



Marathon Petroleum Company LP
1300 South Fort Street
Detroit, MI 48217

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REPORT ON RATA & COMPLIANCE TESTING

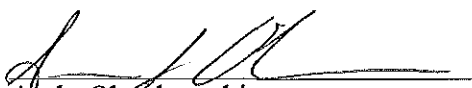
Performed for:
**MARATHON PETROLEUM COMPANY LP
DETROIT REFINERY**

ZURN BOILER STACK (SV22-BR7)

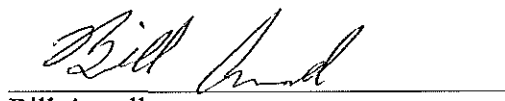
Client Reference No: 4100356132
CleanAir Project No: 12722-2
Revision 0: May 29, 2015

To the best of our knowledge, the data presented in this report are accurate, complete, error free, legible and representative of the actual emissions during the test program. Clean Air Engineering operates in conformance with the requirements of ASTM D7036-04 Standard Practice for Competence of Air Emission Testing Bodies.

Submitted by,


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MICHIGAN DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENT
AIR QUALITY DIVISION

**RENEWABLE OPERATING PERMIT
REPORT CERTIFICATION**

Authorized by 1994 P.A. 451, as amended. Failure to provide this information may result in civil and/or criminal penalties.

Reports submitted pursuant to R 336.1213 (Rule 213), subrules (3)(c) and/or (4)(c), of Michigan's Renewable Operating Permit (ROP) program must be certified by a responsible official. Additional information regarding the reports and documentation listed below must be kept on file for at least 5 years, as specified in Rule 213(3)(b)(II), and be made available to the Department of Natural Resources and Environment, Air Quality Division upon request.

Source Name Marathon Petroleum Company LP County Wayne
Source Address 1300 South Fort Street City Detroit
AQD Source ID (SRN) A9831 ROP No. MI-ROP-A9831-2012b ROP Section No. 01

Please check the appropriate box(es):

Annual Compliance Certification (Pursuant to Rule 213(4)(c))

Reporting period (provide inclusive dates): From _____ To _____

1. During the entire reporting period, this source was in compliance with ALL terms and conditions contained in the ROP, each term and condition of which is identified and included by this reference. The method(s) used to determine compliance is/are the method(s) specified in the ROP.

2. During the entire reporting period this source was in compliance with all terms and conditions contained in the ROP, each term and condition of which is identified and included by this reference, EXCEPT for the deviations identified on the enclosed deviation report(s). The method used to determine compliance for each term and condition is the method specified in the ROP, unless otherwise indicated and described on the enclosed deviation report(s).

Semi-Annual (or More Frequent) Report Certification (Pursuant to Rule 213(3)(c))

Reporting period (provide inclusive dates): From _____ To _____

1. During the entire reporting period, ALL monitoring and associated recordkeeping requirements in the ROP were met and no deviations from these requirements or any other terms or conditions occurred.

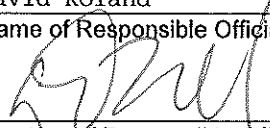
2. During the entire reporting period, all monitoring and associated recordkeeping requirements in the ROP were met and no deviations from these requirements or any other terms or conditions occurred, EXCEPT for the deviations identified on the enclosed deviation report(s).

Other Report Certification

Reporting period (provide inclusive dates): From 04/15/2015 To 04/16/2015

Additional monitoring reports or other applicable documents required by the ROP are attached as described:
Notification of test results for the Zurn Boiler that was tested April 15-16, 2015.

I certify that, based on information and belief formed after reasonable inquiry, the statements and information in this report and the supporting enclosures are true, accurate and complete

David Roland MPC Investment LLC, its General Partner 313-843-9100
Name of Responsible Official (print or type) Deputy Assistant Secretary Phone Number
 6/12/2015
Signature of Responsible Official Date

REVISION HISTORY

REPORT ON RATA & COMPLIANCE TESTING

DRAFT REPORT REVISION HISTORY

Revision:	Date	Pages	Comments
D0a	05/21/15	All	Draft version of original document.

FINAL REPORT REVISION HISTORY

Revision:	Date	Pages	Comments
0	05/29/15	All	Final version of original document.

PROJECT OVERVIEW

1-1

INTRODUCTION

Marathon Petroleum Company (MPC) contracted Clean Air Engineering (CleanAir) to perform emission measurements at the Detroit Refinery for compliance purposes.

All testing was conducted in accordance with the regulations set-forth by the United States Environmental Protection Agency (USEPA) and the Michigan Department of Environmental Quality (DEQ). The permit limits are referenced in Michigan Department of Environmental Quality, Air Quality Division Permit to Install No. 63-08D, issued May 12, 2014.

Key Project Participants

Individuals responsible for coordinating and conducting the test program were:

- Crystal Davis – MPC
- Joe Reidy – MPC
- Thomas Gasloli – DEQ
- Medel Cendaña – CleanAir

Test Program Parameters

The testing was performed at the Zurn Boiler Stack (Emission Unit ID No. EU27-ZURNBOILER-S1; Stack ID No. SV22-BR7) on April 15 and 16, 2015, and included the following emissions measurements:

- particulate matter (PM), assumed equivalent to filterable particulate matter (FPM) only
- sulfuric acid (H₂SO₄)
- volatile organic compounds (VOCs), assumed equivalent to total hydrocarbons (THCs) minus the following constituents:
 - methane (CH₄)
 - ethane (C₂H₆)
- nitrogen oxides (NO_x)
- flue gas composition (e.g., O₂, CO₂, H₂O)
- flue gas flow rate

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PROJECT OVERVIEW**TEST PROGRAM SYNOPSIS****Test Schedule**

The on-site schedule followed during the test program is outlined in Table 1-1.

**Table 1-1:
Schedule of Activities**

Run Number	Location	Method	Analyte	Date	Start Time	End Time
1	Zurn Stack	USEPA Method 5	FPM	04/15/15	11:11	13:20
2	Zurn Stack	USEPA Method 5	FPM	04/15/15	13:49	16:04
3	Zurn Stack	USEPA Method 5	FPM	04/15/15	16:45	19:01
1	Zurn Boiler Stack	USEPA 3A/7E	O ₂ /CO ₂ /NO _x	04/16/15	09:45	10:06
2	Zurn Boiler Stack	USEPA 3A/7E	O ₂ /CO ₂ /NO _x	04/16/15	10:15	10:36
3	Zurn Boiler Stack	USEPA 3A/7E	O ₂ /CO ₂ /NO _x	04/16/15	10:46	11:07
4	Zurn Boiler Stack	USEPA 3A/7E	O ₂ /CO ₂ /NO _x	04/16/15	11:41	12:02
5	Zurn Boiler Stack	USEPA 3A/7E	O ₂ /CO ₂ /NO _x	04/16/15	12:11	12:32
6	Zurn Boiler Stack	USEPA 3A/7E	O ₂ /CO ₂ /NO _x	04/16/15	12:39	13:00
7	Zurn Boiler Stack	USEPA 3A/7E	O ₂ /CO ₂ /NO _x	04/16/15	13:11	13:32
8	Zurn Boiler Stack	USEPA 3A/7E	O ₂ /CO ₂ /NO _x	04/16/15	13:41	14:02
9	Zurn Boiler Stack	USEPA 3A/7E	O ₂ /CO ₂ /NO _x	04/16/15	14:12	14:33
10	Zurn Boiler Stack	USEPA 3A/7E	O ₂ /CO ₂ /NO _x	04/16/15	14:43	15:04
11	Zurn Boiler Stack	USEPA 3A/7E	O ₂ /CO ₂ /NO _x	04/16/15	15:17	15:38
1	Zurn Boiler Stack	USEPA 3A/18/25A	O ₂ /CO ₂ /CH ₄ /C ₂ H ₆ /THC	04/16/15	09:45	11:07
2	Zurn Boiler Stack	USEPA 3A/18/25A	O ₂ /CO ₂ /CH ₄ /C ₂ H ₆ /THC	04/16/15	10:46	12:32
3	Zurn Boiler Stack	USEPA 3A/18/25A	O ₂ /CO ₂ /CH ₄ /C ₂ H ₆ /THC	04/16/15	12:39	14:02
4	Zurn Boiler Stack	USEPA 3A/18/25A	O ₂ /CO ₂ /CH ₄ /C ₂ H ₆ /THC	04/16/15	14:12	15:38
0	Zurn Stack	Draft ASTM CCM	H ₂ SO ₄	04/16/15	09:57	10:57
1	Zurn Stack	Draft ASTM CCM	H ₂ SO ₄	04/16/15	11:51	12:51
2	Zurn Stack	Draft ASTM CCM	H ₂ SO ₄	04/16/15	13:35	14:35
3	Zurn Stack	Draft ASTM CCM	H ₂ SO ₄	04/16/15	15:16	16:16

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PROJECT OVERVIEW

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Results Summary

Tables 1-2 and 1-3 summarize the results of the test program. A more detailed presentation of the test conditions and results of analysis are shown on pages 2-1 through 2-10.

**Table 1-2:
Summary of Emission Compliance Test Results**

<u>Source</u>	<u>Constituent (Units)</u>	<u>Sampling Method</u>	<u>Average Emission</u>	<u>Permit Limit¹</u>
<u>Zurn Boiler Stack</u>				
PM	(lb/MMBtu)	USEPA 5	0.0008	0.0019
H ₂ SO ₄	(ppmdv)	Draft ASTM CCM	0.005	N/A
	(lb/MMBtu)		1.3E-05	N/A
VOC	(lb/MMBtu)	USEPA 18/25A	< 0.0005	0.0055
NO _x	(lb/MMBtu)	USEPA 7E	0.18	0.20

¹ Permit limits obtained from MDEQ Permit To Install No. 63-08D.

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**Table 1-3:
Summary of RATA Results**

<u>Source</u>	<u>Constituent (Units)</u>	<u>Reference Method</u>	<u>Applicable Specification</u>	<u>Relative Accuracy (%)</u>	<u>Specification Limit¹</u>
<u>Zurn Boiler Stack</u>					
	O ₂ (% dv)	USEPA 3A	PS3	0.14	±1.0% dv
	NO _x (ppmdv)	USEPA 7E	PS2	0.2	20% of RM
	NO _x (ppmdv @ 0%O ₂)	USEPA 7E	PS2	3.9	20% of RM
	NO _x (lb/MMBtu)	USEPA 7E	PS2	3.9	20% of RM

¹ Specification limits obtained from 40 CFR 60, Appendix B, Performance Specifications.

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PROJECT OVERVIEW

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Discussion of Test Program***FPM Testing - EPA Method 5***

For this test program, PM emission rate is assumed equivalent to FPM emission rate. Three (3) 120-minute Method 5 test runs were performed on April 15, 2015. The final result was expressed as the average of three (3) valid runs and was below the permit limit for PM.

H₂SO₄ Testing - Draft ASTM Controlled Condensation Method

Three (3) 60-minute test runs were performed on April 16, 2015. The final result was expressed as the average of three valid runs.

O₂ and NO_x Emissions / RATA Testing - EPA Methods 3A and 7E; Performance Specifications 2 and 3

Minute-average data points for O₂, CO₂ and NO_x (dry basis) were collected over a period of 21 minutes for each RATA Reference Method (RM) run. The average result for each RM run was calculated and compared to the average result from the facility CEMS over an identical time interval in order to calculate relative accuracy (RA).

- For O₂, RA is expressed as the average absolute difference between the RM and facility CEMs runs. The final result was below the limit of ±1.0%dv set by PS3.
- For NO_x (ppmdv, ppmdv @ 0% O₂, and lb/MMBtu), RA is expressed as the percent difference between RM and facility CEMs runs. The final results were below the limit of 20% of the RM set by PS2.
- CO₂ data was collected only as supplemental information.

NO_x results from the RATA were converted from units of dry volume-based concentration (ppmdv) to mass-based emission rate units (lb/MMBtu) to demonstrate compliance with permit limits. The final result was expressed as the average of all 11 RATA runs. The final result was below the permit limit.

VOC Testing - EPA Methods 25A and 18

Four (4) VOC test runs were performed concurrently with the RATA testing. Nine (9) 21-minute Method 25 test runs for THC were performed concurrently with three Method 18 bag collections for CH₄ and C₂H₆, with each Method 18 sample collected over a period of about 60 minutes. Method 18 samples were collected as follows:

- Method 18 Run 2: Collected during RATA Runs 3, 4 and 5
- Method 18 Run 3: Collected during RATA Runs 6, 7 and 8
- Method 18 Run 4: Collected during RATA Runs 9, 10 and 11

PROJECT OVERVIEW

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During Method 18 Run 1 (RATA Runs 1-2), the CEMS operator failed to close the inlet valve to the CH₄ and C₂H₆ collection bag during the bias check following RATA Run 2. This resulted in the sample bag being subjected to foreign calibration gas. This run was voided and no analysis was performed.

VOC emission rate is normally equivalent to THC emission rate, minus CH₄ and C₂H₆ emission rate. The calculated emission rate of CH₄ and C₂H₆ detected through analysis of each Method 18 sample bag exceeded the amount of THC measured by the on-line THC analyzer.

This is likely due to variations in the calibration standards, measurement and analytical technique. Therefore, VOC emissions are reported as a value "less than" 1% of the calibration span of THC instrument. The final results were calculated using the average of three valid test runs, all using a concentration of 1% of the instrument span and reported as "less than" the amount.

Calculation of Final Results

Emission results in units of dry volume-based concentration (lb/dscf, ppm_{dv}) were converted to units of pounds per million Btu (lb/MMBtu) using the oxygen-based fuel factor (F_d) for natural gas in EPA Method 19, Table 19-2.

End of Section 1 – Project Overview

RESULTS

2-1

**Table 2-1:
Zurn Boiler Stack – FPM Emissions (USEPA 5)**

Run No.		1	2	3	Average
Date (2015)		Apr 15	Apr 15	Apr 15	
Start Time (approx.)		11:11	13:49	16:45	
Stop Time (approx.)		13:20	16:04	19:01	
Process Conditions					
P ₁	Fuel gas flow rate (Mscf/day)	3,476	3,441	3,299	3,406
F _d	Oxygen-based F-factor (dscf/MMBtu)	8,710	8,710	8,710	8,710
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	8,760
Gas Conditions					
O ₂	Oxygen (dry volume %)	5.5	5.4	5.4	5.4
CO ₂	Carbon dioxide (dry volume %)	8.8	8.9	8.9	8.9
T _s	Sample temperature (°F)	360	359	358	359
B _w	Actual water vapor in gas (% by volume)	14.4	14.9	14.8	14.7
Gas Flow Rate					
Q _a	Volumetric flow rate, actual (acfm)	65,000	66,600	64,700	65,400
Q _s	Volumetric flow rate, standard (scfm)	41,400	42,500	41,300	41,700
Q _{std}	Volumetric flow rate, dry standard (dscfm)	35,400	36,100	35,200	35,600
Q _a	Volumetric flow rate, actual (acf/hr)	3,900,000	4,000,000	3,880,000	3,930,000
Q _s	Volumetric flow rate, standard (scf/hr)	2,480,000	2,550,000	2,480,000	2,500,000
Q _{std}	Volumetric flow rate, dry standard (dscf/hr)	2,130,000	2,170,000	2,110,000	2,130,000
Sampling Data					
V _{mstd}	Volume metered, standard (dscf)	64.62	65.92	63.60	64.71
%I	Isokinetic sampling (%)	101.9	101.9	101.0	101.6
Laboratory Data					
m _n	Total FPM (g)	0.00223	0.00185	0.00207	
m _{Part}	Total filterable particulate matter (g)	0.00223	0.00185	0.00207	
n _{MDL}	Number of non-detectable fractions	N/A	N/A	N/A	
DLC	Detection level classification	ADL	ADL	ADL	
FPM Results					
C _{sd}	Particulate Concentration (lb/dscf)	7.61E-08	6.19E-08	7.18E-08	6.99E-08
E _{lb/hr}	Particulate Rate (lb/hr)	0.162	0.134	0.151	0.149
E _{T/yr}	Particulate Rate (Ton/yr)	0.709	0.588	0.663	0.653
E _{Fd}	Particulate Rate - F _d -based (lb/MMBtu)	9.00E-04	7.27E-04	8.43E-04	8.23E-04

Average includes 3 runs.

Detection level classifications are defined as follows:

ADL = Above Detection Level - all fractions are above detection limit

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RESULTS**Table 2-2:
Uncertainty Analysis – FPM (USEPA 5)**

	FPM Results (lb/MMBtu)		FPM Results (lb/hr)		FPM Results (Ton/yr)	
Method	5		5		5	
Run No.	1	9.00E-04	1	0.162	1	0.709
	2	7.27E-04	2	0.134	2	0.588
	3	8.43E-04	3	0.151	3	0.663
SD		8.81E-05		0.014		0.0611
AVG		8.23E-04		0.149		0.653
RSD		10.7%		9.4%		9.4%
N		3		3		3
SE		5.08E-05		8.0556E-03		0.0353
RSE		6.2%		5.4%		5.4%
P		95.0%		95.0%		95.0%
TINV		4.303		4.30		4.303
CI +		1.04E-03		1.84E-01		0.805
AVG		8.23E-04		1.49E-01		0.653
CI -		6.04E-04		1.14E-01		0.501
TB +		1.50E-03		2.56E-01		1.12

AVG (average) is the mean value of the runs; N is the number of individual runs.

SD (standard deviation) and RSD (relative standard deviation) are measures of the variability of individual runs.

SE (standard error) and RSE (relative standard error) are measures of the variability of the average of the runs.

P (probability) is the confidence level associated with the two-tailed Student's t-distribution.

TINV (t-value) is the value of the Student's t-distribution as a function of P (probability) and N-1 (degrees of freedom).

CI (confidence interval) indicates that if the test is conducted again under the same conditions, the average would be expected to fall within the interval (CI- to CI+) about 95% of the time.

TB+ (upper tolerance bound) is the value below which 95% of future runs are expected to fall (assuming testing at the same conditions).

RESULTS**Table 2-3:
Zurn Boiler Stack – H₂SO₄ Emissions (Draft ASTM CCM)**

Run No.		1	2	3	Average
Date (2015)		Apr 16	Apr 16	Apr 16	
Start Time (approx.)		11:51	13:35	15:16	
Stop Time (approx.)		12:51	14:35	16:16	
Process Conditions					
P ₁	Fuel gas flow rate (Mscf/day)	3,388	3,408	3,411	3,402
F _d	Oxygen-based F-factor (dscf/MMBtu)	8,710	8,710	8,710	8,710
Gas Conditions					
O ₂	Oxygen (dry volume %)	4.5	4.4	4.4	4.4
CO ₂	Carbon dioxide (dry volume %)	9.4	9.5	9.5	9.5
T _s	Sample temperature (°F)	367	367	367	367
B _w	Actual water vapor in gas (% by volume)	15.3	15.5	15.9	15.6
Sampling Data					
V _{mstd}	Volume metered, standard (dscf)	28.07	28.15	28.34	28.19
Laboratory Data (Ion Chromatography)					
m _n	Total H ₂ SO ₄ collected (mg)	0.0109	0.0185	0.0145	
Sulfuric Acid Vapor (H₂SO₄) Results					
C _{sd}	H ₂ SO ₄ Concentration (lb/dscf)	8.59E-10	1.45E-09	1.13E-09	1.16E-09
C _{sd}	H ₂ SO ₄ Concentration (ppmdv)	3.38E-03	5.69E-03	4.46E-03	4.51E-03
E _{Fd}	H ₂ SO ₄ Rate - Fd-based (lb/MMBtu)	9.53E-06	1.60E-05	1.25E-05	1.27E-05

Average includes 3 runs.

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RESULTS

**Table 2-4:
Uncertainty Analysis – H₂SO₄ (Draft ASTM CCM)**

Method	H2SO4 Results (ppmdv)		H2SO4 Results (lb/MMBtu)	
	Run No.	CCM	Run No.	CCM
	1	3.39E-03	1	9.58E-06
	2	5.72E-03	2	1.61E-05
	3	4.47E-03	3	1.25E-05
SD		1.16E-03		3.24E-06
AVG		4.53E-03		1.27E-05
RSD		25.7%		25.5%
N		3		3
SE		6.72E-04		1.87E-06
RSE		14.8%		14.7%
P		95.0%		95.0%
TINV		4.303		4.303
CI +		7.42E-03		2.08E-05
AVG		4.53E-03		1.27E-05
CI -		1.63E-03		4.68E-06
TB +		0.013		3.75E-05

AVG (average) is the mean value of the runs; N is the number of individual runs.

SD (standard deviation) and RSD (relative standard deviation) are measures of the variability of individual runs.

SE (standard error) and RSE (relative standard error) are measures of the variability of the average of the runs.

P (probability) is the confidence level associated with the two-tailed Student's t-distribution.

TINV (t-value) is the value of the Student's t-distribution as a function of P (probability) and N-1 (degrees of freedom).

CI (confidence interval) indicates that if the test is conducted again under the same conditions, the average would be expected to fall within the interval (CI- to CI+) about 95% of the time.

TB+ (upper tolerance bound) is the value below which 95% of future runs are expected to fall (assuming testing at the same conditions).

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RESULTS

2-5

**Table 2-5:
Zurn Boiler Stack – THC, CH₄, C₂H₆ and VOC Emissions (USEPA 25A / 18)**

Run No.		1	2	3	Average
Date (2015)		Apr 16	Apr 16	Apr 16	
Start Time (approx.)		10:46	12:39	14:12	
Stop Time (approx.)		12:32	14:02	15:38	
Process Conditions					
P ₁	Natural gas flow rate (Mscf/day)	3,408	3,396	3,412	3,405
F _d	Oxygen-based F-factor (dscf/MMBtu)	8,710	8,710	8,710	8,710
Gas Conditions					
O ₂	Oxygen (dry volume %)	4.3	4.3	4.2	4.3
CO ₂	Carbon dioxide (dry volume %)	9.7	9.7	9.7	9.7
B _w	Actual water vapor in gas (% by volume) ¹	15.2	15.5	15.7	15.5
THC Results					
C _{sd}	Concentration (ppmdv as C ₃ H ₈)	9.38	9.77	9.69	9.61
C _{sd}	Concentration (lb/dscf)	1.07E-06	1.12E-06	1.11E-06	1.10E-06
E _{Fd}	Emission Rate - F _d -based (lb/MMBtu)	0.0117	0.0123	0.0121	0.0120
Methane Results					
C _{sd}	Concentration (ppmdv)	31.3	32.7	34.3	32.8
C _{sd}	Concentration (lb/dscf)	1.30E-06	1.36E-06	1.43E-06	1.36E-06
E _{Fd}	Emission Rate - F _d -based (lb/MMBtu)	0.0143	0.0149	0.0156	0.0149
Ethane Results					
C _{sd}	Concentration (ppmdv)	1.03	1.07	1.06	1.05
C _{sd}	Concentration (lb/dscf)	8.04E-08	8.35E-08	8.27E-08	8.22E-08
E _{Fd}	Emission Rate - F _d -based (lb/MMBtu)	8.80E-04	9.17E-04	9.04E-04	9.00E-04
VOC Results					
E _{Fd}	Emission Rate - F _d -based (lb/MMBtu)	<5.23E-04	<5.24E-04	<5.21E-04	<5.23E-04

Average includes 3 runs.

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¹ Moisture data used for ppmwv to ppmdv correction obtained from the average of nearly-concurrent Draft ASTM CCM runs.

For VOCs, '<' indicates a measured/calculated response below the detection limit (assumed to be 1% of the instrument calibration span).

RESULTS**Table 2-6:
Zurn Boiler Stack – NO_x Emissions (USEPA 7E)**

Run No.		1	2	3	4	5	6
Date (2015)		Apr 16	Apr 16	Apr 16	Apr 16	Apr 16	Apr 16
Start Time (approx.)		09:45	10:15	10:46	11:41	12:11	12:39
Stop Time (approx.)		10:06	10:36	11:07	12:02	12:32	13:00
Process Conditions							
P ₁	Natural gas flow rate (Mscf/day)	3,251	3,251	3,408	3,408	3,408	3,396
F _d	Oxygen-based F-factor (dscf/MMBtu)	8,710	8,710	8,710	8,710	8,710	8,710
Gas Conditions							
O ₂	Oxygen (dry volume %)	5.4	4.7	4.2	4.3	4.4	4.4
CO ₂	Carbon dioxide (dry volume %)	9.1	9.4	9.8	9.7	9.6	9.6
B _w	Actual water vapor in gas (% by volume) ¹	14.9	14.9	14.9	15.4	15.4	15.4
Nitrogen Oxides Results							
C _{sd}	Concentration (ppmdv)	124	134	144	144	140	137
C _{sd-x}	Concentration @ 0% O ₂ (ppmdv)	166	173	179	181	178	174
C _{sd}	Concentration (lb/dscf)	1.48E-05	1.59E-05	1.72E-05	1.72E-05	1.68E-05	1.64E-05
E _{Fd}	Emission Rate - F _d -based (lb/MMBtu)	0.173	0.180	0.187	0.188	0.185	0.181
<hr/>							
Run No.		7	8	9	10	11	Average
Date (2015)		Apr 16	Apr 16	Apr 16	Apr 16	Apr 16	
Start Time (approx.)		13:11	13:41	14:12	14:43	15:17	
Stop Time (approx.)		13:32	14:02	14:33	15:04	15:38	
Process Conditions							
P ₁	Natural gas flow rate (Mscf/day)	3,396	3,396	3,412	3,412	3,412	3,377
F _d	Oxygen-based F-factor (dscf/MMBtu)	8,710	8,710	8,710	8,710	8,710	8,710
Gas Conditions							
O ₂	Oxygen (dry volume %)	4.2	4.3	4.3	4.2	4.2	4.4
CO ₂	Carbon dioxide (dry volume %)	9.7	9.7	9.7	9.7	9.8	9.6
B _w	Actual water vapor in gas (% by volume) ¹	15.5	15.5	15.5	15.5	15.9	15.4
Nitrogen Oxides Results							
C _{sd}	Concentration (ppmdv)	138	137	135	134	134	136
C _{sd-x}	Concentration @ 0% O ₂ (ppmdv)	173	173	170	167	168	173
C _{sd}	Concentration (lb/dscf)	1.64E-05	1.64E-05	1.62E-05	1.60E-05	1.60E-05	1.63E-05
E _{Fd}	Emission Rate - F _d -based (lb/MMBtu)	0.180	0.179	0.177	0.174	0.175	0.180

Average Includes 11 runs.

080410 154528

RESULTS

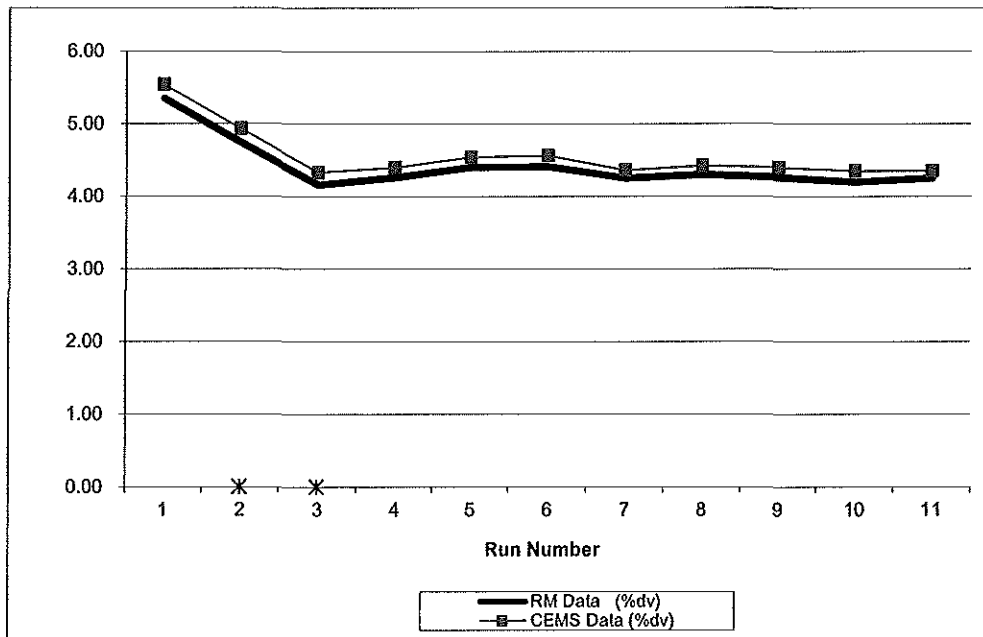
**Table 2-7:
Zurn Boiler Stack – O₂ RATA (USEPA 3A / PS3)**

Run No.	Start Time	Date (2015)	RM Data (%dv)	CEMS Data (%dv)	Difference (%dv)	Difference Percent
1	09:45	Apr 16	5.35	5.54	-0.19	-3.6%
2 *	10:15	Apr 16	4.74	4.93	-0.19	-4.0%
3 *	10:46	Apr 16	4.16	4.33	-0.17	-4.1%
4	11:41	Apr 16	4.26	4.40	-0.14	-3.3%
5	12:11	Apr 16	4.40	4.54	-0.14	-3.2%
6	12:39	Apr 16	4.41	4.56	-0.15	-3.4%
7	13:11	Apr 16	4.25	4.36	-0.11	-2.6%
8	13:41	Apr 16	4.30	4.42	-0.12	-2.8%
9	14:12	Apr 16	4.26	4.40	-0.14	-3.3%
10	14:43	Apr 16	4.20	4.35	-0.15	-3.6%
11	15:17	Apr 16	4.25	4.35	-0.10	-2.4%
Average			4.41	4.55	-0.14	-3.1%

Relative Accuracy Test Audit Results

Standard Deviation of Differences	0.026	
Confidence Coefficient (CC)	0.020	
t-Value for 9 Data Sets	2.306	
Avg. Abs. Diff. (%dv)	0.14	Limit 1.0

RM = Reference Method (CleanAir Data) 051915 113302
 CEMS = Continuous Emissions Monitoring System (Marathon Petroleum Company Data)
 RATA calculations are based on 9 of 11 runs. * indicates the excluded runs.



RESULTS

**Table 2-8:
Zurn Boiler Stack – NO_x (ppmdv) RATA (USEPA 7E / PS2)**

Run No.	Start Time	Date (2015)	RM Data (ppmdv)	CEMS Data (ppmdv)	Difference (ppmdv)	Difference Percent
1 *	09:45	Apr 16	123.55	124.36	-0.81	-0.7%
2	10:15	Apr 16	133.50	133.97	-0.47	-0.4%
3 *	10:46	Apr 16	143.74	143.20	0.54	0.4%
4	11:41	Apr 16	143.88	143.59	0.29	0.2%
5	12:11	Apr 16	140.34	140.46	-0.12	-0.1%
6	12:39	Apr 16	137.36	137.26	0.10	0.1%
7	13:11	Apr 16	137.66	137.55	0.11	0.1%
8	13:41	Apr 16	137.06	137.38	-0.32	-0.2%
9	14:12	Apr 16	135.48	135.72	-0.24	-0.2%
10	14:43	Apr 16	133.74	133.70	0.04	0.0%
11	15:17	Apr 16	133.99	134.04	-0.05	0.0%
Average			137.00	137.07	-0.07	-0.1%

Relative Accuracy Test Audit Results

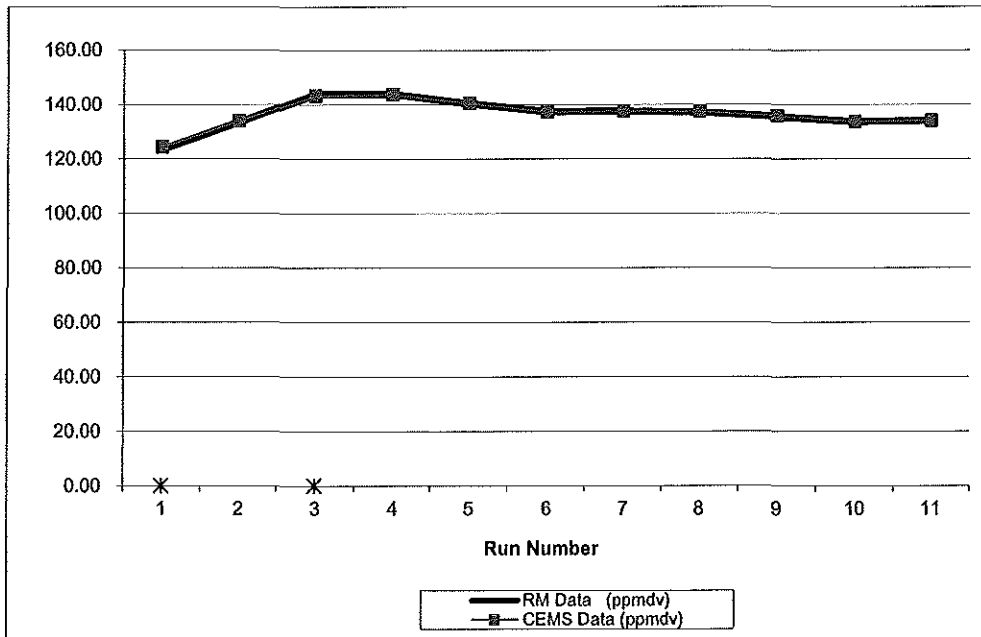
Standard Deviation of Differences	0.239	
Confidence Coefficient (CC)	0.184	
t-Value for 9 Data Sets	2.306	
Relative Accuracy (as % of RM)	0.2%	Limit 20.0%

RM = Reference Method (CleanAir Data)

051915 113302

CEMS = Continuous Emissions Monitoring System (Marathon Petroleum Company Data)

RATA calculations are based on 9 of 11 runs. * Indicates the excluded runs.



RESULTS

**Table 2-9:
Zurn Boiler Stack – NO_x (ppmdv @ 0% O₂) RATA (USEPA 7E / PS2)**

Run No.	Start Time	Date (2015)	RM Data (ppm@0%O2)	CEMS Data (ppm@0%O2)	Difference (ppm@0%O2)	Difference Percent
1 *	09:45	Apr 16	166.09	169.24	-3.15	-1.9%
2 *	10:15	Apr 16	172.70	175.27	-2.57	-1.5%
3	10:46	Apr 16	179.48	180.63	-1.15	-0.6%
4	11:41	Apr 16	180.71	181.86	-1.15	-0.6%
5	12:11	Apr 16	177.74	179.36	-1.62	-0.9%
6	12:39	Apr 16	174.14	175.69	-1.55	-0.9%
7	13:11	Apr 16	172.75	173.70	-0.95	-0.5%
8	13:41	Apr 16	172.53	174.14	-1.61	-0.9%
9	14:12	Apr 16	170.15	171.89	-1.74	-1.0%
10	14:43	Apr 16	167.42	168.88	-1.46	-0.9%
11	15:17	Apr 16	168.18	169.17	-0.99	-0.6%
Average			173.68	175.04	-1.36	-0.8%

Relative Accuracy Test Audit Results

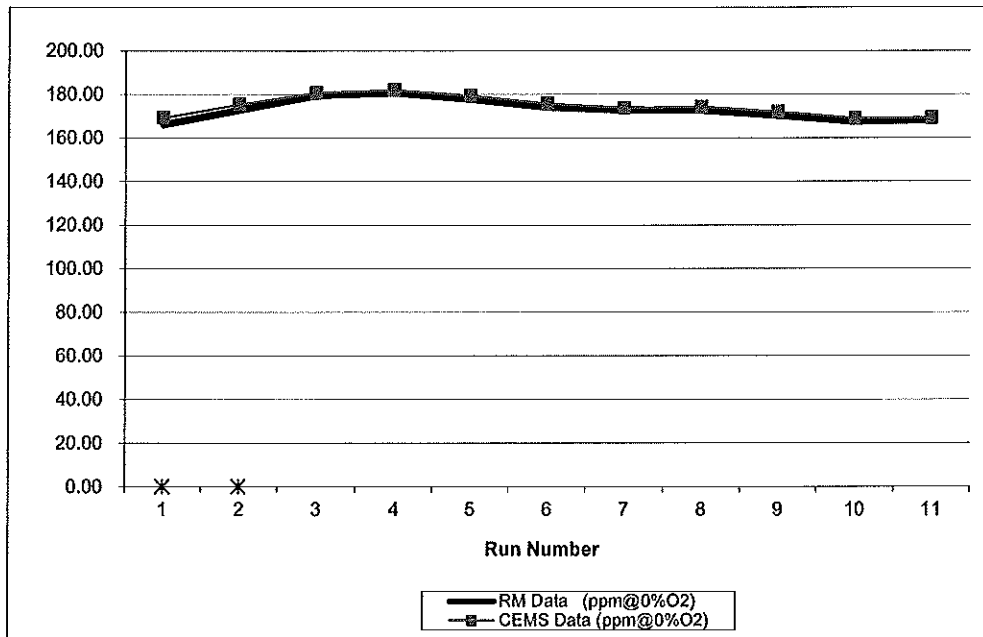
Standard Deviation of Differences	0.299	
Confidence Coefficient (CC)	0.230	
t-Value for 9 Data Sets	2.306	
Relative Accuracy (as % of RM)	0.9%	Limit 20.0%

RM = Reference Method (CleanAir Data)

051915 113302

CEMS = Continuous Emissions Monitoring System (Marathon Petroleum Company Data)

RATA calculations are based on 9 of 11 runs. * Indicates the excluded runs.



RESULTS

**Table 2-10:
Zurn Boiler Stack – NO_x (lb/MMBtu) RATA (USEPA 7E / PS2)**

Run No.	Start Time	Date (2015)	RM Data (lb/MMBtu)	CEMS Data (lb/MMBtu)	Difference (lb/MMBtu)	Difference Percent
1	09:45	Apr 16	0.17	0.17	0.00	0.0%
2	10:15	Apr 16	0.18	0.18	0.00	0.0%
3	10:46	Apr 16	0.19	0.18	0.01	5.3%
4	11:41	Apr 16	0.19	0.18	0.01	5.3%
5	12:11	Apr 16	0.18	0.18	0.00	0.0%
6	12:39	Apr 16	0.18	0.19	-0.01	-5.6%
7	13:11	Apr 16	0.18	0.19	-0.01	-5.6%
8	13:41	Apr 16	0.18	0.19	-0.01	-5.6%
9	14:12	Apr 16	0.18	0.18	0.00	0.0%
10 *	14:43	Apr 16	0.17	0.18	-0.01	-5.9%
11 *	15:17	Apr 16	0.17	0.18	-0.01	-5.9%
Average			0.181	0.182	-0.001	-0.6%

Relative Accuracy Test Audit Results

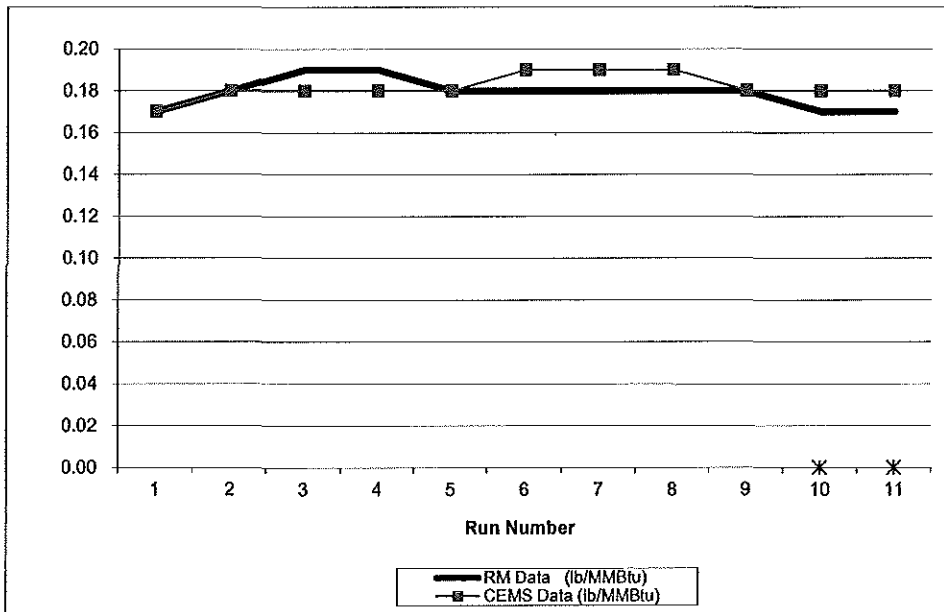
Standard Deviation of Differences	0.008	
Confidence Coefficient (CC)	0.006	
t-Value for 9 Data Sets	2.306	
		Limit
Relative Accuracy (as % of RM)	3.9%	20.0%
Relative Accuracy (as % of Appl. Std.)	3.6%	10.0%
Appl. Std. = 0.2 lb/MMBtu		

RM = Reference Method (CleanAir Data)

051915 113302

CEMS = Continuous Emissions Monitoring System (Marathon Petroleum Company Data)

RATA calculations are based on 9 of 11 runs. * indicates the excluded runs.



End of Section 2 – Results