMPANY: Valero Refining Company

LOCATION: Paulsboro, NJ

SOURCE: FCC FGS

SAMPLE: SW-846 0031

TEST DATE: 8/30/2007

RUN NO: VOST - 2C

INPUT

Compound: Benzene
MW: 78.11 lb/lb-mole
Qs : 6,095,037 dscfh
Pbar : 29.88 in Hg

Sample Train:

Vm Sample: 20.212 liters
Spiked Train: 0.714 cubic ft
Y Sample : 1.009
Tm Sample: 95.8 deg F
 ΔH Sample: 0.59 in. H₂O
Mu : 0.11 Total micrograms

Volume of sample at standard conditions on dry basis

English units
(29.92 in. Hg 68° F)

$$\begin{aligned} \text{Vmstd Sample (Vu)} &= (17.647)(\text{Vm})(\text{Yd})(\text{Pbar} + \text{DH}/13.6)/(\text{Tm}) &= & 0.684 \text{ dscf} \\ \text{Vmstd Sample (Vu}_{\text{liters}}) &= \text{dscf} \times 28.32 &= & 19.376 \text{ std liters} \end{aligned}$$

Organic concentration in stack gas on dry basis

$$\begin{aligned} \text{C's} &= 2.205 \times 10^{-9} \text{ lbs/ug} \times \text{Mu} / \text{Vu} &= & 0.00035 \text{ } \times 10^{-6} \text{ lbs/dscf} \\ \text{ppb} &= \text{C's} \times (385.26 \times 10^9 / \text{MW}) &= & 1.75 \text{ ppbv db} \end{aligned}$$

Stack gas volume flow rate on dry basis

$$\text{Qs} = 6,095,037 \text{ dscfh}$$

Stack organic emission rate

$$\text{Qs} \times \text{Cs} = 0.002161 \text{ lbs/hr}$$

ORGANIC CALCULATION SUMMARY



COMPANY: Valero Refining Company

LOCATION: Paulsboro, NJ

SOURCE: FCC FGS

SAMPLE: SW-846 0031

TEST DATE: 8/30/2007

RUN NO: VOST - 3A

INPUT

Compound: Benzene
MW: 78.11 lb/lb-mole
Qs : 6,095,037 dscfh
Pbar : 29.88 in Hg

Sample Train:

Vm Sample: 21.046 liters
Vm Sample: 0.743 cubic ft
Y Sample : 1.009
Tm Sample: 98.6 deg F
ΔH Sample: 0.59 in. H₂O
Mu : 0.12 Total micrograms

Volume of sample at standard conditions on dry basis

English units
(29.92 in. Hg 68° F)

$V_{mstd} \text{ Sample } (Vu) = (17.647)(Vm)(Yd)(Pbar+DH/13.6)/(Tm)$
 $V_{mstd} \text{ Sample } (Vu_{liters}) = dscf \times 28.32$

= 0.709 dscf
= 20.074 std liters

Organic concentration in stack gas on dry basis

$C's = 2.205 \times 10^{-9} \text{ lbs/ug} \times Mu / Vu$

= $0.00037 \times 10^{-6} \text{ lbs/dscf}$

$ppb = C's * (385.26 \times 10^9 / MW)$

= 1.84 ppbv db

Stack gas volume flow rate on dry basis

Qs = 6,095,037 dscfh

Stack organic emission rate

$Qs \times Cs$ = 0.002275 lbs/hr

ORGANIC CALCULATION SUMMARY



COMPANY: Valero Refining Company
LOCATION: Paulsboro, NJ
SOURCE: FCC FGS
SAMPLE: SW-846 0031
TEST DATE: 8/30/2007
RUN NO: VOST - 3B

INPUT

Compound: Benzene
MW: 78.11 lb/lb-mole
Qs : 6,095,037 dscfh
Pbar : 29.85 in Hg

Sample Train:

Vm Sample: 19.998 liters
Spiked Train: 0.706 cubic ft
Y Sample : 1.009
Tm Sample: 100.4 deg F
ΔH Sample: 0.65 in. H₂O
Mu : 0.12 Total micrograms

Volume of sample at standard conditions on dry basis

English units
(29.92 in. Hg 68° F)

$$\begin{aligned} \text{Vmstd Sample (Vu)} &= (17.647)(\text{Vm})(Y_d)(P_{\text{bar}} + \Delta H / 13.6) / (T_m) &= & 0.671 \text{ dscf} \\ \text{Vmstd Sample (Vu}_{\text{liters}}) &= \text{dscf} \times 28.32 &= & 18.997 \text{ std liters} \end{aligned}$$

Organic concentration in stack gas on dry basis

$$\begin{aligned} C's &= 2.205 \times 10^{-9} \text{ lbs/ug} \times \text{Mu} / \text{Vu} &= & 0.00039 \times 10^{-6} \text{ lbs/dscf} \\ \text{ppb} &= C's \times (385.26 \times 10^9 / \text{MW}) &= & 1.95 \text{ ppbv db} \end{aligned}$$

Stack gas volume flow rate on dry basis

$$\text{Qs} = 6,095,037 \text{ dscfh}$$

Stack organic emission rate

$$\text{Qs} \times C_s = 0.002404 \text{ lbs/hr}$$

ORGANIC CALCULATION SUMMARY



COMPANY: Valero Refining Company

LOCATION: Paulsboro, NJ

SOURCE: FCC FGS

SAMPLE: SW-846 0031

TEST DATE: 8/30/2007

RUN NO: VOST - 3C

INPUT

Compound: Benzene
MW: 78.11 lb/lb-mole
Qs : 6,095,037 dscfh
Pbar : 29.78 in Hg

Sample Train:

Vm Sample: 20.162 liters
Spiked Train: 0.712 cubic ft
Y Sample : 1.009
Tm Sample: 99.6 deg F
ΔH Sample: 0.61 in. H₂O
Mu : 0.11 Total micrograms

Volume of sample at standard conditions on dry basis

English units
(29.92 in. Hg 68° F)

$V_{mstd} \text{ Sample } (V_u) = (17.647)(V_m)(Y_d)(P_{bar} + \Delta H / 13.6) / (T_m)$	=	0.676 dscf
$V_{mstd} \text{ Sample } (V_{u_{liters}}) = \text{dscf} \times 28.32$	=	19.134 std liters

Organic concentration in stack gas on dry basis

$C's = 2.205 \times 10^{-9} \text{ lbs/ug} \times \mu_u / V_u$	=	0.00036 $\times 10^{-6}$ lbs/dscf
$\text{ppb} = C's \times (385.26 \times 10^9 / \text{MW})$	=	1.77 ppbv db

Stack gas volume flow rate on dry basis

Qs	=	6,095,037 dscfh

Stack organic emission rate

Qs x Cs	=	0.002188 lbs/hr



Reference Method Monitor Data
One-Minute Averages

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Run #: HCN-3/M29-1
Test Time: 1744-2201

		Clock Time	Elapsed Time	Monitor #1 Stack Oxygen %	Monitor #2 Stack CO2 %
Reference Method Monitor #1:					
Analyzer Type:	Stack Oxygen	17 : 44	0		
Analyzer Scale:	10.00 %	17 : 45	1	1.3	19.2
Pre-test calibration span value:	4.92 %	17 : 46	2	1.3	19.3
Post-test calibration span value:	4.98 %	17 : 47	3	1.1	19.4
Pre-test calibration zero value:	0.11 %	17 : 48	4	1.1	19.5
Post-test calibration zero value:	0.12 %	17 : 49	5	1.1	19.5
Calibration gas type:	Protocol 1 Oxygen %	17 : 50	6	1.0	19.6
Calibration gas concentration:	5.00 %	17 : 51	7	1.0	19.5
Monitor uncorrected average:	1.07 %	17 : 52	8	1.0	19.6
Monitor drift corrected average:	0.99 %	17 : 53	9	0.9	19.6
		17 : 54	10	1.0	19.5
Reference Method Monitor #2:					
Analyzer Type:	Stack CO2	17 : 55	11	1.1	19.5
Analyzer Scale:	22.82 %	17 : 56	12	1.2	19.4
Pre-test calibration span value:	22.34 %	17 : 57	13	1.3	19.3
Post-test calibration span value:	22.33 %	17 : 58	14	1.2	19.4
Pre-test calibration zero value:	0.15 %	17 : 59	15	1.3	19.3
Post-test calibration zero value:	0.18 %	18 : 0	16	1.0	19.5
Calibration gas type:	Protocol 1 CO2 %	18 : 1	17	1.0	19.5
Calibration gas concentration:	22.82 %	18 : 2	18	0.9	19.6
Monitor uncorrected average:	19.41 %	18 : 3	19	1.1	19.4
Monitor drift corrected average:	19.81 %	18 : 4	20	1.2	19.3
		18 : 5	21	1.1	19.4
		18 : 6	22	1.3	19.3
		18 : 7	23	1.2	19.3
		18 : 8	24	1.3	19.2
		18 : 9	25	1.3	19.3
		18 : 10	26	1.2	19.3
		18 : 11	27	1.1	19.5
		18 : 12	28	1.0	19.5
		18 : 13	29	1.1	19.4
		18 : 14	30	1.1	19.4
		18 : 15	31	0.9	19.6
		18 : 16	32	0.9	19.6
		18 : 17	33	1.0	19.5
		18 : 18	34	1.0	19.5
		18 : 19	35	1.1	19.4
		18 : 20	36	1.1	19.4
		18 : 21	37	1.2	19.4
		18 : 22	38	1.2	19.3
		18 : 23	39	1.3	19.3
		18 : 24	40	1.2	19.3
		18 : 25	41	1.1	19.4
		18 : 26	42	1.1	19.4
		18 : 27	43	1.1	19.4
		18 : 28	44	1.2	19.3
		18 : 29	45	1.2	19.3
		18 : 30	46	1.1	19.4
		18 : 31	47	1.2	19.4
		18 : 32	48	1.1	19.4
		18 : 33	49	1.1	19.4
		18 : 34	50	1.0	19.5
		18 : 35	51	1.1	19.4
		18 : 36	52	1.1	19.4
		18 : 37	53	1.0	19.5
		18 : 38	54	1.0	19.5
		18 : 39	55	1.0	19.5
		18 : 40	56	1.1	19.4
		18 : 41	57	1.1	19.4
		18 : 42	58	1.2	19.3
		18 : 43	59	1.2	19.4
		18 : 44	60	1.1	19.4
		18 : 45	61	1.2	19.4
		18 : 46	62	1.1	19.5
		18 : 47	63	1.1	19.4
		18 : 48	64	1.0	19.5
		18 : 49	65	1.0	19.5
		18 : 50	66	0.9	19.5
		18 : 51	67	1.0	19.4
		18 : 52	68	0.9	19.5
		18 : 53	69	0.8	19.6
		18 : 54	70	0.9	19.6
		18 : 55	71	1.0	19.5
		18 : 56	72	1.0	19.5
		18 : 57	73	1.0	19.5
		18 : 58	74	1.1	19.4
		18 : 59	75	1.1	19.4
		19 : 0	76	1.1	19.3
		19 : 1	77	1.1	19.4
		19 : 2	78	1.0	19.4
		19 : 3	79	1.0	19.4
		19 : 4	80	0.9	19.6
		19 : 5	81	0.9	19.6
		19 : 6	82	0.9	19.6
		19 : 7	83	1.0	19.5
		19 : 8	84	1.1	19.4
		19 : 9	85	1.1	19.5



Reference Method Monitor Data
One-Minute Averages

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Run #: HCN-3/M29-1
Test Time: 1744-2201

Clock Time	Elapsed Time	Monitor #1	Monitor #2
		Stack Oxygen %	Stack CO2 %
19 : 10	86	1.1	19.4
19 : 11	87	0.9	19.5
19 : 12	88	1.0	19.5
19 : 13	89	1.1	19.4
19 : 14	90	1.1	19.4
19 : 15	91	1.2	19.3
19 : 16	92	1.1	19.3
19 : 17	93	1.1	19.3
19 : 18	94	1.1	19.4
19 : 19	95	1.1	19.4
19 : 20	96	1.0	19.5
19 : 21	97	0.9	19.5
19 : 22	98	0.9	19.5
19 : 23	99	1.0	19.5
19 : 24	100	0.9	19.6
19 : 25	101	0.9	19.6
19 : 26	102	1.0	19.5
19 : 27	103	0.9	19.6
19 : 28	104	0.9	19.6
19 : 29	105	0.9	19.5
19 : 30	106	0.9	19.6
19 : 31	107	0.8	19.6
19 : 32	108	0.9	19.5
19 : 33	109	0.9	19.6
19 : 34	110	0.9	19.5
19 : 35	111	0.9	19.5
19 : 36	112	0.9	19.6
19 : 37	113	0.8	19.6
19 : 38	114	1.0	19.5
19 : 39	115	1.1	19.4
19 : 40	116	1.2	19.3
19 : 41	117	1.3	19.3
19 : 42	118	1.2	19.4
19 : 43	119	1.1	19.5
19 : 44	120	1.1	19.5
19 : 45	121	1.1	19.4
19 : 46	122	1.1	19.4
19 : 47	123	1.2	19.3
19 : 48	124	1.1	19.4
19 : 49	125	1.2	19.3
19 : 50	126	1.2	19.3
19 : 51	127	1.3	19.2
19 : 52	128	1.2	19.3
19 : 53	129	1.1	19.4
19 : 54	130	1.1	19.5
19 : 55	131	1.0	19.5
19 : 56	132	1.0	19.6
19 : 57	133	1.0	19.5
19 : 58	134	1.1	19.4
19 : 59	135	1.1	19.4
20 : 0	136	1.1	19.4
20 : 1	137	1.1	19.4
20 : 2	138	1.2	19.4
20 : 3	139	1.1	19.4
20 : 4	140	1.2	19.3
20 : 5	141	1.2	19.3
20 : 6	142	1.2	19.3
20 : 7	143	1.1	19.3
20 : 8	144	1.1	19.3
20 : 9	145	1.1	19.3
20 : 10	146	1.2	19.4
20 : 11	147	1.3	19.3
20 : 12	148	1.1	19.5
20 : 13	149	1.0	19.5
20 : 14	150	1.1	19.5
20 : 15	151	1.1	19.4
20 : 16	152	1.1	19.4
20 : 17	153	1.1	19.4
20 : 18	154	1.1	19.4
20 : 19	155	1.0	19.5
20 : 20	156	1.0	19.5
20 : 21	157	1.0	19.5
20 : 22	158	1.1	19.4
20 : 23	159	1.1	19.4
20 : 24	160	1.0	19.5
20 : 25	161	0.9	19.6
20 : 26	162	0.9	19.6
20 : 27	163	1.0	19.5
20 : 28	164	1.0	19.5
20 : 29	165	1.1	19.4
20 : 30	166	1.0	19.4
20 : 31	167	1.1	19.4
20 : 32	168	1.2	19.3
20 : 33	169	1.2	19.3
20 : 34	170	1.2	19.3
20 : 35	171	1.3	19.3
20 : 36	172	1.1	19.4



Reference Method Monitor Data
One-Minute Averages

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Run #: HCN-3/M29-1
Test Time: 1744-2201

Clock Time	Elapsed Time	Monitor #1	Monitor #2
		Stack Oxygen %	Stack CO2 %
20 : 37	173	1.1	19.4
20 : 38	174	1.0	19.5
20 : 39	175	1.0	19.5
20 : 40	176	1.0	19.5
20 : 41	177	1.0	19.5
20 : 42	178	1.0	19.5
20 : 43	179	0.9	19.6
20 : 44	180	1.0	19.5
20 : 45	181	1.0	19.5
20 : 46	182	1.1	19.5
20 : 47	183	1.1	19.4
20 : 48	184	1.1	19.4
20 : 49	185	1.1	19.4
20 : 50	186	1.3	19.2
20 : 51	187	1.2	19.3
20 : 52	188	1.1	19.4
20 : 53	189	1.0	19.5
20 : 54	190	1.0	19.4
20 : 55	191	1.0	19.4
20 : 56	192	1.0	19.4
20 : 57	193	1.0	19.4
20 : 58	194	1.0	19.4
20 : 59	195	1.1	19.4
21 : 0	196	1.0	19.4
21 : 1	197	1.0	19.5
21 : 2	198	1.0	19.4
21 : 3	199	1.0	19.4
21 : 4	200	1.1	19.4
21 : 5	201	1.0	19.4
21 : 6	202	1.0	19.4
21 : 7	203	1.1	19.4
21 : 8	204	1.2	19.3
21 : 9	205	1.1	19.3
21 : 10	206	1.1	19.4
21 : 11	207	1.2	19.2
21 : 12	208	1.2	19.2
21 : 13	209	1.3	19.2
21 : 14	210	1.2	19.2
21 : 15	211	1.2	19.2
21 : 16	212	1.2	19.3
21 : 17	213	1.2	19.3
21 : 18	214	1.2	19.3
21 : 19	215	1.2	19.3
21 : 20	216	1.3	19.2
21 : 21	217	1.2	19.3
21 : 22	218	1.0	19.4
21 : 23	219	0.9	19.5
21 : 24	220	0.9	19.5
21 : 25	221	1.0	19.4
21 : 26	222	1.0	19.4
21 : 27	223	1.1	19.4
21 : 28	224	1.0	19.4
21 : 29	225	1.1	19.4
21 : 30	226	1.1	19.3
21 : 31	227	1.1	19.3
21 : 32	228	1.1	19.4
21 : 33	229	1.1	19.4
21 : 34	230	1.1	19.4
21 : 35	231	1.2	19.3
21 : 36	232	1.2	19.3
21 : 37	233	1.2	19.3
21 : 38	234	1.1	19.3
21 : 39	235	1.1	19.4
21 : 40	236	1.2	19.3
21 : 41	237	1.1	19.3
21 : 42	238	1.2	19.3
21 : 43	239	1.3	19.2
21 : 44	240	1.3	19.2
21 : 45	241	1.1	19.3
21 : 46	242	1.0	19.4
21 : 47	243	1.0	19.4
21 : 48	244	1.0	19.4
21 : 49	245	1.1	19.4
21 : 50	246	1.1	19.3
21 : 51	247	1.0	19.4
21 : 52	248	1.1	19.3
21 : 53	249	1.0	19.4
21 : 54	250	1.1	19.3
21 : 55	251	1.0	19.4
21 : 56	252	1.0	19.4
21 : 57	253	1.0	19.4
21 : 58	254	0.9	19.4
21 : 59	255	0.9	19.5
22 : 0	256	0.9	19.5
22 : 1	257	0.9	19.4
AVERAGE:		1.1	19.4



**USEPA Method 3-A
Stack Oxygen
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Test Run #: HCN-3/M29-1
Test Time: 1744-2201

Data Input:

Average chart reading (C):	1.07 % db
Average pre/post-test zero calibration reading (C _o):	0.11 % db
Calibration gas concentration (C _{ma}):	5.0 % db
Average pre/post-test calibration gas reading (C _m):	4.94 % db

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack Oxygen

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 0.99 \% \text{ db}$$



**USEPA Method 3-A
Stack CO₂
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Test Run #: HCN-3/M29-1
Test Time: 1744-2201

Data Input:

Average chart reading (C):	19.41 % db
Average pre/post-test zero calibration reading (C _o):	0.17 % db
Calibration gas concentration (C _{ma}):	22.8 % db
Average pre/post-test calibration gas reading (C _m):	22.34 % db

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack CO₂

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 19.81 \% \text{ db}$$



Reference Method Monitor Data
One-Minute Averages

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/30/2007
Run #: M29-2/VOST-1
Test Time: 0838-1255

		Clock Time	Elapsed Time	Monitor #1 Stack Oxygen %	Monitor #2 Stack CO2 %
Reference Method Monitor #1:		08 : 38	0		
Analyzer Type:	Stack Oxygen	08 : 39	1	1.4	19.0
Analyzer Scale:	10.00 %	08 : 40	2	1.4	19.1
Pre-test calibration span value:	5.01 %	08 : 41	3	1.5	19.0
Post-test calibration span value:	4.96 %	08 : 42	4	1.4	19.1
Pre-test calibration zero value:	0.11 %	08 : 43	5	1.4	19.0
Post-test calibration zero value:	0.10 %	08 : 44	6	1.4	19.0
Calibration gas type:	Protocol 1 Oxygen %	08 : 45	7	1.5	19.0
Calibration gas concentration:	5.00 %	08 : 46	8	1.3	19.1
Monitor uncorrected average:	1.26 %	08 : 47	9	1.3	19.1
Monitor drift corrected average:	1.16 %	08 : 48	10	1.3	19.1
Reference Method Monitor #2:		08 : 49	11	1.2	19.1
Analyzer Type:	Stack CO2	08 : 50	12	1.3	19.1
Analyzer Scale:	22.82 %	08 : 51	13	1.3	19.0
Pre-test calibration span value:	22.32 %	08 : 52	14	1.3	19.0
Post-test calibration span value:	22.22 %	08 : 53	15	1.2	19.1
Pre-test calibration zero value:	0.10 %	08 : 54	16	1.3	19.0
Post-test calibration zero value:	0.15 %	08 : 55	17	1.3	19.0
Calibration gas type:	Protocol 1 CO2 %	08 : 56	18	1.2	19.1
Calibration gas concentration:	22.82 %	08 : 57	19	1.3	19.1
Monitor uncorrected average:	19.12 %	08 : 58	20	1.2	19.2
Monitor drift corrected average:	19.68 %	08 : 59	21	1.2	19.1
		9 : 0	22	1.3	19.1
		9 : 1	23	1.2	19.2
		9 : 2	24	1.2	19.1
		9 : 3	25	1.2	19.2
		9 : 4	26	1.1	19.2
		9 : 5	27	1.1	19.2
		9 : 6	28	1.1	19.2
		9 : 7	29	1.2	19.2
		9 : 8	30	1.2	19.2
		9 : 9	31	1.3	19.1
		9 : 10	32	1.3	19.2
		9 : 11	33	1.3	19.1
		9 : 12	34	1.3	19.1
		9 : 13	35	1.3	19.1
		9 : 14	36	1.3	19.1
		9 : 15	37	1.3	19.1
		9 : 16	38	1.4	19.0
		9 : 17	39	1.5	19.0
		9 : 18	40	1.4	19.0
		9 : 19	41	1.4	19.1
		9 : 20	42	1.2	19.1
		9 : 21	43	1.3	19.1
		9 : 22	44	1.2	19.1
		9 : 23	45	1.3	19.1
		9 : 24	46	1.1	19.2
		9 : 25	47	1.2	19.2
		9 : 26	48	1.2	19.2
		9 : 27	49	1.2	19.2
		9 : 28	50	1.2	19.2
		9 : 29	51	1.1	19.2
		9 : 30	52	1.2	19.2
		9 : 31	53	1.1	19.3
		9 : 32	54	1.0	19.3
		9 : 33	55	1.3	19.1
		9 : 34	56	1.4	19.1
		9 : 35	57	1.3	19.1
		9 : 36	58	1.3	19.2
		9 : 37	59	1.3	19.1
		9 : 38	60	1.3	19.1
		9 : 39	61	1.3	19.1
		9 : 40	62	1.3	19.1
		9 : 41	63	1.5	18.9
		9 : 42	64	1.5	18.9
		9 : 43	65	1.3	19.1
		9 : 44	66	1.2	19.2
		9 : 45	67	1.1	19.3
		9 : 46	68	1.1	19.3
		9 : 47	69	1.1	19.2
		9 : 48	70	1.2	19.1
		9 : 49	71	1.3	19.1
		9 : 50	72	1.2	19.1
		9 : 51	73	1.2	19.1
		9 : 52	74	1.4	19.0
		9 : 53	75	1.4	18.9
		9 : 54	76	1.3	19.0
		9 : 55	77	1.4	19.0
		9 : 56	78	1.4	19.0
		9 : 57	79	1.4	19.0
		9 : 58	80	1.4	19.0
		9 : 59	81	1.4	19.0
		10 : 0	82	1.3	19.1
		10 : 1	83	1.2	19.1
		10 : 2	84	1.2	19.2



Reference Method Monitor Data
One-Minute Averages

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/30/2007
Run #: M29-2VOST-1
Test Time: 0838-1255

Clock Time	Elapsed Time	Monitor #1	Monitor #2
		Stack Oxygen %	Stack CO2 %
10 : 3	85	1.2	19.1
10 : 4	86	1.3	19.0
10 : 5	87	1.5	18.9
10 : 6	88	1.4	19.0
10 : 7	89	1.2	19.1
10 : 8	90	1.3	19.0
10 : 9	91	1.3	19.0
10 : 10	92	1.2	19.1
10 : 11	93	1.2	19.1
10 : 12	94	1.2	19.1
10 : 13	95	1.2	19.1
10 : 14	96	1.3	19.0
10 : 15	97	1.6	18.8
10 : 16	98	1.6	18.8
10 : 17	99	1.6	18.8
10 : 18	100	1.5	18.9
10 : 19	101	1.4	18.9
10 : 20	102	1.3	19.1
10 : 21	103	1.1	19.2
10 : 22	104	1.1	19.3
10 : 23	105	1.1	19.3
10 : 24	106	1.1	19.3
10 : 25	107	1.1	19.2
10 : 26	108	1.2	19.2
10 : 27	109	1.2	19.1
10 : 28	110	1.1	19.3
10 : 29	111	1.2	19.1
10 : 30	112	1.2	19.1
10 : 31	113	1.2	19.1
10 : 32	114	1.2	19.1
10 : 33	115	1.3	19.1
10 : 34	116	1.2	19.1
10 : 35	117	1.2	19.1
10 : 36	118	1.3	19.0
10 : 37	119	1.3	19.1
10 : 38	120	1.2	19.1
10 : 39	121	1.2	19.1
10 : 40	122	1.2	19.1
10 : 41	123	1.1	19.2
10 : 42	124	1.1	19.2
10 : 43	125	1.1	19.2
10 : 44	126	1.1	19.2
10 : 45	127	1.1	19.2
10 : 46	128	1.2	19.1
10 : 47	129	1.2	19.1
10 : 48	130	1.3	19.0
10 : 49	131	1.3	19.0
10 : 50	132	1.2	19.1
10 : 51	133	1.2	19.1
10 : 52	134	1.2	19.1
10 : 53	135	1.2	19.1
10 : 54	136	1.2	19.1
10 : 55	137	1.2	19.1
10 : 56	138	1.2	19.2
10 : 57	139	1.2	19.1
10 : 58	140	1.2	19.1
10 : 59	141	1.0	19.3
11 : 0	142	0.9	19.4
11 : 1	143	1.0	19.3
11 : 2	144	1.0	19.3
11 : 3	145	1.1	19.2
11 : 4	146	1.2	19.2
11 : 5	147	1.3	19.0
11 : 6	148	1.3	19.0
11 : 7	149	1.2	19.1
11 : 8	150	1.2	19.2
11 : 9	151	1.2	19.2
11 : 10	152	1.3	19.2
11 : 11	153	1.3	19.1
11 : 12	154	1.4	19.1
11 : 13	155	1.4	19.1
11 : 14	156	1.4	19.0
11 : 15	157	1.4	19.0
11 : 16	158	1.5	19.0
11 : 17	159	1.5	19.0
11 : 18	160	1.6	18.9
11 : 19	161	1.5	19.1
11 : 20	162	1.3	19.2
11 : 21	163	1.2	19.3
11 : 22	164	1.2	19.3
11 : 23	165	1.2	19.2
11 : 24	166	1.2	19.2
11 : 25	167	1.3	19.2
11 : 26	168	1.2	19.3
11 : 27	169	1.3	19.2
11 : 28	170	1.2	19.3



Reference Method Monitor Data
One-Minute Averages

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/30/2007
Run #: M29-2/VOST-1
Test Time: 0838-1255

Clock Time	Elapsed Time	Monitor #1	Monitor #2
		Stack Oxygen %	Stack CO2 %
11 : 29	171	1.1	19.3
11 : 30	172	1.2	19.2
11 : 31	173	1.4	19.1
11 : 32	174	1.4	19.1
11 : 33	175	1.4	19.1
11 : 34	176	1.4	19.0
11 : 35	177	1.4	19.1
11 : 36	178	1.3	19.2
11 : 37	179	1.3	19.1
11 : 38	180	1.4	19.1
11 : 39	181	1.4	19.1
11 : 40	182	1.3	19.2
11 : 41	183	1.3	19.1
11 : 42	184	1.3	19.1
11 : 43	185	1.3	19.1
11 : 44	186	1.3	19.1
11 : 45	187	1.3	19.1
11 : 46	188	1.4	19.0
11 : 47	189	1.4	19.1
11 : 48	190	1.2	19.2
11 : 49	191	1.2	19.2
11 : 50	192	1.3	19.1
11 : 51	193	1.3	19.1
11 : 52	194	1.2	19.2
11 : 53	195	1.2	19.1
11 : 54	196	1.3	19.1
11 : 55	197	1.3	19.1
11 : 56	198	1.4	19.0
11 : 57	199	1.4	19.1
11 : 58	200	1.4	19.0
11 : 59	201	1.3	19.1
12 : 0	202	1.2	19.2
12 : 1	203	1.3	19.1
12 : 2	204	1.4	19.1
12 : 3	205	1.2	19.1
12 : 4	206	1.4	19.0
12 : 5	207	1.4	19.0
12 : 6	208	1.3	19.1
12 : 7	209	1.2	19.2
12 : 8	210	1.3	19.1
12 : 9	211	1.3	19.1
12 : 10	212	1.2	19.2
12 : 11	213	1.3	19.1
12 : 12	214	1.3	19.1
12 : 13	215	1.4	19.0
12 : 14	216	1.4	19.0
12 : 15	217	1.4	19.0
12 : 16	218	1.4	19.0
12 : 17	219	1.3	19.1
12 : 18	220	1.3	19.1
12 : 19	221	1.3	19.1
12 : 20	222	1.2	19.2
12 : 21	223	1.1	19.3
12 : 22	224	1.2	19.2
12 : 23	225	1.3	19.1
12 : 24	226	1.3	19.1
12 : 25	227	1.2	19.2
12 : 26	228	1.2	19.2
12 : 27	229	1.1	19.2
12 : 28	230	1.2	19.2
12 : 29	231	1.2	19.2
12 : 30	232	1.1	19.2
12 : 31	233	1.2	19.1
12 : 32	234	1.3	19.1
12 : 33	235	1.2	19.2
12 : 34	236	1.2	19.2
12 : 35	237	1.1	19.3
12 : 36	238	1.1	19.3
12 : 37	239	1.1	19.3
12 : 38	240	1.2	19.2
12 : 39	241	1.1	19.2
12 : 40	242	1.3	19.1
12 : 41	243	1.3	19.1
12 : 42	244	1.3	19.1
12 : 43	245	1.2	19.2
12 : 44	246	1.2	19.2
12 : 45	247	1.3	19.1
12 : 46	248	1.2	19.1
12 : 47	249	1.2	19.2
12 : 48	250	1.3	19.1
12 : 49	251	1.2	19.2
12 : 50	252	1.2	19.2
12 : 51	253	1.1	19.3
12 : 52	254	1.1	19.2
12 : 53	255	1.2	19.1
12 : 54	256	1.1	19.3



Reference Method Monitor Data
One-Minute Averages

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/30/2007
Run #: M29-2/VOST-1
Test Time: 0838-1255

Clock Time	Elapsed Time	Monitor #1	Monitor #2
		Stack Oxygen %	Stack CO2 %
12 : 55	257	1.0	19.4
AVERAGE:		1.3	19.1



**USEPA Method 3-A
Stack Oxygen
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/30/2007
Test Run #: M29-2/VOST-1
Test Time: 0838-1255

Data Input:

Average chart reading (C):	1.26 % db
Average pre/post-test zero calibration reading (C _o):	0.11 % db
Calibration gas concentration (C _{ma}):	5.0 % db
Average pre/post-test calibration gas reading (C _m):	4.98 % db

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack Oxygen

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 1.18 \% \text{ db}$$



**USEPA Method 3-A
Stack CO₂
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/30/2007
Test Run #: M29-2/VOST-1
Test Time: 0838-1255

Data Input:

Average chart reading (C):	19.12 % db
Average pre/post-test zero calibration reading (C _o):	0.12 % db
Calibration gas concentration (C _{ma}):	22.8 % db
Average pre/post-test calibration gas reading (C _m):	22.27 % db

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack CO₂

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 19.58 \% \text{ db}$$

Stack CO₂



Reference Method Monitor Data
One-Minute Averages

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Run #: M29-3/VOST-2 & -3
Test Time: 1325-1805

Reference Method Monitor #1:	
Analyzer Type:	Stack Oxygen
Analyzer Scale:	10.00 %
Pre-test calibration span value:	4.96 %
Post-test calibration span value:	4.97 %
Pre-test calibration zero value:	0.10 %
Post-test calibration zero value:	0.11 %
Calibration gas type:	Protocol 1 Oxygen %
Calibration gas concentration:	5.00 %
Monitor uncorrected average:	0.97 %
Monitor drift corrected average:	0.89 %

Reference Method Monitor #2:	
Analyzer Type:	Stack CO2
Analyzer Scale:	22.82 %
Pre-test calibration span value:	22.22 %
Post-test calibration span value:	22.38 %
Pre-test calibration zero value:	0.15 %
Post-test calibration zero value:	0.18 %
Calibration gas type:	Protocol 1 CO2 %
Calibration gas concentration:	22.82 %
Monitor uncorrected average:	19.29 %
Monitor drift corrected average:	19.72 %

Clock Time	Elapsed Time	Monitor #1 Stack Oxygen %	Monitor #2 Stack CO2 %
13 : 25	0		
13 : 26	1	0.9	19.5
13 : 27	2	0.8	19.5
13 : 28	3	0.9	19.4
13 : 29	4	1.0	19.4
13 : 30	5	1.0	19.3
13 : 31	6	1.0	19.3
13 : 32	7	1.0	19.3
13 : 33	8	1.1	19.2
13 : 34	9	1.1	19.2
13 : 35	10	1.3	19.0
13 : 36	11	1.4	19.0
13 : 37	12	1.3	19.0
13 : 38	13	1.4	19.0
13 : 39	14	1.2	19.1
13 : 40	15	1.2	19.2
13 : 41	16	0.9	19.4
13 : 42	17	0.8	19.5
13 : 43	18	0.8	19.4
13 : 44	19	0.8	19.4
13 : 45	20	0.8	19.4
13 : 46	21	0.8	19.5
13 : 47	22	0.8	19.5
13 : 48	23	0.7	19.5
13 : 49	24	0.8	19.5
13 : 50	25	0.9	19.4
13 : 51	26	0.9	19.4
13 : 52	27	0.9	19.4
13 : 53	28	0.9	19.4
13 : 54	29	1.0	19.3
13 : 55	30	1.1	19.3
13 : 56	31	1.0	19.3
13 : 57	32	0.9	19.4
13 : 58	33	0.9	19.4
13 : 59	34	0.9	19.3
14 : 0	35	1.1	19.2
14 : 1	36	1.1	19.2
14 : 2	37	0.9	19.3
14 : 3	38	0.8	19.4
14 : 4	39	0.7	19.5
14 : 5	40	0.7	19.5
14 : 6	41	0.8	19.4
14 : 7	42	0.8	19.5
14 : 8	43	0.9	19.4
14 : 9	44	1.0	19.3
14 : 10	45	1.0	19.4
14 : 11	46	1.0	19.3
14 : 12	47	1.0	19.3
14 : 13	48	1.0	19.3
14 : 14	49	1.0	19.3
14 : 15	50	0.9	19.4
14 : 16	51	0.9	19.4
14 : 17	52	0.9	19.4
14 : 18	53	0.9	19.3
14 : 19	54	0.9	19.3
14 : 20	55	0.9	19.3
14 : 21	56	0.9	19.4
14 : 22	57	0.9	19.3
14 : 23	58	1.1	19.2
14 : 24	59	1.0	19.3
14 : 25	60	0.9	19.4
14 : 26	61	0.9	19.4
14 : 27	62	0.9	19.4
14 : 28	63	0.9	19.4
14 : 29	64	1.0	19.3
14 : 30	65	0.9	19.4
14 : 31	66	1.0	19.3
14 : 32	67	0.9	19.4
14 : 33	68	0.9	19.4
14 : 34	69	1.0	19.3
14 : 35	70	1.0	19.3
14 : 36	71	1.0	19.3
14 : 37	72	0.9	19.4
14 : 38	73	1.1	19.2
14 : 39	74	1.0	19.3
14 : 40	75	0.9	19.4
14 : 41	76	0.9	19.3
14 : 42	77	0.9	19.4
14 : 43	78	0.9	19.3
14 : 44	79	1.1	19.2
14 : 45	80	1.0	19.3
14 : 46	81	0.9	19.3
14 : 47	82	0.9	19.4
14 : 48	83	0.9	19.4
14 : 49	84	1.0	19.3



Reference Method Monitor Data
One-Minute Averages

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Run #: M29-3/VOST-2 & -3
Test Time: 1325-1805

Clock Time	Elapsed Time	Monitor #1	Monitor #2
		Stack Oxygen %	Stack CO2 %
14 : 50	85	0.9	19.4
14 : 51	86	0.9	19.4
14 : 52	87	0.9	19.4
14 : 53	88	1.0	19.2
14 : 54	89	1.1	19.2
14 : 55	90	1.1	19.2
14 : 56	91	1.2	19.1
14 : 57	92	1.3	19.0
14 : 58	93	1.2	19.1
14 : 59	94	1.1	19.2
15 : 0	95	1.0	19.3
15 : 1	96	0.9	19.3
15 : 2	97	0.9	19.3
15 : 3	98	1.1	19.1
15 : 4	99	1.0	19.2
15 : 5	100	1.0	19.2
15 : 6	101	1.0	19.3
15 : 7	102	0.9	19.4
15 : 8	103	0.9	19.3
15 : 9	104	0.9	19.4
15 : 10	105	1.0	19.3
15 : 11	106	1.0	19.3
15 : 12	107	0.9	19.4
15 : 13	108	0.9	19.4
15 : 14	109	1.0	19.2
15 : 15	110	1.0	19.2
15 : 16	111	1.1	19.1
15 : 17	112	1.0	19.2
15 : 18	113	1.0	19.2
15 : 19	114	0.9	19.3
15 : 20	115	0.9	19.3
15 : 21	116	0.9	19.3
15 : 22	117	0.9	19.3
15 : 23	118	0.9	19.3
15 : 24	119	1.0	19.2
15 : 25	120	1.0	19.2
15 : 26	121	1.0	19.2
15 : 27	122	0.9	19.3
15 : 28	123	0.8	19.4
15 : 29	124	0.8	19.3
15 : 30	125	0.8	19.4
15 : 31	126	1.0	19.2
15 : 32	127	1.0	19.2
15 : 33	128	1.0	19.2
15 : 34	129	1.2	19.0
15 : 35	130	1.3	19.0
15 : 36	131	1.1	19.1
15 : 37	132	1.1	19.1
15 : 38	133	1.1	19.1
15 : 39	134	1.0	19.2
15 : 40	135	1.0	19.2
15 : 41	136	1.0	19.2
15 : 42	137	1.0	19.2
15 : 43	138	0.9	19.3
15 : 44	139	0.8	19.4
15 : 45	140	0.8	19.3
15 : 46	141	0.8	19.4
15 : 47	142	0.8	19.3
15 : 48	143	0.8	19.4
15 : 49	144	0.8	19.3
15 : 50	145	0.9	19.3
15 : 51	146	0.9	19.3
15 : 52	147	0.9	19.3
15 : 53	148	0.9	19.3
15 : 54	149	0.9	19.3
15 : 55	150	0.9	19.3
15 : 56	151	1.0	19.2
15 : 57	152	1.0	19.2
15 : 58	153	1.1	19.2
15 : 59	154	1.0	19.2
16 : 0	155	0.9	19.3
16 : 1	156	0.9	19.3
16 : 2	157	1.0	19.2
16 : 3	158	1.0	19.2
16 : 4	159	0.9	19.3
16 : 5	160	0.9	19.2
16 : 6	161	0.9	19.3
16 : 7	162	0.8	19.4
16 : 8	163	0.9	19.3
16 : 9	164	0.8	19.4
16 : 10	165	0.9	19.4
16 : 11	166	0.9	19.3
16 : 12	167	0.9	19.3
16 : 13	168	0.9	19.3
16 : 14	169	0.9	19.3
16 : 15	170	0.8	19.4



Reference Method Monitor Data
One-Minute Averages

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Run #: M29-3/VOST-2 & -3
Test Time: 1325-1805

Clock Time	Elapsed Time	Monitor #1	Monitor #2
		Stack Oxygen %	Stack CO2 %
16 : 16	171	0.8	19.4
16 : 17	172	0.8	19.4
16 : 18	173	0.8	19.3
16 : 19	174	0.9	19.2
16 : 20	175	1.1	19.1
16 : 21	176	1.1	19.1
16 : 22	177	1.0	19.2
16 : 23	178	0.9	19.3
16 : 24	179	0.9	19.3
16 : 25	180	0.9	19.2
16 : 26	181	0.9	19.3
16 : 27	182	1.0	19.2
16 : 28	183	1.0	19.2
16 : 29	184	0.9	19.3
16 : 30	185	0.9	19.3
16 : 31	186	0.9	19.4
16 : 32	187	0.8	19.4
16 : 33	188	0.9	19.3
16 : 34	189	1.0	19.2
16 : 35	190	0.9	19.3
16 : 36	191	1.0	19.2
16 : 37	192	1.1	19.2
16 : 38	193	1.0	19.2
16 : 39	194	0.9	19.3
16 : 40	195	0.9	19.3
16 : 41	196	1.0	19.2
16 : 42	197	1.0	19.2
16 : 43	198	0.9	19.3
16 : 44	199	0.9	19.3
16 : 45	200	0.9	19.3
16 : 46	201	1.1	19.2
16 : 47	202	1.0	19.2
16 : 48	203	1.0	19.3
16 : 49	204	0.9	19.4
16 : 50	205	0.9	19.4
16 : 51	206	1.0	19.3
16 : 52	207	1.1	19.3
16 : 53	208	1.1	19.3
16 : 54	209	1.0	19.3
16 : 55	210	0.8	19.5
16 : 56	211	0.8	19.5
16 : 57	212	0.9	19.4
16 : 58	213	0.8	19.5
16 : 59	214	0.8	19.4
17 : 0	215	0.9	19.4
17 : 1	216	1.0	19.3
17 : 2	217	0.9	19.4
17 : 3	218	0.9	19.4
17 : 4	219	1.0	19.3
17 : 5	220	1.0	19.2
17 : 6	221	1.1	19.2
17 : 7	222	1.1	19.2
17 : 8	223	1.1	19.2
17 : 9	224	1.0	19.3
17 : 10	225	1.0	19.3
17 : 11	226	1.0	19.3
17 : 12	227	1.0	19.3
17 : 13	228	1.0	19.3
17 : 14	229	1.0	19.3
17 : 15	230	1.0	19.3
17 : 16	231	1.0	19.3
17 : 17	232	1.0	19.3
17 : 18	233	1.0	19.3
17 : 19	234	1.0	19.3
17 : 20	235	1.0	19.3
17 : 21	236	0.9	19.3
17 : 22	237	0.9	19.4
17 : 23	238	0.8	19.4
17 : 24	239	0.8	19.4
17 : 25	240	0.9	19.3
17 : 26	241	1.0	19.3
17 : 27	242	0.9	19.3
17 : 28	243	0.9	19.3
17 : 29	244	1.0	19.3
17 : 30	245	1.1	19.2
17 : 31	246	1.0	19.3
17 : 32	247	1.1	19.2
17 : 33	248	1.1	19.2
17 : 34	249	1.1	19.2
17 : 35	250	1.1	19.2
17 : 36	251	1.1	19.2
17 : 37	252	1.2	19.2
17 : 38	253	1.1	19.2
17 : 39	254	1.2	19.1
17 : 40	255	1.3	19.0
17 : 41	256	1.3	19.0



Reference Method Monitor Data
One-Minute Averages

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Run #: M29-3/VOST-2 & -3
Test Time: 1325-1805

Clock Time	Elapsed Time	Monitor #1	Monitor #2
		Stack Oxygen %	Stack CO2 %
17 : 42	257	1.1	19.2
17 : 43	258	1.0	19.3
17 : 44	259	0.9	19.4
17 : 45	260	1.0	19.2
17 : 46	261	1.0	19.3
17 : 47	262	1.0	19.3
17 : 48	263	1.0	19.3
17 : 49	264	1.0	19.3
17 : 50	265	0.9	19.2
17 : 51	266	0.8	19.4
17 : 52	267	1.0	19.3
17 : 53	268	1.0	19.2
17 : 54	269	1.1	19.2
17 : 55	270	1.2	19.1
17 : 56	271	1.1	19.2
17 : 57	272	1.1	19.2
17 : 58	273	1.1	19.1
17 : 59	274	1.1	19.2
18 : 0	275	1.0	19.3
18 : 1	276	1.1	19.2
18 : 2	277	1.1	19.2
18 : 3	278	1.0	19.2
18 : 4	279	1.1	19.2
18 : 5	280	1.1	19.2
AVERAGE:		1.0	19.3



**USEPA Method 3-A
Stack Oxygen
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Test Run #: M29-3/VOST-2 & -3
Test Time: 1325-1805

Data Input:

Average chart reading (C):	0.97 % db
Average pre/post-test zero calibration reading (C _o):	0.11 % db
Calibration gas concentration (C _{ma}):	5.0 % db
Average pre/post-test calibration gas reading (C _m):	4.97 % db

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack Oxygen

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 0.89 \% \text{ db}$$



**USEPA Method 3-A
Stack CO₂
Calibration Drift Correction And Emission Rate Calculation**

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack
Test Date: 8/29/2007
Test Run #: M29-3/VOST-2 & -3
Test Time: 1325-1805

Data Input:

Average chart reading (C):	19.29 % db
Average pre/post-test zero calibration reading (C _o):	0.17 % db
Calibration gas concentration (C _{ma}):	22.8 % db
Average pre/post-test calibration gas reading (C _m):	22.30 % db

Sample calculations @ standard conditions (29.92 inches Hg, 68.0 °F):

Stack CO₂

Corrected for zero and calibration drift:

$$C_{\text{gas}} = (\bar{C} - C_o) \frac{C_{ma}}{C_m - C_o} = 19.72 \% \text{ db}$$



Valero Refining Company - New Jersey
Source: FCCU Scrubber Stack
Test Dates: 8/28 - 8/30/07

APPENDIX B

Field Data

TRAVERSE POINT LOCATION FOR CIRCULAR AND RECTANGULAR DUCTS

PLANT Valero
 DATE 8-25-07
 SAMPLING LOCATION FC FG
 INSIDE OF FAR WALL TO
 OUTSIDE OF PORT (DISTANCE C) 125
 INSIDE OF NEAR WALL TO
 OUTSIDE OF PORT (DISTANCE D) 8
 STACK ID 117
 NEAREST UPSTREAM FROM DISTURBANCE (A) 4.822
 NEAREST DOWNSTREAM FROM DISTURBANCE (B) 0.920
 CALCULATOR J. Galt

Location of Traverse Points in Rectangular Stacks

	2	3	4	5	6	7	8	9	10	11	12
1	25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2	75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.5
3	83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	22.8	20.8	
4		87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2	
5			90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5	
6				91.7	78.6	68.8	61.1	55.0	50.0	45.8	
7					92.9	81.3	72.2	65.0	59.1	54.2	
8						93.8	83.3	75.0	68.2	62.5	
9							94.4	85.0	77.3	70.8	
10								95.0	86.4	79.2	
11									95.5	87.5	
12										95.8	

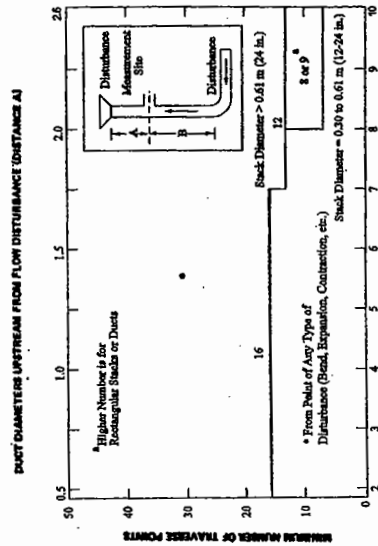
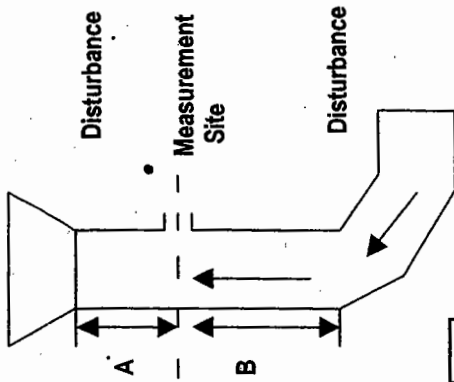
Rectangular Duct Equivalent Diameter Determination

$$\frac{2 \times L \times W}{L + W}$$

LOCATION OF TRAVERSE POINTS ON CIRCULAR STACKS

	4	6	8	10	12	14	16	18	20	22	24
1	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3	75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4	93.3	70.4	52.3	42.6	37.7	34.6	32.5	30.9	29.7	28.7	27.9
5		85.4	67.7	54.2	47.0	42.1	39.1	36.9	35.2	33.9	32.9
6			95.6	80.6	65.8	55.6	49.9	46.8	44.6	42.6	40.8
7				89.5	77.4	68.4	60.6	55.2	51.8	49.1	46.1
8					96.8	85.4	75.0	66.3	59.6	54.8	51.8
9						91.8	82.3	73.1	65.5	59.6	56.2
10							97.4	88.2	79.9	71.7	65.2
11								93.3	85.4	78.0	70.4
12									97.9	90.1	83.1
13										94.3	87.5
14											98.2
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											

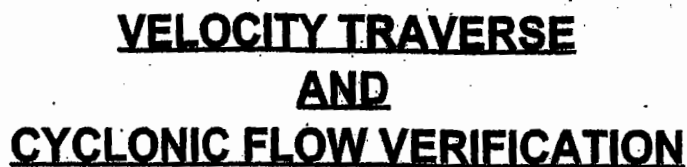
TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 1 AND 2 (TO NEAREST 1/8 INCH)	DISTANCE D (PORT DEPTH)	TRAVERSE POINT LOCATION FROM OUTSIDE OF PORT (SUM OF COLUMNS 3 AND 4)
1	0.021	1174	2.415	8" 11	10.415
2	0.067		7.841		15.841
3	0.118		13.811		21.811
4	0.177		20.711		28.711
5	0.250		29.255		37.255
6	0.350		41.655		49.655
7			CEMS		
8	0.042	117	4.91	8"	12.91
9	0.025		14.63		22.63
10	0.208		24.341		32.341
11	0.272		34.16		42.16
12	0.375		43.82		51.82
13	0.458		53.89		61.89
14	0.542		63.41		71.41
15	0.625		73.13		81.13
16	0.708		82.84		90.84
17	0.792		92.65		100.65
18	0.875		102.38		110.38
19	0.958		112.05		120.05
20					
21	0.167		19.54		27.54
22	0.500		38.50		66.50
23	0.833		97.46		105.46
24					



DUCT DIAMETERS UPSTREAM FROM FLOW DISTURBANCE (DISTANCE A)

DUCT DIAMETERS DOWNSTREAM FROM FLOW DISTURBANCE (DISTANCE B)

Figures 1-2. Minimum number of traverse points for velocity (nonparticulate) traverses.



SCHEMATIC OF TRAVERSE POINT LAYOUT

TRAVERSE POINT NUMBER	VELOCITY HEAD (ΔP_s), in.H ₂ O	STACK TEMP. (T _s), °F	YAW ANGLE °
1-	0.51	148	3
2	0.39	148	5
3	0.28	148	3
4	0.27	148	0
5	0.26	148	2
6	0.18	148	2
2-	0.58	147	4
2	0.51	145	10
3	0.42	145	7
4	0.36	145	5
5	0.27	145	0
6	0.26	148	2
3-	0.52	147	5
2	0.43	147	6
3	0.32	147	10
4	0.26	147	0
5	0.22	147	0
6	0.19	147	2
4-	0.56	147	10 8
2	0.59	147	10
3	0.44	147	8
4	0.35	147	10 8
5	0.30	147	8 10
6	0.23	147	6 8
AVERAGE			5.2

B-2

VACUO REF, VAC-CC.

PI No.: 55829 TST No.: 060004

Date Delivered to Testers: 8/28/07

Delivered by: Dan Strock

[illegible]

My signature below acknowledges that I have received the above listed Reference Method audit samples on the date listed. The audits will be analyzed consistent with the Method(s) and the results included in the final test report.

Signature: Aileen Z. Paez

Print Name: Steven E. Yuchs

Affiliation: ART Environmental, Inc. Date: 2-28-07



FIELD DATA

A= B=

PLANT	Valero	AMBIENT TEMPERATURE	83
DATE	8-28-01	BAROMETRIC PRESSURE	30.12
LOCATION	Panhandle MS	ASSUMED MOISTURE, %	18%
OPERATOR	CF	PROBE LENGTH, in.	63.1
STACK NO.	FCS EG-B	NOZZLE DIAMETER, in.	3.11
RUN NO.	MSB-1	STACK DIAMETER, in.	117"
SAMPLE BOX NO.	4782	MINUTES PER POINT	2.5
METER BOX NO.	508128	NUMBER OF POINTS	24pts
START TIME	1354	NUMBER OF PORTS	2

PROBE HEATER SETTING	326
HEATER BOX SETTING	300
METER H ₂ O	1.69
C ₂ FACTOR	1.74
Y ₂ FACTOR	1.69
PITOT/THERM #	655

WEIGHT OF PARTICULATE, mg	28084
Filter No.	28084
Sample	
Final wt	
Tare wt	523.6
Wt. gain	
TOTAL	

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (s) min.	STATIC PRESSURE (in. H ₂ O)	STACK TEMP (T _s) °F	VELOCITY HEAD (AP _s)	VELOCITY (AP _s)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H ₂ O		GAS SAMPLE VOLUME (V _m) ft ³	GAS SAMPLE TEMP AT DRY GAS METER		FILTER PRECIPITATE TEMP. °F	COND. EXIT TEMP °F	SORBENT MODULE TEMP. °F	LAST IMPINGER OUTLET TEMP. °F	PUMP VACUUM in. Hg
							ACTUAL	DESIRED		INLET (T _m) °F	OUTLET (T _m) °F					
1354	W	0	0.10	146	0.52		3.0	3.04	921.200	83	83	322	324		58	4
1359	2	3		146	0.40		2.3	2.34	923.82	83	83	329	321		51	4
1359	3	3		146	0.35		2.1	2.05	926.11	88	83	318	329		53	3
1359	4	10		146	0.28		1.6	1.64	928.27	88	83	320	321		50	3
1359	5	10		145	0.22		1.3	1.30	930.19	90	83	329	319		58	3
1359	6	15		145	0.19		1.1	1.12	931.91	90	83	328	320		59	2
1359	7	15	0.20	145	0.67		3.4	3.37	933.51	90	86	328	319		61	5
1419	2	20		145	0.45		2.7	2.67	936.27	94	85	327	322		57	4
1419	3	20		145	0.37		2.2	2.17	938.73	96	85	327	320		56	3
1419	4	25		145	0.33		2.0	1.96	940.97	97	85	326	323		64	3
1424	5	25		145	0.27		1.5	1.61	943.10	98	87	325	325		57	2
1429	6	30		145	0.22		1.3	1.31	945.01	97	87	327	321		60	2
1429	7	30	0.25	145	0.55		3.5	3.45	946.74	95	89	320	325		57	5
1439	2	35		145	0.45		2.3	2.22	949.50	98	89	319	326		56	4
1439	3	35		145	0.35		1.8	1.81	951.87	98	89	320	327		50	3
1444	4	40		145	0.29		1.5	1.49	953.90	98	90	327	320		56	2
1444	5	40		145	0.24		1.2	1.24	955.76	98	90	327	319		55	2
1444	6	45		145	0.22		1.1	1.13	957.95	97	89	325	320		55	2
1444	7	45	0.15	145	0.54		2.5	2.77	959.06	93	88	326	322		57	5
1459	2	50		145	0.39		2.0	2.01	961.57	95	88	327	325		55	5
1459	3	50		145	0.30		1.5	1.54	963.72	96	88	324	318		57	2
1459	4	55		145	0.26		1.3	1.34	965.59	97	88	325	321		58	2
1459	5	55		145	0.21		1.1	1.08	967.34	97	88	325	320		58	2
1459	6	60		145	0.18		0.93	0.93	969.78	97	88	327	321		57	2
AVERAGE	24pts	60min	0.20	145.2	0.5749		1.90		970.472	90.3	90.3	320	320		268	5

VOLUME OR WEIGHT OF LIQUID		IMPINGER		SILICA GEL	
WATER COLLECTED		VOLUME (ml) OR WEIGHT (g)		WEIGHT	
FINAL	246	#2	228	#4	214.4
INITIAL	190	#3	0		200.0
LIQUID COLLECTED	190	#4	128		14.4
TOTAL		COLLECTED (specify ml or g)			337.4

ORSAT	DATA	TIME	CO ₂	O ₂
TRIAL 1				
TRIAL 2				
TRIAL 3				
Average			19.50	1.21

SYSTEM PRE: 201	CFM@15"Hg
POST: 201	CFM@15"Hg
PITOT PRE: 27-010	@ 3"H ₂ O
POST: 27-010	@ 3"H ₂ O

LEAK CHECK	
SYSTEM PRE: 201	CFM@15"Hg
POST: 201	CFM@15"Hg
PITOT PRE: 27-010	@ 3"H ₂ O
POST: 27-010	@ 3"H ₂ O



FIELD DATA

PLANT: Valero
DATE: 8-28-07
LOCATION: PARSIPPANY, NJ
OPERATOR: FCC FGB
STACK NO.: MSB-2
SAMPLE BOX NO.: 508128
METER BOX NO.: 1601
START TIME: 2400

AMBIENT TEMPERATURE: 90°
BAROMETRIC PRESSURE: 30.12
ASSUMED MOISTURE, %: 25.92
PROBE LENGTH, in.: 64
NOZZLE DIAMETER, in.: .31
STACK DIAMETER, in.: 11.7
MINUTES PER POINT: 2.5
NUMBER OF POINTS: 2400
NUMBER OF PORTS: 4

PROBE HEATER SETTING: 320
HEATER BOX SETTING: 320
METER H₂O: 169
C₁ FACTOR: .84
Y₂ FACTOR: .969
PITOT/THERM #: 655

WEIGHT OF PARTICULATE, mg
Filter No.: 2801
Sample Final wt: 722.8
Tare wt: 722.8
Wt. gain: TOTAL

A= B=

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (s)	STATIC PRESSURE (in. H ₂ O)	STACK TEMP (T _s) °F	VELOCITY HEAD (AP _s)	VELOCITY (ft/s)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H ₂ O		GAS SAMPLE VOLUME (V _m) ft ³	GAS SAMPLE TEMP AT DRY GAS METER		Filter SAMPLE BOX TEMP °F	Pre-Filter EXIT TEMP °F	SORBENT MODULE TEMP °F	LAST IMPINGER OUTLET TEMP °F	PUMP VACUUM in. Hg
							ACTUAL	DESIRED		INLET (T _m) °F	OUTLET (T _m) °F					
1601	E-1	0	0.15	144	0.51	0.37	2.5	2.62	970.900	90	90	322	319		67	6
1606	2	5		144	0.37		1.9	1.91	973.34	95	90	327	324		63	5
	3	5		144	0.28		1.5	1.45	975.43	95	90	325	321		62	3
	4			144	0.22		1.1	1.14	977.26	97	91	322	325		64	3
1611	5	10		144	0.20		1.0	1.03	978.67	98	90	322	326		65	2
	6			144	0.17		0.88	0.88	980.41	99	90	327	324		63	2
1616/1620	S-1	15	0.20	144	0.56		2.9	2.89	981.84	96	92	331	330		62	5
	2	20		144	0.44		2.3	2.29	984.41	101	92	328	324		57	3
1625	3	20		144	0.34		1.8	1.77	986.71	103	93	328	325		58	3
	4			144	0.26		1.4	1.36	988.74	104	94	327	331		56	3
1630	5	25		144	0.23		1.2	1.20	990.51	104	94	327	326		57	3
	6			145	0.20		1.0	1.03	992.18	105	95	321	329		58	2
1635/1642	W-1	30	0.20	144	0.51		2.7	2.66	993.72	103	96	327	326		66	6
	2	35		144	0.42		2.2	2.19	995.21	105	96	320	324		52	6
1647	3	35		144	0.34		1.8	1.78	998.47	107	97	326	320		53	6
	4			144	0.30		1.6	1.58	1000.51	107	98	329	327		54	4
1652	5	40		144	0.24		1.3	1.26	2.42	107	98	330	322		54	3
	6			147	0.15		0.77	.79	4.14	108	99	325	319		56	3
1659/1705	W-1	45	0.20	144	0.40		2.1	2.07	5.49	103	100	329	322		64	5
	2			144	0.31		1.6	1.63	7.79	103	100	320	329		61	4
1710	3	50		144	0.23		1.2	1.21	9.65	103	100	327	321		61	4
	4			145	0.20		1.1	1.05	11.32	103	100	324	327		60	3
1715	5	55		144	0.16		0.90	.90	12.88	103	100	331	326		60	2
	6			144	0.15		0.78	.78	14.38	103	99					
1720		60							1015.735							
AVERAGE	2400	60min	0.19	144.2	0.5369	1.57			44.825	98.5		320	320		268	6

LEAK CHECK

SYSTEM PRE: 2.00 CFM@15"Hg
POST: 2.00 CFM@15"Hg

PITOT PRE: 81-016 @ > 3"H₂O
POST: 81-016 @ > 3"H₂O

ORSAT DATA

TIME	CO ₂	O ₂
TRIAL 1		
TRIAL 2		
TRIAL 3		
Average	19.66	11.6

SILICA GEL WEIGHT

VOLUME (ml) OR WEIGHT (g)	#1	#2	#3	#4
FINISH	324	144	8	215.2
INITIAL	224	104	0	200.0
LIQUID COLLECTED	224	44	8	15.2
TOTAL				287.2

COLLECTED (specify ml or g)



MSB-3

FIELD DATA

PLANT	16160	AMBIENT TEMPERATURE	9.0	PROBE HEATER SETTING	320	WEIGHT OF PARTICULATE, mg	
DATE	8-28-07	BAROMETRIC PRESSURE	30.12	HEATER BOX SETTING	320	Filter No.	28010
LOCATION	Paulsboro NJ	ASSUMED MOISTURE, %	2.5%	METER H ₂ O	1.69	Sample	
OPERATOR	OK	PROBE LENGTH, in.	6.94	C _p FACTOR	.84	Final wt	
STACK NO.	FCC-FB3	NOZZLE DIAMETER, in.	1.311	Y _d FACTOR	.969	Tare wt	521.4
RUN NO.	MSB-3	STACK DIAMETER, in.	17.7	PITOT/THERM #	655	Wt. gain	
SAMPLE BOX NO.	0828	MINUTES PER POINT	2.5			TOTAL	mg
METER BOX NO.	504128	NUMBER OF POINTS	2463				
START TIME	1913	NUMBER OF PORTS	4				

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (s)	STATIC PRESSURE (in. H ₂ O)	STACK TEMP (°F)	VELOCITY		GAS SAMPLE VOLUME (Nm ³)	DIFFERENTIAL ACROSS ORIFICE METER (AD) in. H ₂ O		GAS SAMPLE DRY GAS METER INLET (T _{in}) °F	GAS SAMPLE DRY GAS METER OUTLET (T _{out}) °F	SAMPLE BOX TEMP. °F	PROBE EXIT TEMP. °F	Filter MODULE TEMP. °F	LAST IMPINGER OUTLET TEMP. °F	PUMP VACUUM in. Hg
					(ΔP _s)	HEAD (ΔP _s)		ACTUAL	DESIRED							
1913	1	0	0.20	145	0.57	0.46	17.400	2.9	2.91	89	88	325	320	253	64	5
1818	2	5		145	0.46	0.35	19.97	2.4	2.35	89	88	327	323	319	55	4
	3	5		144	0.35	0.30	22.29	1.8	1.79	91	88	328	325	323	55	4
	4	10		144	0.30	0.28	24.31	1.5	1.54	91	87	325	330	352	59	3
1823	5	10		144	0.28	0.23	26.18	1.4	1.41	92	87	327	322	340	63	2
	6			145	0.23	0.19	27.99	1.2	1.18	91	87	320	328	342	62	2
1824/1825	7	15	0.20	144	0.19	0.14	29.63	2.5	2.51	89	88	322	321	334	62	5
	2	20		144	0.38	0.38	32.01	2.0	1.95	93	88	325	322	353	62	4
1837	3	20		144	0.31	0.21	34.12	1.6	1.59	93	88	329	327	353	60	4
	4	25		144	0.23	0.21	35.02	1.2	1.18	93	88	330	325	351	61	2
1842	5	25		144	0.21	0.18	37.66	1.1	1.08	93	88	331	329	344	61	2
	6			144	0.18	0.15	39.23	0.92	0.92	92	88	325	328	344	63	2
1845/1850	1	30	0.25	144	0.55	0.43	40.67	2.8	2.81	89	85	323	320	315	65	5
	2	35		144	0.43	0.36	43.20	2.2	2.20	91	85	330	325	352	60	5
1856	3	35		145	0.36	0.28	45.44	1.8	1.84	92	85	321	325	355	60	4
	4	40		145	0.28	0.21	47.48	1.6	1.64	93	85	324	320	352	62	3
1900	5	40		145	0.21	0.15	49.41	1.3	1.28	93	85	322	323	350	63	3
	6			145	0.15	0.10	51.12	1.1	1.08	93	85	329	324	349	63	2
1904/1908	1	45	0.15	144	0.50	0.39	52.69	2.6	2.55	89	84	325	320	329	64	5
	2	50		144	0.39	0.30	55.09	2.0	1.94	92	84	327	326	342	61	5
1913	3	50		145	0.30	0.26	57.22	1.5	1.54	93	84	330	324	329	59	4
	4	55		145	0.26	0.21	59.09	1.3	1.33	93	84	324	320	332	59	3
1918	5	55		145	0.21	0.17	60.83	1.1	1.08	93	84	322	322	325	60	3
	6			145	0.17	0.14	62.39	0.97	0.97	93	84	322	322	325	60	
1923		60					63.879									
AVERAGE	2463	60min	0.20	144.5	0.5676		46.479	1.69		88.6		320	320		268	MAA

VOLUME OR WEIGHT OF LIQUID		IMPINGER		SILICA GEL	
WATER COLLECTED	VOLUME (ml) OR WEIGHT (g)	#3	#4	WEIGHT	
FINAL	332	190	0	211.7	
INITIAL	180	100	0	200	
LIQUID COLLECTED	152	90	0	11.7	
TOTAL	COLLECTED (specify ml or g)			243.7	

LEAK CHECK	
SYSTEM PRE: 1.021	CFM@15"Hg
POST: 1.021	CFM@15"Hg
PITOT PRE: 4.1-0.12	@ > 3"H ₂ O
POST: 4.1-0.12	@ > 3"H ₂ O

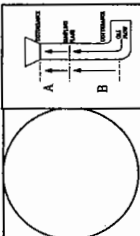
ORSAT DATA	TIME	CO ₂	O ₂
TRIAL 1			
TRIAL 2			
TRIAL 3			
Average			



PLANT Valero AMBIENT TEMPERATURE 77
DATE 02/29/07 BAROMETRIC PRESSURE 30.04
LOCATION Rocky Mt. NIS ASSUMED MOISTURE, % 2.5
OPERATOR BP PROBE LENGTH, in. 72
STACK NO. FLY FLS NOZZLE DIAMETER, in. 0.309
RUN NO. MB-1 STACK DIAMETER, in. 11.9
SAMPLE BOX NO. MB-1 MINUTES PER POINT 2.5
METER BOX NO. 0503002 NUMBER OF POINTS 24
START TIME 0936 NUMBER OF PORTS 4

FIELD DATA

PROBE HEATER SETTING 250
HEATER BOX SETTING 1.85
METER H₂O 0.84
C_p FACTOR 1.002
Y_d FACTOR 0.54
PITOT/THERM # 654



CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (s) min.	STATIC PRESSURE (in. H ₂ O)	STACK TEMP (T _s) °F	VELOCITY HEAD		DIFFERENTIAL PRESSURE ACROSS ORIFICE METER (ΔH) in. H ₂ O	GAS SAMPLE VOLUME (Nm ³) l ¹	GAS SAMPLE DRY GAS METER		SAMPLE BOX TEMP. °F	SORBENT MODULE TEMP. °F	LAST IMPINGER OUTLET TEMP. °F	PUMP VACUUM in. Hg
					(ΔP _s)	(√ΔP _s)			INLET (T _{inlet}) °F	OUTLET (T _{outlet}) °F				
0936	N-1	0	0.20	151	0.52	0.45	2.8	917.023	86		114	114	65	8
0941	2	5		151			2.4	916.35	87				62	8
	3	5		151	0.40		2.1	918.50	87		154		60	7
	4			151	0.32		1.7	920.55	87		253		59	7
0946	5	10		151	0.29		1.5	922.40	87		247		58	7
	6			151	0.21		1.1	924.15	88		258		58	4
0951/55	W-1	15	0.25	151	0.58		3.1	926.15	87		252		61	8
	2			152	0.36		1.4	928.10	88		251		54	7
1000	3	20		151	0.31		1.7	930.80	88		253		55	5
	4			152	0.25		1.3	932.70	88		255		54	5
1005	5	25		151	0.16		0.96	934.20	88		254		54	4
	6			151	0.17		0.91	935.45	88		252		55	4
1010/14	S-1	30	0.25	151	1.63		3.4	936.45	87		250		63	4
	2			151	0.44		2.6	938.70	88		255		53	8
1019	3	35		151	0.36		1.9	941.00	88		255		52	6
	4			152	0.32		1.7	943.10	88		253		55	8
1024	5	40		151	0.24		1.3	944.75	88		255		56	4
	6			151	0.17		0.91	946.30	88		252		56	3
1029/33	E-1	45	0.15	151	0.54		2.9	947.70	88		253		63	4
	2			151	0.37		2.0	950.00	87		256		56	8
36	7	50		151	0.33		1.8	952.00	90		255		58	8
	4			151	0.22		1.2	953.90	90		264		60	3
43	5	55		151	0.18		0.97	956.40	91		251		62	3
	6			152	0.16		0.86	958.80	91		251		62	3
48								958.393						
AVERAGE		60	0.258	151.2		0.5673	1.79	44.370	88.1					

VOLUME OR WEIGHT OF LIQUID	IMPINGER				SILICA GEL WEIGHT
	#1	#2	#3	#4	
WATER COLLECTED					
FINAL	023.5	035.6	728.4	089.9	230.6
INITIAL	006.5	025.2	094.5	074.4	200.0
LIQUID COLLECTED	22.10	10.4	28.9	12.0	30.6
TOTAL	COLLECTED (specify ml or g)				

ORSAT DATA	TIME	CO ₂	O ₂
TRIAL 1			
TRIAL 2			
TRIAL 3			
Average	19.46		1.10

LEAK CHECK
SYSTEM PRE: 0.00 CFM@15"Hg
POST: 0.00
PITOT PRE: 0.00
POST: 0.00

IMPINGER RECOVERY DATA SHEET

Company:
Location:
Source:
Run No.:

Valero
Paulsboro, NJ
FCCU FGS
m8-1

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

8-29-07
8-29-07
8-29-07
m8
Non tared
X 25448

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~~ 10	water	606.5g	827.5g	221.0g	~~92~~ 25448
~~2~~ 1	80% IPA 20% H ₂ O	625.2g	635.6g	10.4g	~~92~~ 25448
~~3~~ 2	3% H ₂ O ₂	699.5g	728.4g	28.9g	— 25449
~~4~~ 3	3% H ₂ O ₂	677.9g	689.9g	12.0g	— 25449
~~5~~ 56	Silica gel	200 g	230.6g	30.6g	—
6					

meter volume for purge final 497.8
initial 484.4
15 min sy



FIELD DATA

MB-2

PLANT	1/2000	AMBIENT TEMPERATURE	89	PROBE HEATER SETTING	250	WEIGHT OF PARTICULATE, mg	
DATE	8-29-07	BAROMETRIC PRESSURE	30.06	HEATER BOX SETTING	1.83	Filter No.	
LOCATION	Rakibero, NJ	ASSUMED MOISTURE, %	25	METER Hg	0.84	Sample	
OPERATOR	BT	PROBE LENGTH, in.	72	C _p FACTOR	1.002	Final wt	
STACK NO.	FW 265	NOZZLE DIAMETER, in.	0.304	Y _d FACTOR		Tare wt	
RUN NO.	MB-2	STACK DIAMETER, in.	11	PITOT/THERM #	0.28	Wt. gain	
SAMPLE BOX NO.	Acex	MINUTES PER POINT	2.5			TOTAL	
METER BOX NO.	050302	NUMBER OF POINTS	24				
START TIME	1300	NUMBER OF PORTS	4				

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (s)	STATIC PRESSURE (in. H ₂ O)	STACK TEMP (T _s) °F	VELOCITY HEAD (ΔP _s)	VELOCITY (ΔP _s)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H ₂ O		GAS SAMPLE VOLUME (V _m) ft ³	GAS SAMPLE TEMP AT DRY GAS METER (T _m) °F		SAMPLE BOX TEMP °F	COND. TEMP °F	SORBENT MODULE TEMP °F	LAST IMPINGER OUTLET TEMP °F	PUMP VACUUM in. Hg
							ACTUAL	DESIRED		INLET (T _m) °F	OUTLET (T _m) °F					
1300	E-1	0	0.20	152	0.60	0.60	2.7	1.89	970.375	94	94	254	254		64	9
1305	2	5		152	0.35	0.35	1.9	1.34	972.70	94	94	254	254		62	9
1310	3	10		152	0.21	0.21	1.1	0.92	974.60	94	94	247	247		61	7
1315	4	15		152	0.17	0.17	0.81	0.81	976.55	94	94	246	246		62	3
1320	5	20		152	0.15	0.15	3.1	3.08	978.05	95	95	247	247		64	3
1325	6	25		152	0.42	0.42	2.3	2.27	979.40	95	95	248	248		64	10
1330	1	30	0.20	152	0.30	0.30	1.6	1.62	981.15	95	95	249	249		61	9
1335	2	35		152	0.27	0.27	1.5	1.46	983.30	95	95	248	248		57	8
1340	3	40		152	0.20	0.20	1.1	1.08	985.30	95	95	246	246		58	4
1345	4	45		152	0.19	0.19	1.0	1.03	987.05	95	95	246	246		59	4
1350	5	50		152	0.52	0.52	2.8	2.81	990.25	95	95	246	246		63	9
1355	6	55		152	0.36	0.36	1.9	1.94	992.20	95	95	247	247		62	8
1400	1	60		152	0.29	0.29	1.6	1.57	994.30	96	96	246	246		59	5
1405	2	65		152	0.22	0.22	1.2	1.18	996.00	96	96	248	248		63	4
1410	3	70		152	0.17	0.17	0.91	0.91	997.80	96	96	249	249		64	4
1415	4	75		152	0.15	0.15	0.81	0.81	999.50	96	96	250	250		63	3
1420	5	80	0.20	152	0.55	0.55	3.0	2.97	1000.70	95	95	250	250		62	10
1425	6	85		152	0.44	0.44	2.4	2.38	1002.00	95	95	249	249		57	9
1430	1	90		153	0.35	0.35	1.9	1.89	1004.35	95	95	251	251		55	6
1435	2	95		153	0.30	0.30	1.6	1.61	1006.6	95	95	252	252		58	5
1440	3	100		152	0.20	0.20	1.5	1.51	1008.45	95	95	254	254		58	4
1445	4	105		152	0.14	0.14	0.76	0.76	1010.25	95	95	254	254		59	4
1450	5	110		152	0.14	0.14	0.76	0.76	1012.00	95	95	254	254		59	4
1455	6	115		152	0.14	0.14	0.76	0.76	1013.623	95	95	254	254		59	4
AVERAGE		60		152.1	0.54	0.54	1.65	1.65	43.248	95.0	95.0					

VOLUME OR WEIGHT OF LIQUID	IMPINGER	SILICA GEL
WATER COLLECTED	VOLUME (ml) OR WEIGHT (g)	WEIGHT
FIN 11	831.3	729.1
INITIAL	100.0	100.0
LIQD COLLECTED	931.3	829.1
TOTAL	931.3	829.1

COLLECTED (specify ml or g)

500.0

ORSAT	DATA	TIME	CO ₂	O ₂
TRIAL 1				
TRIAL 2				
TRIAL 3				
Average		19.75	0.82	

SYSTEM PRE: 0.001	CFM@15"Hg
POST: 0.005	CFM@15"Hg
PITOT PRE: 0.2	@ > 3"H ₂ O
POST: 0.2	@ > 3"H ₂ O

LEAK CHECK

IMPINGER RECOVERY DATA SHEET

Company:
Location:
Source:
Run No.:

Valery
Paulsboro, N.J.
FLU F65
m8-2

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

8-29-07
8-29-07
8-29-07
MB
Non-tared
25450

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.
<i>XK0</i>	<i>water</i>	<i>608.0g</i>	<i>831.3g</i>	<i>223.3g</i>	<i>25450</i>
<i>X1</i>	<i>80%IPA</i>	<i>619.9g</i>	<i>632.9</i>	<i>13.0g</i>	<i>25450</i>
<i>X2</i>	<i>3% H₂O₂</i>	<i>701.7g</i>	<i>729.1</i>	<i>27.4g</i>	<i>30699</i>
<i>X3</i>	<i>"</i>	<i>679.6g</i>	<i>688.8</i>	<i>9.2g</i>	<i>30699</i>
<i>5</i>			<i>22.51</i>		
<i>656</i>		<i>200</i>	<i>227.1</i>	<i>27.1g</i>	<i>—</i>

meter volume for purge final 519.6
15 min initial 500.4
54

m8-3



FIELD DATA

PLANT Valero AMBIENT TEMPERATURE 90
DATE 8-29-07 BAROMETRIC PRESSURE 30.00
LOCATION Refinery ASSUMED MOISTURE, % 25
OPERATOR BP PROBE LENGTH, in. 72
STACK NO. FLU Flg NOZZLE DIAMETER, in. 0.509
RUN NO. 113 STACK DIAMETER, in. 11.3
SAMPLE BOX NO. 118-3 MINUTES PER POINT 2.5
METER BOX NO. 0503002 NUMBER OF POINTS 24
START TIME 1503165 NUMBER OF PORTS 1

PROBE HEATER SETTING 250
HEATER BOX SETTING n/a
METER H₂O 1.83
C₂ FACTOR 0.84
Y₄ FACTOR 1.002
PITOT/THERM # 638

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

A= _____ B= _____

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (s) min.	STATIC PRESSURE (in. H ₂ O)	STACK TEMP (T ₃) °F	VELOCITY HEAD		PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H ₂ O		GAS SAMPLE VOLUME (V _m) ft ³	GAS SAMPLE TEMP AT DRY GAS METER		SAMPLE BOX TEMP. °F	COND. TEMP °F	SORBENT MODULE TEMP. °F	LAST IMPINGER OUTLET TEMP. °F	PUMP VACUUM in. Hg
					(ΔP ₃)	(√ΔP ₃)	ACTUAL	DESIRED		INLET (T _m) °F	OUTLET (T _m) °F					
1505	1-1	0	0.20	151	0.56	0.45	3.0	3.03	14.338	96			250		64	7
	2			151			2.4	2.44	16.80	97			251		52	6
1510	3	5		151	0.38	0.32	2.1	2.06	19.00	97			250		55	4
	4			151			1.7	1.74	21.05	97			251		56	4
1515	5	10		151	0.25	0.25	1.4	1.36	22.90	97			247		58	3
	6			151			1.0	1.03	24.50	98			246		58	2
1520/24	1-1	15	0.20	151	0.52	0.49	2.8	2.83	26.30	99			246		58	7
	2			151			1.9	1.85	28.40	99			247		57	7
1524	3	20		151	0.30	0.30	1.6	1.63	30.30	99			247		57	6
	4			151			1.5	1.50	32.10	100			248		57	4
1534	5	25		151	0.19	0.19	1.0	1.03	33.85	100			245		59	4
	6			151			0.88	0.88	35.80	100			248		62	2
1539/46	5-1	30	0.20	151	0.52	0.52	3.4	3.34	37.40	100			253		57	2
	2			151			2.3	2.27	39.40	100			249		57	7
1551	3	35		152	0.33	0.33	1.8	1.80	41.50	101			249		52	5
	4			152	0.28	0.28	1.5	1.52	43.40	101			250		55	5
1556	5	40		152	0.22	0.22	1.2	1.20	45.40	101			248		57	2
	6			152	0.18	0.18	0.98	0.98	46.75	101			251		59	2
1601/11	E-1	45	0.20	151	0.54	0.54	3.0	2.95	48.10	101			252		62	7
	2			151			2.0	1.97	50.60	101			248		61	7
1616	3	50		151	0.29	0.29	1.6	1.54	52.60	102			250		60	6
	4			151	0.24	0.24	1.3	1.31	54.40	102			250		62	4
1621	5	55		152	0.17	0.17	0.93	0.93	56.00	103			250		64	4
	6			152			0.82	0.82	57.50	102			247		61	2
1626									59.79							
AVERAGE		60	0.20	151.3			0.5528	0.5528	45.441	99.8						

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED

#1	#2	#3	#4
836.3	642.0	141.6	224.1
102.5	638.3	712.4	115.3
237.8	9.5	29.2	13.8

TOTAL COLLECTED (specify ml or g) 290.7

IMPINGER VOLUME (ml) OR WEIGHT (g)

SILICA GEL WEIGHT

ORSAT DATA

TRIAL 1	TRIAL 2	TRIAL 3	Average
			19.85

TIME

CO₂

O₂

LEAK CHECK

SYSTEM PRE: 0.001 CFM@15"Hg

POST: 1.003 CFM@15"Hg

PITOT PRE: 0.02 OK @ > 3"H₂O

POST: 0.01 OK @ > 3"H₂O

IMPINGER RECOVERY DATA SHEET

Company:
Location:
Source:
Run No.:

Wabeno
Paulsboro NJ
FCCU FGS
M-8-3

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

8-29-07
"
"
M-8
NA
30700

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.
<i>1 K0</i>	<i>water</i>	<i>602.5</i>	<i>836.3</i>	<i>233.8 g</i>	<i>30700</i>
<i>2 1</i>	<i>80% IPA</i>	<i>638.5</i>	<i>642.0</i>	<i>3.5 g</i>	<i>30700</i>
<i>2 2</i>	<i>3% H₂O₂</i>	<i>712.4</i>	<i>741.6</i>	<i>29.2 g</i>	<i>30701</i>
<i>1 3</i>	<i>3% H₂O₂</i>	<i>715.3</i>	<i>729.1</i>	<i>13.8 g</i>	<i>30701</i>
<i>5</i>					
<i>6 SG</i>	<i>silica gel</i>	<i>200</i>	<i>210.4</i>	<i>10.4 g</i>	<i>—</i>

meter extreme for purge final 523.9
15min initial 501.6
51



FIELD DATA

M29-1

PLANT	Underc	AMBIENT TEMPERATURE	90
DATE	8-29-07	BAROMETRIC PRESSURE	30.00
LOCATION	Falksboro ME	ASSUMED MOISTURE, %	25%
OPERATOR	CS	PROBE LENGTH, in.	64
STACK NO.	CCC FGD	NOZZLE DIAMETER, in.	3.13
RUN NO.	M29-1	STACK DIAMETER, in.	17.0
SAMPLE BOX NO.	ALEX	MINUTES PER POINT	10
METER BOX NO.	503002	NUMBER OF POINTS	24
START TIME	1544	NUMBER OF PORTS	4

PROBE HEATER SETTING	250
HEATER BOX SETTING	250
METER H ₂ O	1.83
C ₂ FACTOR	1.84
Y ₂ FACTOR	1.004
PITOT/THERM #	638

WEIGHT OF PARTICULATE, mg	259.2
Filter No.	
Sample	
Final wt	
Tare wt	768.1
Wt. gain	
TOTAL	

A= B=

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (s)	STATIC PRESSURE (in. H ₂ O)	STACK TEMP (T _g) °F	VELOCITY HEAD (ΔP _g)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔE) in. H ₂ O		GAS SAMPLE VOLUME (V _m) ft ³	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	DESIRED		INLET (T _{inlet}) °F	OUTLET (T _{outlet}) °F				
1944	E 1	0	0.17	152	0.56	3.2	3.16	61.700	91		251	249	58	4
	2	10		152	0.40	2.3	2.25	71.71	90		259	200	55	2
1804	3	20		152	0.27	1.5	1.52	80.15	90		258	245	56	2
	4	30		152	0.23	1.3	1.29	87.08	89		253	250	59	2
1824	5	40		152	0.19	1.1	1.07	93.47	88		205	250	58	2
	6	50		152	0.18	1.0	1.01	99.27	87		253	251	58	2
1844/1851	1	60	0.19	152	0.62	3.5	3.47	104.89	87		258	250	57	4
	2	70		152	0.43	2.4	2.41	115.35	87		262	249	62	3
1911	3	80		154	0.33	1.8	1.83	124.05	86		258	249	55	3
	4	90		154	0.27	1.5	1.50	131.65	86		256	252	58	2
1931	5	100		154	0.24	1.3	1.33	138.52	85		208	254	58	2
	6	110		153	0.22	1.2	1.22	144.99	84		267	251	59	2
1951/1957	1	120	0.15	153	0.52	2.9	2.88	151.18	82		263	250	57	5
	2	130		153	0.38	2.1	2.12	160.65	82		253	252	58	4
2017	3	140		152	0.31	1.7	1.71	168.76	80		252	250	55	3
	4	150		152	0.23	1.3	1.27	176.05	80		260	249	61	2
2037	5	160		152	0.19	1.1	1.05	182.34	79		250	253	58	2
	6	170		151	0.15	0.82	0.82	188.04	79		250	249	58	2
2057/2101	1	180	0.15	152	0.53	2.9	2.92	193.11	78		250	251	58	5
	2	190		152	0.43	2.4	2.37	202.61	78		251	251	51	5
2121	3	200		151	0.39	2.1	2.09	211.17	78		252	252	53	4
	4	210		151	0.32	1.8	1.76	219.23	78		252	252	53	4
2141	5	220		151	0.26	1.4	1.43	226.62	78		250	252	54	3
	6	230		151	0.23	1.3	1.27	233.28	78		253	251	50	3
2201		240						239.543						
AVERAGE	2443	240 min	0.10	152.2	0.562	1.83		177.843	83.3		250	250	268	5

VOLUME OR WEIGHT OF LIQUID	IMPINGER	SILICA GEL
WATER COLLECTED	VOLUME (ml) OR WEIGHT (g)	WEIGHT
FINAL	#1 #2 #3 #4	#1 #2 #3 #4
INITIAL	232 281 96	21.6
LIQUID COLLECTED	0 160	200
TOTAL	COLLECTED (specify ml or g)	1/51.6

ORSAT	DATA	TIME	CO ₂	O ₂
TRIAL 1				
TRIAL 2				
TRIAL 3				
Average		0.99	17.81	

LEAK CHECK	SYSTEM PRE: 1.001	CFM@15"Hg
	POST: 0.01	CFM@15"Hg
	PITOT PRE: 41-OK	@ 3"H ₂ O
	POST: 41-OK	@ 3"H ₂ O

Nozzle C-1

1-312

2-314

3-313

IMPINGER RECOVERY DATA SHEET

Company:
Location:
Source:
Run No.:

Valeu
Paulsboro, NJ
FLU FGS
m29-1

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

8-25-07
"
"
M-29
25921
25921

Measurement Method: Weight or Volume

<u>Impinger No.</u>	<u>Impinger Contents</u>	<u>Initial wt/vol g/mL</u>	<u>Final wt/vol g/mL</u>	<u>Difference wt/vol g/mL</u>	<u>Sample Container No.</u>
1	<i>water</i>	<i>0</i>	<i>250 + 138</i>	<i>388</i>	<i>25452</i>
2	<i>water</i>	<i>0</i>	<i>240 + 132</i>	<i>372</i>	<i>25452</i>
3	<i>acid/peroxide</i>	<i>100</i>	<i>255 + 126</i>	<i>355 + 281 net</i>	<i>25453</i>
4	<i>"</i>	<i>100</i>	<i>196</i>	<i>96</i>	<i>25453</i>
5	<i>empty</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>—</i>
<i>56</i>	<i>silica gel</i>	<i>200</i>	<i>217.6</i>	<i>17.6</i>	<i>—</i>
				<i>1,754.6</i>	



FIELD DATA

PLANT	16400	AMBIENT TEMPERATURE	77	PROBE HEATER SETTING	250	WEIGHT OF PARTICULATE, mg	
DATE	8-30-07	BAROMETRIC PRESSURE	29.97	HEATER BOX SETTING	250	Filter No.	23918
LOCATION	Paulsboro NJ	ASSUMED MOISTURE, %	25.90	METER Hg	1.83	Sample	
OPERATOR	JE	PROBE LENGTH, in.	614	C _p FACTOR	1.00	Final wt	
STACK NO.	FGC-FGB	NOZZLE DIAMETER, in.	1.313	Y _d FACTOR	1.00	Tare wt	770.5
RUN NO.	NA29-2	STACK DIAMETER, in.	117.0	PITOT/THERM #	658	Wt. gain	
SAMPLE BOX NO.	APLX	MINUTES PER POINT	1.6			TOTAL	
METER BOX NO.	50200	NUMBER OF PORTS	2405				
START TIME	8:38						

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (g) min.	STATIC PRESSURE (in. H ₂ O)	STACK TEMP (T _s) °F	VELOCITY HEAD (AP) (in. H ₂ O)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H ₂ O		GAS SAMPLE VOLUME (V _m) ft ³	GAS SAMPLE TEMP AT DRY GAS METER (T _{mg}) °F		SAMPLE BOX TEMP °F	SORBENT MODULE TEMP °F	LAST IMPINGER OUTLET TEMP °F	PUMP VACUUM in. Hg
						ACTUAL	DESIRED		INLET (T _{mg}) °F	OUTLET (T _{mg}) °F				
8:38	E-1	0	0.20	151	0.55	3.1	3.05	241.400	81		250		65	3
8:58	2	10		151	0.36	2.0	2.01	251.14	84		252		55	2
9:18	3	20		151	0.28	1.6	1.57	255.08	85		251		56	2
	4	30		152	0.21	1.2	1.17	266.08	87		252		58	2
	5	40		152	0.18	1.0	1.01	272.17	88		250		55	2
	6	50		151	0.14	0.79	0.79	277.82	89		250		57	2
	1	60	0.15	151	0.64	3.6	3.60	282.81	87		253		56	2
	2	70		152	0.44	2.5	2.48	283.48	92		258		53	2
10:03	3	80		152	0.35	2.0	1.99	302.37	94		258		55	2
	4	90		152	0.31	1.8	1.76	310.33	95		258		56	2
10:23	5	100		152	0.24	1.4	1.37	317.82	98		260		57	2
	6	110		151	0.17	0.97	0.97	324.44	97		254		59	2
10:45/10:50	1	120	0.15	151	0.62	3.5	3.53	330.02/330.15	95		260		61	2
	2	130		152	0.46	2.6	2.62	340.77	96		257		54	2
11:10	3	140		152	0.36	2.1	2.03	349.93	95		256		54	2
	4	150		151	0.30	1.7	1.71	358.02	97		251		56	2
11:30	5	160		151	0.28	1.6	1.59	365.43	97		259		57	2
	6	170		151	0.24	1.4	1.37	372.59	98		260		59	2
11:50/11:55	1	180	0.20	152	0.59	3.4	3.37	379.24	98		262		58	2
	2	190		152	0.38	2.2	2.18	389.64	99		252		58	2
12:10	3	200		152	0.25	1.4	1.43	398.01	99		262		56	2
	4	210		152	0.22	1.3	1.26	409.79	100		261		49	2
12:35	5	220		152	0.20	1.2	1.15	411.17	100		257		52	2
	6	230		151	0.17	0.97	0.97	417.25	100		250		53	2
12:55		240						472.646						
AVERAGE	2405		0.18	151.5	0.5620	1.89		181.116	93.8		2250		268	max

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	#1	#2	#3	#4	SILICA GEL WEIGHT
FINAP	4102	406	420	467	224.3
INITIAL	0	0	100	150	220
LIQ COLLECTED	462	406	320	38	243
TOTAL					1113

ORSAT DATA	CO ₂	O ₂
TRIAL 1		
TRIAL 2		1.10
TRIAL 3		
Average	19.56	

LEAK CHECK	SYSTEM PRE: 00/1	CFM@15"Hg
	POST: 00/1	CFM@15"Hg
	PITOT PRE: 1/10K	@ > 3"HgO
	POST: 1/10K	@ > 3"HgO

Leak check at 215gpd
330.02 - 330.10



Company:
Location:
Source:
Run No.:

Va/egg PB
PB, NJ
FLCU FGS
M25-2

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

8-30-07

M-29

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	<i>water</i>	<i>0</i>	<i>250 + 152</i>	<i>402</i>	
2	<i>water</i>	<i>0</i>	<i>250 + 156</i>	<i>406</i>	
3	<i>carb peroxide</i>	<i>100</i>	<i>250 + 170</i>	<i>320</i>	
4	<i>oxid peroxide</i>	<i>100</i>	<i>62</i>	<i>-38</i>	
5	<i>empty</i>	<i>0</i>	<i>0</i>		
6	<i>SG</i>	<i>200</i>	<i>227.3g</i>	<i>27.3</i>	
				<i>(1,171.3)</i>	



FIELD DATA

M209-3

PLANT	Vickero	AMBIENT TEMPERATURE	87
DATE	8-30-07	BAROMETRIC PRESSURE	29.71
LOCATION	PAULSBORO, NJ	ASSUMED MOISTURE, %	25.76
OPERATOR	JFC	PROBE LENGTH, in.	654
STACK NO.	FCC-F013	NOZZLE DIAMETER, in.	3.13
RUN NO.	M209-3	STACK DIAMETER, in.	117.3
SAMPLE BOX NO.	4728	MINUTES PER POINT	19
METER BOX NO.	50300	NUMBER OF POINTS	2464
START TIME	1303	NUMBER OF PORTS	4

PROBE HEATER SETTING	250
HEATER BOX SETTING	286
METER H ₀	1.53
C _p FACTOR	1.84
V ₁ FACTOR	1.008
PITOT/THERM #	638

WEIGHT OF PARTICULATE, mg	27773
Filter No.	
Sample	
Final wt	
Tare wt	796.5
Wt. gain	
TOTAL	

A=	B=

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (s) min.	STATIC PRESSURE (in. H ₂ O)	STACK TEMP (°F)	VELOCITY HEAD (AP) (ft/s)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H ₂ O		GAS SAMPLE VOLUME (V _m) ft ³	GAS SAMPLE TEMP AT DRY GAS METER (T _{mg}) °F		COND. EXIT TEMP °F	SORBENT MODULE TEMP. °F	LAST IMPINGER OUTLET TEMP. °F	PUMP VACUUM in. Hg.
						ACTUAL	DESIRED		INLET	OUTLET (T _{mg}) °F				
1325	W-1	0	0.20	153	0.54	3.1	3.09	423.200	97	251	253		52	4
1345	2	10		152	0.36	2.1	2.06	733.17	100	251	250		54	3
1345	3	20		152	0.26	1.5	1.49	441.34	101	258	248		51	2
1405	4	30		152	0.21	1.2	1.21	448.29	102	253	250		58	2
1405	5	40		151	0.19	1.1	1.10	454.59	102	255	251		58	2
1440	1-1	60	0.20	152	0.56	3.2	3.23	460.51	103	260	252		58	2
1440	2	70		152	0.47	2.7	2.71	476.39	104	258	257		64	4
1440	3	80		152	0.34	2.0	1.96	485.79	104	253	260		52	3
1500	4	90		152	0.31	1.8	1.79	493.78	103	251	249		53	3
1500	5	100		152	0.26	1.5	1.49	501.40	103	256	251		56	3
1521/1538	6	110		152	0.23	1.4	1.33	504.37	104	257	248		58	3
1538	7	120	0.20	153	0.64	3.7	3.65	514.95/515.00	102	256	250		52	6
1538	8	130		153	0.60	3.5	3.45	526.02	102	257	250		58	6
1618	3	140		153	0.37	2.1	2.13	536.59	103	253	247		61	4
1638	4	150		153	0.32	1.8	1.84	544.89	103	256	251		63	3
1638	5	160		153	0.28	1.3	1.27	552.62	103	253	248		57	3
1658/1705	6	170		153	0.48	4.0	4.04	559.04	103	256	253		58	3
1725	7	180	0.20	154	0.57	3.3	3.27	564.84	102	254	250		58	3
1725	8	190		154	0.44	2.5	2.52	575.13	102	250	249		56	3
1745	9	200		154	0.26	1.5	1.49	584.17	101	254	249		61	3
1745	10	210		154	0.23	1.3	1.32	591.12	101	258	253		56	3
1805	11	220		154	0.19	1.1	1.08	594.64	100	254	250		59	2
1805	12	230		154	0.16	0.91	0.91	605.56	100	253	251		59	2
AVERAGE	2464	240 min	0.20	152.7	0.567	1.94		185.66	102.04	250	250		268	MAX

VOLUME OR WEIGHT OF LIQUID	IMPINGER	SILICA GEL
WATER COLLECTED	VOLUME (ml) OR WEIGHT (g)	WEIGHT
FINAL	#1 476 344 #2 360 #3 180 #4 214.4	
INITIAL	5 100 100 86	
LIQUID COLLECTED	476 344 286 86	
TOTAL	COLLECTED (specify ml or g)	206.4

ORSAT DATA	TIME	CO ₂	O ₂
TRIAL 1			
TRIAL 2			
TRIAL 3			
Average			

LEAK CHECK	SYSTEM PRE: 1.001 CFM@15" Hg
	POST: 1.001 CFM@15" Hg
	PITOT PRE: 11-010 @ > 3" H ₂ O
	POST: 11-010 @ > 3" H ₂ O

Leak check at 2hr good
514.95 - 515.10



Company:
Location:
Source:
Run No.:

Valery
Panlsboro NJ
FCCU PGS
M29-3

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

8-30-07
↓
M29

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	<u>water</u>	<u>0</u>	<u>250 + 166</u>	<u>416</u>	
2	<u>water</u>	<u>0</u>	<u>250 + 149</u>	<u>299</u>	
3	<u>acidic H₂O</u>	<u>100</u>	<u>250 + 136</u>	<u>386</u>	
4	<u>"</u>	<u>100</u>	<u>186</u>	<u>86</u>	
5	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	
6	<u>Silica gel</u>	<u>200</u>	<u>219.4</u>	<u>19.4</u>	



FIELD DATA

202-1

PLANT	Valero	AMBIENT TEMPERATURE	78	PROBE HEATER SETTING	240	WEIGHT OF PARTICULATE, mg	
DATE	8/28/07	BAROMETRIC PRESSURE	30.12	HEATER BOX SETTING	240	Filter No.	30236
LOCATION	Tomball, TX	ASSUMED MOISTURE, %	18.0	METER Hg	1.85	Sample	
OPERATOR	BT	PROBE LENGTH, in.	72	C _p FACTOR	0.84	Final wt	
STACK NO.	FLC E45	NOZZLE DIAMETER, in.	0.309	Y _d FACTOR	1.002	Tare wt	597.4
RUN NO.	M202-1	STACK DIAMETER, in.	117	POT/OTHERM #	0554	Wt gain	
SAMPLE BOX NO.	Apek	MINUTES PER POINT	2.5			TOTAL	
METER BOX NO.	0503002	NUMBER OF PORTS	4				
START TIME	1031						

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (h) min.	STATIC PRESSURE (in. H ₂ O)	STACK TEMP (T _g) °F	VELOCITY HEAD (AP _h)	VELOCITY (ft/min)	PRESSURE DIFFERENTIAL ACROSS ORIFICE		GAS SAMPLE VOLUME (V _m) ft ³	GAS SAMPLE TEMP AT DRY GAS METER		COND. EXIT TEMP °F	SAMPLE BOX TEMP °F	Filter E _{4.5} SOURCE TEMP °F	LAST IMPINGER OUTLET TEMP °F	PUMP VACUUM in. Hg
							ACTUAL	METER DESIRED		INLET (T _{in}) °F	OUTLET (T _{out}) °F					
1031	N-1	0	0.15	149	0.51	0.51	3.1	3.14	758.073	85				216	64	8
1036	2	5		149	0.42		2.6	2.51	761.35	86				216	63	8
	3	5		149	0.37		2.3	2.28	763.60	86				216	63	8
	4	10		150	0.28		1.7	1.73	765.70	86				216	64	7
	5			149	0.24		1.5	1.48	767.55	86				214	64	7
	6			149	0.17		1.0	1.04	769.25	86				215	63	6
1046/51	w-1	15	0.15	149	0.50		3.1	3.08	770.70	86				219	64	8
	2			149	0.37		2.3	2.28	772.10	86				220	63	8
1054	3	20		149	0.28		1.7	1.73	774.22	86				221	60	6
	4			149	0.23		1.4	1.42	776.50	86				222	60	5
1101	5	25		150	0.17		1.1	1.05	777.75	87				225	60	4
	6			149	0.16		0.99	0.99	779.15	87				220	61	4
1101/24	5-1	30	0.25	149	0.55		3.4	3.39	780.55	85				220	64	8
	2			149	0.40		2.5	2.46	783.10	86				215	59	8
1134	3	35		149	0.30		1.9	1.85	785.30	86				216	57	6
	4			149	0.27		1.7	1.67	787.20	86				219	54	7
1139	5	40		149	0.23		1.4	1.42	789.50	86				218	53	7
	6			150	0.18		1.1	1.10	790.90	86				220	52	7
1144/52	E-1	45	0.25	150	0.51		3.1	3.14	792.795	87				220	49	7
	2			150	0.36		2.2	2.22	794.20	87				224	50	5
57	3	50		150	0.28		1.7	1.73	798.05	88				222	50	5
	4			150	0.26		1.2	1.23	800.00	88				218	51	4
1202	5	55		150	0.17		1.1	1.05	801.90	88				218	53	4
	6			150	0.14		0.98	0.88	802.50	88				218	53	4
1207							0.98	0.88	804.115							
AVERAGE		60	0.20	149.4	0.5400	0.5400	1.67		45.242	86.4						

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	#1	#2	#3	IMPINGER VOLUME (ml) OR WEIGHT (g)	SILICA GEL WEIGHT
INITIAL	337	575.5	110		218.6
FINAL	100.0	100.0	100.0		200.0
LIQUID COLLECTED	237	475.5	10		18.6
TOTAL				COLLECTED (specify ml or g)	417.6

Train purged 60 min @ 20 l/min 5%
313.6
310.6

LEAK CHECK	SYSTEM PRE: 0.001	CFM@15"Hg
	POST: 0.001	CFM@15"Hg
	PITOT PRE: 0.0	@ > 3"H ₂ O
	POST: 0.0	@ > 3"H ₂ O

Nezzle Cal
1 0.309
2 0.308
3 0.310
Avg 0.309

202-2



FIELD DATA

PLANT 16000 AMBIENT TEMPERATURE 80 PROBE HEATER SETTING 2240 WEIGHT OF PARTICULATE, mg 30237 A= B=

DATE 8-28-07 BAROMETRIC PRESSURE 30.07 HEATER BOX SETTING 2240 Filter No.

LOCATION Reels barn, NJ ASSUMED MOISTURE, % 18 METER H₂O 183 Sample

OPERATOR BR PROBE LENGTH, in. 72 C_p FACTOR 1.002 Final wt

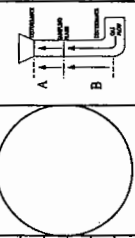
STACK NO. 1102-2 NOZZLE DIAMETER, in. 0.309 Y_d FACTOR 1.002 Tare wt 554.4

RUN NO. 1102-2 STACK DIAMETER, in. 117 PITOT/THERM # 654 Wt. gain

SAMPLE BOX NO. 1102-2 MINUTES PER POINT 2.5 TOTAL

METER BOX NO. 0505002 NUMBER OF PORTS 24

START TIME 1354 NUMBER OF POINTS 4



METER BOX NO. 0503002 START TIME 1354										NUMBER OF POINTS 24		NUMBER OF PORTS 4		PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H ₂ O		GAS SAMPLE VOLUME (V _m) ft ³		GAS SAMPLE TEMP AT DRY GAS METER (T _{mg}) °F		COND. EXIT TEMP °F		SAMPLE BOX TEMP °F		LAST IMPINGING OUTLET TEMP °F		PUMP VACUUM in. Hg	
CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (s)	STATIC PRESSURE (in. H ₂ O)	STACK TEMP (T _s) °F	VELOCITY HEAD (ΔP _s)	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H ₂ O		GAS SAMPLE VOLUME (V _m) ft ³	GAS SAMPLE TEMP AT DRY GAS METER (T _{mg}) °F		COND. EXIT TEMP °F	SAMPLE BOX TEMP °F	LAST IMPINGING OUTLET TEMP °F	PUMP VACUUM in. Hg													
						ACTUAL	DESIRED		INLET (T _{mg}) °F	OUTLET (T _{mg}) °F																	
1354	E-1	0	0.20	151	0.53	3.3	5.27	805.222	87	219	59																
1354	2			151	0.37	2.3	2.28	807.75	87	220	58																
1354	3	5		151	0.26	1.6	1.60	809.90	87	220	57																
	4			151	0.19	1.2	1.17	811.95	87	220	58																
1404	5	10		151	0.19	1.2	1.17	813.50	87	216	63																
	6			151	0.16	0.99	0.99	815.00	87	218	62																
1404/14	5-1	15	0.20	150	0.60	3.7	3.71	816.40	88	214	59																
	2			150	0.42	2.6	2.60	819.10	89	214	55																
1414	3	20		150	0.32	2.0	1.98	821.35	89	215	55																
	4			150	0.28	1.7	1.74	823.50	90	216	56																
1424	5	25		150	0.24	1.5	1.49	825.20	91	216	56																
	6			150	0.20	1.2	1.24	826.90	92	216	56																
1424/14	4-1	30	0.25	150	0.54	2.4	2.91	828.45	93	218	59																
	2			150	0.49	2.7	2.65	830.85	94	220	58																
1434	3	35		151	0.30	0.6	1.62	833.20	94	223	59																
	4			151	0.22	1.2	1.18	835.00	94	222	60																
1444	5	40		151	0.19	1.0	1.03	836.50	94	223	61																
	6			151	0.18	0.97	0.97	838.00	93	222	62																
1444/14	4-1	45	0.15	150	0.59	3.2	3.18	839.37	92	220	62																
	2			150	0.44	2.4	2.37	841.80	92	219	59																
1454	3	50		150	0.37	2.0	1.99	844.00	92	219	60																
	4			150	0.34	1.8	1.83	845.90	92	218	63																
1504	5	55		150	0.28	1.5	1.51	848.00	92	220	64																
	6			150	0.19	1.0	1.02	849.62	92	220	63																
1504														856.268													
AVERAGE														46.046	90.6												

SYSTEM PRE: 02.0001 CFM@15"Hg

POST: 0.005 CFM@15"Hg

PITOT PRE: 0.4 @ > 3"H₂O

POST: 0.4 @ > 3"H₂O

ORSAT DATA	TIME	CO ₂	O ₂
TRIAL 1			
TRIAL 2			
TRIAL 3			
Average	1950	1.21	

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g)	SILICA GEL WEIGHT
FINAL		
INITIAL		
LIQUID COLLECTED		
TOTAL		

Train purged for 60 min @ 201 L/min SV



FIELD DATA

PLANT: Valero AMBIENT TEMPERATURE: 70 PROBE HEATER SETTING: 240 WEIGHT OF PARTICULATE, mg: 30238

DATE: 8-28-07 BAROMETRIC PRESSURE: 30.12 HEATER BOX SETTING: 2240 Filter No.: 30238

LOCATION: Tomball, TX ASSUMED MOISTURE, %: 25 METER H₂O: 1.83 Sample: Final wt

OPERATOR: BP PROBE LENGTH, in.: 42 C₂ FACTOR: 0.84 Final wt: 553.1

STACK NO.: 1122-3 NOZZLE DIAMETER, in.: 0.309 Y₂ FACTOR: 1.002 Tare wt: 553.1

RUN NO.: 1122-3 STACK DIAMETER, in.: 11.7 PITO/THERM # 1122-3 Wt gain: 553.1

SAMPLE BOX NO.: 1122-3 MINUTES PER POINT: 2.5 TOTAL: 553.1

METER BOX NO.: 0503002 NUMBER OF POINTS: 24

START TIME: 1615 NUMBER OF PORTS: 4

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (h) min.	STATIC PRESSURE (in. H ₂ O)	STACK TEMP (T _s) °F	VELOCITY HEAD		GAS SAMPLE VOLUME (V _m) ft ³	PRESSURE DIFFERENTIAL ACROSS ORIFICE METER (ΔH) in. H ₂ O		GAS SAMPLE DRY GAS METER INLET (T _{inlet}) °F	GAS SAMPLE BOX TEMP. °F	COND. EXIT TEMP. °F	SORBENT METER TEMP. °F	LAST IMPINGER OUTLET TEMP. °F	PUMP VACUUM in. Hg
					(ΔP _s)	(√ΔP _s)		ACTUAL	DESIRED						
1615	N-1	0	0.20	150	0.55	0.74	868.068	2.47	2.47	94			212	62	7
1620	2	5		150	0.44	0.66	870.50	2.35	2.35	96			217	60	7
1625	3	10		150	0.34	0.58	872.70	1.85	1.85	97			217	58	6
1630	4	15		150	0.30	0.55	874.60	1.78	1.78	97			219	58	6
1635	5	20		150	0.24	0.49	876.50	1.31	1.31	98			220	57	6
1640	6	25		150	0.14	0.37	878.10	1.03	1.03	98			220	57	5
1645	W-1	30		150	0.55	0.74	879.50	3.0	3.0	99			216	64	8
1650	2	35		144	0.38	0.62	882.00	2.07	2.07	99			223	62	6
1655	3	40		144	0.32	0.57	884.00	1.75	1.75	99			222	62	6
1700	4	45		144	0.23	0.48	885.50	1.26	1.26	99			224	60	6
1705	5	50		144	0.17	0.41	887.50	0.93	0.93	100			225	60	6
1710	6	55		150	0.16	0.40	888.85	0.87	0.87	100			221	57	6
1715	S-1	30		144	0.60	0.77	890.20	3.28	3.28	100			220	65	7
1720	2	35		150	0.48	0.69	892.75	2.62	2.62	100			221	63	7
1725	3	40		150	0.52	0.72	895.00	2.84	2.84	99			220	62	6
1730	4	45		151	0.54	0.73	897.40	2.44	2.44	99			219	62	6
1735	5	50		151	0.30	0.55	899.80	1.63	1.63	99			218	63	5
1740	6	55		150	0.15	0.39	901.65	0.81	0.81	99			218	63	5
1745	E-1	45		150	0.56	0.75	902.90	3.04	3.04	97			215	64	7
1750	2	50		149	0.34	0.58	905.40	1.85	1.85	97			215	62	7
1755	3	55		150	0.28	0.53	907.50	1.52	1.52	97			215	61	5
1800	4	55		150	0.24	0.49	909.05	1.30	1.30	97			222	62	5
1805	5	55		150	0.20	0.45	910.65	1.09	1.09	96			220	61	4
1810	6	55		151	0.17	0.41	912.15	0.92	0.92	96			221	62	4
1815							913.435								
AVERAGE							45.367	18.77	18.77	97.6					

VOLUME OR WEIGHT OF LIQUID COLLECTED: 61 IMPINGER VOLUME (ml) OR WEIGHT (g): 149.9

WATER COLLECTED: 100 #1: 100 #2: 100 #3: 100 #4: 100

FINAL: 100 INITIAL: 100 LIQUID COLLECTED: 100 COLLECTED (specify ml or g): 100

TOTAL: 100

SILICA GEL WEIGHT: 4.50

ORSAT DATA: 18.77 CO₂: 19.08 O₂: 1.14

TIME: 19.08

LEAK CHECK: SYSTEM PRE: 0.001 CFM@15"Hg POST: 0.001 CFM@15"Hg

PITOT PRE: 0.001 @ > 3"H₂O POST: 0.001 @ > 3"H₂O

Train purged for 60 min @ 20 l/min SV

HCN-1



FIELD DATA

PLANT 1660 AMBIENT TEMPERATURE 85 PROBE HEATER SETTING 250 A= B=

DATE 8-29-07 BAROMETRIC PRESSURE 30.09 HEATER BOX SETTING 250

LOCATION Penigoro NJ ASSUMED MOISTURE, % 2.5 METER H₂O 1.69

OPERATOR B. Barten PROBE LENGTH, in. 60 C_p FACTOR 0.84

STACK NO. PCCEG-3 NOZZLE DIAMETER, in. 0.311 Y_d FACTOR 0.969

RUN NO. 117 STACK DIAMETER, in. 11.3 PITOT/THERM # 621

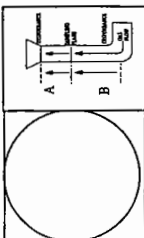
SAMPLE BOX NO. APEX MINUTES PER POINT 2.5

METER BOX NO. 508128 NUMBER OF POINTS 24

START TIME 1300 NUMBER OF PORTS 4

WEIGHT OF PARTICULATE, mg

Filter No.	Sample	Final wt	Tare wt	Wt. gain
				TOTAL



METER BOX NO.		NUMBER OF POINTS		NUMBER OF PORTS		PRESSURE DIFFERENTIAL ACROSS ORIFICE		GAS SAMPLE VOLUME		GAS SAMPLE TEMP AT DRY GAS METER		SAMPLE BOX TEMP.	AUX COND. EXIT TEMP.	LAST IMPINGER OUTLET TEMP.	PUMP VACUUM
CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (s)	STATIC PRESSURE (in. H ₂ O)	STACK TEMP (T _s) (°F)	VELOCITY HEAD (ΔP _s) (in. H ₂ O)	VELOCITY (ft/min)	METER (ΔH) in. H ₂ O	GAS SAMPLE VOLUME (V _m) (ft ³)	DRY GAS METER INLET (T _{m1}) (°F)	DRY GAS METER OUTLET (T _{m2}) (°F)	SAMPLE BOX TEMP. (°F)	AUX COND. EXIT TEMP. (°F)	LAST IMPINGER OUTLET TEMP. (°F)	PUMP VACUUM in. Hg	
1300	N1	0	10.20	146	0.62	0.57	3.2	0.59	84	86	273	264	59	13	
1305	2	5		146	0.37	0.37	2.9	62.41	93	88	277	281	52	13	
1310	3	5		146	0.37	0.37	1.9	64.72	93	88	275	278	51	13	
1315	4	10		147	0.32	0.32	1.6	66.96	93	88	270	271	54	7	
1318	5	15		147	0.30	0.30	1.5	68.62	93	88	270	267	55	7	
1323	6	20		146	0.41	0.41	2.1	70.46	94	88	273	268	53	3	
1328	1	25		146	0.33	0.33	1.7	71.65	95	88	271	266	50	12	
1333	2	30		146	0.25	0.25	1.3	73.87	96	88	252	266	53	8	
1338	3	35		146	0.21	0.21	1.0	76.01	96	89	253	264	54	6	
1343	4	40		146	0.20	0.20	1.0	79.72	97	89	250	262	55	6	
1348	5	45		146	0.26	0.26	1.3	81.28	98	89	250	258	55	5	
1353	6	50		146	0.60	0.60	3.1	82.80	99	90	253	253	60	14	
1358	1	55		146	0.49	0.49	2.5	85.32	94	96	253	258	56	13	
1403	2	60		146	0.36	0.36	1.8	87.73	93	90	253	258	54	9	
1408	3	65		146	0.35	0.35	1.8	89.79	93	90	246	250	56	9	
1413	4	70		146	0.26	0.26	1.3	91.90	93	96	251	249	55	7	
1418	5	75		146	0.26	0.26	1.3	93.54	94	90	253	248	55	7	
1423	6	80		146	0.52	0.52	2.6	95.60	92	89	250	242	64	12	
1428	1	85		146	0.37	0.37	1.9	97.97	92	89	250	243	53	8	
1433	2	90		146	0.30	0.30	1.5	99.94	92	89	249	243	54	7	
1438	3	95		146	0.24	0.24	1.2	101.67	94	89	250	241	56	6	
1443	4	100		146	0.23	0.23	1.2	103.31	95	88	250	239	56	6	
1448	5	105		146	0.23	0.23	1.1	104.92	96	89	250	237	56	6	
1453	6	110		146	0.21	0.21	1.1	106.777							
AVERAGE	24pts	60min	0.20	146.2	0.575	0.575	142.2	47.607	91.2				≤68	≤14	

VOLUME OR WEIGHT OF LIQUID

WATER COLLECTED	IMPINGER VOLUME (ml) OR WEIGHT (g)	SILICA GEL WEIGHT
#1	#2	#4
228	170	102
0	100	112
228	70	100
	62	12
TOTAL	COLLECTED (specify ml or g)	

LEAK CHECK

SYSTEM PRE: 0.001 CFM@15" Hg

POST: 0.001 CFM@15" Hg

PITOT PRE: 1-01 @ > 3" H₂O

POST: 1-01 @ > 3" H₂O

321.8



Company:
Location:
Source:
Run No.:

Valero
Paulsboro, NJ
PCU FGS
~~67A-033~~ HCN-1

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

8-29-07
"
"
CTM-033
NA
NA

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	<u>empty</u>	<u>0</u>	<u>228</u>	<u>228</u>	<u>30697</u>
2	<u>pH < 9.5 NaOH soln</u>	<u>100</u>	<u>170</u>	<u>70</u>	<u>30697</u>
3	<u>pH 11 "</u>	<u>100</u>	<u>~~162~~ 162</u>	<u>2</u>	<u>30697</u>
4	<u>pH > 12 "</u>	<u>100</u>	<u>112</u>	<u>12</u>	<u>30697</u>
5	<u>SG.</u>	<u>200</u>	<u>209.8</u>	<u>9.8</u>	<u>---</u>
6				<u>321.8</u>	



HCN-2

FIELD DATA

PLANT	Valero	AMBIENT TEMPERATURE	91
DATE	8-29-07	BAROMETRIC PRESSURE	30.00
LOCATION	Paulsboro NJ	ASSUMED MOISTURE, %	25
OPERATOR	R. Burton	PROBE LENGTH, in.	60
STACK NO.	FG-5	NOZZLE DIAMETER, in.	0.311
RUN NO.	HCN-2	STACK DIAMETER, in.	11.7
SAMPLE BOX NO.	APFK	MINUTES PER POINT	2.5
METER BOX NO.	508125	NUMBER OF POINTS	24
START TIME	1503	NUMBER OF PORTS	4

WEIGHT OF PARTICULATE, mg	
Filter No.	250
Sample	250
Final wt	1.69
Tare wt	0.82
Wt. gain	0.869
TOTAL	
0.821	

PROBE HEATER SETTING 250
HEATER BOX SETTING 250
METER H₂O 1.69
C_p FACTOR 0.82
Y_d FACTOR 0.969
P/TOT/TERM # 621

PRESSURE DIFFERENTIAL ACROSS ORIFICE METER										GAS SAMPLE VOLUME (V _m) ft ³		GAS SAMPLE TEMP AT DRY GAS METER (T _{mg}) °F		SAMPLE BOX TEMP. °F	COND. EXIT TEMP. °F	CORRECTED MODULE TEMP. °F	LAST IMPINGER OUTLET TEMP. °F	PUMP VACUUM in. Hg
ACTUAL (ΔH) in. H ₂ O		DESIRED		VELOCITY HEAD (ΔP _s) (ft/s)		STACK TEMP (T _s) °F		STATIC PRESSURE (in. H ₂ O)		SAMPLING TIME (s) min.		TRAVERSE POINT NUMBER						
24																		
4																		
508/25																		
1505																		
1505	1	0	0.20	146	0.54	2.8	2.77	107.600	90	89	241	206	249	57	14			
1510	2	5		145	0.41	2.1	2.10	109.33	92	89	244	214	248	53	13			
1510	3	5		145	0.31	1.6	1.59	111.37	94	89	244	229	257	52	13			
1520	4	10		145	0.25	1.3	1.28	113.37	96	89	242	245	255	54	10			
1520	5	10		145	0.20	1.0	1.03	115.30	97	90	258	259	255	55	7			
1524	6	15		145	0.18	0.92	0.92	116.94	98	90	259	268	256	56	6			
1524	1	15		145	0.71	3.6	3.64	118.24	98	92	257	269	263	56	15			
1524	2	15		145	0.47	2.3	2.31	119.66	99	92	260	272	261	52	14			
1529	3	20		145	0.38	2.0	1.95	123.01	99	93	256	273	260	53	13			
1534	4	20		146	0.30	1.5	1.54	125.06	99	93	248	271	258	53	9			
1534	5	25		146	0.28	1.4	1.44	126.89	100	94	249	266	260	54	9			
1546	6	30		146	0.24	1.2	1.23	128.62	102	94	252	262	260	55	8			
1546	1	30		145	0.53	2.7	2.72	130.23	98	95	251	237	261	58	14			
1546	2	30		145	0.41	2.1	2.10	132.10	100	95	249	253	248	55	15			
1546	3	25		146	0.29	1.5	1.49	134.57	100	95	247	273	258	53	12			
1546	4	40		146	0.26	1.3	1.33	136.21	101	95	242	272	257	54	12			
1550	5	40		146	0.20	1.0	1.03	136.41	101	95	246	274	253	57	9			
1550	6	40		146	0.16	0.82	0.82	139.62	102	96	248	276	253	57	7			
1611	1	45		145	0.60	3.0	3.08	141.80	99	96	251	272	260	61	14			
1611	2	45		145	0.44	2.3	2.26	144.81	100	97	255	285	261	55	13			
1616	3	50		145	0.34	1.8	1.76	146.94	101	97	254	287	260	54	13			
1616	4	50		146	0.31	1.6	1.60	149.01	101	97	253	283	260	55	13			
1621	5	55		146	0.28	1.5	1.45	150.97	100	97	253	278	260	56	13			
1621	6	55		145	0.22	1.1	1.14	152.03	99	97	252	277	253	58				
1626																		
AVERAGE	24	60	0.20	145.4	0.29	1.7	1.70	154.54	99	97	252	277	253	58				
										AUG (96.1)						≤ 68	≤ 15	

VOLUME OR WEIGHT OF LIQUID		IMPINGER		SILICA GEL	
WATER COLLECTED	#1	VOLUME (ml) OR WEIGHT (g)	#2	WEIGHT	#4
FINAL	230	156	108	106	208.3
INITIAL	0	136	132	120	200
LIQUID COLLECTED	230	56	5	6	9.3
TOTAL	230	230	230	230	230

Leak check - 0.0012 pie - 0.0012
141.460
142.500
-1.04 ft³

LEAK CHECK	
SYSTEM PRE: 0.0012	CFM@15"Hg
POST: 0.0012	CFM@15"Hg
PITOT PRE: 1/1-02	@ > 3"H ₂ O
POST: 1/1-02	@ > 3"H ₂ O



Company:
Location:
Source:
Run No.:

Valero
Paulsboro, NJ
FCCU F65
HCVN-2

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

8-29-07
"
"
CTM-033
NA
NA

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	<u>water</u>	<u>0</u>	<u>230</u>	<u>230</u>	<u>30658</u>
2	<u>pH 4 NaOH soln</u>	<u>100</u>	<u>156</u>	<u>56</u>	<u> </u>
3	<u>pH 12 NaOH soln</u>	<u>0</u>	<u>108</u>	<u>8</u>	<u> </u>
4	<u>pH 14 NaOH soln</u>	<u>100</u>	<u>106</u>	<u>6</u>	<u> </u>
5		<u>0</u>	<u>0</u>	<u>0</u>	<u> </u>
6	<u>Silver gel</u>	<u>200</u>	<u>209.3</u>	<u>9.3</u>	<u> </u>

3093

HCN-3

FIELD DATA

[illegible]

CLOCK TIME	TRAVERSE POINT NUMBER	SAMPLING TIME (S) min.	STATIC PRESSURE (in. H ₂ O)	STACK TEMP. (°F)	VELOCITY		PRESSURE DIFFERENTIAL ACROSS ORIFICE		GAS SAMPLE VOLUME (V _{ST}) ft ³	GAS SAMPLE TEMP AT DRY GAS METER		SAMPLE BOX TEMP. °F	COND. EXIT °F	SORBENT MODULE TEMP. °F	LAST IMPINGING OUTLET TEMP. °F	PUMP VACUUM in. Hg
					(AF)	HEAD (AF)	ACTUAL (AH) in. H ₂ O	METER DESIRED		INLET (T _{inlet}) °F	OUTLET (T _{outlet}) °F					
1744	145	0	0.17	145	0.41	0.52	3.6	3.87	158.400	87	85	252	251	253	66	1
1802	145	5	0.17	145	0.41	0.52	3.6	3.87	158.400	87	85	252	251	253	66	1
1802	145	10	0.17	145	0.41	0.52	3.6	3.87	158.400	87	85	252	251	253	66	1
1802	145	15	0.17	145	0.41	0.52	3.6	3.87	158.400	87	85	252	251	253	66	1
1802	145	20	0.17	145	0.41	0.52	3.6	3.87	158.400	87	85	252	251	253	66	1
1802	145	25	0.17	145	0.41	0.52	3.6	3.87	158.400	87	85	252	251	253	66	1
1802	145	30	0.17	145	0.41	0.52	3.6	3.87	158.400	87	85	252	251	253	66	1
1802	145	35	0.17	145	0.41	0.52	3.6	3.87	158.400	87	85	252	251	253	66	1
1802	145	40	0.17	145	0.41	0.52	3.6	3.87	158.400	87	85	252	251	253	66	1
1802	145	45	0.17	145	0.41	0.52	3.6	3.87	158.400	87	85	252	251	253	66	1
1802	145	50	0.17	145	0.41	0.52	3.6	3.87	158.400	87	85	252	251	253	66	1
1802	145	55	0.17	145	0.41	0.52	3.6	3.87	158.400	87	85	252	251	253	66	1
1802	145	60	0.17	145	0.41	0.52	3.6	3.87	158.400	87	85	252	251	253	66	1

AVERAGE	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

VOLUME OR WEIGHT OF LIQUID WATER COLLECTED	IMPINGER				SILICON GEL WEIGHT	ORSALT DATA	TIME	CO ₂	O ₂
	#1	#2	#3	#4					
FINAL	205	163	118	45	205.5				
INITIAL	0	100	100	100	200				
LIQUID COLLECTED	205	63	118	55				19.81	0.99

Press 14742 - Leak Net
 3.456
 LEAK CHECK 0.001
 SYSTEM PRE: 0.001 CFM @ 15" Hg
 POST: 0.015 CFM @ 15" Hg
 PITOT PRE: 1/2 - 2 @ > 3" H₂O
 POST: 1/2 - 2 @ > 3" H₂O

TOTAL	COLLECTED (specify ml or g)
367.8	367.8

158,400 - 159,730 ^{test} 161,080 - 162,240 ^{test} 164,346 ^{test} 165,600

IMPINGER RECOVERY DATA SHEET



Company:
Location:
Source:
Run No.:

Valley
Pandora NJ
FCCU P&S
HCU-3

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

8-29-07
11
11
CTM-033
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	<u>water</u>	<u>0</u>	<u>208</u>	<u>208</u>	<u>30702</u>
2	<u>pH 10.5 NaOH soln</u>	<u>100</u>	<u>168</u>	<u>68</u>	
3	<u>pH 12 NaOH soln</u>	<u>100</u>	<u>118</u>	<u>18</u>	
4	<u>pH 14 NaOH soln</u>	<u>100</u>	<u>95</u>	<u>-5</u>	
5		<u>0</u>	<u>10</u>	<u>10</u>	
<u>856</u>	<u>Silica Gel</u>	<u>200</u>	<u>208.8</u>	<u>8.8</u>	

307.8



28

VOST-1A

FIELD DATA SHEET

Plant: Vacuum PB
 Date: 8/30/07
 Location: Rawlsboro, NJ
 Source: FLLV F645
 Run No.: VOST-1A
 Operators: BP
 Comments:

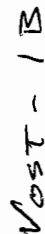
Meter No.: 703006
 Y Factor: 1.000
 Trap Contents: Sorbent tubes
 USEPA Method: SW-846 8031
 Compound Analysis: Benzene
 Spike in Trap (Y/N): N

Ambient Temperature: 85
 Barometric Pressure: 29.97
 Stack Diameter: 117
 Pre-test Leak Check: OK (0.002)
 Post-test Leak Check: OK (0.002)
 Probe Temp: 266

Vacuum

Clock Time	Sampling Time (min)	Meter Pressure mm(H ₂ O)	Gas Sample Rate (liters/min)	Gas Sample Volume (Vm liters)	Gas Meter Temperature Inlet (°F)	Gas Meter Temperature Outlet in H ₂ (°F)
0921	0	20	0.5	0.000	95	4
0931	5	22	0.5	2.47	96	4
0939	10	25	0.5	5.89	99	4
0944	15	25	0.5	7.45	99	5
0949	20	26	0.5	9.85	100	5
0954	25	26	0.5	12.15	100	6
0959	30	26	0.5	14.75	100	6
1004	35	26	0.5	17.10	100	6
1009	40			19.202		
		24.5 mm H ₂ O	0.5	19.202	98.6	
		0.96" H ₂ O				

Sample #
 1) 30710
 2) 30721
 3) 30712



FIELD DATA SHEET

Tube #	Sample #
1	30714
2	30715
3	30716

Ambient Temperature:	85
Barometric Pressure:	29.97
Stack Diameter:	11.7
Pre-test Leak Check:	OK (0.004)
Post-test Leak Check:	OK (0.004)
Probe Temp	266

Meter No.:	100196
Y Factor:	1.009
Trap Contents:	Sorbent Tubes
USEPA Method:	0031
Compound Analysis:	Benzene
Spike in Trap (Y/N):	N

Clock Time	Sampling Time (min)	Meter Pressure mm H ₂ O	Gas Sample Rate (liters/min)	Gas Sample Volume (Vm liters)	Gas Meter Temperature Inlet (°F)	Gas Meter Temperature Outlet <i>m</i> H ₂ (°F)
1019	0	12	0.5	0.000	78	4
1024	5	15	0.5	2.55	81	4
1029	10	15	0.5	5.10	84	5
1034	15	17	0.5	7.20	86	7
1039	20	20	0.5	9.65	86	7
1044	25	20	0.5	12.45	87	7
1049	30	20	0.5	15.0	88	8
1054	35	20	0.5	17.60	90	8
1059	40			20.075		
		17.4 mm H ₂ O	0.5	20.075	85.0	
		0.68" H ₂ O				
B-20						



POST-1C

Tube # Sample #
1 30719
2 30720
3 30721

FIELD DATA SHEET

Plant: Valero PB
Date: 8/30/07
Location: Pawlsboro, NJ
Source: Fluor F&S
Run No.: Post-1C
Operators: BP
Comments:

Meter No.: 100196
Y Factor: 1.009
Trap Contents: Seabart Tubes
USEPA Method: SW-846 8831
Compound Analysis: Benzene
Spike in Trap (Y/N): N

Ambient Temperature: 82
Barometric Pressure: 29.97
Stack Diameter: 117
Pre-test Leak Check: OK (0.002)
Post-test Leak Check: OK (0.004)
Probe Temp: 266

Clock Time	Sampling Time (min)	Meter Pressure in (in. H ₂ O)	Gas Sample Rate (liters/min)	Gas Sample Volume (V _m liters)	Gas Meter Temperature	
					Inlet (°F)	Outlet (°F)
1106	0	15	0.5	0.000	92	6
1111	5	12	0.5	2.80	93	6
1116	10	12	0.5	5.25	94	6
1121	15	12	0.5	7.45	94	6
1126	20	14	0.5	9.90	95	7
1131	26	15	0.5	12.50	96	7
1136	30	15	0.5	15.10	97	8
1141	35	15	0.5	17.65	97	8
1146	40			20.169		
	45					
		13.8 mm H ₂ O	0.5	20.169	94.8	
		0.54 inches H ₂ O				



Vost-ZA

Plant: Valero PB

100196

Ambient Temperature:

Date: 8/30/07

Y Factor:

1.009

Location: Pavlsboro, NJ

Trap Contents:

Incubent Tubes

Source: Full FGS

~~USEPA Method:~~

W-846 0031

Run No.: Vact-2A

Compound Analysis:

2000

Operators: BP

Spike in Trap (Y/N):

Comments:

[illegible]



Valero TB
8/30/07
Paulsboro, NJ
Fav Fls
Lost - 2b
BP

Meter No.: 100196
Y Factor: 1.009
Trap Contents: Sorbent Tubes
USEPA Method: SW-846 8031
Compound Analysis: Benzene
Spike in Trap (Y/N): N

Ambient Temperature:	85 35
Barometric Pressure:	29.91
Stack Diameter:	11.7
Pre-test Leak Check:	OK (0.004)
Post-test Leak Check:	OK (0.004)
probe temp	266 °F

Tube #	Sample #
1	29041
2	29042
3	29043

$V_{OST} - ZB$

FIELD DATA SHEET

Vacuum



West-2c

FIELD DATA SHEET

Tube #
1
2
3

Sample #
29047
29048
29049

Plant: Valero TB
Date: 8/30/07
Location: Paulsboro, NJ
Source: Fluor Labs
Run No.: West-2c
Operators: BP
Comments:

Meter No.: 100196
Y Factor: 1.009
Trap Contents: Sorbent tubes
USEPA Method: SW-846 8031
Compound Analysis: Benzene
Spike in Trap (Y/N): N

Ambient Temperature: 82
Barometric Pressure: 29.88
Stack Diameter: 11.7
Pre-test Leak Check: OK (0.002)
Post-test Leak Check: Probe temp 266°F

Vacuum

Clock Time	Sampling Time (min)	Meter Pressure mm(~~Hg~~) H ₂ O	Gas Sample Rate (liters/min)	Gas Sample Volume (Vm liters)	Gas Meter Temperature Inlet (°F)	Gas Meter Temperature Outlet (°F)
1501	0	15	0.5	0.000	95	4
1506	5	15	0.5	2.00	95	5
1511	10	15	0.5	5.10	95	5
1516	15	15	0.5	8.60	95	5
1521	20	15	0.5	10.00	96	5
1526	25	15	0.5	12.45	96	5
1531	30	15	0.5	15.05	97	5
1536	35	15	0.5	17.50	97	5
1541	40			20.212		
		15 mm H ₂ O	0.5	20.212	95.8	
		0.59 inches Hg				
B-33						



B-34

VOST-3A

FIELD DATA SHEET

Tube # Sample #
1 29051
2 29052
3 29053

Plant: Valero TB
Date: 8/30/07
Location: Pawtucket, NJ
Source: FUV Flas
Run No.: Vost-3a
Operators: BP
Comments:

Meter No.: 100196
Y Factor: 1.009
Trap Contents: Seabent tubes
USEPA Method: SW-846 8031
Compound Analysis: Benzene
Spike in Trap (Y/N): N

Ambient Temperature: 82
Barometric Pressure: 29.88
Stack Diameter: 117
Pre-test Leak Check: OK (0.002)
Post-test Leak Check:
Probe temp: 266 F

Clock Time	Sampling Time (min)	Meter Pressure mm H ₂ O	Gas Sample Rate (liters/min)	Gas Sample Volume (Vm liters)	Gas Meter Temperature Inlet (°F)	Gas Meter Temperature Outlet in H ₂ (°F)
1558	0	15	0.5	0.000	97	7
1603	5	15	0.5	2.40	97	7
1608	10	15	0.5	5.15	98	7
1613	15	15	0.5	7.40	98	7
1618	20	15	0.5	10.15	99	8
1623	25	15	0.5	12.40	99	8
1628	30	15	0.5	15.15	100	8
1633	35	15	0.5	17.55	101	8
1638	40			21.046		
		15 mm H ₂ O	0.5	21.046	98.6	
		0.59 inches H ₂ O				



Vost-3B

FIELD DATA SHEET

Plant: Valero Refinery
Date: 01/30/07
Location: Paulsboro, NJ
Source: Fuel Gas
Run No.: Vost-3B
Operators: BP
Comments:

Meter No.: 100196
Y Factor: 1.009
Trap Contents: Sorbent tubes
USEPA Method: SW-846 8231
Compound Analysis: Benzene
Spike in Trap (Y/N): N

Tube # 1 Sample # 29054
2 29056
3 29057
Ambient Temperature: 80
Barometric Pressure: 29.85
Stack Diameter: 117
Pre-test Leak Check: OK (0.004)
Post-test Leak Check: OK (0.002)
probe temp: 266°F

Clock Time	Sampling Time (min)	Meter Pressure mm(H ₂ O)	Gas Sample Rate (liters/min)	Gas Sample Volume (Vm liters)	Gas Meter Temperature Inlet (°F)	Gas Meter Temperature Outlet Inlet (°F)
1646	0	16	0.5	0.000	98	8
1651	5	16	0.5	2.45	99	8
1656	10	16	0.5	5.00	101	8
1701	15	17	0.5	7.40	101	9
1706	20	17	0.5	9.85	101	9
1711	25	17	0.5	12.30	101	9
1716	30	17	0.5	15.05	101	9
1721	35	17	0.5	17.55	101	9
1726	40	17		19.998		
		16.63 mm H ₂ O	0.5	19.998	100.4	
		0.65 inches H ₂ O				
B-35						



FIELD DATA SHEET

Tube #	Sample #
1	29060
2	29061
3	29062

Meter No.:	100196
Y Factor:	1.009
Trap Contents:	Sorbent Tubes
~~USEPA~~ Method:	SW-846 0031
Compound Analysis:	Benzene
Spike in Trap (Y/N):	N

Ambient Temperature:	77
Barometric Pressure:	29.78
Stack Diameter:	117
Pre-test Leak Check:	OK (0.002)
Post-test Leak Check:	OK (0.002)
Probe Temp:	266 °F

Vaccuum



Valero Refining Company - New Jersey
Source: FCCU Scrubber Stack
Test Dates: 8/28 - 8/30/07

APPENDIX C

Laboratory Data



CleanAir®

CleanAir Engineering, Inc.

500 West Wood Street

Palatine, IL 60067

Laboratory Report

CleanAir Project No: 28,166

Analytes

Particulate Matter

Applicable Analytical Method

U.S. EPA Methods 5/202/NJATM1

NJATM 1

Customer

ARI Environmental, Inc.

951 Old Rand Road, Unit 106

Wauconda, IL 60084

Analysis Case Narrative

Gravimetrics Analysis

Client	ARI Environmental, Inc.	Project Number	28,166	Analyst	Douglas D. Rhoades
Plant	Valero PB	Unit	Belco Scrubber	Balance	Ohaus AP250/GA200D
Test Date	Aug 2007	Method	U.S. EPA Methods 5/202/NJATM1		

Summary of Analysis

This report summarizes the results of analysis performed on samples received on: 09/06/07
The samples were analyzed in accordance with procedures in accordance with the EPA Methods listed above.

Detection Limits

Detection limits have been determined in accordance with procedures in 40 CFR 136, Appendix B, and in accordance with procedures outlined in CleanAir SOP EPA5-11. Documentation showing the determination of detection limits are included with this report.

Sample Preparation

Filters were placed in a desiccator for a minimum of twenty-four hours prior to analysis.
Front half acetone rinses were evaporated in tared teflon bags and placed in a desiccator for a minimum of twenty-four hours prior to analysis.
Back half inorganic fractions were tested for pH in accordance with EPA Method 202. For any samples where the pH fell below 4.5, a 10 ml aliquot was extracted and saved for sulfate content to be determined. The samples were then extracted with methylene chloride in accordance with EPA Method 202 and evaporated in an oven until dryness. Approximately 100 ml of DI water was then added in order to allow titration of sulfates present with ammonium hydroxide using a phenolphthalein indicator. The samples were then again evaporated to dryness and placed into a desiccator for a minimum of twenty-four hours prior to analysis.
Back half organic extractions were performed in accordance with U.S. EPA Method 202 using methylene chloride. The first extraction is performed with the methylene chloride impinger rinse. A minimum of two more extractions are performed using 75 ml portions of methylene chloride. These rinses are placed into tared teflon bags and evaporated at ambient temperature. They are then placed in a desiccator for a minimum of twenty-four hours prior to analysis.

Analysis QA/QC

Following initial desiccation, each sample was weighed to a constant weight. This is performed with a minimum of six hours between weighings. A constant weight is defined as a difference of no more than the greater of 0.5 mg or 1% of the total weight gain (net weight). All tare weights for filters and teflon bags were recorded in similar manners.

Each analytical balance is calibrated using three Class 1 weights on a daily basis. Periodic calibrations are also performed if the analyst believes they're required.

A copy of balance calibration data are included with this report.

Additional Comments

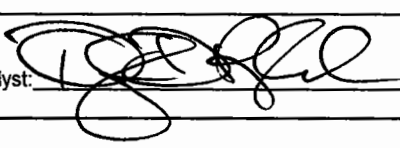
Filter tare weight were supplied by the customer.

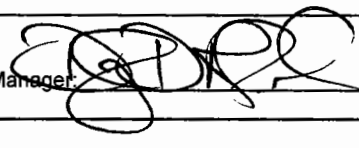
A 10 ml aliquot was extracted from the inorganic back half fractions for ion chromatography analysis. This is why there are two volumes listed for these samples on the weight sheet. The first volume is the original sample volume. The second volume is the volume minus the 10 ml aliquot.

Certificate of Analysis
Gravimetrics Analysis

Client	Environmental, Inc.	Project Number	28,166	Analyst	Douglas D. Rhoades
Plant	Valero PB	Unit	Belco Scrubber	Balance	Ohaus AP250/GA200D
Test Date	Aug 2007	Method	U.S. EPA Methods 5/202/NJATM1		

Identifier	Sample Location	Run Number	Sample volume (ml)	Aliquot used (ml)	Tare weight (g)	Gross weight (g)	Net weight (g)
30242	Belco Scrubber	Blank				0.55311	0.0004
30236	Belco Scrubber	1				0.66315	0.1108
30237	Belco Scrubber	2				0.66691	0.1125
30238	FCCU FGS	3				0.64650	0.0934
501	Belco Scrubber	Blank	220		4.19172	4.19308	0.00136
503	Belco Scrubber	0	175		4.06523	4.06858	0.00335
510	Belco Scrubber	2	220		4.10722	4.11659	0.00937
511	FCCU FGS	3	200		4.01715	4.02025	0.00310
506	Belco Scrubber	Blank	630	620	3.96857	4.00310	0.03453
502	Belco Scrubber	1	660	650	4.01535	4.05002	0.03467
508	Belco Scrubber	2	600	590	4.23015	4.26883	0.03868
509	FCCU FGS	3	590	580	3.87771	3.93054	0.05283
512	Belco Scrubber	Blank	400		4.15684	4.18210	0.02526
507	Belco Scrubber	1	400		4.02081	4.02117	<0.00106
504	Belco Scrubber	2	400		3.88841	3.90881	0.02040
505	FCCU FGS	3	400		4.05694	4.07615	0.01921

Analyst: 

Laboratory Manager: 

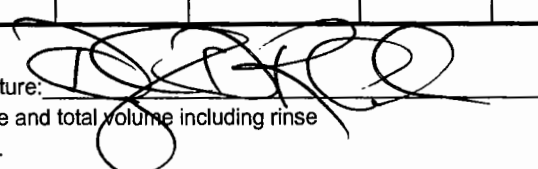
Particulate Testing Weight Sheet

Page 2 of 3

Client	ARI Environmental, Inc.	Project Number	28166	Analyst	Douglas D. Rhoades
Plant	Valero PB	Unit	Belco Scrubber	Balance	Ohaus AP250/GA200D
Test Date	Aug-07	Method	EPA Methods 5/202/NJATM1		

Description	I.D. and Sample Description*	Sample volume (ml)**	Date/Time	Gross Weight (g)	Tare Weight (g)	Date/Time	Net Weight (g)
Type Glass Fiber Filter	30242	Filter	9/17 08:15	0.55285	0.5527		
Run Blank	Clean		9/18 11:15	0.55311			
Location Belco Scrubber	-01			0.55311	0.5527		0.0004
Type Glass Fiber Filter	30236	Filter	9/21 08:15	0.66310	0.5524		
Run 1	Slight Residue		9/24 16:00	0.66315			
Location Belco Scrubber	-02			0.66315	0.5524		0.1108
Type Glass Fiber Filter	30237	Filter	9/20 16:15	0.66677	0.5544		
Run 2	Brown Residue		9/24 16:00	0.66691			
Location Belco Scrubber	-03			0.66691	0.5544		0.1125
Type Glass Fiber Filter	30238	Filter	9/24 09:15	0.64704	0.5531		
Run 3	Brown Residue		9/24 18:00	0.64650			
Location FCCU FGS	-04			0.64650	0.5531		0.0934
Type F1/2 Acetone	501	PTFE Bag	9/24 91:58	4.19301	4.19222	9/20 10:15	
Run Blank	Clean		9/24 18:00	4.19308	4.19172	9/21 16:15	
Location Belco Scrubber	-05			4.19308	4.19172		0.00136
Type F1/2 Acetone	503	PTFE Bag	9/24 91:58	4.06862	4.06545	9/20 10:15	
Run 1	Brown Particulate		9/24 18:00	4.06858	4.06523	9/21 16:15	
Location Belco Scrubber	-06			4.06858	4.06523		0.00335
Type F1/2 Acetone	510	PTFE Bag	9/24 91:58	4.11688	4.10732	9/20 10:15	
Run 2	Brown Particulate		9/24 18:00	4.11659	4.10722	9/21 16:15	
Location Belco Scrubber	-07			4.11659	4.10722		0.00937
Type F1/2 Acetone	511	PTFE Bag	9/24 91:58	4.02016	4.01754	9/20 10:15	
Run 3	Brown Particulate		9/24 18:00	4.02025	4.01715	9/21 16:15	
Location FCCU FGS	-08			4.02025	4.01715		0.00310
Type							
Run							
Location							
Type							
Run							
Location							

*Description of Particulate

Analyst Signature: 

** Two volumes (e.g. 100/125) indicate sample volume and total volume including rinse
Indicate (T)himbale, (F)ilter, or (B)eaker in box below.

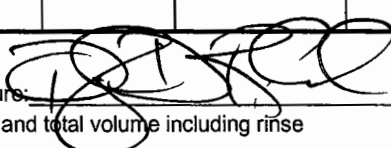
Particulate Testing Weight Sheet

Page 3 of 3

Client	ARI Environmental, Inc.	Project Number	28166	Analyst	Douglas D. Rhoades
Plant	Valero PB	Unit	Belco Scrubber	Balance	Ohaus AP250/GA200D
Test Date	Aug-07	Method	EPA Methods 5/202/NJATM1		

Description	I.D. and Sample Description*	Sample volume (ml)**	Date/Time	Gross Weight (g)	Tare Weight (g)	Date/Time	Net Weight (g)
Type B1/2 Water	506	630	9/27 14:00	4.00320	3.96831	9/21 09:15	
Run Blank	Gray PM - pH = 3.40	620	9/28 13:30	4.00310	3.96857	9/21 16:15	
Location Belco Scrubber	-09	PTFE Bag		4.00310	3.96857		0.03453
Type B1/2 Water	502	660	9/27 14:00	4.05015	4.01528	9/21 16:15	
Run 1	Gray PM - pH = 3.16	650	9/28 13:30	4.05002	4.01535	9/23 14:30	
Location Belco Scrubber	-10	PTFE Bag		4.05002	4.01535		0.03467
Type B1/2 Water	508	600	9/27 14:00	4.26889	4.23009	9/21 09:15	
Run 2	Black PM - pH = 2.96	590	9/28 13:30	4.26883	4.23015	9/23 14:30	
Location Belco Scrubber	-11	PTFE Bag		4.26883	4.23015		0.03868
Type B1/2 Water	509	590	9/27 14:00	3.93065	3.87723	9/21 16:00	
Run 3	Black PM - pH = 3.07	580	9/28 13:30	3.93054	3.87771	9/23 14:30	
Location FCCU FGS	-12	PTFE Bag		3.93054	3.87771		0.05283
Type B1/2 MeCl	512	400	9/27 14:00	4.18210	4.15637	9/21 08:15	
Run Blank	Slight Residue		9/28 13:30	4.18210	4.15684	9/21 16:15	
Location Belco Scrubber	-13	PTFE Bag		4.18210	4.15684		0.02526
Type B1/2 MeCl	507	400	9/27 14:00	4.02125	4.02034	9/21 10:15	
Run 1	Slight Residue		9/28 13:30	4.02117	4.02081	9/21 16:00	
Location Belco Scrubber	-14	PTFE Bag		4.02117	4.02081		<0.00106
Type B1/2 MeCl	504	400	9/27 14:00	3.90888	3.88815	9/21 16:00	
Run 2	Slight Residue		9/28 13:30	3.90881	3.88841	9/23 14:30	
Location Belco Scrubber	-15	PTFE Bag		3.90881	3.88841		0.02040
Type B1/2 MeCl	505	400	9/27 14:00	4.07619	4.05676	9/21 16:00	
Run 3	Black Residue		9/28 13:30	4.07615	4.05694	9/23 14:30	
Location FCCU FGS	-16	PTFE Bag		4.07615	4.05694		0.01921
Type							
Run							
Location							
Type							
Run							
Location							

*Description of Particulate

Analyst Signature: 

** Two volumes (e.g. 100/125) indicate sample volume and total volume including rinse

Indicate (T)himbale, (F)ilter, or (B)eaker in box below.

Minimum Detection Limit Determination

Method USEPA Method 5
Reference 40 CFR 60, Appendix A Non-Iterative Study

MDL Reference 40 CFR 136, Appendix B
CleanAir Reference SOP EPA5-11

Matrix Acetone
Container 250 ml Beaker
Aliquot Size 100.0 ml
Blank Size 100.0 ml
Spike Solution 1.00 mg/ml NaCl
Spike Amount 0.5 ml
Residue Added 0.00050 gm

Blank Aliquots	Blank Number (i)	Blank Result (gm)		
		Final	Tare	Net (r_{ab_i})
XX4	1	106.2360	106.2357	0.0003
D36	2	103.9348	103.9343	0.0005
F52	3	122.3369	122.3366	0.0003
Z12	4	114.3614	114.3610	0.0004
AA48	5	103.7238	103.7223	0.0015
Z17	6	123.5731	123.5726	0.0005
60	7	107.9264	107.9259	0.0005
B7	8	105.4950	105.4945	0.0005
G35	9	110.9614	110.9611	0.0003
Z13	10	123.7090	123.7083	0.0007

Average Blank 0.0006 gm
Average Blank Conc. 0.0055 gm/liter * Blank Level Excessive

Spike Aliquots	Sample Number (i)	Spike Result (gm)			Blank Corrected (m_{a_i})	Status
		Final	Tare	Net (r_{a_i})		
F86	1	122.7947	122.7927	0.0020	0.0015	OK
B8	2	106.2933	106.2919	0.0014	0.0009	OK
F33	3	122.8211	122.8194	0.0017	0.0011	OK
X75	4	107.5068	107.5053	0.0015	0.0009	OK
AA15	5	112.1703	112.1683	0.0020	0.0014	OK
AA33	6	112.2489	112.2477	0.0012	0.0007	OK
XX48	7	109.3594	109.3580	0.0014	0.0008	OK
V1	8	122.4944	122.4921	0.0023	0.0018	OK
AA31	9	118.8643	118.8627	0.0016	0.0010	OK
XX52	10	106.5051	106.5029	0.0022	0.0017	OK

Recovery (R_a) 236.0%
Standard Deviation (S_a) 3.743E-04 gm
MDL_a 0.00106 gm

Minimum Detection Limit Determination

Method USEPA Method 5
Reference 40 CFR 60, Appendix A Non-Iterative Study

MDL Reference 40 CFR 136, Appendix B
CleanAir Reference SOP EPA5-11

Matrix Filter
Container Petri Dish
Aliquot Size n/a
Blank Size n/a
Spike Solution 1.00 mg/ml NaCl
Spike Amount 0.5 ml
Residue Added 0.00050 gm

Spiked Filters	Sample Number (i)	Spike Result (gm)		
		Final	Tare	Net (m_{fi})
205690	1	0.34983	0.34900	0.00083
205691	2	0.35138	0.35070	0.00068
205692	3	0.35288	0.35210	0.00078
205693	4	0.35063	0.34980	0.00083
205694	5	0.35252	0.35160	0.00092
205695	6	0.34918	0.34820	0.00098
205696	7	0.34987	0.34880	0.00107
205697	8	0.34875	0.34790	0.00085
205698	9	0.34448	0.34360	0.00088
205699	10	0.34358	0.34270	0.00088

Recovery (R_f) 174.0%
Standard Deviation (S_f) 1.068E-04 gm
MDL_f 0.00030 gm

Previous Std. Dev. n/a
F-Ratio n/a



2/21/2007
Date Certified

Balance Calibration Log

Balance: Ohaus AP250D

Date	Time	Class 1 Calibration Mass (g)					Analyst
		0.2000	0.5000	1.0000	50.0000	100.0000	
~~07/20/07~~ 07/24/07	0930	0.20001	0.50003	0.99998			AN
07/27/07	0900	0.20000	0.50000	1.00001			AN
07/30/07	0900	0.20006	0.50005	1.00002			AN
07/31/07	0800	0.20002	0.50005	1.00004			AN
08/01/07	0915	0.20000	0.50002	0.99999			AN
8/08/07	0930	0.20002	0.50007	1.00007			CS
8/10/07	0840	0.20005	0.50003	1.00005			CS
08/13/07	0845	0.20007	0.50006	1.00003			AN
08/15/07	0845	0.20001	0.50001	0.99998			AN
08/16/07	1430	0.19998	0.50002	0.99999			DR
08/17/07	1010	0.20002	0.50002	1.00001			DR
08/20/07	0800	0.20002	0.50001	1.00005			CS
08/21/07	0800	0.20004	0.50002	1.00003			CS
08/22/07	0930	0.19999	0.49999	1.00000			AN
08/24/07	1015	0.20000	0.50002	1.00000			AN
08/29/07	0845	0.20000	0.50004	0.99997			AN
09/04/07	0940	0.20000	0.50003	1.00006			DR
09/06/07	0935	0.20000	0.50002	1.00001			DR
09/07/07	1020	0.20000	0.50000	1.00003			DR
09/13/07	1035	0.19999	0.50002	1.00006			CS
09/13/07	1115	0.20001	0.50002	1.00005			CS
9/13/07	1415	0.20003	0.50005	1.00005			CS
9/14/07	0700	0.20005	0.50002	1.00002			CS
9/17/07	0700	0.20003	0.50004	1.00002			CS
9/18/07	0700	0.20002	0.50003	0.99999			CS
9/19/07	1530	0.20001	0.50001	1.00000			CS
9/20/07	0700	0.20000	0.49999	1.00003			CS
9/21/07	0645	0.20004	0.50006	1.00009			CS
09/22/07	1000	0.20001		1.00001			DR
09/23/07	1400	0.20001		0.99998	50.00013		DR
09/24/07	0700	0.20001	0.50002	1.00003			CS
09/26/07	0800	0.20000	0.50003	1.00005			CS
9/27/07	0715	0.20003	0.50000	0.99999			CS
09/28/07	0645	0.20006	0.50004	1.00003			

5312

CHAIN OF CUSTODY RECORD

PROJ. NO.	PROJECT NAME		NO. OF CONTAINERS		REMARKS	
SAMPLERS: (Signature)						
B. Pearce; J. Gold Fin; W. Page; R. Barton						
LAB NO.	SAMPLE NO.	DATE	TIME	SAMPLE LOCATION		
29027		8-28		Probe Wash - Archone M202-1	✓	All samples are to be processed as stated in New Jersey Env Test Method No. 1.
29099		8-28		Probe Wash M202-2	✓	
29088		8-28		Probe Wash M202-3	✓	
25335		8-28		Probe Wash M202-Blank	✓	
29097		8-28		M202-1 Imp Catch	✓	
29098				M202-2 Imp Catch	✓	
25446				M202-3 Imp Catch	✓	
25447				M202-Blank Imp Catch	✓	
25336				M202-1 Imp Rinse Meltz	✓	
25337				M202-2 Imp Rinse Meltz	✓	
25338				M202-3 Imp Rinse Meltz	✓	
25339				M202-Blank Imp Rinse Meltz	✓	
Relinquished by: (Signature)			Date / Time	Received by: (Signature)	Date / Time	Received by: (Signature)
[Signature]			8-30-07	[Signature]	9/6/07	9:00
Relinquished by: (Signature)			Date / Time	Received by: (Signature)	Date / Time	Received by: (Signature)
[Signature]			9-6-07	[Signature]		
Relinquished by: (Signature)			Date / Time	Received for Laboratory by:	Date / Time	
[Signature]				[Signature]	09/06/07	1500
REMARKS: Send results to Eric Vagstad at ARI, B.I. P.O. # IL-350-07						



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

CHAIN OF CUSTODY RECORD

CUSTOMER COPY - GOLDENROD

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Palatine, IL 60067-4975
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CleanAir®

CleanAir Engineering, Inc.

500 West Wood Street

Palatine, IL 60067

Laboratory Report

CleanAir Project No: 28166

Analytes

Sulfate

Applicable Analytical Method

US EPA Method 202

Customer

ARI Environmental, Inc.

951 Old Rand Road, Unit 106

Wauconda, IL 60084

CERTIFICATE OF ANALYSIS

Client Name: ARI Environmental, Inc.
Plant/Facility: Valero PB
Project Number: 28166
Sample Numbers: 09-12

Date Received: 9/6/2007
Date Reported: 9/24/2007
Sample Type: Method 202
Parameters: Sulfate

Laboratory Number	Sample Identification	Sample Volume (ml)	SO42- Sample Conc. (mg/l)	Detection Limit (mg/l)	Reporting Limit (mg/l)
Clean Air					
10000-00	CCB	n.a.	<	0.031	0.157
10000-00	CCV	n.a.	Difference	0.06%	<10% Yes
10000-09	B1/2 Water Blank	630	0.51	0.031	0.157
10000-10	B1/2 Water R1	660	7.33	0.031	0.157
10000-11	B1/2 Water R2	600	49.80	0.031	0.157
10000-12	B1/2 Water R3	590	35.60	0.031	0.157
10000-00	QC	n.a.	Difference	1.89%	<10% Yes
10000-00	CCB	n.a.	<	0.031	0.157
10000-06	CCV	n.a.	Difference	3.12%	<10% Yes

Matrix Spike Analysis

10000-11

% Recovery

106.6%

Analyst:



 Carl Slimp

Analysis Case Narrative

Ion Chromatography Analysis

Client Name:	ARI Environmental, Inc.	Date Received:	9/6/2007
Plant/Facility:	Valero PB	Date Reported:	9/24/2007
Project Number:	28166	Sample Type:	Method 202
Sample Numbers:	09-12	Parameters:	Sulfate
Applicable Analytical Method	US EPA Method 202		

Summary of Analysis

This report summarizes the results of analysis performed on samples received on: 09/06/07

The samples were analyzed in accordance with procedures in the EPA Method listed above.

Method Detection Limits

Method Detection Limits have been determined in accordance with procedures in 40 CFR 136, Appendix B, and in accordance with procedures outlined in CleanAir SOP EPA5-11. Documentation showing the determination of detection limits are included with this report.

Reporting Detection Limits

Reporting limits have been determined in accordance with CleanAir SOPs in reference to the above listed EPA Method.

Sample Preparation

Samples were prepared according to the procedures listed in the EPA Method above. Each sample was analyzed at full strength and a dilution was prepared if necessary to achieve a concentration that was within calibration range limits.

Analysis QA/QC

In accordance with the corresponding CleanAir SOP, The following Quality Assurance steps were taken: Before the first sample was analyzed and every twenty samples thereafter (and before the final calibration) a Continuing Calibration Blank (CCB) and a Continuing Calibration Verification (CCV) were analyzed. The CCB must show a regression concentration of zero; and the CCV must show a regression concentration that matches its actual concentration within 10 percent of the actual concentration. The CCV is a standard that is prepared from the same stock as the calibration standards. A Quality Control (QC) sample was analyzed after the tenth sample and every twenty samples thereafter (as applicable). The QC is prepared from a stock that comes from a completely different manufacturer than used for calibration standards. The QC must also meet the same acceptance criteria as the CCV. In addition to the preceding Quality Assurance steps a matrix spike analysis is performed on ten percent of the total number of samples. This sample is prepared with equal amounts of a sample and a calibration standard whose concentration is known to be larger than that of the sample. The Matrix Spike must have a recovery of 100 ± 10 percent.

CHROMATOGRAPHIC DATA REDUCTION

Client ARI Environmental, Inc.
 Project Number: 28166
 Analyte Sulfate
 Date 9/24/2007
 Stock Standard 5010.26 mg/l
 Working Stock Conc. 50.1026 mg/l
 CCV 2.5510 mg/l
 QC 11.3600 mg/l

Analyte:

Calibration Point Conc. (mg/l)	Date of Injection	Sulfate Standards Calibration Data						
		1 0.0000	2 0.5010	3 1.0021	4 2.0041	5 3.7577	6 5.0103	7 12.5027
Pre-Cal 1 Trial 1	9/21/2007	0.000	223.753	421.481	882.379	1789.359	2285.609	
Pre-Cal 1 Trial 2		0.000	230.911	434.966	885.406	1711.688	2298.383	
Pre-Cal 1 Trial 3			236.468					
Pre-Cal 1 Trial 4			228.791					
Pre-Cal 1 Trial 5			235.827					
Post-Cal 1 Trial 1					873.855			
Post-Cal 1 Trial 2								
Pre-Cal 2 Trial 1	9/24/2007				855.845			5899.237
Pre-Cal 2 Trial 2					873.504			5899.237
Post-Cal 2 Trial 1			233.784		873.213		2239.925	5926.029
Post-Cal 2 Trial 2			236.125		860.753		2211.301	5940.369

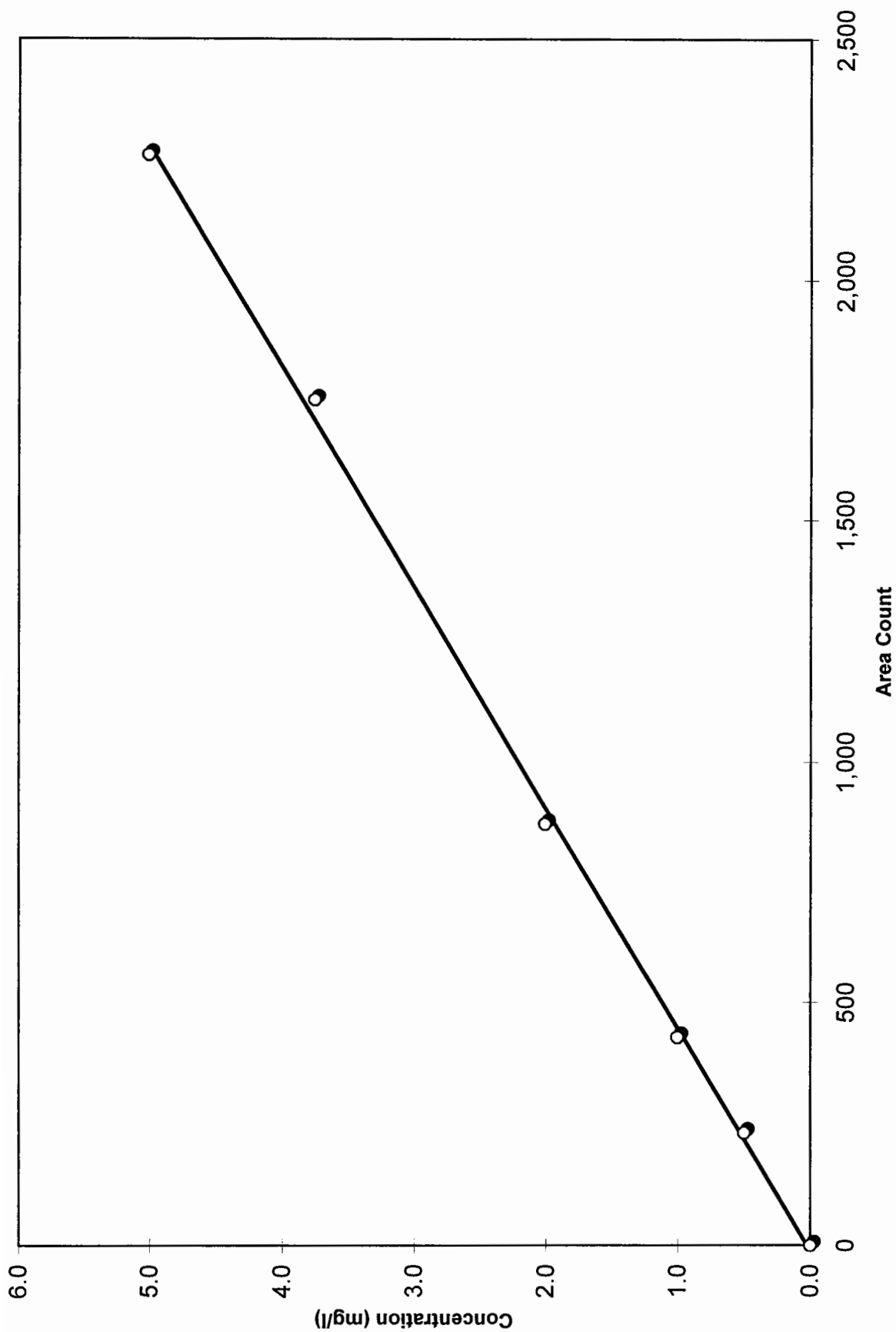
Average 0.000 232.237 428.224 872.136 1750.524 2258.804
 %RSD 0.00 2.03 2.23 1.22 3.14 1.79
 Response Factor 0.0000 0.0022 0.0023 0.0023 0.0021 0.0022
 Avg RF= 0.0022
 %RSD Resp. Factor 3.82

Measured Area Counts (Counts)	Actual Concentration (mg/L)	Regression Concentration (mg/L)	Difference pt-Line (% Scale)	Is Difference Less Than 2% of Scale?	Difference pt-Line (Relative %)	Is Relative Difference Less Than 10%?
0.0000	0.000	0.025	-0.50%	Yes	0.00%	Yes
232.2369	0.501	0.533	-0.64%	Yes	-6.44%	Yes
428.2235	1.002	0.962	0.80%	Yes	4.00%	Yes
872.1364	2.004	1.933	1.42%	Yes	3.54%	Yes
1,750.5235	3.758	3.855	-1.94%	Yes	-2.58%	Yes
2,258.8044	5.010	4.967	0.87%	Yes	0.87%	Yes

Regression Constants

Slope m = 0.0022
 Intercept b = 0.0252
 Coeff. R² = 0.9990

Is Coefficient
 of Regression
 > 0.995?
 Yes



CHROMATOGRAPHIC DATA REDUCTION

Client ARI Environmental, Inc.
 Project Number: 28166
 Analyte Sulfate
 Date 9/24/2007

MDL=	0.031 mg/l
MRL=	0.157 mg/l

Sample Location	Sample Identification Number	Sample Identification	Area Counts		Area Count Average	Area Count Duplicate		Duplicate Relative Difference (%)	DF (Analysis Dilution Factor)	V _{son} (Total Sample Volume, ml)	C _{reg} (Concentration, mg/l from Reg Curve)	C _{resp} (Concentration, mg/l from Resp Factor)	M _{analyte} Total Amount of Analyte (mg)
			Trial 1	Trial 2		Duplicate	Difference						
Clean Air	10000-00	CCB	0.000	0.000	0.000	na	na	na	1	n.a.	<	<	
Clean Air	10000-00	CCV	1173.131	1161.630	1167.381	11.501	11.501	1.0%	1	n.a.	2.55	Difference	0.06%
Belco Scrubber	10000-09	B1/2 Water Blank	201.788	198.233	200.010	3.554	3.554	1.8%	1	630	0.51	0.44	0.32
Belco Scrubber	10000-10	B1/2 Water R1	3497.479	3369.892	3433.686	127.587	127.587	3.7%	1	660	7.33	7.60	4.84
Belco Scrubber	10000-11	B1/2 Water R2	4708.732	4651.723	4680.228	57.009	57.009	1.2%	5	600	49.80	51.77	29.88
Belco Scrubber	10000-12	B1/2 Water R3	1681.521	1611.080	1646.301	70.441	70.441	4.3%	10	590	35.60	36.42	21.00
Clean Air	10000-00	QC	5492.280	5400.000	5446.140	92.279	92.279	1.7%	1	n.a.	11.57	Difference	1.89%
Clean Air	10000-00	CCB	0.000	0.000	0.000	na	na	na	1	n.a.	<	<	
Clean Air	10000-06	CCV	1128.856	1131.944	1130.400	3.088	3.088	0.3%	1	n.a.	2.47	Difference	3.12%
Matrix Spike	10000-11	B1/2 Water R2	5540.461	5448.942	5494.702	91.519	91.519	1.7%					

Spike Recovery
106.6%

Control Limits for Duplicate Analyses		Variable	Value
		R _{avg}	57
		D ₄	3.268
		UCL	187
		UWL	182
		LCL	0
		LWL	0

CHROMATOGRAPHIC DATA REDUCTION

Client ARI Environmental, Inc.
 Project Number: 28166
 Analyte Sulfate
 Date 9/24/2007

Determination of Detection Limit

(in accordance with 40 CFR 136, Appendix B)

Analyte	Sulfate
Area Count	
Trial 1	223.753
Trial 2	230.911
Trial 3	236.468
Trial 4	228.791
Trial 5	235.827
Trial 6	233.784
Trial 7	236.125
Trial 8	
Trial 9	
Trial 10	
Trial 11	
Trial 12	
Trial 13	
Trial 14	
Trial 15	
Trial 16	
Average	232.237
Std Dev	4.7242
RMS Dev	2.03%

n	t _(n-1,0.99)
7	3.143
8	2.998
9	2.896
10	2.821
11	2.764
16	2.602
21	2.528

Average	
Response Factor	0.00223
Measured Concentration (mg/l)	
Trial 1	0.515
Trial 2	0.530
Trial 3	0.543
Trial 4	0.526
Trial 5	0.541
Trial 6	0.537
Trial 7	0.542
Trial 8	
Trial 9	
Trial 10	
Trial 11	
Trial 12	
Trial 13	
Trial 14	
Trial 15	
Trial 16	
Average	0.533
Std Dev	0.0103
RMS Dev	1.94%
t _(n-1,0.99)	3.143
Det Lim (mg/l)	0.032
Rep Lim (mg/L)	0.162

Actual Conc 0.5010
 Slope 2.19E-03
 Intercept 0.0252
 Coeff of Corr 0.9990

CHROMATOGRAPHIC DATA REDUCTION

Client ARI Environmental, Inc.
Project Number: 28166
Analyte Sulfate
Date 9/24/2007

Determination of Control Limits for Duplicate Analyses

$$R_i = |AreaCount_1 - AreaCount_2|$$

$$R_{avg} = \frac{\sum_{i=1}^n R_i}{n}$$

Where: n = Number of duplicates
R_i = Range for each set of duplicates
D₄ = Constant (3.268 for duplicates)
UCL = Upper Control Limit
UWL = Upper Warning Limit
LCL = Lower Control Limit
LWL = Lower Warning Limit

Variable	Value
R _{avg}	57
D ₄	3.268
UCL	187
UWL	182
LCL	0
LWL	0

$$UCL = D_4 R_{avg}$$

$$UWL = \frac{2}{3} (D_4 R_{avg}) + R_{avg}$$

Note: For duplicates, both LCL and LWL are zero.

QA/QC:

CCV: Continuing Calibration Verification
CCB: Continuing Calibration Blank
QC: Quality Check

Determination of Concentration of Analyte

$$C_{reg} = [m(AreaCount) + b]DF$$

Where: C_{reg} = Analyte concentration from regression curve (mg/l)
m = Slope of regression curve
b = Y-Intercept of regression curve
AreaCount = Average area count from duplicate analyses
DF = Sample dilution factor

$$C_{resp} = RF_{avg} (AreaCount)DF$$

Where: C_{resp} = Analyte concentration from response factors (mg/l)
RF_{avg} = Average response factor for analyte (ppm/Area Count)
DF = Sample dilution factor

$$M_{Analyte} = \frac{C_{reg} (V_{soln})}{1000}$$

Where: M_{Analyte} = Total amount of analyte in sample (mg)
C_{reg} = Analyte concentration from regression curve (mg/l)
V_{soln} = Total sample volume (ml)
1000 = Conversion factor (ml)

Laboratory Case Narrative
Valero, Paulsboro, NJ; 8/28/07 – 8/29/07
FCCU FGS
USEPA Method 8 Sulfuric Acid Mist

1) Sample Receipt

Samples were received in good condition on 9/4/07 and logged in for analysis.

2) Laboratory Analysis

The samples were prepared for analysis following USEPA M8. Those samples were then analyzed for Ammonia, Sodium, Potassium, Calcium, Sulfate, Sulfite, Fluoride & Chloride using Ion Chromatography.

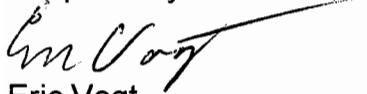
3) QA/QC

All criteria as specified in USEPA Method 8 and USEPA Method 26a were met.

4) Discussion

These are final results for your review. Any questions can be directed to Eric Vogt at ARI at (847) 487-1580.

Respectfully submitted,



Eric Vogt
Chemist
ARI Environmental, Inc.

Valero, Paulsboro NJ; FCCU FGS; 8/29/07
Sulfate Determination

Calibration Curve Calculation

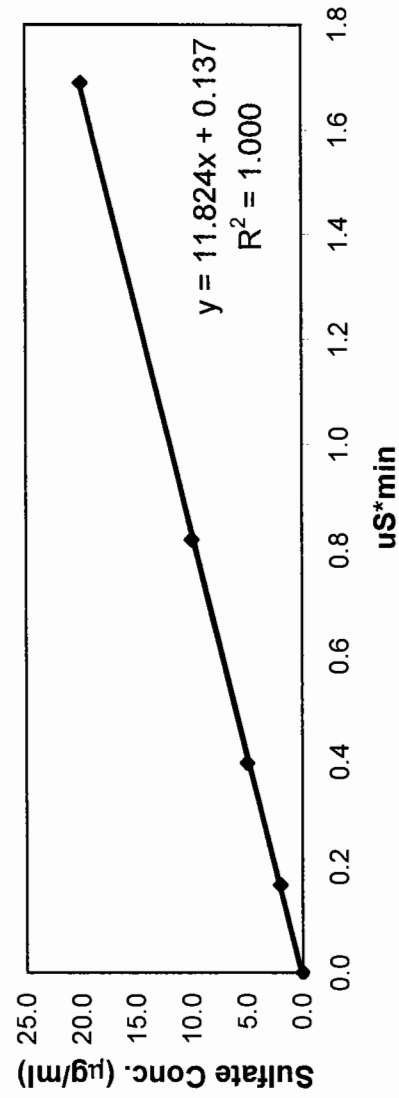
Std. ($\mu\text{g/ml}$)	Pre Cal ($\mu\text{S}\cdot\text{min}$)	Post Cal ($\mu\text{S}\cdot\text{min}$)	Average ($\mu\text{S}\cdot\text{min}$)	Deviation (%)
0.0	0.00	0.00	0.00	0.00
2.0	0.169	0.161	0.165	2.42
5.0	0.398	0.396	0.397	0.25
10.0	0.840	0.800	0.820	2.44
20.0	1.709	1.670	1.690	1.15

Sample Concentration Calculations

Sample Description	Analysis 1 ($\mu\text{S}\cdot\text{min}$)	Analysis 2 ($\mu\text{S}\cdot\text{min}$)	Average ($\mu\text{S}\cdot\text{min}$)	Deviation (%)	Concentration ($\mu\text{g/ml}$)	Sample volume(ml)	Dilution Factor
M8-1 IPA Imp & Filter	1.149	1.180	1.165	-1.3	13.91	1000	4
M8-2 IPA Imp & Filter	1.086	1.076	1.081	0.5	12.92	1000	4
M8-3 IPA Imp & Filter	1.234	1.191	1.213	1.8	14.47	1000	4
80% IPA Blank & Filter	<0.010	<0.010	<0.010	0.00	<0.26	1000	1
M8 H2SO4 Audit H0382	1.263	1.254	1.259	0.36	15.02	250	5

Analyst: E. Vogt
Date Done: 09/25/07

Sulfate Calibration Curve



Valero, Paulsboro NJ; FCCU FGS; 8/29/07
Chloride Determination

Calibration Curve Calculation

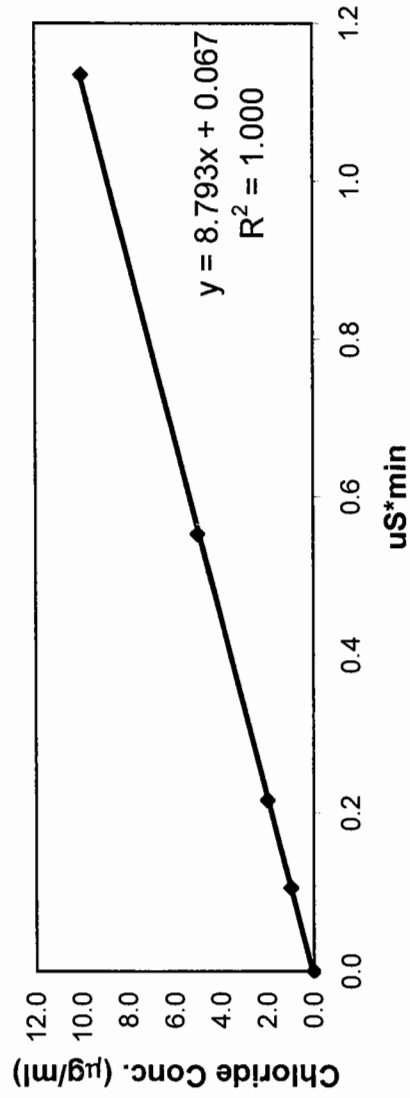
Std. (µg/ml)	Pre Cal (µS*min)	Post Cal (µS*min)	Average (µS*min)	Deviation (%)
0.0	0.00	0.00	0.00	0.00
1.0	0.102	0.109	0.106	-3.32
2.0	0.216	0.217	0.217	-0.23
5.0	0.554	0.551	0.553	0.27
10.0	1.148	1.121	1.135	1.19

Sample Concentration Calculations

Sample Description	Analysis 1 (µS*min)	Analysis 2 (µS*min)	Average (µS*min)	Deviation (%)	Concentration (µg/ml)	Sample volume(ml)
M8-1 IPA Imp & Filter	0.036	0.039	0.038	-4.0	0.40	1000
M8-2 IPA Imp & Filter	0.060	0.056	0.058	3.4	0.58	1000
M8-3 IPA Imp & Filter	0.054	0.059	0.057	-4.4	0.56	1000
80% IPA Blank & Filter	<0.010	<0.010	<0.010	0.0	<0.15	1000

Analyst: E. Vogt
Date Done: 09/25/07

Chloride Calibration Curve



Valero, Paulsboro NJ; FCCU FGS; 8/29/07

Sulfite Determination

Calibration Curve Calculation

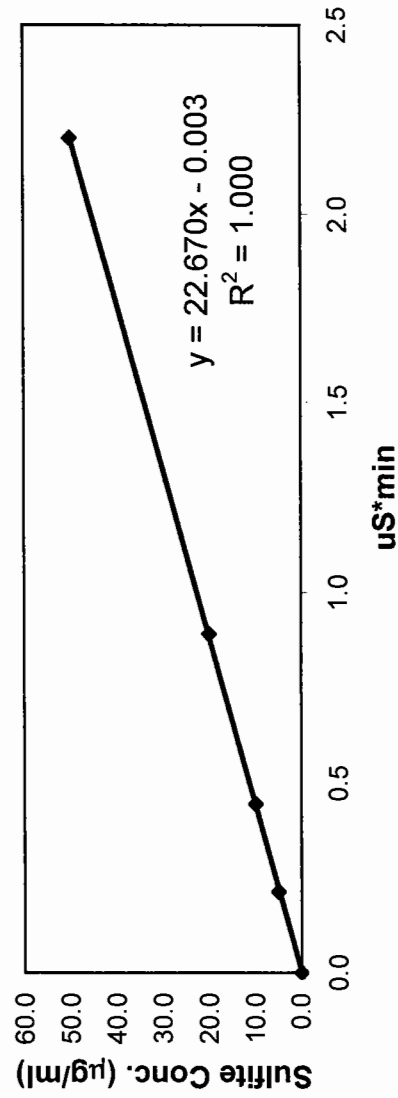
Std. ($\mu\text{g/ml}$)	Pre Cal ($\mu\text{S}^*\text{min}$)	Post Cal ($\mu\text{S}^*\text{min}$)	Average ($\mu\text{S}^*\text{min}$)	Deviation (%)
0.0	0.00	0.00	0.00	0.00
5.0	0.212	-	0.212	0.00
10.0	0.444	-	0.444	0.00
20.0	0.892	-	0.892	0.00
50.0	2.202	-	2.202	0.00

Sample Concentration Calculations

Sample Description	Analysis 1 ($\mu\text{S}^*\text{min}$)	Analysis 2 ($\mu\text{S}^*\text{min}$)	Average ($\mu\text{S}^*\text{min}$)	Deviation (%)	Concentration ($\mu\text{g/ml}$)	Sample volume(ml)
M8-1 IPA Imp & Filter	0.067	0.065	0.066	1.5	1.49	1000
M8-2 IPA Imp & Filter	0.117	0.119	0.118	-0.8	2.67	1000
M8-3 IPA Imp & Filter	<0.010	<0.010	<0.010	0.0	<0.22	1000
80% IPA Blank & Filter	<0.010	<0.010	<0.010	0.0	<0.22	1000

Analyst: E. Vogt
Date Done: 09/25/07

Sulfite Calibration Curve



Valero, Paulsboro NJ; FCCU FGS; 8/29/07
Fluoride Determination

Calibration Curve Calculation

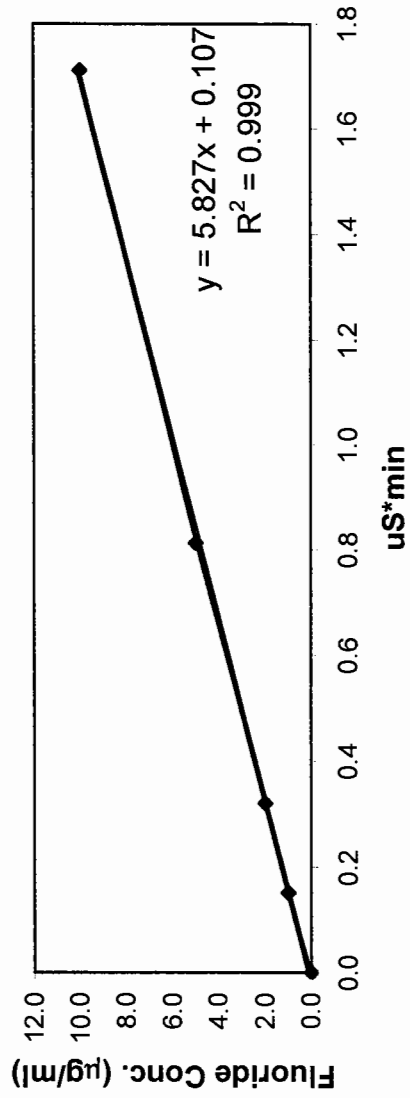
Std. (µg/ml)	Pre Cal (µS*min)	Post Cal (µS*min)	Average (µS*min)	Deviation (%)
0.0	0.00	0.00	0.00	0.00
1.0	0.153	0.150	0.152	0.99
2.0	0.323	0.319	0.321	0.62
5.0	0.820	0.807	0.814	0.80
10.0	1.721	1.701	1.711	0.58

Sample Concentration Calculations

Sample Description	Analysis 1 (µS*min)	Analysis 2 (µS*min)	Average (µS*min)	Deviation (%)	Concentration (µg/ml)	Sample volume(ml)
M8-1 IPA Imp & Filter	<0.010	<0.010	<0.010	0.0	<0.17	1000
M8-2 IPA Imp & Filter	<0.010	<0.010	<0.010	0.0	<0.17	1000
M8-3 IPA Imp & Filter	<0.010	<0.010	<0.010	0.0	<0.17	1000
80% IPA Blank & Filter	<0.010	<0.010	<0.010	0.0	<0.17	1000

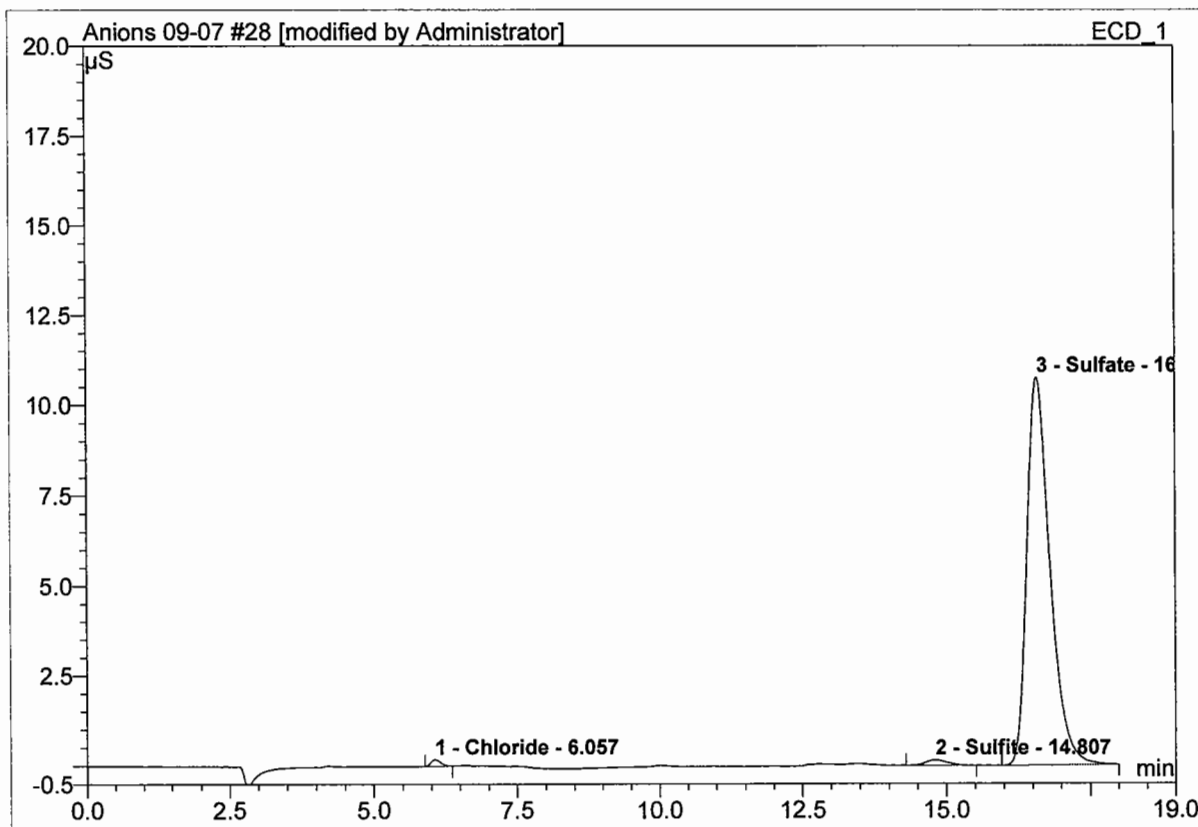
Analyst: E. Vogt
Date Done: 09/25/07

Fluoride Calibration Curve



28 FCCU FGS Run M8-1 Imp 1 + filter

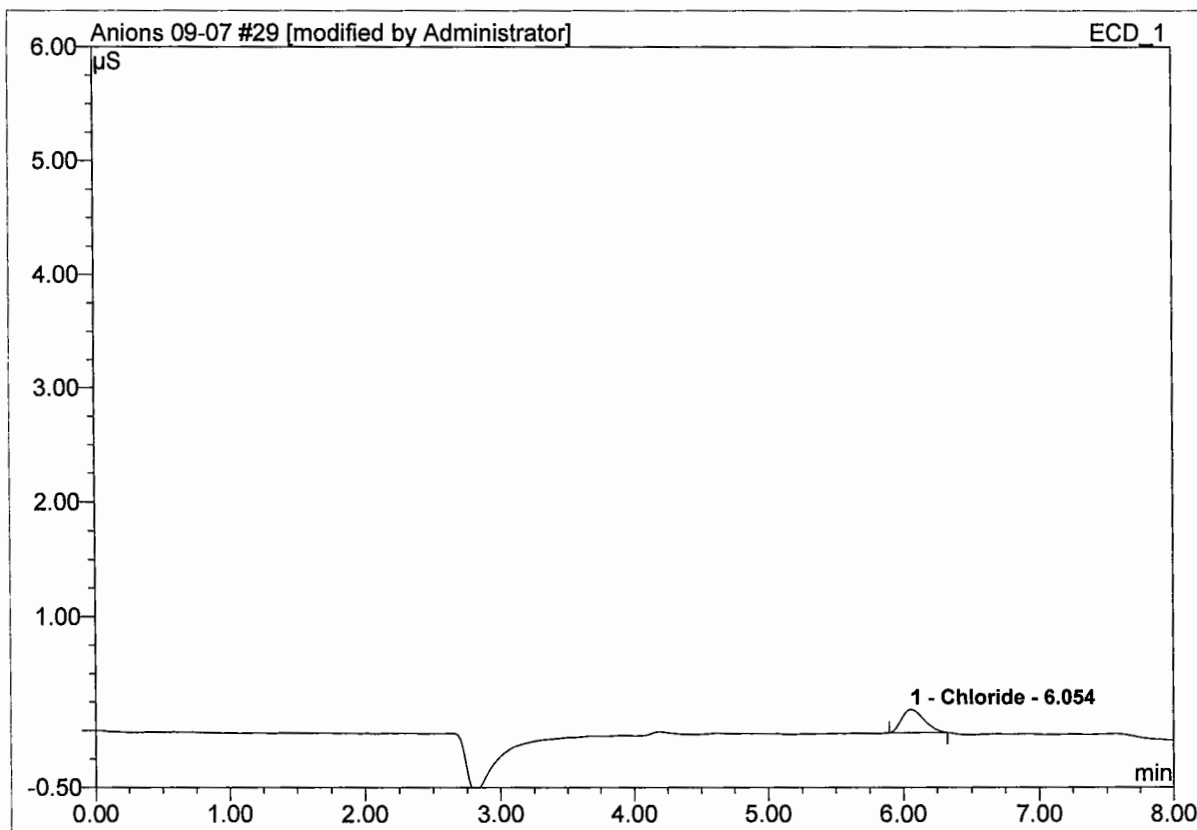
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/6/2007 15:28	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	6.06	Chloride	0.185	0.036
2	14.81	Sulfite	0.155	0.067
3	16.58	Sulfate	10.749	5.009
Total:			11.088	5.112

29 FCCU FGS Run M8-1 Imp 1 + filter

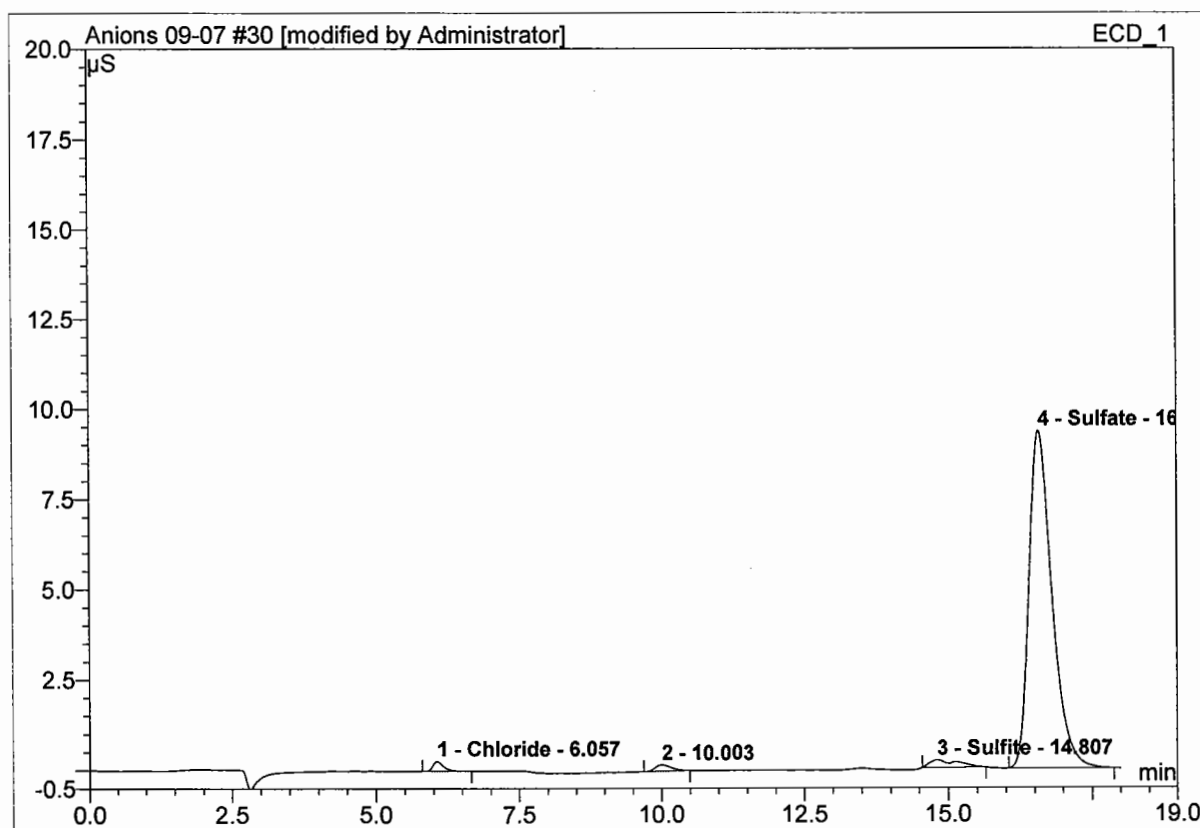
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/6/2007 15:47	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	6.05	Chloride	0.204	0.039
2	14.80	Sulfite	0.145	0.065
3	16.57	Sulfate	10.407	4.824
Total:			10.757	4.928

30 FCCU FGS Run M8-2 Imp 1 + filter

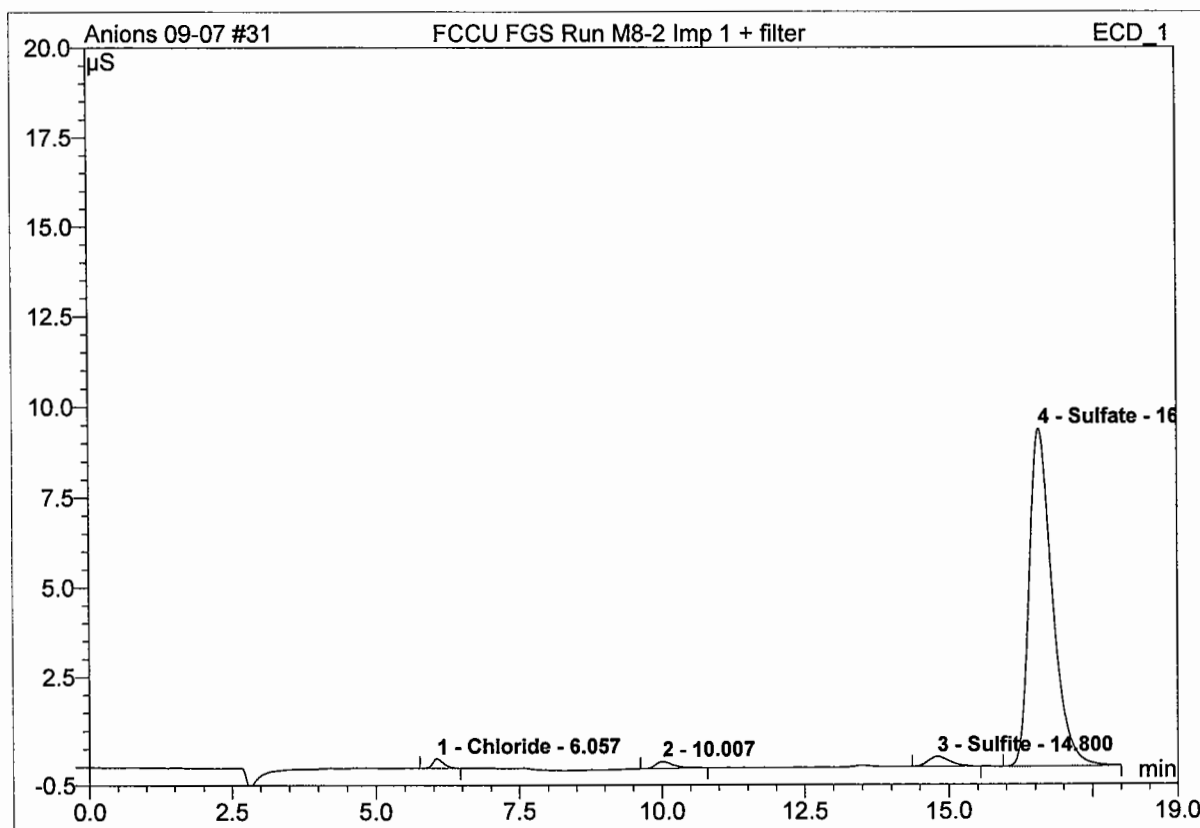
<i>Client</i>	Valero, Paulsboro NJ	<i>Injection Volume:</i>	35.0
<i>Vial Number:</i>	1	<i>Channel:</i>	ECD_1
<i>Sample Type:</i>	unknown	<i>Wavelength:</i>	n.a.
<i>Control Program:</i>	Anions 1000	<i>Bandwidth:</i>	n.a.
<i>Quantif. Method:</i>	ICS_1000_Anions	<i>Dilution Factor:</i>	1.0000
<i>Recording Time:</i>	9/6/2007 16:06	<i>Sample Weight:</i>	1.0000
<i>Run Time (min):</i>	18.00	<i>Sample Amount:</i>	1.0000



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	6.06	Chloride	0.271	0.060
3	14.81	Sulfite	0.208	0.117
4	16.58	Sulfate	9.332	4.343
Total:			9.812	4.521

31 FCCU FGS Run M8-2 Imp 1 + filter

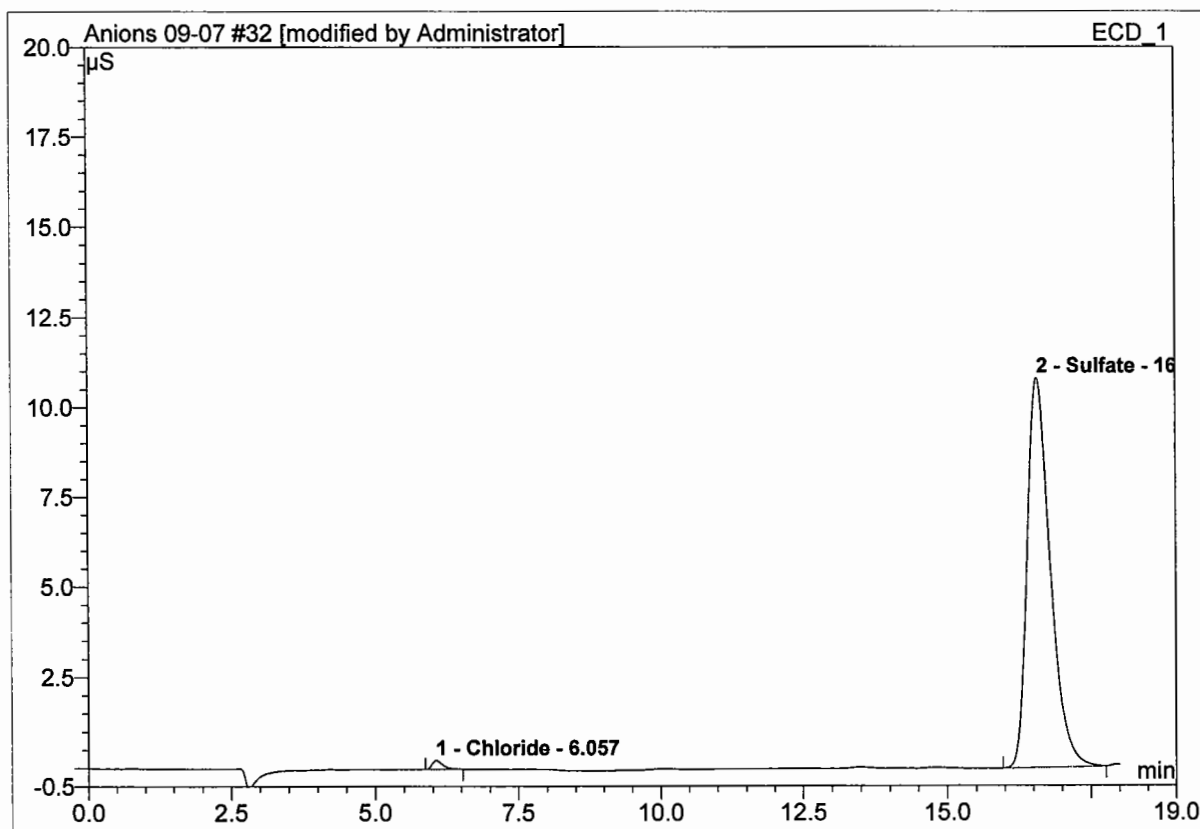
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/6/2007 16:26	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	6.06	Chloride	0.261	0.056
3	14.80	Sulfite	0.273	0.119
4	16.58	Sulfate	9.381	4.376
Total:			9.915	4.552

32 FCCU FGS Run M8-3 Imp 1 + filter

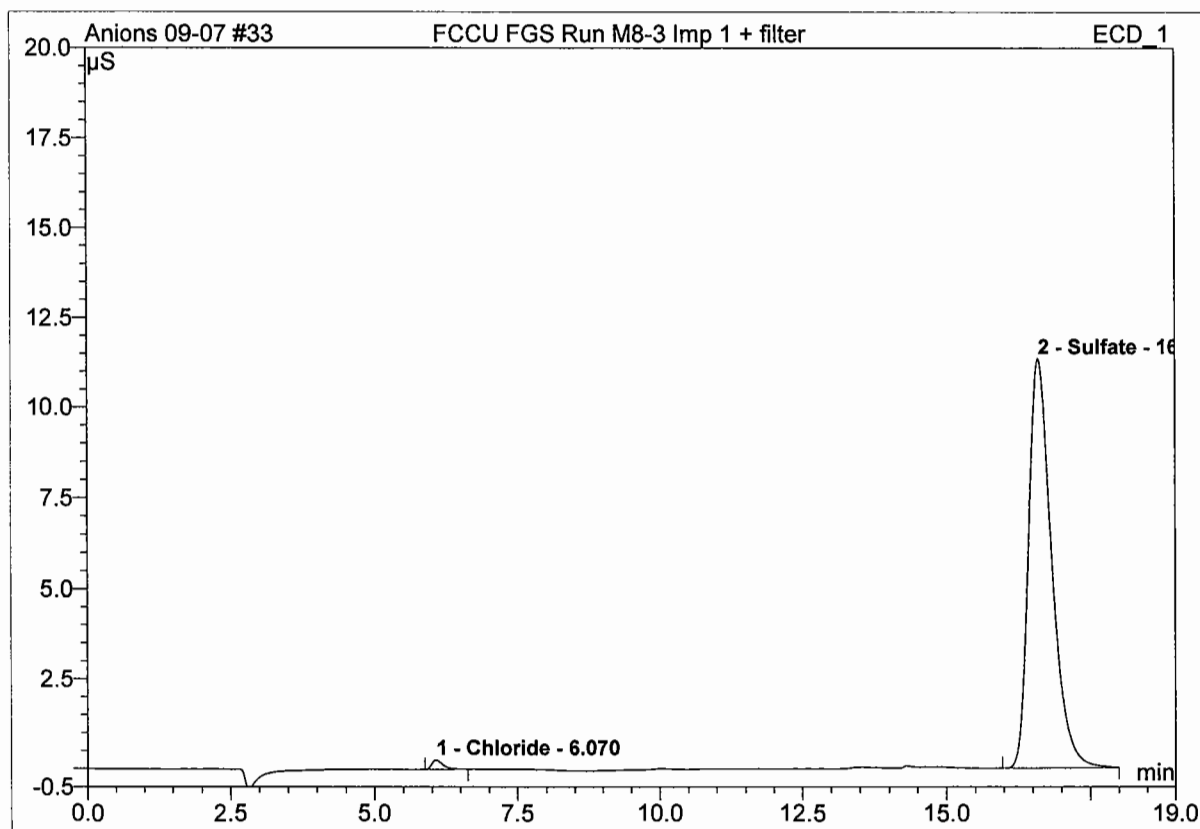
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/6/2007 16:45	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	6.06	Chloride	0.243	0.054
2	16.57	Sulfate	10.804	5.007
Total:			11.048	5.061

33 FCCU FGS Run M8-3 Imp 1 + filter

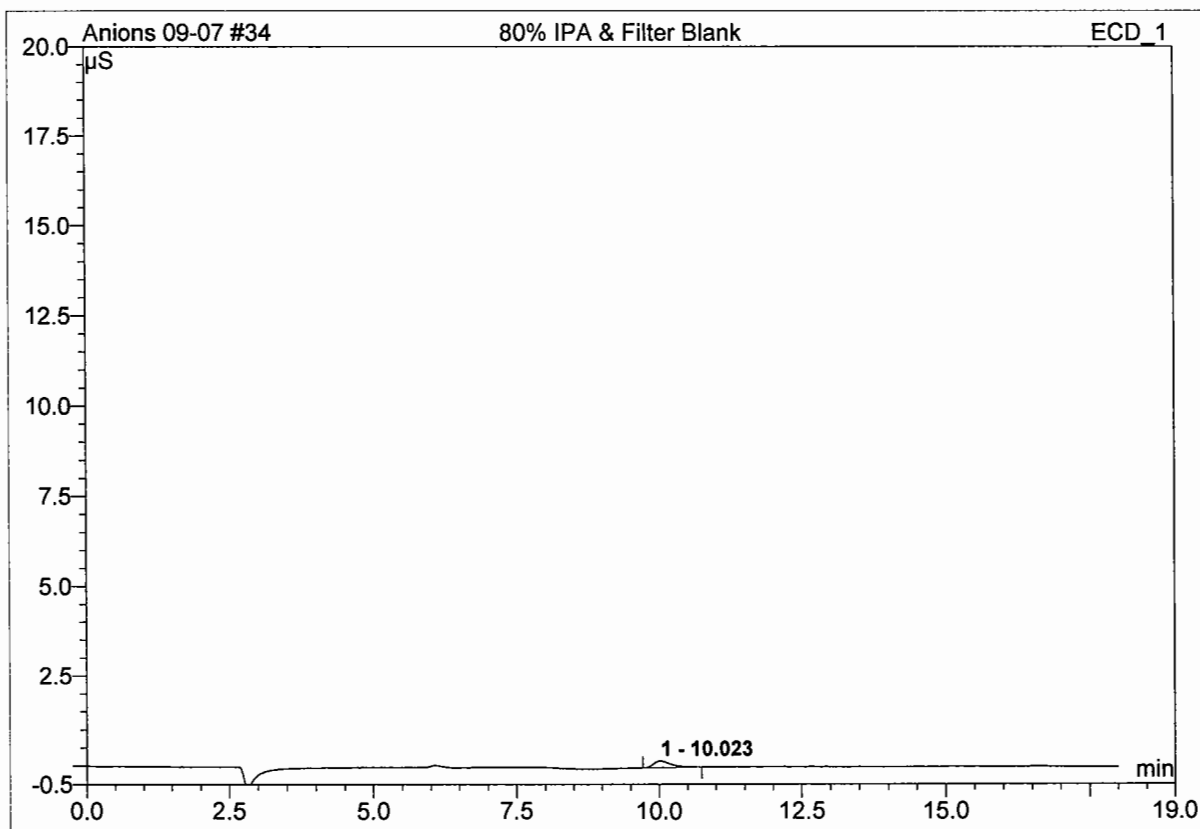
<i>Client</i>	Valero, Paulsboro NJ	<i>Injection Volume:</i>	35.0
<i>Vial Number:</i>	1	<i>Channel:</i>	ECD_1
<i>Sample Type:</i>	unknown	<i>Wavelength:</i>	n.a.
<i>Control Program:</i>	Anions 1000	<i>Bandwidth:</i>	n.a.
<i>Quantif. Method:</i>	ICS_1000_Anions	<i>Dilution Factor:</i>	1.0000
<i>Recording Time:</i>	9/6/2007 17:46	<i>Sample Weight:</i>	1.0000
<i>Run Time (min):</i>	18.00	<i>Sample Amount:</i>	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	6.07	Chloride	0.258	0.059
2	16.60	Sulfate	11.333	5.267
Total:			11.591	5.326

34 80% IPA & Filter Blank

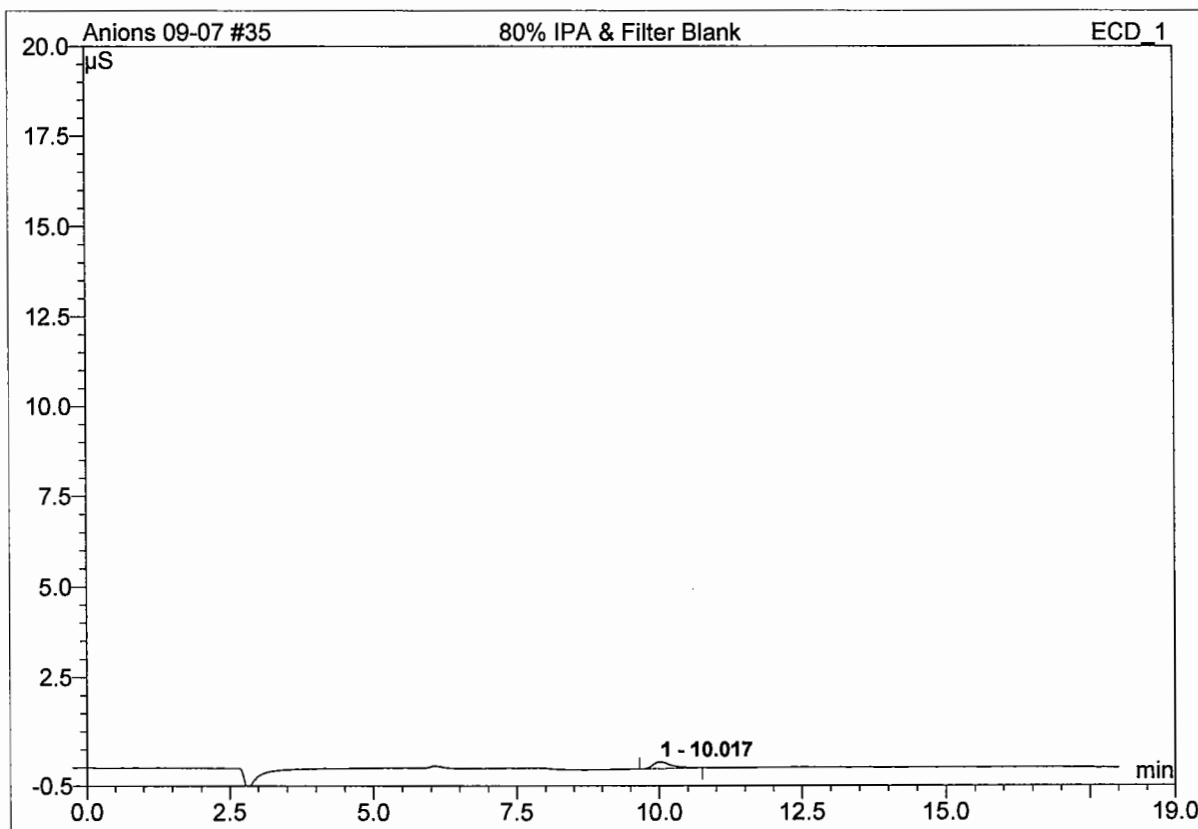
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/6/2007 18:06	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



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

35 80% IPA & Filter Blank

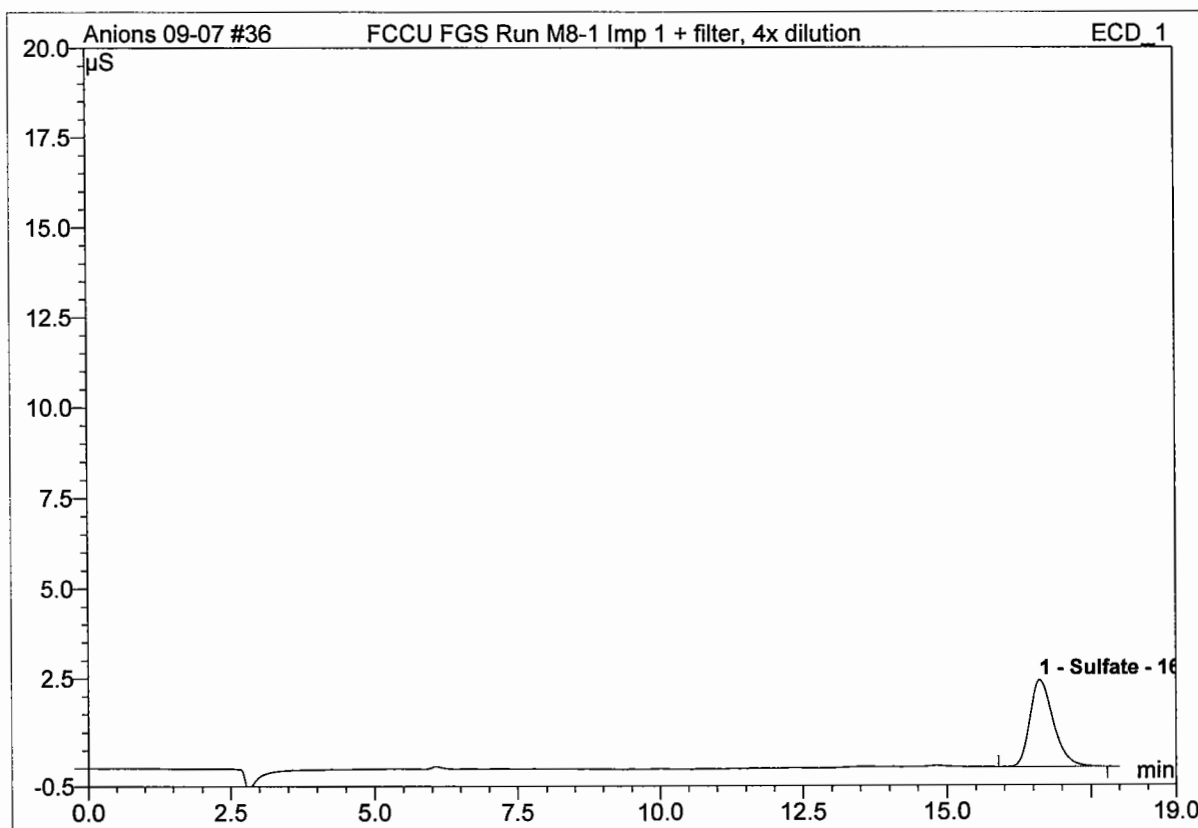
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/6/2007 18:25	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



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

36 FCCU FGS Run M8-1 Imp 1 + filter, 4x dilution

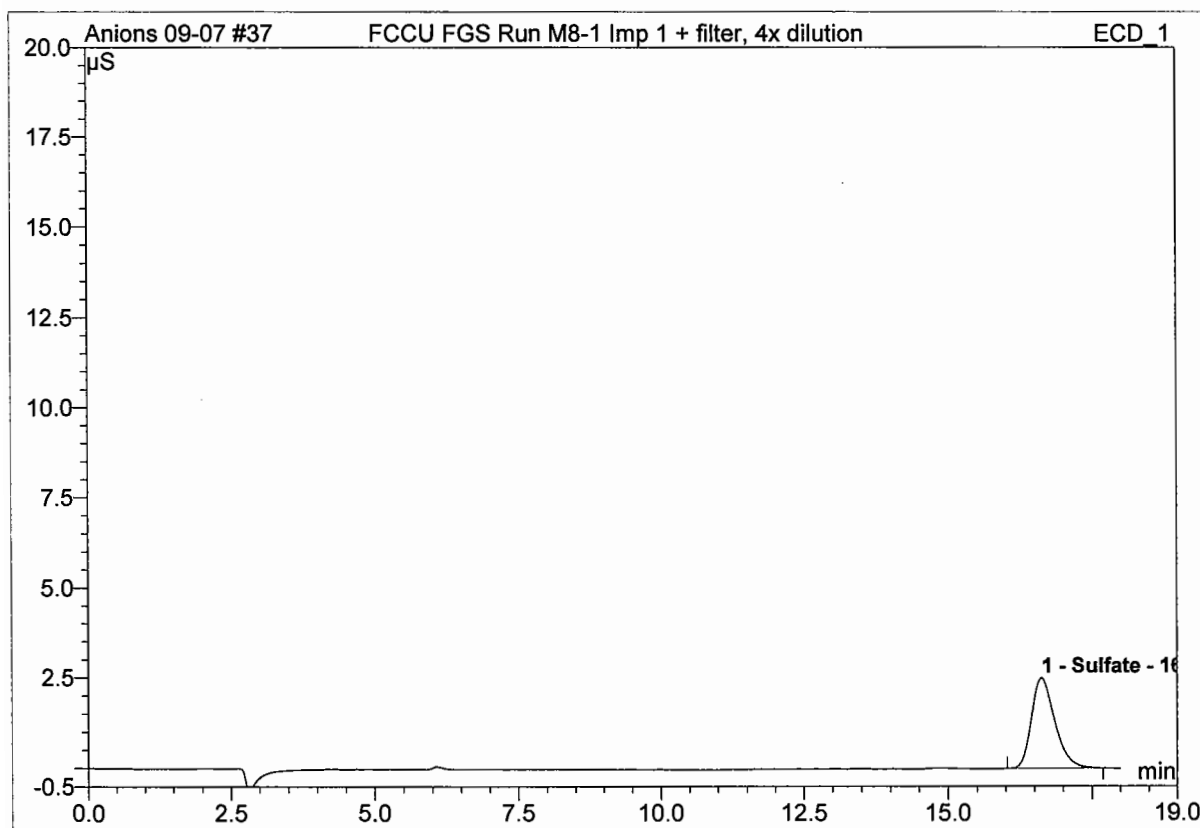
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/7/2007 8:41	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	16.62	Sulfate	2.425	1.149
Total:			2.425	1.149

37 FCCU FGS Run M8-1 Imp 1 + filter, 4x dilution

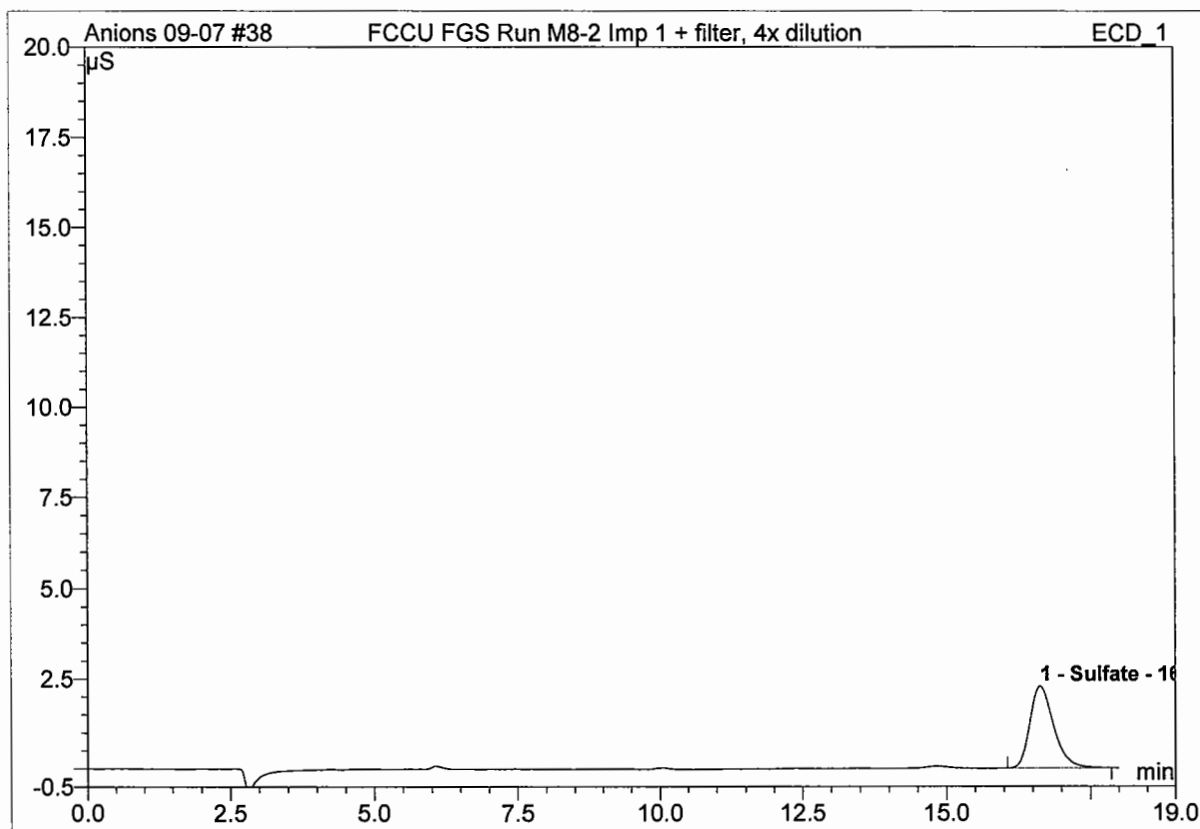
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/7/2007 9:00	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area $\mu\text{S}\cdot\text{min}$
1	16.63	Sulfate	2.502	1.180
Total:			2.502	1.180

38 FCCU FGS Run M8-2 Imp 1 + filter, 4x dilution

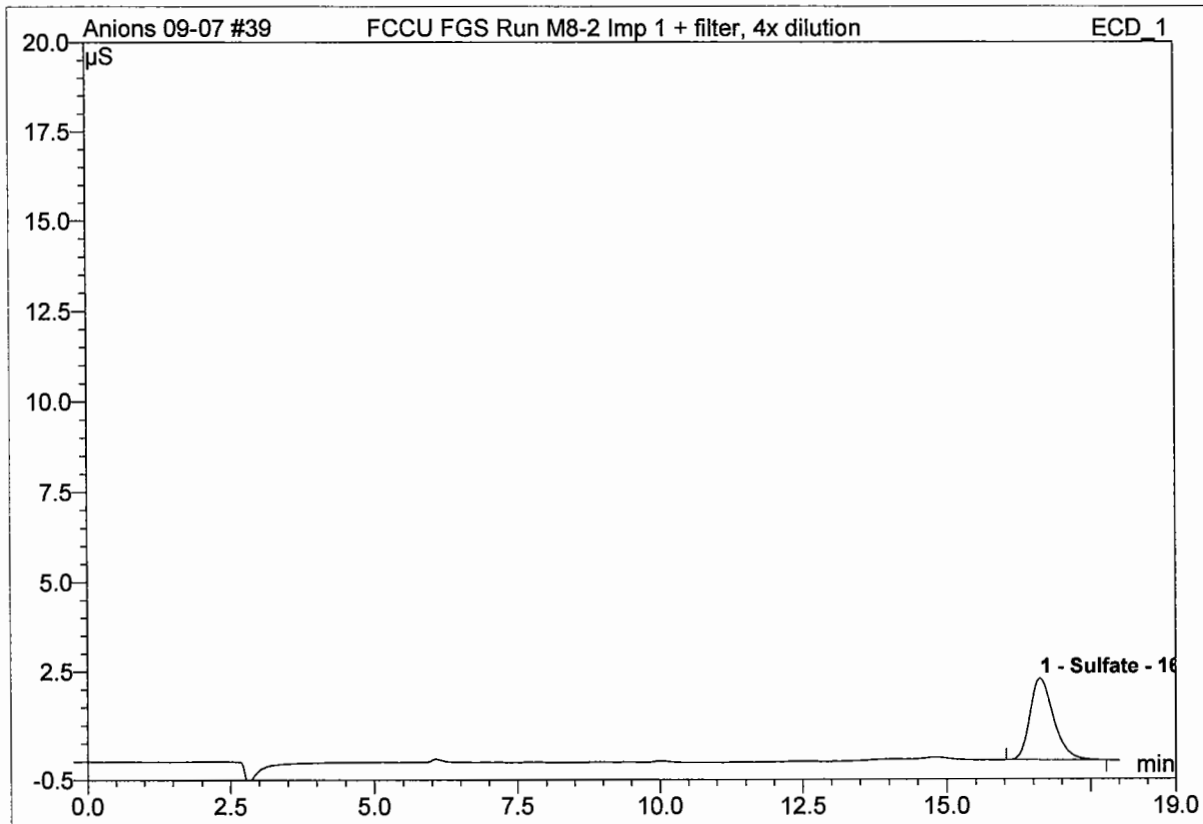
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/7/2007 9:19	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area $\mu\text{S}\cdot\text{min}$
1	16.63	Sulfate	2.288	1.086
Total:			2.288	1.086

39 FCCU FGS Run M8-2 Imp 1 + filter, 4x dilution

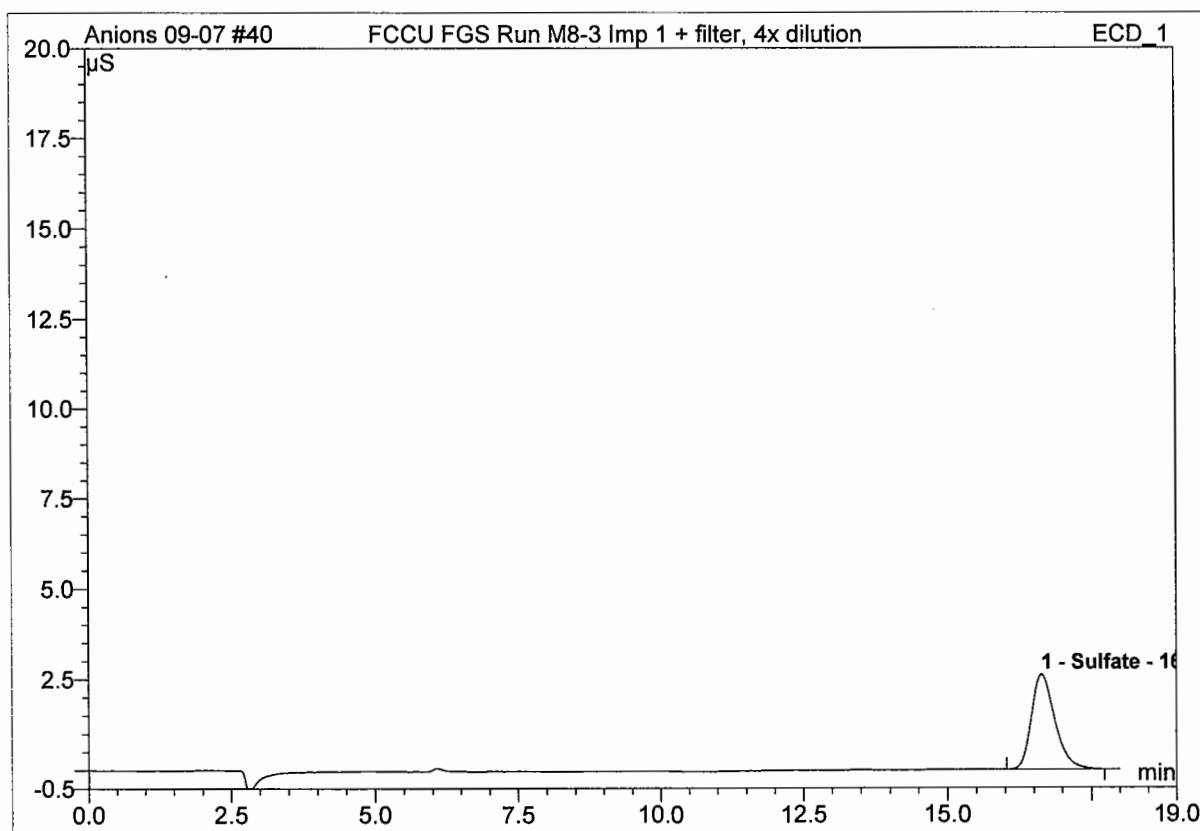
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/7/2007 9:38	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	16.62	Sulfate	2.269	1.076
Total:			2.269	1.076

40 FCCU FGS Run M8-3 Imp 1 + filter, 4x dilution

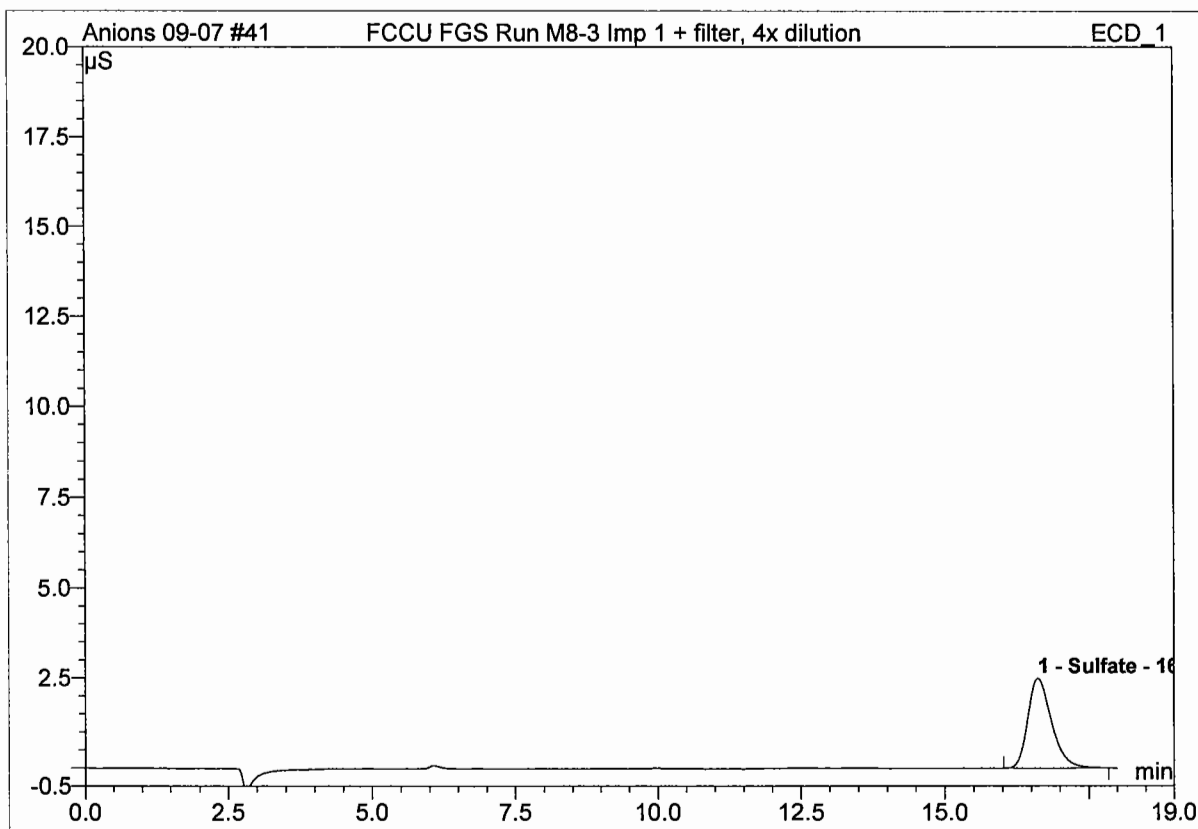
<i>Client</i>	Valero, Paulsboro NJ	<i>Injection Volume:</i>	35.0
<i>Vial Number:</i>	1	<i>Channel:</i>	ECD_1
<i>Sample Type:</i>	unknown	<i>Wavelength:</i>	n.a.
<i>Control Program:</i>	Anions 1000	<i>Bandwidth:</i>	n.a.
<i>Quantif. Method:</i>	ICS_1000_Anions	<i>Dilution Factor:</i>	1.0000
<i>Recording Time:</i>	9/7/2007 9:57	<i>Sample Weight:</i>	1.0000
<i>Run Time (min):</i>	18.00	<i>Sample Amount:</i>	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	16.64	Sulfate	2.618	1.234
Total:			2.618	1.234

41 FCCU FGS Run M8-3 Imp 1 + filter, 4x dilution

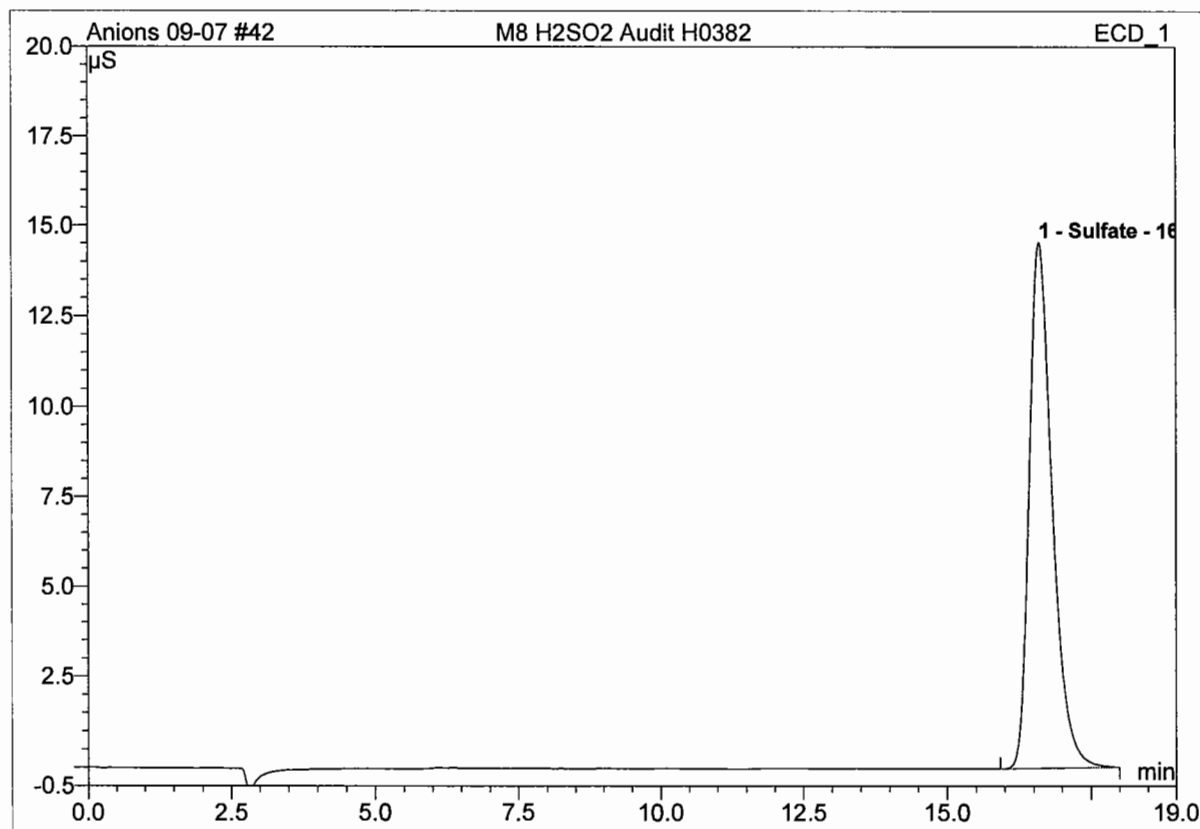
<i>Client</i>	Valero, Paulsboro NJ	<i>Injection Volume:</i>	35.0
<i>Vial Number:</i>	1	<i>Channel:</i>	ECD_1
<i>Sample Type:</i>	unknown	<i>Wavelength:</i>	n.a.
<i>Control Program:</i>	Anions 1000	<i>Bandwidth:</i>	n.a.
<i>Quantif. Method:</i>	ICS_1000_Anions	<i>Dilution Factor:</i>	1.0000
<i>Recording Time:</i>	9/7/2007 10:16	<i>Sample Weight:</i>	1.0000
<i>Run Time (min):</i>	18.00	<i>Sample Amount:</i>	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area $\mu\text{S}\cdot\text{min}$
1	16.62	Sulfate	2.497	1.191
Total:			2.497	1.191

42 M8 H2SO2 Audit H0382

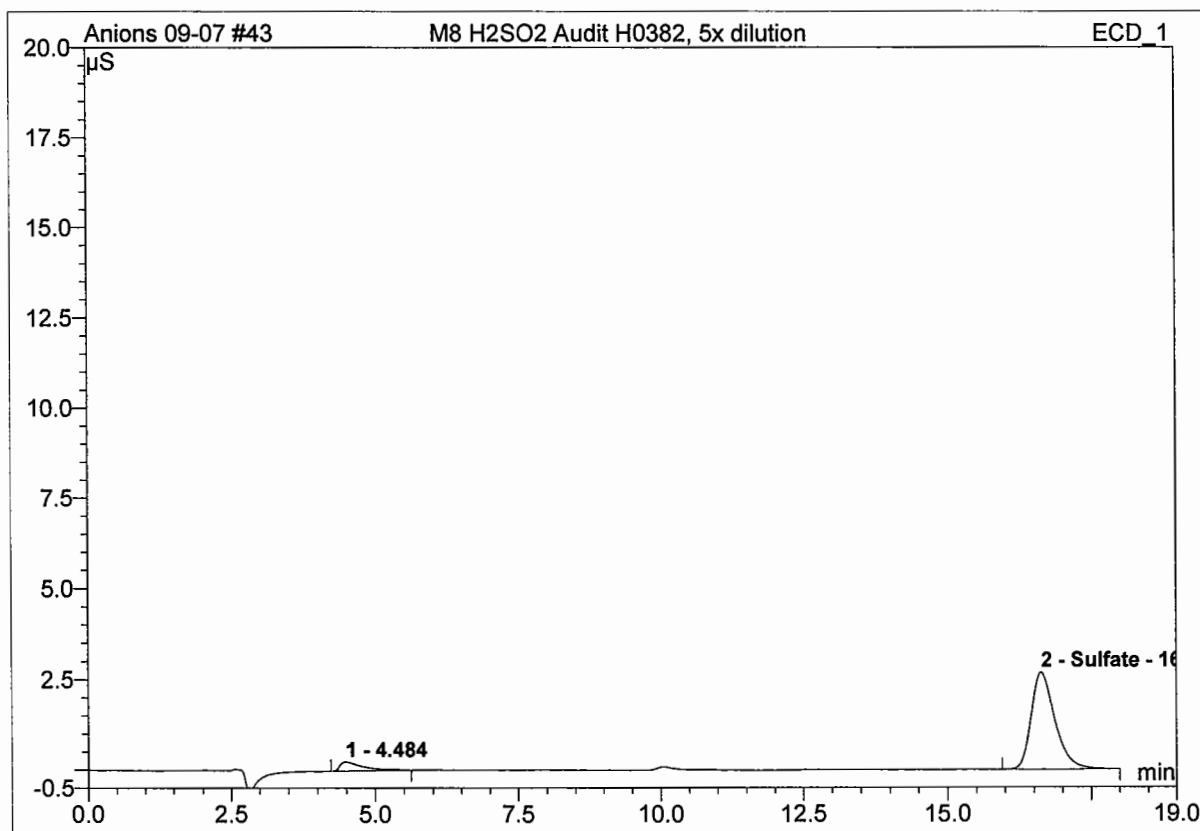
<i>Client</i>	Valero, Paulsboro NJ	<i>Injection Volume:</i>	35.0
<i>Vial Number:</i>	1	<i>Channel:</i>	ECD_1
<i>Sample Type:</i>	unknown	<i>Wavelength:</i>	n.a.
<i>Control Program:</i>	Anions 1000	<i>Bandwidth:</i>	n.a.
<i>Quantif. Method:</i>	ICS_1000_Anions	<i>Dilution Factor:</i>	1.0000
<i>Recording Time:</i>	9/7/2007 10:39	<i>Sample Weight:</i>	1.0000
<i>Run Time (min):</i>	18.00	<i>Sample Amount:</i>	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	16.60	Sulfate	14.546	6.750
Total:			14.546	6.750

43 M8 H2SO2 Audit H0382, 5x dilution

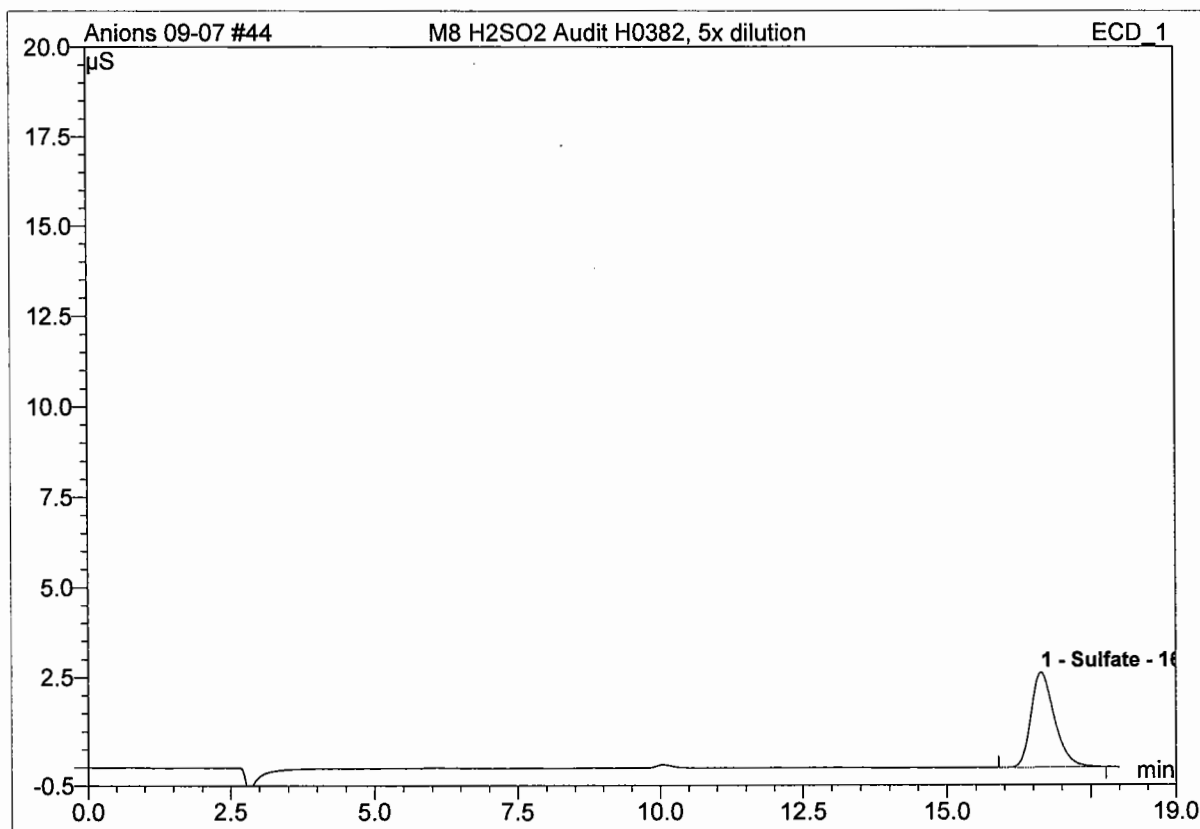
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/7/2007 11:12	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	16.63	Sulfate	2.693	1.297
Total:			2.693	1.297

44 M8 H2SO2 Audit H0382, 5x dilution

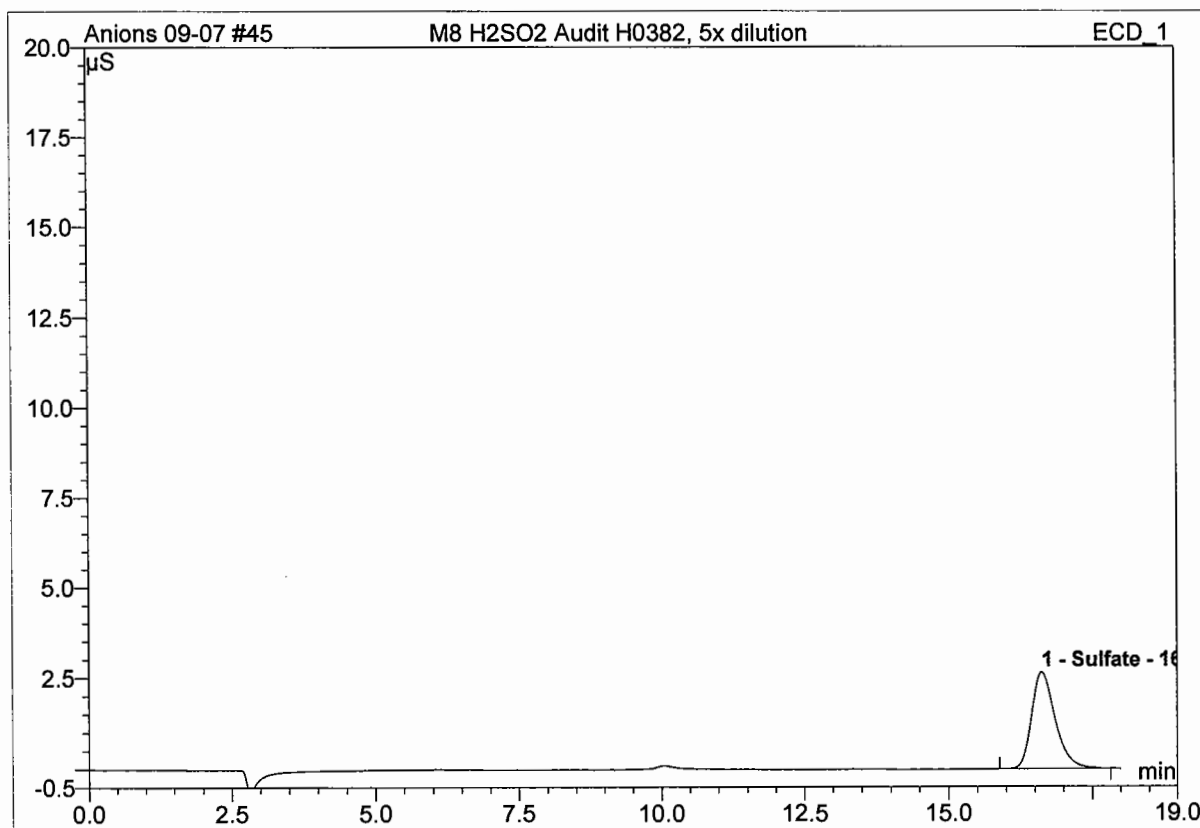
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/7/2007 11:31	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area $\mu\text{S}\cdot\text{min}$
1	16.64	Sulfate	2.648	1.255
Total:			2.648	1.255

45 M8 H2SO2 Audit H0382, 5x dilution

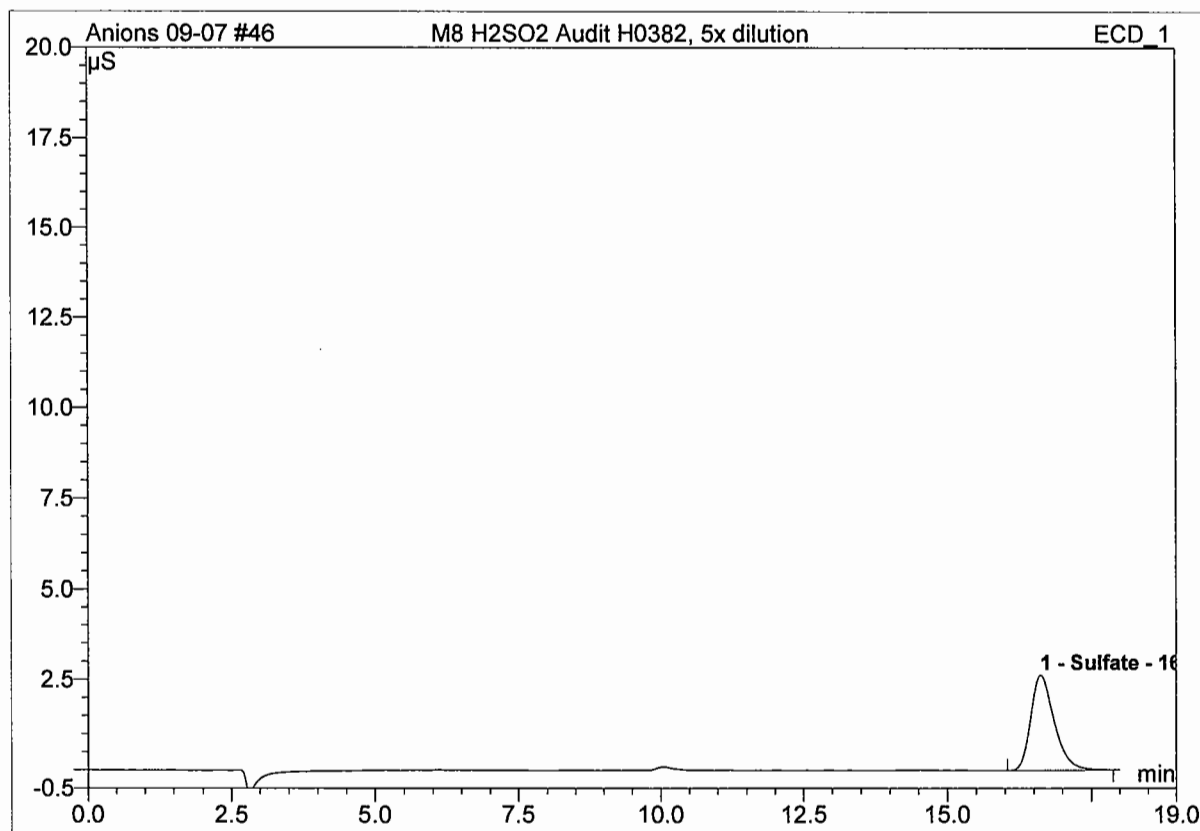
<i>Client</i>	Valero, Paulsboro NJ	<i>Injection Volume:</i>	35.0
<i>Vial Number:</i>	1	<i>Channel:</i>	ECD_1
<i>Sample Type:</i>	unknown	<i>Wavelength:</i>	n.a.
<i>Control Program:</i>	Anions 1000	<i>Bandwidth:</i>	n.a.
<i>Quantif. Method:</i>	ICS_1000_Anions	<i>Dilution Factor:</i>	1.0000
<i>Recording Time:</i>	9/7/2007 11:55	<i>Sample Weight:</i>	1.0000
<i>Run Time (min):</i>	18.00	<i>Sample Amount:</i>	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	16.62	Sulfate	2.657	1.263
Total:			2.657	1.263

46 M8 H2SO2 Audit H0382, 5x dilution

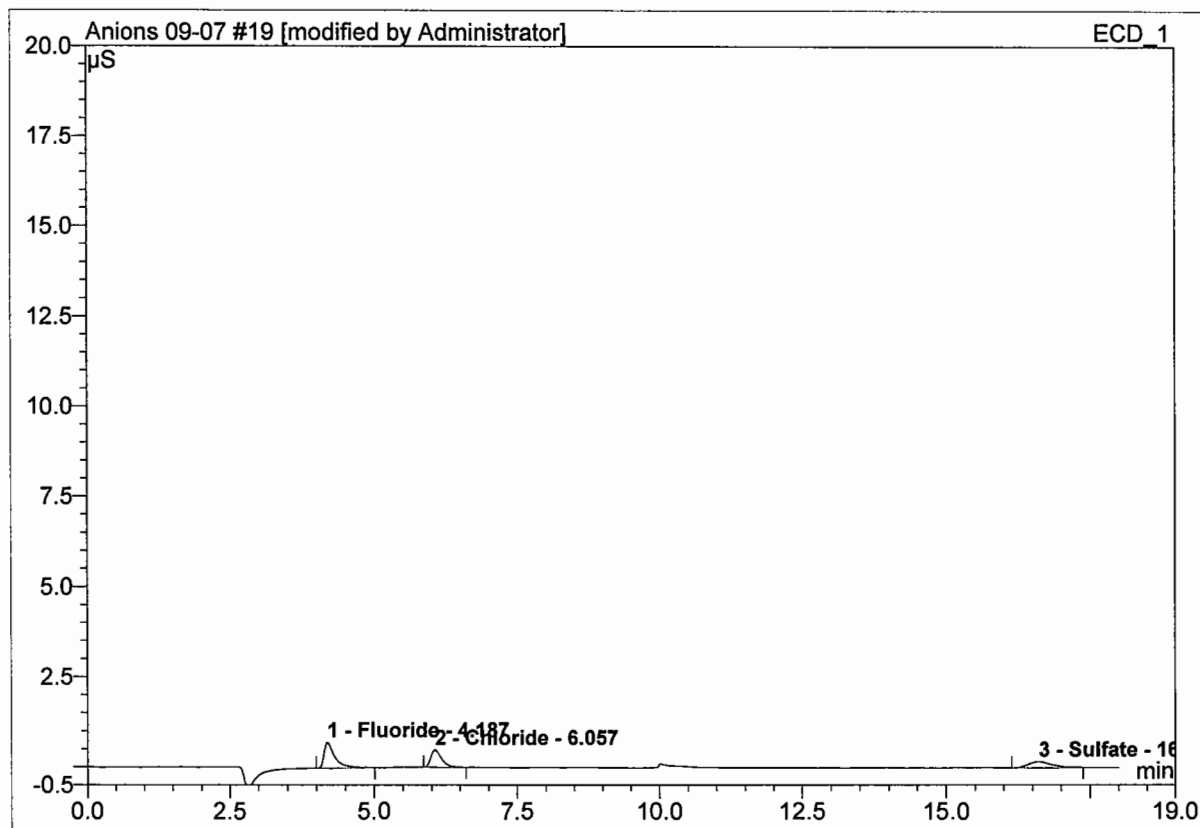
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/7/2007 12:14	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	16.62	Sulfate	2.639	1.254
Total:			2.639	1.254

19 1.0 ppm F, Cl and SO4 - pre

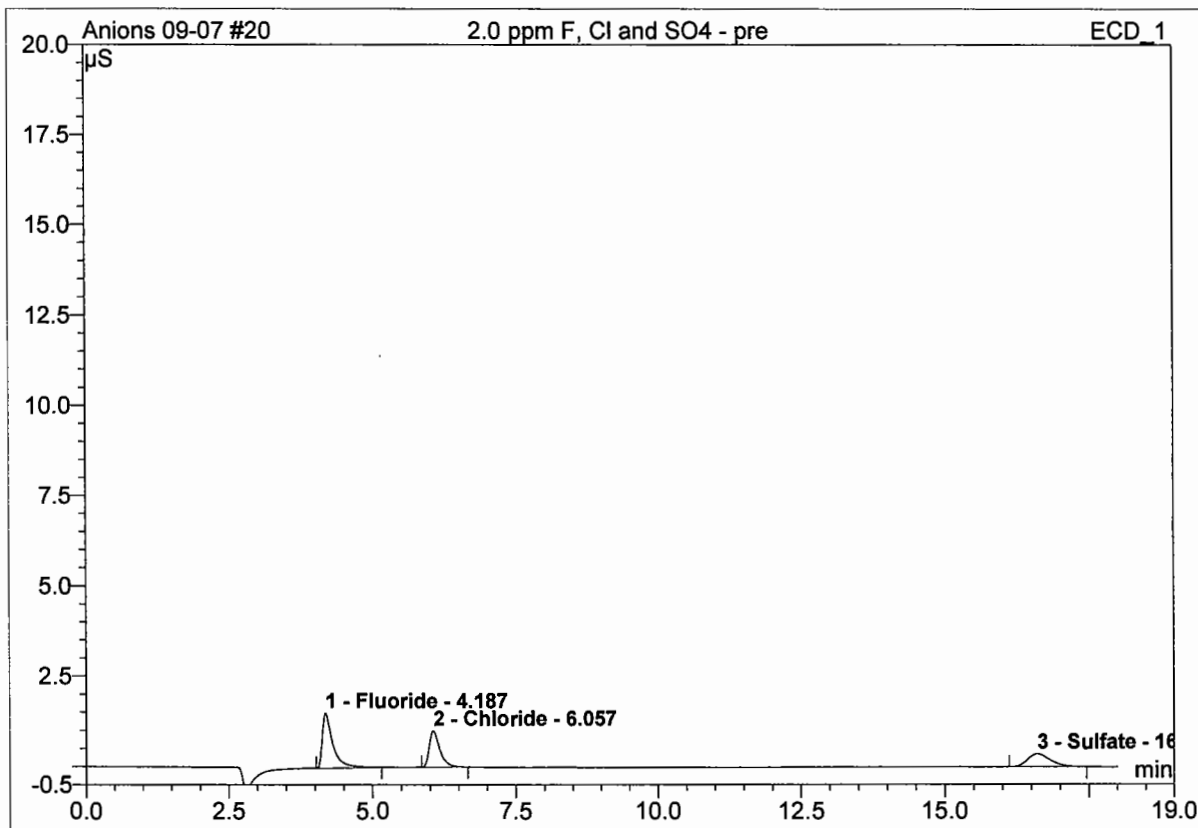
<i>Client</i>	Valero, Paulsboro NJ	<i>Injection Volume:</i>	35.0
<i>Vial Number:</i>	1	<i>Channel:</i>	ECD_1
<i>Sample Type:</i>	standard	<i>Wavelength:</i>	n.a.
<i>Control Program:</i>	Anions 1000	<i>Bandwidth:</i>	n.a.
<i>Quantif. Method:</i>	ICS_1000_Anions	<i>Dilution Factor:</i>	1.0000
<i>Recording Time:</i>	9/6/2007 12:12	<i>Sample Weight:</i>	1.0000
<i>Run Time (min):</i>	18.00	<i>Sample Amount:</i>	1.0000



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	4.19	Fluoride	0.717	0.153
2	6.06	Chloride	0.478	0.102
3	16.60	Sulfate	0.167	0.079
Total:			1.362	0.334

20 2.0 ppm F, Cl and SO4 - pre

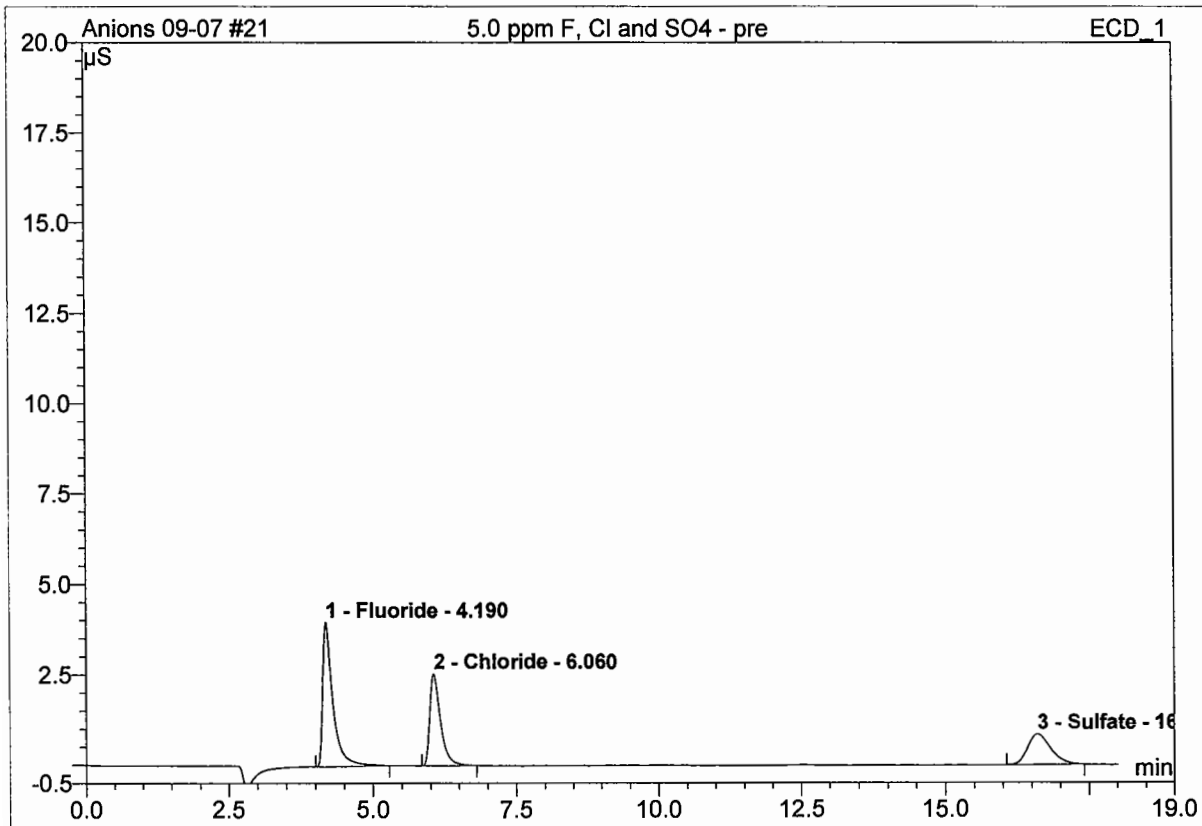
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	standard	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/6/2007 12:31	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	4.19	Fluoride	1.522	0.323
2	6.06	Chloride	1.002	0.216
3	16.60	Sulfate	0.364	0.169
Total:			2.888	0.708

21 5.0 ppm F, Cl and SO4 - pre

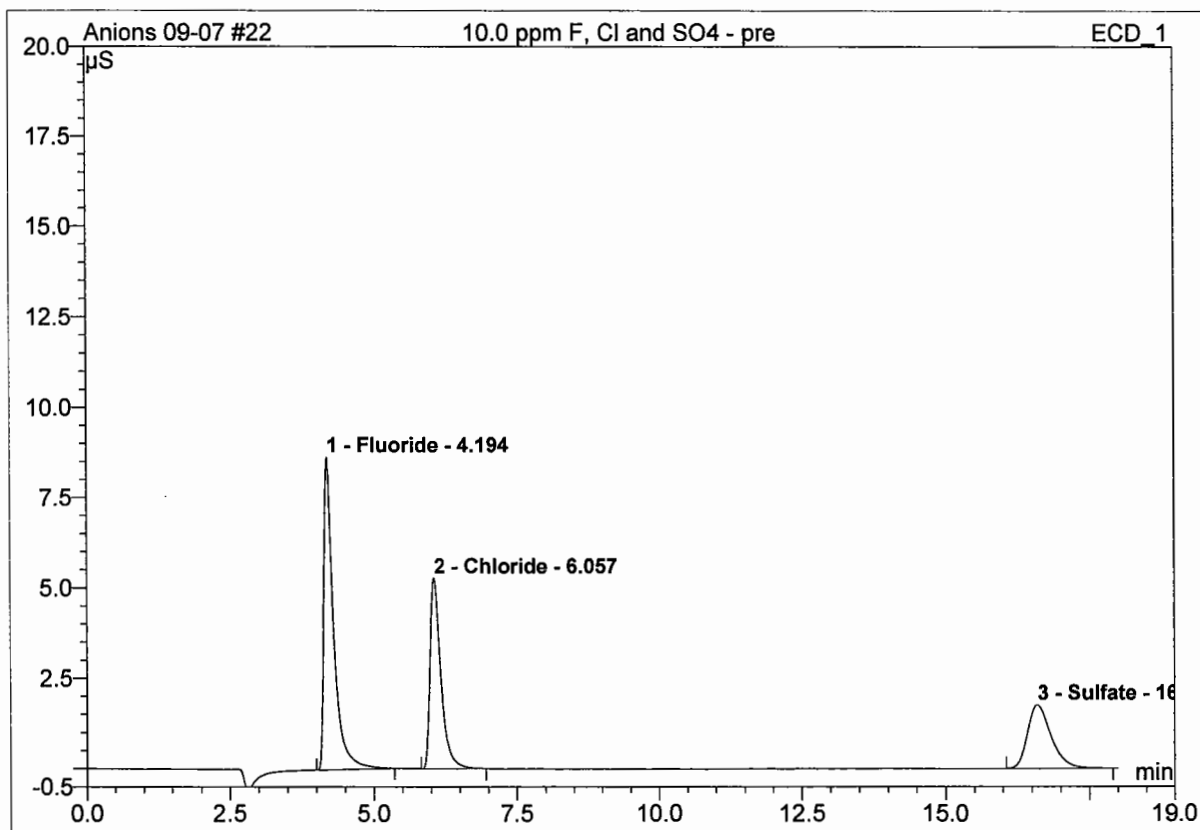
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	standard	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/6/2007 12:50	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	4.19	Fluoride	3.990	0.820
2	6.06	Chloride	2.542	0.554
3	16.60	Sulfate	0.851	0.398
Total:			7.383	1.771

22 10.0 ppm F, Cl and SO4 - pre

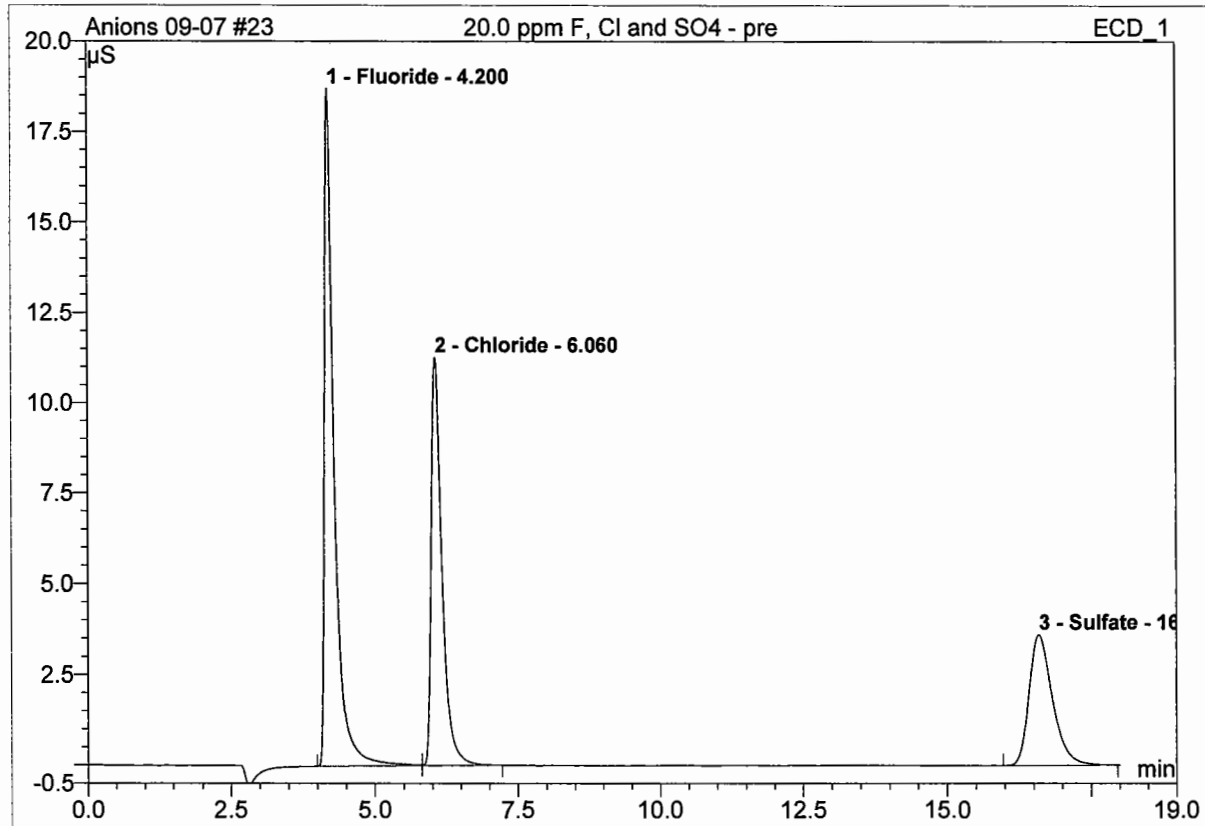
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	standard	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/6/2007 13:09	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	4.19	Fluoride	8.652	1.721
2	6.06	Chloride	5.268	1.148
3	16.60	Sulfate	1.764	0.840
Total:			15.684	3.710

23 20.0 ppm F, Cl and SO4 - pre

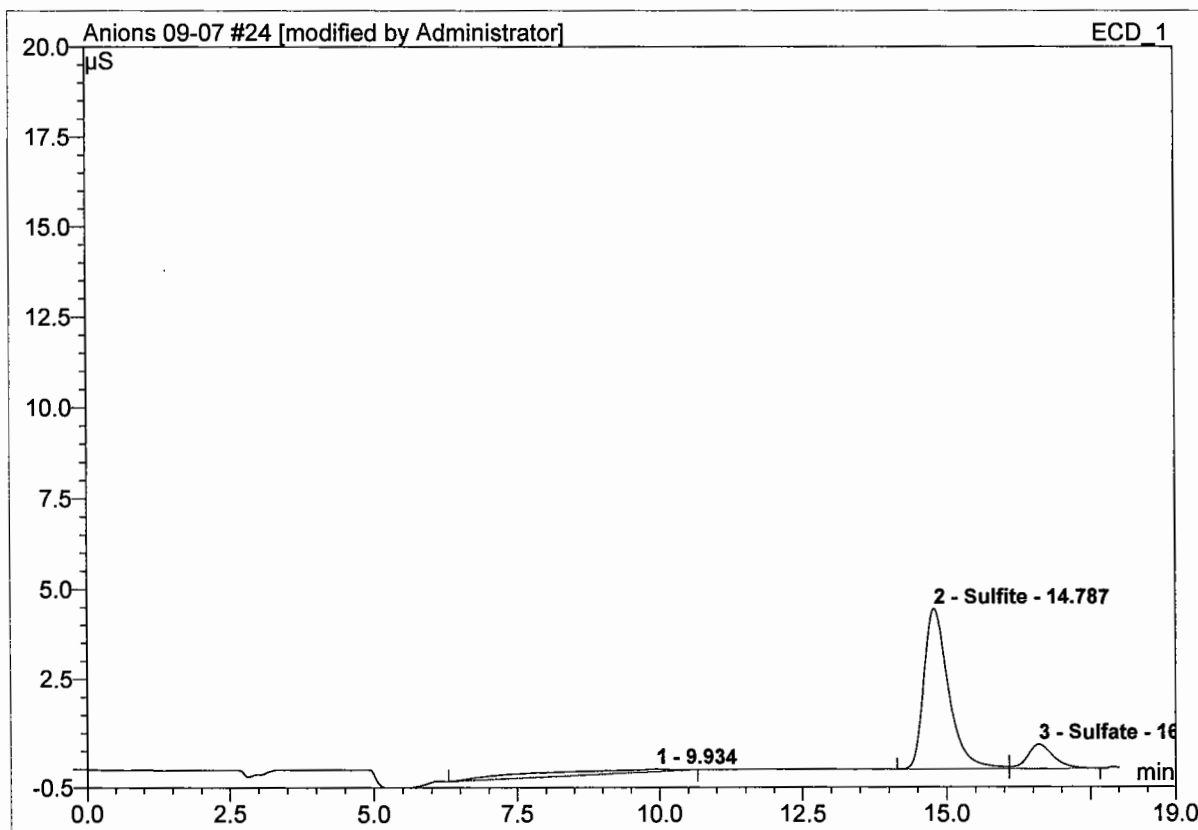
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	standard	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/6/2007 13:28	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	4.20	Fluoride	18.723	3.654
2	6.06	Chloride	11.276	2.441
3	16.59	Sulfate	3.611	1.709
Total:			33.610	7.803

24 50.0 ppm SO3 - pre

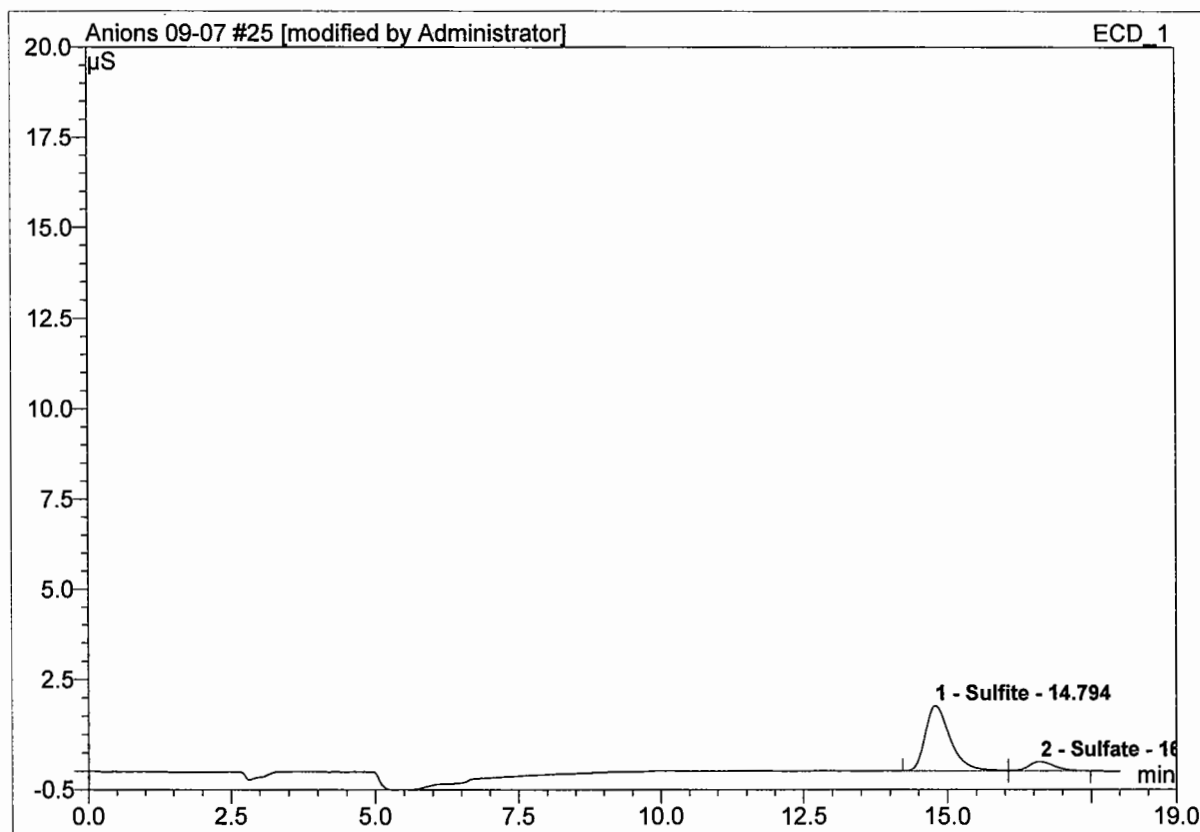
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	standard	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/6/2007 13:56	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
2	14.79	Sulfite	4.453	2.202
3	16.60	Sulfate	0.670	0.350
Total:			5.123	2.552

25 20.0 ppm SO3 - pre

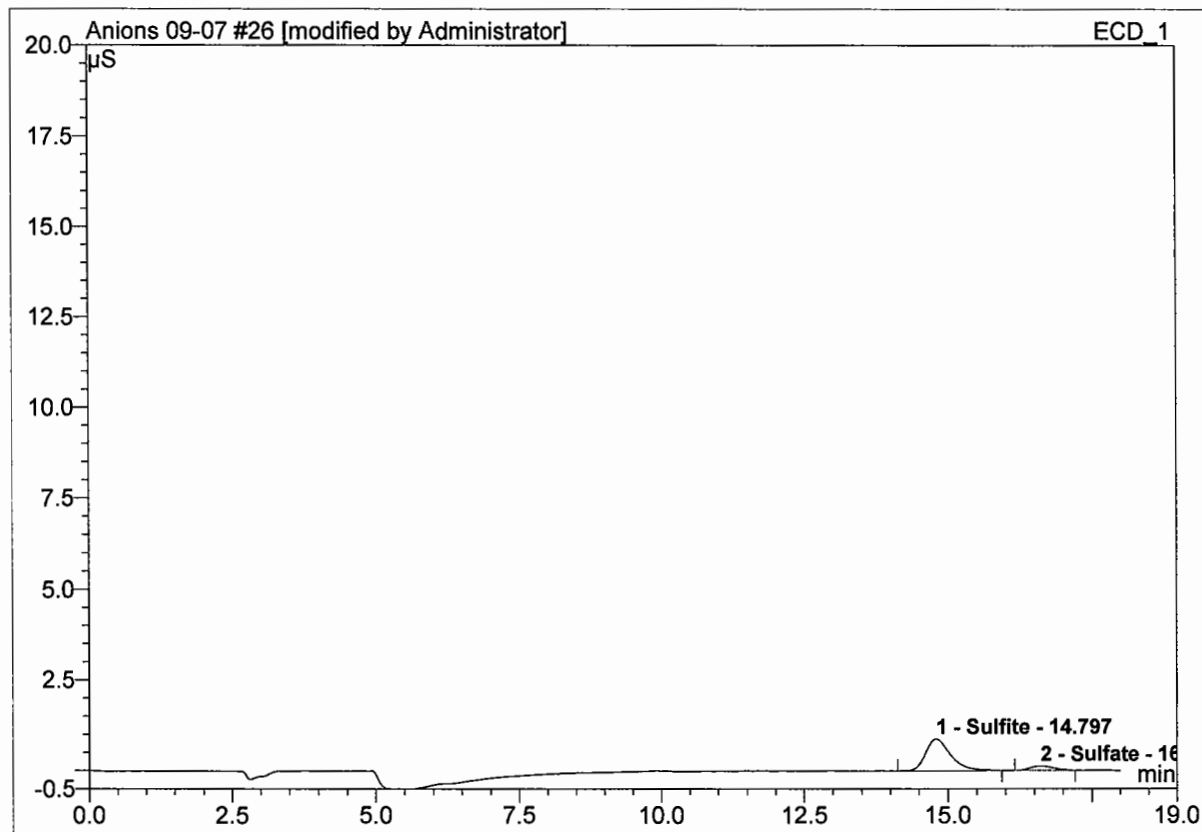
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	standard	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/6/2007 14:19	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area $\mu\text{S}\cdot\text{min}$
1	14.79	Sulfite	1.786	0.892
2	16.62	Sulfate	0.252	0.133
Total:			2.038	1.024

26 10.0 ppm SO3 - pre

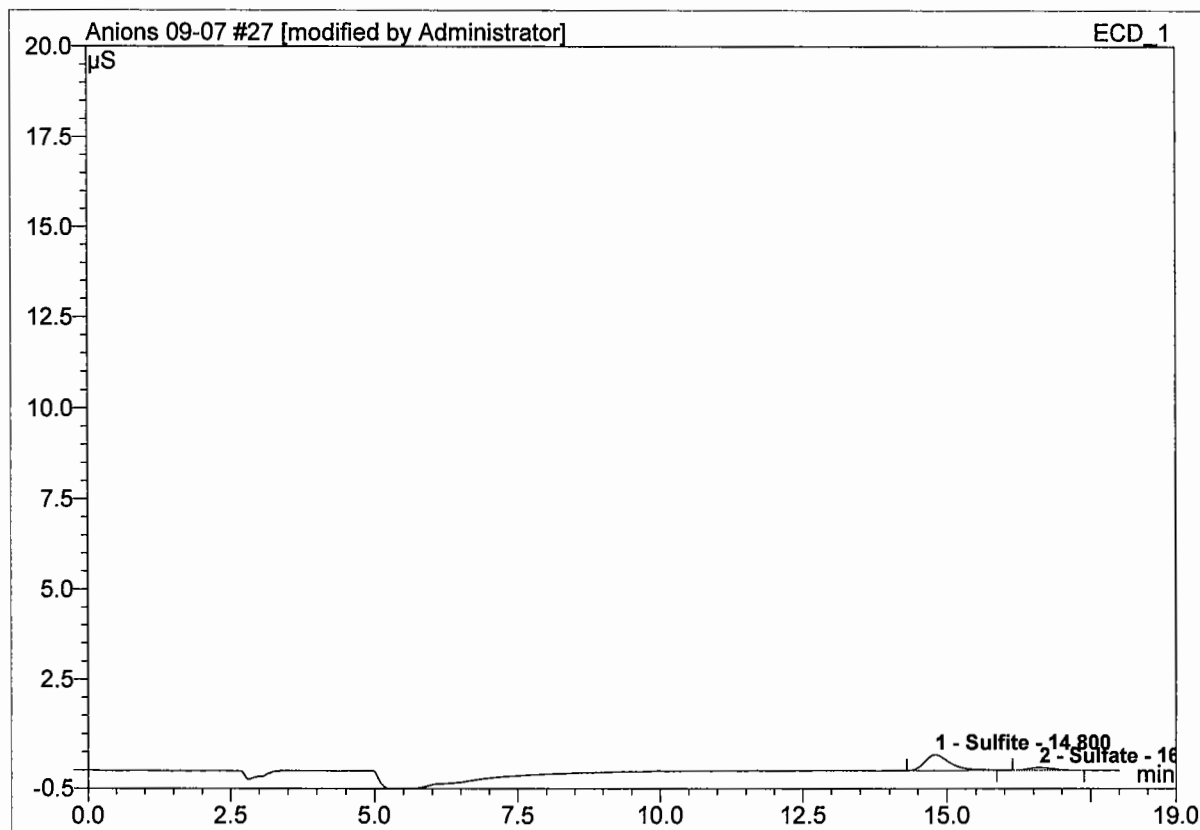
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	standard	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/6/2007 14:43	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	14.80	Sulfite	0.881	0.444
2	16.61	Sulfate	0.119	0.057
Total:			1.000	0.500

27 5.0 ppm SO3 - pre

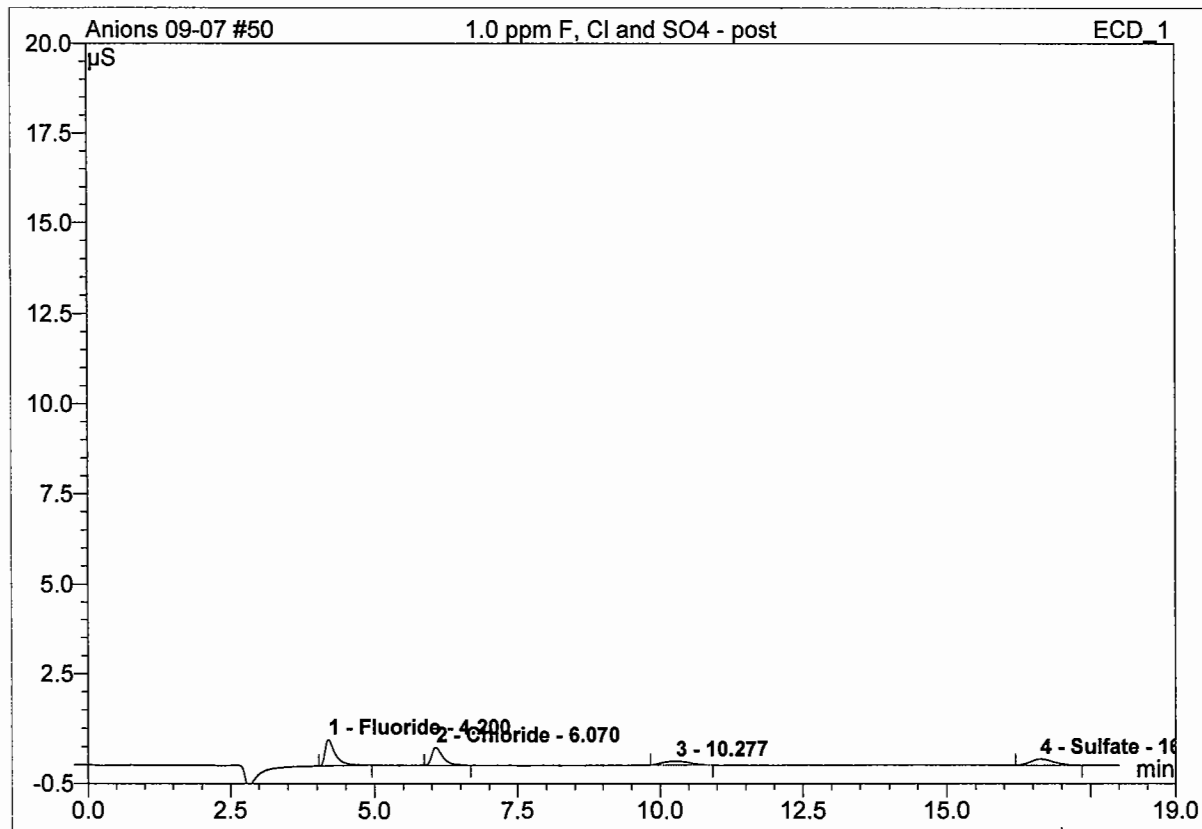
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	standard	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/6/2007 15:05	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	14.80	Sulfite	0.426	0.212
2	16.60	Sulfate	0.070	0.033
Total:			0.496	0.245

50 1.0 ppm F, Cl and SO4 - post

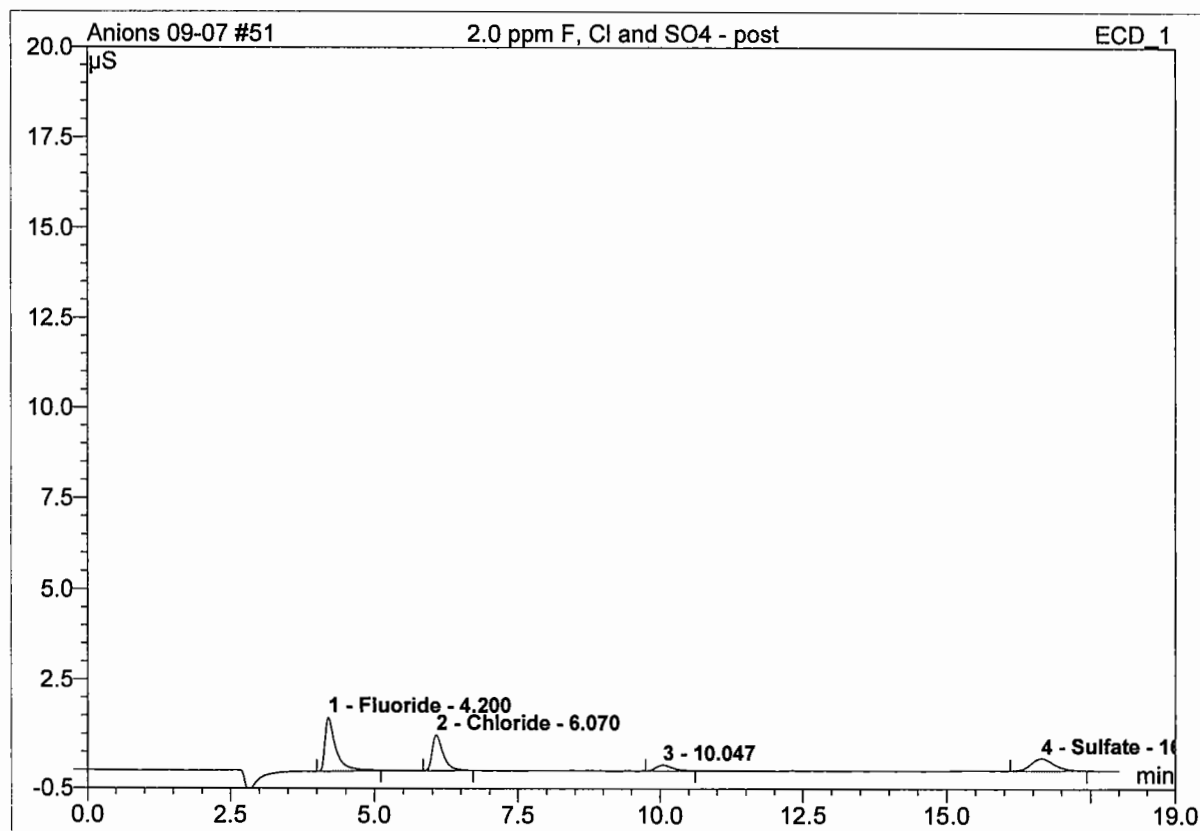
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	standard	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/7/2007 13:53	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	4.20	Fluoride	0.717	0.150
2	6.07	Chloride	0.491	0.109
4	16.63	Sulfate	0.169	0.078
Total:			1.378	0.337

51 2.0 ppm F, Cl and SO4 - post

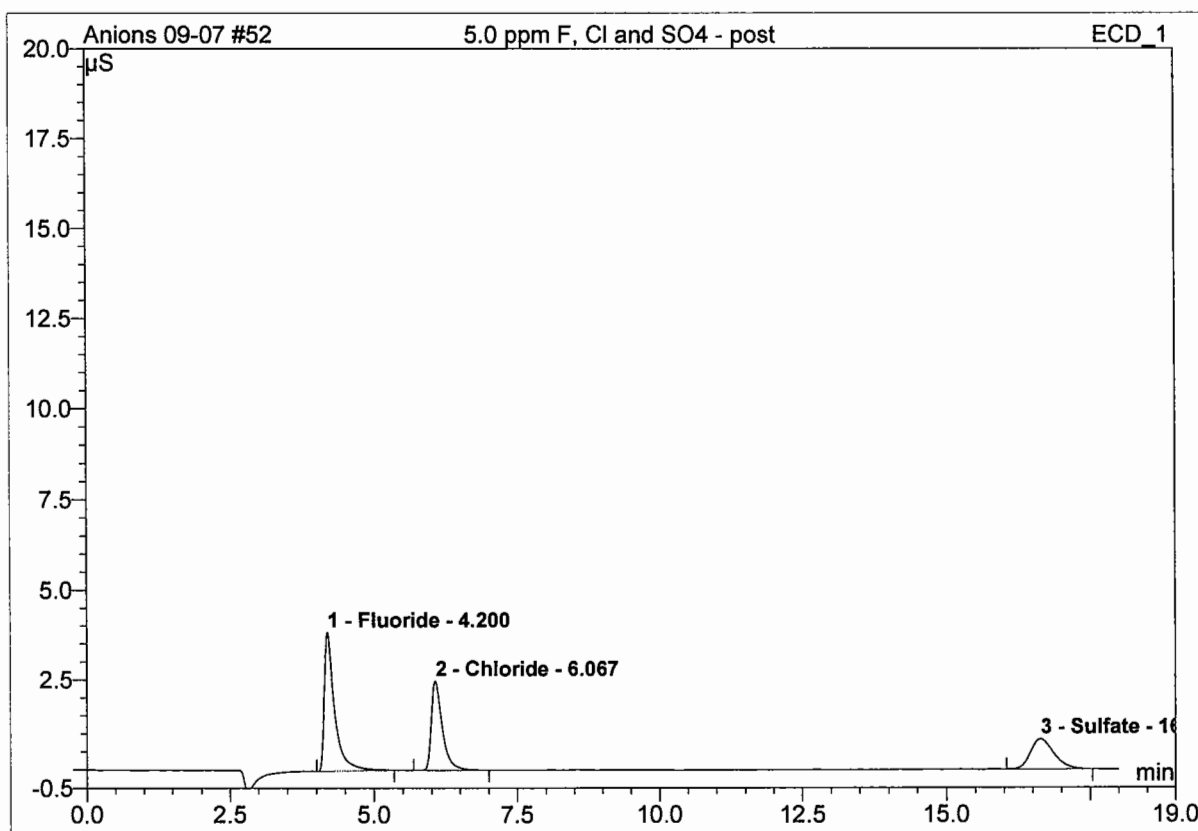
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	standard	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/7/2007 14:12	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	4.20	Fluoride	1.485	0.319
2	6.07	Chloride	0.985	0.217
4	16.64	Sulfate	0.343	0.161
Total:			2.813	0.697

52 5.0 ppm F, Cl and SO4 - post

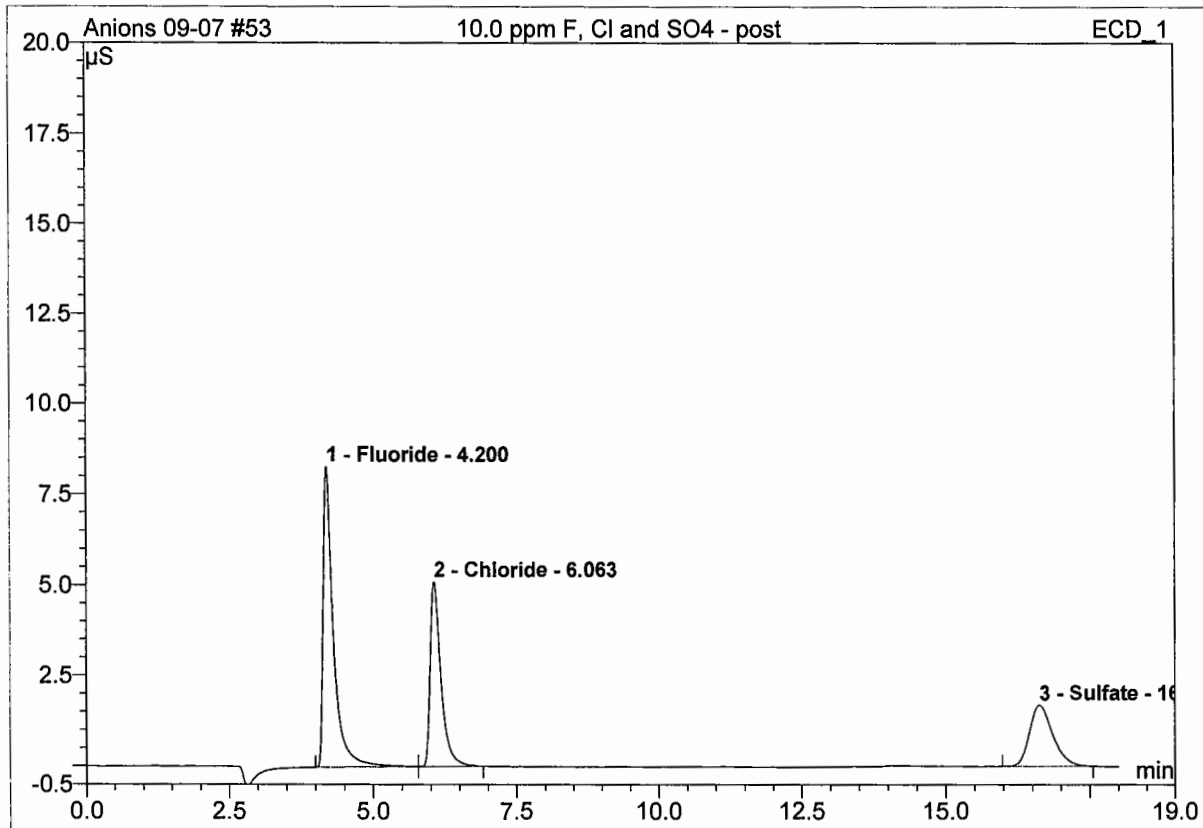
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	standard	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/7/2007 14:31	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	4.20	Fluoride	3.857	0.807
2	6.07	Chloride	2.475	0.551
3	16.64	Sulfate	0.841	0.396
Total:			7.173	1.754

53 10.0 ppm F, Cl and SO4 - post

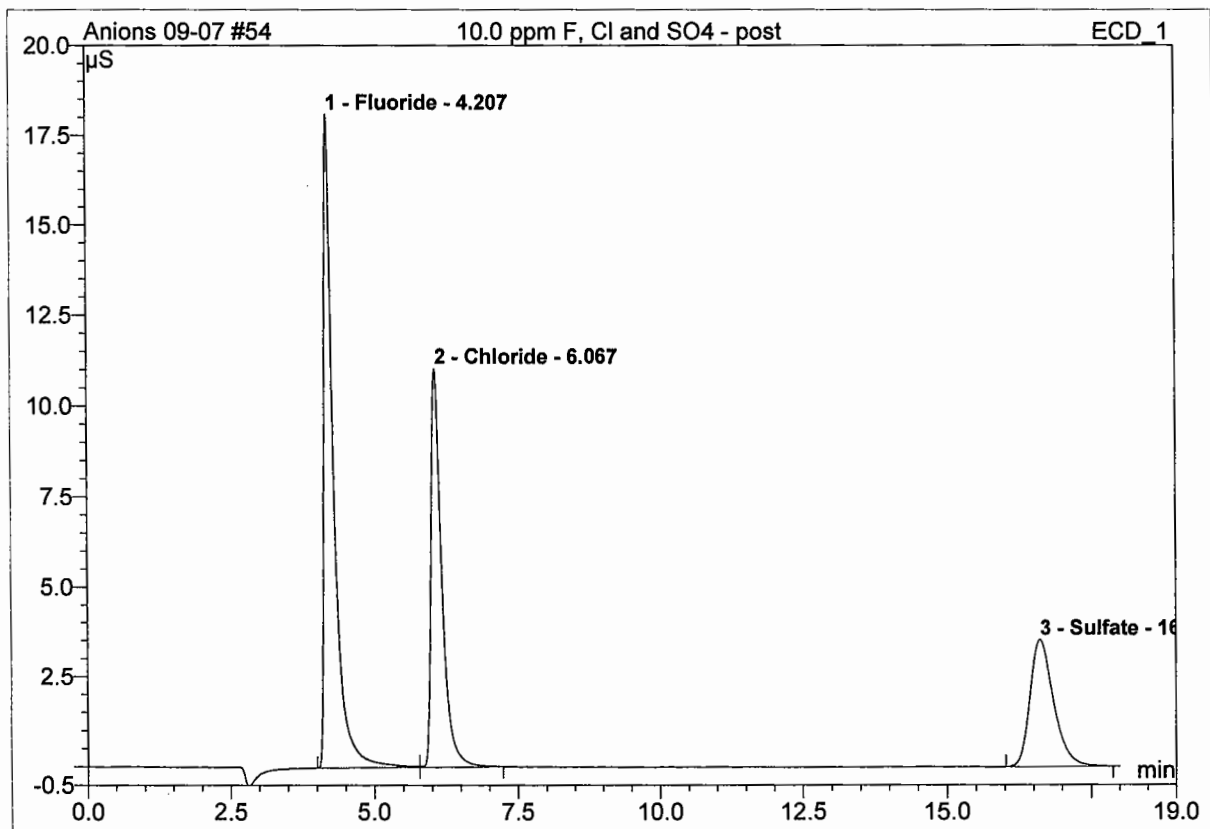
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	standard	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/7/2007 14:50	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret. Time min	Peak Name	Height μS	Area μS*min
1	4.20	Fluoride	8.292	1.701
2	6.06	Chloride	5.100	1.121
3	16.63	Sulfate	1.689	0.800
Total:			15.081	3.622

54 ² ~~10.0~~ ppm F, Cl and SO4 - post
46✓

Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	standard	Wavelength:	n.a.
Control Program:	Anions 1000	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Anions	Dilution Factor:	1.0000
Recording Time:	9/7/2007 15:09	Sample Weight:	1.0000
Run Time (min):	18.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	4.21	Fluoride	18.103	3.579
2	6.07	Chloride	11.020	2.401
3	16.61	Sulfate	3.519	1.670
Total:			32.642	7.649

Valero, Paulsboro NJ; FCCU FGS; 8/29/07
Sodium Determination

Calibration Curve Calculation

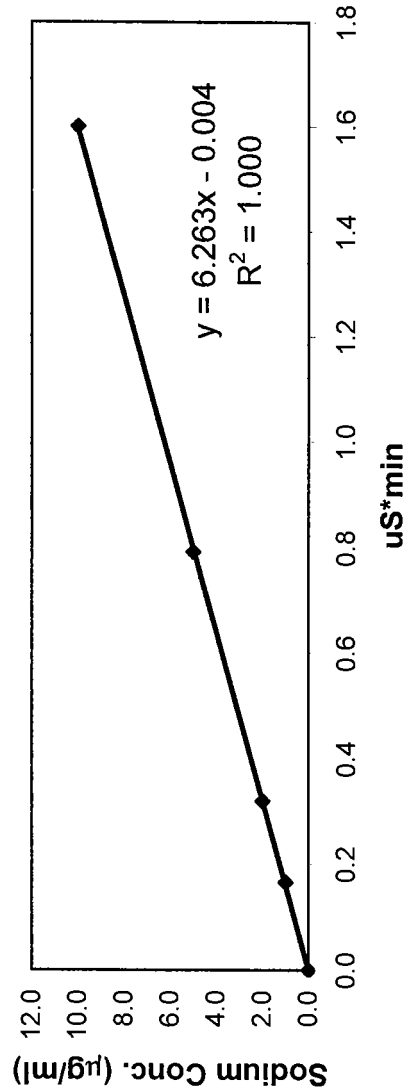
Std. (µg/ml)	Pre Cal (µS*min)	Post Cal (µS*min)	Average (µS*min)	Deviation (%)
0.0	0.00	0.00	0.00	0.00
1.0	0.167	0.165	0.166	0.60
2.0	0.319	0.319	0.319	0.00
5.0	0.791	0.793	0.792	-0.13
10.0	1.594	1.607	1.601	-0.41

Sample Concentration Calculations

Sample Description	Analysis 1 (µS*min)	Analysis 2 (µS*min)	Average (µS*min)	Deviation (%)	Concentration (µg/ml)	Sample volume(ml)
M8-1 IPA Imp & Filter	0.914	0.916	0.915	-0.1	5.73	1000
M8-2 IPA Imp & Filter	0.638	0.657	0.648	-1.5	4.05	1000
M8-3 IPA Imp & Filter	0.672	0.663	0.668	0.7	4.18	1000
80% IPA Blank & Filter	0.138	0.139	0.139	-0.4	0.86	1000

Analyst: E. Vogt
Date Done: 09/25/07

Sodium Calibration Curve



Sodium

<u>Conc. Ug/ml</u>	<u>Peak Area</u>	<u>calc</u>	<u>% Dif</u>
0.0	0.000	0.000	
1.0	0.166	0.166	1.0
2.0	0.319	0.160	2.0
5.0	0.792	0.158	4.9
10.0	1.601	0.160	9.9
			3.11
			-0.92
			-1.61
			-0.58

mean RF-----: 0.1610

Valero, Paulsboro NJ; FCCU FGS; 8/29/07
Potassium Determination

Calibration Curve Calculation

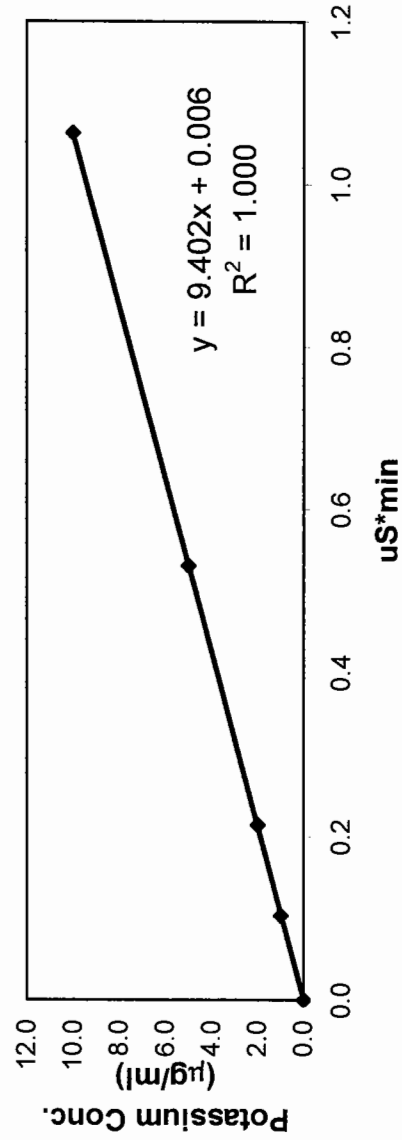
Std. ($\mu\text{g/ml}$)	Pre Cal ($\mu\text{S}\cdot\text{min}$)	Post Cal ($\mu\text{S}\cdot\text{min}$)	Average ($\mu\text{S}\cdot\text{min}$)	Deviation (%)
0.0	0.00	0.00	0.00	0.00
1.0	0.108	0.099	0.104	4.35
2.0	0.212	0.216	0.214	-0.93
5.0	0.531	0.530	0.531	0.09
10.0	1.062	1.064	1.063	-0.09

Sample Concentration Calculations

Sample Description	Analysis 1 ($\mu\text{S}\cdot\text{min}$)	Analysis 2 ($\mu\text{S}\cdot\text{min}$)	Average ($\mu\text{S}\cdot\text{min}$)	Deviation (%)	Concentration ($\mu\text{g/ml}$)	Sample volume(ml)
M8-1 IPA Imp & Filter	0.147	0.145	0.146	0.7	1.38	1000
M8-2 IPA Imp & Filter	0.092	0.098	0.095	-3.2	0.90	1000
M8-3 IPA Imp & Filter	0.092	0.086	0.089	3.4	0.84	1000
80% IPA Blank & Filter	0.011	0.011	0.011	0.0	0.11	1000

Analyst: E. Vogt
 Date Done: 09/25/07

Potassium Calibration Curve



Potassium

<u>Conc. Ug/ml</u>	<u>Peak Area</u>	<u>calc</u>	<u>% Dif</u>	
1.0	0.104	0.104	1.0	-2.10
2.0	0.214	0.107	2.0	1.21
5.0	0.531	0.106	5.0	0.35
10.0	1.063	0.106	10.1	0.54

mean RF-----: 0.1057

Valero, Paulsboro NJ; FCCU FGS; 8/29/07
Calcium Determination

Calibration Curve Calculation

Std. (µg/ml)	Pre Cal (µS*min)	Post Cal (µS*min)	Average (µS*min)	Deviation (%)
0.0	0.00	0.00	0.00	0.00
1.0	0.190	0.184	0.187	1.60
2.0	0.386	0.390	0.388	-0.52
5.0	0.981	0.979	0.980	0.10
10.0	1.965	1.980	1.973	-0.38

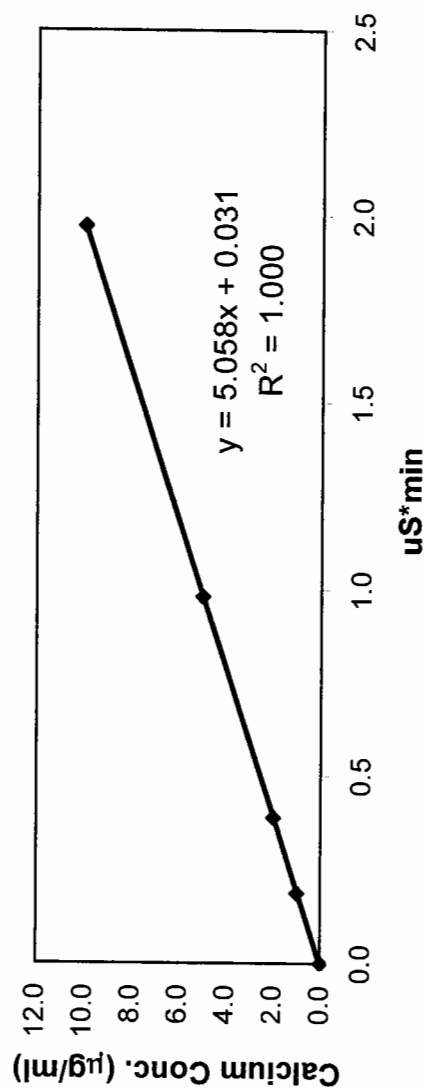
Sample Concentration Calculations

Sample Description	Analysis 1 (µS*min)	Analysis 2 (µS*min)	Average (µS*min)	Deviation (%)	Concentration (µg/ml)	Sample volume(ml)
M8-1 IPA Imp & Filter	0.238	0.229	0.234	1.9	1.21	1000
M8-2 IPA Imp & Filter	0.117	0.120	0.119	-1.3	0.63	1000
M8-3 IPA Imp & Filter	0.112	0.113	0.113	-0.4	0.60	1000
80% IPA Blank & Filter	0.009	0.009	0.009	0.0	0.08	1000

Analyst: E. Vogt

Date Done: 09/25/07

Calcium Calibration Curve



<u>Calcium</u>	<u>Conc. Ug/ml</u>	<u>Peak Area</u>	<u>RE</u>	<u>Cal Conc</u>	<u>% Dif</u>
	1.0	0.187	0.187	1.0	-3.39
	2.0	0.388	0.194	2.0	0.23
	5.0	0.980	0.196	5.1	1.26
	10.0	1.973	0.197	10.2	1.91
mean RF-----:		0.1936			

Valero, Paulsboro NJ; FCCU FGS; 8/29/07
Ammonium Determination

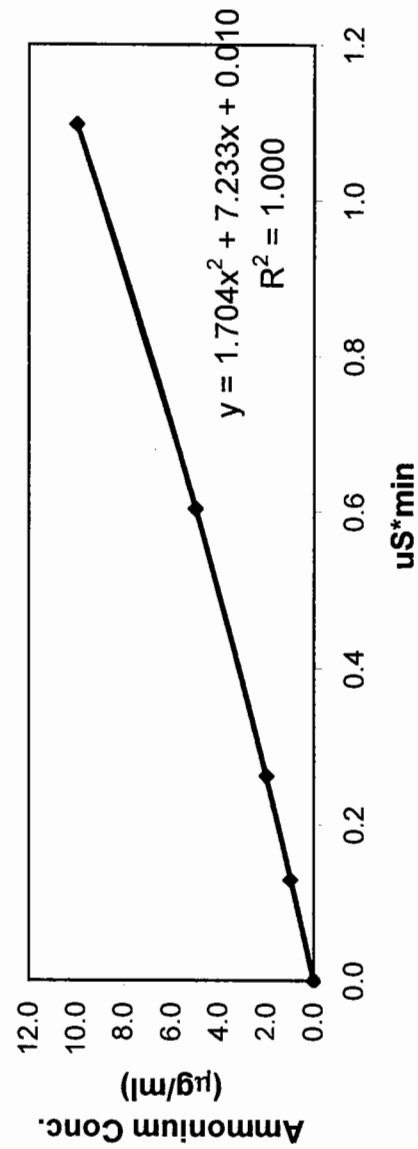
Calibration Curve Calculation				
Std. ($\mu\text{g/ml}$)	Pre Cal ($\mu\text{S}^*\text{min}$)	Post Cal ($\mu\text{S}^*\text{min}$)	Average ($\mu\text{S}^*\text{min}$)	Deviation (%)
0.0	0.00	0.00	0.00	0.00
1.0	0.133	0.125	0.129	3.10
2.0	0.261	0.263	0.262	-0.38
5.0	0.603	0.604	0.604	-0.08
10.0	1.093	1.102	1.098	-0.41

Sample Concentration Calculations

Sample Description	Analysis 1 ($\mu\text{S}^*\text{min}$)	Analysis 2 ($\mu\text{S}^*\text{min}$)	Average ($\mu\text{S}^*\text{min}$)	Deviation (%)	Concentration ($\mu\text{g/ml}$)	Dilution Factor	Sample volume(ml)
M8-1 IPA Imp & Filter	0.817	0.819	0.818	-0.1	7.07	2	1000
M8-2 IPA Imp & Filter	0.742	0.743	0.743	-0.1	6.32	2	1000
M8-3 IPA Imp & Filter	0.715	0.710	0.713	0.4	6.03	2	1000
80% IPA Blank & Filter	<0.010	<0.010	<0.010	0.0	<0.08	1	1000

Analyst: E. Vogt
Date Done: 09/25/07

Ammonium Calibration Curve



Ammonia

<u>Conc. Uq/ml</u>	<u>Peak Area</u>	<u>calc</u>	<u>% Dif</u>
0.0	0.000	0.010	
1.0	0.129	0.971	2.86
2.0	0.262	2.022	1.10
5.0	0.604	4.996	0.09
10.0	1.098	10.001	0.01

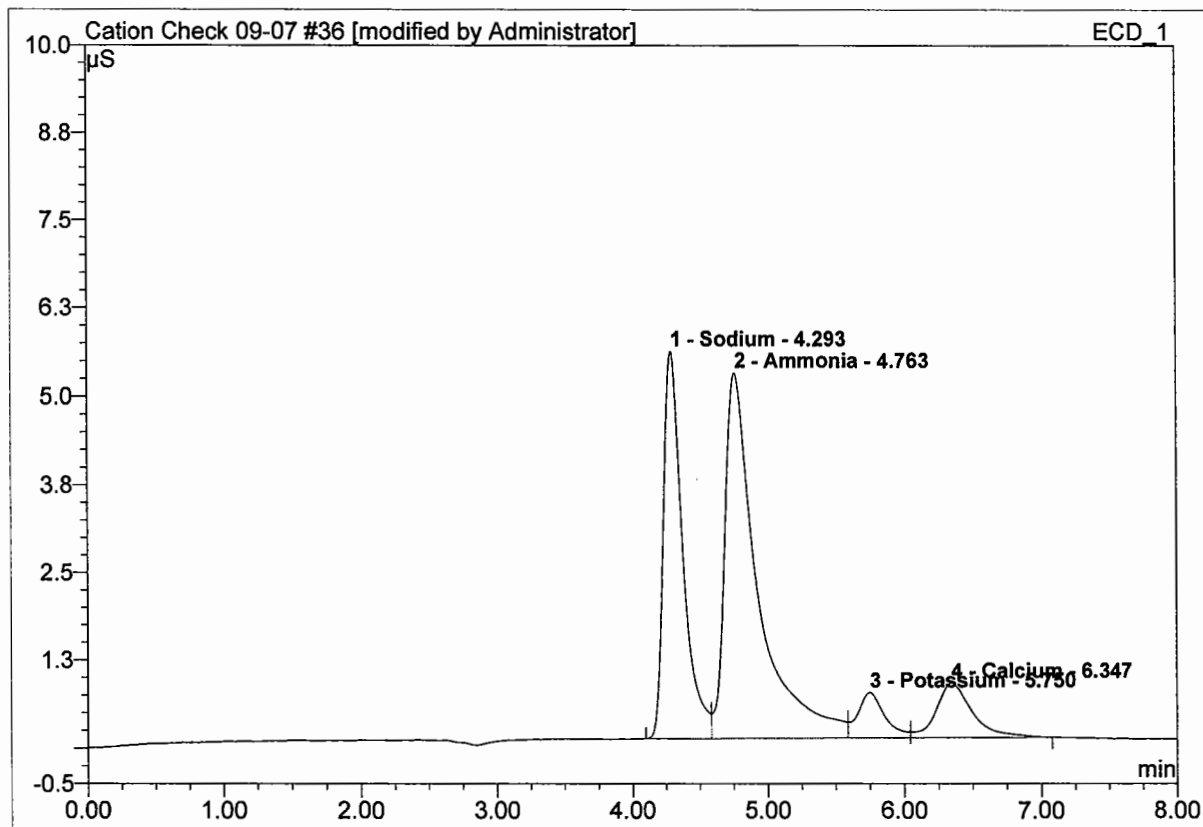
A = 1.704

B = 7.233

C = 0.01

36 FCCU FGS Run M8-1 Imp 1 & Filter

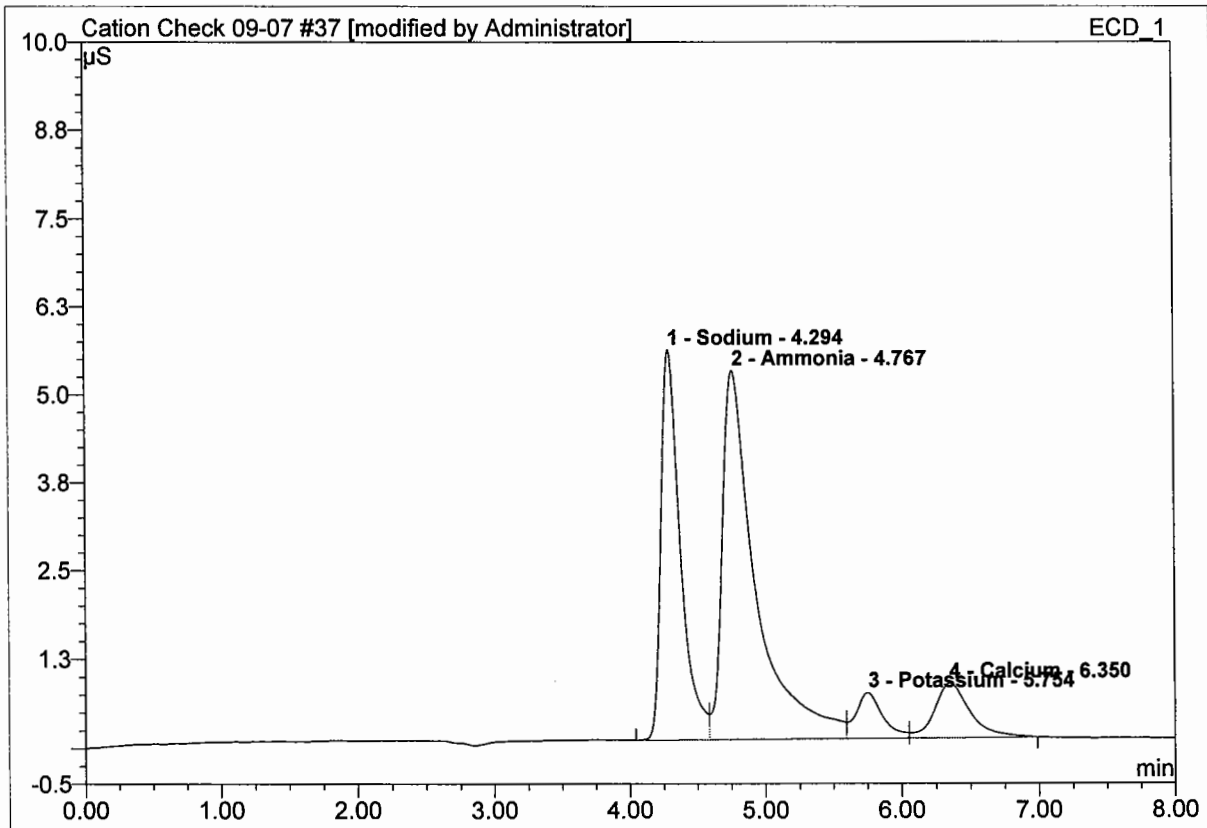
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	ICS_1000_Cations	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Cations	Dilution Factor:	1.0000
Recording Time:	9/21/2007 5:00	Sample Weight:	1.0000
Run Time (min):	8.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	4.29	Sodium	5.499	0.914
2	4.76	Ammonia	5.191	1.476
3	5.75	Potassium	0.644	0.147
4	6.35	Calcium	0.776	0.238
Total:			12.110	2.775

37 FCCU FGS Run M8-1 Imp 1 & Filter

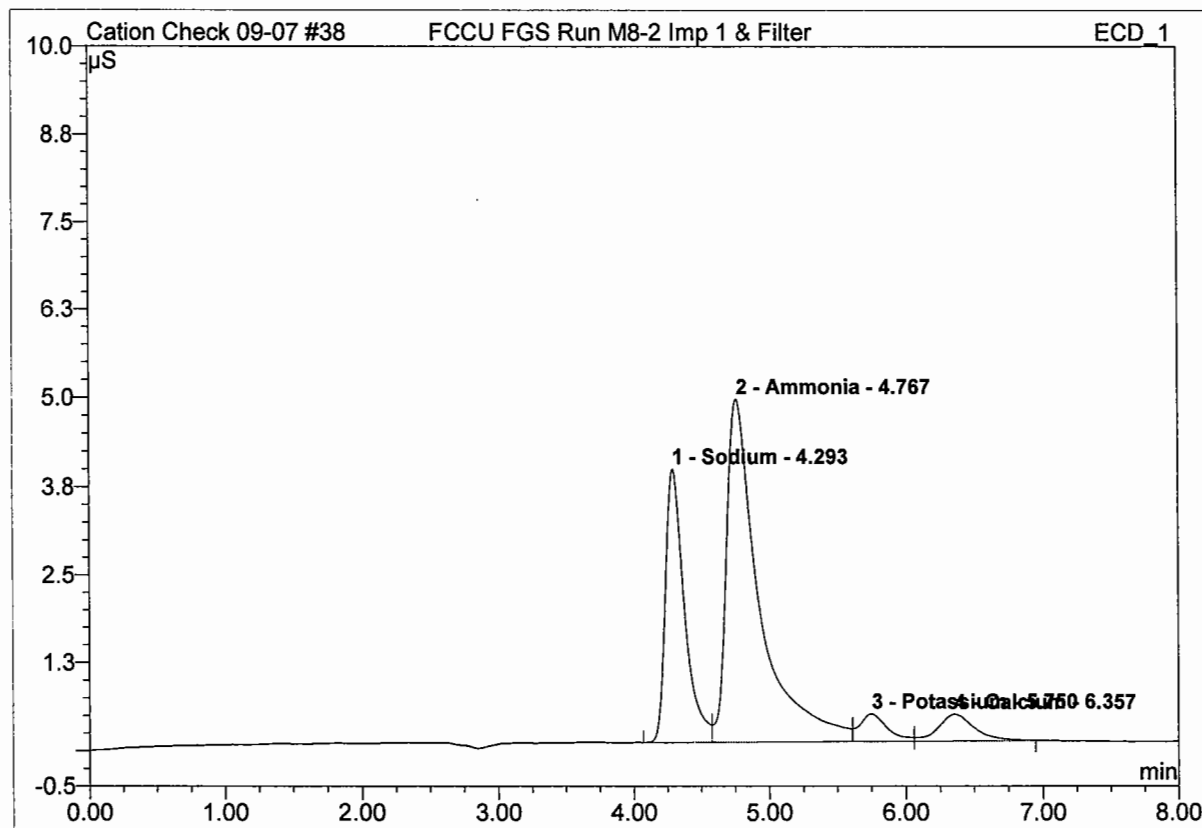
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	ICS_1000_Cations	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Cations	Dilution Factor:	1.0000
Recording Time:	9/21/2007 5:10	Sample Weight:	1.0000
Run Time (min):	8.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	4.29	Sodium	5.516	0.916
2	4.77	Ammonia	5.214	1.488
3	5.75	Potassium	0.638	0.145
4	6.35	Calcium	0.763	0.229
Total:			12.132	2.778

38 FCCU FGS Run M8-2 Imp 1 & Filter

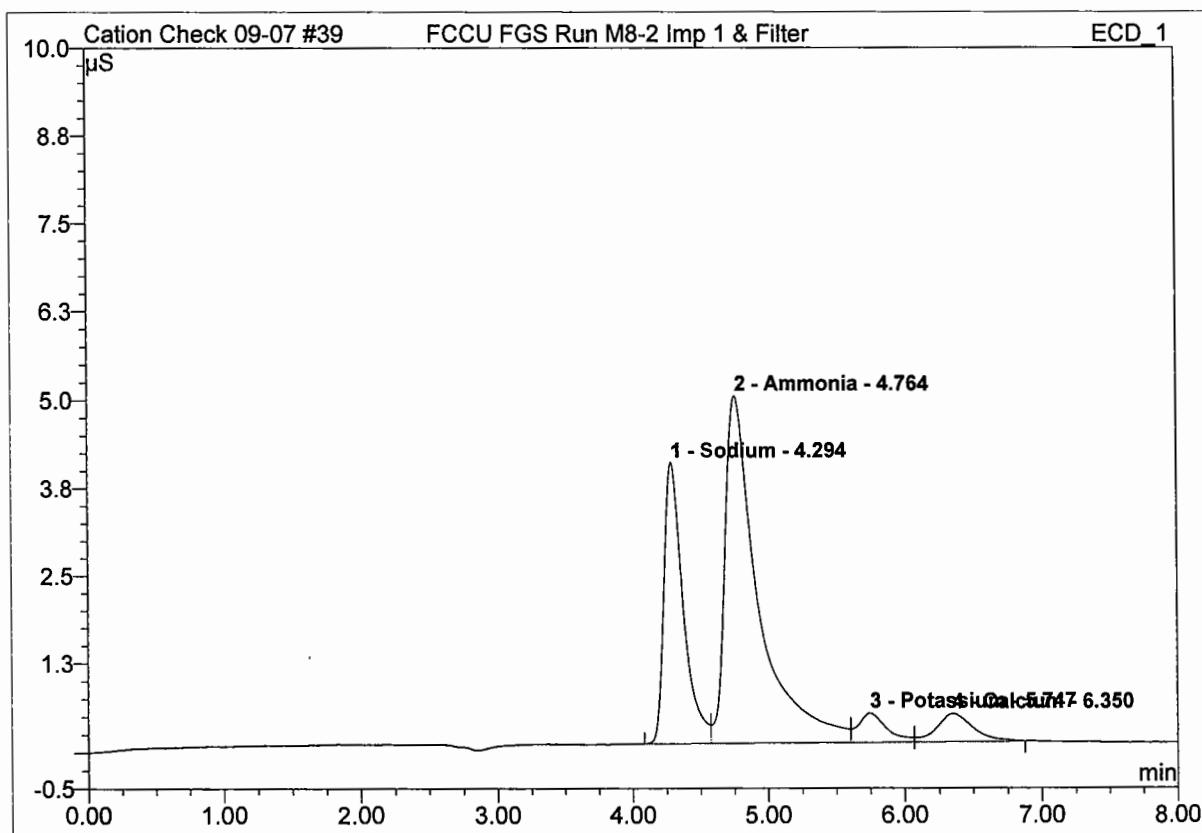
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	ICS_1000_Cations	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Cations	Dilution Factor:	1.0000
Recording Time:	9/21/2007 5:19	Sample Weight:	1.0000
Run Time (min):	8.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	4.29	Sodium	3.876	0.638
2	4.77	Ammonia	4.850	1.370
3	5.75	Potassium	0.391	0.092
4	6.36	Calcium	0.381	0.117
Total:			9.498	2.217

39 FCCU FGS Run M8-2 Imp 1 & Filter

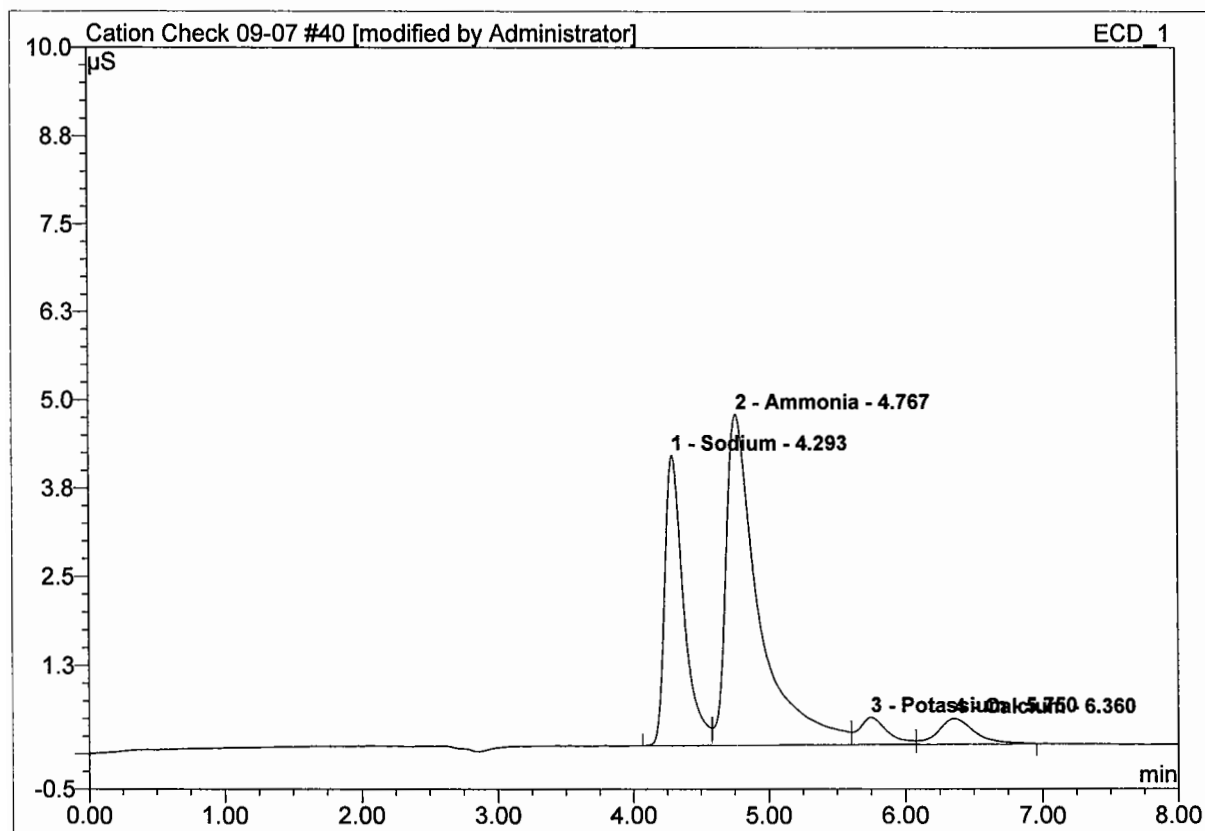
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	ICS_1000_Cations	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Cations	Dilution Factor:	1.0000
Recording Time:	9/21/2007 5:28	Sample Weight:	1.0000
Run Time (min):	8.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	4.29	Sodium	3.989	0.657
2	4.76	Ammonia	4.931	1.398
3	5.75	Potassium	0.408	0.098
4	6.35	Calcium	0.393	0.120
Total:			9.721	2.274

40 FCCU FGS Run M8-3 Imp 1 & Filter

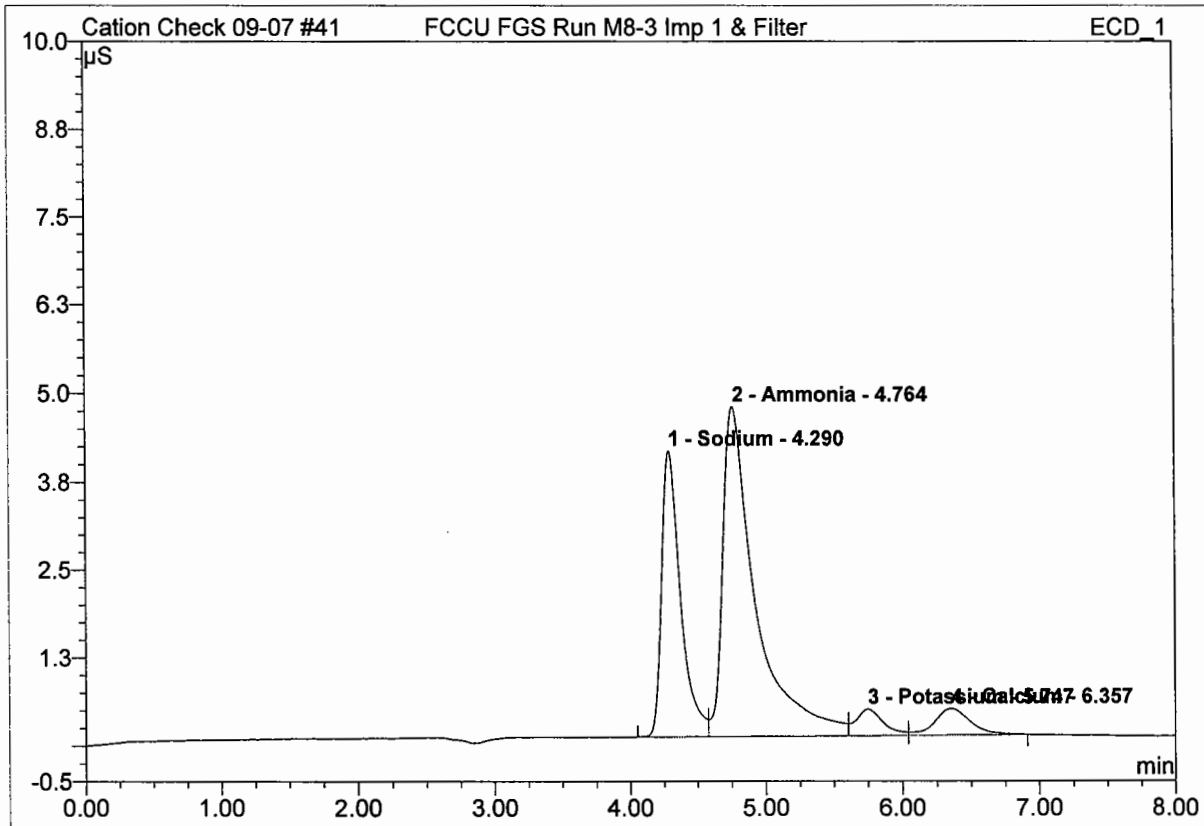
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	ICS_1000_Cations	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Cations	Dilution Factor:	1.0000
Recording Time:	9/21/2007 5:37	Sample Weight:	1.0000
Run Time (min):	8.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	4.29	Sodium	4.094	0.672
2	4.77	Ammonia	4.675	1.315
3	5.75	Potassium	0.385	0.092
4	6.36	Calcium	0.364	0.112
Total:			9.518	2.191

41 FCCU FGS Run M8-3 Imp 1 & Filter

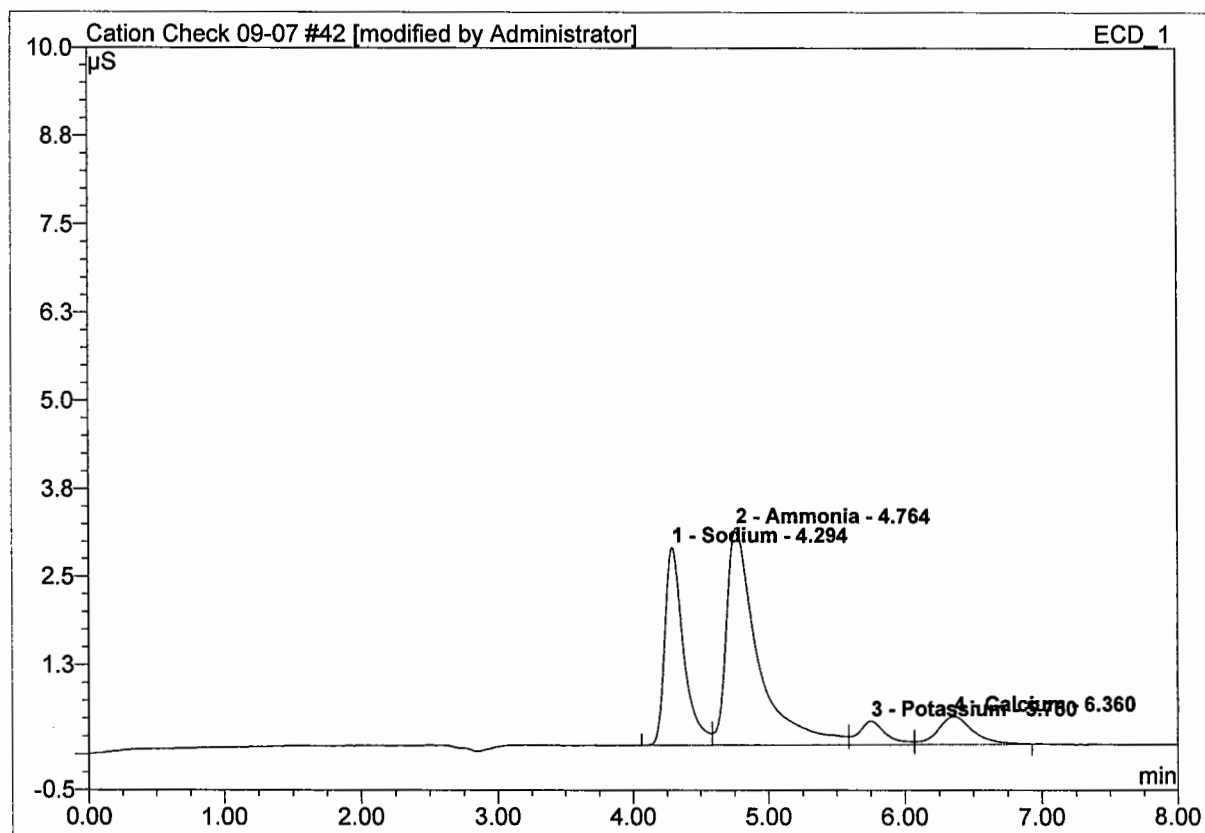
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	ICS_1000_Cations	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Cations	Dilution Factor:	1.0000
Recording Time:	9/21/2007 5:46	Sample Weight:	1.0000
Run Time (min):	8.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	4.29	Sodium	4.062	0.663
2	4.76	Ammonia	4.679	1.305
3	5.75	Potassium	0.375	0.086
4	6.36	Calcium	0.374	0.113
Total:			9.490	2.168

42 FCCU FGS Run M8-1 Imp 1 & Filter, 2x dilution

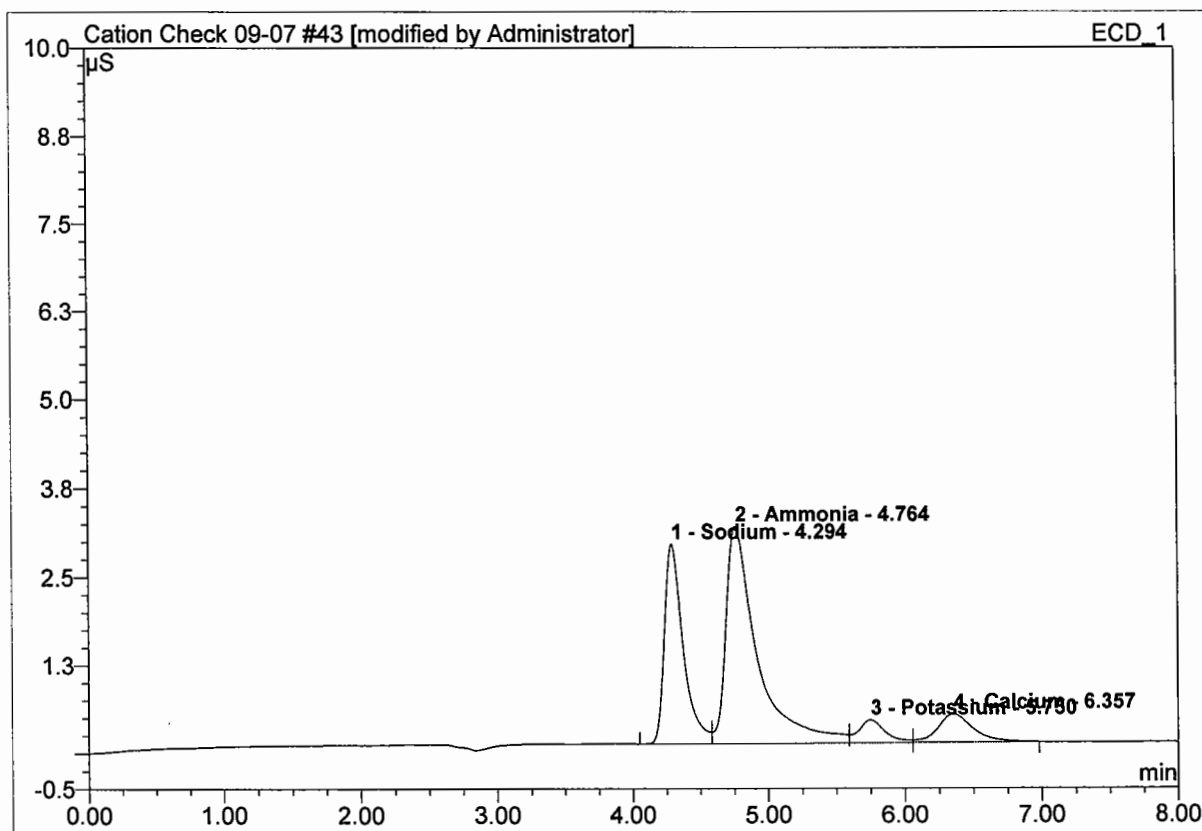
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	ICS_1000_Cations	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Cations	Dilution Factor:	1.0000
Recording Time:	9/21/2007 5:55	Sample Weight:	1.0000
Run Time (min):	8.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	4.29	Sodium	2.789	0.451
2	4.76	Ammonia	3.062	0.817
3	5.75	Potassium	0.327	0.075
4	6.36	Calcium	0.390	0.115
Total:			6.569	1.459

43 FCCU FGS Run M8-1 Imp 1 & Filter, 2x dilution

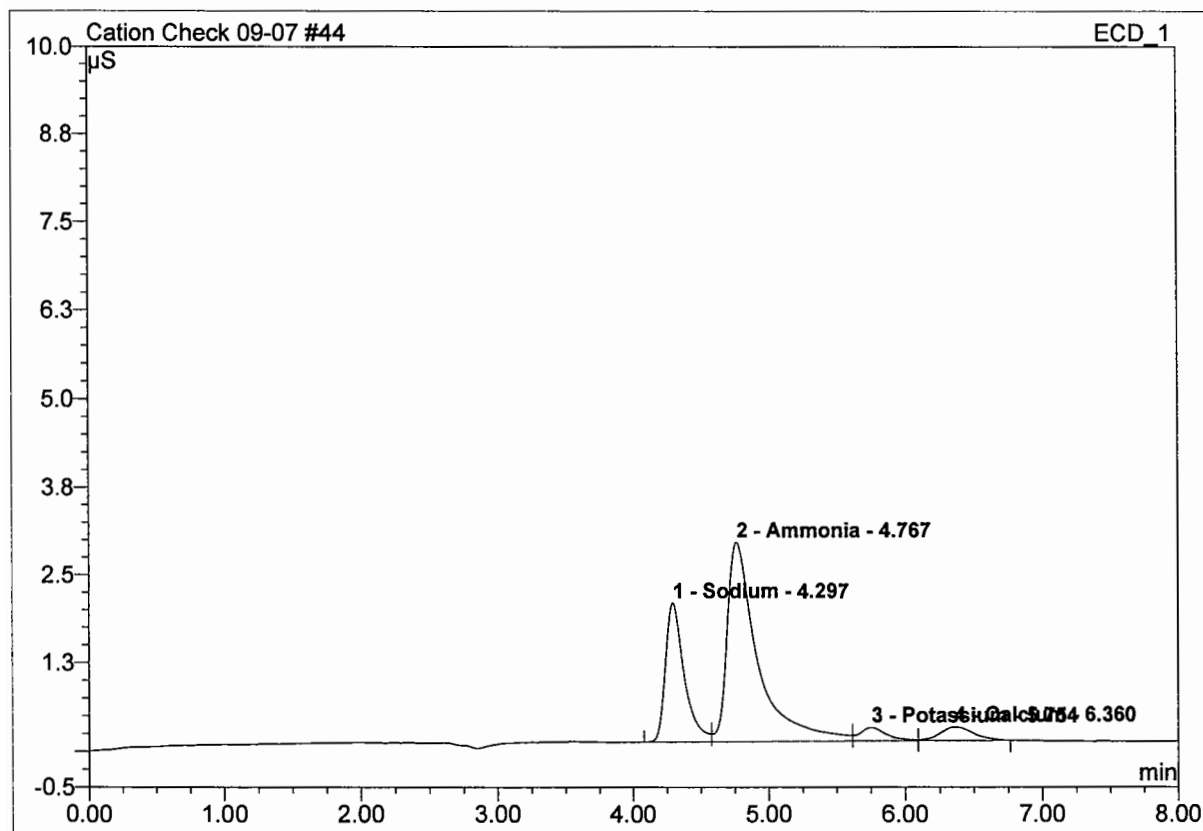
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	ICS_1000_Cations	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Cations	Dilution Factor:	1.0000
Recording Time:	9/21/2007 6:04	Sample Weight:	1.0000
Run Time (min):	8.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	4.29	Sodium	2.832	0.457
2	4.76	Ammonia	3.076	0.819
3	5.75	Potassium	0.322	0.071
4	6.36	Calcium	0.402	0.119
Total:			6.631	1.467

44 FCCU FGS Run M8-1 Imp 2 & Filter, 2x dilution

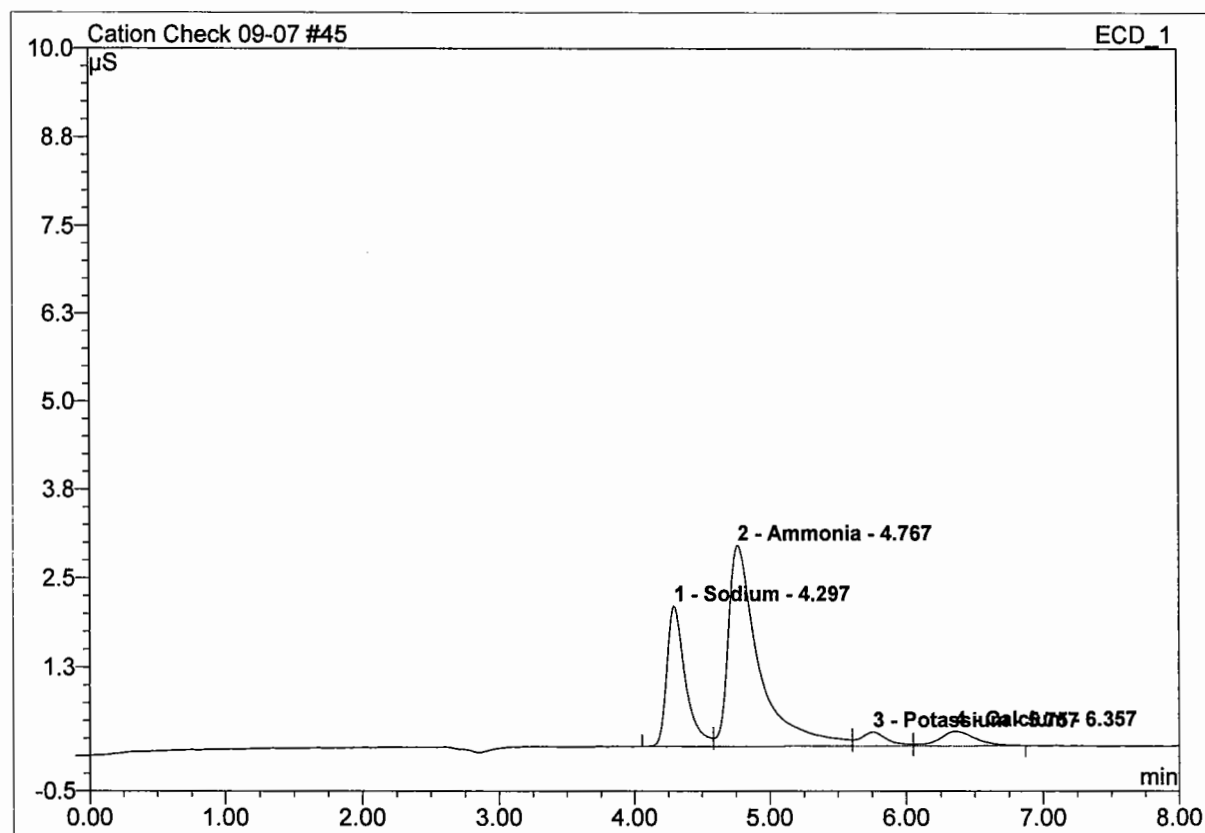
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	ICS_1000_Cations	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Cations	Dilution Factor:	1.0000
Recording Time:	9/21/2007 6:13	Sample Weight:	1.0000
Run Time (min):	8.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	4.30	Sodium	1.969	0.316
2	4.77	Ammonia	2.830	0.742
3	5.75	Potassium	0.188	0.043
4	6.36	Calcium	0.193	0.055
Total:			5.180	1.156

45 FCCU FGS Run M8-1 Imp 2 & Filter, 2x dilution

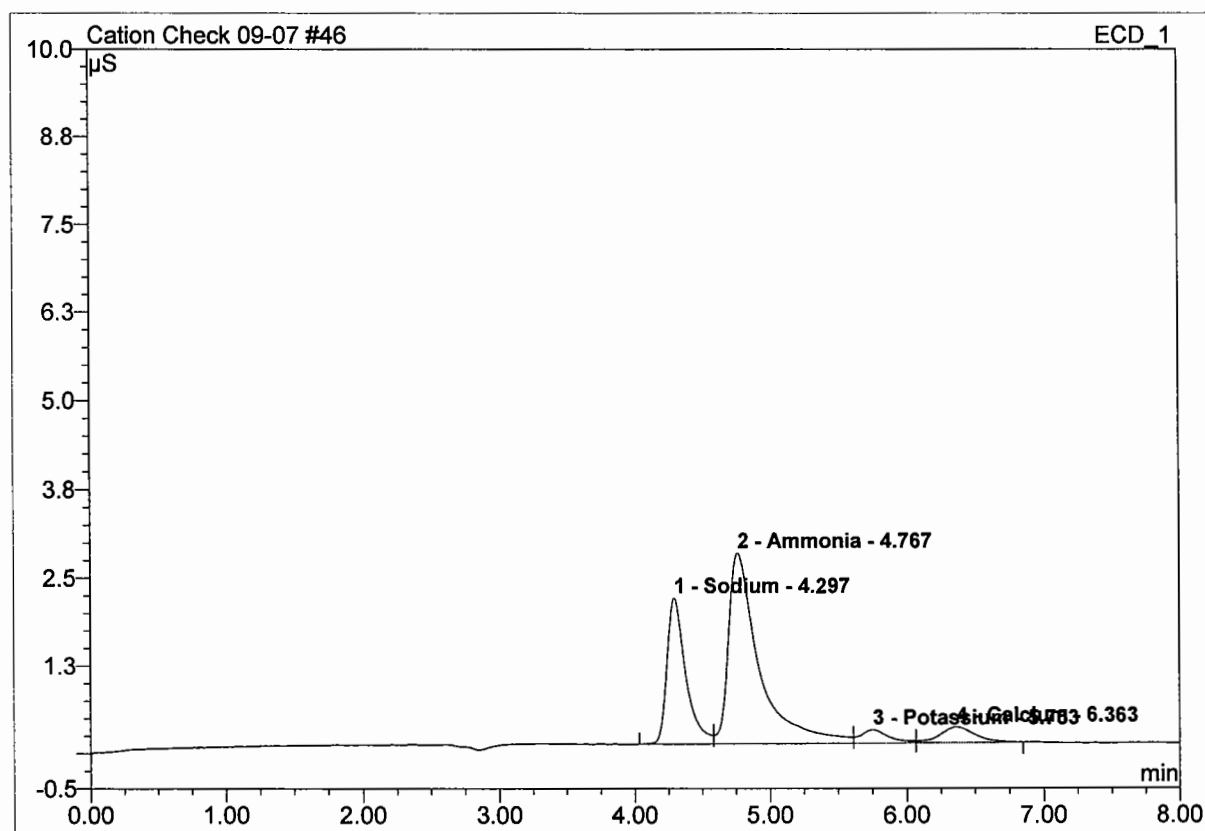
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	ICS_1000_Cations	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Cations	Dilution Factor:	1.0000
Recording Time:	9/21/2007 6:22	Sample Weight:	1.0000
Run Time (min):	8.00	Sample Amount:	1.0000



No.	Ret. Time min	Peak Name	Height μS	Area μS*min
1	4.30	Sodium	1.971	0.318
2	4.77	Ammonia	2.822	0.743
3	5.76	Potassium	0.196	0.044
4	6.36	Calcium	0.206	0.062
Total:			5.194	1.167

46 FCCU FGS Run M8-3 Imp 2 & Filter, 2x dilution

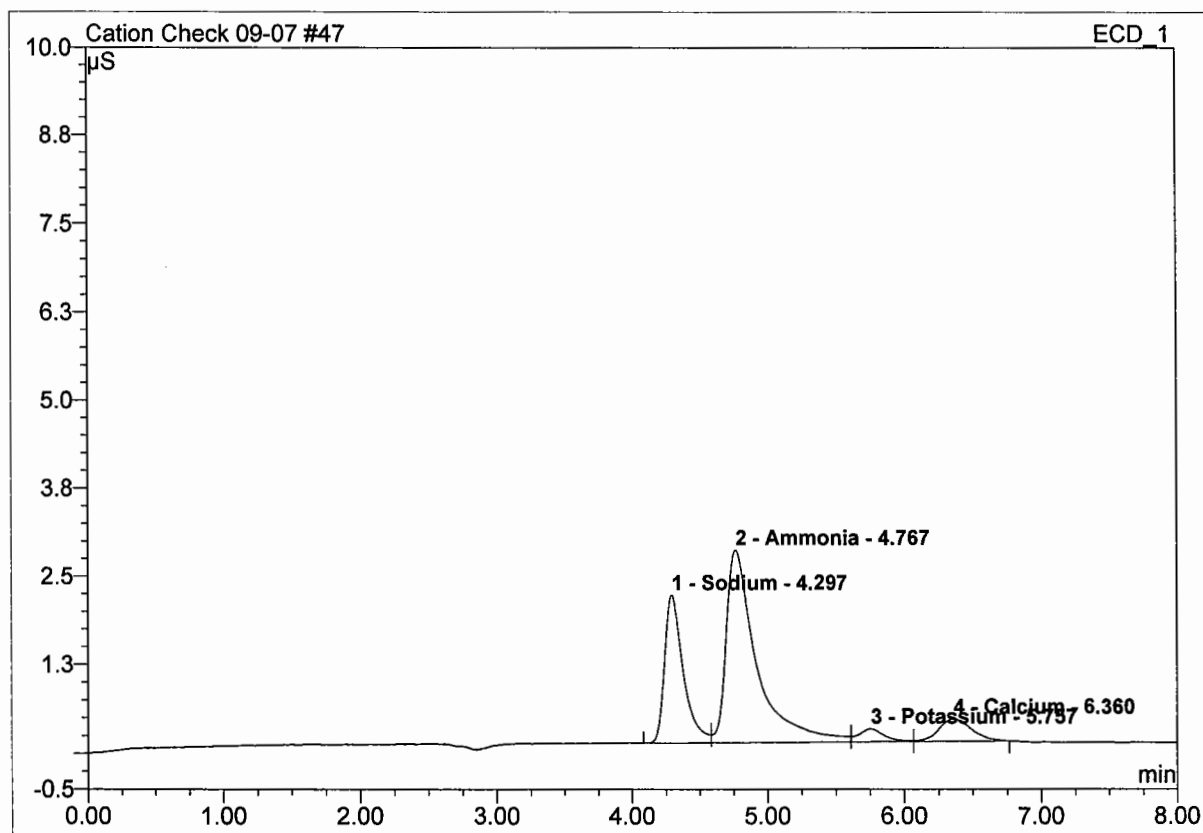
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	ICS_1000_Cations	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Cations	Dilution Factor:	1.0000
Recording Time:	9/21/2007 6:31	Sample Weight:	1.0000
Run Time (min):	8.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	4.30	Sodium	2.083	0.336
2	4.77	Ammonia	2.716	0.715
3	5.75	Potassium	0.190	0.045
4	6.36	Calcium	0.222	0.066
Total:			5.212	1.162

47 FCCU FGS Run M8-3 Imp 2 & Filter, 2x dilution

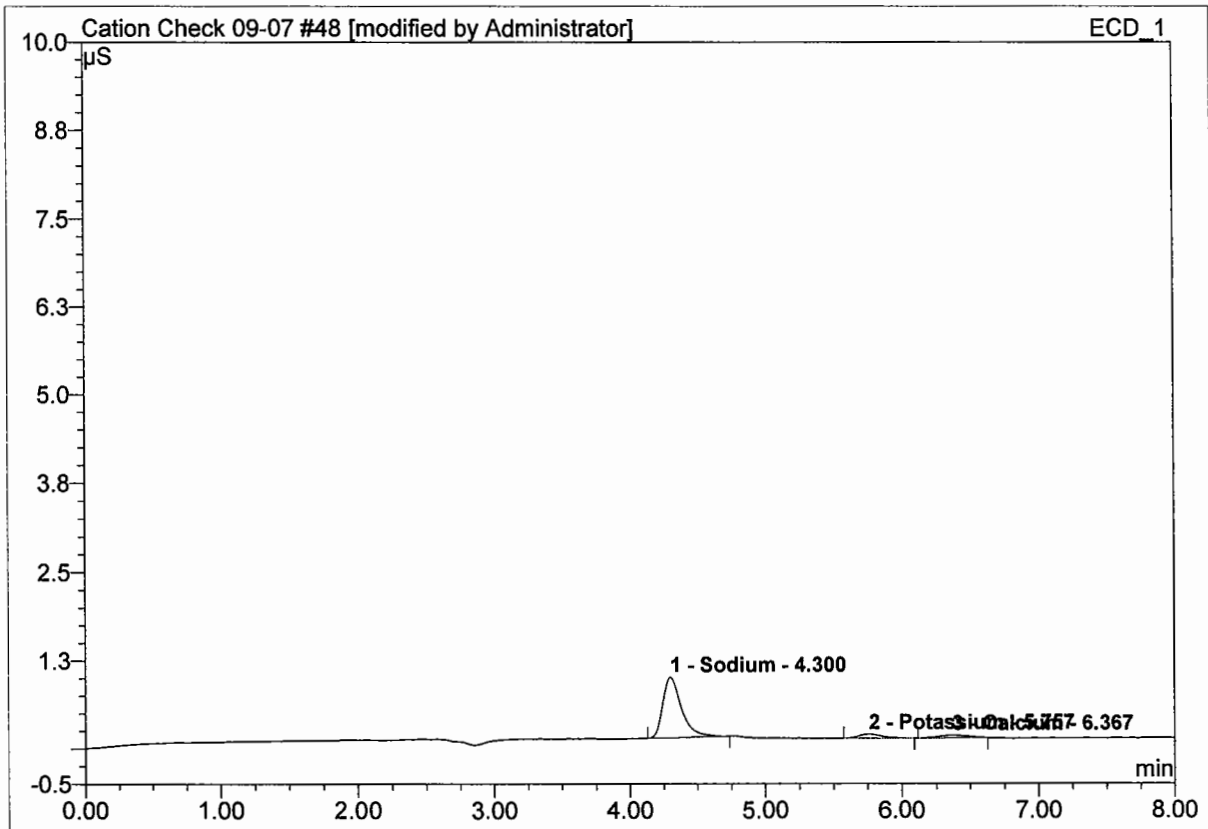
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	ICS_1000_Cations	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Cations	Dilution Factor:	1.0000
Recording Time:	9/21/2007 6:41	Sample Weight:	1.0000
Run Time (min):	8.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	4.30	Sodium	2.090	0.335
2	4.77	Ammonia	2.723	0.710
3	5.76	Potassium	0.182	0.039
4	6.36	Calcium	0.313	0.087
Total:			5.308	1.171

48 Blank 80% IPA

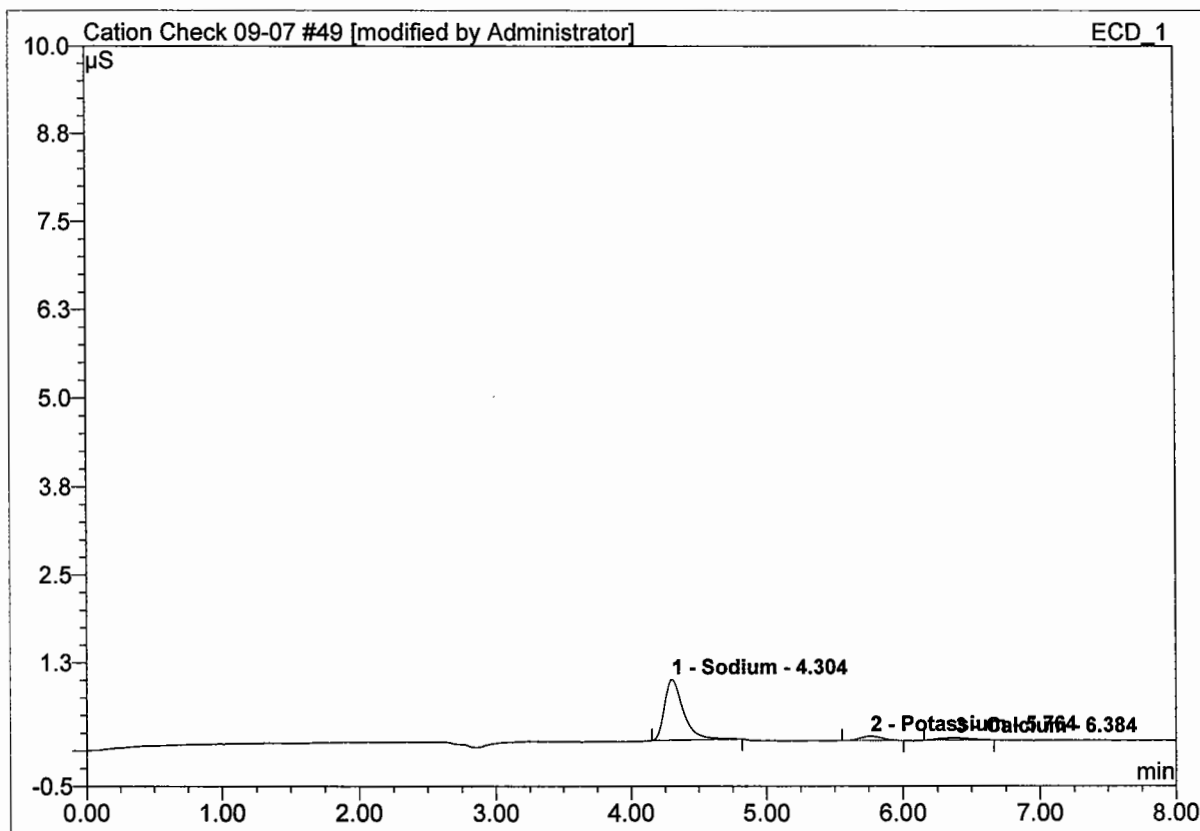
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	ICS_1000_Cations	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Cations	Dilution Factor:	1.0000
Recording Time:	9/21/2007 6:50	Sample Weight:	1.0000
Run Time (min):	8.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	4.30	Sodium	0.863	0.138
2	5.76	Potassium	0.059	0.011
3	6.37	Calcium	0.037	0.009
Total:			0.959	0.159

49 Blank 80% IPA

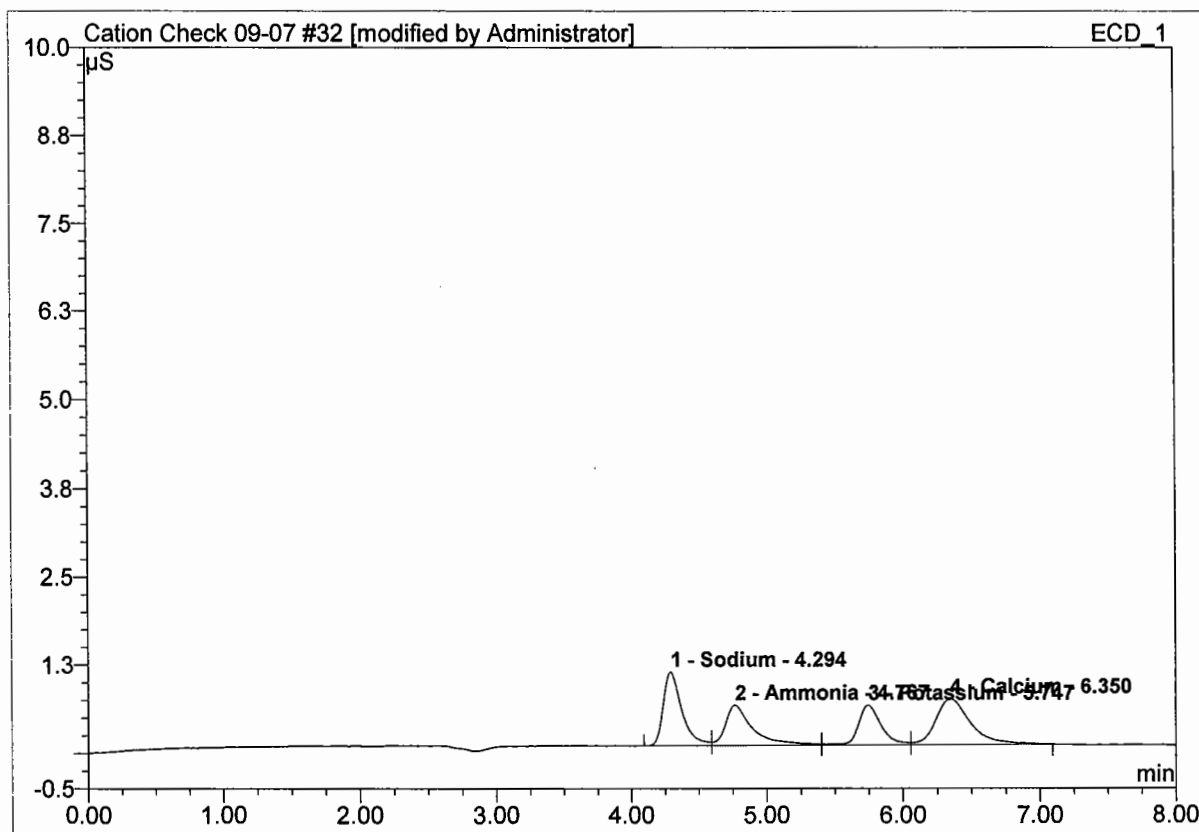
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	unknown	Wavelength:	n.a.
Control Program:	ICS_1000_Cations	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Cations	Dilution Factor:	1.0000
Recording Time:	9/21/2007 6:59	Sample Weight:	1.0000
Run Time (min):	8.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height µS	Area µS*min
1	4.30	Sodium	0.861	0.139
2	5.76	Potassium	0.062	0.011
3	6.38	Calcium	0.034	0.009
Total:			0.957	0.159

32 1.0 ppm Na, NH4, K & Ca - pre

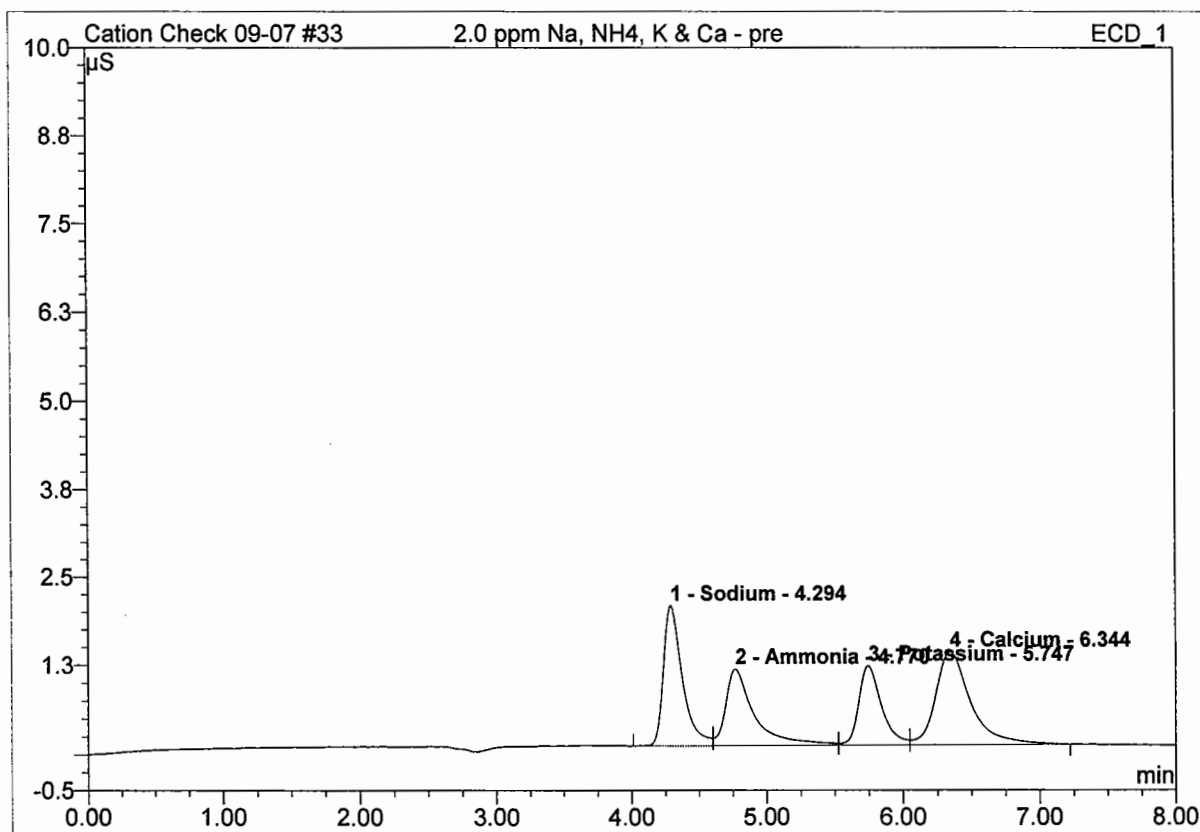
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	standard	Wavelength:	n.a.
Control Program:	ICS_1000_Cations	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Cations	Dilution Factor:	1.0000
Recording Time:	9/21/2007 4:24	Sample Weight:	1.0000
Run Time (min):	8.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	4.29	Sodium	1.043	0.167
2	4.77	Ammonia	0.572	0.133
3	5.75	Potassium	0.564	0.108
4	6.35	Calcium	0.650	0.190
Total:			2.829	0.598

33 2.0 ppm Na, NH4, K & Ca - pre

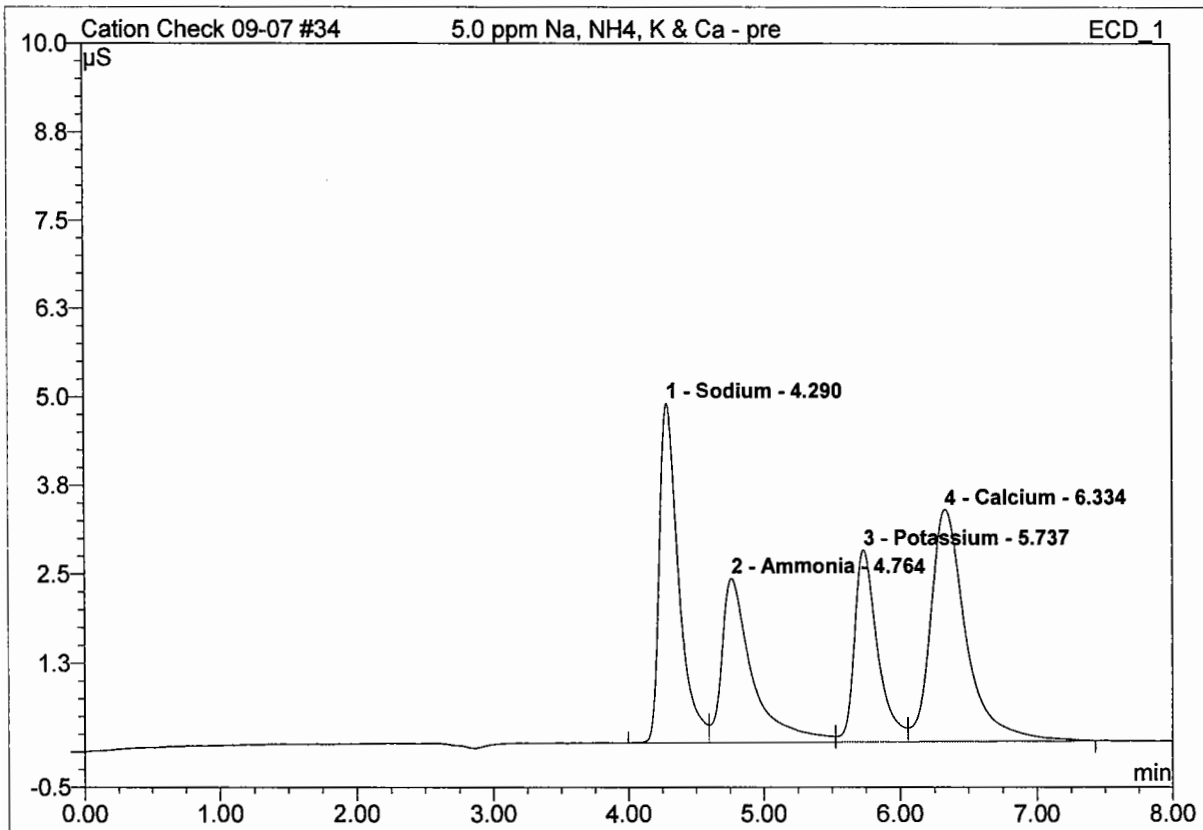
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	standard	Wavelength:	n.a.
Control Program:	ICS_1000_Cations	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Cations	Dilution Factor:	1.0000
Recording Time:	9/21/2007 4:33	Sample Weight:	1.0000
Run Time (min):	8.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	4.29	Sodium	1.965	0.319
2	4.77	Ammonia	1.066	0.261
3	5.75	Potassium	1.106	0.212
4	6.34	Calcium	1.298	0.386
Total:			5.435	1.178

34 5.0 ppm Na, NH4, K & Ca - pre

Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	standard	Wavelength:	n.a.
Control Program:	ICS_1000_Cations	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Cations	Dilution Factor:	1.0000
Recording Time:	9/21/2007 4:42	Sample Weight:	1.0000
Run Time (min):	8.00	Sample Amount:	1.0000

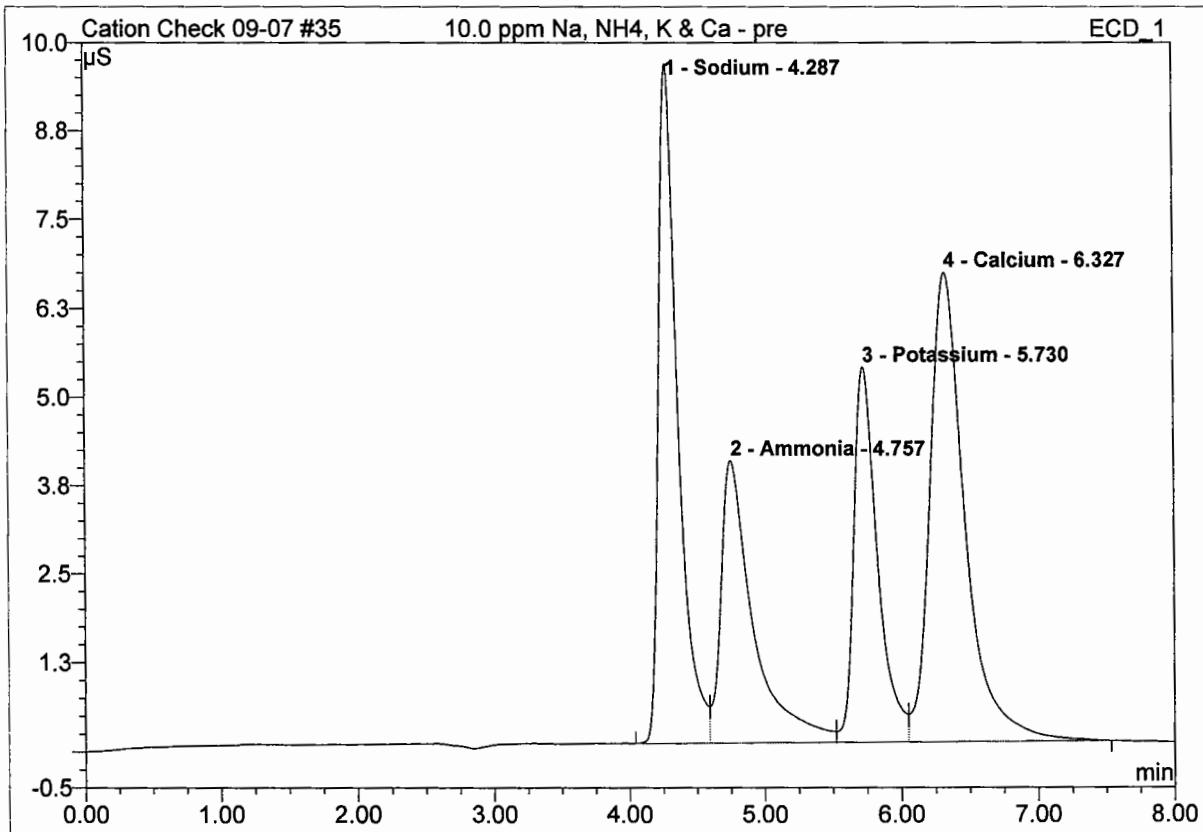


No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	4.29	Sodium	4.784	0.791
2	4.76	Ammonia	2.307	0.603
3	5.74	Potassium	2.697	0.531
4	6.33	Calcium	3.261	0.981
Total:			13.049	2.907

35 10.0 ppm Na, NH₄, K & Ca - pre

Client: Valero, Paulsboro NJ
Vial Number: 1
Sample Type: standard
Control Program: ICS_1000_Cations
Quantif. Method: ICS_1000_Cations
Recording Time: 9/21/2007 4:51
Run Time (min): 8.00

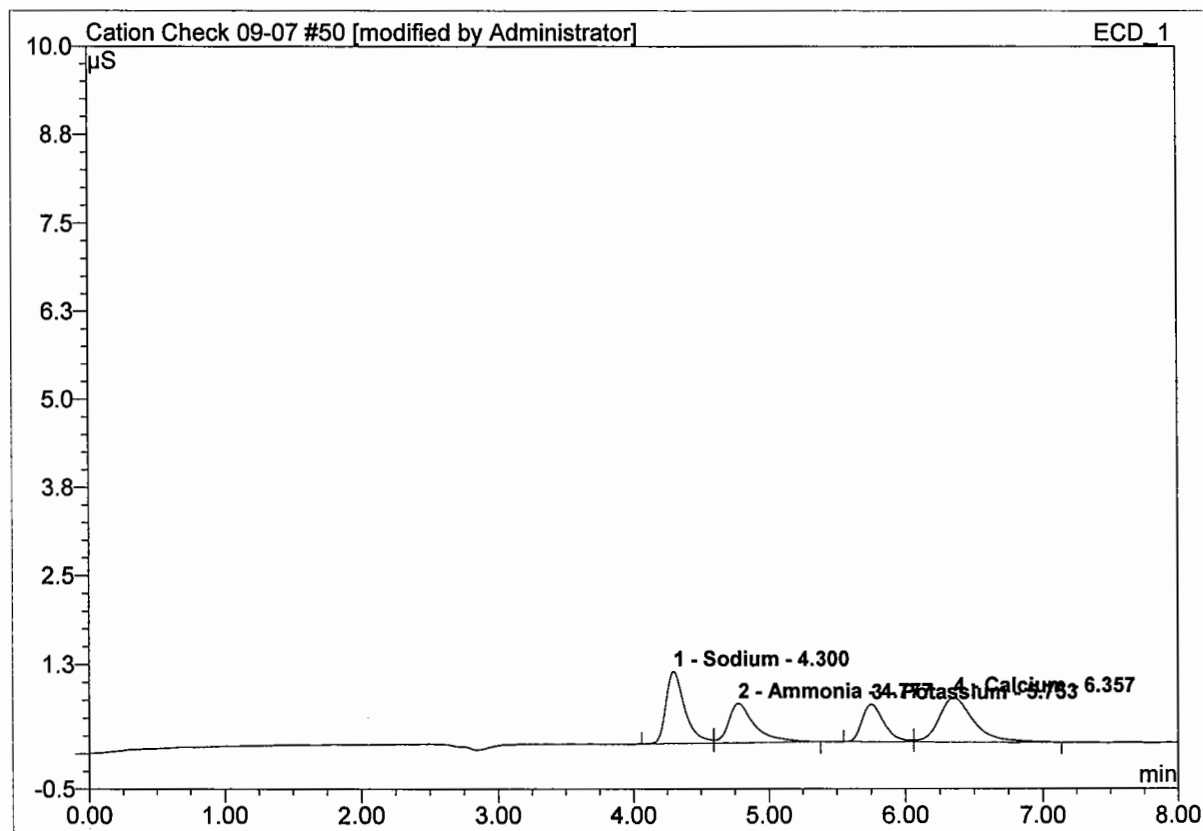
Injection Volume: 35.0
Channel: ECD_1
Wavelength: n.a.
Bandwidth: n.a.
Dilution Factor: 1.0000
Sample Weight: 1.0000
Sample Amount: 1.0000



No.	Ret. Time min	Peak Name	Height μS	Area μS*min
1	4.29	Sodium	9.574	1.594
2	4.76	Ammonia	3.974	1.093
3	5.73	Potassium	5.294	1.062
4	6.33	Calcium	6.612	1.965
Total:			25.453	5.714

50 1.0 ppm Na, NH4, K & Ca - post

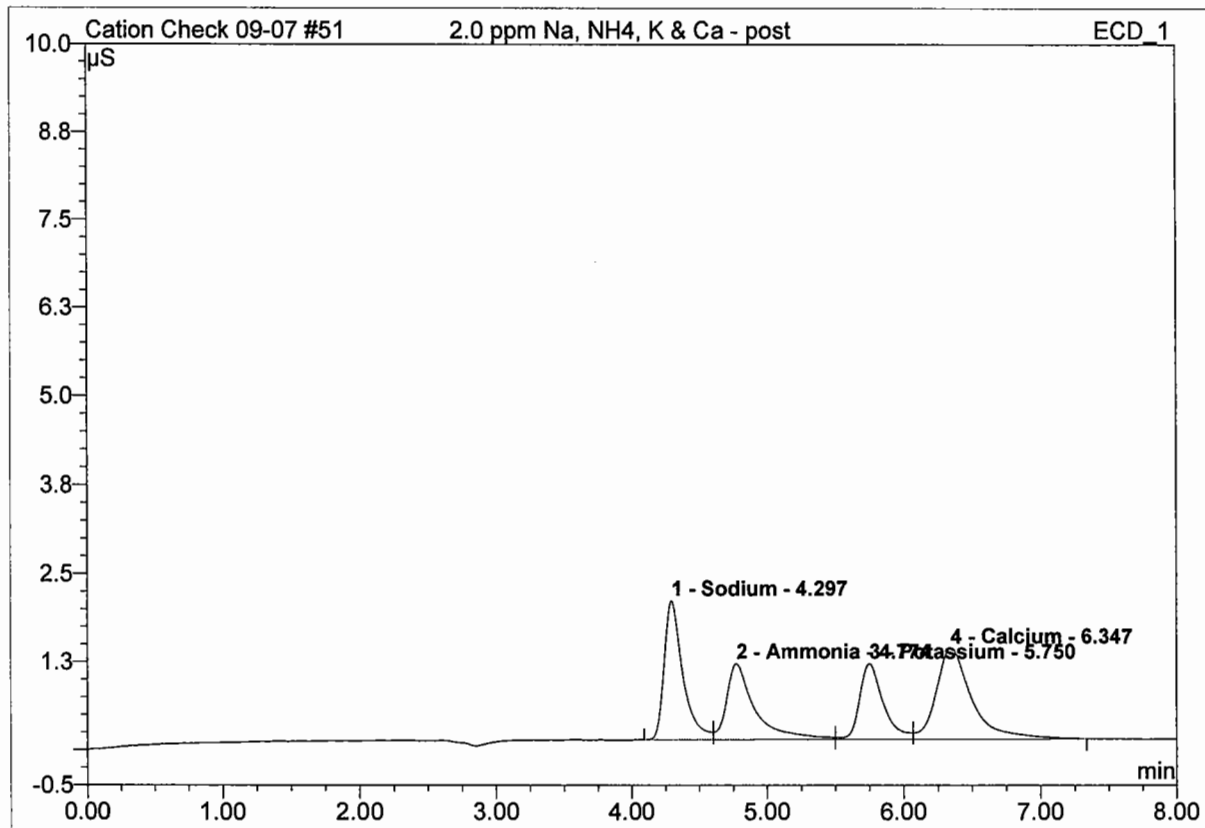
Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	standard	Wavelength:	n.a.
Control Program:	ICS_1000_Cations	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Cations	Dilution Factor:	1.0000
Recording Time:	9/21/2007 7:08	Sample Weight:	1.0000
Run Time (min):	8.00	Sample Amount:	1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	4.30	Sodium	1.015	0.165
2	4.78	Ammonia	0.554	0.125
3	5.75	Potassium	0.528	0.099
4	6.36	Calcium	0.626	0.184
Total:			2.724	0.572

51 2.0 ppm Na, NH4, K & Ca - post

Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	standard	Wavelength:	n.a.
Control Program:	ICS_1000_Cations	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Cations	Dilution Factor:	1.0000
Recording Time:	9/21/2007 7:17	Sample Weight:	1.0000
Run Time (min):	8.00	Sample Amount:	1.0000

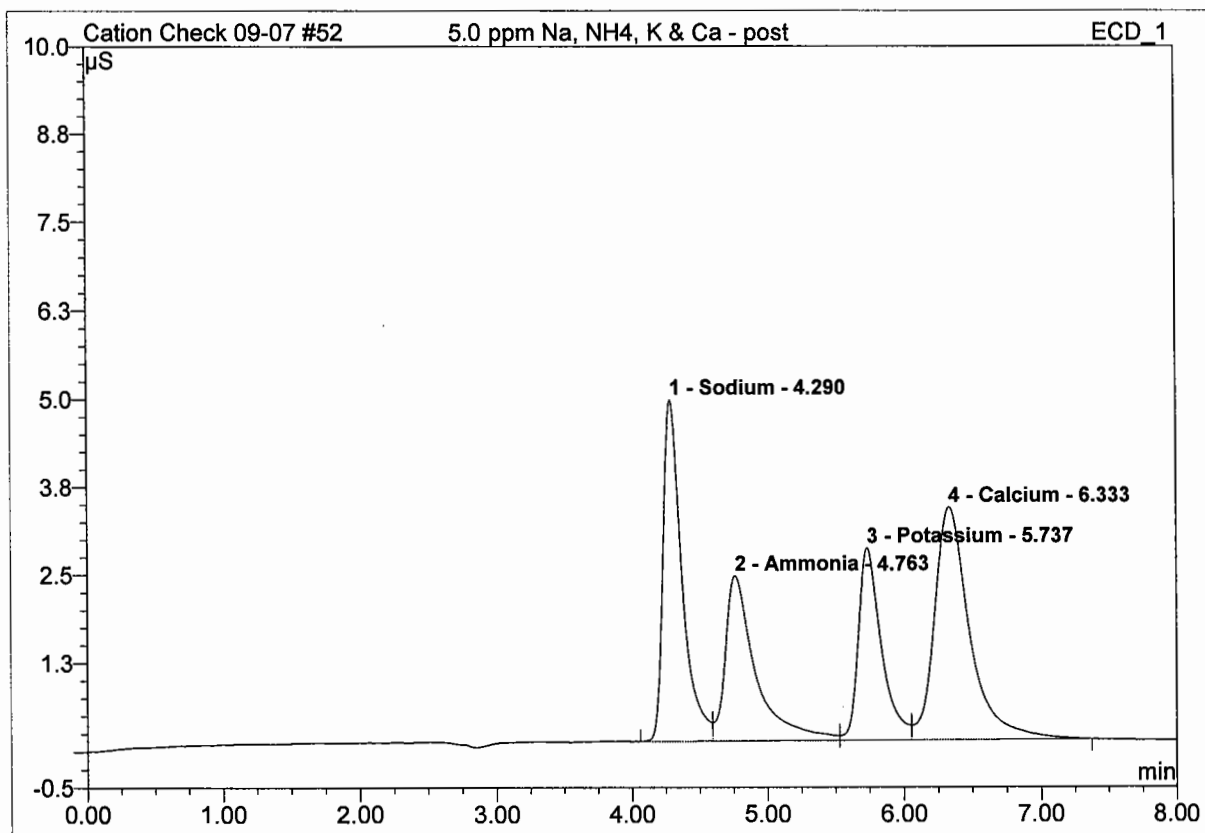


No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	4.30	Sodium	1.978	0.319
2	4.77	Ammonia	1.083	0.263
3	5.75	Potassium	1.081	0.216
4	6.35	Calcium	1.296	0.390
Total:			5.437	1.187

52 5.0 ppm Na, NH4, K & Ca - post

Client: Valero, Paulsboro NJ
Vial Number: 1
Sample Type: standard
Control Program: ICS_1000_Cations
Quantif. Method: ICS_1000_Cations
Recording Time: 9/21/2007 7:26
Run Time (min): 8.00

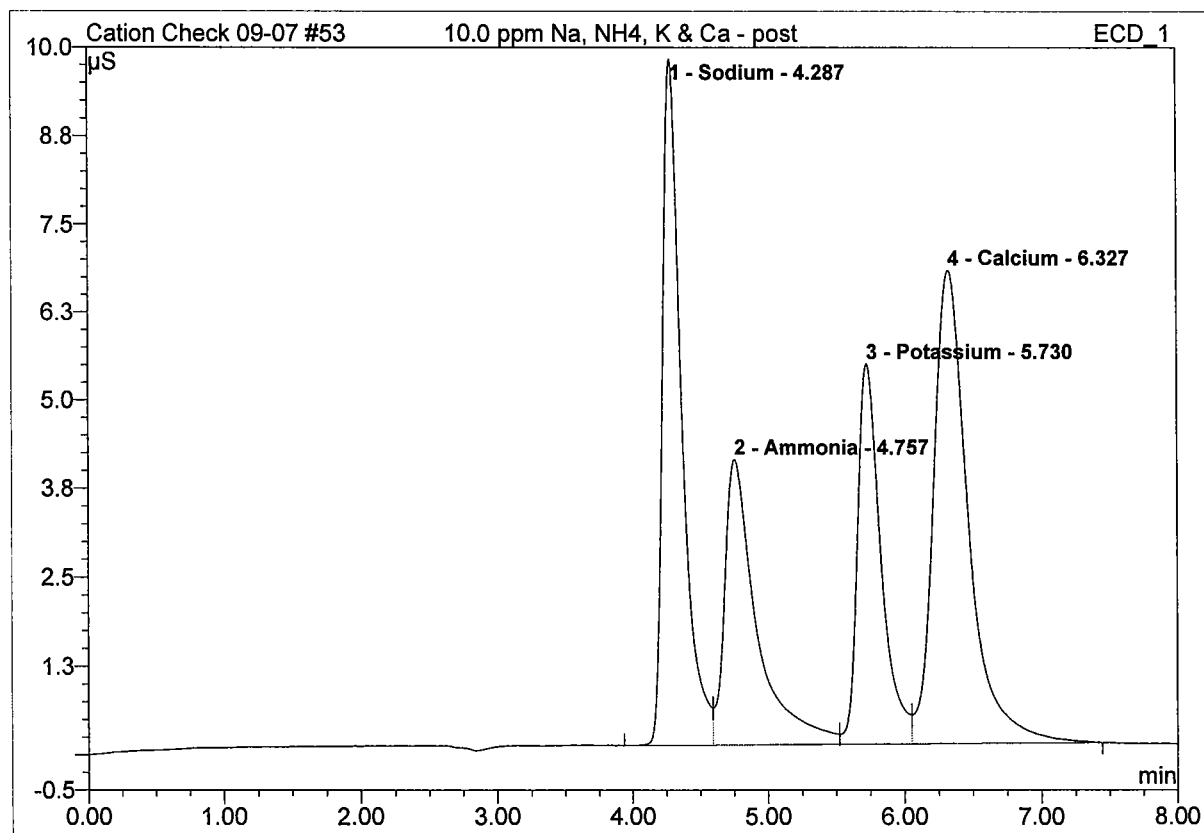
Injection Volume: 35.0
Channel: ECD_1
Wavelength: n.a.
Bandwidth: n.a.
Dilution Factor: 1.0000
Sample Weight: 1.0000
Sample Amount: 1.0000



No.	Ret.Time min	Peak Name	Height μS	Area μS*min
1	4.29	Sodium	4.844	0.793
2	4.76	Ammonia	2.335	0.604
3	5.74	Potassium	2.722	0.530
4	6.33	Calcium	3.294	0.979
Total:			13.196	2.906

53 10.0 ppm Na, NH4, K & Ca - post

Client	Valero, Paulsboro NJ	Injection Volume:	35.0
Vial Number:	1	Channel:	ECD_1
Sample Type:	standard	Wavelength:	n.a.
Control Program:	ICS_1000_Cations	Bandwidth:	n.a.
Quantif. Method:	ICS_1000_Cations	Dilution Factor:	1.0000
Recording Time:	9/21/2007 7:35	Sample Weight:	1.0000
Run Time (min):	8.00	Sample Amount:	1.0000



No.	Ret. Time min	Peak Name	Height μS	Area μS*min
1	4.29	Sodium	9.692	1.607
2	4.76	Ammonia	4.013	1.102
3	5.73	Potassium	5.362	1.064
4	6.33	Calcium	6.685	1.980
Total:			25.751	5.753



Data Analysis Technologies, Inc.
7715 Corporate Blvd.
Plain City, OH 43064
800-733-8644

Sample Analysis Certificate

Client: ARI Environmental
Address: 951 Old Rand Rd, Unit 106
Wauconda, IL 60084

Date: 9/12/07
Project ID: 0907002
Sample Date: 8/29/07
Date Received: 9/6/07
Analysis Date: 9/11/07
Analyst: DE / JO

Attn: Eric Vogt
Your Project: Valero PB
Sampled by: Eric Vogt

Analysis: Method 6010B- Aluminum

Results: See attached summary table.

QC: See attached summary table.

Reviewed and approved for release by: _____

A handwritten signature in black ink, appearing to read "RM", written over a horizontal line.

Ronald Mitchum Ph. D
President DAT

Date: 9/11/07

Data Analysis Technologies

7715 Corporate Blvd

Plain City, OH 43064

Data Summary Table**Client:** ARI Environmental Inc.**Analysis:** Aluminum by 6010B**Client Project:** Valero-DCR**DAT Project:** 0907002**Analysis Date:** 9/11/2007

Client ID	Laboratory ID	Instr. Conc. ug/L	Dil Factor	Sample Vol (mLs)	MDL ug	Aluminum Total ug	Q
Run M8-1 Imp. Contents	0907002- 1	99.97	5	80	8.0	40	D
Run M8-2 Imp. Contents	0907002- 2	73.78	5	80	8.0	30	D
Run M8-3 Imp. Contents	0907002- 3	69.38	5	80	8.0	28	D
Blank Imp. Contents	0907002- 4	54.17	5	80	8.0	22	D

D = Value obtained from a dilution

MDL = Method Detection Limit

QC SUMMARY

Data Analysis Technologies

7715 Corporate Blvd

Plain City, OH 43064

QC Summary Table**Client:** ARI Environmental Inc.**Analysis:** Aluminum by 6010B**Client Project:** Valero-DCR**DAT Project:** 0907002**Analysis Date:** 9/11/2007

Client ID	Laboratory ID	MDL ug/L	Aluminum ug/L	% Rec.	% RPD
Initial Calib Verif Std	ICV		4824	96	
Initial Calib Blank	ICB	20.0	ND		
Method Blank	0907002-MB	20.0	ND		
Lab Spike	0907002-LS		2077	104	
Continuing Calib Verif Std	CCV		4907	98	
Continuing Calib Blank	CCB	20.0	ND		

ND = Not detected at the method detection limit shown.

Lab Spike Concentration = 2000 ug/L

ICV, CCV Concentration = 5000 ug/L

RAW DATA

DAT Labs, Inc. Extraction Form

Project # <u>7401002</u>		Sample: SOLIDS <u>LIQUID</u> AIR																																				
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th>Extraction</th> <th>Solvent</th> <th>Volume mls</th> <th>Reps</th> </tr> <tr><td>Sashlet</td><td>Hexane</td><td></td><td></td></tr> <tr><td>Sep Funnel</td><td>Methanol</td><td></td><td></td></tr> <tr><td>Sonication</td><td>Methylene Chloride</td><td></td><td></td></tr> <tr><td>Cont. Ext</td><td>ACN</td><td></td><td></td></tr> <tr><td>Vial</td><td>Ethyl Acetate</td><td></td><td></td></tr> <tr><td>SPE Disill</td><td>IPA</td><td></td><td></td></tr> <tr><td>Other</td><td>Toluene</td><td></td><td></td></tr> <tr><td>No Extract</td><td>Water</td><td></td><td></td></tr> </table>		Extraction	Solvent	Volume mls	Reps	Sashlet	Hexane			Sep Funnel	Methanol			Sonication	Methylene Chloride			Cont. Ext	ACN			Vial	Ethyl Acetate			SPE Disill	IPA			Other	Toluene			No Extract	Water			Analysis: <u>Al Br 610B</u> Prepared By: <u>DE/JO</u> Date: <u>9/11/07</u> Spike Witness: _____ Solvent Manufac: _____ Solvent Lot #: _____
Extraction	Solvent	Volume mls	Reps																																			
Sashlet	Hexane																																					
Sep Funnel	Methanol																																					
Sonication	Methylene Chloride																																					
Cont. Ext	ACN																																					
Vial	Ethyl Acetate																																					
SPE Disill	IPA																																					
Other	Toluene																																					
No Extract	Water																																					
☒ Other (Describe) <u>DILUTION</u>																																						

SURROGATE ID VOL mls / ul CONC SL - _____ SL - _____ SL - _____	LS/MS ID VOL mls / <u>ul</u> CONC SL- <u>35-16A</u> <u>25</u> <u>2000mg/mL</u> SL - _____ SL - _____	
INT STD ID VOL mls / ul CONC SL - _____ SL - _____ SL - _____	COMMENTS _____ _____ _____	

SAMPLE ID	TOTAL SAMPLE AMNT <u>(mL)</u>	SAMPLE AMNT EXTRACTED	TOTAL <u>EXTRACT VOL</u> (ADD ALL REPS)	FINAL EXTRACT VOL (mls) / ul	SURR INIT	SPK INIT	IS INIT
<u>7401002-1</u>	<u>30mL</u>		<u>5mL</u>	<u>25mL</u>			
<u>2</u>	<u>↓</u>		<u>↓</u>	<u>↓</u>			
<u>3</u>	<u>↓</u>		<u>↓</u>	<u>↓</u>			
<u>4</u>	<u>↓</u>		<u>↓</u>	<u>↓</u>			
<u>7401002-1</u>				<u>25mL</u>			
<u>2</u>				<u>25mL</u>			

If extract was split for additional analyses, please note the aliquot volume for this analysis and at what point the extract was spiked.

ALiquot VOLUME: _____ mls ul (Circle one)

Extract was spiked: Before After the split. (Circle one)

Additional samples may be listed on the back of this page.

Analytical Sequence

Method : Method29-Trace

Seq.	Loc.	Sample ID
1	1	Std Blk
2	2	Std1
3	3	Std2
4	4	Std3
5	5	Std4
6	6	ICV/CCV $\sim 5000 \text{ ng/L}$
7	1	ICB/CCB
8	9	0907002-mb
9	10	0907002-1 5x
10	11	0907002-2 5x
11	12	0907002-3 5x
12	13	0907002-4 5x
13	14	0907002-ls $\sim 2000 \text{ ng/L}$
14	1	ICB/CCB
15	6	ICV/CCV $\sim 5000 \text{ ng/L}$

=====
Analysis Begun

Start Time: 9/11/07 4:31:58 PM
Logged In Analyst: Administrator
Spectrometer Model: Optima 2000 DV

Plasma On Time: 9/11/07 8:44:23 AM
Technique: ICP Continuous
Autosampler Model: AS-90plus

Sample Information File: D:\pe\Administrator\Sample Information\0907002.sif
Results Data Set: 0907002
Results Library: D:\pe\Administrator\Results\Results2007\results2005.mdb

=====
Sequence No.: 1
Sample ID: Std Blk
Analyst:
Nebulizer Back Pressure: 117.0 kPa
Sample Wt:
Dilution:

Autosampler Location: 1
Date Collected: 9/11/07 4:31:58 PM
Nebulizer Flow: 0.80 L/min
Sample Prep Volume:
Data Type: Original

Replicate Data: Std Blk

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc. Units	Analysis Time
1	Aluminum	6945.5	6945.5	[0.00] µg/L	16:32:55
2	Aluminum	7213.3	7213.3	[0.00] µg/L	16:33:00

Mean Data: Std Blk

Analyte	Mean Corrected Intensity	Std.Dev.	RSD	Calib Conc. Units
Aluminum	7079.4	189.33	2.67%	[0.00] µg/L

```
=====
Sequence No.: 2                      Autosampler Location: 2
Sample ID: Std1                      Date Collected: 9/11/07 4:33:38 PM
Analyst:
Nebulizer Back Pressure: 117.0 kPa   Nebulizer Flow: 0.80 L/min
Sample Wt:                          Sample Prep Volume:
Dilution:                          Data Type: Original
=====
```

Replicate Data: Std1

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc. Units	Analysis Time
1	Aluminum	747753.6	740674.2	[10000] µg/L	16:34:28
2	Aluminum	723744.6	716665.2	[10000] µg/L	16:34:32

Mean Data: Std1

Analyte	Mean Corrected Intensity	Std.Dev.	RSD	Calib Conc. Units
Aluminum	728669.7	16976.93	2.33%	[10000] µg/L

```
=====
Sequence No.: 3                      Autosampler Location: 3
Sample ID: Std2                     Date Collected: 9/11/07 4:35:09 PM
Analyst:
Nebulizer Back Pressure: 117.0 kPa   Nebulizer Flow: 0.80 L/min
Sample Wt:                          Sample Prep Volume:
Dilution:                          Data Type: Original
=====
```

Replicate Data: Std2

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc. Units	Analysis Time
1	Aluminum	75490.3	68410.8	[1000] µg/L	16:35:59
2	Aluminum	78228.4	71149.0	[1000] µg/L	16:36:03

Mean Data: Std2

Analyte	Mean Corrected Intensity	Std.Dev.	RSD	Calib Conc. Units
Aluminum	69779.9	1936.17	2.77%	[1000] µg/L

```
=====
Sequence No.: 5                      Autosampler Location: 5
Sample ID: Std4                     Date Collected: 9/11/07 4:36:41 PM
Analyst:
Nebulizer Back Pressure: 117.0 kPa   Nebulizer Flow: 0.80 L/min
Sample Wt:                          Sample Prep Volume:
Dilution:                          Data Type: Original
=====
```

Replicate Data: Std4

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc. Units	Analysis Time
1	Aluminum	14071.5	6992.1	[100] µg/L	16:37:31
2	Aluminum	12783.3	5703.9	[100] µg/L	16:37:35

Mean Data: Std4

Analyte	Mean Corrected Intensity	Std.Dev.	RSD	Calib Conc. Units
Aluminum	6348.0	910.93	14.35%	[100] µg/L

Calibration Summary

Analyte	Stds.	Equation	Intercept	Slope	Curvature	Corr. Coef.	Reslope
Aluminum	3	Lin Thru 0	0.0	72.84	0.00000	0.999990	

Analytical Sequence

Method: Method29-Trace

Seq.	Loc.	ID	Status
1	1	Std Blk	Applied
2	2	Std1	Applied
3	3	Std2	Applied
4	4	Std3	Skipped
5	5	Std4	Applied

=====
Analysis Begun

Start Time: 9/11/07 4:45:58 PM
Logged In Analyst: Administrator
Spectrometer Model: Optima 2000 DV

Plasma On Time: 9/11/07 8:44:23 AM
Technique: ICP Continuous
Autosampler Model: AS-90plus

Sample Information File: D:\pe\Administrator\Sample Information\0907002.sif
Results Data Set: 0907002
Results Library: D:\pe\Administrator\Results\Results2007\results2005.mdb

=====
Sequence No.: 1
Sample ID: ICV/CCV
Analyst:
Nebulizer Back Pressure: 117.0 kPa
Sample Wt:
Dilution:

Autosampler Location: 6
Date Collected: 9/11/07 4:45:58 PM
Nebulizer Flow: 0.80 L/min
Sample Prep Volume:
Data Type: Original

Replicate Data: ICV/CCV

TV = 5000 µg/L

Rep1#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc. Units	Sample Conc. Units	Analysis Time
1	Aluminum	357628.3	350548.8	4813 µg/L	4813 µg/L	16:46:48
2	Aluminum	359307.7	352228.3	4836 µg/L	4836 µg/L	16:46:52

Mean Data: ICV/CCV

Analyte	Mean Corrected Intensity	Calib Conc. Units	Std.Dev.	Sample Conc. Units	Std.Dev.	RSD
Aluminum	351388.6	4824 µg/L	16.3	4824 µg/L	16.3	0.34%

QC value within limits for Aluminum Recovery = 96.49%

All analytes passed QC.

```
=====
Sequence No.: 2                      Autosampler Location: 1
Sample ID: ICB/CCB                  Date Collected: 9/11/07 4:47:31 PM
Analyst:
Nebulizer Back Pressure: 117.0 kPa  Nebulizer Flow: 0.80 L/min
Sample Wt:                          Sample Prep Volume:
Dilution:                           Data Type: Original
=====
```

Replicate Data: ICB/CCB

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc. Units	Sample Conc. Units	Analysis Time
1	Aluminum	6086.7	-992.7	-13.63 µg/L	-13.63 µg/L	16:48:20
2	Aluminum	7630.3	550.9	7.564 µg/L	7.564 µg/L	16:48:24

Mean Data: ICB/CCB

Analyte	Mean Corrected Intensity	Calib Conc. Units	Std.Dev.	Sample Conc. Units	Std.Dev.	RSD
Aluminum	-220.9	-3.033 µg/L	14.9857	-3.033 µg/L	14.9857	494.10%

QC value within limits for Aluminum Recovery = Not calculated

All analytes passed QC.

Sequence No.: 3

Sample ID: 0907002-mb

Analyst: de

Nebulizer Back Pressure: 117.0 kPa

Sample Wt:

Dilution:

Autosampler Location: 9

Date Collected: 9/11/07 4:49:03 PM

Nebulizer Flow: 0.80 L/min

Sample Prep Volume:

Data Type: Original

Replicate Data: 0907002-mb

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc. Units	Sample Conc. Units	Analysis Time
1	Aluminum	6945.5	-133.9	-1.838 µg/L	-1.838 µg/L	16:49:52
2	Aluminum	7175.6	96.2	1.320 µg/L	1.320 µg/L	16:49:57

Mean Data: 0907002-mb

Analyte	Mean Corrected Intensity	Calib Conc. Units	Std.Dev.	Sample Conc. Units	Std.Dev.	RSD
Aluminum	-18.9	-0.2589 µg/L	2.23329	-0.2589 µg/L	2.23329	862.69%


```
=====
Sequence No.: 4                      Autosampler Location: 10
Sample ID: 0907002-1 5x             Date Collected: 9/11/07 4:50:34 PM
Analyst: de
Nebulizer Back Pressure: 117.0 kPa   Nebulizer Flow: 0.80 L/min
Sample Wt:                          Sample Prep Volume:
Dilution:                          Data Type: Original
=====
```

Replicate Data: 0907002-1 5x

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc. Units	Sample Conc. Units	Analysis Time
1	Aluminum	12770.4	5691.0	78.13 µg/L	78.13 µg/L	16:51:24
2	Aluminum	15950.9	8871.4	121.8 µg/L	121.8 µg/L	16:51:29

Mean Data: 0907002-1 5x

Analyte	Mean Corrected Intensity	Calib Conc. Units	Std.Dev.	Sample Conc. Units	Std.Dev.	RSD
Aluminum	7281.2	99.97 µg/L	30.877	99.97 µg/L	30.877	30.89%

=====

Sequence No.: 5	Autosampler Location: 11
Sample ID: 0907002-2 5x	Date Collected: 9/11/07 4:52:07 PM
Analyst: de	
Nebulizer Back Pressure: 117.0 kPa	Nebulizer Flow: 0.80 L/min
Sample Wt:	Sample Prep Volume:
Dilution:	Data Type: Original

Replicate Data: 0907002-2 5x

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc. Units	Sample Conc. Units	Analysis Time
1	Aluminum	12353.9	5274.5	72.42 µg/L	72.42 µg/L	16:52:57
2	Aluminum	12553.2	5473.8	75.15 µg/L	75.15 µg/L	16:53:01

Mean Data: 0907002-2 5x

Analyte	Mean Corrected Intensity	Calib Conc. Units	Std.Dev.	Sample Conc. Units	Std.Dev.	RSD
Aluminum	5374.1	73.78 µg/L	1.936	73.78 µg/L	1.936	2.62%

Sequence No.: 6

Autosampler Location: 12

Sample ID: 0907002-3 5x

Date Collected: 9/11/07 4:53:40 PM

Analyst: de

Nebulizer Back Pressure: 117.0 kPa

Nebulizer Flow: 0.80 L/min

Sample Wt:

Sample Prep Volume:

Dilution:

Data Type: Original

Replicate Data: 0907002-3 5x

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc. Units	Sample Conc. Units	Analysis Time
1	Aluminum	11937.4	4858.0	66.70 µg/L	66.70 µg/L	16:54:30
2	Aluminum	12328.6	5249.1	72.07 µg/L	72.07 µg/L	16:54:34

Mean Data: 0907002-3 5x

Analyte	Mean Corrected Intensity	Calib Conc. Units	Std.Dev.	Sample Conc. Units	Std.Dev.	RSD
Aluminum	5053.6	69.38 µg/L	3.798	69.38 µg/L	3.798	5.47%

Sequence No.: 7

Sample ID: 0907002-4 5x

Analyst: de

Nebulizer Back Pressure: 117.0 kPa

Sample Wt:

Dilution:

Autosampler Location: 13

Date Collected: 9/11/07 4:55:13 PM

Nebulizer Flow: 0.80 L/min

Sample Prep Volume:

Data Type: Original

Replicate Data: 0907002-4 5x

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc. Units	Sample Conc. Units	Analysis Time
1	Aluminum	11227.3	4147.9	56.95 µg/L	56.95 µg/L	16:56:03
2	Aluminum	10823.2	3743.8	51.40 µg/L	51.40 µg/L	16:56:07

Mean Data: 0907002-4 5x

Analyte	Mean Corrected Intensity	Calib Conc. Units	Std.Dev.	Sample Conc. Units	Std.Dev.	RSD
Aluminum	3945.8	54.17 µg/L	3.923	54.17 µg/L	3.923	7.24%

```
=====
Sequence No.: 9                      Autosampler Location: 1
Sample ID: ICB/CCB                  Date Collected: 9/11/07 4:58:20 PM
Analyst:
Nebulizer Back Pressure: 117.0 kPa  Nebulizer Flow: 0.80 L/min
Sample Wt:                          Sample Prep Volume:
Dilution:                           Data Type: Original
=====
```

Analysis Begun

```
Start Time: 9/11/07 5:02:33 PM      Plasma On Time: 9/11/07 8:44:23 AM
Logged In Analyst: Administrator     Technique: ICP Continuous
Spectrometer Model: Optima 2000 DV   Autosampler Model: AS-90plus
```

```
Sample Information File: D:\pe\Administrator\Sample Information\0907002.sif
Results Data Set: 0907002
Results Library: D:\pe\Administrator\Results\Results2007\results2005.mdb
```

```
=====
Sequence No.: 8                      Autosampler Location: 14
Sample ID: 0907002-1s TJ = 2000 µg/L Date Collected: 9/11/07 5:02:33 PM
Analyst: de
Nebulizer Back Pressure: 117.0 kPa   Nebulizer Flow: 0.80 L/min
Sample Wt:                           Sample Prep Volume:
Dilution:                           Data Type: Original
=====
```

Replicate Data: 0907002-1s

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc. Units	Sample Conc. Units	Analysis Time
1	Aluminum	158783.8	151704.4	2083 µg/L	2083 µg/L	17:03:23
2	Aluminum	157912.6	150833.2	2071 µg/L	2071 µg/L	17:03:28

Mean Data: 0907002-1s

Analyte	Mean Corrected Intensity	Calib Conc. Units	Std.Dev.	Sample Conc. Units	Std.Dev.	RSD
Aluminum	151268.8	2077 µg/L	8.5	2077 µg/L	8.5	0.41%

104th Rec.

=====

Sequence No.: 9	Autosampler Location: 1
Sample ID: ICB/CCB	Date Collected: 9/11/07 5:04:15 PM
Analyst:	
Nebulizer Back Pressure: 117.0 kPa	Nebulizer Flow: 0.80 L/min
Sample Wt:	Sample Prep Volume:
Dilution:	Data Type: Original

Replicate Data: ICB/CCB

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc. Units	Sample Conc. Units	Analysis Time
1	Aluminum	7400.8	321.4	4.412 µg/L	4.412 µg/L	17:05:05
2	Aluminum	7630.3	550.9	7.564 µg/L	7.564 µg/L	17:05:09

Mean Data: ICB/CCB

Analyte	Mean Corrected Intensity	Calib Conc. Units	Std.Dev.	Sample Conc. Units	Std.Dev.	RSD
Aluminum	436.1	5.988 µg/L	2.2282	5.988 µg/L	2.2282	37.21%

QC value within limits for Aluminum Recovery = Not calculated

All analytes passed QC.

Sequence No.: 10

Autosampler Location: 6

Sample ID: ICV/CCV *TV- SAW 49/L*

Date Collected: 9/11/07 5:05:51 PM

Analyst:

Nebulizer Back Pressure: 117.0 kPa

Nebulizer Flow: 0.80 L/min

Sample Wt:

Sample Prep Volume:

Dilution:

Data Type: Original

Replicate Data: ICV/CCV

Repl#	Analyte	Net Intensity	Corrected Intensity	Calib. Conc. Units	Sample Conc. Units	Analysis Time
1	Aluminum	367896.0	360816.6	4954 µg/L	4954 µg/L	17:06:41
2	Aluminum	361025.3	353945.9	4860 µg/L	4860 µg/L	17:06:45

Mean Data: ICV/CCV

Analyte	Mean Corrected Intensity	Calib Conc. Units	Std.Dev.	Sample Conc. Units	Std.Dev.	RSD
Aluminum	357381.3	4907 µg/L	66.7	4907 µg/L	66.7	1.36%

QC value within limits for Aluminum Recovery = 98.13%

All analytes passed QC.

Analytical Sequence**Method: Method29-Trace**

Seq.	Loc.	ID	Status
1	6	ICV/CCV	Passed
2	1	ICB/CCB	Passed
3	9	0907002-mb	Analyzed
4	10	0907002-1 5x	Analyzed
5	11	0907002-2 5x	Analyzed
6	12	0907002-3 5x	Analyzed
7	13	0907002-4 5x	Analyzed
8	14	0907002-1s	Analyzed
9	1	ICB/CCB	Passed
10	6	ICV/CCV	Passed

DOCUMENTATION

ENVIRONMENTAL, INC.

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

DAT SAMPLE RECEIVING

7715 Corporate Blvd. Plain City, OH 43064.

Project Number: 0907002

an

ite

FedEx Tracking Number

861996968083

nder's
ime

Phone

Company

Address

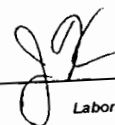
Dept./Floor/Suite/Room

y

State

ZIP

ur Internal Billing Reference



Laboratory Receiving Initials

0907002

9/6/2007 10:08:41 AM

DAT SAMPLE RECEIVING

7715 Corporate Blvd. Plain City, OH 43064.

Project Number: 0907002

Date Received: 9/6/2007

Client Name: ARI Environmental

Tracking number: 8619 9696 8083

Custody Seals?: No

Carrier: FedEx

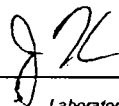
Analysis: Aluminum

Package Temp: Ambient (25°C)

COC: ☒ check if COC from client

Sample Information

Client ID:	Laboratory ID	Date	Matrix:	Container:	Comment:
Run M8-1 Imp. Contents	0907002-1	8/29/2007	Aq	sm nalgene	Has some IPA
Run M8-2 Imp. Contents	0907002-2	8/29/2007	Aq	sm nalgene	Has some IPA
Run M8-3 Imp. Contents	0907002-3	8/29/2007	Aq	sm nalgene	Has some IPA
Blank Imp. Contents	0907002-4	8/29/2007	Aq	sm nalgene	Has some IPA



Laboratory Receiving Initials

0907002

9/6/2007 10:08:41 AM

ARI Environmental, Inc. - Chicago

951 Old Rand Rd, Unit #106
Wauconda, IL 60084

Valero BP
PO # IL-373-07

Analytical Report
(0907-117)

EPA CTM-033
Hydrogen cyanide



Enthalpy Analytical, Inc.

Phone: (919) 850 - 4392 / Fax: (919) 850 - 9012 / www.enthalpy.com
2202 Ellis Road Durham, NC 27703 - 5518

I certify that to the best of my knowledge all analytical data presented in this report:

- Have been checked for completeness
- Are accurate, error-free, and legible
- Have been conducted in accordance with approved protocol, and that all deviations and analytical problems are summarized in the appropriate narrative(s)
- This analytical report was prepared in Portable Document Format (.PDF) and contains 63 pages.

Michael Steven Schapira

QA Review Performed by: Michael Steven Schapira



Summary of Results



Company	ARI Environmental
Analyst	RMB
Parameters	EPA CTM-033
# Samples	3 runs, 1 blank, 2 spikes

Client #	Valero BP
Job #	0907-117
PO #	IL-373-07
Report Date	9/27/2007

Compound	Sample ID / Sample Concentration (ug/mL)		
	HCN-1	HCN-2	HCN-3
Hydrogen cyanide	16.1	15.3	47.4
	HCN Blank	Field Spike	Spike Soln
Hydrogen cyanide	0.0100 ND	25.7	3,317

Results



Company	ARI Environmental
Analyst	RMB
Parameters	EPA CTM-033
# Samples	3 runs, 1 blank, 2 spikes

Client #	Valero BP
Job #	0907-117
PO #	IL-373-07
Report Date	9/27/2007

MDL 0.0100 (ug/mL)

LOQ 0.103 (ug/mL)

Compound Hydrogen cyanide

Lower Curve Limit 0.103 (ug/mL)

Upper Curve Limit 2.08 (ug/mL)

Sample ID	Lab ID # 1	Lab ID # 2	Analysis Method	Ret Time (min)	Ret Time (min)	% Diff Ret	Conc # 1 (ug/mL)	Conc # 2 (ug/mL)	% Diff Conc	Avg Conc (ug/mL)	DF	Vol (mL)	Sample Conc (ug/mL)	Qual
HCN-1	010-1101.D	010-1102.D	907117.	7.79	7.72	0.9	1.07	1.07	0.1	1.07	15	1.00	16.1	
HCN-2	011-1201.D	011-1202.D	907117.	7.84	7.67	2.3	1.03	1.00	1.5	1.02	15	1.00	15.3	
HCN-3	036-0501.D	036-0502.D	907117.	7.80	7.70	1.4	1.17	1.21	1.6	1.19	40	1.00	47.4	
HCN Blank	009-1001.D	009-1002.D	907117.	NA	NA	NA	0.0100	0.0100	0.0	0.0100	1	1.00	0.0100	ND
Field Spike	013-1601.D	013-1602.D	907117.	7.82	7.74	1.1	1.70	1.72	0.5	1.71	15	1.00	25.7	
Spike Soln	017-0201.D	017-0202.D	907117.	7.74	7.73	0.1	0.337	0.326	1.6	0.332	10,000	1.00	3,317	
Method Blank	007-0801.D	007-0802.D	907117.	NA	NA	NA	0.0100	0.0100	0.0	0.0100	1	1.00	0.0100	ND
MS / HCN-1	014-1701.D	014-1702.D	907117	7.82	7.73	1.2	1.66	1.59	2.0	1.63	1	0.750	1.221	
										Spike Amount (ug)			0.416	
										Native Amount (ug)			0.805	
										Spike Recovery (%)			100%	
MSD / HCN-1	015-1801.D	015-1802.D	907117	7.86	7.67	2.4	1.66	1.63	1.0	1.65	1	0.750	1.236	
										Spike Amount (ug/mL)			0.416	
										Native Amount (ug/mL)			0.805	
										Spike Recovery (%)			104%	
LD / HCN-2	016-1901.D	016-1902.D	907117	7.90	7.70	2.5	0.969	0.962	0.3	0.966	15	1.00	14.5	
										% Difference			5.4%	

Company	ARI Environmental
Analyst	RMB
Parameters	ISE Confirmation
# Samples	3 runs

Client #	Valero BP
Job #	0907-117
PO #	IL-373-07
Report Date	9/27/2007

MDL 0.0200 (ug/mL)
 LOQ 0.519 (ug/mL)
 Compound Hydrogen cyanide

Lower Curve Limit 0.519 (ug/mL)
 Upper Curve Limit 20.4 (ug/mL)

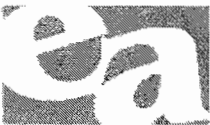
Sample ID	Concentration (ug/mL)	Volume (mL)	Dilution	Catch Weight (ug/mL)	Qual
HCN-1	19.0	1	1	19.0	
HCN-2	18.4	1	1	18.4	
HCN-3	19.3	1	3	57.9	

daw

0907-117-ISE

9/28/2007 9:42 AM

Narrative Summary



Enthalpy Analytical Narrative Summary

Company	ARI Environmental, Inc.
Analyst	RMB
Parameters	EPA CTM-033
# Samples	3 runs, 1 blank, & 2 spikes

Client #	Valero BP
Job #	0907-117
PO #	IL-373-07
Report Date	September 27, 2007

Custody

Amelia Mallner received the samples on 9/25/07 after being relinquished by ARI Environmental, Inc. - Chicago. The samples were received at 24.9 °C in good condition. Prior to and during analysis, the samples were kept under lock with access only to authorized personnel by Enthalpy Analytical, Inc.

Analysis

The samples were analyzed for hydrogen cyanide using the analytical procedures in EPA Conditional Test Method 033, Sampling and Analysis for Hydrogen Cyanide Emissions from Stationary Sources.

The samples were analyzed following the procedures in Section 11.0, Analytical Procedures.

Confirmational analysis were performed for the 3 samples using an Ion Selective Electrode (ISE). The results of this additional analysis can be seen on page 7 of this Adobe PDF report. Though number values are presented, and are comparable to the HPLC results, only the HPLC results should be considered usable numbers. The ISE results are qualitative confirmation only.

The DIONEX Model 500, High Performance Liquid Chromatograph ("Grandmama") was equipped as follows:

Front: DIONEX ED40 Electrochemical Detector

Front: Dionex Ion Pac AS7, 4 x 250 mm (S/N 011640)

Calibration

The calibration curve(s) are located in the back of this report and referenced in the Analysis Method column on the Detailed Results page.

For each calibration curve used, the first page of the curve contains all method specific parameters (i.e., curve type, origin, weight, etc.) used to quantify the samples. The calibration curve section also includes a table with the Retention Time (RetTime), Level (Lvl), Amount (corresponding units), Area, Response Factor (Amt/Area) and the analyte Name. The calibration table is used to identify (by retention time) and quantify each target compound.

Chromatographic Conditions

The acquisition method CTM033.M is included in the Curve/QA Chromatograms section of this report.



Enthalpy Analytical Narrative Summary

(continued)

QC Notes

As required in Section 9.0, Quality Control, client-provided field blank, reagent blank and field spike were analyzed. In the laboratory the following QC samples were analyzed: method blank, Matrix Spike/Matrix Spike Duplicate, and a replicate analysis. Unless otherwise specified, all method required acceptance criteria were met.

All sample preparation and analytical holding times specified in the method were met unless otherwise indicated. In Section 11.1.2 the specified analytical holding time is 30 days from collection.

Reporting Notes

Enthalpy Analytical, Inc. is accredited to perform this method for compliance purposes by the National Environmental Laboratory Accreditation Conference (NELAC) through the Louisiana Environmental Laboratory Accreditation Program (LELAP), certificate number 04010.



General Reporting Notes

The following are general reporting notes that are applicable to all Enthalpy Analytical, Inc. reports, unless specifically noted otherwise.

- The symbol **MDL** represents the Minimum Detection Limit. Below this value the laboratory cannot confirm the presence of the analyte of interest reliably.
- The symbol **LOQ** represents the Limit of Quantification. Below this value the laboratory cannot quantitate the analyte of interest within the criteria of the method.
- The symbol **ND** following a value indicates a non-detect or analytical result below the MDL.
- The symbol **J** following a value indicates an analytical result between the MDL and the LOQ. A J flag indicates that the laboratory can positively identify the analyte of interest as present, but the value should be considered an estimate.
- The symbol **E** following a value indicates an analytical result exceeding 100% of the highest calibration point.
- The symbol **DF** represents a Dilution Factor. This number represents dilutions during the extraction and/or laboratory stages of sample treatment. The analytical result taken from a laboratory instrument is multiplied by the DF to get final results.
- The Sample ID **MS** represents a Matrix Spike. An aliquot of an actual sample is spiked with a known amount of analyte so that a percent recovery value can be determined. This shows what effect the sample matrix may have on the target analyte, i.e. whether or not anything in the sample matrix prohibits analysis for the analyte(s).
- The Sample ID **MSD** represents a Matrix Spike Duplicate. Prepared in the same manner as an MS, the use of duplicate matrix spikes allows further confirmation of laboratory quality by showing the consistency of results gained by performing the same steps multiple times. Most methods performed by Enthalpy do not require analysis of an MSD.
- The Sample ID **BS** represents a Blind Spike. A member of the Quality Assurance department has created BS samples for many of the analytes Enthalpy tests for, and only QA and the Enthalpy Analytical ownership have access to the actual values of these samples. The laboratory analyzes them without knowledge of the actual value, and the spreadsheets get completed for these samples solely by the QA group.
- The Sample ID **LCS** represents a Laboratory Control Sample. Whenever spikes are prepared for our clients more spikes are prepared than needed. The extras (randomly chosen) are kept in-house at the appropriate temperature conditions. When the spike samples come back from the client for analysis, the LCSs (usually two are saved) are analyzed to confirm that the analyte could be recovered from the media, separate from the spike samples which were used on the project and which may have had issues caused during collection and/or transport.
- **Significant Figures:** Where the reported value is much greater than unity (1.00) in the units expressed (specifically values of 1,000 or greater), the number is rounded to a whole number of units, rather than to 3 significant figures. For example, a value of 10,456.45 ug catch is rounded to 10,456 ug. There are five significant digits reported, but no confidence should be placed on more than three significant digits.



Sample Custody



5338

[illegible]

REMARKS:	Please report concentrations, Send report to Eric Voast - Rust per Brian Tyler	Page 13 of 63



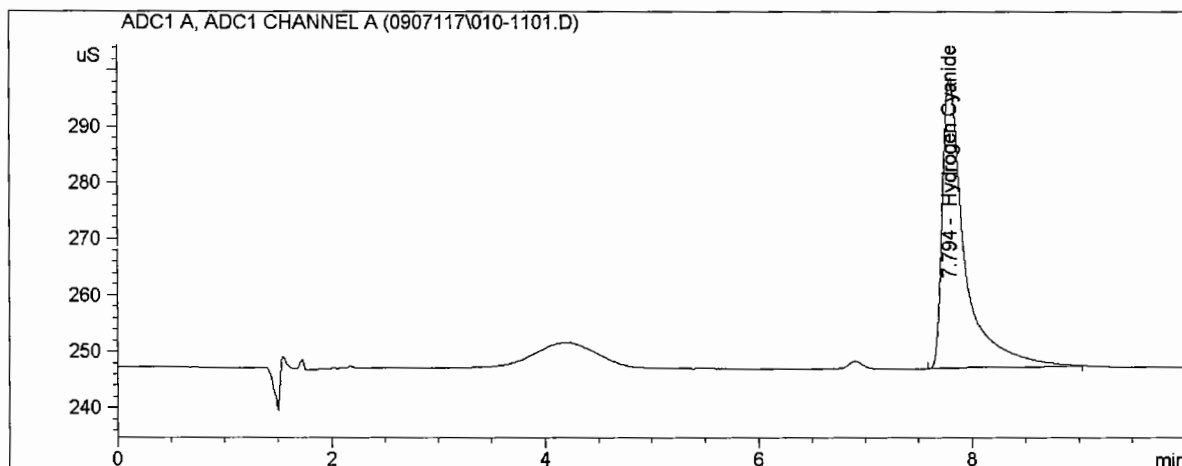
951 Old Rand Road, Unit 106
Wauconda, IL 60084
Telephone (847) 487-1580
Fax (847) 487-1587

RETAIN COPY - PINK

Sample Chromatograms



```
=====
Injection Date   : 9/25/2007 5:35:12 PM      Seq. Line :   11
Sample Name      : HCN-1 *15                 Location  :    -
Acq. Operator    : RMB                       Inj       :    1
Acq. Instrument  : Grandmama
Sequence File    : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method      : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed     : 9/25/2007 1:47:35 PM by RMB
Analysis Method  : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed     : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====
```



```
=====
External Standard Report
=====
```

Sorted By : Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier : 1.0000
Dilution : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: ADC1 A, ADC1 CHANNEL A

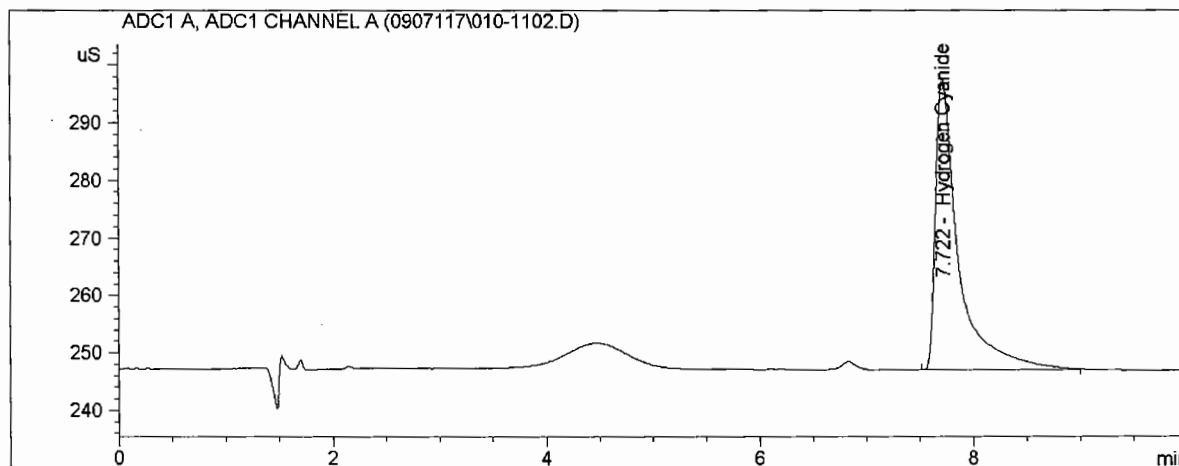
RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.794	PB	751.43500	1.43006e-3	1.07460		Hydrogen Cyanide

Totals : 1.07460

Results obtained with enhanced integrator!

```
=====
*** End of Report ***
```

```
=====
Injection Date   : 9/25/2007 5:46:27 PM      Seq. Line :   11
Sample Name     : HCN-1 *15                 Location  :    -
Acq. Operator   : RMB                      Inj       :    2
Acq. Instrument : Grandmama
Sequence File   : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method     : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed    : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed    : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====
```



External Standard Report

```
=====
Sorted By       :      Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier      :      1.0000
Dilution        :      1.0000
Use Multiplier & Dilution Factor with ISTDs
=====
```

Signal 1: ADC1 A, ADC1 CHANNEL A

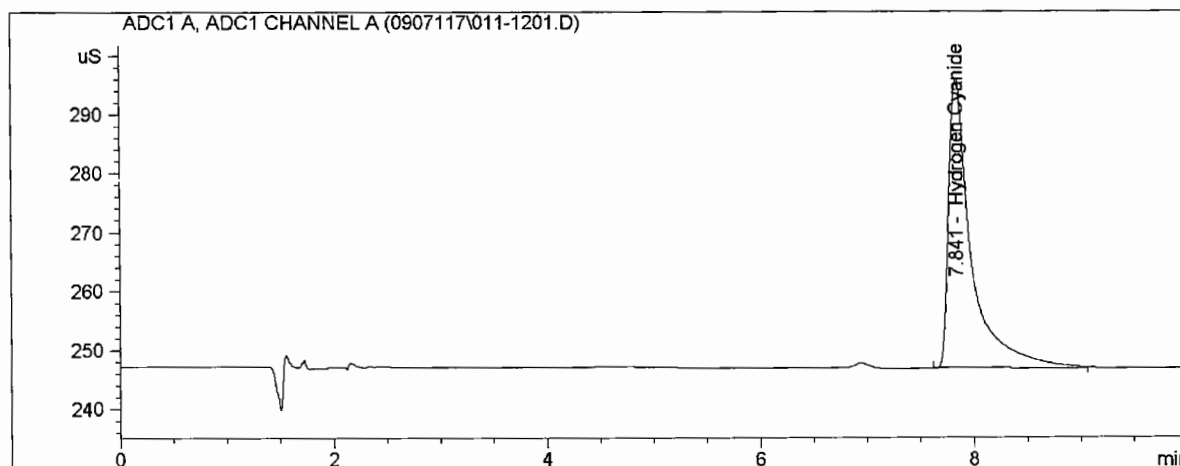
RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.722	PB	749.71820	1.43006e-3	1.07214		Hydrogen Cyanide

Totals : 1.07214

Results obtained with enhanced integrator!

*** End of Report ***

```
=====
Injection Date   : 9/25/2007 5:57:45 PM      Seq. Line :   12
Sample Name      : HCN-2 *15                 Location  :    -
Acq. Operator    : RMB                       Inj       :    1
Acq. Instrument  : Grandmama
Sequence File    : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method      : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed     : 9/25/2007 1:47:35 PM by RMB
Analysis Method  : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed     : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====
```



```
=====
External Standard Report
=====
```

```
Sorted By           :      Signal
Calib. Data Modified :      9/25/2007 4:12:00 PM
Multiplier          :      1.0000
Dilution            :      1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: ADC1 A, ADC1 CHANNEL A

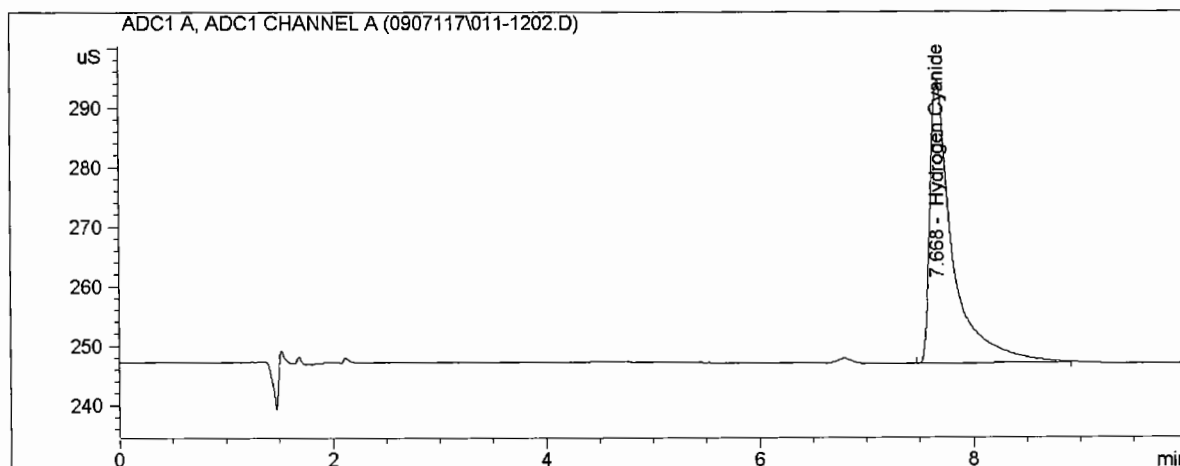
RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.841	PB	723.20911	1.43007e-3	1.03424		Hydrogen Cyanide

Totals : 1.03424

Results obtained with enhanced integrator!

```
=====
*** End of Report ***
```

```
=====
Injection Date   : 9/25/2007 6:09:01 PM      Seq. Line :   12
Sample Name      : HCN-2 *15                 Location  :    -
Acq. Operator    : RMB                      Inj       :    2
Acq. Instrument  : Grandmama
Sequence File    : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method      : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed     : 9/25/2007 1:47:35 PM by RMB
Analysis Method  : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed     : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====
```



External Standard Report

```
=====
Sorted By       :      Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier      :      1.0000
Dilution        :      1.0000
Use Multiplier & Dilution Factor with ISTDs
=====
```

Signal 1: ADC1 A, ADC1 CHANNEL A

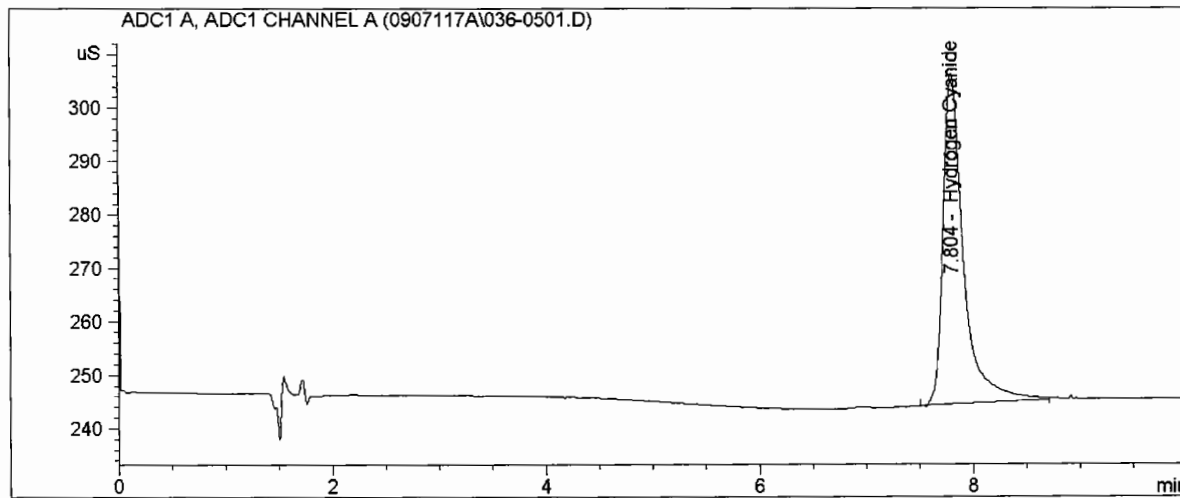
RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.668	PB	701.44598	1.43009e-3	1.00313		Hydrogen Cyanide

Totals : 1.00313

Results obtained with enhanced integrator!

*** End of Report ***

```
=====
Injection Date   : 9/26/2007 6:28:23 PM      Seq. Line :    5
Sample Name      : HCN-3 *40                 Location  :    -
Acq. Operator    : RMB                       Inj       :    1
Acq. Instrument  : Grandmama
Acq. Method      : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed     : 9/25/2007 1:47:35 PM by RMB
Analysis Method  : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed     : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====
```



```
=====
External Standard Report
=====
```

```
Sorted By           :      Signal
Calib. Data Modified :      9/25/2007 4:12:00 PM
Multiplier          :      1.0000
Dilution            :      1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.804	BB	815.71820	1.43003e-3	1.16650		Hydrogen Cyanide

Totals : 1.16650

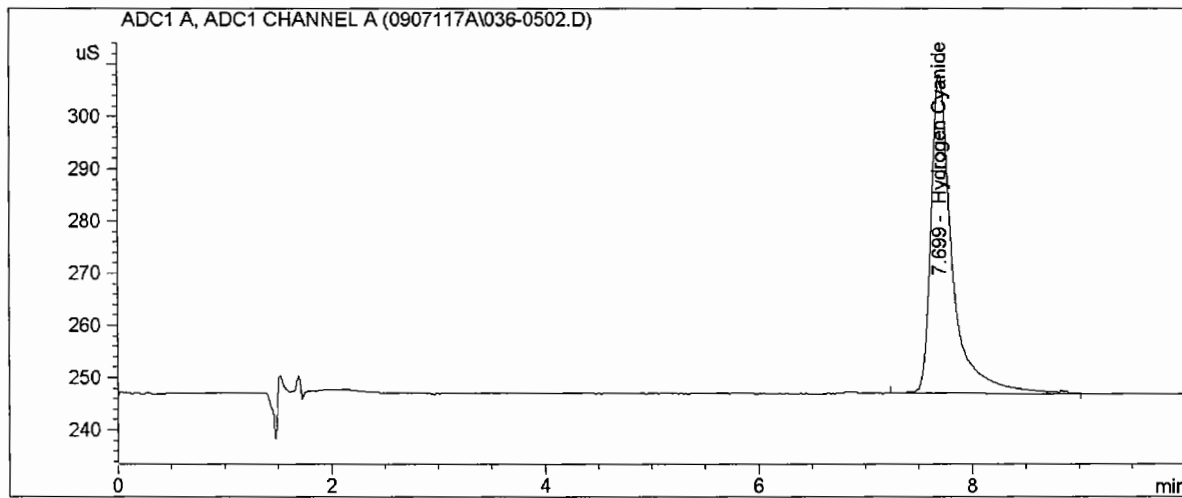
Results obtained with enhanced integrator!

```
=====
*** End of Report ***
=====
```

```

=====
Injection Date   : 9/26/2007 6:39:39 PM      Seq. Line :    5
Sample Name     : HCN-3 *40                 Location  :    -
Acq. Operator   : RMB                       Inj       :    2
Acq. Instrument : Grandmama
Acq. Method     : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed    : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed    : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====

```



```

=====
External Standard Report
=====

```

```

Sorted By      :      Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier     :      1.0000
Dilution       :      1.0000
Use Multiplier & Dilution Factor with ISTDs

```

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.699	BB	842.90936	1.43001e-3	1.20537		Hydrogen Cyanide

Totals : 1.20537

Results obtained with enhanced integrator!

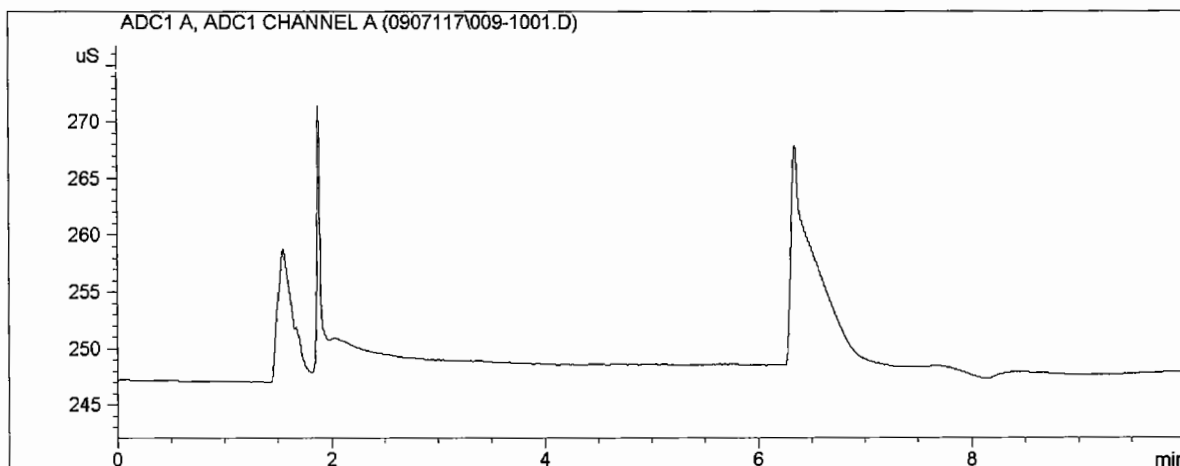
```

=====
*** End of Report ***
=====

```



```
=====
Injection Date   : 9/25/2007 5:12:38 PM          Seq. Line :   10
Sample Name      : HCN Blank                      Location  :    -
Acq. Operator    : RMB                           Inj       :    1
Acq. Instrument  : Grandmama
Sequence File    : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method      : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed     : 9/25/2007 1:47:35 PM by RMB
Analysis Method  : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed     : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====
```



External Standard Report

```
=====
Sorted By       :      Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier      :      1.0000
Dilution        :      1.0000
Use Multiplier & Dilution Factor with ISTDs
=====
```

Signal 1: ADC1 A, ADC1 CHANNEL A

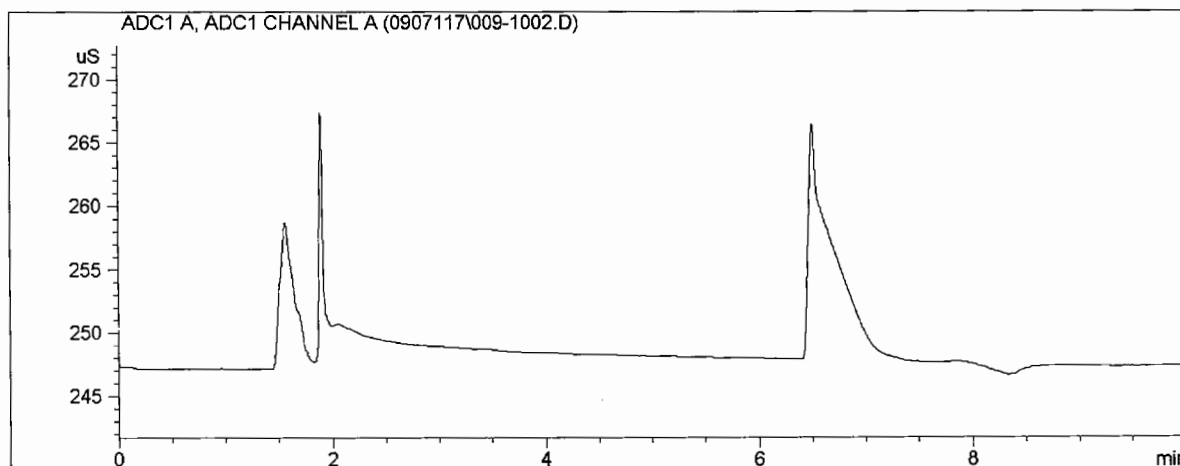
RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.696	-	-	-	-	-	Hydrogen Cyanide

Totals : 0.00000

Results obtained with enhanced integrator!
1 Warnings or Errors :

Warning : Calibrated compound(s) not found

=====
Injection Date : 9/25/2007 5:23:55 PM Seq. Line : 10
Sample Name : HCN Blank Location : -
Acq. Operator : RMB Inj : 2
Acq. Instrument : Grandmama
Sequence File : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====



=====
External Standard Report
=====

Sorted By : Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier : 1.0000
Dilution : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: ADC1 A, ADC1 CHANNEL A

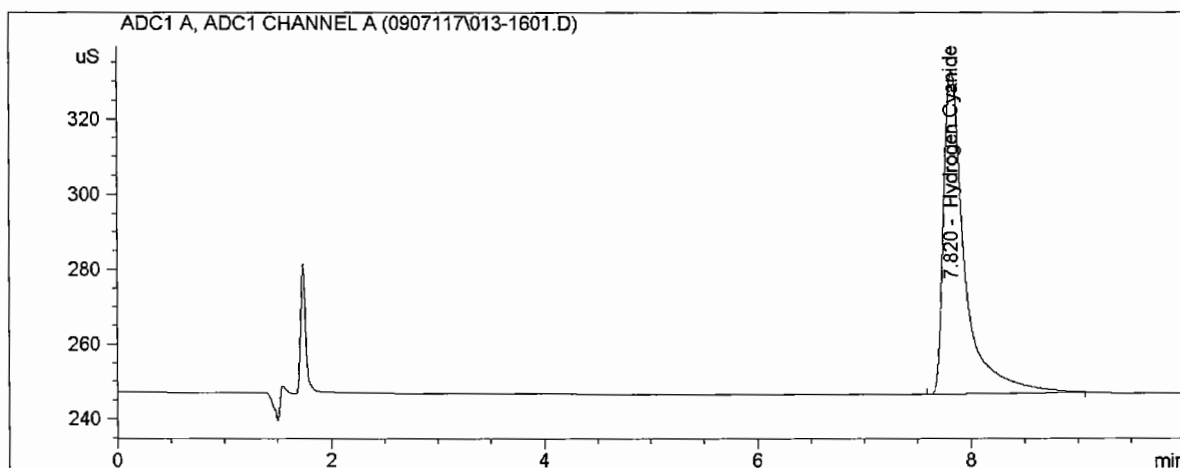
RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.696	-	-	-	-	-	Hydrogen Cyanide

Totals : 0.00000

Results obtained with enhanced integrator!
1 Warnings or Errors :

Warning : Calibrated compound(s) not found
=====

```
=====
Injection Date   : 9/25/2007 7:27:57 PM          Seq. Line :   16
Sample Name      : Field Spike *15              Location  :    -
Acq. Operator    : RMB                          Inj       :    1
Acq. Instrument  : Grandmama
Sequence File    : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method      : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed     : 9/25/2007 1:47:35 PM by RMB
Analysis Method  : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed     : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====
```



External Standard Report

```
=====
Sorted By       : Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier      : 1.0000
Dilution        : 1.0000
Use Multiplier & Dilution Factor with ISTDs
=====
```

Signal 1: ADC1 A, ADC1 CHANNEL A

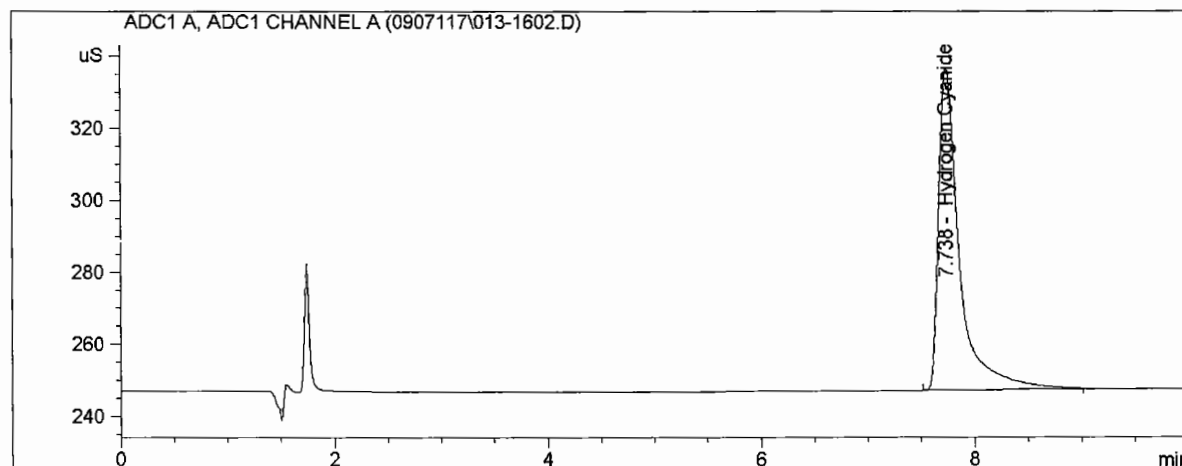
RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.820	PB	1192.01538	1.42991e-3	1.70447		Hydrogen Cyanide

Totals : 1.70447

Results obtained with enhanced integrator!

*** End of Report ***

```
=====
Injection Date   : 9/25/2007 7:39:13 PM      Seq. Line :   16
Sample Name      : Field Spike *15           Location  :    -
Acq. Operator    : RMB                      Inj       :    2
Acq. Instrument  : Grandmama
Sequence File    : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method      : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed     : 9/25/2007 1:47:35 PM by RMB
Analysis Method  : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed     : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====
```



External Standard Report

```
=====
Sorted By       :      Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier      :      1.0000
Dilution        :      1.0000
Use Multiplier & Dilution Factor with ISTDs
=====
```

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.738	BB	1205.09326	1.42991e-3	1.72317		Hydrogen Cyanide

Totals : 1.72317

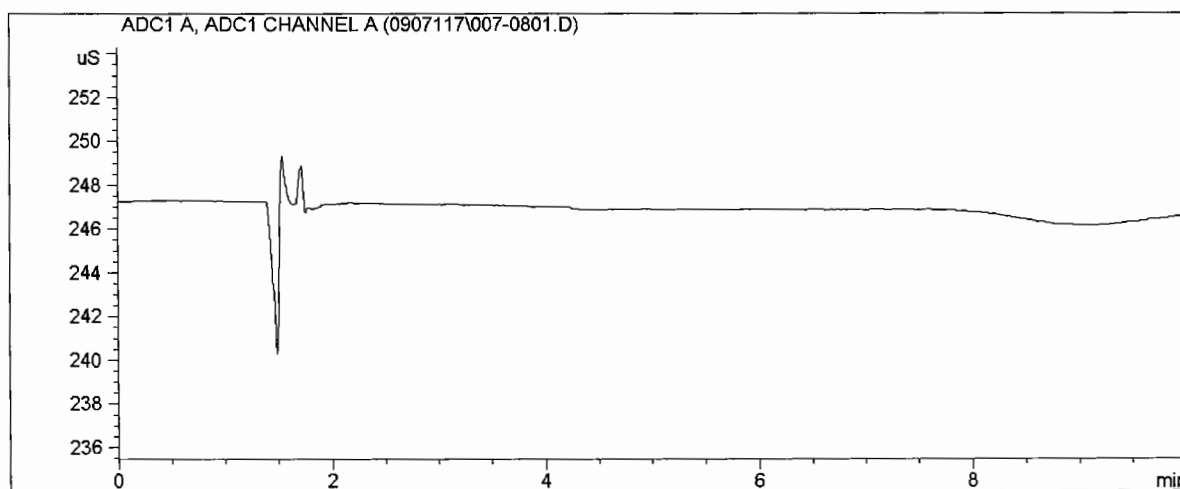
Results obtained with enhanced integrator!

*** End of Report ***

=====

Injection Date	: 9/25/2007 4:27:32 PM	Seq. Line	: 8
Sample Name	: Method Blank	Location	: -
Acq. Operator	: RMB	Inj	: 1
Acq. Instrument	: Grandmama		
Sequence File	: H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S		
Acq. Method	: H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M		
Last changed	: 9/25/2007 1:47:35 PM by RMB		
Analysis Method	: H:\LC2007Q3\GRANDMAM\METHODS\0907117.M		
Last changed	: 9/25/2007 4:12:06 PM by RMB		
Column	: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column		
Eluent	: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine		
Detection	: Integrated Amperometry w/ 1 sec waveform		
Flow rate	: 1.0 mL/min		
Run Time	: 10 min		

=====



=====

External Standard Report

=====

Sorted By : Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier : 1.0000
Dilution : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.696	-	-	-	-	-	Hydrogen Cyanide

Totals : 0.00000

Results obtained with enhanced integrator!

1 Warnings or Errors :

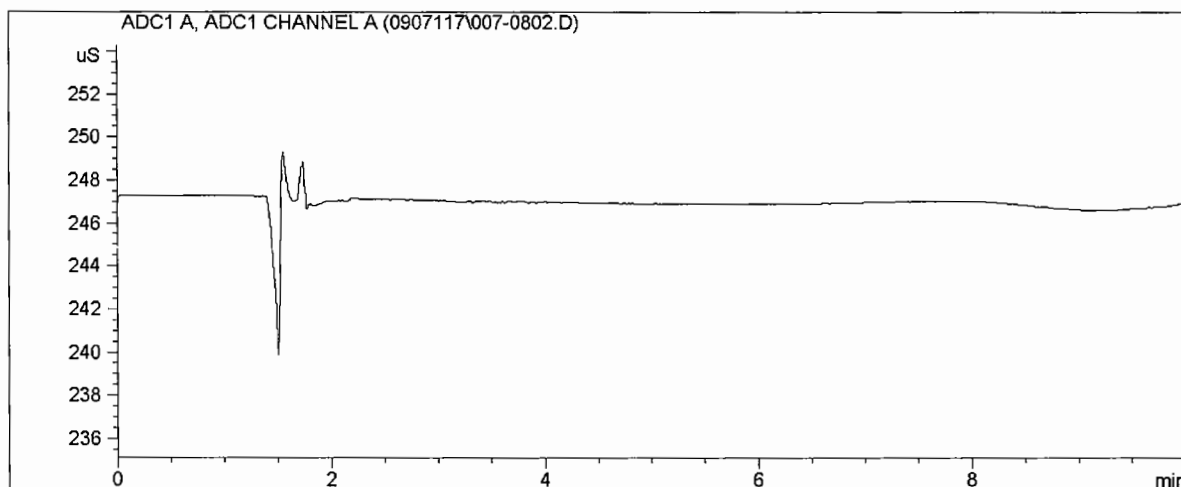
Warning : Calibrated compound(s) not found

=====

```

=====
Injection Date   : 9/25/2007 4:38:49 PM      Seq. Line :    8
Sample Name     : Method Blank              Location  :    -
Acq. Operator   : RMB                      Inj       :    2
Acq. Instrument : Grandmama
Sequence File   : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method     : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed    : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed    : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====

```



```

=====
External Standard Report
=====

```

```

Sorted By      : Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier     : 1.0000
Dilution       : 1.0000
Use Multiplier & Dilution Factor with ISTDs

```

Signal 1: ADC1 A, ADC1 CHANNEL A

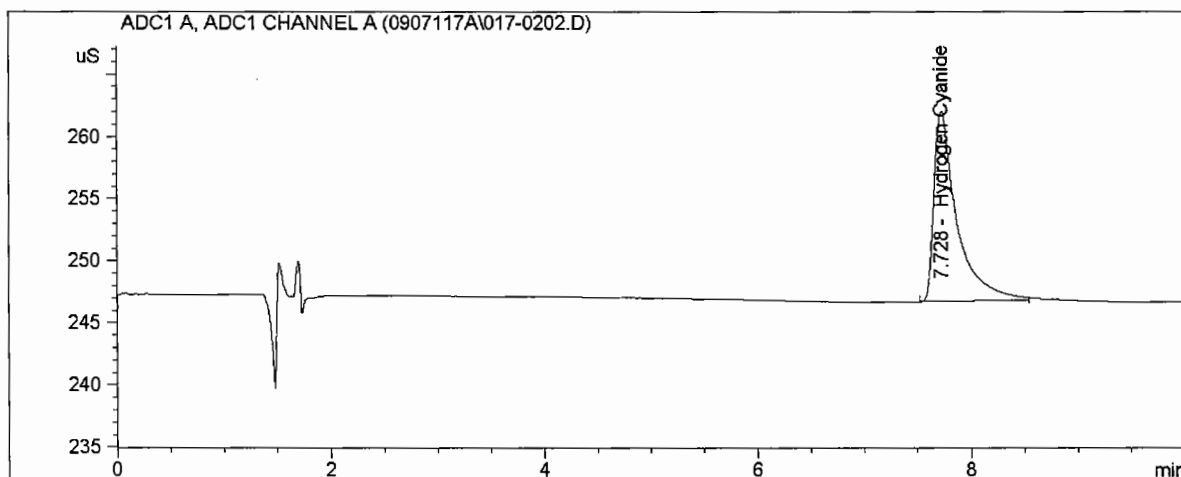
RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.696	-	-	-	-	-	Hydrogen Cyanide

Totals : 0.00000

Results obtained with enhanced integrator!
1 Warnings or Errors :

Warning : Calibrated compound(s) not found

```
=====
Injection Date   : 9/26/2007 12:22:43 PM      Seq. Line :    2
Sample Name      : Spike Soln*10000          Location  :    -
Acq. Operator    : RMB                      Inj       :    2
Acq. Instrument  : Grandmama
Acq. Method      : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed     : 9/25/2007 1:47:35 PM by RMB
Analysis Method  : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed     : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====
```



External Standard Report

```
Sorted By      : Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier     : 1.0000
Dilution       : 1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: ADC1 A, ADC1 CHANNEL A

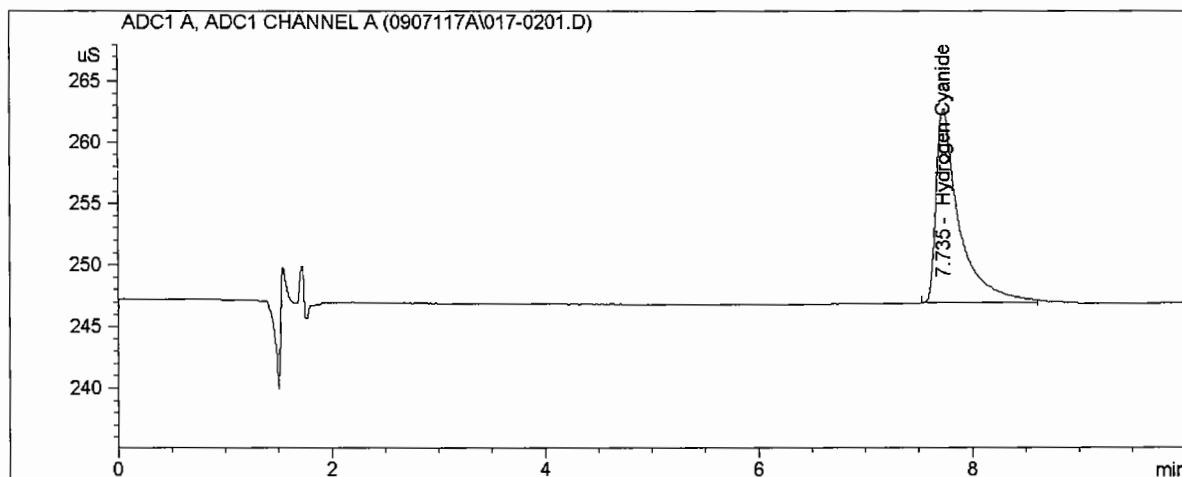
RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.728	BB	228.03906	1.43099e-3	3.26321e-1		Hydrogen Cyanide

Totals : 3.26321e-1

Results obtained with enhanced integrator!

*** End of Report ***

```
=====
Injection Date   : 9/26/2007 11:49:51 AM      Seq. Line :    2
Sample Name      : Spike Soln*10000          Location  :    -
Acq. Operator    : RMB                      Inj       :    1
Acq. Instrument  : Grandmama
Acq. Method      : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed     : 9/25/2007 1:47:35 PM by RMB
Analysis Method  : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed     : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====
```



External Standard Report

```
Sorted By      : Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier     : 1.0000
Dilution       : 1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: ADC1 A, ADC1 CHANNEL A

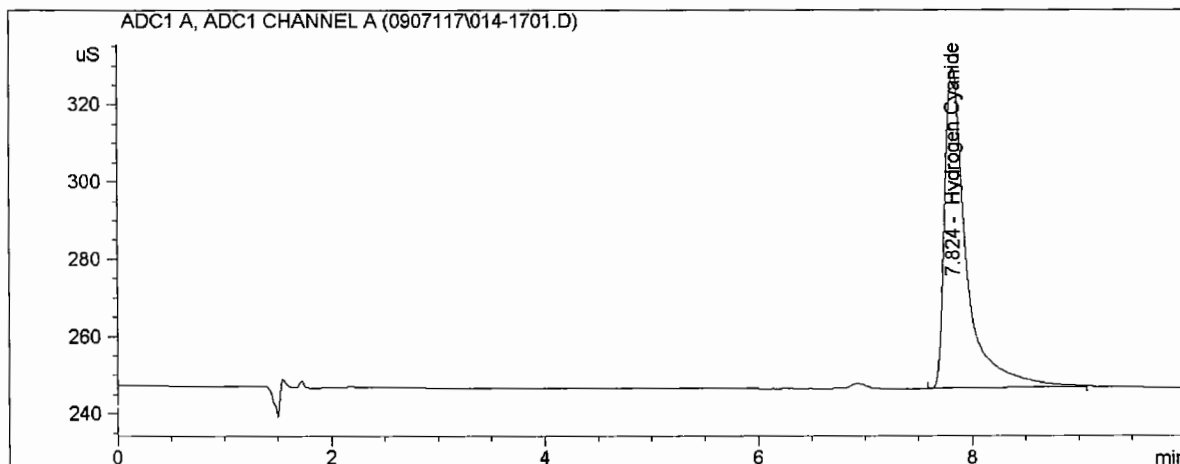
RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.735	BB	235.52614	1.43095e-3	3.37025e-1		Hydrogen Cyanide

Totals : 3.37025e-1

Results obtained with enhanced integrator!

*** End of Report ***


```
=====
Injection Date   : 9/25/2007 7:50:30 PM      Seq. Line :   17
Sample Name      : MS HCN-1 *15              Location  :    -
Acq. Operator    : RMB                      Inj       :    1
Acq. Instrument  : Grandmama
Sequence File    : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method      : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed     : 9/25/2007 1:47:35 PM by RMB
Analysis Method  : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed     : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====
```



```
=====
External Standard Report
=====
```

```
Sorted By           :      Signal
Calib. Data Modified :      9/25/2007 4:12:00 PM
Multiplier          :      1.0000
Dilution            :      1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: ADC1 A, ADC1 CHANNEL A

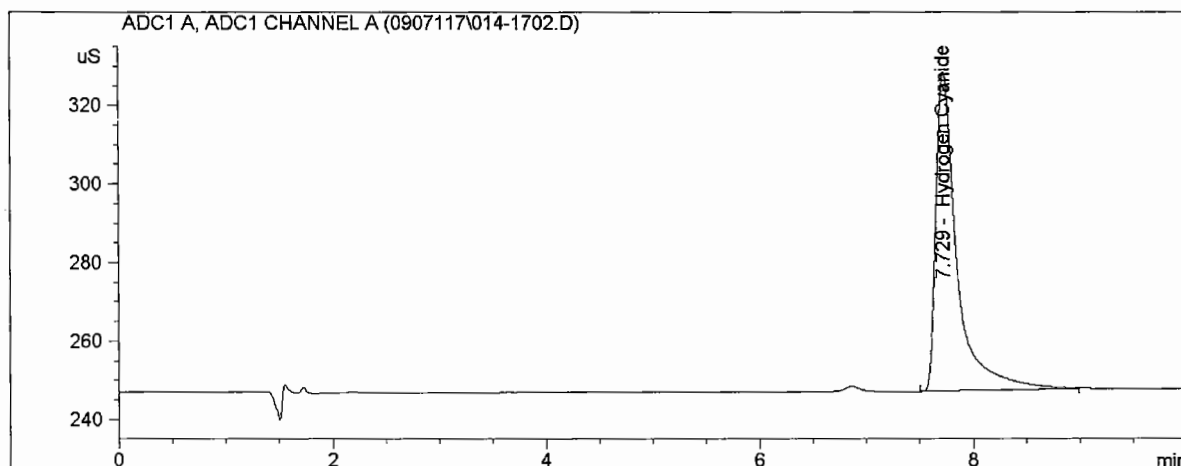
RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.824	PB	1161.24573	1.42992e-3	1.66048		Hydrogen Cyanide

Totals : 1.66048

Results obtained with enhanced integrator!

```
=====
*** End of Report ***
=====
```

=====
Injection Date : 9/25/2007 8:01:45 PM Seq. Line : 17
Sample Name : MS HCN-1 *15 Location : -
Acq. Operator : RMB Inj : 2
Acq. Instrument : Grandmama
Sequence File : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====



=====
External Standard Report
=====

Sorted By : Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier : 1.0000
Dilution : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: ADC1 A, ADC1 CHANNEL A

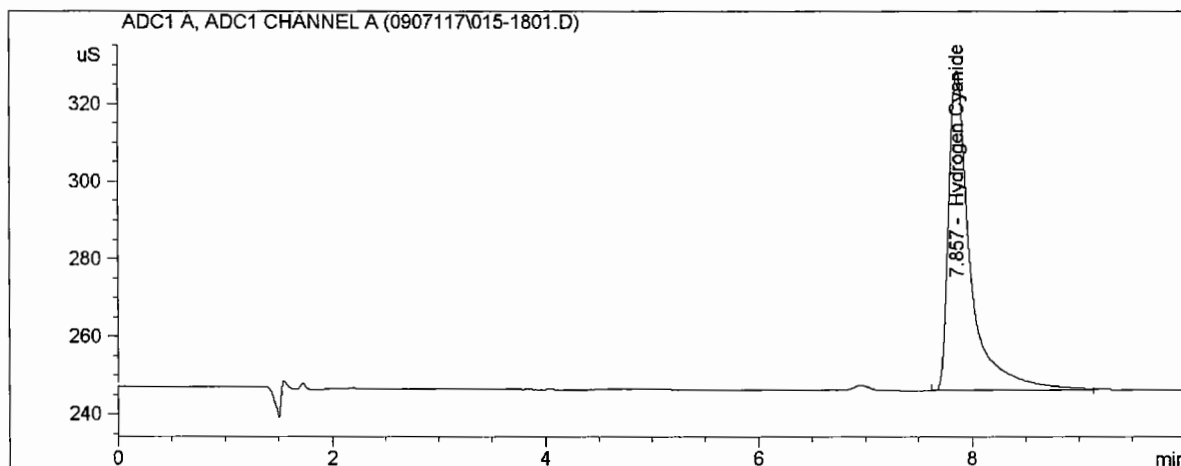
RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.729	PB	1115.43701	1.42993e-3	1.59499		Hydrogen Cyanide

Totals : 1.59499

Results obtained with enhanced integrator!

=====
*** End of Report ***

=====
Injection Date : 9/25/2007 8:13:02 PM Seq. Line : 18
Sample Name : MSD HCN-1 *15 Location : -
Acq. Operator : RMB Inj : 1
Acq. Instrument : Grandmama
Sequence File : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====



=====
External Standard Report
=====

Sorted By : Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier : 1.0000
Dilution : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: ADC1 A, ADC1 CHANNEL A

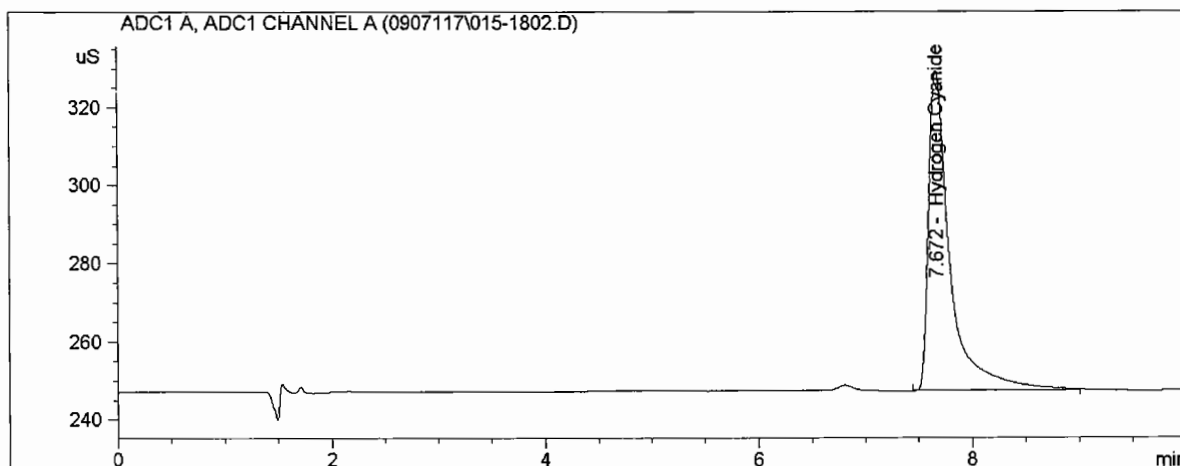
RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.857	PB	1163.40955	1.42992e-3	1.66358		Hydrogen Cyanide

Totals : 1.66358

Results obtained with enhanced integrator!

=====
*** End of Report ***

=====
Injection Date : 9/25/2007 8:24:19 PM Seq. Line : 18
Sample Name : MSD HCN-1 *15 Location : -
Acq. Operator : RMB Inj : 2
Acq. Instrument : Grandmama
Sequence File : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====



=====
External Standard Report
=====

Sorted By : Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier : 1.0000
Dilution : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: ADC1 A, ADC1 CHANNEL A

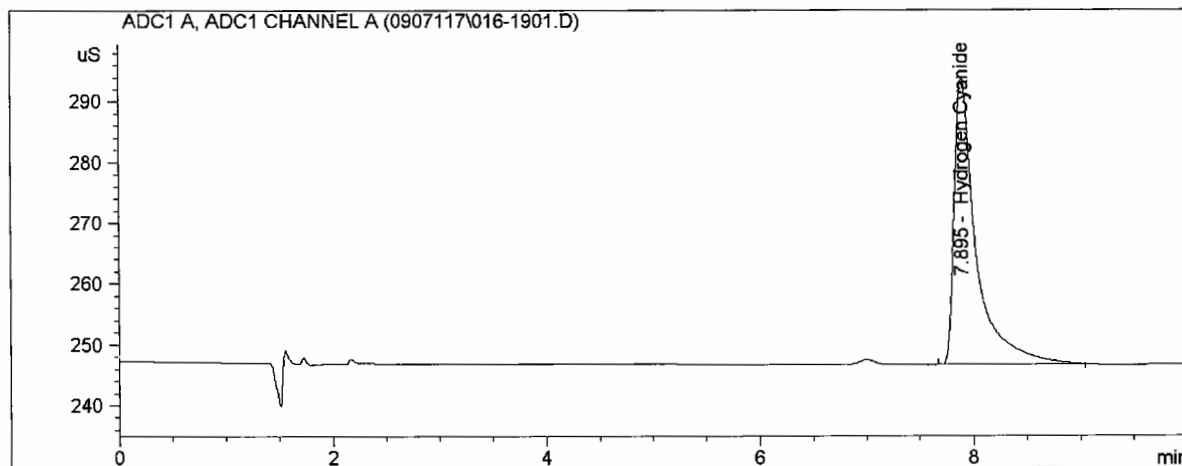
RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.672	PB	1141.12915	1.42992e-3	1.63172		Hydrogen Cyanide

Totals : 1.63172

Results obtained with enhanced integrator!

=====
*** End of Report ***

=====
Injection Date : 9/25/2007 8:35:36 PM Seq. Line : 19
Sample Name : LD HCN-2 *15 Location : -
Acq. Operator : RMB Inj : 1
Acq. Instrument : Grandmama
Sequence File : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====



=====
External Standard Report
=====

Sorted By : Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier : 1.0000
Dilution : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: ADC1 A, ADC1 CHANNEL A

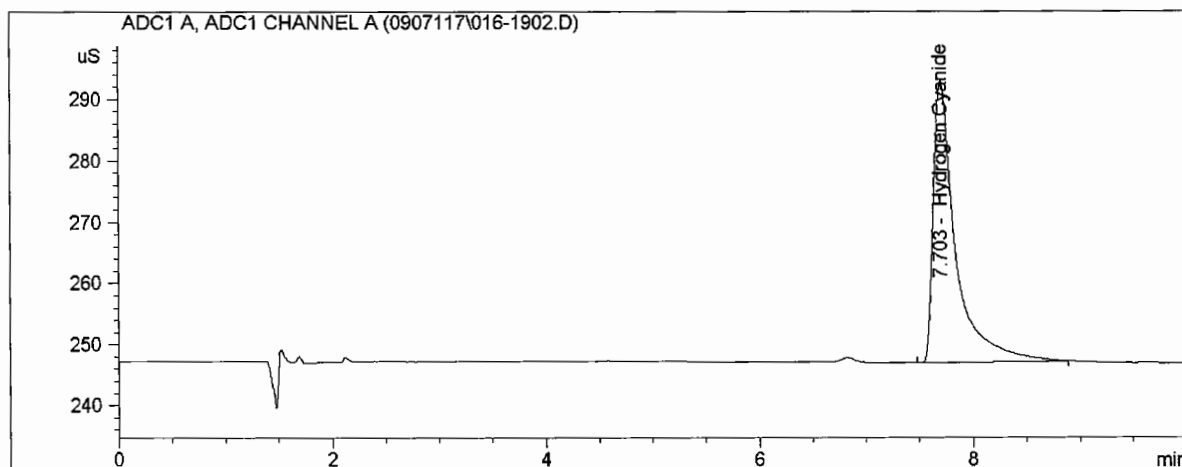
RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.895	PB	677.44446	1.43010e-3	9.68815e-1		Hydrogen Cyanide

Totals : 9.68815e-1

Results obtained with enhanced integrator!

=====
*** End of Report ***

```
=====
Injection Date   : 9/25/2007 8:46:51 PM          Seq. Line :   19
Sample Name      : LD HCN-2 *15                  Location  :    -
Acq. Operator    : RMB                          Inj       :    2
Acq. Instrument  : Grandmama
Sequence File    : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method      : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed     : 9/25/2007 1:47:35 PM by RMB
Analysis Method  : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed     : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====
```



```
=====
External Standard Report
=====
```

```
Sorted By      :      Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier     :      1.0000
Dilution       :      1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: ADC1 A, ADC1 CHANNEL A

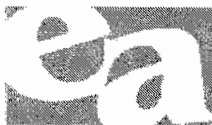
RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.703	PB	672.88312	1.43011e-3	9.62294e-1		Hydrogen Cyanide

Totals : 9.62294e-1

Results obtained with enhanced integrator!

```
=====
*** End of Report ***
```

Curve(s)/QA Point(s) Chromatograms



```

=====
                        Calibration Table
=====

```

Calib. Data Modified : 9/25/2007 4:12:00 PM

Calculate : External Standard
Based on : Peak Area

Rel. Reference Window : 10.000 %

Abs. Reference Window : 0.300 min

Rel. Non-ref. Window : 10.000 %

Abs. Non-ref. Window : 0.300 min

Use Multiplier & Dilution Factor with ISTDs

Uncalibrated Peaks : not reported

Partial Calibration : Yes, identified peaks are recalibrated

Correct All Ret. Times: No, only for identified peaks

Curve Type : Linear

Origin : Connected

Weight : Linear (Amnt)

Recalibration Settings:

Average Response : Average all calibrations

Average Retention Time: Floating Average New 75%

Calibration Report Options :

Printout of recalibrations within a sequence:

Calibration Table after Recalibration

Normal Report after Recalibration

If the sequence is done with bracketing:

Results of first cycle (ending previous bracket)

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime	Lvl	Amount	Area	Amt/Area	Ref Grp Name
[min]	Sig	[ug/mL]			
7.696	1	1.03400e-1	71.48211	1.44652e-3	Hydrogen Cyanide
	2	5.06700e-1	359.33702	1.41010e-3	
	3	9.89000e-1	698.37704	1.41614e-3	
	4	1.53900	1043.80273	1.47442e-3	
	5	2.07800	1474.44281	1.40935e-3	

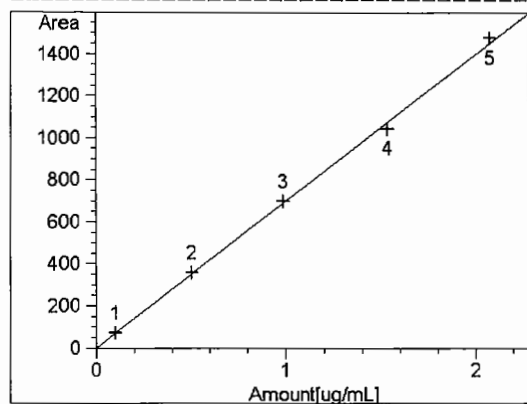
```

=====
                        Peak Sum Table
=====

```

No Entries in table

Calibration Curves

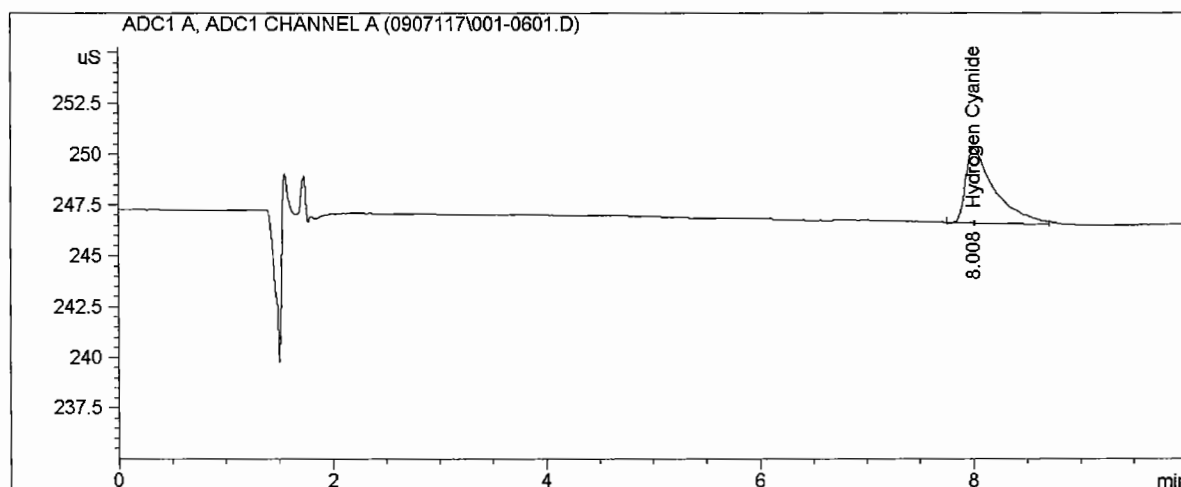


Hydrogen Cyanide at exp. RT: 7.696
 ADC1 A, ADC1 CHANNEL A
 Correlation: 0.99970
 Residual Std. Dev.: 22.91264
 Formula: $y = mx + b$
 m: 699.47014
 b: -2.12899e-1
 x: Amount[ug/mL]
 y: Area
 Calibration Level Weights:
 Level 1 : 1
 Level 2 : 0.204066
 Level 3 : 0.10455
 Level 4 : 0.067186
 Level 5 : 0.049759

```

=====
Injection Date   : 9/25/2007 3:42:27 PM      Seq. Line :    6
Sample Name     : Cal Std 1                  Location  :    -
Acq. Operator   : RMB                        Inj       :    1
Acq. Instrument : Grandmama
Sequence File   : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method     : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed    : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed    : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====

```



```

=====
External Standard Report
=====

```

```

Sorted By      : Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier     : 1.0000
Dilution       : 1.0000
Use Multiplier & Dilution Factor with ISTDs

```

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
8.008	PB	70.31818	1.43387e-3	1.00827e-1		Hydrogen Cyanide

Totals : 1.00827e-1

Results obtained with enhanced integrator!

```

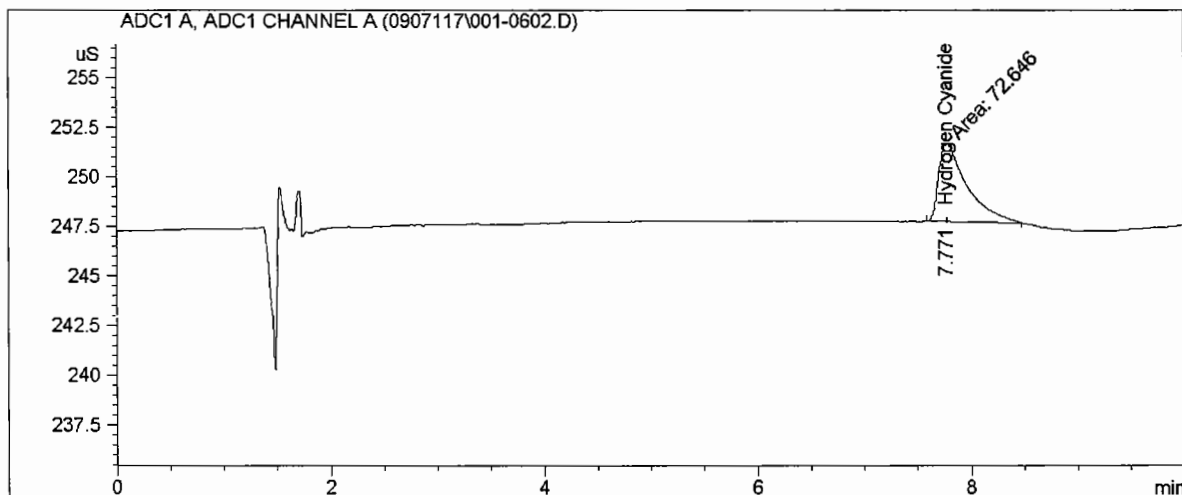
=====
*** End of Report ***
=====

```

=====

Injection Date	: 9/25/2007 3:53:43 PM	Seq. Line	: 6
Sample Name	: Cal Std 1	Location	: -
Acq. Operator	: RMB	Inj	: 2
Acq. Instrument	: Grandmama		
Acq. Method	: H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M		
Last changed	: 9/25/2007 1:47:35 PM by RMB		
Analysis Method	: H:\LC2007Q3\GRANDMAM\METHODS\0907117.M		
Last changed	: 9/25/2007 4:12:06 PM by RMB		
Column	: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column		
Eluent	: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine		
Detection	: Integrated Amperometry w/ 1 sec waveform		
Flow rate	: 1.0 mL/min		
Run Time	: 10 min		

=====



=====

External Standard Report

=====

Sorted By : Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier : 1.0000
Dilution : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: ADC1 A, ADC1 CHANNEL A

Manual Integration by RMB

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.771	MM	72.64603	1.43384e-3	1.04163e-1		Hydrogen Cyanide

Totals : 1.04163e-1

Results obtained with enhanced integrator!

=====

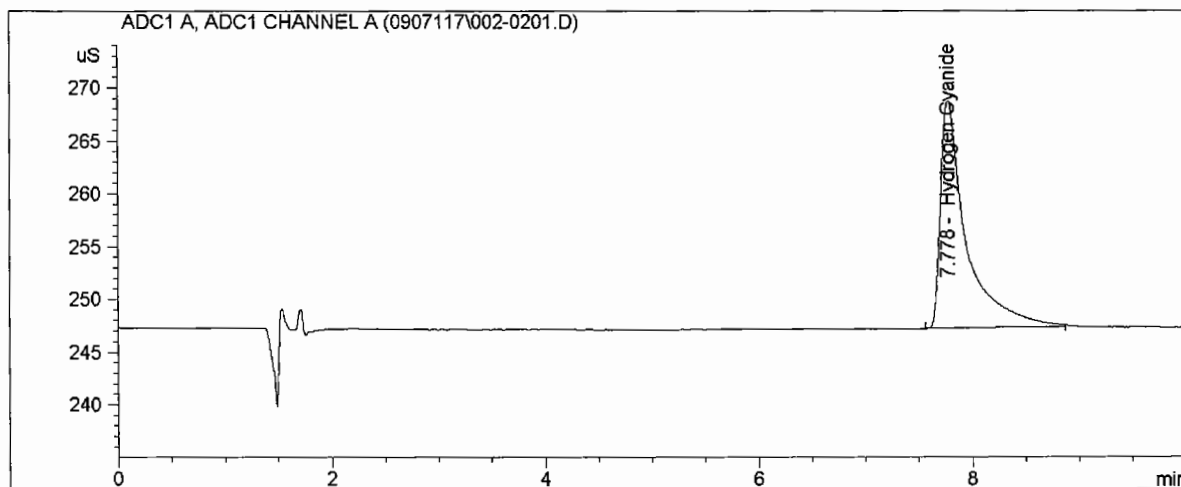
*** End of Report ***

=====

Injection Date	: 9/25/2007 2:12:09 PM	Seq. Line	: 2
Sample Name	: Cal Std 2	Location	: -
Acq. Operator	: RMB	Inj	: 1

Acq. Instrument : Grandmama
Sequence File : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min

=====



=====

External Standard Report

=====

Sorted By : Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier : 1.0000
Dilution : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime	Type	Area	Amt/Area	Amount	Grp	Name
[min]		[uS*s]		[ug/mL]		
7.778	PB	356.94653	1.43051e-3	5.10614e-1		Hydrogen Cyanide

Totals : 5.10614e-1

Results obtained with enhanced integrator!

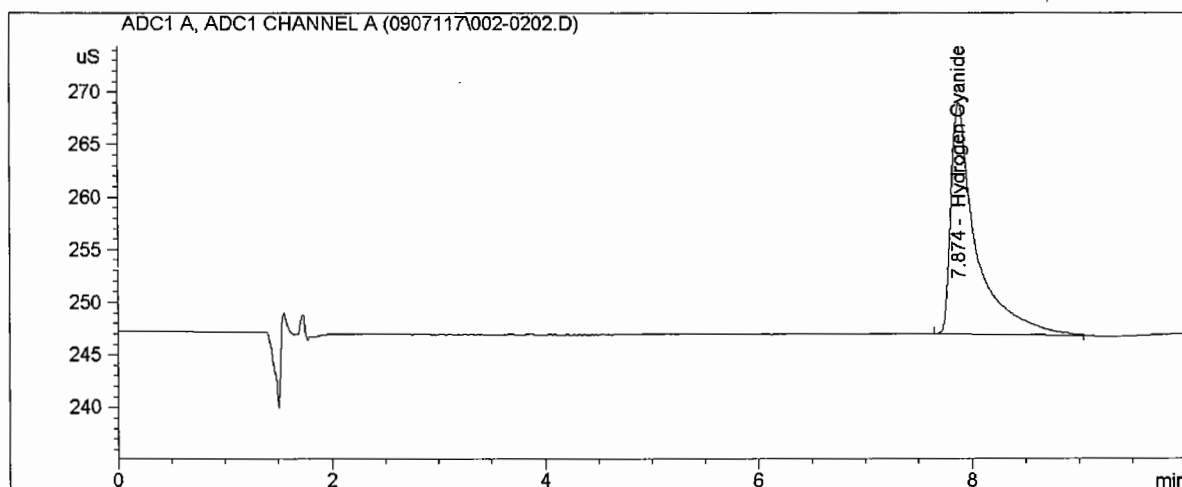
=====

*** End of Report ***

```

=====
Injection Date   : 9/25/2007 2:23:26 PM      Seq. Line :    2
Sample Name     : Cal Std 2                  Location  :    -
Acq. Operator   : RMB                       Inj       :    2
Acq. Instrument : Grandmama
Sequence File   : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method     : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed    : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed    : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====

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External Standard Report
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Sorted By      :      Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier     :      1.0000
Dilution       :      1.0000
Use Multiplier & Dilution Factor with ISTDs

```

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.874	BB	361.72751	1.43050e-3	5.17449e-1		Hydrogen Cyanide

Totals : 5.17449e-1

Results obtained with enhanced integrator!

```

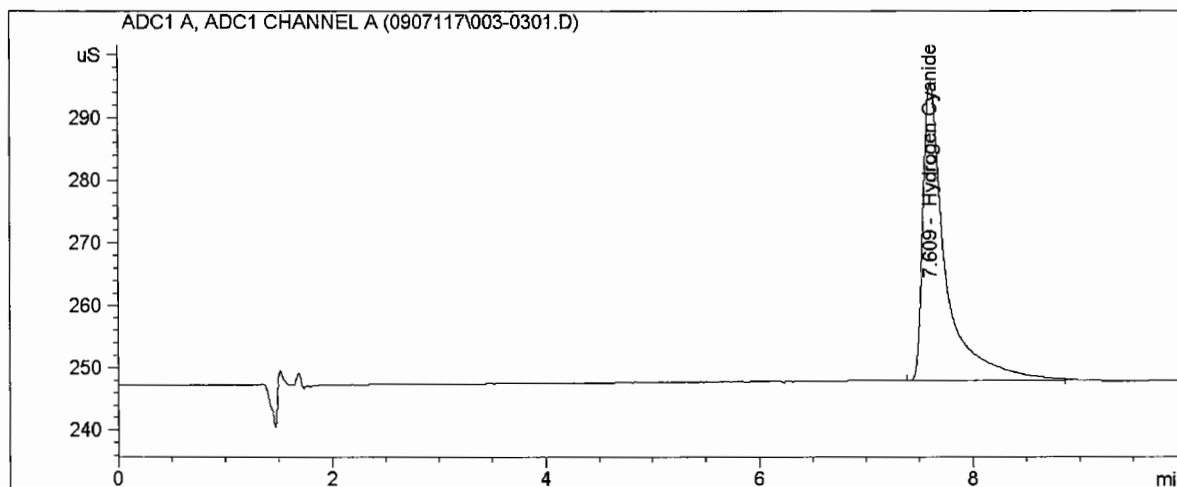
=====
*** End of Report ***
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=====
Injection Date   : 9/25/2007 2:34:42 PM      Seq. Line :    3
Sample Name     : Cal Std 3                  Location  :    -
Acq. Operator   : RMB                       Inj       :    1
Acq. Instrument : Grandmama
Sequence File   : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method     : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed    : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed    : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
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External Standard Report
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Sorted By      :      Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier     :      1.0000
Dilution       :      1.0000
Use Multiplier & Dilution Factor with ISTDs

```

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.609	BB	704.67938	1.43009e-3	1.00775		Hydrogen Cyanide

Totals : 1.00775

Results obtained with enhanced integrator!

```

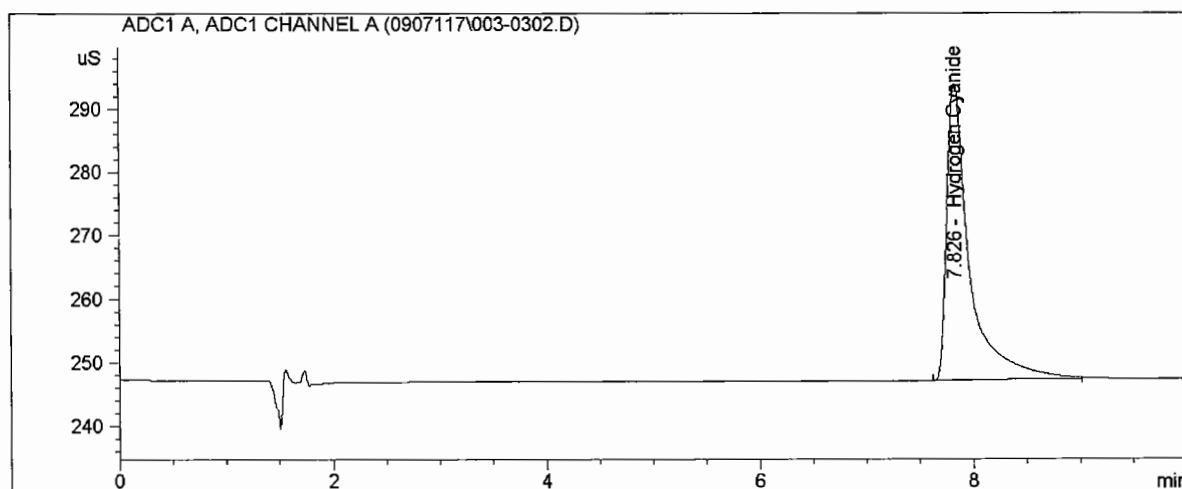
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*** End of Report ***
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Injection Date   : 9/25/2007 2:45:58 PM      Seq. Line :    3
Sample Name     : Cal Std 3                  Location  :    -
Acq. Operator   : RMB                       Inj       :    2
Acq. Instrument : Grandmama
Sequence File   : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method     : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed    : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed    : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
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External Standard Report
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Sorted By      :      Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier     :      1.0000
Dilution       :      1.0000
Use Multiplier & Dilution Factor with ISTDs

```

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.826	PB	692.07471	1.43009e-3	9.89731e-1		Hydrogen Cyanide

Totals : 9.89731e-1

Results obtained with enhanced integrator!

```

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*** End of Report ***

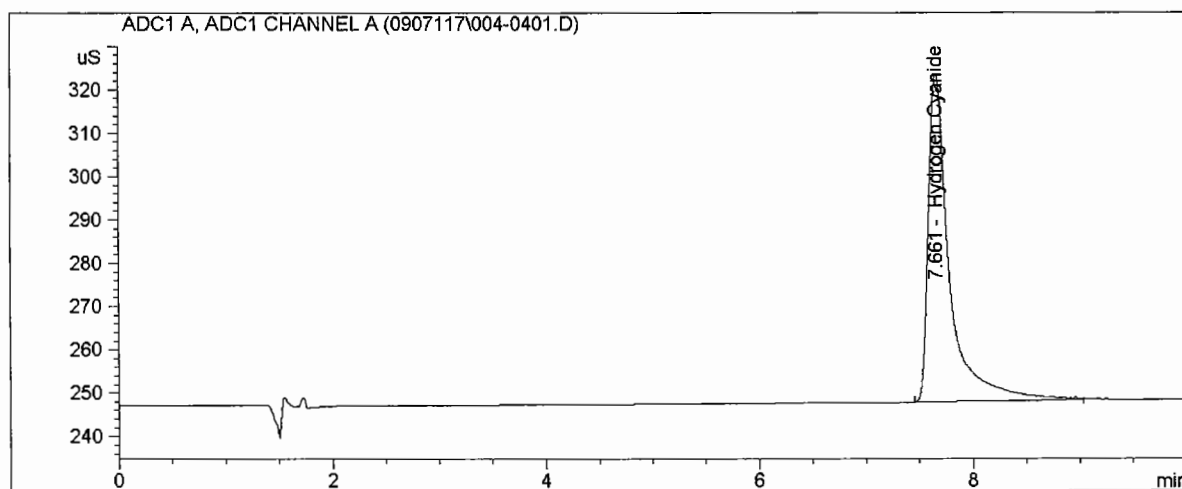
```

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Injection Date	: 9/25/2007 2:57:15 PM	Seq. Line	: 4
Sample Name	: Cal Std 4	Location	: -
Acq. Operator	: RMB	Inj	: 1

Acq. Instrument : Grandmama
Sequence File : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min

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External Standard Report

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Sorted By : Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier : 1.0000
Dilution : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.661	PB	1046.32959	1.42994e-3	1.49619		Hydrogen Cyanide

Totals : 1.49619

Results obtained with enhanced integrator!

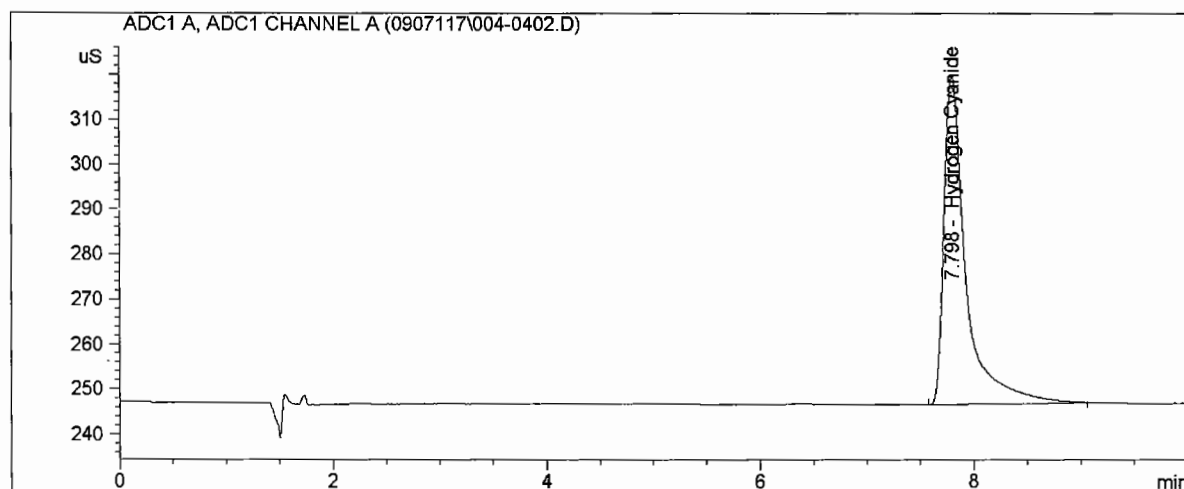
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*** End of Report ***


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Injection Date   : 9/25/2007 3:08:30 PM      Seq. Line :    4
Sample Name     : Cal Std 4                  Location  :    -
Acq. Operator   : RMB                        Inj       :    2
Acq. Instrument : Grandmama
Sequence File   : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method     : H:\LC2007Q2\GRANDM-1\METHODS\CTM033.M
Last changed    : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed    : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
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External Standard Report
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Sorted By      : Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier     : 1.0000
Dilution       : 1.0000
Use Multiplier & Dilution Factor with ISTDs

```

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.798	PB	1041.27588	1.42995e-3	1.48897		Hydrogen Cyanide

Totals : 1.48897

Results obtained with enhanced integrator!

```

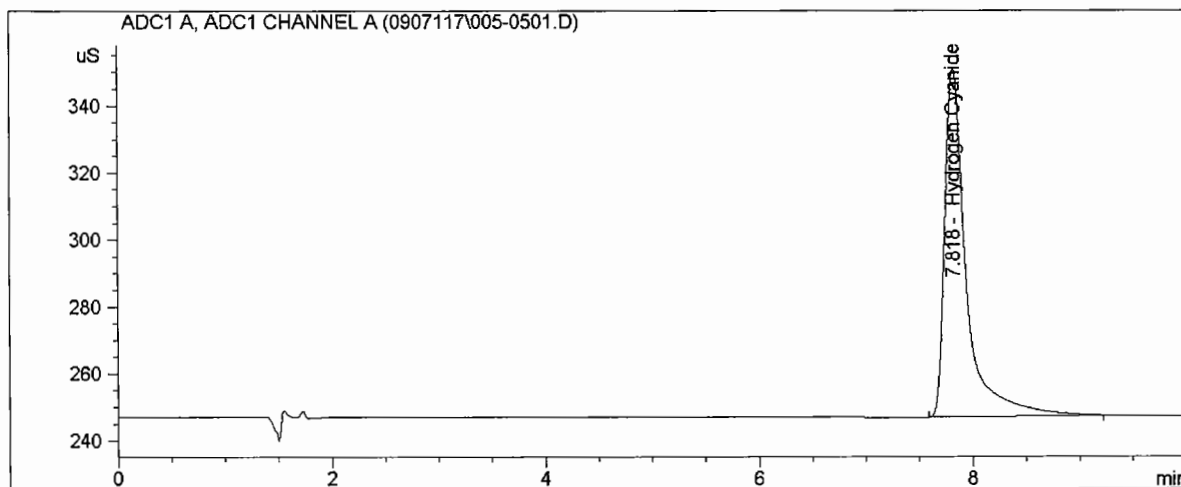
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*** End of Report ***
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Injection Date   : 9/25/2007 3:19:48 PM      Seq. Line :    5
Sample Name      : Cal Std 5                  Location  :    -
Acq. Operator    : RMB                        Inj       :    1
Acq. Instrument  : Grandmama
Sequence File    : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method      : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed     : 9/25/2007 1:47:35 PM by RMB
Analysis Method  : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed     : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
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External Standard Report
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Sorted By      : Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier     : 1.0000
Dilution       : 1.0000
Use Multiplier & Dilution Factor with ISTDs

```

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.818	PB	1454.42773	1.42986e-3	2.07963		Hydrogen Cyanide

Totals : 2.07963

Results obtained with enhanced integrator!

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*** End of Report ***

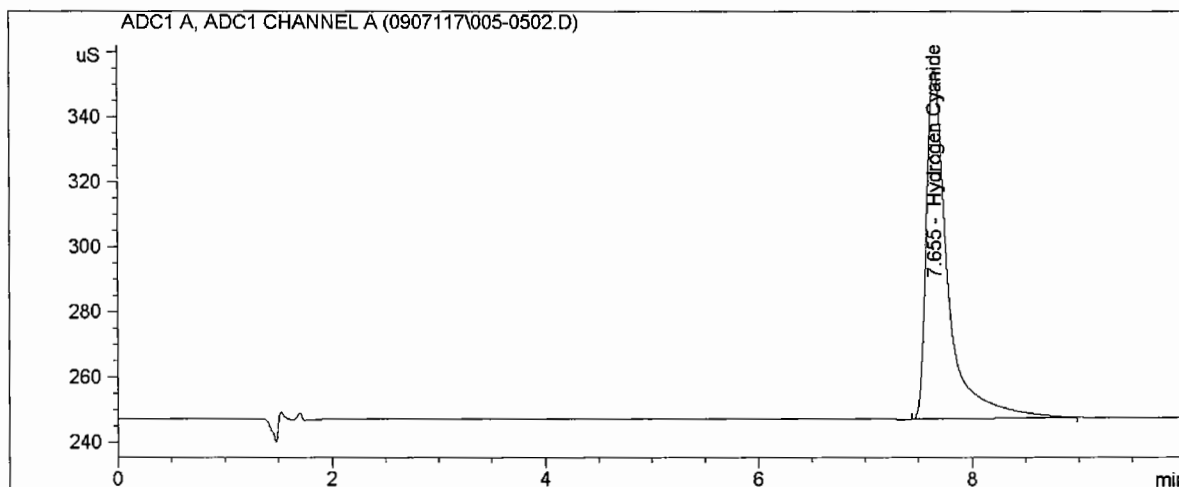
```

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Injection Date	: 9/25/2007 3:31:10 PM	Seq. Line	: 5
Sample Name	: Cal Std 5	Location	: -
Acq. Operator	: RMB	Inj	: 2

Acq. Instrument : Grandmama
Sequence File : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min

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External Standard Report

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Sorted By : Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier : 1.0000
Dilution : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.655	PB	1494.45789	1.42986e-3	2.13686		Hydrogen Cyanide

Totals : 2.13686

Results obtained with enhanced integrator!

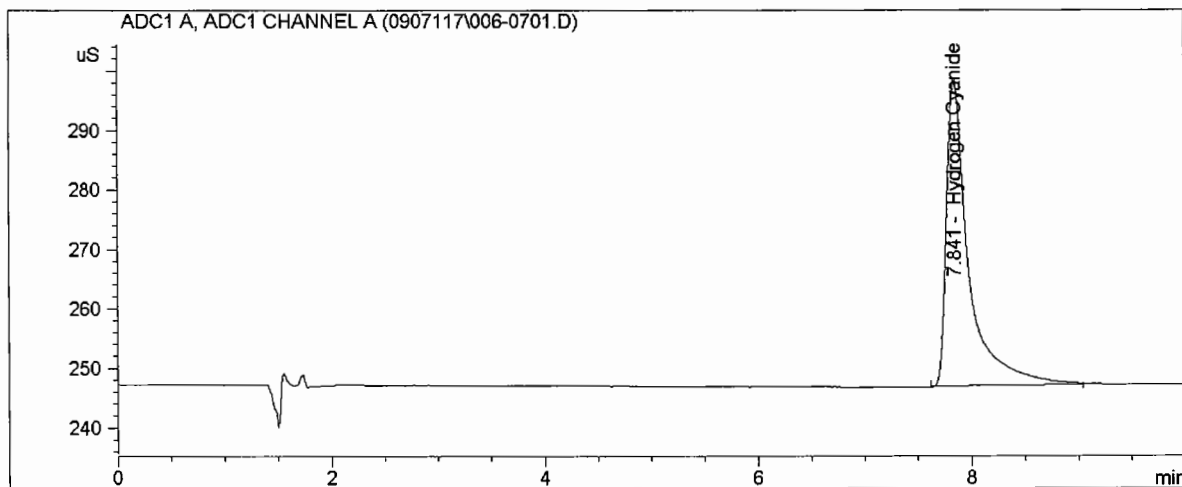
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*** End of Report ***

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Injection Date   : 9/25/2007 4:04:59 PM      Seq. Line :    7
Sample Name     : Cal Std SS                Location  :    -
Acq. Operator   : RMB                      Inj       :    1
Acq. Instrument : Grandmama
Sequence File   : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method     : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed    : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed    : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
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External Standard Report
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Sorted By      :      Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier     :      1.0000
Dilution       :      1.0000
Use Multiplier & Dilution Factor with ISTDs

```

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name	Tag Value
7.841	PB	753.14459	1.43006e-3	1.07704		Hydrogen Cyanide	1.044

Totals : 1.07704

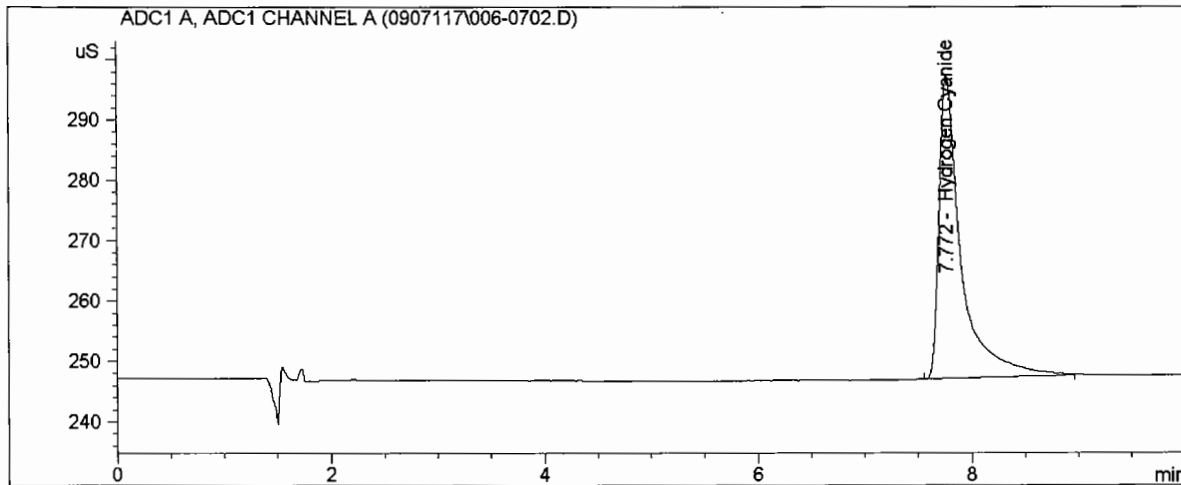
Results obtained with enhanced integrator!

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*** End of Report ***

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Injection Date : 9/25/2007 4:16:16 PM Seq. Line : 7
Sample Name : Cal Std SS Location : -
Acq. Operator : RMB Inj : 2
Acq. Instrument : Grandmama
Sequence File : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
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External Standard Report
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Sorted By : Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier : 1.0000
Dilution : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name	Tag Value
7.772	BB	720.04010	1.43008e-3	1.02971		Hydrogen Cyanide	1.044

Totals : 1.02971

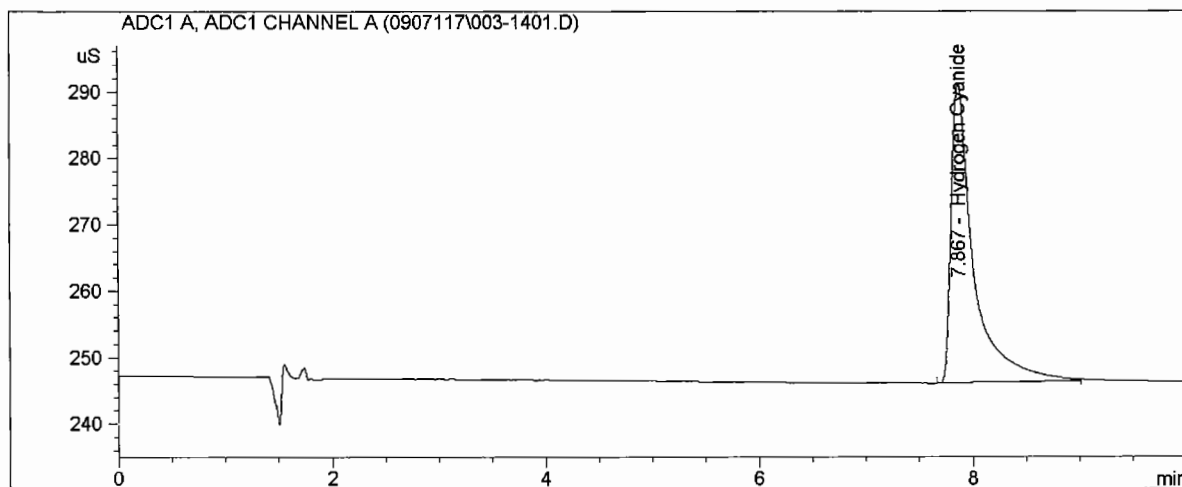
Results obtained with enhanced integrator!

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*** End of Report ***

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Injection Date : 9/25/2007 6:42:51 PM Seq. Line : 14
Sample Name : Cal Std 3 Location : -
Acq. Operator : RMB Inj : 1
Acq. Instrument : Grandmama
Sequence File : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min

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External Standard Report

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Sorted By : Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier : 1.0000
Dilution : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.867	PB	659.30878	1.43012e-3	9.42888e-1		Hydrogen Cyanide

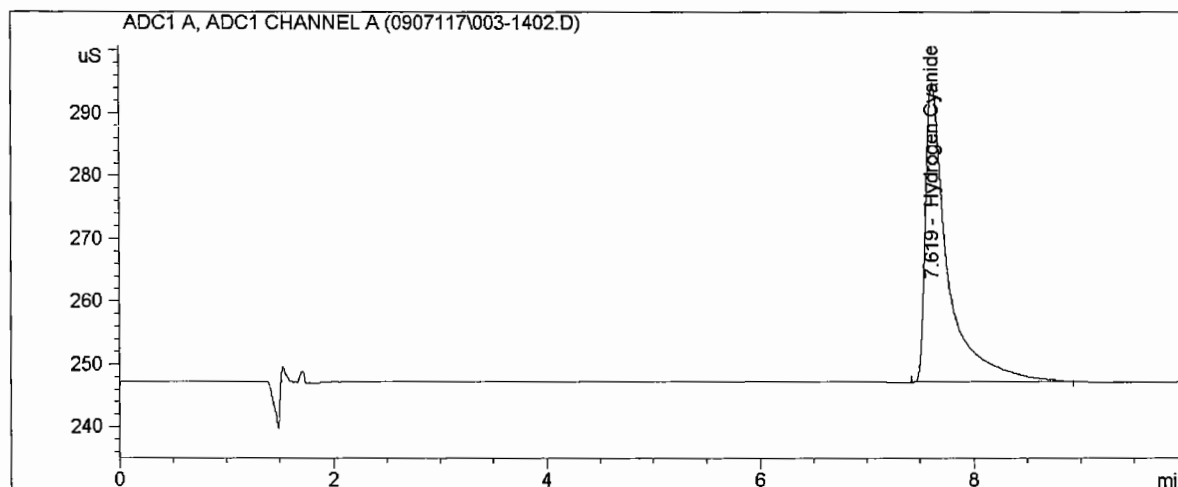
Totals : 9.42888e-1

Results obtained with enhanced integrator!

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*** End of Report ***

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Injection Date : 9/25/2007 6:54:07 PM Seq. Line : 14
Sample Name : Cal Std 3 Location : -
Acq. Operator : RMB Inj : 2
Acq. Instrument : Grandmama
Sequence File : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
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External Standard Report
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Sorted By : Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier : 1.0000
Dilution : 1.0000
Use Multiplier & Dilution Factor with ISTDs

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.619	PB	691.41058	1.43009e-3	9.88782e-1		Hydrogen Cyanide

Totals : 9.88782e-1

Results obtained with enhanced integrator!

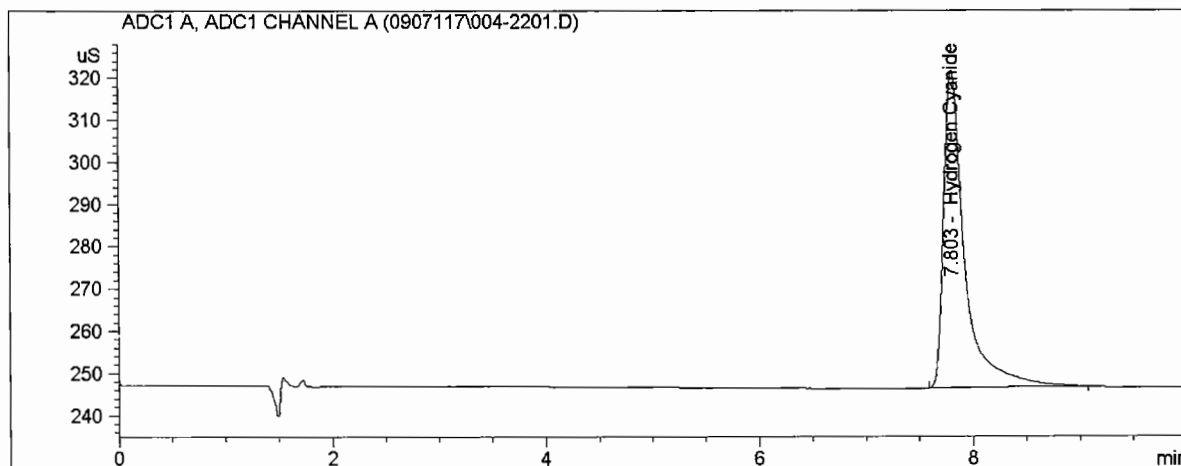
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*** End of Report ***

~~0907-05~~

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=====
Injection Date   : 9/25/2007 9:43:14 PM      Seq. Line :   22
Sample Name     : Cal Std 4                  Location  :    -
Acq. Operator   : RMB                       Inj       :    1
Acq. Instrument : Grandmama
Sequence File   : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method     : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed    : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed    : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
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External Standard Report
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Sorted By      :      Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier     :      1.0000
Dilution       :      1.0000
Use Multiplier & Dilution Factor with ISTDs

```

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.803	BB	1038.64929	1.42995e-3	1.48521		Hydrogen Cyanide

Totals : 1.48521

Results obtained with enhanced integrator!

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*** End of Report ***
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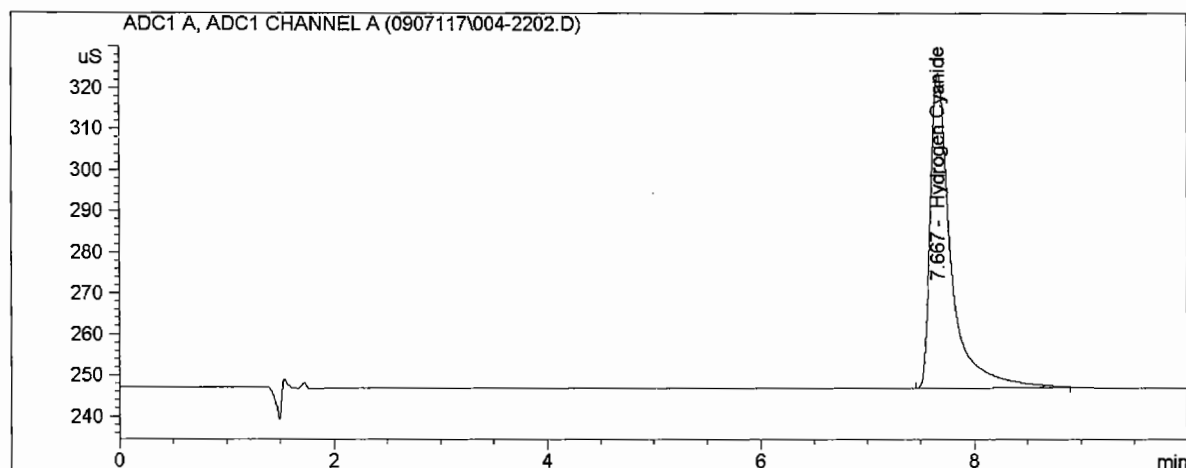
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~~0907-05~~

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Injection Date   : 9/25/2007 9:54:31 PM      Seq. Line :   22
Sample Name     : Cal Std 4                  Location  :    -
Acq. Operator   : RMB                       Inj       :    2
Acq. Instrument : Grandmama
Sequence File   : H:\LC2007Q3\GRANDMAM\SEQUENCE\0907117.S
Acq. Method     : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed    : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed    : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
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External Standard Report
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Sorted By      :      Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier     :      1.0000
Dilution       :      1.0000
Use Multiplier & Dilution Factor with ISTDs

```

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.667	BB	1037.41516	1.42995e-3	1.48345		Hydrogen Cyanide

Totals : 1.48345

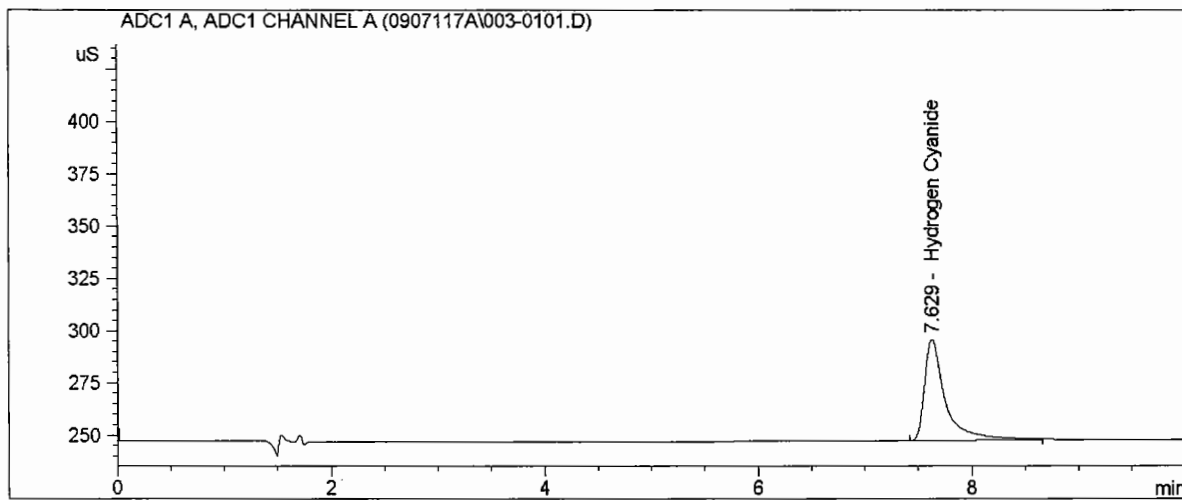
Results obtained with enhanced integrator!

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*** End of Report ***

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=====
Injection Date   : 9/26/2007 11:27:14 AM      Seq. Line :    1
Sample Name      : Cal Std 3                  Location  :    -
Acq. Operator    : RMB                       Inj       :    1
Acq. Instrument  : Grandmama
Acq. Method      : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed     : 9/25/2007 1:47:35 PM by RMB
Analysis Method  : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed     : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
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                        External Standard Report
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Sorted By           :      Signal
Calib. Data Modified :      9/25/2007 4:12:00 PM
Multiplier          :      1.0000
Dilution            :      1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.629	BB	659.22473	1.43012e-3	9.42767e-1		Hydrogen Cyanide

Totals : 9.42767e-1

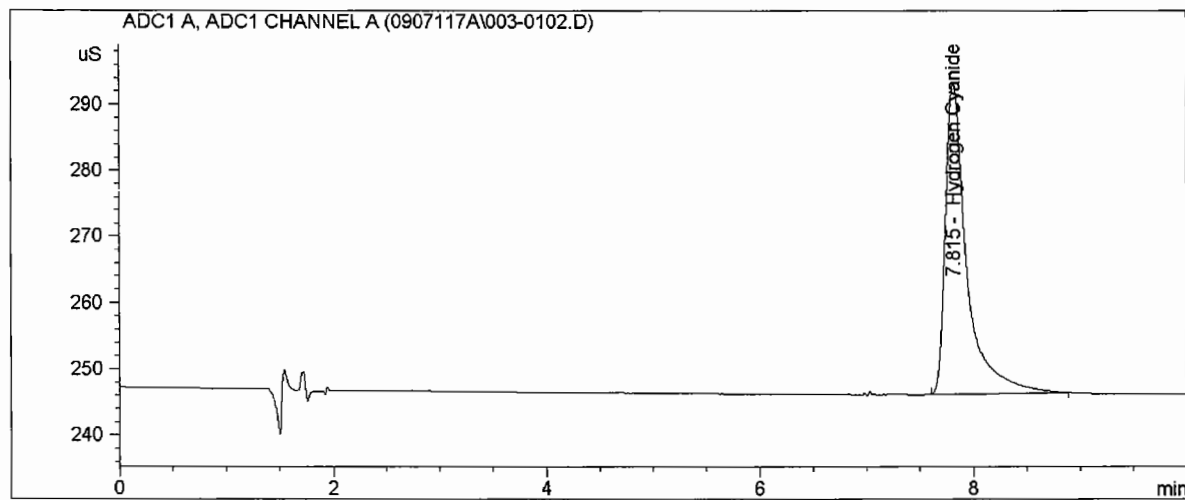
Results obtained with enhanced integrator!

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*** End of Report ***
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=====
Injection Date   : 9/26/2007 11:38:35 AM      Seq. Line :    1
Sample Name     : Cal Std 3                  Location  :    -
Acq. Operator   : RMB                       Inj       :    2
Acq. Instrument : Grandmama
Acq. Method     : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed    : 9/25/2007 1:47:35 PM by RMB
Analysis Method : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed    : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
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External Standard Report
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Sorted By      :      Signal
Calib. Data Modified : 9/25/2007 4:12:00 PM
Multiplier     :      1.0000
Dilution       :      1.0000
Use Multiplier & Dilution Factor with ISTDs

```

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.815	BB	662.70374	1.43011e-3	9.47741e-1		Hydrogen Cyanide

Totals : 9.47741e-1

Results obtained with enhanced integrator!

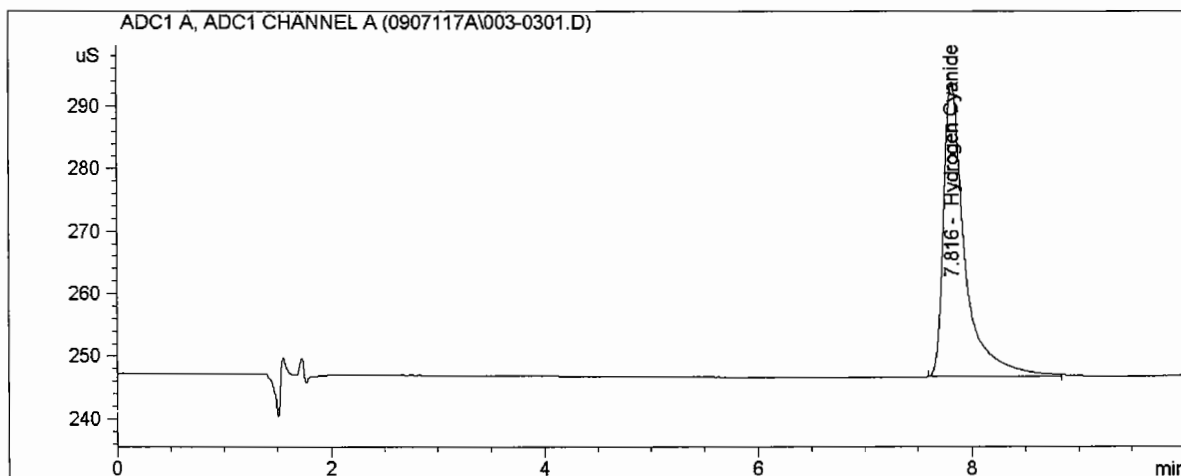
```

=====
*** End of Report ***
=====

```

~~0907-05~~

```
=====
Injection Date   : 9/26/2007 12:34:01 PM      Seq. Line :    3
Sample Name      : Cal Std 3                  Location  :    -
Acq. Operator    : RMB                       Inj       :    1
Acq. Instrument  : Grandmama
Acq. Method      : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed     : 9/25/2007 1:47:35 PM by RMB
Analysis Method  : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed     : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====
```



```
=====
External Standard Report
=====
```

```
Sorted By           :      Signal
Calib. Data Modified :      9/25/2007 4:12:00 PM
Multiplier          :      1.0000
Dilution            :      1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.816	BB	647.98285	1.43012e-3	9.26695e-1		Hydrogen Cyanide

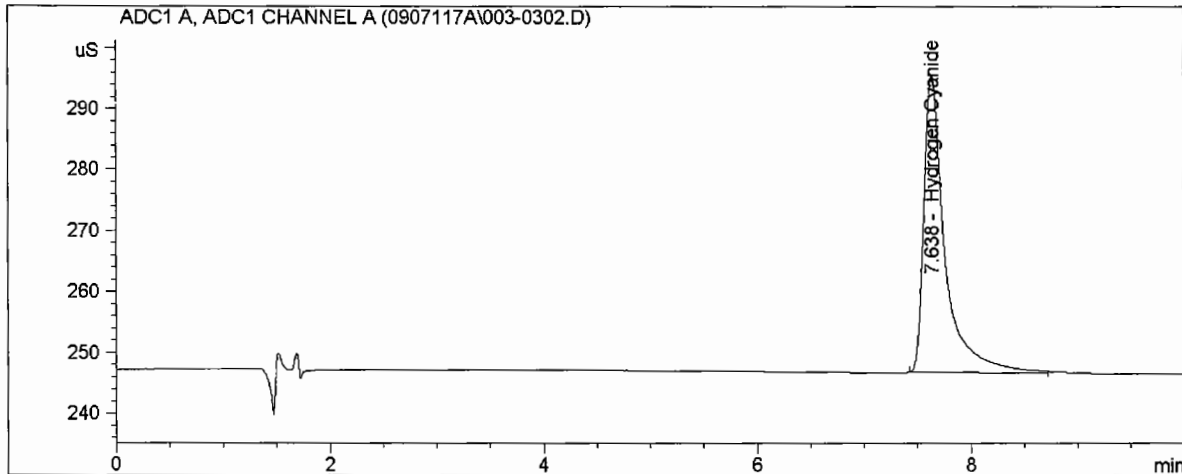
Totals : 9.26695e-1

Results obtained with enhanced integrator!

```
=====
*** End of Report ***
=====
```

~~0907-05~~

```
=====
Injection Date   : 9/26/2007 12:45:17 PM      Seq. Line :    3
Sample Name      : Cal Std 3                  Location  :    -
Acq. Operator    : RMB                       Inj       :    2
Acq. Instrument  : Grandmama
Acq. Method      : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed     : 9/25/2007 1:47:35 PM by RMB
Analysis Method  : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed     : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====
```



```
=====
External Standard Report
=====
```

```
Sorted By           :      Signal
Calib. Data Modified :      9/25/2007 4:12:00 PM
Multiplier          :      1.0000
Dilution            :      1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.638	BB	675.02704	1.43010e-3	9.65359e-1		Hydrogen Cyanide

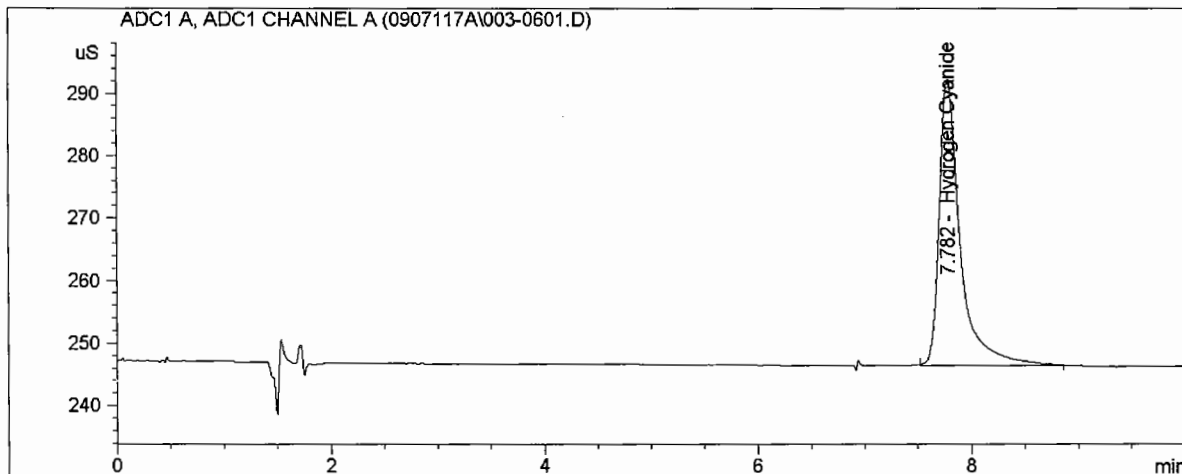
Totals : 9.65359e-1

Results obtained with enhanced integrator!

```
=====
*** End of Report ***
```

~~0907-05~~

```
=====
Injection Date   : 9/26/2007 6:50:56 PM      Seq. Line :    6
Sample Name      : Cal Std 3                  Location  :    -
Acq. Operator    : RMB                        Inj       :    1
Acq. Instrument  : Grandmama
Acq. Method      : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed     : 9/25/2007 1:47:35 PM by RMB
Analysis Method  : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed     : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====
```



```
=====
External Standard Report
=====
```

```
Sorted By          :      Signal
Calib. Data Modified :      9/25/2007 4:12:00 PM
Multiplier         :      1.0000
Dilution           :      1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.782	BB	626.42609	1.43014e-3	8.95877e-1		Hydrogen Cyanide

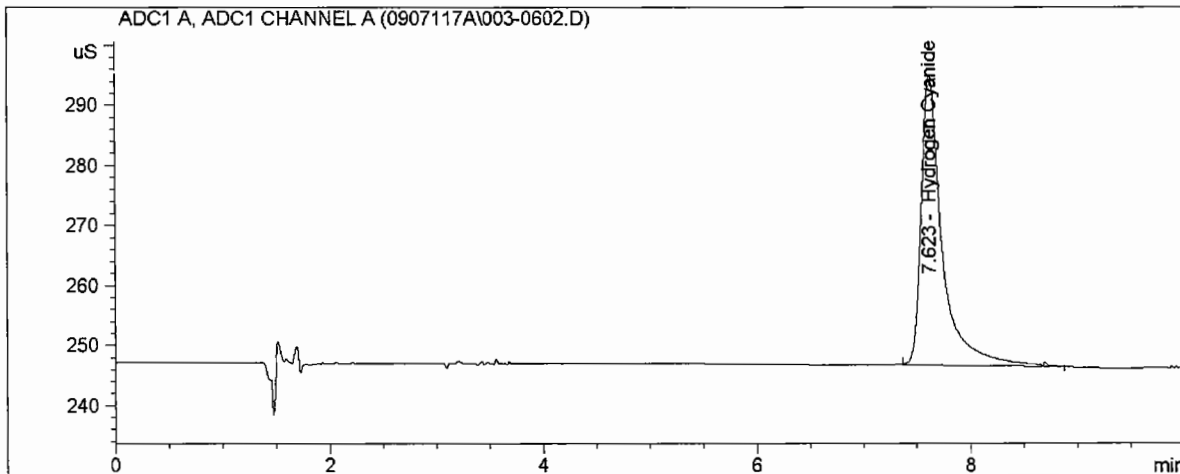
Totals : 8.95877e-1

Results obtained with enhanced integrator!

```
=====
*** End of Report ***
=====
```

~~0907-05~~

```
=====
Injection Date   : 9/26/2007 7:02:11 PM          Seq. Line :    6
Sample Name      : Cal Std 3                     Location  :    -
Acq. Operator    : RMB                           Inj       :    2
Acq. Instrument  : Grandmama
Acq. Method      : H:\LC2007Q2\GRANDM~1\METHODS\CTM033.M
Last changed     : 9/25/2007 1:47:35 PM by RMB
Analysis Method  : H:\LC2007Q3\GRANDMAM\METHODS\0907117.M
Last changed     : 9/25/2007 4:12:06 PM by RMB
Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min
=====
```



```
=====
External Standard Report
=====
```

```
Sorted By           :      Signal
Calib. Data Modified :      9/25/2007 4:12:00 PM
Multiplier          :      1.0000
Dilution            :      1.0000
Use Multiplier & Dilution Factor with ISTDs
```

Signal 1: ADC1 A, ADC1 CHANNEL A

RetTime [min]	Type	Area [uS*s]	Amt/Area	Amount [ug/mL]	Grp	Name
7.623	BB	668.75891	1.43011e-3	9.56398e-1		Hydrogen Cyanide

Totals : 9.56398e-1

Results obtained with enhanced integrator!

```
=====
*** End of Report ***
```

Method Information

Column: Dionex Ionpac AS7 4 X 250mm w/ AG7 guard column
Eluent: 0.5M Sodium Acetate/0.1M NaOH/0.5% v/v Ethylenediamine
Detection: Integrated Amperometry w/ 1 sec waveform
Flow rate: 1.0 mL/min
Run Time: 10 min

Sequence Table:

Method and Injection Info Part:

Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	===	=====	=====	=====
~~1~~	~~Vial 1~~	~~Cal Std 1~~	~~CTM033~~	~~2~~	~~Sample~~		
2	Vial 2	Cal Std 2	CTM033	2	Sample		
3	Vial 3	Cal Std 3	CTM033	2	Sample		
4	Vial 4	Cal Std 4	CTM033	2	Sample		
5	Vial 5	Cal Std 5	CTM033	2	Sample		
6	Vial 1	Cal Std 1	CTM033	2	Sample		
7	Vial 6	Cal Std SS	CTM033	2	Sample		
8	Vial 7	Method Blank	CTM033	2	Sample		
~~9~~	~~Vial 8~~	~~Spike Soln *1001~~	~~CTM033~~	~~2~~	~~Sample~~		
10	Vial 9	HCN Blank	CTM033	2	Sample		
11	Vial 10	HCN-1 *15	CTM033	2	Sample		
12	Vial 11	HCN-2 *15	CTM033	2	Sample		
~~13~~	~~Vial 12~~	~~HCN-3 *15~~	~~CTM033~~	~~2~~	~~Sample~~		
14	Vial 3	Cal Std 3	CTM033	2	Sample		
~~15~~	~~Vial 4~~	~~Cal Std 4~~	~~CTM033~~	~~2~~	~~Sample~~		
16	Vial 13	Field Spike *15	CTM033	2	Sample		
17	Vial 14	MS HCN-1 *15	CTM033	2	Sample		
18	Vial 15	MSD HCN-1 *15	CTM033	2	Sample		
19	Vial 16	LD HCN-2 *15	CTM033	2	Sample		
~~20~~	~~Vial 17~~	~~Spike Soln*10000~~	~~CTM033~~	~~2~~	~~Sample~~		
~~21~~	~~Vial 3~~	~~Cal Std 3~~	~~CTM033~~	~~2~~	~~Sample~~		
22	Vial 4	Cal Std 4	CTM033	2	Sample		

Sequence Table:

Method and Injection Info Part:

Line	Location	SampleName	Method	Inj	SampleType	InjVolume	DataFile
====	=====	=====	=====	==	=====	=====	=====
1	Vial 3	Cal Std 3	CTM033	2	Sample		
2	Vial 17	Spike Soln*10000	CTM033	2	Sample		
3	Vial 3	Cal Std 3	CTM033	2	Sample		
~~4~~	~~Vial 4~~	~~Cal Std 4~~	~~CTM033~~	~~2~~	~~Sample~~		
5	Vial 36	HCN-3 *40	CTM033	2	Sample		
6	Vial 3	Cal Std 3	CTM033	2	Sample		
~~7~~	~~Vial 4~~	~~Cal Std 4~~	~~CTM033~~	~~2~~	~~Sample~~		

**This Is The Last Page
Of This Report.**





October 16, 2007

Mr. Michael Klein
New Jersey Department of Environmental Protection
380 Scotch Road
W. Trenton, New Jersey 08628

Subject: Method 8 Audit Material
Request Number/Sample Number: M08-3444-01/H0832
Valero Refining Company – New Jersey
August 28 through 30, 2007 Test Program

Dear Mr. Klein:

Attached is the Method 8 Audit Material Reporting Form for an audit sample received from your agency. The sample was delivered to ARI Environmental, Inc. during the compliance emission test program conducted on August 28 through 30, 2007 on the FCCU Scrubber at the Valero Refining Company – New Jersey facility in Paulsboro, New Jersey.

Please note that the sample was analyzed by ion chromatography (IC) rather than the barium-thorin titration procedure. The IC analytical approach was following the procedures described in the test protocol pursuant to USEPA Method 8 – Modified.

If you have any questions, please contact me at (847) 487-1580 Ext. 120.

Sincerely,
ARI Environmental, Inc.

A handwritten signature in black ink, appearing to read 'Daniel E. Fitzgerald', is written over a horizontal line.

Daniel E. Fitzgerald
Division Manager
Source Testing

DEF:do
attachment

Method 8 Audit Material
(Sulfuric acid mist Spiked Aqueous Solution)

REPORTING FORM: To be completed by laboratory

Request Number/Sample Number: M08-3444-01/H0832 Date Issued: 08/20/07

Auditee:

Company: ARI Environmental, Inc.
Address: 951 Old Rand Road, Unit 106, Wauconda, IL 60084
Attention of: Daniel E. Fitzgerald Phone: 847-487-1580 Ext. 120

Requestor:

Agency: New Jersey Department of Environmental Protection
Address: 380 Scotch Road, W. Trenton, NJ 08628
Attention of: Michael Klein Phone: 609-530-4041

Project Name: Valero Refining Co.

Audit Results (Results in mg H₂SO₄ / dscm)

<u>Analyte</u>	<u>Result</u>
Sulfuric acid mist	<u>19.17</u>

INSTRUCTIONS FOR THE ANALYSIS OF METHOD 8 SULFURIC ACID MIST AUDIT SAMPLES

The ampule you received contains a sulfuric acid mist audit sample in approximately 20 mL of an aqueous mixture of sulfuric acid at an appropriate concentration in DI water. (See Sections 11.3, *Audit Sample Analysis*, and 11.4, *Audit Sample Results*, of Method 8) To prepare a sulfuric acid mist audit sample for analysis follow the steps outlined below.

- 1) Open the audit sample ampule: Wrap a paper towel around the ampule, and with the ampule in an upright position, break off the top at the pre-scored mark by exerting pressure sideways.
- 2) Prepare audit sample solution to be analyzed: Pipette 10 mL of the audit sample from the ampule into a 250 mL volumetric flask. Add approximately 200 mL of 80% isopropanol and mix well. Dilute exactly to the 250 mL mark with 80% isopropanol and again mix well.
- 3) Analyze: Pipette a 100 mL aliquot of the diluted audit sample into a 250 mL Erlenmeyer flask, add 2 to 4 drops of thorin indicator, and titrate to a pink endpoint with standardized 0.0100N barium solution.
- 4) Calculate results: Calculate the concentration, $C_{H_2SO_4}$ (dry basis and corrected to standard conditions) using the equation shown below. **(NOTE: Reporting units must be in mg dscm⁻¹)**

$$C_{H_2SO_4} = \frac{K_3 N (V_t - V_{tb}) (V_{soln} / V_a)}{V_{m(std)}}$$

where:

K_3	=	49.04 mg meq ⁻¹
N	=	Normality of standardized barium solution, meq mL ⁻¹
V_t	=	Volume of barium standard solution (titrant) used for the sample, mL
V_{tb}	=	Volume of barium standard solution (titrant) used for the blank, mL
V_{soln}	=	Total volume of solution in which the H ₂ SO ₄ sample is contained, 250 mL
V_a	=	Volume of sample aliquot titrated, 100 mL
$V_{m(std)}$	=	Dry gas volume sampled as measured by the DGM corrected to standard conditions, dscm. (use 1.0 dscm, which is based on a nominal sampling rate of 0.75 CFM (0.021 238 cubic meters/min). After this is corrected for moisture, standard temperature and pressure, and rounded to the nearest whole number, it would be approximately 1.)

5) Record results: Record the results on the Method 8 sulfuric acid mist audit solution **Reporting Form** in mg dscm⁻¹.

6) Report results: Report the Method 8 sulfuric acid mist audit solution results recorded on the **Reporting Form** to the designated agent.



Valero Refining Company - New Jersey
Source: FCCU Scrubber Stack
Test Dates: 8/28 - 8/30/07

APPENDIX D

ARI Reference Method Monitoring Data

Client Valero
Location Paulsboro, New Jersey
Source FCC FGS Stack
Date 08/27/07

Range	10.0	22.8	
Units	%	%	
Time	Stack Oxygen	Stack CO2	COMMENTS
08/27/07 17:26:30	1.51	-0.01	
08/27/07 17:26:45	0.18	-0.01	
08/27/07 17:27:00	0.06	-0.01	
08/27/07 17:27:15	0.05	-0.01	
08/27/07 17:27:30	0.04	-0.01	
08/27/07 17:27:45	0.04	-0.01	
08/27/07 17:28:00	0.03	-0.01	
08/27/07 17:28:15	0.03	-0.01	
08/27/07 17:28:30	0.03	-0.01	
08/27/07 17:28:45	0.03	-0.01	Method 205 Dilution System Verification:
08/27/07 17:29:00	0.03	-0.01	Zero nitrogen injection:
08/27/07 17:29:15	0.03	-0.01	0.03 % db Oxygen
08/27/07 17:29:30	0.02	-0.01	
08/27/07 17:29:45	0.03	-0.01	
08/27/07 17:30:00	0.07	-0.01	
08/27/07 17:30:15	1.30	2.75	
08/27/07 17:30:30	9.09	10.70	
08/27/07 17:30:45	15.80	16.36	
08/27/07 17:31:00	19.47	19.44	
08/27/07 17:31:15	20.87	20.42	
08/27/07 17:31:30	21.11	20.63	
08/27/07 17:31:45	21.13	20.96	
08/27/07 17:32:00	21.11	21.38	
08/27/07 17:32:15	21.09	21.61	
08/27/07 17:32:30	21.07	21.69	
08/27/07 17:32:45	21.07	21.72	
08/27/07 17:33:00	20.94	21.73	Method 205 Dilution System Verification:
08/27/07 17:33:15	19.96	21.75	20.0% Oxygen injection:
08/27/07 17:33:30	19.96	21.75	19.96 % db Oxygen
08/27/07 17:33:45	19.96	21.76	Precision Test Conc. #2, Trial #1
08/27/07 17:34:00	19.96	21.77	
08/27/07 17:34:15	19.96	21.77	
08/27/07 17:34:30	19.96	21.78	
08/27/07 17:34:45	19.97	21.78	
08/27/07 17:35:00	19.96	21.79	
08/27/07 17:35:15	19.97	21.79	
08/27/07 17:35:30	19.48	20.14	
08/27/07 17:35:45	16.41	16.27	
08/27/07 17:36:00	13.54	14.14	
08/27/07 17:36:15	12.63	13.72	
08/27/07 17:36:30	12.53	13.69	Method 205 Dilution System Verification:
08/27/07 17:36:45	12.52	13.68	12.5% Oxygen injection:
08/27/07 17:37:00	12.52	13.68	12.52 % db Oxygen
08/27/07 17:37:15	12.52	13.67	Precision Test Conc. #1, Trial #1
08/27/07 17:37:30	12.52	13.67	
08/27/07 17:37:45	12.52	13.67	
08/27/07 17:38:00	12.52	13.66	
08/27/07 17:38:15	12.52	13.67	
08/27/07 17:38:30	12.52	13.67	
08/27/07 17:38:45	12.52	13.67	
08/27/07 17:39:00	12.52	13.63	
08/27/07 17:39:15	12.54	13.10	
08/27/07 17:39:30	12.82	7.71	
08/27/07 17:39:45	12.69	2.71	
08/27/07 17:40:00	12.47	0.46	
08/27/07 17:40:15	12.44	0.17	
08/27/07 17:40:30	12.44	0.13	
08/27/07 17:40:45	12.45	0.11	
08/27/07 17:41:00	12.45	0.10	Method 205 Dilution System Verification:
08/27/07 17:41:15	12.45	0.09	12.47% Oxygen injection:
08/27/07 17:41:30	12.45	0.09	12.45 % db Oxygen
08/27/07 17:41:45	12.45	0.08	Accuracy Verification, Trial #1
08/27/07 17:42:00	12.45	0.07	
08/27/07 17:42:15	12.45	0.07	
08/27/07 17:42:30	12.45	0.07	
08/27/07 17:42:45	12.45	0.06	
08/27/07 17:43:00	12.45	0.07	
08/27/07 17:43:15	13.18	5.24	
08/27/07 17:43:30	16.37	13.46	
08/27/07 17:43:45	18.74	18.64	
08/27/07 17:44:00	19.76	21.11	
08/27/07 17:44:15	20.01	21.62	Method 205 Dilution System Verification:
08/27/07 17:44:30	20.02	21.69	20.0% Oxygen injection:
08/27/07 17:44:45	20.01	21.72	20.01 % db Oxygen

Range	10.0	22.8	
Units	%	%	
Time	Stack Oxygen	Stack CO2	COMMENTS
08/27/07 17:45:00	20.00	21.76	Precision Test Conc. #2, Trial #2
08/27/07 17:45:15	19.99	21.78	
08/27/07 17:45:30	19.98	21.79	
08/27/07 17:45:45	19.98	21.80	
08/27/07 17:46:00	19.98	21.80	
08/27/07 17:46:15	19.95	21.56	
08/27/07 17:46:30	18.40	18.35	
08/27/07 17:46:45	14.90	15.08	
08/27/07 17:47:00	12.95	13.85	
08/27/07 17:47:15	12.55	13.71	
08/27/07 17:47:30	12.52	13.69	
08/27/07 17:47:45	12.52	13.69	Method 205 Dilution System Verification:
08/27/07 17:48:00	12.51	13.69	12.5% Oxygen injection:
08/27/07 17:48:15	12.52	13.69	12.51 % db Oxygen
08/27/07 17:48:30	12.51	13.69	Precision Test Conc. #1, Trial #2
08/27/07 17:48:45	12.51	13.69	
08/27/07 17:49:00	12.51	13.69	
08/27/07 17:49:15	12.51	13.69	
08/27/07 17:49:30	12.51	13.69	
08/27/07 17:49:45	12.51	13.69	
08/27/07 17:50:00	12.52	13.69	
08/27/07 17:50:15	12.52	13.69	
08/27/07 17:50:30	12.52	13.70	
08/27/07 17:50:45	12.52	13.51	
08/27/07 17:51:00	12.52	8.72	
08/27/07 17:51:15	12.45	3.30	
08/27/07 17:51:30	12.41	0.60	
08/27/07 17:51:45	12.43	0.20	
08/27/07 17:52:00	12.44	0.15	Method 205 Dilution System Verification:
08/27/07 17:52:15	12.44	0.13	12.47% Oxygen injection:
08/27/07 17:52:30	12.44	0.12	12.44 % db Oxygen
08/27/07 17:52:45	12.44	0.11	Accuracy Verification, Trial #2
08/27/07 17:53:00	12.44	0.10	
08/27/07 17:53:15	12.44	0.09	
08/27/07 17:53:30	12.44	0.09	
08/27/07 17:53:45	12.48	1.08	
08/27/07 17:54:00	14.41	9.33	
08/27/07 17:54:15	17.54	16.12	
08/27/07 17:54:30	19.28	20.09	
08/27/07 17:54:45	19.91	21.55	
08/27/07 17:55:00	20.00	21.75	Method 205 Dilution System Verification:
08/27/07 17:55:15	20.01	21.78	20.0% Oxygen injection:
08/27/07 17:55:30	20.00	21.80	20.00 % db Oxygen
08/27/07 17:55:45	19.99	21.82	Precision Test Conc. #2, Trial #3
08/27/07 17:56:00	19.98	21.83	
08/27/07 17:56:15	19.98	21.83	
08/27/07 17:56:30	19.98	21.82	
08/27/07 17:56:45	19.31	19.79	
08/27/07 17:57:00	16.07	15.99	
08/27/07 17:57:15	13.36	14.05	
08/27/07 17:57:30	12.58	13.71	
08/27/07 17:57:45	12.49	13.68	Method 205 Dilution System Verification:
08/27/07 17:58:00	12.52	13.73	12.5% Oxygen injection:
08/27/07 17:58:15	12.54	13.72	12.52 % db Oxygen
08/27/07 17:58:30	12.52	13.70	Precision Test Conc. #1, Trial #3
08/27/07 17:58:45	12.51	13.70	
08/27/07 17:59:00	12.51	13.70	
08/27/07 17:59:15	12.51	13.70	
08/27/07 17:59:30	12.51	13.70	
08/27/07 17:59:45	12.52	11.37	
08/27/07 18:00:00	12.49	5.28	
08/27/07 18:00:15	12.42	1.34	
08/27/07 18:00:30	12.42	0.27	
08/27/07 18:00:45	12.44	0.16	Method 205 Dilution System Verification:
08/27/07 18:01:00	12.44	0.14	12.47% Oxygen injection:
08/27/07 18:01:15	12.44	0.13	12.44 % db Oxygen
08/27/07 18:01:30	12.44	0.11	Accuracy Verification, Trial #3
08/27/07 18:01:45	12.44	0.10	

Client Valero
Location Paulsboro, New Jersey
Source FCC Scrubber Stack
Date 08/28/07

	Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS	
	Range Units	10.0 %	25.0 %	
Time	Stack Oxygen	Stack CO2	COMMENTS	
08/28/07 7:31:30	0.04	0.05		
08/28/07 7:31:45	0.02	0.05		
08/28/07 7:32:00	0.01	0.05		
08/28/07 7:32:15	0.01	0.05		
08/28/07 7:32:30	0.01	0.05		
08/28/07 7:32:45	0.01	0.05		
08/28/07 7:33:00	0.01	0.05		
08/28/07 7:33:15	0.01	0.05	Calibration Error Test:	
08/28/07 7:33:30	0.01	0.05	Zero nitrogen injection:	
08/28/07 7:33:45	0.01	0.05	0.01 % db Oxygen	
08/28/07 7:34:00	0.01	0.05	0.05 % db CO2	
08/28/07 7:34:15	0.01	0.05		
08/28/07 7:34:30	0.01	0.05		
08/28/07 7:34:45	0.01	0.05		
08/28/07 7:35:00	0.01	0.05		
08/28/07 7:35:15	0.01	0.05		
08/28/07 7:35:30	0.05	0.30		
08/28/07 7:35:45	2.39	4.11		
08/28/07 7:36:00	6.77	7.28		
08/28/07 7:36:15	9.13	7.99		
08/28/07 7:36:30	9.50	7.19		
08/28/07 7:36:45	6.52	3.52		
08/28/07 7:37:00	2.11	0.76		
08/28/07 7:37:15	0.33	0.17		
08/28/07 7:37:30	0.08	0.12		
08/28/07 7:37:45	0.05	0.10		
08/28/07 7:38:00	0.05	0.09		
08/28/07 7:38:15	0.05	0.14		
08/28/07 7:38:30	1.23	3.48		
08/28/07 7:38:45	5.48	7.85		
08/28/07 7:39:00	8.69	10.16		
08/28/07 7:39:15	9.82	10.69		
08/28/07 7:39:30	10.00	10.74		
08/28/07 7:39:45	10.02	10.74		
08/28/07 7:40:00	10.02	10.74		
08/28/07 7:40:15	10.03	10.74		
08/28/07 7:40:30	10.03	10.74		
08/28/07 7:40:45	10.04	10.74		
08/28/07 7:41:00	10.04	10.75		
08/28/07 7:41:15	10.04	10.75		
08/28/07 7:41:30	10.04	10.76		
08/28/07 7:41:45	10.04	10.77		
08/28/07 7:42:00	10.04	10.78		
08/28/07 7:42:15	10.04	10.78		
08/28/07 7:42:30	10.04	10.79		
08/28/07 7:42:45	10.05	10.80	Calibration Error Test:	
08/28/07 7:43:00	10.05	10.81	10.0% Oxygen injection	
08/28/07 7:43:15	10.05	10.82	10.05 % db Oxygen	
08/28/07 7:43:30	10.05	10.82		
08/28/07 7:43:45	10.05	10.83		
08/28/07 7:44:00	10.05	10.83		
08/28/07 7:44:15	10.05	10.83		
08/28/07 7:44:30	10.05	10.83		
08/28/07 7:44:45	10.05	10.84		
08/28/07 7:45:00	10.05	10.84		
08/28/07 7:45:15	10.06	9.96		
08/28/07 7:45:30	10.06	9.89		
08/28/07 7:45:45	9.49	8.31		
08/28/07 7:46:00	7.02	6.04		
08/28/07 7:46:15	5.38	5.32		
08/28/07 7:46:30	5.05	5.24	Calibration Error Test:	
08/28/07 7:46:45	5.02	5.22	5.0% Oxygen injection	
08/28/07 7:47:00	5.02	5.22	5.02 % db Oxygen	
08/28/07 7:47:15	5.02	5.22		
08/28/07 7:47:30	5.02	5.21		
08/28/07 7:47:45	5.02	5.21		
08/28/07 7:48:00	5.02	5.21		
08/28/07 7:48:15	5.02	5.21		
08/28/07 7:48:30	5.02	5.21		
08/28/07 7:48:45	5.02	5.22		
08/28/07 7:49:00	6.28	9.02		
08/28/07 7:49:15	12.33	15.69		
08/28/07 7:49:30	17.98	19.74		
08/28/07 7:49:45	21.27	21.95		

Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS
08/28/07 7:50:00	22.48	22.54	
08/28/07 7:50:15	22.69	22.64	
08/28/07 7:50:30	22.71	22.68	
08/28/07 7:50:45	22.72	22.71	
08/28/07 7:51:00	22.72	22.73	
08/28/07 7:51:15	22.72	22.74	
08/28/07 7:51:30	22.73	22.75	
08/28/07 7:51:45	22.73	22.76	Calibration Error Test:
08/28/07 7:52:00	22.73	22.77	22.82% CO2 injection:
08/28/07 7:52:15	22.73	22.77	22.73 % db CO2
08/28/07 7:52:30	22.73	22.78	
08/28/07 7:52:45	22.73	22.78	
08/28/07 7:53:00	22.73	22.78	
08/28/07 7:53:15	22.73	22.78	
08/28/07 7:53:30	22.73	22.79	
08/28/07 7:53:45	22.73	22.65	
08/28/07 7:54:00	21.06	18.59	
08/28/07 7:54:15	15.80	13.64	
08/28/07 7:54:30	11.78	10.84	
08/28/07 7:54:45	10.30	10.14	
08/28/07 7:55:00	10.09	10.06	Calibration Error Test:
08/28/07 7:55:15	10.07	10.04	22.82% CO2 injection:
08/28/07 7:55:30	10.06	10.02	10.06 % db CO2
08/28/07 7:55:45	10.06	10.01	
08/28/07 7:56:00	10.05	10.00	
08/28/07 7:56:15	10.05	10.00	
08/28/07 7:56:30	10.05	9.99	
08/28/07 7:56:45	10.05	9.98	
08/28/07 7:57:00	10.05	9.98	
08/28/07 7:57:15	10.05	9.98	
08/28/07 7:57:30	10.05	9.97	
08/28/07 7:57:45	10.66	8.08	
08/28/07 7:58:00	15.40	2.96	
08/28/07 7:58:15	19.68	0.52	
08/28/07 7:58:30	20.76	0.25	
08/28/07 7:58:45	20.87	0.22	CO2 upscale RT
08/28/07 7:59:00	20.34	1.91	135 sec
08/28/07 7:59:15	16.16	6.59	
08/28/07 7:59:30	11.87	9.07	
08/28/07 7:59:45	10.43	9.60	
08/28/07 8:00:00	10.19	9.69	
08/28/07 8:00:15	10.15	9.72	
08/28/07 8:00:30	10.12	9.74	
08/28/07 8:00:45	10.11	9.76	
08/28/07 8:01:00	10.10	9.77	
08/28/07 8:01:15	10.09	9.77	
08/28/07 8:01:30	10.08	9.78	
08/28/07 8:01:45	10.07	9.79	System Bias Test:
08/28/07 8:02:00	10.07	9.79	10% Oxygen/CO2 injection:
08/28/07 8:02:15	10.06	9.80	10.06 % db Oxygen
08/28/07 8:02:30	10.06	9.80	9.80 % db CO2
08/28/07 8:02:45	10.05	9.80	
08/28/07 8:03:00	10.05	9.80	
08/28/07 8:03:15	10.05	9.81	
08/28/07 8:03:30	10.04	9.81	
08/28/07 8:03:45	10.04	9.81	
08/28/07 8:04:00	10.04	9.81	
08/28/07 8:04:15	10.04	9.81	
08/28/07 8:04:30	10.03	9.81	
08/28/07 8:04:45	10.43	8.95	Oxygen/CO2 downscale RT
08/28/07 8:05:00	11.24	8.46	135 sec
08/28/07 8:05:15	7.97	5.33	
08/28/07 8:05:30	3.06	1.82	
08/28/07 8:05:45	0.71	0.48	
08/28/07 8:06:00	0.24	0.31	
08/28/07 8:06:15	0.18	0.26	
08/28/07 8:06:30	0.17	0.23	
08/28/07 8:06:45	0.15	0.21	
08/28/07 8:07:00	0.14	0.19	
08/28/07 8:07:15	0.14	0.17	
08/28/07 8:07:30	0.13	0.16	
08/28/07 8:07:45	0.12	0.16	
08/28/07 8:08:00	0.12	0.15	
08/28/07 8:08:15	0.12	0.14	System Bias Test:
08/28/07 8:08:30	0.12	0.13	Zero nitrogen injection:
08/28/07 8:08:45	0.11	0.13	0.11 % db Oxygen
08/28/07 8:09:00	0.11	0.12	0.12 % db CO2
08/28/07 8:09:15	0.11	0.12	
08/28/07 8:09:30	0.11	0.11	

Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS
08/28/07 8:09:45	0.44	0.12	Oxygen upscale RT
08/28/07 8:10:00	5.64	0.13	135 sec
08/28/07 8:10:15	10.16	0.17	
08/28/07 8:10:30	5.30	3.13	
08/28/07 8:10:45	6.28	7.03	
08/28/07 8:11:00	8.81	9.05	
08/28/07 8:11:15	9.76	9.54	
08/28/07 8:11:30	9.93	9.64	
08/28/07 8:11:45	9.98	9.68	
08/28/07 8:12:00	10.00	9.71	
08/28/07 8:12:15	10.01	9.72	
08/28/07 8:12:30	10.01	9.73	
08/28/07 8:12:45	10.01	9.75	
08/28/07 8:13:00	10.00	9.56	
08/28/07 8:13:15	8.20	6.06	
08/28/07 8:13:30	3.71	2.20	
08/28/07 8:13:45	0.93	0.42	
08/28/07 8:14:00	0.26	0.19	
08/28/07 8:14:15	0.20	0.15	
08/28/07 8:14:30	0.20	0.14	
08/28/07 8:14:45	0.20	0.14	
08/28/07 8:15:00	0.19	0.13	
08/28/07 8:15:15	0.18	0.13	
08/28/07 8:15:30	0.15	0.12	
08/28/07 8:15:45	0.10	0.10	
08/28/07 8:16:00	0.04	0.08	
08/28/07 8:16:15	0.02	0.08	
08/28/07 8:16:30	0.01	0.08	
08/28/07 8:16:45	0.01	0.08	
08/28/07 8:17:00	0.01	0.07	
08/28/07 8:17:15	0.01	0.07	
08/28/07 8:17:30	0.01	0.07	
08/28/07 8:17:45	0.01	0.07	
08/28/07 8:18:00	0.01	0.08	
08/28/07 8:18:15	0.01	0.07	
08/28/07 8:18:30	0.01	0.07	
08/28/07 8:18:45	0.01	0.06	
08/28/07 8:19:00	0.01	0.06	
08/28/07 8:19:15	0.01	0.07	
08/28/07 8:19:30	0.01	0.06	
08/28/07 8:19:45	0.01	0.06	
08/28/07 8:20:00	0.01	0.06	
08/28/07 8:20:15	0.03	0.07	
08/28/07 8:20:30	0.11	0.07	
08/28/07 8:20:45	0.92	0.07	
08/28/07 8:21:00	7.74	0.10	
08/28/07 8:21:15	16.06	0.27	
08/28/07 8:21:30	19.04	0.75	
08/28/07 8:21:45	19.64	0.85	
08/28/07 8:22:00	19.73	0.77	
08/28/07 8:22:15	20.21	0.41	
08/28/07 8:22:30	20.72	0.17	
08/28/07 8:22:45	20.85	0.13	
08/28/07 8:23:00	20.88	0.12	
08/28/07 8:23:15	20.87	0.12	
08/28/07 8:23:30	20.86	0.12	
08/28/07 8:23:45	20.86	0.12	
08/28/07 8:24:00	20.85	0.12	
08/28/07 8:24:15	20.85	0.11	
08/28/07 8:24:30	20.85	0.11	
08/28/07 8:24:45	20.84	0.11	
08/28/07 8:25:00	20.83	0.11	
08/28/07 8:25:15	20.82	0.11	
08/28/07 8:25:30	20.82	0.11	
08/28/07 8:25:45	20.81	0.12	
08/28/07 8:26:00	20.80	0.12	
08/28/07 8:26:15	20.81	0.11	
08/28/07 8:26:30	20.81	0.11	
08/28/07 8:26:45	20.81	0.10	
08/28/07 8:27:00	20.81	0.11	
08/28/07 8:27:15	20.80	0.11	
08/28/07 8:27:30	20.80	0.11	
08/28/07 8:27:45	20.80	0.10	
08/28/07 8:28:00	20.81	0.10	
08/28/07 8:28:15	20.81	0.10	
08/28/07 8:28:30	20.81	0.10	
08/28/07 8:28:45	20.81	0.10	
08/28/07 8:29:00	20.81	0.10	
08/28/07 8:29:15	20.80	0.10	
08/28/07 8:29:30	20.80	0.10	

Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS
08/28/07 8:29:45	20.80	0.10	
08/28/07 8:30:00	20.80	0.10	
08/28/07 8:30:15	20.72	0.78	Sample Probe in North Port (#1)
08/28/07 8:30:30	16.96	7.68	
08/28/07 8:30:45	8.98	14.34	
08/28/07 8:31:00	3.66	17.72	
08/28/07 8:31:15	1.74	18.60	
08/28/07 8:31:30	1.33	18.82	
08/28/07 8:31:45	1.20	18.92	
08/28/07 8:32:00	1.19	18.91	
08/28/07 8:32:15	1.21	18.93	
08/28/07 8:32:30	1.16	18.99	
08/28/07 8:32:45	1.15	19.00	
08/28/07 8:33:00	1.15	19.01	
08/28/07 8:33:15	1.18	18.97	
08/28/07 8:33:30	1.20	19.00	
08/28/07 8:33:45	1.12	19.08	
08/28/07 8:34:00	1.08	19.09	Sample Point #1 Stratification Check:
08/28/07 8:34:15	1.08	19.11	
08/28/07 8:34:30	1.04	19.13	
08/28/07 8:34:45	1.06	19.09	
08/28/07 8:35:00	1.11	19.09	
08/28/07 8:35:15	1.06	19.17	
08/28/07 8:35:30	1.01	19.15	
08/28/07 8:35:45	1.09	19.07	
08/28/07 8:36:00	1.13	19.10	
08/28/07 8:36:15	1.06	19.18	
08/28/07 8:36:30	1.01	19.21	
08/28/07 8:36:45	0.99	19.21	
08/28/07 8:37:00	0.99	19.22	
08/28/07 8:37:15	0.94	19.27	
08/28/07 8:37:30	0.94	19.25	
08/28/07 8:37:45	0.97	19.24	Sample Point #2 Stratification Check:
08/28/07 8:38:00	0.97	19.23	
08/28/07 8:38:15	1.00	19.20	
08/28/07 8:38:30	1.01	19.18	
08/28/07 8:38:45	1.05	19.13	
08/28/07 8:39:00	1.12	19.07	
08/28/07 8:39:15	1.17	19.04	
08/28/07 8:39:30	1.17	19.06	
08/28/07 8:39:45	1.11	19.14	
08/28/07 8:40:00	1.03	19.19	
08/28/07 8:40:15	1.03	19.17	
08/28/07 8:40:30	1.06	19.13	
08/28/07 8:40:45	1.08	19.16	
08/28/07 8:41:00	1.00	19.24	
08/28/07 8:41:15	0.93	19.27	
08/28/07 8:41:30	0.90	19.30	Sample Point #2 Stratification Check:
08/28/07 8:41:45	0.89	19.29	
08/28/07 8:42:00	0.92	19.27	
08/28/07 8:42:15	0.94	19.25	
08/28/07 8:42:30	0.99	19.19	
08/28/07 8:42:45	1.04	19.16	
08/28/07 8:43:00	1.10	19.11	
08/28/07 8:43:15	1.12	19.11	
08/28/07 8:43:30	1.07	19.17	
08/28/07 8:43:45	1.04	19.18	
08/28/07 8:44:00	1.03	19.21	
08/28/07 8:44:15	1.05	19.12	
08/28/07 8:44:30	1.20	19.01	
08/28/07 8:44:45	1.22	19.06	
08/28/07 8:45:00	1.18	19.06	
08/28/07 8:45:15	1.23	19.02	Sample Point #2 Stratification Check:
08/28/07 8:45:30	1.21	19.08	
08/28/07 8:45:45	1.15	19.11	
08/28/07 8:46:00	1.15	19.10	
08/28/07 8:46:15	1.16	19.08	
08/28/07 8:46:30	1.21	19.04	
08/28/07 8:46:45	1.25	19.02	
08/28/07 8:47:00	1.24	19.04	
08/28/07 8:47:15	1.23	19.05	
08/28/07 8:47:30	1.24	19.03	
08/28/07 8:47:45	1.23	19.05	
08/28/07 8:48:00	1.18	19.10	
08/28/07 8:48:15	1.13	19.14	
08/28/07 8:48:30	1.15	19.09	
08/28/07 8:48:45	1.21	19.05	
08/28/07 8:49:00	1.19	19.08	
08/28/07 8:49:15	1.17	19.10	
08/28/07 8:49:30	1.16	19.12	

	Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS	
08/28/07 8:49:45	1.12	19.15		
08/28/07 8:50:00	1.13	19.11		
08/28/07 8:50:15	1.16	19.13	3 point averages:	
08/28/07 8:50:30	1.08	19.21	Oxygen %:	1.07
08/28/07 8:50:45	1.03	19.19	CO2 %:	19.15
08/28/07 8:51:00	1.10	19.12		
08/28/07 8:51:15	1.12	19.15		
08/28/07 8:51:30	1.08	19.18		
08/28/07 8:51:45	1.07	19.20		
08/28/07 8:52:00	1.03	19.22		
08/28/07 8:52:15	1.05	19.19		
08/28/07 8:52:30	1.09	19.15		
08/28/07 8:52:45	1.11	19.14		
08/28/07 8:53:00	1.10	19.16		
08/28/07 8:53:15	1.10	19.14		
08/28/07 8:53:30	1.15	19.08		
08/28/07 8:53:45	1.21	19.04		
08/28/07 8:54:00	1.21	19.08		
08/28/07 8:54:15	1.15	19.10		
08/28/07 8:54:30	1.15	19.11		
08/28/07 8:54:45	1.12	19.15		
08/28/07 8:55:00	1.07	19.19		
08/28/07 8:55:15	1.07	19.16		
08/28/07 8:55:30	1.10	19.14		
08/28/07 8:55:45	1.07	19.18		
08/28/07 8:56:00	1.08	19.15		
08/28/07 8:56:15	1.12	19.10		
08/28/07 8:56:30	1.20	19.03		
08/28/07 8:56:45	1.25	19.02		
08/28/07 8:57:00	1.20	19.10		
08/28/07 8:57:15	1.12	19.16		
08/28/07 8:57:30	1.24	18.18		
08/28/07 8:57:45	6.23	10.22		
08/28/07 8:58:00	14.68	3.75		
08/28/07 8:58:15	19.31	0.88		
08/28/07 8:58:30	20.48	0.48		
08/28/07 8:58:45	20.63	0.41		
08/28/07 8:59:00	20.66	0.36		
08/28/07 8:59:15	20.68	0.33		
08/28/07 8:59:30	20.70	0.31		
08/28/07 8:59:45	20.70	0.29		
08/28/07 9:00:00	20.70	0.29		
08/28/07 9:00:15	20.70	0.28		
08/28/07 9:00:30	20.71	0.26		
08/28/07 9:00:45	20.72	0.25		
08/28/07 9:01:00	20.73	0.24		
08/28/07 9:01:15	20.74	0.23		
08/28/07 9:01:30	20.74	0.23		
08/28/07 9:01:45	20.74	0.22		
08/28/07 9:02:00	20.75	0.21		
08/28/07 9:02:15	20.75	0.21		
08/28/07 9:02:30	20.76	0.20		
08/28/07 9:02:45	20.76	0.20		
08/28/07 9:03:00	20.75	0.19		
08/28/07 9:03:15	20.76	0.19		
08/28/07 9:03:30	20.76	0.19		
08/28/07 9:03:45	20.76	0.18		
08/28/07 9:04:00	20.76	0.18		
08/28/07 9:04:15	20.76	0.18		
08/28/07 9:04:30	20.76	0.18		
08/28/07 9:04:45	20.77	0.17		
08/28/07 9:05:00	20.77	0.17		
08/28/07 9:05:15	20.76	0.17		
08/28/07 9:05:30	20.77	0.17		
08/28/07 9:05:45	20.77	0.16		
08/28/07 9:06:00	20.77	0.16		
08/28/07 9:06:15	20.76	0.16		
08/28/07 9:06:30	20.76	0.16		
08/28/07 9:06:45	20.77	0.16		
08/28/07 9:07:00	20.77	0.16		
08/28/07 9:07:15	20.77	0.16		
08/28/07 9:07:30	20.77	0.15		
08/28/07 9:07:45	20.77	0.15		
08/28/07 9:08:00	20.77	0.15		
08/28/07 9:08:15	20.77	0.15		
08/28/07 9:08:30	20.77	0.15		
08/28/07 9:08:45	20.77	0.14		
08/28/07 9:09:00	20.77	0.14		
08/28/07 9:09:15	20.58	1.29		
08/28/07 9:09:30	15.83	8.67		

Range Units		10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS	
08/28/07 9:09:45	7.88	15.01		
08/28/07 9:10:00	3.16	17.95		
08/28/07 9:10:15	1.68	18.61		
08/28/07 9:10:30	1.44	18.73		
08/28/07 9:10:45	1.38	18.83		
08/28/07 9:11:00	1.28	18.94		
08/28/07 9:11:15	1.23	18.96		
08/28/07 9:11:30	1.25	18.95		
08/28/07 9:11:45	1.22	19.00		
08/28/07 9:12:00	1.18	19.03		
08/28/07 9:12:15	1.16	19.05		
08/28/07 9:12:30	1.17	19.03		
08/28/07 9:12:45	1.20	19.01		
08/28/07 9:13:00	1.20	19.03		
08/28/07 9:13:15	1.18	19.06		
08/28/07 9:13:30	1.13	19.10		
08/28/07 9:13:45	1.10	19.13		
08/28/07 9:14:00	1.09	19.13		
08/28/07 9:14:15	1.12	19.08		
08/28/07 9:14:30	1.17	19.08		
08/28/07 9:14:45	1.13	19.12		
08/28/07 9:15:00	1.13	19.07		
08/28/07 9:15:15	1.18	19.04		
08/28/07 9:15:30	1.15	19.11		
08/28/07 9:15:45	1.08	19.14		
08/28/07 9:16:00	1.11	19.10		
08/28/07 9:16:15	1.14	19.09		
08/28/07 9:16:30	1.12	19.14		
08/28/07 9:16:45	1.02	19.23		
08/28/07 9:17:00	1.03	19.16		
08/28/07 9:17:15	1.13	19.10		
08/28/07 9:17:30	1.14	19.11		
08/28/07 9:17:45	1.10	19.14		
08/28/07 9:18:00	1.07	19.17		
08/28/07 9:18:15	1.06	19.19		
08/28/07 9:18:30	1.05	19.17		
08/28/07 9:18:45	1.12	19.11		
08/28/07 9:19:00	1.13	19.17		
08/28/07 9:19:15	1.04	19.24		
08/28/07 9:19:30	1.01	19.26		
08/28/07 9:19:45	1.02	19.26		
08/28/07 9:20:00	1.02	19.26		
08/28/07 9:20:15	1.03	19.22		
08/28/07 9:20:30	1.07	19.20		
08/28/07 9:20:45	1.06	19.23		
08/28/07 9:21:00	1.03	19.24		
08/28/07 9:21:15	1.04	19.22		
08/28/07 9:21:30	1.11	19.15		
08/28/07 9:21:45	1.19	19.08		
08/28/07 9:22:00	1.23	19.09		
08/28/07 9:22:15	1.20	19.13		
08/28/07 9:22:30	1.19	19.11		
08/28/07 9:22:45	1.21	19.11		
08/28/07 9:23:00	1.20	19.13		
08/28/07 9:23:15	1.17	19.16		
08/28/07 9:23:30	1.14	19.18		
08/28/07 9:23:45	1.14	19.15		
08/28/07 9:24:00	1.20	19.10		
08/28/07 9:24:15	1.19	19.16		
08/28/07 9:24:30	1.15	19.17		
08/28/07 9:24:45	1.18	19.14		
08/28/07 9:25:00	1.17	19.14		
08/28/07 9:25:15	1.14	19.18		
08/28/07 9:25:30	1.09	19.21		
08/28/07 9:25:45	1.08	19.21		
08/28/07 9:26:00	1.08	19.19		
08/28/07 9:26:15	1.10	19.19		
08/28/07 9:26:30	1.09	19.19		
08/28/07 9:26:45	1.11	19.15		
08/28/07 9:27:00	1.16	19.11		
08/28/07 9:27:15	1.18	19.11		
08/28/07 9:27:30	1.12	19.21		
08/28/07 9:27:45	1.03	19.24		
08/28/07 9:28:00	1.04	19.22		
08/28/07 9:28:15	1.04	19.22		
08/28/07 9:28:30	1.09	19.14		
08/28/07 9:28:45	1.17	19.10		
08/28/07 9:29:00	1.16	19.13		
08/28/07 9:29:15	1.14	19.13		
08/28/07 9:29:30	1.17	19.12		

Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS
08/28/07 9:29:45	1.12	19.18	
08/28/07 9:30:00	1.10	19.17	
08/28/07 9:30:15	1.13	19.15	
08/28/07 9:30:30	1.12	19.15	
08/28/07 9:30:45	1.14	19.13	
08/28/07 9:31:00	1.15	19.15	
08/28/07 9:31:15	1.10	19.20	
08/28/07 9:31:30	1.08	19.19	
08/28/07 9:31:45	1.09	19.19	
08/28/07 9:32:00	1.04	19.26	
08/28/07 9:32:15	0.99	19.29	
08/28/07 9:32:30	1.03	19.22	
08/28/07 9:32:45	1.12	19.13	
08/28/07 9:33:00	1.16	19.16	
08/28/07 9:33:15	1.05	19.26	
08/28/07 9:33:30	1.02	19.25	
08/28/07 9:33:45	1.06	19.25	
08/28/07 9:34:00	1.03	19.29	
08/28/07 9:34:15	0.97	19.33	
08/28/07 9:34:30	0.95	19.33	
08/28/07 9:34:45	0.99	19.29	
08/28/07 9:35:00	1.01	19.29	
08/28/07 9:35:15	1.01	19.28	
08/28/07 9:35:30	1.06	19.24	
08/28/07 9:35:45	1.07	19.24	
08/28/07 9:36:00	1.03	19.28	
08/28/07 9:36:15	0.99	19.30	
08/28/07 9:36:30	1.04	19.24	
08/28/07 9:36:45	1.09	19.23	
08/28/07 9:37:00	1.11	19.22	
08/28/07 9:37:15	1.15	19.21	
08/28/07 9:37:30	1.11	19.26	
08/28/07 9:37:45	1.07	19.27	
08/28/07 9:38:00	1.09	19.23	
08/28/07 9:38:15	1.15	19.17	
08/28/07 9:38:30	1.19	19.18	
08/28/07 9:38:45	1.15	19.23	
08/28/07 9:39:00	1.14	19.24	
08/28/07 9:39:15	1.16	19.23	
08/28/07 9:39:30	1.14	19.26	
08/28/07 9:39:45	1.14	19.22	
08/28/07 9:40:00	1.23	19.13	
08/28/07 9:40:15	1.30	19.10	
08/28/07 9:40:30	1.26	19.16	
08/28/07 9:40:45	1.20	19.20	
08/28/07 9:41:00	1.21	19.17	
08/28/07 9:41:15	1.20	19.20	
08/28/07 9:41:30	1.12	19.27	
08/28/07 9:41:45	1.14	19.19	
08/28/07 9:42:00	1.24	19.11	
08/28/07 9:42:15	1.28	19.11	
08/28/07 9:42:30	1.27	19.13	
08/28/07 9:42:45	1.24	19.15	
08/28/07 9:43:00	1.20	19.16	
08/28/07 9:43:15	1.20	19.16	
08/28/07 9:43:30	1.15	19.22	
08/28/07 9:43:45	1.11	19.26	
08/28/07 9:44:00	1.10	19.26	
08/28/07 9:44:15	1.11	19.23	
08/28/07 9:44:30	1.17	19.16	
08/28/07 9:44:45	1.17	19.19	
08/28/07 9:45:00	1.14	19.20	
08/28/07 9:45:15	1.15	19.19	
08/28/07 9:45:30	1.13	19.22	
08/28/07 9:45:45	1.15	19.17	
08/28/07 9:46:00	1.22	19.09	
08/28/07 9:46:15	1.27	19.04	
08/28/07 9:46:30	1.29	19.03	
08/28/07 9:46:45	1.34	18.96	
08/28/07 9:47:00	1.39	18.94	
08/28/07 9:47:15	1.35	19.00	
08/28/07 9:47:30	1.33	18.99	
08/28/07 9:47:45	1.35	18.97	
08/28/07 9:48:00	1.29	19.04	
08/28/07 9:48:15	1.19	19.12	
08/28/07 9:48:30	1.12	19.19	
08/28/07 9:48:45	1.09	19.20	
08/28/07 9:49:00	1.13	19.13	
08/28/07 9:49:15	1.20	19.09	
08/28/07 9:49:30	1.15	19.16	

	Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS	
08/28/07 9:49:45	1.11	19.18		
08/28/07 9:50:00	1.12	19.16		
08/28/07 9:50:15	1.13	19.16		
08/28/07 9:50:30	1.14	19.15		
08/28/07 9:50:45	1.16	19.15		
08/28/07 9:51:00	1.15	19.14		
08/28/07 9:51:15	1.16	19.14		
08/28/07 9:51:30	1.16	19.14		
08/28/07 9:51:45	1.17	19.11		
08/28/07 9:52:00	1.20	19.10		
08/28/07 9:52:15	1.20	19.13		
08/28/07 9:52:30	1.13	19.20		
08/28/07 9:52:45	1.11	19.18		
08/28/07 9:53:00	1.14	19.17		
08/28/07 9:53:15	1.14	19.17		
08/28/07 9:53:30	1.16	19.15		
08/28/07 9:53:45	1.16	19.15		
08/28/07 9:54:00	1.20	19.10		
08/28/07 9:54:15	1.24	19.08		
08/28/07 9:54:30	1.22	19.12		
08/28/07 9:54:45	1.20	19.11		
08/28/07 9:55:00	1.20	19.13		
08/28/07 9:55:15	1.11	19.24		
08/28/07 9:55:30	1.06	19.24		
08/28/07 9:55:45	1.13	19.17		
08/28/07 9:56:00	1.13	19.20		
08/28/07 9:56:15	1.12	19.22		
08/28/07 9:56:30	1.07	19.27		
08/28/07 9:56:45	1.04	19.28		
08/28/07 9:57:00	1.08	19.24		
08/28/07 9:57:15	1.12	19.23		
08/28/07 9:57:30	1.11	19.25		
08/28/07 9:57:45	1.09	19.25		
08/28/07 9:58:00	1.10	19.24		
08/28/07 9:58:15	1.06	19.27		
08/28/07 9:58:30	1.08	19.25		
08/28/07 9:58:45	1.11	19.25		
08/28/07 9:59:00	1.06	19.31		
08/28/07 9:59:15	1.00	19.33		
08/28/07 9:59:30	1.07	19.24		
08/28/07 9:59:45	1.10	19.25		
08/28/07 10:00:00	1.07	19.27		
08/28/07 10:00:15	1.09	19.27		
08/28/07 10:00:30	1.06	19.32		
08/28/07 10:00:45	1.03	19.33		
08/28/07 10:01:00	1.02	19.35		
08/28/07 10:01:15	1.00	19.36		
08/28/07 10:01:30	1.01	19.33		
08/28/07 10:01:45	1.03	19.35		
08/28/07 10:02:00	0.95	19.43		
08/28/07 10:02:15	0.96	19.35		
08/28/07 10:02:30	1.10	19.22		
08/28/07 10:02:45	1.13	19.26		
08/28/07 10:03:00	1.07	19.28		
08/28/07 10:03:15	1.15	19.18		
08/28/07 10:03:30	1.23	19.12		
08/28/07 10:03:45	1.26	19.09		
08/28/07 10:04:00	1.29	19.06		
08/28/07 10:04:15	1.30	19.08		
08/28/07 10:04:30	1.26	19.12		
08/28/07 10:04:45	1.26	19.10		
08/28/07 10:05:00	1.25	19.12		
08/28/07 10:05:15	1.27	19.06		
08/28/07 10:05:30	1.34	19.03		
08/28/07 10:05:45	1.29	19.10		
08/28/07 10:06:00	1.18	19.18		
08/28/07 10:06:15	1.11	19.24		
08/28/07 10:06:30	1.07	19.26		
08/28/07 10:06:45	1.08	19.25		
08/28/07 10:07:00	1.11	19.21		
08/28/07 10:07:15	1.15	19.18		
08/28/07 10:07:30	1.17	19.17		
08/28/07 10:07:45	1.17	19.17		
08/28/07 10:08:00	1.16	19.18		
08/28/07 10:08:15	1.12	19.21		
08/28/07 10:08:30	1.13	19.17		
08/28/07 10:08:45	1.18	19.12		
08/28/07 10:09:00	1.19	19.11		
08/28/07 10:09:15	1.22	19.08		
08/28/07 10:09:30	1.23	19.08		

	Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS	
08/28/07 10:09:45	1.22	19.08		
08/28/07 10:10:00	1.24	19.04		
08/28/07 10:10:15	1.25	19.04		
08/28/07 10:10:30	1.25	19.04		
08/28/07 10:10:45	1.26	19.05		
08/28/07 10:11:00	1.23	19.08		
08/28/07 10:11:15	1.20	19.10		
08/28/07 10:11:30	1.18	19.10		
08/28/07 10:11:45	1.22	19.05		
08/28/07 10:12:00	1.24	19.06		
08/28/07 10:12:15	1.20	19.12		
08/28/07 10:12:30	1.13	19.16		
08/28/07 10:12:45	1.11	19.17		
08/28/07 10:13:00	1.11	19.19		
08/28/07 10:13:15	1.08	19.22		
08/28/07 10:13:30	1.06	19.21		
08/28/07 10:13:45	1.10	19.14		
08/28/07 10:14:00	1.21	19.04		
08/28/07 10:14:15	1.25	19.07		
08/28/07 10:14:30	1.19	19.12		
08/28/07 10:14:45	1.16	19.12		
08/28/07 10:15:00	1.14	19.15		
08/28/07 10:15:15	1.14	19.13		
08/28/07 10:15:30	1.15	19.14		
08/28/07 10:15:45	1.11	19.21		
08/28/07 10:16:00	1.02	19.27		
08/28/07 10:16:15	1.01	19.25		
08/28/07 10:16:30	1.03	19.24		
08/28/07 10:16:45	1.07	19.17		
08/28/07 10:17:00	1.18	19.07		
08/28/07 10:17:15	1.23	19.09		
08/28/07 10:17:30	1.16	19.15		
08/28/07 10:17:45	1.14	19.14		
08/28/07 10:18:00	1.16	19.13		
08/28/07 10:18:15	1.14	19.18		
08/28/07 10:18:30	1.11	19.19		
08/28/07 10:18:45	1.09	19.25		
08/28/07 10:19:00	0.98	19.33		
08/28/07 10:19:15	0.95	19.32		
08/28/07 10:19:30	1.02	19.22		
08/28/07 10:19:45	1.14	19.15		
08/28/07 10:20:00	1.15	19.18		
08/28/07 10:20:15	1.13	19.19		
08/28/07 10:20:30	1.10	19.21		
08/28/07 10:20:45	1.09	19.20		
08/28/07 10:21:00	1.13	19.14		
08/28/07 10:21:15	1.19	19.09		
08/28/07 10:21:30	1.21	19.10		
08/28/07 10:21:45	1.17	19.13		
08/28/07 10:22:00	1.16	19.14		
08/28/07 10:22:15	1.13	19.18		
08/28/07 10:22:30	1.08	19.22		
08/28/07 10:22:45	1.05	19.25		
08/28/07 10:23:00	1.02	19.29		
08/28/07 10:23:15	0.97	19.33		
08/28/07 10:23:30	1.00	19.27		
08/28/07 10:23:45	1.06	19.26		
08/28/07 10:24:00	1.05	19.26		
08/28/07 10:24:15	1.07	19.25		
08/28/07 10:24:30	1.04	19.27		
08/28/07 10:24:45	1.02	19.28		
08/28/07 10:25:00	1.05	19.26		
08/28/07 10:25:15	1.05	19.29		
08/28/07 10:25:30	0.96	19.38		
08/28/07 10:25:45	0.93	19.36		
08/28/07 10:26:00	0.96	19.34		
08/28/07 10:26:15	0.98	19.33		
08/28/07 10:26:30	1.01	19.30		
08/28/07 10:26:45	1.05	19.26		
08/28/07 10:27:00	1.07	19.27		
08/28/07 10:27:15	1.04	19.29		
08/28/07 10:27:30	1.06	19.25		
08/28/07 10:27:45	1.10	19.22		
08/28/07 10:28:00	1.08	19.27		
08/28/07 10:28:15	1.02	19.30		
08/28/07 10:28:30	1.01	19.29		
08/28/07 10:28:45	1.06	19.23		
08/28/07 10:29:00	1.11	19.22		
08/28/07 10:29:15	1.08	19.26		
08/28/07 10:29:30	1.09	19.22		

Range Units		10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS	
08/28/07 10:29:45	1.18	19.13		
08/28/07 10:30:00	1.21	19.14		
08/28/07 10:30:15	1.17	19.16		
08/28/07 10:30:30	1.18	19.15		
08/28/07 10:30:45	1.16	19.19	Begin Run M202-1 only	
08/28/07 10:31:00	1.12	19.22		
08/28/07 10:31:15	1.14	19.18		
08/28/07 10:31:30	1.22	19.11		
08/28/07 10:31:45	1.27	19.08		
08/28/07 10:32:00	1.28	19.05		
08/28/07 10:32:15	1.33	19.00		
08/28/07 10:32:30	1.38	18.98		
08/28/07 10:32:45	1.32	19.05		
08/28/07 10:33:00	1.26	19.08		
08/28/07 10:33:15	1.23	19.12		
08/28/07 10:33:30	1.18	19.15		
08/28/07 10:33:45	1.16	19.15		
08/28/07 10:34:00	1.17	19.13		
08/28/07 10:34:15	1.20	19.11		
08/28/07 10:34:30	1.18	19.16		
08/28/07 10:34:45	1.13	19.19		
08/28/07 10:35:00	1.14	19.15		
08/28/07 10:35:15	1.15	19.17		
08/28/07 10:35:30	1.09	19.22		
08/28/07 10:35:45	1.13	19.14		
08/28/07 10:36:00	1.21	19.11		
08/28/07 10:36:15	1.20	19.13		
08/28/07 10:36:30	1.20	19.11		
08/28/07 10:36:45	1.21	19.09		
08/28/07 10:37:00	1.23	19.07		
08/28/07 10:37:15	1.24	19.06		
08/28/07 10:37:30	1.25	19.07		
08/28/07 10:37:45	1.23	19.08		
08/28/07 10:38:00	1.23	19.08		
08/28/07 10:38:15	1.21	19.12		
08/28/07 10:38:30	1.18	19.13		
08/28/07 10:38:45	1.20	19.10		
08/28/07 10:39:00	1.24	19.08		
08/28/07 10:39:15	1.18	19.16		
08/28/07 10:39:30	1.13	19.16		
08/28/07 10:39:45	1.17	19.14		
08/28/07 10:40:00	1.15	19.15		
08/28/07 10:40:15	1.17	19.14		
08/28/07 10:40:30	1.15	19.17		
08/28/07 10:40:45	1.09	19.22		
08/28/07 10:41:00	1.07	19.21		
08/28/07 10:41:15	1.10	19.19		
08/28/07 10:41:30	1.08	19.23		
08/28/07 10:41:45	1.06	19.24		
08/28/07 10:42:00	1.08	19.23		
08/28/07 10:42:15	1.06	19.27		
08/28/07 10:42:30	1.03	19.28		
08/28/07 10:42:45	1.05	19.24		
08/28/07 10:43:00	1.13	19.16		
08/28/07 10:43:15	1.18	19.14		
08/28/07 10:43:30	1.14	19.20		
08/28/07 10:43:45	1.09	19.24		
08/28/07 10:44:00	1.07	19.26		
08/28/07 10:44:15	1.02	19.30		
08/28/07 10:44:30	1.00	19.30		
08/28/07 10:44:45	1.03	19.26		
08/28/07 10:45:00	1.07	19.23		
08/28/07 10:45:15	1.08	19.25		
08/28/07 10:45:30	1.06	19.25		
08/28/07 10:45:45	1.08	19.26		
08/28/07 10:46:00	1.06	19.24	Port Change	
08/28/07 10:46:15	1.10	19.21		
08/28/07 10:46:30	1.10	19.23		
08/28/07 10:46:45	1.10	19.23		
08/28/07 10:47:00	1.11	19.21		
08/28/07 10:47:15	1.15	19.17		
08/28/07 10:47:30	1.14	19.22		
08/28/07 10:47:45	1.09	19.24		
08/28/07 10:48:00	1.07	19.24		
08/28/07 10:48:15	1.09	19.24		
08/28/07 10:48:30	1.05	19.28		
08/28/07 10:48:45	1.04	19.27		
08/28/07 10:49:00	1.04	19.31		
08/28/07 10:49:15	1.01	19.31		
08/28/07 10:49:30	1.08	19.24		

Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS
08/28/07 10:49:45	1.09	19.28	
08/28/07 10:50:00	1.01	19.34	
08/28/07 10:50:15	1.01	19.32	
08/28/07 10:50:30	1.04	19.30	
08/28/07 10:50:45	1.04	19.30	Resume Sampling M202-1
08/28/07 10:51:00	1.09	19.24	
08/28/07 10:51:15	1.16	19.20	
08/28/07 10:51:30	1.18	19.20	
08/28/07 10:51:45	1.14	19.24	
08/28/07 10:52:00	1.10	19.26	
08/28/07 10:52:15	1.13	19.23	
08/28/07 10:52:30	1.17	19.19	
08/28/07 10:52:45	1.19	19.16	
08/28/07 10:53:00	1.24	19.10	
08/28/07 10:53:15	1.28	19.09	
08/28/07 10:53:30	1.22	19.18	
08/28/07 10:53:45	1.16	19.21	
08/28/07 10:54:00	1.18	19.16	
08/28/07 10:54:15	1.24	19.12	
08/28/07 10:54:30	1.25	19.13	
08/28/07 10:54:45	1.21	19.16	
08/28/07 10:55:00	1.17	19.18	
08/28/07 10:55:15	1.15	19.21	
08/28/07 10:55:30	1.12	19.23	
08/28/07 10:55:45	1.12	19.21	
08/28/07 10:56:00	1.16	19.17	
08/28/07 10:56:15	1.19	19.16	
08/28/07 10:56:30	1.18	19.18	
08/28/07 10:56:45	1.19	19.16	
08/28/07 10:57:00	1.23	19.12	
08/28/07 10:57:15	1.23	19.13	
08/28/07 10:57:30	1.20	19.15	
08/28/07 10:57:45	1.22	19.11	
08/28/07 10:58:00	1.28	19.08	
08/28/07 10:58:15	1.27	19.11	
08/28/07 10:58:30	1.17	19.19	
08/28/07 10:58:45	1.13	19.20	
08/28/07 10:59:00	1.16	19.15	
08/28/07 10:59:15	1.21	19.13	
08/28/07 10:59:30	1.21	19.11	
08/28/07 10:59:45	1.19	19.15	
08/28/07 11:00:00	1.12	19.21	
08/28/07 11:00:15	1.13	19.18	
08/28/07 11:00:30	1.18	19.15	
08/28/07 11:00:45	1.20	19.13	
08/28/07 11:01:00	1.21	19.14	
08/28/07 11:01:15	1.17	19.20	
08/28/07 11:01:30	1.09	19.24	
08/28/07 11:01:45	1.13	19.17	
08/28/07 11:02:00	1.15	19.19	
08/28/07 11:02:15	1.11	19.21	
08/28/07 11:02:30	1.15	19.16	
08/28/07 11:02:45	1.21	19.13	
08/28/07 11:03:00	1.17	19.19	
08/28/07 11:03:15	1.17	19.14	
08/28/07 11:03:30	1.24	19.10	
08/28/07 11:03:45	1.19	19.17	
08/28/07 11:04:00	1.13	19.21	
08/28/07 11:04:15	1.10	19.24	
08/28/07 11:04:30	1.06	19.28	
08/28/07 11:04:45	1.03	19.30	
08/28/07 11:05:00	1.00	19.34	
08/28/07 11:05:15	1.00	19.31	
08/28/07 11:05:30	1.12	19.20	
08/28/07 11:05:45	1.18	19.18	
08/28/07 11:06:00	1.14	19.21	
08/28/07 11:06:15	1.12	19.22	
08/28/07 11:06:30	1.11	19.23	
08/28/07 11:06:45	1.10	19.24	
08/28/07 11:07:00	1.11	19.21	Port Change
08/28/07 11:07:15	1.15	19.20	
08/28/07 11:07:30	1.13	19.21	
08/28/07 11:07:45	1.18	19.15	
08/28/07 11:08:00	1.22	19.15	
08/28/07 11:08:15	1.18	19.19	
08/28/07 11:08:30	1.18	19.19	
08/28/07 11:08:45	1.18	19.19	
08/28/07 11:09:00	1.19	19.19	
08/28/07 11:09:15	1.18	19.19	
08/28/07 11:09:30	1.24	19.11	

Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS
08/28/07 11:09:45	1.27	19.14	
08/28/07 11:10:00	1.22	19.19	
08/28/07 11:10:15	1.19	19.22	
08/28/07 11:10:30	1.16	19.24	
08/28/07 11:10:45	1.18	19.20	
08/28/07 11:11:00	1.24	19.16	
08/28/07 11:11:15	1.22	19.21	
08/28/07 11:11:30	1.18	19.22	
08/28/07 11:11:45	1.19	19.20	
08/28/07 11:12:00	1.16	19.26	
08/28/07 11:12:15	1.11	19.30	
08/28/07 11:12:30	1.13	19.26	
08/28/07 11:12:45	1.13	19.27	
08/28/07 11:13:00	1.16	19.22	
08/28/07 11:13:15	1.22	19.18	
08/28/07 11:13:30	1.20	19.22	
08/28/07 11:13:45	1.14	19.26	
08/28/07 11:14:00	1.13	19.26	
08/28/07 11:14:15	1.12	19.27	
08/28/07 11:14:30	1.17	19.20	
08/28/07 11:14:45	1.25	19.15	
08/28/07 11:15:00	1.25	19.15	
08/28/07 11:15:15	1.23	19.17	
08/28/07 11:15:30	1.24	19.17	
08/28/07 11:15:45	1.15	19.28	
08/28/07 11:16:00	1.09	19.28	
08/28/07 11:16:15	1.13	19.26	
08/28/07 11:16:30	1.14	19.25	
08/28/07 11:16:45	1.19	19.18	
08/28/07 11:17:00	1.24	19.16	
08/28/07 11:17:15	1.21	19.19	
08/28/07 11:17:30	1.19	19.17	
08/28/07 11:17:45	1.25	19.14	
08/28/07 11:18:00	1.23	19.17	
08/28/07 11:18:15	1.18	19.20	
08/28/07 11:18:30	1.14	19.23	
08/28/07 11:18:45	1.11	19.27	
08/28/07 11:19:00	1.06	19.31	
08/28/07 11:19:15	1.06	19.28	
08/28/07 11:19:30	1.10	19.24	
08/28/07 11:19:45	1.13	19.20	
08/28/07 11:20:00	1.15	19.21	
08/28/07 11:20:15	1.11	19.25	
08/28/07 11:20:30	1.12	19.23	
08/28/07 11:20:45	1.08	19.29	
08/28/07 11:21:00	1.05	19.27	
08/28/07 11:21:15	1.12	19.22	
08/28/07 11:21:30	1.11	19.24	
08/28/07 11:21:45	1.11	19.21	
08/28/07 11:22:00	1.15	19.18	
08/28/07 11:22:15	1.13	19.22	
08/28/07 11:22:30	1.08	19.26	
08/28/07 11:22:45	1.11	19.21	
08/28/07 11:23:00	1.13	19.19	
08/28/07 11:23:15	1.17	19.16	
08/28/07 11:23:30	1.17	19.17	
08/28/07 11:23:45	1.15	19.19	
08/28/07 11:24:00	1.10	19.24	
08/28/07 11:24:15	1.09	19.22	
08/28/07 11:24:30	1.10	19.21	
08/28/07 11:24:45	1.09	19.22	
08/28/07 11:25:00	1.07	19.24	
08/28/07 11:25:15	1.04	19.27	
08/28/07 11:25:30	1.02	19.28	
08/28/07 11:25:45	1.03	19.28	
08/28/07 11:26:00	1.05	19.27	
08/28/07 11:26:15	1.07	19.27	
08/28/07 11:26:30	1.00	19.35	
08/28/07 11:26:45	0.97	19.31	
08/28/07 11:27:00	1.09	19.21	
08/28/07 11:27:15	1.15	19.19	
08/28/07 11:27:30	1.12	19.23	
08/28/07 11:27:45	1.10	19.25	
08/28/07 11:28:00	1.12	19.21	
08/28/07 11:28:15	1.16	19.21	
08/28/07 11:28:30	1.13	19.27	
08/28/07 11:28:45	1.07	19.31	Resume Sampling: M202-1 only
08/28/07 11:29:00	1.08	19.29	
08/28/07 11:29:15	1.13	19.26	
08/28/07 11:29:30	1.16	19.24	

Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS
08/28/07 11:29:45	1.19	19.21	
08/28/07 11:30:00	1.18	19.24	
08/28/07 11:30:15	1.12	19.28	
08/28/07 11:30:30	1.15	19.22	
08/28/07 11:30:45	1.25	19.13	
08/28/07 11:31:00	1.32	19.10	
08/28/07 11:31:15	1.31	19.13	
08/28/07 11:31:30	1.27	19.15	
08/28/07 11:31:45	1.25	19.16	
08/28/07 11:32:00	1.23	19.18	
08/28/07 11:32:15	1.18	19.23	
08/28/07 11:32:30	1.14	19.27	
08/28/07 11:32:45	1.12	19.27	
08/28/07 11:33:00	1.19	19.19	
08/28/07 11:33:15	1.22	19.19	
08/28/07 11:33:30	1.21	19.18	
08/28/07 11:33:45	1.23	19.17	
08/28/07 11:34:00	1.21	19.20	
08/28/07 11:34:15	1.22	19.17	
08/28/07 11:34:30	1.24	19.14	
08/28/07 11:34:45	1.27	19.13	
08/28/07 11:35:00	1.24	19.16	
08/28/07 11:35:15	1.22	19.17	
08/28/07 11:35:30	1.19	19.18	
08/28/07 11:35:45	1.23	19.12	
08/28/07 11:36:00	1.23	19.15	
08/28/07 11:36:15	1.24	19.11	
08/28/07 11:36:30	1.31	19.06	
08/28/07 11:36:45	1.33	19.06	
08/28/07 11:37:00	1.29	19.07	
08/28/07 11:37:15	1.32	19.03	
08/28/07 11:37:30	1.33	19.07	
08/28/07 11:37:45	1.23	19.14	
08/28/07 11:38:00	1.22	19.10	
08/28/07 11:38:15	1.29	19.02	
08/28/07 11:38:30	1.32	19.02	
08/28/07 11:38:45	1.26	19.10	
08/28/07 11:39:00	1.24	19.09	
08/28/07 11:39:15	1.28	19.07	
08/28/07 11:39:30	1.24	19.11	
08/28/07 11:39:45	1.23	19.13	
08/28/07 11:40:00	1.20	19.17	
08/28/07 11:40:15	1.18	19.16	
08/28/07 11:40:30	1.20	19.16	
08/28/07 11:40:45	1.18	19.18	
08/28/07 11:41:00	1.15	19.22	
08/28/07 11:41:15	1.12	19.25	
08/28/07 11:41:30	1.13	19.22	
08/28/07 11:41:45	1.15	19.22	
08/28/07 11:42:00	1.08	19.29	
08/28/07 11:42:15	1.04	19.30	
08/28/07 11:42:30	1.06	19.29	
08/28/07 11:42:45	1.05	19.31	
08/28/07 11:43:00	1.02	19.35	
08/28/07 11:43:15	1.00	19.35	
08/28/07 11:43:30	1.06	19.29	
08/28/07 11:43:45	1.09	19.27	
08/28/07 11:44:00	1.10	19.27	
08/28/07 11:44:15	1.09	19.26	
08/28/07 11:44:30	1.12	19.24	
08/28/07 11:44:45	1.13	19.23	
08/28/07 11:45:00	1.13	19.23	Port Change
08/28/07 11:45:15	1.14	19.22	
08/28/07 11:45:30	1.16	19.21	
08/28/07 11:45:45	1.12	19.26	
08/28/07 11:46:00	1.10	19.26	
08/28/07 11:46:15	1.12	19.23	
08/28/07 11:46:30	1.15	19.21	
08/28/07 11:46:45	1.13	19.24	
08/28/07 11:47:00	1.13	19.22	
08/28/07 11:47:15	1.16	19.20	
08/28/07 11:47:30	1.10	19.27	
08/28/07 11:47:45	1.04	19.31	
08/28/07 11:48:00	1.03	19.31	
08/28/07 11:48:15	1.05	19.29	
08/28/07 11:48:30	1.10	19.23	
08/28/07 11:48:45	1.14	19.19	
08/28/07 11:49:00	1.15	19.20	
08/28/07 11:49:15	1.11	19.24	
08/28/07 11:49:30	1.09	19.26	

	Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS	
08/28/07 11:49:45	1.07	19.28		
08/28/07 11:50:00	1.05	19.28		
08/28/07 11:50:15	1.07	19.26		
08/28/07 11:50:30	1.11	19.23		
08/28/07 11:50:45	1.13	19.21		
08/28/07 11:51:00	1.17	19.14		
08/28/07 11:51:15	1.23	19.09		
08/28/07 11:51:30	1.26	19.08		
08/28/07 11:51:45	1.22	19.15	Resume Sampling: M202-1 only	
08/28/07 11:52:00	1.14	19.20		
08/28/07 11:52:15	1.10	19.23		
08/28/07 11:52:30	1.07	19.24		
08/28/07 11:52:45	1.10	19.20		
08/28/07 11:53:00	1.12	19.19		
08/28/07 11:53:15	1.10	19.24		
08/28/07 11:53:30	1.02	19.30		
08/28/07 11:53:45	1.02	19.28		
08/28/07 11:54:00	1.03	19.30		
08/28/07 11:54:15	1.00	19.28		
08/28/07 11:54:30	1.09	19.19		
08/28/07 11:54:45	1.14	19.18		
08/28/07 11:55:00	1.11	19.22		
08/28/07 11:55:15	1.05	19.30		
08/28/07 11:55:30	0.98	19.34		
08/28/07 11:55:45	1.06	19.23		
08/28/07 11:56:00	1.13	19.21		
08/28/07 11:56:15	1.10	19.23		
08/28/07 11:56:30	1.11	19.21		
08/28/07 11:56:45	1.13	19.21		
08/28/07 11:57:00	1.13	19.17		
08/28/07 11:57:15	1.21	19.10		
08/28/07 11:57:30	1.22	19.14		
08/28/07 11:57:45	1.14	19.21		
08/28/07 11:58:00	1.10	19.22		
08/28/07 11:58:15	1.12	19.20		
08/28/07 11:58:30	1.13	19.19		
08/28/07 11:58:45	1.14	19.18		
08/28/07 11:59:00	1.15	19.17		
08/28/07 11:59:15	1.16	19.19		
08/28/07 11:59:30	1.10	19.24		
08/28/07 11:59:45	1.08	19.24		
08/28/07 12:00:00	1.09	19.23		
08/28/07 12:00:15	1.10	19.22		
08/28/07 12:00:30	1.08	19.25		
08/28/07 12:00:45	1.03	19.28		
08/28/07 12:01:00	1.00	19.30		
08/28/07 12:01:15	1.01	19.29		
08/28/07 12:01:30	1.04	19.25		
08/28/07 12:01:45	1.04	19.27		
08/28/07 12:02:00	1.04	19.24		
08/28/07 12:02:15	1.10	19.20		
08/28/07 12:02:30	1.13	19.17		
08/28/07 12:02:45	1.14	19.18		
08/28/07 12:03:00	1.07	19.26		
08/28/07 12:03:15	0.99	19.30		
08/28/07 12:03:30	1.05	19.21		
08/28/07 12:03:45	1.13	19.17		
08/28/07 12:04:00	1.09	19.25		
08/28/07 12:04:15	1.02	19.30		
08/28/07 12:04:30	1.03	19.26		
08/28/07 12:04:45	1.11	19.19		
08/28/07 12:05:00	1.12	19.23		
08/28/07 12:05:15	1.10	19.20		
08/28/07 12:05:30	1.17	19.12		
08/28/07 12:05:45	1.23	19.07		
08/28/07 12:06:00	1.25	19.07		
08/28/07 12:06:15	1.21	19.12		
08/28/07 12:06:30	1.15	19.15		
08/28/07 12:06:45	1.20	19.09		
08/28/07 12:07:00	1.26	19.04		
08/28/07 12:07:15	1.27	19.04		
08/28/07 12:07:30	1.22	19.09		
08/28/07 12:07:45	1.18	19.14	End M202-1	
08/28/07 12:08:00	1.18	19.10		
08/28/07 12:08:15	1.27	19.02		
08/28/07 12:08:30	1.25	19.07		
08/28/07 12:08:45	1.20	19.10		
08/28/07 12:09:00	1.18	19.12		
08/28/07 12:09:15	1.16	19.15		
08/28/07 12:09:30	1.14	19.17		

Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS
08/28/07 12:09:45	1.14	19.17	
08/28/07 12:10:00	1.14	19.17	
08/28/07 12:10:15	1.15	19.15	
08/28/07 12:10:30	1.15	19.15	
08/28/07 12:10:45	1.16	19.13	
08/28/07 12:11:00	1.18	19.13	
08/28/07 12:11:15	1.19	19.11	
08/28/07 12:11:30	1.24	19.06	
08/28/07 12:11:45	1.26	19.05	
08/28/07 12:12:00	1.22	19.10	
08/28/07 12:12:15	1.16	19.15	
08/28/07 12:12:30	1.14	19.17	
08/28/07 12:12:45	1.10	19.23	
08/28/07 12:13:00	1.06	19.26	
08/28/07 12:13:15	1.08	19.23	
08/28/07 12:13:30	1.13	19.18	
08/28/07 12:13:45	1.74	17.20	
08/28/07 12:14:00	8.22	8.88	
08/28/07 12:14:15	12.39	3.33	
08/28/07 12:14:30	6.32	1.08	
08/28/07 12:14:45	1.24	0.47	
08/28/07 12:15:00	0.22	0.37	
08/28/07 12:15:15	0.12	0.33	
08/28/07 12:15:30	0.09	0.29	
08/28/07 12:15:45	0.08	0.27	
08/28/07 12:16:00	0.07	0.25	
08/28/07 12:16:15	0.07	0.24	
08/28/07 12:16:30	0.07	0.23	
08/28/07 12:16:45	0.07	0.22	
08/28/07 12:17:00	0.07	0.21	
08/28/07 12:17:15	0.06	0.20	
08/28/07 12:17:30	0.06	0.19	
08/28/07 12:17:45	0.05	0.18	
08/28/07 12:18:00	0.05	0.17	
08/28/07 12:18:15	0.05	0.17	
08/28/07 12:18:30	0.05	0.16	
08/28/07 12:18:45	0.05	0.16	
08/28/07 12:19:00	0.05	0.16	
08/28/07 12:19:15	0.05	0.16	
08/28/07 12:19:30	0.05	0.15	Post-Test Bias and Drift Check:
08/28/07 12:19:45	0.05	0.14	Zero nitrogen injection:
08/28/07 12:20:00	0.05	0.14	0.05 % db Oxygen
08/28/07 12:20:15	0.05	0.14	0.14 % db CO2
08/28/07 12:20:30	0.05	0.14	
08/28/07 12:20:45	0.04	0.13	
08/28/07 12:21:00	0.04	0.13	
08/28/07 12:21:15	0.05	0.13	
08/28/07 12:21:30	0.04	0.36	
08/28/07 12:21:45	0.15	3.85	
08/28/07 12:22:00	0.25	3.70	
08/28/07 12:22:15	1.78	3.97	
08/28/07 12:22:30	6.37	7.14	
08/28/07 12:22:45	9.04	8.86	
08/28/07 12:23:00	9.75	9.05	
08/28/07 12:23:15	9.83	8.95	
08/28/07 12:23:30	9.84	8.91	
08/28/07 12:23:45	9.85	8.93	
08/28/07 12:24:00	9.86	8.99	
08/28/07 12:24:15	9.87	9.05	
08/28/07 12:24:30	9.88	9.15	
08/28/07 12:24:45	9.90	9.34	
08/28/07 12:25:00	9.91	9.53	
08/28/07 12:25:15	9.93	9.66	
08/28/07 12:25:30	9.93	9.74	
08/28/07 12:25:45	9.94	9.80	
08/28/07 12:26:00	9.95	9.83	
08/28/07 12:26:15	9.95	9.86	
08/28/07 12:26:30	9.95	9.87	Post-Test Bias and Drift Check:
08/28/07 12:26:45	9.95	9.88	10% Oxygen/CO2 injection:
08/28/07 12:27:00	9.95	9.88	9.95 % db Oxygen
08/28/07 12:27:15	9.95	9.89	9.89 % db CO2
08/28/07 12:27:30	9.95	9.89	
08/28/07 12:27:45	9.96	9.90	
08/28/07 12:28:00	9.96	9.90	
08/28/07 12:28:15	9.96	9.90	
08/28/07 12:28:30	9.96	9.91	
08/28/07 12:28:45	9.96	9.91	
08/28/07 12:29:00	9.96	9.91	
08/28/07 12:29:15	9.96	9.91	

	Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS	
08/28/07 12:29:30	9.96	9.91		
08/28/07 12:29:45	9.96	9.91		
08/28/07 12:30:00	9.96	9.92		
08/28/07 12:30:15	9.97	9.92		
08/28/07 12:30:30	9.96	9.92		
08/28/07 12:30:45	9.96	9.93		
08/28/07 12:31:00	9.97	9.93		
08/28/07 12:31:15	9.96	9.93		
08/28/07 12:31:30	9.97	9.93		
08/28/07 12:31:45	9.96	9.93		
08/28/07 12:32:00	9.97	9.93		
08/28/07 12:32:15	9.97	9.93		
08/28/07 12:32:30	9.97	9.93		
08/28/07 12:32:45	9.97	9.93		
08/28/07 12:33:00	9.97	9.93		
08/28/07 12:33:15	9.97	9.93		
08/28/07 12:33:30	9.97	9.92		
08/28/07 12:33:45	9.97	9.93		
08/28/07 12:34:00	9.97	9.95		
08/28/07 12:34:15	9.05	12.37		
08/28/07 12:34:30	5.14	16.61		
08/28/07 12:34:45	2.19	18.57		
08/28/07 12:35:00	1.36	18.95		
08/28/07 12:35:15	1.24	19.02		
08/28/07 12:35:30	1.19	19.09		
08/28/07 12:35:45	1.11	19.17		
08/28/07 12:36:00	1.06	19.22		
08/28/07 12:36:15	1.04	19.21		
08/28/07 12:36:30	1.11	19.15		
08/28/07 12:36:45	1.09	19.20		
08/28/07 12:37:00	1.09	19.17		
08/28/07 12:37:15	1.16	19.10		
08/28/07 12:37:30	1.24	19.02		
08/28/07 12:37:45	1.33	18.95		
08/28/07 12:38:00	1.29	19.03		
08/28/07 12:38:15	1.18	19.13		
08/28/07 12:38:30	1.12	19.17		
08/28/07 12:38:45	1.14	19.14		
08/28/07 12:39:00	1.15	19.17		
08/28/07 12:39:15	1.10	19.19		
08/28/07 12:39:30	1.13	19.14		
08/28/07 12:39:45	1.19	19.11		
08/28/07 12:40:00	1.19	19.12		
08/28/07 12:40:15	1.14	19.18		
08/28/07 12:40:30	1.04	19.30		
08/28/07 12:40:45	0.93	19.40		
08/28/07 12:41:00	0.91	19.39		
08/28/07 12:41:15	0.95	19.33		
08/28/07 12:41:30	1.01	19.28		
08/28/07 12:41:45	1.00	19.32		
08/28/07 12:42:00	0.96	19.35		
08/28/07 12:42:15	0.97	19.33		
08/28/07 12:42:30	0.98	19.33		
08/28/07 12:42:45	0.97	19.36		
08/28/07 12:43:00	0.94	19.37		
08/28/07 12:43:15	0.96	19.33		
08/28/07 12:43:30	1.01	19.30		
08/28/07 12:43:45	1.01	19.32		
08/28/07 12:44:00	0.97	19.34		
08/28/07 12:44:15	1.00	19.28		
08/28/07 12:44:30	1.07	19.25		
08/28/07 12:44:45	1.05	19.28		
08/28/07 12:45:00	1.06	19.27		
08/28/07 12:45:15	1.07	19.28		
08/28/07 12:45:30	1.06	19.29		
08/28/07 12:45:45	1.07	19.30		
08/28/07 12:46:00	1.06	19.31		
08/28/07 12:46:15	1.06	19.31		
08/28/07 12:46:30	1.06	19.29		
08/28/07 12:46:45	1.13	19.19		
08/28/07 12:47:00	1.19	19.19		
08/28/07 12:47:15	1.16	19.22		
08/28/07 12:47:30	1.15	19.22		
08/28/07 12:47:45	1.14	19.24		
08/28/07 12:48:00	1.14	19.23		
08/28/07 12:48:15	1.18	19.22		
08/28/07 12:48:30	1.18	19.24		
08/28/07 12:48:45	1.16	19.25		
08/28/07 12:49:00	1.19	19.21		
08/28/07 12:49:15	1.21	19.21		

Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS
08/28/07 12:49:30	1.20	19.22	
08/28/07 12:49:45	1.15	19.29	
08/28/07 12:50:00	1.06	19.35	
08/28/07 12:50:15	1.06	19.32	
08/28/07 12:50:30	1.11	19.27	
08/28/07 12:50:45	1.12	19.25	
08/28/07 12:51:00	1.16	19.22	
08/28/07 12:51:15	1.19	19.20	
08/28/07 12:51:30	1.22	19.17	
08/28/07 12:51:45	1.24	19.15	
08/28/07 12:52:00	1.21	19.17	
08/28/07 12:52:15	1.23	19.14	
08/28/07 12:52:30	1.24	19.15	
08/28/07 12:52:45	1.20	19.20	
08/28/07 12:53:00	1.13	19.25	
08/28/07 12:53:15	1.11	19.22	
08/28/07 12:53:30	1.16	19.17	
08/28/07 12:53:45	1.15	19.23	
08/28/07 12:54:00	1.07	19.27	
08/28/07 12:54:15	1.05	19.28	
08/28/07 12:54:30	1.02	19.31	
08/28/07 12:54:45	1.01	19.29	
08/28/07 12:55:00	1.03	19.27	
08/28/07 12:55:15	1.07	19.23	
08/28/07 12:55:30	1.12	19.20	
08/28/07 12:55:45	1.11	19.23	
08/28/07 12:56:00	1.05	19.29	
08/28/07 12:56:15	1.02	19.28	
08/28/07 12:56:30	1.04	19.25	
08/28/07 12:56:45	1.10	19.19	
08/28/07 12:57:00	1.17	19.15	
08/28/07 12:57:15	1.15	19.19	
08/28/07 12:57:30	1.13	19.18	
08/28/07 12:57:45	1.16	19.16	
08/28/07 12:58:00	1.13	19.21	
08/28/07 12:58:15	1.09	19.26	
08/28/07 12:58:30	1.04	19.29	
08/28/07 12:58:45	1.08	19.22	
08/28/07 12:59:00	1.13	19.19	
08/28/07 12:59:15	1.12	19.24	
08/28/07 12:59:30	1.07	19.26	
08/28/07 12:59:45	1.09	19.23	
08/28/07 13:00:00	1.10	19.24	
08/28/07 13:00:15	1.10	19.23	
08/28/07 13:00:30	1.07	19.30	
08/28/07 13:00:45	1.00	19.32	
08/28/07 13:01:00	1.06	19.26	
08/28/07 13:01:15	1.06	19.29	
08/28/07 13:01:30	1.03	19.31	
08/28/07 13:01:45	1.06	19.26	
08/28/07 13:02:00	1.15	19.18	
08/28/07 13:02:15	1.17	19.19	
08/28/07 13:02:30	1.17	19.18	
08/28/07 13:02:45	1.15	19.22	
08/28/07 13:03:00	1.08	19.28	
08/28/07 13:03:15	1.05	19.29	
08/28/07 13:03:30	1.06	19.29	
08/28/07 13:03:45	1.06	19.28	
08/28/07 13:04:00	1.03	19.33	
08/28/07 13:04:15	1.00	19.35	
08/28/07 13:04:30	1.01	19.32	
08/28/07 13:04:45	1.05	19.29	
08/28/07 13:05:00	1.07	19.27	
08/28/07 13:05:15	1.10	19.26	
08/28/07 13:05:30	1.12	19.23	
08/28/07 13:05:45	1.18	19.17	
08/28/07 13:06:00	1.22	19.16	
08/28/07 13:06:15	1.16	19.23	
08/28/07 13:06:30	1.14	19.19	
08/28/07 13:06:45	1.23	19.15	
08/28/07 13:07:00	1.19	19.20	
08/28/07 13:07:15	1.17	19.21	
08/28/07 13:07:30	1.20	19.16	
08/28/07 13:07:45	1.24	19.13	
08/28/07 13:08:00	1.22	19.17	
08/28/07 13:08:15	1.17	19.20	
08/28/07 13:08:30	1.15	19.25	
08/28/07 13:08:45	1.10	19.27	
08/28/07 13:09:00	1.10	19.26	
08/28/07 13:09:15	1.11	19.26	

Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS
08/28/07 13:09:30	1.11	19.26	
08/28/07 13:09:45	1.12	19.25	
08/28/07 13:10:00	1.10	19.29	
08/28/07 13:10:15	1.06	19.32	
08/28/07 13:10:30	1.09	19.28	
08/28/07 13:10:45	1.10	19.28	
08/28/07 13:11:00	1.07	19.29	
08/28/07 13:11:15	1.09	19.24	
08/28/07 13:11:30	1.23	19.09	
08/28/07 13:11:45	1.36	19.04	
08/28/07 13:12:00	1.30	19.13	
08/28/07 13:12:15	1.23	19.15	
08/28/07 13:12:30	1.25	19.11	
08/28/07 13:12:45	1.28	19.08	
08/28/07 13:13:00	1.29	19.08	
08/28/07 13:13:15	1.28	19.09	
08/28/07 13:13:30	1.30	19.05	
08/28/07 13:13:45	1.33	19.04	
08/28/07 13:14:00	1.31	19.10	
08/28/07 13:14:15	1.25	19.14	
08/28/07 13:14:30	1.24	19.14	
08/28/07 13:14:45	1.22	19.16	
08/28/07 13:15:00	1.20	19.16	
08/28/07 13:15:15	1.21	19.16	
08/28/07 13:15:30	1.17	19.19	
08/28/07 13:15:45	1.13	19.22	
08/28/07 13:16:00	1.14	19.19	
08/28/07 13:16:15	1.17	19.18	
08/28/07 13:16:30	1.14	19.23	
08/28/07 13:16:45	1.13	19.22	
08/28/07 13:17:00	1.10	19.26	
08/28/07 13:17:15	1.08	19.24	
08/28/07 13:17:30	1.12	19.20	
08/28/07 13:17:45	1.14	19.17	
08/28/07 13:18:00	1.17	19.14	
08/28/07 13:18:15	1.17	19.13	
08/28/07 13:18:30	1.16	19.16	
08/28/07 13:18:45	1.07	19.24	
08/28/07 13:19:00	1.02	19.25	
08/28/07 13:19:15	1.05	19.21	
08/28/07 13:19:30	1.08	19.19	
08/28/07 13:19:45	1.09	19.19	
08/28/07 13:20:00	1.02	19.27	
08/28/07 13:20:15	0.99	19.25	
08/28/07 13:20:30	1.06	19.20	
08/28/07 13:20:45	1.01	19.29	
08/28/07 13:21:00	0.93	19.33	
08/28/07 13:21:15	0.94	19.33	
08/28/07 13:21:30	0.95	19.30	
08/28/07 13:21:45	0.97	19.29	
08/28/07 13:22:00	0.97	19.30	
08/28/07 13:22:15	0.99	19.28	
08/28/07 13:22:30	1.03	19.22	
08/28/07 13:22:45	1.09	19.19	
08/28/07 13:23:00	1.08	19.22	
08/28/07 13:23:15	1.01	19.29	
08/28/07 13:23:30	0.95	19.35	
08/28/07 13:23:45	0.88	19.40	
08/28/07 13:24:00	0.91	19.34	
08/28/07 13:24:15	1.00	19.27	
08/28/07 13:24:30	1.04	19.26	
08/28/07 13:24:45	1.03	19.27	
08/28/07 13:25:00	0.99	19.30	
08/28/07 13:25:15	0.94	19.35	
08/28/07 13:25:30	0.91	19.37	
08/28/07 13:25:45	0.96	19.32	
08/28/07 13:26:00	0.98	19.32	
08/28/07 13:26:15	0.92	19.38	
08/28/07 13:26:30	0.87	19.40	
08/28/07 13:26:45	0.88	19.38	
08/28/07 13:27:00	0.96	19.31	
08/28/07 13:27:15	1.02	19.29	
08/28/07 13:27:30	0.99	19.30	
08/28/07 13:27:45	0.99	19.28	
08/28/07 13:28:00	1.02	19.26	
08/28/07 13:28:15	1.03	19.25	
08/28/07 13:28:30	1.07	19.20	
08/28/07 13:28:45	1.15	19.14	
08/28/07 13:29:00	1.19	19.12	
08/28/07 13:29:15	1.18	19.13	

Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS
08/28/07 13:29:30	1.13	19.17	
08/28/07 13:29:45	1.11	19.19	
08/28/07 13:30:00	1.11	19.18	
08/28/07 13:30:15	1.14	19.15	
08/28/07 13:30:30	1.11	19.21	
08/28/07 13:30:45	1.04	19.23	
08/28/07 13:31:00	1.13	19.12	
08/28/07 13:31:15	1.49	18.10	
08/28/07 13:31:30	3.96	15.84	
08/28/07 13:31:45	3.47	17.83	
08/28/07 13:32:00	1.67	18.97	
08/28/07 13:32:15	1.17	19.17	
08/28/07 13:32:30	1.09	19.20	
08/28/07 13:32:45	1.09	19.20	
08/28/07 13:33:00	1.09	19.20	
08/28/07 13:33:15	1.12	19.16	
08/28/07 13:33:30	1.13	19.16	
08/28/07 13:33:45	1.09	19.20	
08/28/07 13:34:00	1.08	19.19	
08/28/07 13:34:15	1.09	19.19	
08/28/07 13:34:30	1.12	19.17	
08/28/07 13:34:45	1.14	19.16	
08/28/07 13:35:00	1.10	19.20	
08/28/07 13:35:15	1.10	19.19	
08/28/07 13:35:30	1.11	19.21	
08/28/07 13:35:45	1.05	19.26	
08/28/07 13:36:00	1.03	19.25	
08/28/07 13:36:15	1.07	19.23	
08/28/07 13:36:30	1.08	19.21	
08/28/07 13:36:45	1.09	19.22	
08/28/07 13:37:00	1.04	19.26	
08/28/07 13:37:15	1.05	19.24	
08/28/07 13:37:30	1.05	19.25	
08/28/07 13:37:45	1.05	19.23	
08/28/07 13:38:00	1.08	19.22	
08/28/07 13:38:15	1.07	19.25	
08/28/07 13:38:30	1.06	19.23	
08/28/07 13:38:45	1.10	19.18	
08/28/07 13:39:00	1.11	19.21	
08/28/07 13:39:15	1.03	19.28	
08/28/07 13:39:30	1.04	19.23	
08/28/07 13:39:45	1.09	19.19	
08/28/07 13:40:00	1.13	19.14	
08/28/07 13:40:15	1.16	19.13	
08/28/07 13:40:30	1.17	19.11	
08/28/07 13:40:45	1.19	19.12	
08/28/07 13:41:00	1.10	19.21	
08/28/07 13:41:15	1.03	19.26	
08/28/07 13:41:30	1.03	19.22	
08/28/07 13:41:45	1.09	19.18	
08/28/07 13:42:00	1.10	19.18	
08/28/07 13:42:15	1.11	19.18	
08/28/07 13:42:30	1.07	19.24	
08/28/07 13:42:45	1.02	19.32	
08/28/07 13:43:00	0.99	19.32	
08/28/07 13:43:15	1.02	19.28	
08/28/07 13:43:30	1.04	19.24	
08/28/07 13:43:45	1.09	19.20	
08/28/07 13:44:00	1.06	19.24	
08/28/07 13:44:15	1.05	19.23	
08/28/07 13:44:30	1.05	19.24	
08/28/07 13:44:45	1.06	19.19	
08/28/07 13:45:00	1.13	19.15	
08/28/07 13:45:15	1.11	19.19	
08/28/07 13:45:30	1.03	19.27	
08/28/07 13:45:45	0.99	19.28	
08/28/07 13:46:00	1.05	19.22	
08/28/07 13:46:15	1.08	19.20	
08/28/07 13:46:30	1.09	19.20	
08/28/07 13:46:45	1.14	19.14	
08/28/07 13:47:00	1.20	19.08	
08/28/07 13:47:15	1.23	19.07	
08/28/07 13:47:30	1.25	19.04	
08/28/07 13:47:45	1.31	18.98	
08/28/07 13:48:00	1.33	19.00	
08/28/07 13:48:15	1.28	19.04	
08/28/07 13:48:30	1.25	19.07	
08/28/07 13:48:45	1.25	19.05	
08/28/07 13:49:00	1.31	18.99	
08/28/07 13:49:15	1.31	19.02	

Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS
08/28/07 13:49:30	1.24	19.08	
08/28/07 13:49:45	1.21	19.08	
08/28/07 13:50:00	1.28	19.02	
08/28/07 13:50:15	1.37	18.93	
08/28/07 13:50:30	1.47	18.84	
08/28/07 13:50:45	1.53	18.82	
08/28/07 13:51:00	1.51	18.86	
08/28/07 13:51:15	1.43	18.96	
08/28/07 13:51:30	1.35	19.00	
08/28/07 13:51:45	1.37	18.96	
08/28/07 13:52:00	1.40	18.93	
08/28/07 13:52:15	1.43	18.92	
08/28/07 13:52:30	1.40	18.95	
08/28/07 13:52:45	1.39	18.95	
08/28/07 13:53:00	1.40	18.95	
08/28/07 13:53:15	1.40	18.92	
08/28/07 13:53:30	1.41	18.93	
08/28/07 13:53:45	1.40	18.95	Begin M202-2/M5B-1
08/28/07 13:54:00	1.39	18.95	
08/28/07 13:54:15	1.39	18.97	
08/28/07 13:54:30	1.38	18.98	
08/28/07 13:54:45	1.40	18.98	
08/28/07 13:55:00	1.37	19.02	
08/28/07 13:55:15	1.34	19.03	
08/28/07 13:55:30	1.30	19.06	
08/28/07 13:55:45	1.28	19.07	
08/28/07 13:56:00	1.29	19.06	
08/28/07 13:56:15	1.34	19.01	
08/28/07 13:56:30	1.35	19.03	
08/28/07 13:56:45	1.27	19.10	
08/28/07 13:57:00	1.27	19.08	
08/28/07 13:57:15	1.32	19.03	
08/28/07 13:57:30	1.36	19.01	
08/28/07 13:57:45	1.34	19.04	
08/28/07 13:58:00	1.33	19.01	
08/28/07 13:58:15	1.37	18.99	
08/28/07 13:58:30	1.33	19.04	
08/28/07 13:58:45	1.31	19.03	
08/28/07 13:59:00	1.38	18.94	
08/28/07 13:59:15	1.42	18.94	
08/28/07 13:59:30	1.36	19.00	
08/28/07 13:59:45	1.31	19.03	
08/28/07 14:00:00	1.30	19.04	
08/28/07 14:00:15	1.29	19.04	
08/28/07 14:00:30	1.27	19.06	
08/28/07 14:00:45	1.27	19.06	
08/28/07 14:01:00	1.26	19.09	
08/28/07 14:01:15	1.21	19.14	
08/28/07 14:01:30	1.18	19.14	
08/28/07 14:01:45	1.18	19.14	
08/28/07 14:02:00	1.13	19.21	
08/28/07 14:02:15	1.04	19.28	
08/28/07 14:02:30	1.02	19.28	
08/28/07 14:02:45	1.07	19.22	
08/28/07 14:03:00	1.10	19.19	
08/28/07 14:03:15	1.10	19.20	
08/28/07 14:03:30	1.08	19.22	
08/28/07 14:03:45	1.08	19.21	
08/28/07 14:04:00	1.11	19.19	
08/28/07 14:04:15	1.11	19.20	
08/28/07 14:04:30	1.10	19.22	
08/28/07 14:04:45	1.04	19.27	
08/28/07 14:05:00	0.98	19.30	
08/28/07 14:05:15	1.01	19.25	
08/28/07 14:05:30	1.08	19.19	
08/28/07 14:05:45	1.15	19.12	
08/28/07 14:06:00	1.23	19.06	
08/28/07 14:06:15	1.24	19.10	
08/28/07 14:06:30	1.17	19.17	
08/28/07 14:06:45	1.16	19.15	
08/28/07 14:07:00	1.23	19.07	
08/28/07 14:07:15	1.28	19.08	
08/28/07 14:07:30	1.18	19.18	
08/28/07 14:07:45	1.13	19.19	
08/28/07 14:08:00	1.18	19.16	
08/28/07 14:08:15	1.20	19.16	
08/28/07 14:08:30	1.15	19.21	
08/28/07 14:08:45	1.08	19.26	
08/28/07 14:09:00	1.05	19.30	
08/28/07 14:09:15	1.10	19.22	

Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS
08/28/07 14:09:30	1.23	19.09	
08/28/07 14:09:45	1.34	19.01	Port change
08/28/07 14:10:00	1.38	19.00	
08/28/07 14:10:15	1.38	19.00	
08/28/07 14:10:30	1.40	19.00	
08/28/07 14:10:45	1.38	19.03	
08/28/07 14:11:00	1.31	19.09	
08/28/07 14:11:15	1.26	19.11	
08/28/07 14:11:30	1.24	19.14	
08/28/07 14:11:45	1.22	19.16	
08/28/07 14:12:00	1.20	19.17	
08/28/07 14:12:15	1.28	19.07	
08/28/07 14:12:30	1.36	19.04	
08/28/07 14:12:45	1.35	19.03	
08/28/07 14:13:00	1.34	19.04	
08/28/07 14:13:15	1.33	19.06	
08/28/07 14:13:30	1.32	19.07	
08/28/07 14:13:45	1.29	19.09	resume sampling
08/28/07 14:14:00	1.26	19.14	
08/28/07 14:14:15	1.21	19.18	
08/28/07 14:14:30	1.21	19.15	
08/28/07 14:14:45	1.30	19.08	
08/28/07 14:15:00	1.28	19.15	
08/28/07 14:15:15	1.21	19.20	
08/28/07 14:15:30	1.22	19.17	
08/28/07 14:15:45	1.22	19.17	
08/28/07 14:16:00	1.19	19.20	
08/28/07 14:16:15	1.16	19.24	
08/28/07 14:16:30	1.13	19.26	
08/28/07 14:16:45	1.12	19.27	
08/28/07 14:17:00	1.14	19.24	
08/28/07 14:17:15	1.18	19.20	
08/28/07 14:17:30	1.22	19.16	
08/28/07 14:17:45	1.25	19.15	
08/28/07 14:18:00	1.24	19.17	
08/28/07 14:18:15	1.23	19.17	
08/28/07 14:18:30	1.26	19.13	
08/28/07 14:18:45	1.29	19.12	
08/28/07 14:19:00	1.29	19.12	
08/28/07 14:19:15	1.29	19.13	
08/28/07 14:19:30	1.24	19.17	
08/28/07 14:19:45	1.24	19.16	
08/28/07 14:20:00	1.27	19.12	
08/28/07 14:20:15	1.32	19.08	
08/28/07 14:20:30	1.33	19.07	
08/28/07 14:20:45	1.35	19.04	
08/28/07 14:21:00	1.38	18.99	
08/28/07 14:21:15	1.46	18.90	
08/28/07 14:21:30	1.52	18.88	
08/28/07 14:21:45	1.46	18.96	
08/28/07 14:22:00	1.40	19.01	
08/28/07 14:22:15	1.38	19.02	
08/28/07 14:22:30	1.42	18.97	
08/28/07 14:22:45	1.45	18.95	
08/28/07 14:23:00	1.44	18.95	
08/28/07 14:23:15	1.43	18.96	
08/28/07 14:23:30	1.41	18.97	
08/28/07 14:23:45	1.40	18.98	
08/28/07 14:24:00	1.39	18.98	
08/28/07 14:24:15	1.42	18.93	
08/28/07 14:24:30	1.45	18.90	
08/28/07 14:24:45	1.44	18.94	
08/28/07 14:25:00	1.39	18.97	
08/28/07 14:25:15	1.41	18.93	
08/28/07 14:25:30	1.46	18.91	
08/28/07 14:25:45	1.43	18.95	
08/28/07 14:26:00	1.37	19.00	
08/28/07 14:26:15	1.35	18.98	
08/28/07 14:26:30	1.35	19.00	
08/28/07 14:26:45	1.34	19.00	
08/28/07 14:27:00	1.35	18.99	
08/28/07 14:27:15	1.36	19.00	
08/28/07 14:27:30	1.35	19.01	
08/28/07 14:27:45	1.34	18.98	
08/28/07 14:28:00	1.42	18.88	
08/28/07 14:28:15	1.48	18.87	
08/28/07 14:28:30	1.43	18.93	
08/28/07 14:28:45	1.37	18.95	
08/28/07 14:29:00	1.37	18.96	
08/28/07 14:29:15	1.37	18.97	

Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS
08/28/07 14:29:30	1.37	18.97	
08/28/07 14:29:45	1.30	19.07	Port change
08/28/07 14:30:00	1.18	19.16	
08/28/07 14:30:15	1.14	19.18	
08/28/07 14:30:30	1.15	19.17	
08/28/07 14:30:45	1.21	19.10	
08/28/07 14:31:00	1.25	19.09	
08/28/07 14:31:15	1.17	19.20	
08/28/07 14:31:30	1.06	19.28	
08/28/07 14:31:45	1.06	19.22	
08/28/07 14:32:00	1.13	19.16	
08/28/07 14:32:15	1.20	19.10	
08/28/07 14:32:30	1.27	19.04	
08/28/07 14:32:45	1.30	19.03	
08/28/07 14:33:00	1.26	19.07	
08/28/07 14:33:15	1.27	19.07	
08/28/07 14:33:30	1.30	19.04	
08/28/07 14:33:45	1.32	19.02	resume sampling
08/28/07 14:34:00	1.34	19.02	
08/28/07 14:34:15	1.34	19.09	
08/28/07 14:34:30	1.32	19.07	
08/28/07 14:34:45	1.31	19.06	
08/28/07 14:35:00	1.27	19.09	
08/28/07 14:35:15	1.26	19.07	
08/28/07 14:35:30	1.29	19.04	
08/28/07 14:35:45	1.30	19.03	
08/28/07 14:36:00	1.25	19.12	
08/28/07 14:36:15	1.14	19.22	
08/28/07 14:36:30	1.09	19.28	
08/28/07 14:36:45	1.00	19.36	
08/28/07 14:37:00	0.98	19.29	
08/28/07 14:37:15	1.08	19.22	
08/28/07 14:37:30	1.09	19.23	
08/28/07 14:37:45	1.09	19.21	
08/28/07 14:38:00	1.14	19.17	
08/28/07 14:38:15	1.17	19.15	
08/28/07 14:38:30	1.18	19.12	
08/28/07 14:38:45	1.24	19.01	
08/28/07 14:39:00	2.24	16.58	sample conditioner pump overheat
08/28/07 14:39:15	7.35	10.35	sample pump shut-off
08/28/07 14:39:30	13.25	5.64	
08/28/07 14:39:45	16.89	3.11	
08/28/07 14:40:00	18.56	1.95	
08/28/07 14:40:15	19.30	1.32	
08/28/07 14:40:30	19.75	0.89	
08/28/07 14:40:45	20.00	0.74	
08/28/07 14:41:00	19.89	1.07	
08/28/07 14:41:15	19.44	1.48	
08/28/07 14:41:30	19.27	1.47	
08/28/07 14:41:45	19.47	1.14	
08/28/07 14:42:00	19.83	0.78	
08/28/07 14:42:15	20.10	0.62	
08/28/07 14:42:30	19.39	3.34	
08/28/07 14:42:45	12.80	11.19	
08/28/07 14:43:00	5.65	16.67	
08/28/07 14:43:15	2.15	18.71	
08/28/07 14:43:30	1.46	18.83	
08/28/07 14:43:45	1.38	18.94	
08/28/07 14:44:00	1.25	19.04	
08/28/07 14:44:15	1.17	19.10	
08/28/07 14:44:30	1.22	19.04	
08/28/07 14:44:45	1.31	18.98	
08/28/07 14:45:00	1.38	18.92	
08/28/07 14:45:15	1.39	18.92	
08/28/07 14:45:30	1.32	19.00	
08/28/07 14:45:45	1.33	18.95	
08/28/07 14:46:00	1.41	18.90	
08/28/07 14:46:15	1.40	18.93	
08/28/07 14:46:30	1.36	18.96	
08/28/07 14:46:45	1.36	18.94	
08/28/07 14:47:00	1.42	18.79	sample conditioner pump overheat
08/28/07 14:47:15	2.71	15.86	sample pump shut-off
08/28/07 14:47:30	8.18	9.49	
08/28/07 14:47:45	13.99	5.06	
08/28/07 14:48:00	17.35	2.72	
08/28/07 14:48:15	18.87	1.66	
08/28/07 14:48:30	19.47	1.16	
08/28/07 14:48:45	19.85	0.77	Port change
08/28/07 14:49:00	20.09	0.65	
08/28/07 14:49:15	19.99	0.87	

	Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS	
08/28/07 14:49:30	19.68	1.15		
08/28/07 14:49:45	19.46	1.42		
08/28/07 14:50:00	19.19	1.50		
08/28/07 14:50:15	19.52	0.99		
08/28/07 14:50:30	19.89	0.75		
08/28/07 14:50:45	19.78	1.84		
08/28/07 14:51:00	15.10	9.00		
08/28/07 14:51:15	7.45	15.31		
08/28/07 14:51:30	3.04	18.09		
08/28/07 14:51:45	1.80	18.56		
08/28/07 14:52:00	1.52	18.82		
08/28/07 14:52:15	1.41	18.87		
08/28/07 14:52:30	1.49	18.80		
08/28/07 14:52:45	1.53	18.82		
08/28/07 14:53:00	1.41	18.95		
08/28/07 14:53:15	1.29	19.02		
08/28/07 14:53:30	1.29	19.00		
08/28/07 14:53:45	1.32	18.99	resume sampling	
08/28/07 14:54:00	1.34	18.97		
08/28/07 14:54:15	1.34	18.97		
08/28/07 14:54:30	1.28	19.02		
08/28/07 14:54:45	1.27	19.01		
08/28/07 14:55:00	1.30	19.01		
08/28/07 14:55:15	1.29	19.03		
08/28/07 14:55:30	1.29	19.01		
08/28/07 14:55:45	1.32	18.97		
08/28/07 14:56:00	1.35	18.91		
08/28/07 14:56:15	1.39	18.88		
08/28/07 14:56:30	1.35	18.93		
08/28/07 14:56:45	1.29	18.99		
08/28/07 14:57:00	1.27	18.97		
08/28/07 14:57:15	1.32	18.95		
08/28/07 14:57:30	1.27	19.02		
08/28/07 14:57:45	1.17	19.13		
08/28/07 14:58:00	1.03	19.25		
08/28/07 14:58:15	0.93	19.32		
08/28/07 14:58:30	0.88	19.35		
08/28/07 14:58:45	0.90	19.29		
08/28/07 14:59:00	0.96	19.27		
08/28/07 14:59:15	0.96	19.25		
08/28/07 14:59:30	1.01	19.21		
08/28/07 14:59:45	1.02	19.22		
08/28/07 15:00:00	1.01	19.22		
08/28/07 15:00:15	1.03	19.19		
08/28/07 15:00:30	1.07	19.17		
08/28/07 15:00:45	1.06	19.20		
08/28/07 15:01:00	1.01	19.26		
08/28/07 15:01:15	0.99	19.27		
08/28/07 15:01:30	1.03	19.23		
08/28/07 15:01:45	1.10	19.17		
08/28/07 15:02:00	1.16	19.13		
08/28/07 15:02:15	1.19	19.10		
08/28/07 15:02:30	1.20	19.09		
08/28/07 15:02:45	1.20	19.11		
08/28/07 15:03:00	1.16	19.15		
08/28/07 15:03:15	1.17	19.13		
08/28/07 15:03:30	1.22	19.11		
08/28/07 15:03:45	1.22	19.16		
08/28/07 15:04:00	1.16	19.19		
08/28/07 15:04:15	1.20	19.11		
08/28/07 15:04:30	1.23	19.14		
08/28/07 15:04:45	1.19	19.16		
08/28/07 15:05:00	1.27	19.06		
08/28/07 15:05:15	1.38	18.97		
08/28/07 15:05:30	1.41	18.98		
08/28/07 15:05:45	1.34	19.07		
08/28/07 15:06:00	1.28	19.10		
08/28/07 15:06:15	1.29	19.08		
08/28/07 15:06:30	1.32	19.05		
08/28/07 15:06:45	1.39	19.02		
08/28/07 15:07:00	1.42	18.99		
08/28/07 15:07:15	1.47	18.95		
08/28/07 15:07:30	1.45	19.01		
08/28/07 15:07:45	1.37	19.07		
08/28/07 15:08:00	1.33	19.07		
08/28/07 15:08:15	1.39	19.00		
08/28/07 15:08:30	1.44	18.96		
08/28/07 15:08:45	1.48	18.91		
08/28/07 15:09:00	1.50	18.91		
08/28/07 15:09:15	1.48	18.93		

Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS
08/28/07 15:09:30	1.49	18.89	
08/28/07 15:09:45	1.57	18.82	End M202-2/M5B-1
08/28/07 15:10:00	1.57	18.86	
08/28/07 15:10:15	1.46	18.94	
08/28/07 15:10:30	1.44	18.93	
08/28/07 15:10:45	1.44	18.96	
08/28/07 15:11:00	1.34	19.06	
08/28/07 15:11:15	1.29	19.06	
08/28/07 15:11:30	1.31	19.04	
08/28/07 15:11:45	1.31	19.05	
08/28/07 15:12:00	1.35	18.98	
08/28/07 15:12:15	1.42	18.95	
08/28/07 15:12:30	1.39	18.99	
08/28/07 15:12:45	1.37	18.99	
08/28/07 15:13:00	1.39	18.90	
08/28/07 15:13:15	3.10	14.95	
08/28/07 15:13:30	7.50	8.23	
08/28/07 15:13:45	5.61	3.61	
08/28/07 15:14:00	1.73	1.12	
08/28/07 15:14:15	0.31	0.53	
08/28/07 15:14:30	0.12	0.43	
08/28/07 15:14:45	0.10	0.38	
08/28/07 15:15:00	0.09	0.34	
08/28/07 15:15:15	0.08	0.31	
08/28/07 15:15:30	0.08	0.29	
08/28/07 15:15:45	0.08	0.27	
08/28/07 15:16:00	0.07	0.26	
08/28/07 15:16:15	0.06	0.24	
08/28/07 15:16:30	0.07	0.23	
08/28/07 15:16:45	0.06	0.22	
08/28/07 15:17:00	0.06	0.21	
08/28/07 15:17:15	0.07	0.20	
08/28/07 15:17:30	0.06	0.20	
08/28/07 15:17:45	0.06	0.18	Post-Test Bias and Drift Check:
08/28/07 15:18:00	0.06	0.18	Zero nitrogen injection:
08/28/07 15:18:15	0.06	0.18	0.06 % db Oxygen
08/28/07 15:18:30	0.06	0.17	0.17 % db CO2
08/28/07 15:18:45	0.06	0.16	
08/28/07 15:19:00	0.05	0.16	
08/28/07 15:19:15	0.05	0.15	
08/28/07 15:19:30	0.06	0.15	
08/28/07 15:19:45	0.06	0.14	
08/28/07 15:20:00	0.06	0.15	
08/28/07 15:20:15	0.06	0.14	
08/28/07 15:20:30	0.06	0.14	
08/28/07 15:20:45	0.05	0.14	
08/28/07 15:21:00	0.06	0.18	
08/28/07 15:21:15	0.10	1.69	
08/28/07 15:21:30	0.15	1.48	
08/28/07 15:21:45	0.09	0.37	
08/28/07 15:22:00	0.06	0.17	
08/28/07 15:22:15	0.05	0.14	
08/28/07 15:22:30	0.06	0.13	
08/28/07 15:22:45	0.05	0.13	
08/28/07 15:23:00	0.06	0.13	
08/28/07 15:23:15	0.05	0.12	
08/28/07 15:23:30	0.05	0.11	
08/28/07 15:23:45	0.05	0.12	
08/28/07 15:24:00	0.05	0.12	
08/28/07 15:24:15	0.05	0.11	
08/28/07 15:24:30	0.05	0.43	
08/28/07 15:24:45	0.28	5.53	
08/28/07 15:25:00	0.58	6.36	
08/28/07 15:25:15	0.84	4.04	
08/28/07 15:25:30	4.77	6.42	
08/28/07 15:25:45	8.37	8.64	
08/28/07 15:26:00	9.61	9.20	
08/28/07 15:26:15	9.81	9.14	
08/28/07 15:26:30	9.83	9.10	
08/28/07 15:26:45	9.84	9.09	
08/28/07 15:27:00	9.85	9.12	
08/28/07 15:27:15	9.86	9.15	
08/28/07 15:27:30	9.87	9.21	
08/28/07 15:27:45	9.89	9.34	
08/28/07 15:28:00	9.90	9.49	
08/28/07 15:28:15	9.92	9.62	
08/28/07 15:28:30	9.93	9.70	
08/28/07 15:28:45	9.94	9.75	
08/28/07 15:29:00	9.94	9.79	

	Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS	
08/28/07 15:29:15	9.94	9.81		
08/28/07 15:29:30	9.94	9.82	Post-Test Bias and Drift Check:	
08/28/07 15:29:45	9.95	9.83	10% Oxygen/CO2 injection:	
08/28/07 15:30:00	9.94	9.83	9.95 % db Oxygen	
08/28/07 15:30:15	9.95	9.84	9.84 % db CO2	
08/28/07 15:30:30	9.95	9.84		
08/28/07 15:30:45	9.95	9.85		
08/28/07 15:31:00	9.95	9.85		
08/28/07 15:31:15	9.95	9.85		
08/28/07 15:31:30	9.95	9.86		
08/28/07 15:31:45	9.95	9.87		
08/28/07 15:32:00	9.16	12.07		
08/28/07 15:32:15	5.33	16.40		
08/28/07 15:32:30	2.26	18.53		
08/28/07 15:32:45	1.34	18.95		
08/28/07 15:33:00	1.29	18.95		
08/28/07 15:33:15	1.31	18.96		
08/28/07 15:33:30	1.33	18.95		
08/28/07 15:33:45	1.36	18.95		
08/28/07 15:34:00	1.32	19.01		
08/28/07 15:34:15	1.27	19.05		
08/28/07 15:34:30	1.22	19.11		
08/28/07 15:34:45	1.22	19.06		
08/28/07 15:35:00	1.29	19.02		
08/28/07 15:35:15	1.31	19.00		
08/28/07 15:35:30	1.32	19.02		
08/28/07 15:35:45	1.32	19.02		
08/28/07 15:36:00	1.30	19.06		
08/28/07 15:36:15	1.21	19.15		
08/28/07 15:36:30	1.16	19.16		
08/28/07 15:36:45	1.15	19.16		
08/28/07 15:37:00	1.16	19.14		
08/28/07 15:37:15	1.23	19.06		
08/28/07 15:37:30	1.30	19.01		
08/28/07 15:37:45	1.33	18.97		
08/28/07 15:38:00	1.34	19.00		
08/28/07 15:38:15	1.24	19.14		
08/28/07 15:38:30	1.10	19.24		
08/28/07 15:38:45	1.13	19.18		
08/28/07 15:39:00	1.21	19.14		
08/28/07 15:39:15	1.21	19.15		
08/28/07 15:39:30	1.28	19.04		
08/28/07 15:39:45	1.40	18.98		
08/28/07 15:40:00	1.35	19.06		
08/28/07 15:40:15	1.26	19.11		
08/28/07 15:40:30	1.22	19.14		
08/28/07 15:40:45	1.22	19.14		
08/28/07 15:41:00	1.24	19.11		
08/28/07 15:41:15	1.28	19.04		
08/28/07 15:41:30	1.32	19.03		
08/28/07 15:41:45	1.26	19.12		
08/28/07 15:42:00	1.18	19.17		
08/28/07 15:42:15	1.20	19.12		
08/28/07 15:42:30	1.27	19.05		
08/28/07 15:42:45	1.32	19.04		
08/28/07 15:43:00	1.28	19.09		
08/28/07 15:43:15	1.24	19.10		
08/28/07 15:43:30	1.25	19.07		
08/28/07 15:43:45	1.26	19.08		
08/28/07 15:44:00	1.25	19.11		
08/28/07 15:44:15	1.18	19.20		
08/28/07 15:44:30	1.11	19.25		
08/28/07 15:44:45	1.08	19.23		
08/28/07 15:45:00	1.13	19.18		
08/28/07 15:45:15	1.18	19.17		
08/28/07 15:45:30	1.16	19.23		
08/28/07 15:45:45	1.11	19.25		
08/28/07 15:46:00	1.12	19.25		
08/28/07 15:46:15	1.09	19.31		
08/28/07 15:46:30	1.11	19.27		
08/28/07 15:46:45	1.16	19.22		
08/28/07 15:47:00	1.20	19.19		
08/28/07 15:47:15	1.23	19.19		
08/28/07 15:47:30	1.20	19.21		
08/28/07 15:47:45	1.21	19.17		
08/28/07 15:48:00	1.23	19.18		
08/28/07 15:48:15	1.20	19.21		
08/28/07 15:48:30	1.20	19.18		
08/28/07 15:48:45	1.25	19.14		
08/28/07 15:49:00	1.26	19.17		

	Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS	
08/28/07 15:49:15	1.18	19.26		
08/28/07 15:49:30	1.10	19.28		
08/28/07 15:49:45	1.14	19.25		
08/28/07 15:50:00	1.14	19.26		
08/28/07 15:50:15	1.14	19.25		
08/28/07 15:50:30	1.09	19.33		
08/28/07 15:50:45	0.98	19.41		
08/28/07 15:51:00	1.00	19.35		
08/28/07 15:51:15	1.07	19.30		
08/28/07 15:51:30	1.07	19.34		
08/28/07 15:51:45	1.01	19.39		
08/28/07 15:52:00	1.02	19.37		
08/28/07 15:52:15	1.05	19.33		
08/28/07 15:52:30	1.11	19.26		
08/28/07 15:52:45	1.20	19.21		
08/28/07 15:53:00	1.20	19.23		
08/28/07 15:53:15	1.22	19.18		
08/28/07 15:53:30	1.29	19.14		
08/28/07 15:53:45	1.31	19.14		
08/28/07 15:54:00	1.27	19.17		
08/28/07 15:54:15	1.25	19.18		
08/28/07 15:54:30	1.24	19.20		
08/28/07 15:54:45	1.17	19.26		
08/28/07 15:55:00	1.14	19.27		
08/28/07 15:55:15	1.18	19.23		
08/28/07 15:55:30	1.20	19.23		
08/28/07 15:55:45	1.17	19.25		
08/28/07 15:56:00	1.14	19.26		
08/28/07 15:56:15	1.13	19.28		
08/28/07 15:56:30	1.10	19.30		
08/28/07 15:56:45	1.11	19.27		
08/28/07 15:57:00	1.19	19.21		
08/28/07 15:57:15	1.18	19.25		
08/28/07 15:57:30	1.18	19.22		
08/28/07 15:57:45	1.25	19.13		
08/28/07 15:58:00	1.33	19.08		
08/28/07 15:58:15	1.31	19.13		
08/28/07 15:58:30	1.29	19.14		
08/28/07 15:58:45	1.27	19.17		
08/28/07 15:59:00	1.27	19.15		
08/28/07 15:59:15	1.33	19.09		
08/28/07 15:59:30	1.35	19.08		
08/28/07 15:59:45	1.35	19.09		
08/28/07 16:00:00	1.36	19.08		
08/28/07 16:00:15	1.41	19.05		
08/28/07 16:00:30	1.42	19.06		
08/28/07 16:00:45	1.38	19.09	Begin M5B-2	
08/28/07 16:01:00	1.39	19.05		
08/28/07 16:01:15	1.44	19.02		
08/28/07 16:01:30	1.44	19.03		
08/28/07 16:01:45	1.41	19.05		
08/28/07 16:02:00	1.38	19.09		
08/28/07 16:02:15	1.32	19.13		
08/28/07 16:02:30	1.32	19.09		
08/28/07 16:02:45	1.40	19.01		
08/28/07 16:03:00	1.48	18.93		
08/28/07 16:03:15	1.50	18.97		
08/28/07 16:03:30	1.43	19.02		
08/28/07 16:03:45	1.39	19.05		
08/28/07 16:04:00	1.35	19.08		
08/28/07 16:04:15	1.34	19.09		
08/28/07 16:04:30	1.35	19.07		
08/28/07 16:04:45	1.33	19.13		
08/28/07 16:05:00	1.23	19.19		
08/28/07 16:05:15	1.27	19.12		
08/28/07 16:05:30	1.27	19.15		
08/28/07 16:05:45	1.22	19.18		
08/28/07 16:06:00	1.20	19.20		
08/28/07 16:06:15	1.18	19.22		
08/28/07 16:06:30	1.18	19.22		
08/28/07 16:06:45	1.14	19.28		
08/28/07 16:07:00	1.08	19.31		
08/28/07 16:07:15	1.08	19.29		
08/28/07 16:07:30	1.09	19.28		
08/28/07 16:07:45	1.08	19.28		
08/28/07 16:08:00	1.04	19.32		
08/28/07 16:08:15	0.98	19.38		
08/28/07 16:08:30	0.95	19.40		
08/28/07 16:08:45	1.04	19.29		
08/28/07 16:09:00	1.12	19.23		

	Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS	
08/28/07 16:09:15	1.17	19.19		
08/28/07 16:09:30	1.20	19.15		
08/28/07 16:09:45	1.24	19.11		
08/28/07 16:10:00	1.29	19.07		
08/28/07 16:10:15	1.30	19.08		
08/28/07 16:10:30	1.23	19.15		
08/28/07 16:10:45	1.15	19.20		
08/28/07 16:11:00	1.13	19.19		
08/28/07 16:11:15	1.14	19.18		
08/28/07 16:11:30	1.16	19.18		
08/28/07 16:11:45	1.13	19.25		
08/28/07 16:12:00	1.02	19.33		
08/28/07 16:12:15	1.03	19.27		
08/28/07 16:12:30	1.07	19.27		
08/28/07 16:12:45	1.00	19.32		
08/28/07 16:13:00	1.02	19.27		
08/28/07 16:13:15	1.04	19.28		
08/28/07 16:13:30	1.00	19.32		
08/28/07 16:13:45	1.02	19.29		
08/28/07 16:14:00	1.04	19.29		
08/28/07 16:14:15	1.03	19.29		
08/28/07 16:14:30	1.05	19.25		
08/28/07 16:14:45	1.10	19.20	Begin M202-3	
08/28/07 16:15:00	1.16	19.14		
08/28/07 16:15:15	1.15	19.17		
08/28/07 16:15:30	1.09	19.23		
08/28/07 16:15:45	1.05	19.23	M5B-2 Port Change	
08/28/07 16:16:00	1.08	19.19		
08/28/07 16:16:15	1.09	19.21		
08/28/07 16:16:30	1.05	19.25		
08/28/07 16:16:45	1.08	19.19		
08/28/07 16:17:00	1.14	19.15		
08/28/07 16:17:15	1.14	19.15		
08/28/07 16:17:30	1.16	19.12		
08/28/07 16:17:45	1.18	19.09		
08/28/07 16:18:00	1.20	19.09		
08/28/07 16:18:15	1.14	19.16		
08/28/07 16:18:30	1.18	19.05		
08/28/07 16:18:45	1.30	18.99		
08/28/07 16:19:00	1.26	19.05		
08/28/07 16:19:15	1.20	19.08		
08/28/07 16:19:30	1.19	19.08		
08/28/07 16:19:45	1.24	19.03	Resume M5B-2	
08/28/07 16:20:00	1.28	19.02		
08/28/07 16:20:15	1.25	19.07		
08/28/07 16:20:30	1.25	19.04		
08/28/07 16:20:45	1.28	19.02		
08/28/07 16:21:00	1.28	19.03		
08/28/07 16:21:15	1.29	19.03		
08/28/07 16:21:30	1.27	19.06		
08/28/07 16:21:45	1.20	19.14		
08/28/07 16:22:00	1.13	19.20		
08/28/07 16:22:15	1.08	19.24		
08/28/07 16:22:30	1.05	19.27		
08/28/07 16:22:45	1.08	19.23		
08/28/07 16:23:00	1.18	19.16		
08/28/07 16:23:15	1.20	19.19		
08/28/07 16:23:30	1.14	19.27		
08/28/07 16:23:45	1.07	19.30		
08/28/07 16:24:00	1.11	19.25		
08/28/07 16:24:15	1.19	19.18		
08/28/07 16:24:30	1.20	19.21		
08/28/07 16:24:45	1.13	19.27		
08/28/07 16:25:00	1.10	19.30		
08/28/07 16:25:15	1.12	19.30		
08/28/07 16:25:30	1.11	19.31		
08/28/07 16:25:45	1.15	19.23		
08/28/07 16:26:00	1.29	19.10		
08/28/07 16:26:15	1.39	19.06		
08/28/07 16:26:30	1.34	19.12		
08/28/07 16:26:45	1.29	19.13		
08/28/07 16:27:00	1.30	19.13		
08/28/07 16:27:15	1.29	19.15		
08/28/07 16:27:30	1.25	19.18		
08/28/07 16:27:45	1.22	19.20		
08/28/07 16:28:00	1.20	19.21		
08/28/07 16:28:15	1.19	19.21		
08/28/07 16:28:30	1.15	19.24		
08/28/07 16:28:45	1.10	19.29		
08/28/07 16:29:00	1.02	19.35		

Time	Range	10.0	22.8	COMMENTS
	Units	%	%	
08/28/07 16:29:15		1.02	19.32	
08/28/07 16:29:30		1.07	19.28	
08/28/07 16:29:45		1.08	19.29	
08/28/07 16:30:00		1.10	19.24	
08/28/07 16:30:15		1.18	19.18	
08/28/07 16:30:30		1.19	19.20	
08/28/07 16:30:45		1.13	19.26	M202-3 port change
08/28/07 16:31:00		1.09	19.25	
08/28/07 16:31:15		1.13	19.24	
08/28/07 16:31:30		1.11	19.28	
08/28/07 16:31:45		1.08	19.28	
08/28/07 16:32:00		1.13	19.21	
08/28/07 16:32:15		1.21	19.15	
08/28/07 16:32:30		1.22	19.15	
08/28/07 16:32:45		1.21	19.15	
08/28/07 16:33:00		1.21	19.15	
08/28/07 16:33:15		1.19	19.17	
08/28/07 16:33:30		1.19	19.17	
08/28/07 16:33:45		1.18	19.18	
08/28/07 16:34:00		1.21	19.13	
08/28/07 16:34:15		1.27	19.12	
08/28/07 16:34:30		1.23	19.17	
08/28/07 16:34:45		1.22	19.14	
08/28/07 16:35:00		1.28	19.11	
08/28/07 16:35:15		1.24	19.16	
08/28/07 16:35:30		1.16	19.22	
08/28/07 16:35:45		1.15	19.22	Resume M202-3
08/28/07 16:36:00		1.16	19.22	M5B-2 Port Change
08/28/07 16:36:15		1.16	19.22	
08/28/07 16:36:30		1.17	19.19	
08/28/07 16:36:45		1.23	19.13	
08/28/07 16:37:00		1.28	19.10	
08/28/07 16:37:15		1.25	19.15	
08/28/07 16:37:30		1.19	19.19	
08/28/07 16:37:45		1.19	19.18	
08/28/07 16:38:00		1.21	19.16	
08/28/07 16:38:15		1.22	19.17	
08/28/07 16:38:30		1.17	19.21	
08/28/07 16:38:45		1.16	19.21	
08/28/07 16:39:00		1.18	19.20	
08/28/07 16:39:15		1.23	19.14	
08/28/07 16:39:30		1.30	19.09	
08/28/07 16:39:45		1.29	19.13	
08/28/07 16:40:00		1.25	19.12	
08/28/07 16:40:15		1.32	19.06	
08/28/07 16:40:30		1.35	19.06	
08/28/07 16:40:45		1.30	19.11	
08/28/07 16:41:00		1.27	19.10	
08/28/07 16:41:15		1.30	19.08	
08/28/07 16:41:30		1.27	19.15	
08/28/07 16:41:45		1.23	19.14	Resume M5B-2
08/28/07 16:42:00		1.25	19.15	
08/28/07 16:42:15		1.17	19.24	
08/28/07 16:42:30		1.11	19.25	
08/28/07 16:42:45		1.11	19.24	
08/28/07 16:43:00		1.11	19.26	
08/28/07 16:43:15		1.13	19.22	
08/28/07 16:43:30		1.19	19.16	
08/28/07 16:43:45		1.24	19.14	
08/28/07 16:44:00		1.25	19.14	
08/28/07 16:44:15		1.25	19.12	
08/28/07 16:44:30		1.25	19.13	
08/28/07 16:44:45		1.18	19.23	
08/28/07 16:45:00		1.04	19.33	
08/28/07 16:45:15		0.97	19.38	
08/28/07 16:45:30		0.91	19.42	
08/28/07 16:45:45		0.92	19.38	
08/28/07 16:46:00		0.99	19.34	
08/28/07 16:46:15		1.00	19.34	
08/28/07 16:46:30		0.96	19.41	
08/28/07 16:46:45		0.91	19.44	
08/28/07 16:47:00		0.93	19.40	
08/28/07 16:47:15		1.04	19.26	
08/28/07 16:47:30		1.20	19.15	
08/28/07 16:47:45		1.24	19.13	
08/28/07 16:48:00		1.25	19.13	
08/28/07 16:48:15		1.22	19.14	
08/28/07 16:48:30		1.21	19.16	
08/28/07 16:48:45		1.18	19.17	
08/28/07 16:49:00		1.22	19.12	

	Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS	
08/28/07 16:49:15	1.24	19.12		
08/28/07 16:49:30	1.23	19.14		
08/28/07 16:49:45	1.21	19.17		
08/28/07 16:50:00	1.20	19.16		
08/28/07 16:50:15	1.25	19.10		
08/28/07 16:50:30	1.35	19.00		
08/28/07 16:50:45	1.41	18.99		
08/28/07 16:51:00	1.36	19.05		
08/28/07 16:51:15	1.30	19.08		
08/28/07 16:51:30	1.33	19.01		
08/28/07 16:51:45	1.37	19.02	M202-3 port change	
08/28/07 16:52:00	1.28	19.09		
08/28/07 16:52:15	1.30	19.02		
08/28/07 16:52:30	1.43	18.92		
08/28/07 16:52:45	1.48	18.91		
08/28/07 16:53:00	1.45	18.95		
08/28/07 16:53:15	1.42	18.98		
08/28/07 16:53:30	1.43	18.94		
08/28/07 16:53:45	1.51	18.89	Resume M202-3	
08/28/07 16:54:00	1.42	19.02		
08/28/07 16:54:15	1.27	19.12		
08/28/07 16:54:30	1.26	19.10		
08/28/07 16:54:45	1.27	19.10		
08/28/07 16:55:00	1.30	19.07		
08/28/07 16:55:15	1.33	19.06		
08/28/07 16:55:30	1.31	19.10		
08/28/07 16:55:45	1.26	19.12		
08/28/07 16:56:00	1.27	19.13		
08/28/07 16:56:15	1.23	19.14		
08/28/07 16:56:30	1.30	19.07		
08/28/07 16:56:45	1.30	19.12		
08/28/07 16:57:00	1.23	19.18		
08/28/07 16:57:15	1.22	19.16		
08/28/07 16:57:30	1.26	19.14		
08/28/07 16:57:45	1.26	19.14	M5B-2 Port Change	
08/28/07 16:58:00	1.24	19.16		
08/28/07 16:58:15	1.22	19.15		
08/28/07 16:58:30	1.27	19.10		
08/28/07 16:58:45	1.25	19.18		
08/28/07 16:59:00	1.16	19.24		
08/28/07 16:59:15	1.17	19.22		
08/28/07 16:59:30	1.16	19.22		
08/28/07 16:59:45	1.18	19.20		
08/28/07 17:00:00	1.15	19.26		
08/28/07 17:00:15	1.08	19.30		
08/28/07 17:00:30	1.08	19.29		
08/28/07 17:00:45	1.09	19.28		
08/28/07 17:01:00	1.11	19.25		
08/28/07 17:01:15	1.17	19.20		
08/28/07 17:01:30	1.22	19.16		
08/28/07 17:01:45	1.25	19.16		
08/28/07 17:02:00	1.18	19.25		
08/28/07 17:02:15	1.09	19.30		
08/28/07 17:02:30	1.08	19.29		
08/28/07 17:02:45	1.11	19.27		
08/28/07 17:03:00	1.15	19.22		
08/28/07 17:03:15	1.14	19.26		
08/28/07 17:03:30	1.07	19.31		
08/28/07 17:03:45	1.10	19.27		
08/28/07 17:04:00	1.12	19.28		
08/28/07 17:04:15	1.11	19.28		
08/28/07 17:04:30	1.11	19.29		
08/28/07 17:04:45	1.05	19.35	Resume M5B-2	
08/28/07 17:05:00	1.01	19.35		
08/28/07 17:05:15	1.01	19.35		
08/28/07 17:05:30	1.04	19.31		
08/28/07 17:05:45	1.09	19.29		
08/28/07 17:06:00	1.08	19.33		
08/28/07 17:06:15	1.02	19.38		
08/28/07 17:06:30	0.96	19.43		
08/28/07 17:06:45	0.94	19.43		
08/28/07 17:07:00	0.99	19.36		
08/28/07 17:07:15	1.09	19.28		
08/28/07 17:07:30	1.16	19.24		
08/28/07 17:07:45	1.14	19.28		
08/28/07 17:08:00	1.10	19.29		
08/28/07 17:08:15	1.16	19.21		
08/28/07 17:08:30	1.24	19.16		
08/28/07 17:08:45	1.28	19.14		
08/28/07 17:09:00	1.30	19.12		

	Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS	
08/28/07 17:09:15	1.29	19.14		
08/28/07 17:09:30	1.30	19.11		
08/28/07 17:09:45	1.32	19.12		
08/28/07 17:10:00	1.29	19.13		
08/28/07 17:10:15	1.31	19.12		
08/28/07 17:10:30	1.32	19.11		
08/28/07 17:10:45	1.32	19.12		
08/28/07 17:11:00	1.29	19.14		
08/28/07 17:11:15	1.26	19.15		
08/28/07 17:11:30	1.24	19.19		
08/28/07 17:11:45	1.17	19.26		
08/28/07 17:12:00	1.16	19.23		
08/28/07 17:12:15	1.23	19.16		
08/28/07 17:12:30	1.27	19.13		
08/28/07 17:12:45	1.31	19.09		
08/28/07 17:13:00	1.34	19.08		
08/28/07 17:13:15	1.29	19.13		
08/28/07 17:13:30	1.24	19.17		
08/28/07 17:13:45	1.23	19.15		
08/28/07 17:14:00	1.25	19.12		
08/28/07 17:14:15	1.26	19.12		
08/28/07 17:14:30	1.30	19.08		
08/28/07 17:14:45	1.33	19.08		
08/28/07 17:15:00	1.26	19.17		
08/28/07 17:15:15	1.17	19.22		
08/28/07 17:15:30	1.11	19.27		
08/28/07 17:15:45	1.06	19.30		
08/28/07 17:16:00	1.10	19.25		
08/28/07 17:16:15	1.15	19.21		
08/28/07 17:16:30	1.16	19.23		
08/28/07 17:16:45	1.09	19.30		
08/28/07 17:17:00	1.11	19.26		
08/28/07 17:17:15	1.21	19.18		
08/28/07 17:17:30	1.27	19.16		
08/28/07 17:17:45	1.35	19.07		
08/28/07 17:18:00	1.41	19.06		
08/28/07 17:18:15	1.37	19.10	M202-3 port change	
08/28/07 17:18:30	1.36	19.11		
08/28/07 17:18:45	1.28	19.20		
08/28/07 17:19:00	1.19	19.22		
08/28/07 17:19:15	1.20	19.22		
08/28/07 17:19:30	1.17	19.23		
08/28/07 17:19:45	1.22	19.14	Resume M202-3	
08/28/07 17:20:00	1.27	19.15	End M5B-2	
08/28/07 17:20:15	1.20	19.21		
08/28/07 17:20:30	1.21	19.15		
08/28/07 17:20:45	1.29	19.12		
08/28/07 17:21:00	1.24	19.19		
08/28/07 17:21:15	1.16	19.23		
08/28/07 17:21:30	1.16	19.20		
08/28/07 17:21:45	1.20	19.16		
08/28/07 17:22:00	1.26	19.11		
08/28/07 17:22:15	1.29	19.09		
08/28/07 17:22:30	1.25	19.15		
08/28/07 17:22:45	1.16	19.22		
08/28/07 17:23:00	1.12	19.26		
08/28/07 17:23:15	1.08	19.28		
08/28/07 17:23:30	1.12	19.22		
08/28/07 17:23:45	1.20	19.16		
08/28/07 17:24:00	1.22	19.19		
08/28/07 17:24:15	1.16	19.26		
08/28/07 17:24:30	1.13	19.26		
08/28/07 17:24:45	1.16	19.21		
08/28/07 17:25:00	1.21	19.16		
08/28/07 17:25:15	1.23	19.16		
08/28/07 17:25:30	1.23	19.15		
08/28/07 17:25:45	1.23	19.15		
08/28/07 17:26:00	1.20	19.19		
08/28/07 17:26:15	1.17	19.20		
08/28/07 17:26:30	1.20	19.15		
08/28/07 17:26:45	1.19	19.20		
08/28/07 17:27:00	1.13	19.25		
08/28/07 17:27:15	1.10	19.26		
08/28/07 17:27:30	1.11	19.24		
08/28/07 17:27:45	1.12	19.23		
08/28/07 17:28:00	1.16	19.21		
08/28/07 17:28:15	1.16	19.21		
08/28/07 17:28:30	1.16	19.22		
08/28/07 17:28:45	1.15	19.23		
08/28/07 17:29:00	1.14	19.26		

	Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS	
08/28/07 17:29:15	1.06	19.33		
08/28/07 17:29:30	1.02	19.33		
08/28/07 17:29:45	1.04	19.33		
08/28/07 17:30:00	1.02	19.36		
08/28/07 17:30:15	1.01	19.35		
08/28/07 17:30:30	1.06	19.29		
08/28/07 17:30:45	1.13	19.24		
08/28/07 17:31:00	1.18	19.20		
08/28/07 17:31:15	1.25	19.15		
08/28/07 17:31:30	1.29	19.14		
08/28/07 17:31:45	1.24	19.20		
08/28/07 17:32:00	1.20	19.23		
08/28/07 17:32:15	1.21	19.21		
08/28/07 17:32:30	1.24	19.18		
08/28/07 17:32:45	1.28	19.18		
08/28/07 17:33:00	1.23	19.26		
08/28/07 17:33:15	1.16	19.31		
08/28/07 17:33:30	1.10	19.37		
08/28/07 17:33:45	1.08	19.39		
08/28/07 17:34:00	1.09	19.38		
08/28/07 17:34:15	1.09	19.37		
08/28/07 17:34:30	1.07	19.37		
08/28/07 17:34:45	1.11	19.30	End M202-3	
08/28/07 17:35:00	1.20	19.25		
08/28/07 17:35:15	1.19	19.33		
08/28/07 17:35:30	1.12	19.36		
08/28/07 17:35:45	1.13	19.33		
08/28/07 17:36:00	1.12	19.34		
08/28/07 17:36:15	1.11	19.32		
08/28/07 17:36:30	1.14	19.29		
08/28/07 17:36:45	1.17	19.25		
08/28/07 17:37:00	1.25	19.18		
08/28/07 17:37:15	1.28	19.19		
08/28/07 17:37:30	1.20	19.28		
08/28/07 17:37:45	1.10	19.33		
08/28/07 17:38:00	1.14	19.27		
08/28/07 17:38:15	1.19	19.24		
08/28/07 17:38:30	1.19	19.21		
08/28/07 17:38:45	1.21	19.20		
08/28/07 17:39:00	1.21	19.20		
08/28/07 17:39:15	1.24	19.15		
08/28/07 17:39:30	1.27	19.14		
08/28/07 17:39:45	1.28	19.11		
08/28/07 17:40:00	1.32	19.07		
08/28/07 17:40:15	1.30	19.12		
08/28/07 17:40:30	1.23	19.19		
08/28/07 17:40:45	1.13	19.28		
08/28/07 17:41:00	1.02	19.36		
08/28/07 17:41:15	1.00	19.35		
08/28/07 17:41:30	1.03	19.30		
08/28/07 17:41:45	1.09	19.25		
08/28/07 17:42:00	1.15	19.13		
08/28/07 17:42:15	2.82	15.29		
08/28/07 17:42:30	7.40	8.92		
08/28/07 17:42:45	6.08	4.12		
08/28/07 17:43:00	2.03	1.34		
08/28/07 17:43:15	0.36	0.57		
08/28/07 17:43:30	0.13	0.46		
08/28/07 17:43:45	0.10	0.40		
08/28/07 17:44:00	0.09	0.37		
08/28/07 17:44:15	0.09	0.34		
08/28/07 17:44:30	0.09	0.32		
08/28/07 17:44:45	0.08	0.30		
08/28/07 17:45:00	0.08	0.29		
08/28/07 17:45:15	0.08	0.27		
08/28/07 17:45:30	0.07	0.26		
08/28/07 17:45:45	0.07	0.24		
08/28/07 17:46:00	0.07	0.23		
08/28/07 17:46:15	0.07	0.22		
08/28/07 17:46:30	0.07	0.22		
08/28/07 17:46:45	0.07	0.21		
08/28/07 17:47:00	0.07	0.20		
08/28/07 17:47:15	0.06	0.20		
08/28/07 17:47:30	0.07	0.19		
08/28/07 17:47:45	0.06	0.19		
08/28/07 17:48:00	0.06	0.18		
08/28/07 17:48:15	0.06	0.17		
08/28/07 17:48:30	0.06	0.17		
08/28/07 17:48:45	0.06	0.16	Post-Test Bias and Drift Check:	
08/28/07 17:49:00	0.06	0.16	Zero nitrogen injection:	

Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS
08/28/07 17:49:15	0.06	0.15	0.06 % db Oxygen
08/28/07 17:49:30	0.06	0.15	0.15 % db CO2
08/28/07 17:49:45	0.06	0.15	
08/28/07 17:50:00	0.06	0.15	
08/28/07 17:50:15	0.06	0.15	
08/28/07 17:50:30	0.06	0.14	
08/28/07 17:50:45	0.06	0.14	
08/28/07 17:51:00	0.06	0.13	
08/28/07 17:51:15	0.06	0.16	
08/28/07 17:51:30	0.08	0.74	
08/28/07 17:51:45	0.38	1.50	
08/28/07 17:52:00	3.90	5.44	
08/28/07 17:52:15	7.82	8.17	
08/28/07 17:52:30	9.48	9.18	
08/28/07 17:52:45	9.80	9.21	
08/28/07 17:53:00	9.84	9.18	
08/28/07 17:53:15	9.85	9.19	
08/28/07 17:53:30	9.86	9.21	
08/28/07 17:53:45	9.87	9.25	
08/28/07 17:54:00	9.88	9.32	
08/28/07 17:54:15	9.89	9.43	
08/28/07 17:54:30	9.91	9.54	
08/28/07 17:54:45	9.92	9.62	
08/28/07 17:55:00	9.93	9.69	
08/28/07 17:55:15	9.93	9.75	
08/28/07 17:55:30	9.94	9.78	
08/28/07 17:55:45	9.94	9.81	
Post-Test Bias and Drift Check:			
08/28/07 17:56:00	9.94	9.82	10% Oxygen/CO2 injection:
08/28/07 17:56:15	9.95	9.83	9.95 % db Oxygen
08/28/07 17:56:30	9.95	9.84	9.83 % db CO2
08/28/07 17:56:45	9.95	9.84	
08/28/07 17:57:00	9.95	9.85	
08/28/07 17:57:15	9.95	9.85	
08/28/07 17:57:30	9.95	9.85	
08/28/07 17:57:45	9.95	9.85	
08/28/07 17:58:00	9.95	9.86	
08/28/07 17:58:15	9.95	9.86	
08/28/07 17:58:30	9.91	10.16	
08/28/07 17:58:45	7.96	13.89	
08/28/07 17:59:00	3.83	17.54	
08/28/07 17:59:15	1.71	18.77	
08/28/07 17:59:30	1.30	18.94	
08/28/07 17:59:45	1.26	19.00	
08/28/07 18:00:00	1.17	19.12	
08/28/07 18:00:15	1.10	19.15	
08/28/07 18:00:30	1.14	19.12	
08/28/07 18:00:45	1.16	19.12	
08/28/07 18:01:00	1.13	19.19	
08/28/07 18:01:15	1.04	19.27	
08/28/07 18:01:30	1.02	19.26	
08/28/07 18:01:45	1.04	19.24	
08/28/07 18:02:00	1.08	19.22	
08/28/07 18:02:15	1.05	19.28	
08/28/07 18:02:30	1.01	19.28	
08/28/07 18:02:45	1.06	19.22	
08/28/07 18:03:00	1.10	19.19	
08/28/07 18:03:15	1.11	19.18	
08/28/07 18:03:30	1.14	19.16	
08/28/07 18:03:45	1.16	19.16	
08/28/07 18:04:00	1.19	19.12	
08/28/07 18:04:15	1.24	19.09	
08/28/07 18:04:30	1.22	19.12	
08/28/07 18:04:45	1.15	19.18	
08/28/07 18:05:00	1.16	19.14	
08/28/07 18:05:15	1.22	19.12	
08/28/07 18:05:30	1.18	19.17	
08/28/07 18:05:45	1.13	19.19	
08/28/07 18:06:00	1.14	19.17	
08/28/07 18:06:15	1.16	19.16	
08/28/07 18:06:30	1.16	19.18	
08/28/07 18:06:45	1.12	19.24	
08/28/07 18:07:00	1.05	19.28	
08/28/07 18:07:15	1.06	19.26	
08/28/07 18:07:30	1.11	19.21	
08/28/07 18:07:45	1.14	19.18	
08/28/07 18:08:00	1.14	19.18	
08/28/07 18:08:15	1.14	19.18	
08/28/07 18:08:30	1.16	19.16	
08/28/07 18:08:45	1.23	19.11	
08/28/07 18:09:00	1.20	19.17	

	Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS	
08/28/07 18:09:15	1.18	19.15		
08/28/07 18:09:30	1.23	19.10		
08/28/07 18:09:45	1.23	19.12		
08/28/07 18:10:00	1.17	19.18		
08/28/07 18:10:15	1.13	19.21		
08/28/07 18:10:30	1.11	19.24		
08/28/07 18:10:45	1.11	19.23		
08/28/07 18:11:00	1.13	19.23		
08/28/07 18:11:15	1.13	19.24		
08/28/07 18:11:30	1.14	19.23		
08/28/07 18:11:45	1.13	19.24		
08/28/07 18:12:00	1.11	19.27		
08/28/07 18:12:15	1.07	19.32		
08/28/07 18:12:30	1.08	19.28		
08/28/07 18:12:45	1.13	19.25	Start 5B-3	
08/28/07 18:13:00	1.12	19.26		
08/28/07 18:13:15	1.12	19.26		
08/28/07 18:13:30	1.15	19.25		
08/28/07 18:13:45	1.17	19.23		
08/28/07 18:14:00	1.20	19.21		
08/28/07 18:14:15	1.20	19.22		
08/28/07 18:14:30	1.21	19.21		
08/28/07 18:14:45	1.23	19.21		
08/28/07 18:15:00	1.21	19.22		
08/28/07 18:15:15	1.21	19.20		
08/28/07 18:15:30	1.24	19.19		
08/28/07 18:15:45	1.21	19.25		
08/28/07 18:16:00	1.17	19.25		
08/28/07 18:16:15	1.21	19.19		
08/28/07 18:16:30	1.25	19.18		
08/28/07 18:16:45	1.20	19.24		
08/28/07 18:17:00	1.12	19.32		
08/28/07 18:17:15	1.07	19.34		
08/28/07 18:17:30	1.10	19.27		
08/28/07 18:17:45	1.23	19.16		
08/28/07 18:18:00	1.25	19.18		
08/28/07 18:18:15	1.14	19.28		
08/28/07 18:18:30	1.07	19.34		
08/28/07 18:18:45	1.05	19.34		
08/28/07 18:19:00	1.11	19.24		
08/28/07 18:19:15	1.20	19.18		
08/28/07 18:19:30	1.24	19.16		
08/28/07 18:19:45	1.28	19.13		
08/28/07 18:20:00	1.26	19.14		
08/28/07 18:20:15	1.27	19.12		
08/28/07 18:20:30	1.32	19.06		
08/28/07 18:20:45	1.34	19.07		
08/28/07 18:21:00	1.29	19.13		
08/28/07 18:21:15	1.23	19.16		
08/28/07 18:21:30	1.19	19.21		
08/28/07 18:21:45	1.08	19.32		
08/28/07 18:22:00	1.06	19.29		
08/28/07 18:22:15	1.17	19.19		
08/28/07 18:22:30	1.19	19.22		
08/28/07 18:22:45	1.10	19.30		
08/28/07 18:23:00	1.07	19.29		
08/28/07 18:23:15	1.12	19.24		
08/28/07 18:23:30	1.17	19.20		
08/28/07 18:23:45	1.20	19.18		
08/28/07 18:24:00	1.16	19.27		
08/28/07 18:24:15	1.01	19.39		
08/28/07 18:24:30	0.96	19.40		
08/28/07 18:24:45	1.00	19.36		
08/28/07 18:25:00	1.07	19.28		
08/28/07 18:25:15	1.13	19.27		
08/28/07 18:25:30	1.04	19.36		
08/28/07 18:25:45	1.02	19.34		
08/28/07 18:26:00	1.11	19.23		
08/28/07 18:26:15	1.17	19.20		
08/28/07 18:26:30	1.19	19.17		
08/28/07 18:26:45	1.19	19.21		
08/28/07 18:27:00	1.09	19.31		
08/28/07 18:27:15	1.06	19.28		
08/28/07 18:27:30	1.16	19.18		
08/28/07 18:27:45	1.22	19.14		
08/28/07 18:28:00	1.24	19.15		
08/28/07 18:28:15	1.22	19.17		
08/28/07 18:28:30	1.25	19.12		
08/28/07 18:28:45	1.28	19.08	M5B port change	
08/28/07 18:29:00	1.29	19.10		

Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS
08/28/07 18:29:15	1.23	19.17	
08/28/07 18:29:30	1.18	19.20	
08/28/07 18:29:45	1.16	19.23	
08/28/07 18:30:00	1.12	19.27	
08/28/07 18:30:15	1.08	19.30	
08/28/07 18:30:30	1.07	19.30	
08/28/07 18:30:45	1.08	19.29	
08/28/07 18:31:00	1.06	19.31	
08/28/07 18:31:15	1.03	19.35	
08/28/07 18:31:30	0.99	19.35	
08/28/07 18:31:45	1.07	19.28	Resume M5B-3
08/28/07 18:32:00	1.10	19.27	
08/28/07 18:32:15	1.11	19.26	
08/28/07 18:32:30	1.10	19.25	
08/28/07 18:32:45	1.09	19.29	
08/28/07 18:33:00	1.01	19.37	
08/28/07 18:33:15	0.97	19.37	
08/28/07 18:33:30	1.01	19.33	
08/28/07 18:33:45	1.04	19.32	
08/28/07 18:34:00	1.06	19.28	
08/28/07 18:34:15	1.14	19.24	
08/28/07 18:34:30	1.11	19.30	
08/28/07 18:34:45	1.04	19.34	
08/28/07 18:35:00	1.05	19.30	
08/28/07 18:35:15	1.06	19.30	
08/28/07 18:35:30	1.04	19.30	
08/28/07 18:35:45	1.07	19.29	
08/28/07 18:36:00	1.07	19.31	
08/28/07 18:36:15	1.09	19.27	
08/28/07 18:36:30	1.14	19.23	
08/28/07 18:36:45	1.17	19.18	
08/28/07 18:37:00	1.15	19.21	
08/28/07 18:37:15	1.13	19.22	
08/28/07 18:37:30	1.12	19.25	
08/28/07 18:37:45	1.09	19.28	
08/28/07 18:38:00	1.07	19.29	
08/28/07 18:38:15	1.09	19.30	
08/28/07 18:38:30	1.09	19.29	
08/28/07 18:38:45	1.12	19.23	
08/28/07 18:39:00	1.22	19.14	
08/28/07 18:39:15	1.29	19.08	
08/28/07 18:39:30	1.32	19.09	
08/28/07 18:39:45	1.24	19.20	
08/28/07 18:40:00	1.14	19.24	
08/28/07 18:40:15	1.16	19.20	
08/28/07 18:40:30	1.19	19.18	
08/28/07 18:40:45	1.24	19.13	
08/28/07 18:41:00	1.23	19.19	
08/28/07 18:41:15	1.12	19.28	
08/28/07 18:41:30	1.05	19.31	
08/28/07 18:41:45	1.08	19.28	
08/28/07 18:42:00	1.09	19.29	
08/28/07 18:42:15	1.08	19.32	
08/28/07 18:42:30	1.06	19.33	
08/28/07 18:42:45	1.11	19.26	
08/28/07 18:43:00	1.17	19.23	
08/28/07 18:43:15	1.15	19.25	
08/28/07 18:43:30	1.13	19.24	
08/28/07 18:43:45	1.18	19.18	
08/28/07 18:44:00	1.27	19.11	
08/28/07 18:44:15	1.31	19.08	
08/28/07 18:44:30	1.33	19.07	
08/28/07 18:44:45	1.30	19.12	
08/28/07 18:45:00	1.29	19.12	
08/28/07 18:45:15	1.31	19.10	
08/28/07 18:45:30	1.30	19.10	
08/28/07 18:45:45	1.33	19.05	
08/28/07 18:46:00	1.38	19.02	
08/28/07 18:46:15	1.38	19.04	
08/28/07 18:46:30	1.32	19.09	
08/28/07 18:46:45	1.25	19.15	
08/28/07 18:47:00	1.20	19.19	
08/28/07 18:47:15	1.15	19.26	
08/28/07 18:47:30	1.08	19.30	
08/28/07 18:47:45	1.11	19.25	M5B-3 Port Change
08/28/07 18:48:00	1.15	19.24	
08/28/07 18:48:15	1.13	19.23	
08/28/07 18:48:30	1.16	19.21	
08/28/07 18:48:45	1.12	19.26	
08/28/07 18:49:00	1.09	19.26	

Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS
08/28/07 18:49:15	1.15	19.21	
08/28/07 18:49:30	1.16	19.22	
08/28/07 18:49:45	1.13	19.23	Resume M5B-3
08/28/07 18:50:00	1.08	19.30	
08/28/07 18:50:15	1.04	19.30	
08/28/07 18:50:30	1.07	19.29	
08/28/07 18:50:45	1.10	19.26	
08/28/07 18:51:00	1.20	19.15	
08/28/07 18:51:15	1.29	19.07	
08/28/07 18:51:30	1.34	19.06	
08/28/07 18:51:45	1.34	19.06	
08/28/07 18:52:00	1.35	19.06	
08/28/07 18:52:15	1.34	19.05	
08/28/07 18:52:30	1.38	18.99	
08/28/07 18:52:45	1.44	18.94	
08/28/07 18:53:00	1.42	19.00	
08/28/07 18:53:15	1.38	19.03	
08/28/07 18:53:30	1.36	19.06	
08/28/07 18:53:45	1.34	19.08	
08/28/07 18:54:00	1.30	19.10	
08/28/07 18:54:15	1.29	19.10	
08/28/07 18:54:30	1.29	19.12	
08/28/07 18:54:45	1.22	19.19	
08/28/07 18:55:00	1.17	19.22	
08/28/07 18:55:15	1.16	19.23	
08/28/07 18:55:30	1.13	19.28	
08/28/07 18:55:45	1.09	19.32	
08/28/07 18:56:00	1.11	19.29	
08/28/07 18:56:15	1.17	19.27	
08/28/07 18:56:30	1.14	19.32	
08/28/07 18:56:45	1.09	19.35	
08/28/07 18:57:00	1.14	19.29	
08/28/07 18:57:15	1.25	19.23	
08/28/07 18:57:30	1.25	19.25	
08/28/07 18:57:45	1.20	19.29	
08/28/07 18:58:00	1.14	19.34	
08/28/07 18:58:15	1.16	19.28	
08/28/07 18:58:30	1.24	19.22	
08/28/07 18:58:45	1.27	19.22	
08/28/07 18:59:00	1.28	19.22	
08/28/07 18:59:15	1.32	19.17	
08/28/07 18:59:30	1.37	19.14	
08/28/07 18:59:45	1.31	19.22	
08/28/07 19:00:00	1.22	19.26	
08/28/07 19:00:15	1.28	19.18	
08/28/07 19:00:30	1.34	19.16	
08/28/07 19:00:45	1.34	19.15	
08/28/07 19:01:00	1.31	19.19	
08/28/07 19:01:15	1.26	19.24	
08/28/07 19:01:30	1.21	19.29	
08/28/07 19:01:45	1.19	19.28	
08/28/07 19:02:00	1.21	19.24	
08/28/07 19:02:15	1.25	19.20	
08/28/07 19:02:30	1.26	19.23	
08/28/07 19:02:45	1.20	19.29	
08/28/07 19:03:00	1.19	19.26	
08/28/07 19:03:15	1.24	19.20	
08/28/07 19:03:30	1.28	19.17	
08/28/07 19:03:45	1.30	19.16	
08/28/07 19:04:00	1.26	19.23	
08/28/07 19:04:15	1.16	19.32	
08/28/07 19:04:30	1.07	19.40	
08/28/07 19:04:45	1.04	19.39	
08/28/07 19:05:00	1.11	19.28	
08/28/07 19:05:15	1.20	19.23	
08/28/07 19:05:30	1.18	19.28	
08/28/07 19:05:45	1.15	19.29	M5B-3 Port Change
08/28/07 19:06:00	1.18	19.25	
08/28/07 19:06:15	1.20	19.23	
08/28/07 19:06:30	1.24	19.19	
08/28/07 19:06:45	1.24	19.20	
08/28/07 19:07:00	1.24	19.19	
08/28/07 19:07:15	1.25	19.18	
08/28/07 19:07:30	1.23	19.23	
08/28/07 19:07:45	1.15	19.32	Resume M5B-3
08/28/07 19:08:00	1.08	19.36	
08/28/07 19:08:15	1.10	19.32	
08/28/07 19:08:30	1.12	19.30	
08/28/07 19:08:45	1.15	19.26	
08/28/07 19:09:00	1.22	19.17	

Range Units	10.0 %	22.8 %	
Time	Stack Oxygen	Stack CO2	COMMENTS
08/28/07 19:09:15	1.31	19.11	
08/28/07 19:09:30	1.27	19.20	
08/28/07 19:09:45	1.17	19.28	
08/28/07 19:10:00	1.15	19.26	
08/28/07 19:10:15	1.19	19.23	
08/28/07 19:10:30	1.18	19.24	
08/28/07 19:10:45	1.13	19.30	
08/28/07 19:11:00	1.09	19.31	
08/28/07 19:11:15	1.17	19.21	
08/28/07 19:11:30	1.27	19.14	
08/28/07 19:11:45	1.26	19.17	
08/28/07 19:12:00	1.21	19.22	
08/28/07 19:12:15	1.17	19.24	
08/28/07 19:12:30	1.24	19.16	
08/28/07 19:12:45	1.25	19.17	
08/28/07 19:13:00	1.22	19.20	
08/28/07 19:13:15	1.20	19.20	
08/28/07 19:13:30	1.26	19.12	
08/28/07 19:13:45	1.33	19.08	
08/28/07 19:14:00	1.32	19.12	
08/28/07 19:14:15	1.28	19.14	
08/28/07 19:14:30	1.31	19.10	
08/28/07 19:14:45	1.35	19.10	
08/28/07 19:15:00	1.30	19.15	
08/28/07 19:15:15	1.25	19.17	
08/28/07 19:15:30	1.26	19.15	
08/28/07 19:15:45	1.27	19.16	
08/28/07 19:16:00	1.19	19.25	
08/28/07 19:16:15	1.13	19.26	
08/28/07 19:16:30	1.16	19.23	
08/28/07 19:16:45	1.12	19.29	
08/28/07 19:17:00	1.08	19.28	
08/28/07 19:17:15	1.13	19.26	
08/28/07 19:17:30	1.13	19.28	
08/28/07 19:17:45	1.11	19.30	
08/28/07 19:18:00	1.06	19.34	
08/28/07 19:18:15	1.06	19.32	
08/28/07 19:18:30	1.09	19.28	
08/28/07 19:18:45	1.14	19.26	
08/28/07 19:19:00	1.11	19.29	
08/28/07 19:19:15	1.15	19.22	
08/28/07 19:19:30	1.23	19.18	
08/28/07 19:19:45	1.25	19.17	
08/28/07 19:20:00	1.27	19.18	
08/28/07 19:20:15	1.25	19.18	
08/28/07 19:20:30	1.29	19.12	
08/28/07 19:20:45	1.31	19.14	
08/28/07 19:21:00	1.26	19.19	
08/28/07 19:21:15	1.24	19.16	
08/28/07 19:21:30	1.33	19.08	
08/28/07 19:21:45	1.37	19.08	
08/28/07 19:22:00	1.36	19.09	
08/28/07 19:22:15	1.37	19.10	
08/28/07 19:22:30	1.37	19.07	
08/28/07 19:22:45	1.41	19.03	End M5B-3
08/28/07 19:23:00	1.42	19.05	
08/28/07 19:23:15	1.37	19.09	
08/28/07 19:23:30	1.34	19.11	
08/28/07 19:23:45	1.33	19.13	
08/28/07 19:24:00	1.30	19.18	
08/28/07 19:24:15	1.24	19.24	
08/28/07 19:24:30	1.53	17.93	
08/28/07 19:24:45	5.31	12.09	
08/28/07 19:25:00	7.03	6.10	
08/28/07 19:25:15	3.29	2.36	
08/28/07 19:25:30	0.72	0.71	
08/28/07 19:25:45	0.16	0.48	
08/28/07 19:26:00	0.10	0.41	
08/28/07 19:26:15	0.09	0.36	
08/28/07 19:26:30	0.08	0.34	
08/28/07 19:26:45	0.08	0.31	
08/28/07 19:27:00	0.07	0.29	
08/28/07 19:27:15	0.07	0.28	
08/28/07 19:27:30	0.07	0.27	
08/28/07 19:27:45	0.07	0.25	
08/28/07 19:28:00	0.07	0.24	
08/28/07 19:28:15	0.06	0.23	
08/28/07 19:28:30	0.06	0.22	
08/28/07 19:28:45	0.06	0.22	
08/28/07 19:29:00	0.06	0.21	

Range		10.0	22.8	COMMENTS
Units		%	%	
Time	Stack Oxygen	Stack CO2		
08/28/07 19:29:15	0.06	0.20		
08/28/07 19:29:30	0.06	0.19		
08/28/07 19:29:45	0.06	0.18		
08/28/07 19:30:00	0.06	0.18		
08/28/07 19:30:15	0.06	0.17		
08/28/07 19:30:30	0.06	0.17		
08/28/07 19:30:45	0.06	0.17		
08/28/07 19:31:00	0.06	0.17		
08/28/07 19:31:15	0.05	0.16		
08/28/07 19:31:30	0.05	0.16		
08/28/07 19:31:45	0.06	0.16		
08/28/07 19:32:00	0.06	0.16		
08/28/07 19:32:15	0.05	0.15		Post-Test Bias and Drift Check:
08/28/07 19:32:30	0.05	0.15		Zero nitrogen injection:
08/28/07 19:32:45	0.06	0.14		0.05 % db Oxygen
08/28/07 19:33:00	0.06	0.14		0.14 % db CO2
08/28/07 19:33:15	0.05	0.13		
08/28/07 19:33:30	0.06	0.14		
08/28/07 19:33:45	0.05	0.13		
08/28/07 19:34:00	0.05	0.13		
08/28/07 19:34:15	0.05	0.13		
08/28/07 19:34:30	0.06	0.97		
08/28/07 19:34:45	0.25	5.23		
08/28/07 19:35:00	0.34	4.17		
08/28/07 19:35:15	2.15	4.72		
08/28/07 19:35:30	6.69	7.69		
08/28/07 19:35:45	9.15	9.20		
08/28/07 19:36:00	9.76	9.39		
08/28/07 19:36:15	9.84	9.36		
08/28/07 19:36:30	9.86	9.35		
08/28/07 19:36:45	9.87	9.36		
08/28/07 19:37:00	9.88	9.38		
08/28/07 19:37:15	9.89	9.41		
08/28/07 19:37:30	9.90	9.46		
08/28/07 19:37:45	9.91	9.57		
08/28/07 19:38:00	9.92	9.68		
08/28/07 19:38:15	9.93	9.75		
08/28/07 19:38:30	9.94	9.79		
08/28/07 19:38:45	9.94	9.81		
08/28/07 19:39:00	9.94	9.83		
08/28/07 19:39:15	9.94	9.84		Post-Test Bias and Drift Check:
08/28/07 19:39:30	9.94	9.84		10% Oxygen/CO2 injection:
08/28/07 19:39:45	9.94	9.85		9.94 % db Oxygen
08/28/07 19:40:00	9.94	9.85		9.85 % db CO2
08/28/07 19:40:15	9.94	9.85		
08/28/07 19:40:30	9.94	9.86		
08/28/07 19:40:45				

Client Valero
Location Paulsboro, New Jersey
Source FCC FGS Stack
Date 08/29/07

Range	10.0	22.8	100.0	100.0	100.0	100.0	100.0	
Units	%	%	ppm	ppm	ppm	ppm	%	
Time	Stack Oxygen	Stack CO2	Stack SO2	Stack NOx	Stack CO	Stack VOC	Stack Methane	COMMENTS
08/29/07 6:19:15	1.36	0.13	-0.3	0.3	0.2	0.5	1.4	
08/29/07 6:19:30	0.76	0.08	-0.3	0.3	0.2	0.5	1.4	
08/29/07 6:19:45	0.70	0.06	-0.3	0.3	0.2	0.5	1.4	
08/29/07 6:20:00	0.63	0.06	-0.3	0.3	0.2	0.5	1.4	
08/29/07 6:20:15	0.60	0.06	-0.3	0.3	0.2	0.4	1.4	
08/29/07 6:20:30	0.57	0.05	-0.3	0.3	0.2	0.5	1.4	
08/29/07 6:20:45	0.57	0.05	-0.3	0.3	0.2	0.5	1.4	
08/29/07 6:21:00	0.55	0.05	-0.3	0.3	0.2	0.5	1.4	
08/29/07 6:21:15	0.55	0.05	-0.2	0.3	0.2	0.5	1.4	
08/29/07 6:21:30	0.54	0.05	-0.2	0.3	0.2	0.5	1.4	
08/29/07 6:21:45	0.53	0.05	-0.3	0.3	0.2	0.5	1.1	
08/29/07 6:22:00	0.53	0.05	-0.3	0.3	0.2	0.5	0.9	
08/29/07 6:22:15	0.44	0.05	-0.3	0.3	0.0	0.8	0.9	
08/29/07 6:22:30	0.15	0.04	-0.3	0.3	-0.3	1.3	0.9	
08/29/07 6:22:45	0.02	0.03	-0.3	0.3	0.2	1.4	0.9	
08/29/07 6:23:00	0.00	0.03	-0.3	0.3	-0.3	1.6	0.9	
08/29/07 6:23:15	0.00	0.03	-0.3	0.3	0.2	1.7	0.9	Calibration Error Test:
08/29/07 6:23:30	0.00	0.03	-0.3	0.3	0.2	1.7	0.9	Zero nitrogen injection:
08/29/07 6:23:45	0.00	0.03	-0.2	0.3	0.2	1.9	0.9	0.00 % db Oxygen
08/29/07 6:24:00	0.00	0.03	-0.2	0.3	0.2	2.2	0.9	0.03 % db CO2
08/29/07 6:24:15	0.00	0.03	-0.2	0.3	0.2	2.5	0.9	-0.21 ppmv db SO2
08/29/07 6:24:30	0.00	0.03	-0.2	0.3	0.2	2.7	0.9	0.26 ppmv db NOx
08/29/07 6:24:45	-0.01	0.03	-0.2	0.3	0.2	2.5	0.9	0.23 ppmv db CO
08/29/07 6:25:00	0.00	0.03	-0.3	0.3	0.2	2.3	0.9	
08/29/07 6:25:15	-0.01	0.03	-0.3	0.3	0.0	2.7	0.9	
08/29/07 6:25:30	-0.01	0.03	-0.3	0.3	-1.3	2.5	0.9	
08/29/07 6:25:45	0.04	0.28	-0.2	0.3	-1.8	2.8	0.9	
08/29/07 6:26:00	2.45	3.78	0.0	0.3	-1.8	2.7	0.9	
08/29/07 6:26:15	6.90	6.84	0.0	0.3	-1.8	2.7	0.9	
08/29/07 6:26:30	9.23	7.93	0.0	0.3	-1.8	2.6	0.9	
08/29/07 6:26:45	9.74	7.86	0.0	0.3	-1.8	2.7	0.9	
08/29/07 6:27:00	9.81	8.24	0.0	0.3	-1.8	3.0	0.9	
08/29/07 6:27:15	9.90	9.08	-0.1	0.3	-1.8	3.2	0.9	
08/29/07 6:27:30	9.97	9.50	0.0	0.3	-1.8	3.4	0.9	Calibration Error Test:
08/29/07 6:27:45	10.00	9.64	0.0	0.3	-1.8	3.1	1.1	10.0% Oxygen injection:
08/29/07 6:28:00	9.99	9.70	0.0	0.3	-1.8	3.3	1.4	9.99 % db Oxygen
08/29/07 6:28:15	9.98	9.75	0.0	0.3	-1.8	3.2	1.4	
08/29/07 6:28:30	9.98	9.80	-0.1	0.3	-1.8	3.4	1.4	
08/29/07 6:28:45	9.98	9.85	0.0	0.3	-1.8	3.4	1.4	
08/29/07 6:29:00	9.98	9.87	0.0	0.3	-1.8	3.3	1.4	
08/29/07 6:29:15	9.98	9.89	0.0	0.3	-1.8	3.3	1.4	
08/29/07 6:29:30	9.51	8.61	0.0	0.3	-1.8	3.4	1.4	
08/29/07 6:29:45	7.03	6.20	0.0	0.3	-1.8	3.6	1.4	
08/29/07 6:30:00	5.34	5.32	0.0	0.3	-1.8	3.4	1.4	
08/29/07 6:30:15	5.00	5.21	0.0	0.3	-1.8	3.4	1.4	
08/29/07 6:30:30	4.97	5.19	0.0	0.3	-1.8	3.3	1.4	
08/29/07 6:30:45	4.97	5.19	0.0	0.3	-1.8	3.3	1.1	
08/29/07 6:31:00	4.97	5.19	0.0	0.3	-1.8	3.4	0.9	Calibration Error Test:
08/29/07 6:31:15	4.97	5.19	0.0	0.3	-1.8	3.4	0.9	5.0% Oxygen injection:
08/29/07 6:31:30	4.97	5.19	0.0	0.3	-1.8	3.3	0.9	4.97 % db Oxygen
08/29/07 6:31:45	4.97	5.19	0.0	0.3	-1.8	3.2	0.9	
08/29/07 6:32:00	4.97	5.19	0.0	0.3	-1.8	3.3	0.9	
08/29/07 6:32:15	4.97	5.19	0.0	0.3	-2.8	3.3	0.9	
08/29/07 6:32:30	5.06	5.78	-0.2	0.3	-2.8	3.5	0.9	
08/29/07 6:32:45	8.76	12.13	0.0	0.3	-2.8	3.5	0.9	
08/29/07 6:33:00	15.42	17.73	0.0	0.3	-2.8	3.4	0.9	
08/29/07 6:33:15	19.96	21.02	0.0	0.3	-2.8	3.4	0.9	
08/29/07 6:33:30	22.07	22.41	0.0	0.3	-2.8	3.6	0.9	
08/29/07 6:33:45	22.58	22.65	0.0	0.3	-2.8	3.4	0.9	
08/29/07 6:34:00	22.63	22.70	0.0	0.3	-2.8	3.5	0.9	
08/29/07 6:34:15	22.64	22.73	0.0	0.3	-2.8	3.4	0.9	
08/29/07 6:34:30	22.64	22.75	0.0	0.3	-2.8	3.5	0.9	
08/29/07 6:34:45	22.64	22.77	0.0	0.3	-2.8	3.4	0.9	Calibration Error Test:
08/29/07 6:35:00	22.65	22.77	0.0	0.3	-2.8	3.5	0.9	22.62% CO2 injection:
08/29/07 6:35:15	22.65	22.78	0.0	0.3	-2.8	3.5	0.9	22.79 % db CO2
08/29/07 6:35:30	22.65	22.79	0.0	0.3	-2.8	3.6	0.9	
08/29/07 6:35:45	22.65	22.80	0.0	0.3	-2.8	3.7	0.9	
08/29/07 6:36:00	22.48	21.89	0.0	0.3	-2.8	3.8	0.9	
08/29/07 6:36:15	19.06	16.72	0.0	0.3	-2.5	3.7	0.9	
08/29/07 6:36:30	13.85	12.52	0.0	0.3	-1.8	3.7	0.9	
08/29/07 6:36:45	10.88	10.44	0.0	0.3	-1.8	3.7	0.9	
08/29/07 6:37:00	10.08	10.06	0.0	0.3	-1.8	3.7	0.9	Calibration Error Test:
08/29/07 6:37:15	10.00	10.02	0.0	0.3	-1.8	3.7	0.9	10.0% CO2 injection:
08/29/07 6:37:30	9.99	10.00	0.0	0.3	-1.8	3.6	0.9	10.00 % db CO2
08/29/07 6:37:45	9.98	9.99	0.0	0.3	-1.8	3.6	0.9	
08/29/07 6:38:00	9.98	9.98	0.0	0.3	-1.8	3.5	0.9	
08/29/07 6:38:15	9.98	9.97	0.0	0.3	-1.8	3.5	0.9	
08/29/07 6:38:30	9.94	9.68	0.0	0.3	0.5	3.7	0.9	
08/29/07 6:38:45	7.84	6.14	0.0	0.3	1.2	3.6	0.9	
08/29/07 6:39:00	3.60	2.50	0.0	0.3	1.2	3.5	0.9	
08/29/07 6:39:15	0.92	0.52	0.0	0.3	1.2	3.8	0.9	
08/29/07 6:39:30	0.12	0.19	0.0	0.3	1.2	3.7	0.9	
08/29/07 6:39:45	0.02	0.14	0.0	0.3	1.2	3.7	1.1	
08/29/07 6:40:00	0.01	0.13	0.0	0.3	1.2	3.5	1.4	
08/29/07 6:40:15	0.00	0.12	0.0	0.3	1.2	3.7	1.4	
08/29/07 6:40:30	0.00	0.11	0.0	0.3	1.2	3.5	1.4	
08/29/07 6:40:45	0.00	0.10	-0.1	0.3	1.2	3.4	1.4	
08/29/07 6:41:00	0.00	0.10	0.0	0.3	1.2	3.6	1.4	
08/29/07 6:41:15	0.00	0.09	0.0	0.3	1.2	3.5	1.4	
08/29/07 6:41:30	-0.01	0.09	0.1	0.3	1.2	3.3	1.4	
08/29/07 6:41:45	0.00	0.09	7.3	0.3	1.2	3.5	1.4	
08/29/07 6:42:00	0.12	0.09	12.0	0.3	1.2	3.5	1.4	
08/29/07 6:42:15	0.15	0.08	13.8	0.8	1.2	3.6	1.4	
08/29/07 6:42:30	0.05	0.08	20.1	1.0	1.2	3.7	1.4	

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08/29/07 6:42:45	0.02	0.08	29.4	0.3	1.2	3.3	1.1
08/29/07 6:43:00	0.04	0.09	44.9	0.3	1.2	3.4	0.9
08/29/07 6:43:15	0.06	0.10	55.6	0.3	1.2	3.5	0.9
08/29/07 6:43:30	0.06	0.10	74.5	0.3	1.2	3.4	0.9
08/29/07 6:43:45	0.02	0.08	95.7	0.3	1.2	3.4	0.9
08/29/07 6:44:00	0.00	0.07	102.3	0.3	1.2	3.6	0.9
08/29/07 6:44:15	-0.01	0.07	104.2	0.3	1.2	3.5	0.9
08/29/07 6:44:30	-0.01	0.06	105.2	0.3	1.2	3.7	0.9
08/29/07 6:44:45	-0.01	0.06	105.8	0.3	1.2	3.6	0.9
08/29/07 6:45:00	-0.01	0.07	106.0	0.3	1.2	3.6	0.9
08/29/07 6:45:15	-0.01	0.06	106.3	0.3	1.2	3.6	0.9
08/29/07 6:45:30	-0.01	0.06	106.6	0.3	1.2	3.9	0.9
08/29/07 6:45:45	-0.01	0.06	106.6	0.3	1.2	3.5	0.9
08/29/07 6:46:00	-0.01	0.06	106.6	0.3	1.2	3.5	0.9
08/29/07 6:46:15	-0.01	0.05	106.9	0.3	1.2	3.7	0.9
08/29/07 6:46:30	-0.03	0.06	106.9	0.3	1.2	3.5	0.9
08/29/07 6:46:45	-0.02	0.05	106.9	0.3	1.2	3.4	0.9
08/29/07 6:47:00	-0.01	0.06	106.9	0.3	1.2	3.4	0.9
08/29/07 6:47:15	-0.01	0.05	103.8	0.3	1.2	3.9	0.9
08/29/07 6:47:30	-0.01	0.05	100.5	0.3	1.2	3.5	0.9
Calibration Error Test:							
08/29/07 6:47:45	-0.02	0.05	100.8	0.3	1.2	3.5	0.9
08/29/07 6:48:00	-0.02	0.05	100.8	0.3	1.2	3.6	0.9
08/29/07 6:48:15	-0.02	0.05	101.0	0.3	1.2	3.9	0.9
08/29/07 6:48:30	-0.01	0.05	101.1	0.3	1.2	3.7	0.9
100 ppm SO2 injection: 100.89 ppmv db SO2							
08/29/07 6:48:45	-0.02	0.05	101.2	0.3	1.2	3.5	0.6
08/29/07 6:49:00	-0.02	0.05	99.4	0.3	1.2	3.8	0.4
08/29/07 6:49:15	-0.01	0.08	75.2	0.3	1.2	3.8	0.4
08/29/07 6:49:30	0.06	0.13	55.9	0.3	1.2	3.9	0.4
08/29/07 6:49:45	0.02	0.07	51.4	0.3	1.2	3.7	0.4
08/29/07 6:50:00	-0.01	0.05	50.5	0.3	1.2	3.8	0.4
08/29/07 6:50:15	-0.02	0.05	50.1	0.3	1.2	3.5	0.4
Calibration Error Test:							
08/29/07 6:50:30	-0.02	0.05	49.9	0.3	1.2	3.5	0.4
08/29/07 6:50:45	-0.02	0.05	49.8	0.3	1.2	3.7	0.4
08/29/07 6:51:00	-0.02	0.05	49.8	0.3	1.2	3.7	0.4
08/29/07 6:51:15	-0.02	0.05	49.8	0.3	1.2	3.6	0.4
50 ppm SO2 injection: 49.80 ppmv db SO2							
08/29/07 6:51:30	-0.02	0.05	49.8	0.3	1.2	3.4	0.4
08/29/07 6:51:45	-0.02	0.05	49.8	0.3	1.2	3.4	0.4
08/29/07 6:52:00	-0.02	0.04	49.7	0.3	1.2	3.3	0.4
08/29/07 6:52:15	-0.02	0.04	42.8	0.3	1.2	3.2	0.4
08/29/07 6:52:30	-0.02	0.04	26.9	0.3	1.2	3.6	0.4
08/29/07 6:52:45	-0.02	0.04	21.9	0.3	1.2	3.6	0.4
08/29/07 6:53:00	-0.02	0.04	20.8	0.3	1.2	3.5	0.4
08/29/07 6:53:15	-0.02	0.04	20.4	0.3	1.2	3.1	0.4
08/29/07 6:53:30	-0.02	0.04	20.1	0.3	1.2	3.5	0.4
Calibration Error Test:							
08/29/07 6:53:45	-0.02	0.04	20.1	0.3	1.2	3.5	0.4
08/29/07 6:54:00	-0.02	0.04	19.8	0.3	1.2	3.8	0.4
08/29/07 6:54:15	-0.02	0.04	19.8	0.3	1.2	3.8	0.4
08/29/07 6:54:30	-0.02	0.04	19.8	0.3	1.2	3.7	0.4
20 ppm SO2 injection: 19.91 ppmv db SO2							
08/29/07 6:54:45	-0.02	0.04	19.8	0.3	1.2	3.5	0.6
08/29/07 6:55:00	-0.02	0.04	19.8	0.3	1.2	3.4	0.9
08/29/07 6:55:15	-0.02	0.04	19.8	0.3	1.2	3.5	0.9
08/29/07 6:55:30	-0.02	0.04	19.4	0.3	1.2	3.7	0.9
08/29/07 6:55:45	-0.02	0.04	14.2	0.3	1.2	3.4	0.9
08/29/07 6:56:00	-0.01	0.04	16.8	0.5	1.2	3.6	0.9
08/29/07 6:56:15	0.12	0.04	9.1	2.3	1.2	3.8	0.9
08/29/07 6:56:30	0.29	0.04	5.9	7.0	1.2	3.7	0.9
08/29/07 6:56:45	0.22	0.05	5.6	22.3	1.2	3.8	0.9
08/29/07 6:57:00	0.08	0.05	3.2	28.5	1.2	3.5	0.9
08/29/07 6:57:15	0.00	0.04	1.4	9.3	1.2	3.6	0.9
08/29/07 6:57:30	-0.02	0.04	0.9	1.3	1.2	3.9	0.9
08/29/07 6:57:45	-0.02	0.04	0.6	0.5	1.2	3.8	0.5
08/29/07 6:58:00	-0.02	0.03	0.6	3.3	1.2	3.6	0.4
08/29/07 6:58:15	-0.02	0.03	0.6	31.8	1.2	3.7	0.4
08/29/07 6:58:30	-0.01	0.04	0.6	69.0	1.2	3.7	0.4
08/29/07 6:58:45	-0.02	0.04	0.3	83.3	1.2	3.5	0.4
08/29/07 6:59:00	-0.02	0.04	0.3	85.3	1.2	3.4	0.4
08/29/07 6:59:15	-0.02	0.04	0.3	86.0	1.2	3.4	0.4
08/29/07 6:59:30	-0.02	0.04	0.3	87.8	1.2	3.5	0.4
08/29/07 6:59:45	-0.02	0.03	0.3	91.5	1.2	3.4	0.4
08/29/07 7:00:00	-0.02	0.03	0.3	94.5	1.2	3.5	0.4
08/29/07 7:00:15	-0.02	0.03	0.3	96.0	1.2	3.7	0.4
08/29/07 7:00:30	-0.02	0.03	0.3	97.3	1.2	3.6	0.4
08/29/07 7:00:45	-0.02	0.03	0.3	97.3	1.2	3.7	0.4
08/29/07 7:01:00	-0.02	0.03	0.3	97.3	1.2	3.5	0.4
08/29/07 7:01:15	-0.01	0.03	0.2	97.3	1.2	3.5	0.4
08/29/07 7:01:30	-0.01	0.03	0.1	97.3	1.2	3.3	0.4
08/29/07 7:01:45	-0.02	0.03	0.3	98.0	1.2	3.4	0.4
08/29/07 7:02:00	-0.02	0.03	0.1	100.3	1.2	3.5	0.4
Calibration Error Test:							
08/29/07 7:02:15	-0.01	0.04	0.1	100.3	1.2	3.3	0.4
08/29/07 7:02:30	-0.02	0.03	0.1	100.3	1.2	3.3	0.4
08/29/07 7:02:45	-0.02	0.03	0.1	101.0	1.2	3.4	0.4
08/29/07 7:03:00	-0.02	0.04	0.2	101.3	1.2	3.7	0.4
100 ppm NOx injection: 100.71 ppmv db NOx							
08/29/07 7:03:15	-0.02	0.04	0.3	101.3	1.2	3.6	0.4
08/29/07 7:03:30	-0.02	0.03	0.0	101.3	1.2	3.6	0.4
08/29/07 7:03:45	-0.02	0.04	1.1	101.3	1.2	3.3	0.4
08/29/07 7:04:00	-0.02	0.04	7.7	91.5	1.2	3.2	0.4
08/29/07 7:04:15	-0.02	0.03	4.9	58.5	1.2	3.3	0.4
08/29/07 7:04:30	-0.02	0.03	1.5	50.3	1.2	3.4	0.4
08/29/07 7:04:45	-0.02	0.04	0.6	50.3	1.2	3.3	0.4
08/29/07 7:05:00	-0.02	0.04	0.3	50.3	1.2	3.2	0.4
Calibration Error Test:							
08/29/07 7:05:15	-0.02	0.04	0.3	50.3	1.2	3.1	0.4
08/29/07 7:05:30	-0.02	0.03	0.3	50.3	1.2	3.4	0.4
08/29/07 7:05:45	-0.02	0.04	0.1	50.3	1.2	3.4	0.4
08/29/07 7:06:00	-0.02	0.04	0.2	50.5	1.2	3.7	0.4
50 ppm NOx injection: 50.33 ppmv db NOx							
08/29/07 7:06:15	-0.02	0.04	0.1	51.3	1.2	3.3	0.4
08/29/07 7:06:30	-0.02	0.04	0.0	36.8	1.2	3.4	0.4
08/29/07 7:06:45	-0.02	0.04	0.0	20.3	1.2	3.6	0.4
08/29/07 7:07:00	-0.02	0.03	0.0	20.6	1.2	3.4	0.4
08/29/07 7:07:15	-0.02	0.03	0.0	21.3	1.2	3.3	0.4

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08/29/07 7:07:30	-0.03	0.03	0.0	21.3	1.2	3.6	0.4	
08/29/07 7:07:45	-0.03	0.04	0.0	21.3	1.2	3.4	0.4	
08/29/07 7:08:00	-0.02	0.04	0.0	21.3	1.2	3.4	0.4	Calibration Error Test:
08/29/07 7:08:15	-0.02	0.04	0.0	21.3	1.2	3.2	0.4	20 ppm NOx injection:
08/29/07 7:08:30	-0.02	0.03	0.0	21.3	1.2	3.4	0.4	21.26 ppmv db NOx
08/29/07 7:08:45	-0.02	0.03	0.0	21.3	1.2	3.4	0.4	
08/29/07 7:09:00	-0.02	0.03	0.0	21.3	1.2	3.4	0.4	
08/29/07 7:09:15	-0.02	0.04	0.0	21.3	1.2	3.5	0.4	
08/29/07 7:09:30	-0.02	0.03	0.0	21.3	1.2	3.3	0.4	
08/29/07 7:09:45	-0.02	0.03	0.0	21.3	1.2	3.3	0.4	
08/29/07 7:10:00	-0.03	0.03	0.0	21.3	2.5	3.4	0.4	
08/29/07 7:10:15	-0.03	0.03	0.0	21.3	16.7	3.4	0.4	
08/29/07 7:10:30	-0.02	0.04	0.1	20.3	64.5	3.2	0.4	
08/29/07 7:10:45	0.11	0.04	0.4	25.5	90.2	3.3	0.4	
08/29/07 7:11:00	0.67	0.04	0.3	8.7	101.7	3.3	0.4	Calibration Error Test:
08/29/07 7:11:15	0.37	0.04	0.3	2.8	100.7	3.3	0.4	100 ppm CO injection:
08/29/07 7:11:30	0.06	0.04	0.0	1.2	100.2	3.2	0.4	100.33 ppmv db CO
08/29/07 7:11:45	-0.01	0.04	0.0	1.2	100.2	3.3	0.4	
08/29/07 7:12:00	-0.02	0.04	0.3	1.2	100.2	3.3	0.4	
08/29/07 7:12:15	-0.02	0.03	0.1	1.2	99.2	3.5	0.4	
08/29/07 7:12:30	-0.02	0.03	0.0	1.2	73.7	3.5	0.4	
08/29/07 7:12:45	-0.02	0.03	0.2	1.2	54.7	3.3	0.4	
08/29/07 7:13:00	-0.02	0.03	1.6	10.3	49.5	3.2	0.4	
08/29/07 7:13:15	-0.02	0.03	1.4	8.2	50.2	3.3	0.4	Calibration Error Test:
08/29/07 7:13:30	-0.02	0.03	0.6	1.7	50.2	3.3	0.4	50 ppm CO injection:
08/29/07 7:13:45	-0.02	0.03	0.3	0.5	50.2	3.3	0.4	50.22 ppmv db CO
08/29/07 7:14:00	-0.02	0.04	0.3	0.2	50.2	3.2	0.4	
08/29/07 7:14:15	-0.02	0.03	0.1	0.2	50.2	3.3	0.4	
08/29/07 7:14:30	-0.02	0.03	0.0	0.2	50.2	3.1	0.4	
08/29/07 7:14:45	-0.02	0.04	0.0	0.2	48.7	3.2	0.4	
08/29/07 7:15:00	-0.02	0.03	0.0	0.2	33.7	3.1	0.4	
08/29/07 7:15:15	-0.02	0.04	0.0	0.2	23.7	3.4	0.4	
08/29/07 7:15:30	-0.02	0.03	0.4	0.2	20.2	3.3	0.4	Calibration Error Test:
08/29/07 7:15:45	-0.02	0.04	0.6	0.2	21.0	3.3	0.4	20 ppm CO injection:
08/29/07 7:16:00	-0.02	0.04	0.4	0.2	21.2	3.1	0.4	20.98 ppmv db CO
08/29/07 7:16:15	-0.03	0.03	0.3	0.2	20.5	3.2	0.4	
08/29/07 7:16:30	-0.02	0.03	0.0	0.2	21.2	3.2	0.4	
08/29/07 7:16:45	-0.02	0.03	0.0	0.2	21.2	3.2	0.4	
08/29/07 7:17:00	-0.02	0.03	0.0	0.2	21.5	3.2	0.4	
08/29/07 7:17:15	-0.02	0.03	0.0	0.2	21.5	3.2	0.4	
08/29/07 7:17:30	-0.02	0.03	0.2	0.2	14.5	3.2	0.4	
08/29/07 7:17:45	-0.02	0.04	0.3	210.3	6.2	3.3	0.4	
08/29/07 7:18:00	0.01	0.04	0.3	770.4	5.7	3.3	0.4	
08/29/07 7:18:15	0.02	0.04	0.4	976.7	6.5	3.5	0.4	
08/29/07 7:18:30	0.32	0.04	0.9	909.4	3.0	3.3	0.4	
08/29/07 7:18:45	1.54	0.04	1.1	536.4	1.5	3.3	0.4	
08/29/07 7:19:00	0.76	0.03	0.7	143.8	1.2	3.4	0.4	
08/29/07 7:19:15	0.09	0.03	0.4	60.5	1.2	3.3	0.4	
08/29/07 7:19:30	-0.01	0.04	0.3	48.8	1.2	3.2	0.4	
08/29/07 7:19:45	-0.02	0.04	0.3	45.5	1.2	3.3	0.4	
08/29/07 7:20:00	-0.02	0.04	0.3	45.8	1.2	3.2	0.4	
08/29/07 7:20:15	-0.02	0.04	0.3	46.3	1.2	3.1	0.4	
08/29/07 7:20:30	-0.03	0.04	0.3	46.3	1.2	3.4	0.4	
08/29/07 7:20:45	-0.02	0.03	0.3	46.3	1.2	3.4	0.4	
08/29/07 7:21:00	-0.02	0.03	0.3	46.3	1.2	3.4	0.4	
08/29/07 7:21:15	-0.02	0.03	0.3	46.3	1.2	3.6	0.4	
08/29/07 7:21:30	-0.02	0.03	0.3	46.3	1.2	3.5	0.4	
08/29/07 7:21:45	-0.02	0.03	0.3	46.3	1.2	3.3	0.4	
08/29/07 7:22:00	-0.02	0.03	0.3	47.6	1.2	3.2	0.4	
08/29/07 7:22:15	-0.02	0.04	0.3	47.6	1.2	3.2	0.4	
08/29/07 7:22:30	-0.02	0.03	0.3	47.6	1.2	3.2	0.4	
08/29/07 7:22:45	-0.02	0.03	0.3	47.6	1.2	3.4	0.4	
08/29/07 7:23:00	-0.02	0.03	0.3	47.6	1.2	3.3	0.4	
08/29/07 7:23:15	-0.02	0.03	0.3	46.5	1.2	3.3	0.4	
08/29/07 7:23:30	-0.02	0.04	0.3	48.2	1.2	3.3	0.4	
08/29/07 7:23:45	-0.02	0.04	0.3	48.3	1.2	3.1	0.4	
08/29/07 7:24:00	-0.02	0.03	0.3	48.3	1.2	3.5	0.4	
08/29/07 7:24:15	-0.02	0.03	0.3	48.3	1.2	3.4	0.4	
08/29/07 7:24:30	-0.02	0.03	0.3	48.3	1.2	3.4	0.4	
08/29/07 7:24:45	-0.02	0.04	0.3	48.3	1.2	3.2	0.4	
08/29/07 7:25:00	-0.02	0.04	0.3	48.3	1.2	3.2	0.4	
08/29/07 7:25:15	-0.02	0.03	0.3	48.2	1.2	3.1	0.4	
08/29/07 7:25:30	-0.02	0.03	0.3	48.3	1.2	3.0	0.4	
08/29/07 7:25:45	-0.02	0.03	0.3	48.3	1.2	3.0	0.4	
08/29/07 7:26:00	-0.02	0.04	0.3	48.3	1.2	3.3	0.4	
08/29/07 7:26:15	-0.02	0.04	0.3	48.2	1.2	3.2	0.4	
08/29/07 7:26:30	-0.02	0.04	0.3	48.2	1.2	3.2	0.4	
08/29/07 7:26:45	-0.02	0.04	0.3	48.3	1.2	3.1	0.4	
08/29/07 7:27:00	-0.02	0.03	0.3	48.2	1.2	3.1	0.4	NOx low-temp converter efficiency check:
08/29/07 7:27:15	-0.02	0.04	0.3	48.2	1.2	3.1	0.4	Cylinder #ALM-036051
08/29/07 7:27:30	-0.02	0.03	0.3	48.2	1.2	3.3	0.4	52.7 ppmv NO2 injection:
08/29/07 7:27:45	-0.02	0.03	0.3	48.3	1.2	2.9	0.4	48.25 ppmv db NO2
08/29/07 7:28:00	-0.02	0.03	0.3	48.2	1.2	3.2	0.4	Converter Effy. %: 91.6
08/29/07 7:28:15	-0.02	0.03	0.3	48.2	1.2	3.4	0.4	
08/29/07 7:28:30	-0.02	0.03	0.3	48.2	1.2	3.3	0.4	
08/29/07 7:28:45	-0.02	0.03	0.3	48.2	1.2	3.2	0.4	
08/29/07 7:29:00	-0.02	0.04	0.3	48.2	1.2	3.2	0.4	
08/29/07 7:29:15	-0.02	0.04	0.3	48.2	1.2	3.1	0.4	
08/29/07 7:29:30	-0.02	0.04	0.3	48.3	1.7	3.1	0.4	
08/29/07 7:29:45	-0.02	0.04	0.3	48.2	2.2	3.3	0.4	
08/29/07 7:30:00	0.01	0.03	0.4	43.7	3.2	3.4	0.4	
08/29/07 7:30:15	4.00	0.06	0.6	19.5	3.2	3.7	0.4	
08/29/07 7:30:30	14.50	0.09	0.6	8.2	3.7	2.0	0.4	
08/29/07 7:30:45	19.78	0.10	0.6	3.2	4.2	0.8	0.4	
08/29/07 7:31:00	20.71	0.10	0.6	2.7	3.7	0.8	0.4	
08/29/07 7:31:15	20.64	0.11	0.6	2.2	3.2	0.8	0.4	
08/29/07 7:31:30	15.03	0.08	0.6	2.2	4.2	0.7	0.4	
08/29/07 7:31:45	4.64	0.05	0.6	2.2	4.2	0.7	0.4	
08/29/07 7:32:00	0.79	0.05	0.6	1.7	4.2	0.7	0.4	

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08/29/07 7:32:15	0.31	0.05	0.6	1.2	4.2	0.8	0.4	
08/29/07 7:32:30	0.24	0.05	0.6	1.2	1.2	0.8	0.4	
08/29/07 7:32:45	0.21	0.05	0.6	1.2	0.2	0.8	0.4	
08/29/07 7:33:00	0.19	0.05	0.6	1.2	0.2	0.8	0.4	
08/29/07 7:33:15	0.17	0.04	0.6	1.2	0.2	1.0	0.4	
08/29/07 7:33:30	0.17	0.04	0.6	1.2	0.2	0.8	0.4	
08/29/07 7:33:45	0.16	0.04	0.6	1.2	0.2	0.8	0.4	
08/29/07 7:34:00	0.15	0.05	0.7	1.2	0.2	0.7	0.4	
08/29/07 7:34:15	0.14	0.05	0.9	1.2	0.2	3.5	0.4	
08/29/07 7:34:30	0.14	0.05	0.9	1.2	0.2	2.6	0.4	Oxygen upscale RT
08/29/07 7:34:45	0.13	0.05	0.9	1.2	0.2	0.8	0.4	
08/29/07 7:35:00	0.48	0.05	1.1	1.2	0.2	1.6	0.4	
08/29/07 7:35:15	6.62	0.06	1.2	1.2	0.2	1.1	0.4	
08/29/07 7:35:30	8.69	0.05	1.2	1.2	-0.3	0.7	0.4	
08/29/07 7:35:45	2.76	0.71	1.3	8.7	-0.8	0.7	0.4	
08/29/07 7:36:00	2.71	3.19	1.5	6.0	-0.8	0.8	0.4	
08/29/07 7:36:15	4.40	4.58	1.5	2.0	-0.8	0.7	0.4	
08/29/07 7:36:30	4.89	4.87	1.7	1.2	-0.8	0.8	0.4	
08/29/07 7:36:45	4.96	4.92	1.9	1.2	-0.8	0.7	0.4	System Bias Check:
08/29/07 7:37:00	4.98	4.92	2.1	1.2	-0.8	0.8	0.4	5.0% Oxygen injection:
08/29/07 7:37:15	5.00	4.90	2.2	1.2	-0.8	0.7	0.4	5.00 % db Oxygen
08/29/07 7:37:30	5.01	4.90	2.4	1.2	-0.8	0.7	0.4	
08/29/07 7:37:45	5.01	4.89	2.4	1.2	-0.8	0.8	0.4	
08/29/07 7:38:00	5.02	4.89	2.5	1.2	-0.8	0.7	0.4	
08/29/07 7:38:15	5.02	4.89	2.7	1.2	-0.8	0.8	0.4	CH4 GC calibration:
08/29/07 7:38:30	5.03	4.89	2.7	1.2	-0.8	4.4	0.4	Zero nitrogen injection #1:
08/29/07 7:38:45	5.03	4.89	2.7	1.2	-0.8	0.9	0.4	0.40 ppmv CH4
08/29/07 7:39:00	5.03	4.89	3.0	1.2	-0.8	0.7	0.4	
08/29/07 7:39:15	5.58	4.38	3.0	1.2	-1.5	0.8	0.4	
08/29/07 7:39:30	9.18	3.59	2.7	1.2	-2.3	0.6	0.4	
08/29/07 7:39:45	9.03	8.17	2.7	1.2	-2.0	0.5	0.4	
08/29/07 7:40:00	13.52	14.80	2.7	1.2	-1.8	0.5	0.4	
08/29/07 7:40:15	18.60	18.94	2.7	1.2	-1.8	0.6	0.4	CO2 upscale RT
08/29/07 7:40:30	21.40	21.22	2.7	1.2	-1.8	0.5	0.4	
08/29/07 7:40:45	22.31	21.95	2.7	0.2	-1.8	0.6	0.4	
08/29/07 7:41:00	22.46	22.13	2.7	0.2	-1.8	0.5	0.4	CH4 GC calibration:
08/29/07 7:41:15	22.48	22.21	2.7	0.2	-1.8	0.5	0.4	Zero nitrogen injection #2:
08/29/07 7:41:30	22.49	22.26	2.7	0.2	-1.8	0.6	0.4	0.40 ppmv CH4
08/29/07 7:41:45	22.49	22.29	2.7	0.2	-1.8	0.5	0.4	
08/29/07 7:42:00	22.50	22.31	2.7	0.2	-1.8	0.5	0.4	
08/29/07 7:42:15	22.50	22.34	2.7	0.2	-2.0	0.5	0.4	Total VOC calibration:
08/29/07 7:42:30	22.51	22.36	2.7	0.2	-2.3	0.5	0.4	Zero nitrogen injection:
08/29/07 7:42:45	22.51	22.37	2.7	0.2	-1.8	0.4	0.4	0.48 ppmv CH4
08/29/07 7:43:00	22.51	22.39	2.7	0.2	-1.8	0.4	0.4	
08/29/07 7:43:15	22.51	22.39	2.7	0.2	-1.8	0.5	0.4	
08/29/07 7:43:30	22.51	22.41	2.7	0.2	-1.8	1.0	0.4	
08/29/07 7:43:45	22.51	22.42	2.7	0.2	-2.5	0.4	0.4	CH4 GC calibration:
08/29/07 7:44:00	22.51	22.43	2.6	0.2	-2.3	0.4	0.4	Zero nitrogen injection #3:
08/29/07 7:44:15	22.52	22.43	2.4	0.2	-1.8	0.4	0.4	0.40 ppmv CH4
08/29/07 7:44:30	22.51	22.44	2.4	0.2	-1.8	0.4	0.4	
08/29/07 7:44:45	22.52	22.44	2.4	0.2	-1.8	0.4	0.4	
08/29/07 7:45:00	22.52	22.45	2.2	0.2	-2.3	0.4	0.4	
08/29/07 7:45:15	22.51	22.45	2.1	0.2	-2.3	0.4	0.4	System Bias Check:
08/29/07 7:45:30	22.52	22.46	2.1	0.2	-2.3	0.4	0.4	22.82% CO2 injection:
08/29/07 7:45:45	22.52	22.46	2.1	0.2	-1.8	18.4	0.4	22.46 % db CO2
08/29/07 7:46:00	22.52	22.47	2.1	0.2	-1.3	18.8	0.4	
08/29/07 7:46:15	22.52	22.47	2.1	0.2	1.0	16.4	0.4	
08/29/07 7:46:30	22.48	22.42	2.2	1.0	2.2	15.7	0.4	
08/29/07 7:46:45	19.00	21.25	2.6	11.2	2.5	15.2	0.4	
08/29/07 7:47:00	9.25	19.76	3.6	18.0	3.2	15.1	0.4	
08/29/07 7:47:15	3.08	19.16	14.8	20.2	2.7	15.4	0.4	
08/29/07 7:47:30	1.67	19.10	16.1	20.2	3.2	15.4	0.4	
08/29/07 7:47:45	1.50	19.08	17.0	20.2	4.0	14.8	0.4	
08/29/07 7:48:00	1.46	19.06	17.8	20.2	3.7	14.8	0.4	
08/29/07 7:48:15	1.41	19.10	18.4	19.2	3.2	14.7	0.4	
08/29/07 7:48:30	1.32	19.15	18.8	19.2	3.2	14.8	0.4	
08/29/07 7:48:45	1.31	19.12	19.3	19.7	3.2	15.5	0.4	
08/29/07 7:49:00	1.35	19.09	19.7	20.2	3.7	15.0	0.4	Oxygen downscale RT
08/29/07 7:49:15	1.36	19.07	19.8	20.2	5.2	14.9	0.4	SO2 upscale RT
08/29/07 7:49:30	1.34	19.13	19.1	19.5	4.7	14.7	0.4	
08/29/07 7:49:45	1.20	19.25	19.3	16.2	4.2	14.4	0.4	
08/29/07 7:50:00	1.12	19.26	19.4	18.2	4.2	14.4	0.4	
08/29/07 7:50:15	1.14	19.23	19.4	19.2	4.2	14.0	0.4	
08/29/07 7:50:30	1.17	19.21	19.7	19.2	3.7	14.2	0.4	
08/29/07 7:50:45	1.18	19.19	19.7	19.2	3.2	14.2	0.4	
08/29/07 7:51:00	1.17	19.20	19.6	19.2	3.2	14.2	0.4	
08/29/07 7:51:15	1.18	19.18	19.5	19.7	3.2	14.0	0.4	
08/29/07 7:51:30	1.20	19.16	19.7	20.2	3.2	13.9	0.4	
08/29/07 7:51:45	1.20	19.17	19.7	19.7	3.2	14.0	0.4	
08/29/07 7:52:00	1.21	19.14	19.7	20.2	3.2	13.7	0.4	
08/29/07 7:52:15	1.25	19.12	19.4	20.2	3.2	13.4	0.4	
08/29/07 7:52:30	1.25	19.13	19.4	20.2	3.2	12.8	0.4	
08/29/07 7:52:45	1.22	19.15	19.4	20.2	3.0	5.6	0.4	CO2 downscale RT
08/29/07 7:53:00	1.23	19.13	19.4	20.2	1.7	2.7	0.4	
08/29/07 7:53:15	1.24	19.14	19.4	19.7	0.7	2.1	0.4	
08/29/07 7:53:30	3.10	19.61	10.1	14.0	2.7	1.8	0.4	
08/29/07 7:53:45	11.55	18.19	9.0	4.2	2.7	1.8	0.4	
08/29/07 7:54:00	11.79	10.06	7.8	2.2	1.2	1.8	0.4	
08/29/07 7:54:15	5.80	4.88	6.6	1.2	0.2	1.4	0.4	
08/29/07 7:54:30	1.84	1.50	8.2	1.2	0.2	1.4	0.4	
08/29/07 7:54:45	0.43	0.58	6.9	1.2	0.2	1.3	0.4	
08/29/07 7:55:00	0.21	0.45	8.1	1.2	0.2	1.1	0.4	
08/29/07 7:55:15	0.18	0.39	9.3	1.2	0.2	1.1	0.4	
08/29/07 7:55:30	0.16	0.35	10.1	1.2	0.2	0.9	0.4	
08/29/07 7:55:45	0.15	0.32	11.0	1.2	0.2	1.0	0.4	
08/29/07 7:56:00	0.14	0.30	11.5	1.2	0.2	0.9	0.4	
08/29/07 7:56:15	0.13	0.28	11.9	1.2	0.2	1.0	0.4	
08/29/07 7:56:30	0.13	0.26	12.2	1.2	0.2	0.6	0.4	
08/29/07 7:56:45	0.13	0.25	12.4	0.7	0.2	0.6	0.4	

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08/29/07 7:57:00	0.12	0.23	12.6	0.2	0.2	1.0	0.4
08/29/07 7:57:15	0.12	0.22	12.8	0.2	0.2	0.8	0.4
08/29/07 7:57:30	0.12	0.21	13.2	0.2	0.2	0.8	0.4
08/29/07 7:57:45	0.11	0.20	13.7	0.2	0.2	0.6	0.4
08/29/07 7:58:00	0.11	0.19	14.1	0.2	0.2	0.6	0.4
08/29/07 7:58:15	0.11	0.18	14.5	0.2	0.2	0.7	0.4
08/29/07 7:58:30	0.11	0.18	15.0	0.2	0.2	0.6	0.4
08/29/07 7:58:45	0.11	0.17	15.3	0.2	0.2	0.7	0.4
08/29/07 7:59:00	0.11	0.16	15.6	0.2	0.2	0.7	0.4
08/29/07 7:59:15	0.10	0.16	15.9	0.2	0.2	0.7	0.4
08/29/07 7:59:30	0.10	0.16	16.3	0.2	0.2	1.3	0.4
08/29/07 7:59:45	0.11	0.15	16.4	0.2	0.2	0.6	0.4
08/29/07 8:00:00	0.10	0.14	16.6	0.2	0.2	0.7	0.4
08/29/07 8:00:15	0.11	0.14	16.8	0.2	0.2	0.8	0.4
08/29/07 8:00:30	0.11	0.14	17.1	0.2	0.2	0.8	0.4
08/29/07 8:00:45	0.10	0.13	17.2	0.2	0.2	0.6	0.4
08/29/07 8:01:00	0.10	0.13	17.4	0.2	0.2	0.7	0.4
08/29/07 8:01:15	0.10	0.12	17.4	0.2	0.2	0.6	0.4
08/29/07 8:01:30	0.10	0.12	17.6	0.2	0.2	0.6	0.4
System Bias Check:							
08/29/07 8:01:45	0.10	0.12	17.7	0.2	0.2	0.7	0.4
08/29/07 8:02:00	0.10	0.12	17.7	0.2	0.2	0.7	0.4
08/29/07 8:02:15	0.10	0.12	17.7	0.2	0.2	0.8	0.4
08/29/07 8:02:30	0.10	0.12	17.9	0.2	0.2	0.7	0.4
Zero NOx/CO injection:							
						0.20 ppmv db NOx	
						0.22 ppmv db CO	
08/29/07 8:02:45	0.10	0.11	18.1	0.2	0.2	0.8	0.4
System Bias Check:							
08/29/07 8:03:00	0.10	0.11	18.0	0.2	0.2	0.9	0.4
08/29/07 8:03:15	0.10	0.10	18.2	0.2	0.2	0.9	0.4
08/29/07 8:03:30	0.10	0.10	18.3	0.2	0.2	0.9	0.4
08/29/07 8:03:45	0.10	0.10	18.3	0.2	0.2	0.6	2.9
Zero Oxygen/CO2 injection:							
						0.10 % db Oxygen	
						0.10 % db CO2	
08/29/07 8:04:00	0.10	0.10	18.3	0.2	0.2	0.6	2.9
08/29/07 8:04:15	0.10	0.10	18.3	0.2	0.2	0.5	2.9
System Bias Check:							
08/29/07 8:04:30	0.10	0.10	18.3	0.2	0.2	0.5	2.9
08/29/07 8:04:45	0.10	0.10	18.5	0.7	0.2	0.6	2.9
08/29/07 8:05:00	0.10	0.09	18.6	0.5	0.2	0.5	2.9
08/29/07 8:05:15	0.10	0.10	18.6	0.2	0.2	0.5	2.9
20 ppm SO2 injection:							
						18.50 ppmv db SO2	
08/29/07 8:05:30	0.10	0.10	18.6	0.2	0.2	0.5	2.9
08/29/07 8:05:45	0.10	0.09	18.6	0.2	0.3	5.1	2.9
08/29/07 8:06:00	0.10	0.09	18.6	0.2	0.2	3.2	2.9
08/29/07 8:06:15	0.10	0.09	18.6	0.2	0.2	1.0	2.9
SO2 downscale RT							
08/29/07 8:06:30	0.11	0.90	19.9	1.9	0.2	0.9	2.9
08/29/07 8:06:45	0.27	4.03	22.3	5.2	0.2	1.0	0.4
08/29/07 8:07:00	0.29	2.41	21.7	2.7	0.2	0.8	0.4
08/29/07 8:07:15	0.16	0.46	19.3	0.7	0.2	0.7	0.4
08/29/07 8:07:30	0.11	0.15	17.9	0.5	0.2	0.6	0.4
08/29/07 8:07:45	0.11	0.12	15.7	1.2	0.2	0.5	0.4
08/29/07 8:08:00	0.11	0.10	12.9	1.2	0.2	0.5	0.4
08/29/07 8:08:15	0.10	0.09	10.7	1.2	0.2	0.6	0.4
08/29/07 8:08:30	0.10	0.09	9.0	1.2	0.2	0.6	0.4
08/29/07 8:08:45	0.10	0.09	2.8	1.2	0.2	0.5	0.4
08/29/07 8:09:00	0.10	0.09	2.7	1.2	0.2	1.0	0.4
08/29/07 8:09:15	0.10	0.09	2.4	1.2	1.0	0.8	0.4
08/29/07 8:09:30	0.10	0.08	2.3	1.2	0.2	0.5	0.4
08/29/07 8:09:45	0.10	0.08	2.1	1.2	0.2	0.5	0.4
08/29/07 8:10:00	0.10	0.08	2.0	1.2	0.2	0.6	0.4
08/29/07 8:10:15	0.10	0.08	1.8	1.2	0.2	0.6	0.4
08/29/07 8:10:30	0.10	0.07	1.8	2.2	0.2	0.6	0.4
08/29/07 8:10:45	0.10	0.07	1.8	2.2	1.0	0.5	0.4
08/29/07 8:11:00	0.11	0.07	1.8	2.2	1.0	0.5	0.4
08/29/07 8:11:15	0.10	0.07	1.7	2.2	0.2	0.6	0.4
08/29/07 8:11:30	0.10	0.07	1.5	1.2	0.2	0.4	0.4
08/29/07 8:11:45	0.10	0.07	1.5	1.7	0.2	0.5	0.4
08/29/07 8:12:00	0.10	0.08	1.5	2.2	0.2	2.6	0.4
08/29/07 8:12:15	0.10	0.07	1.5	2.2	0.2	2.0	0.4
Nox upscale RT							
08/29/07 8:12:30	0.10	0.07	1.5	2.2	0.2	1.0	0.4
08/29/07 8:12:45	0.10	0.31	1.5	1.7	0.2	0.5	0.4
08/29/07 8:13:00	0.20	2.36	1.5	2.2	0.2	0.6	0.4
08/29/07 8:13:15	0.24	1.42	1.6	8.7	0.7	0.4	0.4
08/29/07 8:13:30	0.19	0.33	2.6	13.5	1.2	0.6	0.4
08/29/07 8:13:45	0.15	0.14	3.4	14.2	1.2	0.5	0.4
08/29/07 8:14:00	0.11	0.09	3.6	16.7	0.5	0.5	0.4
08/29/07 8:14:15	0.11	0.08	3.3	20.2	0.2	2.3	0.4
08/29/07 8:14:30	0.10	0.08	2.9	13.5	0.2	0.8	0.4
08/29/07 8:14:45	0.11	0.08	2.6	14.2	0.2	0.5	0.4
08/29/07 8:15:00	0.15	0.91	2.4	16.7	1.0	0.5	0.4
08/29/07 8:15:15	0.23	1.45	2.1	20.2	0.2	0.5	0.4
08/29/07 8:15:30	0.17	0.36	1.9	21.0	0.2	0.7	0.4
08/29/07 8:15:45	0.12	0.10	1.8	20.4	1.2	0.5	0.4
08/29/07 8:16:00	0.10	0.08	1.8	19.7	1.2	0.5	0.4
08/29/07 8:16:15	0.10	0.07	1.7	21.7	1.2	0.5	0.4
08/29/07 8:16:30	0.11	0.07	1.5	22.2	1.2	0.4	0.4
08/29/07 8:16:45	0.11	0.07	1.5	22.2	0.2	0.5	0.4
08/29/07 8:17:00	0.11	0.07	1.5	22.2	0.2	0.4	0.4
08/29/07 8:17:15	0.11	0.07	1.3	22.2	0.7	0.5	0.4
08/29/07 8:17:30	0.11	0.07	1.2	22.2	1.2	0.5	0.4
08/29/07 8:17:45	0.10	0.07	1.4	22.2	1.2	0.4	0.4
08/29/07 8:18:00	0.10	0.06	1.7	22.2	0.5	0.5	0.4
08/29/07 8:18:15	0.10	0.06	1.8	21.5	0.2	0.5	0.4
System Bias Check:							
08/29/07 8:18:30	0.10	0.07	1.6	20.2	1.0	0.5	0.4
08/29/07 8:18:45	0.10	0.07	1.8	20.2	1.2	0.5	0.4
08/29/07 8:19:00	0.10	0.07	1.5	20.2	1.2	0.5	0.4
08/29/07 8:19:15	0.10	0.06	1.5	20.2	0.7	0.5	0.4
20 ppm NOx injection:							
						20.21 ppmv db NOx	
08/29/07 8:19:30	0.10	0.06	1.4	20.2	0.2	5.1	0.4
08/29/07 8:19:45	0.10	0.06	1.2	20.2	1.2	7.7	0.4
08/29/07 8:20:00	0.10	0.06	1.2	20.2	1.2	1.6	0.4
08/29/07 8:20:15	0.13	1.97	1.3	20.2	1.2	1.0	0.4
08/29/07 8:20:30	0.42	7.67	2.6	20.2	1.0	0.7	0.4
CO upscale RT							
08/29/07 8:20:45	0.55	6.10	3.4	20.2	0.2	0.7	0.4
Nox downscale RT							
08/29/07 8:21:00	0.30	2.06	3.6	21.0	1.5	0.5	0.4
08/29/07 8:21:15	0.14	0.34	3.3	20.2	6.2	0.6	0.4
08/29/07 8:21:30	0.10	0.14	2.9	17.5	14.0	0.5	0.4

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08/29/07 8:21:45	0.11	0.11	2.6	11.5	18.7	0.4	0.4	
08/29/07 8:22:00	0.11	0.09	2.4	4.5	19.2	0.4	0.4	
08/29/07 8:22:15	0.12	0.08	2.1	1.5	19.2	0.4	0.4	
08/29/07 8:22:30	0.11	0.08	1.9	1.2	19.5	0.4	0.4	
08/29/07 8:22:45	0.11	0.07	1.8	1.2	20.2	0.4	0.4	System Bias Check:
08/29/07 8:23:00	0.11	0.07	1.8	1.2	20.2	0.4	0.4	20 ppm CO injection:
08/29/07 8:23:15	0.11	0.07	1.7	0.4	20.2	0.4	0.4	20.11 ppmv db CO
08/29/07 8:23:30	0.11	0.07	1.5	0.2	19.7	0.4	0.4	
08/29/07 8:23:45	0.11	0.06	1.5	0.2	20.2	0.4	0.4	
08/29/07 8:24:00	0.10	0.06	1.5	0.2	20.0	3.5	0.4	CO downscale RT
08/29/07 8:24:15	0.10	0.06	1.3	0.2	18.2	0.8	0.4	
08/29/07 8:24:30	0.10	0.06	1.2	0.5	17.2	68.1	0.4	
08/29/07 8:24:45	0.14	1.56	1.4	2.7	15.7	308.2	0.4	
08/29/07 8:25:00	0.28	2.78	1.7	2.9	10.5	124.9	0.4	
08/29/07 8:25:15	0.20	0.81	1.8	2.2	5.7	100.2	0.4	
08/29/07 8:25:30	0.24	0.17	1.6	4.7	2.5	102.9	0.4	
08/29/07 8:25:45	0.95	0.18	1.8	2.7	1.2	101.3	0.4	
08/29/07 8:26:00	1.63	0.30	1.5	0.7	1.2	101.1	0.4	
08/29/07 8:26:15	1.98	0.23	1.5	0.2	1.2	88.2	0.4	
08/29/07 8:26:30	2.19	0.13	1.4	0.2	1.0	99.1	0.4	
08/29/07 8:26:45	2.26	0.09	1.2	0.2	0.7	83.0	0.4	
08/29/07 8:27:00	2.28	0.19	1.2	0.7	4.7	83.9	0.4	Total VOC calibration:
08/29/07 8:27:15	2.24	1.78	1.3	2.0	7.2	85.2	0.4	85 ppm CH4 injection:
08/29/07 8:27:30	2.22	1.15	1.5	1.2	3.7	85.3	20.8	85.06 ppmv CH4
08/29/07 8:27:45	2.10	0.23	1.5	0.5	1.2	84.9	81.9	
08/29/07 8:28:00	1.94	0.10	1.3	0.2	1.2	84.8	81.9	
08/29/07 8:28:15	1.96	0.07	1.2	0.2	1.2	84.7	81.9	CH4 GC calibration:
08/29/07 8:28:30	1.97	0.07	1.2	0.2	1.2	85.2	81.9	85 ppm CH4 injection #1:
08/29/07 8:28:45	1.97	0.07	1.2	0.2	1.2	85.1	81.9	81.88 ppmv CH4
08/29/07 8:29:00	1.98	0.06	1.2	0.2	1.2	85.6	81.9	
08/29/07 8:29:15	1.97	0.06	1.2	0.2	1.3	85.4	81.9	
08/29/07 8:29:30	1.97	0.06	1.1	0.2	1.2	85.0	81.9	
08/29/07 8:29:45	1.97	0.06	0.9	0.2	1.3	85.3	81.9	
08/29/07 8:30:00	1.97	0.06	0.9	0.2	1.2	85.1	81.9	
08/29/07 8:30:15	1.97	0.06	0.9	0.2	1.2	84.6	81.9	
08/29/07 8:30:30	1.97	0.06	0.9	0.2	1.2	84.4	82.0	
08/29/07 8:30:45	1.97	0.06	0.9	0.2	1.2	84.1	82.4	
08/29/07 8:31:00	1.98	0.06	0.9	0.2	1.2	83.9	82.4	
08/29/07 8:31:15	1.99	0.05	0.9	0.2	1.2	84.0	82.4	CH4 GC calibration:
08/29/07 8:31:30	2.00	0.06	0.9	0.2	1.2	83.8	82.4	85 ppm CH4 injection #2:
08/29/07 8:31:45	2.01	0.06	0.9	0.2	1.2	83.8	82.4	82.38 ppmv CH4
08/29/07 8:32:00	2.02	0.06	0.9	0.2	1.2	83.8	82.4	
08/29/07 8:32:15	2.03	0.06	0.9	0.2	1.2	83.8	82.4	
08/29/07 8:32:30	2.03	0.06	0.9	0.2	1.2	83.8	82.4	
08/29/07 8:32:45	2.03	0.06	0.9	0.2	1.2	83.7	82.4	System Bias Check:
08/29/07 8:33:00	2.04	0.05	0.9	0.2	1.2	84.1	82.4	Zero ppm SO2 injection:
08/29/07 8:33:15	2.04	0.05	0.9	0.2	1.2	83.9	82.4	0.90 ppmv db SO2
08/29/07 8:33:30	2.04	0.05	0.9	0.2	1.2	83.9	82.1	
08/29/07 8:33:45	2.04	0.05	0.9	0.2	1.2	83.9	83.4	
08/29/07 8:34:00	2.04	0.05	0.9	0.2	1.0	83.9	83.4	
08/29/07 8:34:15	2.05	0.06	0.9	0.2	0.7	83.7	83.4	CH4 GC calibration:
08/29/07 8:34:30	2.05	0.06	0.9	0.2	1.2	83.8	83.4	85 ppm CH4 injection #3:
08/29/07 8:34:45	2.05	0.06	0.9	0.2	1.2	83.8	83.4	83.38 ppmv CH4
08/29/07 8:35:00	2.05	0.06	0.9	0.2	1.2	83.9	83.4	
08/29/07 8:35:15	2.05	0.06	0.8	0.2	1.2	73.6	83.4	
08/29/07 8:35:30	2.05	0.06	0.7	0.2	0.2	70.5	83.4	
08/29/07 8:35:45	2.05	0.06	0.9	0.2	0.2	49.5	83.4	
08/29/07 8:36:00	2.04	0.88	0.9	1.2	1.0	49.6	83.4	Total VOC calibration:
08/29/07 8:36:15	2.00	1.45	0.9	1.5	0.7	49.3	83.4	50 ppm CH4 injection:
08/29/07 8:36:30	1.90	0.35	0.9	0.2	1.2	49.4	73.0	49.27 ppmv CH4
08/29/07 8:36:45	1.47	0.10	0.9	0.2	1.2	49.2	47.9	
08/29/07 8:37:00	1.28	0.07	0.9	0.2	1.0	49.2	47.9	
08/29/07 8:37:15	1.25	0.07	0.9	0.2	0.7	49.3	47.9	
08/29/07 8:37:30	1.25	0.06	0.9	0.2	1.2	49.1	47.9	
08/29/07 8:37:45	1.24	0.06	0.9	0.2	1.3	50.0	48.0	CH4 GC calibration:
08/29/07 8:38:00	1.25	0.06	1.0	0.2	1.3	48.9	47.9	50 ppm CH4 injection #1:
08/29/07 8:38:15	1.24	0.06	0.9	0.2	0.7	49.0	47.9	47.91 ppmv CH4
08/29/07 8:38:30	1.24	0.06	0.9	0.2	1.0	49.3	47.9	
08/29/07 8:38:45	1.24	0.05	0.9	0.2	0.7	49.2	47.9	
08/29/07 8:39:00	1.25	0.05	0.9	0.2	0.5	49.3	47.9	
08/29/07 8:39:15	1.24	0.05	0.9	0.2	1.2	49.3	47.9	
08/29/07 8:39:30	1.24	0.05	0.9	0.2	1.2	49.2	50.2	CH4 GC calibration:
08/29/07 8:39:45	1.24	0.05	0.9	0.2	0.7	48.8	60.9	50 ppm CH4 injection #2:
08/29/07 8:40:00	1.24	0.05	0.9	0.2	1.2	49.0	60.9	50.89 ppmv CH4
08/29/07 8:40:15	1.24	0.05	0.9	0.2	1.2	49.3	60.9	
08/29/07 8:40:30	1.24	0.05	0.9	0.2	1.2	48.9	60.9	
08/29/07 8:40:45	1.24	0.05	0.9	0.2	1.2	49.0	50.9	
08/29/07 8:41:00	1.24	0.06	0.9	0.2	1.0	49.1	50.9	
08/29/07 8:41:15	1.24	0.06	0.9	0.2	1.0	49.3	50.9	
08/29/07 8:41:30	1.24	0.05	0.9	0.2	1.0	49.2	50.9	
08/29/07 8:41:45	1.24	0.05	0.9	0.2	1.0	49.1	50.9	
08/29/07 8:42:00	1.24	0.05	0.9	0.2	1.2	49.4	50.9	
08/29/07 8:42:15	1.24	0.06	0.9	0.2	1.2	49.4	50.9	
08/29/07 8:42:30	1.24	0.06	0.9	0.2	0.2	49.4	49.9	CH4 GC calibration:
08/29/07 8:42:45	1.24	0.05	0.9	0.2	1.0	49.3	48.9	50 ppm CH4 injection #3:
08/29/07 8:43:00	1.24	0.05	0.9	0.2	0.5	49.1	48.9	48.90 ppmv CH4
08/29/07 8:43:15	1.24	0.06	0.9	0.2	1.2	49.0	48.9	
08/29/07 8:43:30	1.24	0.06	0.9	0.2	1.2	49.1	48.9	
08/29/07 8:43:45	1.24	0.05	0.9	0.2	0.5	48.9	48.9	
08/29/07 8:44:00	1.24	0.05	0.9	0.2	0.2	44.7	48.9	
08/29/07 8:44:15	1.24	0.05	0.9	0.2	0.2	49.4	48.9	
08/29/07 8:44:30	1.24	0.05	0.9	0.2	0.2	26.3	48.9	Total VOC calibration:
08/29/07 8:44:45	1.24	0.22	0.9	0.4	1.0	24.8	48.9	25 ppm CH4 injection:
08/29/07 8:45:00	1.24	1.56	0.9	1.7	0.2	24.7	48.9	25.16 ppmv CH4
08/29/07 8:45:15	1.23	0.76	0.9	1.0	0.3	28.1	48.9	
08/29/07 8:45:30	0.96	0.15	0.9	0.2	0.5	25.3	42.7	
08/29/07 8:45:45	0.71	0.08	0.9	0.2	1.2	25.5	24.9	CH4 GC calibration:
08/29/07 8:46:00	0.67	0.08	0.9	0.2	1.2	24.6	24.9	25 ppm CH4 injection #1:

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08/29/07 8:46:15	0.87	0.06	0.9	0.2	1.2	24.6	24.9	24.88 ppmv CH4
08/29/07 8:46:30	0.67	0.06	0.9	0.2	0.2	24.5	24.9	
08/29/07 8:46:45	0.67	0.05	0.9	0.2	0.2	24.4	24.9	
08/29/07 8:47:00	0.67	0.05	0.9	0.2	1.2	24.5	24.9	
08/29/07 8:47:15	0.87	0.05	0.9	0.2	1.2	24.4	24.9	
08/29/07 8:47:30	0.67	0.06	0.9	0.2	1.2	24.4	24.9	
08/29/07 8:47:45	0.87	0.06	0.9	0.2	0.5	24.5	24.9	
08/29/07 8:48:00	0.87	0.05	0.9	0.2	0.2	24.6	24.9	
08/29/07 8:48:15	0.67	0.05	0.9	0.2	1.0	24.5	24.9	
08/29/07 8:48:30	0.67	0.05	0.9	0.2	1.2	24.5	24.9	
08/29/07 8:48:45	0.67	0.06	1.0	0.2	1.3	24.8	24.9	CH4 GC calibration:
08/29/07 8:49:00	0.67	0.05	0.9	0.2	1.2	24.8	24.9	25 ppm CH4 injection #2:
08/29/07 8:49:15	0.67	0.06	0.9	0.2	0.5	24.5	24.9	24.88 ppmv CH4
08/29/07 8:49:30	0.67	0.05	0.9	0.2	0.7	24.5	24.9	
08/29/07 8:49:45	0.67	0.05	0.9	0.2	1.2	24.5	24.9	
08/29/07 8:50:00	0.87	0.05	0.9	0.2	1.2	24.8	24.9	
08/29/07 8:50:15	0.67	0.05	0.9	0.2	1.2	24.8	24.9	
08/29/07 8:50:30	0.67	0.05	0.9	0.2	0.7	25.4	24.9	
08/29/07 8:50:45	0.67	0.05	0.9	0.2	0.2	28.3	24.9	
08/29/07 8:51:00	0.87	0.05	0.9	0.2	1.2	26.9	24.9	
08/29/07 8:51:15	0.87	0.05	0.9	0.2	1.2	27.0	24.9	CH4 GC calibration:
08/29/07 8:51:30	0.68	0.05	0.9	0.2	1.2	27.5	26.1	25 ppm CH4 injection #3:
08/29/07 8:51:45	0.70	0.06	0.9	0.2	0.5	27.9	26.4	26.31 ppmv CH4
08/29/07 8:52:00	0.73	0.68	0.9	0.7	0.2	28.3	26.4	
08/29/07 8:52:15	0.78	2.04	0.9	2.2	0.2	29.0	26.4	
08/29/07 8:52:30	0.83	2.92	1.1	2.7	1.2	17.7	26.4	
08/29/07 8:52:45	0.87	3.56	1.4	3.4	1.2	12.5	26.4	
08/29/07 8:53:00	0.92	4.09	1.8	4.2	1.7	12.3	26.4	
08/29/07 8:53:15	0.97	5.95	2.4	7.2	3.0	12.0	26.4	
08/29/07 8:53:30	1.07	11.92	3.7	12.2	3.2	12.1	26.4	
08/29/07 8:53:45	1.16	16.33	5.6	16.7	3.2	12.2	26.4	
08/29/07 8:54:00	1.22	18.30	7.8	18.7	3.2	12.4	26.4	
08/29/07 8:54:15	1.29	18.69	9.5	19.5	4.0	12.4	26.4	
08/29/07 8:54:30	1.37	18.70	10.7	20.2	4.2	12.5	13.9	
08/29/07 8:54:45	1.39	18.78	11.6	19.0	4.2	12.2	0.4	
08/29/07 8:55:00	1.29	18.91	12.2	18.2	4.5	12.0	0.4	
08/29/07 8:55:15	1.23	18.98	12.7	18.3	3.7	12.5	0.4	
08/29/07 8:55:30	1.20	19.00	12.8	18.2	3.2	11.9	0.4	
08/29/07 8:55:45	1.18	19.01	13.0	18.5	3.2	11.9	0.4	
08/29/07 8:56:00	1.25	18.95	13.0	19.2	3.2	12.0	0.4	
08/29/07 8:56:15	1.29	18.94	13.1	19.2	3.2	11.9	0.4	
08/29/07 8:56:30	1.29	18.94	13.1	19.2	3.2	12.0	0.4	
08/29/07 8:56:45	1.31	18.92	13.1	19.2	4.0	12.4	0.4	
08/29/07 8:57:00	1.32	18.95	13.1	19.2	4.2	12.4	0.4	
08/29/07 8:57:15	1.28	18.98	13.1	19.2	4.2	12.6	0.4	
08/29/07 8:57:30	1.27	19.01	13.3	18.5	4.7	13.2	0.4	
08/29/07 8:57:45	1.19	19.10	13.3	17.2	6.0	12.8	0.4	Stratification Check, Point #1
08/29/07 8:58:00	1.15	19.09	13.4	17.2	6.2	12.6	0.4	Point #1 Averages:
08/29/07 8:58:15	1.16	19.12	13.4	16.0	5.5	12.3	0.4	1.15 % db Oxygen
08/29/07 8:58:30	1.08	19.20	13.4	15.2	4.7	12.7	0.4	19.10 % db CO2
08/29/07 8:58:45	1.06	19.18	13.4	15.5	4.2	12.4	0.4	13.42 ppmv db SO2
08/29/07 8:59:00	1.10	19.12	13.4	16.2	4.2	12.7	0.4	16.46 ppmv db NOx
08/29/07 8:59:15	1.19	19.03	13.4	17.2	4.2	12.4	0.4	4.69 ppmv db CO
08/29/07 8:59:30	1.25	19.02	13.4	17.2	4.2	12.6	0.4	
08/29/07 8:59:45	1.24	19.04	13.4	17.2	4.2	12.7	0.4	
08/29/07 9:00:00	1.21	19.06	13.4	17.2	4.7	13.0	0.4	Mean differences
08/29/07 9:00:15	1.18	19.09	13.4	17.2	8.0	12.8	0.4	-2.54 % diff O2
08/29/07 9:00:30	1.15	19.11	13.5	17.2	6.8	13.4	0.7	0.30 % diff CO2
08/29/07 9:00:45	1.13	19.14	13.7	16.2	6.5	12.8	0.9	-3.62 % diff SO2
08/29/07 9:01:00	1.07	19.20	13.7	15.5	6.2	12.7	0.9	5.28 % diff NOx
08/29/07 9:01:15	1.01	19.24	13.6	16.2	5.5	12.5	0.9	-6.65 % diff CO
08/29/07 9:01:30	1.04	19.18	13.4	16.2	4.2	12.4	0.9	
08/29/07 9:01:45	1.08	19.17	13.3	16.5	4.2	12.2	0.9	
08/29/07 9:02:00	1.11	19.12	13.1	17.2	3.2	12.1	0.9	
08/29/07 9:02:15	1.14	19.12	13.0	17.5	3.2	12.0	0.9	
08/29/07 9:02:30	1.16	19.08	12.8	18.2	3.2	12.2	0.9	
08/29/07 9:02:45	1.19	19.07	12.8	18.2	4.0	12.3	0.9	Stratification Check, Point #2
08/29/07 9:03:00	1.17	19.10	12.8	18.2	4.2	12.2	0.9	Point #2 Averages:
08/29/07 9:03:15	1.15	19.11	12.8	18.0	4.2	12.1	0.9	1.14 % db Oxygen
08/29/07 9:03:30	1.13	19.15	12.8	17.2	4.2	11.8	0.6	19.13 % db CO2
08/29/07 9:03:45	1.09	19.21	12.8	17.2	4.2	11.7	0.4	12.82 ppmv db SO2
08/29/07 9:04:00	1.07	19.18	12.8	18.0	4.2	11.9	0.4	17.90 ppmv db NOx
08/29/07 9:04:15	1.14	19.11	12.8	18.2	4.2	12.0	0.4	4.22 ppmv db CO
08/29/07 9:04:30	1.20	19.08	12.8	18.2	4.2	11.9	0.4	
08/29/07 9:04:45	1.17	19.13	12.9	18.2	4.2	12.0	0.4	
08/29/07 9:05:00	1.17	19.13	13.1	18.2	4.2	11.9	0.4	Mean differences
08/29/07 9:05:15	1.15	19.14	13.1	18.2	4.2	12.3	0.4	-1.51 % diff O2
08/29/07 9:05:30	1.16	19.13	13.1	18.2	4.2	11.9	0.4	0.13 % diff CO2
08/29/07 9:05:45	1.16	19.13	13.1	18.2	4.2	11.8	0.4	0.98 % diff SO2
08/29/07 9:06:00	1.17	19.12	13.1	18.2	4.2	12.4	0.4	-3.01 % diff NOx
08/29/07 9:06:15	1.15	19.16	13.1	18.2	4.2	11.8	0.4	4.03 % diff CO
08/29/07 9:06:30	1.11	19.18	12.9	18.2	4.2	11.8	0.4	
08/29/07 9:06:45	1.12	19.18	12.8	18.0	4.2	11.9	0.4	
08/29/07 9:07:00	1.11	19.19	12.8	18.0	4.2	11.7	0.4	
08/29/07 9:07:15	1.10	19.20	12.8	18.2	4.2	11.7	0.4	
08/29/07 9:07:30	1.10	19.20	12.8	18.2	4.2	12.0	0.4	
08/29/07 9:07:45	1.08	19.22	12.8	17.2	4.2	11.9	0.4	Stratification Check, Point #3
08/29/07 9:08:00	1.06	19.23	12.8	18.0	4.2	11.9	0.4	Point #3 Averages:
08/29/07 9:08:15	1.11	19.17	12.8	18.2	5.0	11.9	0.4	1.08 % db Oxygen
08/29/07 9:08:30	1.14	19.19	12.6	18.2	4.7	11.9	0.4	19.24 % db CO2
08/29/07 9:08:45	1.10	19.25	12.6	17.2	4.2	11.6	0.4	12.51 ppmv db SO2
08/29/07 9:09:00	1.05	19.29	12.5	17.2	4.2	11.7	0.4	17.78 ppmv db NOx
08/29/07 9:09:15	1.03	19.30	12.5	17.2	4.2	11.5	0.4	4.29 ppmv db CO
08/29/07 9:09:30	1.04	19.27	12.5	18.0	4.2	11.6	0.4	
08/29/07 9:09:45	1.08	19.24	12.5	18.2	3.5	11.7	0.4	
08/29/07 9:10:00	1.10	19.24	12.8	18.2	3.2	11.7	0.4	Mean differences
08/29/07 9:10:15	1.13	19.19	12.8	18.7	3.2	11.3	0.4	4.05 % diff O2
08/29/07 9:10:30	1.21	19.14	12.7	18.5	3.2	11.2	0.4	-0.44 % diff CO2
08/29/07 9:10:45	1.20	19.15	12.5	18.2	3.2	11.3	0.4	2.65 % diff SO2

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08/29/07 9:11:00	1.21	19.12	12.5	19.0	3.2	11.2	0.4	-2.27 % diff NOx
08/29/07 9:11:15	1.25	19.08	12.5	19.2	3.5	11.7	0.4	2.62 % diff CO
08/29/07 9:11:30	1.26	19.09	12.5	19.2	4.2	11.6	0.4	
08/29/07 9:11:45	1.21	19.16	12.5	18.2	4.2	11.6	0.4	
08/29/07 9:12:00	1.14	19.22	12.5	18.2	4.2	11.5	0.4	
08/29/07 9:12:15	1.11	19.23	12.5	18.2	4.2	11.5	0.4	
08/29/07 9:12:30	1.13	19.20	12.5	18.2	4.2	11.5	0.4	
08/29/07 9:12:45	1.15	19.18	12.5	18.2	3.5	11.4	0.4	
08/29/07 9:13:00	1.19	19.14	12.6	18.2	3.2	11.5	0.4	
08/29/07 9:13:15	1.21	19.13	12.8	19.2	4.0	11.4	0.4	
08/29/07 9:13:30	1.23	19.13	12.8	18.5	4.2	11.3	0.4	
08/29/07 9:13:45	1.17	19.20	12.8	18.2	4.0	11.4	0.4	
08/29/07 9:14:00	1.13	19.21	12.8	18.2	3.2	11.3	0.4	
08/29/07 9:14:15	1.14	19.19	12.8	18.2	3.2	11.4	0.4	
08/29/07 9:14:30	1.19	19.13	12.7	19.0	3.7	11.3	0.4	
08/29/07 9:14:45	1.23	19.11	12.5	18.7	4.2	11.1	0.4	
08/29/07 9:15:00	1.18	19.18	12.5	18.2	3.7	11.4	0.4	
08/29/07 9:15:15	1.16	19.16	12.4	18.2	3.2	11.4	0.4	
08/29/07 9:15:30	1.19	19.13	12.2	18.2	3.7	11.6	0.4	
08/29/07 9:15:45	1.23	19.09	12.1	19.2	5.2	13.5	0.4	
08/29/07 9:16:00	1.25	19.11	12.0	18.5	5.2	12.5	0.4	
08/29/07 9:16:15	1.18	19.19	11.9	18.2	4.2	11.5	0.4	
08/29/07 9:16:30	1.12	19.20	11.9	18.2	4.2	11.4	0.4	
08/29/07 9:16:45	1.14	19.19	11.9	18.2	4.0	11.4	0.4	
08/29/07 9:17:00	1.14	19.20	11.9	18.2	3.2	11.0	0.4	
08/29/07 9:17:15	1.14	19.17	11.9	18.7	3.2	11.2	0.4	
08/29/07 9:17:30	1.21	19.08	11.9	19.2	3.2	11.2	0.4	
08/29/07 9:17:45	1.24	19.08	11.9	19.2	3.2	11.3	0.4	
08/29/07 9:18:00	1.24	19.07	11.9	19.2	3.2	11.3	0.4	
08/29/07 9:18:15	1.25	19.09	11.9	18.7	4.0	11.5	0.4	
08/29/07 9:18:30	1.20	19.15	11.9	18.2	3.2	11.1	0.4	
08/29/07 9:18:45	1.16	19.17	11.9	18.2	3.2	11.1	0.4	
08/29/07 9:19:00	1.18	19.13	11.9	19.0	3.2	11.1	0.4	
08/29/07 9:19:15	1.23	19.09	11.9	19.2	3.2	10.8	0.4	
08/29/07 9:19:30	1.23	19.10	11.9	19.2	3.2	11.0	0.4	
08/29/07 9:19:45	1.24	19.06	11.9	19.7	4.5	10.8	0.4	
08/29/07 9:20:00	1.34	18.97	11.9	20.0	5.2	11.1	0.4	
08/29/07 9:20:15	1.32	19.06	11.9	18.7	4.2	11.2	0.4	
08/29/07 9:20:30	1.17	19.18	11.9	18.2	4.2	11.2	0.4	
08/29/07 9:20:45	1.14	19.16	11.9	18.2	4.2	11.0	0.4	
08/29/07 9:21:00	1.13	19.20	12.1	17.7	4.2	11.2	0.4	
08/29/07 9:21:15	1.11	19.20	12.2	18.2	5.2	11.3	0.4	
08/29/07 9:21:30	1.14	19.18	12.2	17.5	5.2	11.4	0.4	
08/29/07 9:21:45	1.11	19.22	12.2	16.7	4.2	11.5	0.4	
08/29/07 9:22:00	1.09	19.21	12.2	16.2	4.2	11.5	0.4	
08/29/07 9:22:15	1.11	19.22	12.3	16.2	4.2	11.6	0.4	
08/29/07 9:22:30	1.07	19.25	12.5	16.2	4.2	11.5	0.4	
08/29/07 9:22:45	1.07	19.25	12.4	15.7	5.2	11.7	0.4	
08/29/07 9:23:00	1.06	19.28	12.2	15.2	5.2	10.2	0.4	
08/29/07 9:23:15	1.02	19.30	12.2	15.2	4.2	10.6	0.4	
08/29/07 9:23:30	1.03	19.26	12.2	16.0	4.2	10.6	0.4	
08/29/07 9:23:45	1.07	19.22	12.2	16.2	4.2	11.3	0.4	
08/29/07 9:24:00	1.13	19.17	12.2	17.0	4.2	11.4	0.4	
08/29/07 9:24:15	1.17	19.16	12.2	17.2	5.2	11.7	0.4	
08/29/07 9:24:30	1.15	19.20	12.2	16.5	5.2	11.9	0.4	
08/29/07 9:24:45	1.09	19.25	12.2	16.2	5.5	11.9	0.4	
08/29/07 9:25:00	1.05	19.26	12.2	16.2	6.7	12.6	0.4	
08/29/07 9:25:15	1.06	19.24	12.2	16.2	7.2	12.6	0.4	
08/29/07 9:25:30	1.06	19.27	12.2	16.0	7.2	11.9	0.4	
08/29/07 9:25:45	1.00	19.34	12.1	15.2	7.0	12.0	0.4	
08/29/07 9:26:00	0.95	19.36	12.2	15.5	6.2	10.3	0.4	
08/29/07 9:26:15	0.97	19.34	12.2	16.2	6.2	11.6	0.4	
08/29/07 9:26:30	1.02	19.28	12.2	17.0	6.2	11.7	0.4	
08/29/07 9:26:45	1.08	19.24	12.2	16.7	6.0	14.5	0.4	
08/29/07 9:27:00	1.05	19.29	12.2	16.2	3.7	11.3	0.4	
08/29/07 9:27:15	1.03	19.31	12.2	16.2	1.2	11.5	0.4	RM monitor probe removed from stack
08/29/07 9:27:30	2.70	14.98	11.9	11.0	1.2	10.3	0.4	
08/29/07 9:27:45	10.93	6.52	10.5	5.2	1.3	9.7	0.5	
08/29/07 9:28:00	17.65	1.86	8.3	2.0	1.2	7.7	0.4	
08/29/07 9:28:15	20.11	0.59	6.9	1.2	1.3	7.0	0.4	
08/29/07 9:28:30	20.50	0.45	5.7	1.2	1.2	4.0	0.4	
08/29/07 9:28:45	20.56	0.39	4.9	1.2	1.5	4.9	0.4	
08/29/07 9:29:00	20.59	0.43	4.2	2.0	3.0	6.6	0.4	
08/29/07 9:29:15	18.31	5.70	4.0	6.7	6.5	9.4	0.4	
08/29/07 9:29:30	10.47	13.16	4.2	13.7	7.2	8.4	0.4	
08/29/07 9:29:45	4.29	17.50	5.4	15.7	6.0	9.4	0.4	
08/29/07 9:30:00	1.69	18.94	6.9	16.2	5.2	5.9	0.4	RM monitor probe back in stack
08/29/07 9:30:15	1.14	19.16	8.2	16.2	5.0	10.2	0.4	
08/29/07 9:30:30	1.08	19.20	9.2	16.5	4.2	9.6	0.4	
08/29/07 9:30:45	1.11	19.15	10.0	17.2	4.2	9.5	0.4	
08/29/07 9:31:00	1.16	19.13	10.7	17.5	3.5	10.4	0.4	
08/29/07 9:31:15	1.18	19.10	11.3	18.2	3.5	10.7	0.4	
08/29/07 9:31:30	1.23	19.06	11.9	18.2	4.2	11.0	0.4	
08/29/07 9:31:45	1.24	19.08	12.3	18.2	4.2	11.2	0.4	
08/29/07 9:32:00	1.20	19.12	12.5	18.0	3.5	11.5	0.4	
08/29/07 9:32:15	1.17	19.15	12.8	17.7	3.2	11.4	0.4	
08/29/07 9:32:30	1.17	19.13	13.0	18.2	3.2	10.9	0.4	
08/29/07 9:32:45	1.20	19.11	13.1	18.2	3.2	10.2	0.4	
08/29/07 9:33:00	1.22	19.08	13.4	19.2	3.2	11.0	0.4	
08/29/07 9:33:15	1.26	19.03	13.4	19.2	3.2	11.7	0.4	
08/29/07 9:33:30	1.30	19.03	13.4	19.2	3.2	11.4	1.5	
08/29/07 9:33:45	1.27	19.08	13.6	18.7	4.2	11.5	1.9	
08/29/07 9:34:00	1.23	19.10	13.7	18.2	3.5	11.1	1.9	
08/29/07 9:34:15	1.24	19.10	13.9	18.2	3.2	11.1	1.9	
08/29/07 9:34:30	1.21	19.12	14.3	18.5	3.2	11.3	1.9	
08/29/07 9:34:45	1.25	19.05	14.3	19.2	3.2	10.9	1.9	
08/29/07 9:35:00	1.30	19.06	14.3	19.0	3.2	10.5	1.9	
08/29/07 9:35:15	1.22	19.15	14.3	18.2	3.2	8.0	1.9	
08/29/07 9:35:30	1.17	19.17	14.3	18.2	3.2	9.9	1.9	

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08/29/07 9:35:45	1.20	19.12	14.3	18.2	3.2	10.3	1.9	Begin M8-1
08/29/07 9:36:00	1.22	19.12	14.1	18.2	3.3	12.2	1.9	
08/29/07 9:36:15	1.18	19.15	14.0	18.2	3.2	11.1	1.9	
08/29/07 9:36:30	1.18	19.13	14.0	18.5	3.2	11.1	0.8	
08/29/07 9:36:45	1.24	19.09	14.0	19.2	3.2	10.3	0.4	
08/29/07 9:37:00	1.25	19.13	14.3	18.2	4.0	10.6	0.4	
08/29/07 9:37:15	1.21	19.16	14.3	18.2	4.2	10.3	0.4	
08/29/07 9:37:30	1.16	19.22	14.0	17.2	4.2	10.6	0.4	
08/29/07 9:37:45	1.09	19.26	14.0	17.2	3.5	11.2	0.4	
08/29/07 9:38:00	1.11	19.21	14.1	18.2	4.2	11.2	0.4	
08/29/07 9:38:15	1.17	19.18	14.3	18.2	4.2	11.5	0.4	
08/29/07 9:38:30	1.16	19.19	14.4	18.0	4.2	11.7	0.4	
08/29/07 9:38:45	1.14	19.21	14.4	17.2	4.0	11.9	0.4	
08/29/07 9:39:00	1.13	19.22	14.7	17.2	4.0	6.6	0.4	
08/29/07 9:39:15	1.12	19.23	14.9	17.7	4.2	11.2	0.4	
08/29/07 9:39:30	1.13	19.22	14.9	18.0	3.6	10.1	0.4	
08/29/07 9:39:45	1.11	19.26	14.8	17.2	3.2	10.8	0.4	
08/29/07 9:40:00	1.10	19.25	14.6	18.2	3.2	11.1	0.4	
08/29/07 9:40:15	1.13	19.22	14.6	18.2	3.2	11.5	0.4	
08/29/07 9:40:30	1.16	19.20	14.6	18.2	3.2	11.3	0.4	
08/29/07 9:40:45	1.18	19.20	14.6	18.2	4.7	11.3	0.4	
08/29/07 9:41:00	1.19	19.19	14.6	18.2	6.0	11.4	0.4	
08/29/07 9:41:15	1.16	19.21	14.3	18.2	6.7	11.3	0.4	
08/29/07 9:41:30	1.13	19.26	14.3	17.2	5.5	11.2	0.4	
08/29/07 9:41:45	1.07	19.31	14.0	17.2	3.7	10.3	0.4	
08/29/07 9:42:00	1.07	19.29	14.0	17.2	3.2	10.5	0.4	
08/29/07 9:42:15	1.10	19.23	14.0	18.0	3.2	10.7	0.4	
08/29/07 9:42:30	1.19	19.14	14.0	19.2	3.2	10.6	0.4	
08/29/07 9:42:45	1.24	19.12	14.0	18.5	3.2	10.6	0.4	
08/29/07 9:43:00	1.22	19.14	14.0	18.5	3.2	8.4	0.4	
08/29/07 9:43:15	1.25	19.09	14.0	19.2	3.2	10.0	0.4	
08/29/07 9:43:30	1.30	19.09	14.0	19.2	3.2	10.7	0.4	
08/29/07 9:43:45	1.27	19.12	14.1	19.2	3.2	10.7	0.4	
08/29/07 9:44:00	1.25	19.14	14.3	19.0	3.2	10.7	0.4	
08/29/07 9:44:15	1.23	19.14	14.3	19.0	3.2	10.8	0.4	
08/29/07 9:44:30	1.23	19.14	14.3	18.2	3.2	10.2	0.4	
08/29/07 9:44:45	1.20	19.15	14.3	18.2	3.2	9.5	0.4	
08/29/07 9:45:00	1.24	19.08	14.0	19.2	4.0	9.7	0.4	
08/29/07 9:45:15	1.30	19.05	14.0	19.2	4.2	10.6	0.4	
08/29/07 9:45:30	1.26	19.12	14.0	18.0	3.5	10.7	0.4	
08/29/07 9:45:45	1.19	19.17	13.7	17.2	3.2	10.5	0.4	
08/29/07 9:46:00	1.21	19.14	13.6	17.2	4.0	10.8	0.4	
08/29/07 9:46:15	1.28	19.08	13.3	17.2	3.7	11.2	0.4	
08/29/07 9:46:30	1.28	19.11	13.0	16.2	3.2	11.2	0.4	
08/29/07 9:46:45	1.23	19.14	12.7	16.2	3.2	11.0	0.4	
08/29/07 9:47:00	1.21	19.13	12.4	16.5	3.2	8.6	0.4	
08/29/07 9:47:15	1.27	19.05	12.2	17.2	3.2	9.3	0.4	
08/29/07 9:47:30	1.28	19.09	12.2	17.2	3.2	6.8	0.4	
08/29/07 9:47:45	1.21	19.15	12.2	17.2	3.2	7.4	0.4	
08/29/07 9:48:00	1.18	19.18	12.2	17.2	3.2	9.4	0.4	
08/29/07 9:48:15	1.16	19.19	12.2	17.2	3.2	9.9	0.4	
08/29/07 9:48:30	1.18	19.18	12.5	17.2	3.2	10.5	0.4	
08/29/07 9:48:45	1.21	19.12	12.5	18.0	4.2	10.7	0.4	
08/29/07 9:49:00	1.27	19.09	12.7	18.0	4.2	11.1	0.4	
08/29/07 9:49:15	1.20	19.21	12.8	16.5	4.2	11.8	0.4	
08/29/07 9:49:30	1.11	19.24	13.1	16.5	5.0	12.0	0.4	
08/29/07 9:49:45	1.09	19.25	13.2	17.2	6.2	12.5	0.4	
08/29/07 9:50:00	1.07	19.28	13.4	16.2	5.5	12.5	0.4	
08/29/07 9:50:15	1.00	19.38	13.4	15.5	4.2	11.8	0.4	
08/29/07 9:50:30	0.98	19.30	13.5	16.5	4.2	9.8	0.4	
08/29/07 9:50:45	1.13	19.19	13.6	17.2	5.2	10.0	0.4	
08/29/07 9:51:00	1.12	19.24	13.6	17.0	4.5	10.2	0.4	
08/29/07 9:51:15	1.08	19.28	13.7	16.2	4.2	10.6	0.4	
08/29/07 9:51:30	1.08	19.25	13.7	17.2	4.2	10.8	0.4	
08/29/07 9:51:45	1.11	19.21	13.7	17.2	5.2	11.3	0.4	port change
08/29/07 9:52:00	1.14	19.21	13.7	17.2	6.0	11.7	0.4	
08/29/07 9:52:15	1.11	19.25	13.7	16.5	5.7	11.3	0.4	
08/29/07 9:52:30	1.03	19.35	13.8	16.2	4.5	9.8	0.4	
08/29/07 9:52:45	0.95	19.38	14.0	16.2	4.7	10.3	0.4	
08/29/07 9:53:00	1.00	19.30	14.0	17.2	5.2	9.8	0.4	
08/29/07 9:53:15	1.07	19.28	14.0	17.2	5.2	9.9	0.4	
08/29/07 9:53:30	1.04	19.33	14.0	16.2	5.2	10.5	0.4	
08/29/07 9:53:45	1.01	19.34	13.9	16.2	5.7	9.6	0.4	
08/29/07 9:54:00	1.02	19.33	13.7	16.2	6.2	10.5	0.4	
08/29/07 9:54:15	1.02	19.33	13.8	16.2	5.2	11.3	0.4	
08/29/07 9:54:30	1.02	19.32	13.7	16.2	4.5	11.9	0.4	
08/29/07 9:54:45	1.03	19.31	13.7	16.2	4.3	11.8	0.4	resume M5B-1
08/29/07 9:55:00	1.04	19.30	13.6	16.5	4.2	11.6	0.4	
08/29/07 9:55:15	1.07	19.27	13.7	17.2	5.2	11.3	0.4	
08/29/07 9:55:30	1.07	19.29	13.7	17.0	5.2	10.3	0.4	
08/29/07 9:55:45	1.02	19.34	13.9	16.2	5.2	10.4	0.4	
08/29/07 9:56:00	0.98	19.35	14.0	16.2	4.5	10.6	0.4	
08/29/07 9:56:15	1.02	19.29	14.3	17.0	4.2	11.2	0.4	
08/29/07 9:56:30	1.11	19.23	14.3	17.5	4.2	11.3	0.4	
08/29/07 9:56:45	1.18	19.20	14.6	18.2	4.2	12.0	0.4	
08/29/07 9:57:00	1.13	19.27	14.6	17.0	4.2	8.6	0.4	
08/29/07 9:57:15	1.04	19.31	14.9	17.0	3.2	9.5	0.4	
08/29/07 9:57:30	1.06	19.25	14.9	17.5	3.2	9.9	0.4	
08/29/07 9:57:45	1.13	19.21	14.9	18.2	3.7	10.5	0.4	
08/29/07 9:58:00	1.15	19.22	14.9	17.2	3.2	10.7	0.4	
08/29/07 9:58:15	1.11	19.26	15.2	17.2	3.7	10.7	0.4	
08/29/07 9:58:30	1.04	19.30	15.4	17.2	4.2	11.2	0.4	
08/29/07 9:58:45	1.04	19.28	15.5	17.2	4.7	10.4	0.4	
08/29/07 9:59:00	1.08	19.26	15.6	17.2	5.2	10.2	0.4	
08/29/07 9:59:15	1.07	19.30	15.6	16.5	4.2	10.6	0.4	
08/29/07 9:59:30	1.02	19.31	15.8	16.5	3.5	11.1	0.4	
08/29/07 9:59:45	1.09	19.21	15.2	17.2	3.3	11.8	0.4	
08/29/07 10:00:00	1.15	19.18	15.4	17.6	3.2	10.7	0.4	
08/29/07 10:00:15	1.17	19.15	15.2	18.2	4.2	10.8	0.4	

Location Paulsboro, New Jersey
Source FCC FGS Stack
Date 08/29/07

08/29/07 10:00:30	1.23	19.11	15.3	18.2	4.2	11.2	0.4
08/29/07 10:00:45	1.21	19.16	15.3	17.5	3.2	9.2	0.4
08/29/07 10:01:00	1.13	19.23	15.2	17.2	3.2	9.1	0.4
08/29/07 10:01:15	1.11	19.22	15.2	17.2	3.2	9.8	0.4
08/29/07 10:01:30	1.13	19.17	15.2	18.2	3.2	10.2	0.4
08/29/07 10:01:45	1.22	19.09	15.3	18.2	2.7	10.3	0.4
08/29/07 10:02:00	1.25	19.11	15.3	18.2	2.2	10.2	0.4
08/29/07 10:02:15	1.24	19.11	15.6	18.2	2.7	10.3	0.4
08/29/07 10:02:30	1.26	19.08	15.6	19.2	3.2	11.0	0.4
08/29/07 10:02:45	1.29	19.07	15.6	19.2	3.2	9.8	0.4
08/29/07 10:03:00	1.24	19.17	15.6	17.7	3.2	8.5	0.4
08/29/07 10:03:15	1.13	19.23	15.6	17.2	4.7	9.1	0.4
08/29/07 10:03:30	1.14	19.18	15.9	18.2	6.0	8.6	0.4
08/29/07 10:03:45	1.20	19.14	15.9	18.2	4.7	10.0	0.4
08/29/07 10:04:00	1.15	19.21	15.9	17.2	3.6	10.2	0.4
08/29/07 10:04:15	1.13	19.18	15.9	18.0	3.2	10.6	0.4
08/29/07 10:04:30	1.21	19.11	15.9	19.2	2.6	10.7	0.4
08/29/07 10:04:45	1.26	19.08	15.9	19.2	2.2	9.9	0.4
08/29/07 10:05:00	1.30	19.05	15.9	19.7	3.0	9.0	0.4
08/29/07 10:05:15	1.32	19.06	15.9	19.2	3.2	9.6	0.4
08/29/07 10:05:30	1.25	19.15	15.9	18.2	3.2	10.4	0.4
08/29/07 10:05:45	1.14	19.24	15.9	17.5	3.2	9.9	0.4
08/29/07 10:06:00	1.09	19.25	15.9	17.7	3.2	10.0	0.4
08/29/07 10:06:15	1.14	19.18	15.9	18.2	3.2	10.2	0.4
08/29/07 10:06:30	1.17	19.20	15.9	18.2	3.2	10.2	0.4
08/29/07 10:06:45	1.14	19.19	15.9	18.2	3.2	9.9	0.4
08/29/07 10:07:00	1.20	19.11	15.6	19.2	4.0	9.8	0.4
08/29/07 10:07:15	1.24	19.12	15.6	18.5	4.2	9.6	0.4
08/29/07 10:07:30	1.19	19.18	15.6	17.7	4.2	9.1	0.4
08/29/07 10:07:45	1.13	19.21	15.6	17.2	4.2	9.4	0.4
08/29/07 10:08:00	1.12	19.21	15.6	17.2	4.2	9.5	0.4
08/29/07 10:08:15	1.12	19.19	15.6	18.0	4.2	9.9	0.4
08/29/07 10:08:30	1.16	19.18	15.7	17.7	4.2	9.6	0.4
08/29/07 10:08:45	1.15	19.21	15.9	17.2	3.7	9.6	0.4
08/29/07 10:09:00	1.16	19.21	15.8	18.2	3.2	9.3	0.4
08/29/07 10:09:15	1.18	19.18	15.7	18.2	3.2	9.5	0.4
08/29/07 10:09:30	1.25	19.10	15.6	18.7	4.0	8.8	0.4
08/29/07 10:09:45	1.28	19.11	15.6	18.2	4.2	10.5	0.4
08/29/07 10:10:00	1.24	19.15	15.6	16.7	5.0	11.1	0.4
08/29/07 10:10:15	1.20	19.17	15.4	16.2	5.2	11.2	0.4
08/29/07 10:10:30	1.19	19.18	15.2	15.7	4.6	11.2	0.4
08/29/07 10:10:45	1.15	19.23	15.3	15.2	3.7	9.4	0.4
port change							
08/29/07 10:11:00	1.11	19.24	15.2	16.2	3.2	10.2	0.4
08/29/07 10:11:15	1.16	19.16	15.3	17.0	3.7	10.9	0.4
08/29/07 10:11:30	1.21	19.14	14.9	16.7	4.2	10.8	0.4
08/29/07 10:11:45	1.19	19.18	15.2	16.2	4.2	7.3	0.4
08/29/07 10:12:00	1.13	19.22	14.9	16.2	4.2	9.9	0.4
08/29/07 10:12:15	1.12	19.22	14.9	16.2	4.2	10.2	0.4
08/29/07 10:12:30	1.13	19.23	14.9	16.2	4.2	10.6	0.4
08/29/07 10:12:45	1.11	19.25	14.9	16.2	3.7	10.8	0.4
08/29/07 10:13:00	1.11	19.21	14.8	16.7	3.2	11.2	0.4
08/29/07 10:13:15	1.19	19.13	14.9	17.2	3.7	11.4	0.4
08/29/07 10:13:30	1.22	19.15	15.0	16.7	4.2	11.6	0.4
08/29/07 10:13:45	1.16	19.21	14.9	18.2	4.2	11.5	0.4
Resume M8-1							
08/29/07 10:14:00	1.11	19.24	14.9	16.2	4.2	10.9	0.4
08/29/07 10:14:15	1.08	19.26	14.9	16.2	3.7	9.4	0.4
08/29/07 10:14:30	1.06	19.26	15.2	16.2	4.0	10.0	0.4
08/29/07 10:14:45	1.10	19.21	15.2	17.0	4.2	8.6	0.4
08/29/07 10:15:00	1.13	19.21	15.2	16.2	4.7	9.2	0.4
08/29/07 10:15:15	1.09	19.26	14.9	16.2	4.2	10.5	0.4
08/29/07 10:15:30	1.02	19.31	14.9	15.7	4.2	11.0	0.4
08/29/07 10:16:45	1.03	19.26	15.0	17.0	3.7	11.3	0.4
08/29/07 10:16:00	1.09	19.21	14.9	17.2	4.0	11.2	0.4
08/29/07 10:16:15	1.10	19.22	14.9	17.2	5.2	11.2	0.4
08/29/07 10:16:30	1.12	19.20	14.9	17.2	6.0	10.5	0.4
08/29/07 10:16:45	1.10	19.24	14.9	16.5	5.2	9.5	0.4
08/29/07 10:17:00	1.05	19.29	14.9	16.2	4.2	9.7	0.4
08/29/07 10:17:15	1.02	19.29	14.9	16.2	3.2	10.0	0.4
08/29/07 10:17:30	1.06	19.23	14.9	17.2	3.2	11.1	0.4
08/29/07 10:17:45	1.11	19.17	14.9	17.2	3.7	11.3	0.4
08/29/07 10:18:00	1.15	19.16	14.9	17.2	4.2	11.3	0.4
08/29/07 10:18:15	1.15	19.17	14.9	17.2	4.2	10.8	0.4
08/29/07 10:18:30	1.12	19.22	14.9	16.7	3.6	9.7	0.4
08/29/07 10:18:45	1.06	19.27	14.9	17.0	3.2	10.2	0.4
08/29/07 10:19:00	1.05	19.24	14.9	17.7	3.2	10.2	0.4
08/29/07 10:19:15	1.14	19.13	14.9	18.2	3.2	10.8	0.4
08/29/07 10:19:30	1.25	19.05	14.9	18.7	3.5	10.6	0.4
08/29/07 10:19:45	1.25	19.08	14.9	18.2	4.2	10.0	0.4
08/29/07 10:20:00	1.22	19.11	14.9	17.7	4.0	8.9	0.4
08/29/07 10:20:15	1.17	19.19	14.9	17.2	3.2	8.9	0.4
08/29/07 10:20:30	1.09	19.25	14.9	16.7	3.2	8.7	0.4
08/29/07 10:20:45	1.09	19.21	14.9	17.2	3.7	8.7	0.4
08/29/07 10:21:00	1.16	19.16	14.9	17.7	4.0	9.9	0.4
08/29/07 10:21:15	1.14	19.20	14.9	17.2	3.2	9.8	0.4
08/29/07 10:21:30	1.09	19.24	14.7	17.2	3.2	7.4	0.4
08/29/07 10:21:45	1.09	19.24	14.9	17.2	3.2	8.5	0.4
08/29/07 10:22:00	1.09	19.23	14.9	17.2	3.2	9.2	0.4
08/29/07 10:22:15	1.13	19.18	14.9	18.0	3.2	9.6	0.4
08/29/07 10:22:30	1.19	19.14	14.9	18.2	3.2	10.2	0.4
08/29/07 10:22:45	1.19	19.16	15.2	18.2	3.2	10.4	0.4
08/29/07 10:23:00	1.14	19.20	15.5	17.2	3.7	10.6	0.4
08/29/07 10:23:15	1.13	19.20	15.7	17.2	3.2	10.8	0.4
08/29/07 10:23:30	1.13	19.20	15.6	17.2	3.2	10.9	0.4
08/29/07 10:23:45	1.15	19.16	15.5	18.0	3.2	10.2	0.4
08/29/07 10:24:00	1.21	19.13	15.3	18.2	3.0	7.2	0.4
08/29/07 10:24:15	1.23	19.12	14.9	18.2	2.2	3.7	0.4
08/29/07 10:24:30	1.20	19.15	14.9	18.2	2.6	5.7	3.0
08/29/07 10:24:45	1.20	19.13	14.9	18.2	3.2	1.9	3.9
08/29/07 10:25:00	1.23	19.11	14.6	18.2	3.5	0.4	3.9

Location Paulsboro, New Jersey
Source FCC FGS Stack
Date 08/29/07

08/29/07 10:25:15	1.22	19.14	14.6	18.0	4.2	0.4	3.9
08/29/07 10:25:30	1.17	19.19	14.6	17.2	3.5	0.4	3.9
08/29/07 10:25:45	1.12	19.21	14.6	17.5	3.7	0.4	3.9
08/29/07 10:26:00	1.17	19.16	14.6	16.2	4.2	0.5	3.9
08/29/07 10:26:15	1.18	19.19	14.6	17.5	3.7	2.1	3.9
08/29/07 10:26:30	1.14	19.21	14.8	17.2	3.2	6.4	3.9
08/29/07 10:26:45	1.14	19.21	15.0	17.2	3.2	9.2	3.9
08/29/07 10:27:00	1.17	19.16	15.0	17.7	3.2	9.3	3.9
08/29/07 10:27:15	1.24	19.08	14.9	19.0	3.2	9.1	3.9
08/29/07 10:27:30	1.31	19.06	14.6	18.7	3.2	9.5	1.3
08/29/07 10:27:45	1.29	19.10	14.6	18.2	3.2	10.1	0.4
08/29/07 10:28:00	1.23	19.18	14.9	18.2	3.2	10.2	0.4
08/29/07 10:28:15	1.19	19.19	14.9	18.2	3.3	10.5	0.5
08/29/07 10:28:30	1.19	19.18	15.2	18.2	3.2	10.4	0.4
08/29/07 10:28:45	1.21	19.19	15.4	18.0	3.2	10.3	0.4
08/29/07 10:29:00	1.16	19.25	15.6	17.7	3.2	10.2	0.4
08/29/07 10:29:15	1.17	19.19	15.6	18.2	3.2	10.3	0.4
08/29/07 10:29:30	1.25	19.13	15.6	18.2	3.2	10.0	0.4
08/29/07 10:29:45	1.26	19.15	15.6	18.2	3.2	10.2	0.4
port change							
08/29/07 10:30:00	1.25	19.15	15.6	18.2	3.2	10.2	0.4
08/29/07 10:30:15	1.27	19.12	15.6	18.2	3.2	10.5	0.4
08/29/07 10:30:30	1.27	19.16	15.6	17.7	3.2	10.4	0.4
08/29/07 10:30:45	1.19	19.21	15.6	17.7	3.2	10.3	0.4
08/29/07 10:31:00	1.16	19.24	15.6	17.2	3.0	10.2	0.4
08/29/07 10:31:15	1.14	19.24	15.9	17.5	2.2	10.4	0.4
08/29/07 10:31:30	1.19	19.17	15.9	18.2	2.2	9.9	0.4
08/29/07 10:31:45	1.24	19.15	15.9	18.5	2.2	9.8	0.4
08/29/07 10:32:00	1.26	19.14	15.9	18.7	2.5	10.2	0.4
08/29/07 10:32:15	1.25	19.14	16.1	18.2	3.2	10.2	0.4
08/29/07 10:32:30	1.25	19.12	16.2	18.2	3.2	10.2	0.4
08/29/07 10:32:45	1.25	19.13	16.5	18.2	2.7	10.2	0.4
Resume M8-1							
08/29/07 10:33:00	1.23	19.17	16.5	18.2	2.2	11.7	0.4
08/29/07 10:33:15	1.22	19.14	16.6	18.2	2.2	11.1	0.4
08/29/07 10:33:30	1.25	19.12	16.5	18.2	2.5	5.2	0.4
08/29/07 10:33:45	1.26	19.09	16.5	18.2	3.2	10.3	0.4
08/29/07 10:34:00	1.31	19.05	16.5	17.7	3.2	10.6	0.4
08/29/07 10:34:15	1.27	19.12	16.5	16.6	3.2	11.2	0.4
08/29/07 10:34:30	1.22	19.13	16.3	16.7	3.2	11.2	0.4
08/29/07 10:34:45	1.24	19.10	16.2	17.0	3.7	11.5	0.4
08/29/07 10:35:00	1.25	19.11	16.2	16.2	4.0	11.7	0.4
08/29/07 10:35:15	1.20	19.16	16.4	16.2	3.2	11.9	0.4
08/29/07 10:35:30	1.15	19.18	16.2	16.2	4.2	6.6	0.4
08/29/07 10:35:45	1.15	19.17	16.2	16.2	4.2	11.2	0.4
08/29/07 10:36:00	1.16	19.17	16.0	16.2	4.2	10.1	0.4
08/29/07 10:36:15	1.14	19.20	15.9	16.0	4.2	10.8	0.4
08/29/07 10:36:30	1.07	19.25	15.9	15.2	4.2	11.1	0.4
08/29/07 10:36:45	1.09	19.20	15.9	15.7	4.2	11.6	0.4
08/29/07 10:37:00	1.12	19.22	15.9	15.2	3.2	11.3	0.4
08/29/07 10:37:15	1.07	19.27	15.9	15.6	3.2	11.3	0.4
08/29/07 10:37:30	1.09	19.21	15.9	16.2	3.2	11.4	0.4
08/29/07 10:37:45	1.15	19.18	15.6	16.2	3.2	11.3	0.4
08/29/07 10:38:00	1.14	19.19	15.5	16.2	3.2	11.2	0.4
08/29/07 10:38:15	1.14	19.18	15.6	17.0	3.2	10.3	0.4
08/29/07 10:38:30	1.20	19.13	15.6	17.2	3.2	10.5	0.4
08/29/07 10:38:45	1.24	19.15	15.6	17.0	3.7	10.7	0.4
08/29/07 10:39:00	1.17	19.23	15.6	16.7	4.0	10.6	0.4
08/29/07 10:39:15	1.16	19.20	15.6	17.2	3.2	10.6	0.4
08/29/07 10:39:30	1.19	19.22	15.6	17.2	3.2	8.4	1.1
08/29/07 10:39:45	1.21	19.19	15.6	18.2	2.7	10.0	1.4
08/29/07 10:40:00	1.29	19.11	15.6	19.2	2.2	10.7	1.4
08/29/07 10:40:15	1.37	19.08	15.7	19.2	2.2	10.7	1.4
08/29/07 10:40:30	1.40	19.09	15.9	19.2	2.2	10.7	1.4
08/29/07 10:40:45	1.42	19.07	15.9	19.5	2.2	10.8	1.4
08/29/07 10:41:00	1.42	19.09	15.8	19.7	2.2	10.2	1.4
08/29/07 10:41:15	1.38	19.12	15.9	19.2	2.2	9.5	1.4
08/29/07 10:41:30	1.36	19.13	15.8	19.2	2.2	9.7	1.4
08/29/07 10:41:45	1.37	19.11	15.8	19.2	2.2	10.6	1.4
08/29/07 10:42:00	1.39	19.12	15.9	19.2	2.2	10.7	1.4
08/29/07 10:42:15	1.37	19.14	15.9	19.0	2.7	9.9	1.4
08/29/07 10:42:30	1.32	19.20	15.9	18.2	3.2	10.5	0.6
08/29/07 10:42:45	1.27	19.24	15.9	18.2	2.7	10.7	0.4
08/29/07 10:43:00	1.27	19.21	15.8	18.7	2.2	10.7	0.4
08/29/07 10:43:15	1.31	19.16	15.5	19.2	2.2	11.2	0.4
08/29/07 10:43:30	1.34	19.14	15.6	19.2	3.2	10.4	0.4
08/29/07 10:43:45	1.37	19.12	15.6	19.2	3.2	10.2	0.4
08/29/07 10:44:00	1.39	19.14	15.6	18.7	3.0	10.6	0.4
08/29/07 10:44:15	1.31	19.21	15.5	18.2	2.2	11.1	0.4
08/29/07 10:44:30	1.28	19.20	15.6	18.7	2.5	11.8	0.4
08/29/07 10:44:45	1.30	19.17	15.6	19.5	3.2	10.7	0.4
08/29/07 10:45:00	1.38	19.07	16.6	20.2	3.2	10.8	0.4
08/29/07 10:45:15	1.44	19.05	16.9	19.5	3.2	11.2	0.4
08/29/07 10:45:30	1.39	19.07	16.9	19.7	3.0	9.2	0.4
08/29/07 10:45:45	1.40	19.08	15.9	19.6	2.2	9.1	0.4
08/29/07 10:46:00	1.36	19.13	15.9	19.2	2.2	9.8	0.4
08/29/07 10:46:15	1.33	19.13	15.7	19.2	2.2	10.2	0.4
08/29/07 10:46:30	1.36	19.06	15.9	19.7	2.2	10.3	0.4
08/29/07 10:46:45	1.45	18.98	15.8	20.2	2.2	10.2	0.4
08/29/07 10:47:00	1.47	19.01	15.6	19.7	2.2	10.3	0.4
08/29/07 10:47:15	1.43	19.04	15.6	19.2	2.2	11.0	0.4
08/29/07 10:47:30	1.42	19.02	15.6	19.7	2.2	9.8	0.4
08/29/07 10:47:45	1.44	19.00	15.6	20.2	2.2	8.5	0.4
End M8-1							
08/29/07 10:48:00	1.44	18.99	15.4	20.2	2.2	9.1	0.4
08/29/07 10:48:15	1.49	18.94	15.6	20.2	2.2	9.6	0.4
08/29/07 10:48:30	1.49	18.96	15.6	20.2	2.0	10.0	0.4
08/29/07 10:48:45	1.49	18.92	15.8	21.2	1.3	10.2	0.5
08/29/07 10:49:00	1.57	18.85	15.9	21.2	2.3	10.8	0.4
08/29/07 10:49:15	1.58	18.88	15.9	21.0	2.7	10.7	0.4
08/29/07 10:49:30	1.52	18.70	15.9	19.2	10.2	9.9	0.4
08/29/07 10:49:45	2.08	12.69	15.1	11.0	8.7	9.0	0.4

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08/29/07 10:50:00	3.79	6.22	13.0	5.7	1.7	9.6	0.4
08/29/07 10:50:15	8.55	6.60	11.0	2.0	-0.3	10.4	0.4
08/29/07 10:50:30	9.81	9.57	9.4	1.2	-0.8	9.9	0.4
08/29/07 10:50:45	11.18	10.97	7.8	1.2	-0.8	10.0	0.4
08/29/07 10:51:00	11.65	11.18	6.8	1.2	-0.8	10.2	0.4
08/29/07 10:51:15	11.94	11.31	6.0	1.2	-0.8	10.2	0.4
08/29/07 10:51:30	12.22	11.50	5.2	1.2	-0.8	9.9	0.4
08/29/07 10:51:45	12.49	11.73	4.7	1.0	-0.8	9.8	0.4
08/29/07 10:52:00	12.76	11.99	4.2	0.2	-0.8	9.6	0.4
08/29/07 10:52:15	13.04	12.28	3.9	0.2	-0.8	9.1	0.4
08/29/07 10:52:30	13.31	12.64	3.6	0.2	-0.8	9.4	0.4
08/29/07 10:52:45	13.59	13.11	3.3	0.2	-0.8	9.5	0.4
08/29/07 10:53:00	13.87	13.58	3.0	0.2	-0.8	9.9	0.4
08/29/07 10:53:15	14.14	14.01	3.0	0.2	-0.8	9.8	0.4
08/29/07 10:53:30	14.41	14.36	2.7	0.2	-0.8	9.6	0.4
08/29/07 10:53:45	14.67	14.67	2.5	0.2	-0.8	9.3	0.4
08/29/07 10:54:00	14.93	14.96	2.4	0.2	-0.8	9.5	0.4
08/29/07 10:54:15	15.19	15.23	2.4	0.2	-0.8	8.8	0.4
08/29/07 10:54:30	15.44	15.49	2.4	0.2	-1.5	10.5	0.4
08/29/07 10:54:45	15.67	15.73	2.1	0.2	-0.8	11.1	0.4
08/29/07 10:55:00	15.86	15.90	2.1	0.2	-0.8	11.2	0.4
08/29/07 10:55:15	15.75	16.14	1.8	1.2	-0.8	11.2	0.4
08/29/07 10:55:30	15.47	16.61	1.8	1.7	-0.8	9.4	0.4
08/29/07 10:55:45	15.34	16.82	2.1	2.2	-0.8	7.5	0.4
08/29/07 10:56:00	15.24	17.01	2.1	2.2	-0.8	5.7	0.4
08/29/07 10:56:15	15.16	17.22	2.1	2.2	-0.8	8.9	0.4
08/29/07 10:56:30	15.17	17.44	2.1	2.2	-0.8	8.4	0.4
08/29/07 10:56:45	15.21	17.65	2.2	2.5	0.0	8.8	0.4
08/29/07 10:57:00	15.14	17.87	2.4	3.2	0.2	6.8	0.4
08/29/07 10:57:15	14.43	18.13	2.7	4.5	0.2	9.5	0.4
08/29/07 10:57:30	13.49	18.32	3.0	5.2	0.0	9.2	0.4
08/29/07 10:57:45	13.28	18.67	3.5	5.2	0.0	8.7	0.4
08/29/07 10:58:00	14.20	20.02	3.9	5.2	0.2	9.4	0.4
08/29/07 10:58:15	15.41	21.05	4.3	5.2	0.2	9.2	0.4
08/29/07 10:58:30	15.77	21.31	4.6	5.2	0.2	9.3	0.4
08/29/07 10:58:45	15.78	21.35	4.9	5.2	-0.5	8.8	0.4
08/29/07 10:59:00	15.86	21.39	5.2	5.2	-0.8	9.7	0.4
08/29/07 10:59:15	16.02	21.36	5.4	5.2	0.0	9.8	0.4
08/29/07 10:59:30	15.78	21.31	5.5	6.0	0.0	8.2	0.4
08/29/07 10:59:45	15.49	21.22	5.8	6.5	-0.8	9.6	0.4
08/29/07 11:00:00	14.19	21.09	5.8	6.5	-1.8	9.1	0.4
08/29/07 11:00:15	16.57	21.68	5.9	2.7	-1.0	9.3	0.4
08/29/07 11:00:30	18.93	18.27	5.4	0.5	-0.8	8.2	4.4
08/29/07 11:00:45	14.92	13.67	4.9	0.5	-0.8	8.5	4.4
08/29/07 11:01:00	10.99	11.61	4.4	2.0	-0.8	7.7	4.4
08/29/07 11:01:15	9.37	9.58	4.0	1.0	-0.8	7.5	4.4
08/29/07 11:01:30	7.30	6.71	3.6	0.2	-0.3	7.1	4.4
08/29/07 11:01:45	5.55	5.65	3.4	0.2	-0.8	6.8	4.4
08/29/07 11:02:00	5.14	5.45	3.0	0.2	-0.8	6.3	4.4
08/29/07 11:02:15	5.08	5.39	2.8	0.2	-0.8	6.3	4.4
08/29/07 11:02:30	5.06	5.35	2.6	0.2	-0.7	6.9	4.4
08/29/07 11:02:45	5.06	5.33	2.4	0.2	-0.8	7.2	4.4
08/29/07 11:03:00	5.05	5.31	2.2	0.2	-0.8	5.9	4.4
08/29/07 11:03:15	5.04	5.29	2.1	0.2	-0.8	5.4	4.4
08/29/07 11:03:30	5.04	5.28	2.1	0.2	-0.8	4.5	1.4
Post-Test Bias and Drift Check:							
08/29/07 11:03:45	5.04	5.26	1.9	0.2	-0.8	0.5	1.4
08/29/07 11:04:00	5.04	5.25	1.8	0.2	-0.8	4.6	1.4
08/29/07 11:04:15	5.03	5.25	1.8	0.2	0.0	6.5	1.4
08/29/07 11:04:30	5.04	5.24	1.8	0.2	0.2	5.9	1.4
5.0% Oxygen injection: 5.04 % db Oxygen							
08/29/07 11:04:45	4.91	6.85	1.8	3.7	0.2	4.4	1.4
08/29/07 11:05:00	3.69	12.20	2.1	10.5	-1.3	4.3	1.4
08/29/07 11:05:15	3.06	11.17	2.7	7.2	-1.8	3.9	1.4
08/29/07 11:05:30	5.47	10.56	3.3	2.0	-1.8	3.5	1.4
08/29/07 11:05:45	12.83	16.05	3.4	1.0	-1.8	3.5	1.4
08/29/07 11:06:00	18.50	19.75	3.3	0.2	-1.7	3.4	1.4
08/29/07 11:06:15	21.38	21.66	3.4	0.2	-1.8	3.2	1.4
08/29/07 11:06:30	22.27	22.13	3.1	0.2	-1.8	3.2	2.9
08/29/07 11:06:45	22.41	22.24	2.8	0.2	-1.8	2.6	2.9
08/29/07 11:07:00	22.44	22.30	2.6	0.2	-1.8	1.6	2.9
08/29/07 11:07:15	22.45	22.34	2.4	0.2	-1.8	1.8	2.9
08/29/07 11:07:30	22.47	22.36	2.4	0.2	-1.8	2.0	2.9
08/29/07 11:07:45	22.47	22.38	2.1	0.2	-1.8	1.9	2.9
08/29/07 11:08:00	22.48	22.41	2.1	0.2	-1.8	1.8	2.9
08/29/07 11:08:15	22.49	22.42	1.8	0.2	-1.8	2.3	2.9
08/29/07 11:08:30	22.49	22.43	1.8	0.2	-1.8	2.1	2.9
08/29/07 11:08:45	22.49	22.44	1.8	0.2	-1.8	1.6	2.9
08/29/07 11:09:00	22.49	22.45	1.8	0.2	-1.8	0.7	2.9
08/29/07 11:09:15	22.50	22.46	1.6	0.2	-1.8	0.5	2.9
Post-Test Bias and Drift Check:							
08/29/07 11:09:30	22.50	22.46	1.5	0.2	-1.8	0.7	0.9
08/29/07 11:09:45	22.50	22.47	1.5	0.2	-1.8	0.4	0.9
08/29/07 11:10:00	22.50	22.48	1.5	0.2	-1.8	0.4	0.9
08/29/07 11:10:15	22.50	22.48	1.5	0.2	-1.8	1.0	0.9
22.47 % db CO2							
08/29/07 11:10:30	22.50	22.48	1.5	0.2	-1.3	1.1	0.9
08/29/07 11:10:45	22.50	22.48	1.2	0.2	-0.8	2.9	0.9
08/29/07 11:11:00	22.18	22.31	1.4	1.7	-1.3	1.2	0.9
08/29/07 11:11:15	18.92	21.73	1.6	3.7	-1.0	0.5	0.9
08/29/07 11:11:30	16.71	16.94	4.0	1.7	-0.8	0.6	0.9
08/29/07 11:11:45	11.02	8.91	22.7	1.2	0.0	1.9	0.9
08/29/07 11:12:00	4.89	4.06	71.8	1.2	0.2	5.8	0.9
08/29/07 11:12:15	1.50	2.10	111.9	2.2	0.2	0.7	0.9
Post-Test Bias and Drift Check:							
08/29/07 11:12:30	0.47	1.11	108.3	2.2	0.2	0.4	14.9
08/29/07 11:12:45	0.41	0.83	67.5	0.7	0.2	0.4	14.9
08/29/07 11:13:00	0.45	0.56	43.6	0.2	0.2	0.4	14.9
08/29/07 11:13:15	0.29	0.44	33.5	0.2	0.2	0.6	14.9
Zero nitrogen injection: 0.48 ppmv CH4							
08/29/07 11:13:30	0.20	0.38	28.4	0.2	0.2	0.4	14.9
08/29/07 11:13:45	0.18	0.34	25.5	0.2	0.3	0.4	14.9
08/29/07 11:14:00	0.16	0.32	23.5	0.2	0.3	0.4	14.9
08/29/07 11:14:15	0.15	0.30	22.2	0.2	0.2	0.4	14.9
08/29/07 11:14:30	0.15	0.28	21.3	0.2	0.2	0.4	14.9

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08/29/07 11:14:45	0.15	0.26	20.5	0.2	0.2	0.4	14.9	Post-Test Bias and Drift Check:
08/29/07 11:15:00	0.14	0.25	19.8	0.2	0.2	0.4	14.9	Zero NOx/CO injection:
08/29/07 11:15:15	0.14	0.24	19.4	0.2	0.2	0.4	14.9	0.21 ppmv db NOx
08/29/07 11:15:30	0.13	0.23	19.0	0.2	0.2	0.4	0.4	0.22 ppmv db CO
08/29/07 11:15:45	0.13	0.22	18.8	0.2	0.2	0.4	0.4	
08/29/07 11:16:00	0.13	0.21	18.5	0.2	0.2	0.4	0.4	
08/29/07 11:16:15	0.13	0.20	18.3	0.2	0.3	0.5	0.4	
08/29/07 11:16:30	0.12	0.20	18.1	0.2	0.3	0.6	0.4	Post-Test Bias and Drift Check:
08/29/07 11:16:45	0.12	0.19	18.0	0.2	0.2	0.4	0.4	20 ppm SO2 injection:
08/29/07 11:17:00	0.12	0.18	18.0	0.2	0.2	0.4	0.4	18.01 ppmv db SO2
08/29/07 11:17:15	0.12	0.17	18.0	0.2	0.2	0.4	0.4	
08/29/07 11:17:30	0.11	0.17	18.0	0.2	0.2	0.4	0.4	
08/29/07 11:17:45	0.11	0.17	17.8	0.2	0.2	0.4	0.4	Post-Test Bias and Drift Check:
08/29/07 11:18:00	0.11	0.16	17.7	0.2	0.2	1.1	0.4	Zero Oxygen/CO2 injection:
08/29/07 11:18:15	0.11	0.16	17.7	0.2	0.2	1.1	0.4	0.11 % db Oxygen
08/29/07 11:18:30	0.11	0.17	17.9	0.5	0.2	0.4	0.4	0.16 % db CO2
08/29/07 11:18:45	0.11	0.17	19.5	2.2	0.2	0.4	0.4	
08/29/07 11:19:00	0.25	2.45	21.2	2.2	0.2	0.4	0.4	
08/29/07 11:19:15	0.19	0.74	20.1	0.7	0.2	0.4	0.4	
08/29/07 11:19:30	0.12	0.22	18.5	0.5	0.2	0.4	0.4	
08/29/07 11:19:45	0.12	0.17	16.8	3.2	0.2	0.4	0.4	
08/29/07 11:20:00	0.12	0.16	14.3	7.7	0.2	0.4	0.4	
08/29/07 11:20:15	0.11	0.14	11.6	9.2	0.2	0.4	0.4	
08/29/07 11:20:30	0.11	0.13	9.6	9.5	0.2	0.4	0.4	
08/29/07 11:20:45	0.11	0.13	8.1	10.2	0.2	0.5	0.4	
08/29/07 11:21:00	0.11	0.13	7.0	10.2	0.2	0.4	0.4	
08/29/07 11:21:15	0.11	0.12	6.1	10.2	0.5	0.4	0.4	
08/29/07 11:21:30	0.11	0.12	5.4	10.2	0.7	0.4	0.4	
08/29/07 11:21:45	0.11	0.12	4.9	10.2	0.4	0.8	0.4	
08/29/07 11:22:00	0.11	0.12	4.4	10.2	0.3	0.5	0.4	
08/29/07 11:22:15	0.10	0.11	4.0	10.2	0.2	0.4	0.4	
08/29/07 11:22:30	0.11	0.12	3.7	10.2	0.2	0.4	0.4	
08/29/07 11:22:45	0.11	0.12	3.4	10.2	0.5	0.4	0.4	
08/29/07 11:23:00	0.10	0.11	3.1	10.5	0.7	0.4	0.4	
08/29/07 11:23:15	0.11	0.11	2.8	12.7	0.2	0.4	0.4	
08/29/07 11:23:30	0.10	0.11	2.7	17.0	0.2	0.8	0.4	Post-Test Bias and Drift Check:
08/29/07 11:23:45	0.10	0.11	2.5	19.2	0.2	0.4	0.4	20 ppm NOx injection:
08/29/07 11:24:00	0.09	0.14	2.4	20.0	0.2	0.4	0.4	20.03 ppmv db NOx
08/29/07 11:24:15	0.13	1.60	2.7	20.7	0.2	0.4	0.4	
08/29/07 11:24:30	0.19	1.53	2.9	26.2	0.2	0.4	0.4	
08/29/07 11:24:45	0.13	0.36	3.0	97.2	0.2	0.4	0.4	
08/29/07 11:25:00	0.11	0.15	3.3	192.8	0.2	0.4	0.4	
08/29/07 11:25:15	0.11	0.12	3.0	202.3	0.2	0.5	0.4	
08/29/07 11:25:30	0.11	0.11	2.8	183.5	0.2	0.4	0.4	
08/29/07 11:25:45	0.11	0.17	2.7	165.8	0.2	0.4	0.4	
08/29/07 11:26:00	0.14	1.20	2.7	145.5	0.2	0.4	0.4	
08/29/07 11:26:15	0.16	0.74	2.4	132.2	0.2	0.4	0.4	
08/29/07 11:26:30	0.12	0.19	2.4	54.5	0.2	0.4	0.4	
08/29/07 11:26:45	0.10	0.12	2.4	26.2	0.2	0.4	0.4	
08/29/07 11:27:00	0.09	0.11	2.1	17.0	0.2	1.4	0.4	
08/29/07 11:27:15	0.09	0.10	2.2	16.2	0.3	0.9	0.4	
08/29/07 11:27:30	0.10	0.89	2.0	15.5	0.3	1.1	1.5	
08/29/07 11:27:45	0.21	3.10	2.2	16.2	0.2	0.4	1.4	
08/29/07 11:28:00	0.22	1.39	2.4	16.2	0.8	0.4	1.5	
08/29/07 11:28:15	0.12	0.27	2.4	15.7	4.5	0.4	1.4	
08/29/07 11:28:30	0.10	0.14	2.4	14.0	10.7	0.4	1.4	
08/29/07 11:28:45	0.12	0.13	2.1	11.2	17.5	0.4	1.4	
08/29/07 11:29:00	0.12	0.12	2.1	4.7	18.7	0.4	1.4	Post-Test Bias and Drift Check:
08/29/07 11:29:15	0.11	0.10	1.8	2.7	19.2	0.4	1.4	20 ppm CO injection:
08/29/07 11:29:30	0.12	0.09	1.8	1.2	19.2	0.4	1.4	19.23 ppmv db CO
08/29/07 11:29:45	0.11	0.09	1.8	1.2	19.2	0.4	1.4	
08/29/07 11:30:00	0.11	0.09	1.8	1.2	19.2	0.4	1.4	
08/29/07 11:30:15	0.11	0.09	1.5	1.2	19.2	0.4	1.4	
08/29/07 11:30:30	0.11	0.09	1.5	1.2	19.7	0.4	0.4	Post-Test Bias and Drift Check:
08/29/07 11:30:45	0.11	0.09	1.5	1.2	20.2	0.5	0.4	Zero ppm SO2 injection:
08/29/07 11:31:00	0.11	0.09	1.5	1.2	18.7	1.1	0.4	1.43 ppmv db SO2
08/29/07 11:31:15	0.10	0.09	1.3	1.2	17.2	0.4	0.4	
08/29/07 11:31:30	0.11	1.29	1.4	2.5	18.2	2.4	0.4	
08/29/07 11:31:45	0.24	3.23	1.7	3.2	16.0	20.0	0.4	
08/29/07 11:32:00	0.20	1.23	2.1	1.5	9.7	25.4	0.4	
08/29/07 11:32:15	0.14	0.26	2.1	2.7	3.0	24.9	0.4	Post-Test Bias and Drift Check:
08/29/07 11:32:30	0.28	0.16	2.0	2.0	1.7	24.2	0.4	25 ppm CH4 injection:
08/29/07 11:32:45	0.51	0.11	1.8	1.2	1.2	24.2	0.4	24.31 ppmv CH4
08/29/07 11:33:00	0.59	0.10	1.8	1.0	1.2	24.5	0.4	
08/29/07 11:33:15	0.61	0.10	1.5	0.2	1.2	24.3	0.4	
08/29/07 11:33:30	0.62	0.10	1.5	0.2	1.2	20.5	22.9	
08/29/07 11:33:45	0.62	0.11	1.5	0.2	1.2	6.6	22.9	
08/29/07 11:34:00	0.62	0.11	1.4	0.2	1.2	21.2	22.9	
08/29/07 11:34:15	0.64	2.20	1.8	2.7	0.2	21.1	22.9	
08/29/07 11:34:30	0.80	8.73	2.7	9.2	0.2	20.6	22.9	
08/29/07 11:34:45	0.89	7.72	3.9	6.2	0.5	17.7	22.9	
08/29/07 11:35:00	0.77	3.13	4.5	2.7	0.5	6.1	22.9	
08/29/07 11:35:15	0.65	0.60	4.2	1.2	1.2	6.3	22.9	
08/29/07 11:35:30	0.66	2.66	4.1	4.5	2.0	6.7	22.9	
08/29/07 11:35:45	0.66	10.02	5.0	11.2	2.2	7.0	22.9	
08/29/07 11:36:00	1.08	15.29	7.0	15.7	2.2	6.7	22.9	
08/29/07 11:36:15	1.22	17.98	9.5	17.2	2.2	6.7	19.3	
08/29/07 11:36:30	1.24	18.76	11.7	17.5	2.2	6.7	0.4	
08/29/07 11:36:45	1.28	18.82	13.4	18.2	2.2	6.7	0.4	
08/29/07 11:37:00	1.36	18.80	14.8	19.2	2.2	6.8	0.4	
08/29/07 11:37:15	1.38	18.83	15.9	18.5	2.2	6.7	0.4	
08/29/07 11:37:30	1.34	18.88	16.6	18.5	2.2	6.9	0.4	
08/29/07 11:37:45	1.35	18.87	17.2	19.2	2.2	6.8	0.4	
08/29/07 11:38:00	1.34	18.93	17.8	18.0	2.2	6.8	0.4	
08/29/07 11:38:15	1.27	19.02	18.2	17.2	3.0	7.0	0.4	
08/29/07 11:38:30	1.22	19.06	18.5	17.2	2.2	6.7	0.4	
08/29/07 11:38:45	1.21	19.07	18.7	17.2	2.2	6.8	0.4	
08/29/07 11:39:00	1.20	19.06	18.9	17.5	2.2	6.8	0.4	

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08/29/07 11:39:15	1.23	19.03	18.9	18.2	2.2	7.1	0.4
08/29/07 11:39:30	1.26	19.03	19.2	18.2	3.0	7.2	0.4
08/29/07 11:39:45	1.28	19.01	19.2	18.2	3.2	7.2	0.4
08/29/07 11:40:00	1.27	19.06	19.2	17.2	3.2	6.9	0.4
08/29/07 11:40:15	1.17	19.15	19.0	16.5	2.5	6.9	0.4
08/29/07 11:40:30	1.13	19.14	18.9	17.2	3.2	7.3	0.4
08/29/07 11:40:45	1.20	19.05	19.2	18.0	5.5	7.5	0.4
08/29/07 11:41:00	1.25	19.05	19.0	17.2	5.5	7.3	0.4
08/29/07 11:41:15	1.18	19.15	19.2	16.5	4.0	7.3	0.4
08/29/07 11:41:30	1.09	19.20	19.2	16.2	3.2	7.3	0.4
08/29/07 11:41:45	1.12	19.15	19.2	17.0	2.2	7.1	0.4
08/29/07 11:42:00	1.19	19.06	19.2	18.2	2.2	7.0	0.4
08/29/07 11:42:15	1.25	19.03	18.9	18.2	2.2	7.2	0.4
08/29/07 11:42:30	1.30	18.98	19.2	19.2	2.2	7.0	0.4
08/29/07 11:42:45	1.33	18.98	19.0	18.5	2.2	6.9	0.4
08/29/07 11:43:00	1.28	19.05	18.9	18.2	3.0	7.1	0.4
08/29/07 11:43:15	1.25	19.04	18.9	18.2	3.5	7.5	0.4
08/29/07 11:43:30	1.28	19.03	18.6	18.2	5.0	7.3	0.4
08/29/07 11:43:45	1.25	19.08	18.7	17.5	4.2	7.1	0.4
08/29/07 11:44:00	1.16	19.17	18.9	16.2	4.2	7.7	0.4
08/29/07 11:44:15	1.06	19.21	19.1	16.2	5.2	7.6	0.4
08/29/07 11:44:30	1.09	19.20	19.2	16.2	4.5	7.5	0.4
08/29/07 11:44:45	1.07	19.24	18.9	16.2	3.2	7.8	0.4
08/29/07 11:45:00	1.05	19.24	18.9	16.5	4.0	8.0	0.4
08/29/07 11:45:15	1.10	19.18	18.9	17.2	4.2	8.2	0.4
08/29/07 11:45:30	1.14	19.17	18.9	16.2	4.2	7.9	0.4
08/29/07 11:45:45	1.11	19.20	18.9	15.5	4.0	7.7	0.4
08/29/07 11:46:00	1.08	19.22	18.8	15.2	3.2	7.6	0.4
08/29/07 11:46:15	1.09	19.20	18.8	15.2	3.5	7.8	0.4
08/29/07 11:46:30	1.14	19.16	18.8	15.2	6.5	8.2	0.4
08/29/07 11:46:45	1.17	19.13	18.7	16.0	10.5	8.4	0.4
08/29/07 11:47:00	1.18	19.16	18.9	15.0	9.7	8.2	0.4
08/29/07 11:47:15	1.05	19.33	18.9	13.5	7.0	8.4	0.4
08/29/07 11:47:30	0.92	19.38	19.1	14.2	5.5	8.6	0.4
08/29/07 11:47:45	0.96	19.33	19.2	14.2	4.2	8.4	0.4
08/29/07 11:48:00	1.01	19.31	19.2	14.5	4.2	8.4	0.4
08/29/07 11:48:15	1.03	19.27	19.1	15.2	4.5	8.8	0.4
08/29/07 11:48:30	1.09	19.23	19.1	16.0	6.0	8.5	0.4
08/29/07 11:48:45	1.10	19.26	19.2	15.2	4.7	8.3	0.4
08/29/07 11:49:00	1.05	19.31	19.2	15.2	3.5	8.4	0.4
08/29/07 11:49:15	1.04	19.29	19.2	16.0	3.2	8.3	0.4
08/29/07 11:49:30	1.08	19.28	19.2	16.0	3.2	8.1	0.4
08/29/07 11:49:45	1.05	19.32	18.9	15.2	3.2	8.1	0.4
08/29/07 11:50:00	1.04	19.29	18.9	16.2	3.2	8.2	0.4
08/29/07 11:50:15	1.10	19.24	19.1	16.2	3.2	7.9	0.4
08/29/07 11:50:30	1.10	19.29	18.9	16.2	3.2	8.3	0.4
08/29/07 11:50:45	1.07	19.29	18.9	17.0	3.2	8.7	0.4
08/29/07 11:51:00	1.14	19.21	18.8	17.2	2.5	8.1	0.4
08/29/07 11:51:15	1.19	19.19	16.7	17.2	2.2	7.8	0.4
08/29/07 11:51:30	1.18	19.20	18.8	17.2	3.0	7.7	0.4
08/29/07 11:51:45	1.20	19.18	18.9	17.2	3.2	7.6	0.4
08/29/07 11:52:00	1.19	19.24	18.8	17.0	3.2	7.6	0.4
08/29/07 11:52:15	1.12	19.28	18.8	16.2	4.2	7.9	0.4
08/29/07 11:52:30	1.11	19.29	18.6	16.2	5.0	7.0	0.4
08/29/07 11:52:45	1.07	19.34	18.6	15.5	4.7	7.0	0.4
08/29/07 11:53:00	1.02	19.38	18.6	15.2	5.2	7.3	0.4
08/29/07 11:53:15	1.01	19.38	18.6	15.2	5.7	7.5	0.4
08/29/07 11:53:30	1.02	19.38	18.6	15.2	4.5	7.2	0.4
08/29/07 11:53:45	1.00	19.42	18.5	15.2	3.7	7.8	0.4
08/29/07 11:54:00	1.01	19.38	18.5	16.5	5.0	7.7	0.4
08/29/07 11:54:15	1.09	19.29	18.4	17.2	4.7	7.7	0.4
08/29/07 11:54:30	1.10	19.31	18.3	16.2	4.2	8.6	0.4
08/29/07 11:54:45	1.06	19.33	18.3	16.2	4.7	8.6	0.4
08/29/07 11:55:00	1.09	19.31	18.3	16.2	5.2	8.0	0.4
08/29/07 11:55:15	1.08	19.33	18.3	15.5	6.7	7.9	0.4
08/29/07 11:55:30	1.04	19.37	18.3	15.2	8.0	8.1	0.4
08/29/07 11:55:45	1.01	19.38	18.3	15.2	9.2	7.7	0.4
08/29/07 11:56:00	0.97	19.40	18.3	15.2	7.7	7.6	0.4
08/29/07 11:56:15	0.97	19.39	18.5	15.2	5.7	7.9	0.4
08/29/07 11:56:30	1.01	19.34	18.6	15.2	4.5	7.8	0.4
08/29/07 11:56:45	1.04	19.35	18.6	15.2	4.2	7.8	0.4
08/29/07 11:57:00	1.00	19.39	18.3	15.2	3.5	7.7	0.4
08/29/07 11:57:15	0.99	19.37	18.3	16.0	3.7	7.6	0.4
08/29/07 11:57:30	1.06	19.30	18.3	16.2	4.0	7.4	0.4
08/29/07 11:57:45	1.10	19.30	18.3	16.2	6.7	7.9	0.4
08/29/07 11:58:00	1.06	19.34	18.3	15.7	7.2	7.6	0.4
08/29/07 11:58:15	0.99	19.41	18.3	15.2	5.2	7.4	0.4
08/29/07 11:58:30	0.93	19.45	18.3	14.7	4.2	7.5	0.4
08/29/07 11:58:45	0.96	19.39	18.3	16.0	5.2	7.4	0.4
08/29/07 11:59:00	1.05	19.32	18.0	16.2	4.5	7.4	0.4
08/29/07 11:59:15	1.08	19.32	18.0	16.2	4.2	7.5	0.4
08/29/07 11:59:30	1.08	19.30	17.7	16.2	4.2	7.3	0.4
08/29/07 11:59:45	1.10	19.27	17.7	16.2	4.2	7.6	0.4
08/29/07 12:00:00	1.10	19.27	17.7	16.2	4.2	7.8	0.4
08/29/07 12:00:15	1.08	19.31	17.7	16.2	5.2	7.8	0.4
08/29/07 12:00:30	1.01	19.40	17.7	15.2	7.7	10.0	0.4
08/29/07 12:00:45	0.93	19.43	17.7	15.2	8.7	9.8	0.4
08/29/07 12:01:00	0.95	19.40	17.5	15.2	6.7	9.6	0.4
08/29/07 12:01:15	0.95	19.42	17.4	15.2	4.7	8.2	0.4
08/29/07 12:01:30	0.98	19.36	17.4	15.7	4.2	8.1	0.4
08/29/07 12:01:45	1.04	19.32	17.6	16.2	4.2	7.9	0.4
08/29/07 12:02:00	1.02	19.34	17.9	16.2	5.0	7.7	0.4
08/29/07 12:02:15	1.02	19.33	18.0	16.2	5.2	7.7	0.4
08/29/07 12:02:30	1.06	19.29	17.6	16.2	4.5	7.4	0.4
08/29/07 12:02:45	1.04	19.35	17.2	15.5	3.7	7.7	0.4
08/29/07 12:03:00	0.96	19.40	17.1	15.2	3.2	7.4	0.4
08/29/07 12:03:15	0.96	19.37	16.8	16.0	3.2	7.5	0.4
08/29/07 12:03:30	1.05	19.28	16.6	16.7	2.5	7.5	0.4
08/29/07 12:03:45	1.10	19.26	16.3	17.2	3.2	7.0	0.4

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08/29/07 12:04:00	1.12	19.24	16.0	16.7	3.2	8.3	0.4
08/29/07 12:04:15	1.13	19.25	15.9	16.2	3.2	7.2	0.4
08/29/07 12:04:30	1.11	19.23	15.8	17.2	3.2	7.2	0.4
08/29/07 12:04:45	1.16	19.18	15.6	17.2	4.2	7.2	0.4
08/29/07 12:05:00	1.21	19.15	15.5	17.7	4.2	6.9	0.4
08/29/07 12:05:15	1.17	19.24	15.6	16.5	4.2	6.7	0.4
08/29/07 12:05:30	1.07	19.30	15.5	16.2	4.2	6.6	0.4
08/29/07 12:05:45	1.04	19.32	15.3	16.2	4.2	8.8	0.4
08/29/07 12:06:00	1.03	19.33	15.4	18.2	5.0	7.4	0.4
08/29/07 12:06:15	1.05	19.30	15.6	18.2	5.7	7.6	0.9
08/29/07 12:06:30	1.06	19.32	15.5	15.2	5.2	7.6	2.4
08/29/07 12:06:45	1.01	19.36	15.8	15.2	4.7	7.1	2.4
08/29/07 12:07:00	1.02	19.31	15.8	16.2	6.7	7.3	2.4
08/29/07 12:07:15	1.06	19.30	15.5	16.2	9.2	7.5	2.4
08/29/07 12:07:30	1.04	19.36	15.8	15.2	8.5	8.0	2.4
08/29/07 12:07:45	0.96	19.43	15.6	14.5	6.2	6.8	2.4
08/29/07 12:08:00	0.92	19.43	15.6	14.7	5.5	6.7	2.4
08/29/07 12:08:15	0.96	19.40	15.5	15.2	4.7	6.8	2.4
08/29/07 12:08:30	0.95	19.43	15.2	15.2	4.2	6.7	2.4
08/29/07 12:08:45	0.98	19.39	15.2	15.2	4.2	8.5	2.4
08/29/07 12:09:00	1.03	19.34	14.9	18.2	5.0	7.1	2.4
08/29/07 12:09:15	1.08	19.32	14.9	18.2	6.2	5.9	1.9
08/29/07 12:09:30	1.03	19.39	14.6	14.7	5.5	0.5	0.4
08/29/07 12:09:45	0.96	19.45	14.7	14.2	4.7	0.4	0.4
08/29/07 12:10:00	0.94	19.45	14.9	14.2	4.2	0.5	0.4
08/29/07 12:10:15	0.99	19.39	14.9	14.2	4.7	0.4	0.4
08/29/07 12:10:30	1.05	19.34	14.9	14.7	5.2	0.5	0.4
08/29/07 12:10:45	1.04	19.38	14.9	14.2	7.7	0.8	0.4
08/29/07 12:11:00	0.97	19.44	14.9	14.2	11.5	0.7	0.4
08/29/07 12:11:15	0.97	19.41	14.9	14.2	12.2	1.0	0.4
08/29/07 12:11:30	0.95	19.47	14.9	13.7	10.5	1.6	0.4
08/29/07 12:11:45	0.87	19.53	14.9	13.2	10.7	2.1	0.4
08/29/07 12:12:00	0.85	19.54	14.9	13.2	15.2	2.0	0.4
08/29/07 12:12:15	0.86	19.52	14.9	13.2	23.7	2.4	0.4
08/29/07 12:12:30	0.89	19.52	14.9	13.2	26.7	2.7	0.4
08/29/07 12:12:45	0.85	19.58	14.9	12.5	22.7	3.4	0.4
08/29/07 12:13:00	0.76	19.65	14.9	12.2	18.0	3.5	0.4
08/29/07 12:13:15	0.73	19.65	15.1	12.2	16.2	3.6	0.4
08/29/07 12:13:30	0.78	19.59	15.2	13.2	16.2	3.9	0.4
08/29/07 12:13:45	0.81	19.58	15.3	13.2	13.2	4.1	0.4
08/29/07 12:14:00	0.76	19.62	15.4	12.7	10.7	4.1	0.4
08/29/07 12:14:15	0.77	19.80	15.6	13.2	8.7	4.0	0.4
08/29/07 12:14:30	0.80	19.57	15.3	13.2	9.0	3.5	0.4
08/29/07 12:14:45	0.84	19.52	15.2	14.0	12.7	4.1	0.4
08/29/07 12:15:00	0.88	19.46	15.2	14.2	12.5	3.6	0.4
08/29/07 12:15:15	0.91	19.47	15.2	14.2	10.2	4.5	0.4
08/29/07 12:15:30	0.85	19.52	15.2	13.2	8.4	5.1	0.4
08/29/07 12:15:45	0.82	19.54	15.0	13.2	7.2	4.8	0.4
08/29/07 12:16:00	0.82	19.54	14.9	14.2	8.5	5.5	0.4
08/29/07 12:16:15	0.84	19.51	14.9	14.2	10.7	4.5	0.4
08/29/07 12:16:30	0.88	19.47	14.7	14.2	10.7	4.4	0.4
08/29/07 12:16:45	0.93	19.41	14.6	14.2	8.3	4.4	0.4
08/29/07 12:17:00	0.92	19.44	14.7	14.2	6.2	4.4	0.4
08/29/07 12:17:15	0.91	19.42	14.6	14.9	5.2	4.2	0.4
08/29/07 12:17:30	0.93	19.43	14.6	14.2	6.0	3.9	0.4
08/29/07 12:17:45	0.91	19.43	14.6	15.0	9.2	4.0	0.4
08/29/07 12:18:00	0.96	19.35	14.6	15.2	9.7	2.6	0.4
08/29/07 12:18:15	0.99	19.38	14.7	14.5	7.7	4.4	1.0
08/29/07 12:18:30	0.93	19.40	14.9	14.7	8.0	4.0	2.9
08/29/07 12:18:45	0.96	19.37	14.9	15.2	8.7	4.0	2.9
08/29/07 12:19:00	0.96	19.38	14.9	14.7	10.5	4.2	2.9
08/29/07 12:19:15	0.90	19.43	14.9	14.2	12.2	3.7	2.9
08/29/07 12:19:30	0.85	19.46	14.7	14.2	12.7	3.8	2.9
08/29/07 12:19:45	0.86	19.43	14.8	14.2	12.7	3.9	2.9
08/29/07 12:20:00	0.90	19.42	14.8	14.2	13.3	3.9	2.9
08/29/07 12:20:15	0.89	19.46	14.8	13.5	12.8	3.9	2.9
08/29/07 12:20:30	0.85	19.50	14.8	13.2	10.3	4.2	2.9
08/29/07 12:20:45	0.83	19.50	14.7	13.5	7.8	4.4	2.9
08/29/07 12:21:00	0.84	19.47	14.6	14.2	6.2	3.8	2.9
08/29/07 12:21:15	0.89	19.40	14.6	14.5	4.6	3.9	2.8
08/29/07 12:21:30	0.94	19.38	14.3	15.2	4.2	3.3	2.4
08/29/07 12:21:45	0.96	19.35	14.3	15.5	4.2	4.2	2.4
08/29/07 12:22:00	1.02	19.31	14.3	16.2	4.2	3.3	2.4
08/29/07 12:22:15	1.03	19.34	14.3	15.5	4.2	3.4	2.4
08/29/07 12:22:30	1.01	19.37	14.2	15.2	4.2	3.3	2.4
08/29/07 12:22:45	1.01	19.36	14.1	15.2	4.2	3.2	2.4
08/29/07 12:23:00	1.00	19.35	14.1	15.2	4.0	3.4	2.4
08/29/07 12:23:15	1.01	19.32	14.3	16.0	3.2	3.4	2.4
08/29/07 12:23:30	1.06	19.26	14.3	16.2	4.2	3.5	2.4
08/29/07 12:23:45	1.12	19.19	14.3	17.0	5.7	2.9	2.4
08/29/07 12:24:00	1.15	19.20	14.3	16.7	6.0	3.4	2.4
08/29/07 12:24:15	1.08	19.29	14.3	15.5	5.2	3.4	1.9
08/29/07 12:24:30	1.01	19.34	14.2	15.2	5.0	3.2	0.4
08/29/07 12:24:45	0.96	19.37	14.2	15.0	4.2	2.6	0.4
08/29/07 12:25:00	0.93	19.43	14.4	14.2	4.7	3.1	0.4
08/29/07 12:25:15	0.89	19.44	14.6	15.0	7.2	3.2	0.4
08/29/07 12:25:30	0.94	19.37	14.7	15.2	9.2	2.8	0.4
08/29/07 12:25:45	0.99	19.38	14.6	14.5	9.7	2.8	0.4
08/29/07 12:26:00	0.91	19.45	14.5	14.2	8.2	3.3	0.4
08/29/07 12:26:15	0.86	19.44	14.3	14.2	6.7	3.3	0.4
08/29/07 12:26:30	0.89	19.42	14.3	14.2	5.2	3.2	0.4
08/29/07 12:26:45	0.92	19.41	14.3	14.2	4.2	3.1	0.4
08/29/07 12:27:00	0.92	19.41	14.4	14.7	3.5	3.3	0.4
08/29/07 12:27:15	0.98	19.30	14.1	16.0	3.3	3.5	0.4
08/29/07 12:27:30	1.06	19.24	14.0	16.2	3.2	3.0	0.4
08/29/07 12:27:45	1.06	19.23	14.0	16.7	3.7	2.8	0.4
08/29/07 12:28:00	1.10	19.24	14.0	16.2	5.0	3.0	0.4
08/29/07 12:28:15	1.05	19.31	13.9	15.5	5.8	3.3	0.4
08/29/07 12:28:30	0.97	19.38	13.9	14.7	6.2	2.3	0.4

Location Paulsboro, New Jersey
Source FCC FGS Stack
Date 08/29/07

08/29/07 12:28:45	0.92	19.41	13.9	14.5	6.2	2.8	0.4
08/29/07 12:29:00	0.91	19.40	13.7	15.2	6.0	2.6	0.4
08/29/07 12:29:15	0.92	19.42	13.9	14.5	5.2	2.7	0.4
08/29/07 12:29:30	0.90	19.43	14.2	14.2	5.3	2.7	0.4
08/29/07 12:29:45	0.91	19.41	14.4	15.0	5.2	3.4	0.4
08/29/07 12:30:00	0.93	19.37	14.3	15.2	5.0	3.3	0.4
08/29/07 12:30:15	0.95	19.37	14.6	15.2	3.7	2.9	0.4
08/29/07 12:30:30	0.93	19.39	14.6	15.2	3.2	2.0	0.4
08/29/07 12:30:45	0.96	19.34	14.5	16.0	3.7	2.2	0.4
08/29/07 12:31:00	1.06	19.24	14.2	16.2	4.2	2.7	0.4
08/29/07 12:31:15	1.11	19.24	14.0	16.2	4.2	2.7	0.4
08/29/07 12:31:30	1.07	19.28	13.7	15.7	3.7	2.5	0.4
08/29/07 12:31:45	1.03	19.32	13.7	15.2	5.2	2.0	0.4
08/29/07 12:32:00	1.00	19.33	13.7	15.7	7.7	1.8	0.4
08/29/07 12:32:15	1.01	19.32	13.7	15.2	11.7	2.3	0.4
08/29/07 12:32:30	0.95	19.41	14.0	14.2	14.5	1.9	0.4
08/29/07 12:32:45	0.86	19.47	14.0	14.0	16.7	1.6	0.4
08/29/07 12:33:00	0.82	19.51	14.0	13.2	17.0	1.6	0.4
08/29/07 12:33:15	0.81	19.52	14.0	13.2	14.7	1.3	0.4
08/29/07 12:33:30	0.81	19.52	14.0	12.7	12.7	1.2	0.4
08/29/07 12:33:45	0.79	19.53	14.0	12.2	13.7	1.7	0.4
08/29/07 12:34:00	0.79	19.51	14.2	12.2	14.0	2.0	0.4
08/29/07 12:34:15	0.82	19.48	14.0	12.5	13.2	2.0	0.4
08/29/07 12:34:30	0.83	19.46	14.0	13.2	18.2	2.5	0.4
08/29/07 12:34:45	0.86	19.43	14.0	13.0	19.2	2.7	0.4
08/29/07 12:35:00	0.84	19.49	14.3	12.2	16.0	2.8	0.4
08/29/07 12:35:15	0.78	19.53	14.3	12.2	11.7	2.7	0.4
08/29/07 12:35:30	0.78	19.52	14.4	12.7	14.5	2.9	0.4
08/29/07 12:35:45	0.83	19.44	14.4	13.5	20.2	3.1	0.4
08/29/07 12:36:00	0.90	19.40	14.4	13.7	23.0	3.1	0.4
08/29/07 12:36:15	0.86	19.45	14.4	13.0	21.8	3.0	0.6
08/29/07 12:36:30	0.82	19.51	14.3	12.2	16.2	2.8	1.4
08/29/07 12:36:45	0.79	19.51	14.3	12.2	10.7	2.8	1.4
08/29/07 12:37:00	0.79	19.50	14.3	12.7	10.2	3.0	1.4
08/29/07 12:37:15	0.82	19.45	14.3	13.5	11.2	2.9	1.4
08/29/07 12:37:30	0.89	19.40	14.4	13.7	9.5	3.1	1.4
08/29/07 12:37:45	0.87	19.43	14.5	13.5	7.7	2.9	1.4
08/29/07 12:38:00	0.88	19.40	14.4	14.2	7.0	2.8	1.4
08/29/07 12:38:15	0.93	19.38	14.3	14.2	5.7	2.8	1.4
08/29/07 12:38:30	0.90	19.42	14.3	14.2	5.0	2.5	1.4
08/29/07 12:38:45	0.91	19.38	14.3	15.0	3.7	2.9	1.4
08/29/07 12:39:00	0.99	19.32	14.6	15.2	3.5	2.8	1.4
08/29/07 12:39:15	1.03	19.30	14.7	15.5	4.7	2.8	1.1
08/29/07 12:39:30	1.06	19.25	14.6	16.2	7.0	2.8	0.4
08/29/07 12:39:45	1.08	19.26	14.7	15.5	11.7	2.9	0.4
08/29/07 12:40:00	1.01	19.35	14.6	15.2	16.2	2.6	0.4
08/29/07 12:40:15	0.95	19.38	14.6	14.2	20.2	2.9	0.4
08/29/07 12:40:30	0.90	19.41	14.7	13.7	19.7	2.8	0.4
08/29/07 12:40:45	0.86	19.45	14.7	13.0	16.7	2.9	0.4
08/29/07 12:41:00	0.78	19.54	14.9	12.2	17.0	3.1	0.4
08/29/07 12:41:15	0.76	19.54	14.9	13.2	16.2	2.8	0.4
08/29/07 12:41:30	0.76	19.56	14.9	12.7	15.8	2.8	0.4
08/29/07 12:41:45	0.74	19.56	14.8	13.2	17.2	3.6	0.4
08/29/07 12:42:00	0.77	19.53	14.7	13.2	15.5	4.0	0.4
08/29/07 12:42:15	0.79	19.53	14.6	13.2	15.2	4.5	0.4
08/29/07 12:42:30	0.78	19.54	14.8	13.2	20.7	4.6	0.4
08/29/07 12:42:45	0.81	19.52	14.7	13.2	23.7	4.3	0.4
08/29/07 12:43:00	0.80	19.54	14.6	12.7	19.5	4.6	0.4
08/29/07 12:43:15	0.74	19.59	14.7	12.2	15.2	4.9	0.4
08/29/07 12:43:30	0.71	19.60	14.6	12.2	9.7	3.6	0.4
08/29/07 12:43:45	0.75	19.56	14.3	13.2	8.2	3.3	0.4
08/29/07 12:44:00	0.81	19.49	14.3	13.7	7.0	3.6	0.4
08/29/07 12:44:15	0.90	19.42	14.3	15.0	5.2	3.5	0.4
08/29/07 12:44:30	0.92	19.41	14.3	14.7	4.2	3.2	0.4
08/29/07 12:44:45	0.99	19.33	14.2	16.2	5.2	3.4	0.4
08/29/07 12:45:00	1.06	19.30	14.3	15.7	8.5	3.8	0.4
08/29/07 12:45:15	1.02	19.36	14.3	15.0	8.7	3.7	0.4
08/29/07 12:45:30	0.95	19.44	14.3	14.2	7.0	3.9	0.4
08/29/07 12:45:45	0.85	19.50	14.3	14.2	5.7	3.7	0.4
08/29/07 12:46:00	0.87	19.45	14.4	14.7	4.0	3.7	0.4
08/29/07 12:46:15	0.93	19.41	14.6	15.2	3.2	3.5	0.4
08/29/07 12:46:30	0.98	19.35	14.6	15.7	3.2	3.7	0.4
08/29/07 12:46:45	1.04	19.31	14.6	16.2	3.2	3.1	0.4
08/29/07 12:47:00	1.04	19.32	14.6	16.2	3.5	4.1	0.4
08/29/07 12:47:15	1.04	19.33	14.6	16.0	3.8	4.8	0.4
08/29/07 12:47:30	1.04	19.37	14.6	15.2	3.7	2.9	0.4
08/29/07 12:47:45	1.01	19.39	14.6	15.2	5.7	3.3	0.4
08/29/07 12:48:00	1.00	19.39	14.3	15.2	6.0	3.2	0.4
08/29/07 12:48:15	1.00	19.39	14.3	15.2	5.2	2.8	0.4
08/29/07 12:48:30	0.99	19.39	14.0	15.2	8.2	2.9	0.4
08/29/07 12:48:45	1.05	19.33	14.2	16.0	5.7	2.4	0.4
08/29/07 12:49:00	1.08	19.34	15.1	15.2	4.2	2.5	0.4
08/29/07 12:49:15	1.01	19.40	15.8	15.2	3.7	2.3	0.4
08/29/07 12:49:30	1.01	19.37	16.2	15.7	3.2	2.3	0.4
08/29/07 12:49:45	1.05	19.35	16.2	16.2	3.2	2.4	0.4
08/29/07 12:50:00	1.03	19.34	15.9	16.2	4.2	2.6	0.4
08/29/07 12:50:15	1.05	19.32	15.6	16.2	3.7	2.8	0.4
08/29/07 12:50:30	1.06	19.32	15.3	15.7	3.2	2.8	0.4
08/29/07 12:50:45	1.03	19.35	15.2	15.2	3.7	3.0	0.4
08/29/07 12:51:00	1.02	19.34	15.1	15.7	5.5	3.2	0.4
08/29/07 12:51:15	1.02	19.35	15.0	15.0	8.7	3.3	0.4
08/29/07 12:51:30	0.93	19.44	14.9	14.2	8.0	3.4	0.4
08/29/07 12:51:45	0.89	19.43	14.9	15.0	7.2	3.3	0.4
08/29/07 12:52:00	0.91	19.44	14.9	14.2	7.2	3.3	0.4
08/29/07 12:52:15	0.89	19.46	15.2	14.2	7.2	2.5	0.4
08/29/07 12:52:30	0.87	19.49	15.3	14.2	6.5	2.8	0.4
08/29/07 12:52:45	0.85	19.47	15.3	14.2	9.2	1.6	0.4
08/29/07 12:53:00	0.90	19.41	15.7	14.7	21.0	0.7	0.4
08/29/07 12:53:15	0.95	19.39	15.9	14.0	27.2	0.8	0.4

Location Paulsboro, New Jersey
Source FCC FGS Stack
Date 08/29/07

08/29/07 12:53:30	0.90	19.49	15.9	13.2	22.5	2.7	0.4
08/29/07 12:53:45	0.77	19.59	15.8	12.2	15.2	3.3	0.4
08/29/07 12:54:00	0.72	19.58	15.8	12.7	11.5	3.6	0.4
08/29/07 12:54:15	0.77	19.51	15.9	13.2	13.2	3.6	0.4
08/29/07 12:54:30	0.83	19.47	15.7	13.2	13.7	3.5	0.4
08/29/07 12:54:45	0.82	19.50	16.1	13.0	11.2	2.5	0.4
08/29/07 12:55:00	0.76	19.59	16.3	12.2	9.0	2.9	0.4
08/29/07 12:55:15	0.71	19.59	16.3	13.2	7.2	2.9	0.4
08/29/07 12:55:30	0.78	19.52	16.1	13.7	5.0	2.8	0.4
08/29/07 12:55:45	0.84	19.46	15.9	14.5	4.2	2.6	0.4
08/29/07 12:56:00	0.93	19.37	15.5	15.7	4.5	2.8	0.4
08/29/07 12:56:15	1.01	19.34	15.2	15.2	6.2	2.9	0.4
08/29/07 12:56:30	1.01	19.35	14.9	15.2	8.2	3.0	0.4
08/29/07 12:56:45	0.99	19.36	14.9	15.0	8.7	3.2	0.4
08/29/07 12:57:00	0.92	19.44	14.7	13.7	13.0	3.7	0.4
08/29/07 12:57:15	0.85	19.49	14.6	13.2	15.7	3.9	0.4
08/29/07 12:57:30	0.83	19.50	14.7	12.7	13.2	4.2	0.4
08/29/07 12:57:45	0.80	19.52	14.6	12.2	8.7	4.4	0.4
08/29/07 12:58:00	0.80	19.51	14.6	12.2	5.5	4.4	0.4
08/29/07 12:58:15	0.83	19.46	14.9	13.2	7.7	4.5	0.4
08/29/07 12:58:30	0.91	19.38	14.9	13.7	14.7	4.5	0.4
08/29/07 12:58:45	0.94	19.40	14.9	13.2	15.7	4.4	0.4
08/29/07 12:59:00	0.86	19.50	15.0	12.7	10.5	4.3	0.4
08/29/07 12:59:15	0.78	19.55	14.9	12.5	7.7	4.7	0.4
08/29/07 12:59:30	0.81	19.49	14.9	13.2	6.2	4.2	0.4
08/29/07 12:59:45	0.89	19.40	14.7	14.2	6.7	4.7	0.4
Begin M8-2/HCN-1							
08/29/07 13:00:00	0.93	19.39	14.6	14.2	9.6	4.4	0.4
08/29/07 13:00:15	0.93	19.41	14.7	13.2	9.7	4.3	0.4
08/29/07 13:00:30	0.90	19.47	15.0	13.2	13.0	4.4	0.4
08/29/07 13:00:45	0.83	19.52	15.2	13.2	39.2	4.6	0.4
08/29/07 13:01:00	0.86	19.48	14.9	13.2	77.2	4.5	0.4
08/29/07 13:01:15	0.85	19.53	14.9	12.0	72.2	5.2	0.4
08/29/07 13:01:30	0.71	19.67	15.1	11.2	38.0	4.8	0.4
08/29/07 13:01:45	0.61	19.71	15.2	11.5	20.7	4.6	0.4
08/29/07 13:02:00	0.68	19.62	15.2	13.0	12.2	4.7	0.4
08/29/07 13:02:15	0.79	19.63	15.2	13.2	12.2	4.6	0.4
08/29/07 13:02:30	0.82	19.62	15.4	13.2	12.2	4.5	0.4
08/29/07 13:02:45	0.82	19.62	15.9	13.2	11.7	4.7	0.4
08/29/07 13:03:00	0.83	19.62	16.0	13.2	8.7	4.6	0.4
08/29/07 13:03:15	0.86	19.61	15.8	13.2	6.5	4.3	0.4
08/29/07 13:03:30	0.85	19.49	15.6	14.0	5.0	4.5	0.4
08/29/07 13:03:45	0.90	19.45	15.2	14.2	4.2	4.6	0.4
08/29/07 13:04:00	0.98	19.41	15.2	14.2	4.2	4.2	0.4
08/29/07 13:04:15	0.97	19.41	15.6	14.6	4.2	4.0	0.4
08/29/07 13:04:30	0.96	19.42	15.8	15.2	4.5	3.6	0.4
08/29/07 13:04:45	0.97	19.43	15.4	15.2	5.2	4.1	0.4
08/29/07 13:05:00	0.99	19.39	15.1	15.2	5.2	4.0	0.4
08/29/07 13:05:15	0.99	19.42	14.9	15.0	4.5	3.8	0.4
08/29/07 13:05:30	0.93	19.46	14.7	15.0	4.5	3.4	0.4
08/29/07 13:05:45	0.94	19.42	14.6	15.2	5.2	3.8	0.4
08/29/07 13:06:00	0.97	19.41	14.6	15.2	5.0	3.2	0.4
08/29/07 13:06:15	0.94	19.44	15.1	14.2	4.2	3.8	0.4
08/29/07 13:06:30	0.92	19.45	15.2	15.0	5.6	3.4	0.4
08/29/07 13:06:45	0.96	19.39	15.0	15.5	8.2	3.4	0.4
08/29/07 13:07:00	1.02	19.34	14.8	15.6	6.2	3.7	0.4
08/29/07 13:07:15	1.01	19.37	14.5	15.0	8.5	3.3	0.4
08/29/07 13:07:30	0.97	19.40	14.3	14.2	12.2	3.6	0.4
08/29/07 13:07:45	0.94	19.42	14.5	14.2	10.7	3.4	0.4
08/29/07 13:08:00	0.88	19.49	14.7	13.5	8.0	3.7	0.4
08/29/07 13:08:15	0.82	19.49	15.0	13.5	6.5	3.8	0.4
08/29/07 13:08:30	0.84	19.48	14.9	13.5	8.5	3.9	0.4
08/29/07 13:08:45	0.83	19.50	14.9	14.2	9.2	4.2	0.4
08/29/07 13:09:00	0.82	19.50	14.9	13.5	9.0	4.1	0.4
08/29/07 13:09:15	0.82	19.49	14.9	14.2	7.5	4.3	0.4
08/29/07 13:09:30	0.88	19.43	14.7	14.2	8.2	4.1	0.4
08/29/07 13:09:45	0.91	19.42	14.6	14.2	7.7	4.1	0.4
08/29/07 13:10:00	0.93	19.38	14.6	15.0	10.2	3.3	0.4
08/29/07 13:10:15	0.98	19.35	14.4	15.0	8.7	3.6	0.4
08/29/07 13:10:30	0.97	19.37	14.6	14.2	6.0	2.8	0.4
08/29/07 13:10:45	0.94	19.39	14.8	14.2	8.0	3.2	0.4
08/29/07 13:11:00	0.93	19.38	15.0	15.0	8.5	3.2	0.4
08/29/07 13:11:15	0.96	19.36	14.9	15.2	9.2	3.2	0.4
08/29/07 13:11:30	0.96	19.34	14.9	14.5	10.2	3.0	0.4
08/29/07 13:11:45	0.98	19.36	14.9	14.2	12.5	2.8	0.4
08/29/07 13:12:00	0.96	19.39	14.6	14.2	16.7	3.4	0.4
08/29/07 13:12:15	0.91	19.44	14.6	13.2	17.2	3.4	0.4
08/29/07 13:12:30	0.86	19.49	14.7	13.2	14.7	2.7	0.4
08/29/07 13:12:45	0.81	19.60	14.6	13.2	11.7	2.3	0.4
08/29/07 13:13:00	0.81	19.61	14.6	13.2	13.7	2.8	0.4
08/29/07 13:13:15	0.83	19.46	14.9	14.2	14.5	2.8	0.4
08/29/07 13:13:30	0.88	19.44	15.2	13.5	11.0	2.8	0.4
08/29/07 13:13:45	0.82	19.49	15.3	13.2	9.5	2.6	0.4
08/29/07 13:14:00	0.82	19.48	15.2	14.0	7.0	2.7	0.4
08/29/07 13:14:15	0.85	19.49	14.9	13.2	5.5	2.6	0.4
08/29/07 13:14:30	0.83	19.49	15.2	14.0	6.5	2.9	0.4
08/29/07 13:14:45	0.88	19.41	15.7	15.2	8.0	3.2	0.4
08/29/07 13:15:00	0.95	19.35	15.9	15.2	5.0	3.2	0.4
08/29/07 13:15:15	0.96	19.38	15.9	14.7	4.5	3.2	0.4
08/29/07 13:15:30	0.98	19.37	15.9	15.2	3.2	3.0	0.4
08/29/07 13:15:45	1.00	19.33	15.7	15.7	2.5	3.2	0.4
port change							
08/29/07 13:16:00	1.05	19.29	15.6	16.2	2.2	2.8	0.4
08/29/07 13:16:15	1.08	19.27	15.2	16.2	3.0	3.0	0.4
08/29/07 13:16:30	1.09	19.26	15.0	17.0	3.2	3.2	0.4
08/29/07 13:16:45	1.12	19.24	15.0	16.7	3.2	3.1	0.4
08/29/07 13:17:00	1.11	19.27	14.8	16.2	3.2	3.5	0.4
08/29/07 13:17:15	1.08	19.30	14.6	16.2	3.2	3.8	0.4
08/29/07 13:17:30	1.04	19.35	14.3	15.5	4.5	3.7	0.4
08/29/07 13:17:45	1.00	19.37	14.3	15.2	6.0	3.4	0.4
Resume M8-2/HCN-1							
08/29/07 13:18:00	0.97	19.41	14.3	14.5	8.2	3.9	0.4

Location Paulsboro, New Jersey
Source FCC FGS Stack
Date 08/29/07

08/29/07 13:18:15	0.91	19.47	14.3	14.2	8.2	3.7	0.4
08/29/07 13:18:30	0.87	19.50	14.3	14.2	6.0	3.7	0.4
08/29/07 13:18:45	0.84	19.51	14.3	14.2	5.2	3.4	0.4
08/29/07 13:19:00	0.85	19.52	14.6	14.2	7.2	3.6	0.4
08/29/07 13:19:15	0.85	19.51	14.6	14.2	11.7	3.3	0.4
08/29/07 13:19:30	0.86	19.54	14.6	14.2	10.5	3.5	0.4
08/29/07 13:19:45	0.81	19.58	14.7	13.2	8.5	3.7	0.4
08/29/07 13:20:00	0.78	19.56	15.2	13.2	7.7	3.5	0.4
08/29/07 13:20:15	0.80	19.55	15.6	13.2	6.5	3.8	0.4
08/29/07 13:20:30	0.80	19.55	15.6	13.2	6.2	4.0	0.4
08/29/07 13:20:45	0.83	19.50	15.4	14.2	4.6	4.1	0.4
08/29/07 13:21:00	0.92	19.39	15.2	14.2	5.2	3.3	0.4
08/29/07 13:21:15	0.99	19.33	14.9	15.2	6.2	3.5	0.4
08/29/07 13:21:30	1.03	19.31	14.9	14.5	6.7	3.8	0.4
08/29/07 13:21:45	1.00	19.36	14.9	13.7	12.5	3.8	0.4
08/29/07 13:22:00	0.94	19.40	15.2	13.2	23.7	3.8	0.4
08/29/07 13:22:15	0.90	19.45	15.2	12.7	23.7	3.8	0.4
08/29/07 13:22:30	0.81	19.53	15.2	12.2	16.7	3.7	0.4
08/29/07 13:22:45	0.73	19.58	15.2	11.7	12.0	3.8	0.4
08/29/07 13:23:00	0.73	19.56	14.9	12.2	8.7	4.0	0.4
08/29/07 13:23:15	0.76	19.53	14.9	12.7	8.2	4.5	0.4
08/29/07 13:23:30	0.83	19.44	15.5	13.2	6.7	4.0	0.4
08/29/07 13:23:45	0.89	19.42	15.9	13.2	6.2	4.3	0.4
08/29/07 13:24:00	0.88	19.40	15.9	13.2	7.2	4.1	0.4
08/29/07 13:24:15	0.92	19.35	15.9	14.2	7.2	4.2	0.4
08/29/07 13:24:30	0.94	19.37	15.7	13.5	10.2	3.7	0.4
08/29/07 13:24:45	0.91	19.40	15.6	13.2	12.7	3.7	0.4
08/29/07 13:25:00	0.88	19.42	15.6	13.2	13.7	3.6	0.4
08/29/07 13:25:15	0.87	19.43	15.6	13.2	12.5	3.5	0.4
08/29/07 13:25:30	0.86	19.44	15.6	13.2	11.2	3.1	0.4
08/29/07 13:25:45	0.87	19.40	15.6	13.2	8.0	3.2	0.4
08/29/07 13:26:00	0.91	19.37	15.6	14.0	6.2	3.1	0.4
08/29/07 13:26:15	0.96	19.32	15.6	14.2	7.7	3.1	0.4
08/29/07 13:26:30	0.98	19.33	15.9	14.2	12.2	3.2	0.4
08/29/07 13:26:45	0.93	19.40	16.5	13.7	13.3	2.9	0.4
08/29/07 13:27:00	0.84	19.49	16.6	12.5	13.7	2.8	0.4
08/29/07 13:27:15	0.76	19.53	16.7	12.7	17.2	3.2	0.4
08/29/07 13:27:30	0.78	19.49	16.3	13.2	24.2	2.7	0.4
08/29/07 13:27:45	0.80	19.50	16.0	13.2	27.7	2.9	0.4
08/29/07 13:28:00	0.78	19.53	15.9	12.5	21.7	2.7	0.4
08/29/07 13:28:15	0.74	19.56	15.9	12.2	16.2	2.5	0.4
08/29/07 13:28:30	0.73	19.57	16.2	12.2	19.7	2.7	0.4
08/29/07 13:28:45	0.76	19.55	15.9	13.2	20.5	2.6	0.4
08/29/07 13:29:00	0.78	19.55	15.9	12.5	13.2	2.8	0.4
08/29/07 13:29:15	0.74	19.56	16.1	12.7	9.7	2.6	0.4
08/29/07 13:29:30	0.81	19.45	16.6	14.0	8.7	3.0	0.4
08/29/07 13:29:45	0.94	19.37	17.2	14.7	6.7	3.4	0.4
08/29/07 13:30:00	0.93	19.41	17.4	14.2	6.7	3.3	0.4
08/29/07 13:30:15	0.90	19.42	17.2	14.2	7.2	3.5	0.4
08/29/07 13:30:30	0.93	19.37	17.1	15.0	9.7	3.4	0.4
08/29/07 13:30:45	0.97	19.35	17.1	14.7	10.2	3.7	0.4
08/29/07 13:31:00	0.94	19.41	17.1	14.2	10.2	3.8	0.4
08/29/07 13:31:15	0.86	19.47	17.2	13.2	8.5	3.8	0.4
08/29/07 13:31:30	0.85	19.46	17.4	13.2	8.2	3.8	0.4
08/29/07 13:31:45	0.87	19.44	17.4	14.2	8.2	3.4	0.4
08/29/07 13:32:00	0.88	19.44	17.2	14.2	6.7	3.4	0.4
08/29/07 13:32:15	0.86	19.49	17.2	13.2	6.2	3.4	0.4
08/29/07 13:32:30	0.86	19.46	17.1	14.0	6.2	3.5	0.4
08/29/07 13:32:45	0.93	19.39	17.3	15.2	5.5	2.6	0.4
08/29/07 13:33:00	0.96	19.39	17.4	14.5	3.7	2.7	0.4
08/29/07 13:33:15	0.96	19.39	17.4	14.7	3.2	2.9	0.4
08/29/07 13:33:30	0.98	19.36	17.2	15.2	3.2	2.8	0.4
08/29/07 13:33:45	1.01	19.33	17.1	15.7	3.2	2.7	0.4
port change							
08/29/07 13:34:00	1.06	19.28	17.0	16.2	3.2	2.6	0.4
08/29/07 13:34:15	1.11	19.26	16.8	16.2	2.5	2.8	0.4
08/29/07 13:34:30	1.10	19.27	16.6	16.2	1.7	3.0	0.4
08/29/07 13:34:45	1.09	19.26	16.5	16.2	1.2	2.8	0.4
08/29/07 13:35:00	1.12	19.22	16.5	17.0	2.7	3.0	0.4
08/29/07 13:35:15	1.19	19.17	16.5	17.2	3.2	3.2	0.4
08/29/07 13:35:30	1.19	19.22	16.5	16.2	3.2	3.4	0.4
08/29/07 13:35:45	1.08	19.34	16.5	15.2	3.2	3.8	0.4
08/29/07 13:36:00	1.01	19.35	16.5	15.5	2.2	3.9	0.4
08/29/07 13:36:15	1.05	19.31	16.5	16.2	2.2	3.5	0.4
08/29/07 13:36:30	1.07	19.28	16.5	16.5	2.7	3.1	0.4
08/29/07 13:36:45	1.11	19.26	16.6	16.7	3.2	3.0	0.4
Resume M8-2/HCN-1							
08/29/07 13:37:00	1.07	19.32	16.9	16.2	3.7	3.2	0.4
08/29/07 13:37:15	1.06	19.32	17.4	16.2	4.2	3.0	0.4
08/29/07 13:37:30	1.07	19.30	18.0	16.0	4.2	3.2	0.4
08/29/07 13:37:45	1.05	19.32	18.3	15.2	6.7	3.0	0.4
08/29/07 13:38:00	0.99	19.37	18.4	15.0	9.7	2.9	0.4
08/29/07 13:38:15	0.93	19.44	18.3	14.2	10.2	2.3	0.4
08/29/07 13:38:30	0.86	19.48	18.3	13.5	11.2	3.3	0.4
08/29/07 13:38:45	0.84	19.49	18.0	13.2	12.0	3.5	0.4
08/29/07 13:39:00	0.86	19.47	17.9	13.2	15.7	3.5	0.4
08/29/07 13:39:15	0.85	19.48	17.7	13.2	17.2	3.4	0.4
08/29/07 13:39:30	0.83	19.53	17.7	13.0	12.2	3.5	0.4
08/29/07 13:39:45	0.77	19.59	17.5	12.7	8.0	3.7	0.4
08/29/07 13:40:00	0.76	19.64	17.4	13.5	5.7	4.1	0.4
08/29/07 13:40:15	0.82	19.48	17.3	14.2	7.7	3.7	0.4
08/29/07 13:40:30	0.92	19.37	17.1	15.0	8.2	3.4	0.4
08/29/07 13:40:45	1.00	19.33	17.1	14.7	7.5	3.7	0.4
08/29/07 13:41:00	0.86	19.39	17.1	14.2	5.7	3.9	0.4
08/29/07 13:41:15	0.91	19.43	17.1	14.2	6.0	3.6	0.4
08/29/07 13:41:30	0.92	19.39	17.1	15.0	10.2	4.2	0.4
08/29/07 13:41:45	0.95	19.38	17.1	14.7	13.7	4.0	0.4
08/29/07 13:42:00	0.90	19.44	17.2	13.5	14.2	4.0	0.4
08/29/07 13:42:15	0.84	19.48	17.3	13.2	11.7	4.1	0.4
08/29/07 13:42:30	0.80	19.50	17.4	13.2	11.7	4.2	0.4
08/29/07 13:42:45	0.81	19.48	17.6	13.7	17.0	4.0	0.4

Location Paulsboro, New Jersey
Source FCC FGS Stack
Date 08/29/07

08/29/07 13:43:00	0.86	19.45	17.7	14.0	21.2	4.3	0.4
08/29/07 13:43:15	0.82	19.50	17.6	13.2	19.0	4.1	0.4
08/29/07 13:43:30	0.78	19.52	17.4	13.2	10.7	3.9	0.4
08/29/07 13:43:45	0.79	19.49	17.4	13.2	6.7	4.3	0.4
08/29/07 13:44:00	0.85	19.44	17.4	14.0	7.2	4.1	0.4
08/29/07 13:44:15	0.87	19.46	17.2	13.7	15.0	3.8	0.4
08/29/07 13:44:30	0.83	19.49	17.1	13.2	34.7	3.7	0.4
08/29/07 13:44:45	0.84	19.48	17.2	13.2	36.7	1.7	0.4
08/29/07 13:45:00	0.79	19.57	17.3	12.2	26.7	3.5	0.4
08/29/07 13:45:15	0.68	19.55	17.4	11.2	22.0	3.8	0.4
08/29/07 13:45:30	0.66	19.55	17.7	11.5	18.7	4.0	0.4
08/29/07 13:45:45	0.70	19.57	17.7	12.2	14.5	3.6	0.4
08/29/07 13:46:00	0.77	19.51	17.7	12.2	11.2	4.1	0.4
08/29/07 13:46:15	0.80	19.49	17.9	12.2	9.7	4.0	0.4
08/29/07 13:46:30	0.82	19.49	17.8	12.2	12.2	4.0	0.4
08/29/07 13:46:45	0.81	19.53	17.7	12.2	20.5	4.0	0.4
08/29/07 13:47:00	0.76	19.57	17.7	12.0	28.7	3.9	0.4
08/29/07 13:47:15	0.71	19.51	17.7	11.2	25.2	4.2	0.4
08/29/07 13:47:30	0.68	19.54	17.7	11.2	14.7	4.3	0.4
08/29/07 13:47:45	0.65	19.65	17.7	11.2	8.0	4.2	0.4
08/29/07 13:48:00	0.70	19.58	17.6	12.2	6.2	4.2	0.4
08/29/07 13:48:15	0.83	19.46	17.6	13.7	6.5	4.2	0.4
08/29/07 13:48:30	0.92	19.40	17.4	14.0	7.7	4.1	0.4
08/29/07 13:48:45	0.91	19.43	17.4	13.2	7.7	4.5	0.4
08/29/07 13:49:00	0.89	19.45	17.1	13.5	6.2	4.8	0.4
08/29/07 13:49:15	0.90	19.41	17.1	14.2	8.2	4.4	0.4
08/29/07 13:49:30	0.97	19.35	17.1	14.7	12.2	4.4	0.4
08/29/07 13:49:45	0.98	19.39	17.2	13.7	18.0	4.7	0.4
08/29/07 13:50:00	0.88	19.49	17.4	13.0	16.7	4.6	0.4
08/29/07 13:50:15	0.77	19.57	17.4	12.2	9.7	4.6	0.4
08/29/07 13:50:30	0.73	19.57	17.4	13.2	6.2	4.5	0.4
08/29/07 13:50:45	0.83	19.44	17.4	14.7	7.7	4.7	0.4
08/29/07 13:51:00	0.95	19.36	17.4	15.2	7.7	5.0	0.4
08/29/07 13:51:15	0.97	19.37	17.3	14.7	7.2	4.2	0.4
08/29/07 13:51:30	0.94	19.38	17.1	14.2	6.7	3.6	0.4
08/29/07 13:51:45	0.94	19.38	17.1	14.2	6.5	4.0	0.4
08/29/07 13:52:00	0.91	19.42	17.3	14.2	5.2	3.7	0.4
08/29/07 13:52:15	0.91	19.39	17.5	14.2	5.2	3.3	0.4
08/29/07 13:52:30	0.94	19.40	17.6	14.2	5.7	3.4	0.4
08/29/07 13:52:45	0.92	19.41	17.7	14.2	7.2	3.8	0.4
port change							
08/29/07 13:53:00	0.90	19.46	17.7	14.0	8.2	3.8	0.4
08/29/07 13:53:15	0.82	19.51	17.4	13.2	8.2	4.0	0.4
08/29/07 13:53:30	0.81	19.49	17.4	13.2	7.2	4.3	0.4
08/29/07 13:53:45	0.84	19.47	17.4	13.2	5.2	3.9	0.4
08/29/07 13:54:00	0.86	19.44	17.4	14.2	4.2	4.1	0.4
08/29/07 13:54:15	0.94	19.37	17.4	15.2	4.5	4.4	0.4
08/29/07 13:54:30	0.99	19.36	17.2	15.2	5.7	4.2	0.4
08/29/07 13:54:45	0.98	19.37	17.1	15.2	7.2	4.2	0.4
Resume M8-2/HCN-1							
08/29/07 13:55:00	0.97	19.38	17.1	14.5	8.2	4.1	0.4
08/29/07 13:55:15	0.93	19.42	17.1	14.2	7.5	4.1	0.4
08/29/07 13:55:30	0.88	19.47	17.1	13.5	6.7	3.8	0.4
08/29/07 13:55:45	0.85	19.48	17.1	13.7	6.5	3.8	0.4
08/29/07 13:56:00	0.87	19.45	17.1	14.2	7.7	3.5	0.4
08/29/07 13:56:15	0.90	19.42	17.3	14.2	8.7	3.4	0.4
08/29/07 13:56:30	0.88	19.47	17.4	13.3	8.2	3.5	0.4
08/29/07 13:56:45	0.81	19.52	17.4	13.2	8.0	4.2	0.4
08/29/07 13:57:00	0.82	19.49	17.4	14.2	9.7	4.2	0.4
08/29/07 13:57:15	0.88	19.45	17.4	14.2	10.0	3.9	0.4
08/29/07 13:57:30	0.90	19.44	17.4	14.2	8.7	3.7	0.4
08/29/07 13:57:45	0.89	19.45	17.4	14.2	7.5	3.9	0.4
08/29/07 13:58:00	0.91	19.43	17.4	14.2	6.7	4.1	0.4
08/29/07 13:58:15	0.92	19.41	17.5	14.2	7.2	3.9	0.4
08/29/07 13:58:30	0.93	19.40	17.7	14.2	8.7	3.9	0.4
08/29/07 13:58:45	0.93	19.40	17.7	14.2	11.0	4.2	0.4
08/29/07 13:59:00	0.91	19.42	17.7	14.0	11.7	4.1	0.4
08/29/07 13:59:15	0.87	19.47	17.7	13.2	9.0	4.2	0.4
08/29/07 13:59:30	0.81	19.53	17.7	13.2	5.2	4.2	0.4
08/29/07 13:59:45	0.79	19.52	17.7	13.7	3.2	4.2	0.4
08/29/07 14:00:00	0.85	19.45	17.6	14.5	2.2	4.2	0.4
08/29/07 14:00:15	0.94	19.37	17.7	15.7	2.2	3.9	0.4
08/29/07 14:00:30	1.04	19.29	17.7	16.2	2.2	3.8	0.4
08/29/07 14:00:45	1.09	19.26	17.6	16.2	3.0	3.8	0.4
08/29/07 14:01:00	1.10	19.25	17.7	16.2	3.2	4.3	0.4
08/29/07 14:01:15	1.11	19.24	17.7	16.2	2.5	4.0	0.4
08/29/07 14:01:30	1.11	19.25	17.7	16.2	2.2	3.8	0.4
08/29/07 14:01:45	1.10	19.24	17.7	16.2	3.2	4.3	0.4
08/29/07 14:02:00	1.11	19.22	17.7	16.2	4.3	4.2	0.4
08/29/07 14:02:15	1.08	19.29	17.9	15.7	4.3	4.2	0.4
08/29/07 14:02:30	0.97	19.40	18.0	14.2	4.2	3.8	0.4
08/29/07 14:02:45	0.90	19.41	18.0	14.7	3.5	4.1	0.4
08/29/07 14:03:00	0.98	19.35	18.0	15.2	3.2	4.2	0.4
08/29/07 14:03:15	0.97	19.37	18.1	15.2	3.2	4.0	0.4
08/29/07 14:03:30	0.95	19.38	18.3	15.2	3.2	4.0	0.4
08/29/07 14:03:45	0.98	19.34	18.3	15.2	3.5	3.8	0.4
08/29/07 14:04:00	1.01	19.32	18.3	15.5	4.2	3.8	0.4
08/29/07 14:04:15	1.03	19.29	18.3	16.2	3.5	3.7	0.4
08/29/07 14:04:30	1.05	19.28	18.2	15.2	3.2	3.5	0.4
08/29/07 14:04:45	1.05	19.28	18.0	15.7	3.2	3.4	0.4
08/29/07 14:05:00	1.08	19.27	18.0	16.0	3.2	3.7	0.4
08/29/07 14:05:15	1.04	19.33	18.0	15.2	4.5	3.8	0.4
08/29/07 14:05:30	0.99	19.36	18.1	15.0	7.2	4.0	0.4
08/29/07 14:05:45	0.95	19.40	18.3	14.2	8.2	4.2	0.4
08/29/07 14:06:00	0.91	19.43	18.6	14.2	7.7	5.5	0.4
08/29/07 14:06:15	0.89	19.44	18.6	14.2	5.5	3.8	2.1
08/29/07 14:06:30	0.90	19.43	18.6	14.2	4.2	3.6	3.9
08/29/07 14:06:45	0.93	19.40	18.6	14.7	4.5	3.7	3.9
08/29/07 14:07:00	0.95	19.38	18.3	15.2	5.7	3.7	3.9
08/29/07 14:07:15	0.94	19.39	18.3	15.2	5.5	3.7	3.9
08/29/07 14:07:30	0.95	19.38	18.0	15.0	5.7	3.6	3.9

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08/29/07 14:07:45	0.95	19.38	18.0	14.2	11.5	3.8	3.9	
08/29/07 14:08:00	0.95	19.37	17.9	16.2	15.2	4.1	3.9	
08/29/07 14:08:15	0.96	19.41	18.0	14.7	12.2	3.9	3.9	
08/29/07 14:08:30	0.85	19.52	18.0	13.2	8.7	4.1	3.9	
08/29/07 14:08:45	0.80	19.52	17.8	13.2	7.2	4.3	3.9	
08/29/07 14:09:00	0.85	19.46	17.8	13.2	6.2	4.0	3.9	
08/29/07 14:09:15	0.88	19.44	18.0	13.2	7.2	4.4	2.1	
08/29/07 14:09:30	0.90	19.42	18.0	13.2	8.2	4.1	0.4	
08/29/07 14:09:45	0.95	19.38	18.1	13.2	7.4	3.8	0.4	End M8-2/HCN-1
08/29/07 14:10:00	0.96	19.40	18.3	13.2	7.7	4.1	0.4	
08/29/07 14:10:15	0.93	19.42	18.3	13.2	9.2	4.2	0.4	
08/29/07 14:10:30	0.87	19.49	18.3	12.2	9.7	4.3	0.4	
08/29/07 14:10:45	0.83	19.50	18.2	12.7	9.0	4.4	0.4	
08/29/07 14:11:00	0.89	19.47	18.2	13.2	8.2	4.6	0.4	
08/29/07 14:11:15	0.91	19.49	18.0	13.2	6.0	5.7	0.4	
08/29/07 14:11:30	0.89	19.54	16.0	13.2	8.2	13.1	0.4	
08/29/07 14:11:45	0.91	18.49	17.9	12.2	11.5	15.1	0.4	
08/29/07 14:12:00	2.40	10.86	16.9	6.7	6.2	4.7	0.4	
08/29/07 14:12:15	4.15	5.15	14.8	5.2	0.0	2.4	15.1	
08/29/07 14:12:30	4.38	3.92	12.5	2.7	-0.8	1.8	29.9	
08/29/07 14:12:45	4.80	4.74	10.8	1.2	-0.8	1.1	29.9	
08/29/07 14:13:00	4.90	5.10	9.3	1.2	-0.8	0.7	29.9	
08/29/07 14:13:15	4.90	5.14	8.2	1.2	-0.8	0.6	29.9	
08/29/07 14:13:30	4.90	5.09	7.3	1.2	-0.8	0.5	29.9	
08/29/07 14:13:45	4.91	5.02	6.6	1.2	-0.8	0.5	29.9	
08/29/07 14:14:00	4.91	4.96	6.1	1.2	-0.8	0.4	29.9	
08/29/07 14:14:15	4.91	4.93	5.7	1.2	-0.8	2.7	29.9	
08/29/07 14:14:30	4.92	4.89	5.1	0.2	-0.8	1.0	29.9	
08/29/07 14:14:45	4.93	4.88	4.9	0.2	-0.8	0.4	29.9	
08/29/07 14:15:00	4.94	4.86	4.5	0.2	-0.8	0.4	29.9	Post-Test Bias and Drift Check:
08/29/07 14:15:15	4.94	4.85	4.3	0.2	-0.8	0.5	15.1	5.0% Oxygen injection:
08/29/07 14:15:30	4.94	4.84	3.9	0.2	-0.8	0.5	0.4	4.94 % db Oxygen
08/29/07 14:15:45	4.94	4.85	3.8	0.2	-0.8	0.5	0.4	
08/29/07 14:16:00	4.95	4.86	3.6	0.5	-0.8	0.4	0.4	
08/29/07 14:16:15	4.89	5.44	3.4	2.0	-2.0	0.5	0.4	
08/29/07 14:16:30	4.86	6.18	3.3	1.2	-2.8	0.5	0.4	
08/29/07 14:16:45	9.07	11.74	3.3	0.5	-1.8	0.8	0.4	Post-Test Bias and Drift Check:
08/29/07 14:17:00	15.75	17.04	3.3	0.2	-1.8	0.4	0.4	Zero nitrogen injection:
08/29/07 14:17:15	20.01	20.24	3.0	0.2	-1.8	0.5	0.4	0.46 ppmv CH4
08/29/07 14:17:30	21.86	21.69	2.9	0.2	-1.8	0.5	0.4	
08/29/07 14:17:45	22.30	22.04	2.7	0.2	-1.8	0.5	0.4	
08/29/07 14:18:00	22.36	22.17	2.7	0.2	-2.3	0.4	0.4	
08/29/07 14:18:15	22.38	22.25	2.4	0.2	-1.8	0.4	0.6	
08/29/07 14:18:30	22.39	22.29	2.4	0.2	-1.8	0.4	0.9	
08/29/07 14:18:45	22.40	22.32	2.2	0.2	-1.8	0.4	0.9	Post-Test Bias and Drift Check:
08/29/07 14:19:00	22.41	22.34	2.1	0.2	-1.8	0.4	0.9	22.82% CO2 injection:
08/29/07 14:19:15	22.41	22.36	2.1	0.2	-1.8	0.5	0.9	22.36 % db CO2
08/29/07 14:19:30	22.42	22.37	2.1	0.2	-2.3	0.4	0.9	
08/29/07 14:19:45	22.42	22.39	2.0	0.2	-1.7	0.5	0.9	
08/29/07 14:20:00	22.42	22.40	2.1	0.2	-1.8	0.5	0.9	
08/29/07 14:20:15	22.38	22.38	2.0	1.0	-1.8	2.4	0.9	
08/29/07 14:20:30	20.45	21.97	2.1	3.0	-1.8	1.3	0.9	
08/29/07 14:20:45	17.83	16.99	2.4	1.5	-0.8	0.5	0.9	
08/29/07 14:21:00	11.32	8.94	2.2	1.0	-0.1	0.4	0.9	Post-Test Bias and Drift Check:
08/29/07 14:21:15	5.08	4.18	2.1	0.2	0.2	0.4	0.9	Zero NOx/CO injection:
08/29/07 14:21:30	1.70	1.58	2.1	0.5	0.2	0.4	0.9	0.79 ppmv db NOx
08/29/07 14:21:45	0.59	1.64	2.7	1.2	0.2	0.4	0.9	0.22 ppmv db CO
08/29/07 14:22:00	0.37	0.98	7.0	1.2	0.2	0.4	0.9	
08/29/07 14:22:15	0.41	0.63	38.9	1.2	0.2	0.4	0.9	
08/29/07 14:22:30	0.33	0.46	85.7	1.2	0.2	0.5	0.9	
08/29/07 14:22:45	0.22	0.67	115.7	2.0	0.3	0.5	0.9	
08/29/07 14:23:00	0.19	0.64	122.0	2.0	0.2	0.4	0.9	
08/29/07 14:23:15	0.17	0.37	90.1	1.2	0.2	0.5	0.9	
08/29/07 14:23:30	0.16	0.31	59.9	0.2	0.2	0.4	0.9	
08/29/07 14:23:45	0.15	0.28	44.1	0.2	0.2	0.5	0.9	
08/29/07 14:24:00	0.13	0.26	35.6	0.2	0.2	0.4	0.9	
08/29/07 14:24:15	0.13	0.24	30.6	0.2	0.2	0.4	0.6	
08/29/07 14:24:30	0.12	0.23	27.3	0.2	0.2	0.5	0.4	
08/29/07 14:24:45	0.12	0.22	24.8	0.2	0.2	0.5	0.4	
08/29/07 14:25:00	0.12	0.21	23.1	0.2	0.2	0.4	0.4	
08/29/07 14:25:15	0.12	0.20	21.9	0.2	0.2	0.4	0.4	
08/29/07 14:25:30	0.11	0.19	21.1	0.2	0.2	0.5	0.4	
08/29/07 14:25:45	0.11	0.19	20.4	0.2	0.2	0.5	0.4	
08/29/07 14:26:00	0.11	0.18	19.9	0.2	0.2	0.4	0.4	
08/29/07 14:26:15	0.11	0.17	19.4	0.2	0.2	0.5	0.4	
08/29/07 14:26:30	0.11	0.17	19.2	0.2	0.2	0.4	0.4	Post-Test Bias and Drift Check:
08/29/07 14:26:45	0.10	0.17	18.9	0.2	0.2	0.4	0.4	Zero Oxygen/CO2 injection:
08/29/07 14:27:00	0.10	0.16	18.8	0.2	0.2	0.4	0.4	0.10 % db Oxygen
08/29/07 14:27:15	0.10	0.16	18.6	0.2	0.2	0.4	0.4	0.16 % db CO2
08/29/07 14:27:30	0.10	0.16	18.6	0.2	0.2	0.4	0.4	
08/29/07 14:27:45	0.10	0.15	18.5	0.2	0.2	0.4	0.4	Post-Test Bias and Drift Check:
08/29/07 14:28:00	0.10	0.14	18.3	0.2	0.2	0.5	0.4	20 ppm SO2 injection:
08/29/07 14:28:15	0.10	0.14	18.3	0.2	0.2	0.4	0.4	18.32 ppmv db SO2
08/29/07 14:28:30	0.10	0.14	18.3	0.2	0.2	0.4	0.4	
08/29/07 14:28:45	0.10	0.14	18.3	0.2	0.2	0.4	0.4	
08/29/07 14:29:00	0.10	0.14	18.3	0.2	0.2	0.4	0.4	
08/29/07 14:29:15	0.10	0.14	18.3	0.2	-0.8	0.4	0.4	
08/29/07 14:29:30	0.10	0.31	18.6	0.7	0.0	0.4	0.4	
08/29/07 14:29:45	0.17	2.27	20.3	2.0	0.2	0.4	0.4	
08/29/07 14:30:00	0.20	1.50	20.8	1.2	0.2	0.5	0.4	
08/29/07 14:30:15	0.13	0.33	19.7	0.5	0.2	0.4	0.4	
08/29/07 14:30:30	0.10	0.17	18.5	1.2	0.2	0.4	0.4	
08/29/07 14:30:45	0.11	0.15	17.0	5.2	0.2	0.4	0.4	
08/29/07 14:31:00	0.10	0.14	14.6	8.2	0.2	0.4	0.4	
08/29/07 14:31:15	0.10	0.13	12.4	9.0	0.2	0.4	0.4	
08/29/07 14:31:30	0.10	0.13	10.6	9.2	0.2	0.5	0.4	
08/29/07 14:31:45	0.10	0.12	9.3	9.2	0.2	0.4	0.4	
08/29/07 14:32:00	0.10	0.12	8.1	9.2	0.2	0.4	0.4	
08/29/07 14:32:15	0.10	0.12	7.0	9.2	0.2	0.5	0.4	

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08/29/07 14:32:30	0.10	0.12	8.4	9.2	0.2	0.5	0.4
08/29/07 14:32:45	0.10	0.11	5.8	9.2	0.2	0.5	0.4
08/29/07 14:33:00	0.10	0.11	5.3	9.2	0.2	0.5	0.4
08/29/07 14:33:15	0.10	0.11	4.8	9.2	0.2	0.4	0.4
08/29/07 14:33:30	0.10	0.11	4.4	9.2	0.2	0.5	0.4
08/29/07 14:33:45	0.10	0.10	4.1	9.2	0.2	0.5	0.4
08/29/07 14:34:00	0.10	0.10	3.9	10.7	0.2	0.4	0.4
08/29/07 14:34:15	0.10	0.10	3.8	12.7	0.2	0.4	0.4
08/29/07 14:34:30	0.09	0.10	3.3	18.7	0.2	0.4	0.4
08/29/07 14:34:45	0.09	0.10	3.2	18.5	0.2	0.5	0.4
08/29/07 14:35:00	0.09	0.10	3.0	18.2	0.2	0.4	0.4
08/29/07 14:35:15	0.09	0.31	3.0	18.2	0.2	0.4	0.4
08/29/07 14:35:30	0.14	1.09	3.0	18.2	0.2	0.5	0.4
Post-Test Bias and Drift Check: 20 ppm NOx injection: 18.30 ppmv db NOx							
08/29/07 14:35:45	0.13	0.44	3.0	23.2	0.2	0.4	0.4
08/29/07 14:36:00	0.11	0.15	3.1	103.7	0.2	0.4	0.4
08/29/07 14:36:15	0.10	0.20	3.0	127.7	0.2	0.5	0.4
08/29/07 14:36:30	0.13	0.78	3.2	124.2	0.2	0.4	0.4
08/29/07 14:36:45	0.13	0.38	3.3	101.9	0.3	0.5	0.4
08/29/07 14:37:00	0.09	0.13	3.1	37.7	0.2	0.4	0.4
08/29/07 14:37:15	0.09	0.10	3.0	17.9	-0.3	0.4	0.4
08/29/07 14:37:30	0.09	0.09	2.8	13.2	0.2	0.4	0.4
08/29/07 14:37:45	0.09	0.09	2.7	12.5	0.2	0.4	0.4
08/29/07 14:38:00	0.09	0.09	2.4	12.2	0.2	0.5	0.4
08/29/07 14:38:15	0.09	0.09	2.4	12.2	0.2	0.5	0.4
08/29/07 14:38:30	0.09	0.09	2.3	12.2	0.2	0.4	0.4
08/29/07 14:38:45	0.09	0.09	2.1	12.2	0.2	0.4	0.4
08/29/07 14:39:00	0.09	0.09	2.1	12.2	0.2	0.4	0.4
08/29/07 14:39:15	0.09	0.09	1.8	12.2	0.2	0.4	0.4
08/29/07 14:39:30	0.09	0.09	1.8	12.2	0.2	0.4	0.4
08/29/07 14:39:45	0.09	0.09	1.8	12.2	0.2	0.4	0.4
08/29/07 14:40:00	0.09	0.09	1.8	12.7	-0.2	0.5	0.4
08/29/07 14:40:15	0.10	0.49	1.8	13.2	-0.3	0.4	0.4
08/29/07 14:40:30	0.13	0.74	1.8	13.2	0.0	0.4	0.4
08/29/07 14:40:45	0.11	0.23	1.8	12.5	0.2	0.4	0.4
08/29/07 14:41:00	0.09	0.11	1.8	12.7	0.2	0.5	0.4
08/29/07 14:41:15	0.09	0.10	1.8	13.2	0.2	0.5	0.4
08/29/07 14:41:30	0.09	0.09	1.7	13.2	0.2	0.4	0.4
08/29/07 14:41:45	0.09	0.09	1.5	13.2	0.2	0.5	0.4
08/29/07 14:42:00	0.09	0.09	1.5	13.2	0.2	0.4	0.4
08/29/07 14:42:15	0.09	0.08	1.5	13.2	0.2	0.4	0.4
Post-Test Bias and Drift Check: Zero ppm SO2 injection: 1.42 ppmv db SO2							
08/29/07 14:42:30	0.09	0.08	1.5	13.2	0.2	0.4	0.4
08/29/07 14:42:45	0.09	0.08	1.5	13.2	0.2	0.4	0.4
08/29/07 14:43:00	0.09	0.08	1.4	13.2	0.2	0.4	0.4
08/29/07 14:43:15	0.09	0.09	1.3	13.2	0.2	0.4	0.4
08/29/07 14:43:30	0.09	0.08	1.3	13.2	0.2	0.4	0.4
08/29/07 14:43:45	0.09	0.08	1.4	13.2	0.2	0.4	0.4
08/29/07 14:44:00	0.09	0.08	1.3	13.2	0.2	0.4	0.4
08/29/07 14:44:15	0.12	1.64	1.5	13.5	1.2	0.5	0.4
08/29/07 14:44:30	0.20	2.49	1.8	13.7	5.2	0.4	0.4
08/29/07 14:44:45	0.15	0.67	1.8	13.2	14.2	0.5	0.4
08/29/07 14:45:00	0.10	0.17	1.8	13.2	17.7	0.4	0.4
08/29/07 14:45:15	0.10	0.12	1.8	11.7	18.2	0.5	0.4
08/29/07 14:45:30	0.11	0.11	1.8	7.7	18.2	0.4	0.4
08/29/07 14:45:45	0.10	0.10	1.8	3.5	18.7	0.4	0.4
08/29/07 14:46:00	0.11	0.09	2.1	1.2	19.2	0.4	0.4
08/29/07 14:46:15	0.11	0.08	1.8	1.2	18.7	0.4	0.4
08/29/07 14:46:30	0.11	0.08	1.8	1.2	19.0	0.4	0.4
Post-Test Bias and Drift Check: 20 ppm CO injection: 19.23 ppmv db CO							
08/29/07 14:46:45	0.11	0.08	1.8	1.2	19.2	0.5	0.4
08/29/07 14:47:00	0.11	0.08	1.8	0.7	19.2	0.4	0.4
08/29/07 14:47:15	0.11	0.08	1.8	0.2	19.2	0.4	0.4
08/29/07 14:47:30	0.10	0.08	1.7	0.2	19.2	0.5	0.4
08/29/07 14:47:45	0.10	0.08	1.5	0.2	19.2	0.4	0.4
08/29/07 14:48:00	0.09	0.08	1.5	0.2	19.2	0.4	0.4
08/29/07 14:48:15	0.09	0.07	1.5	0.2	19.2	0.4	0.4
08/29/07 14:48:30	0.09	0.08	1.5	0.2	19.2	0.4	0.4
08/29/07 14:48:45	0.09	0.08	1.5	0.2	19.2	0.5	0.4
08/29/07 14:49:00	0.09	0.14	1.5	0.2	19.0	0.8	0.4
08/29/07 14:49:15	0.10	0.38	1.5	1.0	15.7	5.9	0.4
08/29/07 14:49:30	0.10	0.18	1.5	0.7	7.7	13.9	0.4
08/29/07 14:49:45	0.12	0.12	1.6	2.2	2.2	15.6	0.4
08/29/07 14:50:00	0.28	0.11	1.5	1.7	0.5	22.8	0.4
Post-Test Bias and Drift Check: 25 ppm CH4 injection: 24.52 ppmv CH4							
08/29/07 14:50:15	0.51	0.09	1.5	1.0	0.2	24.6	0.4
08/29/07 14:50:30	0.58	0.09	1.6	0.2	0.2	24.5	0.4
08/29/07 14:50:45	0.60	0.09	1.8	0.2	0.2	24.6	0.4
08/29/07 14:51:00	0.81	0.09	1.7	0.2	0.2	24.3	0.4
08/29/07 14:51:15	0.62	0.09	1.5	0.2	0.2	23.8	15.1
08/29/07 14:51:30	0.62	0.09	1.5	0.2	0.2	23.7	21.4
08/29/07 14:51:45	0.62	0.09	1.7	0.2	0.2	23.0	21.4
08/29/07 14:52:00	0.83	0.08	1.6	0.2	0.2	22.6	21.4
08/29/07 14:52:15	0.63	0.08	1.5	0.2	0.2	22.3	21.4
08/29/07 14:52:30	0.64	0.08	1.5	0.2	0.2	22.2	21.4
08/29/07 14:52:45	0.64	0.08	1.5	0.2	0.2	20.4	21.4
08/29/07 14:53:00	0.65	0.08	1.5	0.2	0.2	12.7	21.4
08/29/07 14:53:15	0.65	0.08	1.5	0.7	0.7	5.8	21.4
08/29/07 14:53:30	0.69	3.97	1.9	4.7	2.2	7.3	21.4
08/29/07 14:53:45	0.88	11.28	2.6	11.7	3.2	8.5	21.4
08/29/07 14:54:00	1.03	16.09	3.8	13.7	3.5	9.1	21.4
08/29/07 14:54:15	1.05	18.36	5.3	14.2	4.7	9.3	5.6
08/29/07 14:54:30	1.02	18.92	6.9	14.7	5.0	9.8	0.4
08/29/07 14:54:45	1.04	19.02	8.1	15.0	3.7	10.1	0.4
08/29/07 14:55:00	1.02	19.09	9.2	14.2	2.5	10.5	0.4
08/29/07 14:55:15	1.02	19.11	10.1	15.2	2.2	10.4	0.4
08/29/07 14:55:30	1.05	19.11	10.9	15.2	3.5	10.6	0.4
08/29/07 14:55:45	1.10	19.08	11.8	16.2	5.2	10.9	0.4
08/29/07 14:56:00	1.15	19.08	12.1	15.7	4.2	10.7	0.4
08/29/07 14:56:15	1.09	19.17	12.5	14.5	2.7	11.1	0.4
08/29/07 14:56:30	1.04	19.19	12.7	15.2	1.5	11.3	0.4
08/29/07 14:56:45	1.07	19.17	13.1	15.5	1.2	12.5	0.4
08/29/07 14:57:00	1.11	19.12	13.1	16.2	2.2	12.1	0.4

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08/29/07 14:57:15	1.16	19.11	13.3	15.2	3.2	11.8	0.4	
08/29/07 14:57:30	1.16	19.14	13.4	14.7	4.2	11.7	0.4	
08/29/07 14:57:45	1.11	19.22	13.4	13.2	6.2	11.7	0.4	
08/29/07 14:58:00	1.04	19.26	13.4	13.2	10.7	11.8	0.4	
08/29/07 14:58:15	1.00	19.26	13.4	13.2	13.2	12.0	0.4	
08/29/07 14:58:30	0.98	19.27	13.4	13.2	11.2	12.2	0.4	
08/29/07 14:58:45	0.94	19.32	13.5	12.5	8.7	12.6	0.4	
08/29/07 14:59:00	0.90	19.34	13.6	13.2	8.0	12.4	0.4	
08/29/07 14:59:15	0.91	19.35	13.7	13.2	7.2	12.5	0.4	
08/29/07 14:59:30	0.90	19.39	13.7	12.7	10.7	12.8	0.4	
08/29/07 14:59:45	0.88	19.38	13.7	13.2	16.2	13.9	0.4	
08/29/07 15:00:00	0.91	19.37	13.7	13.2	14.7	14.0	0.4	
08/29/07 15:00:15	0.87	19.43	13.5	12.2	9.2	13.4	0.4	
08/29/07 15:00:30	0.79	19.48	13.5	12.2	7.2	13.6	0.4	
08/29/07 15:00:45	0.81	19.43	13.5	13.2	10.7	14.2	0.4	
08/29/07 15:01:00	0.90	19.35	13.4	13.2	12.5	14.3	0.4	
08/29/07 15:01:15	0.92	19.38	13.4	13.0	9.7	14.2	0.4	
08/29/07 15:01:30	0.83	19.45	13.1	12.2	7.5	13.6	0.4	
08/29/07 15:01:45	0.82	19.44	13.1	12.5	6.7	13.3	0.4	
08/29/07 15:02:00	0.85	19.41	13.1	13.2	5.2	13.3	0.4	
08/29/07 15:02:15	0.90	19.36	13.0	14.2	3.7	13.3	0.4	
08/29/07 15:02:30	0.97	19.29	13.1	14.2	2.5	13.0	0.4	
08/29/07 15:02:45	1.01	19.27	13.0	14.5	2.7	13.3	0.4	
08/29/07 15:03:00	1.02	19.24	12.8	15.2	3.2	12.9	0.4	
08/29/07 15:03:15	1.08	19.21	12.8	15.2	3.2	12.8	0.4	
08/29/07 15:03:30	1.05	19.27	12.8	14.7	3.2	12.7	0.4	
08/29/07 15:03:45	0.97	19.34	13.1	14.2	3.7	12.6	0.4	
08/29/07 15:04:00	0.90	19.39	13.1	14.2	5.5	12.3	0.4	
08/29/07 15:04:15	0.88	19.39	13.1	14.2	8.7	12.7	0.4	
08/29/07 15:04:30	0.91	19.35	12.9	14.2	11.5	12.9	0.4	
08/29/07 15:04:45	0.93	19.37	12.8	13.2	9.7	13.4	0.4	Begin M8-3/HCN-2
08/29/07 15:05:00	0.85	19.44	12.8	13.2	8.2	13.3	0.4	
08/29/07 15:05:15	0.82	19.44	12.7	13.5	12.2	13.1	0.4	
08/29/07 15:05:30	0.88	19.40	12.5	13.7	15.2	13.5	0.4	
08/29/07 15:05:45	0.86	19.47	12.5	13.0	12.7	13.6	0.4	
08/29/07 15:06:00	0.77	19.53	12.5	12.2	10.0	14.2	0.4	
08/29/07 15:06:15	0.79	19.47	12.6	13.2	10.7	13.7	0.4	
08/29/07 15:06:30	0.85	19.46	13.3	13.2	10.7	13.8	0.4	
08/29/07 15:06:45	0.85	19.49	14.1	13.2	9.2	13.7	0.4	
08/29/07 15:07:00	0.84	19.46	14.2	13.2	9.0	13.4	0.4	
08/29/07 15:07:15	0.90	19.38	13.7	14.2	7.2	13.3	0.4	
08/29/07 15:07:30	0.94	19.40	13.3	13.7	4.5	13.1	0.4	
08/29/07 15:07:45	0.88	19.43	13.0	14.2	3.2	13.1	0.4	
08/29/07 15:08:00	0.92	19.38	12.8	14.7	3.2	13.1	0.4	
08/29/07 15:08:15	0.97	19.37	12.6	15.0	3.2	13.2	0.4	
08/29/07 15:08:30	0.96	19.40	12.5	14.2	2.5	13.5	0.4	
08/29/07 15:08:45	0.95	19.38	12.5	15.2	1.7	13.2	0.4	
08/29/07 15:09:00	1.03	19.29	12.5	15.7	1.2	12.6	0.4	
08/29/07 15:09:15	1.13	19.22	12.3	16.2	1.7	12.4	0.4	
08/29/07 15:09:30	1.17	19.21	12.2	16.2	2.2	12.2	0.4	
08/29/07 15:09:45	1.12	19.28	12.0	16.0	2.2	11.9	0.4	
08/29/07 15:10:00	1.04	19.36	11.9	15.2	3.5	12.5	0.4	
08/29/07 15:10:15	0.96	19.41	11.9	15.2	4.7	12.8	0.4	
08/29/07 15:10:30	0.96	19.41	11.6	15.2	5.0	12.5	0.4	
08/29/07 15:10:45	0.97	19.42	11.6	14.2	3.7	12.3	0.4	
08/29/07 15:11:00	0.92	19.47	11.6	14.2	2.0	12.0	0.4	
08/29/07 15:11:15	0.96	19.39	11.3	15.5	1.2	11.6	0.4	
08/29/07 15:11:30	1.12	19.25	11.3	17.0	1.2	11.8	0.4	
08/29/07 15:11:45	1.21	19.20	11.3	17.2	1.2	11.7	0.4	
08/29/07 15:12:00	1.21	19.21	11.2	17.2	2.2	12.4	0.4	
08/29/07 15:12:15	1.21	19.20	11.1	17.0	2.2	12.8	0.4	
08/29/07 15:12:30	1.19	19.25	11.0	16.2	2.2	12.1	0.4	
08/29/07 15:12:45	1.12	19.30	11.0	16.2	2.2	11.9	0.4	
08/29/07 15:13:00	1.10	19.30	11.0	16.2	2.0	11.8	0.4	
08/29/07 15:13:15	1.10	19.30	11.0	16.2	1.2	11.4	0.4	
08/29/07 15:13:30	1.10	19.28	11.0	16.2	1.2	11.5	0.4	
08/29/07 15:13:45	1.14	19.23	11.0	16.5	1.7	11.2	0.4	
08/29/07 15:14:00	1.17	19.21	11.0	17.2	2.2	12.2	0.4	
08/29/07 15:14:15	1.18	19.20	10.9	17.0	2.2	11.9	0.4	
08/29/07 15:14:30	1.17	19.22	10.9	16.2	2.2	12.9	0.4	
08/29/07 15:14:45	1.14	19.24	10.7	16.2	2.2	12.4	0.4	
08/29/07 15:15:00	1.10	19.25	10.7	16.2	3.5	12.4	0.4	
08/29/07 15:15:15	1.08	19.28	10.7	16.0	4.7	11.9	1.1	
08/29/07 15:15:30	1.05	19.31	10.7	15.2	5.0	11.7	1.4	
08/29/07 15:15:45	1.03	19.31	10.7	15.0	3.7	11.9	1.4	
08/29/07 15:16:00	1.02	19.32	10.4	15.0	4.2	11.6	1.4	
08/29/07 15:16:15	1.04	19.29	10.4	15.2	4.2	10.9	1.4	
08/29/07 15:16:30	1.08	19.31	10.4	15.2	4.5	12.7	1.4	
08/29/07 15:16:45	1.00	19.40	10.7	14.2	5.2	12.5	1.4	
08/29/07 15:17:00	0.92	19.43	10.7	14.2	4.2	12.4	1.4	
08/29/07 15:17:15	0.93	19.43	10.8	14.2	4.7	12.7	1.4	
08/29/07 15:17:30	0.91	19.45	10.8	14.2	7.2	11.9	1.4	
08/29/07 15:17:45	0.92	19.42	10.7	14.2	6.2	12.9	1.4	
08/29/07 15:18:00	0.91	19.44	10.7	14.2	4.2	11.9	1.4	
08/29/07 15:18:15	0.90	19.44	10.4	14.5	4.2	11.6	0.6	
08/29/07 15:18:30	0.98	19.34	10.4	15.2	4.0	11.5	0.4	
08/29/07 15:18:45	1.02	19.36	10.3	15.0	3.2	11.3	0.4	
08/29/07 15:19:00	0.95	19.41	10.1	14.2	5.2	11.6	0.4	
08/29/07 15:19:15	0.93	19.41	10.1	14.5	9.7	12.1	0.4	
08/29/07 15:19:30	0.97	19.37	10.1	15.2	10.5	11.9	0.4	
08/29/07 15:19:45	0.95	19.43	10.1	14.0	7.7	12.0	0.4	port change
08/29/07 15:20:00	0.85	19.50	10.1	13.2	10.2	11.4	0.4	
08/29/07 15:20:15	0.85	19.44	10.1	14.2	14.7	11.4	0.4	
08/29/07 15:20:30	0.92	19.43	10.4	13.5	19.0	11.4	0.4	
08/29/07 15:20:45	0.85	19.51	10.4	12.2	22.2	11.8	0.4	
08/29/07 15:21:00	0.79	19.54	10.4	12.2	19.0	12.3	0.4	
08/29/07 15:21:15	0.79	19.54	10.4	12.2	12.2	11.8	0.4	
08/29/07 15:21:30	0.79	19.53	10.4	12.2	7.2	11.4	0.4	
08/29/07 15:21:45	0.84	19.46	10.2	12.5	7.2	12.2	0.4	

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08/29/07 15:22:00	0.91	19.41	10.1	13.2	6.0	11.9	0.4	
08/29/07 15:22:15	0.94	19.41	10.1	13.2	6.7	12.0	0.4	
08/29/07 15:22:30	0.93	19.38	10.1	13.2	12.7	12.7	0.4	
08/29/07 15:22:45	0.97	19.37	10.1	13.2	14.2	12.8	0.4	
08/29/07 15:23:00	0.91	19.45	10.1	12.5	17.2	12.6	0.4	
08/29/07 15:23:15	0.83	19.51	10.1	12.2	22.7	12.8	0.4	
08/29/07 15:23:30	0.82	19.51	10.1	12.2	29.2	13.7	0.4	
08/29/07 15:23:45	0.79	19.54	10.1	12.0	26.7	13.8	0.4	
08/29/07 15:24:00	0.76	19.66	10.1	11.2	17.5	13.8	0.4	Resume M8-3/HCN-2
08/29/07 15:24:15	0.74	19.56	10.1	12.2	14.2	13.0	0.4	
08/29/07 15:24:30	0.79	19.51	10.1	12.2	10.0	13.6	0.4	
08/29/07 15:24:45	0.82	19.50	10.1	12.2	9.7	13.6	0.4	
08/29/07 15:25:00	0.81	19.49	10.1	12.2	12.5	13.9	0.4	
08/29/07 15:25:15	0.82	19.49	9.9	13.2	14.2	13.5	0.4	
08/29/07 15:25:30	0.82	19.50	9.8	12.5	15.0	13.7	0.4	
08/29/07 15:25:45	0.81	19.51	9.8	12.2	13.2	12.5	0.4	
08/29/07 15:26:00	0.78	19.54	9.8	12.2	11.5	12.4	0.4	
08/29/07 15:26:15	0.76	19.53	9.8	12.2	13.7	12.1	0.4	
08/29/07 15:26:30	0.79	19.50	9.5	12.2	19.5	12.5	0.4	
08/29/07 15:26:45	0.81	19.50	9.5	12.2	20.7	12.6	0.4	
08/29/07 15:27:00	0.79	19.54	9.7	12.2	32.2	13.1	0.4	
08/29/07 15:27:15	0.73	19.69	9.8	12.2	43.2	12.9	0.4	
08/29/07 15:27:30	0.71	19.61	9.8	11.5	35.7	12.9	0.4	
08/29/07 15:27:45	0.66	19.68	9.8	11.0	25.7	13.1	0.4	
08/29/07 15:28:00	0.61	19.68	9.9	11.0	26.0	13.1	0.4	
08/29/07 15:28:15	0.67	19.61	10.1	12.0	29.7	13.3	0.4	
08/29/07 15:28:30	0.70	19.60	9.8	11.2	33.0	11.9	0.4	
08/29/07 15:28:45	0.68	19.62	9.8	11.2	31.7	13.4	0.4	
08/29/07 15:29:00	0.67	19.63	9.5	11.2	29.2	13.5	0.4	
08/29/07 15:29:15	0.66	19.63	9.5	11.2	22.7	14.0	0.4	
08/29/07 15:29:30	0.68	19.62	9.5	11.2	11.5	13.8	0.4	
08/29/07 15:29:45	0.70	19.58	9.5	12.5	8.7	14.4	0.4	
08/29/07 15:30:00	0.78	19.61	9.3	13.2	7.2	13.5	0.4	
08/29/07 15:30:15	0.82	19.60	9.1	13.2	6.7	13.0	0.4	
08/29/07 15:30:30	0.82	19.49	9.2	13.2	4.0	12.7	0.4	
08/29/07 15:30:45	0.85	19.47	9.1	13.5	3.2	12.0	0.4	
08/29/07 15:31:00	0.87	19.44	9.1	14.2	4.7	11.7	0.4	
08/29/07 15:31:15	0.90	19.40	9.1	14.2	7.2	11.5	0.4	
08/29/07 15:31:30	0.92	19.39	9.1	14.2	9.2	11.7	0.4	
08/29/07 15:31:45	0.89	19.44	9.2	13.2	8.2	12.6	0.4	
08/29/07 15:32:00	0.85	19.47	9.4	13.2	6.5	12.5	0.4	
08/29/07 15:32:15	0.84	19.45	9.6	13.7	7.3	12.2	0.4	
08/29/07 15:32:30	0.89	19.39	9.5	14.2	8.5	12.3	0.4	
08/29/07 15:32:45	0.91	19.40	9.5	13.7	8.7	12.2	0.4	
08/29/07 15:33:00	0.86	19.45	9.3	13.2	11.2	13.2	0.4	
08/29/07 15:33:15	0.82	19.49	9.1	13.2	15.2	12.6	0.4	
08/29/07 15:33:30	0.82	19.46	9.1	13.2	13.7	12.8	0.4	
08/29/07 15:33:45	0.80	19.49	9.1	13.2	15.7	13.0	0.4	
08/29/07 15:34:00	0.78	19.47	8.8	13.2	29.5	12.8	0.4	
08/29/07 15:34:15	0.85	19.41	8.8	13.2	31.2	12.7	0.4	
08/29/07 15:34:30	0.83	19.49	8.8	12.5	19.5	13.3	0.4	
08/29/07 15:34:45	0.71	19.57	8.8	11.7	12.2	13.2	0.4	
08/29/07 15:35:00	0.71	19.54	8.8	12.2	8.0	12.0	0.4	
08/29/07 15:35:15	0.79	19.49	8.7	13.2	6.2	10.9	0.4	
08/29/07 15:35:30	0.83	19.48	8.5	13.2	4.0	11.5	0.4	
08/29/07 15:35:45	0.85	19.46	8.5	14.2	3.2	11.4	0.4	
08/29/07 15:36:00	0.96	19.35	8.5	15.0	5.7	11.8	0.4	
08/29/07 15:36:15	1.03	19.31	8.5	15.2	7.7	11.7	0.4	
08/29/07 15:36:30	1.03	19.34	8.2	15.2	5.8	12.2	0.4	
08/29/07 15:36:45	0.97	19.40	8.2	14.2	3.7	11.9	0.4	
08/29/07 15:37:00	0.95	19.38	8.3	15.0	4.0	12.3	0.4	
08/29/07 15:37:15	1.00	19.34	8.2	15.2	11.5	11.0	0.4	
08/29/07 15:37:30	1.02	19.38	8.2	14.5	19.2	11.2	0.4	
08/29/07 15:37:45	0.94	19.46	8.2	13.7	17.2	10.7	0.4	
08/29/07 15:38:00	0.83	19.55	8.2	12.5	12.0	10.0	0.4	
08/29/07 15:38:15	0.81	19.53	8.3	13.2	12.0	10.8	0.4	
08/29/07 15:38:30	0.85	19.61	8.5	13.2	9.7	11.5	0.4	
08/29/07 15:38:45	0.83	19.55	8.4	13.2	6.7	11.4	0.4	port change
08/29/07 15:39:00	0.80	19.56	8.2	13.2	5.2	11.5	0.4	
08/29/07 15:39:15	0.85	19.52	8.2	13.7	5.2	11.4	0.4	
08/29/07 15:39:30	0.90	19.47	8.2	14.2	5.2	11.4	0.4	
08/29/07 15:39:45	0.95	19.44	8.2	14.2	4.5	10.9	0.4	
08/29/07 15:40:00	0.94	19.46	8.2	14.2	4.2	11.0	0.4	
08/29/07 15:40:15	0.90	19.48	8.2	14.2	4.2	11.0	0.4	
08/29/07 15:40:30	0.91	19.46	8.1	14.2	3.2	10.7	0.4	
08/29/07 15:40:45	0.92	19.47	8.1	14.2	2.5	10.7	0.4	
08/29/07 15:41:00	0.92	19.44	7.9	15.0	2.2	10.9	0.4	
08/29/07 15:41:15	1.01	19.34	7.9	15.7	2.2	10.5	0.4	
08/29/07 15:41:30	1.10	19.29	7.9	16.2	2.2	10.6	0.4	
08/29/07 15:41:45	1.09	19.34	7.9	15.2	1.5	10.8	0.4	
08/29/07 15:42:00	1.02	19.39	7.9	15.2	1.5	11.0	0.4	
08/29/07 15:42:15	1.01	19.35	7.9	15.7	3.0	10.9	0.8	
08/29/07 15:42:30	1.10	19.24	7.9	17.0	3.2	10.3	0.9	
08/29/07 15:42:45	1.17	19.22	7.8	16.2	3.2	10.8	0.9	
08/29/07 15:43:00	1.13	19.29	7.6	15.5	3.5	11.1	0.9	
08/29/07 15:43:15	1.06	19.34	7.6	15.2	5.7	11.0	0.9	
08/29/07 15:43:30	1.01	19.37	7.6	14.5	7.2	10.8	0.9	
08/29/07 15:43:45	0.97	19.43	7.6	13.7	7.2	10.8	0.9	
08/29/07 15:44:00	0.89	19.52	7.6	13.2	7.5	11.1	0.9	
08/29/07 15:44:15	0.86	19.51	7.6	13.2	8.2	11.0	0.9	
08/29/07 15:44:30	0.88	19.51	7.6	13.2	7.0	11.4	0.9	
08/29/07 15:44:45	0.87	19.51	7.6	13.2	7.0	11.7	0.9	
08/29/07 15:45:00	0.87	19.49	7.6	13.2	11.2	12.0	0.9	
08/29/07 15:45:15	0.89	19.49	7.6	12.7	15.0	12.1	0.5	
08/29/07 15:45:30	0.83	19.55	7.6	12.2	11.2	12.1	0.4	
08/29/07 15:45:45	0.75	19.58	7.6	11.7	6.0	10.9	0.4	Resume M8-3/HCN-2
08/29/07 15:46:00	0.77	19.53	7.6	12.2	4.5	11.8	0.4	
08/29/07 15:46:15	0.89	19.41	7.6	13.7	8.2	12.7	0.4	
08/29/07 15:46:30	1.01	19.33	7.6	14.2	13.5	12.3	0.4	

Location Paulsboro, New Jersey
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08/29/07 15:46:45	1.05	19.33	7.6	13.7	12.7	11.7	0.4
08/29/07 15:47:00	0.94	19.46	7.7	12.5	9.0	11.8	0.4
08/29/07 15:47:15	0.80	19.55	7.9	11.7	12.7	11.7	0.4
08/29/07 15:47:30	0.81	19.49	7.9	13.0	25.2	12.2	0.4
08/29/07 15:47:45	0.92	19.40	7.9	13.2	26.0	13.4	0.4
08/29/07 15:48:00	0.89	19.49	7.9	12.5	15.5	14.3	0.4
08/29/07 15:48:15	0.75	19.59	7.9	11.7	7.2	14.6	1.1
08/29/07 15:48:30	0.74	19.56	7.9	12.2	4.2	11.5	1.4
08/29/07 15:48:45	0.81	19.51	7.9	13.2	4.2	9.9	1.4
08/29/07 15:49:00	0.86	19.45	7.9	13.2	6.7	11.2	1.4
08/29/07 15:49:15	0.91	19.41	7.9	14.2	21.7	10.3	1.4
08/29/07 15:49:30	0.94	19.37	7.8	14.2	31.5	6.1	1.4
08/29/07 15:49:45	0.94	19.43	7.9	12.7	21.7	8.2	1.4
08/29/07 15:50:00	0.80	19.56	7.9	11.5	10.0	9.8	1.4
08/29/07 15:50:15	0.75	19.53	7.9	12.7	5.5	9.3	1.4
08/29/07 15:50:30	0.85	19.45	7.9	13.2	4.5	9.8	1.4
08/29/07 15:50:45	0.91	19.42	7.9	14.2	5.2	10.3	1.4
08/29/07 15:51:00	0.91	19.44	7.9	13.5	7.7	10.7	1.4
08/29/07 15:51:15	0.88	19.47	7.9	13.2	10.0	12.0	0.6
08/29/07 15:51:30	0.83	19.52	7.9	12.5	10.2	11.6	0.4
08/29/07 15:51:45	0.75	19.59	7.9	12.2	10.2	11.3	0.4
08/29/07 15:52:00	0.74	19.54	7.9	13.0	9.7	11.4	0.4
08/29/07 15:52:15	0.84	19.46	7.6	13.2	7.5	9.8	0.4
08/29/07 15:52:30	0.86	19.48	7.6	13.2	6.7	10.5	0.4
08/29/07 15:52:45	0.83	19.51	7.6	13.2	10.5	11.2	0.4
08/29/07 15:53:00	0.83	19.50	7.6	13.2	13.2	11.2	0.4
08/29/07 15:53:15	0.84	19.51	7.7	13.2	13.2	11.5	0.4
08/29/07 15:53:30	0.82	19.52	7.9	12.5	11.0	11.7	0.4
08/29/07 15:53:45	0.81	19.51	7.6	13.2	11.7	13.0	0.4
08/29/07 15:54:00	0.83	19.50	7.6	13.2	16.3	12.8	0.4
08/29/07 15:54:15	0.83	19.51	7.6	13.2	20.7	12.9	0.4
08/29/07 15:54:30	0.80	19.54	7.5	12.5	18.7	12.7	0.4
08/29/07 15:54:45	0.75	19.50	7.3	11.7	16.5	11.9	0.4
08/29/07 15:55:00	0.71	19.53	7.3	12.0	18.0	11.7	0.4
08/29/07 15:55:15	0.71	19.53	7.3	12.2	21.7	11.8	0.4
08/29/07 15:55:30	0.70	19.55	7.3	11.6	24.0	12.5	0.4
08/29/07 15:55:45	0.70	19.54	7.3	12.2	21.0	12.6	0.4
08/29/07 15:56:00	0.71	19.55	7.3	11.5	14.2	12.7	0.4
08/29/07 15:56:15	0.70	19.57	7.3	11.7	9.7	12.9	0.4
08/29/07 15:56:30	0.72	19.52	7.3	12.5	8.0	13.2	0.4
08/29/07 15:56:45	0.80	19.55	7.3	13.2	7.2	13.5	0.4
08/29/07 15:57:00	0.84	19.55	7.3	13.2	7.5	15.2	0.4
08/29/07 15:57:15	0.82	19.58	7.3	13.2	7.5	13.9	0.4
08/29/07 15:57:30	0.81	19.57	7.3	13.2	6.2	13.1	0.4
08/29/07 15:57:45	0.81	19.57	7.3	13.2	5.5	12.5	0.4
08/29/07 15:58:00	0.80	19.55	7.3	13.2	5.7	12.4	0.4
08/29/07 15:58:15	0.85	19.52	7.3	13.2	10.2	11.7	0.4
08/29/07 15:58:30	0.88	19.52	7.3	13.7	12.7	12.8	0.4
08/29/07 15:58:45	0.87	19.54	7.3	13.2	9.0	13.5	0.4
08/29/07 15:59:00	0.81	19.59	7.3	12.7	6.3	13.7	0.4
08/29/07 15:59:15	0.79	19.58	7.3	13.7	6.2	12.6	0.4
08/29/07 15:59:30	0.87	19.49	7.4	14.2	6.0	12.3	0.4
08/29/07 15:59:45	0.92	19.47	7.6	13.7	6.0	12.2	0.4
08/29/07 16:00:00	0.90	19.49	7.6	14.0	8.5	11.2	0.4
08/29/07 16:00:15	0.91	19.48	7.6	14.2	9.2	11.0	0.4
08/29/07 16:00:30	0.91	19.49	7.6	13.5	9.0	11.6	0.4
08/29/07 16:00:45	0.85	19.56	7.6	12.7	8.2	11.3	0.4
port change							
08/29/07 16:01:00	0.78	19.50	7.6	12.5	14.5	11.5	0.4
08/29/07 16:01:15	0.78	19.55	7.6	13.2	18.2	11.5	0.4
08/29/07 16:01:30	0.83	19.52	7.6	13.0	12.8	11.9	0.4
08/29/07 16:01:45	0.79	19.58	7.3	12.2	6.2	11.4	0.4
08/29/07 16:02:00	0.74	19.57	7.3	12.5	3.2	11.3	0.4
08/29/07 16:02:15	0.81	19.47	7.3	13.7	4.7	11.2	0.4
08/29/07 16:02:30	0.94	19.38	7.3	14.2	7.7	11.3	0.4
08/29/07 16:02:45	0.99	19.38	7.3	14.2	9.0	12.4	0.4
08/29/07 16:03:00	0.94	19.43	7.3	13.5	8.7	12.5	0.4
08/29/07 16:03:15	0.91	19.40	7.3	13.2	6.7	12.4	0.4
08/29/07 16:03:30	0.94	19.40	7.3	13.2	5.2	12.0	0.4
08/29/07 16:03:45	0.93	19.38	7.3	13.7	5.2	11.9	0.4
08/29/07 16:04:00	0.97	19.34	7.3	14.2	4.7	12.7	0.4
08/29/07 16:04:15	0.99	19.34	7.3	14.2	4.2	13.1	0.4
08/29/07 16:04:30	0.92	19.41	7.3	13.5	4.2	13.0	0.4
08/29/07 16:04:45	0.86	19.45	7.3	13.2	4.2	13.3	0.4
08/29/07 16:05:00	0.87	19.42	7.3	13.5	5.2	12.7	0.4
08/29/07 16:05:15	0.94	19.34	7.3	14.7	8.5	12.3	0.4
08/29/07 16:05:30	1.04	19.26	7.6	15.0	8.7	12.7	0.4
08/29/07 16:05:45	1.01	19.33	7.6	13.7	7.5	12.8	0.4
08/29/07 16:06:00	0.90	19.43	7.8	13.2	8.7	12.8	0.4
08/29/07 16:06:15	0.82	19.48	7.9	13.2	9.2	11.7	0.4
08/29/07 16:06:30	0.83	19.44	7.9	13.2	8.2	12.3	0.4
08/29/07 16:06:45	0.89	19.38	7.9	13.2	5.7	12.2	0.4
08/29/07 16:07:00	0.94	19.36	7.9	13.5	5.2	12.0	0.4
08/29/07 16:07:15	0.94	19.37	7.9	14.2	6.0	11.8	0.4
08/29/07 16:07:30	0.96	19.34	7.6	14.2	6.2	11.8	0.4
08/29/07 16:07:45	0.99	19.33	7.6	14.2	5.5	11.9	0.4
08/29/07 16:08:00	0.96	19.35	7.6	14.0	3.7	12.0	0.4
08/29/07 16:08:15	0.92	19.40	7.6	13.2	3.2	11.3	0.4
08/29/07 16:08:30	0.89	19.41	7.6	14.0	4.2	12.1	0.4
08/29/07 16:08:45	0.95	19.35	7.6	14.2	6.7	12.3	0.4
08/29/07 16:09:00	1.01	19.32	7.6	14.0	9.7	12.5	0.4
08/29/07 16:09:15	0.98	19.36	7.5	13.2	10.2	12.4	0.4
08/29/07 16:09:30	0.96	19.37	7.5	13.2	9.2	12.8	0.4
08/29/07 16:09:45	0.97	19.36	7.6	13.2	8.2	13.9	0.4
08/29/07 16:10:00	0.94	19.41	7.6	12.5	14.2	13.3	0.4
08/29/07 16:10:15	0.89	19.41	7.8	12.2	18.5	13.2	0.4
08/29/07 16:10:30	0.89	19.43	7.6	12.2	19.7	12.6	0.4
08/29/07 16:10:45	0.82	19.50	7.3	12.2	17.7	12.9	0.4
Resume M8-3/HCN-2							
08/29/07 16:11:00	0.79	19.62	7.3	11.5	13.2	12.7	0.4
08/29/07 16:11:15	0.77	19.54	7.3	11.2	11.5	13.3	0.4

Location Paulsboro, New Jersey
Source FCC FGS Stack
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08/29/07 16:11:30	0.78	19.53	7.3	12.0	10.7	13.7	0.4
08/29/07 16:11:45	0.79	19.50	7.3	12.2	11.2	13.8	0.4
08/29/07 16:12:00	0.83	19.46	7.3	12.2	9.7	13.5	0.4
08/29/07 16:12:15	0.83	19.51	7.3	11.7	10.7	12.4	0.4
08/29/07 16:12:30	0.79	19.51	7.0	12.0	16.2	12.6	0.4
08/29/07 16:12:45	0.83	19.45	7.0	12.2	23.5	12.4	0.4
08/29/07 16:13:00	0.85	19.46	7.0	12.2	20.7	12.6	0.4
08/29/07 16:13:15	0.79	19.51	7.0	11.7	18.5	12.6	0.4
08/29/07 16:13:30	0.73	19.67	7.1	11.2	23.2	12.8	0.4
08/29/07 16:13:45	0.68	19.61	7.3	11.2	29.0	12.9	0.4
08/29/07 16:14:00	0.64	19.66	7.3	10.6	80.7	13.4	0.4
08/29/07 16:14:15	0.61	19.66	7.3	10.2	106.2	13.8	0.4
08/29/07 16:14:30	0.62	19.66	7.3	10.0	82.7	14.5	0.4
08/29/07 16:14:45	0.59	19.69	7.3	9.7	58.7	14.7	0.4
08/29/07 16:15:00	0.60	19.66	7.3	10.2	29.7	14.7	0.4
08/29/07 16:15:15	0.63	19.66	7.3	10.2	16.2	14.6	0.4
08/29/07 16:15:30	0.64	19.62	7.3	11.2	18.2	14.3	0.4
08/29/07 16:15:45	0.74	19.51	7.3	12.7	19.6	15.3	0.4
08/29/07 16:16:00	0.81	19.48	7.3	12.4	13.7	15.4	0.4
08/29/07 16:16:15	0.75	19.55	7.3	12.2	12.2	15.2	0.4
08/29/07 16:16:30	0.76	19.50	7.3	13.0	18.7	14.8	0.4
08/29/07 16:16:45	0.80	19.49	7.5	12.2	25.0	14.6	0.4
08/29/07 16:17:00	0.77	19.54	7.8	12.0	30.7	14.0	0.4
08/29/07 16:17:15	0.71	19.60	7.6	11.2	32.2	14.3	0.4
08/29/07 16:17:30	0.66	19.62	7.6	11.2	25.2	14.6	0.4
08/29/07 16:17:45	0.66	19.63	7.6	11.2	17.0	13.7	0.4
08/29/07 16:18:00	0.64	19.62	7.4	11.5	8.2	13.7	0.4
08/29/07 16:18:15	0.70	19.66	7.4	12.2	5.5	13.4	0.4
08/29/07 16:18:30	0.78	19.61	7.3	13.2	5.2	13.2	0.4
08/29/07 16:18:45	0.87	19.48	7.3	13.7	5.2	11.4	0.4
08/29/07 16:19:00	0.94	19.49	7.3	14.2	4.2	12.6	0.4
08/29/07 16:19:15	0.94	19.53	7.6	14.2	4.2	12.7	0.4
08/29/07 16:19:30	0.94	19.56	7.6	14.2	4.2	12.8	0.4
08/29/07 16:19:45	0.92	19.62	7.6	13.7	4.2	12.7	0.4
08/29/07 16:20:00	0.87	19.66	7.9	14.2	2.7	12.5	0.4
08/29/07 16:20:15	0.91	19.62	7.7	14.7	2.2	12.3	0.4
08/29/07 16:20:30	1.00	19.55	7.6	15.5	1.2	12.1	0.4
08/29/07 16:20:45	1.11	19.45	7.6	16.7	1.2	12.5	0.4
08/29/07 16:21:00	1.20	19.41	7.4	17.2	2.2	12.8	0.4
08/29/07 16:21:15	1.21	19.45	7.3	17.2	3.0	13.0	0.4
08/29/07 16:21:30	1.15	19.51	7.3	16.0	2.7	12.6	0.4
08/29/07 16:21:45	1.05	19.61	7.3	15.2	2.2	12.1	0.4
08/29/07 16:22:00	0.99	19.62	7.3	15.2	1.7	11.9	0.4
08/29/07 16:22:15	1.03	19.58	7.3	15.2	1.2	11.7	0.4
08/29/07 16:22:30	1.07	19.53	7.3	16.2	1.7	11.5	0.4
08/29/07 16:22:45	1.10	19.51	7.3	16.2	3.0	11.6	0.4
08/29/07 16:23:00	1.11	19.50	7.3	16.2	4.2	11.9	0.4
08/29/07 16:23:15	1.09	19.53	7.3	15.7	4.3	12.2	0.4
08/29/07 16:23:30	1.03	19.59	7.3	14.2	4.2	12.0	0.4
08/29/07 16:23:45	0.98	19.62	7.1	14.2	3.5	11.8	0.4
08/29/07 16:24:00	0.88	19.59	7.0	14.5	2.2	11.3	0.4
08/29/07 16:24:15	1.03	19.53	7.0	15.2	2.2	11.3	0.4
08/29/07 16:24:30	1.08	19.50	7.0	16.0	2.2	11.2	0.4
08/29/07 16:24:45	1.05	19.54	7.0	15.2	1.5	11.0	0.4
08/29/07 16:25:00	1.02	19.53	7.0	15.5	1.2	11.0	0.4
08/29/07 16:25:15	1.06	19.45	7.0	16.2	1.2	11.4	0.4
08/29/07 16:25:30	1.15	19.38	7.0	17.2	1.2	11.1	0.4
08/29/07 16:25:45	1.20	19.34	7.0	17.2	0.5	11.6	0.4
End M8-3/HCN-2							
08/29/07 16:26:00	1.27	19.26	6.7	18.2	1.2	11.3	0.4
08/29/07 16:26:15	1.34	19.21	6.7	18.2	1.2	12.3	0.4
08/29/07 16:26:30	1.37	19.20	7.0	18.0	2.2	28.4	0.4
08/29/07 16:26:45	1.31	19.18	7.0	16.7	5.2	32.1	0.4
08/29/07 16:27:00	1.63	13.84	7.0	10.2	3.7	11.7	0.4
08/29/07 16:27:15	2.71	6.71	6.6	6.2	0.5	7.6	19.8
08/29/07 16:27:30	3.30	4.04	6.3	3.7	-0.8	6.7	20.9
08/29/07 16:27:45	4.43	4.63	5.9	1.7	-0.8	5.9	20.9
08/29/07 16:28:00	4.85	5.09	5.6	1.2	-0.8	5.3	20.9
08/29/07 16:28:15	4.89	5.18	5.2	1.2	-1.0	5.0	20.9
08/29/07 16:28:30	4.90	5.14	4.8	1.2	-1.8	4.8	20.9
08/29/07 16:28:45	4.91	5.08	4.5	1.2	-1.5	4.6	20.9
Post-Test Bias and Drift Check:							
08/29/07 16:29:00	4.92	5.02	4.2	1.0	-0.8	4.2	20.9
08/29/07 16:29:15	4.92	4.98	4.0	0.2	-0.8	4.0	20.9
08/29/07 16:29:30	4.93	4.95	3.7	0.2	-0.8	4.1	20.9
08/29/07 16:29:45	4.93	4.94	3.5	0.2	-1.0	4.3	20.9
5.0% Oxygen injection: 4.92 % db Oxygen							
08/29/07 16:30:00	4.94	4.92	3.3	0.2	-1.8	4.0	20.9
08/29/07 16:30:15	4.94	4.91	3.0	0.2	-1.0	3.9	0.6
08/29/07 16:30:30	4.94	4.90	3.0	0.2	-0.8	3.8	0.4
08/29/07 16:30:45	4.94	4.89	2.7	0.2	-0.8	4.1	0.4
08/29/07 16:31:00	4.95	4.89	2.5	0.2	-0.8	3.9	0.4
08/29/07 16:31:15	4.95	4.98	2.4	0.7	-1.8	3.9	0.4
08/29/07 16:31:30	4.90	5.27	2.4	1.0	-2.8	3.5	0.4
08/29/07 16:31:45	7.27	9.67	2.4	0.2	-2.8	3.7	0.4
08/29/07 16:32:00	13.99	15.74	2.4	0.2	-2.8	4.3	0.4
08/29/07 16:32:15	19.00	19.50	2.1	0.2	-2.8	3.9	0.4
08/29/07 16:32:30	21.49	21.45	2.1	0.2	-2.8	3.8	0.4
08/29/07 16:32:45	22.21	21.98	2.1	0.2	-2.8	3.8	0.4
08/29/07 16:33:00	22.32	22.13	2.0	0.2	-2.8	3.8	0.4
08/29/07 16:33:15	22.34	22.20	1.8	0.2	-2.8	3.6	0.4
08/29/07 16:33:30	22.36	22.24	1.8	0.2	-2.8	3.4	0.4
08/29/07 16:33:45	22.36	22.28	1.8	0.2	-2.8	3.4	0.4
08/29/07 16:34:00	22.37	22.30	1.8	0.2	-2.8	3.3	0.4
08/29/07 16:34:15	22.38	22.32	1.8	0.2	-2.8	3.4	0.4
08/29/07 16:34:30	22.38	22.34	1.8	0.2	-2.8	3.4	0.4
Post-Test Bias and Drift Check:							
08/29/07 16:34:45	22.38	22.35	1.8	0.2	-2.8	3.0	0.4
08/29/07 16:35:00	22.39	22.36	1.8	0.2	-2.3	4.1	0.4
08/29/07 16:35:15	22.39	22.37	1.7	0.2	-1.8	4.0	0.4
08/29/07 16:35:30	22.28	22.30	1.7	1.0	-2.3	5.1	0.4
22.34 % db CO2							
08/29/07 16:35:45	19.77	21.80	1.8	3.2	-1.8	4.8	0.4
08/29/07 16:38:00	17.25	16.51	5.1	1.2	-0.8	4.3	0.4

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08/29/07 16:36:15	10.79	8.58	25.9	1.2	-0.8	4.3	0.4
08/29/07 16:36:30	4.64	3.89	72.4	1.5	-0.8	6.1	0.4
08/29/07 16:36:45	1.41	3.18	102.9	3.0	-0.8	13.2	0.4
08/29/07 16:37:00	0.53	2.37	113.6	2.0	-0.8	4.9	0.4
08/29/07 16:37:15	0.37	0.80	85.5	1.2	0.0	4.3	0.4
08/29/07 16:37:30	0.46	0.57	56.1	0.2	0.2	3.8	0.4
08/29/07 16:37:45	0.35	0.47	41.6	0.2	-0.5	3.7	0.4
Post-Test Bias and Drift Check:							
08/29/07 16:38:00	0.22	0.39	34.4	0.2	-0.8	3.7	0.4
08/29/07 16:38:15	0.18	0.35	30.1	0.2	-0.8	4.1	0.4
08/29/07 16:38:30	0.16	0.32	27.1	0.2	-0.3	4.5	0.4
08/29/07 16:38:45	0.15	0.30	25.1	0.2	0.2	3.8	0.4
Zero NOx/CO injection: 0.23 ppmv db NOx -0.40 ppmv db CO							
08/29/07 16:39:00	0.14	0.27	23.7	0.2	0.2	3.7	0.4
08/29/07 16:39:15	0.14	0.25	22.5	0.2	0.0	3.3	0.4
08/29/07 16:39:30	0.13	0.24	21.7	0.2	-0.8	3.4	0.4
08/29/07 16:39:45	0.13	0.23	21.1	0.2	-0.5	3.3	0.4
08/29/07 16:40:00	0.13	0.22	20.6	0.2	0.2	3.3	0.4
08/29/07 16:40:15	0.12	0.21	20.2	0.2	0.2	3.3	0.4
08/29/07 16:40:30	0.12	0.20	19.8	0.2	0.2	3.4	0.4
08/29/07 16:40:45	0.12	0.19	19.7	0.2	0.0	3.3	0.4
08/29/07 16:41:00	0.12	0.18	19.5	0.2	-0.8	3.7	0.4
Post-Test Bias and Drift Check:							
08/29/07 16:41:15	0.12	0.18	19.5	0.2	-0.8	3.6	0.4
08/29/07 16:41:30	0.11	0.18	19.2	0.2	-0.3	3.6	0.4
08/29/07 16:41:45	0.11	0.18	19.2	0.2	0.2	3.3	0.4
08/29/07 16:42:00	0.12	0.17	19.2	0.2	0.2	3.5	0.4
20 ppm SO2 injection: 19.30 ppmv db SO2							
08/29/07 16:42:15	0.11	0.16	19.2	0.2	0.0	3.4	0.4
08/29/07 16:42:30	0.10	0.16	19.2	0.2	-0.8	3.3	0.4
Post-Test Bias and Drift Check:							
08/29/07 16:42:45	0.11	0.16	19.2	0.2	-0.8	3.3	0.4
08/29/07 16:43:00	0.11	0.15	19.2	0.2	-0.8	3.2	0.4
08/29/07 16:43:15	0.11	0.15	19.2	0.2	0.5	3.2	0.4
08/29/07 16:43:30	0.11	0.15	19.2	0.2	2.7	4.5	0.4
Zero Oxygen/CO2 injection: 0.11 % db Oxygen 0.15 % db CO2							
08/29/07 16:43:45	0.11	1.18	20.5	1.7	9.0	6.9	0.4
08/29/07 16:44:00	0.31	8.35	22.4	6.0	12.7	9.3	0.4
08/29/07 16:44:15	0.57	14.43	22.7	9.7	16.2	10.6	0.4
08/29/07 16:44:30	0.74	17.89	20.7	11.2	15.7	12.0	0.4
08/29/07 16:44:45	0.84	19.11	17.9	12.0	11.5	12.4	0.4
08/29/07 16:45:00	0.85	19.32	15.7	11.5	8.2	13.1	0.4
08/29/07 16:45:15	0.86	19.36	13.9	12.2	5.0	13.0	0.4
08/29/07 16:45:30	0.92	19.35	12.6	13.2	3.7	13.2	0.4
08/29/07 16:45:45	0.96	19.34	11.6	13.2	3.2	13.1	0.4
08/29/07 16:46:00	1.02	19.30	10.7	14.7	3.7	13.1	0.4
08/29/07 16:46:15	1.10	19.24	10.0	15.2	3.2	13.2	0.4
08/29/07 16:46:30	1.17	19.22	9.5	15.2	2.7	13.1	0.4
08/29/07 16:46:45	1.18	19.24	9.1	15.2	2.2	13.6	0.4
08/29/07 16:47:00	1.16	19.26	8.7	15.2	1.7	13.4	0.4
08/29/07 16:47:15	1.15	19.26	8.5	15.2	1.2	13.2	0.4
08/29/07 16:47:30	1.19	19.22	8.2	16.7	1.2	13.2	0.4
08/29/07 16:47:45	1.26	19.18	8.2	17.2	2.2	13.0	0.4
08/29/07 16:48:00	1.27	19.20	7.9	16.2	2.2	13.1	0.4
08/29/07 16:48:15	1.24	19.25	7.9	16.2	2.2	12.8	0.4
08/29/07 16:48:30	1.18	19.31	7.8	15.2	2.2	13.3	0.4
08/29/07 16:48:45	1.18	19.27	7.9	16.0	1.2	13.3	0.4
08/29/07 16:49:00	1.22	19.24	7.9	16.2	1.2	12.8	0.4
08/29/07 16:49:15	1.23	19.27	8.2	16.2	1.2	12.4	0.4
08/29/07 16:49:30	1.22	19.29	8.5	16.2	1.2	12.4	0.4
08/29/07 16:49:45	1.18	19.33	8.5	16.2	1.2	12.3	0.4
08/29/07 16:50:00	1.20	19.28	8.5	16.7	1.7	12.3	0.4
08/29/07 16:50:15	1.27	19.22	8.5	17.2	2.2	12.7	0.4
08/29/07 16:50:30	1.31	19.21	8.2	16.7	2.2	12.5	0.4
08/29/07 16:50:45	1.25	19.30	8.0	15.5	2.2	12.6	0.4
08/29/07 16:51:00	1.15	19.37	7.9	15.2	2.2	13.0	0.4
08/29/07 16:51:15	1.11	19.39	7.9	15.2	2.2	12.3	0.4
08/29/07 16:51:30	1.11	19.39	7.9	15.2	1.7	12.1	0.4
08/29/07 16:51:45	1.12	19.37	7.9	16.0	1.2	12.1	0.4
08/29/07 16:52:00	1.19	19.30	7.9	16.7	1.2	11.9	0.4
08/29/07 16:52:15	1.24	19.25	7.9	17.2	1.2	12.0	0.4
08/29/07 16:52:30	1.29	19.22	7.9	17.2	1.7	11.8	0.4
08/29/07 16:52:45	1.29	19.24	7.9	17.2	3.5	11.9	0.4
08/29/07 16:53:00	1.23	19.30	7.9	16.2	3.7	12.3	0.4
08/29/07 16:53:15	1.17	19.36	7.7	15.5	3.0	12.3	0.4
08/29/07 16:53:30	1.11	19.40	7.6	15.2	2.2	12.5	0.4
08/29/07 16:53:45	1.12	19.34	7.6	16.0	2.2	12.8	0.4
08/29/07 16:54:00	1.19	19.33	7.6	15.7	2.2	12.8	0.4
08/29/07 16:54:15	1.16	19.36	7.6	16.0	2.2	12.6	0.4
08/29/07 16:54:30	1.17	19.32	7.4	16.2	2.2	12.4	0.4
08/29/07 16:54:45	1.19	19.33	7.3	16.2	2.2	13.7	0.4
08/29/07 16:55:00	1.18	19.33	7.3	16.2	1.7	13.1	0.4
08/29/07 16:55:15	1.18	19.32	7.3	16.2	1.2	12.3	0.4
08/29/07 16:55:30	1.24	19.24	7.3	17.2	1.2	11.9	0.4
08/29/07 16:55:45	1.34	19.18	7.0	17.2	1.2	12.2	0.4
08/29/07 16:56:00	1.33	19.20	7.0	17.2	1.2	12.3	0.4
08/29/07 16:56:15	1.31	19.22	7.3	17.2	1.2	12.0	0.4
08/29/07 16:56:30	1.29	19.21	7.3	16.7	1.2	12.3	0.4
08/29/07 16:56:45	1.34	19.16	7.3	17.2	1.2	12.3	0.4
08/29/07 16:57:00	1.39	19.13	7.3	16.7	1.2	12.2	0.4
08/29/07 16:57:15	1.40	19.14	7.0	16.2	1.2	12.5	0.4
08/29/07 16:57:30	1.36	19.17	7.0	16.2	1.2	12.1	0.4
08/29/07 16:57:45	1.34	19.18	7.0	15.5	2.2	12.2	0.4
08/29/07 16:58:00	1.33	19.18	7.0	15.2	2.7	11.5	0.4
08/29/07 16:58:15	1.32	19.20	7.0	15.2	3.2	11.5	0.4
08/29/07 16:58:30	1.27	19.26	7.0	14.7	3.2	11.6	0.4
08/29/07 16:58:45	1.18	19.33	7.0	14.2	3.2	11.7	0.4
08/29/07 16:59:00	1.14	19.35	7.0	14.2	3.7	11.8	0.4
08/29/07 16:59:15	1.11	19.38	6.8	14.2	9.0	12.1	0.4
08/29/07 16:59:30	1.09	19.38	6.7	14.2	11.2	11.9	0.4
08/29/07 16:59:45	1.13	19.36	6.7	14.2	7.7	12.5	0.4
08/29/07 17:00:00	1.08	19.43	6.7	13.2	6.7	12.1	0.4
08/29/07 17:00:15	1.04	19.41	6.7	14.0	9.5	12.3	0.4
08/29/07 17:00:30	1.10	19.38	6.7	13.7	9.7	12.8	0.4
08/29/07 17:00:45	1.04	19.48	6.5	13.2	8.0	13.0	0.4

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08/29/07 17:01:00	0.93	19.55	6.4	12.2	7.2	13.1	0.4	
08/29/07 17:01:15	0.92	19.54	6.4	13.0	6.0	12.9	0.4	
08/29/07 17:01:30	0.95	19.50	6.4	13.2	4.7	13.0	0.4	
CH4 GC post-test calibration:								
08/29/07 17:01:45	0.98	19.47	6.4	13.2	3.2	12.9	0.4	Zero nitrogen injection #1: 0.39 ppmv CH4
08/29/07 17:02:00	1.02	19.44	6.4	14.2	3.2	12.8	0.4	
08/29/07 17:02:15	1.07	19.40	6.3	15.0	3.2	12.9	0.4	
08/29/07 17:02:30	1.14	19.35	6.2	15.2	3.2	13.2	0.4	
08/29/07 17:02:45	1.13	19.38	6.1	14.5	3.2	14.6	0.4	
08/29/07 17:03:00	1.08	19.43	6.1	14.2	2.5	14.5	0.4	
08/29/07 17:03:15	1.05	19.45	6.3	14.2	2.2	13.6	0.4	
08/29/07 17:03:30	1.05	19.44	6.2	14.7	3.0	12.9	0.4	
08/29/07 17:03:45	1.08	19.41	6.1	15.2	4.5	13.6	0.4	
08/29/07 17:04:00	1.09	19.45	6.1	14.7	4.5	13.3	0.4	
08/29/07 17:04:15	1.01	19.54	6.1	14.2	3.0	13.1	0.4	
08/29/07 17:04:30	0.96	19.55	6.2	14.2	2.2	13.0	0.4	
CH4 GC post-test calibration:								
08/29/07 17:04:45	1.02	19.45	6.3	15.0	1.2	12.8	0.4	Zero nitrogen injection #2: 0.39 ppmv CH4
08/29/07 17:05:00	1.12	19.40	6.1	16.2	0.5	12.0	0.4	
08/29/07 17:05:15	1.13	19.32	6.1	16.0	0.5	12.2	0.4	
08/29/07 17:05:30	1.16	15.65	6.2	12.2	1.2	10.3	0.4	
08/29/07 17:05:45	1.13	8.22	6.6	6.7	0.2	8.7	0.4	
08/29/07 17:06:00	0.93	3.32	7.6	16.2	0.2	7.2	0.4	
08/29/07 17:06:15	0.47	0.90	8.7	72.0	0.0	6.2	0.4	
08/29/07 17:06:30	0.20	0.47	8.6	115.3	-0.8	5.4	0.4	
08/29/07 17:06:45	0.12	0.39	7.9	131.8	-0.8	5.1	0.4	
08/29/07 17:07:00	0.10	0.34	7.0	160.0	0.0	4.8	0.4	
08/29/07 17:07:15	0.10	0.31	6.3	163.3	-0.5	4.5	0.4	
08/29/07 17:07:30	0.10	0.28	5.5	165.3	0.2	4.4	0.4	
CH4 GC post-test calibration:								
08/29/07 17:07:45	0.10	0.26	5.0	166.8	0.2	4.5	0.4	Zero nitrogen injection #3: 0.39 ppmv CH4
08/29/07 17:08:00	0.10	0.25	4.5	156.5	-0.5	4.8	0.4	
08/29/07 17:08:15	0.10	0.24	4.0	85.7	0.0	4.7	0.4	
08/29/07 17:08:30	0.09	0.22	3.6	27.0	0.0	4.9	0.4	
08/29/07 17:08:45	0.09	0.21	3.3	18.2	0.2	4.6	0.4	
08/29/07 17:09:00	0.10	0.49	3.0	19.0	0.2	4.4	0.4	
08/29/07 17:09:15	0.11	0.54	2.7	18.7	0.2	4.0	0.4	
Post-Test Bias and Drift Check:								
08/29/07 17:09:30	0.10	0.25	2.6	18.2	-0.5	4.0	0.4	20 ppm NOx injection: 18.24 ppmv db NOx
08/29/07 17:09:45	0.10	0.20	2.5	18.2	-0.8	4.0	0.4	
08/29/07 17:10:00	0.10	0.18	2.7	18.2	-0.8	3.8	0.4	
08/29/07 17:10:15	0.09	0.17	2.7	18.2	-0.5	2.2	0.4	
08/29/07 17:10:30	0.09	0.16	2.6	18.2	0.2	0.5	0.4	
Post-Test Bias and Drift Check:								
08/29/07 17:10:45	0.09	0.16	2.4	18.2	0.2	0.5	0.4	Zero nitrogen injection: 0.45 ppmv CH4
08/29/07 17:11:00	0.09	0.15	2.2	18.0	0.2	0.4	0.4	
08/29/07 17:11:15	0.09	0.15	2.1	17.2	-0.8	0.4	0.4	
08/29/07 17:11:30	0.09	0.15	1.9	17.2	-0.8	0.5	0.4	
08/29/07 17:11:45	0.09	0.14	1.8	17.2	-0.8	0.5	0.4	
08/29/07 17:12:00	0.09	0.14	1.8	18.2	0.0	0.5	0.4	
08/29/07 17:12:15	0.09	0.13	1.5	18.0	0.2	0.6	0.4	
08/29/07 17:12:30	0.09	0.13	1.4	17.2	0.2	0.4	0.4	
08/29/07 17:12:45	0.09	0.13	1.3	17.2	-0.8	0.5	0.4	
08/29/07 17:13:00	0.09	0.13	1.2	17.2	-0.8	0.4	0.4	
08/29/07 17:13:15	0.10	0.96	1.2	18.0	-0.8	0.4	0.4	
08/29/07 17:13:30	0.18	1.71	1.2	18.2	-0.8	0.5	0.4	
08/29/07 17:13:45	0.13	0.48	1.2	18.2	1.0	0.5	0.4	
08/29/07 17:14:00	0.10	0.17	1.1	17.7	7.7	0.5	0.4	
08/29/07 17:14:15	0.10	0.14	1.1	14.7	14.7	0.4	0.4	
08/29/07 17:14:30	0.10	0.14	0.9	8.7	17.7	0.5	0.4	
08/29/07 17:14:45	0.10	0.12	0.9	3.7	18.2	0.4	0.4	
08/29/07 17:15:00	0.10	0.12	0.9	1.7	18.2	0.4	0.4	
08/29/07 17:15:15	0.10	0.11	0.9	1.2	18.2	0.4	0.4	
08/29/07 17:15:30	0.10	0.12	0.9	1.2	18.2	0.4	0.4	
Post-Test Bias and Drift Check:								
08/29/07 17:15:45	0.10	0.12	0.9	1.2	19.0	0.4	0.4	20 ppm CO injection: 18.80 ppmv db CO
08/29/07 17:16:00	0.10	0.12	0.9	1.2	16.2	0.4	0.4	
08/29/07 17:16:15	0.10	0.11	0.9	1.2	19.0	0.4	0.4	
08/29/07 17:16:30	0.10	0.11	0.9	1.2	19.0	0.5	0.4	
08/29/07 17:16:45	0.10	0.11	0.9	1.2	18.2	0.4	0.4	
08/29/07 17:17:00	0.09	0.13	0.9	1.2	18.2	0.4	0.4	
Post-Test Bias and Drift Check:								
08/29/07 17:17:15	0.11	0.91	0.7	1.7	17.7	2.4	0.4	Zero ppm SO2 injection: 0.79 ppmv db SO2
08/29/07 17:17:30	0.13	0.67	0.8	1.2	11.7	0.4	0.4	
08/29/07 17:17:45	0.11	0.21	0.9	1.5	3.7	0.5	0.4	
08/29/07 17:18:00	0.19	0.16	0.7	1.7	1.5	0.4	0.4	
08/29/07 17:18:15	0.43	0.13	0.9	1.2	0.2	0.4	23.9	
08/29/07 17:18:30	0.56	0.12	0.9	1.2	0.2	2.4	23.9	
08/29/07 17:18:45	0.60	0.11	0.9	0.2	0.2	19.2	23.9	
Post-Test Bias and Drift Check:								
08/29/07 17:19:00	0.61	0.11	0.9	0.2	0.2	25.0	23.9	25 ppm CH4 injection: 25.02 ppmv CH4
08/29/07 17:19:15	0.61	0.11	0.9	0.2	0.2	25.4	23.9	
08/29/07 17:19:30	0.62	0.10	0.9	0.2	0.2	24.9	23.9	
08/29/07 17:19:45	0.62	0.10	0.8	0.2	0.2	24.8	23.9	
08/29/07 17:20:00	0.62	0.10	0.7	0.2	0.2	23.6	23.9	
CH4 GC post-test calibration:								
08/29/07 17:20:15	0.62	0.10	0.8	0.2	0.2	23.0	23.9	25 ppm CH4 injection #1: 23.87 ppmv CH4
08/29/07 17:20:30	0.63	0.10	0.7	0.2	-0.5	22.9	23.9	
08/29/07 17:20:45	0.63	0.09	0.6	0.2	-0.3	26.2	23.9	
08/29/07 17:21:00	0.63	0.10	0.6	0.2	0.2	26.0	23.9	
08/29/07 17:21:15	0.63	0.10	0.9	0.2	0.2	26.0	24.9	
08/29/07 17:21:30	0.63	0.10	0.8	0.2	0.2	25.5	24.9	
08/29/07 17:21:45	0.63	0.09	0.7	0.2	0.2	25.0	24.9	
08/29/07 17:22:00	0.63	0.09	0.9	0.2	-0.5	24.9	24.9	
CH4 GC post-test calibration:								
08/29/07 17:22:15	0.63	0.09	0.6	0.2	-0.8	23.0	24.9	25 ppm CH4 injection #2: 24.87 ppmv CH4
08/29/07 17:22:30	0.63	0.09	0.6	0.2	-0.6	3.7	24.9	
08/29/07 17:22:45	0.63	0.72	0.6	1.5	0.7	4.2	24.9	
08/29/07 17:23:00	0.75	7.48	0.8	7.2	1.2	6.1	24.9	
08/29/07 17:23:15	1.31	18.97	2.1	16.0	2.2	9.4	15.8	
08/29/07 17:23:30	1.23	19.13	2.5	15.2	2.2	9.4	0.4	
08/29/07 17:23:45	1.11	19.27	2.8	14.5	2.2	9.5	0.4	
08/29/07 17:24:00	1.06	19.30	3.3	14.7	1.5	9.6	0.4	
08/29/07 17:24:15	1.12	19.27	3.6	15.5	1.2	9.8	0.4	
08/29/07 17:24:30	1.17	19.22	3.8	16.7	1.2	10.2	0.4	
08/29/07 17:24:45	1.27	19.13	4.0	17.2	1.2	10.1	0.4	
08/29/07 17:25:00	1.32	19.12	4.1	17.7	1.2	10.1	0.4	
08/29/07 17:25:15	1.36	19.07	4.3	18.5	1.2	10.1	0.4	

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08/29/07 17:25:30	1.44	19.02	4.6	18.7	1.2	10.5	0.4
08/29/07 17:25:45	1.42	19.12	4.7	17.2	0.7	22.4	0.4
08/29/07 17:26:00	1.27	19.27	4.9	16.2	-0.8	31.5	0.4
08/29/07 17:26:15	1.14	15.93	5.1	12.2	-0.8	27.1	5.1
08/29/07 17:26:30	0.99	7.95	4.9	6.7	0.0	27.0	24.4
08/29/07 17:26:45	0.82	3.02	4.8	3.2	0.2	28.3	24.4
08/29/07 17:27:00	0.68	0.73	4.8	1.2	0.2	26.1	24.4
08/29/07 17:27:15	0.62	0.40	4.3	1.2	-0.8	25.6	24.4
08/29/07 17:29:30	0.62	0.32					
08/29/07 17:29:45	0.62	0.28					
08/29/07 17:30:00	0.62	0.25					
08/29/07 17:30:15	0.62	0.23					
08/29/07 17:30:30	0.62	0.21					
08/29/07 17:30:45	0.62	0.19					
08/29/07 17:31:00	0.62	0.18					
08/29/07 17:31:15	0.63	2.29					
08/29/07 17:31:30	0.78	9.79					
08/29/07 17:31:45	0.94	15.35					
08/29/07 17:32:00	1.13	19.23					
08/29/07 17:32:15	1.14	19.24					
08/29/07 17:32:30	1.18	19.25					
08/29/07 17:32:45	1.14	19.32					
08/29/07 17:33:00	1.14	19.29					
08/29/07 17:33:15	1.26	19.21					
08/29/07 17:33:30	1.25	19.27					
08/29/07 17:33:45	1.19	19.30					
08/29/07 17:34:00	1.22	19.27					
08/29/07 17:34:15	1.22	19.31					
08/29/07 17:34:30	1.17	19.40					
08/29/07 17:34:45	1.08	19.48					
08/29/07 17:35:00	1.12	19.09					
08/29/07 17:35:15	3.44	15.37					
08/29/07 17:35:30	6.99	12.23					
08/29/07 17:35:45	8.81	12.59					
08/29/07 17:36:00	5.45	16.88					
08/29/07 17:36:15	2.34	18.84					
08/29/07 17:36:30	1.43	19.22					
08/29/07 17:36:45	1.26	19.31					
08/29/07 17:37:00	1.26	19.29					
08/29/07 17:37:15	1.27	19.30					
08/29/07 17:37:30	1.24	19.34					
08/29/07 17:37:45	1.19	19.40					
08/29/07 17:38:00	1.18	19.39					
08/29/07 17:38:15	1.22	19.35					
08/29/07 17:38:30	1.24	19.33					
08/29/07 17:38:45	1.29	19.27					
08/29/07 17:39:00	1.35	19.28					
08/29/07 17:39:15	1.30	19.32					
08/29/07 17:39:30	1.25	19.35					
08/29/07 17:39:45	1.28	19.27					
08/29/07 17:40:00	1.42	19.14					
08/29/07 17:40:15	1.48	19.14					
08/29/07 17:40:30	1.42	19.21					
08/29/07 17:40:45	1.40	19.19					
08/29/07 17:41:00	1.47	19.13					
08/29/07 17:41:15	1.51	19.11					
08/29/07 17:41:30	1.50	19.11					
08/29/07 17:41:45	1.47	19.14					
08/29/07 17:42:00	1.44	19.15					
08/29/07 17:42:15	1.44	19.15					
08/29/07 17:42:30	1.43	19.15					
08/29/07 17:42:45	1.44	19.13					
08/29/07 17:43:00	1.48	19.11					
08/29/07 17:43:15	1.49	19.11					
08/29/07 17:43:30	1.42	19.18					
08/29/07 17:43:45	1.36	19.21	begin HCN-3/M29-1				
08/29/07 17:44:00	1.38	19.18					
08/29/07 17:44:15	1.37	19.23					
08/29/07 17:44:30	1.28	19.31					
08/29/07 17:44:45	1.36	19.17					
08/29/07 17:45:00	1.43	19.19					
08/29/07 17:45:15	1.31	19.31					
08/29/07 17:45:30	1.22	19.35					
08/29/07 17:45:45	1.19	19.38	HCN train stopped: filter plugged				
08/29/07 17:46:00	1.12	19.44					
08/29/07 17:46:15	1.09	19.46					
08/29/07 17:46:30	1.12	19.42					
08/29/07 17:46:45	1.16	19.39					
08/29/07 17:47:00	1.15	19.42					
08/29/07 17:47:15	1.08	19.47					
08/29/07 17:47:30	1.05	19.49					
08/29/07 17:47:45	1.03	19.51					
08/29/07 17:48:00	1.02	19.54					
08/29/07 17:48:15	1.01	19.54					
08/29/07 17:48:30	1.08	19.44					
08/29/07 17:48:45	1.11	19.44					
08/29/07 17:49:00	1.07	19.47					
08/29/07 17:49:15	1.02	19.54					
08/29/07 17:49:30	0.93	19.61					
08/29/07 17:49:45	0.90	19.61					
08/29/07 17:50:00	0.99	19.52					
08/29/07 17:50:15	1.04	19.52					
08/29/07 17:50:30	1.02	19.52					
08/29/07 17:50:45	1.05	19.48					
08/29/07 17:51:00	1.07	19.49					
08/29/07 17:51:15	1.00	19.57					
08/29/07 17:51:30	0.90	19.65					
08/29/07 17:51:45	0.86	19.66					
08/29/07 17:52:00	0.90	19.63					

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08/29/07 17:52:15	0.96	19.59
08/29/07 17:52:30	0.94	19.60
08/29/07 17:52:45	0.92	19.63
08/29/07 17:53:00	0.94	19.57
08/29/07 17:53:15	1.00	19.55
08/29/07 17:53:30	0.99	19.56
08/29/07 17:53:45	1.06	19.46
08/29/07 17:54:00	1.12	19.44
08/29/07 17:54:15	1.10	19.46
08/29/07 17:54:30	1.11	19.46
08/29/07 17:54:45	1.10	19.47
08/29/07 17:55:00	1.08	19.46
08/29/07 17:55:15	1.13	19.40
08/29/07 17:55:30	1.20	19.36
08/29/07 17:55:45	1.22	19.35
08/29/07 17:56:00	1.23	19.33
08/29/07 17:56:15	1.26	19.31
08/29/07 17:56:30	1.27	19.32
08/29/07 17:56:45	1.26	19.32
08/29/07 17:57:00	1.21	19.36
08/29/07 17:57:15	1.18	19.38
08/29/07 17:57:30	1.21	19.36
08/29/07 17:57:45	1.21	19.33
08/29/07 17:58:00	1.24	19.30
08/29/07 17:58:15	1.27	19.27
08/29/07 17:58:30	1.28	19.28
08/29/07 17:58:45	1.24	19.34
08/29/07 17:59:00	1.14	19.45
08/29/07 17:59:15	1.04	19.52
08/29/07 17:59:30	0.99	19.53
08/29/07 17:59:45	0.97	19.55
08/29/07 18:00:00	0.97	19.54
08/29/07 18:00:15	1.01	19.49
08/29/07 18:00:30	1.03	19.50
08/29/07 18:00:45	0.97	19.58
08/29/07 18:01:00	0.89	19.61
08/29/07 18:01:15	0.93	19.64
08/29/07 18:01:30	0.98	19.62
08/29/07 18:01:45	0.96	19.64
HCN train resumes sampling		
08/29/07 18:02:00	0.99	19.50
08/29/07 18:02:15	1.06	19.43
08/29/07 18:02:30	1.10	19.40
08/29/07 18:02:45	1.15	19.35
08/29/07 18:03:00	1.21	19.29
HCN train stop sampling		
08/29/07 18:03:15	1.23	19.33
08/29/07 18:03:30	1.17	19.39
08/29/07 18:03:45	1.14	19.39
08/29/07 18:04:00	1.12	19.41
08/29/07 18:04:15	1.10	19.39
08/29/07 18:04:30	1.14	19.37
08/29/07 18:04:45	1.15	19.36
08/29/07 18:05:00	1.20	19.28
08/29/07 18:05:15	1.31	19.21
08/29/07 18:05:30	1.30	19.27
08/29/07 18:05:45	1.21	19.34
08/29/07 18:06:00	1.18	19.33
08/29/07 18:06:15	1.23	19.27
08/29/07 18:06:30	1.28	19.24
08/29/07 18:06:45	1.26	19.28
08/29/07 18:07:00	1.23	19.30
08/29/07 18:07:15	1.27	19.22
08/29/07 18:07:30	1.37	19.16
08/29/07 18:07:45	1.33	19.24
08/29/07 18:08:00	1.26	19.28
08/29/07 18:08:15	1.26	19.25
08/29/07 18:08:30	1.29	19.24
08/29/07 18:08:45	1.29	19.24
08/29/07 18:09:00	1.32	19.22
08/29/07 18:09:15	1.28	19.27
08/29/07 18:09:30	1.20	19.33
08/29/07 18:09:45	1.18	19.33
08/29/07 18:10:00	1.18	19.34
08/29/07 18:10:15	1.08	19.45
08/29/07 18:10:30	0.99	19.60
08/29/07 18:10:45	0.96	19.62
08/29/07 18:11:00	0.98	19.63
08/29/07 18:11:15	0.94	19.63
08/29/07 18:11:30	0.98	19.49
08/29/07 18:11:45	1.03	19.46
08/29/07 18:12:00	1.07	19.43
08/29/07 18:12:15	1.07	19.46
08/29/07 18:12:30	1.04	19.47
08/29/07 18:12:45	1.09	19.40
08/29/07 18:13:00	1.16	19.36
08/29/07 18:13:15	1.13	19.41
08/29/07 18:13:30	1.05	19.49
08/29/07 18:13:45	0.98	19.53
08/29/07 18:14:00	0.94	19.66
08/29/07 18:14:15	0.91	19.60
08/29/07 18:14:30	0.87	19.63
08/29/07 18:14:45	0.85	19.63
08/29/07 18:15:00	0.89	19.58
08/29/07 18:15:15	0.93	19.55
08/29/07 18:15:30	0.92	19.57
08/29/07 18:15:45	0.89	19.58
08/29/07 18:16:00	0.91	19.67
08/29/07 18:16:15	0.92	19.56
08/29/07 18:16:30	0.99	19.48
08/29/07 18:16:45	1.01	19.61

Location Paulsboro, New Jersey
Source FCC FGS Stack
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08/29/07 18:17:00	0.93	19.57
08/29/07 18:17:15	0.95	19.53
08/29/07 18:17:30	1.01	19.48
08/29/07 18:17:45	1.03	19.47
08/29/07 18:18:00	1.03	19.47
08/29/07 18:18:15	1.05	19.43
08/29/07 18:18:30	1.13	19.35
08/29/07 18:18:45	1.17	19.34
08/29/07 18:19:00	1.16	19.38
08/29/07 18:19:15	1.12	19.43
08/29/07 18:19:30	1.06	19.46
08/29/07 18:19:45	1.09	19.40
08/29/07 18:20:00	1.18	19.34
08/29/07 18:20:15	1.21	19.35
08/29/07 18:20:30	1.14	19.40
08/29/07 18:20:45	1.11	19.37
08/29/07 18:21:00	1.19	19.30
08/29/07 18:21:15	1.21	19.32
08/29/07 18:21:30	1.19	19.32
08/29/07 18:21:45	1.21	19.30
08/29/07 18:22:00	1.27	19.26
08/29/07 18:22:15	1.27	19.26
08/29/07 18:22:30	1.24	19.28
08/29/07 18:22:45	1.24	19.27
08/29/07 18:23:00	1.22	19.31
08/29/07 18:23:15	1.14	19.20
08/29/07 18:23:30	1.32	19.32
08/29/07 18:23:45	1.15	19.36
08/29/07 18:24:00	1.11	19.40
08/29/07 18:24:15	1.11	19.37
08/29/07 18:24:30	1.16	19.36
08/29/07 18:24:45	1.11	19.40
08/29/07 18:25:00	1.09	19.39
08/29/07 18:25:15	1.13	19.36
08/29/07 18:25:30	1.10	19.41
08/29/07 18:25:45	1.06	19.43
08/29/07 18:26:00	1.05	19.46
08/29/07 18:26:15	1.04	19.47
08/29/07 18:26:30	1.04	19.46
08/29/07 18:26:45	1.09	19.40
08/29/07 18:27:00	1.13	19.36
08/29/07 18:27:15	1.18	19.31
08/29/07 18:27:30	1.21	19.27
08/29/07 18:27:45	1.26	19.23
08/29/07 18:28:00	1.27	19.27
08/29/07 18:28:15	1.18	19.35
08/29/07 18:28:30	1.11	19.39
08/29/07 18:28:45	1.12	19.36
08/29/07 18:29:00	1.14	19.37
08/29/07 18:29:15	1.10	19.42
08/29/07 18:29:30	1.09	19.38
08/29/07 18:29:45	1.18	19.29
08/29/07 18:30:00	1.25	19.27
08/29/07 18:30:15	1.21	19.34
08/29/07 18:30:30	1.13	19.40
08/29/07 18:30:45	1.08	19.43
08/29/07 18:31:00	1.07	19.42
08/29/07 18:31:15	1.11	19.37
08/29/07 18:31:30	1.16	19.34
08/29/07 18:31:45	1.14	19.37
08/29/07 18:32:00	1.09	19.41
08/29/07 18:32:15	1.08	19.40
08/29/07 18:32:30	1.10	19.40
08/29/07 18:32:45	1.10	19.42
08/29/07 18:33:00	1.06	19.46
08/29/07 18:33:15	1.01	19.49
08/29/07 18:33:30	0.97	19.52
08/29/07 18:33:45	0.98	19.47
08/29/07 18:34:00	1.07	19.40
08/29/07 18:34:15	1.08	19.43
08/29/07 18:34:30	1.03	19.47
08/29/07 18:34:45	1.03	19.44
08/29/07 18:35:00	1.08	19.38
08/29/07 18:35:15	1.11	19.40
08/29/07 18:35:30	1.04	19.47
08/29/07 18:35:45	1.02	19.47
08/29/07 18:36:00	1.01	19.49
08/29/07 18:36:15	0.98	19.53
08/29/07 18:36:30	0.92	19.57
08/29/07 18:36:45	0.93	19.54
08/29/07 18:37:00	1.00	19.47
08/29/07 18:37:15	1.10	19.41
08/29/07 18:37:30	1.07	19.48
08/29/07 18:37:45	1.01	19.51
08/29/07 18:38:00	0.99	19.51
08/29/07 18:38:15	0.99	19.50
08/29/07 18:38:30	1.01	19.48
08/29/07 18:38:45	1.03	19.47
08/29/07 18:39:00	1.04	19.48
08/29/07 18:39:15	1.05	19.47
08/29/07 18:39:30	1.12	19.38
08/29/07 18:39:45	1.21	19.32
08/29/07 18:40:00	1.19	19.38
08/29/07 18:40:15	1.13	19.40
08/29/07 18:40:30	1.11	19.40
08/29/07 18:40:45	1.13	19.36
08/29/07 18:41:00	1.20	19.31
08/29/07 18:41:15	1.25	19.30
08/29/07 18:41:30	1.22	19.35

Location Paulsboro, New Jersey
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08/29/07 18:41:45	1.19	19.36	
08/29/07 18:42:00	1.19	19.34	
08/29/07 18:42:15	1.23	19.29	
08/29/07 18:42:30	1.24	19.34	
08/29/07 18:42:45	1.10	19.47	
08/29/07 18:43:00	1.03	19.46	
08/29/07 18:43:15	1.16	19.32	
08/29/07 18:43:30	1.21	19.35	
08/29/07 18:43:45	1.16	19.37	metals train port change
08/29/07 18:44:00	1.19	19.32	
08/29/07 18:44:15	1.23	19.30	
08/29/07 18:44:30	1.20	19.38	
08/29/07 18:44:45	1.09	19.46	
08/29/07 18:45:00	0.98	19.54	
08/29/07 18:45:15	0.98	19.49	
08/29/07 18:45:30	1.10	19.38	
08/29/07 18:45:45	1.13	19.39	
08/29/07 18:46:00	1.11	19.38	
08/29/07 18:46:15	1.15	19.37	
08/29/07 18:46:30	1.14	19.39	
08/29/07 18:46:45	1.11	19.42	
08/29/07 18:47:00	1.08	19.46	
08/29/07 18:47:15	1.03	19.47	
08/29/07 18:47:30	0.98	19.51	
08/29/07 18:47:45	1.02	19.42	
08/29/07 18:48:00	1.08	19.40	
08/29/07 18:48:15	1.05	19.46	
08/29/07 18:48:30	0.97	19.51	
08/29/07 18:48:45	0.98	19.48	
08/29/07 18:49:00	1.01	19.47	
08/29/07 18:49:15	0.93	19.57	
08/29/07 18:49:30	0.85	19.59	
08/29/07 18:49:45	0.94	19.48	
08/29/07 18:50:00	1.03	19.44	
08/29/07 18:50:15	1.05	19.43	
08/29/07 18:50:30	1.03	19.46	
08/29/07 18:50:45	1.01	19.47	Metals restart
08/29/07 18:51:00	1.01	19.48	HCN train resumes sampling
08/29/07 18:51:15	0.86	19.55	
08/29/07 18:51:30	0.87	19.59	
08/29/07 18:51:45	0.86	19.58	
08/29/07 18:52:00	0.85	19.80	
08/29/07 18:52:15	0.85	19.59	
08/29/07 18:52:30	0.86	19.59	
08/29/07 18:52:45	0.83	19.63	
08/29/07 18:53:00	0.81	19.84	
08/29/07 18:53:15	0.83	19.61	
08/29/07 18:53:30	0.87	19.56	
08/29/07 18:53:45	0.95	19.48	
08/29/07 18:54:00	1.01	18.45	
08/29/07 18:54:15	1.00	19.47	
08/29/07 18:54:30	0.98	19.49	
08/29/07 18:54:45	0.99	19.47	
08/29/07 18:55:00	0.98	19.48	
08/29/07 18:55:15	1.01	19.43	
08/29/07 18:55:30	1.05	19.45	
08/29/07 18:55:45	0.96	19.54	
08/29/07 18:56:00	0.93	19.52	
08/29/07 18:56:15	0.97	19.49	
08/29/07 18:56:30	0.97	19.49	
08/29/07 18:56:45	1.01	19.44	
08/29/07 18:57:00	1.05	19.41	
08/29/07 18:57:15	1.07	19.40	
08/29/07 18:57:30	1.06	19.41	
08/29/07 18:57:45	1.06	19.41	
08/29/07 18:58:00	1.08	19.38	
08/29/07 18:58:15	1.10	19.37	
08/29/07 18:58:30	1.10	19.38	
08/29/07 18:58:45	1.11	19.35	
08/29/07 18:59:00	1.13	19.36	
08/29/07 18:59:15	1.12	19.36	
08/29/07 18:59:30	1.12	19.35	
08/29/07 18:59:45	1.14	19.32	
08/29/07 19:00:00	1.19	19.31	
08/29/07 19:00:15	1.15	19.37	
08/29/07 19:00:30	1.11	19.40	
08/29/07 19:00:45	1.05	19.47	
08/29/07 19:01:00	1.01	19.45	
08/29/07 19:01:15	1.07	19.41	
08/29/07 19:01:30	1.07	19.44	
08/29/07 19:01:45	1.03	19.46	
08/29/07 19:02:00	1.07	19.41	
08/29/07 19:02:15	1.09	19.41	
08/29/07 19:02:30	1.05	19.46	
08/29/07 19:02:45	0.99	19.51	
08/29/07 19:03:00	0.94	19.57	
08/29/07 19:03:15	0.88	19.50	
08/29/07 19:03:30	0.93	19.54	
08/29/07 19:03:45	0.94	19.56	
08/29/07 19:04:00	0.92	19.57	
08/29/07 19:04:15	0.89	19.59	
08/29/07 19:04:30	0.89	19.59	
08/29/07 19:04:45	0.86	19.65	
08/29/07 19:05:00	0.82	19.65	
08/29/07 19:05:15	0.87	19.58	
08/29/07 19:05:30	0.95	19.53	
08/29/07 19:05:45	0.96	19.56	
08/29/07 19:06:00	0.89	19.63	
08/29/07 19:06:15	0.91	19.65	

Location Paulsboro, New Jersey
Source FCC FGS Stack
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08/29/07 19:06:30	1.06	19.39
08/29/07 19:06:45	1.17	19.34
08/29/07 19:07:00	1.16	19.35
08/29/07 19:07:15	1.17	19.35
08/29/07 19:07:30	1.15	19.38
08/29/07 19:07:45	1.10	19.42
08/29/07 19:08:00	1.07	19.42
08/29/07 19:08:15	1.09	19.43
08/29/07 19:08:30	1.02	19.50
08/29/07 19:08:45	1.02	19.46
08/29/07 19:09:00	1.11	19.38
08/29/07 19:09:15	1.13	19.39
08/29/07 19:09:30	1.08	19.44
08/29/07 19:09:45	1.02	19.48
08/29/07 19:10:00	0.99	19.49
08/29/07 19:10:15	0.97	19.51
08/29/07 19:10:30	0.93	19.55
08/29/07 19:10:45	0.89	19.57
08/29/07 19:11:00	0.92	19.52
08/29/07 19:11:15	0.96	19.51
08/29/07 19:11:30	0.95	19.49
08/29/07 19:11:45	0.99	19.45
08/29/07 19:12:00	1.02	19.44
08/29/07 19:12:15	1.06	19.42
08/29/07 19:12:30	1.07	19.40
08/29/07 19:12:45	1.10	19.36
08/29/07 19:13:00	1.13	19.36
08/29/07 19:13:15	1.09	19.39
08/29/07 19:13:30	1.06	19.39
08/29/07 19:13:45	1.12	19.31
08/29/07 19:14:00	1.18	19.28
08/29/07 19:14:15	1.19	19.26
08/29/07 19:14:30	1.22	19.26
08/29/07 19:14:45	1.18	19.31
08/29/07 19:15:00	1.14	19.33
08/29/07 19:15:15	1.13	19.32
08/29/07 19:15:30	1.16	19.30
08/29/07 19:15:45	1.17	19.29
08/29/07 19:16:00	1.17	19.32
08/29/07 19:16:15	1.14	19.33
08/29/07 19:16:30	1.13	19.32
08/29/07 19:16:45	1.16	19.30
08/29/07 19:17:00	1.16	19.34
08/29/07 19:17:15	1.12	19.38
08/29/07 19:17:30	1.10	19.38
08/29/07 19:17:45	1.09	19.36
08/29/07 19:18:00	1.11	19.35
08/29/07 19:18:15	1.09	19.37
08/29/07 19:18:30	1.05	19.43
08/29/07 19:18:45	0.97	19.52
08/29/07 19:19:00	0.93	19.52
08/29/07 19:19:15	0.98	19.47
08/29/07 19:19:30	1.03	19.43
08/29/07 19:19:45	1.03	19.43
08/29/07 19:20:00	1.02	19.43
08/29/07 19:20:15	1.00	19.48
08/29/07 19:20:30	0.91	19.56
08/29/07 19:20:45	0.84	19.50
08/29/07 19:21:00	0.86	19.57
08/29/07 19:21:15	0.92	19.52
08/29/07 19:21:30	0.98	19.47
08/29/07 19:21:45	0.98	19.49
08/29/07 19:22:00	0.97	19.47
08/29/07 19:22:15	1.01	19.44
08/29/07 19:22:30	1.02	19.44
08/29/07 19:22:45	1.00	19.46
08/29/07 19:23:00	0.94	19.55
08/29/07 19:23:15	0.86	19.60
08/29/07 19:23:30	0.87	19.57
08/29/07 19:23:45	0.89	19.55
08/29/07 19:24:00	0.87	19.59
08/29/07 19:24:15	0.86	19.59
08/29/07 19:24:30	0.89	19.54
08/29/07 19:24:45	0.94	19.50
08/29/07 19:25:00	0.94	19.53
08/29/07 19:25:15	0.94	19.49
08/29/07 19:25:30	1.02	19.41
08/29/07 19:25:45	1.01	19.47
08/29/07 19:26:00	0.89	19.57
08/29/07 19:26:15	0.84	19.58
08/29/07 19:26:30	0.86	19.57
08/29/07 19:26:45	0.86	19.56
08/29/07 19:27:00	0.86	19.59
08/29/07 19:27:15	0.83	19.60
08/29/07 19:27:30	0.85	19.55
08/29/07 19:27:45	0.89	19.54
08/29/07 19:28:00	0.90	19.53
08/29/07 19:28:15	0.92	19.51
08/29/07 19:28:30	0.90	19.54
08/29/07 19:28:45	0.87	19.58
08/29/07 19:29:00	0.84	19.59
08/29/07 19:29:15	0.84	19.58
08/29/07 19:29:30	0.90	19.52
08/29/07 19:29:45	0.93	19.52
08/29/07 19:30:00	0.87	19.60
08/29/07 19:30:15	0.78	19.67
08/29/07 19:30:30	0.79	19.62
08/29/07 19:30:45	0.85	19.60
08/29/07 19:31:00	0.85	19.59

Location Paulsboro, New Jersey
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08/29/07 19:31:15	0.89	19.55
08/29/07 19:31:30	0.92	19.53
08/29/07 19:31:45	0.94	19.52
08/29/07 19:32:00	0.92	19.54
08/29/07 19:32:15	0.88	19.59
08/29/07 19:32:30	0.85	19.60
08/29/07 19:32:45	0.84	19.61
08/29/07 19:33:00	0.83	19.60
08/29/07 19:33:15	0.87	19.55
08/29/07 19:33:30	0.94	19.49
08/29/07 19:33:45	0.97	19.50
08/29/07 19:34:00	0.92	19.55
08/29/07 19:34:15	0.91	19.53
08/29/07 19:34:30	0.93	19.53
08/29/07 19:34:45	0.88	19.57
08/29/07 19:35:00	0.85	19.58
08/29/07 19:35:15	0.87	19.57
08/29/07 19:35:30	0.87	19.58
08/29/07 19:35:45	0.83	19.63
08/29/07 19:36:00	0.81	19.61
08/29/07 19:36:15	0.84	19.61
08/29/07 19:36:30	0.91	19.63
08/29/07 19:36:45	0.88	19.50
08/29/07 19:37:00	1.00	19.45
08/29/07 19:37:15	0.99	19.48
08/29/07 19:37:30	0.96	19.49
08/29/07 19:37:45	0.99	19.46
08/29/07 19:38:00	1.05	19.43
08/29/07 19:38:15	1.07	19.43
08/29/07 19:38:30	1.09	19.41
08/29/07 19:38:45	1.16	19.36
08/29/07 19:39:00	1.19	19.34
08/29/07 19:39:15	1.24	19.29
08/29/07 19:39:30	1.28	19.31
08/29/07 19:39:45	1.26	19.32
08/29/07 19:40:00	1.29	19.30
08/29/07 19:40:15	1.33	19.28
08/29/07 19:40:30	1.32	19.27
08/29/07 19:40:45	1.32	19.28
08/29/07 19:41:00	1.29	19.32
08/29/07 19:41:15	1.26	19.34
08/29/07 19:41:30	1.23	19.38
08/29/07 19:41:45	1.16	19.44
08/29/07 19:42:00	1.10	19.48
08/29/07 19:42:15	1.07	19.48
08/29/07 19:42:30	1.09	19.45
08/29/07 19:42:45	1.11	19.44
08/29/07 19:43:00	1.09	19.45
08/29/07 19:43:15	1.07	19.48
08/29/07 19:43:30	1.04	19.49
08/29/07 19:43:45	1.03	19.50
08/29/07 19:44:00	1.03	19.47
08/29/07 19:44:15	1.07	19.44
08/29/07 19:44:30	1.10	19.41
08/29/07 19:44:45	1.11	19.40
08/29/07 19:45:00	1.12	19.40
08/29/07 19:45:15	1.12	19.40
08/29/07 19:45:30	1.11	19.39
08/29/07 19:45:45	1.14	19.36
08/29/07 19:46:00	1.16	19.34
08/29/07 19:46:15	1.19	19.30
08/29/07 19:46:30	1.23	19.27
08/29/07 19:46:45	1.20	19.34
08/29/07 19:47:00	1.12	19.42
08/29/07 19:47:15	1.08	19.42
08/29/07 19:47:30	1.11	19.38
08/29/07 19:47:45	1.16	19.33
08/29/07 19:48:00	1.21	19.28
08/29/07 19:48:15	1.22	19.31
08/29/07 19:48:30	1.17	19.36
08/29/07 19:48:45	1.13	19.38
08/29/07 19:49:00	1.16	19.35
08/29/07 19:49:15	1.19	19.33
08/29/07 19:49:30	1.21	19.30
08/29/07 19:49:45	1.26	19.26
08/29/07 19:50:00	1.32	19.20
08/29/07 19:50:15	1.36	19.20
08/29/07 19:50:30	1.31	19.24
08/29/07 19:50:45	1.27	19.27
08/29/07 19:51:00	1.24	19.30
metals train port change		
08/29/07 19:51:15	1.19	19.33
08/29/07 19:51:30	1.19	19.31
08/29/07 19:51:45	1.21	19.32
08/29/07 19:52:00	1.15	19.38
08/29/07 19:52:15	1.11	19.41
08/29/07 19:52:30	1.06	19.45
08/29/07 19:52:45	1.05	19.46
08/29/07 19:53:00	1.05	19.47
08/29/07 19:53:15	1.04	19.48
08/29/07 19:53:30	1.04	19.45
08/29/07 19:53:45	1.09	19.41
08/29/07 19:54:00	1.13	19.39
08/29/07 19:54:15	1.08	19.45
08/29/07 19:54:30	1.01	19.51
08/29/07 19:54:45	0.96	19.55
08/29/07 19:55:00	0.91	19.60
08/29/07 19:55:15	0.91	19.57
08/29/07 19:55:30	0.97	19.53
08/29/07 19:55:45	1.00	19.52

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Source FCC FGS Slack
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08/29/07 19:58:00	1.03	19.48	
08/29/07 19:58:15	1.05	19.47	
08/29/07 19:58:30	1.00	19.54	
08/29/07 19:58:45	0.96	19.55	esume metals test
08/29/07 19:57:00	1.02	19.44	
08/29/07 19:57:15	1.14	19.37	
08/29/07 19:57:30	1.14	19.41	
08/29/07 19:57:45	1.05	19.51	
08/29/07 19:58:00	1.00	19.51	
08/29/07 19:58:15	1.05	19.45	
08/29/07 19:58:30	1.10	19.40	
08/29/07 19:58:45	1.11	19.43	
08/29/07 19:59:00	1.06	19.47	
08/29/07 19:59:15	1.06	19.44	
08/29/07 19:59:30	1.10	19.40	
08/29/07 19:59:45	1.11	19.41	
08/29/07 20:00:00	1.10	19.42	
08/29/07 20:00:15	1.11	19.40	
08/29/07 20:00:30	1.09	19.43	
08/29/07 20:00:45	1.12	19.35	
08/29/07 20:01:00	1.18	19.31	
08/29/07 20:01:15	1.18	19.33	
08/29/07 20:01:30	1.14	19.37	
08/29/07 20:01:45	1.11	19.41	
08/29/07 20:02:00	1.09	19.42	
08/29/07 20:02:15	1.10	19.38	
08/29/07 20:02:30	1.13	19.37	
08/29/07 20:02:45	1.11	19.38	
08/29/07 20:03:00	1.15	19.29	
08/29/07 20:03:15	1.25	19.24	
08/29/07 20:03:30	1.22	19.29	
08/29/07 20:03:45	1.19	19.29	
08/29/07 20:04:00	1.20	19.30	
08/29/07 20:04:15	1.16	19.33	
08/29/07 20:04:30	1.16	19.33	
08/29/07 20:04:45	1.17	19.30	
08/29/07 20:05:00	1.22	19.25	
08/29/07 20:05:15	1.28	19.21	
08/29/07 20:05:30	1.24	19.28	
08/29/07 20:05:45	1.12	19.39	
08/29/07 20:06:00	1.05	19.41	
08/29/07 20:06:15	1.11	19.34	
08/29/07 20:06:30	1.16	19.31	
08/29/07 20:06:45	1.14	19.35	
08/29/07 20:07:00	1.14	19.33	
08/29/07 20:07:15	1.16	19.32	
08/29/07 20:07:30	1.17	19.34	
08/29/07 20:07:45	1.12	19.41	
08/29/07 20:08:00	1.06	19.41	
08/29/07 20:08:15	1.16	19.30	
08/29/07 20:08:30	1.21	19.32	
08/29/07 20:08:45	1.16	19.36	
08/29/07 20:09:00	1.14	19.37	
08/29/07 20:09:15	1.15	19.37	
08/29/07 20:09:30	1.16	19.38	
08/29/07 20:09:45	1.19	19.33	
08/29/07 20:10:00	1.27	19.25	
08/29/07 20:10:15	1.29	19.28	
08/29/07 20:10:30	1.24	19.32	
08/29/07 20:10:45	1.25	19.32	
08/29/07 20:11:00	1.20	19.39	
08/29/07 20:11:15	1.08	19.50	
08/29/07 20:11:30	0.98	19.57	
08/29/07 20:11:45	0.95	19.57	
08/29/07 20:12:00	1.00	19.50	
08/29/07 20:12:15	1.06	19.48	
08/29/07 20:12:30	1.07	19.48	
08/29/07 20:12:45	1.04	19.51	
08/29/07 20:13:00	1.02	19.49	
08/29/07 20:13:15	1.08	19.43	
08/29/07 20:13:30	1.08	19.46	
08/29/07 20:13:45	1.06	19.46	
08/29/07 20:14:00	1.09	19.44	
08/29/07 20:14:15	1.05	19.48	
08/29/07 20:14:30	1.05	19.45	
08/29/07 20:14:45	1.12	19.38	
08/29/07 20:15:00	1.19	19.32	
08/29/07 20:15:15	1.18	19.36	
08/29/07 20:15:30	1.10	19.44	
08/29/07 20:15:45	1.07	19.42	
08/29/07 20:16:00	1.11	19.40	
08/29/07 20:16:15	1.09	19.42	
08/29/07 20:16:30	1.10	19.40	
08/29/07 20:16:45	1.10	19.41	
08/29/07 20:17:00	1.12	19.37	
08/29/07 20:17:15	1.14	19.39	
08/29/07 20:17:30	1.05	19.48	
08/29/07 20:17:45	0.98	19.51	
08/29/07 20:18:00	0.95	19.52	
08/29/07 20:18:15	0.94	19.53	
08/29/07 20:18:30	0.94	19.51	
08/29/07 20:18:45	0.97	19.49	
08/29/07 20:19:00	0.97	19.50	
08/29/07 20:19:15	0.98	19.49	
08/29/07 20:19:30	1.03	19.45	
08/29/07 20:19:45	1.03	19.46	
08/29/07 20:20:00	1.00	19.47	
08/29/07 20:20:15	1.02	19.44	
08/29/07 20:20:30	1.02	19.45	

Location Paulsboro, New Jersey
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08/29/07 20:20:45	1.01	19.46
08/29/07 20:21:00	1.04	19.43
08/29/07 20:21:15	1.07	19.41
08/29/07 20:21:30	1.06	19.40
08/29/07 20:21:45	1.09	19.38
08/29/07 20:22:00	1.11	19.39
08/29/07 20:22:15	1.08	19.42
08/29/07 20:22:30	1.04	19.47
08/29/07 20:22:45	0.98	19.51
08/29/07 20:23:00	0.93	19.53
08/29/07 20:23:15	0.96	19.48
08/29/07 20:23:30	1.01	19.46
08/29/07 20:23:45	1.00	19.48
08/29/07 20:24:00	0.93	19.56
08/29/07 20:24:15	0.89	19.58
08/29/07 20:24:30	0.88	19.59
08/29/07 20:24:45	0.85	19.62
08/29/07 20:25:00	0.85	19.58
08/29/07 20:25:15	0.91	19.54
08/29/07 20:25:30	0.90	19.57
08/29/07 20:25:45	0.87	19.60
08/29/07 20:26:00	0.90	19.54
08/29/07 20:26:15	0.95	19.49
08/29/07 20:26:30	1.01	19.43
08/29/07 20:26:45	1.04	19.45
08/29/07 20:27:00	1.00	19.47
08/29/07 20:27:15	1.02	19.45
08/29/07 20:27:30	1.00	19.49
08/29/07 20:27:45	0.98	19.48
08/29/07 20:28:00	1.03	19.43
08/29/07 20:28:15	1.09	19.38
08/29/07 20:28:30	1.09	19.39
08/29/07 20:28:45	1.07	19.40
08/29/07 20:29:00	1.05	19.45
08/29/07 20:29:15	1.03	19.45
08/29/07 20:29:30	1.04	19.44
08/29/07 20:29:45	1.07	19.41
08/29/07 20:30:00	1.11	19.37
08/29/07 20:30:15	1.10	19.40
08/29/07 20:30:30	1.06	19.43
08/29/07 20:30:45	1.10	19.34
08/29/07 20:31:00	1.23	19.24
08/29/07 20:31:15	1.27	19.24
08/29/07 20:31:30	1.22	19.29
08/29/07 20:31:45	1.18	19.31
08/29/07 20:32:00	1.17	19.31
08/29/07 20:32:15	1.17	19.31
08/29/07 20:32:30	1.19	19.28
08/29/07 20:32:45	1.20	19.31
08/29/07 20:33:00	1.13	19.37
08/29/07 20:33:15	1.10	19.36
08/29/07 20:33:30	1.15	19.30
08/29/07 20:33:45	1.23	19.25
08/29/07 20:34:00	1.24	19.27
08/29/07 20:34:15	1.21	19.28
08/29/07 20:34:30	1.26	19.22
08/29/07 20:34:45	1.28	19.24
08/29/07 20:35:00	1.19	19.34
08/29/07 20:35:15	1.10	19.40
08/29/07 20:35:30	1.08	19.39
08/29/07 20:35:45	1.10	19.39
08/29/07 20:36:00	1.09	19.39
08/29/07 20:36:15	1.08	19.41
08/29/07 20:36:30	1.04	19.45
08/29/07 20:36:45	1.01	19.47
08/29/07 20:37:00	0.99	19.49
08/29/07 20:37:15	0.99	19.48
08/29/07 20:37:30	0.98	19.49
08/29/07 20:37:45	0.98	19.50
08/29/07 20:38:00	0.97	19.51
08/29/07 20:38:15	0.96	19.52
08/29/07 20:38:30	0.95	19.51
08/29/07 20:38:45	0.99	19.49
08/29/07 20:39:00	0.97	19.53
08/29/07 20:39:15	0.96	19.50
08/29/07 20:39:30	1.03	19.43
08/29/07 20:39:45	1.06	19.43
08/29/07 20:40:00	1.05	19.45
08/29/07 20:40:15	1.03	19.47
08/29/07 20:40:30	0.99	19.51
08/29/07 20:40:45	0.94	19.55
08/29/07 20:41:00	0.95	19.53
08/29/07 20:41:15	0.96	19.53
08/29/07 20:41:30	0.98	19.52
08/29/07 20:41:45	0.99	19.51
08/29/07 20:42:00	0.97	19.54
08/29/07 20:42:15	0.93	19.58
08/29/07 20:42:30	0.88	19.63
08/29/07 20:42:45	0.85	19.62
08/29/07 20:43:00	0.93	19.54
08/29/07 20:43:15	0.98	19.50
08/29/07 20:43:30	1.03	19.48
08/29/07 20:43:45	1.02	19.50
08/29/07 20:44:00	1.00	19.51
08/29/07 20:44:15	1.03	19.45
08/29/07 20:44:30	1.08	19.42
08/29/07 20:44:45	1.07	19.45
08/29/07 20:45:00	1.03	19.49
08/29/07 20:45:15	1.03	19.47

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08/29/07 20:45:30	1.07	19.43	
08/29/07 20:45:45	1.09	19.42	
08/29/07 20:46:00	1.10	19.40	
08/29/07 20:46:15	1.08	19.45	
08/29/07 20:46:30	1.02	19.47	
08/29/07 20:46:45	1.08	19.40	
08/29/07 20:47:00	1.12	19.39	
08/29/07 20:47:15	1.08	19.44	
08/29/07 20:47:30	1.03	19.47	
08/29/07 20:47:45	1.05	19.44	
08/29/07 20:48:00	1.10	19.39	
08/29/07 20:48:15	1.12	19.39	
08/29/07 20:48:30	1.11	19.40	
08/29/07 20:48:45	1.11	19.37	
08/29/07 20:49:00	1.22	19.24	
08/29/07 20:49:15	1.32	19.19	
08/29/07 20:49:30	1.29	19.25	
08/29/07 20:49:45	1.22	19.30	
08/29/07 20:50:00	1.20	19.31	
08/29/07 20:50:15	1.17	19.34	
08/29/07 20:50:30	1.15	19.35	
08/29/07 20:50:45	1.17	19.33	
08/29/07 20:51:00	1.18	19.33	
08/29/07 20:51:15	1.15	19.36	
08/29/07 20:51:30	1.12	19.38	
08/29/07 20:51:45	1.11	19.37	
08/29/07 20:52:00	1.10	19.39	
08/29/07 20:52:15	1.06	19.44	
08/29/07 20:52:30	0.99	19.50	
08/29/07 20:52:45	0.98	19.47	
08/29/07 20:53:00	1.06	19.41	
08/29/07 20:53:15	1.04	19.45	
08/29/07 20:53:30	1.04	19.43	
08/29/07 20:53:45	1.06	19.41	
08/29/07 20:54:00	1.05	19.42	
08/29/07 20:54:15	1.03	19.44	
08/29/07 20:54:30	1.00	19.46	
08/29/07 20:54:45	0.99	19.46	
08/29/07 20:55:00	0.99	19.45	
08/29/07 20:55:15	1.03	19.38	
08/29/07 20:55:30	1.11	19.35	
08/29/07 20:55:45	1.06	19.42	
08/29/07 20:56:00	1.02	19.44	
08/29/07 20:56:15	1.03	19.42	
08/29/07 20:56:30	1.05	19.40	
08/29/07 20:56:45	1.02	19.47	m29 port change
08/29/07 20:57:00	0.94	19.50	
08/29/07 20:57:15	0.96	19.44	
08/29/07 20:57:30	1.03	19.37	
08/29/07 20:57:45	1.09	19.35	
08/29/07 20:58:00	1.11	19.32	
08/29/07 20:58:15	1.16	19.30	
08/29/07 20:58:30	1.08	19.41	
08/29/07 20:58:45	0.99	19.45	
08/29/07 20:59:00	1.03	19.38	
08/29/07 20:59:15	1.06	19.38	
08/29/07 20:59:30	1.04	19.40	
08/29/07 20:59:45	1.03	19.40	
08/29/07 21:00:00	1.02	19.42	
08/29/07 21:00:15	0.98	19.46	
08/29/07 21:00:30	0.94	19.49	
08/29/07 21:00:45	0.95	19.45	esume m29 testing
08/29/07 21:01:00	0.99	19.44	
08/29/07 21:01:15	0.98	19.44	
08/29/07 21:01:30	1.03	19.38	
08/29/07 21:01:45	1.04	19.41	
08/29/07 21:02:00	0.99	19.46	
08/29/07 21:02:15	0.97	19.45	
08/29/07 21:02:30	0.98	19.44	
08/29/07 21:02:45	1.03	19.37	
08/29/07 21:03:00	1.09	19.35	
08/29/07 21:03:15	1.07	19.38	
08/29/07 21:03:30	1.05	19.40	
08/29/07 21:03:45	1.04	19.40	
08/29/07 21:04:00	1.05	19.39	
08/29/07 21:04:15	1.05	19.41	
08/29/07 21:04:30	1.04	19.43	
08/29/07 21:04:45	1.00	19.47	
08/29/07 21:05:00	0.97	19.47	
08/29/07 21:05:15	1.04	19.40	
08/29/07 21:05:30	1.05	19.43	
08/29/07 21:05:45	1.02	19.43	
08/29/07 21:06:00	1.03	19.44	
08/29/07 21:06:15	1.03	19.43	
08/29/07 21:06:30	1.09	19.38	
08/29/07 21:06:45	1.10	19.38	
08/29/07 21:07:00	1.15	19.30	
08/29/07 21:07:15	1.24	19.26	
08/29/07 21:07:30	1.19	19.31	
08/29/07 21:07:45	1.15	19.33	
08/29/07 21:08:00	1.12	19.37	
08/29/07 21:08:15	1.10	19.35	
08/29/07 21:08:30	1.13	19.32	
08/29/07 21:08:45	1.16	19.30	
08/29/07 21:09:00	1.13	19.35	
08/29/07 21:09:15	1.06	19.41	
08/29/07 21:09:30	1.01	19.44	
08/29/07 21:09:45	1.01	19.38	
08/29/07 21:10:00	1.14	19.26	

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08/29/07 21:10:15	1.24	19.22
08/29/07 21:10:30	1.21	19.27
08/29/07 21:10:45	1.20	19.23
08/29/07 21:11:00	1.27	19.18
08/29/07 21:11:15	1.24	19.23
08/29/07 21:11:30	1.17	19.28
08/29/07 21:11:45	1.17	19.24
08/29/07 21:12:00	1.24	19.17
08/29/07 21:12:15	1.28	19.17
08/29/07 21:12:30	1.27	19.17
08/29/07 21:12:45	1.26	19.18
08/29/07 21:13:00	1.22	19.24
08/29/07 21:13:15	1.16	19.26
08/29/07 21:13:30	1.20	19.20
08/29/07 21:13:45	1.24	19.18
08/29/07 21:14:00	1.26	19.17
08/29/07 21:14:15	1.25	19.21
08/29/07 21:14:30	1.17	19.30
08/29/07 21:14:45	1.12	19.31
08/29/07 21:15:00	1.16	19.28
08/29/07 21:15:15	1.15	19.32
08/29/07 21:15:30	1.12	19.31
08/29/07 21:15:45	1.18	19.24
08/29/07 21:16:00	1.19	19.27
08/29/07 21:16:15	1.15	19.29
08/29/07 21:16:30	1.18	19.27
08/29/07 21:16:45	1.18	19.28
08/29/07 21:17:00	1.19	19.25
08/29/07 21:17:15	1.20	19.26
08/29/07 21:17:30	1.20	19.27
08/29/07 21:17:45	1.17	19.32
08/29/07 21:18:00	1.13	19.32
08/29/07 21:18:15	1.14	19.32
08/29/07 21:18:30	1.16	19.31
08/29/07 21:18:45	1.22	19.25
08/29/07 21:19:00	1.27	19.22
08/29/07 21:19:15	1.30	19.18
08/29/07 21:19:30	1.34	19.15
08/29/07 21:19:45	1.32	19.20
08/29/07 21:20:00	1.25	19.26
08/29/07 21:20:15	1.24	19.27
08/29/07 21:20:30	1.20	19.31
08/29/07 21:20:45	1.11	19.40
08/29/07 21:21:00	1.03	19.44
08/29/07 21:21:15	1.04	19.43
08/29/07 21:21:30	1.04	19.42
08/29/07 21:21:45	1.04	19.44
08/29/07 21:22:00	0.99	19.49
08/29/07 21:22:15	0.91	19.58
08/29/07 21:22:30	0.88	19.58
08/29/07 21:22:45	0.92	19.52
08/29/07 21:23:00	0.96	19.50
08/29/07 21:23:15	0.98	19.49
08/29/07 21:23:30	0.95	19.53
08/29/07 21:23:45	0.91	19.55
08/29/07 21:24:00	0.94	19.50
08/29/07 21:24:15	1.04	19.40
08/29/07 21:24:30	1.12	19.35
08/29/07 21:24:45	1.09	19.41
08/29/07 21:25:00	1.03	19.44
08/29/07 21:25:15	1.05	19.43
08/29/07 21:25:30	1.03	19.45
08/29/07 21:25:45	1.04	19.40
08/29/07 21:26:00	1.15	19.30
08/29/07 21:26:15	1.17	19.32
08/29/07 21:26:30	1.14	19.36
08/29/07 21:26:45	1.04	19.48
08/29/07 21:27:00	0.95	19.52
08/29/07 21:27:15	1.00	19.44
08/29/07 21:27:30	1.07	19.40
08/29/07 21:27:45	1.08	19.38
08/29/07 21:28:00	1.12	19.34
08/29/07 21:28:15	1.12	19.37
08/29/07 21:28:30	1.05	19.42
08/29/07 21:28:45	1.06	19.38
08/29/07 21:29:00	1.11	19.35
08/29/07 21:29:15	1.13	19.33
08/29/07 21:29:30	1.16	19.33
08/29/07 21:29:45	1.17	19.30
08/29/07 21:30:00	1.21	19.30
08/29/07 21:30:15	1.13	19.37
08/29/07 21:30:30	1.12	19.34
08/29/07 21:30:45	1.14	19.35
08/29/07 21:31:00	1.10	19.40
08/29/07 21:31:15	1.06	19.40
08/29/07 21:31:30	1.09	19.37
08/29/07 21:31:45	1.14	19.33
08/29/07 21:32:00	1.15	19.34
08/29/07 21:32:15	1.12	19.38
08/29/07 21:32:30	1.09	19.38
08/29/07 21:32:45	1.11	19.36
08/29/07 21:33:00	1.08	19.44
08/29/07 21:33:15	0.98	19.48
08/29/07 21:33:30	1.05	19.36
08/29/07 21:33:45	1.18	19.26
08/29/07 21:34:00	1.23	19.26
08/29/07 21:34:15	1.21	19.30
08/29/07 21:34:30	1.11	19.39
08/29/07 21:34:45	1.11	19.33

Location Paulsboro, New Jersey
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Date 08/29/07

08/29/07 21:35:00	1.23	19.22
08/29/07 21:35:15	1.27	19.23
08/29/07 21:35:30	1.19	19.32
08/29/07 21:35:45	1.15	19.32
08/29/07 21:36:00	1.17	19.30
08/29/07 21:36:15	1.20	19.27
08/29/07 21:36:30	1.18	19.32
08/29/07 21:36:45	1.15	19.30
08/29/07 21:37:00	1.18	19.30
08/29/07 21:37:15	1.11	19.36
08/29/07 21:37:30	1.09	19.36
08/29/07 21:37:45	1.11	19.34
08/29/07 21:38:00	1.08	19.39
08/29/07 21:38:15	1.05	19.40
08/29/07 21:38:30	1.09	19.36
08/29/07 21:38:45	1.13	19.30
08/29/07 21:39:00	1.21	19.24
08/29/07 21:39:15	1.22	19.27
08/29/07 21:39:30	1.13	19.35
08/29/07 21:39:45	1.09	19.38
08/29/07 21:40:00	1.09	19.37
08/29/07 21:40:15	1.12	19.34
08/29/07 21:40:30	1.15	19.29
08/29/07 21:40:45	1.21	19.25
08/29/07 21:41:00	1.18	19.32
08/29/07 21:41:15	1.10	19.38
08/29/07 21:41:30	1.12	19.32
08/29/07 21:41:45	1.20	19.25
08/29/07 21:42:00	1.26	19.22
08/29/07 21:42:15	1.26	19.22
08/29/07 21:42:30	1.27	19.20
08/29/07 21:42:45	1.28	19.19
08/29/07 21:43:00	1.26	19.22
08/29/07 21:43:15	1.27	19.17
08/29/07 21:43:30	1.33	19.14
08/29/07 21:43:45	1.28	19.23
08/29/07 21:44:00	1.15	19.33
08/29/07 21:44:15	1.13	19.32
08/29/07 21:44:30	1.12	19.36
08/29/07 21:44:45	1.08	19.38
08/29/07 21:45:00	1.06	19.38
08/29/07 21:45:15	1.03	19.41
08/29/07 21:45:30	1.02	19.41
08/29/07 21:45:45	1.01	19.43
08/29/07 21:46:00	1.02	19.42
08/29/07 21:46:15	1.00	19.43
08/29/07 21:46:30	0.97	19.46
08/29/07 21:46:45	0.93	19.48
08/29/07 21:47:00	0.94	19.46
08/29/07 21:47:15	0.98	19.43
08/29/07 21:47:30	1.01	19.42
08/29/07 21:47:45	1.02	19.39
08/29/07 21:48:00	1.08	19.32
08/29/07 21:48:15	1.12	19.31
08/29/07 21:48:30	1.08	19.36
08/29/07 21:48:45	1.02	19.41
08/29/07 21:49:00	1.01	19.39
08/29/07 21:49:15	1.09	19.30
08/29/07 21:49:30	1.12	19.28
08/29/07 21:49:45	1.08	19.32
08/29/07 21:50:00	1.07	19.34
08/29/07 21:50:15	1.04	19.39
08/29/07 21:50:30	1.00	19.39
08/29/07 21:50:45	1.06	19.34
08/29/07 21:51:00	1.06	19.35
08/29/07 21:51:15	1.05	19.34
08/29/07 21:51:30	1.09	19.30
08/29/07 21:51:45	1.09	19.32
08/29/07 21:52:00	1.03	19.37
08/29/07 21:52:15	1.01	19.38
08/29/07 21:52:30	1.00	19.38
08/29/07 21:52:45	1.04	19.30
08/29/07 21:53:00	1.19	19.18
08/29/07 21:53:15	1.19	19.25
08/29/07 21:53:30	1.08	19.35
08/29/07 21:53:45	0.98	19.42
08/29/07 21:54:00	0.95	19.41
08/29/07 21:54:15	0.99	19.36
08/29/07 21:54:30	1.07	19.31
08/29/07 21:54:45	1.05	19.36
08/29/07 21:55:00	0.99	19.42
08/29/07 21:55:15	0.96	19.40
08/29/07 21:55:30	1.02	19.38
08/29/07 21:55:45	1.00	19.40
08/29/07 21:56:00	1.00	19.37
08/29/07 21:56:15	1.02	19.36
08/29/07 21:56:30	0.99	19.43
08/29/07 21:56:45	0.93	19.45
08/29/07 21:57:00	0.93	19.46
08/29/07 21:57:15	0.92	19.46
08/29/07 21:57:30	0.93	19.44
08/29/07 21:57:45	0.96	19.42
08/29/07 21:58:00	0.93	19.48
08/29/07 21:58:15	0.85	19.53
08/29/07 21:58:30	0.86	19.49
08/29/07 21:58:45	0.87	19.50
08/29/07 21:59:00	0.86	19.50
08/29/07 21:59:15	0.88	19.50
08/29/07 21:59:30	0.80	19.48

Location Paulsboro, New Jersey
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08/29/07 21:50:45	0.88	19.50	
08/29/07 22:00:00	0.86	19.49	
08/29/07 22:00:16	0.92	19.41	
08/29/07 22:00:30	1.00	19.35	
08/29/07 22:00:45	1.00	19.38	End M29-1
08/29/07 22:01:00	0.97	19.39	
08/29/07 22:01:15	1.00	19.34	
08/29/07 22:01:30	1.06	19.31	
08/29/07 22:01:45	1.06	19.31	
08/29/07 22:02:00	1.07	19.29	
08/29/07 22:02:15	1.08	19.29	
08/29/07 22:02:30	1.09	19.28	
08/29/07 22:02:45	1.05	19.35	
08/29/07 22:03:00	0.98	19.38	
08/29/07 22:03:15	1.02	19.32	
08/29/07 22:03:30	1.06	19.29	
08/29/07 22:03:45	1.06	19.29	
08/29/07 22:04:00	1.05	19.33	
08/29/07 22:04:15	1.00	19.38	
08/29/07 22:04:30	0.98	19.37	
08/29/07 22:04:45	1.01	19.34	
08/29/07 22:05:00	1.04	19.33	
08/29/07 22:05:15	1.03	19.34	
08/29/07 22:05:30	1.00	19.38	
08/29/07 22:05:45	0.97	19.39	
08/29/07 22:06:00	1.14	17.73	
08/29/07 22:06:15	3.56	9.95	
08/29/07 22:06:30	5.86	4.78	
08/29/07 22:06:45	5.19	3.90	
08/29/07 22:07:00	5.00	4.67	
08/29/07 22:07:15	4.94	4.94	
08/29/07 22:07:30	4.92	4.95	
08/29/07 22:07:45	4.92	4.86	
08/29/07 22:08:00	4.92	4.80	
08/29/07 22:08:15	4.92	4.74	
08/29/07 22:08:30	4.92	4.70	
08/29/07 22:08:45	4.92	4.67	
08/29/07 22:09:00	4.92	4.65	
08/29/07 22:09:15	4.92	4.64	
08/29/07 22:09:30	4.93	4.63	
08/29/07 22:09:45	4.93	4.64	
08/29/07 22:10:00	4.93	4.66	
08/29/07 22:10:15	4.94	4.68	
08/29/07 22:10:30	4.94	4.70	
08/29/07 22:10:45	4.95	4.73	Post-Test Bias and Drift Check:
08/29/07 22:11:00	4.96	4.79	5.0% Oxygen injection:
08/29/07 22:11:15	4.96	4.85	4.96 % db Oxygen
08/29/07 22:11:30	4.97	4.90	
08/29/07 22:11:45	4.97	4.94	
08/29/07 22:12:00	4.88	5.95	
08/29/07 22:12:15	4.26	7.76	
08/29/07 22:12:30	5.30	8.54	
08/29/07 22:12:45	11.82	14.57	
08/29/07 22:13:00	17.74	18.77	
08/29/07 22:13:15	20.99	21.09	
08/29/07 22:13:30	22.14	21.83	
08/29/07 22:13:45	22.34	21.99	
08/29/07 22:14:00	22.37	22.06	
08/29/07 22:14:15	22.38	22.11	
08/29/07 22:14:30	22.39	22.14	
08/29/07 22:14:45	22.40	22.16	
08/29/07 22:15:00	22.41	22.19	
08/29/07 22:15:15	22.42	22.20	
08/29/07 22:15:30	22.42	22.21	
08/29/07 22:15:45	22.42	22.23	
08/29/07 22:16:00	22.42	22.24	
08/29/07 22:16:15	22.43	22.25	
08/29/07 22:16:30	22.43	22.28	
08/29/07 22:16:45	22.43	22.26	
08/29/07 22:17:00	22.43	22.27	
08/29/07 22:17:15	22.43	22.27	
08/29/07 22:17:30	22.43	22.28	
08/29/07 22:17:45	22.43	22.29	
08/29/07 22:18:00	22.43	22.29	
08/29/07 22:18:15	22.44	22.29	
08/29/07 22:18:30	22.43	22.29	
08/29/07 22:18:45	22.43	22.29	
08/29/07 22:19:00	22.44	22.29	
08/29/07 22:19:15	22.44	22.30	
08/29/07 22:19:30	22.44	22.31	
08/29/07 22:19:45	22.44	22.31	
08/29/07 22:20:00	22.44	22.31	
08/29/07 22:20:15	22.44	22.31	
08/29/07 22:20:30	22.44	22.32	
08/29/07 22:20:45	22.44	22.32	
08/29/07 22:21:00	22.45	22.32	
08/29/07 22:21:15	22.44	22.32	
08/29/07 22:21:30	22.44	22.32	Post-Test Bias and Drift Check:
08/29/07 22:21:45	22.45	22.33	22.82% CO2 injection:
08/29/07 22:22:00	22.44	22.33	22.33 % db CO2
08/29/07 22:22:15	22.44	22.33	
08/29/07 22:22:30	22.45	22.33	
08/29/07 22:22:45	22.44	21.89	
08/29/07 22:23:00	22.28	20.08	
08/29/07 22:23:15	19.10	14.86	
08/29/07 22:23:30	10.36	7.62	
08/29/07 22:23:45	4.09	3.26	
08/29/07 22:24:00	1.11	1.03	
08/29/07 22:24:15	0.38	0.64	

Location Paulsboro, New Jersey
Source FCC FGS Stack
Date 08/29/07

08/29/07 22:24:30	0.28	0.55
08/29/07 22:24:45	0.24	0.49
08/29/07 22:25:00	0.22	0.45
08/29/07 22:25:15	0.20	0.41
08/29/07 22:25:30	0.19	0.38
08/29/07 22:25:45	0.18	0.35
08/29/07 22:26:00	0.17	0.33
08/29/07 22:26:15	0.16	0.32
08/29/07 22:26:30	0.15	0.30
08/29/07 22:26:45	0.15	0.29
08/29/07 22:27:00	0.14	0.27
08/29/07 22:27:15	0.14	0.26
08/29/07 22:27:30	0.14	0.25
08/29/07 22:27:45	0.14	0.24
08/29/07 22:28:00	0.14	0.23
08/29/07 22:28:15	0.13	0.22
08/29/07 22:28:30	0.14	0.21
08/29/07 22:28:45	0.13	0.21
08/29/07 22:29:00	0.13	0.20
08/29/07 22:29:15	0.13	0.20
08/29/07 22:29:30	0.13	0.19

Post-Test Bias and Drift Check:

08/29/07 22:29:45	0.13	0.19	Zero Oxygen/CO2 injection:
08/29/07 22:30:00	0.12	0.18	0.12 % db Oxygen
08/29/07 22:30:15	0.12	0.18	0.18 % db CO2
08/29/07 22:30:30	0.12	0.17	

Client Valero
Location Paulsboro, New Jersey
Source FCC FGS Stack
Date 08/30/07

Range 10.0 22.8
Units % %

Time	Stack Oxygen	Stack CO2	COMMENTS
08/30/07 7:37:30	20.62	0.11	
08/30/07 7:37:45	20.63	0.10	
08/30/07 7:38:00	20.62	0.12	
08/30/07 7:38:15	20.61	0.12	
08/30/07 7:38:30	20.62	0.11	
08/30/07 7:38:45	20.62	0.11	
08/30/07 7:39:00	20.63	0.11	
08/30/07 7:39:15	20.62	0.12	
08/30/07 7:39:30	19.28	0.54	
08/30/07 7:39:45	14.12	1.06	
08/30/07 7:40:00	5.94	0.47	
08/30/07 7:40:15	1.30	0.13	
08/30/07 7:40:30	0.41	0.08	
08/30/07 7:40:45	0.29	0.07	
08/30/07 7:41:00	0.25	0.07	
08/30/07 7:41:15	0.22	0.07	
08/30/07 7:41:30	0.20	0.07	
08/30/07 7:41:45	0.19	0.06	
08/30/07 7:42:00	0.18	0.06	
08/30/07 7:42:15	0.17	0.06	
08/30/07 7:42:30	0.16	0.06	
08/30/07 7:42:45	0.16	0.06	
08/30/07 7:43:00	0.13	0.06	
08/30/07 7:43:15	0.04	0.04	
08/30/07 7:43:30	0.00	0.04	
08/30/07 7:43:45	0.00	0.04	
08/30/07 7:44:00	0.00	0.04	
08/30/07 7:44:15	-0.01	0.04	
08/30/07 7:44:30	0.00	0.04	
08/30/07 7:44:45	0.00	0.04	
08/30/07 7:45:00	0.00	0.04	
08/30/07 7:45:15	-0.01	0.04	
08/30/07 7:45:30	-0.01	0.04	
08/30/07 7:45:45	-0.01	0.04	Calibration Error Test:
08/30/07 7:46:00	-0.01	0.04	Zero nitrogen injection:
08/30/07 7:46:15	-0.01	0.04	-0.01 % db Oxygen
08/30/07 7:46:30	-0.01	0.04	0.04 % db CO2
08/30/07 7:46:45	-0.01	0.04	
08/30/07 7:47:00	-0.01	0.04	
08/30/07 7:47:15	-0.01	0.04	
08/30/07 7:47:30	-0.01	0.04	
08/30/07 7:47:45	0.01	0.22	
08/30/07 7:48:00	2.19	3.55	
08/30/07 7:48:15	6.71	6.85	
08/30/07 7:48:30	9.16	8.23	
08/30/07 7:48:45	9.74	8.19	
08/30/07 7:49:00	9.77	8.03	
08/30/07 7:49:15	9.77	8.04	
08/30/07 7:49:30	9.82	8.26	
08/30/07 7:49:45	9.93	8.54	
08/30/07 7:50:00	9.96	8.75	
08/30/07 7:50:15	9.98	9.02	
08/30/07 7:50:30	10.01	9.32	
08/30/07 7:50:45	10.03	9.55	
08/30/07 7:51:00	9.99	9.68	
08/30/07 7:51:15	9.99	9.74	
08/30/07 7:51:30	9.99	9.77	
08/30/07 7:51:45	9.99	9.79	
08/30/07 7:52:00	9.99	9.80	
08/30/07 7:52:15	9.99	9.80	
08/30/07 7:52:30	9.99	9.81	
08/30/07 7:52:45	9.99	9.81	
08/30/07 7:53:00	9.99	9.81	
08/30/07 7:53:15	10.00	9.82	
08/30/07 7:53:30	9.99	9.82	
08/30/07 7:53:45	9.99	9.82	
08/30/07 7:54:00	10.00	9.82	
08/30/07 7:54:15	10.00	9.83	
08/30/07 7:54:30	10.00	9.83	
08/30/07 7:54:45	10.00	9.83	
08/30/07 7:55:00	10.00	9.83	
08/30/07 7:55:15	10.00	9.83	
08/30/07 7:55:30	10.00	9.83	
08/30/07 7:55:45	10.00	9.83	
08/30/07 7:56:00	10.00	9.84	

08/30/07 7:56:15	10.00	9.84	
08/30/07 7:56:30	10.00	9.84	
08/30/07 7:56:45	10.01	9.84	
08/30/07 7:57:00	10.00	9.84	Calibration Error Test:
08/30/07 7:57:15	10.00	9.84	10.0% Oxygen injection:
08/30/07 7:57:30	10.01	9.84	10.00 % db Oxygen
08/30/07 7:57:45	10.00	9.84	
08/30/07 7:58:00	10.00	9.84	
08/30/07 7:58:15	10.01	9.84	
08/30/07 7:58:30	10.00	9.85	
08/30/07 7:58:45	10.00	9.85	
08/30/07 7:59:00	10.00	9.77	
08/30/07 7:59:15	8.93	7.67	
08/30/07 7:59:30	6.28	5.70	
08/30/07 7:59:45	5.14	5.22	
08/30/07 8:00:00	4.99	5.17	
08/30/07 8:00:15	4.97	5.16	
08/30/07 8:00:30	4.97	5.16	
08/30/07 8:00:45	4.98	5.16	
08/30/07 8:01:00	4.97	5.16	
08/30/07 8:01:15	4.97	5.15	Calibration Error Test:
08/30/07 8:01:30	4.97	5.15	5.0% Oxygen injection:
08/30/07 8:01:45	4.98	5.15	4.97 % db Oxygen
08/30/07 8:02:00	4.97	5.15	
08/30/07 8:02:15	4.97	5.15	
08/30/07 8:02:30	4.98	5.15	
08/30/07 8:02:45	6.17	8.52	
08/30/07 8:03:00	12.36	15.33	
08/30/07 8:03:15	18.07	19.49	
08/30/07 8:03:30	21.31	21.74	
08/30/07 8:03:45	22.46	22.34	
08/30/07 8:04:00	22.64	22.42	
08/30/07 8:04:15	22.66	22.45	
08/30/07 8:04:30	22.66	22.46	
08/30/07 8:04:45	22.66	22.48	Calibration Error Test:
08/30/07 8:05:00	22.67	22.49	22.82% CO2 injection:
08/30/07 8:05:15	22.66	22.49	22.50 % db CO2
08/30/07 8:05:30	22.66	22.50	
08/30/07 8:05:45	22.66	22.51	
08/30/07 8:06:00	22.67	22.51	
08/30/07 8:06:15	22.67	22.51	
08/30/07 8:06:30	22.67	22.51	
08/30/07 8:06:45	22.67	22.52	
08/30/07 8:07:00	22.28	20.98	
08/30/07 8:07:15	18.14	15.63	
08/30/07 8:07:30	13.13	11.76	
08/30/07 8:07:45	10.60	10.14	
08/30/07 8:08:00	10.05	9.92	
08/30/07 8:08:15	10.00	9.90	
08/30/07 8:08:30	9.99	9.88	
08/30/07 8:08:45	9.99	9.87	Calibration Error Test:
08/30/07 8:09:00	9.99	9.87	10.0% CO2 injection:
08/30/07 8:09:15	9.99	9.86	9.86 % db CO2
08/30/07 8:09:30	9.98	9.86	
08/30/07 8:09:45	9.98	9.85	
08/30/07 8:10:00	9.98	9.85	
08/30/07 8:10:15	9.97	9.85	
08/30/07 8:10:30	9.98	9.85	
08/30/07 8:10:45	9.98	9.84	
08/30/07 8:11:00	9.98	9.84	
08/30/07 8:11:15	9.98	9.84	
08/30/07 8:11:30	9.97	9.84	
08/30/07 8:11:45	9.98	9.84	
08/30/07 8:12:00	9.98	9.84	
08/30/07 8:12:15	9.97	9.84	
08/30/07 8:12:30	9.97	9.84	
08/30/07 8:12:45	9.98	9.84	
08/30/07 8:13:00	9.98	9.84	
08/30/07 8:13:15	9.98	9.84	
08/30/07 8:13:30	9.98	9.84	
08/30/07 8:13:45	9.98	9.84	
08/30/07 8:14:00	9.98	9.84	
08/30/07 8:14:15	9.97	9.84	
08/30/07 8:14:30	9.98	9.84	
08/30/07 8:14:45	9.98	9.84	
08/30/07 8:15:00	9.98	9.81	
08/30/07 8:15:15	9.31	7.18	
08/30/07 8:15:30	6.61	2.92	
08/30/07 8:15:45	4.71	0.75	
08/30/07 8:16:00	4.27	0.46	
08/30/07 8:16:15	4.24	0.43	
08/30/07 8:16:30	4.15	0.42	
08/30/07 8:16:45	2.84	0.28	

08/30/07 8:17:00	0.79	0.16	
08/30/07 8:17:15	0.24	0.14	
08/30/07 8:17:30	0.16	0.13	
08/30/07 8:17:45	0.15	0.12	
08/30/07 8:18:00	0.14	0.12	
08/30/07 8:18:15	0.13	0.11	
08/30/07 8:18:30	0.13	0.11	
08/30/07 8:18:45	0.13	0.11	
08/30/07 8:19:00	0.12	0.10	
08/30/07 8:19:15	0.12	0.10	
08/30/07 8:19:30	0.11	0.10	
System Bias Check:			
08/30/07 8:19:45	0.11	0.10	Zero nitrogen injection:
08/30/07 8:20:00	0.11	0.10	0.11 % db Oxygen
08/30/07 8:20:15	0.11	0.09	0.10 % db CO2
08/30/07 8:20:30	0.11	0.09	
08/30/07 8:20:45	0.12	0.09	
08/30/07 8:21:00	0.12	0.09	
08/30/07 8:21:15	0.11	0.09	
08/30/07 8:21:30	0.11	0.09	
08/30/07 8:21:45	0.11	0.13	
08/30/07 8:22:00	0.14	0.63	
08/30/07 8:22:15	0.21	0.67	
08/30/07 8:22:30	1.74	2.83	
08/30/07 8:22:45	4.01	4.48	
08/30/07 8:23:00	4.81	4.86	
08/30/07 8:23:15	4.93	4.93	
08/30/07 8:23:30	4.96	4.96	
08/30/07 8:23:45	4.97	4.97	
08/30/07 8:24:00	4.98	4.99	
08/30/07 8:24:15	4.99	5.00	
System Bias Check:			
08/30/07 8:24:30	5.00	5.00	5.0% Oxygen injection:
08/30/07 8:24:45	5.00	5.01	5.01 % db Oxygen
08/30/07 8:25:00	5.01	5.02	
08/30/07 8:25:15	5.01	5.03	
08/30/07 8:25:30	4.95	5.58	
08/30/07 8:25:45	5.07	6.61	
08/30/07 8:26:00	9.72	12.70	
08/30/07 8:26:15	16.18	17.65	
08/30/07 8:26:30	20.25	20.49	
08/30/07 8:26:45	21.99	21.63	
08/30/07 8:27:00	22.38	21.86	
08/30/07 8:27:15	22.44	21.94	
08/30/07 8:27:30	22.45	21.99	
08/30/07 8:27:45	22.47	22.02	
08/30/07 8:28:00	22.48	22.05	
08/30/07 8:28:15	22.48	22.07	
08/30/07 8:28:30	22.49	22.09	
08/30/07 8:28:45	22.49	22.11	
System Bias Check:			
08/30/07 8:29:00	22.49	22.11	22.82% CO2 injection:
08/30/07 8:29:15	22.50	22.13	22.12 % db CO2
08/30/07 8:29:30	22.50	22.14	
08/30/07 8:29:45	22.48	22.11	
08/30/07 8:30:00	19.42	21.03	
08/30/07 8:30:15	9.83	19.62	
08/30/07 8:30:30	3.38	19.05	
08/30/07 8:30:45	1.82	19.01	
08/30/07 8:31:00	1.60	18.98	
08/30/07 8:31:15	1.59	18.94	
08/30/07 8:31:30	1.56	18.96	
08/30/07 8:31:45	1.51	18.98	
08/30/07 8:32:00	1.49	18.97	
08/30/07 8:32:15	1.50	18.96	
08/30/07 8:32:30	1.45	19.03	
08/30/07 8:32:45	1.40	19.04	
08/30/07 8:33:00	1.40	19.03	
08/30/07 8:33:15	1.40	19.04	
08/30/07 8:33:30	1.40	19.06	
08/30/07 8:33:45	1.35	19.09	
08/30/07 8:34:00	1.34	19.07	
08/30/07 8:34:15	1.38	19.03	
08/30/07 8:34:30	1.40	19.03	
08/30/07 8:34:45	1.40	19.02	
08/30/07 8:35:00	1.43	19.00	
08/30/07 8:35:15	1.42	19.04	
08/30/07 8:35:30	1.37	19.05	
08/30/07 8:35:45	1.38	19.02	
08/30/07 8:36:00	1.41	18.98	
08/30/07 8:36:15	1.41	19.02	
08/30/07 8:36:30	1.37	19.07	
08/30/07 8:36:45	1.35	19.07	
08/30/07 8:37:00	1.37	19.07	
08/30/07 8:37:15	1.36	19.08	
08/30/07 8:37:30	1.36	19.06	

08/30/07 8:37:45	1.38	19.04	Begin M29-2

08/30/07 8:38:00	1.41	19.02
08/30/07 8:38:15	1.40	19.04
08/30/07 8:38:30	1.40	19.04
08/30/07 8:38:45	1.40	19.06
08/30/07 8:39:00	1.38	19.09
08/30/07 8:39:15	1.36	19.08
08/30/07 8:39:30	1.39	19.04
08/30/07 8:39:45	1.44	19.01
08/30/07 8:40:00	1.44	19.01
08/30/07 8:40:15	1.45	18.99
08/30/07 8:40:30	1.47	18.97
08/30/07 8:40:45	1.49	18.97
08/30/07 8:41:00	1.46	19.01
08/30/07 8:41:15	1.44	19.04
08/30/07 8:41:30	1.39	19.10
08/30/07 8:41:45	1.33	19.11
08/30/07 8:42:00	1.38	19.04
08/30/07 8:42:15	1.43	18.99
08/30/07 8:42:30	1.48	18.96
08/30/07 8:42:45	1.45	19.03
08/30/07 8:43:00	1.38	19.08
08/30/07 8:43:15	1.34	19.10
08/30/07 8:43:30	1.37	19.03
08/30/07 8:43:45	1.46	18.97
08/30/07 8:44:00	1.46	18.97
08/30/07 8:44:15	1.46	18.98
08/30/07 8:44:30	1.45	18.99
08/30/07 8:44:45	1.43	19.01
08/30/07 8:45:00	1.38	19.06
08/30/07 8:45:15	1.30	19.11
08/30/07 8:45:30	1.30	19.06
08/30/07 8:45:45	1.36	19.04
08/30/07 8:46:00	1.32	19.09
08/30/07 8:46:15	1.31	19.07
08/30/07 8:46:30	1.32	19.07
08/30/07 8:46:45	1.29	19.07
08/30/07 8:47:00	1.30	19.05
08/30/07 8:47:15	1.32	19.02
08/30/07 8:47:30	1.32	19.06
08/30/07 8:47:45	1.26	19.12
08/30/07 8:48:00	1.23	19.14
08/30/07 8:48:15	1.22	19.15
08/30/07 8:48:30	1.21	19.14
08/30/07 8:48:45	1.24	19.11
08/30/07 8:49:00	1.27	19.09
08/30/07 8:49:15	1.25	19.12
08/30/07 8:49:30	1.24	19.11
08/30/07 8:49:45	1.25	19.11
08/30/07 8:50:00	1.25	19.09
08/30/07 8:50:15	1.30	19.03
08/30/07 8:50:30	1.35	19.01
08/30/07 8:50:45	1.33	19.03
08/30/07 8:51:00	1.33	19.01
08/30/07 8:51:15	1.38	19.00
08/30/07 8:51:30	1.35	19.03
08/30/07 8:51:45	1.30	19.08
08/30/07 8:52:00	1.27	19.10
08/30/07 8:52:15	1.25	19.14
08/30/07 8:52:30	1.22	19.13
08/30/07 8:52:45	1.25	19.10
08/30/07 8:53:00	1.26	19.10
08/30/07 8:53:15	1.30	19.02
08/30/07 8:53:30	1.39	18.99
08/30/07 8:53:45	1.37	19.03
08/30/07 8:54:00	1.36	19.00
08/30/07 8:54:15	1.39	18.98
08/30/07 8:54:30	1.34	19.06
08/30/07 8:54:45	1.29	19.06
08/30/07 8:55:00	1.31	19.05
08/30/07 8:55:15	1.28	19.11
08/30/07 8:55:30	1.22	19.18
08/30/07 8:55:45	1.18	19.19
08/30/07 8:56:00	1.21	19.11
08/30/07 8:56:15	1.30	19.04
08/30/07 8:56:30	1.30	19.09
08/30/07 8:56:45	1.19	19.20
08/30/07 8:57:00	1.11	19.25
08/30/07 8:57:15	1.13	19.20
08/30/07 8:57:30	1.18	19.18
08/30/07 8:57:45	1.20	19.16
08/30/07 8:58:00	1.21	19.15
08/30/07 8:58:15	1.20	19.13
08/30/07 8:58:30	1.24	19.09

08/30/07 8:58:45	1.27	19.09
08/30/07 8:59:00	1.28	19.10
08/30/07 8:59:15	1.27	19.09
08/30/07 8:59:30	1.32	19.04
08/30/07 8:59:45	1.30	19.10
08/30/07 9:00:00	1.21	19.17
08/30/07 9:00:15	1.19	19.17
08/30/07 9:00:30	1.18	19.17
08/30/07 9:00:45	1.21	19.12
08/30/07 9:01:00	1.25	19.10
08/30/07 9:01:15	1.28	19.08
08/30/07 9:01:30	1.28	19.12
08/30/07 9:01:45	1.20	19.17
08/30/07 9:02:00	1.18	19.18
08/30/07 9:02:15	1.16	19.22
08/30/07 9:02:30	1.14	19.22
08/30/07 9:02:45	1.16	19.17
08/30/07 9:03:00	1.19	19.16
08/30/07 9:03:15	1.17	19.19
08/30/07 9:03:30	1.12	19.25
08/30/07 9:03:45	1.08	19.28
08/30/07 9:04:00	1.07	19.29
08/30/07 9:04:15	1.08	19.25
08/30/07 9:04:30	1.13	19.21
08/30/07 9:04:45	1.15	19.21
08/30/07 9:05:00	1.13	19.25
08/30/07 9:05:15	1.07	19.26
08/30/07 9:05:30	1.12	19.19
08/30/07 9:05:45	1.22	19.15
08/30/07 9:06:00	1.22	19.14
08/30/07 9:06:15	1.26	19.12
08/30/07 9:06:30	1.23	19.19
08/30/07 9:06:45	1.14	19.27
08/30/07 9:07:00	1.10	19.27
08/30/07 9:07:15	1.17	19.20
08/30/07 9:07:30	1.24	19.14
08/30/07 9:07:45	1.27	19.10
08/30/07 9:08:00	1.32	19.05
08/30/07 9:08:15	1.38	19.01
08/30/07 9:08:30	1.36	19.09
08/30/07 9:08:45	1.27	19.14
08/30/07 9:09:00	1.26	19.14
08/30/07 9:09:15	1.26	19.15
08/30/07 9:09:30	1.24	19.18
08/30/07 9:09:45	1.26	19.14
08/30/07 9:10:00	1.31	19.11
08/30/07 9:10:15	1.31	19.11
08/30/07 9:10:30	1.29	19.14
08/30/07 9:10:45	1.29	19.14
08/30/07 9:11:00	1.28	19.14
08/30/07 9:11:15	1.31	19.11
08/30/07 9:11:30	1.30	19.13
08/30/07 9:11:45	1.30	19.11
08/30/07 9:12:00	1.31	19.12
08/30/07 9:12:15	1.28	19.16
08/30/07 9:12:30	1.25	19.17
08/30/07 9:12:45	1.27	19.15
08/30/07 9:13:00	1.26	19.17
08/30/07 9:13:15	1.26	19.14
08/30/07 9:13:30	1.32	19.10
08/30/07 9:13:45	1.32	19.13
08/30/07 9:14:00	1.32	19.08
08/30/07 9:14:15	1.39	19.02
08/30/07 9:14:30	1.38	19.08
08/30/07 9:14:45	1.30	19.13
08/30/07 9:15:00	1.33	19.05
08/30/07 9:15:15	1.43	18.99
08/30/07 9:15:30	1.44	19.01
08/30/07 9:15:45	1.45	18.94
08/30/07 9:16:00	1.56	18.85
08/30/07 9:16:15	1.54	18.93
08/30/07 9:16:30	1.42	19.02
08/30/07 9:16:45	1.36	19.03
08/30/07 9:17:00	1.39	18.98
08/30/07 9:17:15	1.44	18.96
08/30/07 9:17:30	1.43	18.98
08/30/07 9:17:45	1.40	18.99
08/30/07 9:18:00	1.39	19.01
08/30/07 9:18:15	1.37	19.03
08/30/07 9:18:30	1.36	19.04
08/30/07 9:18:45	1.30	19.12
08/30/07 9:19:00	1.23	19.17
08/30/07 9:19:15	1.20	19.17
08/30/07 9:19:30	1.24	19.12

08/30/07 9:19:45	1.29	19.07	
08/30/07 9:20:00	1.32	19.05	
08/30/07 9:20:15	1.29	19.11	
08/30/07 9:20:30	1.21	19.18	
08/30/07 9:20:45	1.19	19.16	
08/30/07 9:21:00	1.22	19.13	
08/30/07 9:21:15	1.23	19.15	
08/30/07 9:21:30	1.19	19.17	
08/30/07 9:21:45	1.23	19.12	
08/30/07 9:22:00	1.27	19.10	
08/30/07 9:22:15	1.27	19.09	
08/30/07 9:22:30	1.25	19.13	
08/30/07 9:22:45	1.22	19.16	
08/30/07 9:23:00	1.17	19.21	
08/30/07 9:23:15	1.12	19.25	
08/30/07 9:23:30	1.11	19.24	
08/30/07 9:23:45	1.18	19.16	
08/30/07 9:24:00	1.25	19.13	
08/30/07 9:24:15	1.23	19.17	
08/30/07 9:24:30	1.18	19.19	
08/30/07 9:24:45	1.18	19.18	
08/30/07 9:25:00	1.16	19.22	
08/30/07 9:25:15	1.14	19.21	
08/30/07 9:25:30	1.17	19.19	
08/30/07 9:25:45	1.14	19.24	
08/30/07 9:26:00	1.12	19.23	
08/30/07 9:26:15	1.19	19.16	
08/30/07 9:26:30	1.26	19.12	
08/30/07 9:26:45	1.28	19.12	
08/30/07 9:27:00	1.22	19.20	
08/30/07 9:27:15	1.15	19.22	
08/30/07 9:27:30	1.16	19.21	
08/30/07 9:27:45	1.15	19.23	
08/30/07 9:28:00	1.13	19.24	
08/30/07 9:28:15	1.16	19.22	
08/30/07 9:28:30	1.15	19.24	
08/30/07 9:28:45	1.12	19.27	Start VOST-1
08/30/07 9:29:00	1.13	19.23	
08/30/07 9:29:15	1.21	19.17	
08/30/07 9:29:30	1.24	19.17	
08/30/07 9:29:45	1.16	19.26	
08/30/07 9:30:00	1.07	19.32	
08/30/07 9:30:15	1.06	19.30	
08/30/07 9:30:30	1.09	19.31	
08/30/07 9:30:45	1.03	19.37	
08/30/07 9:31:00	0.97	19.42	
08/30/07 9:31:15	0.99	19.37	
08/30/07 9:31:30	1.07	19.32	
08/30/07 9:31:45	1.13	19.26	
08/30/07 9:32:00	1.23	19.16	
08/30/07 9:32:15	1.31	19.13	
08/30/07 9:32:30	1.29	19.14	
08/30/07 9:32:45	1.30	19.10	
08/30/07 9:33:00	1.36	19.06	
08/30/07 9:33:15	1.42	19.06	
08/30/07 9:33:30	1.41	19.06	
08/30/07 9:33:45	1.36	19.09	
08/30/07 9:34:00	1.34	19.09	
08/30/07 9:34:15	1.31	19.13	
08/30/07 9:34:30	1.29	19.14	
08/30/07 9:34:45	1.26	19.19	
08/30/07 9:35:00	1.22	19.18	
08/30/07 9:35:15	1.27	19.14	
08/30/07 9:35:30	1.29	19.13	
08/30/07 9:35:45	1.25	19.17	
08/30/07 9:36:00	1.22	19.18	
08/30/07 9:36:15	1.24	19.15	
08/30/07 9:36:30	1.28	19.11	
08/30/07 9:36:45	1.32	19.09	
08/30/07 9:37:00	1.30	19.16	
08/30/07 9:37:15	1.22	19.20	
08/30/07 9:37:30	1.22	19.16	
08/30/07 9:37:45	1.29	19.09	M29-2 port change
08/30/07 9:38:00	1.31	19.09	
08/30/07 9:38:15	1.33	19.03	
08/30/07 9:38:30	1.40	19.00	
08/30/07 9:38:45	1.35	19.09	
08/30/07 9:39:00	1.22	19.21	
08/30/07 9:39:15	1.17	19.21	
08/30/07 9:39:30	1.27	19.07	
08/30/07 9:39:45	1.43	18.97	
08/30/07 9:40:00	1.43	19.02	
08/30/07 9:40:15	1.38	19.01	
08/30/07 9:40:30	1.46	18.91	

08/30/07 9:40:45	1.55	18.85
08/30/07 9:41:00	1.56	18.87
08/30/07 9:41:15	1.49	18.95
08/30/07 9:41:30	1.42	18.99
08/30/07 9:41:45	1.40	18.98
08/30/07 9:42:00	1.40	19.00
08/30/07 9:42:15	1.35	19.06
08/30/07 9:42:30	1.31	19.08
08/30/07 9:42:45	1.27	19.13

Resume M29-2

08/30/07 9:43:00	1.23	19.15
08/30/07 9:43:15	1.23	19.14
08/30/07 9:43:30	1.19	19.22
08/30/07 9:43:45	1.09	19.30
08/30/07 9:44:00	1.06	19.31
08/30/07 9:44:15	1.07	19.27
08/30/07 9:44:30	1.11	19.24
08/30/07 9:44:45	1.14	19.21
08/30/07 9:45:00	1.16	19.21
08/30/07 9:45:15	1.12	19.25
08/30/07 9:45:30	1.09	19.28
08/30/07 9:45:45	1.07	19.30
08/30/07 9:46:00	1.06	19.29
08/30/07 9:46:15	1.16	19.14
08/30/07 9:46:30	1.23	19.15
08/30/07 9:46:45	1.12	19.26
08/30/07 9:47:00	1.08	19.23
08/30/07 9:47:15	1.15	19.14
08/30/07 9:47:30	1.25	19.07
08/30/07 9:47:45	1.29	19.07
08/30/07 9:48:00	1.28	19.09
08/30/07 9:48:15	1.24	19.13
08/30/07 9:48:30	1.24	19.09
08/30/07 9:48:45	1.29	19.06
08/30/07 9:49:00	1.26	19.11
08/30/07 9:49:15	1.20	19.14
08/30/07 9:49:30	1.19	19.14
08/30/07 9:49:45	1.18	19.17
08/30/07 9:50:00	1.16	19.17
08/30/07 9:50:15	1.19	19.16
08/30/07 9:50:30	1.19	19.14
08/30/07 9:50:45	1.23	19.11
08/30/07 9:51:00	1.25	19.06
08/30/07 9:51:15	1.36	18.95
08/30/07 9:51:30	1.41	18.97
08/30/07 9:51:45	1.38	18.99
08/30/07 9:52:00	1.40	18.95
08/30/07 9:52:15	1.45	18.91
08/30/07 9:52:30	1.48	18.91
08/30/07 9:52:45	1.43	18.98
08/30/07 9:53:00	1.35	19.03
08/30/07 9:53:15	1.34	19.03
08/30/07 9:53:30	1.33	19.03
08/30/07 9:53:45	1.33	19.04
08/30/07 9:54:00	1.32	19.04
08/30/07 9:54:15	1.41	18.93
08/30/07 9:54:30	1.48	18.90
08/30/07 9:54:45	1.46	18.97
08/30/07 9:55:00	1.37	19.04
08/30/07 9:55:15	1.36	19.01
08/30/07 9:55:30	1.41	18.96
08/30/07 9:55:45	1.42	18.98
08/30/07 9:56:00	1.40	18.98
08/30/07 9:56:15	1.41	18.99
08/30/07 9:56:30	1.36	19.03
08/30/07 9:56:45	1.38	18.98
08/30/07 9:57:00	1.44	18.95
08/30/07 9:57:15	1.43	18.96
08/30/07 9:57:30	1.43	18.95
08/30/07 9:57:45	1.45	18.95
08/30/07 9:58:00	1.44	18.95
08/30/07 9:58:15	1.41	18.98
08/30/07 9:58:30	1.38	18.99
08/30/07 9:58:45	1.36	19.04
08/30/07 9:59:00	1.29	19.11
08/30/07 9:59:15	1.23	19.12
08/30/07 9:59:30	1.25	19.08
08/30/07 9:59:45	1.29	19.09
08/30/07 10:00:00	1.26	19.12
08/30/07 10:00:15	1.23	19.11
08/30/07 10:00:30	1.24	19.10
08/30/07 10:00:45	1.24	19.11
08/30/07 10:01:00	1.24	19.11
08/30/07 10:01:15	1.24	19.15
08/30/07 10:01:30	1.17	19.21

08/30/07 10:01:45	1.09	19.26
08/30/07 10:02:00	1.09	19.20
08/30/07 10:02:15	1.22	19.08
08/30/07 10:02:30	1.29	19.04
08/30/07 10:02:45	1.30	19.03
08/30/07 10:03:00	1.32	19.01
08/30/07 10:03:15	1.34	19.00
08/30/07 10:03:30	1.32	19.02
08/30/07 10:03:45	1.31	19.01
08/30/07 10:04:00	1.37	18.92
08/30/07 10:04:15	1.52	18.77
08/30/07 10:04:30	1.58	18.83
08/30/07 10:04:45	1.45	18.94
08/30/07 10:05:00	1.40	18.95
08/30/07 10:05:15	1.39	18.97
08/30/07 10:05:30	1.37	19.00
08/30/07 10:05:45	1.31	19.06
08/30/07 10:06:00	1.24	19.12
08/30/07 10:06:15	1.19	19.13
08/30/07 10:06:30	1.23	19.08
08/30/07 10:06:45	1.32	19.01
08/30/07 10:07:00	1.35	19.01
08/30/07 10:07:15	1.30	19.06
08/30/07 10:07:30	1.31	19.01
08/30/07 10:07:45	1.41	18.95
08/30/07 10:08:00	1.43	18.95
08/30/07 10:08:15	1.39	19.02
08/30/07 10:08:30	1.27	19.11
08/30/07 10:08:45	1.20	19.11
08/30/07 10:09:00	1.22	19.09
08/30/07 10:09:15	1.20	19.15
08/30/07 10:09:30	1.16	19.17
08/30/07 10:09:45	1.20	19.11
08/30/07 10:10:00	1.30	19.06
08/30/07 10:10:15	1.29	19.10
08/30/07 10:10:30	1.22	19.15
08/30/07 10:10:45	1.18	19.16
08/30/07 10:11:00	1.19	19.13
08/30/07 10:11:15	1.24	19.09
08/30/07 10:11:30	1.27	19.08
08/30/07 10:11:45	1.27	19.11
08/30/07 10:12:00	1.20	19.17
08/30/07 10:12:15	1.19	19.16
08/30/07 10:12:30	1.23	19.10
08/30/07 10:12:45	1.28	19.07
08/30/07 10:13:00	1.28	19.06
08/30/07 10:13:15	1.31	19.03
08/30/07 10:13:30	1.35	19.01
08/30/07 10:13:45	1.41	18.94
08/30/07 10:14:00	1.51	18.85
08/30/07 10:14:15	1.57	18.82
08/30/07 10:14:30	1.62	18.75
08/30/07 10:14:45	1.73	18.65
08/30/07 10:15:00	1.76	18.71
08/30/07 10:15:15	1.62	18.83
08/30/07 10:15:30	1.57	18.83
08/30/07 10:15:45	1.64	18.74
08/30/07 10:16:00	1.73	18.69
08/30/07 10:16:15	1.67	18.79
08/30/07 10:16:30	1.51	18.93
08/30/07 10:16:45	1.44	18.93
08/30/07 10:17:00	1.47	18.90
08/30/07 10:17:15	1.48	18.91
08/30/07 10:17:30	1.45	18.94
08/30/07 10:17:45	1.41	19.00
08/30/07 10:18:00	1.36	19.02
08/30/07 10:18:15	1.39	18.94
08/30/07 10:18:30	1.52	18.84
08/30/07 10:18:45	1.51	18.92
08/30/07 10:19:00	1.38	19.03
08/30/07 10:19:15	1.30	19.10
08/30/07 10:19:30	1.22	19.15
08/30/07 10:19:45	1.20	19.15
08/30/07 10:20:00	1.15	19.22
08/30/07 10:20:15	1.08	19.25
08/30/07 10:20:30	1.11	19.20
08/30/07 10:20:45	1.17	19.16
08/30/07 10:21:00	1.15	19.20
08/30/07 10:21:15	1.09	19.27
08/30/07 10:21:30	1.04	19.30
08/30/07 10:21:45	1.01	19.31
08/30/07 10:22:00	1.03	19.26
08/30/07 10:22:15	1.08	19.24
08/30/07 10:22:30	1.09	19.26

08/30/07 10:22:45	1.06	19.29
08/30/07 10:23:00	1.07	19.26
08/30/07 10:23:15	1.08	19.26
08/30/07 10:23:30	1.06	19.29
08/30/07 10:23:45	1.05	19.26
08/30/07 10:24:00	1.09	19.22
08/30/07 10:24:15	1.10	19.23
08/30/07 10:24:30	1.12	19.19
08/30/07 10:24:45	1.16	19.16
08/30/07 10:25:00	1.17	19.16
08/30/07 10:25:15	1.18	19.15
08/30/07 10:25:30	1.18	19.18
08/30/07 10:25:45	1.16	19.21
08/30/07 10:26:00	1.15	19.19
08/30/07 10:26:15	1.20	19.13
08/30/07 10:26:30	1.24	19.12
08/30/07 10:26:45	1.22	19.15
08/30/07 10:27:00	1.15	19.23
08/30/07 10:27:15	1.07	19.28
08/30/07 10:27:30	1.04	19.30
08/30/07 10:27:45	1.06	19.25
08/30/07 10:28:00	1.14	19.18
08/30/07 10:28:15	1.18	19.17
08/30/07 10:28:30	1.19	19.14
08/30/07 10:28:45	1.23	19.11
08/30/07 10:29:00	1.22	19.13
08/30/07 10:29:15	1.21	19.11
08/30/07 10:29:30	1.23	19.12
08/30/07 10:29:45	1.20	19.14
08/30/07 10:30:00	1.20	19.12
08/30/07 10:30:15	1.22	19.11
08/30/07 10:30:30	1.22	19.13
08/30/07 10:30:45	1.19	19.14
08/30/07 10:31:00	1.20	19.14
08/30/07 10:31:15	1.19	19.16
08/30/07 10:31:30	1.22	19.10
08/30/07 10:31:45	1.30	19.03
08/30/07 10:32:00	1.29	19.08
08/30/07 10:32:15	1.23	19.11
08/30/07 10:32:30	1.22	19.09
08/30/07 10:32:45	1.27	19.03
08/30/07 10:33:00	1.31	19.03
08/30/07 10:33:15	1.25	19.11
08/30/07 10:33:30	1.17	19.17
08/30/07 10:33:45	1.14	19.17
08/30/07 10:34:00	1.17	19.15
08/30/07 10:34:15	1.18	19.14
08/30/07 10:34:30	1.20	19.11
08/30/07 10:34:45	1.21	19.12
08/30/07 10:35:00	1.21	19.10
08/30/07 10:35:15	1.29	19.02
08/30/07 10:35:30	1.31	19.00
08/30/07 10:35:45	1.32	19.00
08/30/07 10:36:00	1.29	19.07
08/30/07 10:36:15	1.25	19.06
08/30/07 10:36:30	1.28	19.06
08/30/07 10:36:45	1.24	19.10
08/30/07 10:37:00	1.21	19.14
08/30/07 10:37:15	1.21	19.11
08/30/07 10:37:30	1.25	19.08
08/30/07 10:37:45	1.25	19.09
08/30/07 10:38:00	1.23	19.10
08/30/07 10:38:15	1.26	19.06
08/30/07 10:38:30	1.26	19.10
08/30/07 10:38:45	1.18	19.16
08/30/07 10:39:00	1.16	19.15
08/30/07 10:39:15	1.16	19.15
08/30/07 10:39:30	1.20	19.12
08/30/07 10:39:45	1.23	19.10
08/30/07 10:40:00	1.22	19.14
08/30/07 10:40:15	1.15	19.21
08/30/07 10:40:30	1.11	19.21
08/30/07 10:40:45	1.12	19.21
08/30/07 10:41:00	1.11	19.22
08/30/07 10:41:15	1.10	19.22
08/30/07 10:41:30	1.12	19.19
08/30/07 10:41:45	1.14	19.19
08/30/07 10:42:00	1.11	19.23
08/30/07 10:42:15	1.04	19.29
08/30/07 10:42:30	1.03	19.24
08/30/07 10:42:45	1.13	19.15
M29-2 port change		
08/30/07 10:43:00	1.14	19.19
08/30/07 10:43:15	1.06	19.26
08/30/07 10:43:30	1.04	19.25

08/30/07 10:43:45	1.05	19.24
08/30/07 10:44:00	1.06	19.22
08/30/07 10:44:15	1.07	19.22
08/30/07 10:44:30	1.08	19.20
08/30/07 10:44:45	1.15	19.11
08/30/07 10:45:00	1.23	19.07
08/30/07 10:45:15	1.23	19.10
08/30/07 10:45:30	1.18	19.14
08/30/07 10:45:45	1.16	19.14
08/30/07 10:46:00	1.19	19.12
08/30/07 10:46:15	1.17	19.17
08/30/07 10:46:30	1.18	19.11
08/30/07 10:46:45	1.26	19.04
08/30/07 10:47:00	1.28	19.05
08/30/07 10:47:15	1.28	19.02
08/30/07 10:47:30	1.34	18.96
08/30/07 10:47:45	1.36	18.97
08/30/07 10:48:00	1.33	18.98
08/30/07 10:48:15	1.35	18.96
08/30/07 10:48:30	1.33	19.01
08/30/07 10:48:45	1.22	19.15
08/30/07 10:49:00	1.12	19.18
08/30/07 10:49:15	1.17	19.10
08/30/07 10:49:30	1.25	19.03
08/30/07 10:49:45	1.27	19.03

M29-2 resume sampling

08/30/07 10:50:00	1.23	19.10
08/30/07 10:50:15	1.17	19.16
08/30/07 10:50:30	1.16	19.15
08/30/07 10:50:45	1.18	19.14
08/30/07 10:51:00	1.18	19.13
08/30/07 10:51:15	1.18	19.11
08/30/07 10:51:30	1.18	19.12
08/30/07 10:51:45	1.16	19.15
08/30/07 10:52:00	1.13	19.17
08/30/07 10:52:15	1.11	19.19
08/30/07 10:52:30	1.16	19.09
08/30/07 10:52:45	1.28	19.01
08/30/07 10:53:00	1.30	19.04
08/30/07 10:53:15	1.26	19.10
08/30/07 10:53:30	1.20	19.14
08/30/07 10:53:45	1.16	19.18
08/30/07 10:54:00	1.11	19.20
08/30/07 10:54:15	1.14	19.14
08/30/07 10:54:30	1.19	19.11
08/30/07 10:54:45	1.18	19.13
08/30/07 10:55:00	1.19	19.10
08/30/07 10:55:15	1.21	19.12
08/30/07 10:55:30	1.15	19.20
08/30/07 10:55:45	1.10	19.21
08/30/07 10:56:00	1.12	19.19
08/30/07 10:56:15	1.14	19.15
08/30/07 10:56:30	1.19	19.11
08/30/07 10:56:45	1.20	19.11
08/30/07 10:57:00	1.20	19.11
08/30/07 10:57:15	1.18	19.16
08/30/07 10:57:30	1.15	19.15
08/30/07 10:57:45	1.17	19.14
08/30/07 10:58:00	1.12	19.24
08/30/07 10:58:15	1.04	19.30
08/30/07 10:58:30	0.99	19.32
08/30/07 10:58:45	1.01	19.28
08/30/07 10:59:00	1.04	19.28
08/30/07 10:59:15	0.97	19.37
08/30/07 10:59:30	0.90	19.40
08/30/07 10:59:45	0.89	19.39
08/30/07 11:00:00	0.92	19.35
08/30/07 11:00:15	0.97	19.31
08/30/07 11:00:30	1.01	19.34
08/30/07 11:00:45	0.98	19.36
08/30/07 11:01:00	1.00	19.32
08/30/07 11:01:15	1.03	19.30
08/30/07 11:01:30	1.02	19.30
08/30/07 11:01:45	1.07	19.21
08/30/07 11:02:00	1.17	19.14
08/30/07 11:02:15	1.18	19.20
08/30/07 11:02:30	1.09	19.26
08/30/07 11:02:45	1.09	19.24
08/30/07 11:03:00	1.12	19.19
08/30/07 11:03:15	1.19	19.15
08/30/07 11:03:30	1.18	19.17
08/30/07 11:03:45	1.14	19.19
08/30/07 11:04:00	1.19	19.12
08/30/07 11:04:15	1.29	19.02
08/30/07 11:04:30	1.38	18.95

08/30/07 11:04:45	1.41	18.94
08/30/07 11:05:00	1.40	18.96
08/30/07 11:05:15	1.34	19.05
08/30/07 11:05:30	1.29	19.06
08/30/07 11:05:45	1.30	19.07
08/30/07 11:06:00	1.25	19.12
08/30/07 11:06:15	1.24	19.13
08/30/07 11:06:30	1.25	19.12
08/30/07 11:06:45	1.24	19.14
08/30/07 11:07:00	1.22	19.17
08/30/07 11:07:15	1.19	19.21
08/30/07 11:07:30	1.17	19.23
08/30/07 11:07:45	1.15	19.26
08/30/07 11:08:00	1.14	19.25
08/30/07 11:08:15	1.17	19.23
08/30/07 11:08:30	1.19	19.22
08/30/07 11:08:45	1.21	19.21
08/30/07 11:09:00	1.23	19.21
08/30/07 11:09:15	1.22	19.21
08/30/07 11:09:30	1.26	19.15
08/30/07 11:09:45	1.31	19.13
08/30/07 11:10:00	1.31	19.13
08/30/07 11:10:15	1.30	19.14
08/30/07 11:10:30	1.30	19.16
08/30/07 11:10:45	1.29	19.17
08/30/07 11:11:00	1.31	19.12
08/30/07 11:11:15	1.37	19.06
08/30/07 11:11:30	1.42	19.03
08/30/07 11:11:45	1.45	19.03
08/30/07 11:12:00	1.44	19.07
08/30/07 11:12:15	1.40	19.06
08/30/07 11:12:30	1.43	19.03
08/30/07 11:12:45	1.42	19.06
08/30/07 11:13:00	1.41	19.05
08/30/07 11:13:15	1.43	19.03
08/30/07 11:13:30	1.46	19.01
08/30/07 11:13:45	1.45	19.03
08/30/07 11:14:00	1.42	19.06
08/30/07 11:14:15	1.41	19.06
08/30/07 11:14:30	1.44	18.99
08/30/07 11:14:45	1.53	18.95
08/30/07 11:15:00	1.50	18.99
08/30/07 11:15:15	1.51	18.96
08/30/07 11:15:30	1.51	18.99
08/30/07 11:15:45	1.47	19.02
08/30/07 11:16:00	1.49	18.97
08/30/07 11:16:15	1.57	18.93
08/30/07 11:16:30	1.52	19.00
08/30/07 11:16:45	1.47	19.01
08/30/07 11:17:00	1.51	18.96
08/30/07 11:17:15	1.58	18.91
08/30/07 11:17:30	1.60	18.92
08/30/07 11:17:45	1.53	18.99
08/30/07 11:18:00	1.51	18.98
08/30/07 11:18:15	1.51	19.00
08/30/07 11:18:30	1.44	19.08
08/30/07 11:18:45	1.35	19.16
08/30/07 11:19:00	1.30	19.19
08/30/07 11:19:15	1.31	19.18
08/30/07 11:19:30	1.33	19.17
08/30/07 11:19:45	1.31	19.20
08/30/07 11:20:00	1.25	19.26
08/30/07 11:20:15	1.19	19.28
08/30/07 11:20:30	1.22	19.24
08/30/07 11:20:45	1.21	19.27
08/30/07 11:21:00	1.19	19.26
08/30/07 11:21:15	1.21	19.26
08/30/07 11:21:30	1.19	19.27
08/30/07 11:21:45	1.20	19.26
08/30/07 11:22:00	1.17	19.30
08/30/07 11:22:15	1.16	19.27
08/30/07 11:22:30	1.24	19.16
08/30/07 11:22:45	1.34	19.15
08/30/07 11:23:00	1.26	19.25
08/30/07 11:23:15	1.18	19.28
08/30/07 11:23:30	1.20	19.22
08/30/07 11:23:45	1.29	19.15
08/30/07 11:24:00	1.32	19.15
08/30/07 11:24:15	1.33	19.13
08/30/07 11:24:30	1.32	19.16
08/30/07 11:24:45	1.27	19.21
08/30/07 11:25:00	1.20	19.28
08/30/07 11:25:15	1.13	19.32
08/30/07 11:25:30	1.13	19.29

08/30/07 11:25:45	1.20	19.21
08/30/07 11:26:00	1.29	19.15
08/30/07 11:26:15	1.28	19.20
08/30/07 11:26:30	1.22	19.22
08/30/07 11:26:45	1.23	19.20
08/30/07 11:27:00	1.24	19.23
08/30/07 11:27:15	1.16	19.29
08/30/07 11:27:30	1.17	19.25
08/30/07 11:27:45	1.18	19.28
08/30/07 11:28:00	1.14	19.31
08/30/07 11:28:15	1.12	19.31
08/30/07 11:28:30	1.11	19.30
08/30/07 11:28:45	1.13	19.29
08/30/07 11:29:00	1.17	19.27
08/30/07 11:29:15	1.22	19.23
08/30/07 11:29:30	1.26	19.19
08/30/07 11:29:45	1.28	19.15
08/30/07 11:30:00	1.33	19.11
08/30/07 11:30:15	1.35	19.10
08/30/07 11:30:30	1.38	19.04
08/30/07 11:30:45	1.45	18.98
08/30/07 11:31:00	1.49	18.98
08/30/07 11:31:15	1.43	19.06
08/30/07 11:31:30	1.35	19.10
08/30/07 11:31:45	1.35	19.08
08/30/07 11:32:00	1.40	19.04
08/30/07 11:32:15	1.43	19.04
08/30/07 11:32:30	1.37	19.11
08/30/07 11:32:45	1.34	19.10
08/30/07 11:33:00	1.41	19.02
08/30/07 11:33:15	1.45	19.03
08/30/07 11:33:30	1.41	19.05
08/30/07 11:33:45	1.43	19.03
08/30/07 11:34:00	1.41	19.07
08/30/07 11:34:15	1.36	19.09
08/30/07 11:34:30	1.39	19.03
08/30/07 11:34:45	1.40	19.08
08/30/07 11:35:00	1.30	19.18
08/30/07 11:35:15	1.23	19.23
08/30/07 11:35:30	1.23	19.21
08/30/07 11:35:45	1.29	19.16
08/30/07 11:36:00	1.31	19.16
08/30/07 11:36:15	1.33	19.12
08/30/07 11:36:30	1.37	19.10
08/30/07 11:36:45	1.33	19.14
08/30/07 11:37:00	1.34	19.09
08/30/07 11:37:15	1.38	19.06
08/30/07 11:37:30	1.39	19.05
08/30/07 11:37:45	1.39	19.05
08/30/07 11:38:00	1.37	19.06
08/30/07 11:38:15	1.39	19.04
08/30/07 11:38:30	1.40	19.03
08/30/07 11:38:45	1.40	19.08
08/30/07 11:39:00	1.30	19.21
08/30/07 11:39:15	1.23	19.21
08/30/07 11:39:30	1.28	19.13
08/30/07 11:39:45	1.35	19.09
08/30/07 11:40:00	1.34	19.13
08/30/07 11:40:15	1.28	19.16
08/30/07 11:40:30	1.30	19.14
08/30/07 11:40:45	1.32	19.13
08/30/07 11:41:00	1.29	19.18
08/30/07 11:41:15	1.25	19.17
08/30/07 11:41:30	1.30	19.10
08/30/07 11:41:45	1.35	19.07
08/30/07 11:42:00	1.36	19.10
08/30/07 11:42:15	1.31	19.15
08/30/07 11:42:30	1.27	19.16
08/30/07 11:42:45	1.28	19.15
08/30/07 11:43:00	1.27	19.19
08/30/07 11:43:15	1.25	19.16
08/30/07 11:43:30	1.32	19.11
08/30/07 11:43:45	1.33	19.13
08/30/07 11:44:00	1.30	19.15
08/30/07 11:44:15	1.27	19.16
08/30/07 11:44:30	1.27	19.14
08/30/07 11:44:45	1.30	19.10
08/30/07 11:45:00	1.36	19.04
08/30/07 11:45:15	1.42	19.02
08/30/07 11:45:30	1.39	19.07
08/30/07 11:45:45	1.37	19.05
08/30/07 11:46:00	1.43	19.00
08/30/07 11:46:15	1.44	19.03
08/30/07 11:46:30	1.39	19.09

08/30/07 11:46:45	1.32	19.13	
08/30/07 11:47:00	1.28	19.16	
08/30/07 11:47:15	1.22	19.21	
08/30/07 11:47:30	1.17	19.23	
08/30/07 11:47:45	1.19	19.21	
08/30/07 11:48:00	1.21	19.22	
08/30/07 11:48:15	1.21	19.20	
08/30/07 11:48:30	1.26	19.16	
08/30/07 11:48:45	1.28	19.16	
08/30/07 11:49:00	1.30	19.10	
08/30/07 11:49:15	1.33	19.10	
08/30/07 11:49:30	1.29	19.13	
08/30/07 11:49:45	1.27	19.16	M29-2 port change
08/30/07 11:50:00	1.23	19.18	
08/30/07 11:50:15	1.25	19.13	
08/30/07 11:50:30	1.29	19.11	
08/30/07 11:50:45	1.31	19.09	
08/30/07 11:51:00	1.32	19.09	
08/30/07 11:51:15	1.26	19.12	
08/30/07 11:51:30	1.24	19.19	
08/30/07 11:51:45	1.14	19.25	
08/30/07 11:52:00	1.15	19.21	
08/30/07 11:52:15	1.20	19.15	
08/30/07 11:52:30	1.26	19.10	
08/30/07 11:52:45	1.29	19.10	
08/30/07 11:53:00	1.25	19.14	
08/30/07 11:53:15	1.25	19.11	
08/30/07 11:53:30	1.32	19.06	
08/30/07 11:53:45	1.30	19.12	
08/30/07 11:54:00	1.26	19.09	
08/30/07 11:54:15	1.26	19.14	
08/30/07 11:54:30	1.25	19.12	
08/30/07 11:54:45	1.35	19.03	Resume M29-2
08/30/07 11:55:00	1.41	19.00	
08/30/07 11:55:15	1.42	18.99	
08/30/07 11:55:30	1.45	18.96	
08/30/07 11:55:45	1.44	18.99	
08/30/07 11:56:00	1.38	19.04	
08/30/07 11:56:15	1.37	19.05	
08/30/07 11:56:30	1.36	19.06	
08/30/07 11:56:45	1.34	19.08	
08/30/07 11:57:00	1.37	19.03	
08/30/07 11:57:15	1.42	19.01	
08/30/07 11:57:30	1.41	19.02	
08/30/07 11:57:45	1.42	19.01	
08/30/07 11:58:00	1.36	19.09	
08/30/07 11:58:15	1.28	19.12	
08/30/07 11:58:30	1.26	19.16	
08/30/07 11:58:45	1.22	19.20	
08/30/07 11:59:00	1.18	19.22	
08/30/07 11:59:15	1.19	19.18	
08/30/07 11:59:30	1.23	19.17	
08/30/07 11:59:45	1.20	19.22	
08/30/07 12:00:00	1.17	19.22	
08/30/07 12:00:15	1.20	19.18	
08/30/07 12:00:30	1.25	19.10	
08/30/07 12:00:45	1.39	18.96	
08/30/07 12:01:00	1.47	18.95	
08/30/07 12:01:15	1.41	19.03	
08/30/07 12:01:30	1.33	19.09	
08/30/07 12:01:45	1.26	19.16	
08/30/07 12:02:00	1.22	19.17	
08/30/07 12:02:15	1.22	19.16	
08/30/07 12:02:30	1.24	19.12	
08/30/07 12:02:45	1.29	19.10	
08/30/07 12:03:00	1.28	19.12	
08/30/07 12:03:15	1.31	19.06	
08/30/07 12:03:30	1.40	18.97	
08/30/07 12:03:45	1.46	18.94	
08/30/07 12:04:00	1.46	18.98	
08/30/07 12:04:15	1.43	19.00	
08/30/07 12:04:30	1.40	19.03	
08/30/07 12:04:45	1.41	19.02	
08/30/07 12:05:00	1.36	19.08	
08/30/07 12:05:15	1.30	19.11	
08/30/07 12:05:30	1.28	19.14	
08/30/07 12:05:45	1.25	19.15	
08/30/07 12:06:00	1.25	19.16	
08/30/07 12:06:15	1.21	19.20	
08/30/07 12:06:30	1.20	19.17	
08/30/07 12:06:45	1.25	19.14	
08/30/07 12:07:00	1.23	19.18	
08/30/07 12:07:15	1.23	19.13	
08/30/07 12:07:30	1.32	19.06	

08/30/07 12:07:45	1.36	19.04
08/30/07 12:08:00	1.37	19.04
08/30/07 12:08:15	1.36	19.07
08/30/07 12:08:30	1.33	19.12
08/30/07 12:08:45	1.28	19.16
08/30/07 12:09:00	1.27	19.14
08/30/07 12:09:15	1.25	19.18
08/30/07 12:09:30	1.19	19.24
08/30/07 12:09:45	1.17	19.21
08/30/07 12:10:00	1.23	19.14
08/30/07 12:10:15	1.29	19.08
08/30/07 12:10:30	1.32	19.08
08/30/07 12:10:45	1.29	19.12
08/30/07 12:11:00	1.25	19.14
08/30/07 12:11:15	1.25	19.12
08/30/07 12:11:30	1.30	19.07
08/30/07 12:11:45	1.34	19.06
08/30/07 12:12:00	1.33	19.06
08/30/07 12:12:15	1.41	18.96
08/30/07 12:12:30	1.50	18.93
08/30/07 12:12:45	1.46	18.97
08/30/07 12:13:00	1.39	19.04
08/30/07 12:13:15	1.35	19.05
08/30/07 12:13:30	1.39	19.01
08/30/07 12:13:45	1.39	19.01
08/30/07 12:14:00	1.39	18.98
08/30/07 12:14:15	1.42	18.97
08/30/07 12:14:30	1.40	19.02
08/30/07 12:14:45	1.37	19.04
08/30/07 12:15:00	1.39	19.01
08/30/07 12:15:15	1.40	19.02
08/30/07 12:15:30	1.37	19.05
08/30/07 12:15:45	1.34	19.07
08/30/07 12:16:00	1.34	19.05
08/30/07 12:16:15	1.33	19.09
08/30/07 12:16:30	1.30	19.10
08/30/07 12:16:45	1.35	19.05
08/30/07 12:17:00	1.40	19.04
08/30/07 12:17:15	1.31	19.14
08/30/07 12:17:30	1.22	19.17
08/30/07 12:17:45	1.22	19.16
08/30/07 12:18:00	1.20	19.19
08/30/07 12:18:15	1.23	19.13
08/30/07 12:18:30	1.33	19.04
08/30/07 12:18:45	1.35	19.08
08/30/07 12:19:00	1.27	19.15
08/30/07 12:19:15	1.21	19.19
08/30/07 12:19:30	1.20	19.18
08/30/07 12:19:45	1.21	19.17
08/30/07 12:20:00	1.17	19.25
08/30/07 12:20:15	1.09	19.30
08/30/07 12:20:30	1.11	19.25
08/30/07 12:20:45	1.14	19.22
08/30/07 12:21:00	1.20	19.14
08/30/07 12:21:15	1.25	19.14
08/30/07 12:21:30	1.19	19.22
08/30/07 12:21:45	1.14	19.21
08/30/07 12:22:00	1.20	19.12
08/30/07 12:22:15	1.27	19.08
08/30/07 12:22:30	1.28	19.08
08/30/07 12:22:45	1.31	19.05
08/30/07 12:23:00	1.33	19.04
08/30/07 12:23:15	1.31	19.05
08/30/07 12:23:30	1.28	19.07
08/30/07 12:23:45	1.28	19.07
08/30/07 12:24:00	1.27	19.12
08/30/07 12:24:15	1.21	19.18
08/30/07 12:24:30	1.17	19.19
08/30/07 12:24:45	1.19	19.18
08/30/07 12:25:00	1.17	19.20
08/30/07 12:25:15	1.16	19.17
08/30/07 12:25:30	1.20	19.16
08/30/07 12:25:45	1.17	19.20
08/30/07 12:26:00	1.13	19.24
08/30/07 12:26:15	1.12	19.22
08/30/07 12:26:30	1.17	19.17
08/30/07 12:26:45	1.19	19.18
08/30/07 12:27:00	1.17	19.19
08/30/07 12:27:15	1.18	19.17
08/30/07 12:27:30	1.17	19.19
08/30/07 12:27:45	1.16	19.19
08/30/07 12:28:00	1.17	19.19
08/30/07 12:28:15	1.19	19.16
08/30/07 12:28:30	1.22	19.14

08/30/07 12:28:45	1.23	19.16
08/30/07 12:29:00	1.19	19.21
08/30/07 12:29:15	1.13	19.26
08/30/07 12:29:30	1.11	19.25
08/30/07 12:29:45	1.16	19.19
08/30/07 12:30:00	1.22	19.15
08/30/07 12:30:15	1.24	19.14
08/30/07 12:30:30	1.25	19.13
08/30/07 12:30:45	1.28	19.10
08/30/07 12:31:00	1.31	19.09
08/30/07 12:31:15	1.31	19.09
08/30/07 12:31:30	1.35	19.05
08/30/07 12:31:45	1.35	19.10
08/30/07 12:32:00	1.22	19.25
08/30/07 12:32:15	1.13	19.27
08/30/07 12:32:30	1.17	19.22
08/30/07 12:32:45	1.23	19.18
08/30/07 12:33:00	1.23	19.20
08/30/07 12:33:15	1.16	19.26
08/30/07 12:33:30	1.17	19.21
08/30/07 12:33:45	1.24	19.17
08/30/07 12:34:00	1.19	19.27
08/30/07 12:34:15	1.07	19.36
08/30/07 12:34:30	1.02	19.37
08/30/07 12:34:45	1.07	19.32
08/30/07 12:35:00	1.10	19.30
08/30/07 12:35:15	1.06	19.34
08/30/07 12:35:30	1.04	19.32
08/30/07 12:35:45	1.10	19.26
08/30/07 12:36:00	1.13	19.25
08/30/07 12:36:15	1.11	19.28
08/30/07 12:36:30	1.09	19.27
08/30/07 12:36:45	1.14	19.22
08/30/07 12:37:00	1.16	19.23
08/30/07 12:37:15	1.16	19.20
08/30/07 12:37:30	1.19	19.17
08/30/07 12:37:45	1.17	19.20
08/30/07 12:38:00	1.10	19.27
08/30/07 12:38:15	1.06	19.25
08/30/07 12:38:30	1.13	19.18
08/30/07 12:38:45	1.21	19.11
08/30/07 12:39:00	1.26	19.09
08/30/07 12:39:15	1.26	19.11
08/30/07 12:39:30	1.24	19.11
08/30/07 12:39:45	1.25	19.09
08/30/07 12:40:00	1.24	19.11
08/30/07 12:40:15	1.22	19.12
08/30/07 12:40:30	1.27	19.04
08/30/07 12:40:45	1.33	19.02
08/30/07 12:41:00	1.28	19.09
08/30/07 12:41:15	1.26	19.07
08/30/07 12:41:30	1.28	19.09
08/30/07 12:41:45	1.20	19.22
08/30/07 12:42:00	1.13	19.23
08/30/07 12:42:15	1.17	19.16
08/30/07 12:42:30	1.22	19.13
08/30/07 12:42:45	1.24	19.11
08/30/07 12:43:00	1.25	19.12
08/30/07 12:43:15	1.17	19.22
08/30/07 12:43:30	1.10	19.23
08/30/07 12:43:45	1.20	19.08
08/30/07 12:44:00	1.32	19.05
08/30/07 12:44:15	1.30	19.07
08/30/07 12:44:30	1.31	19.04
08/30/07 12:44:45	1.31	19.07
08/30/07 12:45:00	1.27	19.11
08/30/07 12:45:15	1.24	19.12
08/30/07 12:45:30	1.20	19.16
08/30/07 12:45:45	1.18	19.19
08/30/07 12:46:00	1.17	19.18
08/30/07 12:46:15	1.19	19.17
08/30/07 12:46:30	1.20	19.17
08/30/07 12:46:45	1.22	19.15
08/30/07 12:47:00	1.22	19.15
08/30/07 12:47:15	1.25	19.11
08/30/07 12:47:30	1.28	19.10
08/30/07 12:47:45	1.27	19.13
08/30/07 12:48:00	1.24	19.16
08/30/07 12:48:15	1.25	19.13
08/30/07 12:48:30	1.24	19.16
08/30/07 12:48:45	1.22	19.15
08/30/07 12:49:00	1.24	19.15
08/30/07 12:49:15	1.17	19.24
08/30/07 12:49:30	1.09	19.27

08/30/07 12:49:45	1.13	19.20	
08/30/07 12:50:00	1.14	19.26	
08/30/07 12:50:15	1.04	19.33	
08/30/07 12:50:30	1.06	19.28	
08/30/07 12:50:45	1.11	19.27	
08/30/07 12:51:00	1.07	19.29	
08/30/07 12:51:15	1.11	19.24	
08/30/07 12:51:30	1.17	19.19	
08/30/07 12:51:45	1.21	19.15	
08/30/07 12:52:00	1.24	19.14	
08/30/07 12:52:15	1.23	19.15	
08/30/07 12:52:30	1.23	19.12	
08/30/07 12:52:45	1.26	19.11	
08/30/07 12:53:00	1.21	19.20	
08/30/07 12:53:15	1.10	19.27	
08/30/07 12:53:30	1.07	19.28	
08/30/07 12:53:45	1.04	19.32	
08/30/07 12:54:00	0.99	19.37	
08/30/07 12:54:15	0.94	19.40	
08/30/07 12:54:30	0.95	19.36	
08/30/07 12:54:45	1.02	19.27	End M29-2
08/30/07 12:55:00	1.08	19.24	
08/30/07 12:55:15	1.08	19.25	
08/30/07 12:55:30	1.11	19.19	
08/30/07 12:55:45	1.18	19.15	
08/30/07 12:56:00	1.13	19.26	
08/30/07 12:56:15	1.24	18.68	
08/30/07 12:56:30	7.71	13.27	
08/30/07 12:56:45	15.99	11.23	
08/30/07 12:57:00	10.55	15.73	
08/30/07 12:57:15	3.60	18.46	
08/30/07 12:57:30	1.43	19.15	
08/30/07 12:57:45	1.07	19.26	
08/30/07 12:58:00	0.96	19.37	
08/30/07 12:58:15	0.87	19.42	
08/30/07 12:58:30	0.88	19.38	
08/30/07 12:58:45	0.93	19.33	
08/30/07 12:59:00	0.98	19.32	
08/30/07 12:59:15	0.94	18.95	
08/30/07 12:59:30	0.91	12.25	
08/30/07 12:59:45	0.89	5.58	
08/30/07 13:00:00	0.71	1.77	
08/30/07 13:00:15	0.28	0.56	
08/30/07 13:00:30	0.14	0.43	
08/30/07 13:00:45	0.12	0.37	
08/30/07 13:01:00	0.12	0.34	
08/30/07 13:01:15	0.11	0.31	
08/30/07 13:01:30	0.12	0.29	
08/30/07 13:01:45	0.11	0.27	
08/30/07 13:02:00	0.11	0.26	
08/30/07 13:02:15	0.11	0.25	
08/30/07 13:02:30	0.11	0.23	
08/30/07 13:02:45	0.11	0.23	
08/30/07 13:03:00	0.11	0.22	
08/30/07 13:03:15	0.11	0.21	
08/30/07 13:03:30	0.11	0.20	
08/30/07 13:03:45	0.11	0.19	
08/30/07 13:04:00	0.11	0.19	
08/30/07 13:04:15	0.10	0.18	
08/30/07 13:04:30	0.11	0.18	
08/30/07 13:04:45	0.11	0.17	
08/30/07 13:05:00	0.10	0.17	
08/30/07 13:05:15	0.10	0.17	
08/30/07 13:05:30	0.10	0.16	
08/30/07 13:05:45	0.10	0.16	System Bias Check:
08/30/07 13:06:00	0.10	0.16	Zero nitrogen injection:
08/30/07 13:06:15	0.10	0.15	0.10 % db Oxygen
08/30/07 13:06:30	0.10	0.15	0.15 % db CO2
08/30/07 13:06:45	0.10	0.15	
08/30/07 13:07:00	0.10	0.15	
08/30/07 13:07:15	0.10	0.14	
08/30/07 13:07:30	0.10	0.14	
08/30/07 13:07:45	0.10	0.14	
08/30/07 13:08:00	0.10	0.20	
08/30/07 13:08:15	0.14	1.06	
08/30/07 13:08:30	0.20	0.82	
08/30/07 13:08:45	1.59	2.41	
08/30/07 13:09:00	3.98	3.98	
08/30/07 13:09:15	4.81	4.63	
08/30/07 13:09:30	4.91	4.75	
08/30/07 13:09:45	4.92	4.73	
08/30/07 13:10:00	4.94	4.67	
08/30/07 13:10:15	4.94	4.62	
08/30/07 13:10:30	4.95	4.59	System Bias Check:

08/30/07 13:10:45	4.96	4.57	5.0% Oxygen injection:
08/30/07 13:11:00	4.96	4.55	4.96 % db Oxygen
08/30/07 13:11:15	4.97	4.55	
08/30/07 13:11:30	4.97	4.57	
08/30/07 13:11:45	4.98	4.66	
08/30/07 13:12:00	4.99	4.79	
08/30/07 13:12:15	5.00	4.87	
08/30/07 13:12:30	5.00	4.91	
08/30/07 13:12:45	5.01	4.94	
08/30/07 13:13:00	5.01	4.98	
08/30/07 13:13:15	4.97	5.29	
08/30/07 13:13:30	5.48	7.11	
08/30/07 13:13:45	10.94	13.69	
08/30/07 13:14:00	17.06	18.26	
08/30/07 13:14:15	20.68	20.82	
08/30/07 13:14:30	22.08	21.71	
08/30/07 13:14:45	22.36	21.89	
08/30/07 13:15:00	22.40	21.96	
08/30/07 13:15:15	22.42	22.01	
08/30/07 13:15:30	22.43	22.04	
08/30/07 13:15:45	22.43	22.07	
08/30/07 13:16:00	22.44	22.09	
08/30/07 13:16:15	22.44	22.11	
08/30/07 13:16:30	22.45	22.13	
08/30/07 13:16:45	22.45	22.14	
08/30/07 13:17:00	22.45	22.15	
08/30/07 13:17:15	22.46	22.16	System Bias Check:
08/30/07 13:17:30	22.46	22.17	22.82% CO2 injection:
08/30/07 13:17:45	22.46	22.18	22.18 % db CO2
08/30/07 13:18:00	22.46	22.19	
08/30/07 13:18:15	22.46	22.19	
08/30/07 13:18:30	22.46	22.20	
08/30/07 13:18:45	22.46	22.20	
08/30/07 13:19:00	22.47	22.21	
08/30/07 13:19:15	22.47	22.21	
08/30/07 13:19:30	22.47	22.22	
08/30/07 13:19:45	22.47	22.22	
08/30/07 13:20:00	22.47	22.22	
08/30/07 13:20:15	22.09	21.97	
08/30/07 13:20:30	15.72	20.60	
08/30/07 13:20:45	6.12	19.64	
08/30/07 13:21:00	1.93	19.42	
08/30/07 13:21:15	1.24	19.39	
08/30/07 13:21:30	1.11	19.40	
08/30/07 13:21:45	1.12	19.32	
08/30/07 13:22:00	1.18	19.28	
08/30/07 13:22:15	1.16	19.29	
08/30/07 13:22:30	1.15	19.27	
08/30/07 13:22:45	1.13	19.32	
08/30/07 13:23:00	1.03	19.39	
08/30/07 13:23:15	1.01	19.38	
08/30/07 13:23:30	1.04	19.36	
08/30/07 13:23:45	1.03	19.39	
08/30/07 13:24:00	1.00	19.41	
08/30/07 13:24:15	0.92	19.49	
08/30/07 13:24:30	0.86	19.50	
08/30/07 13:24:45	0.88	19.47	Begin M29-3/VOST-2
08/30/07 13:25:00	0.92	19.45	
08/30/07 13:25:15	0.87	19.50	
08/30/07 13:25:30	0.84	19.50	
08/30/07 13:25:45	0.84	19.51	
08/30/07 13:26:00	0.83	19.54	
08/30/07 13:26:15	0.81	19.54	
08/30/07 13:26:30	0.82	19.53	
08/30/07 13:26:45	0.81	19.54	
08/30/07 13:27:00	0.86	19.45	
08/30/07 13:27:15	0.99	19.35	
08/30/07 13:27:30	0.98	19.41	
08/30/07 13:27:45	0.90	19.45	
08/30/07 13:28:00	0.91	19.42	
08/30/07 13:28:15	0.94	19.38	
08/30/07 13:28:30	0.99	19.34	
08/30/07 13:28:45	1.02	19.33	
08/30/07 13:29:00	1.02	19.33	
08/30/07 13:29:15	1.01	19.34	
08/30/07 13:29:30	1.01	19.33	
08/30/07 13:29:45	1.00	19.35	
08/30/07 13:30:00	0.99	19.34	
08/30/07 13:30:15	1.00	19.34	
08/30/07 13:30:30	0.98	19.35	
08/30/07 13:30:45	0.99	19.34	
08/30/07 13:31:00	0.99	19.36	
08/30/07 13:31:15	0.98	19.35	
08/30/07 13:31:30	1.00	19.32	

08/30/07 13:31:45	1.03	19.30
08/30/07 13:32:00	1.05	19.29
08/30/07 13:32:15	1.09	19.23
08/30/07 13:32:30	1.16	19.17
08/30/07 13:32:45	1.15	19.21
08/30/07 13:33:00	1.09	19.25
08/30/07 13:33:15	1.09	19.25
08/30/07 13:33:30	1.08	19.25
08/30/07 13:33:45	1.14	19.15
08/30/07 13:34:00	1.27	19.04
08/30/07 13:34:15	1.32	19.04
08/30/07 13:34:30	1.35	18.99
08/30/07 13:34:45	1.40	18.97
08/30/07 13:35:00	1.41	18.95
08/30/07 13:35:15	1.43	18.95
08/30/07 13:35:30	1.39	19.02
08/30/07 13:35:45	1.31	19.07
08/30/07 13:36:00	1.32	19.03
08/30/07 13:36:15	1.34	19.04
08/30/07 13:36:30	1.28	19.08
08/30/07 13:36:45	1.29	19.04
08/30/07 13:37:00	1.40	18.94
08/30/07 13:37:15	1.48	18.91
08/30/07 13:37:30	1.43	19.00
08/30/07 13:37:45	1.31	19.11
08/30/07 13:38:00	1.24	19.15
08/30/07 13:38:15	1.20	19.16
08/30/07 13:38:30	1.22	19.12
08/30/07 13:38:45	1.25	19.11
08/30/07 13:39:00	1.24	19.14
08/30/07 13:39:15	1.21	19.17
08/30/07 13:39:30	1.16	19.22
08/30/07 13:39:45	1.07	19.29
08/30/07 13:40:00	1.01	19.33
08/30/07 13:40:15	0.93	19.40
08/30/07 13:40:30	0.83	19.48
08/30/07 13:40:45	0.76	19.54
08/30/07 13:41:00	0.70	19.57
08/30/07 13:41:15	0.73	19.50
08/30/07 13:41:30	0.82	19.43
08/30/07 13:41:45	0.87	19.40
08/30/07 13:42:00	0.88	19.41
08/30/07 13:42:15	0.85	19.44
08/30/07 13:42:30	0.83	19.44
08/30/07 13:42:45	0.78	19.49
08/30/07 13:43:00	0.74	19.50
08/30/07 13:43:15	0.80	19.42
08/30/07 13:43:30	0.83	19.41
08/30/07 13:43:45	0.83	19.43
08/30/07 13:44:00	0.82	19.43
08/30/07 13:44:15	0.85	19.39
08/30/07 13:44:30	0.86	19.42
08/30/07 13:44:45	0.83	19.43
08/30/07 13:45:00	0.82	19.44
08/30/07 13:45:15	0.77	19.50
08/30/07 13:45:30	0.74	19.48
08/30/07 13:45:45	0.77	19.48
08/30/07 13:46:00	0.73	19.49
08/30/07 13:46:15	0.78	19.46
08/30/07 13:46:30	0.77	19.47
08/30/07 13:46:45	0.77	19.47
08/30/07 13:47:00	0.75	19.52
08/30/07 13:47:15	0.70	19.55
08/30/07 13:47:30	0.69	19.57
08/30/07 13:47:45	0.69	19.56
08/30/07 13:48:00	0.73	19.51
08/30/07 13:48:15	0.78	19.49
08/30/07 13:48:30	0.78	19.48
08/30/07 13:48:45	0.82	19.42
08/30/07 13:49:00	0.90	19.35
08/30/07 13:49:15	0.92	19.37
08/30/07 13:49:30	0.88	19.42
08/30/07 13:49:45	0.88	19.40
08/30/07 13:50:00	0.88	19.40
08/30/07 13:50:15	0.89	19.41
08/30/07 13:50:30	0.89	19.40
08/30/07 13:50:45	0.88	19.43
08/30/07 13:51:00	0.88	19.42
08/30/07 13:51:15	0.89	19.41
08/30/07 13:51:30	0.85	19.45
08/30/07 13:51:45	0.83	19.42
08/30/07 13:52:00	0.88	19.42
08/30/07 13:52:15	0.84	19.45
08/30/07 13:52:30	0.88	19.37

08/30/07 13:52:45	0.94	19.35
08/30/07 13:53:00	0.94	19.32
08/30/07 13:53:15	1.02	19.26
08/30/07 13:53:30	1.07	19.24
08/30/07 13:53:45	1.10	19.19
08/30/07 13:54:00	1.12	19.19
08/30/07 13:54:15	1.09	19.23
08/30/07 13:54:30	1.03	19.30
08/30/07 13:54:45	0.97	19.31
08/30/07 13:55:00	0.99	19.27
08/30/07 13:55:15	1.00	19.30
08/30/07 13:55:30	0.96	19.34
08/30/07 13:55:45	0.92	19.38
08/30/07 13:56:00	0.88	19.40
08/30/07 13:56:15	0.87	19.38
08/30/07 13:56:30	0.90	19.35
08/30/07 13:56:45	0.94	19.32
08/30/07 13:57:00	0.92	19.38
08/30/07 13:57:15	0.87	19.39
08/30/07 13:57:30	0.90	19.35
08/30/07 13:57:45	0.91	19.33
08/30/07 13:58:00	0.95	19.30
08/30/07 13:58:15	0.96	19.30
08/30/07 13:58:30	0.93	19.33
08/30/07 13:58:45	0.94	19.30
08/30/07 13:59:00	0.98	19.26
08/30/07 13:59:15	1.04	19.19
08/30/07 13:59:30	1.11	19.14
08/30/07 13:59:45	1.14	19.12
08/30/07 14:00:00	1.14	19.15
08/30/07 14:00:15	1.08	19.18
08/30/07 14:00:30	1.06	19.21
08/30/07 14:00:45	1.01	19.26
08/30/07 14:01:00	0.97	19.29
08/30/07 14:01:15	0.97	19.27
08/30/07 14:01:30	0.97	19.31
08/30/07 14:01:45	0.88	19.39
08/30/07 14:02:00	0.82	19.41
08/30/07 14:02:15	0.83	19.40
08/30/07 14:02:30	0.83	19.42
08/30/07 14:02:45	0.78	19.48
08/30/07 14:03:00	0.73	19.53
08/30/07 14:03:15	0.69	19.54
08/30/07 14:03:30	0.71	19.51
08/30/07 14:03:45	0.71	19.53
08/30/07 14:04:00	0.69	19.55
08/30/07 14:04:15	0.67	19.58
08/30/07 14:04:30	0.68	19.53
08/30/07 14:04:45	0.79	19.43
08/30/07 14:05:00	0.86	19.40
08/30/07 14:05:15	0.84	19.43
08/30/07 14:05:30	0.83	19.43
08/30/07 14:05:45	0.81	19.46
08/30/07 14:06:00	0.75	19.54
08/30/07 14:06:15	0.67	19.56
08/30/07 14:06:30	0.77	19.44
08/30/07 14:06:45	0.89	19.37
08/30/07 14:07:00	0.92	19.35
08/30/07 14:07:15	0.90	19.38
08/30/07 14:07:30	0.90	19.36
08/30/07 14:07:45	0.95	19.33
08/30/07 14:08:00	0.96	19.33
08/30/07 14:08:15	0.96	19.32
08/30/07 14:08:30	1.01	19.25
08/30/07 14:08:45	1.08	19.24
08/30/07 14:09:00	1.03	19.29
08/30/07 14:09:15	0.98	19.35
08/30/07 14:09:30	0.92	19.38
08/30/07 14:09:45	0.89	19.39
08/30/07 14:10:00	0.93	19.34
08/30/07 14:10:15	0.97	19.31
08/30/07 14:10:30	1.00	19.28
08/30/07 14:10:45	1.03	19.26
08/30/07 14:11:00	1.00	19.31
08/30/07 14:11:15	0.92	19.36
08/30/07 14:11:30	0.93	19.31
08/30/07 14:11:45	1.01	19.27
08/30/07 14:12:00	1.03	19.27
08/30/07 14:12:15	1.03	19.26
08/30/07 14:12:30	1.00	19.27
08/30/07 14:12:45	0.98	19.29
08/30/07 14:13:00	0.95	19.32
08/30/07 14:13:15	0.96	19.31
08/30/07 14:13:30	0.98	19.31

08/30/07 14:13:45	0.92	19.38	
08/30/07 14:14:00	0.86	19.40	
08/30/07 14:14:15	0.89	19.38	
08/30/07 14:14:30	0.87	19.42	
08/30/07 14:14:45	0.87	19.41	
08/30/07 14:15:00	0.89	19.37	
08/30/07 14:15:15	0.93	19.34	
08/30/07 14:15:30	0.92	19.37	
08/30/07 14:15:45	0.86	19.42	
08/30/07 14:16:00	0.87	19.38	
08/30/07 14:16:15	0.87	19.41	
08/30/07 14:16:30	0.85	19.40	
08/30/07 14:16:45	0.94	19.29	
08/30/07 14:17:00	1.02	19.27	
08/30/07 14:17:15	0.94	19.37	
08/30/07 14:17:30	0.87	19.36	
08/30/07 14:17:45	0.93	19.30	
08/30/07 14:18:00	0.96	19.29	
08/30/07 14:18:15	0.94	19.35	
08/30/07 14:18:30	0.89	19.37	
08/30/07 14:18:45	0.89	19.36	
08/30/07 14:19:00	0.88	19.36	
08/30/07 14:19:15	0.92	19.31	
08/30/07 14:19:30	0.95	19.33	
08/30/07 14:19:45	0.91	19.37	
08/30/07 14:20:00	0.91	19.35	
08/30/07 14:20:15	0.91	19.39	
08/30/07 14:20:30	0.83	19.47	
08/30/07 14:20:45	0.78	19.47	
08/30/07 14:21:00	0.85	19.38	
08/30/07 14:21:15	0.96	19.30	
08/30/07 14:21:30	0.99	19.30	
08/30/07 14:21:45	0.97	19.32	
08/30/07 14:22:00	1.00	19.27	
08/30/07 14:22:15	1.09	19.18	
08/30/07 14:22:30	1.14	19.15	
08/30/07 14:22:45	1.19	19.11	
08/30/07 14:23:00	1.21	19.13	
08/30/07 14:23:15	1.11	19.24	
08/30/07 14:23:30	0.96	19.36	
08/30/07 14:23:45	0.87	19.39	
08/30/07 14:24:00	0.90	19.36	
08/30/07 14:24:15	0.87	19.40	
08/30/07 14:24:30	0.85	19.41	
08/30/07 14:24:45	0.85	19.42	M29-3 port change
08/30/07 14:25:00	0.83	19.44	
08/30/07 14:25:15	0.84	19.40	
08/30/07 14:25:30	0.92	19.35	
08/30/07 14:25:45	0.92	19.39	
08/30/07 14:26:00	0.88	19.42	
08/30/07 14:26:15	0.87	19.39	
08/30/07 14:26:30	0.91	19.38	
08/30/07 14:26:45	0.87	19.43	
08/30/07 14:27:00	0.82	19.45	
08/30/07 14:27:15	0.87	19.39	
08/30/07 14:27:30	0.93	19.38	
08/30/07 14:27:45	0.91	19.38	
08/30/07 14:28:00	0.94	19.35	
08/30/07 14:28:15	0.96	19.34	
08/30/07 14:28:30	0.97	19.34	
08/30/07 14:28:45	0.96	19.35	resume M29-3 sampling
08/30/07 14:29:00	0.94	19.37	
08/30/07 14:29:15	0.92	19.38	
08/30/07 14:29:30	0.93	19.36	
08/30/07 14:29:45	0.95	19.33	
08/30/07 14:30:00	1.01	19.25	
08/30/07 14:30:15	1.07	19.23	
08/30/07 14:30:30	1.00	19.34	
08/30/07 14:30:45	0.89	19.42	
08/30/07 14:31:00	0.87	19.39	
08/30/07 14:31:15	0.92	19.34	
08/30/07 14:31:30	0.94	19.36	
08/30/07 14:31:45	0.89	19.42	
08/30/07 14:32:00	0.87	19.39	
08/30/07 14:32:15	0.94	19.33	
08/30/07 14:32:30	0.96	19.35	
08/30/07 14:32:45	0.94	19.35	
08/30/07 14:33:00	0.94	19.36	
08/30/07 14:33:15	0.95	19.35	
08/30/07 14:33:30	0.96	19.34	
08/30/07 14:33:45	0.99	19.30	
08/30/07 14:34:00	1.03	19.28	
08/30/07 14:34:15	1.02	19.30	
08/30/07 14:34:30	0.95	19.37	

08/30/07 14:34:45	0.89	19.41
08/30/07 14:35:00	0.87	19.41
08/30/07 14:35:15	0.92	19.34
08/30/07 14:35:30	0.99	19.27
08/30/07 14:35:45	1.05	19.25
08/30/07 14:36:00	0.98	19.36
08/30/07 14:36:15	0.87	19.42
08/30/07 14:36:30	0.90	19.35
08/30/07 14:36:45	0.99	19.29
08/30/07 14:37:00	1.06	19.25
08/30/07 14:37:15	1.07	19.23
08/30/07 14:37:30	1.11	19.19
08/30/07 14:37:45	1.11	19.21
08/30/07 14:38:00	1.04	19.27
08/30/07 14:38:15	0.98	19.32
08/30/07 14:38:30	0.95	19.33
08/30/07 14:38:45	0.96	19.33
08/30/07 14:39:00	0.95	19.35
08/30/07 14:39:15	0.91	19.38
08/30/07 14:39:30	0.90	19.37
08/30/07 14:39:45	0.92	19.34
08/30/07 14:40:00	0.97	19.30
08/30/07 14:40:15	0.99	19.30
08/30/07 14:40:30	0.93	19.37
08/30/07 14:40:45	0.87	19.40
08/30/07 14:41:00	0.87	19.40
08/30/07 14:41:15	0.89	19.39
08/30/07 14:41:30	0.90	19.39
08/30/07 14:41:45	0.88	19.38
08/30/07 14:42:00	0.92	19.34
08/30/07 14:42:15	0.93	19.34
08/30/07 14:42:30	0.95	19.32
08/30/07 14:42:45	0.98	19.28
08/30/07 14:43:00	1.03	19.23
08/30/07 14:43:15	1.08	19.20
08/30/07 14:43:30	1.08	19.25
08/30/07 14:43:45	1.04	19.25
08/30/07 14:44:00	1.03	19.27
08/30/07 14:44:15	1.00	19.31
08/30/07 14:44:30	0.95	19.35
08/30/07 14:44:45	0.90	19.38
08/30/07 14:45:00	0.90	19.35
08/30/07 14:45:15	0.96	19.32
08/30/07 14:45:30	0.98	19.31
08/30/07 14:45:45	0.96	19.34
08/30/07 14:46:00	0.91	19.40
08/30/07 14:46:15	0.83	19.46
08/30/07 14:46:30	0.82	19.42
08/30/07 14:46:45	0.89	19.37
08/30/07 14:47:00	0.91	19.38
08/30/07 14:47:15	0.88	19.39
08/30/07 14:47:30	0.92	19.35
08/30/07 14:47:45	0.94	19.35
08/30/07 14:48:00	0.95	19.34
08/30/07 14:48:15	0.95	19.32
08/30/07 14:48:30	0.99	19.28
08/30/07 14:48:45	0.98	19.32
08/30/07 14:49:00	0.95	19.32
08/30/07 14:49:15	0.95	19.33
08/30/07 14:49:30	0.87	19.44
08/30/07 14:49:45	0.80	19.46
08/30/07 14:50:00	0.85	19.39
08/30/07 14:50:15	0.91	19.38
08/30/07 14:50:30	0.89	19.40
08/30/07 14:50:45	0.89	19.39
08/30/07 14:51:00	0.90	19.38
08/30/07 14:51:15	0.88	19.41
08/30/07 14:51:30	0.88	19.38
08/30/07 14:51:45	0.96	19.29
08/30/07 14:52:00	1.01	19.28
08/30/07 14:52:15	1.01	19.24
08/30/07 14:52:30	1.08	19.19
08/30/07 14:52:45	1.07	19.18
08/30/07 14:53:00	1.10	19.16
08/30/07 14:53:15	1.09	19.20
08/30/07 14:53:30	1.03	19.24
08/30/07 14:53:45	1.08	19.18
08/30/07 14:54:00	1.11	19.15
08/30/07 14:54:15	1.12	19.16
08/30/07 14:54:30	1.05	19.23
08/30/07 14:54:45	1.00	19.23
08/30/07 14:55:00	1.04	19.15
08/30/07 14:55:15	1.15	19.05
08/30/07 14:55:30	1.24	19.02

08/30/07 14:55:45	1.22	19.07
08/30/07 14:56:00	1.21	19.04
08/30/07 14:56:15	1.27	19.00
08/30/07 14:56:30	1.29	19.00
08/30/07 14:56:45	1.23	19.08
08/30/07 14:57:00	1.14	19.12
08/30/07 14:57:15	1.14	19.10
08/30/07 14:57:30	1.18	19.06
08/30/07 14:57:45	1.20	19.06
08/30/07 14:58:00	1.20	19.06
08/30/07 14:58:15	1.18	19.10
08/30/07 14:58:30	1.08	19.21
08/30/07 14:58:45	0.99	19.26
08/30/07 14:59:00	0.95	19.32
08/30/07 14:59:15	0.91	19.30
08/30/07 14:59:30	0.99	19.22
08/30/07 14:59:45	1.03	19.20
08/30/07 15:00:00	1.00	19.25
08/30/07 15:00:15	0.94	19.29
08/30/07 15:00:30	0.91	19.30
08/30/07 15:00:45	0.90	19.32
08/30/07 15:01:00	0.89	19.33
08/30/07 15:01:15	0.91	19.33
08/30/07 15:01:30	0.93	19.29
08/30/07 15:01:45	0.99	19.22
08/30/07 15:02:00	1.07	19.14
08/30/07 15:02:15	1.13	19.11
08/30/07 15:02:30	1.15	19.09
08/30/07 15:02:45	1.13	19.16
08/30/07 15:03:00	1.05	19.23
08/30/07 15:03:15	1.03	19.22
08/30/07 15:03:30	1.04	19.21
08/30/07 15:03:45	1.04	19.22
08/30/07 15:04:00	1.04	19.21
08/30/07 15:04:15	1.07	19.19
08/30/07 15:04:30	1.00	19.28
08/30/07 15:04:45	0.94	19.29
08/30/07 15:05:00	0.97	19.26
08/30/07 15:05:15	0.96	19.29
08/30/07 15:05:30	0.93	19.30
08/30/07 15:05:45	0.95	19.29
08/30/07 15:06:00	0.92	19.34
08/30/07 15:06:15	0.87	19.39
08/30/07 15:06:30	0.84	19.39
08/30/07 15:06:45	0.87	19.37
08/30/07 15:07:00	0.89	19.34
08/30/07 15:07:15	0.91	19.33
08/30/07 15:07:30	0.95	19.28
08/30/07 15:07:45	1.01	19.24
08/30/07 15:08:00	0.97	19.33
08/30/07 15:08:15	0.87	19.40
08/30/07 15:08:30	0.85	19.39
08/30/07 15:08:45	0.87	19.36
08/30/07 15:09:00	0.94	19.27
08/30/07 15:09:15	1.05	19.21
08/30/07 15:09:30	1.02	19.30
08/30/07 15:09:45	0.93	19.34
08/30/07 15:10:00	0.94	19.31
08/30/07 15:10:15	0.97	19.28
08/30/07 15:10:30	0.97	19.30
08/30/07 15:10:45	0.94	19.34
08/30/07 15:11:00	0.89	19.38
08/30/07 15:11:15	0.86	19.39
08/30/07 15:11:30	0.87	19.37
08/30/07 15:11:45	0.91	19.34
08/30/07 15:12:00	0.89	19.39
08/30/07 15:12:15	0.83	19.41
08/30/07 15:12:30	0.86	19.34
08/30/07 15:12:45	0.93	19.31
08/30/07 15:13:00	0.97	19.26
08/30/07 15:13:15	1.03	19.24
08/30/07 15:13:30	1.01	19.24
08/30/07 15:13:45	1.06	19.17
08/30/07 15:14:00	1.09	19.17
08/30/07 15:14:15	1.03	19.26
08/30/07 15:14:30	0.99	19.24
08/30/07 15:14:45	1.05	19.17
08/30/07 15:15:00	1.10	19.15
08/30/07 15:15:15	1.11	19.11
08/30/07 15:15:30	1.13	19.11
08/30/07 15:15:45	1.08	19.19
08/30/07 15:16:00	1.02	19.23
08/30/07 15:16:15	1.00	19.23
08/30/07 15:16:30	1.01	19.23

08/30/07 15:16:45	1.02	19.22
08/30/07 15:17:00	1.02	19.20
08/30/07 15:17:15	1.00	19.22
08/30/07 15:17:30	0.97	19.23
08/30/07 15:17:45	0.98	19.22
08/30/07 15:18:00	0.98	19.28
08/30/07 15:18:15	0.88	19.34
08/30/07 15:18:30	0.88	19.33
08/30/07 15:18:45	0.87	19.32
08/30/07 15:19:00	0.90	19.28
08/30/07 15:19:15	0.94	19.25
08/30/07 15:19:30	0.97	19.26
08/30/07 15:19:45	0.94	19.28
08/30/07 15:20:00	0.98	19.25
08/30/07 15:20:15	0.98	19.27
08/30/07 15:20:30	0.93	19.29
08/30/07 15:20:45	0.92	19.28
08/30/07 15:21:00	0.93	19.30
08/30/07 15:21:15	0.88	19.35
08/30/07 15:21:30	0.85	19.35
08/30/07 15:21:45	0.88	19.33
08/30/07 15:22:00	0.90	19.29
08/30/07 15:22:15	0.90	19.30
08/30/07 15:22:30	0.93	19.27
08/30/07 15:22:45	0.99	19.22
08/30/07 15:23:00	0.99	19.24
08/30/07 15:23:15	0.96	19.25
08/30/07 15:23:30	0.97	19.24
08/30/07 15:23:45	0.99	19.24
08/30/07 15:24:00	0.99	19.21
08/30/07 15:24:15	1.00	19.23
08/30/07 15:24:30	0.97	19.26
08/30/07 15:24:45	0.99	19.23
08/30/07 15:25:00	0.99	19.23
08/30/07 15:25:15	0.98	19.25
08/30/07 15:25:30	0.94	19.28
08/30/07 15:25:45	0.98	19.21
08/30/07 15:26:00	0.99	19.26
08/30/07 15:26:15	0.90	19.33
08/30/07 15:26:30	0.88	19.33
08/30/07 15:26:45	0.87	19.34
08/30/07 15:27:00	0.83	19.37
08/30/07 15:27:15	0.81	19.39
08/30/07 15:27:30	0.81	19.38
08/30/07 15:27:45	0.85	19.30

M29 port change

08/30/07 15:28:00	0.89	19.29
08/30/07 15:28:15	0.85	19.35
08/30/07 15:28:30	0.78	19.39
08/30/07 15:28:45	0.79	19.36
08/30/07 15:29:00	0.81	19.35
08/30/07 15:29:15	0.84	19.33
08/30/07 15:29:30	0.83	19.37
08/30/07 15:29:45	0.82	19.34
08/30/07 15:30:00	0.89	19.27
08/30/07 15:30:15	0.94	19.24
08/30/07 15:30:30	0.97	19.20
08/30/07 15:30:45	1.02	19.16
08/30/07 15:31:00	1.05	19.13
08/30/07 15:31:15	1.06	19.14
08/30/07 15:31:30	1.02	19.19
08/30/07 15:31:45	0.98	19.23
08/30/07 15:32:00	0.96	19.23
08/30/07 15:32:15	0.97	19.25
08/30/07 15:32:30	0.96	19.24
08/30/07 15:32:45	1.02	19.16
08/30/07 15:33:00	1.10	19.10
08/30/07 15:33:15	1.13	19.09
08/30/07 15:33:30	1.15	19.05
08/30/07 15:33:45	1.24	18.95
08/30/07 15:34:00	1.32	18.88
08/30/07 15:34:15	1.35	18.88
08/30/07 15:34:30	1.28	18.99
08/30/07 15:34:45	1.13	19.11
08/30/07 15:35:00	1.08	19.11
08/30/07 15:35:15	1.14	19.05
08/30/07 15:35:30	1.16	19.08
08/30/07 15:35:45	1.11	19.12
08/30/07 15:36:00	1.09	19.14
08/30/07 15:36:15	1.08	19.11
08/30/07 15:36:30	1.13	19.08
08/30/07 15:36:45	1.14	19.09
08/30/07 15:37:00	1.12	19.11
08/30/07 15:37:15	1.08	19.14
08/30/07 15:37:30	1.12	19.07

08/30/07 15:37:45	1.18	19.07
08/30/07 15:38:00	1.12	19.14
08/30/07 15:38:15	1.04	19.21
08/30/07 15:38:30	1.00	19.20
08/30/07 15:38:45	1.02	19.19
08/30/07 15:39:00	1.00	19.24
08/30/07 15:39:15	0.99	19.22
08/30/07 15:39:30	1.04	19.18
08/30/07 15:39:45	1.05	19.19
08/30/07 15:40:00	1.02	19.23
08/30/07 15:40:15	1.00	19.22
08/30/07 15:40:30	1.05	19.15
08/30/07 15:40:45	1.11	19.11
08/30/07 15:41:00	1.11	19.15
08/30/07 15:41:15	1.05	19.19
08/30/07 15:41:30	1.01	19.23
08/30/07 15:41:45	0.97	19.25
08/30/07 15:42:00	0.93	19.31
08/30/07 15:42:15	0.87	19.34
08/30/07 15:42:30	0.88	19.31
08/30/07 15:42:45	0.90	19.30
08/30/07 15:43:00	0.87	19.34
08/30/07 15:43:15	0.81	19.38
08/30/07 15:43:30	0.80	19.40
08/30/07 15:43:45	0.79	19.39
08/30/07 15:44:00	0.79	19.37
08/30/07 15:44:15	0.82	19.35
08/30/07 15:44:30	0.84	19.34
08/30/07 15:44:45	0.85	19.33
08/30/07 15:45:00	0.88	19.33
08/30/07 15:45:15	0.83	19.39
08/30/07 15:45:30	0.76	19.43
08/30/07 15:45:45	0.81	19.32
08/30/07 15:46:00	0.91	19.28
08/30/07 15:46:15	0.87	19.35
08/30/07 15:46:30	0.80	19.37
08/30/07 15:46:45	0.80	19.39
08/30/07 15:47:00	0.77	19.41
08/30/07 15:47:15	0.77	19.39
08/30/07 15:47:30	0.78	19.38
08/30/07 15:47:45	0.79	19.38
08/30/07 15:48:00	0.78	19.40
08/30/07 15:48:15	0.79	19.37
08/30/07 15:48:30	0.86	19.29
08/30/07 15:48:45	0.91	19.27
08/30/07 15:49:00	0.90	19.30
08/30/07 15:49:15	0.89	19.29
08/30/07 15:49:30	0.92	19.27
08/30/07 15:49:45	0.91	19.32
08/30/07 15:50:00	0.87	19.33
08/30/07 15:50:15	0.88	19.31
08/30/07 15:50:30	0.87	19.33
08/30/07 15:50:45	0.86	19.32
08/30/07 15:51:00	0.87	19.32
08/30/07 15:51:15	0.85	19.37
08/30/07 15:51:30	0.83	19.35
08/30/07 15:51:45	0.89	19.30
08/30/07 15:52:00	0.88	19.34
08/30/07 15:52:15	0.84	19.34
08/30/07 15:52:30	0.94	19.22
08/30/07 15:52:45	0.99	19.23
08/30/07 15:53:00	0.94	19.28
08/30/07 15:53:15	0.92	19.29
08/30/07 15:53:30	0.92	19.30
08/30/07 15:53:45	0.90	19.31
08/30/07 15:54:00	0.90	19.30
08/30/07 15:54:15	0.94	19.28
08/30/07 15:54:30	0.91	19.34
08/30/07 15:54:45	0.84	19.36
08/30/07 15:55:00	0.92	19.25
08/30/07 15:55:15	1.03	19.19
08/30/07 15:55:30	1.03	19.21
08/30/07 15:55:45	1.00	19.24
08/30/07 15:56:00	0.98	19.25
08/30/07 15:56:15	0.99	19.22
08/30/07 15:56:30	1.02	19.19
08/30/07 15:56:45	1.06	19.14
08/30/07 15:57:00	1.11	19.10
08/30/07 15:57:15	1.10	19.14
08/30/07 15:57:30	1.04	19.21
08/30/07 15:57:45	1.00	19.21
08/30/07 15:58:00	1.02	19.20
08/30/07 15:58:15	1.01	19.21
08/30/07 15:58:30	1.06	19.15

resume M29-3

08/30/07 15:58:45	1.08	19.14
08/30/07 15:59:00	1.05	19.21
08/30/07 15:59:15	0.93	19.32
08/30/07 15:59:30	0.82	19.40
08/30/07 15:59:45	0.80	19.37
08/30/07 16:00:00	0.86	19.33
08/30/07 16:00:15	0.87	19.31
08/30/07 16:00:30	0.90	19.28
08/30/07 16:00:45	0.94	19.23
08/30/07 16:01:00	1.00	19.19
08/30/07 16:01:15	1.00	19.21
08/30/07 16:01:30	0.98	19.22
08/30/07 16:01:45	0.99	19.22
08/30/07 16:02:00	0.97	19.25
08/30/07 16:02:15	0.93	19.26
08/30/07 16:02:30	0.95	19.23
08/30/07 16:02:45	0.97	19.23
08/30/07 16:03:00	0.96	19.25
08/30/07 16:03:15	0.93	19.28
08/30/07 16:03:30	0.92	19.28
08/30/07 16:03:45	0.92	19.25
08/30/07 16:04:00	0.95	19.23
08/30/07 16:04:15	0.95	19.23
08/30/07 16:04:30	0.95	19.24
08/30/07 16:04:45	0.93	19.27
08/30/07 16:05:00	0.90	19.26
08/30/07 16:05:15	0.97	19.23
08/30/07 16:05:30	0.94	19.32
08/30/07 16:05:45	0.84	19.39
08/30/07 16:06:00	0.79	19.40
08/30/07 16:06:15	0.78	19.41
08/30/07 16:06:30	0.79	19.38
08/30/07 16:06:45	0.87	19.28
08/30/07 16:07:00	0.95	19.25
08/30/07 16:07:15	0.91	19.32
08/30/07 16:07:30	0.89	19.30
08/30/07 16:07:45	0.91	19.32
08/30/07 16:08:00	0.84	19.40
08/30/07 16:08:15	0.76	19.44
08/30/07 16:08:30	0.77	19.42
08/30/07 16:08:45	0.79	19.41
08/30/07 16:09:00	0.82	19.38
08/30/07 16:09:15	0.86	19.35
08/30/07 16:09:30	0.86	19.35
08/30/07 16:09:45	0.86	19.33
08/30/07 16:10:00	0.90	19.29
08/30/07 16:10:15	0.95	19.25
08/30/07 16:10:30	0.97	19.24
08/30/07 16:10:45	0.96	19.25
08/30/07 16:11:00	0.91	19.33
08/30/07 16:11:15	0.81	19.40
08/30/07 16:11:30	0.83	19.34
08/30/07 16:11:45	0.90	19.29
08/30/07 16:12:00	0.96	19.23
08/30/07 16:12:15	0.99	19.24
08/30/07 16:12:30	0.95	19.28
08/30/07 16:12:45	0.87	19.36
08/30/07 16:13:00	0.83	19.35
08/30/07 16:13:15	0.91	19.26
08/30/07 16:13:30	0.96	19.25
08/30/07 16:13:45	0.92	19.32
08/30/07 16:14:00	0.82	19.42
08/30/07 16:14:15	0.72	19.46
08/30/07 16:14:30	0.74	19.40
08/30/07 16:14:45	0.81	19.36
08/30/07 16:15:00	0.78	19.42
08/30/07 16:15:15	0.74	19.41
08/30/07 16:15:30	0.80	19.35
08/30/07 16:15:45	0.81	19.37
08/30/07 16:16:00	0.78	19.40
08/30/07 16:16:15	0.74	19.44
08/30/07 16:16:30	0.72	19.44
08/30/07 16:16:45	0.78	19.37
08/30/07 16:17:00	0.81	19.37
08/30/07 16:17:15	0.79	19.39
08/30/07 16:17:30	0.82	19.32
08/30/07 16:17:45	0.92	19.25
08/30/07 16:18:00	0.92	19.27
08/30/07 16:18:15	0.92	19.25
08/30/07 16:18:30	0.94	19.24
08/30/07 16:18:45	0.96	19.22
08/30/07 16:19:00	1.00	19.16
08/30/07 16:19:15	1.10	19.08
08/30/07 16:19:30	1.15	19.05

08/30/07 16:19:45	1.16	19.05
08/30/07 16:20:00	1.14	19.06
08/30/07 16:20:15	1.12	19.10
08/30/07 16:20:30	1.08	19.14
08/30/07 16:20:45	1.07	19.13
08/30/07 16:21:00	1.10	19.10
08/30/07 16:21:15	1.10	19.14
08/30/07 16:21:30	1.01	19.22
08/30/07 16:21:45	0.94	19.26
08/30/07 16:22:00	0.94	19.26
08/30/07 16:22:15	0.91	19.31
08/30/07 16:22:30	0.87	19.31
08/30/07 16:22:45	0.90	19.27
08/30/07 16:23:00	0.90	19.31
08/30/07 16:23:15	0.83	19.37
08/30/07 16:23:30	0.84	19.34
08/30/07 16:23:45	0.89	19.28
08/30/07 16:24:00	0.93	19.27
08/30/07 16:24:15	0.92	19.27
08/30/07 16:24:30	0.95	19.24
08/30/07 16:24:45	0.99	19.21
08/30/07 16:25:00	0.98	19.25
08/30/07 16:25:15	0.91	19.29
08/30/07 16:25:30	0.90	19.30
08/30/07 16:25:45	0.91	19.29
08/30/07 16:26:00	0.96	19.24
08/30/07 16:26:15	1.00	19.20
08/30/07 16:26:30	1.05	19.14
08/30/07 16:26:45	1.09	19.14
08/30/07 16:27:00	1.10	19.13
08/30/07 16:27:15	1.10	19.17
08/30/07 16:27:30	1.02	19.24
08/30/07 16:27:45	0.95	19.26
08/30/07 16:28:00	0.95	19.29
08/30/07 16:28:15	0.87	19.38
08/30/07 16:28:30	0.84	19.34
08/30/07 16:28:45	0.93	19.24
08/30/07 16:29:00	0.97	19.28
08/30/07 16:29:15	0.89	19.35
08/30/07 16:29:30	0.88	19.34
08/30/07 16:29:45	0.89	19.33
08/30/07 16:30:00	0.88	19.35
08/30/07 16:30:15	0.84	19.38
08/30/07 16:30:30	0.83	19.37
08/30/07 16:30:45	0.87	19.33
08/30/07 16:31:00	0.85	19.39
08/30/07 16:31:15	0.78	19.44
08/30/07 16:31:30	0.81	19.38
08/30/07 16:31:45	0.85	19.36
08/30/07 16:32:00	0.86	19.33
08/30/07 16:32:15	0.93	19.26
08/30/07 16:32:30	0.98	19.24
08/30/07 16:32:45	0.98	19.25
08/30/07 16:33:00	0.96	19.26
08/30/07 16:33:15	1.00	19.21
08/30/07 16:33:30	1.04	19.21
08/30/07 16:33:45	1.00	19.24
08/30/07 16:34:00	0.98	19.26
08/30/07 16:34:15	0.94	19.30
08/30/07 16:34:30	0.90	19.33
08/30/07 16:34:45	0.90	19.31
08/30/07 16:35:00	0.96	19.24
08/30/07 16:35:15	1.01	19.21
08/30/07 16:35:30	0.99	19.25
08/30/07 16:35:45	1.00	19.19
08/30/07 16:36:00	1.09	19.13
08/30/07 16:36:15	1.11	19.14
08/30/07 16:36:30	1.04	19.22
08/30/07 16:36:45	0.98	19.23
08/30/07 16:37:00	1.02	19.22
08/30/07 16:37:15	1.04	19.21
08/30/07 16:37:30	1.01	19.24
08/30/07 16:37:45	0.98	19.26
08/30/07 16:38:00	0.94	19.31
08/30/07 16:38:15	0.90	19.32
08/30/07 16:38:30	0.92	19.31
08/30/07 16:38:45	0.90	19.33
08/30/07 16:39:00	0.87	19.37
08/30/07 16:39:15	0.83	19.37
08/30/07 16:39:30	0.87	19.32
08/30/07 16:39:45	0.89	19.32
08/30/07 16:40:00	0.91	19.29
08/30/07 16:40:15	0.95	19.25
08/30/07 16:40:30	1.00	19.19

08/30/07 16:40:45	1.04	19.18
08/30/07 16:41:00	1.04	19.19
08/30/07 16:41:15	1.01	19.24
08/30/07 16:41:30	0.98	19.26
08/30/07 16:41:45	0.98	19.23
08/30/07 16:42:00	1.00	19.22
08/30/07 16:42:15	0.95	19.29
08/30/07 16:42:30	0.91	19.29
08/30/07 16:42:45	0.92	19.29
08/30/07 16:43:00	0.91	19.30
08/30/07 16:43:15	0.94	19.26
08/30/07 16:43:30	0.96	19.26
08/30/07 16:43:45	0.91	19.31
08/30/07 16:44:00	0.85	19.35
08/30/07 16:44:15	0.86	19.32
08/30/07 16:44:30	0.90	19.29
08/30/07 16:44:45	0.98	19.18
08/30/07 16:45:00	1.09	19.11
08/30/07 16:45:15	1.09	19.14
08/30/07 16:45:30	1.05	19.18
08/30/07 16:45:45	1.04	19.19
08/30/07 16:46:00	1.06	19.18
08/30/07 16:46:15	1.06	19.20
08/30/07 16:46:30	1.04	19.22
08/30/07 16:46:45	1.03	19.24
08/30/07 16:47:00	1.01	19.27
08/30/07 16:47:15	0.99	19.29
08/30/07 16:47:30	0.99	19.31
08/30/07 16:47:45	0.95	19.34
08/30/07 16:48:00	0.96	19.32
08/30/07 16:48:15	0.97	19.34
08/30/07 16:48:30	0.92	19.38
08/30/07 16:48:45	0.90	19.40
08/30/07 16:49:00	0.89	19.42
08/30/07 16:49:15	0.90	19.38
08/30/07 16:49:30	0.94	19.35
08/30/07 16:49:45	0.93	19.39
08/30/07 16:50:00	0.91	19.39
08/30/07 16:50:15	0.98	19.28
08/30/07 16:50:30	1.11	19.20
08/30/07 16:50:45	1.15	19.18
08/30/07 16:51:00	1.14	19.20
08/30/07 16:51:15	1.10	19.24
08/30/07 16:51:30	1.07	19.28
08/30/07 16:51:45	1.02	19.32
08/30/07 16:52:00	1.03	19.28
08/30/07 16:52:15	1.09	19.23
08/30/07 16:52:30	1.07	19.26
08/30/07 16:52:45	1.04	19.28
08/30/07 16:53:00	1.04	19.26
08/30/07 16:53:15	1.06	19.25
08/30/07 16:53:30	1.05	19.27
08/30/07 16:53:45	1.00	19.33
08/30/07 16:54:00	0.88	19.45
08/30/07 16:54:15	0.81	19.46
08/30/07 16:54:30	0.82	19.46
08/30/07 16:54:45	0.80	19.48
08/30/07 16:55:00	0.78	19.49
08/30/07 16:55:15	0.79	19.47
08/30/07 16:55:30	0.77	19.50
08/30/07 16:55:45	0.75	19.50
08/30/07 16:56:00	0.81	19.44
08/30/07 16:56:15	0.87	19.40
08/30/07 16:56:30	0.91	19.36
08/30/07 16:56:45	0.93	19.35
08/30/07 16:57:00	0.89	19.41
08/30/07 16:57:15	0.81	19.49
08/30/07 16:57:30	0.73	19.63
08/30/07 16:57:45	0.71	19.53
08/30/07 16:58:00	0.75	19.49
08/30/07 16:58:15	0.80	19.44
08/30/07 16:58:30	0.84	19.43
08/30/07 16:58:45	0.83	19.44
08/30/07 16:59:00	0.85	19.38
08/30/07 16:59:15	0.90	19.38
08/30/07 16:59:30	0.85	19.41
08/30/07 16:59:45	0.89	19.33
08/30/07 17:00:00	0.95	19.31
08/30/07 17:00:15	0.96	19.30
08/30/07 17:00:30	0.97	19.30
08/30/07 17:00:45	0.94	19.34
08/30/07 17:01:00	0.91	19.35
08/30/07 17:01:15	0.89	19.39
08/30/07 17:01:30	0.83	19.45

M29-3 port change

08/30/07 17:01:45	0.80	19.45
08/30/07 17:02:00	0.82	19.42
08/30/07 17:02:15	0.86	19.39
08/30/07 17:02:30	0.89	19.36
08/30/07 17:02:45	0.92	19.34
08/30/07 17:03:00	0.94	19.31
08/30/07 17:03:15	0.96	19.29
08/30/07 17:03:30	0.97	19.29
08/30/07 17:03:45	0.95	19.31
08/30/07 17:04:00	0.94	19.30
08/30/07 17:04:15	1.00	19.25
08/30/07 17:04:30	1.04	19.21
08/30/07 17:04:45	1.08	19.20

resume M29-3

08/30/07 17:05:00	1.09	19.24
08/30/07 17:05:15	1.06	19.24
08/30/07 17:05:30	1.08	19.21
08/30/07 17:05:45	1.08	19.22
08/30/07 17:06:00	1.06	19.22
08/30/07 17:06:15	1.07	19.21
08/30/07 17:06:30	1.09	19.19
08/30/07 17:06:45	1.10	19.21
08/30/07 17:07:00	1.09	19.21
08/30/07 17:07:15	1.10	19.19
08/30/07 17:07:30	1.08	19.24
08/30/07 17:07:45	1.01	19.30
08/30/07 17:08:00	0.98	19.31
08/30/07 17:08:15	0.99	19.28
08/30/07 17:08:30	1.02	19.26
08/30/07 17:08:45	1.02	19.28
08/30/07 17:09:00	0.98	19.32
08/30/07 17:09:15	0.99	19.29
08/30/07 17:09:30	1.02	19.29
08/30/07 17:09:45	0.98	19.34
08/30/07 17:10:00	0.94	19.36
08/30/07 17:10:15	0.99	19.27
08/30/07 17:10:30	1.07	19.23
08/30/07 17:10:45	1.06	19.25
08/30/07 17:11:00	1.05	19.27
08/30/07 17:11:15	1.04	19.30
08/30/07 17:11:30	1.04	19.29
08/30/07 17:11:45	1.05	19.27
08/30/07 17:12:00	1.05	19.28
08/30/07 17:12:15	1.02	19.29
08/30/07 17:12:30	1.00	19.32
08/30/07 17:12:45	1.00	19.30
08/30/07 17:13:00	1.04	19.25
08/30/07 17:13:15	1.05	19.27
08/30/07 17:13:30	1.00	19.33
08/30/07 17:13:45	0.98	19.33
08/30/07 17:14:00	0.99	19.32
08/30/07 17:14:15	0.98	19.32
08/30/07 17:14:30	1.02	19.26
08/30/07 17:14:45	1.05	19.26
08/30/07 17:15:00	1.04	19.26
08/30/07 17:15:15	1.04	19.28
08/30/07 17:15:30	1.01	19.28
08/30/07 17:15:45	1.02	19.26
08/30/07 17:16:00	1.04	19.26
08/30/07 17:16:15	1.04	19.27
08/30/07 17:16:30	1.03	19.27
08/30/07 17:16:45	1.01	19.31
08/30/07 17:17:00	0.97	19.31
08/30/07 17:17:15	1.01	19.27
08/30/07 17:17:30	1.03	19.27
08/30/07 17:17:45	1.02	19.28
08/30/07 17:18:00	1.00	19.30
08/30/07 17:18:15	0.99	19.30
08/30/07 17:18:30	1.00	19.23
08/30/07 17:18:45	1.05	19.19
08/30/07 17:19:00	1.04	19.24
08/30/07 17:19:15	1.00	19.28
08/30/07 17:19:30	1.02	19.26
08/30/07 17:19:45	0.99	19.30
08/30/07 17:20:00	0.95	19.34
08/30/07 17:20:15	0.93	19.34
08/30/07 17:20:30	0.95	19.33
08/30/07 17:20:45	0.90	19.39
08/30/07 17:21:00	0.89	19.35
08/30/07 17:21:15	0.94	19.33
08/30/07 17:21:30	0.89	19.40
08/30/07 17:21:45	0.80	19.46
08/30/07 17:22:00	0.79	19.43
08/30/07 17:22:15	0.84	19.39
08/30/07 17:22:30	0.84	19.43

08/30/07 17:22:45	0.76	19.53
08/30/07 17:23:00	0.70	19.54
08/30/07 17:23:15	0.78	19.40
08/30/07 17:23:30	0.91	19.32
08/30/07 17:23:45	0.92	19.35
08/30/07 17:24:00	0.89	19.36
08/30/07 17:24:15	0.89	19.33
08/30/07 17:24:30	0.92	19.29
08/30/07 17:24:45	0.99	19.22
08/30/07 17:25:00	1.00	19.27
08/30/07 17:25:15	0.96	19.29
08/30/07 17:25:30	0.99	19.27
08/30/07 17:25:45	0.97	19.31
08/30/07 17:26:00	0.89	19.39
08/30/07 17:26:15	0.85	19.37
08/30/07 17:26:30	0.94	19.28
08/30/07 17:26:45	0.99	19.28
08/30/07 17:27:00	0.97	19.29
08/30/07 17:27:15	0.93	19.35
08/30/07 17:27:30	0.89	19.36
08/30/07 17:27:45	0.92	19.34
08/30/07 17:28:00	0.95	19.30
08/30/07 17:28:15	1.00	19.27
08/30/07 17:28:30	1.02	19.26
08/30/07 17:28:45	1.03	19.24
08/30/07 17:29:00	1.08	19.19
08/30/07 17:29:15	1.11	19.18
08/30/07 17:29:30	1.13	19.17
08/30/07 17:29:45	1.10	19.23
08/30/07 17:30:00	1.04	19.26
08/30/07 17:30:15	1.02	19.26
08/30/07 17:30:30	1.01	19.25
08/30/07 17:30:45	1.02	19.24
08/30/07 17:31:00	1.06	19.19
08/30/07 17:31:15	1.11	19.20
08/30/07 17:31:30	1.04	19.28
08/30/07 17:31:45	1.03	19.25
08/30/07 17:32:00	1.06	19.24
08/30/07 17:32:15	1.06	19.22
08/30/07 17:32:30	1.07	19.20
08/30/07 17:32:45	1.09	19.19
08/30/07 17:33:00	1.10	19.19
08/30/07 17:33:15	1.07	19.23
08/30/07 17:33:30	1.07	19.20
08/30/07 17:33:45	1.09	19.21
08/30/07 17:34:00	1.06	19.23
08/30/07 17:34:15	1.05	19.23
08/30/07 17:34:30	1.06	19.23
08/30/07 17:34:45	1.09	19.18
08/30/07 17:35:00	1.13	19.19
08/30/07 17:35:15	1.07	19.26
08/30/07 17:35:30	1.05	19.25
08/30/07 17:35:45	1.09	19.20
08/30/07 17:36:00	1.14	19.16
08/30/07 17:36:15	1.17	19.14
08/30/07 17:36:30	1.16	19.16
08/30/07 17:36:45	1.13	19.18
08/30/07 17:37:00	1.13	19.18
08/30/07 17:37:15	1.10	19.20
08/30/07 17:37:30	1.12	19.16
08/30/07 17:37:45	1.19	19.10
08/30/07 17:38:00	1.22	19.10
08/30/07 17:38:15	1.19	19.12
08/30/07 17:38:30	1.19	19.09
08/30/07 17:38:45	1.22	19.06
08/30/07 17:39:00	1.31	18.98
08/30/07 17:39:15	1.35	18.97
08/30/07 17:39:30	1.34	18.97
08/30/07 17:39:45	1.38	18.93
08/30/07 17:40:00	1.40	18.93
08/30/07 17:40:15	1.36	18.98
08/30/07 17:40:30	1.27	19.07
08/30/07 17:40:45	1.19	19.13
08/30/07 17:41:00	1.12	19.18
08/30/07 17:41:15	1.07	19.22
08/30/07 17:41:30	1.03	19.26
08/30/07 17:41:45	1.02	19.27
08/30/07 17:42:00	0.99	19.30
08/30/07 17:42:15	0.98	19.28
08/30/07 17:42:30	1.00	19.27
08/30/07 17:42:45	0.96	19.32
08/30/07 17:43:00	0.90	19.37
08/30/07 17:43:15	0.88	19.36
08/30/07 17:43:30	0.91	19.35

08/30/07 17:43:45	0.91	19.37
08/30/07 17:44:00	0.89	19.38
08/30/07 17:44:15	0.94	19.29
08/30/07 17:44:30	1.04	19.19
08/30/07 17:44:45	1.12	19.13
08/30/07 17:45:00	1.12	19.17
08/30/07 17:45:15	1.01	19.28
08/30/07 17:45:30	0.95	19.31
08/30/07 17:45:45	0.94	19.32
08/30/07 17:46:00	0.96	19.29
08/30/07 17:46:15	0.99	19.29
08/30/07 17:46:30	0.97	19.31
08/30/07 17:46:45	0.97	19.29
08/30/07 17:47:00	0.97	19.29
08/30/07 17:47:15	0.96	19.28
08/30/07 17:47:30	0.98	19.26
08/30/07 17:47:45	1.02	19.22
08/30/07 17:48:00	1.06	19.21
08/30/07 17:48:15	1.00	19.28
08/30/07 17:48:30	0.96	19.30
08/30/07 17:48:45	0.95	19.30
08/30/07 17:49:00	0.94	19.32
08/30/07 17:49:15	0.91	18.75
08/30/07 17:49:30	0.88	19.38
08/30/07 17:49:45	0.83	19.39
08/30/07 17:50:00	0.83	19.39
08/30/07 17:50:15	0.78	19.46
08/30/07 17:50:30	0.76	19.46
08/30/07 17:50:45	0.81	19.40
08/30/07 17:51:00	0.91	19.28
08/30/07 17:51:15	1.03	19.21
08/30/07 17:51:30	1.01	19.30
08/30/07 17:51:45	0.94	19.33
08/30/07 17:52:00	0.97	19.27
08/30/07 17:52:15	1.01	19.25
08/30/07 17:52:30	1.02	19.22
08/30/07 17:52:45	1.09	19.16
08/30/07 17:53:00	1.08	19.21
08/30/07 17:53:15	1.03	19.23
08/30/07 17:53:30	1.10	19.13
08/30/07 17:53:45	1.16	19.13
08/30/07 17:54:00	1.12	19.16
08/30/07 17:54:15	1.15	19.08
08/30/07 17:54:30	1.22	19.05
08/30/07 17:54:45	1.22	19.04
08/30/07 17:55:00	1.22	19.07
08/30/07 17:55:15	1.12	19.20
08/30/07 17:55:30	1.00	19.28
08/30/07 17:55:45	0.99	19.27
08/30/07 17:56:00	1.00	19.25
08/30/07 17:56:15	1.03	19.20
08/30/07 17:56:30	1.09	19.16
08/30/07 17:56:45	1.10	19.16
08/30/07 17:57:00	1.13	19.11
08/30/07 17:57:15	1.16	19.11
08/30/07 17:57:30	1.12	19.15
08/30/07 17:57:45	1.08	19.18
08/30/07 17:58:00	1.07	19.18
08/30/07 17:58:15	1.09	19.18
08/30/07 17:58:30	1.07	19.21
08/30/07 17:58:45	1.00	19.28
08/30/07 17:59:00	0.96	19.29
08/30/07 17:59:15	0.97	19.29
08/30/07 17:59:30	0.94	19.31
08/30/07 17:59:45	0.96	19.27
08/30/07 18:00:00	1.01	19.24
08/30/07 18:00:15	1.06	19.19
08/30/07 18:00:30	1.09	19.19
08/30/07 18:00:45	1.07	19.21
08/30/07 18:01:00	1.06	19.22
08/30/07 18:01:15	1.08	19.20
08/30/07 18:01:30	1.10	19.19
08/30/07 18:01:45	1.09	19.22
08/30/07 18:02:00	1.07	19.24
08/30/07 18:02:15	1.03	19.27
08/30/07 18:02:30	1.01	19.26
08/30/07 18:02:45	1.04	19.21
08/30/07 18:03:00	1.08	19.19
08/30/07 18:03:15	1.08	19.21
08/30/07 18:03:30	1.11	19.15
08/30/07 18:03:45	1.14	19.14
08/30/07 18:04:00	1.15	19.12
08/30/07 18:04:15	1.16	19.13
08/30/07 18:04:30	1.12	19.20

08/30/07 18:04:45	1.04	19.29	End M29-3/V-3OST
08/30/07 18:05:00	1.01	19.27	
08/30/07 18:05:15	1.07	19.23	
08/30/07 18:05:30	1.09	19.23	
08/30/07 18:05:45	1.06	19.27	
08/30/07 18:06:00	1.00	19.29	
08/30/07 18:06:15	2.55	16.76	
08/30/07 18:06:30	11.84	11.73	
08/30/07 18:06:45	15.10	13.42	
08/30/07 18:07:00	7.04	17.47	
08/30/07 18:07:15	2.24	18.97	
08/30/07 18:07:30	1.11	19.30	
08/30/07 18:07:45	0.92	19.37	
08/30/07 18:08:00	0.90	19.37	
08/30/07 18:08:15	0.93	19.36	
08/30/07 18:08:30	0.94	19.36	
08/30/07 18:08:45	0.94	19.37	
08/30/07 18:09:00	0.92	19.38	
08/30/07 18:09:15	0.94	19.35	
08/30/07 18:09:30	1.01	19.28	
08/30/07 18:09:45	1.06	19.29	
08/30/07 18:10:00	1.08	19.25	
08/30/07 18:10:15	1.16	19.18	
08/30/07 18:10:30	1.20	19.18	
08/30/07 18:10:45	1.16	19.24	
08/30/07 18:11:00	1.13	19.26	
08/30/07 18:11:15	1.12	19.29	
08/30/07 18:11:30	1.07	19.33	
08/30/07 18:11:45	1.00	19.40	
08/30/07 18:12:00	0.92	19.45	
08/30/07 18:12:15	0.91	18.58	
08/30/07 18:12:30	0.98	15.40	
08/30/07 18:12:45	0.98	10.90	
08/30/07 18:13:00	1.95	7.47	
08/30/07 18:13:15	7.00	8.50	
08/30/07 18:13:30	8.18	6.46	
08/30/07 18:13:45	4.15	2.71	
08/30/07 18:14:00	1.08	0.75	
08/30/07 18:14:15	0.27	0.45	
08/30/07 18:14:30	0.15	0.38	
08/30/07 18:14:45	0.14	0.35	
08/30/07 18:15:00	0.13	0.32	
08/30/07 18:15:15	0.13	0.30	
08/30/07 18:15:30	0.12	0.28	
08/30/07 18:15:45	0.12	0.27	
08/30/07 18:16:00	0.12	0.25	
08/30/07 18:16:15	0.13	0.24	
08/30/07 18:16:30	0.11	0.23	
08/30/07 18:16:45	0.12	0.22	
08/30/07 18:17:00	0.11	0.21	
08/30/07 18:17:15	0.11	0.21	
08/30/07 18:17:30	0.11	0.20	
08/30/07 18:17:45	0.12	0.20	
System Bias Check:			
08/30/07 18:18:00	0.11	0.19	Zero nitrogen injection:
08/30/07 18:18:15	0.11	0.18	0.11 % db Oxygen
08/30/07 18:18:30	0.11	0.18	0.18 % db CO2
08/30/07 18:18:45	0.11	0.18	
08/30/07 18:19:00	0.21	0.66	
08/30/07 18:19:15	1.96	3.02	
08/30/07 18:19:30	4.11	4.30	
08/30/07 18:19:45	4.78	4.51	
08/30/07 18:20:00	4.88	4.54	
08/30/07 18:20:15	4.90	4.55	
08/30/07 18:20:30	4.92	4.55	
08/30/07 18:20:45	4.93	4.55	
08/30/07 18:21:00	4.94	4.56	
08/30/07 18:21:15	4.95	4.57	
08/30/07 18:21:30	4.95	4.59	
08/30/07 18:21:45	4.96	4.62	
System Bias Check:			
08/30/07 18:22:00	4.96	4.67	5.0% Oxygen injection:
08/30/07 18:22:15	4.97	4.75	4.97 % db Oxygen
08/30/07 18:22:30	4.97	4.81	
08/30/07 18:22:45	4.98	4.84	
08/30/07 18:23:00	5.74	7.53	
08/30/07 18:23:15	11.39	14.10	
08/30/07 18:23:30	17.32	18.41	
08/30/07 18:23:45	20.76	20.78	
08/30/07 18:24:00	22.05	21.59	
08/30/07 18:24:15	22.30	21.76	
08/30/07 18:24:30	22.34	21.84	
08/30/07 18:24:45	22.36	21.89	
08/30/07 18:25:00	22.36	21.92	
08/30/07 18:25:15	22.37	21.95	
08/30/07 18:25:30	22.38	21.98	

08/30/07 18:25:45	22.38	21.99
08/30/07 18:26:00	22.38	22.01
08/30/07 18:26:15	22.39	22.02
08/30/07 18:26:30	22.40	22.03
08/30/07 18:26:45	22.40	22.04
08/30/07 18:27:00	22.39	22.06

System Bias Check:

08/30/07 18:27:15	22.40	22.07	22.82% CO2 injection:
08/30/07 18:27:30	22.40	22.07	22.08 % db CO2
08/30/07 18:27:45	22.40	22.08	
08/30/07 18:28:00	22.40	22.09	



Valero Refining Company - New Jersey
Source: FCCU Scrubber Stack
Test Dates: 8/28 - 8/30/07

APPENDIX E

Process Data

MultiMonitor 1.3

Hourly Average (PBRFRaw)

Tag ID / Calculation:

49FI027.PV

50F355K

Description: 49-C-4 EXHAUST FLOW @70F FCC FRESH FEED CORR

Engineering Unit:

MACF/M

MB/D

Lab Sample Time:

Lab Days (UMTWHFS):

DateTime	Value_001	Value_002
Fri, 31 Aug 07, 11:00 PM	140.46	55.78
Fri, 31 Aug 07, 10:00 PM	140.14	55.78
Fri, 31 Aug 07, 09:00 PM	138.63	55.78
Fri, 31 Aug 07, 08:00 PM	138.88	55.79
Fri, 31 Aug 07, 07:00 PM	138.73	55.77
Fri, 31 Aug 07, 06:00 PM	138.26	55.75
Fri, 31 Aug 07, 05:00 PM	139.45	55.75
Fri, 31 Aug 07, 04:00 PM	139.74	55.74
Fri, 31 Aug 07, 03:00 PM	139.89	55.74
Fri, 31 Aug 07, 02:00 PM	141.01	55.72
Fri, 31 Aug 07, 01:00 PM	139.97	55.73
Fri, 31 Aug 07, 12:00 PM	140.69	55.71
Fri, 31 Aug 07, 11:00 AM	141.97	55.71
Fri, 31 Aug 07, 10:00 AM	142.18	55.72
Fri, 31 Aug 07, 09:00 AM	142.21	55.33
Fri, 31 Aug 07, 08:00 AM	135.12	54.73
Fri, 31 Aug 07, 07:00 AM	142.53	54.71
Fri, 31 Aug 07, 06:00 AM	141.57	54.70
Fri, 31 Aug 07, 05:00 AM	138.87	54.69
Fri, 31 Aug 07, 04:00 AM	139.08	54.69
Fri, 31 Aug 07, 03:00 AM	139.48	54.69
Fri, 31 Aug 07, 02:00 AM	139.58	54.70
Fri, 31 Aug 07, 01:00 AM	139.12	54.71
Fri, 31 Aug 07, 12:00 AM	138.52	54.67
Thu, 30 Aug 07, 11:00 PM	138.95	54.68
Thu, 30 Aug 07, 10:00 PM	137.75	54.68
Thu, 30 Aug 07, 09:00 PM	137.96	54.68
Thu, 30 Aug 07, 08:00 PM	137.60	54.66
Thu, 30 Aug 07, 07:00 PM	137.63	54.68
Thu, 30 Aug 07, 06:00 PM	137.71	54.66
Thu, 30 Aug 07, 05:00 PM	138.89	54.65
Thu, 30 Aug 07, 04:00 PM	137.79	54.64
Thu, 30 Aug 07, 03:00 PM	137.66	54.66
Thu, 30 Aug 07, 02:00 PM	137.82	54.64
Thu, 30 Aug 07, 01:00 PM	137.36	54.67
Thu, 30 Aug 07, 12:00 PM	139.07	54.67
Thu, 30 Aug 07, 11:00 AM	139.27	54.69
Thu, 30 Aug 07, 10:00 AM	138.71	54.68
Thu, 30 Aug 07, 09:00 AM	138.23	54.68
Thu, 30 Aug 07, 08:00 AM	132.48	54.64
Thu, 30 Aug 07, 07:00 AM	139.15	54.63
Thu, 30 Aug 07, 06:00 AM	136.74	54.62
Thu, 30 Aug 07, 05:00 AM	136.48	54.62
Thu, 30 Aug 07, 04:00 AM	136.93	54.62
Thu, 30 Aug 07, 03:00 AM	136.85	54.61

Exhaust Flow =	137.72
Feed Rate =	54.66

MultiMonitor 1.3

Hourly Average (PBRFRaw)

Tag ID / Calculation:

49FI027.PV

50F355K

Description: 49-C-4 EXHAUST FLOW @70F FCC FRESH FEED CORR

Engineering Unit:

MACF/M

MB/D

Lab Sample Time:

Lab Days (UMTWHFS):

DateTime	Value_001	Value_002
Thu, 30 Aug 07, 02:00 AM	137.63	54.61
Thu, 30 Aug 07, 01:00 AM	137.73	54.62
Thu, 30 Aug 07, 12:00 AM	137.36	54.61
Wed, 29 Aug 07, 11:00 PM	138.00	54.59
Wed, 29 Aug 07, 10:00 PM	137.46	54.58
Wed, 29 Aug 07, 09:00 PM	137.26	54.59
Wed, 29 Aug 07, 08:00 PM	137.58	54.58
Wed, 29 Aug 07, 07:00 PM	136.71	54.56
Wed, 29 Aug 07, 06:00 PM	137.14	54.54
Wed, 29 Aug 07, 05:00 PM	137.66	54.54
Wed, 29 Aug 07, 04:00 PM	137.12	54.54
Wed, 29 Aug 07, 03:00 PM	137.09	54.54
Wed, 29 Aug 07, 02:00 PM	137.34	54.55
Wed, 29 Aug 07, 01:00 PM	138.03	54.53
Wed, 29 Aug 07, 12:00 PM	138.59	54.53
Wed, 29 Aug 07, 11:00 AM	139.96	54.56
Wed, 29 Aug 07, 10:00 AM	140.72	54.56
Wed, 29 Aug 07, 09:00 AM	141.32	54.55
Wed, 29 Aug 07, 08:00 AM	134.18	54.60
Wed, 29 Aug 07, 07:00 AM	143.01	54.63
Wed, 29 Aug 07, 06:00 AM	142.29	54.61
Wed, 29 Aug 07, 05:00 AM	140.28	54.60
Wed, 29 Aug 07, 04:00 AM	139.92	54.61
Wed, 29 Aug 07, 03:00 AM	139.54	54.60
Wed, 29 Aug 07, 02:00 AM	139.86	54.60
Wed, 29 Aug 07, 01:00 AM	139.38	54.57
Wed, 29 Aug 07, 12:00 AM	138.89	54.57
Tue, 28 Aug 07, 11:00 PM	138.83	54.58
Tue, 28 Aug 07, 10:00 PM	138.96	54.58
Tue, 28 Aug 07, 09:00 PM	138.12	54.59
Tue, 28 Aug 07, 08:00 PM	138.36	54.58
Tue, 28 Aug 07, 07:00 PM	138.46	54.55
Tue, 28 Aug 07, 06:00 PM	138.41	54.57
Tue, 28 Aug 07, 05:00 PM	138.75	54.55
Tue, 28 Aug 07, 04:00 PM	138.65	54.54
Tue, 28 Aug 07, 03:00 PM	139.39	54.56
Tue, 28 Aug 07, 02:00 PM	141.25	54.57
Tue, 28 Aug 07, 01:00 PM	142.26	54.57
Tue, 28 Aug 07, 12:00 PM	141.26	54.58
Tue, 28 Aug 07, 11:00 AM	139.91	54.57
Tue, 28 Aug 07, 10:00 AM	139.46	54.59
Tue, 28 Aug 07, 09:00 AM	139.84	54.59
Tue, 28 Aug 07, 08:00 AM	130.83	54.58
Tue, 28 Aug 07, 07:00 AM	140.50	54.58
Tue, 28 Aug 07, 06:00 AM	141.06	54.57

Exhaust Flow =
138.14
Feed Rate =
54.55

Exhaust Flow =
139.65
Feed Rate =
54.57

MultiMonitor 1.3

Hourly Average (PBRFRaw)

Tag ID / Calculation:

49FI027.PV

50F355K

Description:

49-C-4 EXHAUST FLOW @70F

FCC FRESH FEED CORR

Engineering Unit:

MACF/M

MB/D

Lab Sample Time:

Lab Days (UMTWHFS):

DateTime	Value_001	Value_002
Tue, 28 Aug 07, 05:00 AM	140.62	54.60
Tue, 28 Aug 07, 04:00 AM	140.25	54.61
Tue, 28 Aug 07, 03:00 AM	139.97	54.59
Tue, 28 Aug 07, 02:00 AM	139.66	54.59
Tue, 28 Aug 07, 01:00 AM	140.87	54.60
Tue, 28 Aug 07, 12:00 AM	140.92	54.61
Mon, 27 Aug 07, 11:00 PM	141.88	54.61
Mon, 27 Aug 07, 10:00 PM	141.80	54.62
Mon, 27 Aug 07, 09:00 PM	140.59	54.61
Mon, 27 Aug 07, 08:00 PM	140.34	54.61
Mon, 27 Aug 07, 07:00 PM	140.61	54.62
Mon, 27 Aug 07, 06:00 PM	140.12	54.62
Mon, 27 Aug 07, 05:00 PM	140.41	54.62
Mon, 27 Aug 07, 04:00 PM	139.63	54.61
Mon, 27 Aug 07, 03:00 PM	138.84	54.60
Mon, 27 Aug 07, 02:00 PM	139.37	54.65
Mon, 27 Aug 07, 01:00 PM	140.55	54.64
Mon, 27 Aug 07, 12:00 PM	140.62	54.47
Mon, 27 Aug 07, 11:00 AM	140.86	54.26
Mon, 27 Aug 07, 10:00 AM	140.87	54.00
Mon, 27 Aug 07, 09:00 AM	140.04	53.68
Mon, 27 Aug 07, 08:00 AM	134.28	53.13
Mon, 27 Aug 07, 07:00 AM	139.91	53.07
Mon, 27 Aug 07, 06:00 AM	139.62	53.07
Mon, 27 Aug 07, 05:00 AM	139.92	53.09
Mon, 27 Aug 07, 04:00 AM	139.82	53.09
Mon, 27 Aug 07, 03:00 AM	140.67	53.10
Mon, 27 Aug 07, 02:00 AM	140.45	53.05
Mon, 27 Aug 07, 01:00 AM	140.02	52.87
Mon, 27 Aug 07, 12:00 AM	140.27	52.88

Tag ID / Calculation:	49A008E PV SCRUBBER STACK CEMS		49A008B PV SCRUBBER STACK CEMS		49A008B PV SCRUBBER STACK CEMS		49C027.PV DRY FLUE GAS FLOW @70F MACF/M	50F115K.PV AIR TO REGENERATO R COMP MSCFH	#VALUE! Air to Regen SCF/min	#VALUE! Dry flue gas rate SCF/min	#VALUE! Coke burn for environmental lb/hr	50CV011 FCC COKE PRODUCTION MLB/H	#VALUE! Online coke burn lb/hr			
	CO2 PCT	PPM	CO PPM	O2 PCT	Value_001	Value_002	Value_003	Value_004	Value_005	Value_006	Value_007	Value_008	Value_009	Value_010	Value_011	Value_012
Wed, 29 Aug 07, 06:00:00 AM	19.98	3.85	1.22	109.45	6266.91	104448.44	107388.80	39915.60	13609.63	14116.82	39408.41	42.34	42336.91			
Wed, 29 Aug 07, 07:00:00 AM	17.82	3.17	1.79	109.85	6268.43	104473.75	107772.88	35724.09	13612.93	13102.41	36234.61	42.22	42224.45			
Wed, 29 Aug 07, 08:00:00 AM	18.20	4.18	0.79	101.40	6261.26	104354.26	99483.76	33678.61	13597.36	11714.00	35561.96	42.29	42291.36			
Wed, 29 Aug 07, 09:00:00 AM	19.98	4.17	1.08	108.29	6262.15	104202.44	106241.93	39489.38	13577.58	13871.60	39195.36	42.16	42163.04			
Wed, 29 Aug 07, 10:00:00 AM	19.98	3.15	1.16	108.21	6247.66	104127.63	106169.82	39462.37	13567.83	13917.24	39112.96	42.29	42289.33			
Wed, 29 Aug 07, 11:00:00 AM	14.44	4.21	2.19	107.29	6214.94	103582.04	105265.93	28276.49	13496.79	10857.53	30915.75	42.04	42042.14			
Wed, 29 Aug 07, 12:00:00 PM	19.98	9.69	1.13	106.41	6157.80	102630.04	104402.16	38606.62	13372.69	13669.35	38609.96	41.59	41591.59			
Wed, 29 Aug 07, 01:00:00 PM	19.98	9.04	1.10	105.95	6151.04	102517.33	103947.79	38637.60	13358.01	13591.00	38404.61	41.72	41719.52			
Wed, 29 Aug 07, 02:00:00 PM	19.98	6.15	1.23	105.57	6150.86	102514.36	103578.45	39499.76	13357.62	13622.42	38234.96	41.63	41631.15			
Wed, 29 Aug 07, 03:00:00 PM	19.98	13.18	1.06	105.45	6147.17	102452.90	103461.38	38457.60	13349.61	13499.71	38307.50	41.63	41628.41			
Wed, 29 Aug 07, 04:00:00 PM	19.98	10.59	1.22	105.45	6124.78	102079.72	103462.69	38457.59	13300.99	13300.99	38158.85	41.64	41639.06			
Wed, 29 Aug 07, 05:00:00 PM	19.98	3.73	1.35	105.95	6123.58	102059.71	103948.58	38636.87	13298.38	13750.09	38185.16	41.57	41569.05			
Wed, 29 Aug 07, 06:00:00 PM	19.98	6.85	1.32	105.58	6126.81	102113.46	103588.05	38503.46	13305.38	13680.06	38128.79	41.59	41590.47			
Wed, 29 Aug 07, 07:00:00 PM	19.98	5.94	1.28	105.25	6128.07	102134.48	103263.16	38382.53	13308.12	13615.62	38075.03	41.54	41538.64			
Wed, 29 Aug 07, 08:00:00 PM	19.98	4.94	1.32	105.93	6128.91	102148.47	103927.47	38629.26	13309.95	13727.39	38211.81	41.59	41594.08			
Wed, 29 Aug 07, 09:00:00 PM	19.98	6.55	1.35	105.79	6130.74	102178.98	103795.14	38590.38	13313.92	13727.64	38186.66	41.60	41602.03			
Wed, 29 Aug 07, 10:00:00 PM	19.98	6.44	1.35	105.85	6131.59	102193.12	103850.52	38600.95	13315.76	13735.09	38181.62	41.58	41576.72			
Wed, 29 Aug 07, 11:00:00 PM	19.98	4.58	1.41	106.16	6142.18	102369.62	104157.55	38714.71	13338.76	13815.92	38237.55	41.60	41604.30			
Thu, 30 Aug 07, 00:00:00 AM	19.98	6.55	1.36	105.81	6137.39	102289.85	103811.82	38586.58	13328.37	13736.42	38178.53	41.67	41670.78			
Thu, 30 Aug 07, 01:00:00 AM	19.98	6.05	1.32	105.99	6137.65	102294.14	103985.76	38651.14	13328.93	13733.19	38246.87	41.70	41703.24			
Thu, 30 Aug 07, 02:00:00 AM	19.98	7.71	1.32	105.92	6138.50	102308.25	103918.36	38626.41	13330.77	13728.49	38228.69	41.69	41687.95			
Thu, 30 Aug 07, 03:00:00 AM	19.98	6.17	1.31	105.33	6142.71	102378.50	103337.91	38410.36	13339.92	13644.71	38105.57	41.72	41724.76			
Thu, 30 Aug 07, 04:00:00 AM	19.98	5.59	1.36	105.55	6139.97	102332.91	103561.71	38493.43	13333.98	13705.24	38122.18	41.62	41619.25			
Thu, 30 Aug 07, 05:00:00 AM	19.98	6.27	1.31	105.25	6143.47	102391.24	103268.57	38384.61	13341.58	13630.48	38095.71	41.70	41702.11			
Thu, 30 Aug 07, 06:00:00 AM	19.98	8.68	1.28	105.43	6139.78	102329.66	103439.82	38448.72	13333.56	13638.42	38143.86	41.72	41722.89			
Thu, 30 Aug 07, 07:00:00 AM	17.93	12.29	2.00	107.18	6230.80	103846.99	105157.74	35064.94	13531.21	12993.33	35602.82	42.25	42254.45			
Thu, 30 Aug 07, 08:00:00 AM	19.98	4.14	1.18	100.21	6221.94	103698.98	98321.63	32907.88	13511.98	11688.94	34730.92	42.19	42187.33			
Thu, 30 Aug 07, 09:00:00 AM	19.98	4.17	1.50	106.30	6228.98	103833.02	104291.66	38754.48	13529.44	13888.33	38405.59	42.00	42000.44			
Thu, 30 Aug 07, 10:00:00 AM	19.98	4.46	1.45	106.68	6220.61	103763.87	104689.66	38905.03	13509.10	13906.17	38507.95	42.16	42164.19			
Thu, 30 Aug 07, 11:00:00 AM	19.98	3.43	1.52	107.21	6227.63	103793.90	105188.58	39097.71	13524.34	14022.51	38599.55	42.21	42206.24			
Thu, 30 Aug 07, 12:00:00 PM	19.98	4.47	1.44	106.94	6209.23	103487.21	104923.92	38999.54	13484.38	13937.85	38546.07	42.02	42021.19			
Thu, 30 Aug 07, 01:00:00 PM	19.98	15.50	1.21	105.60	6144.63	102410.47	103611.63	38513.90	13344.08	13617.33	38240.65	41.81	41805.90			
Thu, 30 Aug 07, 02:00:00 PM	19.98	12.81	1.17	105.90	6166.54	102775.59	103906.09	38622.83	13391.66	13624.55	38399.94	41.78	41779.53			
Thu, 30 Aug 07, 03:00:00 PM	19.98	10.36	1.17	105.74	6152.63	102543.87	103746.09	38562.89	13361.47	13609.05	38315.30	41.80	41802.23			
Thu, 30 Aug 07, 04:00:00 PM	19.98	11.79	1.13	105.80	6139.36	102322.71	103803.87	38584.64	13332.65	13588.60	38328.68	41.65	41646.69			
Thu, 30 Aug 07, 05:00:00 PM	19.98	8.59	1.22	106.74	6117.79	101963.24	104728.63	38927.76	13285.81	13767.70	38445.87	41.54	41539.48			
Thu, 30 Aug 07, 06:00:00 PM	19.98	7.56	1.27	106.00	6121.87	102031.19	103996.84	38655.55	13294.66	13701.37	38248.84	41.43	41428.47			
Thu, 30 Aug 07, 07:00:00 PM	19.98	12.36	1.20	105.70	6097.43	101623.81	103701.30	38546.62	13241.58	13621.76	38166.44	41.41	41409.95			
Thu, 30 Aug 07, 08:00:00 PM	19.98	19.68	1.08	105.82	6105.60	101776.75	103827.33	38594.89	13261.51	13556.25	38298.14	41.49	41486.35			
Thu, 30 Aug 07, 09:00:00 PM	19.98	9.87	1.20	106.16	6115.54	101925.64	104154.88	38714.74	13280.91	13682.18	38313.47	41.61	41610.81			
Thu, 30 Aug 07, 10:00:00 PM	19.98	13.78	1.18	105.84	6125.03	102083.89	103845.98	38600.68	13301.53	13623.58	38278.63	41.54	41541.90			
Thu, 30 Aug 07, 11:00:00 PM	19.98	7.72	1.23	107.02	6145.13	102418.88	105002.21	39029.28	13345.18	13808.41	38566.05	41.73	41731.93			
Fri, 31 Aug 07, 00:00:00 AM	19.98	11.53	1.19	106.40	6150.02	102500.36	104396.92	38805.03	13355.80	13703.91	38496.92	41.82	41822.91			
Fri, 31 Aug 07, 01:00:00 AM	19.98	5.58	1.29	106.99	6155.88	102598.07	104967.68	39016.02	13368.53	13844.97	38539.59	41.84	41840.60			
Fri, 31 Aug 07, 02:00:00 AM	19.98	9.21	1.24	107.28	6156.20	102603.26	105253.45	39122.95	13369.20	13851.34	38640.82	41.76	41757.19			
Fri, 31 Aug 07, 03:00:00 AM	19.98	10.84	1.22	107.30	6155.29	102588.22	105277.51	39132.22	13367.24	13836.90	38662.56	41.89	41891.98			
Fri, 31 Aug 07, 04:00:00 AM	19.98	8.29	1.21	106.95	6157.96	102632.62	104933.58	39003.88	13373.03	13789.60	38587.31	41.95	41948.35			
Fri, 31 Aug 07, 05:00:00 AM	19.98	5.58	1.30	106.91	6159.16	102652.69	104890.77	38987.44	13375.64	13840.48	38522.60	41.82	41815.82			
Fri, 31 Aug 07, 06:00:00 AM	19.98	7.13	1.38	109.05	6297.14	104952.33	106987.64	39757.14	13675.29	14168.73	39273.70	42.57	42566.75			
Fri, 31 Aug 07, 07:00:00 AM	18.24	4.69	1.97	109.47	6313.61	105226.77	107401.76	39433.72	13711.05	13458.91	39685.86	42.69	42693.74			
Fri, 31 Aug 07, 08:00:00 AM	19.98	4.23	1.10	103.89	6314.28	105238.00	107929.27	39566.06	13712.51	11884.96	39393.61	42.72	42723.60			
Fri, 31 Aug 07, 09:00:00 AM	19.98	4.25	1.44	109.40	6312.11	105200.85	107240.47	39860.55	13707.80	14241.68	39326.67	42.80	42602.84			
Fri, 31 Aug 07, 10:00:00 AM	19.98	4.25	1.42	109.42	6315.16	105252.71	107356.22	39903.57	13714.43	14249.39	39368.61	42.86	42664.46			
Fri, 31 Aug 07, 11:00:00 AM	19.98	9.50	1.39	109.26	6295.46	104924.41	107196.69	39845.32	13671.65	14207.10	39309.87	42.53	42531.68			

Tag ID / Calculation:	Description:	Engineering Unit:	Lab Sample Time:	Lab Days (UMTWHS):												
				49A008E.PV SCRUBBER STACK CEMS CO2 PCT	49A008B.PV SCRUBBER STACK CEMS CO PPM	49A008B.PV SCRUBBER STACK CEMS O2 PCT	49C027.PV DRY FLUE GAS FLOW @70F MACF/M	50F115K.PV AIR TO REGENERATOR R COMP MSCF/H	#VALUE! Air to Regen SCF/min	#VALUE! Dry flue gas rate SCF/min	#VALUE!	#VALUE!	#VALUE!	50CV011 FCC COKE PRODUCTION MLB/H	#VALUE! Online coke burn lb/hr	
				Value_001	Value_002	Value_003	Value_004	Value_005	Value_006	Value_007	Value_008	Value_009	Value_010	Value_011	Value_012	Value_013
Fri, 31 Aug 07, 12:00:00 PM	19.98	7.93	1.34	108.42	6252.63	104210.50	106371.46	39538.27	13578.63	14061.38	39055.51	42.37	42368.31	39055.51	42.37	42368.31
Fri, 31 Aug 07, 01:00:00 PM	19.98	7.26	1.31	107.85	6249.24	104153.99	105813.51	39330.74	13571.26	13971.35	38930.66	42.39	42389.04	38930.66	42.39	42389.04
Fri, 31 Aug 07, 02:00:00 PM	19.98	9.27	1.33	108.41	6247.55	104125.87	106366.35	39536.63	13567.60	14053.16	39051.08	42.29	42293.37	39051.08	42.29	42293.37
Fri, 31 Aug 07, 03:00:00 PM	19.98	3.91	1.41	107.84	6251.51	104191.88	105805.58	39327.14	13576.20	14036.95	38866.39	42.35	42348.18	38866.39	42.35	42348.18
Fri, 31 Aug 07, 04:00:00 PM	19.98	3.82	1.37	107.64	6246.17	104102.80	105610.17	39254.49	13564.59	13981.61	38937.48	42.41	42406.68	38937.48	42.41	42406.68
Fri, 31 Aug 07, 05:00:00 PM	19.98	3.79	1.48	107.41	6204.45	103407.52	105379.72	39168.83	13474.00	14023.73	38619.09	42.12	42116.66	38619.09	42.12	42116.66
Fri, 31 Aug 07, 06:00:00 PM	19.98	4.58	1.41	106.54	6183.90	103065.06	104530.20	38853.22	13429.38	13931.62	38420.28	42.14	42141.03	38420.28	42.14	42141.03
Fri, 31 Aug 07, 07:00:00 PM	19.98	4.99	1.41	107.05	6182.25	103037.42	105030.74	39039.35	13425.78	13931.62	38533.50	42.07	42066.13	38533.50	42.07	42066.13
Fri, 31 Aug 07, 08:00:00 PM	19.98	5.99	1.38	106.94	6192.09	103201.46	104924.74	39000.14	13447.15	13989.81	38548.49	42.15	42146.90	38548.49	42.15	42146.90
Fri, 31 Aug 07, 09:00:00 PM	19.98	4.71	1.41	106.85	6189.23	103153.87	104837.27	38967.38	13440.95	13906.41	38501.92	42.45	42452.47	38501.92	42.45	42452.47
Fri, 31 Aug 07, 10:00:00 PM	19.98	3.85	1.45	108.12	6264.06	104401.06	106076.57	39427.85	13603.46	14097.41	38933.90	42.79	42789.43	38933.90	42.79	42789.43
Fri, 31 Aug 07, 11:00:00 PM	19.98	4.22	1.47	108.39	6337.18	105619.66	106342.31	39526.70	13762.24	14146.16	39142.79	42.79	42789.43	39142.79	42.79	42789.43



Valero Refining Company - New Jersey
Source: FCCU Scrubber Stack
Test Dates: 8/28 - 8/30/07

APPENDIX F

Calibration Data



CEM Calibration Error Data Sheet
Analyzer Response

Plant Name: Valero
Sampling Location: FCC FGS Stack
Date: 8/28/2007

ANALYZER SPAN VALUE (% or ppm)		ANALYZER SPAN VALUE (% or ppm)
Stack Oxygen	10.00	
Stack CO2	22.82	

	MONITOR SERIAL NUMBER	CYLINDER NUMBER	CYLINDER VALUE (% or ppm)	ANALYZER CALIBRATION RESPONSE	DIFFERENCE (% OF GAS/SPAN)
Stack Oxygen	01420c/2738	ALM-044363: Zero N2	0.0	0.01	0.10
Stack Oxygen					
Stack Oxygen		ALM-049488	5.0	5.02	0.18
Stack Oxygen		ALM-049488	10.0	10.05	0.48
Stack CO2	01420c/2738	ALM-044363: Zero N2	0.0	0.05	0.22
Stack CO2					
Stack CO2		ALM-049488	10.0	10.06	0.26
Stack CO2		ALM-049488	22.8	22.73	-0.40



CEM CALIBRATION DATA
System Bias and Drift
Page #1

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack

Run:	202-1	202-2/5B-1	202-3/5B-2	M5B-3
Date:	8/28/2007	8/28/2007	8/28/2007	8/28/2007
Time:	1031-1207	1354-1510	1601-1735	1813-1923
Stack Oxygen	Pretest	Posttest	Pretest	Posttest
Zero Reading	0.11	0.05	0.06	0.06
Zero Bias, % of Span	1.12	0.48	0.58	0.60
Mid-Range Calibration Conc.	Pretest	Posttest	Pretest	Posttest
System Response to Cal	10.00	10.00	10.00	10.00
Cal Bias, % of Span	10.06	9.95	9.95	9.95
Stack CO2	Pretest	Posttest	Pretest	Posttest
Zero Reading	0.60	-0.47	-0.54	-0.54
Zero Bias, % of Span	1.07	-1.07	-0.07	-0.07
Mid-Range Calibration Conc.	Pretest	Posttest	Pretest	Posttest
System Response to Cal	10.12	0.14	0.17	0.15
Cal Bias, % of Span	0.55	0.61	0.76	0.67
Mid-Range Calibration Conc.	Pretest	Posttest	Pretest	Posttest
System Response to Cal	10.00	10.00	10.00	10.00
Cal Bias, % of Span	9.80	9.89	9.84	9.83
	-0.89	-0.50	-0.72	-0.73
		0.39	-0.22	-0.66
			-0.01	0.07



CEM Calibration Error Data Sheet

Analyzer Response

Plant Name: Valero Paulsboro
 Sampling Location: FCCU FGS Stack
 Date: 8/29/2007

ANALYZER SPAN VALUE (% or ppm)	
Stack Oxygen	10.00
Stack CO2	22.82
Stack SO2	100.00
Stack NOx	100.00
Stack CO	100.00
Stack VOC	100.00
Stack Methane	100.00

		MONITOR SERIAL NUMBER	CYLINDER NUMBER	CYLINDER VALUE (% or ppm)	ANALYZER CALIBRATION RESPONSE	DIFFERENCE (% OF GAS/SPAN)
Stack Oxygen	Zero	01420C/2738	ALM-044363: Zero N2	0.0	0.00	-0.04
Stack Oxygen	Low					
Stack Oxygen	Mid		ALM-049488	5.0	4.97	-0.27
Stack Oxygen	High		ALM-049488	10.0	9.99	-0.11
Stack CO2	Zero	01420C/2738	ALM-044363: Zero N2	0.0	0.03	0.13
Stack CO2	Low					
Stack CO2	Mid		ALM-049488	10.0	10.00	-0.02
Stack CO2	High		ALM-049488	22.8	22.79	-0.15
Stack SO2	Zero	AD-921-SO98	ALM-044363: Zero N2	0.0	-0.21	-0.21
Stack SO2	Low		ALM-060437	20.0	19.91	-0.09
Stack SO2	Mid		ALM-060437	50.0	49.80	-0.20
Stack SO2	High		ALM-060437	100.0	100.89	0.89
Stack NOx	Zero	519312097	ALM-044363: Zero N2	0.0	0.26	0.26
Stack NOx	Low		ALM-054470	20.0	21.26	1.26
Stack NOx	Mid		ALM-054470	50.0	50.33	0.33
Stack NOx	High		ALM-054470	100.0	100.71	0.71
Stack CO	Zero	506610701	ALM-044363: Zero N2	0.0	0.23	0.23
Stack CO	Low		ALM-015730	20.0	20.98	0.98
Stack CO	Mid		ALM-015730	50.0	50.22	0.22
Stack CO	High		ALM-015730	100.0	100.33	0.33
Stack VOC	Zero	6901100 Ch1	ALM-044363: Zero N2	0.0	0.48	0.48
Stack VOC	Low		ALM-059410	25.0	25.16	-0.63
Stack VOC	Mid		ALM-059410	50.0	49.27	1.46
Stack VOC	High		ALM-059410	85.0	85.06	-0.07
Stack Methane	Zero	6901100 Ch2	ALM-044363: Zero N2	0.0	0.40	3.98
Stack Methane	Low		ALM-059410	25.0	24.88	0.47
Stack Methane	Mid		ALM-059410	50.0	49.23	1.54
Stack Methane	High		ALM-059410	85.0	82.55	2.89



Company: Valero
Location: Paulsboro, New Jersey
Source: FCCU FGS Stack

Run: Date: Time:	M8-1				M8-2/HCN-1				M8-3/HCN-2				HCN-3/M29-1			
	Pretest	Posttest	Drift		Pretest	Posttest	Drift		Pretest	Posttest	Drift		Pretest	Posttest	Drift	
Stack Oxygen																
Zero Reading	0.10	0.11	0.01	0.01	0.11	0.10	-0.01		0.10	0.11	0.00		0.11	0.12	0.01	
Zero Bias, % of Span	0.99	1.10	0.11	0.11	1.10	1.03	-0.07		1.03	1.08	0.05		1.08	1.22	0.14	
Mid-Range Calibration Conc.	5.00	5.00			5.00	5.00			5.00	5.00			5.00	5.00		
System Response to Cal	5.00	5.04	0.04	0.04	5.04	4.94	-0.09		4.94	4.92	-0.02		4.92	4.96	0.04	
Cal Bias, % of Span	-0.01	0.36	0.38	0.38	0.36	-0.57	-0.93		-0.57	-0.75	-0.19		-0.75	-0.40	0.35	
Stack CO ₂																
Zero Reading	0.10	0.16	0.06	0.06	0.16	0.16	0.00		0.16	0.15	-0.01		0.15	0.18	0.03	
Zero Bias, % of Span	0.46	0.72	0.26	0.26	0.72	0.71	-0.01		0.71	0.66	-0.04		0.66	0.79	0.12	
Mid-Range Calibration Conc.	22.82	22.82			22.82	22.82			22.82	22.82			22.82	22.82		
System Response to Cal	22.46	22.47	0.01	0.01	22.47	22.36	-0.11		22.36	22.34	-0.02		22.34	22.33	-0.01	
Cal Bias, % of Span	-1.57	-1.53	0.03	0.03	-1.53	-2.00	-0.47		-2.00	-2.08	-0.09		-2.08	-2.14	-0.06	
Stack SO ₂																
Zero Reading	0.90	1.43	0.53	0.53	1.43	1.42	-0.01		1.42	0.79	-0.63		0.79	0.79	0.00	
Zero Bias, % of Span	0.90	1.43	0.53	0.53	1.43	1.42	-0.01		1.42	0.79	-0.63		0.79	0.79	0.00	
Mid-Range Calibration Conc.	20.00	20.00			20.00	20.00			20.00	20.00			20.00	20.00		
System Response to Cal	18.50	18.01	-0.49	-0.49	18.01	18.32	0.31		18.32	19.30	0.98		19.30	19.30	0.00	
Cal Bias, % of Span	-1.50	-1.99	-0.49	-0.49	-1.99	-1.68	0.31		-1.68	-0.70	0.98		-0.70	-0.70	0.00	
Stack NO _x																
Zero Reading	0.20	0.21	0.01	0.01	0.21	0.79	0.58		0.79	0.23	-0.56		0.23	0.23	0.00	
Zero Bias, % of Span	0.20	0.21	0.01	0.01	0.21	0.79	0.58		0.79	0.23	-0.56		0.23	0.23	0.00	
Mid-Range Calibration Conc.	20.00	20.00			20.00	20.00			20.00	20.00			20.00	20.00		
System Response to Cal	20.21	20.03	-0.18	-0.18	20.03	18.30	-1.73		18.30	18.24	-0.06		18.24	18.24	0.00	
Cal Bias, % of Span	0.21	0.03	-0.18	-0.18	0.03	-1.70	-1.73		-1.70	-1.76	-0.06		-1.76	-1.76	0.00	
Stack CO																
Zero Reading	0.22	0.22	0.00	0.00	0.22	0.22	0.00		0.22	-0.40	-0.62		-0.40	-0.40	0.00	
Zero Bias, % of Span	0.22	0.22	0.00	0.00	0.22	0.22	0.00		0.22	-0.40	-0.62		-0.40	-0.40	0.00	
Mid-Range Calibration Conc.	20.00	20.00			20.00	20.00			20.00	20.00			20.00	20.00		
System Response to Cal	20.11	19.23	-0.87	-0.87	19.23	19.23	0.00		19.23	18.80	-0.44		18.80	18.80	0.00	
Cal Bias, % of Span	0.11	-0.77	-0.87	-0.87	-0.77	-0.77	0.00		-0.77	-1.20	-0.44		-1.20	-1.20	0.00	
Stack VOC																
Zero Reading	0.48	0.48	0.00	0.00	0.48	0.46	-0.02		0.46	0.45	-0.01		0.45	0.45	0.00	
Zero Bias, % of Span	0.48	0.48	0.00	0.00	0.48	0.46	-0.02		0.46	0.45	-0.01		0.45	0.45	0.00	
Mid-Range Calibration Conc.	25.00	25.00			25.00	25.00			25.00	25.00			25.00	25.00		
System Response to Cal	25.16	24.31	-0.85	-0.85	24.31	24.52	0.21		24.52	25.02	0.50		25.02	25.02	0.00	
Cal Bias, % of Span	0.16	-0.69	-0.85	-0.85	-0.69	-0.48	0.21		-0.48	0.02	0.50		0.02	0.02	0.00	
Stack Methane																
Zero Reading	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00		0.00	0.00	0.00	
Zero Bias, % of Span	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00		0.00	0.00	0.00	
Mid-Range Calibration Conc.	25.00	25.00			25.00	25.00			25.00	25.00			25.00	25.00		
System Response to Cal	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00		0.00	0.00	0.00	
Cal Bias, % of Span	-25.00	-25.00	0.00	0.00	-25.00	-25.00	0.00		-25.00	-25.00	0.00		-25.00	-25.00	0.00	



CEM Calibration Error Data Sheet

Analyzer Response

Plant Name: Valero
Sampling Location: FCC FGS Stack
Date: 8/30/2007

ANALYZER SPAN VALUE (% or ppm)	
Stack Oxygen	10.00
Stack CO2	22.82

Stack Oxygen	Zero	01420C/2738	CYLINDER NUMBER	CYLINDER VALUE (% or ppm)	ANALYZER CALIBRATION RESPONSE	DIFFERENCE (% OF GAS/SPAN)
Stack Oxygen	Low		ALM-044363: Zero N2	0.0	-0.01	-0.08
Stack Oxygen	Mid		ALM-049488	5.0	4.97	-0.26
Stack Oxygen	High		ALM-049488	10.0	10.00	0.02
Stack CO2	Zero	01420C/2738	ALM-044363: Zero N2	0.0	0.04	0.17
Stack CO2	Low					
Stack CO2	Mid		ALM-049488	10.0	9.86	-0.62
Stack CO2	High		ALM-049488	22.8	22.50	-1.41



CEM CALIBRATION DATA
System Bias and Drift
Page #3

Company: Valero
Location: Paulsboro, New Jersey
Source: FCC FGS Stack

Run:	M29-2/VOST-1			M29-3/VOST-2 & -3		
Date:	8/30/2007			8/29/2007		
Time:	0838-1255			1325-1805		
Stack Oxygen	Pretest	Posttest	Drift	Pretest	Posttest	Drift
Zero Reading	0.11	0.10	-0.01	0.10	0.11	0.01
Zero Bias, % of Span	1.13	1.01	-0.12	1.01	1.09	0.08
Mid-Range Calibration Conc.	5.00	5.00		5.00	5.00	
System Response to Cal	5.01	4.96	-0.04	4.96	4.97	0.01
Cal Bias, % of Span	0.06	-0.37	-0.43	-0.37	-0.29	0.07
Stack CO2	Pretest	Posttest	Drift	Pretest	Posttest	Drift
Zero Reading	0.10	0.15	0.06	0.15	0.18	0.03
Zero Bias, % of Span	0.42	0.67	0.25	0.67	0.79	0.13
Mid-Range Calibration Conc.	22.82	22.82		22.82	22.82	
System Response to Cal	22.32	22.22	-0.11	22.22	22.38	0.16
Cal Bias, % of Span	2.18	-2.65	-0.47	-2.65	-1.94	0.71

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

Company: Valero
Location: Paulsboro, New Jersey
Dilution System ID: 3600
Dilution Flow Rate: 4 lpm
Verification date: 8/27/2007

Analyzer Info
Monitor type: Servomex Oxygen Analyzer
Monitor range: 20
Monitor Serial No.: 04120c/2738

Initial Calibration Data

<u>Calibration Concentration</u>	<u>Calibration results</u>	<u>% Difference</u>
Zero: 0.0	Zero: 0.03	Zero: 0.00
Mid: 12.5	Mid: 12.52	Mid: 0.50
High: 20.0	High: 19.96	High: 0.20

Dilution System Verification

Mid level gas type: <u>USEPA Protocol 1</u>	High level dilution gas type: <u>USEPA Protocol 1</u>
Mid level concentration: <u>12.47</u>	High level concentration: <u>22.75</u>
Mid level tank serial #: <u>ALM-033373</u>	High level tank serial #: <u>ALM-049488</u>
	Target concentration No. 1: <u>12.47</u>
	Target concentration No. 2: <u>20.00</u>

Dilution System Results (Precision Test)

<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: 12.52	0.02	Trial No. 1: 19.96	0.14
Trial No. 2: 12.51	0.05	Trial No. 2: 20.01	0.10
Trial No. 3: 12.52	0.03	Trial No. 3: 20.00	0.04
Average: 12.519		Average: 19.987	

% Difference from target concentration: 0.40% % Difference from target concentration: 0.06%

Mid Level Calibration Gas Results (Accuracy Test)

<u>Instrument Response</u>	
Trial No. 1: 12.45	Mid Level calibration gas concentration: <u>12.47</u>
Trial No. 2: 12.44	Average analyzer response: <u>12.442</u>
Trial No. 3: 12.44	Percent difference: <u>0.22</u> *

* Must be less than 2 %

Enviro[®] Gas Dilution System
Mass Flow Controller #1
Gilibrator Flow Standardization (32° F, 29.92 in. Hg)

Date= 8/16/2007

Technician = Steve Flaherty

System S/N = 3600

MFC S/N =

T_{amb} = 74.0

° F

P_{bar} = 29.32

in. Hg

Maximum Flow = 5000

cc

$$\text{flow}_{\text{std}} = g \times \left(\frac{32^{\circ} \text{F} + 460}{T_{\text{amb}} + 460} \right) \times \left(\frac{P_{\text{bar}}}{29.92 \text{ in. Hg}} \right)$$

% of max. flow	set flow	Gilibrator flow (g)	True flow (flow _{std})
5	250.0	290.5	262.28
10	500.0	586.8	529.81
20	1000.0	1160	1047.33
30	1500.0	1733	1564.68
40	2000.0	2308	2083.83
50	2500.0	2863	2584.92
60	3000.0	3428	3095.05
70	3500.0	3990	3602.46
80	4000.0	4553	4110.78
90	4500.0	5116	4619.09
100	5000.0	5715	5159.91

Environics^R Gas Dilution System
Mass Flow Controller #2
Gilibrator Flow Standardization (32° F, 29.92 in. Hg)

Date= 8/16/2007

Technician = Steve Flaherty

System S/N = 3600

MFC S/N =

T_{amb} = 74.0 ° F

P_{bar} = 29.32 in. Hg

Maximum Flow = 5000 cc

$$\text{flow}_{\text{std}} = g \times \left(\frac{32^{\circ} \text{F} + 460}{T_{\text{amb}} + 460} \right) \times \left(\frac{P_{\text{bar}}}{29.92 \text{ in. Hg}} \right)$$

% of max. flow	set flow	Gilibrator flow (g)	True flow (flow _{std})
5	250.0	300.2	271.04
10	500.0	581.7	525.20
20	1000.0	1151	1039.21
30	1500.0	1707	1541.20
40	2000.0	2265	2045.01
50	2500.0	2822	2547.91
60	3000.0	3377	3049.00
70	3500.0	3936	3553.70
80	4000.0	4506	4068.34
90	4500.0	5036	4546.86
100	5000.0	5629	5082.27

Environics^R Gas Dilution System
Mass Flow Controller #3
Gilibrator Flow Standardization (32° F, 29.92 in. Hg)

Date= 8/16/2007

Technician = Steve Flaherty

System S/N = 3600

MFC S/N =

T_{amb} = 74.0 ° F

P_{bar} = 29.32 in. Hg

Maximum Flow = 500.00 cc

$$\text{flow}_{\text{std}} = g \times \left(\frac{32^{\circ} \text{F} + 460}{T_{\text{amb}} + 460} \right) \times \left(\frac{P_{\text{bar}}}{29.92 \text{ in. Hg}} \right)$$

% of max. flow	set flow	Gilibrator flow (g)	True flow (flow _{std})
5	25.0	27.83	25.13
10	50.0	56.20	50.74
20	100.0	112.3	101.39
30	150.0	167.9	151.59
40	200.0	223.1	201.43
50	250.0	277.6	250.64
60	300.0	331.1	298.94
70	350.0	385.9	348.42
80	400.0	441.9	398.98
90	450.0	500.8	452.16
100	500.0	562.1	507.50

Envionics^R Gas Dilution System
Mass Flow Controller #4
Gilibrator Flow Standardization (32° F, 29.92 in. Hg)

Date= 8/16/2007

Technician = Steve Flaherty

System S/N = 3600

MFC S/N =

T_{amb} = 74.0 ° F

P_{bar} = 29.32 in. Hg

Maximum Flow = 50.0 cc

$$\text{flow}_{\text{std}} = g \times \left(\frac{32^{\circ} \text{F} + 460}{T_{\text{amb}} + 460} \right) \times \left(\frac{P_{\text{bar}}}{29.92 \text{ in. Hg}} \right)$$

% of max. flow	set flow	Gilibrator flow (g)	True flow (flow _{std})
5	2.50	2.855	2.578
10	5.00	5.859	5.290
20	10.00	11.89	10.74
30	15.00	18.00	16.25
40	20.00	23.63	21.33
50	25.00	29.79	26.90
60	30.00	35.17	31.75
70	35.00	41.31	37.30
80	40.00	47.01	42.44
90	45.00	53.25	48.08
100	50.00	59.36	53.59

Instrument: 3600 MFC: 1

MAX Flow: 5,000.00 CCM
 Cal Date: 08/16/2007 , 13:59:33
 Reference Gas: NITROGEN
 Description: Factory MFC #1 Calibration Table

Set Flow	True Flow	- Table is selected
250.00	262.28	
500.00	529.81	
1,000.00	1,047.33	
1,500.00	1,564.68	
2,000.00	2,083.83	
2,500.00	2,584.92	
3,000.00	3,095.05	
3,500.00	3,602.46	
4,000.00	4,110.78	
4,500.00	4,619.09	
5,000.00	5,159.91	

Instrument: 3600 MFC: 2

MAX Flow: 5,000.00 CCM
 Cal Date: 08/16/2007 , 14:57:58
 Reference Gas: NITROGEN
 Description: Factory MFC #2 Calibration Table

Set Flow	True Flow	- Table is selected
250.00	271.04	
500.00	525.20	
1,000.00	1,039.21	
1,500.00	1,541.20	
2,000.00	2,045.01	
2,500.00	2,547.91	
3,000.00	3,049.00	
3,500.00	3,553.70	
4,000.00	4,068.34	
4,500.00	4,546.86	
5,000.00	5,082.27	

Instrument: 3600 MFC: 3

MAX Flow: 500.00 CCM
 Cal Date: 08/16/2007 , 16:39:09
 Reference Gas: NITROGEN
 Description: Factory MFC #3 Calibration Table

Set Flow	True Flow	- Table is selected
25.00	27.83	
50.00	50.74	

100.00	101.39
150.00	151.59
200.00	201.43
250.00	250.64
300.00	298.94
350.00	348.42
400.00	398.98
450.00	452.16
500.00	507.50

Instrument: 3600

MFC: 4

MAX Flow: 50.00 CCM
 Cal Date: 08/16/2007 , 17:25:07
 Reference Gas: NITROGEN
 Description: Factory MFC #4 Calibration Table

Set Flow True Flow - Table is selected

2.50	2.58
5.00	5.29
10.00	10.74
15.00	16.25
20.00	21.33
25.00	26.90
30.00	31.75
35.00	37.30
40.00	42.44
45.00	48.08
50.00	53.59

Interference Response

Analyzer Type: Oxygen (O₂)
 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 ₂ without interferent	O ₂ with interferent	% Interference	Zero without Interferent	Zero with interferent	% Interference	
NH ₃	10 ppm	11.27	11.27	0.00	0.03	0.01	0.18	0.18
SO ₂	20 ppm	11.25	11.25	0.00	0.01	0.01	0.00	0.00
CH ₄	50 ppm	11.24	11.25	0.09	0.02	0.04	-0.18	0.18
CO	50 ppm	11.23	11.24	0.09	0.00	0.01	-0.09	0.09
CO ₂	5%	11.23	11.26	0.27	0.00	-0.01	0.09	0.27
CO ₂	12.55%	11.25	11.27	0.18	0.03	-0.02	0.44	0.44
NO ₂	15 ppm	11.22	11.24	0.18	0.01	0.00	0.09	0.18
NO _x	15 ppm	11.22	11.25	0.27	0.01	0.01	0.00	0.27
H ₂	1,020 ppm	11.24	11.23	-0.09	0.02	0.01	0.09	0.09
HCl	10 ppm	11.29	11.31	0.18	0.00	-0.01	0.09	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 (CO₂)
 Manufacturer: Servomex
 Detector Type: NDIR
 Model No.: 1440
 Serial No.: 1415C
 Calibration Span (%): 11.41

Test Gas	Test Gas Conc.	High Standard			Zero			Maximum % Interference
		CO ₂ without interferent	CO ₂ with interferent	% Interference	Zero without interferent	Zero with interferent	% Interference	
NH ₃	10 ppm	11.41	11.39	-0.18	0.01	0.01	0.00	0.18
SO ₂	20 ppm	11.37	11.37	0.00	0.01	0.01	0.00	0.00
CH ₄	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 ₂	15 ppm	11.37	11.37	0.00	0.01	0.01	0.00	0.00
NO _x	15 ppm	11.37	11.37	0.00	0.01	0.01	0.00	0.00
H ₂	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: 

Interference Response

Analyzer Type: Sulfur Dioxide (SO₂)
 Manufacturer: Bover Engineering 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 ₂ without Interferent	SO ₂ with Interferent	Zero without Interferent	Zero with Interferent	
NH ₃	10 ppm	100.1	100.1	0.1	0.1	0.0
CH ₄	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 ₂	5%	100.9	101.1	0.1	0.1	0.2
CO ₂	12.55%	100.9	101.2	0.1	0.2	0.3
NO ₂	15 ppm	101.6	102.2	0.3	0.5	0.6
NO _x	15 ppm	101.4	101.4	0.3	0.3	0.0
H ₂	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: 

Interference Response

Analyzer Type: Oxides of Nitrogen (NO_x)
 Manufacturer: Thermo Electron Corporation
 Detector Type: Chemiluminescent
 Model No.: 10/10S
 Serial No.: 10AR-13151-134
 Calibration Span (ppm): 100

Test Gas	Test Gas Conc.	High Standard			Zero			Maximum % Interference
		NO _x without interferent	NO _x with interferent	% Interference	Zero without interferent	Zero with interferent	% Interference	
NH ₃	10 ppm	99.96	99.92	-0.04	0.11	0.08	-0.03	0.04
CH ₄	50 ppm	99.91	99.92	0.01	0.11	0.05	-0.06	0.06
CO ₂	5%	100.25	100.09	-0.16	0.11	0.02	-0.09	0.16
CO ₂	12.55%	99.94	98.82	-1.12	0.11	-0.41	-0.52	1.12
SO ₂	20 ppm	99.91	99.95	0.04	0.11	0.01	-0.10	0.10
CO	50 ppm	99.92	99.92	0.00	0.11	0.10	-0.01	0.01
H ₂	1020 ppm	99.94	99.94	0.00	0.11	0.04	-0.07	0.07
HCl	10 ppm	99.96	99.95	-0.01	0.11	0.10	-0.01	0.01

Sum of the highest absolute value obtained with and without the pollutant present: 1.57 %
 Allowable interference response: 2.5 %

Certification Date: 8-9-06
 Operator: [Signature]

Interference Response

Analyzer Type: Oxides of Nitrogen (NO_x)
 Manufacturer: Thermo Environmental Instruments Inc.
 Detector Type: Chemiluminescent
 Model No.: 42C
 Serial No.: 42CHL64932-345
 Calibration Span (ppm): 100

Test Gas	Test Gas Conc.	High Standard			Zero			Maximum % Interference
		NO _x without interferent	NO _x with interferent	% Interference	Zero without interferent	Zero with interferent	% Interference	
NH ₃	10 ppm	100.02	100.00	-0.02	0.08	-0.06	-0.14	0.14
CH ₄	50 ppm	100.10	100.04	-0.06	0.08	0.05	-0.03	0.06
CO ₂	5%	100.07	99.92	-0.15	0.08	-0.13	-0.21	0.21
CO ₂	12.55%	100.11	99.07	-1.04	0.08	-0.42	-0.50	1.04
SO ₂	20 ppm	100.10	100.08	-0.02	0.08	0.09	0.01	0.02
CO	50 ppm	100.09	99.96	-0.13	0.08	0.07	-0.01	0.13
H ₂	1,020 ppm	100.11	100.10	-0.01	0.08	0.01	-0.07	0.07
HCl	10 ppm	100.02	99.94	-0.08	0.08	0.01	-0.07	0.08

Sum of the highest absolute value obtained with and without the pollutant present: 1.75 %
 Allowable interference response: 2.5 %

Certification Date: 8/9/2006
 Operator: 

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 ₃	10 ppm	100.0	100.0	0.0	0.0	0.0
SO ₂	20 ppm	100.0	100.0	0.0	0.3	0.3
CH ₄	50 ppm	100.0	100.0	0.0	0.1	0.1
CO ₂	5%	100.0	99.8	0.0	0.2	0.2
CO ₂	12.55%	100.0	99.6	0.0	-0.1	0.4
NO ₂	15 ppm	100.0	100.0	0.0	0.2	0.2
NO _x	15 ppm	100.0	100.0	0.0	0.2	0.2
H ₂	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: 

Interference Response

Analyzer Type: Carbon Monoxide (CO)
 Manufacturer: Thermo Environmental Instruments Inc.
 Detector Type: Non-Dispersive Infrared (NDIR)
 Model No.: 48H
 Serial No.: 000632
 Calibration Span (ppm): 100

Test Gas	Test Gas Conc.	High Standard			Zero			Maximum % Interference
		CO without interferent	CO with Interferent	% Interference	Zero without interferent	Zero with Interferent	% Interference	
NH ₃	10 ppm	101.5	101.7	0.2	1.6	1.5	-0.1	0.2
SO ₂	20 ppm	101.5	101.6	0.1	1.6	1.9	0.3	0.3
CH ₄	50 ppm	101.5	101.6	0.1	1.6	1.8	0.2	0.2
CO ₂	5%	101.5	101.4	-0.1	1.6	1.6	0.0	0.1
CO ₂	12.55%	101.5	101.1	-0.4	1.6	1.4	-0.2	0.4
NO ₂	15 ppm	101.5	101.6	0.1	1.6	1.6	0.0	0.1
NO _x	15 ppm	101.5	101.8	0.3	1.6	1.9	0.3	0.3
H ₂	1,020 ppm	101.5	101.7	0.2	1.6	1.8	0.2	0.2
HCl	10 ppm	101.5	101.6	0.1	1.6	1.8	0.2	0.2

Sum of the highest absolute value obtained with and without the pollutant present: 2.0 %
 Allowable interference response: 2.5 %

Certification Date: 8-9-06
 Operator: [Signature]



Scott Specialty Gases

1290 COMBERMERE STREET

MI:

TROY

MI 48083

Phone: 248-589-2950

Fax: 248-589-2134

C E R T I F I C A T E O F A N A L Y S I S

ARI ENVIRONMENTAL, INC.

951 OLD RAND ROAD #106

WAUCONDA

IL 60084

PROJECT #: 05-48834-002

PO#: IL-364-06

ITEM #: 0501813 AL

DATE: 08Nov2006

CYLINDER #: ALM044363

FILL PRESSURE: 02000 PSIG

PURE MATERIAL: NITROGEN

CAS# 7727-37-9

GRADE: ZERO GAS

PURITY: 99.998%

IMPURITY
THC

MAXIMUM
CONCENTRATIONS
0.5 PPM

ANALYST: _____



Scott Specialty Gases

1290 COMBERMERE STREET, TROY, MI 48083

Dual-Analyzed Calibration Standard

Phone: 248-589-2950

Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.: IL-128-07

Project No.: 05-51731-004

Customer

ARI ENVIRONMENTAL, INC.

951 OLD RAND ROAD #106
WAUCONDA IL 60084

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: ALM033373 Certification Date: 08Feb2007 Exp. Date: 07Feb2010
Cylinder Pressure***: 1900 PSIG

COMPONENT

CERTIFIED CONCENTRATION (Moles)

ANALYTICAL

ACCURACY**

TRACEABILITY

OXYGEN

12.47 %

+/- 1%

Direct NIST and NMI

NITROGEN

BALANCE

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

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

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2350	01May2009	K026542	23.48 %	OXYGEN

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#

CALIFORNIA/110P/S02041

DATE LAST CALIBRATED

11Jan2007

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: 06Feb2007 Response Unit: MV

Z1 = 0.00000	R1 = 23.48000	T1 = 12.47000
R2 = 23.49000	Z2 = 0.01000	T2 = 12.48000
Z3 = 0.01000	T3 = 12.48000	R3 = 23.49000
Avg. Concentration: 12.47 %		

Concentration = A + Bx + Cx² + Dx³ + Ex⁴
r = 0.999998

Constants: A = 0.002234
B = 0.999670 C = 0.000000
D = 0.000000 E = 0.000000

APPROVED BY: _____

F-22



CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.: IL-201-07
Project No.: 05-54318-002

Customer

ARI ENVIRONMENTAL
951 OLD RAND ROAD #106
WAUCONDA IL 60084

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: ALM049488 Certification Date: 23Apr2007 Exp. Date: 22Apr2010
Cylinder Pressure***: 1900 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ANALYTICAL ACCURACY**	TRACEABILITY
CARBON DIOXIDE	22.82 %	+/- 1 %	Direct NIST and NMi
OXYGEN	22.75 %	+/- 1 %	Direct NIST and NMi
NITROGEN	BALANCE		

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

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

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2300	01Nov2010	1D002807	23.04 %	CARBON DIOXIDE
NTRM 2350	01May2009	K026542	23.48 %	OXYGEN

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
VARIAN/3400/10693	04Apr2007	THERMAL CONDUCTIVITY
ROSEMOUNT/755R/1000430	02Apr2007	PARAMAGNETIC

ANALYZER READINGS

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

First Triad Analysis

Second Triad Analysis

Calibration Curve

CARBON DIOXIDE

Date: 23Apr2007 Response Unit: AREA
Z1 = 0.00000 R1 = 1166612. T1 = 1154586.
R2 = 1166039. Z2 = 0.00000 T2 = 1154411.
Z3 = 0.00000 T3 = 1154793. R3 = 1167335.
Avg. Concentration: 22.82 %

Concentration = A + Bx + Cx² + Dx³ + Ex⁴
r = 0.999996
Constants: A = 0.010560
B = 0.000020 C = 0
D = 0 E = 0

OXYGEN

Date: 24Apr2007 Response Unit: %
Z1 = 0.00000 R1 = 23.49000 T1 = 22.75000
R2 = 23.47000 Z2 = 0.00000 T2 = 22.74000
Z3 = 0.00000 T3 = 22.75000 R3 = 23.46000
Avg. Concentration: 22.75 %

Concentration = A + Bx + Cx² + Dx³ + Ex⁴
r = 0.999999
Constants: A = -0.000722
B = 0.999696 C = 0
D = 0 E = 0

APPROVED BY:



Scott Specialty Gases

1290 COMBERMERE STREET, TROY, MI 48083

Dual-Analyzed Calibration Standard

Phone: 248-589-2950

Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.: IL-204-06

Project No.: 05-43059-004

Customer

ARI ENVIRONMENTAL

951 OLD RAND ROAD #106
WAUCONDA IL 60084

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: ALM060437 Certification Date: 15May2006 Exp. Date: 14May2009
Cylinder Pressure***: 1935 PSIG

COMPONENT

SULFUR DIOXIDE *
NITROGEN

CERTIFIED CONCENTRATION (Moles)

911.1 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.

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

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1662	01Jul2008	ALM065383	964.5 PPM	SULFUR DIOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#
FTIR//0928621

DATE LAST CALIBRATED
28Apr2006

ANALYTICAL PRINCIPLE
FTIR

ANALYZER READINGS

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

First Triad Analysis

Second Triad Analysis

Calibration Curve

SULFUR DIOXIDE *

Date: 08May2006 Response Unit: PPM
Z1 = -0.24386 R1 = 1487.556 T1 = 910.9115
R2 = 1489.141 Z2 = -0.07799 T2 = 911.3347
Z3 = 0.36162 T3 = 911.6497 R3 = 1490.132
Avg. Concentration: 912.5 PPM

Date: 15May2006 Response Unit: PPM
Z1 = 0.10684 R1 = 966.2131 T1 = 912.1329
R2 = 967.8692 Z2 = 0.41093 T2 = 912.5318
Z3 = 0.60580 T3 = 912.9719 R3 = 968.4937
Avg. Concentration: 909.7 PPM

Concentration = A + Bx + Cx2 + Dx3 + Ex4
r = 9.99985E-1
Constants: A = 0.00000E+0
B = 9.99928E-1 C = 4.00000E-6
D = 0.00000E+0 E = 0.00000E+0

APPROVED BY:

F-24

JEFF CROTEAU



Scott Specialty Gases

1290 COMBERMERE STREET, TROY, MI 48083

Phone: 248-589-2950

Fax: 248-589-2134

Dual-Analyzed Calibration Standard

CERTIFICATE OF ACCURACY: EPA Protocol Gas**Assay Laboratory**SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY, MI 48083P.O. No.: IL-106-06
05-39709-002**Customer**ARI ENVIRONMENTAL, INC.
951 OLD RAND ROAD #106
WAUCONDA IL 60084**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: ALM036051 Certification Date: 25Jan2006 Exp. Date: 25Jan2008
Cylinder Pressure***: 1500 PSIG**COMPONENT**NITROGEN DIOXIDE
NITROGEN**CERTIFIED CONCENTRATION (Moles)**52.7 PPM
BALANCE**ANALYTICAL****ACCURACY****

+/- 2%

TRACEABILITY

NIST and NMI

*** 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	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2654	04Jul2008	ALM058105	528.0 PPM	NITROGEN DIOXIDE

INSTRUMENTATION**INSTRUMENT/MODEL/SERIAL#**

BECKMAN/951/010177

DATE LAST CALIBRATED

25Jan2006

ANALYTICAL PRINCIPLE

CHEMILUMINESCENCE

APPROVED BY:



Scott Specialty Gases

290 COMBERMERE STREET, TROY, MI 48083

Dual-Analyzed Calibration Standard

Phone: 248-589-2950

Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.: IL-128-07

Project No.: 05-51731-007

Customer

ARI ENVIRONMENTAL, INC.

951 OLD RAND ROAD #106
WAUCONDA IL 60084

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: ALM054470 Certification Date: 06Feb2007 Exp. Date: 05Feb2009
Cylinder Pressure***: 1870 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ANALYTICAL ACCURACY**	TRACEABILITY
NITRIC OXIDE	893.1	PPM	+/- 1%	Direct NIST and NMI
NITROGEN - OXYGEN FREE		BALANCE		
TOTAL OXIDES OF NITROGEN	894.1	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	01Dec2008	AAL070238	970.3 PPM	NITRIC OXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
FTIR//0928621	15Jan2007	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: 29Jan2007	Response Unit: PPM	
Z1 = 0.25170	R1 = 976.2720	T1 = 898.4763
R2 = 976.5506	Z2 = 0.73094	T2 = 898.6444
Z3 = 0.75759	T3 = 899.9419	R3 = 977.7257
Avg. Concentration: 892.9 PPM		

Date: 06Feb2007	Response Unit: PPM	
Z1 = -0.35064	R1 = 975.3578	T1 = 897.2654
R2 = 976.4555	Z2 = 1.04883	T2 = 899.6705
Z3 = 1.19534	T3 = 899.8936	R3 = 977.4018
Avg. Concentration: 893.3 PPM		

Concentration = A + Bx + Cx ² + Dx ³ + Ex ⁴	
r = 9.99999E-1	
Constants:	A = 0.00000E+0
B = 9.85324E-1	C = 5.10000E-5
D = 0.00000E+0	E = 0.00000E+0

APPROVED BY:

F-26

Scott King



Scott Specialty Gases

1290 COMBERMERE STREET, TROY, MI 48083

RATA CLASS

Dual-Analyzed Calibration Standard

Phone: 248-589-2950

Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory

SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY, MI 48083

P.O. No.: IL-330-06

Project No.: 05-47370-003

Customer

ARI ENVIRONMENTAL, INC.

951 OLD RAND ROAD #106
WAUCONDA IL 60084

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: ALM015730 Certification Date: 28Sep2006 Exp. Date: 27Sep2009
Cylinder Pressure***: 1888 PSIG

COMPONENT

CARBON MONOXIDE
NITROGEN

CERTIFIED CONCENTRATION (Moles)

898.1 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 1681	01Mar2008	ALM024603	1013. PPM	CARBON MONOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#

FTIR//0928621

DATE LAST CALIBRATED

28Sep2006

ANALYTICAL PRINCIPLE

FTIR

ANALYZER READINGS

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

First Triad Analysis

Second Triad Analysis

Calibration Curve

CARBON MONOXIDE

Date: 21Sep2006 Response Unit: PPM
Z1=0.01231 R1=1017.021 T1=902.2114
R2=1018.212 Z2=0.12771 T2=902.9951
Z3=0.21216 T3=903.6212 R3=1018.923
Avg. Concentration: 898.0 PPM

Date: 28Sep2006 Response Unit: PPM
Z1=0.05395 R1=1018.158 T1=902.6062
R2=1018.601 Z2=0.63197 T2=903.0632
Z3=0.65836 T3=903.8681 R3=1019.053
Avg. Concentration: 898.2 PPM

Concentration = A + Bx + Cx² + Dx³ + Ex⁴
r = 9.99973E-1
Constants: A = -4.43978E+3
B = 1.86347E+0 C = 0.00000E+0
D = 0.00000E+0 E = 0.00000E+0

APPROVED BY:

JEFF CROTEAU

F-27



Scott Specialty Gases

Dual-Analyzed Calibration Standard

1290 COMBERMERE STREET, TROY, MI 48083

Phone: 248-589-2950

Fax: 248-589-2134

CERTIFICATE OF ACCURACY: EPA Protocol Gas**Assay Laboratory**SCOTT SPECIALTY GASES
1290 COMBERMERE STREET
TROY, MI 48083P.O. No.: IL-306-06
Project No.: 05-46621-002**Customer**

ARI ENVIRONMENTAL, INC.

951 OLD RAND ROAD #106
WAUCONDA IL 60084**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: ALM059410 Certification Date: 06Sep2006 Exp. Date: 05Sep2009
Cylinder Pressure***: 2000 PSIG**COMPONENT**METHANE
AIR**CERTIFIED CONCENTRATION (Moles)**851.4 PPM
BALANCE**ANALYTICAL****ACCURACY****

+/- 2%

TRACEABILITY

NIST and NMI

*** 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

<u>TYPE/SRM NO.</u>	<u>EXPIRATION DATE</u>	<u>CYLINDER NUMBER</u>	<u>CONCENTRATION</u>	<u>COMPONENT</u>
NTRM 2751	01Mar2007	ALM035569	100.2 PPM	METHANE

INSTRUMENTATION**INSTRUMENT/MODEL/SERIAL#**

BECKMAN/400 A/2000630

DATE LAST CALIBRATED

06Sep2006

ANALYTICAL PRINCIPLE

FLAME IONIZATION

APPROVED BY:

F-28

HILARY THATCHER

PRE TEST METER CALIBRATION DATA AND CALCULATION FORM

COMPANY:

METER NUMBER: 100196
 BAROMETRIC PRESSURE: 28.81
 DATE: 4/11/2007
 CALIBRATED BY: B. Crane

ROTAMETER SETTING	GILBRATOR FLOWRATE	TIME	PK III INITIAL READING	PK III FINAL READING	PK III VOLUME (V _m) liters	CALCULATED GILBRATOR VOLUME (V _w) liters	CALCULATED Y
liters/min	ml/min	minutes	liters	liters			
0.5	496.1	10.0	0.0	4.9	4.90	4.96	1.012
1.0	1,085.0	10.0	0.0	10.7	10.70	10.85	1.014
1.5	1,486.0	10.0	0.0	14.8	14.80	14.86	1.004
2.0	2,025.0	10.0	0.0	20.1	20.10	20.25	1.007
Average =							1.009

POST TEST METER CALIBRATION DATA AND CALCULATION FORM

COMPANY:

METER NUMBER: 100196

BAROMETRIC PRESSURE: 29.26

DATE: 9/6/2007

CALIBRATED BY: B. Crane

PRETEST Y FACTOR: 1.009

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
liters/min	ml/min	minutes	liters	liters	liters	liters	
1.0	993.4	11.0	0.0	11.1	11.14	10.93	0.981
1.0	976.9	10.0	0.0	10.2	10.21	9.77	0.957
1.0	976.9	10.0	0.0	10.2	10.23	9.77	0.955
Average =							0.964

PRETEST Y FACTOR = 1.009

POSTTEST Y FACTOR = 0.964

DIFFERENCE, % = -4.6 (Must be < 5%)

ARI Environmental, Inc.
 Gas Meter Thermometer Calibration Data Form
 PRE test calibration

Meter Box: 100196
 Calibrator: B. Crane
 Date: 4/11/2007
 Barometric 28.81
 Ambient Temp: 66
 Ref. Thermometer: Altek Thermocouple Source

Reference Temperature	Thermometer Temperature	Difference %	Thermometer Temperature	Difference %
Altek	Probe	Probe	Filter	Filter
0	-2	N/A	-2	N/A
100	99	1.0	99	1.0
200	199	0.5	199	0.5
300	300	0.0	300	0.0
400	399	0.3	399	0.3
500	498	0.4	498	0.4

Reference Temperature	Thermometer Temperature	Difference %	Thermometer Temperature	Difference %
Altek	Meter	Meter	Aux	Aux
0	-2	N/A	-2	N/A
100	99	1.0	99	1.0
200	199	0.5	199	0.5
300	300	0.0	300	0.0
400	399	0.3	399	0.3
500	498	0.4	498	0.4

ARI Environmental, Inc.
 Gas Meter Thermometer Calibration Data Form
~~PRE~~ test calibration

POST

Meter Box: 100196
 Calibrator: B. Crane
 Date: 9/6/2007
 Barometric 29.26
 Ambient Temp: 78
 Ref. Thermometer: Altek Thermocouple Source

Reference Temperature	Thermometer Temperature	Difference %	Thermometer Temperature	Difference %
Altek	Probe	Probe	Filter	Filter
0	-3	N/A	0	N/A
100	96	4.1	96	4.1
200	198	1.0	203	1.5
300	299	0.3	299	0.3
400	395	1.3	400	0.0
500	497	0.6	498	0.4

Reference Temperature	Thermometer Temperature	Difference %
Altek	Meter	Meter
0	-1	N/A
100	96	4.1
200	199	0.5
300	299	0.3
400	397	0.8
500	498	0.4

APEX INSTRUMENTS METHOD 5 PRE-TEST CONSOLE CALIBRATION
USING CALIBRATED CRITICAL ORIFICES
5-POINT ENGLISH UNITS

Meter Console Information	
Console Model Number	MC522
Console Serial Number	503002
DGM Model Number	MS-4
DGM Serial Number	600396

Calibration Conditions	
Date	18-Dec-06
Time	12:30
Barometric Pressure	29.6 in Hg
Theoretical Critical Vacuum ¹	14.0 in Hg
Calibration Technician	J. Goldfine

Factors/Conversions	
Std Temp	528 °R
Std Press	29.92 in Hg
K ₁	17.647 or/in Hg

¹For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

²The Critical Orifice Coefficient, K', must be entered in English units, (ft³·s^{1/2})/(in.Hg^{1/2}·min).

Calibration Data									
Metering Console					Critical Orifice				
Run Time	DGM Orifice	Volume	Volume	Outlet Temp	Outlet Temp	Serial	Coefficient	Amb Temp	Actual
Elapsed (t)	ΔH	Initial (V _{ini})	Final (V _{fin})	Initial (t _{ini})	Final (t _{fin})	Number	K'	Initial (t _{ini})	Vacuum
min	(P _{atm})	cubic feet	cubic feet	°F	°F		see above ²	°F	in Hg
12.50	0.60	373.400	378.690	77	77	47	0.3266	72	23
11.00	1.10	379.300	385.760	77	77	55	0.4497	72	22
10.50	2.00	386.900	395.320	77	78	63	0.6235	72	20
10.00	3.30	397.200	407.480	78	80	73	0.7777	72	18
10.00	4.90	409.300	421.930	80	82	81	0.9354	73	15

Results									
Standardized Data					Dry Gas Meter				
Dry Gas Meter		Critical Orifice		Calibration Factor		Flowrate		ΔH @	
(V _{meas})	(Q _{meas})	(V _{crit})	(Q _{crit})	Value (Y)	Variation (ΔY)	Std & Corr (Q _{meas/corr})	0.75 SCFM (ΔH ₀)	Variation (ΔΔH ₀)	
cubic feet	cfm	cubic feet	cfm			cfm	in H ₂ O		
5.157	0.413	5.243	0.419	1.017	0.015	0.419	1.875	0.044	
6.305	0.573	6.353	0.578	1.007	0.005	0.578	1.817	-0.013	
8.229	0.784	8.407	0.801	1.022	0.020	0.801	1.725	-0.106	
10.051	1.005	9.982	0.998	0.993	-0.009	0.998	1.838	0.007	
12.351	1.235	11.995	1.200	0.971	-0.031	1.200	1.898	0.067	
				1.002	Y Average		1.830	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.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3

Signature _____

Date _____

Factors/Conversions	
Std Temp	528 °R
Std Press	29.92 in Hg
K ₁	17.647 oR/in Hg

Calibration Conditions			
Date	Time	5-Sep-07	10:30
Barometric Pressure		29.3	in Hg
Theoretical Critical Vacuum ¹		13.8	in Hg
Calibration Technician		B. Crane	

¹For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

²The Critical Orifice Coefficient, K' , must be entered in English units, $(R^{3/2} \text{ } ^\circ\text{R}^{1/2})/(\text{in. Hg} \cdot \text{min})$.

Run Time		Calibration Data									
		Metering Console					Critical Orifice				
Elapsed (e)	min	DGM Orifice ΔH	Volume Initial	Volume Final	Outlet Temp Initial	Outlet Temp Final	Serial Number	Coefficient	Amb Temp Initial	Amb Temp Final	Actual Vacuum
		(P_m) in H_2O	(V_m) cubic feet	(V_m) cubic feet	(t_m) °F	(t_m) °F		K' see above2	(t_{amb}) °F	(t_{amb}) °F	in Hg
	10.0	3.2	650.100	660.500	83	85	BB73	0.7777	81	82	15
	10.0	3.2	660.500	670.920	85	86	BB73	0.7777	82	82	15
	10.0	3.2	670.920	681.380	86	87	BB73	0.7777	82	83	15

Standardized Data					Results				
Dry Gas Meter			Critical Orifice		Calibration Factor		Dry Gas Meter		
(V _{meas})	(Q _{meas})	(V _{Cr, test})	(Q _{Cr, test})	Value	Variation	Flowrate	Std & Corr	0.75 SCFM	ΔH @
cubic feet	cfm	cubic feet	cfm	(Y)	(ΔY)		(Q _{meas/corr})	(ΔH@)	
							cfm	in H ₂ O	
9.964	0.996	9.792	0.979	0.983	0.001	0.979	1.814	0.003	
9.956	0.996	9.788	0.979	0.983	0.001	0.979	1.811	-0.001	
9.976	0.998	9.783	0.978	0.981	-0.001	0.978	1.809	-0.002	
Pretest Gamma	1.002	% Deviation	2.0	0.982	Y Average		1.812	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 .

certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3

Signature _____

Date _____

9.5.07

ARI Environmental, Inc.

Gas Meter Thermometer Calibration Data Form

Pre-Test

Meter Box: 503002

Calibrator: J. Goldfine

Date: 12/18/06

Barometric: 29.62

Amb. Temp: 73

Reference Thermometer: Altek Thermocouple Source

Reference Temperature Altek	Thermometer Temperature Inlet	Difference (%) mean Inlet	Thermometer Temperature Outlet	Difference (%) mean Outlet	Thermometer Temperature Probe	Difference (%) mean Probe	Thermometer Temperature Stack	Difference (%) mean Stack
0	1	0.22	1	0.22	1	0.22	1	0.22
100	100	0.00	98	-0.36	98	-0.36	101	0.18
200	201	0.15	200	0.00	202	0.30	202	0.30
300	302	0.26	298	-0.26	299	-0.13	303	0.39
400	400	0.00	399	-0.12	399	-0.12	399	-0.12
500	500	0.00	500	0.00	495	-0.52	501	0.10

Reference Temperature Altek	Thermometer Temperature Filter	Difference (%) mean Filter	Thermometer Temperature Exit	Difference (%) mean Exit	Thermometer Temperature Aux	Difference (%) mean Aux
0	1	0.22	1	0.22	1	0.22
100	100	0.00	100	0.00	100	0.00
200	201	0.15	202	0.30	202	0.30
300	302	0.26	302	0.26	302	0.26
400	398	-0.23	398	-0.23	399	-0.12
500	500	0.00	500	0.00	499	-0.10



ARI Environmental, Inc.
Gas Meter Thermometer Calibration Data Form

Post Test

Meter Box: 503002

Calibrator: B. Crane

Date: 9/5/2007

Barometric: 29.3

Ambient Temp: 80

Reference Thermometer: Altek Thermocouple Source



Reference Temperature Altek	Thermometer Temperature Inlet	Difference (%) mean Inlet	Thermometer Temperature Outlet	Difference (%) mean Outlet	Thermometer Temperature Probe	Difference (%) mean Probe	Thermometer Temperature Stack	Difference (%) mean Stack
0	1	0.22	1	0.22	1	0.22	1	0.22
100	100	0.00	100	0.00	100	0.00	100	0.00
200	202	0.30	202	0.30	202	0.30	202	0.30
300	302	0.26	302	0.26	302	0.26	302	0.26
400	399	-0.12	399	-0.12	398	-0.23	398	-0.23
500	500	0.00	500	0.00	500	0.00	500	0.00

Reference Temperature Altek	Thermometer Temperature Filter	Difference (%) mean Filter	Thermometer Temperature Exit	Difference (%) mean Exit	Thermometer Temperature Aux	Difference (%) mean Aux
0	1	0.22	1	0.22	1	0.22
100	100	0.00	100	0.00	100	0.00
200	202	0.30	202	0.30	202	0.30
300	302	0.26	302	0.26	302	0.26
400	398	-0.23	399	-0.12	398	-0.23
500	500	0.00	500	0.00	500	0.00

**APEX INSTRUMENTS METHOD 5 PRE-TEST CONSOLE CALIBRATION
USING CALIBRATED CRITICAL ORIFICES
5-POINT ENGLISH UNITS**

Meter Console Information		Calibration Conditions		Factors/Conversions	
Console Model Number	MCS22	Date	13-Nov-06	Std Temp	528 °R
Console Serial Number	508128	Barometric Pressure	29.3 in Hg	Std Press	29.92 in Hg
DGM Model Number	MS-4	Theoretical Critical Vacuum ¹	13.8 in Hg	K ₁	17.647 or/in Hg
DGM Serial Number	JC04927	Calibration Technician	S. Flaherty		

Meter Console Information		Calibration Conditions		Factors/Conversions	
Console Model Number	MCS22	Date	13-Nov-06	Std Temp	528 °R
Console Serial Number	508128	Barometric Pressure	29.3 in Hg	Std Press	29.92 in Hg
DGM Model Number	MS-4	Theoretical Critical Vacuum ¹	13.8 in Hg	K ₁	17.647 or/in Hg
DGM Serial Number	JC04927	Calibration Technician	S. Flaherty		

¹For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

²The Critical Orifice Coefficient, K', must be entered in English units, (ft³·s^{-1/2})/(in.²·Hg^{1/2}·min).

Calibration Data									
Metering Console					Critical Orifice				
Run Time	Elapsed (t)	DGM Orifice (P _m)	Volume Initial (V _m)	Volume Final (V _m)	Outlet Temp Initial (T _m)	Outlet Temp Final (T _m)	Serial Number	Coefficient K'	Amb Temp Initial (T _{amb})
	min	in H ₂ O	cubic feet	cubic feet	°F	°F		see above ²	°F
	10.0	0.5	278.900	283.193	63	64	47	0.3266	66
	10.0	1.0	283.600	289.608	64	65	55	0.4497	67
	10.0	1.8	258.796	266.907	59	61	63	0.6235	66
	19.0	3.0	290.200	310.164	65	68	73	0.7777	66
	19.0	4.6	311.100	335.200	68	72	81	0.9354	66
									Actual Vacuum in Hg
									23
									21
									20
									17
									15

Results									
Standardized Data					Dry Gas Meter				
V _{meas}	(Q _{meas})	(V _{cr})	Critical Orifice		Calibration Factor		Flowrate		ΔH @
			(V _{cr})	(Q _{cr})	Value (Y)	Variation (ΔY)	Std & Corr (Q _{meas})	0.75 SCFM (ΔH@)	
cubic feet	cfm	cubic feet	cubic feet	cfm			cfm	in H ₂ O	
4.246	0.425	4.172	0.574	0.417	0.983	0.014	0.417	1.633	-0.056
5.938	0.594	5.740	0.574	0.574	0.967	-0.002	0.574	1.693	0.004
8.102	0.810	7.965	0.797	0.797	0.983	0.015	0.797	1.602	-0.086
19.754	1.040	18.877	0.984	0.984	0.956	-0.013	0.984	1.706	0.017
23.783	1.252	22.705	1.195	1.195	0.955	-0.014	1.195	1.810	0.121
					0.969	Y Average		1.689	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.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3

Signature

Date

**APEX INSTRUMENTS METHOD 5 POST-TEST CONSOLE CALIBRATION
USING CALIBRATED CRITICAL ORIFICES
3-POINT ENGLISH UNITS**

Meter Console Information	
Console Model Number	MC522
Console Serial Number	508128
DGM Model Number	MS-4
DGM Serial Number	

Calibration Conditions	
Date	6-Sep-07
Barometric Pressure	29.3 in Hg
Theoretical Critical Vacuum ¹	13.8 in Hg
Calibration Technician	B. Crane

Factors/Conversions	
Std Temp	528 °R
Std Press	29.92 in Hg
K ₁	17.647 or/in Hg

¹For valid test results, the Actual Vacuum should be 1 to 2 in. Hg greater than the Theoretical Critical Vacuum shown above.

²The Critical Orifice Coefficient, K₁, must be entered in English units, (ft³·s^{1/2})/(in·Hg^{1/2}·min).

Calibration Data									
Metering Console					Critical Orifice				
Run Time	DGM Orifice	Volume	Volume	Outlet Temp	Outlet Temp	Serial	Coefficient	Amb Temp	Actual
Elapsed	ΔH	Initial	Final	Initial	Final	Number		Initial	Vacuum
(e)	(P _m)	(V _m)	(V _m)	(t _m)	(t _m)		K ²	(t _{amb})	
min	in H ₂ O	cubic feet	cubic feet	°F	°F		see above ²	°F	in Hg
10.0	3.0	236.000	246.720	78	80	BB73	0.7777	77	16
10.0	3.0	246.720	257.460	80	81	BB73	0.7777	78	16
10.0	3.0	257.460	268.240	81	83	BB73	0.7777	79	16

Results									
Standardized Data					Dry Gas Meter				
Dry Gas Meter		Critical Orifice		Calibration Factor		Flowrate		ΔH @	
(V _{test})	(Q _{mtest})	(V _{crit})	(Q _{mtest})	Value	Variation	Std & Corr	75 SCFM	Variation	
cubic feet	cfm	cubic feet	cfm	(V)	(ΔV)	(Q _{mtest})	(ΔH@)	(ΔΔH@)	
10.347	1.035	9.815	0.982	0.949	0.001	0.982	1.705	0.002	
10.338	1.034	9.806	0.981	0.949	0.001	0.981	1.703	0.000	
10.347	1.035	9.797	0.980	0.947	-0.001	0.980	1.702	-0.002	
Pretest Gamma	0.969	% Deviation	2.2	Y Average			1.703	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.

I certify that the above Dry Gas Meter was calibrated in accordance with USEPA Methods, CFR Title 40, Part 60, Appendix A-3, Method 5, 16.2.3

Signature

B. Crane

Date

9-6-07



ARI Environmental, Inc.
Gas Meter Thermometer Calibration Data Form
Pre-Test Calibration

Meter Box: 508128
Calibrator: SF
Date: 11/13/06
Barometric: 29.3
Ambient Temp: 66

Reference Thermometer: Altek Thermocouple Source

Reference Temperature	Thermometer Temperature	Difference (%) mean	Thermometer Temperature	Difference (%) mean	Thermometer Temperature	Difference (%) mean
Altek	Inlet	Inlet	Oulet	Oulet	Probe	Stack
0	1	0.22	1	0.22	1	0.22
100	99	-0.18	99	-0.18	99	-0.18
200	201	0.15	200	0.00	201	0.15
300	300	0.00	299	-0.13	300	0.00
400	398	-0.23	399	-0.12	398	-0.23
500	498	-0.21	498	-0.21	497	-0.31

Reference Temperature	Thermometer Temperature	Difference (%) mean	Thermometer Temperature	Difference (%) mean	Thermometer Temperature	Difference (%) mean
Altek	Filter	Filter	Exit	Exit	Aux	Aux
0	1	0.22	1	0.22	1	0.22
100	99	-0.18	99	-0.18	99	-0.18
200	201	0.15	201	0.15	201	0.15
300	300	0.00	300	0.00	300	0.00
400	398	-0.23	398	-0.23	398	-0.23
500	497	-0.31	497	-0.31	497	-0.31

ARI Environmental, Inc.
Gas Meter Thermometer Calibration Data Form

Post Test

Meter Box: 508128

Calibrator: B. Crane

Date: 9/6/2007

Barometric: 29.26

Ambient Temp: 79

Reference Thermometer: Altek Thermocouple Source

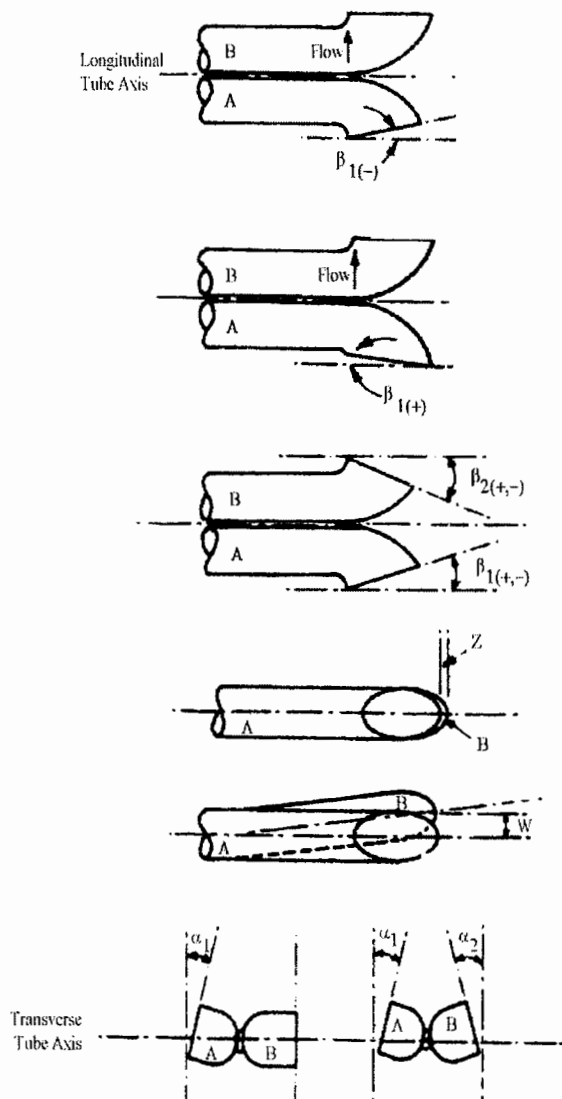


Reference Temperature Altek	Thermometer Temperature Inlet	Difference (%) mean Inlet	Thermometer Temperature Outlet	Difference (%) mean Outlet	Thermometer Temperature Probe	Difference (%) mean Probe	Thermometer Temperature Stack	Difference (%) mean Stack
0	-2	-0.43	-2	-0.43	-2	-0.43	0	0.00
100	95	-0.89	96	-0.71	96	-0.71	96	-0.71
200	198	-0.30	198	-0.30	198	-0.30	201	0.15
300	297	-0.39	298	-0.26	298	-0.26	298	-0.26
400	395	-0.58	395	-0.58	395	-0.58	397	-0.35
500	495	-0.52	496	-0.42	496	-0.42	496	-0.42

Reference Temperature Altek	Thermometer Temperature Filter	Difference (%) mean Filter	Thermometer Temperature Exit	Difference (%) mean Exit	Thermometer Temperature Aux	Difference (%) mean Aux
0	-1	-0.22	-1	-0.22	-1	-0.22
100	96	-0.71	96	-0.71	96	-0.71
200	199	-0.15	199	-0.15	199	-0.15
300	299	-0.13	299	-0.13	299	-0.13
400	396	-0.47	396	-0.47	396	-0.47
500	496	-0.42	496	-0.42	496	-0.42

Pitot Tube Inspection Data

Client Name: _____

Pre-Sample
Date: 3/15/2007Post-Sample
Date: 8/24/2007

Y	level?	Y
N	obstructions?	N
N	damaged?	N
1	$-10^\circ < \alpha_1 < +10^\circ$	0
0	$-10^\circ < \alpha_2 < +10^\circ$	0
0	$-5^\circ < \beta_1 < +5^\circ$	0
0	$-5^\circ < \beta_2 < +5^\circ$	0
0	γ	1
0	θ	1
0.946	A	0.95
0.473	$0.39375 < P_A < 0.5625$	0.470
0.473	$0.39375 < P_B < 0.5625$	0.480
0.375	$0.1875 \leq D_t \leq 0.375$	0.375
0.000	$A \tan \gamma < 0.125''$	0.017
0.00000	$A \tan \theta < 0.03125''$	0.01658
TRUE	$P_A = P_B \pm 0.063$	TRUE
PASS	PASS/FAIL	PASS

Comments: 5' effective length s-type pitot tube with 3/8" tips, and K-type thermocouple attached to heated M5 probe.

Pitot tube/probe number 621 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.

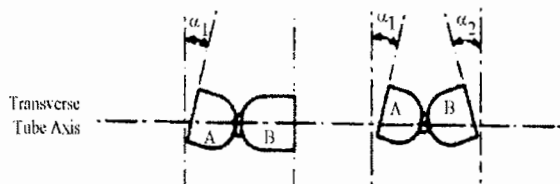
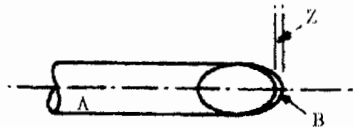
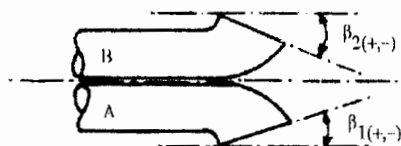
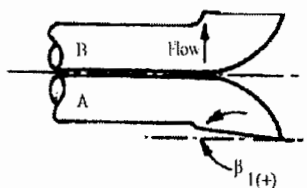
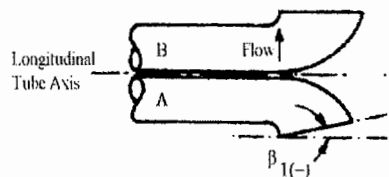
Signature: _____

Date: _____

W. H. Crane
8-24-07

Pitot Tube Inspection Data

Client Name: _____

Pre-Sample
Date: 3/15/2007Post-Sample
Date: 9/25/2007

Y	level?	Y
N	obstructions?	N
N	damaged?	N
1	$-10^\circ < \alpha_1 < +10^\circ$	0
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	γ	0
0	θ	0
0.946	A	0.946
0.473	$0.39375 < P_A < 0.5625$	0.473
0.473	$0.39375 < P_B < 0.5625$	0.473
0.375	$0.1875 \leq D_t \leq 0.375$	0.375
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: 5' effective length s-type pitot tube with 3/8" tips, and K-type thermocouple attached to heated M5 probe.

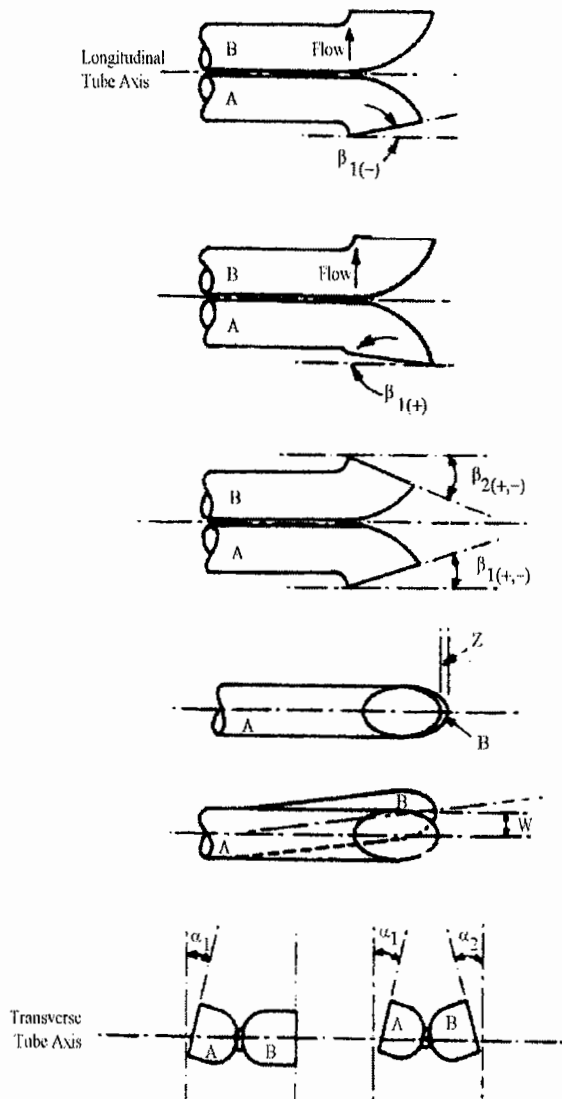
Pitot tube/probe number 621 meets or exceeds all specifications and criteria and/or applicable design features (per 40CFR60 Appendix A; Method 2) and is hereby assigned a pitot tube calibration factor of 0.84.

Signature:
Date:

U. H. Crane
9-25-07

Pitot Tube Inspection Data

Client Name: _____

Pre-Sample
Date: 2/13/2007Post-Sample
Date: 8/24/2007

Y	level?	Y
N	obstructions?	N
N	damaged?	N
0	$-10^\circ < \alpha_1 < +10^\circ$	1
1	$-10^\circ < \alpha_2 < +10^\circ$	0
1	$-5^\circ < \beta_1 < +5^\circ$	1
0	$-5^\circ < \beta_2 < +5^\circ$	0
1	γ	1
0	θ	0
0.936	A	0.936
0.468	$0.39375 < P_A < 0.5625$	0.468
0.468	$0.39375 < P_B < 0.5625$	0.468
0.375	$0.1875 \leq D_t \leq 0.375$	0.375
0.016	$A \tan \gamma < 0.125''$	0.016
0.00000	$A \tan \theta < 0.03125''$	0.00000
TRUE	$P_A = P_B \pm 0.063$	TRUE
PASS	PASS/FAIL	PASS

Comments: 5' effective length s-type pitot tube with 3/8" tips and K-type thermocouple attached to heated M5 probe.

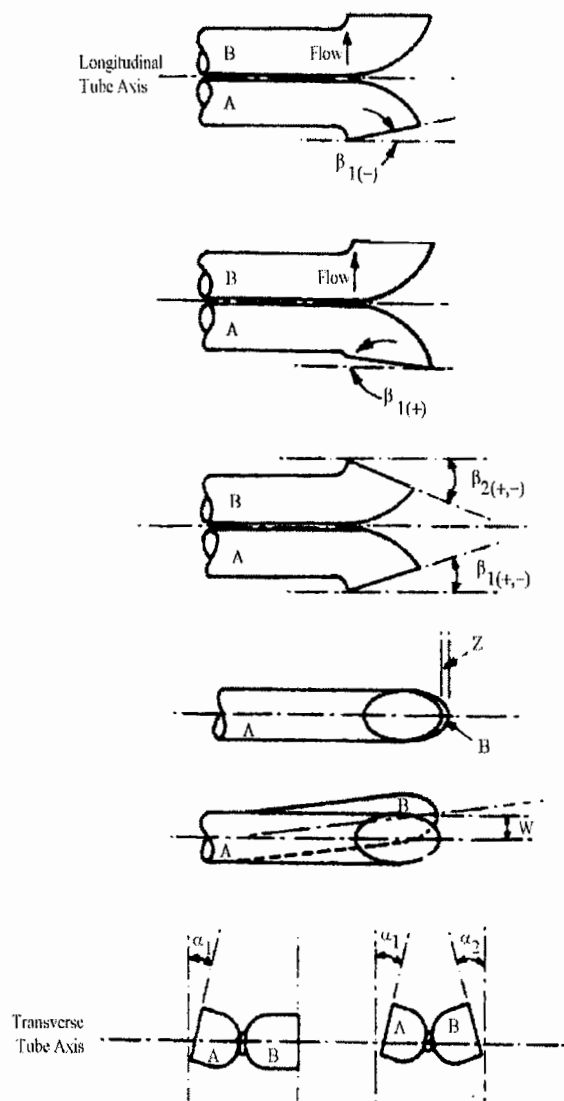
Pitot tube/probe number 638 meets or exceeds all specifications and criteria and/or applicable design features (per 40CFR60 Appendix A; Method 2) and is hereby assigned a pitot tube calibration factor of 0.84.

Signature:
Date:

[Signature]
8-24-07

Pitot Tube Inspection Data

Client Name: _____

Pre-Sample
Date: 2/13/2007Post-Sample
Date: 9/5/2007

Y	level?	Y
N	obstructions?	N
N	damaged?	N
0	$-10^\circ < \alpha_1 < +10^\circ$	0
1	$-10^\circ < \alpha_2 < +10^\circ$	0
1	$-5^\circ < \beta_1 < +5^\circ$	0
0	$-5^\circ < \beta_2 < +5^\circ$	-1
1	γ	0
0	θ	0
0.936	A	0.94
0.468	$0.39375 < P_A < 0.5625$	0.470
0.468	$0.39375 < P_B < 0.5625$	0.470
0.375	$0.1875 \leq D_t \leq 0.375$	0.375
0.016	$A \tan \gamma < 0.125''$	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: 5' effective length s-type pitot tube with 3/8" tips and K-type thermocouple attached to heated M5 probe.

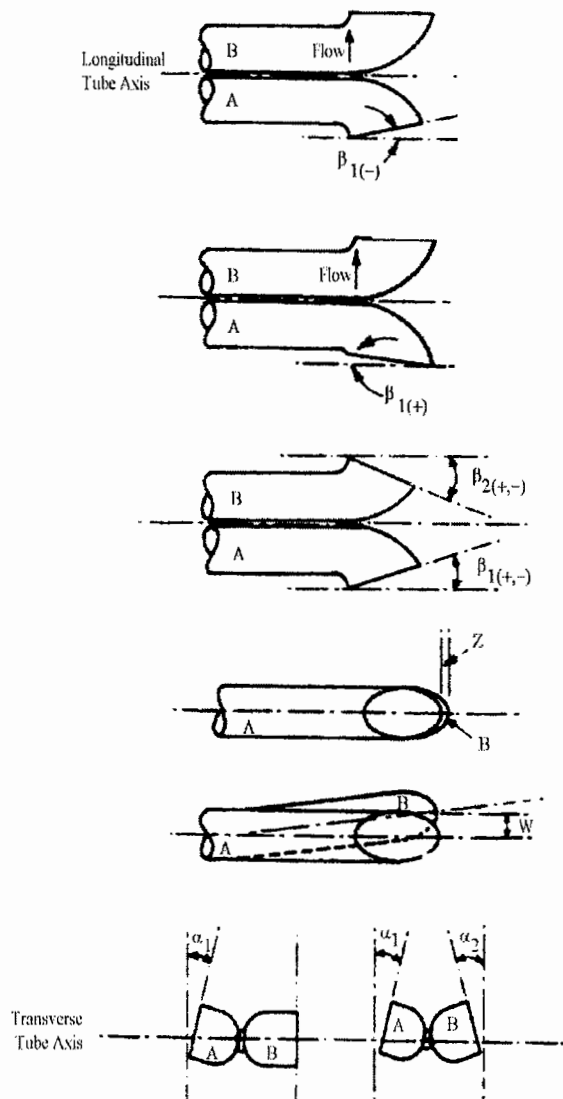
Pitot tube/probe number 638 meets or exceeds all specifications and criteria and/or applicable design features (per 40CFR60 Appendix A; Method 2) and is hereby assigned a pitot tube calibration factor of 0.84.

Signature:
Date:

alt Crane
9.5.07

Pitot Tube Inspection Data

Client Name: _____

Pre-Sample
Date: 2/9/2007Post-Sample
Date: 8/24/2007

Y	level?	Y
N	obstructions?	N
N	damaged?	N
0	$-10^\circ < \alpha_1 < +10^\circ$	0
2	$-10^\circ < \alpha_2 < +10^\circ$	1
2	$-5^\circ < \beta_1 < +5^\circ$	2
1	$-5^\circ < \beta_2 < +5^\circ$	2
1	γ	2
1	θ	0
0.940	A	0.94
0.460	$0.39375 < P_A < 0.5625$	0.470
0.480	$0.39375 < P_B < 0.5625$	0.470
0.375	$0.1875 \leq D_t \leq 0.375$	0.375
0.016	$A \tan \gamma < 0.125''$	0.033
0.01641	$A \tan \theta < 0.03125''$	0.00000
TRUE	$P_A = P_B \pm 0.063$	TRUE
PASS	PASS/FAIL	PASS

Comments: 5' effective length s-type pitot tube with 3/8" tips and K-type thermocouple attached to heated M5 probe.

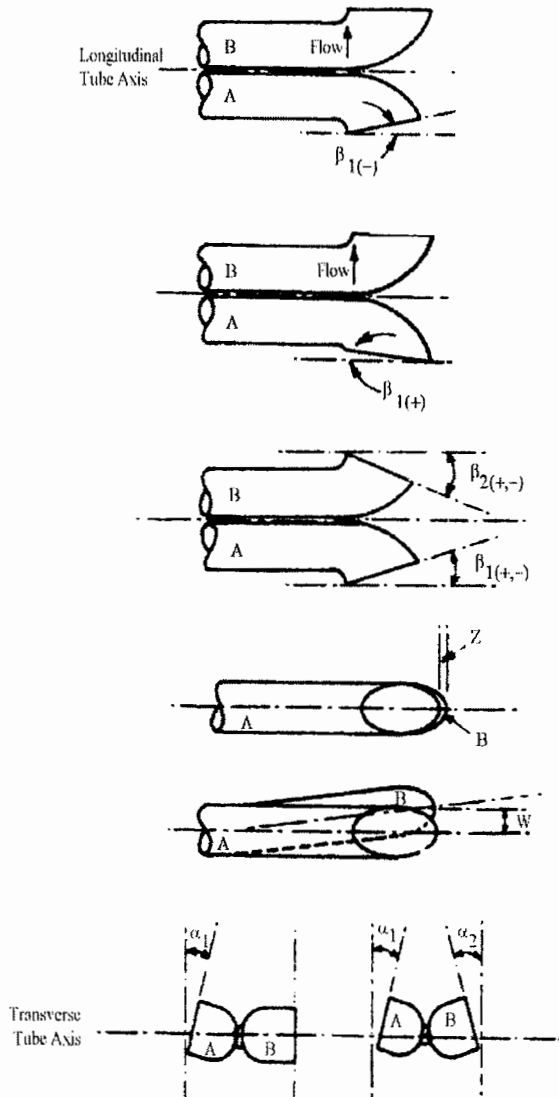
Pitot tube/probe number 654 meets or exceeds all specifications and criteria and/or applicable design features (per 40CFR60 Appendix A; Method 2) and is hereby assigned a pitot tube calibration factor of 0.84.

Signature: _____

Date: _____

Pitot Tube Inspection Data

Client Name: _____

Pre-Sample
Date: 2/9/2007Post-Sample
Date: 9/25/2007

Y	level?	Y
N	obstructions?	N
N	damaged?	N
0	$-10^\circ < \alpha_1 < +10^\circ$	0
2	$-10^\circ < \alpha_2 < +10^\circ$	1
2	$-5^\circ < \beta_1 < +5^\circ$	2
1	$-5^\circ < \beta_2 < +5^\circ$	2
1	γ	2
1	θ	0
0.940	A	0.94
0.460	$0.39375 < P_A < 0.5625$	0.460
0.480	$0.39375 < P_B < 0.5625$	0.480
0.375	$0.1875 \leq D_t \leq 0.375$	0.375
0.016	$A \tan \gamma < 0.125''$	0.033
0.01641	$A \tan \theta < 0.03125''$	0.00000
TRUE	$P_A = P_B \pm 0.063$	TRUE
PASS	PASS/FAIL	PASS

Comments: 5' effective length s-type pitot tube with 3/8" tips and K-type thermocouple attached to heated M5 probe.

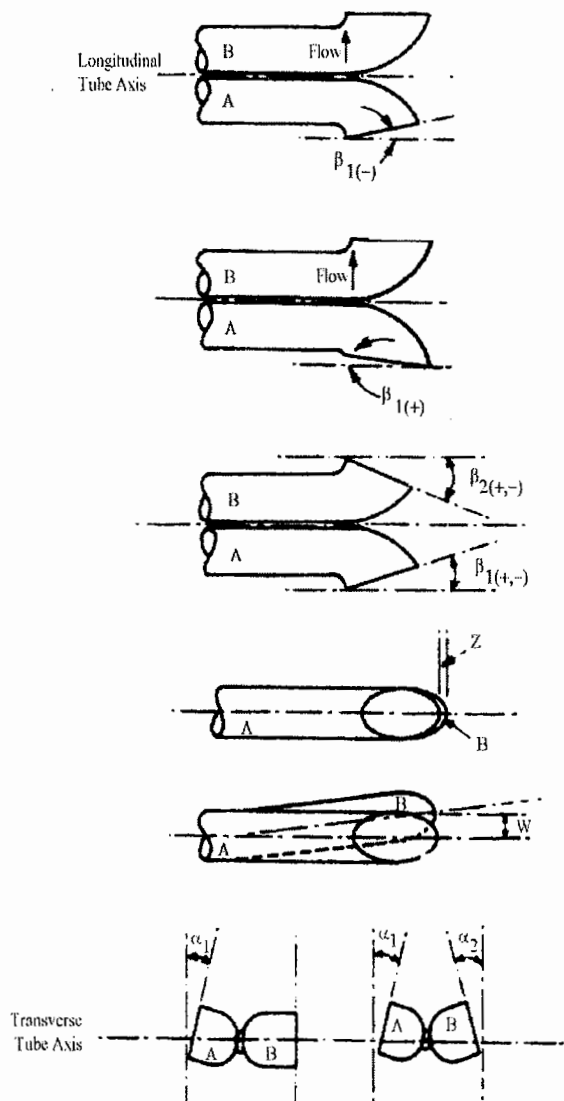
Pitot tube/probe number 654 meets or exceeds all specifications and criteria and/or applicable design features (per 40CFR60 Appendix A; Method 2) and is hereby assigned a pitot tube calibration factor of 0.84.

Signature: _____
Date: _____

[Signature]
9-25-07

Pitot Tube Inspection Data

Client Name: _____

Pre-Sample
Date: 2/15/2007Post-Sample
Date: 8/10/2007

Y	level?	Y
N	obstructions?	N
N	damaged?	N
1	$-10^\circ < \alpha_1 < +10^\circ$	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	γ	1
1	θ	0
0.916	A	0.918
0.458	$0.39375 < P_A < 0.5625$	0.460
0.458	$0.39375 < P_B < 0.5625$	0.458
0.375	$0.1875 \leq D_t \leq 0.375$	0.375
0.000	$A \tan \gamma < 0.125''$	0.016
0.01599	$A \tan \theta < 0.03125''$	0.00000
TRUE	$P_A = P_B \pm 0.063$	TRUE
PASS	PASS/FAIL	PASS

Comments: 5' EFFECTIVE LENGTH m5 PROBE, 3/8" PITOT TIPS, GLASS LINER, K-TYPE THERMOCOUPLE.

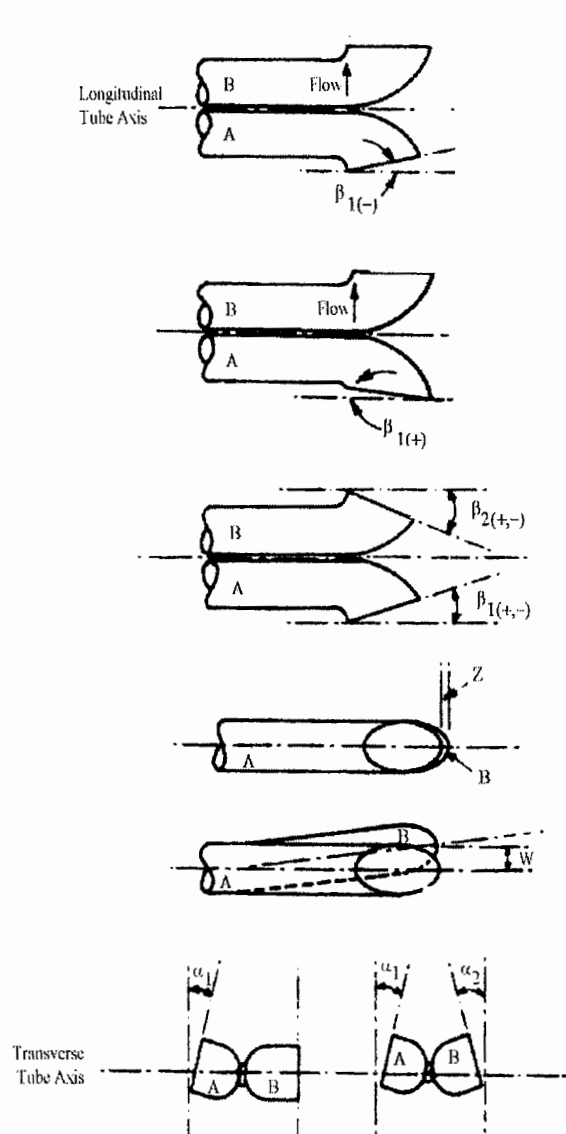
Pitot tube/probe number 655 meets or exceeds all specifications and criteria and/or applicable design features (per 40CFR60 Appendix A; Method 2) and is hereby assigned a pitot tube calibration factor of 0.84.

Signature: _____

Date: _____

Pitot Tube Inspection Data

Client Name: _____

Pre-Sample
Date: 2/15/2007Post-Sample
Date: 9/25/2007

Y	level?	Y
N	obstructions?	N
N	damaged?	N
1	$-10^\circ < \alpha_1 < +10^\circ$	1
0	$-10^\circ < \alpha_2 < +10^\circ$	0
0	$-5^\circ < \beta_1 < +5^\circ$	0
0	$-5^\circ < \beta_2 < +5^\circ$	0
0	γ	0
1	θ	1
0.916	A	0.91
0.458	$0.39375 < P_A < 0.5625$	0.450
0.458	$0.39375 < P_B < 0.5625$	0.460
0.375	$0.1875 \leq D_t \leq 0.375$	0.375
0.000	$A \tan \gamma < 0.125''$	0.000
0.01599	$A \tan \theta < 0.03125''$	0.01588
TRUE	$P_A = P_B \pm 0.063$	TRUE
PASS	PASS/FAIL	PASS

Comments: 5' effective length s-type pitot tube with 3/8" pitot tips, K-type thermocouple attached to glass-lined M5 probe.

Pitot tube/probe number 655 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]
9-25-07

ARI Environmental Inc.
Thermocouple Calibration Data Form

Calibrator: B. Crane
 Thermocouple ID. 621
 Date: pretest posttest
 3/15/2007 8/24/2007
 Barometric: 29.50 29.15
 Reference Thermometer = Mercury in glass

	Reference Point Number	Source	Reference Thermometer Temperature	Meter Readout Temperature	Difference (%)
Pre- Test	T.C	Ice Water	38.0	38.8	-0.16
		Ambient	68.0	69.1	-0.21
		Hot Water	200.0	200.4	-0.06
Post- Test	T.C	Ice Water	36.0	37.2	-0.24
		Ambient	79.0	80.4	-0.26
		Hot Water	209.0	209.8	-0.12

$$a \text{ (temp. diff.)} = (\text{ref.temp} + 460) - (\text{Thermo. temp.} + 460) / (\text{ref. temp.} + 460) \times 100$$

Where $-1.5 < a < 1.5$

ARI Environmental Inc.
Thermocouple Calibration Data Form

Calibrator: B. Crane
 Thermocouple ID. 621
 pretest posttest
 Date: 3/15/2007 9/25/2007
 Barometric: 29.50 29.27
 Reference Thermometer = Mercury in glass

	Reference Point Number	Source	Reference Thermometer Temperature	Meter Readout Temperature	Difference (%)
Pre- Test	T.C	Ice Water	38.0	38.8	-0.16
		Ambient	68.0	69.1	-0.21
		Hot Water	200.0	200.4	-0.06
Post- Test	T.C	Ice Water	33.0	34.2	-0.24
		Ambient	76.0	76.5	-0.09
		Hot Water	209.0	210.0	-0.15

$$a \text{ (temp. diff.)} = (\text{ref.temp} + 460) - (\text{Thermo. temp.} + 460) / (\text{ref. temp.} + 460) \times 100$$

Where $-1.5 < a < 1.5$

ARI Environmental Inc.
Thermocouple Calibration Data Form

Calibrator: B. Crane
Thermocouple ID. 638
pretest **posttest**
Date: 2/13/2007 8/24/2007
Barometric: 29.40 29.15
Reference Thermometer = Mercury in glass

	Reference Point Number	Source	Reference Thermometer Temperature	Meter Readout Temperature	
Pre- Test	T.C	Ice Water	34.0	34.6	0.47
		Ambient	74.0	74.1	0.38
		Hot Water	209.0	208.0	0.15
Post- Test	T.C	Ice Water	36.0	37.0	-0.20
		Ambient	79.0	80.2	-0.22
		Hot Water	209.0	210.0	-0.15

$$a \text{ (temp. diff.)} = (\text{ref. temp.} + 460) - (\text{Thermo. temp.} + 460) / (\text{ref. temp.} + 460) \times 100$$

Where $-1.5 < a < 1.5$

ARI Environmental Inc.
Thermocouple Calibration Data Form

Calibrator: J. Clark
 Thermocouple ID. 638
 Date: pretest posttest
 2/13/2007 9/5/2007
 Barometric: 29.40 29.3
 Reference Thermometer = Mercury in glass

	Reference Point Number	Source	Reference Thermometer Temperature	Meter Readout Temperature	Difference (%)
Pre- Test	T.C	Ice Water	34.0	34.6	-0.12
		Ambient	74.0	74.1	-0.02
		Hot Water	209.0	208.0	0.15
Post- Test	T.C	Ice Water	36.0	37.0	-0.20
		Ambient	79.0	80.4	-0.26
		Hot Water	210.0	210.6	-0.09

$$a \text{ (temp. diff.)} = (\text{ref.temp} + 460) - (\text{Thermo. temp.} + 460) / (\text{ref. temp.} + 460) \times 100$$

Where $-1.5 < a < 1.5$

ARI Environmental Inc.
Thermocouple Calibration Data Form

Calibrator: R. Burton
Thermocouple ID. 654
pretest **posttest**
Date: 2/9/2007
Barometric: 29.60
Reference Thermometer = Mercury in glass

	Reference Point Number	Source	Reference Thermometer Temperature	Meter Readout Temperature	Difference (%)
Pre- Test	T.C	Ice Water	34.0	33.6	0.08
		Ambient	67.0	68.2	-0.23
		Hot Water	208.0	207.9	0.01
Post- Test	T.C	Ice Water	37.0	36.8	0.04
		Ambient	79.0	79.5	-0.09
		Hot Water	210.0	210.6	-0.09

$$a \text{ (temp. diff.)} = (\text{ref. temp.} + 460) - (\text{Thermo. temp.} + 460) / (\text{ref. temp.} + 460) \times 100$$

Where $-1.5 < a < 1.5$

ARI Environmental Inc.
Thermocouple Calibration Data Form

Calibrator: R. Burton
 Thermocouple ID. 654
 Date: pretest posttest
 2/9/2007 9/25/2007
 Barometric: 29.60 29.27
 Reference Thermometer = Mercury in glass

	Reference Point Number	Source	Reference Thermometer Temperature	Meter Readout Temperature	Difference (%)
Pre- Test	T.C	Ice Water	34.0	33.6	0.08
		Ambient	67.0	68.2	-0.23
		Hot Water	208.0	207.9	0.01
Post- Test	T.C	Ice Water	33.0	33.2	-0.04
		Ambient	76.0	77.0	-0.19
		Hot Water	209.0	208.6	0.06

$$a \text{ (temp. diff.)} = (\text{ref.temp} + 460) - (\text{Thermo. temp.} + 460) / (\text{ref. temp.} + 460) \times 100$$

Where $-1.5 < a < 1.5$

ARI Environmental Inc.
Thermocouple Calibration Data Form

Calibrator: R. Burton
Thermocouple ID. 655
Date: **pretest** **posttest**
 2/15/2007 8/10/2007
Barometric: 29.50 29.22
Reference Thermometer = Mercury in glass

	Reference Point Number	Source	Reference Thermometer Temperature	Meter Readout Temperature	Difference (%)
Pre- Test	T.C	Ice Water	38.0	39.1	-0.22
		Ambient	64.0	63.6	0.08
		Hot Water	198.0	199.3	-0.20
Post- Test	T.C	Ice Water	35.0	36.0	-0.20
		Ambient	79.0	80.1	-0.20
		Hot Water	208.0	208.8	-0.12

$a \text{ (temp. diff.)} = (\text{ref.temp} + 460) - (\text{Thermo. temp.} + 460) / (\text{ref. temp.} + 460) \times 100$

Where $-1.5 < a < 1.5$

ARI Environmental Inc.
Thermocouple Calibration Data Form

Calibrator: R. Burton
 Thermocouple ID. 655
 Date: pretest posttest
 2/15/2007 9/25/2007
 Barometric: 29.50 29.27
 Reference Thermometer = Mercury in glass

	Reference Point Number	Source	Reference Thermometer Temperature	Meter Readout Temperature	Difference (%)
Pre- Test	T.C	Ice Water	38.0	39.1	-0.22
		Ambient	64.0	63.6	0.08
		Hot Water	198.0	199.3	-0.20
Post- Test	T.C	Ice Water	33.0	33.8	-0.16
		Ambient	76.0	76.6	-0.11
		Hot Water	209.0	209.8	-0.12

$$a \text{ (temp. diff.)} = (\text{ref.temp} + 460) - (\text{Thermo. temp.} + 460) / (\text{ref. temp.} + 460) \times 100$$

Where $-1.5 < a < 1.5$



Valero Refining Company - New Jersey
Source: FCCU Scrubber Stack
Test Dates: 8/28 - 8/30/07

APPENDIX G Method 8 (Modified) USEPA Acceptance Letter



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

Mr. Lyn Holmes
Valero Energy Corporation
Post Office Box 696000
San Antonio, Texas 78269-6000

Dear Mr. Holmes:

This is in response to your letter dated September 11, 2006, asking us to approve a modification to Method 8 when used to measure sulfuric acid emissions from fluid catalytic cracking units (FCCUs) at petroleum refineries. The modification is entitled "Sulfuric Acid Determination (Modified USEPA Method 8)." You are planning to modify the Method 8 analytical procedures to use ion chromatography to measure sulfate, chloride, fluoride, and sulfite anions and ammonium, potassium, sodium, and calcium cations. You also propose to measure aluminum cations by inductively coupled argon plasma spectrometry. You then propose to calculate the total cations and total anions in the solution and determine the excess anions by subtracting the total cations from the total anions. The equations that you propose to use are included in your request and enclosed with this letter. The excess cations will be assumed to be sulfate anions and will be reported as sulfuric acid.

We agree that this is a reasonable approach to determine sulfuric acid in a Method 8 sample when large amounts of metallic salts, including sulfate salts, may be collected in the sampling solution. Therefore, we agree that this is an accurate procedure for measuring sulfuric acid emissions from FCCUs at the Paulsboro Refinery at 800 Billingsport Road in Paulsboro, New Jersey. A copy of the procedure we reviewed is enclosed. If you need further assistance, please contact me at (919) 541-1062.

Sincerely,

Gary D. McAlister
Measurement Technology Group

Enclosure

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Valero Refining Company - New Jersey
Source: FCCU Scrubber Stack
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APPENDIX H

Personnel Qualifications



Personnel Qualifications

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 28 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.

His source sampling experience includes conducting over 1000 separate test programs involving emissions testing at steel mills, refineries, printing operations, food processing, chemical plants, fume incineration systems, hazardous waste incinerators, bulk gasoline terminals and power plants.

William Craig James

Mr. James is the Midwest Regional Manager and a Senior Project Manager with ARI. His 14 years of experience include 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.

William Pearce

Mr. Pearce is a Project Manager with ARI. His 6 years of experience include 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.

Steven Yuchs, PhD.

Dr. Yuchs has 11 years experience in environmental analysis and research and development. His experience includes industrial, academic and governmental laboratory management, with an emphasis in the environmental remediation sector. He is currently the Analytical Services section manager, and is responsible for all laboratory activities for ARI. He is also responsible for coordinating and developing laboratory analysis procedures, laboratory quality assurance, new methods of laboratory analysis, and laboratory data reduction.

Jeff Goldfine

Mr. Goldfine is a field technician specializing in sampling equipment preparation, maintenance and calibration, equipment setup, field sampling, sample recovery, and posttest equipment clean up. Mr. Goldfine has over 3 years experience in conducting various source emission test programs.

Robert Burton

Mr. Burton is a field technician specializing in sampling equipment preparation, maintenance and calibration, equipment setup, field sampling, sample recovery, and posttest equipment clean up.

Walter Page

Mr. Page is a field technician specializing in sampling equipment preparation, maintenance and calibration, equipment setup, field sampling, sample recovery, and posttest equipment clean up.