CleanAir

CleanAir Engineering
500 W. Wood Street
Palatine, IL 60067-4975
cleanair.com

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

REPORT ON RATA & COMPLIANCE TESTING

Performed for:
MARATHON PETROLEUM COMPANY LP
DETROIT REFINERY

CCR CHARGE HEATER STACK (14H8-9)
CCR INTERHEATER STACK (14H1-4)

Client Reference No: 4100665755
CleanAir Project No: 13047
Revision 0: September 7, 2016

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,

Andy Obuchowski
Midwest Engineering Group Leader
aobuchowski@cleanair.com
(800) 627-0033 ext. 4537

Reviewed by,

Scott Brown
Quality Director
sbrown@cleanair.com
(800) 627-0033 ext. 4544

DEQ

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

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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 Environmental Quality, 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 07/12/2016 To 07/14/2016

Additional monitoring reports or other applicable documents required by the ROP are attached as described:

Submittal of Stack Test and RATA results.

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 T. Roland	MPC Investment LLC, its General Partner Deputy Assistant Secretary	313-843-9100
Name of Responsible Official (print or type)	Title	Phone Number
Signature of Responsible Official		9/9/2016 Date

* Photocopy this form as needed.

EQP 5736 (Rev 11-04)

REVISION HISTORY

REPORT ON RATA & COMPLIANCE TESTING

DRAFT REPORT REVISION HISTORY

Revision:	Date	Pages	Comments
D0a	08/22/16	All	Draft version of original document.

FINAL REPORT REVISION HISTORY

Revision:	Date	Pages	Comments
0	09/07/16		

PROJECT OVERVIEW

INTRODUCTION

Marathon Petroleum Company LP (MPC) contracted Clean Air Engineering (CleanAir) to perform emission measurements at the Detroit refinery for relative accuracy test audit (RATA) and compliance purposes.

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
Chad Eilering – CleanAir

Test Program Parameters

Testing was performed at the CCR Charge Heater (Heater ID 14H8-9, Emission Unit ID EU14-CCRPLCHARHTR-S1, Stack ID SV14-H6) on July 12, 2016, and included the following emissions measurements:

- particulate matter (PM), assumed equivalent to filterable particulate matter (FPM) only
- nitrogen oxides (NO_X)
- flue gas composition (e.g., O_2, CO_2, H_2O)
- flue gas flow rate

Testing was performed at the CCR Interheater (Heater ID 14H1-4, Emission Unit ID EU14-CCRPLINTHTR-S1, Stack ID SV14-H4A) on July 13 and 14, 2016, and included the following emissions measurements:

- particulate matter (PM), assumed equivalent to filterable particulate matter (FPM) only
- nitrogen oxides (NO_X)
- flue gas composition (e.g., O_2, CO_2, H_2O)
- flue gas flow rate

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	CCR Charge Heater Stack	USEPA Method 5	FPM	07/12/16	10:00	12:13
2	CCR Charge Heater Stack	USEPA Method 5	FPM	07/12/16	12:59	15:14
3	CCR Charge Heater Stack	USEPA Method 5	FPM	07/12/16	16:00	18:08
1	CCR Charge Heater Stack	USEPA Method 3A/7E	$O_2/CO_2/NO_X$	07/12/16	09:55	10:16
2	CCR Charge Heater Stack	USEPA Method 3A/7E	$O_2/CO_2/NO_X$	07/12/16	10:23	10:44
3	CCR Charge Heater Stack	USEPA Method 3A/7E	$O_2/CO_2/NO_X$	07/12/16	10:53	11:14
4	CCR Charge Heater Stack	USEPA Method 3A/7E	$O_2/CO_2/NO_X$	07/12/16	11:21	11:42
5	CCR Charge Heater Stack	USEPA Method 3A/7E	$O_2/CO_2/NO_X$	07/12/16	11:50	12:11
6	CCR Charge Heater Stack	USEPA Method 3A/7E	$O_2/CO_2/NO_X$	07/12/16	12:19	12:40
7	CCR Charge Heater Stack	USEPA Method 3A/7E	$O_2/CO_2/NO_X$	07/12/16	12:48	13:09
8	CCR Charge Heater Stack	USEPA Method 3A/7E	$O_2/CO_2/NO_X$	07/12/16	13:22	13:43
9	CCR Charge Heater Stack	USEPA Method 3A/7E	$O_2/CO_2/NO_X$	07/12/16	13:53	14:14
10	CCR Charge Heater Stack	USEPA Method 3A/7E	$O_2/CO_2/NO_X$	07/12/16	14:24	14:45
1	CCR Interheater Stack	USEPA Method 5	FPM	07/13/16	14:37	16:46
2	CCR Interheater Stack	USEPA Method 5	FPM	07/14/16	09:14	11:47
3	CCR Interheater Stack	USEPA Method 5	FPM	07/14/16	12:24	14:30
1	CCR Interheater Stack	USEPA Method 3A/7E	$O_2/CO_2/NO_X$	07/14/16	09:05	09:26
2	CCR Interheater Stack	USEPA Method 3A/7E	$O_2/CO_2/NO_X$	07/14/16	09:33	09:54
3	CCR Interheater Stack	USEPA Method 3A/7E	$O_2/CO_2/NO_X$	07/14/16	10:02	10:23
4	CCR Interheater Stack	USEPA Method 3A/7E	$O_2/CO_2/NO_X$	07/14/16	10:31	10:52
5	CCR Interheater Stack	USEPA Method 3A/7E	$O_2/CO_2/NO_X$	07/14/16	11:06	11:27
6	CCR Interheater Stack	USEPA Method 3A/7E	$O_2/CO_2/NO_X$	07/14/16	11:36	11:57
7	CCR Interheater Stack	USEPA Method 3A/7E	$O_2/CO_2/NO_X$	07/14/16	12:05	12:26
8	CCR Interheater Stack	USEPA Method 3A/7E	$O_2/CO_2/NO_X$	07/14/16	12:39	13:00
9	CCR Interheater Stack	USEPA Method 3A/7E	$O_2/CO_2/NO_X$	07/14/16	13:53	14:14
10	CCR Interheater Stack	USEPA Method 3A/7E	$O_2/CO_2/NO_X$	07/14/16	14:25	14:46

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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

Source Constituent (Units)	Sampling Method	Average Emission	Permit Limit[1]
CCR Charge Heater Stack			
PM (lb/MMBtu)	USEPA 5	0.0015	0.0019
CCR Interheater Stack			
PM (lb/MMBtu)	USEPA 5	0.0015	0.0019

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

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Table 1-3:
Summary of RATA Results

Source Constituent (Units)	Reference Method (USEPA)	Applicable Specification	Relative Accuracy[1]	Standard Used	Specification Limit
CCR Charge Heater Stack					
O_2 (% dv)	3A	PS3	0.17	abs. diff.	±1.0%[2]
NO_X (lb/MMBtu)	7E	PS2	2.8	% of RM	20%[2]
CCR Interheater Stack					
O_2 (% dv)	3A	PS3	0.50	abs. diff.	±1.0%[2]
NO_X (lb/MMBtu)	7E	PS2	0.009	abs. diff.	±0.02 lb/MMBtu[3]

[1] Relative Accuracy is expressed in terms of comparison to the reference method (% RM) or applicable emission standard (% Std.).
[2] Specification limits obtained from 40 CFR 60, Appendix B, Performance Specifications.
[3] Alternative specification per Table 16 in the Plain English Guide to the Part 75 Rule.

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Discussion of Test Program

FPM Testing - USEPA Method 5

For this test program, PM emission rate is assumed equivalent to FPM emission rate. FPM testing occurred over two separate mobilizations.

Three (3) 120-minute Method 5 test runs were performed on July 12, at the CCR Charge Heater Stack. The final result was expressed as the average of three (3) valid runs.

Three (3) 120-minute Method 5 test runs were performed on July 13 and 14, at the CCR Interheater Stack. The final result was expressed as the average of three (3) valid runs.

O_2 and NO_X RATA Testing - USEPA Methods 3A and 7E; Performance Specifications 2 and 3

Minute-average data points for O_2 and NO_X (dry basis) were collected over a period of 21 minutes for each RATA reference method run. The average result for each reference method run was calculated and compared to the average result from the facility's CEMS over an identical time interval in order to calculate relative accuracy (RA).

Ten (10) RATA test runs were performed at the CCR Charge Heater Stack on July 12.

Ten (10) RATA test runs were performed at the CCR Interheater Stack on July 14.

The facility CEMS results as lb/MMBtu were calculated and provided by MPC, along with all other applicable RATA and process data, and can be found in Appendix H of this report.

The NO_X lb/MMBtu RATA on the CCR Interheater stack utilized the alternative specification outlined in Table 16 of the Plain English Guide to the Part 75 Rule. The alternative specification is allowable based on:

- The NO_X lb/MMBtu limit on this unit is not regulated by Part 60
- The NO_X lb/MMBtu emissions on this unit meets the low emitter conditions of $\leq$0.200 lb/MMBtu

MPC verified the requirements of this alternative specification with Thomas Maza from MDEQ. Email transmissions can be found in Appendix L.

Calculation of Final Results

Emission results in units of dry volume-based concentration (lb/dscf, ppmdv) were converted to units of pounds per million Btu (lb/MMBtu) by calculating an oxygen-based fuel factor (F_d) for refinery gas per USEPA Method 19 specifications. The heat content and F_d factor were calculated from percent volume composition analytical data provided by MPC for each test day and tabulated heating values for each of the measured constituents.

End of Section 1 – Project Overview

RESULTS

Table 2-1:
CCR Charge Heater Stack – FPM Emissions (USEPA 5)

Run No.		1	2	3	Average
Date (2016)		Jul 12	Jul 12	Jul 12	
Start Time (approx.)		10:00	12:59	16:00	
Stop Time (approx.)		12:13	15:14	18:08	
Process Conditions					
P_1	Fuel gas flow rate (Mscf/day)	2,203	2,206	2,151	**2,187**
P_2	Charge rate (bpd)	18,002	18,001	17,999	**18,001**
F_d	Oxygen-based F-factor (dscf/MMBtu)	8,346	8,346	8,346	**8,346**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	7.2	6.9	7.1	**7.1**
CO_2	Carbon dioxide (dry volume %)	7.7	7.8	8.0	**7.8**
T_s	Sample temperature (°F)	349	349	348	**349**
B_w	Actual water vapor in gas (% by volume)	13.8	14.7	14.5	**14.3**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	50,400	46,100	52,600	**49,700**
Q_s	Volumetric flow rate, standard (scfm)	32,100	29,400	33,600	**31,700**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	27,700	25,100	28,700	**27,200**
Q_a	Volumetric flow rate, actual (acf/hr)	3,020,000	2,770,000	3,150,000	**2,980,000**
Q_s	Volumetric flow rate, standard (scf/hr)	1,930,000	1,770,000	2,010,000	**1,900,000**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	1,660,000	1,510,000	1,720,000	**1,630,000**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	74.07	68.80	77.66	**73.51**
%I	Isokinetic sampling (%)	97.7	100.2	98.9	**98.9**
Laboratory Data					
m_n	Total FPM (g)	0.00440	0.00335	0.00375	
DLC	Detection level classification	ADL	ADL	ADL	
FPM Results					
C_{sd}	Particulate Concentration (lb/dscf)	1.31E-07	1.07E-07	1.06E-07	**1.15E-07**
$E_{lb/hr}$	Particulate Rate (lb/hr)	0.218	0.162	0.183	**0.188**
$E_{T/yr}$	Particulate Rate (Ton/yr)	0.953	0.708	0.803	**0.821**
E_{Fd}	Particulate Rate - F_d-based (lb/MMBtu)	0.00167	0.00134	0.00135	**0.00145**

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:
CCR Charge Heater Stack Uncertainty – FPM (USEPA 5)

		FPM Results (lb/MMBtu)		FPM Results (lb/hr)		FPM Results (Ton/yr)
Method		**5**		**5**		**5**
Run No.	**1**	0.00167	**1**	0.218	**1**	0.953
	2	0.00134	**2**	0.162	**2**	0.708
	3	0.00135	**3**	0.183	**3**	0.803
SD		1.88E-04		0.0282		0.124
AVG		**0.00145**		**0.188**		**0.821**
RSD		13.0%		15.1%		15.1%
N		3		3		3
SE		1.09E-04		0.0163		0.0714
RSE		7.5%		8.7%		8.7%
P		95.0%		95.0%		95.0%
TINV		4.30		4.30		4.30
CI +		0.00192		0.258		1.13
AVG		**0.00145**		**0.188**		**0.821**
CI -		0.00098		0.117		0.514
TB +		0.00289		0.404		1.77

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-distrubution 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:
CCR Interheater Stack – FPM Emissions (USEPA 5)

Run No.		1	2	3	Average
Date (2016)		Jul 13	Jul 14	Jul 14	
Start Time (approx.)		14:37	09:14	12:24	
Stop Time (approx.)		16:46	11:47	14:30	
Process Conditions					
P_1	Fuel gas flow rate (Mscf/day)	2,132	2,180	2,214	**2,175**
P_2	Charge rate (bpd)	17,999	18,005	18,448	**18,151**
F_d	Oxygen-based F-factor (dscf/MMBtu)	8,328	8,330	8,330	**8,329**
Cap	Capacity factor (hours/year)	8,760	8,760	8,760	**8,760**
Gas Conditions					
O_2	Oxygen (dry volume %)	6.1	6.3	5.9	**6.1**
CO_2	Carbon dioxide (dry volume %)	8.6	8.5	8.8	**8.6**
T_s	Sample temperature (°F)	481	480	482	**481**
B_w	Actual water vapor in gas (% by volume)	16.0	14.9	15.1	**15.3**
Gas Flow Rate					
Q_a	Volumetric flow rate, actual (acfm)	33,700	39,400	36,900	**36,700**
Q_s	Volumetric flow rate, standard (scfm)	18,500	21,600	20,200	**20,100**
Q_{std}	Volumetric flow rate, dry standard (dscfm)	15,500	18,400	17,100	**17,000**
Q_a	Volumetric flow rate, actual (acf/hr)	2,020,000	2,360,000	2,220,000	**2,200,000**
Q_s	Volumetric flow rate, standard (scf/hr)	1,110,000	1,300,000	1,210,000	**1,210,000**
Q_{std}	Volumetric flow rate, dry standard (dscf/hr)	932,000	1,100,000	1,030,000	**1,020,000**
Sampling Data					
V_{mstd}	Volume metered, standard (dscf)	60.27	69.78	65.77	**65.28**
%I	Isokinetic sampling (%)	100.2	98.2	99.1	**99.1**
Laboratory Data					
m_n	Total FPM (g)	0.00445	0.00325	0.00361	
DLC	Detection level classification	ADL	ADL	ADL	
FPM Results					
C_{sd}	Particulate Concentration (lb/dscf)	1.63E-07	1.03E-07	1.21E-07	**1.29E-07**
$E_{lb/hr}$	Particulate Rate (lb/hr)	0.152	0.113	0.125	**0.130**
$E_{T/yr}$	Particulate Rate (Ton/yr)	0.665	0.496	0.545	**0.569**
E_{Fd}	Particulate Rate - F_d-based (lb/MMBtu)	0.00191	0.00122	0.00140	**0.00151**

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 2-4:
CCR Interheater Stack Uncertainty – FPM (USEPA 5)

		FPM Results (lb/MMBtu)		FPM Results (lb/hr)		FPM Results (Ton/yr)
Method		**5**		**5**		**5**
Run No.	**1**	0.00191	**1**	0.152	**1**	0.665
	2	0.00122	**2**	0.113	**2**	0.496
	3	0.00140	**3**	0.125	**3**	0.545
SD		3.58E-04		0.0198		0.0869
AVG		**0.00151**		**0.130**		**0.569**
RSD		23.6%		15.3%		15.3%
N		3		3		3
SE		2.07E-04		0.0115		0.0502
RSE		13.6%		8.8%		8.8%
P		95.0%		95.0%		95.0%
TINV		4.30		4.30		4.30
CI +		0.00240		0.179		0.784
AVG		**0.00151**		**0.130**		**0.569**
CI -		0.000625		0.0805		0.353
TB +		0.00425		0.282		1.23

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-distrubution 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 2-5:
CCR Charge Heater Stack – NO_X Emissions (USEPA 7E)

Run No.		1	2	3	4	5	6
Date (2016)		Jul 12	Jul 12	Jul 12	Jul 12	Jul 12	Jul 12
Start Time (approx.)		09:55	10:23	10:53	11:21	11:50	12:19
Stop Time (approx.)		10:16	10:44	11:14	11:42	12:11	12:40
Process Conditions							
F_d	Oxygen-based F-factor (dscf/MMBtu)	8,346	8,346	8,346	8,346	8,346	8,346
Gas Conditions							
O_2	Oxygen (dry volume %)	6.6	6.7	6.6	6.6	6.4	6.5
CO_2	Carbon dioxide (dry volume %)	8.3	8.3	8.3	8.4	8.5	8.4
Nitrogen Oxides Results							
C_{sd}	Concentration (ppmdv)	21.2	21.0	21.1	20.7	20.7	21.0
$C_{sd\text{-}x}$	Concentration @ 0% O_2 (ppmdv)	31.0	30.9	30.9	30.1	30.0	30.4
C_{sd}	Concentration (lb/dscf)	2.53E-06	2.51E-06	2.52E-06	2.47E-06	2.48E-06	2.50E-06
E_{Fd}	Emission Rate - F_d-based (lb/MMBtu)	0.0309	0.0308	0.0308	0.0300	0.0299	0.0303

Run No.		7	8	9	10	Average
Date (2016)		Jul 12	Jul 12	Jul 12	Jul 12	
Start Time (approx.)		12:48	13:22	13:53	14:24	
Stop Time (approx.)		13:09	13:43	14:14	14:45	
Process Conditions						
F_d	Oxygen-based F-factor (dscf/MMBtu)	8,346	8,346	8,346	8,346	**8,346**
Gas Conditions						
O_2	Oxygen (dry volume %)	6.5	6.6	6.4	6.3	**6.5**
CO_2	Carbon dioxide (dry volume %)	8.4	8.3	8.4	8.5	**8.4**
Nitrogen Oxides Results						
C_{sd}	Concentration (ppmdv)	20.9	20.3	20.4	20.7	**20.8**
$C_{sd\text{-}x}$	Concentration @ 0% O_2 (ppmdv)	30.4	29.7	29.4	29.8	**30.3**
C_{sd}	Concentration (lb/dscf)	2.49E-06	2.42E-06	2.44E-06	2.48E-06	**2.48E-06**
E_{Fd}	Emission Rate - F_d-based (lb/MMBtu)	0.0303	0.0296	0.0293	0.0297	**0.0302**

Average includes 10 runs.

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RESULTS

Table 2-6:
CCR Interheater Stack – NO_X Emissions (USEPA 7E)

Run No.		1	2	3	4	5	6
Date (2016)		Jul 14	Jul 14	Jul 14	Jul 14	Jul 14	Jul 14
Start Time (approx.)		09:05	09:33	10:02	10:31	11:06	11:36
Stop Time (approx.)		09:26	09:54	10:23	10:52	11:27	11:57
Process Conditions							
F_d	Oxygen-based F-factor (dscf/MMBtu)	8,330	8,330	8,330	8,330	8,330	8,330
Gas Conditions							
O_2	Oxygen (dry volume %)	6.2	6.1	6.0	5.9	6.0	6.0
CO_2	Carbon dioxide (dry volume %)	8.7	8.7	8.8	8.9	8.8	8.9
Nitrogen Oxides Results							
C_{sd}	Concentration (ppmdv)	23.1	23.0	22.8	22.8	22.9	22.9
$C_{sd\text{-}x}$	Concentration @ 0% O_2 (ppmdv)	32.8	32.6	31.9	31.8	32.1	32.1
C_{sd}	Concentration (lb/dscf)	2.75E-06	2.75E-06	2.72E-06	2.72E-06	2.73E-06	2.74E-06
E_{Fd}	Emission Rate - F_d-based (lb/MMBtu)	0.0326	0.0325	0.0318	0.0316	0.0320	0.0319

Run No.		7	8	9	10	Average
Date (2016)		Jul 14	Jul 14	Jul 14	Jul 14	
Start Time (approx.)		12:05	12:39	13:53	14:25	
Stop Time (approx.)		12:26	13:00	14:14	14:46	
Process Conditions						
F_d	Oxygen-based F-factor (dscf/MMBtu)	8,330	8,330	8,330	8,330	**8,330**
Gas Conditions						
O_2	Oxygen (dry volume %)	6.0	6.0	5.4	4.7	**5.8**
CO_2	Carbon dioxide (dry volume %)	8.9	8.9	9.2	9.6	**8.9**
Nitrogen Oxides Results						
C_{sd}	Concentration (ppmdv)	23.0	22.9	21.9	20.8	**22.6**
$C_{sd\text{-}x}$	Concentration @ 0% O_2 (ppmdv)	32.3	32.1	29.4	26.8	**31.4**
C_{sd}	Concentration (lb/dscf)	2.75E-06	2.74E-06	2.61E-06	2.48E-06	**2.70E-06**
E_{Fd}	Emission Rate - F_d-based (lb/MMBtu)	0.0321	0.0320	0.0293	0.0267	**0.0312**

Average includes 10 runs.

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RESULTS

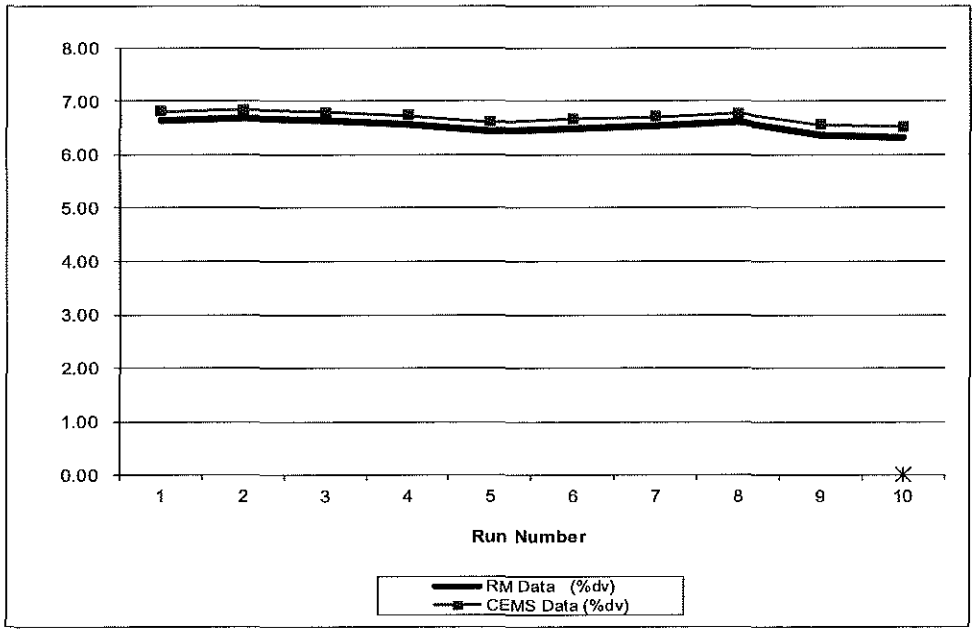
Table 2-7:
CCR Charge Heater Stack – O_2 RATA (USEPA 3A/PS 3)

Run No.	Start Time	Date (2016)	RM Data (%dv)	CEMS Data (%dv)	Difference (%dv)	Difference Percent
1	09:55	Jul 12	6.63	6.81	-0.18	-2.7%
2	10:23	Jul 12	6.68	6.84	-0.16	-2.4%
3	10:53	Jul 12	6.63	6.79	-0.16	-2.4%
4	11:21	Jul 12	6.56	6.73	-0.17	-2.6%
5	11:50	Jul 12	6.44	6.61	-0.17	-2.6%
6	12:19	Jul 12	6.49	6.67	-0.18	-2.8%
7	12:48	Jul 12	6.55	6.71	-0.16	-2.4%
8	13:22	Jul 12	6.61	6.77	-0.16	-2.4%
9	13:53	Jul 12	6.38	6.56	-0.18	-2.8%
10 *	14:24	Jul 12	6.33	6.52	-0.19	-3.0%
Average			**6.55**	**6.72**	**-0.17**	**-2.6%**

Relative Accuracy Test Audit Results

Standard Deviation of Differences	0.009	
Confidence Coefficient (CC)	0.007	
t-Value for 9 Data Sets	2.306	
		Limit
Avg. Abs. Diff. (%dv)	**0.17**	**1.0**

RM = Reference Method (CleanAir Data) 081816 142246
CEMS = Continuous Emissions Monitoring System (Marathon Petroleum Company Data)
RATA calculations are based on 9 of 10 runs. * indicates the excluded run.



RESULTS

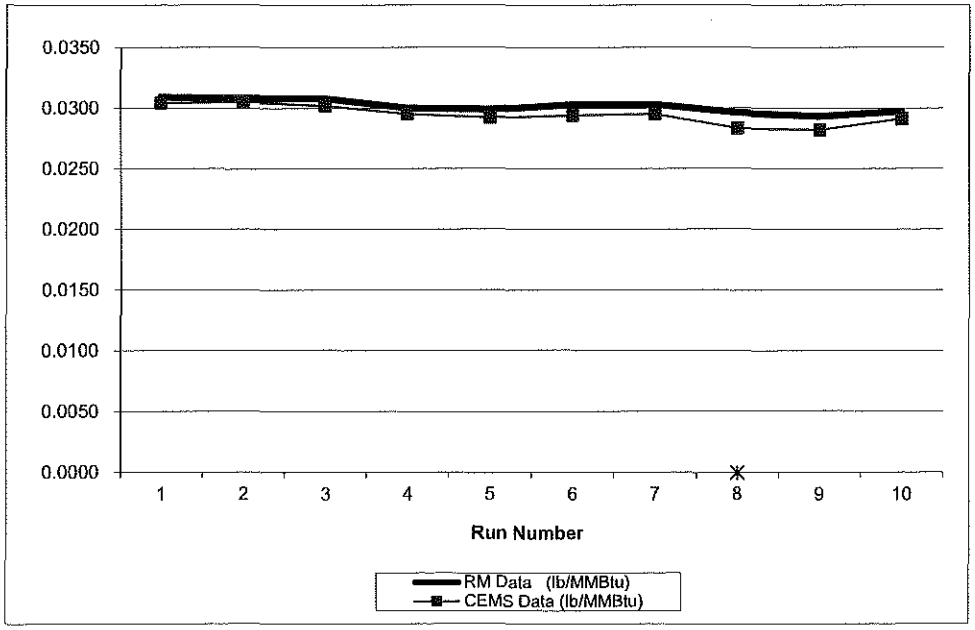
Table 2-8:
CCR Charge Heater Stack – NO_X (lb/MMBtu) RATA (USEPA 7E/PS 2)

Run No.	Start Time	Date (2016)	RM Data (lb/MMBtu)	CEMS Data (lb/MMBtu)	Difference (lb/MMBtu)	Difference Percent
1	09:55	Jul 12	0.0309	0.0304	0.0005	1.6%
2	10:23	Jul 12	0.0308	0.0305	0.0003	1.0%
3	10:53	Jul 12	0.0308	0.0302	0.0006	1.9%
4	11:21	Jul 12	0.0300	0.0295	0.0005	1.7%
5	11:50	Jul 12	0.0299	0.0292	0.0007	2.3%
6	12:19	Jul 12	0.0303	0.0294	0.0009	3.0%
7	12:48	Jul 12	0.0303	0.0295	0.0008	2.6%
8 *	13:22	Jul 12	0.0296	0.0283	0.0013	4.4%
9	13:53	Jul 12	0.0293	0.0282	0.0011	3.8%
10	14:24	Jul 12	0.0297	0.0291	0.0006	2.0%
	Average		**0.0302**	**0.0296**	**0.0007**	**2.2%**

Relative Accuracy Test Audit Results

Standard Deviation of Differences	0.0002	
Confidence Coefficient (CC)	0.0002	
t-Value for 9 Data Sets	2.306	
		Limit
Relative Accuracy (as % of RM)	**2.8%**	**20.0%**
Relative Accuracy (as % of Appl. Std.)	**1.7%**	**10.0%**
Appl. Std. = 0.05 lb/MMBtu		

RM = Reference Method (CleanAir Data) 081816 142246
CEMS = Continuous Emissions Monitoring System (Marathon Petroleum Company Data)
RATA calculations are based on 9 of 10 runs. * indicates the excluded run.



RESULTS

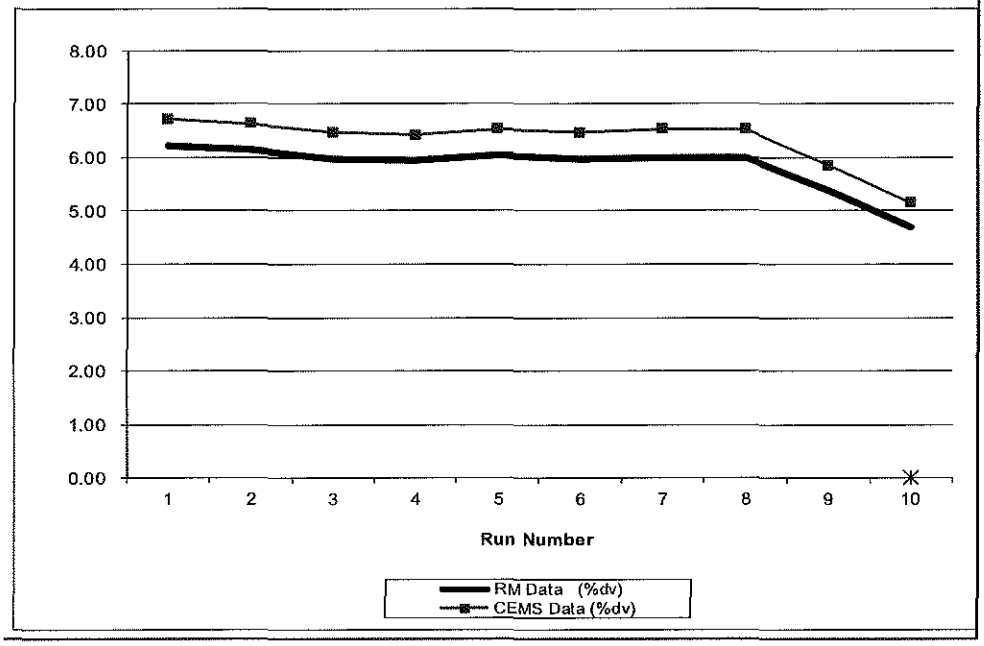
Table 2-9:
CCR Interheater Stack – O_2 RATA (USEPA 3A/PS 3)

Run No.	Start Time	Date (2016)	RM Data (%dv)	CEMS Data (%dv)	Difference (%dv)	Difference Percent
1	09:05	Jul 14	6.21	6.72	-0.51	-8.2%
2	09:33	Jul 14	6.15	6.64	-0.49	-8.0%
3	10:02	Jul 14	5.98	6.48	-0.50	-8.4%
4	10:31	Jul 14	5.94	6.43	-0.49	-8.2%
5	11:06	Jul 14	6.04	6.53	-0.49	-8.1%
6	11:36	Jul 14	5.97	6.47	-0.50	-8.4%
7	12:05	Jul 14	6.00	6.54	-0.54	-9.0%
8	12:39	Jul 14	5.99	6.53	-0.54	-9.0%
9	13:53	Jul 14	5.39	5.86	-0.47	-8.7%
10 *	14:25	Jul 14	4.69	5.16	-0.47	-10.0%
Average			**5.96**	**6.47**	**-0.50**	**-8.4%**

Relative Accuracy Test Audit Results

Standard Deviation of Differences	0.023	
Confidence Coefficient (CC)	0.018	
t-Value for 9 Data Sets	2.306	
		Limit
Appl. Std. = %dv		
Avg. Abs. Diff. (%dv)	**0.50**	**0.02**

RM = Reference Method (CleanAir Data) 082216 165606
CEMS = Continuous Emissions Monitoring System (Marathon Petroleum Company Data)
RATA calculations are based on 9 of 10 runs. * indicates the excluded run.



RESULTS

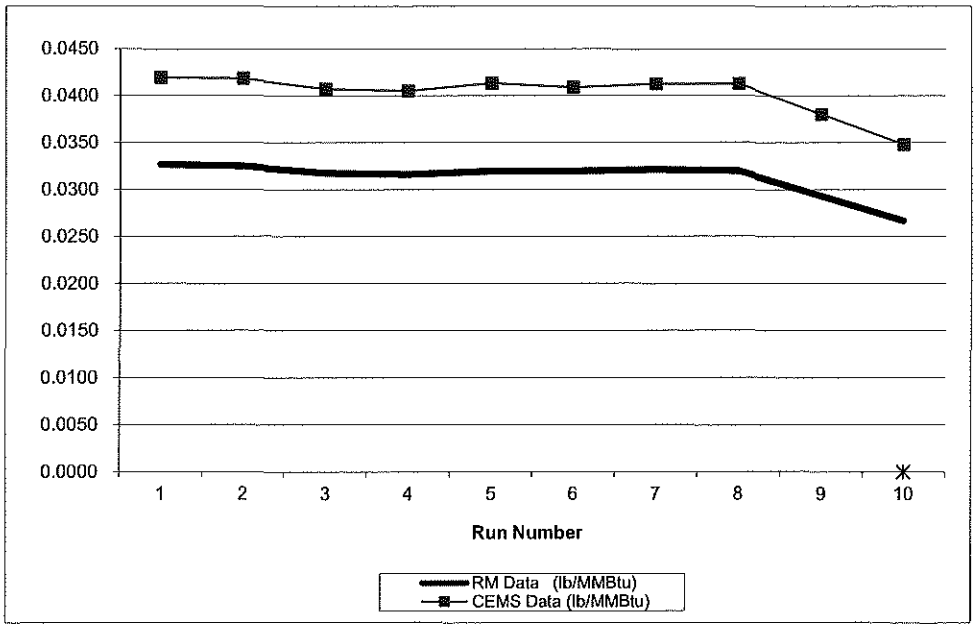
Table 2-10:
CCR Interheater Stack – NO_X (lb/MMBtu) RATA (USEPA 7E/PS 2)

Run No.	Start Time	Date (2016)	RM Data (lb/MMBtu)	CEMS Data (lb/MMBtu)	Difference (lb/MMBtu)	Difference Percent
1	09:05	Jul 14	0.0326	0.0419	-0.0093	-28.4%
2	09:33	Jul 14	0.0325	0.0418	-0.0093	-28.8%
3	10:02	Jul 14	0.0318	0.0407	-0.0089	-28.2%
4	10:31	Jul 14	0.0316	0.0405	-0.0089	-28.0%
5	11:06	Jul 14	0.0320	0.0413	-0.0093	-29.2%
6	11:36	Jul 14	0.0319	0.0409	-0.0090	-28.0%
7	12:05	Jul 14	0.0321	0.0412	-0.0091	-28.3%
8	12:39	Jul 14	0.0320	0.0412	-0.0092	-28.9%
9	13:53	Jul 14	0.0293	0.0380	-0.0087	-29.8%
10 *	14:25	Jul 14	0.0267	0.0348	-0.0081	-30.5%
Average			**0.0317**	**0.0408**	**-0.0091**	**-28.6%**

Relative Accuracy Test Audit Results

Standard Deviation of Differences	0.000225	
Confidence Coefficient (CC)	0.000173	
t-Value for 9 Data Sets	2.306	
		Limit
Avg. Abs. Diff. (lb/MMBtu)	**0.009**	**0.02**

RM = Reference Method (CleanAir Data) 082216 165606
CEMS = Continuous Emissions Monitoring System (Marathon Petroleum Company Data)
RATA calculations are based on 9 of 10 runs. * indicates the excluded run.



End of Section 2 – Results