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South Coast Air Quality Management District
Energy, Terminals, and Waste Management Permitting
Engineering and Compliance Division
21865 Copley Drive
Diamond Bar, California 91765-4178

December 8, 2017

Subject: Results of the NOx Emissions Test of the Regenerative Thermal Oxidizer at the SFPP Norwalk Pump Station, Norwalk, California (Facility ID 110835), Permitted under SCAQMD Permit to Operate (Permit No. G46187, A/N 578777)

To Whom it May Concern,

This letter has been prepared on behalf of Kinder Morgan Energy Partners, L.P. (Kinder Morgan) to provide results of the nitrogen oxide (NOx) emissions test of the soil vapor extraction (SVE) and biosparge system at the SFPP, L.P. (SFPP) Norwalk Pump Station located at 15306 Norwalk Boulevard, Norwalk, California (Facility identification [ID] 110835). The SVE and biosparge system at the SFPP Norwalk Pump Station are operating under the South Coast Air Quality Management District (SCAQMD) permit to operate number (No.) G46187 (A/N 578777).

As part of Condition 20 of the permit, a NOx emissions test of the burner of the new regenerative thermal oxidizer shall be performed within 90 days of initial operation of the SVE system. The SVE system was restarted on June 6, 2017. The NOx emissions test was conducted on August 29, 2017. Results of the NOx test, which was conducted by Montrose Air Quality Services, are included in the attached report.

Please let us know if you have questions or need further information. I can be reached at (404) 323-1600.

Regards,
CH2M HILL Engineers, Inc.

Eric Davis
Project Manager

c: Steve Defibaugh, Kinder Morgan

Attachment: *Source Test Report for Measurement of Oxides of Nitrogen Emissions, from a Regenerative Thermal Oxidizer* (Montrose Air Quality Services, LLC, October 24, 2017)

SOURCE TEST REPORT FOR MEASUREMENT OF OXIDES OF NITROGEN EMISSIONS FROM A REGENERATIVE THERMAL OXIDIZER

PREPARED FOR:

SFFP, L.P.
15306 NORWALK BLVD.
NORWALK, CALIFORNIA 90650

FOR SUBMITTAL TO:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 COPLEY DRIVE
DIAMOND BAR, CALIFORNIA 91765

PREPARED BY:

MONTROSE AIR QUALITY SERVICES, LLC
1631 E. ST. ANDREW PL.
SANTA ANA, CALIFORNIA 92705
(714) 279-6777

JOE RUBIO

PROJECT NUMBER: **002AS2-214705**

TEST DATE: **AUGUST 29, 2017**

PRODUCTION DATE: **OCTOBER 24, 2017**

REPORT NUMBER: **R9315539**

MONTROSE
AIR QUALITY SERVICES

CONFIDENTIALITY STATEMENT

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REPORT REVIEW AND CERTIFICATION

I certify that all work performed in the preparation and production of this report was performed by me or under my supervision and that all data presented is authentic.

I certify that I have also reviewed this report, both in form and content, and that all data, calculations, and presentations are authentic, accurate, and complete.

To the best of our knowledge, the report has been checked for completeness and the results presented are accurate, error-free, legible, and representative of the actual emissions measured during the test, and do conform to the requirements of ASTM D7036-04, Standard Practice for Competence of Air Emission Testing Bodies (AETB's).

Date: 10/24/2017

Joe Rubio
Project Manager

GENERAL INFORMATION

Source:	Regenerative Thermal Oxidizer Manufactured by Alliance Corp Rated at 0.9 MMBtu/hr
Source Location:	SFFP, L.P. 15306 Norwalk Blvd. Norwalk, California 90650
Facility ID:	110835
Permit to Operate:	Permit No. G46187, A/N 578777
Consultant:	CHM2 6 Hutton Centre Dr., Suite 700 Santa Ana, California 92707
Contact:	Vladimir Carino Telephone: 714-435-6017 Email: Vladimir.Carino@ch2m.com
Agency:	SCAQMD 21865 Copley Drive Diamond Bar, California 91765
Source Test Contractor:	MAQS 1631 E. St. Andrew Pl. Santa Ana, California 92705
Project Manager:	Joe Rubio Telephone: (714) 332-8486 Email: jrubio@montrose-env.com
Test Date:	August 29, 2017

TABLE OF CONTENTS

Section Page

1.0 INTRODUCTION....1

2.0 EQUIPMENT AND PROCESS DESCRIPTION....2

3.0 TESTING METHODOLOGY....3
3.1 SCAQMD METHODS 1.1–4.1 (EXHAUST GAS FLOW)....3
3.2 SCAQMD METHOD 100.1 (NO_X, CO, O_2 AND CO_2 DETERMINATION)....4

4.0 RESULTS....6

APPENDICES

A TEST DATA....A-1
A.1 Gaseous Emissions Data....A-2
A.2 Exhaust Flow Data....A-3
A.3 Calibration Certificates....A-4

B CALCULATIONS....B-1

C QUALITY ASSURANCE....C-1
C.1 Quality Assurance Program Summary....C-2
C.2 SCAQMD LAP, STAC Certifications....C-4
C.3 Individual QI Certificates....C-5
C.4 Statement of No Conflict of Interest....C-6

D PERMIT TO OPERATE....D-1

LIST OF FIGURES

Figure 2-1 Diagram Showing the RTO and location of Sampling Ports....2
Figure 3-1 SCAMD Method 100.1 Diagram....5

LIST OF TABLES

Figure 4-1 Emissions Summary....6

1.0 INTRODUCTION

SFFP, L.P. operates a groundwater and soil vapor extraction system at its facility in Norwalk, California. As part of the system, the facility operates a regenerative thermal oxidizer (RTO). The RTO was tested to show compliance with Permit to Operate No. G46187, A/N 578777. The permit was issued by the South Coast Air Quality Management District (SCAQMD) and a copy of the permit can be found in Appendix D. The permit requires compliance with SCAQMD Rule 1147 and limits the RTO burner to 60 ppmv NO_x at 3%O_2 (or 0.073 lb/MMBtu).

In order to show compliance with the permit conditions, source testing was performed to determine the oxides of nitrogen (NO_x) emissions at the RTO exhaust after start-up, and in the unit's as-found operating condition for a duration of thirty-two (32) minutes by SCAQMD Method 100.1 while the burners are at high fire.

Montrose Air Quality Services, LLC (MAQS), was retained by CH2M, a consultant to SFFP, L.P. to perform the required testing. MAQS qualifies as an independent testing laboratory under SCAQMD Rule 304 (no conflict of interest) and is certified by the SCAQMD to conduct testing for criteria pollutants according to District Methods. Appendix C contains MAQS's certifications for the SCAQMD Laboratory Approval Program and ASTM A2LA Accreditation, as well as a Statement of No Conflict of Interest form.

2.0 EQUIPMENT AND PROCESS DESCRIPTION

Regenerative Thermal Oxidizer, Permit No G46187, A/N 578777, was manufactured by Alliance Corporation. The RTO is equipped with a 0.9 MMBtu/hr natural gas fired Maxon Kinemax-2G burner, a 333 scfm combustion air blower and a fully modulating temperature control system. A diagram showing the RTO and location of the sampling ports can be seen in figure 2-1.

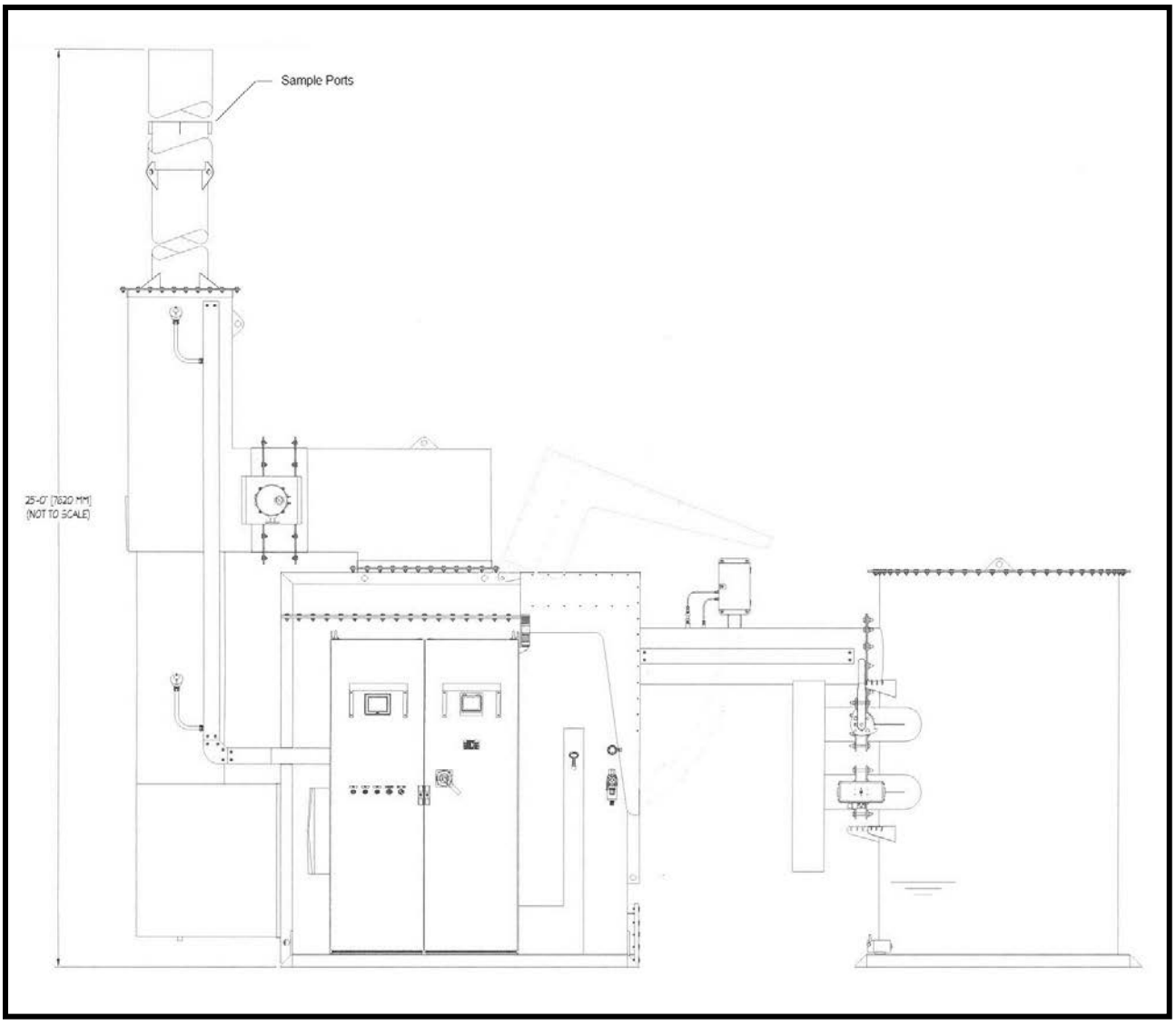


Figure 2-1 Diagram Showing the RTO and location of Sampling Ports

3.0 TESTING METHODOLOGY

Source testing was conducted on the RTO after start-up, and in the unit's as-found operating condition while the burner was operating at maximum fire. Operation at maximum fire was verified by observing the air/fuel valve on the burner. The test at high fire was 32 minutes in duration. To account for potential stratification of the flue gas, the monitoring was conducted at every other traverse point (points 2, 4, 6 and 8) on each of 2 sample ports for 4 minutes per point. The test crew logged the following parameters for the testing period:

- RTO operating temperatures
- Exhaust gas flow

3.1 SCAQMD METHODS 1.1–4.1 (EXHAUST GAS FLOW)

The exhaust gas flow rate was determined by SCAQMD Methods 1.1 – 4.1. The procedures specified in SCAQMD Method 1.1, "Sample and Velocity Traverses for Stationary Sources", was followed to determine the number and location of traverse points used for the velocity traverses. The number of straight run stack diameters (equivalent diameters) upstream and downstream from the sample ports was used to determine the minimum number of traverse points required. Parallel or non-cyclonic gas stream flow was verified using a S-Type Pitot tube connected to a 10-inch water column inclined-vertical oil manometer. The manometer has 0.01-inch gradations on the inclined scale and 0.10 inch gradations on the vertical scale. In practice, the Pitot tube is rotated so the planes of the face openings are perpendicular to the stack cross-sectional plane. This is referred to as the 0 degree reference position. A zero manometer reading obtained in this position indicates no cyclonic flow. If the manometer does not read zero, the Pitot tube is rotated up to a 90 degrees yaw angle until a zero reading is obtained. The angle of rotation is measured to the nearest degree. All traverse points were examined in this fashion. If the average of all the rotation angles is less than 10 degrees the reference method sampling ports are located in a point in the exhaust gas stream that is considered to be non-cyclonic.

The procedures of SCAQMD Method 2.1, "Determination of Stack Gas Velocity and Volumetric Flow Rate (S-Type Pitot tube)," was followed to determine the engine exhaust gas velocity and volumetric flow rate. Based on the number and location of traverse points, velocity and temperature traverses were conducted during each test run. A S-Type Pitot tube and K-Type thermocouple were positioned at each traverse point and the Pitot tube differential pressure and exhaust gas temperature data was recorded on field data sheets.

The Pitot tube was connected to a Dwyer inclined oil manometer and the thermocouple was connected to an Omega, Model 601 digital temperature readout. The Pitot tube, thermocouple and readout devices were calibrated in accordance with US EPA and CARB requirements prior to and after field use.

The stack gas molecular weight was determined in accordance with SCAQMD Method

3.1 from oxygen and carbon dioxide data, collected in accordance with SCAQMD Method 100.1.

The sampling train used to determine the moisture content of the exhaust gas was configured in accordance with SCAQMD Method 4.1. The sampling train was comprised of a stainless steel probe connected via a short length of Teflon tubing to four impingers in a series. The first two impingers each will contain 100 mls of deionized water, the third impinger was empty, and the fourth impinger will contain approximately 400 grams of silica gel. A total of approximately 21 dry cubic feet were sampled for the moisture determination. The sampling train was leak checked at the beginning and at the conclusion of the test run.

3.2 SCAQMD METHOD 100.1 (NO_X, CO, O_2 AND CO_2 DETERMINATION)

The NO_x emissions of the furnace exhaust was determined by SCAQMD Method 100.1. The exhaust was monitored for nitrogen oxides (NO_x) carbon monoxide (CO), carbon dioxide (CO_2), oxygen (O_2), and carbon monoxide (CO) by continuous emission monitoring (CEM).

Exhaust gas samples were collected through a heated stainless steel probe inserted into the stack through the existing sample ports. Sample was passed through a sample conditioning and delivery system comprised of an insulated 1/4" OD Teflon heated sample line, a Peltier thermoelectric cooler (for moisture removal), Balston filter (for particulate removal), and a pump manifold system for sample distribution to the continuous analyzers (see Figure 3-1).

The NO_x reference method testing was conducted in accordance with SCAQMD Method 100.1. A CAI Model 600, chemiluminescent analyzer equipped with a mini-HICON stainless steel converter was utilized. This instrument was calibrated with gases contained in compressed gas cylinders that are certified as EPA Protocol I gases that are accurate to +1%. The instrument initial calibration was comprised of a zero gas plus two upscale concentrations to achieve a multi-point calibration. The instrument full-scale was 10 ppm. Final calibrations and a sampling system bias check was comprised of zero gas, and two upscale calibration gases.

A CAI, Model 600, gas filter correlation nondispersive infrared (NDIR) analyzer was used to determine the CO concentration and was operated in accordance with SCAQMD Method 100.1. The calibration procedures were identical to the NO_x Reference Method. The instrument full scale was 100 ppm.

The O_2 analyzer was a Servomex, Model 1400 utilizing the paramagnetic detection method and was operated in accordance with SCAQMD Method 100.1. The calibration procedures was similar to the NO_X Reference Method. The instrument full scale was 25%.

The CO_2 analyzer was a Servomex Model 1400B NDIR analyzer that was operated in accordance with SCAQMD Method 100.1. The calibration procedures was similar to the NO_x Reference Method. The instrument full scale was 25%.

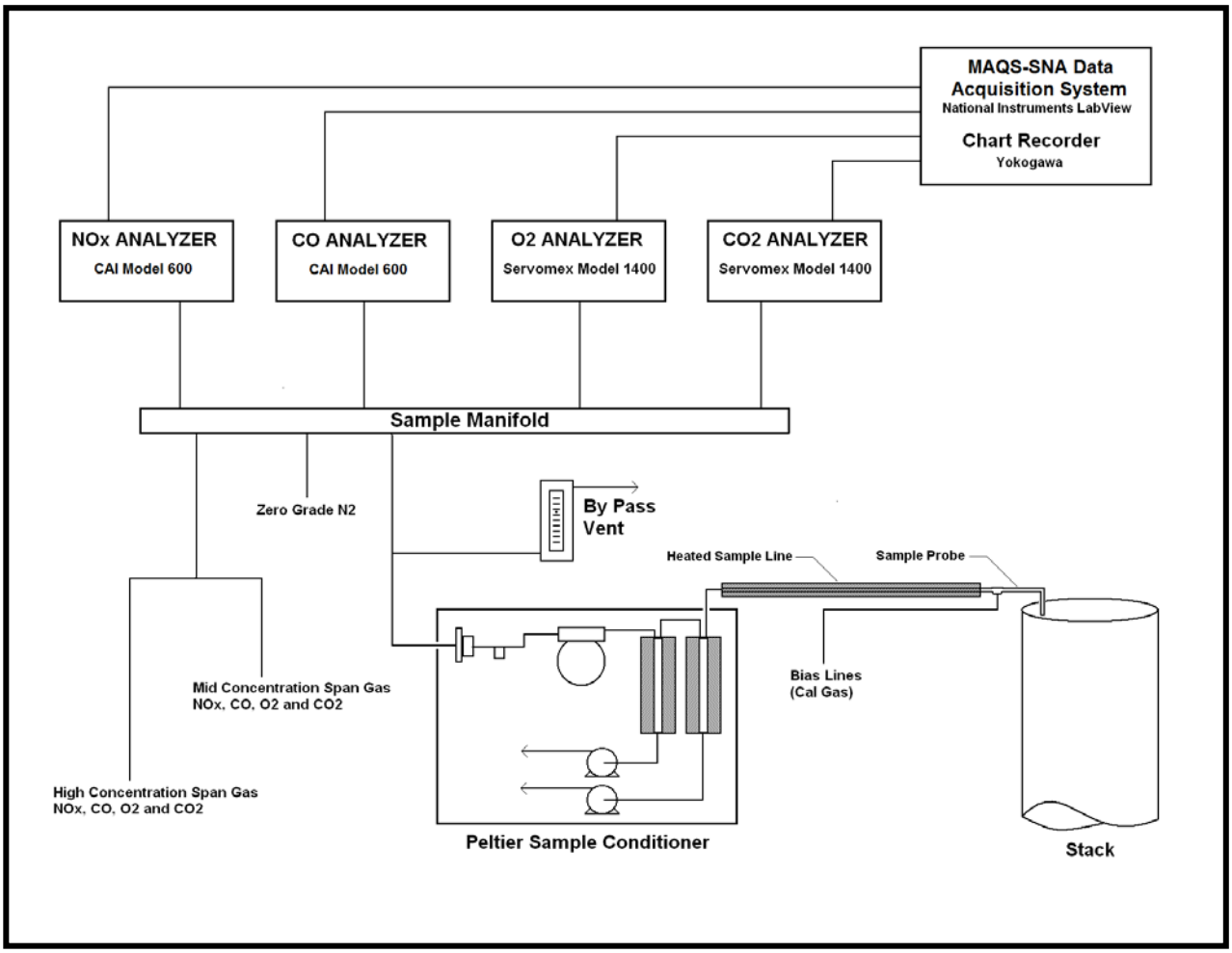


Figure 3-1 SCAMD Method 100.1 Diagram

4.0 RESULTS

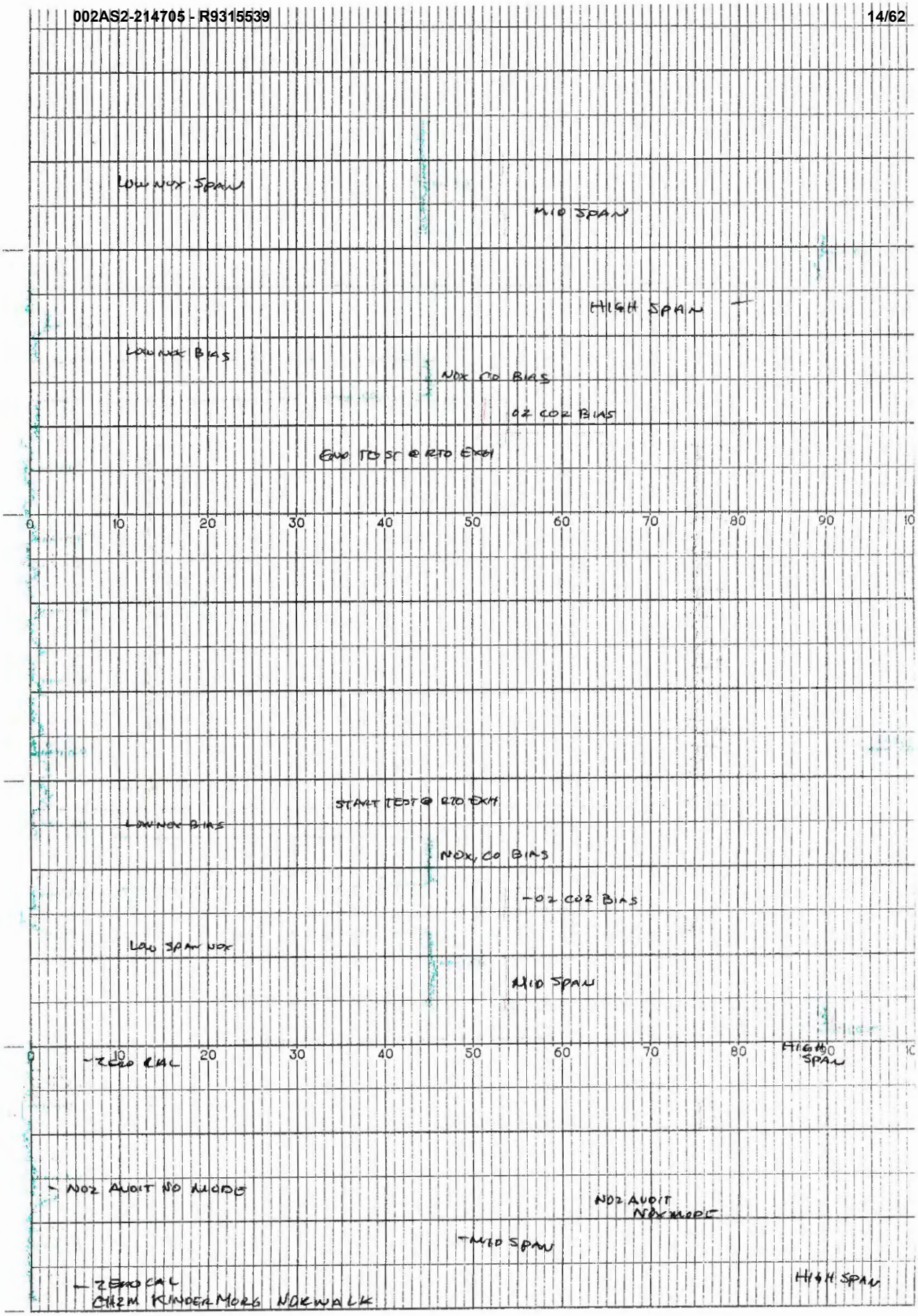
Results indicate that the RTO was found to be operating in compliance with all applicable emissions limits. The monitoring results for CO concentration were less than 20% of scale on both stacks. At a scale of 0-100 ppmv, the practical detection limit of the CO analyzer was 20 ppmv. Table 4-1 shows the analytical results of the NO_x and CO sampling and the field measurements taken during each test. Additional information such as gas calibrations and permits can be located in Appendix A and D, respectively

TABLE 4-1
EMISSIONS SUMMARY
RTO BURNER
SFFP, L.P.

Parameter	Result	Compliance Limit
NO_x Data:		
ppm (v/v)	2.2	
ppm (v/v) @3% oxygen	18.6	60
lbs/hr	0.023	
CO Data:		
ppm (v/v)	0.47	
ppm (v/v) @ 3% oxygen	4.0	
lbs/hr	0.0030	
O_2 (%)	18.8	
CO_2 (%)	1.37	
Exhaust Gas Flow (dscfm)	1,456	

APPENDIX A TEST DATA

Appendix A.1 Gaseous Emissions Data


LOW NOX SPAN
MID SPAN
HIGH SPAN
LOW NOX BIAS
NOX CO BIAS
O2 CO2 BIAS
END TEST @ RTO EXH
0 10 20 30 40 50 60 70 80 90 10
START TEST @ RTO EXH
LOW NOX BIAS
NOX, CO BIAS
O2 CO2 BIAS
LOW SPAN NOX
MID SPAN
0 10 20 30 40 50 60 70 80 90 10
ZERO CAL
HIGH SPAN
NO2 AUDIT NO NOX MODE
NO2 AUDIT NOX MODE
MID SPAN
HIGH SPAN
ZERO CAL
CHEM KINDER MORG NORWALK

MONTROSE
AIR QUALITY SERVICES

1631 E. Saint Andrew Place
Santa Ana, California, 92705
Office: 714-297-6777 Fax: 714-279-6781

DRIFT CORRECTION

Facility: Kinder Morgan
Source: RTO Exhaust
Date: 08/29/17
Operator: P. San Juan

RTO Exhaust							
	Ave Conc.	Initial Zero	Final Zero	Initial Bias	Final Bias	Cal Gas Conc.	Corrected Conc.
NOx (ppm)	2.19	0.00	0.01	4.43	4.41	4.40	**2.18**
CO (ppm)	0.48	0.00	0.00	45.07	45.15	45.00	**0.47**
O2 (%)	18.87	0.01	0.02	13.46	13.49	13.42	**18.80**
CO2 (%)	1.36	0.01	0.01	5.12	5.15	5.18	**1.37**

MONTROSE AIR QUALITY SERVICES

1631 E. Saint Andrew Place
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Office: 714-297-6777 Fax: 714-279-6781

Facility: Kinder Morgan
Source: RTO Exhaust
Date: 08/29/17
Operator: P. San Juan

NOx CONVERTER EFFICIENCY

Zero:	0.00
Audit Gas:	
C_0, ppmv: NO_2 Concentration:	16.30
Calibration Gas:	
NO, ppmv	22.20
NOx, ppm	22.30
Calibration Gas:	
NO, ppmv	11.50
NOx, ppm	11.60
Converter Efficiency Calculations:	
C_1, ppmv: Analyze Audit Gas with NO Mode	0.05
C_2, ppmv:Analyze Audit Gas with NO_X Mode	15.89
Converter Efficiency, % = $((C_2-C_1)/C_0) \times 100$	97.13 %

08_29_17_1m Kinder Morgan

Date	Time	NOx	CO	O_2	CO_2	Field Notes
8/29/2017	8:39:00	0.01	2.26	0.06	0.01	
8/29/2017	8:40:00	0.02	0.08	0.06	0.01	
8/29/2017	8:41:00	**0.01**	0.01	0.01	0.01	< Zero Cal
8/29/2017	8:42:00	9.87	0.19	0.00	0.01	
8/29/2017	8:43:00	22.26	0.11	0.00	0.01	
8/29/2017	8:44:00	**22.33**	0.31	0.00	0.01	< Span High
8/29/2017	8:45:00	13.49	0.29	0.00	0.00	
8/29/2017	8:46:00	**11.50**	0.33	0.00	0.00	< Span Mid
8/29/2017	8:47:00	12.31	0.22	0.00	0.00	
8/29/2017	8:48:00	15.22	0.12	0.01	0.00	
8/29/2017	8:49:00	15.53	0.11	0.01	0.00	
8/29/2017	8:50:00	**15.89**	0.37	0.01	0.00	< Span 3 (Audit Gas)
8/29/2017	8:51:00	6.58	2.00	0.01	0.00	NOx Mode
8/29/2017	8:52:00	**0.05**	0.12	0.01	0.00	< Span 3 (Audit Gas)
8/29/2017	8:53:00	0.08	0.19	0.01	0.00	NO Mode
8/29/2017	8:54:00	0.01	0.01	0.00	0.00	
8/29/2017	8:55:00	0.00	0.01	0.00	0.00	Efficiency = 97.13%
8/29/2017	8:56:00	0.01	0.12	0.00	0.00	
	Zero	**0.01**	-----	-----	-----	
	Span 1	**22.33**	-----	-----	-----	
	Span 2	**11.50**	-----	-----	-----	
Span Audit NOx Mode		**15.89**	-----	-----	-----	
Span Audit NO Mode		**0.05**	-----	-----	-----	

08_29_17_1m Kinder Morgan

Date	Time	NOx	CO	O2	CO2	Field Notes
8/29/2017	8:57:00	0.01	0.43	0.00	0.00	
8/29/2017	8:58:00	0.01	0.66	2.61	0.00	
8/29/2017	8:59:00	2.00	0.35	18.96	1.07	
8/29/2017	9:00:00	2.02	0.77	18.97	1.31	
8/29/2017	9:01:00	2.06	1.81	18.95	1.38	
8/29/2017	9:02:00	0.66	1.16	2.95	0.45	
8/29/2017	9:03:00	0.01	0.08	0.02	0.01	
8/29/2017	9:04:00	0.00	0.03	0.01	0.01	
8/29/2017	9:05:00	0.01	0.02	0.01	0.01	
8/29/2017	9:06:00	0.00	0.06	0.01	0.01	
8/29/2017	9:07:00	**0.01**	**0.01**	**0.00**	**0.01**	< Zero
8/29/2017	9:08:00	0.01	0.06	0.00	0.01	
8/29/2017	9:09:00	4.18	42.94	14.92	4.26	
8/29/2017	9:10:00	**8.32**	**90.03**	**22.81**	**9.06**	< Span High
8/29/2017	9:11:00	4.53	90.03	22.81	9.11	
8/29/2017	9:12:00	3.97	76.26	18.25	7.71	
8/29/2017	9:13:00	2.40	45.19	13.48	5.37	
8/29/2017	9:14:00	3.70	45.40	13.48	5.15	
8/29/2017	9:15:00	4.41	45.46	13.48	5.14	
8/29/2017	9:16:00	**4.42**	**45.62**	**13.48**	**5.14**	< Span Mid
8/29/2017	9:17:00	4.52	45.67	13.48	5.14	
8/29/2017	9:18:00	4.52	45.49	12.55	5.14	
8/29/2017	9:19:00	2.37	45.35	0.07	3.23	
8/29/2017	9:20:00	**0.97**	45.34	0.00	0.23	< 0.9 NOx Span
8/29/2017	9:21:00	1.64	31.41	12.54	0.64	
8/29/2017	9:22:00	1.60	0.30	16.84	1.87	
8/29/2017	9:23:00	0.05	1.33	13.42	5.09	
8/29/2017	9:24:00	0.04	0.23	13.56	5.11	
8/29/2017	9:25:00	0.00	0.00	**13.46**	**5.12**	< O2, CO2 Bias
8/29/2017	9:26:00	1.64	12.40	8.27	3.97	
8/29/2017	9:27:00	4.41	45.22	0.03	0.10	
8/29/2017	9:28:00	**4.43**	**45.07**	0.01	0.01	< NOx, CO Bias
8/29/2017	9:29:00	4.52	45.07	0.01	0.06	
8/29/2017	9:30:00	4.51	45.14	0.01	0.05	
8/29/2017	9:31:00	4.51	45.11	0.01	0.04	
8/29/2017	9:32:00	2.18	17.34	0.21	0.05	
8/29/2017	9:33:00	**0.95**	0.37	0.01	0.00	< NOx 0.9 Bias
8/29/2017	9:34:00	0.94	0.18	0.00	0.03	
8/29/2017	9:35:00	1.30	0.66	5.76	0.15	
	Zero Cal	**0.01**	**0.01**	**0.00**	**0.01**	
	Span High	**8.32**	**90.03**	**22.81**	**9.06**	
	Span Mid	**4.42**	**45.62**	**13.48**	**5.14**	
	Zero Bias	**0.00**	**0.00**	**0.01**	**0.01**	
	Span Bias	**4.43**	**45.07**	**13.46**	**5.12**	
8/29/2017	9:36:00	2.16	1.66	18.82	1.36	
8/29/2017	9:37:00	2.16	1.82	18.87	1.31	
8/29/2017	9:38:00	2.25	1.14	18.83	1.38	
8/29/2017	9:39:00	2.19	1.91	18.84	1.37	
8/29/2017	9:40:00	**2.17**	**1.84**	**18.84**	**1.34**	< Start Test Point 2
8/29/2017	9:41:00	**2.16**	**0.81**	**18.88**	**1.37**	
8/29/2017	9:42:00	**2.25**	**0.47**	**18.87**	**1.35**	
8/29/2017	9:43:00	**2.23**	**0.52**	**18.86**	**1.34**	

08_29_17_1m Kinder Morgan

Date	Time	NOx	CO	O2	CO2	Field Notes
8/29/2017	9:44:00	**2.19**	**1.31**	**18.86**	**1.37**	< Point 4
8/29/2017	9:45:00	**2.13**	**0.67**	**18.85**	**1.36**	
8/29/2017	9:46:00	**2.17**	**0.20**	**18.89**	**1.33**	
8/29/2017	9:47:00	**2.27**	**0.09**	**18.86**	**1.38**	
8/29/2017	9:48:00	**2.17**	**0.92**	**18.86**	**1.36**	< Point 6
8/29/2017	9:49:00	**2.18**	**0.89**	**18.86**	**1.35**	
8/29/2017	9:50:00	**2.17**	**0.24**	**18.87**	**1.38**	
8/29/2017	9:51:00	**2.22**	**0.18**	**18.87**	**1.35**	
8/29/2017	9:52:00	**2.21**	**0.31**	**18.85**	**1.35**	< Point 8
8/29/2017	9:53:00	**2.21**	**1.19**	**18.96**	**1.39**	
8/29/2017	9:54:00	**2.13**	**0.57**	**18.95**	**1.38**	
8/29/2017	9:55:00	**2.15**	**0.12**	**18.88**	**1.34**	
8/29/2017	9:56:00	2.22	0.01	18.89	1.39	< Port Change
8/29/2017	9:57:00	**2.18**	**0.72**	**18.81**	**1.37**	< Point 2
8/29/2017	9:58:00	**2.17**	**0.66**	**18.90**	**1.36**	
8/29/2017	9:59:00	**2.16**	**0.02**	**18.88**	**1.37**	
8/29/2017	10:00:00	**2.22**	**0.10**	**18.89**	**1.35**	
8/29/2017	10:01:00	**2.19**	**0.04**	**18.85**	**1.37**	< Point 4
8/29/2017	10:02:00	**2.17**	**0.72**	**18.91**	**1.36**	
8/29/2017	10:03:00	**2.16**	**0.02**	**18.84**	**1.36**	
8/29/2017	10:04:00	**2.19**	**0.15**	**18.88**	**1.35**	
8/29/2017	10:05:00	**2.22**	**0.12**	**18.87**	**1.38**	< Point 6
8/29/2017	10:06:00	**2.18**	**0.47**	**18.86**	**1.36**	
8/29/2017	10:07:00	**2.15**	**0.23**	**18.86**	**1.37**	
8/29/2017	10:08:00	**2.11**	**0.38**	**18.89**	**1.38**	
8/29/2017	10:09:00	**2.25**	**0.54**	**18.83**	**1.37**	< Point 8
8/29/2017	10:10:00	**2.20**	**0.19**	**18.87**	**1.36**	
8/29/2017	10:11:00	**2.16**	**0.28**	**18.89**	**1.37**	
8/29/2017	10:12:00	**2.36**	**0.38**	**18.83**	**1.37**	< End Test
8/29/2017	10:13:00	2.22	0.62	18.88	1.36	
8/29/2017	10:14:00	2.23	0.67	18.89	1.36	
8/29/2017	10:15:00	2.21	0.08	18.84	1.37	
8/29/2017	10:16:00	1.69	0.36	17.07	1.58	
8/29/2017	10:17:00	0.01	0.49	13.61	5.07	
8/29/2017	10:18:00	0.02	0.74	13.49	5.13	
8/29/2017	10:19:00	0.01	0.71	13.49	5.14	
8/29/2017	10:20:00	0.01	0.00	**13.49**	**5.15**	< O2, CO2 Bias
8/29/2017	10:21:00	1.29	10.38	8.89	4.39	
8/29/2017	10:22:00	4.47	45.10	0.03	0.10	
8/29/2017	10:23:00	**4.41**	**45.15**	0.02	0.01	< NOx, CO Bias
8/29/2017	10:24:00	4.48	45.15	0.01	0.05	
8/29/2017	10:25:00	4.49	45.03	0.13	0.05	
8/29/2017	10:26:00	1.39	8.22	0.26	0.07	
8/29/2017	10:27:00	**0.92**	0.54	0.01	0.04	< NOx 0.9 Bias
8/29/2017	10:28:00	0.91	0.54	0.01	0.03	
8/29/2017	10:29:00	0.84	1.37	0.09	0.03	
8/29/2017	10:30:00	0.03	1.99	0.00	0.03	
8/29/2017	10:31:00	0.04	1.14	0.01	0.03	
8/29/2017	10:32:00	0.03	0.21	0.01	0.02	
8/29/2017	10:33:00	**0.00**	**0.01**	**0.01**	**0.02**	< Zero Cal
8/29/2017	10:34:00	4.72	42.75	11.96	3.28	
8/29/2017	10:35:00	8.54	89.25	22.99	8.80	
8/29/2017	10:36:00	8.52	89.18	23.01	9.00	
8/29/2017	10:37:00	**8.35**	**90.03**	**22.83**	**9.08**	< Span High

08_29_17_1m Kinder Morgan

Date	Time	NOx	CO	O2	CO2	Field Notes
8/29/2017	10:38:00	8.35	89.79	22.83	9.09	
8/29/2017	10:39:00	8.39	89.81	22.12	9.10	
8/29/2017	10:40:00	4.93	49.34	13.45	5.44	
8/29/2017	10:41:00	**4.40**	**45.03**	**13.49**	**5.17**	< Span Mid
8/29/2017	10:42:00	3.69	44.55	13.42	5.33	
8/29/2017	10:43:00	0.88	44.40	13.37	5.30	
8/29/2017	10:44:00	0.86	44.47	13.37	5.28	
8/29/2017	10:45:00	0.85	44.65	13.37	5.27	
8/29/2017	10:46:00	0.85	44.55	13.37	5.23	
8/29/2017	10:47:00	**0.95**	44.50	13.37	5.20	< 0.9 NOx Span
8/29/2017	10:48:00	0.86	44.41	13.37	5.18	
8/29/2017	10:49:00	0.48	44.27	13.37	5.15	
8/29/2017	10:50:00	0.31	44.28	13.37	5.12	
8/29/2017	10:51:00	0.33	44.27	13.37	5.10	
8/29/2017	10:52:00	0.38	44.35	13.37	5.07	
32 Minute Average		**2.19**	**0.48**	**18.87**	**1.36**	
	Zero Cal	**0.00**	**0.01**	**0.01**	**0.02**	
	Span High	**8.35**	**90.03**	**22.83**	**9.08**	
	Span Mid	**4.40**	**45.03**	**13.49**	**5.17**	
	Zero Bias	**0.01**	**0.00**	**0.02**	**0.01**	
	Span Bias	**4.41**	**45.15**	**13.49**	**5.15**	

08_29_17_1m Kinder Morgan

NOx High	Certified Conc.	Initial Actual	Error [%]	Final Actual	Error [%]	Drift [%]	Cylinder Number	Expiration Date
Zero	0.00	0.01	0.07	0.00	0.04	0.03	na	na
Span 1	8.34	8.32	-0.19	8.35	0.13	-0.32	CC 332406	12-Dec-19
Span 2	4.40	4.42	0.20	4.40	-0.04	0.24	DT 0010001	12-Dec-19
Zero Bias	0.00	0.00	-0.06	0.01	0.03	-0.06	na	na
Span Bias	4.40	4.43	0.08	4.41	0.17	0.15	DT 0010001	12-Dec-19
Range = 10.00		Pre Predicted Value= 4.39			Post Predicted Value= 4.41			
Pre Linearity = 0.27					Post Linearity = -0.13			

CO High	Certified Conc.	Initial Actual	Error [%]	Final Actual	Error [%]	Drift [%]	Cylinder Number	Expiration Date
Zero	0.00	0.01	0.01	0.01	0.01	0.00	na	na
Span 1	90.00	90.03	0.03	90.03	0.03	0.01	CC 332406	12-Dec-19
Span 2	45.00	45.62	0.62	45.03	0.02	0.59	DT 0010001	12-Dec-19
Zero Bias	0.00	0.00	-0.01	0.00	-0.01	0.00	na	na
Span Bias	45.00	45.07	-0.55	45.15	0.13	-0.08	DT 0010001	12-Dec-19
Range = 100.0		Pre Predicted Value= 45.02			Post Predicted Value= 45.02			
Pre Linearity = 0.60					Post Linearity = 0.01			

O_2 High	Certified Conc.	Initial Actual	Error [%]	Final Actual	Error [%]	Drift [%]	Cylinder Number	Expiration Date
Zero	0.00	0.00	0.02	0.01	0.03	-0.02	na	na
Span 1	22.87	22.81	-0.24	22.83	-0.16	-0.08	SA 8836	26-Jun-25
Span 2	13.42	13.48	0.22	13.49	0.30	-0.07	CC 506411	19-Jun-25
Zero Bias	0.00	0.01	0.01	0.02	0.04	-0.04	na	na
Span Bias	13.42	13.46	-0.07	13.49	-0.02	-0.12	CC 506411	19-Jun-25
Range = 25.00		Pre Predicted Value= 13.39			Post Predicted Value= 13.40			
Pre Linearity = 0.36					Post Linearity = 0.38			

CO_2 High	Certified Conc.	Initial Actual	Error [%]	Final Actual	Error [%]	Drift [%]	Cylinder Number	Expiration Date
Zero	0.00	0.01	0.08	0.02	0.21	-0.13	na	na
Span 1	9.03	9.06	0.31	9.08	0.45	-0.14	SA 8836	26-Jun-25
Span 2	5.18	5.14	-0.41	5.17	-0.06	-0.35	CC 506411	19-Jun-25
Zero Bias	0.00	0.01	0.01	0.01	-0.16	0.04	na	na
Span Bias	5.02	5.12	-0.21	5.15	-0.25	-0.31	CC 506411	19-Jun-25
Range = 10.00		Pre Predicted Value= 5.20			Post Predicted Value= 5.21			
Pre Linearity = -0.62					Post Linearity = -0.41			

Appendix A.2 Exhaust Flow Data

PLANT: Kinder Morgan - Norwalk
SOURCE: RTO Exhaust
DATE: 08/29/17
STANDARD TEMPERATURE (°F): 60

RUN NUMBER	**1**
FIELD DATA INPUTS:	
Barometric Pressure ("Hg)	29.72
Stack Diameter (Inches)	14.00
Pitot Correction	0.84
Sqrt Delta P ("$H_2$0)	0.479
Stack Temperature (°F)	229.5
Static Pressure ("$H_2$0)	-0.18
Volume Sampled (cf)	22.365
Meter Temperature (°F)	88.2
Meter Gamma	1.016
Delta H ("$H_2$0)	1.76
Liquid Collected (mils)	9.0
Oxygen (%)	18.8
Carbon Dioxide (%)	1.37
FLOW RESULTS:	
Volume Sampled, DSCF	21.503
Volume Sampled, DSCM	0.609
Moisture in Sample (CF)	0.42
Moisture(%)	1.91
Molecular Weight (Dry)	28.97
Molecular Weight (Wet)	28.76
Stack Velocity (Ft/Sec)	30.90
Actual CFM	1982
Standard CFM	1484
Dry Standard CFM	1456
NOx:	
ppm	2.2
ppm @ 3% O2	18.6
lbs/hr	0.023
CO:	
ppm	0.47
ppm @ 3% O2	4.0
lbs/hr	0.0030

MONTROSE AIR QUALITY SERVICES

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Santa Ana, California 92705
Phone: 714-279-6777
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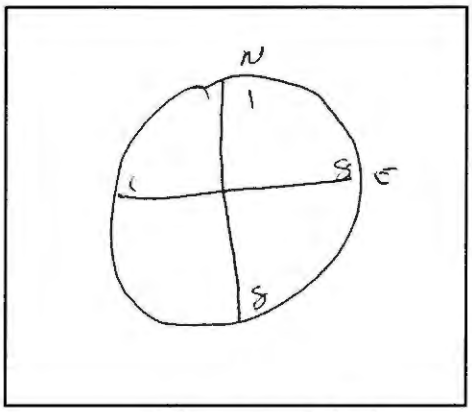
TRAVERSE POINT LOCATION FOR CIRCULAR STACKS

Job Number: _____

Checked by: _____

Plant: Kinder Morgan (Carneval)
Source: RTO EXHAUST
Date: 8/29/17
Inside of far wall to outside of nipple (a): 14"
Inside of near wall to outside of nipple (b): 2"
Stack I.D. (a-b): 16"
Nearest upstream disturbance: 30
Nearest downstream disturbance: 20
Calculator: OC



Schematic of duct

Traverse Point Number	Fraction of Stack I.D.	Stack I.D.	Products of Columns 2 & 3	Nipple Length	Traverse Point (sum of columns 4 & 5)
1	3.2	14"	0.4	2"	2.4
2	10.5	↓	1.5	↓	3.5
3	19.4	↓	2.7	↓	4.7
4	32.2	↓	4.5	↓	6.5
5	67.7	↓	9.5	↓	11.5
6	80.6	↓	11.3	↓	13.3
7	89.5	↓	12.5	↓	14.5
8	96.8	↓	13.6	↓	15.6

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VELOCITY TRAVERSE

Job Number: _____

Checked by: _____

Plant: Kinder Morgan (Carlwalk)
Source: 250 EXHAUST
Date: 8/26/17
Stack I.D.: 19"
Barometric Pressure: 29.72 " Hg
Stack Static Pressure: -0.18 " H_2O
Operator: DH
Pitot I.D. #: D-6
Temp Readout: PTC 52
Delta P Readout: YDG2
Pitot Leak Check: ok

Schematic of duct

Traverse Point Number	Velocity Head "H_2O	Stack Temp °F	Cyclonic Flow ° from null
1	0.24	211	<10
2	0.26	217	<10
3	0.30	229	<10
4	0.28	234	<10
5	0.27	241	<10
6	0.20	247	<10
7	0.17	240	<10
8	0.14	232	<10
Average:			

Traverse Point Number	Velocity Head "H_2O	Stack Temp °F	Cyclonic Flow ° from null
1	0.16	222	<10
2	0.17	229	<10
3	0.22	237	<10
4	0.26	244	<10
5	0.28	236	<10
6	0.29	220	<10
7	0.24	216	<10
8	0.24	209	<10
Average:	√0.475	229.0	

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Meter Box Field Data

Job Number: ______________ Checked by: ______________

Plant:	Kinder Morgan Norwalk	Probe length / Type:	24" SS
Source:	RTO EXHAUST	Pitot tube ID:	—
Date:	8/29/17	Nozzle ID/diameter:	—
Operator:	DH	Meter/Pump Box #:	36 WB (?)
Filter #:	—	Meter Delta H@:	1.782 (?)
Imp. Box #:	1	Meter Gamma:	1.016
Method:	4.1	Impinger Pre Leak:	0.005 CFM @ 10 " Hg
Static Pressure:	— " H_2O	Impinger Post Leak:	0.005 CFM @ 10 " Hg
Run #:	1	Pitot Pre Leak:	OK
Barometric Pressure:	29.77 " Hg	Pitot Post Leak:	ok

Traverse Point Number	Sampling Time (minutes)	Clock Time (24 hr clock)	Gas Meter Reading (cubic feet)	Velocity Head "H_2O	Delta H Actual "H_2O	Stack Temp (°F)	Dry Gas Meter Temp Inlet (°F)	Dry Gas Meter Temp Outlet (°F)	Pump Vacuum (in. Hg)	Heated Probe (°F)	Heated Filter (°F)	Silica Gel Imp. (°F)
	0	0940	558.399	—	1.8	—	84	85	3	—	—	58
	10	0950	565.9	—	1.8	—	89	86	3	—	—	59
	20	1600	573.5	—	1.8	—	96	91	3	—	—	59
	30	1010	580.764			END	TEST					
Ave / Sum	30		22.365	/	1.8	/	88.2					

MONTROSE

1631 E St. Andrew Place
Santa Anita, California 92705
Phone: 714-279-6777
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MOISTURE RECOVERY SHEET

Job Number: _____ Checked by: _____

FACILITY: Kinder Morgan Norwalk

SOURCE: RTO

DATE: 8/29/17

RUN #: 1

METHOD #: 4.1

BOX #: 1

IMPINGER	CONTENTS	FINAL GRAMS	INITIAL GRAMS	TOTAL GRAMS
1	D.I. WATER	634.8	634.3	0.5
2	D.I. WATER	772.8	772.6	0.2
3	EMPTY	550.8	550.6	0.2
4	SILICA GEL	859.3	851.2	8.1

TOTAL GRAMS COLLECTED	9.0

Prep/Recover

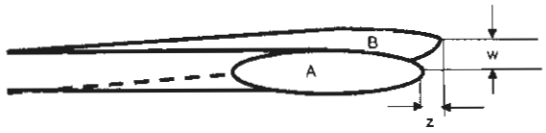
INITALS: RCI BK

Facility: ICM NORWALK
Date: 8/29/17

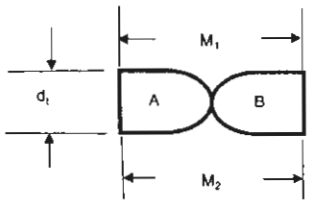
	CHAMBER	PROCESS FLOW
0900	1618	1430
0910	1618	1479
0920	1615	1454
0930	1617	1460
0940	1618	1466
0950	1617	1473
1000	1618	1468
1010	1616	1457
1020	1617	1449
1030	1619	1451

Appendix A.3 Calibration Certificates

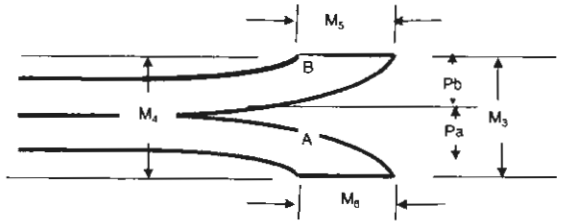
S Type Pitot Tube Dimensional Calibration Record



Side View



End View



Top View

Acceptability Criteria			z < 1/8"	w < 1/32"	Yes	"3/16" < Dt < 3/8"	n/a	n/a	n/a	n/a	n/a	n/a	10 degrees	5 degrees	1.05 Dt < P < 1.5 Dt	
Pitot ID	Date	Calibrated By	Side View, Impact openings Properly aligned, z < 1/8"	Side View, Impact openings Properly aligned, w < 1/32"	Pa = Pb	Tubing Diameter, dt	M1	M2	M3	M4	M5	M6	Average Face Opening Plane Angle, offset from perpendicular to transverse axis	Average Face Opening Plane Frontal Angle from parallel to Longitudinal Axis	Ratio of P/Dt	Status
S-16	7/5/17	SD	Y	Y	Y	0.375	0.950	0.950	0.950	0.949	0.475	0.475	0.0	0.1	1.3	Pass
S-18	7/5/17	SD	Y	Y	Y	0.375	0.950	0.948	0.949	0.947	0.475	0.475	0.2	0.1	1.3	Pass
S-19	7/5/17	SD	Y	Y	Y	0.374	0.936	0.935	0.936	0.934	0.468	0.468	0.1	0.1	1.3	Pass
D-1	7/5/17	SD	Y	Y	Y	0.315	0.670	0.671	0.671	0.671	0.320	0.320	-0.1	0.0	1.1	Pass
D-2	7/5/17	SD	Y	Y	Y	0.251	0.638	0.640	0.638	0.638	0.319	0.319	-0.2	0.0	1.3	Pass
D-5	7/5/17	SD	Y	Y	Y	0.375	0.865	0.868	0.875	0.873	0.397	0.412	-0.2	0.1	1.2	Pass
D-6	7/5/17	SD	Y	Y	Y	0.375	0.864	0.865	0.881	0.863	0.431	0.403	-0.1	1.2	1.2	Pass
D-7	7/5/17	SD	Y	Y	Y	0.315	0.811	0.810	0.812	0.810	0.405	0.405	0.1	0.1	1.3	Pass
D-8	7/5/17	SD	Y	Y	Y	0.314	0.818	0.817	0.818	0.815	0.409	0.409	0.1	0.2	1.3	Pass
D-10	7/5/17	SD	Y	Y	Y	0.375	0.921	0.920	0.922	0.921	0.460	0.461	0.1	0.1	1.2	Pass
D-11	7/5/17	SD	Y	Y	Y	0.374	0.961	0.961	0.961	0.960	0.480	0.481	0.0	0.1	1.3	Pass
D-12	7/5/17	SD	Y	Y	Y	0.371	0.954	0.947	0.965	0.952	0.423	0.415	0.5	0.9	1.3	Pass

Notes: Reference - Type-S Pitot Tube Calibration Study, Robert F. Vollaro, October 15, 1975
If tube is not visibly deformed, then average face angles to tube axes is presumed to represent each of the individual face angles to the axis

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DIGITAL TEMPERATURE READOUT CALIBRATION

Digital Temperature Readout ID: 36-WCS
Readout Description: Control Box
Date: 7/5/17
Performed By: SD/DA/MK

Calibrated Thermocouple ID: 157
T1 Reference Thermometer ID: 313010
T2 Reference Thermometer ID: 805002803
T3 Reference Thermometer ID: 805002770

T/C I.D. 157	Readout I.D.	T/C - Readout °F				Reference Thermometer °F				Difference		
		Reading 1	Reading 2	Reading 3	Average	Reading 1	Reading 2	Reading 3	Average	°F	%, (°R)	
T3 (OIL)	36-WCS	364	364	364	364	355	355	355	355	9.0	1.1%	Pass
T2 (Boiling H_2O)	36-WCS	210	210	210	210	212	212	212	212	2.0	0.3%	Pass
T1 (Ice/Water)	36-WCS	32	32	32	32	32	32	32	32	0.0	0.0%	Pass

1) Difference % (°R) = Difference (°F) / (Average Tref + 460)
2) Pass if all Differences are less than 1.5% (°R)

Thermocouple Source Readings

	T/C Source S/N	T/C - Readout °F				T/C Source °F				Difference		
		Reading 1	Reading 2	Reading 3	Average	Reading 1	Reading 2	Reading 3	Average	°F	%, (°R)	
T4 (~650 F)	S/N 106970	658	658	658	658	650	650	650	650	8.0	0.7%	Pass
T3 (~370 F)	S/N 106970	365	365	365	365	370	370	370	370	5.0	0.6%	Pass
T2 (~212 F)	S/N 106970	211	211	211	211	212	212	212	212	1.0	0.1%	Pass
T1 (~32 F)	S/N 106970	32	32	32	32	32	32	32	32	0.0	0.0%	Pass

1) Difference % (°R) = Difference (°F) / (Average Tref + 460)
2) Pass if all Differences are less than 1.5% (°R)

SEMI-ANNUAL DRY GAS METER/ORIFICE CALIBRATION

Orifice Method - Triplicate Runs/Four Calibration Points
English Meter Box Units, English K' Factor
Filename C:\Users\jdeberg\Desktop\CB\[semi annual cal 36wcs 7-27-17.xlsx]WCS
File Modified From APEX 522 Series Meter box Calibration
Revised 4/8/2005

c-5000
ID # 36-wcs
Date 7/26/2017
Bar Pressure 30.00 (in Hg)
Performed By J DeBerg
Meter Serial #

DRY GAS METER READINGS									CRITICAL ORIFICE READINGS					
					Initial Temps		Final Temps					Ambient Temperature		
dH (in H2O)	Time (min)	Volume Initial (cu ft)	Volume Final (cu ft)	Volume Total (cu ft)	Inlet (deg F)	Outlet (deg F)	Inlet (deg F)	Outlet (deg F)	Orifice Serial# (number)	K' Orifice Coefficient (see above)	Actual Vacuum (in Hg)	Initial (deg F)	Final (deg F)	Average (deg F)
0.13	26.00	396.343	401.693	5.350	82.0	82.0	84.0	84.0	33	0.1553	25.0	79.0	79.0	79.0
0.13	26.00	401.693	407.067	5.374	84.0	84.0	85.0	85.0	33	0.1553	25.0	79.0	79.0	79.0
0.13	26.00	407.067	412.436	5.369	85.0	85.0	86.0	85.0	33	0.1553	25.0	79.0	79.0	79.0
0.60	12.00	412.436	417.792	5.356	86.0	85.0	87.0	86.0	48	0.3465	22.0	79.0	79.0	79.0
0.60	12.00	417.792	423.162	5.370	87.0	86.0	88.0	87.0	48	0.3465	22.0	79.0	79.0	79.0
0.60	12.00	423.162	428.537	5.375	88.0	87.0	89.0	88.0	48	0.3465	22.0	79.0	79.0	79.0
2.00	7.00	428.537	433.929	5.392	89.0	88.0	90.0	89.0	63	0.5888	20.0	79.0	79.0	79.0
2.00	7.00	433.929	439.332	5.403	90.0	89.0	90.0	89.0	63	0.5888	20.0	79.0	79.0	79.0
2.00	7.00	439.332	444.739	5.407	90.0	89.0	91.0	90.0	63	0.5888	20.0	79.0	79.0	79.0
3.70	5.00	445.321	450.760	5.439	91.0	90.0	92.0	91.0	73	0.8202	17.0	79.0	79.0	79.0
3.70	5.00	450.760	456.162	5.402	92.0	91.0	93.0	92.0	73	0.8202	17.0	79.0	79.0	79.0
3.70	5.00	456.162	461.572	5.410	93.0	92.0	94.0	93.0	73	0.8202	17.0	79.0	79.0	79.0

DRY GAS METER		ORIFICE			DRY GAS METER CALIBRATION FACTOR	ORIFICE CALIBRATION FACTOR	Individual Run	Individual Orifice	Orifice Average	Orifice Average
VOLUME CORRECTED Vm(std) (cu ft)	VOLUME CORRECTED Vm(std) (liters)	VOLUME CORRECTED Vcr(std) (cu ft)	VOLUME CORRECTED Vcr(std) (liters)	VOLUME NOMINAL Vcr (cu ft)	Y Value (number)	dH@ Value (in H2O)	0.95 < Y < 1.05?	Ymax - Ymin < 0.010?	0.98 < Y/Yd < 1.02?	dH@ - dH@ av < 0.155?
5.216	147.7	5.218	147.8	5.314	1.000	1.770	Pass			
5.225	148.0	5.218	147.8	5.314	0.999	1.765	Pass			
5.213	147.6	5.218	147.8	5.314	1.001	1.764	Pass			
				Average	**1.000**	**1.767**		Pass	Pass	Pass
5.199	147.2	5.373	152.2	5.472	1.033	1.634	Pass			
5.203	147.3	5.373	152.2	5.472	1.033	1.631	Pass			
5.198	147.2	5.373	152.2	5.472	1.034	1.628	Pass			
				Average	**1.033**	**1.631**		Pass	Pass	Pass
5.223	147.9	5.326	150.8	5.425	1.020	1.876	Pass			
5.229	148.1	5.326	150.8	5.425	1.019	1.874	Pass			
5.228	148.1	5.326	150.8	5.425	1.019	1.872	Pass			
				Average	**1.019**	**1.874**		Pass	Pass	Pass
5.271	149.3	5.299	150.1	5.397	1.005	1.782	Pass			
5.226	148.0	5.299	150.1	5.397	1.014	1.779	Pass			
5.224	147.9	5.299	150.1	5.397	1.014	1.775	Pass			
				Average	**1.011**	**1.779**		Pass	Pass	Pass

Average Yd: **1.016** dH@: **1.762**

Q @ dH = 1: **0.565**

SIGNED Signature on File Date 7/26/2017

PRAXAIR

Praxair
5700 South Alameda Street
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PGVPID: F22017

DocNumber: 000103029

MONTROSE

F ANALYSIS / EPA PROTOCOL GAS

Montrose Air Quality Services, LLC
1631 E. St. Andrew Pl.
Santa Ana, CA 92705

Praxair Order Number: 70155066
Customer P. O. Number:
Customer Reference Number:

Fill Date: 1/12/2017
Part Number: Al NX17MZE-AS
Lot Number: 109701202
Cylinder Style & Outlet: AS CGA 660
Cylinder Pressure & Volume: 2000 psig 140 cu ft

NO2 16.3
DT0012747
1/24/20
F22017

Certified Concentration:

Expiration Date:		1/24/2020	NIST Traceable
Cylinder Number:		DT0012747	Analytical Uncertainty:
16.3	ppm	NITROGEN DIOXIDE (as NOx)	± 1.1 %
	Balance	AIR	

Certifcation Information: *Certification Date:* 1/24/2017 *Term:* 36 Months *Expiration Date:* 1/24/2020

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

The above certified concentration of Total Oxides of Nitrogen (NOx) excludes HNO3. [HNO3] 0.81 ppm for reference only.

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

1. **Component: NITROGEN DIOXIDE (as NOx)**

Requested Concentration: 17 ppm
Certified Concentration: 16.3 ppm
Instrument Used: MKS Multigas 2031 FTIR
Analytical Method: Fourier Transform Infrared
Last Multipoint Calibration: 1/12/2017

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC308835
Ref. Std. Conc: 97.5 ppm
Ref. Std. Traceable to SRM #: 2660a
SRM Sample #: 2660-C-45
SRM Cylinder #: CAL016162

First Analysis Data:						Date:	1/17/2017
Z:	0	R:	97.5	C:	16.3	Conc:	16.3
R:	97.5	Z:	0	C:	16.35	Conc:	16.35
Z:	0	C:	16.33	R:	97.5	Conc:	16.33
UOM:	ppm			Mean Test Assay:			16.327 ppm

Second Analysis Data:						Date:	1/24/2017
Z:	0	R:	97.5	C:	16.33	Conc:	16.33
R:	97.5	Z:	0	C:	16.38	Conc:	16.38
Z:	0	C:	16.36	R:	97.5	Conc:	16.36
UOM:	ppm			Mean Test Assay:			16.357 ppm

Analyzed by: Henry Koung

Certified by: Jack Fu

MC 2/14/17

PRAXAIR

Praxair
5700 South Alameda Street
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PGVPID: F22016

DocNumber: 000098406

MONTROSE

OF ANALYSIS / EPA PROTOCOL GAS

Montrose Air Quality Services, LLC
1631 E. St. Andrew Pl.
Santa Ana, CA 92705

Praxair Order Number: 34797301
Customer P. O. Number: 06114122
Customer Reference Number:

Fill Date: 9/1/2016
Part Number: NI NO11.5MZE-AS
Lot Number: 109624512
Cylinder Style & Outlet: AS CGA 660
Cylinder Pressure & Volume: 2000 psig 140 cu ft

NOx 11.6
CC457556
9/15/19
F22016

Certified Concentration:

Expiration Date:	9/15/2019		NIST Traceable
Cylinder Number:	CC457556		Analytical Uncertainty:
11.6	ppm	NITRIC OXIDE (as NOx)	± 1 %
Balance		NITROGEN	

NO = 11.5 ppm **NO for Reference Only**

Certifcation Information: *Certification Date:* 9/15/2016 *Term:* 36 Months *Expiration Date:* 9/15/2019

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

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

1. **Component: NITRIC OXIDE (as NOx)**

Requested Concentration: 11.5 ppm
Certified Concentration: 11.6 ppm
Instrument Used: Thermo Electron 42i-LS S/N 1030645077
Analytical Method: Chemiluminescence
Last Multipoint Calibration: 8/26/2016

First Analysis Data: **Date:** 9/8/2016

Z:	0	R:	9.99	C:	11.57	Conc:	11.57
R:	9.99	Z:	0	C:	11.58	Conc:	11.58
Z:	0	C:	11.55	R:	9.99	Conc:	11.55

UOM: ppm **Mean Test Assay:** 11.567 ppm

Analyzed by: Matthew Angerer

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC443973
Ref. Std. Conc: 9.99 ppm
Ref. Std. Traceable to SRM #: vs 2628a
SRM Sample #: 49-H-61
SRM Cylinder #: CAL016271

Second Analysis Data: **Date:** 9/15/2016

Z:	0	R:	9.99	C:	11.59	Conc:	11.59
R:	9.99	Z:	0	C:	11.68	Conc:	11.68
Z:	0	C:	11.61	R:	9.99	Conc:	11.61

UOM: ppm **Mean Test Assay:** 11.627 ppm

Certified by: Henry Koung

MC 1/26/17

PRAXAIR

Praxair
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Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22016

DocNumber: 000096303

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

MONTROSE

Montrose Air Quality Services, LLC
1631 E. St. Andrew Pl.
Santa Ana, CA 92705

Praxair Order Number: 34529715
Customer P. O. Number: 06064636
Customer Reference Number:

Fill Date: 6/30/2016
Part Number: NI NO22MZ1E-AS
Lot Number: 109618203
Cylinder Style & Outlet: AS CGA 660
Cylinder Pressure & Volume: 2000 psig 140 cu. ft

NOx 22.3
CC335819
7/19/19
F22016

Certified Concentration:

Expiration Date:	7/19/2019		NIST Traceable
Cylinder Number:	CC335819		Analytical Uncertainty:
22.3	ppm	NITRIC OXIDE (as NOx)	± 1 %
	Balance	NITROGEN	

NO = 22.2 ppm

NO for Reference Only

Certifcation Information: *Certification Date:* 7/19/2016 *Term:* 36 Months *Expiration Date:* 7/19/2019

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

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

1. **Component: NITRIC OXIDE (as NOx)**

Requested Concentration: 22 ppm
Certified Concentration: 22.3 ppm
Instrument Used: Thermo Electron 42i-LS S/N 1030645077
Analytical Method: Chemiluminescence
Last Multipoint Calibration: 6/23/2016

First Analysis Data:						Date: 7/12/2016
Z: 0	R: 20.3	C: 22.2	Conc: 22.32			
R: 20.3	Z: 0	C: 22.1	Conc: 22.22			
Z: 0	C: 22.2	R: 20.3	Conc: 22.32			
UOM: ppm		Mean Test Assay: 22.287 ppm				

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC457647
Ref. Std. Conc: 20.41 ppm
Ref. Std. Traceable to SRM #: 2629a
SRM Sample #: 50-G-17
SRM Cylinder #: FF31691

Second Analysis Data:						Date: 7/19/2016
Z: 0	R: 20.3	C: 22.1	Conc: 22.22			
R: 20.3	Z: 0	C: 22.2	Conc: 22.32			
Z: 0	C: 22.2	R: 20.3	Conc: 22.32			
UOM: ppm		Mean Test Assay: 22.287 ppm				

Analyzed by: Matthew Angerer

Certified by: Henry Koung

MC 7/26/16

PRAXAIR

Praxair
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PGVPID: F22016

DocNumber: 000101461

MONTROSE

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Montrose Air Quality Services, LLC
1631 E. St. Andrew Pl.
Santa Ana, CA 92705

Praxair Order Number: 70150909
Customer P. O. Number:
Customer Reference Number:

Fill Date: 11/18/2016
Part Number: NI CO90MN3ZE-AS
Lot Number: 109632303
Cylinder Style & Outlet: AS CGA 660
Cylinder Pressure & Volume: 2000 psig 140 cu ft

CO 90.0
NOx 8.34
CC332406
12/12/19
F22016

Certified Concentration:

Expiration Date:		12/12/2019	NIST Traceable
Cylinder Number:		CC332406	Analytical Uncertainty:
90.0	ppm	CARBON MONOXIDE	± 0.4 %
8.34	ppm	NITRIC OXIDE (as NOx)	± 1 %
	Balance	NITROGEN	

NO = 8.30 ppm

NO for Reference Only

Certifcation Information: *Certification Date:* 12/12/2016 *Term:* 36 Months *Expiration Date:* 12/12/2019

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

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

1. Component: **CARBON MONOXIDE**

Requested Concentration: 90 ppm
Certified Concentration: 90.0 ppm
Instrument Used: Horiba VIA-510 S/N 576876015
Analytical Method: NDIR
Last Multipoint Calibration: 11/25/2016

First Analysis Data: Date: 12/5/2016

Z:	0	R:	101.3	C:	90	Conc:	89.944
R:	101.4	Z:	0	C:	90.1	Conc:	90.044
Z:	0	C:	90.1	R:	101.3	Conc:	90.044

UOM: ppm Mean Test Assay: 90.01 ppm

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC119961
Ref. Std. Conc: 101.27 ppm
Ref. Std. Traceable to SRM #: 1679c
SRM Sample #: 3-J-30
SRM Cylinder #: CAL017865

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: ppm Mean Test Assay: 0 ppm

2. Component: **NITRIC OXIDE (as NOx)**

Requested Concentration: 9 ppm
Certified Concentration: 8.34 ppm
Instrument Used: Thermo Electron 42i-LS S/N 1030645077
Analytical Method: Chemiluminescence
Last Multipoint Calibration: 11/28/2016

First Analysis Data: Date: 12/5/2016

Z:	0	R:	10.03	C:	8.33	Conc:	8.327
R:	10.04	Z:	0	C:	8.35	Conc:	8.347
Z:	0	C:	8.34	R:	10.03	Conc:	8.337

UOM: ppm Mean Test Assay: 8.337 ppm

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC444024
Ref. Std. Conc: 10.03 ppm
Ref. Std. Traceable to SRM #: vs 2528a
SRM Sample #: 49-H-51
SRM Cylinder #: CAL016271

Second Analysis Data: Date: 12/12/2016

Z:	0	R:	10.03	C:	8.35	Conc:	8.35
R:	10.03	Z:	0	C:	8.33	Conc:	8.33
Z:	0	C:	8.33	R:	10.03	Conc:	8.33

UOM: ppm Mean Test Assay: 8.337 ppm

Analyzed by: Henry Koung

Certified by: Jack Fu

ML 1/10/17

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PGVPID: F22016

DocNumber: 000101460

F ANALYSIS / EPA PROTOCOL GAS

Montrose Air Quality Services, LLC
1631 E. St. Andrew Pl.
Santa Ana, CA 92705

Praxair Order Number: 70150909
Customer P. O. Number:
Customer Reference Number:

Fill Date: 11/22/2016
Part Number: NI CO45N2ZE-AS
Lot Number: 109632717
Cylinder Style & Outlet: AS CGA 660
Cylinder Pressure & Volume: 2000 psig 140 cu ft

CO 45.0
NOx 4.40
DT0010001
12/12/19
F22016

Certified Concentration:

Expiration Date:		12/12/2019	NIST Traceable
Cylinder Number:		DT0010001	Analytical Uncertainty:
45.0	ppm	CARBON MONOXIDE	± 0.6 %
4.40	ppm	NITRIC OXIDE (as NOx)	± 1 %
	Balance	NITROGEN	

NO = 4.38 ppm

NO for Reference Only

Certification Information: *Certification Date:* 12/12/2016 *Term:* 36 Months *Expiration Date:* 12/12/2019

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

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

1. **Component:** CARBON MONOXIDE

Requested Concentration 45 ppm
Certified Concentration 45.0 ppm
Instrument Used Horiba VIA-510 S/N 576876015
Analytical Method NDIR
Last Multipoint Calibration 11/25/2016

First Analysis Data: **Date:** 12/5/2016

Z:	0	R:	50.3	C:	45	Conc:	45
R:	50.3	Z:	0	C:	45.1	Conc:	45.1
Z:	0	C:	45	R:	50.3	Conc:	45

UOM: ppm **Mean Test Assay:** 45.033 ppm

Reference Standard Type GMIS
Ref Std Cylinder # CC186877
Ref Std Conc 50.3 ppm
Ref Std Traceable to SRM # 1678c
SRM Sample # C4-41
SRM Cylinder # FF18402

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: ppm **Mean Test Assay:** 0 ppm

2. **Component:** NITRIC OXIDE (as NOx)

Requested Concentration 4.5 ppm
Certified Concentration 4.40 ppm
Instrument Used Thermo Electron 42i-LS S/N 1030615077
Analytical Method Chemiluminescence
Last Multipoint Calibration 11/28/2016

First Analysis Data: **Date:** 12/5/2016

Z:	0	R:	10.03	C:	4.39	Conc:	4.389
R:	10.04	Z:	0	C:	4.38	Conc:	4.379
Z:	0	C:	4.38	R:	10.03	Conc:	4.379

UOM: ppm **Mean Test Assay:** 4.382 ppm

Reference Standard Type GMIS
Ref Std Cylinder # CC444024
Ref Std Conc 10.03 ppm
Ref Std Traceable to SRM # vs ZG28a
SRM Sample # 49-H-61
SRM Cylinder # CAL016271

Second Analysis Data: **Date:** 12/12/2016

Z:	0	R:	10.03	C:	4.41	Conc:	4.41
R:	10.03	Z:	0	C:	4.43	Conc:	4.43
Z:	0	C:	4.41	R:	10.03	Conc:	4.41

UOM: ppm **Mean Test Assay:** 4.417 ppm

Analyzed by: Henry Koung

Certified by: Jack Fu

MC 1/10/17

PRAXAIR

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PGVPID: F22017

DocNumber: 000111692

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

MONTROSE

Montrose Air Quality Services, LLC
1631 E. St. Andrew Pl.
Santa Ana, CA 92705

Praxair Order Number: 70297908
Customer P. O. Number:
istomer Reference Number:

Fill Date: 6/20/2017
Part Number: EV NICDOXE109AS
Lot Number: 70086717110
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure & Volume: 2000 psig 140 cu ft

O2-22.87
CO2-9.03
SA 8836
6/26/25
F22017

Certified Concentration:

Expiration Date:		6/26/2025	NIST Traceable
Cylinder Number:		SA8836	Analytical Uncertainty:
22.87	%	OXYGEN	± 0.2 %
9.03	%	CARBON DIOXIDE	± 0.4 %
	Balance	NITROGEN	

Certification Information: *Certification Date:* 6/26/2017 *Term:* 96 Months *Expiration Date:* 6/26/2025

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

O2 responses have been corrected for CO2 interference. CO2 responses have been corrected for O2 IR boardening effect.

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

1. Component: OXYGEN

Requested Concentration: 22.85 %
Certified Concentration: 22.87 %
Instrument Used: PARA 1 OXYMAT 5E
Analytical Method: PARAMAGNETIC
Last Multipoint Calibration: 5/26/2017

First Analysis Data:						Date: 6/26/2017
Z: 0	R: 20	C: 22.88	Conc: 22.869			
R: 20	Z: 0	C: 22.88	Conc: 22.869			
Z: 0	C: 22.88	R: 20	Conc: 22.869			
UOM: %		Mean Test Assay: 22.869 %				

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC98135
Ref. Std. Conc.: 19.99 %
Ref. Std. Traceable to SRM #: 2659a
SRM Sample #: 71-E-19
SRM Cylinder #: FF22331

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: CARBON DIOXIDE

Requested Concentration: 9 %
Certified Concentration: 9.03 %
Instrument Used: Horiba VIA-510 S/N 20C194WK
Analytical Method: NDIR
Last Multipoint Calibration: 6/22/2017

First Analysis Data:						Date: 6/26/2017
Z: 0	R: 14	C: 9.04	Conc: 9.034			
R: 14	Z: 0	C: 9.04	Conc: 9.034			
Z: 0	C: 9.04	R: 14	Conc: 9.034			
UOM: %		Mean Test Assay: 9.034 %				

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC283552
Ref. Std. Conc.: 13.99%
Ref. Std. Traceable to SRM #: 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: Pupongmontre Pete (X)
Pupongmontre Pete

Certified by:
Ying Yu

7/24/17

PRAXAIR

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PGVPID: F22017

DocNumber: 000111214

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

MONTROSE

Montrose Air Quality Services, LLC
631 E. St. Andrew Pl.
Santa Ana, CA 92705

Praxair Order Number: 70296002
Customer P. O. Number:
Customer Reference Number:

Fill Date: 6/6/2017
Part Number: NI CD5 202E-AS
Lot Number: 70086715702
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure & Volume: 2000 psig 140 cu. ft

O_2 13.42%
CO_2 5.18%
Exp 6/19/25
CC506411
F22017

Certified Concentration:

Expiration Date:	6/19/2025	NIST Traceable
Cylinder Number:	CC506411	Analytical Uncertainty:
5.18 %	CARBON DIOXIDE	± 0.3 %
13.42 %	OXYGEN	± 0.3 %
Balance	NITROGEN	

Certification Information: *Certification Date:* 6/19/2017 *Term:* 96 Months *Expiration Date:* 6/19/2025

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

O2 responses have been corrected for CO2 interference. CO2 responses have been corrected for O2 IR boardening effect.

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

1. Component: CARBON DIOXIDE

Requested Concentration: 5.2 %
Certified Concentration: 5.18 %
Instrument Used: Horiba VIA-510 S/N 20C194WK
Analytical Method: NDIR
Last Multipoint Calibration: 5/22/2017

First Analysis Data:						Date: 6/19/2017
Z: 0	R: 7.02	C: 5.19	Conc: 5.175			
R: 7.02	Z: 0	C: 5.19	Conc: 5.175			
Z: 0	C: 5.19	R: 7.02	Conc: 5.175			
UOM: %		Mean Test Assay: 5.175 %				

Reference Standard Type: GMIS
Ref. Std. Cylinder #: DT0008914
Ref. Std. Conc: 7.00 %
Ref. Std. Traceable to SRM #: 1674b
SRM Sample #: 7-H-07
SRM Cylinder #: FF10631

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: 13.5 %
Certified Concentration: 13.42 %
Instrument Used: PARA 1 OXYMAT 5E
Analytical Method: PARAMAGNETIC
Last Multipoint Calibration: 5/26/2017

First Analysis Data:						Date: 6/19/2017
Z: 0	R: 20	C: 13.43	Conc: 13.423			
R: 20	Z: 0	C: 13.43	Conc: 13.423			
Z: 0	C: 13.43	R: 20	Conc: 13.423			
UOM: %		Mean Test Assay: 13.423 %				

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC98135
Ref. Std. Conc: 19.99 %
Ref. Std. Traceable to SRM #: 2659a
SRM Sample #: 71-E-19
SRM Cylinder #: FF22331

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: Pupongmontre Pete

Certified by: Ying Yu (JY)
Ying Yu

PW 7/21/17

APPENDIX B CALCULATIONS

GENERAL EMISSION CALCULATIONS

I. Stack Gas Velocity

A. Stack gas molecular weight, lb/lb-mole

$$MW_{dry} = 0.44 * \%CO_2 + 0.32 * \%O_2 + 0.28 * \%N_2$$

$$MW_{wet} = MW_{dry} * (1 - B_{wo}) + 18 * B_{wo}$$

B. Absolute stack pressure, iwg

$$Ps = Pbar + \frac{Psg}{13.6}$$

C. Stack gas velocity, ft/sec

$$V_s = 2.9 * C_p * \sqrt{\Delta P} * \sqrt{T_s} * \sqrt{\frac{29.92 * 28.95}{P_s * MW_{wet}}}$$

II. Moisture

A. Sample gas volume, dscf

$$V_{mstd} = 0.03342 * V_m * (P_{bar} + \frac{\Delta H}{13.6}) * \frac{T_{ref}}{T_m} * Y_d$$

B. Water vapor volume, scf

$$V_{wstd} = 0.0472 * V_{lc} * \frac{T_{ref}}{528\ ^oR}$$

C. Moisture content, dimensionless

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

III. Stack gas volumetric flow rate

A. Actual stack gas volumetric flow rate, wacfm

$$Q = V_s * A_s * 60$$

B. Standard stack gas flow rate, dscfm

$$Q_{sd} = Q * (1 - B_{wo}) * \frac{T_{ref}}{T_s} * \frac{P_s}{29.92}$$

IV. Gaseous Mass Emission Rates, lb/hr

$$M = \frac{ppm * MW_i * Q_{sd} * 60}{SV * 10^6}$$

V. Emission Rates, lb/MMBtu

$$\frac{lb}{MMBtu} = \frac{ppm * MW_i * F}{SV * 10^6} * \frac{20.9}{20.9 - \%O_2}$$

6. Percent Isokinetic

$$I = \frac{17.32 x T_s (V_m std)}{(1 - Bwo) 0 x V_s x Ps x Dn^2} x \frac{528\ R}{T_{ref}}$$

7. Particulate emissions

a) Grain loading, gr/dscf

C = 0.01543 ($M_n/V_{m\ std}$)

b) Grain loading at 12% CO_2, gr/dscf

$C_{12\%}\ CO_2 = C\ (12/\%\ CO_2)$

c) Mass emissions, lb/hr

M = C x Qsd x (60 min/hr)/(7000 gr/lb)

d) Particulate emission factor

$$lb/10^6 Btu = Cx \frac{1lb}{7000gr} xFx \frac{20..9}{20.9 - \%O_2}$$

Nomenclature:

A_s	= stack area, ft^2
B_{wo}	= flue gas moisture content, dimensionless
$C_{12\%CO2}$	= particulate grain loading, gr/dscf corrected to 12% CO_2
C	= particulate grain loading, gr/dscf
C_p	= pitot calibration factor, dimensionless
Dn	= nozzle diameter, in.
F	= fuel F-Factor, dscf/MMBtu @ 0% O_2
H	= orifice differential pressure, iwg
I	= % isokinetics
M_n	= mass of collected particulate, mg
M_i	= mass emission rate of specie i, lb/hr
MW	= molecular weight of flue gas, lb/lb-mole
M_{wi}	= molecular weight of specie i: SO_2: 64 NO_x: 46 CO: 28 HC: 16
0	= sample time, min.
ΔP	= average velocity head, iwg = $(\sqrt{\Delta P})^2$
P_{bar}	= barometric pressure, inches Hg
P_s	= stack absolute pressure, inches Hg
P_{sg}	= stack static pressure, iwb
Q	= wet stack flow rate at actual conditions, wacfm
Q_{sd}	= dry standard stack flow rate, dscfm
SV	= specific molar volume of an ideal gas at standard conditions, ft^3/lb-mole
T_m	= meter temperature, ^oR
T_{ref}	= reference temperature, ^oR
T_s	= stack temperature, ^oR
V_s	= stack gas velocity, ft/sec
V_{lc}	= volume of liquid collected in impingers, ml
V_m	= uncorrected dry meter volume, dcf
V_{mstd}	= dry meter volume at standard conditions, dscf
V_{wstd}	= volume of water vapor at standard conditions, scf
Y_d	= meter calibration coefficient

APPENDIX C QUALITY ASSURANCE

Appendix C.1 Quality Assurance Program Summary

QUALITY ASSURANCE PROGRAM SUMMARY

As part of Montrose Air Quality Services, LLC (MAQS) ASTM D7036-04 certification, MAQS is committed to providing emission related data which is complete, precise, accurate, representative, and comparable. MAQS quality assurance program and procedures are designed to ensure that the data meet or exceed the requirements of each test method for each of these items. The quality assurance program consists of the following items:

- Assignment of an Internal QA Officer
- Development and use of an internal QA Manual
- Personnel training
- Equipment maintenance and calibration
- Knowledge of current test methods
- Chain-of-custody
- QA reviews of test programs

Assignment of an Internal QA Officer: MAQS has assigned an internal QA Officer who is responsible for administering all aspects of the QA program.

Internal Quality Assurance Manual: MAQS has prepared a QA Manual according to the requirements of ASTM D7036-04 and guidelines issued by EPA. The manual documents and formalizes all of MAQS QA efforts. The manual is revised upon periodic review and as MAQS adds capabilities. The QA manual provides details on the items provided in this summary.

Personnel Testing and Training: Personnel testing and training is essential to the production of high quality test results. MAQS training programs include:

- A requirement for all technical personnel to read and understand the test methods performed
- A requirement for all technical personnel to read and understand the MAQS QA manual
- In-house testing and training
- Quality Assurance meetings
- Third party testing where available
- Maintenance of training records.

Equipment Maintenance and Calibration: All laboratory and field equipment used as a part of MAQS emission measurement programs is maintained according to manufacturer's recommendations. A summary of the major equipment maintenance schedules is summarized in Table 1. In addition to routine maintenance, calibrations are performed on all sampling equipment according to the procedures outlined in the applicable test method. The calibration intervals and techniques for major equipment components is summarized in Table 2. The calibration technique may vary to meet regulatory agency requirements.

Knowledge of Current Test Methods: MAQS maintains current copies of EPA, ARB, and SCAQMD Source Test Manuals and Rules and Regulations.

Chain-of-Custody: MAQS maintains chain-of-custody documentation on all data sheets and samples. Samples are stored in a locked area accessible only to MAQS source test personnel. Data sheets are kept in the custody of the originator, program manager, or in locked storage until return to MAQS office. Electronic field data is duplicated for backup on secure storage media. The original data sheets are used for report preparation and any additions are initialed and dated.

QA Reviews: Periodic field, laboratory, and report reviews are performed by the in-house QA coordinator. Periodically, test plans are reviewed to ensure proper test methods are selected and reports are reviewed to ensure that the methods were followed and any deviations from the methods are justified and documented.

ASTM D7036-04 Required Information

Uncertainty Statement

"Both qualitative and quantitative factors contribute to field measurement uncertainty and should be taken into consideration when interpreting the results contained within this report. Whenever possible, Montrose Air Quality Services, LLC (MAQS) personnel reduce the impact of these uncertainty factors through the use of approved and validated test methods. In addition, MAQS personnel perform routine instrument and equipment calibrations and ensure that the calibration standards, instruments, and equipment used during test events meet, at a minimum, test method specifications as well as the specifications of our Quality Manual and ASTM D 7036-04. The limitations of the various methods, instruments, equipment, and materials utilized during this test have been reasonably considered, but the ultimate impact of the cumulative uncertainty of this project is not fully identified within the results of this report."

Performance Data

Performance data are available for review.

Qualified Personnel

A qualified individual (QI), defined by performance on a third party or internal test on the test methods, was present on each test event.

Plant Entry and Safety Requirements

Plant Entry

All test personnel are required to check in with the guard at the entrance gate or other designated area. Specific details are provided by the facility and project manager.

Safety Requirements

All personnel shall have the following personal protective equipment (PPE) and wear them where designated:

- Hard Hat
- Safety Glasses
- Steel Toe Boots
- Hearing Protection
- Gloves
- High Temperature Gloves (if required)

The following safety measures were followed:

- Good housekeeping
- SDS for all on-site hazardous materials
- Confine selves to necessary areas (stack platform, mobile laboratory, CEMS data acquisition system, control room, administrative areas)
- Knowledge of evacuation procedures

Each facility will provide plant specific safety training.

TABLE 1
EQUIPMENT MAINTENANCE SCHEDULE

Equipment	Acceptance Limits	Frequency of Service	Methods of Service
Pumps	1. Absence of leaks 2. Ability to draw manufacturers required vacuum and flow	As recommended by manufacturer	1. Visual inspection 2. Clean 3. Replace parts 4. Leak check
Flow Meters	1. Free mechanical movement	As recommended by manufacturer	1. Visual inspection 2. Clean 3. Calibrate
Sampling Instruments	1. Absence of malfunction 2. Proper response to zero, span gas	As recommended by manufacturer	As recommended by manufacturer
Integrated sampling tanks	1. Absence of leaks	Depends on nature of use	1. Steam clean 2. Leak check
Mobile van sampling system	1. Absence of leaks	Depends on nature of use	1. Change filters 2. Change gas dryer 3. Leak check 4. Check for system contamination
Sampling lines	1. Sample degradation less than 2%	After each test series	1. Blow dry, inert gas through line until dry.

TABLE 2
MAJOR SAMPLING EQUIPMENT CALIBRATION REQUIREMENTS

Sampling Equipment	Calibration Frequency	Calibration Procedure	Acceptable Calibration Criteria
Continuous Analyzers	Before and After Each Test Day	3-point calibration error test	< 2% of analyzer range
Continuous Analyzers	Before and After Each Test Run	2-point sample system bias check	< 5% of analyzer range
Continuous Analyzers	After Each Test Run	2-point analyzer drift determination	< 3% of analyzer range
CEMS System	Beginning of Each Day	leak check	< 1 in. Hg decrease in 5 min. at > 20 in. Hg
Continuous Analyzers	Semi-Annually	3-point linearity	< 1% of analyzer range
NO_x Analyzer	Daily	NO_2 -> NO converter efficiency	> 90%
Differential Pressure Gauges (except for manometers)	Semi-Annually	Correction factor based on 5-point comparison to standard	+/- 5%
Differential Pressure Gauges (except for manometers)	Bi-Monthly	3-point comparison to standard, no correction factor	+/- 5%
Barometer	Semi-Annually	Adjusted to mercury-in-glass or National Weather Service Station	+/- 0.1 inches Hg
Dry Gas Meter	Semi-Annually	Calibration check at 4 flow rates using a NIST traceable standard	+/- 2%
Dry Gas Meter	Bi-Monthly	Calibration check at 2 flow rates using a NIST traceable standard	+/- 2% of semi-annual factor
Dry Gas Meter Orifice	Annually	4-point calibration for ΔH@	--
Temperature Sensors	Semi-Annually	3-point calibration vs. NIST traceable standard	+/- 1.5%

Note: Calibration requirements were used that meet applicable regulatory agency requirements.

Appendix C.2 SCAQMD and STAC Certifications

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

October 28, 2016

Mr. James Ritchey
Montrose Air Quality Services, LLC (MAQS-SNA, Delta, SCEC)
1631 E. Saint Andrew Place
Santa Ana, CA 92705

Subject: LAP Approval Notice
Reference # 96LA1220

Dear Mr. Ritchey:

We have reviewed your application to change your company name to Montrose Air Quality Services, LLC (MAQS-SNA, Delta, SCEC) under the South Coast Air Quality Management District's Laboratory Approval Program (SCAQMD LAP). We are pleased to inform you that your firm is approved for the period beginning October 28, 2016, and ending September 30, 2017 for the following methods, subject to the requirements in the LAP Conditions For Approval Agreement and conditions listed in the attachment to this letter:

SCAQMD Methods 1-4	SCAQMD Methods 5.1, 5.2, 5.3, 6.1 (Sampling)
SCAQMD Methods 10.1 and 100.1	SCAQMD Methods 25.1 and 25.3 (Sampling)
USEPA CTM-030 and ASTM D6522-00	SCAQMD Rule 1121/ 1146.2 Protocol
SCAQMD Rule 1420/1420.1/1420.2 – (Lead) Source Sampling	

Your LAP approval to perform nitrogen oxide emissions compliance testing for SCAQMD Rule 1121/ 1146.2 Protocols includes satellite facilities located at:

McKenna Boiler 1510 North Spring Street Los Angeles, CA 90012	Noritz America Corp. 11160 Grace Avenue Fountain Valley, CA 92708	Ajax Boiler, Inc. 2701 S. Harbor Blvd. Santa Ana, CA 92704

Thank you for participating in the SCAQMD LAP. Your cooperation helps us to achieve the goal of the LAP: to maintain high standards of quality in the sampling and analysis of source emissions. You may direct any questions or information to LAP Coordinator, Glenn Kasai. He may be reached by telephone at (909) 396-2271, or via e-mail at gkasai@aqmd.gov.

Sincerely,

Jason Low, Ph.D.
Assistant Deputy Executive Officer
Monitoring & Analysis

JL:GK/gk
Attachment

cc: Dipankar Sarkar

161028 NameRevision.doc

Cleaning the air that we breathe...™

STAC STACK TESTING ACCREDITATION COUNCIL

A2LA American Association for Laboratory Accreditation

Accredited Air Emission Testing Body

A2LA has accredited

MONTROSE AIR QUALITY SERVICES

In recognition of the successful completion of the joint A2LA and Stack Testing Accreditation Council (STAC) evaluation process, this organization is accredited to perform testing activities in compliance with ASTM D7036 - Standard Practice for Competence of Air Emission Testing Bodies.

Presented this 2nd day of February 2016

Senior Director of Quality and Communications
Certificate Number 3925.01
Valid to February 28, 2018

This accreditation program is not included under the A2LA ILAC Mutual Recognition Arrangement.

MONTROSE AIR QUALITY SERVICES

Appendix C.3 Statement of No Conflict of Interest

STATEMENT OF NO CONFLICT OF INTEREST AS AN INDEPENDENT TESTING LABORATORY

(To be completed by authorized source testing firm representative and included in source test report)

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

Facility ID: 114406
Date(s) Tested: 8/29/2017
Facility Name: SFFP, L.P.
Equipment Address: 15306 Norwalk Blvd.
Norwalk, California 90650
Equipment Tested: Regenerative Thermal Oxidizer
Device ID, A/N, P/N: P/N G46187, A/N 578777

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

Source Test Firm: Montrose Air Quality Services, LLC

Business Address: 1631 E. St. Andrew Pl.

Santa Ana, California 92705

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: Joe Rubio **Date:** 10/24/2017

Joe Rubio	Project Manager	714-332-8486	10/25/2017
(Name)	(Title)	(Phone)	(Date)

FORM ST-110 :stevforl.doc (Revised 11/18/98)

APPENDIX D PERMIT TO OPERATE

South Coast Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178

PERMIT TO OPERATE

Page 1
Permit No.
G46187
A/N 578777

This initial permit must be renewed ANNUALLY unless the equipment is moved, or changes ownership.
If the billing for the annual renewal fee (Rule 301.f) is not received by the expiration date, contact the District.

ID 110835

Legal Owner or Operator: SFPP, L P
1100 TOWN AND COUNTRY RD
ORANGE, CA 92868

Equipment Location: 15306 NORWALK BLVD, NORWALK, CA 90650

Equipment Description :

1. Soil Vapor Extraction Wells and Blower.
2. Dual Phase Soil Vapor and Groundwater Extraction Wells and Ducts.
3. Regenerative Thermal Oxidizer, Alliance Corp., Oxidizer, 3-bed, with a 900,000 Btu/hr burner, Maxon Kinemax-2G, natural gas fired, 333 scfm combustion air blower, and a fully modulating automatic temperature control system, venting vapor extraction wells, oil water separator under (A/N 578779), and free product tank under (A/N 578779), connecting to an exhaust stack at least 25 feet above grade with a rain cap.
4. Water Knockout Chamber with drainage pump to groundwater treatment system (A/N 578779).
5. Dilution Air Inlet Control.
6. Soil Vapor Extraction Blower, maximum flow rate of 3,000 scfm.
7. Biosparge System with associated accessories, air compressor, condensate tank and biosparge well(s).

Conditions :

1. Operation of this equipment shall be conducted in accordance with all data and specifications submitted with the application under which this permit is issued unless otherwise noted below.
2. This equipment shall be properly maintained and kept in good operating condition at all times.
3. This equipment shall be operated by personnel properly trained in its operation.
4. An identification tag or nameplate shall be displayed on the equipment to show manufacturer model no. and serial no. The tag(s) or plate(s) shall be issued by the manufacturer and shall be adhered to the equipment in a permanent and conspicuous position.
5. A copy of this permit, the current contact person name, phone number, and company name shall be displayed in a permanent and conspicuous location near the equipment.

ORIGINAL

South Coast Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178

PERMIT TO OPERATE

6. Upon completion, any vapor extraction wells and ducts shall be capped to prevent vapors from venting to the atmosphere. Vapors shall not be extracted from the soil unless they are vented to the vapor control system, with no detectable leak between the outlet of the blower and the outlet of the vapor control system.

7. The operator shall:

a. only operate this equipment to to extract and treat primarily non-chlorinated petroleum hydrocarbons, and
b. only operate this equipment such that the emissions total chlorides, as HCl, does not exceed 1 lb/day, and
c. the operator shall keep monthly logs of the inlet vapor chlorinated compounds lab results, calculated concentration of total inlet chloride ions in the inlet stream, and calculated emissions total chlorides, as HCl. The emission calculation used shall be as follows:

Sum [Inlet PPMV of Cl compound x Exhaust Flow scfm x # Cl atoms in Cl compound x 1/7,230]

8. Volatile organic compounds (VOC) concentration shall be measured and recorded at least once a week at the inlet and outlet of the vapor control system using a flame ionization detector or an SCAQMD approved organic vapor analyzer calibrated in parts per million by volume (PPMV) as hexane. Calibration shall be performed with each monitoring visit. The vapor analyzer shall meet EPA Method 21 requirements.

9. The maximum BTU rating of the regenerative thermal oxidizer burner shall not exceed 900,000 BTU/hr.

10. Prior to operating the new regenerative thermal oxidizer under which this permit is granted, the operator shall notify SCAQMD by submitting a Rule 1166 notification form with the appropriate fees as per the form instructions. The notification information shall include:

A. The permit number of the equipment
B. The name and phone number of a contact person.
C. The project start date and the estimated project completion data.

11. A flow indicator shall be installed and maintained to measure air flow rate (including dilution air) from soil vapor wells to the vapor control system. The total air flow from the soil vapor wells to the control system shall not exceed 3,000 scfm. In case a pressure sensor device is used in place of the flow indicator, a conversion chart shall be posted on the equipment to indicate the flow rate in scfm corresponding to the pressure drop reading. Vapor extraction flow shall be measured upon each monitoring visit.

12. A temperature indicator and recorder with an accuracy of plus or minus 20 degrees Fahrenheit shall be installed and maintained in the combustion chamber of the oxidizer. The temperature indicator and recorder shall operate whenever the thermal oxidizer is operating.

13. The temperature of the combustion chamber shall not be less than 1,500 degrees Fahrenheit (on a 15-minute average) except for periods of start-up and shutdown, and shall be regulated automatically via a fully modulated temperature/fuel control system. Start-up is defined as the period from ignition to the time when 1,500 degrees Fahrenheit is achieved, not to exceed 180 minutes. Shutdown is defined as the period from when the automatic well field valve begins to shut and is completely closed shut, not to exceed 30 minutes.

ORIGINAL

South Coast Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
PERMIT TO OPERATE

Page 3
Permit No.
G46187
A/N 578777

14. Equipment interlocks for low oxidation temperature as described in Condition no. 14 shall be provided and it shall isolate the well field influent venting to this equipment.

15. The concentrations of the following compounds measured at the outlet of the oxidizer shall not exceed the following list:

Compound name	PPM
VOC as hexane	19.7
Benzene	4.0
Chloroform	0.25
Carbon tetrachloride (Tetrachloromethane)	0.20
Dioxane, 1,4-	0.45
Dichlorobenzene, p- (1,4-dichlorobenzene)	0.25
Dichloroethane, 1,1-	0.50
Ethylbenzene	2.20
Ethylene dichloride (1,2-dichloroethane)	0.20
Methylene chloride (Dichloromethane)	0.50
Methyl tertiary-butyl ether	1.60
Perchloroethylene (Tetrachloroethylene)	0.50
Trichloroethane, 1, 1, 2-	0.25
Trichloroethylene	0.70
Vinyl chloride (Chloroethylene)	0.25
Napthalene	0.20

The lab detection limit shall be lower than the emission limit specified above.

16. Samples shall be collected and analyzed, during the first week of operation under this permit for volatile organic compounds and speciated for compounds listed in the condition above, and other toxics as required in (e) as follows:

A. Samples shall be collected at the inlet (after the point where dilution air is mixed with vapor stream) and outlet of the thermal oxidizer.

B. Sampling and analysis shall be conducted by an independent laboratory per Rule 304.

C. Sampling shall conform to CARB Method 422 or equivalent. Samples with high moisture shall be collected using an appropriate such as SCAQMD Method 25.1/25.3 or other SCAQMD approved methods.

D. Analysis shall be conducted using EPA Method TO-3 and EPA Method TO-15 or other SCAQMD approved method.

E. The inlet sample shall also be analyzed for all volatile organic compounds that were both detected by the phase II site assessments (soil and groundwater characterization studies) and found on the Rule 1401 compound list. If no assessments of soil or groundwater exists, the inlet sample shall be analyzed for all volative organic compounds listed in SCAQMD Rule 1401, unless otherwise approved in writing by SCAQMD.

ORIGINAL

South Coast Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178

PERMIT TO OPERATE

Page 4
Permit No.
G46187
A/N 578777

17. Samples shall be collected and analyzed once each month of operation for volatile organic compounds and speciated for compounds listed in Condition no. 16 above as follows:

    A. Samples shall be collected at the inlet (after the point where dilution air is mixed with vapor stream) and outlet of the thermal oxidizer.

    B. Sampling shall conform to CARB Method 422 or equivalent. Samples with high moisture shall be collected using an appropriate method as SCAQMD Method 25.1/25.3 or other SCAQMD approved methods.

    C. Analysis shall be conducted using EPA Method TO-3 and EPA Method TO-15 or other SCAQMD approved method.

18. The operator shall submit to the SCAQMD in writing the results of the first month of operating records, including, but not limited to, monitoring data, lab analysis, flow reading and temperature readings, to prove compliance with the conditions of this permit. Submittal shall be within 45 days of startup and addressed to:

    SCAQMD
    Energy, Terminals, and Waste Management Permitting
    Engineering and Compliance Division
    21865 Copley Drive
    Diamond Bar, CA 91765-4178

19. The equipment shall only exhaust through a vertical stack with a height of at least 25 feet above ground.

20. The equipment shall be operated in compliance with Rule 1147. A test of the NOx emissions from the burner of this new regenerative thermal oxidizer shall be performed within 90 days of initial operation of the equipment.

21. The operator shall perform combustion system maintenance in accordance with manufacturer recommended maintenance schedule. Copy of the manufacturer's manual or other written guidance materials supplied by the manufacturer or distributor and records of maintenance activities shall be retained on-site for at least three years and shall be made available to SCAQMD personnel upon request.

22. This permit shall expire if construction is not complete within one year from the date of issuance of this permit unless an extension is granted by the Executive Officer.

23. All records required by this permit shall be kept on file for a minimum of two years and shall be made available to SCAQMD personnel upon request.

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South Coast Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178

PERMIT TO OPERATE

NOTICE

In accordance with Rule 206, this Permit to Operate or copy shall be posted on or within 8 meters of the equipment.

This permit does not authorize the emission of air contaminants in excess of those allowed by Division 26 of the Health and Safety Code of the State of California or the applicable Rules and Regulations of the South Coast Air Quality Management District (SCAQMD). This permit cannot be considered as permission to violate existing laws, ordinances, regulations or statutes of other government agencies.

Executive Officer

Dorris M Bailey

By Dorris M.Bailey/CG06
4/20/2017

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END OF DOCUMENT