COMPLIANCE SOURCE TEST REPORT FOR CO & PM EMISSIONS

TAIL GAS INCINERATOR 28F-11

Source Location:

ExxonMobil Torrance Refinery
3700 West 190th Street
Torrance, California 90509
Facility ID: 800089
Device ID: C626

Test Date: September 14 and November 17, 2010
Issue Date: February 9, 2011
Revision: 0

Prepared for:

ExxonMobil Torrance Refinery
3700 West 190th Street
Torrance, California 90509

Prepared by:

AirKinetics, Inc.
1308 S. Allec Street
Anaheim, California 92805
(714) 254-1945 Fax: (714) 956-2350
AKI No.: 13147 B

AirKinetics, Inc.
EMISSIONS CHARACTERIZATION
AND TESTING SERVICES

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Prepared By: Jason Mai
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Reviewed By:
Gary Mata
Laboratory Manager

AirKinetics, Inc.
EMISSIONS CHARACTERIZATION
AND TESTING SERVICES

TABLE OF CONTENTS

1.0 SUMMARY

1.1 Source Information

Plant Name and Address:	ExxonMobil Torrance Refinery 3700 West 190th Street Torrance, California 90509
Facility ID No.:	800089
Source Tested:	Tail Gas Incinerator 28F-11
Device ID No.:	C626
Plant Contact:	Parvez Abbas
Phone Number:	310-212-1755

1.2 Testing Firm Information

Firm Name and Address:	AirKinetics, Inc. 1308 S. Allec Street Anaheim, California 92802
Firm Contact:	Hung Duong
Phone Number:	714-254-1945 ext. 108

1.3 Test Information

Test Requested By:	ExxonMobil Torrance Refinery
Firm Contact:	Parvez Abbas
Phone Number:	310-212-1755
Test Objective:	To demonstrate compliance with SCAQMD Rule 407 for CO and Rule 409 for Particulate Matter.
Test Date:	September 14 and November 17, 2010
Test Methods:	SCAQMD 1.1 Sampling Points SCAQMD 2.1 Velocity SCAQMD 4.1 Moisture SCAQMD 5.2 Total Particulate SCAQMD 100.1 O_2, CO_2, and CO

1.4 Test Personnel

Test Coordinator:	Parvez Abbas
AirKinetics Test Personnel:	Jose Vital, Project Supervisor Ting Chorng, Project Supervisor Jorge Gonzalez, Team Leader

2.0 TEST RESULTS AND DATA PRESENTATION

The test program results are summarized in Table 2-1. All data pertaining to the tests are included in the appendices to this report. Particulate matter (PM) results, field data, analytical data, and equipment calibrations are presented in Appendix A. CO, O_2, and CO_2 results, field data, calibration gas certificates, and EPA 205 – calibration gas dilution system verification are presented in Appendix B. Facility process data are presented in Appendix C. Sampling method descriptions and schematics are presented in Appendix D. The Statement of No Conflict of Interest is presented in Appendix E.

TABLE 2-1

TEST RESULTS

PARAMETER	TEST DATE	UNITS	RESULT	LIMITS	APPLICABLE RULE
CO	9/14/10	ppmv	6.81 (20)*	2000	407
Total Particulate	11/17/10	gr/DSCF@12%CO_2	0.0202	0.1	409

*Actual values measured were below 20% of analyzer range. Values in parentheses are values equal to 20% of the analyzer's range. Compliance was demonstrated, since the values equal to 20% of the analytical range were below the emission limit.

3.0 INTRODUCTION

On September 14 and November 17, 2010, AirKinetics, Inc. conducted a test program for ExxonMobil Torrance Refinery in Torrance, California. The test objective was to demonstrate compliance with SCAQMD Rule 407 for CO and Rule 409 for Particulate Matter. Testing was conducted on Tail Gas Incinerator 28F-11.

AirKinetics certifies that the independent testing laboratory criteria established in District Rule 304 (l), (1), (2), (3), and (4) are satisfied and that no conflict of interest exists between parties involved in the test program per District Rule 304.

4.0 SOURCE PROCESS AND EQUIPMENT DESCRIPTION

4.1 Process Description

Incinerator 28F-11 was designed to accept SRU Nos. 1 and 2 tail gas. It now functions primarily as a control device for the sulfur storage pit and loading rack. The incinerator oxidizes sulfur bearing compounds in these gases. Design combustion temperature is maintained by burning an auxiliary fuel gas stream as well as the effluent vapor.

Figure 4-1 on page 4-2 shows a simplified stack diagram for Heater 28F-11. The flue gas from this heater is discharged into the environment in accordance with the requirements set forth by the SCAQMD.

4.2 Location Description

A summary of the test location information is presented in Table 4-1. A sampling location schematic is presented in Appendix A.2.

TABLE 4-1

TEST LOCATION INFORMATION

Location	Dimensions (inches)	Cross Sectional Area (in^2)	Upstream Distance		Downstream Distance	
			Inches	Equivalent Diameter	Inches	Equivalent Diameter
Stack	77.0 ID	4,657	432	5.61	504	6.55

4.3 Process Operation

During the testing period, the heater was operated at the firing rates shown in Table 4-2.

TABLE 4-2

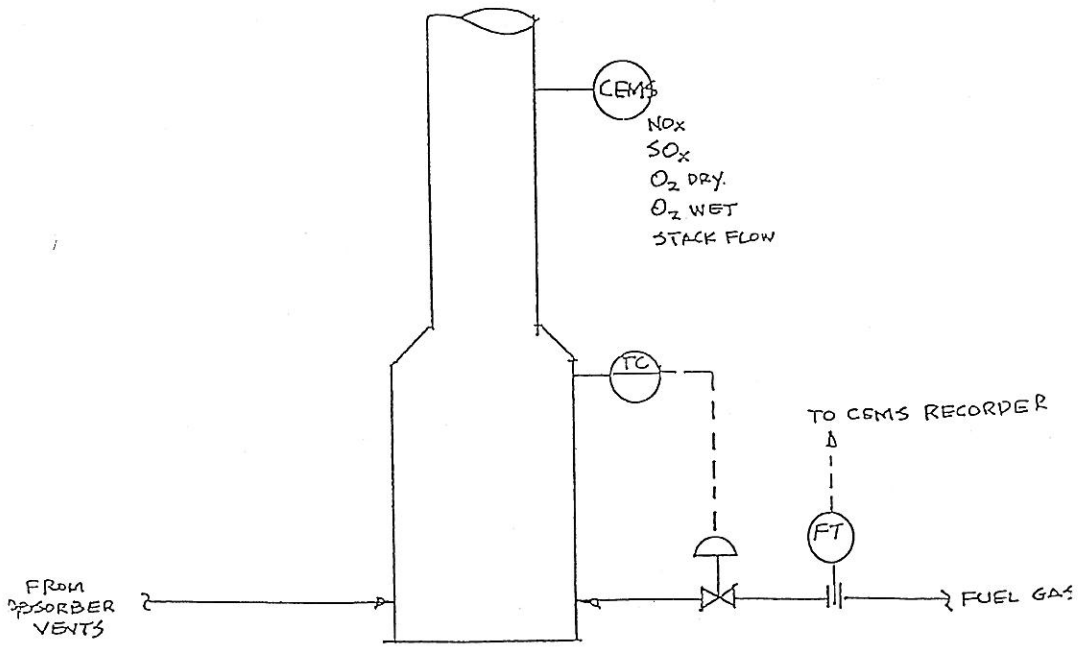
FIRING RATE

Test Date	Fuel Rate Kscfd	Heating Value Btu/scf	Firing Rate MMBtu/Hr	Max Firing Rate MMBtu/Hr	% of Max Capacity
9/14/10	650.24	1034.91	28.04	60	46.7
11/17/10	623.60	1093.41	28.41	60	47.4

* The firing rate was calculated using the CEMS fuel flow data and heating value.

Figure 4-1.

Tail Gas Incinerator



5.0 SAMPLING AND ANALYTICAL PROCEDURES

A list of the sampling and analytical procedures employed during this test program is presented in Table 5-1. Sampling method descriptions and schematics are presented in Appendix D, except SCAQMD Method 5.2 which is presented below.

TABLE 5-1
SAMPLING AND ANALYTICAL PROCEDURES

PARAMETER	TEST METHOD
Traverse Points	SCAQMD Method 1.1
Velocity	SCAQMD Method 2.1
Moisture	SCAQMD Method 4.1
Particulate	SCAQMD Method 5.2
Oxygen, Carbon Dioxide, and Carbon Monoxide	SCAQMD Method 100.1

5.1 SCAQMD Method 5.2 – Total Particulate

The concentration and emission rate of particulate were determined using the procedures and equipment described in SCAQMD Method 5.2 with Methods 1.1 through 4.1.

Sampling Train Description. The sampling train consisted of a stainless steel nozzle, a heated glass lined probe with an standard Pitot tube and thermocouple attached, a heated glass fiber filter, three chilled impingers in series, a silica gel impinger, a pump, a dry gas meter and a calibrated orifice. The filter was housed in a glass filter holder and supported on a Teflon frit. The first and second impingers each contained 100 ml of deionized (DI) water, the third was empty, and the fourth contained preweighed silica gel. All glassware was precleaned using soap, tap water, and deionized (DI) water. Although a chain of custody was not required nor established for the glassware per the method protocol, all glassware remained in AirKinetics' custody throughout the test program.

Sample Train Operation. The entire sample train was leak tested to ensure that leakage does not exceed the lesser of a) 4 percent of the average sampling rate, or b) 0.02 cfm. The filter temperature was measured with a thermocouple and maintained at 180°F to 200°F. The filter heat was controlled by a Fuji temperature controller. Sampling was maintained within ± 10 percent of isokinetics.

Sample Recovery. The filter was removed and placed in a filter container. The contents of the impingers were returned to the original impinger jar, weighed, the weight recorded and the liquid level marked. The silica gel was returned to the original tared silica gel jar, weighed and the weight recorded. The nozzle, probe liner, and filter holder were rinsed with DI into the probe rinse jar. The impingers were rinsed with DI in the impinger jar.

Sample Analysis. The particulate mass was determined according to the procedures described in SCAQMD Method 5.2. The particulate consisted of three (3) separate components, filter catch, probe catch and impinger catch.

Following gravimetric determination for particulate, aliquots of the filter, probe, and impinger samples were analyzed for acid and sulfate by titration in accordance with SCAQMD Method 5.2. Barium perchlorate was used for the sulfate titrations.

The following method improvements as outlined in the SCAQMD Laboratory Approval Programs (LAP) are incorporated into the sample analysis.

1. All weights must be constant weights. The date of each weighing must be recorded to validate proper equilibration time.
2. Gravimetric analysis is used for moisture gain determination

6.0 TEST CRITIQUE

The NO_x measurement concentrations appear in some sections of the appendices to this report. This data was collected as part of the concurrent SCAQMD RECLAIM RATA test program and was not used to demonstrate compliance. No calculations or final test results for this data are presented in this test report.

The measured CO concentrations were below 20% of analyzer range. Presented in Table 2-1 are actual values as well as values equal to 20% of the analyzer's range. Compliance was demonstrated, since the values equal to 20% of the analytical range were below the emission limit.

No other anomalies were encountered during this test program.

APPENDIX A

PARTICULATE MATTER

1.0 RESULTS

ISOKINETIC SAMPLING TRAIN RESULTS - METHOD: **AQMD 5.2**

Client Name	EXXONMOBIL TORRANCE	Operator		JG
Plant Name	EXXONMOBIL TORRANCE REFINERY	Project #		13147
Sampling Location	INCINERATOR UNIT 28F-11 STACK	Standard Temperature, °F		60

USE IN AVERAGE OF RUN SET? 1 or 0 =>		1			SET AVERAGE
Run Number		II-28F-11-M5/5.2-1			
Run Date		11-17-10			
Run Start Time	hh:mm	1300			
Run Stop Time	hh:mm	1410			
Meter Calibration Factor	Y	1.01			
Pitot Tube Coefficient	C_p	0.99			
Actual Nozzle Diameter	in	0.509			
Sample Volume	ft^3	43.100			43.100
Total Sampling Time	min	60			60
Average Meter Temperature	°F	77.5			77.5
Average Stack Temperature	°F	1138.9			1138.9
Barometric Pressure	in Hg	29.9			29.9
Stack/Duct Static Pressure	in H_2O	-0.80			-0.80
Absolute Stack/Duct Pressure	in Hg	29.9			29.9
Average Delta H	in H_2O	1.66			1.66
Absolute Meter Pressure	in Hg	30.1			30.1
Avg Differential Pressure (Delta P)	in H_2O	0.060			0.060
Total Water Volume Collected	mL	83.5			83.5
Volume of Water vapor @ STP	SCF	3.871			3.871
Volume Metered @ STP	DSCF	42.295			42.295
Calculated Stack Moisture	% H_20	8.4			8.4
Saturated Stack Moisture	% H_20	100.0			100.0
Reported Stack Moisture Content	% H_20	8.4			8.4
Carbon Dioxide Percentage	% CO_2	3.16			3.16
Oxygen Percentage	% O_2	16.04			16.04
Carbon Monoxide Percentage	% CO	0.0			0.0
Nitrogen Percentage	% N_2	80.8			80.8
Dry Mole Fraction	decimal	0.916			0.916
Dry Gas Molecular Weight	lb/lb-mole	29.15			29.15
Wet Stack Gas Molecular Weight	lb/lb-mole	28.21			28.21
Flue Gas Density	lb/ft^3	0.0732			0.0732
Calculated Fuel Factor	F_o	1.54			1.54
Percent Excess Air	% EA	303.1			303.1
Stack Cross-Sectional Area	in^2	4656.6			4656.6
Stack Cross-Sectional Area	ft^2	32.34			32.34
Percent of Isokinetic Rate	% ISO	97.9			97.9
Air Flow Rate Results					
Average Stack Gas Velocity	ft/sec	28.56			28.56
Actual Stack Flow/Minute	ACFM	55,422			55,422
Dry Standard Stack Flow/Minute	DSCFM	16,492			16,492
Wet Standard Stack Flow/Minute	WSCFM	18,001			18,001

ISOKINETIC SAMPLING TRAIN RESULTS - METHOD: **AQMD 5.2**

Concentration and Emission Rate Data Summary					
Run Number		**II-28F-11-M5/5.2-1**			**AVERAGE**
Filterable Particulate	mg	12.5			12.5
Concentration, Gr/DSCF	gr/DSCF	4.56E-03			4.56E-03
Concentration @ 12% CO2	Gr@12%	1.73E-02			1.73E-02
Concentration @ 3% O2	Gr@3%	1.68E-02			1.68E-02
Emission Rate, lb/hr	lb/hr	6.45E-01			6.45E-01
Backhalf Particulate	mg	5.3			5.3
Concentration, Gr/DSCF	gr/DSCF	1.93E-03			1.93E-03
Concentration @ 12% CO2	Gr@12%	7.34E-03			7.34E-03
Concentration @ 3% O2	Gr@3%	7.12E-03			7.12E-03
Emission Rate, lb/hr	lb/hr	2.73E-01			2.73E-01
Total Particulate	mg	14.6			14.6
Concentration, Gr/DSCF	gr/DSCF	5.33E-03			5.33E-03
Concentration @ 12% CO2	Gr@12%	2.02E-02			2.02E-02
Concentration @ 3% O2	Gr@3%	1.96E-02			1.96E-02
Emission Rate, lb/hr	lb/hr	7.53E-01			7.53E-01
Solid Particulate	mg	13.8			13.8
Concentration, grams/DSCF	gms/DSCF	3.26E-04			3.26E-04
Concentration, Gr/DSCF	gr/DSCF	5.04E-03			5.04E-03
Concentration @ 12% CO2	Gr@12%	1.91E-02			1.91E-02
Concentration @ 3% O2	Gr@3%	1.85E-02			1.85E-02
Emission Rate, lb/hr	lb/hr	7.12E-01			7.12E-01

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EXAMPLE CALCULATIONS, RUN II-28F-11-M5/5.2-1

ABSOLUTE PRESSURE, INCHES OF MERCURY

Ps = Pbar + Pg/13.6
= 29.94 + -0.80/13.6
= 29.9

VOLUME OF WATER VAPOR, STANDARD CUBIC FEET

Vwstd = 0.002667 * [(Tstd + 460) / Pstd] * Vlc
= 0.002667 * [(60 + 460) / 29.92 * 83.5
= 3.871

SAMPLED VOLUME OF SOURCE GAS, DRY STANDARD CUBIC FEET

Vmstd = [(Tstd + 460)/Pstd] * Y * Vm * (Pbar + Delta-H/13.6) / (460 + tm)
= [(60 + 460)/ 29.92] * 1.0100 * 43.100 * (29.94 + 1.663/13.6) / (460 + 78)
= 42.295

MOISTURE CONTENT, PERCENT BY VOLUME

%H2O = Vwstd / (Vwstd + Vmstd)
= 3.871 / (3.871 + 42.295)
= 8.4

DRY MOLE FRACTION, LB-MOLE/LB-MOLE

Mfd = 1 - %H2O/100
= 1 - 8.38/100
= 0.916

DRY MOLECULAR WEIGHT, LB/LB-MOLE

Md = 44*(%CO2/100) + 32*(%O2/100) + 28*{[100-(%CO2+%O2)]/100}
= 44*(3.2/100) + 32*(16.0/100) + 28*{[100-(3.2+16.0)]/100}
= 29.15

WET MOLECULAR WEIGHT, LB/LB-MOLE

Ms = Md*Mfd + 18.0*%H2O/100
= 29.15*0.916 + 18.0*8.38/100
= 28.21

FUEL FACTOR

Fo = (20.9 - %O2) / %CO2
= (20.9 - 16.0) / 3.2
= 1.54

ISOKINETIC SAMPLING RATE, PERCENT

%I = Pstd/(Tstd + 460) * (100/60) * Vmstd*(ts + 460)/[Ps*vs*Mfd*Theta*(PI*Dia*Dia/576)]
= 29.92/(60 + 460) * (100/60) * 42.295*(1139 + 460)/[29.88*28.56*0.916*60.00*(PI*0.509*0.509/576)]
= 97.9

VELOCITY, FEET PER SECOND

vs = 85.49 * Cp * SQRT[Delta-p*(460+ts)/Ps/Ms]
= 85.49 * 0.99 * SQRT[0.0601*(460+1139)/29.88/28.21]
= 28.56

VOLUMETRIC FLOW RATE, ACTUAL CUBIC FEET PER MINUTE

Qaw = (60/144) * vs * A
= (60/144) * 28.56 * 4657
= 55422

VOLUMETRIC FLOW RATE, DRY STANDARD CUBIC FEET PER MINUTE

Qsd = (60/144) * Mfd * vs * A * (Tstd + 460)/(ts + 460) * (Ps/Pstd)
= (60/144) * 0.916 * 28.56 * 4657 * (60 + 460)/(1139 + 460) * (29.88/29.92)
= 16492

EXAMPLE CALCULATIONS, RUN II-28F-11-M5/5.2-1

FILTERABLE PARTICULATE CONCENTRATION, GRAINS PER DRY STANDARD CUBIC FOOT

gr/DSCF = (Catch/Conversion) * 7,000 / 453.592 / Vmstd
= (12.50/1000) * 7,000 / 453.592 / 42.295
= 0.00456

FILTERABLE PARTICULATE CONCENTRATION, GRAINS PER DRY STANDARD CUBIC FOOT @ 3% O2

Gr@3%O2 = gr/DSCF * (20.9-3) / (20.9-%O2)
= 0.00456 * (20.9-3) / (20.9-16.04)
= 0.0168

FILTERABLE PARTICULATE EMISSION RATE, POUNDS PER HOUR

lb/hr = 60 * (Catch/Conversion) * Qsd / 453.592 / Vmstd
= 60 * (12.50/1000) * 16492 / 453.592 / 42.295
= 0.645

APPENDIX A

PARTICULATE MATTER

2.0 FIELD DATA

SAMPLING AND VELOCITY TRAVERSE POINT DETERMINATION
EPA METHOD 1

CLIENT: Exxon-Mobil
PLANT NAME: Mobil Torrance Refinery
CITY, STATE: Torrance, CA
SAMPLING LOCATION: Incinerator 28F-11 Stack
TYPE OF TESTING: Particulate

NO. OF PORTS AVAILABLE: 2
NO. OF PORTS TO BE USED: 2
PORT INSIDE DIAMETER: 4 inches

DISTANCE FROM FAR WALL TO OUTSIDE OF PORT: 88.50 inches
NIPPLE LENGTH AND/OR WALL THICKNESS: 11.50 inches
DEPTH OF STACK OR DUCT, D: 77.00 inches
STACK OR DUCT WIDTH (IF RECTANGULAR), W: #N/A inches

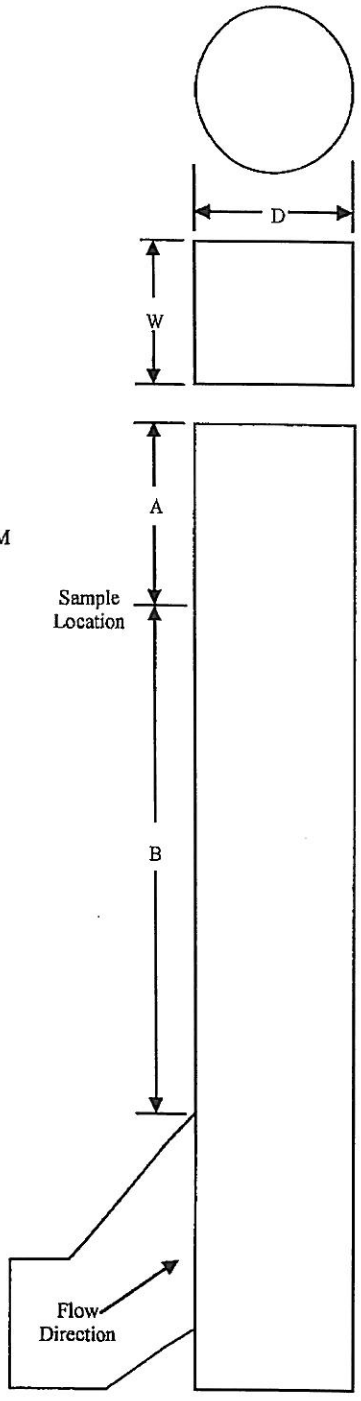
EQUIVALENT DIAMETER
De = 2*(DEPTH)*(WIDTH)/(DEPTH+WIDTH) = 77.00 inches

STACK/DUCT AREA = 32.34 sq.feet 4656.6 sq.inches

DISTANCE FROM PORT TO FLOW DISTURBANCES	UPSTREAM B	DOWNSTREAM A
# OF INCHES	432.00	504.00
# OF DIAMETERS	5.61	6.55

MINIMUM NUMBER OF TRAVERSE POINTS: 20

POINT NO.	% OF DUCT DEPTH	DISTANCE FROM INSIDE WALL (in.)	DISTANCE FROM OUTSIDE OF PORT (in.)
1	2.6	2.00	13 1/2
2	8.2	6.31	17 7/8
3	14.6	11.24	22 3/4
4	22.6	17.40	28 7/8
5	34.2	26.33	37 7/8
6	65.8	50.67	62 1/8
7	77.4	59.60	71 1/8
8	85.4	65.76	77 1/4
9	91.8	70.69	82 1/8
10	97.4	75.00	86 1/2



DRAWING NOT TO SCALE

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ISOKINETIC SAMPLING TRAIN DATASHEET - METHOD EPA 5/M5.2

Client Name	EXXONMOBIL		Run #	~~S-M5/M5.2-1AA~~	11-28F-11-M5/5.2-1		
Plant Name	TORRANCE REFINERY		Project #	13147	Run Start	1300	
Plant City, State	TORRANCE,CA		Personnel	JG	Run End	1410	
Test Location	INCINERATOR UNIT 28F-11 STACK		Tester Signature				
Date of Test	11-17-10		Checked By	TM			

Isokinetic Factor Setup		~~-0.8~~	Pressures		Sampling Equipment		Filter ID & Tares		Actuals
ΔH @ 0.75 SCFM		1.86	Pbar	29.94	Meter Console #	488	1956	0.3692	CO_2
Meter Calibration Factor		1.01	Pstatic	~~-0.72~~	Ideal Nozzle Diameter	#NUM!	528		5.16
Pitot Tube Coefficient		0.990	Abs P	~~29.9-0.1~~	Nozzle #	SS503			O_2
Estimated Dry Gas Meter Temp		80	Tstd, °F	~~68~~	Actual Nozzle Diameter	0.509			16.04
Estimated Stack Temp or M2 Avg.	1145	~~1249~~	Pstd	29.92	Probe Lgth/ID #	SSIM8	SP76-1		CO
Estimated Delta P or M2 Avg.	0.06	~~0.048~~	Estimates		Liner Material		GL	XAD ID & Tares	0.0
Estimated Moisture Content	13.5	~~12.9~~	CO_2	~~3.1~~ 3.65	Filter Box #		NA	NA NA	N_2
Estimated Dry Molecular Weight	29.12	~~29.17~~	O_2	~~15.1~~ 15.1	Cold Box ID #		NA		~~100.0~~ 80.8
Estimated Velocity, ft/sec	28.9	#NUM!	CO	0.0	Umbilical ID #		NA		H_2O
K Factor (delta H/delta P)	27.45	######	N_2	~~81.6~~	TC ID #s		11-1		~~835~~

Equipment & Leak Check Data, OK? Y or N				Leak Checks	1	2	3	4	5	6	Status
Tambient	NA	NA	PRE	POST	DGM initial							
Thermocouples			Y	Y	Vacuum	15	9					0
Pitots			Y	Y	Leak Rate	0.002	0.002					OK
Tedlar Bag		NA	NA	NA	DGM final							

Point #	Clock Time	Test Time	Dry Gas Meter Reading	Velocity Head	Desired Orifice ΔH	Actual Orifice ΔH	Pump Vac.	DGM Inlet Temp	DGM Outlet Temp	Stack Temp	Filter Temp	Imp. Exit Temp	~~NA~~ Probe Temp
	24 hr	min	ft^3	in H_2O	in H_2O	in H_2O	in Hg	°F	°F	°F	°F	°F	°F
SW 10	1300	0.0	932.700	0.065	1.78	1.80	6	77	75	1135	185	58	
9		3.0	935.00	0.065	1.78	1.80	6	77	76	1140	189	57	
8		6.0	937.10	0.060	1.65	1.65	6	76	75	1137	192	57	
7		9.0	939.20	0.060	1.65	1.65	6	78	75	1136	191	56	
6		12.0	941.40	0.050	1.37	1.35	5	78	75	1135	1941	56	
5		15.0	943.40	0.055	1.51	1.50	6	78	75	1140	195	56	
4		18.0	945.50	0.060	1.65	1.65	6	77	75	1137	197	56	
3		21.0	947.50	0.070	1.92	1.90	6	77	75	1135	195	56	
2		24.0	949.70	0.070	1.92	1.90	6	79	75	1147	197	57	
1		27.0	952.00	0.060	1.65	1.65	6	79	75	1145	195	57	
NW 10		30.0	954.20	0.050	1.37	1.35	6	80	76	1140	196	57	
9		33.0	956.10	0.080	2.20	2.20	6	80	77	1137	194	57	
8		36.0	958.60	0.065	1.78	1.80	6	80	76	1135	195	56	
7		39.0	960.80	0.065	1.78	1.80	8	81	77	1146	194	56	
6		42.0	963.00	0.045	1.24	1.25	5	90	76	1140	195	56	
5		45.0	965.00	0.045	1.24	1.25	5	80	77	1137	197	56	
4		48.0	967.00	0.075	2.06	2.05	5	80	76	1140	194	56	
3		51.0	969.50	0.065	1.78	1.80	5	81	77	1137	195	57	
2		54.0	971.70	0.065	1.78	1.80	5	80	76	1149	196	57	
1		57.0	974.00	0.040	1.10	1.10	5	80	75	1149	196	57	
END	1410	60.0	975.800										
						MAX =>	8						
Average Values		60.0	0.000	0.060	1.661	1.663		77.5	1138.9				

43,100

~~Probe and Filter heat shall be maintained at 248 ±25 °F~~

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MOISTURE ANALYTICAL RESULTS - METHOD SCAQMD 5.2

Plant Name: ExxonMobil Torrance Refinery — Job No.: 13147

City/State: Torrance, CA — Sampling Location: 28F-11 Stack

Run Number	II-28F-11-M5.2-1		
Sampling Date	10/17/10		
Analysis Date	10/18/10		
Analyst	Jose. V		

Reagent: DI H_2O

Final Weight, g	652.1 g		
Tared Weight, g	577.2 g		
Water Catch, g	74.9		

Reagent: _____

Final Weight, g			
Tared Weight, g			
Water Catch, g			

Reagent: _____

Final Weight, g			
_____ ml used, g*			
Empty Tared Weight, g			
Water Catch, g			

*Weight of Reagent calculated by multiplying ml of $KMnO_4$ by density of 1.1 g/ml

CONDENSED WATER, g			

Silica Gel

Final Weight, g	209.6 g		
Tared Weight, g	200.0 g		
ADSORBED WATER, g	8.6 g		

TOTAL WATER COLLECTED, g	83.5		

Balance No. DT# 2 ☐ Triple Beam ☒ Electronic

Balance located in stable, draft-free area? ☒ Yes ☐ No

Comments: _____

Reviewer: JM

AirKinetics, Inc.

FIELD SAMPLE RECOVERY QUALITY CONTROL

Box No. 208 Assembly Date 11/12/10 Assembled By T. Chorng

Client ExxonMobil Job No. 13147.

Plant ExxonMobil Torrance Refinery City / State Torrance, CA

Sampling Location 28F-11 Stack Method SCAQMD 5.2

Individual Tare of Reagent 200 (ml) (~~gm~~) of DI H_2O

Individual Tare of Reagent ______ (ml) (gm) of ______

Individual Tare of Reagent ______ (ml) (gm) of ______

Individual Tare of Silca Gel 200 gm ______

Other (specify)

Run Number	Run Date	Filter or XAD Number	Filter or XAD Tare, grams	Liquid Tare at Mark?	Inits.	Sample Recovery Date	% Sil. Gel Spent	Liquid Level Marked	Initials
#-28F-11-M5.2-1	11/17	C956	0.3692	✓	J.V	11/18	60%	Yes	J.V

Filter Appearance* Dark Dark Brown (Black)

Reagent Appearance* clear

Filter Appearance*

Reagent Appearance*

Filter Appearance*

Reagent Appearance*

Filter Appearance*

Reagent Appearance*

* Use "REMARKS" section if needed.

All liquid levels at mark? (circle) (YES) NO (estimate loss if not at mark; use "REMARKS" section if needed.)

REMARKS ______

AirKinetics, inc.

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RECORD OF CUSTODY, CONTAINER No. 208

Client ExxonMobil **Job No.** 13147

Plant Name ExxonMobil Torrance Refinery

City/State Torrance, CA

Sampling Method (s) SCAQMD5.2 **(EPA, NIOSH, etc.)**

Container Type (√) Reagent Box ✓ **Cooler** ____ **Other (specify)** ____

Seal No. or "PC"	Date	Time	*	Full Signature	Reason for Breaking Seal**
1581323	11/12/10	14:19	S	~~Ly Chang~~	
	11/17/10	10:20	B	~~Jose Portillo~~	charge train
			S		
			B		
			S		
			B		
			S		
			B		
			S		
			B		
			S		
			B		

PC = Personal Custody * S = Sealed By; B = Broken ** Use "REMARKS" Section if more space needed

Container Received by AirKinetics Sample Custodian			Seal Intact?**
Signature	Date	Time	Yes ___ No ___ N/A ___

As Applicable:
All liquid levels at mark (√) Yes ___ No ___ (Estimate loss if not at mark; describe in "REMARKS")

As Applicable:
TUBE SAMPLES put in freezer by ____ Date ____ Time ____

CONDENSATE SAMPLES put in refridge. by ____ Date ____ Time ____

REMARKS ____

AirKinetics, Inc.

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00143

APPENDIX A

PARTICULATE MATTER

3.0 ANALYTICAL DATA

ANALYTICAL NARRATIVE
AKI No.: #13147

Plant Name: ExxonMobil – Torrance Refinery

Analyst: T. Chorng & G. Mata **Date Rec'd. in Lab:** 11/19/10

Analysis Method & Analytes: SCAQMD Method 5.2 – Particulate Matter

Sample Matrix & Components: Front Half Rinse (DI H_2O), Tared Filter, Impinger Contents and Rinses (DI H_2O)

Summary of Sample Prep (added rinse in lab, final volume, pH adjusted, etc.):

All samples received by AKI, were volumed in the lab. Samples were evaporated under a laboratory hood. All samples were desiccated a minimum of 24 hours prior to the 1st weighing. A minimum of 6 hours was observed between consecutive weighings.

Summary of Instrumentation:

Mettler XP204 (#1129461937) Analytical Balance, Brand III 25ml digital buret, and an Accumet AB15 pH Meter with pH and temperature electrodes

Minimum Detectable Limit: 0.5mg per sample fraction

Summary of QA/QC sample analysis: Consecutive weighings agreed within $\pm$0.5mg. An SO_2 audit with an actual value of 35.7mg was titrated to a value of 35.8mg for a deviation of 0.22%.

Spikes (describe spikes and % recovery): N/A

Specific Comments Regarding Sample Analyses :

No anomalies were associated with the sample analyses.

CONFIRMATION OF DATA REVIEW

Lab Manager Signature: _____ **Date:** 12/01/10

AirKinetics, Inc.

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00145

Particulate Calculation Sheet

	Run Numbers	
LAB ANALYSIS (mg)	II-28F-11-M5.2-1	II-28F-11-M5.2-BL
A. Filter Catch	8.2	0.1
B. (1) Filter Acid	0.7	0.0
(2) Filter Total Sulfate	8.0	0.0
C. Probe Catch	4.3	1.4
D. (1) Probe Acid	0.0	0.0
(2) Probe Total Sulfate	1.1	0.6
E. Impinger Catch	5.1	1.4
F. (1) Impinger Acid	3.2	0.0
(2) Impinger Total Sulfate	4.7	0.6
G. Organic Extract	0.2	0.2
FILTER TEMPERATURE LESS THAN 200 DEGREES F (mg)		
H. Filterable Particulate (A+C)	12.5	1.5
I. Backhalf Particulate (E+G)	5.3	1.6
J. Total Particulate (A+C+E-F*+G)	14.6	3.1
K. Solid Particulate (J-B*-D*-G)	13.8	2.9

* Use Lower of (1) and (2)

PARTICULATE SAMPLING LABORATORY RESULTS (Version 11.16.99)

Plant Name: ExxonMobil - Torrance Refinery — AKI Ref#: 13147

Sampling Location: 28F-11 Stack

Date Received: November 19, 2010

Run Number		II-28F-11-M5.2-1		II-28F-11-M5.2-BL		
Sample ID/Container #	init.	date / time	*F / A975*	date / time	*F / A979*	date / time	*F /*
	GM			11/24/10 07:51	4.5003		
	TC	11/23/10 15:33 @	4.6077	11/23/10 15:34 @	4.5002		
	TC	11/23/10 08:33	4.6078	11/23/10 08:34	4.5016		
	TC	11/22/10 15:28	4.6087	11/22/10 15:30	4.5036		
Baggie Tare Wt., g.			4.2303		4.1285		
Filter Tare Wt., g.		C956	*0.3692*	C959	*0.3716*		
FILTER SAMPLE WT., g.			*0.0082*		*0.0001*		*0.0000*

Sample ID/Container #	init.	date / time	*R / A976*	date / time	*R / A980*	date / time	*R /*
	TC	11/23/10 08:35 @	4.3815	11/23/10 08:36	4.2733		
	TC	11/22/10 15:31	4.3816	11/22/10 15:32 @	4.2729		
Tare Wt., g.		(125 ml)	4.3772	(100 ml)	4.2715	(ml)	
RINSE SAMPLE WT., g.			*0.0043*		*0.0014*		*0.0000*

Filter Catch, mg.	*8.2*	*0.1*	*0.0*
Rinse Catch, mg.	*4.3*	*1.4*	*0.0*
Rinse Blank Residue, mg.	*0.0*	*0.0*	*0.0*
Net Rinse Catch, mg.	*4.3*	*1.4*	*0.0*
FILTERABLE PARTICULATE, mg.	*12.5*	*1.5*	*0.0*

Blank Beaker #	*B /*
Final wt., mg.	*0.0000*
Tare wt., mg.	*0.0000*
Residue, mg.	*0*
Volume, ml.	*100*
Density, mg/ml	*1000.0*
Conc., mg/mg.	*0.0E+00* <--
Upper Limit, mg/mg	*1.0E-05*

Visual Analysis of Filters:

Run Number:	Color:	Texture:	F.Matter:	R.Comparison:
II-28F-11-M5.2-1	Black	Powdery	None	N/A
II-28F-11-M5.2-BL	White	None	None	N/A

Balance Spanned? November 22, 2010

Specific Comments about Samples:

Visual Analysis of Rinses:

Run Number:	Color:	Texture:	F.Matter:	R.Comparison:
II-28F-11-M5.2-1	Gray	Powdery	None	N/A
II-28F-11-M5.2-BL	Clear	None	None	N/A

Printing Date: 01-Dec-10 Printing Time: 09:40 AM

SUMMARY OF IMPINGERS' WATER ANALYSIS (Version 11.16.99)

Plant Name:	ExxonMobil - Torrance Refinery						AKJ Ref#:	13147	
Run Number			II-28F-11-M5.2-1			II-28F-11-M5.2-BL			
Sample ID/Container #			1 / A977			1 / A981			1 /
	init.	date / time		date / time			date / time		
	TC	11/23/10 08:38 @	4.1976	11/23/10 08:39 @		4.3824			
	TC	11/22/10 15:35	4.1979	11/22/10 15:36		4.3825			
Tare Wt., g.		(125 ml)	4.1974	(125 ml)		4.3822	(ml)		
SAMPLE WT., g.			0.0002			0.0002			0.0000
Sample ID/Container #			2 / A978			2 / A982			2 /
	init.	date / time		date / time			date / time		
	TC	11/23/10 15:35 @	4.2999	11/23/10 15:36 @		4.3747			
	TC	11/23/10 08:39 @	4.2999	11/23/10 08:39		4.3749			
Tare Wt., g.		(390 ml)	4.2948	(294 ml)		4.3733	(ml)		
SAMPLE WT., g.			0.0051			0.0014			0.0000
1 Condensible Organic Catch, mg.			0.2			0.2			0.0
Solvent Blank Residue, mg.			0.0			0.0			0.0
ORGANIC CONDENSIBLES,mg			0.2			0.2			0.0
2 Inorganic Fraction Catch, mg.			5.1			1.4			0.0
Water Blank Residue, mg.			0.0			0.0			0.0
INORGANIC CONDENSIBLES, mg.			5.1			1.4			0.0
TOTAL CONDENSIBLES PARTICULATE, mg.			5.3			1.6			0.0
TOTAL FILTERABLE PARTICULATE, mg.			12.5			1.5			0.0
TOTAL PARTICULATE, mg.			17.8			3.1			0.0

* Adjusted Catch (Negative Results Reported as Zero)

Procedure Explanation

1 - Extractable with methylene chloride

2 - Water catch after extraction and heating to 210 F

Printing Date 12/01/10 Printing Time 09:40 AM

FILTER ACID TITRATION ANALYSIS

SCAQMD Method: 5.2

Plant Name: ExxonMobil - Torrance Refinery Job No.: 13147

City/State: Torrance, CA Date Analyzed: November 30, 2010

Analyst: G. Mata Sampling Location: 28F-11 Stack

Burette Size: 25ml Digital Analytical Media: DI H2O

Run Number	Sample Vol., mL (A)	Aliquot Vol., mL (A)	Aliquot Factor (F)	Titrant Vol., mL (T)	Mass H_2SO_4, mg (MAcid)
Reagent Blank		150		4.28	T_{bavg}
II-28F-11-M5.2-1	150	150	1	4.38	0.7
II-28F-11-M5.2-BL	150	150	1	4.28	0.0

Sodium Hydroxide Solution Prestandardized against Potassium Acid Phthalate
Equivalence: 4.00mg NaOH/mL N = 0.1000

$$F = V / A$$

$$MAcid = (T - T_{bavg}) \times N \times \frac{134.11}{2} \times F$$

For Run No. II-28F-11-M5.2-1 :

$$MAcid = 0.1 \times 0.1000 \times \frac{134.11}{2} \times 1$$

$$MAcid = 0.671$$

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FILTER SULFATES (SO4) ANALYTICAL RESULTS

Version No.: 2, 11/18/99

SCAQMD REFERENCE METHOD: 5.2

Company Name: ExxonMobil - Torrance Refinery — AKI Ref.#: 13147

Sampling Location: 28F-11 Stack — Date Analyzed: November 30, 2010

Analyst: T. Chorng

Burette Size Used: 25ml Digital — Analytical Media: DI H2O

Printing Date: 12/01 — Printing time: 09:40

RUN NUMBER	SAMPLE VOLUME, mL (V)	DILUTION FACTOR (D)	ALIQUOT VOLUME, mL (A)	ALIQUOT FACTOR (F)	TITRANT VOLUME, mL (T_1)	TITRANT VOLUME, mL (T_2)	TITRANT VOLUME, mL (T_{avg})	MASS SO_4, mg (MSO_4)
Reagent Blank		1	10		0.12	0.12	0.12	Tbavg
II-28F-11-M5.2-1	200	1	10	20.0	0.72	0.71	0.72	8.0
II-28F-11-M5.2-BL	200	1	10	20.0	0.12	0.12	0.12	0.0

Where:

Tavg = (T + T) / 2

F = V / A

N = Volume H2SO4 * 0.02N / Volume BaCl2 * $2H_2O$

MSO4 = 134.11/2 x (Tavg - Tbavg) x N x F x D

Titration Standardization against 0.02N H2SO4

H2SO4 Volume	BaCl2 Volume	BaCl2 Normality
10	20.01	0.0100
10	19.98	0.0100
10	19.96	0.0100
	Avg. N	0.0100

For Run: II-28F-11-M5.2-1

MSO4 = 134.11/2 x (0.715 - 0.120) x 0.0100 x 20.0 x 1

MSO4 = 7.98 mg

NOTE: Results reported to three significant digits

FRONT HALF ACID TITRATION ANALYSIS

SCAQMD Method: 5.2

Plant Name: ExxonMobil - Torrance Refinery Job No.: 13147

City/State: Torrance, CA Date Analyzed: November 30, 2010

Analyst: G. Mata Sampling Location: 28F-11 Stack

Burette Size: 25ml Digital Analytical Media: DI H2O

Run Number	Sample Vol., mL (A)	Aliquot Vol., mL (A)	Aliquot Factor (F)	Titrant Vol., mL (T)	Mass H_2SO_4, mg (MAcid)
Reagent Blank		100		0	T_{bavg}
II-28F-11-M5.2-1	100	100	1	0	0
II-28F-11-M5.2-BL	100	100	1	0	0

Sodium Hydroxide Solution Prestandardized against Potassium Acid Phthalate
Equivalence: 4.00mg NaOH/mL N = 0.1000

$F = V / A$

$MAcid = T \times N \times \frac{134.11}{2} \times F$

For Run No. II-28F-11-M5.2-1 :

$MAcid = 0 \times 0.1000 \times \frac{134.11}{2} \times 1$

$MAcid = 0$

FRONT HALF SULFATES (SO4) ANALYTICAL RESULTS

Version No.: 2, 11/18/99

SCAQMD REFERENCE METHOD: 5.2

Company Name: ExxonMobil - Torrance Refinery *AKI Ref.#:* 13147

Sampling Location: 28F-11 Stack

Analyst: T. Chorng *Date Analyzed:* November 30, 2010

Burette Size Used: 25ml Digital *Analytical Media:* DI H2O

Printing Date: 12/01 *Printing time:* 09:40

RUN NUMBER	SAMPLE VOLUME, mL (V)	DILUTION FACTOR (D)	ALIQUOT VOLUME, mL (A)	ALIQUOT FACTOR (F)	TITRANT VOLUME, mL (T_1)	TITRANT VOLUME, mL (T_2)	TITRANT VOLUME, mL (T_{avg})	MASS SO_4, mg (MSO_4)
Reagent Blank		1	10		0.00	0.00	0.00	Tbavg
II-28F-11-M5.2-1	100	1	10	10.0	0.17	0.17	0.17	1.1
II-28F-11-M5.2-BL	100	1	10	10.0	0.09	0.10	0.10	0.6

Where:

Tavg = (T + T) / 2

F = V / A

*N = Volume H2SO4 * 0.02N / Volume BaCl2 * $2H_2O$*

MSO4 = 134.11/2 x (Tavg - Tbavg) x N x F x D

Titration Standardization against 0.02N H2SO4

H2SO4 Volume	BaCl2 Volume	BaCl2 Normality
10	20.01	0.0100
10	19.98	0.0100
10	19.96	0.0100
	Avg. N	0.0100

For Run: II-28F-11-M5.2-1

MSO4 = 134.11/2 x (0.170 - 0.000) x 0.0100 x 10.0 x 1

MSO4 = 1.14 mg

NOTE: Results reported to three significant digits

IMPINGER ACID TITRATION ANALYSIS

SCAQMD Method: 5.2

Plant Name: ExxonMobil - Torrance Refinery Job No.: 13147

City/State: Torrance, CA Date Analyzed: November 30, 2010

Analyst: G. Mata Sampling Location: 28F-11 Stack

Burette Size: 25ml Digital Analytical Media: DI H2O

Run Number	Sample Vol., mL (A)	Aliquot Vol., mL (A)	Aliquot Factor (F)	Titrant Vol., mL (T)	Mass H_2SO_4, mg (MAcid)
Reagent Blank		100		0	T_{bavg}
II-28F-11-M5.2-1	100	100	1	0.47	3.2
II-28F-11-M5.2-BL	100	100	1	0	0.0

Sodium Hydroxide Solution Prestandardized against Potassium Acid Phthalate
Equivalence: 4.00mg NaOH/mL N = 0.1000

$F = V / A$

$MAcid = T \times N \times \frac{134.11}{2} \times F$

For Run No. II-28F-11-M5.2-1 :

$MAcid = 0.47 \times 0.1000 \times \frac{134.11}{2} \times 1$

$MAcid = 3.154$

IMPINGER SULFATES (SO4) ANALYTICAL RESULTS

Version No.: 2, 11/18/99

SCAQMD REFERENCE METHOD: 5.2

Company Name: ExxonMobil - Torrance Refinery — AKI Ref.#: 13147

Sampling Location: 28F-11 Stack

Date Analyzed: November 30, 2010

Analyst: T. Chorng

Burette Size Used: 25ml Digital — Analytical Media: DI H2O

Printing Date: 02/09 — Printing time: 09:42

RUN NUMBER	SAMPLE VOLUME, mL (V)	DILUTION FACTOR (D)	ALIQUOT VOLUME, mL (A)	ALIQUOT FACTOR (F)	TITRANT VOLUME, mL (T_1)	TITRANT VOLUME, mL (T_2)	TITRANT VOLUME, mL (T_{avg})	MASS SO_4, mg (MSO_4)
Reagent Blank		1	10		0.00	0.00	0.00	**Tbavg**
II-28F-11-M5.2-1	150	1	10	15.0	0.46	0.47	0.47	**4.7**
II-28F-11-M5.2-BL	100	1	10	10.0	0.09	0.09	0.09	**0.6**
AUDIT*(as SO_2)	100	1	10	10.0	11.18	11.16	11.17	**35.8**

*USEPA audit — Lot / Sample #: 6132 Series A — Actual value mg.: 35.7 — % Dev. = 0.22%

Use SO2 as Audit Sample

MSO2 = 64.06/2 x (11.17 - 0.000) x 0.0000 x 10.0 x 1

MSO2 = 35.8 mg

Where:

Tavg = (T + T) / 2

F = V / A

N = Volume H2SO4 * 0.02N / Volume BaCl2 * $2H_2O$

MSO4 = 134.11/2 x (Tavg - Tbavg) x N x F x D

Titration Standardization against 0.02N H2SO4

H2SO4 Volume	BaCl2 Volume	BaCl2 Normality
10	20.01	0.0100
10	19.98	0.0100
10	19.96	0.0100
	Avg. N	0.0100

For Run: II-28F-11-M5.2-1

MSO4 = 134.11/2 x (0.465 - 0.000) x 0.0100 x 15.0 x 1

MSO4 = 4.677 mg

NOTE: Results reported to three significant digits

PARTICULATE SAMPLING LABORATORY RESULTS (Version 11.16.99)

Plant Name: EXXONMOBIL - TORRANCE REFINERY
AKI Ref#: 13147
Filename:
Sampling Location: 28F-11
Date Received: NOV. 19, 2010 File Pathway: H:\JOBS\11JOBS\500JOBS\0\

Run Number	II-28F-11-M5.2-1	II-28F-11-M5.2-BL
Sample ID/Container #	F/ A975	F/ A974
init. / date / time		
CM / TC	11/23/10 15:33	11/24 0751
TC	11/23/10 08:33	11/23/10 15:34
TC	11/22/10 15:28	11/23/10 08:34
		11/22/10 15:30
Baggie Tare Wt., g.	4.2303	4.1285
Filter Tare Wt., g.	C956 0.3692	C959 0.3716
FILTER SAMPLE WT., g.		

Sample ID/Container #	R/ A976	R/ A980	R/
init. / date / time			
TL	11/23/10 08:35	11/22/10 08:36	
TC	11/22/10 15:31	11/22/10 15:32	
Tare Wt., g.	(125 ml) 4.3772	(100 ml) 4.2715	(ml)
RINSE SAMPLE WT., g.			

Filter Catch, mg.
Rinse Catch, mg.
Rinse Blank Residue, mg.
Net Rinse Catch, mg.

FILTERABLE PARTICULATE, mg.

Blank Beaker #	B /
Final wt., mg.	0.0000
Tare wt., mg.	0.0000
Residue, mg.	0
Volume, ml.	100
Density, mg/ml	1000.0
Conc., mg/mg	0.0E+00 <--
Upper Limit, mg/mg	1.0E-05

** *Adjusted Catch (Negative Results Set To Zero)*
Balance Spanned? NOV. 22, 2010
Specific Comments about Samples:

Visual Analysis of Filters:

Run Number:	Color:	Texture:	F.Matter:	R.Comparison:
II-28F-11-M5.2-1	Black	Powdery	None	NA
II-28F-11-M5.2-BL	White	None	None	NA

Visual Analysis of Rinses:

Run Number:	Color:	Texture:	F.Matter:	R.Comparison:
II-28F-11-M5.2-1	Gray	Powdery	None	NA
II-28F-11-M5.2-BL	Clear	None	None	NA

Printing Date: 12-Jan-04 Printing Time: 03:39 PM

SUMMARY OF IMPINGERS' WATER ANALYSIS (Version 11.16.99)

Plant Name: ExxonMobil - Torrance Refinery AKI Ref#: 13147

Run Number		II-28F-11-M5.2-1	II-28F-11-M5.2-BL	
Sample ID/Container #		1/ A977	1/ A981	1/
	init. / date / time		date / time	date / time
	TC 11/23/10 08:38	4.1976 ✓	11/23/10 08:39	4.3824 ✓
	TC 11/22/10 15:35	4.1979	11/22/10 15:36	4.3825
Tare Wt., g.	(125 ml)	4.1974	(125 ml) 4.3822	(125 ml)
SAMPLE WT., g.				

Sample ID/Container #		2/ A978	2/ A982	2/
	init. / date / time		date / time	date / time
	TC 11/23/10 15:35	4.2999 ✓	11/23/10 15:36	4.3747 ✓
	TC 11/23/10 08:39	4.2999 ✓	11/23/10 08:40	4.3749
Tare Wt., g.	(390 ml)	4.2948	(294 ml) 4.3733	(ml)
SAMPLE WT., g.				

1 Condensible Organic Catch, mg.
Solvent Blank Residue, mg.
ORGANIC CONDENSIBLES,mg

2 Inorganic Fraction Catch, mg.
Water Blank Residue, mg.
INORGANIC CONDENSIBLES, mg.

TOTAL CONDENSIBLES PARTICULATE, mg.	0.0	0.0	0.0
TOTAL FILTERABLE PARTICULATE, mg.	0.0	0.0	0.0
TOTAL PARTICULATE, mg.	0.0	0.0	0.0

* Adjusted Catch (Negative Results Reported as Zero)

Procedure Explanation

1 - Extractable with methylene chloride

2 - Water catch after extraction and heating to 210 F

Printing Date 01/12/04 Printing Time 03:39 PM

Filter Dimensions: 85 mm Filters Desiccated a Minimum of
Lot No.: T80988 24 Hours Prior To 1ST Weighing: Ye

	1ST Weighing	2ND Weighing
Lab. Temp.:	68°F	70°F
Bar. Press.:	30.02" Hg	30.02" Hg
Rel. Hum.:	26%	25%
Initials:	GM	GM
Time:	08:47	15:04
Date:	Dec. 23, 2009	Dec. 23, 2009

Filter #	1ST Weighing (g)		2ND Weighing (g)		Job #
C947	0.3726	✓	0.3726	✓	13115
C948	0.3725		0.3723	✓	13115
C949	0.3718	✓	0.3718	✓	
C950	0.3730	✓	0.3733	✓	
C951	0.3742		0.3739	✓	
C952	0.3712		0.3710	✓	
C953	0.3725		0.3724	✓	
C954	0.3748		0.3745	✓	13179
C955	0.3704	✓	0.3704	✓	13175
C956	0.3693		0.3692	✓	13147
C957	0.3706		0.3703	✓	
C958	0.3695		0.3693	✓	
C959	0.3716	✓	0.3719		13147
C960	0.3751		0.3749	✓	
C961	0.3781		0.3779	✓	
C962	0.3786		0.3782	✓	
C963	0.3758		0.3756	✓	
C964	0.3747		0.3746	✓	
C965	0.3737	✓	0.3737	✓	
C966	0.3756	✓	0.3757		
C967	0.3767		0.3765	✓	
C968	0.3749	✓	0.3749	✓	
C969	0.3749		0.3746	✓	

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Signed Date Signed Date

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	1ST WEIGHING	2ND WEIGHING	3RD WEIGHING	
DATE:	OCT. 27, 2010	OCT. 28, 2010	OCT. 28 2010	
LAB. TEMP:	73°F	74°F	75°F	
BAR. PRESS.:	30.00"Hg	30.05"Hg	30.00"Hg	
REL. HUM:	28%	24%	25%	
INITIALS:	GM	GM	GM	
TIME:	15:25	07:25	15:31	
BAGGIE #	1ST WEIGHING (g)	2ND WEIGHING (g)	3RD WEIGHING (g)	JOB #
A961	4.2622	4.2600 ✓	4.2600 ✓	
A962	4.1969	4.1962	4.1958 ✓	
A963	3.7227 ✓	3.7231		
A964	4.3969	4.3959	4.3954 ✓	
A965	4.1402	4.1387 ✓	4.1391	
A966	4.4108 ✓	4.4112		
A967	4.2427	4.2426 ✓		
A968	3.5742	3.5737 ✓		
A969	4.2185	4.2176	4.2175 ✓	
A970	4.8430	4.8412 ✓	4.8413	
A971	4.2096 ✓	4.2098		
A972	4.2816 ✓	4.2820		
A973	4.4040 ✓	4.4044		
A974	3.6144	3.6140 ✓		13220
A975	4.2303 ✓	4.2304		13220
A976	4.3790	4.3777	4.3772 ✓	13147
A977	4.1974 ✓	4.1975		13147
A978	4.2948 ✓	4.2948 ✓		13147
A979	4.1288	4.1285 ✓		13147
A980	4.2715 ✓	4.2717		13147
A981	4.3822 ✓	4.3824		13147
A982	4.3754	4.3738	4.3733 ✓	13147
A983	4.3815 ✓	4.3816		13147
A984	4.1838 ✓	4.1841		

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Certificate No.: 073054-610-020410

Mettler Toledo
Service Business Unit Laboratory
1900 Polaris Parkway
Columbus, OH 43240
1-800-METTLER

METTLER TOLEDO

ISO 9001 : 2000 Registered

Calibration Certificate

Customer

Company:	AirKinetics Inc		
Address:	1308 S Allec Street		
City:	Anaheim	*State/Province:*	CA
Zip/Postal:	92805		

Device

Manufacturer:	Mettler Toledo	*Asset No.:*	
Serial No.:	1129461937	*Dept./Room:*	
Max Capacity:	220 g	*Readability:*	0.0001 g
Model:	XP204		

Procedure Statement: The device referenced in this document has been metrologically tested in accordance with METTLER TOLEDO Work Instruction VW0152A. All translations into other languages are based on the referenced work instruction, which is in English.
This certificate refers to: As Found and As Left

Test Date:	4-Feb-2010	*Next Cal. Due Date:*	28-Feb-2011
Service Technician:	Calvin Macklin	*Signature:*	

Reference Weights

Traceability of Test Equipment: All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1

Weight Set No.:	354	*Date of Issue:*	10-Mar-2009
Calibration Due Date:	30-Mar-2010	*NIST Traceability No.*	MT5061/1788.01
Class:	E2		

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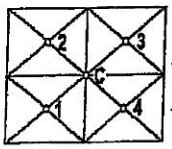
00159

Measuring Results

Eccentricity



Test Weight	Position	As Found		As Left	
		Displayed Value	Deviation	Displayed Value	Deviation
C: 100 g	Center	0.0000 g	N/A	0.0000 g	N/A
1: 100 g	Left Front	-0.0003 g	-0.0003 g	-0.0002 g	-0.0002 g
2: 100 g	Left Rear	-0.0002 g	-0.0002 g	-0.0002 g	-0.0002 g
3: 100 g	Right Rear	0.0002 g	0.0002 g	0.0003 g	0.0003 g
4: 100 g	Right Front	0.0001 g	0.0001 g	0.0002 g	0.0002 g
Eccentric Load Deviation:		0.0003 g		0.0003 g	
Manufacturer Specifications:		0.00025 g		0.00025 g	
Manufacturer Specifications Rounded to Resolution of Eccentric Load Deviation:		0.0003		0.0003	
Specifications Met:		YES		YES	

Sensitivity

Reference Weight	As Found			As Left		
	Displayed Value		Deviation	Displayed Value		Deviation
	Without Reference Weight	With Reference Weight		Without Reference Weight	With Reference Weight	
200.0001 g	0.0000 g	200.0001 g	0.0000 g	0.0000 g	200.0004 g	0.0003 g
Sensitivity Offset:			0.0000 g	Sensitivity Offset:		0.0003 g
Manufacturer Specifications:			N/A	Manufacturer Specifications:		0.0006 g
Manufacturer Specifications Rounded to Resolution of Sensitivity Offset:			N/A	Manufacturer Specifications Rounded to Resolution of Sensitivity Offset:		0.0006 g
Specifications Met:			N/A	Specifications Met:		YES

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Linearity - Differential Method

Test Weight 50.0000 g

		As Found			As Left		
		Displayed Value		Deviation *	Displayed Value		Deviation *
	Preload Weight	Preload	Test Weight		Preload	Test Weight	
1	0 g	0.0000 g	50.0002 g	0.00002 g	0.0000 g	50.0001 g	-0.00013 g
2	50 g	50.0002 g	100.0003 g	-0.00006 g	50.0000 g	100.0003 g	-0.00006 g
3	100 g	100.0001 g	150.0003 g	-0.00004 g	100.0001 g	150.0003 g	-0.00009 g
4	150 g	150.0000 g	200.0002 g	-0.00002 g	150.0001 g	200.0004 g	-0.00002 g
		Linearity Deviation:		0.00006 g	*Linearity Deviation:*		0.00013 g
		Manufacturer Specifications:		0.0002 g	*Manufacturer Specifications:*		0.0002 g
		Manufacturer Specifications Rounded to Resolution of Linearity Deviation:		0.00020 g	*Manufacturer Specifications Rounded to Resolution of Linearity Deviation:*		0.00020 g
		Specifications Met:		YES	*Specifications Met:*		YES

* This Linearity Deviation is zero point offset and sensitivity error compensated.

Remarks

BALANCE MEETS MANUFACTURE'S SPECIFICATIONS.

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00161

Project METTLER XP-204 (1129461937) Notebook No.

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DATE: Nov. 22, 2010
LAB. TEMP.: 69°F
BAR. PRESS: ~~30.02"Hg~~ 30.20"Hg
REL. HUM: 35%
INITIALS: GM
TIME: 08:32

ACTUAL	BALANCE (g)	%. DEV.
2 mg	0.0020	—
10 mg	0.0100	—
50 mg	0.0500	—
100 mg	0.1000	—
500 mg	0.5000	—
1 g	1.0000	—
5 g	5.0000	—
10 g	10.0000	—
50 g	50.0001	0.0002
100 g	100.0002	0.0002

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Read and Understood By

Signed Date Signed Date

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APPENDIX A

PARTICULATE MATTER

4.0 EQUIPMENT CALIBRATIONS

Isokinetic Meterbox Calibration
FULL TEST

Meterbox ID: MB 08
Calibrated by: AS
Date: 10/01/10

AIRKINETICS, Inc.

Range	Low			Low Medium			Medium			High		
Run No.	1A	1B	1C	2A	2B	2C	3A	3B	3C	4A	4B	4C
Stand. Crit. Orifice (SCRIT)												
SCRIT ID#	33	33	33	48	48	48	63	63	63	73	73	73
SCRIT K' Factor												
Min. SCRIT Vac., Vcr in. Hg	17	17	17	16	16	16	16	16	16	14	14	14
Amb Temp, tamb °F	75	75	75	75	75	75	75	75	75	75	75	75
Bar. Pressure, Pb in. Hg	29.85	29.85	29.85	29.85	29.85	29.85	29.85	29.85	29.85	29.85	29.85	29.85
Meterbox (MB)												
Leak-check OK? *(Y or N)*	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
MB Orifice Delta H in. H2O	0.13	0.13	0.13	0.65	0.65	0.65	1.90	1.90	1.90	3.65	3.65	3.65
Initial MB Vol. Reading, Vdi acf	4.31	9.34	14.40	19.54	24.58	29.61	34.80	40.20	45.62	51.21	56.54	61.88
Final MB Vol. Reading, Vdf acf	9.34	14.40	19.45	24.58	29.61	34.67	40.20	45.62	51.04	56.54	61.88	67.21
Difference > *5.0 cf?*												
Initial MB Temp, tdi oF	83	84	86	87	88	89	89	90	92	92	93	94
Final MB Temp, tdf oF	84	86	87	88	89	89	90	92	92	93	94	94
Pump Vac *(> Vcr in. HG?)*	19	19	19	18	18	18	18	18	18	16	16	16
Time, Minutes (M)	26	26	26	11	11	11	7	7	7	5	5	5
Time, Seconds (S)	0	0	0	0	0	0	0	0	0	0	0	0
Calculations												
M5 DGM Factor, Y_i,												
Yi: **0.95 < Yi < 1.05?**												
Diff = $Y_{i(max)} - Y_{i(min)}$; **Diff≤±0.010?**												
Average, $Y_{ac(avg)}$												
Diff=$Y_{i(avg)}$-$Y_{ac(avg)}$; **Diff ≤±0.02?**												
ΔH@I												
Average, $\Delta H_{@ac(avg)}$												
Diff=$\Delta H_{@i(avg)}$- $\Delta H_{@ac(avg)}$; **Diff<+0.20?**												
Flow Rate$_i$, scfm*												
Average Flow Rate, scfm*												
Requirements --- OK?												

*Gamma Corrected at Standard Conditions. Standard Temp = 68°F, Standard Pressure = 29.92 in Hg.

$$Y_i = \frac{K' P_b \left(\frac{t_{di} + t_{df}}{2} + 460\right)\left(M + \frac{S}{60}\right)}{17.65\left(V_{df} - V_{di}\right)\left(P_b + \frac{\Delta H}{13.6}\right)\sqrt{t_{amb} + 460}}$$

$$\Delta H_{@i} = \frac{9.926\,\Delta H\left(P_b + \frac{\Delta H}{13.6}\right)}{(K' P_b)^2} \frac{(t_{amb} + 460)}{\left(\frac{t_{di} + t_{df}}{2} + 460\right)}$$

$Y_{i(avg)}$	1.01
SCAQMD $\Delta H_{@i(avg)}$	1.88
EPA $\Delta H_{@i(avg)}$	1.84
In Range	

Notes:

Checked By: GM 10/01/10
QA Administrator (Signature/Date)

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Stainless Steel Nozzle Calibrations

NOZZLE ID	DATE	CALIB. BY	DIA. 1	DIA. 2	DIA. 3	DIA. 4	DIA. 5
500	1/20/10	AS	0.500	0.503	0.503	0.501	0.501
501	1/20/10	AS	0.505	0.501	0.503	0.502	0.505
502	1/20/10	AS	0.500	0.503	0.505	0.503	0.500
503	1/20/10	AS	0.509	0.504	0.511	0.510	0.509

THERMOCOUPLE CALIBRATION REPORT

FULL CALIBRATION
per AQMD Chapter III Calibrations, par. 5

AirKinetics, Inc.

Description: TC for SP 36-1
Thermocouple No: TC 11-1

Date: 8/20/2010
Barometric Pressure, in. Hg: 30.08

Calibrated By: JG
Ambient Temperature, °F: 68

Calibration System Used	Reference Thermometer	Reference Thermometer Temperature (T_r, °F)	Test Digital Thermometer I.D. No.	Test Thermocouple Temperature (T_t, °F)	Temperature Difference, % (Allowable ≤ 1.5%)
32 F	1011	32.5	402123	33.0	-0.10
32 F	1011	32.5	402123	33.0	-0.10
32 F	1011	32.5	402123	33.0	-0.10
212 F	CL-351A	212.1	402123	215.0	-0.43
212 F	CL-351A	212.1	402123	215.0	-0.43
212 F	CL-351A	212.0	402123	215.0	-0.45
650 F	CL-351A	650.2	402123	654.0	-0.34
650 F	CL-351A	650.2	402123	654.0	-0.34
650 F	CL-351A	650.2	402123	654.0	-0.34

$$\% \text{ Temperature Difference} = \frac{T_r - T_t}{T_r + 460} * 100$$

Notes: _____

Checked By: GM
QC Administrator

Date: 8/20/2010

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THERMOCOUPLE CALIBRATION REPORT

FULL CALIBRATION - Impinger Exit
per AQMD Chapter III Calibrations, par. 5

AirKinetics, Inc.

Description: IMPINGER EXIT TC
Thermocouple No: IE-30

Date: 9/15/2010 Calibrated By: JG
Barometric Pressure, in. Hg: 30.02 Ambient Temperature, °F: 64

Calibration System Used	Reference Thermometer	Reference Thermometer Temperature (T_r, °F)	Test Digital Thermometer I.D. No.	Test Thermocouple Temperature (T_t, °F)	Temperature Difference, % (Allowable ≤ 1.5%)
32 F	#1011	33.5	702299	33.5	0.00
32 F	#1011	33.5	702299	34.0	-0.10
32 F	#1011	33.0	702299	34.0	-0.20
Ambient	#1011	65.0	702299	64.5	0.10
Ambient	#1011	65.0	702299	64.5	0.10
Ambient	#1011	65.0	702299	65.0	0.00

$$\% \text{ Temperature Difference} = \frac{T_r - T_t}{T_r + 460} * 100$$

Notes:

Checked By: GM **Date:** 9/15/2010
QC Administrator

Barometer No. LB 1 GARY LAB

Date	Calibrated By	Weather Station Reading (in. Hg)	Barometer Reading (in. Hg)	Adjustment Factor (in. Hg)
2/15/2007	JG	30.36	30.12	0.24
9/25/2007	TSM	30.1	29.85	0.25
7/28/2008	AS	29.88	29.71	0.17
7/7/2009	JG	29.74	29.91	-0.17
1/25/2010	JG	30.08	29.91	0.17

Call Long Beach Airport@
(562) 595-8564
for Altimeter reading

Note: No correction for elevation is needed. The Weather Station Reading is corrected to sea level and AirKinetics' office location is in Anaheim, CA also at sea level.

DIGITAL TOPLOADER CALIBRATION

ACCULAB Digital Toploader

Balance No.: VI-1200 (DT #2)

Date: September 24, 2010

Laboratory Temperature: 75° F

Barometric Pressure: 29.85" Hg

Relative Humidity: 35%

Initials: TC

Time: 15:39

NIST Traceable Weights (g)	Balance Reading (g)	% Deviation
0.5	0.5	0.0000%
2	2.0	0.0000%
10	10.0	0.0000%
50	50.0	0.0000%
100	100.0	0.0000%
300	300.0	0.0000%
500	500.0	0.0000%
1000	1000.1	0.0100%
1100	1100.1	0.0091%

$$\% \text{ Deviation} = \left| \frac{\text{NIST Traceable Weights - Balance Reading}}{\text{NIST Traceable Weights}} \right| \times 100$$

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APPENDIX B

CO, O_2, AND CO_2

1.0 RESULTS

REFERENCE METHOD DATA SUMMARY

Client Name: ExxonMobil
Plant Name: ExxonMobil Torrance Refinery
City, State: Torrance,CA
Test Location: 28F-11
Job Number: 13147

Run Information			Flue Gas Composition		Pollutant 3: CO (MW: 28 lb/lb-mole)	
			O2	CO2	dry	dry ppm
No.	Date	Time	dry %	dry %	ppm	@3%O2
5	09/14/10	1510-1539	15.84	2.84	6.75	23.9
6	09/14/10	1540-1609	15.85	2.83	6.96	24.7
7	09/14/10	1610-1639	15.84	2.84	6.71	23.7
Average:			15.85	2.84	6.81	24.1

* Based on Standard
Conditions of:
60 deg. F and
29.92 in. Hg

CLIENT NAME:	**ExxonMobil**	JOB NUMBER:	**13147**
PLANT NAME:	**ExxonMobil Torrance Refinery**	RUN NO.:	**5**
TEST LOCATION:	**28F-11**	TEST DATE:	**09/14/10**
CITY/STATE:	**Torrance,CA**	RUN TIME:	**1510-1539**

TEST DATA

VARIABLE	DESCRIPTION	Pollutant 3 CO	Diluent 1 O2	Diluent 2 CO2	
A	ANALYTICAL RANGE	100	25	10	
	Unit of Measurement	ppmd	% dry	% dry	
	CALIBRATION GAS INFORMATION				
B	Zero Gas	0.0	0.00	0.00	
C	Mid Gas Concentration	45.9	12.04	5.05	
	Mid Gas Cylinder S/N:	CC301113	CC245987	CC257914	
D	High Gas Concentration	90.8	22.01	9.13	
	High Gas Cylinder S/N:	CC149350	CC272672	SA5210	
E	UPSCALE CALIBRATION GAS USED	45.90	12.04	5.05	
	L=Low, M=Mid, H=High	M	M	M	
	INITIAL CALIBRATION ERROR TEST				
F	Zero Gas Response	0.20	0.02	0.04	
G	Mid Gas Response	45.39	12.07	5.09	
H	High Gas Reponse	90.65	22.08	9.03	
	INITIAL SYSTEM CALIBRATION CHECK				
I	Zero Gas Response	0.28	0.04	0.04	
J	Upscale Gas Response	44.84	12.02	5.35	
	FINAL SYSTEM CALIBRATION CHECK				
K	Zero Gas Response	0.19	0.06	0.05	
L	Upscale Gas Response	44.76	12.00	5.06	
	FINAL CALIBRATION ERROR CHECK				
M	Zero Gas Response	0.15	0.00	0.04	
N	Mid Gas Response	45.41	12.03	5.12	
O	High Gas Reponse	90.67	22.05	9.06	
		x			*<-- Out of Range! Additional Cal. Gas Required at x*
P	AS MEASURED FLUE GAS CONCENTRATION	6.79	15.79	2.95	

CALCULATIONS

					FORMULA
	AVERAGE SYSTEM CALIBRATION				
Q	Zero Response	0.24	0.05	0.05	(I+K)/2
R	Upscale Response	44.80	12.01	5.21	(J+L)/2
		x			*<-- Out of Range! Additional Cal. Gas Required at x*
S	CORRECTED CONC.	6.75	15.84	2.84	E*(P-Q)/(R-Q)

QA/QC CALCULATIONS

CALIBRATION GAS SELECTION, % of Range				
Mid Gas	45.9	48.2	50.5	C*100/A
High Gas	90.8	88.0	91.3	D*100/A
CALIBRATION ERROR, % of Range				
Initial Zero Gas Error	0.20	0.08	0.40	(F-B)*100/A
Initial Mid Gas Error	-0.51	0.12	0.40	(G-C)*100/A
Initial High Gas Error	-0.15	0.28	-1.00	(H-D)*100/A
Final Zero Gas Error	0.15	0.00	0.40	(M-B)*100/A
Final Mid Gas Error	-0.49	-0.04	0.70	(N-C)*100/A
Final High Gas Error	-0.13	0.16	-0.70	(O-D)*100/A
LINEARITY, % of Range				
Initial	-0.53	-0.07	0.77	{(G-F)-[(H-F)*C]/D}*100/A
Final	-0.50	-0.13	0.91	{(N-M)-[(O-M)*C]/D}*100/A
SAMPLING SYSTEM BIAS, % of Range				
Initial Zero Gas Bias	0.08	0.08	0.00	(I-F)*100/A
Initial Upscale Gas Bias	-0.55	-0.20	2.60	(J-G[or G', or H]*100/A
Final Zero Gas Bias	0.04	0.24	0.10	(K-M)*100/A
Final Upscale Gas Bias	-0.65	-0.12	-0.60	(L-N[or N', or O]*100/A
CALIBRATION DRIFT, % of Range				
Zero	-0.09	0.08	0.10	(K-I)*100/A
Upscale	-0.08	-0.08	-2.90	(L-J)*100/A

CLIENT NAME:	**ExxonMobil**	JOB NUMBER:	**13147**
PLANT NAME:	**ExxonMobil Torrance Refinery**	RUN NO.:	**6**
TEST LOCATION:	**28F-11**	TEST DATE:	**09/14/10**
CITY/STATE:	**Torrance,CA**	RUN TIME:	**1540-1609**

TEST DATA

VARIABLE	DESCRIPTION	Pollutant 3 CO	Diluent 1 O2	Diluent 2 CO2	
A	ANALYTICAL RANGE	100	25	10	
	Unit of Measurement	ppmd	% dry	% dry	
	CALIBRATION GAS INFORMATION				
B	Zero Gas	0.0	0.00	0.00	
C	Mid Gas Concentration	45.9	12.04	5.05	
	Mid Gas Cylinder S/N:	CC301113	CC245987	CC257914	
D	High Gas Concentration	90.8	22.01	9.13	
	High Gas Cylinder S/N:	CC149350	CC272672	SA5210	
E	UPSCALE CALIBRATION GAS USED	45.90	12.04	5.05	
	L=Low, M=Mid, H=High	M	M	M	
	INITIAL CALIBRATION ERROR TEST				
F	Zero Gas Response	0.20	0.02	0.04	
G	Mid Gas Response	45.39	12.07	5.09	
H	High Gas Reponse	90.65	22.08	9.03	
	INITIAL SYSTEM CALIBRATION CHECK				
I	Zero Gas Response	0.28	0.04	0.04	
J	Upscale Gas Response	44.84	12.02	5.35	
	FINAL SYSTEM CALIBRATION CHECK				
K	Zero Gas Response	0.19	0.06	0.05	
L	Upscale Gas Response	44.76	12.00	5.06	
	FINAL CALIBRATION ERROR CHECK				
M	Zero Gas Response	0.15	0.00	0.04	
N	Mid Gas Response	45.41	12.03	5.12	
O	High Gas Reponse	90.67	22.05	9.06	
		x			*<-- Out of Range! Additional Cal. Gas Required at x*
P	AS MEASURED FLUE GAS CONCENTRATION	6.99	15.80	2.94	

CALCULATIONS

					FORMULA
	AVERAGE SYSTEM CALIBRATION				
Q	Zero Response	0.24	0.05	0.05	(I+K)/2
R	Upscale Response	44.80	12.01	5.21	(J+L)/2
		x			*<-- Out of Range! Additional Cal. Gas Required at x*
S	CORRECTED CONC.	6.96	15.85	2.83	E*(P-Q)/(R-Q)

QA/QC CALCULATIONS

CALIBRATION GAS SELECTION, % of Range				
Mid Gas	45.9	48.2	50.5	C*100/A
High Gas	90.8	88.0	91.3	D*100/A
CALIBRATION ERROR, % of Range				
Initial Zero Gas Error	0.20	0.08	0.40	(F-B)*100/A
Initial Mid Gas Error	-0.51	0.12	0.40	(G-C)*100/A
Initial High Gas Error	-0.15	0.28	-1.00	(H-D)*100/A
Final Zero Gas Error	0.15	0.00	0.40	(M-B)*100/A
Final Mid Gas Error	-0.49	-0.04	0.70	(N-C)*100/A
Final High Gas Error	-0.13	0.16	-0.70	(O-D)*100/A
LINEARITY, % of Range				
Initial	-0.53	-0.07	0.77	{(G-F)-[(H-F)*C]/D}*100/A
Final	-0.50	-0.13	0.91	{(N-M)-[(O-M)*C]/D}*100/A
SAMPLING SYSTEM BIAS, % of Range				
Initial Zero Gas Bias	0.08	0.08	0.00	(I-F)*100/A
Initial Upscale Gas Bias	-0.55	-0.20	2.60	(J-G[or G', or H]*100/A
Final Zero Gas Bias	0.04	0.24	0.10	(K-M)*100/A
Final Upscale Gas Bias	-0.65	-0.12	-0.60	(L-N[or N', or O]*100/A
CALIBRATION DRIFT, % of Range				
Zero	-0.09	0.08	0.10	(K-I)*100/A
Upscale	-0.08	-0.08	-2.90	(L-J)*100/A

CLIENT NAME:	**ExxonMobil**	JOB NUMBER:	**13147**
PLANT NAME:	**ExxonMobil Torrance Refinery**	RUN NO.:	**7**
TEST LOCATION:	**28F-11**	TEST DATE:	**09/14/10**
CITY/STATE:	**Torrance,CA**	RUN TIME:	**1610-1639**

TEST DATA

VARIABLE	DESCRIPTION	Pollutant 3 CO	Diluent 1 O2	Diluent 2 CO2	
A	ANALYTICAL RANGE	100	25	10	
	Unit of Measurement	ppmd	% dry	% dry	
	CALIBRATION GAS INFORMATION				
B	Zero Gas	0.0	0.00	0.00	
C	Mid Gas Concentration	45.9	12.04	5.05	
	Mid Gas Cylinder S/N:	CC301113	CC245987	CC257914	
D	High Gas Concentration	90.8	22.01	9.13	
	High Gas Cylinder S/N:	CC149350	CC272672	SA5210	
E	UPSCALE CALIBRATION GAS USED	45.90	12.04	5.05	
	L=Low, M=Mid, H=High	M	M	M	
	INITIAL CALIBRATION ERROR TEST				
F	Zero Gas Response	0.20	0.02	0.04	
G	Mid Gas Response	45.39	12.07	5.09	
H	High Gas Reponse	90.65	22.08	9.03	
	INITIAL SYSTEM CALIBRATION CHECK				
I	Zero Gas Response	0.28	0.04	0.04	
J	Upscale Gas Response	44.84	12.02	5.35	
	FINAL SYSTEM CALIBRATION CHECK				
K	Zero Gas Response	0.19	0.06	0.05	
L	Upscale Gas Response	44.76	12.00	5.06	
	FINAL CALIBRATION ERROR CHECK				
M	Zero Gas Response	0.15	0.00	0.04	
N	Mid Gas Response	45.41	12.03	5.12	
O	High Gas Reponse	90.67	22.05	9.06	
		x			*<-- Out of Range! Additional Cal. Gas Required at x*
P	AS MEASURED FLUE GAS CONCENTRATION	6.75	15.79	2.94	

CALCULATIONS

					FORMULA
	AVERAGE SYSTEM CALIBRATION				
Q	Zero Response	0.24	0.05	0.05	(I+K)/2
R	Upscale Response	44.80	12.01	5.21	(J+L)/2
		x			*<-- Out of Range! Additional Cal. Gas Required at x*
S	CORRECTED CONC.	6.71	15.84	2.84	E*(P-Q)/(R-Q)

QA/QC CALCULATIONS

CALIBRATION GAS SELECTION, % of Range				
Mid Gas	45.9	48.2	50.5	C*100/A
High Gas	90.8	88.0	91.3	D*100/A
CALIBRATION ERROR, % of Range				
Initial Zero Gas Error	0.20	0.08	0.40	(F-B)*100/A
Initial Mid Gas Error	-0.51	0.12	0.40	(G-C)*100/A
Initial High Gas Error	-0.15	0.28	-1.00	(H-D)*100/A
Final Zero Gas Error	0.15	0.00	0.40	(M-B)*100/A
Final Mid Gas Error	-0.49	-0.04	0.70	(N-C)*100/A
Final High Gas Error	-0.13	0.16	-0.70	(O-D)*100/A
LINEARITY, % of Range				
Initial	-0.53	-0.07	0.77	{(G-F)-[(H-F)*C]/D}*100/A
Final	-0.50	-0.13	0.91	{(N-M)-[(O-M)*C]/D}*100/A
SAMPLING SYSTEM BIAS, % of Range				
Initial Zero Gas Bias	0.08	0.08	0.00	(I-F)*100/A
Initial Upscale Gas Bias	-0.55	-0.20	2.60	(J-G[or G', or H]*100/A
Final Zero Gas Bias	0.04	0.24	0.10	(K-M)*100/A
Final Upscale Gas Bias	-0.65	-0.12	-0.60	(L-N[or N', or O]*100/A
CALIBRATION DRIFT, % of Range				
Zero	-0.09	0.08	0.10	(K-I)*100/A
Upscale	-0.08	-0.08	-2.90	(L-J)*100/A

REFERENCE METHOD DATA SUMMARY

Client Name: ExxonMobil
Plant Name: ExxonMobil Torrance Refinery
City, State: Torrance,CA
Test Location: 28F-11
Job Number: 13147

Run Information			Flue Gas Composition	
			O2	CO2
No.	Date	Time	dry %	dry %
1	11/17/10	1300-1359	16.04	3.16

* Based on Standard
Conditions of:
60 deg. F and
29.92 in. Hg

CLIENT NAME:	ExxonMobil	JOB NUMBER:	13147
PLANT NAME:	ExxonMobil Torrance Refinery	RUN NO.:	1
TEST LOCATION:	28F-11	TEST DATE:	11/17/10
CITY/STATE:	Torrance,CA	RUN TIME:	1300-1359

TEST DATA

VARIABLE	DESCRIPTION	Diluent 1 O2	Diluent 2 CO2
A	ANALYTICAL RANGE	25	10
	Unit of Measurement	% dry	% dry
	CALIBRATION GAS INFORMATION		
B	Zero Gas	0.00	0.00
C	Mid Gas Concentration	11.98	4.56
	Mid Gas Cylinder S/N:	CC221701	Diluted
D	High Gas Concentration	21.89	9.11
	High Gas Cylinder S/N:	CC112155	CC107583
E	UPSCALE CALIBRATION GAS USED	11.98	4.56
	L=Low, M=Mid, H=High	M	M
	INITIAL CALIBRATION ERROR TEST		
F	Zero Gas Response	0.05	0.04
G	Mid Gas Response	11.97	4.48
H	High Gas Reponse	21.84	9.11
	INITIAL SYSTEM CALIBRATION CHECK		
I	Zero Gas Response	0.09	0.10
J	Upscale Gas Response	11.84	4.49
	FINAL SYSTEM CALIBRATION CHECK		
K	Zero Gas Response	0.11	0.16
L	Upscale Gas Response	11.83	4.43
	FINAL CALIBRATION ERROR CHECK		
M	Zero Gas Response	0.02	0.09
N	Mid Gas Response	11.94	4.49
O	High Gas Reponse	21.80	9.05
P	AS MEASURED FLUE GAS CONCENTRATION	15.81	3.14

CALCULATIONS

				FORMULA
	AVERAGE SYSTEM CALIBRATION			
Q	Zero Response	0.10	0.13	(I+K)/2
R	Upscale Response	11.84	4.46	(J+L)/2
S	CORRECTED CONC.	16.04	3.16	E*(P-Q)/(R-Q)

QA/QC CALCULATIONS

CALIBRATION GAS SELECTION, % of Range			
Mid Gas	47.9	45.6	C*100/A
High Gas	87.6	91.1	D*100/A
CALIBRATION ERROR, % of Range			
Initial Zero Gas Error	0.20	0.40	(F-B)*100/A
Initial Mid Gas Error	-0.04	-0.75	(G-C)*100/A
Initial High Gas Error	-0.20	0.00	(H-D)*100/A
Final Zero Gas Error	0.08	0.90	(M-B)*100/A
Final Mid Gas Error	-0.16	-0.65	(N-C)*100/A
Final High Gas Error	-0.36	-0.60	(O-D)*100/A
LINEARITY, % of Range			
Initial	-0.02	-0.95	{(G-F)-[(H-F)*C]/D}*100/A
Final	0.00	-0.80	{(N-M)-[(O-M)*C]/D}*100/A
SAMPLING SYSTEM BIAS, % of Range			
Initial Zero Gas Bias	0.16	0.60	(I-F)*100/A
Initial Upscale Gas Bias	-0.52	0.10	(J-G[or G', or H]*100/A
Final Zero Gas Bias	0.36	0.70	(K-M)*100/A
Final Upscale Gas Bias	-0.44	-0.60	(L-N[or N', or O]*100/A
CALIBRATION DRIFT, % of Range			
Zero	0.08	0.60	(K-I)*100/A
Upscale	-0.04	-0.60	(L-J)*100/A

APPENDIX B

CO, O_2, AND CO_2

2.0 FIELD DATA

a. DAS

Calibration Summary

Client:	**Exxon Mobil Refinery**
Job Number:	**13147-2**
Plant:	**ExxonMobil Torrance Refinery**
Unit:	**28F-11**
System ID:	**DAQ-SYS-T1**
Operator:	**Jose Vital**
SW Version:	**1.19**
Start Time:	**9/14/2010 14:20**
End Time:	**9/14/2010 14:27**
Comment:	**System Cal Error Check**

A/D Chan	Description	Gas Value	Monitor Value	Units
4	600030	0	0.01	ppmNOx
4	600030	45.7	45.33	ppmNOx
1	SER769	0	0.04	% O2
1	SER769	12.04	12.02	% O2
2	PIR012	0	0.04	% CO2
2	PIR012	5.05	5.35	% CO2

B 9

00178

Calibration Summary

Client:	**Exxon Mobil Refinery**
Job Number:	**13147-2**
Plant:	**ExxonMobil Torrance Refinery**
Unit:	**28F-11**
System ID:	**DAQ-SYS-T1**
Operator:	**Jose Vital**
SW Version:	**1.19**
Start Time:	**9/14/2010 14:30**
End Time:	**9/14/2010 14:56**
Comment:	**Direct Cal Error Check**

A/D Chan	Description	Gas Value	Monitor Value	Units
4	600030	0	0.01	ppmNOx
4	600030	45.7	45.96	ppmNOx
4	600030	91.7	92.6	ppmNOx
3	48-241	0	0.2	ppmCO
3	48-241	45.9	45.39	ppmCO
3	48-241	90.8	90.65	ppmCO
1	SER769	0	0.02	% O2
1	SER769	12.04	12.07	% O2
1	SER769	22.01	22.08	% O2
2	PIR012	0	0.04	% CO2
2	PIR012	5.05	5.09	% CO2
2	PIR012	9.13	9.03	% CO2

B 10

00179

Calibration Summary

Client:	Exxon Mobil Refinery
Job Number:	13147-2
Plant:	ExxonMobil Torrance Refinery
Unit:	28F-11
System ID:	DAQ-SYS-T1
Operator:	Jose Vital
SW Version:	1.19
Start Time:	9/14/2010 14:59
End Time:	9/14/2010 15:05
Comment:	System Cal Error Check

A/D Chan	Description	Gas Value	Monitor Value	Units
3	48-241	0	0.28	ppmCO
3	48-241	45.9	44.84	ppmCO

B 11

00180

Continuous Emissions Monitoring Summary

Client:	Exxon Mobil Refinery
Job Number:	13147-2
Run Number:	1
Plant:	ExxonMobil Torrance Refinery
Unit:	28F-11
System ID:	DAQ-SYS-T1
Operator:	Jose Vital
Software Version:	1.19
Date:	9/14/2010
Time:	4:37 PM
Raw Data File:	SYS-DAQ-SYS-T1_JN-13147-2_RN-001_Raw_Data_2010_09_14_10_50_00.csv
Comment:	Unit 28F-11 RATA Run 5

	CHAN 4	CHAN 3	CHAN 1	CHAN 2	
	600030	48-241	SER769	PIR012	
Time	**ppmNOx**	**ppmCO**	**% O2**	**% CO2**	**Comments**
9/14/2010 15:10	37.39	7.79	15.77	2.95	
9/14/2010 15:11	37.24	5.35	15.78	2.95	
9/14/2010 15:12	37.19	6.51	15.81	2.93	
9/14/2010 15:13	37.31	5.11	15.75	2.96	
9/14/2010 15:14	37.34	7.07	15.8	2.95	
9/14/2010 15:15	37.33	6.16	15.77	2.96	
14/2010 15:16	36.8	7.46	15.83	2.94	
4/2010 15:17	37.26	6.76	15.82	2.94	
9/14/2010 15:18	37.99	8.12	15.78	2.96	
9/14/2010 15:19	37.65	5.2	15.76	2.96	
9/14/2010 15:20	36.73	5.03	15.83	2.92	
9/14/2010 15:21	37.05	5.71	15.8	2.94	
9/14/2010 15:22	37.38	5.98	15.79	2.96	
9/14/2010 15:23	37.45	6.32	15.8	2.96	
9/14/2010 15:24	37.2	6.95	15.82	2.93	
9/14/2010 15:25	37.11	8.79	15.89	2.9	
9/14/2010 15:26	37.3	8.36	15.8	2.94	
9/14/2010 15:27	37.82	6.47	15.76	2.98	
9/14/2010 15:28	37.71	4.65	15.69	3.01	
9/14/2010 15:29	36.88	5.36	15.75	2.97	
9/14/2010 15:30	37.02	6.01	15.76	2.97	
9/14/2010 15:31	36.59	7.51	15.72	2.99	
9/14/2010 15:32	36.76	8.22	15.78	2.95	
9/14/2010 15:33	36.55	8.35	15.78	2.95	
9/14/2010 15:34	36.94	7.01	15.84	2.92	
9/14/2010 15:35	36.83	7.95	15.79	2.95	
9/14/2010 15:36	36.76	5.92	15.78	2.94	
9/14/2010 15:37	37.28	8.04	15.79	2.94	
9/14/2010 15:38	37.48	7.34	15.79	2.95	
9/14/2010 15:39	36.71	8.28	15.79	2.94	
nin Avg	37.168	6.793	15.787	2.95	

8 12

08100

00181

Continuous Emissions Monitoring Summary

Client:	Exxon Mobil Refinery
Job Number:	13147-2
Run Number:	1
Plant:	ExxonMobil Torrance Refinery
Unit:	28F-11
System ID:	DAQ-SYS-T1
Operator:	Jose Vital
Software Version:	1.19
Date:	9/14/2010
Time:	4:37 PM
Raw Data File:	SYS-DAQ-SYS-T1_JN-13147-2_RN-001_Raw_Data_2010_09_14_10_50_00.csv
Comment:	Unit 28F-11 RATA Run 6

	CHAN 4 600030	CHAN 3 48-241	CHAN 1 SER769	CHAN 2 PIR012	
Time	**ppmNOx**	**ppmCO**	**% O2**	**% CO2**	**Comments**
9/14/2010 15:40	36.69	9.19	15.8	2.94	
9/14/2010 15:41	36.94	6.89	15.85	2.92	
9/14/2010 15:42	36.48	6.08	15.85	2.91	
9/14/2010 15:43	36.41	7.95	15.81	2.93	
9/14/2010 15:44	36.86	7.29	15.81	2.93	
9/14/2010 15:45	36.83	8.15	15.83	2.93	
14/2010 15:46	37.12	5.07	15.79	2.95	
4/2010 15:47	37.56	4.71	15.74	2.98	
9/14/2010 15:48	36.97	5.47	15.74	2.97	
9/14/2010 15:49	37.19	5.75	15.76	2.96	
9/14/2010 15:50	36.92	6.29	15.78	2.93	
9/14/2010 15:51	37.25	6.29	15.8	2.94	
9/14/2010 15:52	36.75	6.57	15.76	2.97	
9/14/2010 15:53	37.22	4.85	15.76	2.95	
9/14/2010 15:54	36.65	7.28	15.88	2.88	
9/14/2010 15:55	36.71	8.89	15.83	2.92	
9/14/2010 15:56	36.51	7.11	15.8	2.93	
9/14/2010 15:57	37.17	7.48	15.76	2.96	
9/14/2010 15:58	36.07	7.43	15.83	2.92	
9/14/2010 15:59	36.42	7.84	15.81	2.93	
9/14/2010 16:00	35.95	8.44	15.84	2.9	
9/14/2010 16:01	36.68	10.36	15.83	2.92	
9/14/2010 16:02	36.53	6.82	15.86	2.91	
9/14/2010 16:03	36.97	6.06	15.8	2.93	
9/14/2010 16:04	36.99	5.78	15.77	2.95	
9/14/2010 16:05	36.76	7.11	15.75	2.95	
9/14/2010 16:06	36.35	6.8	15.75	2.96	
9/14/2010 16:07	36.88	6.32	15.79	2.93	
9/14/2010 16:08	36.39	6.78	15.79	2.94	
9/14/2010 16:09	36.91	8.77	15.8	2.93	
nin Avg	36.771	6.994	15.799	2.936	

8-13

00182

Continuous Emissions Monitoring Summary

Client:	Exxon Mobil Refinery
Job Number:	13147-2
Run Number:	1
Plant:	ExxonMobil Torrance Refinery
Unit:	28F-11
System ID:	DAQ-SYS-T1
Operator:	Jose Vital
Software Version:	1.19
Date:	9/14/2010
Time:	4:41 PM
Raw Data File:	SYS-DAQ-SYS-T1_JN-13147-2_RN-001_Raw_Data_2010_09_14_10_50_00.csv
Comment:	Unit 28F-11 RATA Run 7

	CHAN 4	CHAN 3	CHAN 1	CHAN 2	
	600030	48-241	SER769	PIR012	
Time	**ppmNOx**	**ppmCO**	**% O2**	**% CO2**	**Comments**
9/14/2010 16:10	37.16	7.56	15.76	2.96	
9/14/2010 16:11	37.1	6.09	15.72	2.98	
9/14/2010 16:12	36.76	7.43	15.75	2.97	
9/14/2010 16:13	36.84	7.26	15.8	2.94	
9/14/2010 16:14	36.75	5.61	15.76	2.95	
9/14/2010 16:15	36.54	5.9	15.85	2.91	
14/2010 16:16	37.51	5.22	15.74	2.98	
14/2010 16:17	37.26	7.46	15.78	2.96	
9/14/2010 16:18	36.72	4.19	15.77	2.94	
9/14/2010 16:19	36.39	5.27	15.89	2.89	
9/14/2010 16:20	37.19	7.41	15.82	2.92	
9/14/2010 16:21	37.48	5.85	15.77	2.94	
9/14/2010 16:22	37.45	6.15	15.77	2.95	
9/14/2010 16:23	36.53	5.38	15.81	2.92	
9/14/2010 16:24	36.92	6.12	15.86	2.91	
9/14/2010 16:25	36.46	5.93	15.84	2.91	
9/14/2010 16:26	37.68	7.38	15.78	2.94	
9/14/2010 16:27	37.3	7.15	15.75	2.96	
9/14/2010 16:28	36.5	8.53	15.81	2.93	
9/14/2010 16:29	36.86	9.16	15.74	2.97	
9/14/2010 16:30	36.89	5.82	15.74	2.96	
9/14/2010 16:31	37.39	7.35	15.75	2.96	
9/14/2010 16:32	37.4	9.32	15.74	2.96	
9/14/2010 16:33	36.71	6.48	15.81	2.93	
9/14/2010 16:34	37.08	7.19	15.75	2.96	
9/14/2010 16:35	37.04	5.85	15.8	2.93	
9/14/2010 16:36	36.95	6.9	15.84	2.91	
9/14/2010 16:37	37.04	6.68	15.78	2.94	
9/14/2010 16:38	36.66	7.77	15.83	2.92	
9/14/2010 16:39	37.37	8.02	15.77	2.97	
min Avg	36.998	6.748	15.786	2.942	

B 14

00183

Calibration Summary

Client:	**Exxon Mobil Refinery**
Job Number:	**13147-2**
Plant:	**ExxonMobil Torrance Refinery**
Unit:	**28F-11**
System ID:	**DAQ-SYS-T1**
Operator:	**Jose Vital**
SW Version:	**1.19**
Start Time:	**9/14/2010 16:43**
End Time:	**9/14/2010 16:54**
Comment:	**System Cal Error Check**

A/D Chan	Description	Gas Value	Monitor Value	Units
4	600030	0	0.01	ppmNOx
4	600030	45.7	45.93	ppmNOx
3	48-241	0	0.19	ppmCO
3	48-241	45.9	44.76	ppmCO
1	SER769	0	0.06	% O2
1	SER769	12.04	12	% O2
2	PIR012	0	0.05	% CO2
2	PIR012	5.05	5.06	% CO2

8 15

00184

Calibration Summary

Client:	**Exxon Mobil Refinery**
Job Number:	**13147-2**
Plant:	**ExxonMobil Torrance Refinery**
Unit:	**28F-11**
System ID:	**DAQ-SYS-T1**
Operator:	**Jose Vital**
SW Version:	**1.19**
Start Time:	**9/14/2010 16:57**
End Time:	**9/14/2010 17:18**
Comment:	**Direct Cal Error Check**

A/D Chan	Description	Gas Value	Monitor Value	Units
4	600030	0	0.01	ppmNOx
4	600030	45.7	46.62	ppmNOx
4	600030	91.7	91.74	ppmNOx
3	48-241	0	0.15	ppmCO
3	48-241	45.9	45.41	ppmCO
3	48-241	90.8	90.67	ppmCO
1	SER769	0	0	% O2
1	SER769	12.04	12.03	% O2
1	SER769	22.01	22.05	% O2
2	PIR012	0	0.04	% CO2
2	PIR012	5.05	5.12	% CO2
2	PIR012	9.13	9.06	% CO2

B 16

00185

Calibration Summary

Client:	**Exxonmobil**
Job Number:	**13147**
Plant:	**Exxonmobil Torrance Refinery**
Unit:	**28F-11**
System ID:	**DAS03-PLEX740-T4**
Operator:	**Jose Vital**
SW Version:	**1.19**
Start Time:	**11/17/2010 12:12**
End Time:	**11/17/2010 12:29**
Comment:	**Direct Cal Error Check**

A/D Chan	Description	Gas Value	Monitor Value	Units
1	650081	0	0.05	% O2
1	650081	11.98	11.97	% O2
1	650081	21.89	21.84	% O2
2	CO2T1B	0	0.04	% CO2
2	CO2T1B	4.56	4.48	% CO2
2	CO2T1B	9.11	9.11	% CO2

8 17

00186

Calibration Summary

Client:	**Exxonmobil**
Job Number:	**13147**
Plant:	**Exxonmobil Torrance Refinery**
Unit:	**28F-11**
System ID:	**DAS03-PLEX740-T4**
Operator:	**Jose Vital**
SW Version:	**1.19**
Start Time:	**11/17/2010 12:32**
End Time:	**11/17/2010 12:39**
Comment:	**System Cal Error Check**

A/D Chan	Description	Gas Value	Monitor Value	Units
1	650081	0	0.09	% O2
1	650081	11.98	11.84	% O2
2	CO2T1B	0	0.1	% CO2
2	CO2T1B	4.56	4.49	% CO2

B 18

00187

Continuous Emissions Monitoring Summary

Client:	Exxonmobil
Job Number:	13147
Run Number:	1
Plant:	Exxonmobil Torrance Refinery
Unit:	28F-11
System ID:	DAS03-PLEX740-T4
Operator:	Jose Vital
Software Version:	1.19
Date:	11/17/2010
Time:	2:03 PM
Raw Data File:	SYS-DAS03-PLEX740-T4_JN-13147_RN-001_Raw_Data_2010_11_17_12_40_31.csv
Comment:	28F-11 O2 CO2 for PM first Half Hour

	CHAN 1	CHAN 2	
	650081	CO2T1B	
Time	**% O2**	**% CO2**	**Comments**
11/17/2010 13:00	15.81	3.15	
11/17/2010 13:01	15.81	3.14	
11/17/2010 13:02	15.81	3.14	
11/17/2010 13:03	15.86	3.12	
11/17/2010 13:04	15.84	3.12	
11/17/2010 13:05	15.81	3.14	
11/17/2010 13:06	15.78	3.16	
11/17/2010 13:07	15.84	3.13	
11/17/2010 13:08	15.85	3.13	
11/17/2010 13:09	15.84	3.13	
11/17/2010 13:10	15.82	3.14	
11/17/2010 13:11	15.83	3.14	
11/17/2010 13:12	15.82	3.14	
11/17/2010 13:13	15.79	3.16	
11/17/2010 13:14	15.76	3.17	
11/17/2010 13:15	15.85	3.13	
11/17/2010 13:16	15.85	3.12	
11/17/2010 13:17	15.83	3.14	
11/17/2010 13:18	15.85	3.13	
11/17/2010 13:19	15.8	3.15	
11/17/2010 13:20	15.77	3.16	
11/17/2010 13:21	15.75	3.17	
11/17/2010 13:22	15.79	3.15	
11/17/2010 13:23	15.81	3.13	
11/17/2010 13:24	15.88	3.1	
11/17/2010 13:25	15.85	3.11	
11/17/2010 13:26	15.85	3.11	
11/17/2010 13:27	15.83	3.12	
11/17/2010 13:28	15.8	3.14	
11/17/2010 13:29	15.86	3.11	
30 min Avg	15.821	3.136	

B 19

Continuous Emissions Monitoring Summary

Client:	Exxonmobil
Job Number:	13147
Run Number:	1
Plant:	Exxonmobil Torrance Refinery
Unit:	28F-11
System ID:	DAS03-PLEX740-T4
Operator:	Jose Vital
Software Version:	1.19
Date:	11/17/2010
Time:	2:03 PM
Raw Data File:	SYS-DAS03-PLEX740-T4_JN-13147_RN-001_Raw_Data_2010_11_17_12_40_31.csv
Comment:	28F-11 O2 CO2 for PM Test Second Half Hour

	CHAN 1	CHAN 2	
	650081	CO2T1B	
Time	**% O2**	**% CO2**	**Comments**
11/17/2010 13:30	15.87	3.1	
11/17/2010 13:31	15.82	3.13	
11/17/2010 13:32	15.8	3.13	
11/17/2010 13:33	15.77	3.16	
11/17/2010 13:34	15.78	3.16	
11/17/2010 13:35	15.83	3.13	
11/17/2010 13:36	15.84	3.12	
11/17/2010 13:37	15.8	3.13	
11/17/2010 13:38	15.79	3.14	
11/17/2010 13:39	15.81	3.14	
11/17/2010 13:40	15.75	3.16	
11/17/2010 13:41	15.8	3.13	
11/17/2010 13:42	15.8	3.13	
11/17/2010 13:43	15.84	3.11	
11/17/2010 13:44	15.83	3.12	
11/17/2010 13:45	15.79	3.14	
11/17/2010 13:46	15.78	3.14	
11/17/2010 13:47	15.76	3.15	
11/17/2010 13:48	15.75	3.16	
11/17/2010 13:49	15.76	3.15	
11/17/2010 13:50	15.8	3.13	
11/17/2010 13:51	15.78	3.14	
11/17/2010 13:52	15.78	3.14	
11/17/2010 13:53	15.82	3.13	
11/17/2010 13:54	15.79	3.15	
11/17/2010 13:55	15.79	3.14	
11/17/2010 13:56	15.81	3.13	
11/17/2010 13:57	15.82	3.13	
11/17/2010 13:58	15.78	3.14	
11/17/2010 13:59	15.77	3.15	
30 min Avg	15.797	3.137	

Average 1300 - 1359 :

15.809 3.1365

B 20

00189

Calibration Summary

Client:	**Exxonmobil**
Job Number:	**13147**
Plant:	**Exxonmobil Torrance Refinery**
Unit:	**28F-11**
System ID:	**DAS03-PLEX740-T4**
Operator:	**Jose Vital**
SW Version:	**1.19**
Start Time:	**11/17/2010 14:15**
End Time:	**11/17/2010 14:23**
Comment:	**System Cal Error Check**

A/D Chan	Description	Gas Value	Monitor Value	Units
1	650081	0	0.11	% O2
1	650081	11.98	11.83	% O2
2	CO2T1B	0	0.16	% CO2
2	CO2T1B	4.56	4.43	% CO2

B 21

00199

Calibration Summary

Client:	**Exxonmobil**
Job Number:	**13147**
Plant:	**Exxonmobil Torrance Refinery**
Unit:	**28F-11**
System ID:	**DAS03-PLEX740-T4**
Operator:	**Jose Vital**
SW Version:	**1.19**
Start Time:	**11/17/2010 14:26**
End Time:	**11/17/2010 14:36**
Comment:	**Direct Cal Error Check**

A/D Chan	Description	Gas Value	Monitor Value	Units
1	650081	0	0.02	% O2
1	650081	11.98	11.94	% O2
1	650081	21.89	21.8	% O2
2	CO2T1B	0	0.09	% CO2
2	CO2T1B	4.56	4.49	% CO2
2	CO2T1B	9.11	9.05	% CO2

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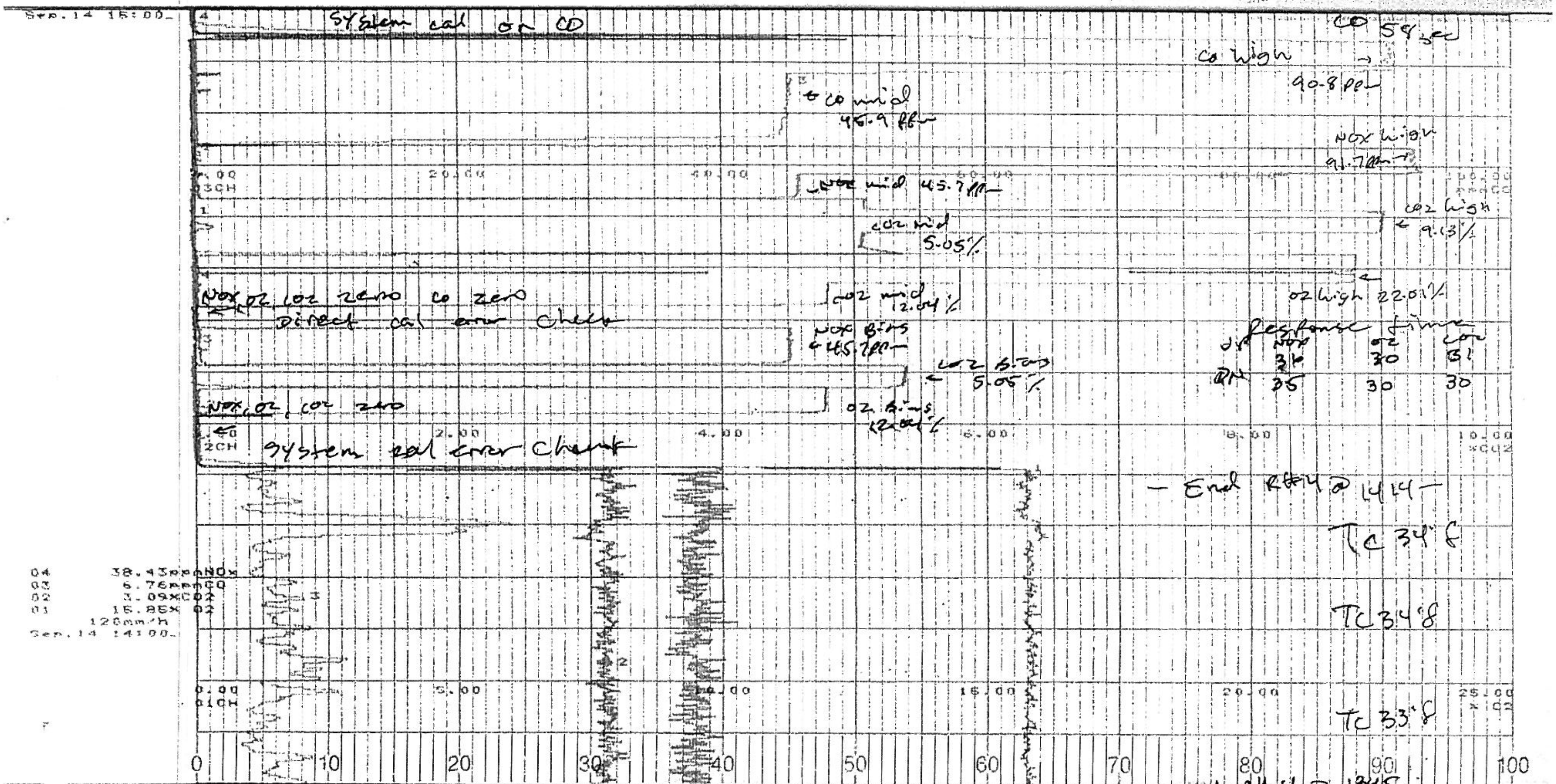
APPENDIX B

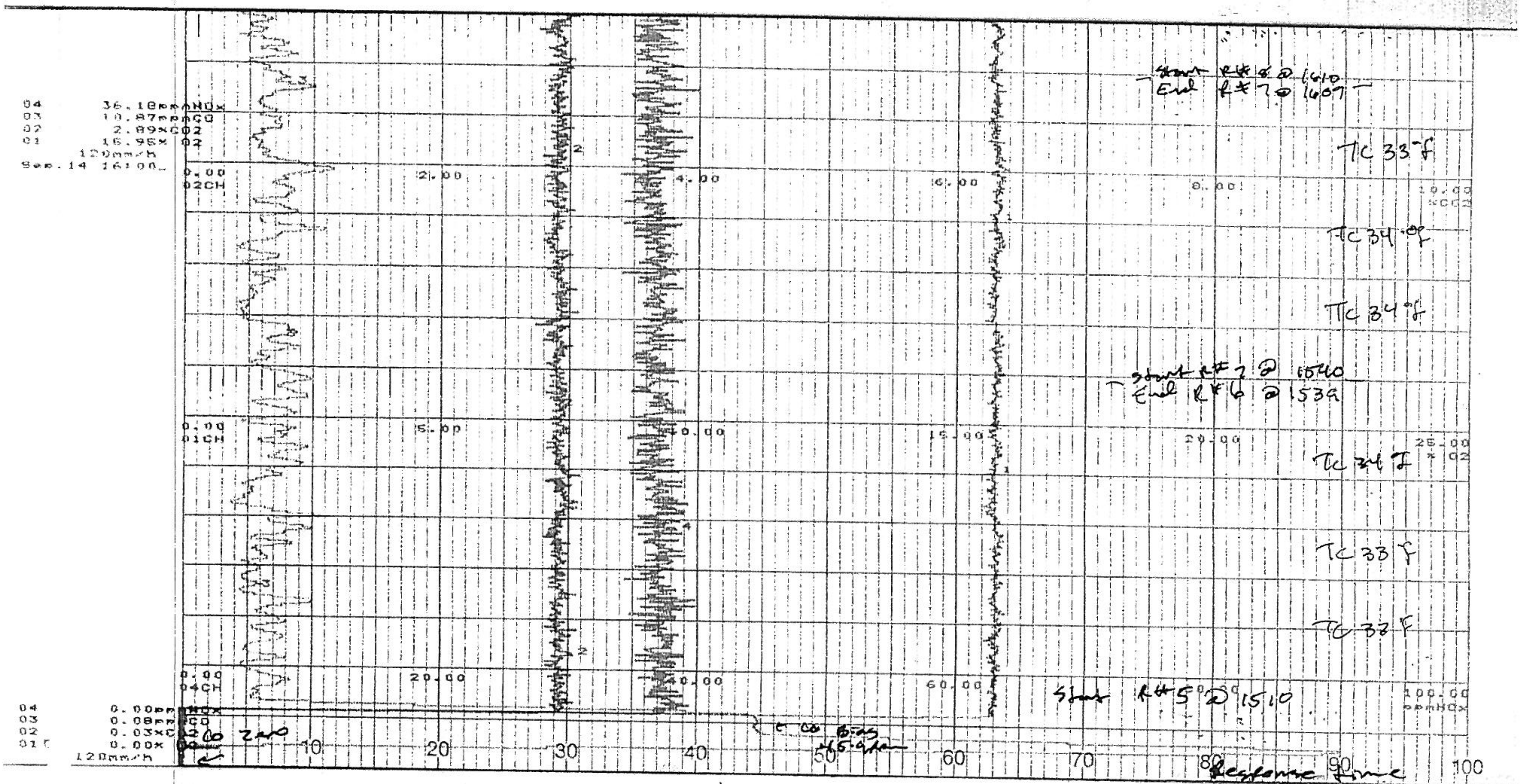
CO, O_2, AND CO_2

2.0 FIELD DATA

b. STRIPCHART



Sep.14 15:00
System cal on CO
CO 59 sec
CO high 90.8 ppm
CO mid 45.9 ppm
NOx high 91.7 ppm
NOx mid 45.7 ppm
CO2 high 9.13%
CO2 mid 5.05%
O2 high 22.01%
O2 mid 12.04%
NOx, O2, CO2 zero CO zero
Direct cal error check
NOx Bias 45.7 ppm
CO2 Bias 5.05%
O2 Bias 12.04%
NOx, O2, CO2 zero
System cal error check
Response time NOx O2 CO2
31 30 31
35 30 30
- End R#4 @ 1414 -
TC 34°F
TC 34°F
TC 33°F
04 38.43ppmNOx
03 6.76ppmCO
02 3.09%CO2
01 15.85% O2
120mm/h
Sep.14 14:00
0 10 20 30 40 50 60 70 80 90 100



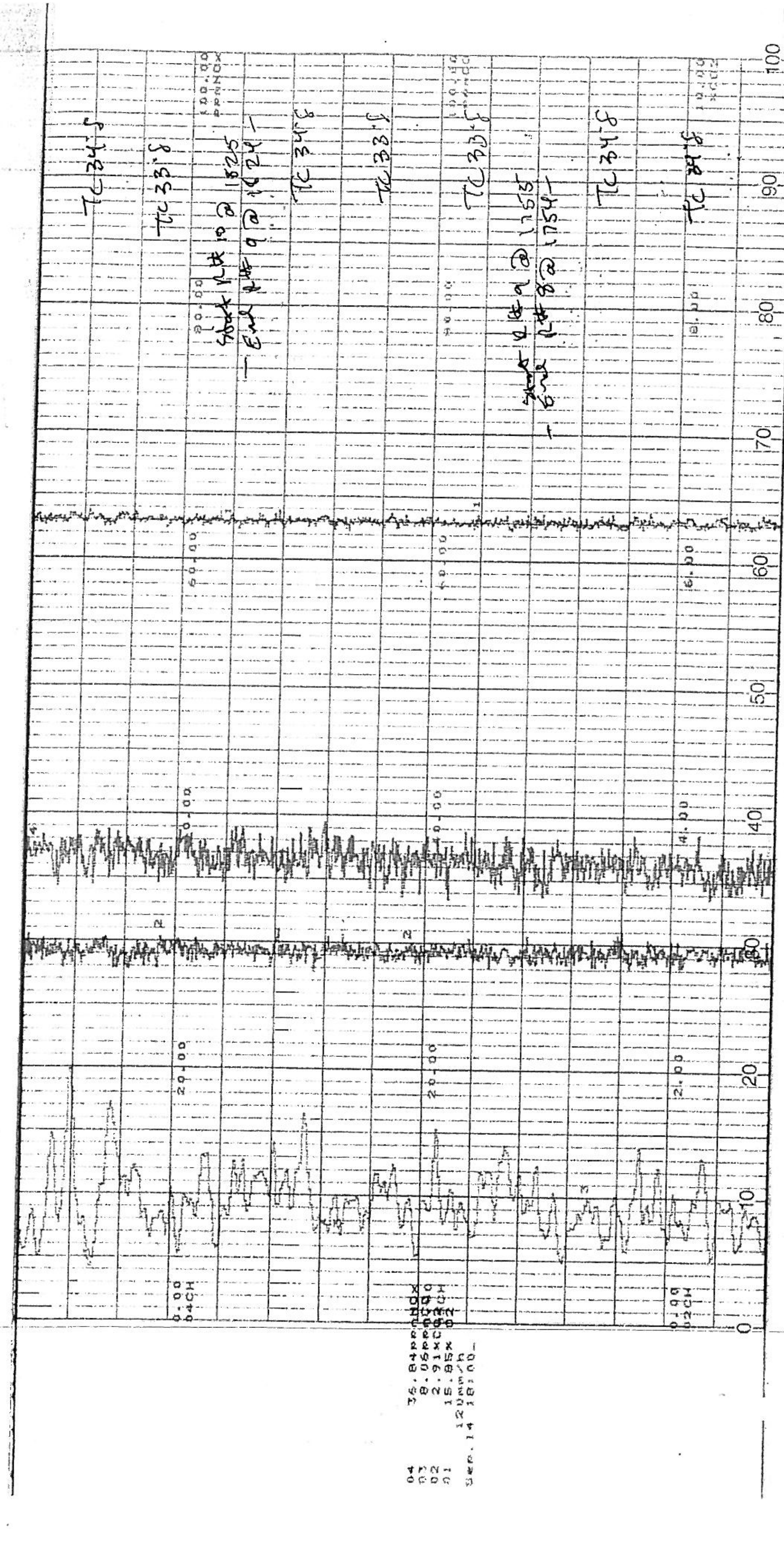
04 36.18ppmNOx
03 10.87ppmCO
02 2.89xCO2
01 16.95x O2
120mm/h
Sep.14 16:00
0.00 02CH
2.00
4.00
6.00
8.00
10.00 xCO2
0.00 01CH
5.00
10.00
15.00
20.00
25.00 x O2
0.00 04CH
20.00
40.00
60.00
100.00 ppmNOx
04 0.00ppmNOx
03 0.08ppmCO
02 0.03xCO2
01 0.00x O2
120mm/h
Start R#6 @ 1610
End R#7 @ 1607
TC 33°F
TC 34°F
TC 34°F
Start R#7 @ 1540
End R#6 @ 1539
TC 34°F
TC 33°F
TC 33°F
Start R#5 @ 1510
CO zero
CO Bias
10
20
30
40
50
60
70
80
90
100
Response Time

B 25

00194

B 26

00195



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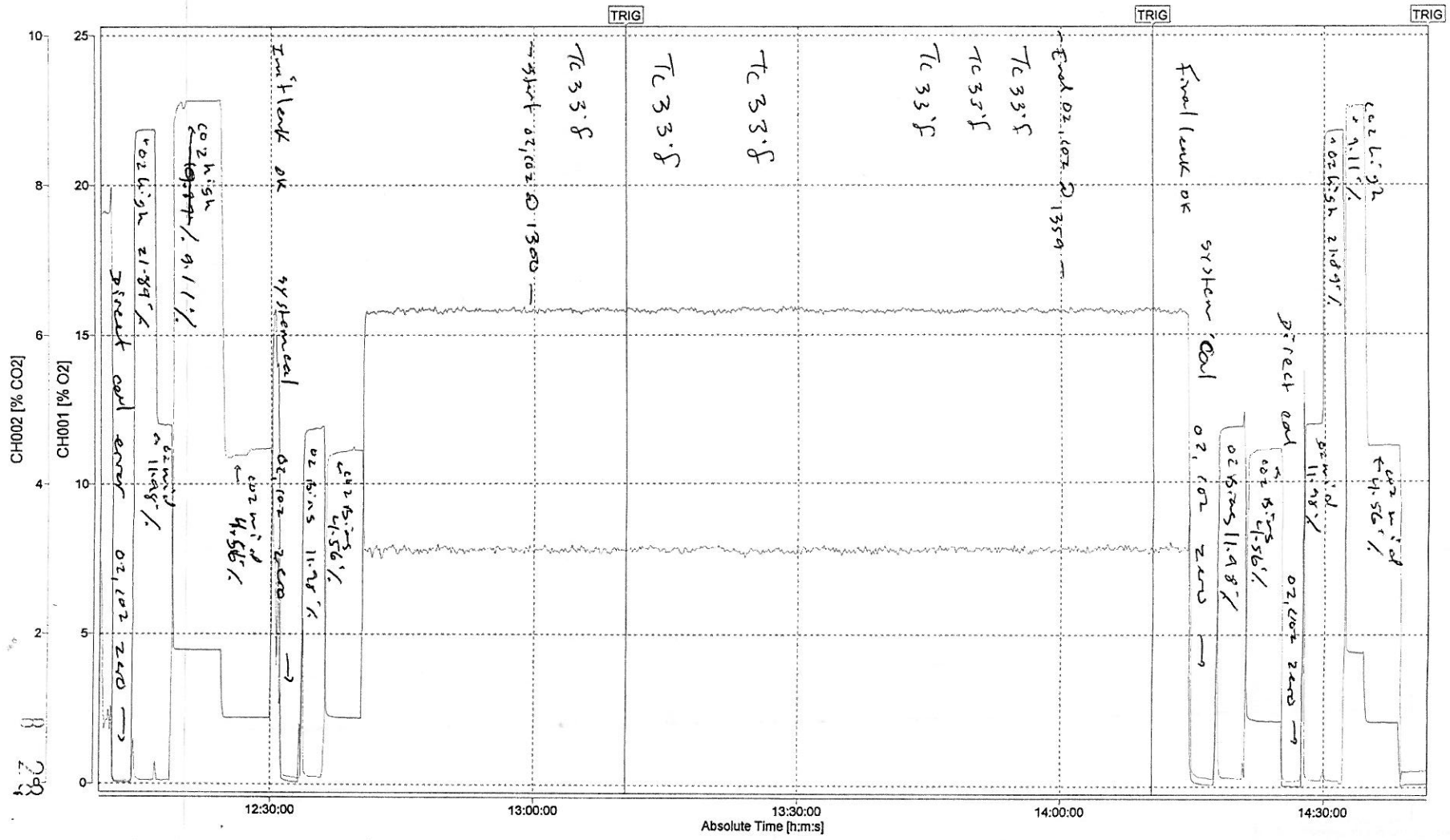
File Message	:	29F-4-5	Data Count	:	908
File Name	:	001050_00001101117_121040.DAE.ldx	Sampling Interval	:	10.000 sec
Device Type	:	DX2000	Start Time	:	2010/11/17 12:10:40.000
Serial No.	:	S5JB06571	Stop Time	:	2010/11/17 14:41:50.000
Time Correction	:	None	Trigger Time	:	2010/11/17 13:10:30.000
Starting Condition	:	Manual	Trigger No.	:	359
Dividing Condition	:	Manual	Damage Check	:	Not Damaged
Meas Ch.	:	2	Started by	:	[Comm. In]
Math Ch.	:	0	Stopped by	:	[Comm. In]
Ext Ch.	:	0			

Printed Group	:	AKI DAQView
Printed Range	:	2010/11/17 12:10:40.000 - 2010/11/17 14:41:50.000
Comment	:	



APPENDIX B

CO, O_2, AND CO_2

2.0 FIELD DATA

c. RESPONSE TIME

RESPONSE TIME (Reference Method)

Facility/Unit: ExxonMobil Torrance Refinery / 28F-11
Test Date: 9/14/10
Analyzer: Thermo Electron Model 48 (CO)

9/14/2010	CO	
	Up	Down
1st Response	0:57	0:58
Maximum Response	0:58	

APPENDIX B

CO, O_2, AND CO_2

3.0 CALIBRATION GAS CERTIFICATES

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6689

DocNumber: 000003627

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR WHSE SANTA ANA CA
1545 E EDINGER AVE
SANTA ANA CA 927050

Praxair Order Number: 11687071
Customer P. O. Number: 02647642
Customer Reference Number:

Fill Date: 11/10/2009
Part Number: EV NICO45ME-AS
Lot Number: 109931403
Cylinder Style & Outlet: AS CGA 350
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:	12/2/2012	NIST Traceable
Cylinder Number:	CC 301113	Analytical Uncertainty:
45.9 ppm	CARBON MONOXIDE	± 1 %
Balance	NITROGEN	

Certifcation Information: *Certification Date:* 12/2/2009 *Term:* 36 Months *Expiration Date:* 12/2/2012

This cylinder was certified according to the 1997 EPA Traceability Protocol, Document #EPA-600/R-97/121, using Procedure G1
Do Not Use this Standard if Pressure is less than 150 PSIG

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1 . Component: CARBON MONOXIDE

Requested Concentration: 45.0 ppm
Certified Concentration: 45.9 ppm
Instrument Used: Siemens Ultramat 5E S/N B01-728
Analytical Method: NDIR
Last Multipoint Calibration: 11/12/2009

First Analysis Data:						Date:	11/25/2009
Z:	0	R:	100	C:	45.9	Conc:	45.9
R:	100	Z:	0	C:	45.9	Conc:	45.9
Z:	0	C:	45.9	R:	100	Conc:	45.9
UOM:	ppm			Mean Test Assay:			45.9 ppm

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC 199142
Ref. Std. Conc: 100.0 ppm
Ref. Std. Traceable to SRM # : vs. 1679c
SRM Sample # : 3-I-45
SRM Cylinder # : FF28593

Second Analysis Data:						Date:	12/2/2009
Z:	0	R:	100	C:	45.9	Conc:	45.9
R:	100	Z:	0	C:	45.9	Conc:	45.9
Z:	0	C:	45.9	R:	100	Conc:	45.9
UOM:	ppm			Mean Test Assay:			45.9 ppm

Analyzed by: Shameela Jiffrey

Certified by: Nelson Ma

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00201

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6689

DocNumber: 000001547

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR WHSE SANTA ANA CA
1545 E EDINGER AVE
SANTA ANA CA 927050

Praxair Order Number: 11221065
Customer P. O. Number: 02582625
Customer Reference Number:

Fill Date: 9/23/2009
Part Number: NI CO90ME-AS
Lot Number: 109926601
Cylinder Style & Outlet: AS CGA 350
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:	**10/12/2012**		NIST Traceable
Cylinder Number:	**CC 149350**		Analytical Uncertainty:
90.8	**ppm**	**CARBON MONOXIDE**	± 1 %
Balance		**NITROGEN**	

Certifcation Information: *Certification Date:* 10/12/2009 *Term:* 36 Months *Expiration Date:* 10/12/2012

This cylinder was certified according to the 1997 EPA Traceability Protocol, Document #EPA-600/R-97/121, using Procedure G1
Do Not Use this Standard if Pressure is less than 150 PSIG

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: CARBON MONOXIDE

Requested Concentration: 90 ppm
Certified Concentration: 90.8 ppm
Instrument Used: Siemens Ultramat 5E S/N A12-729
Analytical Method: NDIR
Last Multipoint Calibration: 10/6/2009

First Analysis Data:						Date: 9/28/2009
Z: 0	R: 100	C: 90.8	Conc: 90.8			
R: 100	Z: 0	C: 90.8	Conc: 90.8			
Z: 0	C: 90.8	R: 100	Conc: 90.8			
UOM: ppm			Mean Test Assay: 90.8 ppm			

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC 199142
Ref. Std. Conc: 100.0 ppm
Ref. Std. Traceable to SRM # : vs. 1679c
SRM Sample # : 3-I-45
SRM Cylinder # : FF28593

Second Analysis Data:						Date: 10/8/2009
Z: 0	R: 100	C: 90.8	Conc: 90.8			
R: 100	Z: 0	C: 90.8	Conc: 90.8			
Z: 0	C: 90.8	R: 100	Conc: 90.8			
UOM: ppm			Mean Test Assay: 90.8 ppm			

Analyzed by: Shameela Jiffrey

Certified by: Nelson Ma
Nelson Ma

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00202

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6689

DocNumber: 000003692

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR WHSE SANTA ANA CA
1545 E EDINGER AVE
SANTA ANA CA 927050

Praxair Order Number: 11846656
Customer P. O. Number: 02668661
Customer Reference Number:

Fill Date: 11/30/2009
Part Number: EV NIOX12E-AS
Lot Number: 109933402
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:	12/4/2012	NIST Traceable
Cylinder Number:	CC 221701	Analytical Uncertainty:
11.98 %	OXYGEN	± 1 %
Balance	NITROGEN	

Certification Information: *Certification Date:* 12/4/2009 *Term:* 36 Months *Expiration Date:* 12/4/2012

This cylinder was certified according to the 1997 EPA Traceability Protocol, Document #EPA-600/R-97/121, using Procedure G1

Do Not Use this Standard If Pressure is less than 150 PSIG

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: OXYGEN

Requested Concentration: 12 %
Certified Concentration: 11.98 %
Instrument Used: OXYMAT 5E
Analytical Method: PARAMAGNETIC
Last Multipoint Calibration: 11/12/2009

First Analysis Date:						Date:	12/4/2009
Z:	0	R:	15.1	C:	11.98	Conc:	11.98
R:	15.1	Z:	0	C:	11.98	Conc:	11.98
Z:	0	C:	11.98	R:	15.1	Conc:	11.98
UOM:	%			Mean Test Assay:			11.98 %

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC 186866
Ref. Std. Conc: 15.10 %
Ref. Std. Traceable to SRM #: vs. 2659a
SRM Sample #: 71-37-B
SRM Cylinder #: CLM-006734

Second Analysis Date:						Date:	
Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0
UOM:	%			Mean Test Assay:			0 %

Analyzed by: Shameela Jiffrey
Shameela Jiffrey

Certified by: Nelson Ma
Nelson Ma

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PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6689

DocNumber: 000005643

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR WHSE SANTA ANA CA
1545 E EDINGER AVE
SANTA ANA CA 927050

Praxair Order Number: 12232683
Customer P. O. Number: 02721183
Customer Reference Number:

Fill Date: 1/20/2010
Part Number: NI OX12E-AS
Lot Number: 109002011
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:	1/26/2013	NIST Traceable
Cylinder Number:	CC 245987	Analytical Uncertainty:
12.04 %	OXYGEN	± 1 %
Balance	NITROGEN	

Certification Information: *Certification Date:* 1/26/2010 *Term:* 36 Months *Expiration Date:* 1/26/2013
This cylinder was certified according to the 1997 EPA Traceability Protocol, Document #EPA-600/R-97/121, using Procedure G1
Do Not Use this Standard if Pressure is less than 150 PSIG

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: OXYGEN

Requested Concentration: 12 %
Certified Concentration: 12.04 %
Instrument Used: OXYMAT 5E
Analytical Method: PARAMAGNETIC
Last Multipoint Calibration: 1/11/2010

First Analysis Date:						Date:	1/25/2010
Z:	0	R:	16.42	C:	12.04	Conc:	12.04
R:	15.42	Z:	0	C:	12.04	Conc:	12.04
Z:	0	C:	12.04	R:	15.42	Conc:	12.04
UOM:	%			Mean Test Assay:			12.04 %

Reference Standard Type: SRM
Ref. Std. Cylinder #: HA 9163
Ref. Std. Conc: 15.42 %
Ref. Std. Traceable to SRM #: vs. 2659a
SRM Sample #: 71-37-B
SRM Cylinder #: CLM-006734

Second Analysis Data:						Date:	
Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0
UOM:	%			Mean Test Assay:			0 %

Analyzed by: Nelson Ma
Nelson Ma

Certified by: Shameela J
Shameela Jiffrey

8.35

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6689

DocNumber: 000010820

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR WHSE SANTA ANA CA
1545 E EDINGER AVE
SANTA ANA CA 927050

Praxair Order Number: 13452266
Customer P. O. Number: 02894671
Customer Reference Number:

Fill Date: 5/18/2010
Part Number: NI OX22E-AS
Lot Number: 109013803
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:	5/26/2013	NIST Traceable
Cylinder Number:	CC112155	Analytical Uncertainty:
21.89 %	OXYGEN	± 1 %
Balance	NITROGEN	

Certifcation Information: *Certification Date:* 5/26/2010 *Term:* 36 Months *Expiration Date:* 5/26/2013

This cylinder was certified according to the 1997 EPA Traceability Protocol, Document #EPA-600/R-97/121, using Procedure G1
Do Not Use this Standard if Pressure is less than 150 PSIG

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: OXYGEN

Requested Concentration: 22 %
Certified Concentration: 21.89 %
Instrument Used: OXYMAT 5E
Analytical Method: PARAMAGNETIC
Last Multipoint Calibration: 5/11/2010

First Analysis Data:						Date: 5/26/2010
Z: 0	R: 20.98	C: 21.9	Conc: 21.89			
R: 20.98	Z: 0	C: 21.9	Conc: 21.89			
Z: 0	C: 21.9	R: 20.98	Conc: 21.89			
UOM: %		Mean Test Assay: 21.89 %				

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC 178133
Ref. Std. Conc: 20.97%
Ref. Std. Traceable to SRM #: 2659a
SRM Sample #: 71-37-B
SRM Cylinder #: CLM 005734

Second Analysis Data:						Date:
Z: 0	R: 0	C: 0	Conc: 0			
R: 0	Z: 0	C: 0	Conc: 0			
Z: 0	C: 0	R: 0	Conc: 0			
UOM: %		Mean Test Assay: 0 %				

Analyzed by: Aruna Naila

Certified by: Shameela Jiffrey

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00205

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6689

DocNumber: 000005649

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR WHSE SANTA ANA CA
1545 E EDINGER AVE
SANTA ANA CA 927050

Praxair Order Number: 12232832
Customer P. O. Number: 02721171
Customer Reference Number:

Fill Date: 1/20/2010
Part Number: NI OX22E-AS
Lot Number: 109002009
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:	1/26/2013	NIST Traceable
Cylinder Number:	CC 272672	Analytical Uncertainty:
22.01 %	OXYGEN	± 1 %
Balance	NITROGEN	

Certification Information: *Certification Date:* 1/26/2010 *Term:* 36 Months *Expiration Date:* 1/26/2013

This cylinder was certified according to the 1997 EPA Traceability Protocol, Document #EPA-600/R-97/121, using Procedure G1
Do Not Use this Standard if Pressure is less than 150 PSIG

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: OXYGEN

Requested Concentration: 22 %
Certified Concentration: 22.01 %
Instrument Used: OXYMAT 6E
Analytical Method: PARAMAGNETIC
Last Multipoint Calibration: 1/11/2010

First Analysis Data:					Date: 1/25/2010
Z: 0	R: 20.98	C: 22.02	Conc:	22.01	
R: 20.98	Z: 0	C: 22.02	Conc:	22.01	
Z: 0	C: 22.02	R: 20.98	Conc:	22.01	
UOM: %		Mean Test Assay:		22.01 %	

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC 178133
Ref. Std. Conc: 20.97%
Ref. Std. Traceable to SRM #: 2659a
SRM Sample #: 71-37-B
SRM Cylinder #: CLM 006734

Second Analysis Data:					Date:
Z: 0	R: 0	C: 0	Conc:	0	
R: 0	Z: 0	C: 0	Conc:	0	
Z: 0	C: 0	R: 0	Conc:	0	
UOM: %		Mean Test Assay:		0 %	

Analyzed by: Shameela Jiffrey
Shameela Jiffrey

Certified by: Nelson Ma
Nelson Ma

R 37

00206

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6689

DocNumber: 00000013062

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

AIRKINETICS

Praxair Order Number: 08691050-00
Customer P. O. Number: 02254545
Customer Reference Number: WA260

Fill Date:
Part Number: EV NICD5E-AS
Lot Number: 109901403
Cylinder Style & Outlet: AS 350
Cylinder Pressure & Volume: 2000 psi 140 cu ft

Certified Concentration:

Expiration Date:		1/23/2012	
Cylinder Number:		CC 257914	Analytical Uncertainty:
5.05	%	CARBON DIOXIDE	± 1 %
Balance		NITROGEN	

NOx ppm = N/A NOX Values for Reference Only

Certifcation Information: *Certification Date:* 1/23/2009 *Term:* 36 Months *Expiration Date:* 1/23/2012

This cylinder was certified according to the 1997 EPA Traceability Protocol, Document #EPA-600/R-97/121, using Procedure G1

Do Not Use this Standard if Pressure is less than 150 PSIG

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: CARBON DIOXIDE

Requested Concentration: 5 %
Certified Concentration: 5.05 %
Instrument Used: Siemens Ultramat 5E S/N A12-730
Analytical Method NDIR
Last Multipoint Calibration 1/12/2009

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC 149450
Ref. Std. Conc: 5.00 %
Ref Std. Traceable to SRM # : vs. 1674b
SRM Sample # : 7-F-32
SRM Cylinder # : CAL014845

First Analysis Data: **Date:** 1/21/2009

Z:	0	R:	5	C:	5.05	Conc:	5.05
R:	5	Z:	0	C:	5.05	Conc:	5.05
Z:	0	C:	5.05	R:	5	Conc:	5.05

UOM: % Mean Test Assay: 5.05 %

Second Analysis Data: **Date:**

Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0

UOM: % Mean Test Assay: 0 %

Analyzed by: Pablo Reyes

Certified by: Peter Ngo

Making Our Planet More Productive

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6689

DocNumber: 000010940

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR WHSE SANTA ANA CA
1545 E EDINGER AVE
SANTA ANA CA 927050

Praxair Order Number: 13483182
Customer P. O. Number: 02899245
Customer Reference Number:

Fill Date: 5/21/2010
Part Number: EV NICDOXE154AS
Lot Number: 109014106
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:	5/27/2013	NIST Traceable Analytical Uncertainty:
Cylinder Number:	CC107583	
9.11 %	CARBON DIOXIDE	± 1 %
4.43 %	OXYGEN	± 1 %
Balance	NITROGEN	

Certification Information: *Certification Date:* 5/27/2010 *Term:* 36 Months *Expiration Date:* 5/27/2013

This cylinder was certified according to the 1997 EPA Traceability Protocol, Document #EPA-600/R-97/121, using Procedure G1

Do Not Use this Standard if Pressure is less than 150 PSIG

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: CARBON DIOXIDE

Requested Concentration: 9 %
Certified Concentration: 9.11 %
Instrument Used: Siemens Ultramat 5E S/N A12-730
Analytical Method: NDIR
Last Multipoint Calibration: 5/10/2010

First Analysis Data:					Date: 5/27/2010
Z: 0	R: 10.08	C: 9.1	Conc:	9.11	
R: 10.08	Z: 0	C: 9.1	Conc:	9.11	
Z: 0	C: 9.12	R: 10.1	Conc:	9.11	
UOM: %		Mean Test Assay:		9.11 %	

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC 78305
Ref. Std. Conc: 10.09%
Ref. Std. Traceable to SRM #: va. 1675b
SRM Sample #: 8-F-51
SRM Cylinder #: CAL014536

Second Analysis Data:					Date:
Z: 0	R: 0	C: 0	Conc:	0	
R: 0	Z: 0	C: 0	Conc:	0	
Z: 0	C: 0	R: 0	Conc:	0	
UOM: %		Mean Test Assay:		0 %	

2. Component: OXYGEN

Requested Concentration: 4.5 %
Certified Concentration: 4.43 %
Instrument Used: OXYMAT 5E
Analytical Method: PARAMAGNETIC
Last Multipoint Calibration: 5/11/2010

First Analysis Data:					Date: 5/27/2010
Z: 0	R: 5.07	C: 4.43	Conc:	4.43	
R: 5.07	Z: 0	C: 4.43	Conc:	4.43	
Z: 0	C: 4.43	R: 5.07	Conc:	4.43	
UOM: %		Mean Test Assay:		4.43 %	

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC 134414
Ref. Std. Conc: 5.07%
Ref. Std. Traceable to SRM #: va. 2658a
SRM Sample #: 72-28-B
SRM Cylinder #: CLM-008898

Second Analysis Data:					Date:
Z: 0	R: 0	C: 0	Conc:	0	
R: 0	Z: 0	C: 0	Conc:	0	
Z: 0	C: 0	R: 0	Conc:	0	
UOM: %		Mean Test Assay:		0 %	

Analyzed by: Shameela Jiffrey

Certified by: Aruna Naila

R 39

00208

PRAXAIR

Praxair
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DocNumber: 000008625

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR WHSE SANTA ANA CA
1545 E EDINGER AVE
SANTA ANA CA 927050

Praxair Order Number: 12887535
Customer P. O. Number: 02813942
Customer Reference Number:

Fill Date: 3/23/2010
Part Number: EV NICD9E-AS
Lot Number: 109008205
Cylinder Style & Outlet: AS CGA 680
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:	4/2/2013	NIST Traceable
Cylinder Number:	SA 5210	Analytical Uncertainty:
9.13 %	CARBON DIOXIDE	± 1 %
Balance	NITROGEN	

Certifcation Information: *Certification Date:* 4/2/2010 *Term:* 36 Months *Expiration Date:* 4/2/2013

This cylinder was certified according to the 1997 EPA Traceability Protocol, Document #EPA-600/R-97/121, using Procedure G1
Do Not Use this Standard if Pressure is less than 150 PSIG

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: CARBON DIOXIDE

Requested Concentration: 9 %
Certified Concentration: 9.13 %
Instrument Used: Siemens Ultramat 5E S/N A12-730
Analytical Method: NDIR
Last Multipoint Calibration: 3/11/2010

First Analysis Data:						Date: 4/1/2010
Z: 0	R: 10.09	C: 9.12	Conc: 9.12			
R: 10.09	Z: 0	C: 9.14	Conc: 9.14			
Z: 0	C: 9.12	R: 10.09	Conc: 9.12			
UOM: %		Mean Test Assay: 9.13 %				

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC78305
Ref. Std. Conc: 10.09%
Ref. Std. Traceable to SRM #: vs. 1675b
SRM Sample #: 6-F-51
SRM Cylinder #: CAL014538

Second Analysis Data:						Date:
Z: 0	R: 0	C: 0	Conc: 0			
R: 0	Z: 0	C: 0	Conc: 0			
Z: 0	C: 0	R: 0	Conc: 0			
UOM: %		Mean Test Assay: 0 %				

Analyzed by: Shameela Jiffrey

Certified by: Nelson Ma

R 40

00209

PRAXAIR

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Telephone: (323) 585-2154
Facsimile: (714) 542-6689

DocNumber: 000001918

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR WHSE SANTA ANA CA
1545 E EDINGER AVE
SANTA ANA CA 927050

Praxair Order Number: 11241784
Customer P. O. Number: 02585712
Customer Reference Number:

Fill Date: 9/26/2009
Part Number: EV NINO22ME-AS
Lot Number: 109926901
Cylinder Style & Outlet: AS CGA 660
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:	10/19/2011	NIST Traceable
Cylinder Number:	CC 244606	Analytical Uncertainty:
22.4 ppm	NITRIC OXIDE	± 1 %
Balance	NITROGEN	

NOx = 22.7 ppm **NOx for Reference Only**

Certifcation Information: *Certification Date:* 10/19/2009 *Term:* 24 Months *Expiration Date:* 10/19/2011

This cylinder was certified according to the 1997 EPA Traceability Protocol, Document #EPA-600/R-97/121, using Procedure G1
Do Not Use this Standard if Pressure is less than 150 PSIG

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: NITRIC OXIDE

Requested Concentration: 22 ppm
Certified Concentration: 22.4 ppm
Instrument Used: Thermo Electron 42C S/N 518112467
Analytical Method: Chemiluminescence
Last Multipoint Calibration: 9/20/2009

First Analysis Data:						Date:	10/1/2009
Z:	0	R:	25.1	C:	22.3	Conc:	22.3
R:	25.1	Z:	0	C:	22.4	Conc:	22.4
Z:	0	C:	22.5	R:	25.1	Conc:	22.5
UOM:	ppm			Mean Test Assay:			22.4 ppm

Analyzed by: Ben McCauley

Reference Standard Type: GMIS
Ref. Std. Cylinder # : SA 18935
Ref. Std. Conc: 25.1 ppm
Ref. Std. Traceable to SRM # : vs 2629a
SRM Sample # : 50-G-101
SRM Cylinder # : FF 31652

Second Analysis Data:						Date:	10/12/2009
Z:	0	R:	25.1	C:	22.3	Conc:	22.3
R:	25.1	Z:	0	C:	22.3	Conc:	22.3
Z:	0	C:	22.3	R:	25.1	Conc:	22.3
UOM:	ppm			Mean Test Assay:			22.3 ppm

Certified by: Ying Xu

PRAXAIR

Praxair
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Telephone: (323) 585-2154
Facsimile: (714) 542-6689

DocNumber: 000004355

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR WHSE SANTA ANA CA
1545 E EDINGER AVE
SANTA ANA CA 927050

Praxair Order Number: 11771548
Customer P. O. Number: 02659502
Customer Reference Number:

Fill Date: 12/8/2009
Part Number: EV NIN045ME-AS
Lot Number: 109934202
Cylinder Style & Outlet: AS CGA 660
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:		**12/21/2011**	NIST Traceable
Cylinder Number:		**CC 139911**	Analytical Uncertainty:
45.4	**ppm**	**NITRIC OXIDE**	± 1 %
	Balance	**NITROGEN**	

NOx = 45.7 ppm **NOx for Reference Only**

Certifcation Information: *Certification Date:* 12/21/2009 *Term:* 24 Months *Expiration Date:* 12/21/2011

This cylinder was certified according to the 1997 EPA Traceability Protocol, Document #EPA-600/R-97/121, using Procedure G1
Do Not Use this Standard if Pressure is less than 150 PSIG

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: NITRIC OXIDE

Requested Concentration: 45 ppm
Certified Concentration: 45.4 ppm
Instrument Used: Thermo Electron 42C S/N 518112467
Analytical Method: Chemiluminescence
Last Multipoint Calibration: 12/1/2009

First Analysis Data:						Date:	12/14/2009
Z:	0	R:	50.2	C:	45.4	Conc:	45.4
R:	50.2	Z:	0	C:	45.4	Conc:	45.4
Z:	0	C:	45.4	R:	50.2	Conc:	45.4
UOM:	ppm			Mean Test Assay:			45.4 ppm

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC 24446
Ref. Std. Conc: 50.2 ppm
Ref. Std. Traceable to SRM # : vs. 1683b
SRM Sample # : 45-U-65
SRM Cylinder # : CAL015626

Second Analysis Data:						Date:	12/21/2009
Z:	0	R:	50.2	C:	45.5	Conc:	45.5
R:	50.2	Z:	0	C:	45.4	Conc:	45.4
Z:	0	C:	45.4	R:	50.2	Conc:	45.4
UOM:	ppm			Mean Test Assay:			45.4 ppm

Analyzed by: Ying Xie

Certified by: Ben McCauley

APPENDIX B

CO, O_2, AND CO_2

4.0 EPA 205 – CALIBRATION GAS DILUTION SYSTEM VERIFICATION

EPA 205 - Calibration Gas Dilution System Verification

Client Name: EXXONMOBIL TORRANCE REFINERY
Source Name: UNIT 28F11

AKI Job Number: 13147
Test Date: 11/17/2010

Primary Gas Concentration	% of primary gas	Diluted Concentration	Total Flow	Component Flow		2% Error Limits		Actual Response	%Error
				Balance Gas	Primary Gas	*Max*	*Min*		
45.7	Challenge	**22.7**	5			*23.154*	*22.246*	22.7	0.0%
ppmNOx	25	**11.425**	5	**3.750**	**1.250**	*11.654*	*11.197*	11.56	1.2%
GAS DIVIDER	45	**20.565**	5	**2.750**	**2.250**	*20.976*	*20.154*	20.92	1.7%
#2208	50	**22.85**	5	**2.500**	**2.500**	*23.307*	*22.393*	23	0.7%
	65	**29.705**	5	**1.750**	**3.250**	*30.299*	*29.111*	30.21	1.7%
	75	**34.275**	5	**1.250**	**3.750**	*34.961*	*33.590*	34.82	1.6%
	100	**45.7**	5	**0.000**	**5.000**	*46.614*	*44.786*	45.86	0.4%
45.7	Challenge	**22.7**	5			*23.154*	*22.246*	22.77	0.3%
ppmNOx	25	**11.425**	5	**3.750**	**1.250**	*11.654*	*11.197*	11.52	0.8%
	45	**20.565**	5	**2.750**	**2.250**	*20.976*	*20.154*	20.82	1.2%
	50	**22.85**	5	**2.500**	**2.500**	*23.307*	*22.393*	22.9	0.2%
	65	**29.705**	5	**1.750**	**3.250**	*30.299*	*29.111*	30.08	1.3%
	75	**34.275**	5	**1.250**	**3.750**	*34.961*	*33.590*	34.65	1.1%
45.7	Challenge	**22.7**	5			*23.154*	*22.246*	22.52	-0.8%
ppmNOx	25	**11.425**	5	**3.750**	**1.250**	*11.654*	*11.197*	11.36	-0.6%
	45	**20.565**	5	**2.750**	**2.250**	*20.976*	*20.154*	20.59	0.1%
	50	**22.85**	5	**2.500**	**2.500**	*23.307*	*22.393*	22.61	-1.1%
	65	**29.705**	5	**1.750**	**3.250**	*30.299*	*29.111*	29.74	0.1%
	75	**34.275**	5	**1.250**	**3.750**	*34.961*	*33.590*	34.38	0.3%

Calibration Summary

Client:	**EXXONMOBIL**
Job Number:	**13147**
Plant:	**EXXONMOBIL TORRANCE REFINERY**
Unit:	**28F11**
System ID:	**DAS03-PLEX740-T4**
Operator:	**Jose Vital**
SW Version:	**1.19**
Start Time:	**11/17/2010 10:23**
End Time:	**11/17/2010 10:41**
Comment:	**EPA 205 FIRST PASS**

A/D Chan	Description		Gas Value	Monitor Value	Units
4	650081		0	0.01	ppmNOx
4	650081	25%	11.43	11.56	ppmNOx
4	650081	45%	20.57	20.92	ppmNOx
4	650081	~~50~~	22.7 Challenge GAS	22.7	ppmNOx
4	650081	50 %	22.85	23	ppmNOx
4	650081	65 %	29.71	30.21	ppmNOx
4	650081	75 %	34.28	34.82	ppmNOx
4	650081	Span GAS:	45.7	45.86	ppmNOx

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00214

Calibration Summary

Client:	**EXXONMOBIL**
Job Number:	**13147**
Plant:	**EXXONMOBIL TORRANCE REFINERY**
Unit:	**28F11**
System ID:	**DAS03-PLEX740-T4**
Operator:	**Jose Vital**
SW Version:	**1.19**
Start Time:	**11/17/2010 10:44**
End Time:	**11/17/2010 10:55**
Comment:	**EPA 205 SECOND PASS**

A/D Chan	Description	Gas Value	Monitor Value	Units
4	650081	11.43	11.52	ppmNOx
4	650081	20.57	20.82	ppmNOx
4	650081	22.7	22.77	ppmNOx
4	650081	22.85	22.9	ppmNOx
4	650081	29.71	30.08	ppmNOx
4	650081	34.28	34.65	ppmNOx

B 46

00215

Calibration Summary

Client:	**EXXONMOBIL**
Job Number:	**13147**
Plant:	**EXXONMOBIL TORRANCE REFINERY**
Unit:	**28F11**
System ID:	**DAS03-PLEX740-T4**
Operator:	**Jose Vital**
SW Version:	**1.19**
Start Time:	**11/17/2010 10:56**
End Time:	**11/17/2010 11:18**
Comment:	**EPA 205 THIRD PASS**

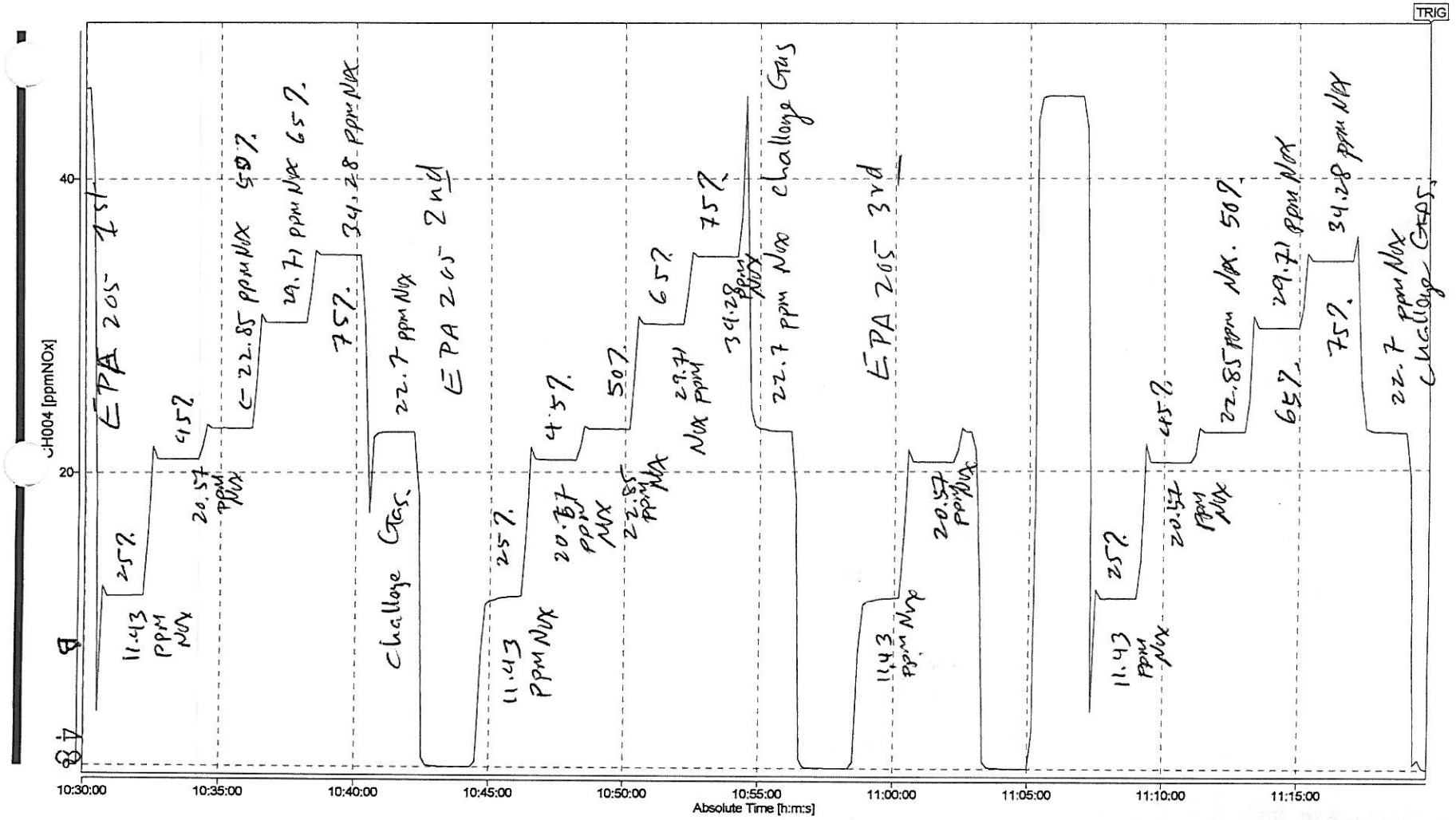
A/D Chan	Description	Gas Value	Monitor Value	Units
4	650081	11.43	11.36	ppmNOx
4	650081	20.57	20.59	ppmNOx
4	650081	22.7	22.52	ppmNOx
4	650081	22.85	22.61	ppmNOx
4	650081	29.71	29.74	ppmNOx
4	650081	34.28	34.38	ppmNOx

B 47

00216

File Message	:	2GA	Data Count	:	360
File Name	:	001136_00001101201_084210.DAE	Sampling Interval	:	10.000 sec
Device Type	:	DX2000	Start Time	:	2010/11/17 10:20:00.000
Serial No.	:	S5JB06571	Stop Time	:	2010/11/17 11:19:50.000
Time Correction	:	Done	Trigger Time	:	2010/11/17 11:19:50.000
Starting Condition	:	Manual	Trigger No.	:	359
Dividing Condition	:	Auto	Damage Check	:	Not Damaged
Meas Ch.	:	1	Started by	:	[Comm. In]
Math Ch.	:	0	Stopped by	:	[Running]
Ext Ch.	:	0			

Printed Group	:	GROUP 3
Printed Range	:	2010/11/17 10:30:00.000 - 2010/11/17 11:19:50.000
Comment	:	EPA 205



APPENDIX C

FACILITY PROCESS DATA

Exxon[illegible]l Torrance Refinery RATA[illegible]ort 28F-11 Facility CE[illegible]Data

UNIT 28F-11

PHD

Run #	Date & Time (Start Time)	NOx ppm	SOx ppm	Dry O2 %	Wet O2 %	Moisture %	Wet Flow wkscfh	Dry Flow dkscfh	Fuel Flow kscfd	HHV btu/scf	F-Factor dscf/mmBTU	NOx Mass lbs/day	SOx Mass lbs/day
1	9/14/2010 11:40	38.76	2.24	15.94	13.56	14.96	873.86	743.11	635.49	1,060.08	8,649.81	82.61	6.64
2	9/14/2010 12:45	38.02	2.11	15.96	13.61	14.77	878.61	748.83	643.75	1,046.20	8,638.07	81.65	6.30
3	9/14/2010 13:15	38.46	2.02	15.94	13.56	14.92	877.26	746.40	646.88	1,028.81	8,637.73	82.34	6.01
4	9/14/2010 13:45	38.72	2.08	15.94	13.58	14.83	878.09	747.85	645.78	1,033.88	8,632.02	83.05	6.20
5	9/14/2010 15:10	37.35	2.09	15.92	13.53	15.00	879.25	747.37	645.77	1,038.17	8,632.02	80.07	6.24
6	9/14/2010 15:40	36.84	2.10	15.93	13.55	14.88	880.05	749.06	656.24	1,028.36	8,629.00	79.15	6.27
7	9/14/2010 16:10	37.12	2.02	15.92	13.56	14.83	879.88	749.42	660.37	1,015.06	8,633.37	79.77	6.04
8	9/14/2010 17:25	37.22	2.08	15.89	13.53	14.86	876.67	746.45	654.50	1,028.10	8,637.06	79.68	6.18
9	9/14/2010 17:55	37.73	2.20	15.88	13.53	14.79	879.23	749.22	655.11	1,030.26	8,637.73	81.08	6.57
10	9/14/2010 18:25	37.86	2.07	15.87	13.50	14.93	879.77	748.45	658.52	1,040.17	8,642.43	81.28	6.19
Average		**37.81**	**2.10**	**15.92**	**13.55**	**14.88**	**878.27**	**747.61**	**650.24**	**1,034.91**	**8,636.92**	**81.07**	**6.27**

1M	9/14/2010 11:40 9/14/2010 12:09	NOx ppm	SOx ppm	Dry O2 %	Wet O2 %	Moisture %	Wet Flow wkscfh	Dry Flow dkscfh	Fuel Flow kscfd	HHV btu/scf	F-Factor dscf/mmBTU	NOx Mass lbs/day	SOx Mass lbs/day
1	9/14/2010 11:40	39.65	2.21	15.94	13.54	15.08	878.14	745.69	636.43	1,066.00	8,657.87	84.80	6.57
1	9/14/2010 11:41	39.59	2.17	15.92	13.60	14.55	880.37	752.26	627.76	1,066.00	8,657.87	85.42	6.50
1	9/14/2010 11:42	38.21	2.17	15.92	13.57	14.71	879.31	749.94	623.95	1,066.00	8,657.87	82.18	6.48
1	9/14/2010 11:43	38.23	2.29	15.89	13.55	14.72	873.17	744.62	629.54	1,066.00	8,657.87	81.65	6.80
1	9/14/2010 11:44	38.97	2.29	15.95	13.52	15.19	871.85	739.41	635.01	1,066.00	8,657.87	82.65	6.75
1	9/14/2010 11:45	39.61	2.44	15.90	13.59	14.52	872.92	746.21	645.03	1,066.00	8,657.87	84.78	7.26
1	9/14/2010 11:46	39.50	2.24	15.91	13.57	14.69	871.01	743.10	632.94	1,062.97	8,647.80	84.18	6.63
1	9/14/2010 11:47	38.91	2.37	15.94	13.56	14.89	875.33	744.96	630.32	1,062.97	8,647.80	83.14	7.03
1	9/14/2010 11:48	39.48	2.46	15.93	13.54	15.00	871.92	741.13	640.28	1,062.97	8,647.80	83.91	7.28
1	9/14/2010 11:49	38.77	2.19	15.96	13.55	15.10	865.24	734.60	629.41	1,062.97	8,647.80	81.68	6.42
1	9/14/2010 11:50	37.86	2.26	15.98	13.50	15.52	864.34	730.15	623.58	1,062.97	8,647.80	79.28	6.60
1	9/14/2010 11:51	38.77	2.32	15.92	13.55	14.88	866.27	737.33	647.21	1,062.97	8,647.80	81.98	6.81
1	9/14/2010 11:52	39.27	2.24	15.95	13.63	14.59	860.85	735.22	631.89	1,062.97	8,647.80	82.81	6.56
1	9/14/2010 11:53	38.17	2.19	15.95	13.54	15.08	865.63	735.10	625.76	1,062.97	8,647.80	80.47	6.42
1	9/14/2010 11:54	39.03	2.32	15.98	13.61	14.86	869.06	739.93	629.11	1,062.97	8,647.80	82.82	6.83
1	9/14/2010 11:55	37.76	2.14	16.01	13.58	15.16	872.49	740.23	639.70	1,062.97	8,647.80	80.15	6.32
1	9/14/2010 11:56	38.41	2.14	15.99	13.47	15.74	872.37	735.07	631.93	1,062.97	8,647.80	80.97	6.28
1	9/14/2010 11:57	39.02	2.26	15.95	13.56	14.99	876.86	745.46	626.79	1,062.97	8,647.80	83.41	6.73
1	9/14/2010 11:58	39.02	2.19	15.92	13.52	15.09	881.75	748.72	648.28	1,062.97	8,647.80	83.78	6.54
1	9/14/2010 11:59	38.69	2.19	15.89	13.57	14.59	886.77	757.38	634.85	1,062.97	8,647.80	84.05	6.62
1	9/14/2010 12:00	39.51	2.19	15.85	13.57	14.33	879.19	753.19	639.35	1,062.97	8,647.80	85.34	6.58
1	9/14/2010 12:01	37.99	2.11	15.95	13.55	15.06	873.77	742.16	643.29	1,062.97	8,647.80	80.85	6.25
1	9/14/2010 12:02	37.90	2.21	15.99	13.58	15.05	879.83	747.40	632.69	1,062.97	8,647.80	81.25	6.59
1	9/14/2010 12:03	38.21	2.21	15.93	13.60	14.62	882.50	753.50	635.71	1,047.98	8,647.80	82.57	6.64
1	9/14/2010 12:04	38.95	2.21	15.95	13.61	14.70	880.25	750.89	647.71	1,047.98	8,647.80	83.88	6.62
1	9/14/2010 12:05	39.34	2.26	15.96	13.54	15.14	868.39	736.95	637.66	1,047.98	8,647.80	83.16	6.66
1	9/14/2010 12:06	37.97	2.14	15.98	13.49	15.60	862.03	727.59	649.92	1,047.98	8,647.80	79.24	6.21
1	9/14/2010 12:07	39.04	2.29	15.97	13.55	15.14	876.31	743.62	642.61	1,047.98	8,647.80	83.27	6.79
1	9/14/2010 12:08	38.37	2.26	15.96	13.49	15.48	880.27	744.00	632.66	1,047.98	8,647.80	81.88	6.72
1	9/14/2010 12:09	38.65	2.21	15.89	13.53	14.82	877.53	747.46	633.35	1,047.98	8,647.80	82.86	6.59
	Average	**38.76**	**2.24**	**15.94**	**13.56**	**14.96**	**873.86**	**743.11**	**635.49**	**1,060.08**	**8,649.81**	**82.61**	**6.64**

1M	9/14/2010 12:45 9/14/2010 13:14	NOx ppm	SOx ppm	Dry O2 %	Wet O2 %	Moisture %	Wet Flow wkscfh	Dry Flow dkscfh	Fuel Flow kscfd	HHV btu/scf	F-Factor dscf/mmBTU	NOx Mass lbs/day	SOx Mass lbs/day
2	9/14/2010 12:45	38.62	2.46	16.09	13.60	15.47	885.74	748.71	629.89	1,062.97	8,657.87	82.93	7.36
2	9/14/2010 12:46	38.80	2.26	15.87	13.53	14.77	881.00	750.86	624.03	1,062.97	8,657.87	83.55	6.78
2	9/14/2010 12:47	38.14	2.03	15.87	13.56	14.55	874.58	747.32	635.57	1,062.97	8,657.87	81.74	6.06
2	9/14/2010 12:48	37.82	2.09	16.00	13.54	15.35	869.83	736.33	641.71	1,062.97	8,657.87	79.87	6.14
2	9/14/2010 12:49	38.23	2.19	15.95	13.51	15.29	873.28	739.75	636.85	1,062.97	8,657.87	81.11	6.46
2	9/14/2010 12:50	37.44	2.14	15.95	13.61	14.68	880.63	751.35	630.41	1,062.97	8,657.87	80.67	6.41
2	9/14/2010 12:51	37.33	1.99	15.91	13.60	14.50	876.26	749.23	643.26	1,062.97	8,657.87	80.22	5.95
2	9/14/2010 12:52	38.27	1.99	15.90	13.68	13.95	882.11	759.02	627.89	1,062.97	8,657.87	83.31	6.03
2	9/14/2010 12:53	37.62	2.26	16.03	13.59	15.18	886.72	752.14	632.14	1,062.97	8,657.87	81.16	6.79
2	9/14/2010 12:54	38.55	2.24	15.98	13.50	15.51	886.00	748.61	644.60	1,039.02	8,627.66	82.77	6.68
2	9/14/2010 12:55	38.69	2.26	15.94	13.56	14.92	881.66	750.11	649.80	1,039.02	8,627.66	83.24	6.78
2	9/14/2010 12:56	38.71	2.17	15.93	13.60	14.63	878.57	750.03	657.89	1,039.02	8,627.66	83.28	6.49
2	9/14/2010 12:57	36.94	2.29	16.04	13.68	14.75	876.33	747.07	659.65	1,039.02	8,627.66	79.16	6.82
2	9/14/2010 12:58	38.52	2.24	15.99	13.63	14.81	875.46	745.82	664.98	1,039.02	8,627.66	82.39	6.66
2	9/14/2010 12:59	37.80	2.19	15.93	13.59	14.65	878.78	750.01	647.78	1,039.02	8,627.66	81.31	6.55
2	9/14/2010 13:00	39.34	2.14	15.92	13.62	14.48	877.51	750.43	643.78	1,039.02	8,627.66	84.68	6.41
2	9/14/2010 13:01	38.60	2.19	15.96	13.59	14.86	871.97	742.43	650.96	1,039.02	8,627.66	82.20	6.49
2	9/14/2010 13:02	37.72	2.09	16.00	13.55	15.27	872.54	739.27	641.83	1,039.02	8,627.66	79.97	6.16
2	9/14/2010 13:03	37.76	2.09	15.93	13.51	15.20	871.80	739.29	639.46	1,039.02	8,627.66	80.05	6.16
2	9/14/2010 13:04	37.57	2.01	15.91	13.58	14.63	876.78	748.55	663.70	1,039.02	8,627.66	80.66	6.00
2	9/14/2010 13:05	37.57	2.01	15.91	13.58	14.63	884.10	754.79	655.39	1,039.02	8,627.66	81.33	6.05
2	9/14/2010 13:06	37.16	2.01	16.00	13.57	15.19	887.99	753.08	634.98	1,039.02	8,627.66	80.25	6.04
2	9/14/2010 13:07	37.16	2.01	16.00	13.57	15.19	881.66	747.71	631.36	1,039.02	8,627.66	79.68	6.00
2	9/14/2010 13:08	38.75	1.94	15.92	13.74	13.70	874.19	754.44	645.65	1,039.02	8,627.66	83.84	5.84
2	9/14/2010 13:09	37.55	1.94	15.99	13.69	14.38	875.97	750.02	638.50	1,039.02	8,627.66	80.78	5.81
2	9/14/2010 13:10	38.15	2.09	15.99	13.61	14.89	877.77	747.07	636.81	1,039.02	8,627.66	81.74	6.23
2	9/14/2010 13:11	37.46	1.99	16.00	13.79	13.80	881.40	759.74	654.02	1,039.02	8,637.73	81.62	6.04
2	9/14/2010 13:12	38.41	2.01	16.06	13.64	15.11	879.49	746.59	655.62	1,039.02	8,637.73	82.24	5.99
2	9/14/2010 13:13	37.71	2.01	15.95	13.69	14.17	877.22	752.95	649.51	1,039.02	8,637.73	81.43	6.04
2	9/14/2010 13:14	38.22	1.96	16.03	13.69	14.61	880.96	752.26	644.50	1,039.02	8,637.73	82.46	5.90
	Average	**38.02**	**2.11**	**15.96**	**13.61**	**14.77**	**878.61**	**748.83**	**643.75**	**1,046.20**	**8,638.07**	**81.65**	**6.30**

1M	9/14/2010 13:15 9/14/2010 13:44	NOx ppm	SOx ppm	Dry O2 %	Wet O2 %	Moisture %	Wet Flow wkscfh	Dry Flow dkscfh	Fuel Flow kscfd	HHV btu/scf	F-Factor dscf/mmBTU	NOx Mass lbs/day	SOx Mass lbs/day
3	9/14/2010 13:15	37.42	2.03	15.98	13.55	15.22	881.99	747.73	644.85	1,039.02	8,637.73	80.24	6.07
3	9/14/2010 13:16	38.88	1.99	15.95	13.67	14.30	883.19	756.93	660.64	1,039.02	8,637.73	84.40	6.02
3	9/14/2010 13:17	38.40	2.01	16.02	13.60	15.14	881.95	748.45	648.38	1,039.02	8,637.73	82.42	6.00
3	9/14/2010 13:18	39.02	1.89	15.94	13.53	15.10	873.91	741.92	655.27	1,039.02	8,637.73	83.02	5.58
3	9/14/2010 13:19	39.10	1.99	15.95	13.55	15.06	871.29	740.06	647.17	1,039.02	8,637.73	82.98	5.88
3	9/14/2010 13:20	38.73	2.01	15.92	13.49	15.27	872.03	738.88	645.20	1,039.02	8,637.73	82.06	5.93
3	9/14/2010 13:21	38.10	2.01	15.95	13.60	14.76	874.03	745.04	645.80	1,039.02	8,637.73	81.40	5.98
3	9/14/2010 13:22	38.21	1.99	15.87	13.56	14.60	875.68	747.80	651.41	1,039.02	8,637.73	81.95	5.94
3	9/14/2010 13:23	38.70	1.96	15.91	13.71	13.80	870.17	750.09	636.38	1,039.02	8,637.73	83.26	5.88
3	9/14/2010 13:24	38.94	2.03	15.95	13.58	14.87	870.69	741.23	650.94	1,039.02	8,637.73	82.79	6.01
3	9/14/2010 13:25	37.19	2.01	15.93	13.62	14.50	880.88	753.14	655.33	1,039.02	8,637.73	80.33	6.04
3	9/14/2010 13:26	38.88	2.03	15.83	13.63	13.89	887.10	763.90	645.03	1,039.02	8,637.73	85.18	6.20
3	9/14/2010 13:27	38.99	2.11	15.93	13.58	14.73	880.27	750.58	646.06	1,039.02	8,637.73	83.94	6.32
3	9/14/2010 13:28	38.13	2.01	15.98	13.48	15.68	875.30	738.06	653.35	1,021.00	8,637.73	80.71	5.92
3	9/14/2010 13:29	38.15	1.94	15.92	13.54	14.94	875.23	744.50	641.19	1,021.00	8,637.73	81.46	5.77
3	9/14/2010 13:30	39.51	2.01	15.94	13.50	15.31	877.33	743.03	641.39	1,021.00	8,637.73	84.19	5.96
3	9/14/2010 13:31	38.55	2.01	15.96	13.57	14.98	882.06	749.94	648.12	1,021.00	8,637.73	82.91	6.02
3	9/14/2010 13:32	38.65	2.03	15.91	13.57	14.66	881.16	752.00	645.91	1,021.00	8,637.73	83.37	6.10
3	9/14/2010 13:33	38.64	1.99	15.97	13.63	14.61	879.06	750.60	642.20	1,021.00	8,637.73	83.19	5.97
3	9/14/2010 13:34	37.84	2.14	15.96	13.61	14.69	875.44	746.81	646.05	1,021.00	8,637.73	81.04	6.38
3	9/14/2010 13:35	38.76	2.14	16.04	13.57	15.38	874.03	739.63	653.67	1,021.00	8,637.73	82.21	6.31
3	9/14/2010 13:36	39.09	2.17	15.93	13.54	15.01	881.09	748.87	654.10	1,021.00	8,637.73	83.95	6.48
3	9/14/2010 13:37	38.92	2.14	15.95	13.41	15.93	884.02	743.16	637.99	1,021.00	8,637.73	82.96	6.34
3	9/14/2010 13:38	38.93	1.94	15.90	13.51	14.99	879.40	747.61	642.18	1,021.00	8,637.73	83.48	5.79
3	9/14/2010 13:39	38.90	1.96	15.92	13.55	14.91	874.84	744.36	648.65	1,021.00	8,637.73	83.05	5.83
3	9/14/2010 13:40	37.25	2.03	15.93	13.54	14.96	874.84	744.00	636.24	1,021.00	8,637.73	79.49	6.04
3	9/14/2010 13:41	38.53	1.94	15.90	13.53	14.92	872.08	741.97	638.05	1,021.00	8,637.73	81.99	5.75
3	9/14/2010 13:42	38.37	1.96	15.93	13.56	14.90	871.65	741.74	652.17	1,021.00	8,637.73	81.61	5.81
3	9/14/2010 13:43	37.20	2.09	16.00	13.66	14.66	883.31	753.83	642.46	1,021.00	8,637.73	80.43	6.28
3	9/14/2010 13:44	37.93	1.96	15.98	13.46	15.76	873.71	736.00	650.17	1,021.00	8,637.73	80.07	5.77
	Average	**38.46**	**2.02**	**15.94**	**13.56**	**14.92**	**877.26**	**746.40**	**646.88**	**1,028.81**	**8,637.73**	**82.34**	**6.01**

1M	9/14/2010 13:45 9/14/2010 14:14	NOx ppm	SOx ppm	Dry O2 %	Wet O2 %	Moisture %	Wet Flow wkscfh	Dry Flow dkscfh	Fuel Flow kscfd	HHV btu/scf	F-Factor dscf/mmBTU	NOx Mass lbs/day	SOx Mass lbs/day
4	9/14/2010 13:45	37.95	2.06	15.99	13.50	15.55	882.81	745.52	647.66	1,029.96	8,627.66	81.15	6.13
4	9/14/2010 13:46	38.70	2.06	16.01	13.57	15.26	887.77	752.31	655.88	1,029.96	8,627.66	83.51	6.19
4	9/14/2010 13:47	37.99	2.14	15.92	13.69	14.03	884.29	760.24	653.93	1,029.96	8,627.66	82.82	6.49
4	9/14/2010 13:48	38.42	1.96	15.96	13.54	15.18	888.33	753.52	665.92	1,029.96	8,627.66	83.02	5.91
4	9/14/2010 13:49	37.95	2.09	15.95	13.55	15.09	889.12	754.96	643.09	1,029.96	8,627.66	82.17	6.29
4	9/14/2010 13:50	38.62	2.06	15.87	13.52	14.76	886.12	755.36	649.61	1,029.96	8,627.66	83.67	6.21
4	9/14/2010 13:51	39.14	1.96	15.87	13.54	14.65	884.10	754.62	652.18	1,029.96	8,627.66	84.70	5.91
4	9/14/2010 13:52	38.90	1.94	15.93	13.58	14.78	883.70	753.09	649.66	1,029.96	8,627.66	84.02	5.83
4	9/14/2010 13:53	39.33	1.94	15.87	13.52	14.81	876.71	746.90	648.53	1,029.96	8,627.66	84.25	5.79
4	9/14/2010 13:54	39.11	2.03	15.93	13.55	14.95	875.83	744.86	643.71	1,029.96	8,627.66	83.55	6.04
4	9/14/2010 13:55	39.81	1.94	15.89	13.60	14.40	876.55	750.33	629.07	1,029.96	8,627.66	85.66	5.81
4	9/14/2010 13:56	38.87	2.01	15.94	13.56	14.97	874.05	743.20	640.54	1,029.96	8,627.66	82.85	5.96
4	9/14/2010 13:57	38.09	2.11	15.94	13.67	14.27	870.55	746.36	639.75	1,029.96	8,627.66	81.53	6.29
4	9/14/2010 13:58	39.20	2.11	15.92	13.67	14.12	872.11	749.01	641.92	1,029.96	8,627.66	84.21	6.31
4	9/14/2010 13:59	38.56	2.03	15.98	13.60	14.89	878.61	747.82	647.69	1,029.96	8,627.66	82.70	6.07
4	9/14/2010 14:00	38.37	2.01	15.97	13.66	14.45	875.40	748.90	646.18	1,029.96	8,627.66	82.42	6.01
4	9/14/2010 14:01	37.51	2.09	16.06	13.56	15.58	869.37	733.95	653.36	1,029.96	8,627.66	78.95	6.12
4	9/14/2010 14:02	38.50	2.14	16.02	13.56	15.38	881.39	745.86	654.80	1,039.02	8,637.73	82.36	6.37
4	9/14/2010 14:03	38.71	2.09	15.87	13.49	14.97	881.10	749.21	646.88	1,039.02	8,637.73	83.19	6.24
4	9/14/2010 14:04	38.69	1.99	15.97	13.56	15.09	877.22	744.83	641.17	1,039.02	8,637.73	82.66	5.92
4	9/14/2010 14:05	39.58	1.89	15.92	13.54	14.95	877.16	746.06	656.50	1,039.02	8,637.73	84.69	5.61
4	9/14/2010 14:06	39.02	2.06	15.99	13.64	14.68	877.19	748.40	639.36	1,039.02	8,637.73	83.74	6.15
4	9/14/2010 14:07	39.19	2.17	15.95	13.48	15.48	876.09	740.48	639.84	1,039.02	8,637.73	83.23	6.40
4	9/14/2010 14:08	38.88	2.03	15.86	13.65	13.92	874.07	752.37	645.63	1,039.02	8,637.73	83.89	6.10
4	9/14/2010 14:09	37.88	2.09	16.01	13.62	14.94	880.55	748.98	615.92	1,039.02	8,637.73	81.37	6.24
4	9/14/2010 14:10	38.29	2.01	15.96	13.60	14.79	876.64	747.01	625.24	1,039.02	8,637.73	82.04	5.99
4	9/14/2010 14:11	39.43	1.99	15.94	13.84	13.17	867.21	752.96	627.66	1,039.02	8,637.73	85.14	5.98
4	9/14/2010 14:12	38.50	2.52	16.05	13.64	14.98	868.34	738.28	660.59	1,039.02	8,637.73	81.52	7.42
4	9/14/2010 14:13	38.88	2.62	15.99	13.48	15.72	874.03	736.65	656.61	1,039.02	8,637.73	82.14	7.70
4	9/14/2010 14:14	39.59	2.21	15.78	13.39	15.14	876.21	743.56	654.49	1,039.02	8,637.73	84.43	6.55
	Average	**38.72**	**2.08**	**15.94**	**13.58**	**14.83**	**878.09**	**747.85**	**645.78**	**1,033.88**	**8,632.02**	**83.05**	**6.20**

1M	9/14/2010 15:10 9/14/2010 15:39	NOx ppm	SOx ppm	Dry O2 %	Wet O2 %	Moisture %	Wet Flow wkscfh	Dry Flow dkscfh	Fuel Flow kscfd	HHV btu/scf	F-Factor dscf/mmBTU	NOx Mass lbs/day	SOx Mass lbs/day
5	9/14/2010 15:10	37.40	2.09	15.97	13.58	14.96	877.56	746.25	636.16	1,032.98	8,627.66	80.04	6.22
5	9/14/2010 15:11	37.53	2.14	15.90	13.56	14.75	872.08	743.40	650.62	1,032.98	8,627.66	80.02	6.35
5	9/14/2010 15:12	37.10	2.14	15.90	13.54	14.82	879.71	749.34	646.22	1,032.98	8,627.66	79.73	6.40
5	9/14/2010 15:13	37.48	2.11	15.94	13.54	15.05	875.64	743.86	634.78	1,032.98	8,627.66	79.96	6.27
5	9/14/2010 15:14	37.79	2.03	15.90	13.44	15.42	867.21	733.47	654.89	1,032.98	8,627.66	79.49	5.95
5	9/14/2010 15:15	37.92	2.11	15.93	13.40	15.87	869.20	731.24	633.29	1,032.98	8,627.66	79.53	6.16
5	9/14/2010 15:16	37.76	2.09	15.83	13.50	14.74	875.27	746.26	651.67	1,032.98	8,627.66	80.81	6.22
5	9/14/2010 15:17	36.93	2.19	15.97	13.56	15.09	882.04	748.93	651.92	1,032.98	8,627.66	79.33	6.54
5	9/14/2010 15:18	37.64	2.19	15.97	13.51	15.40	888.92	752.03	648.35	1,032.98	8,627.66	81.17	6.57
5	9/14/2010 15:19	38.43	2.14	15.95	13.56	14.95	886.58	754.01	643.45	1,032.98	8,627.66	83.10	6.44
5	9/14/2010 15:20	37.87	2.06	15.87	13.52	14.81	873.91	744.51	641.16	1,032.98	8,627.66	80.86	6.12
5	9/14/2010 15:21	37.49	2.03	15.92	13.57	14.72	868.56	740.68	652.20	1,032.98	8,627.66	79.64	6.01
5	9/14/2010 15:22	36.97	2.09	15.95	13.52	15.28	864.63	732.49	644.21	1,032.98	8,627.66	77.66	6.10
5	9/14/2010 15:23	36.97	2.09	15.95	13.52	15.28	873.45	739.97	644.15	1,032.98	8,627.66	78.45	6.17
5	9/14/2010 15:24	37.88	2.01	15.94	13.61	14.65	885.33	755.65	660.80	1,032.98	8,627.66	82.10	6.06
5	9/14/2010 15:25	37.32	2.06	15.91	13.61	14.46	884.40	756.53	650.70	1,032.98	8,627.66	80.98	6.22
5	9/14/2010 15:26	37.38	2.19	15.99	13.67	14.48	884.46	756.39	659.70	1,032.98	8,627.66	81.08	6.61
5	9/14/2010 15:27	37.18	2.21	15.90	13.52	14.92	886.93	754.62	661.69	1,044.95	8,637.73	80.47	6.65
5	9/14/2010 15:28	36.84	2.01	15.97	13.52	15.36	889.24	752.64	663.99	1,044.95	8,637.73	79.52	6.04
5	9/14/2010 15:29	38.05	2.03	15.83	13.36	15.60	884.92	746.90	666.02	1,044.95	8,637.73	81.50	6.06
5	9/14/2010 15:30	37.48	2.01	15.88	13.53	14.79	877.49	747.66	658.56	1,044.95	8,637.73	80.37	6.00
5	9/14/2010 15:31	37.05	1.99	15.86	13.53	14.70	876.69	747.82	653.90	1,044.95	8,637.73	79.46	5.94
5	9/14/2010 15:32	36.94	1.96	15.88	13.46	15.26	880.72	746.37	622.50	1,044.95	8,637.73	79.08	5.85
5	9/14/2010 15:33	36.33	2.06	15.89	13.60	14.37	883.86	756.84	597.54	1,044.95	8,637.73	78.85	6.22
5	9/14/2010 15:34	37.21	2.11	15.94	13.64	14.41	879.14	752.46	606.70	1,044.95	8,637.73	80.31	6.34
5	9/14/2010 15:35	37.33	2.17	15.97	13.57	15.04	875.82	744.10	631.22	1,044.95	8,637.73	79.67	6.43
5	9/14/2010 15:36	36.57	2.06	16.04	13.55	15.56	888.61	750.36	648.76	1,044.95	8,637.73	78.70	6.17
5	9/14/2010 15:37	37.44	2.17	15.92	13.57	14.77	893.00	761.08	656.39	1,044.95	8,637.73	81.72	6.58
5	9/14/2010 15:38	37.16	2.17	15.90	13.51	15.04	882.83	750.08	651.66	1,044.95	8,637.73	79.94	6.49
5	9/14/2010 15:39	37.22	2.09	15.92	13.47	15.41	869.23	735.27	649.98	1,044.95	8,637.73	78.50	6.13
	Average	**37.35**	**2.09**	**15.92**	**13.53**	**15.00**	**879.25**	**747.37**	**645.77**	**1,038.17**	**8,632.02**	**80.07**	**6.24**

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1M	9/14/2010 15:40 9/14/2010 16:09	NOx ppm	SOx ppm	Dry O2 %	Wet O2 %	Moisture %	Wet Flow wkscfh	Dry Flow dkscfh	Fuel Flow kscfd	HHV btu/scf	F-Factor dscf/mmBTU	NOx Mass lbs/day	SOx Mass lbs/day
6	9/14/2010 15:40	37.22	2.17	16.02	13.53	15.51	871.42	736.28	645.57	1,044.95	8,637.73	78.60	6.37
6	9/14/2010 15:41	35.89	2.17	16.02	13.62	14.96	879.88	748.21	648.02	1,044.95	8,637.73	77.02	6.47
6	9/14/2010 15:42	37.05	2.14	15.95	13.56	15.01	879.54	747.50	648.20	1,044.95	8,637.73	79.44	6.38
6	9/14/2010 15:43	36.70	2.06	15.95	13.64	14.45	878.50	751.52	663.07	1,044.95	8,637.73	79.10	6.18
6	9/14/2010 15:44	36.06	2.14	15.91	13.54	14.86	878.92	748.28	644.82	1,029.96	8,627.66	77.38	6.39
6	9/14/2010 15:45	36.95	2.34	15.90	13.60	14.42	883.39	755.97	672.11	1,029.96	8,627.66	80.12	7.07
6	9/14/2010 15:46	36.97	2.34	15.94	13.59	14.72	884.77	754.55	661.67	1,029.96	8,627.66	80.01	7.05
6	9/14/2010 15:47	37.02	2.21	15.87	13.52	14.83	882.11	751.32	670.99	1,029.96	8,627.66	79.76	6.62
6	9/14/2010 15:48	37.43	2.01	15.82	13.46	14.89	881.01	749.85	661.46	1,029.96	8,627.66	80.49	6.01
6	9/14/2010 15:49	37.14	2.09	15.87	13.51	14.85	877.48	747.14	653.93	1,029.96	8,627.66	79.58	6.23
6	9/14/2010 15:50	36.87	2.03	15.92	13.53	15.02	879.95	747.82	653.89	1,029.96	8,627.66	79.08	6.07
6	9/14/2010 15:51	37.72	2.14	15.89	13.59	14.48	885.07	756.95	649.87	1,029.96	8,627.66	81.88	6.46
6	9/14/2010 15:52	37.05	2.19	15.97	13.63	14.67	878.61	749.69	646.35	1,029.96	8,627.66	79.67	6.55
6	9/14/2010 15:53	36.89	1.99	15.92	13.56	14.77	868.13	739.87	647.54	1,029.96	8,627.66	78.28	5.88
6	9/14/2010 15:54	37.45	2.01	15.85	13.56	14.44	871.44	745.62	644.03	1,029.96	8,627.66	80.08	5.98
6	9/14/2010 15:55	37.40	2.01	15.94	13.61	14.60	878.54	750.31	653.21	1,029.96	8,627.66	80.48	6.02
6	9/14/2010 15:56	37.16	2.06	15.99	13.58	15.08	881.39	748.47	652.13	1,029.96	8,627.66	79.76	6.16
6	9/14/2010 15:57	37.25	1.96	15.97	13.50	15.46	874.43	739.26	638.21	1,029.96	8,627.66	78.98	5.79
6	9/14/2010 15:58	36.84	2.03	15.90	13.44	15.46	874.24	739.05	655.45	1,029.96	8,627.66	78.09	6.00
6	9/14/2010 15:59	36.92	2.01	15.92	13.61	14.53	882.66	754.45	641.44	1,029.96	8,627.66	79.89	6.05
6	9/14/2010 16:00	36.13	2.17	15.98	13.53	15.36	877.41	742.62	644.07	1,029.96	8,627.66	76.95	6.42
6	9/14/2010 16:01	36.26	2.03	15.92	13.69	14.00	870.38	748.53	654.44	1,017.98	8,627.66	77.85	6.07
6	9/14/2010 16:02	35.44	2.24	15.96	13.50	15.38	870.34	736.51	657.25	1,017.98	8,627.66	74.86	6.57
6	9/14/2010 16:03	36.30	2.17	15.98	13.62	14.82	880.19	749.75	682.50	1,017.98	8,627.66	78.06	6.48
6	9/14/2010 16:04	36.90	2.01	15.95	13.51	15.34	890.77	754.17	680.46	1,017.98	8,627.66	79.82	6.05
6	9/14/2010 16:05	37.22	1.94	15.97	13.55	15.14	894.52	759.07	669.78	1,017.98	8,627.66	81.04	5.88
6	9/14/2010 16:06	36.69	2.06	15.86	13.50	14.89	888.47	756.16	652.84	1,017.98	8,627.66	79.56	6.22
6	9/14/2010 16:07	36.36	2.06	15.87	13.48	15.02	888.90	755.42	667.29	1,017.98	8,627.66	78.77	6.21
6	9/14/2010 16:08	36.39	2.11	15.85	13.51	14.77	885.17	754.47	660.55	1,017.98	8,627.66	78.73	6.36
6	9/14/2010 16:09	37.52	2.01	15.90	13.54	14.81	883.82	752.95	666.09	1,017.98	8,627.66	81.02	6.04
	Average	**36.84**	**2.10**	**15.93**	**13.55**	**14.88**	**880.05**	**749.06**	**656.24**	**1,028.36**	**8,629.00**	**79.15**	**6.27**

1M	9/14/2010 16:10 9/14/2010 16:39	NOx ppm	SOx ppm	Dry O2 %	Wet O2 %	Moisture %	Wet Flow wkscfh	Dry Flow dkscfh	Fuel Flow kscfd	HHV btu/scf	F-Factor dscf/mmBTU	NOx Mass lbs/day	SOx Mass lbs/day
7	9/14/2010 16:10	36.00	2.17	15.90	13.54	14.82	882.66	751.84	667.37	1,017.98	8,627.66	77.62	6.50
7	9/14/2010 16:11	37.23	2.14	15.92	13.46	15.43	880.79	744.86	672.27	1,017.98	8,627.66	79.53	6.36
7	9/14/2010 16:12	36.93	2.06	15.87	13.51	14.92	882.38	750.75	659.29	1,017.98	8,627.66	79.52	6.17
7	9/14/2010 16:13	37.91	2.14	15.89	13.53	14.85	889.82	757.69	672.74	1,017.98	8,627.66	82.39	6.47
7	9/14/2010 16:14	36.09	2.01	15.89	13.59	14.46	895.61	766.07	657.74	1,017.98	8,627.66	79.29	6.15
7	9/14/2010 16:15	37.93	2.03	15.99	13.53	15.40	889.62	752.60	664.81	1,017.98	8,627.66	81.87	6.11
7	9/14/2010 16:16	36.62	2.03	15.94	13.67	14.23	887.27	760.98	664.13	1,017.98	8,627.66	79.93	6.17
7	9/14/2010 16:17	38.06	1.94	15.91	13.42	15.68	882.84	744.41	669.65	1,017.98	8,627.66	81.25	5.77
7	9/14/2010 16:18	37.96	2.06	15.86	13.55	14.56	884.75	755.94	666.03	1,011.94	8,637.73	82.31	6.22
7	9/14/2010 16:19	37.93	2.03	15.84	13.61	14.09	884.20	759.63	653.56	1,011.94	8,637.73	82.64	6.16
7	9/14/2010 16:20	37.12	1.94	15.93	13.62	14.52	880.41	752.58	665.79	1,011.94	8,637.73	80.12	5.83
7	9/14/2010 16:21	36.84	1.94	16.00	13.63	14.83	883.46	752.43	660.53	1,011.94	8,637.73	79.50	5.83
7	9/14/2010 16:22	37.67	1.91	15.87	13.51	14.90	875.78	745.25	653.31	1,011.94	8,637.73	80.52	5.69
7	9/14/2010 16:23	38.10	2.01	15.88	13.54	14.75	875.13	746.07	667.67	1,011.94	8,637.73	81.51	5.98
7	9/14/2010 16:24	36.36	1.89	15.91	13.64	14.30	881.01	755.02	646.81	1,011.94	8,637.73	78.74	5.68
7	9/14/2010 16:25	36.38	1.99	16.00	13.61	14.95	887.32	754.64	670.23	1,011.94	8,637.73	78.73	6.00
7	9/14/2010 16:26	35.51	1.84	15.94	13.63	14.49	883.65	755.59	663.84	1,011.94	8,637.73	76.95	5.53
7	9/14/2010 16:27	37.33	1.94	15.92	13.49	15.25	874.73	741.32	672.76	1,011.94	8,637.73	79.37	5.74
7	9/14/2010 16:28	37.96	2.09	15.87	13.46	15.19	872.79	740.18	662.79	1,011.94	8,637.73	80.59	6.17
7	9/14/2010 16:29	37.57	2.03	15.94	13.61	14.62	876.89	748.68	651.50	1,011.94	8,637.73	80.67	6.07
7	9/14/2010 16:30	36.07	2.11	15.97	13.46	15.68	873.33	736.36	654.24	1,011.94	8,637.73	76.17	6.20
7	9/14/2010 16:31	37.52	2.11	15.86	13.54	14.64	875.06	746.97	657.71	1,011.94	8,637.73	80.38	6.29
7	9/14/2010 16:32	37.76	2.09	15.88	13.47	15.17	876.14	743.26	657.10	1,011.94	8,637.73	80.48	6.19
7	9/14/2010 16:33	36.90	2.24	15.93	13.49	15.35	880.20	745.06	651.42	1,011.94	8,637.73	78.85	6.65
7	9/14/2010 16:34	36.53	2.03	15.91	13.56	14.77	874.98	745.75	662.24	1,011.94	8,637.73	78.14	6.05
7	9/14/2010 16:35	36.89	2.03	15.90	13.53	14.89	871.55	741.76	650.86	1,021.00	8,627.66	78.48	6.02
7	9/14/2010 16:36	37.27	2.03	15.91	13.61	14.51	871.05	744.70	649.20	1,021.00	8,627.66	79.61	6.04
7	9/14/2010 16:37	37.12	1.86	15.93	13.64	14.40	871.55	746.09	654.21	1,021.00	8,627.66	79.43	5.53
7	9/14/2010 16:38	36.71	1.96	15.93	13.65	14.28	872.75	748.13	646.04	1,021.00	8,627.66	78.78	5.86
7	9/14/2010 16:39	37.18	1.94	15.97	13.59	14.88	878.73	747.94	665.25	1,021.00	8,627.66	79.76	5.79
	Average	**37.12**	**2.02**	**15.92**	**13.56**	**14.83**	**879.88**	**749.42**	**660.37**	**1,015.06**	**8,633.37**	**79.77**	**6.04**

1M	9/14/2010 17:25 9/14/2010 17:54	NOx ppm	SOx ppm	Dry O2 %	Wet O2 %	Moisture %	Wet Flow wkscfh	Dry Flow dkscfh	Fuel Flow kscfd	HHV btu/scf	F-Factor dscf/mmBTU	NOx Mass lbs/day	SOx Mass lbs/day
8	9/14/2010 17:25	36.75	2.03	15.89	13.53	14.85	868.97	739.88	654.90	1,036.00	8,627.66	77.98	6.00
8	9/14/2010 17:26	37.17	1.99	15.85	13.51	14.78	871.78	742.93	643.80	1,036.00	8,627.66	79.20	5.90
8	9/14/2010 17:27	36.71	1.99	15.87	13.48	15.03	879.75	747.49	654.75	1,024.02	8,637.73	78.70	5.94
8	9/14/2010 17:28	37.76	2.03	15.94	13.63	14.50	884.41	756.18	646.86	1,024.02	8,637.73	81.88	6.14
8	9/14/2010 17:29	36.97	2.01	15.91	13.58	14.61	881.10	752.41	651.61	1,024.02	8,637.73	79.77	6.04
8	9/14/2010 17:30	36.86	2.26	15.92	13.59	14.59	878.44	750.31	653.13	1,024.02	8,637.73	79.32	6.78
8	9/14/2010 17:31	36.80	2.03	16.01	13.43	16.15	878.28	736.43	650.15	1,024.02	8,637.73	77.72	5.98
8	9/14/2010 17:32	36.99	2.01	15.96	13.57	14.99	872.30	741.58	644.28	1,024.02	8,637.73	78.68	5.95
8	9/14/2010 17:33	37.22	1.99	15.91	13.58	14.61	875.52	747.64	660.84	1,024.02	8,637.73	79.82	5.94
8	9/14/2010 17:34	37.59	2.17	15.90	13.61	14.42	877.36	750.88	648.94	1,024.02	8,637.73	80.95	6.49
8	9/14/2010 17:35	36.74	2.21	15.91	13.49	15.21	872.20	739.49	651.41	1,024.02	8,637.73	77.91	6.52
8	9/14/2010 17:36	37.07	2.03	15.86	13.59	14.33	876.54	750.97	650.90	1,024.02	8,637.73	79.83	6.09
8	9/14/2010 17:37	36.21	2.11	15.88	13.50	14.98	877.65	746.17	655.15	1,024.02	8,637.73	77.49	6.29
8	9/14/2010 17:38	37.52	2.01	15.86	13.65	13.94	881.25	758.39	653.42	1,024.02	8,637.73	81.61	6.08
8	9/14/2010 17:39	36.11	2.24	15.88	13.55	14.67	887.92	757.68	665.02	1,024.02	8,637.73	78.46	6.76
8	9/14/2010 17:40	37.21	2.24	15.85	13.56	14.44	880.46	753.29	662.69	1,024.02	8,637.73	80.40	6.72
8	9/14/2010 17:41	37.22	2.11	15.84	13.50	14.78	877.32	747.63	659.93	1,024.02	8,637.73	79.82	6.30
8	9/14/2010 17:42	37.71	2.03	15.88	13.47	15.16	884.06	750.03	655.35	1,024.02	8,637.73	81.11	6.09
8	9/14/2010 17:43	38.27	2.01	15.91	13.54	14.92	878.52	747.41	649.94	1,024.02	8,637.73	82.04	6.00
8	9/14/2010 17:44	36.78	2.11	15.82	13.52	14.54	874.87	747.64	660.95	1,032.98	8,637.73	78.86	6.30
8	9/14/2010 17:45	36.14	2.03	15.87	13.51	14.86	872.83	743.13	647.84	1,032.98	8,637.73	77.02	6.03
8	9/14/2010 17:46	37.60	2.19	15.88	13.40	15.62	873.42	736.99	660.10	1,032.98	8,637.73	79.48	6.44
8	9/14/2010 17:47	37.10	1.94	15.95	13.61	14.72	877.82	748.59	652.23	1,032.98	8,637.73	79.65	5.80
8	9/14/2010 17:48	37.31	2.01	15.84	13.52	14.62	878.13	749.70	660.07	1,032.98	8,637.73	80.23	6.01
8	9/14/2010 17:49	37.45	2.01	15.93	13.49	15.32	879.95	745.11	659.16	1,032.98	8,637.73	80.03	5.98
8	9/14/2010 17:50	37.05	2.14	15.92	13.57	14.74	882.14	752.11	662.50	1,032.98	8,637.73	79.93	6.42
8	9/14/2010 17:51	37.64	2.09	15.93	13.43	15.66	879.86	742.04	659.61	1,032.98	8,637.73	80.11	6.18
8	9/14/2010 17:52	37.94	2.09	15.91	13.55	14.84	869.85	740.73	651.98	1,032.98	8,637.73	80.61	6.17
8	9/14/2010 17:53	38.25	2.03	15.92	13.55	14.87	861.49	733.39	656.89	1,032.98	8,637.73	80.46	5.95
8	9/14/2010 17:54	38.41	2.11	15.82	13.47	14.89	866.08	737.16	650.70	1,032.98	8,637.73	81.20	6.21
	Average	**37.22**	**2.08**	**15.89**	**13.53**	**14.86**	**876.67**	**746.45**	**654.50**	**1,028.10**	**8,637.06**	**79.68**	**6.18**

1M	9/14/2010 17:55 9/14/2010 18:24	NOx ppm	SOx ppm	Dry O2 %	Wet O2 %	Moisture %	Wet Flow wkscfh	Dry Flow dkscfh	Fuel Flow kscfd	HHV btu/scf	F-Factor dscf/mmBTU	NOx Mass lbs/day	SOx Mass lbs/day
9	9/14/2010 17:55	36.77	2.01	15.90	13.55	14.76	872.80	744.00	652.88	1,032.98	8,637.73	78.46	5.97
9	9/14/2010 17:56	36.38	2.14	15.88	13.56	14.60	873.59	746.05	650.89	1,032.98	8,637.73	77.83	6.37
9	9/14/2010 17:57	38.56	2.19	15.85	13.55	14.56	869.85	743.22	652.98	1,032.98	8,637.73	82.20	6.50
9	9/14/2010 17:58	37.55	2.14	15.95	13.55	15.08	866.04	735.46	661.01	1,032.98	8,637.73	79.21	6.28
9	9/14/2010 17:59	37.19	2.32	15.91	13.44	15.52	872.99	737.50	651.90	1,032.98	8,637.73	78.67	6.81
9	9/14/2010 18:00	37.31	2.14	15.84	13.54	14.52	878.62	751.02	654.00	1,032.98	8,637.73	80.37	6.41
9	9/14/2010 18:01	37.07	2.26	15.87	13.47	15.13	880.39	747.20	663.29	1,026.93	8,637.73	79.43	6.75
9	9/14/2010 18:02	37.30	2.14	15.83	13.52	14.57	878.82	750.76	656.64	1,026.93	8,637.73	80.30	6.41
9	9/14/2010 18:03	37.42	2.11	15.88	13.43	15.42	876.26	741.12	657.08	1,026.93	8,637.73	79.53	6.24
9	9/14/2010 18:04	38.43	2.11	15.85	13.52	14.73	878.90	749.46	649.78	1,026.93	8,637.73	82.61	6.32
9	9/14/2010 18:05	37.40	2.34	15.92	13.53	14.98	879.45	747.70	654.32	1,026.93	8,637.73	80.21	6.99
9	9/14/2010 18:06	37.40	2.24	15.92	13.54	14.91	878.16	747.19	664.47	1,026.93	8,637.73	80.16	6.67
9	9/14/2010 18:07	37.52	2.24	15.92	13.54	14.91	888.47	755.96	645.17	1,026.93	8,637.73	81.35	6.75
9	9/14/2010 18:08	38.53	2.03	15.89	13.64	14.15	886.43	761.04	649.32	1,026.93	8,637.73	84.10	6.17
9	9/14/2010 18:09	37.95	2.11	15.90	13.53	14.92	883.82	751.98	644.90	1,026.93	8,637.73	81.85	6.34
9	9/14/2010 18:10	36.26	2.17	15.87	13.55	14.66	878.11	749.34	648.60	1,026.93	8,637.73	77.93	6.48
9	9/14/2010 18:11	38.17	2.21	15.85	13.48	14.91	876.41	745.74	664.50	1,026.93	8,637.73	81.64	6.57
9	9/14/2010 18:12	37.82	2.26	15.96	13.48	15.51	887.42	749.81	642.45	1,026.93	8,637.73	81.33	6.77
9	9/14/2010 18:13	39.03	2.09	15.81	13.47	14.78	890.41	758.81	661.93	1,026.93	8,637.73	84.95	6.32
9	9/14/2010 18:14	37.58	2.14	15.92	13.54	14.98	885.35	752.74	661.64	1,026.93	8,637.73	81.13	6.43
9	9/14/2010 18:15	38.16	2.24	15.89	13.53	14.83	873.00	743.49	658.10	1,026.93	8,637.73	81.37	6.63
9	9/14/2010 18:16	37.54	2.17	15.85	13.51	14.77	870.78	742.21	663.86	1,026.93	8,637.73	79.91	6.42
9	9/14/2010 18:17	38.43	2.24	15.84	13.48	14.89	880.03	748.95	652.49	1,026.93	8,637.73	82.55	6.68
9	9/14/2010 18:18	39.27	2.19	15.89	13.65	14.10	878.35	754.46	654.54	1,036.00	8,637.73	84.98	6.59
9	9/14/2010 18:19	38.94	2.34	15.86	13.55	14.56	880.43	752.28	653.68	1,036.00	8,637.73	84.02	7.03
9	9/14/2010 18:20	37.82	2.21	15.85	13.56	14.39	875.04	749.09	653.61	1,036.00	8,637.73	81.25	6.60
9	9/14/2010 18:21	37.27	2.26	15.97	13.66	14.45	883.95	756.20	661.81	1,036.00	8,637.73	80.84	6.83
9	9/14/2010 18:22	37.40	2.34	15.89	13.54	14.83	889.05	757.18	653.34	1,036.00	8,637.73	81.23	7.08
9	9/14/2010 18:23	37.95	2.29	15.87	13.59	14.37	882.31	755.54	650.29	1,036.00	8,637.73	82.24	6.89
9	9/14/2010 18:24	37.54	2.29	15.87	13.52	14.82	881.66	750.98	663.87	1,036.00	8,637.73	80.86	6.85
	Average	**37.73**	**2.20**	**15.88**	**13.53**	**14.79**	**879.23**	**749.22**	**655.11**	**1,030.26**	**8,637.73**	**81.08**	**6.57**

1M	9/14/2010 18:25 9/14/2010 18:54	NOx ppm	SOx ppm	Dry O2 %	Wet O2 %	Moisture %	Wet Flow wkscfh	Dry Flow dkscfh	Fuel Flow kscfd	HHV btu/scf	F-Factor dscf/mmBTU	NOx Mass lbs/day	SOx Mass lbs/day
10	9/14/2010 18:25	37.23	2.14	15.95	13.50	15.40	879.96	744.47	655.61	1,036.00	8,637.73	79.49	6.36
10	9/14/2010 18:26	38.99	2.26	15.87	13.48	15.08	880.15	747.39	654.24	1,036.00	8,637.73	83.58	6.75
10	9/14/2010 18:27	38.81	2.21	15.79	13.52	14.41	878.74	752.12	653.31	1,036.00	8,637.73	83.71	6.63
10	9/14/2010 18:28	37.56	2.06	15.87	13.48	15.09	875.32	743.22	653.56	1,036.00	8,637.73	80.07	6.11
10	9/14/2010 18:29	37.31	2.17	15.88	13.56	14.57	876.01	748.40	664.89	1,036.00	8,637.73	80.09	6.47
10	9/14/2010 18:30	37.31	2.11	15.93	13.56	14.91	882.14	750.64	663.48	1,036.00	8,637.73	80.33	6.33
10	9/14/2010 18:31	38.12	2.11	15.93	13.51	15.20	879.69	746.00	652.90	1,036.00	8,637.73	81.55	6.29
10	9/14/2010 18:32	39.38	2.11	15.83	13.43	15.15	875.06	742.45	669.35	1,036.00	8,637.73	83.86	6.26
10	9/14/2010 18:33	37.74	2.11	15.86	13.55	14.57	875.79	748.16	643.72	1,036.00	8,637.73	80.99	6.30
10	9/14/2010 18:34	37.20	2.03	15.83	13.51	14.64	881.33	752.30	646.79	1,036.00	8,637.73	80.26	6.10
10	9/14/2010 18:35	37.23	2.01	15.87	13.56	14.55	882.77	754.30	642.64	1,044.95	8,647.80	80.54	6.05
10	9/14/2010 18:36	37.40	2.11	15.91	13.44	15.48	880.43	744.15	662.48	1,044.95	8,647.80	79.82	6.27
10	9/14/2010 18:37	37.99	2.17	15.86	13.58	14.36	882.19	755.48	654.47	1,044.95	8,647.80	82.30	6.53
10	9/14/2010 18:38	38.11	2.19	15.83	13.47	14.90	880.00	748.86	673.02	1,044.95	8,647.80	81.84	6.54
10	9/14/2010 18:39	37.82	2.32	15.98	13.54	15.31	883.65	748.32	655.60	1,044.95	8,647.80	81.17	6.91
10	9/14/2010 18:40	38.11	2.09	15.87	13.52	14.81	885.97	754.79	658.06	1,044.95	8,647.80	82.49	6.29
10	9/14/2010 18:41	37.34	2.01	15.92	13.65	14.24	879.57	754.34	662.40	1,044.95	8,647.80	80.79	6.05
10	9/14/2010 18:42	36.18	2.09	15.92	13.42	15.75	870.59	733.51	642.45	1,044.95	8,647.80	76.12	6.11
10	9/14/2010 18:43	38.26	2.19	15.85	13.58	14.37	880.46	753.95	658.65	1,044.95	8,647.80	82.73	6.59
10	9/14/2010 18:44	38.30	2.11	15.94	13.46	15.55	886.57	748.70	654.60	1,044.95	8,647.80	82.25	6.31
10	9/14/2010 18:45	36.36	2.01	15.83	13.55	14.45	884.46	756.68	647.81	1,044.95	8,647.80	78.92	6.07
10	9/14/2010 18:46	38.87	1.96	15.87	13.49	14.95	883.80	751.63	658.73	1,044.95	8,647.80	83.79	5.89
10	9/14/2010 18:47	38.05	1.94	15.93	13.54	15.01	884.46	751.74	658.81	1,044.95	8,647.80	82.03	5.82
10	9/14/2010 18:48	37.84	1.94	15.89	13.55	14.70	880.86	751.41	674.66	1,044.95	8,647.80	81.54	5.82
10	9/14/2010 18:49	37.92	2.01	15.84	13.39	15.46	873.30	738.28	661.14	1,044.95	8,647.80	80.29	5.92
10	9/14/2010 18:50	37.40	1.94	15.81	13.42	15.13	875.76	743.30	663.71	1,044.95	8,647.80	79.74	5.76
10	9/14/2010 18:51	37.10	1.99	15.86	13.49	14.93	886.02	753.76	668.79	1,044.95	8,647.80	80.20	5.99
10	9/14/2010 18:52	37.99	1.86	15.84	13.44	15.16	883.41	749.51	663.11	1,026.93	8,627.66	81.65	5.56
10	9/14/2010 18:53	39.24	1.96	15.81	13.53	14.47	872.94	746.65	670.67	1,026.93	8,627.66	84.03	5.85
10	9/14/2010 18:54	38.78	1.96	15.85	13.43	15.25	871.75	738.84	665.94	1,026.93	8,627.66	82.17	5.79
	Average	**37.86**	**2.07**	**15.87**	**13.50**	**14.93**	**879.77**	**748.45**	**658.52**	**1,040.17**	**8,642.43**	**81.28**	**6.19**

UNIT 28F-11

PHD

Run #	Date & Time (Start Time)	NOx ppm	SOx ppm	Dry O2 %	Wet O2 %	Moisture %	Wet Flow wkscfh	Dry Flow dkscfh	Fuel Flow kscfd	HHV btu/scf	F-Factor dscf/mmBTU	NOx Mass lbs/day	SOx Mass lbs/day
1	11/17/2010 13:00	41.32	3.91	16.11	13.56	15.87	899.13	756.48	618.68	1,101.53	8,657.87	89.64	11.79
2	11/17/2010 13:30	40.68	3.94	16.09	13.53	15.92	899.69	756.49	626.73	1,096.05	8,657.87	88.25	11.89
3	11/17/2010 14:00	40.68	3.92	16.09	13.49	16.17	905.82	759.37	625.39	1,082.67	8,657.87	88.60	11.88
Average		**40.89**	**3.92**	**16.10**	**13.53**	**15.98**	**901.55**	**757.45**	**623.60**	**1,093.41**	**8,657.87**	**88.83**	**11.86**

1M	11/17/2010 13:00 11/17/2010 13:29	NOx ppm	SOx ppm	Dry O2 %	Wet O2 %	Moisture %	Wet Flow wkscfh	Dry Flow dkscfh	Fuel Flow kscfd	HHV btu/scf	F-Factor dscf/mmBTU	NOx Mass lbs/day	SOx Mass lbs/day
1	11/17/2010 13:00	42.29	3.80	16.08	13.54	15.80	899.17	757.12	614.98	1,099.02	8,657.87	91.83	11.49
1	11/17/2010 13:01	41.18	3.86	16.11	13.61	15.51	893.61	754.98	613.39	1,099.02	8,657.87	89.16	11.62
1	11/17/2010 13:02	41.76	3.86	16.09	13.52	15.97	892.45	749.90	618.95	1,099.02	8,657.87	89.81	11.55
1	11/17/2010 13:03	40.11	3.83	16.11	13.61	15.53	896.25	757.03	627.11	1,099.02	8,657.87	87.09	11.57
1	11/17/2010 13:04	41.34	3.83	16.18	13.53	16.38	894.33	747.80	615.79	1,099.02	8,657.87	88.65	11.43
1	11/17/2010 13:05	41.32	3.80	16.14	13.49	16.42	896.17	749.06	610.39	1,099.02	8,657.87	88.76	11.37
1	11/17/2010 13:06	42.63	3.86	16.04	13.46	16.13	901.82	756.39	611.44	1,099.02	8,657.87	92.47	11.65
1	11/17/2010 13:07	41.15	3.91	16.13	13.61	15.64	901.50	760.54	617.03	1,099.02	8,657.87	89.75	11.86
1	11/17/2010 13:08	41.94	3.86	16.15	13.58	15.93	899.17	755.90	620.11	1,099.02	8,657.87	90.91	11.64
1	11/17/2010 13:09	40.83	3.94	16.16	13.62	15.69	896.25	755.66	618.25	1,099.02	8,657.87	88.50	11.87
1	11/17/2010 13:10	41.90	3.80	16.08	13.62	15.35	895.89	758.37	621.65	1,099.02	8,657.87	91.13	11.51
1	11/17/2010 13:11	41.90	3.80	16.08	13.62	15.35	903.81	765.07	623.12	1,102.04	8,657.87	91.93	11.61
1	11/17/2010 13:12	41.04	3.91	16.08	13.63	15.23	908.79	770.35	629.66	1,102.04	8,657.87	90.67	12.02
1	11/17/2010 13:13	41.09	3.83	16.12	13.56	15.90	902.75	759.24	620.02	1,102.04	8,657.87	89.48	11.61
1	11/17/2010 13:14	41.20	3.88	16.12	13.62	15.52	899.89	760.22	625.28	1,102.04	8,657.87	89.82	11.78
1	11/17/2010 13:15	43.12	3.94	16.09	13.40	16.70	893.94	744.67	616.22	1,102.04	8,657.87	92.09	11.70
1	11/17/2010 13:16	40.48	3.98	16.18	13.59	16.04	895.29	751.70	610.48	1,102.04	8,657.87	87.27	11.93
1	11/17/2010 13:17	42.01	3.96	16.08	13.62	15.32	896.82	759.38	618.54	1,102.04	8,657.87	91.50	12.00
1	11/17/2010 13:18	41.19	3.91	16.16	13.54	16.22	903.75	757.18	631.43	1,102.04	8,657.87	89.44	11.81
1	11/17/2010 13:19	41.68	3.98	16.20	13.42	17.16	897.90	743.80	630.14	1,102.04	8,657.87	88.91	11.81
1	11/17/2010 13:20	41.85	4.04	16.03	13.29	17.12	895.02	741.77	626.28	1,102.04	8,657.87	89.03	11.94
1	11/17/2010 13:21	42.23	4.06	16.06	13.42	16.44	897.88	750.31	618.94	1,102.04	8,657.87	90.88	12.15
1	11/17/2010 13:22	40.61	4.04	16.14	13.56	15.96	896.45	753.41	608.61	1,102.04	8,657.87	87.74	12.13
1	11/17/2010 13:23	40.23	3.94	16.14	13.62	15.58	900.56	760.23	611.73	1,102.04	8,657.87	87.72	11.94
1	11/17/2010 13:24	42.06	3.91	16.09	13.72	14.73	902.53	769.61	615.41	1,102.04	8,657.87	92.83	12.01
1	11/17/2010 13:25	39.79	3.94	16.12	13.63	15.47	904.34	764.45	614.57	1,102.04	8,657.87	87.23	12.01
1	11/17/2010 13:26	40.54	3.94	16.11	13.61	15.52	904.47	764.11	616.01	1,102.04	8,657.87	88.84	12.00
1	11/17/2010 13:27	40.38	3.88	16.10	13.53	15.99	900.79	756.80	619.90	1,102.04	8,657.87	87.64	11.72
1	11/17/2010 13:28	41.55	3.94	16.11	13.52	16.09	900.02	755.21	615.32	1,111.10	8,657.87	90.00	11.86
1	11/17/2010 13:29	40.22	4.01	16.06	13.60	15.32	902.24	764.06	619.74	1,111.10	8,657.87	88.14	12.21
Average		**41.32**	**3.91**	**16.11**	**13.56**	**15.87**	**899.13**	**756.48**	**618.68**	**1,101.53**	**8,657.87**	**89.64**	**11.79**

1M	11/17/2010 13:30 11/17/2010 13:59	NOx ppm	SOx ppm	Dry O2 %	Wet O2 %	Moisture %	Wet Flow wkscfh	Dry Flow dkscfh	Fuel Flow kscfd	HHV btu/scf	F-Factor dscf/mmBTU	NOx Mass lbs/day	SOx Mass lbs/day
2	11/17/2010 13:30	40.71	4.04	16.13	13.57	15.86	898.41	755.90	621.44	1,111.10	8,657.87	88.26	12.17
2	11/17/2010 13:31	41.64	3.91	16.07	13.47	16.22	900.45	754.43	622.06	1,111.10	8,657.87	90.10	11.77
2	11/17/2010 13:32	40.92	3.94	16.06	13.51	15.86	905.10	761.58	622.37	1,111.10	8,657.87	89.39	11.96
2	11/17/2010 13:33	41.43	3.88	16.05	13.49	16.00	907.31	762.15	620.61	1,111.10	8,657.87	90.57	11.81
2	11/17/2010 13:34	41.70	3.91	16.01	13.55	15.36	901.05	762.62	619.87	1,111.10	8,657.87	91.20	11.90
2	11/17/2010 13:35	40.30	3.94	16.07	13.55	15.71	896.46	755.63	614.75	1,111.10	8,657.87	87.34	11.87
2	11/17/2010 13:36	40.76	3.94	16.07	13.62	15.27	897.47	760.40	623.18	1,111.10	8,657.87	88.88	11.95
2	11/17/2010 13:37	39.68	3.86	16.06	13.55	15.63	896.25	756.16	622.75	1,111.10	8,657.87	86.06	11.64
2	11/17/2010 13:38	40.51	3.96	16.09	13.55	15.76	895.33	754.20	623.68	1,111.10	8,657.87	87.63	11.92
2	11/17/2010 13:39	39.97	3.83	16.07	13.54	15.76	898.26	756.70	639.99	1,111.10	8,657.87	86.73	11.57
2	11/17/2010 13:40	41.52	3.86	16.08	13.40	16.64	906.24	755.42	626.11	1,111.10	8,657.87	89.96	11.63
2	11/17/2010 13:41	41.52	3.86	16.08	13.40	16.64	899.60	749.88	617.48	1,111.10	8,657.87	89.30	11.55
2	11/17/2010 13:42	40.12	4.01	16.03	13.55	15.47	891.98	753.97	618.28	1,111.10	8,657.87	86.76	12.05
2	11/17/2010 13:43	39.14	3.94	16.12	13.51	16.20	896.79	751.50	628.23	1,111.10	8,657.87	84.35	11.81
2	11/17/2010 13:44	40.06	3.96	16.17	13.58	16.02	896.87	753.15	628.58	1,111.10	8,657.87	86.54	11.90
2	11/17/2010 13:45	40.53	3.98	16.09	13.54	15.86	894.30	752.44	631.78	1,080.99	8,657.87	87.46	11.95
2	11/17/2010 13:46	40.55	3.96	16.20	13.59	16.15	897.32	752.36	630.40	1,080.99	8,657.87	87.49	11.89
2	11/17/2010 13:47	40.53	3.88	16.11	13.53	16.04	899.62	755.32	639.46	1,080.99	8,657.87	87.79	11.70
2	11/17/2010 13:48	41.78	3.94	16.10	13.51	16.10	900.11	755.24	629.06	1,080.99	8,657.87	90.49	11.86
2	11/17/2010 13:49	41.79	3.86	16.05	13.44	16.25	897.69	751.83	633.48	1,080.99	8,657.87	90.11	11.58
2	11/17/2010 13:50	39.57	4.11	16.08	13.57	15.62	899.64	759.08	625.29	1,080.99	8,657.87	86.15	12.46
2	11/17/2010 13:51	41.00	4.06	16.08	13.54	15.82	902.11	759.41	631.15	1,080.99	8,657.87	89.30	12.29
2	11/17/2010 13:52	41.38	3.94	16.08	13.55	15.74	905.99	763.42	631.12	1,080.99	8,657.87	90.61	11.99
2	11/17/2010 13:53	39.78	3.94	16.11	13.59	15.63	906.33	764.68	629.04	1,080.99	8,657.87	87.24	12.01
2	11/17/2010 13:54	40.50	3.98	16.21	13.59	16.18	903.33	757.14	623.00	1,080.99	8,657.87	87.94	12.02
2	11/17/2010 13:55	41.66	3.83	16.08	13.54	15.83	899.47	757.08	630.64	1,080.99	8,657.87	90.46	11.57
2	11/17/2010 13:56	39.29	3.88	16.14	13.54	16.13	902.04	756.56	627.64	1,080.99	8,657.87	85.26	11.72
2	11/17/2010 13:57	40.34	3.98	16.12	13.61	15.55	899.90	759.95	633.04	1,080.99	8,657.87	87.93	12.06
2	11/17/2010 13:58	40.20	4.04	16.08	13.51	15.97	895.25	752.24	632.30	1,080.99	8,657.87	86.73	12.11
2	11/17/2010 13:59	41.40	4.04	16.07	13.47	16.19	900.06	754.37	625.14	1,080.99	8,657.87	89.58	12.14
Average		**40.68**	**3.94**	**16.09**	**13.53**	**15.92**	**899.69**	**756.49**	**626.73**	**1,096.05**	**8,657.87**	**88.25**	**11.89**

1M	11/17/2010 14:00 11/17/2010 14:29	NOx ppm	SOx ppm	Dry O2 %	Wet O2 %	Moisture %	Wet Flow wkscfh	Dry Flow dkscfh	Fuel Flow kscfd	HHV btu/scf	F-Factor dscf/mmBTU	NOx Mass lbs/day	SOx Mass lbs/day
3	11/17/2010 14:00	40.83	3.98	16.08	13.60	15.47	905.10	765.11	626.70	1,080.99	8,657.87	89.61	12.15
3	11/17/2010 14:01	40.63	3.94	16.07	13.55	15.69	906.83	764.52	636.19	1,080.99	8,657.87	89.08	12.01
3	11/17/2010 14:02	40.78	3.88	16.13	13.59	15.76	899.86	758.00	627.79	1,078.08	8,657.87	88.66	11.74
3	11/17/2010 14:03	40.46	3.80	16.05	13.56	15.51	902.41	762.42	623.81	1,078.08	8,657.87	88.47	11.57
3	11/17/2010 14:04	39.52	3.88	16.10	13.45	16.50	903.66	754.52	620.42	1,078.08	8,657.87	85.53	11.69
3	11/17/2010 14:05	39.75	3.91	16.10	13.49	16.23	907.38	760.07	633.15	1,078.08	8,657.87	86.65	11.86
3	11/17/2010 14:06	42.29	3.83	16.05	13.49	15.99	906.41	761.50	638.07	1,078.08	8,657.87	92.36	11.64
3	11/17/2010 14:07	40.65	3.83	16.08	13.38	16.83	895.74	745.00	632.00	1,078.08	8,657.87	86.85	11.39
3	11/17/2010 14:08	42.40	3.83	16.01	13.39	16.40	890.44	744.40	628.59	1,078.08	8,657.87	90.52	11.38
3	11/17/2010 14:09	42.22	3.94	16.12	13.46	16.50	896.17	748.28	628.99	1,078.08	8,657.87	90.62	11.76
3	11/17/2010 14:10	41.58	3.94	16.16	13.46	16.68	895.88	746.47	636.01	1,078.08	8,657.87	89.02	11.73
3	11/17/2010 14:11	40.94	3.94	16.13	13.45	16.60	900.20	750.73	629.13	1,078.08	8,657.87	88.15	11.79
3	11/17/2010 14:12	39.88	4.01	16.11	13.50	16.17	908.05	761.24	632.73	1,078.08	8,657.87	87.06	12.17
3	11/17/2010 14:13	39.88	3.98	16.11	13.44	16.53	912.58	761.72	634.80	1,078.08	8,657.87	87.12	12.09
3	11/17/2010 14:14	40.48	3.98	16.08	13.44	16.38	912.58	763.06	623.64	1,078.08	8,657.87	88.58	12.11
3	11/17/2010 14:15	40.38	4.18	15.97	13.53	15.24	910.25	771.53	619.21	1,078.08	8,657.87	89.35	12.87
3	11/17/2010 14:16	40.56	3.98	16.01	13.50	15.64	907.90	765.89	613.48	1,078.08	8,657.87	89.09	12.16
3	11/17/2010 14:17	40.72	3.96	16.08	13.56	15.70	908.75	766.06	617.43	1,078.08	8,657.87	89.47	12.11
3	11/17/2010 14:18	40.45	3.91	16.02	13.54	15.47	909.40	768.71	618.05	1,078.08	8,657.87	89.17	11.99
3	11/17/2010 14:19	39.44	3.94	16.19	13.58	16.10	912.23	765.37	636.20	1,090.06	8,657.87	86.56	12.02
3	11/17/2010 14:20	39.86	3.86	16.24	13.54	16.63	913.74	761.77	625.71	1,090.06	8,657.87	87.08	11.73
3	11/17/2010 14:21	41.65	3.83	16.13	13.46	16.57	915.30	763.64	625.34	1,090.06	8,657.87	91.22	11.67
3	11/17/2010 14:22	40.52	3.86	16.05	13.50	15.90	912.94	767.79	616.90	1,090.06	8,657.87	89.22	11.82
3	11/17/2010 14:23	40.10	3.94	16.03	13.47	15.94	908.63	763.79	617.74	1,090.06	8,657.87	87.83	12.00
3	11/17/2010 14:24	40.77	3.94	16.03	13.40	16.40	909.02	759.98	620.53	1,090.06	8,657.87	88.87	11.94
3	11/17/2010 14:25	40.86	3.88	16.06	13.45	16.24	909.11	761.49	616.36	1,090.06	8,657.87	89.24	11.80
3	11/17/2010 14:26	41.65	3.83	16.13	13.57	15.89	910.39	765.74	619.20	1,090.06	8,657.87	91.47	11.71
3	11/17/2010 14:27	41.32	3.98	16.07	13.47	16.21	906.13	759.27	621.61	1,090.06	8,657.87	89.97	12.05
3	11/17/2010 14:28	40.19	3.88	16.19	13.47	16.76	900.73	749.75	616.05	1,090.06	8,657.87	86.42	11.61
3	11/17/2010 14:29	39.77	3.96	16.21	13.44	17.11	896.65	743.22	625.80	1,090.06	8,657.87	84.77	11.74
Average		**40.68**	**3.92**	**16.09**	**13.49**	**16.17**	**905.82**	**759.37**	**625.39**	**1,082.67**	**8,657.87**	**88.60**	**11.88**

APPENDIX D

SAMPLING METHOD DESCRIPTIONS AND SCHEMATICS

SCAQMD Method 1.1
Sample and Velocity Traverses for Stationary Sources

Principle:

To make a representative measurement of pollutant emissions and/or total volumetric flow rate from a stationary source, select a measurement site where the effluent stream flows in a known direction and divide the cross section of the stack into a number of equal areas. Then locate a traverse point at the centroid of each of these equal areas.

Selection of Measurement Site:

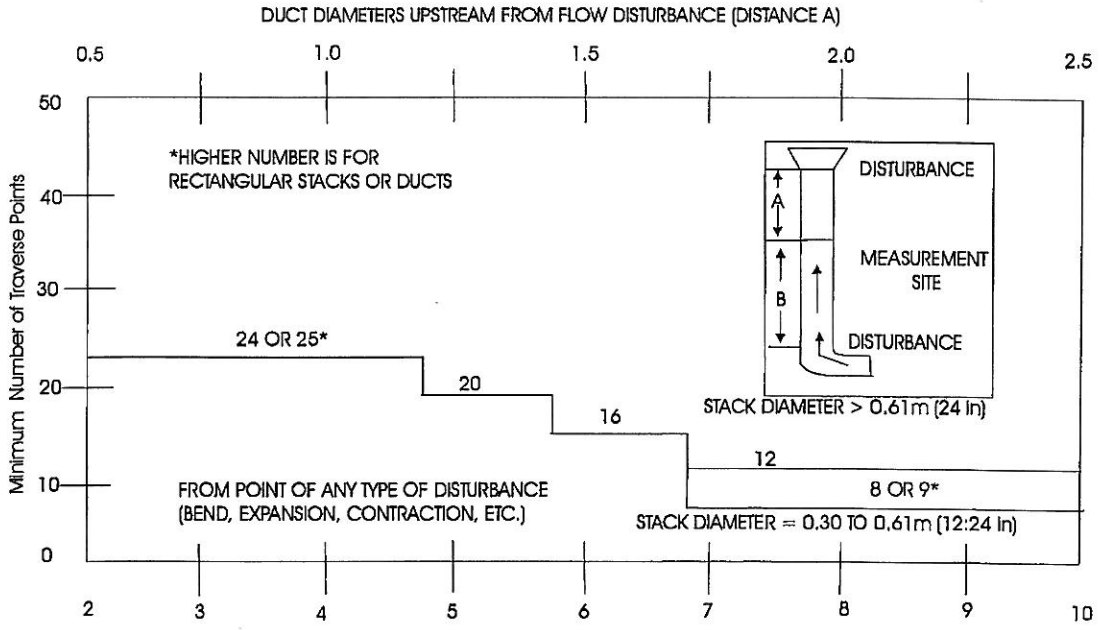
The ideal sampling location is at least eight stack or duct diameters downstream and two diameters upstream from a flow disturbance. At a minimum, the sampling location is two stack or duct diameters downstream and one-half diameter upstream from any flow disturbance.

Determination of Number of Traverse Points:

The downstream and upstream distances are measured and the number of sampling points determined according to Figure 1.1-1 for particulate traverses and Figure 1.1-2 for velocity (nonparticulate) traverses.

Figure 1.1-1

Minimum Number of Traverse Points for Particulate Traverses

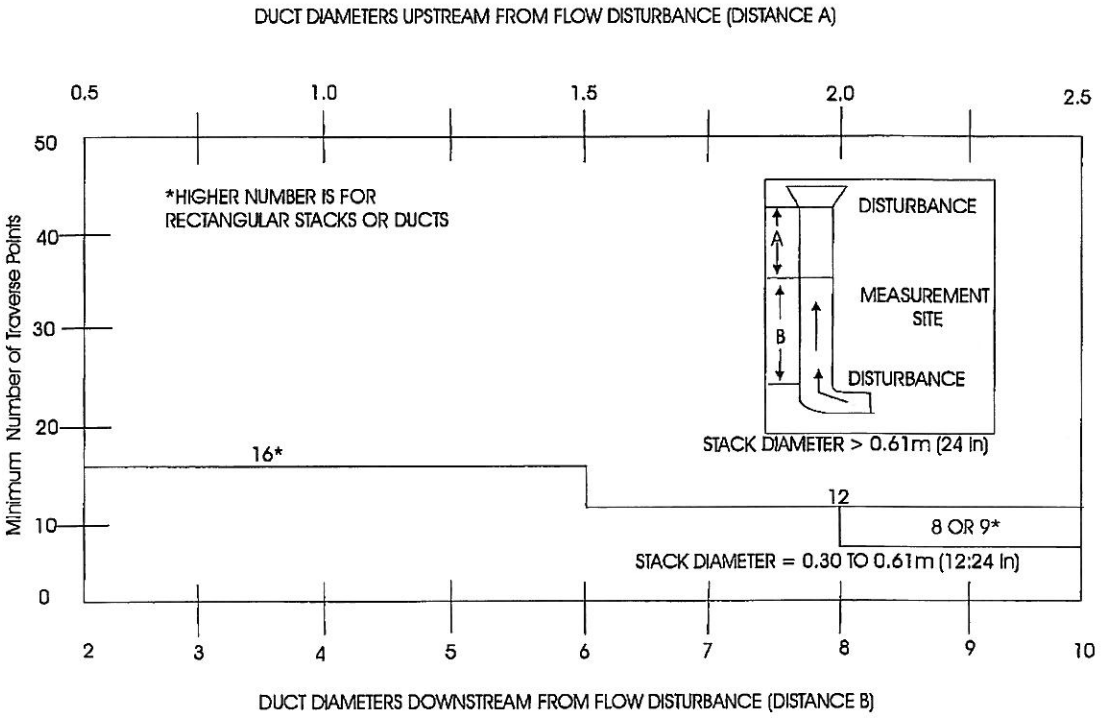


D 2

00235

Figure 1.1-2

Minimum Number of Traverse Points for Velocity (Nonparticulate Traverses)



Cross Sectional Layout and Location of Traverse Points:

For circular stacks, the traverse points are located on two perpendicular diameters according to Table 1.1-2. For rectangular stacks, the minimum number of points is determined from Figures 1.1-1 and 1.1-2. From Table 1.1-1, the grid configuration is determined. The stack cross section is divided into as many equal rectangular elemental areas as traverse points. The traverse points are located at the centroid of each equal area.

Table 1.1 – 1
Cross Sectional Layout for Rectangular Stacks

[illegible]	[illegible]
9	3 X 3
12	4 X 3
16	4 X 4
20	5 X 4
25	5 X 5
30	6 X 5
36	6 X 6
42	7 X 6
49	7 X 7

Table 1.1 – 2
Location of Traverse Points in Circular Stacks

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

Verification of Absence of Cyclonic Flow:

For locations that may have cyclonic flow, the absence of cyclonic flow will be determined prior to sampling. If the average of the absolute values of the rotational angles is greater than 10°, the overall flow condition in the stack is unacceptable. In addition, measuring sites with yaw angles above 30° at more than four traverse points or reverse flow at any traverse points are not acceptable.

SCAQMD Method 2.1
Determination of Stack Gas Velocity and Volumetric Flow Rate
(S-Type Pitot Tube)

Principle:

The average gas velocity in a stack is determined from the gas density and from measurement of the average velocity head with an S-Type (Stausscheibe or reverse type) Pitot tube.

Equipment:

The stack gas velocity is measured using an S-Type or Standard pitot tube.

1) S-Type Pitot tube
The S-Type Pitot tube (Figure 2.1-1) is made of metal tubing (e.g. stainless steel). The S-Type pitot is manufactured in accordance with the dimension and alignment specifications presented in SCAQMD Method 2.1, Figures 2.1-2 and 2.1-3 respectively. The S-Type Pitot type is assigned an identification number and default coefficient of 0.84.

2) Standard Pitot Tube
A Standard Pitot Tube may be used instead of an S-Type, provided it meets the specifications stated in this method. Standard Pitots are susceptible to plugging. To verify plugging has not occurred, take a velocity head (ΔP) reading at the final traverse point, clean out the impact and static holes of the standard Pitot tube by "backpurging" with pressurized air and then take another ΔP reading. If the ΔP readings made before and after the air purge are the same (±5%), the traverse is acceptable. A standard Pitot tube designed according to the specifications illustrated in Figure 2.1-4 of SCAQMD Method 2.1 will have baseline coefficients of about 0.99 ± 0.01.

3) S-Type Pitot Assemblies
During sample and velocity traverses, the S-Type Pitot tube is in combination with other source sampling components (thermocouple, sampling probe, nozzle) as part of an "assembly". In this situation, the assembly specifications are in accordance with SCAQMD Method 2.1 Figures 2.1-6 to 2.1-8 to eliminate interference effects. Therefore, a pitot coefficient of 0.84 is assigned to the assembly.

4) Differential Pressure Gauge
An appropriate water column inclined-vertical manometer, having 0.01 in. H_2O divisions on the 1 to 10 in. vertical scale or an equivalent device such as a magnehelic gauge is used. This type of manometer, or magnehelic gauge, is satisfactory for the measurement of ΔP values as low as 1.3 mm (0.05 in) H_2O. However, a differential pressure gauge of greater sensitivity must be used if one of the following criteria exists:
   A) The arithmetic average of all ΔP readings at the traverse points in the stacks is less than 1.3 mm (0.05 in.) H_2O.
   B) For a traverse of 12 or more points, more than 10 percent of the individual ΔP readings are below 1.3 mm (0.05 in.) H_2O.
   C) For a traverse of fewer than 12 points, more than one ΔP reading is below 1.3 mm (0.05 in.) H_2O.

5) Temperature Gauge
A thermocouple capable of measuring temperature to within 1.5 percent of the minimum absolute stack temperature is used.

6) Barometer
A barometer capable of measuring atmospheric pressure to within 2.5 mm (0.1 in.) Hg is used. Alternatively, the barometric reading may be obtained from a National Weather Service station and adjusted for elevation (0.1 in. Hg per 100 ft).

7) Gas Density Determination Equipment
Method 3.1 or 100.1 is used to determine the stack gas dry molecular weight, if needed, and Method 4.1 or Method 5.1 equipment for moisture content. For processes emitting essentially air, a dry molecular weight of 29.0 is used.

Procedure:

1) Equipment Setup and Leak Check
The apparatus is setup as shown in Figure 2.1-1. Leak checks are conducted as follows (1) Blow through the Pitot impact opening until at least 80 percent of full scale or 7.6 cm (3 in.) H_2O pressure, whichever is less, registers on the manometer. Close the impact opening. The pressure should remain stable for at least 15 seconds. (2) Do the same for the static pressure side, but use suction to obtain the minimum of 7.6 cm (3 in.) H_2O.

2) Manometer Level and Zero
Because the manometer level and zero may drift due to vibrations and temperature changes, periodic checks are made during the traverse.

3) Data Measurements
The velocity head and temperature are measured at the traverse points specified by Method 1.1. To validate the traverse run, a mandatory post test leak check is conducted. The static pressure in the stack is measured once per run. The atmospheric pressure is measured once per day and corrected for stack height if greater than 100 ft.

Calculations:

Perform calculations, recording values to at least one decimal place more than that of the acquired data. Round off final results.

1) Nomenclature

A = Stack Cross sectional area, ft^2
B_w = Moisture content in gas stream, percent (from Method 4.1 or Method 5.1)
C_p = Pitot tube coefficient, dimensionless
P_{bar} = Barometric pressure at measurement site, in. Hg.
P_{static} = Stack static pressure, in. Hg
P_s = Absolute stack gas pressure ($P_{bar} + P_{static}$)
P_{std} = Standard absolute pressure, 29.92 in. Hg
F_p = Pressure correction factor, dimensionless

$$Fp = \sqrt{\frac{P_{std}}{P_{bar} + P_{static}}} = \sqrt{\frac{29.92}{P_s}}$$

t_s = Stack gas temperature, ^oF
T_{std} = Standard absolute temperature, 520^oR
M_d = Wet Molecular weight of stack gas, lb/lb mole (from Method 3.1)
M_{std} = Standard dry molecular weight, 28.95 lb/lb-mole
F_d = Gas Density correction factor, dimensionless

$$F_d = \sqrt{\frac{M_{std}}{M_d}} = \sqrt{\frac{28.95}{M_d}}$$

H = Velocity head of stack gas, in. H_2O
V_t = Average velocity of stack gas during test, ft/sec

2) Volumetric Flow Rate

A. Stack gas velocity at each traverse point, ft/sec:

$$V = 2.9\sqrt{H \bullet (t_s + 460)}$$

Obtain the value of V_t by averaging the velocities at all the traverse points.

B. Stack gas volumetric flow rate, cfm:

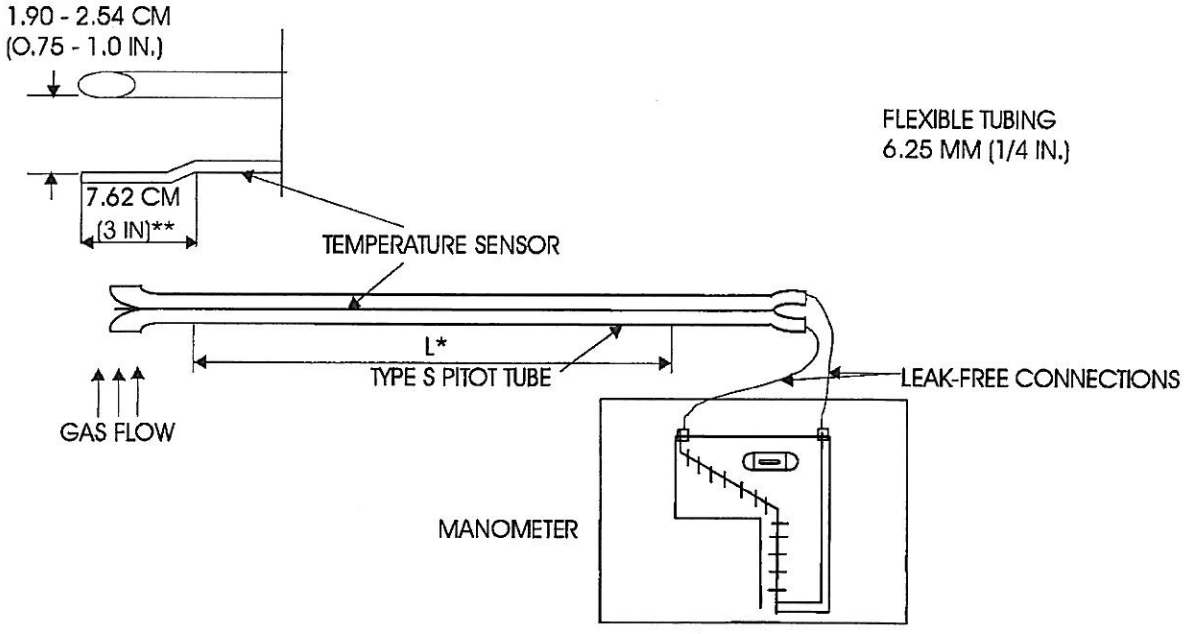
$$Q = C_p \bullet V_t \bullet F_d \bullet F_p \bullet A \bullet 60$$

C. Dry standard stack gas volumetric flow rate, scfm:

$$Q_{sd} = \frac{Q \bullet (P_s) \bullet (T_{std}) \bullet (100 - B_w)}{(P_{std}) \bullet (T_s + 460) \bullet (100)}$$

$$Q_{sd} = \frac{Q \bullet (P_s) \bullet (520) \bullet (1 - 0.01\, B_w)}{(29.92) \bullet (T_s + 460)}$$

Figure 2.1 – 1
S-Type Pitot Tube-Manometer Assembly



*L = DISTANCE TO FURTHEST SAMPLING POINT PLUS 30 CM (12 IN.)
**PITOT TUBE - TEMPERATURE SENSOR SPACING

SCAQMD Method 4.1
Determination of Moisture Content in Stack Gases

Principle:

A gas sample is extracted from the source. Moisture is removed from the sample stream and determined gravimetrically.

Equipment:

A schematic of the sampling train is shown in Figure 4.1-1. All components are maintained and calibrated according to the procedure outlined in Method 5.1.

1) Sampling Train
The probe is constructed of stainless steel or glass tubing. The train consists of four impingers connected in series with leak-free fittings. A pre-weighed container with 200 ml of DI water is loaded into the first two impingers, 100 ml each. The third impinger is empty. About 200 g of silica gel from a pre-weighed container is placed in the fourth impinger. The cooling system is an ice bath container. This system includes a vacuum gauge, leak-free pump, thermometer capable of measuring temperature to within 3°C (5.4°F), dry gas meter capable of measuring volume to within 2 percent, and related equipment as shown in Figure 4.1-1.

2) Barometer
A barometer capable of measuring atmospheric pressure to within 2.5 mm (0.1 in.) Hg is used. Alternatively, the barometric reading may be obtained from a National Weather Service station and adjusted for elevation (0.1 in. Hg per 100 ft).

3) Balance
A balance is used to measure condensed water and moisture caught in the silica gel to within 0.5g.

Procedure:

The sampling point in the stack should be either at the center of the cross section or at a point no closer to the walls than 1.00 m (3.3 ft). The total sampling time is determined to collect a minimum total gas volume of 0.60 scm (21 scf) at a rate no greater than 0.021 m^3/min (0.75 ft^3/min). When both moisture content and pollutant emission rate are to be measured, the moisture determination is simultaneous with, and for the same total length of time as, the pollutant emission rate run.

The sampling equipment is set-up as shown in Figure 4.1-1. Ice is placed in the water of the ice bath container. Leak checks are performed before and after each test at a vacuum of 15 in. Hg. A lesser vacuum may be used if it is not exceeded during the test. A leakage rate in excess of either 4 percent of the average sampling rate or 0.0007 m^3/min (0.02 ft^3/min) is unacceptable.

During the sample run, maintain a sampling rate within 10 percent of constant rate unless the stack flow rate changes by more than 20 percent, in which case the sample rate should be changed in proportion to the stack flow rate change. Data readings are recorded at appropriate intervals. To begin sampling, position the probe tip at the sampling point. Immediately start the pump and adjust flow to the desired rate. Add more ice, if necessary, to maintain a temperature below 15°C (60°F) at the silica gel outlet. After collecting the sample, conduct a leak check and record the leak rate.

Analysis:

For gravimetric analysis, the liquid impinger contents are returned to the pre-weighed container and weighed to the nearest 0.5 g. The silica gel is also returned to its pre-weighed container and weighed to the nearest 0.5 g. Note if the silica gel is completely expended.

Calculations:

1) Nomenclature:

B_W	=	Water Percent
P_{bar}	=	Barometric pressure, in Hg
P_{ma}	=	Absolute pressure at the gas meter, in Hg
ΔP	=	Orifice pressure, in. H_2O (if used)
$^{V}m_{std}$	=	Dry gas volume metered, corrected to standard conditions, dscf
V_m	=	Dry gas volume metered, dcf
y	=	Meter correction factor (no units)
T_m	=	Absolute temperature at meter, °R
$^{V}w_{std}$	=	Volume of total water caught, corrected to standard conditions scf
$V_l=(V_c+V_s)$	=	Volume of total water in the train, gm
V_c	=	Volume of water condensed, gm
V_s	=	Volume of water absorbed by silica gel, gm

Note: If the post test leak rate exceeds the allowable rate, correct the value of V_m as described in Chapter X.

Calculations are performed in accordance with the following equations:

A) Gas Volume Metered ($^{V}m_{std}$)

$$^{V}m_{std} = y \cdot \frac{520°R}{29.92 \text{ in. Hg}} \cdot \frac{V_m P_{ma}}{T_m} = (17.38)(\ )(\ ) = \_\_\_ \text{ dscf}$$

Where:

$$^{P}m_a = P_{bar} + (\Delta P/13.6) = (\ ) + (\frac{\ }{13.6}) = \_\_\_\_ \text{ in. Hg}$$

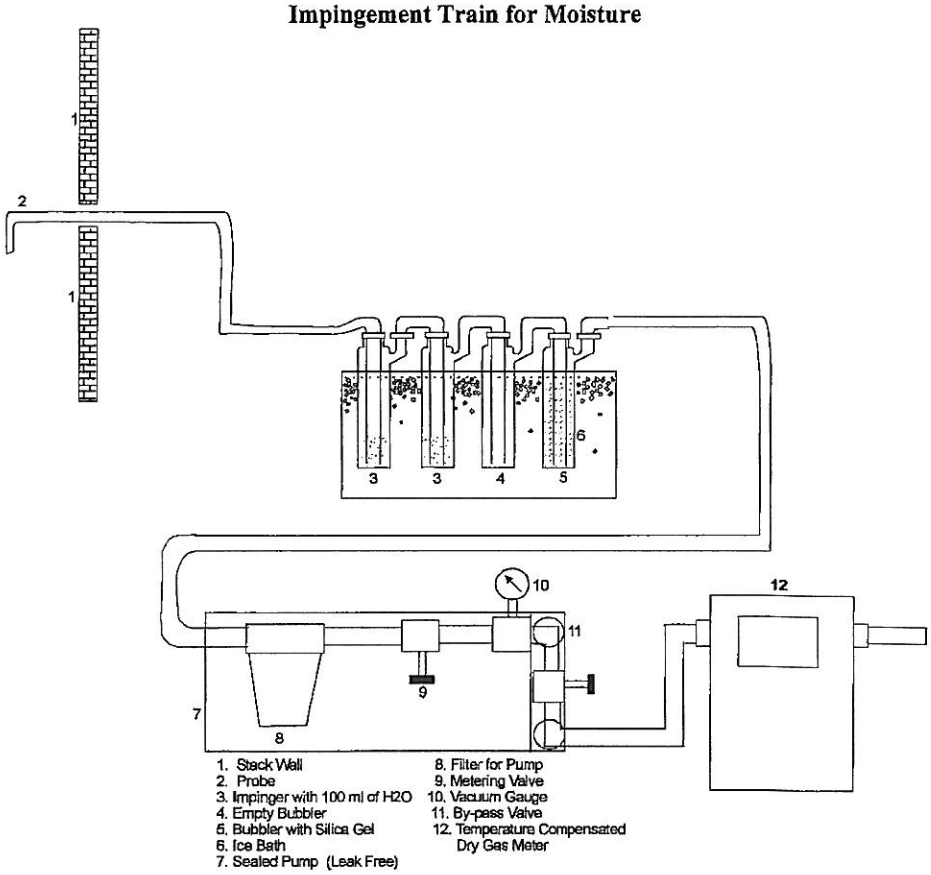
B) Volume of Water Condensed ($^{V}w_{std}$)

$$^{V}m_{std} = (0.0464 \text{ ft}^3/\text{ml})(V_l) = (0.0464)(\ ) = \text{scf}$$

C) Moisture in Stack Gas (B_W)

$$B_W = \frac{Vw}{^{V}m_{std} + ^{V}w_{std}} \times 100 = \frac{(\ \ )}{(\ \ )} \times 100 = \_\_\_\_\%$$

Figure 4.1-1
Impingement Train for Moisture



1. Stack Wall
2. Probe
3. Impinger with 100 ml of H2O
4. Empty Bubbler
5. Bubbler with Silica Gel
6. Ice Bath
7. Sealed Pump (Leak Free)
8. Filter for Pump
9. Metering Valve
10. Vacuum Gauge
11. By-pass Valve
12. Temperature Compensated Dry Gas Meter

Method 100.1
Instrumental Analyzer Procedures for Continuous Gaseous Emission Sampling

Principle:

A representative sample of an exhaust gas stream is continuously extracted, conditioned, and conveyed to instrumental analyzers for the determination of:

- Sulfur dioxide (SO_2)
- Oxides of nitrogen (NO_X)
- Oxygen (O_2)
- Carbon monoxide (CO)
- Carbon dioxide (CO_2)

Analytical Range:

The analytical range is selected so that the sample gas concentration for each run is between 20 and 95 percent of the range, for 95 percent of the test period. Data obtained below 20 percent of the range can be used only for qualitative purpose.

Measurement System Performance Specifications:

PARAMETER	PERFORMANCE SPECIFICATION
Analyzer Calibration Error	< ± 2% of the range for the zero, mid-range, and high-range calibration gases
Sampling System Bias	< ± 5% of the range for the zero, and mid or high-range calibration gases
Zero Drift	< ± 3% percent of the range over the period of each run
Calibration Drift	< ± 3% of the range over the period of each run
Linearity	< ± 1% of the range for the pre-test and post test values

Equipment:

A schematic of the measurement system is shown in Figure 100.1-1. The essential components of the measurement system are described below.

1) Probe

The probe is constructed of quartz, borosilicate glass, stainless steel, aluminum oxide, porcelain, Hastalloy, or Inconel tubing of approximately ¼ inch diameter or larger. A heated probe is used if condensation occurs.

2) Sample Line

Teflon tubing is used to transport the sample gas to the moisture removal system. The sampling line is heated to prevent condensation.

3) Probe Calibration System

Calibration gases are introduced at the probe exit when in the probe calibration mode.

4) Sample Conditioning

The sample conditioner consists of a thermo electric cooler, or stainless steel impingers in an ice water bath with a peristaltic pump capable of reducing moisture content to below a dew point of 37°F. All parts exposed to the sample are glass, stainless steel, or Teflon.

5) Sample Transport Lines

Teflon lines are used to transport the sample from the moisture removal system to the sample pump, sample flow rate control, and sample gas manifold.

6) Particulate Filter

An in-stack 5 micron stainless steel or Inconel 600 porous filter or a heated (sufficient to prevent water condensation) out-of-stack filter is used. The out-of-stack filter is borosilicate or quartz glass wool or glass fiber mat. All filters are nonreactive to the gas being sampled.

7) Sample Pump

A leak-free pump is used to pull the sample gas through the system at a flow rate sufficient to minimize the response time of the measurement system.

8) Sample Flow Rate Control

A control valve and rotameter is used to maintain a sampling rate constant within 10 percent.

9) Sample Gas Manifold

A sample gas manifold is used to divert a portion of the sample gas stream to the analyzer, and the remainder to the bypass discharge vent. The sample gas manifold also includes provisions for introducing calibration gases directly into the analyzer.

10) Data Recorder

A strip chart recorder and an analog computer are used for recording measurement data. The data recorder resolution, or readability should be 0.5 percent of range. Sampling measurements are obtained at a minimum of 1 minute intervals.

11) Interference Response Sampling System

An interference test gas is introduced to the analyzer. The analyzer zero is given a positive offset prior to the test to allow measurement of a negative interference.

12) Vacuum Gauge

A 30 in. Hg gauge is used for leak checking the sampling system.

13) Calibration Gases/Gas Divider Verification

Calibration gases shall be certified according to EPA Traceability Protocol Number 1. Calibration gas divider, Environics 4000, may be used to dilute primary calibration gases to appropriate concentrations to calibrate analyzers. Prior to field use, EPA Method 205 will be conducted to verify the accuracy of the gas divider using 5 points.

Use three calibration gases as specified below:

A) High-Range Gas

The concentration should be equivalent to 80 to 100 percent of the range.

B) Mid-Range Gas (Challenge Gas)

The concentration should be equivalent to 40 to 60 percent of the range.

C) Zero Gas

Ultra zero grade nitrogen gas is used for zeroing the analyzers.

Measurement System Performance Test Procedures:

1) Sampling System Preparation

Before measurement of emissions, leak check the vacuum side of the assembly to a minimum of 20 inches of Hg (gauge). The sampling system should hold 20 inches Hg vacuum for 5 minutes with less than 1 in. Hg loss. Zero and high range calibration gases are introduced to the instruments and all necessary adjustments are made to calibrate the analyzer and the data recorder.

2) Analyzer Calibration Error

The analyzer calibration error check is conducted at the beginning and end of each test run by introducing calibration gases (zero, mid-range, and high-range) directly to the gas analyzer. During this check, no adjustments are made to the system except those necessary to achieve the correct calibration gas flow rate at the analyzer.

3) Sampling System Bias Check

A bias check of the sampling system is also performed at the beginning and end of each 30 minutes test run by introducing calibration gases into the probe. A zero gas and either the mid-range or high-range gas, whichever most closely approximates the effluent concentrations, is used for this check.

During the sampling system bias check operate the system at the normal sampling rate and no adjustments are made to measurement system other than those necessary to achieve the correct calibration gas flow rates at the analyzer.

4) NO_2 to NO Conversion Efficiency

An NO_2 to NO conversion efficiency test is conducted by using an NBS traceable gas mixture of NO_2 in nitrogen. The NO_2 to NO converter test will follow the SCAQMD Attachment C, Addendum to "General Continuous Gas Monitoring Procedure".

Emission Test Procedure:

The duct is traversed to determine if there is stratification (see Chapter X). Single point gas sampling is performed if the stratification is not present. For multipoint gas sampling every other point is used as required by SCAQMD Method 5.1 for particulate matter.

1) Chart Recorder Label

The strip chart is labeled with the following: pollutant, source, range, calibration cylinder ID number, certified expiration date, zero and upper range calibration settings, chart speeds, date, time, person operating instruments, and other pertinent data.

2) Sample Probe Traverse and Minimum Sampling

If a traverse is required, the probe is placed at each traverse point for at least the system response time plus one minute, allowing enough time for the system to be flushed and the instruments to respond fully. The probe is moved to the next traverse point and repeated until the stack has been fully traversed.

A minimum sample time of 60 minutes is recommended, but see District Rules and Regulations and permit conditions for applicable requirements. When the test duration exceeds one hour, zero and span checks are conducted every 2 hours.

3) Zero and Calibration Drift Tests

Immediately preceding and following each run, the sampling system bias check procedure is repeated with no adjustments to the measurement system.

Emission Calculation:

1) Concentrations

The average gas effluent concentration is determined from the average gas concentration displayed by the gas analyzer and adjusted for zero and high-range calibration drift.

The effluent gas concentration is calculated using the following equation:

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

Where:

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

C = Average gas concentration indicated by gas analyzer, dry basis, ppm

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

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

C_O = Average of initial and final system calibration bias check responses for the zero gas, ppm

2) Emission Rate

$$E = \frac{(C_g)(M)}{(385.3 \times 10^6)} (Q)(60)\left(\frac{528}{460+T}\right)$$

Where:

E = Emission rate, lb/hr

C_g = Concentration of gas, ppm

M = Molecular weight of gas*, lb/lb-mole

Q = Stack Effluent, dsfm

60 = Conversion factor, min/hr

385.3×10^6 = Conversion factor, scf/lb-mole

T = Temperature, °F

*NO_X is often expressed as NO_2

3) Pollutant Concentration Calculated to 12% CO_2, 3% O_2, and 15% O_2

$$\text{Concentration (12\% } CO_2) = \text{Concentration}_{(std)} \times \frac{12}{\%CO_2 \text{ (measured)}}$$

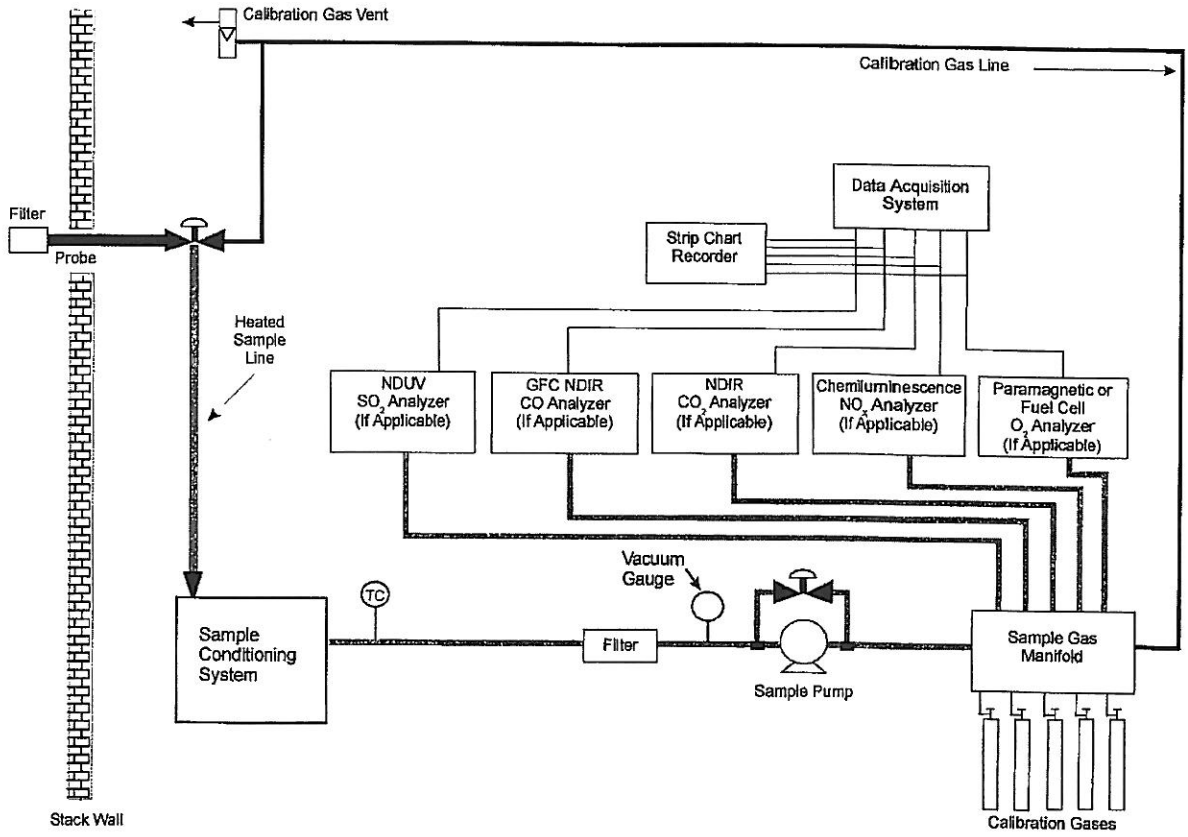
$$\text{Concentration (3\% } O_2) = \text{Concentration}_{(std)} \times \frac{20.9 - 3.0}{20.9 - O_2 \text{ (measured)}}$$

$$\text{Concentration (15\% } O_2) = \text{Concentration}_{(std)} \times \frac{20.9 - 15.0}{20.9 - O_2 \text{ (measured)}}$$

$\%\ CO_2$ = Percent CO_2 by volume, dry basis
$\%\ O_2$ = Perent O_2 by volume, dry basis
Based on O_2 in air as 20.9 percent

Figure 100.1 – 1

SCAQMD Method 100.1 CEM Schematic



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APPENDIX E

STATEMENT OF NO CONFLICT OF INTEREST

STATEMENT OF NO CONFLICT OF INTEREST AS AN INDEPENDENT TESTING LABORATORY

The following facility and equipment were tested by my source testing firm, and are the subject of this Statement:

Facility ID:	800089	**Date(s) Tested:**	September 14 and November 17, 2010
Facility Name:	Mobil Torrance Refinery		
Equipment Address:	3700 West 190th Street		
	Torrance, California 90509		
Equipment Tested:	Unit 28F-11		
Device ID, A/N, P/N:	C 626		
Report ID or Job No:	13147		

I state, as its legally authorized representative, that the source testing firm of:

Source Test Firm:	AirKinetics, Inc.
Business Address:	1308 S. Allec Street
	Anaheim, CA 92805

is an "Independent Testing Laboratory" as defined in **District Rule 304(K):**

For the purposes of this Rule, when an independent testing laboratory is used for the purposes of establishing compliance with District rules or to obtain a District permit to operate, it must meet all of the following criteria:

(1) *The testing laboratory shall have no financial interest in the company or facility being tested, or in the parent company or any subsidiary thereof;*

(2) *The company or facility being tested, or parent company or any subsidiary thereof, shall have no financial interest in the testing laboratory;*

(3) *Any company or facility responsible for the emission of significant quantities of pollutants to the atmosphere, or parent company or any subsidiary thereof, shall have no financial interest in the testing laboratory; and*

(4) *The testing laboratory shall not be in partnership with, own or be owned by, in part or in full, the contractor who has provided or installed equipment (basic or control), or monitoring systems, or is providing maintenance for installed equipment or monitoring systems, for the company being tested.*

Furthermore, I state that any contracts or agreements entered into by my source testing firm and the facility referenced above, or its designated contractor(s), either verbal or written, are not contingent upon the outcome of the source testing, or the source testing information provided to the SCAQMD.

Signature: _____ **Date:** 1/4/11

Jason Mai	**Report Writer**	**714-254-1945**
(Name)	**(Title)**	**(Phone)**